



IRS

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TECHNICAL SPECIFICATIONS

for

ASPHALT OVERLAY & CONCRETE INSTALLATION

PRE-TRIAL FACILITY

IRS JOB# 18112

Located at

927 54TH STREET

in

KENOSHA, WISCONSIN

Prepared for

Mr. Matt Sturino
Facilities Manager

Kenosha County DPW
912 56th Street
Kenosha, Wisconsin 53140

February 27, 2023

00 01 10

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01 11 00

SUMMARY OF WORK**PART 1 - GENERAL****1.01 PROJECT OVERVIEW**

- A. The Work consists of asphalt overlay and concrete installation at the Pre-Trial Facility in Kenosha, Wisconsin for Kenosha County DPW. Work areas as shown in the Construction Drawings:
1. **Area A**
 - a. Asphalt overlay
 2. **Area B**
 - a. Isolated cutting and patching of existing pavement prior to overlay
 3. **Area C**
 - a. Installation of concrete collar around one (1) existing storm inlet
- B. The work also includes:
1. Removal and reinstallation of walls of the existing wood dumpster enclosure/fence, between permanent vertical posts, as needed to complete the work.
 2. Cleaning and repainting the existing yellow bollards at garage door entrances within the work area.
 3. Installation of new handicap parking signage, as shown in the drawings.
- C. Restoration of any damaged landscaping and/or adjustment of grades to accommodate a change in pavement grade is incidental to the contract. DS-75 erosion control blanket or equivalent and seed to be used in restoration. Topsoil is to be installed to encourage seed growth. Maximum slope of affected areas to be 1v:5h. Watering of new seed is required for 2 weeks to establish growth.
- D. Contractor is responsible for avoiding underground apparatuses, including but not limited to: street light wire, lawn irrigation facilities, etc. Any damaged apparatuses are the Contractors responsibility and cost to repair. Location of all utilities including private utilities is the contractor's responsibility. Costs for private utility locates are the Contractors responsibility.
- E. The Contractor is responsible for cleaning and returning any affected components around the site to their original condition after completion of the work.
- F. The Owner will not be responsible for any work associated with this project.

PART 2 - PRODUCTS**2.01 SYSTEM COMPONENTS**

- A. Asphaltic concrete pavement
- B. Tack Coat
- C. Concrete extension rings
- D. 4000 PSI Portland cement concrete pavement
- E. Epoxy coated rebar
- F. Sealant

- G. Sealant Primer
- H. Closed Cell Expansion Joint Filler
- I. Striping Paint

2.02 COMPONENTS SUPPLIED BY OWNER

- A. None.

PART 3 - EXECUTION

3.01 WORK PERFORMED BY CONTRACTOR

- A. **Asphalt overlay (AREA A)**
 - 1. Examine existing asphalt pavement to identify any areas that require milling/modification to ensure the proposed overlay will drain properly and accommodate 1-1/2" of new asphalt. All efforts must be made to maintain a slope minimum of 1.0%. Deviation from the 1.0% minimum may be allowed once the cut sheets submitted by the Contractor have been approved by the Consultant.
 - 2. Mill/remove existing pavements along fixed elevations (adjacent building, adjacent sidewalk, etc...) as required, as needed to maintain a minimum 1.5" overlay, positive drainage of min 1.0%, and a smooth transition from existing pavement to overlaid pavement.
 - 3. At overlay terminations, mill pavement from 0" to a depth of 1.5" over a distance of 4' – 8', depending upon grade at terminations.
 - 4. Existing catch basins, manholes, valve boxes, etc. are to be adjusted as necessary to accommodate the new grade. Adjustment is to include new concrete adjustment rings, if necessary.
 - 5. Sweep and tack coat the entire surface to be overlaid.
 - 6. Provide 1-1/2" (compacted thickness) of asphaltic pavement surface course over the existing pavement.
 - 7. Restripe per the layout as indicated in the construction drawings. Two (2) coats of paint required. Confirm striping layout plan and color with Owner prior to execution.
- B. **Isolated cutting and patching (AREA B) (to be completed prior to the overlay)**
 - 1. Inspect and prepare existing asphalt with consultant oversight.
 - 2. Remediate failing areas at the direction of the consultant as outlined below.
 - a. **The contractor is to include 2,000 square feet worth of cutting and patching in their base bid.**
 - 1) Reduction or additional remediation, if necessary, will be considered on a unit price basis.
 - b. In the areas identified by the Consultant, complete the following work prior to the overlay:
 - 1) Saw cut existing pavement at full depth to leave a straight, vertical cut against which asphalt will be placed.
 - 2) Mill the existing asphalt to a depth of 4" and dispose of material properly offsite.
 - 3) Replace removed material with 4" inches asphaltic concrete binder course, installed in two (2) 2" lifts
- C. **Install concrete collar around north inlet (AREA C)**
 - 1. In the area identified in the drawings, around the north inlet, remove existing asphalt pavement and dispose of properly off site. Saw-cut perimeter at full depth to leave a straight, vertical cut.

2. Before preparing the stone subgrade, where shown in the drawings, install two (2) 4-foot bleeder drains to allow drainage of the existing stone subgrade, below the new collar, into the existing catch basin.
 - a. Create 12"x12" trench in existing subgrade, extending 4' out from the catch basin.
 - b. Install 4' drain tile (4" corrugated pipe with geotextile filter sock) within the trench, that will allow any water within the stone subgrade to drain into the catch basin.
 - c. Seal drain tile to catch basin with appropriate material.
 - d. Cover drain tile with stone.
3. Grade and compact the existing stone subgrade to accommodate the new concrete collar. All efforts must be made to maintain 2% minimum slope. Deviation from the 2% minimum may be allowed once cut sheets submitted by the contractor have been approved by the Consultant.
4. If needed, adjust existing catch basins inlet as necessary to accommodate the new grade. Adjustment is to include new concrete adjustment rings, if necessary.
5. Install new concrete collar, per city requirements, and as shown in the Construction Drawings.

3.02 INCLUSIONS

- A. The Contractor shall include, in his bid, all costs incurred in complying with the intent of the Construction Drawings.

END OF SECTION

01 25 00

APPLICATIONS FOR PAYMENT**PART 1 - GENERAL****1.01 DESCRIPTION**

- A. This section describes the procedures and submittal requirements regarding Unit Pricing, Change Orders, and Application for Payment requests to the Owner.

1.02 PROGRESS PAYMENTS

- A. Unit Pricing:
1. The Unit Pricing submitted by the Contractor shall be considered fixed and inclusive of its purchase, installation, overhead expenses, and profit.
 2. Units of measurement shall be as described on the Bid Form:
 - a. Dollars per square foot.
 - b. Dollars per square yard.
 3. The Contractor shall obtain written approval, on the Unit Pricing forms provided by or acceptable to the Consultant, by the signature of the Consultant or an authorized on-site representative of the Owner, for each day's quantity of completed work affected by unit pricing.
 4. The Contractor shall accumulate the completed Unit Pricing forms and submit them to the Consultant, weekly, in conjunction with a completed Change Order form totaling the cost of the approved Unit Pricing.
 5. If proper approval of Unit Pricing is not obtained, the Owner reserves the right to reject the Contractor's measurement of Unit Pricing work-in-place and to have the Work measured by the Consultant, or an independent surveyor acceptable to both the Owner and Contractor, at the Contractor's expense.
 6. Unit Pricing is intended to be used for small-scale areas of extra work. If the scope of the work covered by the unit pricing escalates, the Owner reserves the right to use the Contractor's time and materials (T&M) rate or negotiate a lump sum price in place of the Unit Pricing.
- B. Time and materials (T&M) pricing:
1. The Time & Material Rate submitted by the Contractor shall be considered fixed and inclusive of overhead and profit.
 2. Repair of latent defects or the execution of additional work for which unit prices were not submitted:
 - a. Dollars, per man-hour, for labor.
 - b. Percentage mark-up over purchase price for materials furnished.
- C. Change Orders:
1. The Contractor shall be responsible for initiating the request for Change Order, on the forms provided by or acceptable to the Consultant, to include:
 - a. A summary of the approved Unit Pricing (include copies of approved Unit Pricing forms), weekly.
 - b. A description of the approved change in the Work, within one (1) week of initiation.
 2. The Consultant will review the Change Order requests and forward them with his recommendation to the Owner; copies approved by the Consultant and Owner will be returned to the Contractor.
 3. The Contractor shall submit the approved Change Order forms in conjunction with an Application for Payment form, including the total of the approved Change Orders.

- 4. Change Orders shall be considered valid only if:
 - a. Submitted in writing on the proper Change Order form.
 - b. Approved by signatures of both the Consultant and the Owner.

D. Application for Payment:

- 1. The Contractor shall submit:
 - a. Completed Application for Payment, on standard AIA formats.
 - b. Contractor's original invoice.
 - c. Subcontractor's material and/or labor Waivers of Lien, where applicable, to match the amount requested.
 - d. Written justification for payment of materials, not in-place utilizing supplier invoices, bills of lading, Waivers of Lien, etc.
- 2. The Contractor shall submit Application for Payment, periodically as determined in the Agreement, to:

**Industrial Roofing Services, Inc.
13000 West Silver Spring Drive
Butler, WI 53007**

EMAIL – office@irsroof.com

- 3. The Consultant shall review the Application for Payment and either:
 - a. Approve the requested amount as a representation that the Work has progressed to the point indicated and, that to the best of his knowledge, information, and belief, the quality of the Work is per the Contract Documents, or;
 - b. Revise the amount requested to an amount for which he can make such representation to the Owner.
 - c. Notify the contractor in writing of the application's rejection due to error and/or incompleteness
- 4. Payments will be reviewed, approved, and submitted to the Owner with the Consultant's recommendations on a timely basis.

PART 2 - PRODUCTS

- A. Not Used.

PART 3 - EXECUTION

- A. Not Used.

END OF SECTION

01 30 00

ALTERNATES, ALLOWANCES, AND SUBSTITUTIONS**PART 1 - GENERAL****1.01 DESCRIPTION**

- A. This section identifies each voluntary and/or mandatory Alternate, by number, and describes the basic changes to be incorporated into the Work; only if that Alternate is made a part of the Work by acceptance by the Owner in the Agreement.
 - 1. A Mandatory Alternate Bid shall be in addition to the Base Bid. It may contain some or all aspects of the Base Bid, except those changes specifically described herein.
 - 2. An Alternate Bid shall be in place of the Base Bid. It shall contain all aspects of the Base Bid, except those changes specifically described herein.
 - 3. An Alternate Add or Alternate Deduct, as described herein, shall add work to, or deduct work from, the Base Bid.
- B. This section also includes the Contractor's options in selecting products or requesting the acceptance of substitute products.
- C. This section also specifies Allowances – monetary amounts (or materials) to be included in the Contractor's bid prices – which will be used to cover change orders, unit pricing, deteriorated material replacement, and/or other intangibles during the Work.

1.02 RELATED REQUIREMENTS

- A. Bidding Documents: Method of quotation for each Alternate, and the basis of the Owner's acceptance of Alternates.
- B. Referenced sections of these specifications, or drawing details, which stipulate the products and methods necessary to achieve the Work for each Alternate, as described below.
- C. Coordination of related work and modification of surrounding work of the Base Bid, as required to properly integrate the work of each Alternate, to provide the Work as required by the Contract Documents.

1.03 DESCRIPTION OF ALTERNATES

- A. None.

1.04 PRODUCT OPTIONS AND SUBSTITUTIONS

- A. Contractor's product options:
 - 1. If products are specified only by reference standard, any product which meets that standard, by any manufacturer, shall be used.
 - 2. If several products are specified by name or manufacturer, any of the listed products may be used.
 - 3. If only one product is specified by name or manufacturer, that product shall be used, or the Contractor shall submit a request for substitution, as specified below, for a product that meets or exceeds the quality standards of the listed product.
 - 4. If the product list is followed by "Approved equal", the Contractor may use any of the listed products or shall submit his "or equal" for consideration, following the substitution procedure, as specified below.
- B. Substitutions:

1. During the Bidding process, the Consultant may consider written requests from Bidders for substitute products in place of those specified. If the Consultant deems the substitute product to be worthy of approval, it will be incorporated as such into an Addendum to all Bidders. Requests for substitutions shall include data as listed below.
 2. Any Bidder who wishes to propose substitute products must nevertheless submit his Bid Price per the specifications. Failure to do so may result in the substitution being rejected without consideration. He shall then submit his substitute product, and corresponding bid adjustment amount, in conjunction with the Bid Form, on the form provided.
 3. After the Bid Opening but before Contract Award, the Consultant may consider the requests, submitted in conjunction with the Bid Form, from Bidders for substitute products in place of those specified. If the Owner deems the substitute product to be worthy of approval, it will be incorporated as such into the Agreement. Requests for substitutions shall include data as listed below.
 4. After Contract Award, the Consultant will consider written requests for "or equal" product substitutions in place of those specified. Such requests must be submitted with the product list submittals. Approval of the submittal package shall constitute the approval of proposed substitute products. Requests for substitutions shall include data listed below.
 5. Submit two (2) copies of the request form for each substitution, supported with complete data, drawings, and/or appropriate samples as necessary to show compliance with the intent of the Contract Documents, including:
 - a. Product description, performance, and test data, and applicable reference standards.
 - b. Name, address, date of installation, and Owner contact of similar projects on which the product was used.
 - c. Changes that are required in other elements of the Work as a result of the incorporation of the substitute product.
 - d. Effect on the anticipated construction schedule, if any.
 - e. Cost of incorporation of the proposed substitution regardless of whether the Contract Sum is affected or not.
- C. Contractor's representation: a request for substitution constitutes a representation that the Contractor:
1. Has investigated and determined that the proposed substitute product is equal or superior, in all respects, to the specified product.
 2. Will provide the same warranty as specified if substitute products are utilized.
 3. Will coordinate the incorporation of the proposed substitution in the Work
 4. Will modify other portions of the Work, as may be required, to complete the project per the intent of the Contract Documents.
 5. Waive all future claims for added costs to the Contract, over and above those approved by the Owner that may be caused by the use of the substitute product.
- D. Substitutions will not be considered if:
1. They are indicated or implied on shop drawings or product data submittals, except as described above.
 2. The substitute product is considered, in the opinion of the Consultant, to be outside of the general classifications of the specified product.
 3. Approval of the substitution would require substantial revisions to the Contract Documents.
- E. The contractor shall not order or install substitute products without Written Notice of Acceptance of the request for substitution by the Consultant and the Owner. Submission of the Substitution Request Form does not in any way constitute approval. If the substitution is not approved, the rejection shall be considered final and the Contractor shall furnish a specified product.

1.05 ALLOWANCES

1. None.

PART 2 - PRODUCTS

A. Not Used.

PART 3 - EXECUTION

A. Not Used.

END OF SECTION

01 31 19

PROJECT MEETINGS**PART 1 - GENERAL****1.01 DESCRIPTION**

- A. This section provides information regarding the Consultant's scheduled project meetings.

1.02 PRE-BID MEETING

- A. If applicable, a pre-bid meeting will be held, at the project site, at the time designated in 00 11 16 – "Invitation to Bid."
- B. Representatives of all prospective Bidders shall meet with the Consultant to review the existing conditions on the project site.
- C. The Consultant will, as a minimum, address the following items at the pre-bid meeting:
1. Introduction of key project personnel;
 2. The general project scope, including site walkover;
 3. The requirements of 00 21 13 – "Instructions to Bidders";
 4. The bid(s) to be included;
 5. The Bid due date;
 6. The Owner's intended project construction schedule;
 7. Required project warranties;
 8. Any special requirements;
 9. Anticipated construction facilities:
 - a. Use of the site and restrictions, if any;
 - b. Temporary services and controls.

1.03 PRE-CONSTRUCTION CONFERENCE

- A. Within ten (10) days after Consultants receipt and approval of required project submittals Contractor shall provide Consultant with written notice of his intent to start the work.
- B. Within ten (10) days after receipt of Contractors written notice of his intent to start the work Consultant will schedule a formal pre-construction conference to be held at the project site, at a time designated by the Consultant.
- C. Representatives of the Contractor and his subcontractors, including the project superintendent and foreman, shall attend the pre-construction conference with the Consultant and a representative of the Owner.
- D. The Consultant will, as a minimum, address the following items at the pre-construction meeting:
1. Designation of key personnel and their duties;
 2. The channels for project communication;
 3. Review of the Project Scope of Work;
 4. The anticipated project construction schedule, showing timeframe for the start and completion of each portion of the Work;
 5. Review of the material list (Contractor shall provide an updated list if changes were made from initial submittal);
 6. Review of sequencing for critical areas of the Work;
 7. The requirements for approving and processing of Unit Pricing and Change Orders;

8. Job site conditions and requirements:
 - a. Use of site and restrictions;
 - b. Temporary services and controls;
 - c. Existing facilities and maintenance of operation;
9. Notification procedures;
10. Expectations of the Owner and IRS;
11. Quality control of new work.

PART 2 - PRODUCTS

- A. Not Used.

PART 3 - EXECUTION

- A. Not Used.

END OF SECTION

01 33 00

SUBMITTAL PROCEDURES**PART 1 - GENERAL****1.01 DESCRIPTION**

- A. This section provides requirements for project submittals and guidelines for submittals, by the Contractor or his Subcontractor, of shop drawings and other submittals as requested in the Project Documents.

1.02 SUBMISSION REQUIREMENTS

- A. Submittals listed below shall be delivered to the Consultant as soon as possible after Contract Award, but no later than ten (10) days before Contractor's intent to start work, and/or a minimum of five (5) days before approval is needed to order materials.
- B. Required Submittal items:
1. Insurance Certificate: Original copy, with the Owner as the certificate holder and the Consultant (and any other entities specified) named as Additional Insureds.
 2. Performance and Payment Bonds: provide an original, sealed copy for the Owner.
 3. Materials: **List** of major products proposed for use, with the name of the manufacturer, trade name, or model number of product or materials (final list may be provided at the pre-construction meeting if changing between specified products). Submit product data sheets, printed information, installation instructions, catalog cuts, or material color charts.
 4. Safety Data Sheets: Provide copies of SDS for each product that will be brought on-site.
 5. Project Schedule: Provide a breakdown of the project schedule timetable by **each major portion** of the work. As a minimum, include start and completion dates for each required task.
 6. Schedule of Values: Provide a breakdown of the project cost by **each major portion** of the Work. **DO NOT** list only material and labor.
 7. Warranty: Submit a sample copy of the Contractor's two (2) year workmanship warranty.
 8. Project Contacts: Provide all necessary contact numbers (cellular, etc.) for key personnel involved in the project. Include an after-hours contact name and home telephone number in case of an emergency. Also provide subcontractors' names, addresses, contact names, and phone/fax numbers, if applicable.
 9. Permit: Submit a copy of the building permit. (contractor is responsible for obtaining and paying for building permit)

1.03 CONTRACTOR RESPONSIBILITIES

- A. The Contractor shall review the shop drawings, product data, and samples before submission. The Contractor shall initial, sign, or stamp the submittals to certify his review and acceptance.
- B. Verification of existing field measurements and conditions is the **SOLE** responsibility of the Contractor.
- C. The Contractor's responsibility for errors and omissions in submittals is not relieved by the Consultant's review or acceptance of submittals.
- D. Indicate, in the submittals, any deviations from the requirements of the Project Documents caused by acceptance of substitutions, negotiations with the Owner after the Bid, etc. Any changes to the Project Documents must be confirmed by written Change Order.

- E. The Contractor shall not begin work before receipt of the approved submittals from the Consultant.

1.04 DISTRIBUTION OF SUBMITTALS

- A. The Consultant will retain three (3) copies of approved or approved-as-noted submittals, two for IRS office use, and one for the Owner, and will return the remaining copies to the Contractor.
- B. The Contractor shall be responsible for distributing submittals that carry the Consultant's approval, as required for construction or fabrication, to the project superintendent, subcontractors, and material suppliers or distributors.

PART 2 - PRODUCTS

- A. Not Used.

PART 3 - EXECUTION

- A. Not Used.

END OF SECTION

01 40 00

QUALITY CONTROL**PART 1 - GENERAL****1.01 DESCRIPTION**

- A. This section provides requirements for the standards of quality for materials and workmanship for this project.

1.02 GENERAL

- A. The Contractor shall maintain quality control over his employees, suppliers, manufacturer's products, services, and site conditions to produce work of specified quality.

1.03 WORKMANSHIP

- A. Comply with recognized industry standards, except where specifications indicate more rigid standards or more precise workmanship.
- B. Perform the Work with personnel qualified to produce workmanship of specified quality.

1.04 APPLICATION QUALITY CONTROL

- A. The Contractor shall be experienced in all aspects of the type of work being performed.
- B. The Contractor shall, at all times, have a complete set of Project Documents, including specifications, drawings, SDS sheets and approved submittals for his use and reference, on the project site. The site superintendent shall produce these Project Documents upon request of either the Owner or the Consultant. Failure to do so will result in a violation of Item 1.06 of this Section.

1.05 TESTING SERVICES

- A. During the work, the Consultant may secure samples of materials being used and/or samples of the work in place at the project site. The samples will be submitted to an Independent Testing Laboratory for comparison with the specifications.
- B. Should it be determined by the Consultant that the materials and/or application rates being utilized do not meet the specification requirements; the Contractor shall pay for the services of the Independent Testing Laboratory to perform reviews, tests, and other services, including costs incurred by the Consultant.
 - 1. If test results prove that the material and/or work in place is not in compliance with the specifications, the Contractor shall be charged for all testing and other services, including costs incurred by the Consultant.
 - a. If the Work has been completed when test results are received, the Owner may charge the Contractor a penalty of up to twenty percent (20%) of the Contract price or require the Contractor to remove and replace the Work.
 - b. If only a portion of the Work has been completed when test results are received, the Owner may charge the Contractor a penalty in proportion to the amount completed or require the Contractor to remove and replace the Work. All remaining work shall be completed per the specifications.
- C. Testing services shall be performed following the requirements of governing authorities, industry, and specified standards.

- D. Reports shall be submitted to the Owner, in duplicate, giving observations and results of the tests, indicating compliance or non-compliance with specified standards and the Project Documents.

1.06 MANUFACTURER'S FIELD SERVICES

- A. Product Manufacturer(s) shall make available, upon request, qualified personnel to observe field conditions, conditions of surfaces and installation, and quality of workmanship.
- B. The product manufacturer shall make qualified personnel available to make necessary recommendations during the project and to perform a final review of the work if requested.
- C. The manufacturer's representative shall submit a copy of his written report to the Consultant, listing observations and recommendations.

1.07 CONSTRUCTION OBSERVATION

- A. Construction observation shall be conducted by the Consultant periodically, as determined by agreement with the Owner. If the Contractor is cited for non-compliance with the specifications during a site visit, all parties shall be notified with a copy of the observation report.
- B. If the Contractor is cited for the same non-compliance item twice, or any three items total, the Owner may employ the Consultant to provide more frequent observation or full-time observation, to ensure compliance with the Project Documents. The cost of these additional visits may be deducted, in whole or in part, from the Contractor's final contract amount.

PART 2 - PRODUCTS

- A. Not Used.

PART 3 PART 3 - EXECUTION

- A. Not Used.

END OF SECTION

01 50 00

SITE CONDITIONS AND CONTROLS**PART 1 - GENERAL****1.01 DESCRIPTION**

- A. This section provides requirements for the Contractor's operations at the project site, including the use of existing facilities and utilities, delivery, and storage of materials and equipment and controls affecting work operations.

1.02 SECURITY AND ACCESS

- A. Security: follow the Owner's procedures and requirements, as established during the pre-construction conference.
- B. Maintenance of access and operations:
 - 1. During the performance of the Work, the Owner shall continue to perform his normal operations in the building. The Contractor shall maintain access to Owner-occupied areas at all times.
 - 2. Schedule demolition and site work with the Owner in such a manner as to allow his normal operations to continue without interruption.
- C. Maintenance of existing services:
 - 1. The Contractor shall, during the performance of the Work, not adversely affect the temperature and humidity of the building interior; dust and debris shall be controlled to prevent interference with normal operations.
 - 2. Notify the Owner a minimum of three (3) days before each required interruption of mechanical or electrical services in the building. Such interruptions shall occur only when, and for the length of time, approved by the Owner.

1.03 MATERIAL STORAGE AND HANDLING

- A. Store materials on-site where specified in 01 60 00 - "Materials and Equipment." Do not use any portion of the building interior for storage, unless specifically approved by the Owner.
- B. Stored materials shall be available for review by the Owner or Consultant at all times.
- C. Handle all materials properly and in original cartons or containers to prevent damage. Provide for all necessary rigging of materials and equipment supplied to the project site.

1.04 SANITARY FACILITIES

- A. The Contractor shall provide adequate, temporary chemical toilets for use by his employees. The toilets shall be in place at the project site when the Work is commenced.
- B. Upon completion of the Work, remove these facilities and all traces thereof.

1.05 TEMPORARY WATER

- A. The Contractor shall make arrangements with the Owner for water as required during the performance of the Work.
- B. The Owner shall be responsible for the cost of the water supply.

- C. The Contractor shall be responsible for providing hoses necessary for conveyance.

1.06 TEMPORARY ELECTRICAL POWER

- A. The Contractor shall make arrangements for electrical service, as necessary for the completion of the Work, as established during the pre-construction conference.
- B. If the Owner agrees to provide access to electrical service, he shall pay all energy charges for power and/or lighting used by the Contractor.

1.07 ENVIRONMENTAL CONDITIONS

- A. Do not work in rain or snow, or the presence of visible precipitation.
- B. Do not install materials marked "Keep from Freezing" when daily temperatures are predicted to fall below 40°F.
- C. Do not perform masonry work unless the temperature is above 35°F and rising. Make provisions to protect masonry work from freezing for a period of forty-eight (48) hours after completion. Remove any masonry work that has been exposed to freezing within forty-eight (48) hours of completion.

1.08 DEBRIS REMOVAL

- A. Remove debris promptly from work areas each day. Do not allow piled debris to accumulate.
- B. All removed material, unless specifically noted for retention by the Owner, becomes the property of the Contractor.
- C. Do not allow debris to enter storm sewers, catch basins, etc.
- D. Provide at the site, before commencing removal of debris, a dumpster or dump truck to be located adjacent to the building as directed by the Owner.
- E. Protect the building surfaces at set-up and debris removal areas. Take all precautions necessary to prevent the scattering of debris during operations.
- F. Remove dumpster or dump truck from the premises when full and dispose of at approved dumping or refuse area.
- G. Upon job completion, dumpster or dump truck and set-up area protection shall be removed from premises. All spilled or scattered debris shall be cleaned up immediately.

1.09 PARKING FACILITIES

- A. The Owner shall provide vehicle parking assignments and/or restrictions for the Contractor to the extent established during the pre-construction conference.

1.10 CLEANING

- A. The Contractor shall remove all spillage, overspray, or collections of dust or debris, and repair any damage inflicted on Owner-occupied spaces during the Work.
- B. As soon as work for an area is complete, clean up all surfaces, remove equipment, materials, and debris, and restore to a condition suitable for use by the Owner as quickly as possible.

PART 2 - PRODUCTS

A. Not Used.

PART 3 - EXECUTION

A. Not Used.

END OF SECTION

01 60 00

MATERIALS AND EQUIPMENT**PART 1 - GENERAL****1.01 DESCRIPTION**

- A. This section includes general requirements for delivery, storage, and handling of products to be used in the Work.

1.02 GENERAL

- A. Materials to be incorporated into the Work:
1. Shall conform to applicable specifications and standards.
 2. Shall comply with the size, make, type, and quality specified or shall be substitute products as specifically approved, in writing, by the Consultant.
 3. Fabricated products:
 - a. Fabricate and assemble according to recognized industry standards.
 - b. Shall conform to the dimensions and configuration as shown or specified or per approved shop drawing submittals.
- B. Materials shall not be used for purposes other than those for which they are designed unless otherwise specified.

1.03 REUSE OF EXISTING MATERIALS

- A. Except as specifically indicated in the Construction Drawings or in 01 11 00 - "Summary of Work," materials and equipment removed from the existing construction shall not be utilized in the completed Work.
- B. Where materials and equipment are specifically indicated to be reused in the Work:
1. Use special care in removal, handling, storage, and reinstallation, to assure adequate and proper function in the completed Work.
 2. The Contractor shall be responsible for transportation, storage, and handling of products that require off-site storage, restoration, or renovation.

1.04 MANUFACTURER'S INSTRUCTIONS

- A. Where Project Documents require that the installation of work shall comply with the manufacturer's printed instructions, obtain and distribute copies of those instructions to all parties involved in the installation, including two copies to the Consultant.
1. Maintain one set of complete instructions at the project site until completion of the work.
 2. Include copies of the printed instructions with the appropriate Product Data submittal.
- B. Handle, install, connect, clean, condition, and adjust products in strict accordance with such instructions, and in conformity with specified requirements.
1. Should existing conditions or specified requirements conflict, in any way, with the manufacturer's instructions, request clarification from the Consultant. Failure to notify the Consultant shall be grounds for rejection of the completed work.
 2. Do not proceed with work without clear instructions.

1.05 TRANSPORTATION AND HANDLING

- A. Arrange for delivery of materials per construction schedules; coordinate to avoid conflict with the sequencing of the Work and conditions at the project site.
 - 1. When being transported to the project site by the Contractor, cover and protect materials in transit against the entrance of dirt and/or weather damage.
 - 2. Deliver materials in undamaged condition, in manufacturer's original containers or packaging, with identifying labels intact and legible.
 - 3. Immediately upon delivery, inspect shipments to assure compliance with requirements of the Project Documents and approved submittals, and to assure that materials are properly protected and undamaged.
- B. Handle all materials properly and in original cartons or containers to prevent damage.
- C. Provide equipment and personnel to handle materials using methods necessary to prevent soiling or damage to products or packaging.

1.06 STORAGE OF MATERIALS

- A. Stored materials shall be available for review by the Owner or Consultant at all times.
- B. Store rolled goods on ends only. Discard rolls that have been flattened, creased, or otherwise damaged.
- C. Do not use any portion of the building interior for storage, unless specifically approved by the Owner.
- D. Stack insulation and roll goods on pallets; neatly stack the wood on dunnage. Do not stack pallets.
- E. Completely cover the top and sides of materials with tarpaulin. Secure tarpaulin to prevent blow-off.
- F. Materials that, in the judgment of the Consultant, have been damaged, contaminated, or improperly stored shall be immediately removed from the project site and replaced with new materials.

PART 2 - PRODUCTS

- A. Not Used.

PART 3 - EXECUTION

- A. Not Used.

END OF SECTION

01 70 00

CONTRACT CLOSE-OUT AND WARRANTIES**PART 1 - GENERAL****1.01 DESCRIPTION**

- A. This section includes requirements for specific administrative procedures, close-out submittals, warranties and other forms to be used at the completion of the Work.

1.02 CLOSE-OUT PROCEDURES

- A. When the Contractor considers the Work complete, he shall submit **Written Notice** to the Consultant that:
1. He has reviewed the Project Documents and inspected the project for compliance with them;
 2. He certifies that the Work has been completed per the Project Documents; and
 3. He certifies that the project is complete, to his satisfaction, and is ready for the Final Review.
- B. The Consultant will perform the Final Review after receipt of the Contractor's **Written Notice** of project completion.
1. If the Consultant considers the Work to be complete and per the requirements of the Project Documents he shall notify the Contractor to produce the Contract Close-out submittals, as described below.
 2. If the Consultant considers the Work to be incomplete or not per the requirements of Project Documents:
 - a. He shall notify the Contractor, in writing, of the deficiencies.
 - b. The Contractor shall take immediate steps to remedy the identified deficiencies, and shall make the Work ready for re-review.
 - c. The Contractor shall submit a second **Written Notice** to the Consultant confirming that the identified deficiencies have been remedied.
 - d. The Consultant shall review the Work and, if complete, shall notify the Contractor to produce the Contract Close-out Submittals.
 3. Should the Consultant be required to perform a third review of the Work due to the failure of the Contractor to correct previously-identified deficiencies, the Owner may retain, from amounts of money due to the Contractor, such amount as necessary to compensate the Consultant for additional visits.

1.03 FINAL CLEANING

- A. Perform project clean-up before the Final Review:
1. Clean surfaces and drainage system free from foreign matter and debris.
 2. Remove all grease, mastics, adhesives, bitumen, or other foreign materials from sight-exposed exterior surfaces of the building.
 3. Repair, patch and touch up marred surfaces to match adjacent finishes.
 4. Remove all waste and surplus material, rubbish, and construction facilities from the project site.
 5. Repair the grounds and landscaping per 01 74 29 - "Grounds Repair."
 6. Before leaving the project site, conduct a thorough review of the work surfaces and all sight-exposed exterior surfaces in work areas, to verify that the entire Work is clean.

1.04 CLOSE-OUT SUBMITTALS AND WARRANTIES

- A. Guarantees, Warranties, and Bonds:
 - 1. The Contractor shall, upon project completion provide the following original warranty documents to the Consultant for the delivery to the Owner:
 - a. After the Consultant's acceptance, the Contractor shall deliver to the Consultant each manufacturer warranty required by individual Sections of the Project Specifications, to be effective once complete payment has been received by both the Contractor and material suppliers.
 - b. Contractors two (2) year workmanship warranty for labor and materials.
- B. Certification:
 - 1. Lien Waivers: The Contractor shall submit final Waivers of Lien including those from subcontractors, material suppliers, or any other parties that may have lien rights against the property of the Owner, including a list of those parties. All waivers of lien shall be verified and duly executed before submittal.
- C. Final Application for Payment:
 - 1. The Contractor shall submit a final Application for Payment form showing the remaining amount due.

1.05 CONTRACT CLOSE-OUT PACKAGE

- A. The Contractor shall submit the Contract Close-out package to the IRS Corporate Office per these requirements. The Consultant shall review the Contract Close-out Package for accuracy and completeness.
 - 1. Contract Close-out Packages that **are accurate, complete, and in proper form** shall be approved by Consultant and submitted to Owner on a timely basis.
 - 2. Contract Close-out Packages that **are not accurate, complete and in proper form**, Consultant shall notify Contractor of its rejection and cause the Package to be set aside for forty-five (45) days, after which time Consultant shall again review corrected Contract Close-out Package if received and if correct, shall approve the final payment and submit them to the Owner on a timely basis.

IRS CORPORATE OFFICE
Industrial Roofing Services, Inc.
13000 West Silver Spring Drive
Butler, Wisconsin 53007
c/o Kim Wesell office@irsroof.com

PART 2 - PRODUCTS

- A. Not Used.

PART 3 - EXECUTION

- A. Not Used.

END OF SECTION

01 74 29

GROUNDS REPAIR**PART 1 - GENERAL****1.01 DESCRIPTION**

- A. This section covers the removal, and replacement with like materials, of lawns, plantings, and pavement damaged by the Contractor during the performance of the Work.
- B. The cost of all repairs covered under this section shall be the **sole** responsibility of the Contractor. If the Contractor fails to make repairs to the Owner's satisfaction, the Owner reserves the right to retain, from amounts of money due to the Contractor, such amount as necessary to repair the grounds to their previous condition.

1.02 REQUIREMENTS

- A. Verify, with the Owner, at the pre-construction meeting, as to whether re-seeding will be acceptable for the repair of lawn areas; if not, areas shall be resodded.
- B. All plants and planting materials shall meet "Horticultural Standards" for the number one grade nursery stock as adopted by the American Association of Nurserymen.
- C. All plants and planting materials shall meet or exceed applicable regulatory requirements and inspections for plant disease and insect control.

1.03 WORK SEQUENCING

- A. Do not proceed with permanent replacements until after the Contractor has cleaned and vacated the project site.
- B. Replacement plantings and/or sod:
 - 1. Place plantings and/or sod within forty-eight (48) hours of cutting; protect and maintain during transit and storage on the site to prevent dry-out.
 - 2. All plantings and/or sod remaining unplaced on the site longer than forty-eight (48) hours, as well as any yellowing or otherwise discolored plantings and/or sod, shall be discarded.

1.04 WARRANTY

- A. The Contractor shall maintain and warrant all work performed under this section for ninety (90) days from the date of its completion. The Contractor shall be responsible for the correction of unsatisfactory landscaping materials or workmanship and shall repair such defects promptly upon notice, at no additional cost to the Owner.

PART 2 - PRODUCTS**2.01 ACCEPTABLE LAWN REPAIR PRODUCTS**

- A. Provide topsoil which is:
 - 1. Natural, friable, and characteristic of soil on the project site;
 - 2. Not extremely acidic nor alkaline, nor containing toxic substances;
 - 3. Free from the subsoil, clay lumps, stones, roots, debris, or other foreign objects;
 - 4. Contains 1/3, by volume, soil amendment – organic material, fortified with organic nitrogen.

- B. Provide fertilizer which is:
 - 1. Commercially-balanced 11-8-4 composition.
 - 2. Free-flowing to allow for mechanical spreading.

- C. Provide grass seed, if acceptable, which is:
 - 1. Free from noxious weeds, and recleaned;
 - 2. Grade A recent crop seed;
 - 3. Treated with appropriate fungicide at the time of mixing;
 - 4. In proportion, by weight:
 - a. Kentucky Bluegrass – 35%
 - b. Red Fescue – 20%
 - c. Hard Fescue – 20%
 - d. Improved Fine Perennial Ryegrass – 25%
 - 5. Covered with DS-75 erosion blanket or equivalent.

- D. Provide sod, if grass seed is not acceptable, which is:
 - 1. Well established, containing dense root systems;
 - 2. Exhibiting vigorous, healthy root growth;
 - 3. Free of noxious weeds, objectionable grasses, grubs, diseases, or injurious insects.

- E. Erosion Control Blanket:
 - 1. Manufacturer: North American Green or approved equivalent
 - 2. Model #: DS75 or approved equivalent
 - 3. Equivalent shall meet or exceed Type 1.C specification requirements established by the Erosion Control Technology Council

2.02 ACCEPTABLE PLANTING REPAIR PRODUCTS

- A. Provide trees and/or plants which are:
 - 1. Of the same species and size of growth to match those being replaced;
 - 2. Well established, containing dense root systems;
 - 3. Exhibiting vigorous, healthy root growth;
 - 4. Free of grubs, diseases, or injurious insects.

- B. Provide planting bed cover consisting of:
 - 1. Ground mulch chips;
 - 2. Shredded bark.

2.03 VEHICLE & PEDESTRIAN PAVEMENTS

- A. Asphalt pavement:
 - 1. Base course aggregate:
 - a. Crushed limestone (traffic-bond) or crushed concrete, containing no pieces over three-quarter (3/4) inch in greatest dimension, for base courses less than four (4) inches thick.
 - b. Crushed limestone, containing no pieces over one and one-half (1-1/2) inches in greatest dimension, for base courses over four (4) inches thick.
 - 2. Paving asphalt:
 - a. Shall comply with applicable sections of the State Highway Specifications for binder and surface-grade paving asphalt mixes.
 - b. Shall be hot, plant-mixed asphalt paving material; temperature shall be 290-320°F when leaving the plant and 280°F, minimum, at time of placement.

- B. Concrete pavement: Compressive strength shall achieve a minimum of 4000 psi in twenty-eight (28) days. Mix concrete materials following ASTM C94, to comply with the following:
1. Slump: three (3) inches, plus one (1) inch or minus one-half (1/2) inch.
 2. Air entrainment: Maximum five percent (5%) at the time of placement.
 3. Maximum aggregate size: ¾ inch.
 4. Minimum cement content: 440 lbs./cu. Yd.
 5. Maximum fly ash content: 100 lbs./cu. Yd.
 6. Maximum water-to-cementitious material ratio (W/C): 0.55.

PART 3 - EXECUTION

3.01 EXAMINATION

- A. Examine the project site and verify satisfactory conditions for the performance of the work.
- B. Notify the Owner and Consultant of pre-existing defects or conditions which may interfere with the requirements of this section. The absence of notice will constitute the Contractor's acceptance of the site.
- C. Verify the existence and location of underground utilities, water and gas lines, fire sprinkler systems, pavement heating devices, and lawn sprinkling systems.

3.02 PREPARATION

- A. Protect existing adjacent trees, plantings, lawns, and pavement before commencing repairs.
- B. Lawn replacement areas:
1. Fill ruts and depressions with topsoil. Work the soil to a depth of not less than three (3) inches with a rototiller.
 2. Remove stones, debris, and foreign objects larger than one (1) inch in diameter from the lawn repair area before seeding or sodding.
 3. Grade the repair area, thoroughly remove ridges and depressions, and make the area a smooth, continuous, firm plane that ensures proper drainage.
- C. Planting replacement areas:
1. Remove existing damaged trees, plants, or ground cover. Remove large root systems, stones, debris, or foreign objects larger than one (1) inch in diameter from the area before installation of new plantings.
 2. Remove the topsoil, to a depth of not less than three (3) inches, from an area not less than three (3) times the width of the root ball of the new planting.
 3. Dig a hole in the center of the prepared area:
 - a. For a one (1) gallon plant container, twelve (12) inches wide and deep.
 - b. For a five (5) gallon plant container, twenty (20) inches wide and deep.
 - c. For a fifteen (15) gallon plant container, thirty (30) inches wide and deep.
 - d. For larger trees, 1-1/2 times the root ball diameter wide and deep.

3.03 LAWN REPLACEMENT – SEEDING

- A. When preparations are complete, seed the repair area:
1. Sow the grass seed over the area with a mechanical seeder at the rate of five (5) pounds per thousand (1,000) square feet.
 2. Promptly after seeding, water until the soil is saturated to a depth of two (2) inches; apply water slowly to prevent erosion of the seedbed.
 3. Apply the specified fertilizer at the rate of seven (7) pounds per thousand (1,000) square feet; rake lightly into the soil.
 4. Covered with DS-75 erosion blanket or equivalent.
 5. Make arrangements to keep the seedbeds moist throughout the germination process.

3.04 LAWN REPLACEMENT – SODDING

- A. When preparations are complete, install sod:
1. Fit sod pieces tightly together so that no joint is visible, with alternate courses staggered. Compact sod to eliminate all air pockets, provide a true and even surface, and ensure knitting without displacement of sod or deformation of the surface of sodded areas.
 2. Fill cracks between sod pieces with screened topsoil following compaction.
 3. Excess soil shall be worked into the grass surface.
 4. Bury edges of sod pieces flush with adjacent soil.
 5. After the sod has been placed, water with a fine spray until the soil is saturated to a depth of two (2) inches.
 6. Make arrangements to keep the sod moist until it is rooted in place.

3.05 TREE, PLANT, AND GROUND COVER REPLACEMENT

- A. When preparations are complete, install planting:
1. Fill the bottom of the hole with a backfill mixture, consisting of three (3) parts soil (removed from the hole) and one (1) part soil amendment, to support the root ball so that the top of the ball is just above or equal to the existing grade for drainage.
 2. Place the root ball of the planting into the hole and adjust for height and position of the planting. Work excess soil to the sides for support of the root ball.
 3. Fill the remaining area of the hole with backfill mixture around the root ball; tamp firmly to eliminate all air pockets. When the hole is 2/3 full, thoroughly water the plant to saturate the soil.
 4. Fill the remainder of the area with topsoil and tamp into place until the surface is slightly sloping to the edge of the surrounding area.
 5. Remove excess soil from the area.
 6. Stake trees over four (4) feet high with a minimum of two (2) stakes and ties. Drive stakes a minimum of twelve (12) inches deep; protect trunk at the tree-tie location.
 7. Apply the specified planting bed cover to a minimum depth of two (2) inches, evenly spread over the entire area.
 8. Water with a fine spray to ensure that the soil is thoroughly saturated.
 9. Make arrangements to water the planting regularly until it is rooted in place.

3.06 PAVEMENT REPLACEMENT

- A. Removal and subgrade preparation:
1. Remove damaged areas of paving, as well as areas of unsound pavement and areas heavily stained with grease and oil.
 2. Cut edges to a straight, vertical edge of ½-inch or more, utilizing mechanical sawing. Excavate a minimum of six (6) inches below the existing, surrounding pavement surface, or as necessary to reach sound base material.
 3. Provide new aggregate subbase as required to fill within three (3) inches of existing, surrounding asphalt pavement surface or to within four (4) or six (6) inches of existing, surrounding concrete pavement surface, depending on slab thickness. Compact aggregate subbase to 95% density.
- B. Asphalt paving replacement:
1. Place the new asphalt paving material in two lifts:
 - a. The first lift shall be 2-1/2 inches, after compaction, binder-grade asphalt.
 - b. The second lift shall be 1-1/2 inches, after compaction, surface-grade asphalt.
 2. Spread material in a manner that requires minimal handling.
 3. After the material is placed, to the proper depth, roll until the surface is hard, smooth, unyielding, and true to the specified thickness and elevation of the existing, surrounding asphalt pavement.
 4. Roll surface layer in at least two directions until no roller marks are visible.

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5. Finish paving surface shall be free from “birdbaths,” with no variations of more than 1/8-inch in six (6) feet.
 6. Seal the interface of the existing pavement with hot rubberized crack filler to prevent water infiltration.
- C. Concrete paving replacement:
1. Place wooden forms where necessary, staked into the ground, to provide straight and true edges for new pavement.
 2. Dampen the subgrade material before placing concrete.
 3. Pour concrete over the prepared subgrade. Tamp the freshly-placed concrete, using a heavy tamper, until at least 3/8-inch of mortar is brought to the surface.
 4. Trowel surface and screed with a straightedge until depressions and irregularities are worked out and the surface is true to specified thickness and elevation of the existing, surrounding concrete pavement.
 5. Float surface to a compact, smooth surface.
 6. When the concrete has set sufficiently, provide a non-slip, “broomed” surface finish.

END OF SECTION

32 12 16

ASPHALT PAVING**PART 1 - GENERAL****1.01 RELATED DOCUMENTS**

- A. Drawings and general provisions of the Contract including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

1.02 SUMMARY

- A. Section Includes:
1. Cold milling of existing hot-mix asphalt pavement.
 2. Hot-mix asphalt patching
 3. Hot-mix asphalt paving overlay.
 4. Pavement-marking paint.

1.03 REFERENCES

- A. ASTM International
- | | |
|--------------|--|
| D242/D242M | Standard Specification for Mineral Filler for Bituminous Paving Mixtures |
| D692/D692M | Standard Specification for Coarse Aggregate for Bituminous Paving Mixtures |
| D946/D946M | Standard Specification for Penetration-Graded Asphalt Cement for Use in Pavement Construction |
| D977 | Standard Specification for Emulsified Asphalt |
| D1073 | Standard Specification for Fine Aggregate for Asphalt Paving Mixtures |
| D1188 | Standard Test Method for Bulk Specific Gravity and Density of Compacted Bituminous Mixtures Using Coated Samples |
| D2041/D2041M | Standard Test Method for Theoretical Maximum Specific Gravity and Density of Bituminous Paving Mixtures |
| D2397/D2397M | Standard Specification for Cationic Emulsified Asphalt |
| D2726/D2726M | Standard Test Method for Bulk Specific Gravity and Density of Non-Absorptive Compacted Asphalt Mixtures |
| D3381/D3381M | Standard Specification for Viscosity-Graded Asphalt Binder for Use in Pavement Construction |
| D3666 | Standard Specifications for Minimum Requirements for Agencies Testing and Inspecting Road and Paving Materials |
| D6690 | Standard Specification for Joint and Crack Sealants, Hot-Applied, for Concrete and Asphalt Pavements |
| D8118b | Standard Terminology Relating to Materials for Roads and Pavements |

- B. Wisconsin Department of Transportation (WisDOT)
Standard Specifications for Highway and Structure Construction (SSHSC)
- C. Wisconsin Asphalt Paving Association (WAPA) http://www.wispave.org/wp-content/uploads/dlm_uploads/Asphalt-Bid-Mix-Specifications-Tear-off-Quick-Reference-Card.pdf
- D. Asphalt Institute (AI)
 - AI MS-2 Mix Design Methods for Asphalt Concrete and Other Hot-Mix Types
 - AI MS-22 Construction of Quality Hot Mix Asphalt Pavements
- E. American Association of State Highway Transportation Officials (AASHTO)
 - M 320 Standard Specification for Performance-Graded Asphalt Binder
 - M 248 Standard Specification for Ready-Mixed White and Yellow Traffic Paints

1.04 SUBMITTALS

- A. Submit under provisions of 01 30 00 – Submittal Procedures.
- B. Product Data: For each type of product indicated. Include technical data and tested physical and performance properties.
 - 1. Job-Mix Designs: Certification, by authorities having jurisdiction, of approval of each job mix proposed for Work.
 - 2. Comply with WisDOT criteria for information to be included in mix design.
 - 3. Mix design shall correspond to materials delivered to site and based on testing of materials produced on the same date as those delivered to site.
- C. Qualification Data: For qualified manufacturer and installer.
- D. Material Certificates: For each paving material, signed by manufacturer.

1.05 QUALITY ASSURANCE

- A. Manufacturer Qualifications: The paving-mix manufacturer must be registered with and approved by WisDOT.
- B. Testing Agency Qualifications: Qualified according to ASTM D3666 for testing indicated.
- C. Regulatory Requirements: Comply with materials, workmanship, and other applicable requirements of WisDOT (SSHSC) for asphalt paving work.
 - 1. Measurement and payment provisions and safety program submittals included in standard specifications do not apply to this Section.
- D. Asphalt-Paving Publication: Comply with WisDOT, unless more stringent requirements are indicated.
- E. Preinstallation Conference: Conduct conference at Project Site.
 - 1. Review methods and procedures related to hot-mix asphalt paving including, but not limited to, the following:
 - a. Review condition of subgrade and preparatory work.
 - b. Review requirements for protecting paving work, including restriction of traffic during installation period and for remainder of construction period.

1.06 DELIVERY, STORAGE, AND HANDLING

- A. Deliver pavement-marking materials to Project site in original packages with seals unbroken and bearing manufacturer's labels containing brand name and type of material, date of manufacture and directions for storage.
- B. Store pavement-marking materials in a clean, dry, protected location within temperature range required by manufacturer. Protect stored materials from direct sunlight.

1.07 PROJECT CONDITIONS

- A. Environmental Limitations: Do not apply asphalt materials if subgrade or paving surface is wet or excessively damp, if rain is imminent or expected before time required for adequate cure, or if the following conditions are not met:
 - 1. Tack Coat: Minimum surface temperature of 60° F.
 - 2. Slurry Coat: Comply with weather limitations in ASTM D3910.
 - 3. Asphalt Base, Binder, and Wearing Courses: Minimum air and surface temperature of 40° F and rising at time of placement.
- B. Pavement-Marking Paint: Proceed with pavement marking only on clean, dry surfaces and at a minimum ambient or surface temperature of 40° F for oil-based materials, 55° F for water-based materials, and not exceeding 95° F.
- C. Access Control: Provide temporary signs, barricades, warning tape, and fencing as necessary to limit public access during progress of the Work.

1.08 WARRANTY

- A. None

PART 2 – PRODUCTS**2.01 MANUFACTURERS**

- A. None

2.02 AGGREGATES

- A. General: Use materials and gradations that have performed satisfactorily in previous installations.
 - 1. The use of blast furnace slag as outlined in WisDOT is prohibited.
- B. Coarse Aggregate: Sound, angular crushed stone or crushed gravel complying with ASTM D692 and WisDOT.
- C. Fine Aggregate: Sharp-edged natural sand or sand prepared from stone, gravel, cured blast-furnace slag, or combinations thereof, complying with ASTM D1073 and WisDOT.
 - 1. For hot-mix asphalt, limit natural sand to a maximum of 20 percent by weight of the total aggregate mass.
- D. Mineral Filler: ASTM D242, rock, or slag dust, hydraulic cement, or other inert material.

2.03 ASPHALT MATERIALS

- A. Provide WisDOT HMA pavement. Utilize the same material type throughout the paving operation. All materials provided under this section shall conform to the requirements of the WisDOT Standard Specifications, Section 460 and as revised in any current Supplemental Specifications.

- B. WisDOT gradation nominal size 19.0mm shall be used for the binder course, if applicable, and WisDOT gradation nominal size 9.5mm shall be used for the surface and leveling course, if applicable.
 - 1. Binder Mix Specification:
 - a. 3 LT 58-28 S
 - 2. Leveling Mix Specification:
 - a. 5 LT 58-28 S
 - 3. Surface Mix Specification:
 - a. 5 LT 58-28 V
- C. Tack Coat: ASTM D977 emulsified asphalt, or ASTM D2397, cationic emulsified asphalt, slow setting, diluted in water, of suitable grade and consistency for application complying with WisDOT.
- D. Water: Potable

2.04 AUXILIARY MATERIALS

- A. Joint Sealant: ASTM D 6690, Type II or III, hot-applied, single-component, polymer-modified bituminous sealant, meeting WisDOT.
- B. Pavement-Marking Paint: Alkyd-resin type, ready mixed; complying with AASHTO M 248, Type 1, and WisDOT, except that the materials shall be supplied by the Contractor.
 - 1. Color for Typical Markings: To be chosen by Owner
 - 2. Color for Accessible Parking Areas: To be chosen by Owner.

PART 3 - EXECUTION

3.01 EXAMINATION

- A. Verify that subgrade is dry and in suitable condition to begin paving.
- B. Notify Consultant of unsatisfactory conditions. Proceed with paving only after unsatisfactory conditions have been corrected.

3.02 PATCHING

- A. Hot-Mix Asphalt Pavement: Saw cut perimeter of patch and excavate existing pavement section to sound base. Excavate rectangular or trapezoidal patches, extending 12 inches into adjacent sound pavement, unless otherwise indicated. Cut excavation faces vertically. Remove excavated material. Recompact existing unbound-aggregate base course to form new subgrade.
 - 1. Add new aggregate as necessary to bring elevation(s) up to design subbase elevations.
- B. Tack Coat: Apply uniformly to vertical surfaces abutting or projecting into new, hot-mix asphalt paving at a rate of 0.05 to 0.07 gal./sq. yd.
 - 1. Allow tack coat to cure undisturbed before applying hot-mix asphalt paving.
 - 2. Avoid smearing or staining adjoining surfaces, appurtenances, and surroundings. Remove spillages and clean affected surfaces.
- C. Patching: Fill excavated pavements with hot-mix asphalt base mix for full thickness of patch and while still hot, compact flush with adjacent surface.

3.03 REPAIRS

- A. Use hot-applied joint sealant to seal cracks new and existing asphalt interface.

3.04 SURFACE PREPARATION

- A. General: Immediately before placing asphalt materials, remove loose and deleterious material from substrate surfaces. Ensure that prepared subgrade is ready to receive paving.
 - 1. Sweep loose granular particles from surface of subbase course. Do not dislodge or disturb aggregate embedded in compacted surface of subbase course.
- B. Joining New Pavements to Existing: Saw cut contact area between existing and new pavements so they are smooth and straight before starting paving.
 - 1. Provide a contact area of the surface layer not less than 18 inches wider than the base, unless otherwise indicated.
 - 2. Provide horizontal distance between concrete curbs and similar construction to allow room for compaction equipment to be used on all layers.
- C. Joint Sealer: Apply to surfaces in cracks and at joints of previously constructed asphalt pavement.
 - 1. Apply to surface that is clean, dry, free of grease, dust and loose particles; apply when air and surface temperatures are above 40° F and rising.
 - 2. Remove all loose stones and chips from the crack/joint before filling.
 - 3. Do not apply if rain threatens or is predicted within 12 to 14 hours.
 - 4. Apply two 3/8-inch to 1/2-inch layers of filler, and allow drying thoroughly between applications; complying with manufacturer's directions.
- D. Tack Coat: Apply uniformly to contact surfaces of previously constructed asphalt or Portland cement concrete and surfaces abutting or projecting into hot-mixed asphalt pavement, including the vertical surfaces of concrete to be in contact with the hot-mixed asphalt. Distribute at a rate to leave a uniform asphalt residue of 0.07 to 0.15 gal. /sq. yd.
 - 1. Allow tack coat to cure undisturbed before applying hot-mix asphalt paving.
 - 2. Avoid smearing or staining adjoining surfaces, appurtenances, and surroundings. Remove spillages and clean affected surfaces.

3.05 HOT-MIX ASPHALT PLACING

- A. Machine place hot-mix asphalt on prepared surface, spread uniformly, and strike off. Place asphalt mix by hand to areas inaccessible to equipment in a manner that prevents segregation of mix. Place each course to required grade, cross-section, and thickness when compacted.
 - 1. Place hot-mix asphalt binder and wearing courses in single lifts.
 - 2. Spread mix at minimum temperature of 250° F.
 - 3. Begin applying mix along centerline of crown for crowned sections and on high side of one-way slopes unless otherwise indicated.
 - 4. Regulate paver machine speed to obtain smooth, continuous surface free of pulls and tears in asphalt paving mat.
- B. Place paving in consecutive strips not less than 10 feet wide unless infill edge strips of a lesser width are required.
 - 1. After first strip has been placed and rolled, place succeeding strips and extend rolling to overlap previous strips. Complete a section of asphalt base course before placing asphalt surface course.
- C. Promptly correct surface irregularities in paving course behind paver. Use suitable hand tools to remove excess material forming high spots. Fill depressions with hot-mix asphalt to prevent segregation of mix; use suitable hand tools to smooth surface.
- D. Surface Tolerance
 - 1. The finished bituminous surfacing shall pitch to drain and have a uniform required thickness at all points. The contractor shall conform to the requirements of the City of Oshkosh.

- E. Protection for Asphaltic Concrete Surfacing
 - 1. The Contractor shall protect all completed sections of bituminous paving until the Consultant has approved the pavement for traffic.
- F. Tickets
 - 1. The Contractor shall verify asphaltic concrete quantities used with truck delivery tickets.

3.06 JOINTS

- A. Construct joints to ensure a continuous bond between adjoining paving sections. Construct joints free of depressions, with same texture and smoothness as other sections of hot-mix asphalt course.
 - 1. Clean contact surfaces and apply tack coat to joints.
 - 2. Offset longitudinal joints, in successive courses, a minimum of 6 inches.
 - 3. Offset transverse joints, in successive courses, a minimum of 24 inches.
 - 4. Construct transverse joints at each point where paver ends a day's work and resumes work at a subsequent time. Transverse Joints shall be constructed perpendicular to driveway and roadway centerlines. Construct these joints using either "bulkhead" or "papered" method according to AI MS-22, for both "Ending a Lane" and "Resumption of Paving Operations."
 - 5. Compact joints as soon as hot-mix asphalt will bear roller weight without excessive displacement.
 - 6. Compact asphalt at joints to a density within 2 percent of specified course density.

3.07 COMPACTION

- A. General: Begin compaction as soon as placed hot-mix asphalt paving will bear roller weight without excessive displacement. Compact hot-mix asphalt paving with hot, hand tampers or with vibratory-plate compactors in areas inaccessible to rollers.
 - 1. Complete compaction before mix temperature cools to 185° F.
- B. Breakdown Rolling: Complete breakdown or initial rolling immediately after rolling joints and outside edge. Examine surface immediately after breakdown rolling for indicated crown, grade, and smoothness. Correct laydown and rolling operations to comply with requirements.
- C. Intermediate Rolling: Begin intermediate rolling immediately after breakdown rolling while hot-mix asphalt is still hot enough to achieve specified density. Continue rolling until hot-mix asphalt course has been uniformly compacted to the following density:
 - 1. Average Density: Not less than, 90 percent nor greater than 97 percent of reference maximum theoretical density according to ASTM D2041 and in accordance with WisDOT.
- D. Finish Rolling: Finish roll paved surfaces to remove roller marks while hot-mix asphalt is still warm.
- E. Edge Shaping: While surface is being compacted and finished, trim edges of pavement to proper alignment. Bevel edges while asphalt is still hot; compact thoroughly.
- F. Repairs: Remove paved areas that are defective or contaminated with foreign materials and replace with fresh, hot-mix asphalt. Compact by rolling to specified density and surface smoothness.
- G. Protection: After final rolling, do not permit vehicular traffic on pavement until it has cooled and hardened.
- H. Erect barricades to protect paving from traffic until mixture has cooled enough not to become marked.

3.08 INSTALLATION TOLERANCES

- A. Pavement Thickness: Compact each course to produce the thickness indicated within the following tolerances:
 - 1. Binder Course: Plus or minus 1/2 inch.
 - 2. Surface Course: Plus 1/4 inch, no minus.
- B. Pavement Surface Smoothness: Compact each course to produce a surface smoothness within the following tolerances as determined by using a 10-foot straightedge applied transversely or longitudinally to paved areas:
 - 1. Base Course: 1/4 inch.
 - 2. Surface Course: 3/16 inch.
 - 3. Crowned Surfaces: Test with crowned template centered and at right angle to crown. Maximum allowable variance from template is 1/4 inch.

3.09 FIELD QUALITY CONTROL

- A. Testing Agency: Engage a qualified testing agency to perform tests and inspections.
 - 1. Testing agency will conduct and interpret tests and state in each report whether tested Work complies with or deviates from specified requirements.
- B. Additional testing and inspecting, at Contractor's expense, will be performed to determine compliance of replaced or additional work with specified requirements.
- C. Thickness: In-place compacted thickness of hot-mix asphalt courses will be determined according to ASTM D3549.
- D. Surface Smoothness: Finished surface of each hot-mix asphalt course will be tested for compliance with smoothness tolerances.
- E. In-Place Density: Test in-place density of compacted pavement determined by nuclear testing complying with WisDOT Specifications or appropriate PTM's.
 - 1. Perform one test for every 2000 sq. ft. or less of installed pavement, but in no case fewer than 3 tests per area or placement.
- F. If required by Municipality or WisDOT, in addition to nuclear testing, take core samples of paving in public right-of-way, according to ASTM D1188 or ASTM D2726, with frequency of samples to comply with WisDOT criteria.
 - 1. Conduct thickness tests of in-place compacted hot-mix asphalt courses according to ASTM D3549.
- G. Remove and replace or install additional hot-mix asphalt where test results or measurements indicate that it does not comply with specified requirements.
 - 1. Adjust placement procedures, placement temperature, and rolling pattern as directed by testing agency to meet density criteria.
- H. Replace and compact hot-mix asphalt where core tests were taken.
- I. Remove and replace or install additional hot-mix asphalt where test results or measurements indicate that it does not comply with specified requirements

3.10 DISPOSAL/ CLEANING

- A. Except for material indicated to be recycled, remove excavated materials from Project site, and legally dispose of them in an EPA-approved landfill.
 - 1. Do not allow milled and/or excavated materials to accumulate on-site.

3.11 PROTECTION

A. None

END OF SECTION

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CONCRETE PAVING**PART 1 - GENERAL****1.01 RELATED DOCUMENTS**

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

1.02 SUMMARY

- A. This section includes:
1. Concrete collar

1.03 REFERENCES

- A. All referenced codes and standards including all revisions and commentaries shall be the most currently adopted as of the date of these contract documents.
- B. American Society for Testing and Materials (ASTM):
Specific ASTM numbers are noted in later text.
- C. American Association of State Highway and Transportation Officials (AASHTO)
M85 Standard Specification for Portland Cement.
T27 Sieve Analysis of Fine and Coarse Aggregates.
- D. American Concrete Institute (ACI)
117 Standard Specifications for Tolerances for Concrete Construction and Materials.
301 Specification for Structural Concrete
302 Guide for Concrete Floor and Slab Construction.
306.1 Standard Specification for Cold Weather Concreting
318 Building Code Requirements for Structural Concrete and Commentary
350R Environmental Engineering Concrete Structure
Additional ACI sections are noted in later text.

1.04 DEFINITIONS

- A. Cementitious Materials: Portland cement along or in combination with one or more of blended hydraulic cement, fly ash and other pozzolans, and ground granulated blast-furnace slag.

1.05 SUBMITTALS

- A. Submit under provisions of Section 01 33 00 – Submittal Procedures

- B. Product Data: For each type of manufactured material and product indicated.
- C. Design Mixtures: For each concrete pavement mixture. Include alternate mixing designs when characteristics of materials, Project conditions, weather, test results, or other circumstances warrant adjustments.
- D. Material Test Reports: From a qualified testing agency indicating and interpreting test results for compliance of the following with requirements indicated, based on comprehensive testing of current materials:
 - 1. Aggregates: Include service record data indicating the absence of deleterious expansion of concrete due to alkali-aggregate reactivity.
- E. Material Certificates: Signed by manufacturers certifying that each of the following materials complies with requirements:
 - 1. Cementitious materials.
 - 2. Steel reinforcement and reinforcement accessories.
 - 3. Admixtures.
 - 4. Curing compounds.
 - 5. Applied finish materials.
 - 6. Joint fillers.
- F. Field quality-control test reports.

1.06 QUALITY ASSURANCE

- A. Manufacturer Qualifications: Manufacturer of ready-mixed concrete products that comply with ASTM C94 / C94M requirements for production facilities and equipment.
 - 1. Manufacturer certified according to NRMCA's "Certification of Ready Mixed Concrete Production Facilities."
- B. Testing Agency Qualifications: An independent agency qualified according to ASTM C1077 and ASTM E329 for testing indicated, as documented according to ASTM E548.
 - 1. Personnel conducting field tests shall be qualified as ACI Concrete Field Testing Technician, Grade 1, according to ACI CP-01 or an equivalent certification program.
- C. ACI Publications: Comply with ACI 301, "Specification for Structural Concrete", unless modified by requirements of Contract Documents.
- D. Concrete Testing Service: Engage a qualified independent testing agency to perform material evaluation tests and to design concrete mixtures.

1.07 PROJECT CONDITIONS

- A. Traffic Control: Maintain access for vehicular and pedestrian traffic as required for other construction and building usage.

PART 2 - PRODUCTS**2.01 MANUFACTURERS**

- A. In other Part 2 articles where titles below introduce lists, the following requirements apply to product selection:
1. Available Products: Subject to compliance with requirements, products that may be incorporated into the Work include, but are not limited to, products specified.
 2. Available Manufacturers: Subject to compliance with requirements, manufacturers offering products that may be incorporated into the Work include, but are not limited to, manufacturers specified.

2.02 FORMS

- A. Form Materials: Plywood, metal, metal-framed plywood, or other approved panel-type materials to provide full-depth, continuous, straight smooth exposed surfaces.
1. Use flexible or curved forms for curves with a radius one hundred (100) feet or less.
- B. Form-Release Agent: Commercially formulated form-release agent that will not bond with, stain, or adversely affect concrete surfaces and will not impair subsequent treatments of concrete surfaces.

2.03 STEEL REINFORCEMENT

- A. Epoxy-Coated Welded Wire Reinforcement: ASTM A884, fabricated from as-drawn steel wire into flat sheets.
- B. Epoxy-Coated Steel Bars: Conforming to ASTM A775.
- C. Epoxy-Coated Dowel Bars: Plain steel bars, ASTM A1078 / A1078M, Grade 60.
- D. Cut bars true to length with ends square and free of burrs.
- E. Epoxy Coated Tie Bars: ASTM A615 / A615M, Grade 60, deformed.
- F. All steel reinforcement shall be epoxy coated, free from rust, scale, mortar, dirt, or other objectionable coatings.

2.04 CONCRETE MATERIALS

- A. Cementitious Material: Use the following cementitious materials, of the same type, brand, and source throughout the Project:
1. Portland Cement: ASTM C150, Type I
- B. Normal-Weight Aggregates: ASTM C33, all course aggregate shall meet requirements for deleterious substances (severe weathering regions) as specified with the following exception. Chert that has a specific gravity of less than 2.40 shall not exceed 2% of the weight of the coarse aggregate.
1. Maximum Coarse-Aggregate Size: $\frac{3}{4}$ inch nominal.
 2. Fine Aggregate: Free of materials with deleterious reactivity to alkali in cement.
- C. Water: ASTM C94 / C94M.
- D. Air-Entraining Admixture: ASTM C260 for use in all exterior concrete exposed to freezing temperatures both above and below grade.

- E. Chemical Admixtures: Provide admixtures certified by the manufacturer to be compatible with other admixtures and to contain not more than 0.1 percent water-soluble chloride ions by mass of cementitious material.
1. Water-Reducing Admixture: ASTM C494 / C494M, Type A.
 2. Retarding Admixture: ASTM C494 / C494M, Type B
 3. Water-Reducing and Retarding Admixture: ASTM C494 / C494M, Type D.
 4. High-Range, Water-Reducing Admixture: ASTM C494 / C494M, Type F.
 5. High-Range, Water-Reducing, and Retarding Admixture: ASTM C494 / C494M, Type G.
 6. Plasticizing and Retarding Admixture: ASTM C1017 / C1017M, Type II.

2.05 CURING MATERIALS

- A. Absorptive Cover: AASHTO M182, Class 2, burlap cloth made from jute or kenaf, weighing approximately 9 oz. /sq. yd. dry.
- B. Moisture-Retaining Cover: ASTM C171, polyethylene film, or white burlap-polyethylene sheet.
- C. Water: Potable.
- D. Evaporation Retarder: Waterborne, monomolecular film-forming; manufactured for application to fresh concrete.
- E. White Waterborne Membrane-Forming Curing Compound: ASTM C309, Type 2, Class B.

2.06 RELATED MATERIALS

- A. Expansion and Isolation Joint Filler Strips:
1. ASTM D1751, asphalt-saturated cellulosic fiber.
 2. Polyurethane, closed cell joint filler
 - a. W.R. Meadows - Deck-O-Foam or approved equal
 - 1) Prescored removable strip for sealant placement.

2.07 CONCRETE MIXTURES

- A. Prepared design mixtures, proportioned according to ACI 301, for each type and strength of normal-weight concrete determined by either laboratory trial mixes or field experience.
1. Use a qualified independent testing agency for preparing and reporting proposed concrete mixture designs for the trial batch method.
- B. Proportion mixtures to provide normal-weight concrete with the following properties:
1. Compressive Strength (3 Days): 4000 psi.
 2. Maximum Water-Cementitious Materials Ratio at Point of Placement: 0.50.
 3. Slump Limit: three (3) inches, plus or minus one (1) inch.
- C. Add air-entraining admixture at the manufacturer's prescribed rate to result in normal-weight concrete at the point of placement having an air content as follows:
1. Air Content: 4.5 to 6 percent for ¾-inch nominal maximum aggregate size.
- D. Chemical Admixtures: Use admixtures according to manufacturer's written instructions.
1. Use water-reducing and retarding admixture when required by high temperatures, low humidity, or other adverse placement conditions.
- E. Cementitious Materials: Limit percentage, by weight, of cementitious materials other than Portland cement according to ACI 301 requirements for concrete exposed to deicing chemicals.

2.08 CONCRETE MIXING

- A. Ready-Mixed Concrete: Measure, batch, and mix concrete materials and concrete according to ASTM C94 / C94M. Furnish batch certificates for each batch discharged and used in the Work.
 - 1. When the air temperature is between 85° F and 90° F, reduce mixing and delivery time from 1-1/2 hours to 75 minutes; when the air temperature is above 90° F, reduce mixing and delivery time to 60 minutes.

PART 3 - EXECUTION**3.01 EXAMINATION**

- A. Examine exposed subgrades and subbase surfaces for compliance with requirements for dimensional, grading, and elevation tolerances.
- B. Proceed with concrete pavement operations only after nonconforming conditions have been corrected and subgrade is ready to receive pavement.

3.02 PREPARATION

- A. Remove loose material from compacted subbase surfaces immediately before placing concrete.

3.03 EDGE FORMS AND SCREED CONSTRUCTION

- A. Set, brace, and secure edge forms, bulkheads, and intermediate screed guides for the pavement to required lines, grades, and elevations. Install forms to allow continuous progress of work and so forms can remain in place at least 24 hours after concrete placement.
 - 1. Clean forms after each use and coat with a form-release agent to ensure separation from concrete without damage.

3.04 STEEL REINFORCEMENT

- A. General: Comply with CRSI's "Manual of Standard Practice" for fabricating, placing, and supporting reinforcement.
- B. Clean reinforcement of loose rust and mill scale, earth, ice, or other bond-reducing materials.
 - 1. Install welded wire reinforcement in lengths as long as practicable. Lap adjoining pieces at least one full mesh, and lace splices with wire. Offset laps of adjoining widths to prevent continuous laps in either direction.

3.05 JOINTS

- A. General: Form construction, isolation, and contraction joints and tool edgings true to line with faces perpendicular to the surface plane of concrete. Construct transverse joints at right angles to the centerline, unless otherwise indicated.
 - 1. When joining existing pavement, place transverse joints to align with previously placed joints, unless otherwise indicated.
- B. Construction Joints: Set construction joints at side and end terminations of pavement and at locations where pavement operations are stopped for more than one-half hour unless pavement terminates at isolation joints.
 - 1. Continue steel reinforcement across construction joints, unless otherwise indicated.
 - 2. Provide tie bars at the concrete driveway where indicated.
- C. Isolation Joints: Form isolation joints of preformed joint-filler strips abutting concrete curbs, catch basins, manholes, structures, walks, other fixed objects, and where indicated.
 - 1. Extend joint filler's full width and depth of joint.

2. Terminate joint filler not less than $\frac{1}{2}$ inch or more than 1 inch below the finished surface if the joint sealant is indicated.
 3. Place the top of the joint filler flush with the finished concrete surface if the joint sealant is not indicated.
 4. Furnish joint fillers in one-piece lengths. Where more than one length is required, lace or clip joint-filler sections together.
 5. Protect the top edge of joint filler during concrete placement with metal, plastic, or another temporary preformed cap. Remove the protective cap after the concrete has been placed on both sides of the joint.
- D. Contraction Joints: Form weakened-plane contraction joints, sectioning concrete into areas as indicated. Construct contraction joints for a depth equal to at least one-fourth of the concrete thickness, as follows:
1. Grooved Joints: Form contraction joints after initial floating by grooving and finishing each edge joint with a grooving tool to a $\frac{1}{4}$ -inch radius. Repeat grooving of contraction joints after applying surface finishes. Eliminate groove marks on concrete surfaces.
- E. Edging: Tool edges of pavement, gutters, curbs, and joints in concrete after initial floating with an edging tool to a $\frac{1}{4}$ -inch radius. Repeat tooling of edges after applying surface finishes. Eliminate tool marks on concrete surfaces.

3.06 CONCRETE PLACEMENT

- A. Inspection: Before placing concrete, inspect and complete formwork installation, steel reinforcement, and items to be embedded or cast in. Notify other trades to permit installation of their work.
- B. Remove snow, ice, or frost from subbase surface and reinforcement before placing concrete. Do not place concrete on frozen surfaces.
- C. Moisten subbase to provide a uniform dampened condition at time concrete is placed. Do not place concrete around manholes or other structures until they are at the required finished elevation and alignment.
- D. Comply with ACI 301 requirements for measuring, mixing, transporting, and placing concrete.
- E. Do not add water to concrete during delivery or at the Project site.
- F. Do not add water to fresh concrete after testing.
- G. Deposit and spread concrete in continuous operation between transverse joints. Do not push or drag concrete into place or use vibrators to move the concrete into place.
- H. Consolidate concrete according to ACI 301 by mechanical vibrating equipment supplemented by hand spading, rodding, or tamping.
1. Consolidate concrete along the face of forms and adjacent to transverse joints with an internal vibrator. Keep the vibrator away from joint assemblies, reinforcement, or side forms. Use only square-faced shovels for hand spreading and consolidation. Consolidate with care to prevent dislocating reinforcement, dowels, and joint devices.
- I. Screed pavement surfaces with a straightedge and strikes off.
- J. Commence initial floating using bull floats or darbies to impart an open textured and uniform surface plane before excess moisture or bleed water appears on the surface. Do not further disturb concrete surfaces before beginning finishing operations or spreading surface treatments.

- K. Cold Weather Placement: Comply with ACI 301 and as follows. Protect concrete work from physical damage or reduced strength that could be caused by frost, freezing actions, or low temperatures.
1. When air temperature has fallen to or is expected to fall below 40° F, uniformly heat water and aggregates before mixing to obtain a concrete mixture temperature of not less than 50° F and not more than 80° F at point of placement.
 2. Do not use frozen materials or materials containing ice or snow.
 3. Do not use calcium chloride, salt, or other materials containing antifreeze agents or chemical accelerators unless specified and approved in mix designs.
- L. Hot Weather Placement: Comply with ACI 301 and as follows when hot weather conditions exist:
1. Cool ingredients before mixing to maintain a concrete temperature below 90° F at the time of placement. Chilled mixing water or chopped ice may be used to control temperature, provided water equivalent of ice is calculated to the total amount of mixing water. Using liquid nitrogen to cool concrete is the Contractor's option.
 2. Cover steel reinforcement with water-soaked burlap so steel temperature will not exceed ambient air temperature immediately before embedding in concrete.
 3. Fog-spray forms, steel reinforcement, and subgrade just before placing concrete. Keep subgrade moisture uniform without standing water, soft spots, or dry areas.

3.07 FLOAT FINISHING

- A. General: Do not add water to concrete surfaces during finishing operations.
- B. Float Finish: Begin the second floating operation when bleed-water sheen has disappeared and the concrete surface has stiffened sufficiently to permit operations. Float surface with power-driven floats, or by hand-floating if the area is small or inaccessible to power units. Finish surfaces to true planes. Cut down high spots and fill low spots. Refloat surface immediately to uniform granular texture.
1. Medium-to-Fine-Textured Broom Finish: Draw a soft bristle broom across float-finished concrete surface perpendicular to the line of traffic to provide a uniform, fine-line texture.

3.08 CONCRETE PROTECTION AND CURING

- A. General: Protect freshly placed concrete from premature drying and excessive cold or hot temperatures.
- B. Comply with ACI 306.1 for cold-weather protection.
- C. Evaporation Retarder: Apply evaporation retarder to concrete surfaces if hot, dry, or windy conditions cause moisture loss approaching 0.2 lb./sq. ft. x h before and during finishing operations. Apply according to manufacturer's written instructions after placing, screeding, and bull floating or darbying concrete, but before float finishing.
- D. Begin curing after finishing concrete but not before free water has disappeared from the concrete surface.
- E. Curing Methods: Cure concrete by moisture curing, moisture-retaining-cover curing, curing compound, or a combination of these as follows:
1. Moisture Curing: Keep surfaces continuously moist for not less than seven (7) days with the following materials:
 - a. Water.
 - b. Continuous water-fog spray.
 - c. Absorptive cover, water-saturated, and kept continuously wet. Cover concrete surfaces and edges with a 12-inch lap over adjacent absorptive covers.
 2. Moisture-Retaining-Cover Curing: Cover concrete surfaces with moisture-retaining cover for curing concrete, placed in widest practicable width, with sides and ends lapped

- at least 12 inches, and sealed by waterproof tape or adhesive. Immediately repair any holes or tears during the curing period using cover material and waterproof tape.
3. Curing Compounds: Apply uniformly in continuous operation by power spray or roller according to manufacturer's written instructions. Recoat areas subjected to heavy rainfall within three (3) hours after initial application. Maintain continuity of coating and repair damage during the curing period.

3.09 PAVEMENT TOLERANCES

- A. Comply with tolerances of ACI 117 and as follows:
 1. Elevation: $\frac{1}{4}$ inch.
 2. Thickness: Plus $\frac{3}{8}$ inch, minus $\frac{1}{4}$ inch.
 3. Surface: Gap below 10-foot-long, unlevelled straightedge not to exceed $\frac{1}{4}$ inch.
 4. Lateral Alignment and Spacing of Tie Bars: 1 inch.
 5. Vertical Alignment of Tie Bars: $\frac{1}{4}$ inch.
 6. Alignment of Tie-Bar End Relative to Line Perpendicular to Pavement Edge: $\frac{1}{2}$ inch.
 7. Joint Spacing: 3 inches
 8. Contraction Joint Depth: Plus $\frac{1}{4}$ inch, no minus.
 9. Joint Width: Plus $\frac{1}{8}$ inch, no minus.

3.10 FIELD QUALITY CONTROL

- A. Testing Agency: Engage a qualified independent testing and inspecting agency to perform field tests and inspections and prepare test reports.
- B. Testing Services: Testing of composite samples of fresh concrete obtained according to ASTM C172 shall be performed according to the following requirements:
 1. Testing Frequency: Obtain at least one (1) composite sample for each one hundred (100) cubic yard or fraction thereof of each concrete mix placed each day.
 - a. When the frequency of testing will provide fewer than five compressive-strength tests for each concrete mixture, testing shall be conducted from at least five randomly selected batches or each batch if fewer than five are used.
 2. Slump: ASTM C143 / C143M; one test at the point of placement for each composite sample, but not less than one test for each day's pour of each concrete mix. Perform additional tests when concrete consistency appears to change.
 3. Air Content: ASTM C231, pressure method; one test for each composite sample, but not less than one test for each day's pour of each concrete mix.
 4. Concrete Temperature: ASTM C1064; one test hourly when the air temperature is 40° F and below and when 80° F and above, and one test for each composite sample.
 5. Compression Test Specimens: ASTM C31 / C31M; cast and laboratory cure one set of three standard cylinder specimens for each composite sample.
 - a. Compressive-Strength Tests: ASTM C39 / C39M; test one (1) specimen at seven (7) days and e specimens at twenty-eight (28) days.
- C. A compressive-strength test shall be the average compressive strength from two (2) specimens obtained from the same composite sample and tested at twenty-eight (28) days.
- D. The strength of each concrete mix will be satisfactory if the average of any three (3) consecutive compressive-strength tests equals or exceeds specified compressive strength and no compressive-strength test value falls below specified compressive strength by more than 500 psi.
- E. Test results shall be reported in writing to the Consultant, concrete manufacturer, and Contractor within 48 hours of testing. Reports of compressive-strength tests shall contain Project identification name and number, date of concrete placement, name of concrete testing and inspecting agency, location of the concrete batch in Work, design compressive strength at twenty-eight (28) days, concrete mixture proportions and materials, compressive breaking strength, and type of break for both 7 and 28-day tests.

- F. Nondestructive Testing: Impact hammer, sonoscope, or another non-destructive device may be permitted by the Consultant but will not be used as the sole basis for approval or rejection of concrete.
- G. Additional Tests: The testing and inspecting agency shall make additional tests of concrete when test results indicate that slump, air entrainment, compressive strengths, or other requirements have not been met, as directed by the Consultant.
- H. Remove and replace concrete pavement where test results indicate that it does not comply with specified requirements.
- I. Additional testing and inspecting, at the Contractor's expense, will be performed to determine compliance of replaced or additional work with specified requirements.

3.11 REPAIRS AND PROTECTION

- A. Remove and replace concrete pavement that is broken, damaged, or defective or that does not comply with requirements in this Section.
- B. Drill test cores, where directed by the Consultant, when necessary to determine the magnitude of cracks or defective areas. Fill drilled core holes in satisfactory pavement areas with Portland cement concrete bonded to the pavement with epoxy adhesive.
- C. Protect concrete from damage. Exclude traffic from the pavement for at least fourteen (14) days after placement. When construction traffic is permitted, maintain pavement as clean as possible by removing surface stains and spillage of materials as they occur.
- D. Maintain concrete pavement free of stains, discoloration, dirt, and other foreign material. Sweep concrete pavement not more than two days before the date scheduled for Substantial Completion inspections.

END OF SECTION