City of Milwaukee

Milwaukee Water Works

Safe, Abundant Drinking Water.

City of Milwaukee
Department of Public Works
Milwaukee Water Works

Specifications for

Official Notice No. 142-2010

Elevated Water Storage Tank

GT-12: Coating & Appurtenance Modifications

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GENERAL REQUIREMENTS

PART 1 DEPARTMENT OF PUBLIC WORKS – GENERAL SPECIFICATIONS

The Department of Public Works General Specifications applies to all contracts. These specifications are in a separate booklet.

PART 2 SPECIFIC OFFICIAL NOTICE & GENERAL OFFICIAL NOTICE

The Specific Official Notice as it appears in The Daily Reporter and General Official Notice is part of these Contract Documents.

PART 3 SPECIFICATIONS

GT-12; Coating and Appurtenance Modifications to Elevated Water Storage Tank

Table of Contents

DRAWINGS

JOB REQUIREMENTS

GT-12 COATING & APPURTENANCE MODIFICATIONS

JR-1 FORM OF BID Contractor shall submit a lump sum bid for furnishing the complete job in accordance with plans and specifications.

JR-2 JOB LOCATION The elevated water storage tank is located at 8787 West Waterford Avenue, Greenfield, WI 53228.

JR-3 GENERAL DESCRIPTION OF WORK The work to be performed under the provisions of this contract and as set forth in these documents consists of the supply and installation of all materials, labor, supervision, inspection, and rentals for all work involved and described below.

JR-4 CONTRACT DRAWINGS The contract drawings upon which the proposal is to be based are listed hereunder:

GT - 12 - 01	Location Map & Drawing Index
GT - 12 - 02	Site Plan
GT - 12 - 03	Tank Elevation, Section & Plan
GT - 12 - 04	Gate House
GT - 12 - 05	Appurtenance Modification Details
GT - 12 - 06	Appurtenance Modification Details
GT - 12 - 07	Appurtenance Modification Details
GT - 12 - 08	Antenna Installation
GT - 12 - 09	Antenna Installation
GT - 12 - 10	Antenna Installation

Above drawings are general in nature and are intended to indicate the relative locations of the equipment specified in the space provided. It shall be the responsibility of the successful bidder to ascertain the suitability of the specific equipment to be furnished in regard to the space allotted.

JR-5 PRE-BID MEETING A **MANDATORY** pre-bid meeting for all prospective bidders will be held on Wednesday, November 17, 2010 at 9:00 A.M. in the Zeidler Municipal Building, Room 102; 841 North Broadway, Milwaukee WI, 53202. The City of Milwaukee will **ONLY** receive bids from prospective bidders who are in attendance at the **MANDATORY** Pre-Bid Meeting. The official envelope for submitting a bid will be available at the **MANDATORY** Pre-Bid Meeting. Bidder participation is urged to become familiar with all aspects of the project and bidding requirements.

JR-6 SITE VISIT A site visit will be available at the conclusion of the **MANDATORY** Pre-Bid Meeting.

JR-7 PRE-CONSTRUCTION MEETING After the Notice to Proceed is issued, a date shall be set for the pre-construction meeting to be held at the job site. Construction details of the project will be discussed in the meeting.

JR-8 JOB SCHEDULE Within ten (10) days after Notice to Proceed is issued; the contractor shall submit a construction schedule for approval. The schedule shall be made in sufficient detail to indicate dates of each significant operation. The schedule shall be such that the entire job will be completed within the specified completion time. Microsoft Project 2000 shall be used to create the schedule. Submit an electronic file and hardcopy of the schedule.

The contractor shall place all orders for materials promptly after award of the contract. With submittal of the construction schedule, he shall include a schedule of delivery of all major material and equipment required for the job.

The contractor shall immediately notify the City, in writing, of any problems with meeting this schedule. If the construction schedule cannot be met because of materials or equipment deliveries, the contractor shall be required to submit purchase orders and confirmations of delivery, showing the date the order was placed and the promised date of delivery.

JR-9 WORK DAYS AND TIMES Work shall take place between the hours of 7:00 AM to 7:00 PM. Work shall not be allowed on Sunday or City of Milwaukee holidays.

JR-10 START & COMPLETION DATE The Contractor shall not start work on the project site prior to Monday, April 4, 2011. The tank will be out of service when the Contractor is ready to commence work. Work on this project shall be complete by Friday, September 30, 2011.

JR-11 CHARGE FOR INSPECTION The Contractor will be charged $350.00 per day per inspector for each and every day inspection is required on this Contract after the date allowed for completion or after such extension of time as may have been granted. This charge is further defined in Section 2.5.11 of the Department of Public Works (DPW) General Specifications.

JR-12 PROGRESS PAYMENTS Within ten (10) days after the Notice to Proceed is issued, the contractor shall submit to the City for approval a schedule showing the breakdown of the contract with quantities and prices as a basis for checking and computing progress estimates. The values shown in the approved breakdown shall be used for pay purposes only and shall not be used as a basis for additions to or deductions from contract work.

When the contractor proceeds properly and with diligence to perform and complete the work on this contract, the Commissioner of Public Works may, from time to time as the work progresses, grant to the contractor an estimate of the amount already earned. In making such progress estimates, there shall be retained 5% of each progress estimate until final completion and acceptance of the work; except that after 50% of the work has

been completed and the Commissioner finds that satisfactory progress is being made and all conditions complied with, he may authorize any of the remaining progress payments to be paid in full to the contractor. Progress Payments are further defined in Section 2.9.14 of the Department of Public Works (DPW) General Specifications.

In accordance with Charter Ordinance 7.26 as amended 6-1-72, payment for materials delivered to the work or storage site may be authorized by the Commissioner of Public Works providing the following terms and conditions are met:

A. The work is progressing properly and such materials as specified are properly stored and suitable for permanent incorporation in the work.

B. Materials designated for pay in the next progress estimate after delivery shall be limited to fabricated or manufactured components which are assembled in final form ready for placement in the work

C. The following forms shall be submitted with requests for payment.

   1. Progress Estimate and Request for Payment for Fabricated Materials or Components Properly Stored.

   2. Certification of the Contractor or his duly authorized representative.

   Field Engineer shall verify that material is as specified and properly stored.

D. The contractor shall be responsible for the safeguarding of any such materials against loss or damage whatsoever, and in the case of any loss or damage, the contractor shall replace such lost or damaged materials at no cost to the City. The Commissioner shall reserve the right to deduct from ensuing progress estimates the value of any lost or damaged materials until such loss or damage is restored by the contractor.

E. The Commissioner may limit processing progress estimates to those cases where the amount earned in any pay period for work and materials is $5,000 or more.

F. Any materials for which payment has been made shall not be removed from the work or storage site without the specific written approval of the Commissioner of Public Works.

JR-13 FORMAL CORRESPONDENCE Formal correspondence shall be addressed to: Ms. Carrie M. Lewis, Superintendent of Milwaukee Water Works, 841 North Broadway, Room 409, Zeidler Municipal Building, Milwaukee, WI 53202. Formal correspondence shall include:

1. Request for Change Order.

2. Request for extension of Completion Date

3. Disputes concerning Payment or Field Issues.

4. Payment Requests.

5. Submittals.

END OF SECTION

SECTION 01010

SUMMARY OF WORK

PART 1 GENERAL

1.01 SUMMARY

A. Section Includes:

1. Contract description.
2. Owner operations and antennas.
3. Qualifications
4. Specifications and standards.
5. Shop Drawings.
6. Warranty and guarantee.

1.02 CONTRACT DESCRIPTION

A. This contract includes the furnishing of all equipment, labor, supervision, materials and appurtenances for and in connection with the abrasive blasting, coating and appurtenance modifications of the elevated storage tank as shown on the contract drawings and further specified herein.

B. The Work to be performed shall include but not be limited to the following:

1. Complete abrasive blasting and coating of elevated storage tank's exterior.
2. Complete abrasive blasting and coating of elevated storage tank's wet interior, including the riser.
3. Partial abrasive blasting and coating of elevated storage tank's dry interior. Remainder of tank's dry interior will be power tool cleaned and spot treated. The tank's dry-interior contains lead paint.
4. Power tool clean and complete coating of piping and related accessories in basement of Gate House.
5. Power wash and coating of Gate House exterior.

6. Provide temporary containment system during abrasive blasting and coating operations.

7. Provide new or modify existing tank appurtenances.

8. Provide fall prevention systems for ladders.

9. Removal of specified tank appurtenances, aviation lights, motorized hoists, rotational ladder system, interior-wet lighting, and interior-wet outlets.

10. Provide new gaskets and mounting hardware for tank's existing appurtenances that are removed or modified during the work.

11. Repair grout that has deteriorated beneath columns, wet-riser and dry-riser.

12. Provide automatically controlled impressed current cathodic protection system with horizontal anode system for the interior of steel water tank. Cathodic protection system shall be permanently energized after the coating contractor's warranty has expired. The cathodic protection system's warranty shall commence once the system is permanently energized.

13. Provide high water level alarm.

14. Provide mounting system for antenna installation. Antenna installation shall be by others.

1.03 OWNER OPERATIONS & ANTENNAS

A. Milwaukee County currently has antennas installed on the elevated water storage tank. The County will remove their antennas, cables and associated equipment prior to the start date for abrasive blasting and coating. The antennas will be relocated from the water tank to an on-site cell-on-wheels (COW). A steel conduit will be laid on the ground to route cables from the building to the COW. The conduit will be covered with gravel to allow trucks to easily cross over it. After the abrasive blasting and coating of the tank is completed, the County will reinstall their antennas.

B. Milwaukee County has a building and generator located underneath the water tank. The building houses equipment associated with their antenna installation. This equipment and generator will need to be operational throughout the entire project. The County shall be responsible for protecting their building, equipment and generator from abrasive blasting and painting. The contractor shall allow the County's technicians access to the building and generator at any time.

C. Cooperate with City and Milwaukee County to minimize conflict, and to facilitate City and County operations.

1.04 QUALIFICATIONS

A. Submit Contractor's Project Experience form.

1.05 SPECIFICATIONS AND STANDARDS

A. Materials, general design, design loads, allowable stresses, joint design, shop fabrication and field construction shall conform to the requirements of the following latest standard specifications of any technical society, organization, or association, or to codes of local or state authorities:

1. NEC, National Electric Code.

2. AWWA, American Water Works Association.

3. IEEE, Institute of Electrical and Electronic Engineers.

4. ANSI, American National Standards Institute.

5. SSPC, The Society for Protective Coatings.

6. ASTM, American Society for Testing and Material.

7. The Wisconsin Administrative Code.

8. OSHA, U.S. Department of Labor Occupational Safety and Health Act.

9. EPA, United States Environmental Protection Agency.

B. The contractor shall be familiar with the requirements of the above agencies. Any conflict in the contract drawings, these specifications, the contractor's design or construction methods shall result in this contractor performing in a manner which conforms to the applicable requirements. Agencies and/or associations not specified above are referenced in individual specification sections as required.

1.06 SHOP DRAWINGS

A. Within three weeks after Notice to Proceed is issued, the Contractor shall submit to the City for approval a minimum three (3) copies of all shop, fabrication, assembly, and other drawings required by the specifications; all drawings of equipment and devices offered by the Contractor; all drawings showing essential details of any change in design or construction proposed by the Contractor; and all necessary wiring, piping and appurtenance layouts. Drawings of equipment and devices shall show sufficient detail to adequately depict the construction and operation of each item.

B. Each shop drawing shall bear City of Milwaukee, the name and location of the structure, job number, the name of Contractor, the date of the drawing, the date of

each correction or revision and the specification numbers and plan sheet numbers applicable thereto.

C. Three (3) revised copies of each drawing shall be submitted each time a drawing is returned to the Contractor for revision. The final approval of a drawing shall be included in the Operation and Maintenance manuals,

D. After approval by the City, all such drawings shall become a part of the contract documents and the work or equipment shown thereby shall be furnished and installed as shown unless otherwise required by the City. No work shall be performed or equipment manufactured until drawings have been approved. The approval of drawings submitted by the Contractor will be for, and will cover only general conformity to the plans and specifications and will not constitute a blanket approval of all dimensions, quantities, or details of the material or equipment shown by such drawings, nor shall such approval relieve the Contractor of responsibility for errors contained therein

E. At the completion of work and prior to final payment, the Contractor shall provide the City with three (3) sets of "as-built" drawings for the completed job showing all new and modified appurtenances. All conduit or similar items shall be located by dimensions and elevations. The Contractor will be responsible for the accuracy of these drawings.

1.07 WARRANTY AND GUARANTEE

A. The Contractor shall furnish a written two (2) year warranty from the date of official acceptance against defective materials or workmanship before the final payment is made.

B. During the period of two (2) years from and after the date of the final acceptance by the City of the work embraced by this contract, the Contractor shall make all needed repairs arising out of defective workmanship or materials, or both, which in the judgment of the Commissioner of Public Works, shall become necessary during such period. The City will perform an inspection during the spring of the final year of the warranty. The Contractor is not required to attend this inspection. A written report summarizing the inspection and detailing any needed repairs will be provided to the Contractor. The Contractor shall make all repairs within 6 months of receiving the report.

C. Whenever defective equipment or materials are replaced, the warranty period for the replacement equipment or materials shall be the remaining warranty period for the original, replaced equipment or materials.

D. If within ten days after mailing of a notice in writing to the Contractor, or his agent, the said Contractor shall neglect to make, or undertake with due diligence to make, the aforesaid repairs, the City is hereby authorized to make such repair at the

Contractor's expense; providing, however, that in case of an emergency where, in the judgment of the Commissioner, delay would cause serious loss or damage, repairs may be made without notice being sent to the Contractor, and the Contractor shall pay the cost thereof.

E. The Contractor shall also furnish written guarantees as required by each Section. Length of time and requirements of guarantees are specified in each Section. Each guarantee shall commence on the date of official acceptance. Final payment will not be paid until the City receives all guarantees.

PART 2 PRODUCTS

Not Used.

PART 3 EXECUTION

Not Used.

END OF SECTION

SECTION 01039

COORDINATION AND MEETINGS

PART 1 GENERAL

1.01 SECTION INCLUDES:

A. Coordination

B. Alterations

C. Cutting and Patching

D. Pre-construction Meeting

E. Pre-installation Meetings

F. Progress Meetings

1.02 COORDINATION

A. Coordinate scheduling, submittals, and Work on the various Sections of specifications to assure efficient and orderly sequence of installation of interdependent construction elements.

B. Verify that the City requirement characteristics of operating equipment are compatible with building utilities. Coordinate work of various Sections having interdependent responsibilities for installing, connecting to, and placing in service, such equipment.

C. Coordinate space requirements and installation of appurtenance, mechanical and electrical work. Follow routing shown for pipes, and conduit, as closely as practicable; place runs parallel with line of structure. Utilize spaces efficiently to maximize accessibility for other installations, for maintenance, and for repairs.

D. Coordinate completion and clean up of Work of separate Sections in preparation for Substantial Completion.

E. Coordinate correction of defective Work and Work not in accordance with Contract Documents, to minimize disruption of the City of Milwaukee's activities.

F. During the project, Milwaukee County and the United States Secret Service may require access to the on-site emergency generator and building housing antenna

equipment. Coordinate access and work on the project with Milwaukee County and the United States Secret Service.

1.03 ALTERATIONS

A. Materials: As specified in product Sections; match existing products and work for patching and extending work.

B. Close openings in exterior surfaces to protect existing work from weather and extremes of temperature and humidity.

C. Remove, cut and patch work in a manner to minimize damage and to provide a means of restoring products and finishes to original condition.

D. Refinish visible existing surfaces to original condition.

E. Where new work abuts or align with existing, perform a smooth and even transition. Patched work to match existing adjacent work in texture and appearance.\

F. When finished surfaces are cut so that a smooth transition with new work is not possible, terminate existing surface along a straight line at a natural line of division and make recommendation to the City.

G. Patch or replace portions of existing surfaces that are damaged, lifted or discolored, or showing other imperfections.

H. Finish surfaces as specified in individual product Sections.

1.04 CUTTING AND PATCHING

A. Employ skilled and experienced installer to perform cutting and patching.

B. Submit written request in advance of cutting or altering elements which affects:

1. Structural integrity of element.

2. Integrity of weather-exposed or moisture resistant element.

3. Efficiency, maintenance or safety of element.

4. Visual qualities of sight-exposed elements.

5. Work of City of Milwaukee or separate contractor.

C. Execute cutting, fitting and patching to complete Work, and to:

1. Fit the several parts together, to integrate with other Work.

2. Uncover Work to install or correct ill-timed work.

3. Remove and replace defective and non-conforming Work.

4. Remove samples of installed Work for testing.

5. Provide openings in elements of Work for penetrations of mechanical and electrical Work.

6. Execute work by methods which will avoid damage to other Work, and provide proper surfaces to receive patching and finishing.

7. Cut rigid materials using masonry saw or core drill.

8. Restore Work with new products in accordance with requirements of Contract Documents.

9. Fit Work tight to pipes, sleeves, ducts, conduit, and other penetrations through surfaces.

10. Maintain integrity of wall, ceiling, or floor construction; completely seal voids.

11. Refinish surfaces to match adjacent finishes. For continuous surfaces, refinish to nearest intersection; for an assembly, refinish entire unit.

12. Identify and hazardous substance or condition exposed during the Work to the City.

1.05 PRECONSTRUCTION MEETING

A. The City will schedule a pre-construction conference after Notice of Award.

B. Attendance Required: City and Contractor.

C. Agenda

1. Submission of executed bonds and insurance certificates (unless previously submitted to DPW).

2. Submission of list of Subcontractor, list of products, Schedule of Values, and progress schedule.

3. Designation of personnel representing the parties in Contract.

4. Procedures and processing of field decisions, submittals, substitutions, applications for payments, proposal request, Change Orders and Contract closeout procedures.

5. Scheduling and reports.

6. Use of premises by City and Contractor.

7. Construction facilities and controls provided by City.

8. Temporary utilities and controls provided by City, if any.

9. Security and housekeeping procedures.

10. Procedures for testing.

11. Procedures for start-up of equipment.

12. Requirements for maintaining record documents.

13. Inspection and acceptance of equipment put into service during construction period.

14. Conflicts.

15. A review of Contract Documents shall be made and deviations or differences shall be resolved.

16. Establish which areas on-site will be available for use as storage areas and working area.

1.06 PRE-INSTALLATION MEETING

A. When determined by the City, convene a pre-installation meeting at work site prior to commencing work.

B. Require attendance of parties directly affecting, or affected by, work of the specific Section.

C. Notify all parties four days in advance of meeting date.

D. Prepare agenda, preside at meetings, record minutes, and distribute copies within three days after the meeting to participants, with one copy to the City.

E. Review conditions of installation, preparation and installation procedures, and coordination with related work.

1.07 PROGRESS MEETING

A. The City will schedule and administer meetings throughout progress of the Work as required.

B. The City will make arrangements for meetings, prepare agenda with copies for participants, preside at meetings, record minutes, and distribute copies within three days to the City, participants, and those affected by decisions made.

C. Attendance Required: Contractor's general superintendent, major Subcontractors and suppliers, City, as appropriate to agenda topics for each meeting.

D. Agenda

1. Review minutes of previous meeting.
2. Review of Work.
3. Field observations, problems and decisions.
4. Field observations of problems that impede planned progress.
5. Review submittal schedule and status of submittals.
6. Review of off-site fabrication and delivery schedules.
7. Maintenance of progress schedule.
8. Corrective measures to regain projected schedules.
9. Planned progress during succeeding Work period.
10. Coordination of projected progress.
11. Maintenance of quality and Work standards of proposed changes on progress schedule and coordination.
12. Other business relating to work.

END OF SECTION

SECTION 01500

JOB SITE SECURITY, UTILITES AND FACILITIES

PART 1 SCOPE

1.01 INDEX

A. Scope

B. Security and Safety

C. City of Milwaukee Permits

D. Electric Power & Telephone Service

E. Water

F. Toilet Facilities

G. Deliveries

1.02 GENERAL CONDITIONS

A. All operations shall be carried on with a minimum of damage and disturbance. All damages shall be repaired to the original condition to the satisfaction of the Field Engineer.

B. All removals become the property of the Contractor and shall be disposed of off the site unless otherwise specified.

1.03 BARRIERS

A. Provide barriers to prevent unauthorized entry to construction areas and to protect existing facilities and adjacent properties from damage during construction operations and demolition. Temporary fence shall be at least the same height as the highest point of existing security fence.

B. Fencing that is removed for access shall be restored. Materials and accessories that are damaged during removal shall be replaced with new that are of the same design, size and quality. Provide new wire ties for attaching fabric that was removed to posts. Provide new tension wire at bottom of fence. Length of tension wire shall be the same as existing with no splices permitted. Fence shall be restored to “like new” condition with the same design standards as existing.

C. Fence posts that are removed shall be replaced with new posts. New posts shall be imbedded in concrete foundations that match existing.

D. Fence fabric and barb wire that is cut shall be replaced with new fabric and barb wire. The length of the replacement fabric and barb wire shall be the same length as the existing fabric and barb wire was prior to being cut. Splicing cut fabric or barb wire is not permitted. Fence fabric that is removed shall be stored in a manner that does not damage fabric. Fabric and barb wire shall remain in tension after pulling force is released.

E. Protect non-owned vehicular traffic, site and structures from damage.

1.04 PROGRESS CLEANING

A. Waste materials, debris, and rubbish shall be removed daily after work. Maintain site in a clean and orderly condition.

B. Clean and repair damage caused by removals or installations.

C. Restore existing facilities used during construction to original condition.

PART 2 SECURITY AND SAFETY

2.01 GENERAL

A. The Milwaukee Water Works consists of a number of facilities to treat and deliver drinking water to the City and surrounding suburban communities. To insure the safety and security of drinking water, the Milwaukee Water Works has instituted protocols for visitors and contractors to control entry to these facilities. It is essential that contractors strictly comply with the security policy outlined in the specification section.

B. For this project, the Contractor shall continuously coordinate building and site security measures, including accessing the site, with the designated Water Engineering representative or the Water Security Manager, Telephone # (414) 286-3465.

2.02 SCOPE

A. Any and all City agencies and contractors engaged for work at Milwaukee Water Works facilities shall be required to attend the "Pre-Construction Meeting" before any contracted work can be initiated. At this meeting, the contractor and sub-contractors shall have a detailed briefing with discussions regarding the following items:

1. Milwaukee Water Works site security policies and procedures

2. Contractor & Sub-Contractor Obligations

3. Notifying City prior to commencing work that may impact Milwaukee Water Works operations.

2.03 POLICIES

A. At the, "Pre-Construction Meeting", Milwaukee Water Works staff shall provide the Prime Contractor with site polices to be reviewed by the Prime and Sub Contractors. These documents may include:

1. Lock-out / Tag-out Policy

2. Confined Space Entry Procedures

3. Evacuation Procedure for Propane, Lox, & Ammonia Releases

4. Personal Protective Equipment Guidelines

5. No Smoking Policy

6. Prohibited Materials

B. Additionally, the Contractor will be provided:

1. Contact Phone Numbers for MWW Staff.

2. On-Site Parking Location and designated construction entrance.

3. Site security policy and procedures.

C. The contractor shall be required to review these documents and is responsible for conveying the contents of these submittals to their employees, sub-contractors, and any other parties working directly or indirectly for them. These policies apply equally to all contractors. Failure to comply with established policies and procedures may result in access privileges being withdrawn.

D. MWW Staff shall provide a “walk-through” session with the contractor to review area layout and site plans as part of this orientation process and to establish the specific work areas necessary for the contractors to perform their scope of work. Topics covered in this session include: site overview with hazards, material safety data sheets, fire extinguisher placement, and the storm water protection policy.

2.04 CONTRACTOR RESPONSIBILITIES

A. Contractors shall provide the following documents no less than 7 days prior to the start of contracted work. Documents shall be sent to the Water Security Manager, (414) 286-3465:

1. Scope of work to be performed;

2. Name of primary contractor's onsite representative;

3. Names of all companies sub-contracted to do work on the project;

4. Completed "Contract Firm Registration Form" (see attachment 'A') for prime contract firm and every sub-contract firm;

5. A "Contractor Employee Registration Form" completed for the contractors and every employee who needs to be granted site access (see attachment 'B');

6. List of items to be stored on-site;

7. Material Safety Data Sheets for all chemicals to be used/stored on-site;

B. It is the responsibility of the Primary Contractor to facilitate gathering the "Contractor Employee Registration Form" for all sub-contractors working on the project. A sub-contractor is defined as an individual or firm hired by the primary contractor to perform a specific task as part of the overall project. This would not include an organization making deliveries of supplies or equipment to the job site; procedures for these firms are covered under Part 8, "DELIVERIES".

C. In the event it is necessary for the Prime Contractor to add additional employees to the list of approved personnel, a minimum of 72 hours, or 3 business days, must be allowed for processing of the request. Site access will be denied to the additional personnel until processing is complete.

D. Contract firms are obligated to notify the Water Security Manager, (414) 286-3465 in a timely manner of any site-authorized staff that leaves the employ of the contractor.

E. Only the Primary Contractor should be contacting the Water Security Manager with issues or access requests. If a request for site access does not come from the Primary Contractor, the request will not be processed.

F. During the time period that the Contractor is on-site, they must agree to:

1. Notify the Plant Manager immediately of any significant chemical spills or leaks;

2. Maintain Normal Non-Toxic Breathable Air Quality, through Adequate Ventilation, at their work site;

3. Perform no equipment isolations or tie-ins without the signed approval of Milwaukee Water Works;

4. Restrict movement to the specific work areas within the Site to perform Contractors Scope of Work;

2.05 CONTRACTOR NOTIFICATION OF CITY

A. Contractors must notify Engineering / Site Management Staff of any welding, torching, or potentially hazardous or operational impact request, prior to commencing such operations.

B. Failure to comply with the terms of the provisions that provide for MWW Employee Safety shall be cause for the contractor to discontinue activities at the Site.

2.06 CONTRACTOR IDENTIFICATION AND DAILY REGISTRATION

A. Every day, all contractors shall be required to sign-in at the start of work and sign out at the end of work. At the end of the week, each of the daily logs from that week shall be submitted to the Water Security Manager for review.

2.07 CONTRACTOR GATE ACCESS & PARKING

A. Contractors must comply with the terms of entry for the site and park only in the areas designated for parking by the MWW site representative.

B. Parking privileges may be rescinded at any time as Site Operational Requirements dictate

PART 3 CITY OF MILWAUKEE PERMITS

3.01 See Chapter 2.3.0 – Necessary Notices and Permits of the Department of Public Works General Specifications for further information and requirements.

PART 4 ELECTRICAL POWER AND TELEPHONE SERVICE

4.01 Limited electrical power for construction purposes is available at the site and will be made available to the Contractor. The Contractor's equipment shall not exceed the capabilities of these receptacles. The Contractor shall provide additional electrical power if their equipment exceeds the capabilities of the receptacles.

4.02 Contractor shall provide and maintain all necessary power cords, electrical lighting, heat and ventilation, and shall make all necessary connections in accordance with OSHA regulations.

4.03 Contractor shall provide and pay for his own telephone service.

PART 5 WATER

5.01 Water for construction purposes is not available at the site. Water for construction purposes may be obtained from City of Milwaukee fire hydrants that are in the area of the work. If Contractor uses hydrants as a water source, they shall apply for permit.

PART 6 TOILET FACILITIES

6.01 Contractor shall furnish portable facilities. Contractor shall maintain these toilet facilities in a sanitary condition throughout the duration of the project and shall remove them from site at the end of the project. The placement and location of the temporary portable toilets shall be coordinated with the Water Engineering Representative.

PART 7 DELIVERIES

7.01 Contractor shall coordinate the delivery of all equipment, material, Dumpsters, portable toilets and other required items required for the contract work with the MWW staff. A minimum of 24 hours prior notice in advance of the desired delivery date shall be transmitted to the designated Water Engineering Representative. Contractor shall provide the following information in the notification:

A. Trucking/Delivery Company

B. Driver Name

C. Truck License Plate Number

7.02 The driver of the delivery vehicle is required to display picture identification as a pre-requisite for entry to the MWW facility for the delivery. Failure to comply with the above will result in denial of project site access, requiring the contractor to re-schedule delivery.

END OF SECTION

Milwaukee Water Works

Safe, Abundant Drinking Water.

FORM A

CONTRACT FIRM REGISTRATION FORM

CONTRACTOR:_____

PLANT/SITE:_____

CONTRACT/SERVICE ORDER No._____

WATER ENGINEERING PROJECT No._____

PRIMARY CONTACT PERSON:_____

OFFICE PHONE NUMBER:_____

CELL PHONE NUMBER:_____

REQUESTED WORK HOURS (00am – 00pm): _____

NUMBER OF EMPLOYEES TO BE WORKING ON-SITE: _____

Signature certifies receipt of the materials outlined in Contract Section 01500, Part 2 – Security and Safety, Section C, Policies.

SIGNATURE:_____ DATE:_____

PRIMARY CONTACT PERSON

Accompanying this form should be a complete listing of all equipment to be stored on site for the duration of the project.

Updated August, 2007

Milwaukee Water Works

Safe, Abundant Drinking Water.

FORM B

CONTRACTOR EMPLOYEE REGISTRATION FORM

Contract Firm: _____

Plant/Site/Project: _____

Employee Name (Printed): _____

This certifies that I have received the building site security and safety policies.

EMPLOYEE
SIGNATURE: _____ DATE: _____
Required

ONSITE PARKING

☐ I will always be driving a Company vehicle.
☐ I will always be a passenger in a vehicle.
☐ I will be driving my personal vehicle. If checked here complete and sign the next section.

Contractor Personal Vehicle Liability Waiver

EMPLOYEE VEHICLE
MAKE & MODEL: _____ LICENSE PLATE: _____

I, hereby agree to hold harmless the City of Milwaukee for any and all damage, loss or injury, which may occur as a result of utilizing the contractor onsite parking area.

EMPLOYEE
SIGNATURE: _____ DATE: _____
Required

Updated August, 2007

SECTION 01600

MATERIAL AND EQUIPMENT

PART 1 GENERAL

1.01 SUMMARY

A. Section Includes:

1. Products.
2. Transportation and handling.
3. Storage and protection.
4. Product options.
5. Substitutions.

1.02 PRODUCTS

A. Material, machinery, components, equipment, fixtures and system shall be new. Assure standardization and uniformity by using products from one manufacturer.

B. Do not use materials and equipment removed from existing premises, except as specifically permitted by the Contract Documents.

C. Provide interchangeable components of the same manufacture for components being replaced.

1.03 TRANSPORTATION AND HANDLING

A. Transport and handle Products in accordance with manufacturer's instructions.

B. Promptly inspect shipments to ensure that Products comply with requirements, quantities are correct and Products are undamaged.

C. Provide equipment and personnel to handle Products by methods to prevent soiling, disfigurement or damage.

1.04 STORAGE AND PROTECTION

A. Store and protect Products in accordance with manufacturer's instructions.

B. Store with seals and labels intact and legible.

C. Store sensitive Products in weather tight, climate controlled, enclosures in an environment favorable to Product.

D. For exterior storage of fabricated Products, place on sloped supports above ground.

E. Provide off-site storage and protection when site does not permit on-site storage or protection.

F. Cover Products subject to deterioration with impervious sheet covering. Provide ventilation to prevent condensation and degradation of Products.

G. Store loose granular materials on solid flat surfaces in a well-drained area. Prevent mixing with foreign matter.

H. Provide equipment and personnel to store Products by methods to prevent soiling, disfigurement or damage.

I. Arrange storage of Products to permit access for inspection. Periodically inspect to verify Products are undamaged and are maintained in acceptable condition.

1.05 PRODUCT OPTIONS

A. Products specified by reference standards or by description only: Any Product meeting those standards or description.

B. Products specified by naming one or more manufacturers: Products of manufacturers named and meeting specifications, no options or substitutions allowed.

C. Products specified by naming one or more manufacturers with a provision for substitutions: Submit a request for substitution for any manufacturer not named in accordance with the following article.

1.06 SUBSTITUTIONS

A. City will consider requests for Substitutions only within 15 days after date established in Notice to Proceed.

B. Substitutions may be considered when a Product becomes unavailable through no fault of the Contractor.

C. Document each request with complete data substantiating compliance of proposed Substitution with Contract Documents.

D. A request constitutes a representation that the Contractor:

1. Has investigated proposed Product and determined that it meets or exceeds the quality level of the specified Product.

2. Will provide the same warranty for the Substitution as for the specified Product.

3. Will coordinate installation and make changes to other Work that may be required for the Work to be complete with no additional cost to City.

4. Waives claims for additional costs or time extension that may subsequently become apparent.

5. Will reimburse City for review or redesign services associated with re-approval by authorities.

E. Substitutions will not be considered when they are indicated or implied on shop drawing or product data submittals, without separate written request, or when acceptance will require revision to the Contract Documents.

F. Substitution Submittal Procedure:

1. Submit two copies of request for Substitution for consideration. Limit each request to one proposed Substitution.

2. Submit shop drawings, product data and certified test results attesting to the proposed Product equivalence. Burden of proof is on proposer.

3. The City will notify Contractor in writing of decision to accept or reject request.

PART 2 PRODUCTS

Not Used.

PART 3 EXECUTION

Not Used.

END OF SECTION

SECTION 01700

CONTRACT CLOSEOUT

PART 1 GENERAL

1.01 SUMMARY

A. Section Includes:

1. Closeout Procedures.
2. Final Cleaning.
3. Adjusting
4. Project Record Documents.
5. Operation and Maintenance Data.
6. Spare Parts and Maintenance Products
7. Guarantee

B. Related Sections

1. Section 01500 – Job Site Security, Utilities and Facilities: Progress cleaning.

1.02 CLOSEOUT PROCEDURES

A. Submit written certification that Contract Documents have been reviewed, Work has been inspected, and that Work is complete in accordance with Contract Documents and ready for City's review.

B. Provide submittals to City that is required by governing or other authorities.

C. Submit final Application for Payment identifying total adjusted Contract Sum, previous payments and sum remaining due.

1.03 FINAL CLEANING

A. Execute final cleaning prior to final inspection.

B. Clean surfaces exposed to view; remove temporary labels, stains and foreign substances, polish transparent and glossy surfaces.

C. Clean equipment and fixtures to a sanitary condition with cleaning materials appropriate to the surface and material being cleaned.

D. Clean site, tank and gate house; sweep paved areas, rake clean landscaped surfaces.

E. Remove waste and surplus materials, rubbish and construction facilities from the site, tank and gate house.

1.04 ADJUSTING

A. Adjust operating appurtenances and equipment to ensure smooth and unhindered operation.

1.05 PROJECT RECORD DOCUMENTS

A. Maintain on site one set of the following record documents; record actual revisions to the Work:

1. Contract Drawings.

2. Specifications.

3. Addenda.

4. Change Orders.

5. Reviewed Shop Drawings, Product Data, and Samples.

6. Manufacturer’s instructions for assembly, installation and adjusting.

B. Ensure entries are complete and accurate, enabling future reference by City.

C. Store record documents separate from documents used for construction.

D. Record information concurrent with construction progress.

E. Contract Drawings and Shop Drawings: Legibly mark each item to record actual construction including:

1. Field changes of dimension and detail.

2. Details not on original Drawings.

F. Specifications: Legibly mark and record at each Product section description of actual Products installed, including the following:

1. Manufacturer’s name and product model and number.

2. Product substitutions or alternates utilized.

3. Changes made by Addenda or Change Orders.

G. Submit documents to City in the following manner:

1. Submit prior to final Application for Payment.

2. Documents shall be accompanied with a transmittal letter that includes the following:

a) Date.

b) City's project title and number.

c) Contractor's name and address.

d) Title and number of each record document.

e) Certification that each document as submitted is complete and accurate.

f) Contractor's signature or authorized representative.

3. Delete Consultant and City's title block from documents. Delete Engineer's seals from documents.

4. Submit two sets of documents.

5. Submit one set of reproducible "mylar" Contract Drawings.

1.06 OPERATION AND MAINTENANCE DATA

A. Submit data bound in 8-1/2 x 11 inch text pages, three D-side ring binders with durable plastic covers. Drawings and diagrams shall be reduced to 8-1/2 x 11 inches or 11 x 17 inches. Where reduction is not practicable, large drawings shall be folded separately and placed in an envelope that is bound into the manuals. Envelope shall bear suitable outside identification.

B. Prepare binder cover and spine with printed title "OPERATION & MAINTENANCE INSTRUCTION", title of project, project number and subject matter of binder when multiple binders are required.

C. Internally subdivide the binder contents with permanent page dividers, logically organized as described below; with tab titling clearly printed under reinforced laminated plastic tabs.

D. Contents: Prepare a Table of Contents for each volume, with each Product or system description identified, typed on 24 pound white paper, in three parts as follows:

1. Part 1: Directory, listing names, addresses, telephone numbers and e-mails of Architect/Engineer, Contractor, Subcontractors and major equipment suppliers.

2. Part 2: Operation and maintenance instructions, arranged by system and subdivided by specification section. For each category, identify names, addresses, telephone numbers and e-mails of Subcontractors and suppliers. Identify the following:

    a) Significant design criteria.

    b) List of Equipment.

    c) Parts list and assembly drawings for each component.

    d) Operating instructions for start-up, normal operation, shutdown and emergency conditions.

    e) Maintenance instructions for equipment and systems.

    f) Maintenance instructions for finishes, including recommended cleaning methods and materials, and special precautions identifying detrimental agents.

    g) Troubleshooting Guide.

3. Part 3: Project documents and certificates, including the following:

    a) Shop drawings and product data.

    b) Air and water balance reports.

    c) Certificates.

    d) Photocopies of warranties.

E. Submit one draft copy of volumes 15 days prior to final inspection. This copy will be reviewed and returned with City comments. Revise content of all document sets as required prior to final submission.

F. Submit four sets of revised final volumes within 10 days after receipt of City's comments.

1.07 SPARE PARTS AND MAINTENANCE PRODUCTS

A. Provide spare parts, maintenance, and extra Products in quantities specified in individual specification sections.

B. Deliver to Project site and place in location as directed; obtain receipt prior to final payment.

1.08 WARRANTY AND GUARANTEE

A. Provide duplicate notarized copies.

B. Execute and assemble transferable warranty documents from Subcontractors, suppliers and manufacturers.

C. Provide Table of Contents and assemble in binder with durable plastic cover.

D. Submit prior to final Application for Payment.

PART 2 PRODUCTS

Not Used.

PART 3 EXECUTION

Not Used.

END OF SECTION

SECTION 02683

DISINFECTION OF WATER STORAGE TANK

PART 1 GENERAL

1.01 SUMMARY

A. Section Includes:

1. Disinfection of water storage tank.

1.02 REFERENCES

A. AWWA C652-02 – Disinfection of Water Storage Facilities.

B. ANSI/AWWA B300 – Hypochlorites.

1.03 SUBMITTALS

A. Submit under provisions of Section 01010 – Summary of Work.

B. Product Data:

1. Submit manufacturer's descriptive literature and product specifications for each product.

C. Schedule and duration of disinfection operations.

D. Calculations for determining the quantity of chlorine required to achieve available chlorine solutions of 200-mg/L and 10-mg/L.

1.04 DELIVERY, STORAGE AND HANDLING

A. Comply with requirements of Section 01600 – Material and Equipment.

PART 2 PRODUCTS

2.01 ACCEPTABLE FORMS OF CHLORINE

A. Sodium hypochlorite shall conform to ANSI/AWWA B300.

B. Calcium hypochlorite shall conform to ANSI/AWWA B300.

PART 3 EXECUTION

3.01 EXAMINATION

A. Cleaning and chlorination of the tank shall not commence until paint has cured, but in no instance sooner than 7 days after the final coating has been applied.

3.02 CLEANING

A. Remove scaffolding, planks, tools, rags and other materials not part of the structural or operating facilities of the tank.

B. Surfaces of walls, floors, and operating facilities of the storage tank shall be cleaned thoroughly using a high-pressure water jet, sweeping, scrubbing, or equally effective means.

C. Water, dirt and foreign material accumulated in this cleaning operation shall be discharged from the storage facility or otherwise removed.

D. Following the cleaning operation, the vent screen, overflow screen, and any other screened opening shall be checked and put in satisfactory condition to prevent birds, insects and other possible contaminants from entering the facility.

E. Any material required to be in the operating storage facility after the cleaning procedure has been completed shall be clean and sanitary when placed in the facility. In these instances, care shall be taken to minimize the introduction of dirt or other foreign material.

3.03 PREPARATION

A. City shall operate the necessary valves so potable water can be admitted to the inlet riser piping and storage tank. The contractor shall not operate valves under any circumstances.

3.04 CHLORINATION PROCEDURE

A. General

1. In the event of failing test results, the Contractor shall be responsible for all costs associated with draining, refilling, disinfecting and re-testing the tank until satisfactory results are obtained.

B. Inlet/Outlet Riser Piping

1. City will fill inlet/outlet riser with potable water.

2. Add chlorine to inlet/outlet riser such that it will have available chlorine of not less than 10 mg/L.

3. The inlet/outlet riser's interior-wet surfaces shall remain in contact with the chlorine solution for at least 6 hours.

4. City will collect and test a water sample.

5. If sample passes test, City will drain 10 mg/L chlorinated water from inlet/outlet riser just prior to filling storage tank to its overflow level with potable water.

C. Interior, Wet

1. Prior to filling storage tank to its overflow level with potable water, a solution of 200-mg/L available chlorine shall be applied directly to the surfaces of all parts of the storage facility that would be in contact with water when the storage facility is full to the overflow elevation.

2. The chlorine solution may be applied with suitable brushes or spray equipment.

3. The solution shall thoroughly coat all surfaces to be treated.

4. The disinfected surfaces shall remain in contact with the chlorine solution for at least 30 minutes, after which potable water shall be admitted.

3.05 TESTING

A. After the chlorination procedure for the inlet/outlet riser piping is completed, the City will collect and test one (1) sample of the solution inside the inlet/outlet riser piping. Results from this test will be available 36 hours after the sample is collected.

B. After the solution inside the inlet/outlet riser piping passes the test, the City will then fill the storage tank to its overflow level with potable water. Once the tank reaches its overflow level, the City will take one (1) water sample. A second water sample will be taken 24-hours after the first sample was taken. Results from these two tests will be available 36 hours after the second sample is collected.

C. The water samples will be tested for coliform organisms, available chlorine, threshold odor number and taste in accordance with the latest edition of Standard Methods for the Examination of Water and Wastewater. If the test for coliform organisms is negative, then the storage facility may be placed in service. If the test shows the presence of coliform bacteria, objectionable taste or odor, then the situation will be evaluated by the City. In any event, repeat samples shall be taken until two (2) samples collected 24 hours apart are negative, or the storage facility shall again be subjected to disinfection.

END OF SECTION

SECTION 02920

LANDSCAPE RESTORATION

PART 1 GENERAL

1.01 SUMMARY

A. Section Includes:

1. Restoration of landscape.

1.02 SUBMITTALS

A. Submit under provisions of Section 01010 – Summary of Work.

B. Product Data:

1. Submit manufacturer's descriptive literature and product specifications for each product.

1.03 PRE-INSTALLATION MEETING

A. Conduct pre-installation meeting in accordance with Section 01039

B. Convene pre-installation meeting one week prior to commencing work of this Section.

1.04 DELIVERY, STORAGE AND HANDLING

A. Comply with requirements of Section 01600 – Material and Equipment.

PART 2 PRODUCTS

2.01 TOPSOIL

A. Topsoil shall be a natural, fertile, friable soil, possessing characteristics of representative productive soils in the vicinity. It shall not be excessively acid or alkaline or contain toxic substances, which may be harmful to plant growth.

B. Topsoil shall be screened and processed and shall be free from clay lumps, weeds, roots stones and other debris. Topsoil depth shall be placed to a minimum depth of 3" after compaction.

2.02 GRASS SEED

A. Seed shall be delivered to the site in unopened containers, giving the manufacturer's guaranteed analysis.

B. Grass seed shall be mixed and guaranteed by dealer to be as follows: 33.5 percent Kentucky Bluegrass, 14.4 percent Creeping Red Fescue, 24.6 percent Annual Rye, 25.0 percent Perennial Rye, 0.5 percent Weeds (maximum), and 2.0 percent Crop Seeds (maximum).

2.03 EROSION MAT

A. Erosion mat shall consist of a uniform web of interlocking wood excelsior fibers with a net backing on one side. The blanket shall be of a uniform thickness with the wood fibers evenly distributed over the entire area of the blanket. The blanket shall be furnished in rolled strips. The net backing shall have a mesh size not exceeding 1-1/2 by 3 inches and may be woven from twisted paper, cotton cord, a biodegradable plastic or other approved material. The blanket shall be non-toxic to vegetation.

B. Staples for anchoring the erosion mat in place shall be U-shaped, made of No. 11 gage or larger diameter steel wire, or other approved material, have a width of one to two inches, and a length of not less than 6 inches

PART 3 EXECUTION

3.01 EXAMINATION

A. Spent blast media and paint chips shall be thoroughly removed from all lawn areas and disposed of prior to beginning any restoration work.

3.02 APPLICATION

A. Application of grass seed shall be in areas where the existing lawn was damaged or disturbed by Contractor's operations.

3.03 GRADE

A. Lawn areas that have been damaged or disturbed shall have their grade restored to match the undisturbed surrounding landscape. Restored area shall not have any low points that would allow water to pond and contours shall fit the surrounding landscape. Restored area shall have the top layer of material loosened and mixed, and all stones, sticks and rubbish shall be removed. No heavy objects shall be moved over lawn areas after the graded soil was been prepared.

B. After graded soil has been prepared, topsoil shall be spread evenly thereon and lightly compacted. No topsoil shall be spread in a frozen or muddy condition. Contractor shall allow for compaction of approximately 20 percent when spreading topsoil.

C. All surplus excavation, stones, and other foreign materials removed in preparation of the areas to be restored, shall be disposed of by the Contractor.

D. Areas where topsoil has not been removed shall be scarified, smoothed and all stones, sticks and rubbish shall be removed.

3.04 SEEDING

A. Areas to be seeded shall be prepared by application of topsoil as specified. The areas to be seeded shall be dragged and raked to form a level and loose seedbed. A light rolling before final raking to locate soft spots and mounds shall be accomplished if necessary.

B. Area should be uniformly seeded with a specified mixture at the rate of 7 lbs. of pure live seed per 1000 square feet. On hills and slopes, seed shall be broadcast. Broadcast seeding shall be uniformly distributed on designated areas. No seeding shall be done during windy weather.

C. Seeded areas shall be compacted with an appropriate roller in a manner satisfactory to the City.

3.05 EROSION MAT

A. Erosion mat shall be placed on the restored areas immediately after seeding operations have been completed. The mat shall bear continuously on the soil and shall have its lateral edges impressed in the soil to permit runoff water to flow over it.

B. Any seeded areas damaged during erosion mat placing operations shall be re-seeded as specified at the Contractor’s expense.

C. Following the placement of the mat, water shall be uniformly applied to the area sufficiently to moisten the seedbed to a depth of 2 inches and in a manner to preclude washing or erosion.

3.06 FINAL ACCEPTANCE

A. Final acceptance of the seeded areas by the City shall be based on the establishment of a stand of grass free of any exposed area of topsoil.

END OF SECTION

SECTION 05000

METALS - TANKS

PART 1 GENERAL

1.01 SUMMARY

A. Section Includes:

1. Install riser manway hatch.
2. Replace wet interior roof hatch.
3. Install riser grate.
4. Install overflow valve.
5. Replace wet interior ladder and provide fall prevention device.
6. Fix roof ladder and provide fall prevention device.
7. Replace vent with a frost/free roof vent.
8. Replace temporary patch of bowl “drains”
9. Install safety railing on the roof.
10. Install fall prevention devices on access tube ladder.
11. Remove the interior crow’s nest and relocate level sensor.
12. Remove existing antenna mounts and hardware. Provide new antenna mounts.
13. Repair grout at foundation.

1.02 SUBMITTALS

A. Submit under provisions of Section 01010 – Summary of Work.

B. Product Data:

1. Submit manufacturer’s descriptive literature and product specifications for each product.

C. Shop Drawings:

1. Indicate typical layout including dimensions.

2. Submit detail drawings of fabrications.

3. Submit detail drawings of special accessory components not included in manufacturer's product data.

D. Welder's Certifications

1.03 PROJECT RECORD DOCUMENTS

A. Submit under provisions of Section 01700 – Contract Closeout.

1.04 OPERATION AND MAINTENANCE DATA

A. Submit under provisions of Section 01700 – Contract Closeout.

B. Maintenance Data

1.05 QUALITY ASSURANCE

A. Fabricator Qualifications: Company specializing in fabricating work specified in this Section with minimum five years experience.

B. Welder Qualifications: The welder shall be certified for type and position of weld specified. The welder shall be specialized in industrial or heavy commercial welding, and experienced in rigging and elevated work.

1.06 DELIVERY, STORAGE AND HANDLING

A. Comply with requirements of Section 01600 – Material and Equipment.

PART 2 PRODUCTS

2.01 STEEL PLATING & OTHER STRUCTURAL SHAPES

A. ASTM – A36

2.02 GALVANIZED STEEL BOLTS

A. ASTM A307 Steel Bolts and Nuts.

2.03 WELDS

A. Final – E70XX Electrodes.

B. Root – E60XX Electrodes.

C. Wire – ER70S Electrodes.

2.04 SCREEN

A. Stainless steel wire mesh manufactured by McNichols Co. (800) 237-3820.

B. For overflow screen use four (4) meshes per lineal inch, 0.054 inch wire diameter, 0.196 inch opening width, 61.5% opening.

C. For vent screen use ten (10) meshes per lineal inch, 0.028 inch wire diameter, 0.0720 inch opening width, 51.9% opening.

2.05 FALL PREVENTION DEVICE

A. Cable-Type as manufactured by DBI Sala of Red Wing, MN 1-800-873-5242.

1. Fall prevention system: Lad-Saf Model 6116502 and all appurtenances.

2. The device shall meet all OSHA requirements.

3. The device and appurtenances shall be fabricated of galvanized steel.

4. Access tube and wet interior ladder – top bracket TB-3, bottom bracket BB-1 (KC3PL90), guides CG-3 (galvanized)

5. Roof ladder – top bracket TB-11, bottom bracket BB-1 (KC3PL90), guides CG-3 (galvanized)

6. Detachable cable sleeve – LS-2

2.06 CAULK

A. Sika Corporation Sikaflex 1a

2.07 GROUT

A. Sika Corporation Sika 212.

B. Where backer rod is required, use ITP standard closed cell polyethylene foam manufactured by Industrial Thero Polymers, Ltd., 2316 Delaware Ave., Suite 216, Buffalo, NY 14216, 1-800-387-3847.

PART 3 EXECUTION

3.01 GENERAL

A. Comply with the AWS D1.1 Structural Welding Code, ANSI/AWWA D100-96 (latest edition thereof), "AWWA Standard for Welded Steel Tanks for Water Storage" and federal state and local codes, during construction design and fabrication.

B. Field fit-up problems or changes to the plan sheets are to be brought to the attention of the Engineer.

3.02 EXAMINATION

A. Examine areas and conditions under which work is to be performed. Notify Engineer of areas or conditions that are not acceptable. Do not begin work until unacceptable areas or conditions have been corrected.

3.03 INSTALLATION

A. Install in accordance with manufacturer's printed instructions and approved shop drawings.

B. Before welding, remove all coatings within 6 inches of the area to be welded.

C. Weld smooth and avoid undercuts and burrs.

D. Appurtenances that were added, replaced or modified shall have slag chipped from welds.

E. Appurtenances that were added, replaced or modified shall have rough welds and spatter ground smooth. Smooth is defined as "No cuts or abrasions occur when rubbing your hand over the weld".

F. In the event the base metal is gouged during removal, the affected areas are to be built-up to original steel thickness. Grind built-up areas flush with adjacent surfaces.

G. Metal that is cut shall be ground smooth. Sharp edges on the cut metal shall be eliminated. Smooth is defined as "No cuts or abrasions occur when rubbing your hand over the weld".

H. Metal and welds of demolished or modified appurtenances shall be removed where they came in contact with the tank. Grind metal and welds flush with adjacent surfaces.

I. Fill mounting holes from demolished or abandoned appurtenances with weld material. Grind welds flush with adjacent surfaces.

3.04 RISER MANWAY HATCH

A. Install a 36-inch diameter manway hatch in the tank's riser.

B. Install new ⅜-inch flat neoprene gasket material.

C. Manway door shall not come in contact with any obstructions while opening.

D. Surface prepare and coat in accordance with the specifications.

E. See Drawing GT-12-05.

3.05 WET INTERIOR ROOF HATCH

A. Remove the existing wet interior hatch. Hatch to become property of the contractor for proper disposal.

B. Furnish and install a 30-inch diameter hinged hatch.

C. Install a ¼-inch roof plate to cover the opening left by removal of the old hatch as shown on Drawing.

D. Use full fillet welds on plate and on manway neck.

E. Weld a 6-inch by 3-inch by ⅜-inch diameter rung on the roof for a hand-hold. Hatch to be located next to the access tube as close as allowable. Verify location with City prior to installation. Ensure cover opens and closes properly.

F. Surface prepare and coat in accordance with the specifications.

G. See Drawing GT-12-05.

3.06 RISER GRATE with HINGED OPENING

A. Install a grate with a hinged opening across the top of the riser.

B. Construct the outer ring of the grate from 2-inch by ¼-inch bar stock. Overlap the grate on all sides by 3 inches minimum.

C. Fabricate the grate from 2-inch by ¼-inch stock.

D. Fabricate the grate in a cross-hatch design, with 90 degree corners. Fabricate from 2 inch by ¼-inch bar stock to create spacing as shown in the Drawing.

E. Weld all interconnections solid. Eliminate all crevices.

F. Surface prepare and coat in accordance with the specifications.

G. See Drawing GT-12-05.

3.07 OVERFLOW VALVE

A. Cut and remove the cone at the bottom of the bottom of the overflow pipe, to become the property of the contractor for proper disposal.

B. Weld a new flange using ⅜-inch plate to accept a Tideflex check valve.

C. Install a Tideflex check valve series 35 to the new flange attach with stainless steel bolts.

D. Replace the mesh screen around the overflow discharge down to the catch basin pipe. Reuse existing connections for the screen.

E. Surface prepare and coat burnt paint per specifications.

F. See Drawing GT-12-07.

3.08 NEW INTERIOR LADDER

A. Remove the existing wet interior ladder. Ladder to become property of the contractor for proper disposal.

B. Furnish and install a new wet interior ladder.

C. Ladder to be 16 inches wide with ¾-inch diameter rungs, spaced every 12 inches on center, and provide a minimum of 7 inches of toe clearance.

D. Construct side rails of 4-inch by 3-inch by ⅜-inch angle.

E. Construct stiffening supports of 4-inch by 3-inch by ⅜-inch.

F. Ladder shall meet or exceed all OSHA requirements. Equip with cable-type fall prevention device.

G. Surface prepare and coat in accordance with the specifications.

H. See Drawing GT-12-06.

3.09 FIXED ROOF LADDER

A. Remove the wheels, brackets, tracks and attachment points from the existing roof ladder, and convert the ladder to a fixed ladder.

B. Attach ladder to tank using 2-inch by 2-inch by ¼-inch angle at every railing support

C. Maintain 7 inches of toe clearance throughout length of ladder.

D. Roof ladder to line-up with the existing opening in the roof handrail.

E. Furnish and install a cable-type fall prevention device.

F. Surface prepare and coat in accordance with the specifications.

G. See Drawing GT-12-07.

3.10 REPLACE VENT WITH FROST-FREE ROOF VENT

A. Remove the existing roof vent and obstruction light mounting pole. Vent and obstruction light mounting pole to become property of the contractor for proper disposal. Turn over obstruction light to owner.

B. Furnish and install a new frost-free roof vent on bolted flange that has been cut and constructed as shown in the drawings.

C. See Drawing GT-12-06.

3.11 WELD PATCH PLATES

A. Remove temporary patch plates from the bowl.

B. Weld ⅜-inch plates over all openings. Plates to overlap all holes by 2 inches on all sides.

C. Weld using ⅜-inch full fillet welds on both sides of the patch.

D. Surface prepare and coat in accordance with the specifications.

E. See Drawing GT-12-07.

3.12 SAFETY RAIL MODIFICATION

A. Remove the existing plate mid-rail, install a new angle mid-rail and a kick plate on the existing roof railing.

B. Install per drawing.

C. Surface prepare and coating in accordance with the specifications.

D. See Drawing GT-12-07.

3.13 FALL PREVENTION DEVICE – ACCESS TUBE

A. Furnish and install a cable-type fall prevention device on the access tube ladder.

B. The device shall meet all OSHA requirements. The device shall be equal to the Lad-Saf flexible cable system as manufactured by DBI-SALA Co. of Red Wing, MN

C. Install cable guides every 15 feet on center.

3.14 REMOVE INTERIOR CROWS NEST AND RELOCATE LEVEL SENSOR

A. Remove the crow's nest from the wet interior roof. Crow's nest to become the property of the contractor for proper disposal.

B. Relocate wiring for high water level sensor to the tank's roof. Provide new level sensor. See Drawing GT-12-07.

C. Replace the wiring to the sensor box inside new galvanized conduit.

3.15 ANTENNA MOUNT REMOVAL AND INSTALLATION

A. Before the tank is taken out of service, Milwaukee County will remove their five (5) antennas along with the associated antenna mounting poles, coaxial cable, hangers and hardware.

B. After Milwaukee County removes their equipment, the contractor shall remove all remaining antennas along with the associated antenna mounting poles, coaxial cable, wiring, hangers and hardware.

C. Remove mounts or attachments that have been welded to the tank for Milwaukee County's and abandoned antenna installations. Holes that were drilled in the tank for installing Milwaukee County's and abandoned antenna installations shall be filled with weld material. Large openings that were cut into the tank and gatehouse for installing Milwaukee County's and abandoned antenna installations shall be patched with steel plates that are welded in place over the opening.

D. Make all welds to the tank wall with E7018 low hydrogen rods.

E. Remount new poles to the existing safety rail using stainless steel U-bolts. Coordinate location with Milwaukee County.

F. Remove tripod antenna mount from roof of tank.

G. See drawings GT-12-08, GT-12-09, and GT-12-10.

3.16 REPAIR GROUT AT FOUNDATION

A. Remove all loose, soft, or mottled grout from the between the steel plate and tops of the foundations. Removal of grout shall be by hand, hammer, or chisel.

B. Pressure wash the grout using a minimum nozzle tip pressure of 2,000 pounds per square inch. All surfaces shall be free of all standing water or frost in accordance with the manufacturer's recommendations. Surface to be Saturated Surface Dry (SSD).

C. Properly and thoroughly mix the grout in accordance with the manufacturer's recommendations as a dry mix.

D. Force the grouting material into the annular space to ensure there are no voids. Make flush with the baseplate.

END OF SECTION

SECTION 09800

ABRASIVE BLASTING

PART 1 GENERAL

1.01 SUMMARY

A. Section Includes:

1. Abrasive blasting of steel water storage tank.
2. Containment System.
3. Disposal of waste.

B. Related Sections

1. Section 09960 – Coating Systems for Water Storage Tanks

C. Scope

1. The Contactor shall be responsible to comply with local, state and federal rules and regulations concerning emissions and disposal of solids and other materials generated from cleaning, preparation and blasting operations. Containment, handling and disposal of materials, and means and methods employed by the Contractor, is the entire responsibility of the Contractor.

1.02 REFERENCES

A. Code of Federal Regulations 29 CFR 1910 – Occupational Safety and Health Standards

B. Code of Federal Regulations 40 CFR – Solid Wastes

1.03 DEFINITIONS

A. Occupational Safety and Health Administration – OSHA

B. United States Environmental Protection Agency – USEPA

C. Resource Conservation and Recovery Act – RCRA

D. Toxicity Characteristic Leaching Procedure – TCLP

E. Wisconsin Department of Natural Resources – WDNR

1.04 SUBMITTALS

A. Submit under provisions of Section 01010 – Summary of Work.

B. Product Data:

1. Submit manufacturer's product data for each specified product.

2. Include data to indicate

a) Generic description

b) Complete technical data

C. Containment Plan; plan shall include, but not be limited to:

1. Containment System Design Drawings. Drawings shall be signed and stamped by a Professional Engineer registered in the State of Wisconsin.

2. Containment System Design Calculations. Calculations shall be signed and stamped by a Professional Engineer registered in the State of Wisconsin.

3. Description and technical data for structure, equipment, screens and ground cover.

4. Indicate locations of all welding and cutting that will be performed on tank in order to install containment system.

D. Waste Management Plan; plan shall include, but not be limited to:

1. Name of laboratory that will perform TLCP tests.

2. TCLP Sampling Plan.

3. Waste Transporter's certification to haul waste.

4. Manifest indicating disposal site's acceptance of waste and proper disposal of.

E. Air Monitoring Plan.

F. Noise Suppression and Monitoring Plan. The plan shall be in compliance with the City of Milwaukee's Code of Ordinances; 80 Nuisances; Subchapter 2 Noise Control.

1.05 QUALITY ASSURANCE

A. Contractor Qualifications:

1. Contractor shall have completed a minimum of five (5) projects of similar scope, size, complexity and schedule to the specified Work within the last ten (10) years. Also, each project shall have been on a tank with a minimum 1,000,000 gallon capacity that is multi-legged and required containment of the exterior. The completed "Contractor's Project Experience" form that is found within the Bid Documents needs to be submitted by the apparent low bidder within **two (2)** business days of the bid opening.

2. Contractor's Personnel: Employ persons trained for abrasive blasting.

B. Blasting Standard: Prepare 5 foot by 5 foot mock-up for each of the specified surface preparations using same materials, tools, equipment, and procedures intended for actual surface preparation. Obtain City's approval of mock-ups.

C. Waste Testing Laboratory: Laboratory shall be certified and registered by the Wisconsin Department of Natural Resources.

1.06 PRE-APPLICATION MEETING

A. See Section 09960 – Coating Systems for Water Storage Tanks.

1.07 DELIVERY, STORAGE AND HANDLING

A. Comply with requirements of Section 01600 – Material and Equipment.

B. Delivery: Deliver materials to site in manufacturer's original, unopened packaging, with labels clearly identifying:

1. Manufacturer and product name.

C. Storage:

1. Store materials in a clean dry area and within temperature range in accordance with manufacturer's instructions.

2. Keep containers sealed until ready for use.

3. Do not use materials beyond manufacturer's shelf life limits.

D. Handling: Protect materials during handling and application to prevent damage or contamination.

PART 2 PRODUCTS

2.01 MATERIALS

A. Abrasive

1. Abrasive shall create a uniform surface profile that meets the projects and coating manufacturer's specifications.

2. Abrasive shall be graded as to proper size, shape and hardness. It shall be free of moisture and contaminants and shall not imbed itself in the blasted surface.

3. Silica sand, flint sand and glass beads are prohibited.

4. Mineral and Slag Abrasives shall meet the requirements of SSPC-AB 1. Ferrous Metallic Abrasives shall meet the requirements of SSPC-AB 3.

2.02 FULL CONTAINMENT SYSTEM

A. Provide Class 2A full containment of the elevated water tank per SSPC – Guide 6.

1. Containment Enclosure Components

a) Containment Materials: Type A1-Rigid or Type A2-Flexible

b) Penetrability of Containment Materials: Type B1-Air impenetrable

c) Support Structure: Type C1-Rigid or Type C2-Flexible

d) Treatment of Joints: Type D1-Fully Sealed Joints

e) Entryway: Type E2-Resealable Doors or Type E3- Overlapping Door Tarps

2. Ventilation System Components

a) Air Supply (Intake) Points: Type F1 Controlled Air Supply or F2 Open Air Supply

b) Input Air Flow: Type G1 Forced Input Air Flow or G2 Natural Input Air Flow

c) Air Pressure Inside Containment: Type H2 Visual Verification

d) Air Movement inside Containment: Type I1 Provide an air velocity that is adequate to protect the worker from exposure to airborne dust

e) Exhaust Air Flow/Dust Collection: Type J1 Air Filtration Required

3. Prior to erection, provide certification that the containment system has been reviewed by a Professional Engineer registered in the State of Wisconsin to confirm the structural adequacy of the containment and the effect of various loads imposed including wind loads.

4. The City of Milwaukee does not have structural calculations for the Elevated Water Storage Tank in its possession.

5. Provide a Ground Covering that is impenetrable to dust and resistant to tearing.

2.03 DEHUMIDIFICATION & HEATING

A. Dehumidifiers shall be capable of continuous and unattended operation.

B. Heaters shall be electric or indirect fired.

C. The contractor shall be responsible for all costs associated with dehumidification and heating

2.04 COMPRESSED AIR SUPPLY

A. Compressed air supply shall be equipped with suitable after coolers, oil separators and moisture separators.

B. Separators shall be of the continuous bleeding or automatic dumping type.

PART 3 EXECUTION

3.01 EXAMINATION

A. Examine areas and conditions under which coating systems are to be applied. Notify Engineer of areas or conditions that are not acceptable. Do not begin surface preparation or application until unacceptable areas or conditions have been corrected.

3.02 PREPARATION

A. The City will take the tank out of service and drain the tank. The contractor shall remove any standing water that remains in the tank's bowl and wet-riser after the City has drained it.

B. Remove sediment, dirt ice and debris from tank's bowl.

C. Remove sediment, dirt ice and debris from tank's wet-riser.

D. Remove abandoned antennas and associated coaxial cables, wiring, mounts and hardware.

E. Verify that appurtenances are free from rough welds, spatter, slag, and sharp edges.

F. Verify that mounting holes from demolished or abandoned appurtenances have been filled.

G. Verify that metal and welds from demolished or modified appurtenances has been removed from the tank's surface.

H. Electrical, communication, dehumidification and heating systems shall be protected from damage due to abrasive blasting. Items to be protected shall include, but not be limited to: panels, controls, conduit, motors, lights, dehumidifiers, heaters, gauges, etc. Protection shall not allow systems that are to remain in service to overheat.

I. Existing coating systems that are to remain shall be protected from damage due to abrasive blasting.

J. Protection of Water Supply

1. Cover all openings, including the fill/drain pipe, overflow pipe and overflow/sewer air gap.

2. Debris, dust, abrasive, etc. shall not enter the water piping.

3.03 CONTAINMENT SYSTEM

A. A full containment system shall be provided during solvent cleaning and abrasive blasting operations. Contractor shall prevent the drift of abrasive and/or paint chip debris onto adjacent property, streets and structures.

B. Contractor shall stop abrasive blasting when excessive winds cause drift of abrasive and/or paint chip debris outside the area of containment.

C. Provide full ground cover within the containment system that is sufficiently overlapped and secured to prevent contamination of the ground by coming in contact with abrasive and paint chip debris.

D. Contain abrasive and paint chip debris within the confines of the containment system and provide measures necessary to prevent the release of fugitive dust emission from the containment system.

E. Replace or repair any damaged portion of the containment system that allows abrasive and/or paint chip debris to escape the containment system. Stop abrasive blasting operations that are emitting abrasive and/or paint chip debris through the damaged portion until the replacement or repair is made.

F. Contractor shall provide an operational containment system in conformance with all Federal, State and Local requirements sufficient to protect persons, property and the environment from injury and damage due to the Contractor's operation.

G. Contractor is responsible for the repair of damage that arises from the containment system.

H. Contractor shall provide an AWS certified welder for all tank connections that require welding.

I. Permanently install the roof lugs for the containment system to the water tank.

1. Provide a continuous weld were the tank surface meets the perimeter of the roof lug.

2. Weld slag, weld spatter, rough edges and sharp edges of weld shall be ground smooth. Grind welds flush with adjacent surfaces.

3.04 DEHUMIDIFICATION & HEATING

A. The contractor has the option of providing dehumidification and/or heating if the ambient air conditions and/or surface temperature do not meet either of the following conditions:

1. Minimum surface temperature required by abrasive manufacturer.

2. Relative humidity recommended by abrasive manufacturer.

3. Surface temperature is less than 15°F above the dew point

B. Operate dehumidification and/or heating equipment for a minimum of 24 hours prior to starting abrasive blasting

3.05 ABRASIVE BLASTING

A. Prepare steel surfaces in accordance with coating manufacturer's instructions.

B. Fabrication Defects

1. Correct steel and fabrication defects revealed by surface preparation.

2. Remove weld spatter and slag. Applies only to welding that was required as part of this contract.

3. Round sharp edges and corners of welds to a smooth contour. Applies only to welds that were required as part of this contract.

4. Smooth weld undercuts and recesses. Applies only to welds that were required as part of this contract.

5. Grind down porous welds to pinhole-free metal. Applies only to welds that were required as part of this contract.

C. Areas where grinding occurs after abrasive blasting shall be spot blast cleaned to the applicable surface specification.

D. Ensure surfaces are dry prior to abrasive blasting.

E. Surface Preparation

1. Interior-Wet Substrate (Bowl and Wet-riser): Remove visible oil, grease, dirt, dust, mill scale, rust, paint, oxides, corrosion products, and other foreign matter in accordance with SSPC-SP10 (NACE No. 2).

2. Interior-Dry Substrate (Wet-riser, Dry-riser, portion of Dry-riser's exterior that is exposed inside Gate House, piping and miscellaneous items inside Gate House): Remove visible oil, grease, dirt, dust, mill scale, rust, paint, oxides, corrosion products, and other foreign matter in accordance with, SSPC-SP1, SSPC-SP3 and SSPC-SP11.

3. Interior-Dry Substrate (Access Tube and underside of Bowl): Remove visible oil, grease, dirt, dust, mill scale, rust, paint, oxides, corrosion products, and other foreign matter in accordance with SSPC-SP10 (NACE No. 2).

4. Exterior Substrate: Remove visible oil, grease, dirt, dust, mill scale, rust, paint, oxides, corrosion products, and other foreign matter in accordance with SSPC-SP6 (NACE No. 3).

F. Wet-riser's Interior Wet Substrate Extent of Work: Extent of work shall be from the wet riser's top edge to its base in the gatehouse basement. Blasting the twenty-four inch fill/drain piping that connects to wet riser is not part the work.

G. Abrasive Blast-Cleaned Surfaces: Coat abrasive blast-cleaned surfaces with primer before visible rust forms on surface.

3.06 FIELD QUALITY CONTROL

A. General:

1. Notify the City of any open seams, pitting that exceeds twenty percent of plate thickness or structural defects that are uncovered during abrasive blasting.

B. Tests:

1. A blotter test shall be performed daily. A clean white blotter shall be held directly in front of the air stream for two minutes. The blotter shall be held no more than eighteen inches from the outlet of the air supply. After being held in front of the air stream the blotter shall show no signs of oil or moisture. Any signs of oil or moisture will cause the abrasive blasting performed that day to be rejected.

2. Perform required Blasting Standard samples. The City's approval is required prior to commencement of work.

C. Inspections:

1. Performed by City's consultant.

3.07 WASTE MANAGEMENT

A. General:

1. Waste generated on site shall be managed in accordance with the requirements of the USEPA, RCRA (including the Hazardous and Solid Wastes Amendments of 1984) and WDNR.

2. Fees and transportation costs shall be the Contractor's responsibility. The Contractor shall be responsible for fines or assessments levied against the project due to improper handling and disposal of the waste.

B. Testing

1. The waste streams of spent abrasive and paint shall be sampled and tested per EPA publication SW-846.

2. Laboratory performing TCLP tests shall be certified and registered by the WDNR.

3. Provide copies of TCLP results to City.

C. Documentation

1. Provide copies of documentation required by the USEPA, RCRA (including the Hazardous and Solid Wastes Amendments of 1984) and WDNR to the City.

2. Documentation shall encompass transporting and disposal of the waste.

END OF SECTION

SECTION 09960

COATING SYSTEMS FOR WATER STORAGE TANKS

PART 1 GENERAL

1.01 SUMMARY

A. Section Includes:

1. Coating Systems for steel water storage tanks.

B. Related Sections

1. Section 02683 – Disinfection of Water Storage Tank

2. Section 09800 – Abrasive Blasting

1.02 REFERENCES

A. ANSI/NSF 61 - Drinking Water System Components - Health Effects.

B. ASTM D 16 - Terminology Relating to Paint, Varnish, Lacquer, and Related Products.

C. AWWA C 652 - Disinfection of Water-Storage Facilities.

D. AWWA D 102 - Painting Steel Water Storage Tanks.

E. SSPC-SP 1- Solvent Clean.

F. SSPC-SP 3 - Power Tool Cleaning.

G. SSPC-SP 6/NACE 3 - Commercial Blast Cleaning.

H. SSPC-SP 10/NACE 2 - Near-White Metal Blast Cleaning.

I. SSPC-SP 11 - Power Tool Cleaning to Bare Metal.

1.03 DEFINITIONS

A. Definitions of Painting Terms: ASTM D 16, unless otherwise specified.

B. Dry Film Thickness (DFT): Thickness of a coat of paint in fully cured state measured in mils (1/1000 inch).

1.04 SUBMITTALS

A. Submit under provisions of Section 01010 – Summary of Work.

B. Product Data:

1. Submit manufacturer's product data for each specified product.

2. Include data to indicate:

a) Generic description

b) Compete technical data

3. Coating submittals shall also include:

a) Surface preparation and application instructions

b) MSDS Sheets

C. Color Samples: Submit manufacturer’s color samples showing full range of standard colors.

D. Manufacturer’s Quality Assurance: Submit manufacturer’s certification that coatings comply with specified requirements and are suitable for intended application.

E. Guarantee: Submit manufacturer’s guarantee for the following:

1. Coating system for exterior steel.

2. Coating system for interior-wet steel.

F. Original Project Color Standards for each exterior finish color.

G. Dehumidification and Heating Plan

H. Ventilation Plan

I. Substitutions: Alternate manufacturer submittal must be given to Engineer fourteen (14) days prior to bid date. In addition to the preceding submittals, the following shall be provided:

1. Test results of the following ASTM Standards for the prime coat used in the exterior and interior-wet coating systems. Alternate coating’s test results shall meet or exceed the specified requirement:

a) ASTM D 4585 Humidity

(1) Requirement: No blistering, cracking, rusting or delamination of film after 4,000 hours exposure.

b) ASTM D 870 Immersion

(1) Requirement: No blistering, cracking, rusting or delamination of film after seven years immersion.

c) ASTM B 117 Salt Spray (Fog)

(1) Requirement: No blistering, cracking or delamination of film. No more than 1% rusting on plane and no more than ¼" rust creepage at scribe after 20,000 hours.

2. Test results of the following ASTM Standards for the finish coat used in the exterior coating system. Alternate coating's test results shall meet or exceed the specified requirement:

a) ASTM D 4141, Method C (EMMAQUA)

(1) Requirement: No blistering, cracking or chalking. No less than 84% gloss retention, no more than 13 units gloss loss and no more than 0.41 DE_{Hunter} color change after 3,500 MJ/m^2 EMMAQUA exposure (TR5747).

3. Test results of the following ASTM Standards for the intermediate and finish coats used in the interior-wet and interior-dry coating systems. Alternate coating's test results shall meet or exceed the specified requirement:

a) ASTM D 4585 Humidity

(1) Requirement: No blistering, cracking or delamination of film after 10,000 hours exposure.

b) ASTM D 870 Immersion

(1) Requirement: No blistering, cracking, checking, rusting or delamination of film after two years continuous water immersion.

c) ASTM B 117 Salt Spray (Fog)

(1) Requirement: No blistering, cracking or delamination of film. No more than 1% rusting on plane. No more than 1/64" rust creepage at scribe after 10,000 hours exposure.

4. Case history information for alternate coating systems; showing a minimum of fifteen (15) projects within the Midwest. Also show similar projects that have

had the alternate coating system applied to them for a minimum of five (5) years within the Midwest.

5. Coating systems for the interior-wet steel shall have written approval from the Wisconsin Department of Natural Resources.

1.05 QUALITY ASSURANCE

A. Manufacturer Qualifications:

1. Specialize in manufacture of coatings with a minimum of 10 years successful experience.

2. Able to demonstrate successful performance on comparable projects.

3. Single Source Responsibility: Coatings and coating application accessories shall be products of a single manufacturer.

B. Applicator Qualifications:

1. Contractor shall have completed a minimum of five (5) projects of similar scope, size, complexity and schedule to the specified Work within the last ten (10) years. Also, each project shall have been on a tank with a minimum 1,000,000 gallon capacity that is multi-legged and required containment of the exterior. The completed "Contractor's Project Experience" form that is found within the Bid Documents needs to be submitted by the apparent low bidder within **two (2)** business days of the bid opening.

2. Applicator's Personnel: Employ persons trained for application of specified coatings.

C. Original Project Color Standards: Prepare six (6) samples for each exterior finish color. Minimum sample size shall be 3-in x 6-in. Sample panel shall be supplied by coating manufacturer. Samples shall be prepared in the field and coated with the same coating system as the tank's exterior.

1.06 PRE-APPLICATION MEETING

A. Conduct pre-application meeting in accordance with Section 01039

B. Convene pre-application meeting two weeks prior to commencing work of this Section.

C. Require attendance of parties directly affecting work of this section, including Contractor, Engineer, applicator, inspector and manufacturer's representative. Review the following:

1. Environmental Requirements
2. Protection of surfaces not scheduled to be coated.
3. Surface preparation.
4. Application.
5. Disinfection.
6. Repair
7. Field quality control.
8. Cleaning.
9. Protection of coating system.
10. Two-year inspection.
11. Coordination with other work.

1.07 DELIVERY, STORAGE AND HANDLING

A. Comply with requirements of Section 01600 – Material and Equipment.

B. Delivery: Deliver materials to site in manufacturer's original, unopened containers and packaging, with labels clearly identifying:

1. Coating or material name
2. Manufacturer.
3. Color name and number.
4. Batch or lot number.
5. Date of manufacturer.
6. Mixing and thinning instructions.

C. Storage:

1. Store materials in a clean dry area and within temperature range in accordance with manufacturer's instructions.
2. Keep containers sealed until ready for use.

3. Do not use materials beyond manufacturer's shelf life limits.

D. Handling: Protect materials during handling and application to prevent damage or contamination.

1.08 ENVIRONMENTAL REQUIREMENTS

A. Weather:

1. Air and Surface Temperatures: Prepare surfaces and apply and cure coatings within air and surface temperature range in accordance with manufacturer's instructions.

2. Surface Temperature: Minimum of 5 degrees F above dew point.

3. Relative Humidity: Prepare surfaces and apply and cure coatings within relative humidity range in accordance with manufacturer's instructions.

4. Precipitation: Do not prepare surfaces or apply coatings in rain, snow, fog, or mist.

5. Wind: Do not spray coatings if wind velocity is above manufacturer's limit.

B. Ventilation: Provide ventilation during coating evaporation stage in confined or enclosed areas in accordance with AWWA D 102.

C. Dust and Contaminants:

1. Schedule coating work to avoid excessive dust and airborne contaminants.

2. Protect work areas from excessive dust and airborne contaminants during coating application and curing.

1.09 GUARANTEE

A. Comply with provisions of Section 01010 – Summary of Work.

B. Guarantee coating system for interior-wet steel to be free from defects in material for ten (10) years. The coating shall not:

1. Check, crack, blister or delaminate from the substrate.

2. Allow the substrate to corrode in excess of 1.0% of the surface area being coated as measured in accordance with ASTM D 610-95 "Standard Test Method for Evaluating Degree of Rusting on Painted Surfaces" for a period of five (5) years from substantial completion date or corrode in excess of 0.5% per year for the remaining five (5) years of the warranty coverage period (3.5% maximum allowable corrosion at 10 years).

C. Guarantee coating system for exterior steel to be free from defects in material for fifteen (15) years. The coating shall not:

1. Check, crack, blister or delaminate from the substrate.

2. Change color more than 5 DE Hunter units as determined in accordance with ASTM D 2244 by comparing the affected exposed coating cleaned with water and a soft cloth with unexposed Original Project Color Standards maintained by the manufacturer and the City.

3. Exhibit loss of gloss in excess of 24 units as measured by a gloss meter in accordance with ASTM D 523-89 with 60 degree geometry.

4. Chalk in excess of a rating of 8 as measured in accordance with ASTM D 4214, Method A.

PART 2 PRODUCTS

2.01 MANUFACTURERS

A. Acceptable Manufacturers:

1. Tnemec Company Incorporated; Kansas City, MO

2. Equal

B. Substitutions: Comply with requirements of Section 01600 and this Section.

2.02 COATING SYSTEMS FOR INTERIOR STEEL

A. Interior-Wet (Bowl and Wet-riser)

1. System: AWWA D 102-06 Inside Coating System No. 1; Zinc/Epoxy/Epoxy

2. ANSI/NSF 61 Certified: For use inside potable water storage tanks.

3. Surface Preparation: SSPC-SP10 (NACE No. 2); A minimum surface profile of 1.5 mils is required.

4.	Prime Coat:	Series 91-H_2O Hydro Zinc;	DFT 2.5-3.5
5.	Stripe:	Series N140 Pota Pox Plus (Tank White);	DFT 3.0-5.0
6.	Intermediate Coat:	Series N140 Pota Pox Plus (Beige);	DFT 4.0-6.0
7.	Finish Coat:	Series N140 Pota Pox Plus (Tank White);	DFT 4.0-6.0

8. Total DFT of Coating System: 10.5-15.5 (13.5-20.5 at weld seams)

B. Interior-Dry System #1 (Wet-riser, Dry-riser, portion of Dry-Riser's exterior that is exposed inside Gate House, piping and miscellaneous items inside Gate House)

1. System: Epoxy/Epoxy/Epoxy

2. Surface Spot Preparation: SSPC-SP1, SSPC-SP3 and SSPC-SP11; feathering edges; A minimum surface profile of 1.5 mils is required.

3. Prime Coat: Series N140 Pota Pox Plus; DFT 3.0-5.0

4. Intermediate Coat: Series N140 Pota Pox Plus; DFT 3.0-5.0

5. Finish Coat: Series N140 Pota Pox Plus (Match Existing); DFT 3.0-5.0

6. Total DFT of Coating System: 9.0 - 15.0

C. Interior-Dry System #2 (Access Tube and underside of Bowl)

1. System: AWWA D 102-06 Inside Coating System No. 1; Zinc/Epoxy/Epoxy

2. Surface Preparation: SSPC-SP10 (NACE No. 2); A minimum surface profile of 1.5 mils is required.

3. Prime Coat: Series 91-H2O Hydro Zinc; DFT 2.5-3.5

4. Stripe: Series N140 Pota Pox Plus (Tank White); DFT 3.0-5.0

5. Intermediate Coat: Series N140 Pota Pox Plus (Beige); DFT 4.0-6.0

6. Finish Coat: Series N140 Pota Pox Plus (Match Existing); DFT 4.0-6.0

7. Total DFT of Coating System: 10.5-15.5 (13.5-20.5 at weld seams)

2.03 COATING SYSTEMS FOR EXTERIOR STEEL

A. Exterior System #1 (Tank)

1. System: AWWA D 102-06 Outside Coating System No. 5; Zinc/Urethane/Fluoropolymer

2. Surface Preparation: SSPC-SP6 (NACE No. 3); A minimum surface profile of 1.5 mils is required.

3. Prime Coat: Series 91-H2O Hydro Zinc DFT 2.5-3.5

4. Stripe: Series N140 Pota Pox Plus (Beige) DFT 3.0-5.0

5.	Intermediate Coat:	Series 73 Endura Shield (Color by Tnemec)	DFT 2.0-3.0
6.	Finish Coat:	Series 700 Hydroflon (Tank White)	DFT 2.0-3.0
		Series 700 Hydroflon for underside of bowl (Deep Space)	DFT 2.0-3.0
7.	Total DFT of Coating System:		6.5-9.5 (9.5-14.5 at weld seams)

B. Exterior System #2 (Gatehouse)

1.	System:	Series 1028 Enduratone	
2.	Surface Preparation:	Power Wash with biodegradable cleanser	
3.	Prime Coat:	HDP Acrylic Polymer (Color)	DFT 2.0-3.0
4.	Finish Coat:	HDP Acrylic Polymer (Tank White)	DFT 2.0-3.0
5.	Total DFT of Coating System:		DFT 4.0-6.0

2.04 COATING SYSTEMS FOR CONCRETE PIERS

A. System for Column Piers

1.	Surface Preparation:	SSPC-SP13/ICRI 1-3	
2.	Prime Coat:	Series 156 Enviro-Crete (Color)	DFT 5.0-7.0
3.	Finish Coat:	Series 156 Enviro-Crete (Deep Space)	DFT 5.0-7.0
4.	Total DFT of Coating System:		DFT 10.0-14.0

2.05 SEALANTS

A. Sikaflex 1A as manufactured by Sika Corporation of Lyndhurst, New Jersey. Sealant shall be NSF-61 approved. Use where sealant will come in contact with potable water.

B. Dymonic FC as manufactured by Tremco CS&W of Beachwood, Ohio. Use at exterior joints where Gate House intersects the dry-well. Solvent used to clean joints shall be Xylol.

2.06 COATING APPLICATION ACCESSORIES

A. Accessories required for application of specified coatings in accordance with manufacturer's instructions, including thinners.

2.07 DEHUMIDIFICATION & HEATING

A. Dehumidifier and heaters shall be capable of continuous and unattended operation.

B. Heaters shall be electric or indirect fired.

C. The contractor shall be responsible for all costs associated with dehumidification and heating.

2.08 VENTILATION

A. Ensure that air is free of contaminants prior to applying coatings.

B. Provide ventilation for the tank interior during coating application and continue until the coating has fully cured. Follow manufacturer's ventilation recommendations for type of equipment, number of air changes and duration of curing period.

2.09 DUST COLLECTORS

A. Dust collectors shall be provided if the ambient air quality exceeds levels set by the applicable regulatory agencies.

2.10 GASKETS

A. Gasket material shall be 3/8 inch thick neoprene. Gaskets for existing appurtenances shall be of the same type and dimensions as the original gasket. The gasket type and dimensions for new appurtenances shall be as recommended by the appurtenance manufacturer.

2.11 HARDWARE

A. Fastening hardware shall be galvanized and per ASTM A307 Steel Bolts and Nuts.

PART 3 EXECUTION

3.01 EXAMINATION

A. Examine areas and conditions under which coating systems are to be applied. Notify Engineer of areas or conditions that are not acceptable. Do not begin surface preparation or application until unacceptable areas or conditions have been corrected.

3.02 PREPARATION

A. Remove dirt, dust, residue and abrasive from tank's surface prior to applying coatings.

B. Protection of surfaces not scheduled to be coated:

1. Immediately remove coatings that fall on surrounding areas and surfaces not scheduled to be coated.

2. Electrical, communication, dehumidification and heating systems shall be protected from damage due to coating application. Items to be protected shall include, but not be limited to: panels, controls, conduit, motors, lights, dehumidifiers, heaters, gauges, etc. Protection shall not allow systems to overheat.

3.03 POWERWASHING

A. The following shall be power-washed with a biodegradable cleanser

1. Exterior of Gate House including the walls, roof and door.

2. First floor of Gate House including the concrete floor, concrete curb, exposed portion of dry-well and stairs.

3. Lower floor of Gate House including concrete floor, concrete walls, piping, valves and pipe supports.

B. Protect power and communication electrical panels, lights, unit heaters, gauges, and equipment from damage by power-washing.

3.04 CONTAINMENT SYSTEM

A. A full containment system shall be provided during solvent cleaning and painting operations. Contractor shall prevent the drift of paint onto adjacent property, streets and structures.

B. Contractor shall stop applying paint when excessive winds cause drift of paint outside the area of containment.

C. Provide full ground cover within the containment system that is sufficiently overlapped and secured to prevent contamination of the ground by paint.

D. Contain all paint within the confines of the containment system and provide measures necessary to prevent the release of fugitive dust emission from the containment system.

E. Replace or repair any damaged portion of the containment system that allows paint to escape the containment system. Stop painting operations that are emitting paint through the damaged portion until the replacement or repair is made.

F. See Section 09800 Part 3 for additional requirements.

3.05 DEHUMIDIFICATION & HEATING

A. The contractor has the option of providing dehumidification and/or heating if the ambient air conditions and/or surface temperature do not meet either of the following conditions:

1. Minimum surface temperature required by coating manufacturer while applying the coating and while the coating cures.

2. Relative humidity recommended by coating manufacturer while applying the coating and while the coating cures.

3. Surface temperature is less than 5°F above the dew point while applying the coating and while the coating cures.

B. Operate dehumidification and heating equipment for a minimum of 24 hours prior to starting abrasive blasting.

3.06 VENTILATION

A. Ensure that air is free of contaminates before coatings are applied.

B. Provide ventilation for the wet interior during coating application and continue until the coating has fully cured. Follow the manufacturer's recommendations for type of equipment, number of air changes per hour and duration during the curing period.

3.07 APPLICATION

A. Apply coatings in accordance with manufacturer's instructions.

B. Mix and thin coatings, including multi-component materials, in accordance with manufacturer's instructions.

C. Keep containers closed when not in use to avoid contamination.

D. Do not use mixed coatings beyond pot life limits.

E. Use application equipment, tools, pressure settings, and techniques in accordance with manufacturer's instructions.

F. Uniformly apply coatings at spreading rate required to achieve specified DFT.

G. Apply coatings to be free of film characteristics or defects that would adversely affect performance or appearance of coating systems.

H. Exterior and interior weld seams that join the tank's steel plates shall be stripe painted with a brush. Erection scabs shall be stripe painted. Striping shall occur

after the prime coat is applied and before the intermediate coat is applied. Striping shall be with the same coating as the intermediate coat, but of a different color.

I. Recoat times recommended by manufacturer shall be followed.

J. Wet-Riser: The surface located in the Interior-Dry portion of the tank shall have areas of corrosion that have broken through the existing finish coat repaired. This also applies to the angle iron mounts that attach stair treads to the wet-riser. Areas where the existing finish coat is "flaking" off the aluminum coating are not required to be repaired. Areas where rust bleed or corrosion is occurring beneath the existing finish coat are not required to be repaired. Areas where the existing lead primer has been exposed are not required to be repaired.

K. Bowl: The bottom half of the bowl's exterior shall be painted a color that is darker than the remainder of the tanks exterior. The extents of the specified color shall be from the balcony's deck to the bowl's intersection with the dry-riser. The intent of the dark grey color is to hide future staining that occurs on the tank.

L. Column Piers: The concrete foundations shall be painted.

M. Intersection of Dry-Riser and Gate House Roof and Walls: Contractor has the option to prepare underside of flange at this intersection to a SSPC-SP1, SSPC-SP3, SSPC-SP11 or SSPC-SP6 level of cleanliness. Apply new sealant to the joint between the intersection of the Gate House and dry-riser.

N. Wet-riser's Interior-Wet Substrate Extent of Work: Extent of work shall be from the wet riser's top edge to its base in the gatehouse basement. Coating the twenty-four inch fill/drain piping that connects to wet riser is not part the work.

3.08 SEALANTS

A. Apply per manufacturer's instructions.

B. Provide backing material on joints of Gate House and dry-well if depth of joint is deeper than maximum usable depth of sealant. Sealant shall be applied at intersection of Gate House roof and dry-well and Gate House walls and dry-well.

3.09 GASKETS, HARDWARE & SCREENS

A. Provide new gaskets and fastening hardware for tank's existing appurtenances that were unfastened during the work.

B. Provide new screens and fastening hardware for tank's existing appurtenances that were unfastened during the work.

3.10 DISINFECTION

A. Disinfection of Water Contact Surfaces and Filling of Water Storage Tanks

1. Do not disinfect water contact surfaces or fill water storage tanks until application of coating systems is complete, coatings have fully cured, and field quality control inspection is complete.

2. Allow number of days in accordance with manufacturer's instructions and as directed by Engineer for full cure of coating systems on water contact surfaces before flushing, disinfecting, or filling with water.

3.11 REPAIR

A. Damaged Materials: Repair or replace damaged materials and surfaces not scheduled to be coated.

B. Damaged Coatings: Touch-up or repair damaged coatings. Touch-up of minor damage shall be acceptable where result is not visibly different from adjacent surfaces. Recoat entire surface where touch-up result is visibly different, either in sheen, texture, or color.

C. Coating Defects: Repair in accordance with manufacturer's instructions coatings that exhibit film characteristics or defects that would adversely affect performance or appearance of coating systems.

3.12 FIELD QUALITY CONTROL

A. Verify coatings and other materials are as specified.

B. Verify surface preparation and application is as specified.

C. Verify DFT of each coat and total DFT of each coating system are as specified using wet film and dry film gauges.

D. Coating Defects: Check coatings for film characteristics or defects that would adversely affect performance or appearance of coating systems.

1. Check for holidays on interior steel immersion surfaces using holiday detector.

E. Manufacturer's Field Services: Manufacturer's representative shall provide technical assistance and guidance for surface preparation and application of coating systems:

3.13 CLEANING

A. Remove temporary coverings and protection of surrounding areas and surfaces.

3.14 PROTECTION OF COATING SYSTEMS

A. Protect surfaces of coating systems from damage during construction.

3.15 TWO-YEAR INSPECTION

A. Owner will set date for two-year inspection of coating systems.

B. Inspection shall be attended by City, Contractor, Inspector and manufacturer's representative.

C. Repair deficiencies in coating systems as determined by Engineer in accordance with manufacturer's instructions.

END OF SECTION

SECTION 16050

BASIC ELECTRICAL MATERIALS AND METHODS

PART 1 GENERAL

1.01 SECTION INCLUDES

A. Junction and pull boxes used at, or below grade.

B. Device plates and decorative box covers.

C. Metal and Liquidtight conduit.

D. Building wire and cable.

E. Wiring connectors and connections.

1.02 REFERENCES

A. NECA Standard of Installation (published by the National Electrical Contractors Association).

B. NEMA AB1 - Molded Case Circuit Breakers.

C. NEMA WD 1 – General Requirements for wiring Devices.

D. NEMA WD 6 – Wiring Device – Dimensional Requirements.

E. NETA ATS - Acceptance Testing Specifications for Electrical Power Distribution Equipment (published by the International Electrical Testing Association).

F. ANSI/NFPA 70 - National Electrical Code.

G. ANSI C80.1 – Rigid Steel Conduit, Zinc Coated.

H. ANSI/NEMA FB 1 – Fittings, Cast Metal Boxes, and Conduit Bodies for Conduit and Cable Assemblies.

1.03 SUBMITTALS FOR REVIEW AND INFORMATION

A. Section 01300 - Submittals: Procedures for submittals and information.

B. Submit manufacturer's installation instructions. Indicate application conditions and limitations of use stipulated by Product testing agency specified under Regulatory Requirements. Include instructions for storage, handling, protection, examination, preparation, and installation of Product.

C. Upon project completion, record actual circuiting arrangements in project record documents and update panelboard directories to reflect new loads.

1.04 QUALIFICATIONS

A. Manufacturer: Company specializing in manufacturing the Products specified in this section with minimum three years documented experience.

1.05 REGULATORY REQUIREMENTS

A. Conform to requirements of NFPA 70.

B. Products: Listed and classified by Underwriters Laboratories, Inc. or testing firm acceptable to the authority having jurisdiction as suitable for the purpose specified and indicated. Approval by local authority shall be documented prior to submittal.

PART 2 PRODUCTS

2.01 INSTRUMENTATION

A. Conductivity Sensor:

1. The Contractor shall furnish and install two (2) new solid-state suspended probe-type conductivity sensors at the top of the Greenfield Tank; manufactured by Warrick or approved equal. The sensors shall be used to detect HI and HI HI water levels in the storage tank and activate relay contact outputs to the Milwaukee Water works SCADA system for alarming. Both sensors shall utilize the same single, stainless steel threaded probe fitting, and which shall be equipped with two (2) stainless steel suspended probes, probe adapters, and suspension cable. Two (2), required solid-state control modules shall be housed in one NEMA 4, stainless steel housing to be mounted on top of the tank. New level sensing equipment shall be rated 120VAC, 60 Hz.

2. The Contractor shall verify the required size and number of bosses with the manufacturer, prior to installation.

2.02 OUTLET BOXES

A. Sheet Metal Outlet Boxes: NEMA OS 1, galvanized steel.

1. Wiring devices mounted inside of panels shall be NEMA OS 1, galvanized steel. Cover Plates: As specified in Section 16140.

B. Cast boxes: NEMA FB 1, Type FD, cast feralloy. Provide gasketed cover, by box manufacturer, and threaded hubs.

2.03 PULL AND JUNCTION BOXES

A. Cast Boxes: NEMA 250, Type 4, feralloy, flat-flanged for surface mounting. Boxes shall be galvanized cast iron with neoprene gasketed cover and stainless steel cover screws.

B. All contractor fabricated boxes shall be stainless steel.

2.04 WIRING DEVICES

A. Receptacles

1. Manufacturer: Hubbell, Cooper Crouse-Hinds, approved equal.

2. Description: NEMA WD 1, heavy-duty, specification grade, general use, receptacle with cover.

3. Configuration: NEMA WD 6, type as specified and indicated.

4. GFCI Receptacle and cover plate: Convenience receptacle with integral ground fault circuit interrupter to meet regulatory requirements, Type 5-20R, Hubbell Model GFR8300.

2.05 NAMEPLATES AND LABELS

A. Nameplates: Engraved three layer laminated plastic, ¼ inch white letters on black background.

B. Locations:

1. Each electrical distribution and control equipment enclosure.

2. Communication cabinets.

C. Letter Size: Use 1/4 inch letters for identifying grouped equipment and loads.

D. Labels: Embossed adhesive tape, with 3/16 inch (5 mm) white letters on black

background. Use only for identification of individual wall switches and receptacles, control device stations, which shall include panel and circuit number.

2.06 WIRE MARKERS

A. Manufacturers: 3M, or approved equal.

B. Description: Cloth, tape, split sleeve, or tubing type wire markers.

C. Locations: Each conductor at panelboard gutters, pull boxes, outlets, junction boxes, and each load connection.

D. Legend:

1. Power and Lighting Circuits: Branch circuit or feeder number.

2. Control Circuits: Control wire number indicated as indicated on schematic and interconnection diagrams or equipment manufacturer's shop drawings for control wiring shop drawings.

2.07 CONDUIT REQUIREMENTS

A. Minimum Size: ¾ inch unless otherwise specified.

B. Underground and Outdoor Installations: Use heavy wall, galvanized, rigid steel conduit.

C. Indoor Installations: Use heavy wall, galvanized, rigid steel conduit or intermediate steel, metal conduit.

D. Liquidtight Flexible Metal Conduit: Use in all areas for flexible connections.

E. Support conduit using coated steel or malleable iron straps, lay-in adjustable hangers, clevis hangers, and split hangers and fasten conduit supports to building structure and surfaces, grouping related conduits.

F. Fasten conduit to concrete structural members using expansion anchors or preset inserts. Fasten conduit to concrete surfaces using expansion anchors or self-drilling anchors. All materials shall be corrosion resistant.

2.08 CONDUCTORS 600 VOLTS AND BELOW

A. Conform to applicable requirements of NEMA WC 3, WC 5, and WC 7.

B. Conductor Type: Conductors No. 10 AWG and smaller: solid copper. All other circuits stranded copper.

C. Insulation Voltage Rating: 600 Volts.

D. Insulation: ANSI/NFPA 70; insulation shall be rated for use at 75 °C minimum, in dry and wet locations.

2.07 CABLE RATED 600 VOLTS

A. General:

1. Type: TC, meeting requirements of UL 1277, including Vertical Tray Flame Test at 20,000 BTU/hr, and NFPA 70, Article 340, or UL 13 Listed Power Limited Circuit Cable meeting requirements of NFPA 70, Article 725.

2. Permanently and legibly marked with manufacturer's name, maximum working voltage for which cable was tested, type of cable, and UL Listing mark.

3. Suitable for installation in open air, cable trays, or conduit.

4. Minimum Temperature Rating: 75° C in dry and wet locations.

5. Overall Outer Jacket: PVC flame-retardant, sunlight- and oil- resistant.

PART 3 EXECUTION

3.01 INSTALLATION

A. The Contractor shall remove exterior beacon and clearance lights, motor hoist, wet interior tank spotlights, convenience receptacle, and high level sensor and probes. The Contractor shall remove all abandoned conduit and wiring associated with this equipment, back to the panel.

B. The Contractor shall also furnish and install new level sensing equipment in the top of the tank and one new GFCI convenience receptacle; this equipment shall be fed from the same, existing power supply as the old one. The Contractor shall replace the existing probe control modules on the Instrumentation Panel located at the bottom of the bowl and shall run new power and control conduits and wiring from the panel location to the new probes and receptacle at the top of the tank. The Contractor shall reuse and reconnect the existing control wiring that runs from the Instrumentation panel at the bottom of the bowl to the SCADA equipment on the ground floor All abandoned conduit that has not been reused, and all abandoned wiring, shall be removed back to the panel.

C. All work and material installation shall be performed in a neat and workmanlike manner in keeping with the best practices of the trade and in accordance with: NFPA 70, NECA "Standard of Installation", and all other governing codes.

D. Update panelboard circuit directory for each branch circuit.

E. Equipment ground shall originate at panelboard ground bus and shall be securely bonded to all switches and receptacle boxes and electrical equipment enclosures to ensure continuous system ground in accordance with applicable sections of NFPA 70.

F. Install receptacles with grounding pole on top.

G. Connect wiring device grounding terminal to branch circuit equipment grounding conductor.

H. Install weatherproof plates on switches, receptacles, and blank outlets.

I. Coordinate mounting of equipment and outlet boxes with Field Engineer for exact locations and mounting heights.

J. Conduit shall be run parallel and perpendicular to walls inside building, maintaining adequate head room; ground and bond conduit, equipment and piping to meet all Regulatory Requirements.

K. Support conduit using coated steel or malleable iron straps, lay-in adjustable hangers, clevis hangers, and split hangers and fasten conduit supports to building structure and surfaces, grouping related conduits.

L. Provide separate, insulated equipment grounding conductor within each feeder and branch circuit raceway. Equipment ground shall originate at panelboard ground bus and shall be securely bonded to all switches and receptacle boxes and electrical equipment enclosures to ensure continuous system ground in accordance with applicable sections of NFPA 70. Terminate each end on suitable lug, bus, or bushing.

M. All wire and cable shall be installed in conduit. Do not use wire smaller than 12 AWG for power and lighting circuits, 14 AWG for control wiring. All conductors shall be sized to prevent excessive voltage drop at rated circuit ampacity. As a minimum use 10 AWG conductor for 20 ampere, 120 volt branch circuit home runs longer than 100 feet (30 m), and for 20 ampere, 277 volt branch circuit home runs longer than 200 feet (61 m).

N. Make conductor lengths for parallel conductors equal.

O. Splice only in junction or outlet boxes.

P. Neatly train & lace wiring inside boxes, equipment, and panelboards.

3.02 FIELD QUALITY CONTROL

A. Inspect and test in accordance with all applicable sections of NETA ATS.

B. Perform inspections and tests listed in NETA ATS, Section 7.4 for switches, Section 7.5 for circuit breakers.

C. Inspect each wiring device for defects.

D. Operate each wall switch with circuit energized and verify proper operation.

E. Verify that each receptacle is energized.

F. Test each receptacle device for proper polarity.

G. Test each GFCI receptacle device for proper operation.

H. Adjust devices and wall plates to be flush and level.

END OF SECTION

SECTION 16600

CATHODIC PROTECTION

PART 1 GENERAL

1.01 SUMMARY

A. Section Includes:

1. Cathodic Protection for Water Storage Tank: Automatically controlled impressed current cathodic protection system to provide corrosion control for the interior submerged surface of tank.

B. Related Sections

1. Section 09960 - Coating Systems for Water Storage Tanks.

1.02 REFERENCES

A. American Water Works Association (AWWA) Standard D 104.

B. American National Standards Institute/National Science Foundation (ANSI/NSF) 61.

1.03 SUBMITTALS

A. Submit under provisions of Section 01010 - Summary of Work.

B. Product Data:

1. Submit manufacturer's descriptive literature and product specifications for each system component. Literature shall include a copy of ANSI/NSF 61 classification for system components located within the tank and riser.

C. Design calculations for required voltage, amperage and life expectancy.

D. Shop Drawings:

1. Submit drawings showing system design/configuration.

E. Designer's NACE International certification.

1.04 PROJECT RECORD DOCUMENTS

A. Submit under provisions of Section 01700 – Contract Closeout.

B. As-built drawings.

1.05 OPERATION AND MAINTENANCE DATA

A. Submit under provisions of Section 01700 – Contract Closeout.

B. Owners Maintenance Manual.

C. Report Cards: Two (2) year supply of self-addressed report cards.

1.06 QUALITY ASSURANCE

A. Manufacturer Qualifications: Company with a minimum five (5) years experience in manufacturing products specified in this Section.

B. Designer Qualifications: Designer shall be accredited by NACE International as a Senior Corrosion Technologist, Corrosion Specialist or Cathodic Protection Specialist. The designer shall have designed a minimum ten (10) projects that are similar to the specified tank.

C. Installer Qualifications: A minimum of five (5) years experience installing and servicing the types of systems described in this specification. Installer shall be trained by the manufacturer and approved by the manufacturer to install and service their products.

D. Work shall be in accordance with AWWA Standard D104 and ANSI/NSF 61.

1.07 PRE-INSTALLATION MEETING

A. Conduct pre-installation meeting in accordance with Section 01039 - Coordination and Meetings.

1.08 DELIVERY, STORAGE AND HANDLING

A. Comply with requirements of Section 01600 - Material and Equipment.

1.09 MONITORING

A. Once a month, City will furnish Report Cards with requested information entered on the cards and send them to cathodic protection manufacturer.

B. Cathodic protection manufacturer shall evaluate system performance based on entered information. Information requested on Report Card shall include:

1. System Voltage

2. Current Main: Actual Potential and Set Potential

3. Current Auxiliary: Actual Potential and Set Potential

4. Checking fuses

5. Status of indicator lights

6. Approximate water level in tank.

C. Cathodic protection manufacturer shall evaluate system performance once a month during the guarantee period.

1.10 GUARANTEE

A. Comply with provisions of Section 01010 - Summary of Work.

B. Guarantee installed system to be free from defects in material and workmanship for one (1) year after the system is energized.

C. Guarantee period shall commence immediately after the coating contractor's warranty has expired. The cathodic protection system will be energized after the coating contractor's warranty expires.

PART 2 PRODUCTS

2.01 MANUFACTURERS

A. Acceptable Manufacturers:

1. Corrpro Waterworks; Medina, Ohio

2. Equal

B. Substitutions: Under provisions of Section 01600 - Material and Equipment.

2.02 DESIGN

A. Criteria for protection shall be based on a tank-to-water potential, IR drop free, within a range of -0.850 volts to -1.050 volts relative to a stationary copper-copper sulfate

reference electrode. The potential shall be measured free of the effect of voltage gradients (IR drop).

B. System capacity and performance shall also be based on:

1. Total submerged surface area of the tank. (includes area up to high water line within tank bowl and wet risers in elevated tanks which are 30” in diameter or larger).

2. Type of coating and condition of coating.

3. Total bare surface area to be protected will be a minimum of 25% of total surface area.

4. Minimum current density of 0.5 MA/ft.^{2} bare surface area.

5. Chemical analysis of water including resistivity expressed in ohm-cm.

6. Susceptibility of tank to icing conditions.

7. Minimum anode design life of twenty (20) years.

8. Selection, dimensions, and layout of system components.

2.03 COMPONENTS

A. General: Materials in contact with the water or exposed to the interior of the tank shall be classified in accordance with ANSI/NSF 61 "Drinking Water System Components."

B. Rectifier: The rectifier unit shall perform in accordance with ANSI/AWWA Standard D104 and shall include:

1. Transformer

2. Silicon rectifying elements

3. Circuit Breaker(s)

4. Lighting, surge and overload protection

5. Provision for air-cooling operation

6. Digital voltmeter(s), ammeter(s) and potential meter(s)

7. Provision to vary current output from 0% to 100% of rated capacity

8. Provisions for mounting, grounding, and locking

9. Provision for 110-120 volt, 60 Hz, single phase A.C. power.

10. D.C. output capacity in volts and amperes in accordance with Design.

11. Number of circuits in accordance with Design.

12. Automatic controller shall adjust current output to compensate for changes in water level, temperature of water, water chemistry, and cathodic polarization, and shall include the following provisions:

    a) Utilize reference electrode(s) installed within the tank.

    b) Monitor the tank-to-water potential, free of IR drop.

    c) Automatically adjust the tank-to-water potential, free of IR drop, to a preset value.

    d) Operate within 25MV of preset value.

    e) Limit current to a preset value.

    f) Utilize digital potential meter(s) to display tank-to-water potential, free of IR drop.

C. Reference Electrodes

1. The permanent reference electrode shall consist of a copper-copper sulfate electrode which is manufactured to remain stable (plus or minus 10MV) for minimum of ten (10) years.

2. The reference electrode to lead wire connection shall be encapsulated to prevent water migration.

3. The stationary reference electrode shall be positioned within the tank to provide the most representative measurements for the submerged surface area(s).

D. Horizontal Anode Suspension System

1. The anode suspension system shall be designed to be resistant to ice damage and in accordance with ANSI/AWWA Standard D104, Section 4.2.4.1.1 Type A, Horizontal System.

2. The anode suspension system shall consist of a minimum 5/16" polyester cord. The cord shall be secured to steel anchors welded to the side wall and/or floor of the tank bowl.

3. The wet riser shall incorporate an anode suspension system with the steel anchors welded to the sidewall of the riser pipe. All cord to cord connections shall be tied and taped.

E. Anode Materials

1. The anode materials shall be selected in accordance with Design and shall consist of one of the following:

   a) Minimum .062" diameter titanium with a mixed metal oxide coating.

   b) Minimum .062” diameter platinized niobium with 25 micro-inches of platinum.

2. Anode to header cable connections shall be sealed to prevent water migration.

F. Pressure Entrance Fitting

1. The pressure entrance fitting shall accommodate anode and reference electrode lead wires at the base of wet riser.

2. The fitting shall be manufactured to prevent leakage through the fitting and to prevent water migration through the wire insulation.

3. The pressure entrance fitting shall be sized for minimum of 1.0 inch NPT, 3000 p.s.i. steel coupling.

G. Wiring

1. Wiring within the tank shall be insulated to prevent copper conductor to water contact.

2. Wiring on the exterior of the tank shall be insulated and run in rigid conduit.

H. Hardware

1. Hardware used in conjunction with the system shall be protected against corrosion.

PART 3 EXECUTION

3.01 EXAMINATION

A. Verify that tank surfaces and project conditions are ready to receive work of this section.

3.02 PREPARATION

A. Welding and cutting for the cathodic protection system shall be done prior to abrasive blasting and coating of the tank.

3.03 INSTALLATION

A. Install in accordance with the following requirements and approved shop drawings.

1. Components of the cathodic protection system shall be installed in the manner and at the locations as shown on the design drawings prepared by the Designer.

2. Pressure entrance fitting shall be installed in accordance with AWWA D100.

3. Welding, cutting, and coating shall be in accordance with AWWA Standards D100, D102 and D105.

4. Welding of steel coupling and anchors for horizontal anode suspension and rectifier mounting bracket shall be performed prior to coating the tank.

5. Materials and equipment shall be inspected prior to installation. Any defective component shall be repaired or replaced.

6. Lead wires shall be installed to prevent damage from abrasion.

7. Electrical connections within the tank shall be sealed to prevent water migration.

8. The rectifier shall be mounted at a convenient height (eye level) above grade for monitoring and service purposes.

9. AC power to the rectifier shall be furnished by the City.

10. Work provided by the Installer shall be completed in a clean and safe manner.

3.04 ENERGIZING THE SYSTEM

A. After the system is installed and the tank is filled, the cathodic protection constructor shall provide start-up service which includes energizing, testing, and adjusting the system for optimum performance of the cathodic protection system. After the start-up service has been completed, the system shall be de-energized until the coating contractor's warranty has expired.

B. Start-up service shall be in performed in accordance with ANSI/AWWA D104 Section 5.2 Testing.

C. Start-up service shall be coordinated with the City.

D. Tank-to-water potential measurements shall be conducted with a calibrated portable copper-copper sulfate reference electrode and a portable high impedance voltmeter. A minimum of five (5) locations shall be measured. All test data shall be reviewed and evaluated by the Designer

E. The final test and adjustment of the system shall be conducted approximately twenty four (24) months after the start-up service. In addition to the start-up service, "as-built" drawings and an Owners Maintenance Manual shall be submitted to the City.

3.05 CLEANING

A. Clean as recommended by manufacturer. Do not use materials or methods, which may damage finish or surrounding construction.

END OF SECTION