# PROJECT MANUAL

***Renovations to Exterior***

***Missouri State Highway Patrol***
***Troop B Headquarters and Crime Lab***

Designed By: McClure Engineering Company
2001 W. Broadway
Columbia, MO 65203

Date Issued: April 22, 2026

Project No.: R2510-01

## STATE *of* MISSOURI

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OFFICE *of* ADMINISTRATION
Facilities Management, Design and Construction

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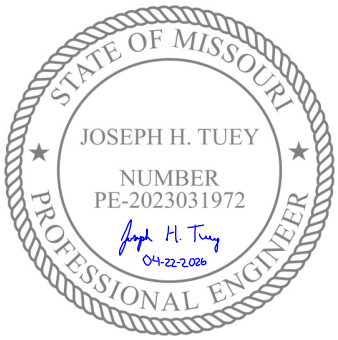
## SECTION 000107 - PROFESSIONAL SEALS AND CERTIFICATIONS

**PROJECT NUMBER: R2510-01**

**THE FOLLOWING DESIGN PROFESSIONALS HAVE SIGNED AND SEALED THE ORIGINAL PLANS AND SPECIFICATIONS FOR THIS PROJECT, WHICH ARE ON FILE WITH THE DIVISION OF FACILITIES MANAGEMENT, DESIGN AND CONSTRUCTION:**

**ALL:**




**Joseph H. Tuey, PE**

**Exp. 12/31/2027**

**McClure Engineering Company**

**Certificate of Authority#:E-2006023253**

**Exp. 12/31/2026**

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**NOTICE TO BIDDERS**

**The following procurement forms can be found on our website at:**
**https://oa.mo.gov/facilities/bid-opportunities/bid-listing-electronic-plans**
**and shall be submitted with your bid to FMDCBids@oa.mo.gov**

**SECTION 000115**
**LIST OF DRAWINGS**

## PART 1 - GENERAL

### 1.1 RELATED DOCUMENTS

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

### 1.2 SUMMARY

A. This Section provides a comprehensive list of the drawings that comprise the Bid Documents for this project.

## PART 2 - PRODUCTS (NOT APPLICABLE)

## PART 3 - EXECUTION

### 3.1 LIST OF DRAWINGS

A. The following list of drawings is a part of the Bid Documents:

| | TITLE | SHEET # | DATE | CAD # |
|---|---|---|---|---|
| 1. | Cover Sheet | Sheet G-001 | 04/17/2026 | R2510-01-XXX-G001 |
| 2. | Vicinity Map & Notes | Sheet G-002 | 04/17/2026 | R2510-01-XXX-G002 |
| 3. | Existing Conditions | Sheet G-003 | 04/17/2026 | R2510-01-XXX-G003 |
| 4. | Phasing Plan | Sheet G-004 | 04/17/2026 | R2510-01-XXX-G004 |
| 5. | Demolition Plan Base Bid | Sheet D-100 | 04/17/2026 | R2510-01-XXX-D100 |
| 6. | Demolition Plan Alternate No. 1 | Sheet D-101 | 04/17/2026 | R2510-01-XXX-D101 |
| 7. | Improvement Plan Base Bid | Sheet C-100 | 04/17/2026 | R2510-01-XXX-C100 |
| 8. | Improvement Plan Alternate No.1 | Sheet C-101 | 04/17/2026 | R2510-01-XXX-C101 |
| 9. | Grading Plan Base Bid | Sheet C-200 | 04/17/2026 | R2510-01-XXX-C200 |
| 10. | Grading Plan Alternate No.1 | Sheet C-201 | 04/17/2026 | R2510-01-XXX-C201 |
| 11. | Details | Sheet C-500 | 04/17/2026 | R2510-01-XXX-C500 |
| 12. | Details 2 | Sheet C-501 | 04/17/2026 | R2510-01-XXX-C501 |
| 13. | Details 3 | Sheet C-502 | 04/17/2026 | R2510-01-XXX-C502 |

**END OF SECTION 000115**

## SECTION 001116 - INVITATION FOR BID

**1.0 OWNER:**

A. The State of Missouri
Office of Administration,
Division of Facilities Management, Design and Construction
Jefferson City, Missouri

**2.0 PROJECT TITLE AND NUMBER:**

A. Renovations to Exterior
Missouri State Highway Patrol Troop B Headquarters and Crime Lab
Macon, Missouri
**Project No.: R2510-01**

**3.0 BIDS WILL BE RECEIVED:**

A. Until: 1:30 PM, October 1, 2026

B. **Only electronic bids sent to FMDCBids@oa.mo.gov shall be accepted: (See Instructions to Bidders for further detail)**

**4.0 DESCRIPTION:**

A. Scope: The project includes the replacement of the existing retaining wall as well as repairs to the existing parking lot on the east/south side of the existing Troop B Headquarters and Crime Lab location.

B. MBE/WBE/SDVE Goals: MBE **0%**, WBE **0%**, and SDVE **3%. NOTE: Only MBE/WBE firms certified by the State of Missouri Office of Equal Opportunity as of the date of bid opening, or SDVE(s) meeting the requirements of Section 34.074, RSMo and 1 CSR 30-5.010, can be used to satisfy the MBE/WBE/SDVE participation goals for this project.**

**5.0 PRE-BID MEETING:**

A. Place/Time**:** 10:00 AM, September 16, 2026, at Troop B HQ Conference Room, 308 Pine Crest Drive, Macon, MO 63552

B. Access to State of Missouri property requires presentation of a photo ID by all persons.

**6.0 HOW TO GET PLANS & SPECIFICATIONS:**

A. View Only Electronic bid sets are available at no cost or paper bid sets for a deposit of $100.00 from American Document Solutions (ADS). MAKE CHECKS PAYABLE TO: American Document Solutions. Mail to: American Document Solutions, 1400 Forum Blvd., Suite 7A, Columbia, Missouri 65203. Phone 573-446-7768, Fax 573-355-5433, https://www.adsplanroom.net. NOTE: Prime contractors will be allowed a maximum of two bid sets at the deposit rate shown above. Other requesters will be allowed only one bid set at this rate. Additional bid sets or parts thereof may be obtained by any bidder at the cost of printing and shipping by request to American Document Solutions at the address shown above. Bidder must secure at least one bid set to become a planholder.

B. **Refunds: Return plans and specifications in unmarked condition within 15 working days of bid opening to American Document Solutions, 1400 Forum Blvd., Suite 7A, Columbia, Missouri 65203. Phone 573-446-7768, Fax 573-355-5433. Deposits for plans not returned within 15 working days shall be forfeited.**

C. Information for upcoming bids, including downloadable plans, specifications, Invitation for Bid, bid tabulation, award, addenda, and access to the ADS planholders list, is available on the Division of Facilities Management, Design and Construction's web site: https://oa.mo.gov/facilities/bid-opportunities/bid-listing-electronic-plans.

**7.0 POINT OF CONTACT:**

A. Project Manager: L. Scott Samuels, PE, 573.690.6760, email: scott.samuels@oa.mo.gov

**8.0 GENERAL INFORMATION:**

A. The State reserves the right to reject any and all bids and to waive all informalities in bids. No bid may be withdrawn for a period of 20 working days subsequent to the specified bid opening time. The contractor shall pay not less than the prevailing hourly rate of wages for work of a similar character in the locality in which the work is performed, as determined by the Missouri Department of Labor and Industrial Relations and as set out in the detailed plans and specifications.

B. Bid results will be available at https://oa.mo.gov/facilities/bid-opportunities/bid-listing-electronic-plans after it is verified that at least one bid is awardable and affordable.

**SECTION 002113 – INSTRUCTIONS TO BIDDERS**

## 1.0 - SPECIAL NOTICE TO BIDDERS

A. If awarded a contract, the Bidder's employees, and the employees of all subcontractors, who perform the work on the project must adhere to requirements in Section 013513 – Site Security and Health Requirements as applicable per Agency.

B. The Bidder's prices shall include all city, state, and federal sales, excise, and similar taxes that may lawfully be assessed in connection with the performance of work, and the purchased of materials to be incorporated in the work. **THIS PROJECT IS NOT TAX EXEMPT.**

## 2.0 - BID DOCUMENTS

A. The number of sets obtainable by one (1) party may be limited in accordance with available supply.

B. For the convenience of contractors, subcontractors and suppliers, bidding documents are available on the Owner's website at https://oa.mo.gov/facilities/bid-opportunities/bid-listing-electronic-plans.

## 3.0 - BIDDERS' OBLIGATIONS

A. Bidders must carefully examine the entire site of the work and shall make all reasonable and necessary investigations to inform themselves thoroughly as to the facilities available as well as to all the difficulties involved in the completion of all work in accordance with the specifications and the plans. Bidders are required to examine all maps, plans and data mentioned in the specifications. No plea of ignorance concerning observable existing conditions or difficulties that may be encountered in the execution of the work under this contract will be accepted as an excuse for any failure or omission on the part of the successful Bidder (contractor) to fulfill every detail of the requirements of the contract, nor accepted as a basis for any claims for extra compensation or time extension.

B. Under no circumstances will Bidders give their plans and specifications to other Bidders. It is highly encouraged, but not required, that all Bidders be on the official planholders list to receive project updates including but not limited to any addenda that are issued during the bidding process.

## 4.0 - INTERPRETATIONS

A. No Bidder shall be entitled to rely on oral or written representations from any person as to the meaning of the plans and specifications or the acceptability of alternate products, materials, form or type of construction.

B. Bidders shall make all requests for interpretations in writing and submit all requests to the Project Manager identified in Section 007300 – Supplementary Conditions with all necessary supporting documentation no less than five (5) working days before opening of bids. Responses to requests for interpretation will be issued via a written addendum and will be sent as promptly as is practicable to all official planholders and posted on the Owner's website. All such addenda shall become part of the bid and contract documents.

C. Bidders shall make all requests for an "Acceptable Substitution" on the Section 006325 Substitution Request Form. The request shall be emailed to the Project Manager identified in Section 007300 – Supplementary Conditions no less than five (5) working days before opening of bids. Responses to requests for substitutions will be issued via a written addendum and will be sent as promptly as is practicable to all official planholders and posted on the Owner's website. All such addenda shall become part of the bid and contract documents.

D. An "Acceptable Substitution" requested after the award of bid will only be approved if proven to the satisfaction of the Owner and the Designer that the product is acceptable in design, strength, durability, usefulness, and convenience for the purpose intended. Approval of the substitution after award is at the sole discretion of the Owner and all requests of this nature must be submitted in accordance with Article 3.1 of the General Conditions.

## 5.0 - BIDS AND BIDDING PROCEDURE

A. Bidders shall submit all submission forms and accompanying documents listed in Section 004113 – Bid Form, Article 5.0, Attachments to Bid by the stated time on the bid documents or the bid will be rejected for being non-responsive.

B. Depending on the specific project requirements, **the following is a GENERIC list** of all possible bid forms that may be due with bid submittals. Bidders must verify each specific project's requirements in Section 004113 to ensure they have provided all the required documentation with their submission.

**Bid Submittal – due before stated date and time of bid opening (see IFB):**

| | |
|---|---|
| 004113 | Bid Form (all pages are always required) |
| 004322 | Unit Prices Form |
| 004336 | Proposed Subcontractors Form |
| 004337 | MBE/WBE/SDVE Compliance Evaluation Form |
| 004338 | MBE/WBE/SDVE Eligibility Determination for Joint Ventures |
| 004339 | MBE/WBE/SDVE GFE Determination |
| 004340 | SDVE Business Form |
| 004541 | Affidavit of Work Authorization |
| 004545 | Anti-Discrimination Against Israel Act Certification form |

C. The Bidder shall submit its bid on the forms provided by the Owner in the same file format (PDF) with each space fully and properly completed, typewritten or legibly printed, including all amounts required for alternate bids, unit prices, cost accounting data, etc. The Owner will reject bids that are not on the Owner's forms and that do not contain all requested information. All forms can be found on the Owner's website at https://oa.mo.gov/facilities/bid-opportunities/bid-listing-electronic-plans and shall be submitted to FMDCBids@oa.mo.gov.

D. All bids shall be submitted without additional terms and conditions, modifications, or reservations. The completed forms shall not include interlineations, alterations, or erasures. Bids not in compliance with the requirements of this paragraph will be rejected as non-responsive.

E. All bids shall be accompanied by a bid bond executed by the bidder and a duly authorized surety company, certified check, cashier's check or bank draft made payable to the Division of Facilities Management, Design and Construction, State of Missouri, in the amount indicated in the bid documents in Section 004113. Failure of the Bidder to submit the duly authorized bid bond or the full amount required shall be sufficient cause to reject his bid. The Bidder agrees that the proceeds of the check, draft, or bond shall become the property of the State of Missouri, if for any reason the Bidder withdraws his bid after bid closing or if the Bidder, within ten (10) working days after notification of award, refuses or is unable to 1) execute the tendered contract, 2) provide an acceptable performance and payment bond, or 3) provide evidence of required insurance coverage.

F. The bid bond check or draft submitted by the successful Bidder will be returned after the receipt of an acceptable performance and payment bond and execution of the formal contract. Checks or drafts of all other Bidders will be returned within a reasonable time after it is determined that the bid represented by same will receive no further consideration by the State of Missouri.

## 6.0 - SIGNING OF BIDS

A. A bid shall contain the full and correct legal name of the Bidder. If the Bidder is an entity registered with the Missouri Secretary of State, the Bidder's name on the bid form shall appear as shown in the Secretary of State's records. If the Bidder is an entity organized in a state other than Missouri, the Bidder must provide a Certificate of Authority to do business in the State of Missouri.

B. If the successful Bidder is doing business in the State of Missouri under a fictitious name, the Bidder shall furnish to Owner, attached to the Bid Form, a properly certified copy of the certificate of Registration of Fictitious Name from the State of Missouri, and such certificate shall remain on file with the Owner.

C. A bid from an individual shall be signed as noted on the Bid Form.

D. A bid from a partnership or joint venture shall require only one signature of a partner, an officer of the joint venture authorized to bind the venture, or an attorney-in-fact. If the bid is signed by an officer of

a joint venture or an attorney-in-fact, a document evidencing the individual's authority to execute contracts should be included with the bid form.

E. A bid from a limited liability company (LLC) shall be signed by a manager or a managing member of the LLC.

F. A bid from a corporation shall have the correct corporate name thereon and the signature of an authorized officer of the corporation. Title of office held by the person signing for the corporation shall appear, along with typed name of said individual and the corporate license number shall be provided. In addition, for corporate proposals, the President or Vice-President listed per the current filing with the Missouri Secretary of State should sign as the Bidder. If the signatory is other than the corporate president or vice president, the bidder must provide satisfactory evidence that the signatory has the legal authority to bind the corporation.

## 7.0 - RECEIVING BID SUBMITTALS

A. It is the Bidder's sole responsibility to ensure receipt of the bid submittals by Owner on or before the date and time specified in the Invitation for Bid or as modified via written addenda. Bids received after the date and time specified will not be considered by the Owner.

B. All bids shall be received via email at FMDCBids@oa.mo.gov. A bid submitted through any other means, including hard copies, will not be considered and will be discarded by the Owner unopened.

## 8.0 - MODIFICATION AND WITHDRAWAL OF BIDS

A. Bidder may withdraw a bid at any time prior to the scheduled closing time for receipt of bids, but no bidder may withdraw his bid for a period of twenty (20) working days after the scheduled closing time for receipt of bids.

B. Bidder may modify a bid until the scheduled closing time by sending a revised bid to FMDCBids@oa.mo.gov with a note in the subject line and body of the email that it is a revised bid. A revised bid sent via any other method will not be considered.

## 9.0 - AWARD OF CONTRACT

A. The Owner reserves the right to reject any and/or all bids and further to waive all informalities in bidding when deemed in the best interest of the State of Missouri.

B. The Owner reserves the right to let other contracts in connection with the work including, but not limited to, contracts for the furnishing and installation of furniture, equipment, machinery, appliances and other apparatuses.

C. The Owner will award a contract to the lowest, responsive, and responsible Bidder in accordance with Section 8.250, RSMo. No contract will be awarded to any Bidder who has had a contract with the Owner terminated within the preceding twelve months for material breach of contract or who has been suspended or debarred by the Owner.

D. Award of alternates, if any, will be made in numerical order unless all bids received are such that the order of acceptance of alternates does not affect the determination of the lowest, responsive, responsible bidder.

E. No award shall be considered binding upon the Owner until the written contract has been properly executed and the following documentation has been provided: 1) performance and payment bond consistent with Article 6.1 of the General Conditions; 2) proof of the required insurance coverage; 3) an executed Section 004541 - Affidavit of Work Authorization form; and 4) documentation evidence enrollment and participation in a federal work authorization program.

F. Failure to execute and return the contract and associated documents within the prescribed period shall be treated, at the option of the Owner, as a breach of Bidder's obligation and the Owner shall be under no further obligation to Bidder.

G. Transient employers subject to Sections 285.230 and 285.234, RSMo, (out-of-state employers who temporarily transact any business in the State of Missouri) may be required to file a bond with the Missouri Department of Revenue. No contract will be awarded by the Owner unless the successful Bidder certifies that he has complied with all applicable provisions of Section 285.230-234.

H. Sections 285.525 and 285.530, RSMo, require business entities to enroll and participate in a federal work authorization program in order to be eligible to receive award of any state contract in excess of $5,000. Bidders should submit with their bid an Affidavit of Work Authorization (Section 004541) along with appropriate documentation evidencing such enrollment and participation. Bidders must also submit an E-Verify Memorandum before the Owner may award a contract to the Bidder. Information regarding E-Verify is located at https://www.e-verify.gov/employers/enrolling-in-e-verify. The contractor shall be responsible for ensuring that all subcontractors and suppliers associated with this contract enroll in E-Verify.

I. The successful Bidder must be registered in MissouriBUYS powered by MOVERS at https://missouribuys.mo.gov/supplier-registration# as an approved vendor prior to being issued a contract.

**10.0 - CONTRACT SECURITY**

A. The successful Bidder shall furnish a performance/payment bond as set forth in General Conditions Article 6.1 prior to the State executing the contract and issuing a notice to proceed.

**11.0 - WORKING DAYS**

A. Contract duration time is stated in working days and will use the following definition in determining the actual calendar date for contract completion:

1. Working days are defined as all calendar days except Saturdays, Sundays and the following State of Missouri observed holidays: New Year's Day, Martin Luther King, Jr. Day, Lincoln Day, Washington's Birthday, Truman Day, Memorial Day, Juneteenth, Independence Day, Labor Day, Columbus Day, Veterans Day, Thanksgiving Day and Christmas Day.

**12.0 - AMERICAN AND MISSOURI - MADE PRODUCTS AND FIRMS**

A. By signing the bid form and submitting a bid on this project, the Bidder certifies that it will use American and Missouri products as set forth in Article 1.7 of the General Conditions. Bidders are advised to review those requirements carefully prior to bidding.

B. A preference shall be given to Missouri firms, corporations or individuals, or firms, corporations or individuals that maintain Missouri offices or places of business, when the quality of performance promised is equal or better and the price quoted is the same or less.

C. Pursuant to Section 34.076, RSMo, a contractor or Bidder domiciled outside the boundaries of the State of Missouri shall be required, in order to be successful, to submit a bid the same percent less than the lowest bid submitted by a responsible contractor or Bidder domiciled in Missouri as would be required for such a Missouri domiciled contractor or Bidder to succeed over the bidding contractor or Bidder domiciled outside Missouri on a like contract or bid being let in the Bidder's domiciliary state and, further, the contractor or Bidder domiciled outside the boundaries of Missouri shall be required to submit an audited financial statement as would be required of a Missouri domiciled contractor or Bidder on a like contract or bid being let in the domiciliary state of that contractor or Bidder.

**13.0 – ANTI-DISCRIMINATION AGAINST ISRAEL ACT CERTIFICATION:**

A. If the Bidder meets the section 34.600, RSMo., definition of a "company" and the Bidder has ten or more employees, the Bidder must certify in writing that the Bidder is not currently engaged in a boycott of goods or services from the State of Israel and shall not engage in a boycott of goods or services from the State of Israel, if awarded a contract, for the duration of the contract. The Bidder is required to complete and submit the applicable portion of Section 004545 - Anti-Discrimination Against Israel Act Certification with its Bid Form. The applicable portion of the exhibit must be submitted prior to execution of a contract by the Owner and issuance of Notice to Proceed.

**14.0 - MBE/WBE/SDVE INSTRUCTIONS**

A. Definitions:

1. **"MBE"** means a Minority Business Enterprise.

2. **"MINORITY"** has the same meaning as set forth in 1 C.S.R. 10-17.010.

3. **"MINORITY BUSINESS ENTERPRISE"** has the same meaning as set forth in section 37.020, RSMo.

4. **"WBE"** means a Women's Business Enterprise.

5. **"WOMEN'S BUSINESS ENTERPRISE"** has the same meaning as set forth in section 37.020, RSMo.

6. **"SDVE"** means a Service-Disabled Veterans Enterprise.

7. **"SERVICE-DISABLED VETERAN"** has the same meaning as set forth in section 34.074, RSMo.

8. **"SERVICE-DISABLED VETERAN ENTERPRISE"** has the same meaning as "Service-Disabled Veteran Business" set forth in section 34.074, RSMo.

B. MBE/WBE/SDVE General Requirements:

1. For all bids greater than $100,000, the Bidder shall obtain MBE, WBE and SDVE participation in an amount equal to or greater than the percentage goals set forth in the Invitation for Bid and the Bid Form, unless the Bidder is granted a Good Faith Effort waiver by the Director of the Division, as set forth below. If the Bidder does not meet the MBE, WBE and SDVE goals, or make a good faith effort to do so, the Bidder shall be nonresponsive, and its bid shall be rejected.

2. The Bidder should submit with its bid all the information requested in the MBE/WBE/SDVE Compliance Evaluation Form for every MBE, WBE, or SDVE subcontractor or material supplier the Bidder intends to use for the contract work. The Bidder is required to submit all MBE/WBE/SDVE documentation before the stated time and date set forth in the Invitation for Bid. If the Bidder fails to provide such information by the specified date and time, the Owner shall reject the bid.

3. The Director reserves the right to request additional information from a Bidder to clarify the Bidder's proposed MBE, WBE, and/or SDVE participation. The Bidder shall submit the clarifying information requested by the Owner within two (2) working days of receiving the request for clarification.

4. Pursuant to section 34.074, RSMo, a Prime Bidder that qualifies as an SDVE shall receive a three-percentage point bonus preference in the contract award evaluation process. The bonus preference will be calculated and applied by reducing the bid amount of the eligible SDVE by three percent of the apparent low responsive Bidder's bid. Based on this calculation, if the eligible SDVE's evaluation is less than the apparent low responsive Bidder's bid, the eligible SDVE's bid will become the apparent low responsive bid. This reduction is for evaluation purposes only and will have no impact on the actual amount(s) of the bid or the amount(s) of any contract awarded. In order to be eligible for the SDVE preference, the Bidder must complete and submit with its bid the Missouri Service-Disabled Veteran Business Form, and any information required by the form.

C. Computation of MBE/WBE/SDVE Goal Participation:

1. A Bidder who is a MBE, WBE, or SDVE may count 100% of the contract towards the MBE, WBE or SDVE goal, less any amounts awarded to another MBE, WBE or SDVE. (NOTE: a MBE firm that bids as general contractor must obtain WBE and SDVE participation; a WBE firm that bids as a general contractor must obtain MBE and SDVE participation; and a SDVE firm that bids as general contractor must obtain MBE and WBE participation.) For the remaining contract amount to be counted towards the MBE, WBE or SDVE goal, the Bidder must complete the MBE/WBE/SDVE Compliance Evaluation Form (Section 004337) identifying itself as an MBE, WBE or SDVE.

2. The total dollar value of the work granted to a certified MBE, WBE or SDVE by the Bidder shall be counted towards the applicable goal.

3. Expenditures for materials and supplies obtained from a certified MBE, WBE, or SDVE supplier or manufacturer may be counted towards the MBE, WBE and SDVE goals, if the MBE, WBE, or SDVE assumes the actual and contractual responsibility for the provision of the materials and supplies.

4. The total dollar value of the work granted to a second or subsequent tier subcontractor or a supplier may be counted towards a Bidder's MBE, WBE and SDVE goals, if the MBE, WBE, or SDVE properly assumes the actual and contractual responsibility for the work.

5. The total dollar value of work granted to a certified joint venture equal to the percentage of the ownership and control of the MBE, WBE, or SDVE partner in the joint venture may be counted towards the MBE/WBE/SDVE goals.

6. Only expenditures to a MBE, WBE, or SDVE that performs a commercially useful function in the work may be counted towards the MBE, WBE and SDVE goals. A MBE, WBE, or SDVE performs a commercially useful function when it is responsible for executing a distinct element of the work and carrying out its responsibilities by performing, managing and supervising the work or providing supplies or manufactured materials.

D. Certification of MBE/WBE/SDVE Subcontractors:

1. In order to be counted towards the goals, an MBE or WBE must be certified by the State of Missouri Office of Equal Opportunity and an SDVE must be certified by the State of Missouri, Office of Equal Opportunity or by the Federal U.S. Small Business Administration directory.

2. The Bidder may determine the certification status of a proposed MBE or WBE subcontractor or supplier by referring to the Office of Equal Opportunity (OEO)'s online MBE/WBE directory https://apps1.mo.gov/MWBCertifiedFirms/. The Bidder may determine the eligibility of a SDVE subcontractor or supplier by referring to the Office of Equal Opportunity online SDVE directory at https://oeo.mo.gov/sdve-certification-program/ or the Federal U.S. Small Business Administration directory https://veterans.certify.sba.gov/#search.

3. Additional information, clarifications, or other information regarding the MBE/WBE/SDVE listings in the directories may be obtained by contacting the Contract Specialist of record as shown in the Supplementary Conditions (Section 007300).

E. Waiver of MBE/WBE/SDVE Participation:

1. If a Bidder has made a good faith effort to secure the required MBE, WBE and/or SDVE participation and has failed, the Bidder shall submit with its bid the information requested in MBE/WBE/SDVE Good Faith Effort (GFE) Determination form. The Director will determine if the Bidder made a good faith effort to meet the applicable goals. If the Director determines that the Bidder did not make a good faith effort, the bid shall be rejected as being nonresponsive to the bid requirements. Bidders who demonstrate that they have made a good faith effort to include MBE, WBE, and/or SDVE participation will be granted a waiver and will be considered to be responsive to the applicable participation goals, regardless of the percent of actual participation obtained, if the bid is otherwise acceptable.

2. In determining whether a Bidder has made a good faith effort to obtain MBE, WBE and/or SDVE participation, the Director may evaluate the factors set forth in 1 CSR 30-5.010(6)(C) and the following:

   a. The amount of actual participation obtained;

   b. How and when the Bidder contacted potential MBE, WBE, and SDVE subcontractors and suppliers;

   c. The documentation provided by the Bidder to support its contacts, including whether the Bidder provided the names, addresses, phone numbers, and dates of contact for MBE/WBE/SDVE firms contacted for specific categories of work;

   d. If project information, including plans and specifications, were provided to MBE/WBE/SDVE subcontractors;

   e. Whether the Bidder made any attempts to follow-up with MBE, WBE or SDVE firms prior to bid;

f. Amount of bids received from any of the subcontractors and/or suppliers that the Bidder contacted;

g. The Bidder's stated reasons for rejecting any bids;

F. Contractor MBE/WBE/SDVE Obligations

1. If awarded a contract, the Bidder will be contractually required to subcontract with or obtain materials from the MBE, WBE, and SDVE firms listed in its bid, in amounts equal to or greater than the dollar amount in the bid, unless the amount is modified in writing by the Owner.

2. If the Contractor fails to meet or maintain the participation requirements contained in the Contractor's bid, the Contractor must satisfactorily explain to the Director why it cannot comply with the requirement and why failing meeting the requirement was beyond the Contractor's control. If the Director finds the Contractor's explanation unsatisfactory, the Director may take any appropriate action including, but not limited to:

   a. Declaring the Contractor ineligible to participate in any contracts with the Division for up to twelve (12) months (suspension); and/or

   b. Declaring the Contractor be nonresponsive to the Invitation for Bid, or in breach of contract and rejecting the bid or terminating the contract.

3. If the Contractor replaces an MBE, WBE, or SDVE during the course of the contract, the Contractor shall replace it with another MBE, WBE, or SDVE or make a good faith effort to do so. All MBE, WBE and SDVE substitutions must be approved by the Director in writing.

4. The Contractor shall provide the Owner with regular reports on its progress in meeting its MBE/WBE/SDVE obligations. At a minimum, the Contractor shall report the dollar-value of work completed by each MBE, WBE, or SDVE during the preceding month and the cumulative total of work completed by each MBE, WBE or SDVE to date with each monthly application for payment. The Contractor shall also make a final report, which shall include the total dollar-value of work completed by each MBE, WBE, and SDVE during the entire contract.

# State of Missouri
# Construction Contract

**THIS AGREEMENT** is made (DATE) by and between:

***Contractor Name and Address***

hereinafter called the "Contractor," and the **State of Missouri**, hereinafter called the **"Owner"**, represented by the Office of Administration, Division of Facilities Management, Design and Construction.

WITNESSETH, that the Contractor and the Owner, for the consideration stated herein agree as follows:

**ARTICLE 1. STATEMENT OF WORK**

The Contractor shall furnish all labor and materials and perform all work required for furnishing and installing all labor, materials, equipment and transportation and everything necessarily inferred from the general nature and tendency of the plans and specifications for the proper execution of the work for:

| | |
|---|---|
| **Project Name:** | **Renovations to Exterior**<br>**Missouri State Highway Patrol Troop B Headquarters and Crime Lab**<br>**Macon, Missouri** |
| **Project Number:** | **R2510-01** |

in strict accordance with the Contract Documents as enumerated in Article 7, all of which are made a part hereof.

**ARTICLE 2. TIME OF COMPLETION**

The contract performance time is **140 working days** from the transmittal date of this agreement. The contract completion date is **MONTH, DAY, YEAR**. This time includes ten (10) working days for the Contractor to receive, sign and return the contract form along with required bonding and insurance certificates. Failure of the Contractor to provide correct bonding and insurance within the ten (10) working days shall not be grounds for a time extension. Receipt of proper bonding and insurance is a condition precedent to the formation of the contract and if not timely received, may result in forfeiture of the Contractor's bid security. Work may not commence until the Owner issues a written Notice to Proceed and must commence within seven (7) working days thereafter.

**ARTICLE 3. LIQUIDATED DAMAGES**

Whenever time is mentioned in this contract, time shall be and is of the essence of this contract. The Owner would suffer a loss should the Contractor fail to have the work embraced in this contract fully completed on or before the time above specified. THEREFORE, the parties hereto realize in order to adjust satisfactorily the damages on account of such failure that it might be impossible to compute accurately or estimate the amount of such loss or damages which the Owner would sustain by reason of failure to complete fully said work within the time required by this contract. The Contractor hereby covenants and agrees to pay the Owner, as and for **liquidated damages, the sum of $700** per day for each and every day, Sunday and legal holidays excepted, during which the work remains incomplete and unfinished. Any sum which may be due the Owner for such damages shall be deducted and retained by the Owner from any balance which may be due the Contractor when said work shall have been finished and accepted. But such provisions shall not release the Bond of the Contractor from liability according to its terms. In case of failure to complete, the Owner will be under no obligation to show or prove any actual or specific loss or damage.

**ARTICLE 4. CONTRACT SUM**

The Owner shall pay the Contractor for the prompt, faithful and efficient performance of the conditions and undertakings of this contract, subject to additions, and deductions as provided herein, in current funds the sum of:

Base Bid: $

Accepted Alternates, if applicable to the Project and accepted by the Owner.

**TOTAL CONTRACT AMOUNT: ($CONTRACT AMOUNT)**

**UNIT PRICES:** The Owner accepts the following Unit Prices:

For changing specified quantities of work from those indicated by the contract drawings and specifications, upon written instructions of Owner, the following unit prices shall prevail. The unit prices include all labor, overhead and profit, materials, equipment, appliances, bailing, shoring, shoring removal, etc., to cover the finished work of the several kinds of work called for. Only a single unit price shall be given and it shall apply for either MORE or LESS work than that shown on the drawings and called for in the specifications or included in the Base Bid. In the event of more or less units than so indicated or included, change orders may be issued for the increased or decreased amount.

**ARTICLE 5. PREVAILING WAGE RATE**

**MISSOURI PREVAILING WAGE LAW (Sections 290.210 to 290.340, RSMo)**: The Contractor shall pay not less than the specified hourly rate of wages, as set out in the wage order attached to and made part of the specifications for work under this contract, to all workers performing work under the contract, in accordance with sections 290.210 to 290.340, RSMo. The Contractor shall forfeit a penalty to the Owner of one hundred dollars per day (or portion of a day) for each worker that is paid less than the specified rates for any work done under the contract by the Contractor or by any subcontractor, in accordance with section 290.250, RSMo.

**DAVIS-BACON ACT:** If this Project is financed in whole or in part from Federal funds (as indicated in the Instructions to Bidders or other bid or contract documents for this Project), then this contract shall be subject to all applicable federal labor statutes, rules and regulations, including provisions of the Davis-Bacon Act, 40 U.S.C. §3141 et seq., and the "Federal Labor Standards Provisions," as further set forth in Section 007333 – Supplementary General Conditions for Federally Funded/Assisted Construction Projects, which is incorporated into the contract by reference. Where the Missouri Prevailing Wage Law and the Davis-Bacon Act require payment of different wages for work performed under this contract, the Contractor and all Subcontractors shall pay the greater of the wages required under either law, on a classification-by-classification basis.

**ARTICLE 6. MINORITY/WOMEN/SERVICE DISABLED VETERAN BUSINESS ENTERPRISE PARTICIPATION**

The Contractor has been granted a waiver of the 0% MBE and 0% WBE and 3% SDVE participation goals. The Contractor agrees to secure the MBE/WBE/SDVE participation amounts for this project as follows: (OR)

The Contractor has met the MBE/WBE/SDVE participation goals and agrees to secure the MBE/WBE/SDVE participation amounts for this project as follows:

MBE/WBE/SDVE Firm: Subcontract Amt:$
MBE/WBE/SDVE Firm: Subcontract Amt:$
MBE/WBE/SDVE Firm: Subcontract Amt:$

Total $

MBE/WBE/SDVE assignments identified above shall not be changed without a contract change signed by the Owner.

The Director of the Division of Facilities Management, Design and Construction or his Designee shall be the final authority to resolve disputes and disagreements between the Contractor and the MBE/WBE/SDVE firms listed above when such disputes impact the subcontract amounts shown above.

**ARTICLE 7. CONTRACT DOCUMENTS**

The following documents are hereby incorporated into this contract by reference (all division/section numbers and titles are as utilized in the Project Manual published by the Owner for this Project):

1. Division 0 – Procurement and Contracting Information, including, but not limited to:
    a. Invitation for Bid (Section 001116)
    b. Instructions to Bidders (Section 002113)
    c. Supplementary Instructions to Bidders (if applicable) (Section 002213)
    d. The following documents as completed and executed by the Contractor and accepted by the Owner, if applicable:
        i. Bid Form (Section 004113)
        ii. Unit Prices (Section 004322)
        iii. Proposed Contractors Form (Section 004336)
        iv. MBE, WBE, SDVE Compliance Evaluation Form(s) (Section 004337)
        v. MBE, WBE, SDVE Eligibility Determination Form for Joint Ventures (Section 004338)
        vi. MBE, WBE, SDVE Good Faith Effort (GFE) Determination Form (Section 004339)
        vii. Missouri Service Disabled Veteran Business Form (Section 004340)
        viii. Affidavit of Work Authorization (Section 004541)
    e. Performance and Payment Bond, completed and executed by the Contractor and surety (Section 006113)
    f. General Conditions (Section 007213)
    g. Supplementary Conditions (Section 007300)
    h. Supplementary General Conditions for Federally Funded/Assisted Construction Projects (Section 007333), if applicable
    i. Wage Rate(s) (Section 007346)
2. Division 1 – General Requirements
3. All Drawings identified in the Project Manual
4. All Technical Specifications included in the Project Manual
5. Addenda, if applicable

**ARTICLE 8 – CERTIFICATION**

By signing this contract, the Contractor hereby re-certifies compliance with all legal requirements set forth in Section 6.0, Bidder's Certifications of the Bid Form.

By signature below, the parties hereby execute this contract document.

**APPROVED:**

_____
Crystal Wessing, Interim Director
Division of Facilities Management,
Design and Construction

_____
Contractor's Authorized Signature

I, Corporate Secretary, certify that I am Secretary of the corporation named above and that (CONTRACTOR NAME), who signed said contract on behalf of the corporation, was then (TITLE) of said corporation and that said contract was duly signed for and in behalf of the corporation by authority of its governing body, and is within the scope of its corporate powers.

_____
*Corporate Secretary*

**Bond No._____**

**SECTION 006113 - PERFORMANCE AND PAYMENT BOND FORM**

KNOW ALL MEN BY THESE PRESENTS, THAT we _____

as principal, and _____

_____as Surety, are held and firmly bound unto the

STATE OF MISSOURI. in the sum of _____ Dollars ($ )

for payment whereof the Principal and Surety bind themselves, their heirs, executors, administrators and successors, jointly and severally, firmly by these presents.

WHEREAS, the Principal has, by means of a written agreement dated the _____

day of_____, 20_____, enter into a contract with the State of Missouri for

_____

_____

_____

(Insert Project Title and Number)

NOW, THEREFORE, if the Principal shall faithfully perform and fulfill all the undertakings, covenants, terms, conditions and agreements of said contract during the original term of said contract and any extensions thereof that may be granted by the State of Missouri, with or without notice to the Surety and during the life of any guaranty required under the contract; and shall also faithfully perform and fulfill all undertakings, covenants, terms, conditions and agreements of any and all duly authorized modifications of said contract that may hereafter be made with or without notice to the Surety; and shall also promptly make payment for materials incorporated, consumed or used in connection with the work set forth in the contract referred to above, and all insurance premiums, both compensation and all other kinds of insurance, on said work, and for all labor performed on such work, whether by subcontractor or otherwise, at not less than the prevailing hourly rate of wages for work of a similar character (exclusive of maintenance work) in the locality in which the work is performed and not less than the prevailing hourly rate of wages for legal holiday and overtime work (exclusive of maintenance work) in the locality in which the work is performed both as determined by the Department of Labor and Industrial Relations or determined by the Court of Appeal, as provided for in said contract and in any and all duly authorized modifications of said contract that may be hereafter made, with or without notice to the Surety, then, this obligation shall be void and of no effect, but it is expressly understood that if the Principal should make default in or should fail to strictly, faithfully and efficiently do, perform and comply with any or more of the covenants, agreements, stipulations, conditions, requirements or undertakings, as specified in or by the terms of said contract, and with the time therein named, then this obligation shall be valid and binding upon each of the parties hereto and this bond shall remain in full force and effect; and the same may be sued on at the instance of any material man, laborer, mechanic, subcontractor, individual, or otherwise to whom such payment is due, in the name of the State of Missouri, to the use of any such person.

AND, IT IS FURTHER specifically provided that any modifications which may hereinafter be made in the terms of the contract or in the work to be done under it or the giving by the Owner of any extension of the time for the performance of the contract or any other forbearance on the part of either the Owner or the Principal to the other, shall not in any way release the Principal and the Surety, or either or any of them, their heirs, executors, administrators and successors, from their liability hereunder, notice to the Surety of any such extension, modifications or forbearance being hereby waived.

IN WITNESS WHEREOF, the above bounden parties have executed the within instrument this _____ day of _____, 20 ____.

**AS APPLICABLE:**

AN INDIVIDUAL

Name: _____

Signature: _____

A PARTNERSHIP

Name of Partner: _____

Signature of Partner: _____

Name of Partner: _____

Signature of Partner: _____

CORPORATION

Firm Name: _____

Signature of President: _____

SURETY

Surety Name: _____

Attorney-in-Fact: _____

Address of Attorney-in-Fact: _____

_____

Telephone Number of Attorney-in-Fact: _____

Signature Attorney-in-Fact: _____

**NOTE**: Surety shall attach Power of Attorney

STATE OF MISSOURI
OFFICE OF ADMINISTRATION
DIVISION OF FACILITIES MANAGEMENT, DESIGN AND CONSTRUCTION

# PRODUCT SUBSTITUTION REQUEST

*PROJECT NUMBER*

PROJECT TITLE AND LOCATION

CHECK APPROPRIATE BOX

☐ SUBSTITUTION PRIOR TO BID OPENING
(Minimum of (5) working days prior to receipt of Bids as per Article 4 – Instructions to Bidders)

☐ SUBSTITUTION FOLLOWING AWARD
(Maximum of (20) working days from Notice to Proceed as per Article 3 – General Conditions)

FROM: BIDDER/CONTRACTOR (PRINT COMPANY NAME)

TO: ARCHITECT/ENGINEER (PRINT COMPANY NAME)

Bidder/Contractor hereby requests acceptance of the following product or systems as a substitution in accordance with provisions of Division One of the Bidding Documents:

SPECIFIED PRODUCT OR SYSTEM

SPECIFICATION SECTION NO.

SUPPORTING DATA

☐ Product data for proposed substitution is attached (include description of product, standards, performance, and test data)

☐ Sample ☐ Sample will be sent, if requested

**QUALITY COMPARISON**

| | SPECIFIED PRODUCT | SUBSTITUTION REQUEST |
|---|---|---|
| NAME, BRAND | | |
| CATALOG NO. | | |
| MANUFACTURER | | |
| VENDOR | | |

**PREVIOUS INSTALLATIONS**

| PROJECT | ARCHITECT/ENGINEER | |
|---|---|---|
| LOCATION | | DATE INSTALLED |

**SIGNIFICANT VARIATIONS FROM SPECIFIED PRODUCT**

**REASON FOR SUBSTITUTION**

**DOES PROPOSED SUBSTITUTION AFFECT OTHER PARTS OF WORK?**

☐ YES ☐ NO

IF YES, EXPLAIN

**SUBSTITUTION REQUIRES DIMENSIONAL REVISION OR REDESIGN OF STRUCTURE OR A/E WORK**

☐ YES ☐ NO

**BIDDER'S/CONTRACTOR'S STATEMENT OF CONFORMANCE OF PROPOSED SUBSTITUTION TO CONTRACT REQUIREMENT:**

We have investigated the proposed substitution. We believe that it is equal or superior in all respects to specified product, except as stated above; that it will provide the same Warranty as specified product; that we have included complete implications of the substitution; that we will pay redesign and other costs caused by the substitution which subsequently become apparent; and that we will pay costs to modify other parts of the Work as may be needed, to make all parts of the Work complete and functioning as a result of the substitution.

| BIDDER/CONTRACTOR | DATE |
|---|---|
| | |

**REVIEW AND ACTION**

☐ Resubmit Substitution Request with the following additional information:

☐ Substitution is accepted.

☐ Substitution is accepted with the following comments:

☐ Substitution is not accepted.

| ARCHITECT/ENGINEER | DATE |
|---|---|
| | |

STATE OF MISSOURI
OFFICE OF ADMINISTRATION
DIVISION OF FACILITIES MANAGEMENT, DESIGN AND CONSTRUCTION

# FINAL RECEIPT OF PAYMENT AND RELEASE

PROJECT NUMBER

KNOW ALL MEN BY THESE PRESENT THAT: hereinafter called "Subcontractor" who heretofore entered into an agreement with hereinafter called "Contractor", for the performance of work and/or furnishing of material for the construction of the project entitled

(PROJECT TITLE, PROJECT LOCATION, AND PROJECT NUMBER)

at

(ADDRESS OF PROJECT)

for the State of Missouri (Owner) which said subcontract is by this reference incorporated herein, in consideration of such final payment by Contractor.

DOES HEREBY:

1. ACKNOWLEDGE that they have been **PAID IN FULL** all sums due for work and materials contracted or done by their Subcontractors, Material Vendors, Equipment and Fixture Suppliers, Agents and Employees, or otherwise in the performance of the Work called for by the aforesaid Contract and all modifications or extras or additions thereto, for the construction of said project or otherwise.
2. RELEASE and fully, finally, and forever discharge the Owner from any and all suits, actions, claims, and demands for payment for work performed or materials supplied by Subcontractor in accordance with the requirements of the above referenced Contract.
1. REPRESENT that all of their Employees, Subcontractors, Material Vendors, Equipment and Fixture Suppliers, and everyone else has been **paid in full** all sums due them, or any of them, in connection with performance of said Work, or anything done or omitted by them, or any of them in connection with the construction of said improvements, or otherwise.

DATED this day of , 20 .

NAME OF SUBCONTRACTOR

BY (TYPED OR PRINTED NAME)

SIGNATURE

TITLE

ORIGINAL: FILE/Closeout Documents

STATE OF MISSOURI
OFFICE OF ADMINISTRATION
DIVISION OF FACILITIES MANAGEMENT,
DESIGN AND CONSTRUCTION

| PAY APP NO. | PROJECT NUMBER |
|---|---|
| CHECK IF FINAL ☐**FINAL** | DATE |

## MBE/WBE/SDVE PROGRESS REPORT

Remit with **ALL** Progress and Final Payments

(Please check appropriate box) ☐CONSULTANT ☐CONSTRUCTION

| PROJECT TITLE | |
|---|---|
| PROJECT LOCATION | |
| FIRM | |
| ORIGINAL CONTRACT SUM (Same as Line Item 1. on Form A of Application for Payment) **$** | TOTAL CONTRACT SUM TO DATE (Same as Line Item 3. on Form A of Application for Payment) **$** |

THE TOTAL MBE/WBE/SDVE PARTICIPATION DOLLAR AMOUNT OF THIS PROJECT AS INDICATED IN THE ORIGINAL CONTRACT: **$**

| SELECT MBE, WBE, SDVE | ORIGINAL CONTRACT PARTICIPATION AMOUNT | PARTICIPATION AMOUNT PAID-TO-DATE (includes approved contract changes) | CONSULTANT/SUBCONSULTANT OR CONTRACTOR/SUBCONTRACTOR/SUPPLIER COMPANY NAME |
|---|---|---|---|
| ☐ MBE ☐ WBE ☐ SDVE | $ | $ | |
| ☐ MBE ☐ WBE ☐ SDVE | $ | $ | |
| ☐ MBE ☐ WBE ☐ SDVE | $ | $ | |
| ☐ MBE ☐ WBE ☐ SDVE | $ | $ | |
| ☐ MBE ☐ WBE ☐ SDVE | $ | $ | |
| ☐ MBE ☐ WBE ☐ SDVE | $ | $ | |

*Revised 06/2023*

## INSTRUCTIONS FOR MBE/WBE/SDVE PROGRESS REPORT

**CONTRACTOR OR CONSULTANT TO FILL OUT AND REMIT WITH EACH PAY APPLICATION:**

The MBE/WBE/SDVE Progress Report for the project is issued with the contract comprising values reported in the consultant's Proposal or on the successful contractor's Section 004337 Compliance Evaluation Forms.

At Initial Pay Application fill in the following:

1. Pay App No. Start with 1.
2. Fill in the Project Number and Date.
3. Enter Project Title, Project Location, and Firm.
4. Fill in the "Original Contract Sum" and "Total Contract Sum To Date" (Reference applicable Line Items on Form A of Application for Payment).
5. Indicate the Total Participation Dollar Amount from the Original Contract.
6. Select MBE, WBE, or SDVE for each Consultant/Subconsultant or Contractor/Subcontractor/Supplier.
7. Enter the "Total Amount of Subcontract", "$ Amount (Paid-To-Date)", and Company Name.

For all subsequent Pay Applications fill in the following:

1. Pay App No.
2. If Final Pay App, check box.
3. Fill in the Project Number and Date.
4. Enter Project Title, Project Location, and Firm
5. At each Pay App fill in the "Original Contract Sum" and "Total Contract Sum To Date" (reference applicable Line Items on Form A of Application for Payment).
6. Indicate the Total Participation Dollar Amount from the Original Contract.
7. Select MBE, WBE, or SDVE for each Consultant/Subconsultant or Contractor/Subcontractor/Supplier
8. Enter the "Total Amount of Subcontract", "$ Amount (Paid-To-Date)", and Company Name.

STATE OF MISSOURI
OFFICE OF ADMINISTRATION
DIVISION OF FACILITIES MANAGEMENT, DESIGN AND CONSTRUCTION
**AFFIDAVIT – COMPLIANCE WITH PREVAILING WAGE LAW**

PROJECT NUMBER

Before me, the undersigned Notary Public, in and for the County of _____

State of _____ personally came and appeared _____
(NAME)

_____ of the _____
(POSITION) (NAME OF THE COMPANY)

(a corporation) (a partnership) (a proprietorship) and after being duly sworn did depose and say that all provisions and requirements set out in Chapter 290, Sections 290.210 through and including 290.340, Missouri Revised Statutes, pertaining to the payment of wages to workmen employed on public works project have been fully satisfied and there has been no exception to the full and completed compliance with said provisions and requirements and with Wage Determination No: _____ issued by the Department of Labor and Industrial Relations, State of Missouri on the _____ day of _____ 20 __ in carrying out the contract and working in connection with _____
(NAME OF PROJECT)

Located at _____ in _____ County
(NAME OF THE INSTITUTION)

Missouri, and completed on the _____ day of _____ 20 __

SIGNATURE

**NOTARY INFORMATION**

| | | | |
|---|---|---|---|
| NOTARY PUBLIC EMBOSSER OR BLACK INK RUBBER STAMP SEAL | STATE | | COUNTY (OR CITY OF ST. LOUIS) |
| | SUBSCRIBED AND SWORN BEFORE ME, THIS<br>DAY OF YEAR | | **USE RUBBER STAMP IN CLEAR AREA BELOW** |
| | NOTARY PUBLIC SIGNATURE | MY COMMISSION EXPIRES | |
| | NOTARY PUBLIC NAME (TYPED OR PRINTED) | | |

FILE: Closeout Documents

# GENERAL CONDITIONS

# INDEX

A. These General Conditions apply to each section of these specifications. The Contractor is subject to the provisions contained herein.

B. The General Conditions are intended to define the relationship of the Owner, the Designer and the Contractor thereby establishing certain rules and provisions governing the operation and performance of the work so that the work may be performed in a safe, orderly, expeditious and workmanlike manner.

## ARTICLE 1 – GENERAL PROVISIONS

### ARTICLE 1.1 - DEFINITIONS

As used in these contract documents, the following terms shall have the meanings and refer to the parties designated in these definitions.

1. **"COMMISSIONER":** The Commissioner of the Office of Administration.
2. **"CONSTRUCTION DOCUMENTS":** The "Construction Documents" shall consist of the Project Manual, Drawings and Addenda.
3. **"CONSTRUCTION REPRESENTATIVE:"** Whenever the term "Construction Representative" is used, it shall mean the Owner's Representative at the work site.
4. **"CONTRACTOR"**: Party or parties who have entered into a contract with the Owner to furnish work under these specifications and drawings.
5. **"DESIGNER"**: When the term "Designer" is used herein, it shall refer to the Architect, Engineer, or Consultant of Record specified and defined in Paragraph 2.0 of the Supplemental Conditions, or his duly authorized representative. The Designer may be either a consultant or state employee.
6. **"DIRECTOR"**: Whenever the term "Director" is used, it shall mean the Director of the Division of Facilities Management, Design and Construction or his Designee, representing the Office of Administration, State of Missouri. The Director is the agent of the Owner.
7. **"DIVISION":** Shall mean the Division of Facilities Management, Design and Construction, State of Missouri.
8. **"INCIDENTAL JOB BURDENS":** Shall mean those expenses relating to the cost of work, incurred either in the home office or on the job-site, which are necessary in the course of doing business but are incidental to the job. Such costs include office supplies and equipment, postage, courier services, telephone expenses including long distance, water and ice and other similar expenses.
9. **"JOINT VENTURE"**: An association of two (2) or more businesses to carry out a single business enterprise for profit for which purpose they combine their property, capital, efforts, skills and knowledge.
10. **"OWNER"**: Whenever the term "Owner" is used, it shall mean the State of Missouri. Acting by and through the Office of Administration, Division of Facilities Management, Design and Construction.
11. **"PROJECT"**: Wherever the term "Project" is used, it shall mean the work required to be completed by the construction contract.
12. **"PROJECT MANUAL"**: The "Project Manual" shall consist of Introductory Information, Invitation for Bid, Instructions to Bidders, Bid Documents, Additional Information, Standard Forms, General Conditions, Supplemental General Conditions, General Requirements and Technical Specifications.
13. **"SUBCONTRACTOR"**: Party or parties who contract under, or for the performance of part or this entire Contract between the Owner and Contractor. The subcontract may or may not be direct with the Contractor.
14. **"WORK"**: All supervision, labor, materials, tools, supplies, equipment, and any incidental operations and/or activities required by or reasonably inferable from the Contract Documents necessary to construct the Project and to produce the results intended by the Contract Documents in a safe, expeditious, orderly, and workmanlike manner so that the project shall be complete and finished in the best manner known to each respective trade.
15. "**WORKING DAYS**": are all calendar days except Saturdays, Sundays and the following holidays: New Year's Day, Martin Luther King, Jr. Day, Lincoln Day, Washington's Birthday (observed), Truman Day, Memorial Day, Juneteenth, Independence Day, Labor Day, Columbus Day, Veterans Day (observed), Thanksgiving Day, Christmas Day.

**ARTICLE 1.2 DRAWINGS AND SPECIFICATIONS**

A. In case of discrepancy between drawings and specifications, specifications shall govern. Should discrepancies in architectural drawings, structural drawings and mechanical drawings occur, architectural drawings shall govern and, in case of conflict between structural and mechanical drawings, structural drawings shall govern.

B. Specifications are separated into titled divisions for convenience of reference only and to facilitate letting of contracts and subcontracts. The Contractor is responsible for establishing the scope of work for subcontractors, which may cross titled divisions. Neither the Owner nor Designer will establish limits and jurisdiction of subcontracts.

C. Figured dimensions take precedence over scaled measurements and details over smaller scale general drawings. In the event of conflict between any of the documents contained within the contract, the documents shall take precedence and be controlling in the following sequence: addenda, supplementary general conditions, general conditions, division 1 specifications, technical division specifications, drawings, bid form and instructions to bidders.

D. Anything shown on drawings and not mentioned in these specifications or vice versa, as well as any incidental work which is obviously necessary to complete the project within the limits established by the drawings and specifications, although not shown on or described therein, shall be performed by the Contractor at no additional cost as a part of his contract.

E. Upon encountering conditions differing materially from those indicated in the contract documents, the Contractor shall promptly notify the Designer and Construction Representative in writing before such conditions are disturbed. The Designer shall promptly investigate said conditions and report to the Owner, with a recommended course of action**.** If conditions do materially differ and cause an increase or decrease in contract cost or time required for completion of any portion of the work, a contract change will be initiated as outlined in Article 4 of these General Conditions.

E. Only work included in the contract documents is authorized, and the Contractor shall do no work other than that described therein or in accordance with appropriately authorized and approved contract changes.

**ARTICLE 1.3 - COMPLIANCE WITH LAWS, PERMITS, REGULATIONS AND INSPECTIONS**

A. Since the Owner is the State of Missouri, municipal or political subdivisions, zoning ordinances, construction codes (other than licensing of trades), and other like ordinances are not applicable to construction on Owner's property, and Contractor will not be required to submit drawings and specifications to any municipal or political subdivision, authority, obtain construction permits or any other licenses (other than licensing of trades) or permits from or submit to inspections by any municipality or political subdivision relating to the construction for this project. All permits or licenses required by municipality or political subdivision for operation on property not belonging to Owner shall be obtained by and paid for by Contractor. Each Contractor shall comply with all applicable laws, ordinances, rules and regulations that pertain to the work of this contract.

B. Contractors, subcontractors and their employees engaged in the businesses of electrical, mechanical, plumbing, carpentry, sprinkler system work, and other construction related trades shall be licensed to perform such work by the municipal or political subdivision where the project is located, if such licensure is required by local code. Local codes shall dictate the level (master, journeyman, and apprentice) and the number, type and ratio of licensed tradesmen required for this project within the jurisdiction of such municipal or political subdivision.

C. Equipment and controls manufacturers and their authorized service and installation technicians that do not maintain an office within the jurisdiction of the municipal or political subdivision but are a listed or specified contractor or subcontractor on this project are exempt from Paragraph 1.3 B above.

D. The Contractor shall post a copy of the wage determination issued for the project and included as a part of the contract documents, in a prominent and easily accessible location at the site of construction for the duration of the project.

E. Any contractor or subcontractor to such contractor at any tier signing a contract to work on this project shall provide a ten-hour Occupational Safety and Health Administration (OSHA) construction safety program for their on-site employees which includes a course in construction safety and health approved by OSHA or a similar program approved by the Department of Labor and Industrial Relations which is at least as stringent as an approved OSHA program. The contractor shall forfeit as a penalty to the public body on whose

behalf the contract is made or awarded, two thousand five hundred dollars plus one hundred dollars for each employee employed by the contractor or subcontractor, for each calendar day, or portion thereof, such employee is employed without the required training.

**ARTICLE 1.4 - NONDISCRIMINATION IN EMPLOYMENT**

A. The Contractor and his subcontractors will not discriminate against individuals based on race, color, religion, national origin, sex, disability, or age, but may use restrictions which relate to bona fide occupational qualifications. Specifically, the Contractor and his subcontractors shall not discriminate:

1. Against recipients of service on the basis of race, color, religion, national origin, sex, disability or age.
2. Against any employee or applicant, for employment on the basis of race, color, religion, national origin, sex or otherwise qualified disability status.
3. Against any applicant for employment or employee on the basis of age, where such applicant or employee is between ages 40 and 70 and where such Contractor employs at least 20 persons.
4. Against any applicant for employment or employee on the basis of that person's status as a disabled or Vietnam-era veteran.

The Contractor and his Subcontractors will ensure applicants for employment and employees are treated equally without regard to race, color, religion, national origin, sex, disability, or age. Such action shall include, but not be limited to, the following: employment, upgrading, demotion and transfer; recruitment or recruitment advertising; and selection for training, including apprenticeship. The Contractor and his Subcontractors will give written notice of their commitments under this clause to any labor union with which they have bargaining or other agreements under this clause to any labor union with which they have bargaining or other agreements.

B. In the event of the Contractor's or his subcontractor's noncompliance with any provisions of this Article of the Contract, the Owner may cancel this contract in whole or in part or require the Contractor to terminate his contract with the subcontractor.

**ARTICLE 1.5 - ANTI-KICKBACK**

No employee of the division, shall have or acquire any pecuniary interest, whether direct or indirect, in this contract or in any part hereof. No officer, employee, designer, attorney, or administrator of or for the Owner who is authorized in such capacity and on behalf of the Owner to exercise any legislative, executive, supervisory or other similar functions in connection with the construction of the project, shall have or acquire any pecuniary interest, whether direct or indirect, in this contract, any material supply contract, subcontract, insurance contract, or any other contract pertaining to the project.

**ARTICLE 1.6 - PATENTS AND ROYALTIES**

A. The Contractor shall hold and save the Owner and its officers, agents, servants, and employees harmless from liabilities of any nature or kind, including cost and expenses, for, or on account of, any patented or unpatented invention, process, article or appliance manufactured or used in the performance of this contract, including its use by the Owner, unless otherwise specifically stipulated in the contract documents.

B. If the Contractor uses any design, device or materials covered by letters, patent or copyright, the Contractor shall provide for such use by suitable agreement with the Owner of such patented or copyrighted design, device or material. It is mutually agreed and understood, without exception, that the contract prices shall include all royalties or costs arising from the use of such design, device or materials, in any way involved in the work. The Contractor and/or his sureties shall indemnify and save harmless the Owner of the project from any and all claims for infringement by reason of the use of such patented or copyrighted design, device or materials or any trademark or copyright in connection with work agreed to be performed under this contract and shall indemnify the Owner for any cost, expense or damage it may be obliged to pay by reason of such infringement at any time during the prosecution of the work or after completion of the work.

**ARTICLE 1.7 - PREFERENCE FOR AMERICAN AND MISSOURI PRODUCTS AND SERVICES**

A. By virtue of statutory authority a preference will be given to Missouri labor and to products of mines, forests and quarries of the state of Missouri when they are found in marketable quantities in the state, and all such materials shall be of the best quality and suitable character that can be obtained at reasonable market prices, all as provided for in Section 8.280, Missouri Revised Statutes and Cumulative Supplements.

B. Furthermore, pursuant to Section 34.076 Missouri Revised Statutes and Cumulative Supplements, a preference shall be given to those persons doing business as Missouri firms, corporations, or individuals, or which maintain Missouri offices or places of business, when the quality of performance promised is equal or better and the price quoted is the same or less. In addition, in order for a non-domiciliary bidder to be successful, his bid must be that same percentage lower than a domiciliary Missouri bidder's bid, as would be required for a Missouri bidder to successfully bid in the non-domiciliary state.

C In accordance with the Missouri Domestic Products Procurement Act Section 34.350 RSMo and Cumulative Supplements any manufactured goods or commodities used or supplied in the performance of this contract or any subcontract thereto shall be manufactured, assembled or produced in the United States, unless the specified products are not manufactured, assembled or produced in the United States in sufficient quantities to meet the agency's requirements or cannot be manufactured, assembled or produced in the United States within the necessary time in sufficient quantities to meet the contract requirements, or if obtaining the specified products manufactured, assembled or produced in the United States would increase the cost of this contract for purchase of the product by more than ten percent.

**ARTICLE 1.8 - COMMUNICATIONS**

A. All notices, requests, instructions, approvals, and claims must be in writing and shall be delivered to the Designer and copied to the Construction Representative for the project except as required by Article 1.12 Disputes and Disagreements, or as otherwise specified by the Owner in writing as stated in Section 012600. Any such notice shall be deemed to have been given as of the time of actual receipt.

B. The Contractor shall attend on-site progress and coordination meetings, as scheduled by the Construction Representative, no less than once a month.

C. The Contractor shall ensure that major subcontractors and suppliers shall attend monthly progress meetings as necessary to coordinate the work, and as specifically requested by the Construction Representative.

**ARTICLE 1.9 - SEPARATE CONTRACTS AND COOPERATION**

A. The Owner reserves the right to let other contracts in connection with this work. The Contractor shall afford other contractors reasonable opportunity for the introduction and storage of their materials and the execution of their work and shall properly connect and coordinate his work with theirs.

B. The Contractor shall consult the drawings for all other contractors in connection with this work. Any work conflicting with the above shall be brought to the attention of the Owner’s Representative before the work is performed. If the Contractor fails to do this, and constructs any work which interferes with the work of another contractor, the Contractor shall remove any part so conflicting and rebuild same, as directed by the Owner’s Representative at no additional cost to the Owner.

C. Each contractor shall be required to coordinate his work with other contractors so as to afford others reasonable opportunity for execution of their work. No contractor shall delay any other contractor by neglecting to perform contract work at the proper time. If any contractor causes delay to another, they shall be liable directly to that contractor for such delay in addition to any liquidated damages which might be due the Owner.

D. Should the Contractor or project associated subcontractors refuse to cooperate with the instructions and reasonable requests of other Contractors or other subcontractors in the overall coordinating of the work, the Owner may take such appropriate action and issue directions, as required, to avoid unnecessary and unwarranted delays.

E. Each Contractor shall be responsible for damage done to Owner's or other Contractor's property by him/her or workers in his employ through their fault or negligence.

F. Should a Contractor sustain any damage through any act or omission of any other Contractor having a contract with the Owner, the Contractor so damaged shall have no claim or cause of action against the Owner for such damage, but shall have a claim or cause of action against the other Contractor to recover any and all damages sustained by reason of the acts or omissions of such Contractor. The phrase "acts or omissions" as used in this section shall be defined to include, but

not be limited to, any unreasonable delay on the part of any such contractors.

**ARTICLE 1.10 - ASSIGNMENT OF CONTRACT**

A. No assignment by Contractor of any amount or any part of this contract or of the funds to be received there under will be recognized unless such assignment has had the written approval of the Director and the surety has been given due notice of such assignment and has furnished written consent thereto. In addition to the usual recitals in assignment contracts, the following language must be set forth: "It is agreed that the funds to be paid to the assignee under this assignment are subject to performance by the Contractor of this contract and to claims or liens for services rendered or materials supplied for the performance of the work called for in said contract in favor of all persons, firms or corporations rendering such services or supplying such materials."

**ARTICLE 1.11 - INDEMNIFICATION**

A. Contractor agrees to indemnify and save harmless Owner and its respective commissioners, officers, officials, agents, consultants and employees and Designer, their agents, servants and employees, from and against any and all liability for damage arising from injuries to persons or damage to property occasioned by any acts or omissions of Contractor, any subcontractors, agents, servants or employees, including any and all expense, legal or otherwise, which may be incurred by Owner or Designer, its agents, servants or employees, in defense of any claim, action or suit.

B. The obligations of the Contractor under this paragraph shall not extend to the liability of the Designer, his agents or employees, arising out of (1) the preparation or approval of maps, drawings, opinions, reports, surveys, contract changes, design or specifications, or (2) giving of or the failure to give directions or instructions by the Designer, his agents or employees as required by this contract documents provided such giving or failure to give is the primary cause of the injury or damage.

**ARTICLE 1.12 - DISPUTES AND DISAGREEMENTS**

It is hereby expressly agreed and understood that in case any controversy or difference of opinion arises during construction, best efforts will be given to resolution at the field level. Should those efforts be unsuccessful, the Contractor has the right to appeal in writing, the decision of the Director's Designee to the Director at Room 730 Truman Building, P.O. Box 809, Jefferson City, Missouri 65102. The decision of the Director shall be final and binding on all parties.

**ARTICLE 2 -- OWNER/DESIGNER RESPONSIBILITIES**

A. The Owner shall give all orders and directions contemplated under this contract relative to the execution of the work. During progress of work the Owner will be represented at the project site by the Construction Representative and/or Designer, whose responsibilities are to see that this contract is properly fulfilled.

B. The Owner shall at all times have access to the work whenever it is in preparation or progress. The Contractors shall provide proper facilities for such access and for inspection and supervision.

C. All materials and workmanship used in the work shall be subject to the inspection of the Designer and Construction Representative, and any work which is deemed defective shall be removed, rebuilt or made good immediately upon notice. The cost of such correction shall be borne by the Contractor. Contractor shall not be entitled to an extension of the contract completion date in order to remedy defective work. All rejected materials shall be immediately removed from the site of the work.

D. If the Contractor fails to proceed at once with the correction of rejected defective materials or workmanship, the Owner may, by separate contract or otherwise, have the defects remedied or rejected. Materials removed from the site and charge the cost of the same against any monies which may be due the Contractor, without prejudice to any other rights or remedies of the Owner.

E. Failure or neglect on the part of Owner to observe faulty work, or work done which is not in accordance with the drawings and specifications shall not relieve the Contractor from responsibility for correcting such work without additional compensation.

F. The Owner shall have the right to direct the Contractor to uncover any completed work.

1. If the Contractor fails to adequately notify the Construction Representative and/or Designer of an inspection as required by the Contract Documents, the Contractor shall, upon written request, uncover the work. The Contractor shall bear all costs associated with uncovering and again covering the work exposed.

2. If the Contractor is directed to uncover work, which was not otherwise required by the Contract Documents to be inspected, and the work is found to be defective in any respect, no compensation shall be allowed for this work. If, however, such work is found to meet

the requirements of this contract, the actual cost of labor and material necessarily involved in the examination and replacement plus 10% shall be allowed the Contractor.

G. The Designer shall give all orders and directions contemplated under this contract relative to the scope of the work and shall give the initial interpretation of the contract documents.

H. The Owner may file a written notice to the Contractor to dismiss immediately any subcontractors, project managers, superintendents, foremen, workers, watchmen or other employees whom the Owner may deem incompetent, careless or a hindrance to proper or timely execution of the work. The Contractor shall comply with such notice as promptly as practicable without detriment to the work or its progress.

I. If in the Owner's judgment it becomes necessary at any time to accelerate work, when ordered by the Owner in writing, the Contractor shall redirect resources to such work items and execute such portions of the work as may be required to complete the work within the current approved contract schedule.

## ARTICLE 3 -- CONTRACTOR RESPONSIBILITIES

The Contractor shall register and utilize the Owner's eBuilder digital project management system for submission of documents described in the following sections. This includes but is not limited to submittals as required by designer, payment applications, Request for Information (RFI), construction change orders, Request for Proposals (RFP), Designer Supplemental Instructions (DSI), etc.

## ARTICLE 3.1 -- ACCEPTABLE SUBSTITUTIONS

A. The Contractor may request use of any article, device, product, material, fixture, form or type of construction which in the judgment of the Owner and Designer is equal in all respects to that named. Standard products of manufacturers other than those specified will be accepted when, prior to the ordering or use thereof, it is proven to the satisfaction of the Owner and Designer that they are equal in design, strength, durability, usefulness and convenience for the purpose intended.

B. Any changes required in the details and dimensions indicated on the drawings for the substitution of products other than those specified shall be properly made at the expense of the Contractor requesting the substitution or change.

C. The Contractor shall submit a request for such substitutions in writing to the Owner and Designer within twenty (20) working days after the date of the "Notice to Proceed." Thereafter no consideration will be given to alternate forms of accomplishing the work. This Article does not preclude the Owner from exercising the provisions of Article 4 hereof.

D. Any request for substitution by the Contractor shall be submitted in accordance with SECTION 002113 - INSTRUCTIONS TO BIDDERS.

E. When a material has been approved, no change in brand or make will be permitted unless:

1. Written verification is received from the manufacturer stating they cannot make delivery on the date previously agreed, or
2. Material delivered fails to comply with contract requirements.

## ARTICLE 3.2 -- SUBMITTALS

A. The Contractor's submittals must be submitted with such promptness as to allow for review and approval so as not to cause delay in the work. The Contractor shall coordinate preparation and processing of submittals with performance of construction activities.

Coordinate each submittal with fabrication, = purchasing, testing, delivery, other submittals, and related activities that require sequential activity.

Submit four (4) copies to the Designer and additional copies as required for the subcontractors and material suppliers. Also provide copies to meet the requirements for maintenance manuals.

B. All subcontractors' shop drawings and schedules shall be submitted by the Contractor and shall bear evidence that Contractor has received, reviewed, and approved them. Any shop drawings and schedules submitted without this evidence will be returned to the Contractor for resubmission.

C. The Contractor shall include with the shop drawing, a letter indicating any and all deviations from the drawings and/or specifications. Failure to notify the Designer of such deviations will be grounds for subsequent rejection of the related work or materials. If, in the opinion of the Designer, the deviations are not acceptable, the Contractor will be required to furnish the item as specified and indicated on the drawings.

D. The Designer shall check shop drawings and schedules with reasonable promptness and approve them only if they conform to the design concept of the project and comply with the information given in the contract documents. The approval shall not relieve the Contractor from the responsibility to comply with the drawings and specifications, unless the Contractor has called the Designer's attention to the deviation, in writing, at the time of

submission and the Designer has knowingly approved thereof. An approval of any such modification will be given only under the following conditions:

1. It is in the best interest of the Owner
2. It does not increase the contract sum and/or completion time
3. It does not deviate from the design intent
4. It is without prejudice to any and all rights under the surety bond.

E. No extension of time will be granted because of the Contractor's failure to submit shop drawings and schedules in ample time to allow for review, possible resubmission, and approval. Fabrication of work shall not commence until the Contractor has received approval. The Contractor shall furnish prints of approved shop drawings and schedules to all subcontractors whose work is in any way related to the work under this contract. Only prints bearing this approval will be allowed on the site of construction

F. The Contractor shall maintain a complete file on-site of approved shop drawings available for use by the Construction Representative.

**ARTICLE 3.3 – AS-BUILT DRAWINGS**

A. The Contractor shall update a complete set of the construction drawings, shop drawings and schedules of all work monthly by marking changes, and at the completion of their work (prior to submission of request for final payment) note all changes and turn the set over to the Construction Representative. The updates shall show all addenda, all field changes that were made to adapt to field conditions, changes resulting from contract changes or supplemental instructions, and all locations of structures, buried installations of piping, conduit, and utility services. All buried and concealed items both inside and outside shall be accurately located as to depth and referenced to permanent features such as interior or exterior wall faces and dimensions shall be given in a neat and legible manner in a contrasting colored pencil or ink. If approved by the Designer, an electronic file format may be provided.

**ARTICLE 3.4 – GUARANTY AND WARRANTIES**

A. General Guaranty

1. Neither the final certificate of payment nor any provision in the contract documents nor partial use or occupancy of the premises by the Owner shall constitute an acceptance of work not done in accordance with contract requirements.
2. The Contractor or surety shall remedy any defects in the work and pay for any damage to property resulting there from which shall appear within a period of one (1) year from the date of substantial completion unless a longer period is otherwise specified or a differing guaranty period has been established in the substantial completion certificate. The Owner will give notice of observed defects with reasonable promptness.
3. In case of default on the part of the Contractor in fulfilling this part of this contract, the Owner may correct the work or repair the damage and the cost and expense incurred in such event shall be paid by or recoverable from the Contractor or surety.
4. The work will be free from defects not inherent in the quality required or permitted, and that the Work will conform to the requirements of the Contract Documents. Work not conforming to these requirements, including substitutions not properly approved and authorized, may be considered defective. The Contractor's guaranty excludes remedy for damage or defect caused by abuse, modifications not executed by the Contractor, improper or insufficient maintenance, improper operation, or normal wear and tear under normal usage. If required by the Owner, the Contractor shall furnish satisfactory evidence as to the kind and quality of materials and equipment

B. Extended Warranty

Manufacturer's certificates of warranty shall be obtained for all major equipment. Warranty shall be obtained for at least one year. Where a longer period is offered at no additional cost or called for in the specific equipment specifications, the longer period shall govern.

**ARTICLE 3.5 -- OPERATION AND MAINTENANCE MANUALS**

A. Immediately after equipment submittals are approved and no later than ten (10) working days prior to the substantial completion inspection, the Contractor shall provide to the Designer three (3) copies of operating instructions and service manuals, containing the following:

1. Start-up and Shut-down Procedures: Provide a step-by-step write up of all major equipment. When manufacturer’s printed start-up, trouble shooting and shut-down procedures are available; they may be incorporated into the operating manual for reference.

2. Operating Instructions: Written operating instructions shall be included for the efficient and safe operation of all equipment.

3. Equipment List: List of all major equipment as installed shall be prepared to include model number, capacities, flow rate, name place data, shop drawings and air and water balance reports.

4. Service Instructions: Provide the following information for all pieces of equipment.

   a. Recommended spare parts including catalog number and name of local supplier or factory representative.

   b. Belt sizes, types, and lengths.

   c. Wiring diagrams.

5. Manufacturer's Certificate of Warranty as described in Article 3.4.

6. Prior to the final payment, furnish to the Designer three (4) copies of parts catalogs for each piece of equipment furnished by him/her on the project with the components identified by number for replacement ordering.

B. Submission of operating instructions shall be done in the following manner.

1. Manuals shall be in quadruplicate, and all materials shall be bound into volumes of standard 8½" x 11" hard binders. Large drawings too bulky to be folded into 8½" x 11" shall be separately bound or folded and in envelopes, cross referenced and indexed with the manuals.

2. The manuals shall identify project name, project number, and include the name and address of the Contractor, subcontractors and manufacturers who were involved with the activity described in that particular manual.

3. Internally subdivide the binder contents with permanent page dividers, logically organized with tab titles clearly printed under reinforced laminated plastic tabs.

4. Contents: Prepare a Table of Contents for each volume, with each product or system description identified.

**ARTICLE 3.6 – OTHER CONTRACTOR RESPONSIBILITIES**

A. The Contractor shall keep on site, during progress of the work, a competent superintendent satisfactory to the Construction Representative. The superintendent shall represent the Contractor and all agreements made by the superintendent shall be binding. The superintendent shall carefully study and compare all drawings, specifications and other instructions and shall promptly notify the Construction Representative and Designer, in writing, any error, inconsistency or omission which may be discovered. The superintendent shall coordinate all work on the project. Any change of the superintendent shall be approved by the Construction Representative.

B. Contractor shall, at all times, enforce strict discipline and good order among his employees, and shall not employ on the work any unfit person or anyone not skilled in the work assigned to him/her.

C. The Contractor shall supply sufficient labor, material, plant and equipment and pay when due any laborer, subcontractor or supplier for supplies furnished and otherwise prosecute the work with diligence to prevent work stoppage and ensure completion thereof within the time specified.

D. The Contractor and each of his subcontractors shall submit to the Construction Representative, through the Designer such schedules of quantities and costs, progress schedules, payrolls, reports, estimates, records and other data as the Owner may request concerning work performed or to be performed under this contract.

E. The Contractor, subcontractors, and material suppliers shall upon written request, give the Owner access to all time cards, material invoices, payrolls, estimates, profit and loss statements, and all other direct or indirect costs related to this work.

F. The Contractor shall be responsible for laying out all contract work such as layout of architectural, structural, mechanical and electrical work, which shall be coordinated with layouts of subcontractors for general construction work. The Contractor is also responsible for unloading, uncrating and handling of all materials and equipment to be erected or placed by him/her, whether furnished by Contractor or others. No extra charges or compensation will be allowed as a result of failure to verify dimensions before ordering materials or fabricating items.

G. The Contractor must notify the Construction Representative at least one working day before placing concrete or burying underground utilities, pipelines, etc.

H. Contractors shall prearrange time with the Construction Representative for the interruption of any facility operation. Unless otherwise specified in these documents, all connections, alterations or relocations as well as all other portions of the work will be performed during normal working hours.

I. The Contractor shall coordinate all work so there will not be prolonged interruptions of existing equipment operation. Any existing plumbing, heating, ventilating, air conditioning or electrical disconnections necessary for the project, which affect portions of this construction or building or any other building must be scheduled with the Construction Representative to minimize or avoid any disruption of facility operations. In no case, unless previously approved in writing by the Construction Representative, shall utilities be left disconnected at the end of a work day or over a weekend. Any interruption of utilities either intentionally or accidentally shall not relieve the Contractor responsible for the interruption from the responsibility to repair and restore the utility to normal service. Repairs and restoration shall be made before the workers responsible for the repair and restoration leave the job.

J. Contractors shall limit operations and storage of materials to the area within the project, except as necessary to connect to existing utilities, and shall not encroach on neighboring property. The Contractor shall be responsible for repair of their damage to property on or off the project site occurring during construction of project. All such repairs shall be made to the satisfaction of the property owner.

K. Unless otherwise permitted, all materials shall be new and both workmanship and materials shall be of the best quality.

L. Unless otherwise provided and stipulated within these specifications, the Contractor shall furnish, construct, and/or install and pay for materials, devices, mechanisms, equipment, all necessary personnel, utilities including, but not limited to water, heat, light and electric power, transportation services, applicable taxes of every nature, and all other facilities necessary for the proper execution and completion of the work.

M. Contractor shall carefully examine the plans and drawings and shall be responsible for the proper fitting of his material, equipment and apparatus into the building.

N. The Contractor or subcontractors shall not overload, or permit others to overload, any part of any structure during the performance of this contract.

O. All temporary shoring, bracing, etc., required for the removal of existing work and/or for the installation of new work shall be included in this contract. The Contractor shall make good, at no cost to the Owner, any damage caused by improper support or failure of shoring in any respect. Each Contractor shall be responsible for shoring required to protect his work or adjacent property and improvements of Owner and shall be responsible for shoring or for giving written notice to adjacent property owners. Shoring shall be removed only after completion of permanent supports.

P. The Contractor shall provide at the proper time such material as is required for support of the work. If openings are required, whether shown on drawings or not, the Contractor shall see that they are properly constructed.

Q. During the performance of work the Contractor shall be responsible for providing and maintaining warning signs, lights, signal devices, barricades, guard rails, fences and other devices appropriately located on site which will give proper and understandable warning to all persons of danger of entry onto land, structure or equipment.

R. The Contractor shall be responsible for protection, including weather protection, and proper maintenance of all equipment and materials.

S. The Contractor shall be responsible for care of the finished work and shall protect same from damage or defacement until substantial completion by the Owner. If the work is damaged by any cause, the Contractor shall immediately begin to make repairs in accordance with the drawings and specifications. Contractor shall be liable for all damage or loss unless attributable to the acts or omissions of the Owner or Designer. Any claim for reimbursement shall be submitted in accordance with Article 4. After substantial completion the Contractor will only be responsible for damage resulting from acts or omissions of the Contractor or subcontractors through final warranty.

T. In the event the Contractor encounters an unforeseen hazardous material, the Contractor shall immediately stop work in the area affected and report the condition to the Owner and Designer in writing. The Contractor shall not be required, pursuant to Article 4, to perform, any work relating to hazardous materials.

U. In an emergency affecting safety of persons or property, the Contractor shall act, at the Contractor's discretion, to prevent threatened damage, injury or loss. Additional compensation or extension of time claimed by the Contractor on account of an emergency shall be determined as provided in Article 4.

V. Before commencing work, Contractors shall confer with the Construction Representative and facility representative and review any facility rules and regulations which may affect the conduct of the work.

W. Project signs will only be erected on major projects and only as described in the specifications. If no sign is specified, none shall be erected.

**ARTICLE 3.7 -- SUBCONTRACTS**

A. Subcontractor assignments as identified in the bid form shall not be changed without written approval of the Owner. The Owner will not approve changes of a listed subcontractor unless the Contractor documents, to the satisfaction of the Owner that the subcontractor cannot or will not perform the work as specified.

B. The Contractor is fully responsible to the Owner for the acts and omissions of all subcontractors and of persons either directly or indirectly employed by them.

C. Every subcontractor shall be bound by the applicable terms and provisions of these contract documents, but no contractual relationship shall exist between any subcontractor and the Owner unless the right of the Contractor to proceed with the work is suspended or this contract is terminated as herein provided, and the Owner in writing elects to assume the subcontract.

D. The Contractor shall upon receipt of "Notice to Proceed" and prior to submission of the first payment request, notify the Designer and Construction Representative in writing of the names of any subcontractors to be used in addition to those identified in the bid form and all major material suppliers proposed for all parts of the work.

**ARTICLE 4 -- CHANGES IN THE WORK**

**4.1 CHANGES IN THE WORK**

A. The Construction Representative, without giving notice to the surety and without invalidating this contract, may order extra work or make changes by altering, adding to or deducting from the work, this contract sum being adjusted accordingly. All such work shall be executed under the conditions of the original contract. A claim for extension of time caused by any change must be adjusted at the time of ordering such change. No future request for time will be considered.

B. Each Contract Change shall include all costs required to perform the work including all labor, material, equipment, overheads and profit, delay, disruptions, or other miscellaneous expenses. No subsequent requests for additional compensation including claims for delay, disruption, or reduced efficiency as a result of each change will be considered. Values from the Schedule of Values will not be binding as a basis for additions to or deductions from the contract price.

C. The amount of any adjustment in this contract price for authorized changes shall be agreed upon before such changes become effective and shall be determined, through submission of a request for proposal, as follows:

1. By an acceptable fixed price proposal from the Contractor. Breakdowns shall include all takeoff sheets of each Contractor and subcontractor. Breakdown shall include a listing of each item of material with unit prices and number of hours of labor for each task. Labor costs per hour shall be included with labor burden identified, which shall be not less than the prevailing wage rate, etc. Overhead and profit shall be shown separately for each subcontractor and the Contractor.

2. By a cost-plus-fixed-fee (time and material) basis with maximum price, total cost not to exceed said maximum. Breakdown shall include a listing of each item of material with unit prices and number of hours of labor for each task. Labor costs per hour shall be included with labor burden identified, which shall be not less than the prevailing wage rate, etc. Overhead and profit shall be shown separately for each subcontractor and the Contractor.

3. By unit prices contained in Contractor's original bid form and incorporated in the construction contract.

D. Overhead and Profit on Contract Changes shall be applied as follows:

1. The overhead and profit charge by the Contractor and all subcontractors shall be considered to include, but is not limited to: incidental job burdens, small truck (under 1 ton) expense, mileage, small hand tools, warranty costs, company benefits and general office overhead. Project supervision including field supervision and job site office expense shall be considered a part of overhead and profit unless a compensable time extension is granted.

2. The percentages for overhead and profit charged on Contract Changes shall be subject to the following limits: (a) the percentage mark-up for the Contractor shall be limited to the Contractor’s fee: (b) fifteen percent (15%) maximum for Work directly performed by employees of a subcontractor, or sub-subcontractor; (c) five percent (5%) maximum for the Work performed or passed through to the Owner by the Contractor; (d) five percent (5%) maximum subcontractor’s mark-up for

Work performed by a sub-subcontractor and passed through to the Owner by the subcontractor and Contractor; and (e) in no case shall the total overhead and profit paid by the Owner on any Contract Changes exceed twenty-five percent (25%) of the cost of materials, labor and equipment (exclusive of Contractor or any Subcontractor overhead and profit) necessary to put the contract change work in place.

3. The Contractor will be allowed to add the cost of Contractor's payment and performance bonding, builder's risk insurance, and general liability insurance to their cost of work. The above listed bonding and insurance cost shall not exceed two percent (2%) and shall be allowed on the total cost of the added work, including overhead and profit.

4. On proposals covering both increases and decreases in the amount of this contract, the application of overhead and profit shall be on the net change in the cost of the work.

5. The percentage(s) for overhead and profit to be credited to the Owner on Contract Changes that are solely decreases in the quantity of work or materials shall be the same as those for additive Contract Changes provided above.

E. No claim for an addition to this contract sum shall be valid unless authorized as aforesaid in writing by the Owner. In the event that none of the foregoing methods are agreed upon, the Owner may order the Contractor to perform work on a time and material basis. The cost of such work shall be determined by the Contractor's actual labor and material cost to perform the work plus overhead and profit as outlined herein. The Designer and Construction Representative shall approve the Contractor's daily time and material invoices for the work involved.

F. If the Contractor claims that any instructions involve extra cost under this contract, the Contractor shall give the Owner's Representative written notice thereof within a reasonable time after the receipt of such instructions, and in any event before proceeding to execute the work. No such claim shall be valid unless so made and authorized by the Owner, in writing.

G. In an emergency affecting the safety of life or of the structure or of adjoining property, the Contractor, without special instruction or authorization from the Construction Representative, is hereby permitted to act at their discretion to prevent such threatened loss or injury. The Contractor shall submit a claim for compensation for such emergency work in writing to the Owner's Representative.

**ARTICLE 4.2 – CHANGES IN COMPLETION TIME**

A. Extension of the number of work days stipulated in the Contract for completion of the work with compensation may be made when:

1. The contractor documents that proposed Changes in the work, as provided in Article 4.1, extends construction activities critical to contract completion date, OR

2. The Owner suspends all work for convenience of the Owner as provided in Article 7.3, OR

3. An Owner caused delay extends construction activities critical to contract completion (except as provided elsewhere in these General Conditions). The Contractor is to review the work activities yet to begin and evaluate the possibility of rescheduling the work to minimize the overall project delay.

B. Extension of the number of work days stipulated in the Contract for completion of the work <u>without</u> compensation may be made when:

1. Weather-related delays occur, subject to provisions for the inclusion of a specified number of "bad weather" days when provided for in Section 012100-Allowances, OR

2. Labor strikes or acts of God occur, OR

3. The work of the Contractor is delayed on account of conditions which were beyond the control of the Contractor, subcontractors or suppliers, and were not the result of their fault or negligence.

C. No time extension or compensation will be provided for delays caused by or within the control of the Contractor, subcontractors or suppliers and for concurrent delays caused by the Owner.

D. The Contractor shall notify the Owner promptly of any occurrence or conditions which in the Contractor's opinion results in a need for an extension of time. The notice shall be in writing and shall include all necessary supporting materials with details of any resultant costs and be submitted in time to permit full investigation and evaluation of the Contractor's claim. The Owner shall promptly acknowledge the Contractor's notice and, after recommendation from the Owner's Representative and/or Designer, shall provide a decision to the Contractor. Failure on the part of the Contractor to provide such notice and to detail the costs shall constitute a waiver by the Contractor of any claim. Requests for extensions of time shall be for working days only.

## ARTICLE 5 - CONSTRUCTION AND COMPLETION

### ARTICLE 5.1 – CONSTRUCTION COMMENCEMENT

A. Upon receipt of the "Intent to Award" letter, the Contractor must submit the following properly executed instruments to the Owner:

1. Contract;
2. Performance/payment bond as described in Article 6.1;
3. Certificates of Insurance, or the actual policies themselves, showing that the Contractor has obtained the insurance coverage required by Article 6.2.

Above referenced items must be received by the Owner within ten (10) working days after the effective date of the contract. If not received, the Owner may treat the failure to timely submit them as a refusal by the Contractor to accept a contract for this work and may retain as liquidated damages the Contractor's bid bond, cashier's check or certified check as provided in the Instructions to Bidders. Upon receipt the Owner will issue a "Notice to Proceed" with the work to the Contractor.

B. Within the time frame noted in Section 013200 - Schedules, following receipt of the "Notice to Proceed", the Contractor shall submit to the Owner a progress schedule and schedule of values, showing activities through the end of the contract period. Should the Contractor not receive written notification from the Owner of the disapproval of the schedule of values within fifteen (15) working days, the Contractor may consider it approved for purpose of determining when the first monthly Application and Certification for Payment may be submitted.

C. The Contractor may commence work upon receipt of the Division of Facilities Management, Design and Construction's "Notice to Proceed" letter. Contractor shall prosecute the work with faithfulness and energy, and shall complete the entire work on or before the completion time stated in the contract documents or pay to the Owner the damages resulting from the failure to timely complete the work as set out within Article 5.4.

### ARTICLE 5.2 -- PROJECT CONSTRUCTION

A. Each Contractor shall submit for the Owner's approval, in reproducible form, a progress schedule showing the rate of progress and the order of the work proposed to carry on various phases of the project. The schedule shall be in conformance with the requirements outlined in Section 013200 – Schedules.

B. Contractor shall employ and supply a sufficient force of workers, material, and equipment and shall pay when due, any worker, subcontractor or supplier and otherwise prosecute the work with such diligence so as to maintain the rate of progress indicated on the progress schedule, prevent work stoppage, and insure completion of the project within the time specified.

### ARTICLE 5.3 -- PROJECT COMPLETION

A. Substantial Completion. A Project is substantially complete when construction is essentially complete and work items remaining to be completed can be done without interfering with the Owner's ability to use the Project for its intended purpose.

1. Once the Contractor has reached what they believe is Substantial Completion, the Contractor shall notify the Designer and the Construction Representative of the following:
   a. That work is essentially complete with the exception of certain listed work items. The list shall be referred to as the "Contractor's Punch."
   b. That all Operation and Maintenance Manuals have been assembled and submitted in accordance with Article 3.5A.
   c. That the Work is ready for inspection by the Designer and Construction Representative. The Owner shall be entitled to a minimum of ten working days notice before the inspection shall be performed.
2. If the work is acceptable, the Owner shall issue a Certificate of Substantial Completion, which shall set forth the responsibilities of the Owner and the Contractor for utilities, security, maintenance, damage to the work and risk of loss. The Certificate shall also identify those remaining items of work to be performed by the Contractor. All such work items shall be complete within 30 working days of the date of the Certificate, unless the Certificate specifies a different time. If the Contractor shall be required to perform tests that must be delayed due to climatic conditions, it is understood that such tests and affected equipment will be identified on the Certificate and shall be accomplished by the Contractor at the earliest possible date. Performance of the tests may not be required before Substantial Completion can be issued. The date of the issuance of the Certificate of

Substantial Completion shall determine whether or not the work was completed within the contract time and whether or not Liquidated Damages are due.

3. If the work is not acceptable, and the Owner does not issue a Certificate of Substantial Completion, the Owner shall be entitled to charge the Contractor with the Designer's and Owner's costs of re-inspection, including time and travel.

B. Partial Occupancy. Contractor agrees that the Owner shall be permitted to occupy and use any completed or partially completed portions of the Project, when such occupancy and use is in the Owner's best interest. Owner shall notify Contractor of its desire and intention to take Partial Occupancy as soon as possible but at least ten (10) working days before the Owner intends to occupy. If the Contractor believes that the portion of the work the Owner intends to occupy is not ready for occupancy, the Contractor shall notify the Owner immediately. The Designer shall inspect the work in accordance with the procedures above. If the Contractor claims increased cost of the project or delay in completion as a result of the occupancy, he shall notify the Owner immediately but in all cases before occupancy occurs.

C. Final Completion. The Project is finally complete when the Certificate of Substantial Completion has been issued and all work items identified therein as incomplete have been completed, and when all administrative items required by the contract have been completed. Final Completion entitles the Contractor to payment of the outstanding balance of the contract amount including all change orders and retainage. Within five (5) working days of the date of the Certificate of Substantial Completion, the Contractor shall identify the cost to complete any outstanding items of work. The Designer shall review the Contractor's estimate and either approve it or provide an independent estimate for all such items. If the Contractor fails to complete the remaining items within the time specified in the Certificate, the Owner may terminate the contract and go to the surety for project completion in accordance with Article 7.2 or release the contract balance to the Contractor less 150% of the approved estimate to complete the outstanding items. Upon completion of the outstanding items, when a final cost has been established, any monies remaining shall be paid to the Contractor. Failure to complete items of work does not relieve the Contractor from the obligation to complete the administrative requirements of the contract, such as the provisions of Article 5.3 FAILURE TO COMPLETE ALL ITEMS OF WORK UNDER THE CONTRACT SHALL BE CONSIDERED A DEFAULT AND BE GROUNDS FOR CONTRACT TERMINATION AND DEBARMENT.

D. Liquidated Damages. Contractor agrees that the Owner may deduct from the contract price and retain as liquidated damages, and not as penalty or forfeiture, the sum stipulated in this contract for each work day after the Contract Completion Day on which work is not Substantially Complete. Assessment of Liquidated Damages shall not relieve the Contractor or the surety of any responsibility or obligation under the Contract. In addition, the Owner may, without prejudice to any other rights, claims, or remedies the Owner may have including the right to Liquidated Damages, charge the Contractor for all additional expenses incurred by the Owner and/or Designer as the result of the extended contract period through Final Completion. Additional Expenses shall include but not be limited to the costs of additional inspections.

E. Early Completion. The Contractor has the right to finish the work before the contract completion date; however, the Owner assumes no liability for any hindrances to the Contractor unless Owner caused delays result in a time extension to the contract completion date. The Contractor shall not be entitled to any claims for lost efficiencies or for delay if a Certificate of Substantial Completion is given on or before the Contract Completion Date.

**ARTICLE 5.4 -- PAYMENT TO CONTRACTOR**

A. Payments on account of this contract will be made monthly in proportion to the work which has been completed. Request for payment must be submitted on the Owner's forms. No other pay request will be processed. Supporting breakdowns must be in the same format as Owner's forms and must provide the same level of detail. The Designer will, within 5 working days from receipt of the contractor's request for payment either issue a Certificate for Payment to the Owner, for such amount as the Designer determines is properly due, or notify the Contractor in writing of reasons for withholding a Certificate. The Owner shall make payment within 30 calendar days after the "Application and Certification for Payment" has been received and certified by the Designer. The following items are to be attached to the contractor's pay request:

1. Updated construction schedule
2. Certified payrolls consisting of name, home addresses of all workers, occupation and craft, number of hours worked and actual wages paid for each individual employee, of the Contractor and all subcontractors working on the project

B. The Owner shall retain 5 percent of the amount of each such payment application, except as allowed by Article 5.4, until final completion and acceptance of all work covered by this contract.

C. Each payment made to Contractor shall be on account of the total amount payable to Contractor and all material and work covered by paid partial payment shall thereupon become the sole property of Owner. This provision shall not be construed as relieving Contractor from sole responsibility for care and protection of materials and work upon which payments have been made or restoration of any damaged work or as a waiver of the right of Owner to require fulfillment of all terms of this contract.

D. Materials delivered to the work site and not incorporated in the work will be allowed in the Application and Certification for Payment on the basis of one hundred (100%) percent of value, subject to the 5% retainage providing that they are suitably stored on the site or in an approved warehouse in accordance with the following requirements:

1. Material has previously been approved through submittal and acceptance of shop drawings conforming to requirements of Article 3.2 of General Conditions.

2. Delivery is made in accordance with the time frame on the approved schedule.

3. Materials, equipment, etc., are properly stored and protected from damage and deterioration and remain so - if not, previously approved amounts will be deleted from subsequent pay applications.

4. The payment request is accompanied by a breakdown identifying the material equipment, etc. in sufficient detail to establish quantity and value.

E. The Contractor shall be allowed to include in the Application and Certification for Payment, one hundred (100%) of the value, subject to retainage, of major equipment and material stored off the site if all of the following conditions are met:

1. The request for consideration of payment for materials stored off site is made at least 15 working days prior to submittal of the Application for Payment including such material. Only materials inspected will be considered for inclusion on Application for Payment requests.

2. Materials stored in one location off site are valued in excess of $25,000.

3. That a Certificate of Insurance is provided indicating adequate protection from loss, theft conversion or damage for materials stored off site. This Certificate shall show the State of Missouri as an additional insured for this loss.

4. The materials are stored in a facility approved and inspected, by the Construction Representative.

5. Contractor shall be responsible for, Owner costs to inspect out of state facilities, and any delays in the completion of the work caused by damage to the material or for any other failure of the Contractor to have access to this material for the execution of the work.

F. The Owner shall determine the amount, quality and acceptability of the work and materials which are to be paid for under this contract. In the event any questions shall arise between the parties, relative to this contract or specifications, determination or decision of the Owner or the Construction Representative and the Designer shall be a condition precedent to the right of the Contractor to receive any money or payment for work under this contract affected in any manner or to any extent by such question.

G. Payments Withheld: The Owner may withhold or nullify in whole or part any certificate to such extent as may be necessary to protect the Owner from loss on account of:

1. Defective work not remedied. When a notice of noncompliance is issued on an item or items, corrective action shall be undertaken immediately. Until corrective action is completed, no monies will be paid and no additional time will be allowed for the item or items. The cost of corrective action(s) shall be borne by the Contractor.

2. A reasonable doubt that this contract can be completed for the unpaid balance.

3. Failure of the Contractor to update as-built drawings monthly for review by the Construction Representative.

4. Failure of the Contractor to update the construction schedule.

When the Construction Representative is satisfied the Contractor has remedied above deficiencies, payment shall be released.

H. Final Payment: Upon receipt of written notice from the Contractor to the Designer and Project Representative that the work is ready for final inspection and acceptance, the Designer and Project Representative, with the Contractor, shall promptly make such inspection. If the work is acceptable and the contract fully performed, the Construction Representative shall complete a final acceptance report and the Contractor will be

directed to submit a final Application and Certification for Payment. If the Owner approves the same, the entire balance shall be due and payable, with the exception of deductions as provided for under Article 5.4.

1. Where the specifications provide for the performance by the Contractor of (certain tests for the purpose of balancing and checking the air conditioning and heating equipment and the Contractor shall have furnished and installed all such equipment in accordance with the specifications, but said test cannot then be made because of climatic conditions, such test shall may be considered as required under the provisions of the specifications, Section 013300 and this contract may be substantial Full payment will not be made until the tests have been made and the equipment and system is finally accepted. If the tests are not completed when scheduled, the Owner may deduct 150% of the value of the tests from the final payment.
2. The final payment shall not become due until the Contractor delivers to the Construction Representative:

    a) A complete file of releases, on the standard form included in the contract documents as "Final Receipt of Payment and Release Form", from subcontractors and material suppliers evidencing payment in full for services, equipment and materials, as the case may require, if the Owner approves, or a consent from the Surety to final payment accepting liability for any unpaid amounts.

    b) An Affidavit of Compliance with Prevailing Wage Law, in the form as included in this contract specifications, properly executed by each subcontractor, and the Contractor

    c) Certified copies of all payrolls

    d) As-built drawings

3. If any claim remains unsatisfied after all payments are made, the Contractor shall refund to the Owner all monies that the latter may be compelled to pay in discharging such a claim including all costs and a reasonable attorney's fee.
4. Missouri statute requires prompt payment from the Owner to the Contractor within thirty calendar days and from the Contractor to his subcontractors within fifteen calendar days. Failure to make payments within the required time frame entitles the receiving party to charge interest at the rate of one and one half percent per month calculated from the expiration of the statutory time period until paid.
5. The value of all unused unit price allowances and/or 150% of the value of the outstanding work items, and/or liquidated damages may be deducted from the final pay request without executing a Contract Change. Any unit price items which exceed the number of units in the contract may be added by Contract Change.

**ARTICLE 6 -- INSURANCE AND BONDS**

**ARTICLE 6.1 -- BOND**

A. Contractor shall furnish a performance/payment bond in an amount equal to 100% of the contract price to guarantee faithful performance of the contract and 100% of the contract price to guarantee the payment of all persons performing labor on the project and furnishing materials in connection therewith under this contract as set forth in the standard form of performance and payment bond included in the contract documents. The surety on such bond shall be issued by a surety company authorized by the Missouri Department of Insurance to do business in the state of Missouri.

B. All Performance/Payment Bonds furnished in response to this provision shall be provided by a bonding company with a rating of B+ or higher as established by A.M. Best Company, Inc. in their most recent publication.

**ARTICLE 6.2 – INSURANCE**

A. The successful Contractor shall procure and maintain for the duration of the contract issued a policy or policies of insurance for the protection of both the Contractor and the Owner and their respective officers, officials, agents, consultants and employees. The Owner requires certification of insurance coverage from the Contractor prior to commencing work.

B. Minimum Scope and Extent of Coverage

1. General Liability

Commercial General Liability, ISO coverage form number or equivalent CG 00 01 ("occurrence" basis), or I-SO coverage form number CG 00 02, or ISO equivalent.

If ISO equivalent or manuscript general liability coverage forms are used, minimum coverage will be as follows: Premises/Operations; Independent Contractors; Products/Completed Operations; personal Injury; Broad Form Property Damage including Completed Operations; Broad Form Contractual Liability Coverage to include Contractor's obligations under Article 1.11 Indemnification and any other Special Hazards required by the work of the contract.

2. Automobile Liability

Business Automobile Liability Insurance, ISO Coverage form number or equivalent CA 00 01 covering automobile liability, code 1 "ANY AUTO".

3. Workers' Compensation and Employer's Liability

Statutory Workers' Compensation Insurance for Missouri and standard Employer's Liability Insurance, or the authorization to self-insure for such liability from the Missouri Division of Workers' Compensation.

4. Builder's Risk or Installation Floater Insurance

Insurance upon the work and all materials, equipment, supplies, temporary structures and similar items which may be incident to the performance of the work and located at or adjacent to the site, against loss or damage from fire and such other casualties as are included in extended coverage in broad "All Risk" form, including coverage for Flood and Earthquake, in an amount not less than the replacement cost of the work or this contact price, whichever is greater, with loss payable to Contractor and Owner as their respective interests may appear.

Contractor shall maintain sufficient insurance to cover the full value of the work and materials as the work progresses, and shall furnish Owner copies of all endorsements. If Builder's Risk Reporting- Form of Endorsement is used, Contractor shall make all reports as required therein so as to keep in force an amount of insurance which will equal the replacement cost of the work, materials, equipment, supplies, temporary structures, and other property covered thereby; and if, as a result of Contractor's failure to make any such report, the amount of insurance so recoverable shall be less than such replacement cost, Contractor's interest in the proceeds of such insurance, if any, shall be subordinated to Owner's interest to the end that Owner may receive full reimbursement for its loss.

C. Minimum Limits of Insurance

1. General Liability

Contractor

| | |
|---|---|
| $2,000,000 | combined single limit per occurrence for bodily injury, personal injury, and property damage |
| $2,000,000 | annual aggregate |

2. Automobile Liability

| | |
|---|---|
| $2,000,000 | combined single limit per occurrence for bodily injury and property damage |

3. Workers' Compensation and Employers Liability

Workers' Compensation limits as required by applicable State Statutes (generally unlimited) and minimum of $1,000,000 limit per accident for Employer's Liability.

General Liability and Automobile Liability insurance may be arranged under individual policies for the full limits required or by a combination of underlying policies with the balance provided by a form-following Excess or Umbrella Liability policy.

D. Deductibles and Self-Insured Retentions

All deductibles, co-payment clauses, and self-insured retentions must be declared to and approved by the Owner. The Owner reserves the right to request the reduction or elimination of unacceptable deductibles or self-insured retentions, as they would apply to the Owner, and their respective officers, officials, agents, consultants and employees. Alternatively, the Owner may request Contractor to procure a bond guaranteeing

payment of losses and related investigations, claims administration, and defense expenses.

E. Other Insurance Provisions and Requirements

The respective insurance policies and coverage, as specified below, must contain, or be endorsed to contain the following conditions or provisions:

1. General Liability

The Owner, and its respective commissioners, officers, officials, agents, consultants and employees shall be endorsed as additional insured's by ISO form CG 20 26 Additional Insured - Designated Person or Organization. As additional insured's, they shall be covered as to work performed by or on behalf of the Contractor or as to liability which arises out of Contractor's activities or resulting from the performance of services or the delivery of goods called for by the Contract.

Contractor's insurance coverage shall be primary with respect to all additional insured's. Insurance of self-insurance programs maintained by the designated additional -insured's shall be excess of the Contractor's insurance and shall not contribute with it.

Additionally, the Contractor and Contractor's general liability insurer shall agree to waive all rights of subrogation against the Owner and any of their respective officers, officials, agents, consultants or employees for claims, losses, or expenses which arise out of Contractor's activities or result from the performance of services or the delivery of goods called for by the Contract.

Contractor's failure to comply with the terms and conditions of these insurance policies shall not affect or abridge coverage for the Owner, or for any of their officers, officials, agents, consultants or employees.

2. Automobile Insurance

The Owner, and their respective officers, officials, agents, consultants and employees shall be endorsed as additional insured's by ISO form CG 20 26 - Additional Insured Designated Person or Organization. As additional insured's, they shall be covered as to work performed by or on behalf of the Contractor or as to liability which arises out of Contractor's activities or resulting from the performance of services or the delivery of goods called for by the Contract.

Contractor's insurance coverage shall be primary with respect to all additional insured's. Insurance or self-insurance programs maintained by the designated additional insured's shall be in excess of the Contractor's insurance and shall not contribute with it.

Additionally, the Contractor and Contractor's automobile insurer shall agree to waive all rights of subrogation against the Owner and any of their respective officers, officials, agents, consultants or employees for claims, losses, or expenses which arise out of Contractor's activities or result from the performance of services or the delivery of goods called for by the Contract.

Contractor's failure to comply with the terms and conditions of these insurance policies shall not affect or abridge coverage for the Owner or for any of its officers, officials, agents, consultants or employees.

3. Workers' Compensation/Employer's Liability

Contractor's workers' compensation insurance shall be endorsed with NCCI form WC 00 03 01 A - Alternative Employer Endorsement. The Alternative Employer Endorsement shall designate the Owner as "alternate employers."

4. All Coverages

Each insurance policy required by this section of the Contract shall contain a stipulation, endorsed if necessary, that the Owner will receive a minimum of a thirty (30) calendar day advance notice of any policy cancellation. Ten (10) calendar days advance notice is required for policy cancellation due to non-payment of premium.

F. Insurer Qualifications and Acceptability

Insurance required hereunder shall be issued by an A.M. Best, "B+" rated, Class IX insurance company approved to conduct insurance business in the state of Missouri.

G. Verification of Insurance Coverage

Prior to Owner issuing a Notice to Proceed, the Contractor-shall furnish the Owner with Certificate(s) of Insurance and with any applicable original endorsements evidencing the required insurance coverage. The insurance certificates and endorsements are to be signed by a person authorized by that insurer to bind coverage on its behalf. All certificates and endorsements received by the Owner are subject to review and approval by the Owner. The Owner reserves the right to require certified copies of all required policies at any time. If the scope of this contract will exceed one (1) year - or, if any of Contractor's applicable insurance coverage expires prior to completion of the work or services required under this contract -

the Contractor will provide a renewal or replacement certificate before continuing work or services hereunder. If the Contractor fails to provide documentation of required insurance coverage, the Owner may issue a stop work order and no additional contract completion time and/or compensation shall be granted as a result thereof.

## ARTICLE 7 – SUSPENSION OR TERMINATION OF CONTRACT

### ARTICLE 7.1 - FOR SITE CONDITIONS

When conditions at the site of the proposed work are considered by the Owner to be unsatisfactory for prosecution of the work, the Contractor may be ordered in writing to suspend the work or any part thereof until reasonable conditions exist. When such suspension is not due to fault or negligence of the Contractor, time allowed for completion of such suspended work will be extended by a period of time equal to that lost due to delay occasioned by ordered suspension. This will be a no cost time extension.

### ARTICLE 7.2 - FOR CAUSE

A. Termination or Suspension for Cause:

1. If the Contractor shall file for bankruptcy, or should make a general assignment for the benefit of the creditors, or if a receiver should be appointed on account of insolvency, or if the contractor should persistently or repeatedly refuse or fail to supply enough properly skilled workers or proper materials, or if the contractor should fail to make prompt payment to subcontractors or for material or labor, or persistently disregard laws, ordinances or the instructions of the Owner, or otherwise be guilty of a substantial violation of any provision of this contract, then the Owner may serve notice on the Contractor and the surety setting forth the violations and demanding compliance with this contract. Unless within ten (10) consecutive calendar days after serving such notice, such violations shall cease and satisfactory arrangements for correction be made, the Owner may suspend the Contractor's right to proceed with the work or terminate this contract.

2. In the event the Owner suspends Contractor's right to proceed with the work or terminates the contract, the Owner may demand that the Contractor's surety take over and complete the work on this contract, after the surety submits a written proposal to the Owner and receives written approval and upon the surety's failure or refusal to do so within ten (10) consecutive calendar days after demand therefore, the Owner may take over the work and prosecute the same to completion by bid or negotiated contract, or the Owner may elect to take possession of and utilize in completing the work such materials, supplies, appliances and plant as may be on the site of the work, and all subcontractors, if the Owner elects, shall be bound to perform their contracts.

B. The Contractor and its surety shall be and remain liable to the Owner for any excess cost or damages occasioned to the Owner as a result of the actions above set forth.

C. The Contractor in the event of such suspension or termination shall not be entitled to receive any further payments under this contract until the work is wholly finished. Then if the unpaid balance under this contract shall exceed all expenses of the Owner as certified by the Director, such excess shall be paid to the Contractor; but, if such expenses shall exceed the unpaid balance as certified by the Director, the Contractor and their surety shall be liable for and shall pay the difference and any damages to the Owner.

D. In exercising Owner's right to secure completion of the work under any of the provisions hereof, the Director shall have the right to exercise Owner's sole discretion as to the manner, methods and reasonableness of costs of completing the work.

E. The rights of the Owner to suspend or terminate as herein provided shall be cumulative and not exclusive and shall be in addition to any other remedy provided by law.

F. The Contractor in the event of such suspension or termination may be declared ineligible for Owner contracts for a minimal period of twelve (12) months. Further, no contract will be awarded to any Contractor who lists in their bid form any subcontractor whose prior performance has contributed, as determined by the Owner, to a breach of a contract. In order to be considered for state-awarded contracts after this period, the Contractor/subcontractor will be required to forward acceptance reports to the Owner regarding successful completion of non-state projects during the intervening twelve (12) months from the date of default. No contracts will be awarded to a subcontractor/Contractor until the ability to perform responsibly in the private sector has been proven to the Owner.

### ARTICLE 7.3 -- FOR CONVENIENCE

A. The Owner may terminate or suspend the Contract or any portion of the Work without cause at any time, and at the Owner's convenience. Notification of a termination or suspension shall be in writing

and shall be given to the Contractor and their surety. If the Contract is suspended, the notice will contain the anticipated duration of the suspension or the conditions under which work will be permitted to resume. If appropriate, the Contractor will be requested to demobilize and re-mobilize and will be reimbursed time and costs associated with the suspension.

B. Upon receipt of notification, the Contractor shall:

1. Cease operations when directed.

2. Take actions to protect the work and any stored materials.

3. Place no further subcontracts or orders for material, supplies, services or facilities except as may be necessary to complete the portion of the Contract that has not been terminated. No claim for payment of materials or supplies ordered after the termination date shall be considered.

4. Terminate all existing subcontracts, rentals, material, and equipment orders.

5. Settle all outstanding liabilities arising from termination with subcontractors and suppliers.

6. Transfer title and deliver to the Owner, work in progress, completed work, supplies and other material produced or acquire for the work terminated, and completed or partially completed plans, drawings information and other property that, if the Contract had been completed, would be required to be furnished to the Owner.

C. For termination without cause and at the Owner's convenience, in addition to payment for work completed prior to date of termination, the Contractor may be entitled to payment of other documented costs directly associated with the early termination of the contract. Payment for anticipated profit and unapplied overhead will not be allowed.

# SECTION 007300 - SUPPLEMENTARY CONDITIONS

## 1.0 GENERAL:

A. These Supplementary General Conditions clarify, add, delete, or otherwise modify standard terms and conditions of DIVISION 0, BIDDING AND CONTRACTING REQUIREMENTS.

## 2.0 CONTACTS:

Project Manager:

L. Scott Samuels, PE
Division of Facilities Management, Design and Construction
301 West High Street, Room 730
Jefferson City, MO 65101
Telephone: 573.690.6760
Email: scott.samuels@oa.mo.gov

## 3.0 NOTICE: ALL BID MATERIALS ARE DUE AT THE TIME OF BID SUBMITTAL. THERE IS NO SECOND SUBMITTAL FOR THIS PROJECT.

## 4.0 FURNISHING CONSTRUCTION DOCUMENTS:

A. The Owner will furnish the Contractor with approximately 5 complete sets of drawings and specifications at no charge.

B. The Owner will furnish the Contractor with approximately 5 sets of explanatory or change drawings at no charge.

C. The Contractor may make copies of the documents as needed with no additional cost to the Owner.

## 5.0 SAFETY REQUIREMENTS

Contractor and subcontractors at any tier shall comply with RSMo 292.675 and Article 1.3, E, of Section 007213, General Conditions.

# Missouri
# Division of Labor Standards
WAGE AND HOUR SECTION

MIKE KEHOE, Governor

# Annual Wage Order No. 33

Section 061
**MACON COUNTY**

In accordance with Section 290.262 RSMo 2000, within thirty (30) days after a certified copy of this Annual Wage Order has been filed with the Secretary of State as indicated below, any person who may be affected by this Annual Wage Order may object by filing an objection in triplicate with the Labor and Industrial Relations Commission, P.O. Box 599, Jefferson City, MO 65102-0599. Such objections must set forth in writing the specific grounds of objection. Each objection shall certify that a copy has been furnished to the Division of Labor Standards, P.O. Box 449, Jefferson City, MO 65102-0449 pursuant to 8 CSR 20-5.010(1). A certified copy of the Annual Wage Order has been filed with the Secretary of State of Missouri.

Original Signed by
Logan Hobbs, Director
Division of Labor Standards

Filed With Secretary of State: **March 10, 2026**

Last Date Objections May Be Filed: **April 9, 2026**

**Prepared by Missouri Department of Labor and Industrial Relations**

## MACON COUNTY

| OCCUPATIONAL TITLE | **Prevailing Hourly Rate |
|---|---|
| Asbestos Worker | $26.00* |
| Boilermaker | $26.00* |
| Bricklayer - Stone Mason | $26.00* |
| Carpenter | $56.26 |
| Lather | |
| Linoleum Layers & Cutter | |
| Millwright | |
| Pile Driver | |
| Cement Mason | $26.00* |
| Plasterer | |
| Communication Technician | $26.00* |
| Electrician (Inside Wireman) | $62.85 |
| Electrician (Outside Lineman) | $26.00* |
| Outside - Groundman | |
| Outside - Groundman Tree Trimmer | |
| Outside - Lineman Operator | |
| Outside - Lineman Tree Trimmer | |
| Elevator Constructor | $26.00* |
| Glazier | $26.00* |
| Iron Worker | $26.00* |
| Laborer | $26.00* |
| Laborer - First Semi-Skilled | |
| Laborer - General | |
| Laborer - Second Semi-Skilled | |
| Laborer - Skilled | |
| Mason | $26.00* |
| Marble Finisher | |
| Marble Mason | |
| Terrazzo Finisher | |
| Terrazzo Worker | |
| Tile Finisher | |
| Tile Setter | |
| Operating Engineer | $77.87 |
| Operating Engineer - Group I | |
| Operating Engineer - Group II | |
| Operating Engineer - Group III | |
| Operating Engineer - Group III - A | |
| Operating Engineer - Group IV | |
| Operating Engineer - Group V | |
| Painter | $26.00* |
| Plumber | $75.01 |
| Pipe Fitter | |
| Roofer/WaterProofer | $26.00* |
| Sheet Metal Worker | $26.00* |
| Sprinkler Fitter - Fire Protection | $26.00* |
| Truck Driver | $26.00* |
| Truck Control Service Driver | |
| Truck Driver, Teamsters Group I | |
| Truck Driver, Teamsters Group II | |
| Truck Driver, Teamsters Group III | |
| Truck Driver, Teamsters Group IV | |

*** The Division of Labor Standards received fewer than 1,000 reportable hours for this occupational title. The public works contracting minimum wage is established for this occupational title using data provided by Missouri Economic Research and Information Center.**

****The Prevailing Hourly Rate includes any applicable fringe benefit amounts for each occupational title as defined in RSMo Section 290.210.**

MACON COUNTY

| OCCUPATIONAL TITLE | **Prevailing Hourly Rate |
|---|---|
| Carpenter | $69.13 |
| Millwright | |
| Pile Driver | |
| Electrician (Outside Lineman) | $26.00* |
| Outside - Groundman | |
| Outside - Groundman Tree Trimmer | |
| Outside - Lineman Operator | |
| Outside - Lineman Tree Trimmer | |
| Laborer | $57.35 |
| Laborer - General | |
| Laborer - Skilled | |
| Operating Engineer | $75.09 |
| Operating Engineer - Group I | |
| Operating Engineer - Group II | |
| Operating Engineer - Group III | |
| Operating Engineer - Group IV | |
| Truck Driver | $26.00* |
| Truck Control Service Driver | |
| Truck Driver, Teamsters Group I | |
| Truck Driver, Teamsters Group II | |
| Truck Driver, Teamsters Group III | |
| Truck Driver, Teamsters Group IV | |

**Use Heavy Construction Rates on Highway and Heavy construction in accordance iwth the classifications of construction work established in 8 CSR 30-3.040(3).**

**Use Building Construction Rates on Building construction in accordance with the classifications of construction work established in 8 CSR 30-3.040(2).**

**If a worker is performing work on a heavy construction project within an occupational title that is not listed on the Heavy Construction Rate Sheet, use the rate for that occupational title shown on the Building Construction Rate Sheet.**

***The Division of Labor Standards received fewer than 1,000 reportable hours for this occupational title. Public works contracting minimum wage is established for this occupational title using data provided by Missouri Economic Research and Information Center.**

****The Prevailing Hourly Rate includes any applicable fringe benefit amounts for each occupational title.**

# OVERTIME
# and
# HOLIDAYS

## OVERTIME

For all work performed on a Sunday or a holiday, not less than twice (2x) the prevailing hourly rate of wages for work of a similar character in the locality in which the work is performed or the public works contracting minimum wage, whichever is applicable, shall be paid to all workers employed by or on behalf of any public body engaged in the construction of public works, exclusive of maintenance work.

For all overtime work performed, not less than one and one-half (1½) the prevailing hourly rate of wages for work of a similar character in the locality in which the work is performed or the public works contracting minimum wage, whichever is applicable, shall be paid to all workers employed by or on behalf of any public body engaged in the construction of public works, exclusive of maintenance work or contractual obligation. For purposes of this subdivision, **"overtime work"** shall include work that exceeds ten hours in one day and work in excess of forty hours in one calendar week; and

A thirty-minute lunch period on each calendar day shall be allowed for each worker on a public works project, provided that such time shall not be considered as time worked.

## HOLIDAYS

January first;
The last Monday in May;
July fourth;
The first Monday in September;
November eleventh;
The fourth Thursday in November; and
December twenty-fifth;

If any holiday falls on a Sunday, the following Monday shall be considered a holiday.

**SECTION 011000**
**SUMMARY OF WORK**

## PART 1 - GENERAL

### 1.1 SECTION INCLUDES

A. Project Description:

The Project consists of the replacement of the existing retaining wall as well as repairs to the existing parking lot on the east/south side of the existing Troop B Headquarters and Crime Lab building at the Troop B Headquarters in Macon, Missouri.

1. Project Location: Missouri State Highway Patrol Troop B Headquarters, 308 Pine Crest Drive, Macon, MO 63552.
2. Owner: State of Missouri, Office of Administration, Division of Facilities Management, Design and Construction, Harry S Truman State Office Building, Post Office Box 809, 301 West High Street, Jefferson City, Missouri 65102.

B. Contractor Use of Site and Premises.

C. Work Sequence.

D. Drawings and General Provisions of Contract, including General and Special Conditions, apply to this section.

### 1.2 GENERAL

A. Laws and Regulations: Contractor shall comply with all laws, ordinances, rules and regulations applicable to the work, including those of the DOT, DNR, Corps of Engineers, etc.

B. Permits: The Owner will obtain and pay for construction permits required for the project unless noted or otherwise identified as the responsibility of the Contractor.

C. The Contractor shall abide by requirements included in permits from regulatory agencies.

D. If a conflict exists between the requirements of a regulatory agency and these Contract Documents, the regulatory requirement shall take precedence. If a conflict is discovered the Contractor shall notify the Owner's Representative prior to proceeding with the work.

E. The Contractor shall sign permits required by regulatory agencies and provide bonds and insurance certificates as required by the regulatory agencies.

F. Taxes: Contractor shall pay all sales, consumer, use and other similar taxes required to be paid by Contractor in accordance with the Laws and Regulations of the place of the project, which are applicable during the performance of this work.

### 1.3 CONTRACTOR USE OF SITE AND PREMISES

A. A. General: During the construction period the Contractor shall have full use of the premises for construction operations, including use of the site. The Contractor's use of the premises limited only by the Owner's right to perform work or to retain other contractors on portions of the Project.

B. Use of the Site: Limit use of the premises to work in areas indicated. Confine operations to areas within contract limits indicated. Do not disturb portions of the site beyond the areas in which the Work is indicated.

1. Owner Occupancy: Allow for Owner occupancy and use by the public.

2. Driveways and Entrances: Keep driveways and entrances serving the premises clear and available to the Owner, the Owner's employees, and emergency vehicles at all times. Do not use these areas for parking or storage of materials. Schedule deliveries to minimize space and time requirements for storage of materials and equipment on-site. **One drive MUST be open at all times.**

C. Use of the Existing Building: Maintain the existing building in a weathertight condition throughout the construction period. Repair damage cause by construction operations. Take all precautions necessary to protect the building and its occupants during the construction period.

D. The Contractor shall limit the use of site and premises to allow:

1. Ingress and Egress through the project limits by the public and partial Owner occupancy or use.

2. Construction by the Owner or others if noted in the Contract Documents.

E. Contractor shall confine construction equipment, storage of materials, and the operation of workers to the project site and other areas identified by the Contract Documents.

F. Contractor shall keep the site(s) free from accumulation of waste materials, rubbish, and other debris during the progress of the work and shall leave the site(s) in equal to or better than original condition.

G. Contractor shall not load nor permit any part of any structure to be loaded in any manner that will endanger the structure, nor shall Contractor subject any part of the work or adjacent properties to stresses or pressures that will endanger it.

H. Labor, Materials and Equipment:

1. Contractor shall provide competent, suitably qualified personnel to lay out the work and perform construction as required by the Contract Documents. He shall maintain good discipline and order at the site at all times.

2. Contractor shall provide sufficient quantity and quality of labor and supervision necessary to fulfill the contractual obligations.

3. Contractor shall furnish all materials, equipment, labor, transportation, construction equipment, machinery, tools, appliances, fuel, power, light, heat, telephone, water, and sanitary facilities and all other facilities and incidentals necessary for the execution, testing, initial operation, and completion of the work.

I. The means of the work and the safety of the Contractor's employees are solely the responsibility of the Contractor. The Contractor has a contractual obligation to comply with all applicable laws and regulations including those of OSHA. At no time will either the Owner or the Owner's Representative take responsibility for either the means of the work or the safety of the Contractor's employees.

## 1.4 WORK SEQUENCE

A. If noted in the Contract Documents, construct the work in phases to accommodate the Owner's requirements during the construction period. The Contractor shall coordinate the construction schedule and operations with the Owner's Representative.

## 1.5 PRODUCTS FURNISHED BY OWNER NOT USED

## 1.6 COORDINATION

A. Utilities: Prior to starting work Contractor shall notify all utilities that may have facilities in the work area. Contractor shall be responsible for coordinating relocation as necessary unless otherwise directed by the Contract Documents.

B. Restricted Work Times: Contractor shall restrict hours of operation to 7:00 a.m. to 8:00 p.m. on Monday through Saturday, except in the case of an emergency. This does not relieve the Contractor from his contractual obligation to meet the contract period.

C. Notice: Contractor shall give Owner's Representative 72-hour notice of readiness for all required inspections, tests, or approvals, including startup or activation of system equipment. The Contractor shall give the Owner's Representative one-week notice for pre-final and/or final inspection.

D. Unsuccessful Inspections: Contractor shall notify the Owner's Representative by 3:00 p.m. of the preceding day if he is not ready for a scheduled inspection. If notification is not made the Contractor may be responsible for the cost of re-inspection.

## 1.7 REFERENCE SPECIFICATIONS

A. Specifications referred to in the Contract Documents shall be the latest version on the date of Advertisement for Bids, unless otherwise designated. The section(s) referenced shall be considered a part of the Contract Documents as if set out fully herein.

B. The following are commonly referenced specifications and/or standards along with their abbreviations:

1. AASHTO: American Association of State Highway and Transportation Officials
2. ACI: American Concrete Institute
3. ANSI: American National Standard Institute
4. ASA: American Standard Association
5. ASTM: American Society for Testing and Materials
6. AWS: American Welding Society
7. AWWA: American Water Works Association
8. CRSI: Concrete Reinforcing Steel Institute
9. CSI: Construction Specifications Institute
10. DNR: Missouri Department of Natural Resources
11. MoDOT: Missouri Standard Specifications for Highway Construction; Missouri Department of Transportation
12. NEC: National Electric Code
13. NEMA: National Electrical Manufacturer's Association
14. OSHA: Occupational Safety and Health Association
15. UL: Underwriters Laboratory
16. FM: Factory Mutual

## 1.8 PROJECT RECORD DOCUMENTS

A. Contractor shall keep at least one (1) set of Drawings and Project Manual available on the job at all times for construction purposes.

B. The Contractor shall maintain on site, one (1) set of the following record documents, and shall record actual revisions to the Work:

1. Contract Drawings.
2. Project Manual.
3. Addenda.
4. Change Orders and other modifications to the contract.
5. Reviewed shop drawings, product data, and samples.
6. Store record documents separate from documents used for construction.
7. Record information concurrent with construction progress.
8. Specifications: In each product section, legibly record a description of the actual products installed. Include the following:
9. Manufacturer's name and product model and number.
10. Product substitutions or alternates utilized.
11. Changes made by addenda and modifications.
12. Record documents and shop drawings: Legibly mark each item to record actual construction including:
13. Measured depths of structures in relation to finish floor datum or lid.
14. Measured horizontal and vertical locations of underground utilities and appurtenances referenced to permanent surface improvements.
15. Measured locations of internal utilities and appurtenances concealed in construction, referenced to visible and accessible features of the work.
16. Field changes of dimension and detail.
17. Details not on original contract drawings.
18. Submit documents to Owner’s Representative prior to Final Payment Request.

## 1.9 MEASUREMENT AND PAYMENT

A. Measurement and payment for the work is defined in the individual sections of the technical portion of the Project Manual and is listed on the bid document. Work will be paid for on a Lump Sum or Unit Price basis if set forth in the Bid Document. If work is not directly listed on the Bid Document, it shall be considered incidental to the total project.

B. If a disagreement exists between a specification section and the Bid Document, the Bid Document shall take precedence.

**PART 2 – PRODUCTS** **NOT USED**

**PART 3 – EXECUTION** **NOT USED**

**END OF SECTION 011000**

**SECTION 012100**
**ALLOWANCES**

## PART 1 - GENERAL

### 1.1 RELATED DOCUMENTS

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

### 1.2 SUMMARY

A. This Section includes administrative and procedural requirements governing allowances.

1. Certain items are specified in the Contract Documents by allowances. Allowances have been established in lieu of additional requirements and to defer selection of actual materials and equipment to a later date when additional information is available for evaluation. If necessary, additional requirements will be issued by Change Order.

B. Types of allowances include the following:

1. Weather allowances.

C. Related Sections include the following:

1. Division 01 Section "Contract Modification Procedures" for procedures for submitting and handling Change Orders for allowances.
2. Division 01 Section "Unit Prices" for procedures for using unit prices.

### 1.3 WEATHER ALLOWANCE

A. Included within the completion period for this project are a specified number of “bad weather” days (see Schedule of Allowances).

B. In the event weather conditions preclude performance of critical work activities for 50% or more of the Contractor’s scheduled workday, that day shall be declared unavailable for work due to weather (a “bad weather” day) and charged against the above allowance. Critical work activities will be determined by review of the Contractor’s current progress schedule.

C. The Contractor’s Representative and the Construction Representative shall agree monthly on the number of “bad weather” days to be charged against the allowance. This determination will be documented in writing and be signed by the Contractor and the Construction Representatives. If there is a failure to agree on all or part of the “bad weather” days for a particular month, that disagreement shall be noted on this written document and signed by each party’s representative. Failure of the Contractor’s representative to sign the “bad weather” day documentation after it is presented, with or without the notes of disagreement, shall constitute agreement with the “bad weather” day determination contained in that document.

D. There will be no modification to the time of contract performance due solely to the failure to deplete the “bad weather” day allowance.

## PART 2 - EXECUTION

### 2.1 EXAMINATION

A. Examine products covered by an allowance promptly on delivery for damage or defects. Return damaged or defective products to manufacturer for replacement.

### 2.2 PREPARATION

A. Coordinate materials and their installation for each allowance with related materials and installations to ensure that each allowance item is completely integrated and interfaced with related work.

### 2.3 SCHEDULE OF ALLOWANCES

**A. Weather Allowance: Included within the completion period (140 working days) for this Project is TWENTY (20) “bad weather” days.**

**END OF SECTION 012100**

**SECTION 012200**
**UNIT PRICES**

## PART 1 - GENERAL

### 1.1 RELATED DOCUMENTS

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

B. Quantities of Units to be included in the Base Bid are indicated in Section 004322 – Unit Prices.

### 1.2 SUMMARY

A. This Section includes administrative and procedural requirements for Unit Prices.

B. Related Sections include the following:

1. Division 01 Section "Allowances" for procedures for using Unit Prices to adjust quantity allowances.
2. Division 01 Section "Contract Modification Procedures" for procedures for submitting and handling Change Orders.

### 1.3 DEFINITIONS

A. Unit Price is **an amount proposed by bidders, stated on the Bid Form Attachment 004322** a price per unit of measurement for materials or services added to or deducted from the Contract Sum by appropriate modification, if estimated quantities of Work required by the Contract Documents are increased or decreased.

### 1.4 PROCEDURES

A. Unit Prices include all necessary material plus cost for delivery, installation, insurance, **applicable taxes,** overhead, and profit.

B. Measurement and Payment: Refer to individual Specification Sections for work that requires establishment of Unit Prices. Methods of measurement and payment for Unit Prices are specified in those Sections.

C. Owner reserves the right to reject Contractor's measurement of Work in-place that involves use of established Unit Prices and to have this work measured, at Owner's expense, by an independent surveyor acceptable to Contractor.

D. List of Unit Prices: A list of Unit Prices is included in Part 3. Specification Sections referenced in the schedule contain requirements for materials described under each Unit Price.

## PART 2 - PRODUCTS (Not Used)

## PART 3 - EXECUTION

### 3.1 LIST OF UNIT PRICES

A. Unit Price No. 1 – Removal of Unsuitable Soil:

1. Description: Removal of up to 3’ depth of Unsuitable Soil according to Excavation and Fill Specification 312300.
2. Unit of Measurements: Square Feet (SF)
3. Base Bid Quantity: 4320 SF
4. Alternate No. 1 Quantity: 300 SF

B. Unit Price No. 2 – 3” Minus Aggregate Base Course:

1. Description: Subgrade preparation of up to 3’ depth below pavement and sidewalks according to Excavation and Fill Specification 312300.
2. Unit of Measurements: Square Feet (SF)
3. Base Bid Quantity: 4320 SF
4. Alternate No. 1 Quantity: 300 SF

**END OF SECTION 012200**

**SECTION 012300**
**ALTERNATES**

## PART 1 - GENERAL

### 1.1 RELATED DOCUMENTS

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

### 1.2 SUMMARY

A. This Section includes administrative and procedural requirements governing Alternates.

### 1.3 DEFINITIONS

A. Definition: An alternate is an amount proposed by bidders and stated on the Bid Form for certain work defined in the Bidding Requirements that may be added to the Base Bid amount if the Owner decides to accept a corresponding change in either the amount of construction to be completed, or in the products, materials, equipment, systems, or installation methods described in the Contract Documents..

1. The cost for each alternate is the net addition to the Contract Sum to incorporate the Alternate into the Work. No other adjustments are made to the Contract Sum.

### 1.4 PROCEDURES

A. Coordination: Modify or adjust affected adjacent Work as necessary to completely and fully integrate the Alternate Work into the Project.

1. Include as part of each alternate, miscellaneous devices, accessory objects, and similar items incidental to or required for a complete installation whether or not mentioned as part of the Alternate.

B. Notification: The award of the Contract will indicate whether alternates have been accepted or rejected.

C. Execute accepted alternates under the same conditions as other Work of this Contract.

D. Schedule: A “Schedule of Alternates” is included at the end of this Section. Specification Sections referenced in the Schedule contain requirements for materials necessary to achieve the Work described under each alternate.

## PART 2 - PRODUCTS (Not Applicable)

## PART 3 - EXECUTION

### 3.1 SCHEDULE OF ALTERNATES

A. Alternate No. 1: *Remove existing gravel pavement and fencing as shown on Sheet D-101. Replace existing fencing and construct pavement improvements as shown on Sheet C-101.*

**END OF SECTION 012300**

**SECTION 012600**
**CONTRACT MODIFICATION PROCEDURES**

## PART 1 - GENERAL

### 1.1 RELATED DOCUMENTS

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

### 1.2 SUMMARY

A. This Section specifies administrative and procedural requirements for handling and processing Contract Modifications.

B. Related Sections include the following:

1. Division 01, Section 012100 "Allowances" for procedural requirements for handling and processing Allowances.
2. Division 01, Section 012200 "Unit Prices" for administrative requirements for using Unit Prices.
3. Division 01, Section 013115 “Project Management Communications” for administrative requirements for communications.
4. Division 00, Section 007213, Article 3.1 "Acceptable Substitutions" for administrative procedures for handling Requests for Substitutions made after Contract award.
5. Division 00, Section 007213, Article 4.0 "Changes in the Work" for Change Order requirements.

### 1.3 REQUESTS FOR INFORMATION

A. In the event that the Contractor or Subcontractor, at any tier, determines that some portion of the Drawings, Specifications, or other Contract Documents requires clarification or interpretation, the Contractor shall submit a “Request for Information” (RFI) in writing to the Designer. A RFI may only be submitted by the Contractor and shall only be submitted on the RFI forms provided by the Owner. The Contractor shall clearly and concisely set forth the issue for which clarification or interpretation is sought and why a response is needed. In the RFI, the Contractor shall set forth an interpretation or understanding of the requirement along with reasons why such an understanding was reached.

B. Responses to RFI shall be issued within ten (10) working days of receipt of the Request from the Contractor unless the Designer determines that a longer time is necessary to provide an adequate response. If a longer time is determined necessary by the Designer, the Designer will, within five (5) working days of receipt of the request, notify the Contractor of the anticipated response time. If the Contactor submits a RFI on a time sensitive activity on the current project schedule, the Contractor shall not be entitled to any time extension due to the time it takes the Designer to respond to the request provided that the Designer responds within the ten (10) working days set forth above.

C. Responses from the Designer will not change any requirement of the Contract Documents. In the event the Contractor believes that a response to a RFI will cause a change to the requirements of the Contract Document, the Contractor shall give written notice to the Designer requesting a Change Order for the work. Failure to give such written notice within ten (10) working days, shall waive the Contractor's right to seek additional time or cost under Article 4, "Changes in the Work" of the General Conditions.

## 1.4 MINOR CHANGES IN THE WORK

A. Designer will issue supplemental instructions authorizing Minor Changes in the Work, not involving adjustment to the Contract Amount or the Contract Time, on "Designer's Supplemental Instructions" (DSI).

## 1.5 PROPOSAL REQUESTS

A. The Designer or Owner Representative will issue a detailed description of proposed Changes in the Work that may require adjustment to the Contract Amount or the Contract Time. The proposed Change Description will be issued using the "Request for Proposal" (RFP) form. If necessary, the description will include supplemental or revised Drawings and Specifications.

1. Proposal Requests issued by the Designer or Owner Representative are for information only. Do not consider them instructions either to stop work in progress or to execute the proposed change.

2. Within ten (10) working days after receipt of Proposal Request, submit a proposal for the cost adjustments to the Contract Amount and the Contract Time necessary to execute the Change. The Contractor shall submit his proposal on the appropriate Change Order Detailed Breakdown form. Subcontractors may use the appropriate Change Order Detailed Breakdown form or submit their proposal on their letterhead provided the same level of detail is included. All proposals shall include:

   a. A detailed breakdown of costs per Article 4.1 of the General Conditions.

   b. If requesting additional time per Article 4.2 of the General Conditions, include an updated Contractor's Construction Schedule that indicates the effect of the Change including, but not limited to, changes in activity duration, start and finish times, and activity relationship.

## 1.6 CHANGE ORDER PROCEDURES

A. On Owner's approval of a Proposal Request, the Designer or Owner Representative will issue a Change Order for signatures of Owner and Contractor on the "Change Order" form.

## PART 2 - PRODUCTS (Not Used)

## PART 3 - EXECUTION (Not Used)

**END OF SECTION 012600**

**SECTION 013100**
**COORDINATION**

## PART 1 - GENERAL

### 1.1 RELATED DOCUMENTS

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

### 1.2 SUMMARY

A. This Section includes administrative provisions for coordinating construction operations on Projects including, but not limited to, the following:

1. Coordination Drawings.
2. Administrative and supervisory personnel.
3. Project meetings.

B. Each Contractor shall participate in coordination requirements. Certain areas of responsibility will be assigned to a specific Contractor.

C. Related Sections include the following:

1. Division 1, Section 013200 "Schedules" for preparing and submitting Contractor's Construction Schedule.
2. Articles 1.8.B and 1.8.C of Section 007213 "General Conditions" for coordinating meetings onsite.
3. Article 5.4.H of Section 007213 "General Conditions" for coordinating Closeout of the Contract.

### 1.3 COORDINATION

A. Coordination: Coordinate construction operations included in different Sections of the Specifications to ensure efficient and orderly installation of each part of the Work. Coordinate construction operations included in different Sections, which depend on each other for proper installation, connection, and operation.

B. Coordination: Each Contractor shall coordinate its construction operations with those of other contractors and entities to ensure efficient and orderly installation of each part of the Work. Each Contractor shall coordinate its operations with operations included in different Sections that depend on each other for proper installation, connection, and operation.

1. Schedule construction operations in sequence required to obtain the best results where installation of one part of the Work depends on installation of other components, before or after its own installation.
2. Coordinate installation of different components with other Contractors to ensure maximum accessibility for required maintenance, service, and repair.

3. Make adequate provisions to accommodate items scheduled for later installation.

4. Where availability of space is limited, coordinate installation of different components to ensure maximum performance and accessibility for required maintenance, service, and repair of all components including mechanical and electrical.

C. Prepare memoranda for distribution to each party involved outlining special procedures required for coordination. Include such items as required notices, reports, and list of attendees at meetings.

1. Prepare similar memoranda for Owner and separate Contractors if coordination of their Work is required.

D. Administrative Procedures: Coordinate scheduling and timing of required administrative procedures with other construction activities and activities of other Contractors to avoid conflicts and to ensure orderly progress of the Work. Such administrative activities include, but are not limited to, the following:

1. Preparation of Contractor's Construction Schedule.

2. Preparation of the Schedule of Values.

3. Installation and removal of temporary facilities and controls.

4. Delivery and processing of submittals.

5. Progress meetings.

6. Preinstallation conferences.

7. Startup and adjustment of systems.

8. Project Closeout activities.

E. Conservation: Coordinate construction activities to ensure that operations are carried out with consideration given to conservation of energy, water, and materials.

1. Salvage materials and equipment involved in performance of, but not actually incorporated into, the Work. Refer to other Sections for disposition of salvaged materials that are designated as Owner's property.

## 1.4 SUBMITTALS

A. Coordination Drawings: Prepare Coordination Drawings if limited space availability necessitates maximum utilization of space for efficient installation of different components or if coordination is required for installation of products and materials fabricated by separate entities.

B. Key Personnel Names: Within fifteen (15) work days of starting construction operations, submit a list of key personnel assignments including superintendent and other personnel in attendance at Project site. Identify individuals and their duties and responsibilities; list addresses and telephone numbers including home and office telephone numbers. Provide names, addresses, and telephone numbers of individuals assigned as standbys in the absence of individuals assigned to Project.

1. Post copies of list in Project meeting room, in temporary field office, and by each temporary telephone. Keep list current at all times.

## 1.5 PROJECT MEETINGS

A. The Owner's Construction Representative will schedule a Pre-Construction Meeting prior to beginning of construction. The date, time, and exact place of this meeting will be determined after Contract Award and notification of all interested parties. The Contractor shall arrange to have the Job Superintendent and all prime Subcontractors present at the meeting. During the Pre-Construction Meeting, the construction procedures and information necessary for submitting payment requests will be discussed and materials distributed along with any other pertinent information.

1. Minutes: Designer will record and distribute meeting minutes.

B. Progress Meetings: The Owner's Construction Representative will conduct Monthly Progress Meetings as stated in Articles 1.8.B and 1.8.C of Section 007213 "General Conditions".

1. Minutes: Designer will record and distribute to Contractor the meeting minutes.

C. Preinstallation Conferences: Contractor shall conduct a preinstallation conference at Project site before each construction activity that requires coordination with other construction.

1. Attendees: Installer and representatives of Manufacturers and Fabricators involved in or affected by the installation and its coordination or integration with other materials and installations that have preceded or will follow, shall attend the meeting. Advise Designer and Construction Representative of scheduled meeting dates.

2. Agenda: Review progress of other construction activities and preparations for the particular activity under consideration including requirements for the following:

a. Contract Documents

b. Options

c. Related RFIs

d. Related Change Orders

e. Purchases

f. Deliveries

g. Submittals

h. Review of mockups

i. Possible conflicts

j. Compatibility problems

k. Time schedules

l. Weather limitations

m. Manufacturer's written recommendations

n. Warranty requirements

o. Compatibility of materials

p. Acceptability of substrates

q. Temporary facilities and controls

r. Space and access limitations

s. Regulations of authorities having jurisdiction

t. Testing and inspecting requirements

u. Installation procedures

v. Coordination with other Work

w. Required performance results

x. Protection of adjacent Work

y. Protection of construction and personnel

3. Contractor shall record significant conference discussions, agreements, and disagreements including required corrective measures and actions.

4. Reporting: Distribute minutes of the meeting to each party present and to parties who should have been present.

5. Do not proceed with installation if the conference cannot be successfully concluded. Initiate whatever actions are necessary to resolve impediments to performance of the Work and reconvene the conference at earliest feasible date.

6. Revise paragraph below if Project requires holding progress meetings at different intervals. Insert special intervals such as "every third Tuesday" to suit special circumstances.

7. Project name

8. Name and address of Contractor

9. Name and address of Designer

10. RFI number including RFIs that were dropped and not submitted

11. RFI description

12. Date the RFI was submitted

13. Date Designer's response was received

14. Identification of related DSI or Proposal Request, as appropriate

**PART 2 - PRODUCTS (Not Used)**

**PART 3 - EXECUTION (Not Used)**

**END OF SECTION 013100**

# SECTION 013115
# PROJECT MANAGEMENT COMMUNICATIONS

## PART 1 - GENERAL

### 1.1 RELATED DOCUMENTS

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

B. Division 01, Section 013300 - Submittals

C. Division 01, Section 012600 – Contract Modification Procedures

### 1.2 SUMMARY

A. Project Management Communications: The Contractor shall use the Internet web based project management communications tool, E-Builder® ASP software, and protocols included in that software during this project. The use of project management communications as herein described does not replace or change any contractual responsibilities of the participants.
   1. Project management communications is available through E-Builder® as provided by "e-Builder®" in the form and manner required by the Owner.
   2. The project communications database is on-line and fully functional. User registration, electronic and computer equipment, and Internet connections are the responsibility of each project participant. The sharing of user accounts is prohibited

B. Support: E-Builder® will provide on-going support through on-line help files.

C. Copyrights and Ownership: Nothing in this specification or the subsequent communications supersedes the parties' obligations and rights for copyright or document ownership as established by the Contract Documents. The use of CAD files, processes or design information distributed in this system is intended only for the project specified herein.

D. Purpose: The intent of using E-Builder® is to improve project work efforts by promoting timely initial communications and responses. Secondly, to reduce the number of paper documents while providing improved record keeping by creation of electronic document files

E. Authorized Users: Access to the web site will be by individuals who are authorized users.
   1. Individuals shall complete the E-Builder New Company/User Request Form located at the following web site: https://oa.mo.gov/facilities/vendor-links/contractor-forms. Completed forms shall be emailed to the following email address: OA.FMDCE-BuilderSupport@oa.mo.gov.
   2. Authorized users will be contacted directly and assigned a temporary user password.

3. Individuals shall be responsible for the proper use of their passwords and access to data as agents of the company in which they are employed.

F. Administrative Users: Administrative users have access and control of user licenses and all posted items. DO NOT POST PRIVATE OR YOUR COMPANY CONFIDENTIAL ITEMS IN THE DATABASE! Improper or abusive language toward any party or repeated posting of items intended to deceive or disrupt the work of the project will not be tolerated and will result in deletion of the offensive items and revocation of user license at the sole discretion of the Administrative User(s).

G. Communications: The use of fax, email and courier communication for this project is discouraged in favor of using E-Builder® to send messages. Communication functions are as follows:
   1. Document Integrity and Revisions:
      a. Documents, comments, drawings and other records posted to the system shall remain for the project record. The authorship time and date shall be recorded for each document submitted to the system. Submitting a new document or record with a unique ID, authorship, and time stamp shall be the method used to make modifications or corrections.
      b. The system shall make it easy to identify revised or superseded documents and their predecessors.
      c. Server or Client side software enhancements during the life of the project shall not alter or restrict the content of data published by the system. System upgrades shall not affect access to older documents or software.
   2. Document Security:
      a. The system shall provide a method for communication of documents. Documents shall allow security group assignment to respect the contractual parties communication except for Administrative Users. DO NOT POST PRIVATE OR YOUR COMPANY CONFIDENTIAL ITEMS IN THE DATABASE!
   3. Document Integration:
      a. Documents of various types shall be logically related to one another and discoverable. For example, requests for information, daily field reports, supplemental sketches and photographs shall be capable of reference as related records.
   4. Reporting:
      a. The system shall be capable of generating reports for work in progress, and logs for each document type. Summary reports generated by the system shall be available for team members.
   5. Notifications and Distribution:
      a. Document distribution to project members shall be accomplished both within the extranet system and via email as appropriate. Project document distribution to parties outside of the project communication system shall be accomplished by secure email of outgoing documents and attachments, readable by a standard email client.
   6. Required Document Types:
      a. RFI, Request for Information.
      b. Submittals, including record numbering by drawing and specification section.
      c. Transmittals, including record of documents and materials delivered in hard copy.

d. Meeting Minutes.
e. Application for Payments (Draft or Pencil).
f. Review Comments.
g. Field Reports.
h. Construction Photographs.
i. Drawings.
j. Supplemental Sketches.
k. Schedules.
l. Specifications.
m. Request for Proposals
n. Designer's Supplemental Instructions
o. Punch Lists

H. Record Keeping: Except for paper documents, which require original signatures and large format documents (greater than 8½ x 11 inches), all other 8½ x 11 inches documents shall be submitted by transmission in electronic form to the E-Builder® web site by licensed users.
   a. The Owner and his representatives, the Designer and his consultants, and the Contractor and his Sub Contractors and suppliers at every tier shall respond to documents received in electronic form on the web site, and consider them as if received in paper document form.
   b. The Owner and his representatives, the Designer and his consultants, and the Contractor and his Sub Contractors and suppliers at every tier reserves the right to and shall reply or respond by transmissions in electronic form on the web site to documents actually received in paper document form.
   c. The Owner and his representatives, the Designer and his consultants, and the Contractor and his Sub Contractors and suppliers at every tier reserves the right to and shall copy any paper document into electronic form and make same available on the web site.

I. Minimum Equipment and Internet Connection: In addition to other requirements specified in this Section, the Owner and his representatives, the Construction Manager and his representatives, the Architect and his consultants, and the Contractor and his sub-contractors and suppliers at every tier required to have a user license(s) shall be responsible for the following:
   1. Providing suitable computer systems for each licensed user at the users normal work location[1] with high-speed Internet access, i.e. DSL, local cable company's Internet connection, or T1 connection.
   2. Each of the above referenced computer systems shall have the following minimum system[2] and software requirements:
      a. Desktop configuration (Laptop configurations are similar and should be equal to or exceed desktop system.)
         1) Operating System: Windows XP or newer
         2) Internet Browser: Internet Explorer 6.01SP2+ (Recommend IE7.0+)
         3) Minimum Recommend Connection Speed: 256K or above
         4) Processor Speed: 1 Gigahertz and above

[1] The normal work location is the place where the user is assigned for more than one-half of his time working on this project.
[2] The minimum system herein will not be sufficient for many tasks and may not be able to process all documents and files stored in the E-Builder® Documents area.

5) RAM: 512 mb
6) Operating system and software shall be properly licensed.
7) Internet Explorer version 7 (current version is a free distribution for download). This specification is not intended to restrict the host server or client computers provided that industry standard HTTP clients may access the published content.
8) Adobe Acrobat Reader (current version is a free distribution for download).
9) Users should have the standard Microsoft Office Suite (current version must be purchased) or the equivalent.

**PART 2 - PRODUCTS (Not Applicable)**

**PART 3 - EXECUTION (Not Applicable.)**

**END OF SECTION 013115**

# SECTION 013200
# SCHEDULE – BAR CHART

## PART 1 - GENERAL

### 1.1 RELATED DOCUMENTS

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

### 1.2 SUMMARY

A. This Section includes requirements for a Bar Chart Schedule for the project construction activities, schedule of submittals, and schedule for testing.

## PART 2 - PRODUCTS – (Not Applicable)

## PART 3 - EXECUTION

### 3.1 SUBMITTAL PROCEDURES

A. The Contractor shall submit to the Designer, within ten (10) working days following the Notice to Proceed, a Progress Schedule including Schedule of Values showing the rate of progress the Contractor agrees to maintain and the order in which he proposed to carry out the various phases of Work. No payments shall be made to the Contractor until the Progress Schedule has been approved by the Owner.

1. The Schedule of Values must have the following line items included with the value of the item as indicated below:

    a. O&M's (Owner's Manual)

        1) $1,000,000.00 (One million) and under – 2% of the total contract amount

        2) Over $1,000,000.00 (One million) – 1% of the total contract amount

    b. Close Out Documents

        1) $1,000,000.00 (One million) and under – 2% of the total contract amount

        2) Over $1,000,000.00 (One million) – 1% of the total contract amount

    c. General Conditions

        1) No more than 10%

B. The Contractor shall submit an updated Schedule for presentation at each Monthly Progress Meeting. The Schedule shall be updated by the Contractor as necessary to reflect the current Schedule and its relationship to the original Schedule. The updated Schedule shall reflect any changes in the logic, sequence, durations, or completion date. Payments to the Contractor shall be suspended if the Progress Schedule is not adequately updated to reflect actual conditions.

C. The Contractor shall submit Progress Schedules to Subcontractors to permit coordinating their Progress Schedules to the general construction Work. The Contractor shall coordinate preparation and processing of Schedules and reports with performance of other construction activities.

## 3.2 CONSTRUCTION PROGRESS SCHEDULE – BAR CHART SCHEDULE

A. Bar-Chart Schedule: The Contractor shall prepare a comprehensive, fully developed, horizontal bar chart-type Contractor's Construction Schedule. The Contractor for general construction shall prepare the Construction Schedule for the entire Project. The Schedule shall show the percentage of work to be completed at any time, anticipated monthly payments by Owner, as well as significant dates (such as completion of excavation, concrete foundation work, underground lines, superstructure, rough-ins, enclosure, hanging of fixtures, etc.) which shall serve as check points to determine compliance with the approved Schedule. The Schedule shall also include an activity for the number of "bad" weather days specified in Section 012100 – Allowances.

1. The Contractor shall provide a separate time bar for each significant construction activity. Provide a continuous vertical line to identify the first working day of each week.

    a. If practical, use the same Schedule of Values breakdown for schedule time bars.

2. The Contractor shall provide a base activity time bar showing duration for each construction activity. Each bar is to indicate start and completion dates for the activity. The Contractor is to place a contrasting bar below each original schedule activity time for indicating actual progress and planned remaining duration for the activity.

3. The Contractor shall prepare the Schedule on a minimal number of separate sheets to readily show the data for the entire construction period.

4. Secure time commitments for performing critical elements of the Work from parties involved. Coordinate each element on schedule with other construction activities. Include minor elements involved in the overall sequence of the Work. Show each activity in proper sequence. Indicate graphically the sequences necessary for completion of related portions of the Work.

5. Coordinate the Contractor's Construction Schedule with the Schedule of Values, list of subcontracts, Submittal Schedule, progress reports, payment requests, and other required schedules and reports.

6. Indicate the Intent to Award and the Contract Substantial Completion dates on the schedule.

B. Phasing: Provide notations on the schedule to show how the sequence of the Work is affected by the following:

1. Requirement for Phased completion

2. Work by separate Contractors

3. Work by the Owner

4. Pre-purchased materials
5. Coordination with existing construction
6. Limitations of continued occupancies
7. Un-interruptible services
8. Partial Occupancy prior to Substantial Completion
9. Site restrictions
10. Provisions for future construction
11. Seasonal variations
12. Environmental control

C. Work Stages: Use crosshatched bars to indicate important stages of construction for each major portion of the Work. Such stages include, but are not necessarily limited to, the following:

1. Subcontract awards
2. Submittals
3. Purchases
4. Mockups
5. Fabrication
6. Sample testing
7. Deliveries
8. Installation
9. Testing
10. Adjusting
11. Curing
12. Startup and placement into final use and operation

D. Area Separations: Provide a separate time bar to identify each major area of construction for each major portion of the Work. For the purposes of this Article, a “major area” is a story of construction, a separate building, or a similar significant construction element.

1. Indicate where each construction activity within a major area must be sequenced or integrated with other construction activities to provide for the following:
    a. Structural completion.
    b. Permanent space enclosure
    c. Completion of mechanical installation
    d. Completion of the electrical portion of the Work
    e. Substantial Completion

## 3.3 SCHEDULE OF SUBMITTALS

A. Upon acceptance of the Construction Progress Schedule, prepare and submit a complete schedule of submittals. Coordinate the submittal schedule with Section 013300 SUBMITTALS, the approved Construction Progress Schedule, list of subcontracts, Schedule of Values and the list of products.

B. Prepare the schedule in chronological order. Provide the following information

1. Scheduled date for the first submittal
2. Related Section number
3. Submittal category
4. Name of the Subcontractor
5. Description of the part of the Work covered
6. Scheduled date for resubmittal
7. Scheduled date for the Designer's final release or approval

C. Distribution: Following the Designer's response to the initial submittal schedule, print and distribute copies to the Designer, Owner, subcontractors, and other parties required to comply with submittal dates indicated.

1. Post copies in the Project meeting room and temporary field office.
2. When revisions are made, distribute to the same parties and post in the same locations. Delete parties from distribution when they have completed their assigned part of the Work and are no longer involved in construction activities.

D. Schedule Updating: Revise the schedule after each meeting or other activity where revisions have been recognized or made. Issue the updated schedule concurrently with the report of each meeting.

## 3.4 SCHEDULE OF INSPECTIONS AND TESTS

A. Prepare a schedule of inspections, tests, and similar services required by the Contract Documents. Submit the schedule with (15) days of the date established for commencement of the Contract Work. The Contractor is to notify the testing agency at least (5) working days in advance of the required tests unless otherwise specified.

B. Form: This schedule shall be in tabular form and shall include, but not be limited to, the following:

1. Specification Section number
2. Description of the test
3. Identification of applicable standards
4. Identification of test methods
5. Number of tests required
6. Time schedule or time span for tests

7. Entity responsible for performing tests
8. Requirements for taking samples
9. Unique characteristics of each service

C. Distribution: Distribute the schedule to the Owner, Architect, and each party involved in performance of portions of the Work where inspections and tests are required.

**END OF SECTION 013200**

**SECTION 013300**
**SUBMITTALS**

## PART 1 - GENERAL

### 1.1 SECTION INCLUDES

A. Submittal Procedures

B. Construction Progress Schedules

C. Proposed Products List

D. Shop Drawings

E. Product Data

F. Manufacturers' Instructions

G. Manufacturers' Certificates

H. Drawings and General Provisions of Contract, including General and Special Conditions, apply to this section.

### 1.2 SUBMITTAL PROCEDURES

A. Transmit each submittal with Contractors transmittal form.

B. Identify Project, Contractor, Subcontractor or Supplier; pertinent drawing sheet and detail number, and specification section number, as appropriate.

C. Apply Contractors stamp, signed or initialed, certifying that review, verification of Products required, field dimensions, adjacent construction Work, and coordination of information, is in accordance with the requirements of the Work and Contract Documents.

D. Schedule submittals to expedite the project, and deliver to Owners Representative at his business address. Coordinate submission of related items.

E. Identify variations from Contract Documents and Product or system limits which may be detrimental to successful performance of the completed Work.

F. Provide space for review stamp of Owner's Representative.

G. Revise and resubmit submittals as required. Identify all changes made since previous submission.

H. Distribute copies of reviewed submittals to concerned parties. Instruct parties to promptly report inability to comply with provisions.

I. Contractor shall allow 2 weeks in his schedule for submittal review.

J. Revise and resubmit non-approved submittals. Follow the same procedure as the initial submission.

K. Review and approval or acceptance of a submittal by the Owner's Representative does not relieve the Contractor of his responsibility under the Contract Documents.

### 1.3 CONSTRUCTION PROGRESS SCHEDULES

A. Submit initial progress schedule in duplicate within 15 days after date of Owner-Contractor Agreement or Notice to Proceed for Owners Representative review. Contractor must submit the schedule prior to commencement of work.

B. Contractor shall coordinate all activities on the project.

C. Contractor shall notify the Owner's Representative 72 hours prior to the start of construction or a major increase / decrease in the work force.

D. Schedule shall take the form of a horizontal bar chart with a weekly breakdown of each operation or major specification section in chronological order. Alternate project management schedules with equal or greater detail are allowed.

E. Revise and resubmit schedules with each Application for Payment, identifying changes since previous version.

F. Indicate estimated percentage of completion for each item of work at each submission.

G. Indicate submittal dates required for shop drawings, product data, samples, and product delivery dates, including those furnished by Owner and under Allowances.

## 1.4 PROPOSED PRODUCTS LIST

A. Within 15 days after date of Owner-Contractor Agreement or Notice to Proceed, submit complete list of major products proposed for use, with name of manufacturer, trade name, and model number of each product.

B. For products specified only by reference standards, give manufacturer, trade name, model or catalog designation, and reference standards.

## 1.5 SHOP DRAWINGS

A. Submit three copies plus additional copies for return to the Contractor (maximum of 9).

B. Shop drawings require preparation by a licensed engineer or architect. They shall carry an original seal and signature on the two copies.

C. After review, reproduce and distribute in accordance with Article on Procedures above and maintain copies of Record Documents required for Contract Close out.

## 1.6 PRODUCT DATA

A. Submit three copies plus additional copies for return to the Contractor (maximum of 9).

B. Contractor shall mark each copy to identify applicable products, models, options, and other data. Supplement manufacturers standard data to provide information unique to this project.

C. After review, Contractor to distribute in accordance with Article on Procedures above and maintain copies for Record Documents required for Contract Close out.

## 1.7 MANUFACTURER'S INSTRUCTIONS

A. Submit three copies plus additional copies for return to the Contractor (maximum of 9).

B. Submit manufacturers' printed instructions for delivery, storage, assembly, installation, start-up, adjusting, and finishing.

C. Identify conflicts between manufacturers' instructions and contract documents.

## 1.8 MANUFACTURER'S CERTIFICATIONS

A. Submit three copies plus additional copies for return to the Contractor (maximum of 9).

B. Indicate material or product conforms to or exceeds specified requirements. Submit supporting reference data, affidavits, and certifications as appropriate.

C. Certifications may be recent or previous test results on material or product, but must be acceptable to Owners Representative.

## 1.9 SUBMITTAL

A. The contractor shall identify shop drawings in accordance with the following coded legend:

1. Shop Drawings
2. Catalog
3. Material List, Product Data
4. Samples
5. Certification
6. Performance Curves, Certificates, and Test Data

B. The following items shall require shop drawing submittals

**(a)**

| SPEC SECTION | TITLE | CATEGORY |
|---|---|---|
| 013200 | Schedules | Construction Schedule |
| 013200 | Schedules | Schedule of Values |
| 013200 | Schedules | List of Subcontractors |
| 013200 | Schedules | Major Material Suppliers |
| 024100 | Site Demolition | Certification |
| 024100 | Site Demolition | Construction Schedule |
| 024113 | Selective Site Demolition | Shop Drawings |
| 032000 | Concrete Reinforcement | Shop Drawings |
| 033000 | Cast in Place Concrete | Product Data |
| 033000 | Cast in Place Concrete | Test Report |
| 033000 | Cast in Place Concrete | Certification |
| 055200 | Exterior Handrails | Shop Drawings |
| 312500 | Erosion Control | Mock up |
| 312500 | Erosion Control | Certification |
| 321300 | Portland Cement Paving | Certification |
| 321723 | Pavement Markings | Product Data |
| 330516 | Manholes and Structures | Product Data |
| 330516 | Manholes and Structures | Shop Drawings |
| 330516 | Manholes and Structures | Certification |

| | | |
|---|---|---|
| 333000 | Sanitary Sewerage | Product Data |
| 333000 | Sanitary Sewerage | Shop Drawings |
| 333000 | Sanitary Sewerage | Certification |
| 334000 | Storm Drainage | Product Data |
| 334000 | Storm Drainage | Shop Drawings |
| 334000 | Storm Drainage | Certification |
| 334600 | Subdrainage | Product Data |
| 334600 | Subdrainage | Shop Drawings |
| 334600 | Subdrainage | Certification |

### 1.10 CONSTRUCTION PHOTOGRAPH / VIDEOTAPES

A. Contractor is responsible to acquire adequate visual records of the preconstruction conditions, sufficient to protect the Contractor, Owner, and Owner's Representative from damage claims. Contractor shall make copies of these records available to the Owner or Owner's Representative upon their request.

**PART 2 – PRODUCTS** **NOT USED**

**PART 3 – EXECUTION** **NOT USED**

**END OF SECTION 013300**

# SECTION 013513.25
# SITE SECURITY AND HEALTH REQUIREMENTS

## PART 1 - GENERAL

### 1.1 RELATED DOCUMENTS

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

### 1.2 SUBMITTALS

A. List of required submittals:

1. Materials Safety Data Sheets for all hazardous materials to be brought onsite.

2. Schedule of proposed shutdowns, if applicable.

3. A list of the names of all employees who will submit fingerprints for a background check, and the signed privacy documents identified below for each employee.

## PART 2 - PRODUCTS (Not Applicable)

## PART 3 - EXECUTION

### 3.1 ACCESS TO THE SITE

A. The Contractor shall arrange with Facility Representatives to establish procedures for the controlled entry of workers and materials into the work areas at the Facility.

B. The Contractor shall establish regular working hours with Facility Representatives. The Contractor must report changes in working hours or overtime to Facility Representatives and obtain approval twenty-four (24) hours ahead of time. The Contractor shall report emergency overtime to Facility Representatives as soon as it is evident that overtime is needed. The Contractor must obtain approval from Facility Representatives for all work performed after dark.

C. The Contractor shall provide the name and phone number of the Contractor's employee or agent who is in charge onsite; this individual must be able to be contacted in case of emergency. The Contractor must be able to furnish names and address of all employees upon request.

D. All construction personnel shall visibly display issued identification cards.

### 3.2 FIRE PROTECTION, SAFETY, AND HEALTH CONTROLS

A. The Contractor shall take all necessary precautions to guard against and eliminate possible fire hazards.

1. Onsite burning is prohibited.

2. The Contractor shall store all flammable or hazardous materials in proper containers located outside the buildings or offsite, if possible.

3. The Contractor shall provide and maintain, in good order, during construction fire extinguishers as required by the National Fire Protection Association. In areas of flammable liquids, asphalt, or electrical hazards, 15-pound carbon dioxide or 20-pound dry chemical extinguishers shall be provided.

B. The Contractor shall not obstruct streets or walks without permission from the Owner's Construction Representative and Facility Representatives.

C. The Contractor's personnel shall not exceed the speed limit of 15 mph while at the Facility unless otherwise posted.

D. The Contractor shall take all necessary, reasonable measures to reduce air and water pollution by any material or equipment used during construction. The Contractor shall keep volatile wastes in covered containers, and shall not dispose of volatile wastes or oils in storm or sanitary drains.

E. The Contractor shall keep the project site neat, orderly, and in a safe condition at all times. The Contractor shall immediately remove all hazardous waste, and shall not allow rubbish to accumulate. The Contractor shall provide onsite containers for collection of rubbish and shall dispose of it at frequent intervals during the progress of the Work.

F. Fire exits, alarm systems, and sprinkler systems shall remain fully operational at all times, unless written approval is received from the Owner's Construction Representative and the appropriate Facility Representative at least twenty-four (24) hours in advance. The Contractor shall submit a written time schedule for any proposed shutdowns.

G. For all hazardous materials brought onsite, Material Safety Data Sheets shall be on site and readily available upon request at least a day before delivery.

H. Alcoholic beverages or illegal substances shall not be brought upon the Facility premises. The Contractor's workers shall not be under the influence of any intoxicating substances while on the Facility premises.

I. Masks shall be worn when the minimum required social distancing (6 feet minimum) is not possible.

## 3.3 MSHP SECURITY CLEARANCE REQUIREMENTS

A. Contractor Background Screening Policy: As a normal business activity, the Missouri State Highway Patrol (MSHP) may contract with external companies to perform various duties for the Missouri State Highway Patrol. Any personnel working for a contractor, and who has access to criminal justice information is required to pass a background check prior to beginning work on the contract. A contractor's proposed candidate may also be required to undergo a MSHP approved drug screening. This background check requirement will be included as part of all PAQs or solicitations for bids. The contract/PAQ award is contingent upon the proposed candidate background checks being completed.

B. This background check will include, but not be limited to, state of residency and national fingerprint-based record checks. If the proposed candidate lives outside the United States, the contractor will submit similar documentation from their respective country. Qualification to work on contract will be based upon the following criteria:

1. A felony conviction or guilty plea will be an automatic disapproval of the candidate.
2. Any conviction whether misdemeanor or felony, involving violence, crimes against children, and all sexual crimes regardless of timeframe will be an automatic disapproval of the candidate.
3. Candidates will be disqualified if it is confirmed there are outstanding arrest warrants for the candidate.
4. Any other misdemeanor convictions and guilty pleas may be considered for automatic disapproval. The State CSO (CJIS Security Officer) has final authority regarding if the nature or severity of the misdemeanor offense(s) does or does not warrant a disqualification.

C. For misdemeanors, consideration will be given to the relationship between the information obtained in the background check and the responsibilities of the position. Time and severity of crime may also be considered as factors in a disqualification. Candidates may submit a written request for waiver through their contracting company if they have been disapproved and wish to contest the decision. The request will need to explain the circumstances of the crime and justification for a waiver.

D. Contractors will be required to undergo a background check at a minimum once every five years. If there is a significant gap between contracts, candidates may be required to undergo a background check before working under a new contract.

E. The CSO or their designee will maintain a list of contractors who have been approved to work at the MSHP.

F. If a candidate goes through a background check with one contractor and then goes to work at a different contractor, the candidate will not be required to undergo a separate background check unless the timeframe exceeds five-year limit.

G. The CSO for the MSHP has the right to approve or disapprove any candidate and has the right to revoke a candidate's approval at any time.

H. The FBI CJIS Security Policy requires the MSHP to conduct background checks on all contractors needing MSHP access.

I. Contractors working on-site and/or need **escorted access** are required to provide name, date of birth and social security number to enable the MSHP to run a name based background check prior to their arrival on-site.

J. Contractors working on-site with **unescorted access and/or need access to our network** are required to submit fingerprints. Required fields for print cards are as follows:

1. ORI: MOMHP0070
2. OCA: CONTRACTOR

3. Employer and Address: COMPANY NAME AND ADDRESS

4. Reason Fingerprinted: CONTRACTOR

K. The FBI CJIS Security Policy requires the Missouri State Highway Patrol to conduct background checks on all contractors needing Patrol access.

Please provide name of your company, mailing address, point of contact with email address and phone number. If possible, include a list of employee names submitting background checks for verification purposes.
Requirements are as follows:

1. **Fingerprint submission** - employees may go online to MACHS.MO.GOV, click on fingerprint portal to register. The SHP-984 MACHS Fingerprint Instruction Form Link is located at:

   https://www.mshp.dps.missouri.gov/MSHPWeb/PatrolDivisions/CRID/documents/SHP-984_MACHS_Fingerprint_Instruction_Form.pdf
   Payment of $33.25 is due at the time of service.

   Instructions for fingerprint submission(s) for applicants residing outside of Missouri may be found at:

   https://www.mshp.dps.missouri.gov/MSHPWeb/PatrolDivisions/CRID/crimRecChk.html

   Required fields for print cards or digital prints:

   **ORI:** MOMHP0070
   **REGISTRATION NUMBER**: 7965
   **OCA DESIGNATION**: CONTRACTOR
   **AGENCY NAME:** CJIS INFO SECURITY UNIT CONTRACTORS

2. **Security Awareness Test** - employees may go online at www.cjisonline.com to take the security awareness test. Please provide a designated employee including their email address and phone number, from your company to be assigned as the CJIS Online Administrator allowing them to oversee all employee certification tests and finger print submission profiles.

**If the online Security Awareness Test is not an option, please contact: securityaudit@mshp.dps.mo.gov or call 573-526-6153 x2658.

Once fingerprints, security forms and security awareness tests have been completed, background results with yes/no approved access will be provided via encrypted email.

Those needing the results may request them from the Security Audit Compliance Unit at securityaudit@mshp.dps.mo.gov and call 573-526-6153 x2658 for the encrypted password and for further questions or assistance.

L. Once background checks are completed, results will be returned via encrypted email to the requestor. Processing time varies. Please contact the Security Audit and Compliance Unit for questions at 573-526-6153 x2658.

## 3.4 DISRUPTION OF UTILITIES

A. The Contractor shall give a minimum of seventy-two (72) hours written notice to the Construction Representative and the Facility Representative before disconnecting electric, gas, water, fire protection, or sewer service to any building.

B. The Contractor shall give a minimum of seventy-two (72) hours written notice to the Construction Representative and Facility Representative before closing any access drives, and shall make temporary access available, if possible. The Contractor shall not obstruct streets, walks, or parking.

**END OF SECTION 013513.25**

**SECTION 015000**
**TEMPORARY FACILITIES AND CONTROLS**

## PART 1 - GENERAL

### 1.1 SECTION INCLUDES

A. Temporary Utilities: Sanitary facilities.

B. Temporary Controls: Barriers, enclosures and fencing, protection of the Work, and water control

C. Construction Facilities: Access roads, parking, progress cleaning, and project signage.

D. Drawings and General Provisions of Contract, including General and Special Conditions, apply to this section.

### 1.2 TEMPORARY SANITARY FACILITIES

A. The contractor shall provide and maintain such accommodations, for the use of his employees, to comply with the requirements and regulations of the Department of Natural Resources. Do not use existing facilities.

### 1.3 BARRIERS

A. Provide barriers to prevent unauthorized entry to construction areas and to protect existing facilities and adjacent properties from damage from construction operations.

B. Provide barricades required by governing authorities for public rights-of-way and for public access to adjacent properties.

C. Provide protection for plant life designated to remain. Replace damaged plant life.

D. Protect non-owned vehicular traffic, stored materials, site and structures from damage.

### 1.4 FENCING

A. Provide construction fencing at any open excavations that are left unattended and at other locations necessary to protect the work and the public.

### 1.5 WATER CONTROL

A. Grade site to drain. Maintain excavations free of water. Provide, operate, and maintain pumping equipment.

B. Protect site from puddling or running water. Provide water barriers as required to protect site from soil erosion.

### 1.6 PROTECTION OF INSTALLED WORK

A. Protect installed Work and provide special protection where specified in individual specification sections.

B. Provide temporary and removable protection for installed Products. Control activity in immediate work area to minimize damage.

### 1.7 SECURITY

A. Provide security and facilities to protect Work, and Owner’s operations from unauthorized entry, vandalism, or theft.

### 1.8 ACCESS ROADS

A. Construct and maintain temporary roads accessing public thoroughfares to serve construction area.

B. Extend and relocate, as work progress requires. Maintain necessary construction access for the abutting properties.

C. Provide and maintain access to fire hydrants, free of obstructions.

D. Provide means of removing mud from vehicle wheels before entering streets.

### 1.9 PARKING

A. Arrange for temporary parking areas to accommodate construction personnel.

B. When site space is not adequate, provide additional off-site parking.

C. Provide protection for plant life designated to remain. Replace damaged plant life.

D. Protect non-owned vehicular traffic, stored materials, site and structures from damage.

### 1.10 PROGRESS CLEANING

A. Maintain areas free of waste materials, debris, and rubbish. Maintain site in a clean and orderly condition.

B. Remove waste materials, debris and rubbish from site periodically and dispose off-site.

### 1.11 REMOVAL OF UTILITIES, FACILITIES, AND CONTROLS

A. Remove temporary above grade or buried utilities, equipment, facilities, materials, prior to Substantial Completion.

B. Clean and repair damage caused by installation or temporary use of facilities.

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

### 1.12 CONTRACTOR'S REPRESENTATIVE

A. Prior to the start of the work, contractor shall designate a representative for the project and a telephone number equipped with an operator or answering machine available on a 24-hour basis.

## PART 2 – PRODUCTS NOT USED

## PART 3 – EXECUTION NOT USED

**END OF SECTION 015000**

**SECTION 015000.15**
**CONSTRUCTION FACILITIES AND TEMPORARY CONTROLS**

## PART 1 - GENERAL

### 1.1 RELATED DOCUMENTS

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

### 1.2 SUMMARY

A. This Section includes requirements for construction facilities and temporary controls including temporary utilities, support facilities, security, and protection.

B. Temporary utilities include, but are not limited to, the following:

1. Storm sewer

C. Support facilities include, but are not limited to, the following:

1. Dewatering facilities and drains
2. Temporary enclosures
3. Temporary project identification signs and bulletin boards
4. Waste disposal services
5. Construction aids and miscellaneous services and facilities

D. Security and protection facilities include, but are not limited to, to following:

1. Barricades, warning signs, and lights
2. Environmental protection

### 1.3 SUBMITTALS

A. Not applicable. Contained in other sections.

### 1.4 QUALITY ASSURANCE

A. Regulations: Comply with industry standards and applicable laws and regulations including, but not limited to, the following:

1. Building code requirements
2. Health and safety regulations
3. Utility company regulations
4. Police, fire department, and rescue squad rules
5. Environmental protection regulations

### 1.5 PROJECT CONDITIONS

A. Conditions of Use: Keep temporary services and facilities clean and neat in appearance. Operate in a safe and efficient manner. Relocate temporary

services and facilities as the Work progresses. Do not overload facilities or permit them to interfere with progress. Take necessary fire-prevention measures. Do not allow hazardous, dangerous, or unsanitary conditions, or public nuisances to develop or persist onsite.

## PART 2 - PRODUCTS

### 2.1 MATERIALS

A. General: Provide new materials. If acceptable to the Designer, the Contractor may use undamaged, previously used materials in serviceable condition. Provide materials suitable for use intended.

B. Paint:

1. For job-built temporary offices, shops, sheds, fences, and other exposed lumber and plywood, provide exterior-grade acrylic-latex emulsion over exterior primer.

2. For sign panels and applying graphics, provide exterior-grade alkyd gloss enamel over exterior primer.

C. Tarpaulins: Provide waterproof, fire-resistant, UL-labeled tarpaulins with flame-spread rating of (15) or less. For temporary enclosures, provide translucent, nylon-reinforced laminated polyethylene or polyvinyl chloride, fire-retardant tarpaulins.

D. Open-Mesh Fencing: Provide 0.120” (3mm) thick, galvanized 2” (50mm) chainlink fabric fencing 6’ (2m) high with galvanized steel pipe posts, 1½” (38mm) ID for line posts and 2½” (64mm) ID for corner posts.

### 2.2 EQUIPMENT

A. General: Provide new equipment. If acceptable to the Designer, the Contractor may use undamaged, previously used equipment in serviceable condition. Provide equipment suitable for use intended.

B. Temporary Toilet Units: Provide self-contained, single-occupant toilet units of the chemical, aerated re-circulation, or combustion type. Provide units properly vented and fully enclosed with a glass-fiber-reinforced polyester shell or similar nonabsorbent material.

## PART 3 - EXECUTION

### 3.1 INSTALLATION

A. Use qualified personnel for installation of temporary facilities. Locate facilities where they will serve the Project adequately and result in minimum interference with performance of the Work. Relocate and modify facilities as required.

B. Provide each Facility ready for use when needed to avoid delay. Maintain and modify as required. Do not remove until facilities are no longer needed or are replaced by authorized use of completed permanent facilities.

## 3.2 TEMPORARY UTILITY INSTALLATION

A. General: Engage the appropriate local utility company to install temporary service or connect to existing service. Where company provides only part of the service, provide the remainder with matching, compatible materials and equipment. Comply with company recommendations.

1. Arrange with company and existing users for a time when service can be interrupted, if necessary, to make connections for temporary services.

2. Provide adequate capacity at each stage of construction. Prior to temporary utility availability, provide trucked-in services.

3. Obtain easements to bring temporary utilities to the site where the Owner's easements cannot be used for that purpose.

4. Use Charges: Cost or use charges for temporary facilities are not chargeable to the Owner or Designer. Neither the Owner nor Designer will accept cost or use charges as a basis of claims for Change Order.

B. Temporary Toilets: Install self-contained toilet units. Use of pit-type privies will not be permitted. Comply with regulations and health codes for the type, number, location, operation, and maintenance of fixtures and facilities. Install where facilities will best serve the Project's needs.

1. Shield toilets to ensure privacy.

2. Provide separate facilities for male and female personnel.

3. Provide toilet tissue materials for each facility.

C. Wash Facilities: Install wash facilities supplied with potable water at convenient locations for personnel involved in handling materials that require wash-up for a health and sanitary condition. Dispose of drainage properly. Supply cleaning compounds appropriate for each condition.

1. Provide paper towels or similar disposable materials for each facility.

2. Provide covered waste containers for used material.

D. Provide earthen embankments and similar barriers in and around excavations and subgrade construction, sufficient to prevent flooding by runoff of storm water from heavy rains.

## 3.3 SUPPORT FACILITIES INSTALLATION

A. General: Locate field offices, storage sheds, and other temporary construction and support facilities for easy access.

1. Maintain support facilities until near Substantial Completion. Remove prior to Substantial Completion. Personnel remaining after Substantial Completion will be permitted to use permanent facilities, under conditions acceptable to the Owner.

B. Storage Facilities: Limited areas for storage of building materials are available onsite. Available storage areas are shown on the drawings. The Contractor shall provide his own security. Specific locations for storage will be discussed at the Pre-Bid Meeting and the Pre-Construction Meeting.

C. Construction Parking: Parking at the site will be provided in the areas designated at the Pre-Construction Meeting.

D. Dewatering Facilities and Drains: For temporary drainage and dewatering facilities and operations not directly associated with construction activities included under individual Sections, comply with dewatering requirements of applicable Division 02 Sections. Where feasible, utilize the same facilities. Maintain the site, excavations, and construction free of water.

E. Temporary Enclosures: Provide temporary enclosures for protection of construction, in progress and completed, from exposure, foul weather, other construction operations, and similar activities.

1. Install tarpaulins securely with incombustible wood framing and other materials. Close openings of 25SqFt (2.3SqM) or less with plywood or similar materials.

F. Temporary Lifts and Hoists: Provide facilities for hoisting materials and employees. Truck cranes and similar devices used for hoisting materials are considered “tools and equipment” and not temporary facilities.

G. Project Identification and Temporary Signs: Prepare project identification and other signs of size indicated. Install signs where indicated to inform the public and persons seeking entrance to the Project. Support on posts or framing of preservative-treated wood or steel. Do not permit installation of unauthorized signs.

1. Project Identification Signs: Engage an experienced sign painter to apply graphics. Comply with details indicated.

2. Temporary Signs: Prepare signs to provide directional information to construction personnel and visitors.

H. Collection and Disposal of Waste: Collect waste from construction areas and elsewhere daily. Comply with requirements of NFPA 241 for removal of combustible waste material and debris. Enforce requirements strictly. Do not hold materials more than seven (7) days during normal weather or three (3) days when the temperature is expected to rise above 80°F (27°C). Handle hazardous, dangerous, or unsanitary waste materials separately from other waste by containerizing properly. Dispose of material lawfully.

## 3.4 SECURITY AND PROTECTION FACILITIES INSTALLATION

A. Barricades, Warning Signs, and Lights: Comply with standards and code requirements for erection of structurally adequate barricades. Paint with appropriate colors, graphics, and warning signs to inform personnel and the public of the hazard being protected against. Where appropriate and needed, provide lighting including flashing red or amber lights.

B. Security Enclosure and Lockup: Install substantial temporary enclosure of partially completed areas of construction. Provide locking entrances to prevent unauthorized entrance, vandalism, theft, and similar violations of security.

1. Storage: Where materials and equipment must be stored and are of value or attractive for theft, provide a secure lockup. Enforce discipline in

connection with the installation and release of material to minimize the opportunity for theft and vandalism.

C. Environmental Protection: Provide protection, operate temporary facilities, and conduct construction in ways and by methods that comply with environmental regulations and minimize the possibility that air, waterways, and subsoil might be contaminated or polluted or that other undesirable effects might result. Avoid use of tools and equipment that produce harmful noise. Restrict use of noisemaking tools and equipment to hours that will minimize complaints from persons or firms near the site.

## 3.5 OPERATION, TERMINATION AND REMOVAL

A. Supervision: Enforce strict discipline in use of temporary facilities. Limit availability of temporary facilities to essential and intended uses to minimize waste and abuse.

B. Maintenance: Maintain facilities in good operating condition until removal. Protect from damage by freezing temperatures and similar elements.

1. Maintain operation of temporary enclosures, heating, cooling, humidity control, ventilation, and similar facilities on a 24-hour basis where required to achieve indicated results and to avoid possibility of damage.

2. Protection: Prevent water-filled piping from freezing. Maintain markers for underground lines. Protect from damage during excavation operations.

C. Termination and Removal: Unless the Designer requests that it be maintained longer, remove each temporary facility when the need has ended, when replaced by authorized use of a permanent facility, or no later than Substantial Completion. Complete or, if necessary, restore permanent construction that may have been delayed because of interference with the temporary facility. Repair damaged Work, clean exposed surfaces, and replace construction that cannot be satisfactorily repaired.

1. Materials and facilities that constitute temporary facilities are the Contractor’s property. The Owner reserves the right to take possession of project identification signs.

2. Remove temporary paving not intended for or acceptable for integration into permanent paving. Where the area is intended for landscape development, remove soil and aggregate fill that do not comply with requirements for fill or subsoil in the area. Remove materials contaminated with road oil, asphalt and other petrochemical compounds, and other substances that might impair growth of plant materials or lawns. Repair or replace street paving, curbs, and sidewalks at the temporary entrances as required by the governing authority.

**END OF SECTION 015000.15**

**SECTION 017400**
**CLEANING**

## PART 1 - GENERAL

### 1.1 RELATED DOCUMENTS

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

### 1.2 SUMMARY

A. This Section includes administrative and procedural requirements for cleaning during the Project.

B. Environmental Requirements: Conduct cleaning and waste-disposal operations in compliance with local laws and ordinances. Comply fully with federal and local environmental and anti-pollution regulations.

1. Do not dispose of volatile wastes such as mineral spirits, oil, or paint thinner in storm or sanitary drains.
2. Burning or burying of debris, rubbish, or other waste material on the premises is not permitted.

## PART 2 - PRODUCTS

### 2.1 MATERIALS

A. Cleaning Agents: Use cleaning materials and agents recommended by the manufacturer or fabricator for the surface to be cleaned. Do not use cleaning agents that are potentially hazardous to health or property or that might damage finished surfaces.

## PART 3 - EXECUTION

### 3.1 PROGRESS CLEANING

A. General

1. Retain all stored items in an orderly arrangement allowing maximum access, not impending drainage or traffic, and providing the required protection of materials.
2. Do not allow the accumulation of scrap, debris, waste material, and other items not required for construction of this Work.
3. At least twice each month, and more often if necessary, completely remove all scrap, debris, and waste material from the jobsite.
4. Provide adequate storage for all items awaiting removal from the jobsite, observing all requirements for fire protection and protection of the ecology.

B. Site

1. Daily, inspect the site and pick up all scrap, debris, and waste material. Remove all such items to the place designated for their storage.

2. Weekly, inspect all arrangements of materials stored onsite. Re-stack, tidy, or otherwise service all material arrangements.

3. Maintain the site in a neat and orderly condition at all times.

## 3.2 FINAL CLEANING

A. General: Provide final cleaning operations when indicated. Employ experienced workers or professional cleaners for final cleaning. Clean each surface or unit of Work to the condition expected from a commercial building cleaning and maintenance program. Comply with manufacturer's instructions.

B. Complete the following cleaning operations before requesting inspection for certification of Substantial Completion for the entire Project or a portion of the Project.

1. Clean the Project Site, yard and grounds, in areas disturbed by construction activities including landscape development areas, of rubbish, waste material, litter, and foreign substances.

2. Sweep paved areas broom clean. Rake grounds that are neither planted nor paved to a smooth, even-textured surface.

3. Remove petrochemical spills, stains, and other foreign deposits.

4. Remove tools, construction equipment, machinery, and surplus material from the site.

5. Leave the Project clean and ready for occupancy.

C. Removal of Protection: Remove temporary protection and facilities installed during construction to protect previously completed installations during the remainder of the construction period.

D. Compliances: Comply with governing regulations and safety standards for cleaning operations. Remove waste materials from the site and dispose of lawfully.

1. Where extra materials of value remain after Final Acceptance by the Owner, they become the Owner's property.

**END OF SECTION 017400**

**SECTION 024100**
**SITE DEMOLITION**

## PART 1 - GENERAL

### 1.1 SECTION INCLUDES

A. Removal of drainage structures, pavements, surfacing, base courses, curb, curb and gutter, sidewalks, steps, retaining walls, foundation walls, utility pipes, and other existing improvements which conflict with the work and are not designated to remain in place.

B. Drawings and General Provisions of Contract, including General and Special Conditions, apply to this section.

### 1.2 GENERAL

A. The Contractor shall remove old pavements, abandoned sewers or pipelines, and other obstructions to the work within the construction limits, and not designated or permitted to remain. The Contractor shall dispose of the materials away from the site of work.

B. It is the intent that the demolition be complete and adequate for the intended purpose. This work shall include the removal of all items, whether in view or hidden underneath the surface of the ground, regardless of whether shown on the Drawings or encountered during construction.

### 1.3 RELATED SECTIONS

A. Section 311000 – Site Clearing

B. Section 312300 – Excavation and Fill

C. Section 312333 – Trenching and Backfilling

### 1.4 PERMITS

A. Contractor shall comply with all applicable local, state, and federal requirements regarding materials, methods of work, and disposal of excess and waste materials.

B. Contractor shall obtain and pay for all required inspections, permits, and fees. Provide notices required by governmental authorities.

### 1.5 SUBMITTALS

A. The Contractor shall submit utility service termination certificates, copies of demolition notices, and permits to the Owner’s Representative prior to removal.

B. If the Drawings or Specifications do not specify phasing, the Contractor shall submit demolition procedures and operational sequence for review and acceptance by the Owner’s Representative.

### 1.6 JOB CONDITIONS

A. Protection

B. Erect barriers, fences, guardrails, enclosures, chutes, and shoring to protect personnel, structures, and utilities remaining intact.

C. Protect on-site trees and plants as noted on Drawings. Protect all off-site trees and plants from damage.

D. Protect existing objects designated to remain. In case of damage, immediately make repairs or replacements necessary to the approval of the Owner's Representative at no additional cost to the Owner.

E. Maintaining Traffic

1. Minimize interference with roads, streets, driveways, sidewalks, and adjacent facilities.
2. Do not close or obstruct streets, sidewalks, alleys, or passageways without permission from authorities having jurisdiction.
3. If closure is permitted, provide signage indicating closure and signage to direct traffic to alternate route.

F. Dust Control

1. Moisten surfaces as required to prevent dust from being a nuisance to the public, neighbors, and concurrent performance of other work on the site.

## PART 2 - MATERIALS NOT USED

## PART 3 - EXECUTION

### 3.1 PREPARATION

A. Notification: Provide the Owner's Representative a minimum of seventy two (72) hours notice prior to commencing the work of this section. Notice may not include weekends or holidays.

B. Site Inspection: Prior to work under this section, the Contractor shall carefully inspect the entire site and verify all objects designated to be removed or to be preserved.

C. Protection of Utilities: The Contractor shall locate existing utility lines and services traversing the site and determine the requirements for their protection. The Contractor shall preserve in operating condition active utilities traversing the site that are designated to remain.

D. Disconnection of Utilities: Before starting site operations, the Contractor shall disconnect or arrange for the disconnection of all utility services designated to be removed. The Contractor shall perform all such work in accordance with the requirements of the utility company or agency involved.

### 3.2 PAVEMENTS

A. In removing pavement, curb and gutter, sidewalks, and similar improvements, where a portion is to be left in place, removal shall be to an existing joint. Remove sufficient pavement to provide for proper grade and connections in the new work regardless of any limits indicated on the Drawings.

### 3.3 SEWERS

A. Existing castings and culverts, if salvageable and removed intact, shall remain the property of the owner. The Contractor shall use reasonable care in the removal. If privately owned, leave on the owner’s property. Arrange pickup by the appropriate agency if owned publicly.

B. All sewers, drainage pipe, and floor drains, which have been or are to be abandoned, shall be permanently sealed at the ends with bulkheads constructed of concrete, having a minimum thickness of 8”. No direct payment will be made for blocking abandoned sewers, drainage pipes, or floor drains.

C. Abandon storm or sanitary sewer structures by breaking the concrete bottom of the structure into pieces no larger than 12” in any direction and removing the top of the structure to 3' below finished grade. Plug all pipes with concrete and fill structure with 3/4" or 1” clean gravel.

## 3.4 BLASTING

A. Blasting is not permitted.

## 3.5 DISPOSAL

A. All debris shall be disposed of off site.

B. If off-site disposal of debris is required in the Drawings or Specifications, the Contractor shall remove demolition debris and grindings as soon as practicable.

C. Do not store or burn materials on site.

D. All asphaltic materials shall be disposed of off site.

## 3.6 CONSTRUCTION LIMITS

A. The Contractor's operations shall be restricted to those areas inside the construction limits indicated on the Drawings. If limits are not indicated, restrict work to the Owner’s property, easement, or public rights-of-way.

B. Complete work within public rights-of-way under the permission of the governing agency.

C. Restoration and site repair within the construction limits shall be included in the base bid.

D. The Contractor shall repair damage outside the construction limits at no additional expense to the Owner.

## 3.7 UTILITY ADJUSTMENT

A. The Contractor is responsible for the adjustment of all gas vents, manholes, castings, and water valves within the grading limits to match the finished surface.

B. Adjustments shall be coordinated with the utility companies and the cost for all adjustments shall be incidental to construction unless noted as a bid item.

C. The Contractor shall repair any damage to utility structures and appurtenances that occurs during construction at no additional cost to the Owner.

## 3.8 EXISTING SIGNAGE

A. Carefully remove traffic signs designated on the Drawings or in conflict with the work and within the project limits. Protect from damage. Temporarily store and reinstall in the same fashion as their original installation.

B. The Contractor shall replace any signs he damages during construction at no cost to the Owner.

**END OF SECTION 024100**

**SECTION 024100.24**
**COLUMN REPLACEMENT**

## PART 1 - GENERAL

### 1.1 SECTION INCLUDES

A. Selective demolition of building elements for alteration purposes.

### 1.2 DEFINITIONS

A. Remove: Detach or dismantle items from existing construction and dispose of them off site, unless items are indicated to be salvaged or reinstalled.

B. Remove and Salvage: Detach or dismantle items from existing construction in a manner to prevent damage. Clean, package, label and deliver salvaged items to Owner in ready-for-reuse condition.

C. Existing to Remain: Designation for existing items that are not to be removed and that are not otherwise indicated to be salvaged or reinstalled.

### 1.3 REFERENCE STANDARDS

A. 29 CFR 1926 - Safety and Health Regulations for Construction; Current Edition.

## PART 3 - EXECUTION

### 2.1 DEMOLITION

A. Remove portions of existing buildings in the following sequence:
   1. Wood post column support for entry roof overhang to be replaced.

B. Remove other items indicated, for salvage and recycling.

C. Fill excavations, open pits, and holes in ground areas generated as result of removals, using specified fill; compact fill as specified in Section 312300.

### 2.2 GENERAL PROCEDURES AND PROJECT CONDITIONS

A. Comply with applicable codes and regulations for demolition operations and safety of adjacent structures and the public.
   1. Obtain required permits.
   2. Take precautions to prevent catastrophic or uncontrolled collapse of structures to be removed; do not allow worker or public access within range of potential collapse of unstable structures.
   3. Provide, erect, and maintain temporary barriers and security devices.
   4. Conduct operations to minimize effects on and interference with adjacent structures and occupants.
   5. Do not close or obstruct roadways or sidewalks without permits from authority having jurisdiction.

6. Conduct operations to minimize obstruction of public and private entrances and exits. Do not obstruct required exits at any time. Protect persons using entrances and exits from removal operations.
7. Obtain written permission from owners of adjacent properties when demolition equipment will traverse, infringe upon, or limit access to their property.

B. Do not begin removal until receipt of notification to proceed from Owner.

C. Protect existing structures and other elements to remain in place and not removed.
1. Provide bracing and shoring.
2. Prevent movement or settlement of adjacent structures.
3. Stop work immediately if adjacent structures appear to be in danger.

## 2.3 SELECTIVE DEMOLITION FOR ALTERATIONS

A. Remove existing work as indicated and required to accomplish new work.
1. Remove items indicated on drawings.

B. Protect existing work to remain.
1. Prevent movement of structure. Provide shoring and bracing as required.
2. Perform cutting to accomplish removal work neatly and as specified for cutting new work.
3. Repair adjacent construction and finishes damaged during removal work.
4. Patch to match new work.

## 2.4 DEBRIS AND WASTE REMOVAL

A. Remove debris, junk, and trash from site.

B. Leave site in clean condition, ready for subsequent work.

C. Clean up spillage and wind-blown debris from public and private lands.

**END OF SECTION 024100.24**

# SECTION 024113
# SELECTIVE SITE DEMOLITION

## PART 1 - GENERAL

### 1.1 SUMMARY

A. Section includes:
   1. Demolishing designated pavement.
   2. Removing demolished materials.

### 1.2 SUBMITTALS

A. Section 013300 – Submittals: requirements for submittals

B. Shop Drawings: Indicate demolition and removal sequence and location of salvageable items; location and construction of barricades, fences, and temporary work

C. Design data: Submit calculations for bracing, shoring, and underpinning signed and sealed by professional engineer.

### 1.3 QUALITY ASSURANCE

A. Conform to applicable code for demolition of structures, safety of adjacent structures, dust control, runoff control, and disposal

B. Conform to applicable code for procedures when hazardous or contaminated materials are discovered

C. Obtain required permits from authorities having jurisdiction.

### 1.4 SEQUENCING

A. Section 011000 – Summary of Work and Drawings for requirements for sequencing.

### 1.5 SCHEDULING

A. Section 013200 - Schedules: Requirements for scheduling.

B. Schedule:
   1. Perform demolition and removal work so as not to interfere with Owner's operations.
   2. Coordinate demolition and removal work so new construction can proceed without undue delay.

### 1.6 PROJECT CONDITIONS

A. Protection
   1. Do not close or obstruct streets, walks and other public facilities occupied and used by Owner and public without prior written permission from Owner and other authorities having jurisdiction.

2. Maintain in service and protect from damage existing facilities, utilities, and equipment indicated to remain or adjacent to work areas.

## PART 2 - PRODUCTS (Not Applicable)

## PART 3 - EXECUTION

### 3.1 EXAMINATION

A. Examine existing structures and pavements indicated to be demolished before demolition.

B. Determine where removals may result in structural deficiency or unplanned collapse during demolition. Coordinate demolition sequence and procedures to prevent structures from becoming unstable.

C. Identify measures required to protect structures from damage.

### 3.2 PREPARATION

A. Provide, erect, and maintain temporary barriers and security devices.

B. Protect existing landscaping materials, appurtenances, structures and utilities which are not to be demolished.

C. Prevent movement or settlement of adjacent structures. Provide bracing and shoring.

D. Mark location of utilities.

### 3.3 DEMOLITION REQUIREMENTS

A. Conduct demolition to minimize interference with adjacent structures and utilities.

B. Cease operations immediately if adjacent structures appear to be in danger. Notify Engineer. Do not resume operations until directed.

C. Conduct operations with minimum interference to public or private accesses.

D. Obtain written permission from adjacent property owners when demolition equipment will traverse, infringe upon or limit access to their property.

E. Keep work sprinkled with water to minimize dust. Provide hoses and water connections for this purpose.

### 3.4 DEMOLITION REQUIREMENTS

A. Remove existing concrete, steel and masonry to extent indicated on drawings. Provide smooth, straight joint or cut line. Make cuts parallel with adjoining pavement

B. Concrete structures to be removed to limits shown on drawings.

C. Provide temporary shoring and bracing to transfer loads of existing construction to remain from construction being removed.

D. Remove materials to be salvaged, re-installed or retained in manner to prevent damage. Store and protect.

E. Do not burn or bury materials on site. Leave site in clean condition.

F. Do not use blasting method for demolition.

G. Fill below grade abandoned structures with compacted fill material.

## 3.5 ABANDONMENT

A. Abandon disconnected utilities and underground piping within influence zone of proposed underground piping and proposed structures.

## 3.6 DISPOSAL

A. Separate all non-concrete materials from concrete rubble and stone rubble.

B. Concrete and brick shall be disposed of as follows:
   1. Cut exposed rebar from all concrete rubble.
   2. Haul above listed materials to contractor obtained site. Contractor to pay all disposal costs.
   3. Legally dispose of materials at a location off site.

C. All disposals shall be in accordance with Federal, State and local laws, ordinances and rules.

**END OF SECTION 024113**

# SECTION 031000
# CONCRETE FORMS AND ACCESSORIES

## PART 1 - GENERAL

### 1.1 SECTION INCLUDES

A. Form work for cast-in-place concrete shown on the drawings or required by other sections of these Specifications.

B. Drawings and General Provisions of Contract, including General and Special Conditions, apply to this section.

### 1.2 RELATED SECTIONS

A. Section 032000 – Concrete Reinforcement.

B. Section 033000 – Cast-in-Place Concrete.

### 1.3 QUALITY ASSURANCE

A. Comply with all pertinent provisions of the following standards

B. ACI 847 - Recommended Practice for Concrete Formwork

C. ACI 301 - Standard Specification for Structural Concrete for Building

## PART 2 - PRODUCTS

### 2.1 MATERIALS

A. Forms

1. Construct forms for exposed (painted or unpainted) concrete surfaces with smooth faced undamaged plywood to provide continuous, straight, and smooth as-cast surfaces.
2. Construct forms for concrete concealed from view with rough-sawed boards of sound grade, plywood, or steel.
3. Provide form material with sufficient thickness to withstand pressure of newly placed concrete without excessive and objectionable bow or deflection.

B. Form Ties

1. Provide factory-fabricated, adjustable-length, removable or snap off metal form ties, designed to prevent form deflection and spalling concrete surfaces upon removal.
2. Provide ties so that the portion remaining within the concrete after removal is at least 1-1/2" from the outer concrete surface.
3. Provide ties that do not leave a hole larger than one inch in diameter in the concrete’s surface.

C. Form Coatings

1. Provide commercial formulation, form-coating compounds that do not bond with, stain, or adversely affect concrete surfaces requiring bond or adhesion, nor impede the wetting of surfaces to be cured with water or curing compounds.

### 2.2 FABRICATION

A. Design, erect, support, brace, and maintain forms that will safely support vertical and lateral loads until the concrete structure can support such loads.

B. Design forms to include assumed values of live and dead loads, weight of moving equipment operated on forms, concrete mix, height of concrete drop, vibrator frequency, ambient temperature, foundation pressures, stresses, lateral stability, and other factors pertinent to safety of structure during construction.

C. Provide shoring and struts with positive means of adjustment capable of taking up form settlement during concrete placement.

D. Provide trussed supports when adequate foundations for shores and struts cannot be secured.

E. Support form facing materials by structural members spaced sufficiently to prevent deflection.

F. Fit forms placed in successive units for continuous surfaces to provide accurate alignment, free from irregularities, and within allowable tolerances.

G. Provide camber in forms required for anticipated deflections due to weight and pressures of fresh concrete and construction loads.

## PART 3 - EXECUTION

### 3.1 EXAMINATION

A. Examine substrata and conditions which work under section is to be performed.

B. Correct conditions detrimental to the proper and timely completion of the work.

C. Do not proceed until satisfactory conditions have been corrected.

### 3.2 ERECTION

A. General

1. Construct forms complying with ACI 347 to the size, shape, line, and dimensions shown, and required to obtain accurate alignment, location, grade, level, and plumb in finish structure.

2. Provide for features including openings, offsets, sinkages, keyways, recesses, moldings, reglets, chamfers, blocking, screeds, bullheads, anchorages, and inserts. Use selected materials to obtain required finish.

3. Provide openings in concrete forms to accommodate work of other trades after verifying size and location of openings with the trade requiring such items.

B. Fabrication

1. Place forms to protect previously installed structures.

2. Fabricate forms for easy removal without hammering or prying against exposed concrete surfaces.

3. Where stripping may damage cast concrete surfaces, provide crush or wrecking plates.

4. Forms shall be sufficiently tight to prevent loss of mortar from the concrete.

5. Solidly butt joints and provide material at joints as needed.

### 3.3 PREPARATION

A. Cleaning

1. Thoroughly clean forms and adjacent surfaces of accumulated mortar, grout, wood chips, sawdust, dirt, or other foreign material before placing concrete.

B. Form Coating

1. Coat form contact surfaces with an approved form coating material that will effectively prevent absorption of moisture and prevent bond with the concrete.
2. Do not allow excess form-coating material to accumulate or contact surfaces that will be bonded to fresh concrete.
3. Apply in accordance with manufacturers instructions.

## 3.4 INSTALLATION

A. Set and build into the work anchorage and other embedded items required for other work to be attached or supported by cast-in-place concrete.

B. Use supplier provided setting drawings, diagrams, instructions, and directions for embedded items.

C. Forms not supporting concrete, such as sides of beams, walls, columns, and similar parts of the work, may be removed after cumulatively curing at not less than 50°F for 24 hours after placing, provided that:

1. Concrete is sufficiently hard to not be damaged by form removal operations.
2. Maintain curing and protection operations

D. Backfilling on only one side of concrete walls shall not be permitted unless:

1. The walls have attained the 28-day design compressive strength and have appropriate lateral bracing. The final concrete structure or sufficient temporary bracing may be used for the lateral support.
2. Sufficient temporary bracing is installed to provide adequate lateral support of the entire wall surface until condition 1 above occurs.

E. Forms supporting weight of concrete, such as beam soffits, joists, slabs, and other structural elements may not be removed in less than 14 days, and not until concrete has attained design minimum 28-day compressive strength. Determine the compressive strength of in-place concrete by testing field-cured specimens representative of the concrete locations or members.

F. Forms supporting weight of concrete may be removed four days after concrete placement only if shores and other vertical supports have been arranged to adequately support the concrete until the concrete has attained the design minimum 28 -day compressive strength.

**END OF SECTION 031000**

**SECTION 032000**
**CONCRETE REINFORCEMENT**

## PART 1 - GENERAL

### 1.1 SECTION INCLUDES

A. Reinforcing steel bars and welded steel wire fabric for cast-in-place concrete, complete with tie wire.

B. Support chairs, bolster, bar supports, and spacers for reinforcing.

C. Drawings and General Provisions of Contract, including General and Special Conditions, apply to this section.

### 1.2 RELATED SECTIONS

A. Section 031000 – Concrete Forms and Accessories.

B. Section 033000 – Cast-In-Place Concrete.

### 1.3 REFERENCE

A. ACI 315 - American Concrete Institute - Manual of Standard Practice.

B. ACI 318 - Building Code Requirements for Reinforced Concrete.'

### 1.4 SUBMITTALS

A. Submit shop drawings under provisions of Section 013300.

B. Include diagram of bent bars and arrangement, bar schedules, and stirrup spacing.

C. Make shop drawings in accordance with ACI 315.

D. Submit steel producers certificates of mill analysis, tensile, and bend tests for reinforcing steel.

### 1.5 QUALITY ASSURANCE

A. Perform concrete reinforcing work in accordance with CRSI and ACI Publications listed in reference standards unless specified otherwise in this section or on the drawings.

B. CRSI - Manual of Standard Practice

C. CRSI - Recommended Practice for Placing Reinforcing Bars

D. CRSI - Recommended Practice for Placing Bar Supports, Specifications, and Nomenclature

E. CRSI - Recommended Practice for Reinforcing Bar Splices

F. ASTM A82 - Standard Specifications for Cold-Drawn Steel Wire For Concrete Reinforcement

G. ASTM Al 85 - Welded Steel Wire Fabric for Concrete Reinforcement

H. ASTM A615 - Deformed and Plain Billet Steel Bars for Concrete Reinforcement

I. AWS D12.1 - Welding Reinforcing Steel, Metal Inserts, and Connections in Reinforced Concrete Construction

### 1.6 DELIVERY, STORAGE AND HANDLING

A. Delivery

1. Deliver reinforcement to the job site bundled, tagged, and marked.

2. Use metal tags indicating bar size, lengths, and other information corresponding to markings shown on placement diagrams.

B. Storage

1. Store reinforcement at the job site in a manner to prevent damage and accumulation of dirt and excessive rust.

## PART 2 - PRODUCTS

### 2.1 MATERIALS

A. Reinforcing steel: 60 ksi yield grade, ASTM A615, plain finish.

B. Tie rods, turn buckles, plates, and nuts: ASTM A36.

C. Welded Steel Wire Fabric: ASTM A185; in flat sheets, plain finish; 12” maximum wire spacing. Use WWF 6x6-W4.0xW4.0 unless otherwise noted.

D. Steel Wire: ASTM A82.

### 2.2 ACCESSORIES

A. Chairs, Bolster, Bar Supports, Spacers: Sized and shaped for strength and support of reinforcing during construction conditions.

B. Tie Wire: Minimum 16.5 gauge, black annealed type, or patented system accepted by the Owner’s Representative.

C. Special Chairs, Bolsters, Bar Supports, Spacers where adjacent to exposed concrete surfaces: Plastic-coated or hot-dipped galvanized steel type, sized and shaped as required.

## PART 3 - EXECUTION

### 3.1 FABRICATION

A. General

1. Fabricate reinforcing bars to conform to required shapes and dimensions, with fabrication tolerances complying with CRSI Manual of Standard Practices and ACI 315.

2. In case of fabricating errors, do not rebend or straighten reinforcement in a manner that will injure or weaken the material.

3. Locate reinforcing splices, not indicated on drawings, at points of minimum stress. Location of splices subject to review of Owner’s Representative.

4. Where indicated, weld reinforcing bars in accordance with AWS D12.1.

B. Reinforcement with any of the following defects shall be deemed unacceptable and will not be permitted in the work.

1. Bar lengths, depths, and bends exceeding specified fabrication tolerances.

2. Bends or kinks not indicated on drawings or final shop drawings.

3. Bar with reduced cross-section due to excessive rusting or other cause.

### 3.2 PREPARATION

A. Examine the substrate, forms, and the conditions under which concrete reinforcement is to be placed.

B. Correct conditions detrimental to the proper and timely completion of the work.

C. Do not proceed until unsatisfactory conditions have been corrected.

## 3.3 INSTALLATION

A. Reinforcing shall be accurately placed and rigidly secured in position in accordance with the requirements of Recommended Practice for Placing Reinforcing Bars (CRSI), Recommended Practice for Placing Bar Supports (CRSI), and with further requirements specified herein and on the drawings.

B. Tie reinforcing with black annealed (16.5 gauge min.) wire and bend all wire back beyond general plane of reinforcing.

C. Welded wire fabric reinforcement in slabs shall be continuous, shall have joints lapped at least one full mesh, but not less than 8", and shall be supported at proper elevations by accessories. Stagger laps of sheets to avoid continuous lap in either direction. Provide support bars to maintain the fabric in its proper position during the placing of the concrete.

D. Bending, tack welding, curing or substituting reinforcement in the field, other than shown on the contract drawings, in any manner is prohibited, unless the Engineer gives specific approval for each case.

E. At the time of placing the concrete, all reinforcement shall be free from excessive rust, scale, or other coatings that might destroy or reduce the bond.

F. Prior to placing concrete, avoid reinforcement's exposure to the weather for any considerable length of time. Where this is unavoidable, paint reinforcement with a heavy coat of cement grout. The Contractor shall be responsible for protecting exposed concrete and any other materials against staining from exposed reinforcement.

G. Before concrete is cast, check all reinforcement after placement to insure reinforcement conforms to contract drawings, approved shop detail drawings, and Specification requirements.

   1. Checking shall be done by qualified, experienced personnel

   2. Notify the Owner’s Representative at least 36 hours (excluding weekends and holidays) prior to concrete placement and given the opportunity to inspect the completed reinforcement and forms before concrete placement.

H. Splice the reinforcement in accordance with recommended practice for reinforcing bar splices (CRSI) unless shown otherwise on the drawings or approved by the Owner’s Representative.

I. The minimum cover of concrete for all reinforcement shall conform to the drawing dimensions, which indicate the clear distance from the edge of the reinforcement to the concrete surface. Where not otherwise specified or shown by written dimension, the minimum coverage of the concrete over the steel shall be as follows:

   1. Concrete cast against and permanently exposed to earth — 3 inches

   2. Formed concrete exposed to earth or weather — 2 inches

   3. Formed concrete not exposed to weather or in contact with ground.

a. Slabs and walls ¾ inch

b. Beams and columns 1-½ inches

J. Lap splices as shown or called for on the drawings. Those not shown or called out shall have a minimum lap of 30 bar diameters.

**END OF SECTION 032000**

**SECTION 033000**
**CAST IN PLACE CONCRETE**

## PART 1- GENERAL

### 1.1 SECTION INCLUDES

A. Poured-in-place concrete floors, walls, and supported slabs

B. Floors and slabs on grade

C. Poured-in-place equipment pads

D. Surface finish of walls, beams, and other formed surfaces

E. Grouting for base plates and bearing plates

F. Drawings and General Provisions of Contract, including General and Special Conditions, apply to this section.

### 1.2 RELATED SECTIONS

A. Section 013300 – Submittals

B. Section 031000 – Concrete Forms and Accessories

C. Section 032000 – Concrete Reinforcement

### 1.3 REFERENCE STANDARDS

A. Applicable standards listed in this section include, but are not necessarily limited to, the following:

1. ACI 21 1.1 - Recommended Practice for Selecting Proportions for Normal Weight Concrete
2. ACI 301 - Specification for Structural Concrete for Buildings
3. ACI 304 - Recommended Practice for Measuring, Mixing, Transporting, and Placing Concrete
4. AC I 305 - Recommended Practice for Hot Weather Concreting
5. ACI 306 - Recommended Practice for Cold Weather Concreting
6. ACI 318 - Building Code Requirements for Reinforced Concrete
7. ASTM C31 - Making and Curing Concrete Test Specimens
8. ASTM C33 - Concrete Aggregates
9. ASTM C94 - Ready-mixed Concrete
10. ASTM C143 - Test for Slump of P.C. Concrete
11. ASTM C150 - Portland Cement
12. ASTM C171 - Sheet Materials for Curing Concrete
13. ASTM C260 - Air Entraining Admixtures for Concrete
14. ASTM C309 - Liquid Membrane - Forming Compound for Curing Concrete
15. ASTM C494 - Chemical Admixtures for Concrete
16. AASHTO M 182 - Specification for Burlap Cloth made from Jute or Kenaf

### 1.4 SUBMITTALS

A. Manufacturer's Data in accordance with Section 013300.

1. Submit manufacturers data and instructions for proprietary materials and items, including reinforcement accessories, admixtures, patching compounds, joint systems, and others as requested.

B. Ready-mixed concrete delivery tickets: Furnish duplicate delivery tickets with each load of concrete. Delivery tickets shall provide the following information:

1. Date
2. Name of supplier
3. Job location
4. Contractor
5. Type and brand name of cement
6. Class and specified cement content - bags per cu./yd.
7. Truck number
8. Time dispatched and time placed
9. Amount of concrete in load
10. Admixture, if any
11. Maximum size aggregate
12. Time water is added to dry cement and aggregate

C. Certificates of Compliance: Submit certificates of material properties and compliance with specified requirements if requested by the Owner's Representative. The material's producer and the Contractor must sign certificates of compliance.

## 1.5 QUALITY ASSURANCE

A. Standards

1. Comply with standards specified in this section.
2. In case of conflict between the referenced standards, the more stringent requirements shall govern.

B. Quality Control

1. The Owner or his Representative will provide materials testing.
2. Provide free access to work and cooperation.
3. Take three concrete test cylinders for every 75 or less cubic yards of concrete placed.
4. Take one slump test for each set of test cylinders taken.

C. Use necessary means to protect the materials before, during, and after installation. Protect the work and materials of all other trades.

D. In cause of damage, immediately make repairs and replacements necessary to the approval of the Owner's Representative and at no additional cost to the Owner.

## PART 2 - PRODUCTS

### 2.1 CONCRETE MATERIALS

A. Cement

1. Portland cement shall conform to the requirements of ASTM C 150, Type 1.
2. Use only one brand of cement for the entire work. Use in same sequence as received at the site.

B. Aggregates

1. Aggregates shall conform to requirements of ASTM C33.
2. Maximum aggregate size shall be not larger than 1/5$^{th}$ of the narrowest dimension between sides of form, 1/3$^{rd}$ of the depth of the slabs, or ¾ of the minimum clear spacing between individual reinforcing bars.
3. The combined maximum weight of flint and chert shall be 1% of the weight of coarse aggregate.
4. The maximum weight of lignite shall be 0.07% of the weight of the fine aggregate.

C. Water

1. Water used as an ingredient in concrete shall be clean, potable, and free from injurious amounts of foreign matter.

### 2.2 ADMIXTURES

A. Air Entrainment: ASTM C260

B. Chemical: ASTMC494, Type A, Water-reducing agents shall be applied at the dosage rates recommended by the manufacturer. Chlorides are not permitted.

### 2.3 CURING MATERIALS

A. Liquid curing and sealing compounds shall conform to ASTM C309, Type 1. Curing materials used with metallic toppings and hardeners shall be Masterseal, by Master Builders.

B. Sheet material shall conform to ASTM C171.

C. Burlap cloth made from jute or kenaf. Material shall weigh approximately 9 oz/sy, conform to AASHTO M 182 for moist curing, and shall be used in two layers.

### 2.4 JOINT MATERIALS

A. Performed joint filler shall be Sonoflex F by Sonnebom, or approved equal.

B. Backup rod shall be Ethafoam by Dow Chemical, or approved equal.

C. Joint filler for slabs shall be Dymeric sealant, by Tremco, or approved equal.

### 2.5 SURFACE HARDENERS

A. Surface hardener shall be MasterCron, by Master Builders, or approved equal.

### 2.6 RELATED MATERIALS

A. Concrete repair compound shall be Sonopatch, by Sonneborn Building Products Division, Embeco 411 Mortar, by Master Builders, or approved equal.

## 2.7 PROPORTIONING AND DESIGN OF MIXES

A. Proportion mixes by the Laboratory Trial Batch Method. Use the same materials to be employed on the project for each class of concrete required. Comply with ACI 211.

1. Required 28-day compressive strength of concrete: 4,000 psi.
2. Slump: 4-in. maximum, 2-in. minimum.

B. Laboratory Trial Batches:

1. The Contractor shall retain an independent testing facility or concrete plant, acceptable to the Owner's Representative, to select concrete mix proportions.
2. Test specimens shall be prepared in accordance with ASTM C192.
3. Conduct strength tests in accordance with ASTM C39, specified in ACI 301.

C. Submit written test reports, to the Owner's Representative, for each proposed mix for each class of concrete at least 15 days prior to start of work. Do not begin concrete production until the Owner's Representative has accepted mixes.

D. Adjustment to Concrete Mixes: The Contractor may propose mix design adjustments when characteristics of materials, job conditions, weather, test results or other circumstances, warrant. The Owner's Representative must accept test data for revised mix designs and strength results before using in the work.

E. Use air-entraining admixture in exterior exposed concrete or structures and slabs exposed to freezing and thawing. Add air-entraining admixture at the manufacturers prescribed rate to result in concrete at the point of placement having air content within the following limits:

1. 1" Aggregate Concrete Mix: 4% to 5%
2. ¾" Aggregate Concrete Mix: 6% to 7%
3. ½" Aggregate Concrete Mix: 7% to 8%

F. The mix may use water-reducing agents as determined by the mix design organization subject to the approval of the Owner's Representative. Water-reducing agents are encouraged in conjunction with slabs to receive metallic hardeners or Anvil-Top.

## 2.8 CONCRETE MIXING

A. Ready-Mix Concrete: Comply with the requirements of ASTM C94, and as herein specified. Do NOT add water to the batch.

B. During hot weather or under conditions contributing to rapid setting of concrete, a shorter mixing time than specified in ASTM C94 may be required.

C. When the air temperature is between 85°F and 90°F, reduce the mixing and delivery time from 90 minutes to 75 minutes. When the air temperature is above 90°F, reduce the mixing and delivery time to 60 minutes.

# PART 3 - EXECUTION

## 3.1 EXAMINATION

A. Examine the area and condition that work under this section.

B. Correct conditions detrimental to the proper and timely completion of the work.

C. Do not proceed until achieving satisfactory conditions.

## 3.2 CONCRETE PLACEMENT

A. Place concrete in accordance with ACI 304.

B. Notify Owner's Representative 36 hours prior to commencement of concrete placing operations.

C. Ensure anchors, seats, plates, and other items cast into concrete, are placed, held securely, and will not cause hardship in placing concrete.

D. Maintain records of poured concrete items. Record date, location of pour, quantity, air temperature, and test samples taken.

E. Ensure concrete placement does not disturb reinforcement, inserts, embedded parts, formed expansion and contraction joints, and special form materials.

F. Concrete shall be deposited continuously, in layers of such thickness that no concrete will be deposited on concrete that has hardened sufficiently to cause the formation of seams and planes of weakness within the section.

1. If, due to emergency conditions, the Contractor cannot place a section continuously between planned construction joints, introduce a field joint and additional reinforcement to preserve the structural continuity.
2. Notify the Owner's Representative immediately and obtain his consent.

G. Construction Joints

1. Place construction joints in slabs and beams at the center of spans.
2. Secure full bond at construction joints. Prior to placement of new concrete, clean the surfaces of the concrete already placed, including vertical and inclined surfaces.
    a. Thoroughly clean surface of foreign materials and laitance.
    b. Roughen with suitable tools; chipping hammers, wire brushes, etc.
    c. Re-clean with a stream of water or compressed air.
3. Dampen the joints with water.
4. Apply bonding compound: Euro Weld, by Euclid Chemical Company, or approved equal. Place new concrete after the bonding compound has dried.

H. Place concrete in a manner to prevent segregation and accumulations of hardened concrete on the forms or reinforcement above the placed mass of concrete. Use hoppers, spouts with restricted outlets, tremies, etc. as needed.

I. Do NOT add water to concrete between the mixing and placing operation without approval of Owner's Representative. Under no circumstances shall added water cause concrete to slump greater than that established in the design of the mix.

J. Avoid cold joints. If a cold joint occurs, the Owner's Representative may require removal of all or parts of the concrete at the cold joint. Minimum requirement is treating a cold joint as a bonded construction joint as specified above.

K. Footings: Pour footings and grade beams on well dampened, firm, undisturbed soil or engineered compacted backfill, unless otherwise shown on the Drawings.

L. In locations where doweling new concrete to existing work, drill holes in existing concrete, inset steel dowels, and pack solidly with non shrink grout.

M. Excessive honeycomb or embedded debris in concrete is not acceptable. Notify Owner's Representative upon discovery.

N. Maintain minimum concrete cover around reinforcing as follows, unless noted otherwise:

1. Walls (exposed to weather or backfill) 2 in
2. Footings and concrete formed against earth 3 in

## 3.3 HOT WEATHER PLACEMENT

A. Hot weather concrete placement procedures shall be followed when the rate of evaporation is expected to approach 0.2-lb./sq. ft./hr., calculated from Figure 2.1.5, ACI 301, or when the maximum daytime temperature exceeds 85°F.

B. Place and protect concrete in conformance with ACI 305 during hot weather. The critical air temperature decreases as relative humidity decreases, as concrete temperature as placed increases, and as wind increases.

C. The temperature of the concrete as placed shall be kept below 80°F by one or more of the following:

1. Sprinkle aggregate stockpiles to lower temperatures through evaporation
2. Chilling the mixing water
3. Replacing some of the mixing water with shaved ice

D. Cool forms by sprinkling. Remove all excess water before placing concrete.

E. Concrete shall be in the forms within 45 minutes after water is added to the dry ingredients.

F. Curing procedures shall start as soon as the condition of the concrete surface permits.

G. Use windbreaks and sunshades to protect flat work from drying winds and direct sun.

H. Do NOT use admixtures to retard setting without the authorization of the Owner's Representative.

## 3.4 COLD WEATHER PLACEMENT

A. Follow cold weather concrete placement procedures when the surrounding air temperature is below 40°F or if freezing temperatures are likely during the specified curing period.

B. Place and protect concrete in accordance with ACI 306 during cold weather. Minimum temperature maintained during curing shall be as specified in Table 1.4.1, ACI 306.

C. From November 1st to April 15th, concrete shall not be placed without materials for its protection readily available on the job site, in quantities sufficient to protect all concrete that has not cured for the specified curing time.

D. The tables and graphs in Chapter 4, ACI 306 indicate the required minimum amount of insulation.

E. Do NOT use frozen materials or materials containing ice in the concrete.

F. Forms, reinforcement, filler, etc. are to be free from frost and concrete. Do NOT place forms over or in contact with frozen earth.

G. Concrete placement with air temperature at or anticipated to fall below 40°F within the 24-hours of placement shall use heated mixing water and aggregate. Protect the concrete by adequate heating and/or covering.

H. Heating: Within the enclosure, provide artificial heat to maintain the temperatures specified, continuously, and with a reasonable degree of uniformity in all parts of the enclosure.

1. All exposed concrete surfaces within the heated area shall be wet down with a hose stream at least once every 24 hours during the heating period.
2. The Contractor shall provide' adequate fire protection at all times on each floor where heating is in progress.
3. The Contractor shall maintain watchmen or other attendants to keep the heating units in continuous operation.
4. Do NOT place heating appliances in a manner to endanger formwork, expose any area of concrete to drying out, or other injury due to excessive temperatures.
5. Vent heating units. Do NOT permit the heat to dry the concrete. Venting shall adequately exhaust carbon dioxide and carbon monoxide to prevent damage to the concrete and protect the workers.

I. Covering: Protect exposed surfaces of slabs on earth, frames, slabs, beams, girders, walls, etc., formed with 1 in. or less thick wood forms or all metal forms. Protect with 2-in. blanket insulation covered with polyethylene sheets, Sisalkraft, or tarpaulins. Protection is in addition to curing membrane.

J. Placing concrete when outside temperature is below 40°F:

1. Standard concrete mixes shall have a temperature of not less than 70°F or more than 80°F when placed in the forms.
2. Maintain standard concrete mixes at a temperature of not less than 70°F for three days or 50°F for five days.
3. Maintain high strength concrete at a temperature of not less than 70°F for two days or 50°F for three days.
4. The method of protection and curing shall prevent evaporation of moisture from the concrete and injury to the surface.

K. After discontinuing heating, lower temperatures gradually. Drop shall not exceed 1 degree per hour for the first 24 hours and 2 degrees per hour thereafter until reaching the outside temperature.

L. Do NOT use of salts or chemicals for protection from freezing.

M. Remove and replace concrete damaged by freezing at the Contractor’s expense.

## 3.5 CONVEYING

A. Conveying method shall insure a uniform concrete mixture at the forms faces with a minimum slump loss.

B. Use chutes, steep enough to permit concrete of design consistency to flow to point of deposit, or other means of conveying.

C. Placement in Deep, Narrow Forms

1. If free fall exceeds 3-feet, discharge into a hopper feeding into a drop chute (tremie).
2. Drop to vertical: Do NOT push or pull the chute bottom from the vertical position to distribute the concrete. Move the chute.
3. Place concrete of a drier consistency near top of lift to offset the tendency of the concrete to become wetter at top.
4. Place full height of each section in one day.

D. Allow six hours (minimum) after depositing concrete in columns or walls before depositing beams, girders, or slabs supported thereon.

E. Unless otherwise permitted, execute the work so a section begun on any one day is complete in daylight on the same day.

## 3.6 PLACING CONCRETE BY PUMPING

A. Contractor may place cast-in-place concrete by pumping in accordance with ACI 304.

B. Design Mix

1. Submit separate design mix for pumped concrete.
2. Note, the fine aggregate gradation, and water and cement content are more critical and different from the regular concrete mix.
3. The supplier may increase the slump 1-in. for individual batches at point of discharge. Flowable Concrete may have a 7-in. slump.

C. Pumping Equipment and Placement

1. Do not convey concrete through aluminum or aluminum alloy pipes.
2. The loss of slump in pumping equipment shall not exceed 2 inches.
3. Discard the mortar used for lubricating the pumping equipment. Do not incorporate in the work.
4. Take slump and air tests at both points of delivery to pump equipment and at point of discharge from the line.
5. Take concrete cylinders at the point of discharge from the line.

## 3.7 VIBRATION OF CONCRETE

A. Insert and withdraw slowly internal type vibrators.

B. Insert vibrator vertically to full depth of placed layer at regular intervals (18 to 30).

C. All vibrators used for normal weight concrete shall operate at a speed of not less than 10,000 rpm and be of suitable capacity.

D. For all surfaces exposed to view in the finished work, supplement vibration by proper wooden spade puddling to remove bubbles and honeycomb.

E. For placements other than concealed massive foundations, etc., at least one vibrator shall be on hand for every 10 cubic yards of concrete placed per hour plus one spare. All vibrators shall be operable and on the site prior to starting equipment.

F. Do not use vibrator to cause concrete to flow from one location to another.

## 3.8 SCREEDING

A. Screed floors, slabs-on-fill, and concrete base for toppings level: Maintain surface flatness of maximum 1/8$^{th}$ in. in 10 ft. except where drains occur. Around drains, pitch floors in planes true to the same tolerance.

## 3.9 CONCRETE FINISHING

A. Finish concrete surfaces to be left exposed without special finish as follows:

1. Fill honeycomb, tie holes, and other depressions.
2. Remove projecting fins.
3. Leave surfaces as they come from forms, except as noted above.

## 3.10 CONCRETE CURING AND PROTECTION

A. General

1. Protect exposed, freshly placed concrete from drying and wash by rain, water leaks, falling objects, floor traffic, and other hazards that might mar the surface.
2. Concrete shall be kept continually wet for seven days after placing, including weekends and holidays. Do NOT alternate cycle of wetting and drying. Take particular care when heating surrounding air during cold weather operations. Provide uniform distribution of heat during cold weather, between 50°F and 60°F.

B. The following are approved methods of curing:

1. Horizontal Surfaces
    a. Cover with burlap, cotton, or other approved fabric mats. Keep mat wet during curing period.
    b. Cover with 0.004 thick Polyethylene sheets. Lap edges 4” (min.). Seal with adhesive tape.
    c. Apply one coat of concrete curing compound. Apply with lamb’s wool applicator paintbrush or spray. Make application immediately after troweling or as soon as the concrete can be walked upon (usually 1 to 8 hours). Apply in accordance with manufacturers specifications.
    d. Curing compound shall not be used when other hardeners and applications are specified which are not compatible with curing compounds, or on horizontal exposed surfaces on top of walls.
2. Vertical Surfaces
    a. Wood forms (kept wet), and metal forms provide satisfactory protection against loss of moisture; top surfaces are to be cured as specified above.
    b. After removal of forms, continue curing for specified period with one of the methods listed for horizontal surfaces. Do not use curing compound on exposed vertical surfaces.

## 3.11 GROUTING OF BASE PLATES AND BEARING PLATES

A. Grout Mixture

1. Grout shall consist of the approved package grout mixture and water. Use the minimum amount of water required to produce a flowable grout. Take care to avoid the use of excessive water, which may cause segregation or bleeding.
2. Minimum ultimate compressive strength of grout shall be 5,000 psi at seven days and 7,500 psi at 28 days.

B. Mixing

1. Mix materials and water in a paddle type, mortar mixer for not less than three minutes.
2. Mix the material as close to the grouted area as possible. Provide adequate means to transport the mixed grout as quickly as possible, and in a manner to prevent segregation.
3. Place grout within a period of 15 minutes after mixing. After mixing the grout, do not re-temper by adding water.

C. Preparation

1. Remove all defective concrete, laitance, dirt, oil, grease, and loose material from the concrete foundation by bush hammering, chipping, or other approved means until obtaining sound, clean concrete.
2. Leave the surface of the concrete reasonably rough, but not so rough as to interfere with proper placing of the grout.
3. Cover the area as completely as possible with a waterproof paper to prevent contamination prior to grouting.

## 3.12 PATCHING

A. Repair surface defects, including tie holes and honeycomb, unless otherwise specified by the contract documents immediately after form removal.

B. Remove all honeycombed and other defective concrete down to sound concrete with edges perpendicular to the surface or slightly undercut.

1. Do NOT feather the edges.
2. Dampen the area for patching and an area at least six inches wide surrounding it, to prevent absorption of water from the patching mortar.
3. A bonding grout shall be prepared using a mix of approximately 1 part cement to 1 part fine sand passing a No. 30 mesh sieve, mixed to the consistency of thick cream, and then well brushed into the surface.

C. The patching mixture shall be consist of the same materials and approximate the same proportions used for the concrete with the following changes:

1. Omit the coarse aggregate
2. The mortar shall consist of not more than 1 part cement to 2-1/2 parts sand by damp loose volume

3. Substitute white portland cement for a part of the gray portland cement on exposed concrete. Match color by a trial patch.
4. Quantity of mixing water shall be no more than necessary for handling and placing.
5. Mix the patching mortar in advance. Allow mortar to stand with frequent manipulation with a trowel, without addition of water, until it has reached the stiffest consistency that will permit placing.

D. After evaporation of the surface water from the patched area, brush the bond coat into the surface.
1. When the bond coat begins to lose the water sheen, apply the premixed patching mortar.
2. Thoroughly consolidate into place and strike off the mortar.
3. Leave the patch slightly higher than the surrounding surface.
4. To permit initial shrinkage, leave the patch undisturbed for at least one hour before final finishing.
5. Keep the patched area damp for seven days. In a formed, exposed wall, do NOT use metal tools to finish a patch.

E. After cleaning and thoroughly dampening, fill the tie holes solid with patching mortar.

F. Repair concrete slab surfaces containing defects that adversely affect durability, strength, or appearance, by a method approved by the Owners Representative or replace.

## 3.13 DEFECTIVE CONCRETE

A. Do not patch defective concrete until the Owner's Representative examines and approves the areas. Where so approved, make repairs using the following procedures:
1. Clean surfaces to patch of all loose particles, oils, grease, etc., and roughen surfaces as required.
2. Pre-dampen surfaces before application of patching compound.
3. Mix, apply, finish, and cure patching compound in strict compliance with the manufacturer's instructions.

B. Where concrete is to be exposed to view in the finished work, exercise care to avoid damaging the virgin skin of surrounding parent concrete.

**END OF SECTION 033000**

**SECTION 055200**
**EXTERIOR HANDRAILS**

## PART 1 – GENERAL

### 1.01 SECTION INCLUDES

A. Steel Two Pipe Handrail or Guardrail.

B. Drawings and general provisions of Contract, including General and Special Conditions, apply to this Section.

### 1.02 WORK INCLUDES

A. Design of railings and attachments to resist a lateral force of 75 lbs (333 N) at any point without damage or permanent set.

### 1.03 SUBMITTALS

A. Shop Drawings: Indicate profiles, sizes, connections, reinforcing, anchorage, size and type of fasteners, and accessories. Include erection drawings, elevations, and details where applicable.

B. Indicate welded connections using standard AWS A2.0 welding symbols. Indicate net weld lengths.

## PART 2 – PRODUCTS

### 2.01 MATERIALS

A. Posts: 1½" (1.900" O.D.) schedule 40, galvanized pipe, ASTM A53, Grade B.

B. Rails: 1" (1.315" O.D.) schedule 40, galvanized pipe, ASTM A53, Grade B.

C. Vertical Balusters: ½" (0.840" O.D.) Schedule 40, galvanized pipe, ASTM-A53, Grade B.

D. Welding Materials: AWS D1.1.

E. Paint:

1. Intermediate Coat: Tnemec Series 27 Typoxy (or approved equal)
2. Top Finish: Tnemec Series 1074, Endura Shield (or approved equal)
3. Color: The Owner's representative will select final color and finish from Contractor's submittal.

### 2.02 FABRICATION - GENERAL

A. Fit and shop assemble items complete rail sections, for delivery to site.

B. Continuously seal joined members by continuous welds.

C. Grind exposed joints flush and smooth with adjacent finish surface. Make exposed joints butt tight, flush and hairline. Ease exposed edges to small uniform radius.

D. Exposed Mechanical Fastenings: Flush countersunk screws or bolts, consistent with design of component.

E. Supply components required for anchorage of fabrications. Fabricate anchors and related components of same material and finish as fabrication.

F. Accurately form components required for anchorage of railings to each other and to ramp structure.

### 2.03 FINISHES

A. Hand rails may be shop or field painted. Paint in accordance with manufacturer's instructions.

B. Clean surface per SSPC-SP7/NACE 4, Brush-off blast cleaning.

C. Prime surface with F.C. Typoxy, Series 27. Provide 4.0 to 6.0 mil dry thickness

D. Paint with Endura-Shield Series 1074 with 6.0 to 9.0 total mil dry film thickness. Place in two to three coats have 2.0 to 3.0 mil dry film thickness

## PART 3 - EXECUTION

### 3.01 GENERAL

A. Obtain review by Owner's Representative prior to site cutting or making adjustments that are not part of scheduled work.

B. Make provision for erections stresses by temporary bracing. Keep work in alignment.

C. Replace items damaged in course of installation.

D. Verify that field conditions are acceptable and ready to receive work.

E. Supply to appropriate trades items required to be cast into concrete or embedded in masonry, complete with necessary setting templates.

### 3.02 INSTALLATION

A. Install items plumb and level, accurately fitted, free from distortion or defects.

B. Allow for erection loads and provide temporary bracing to maintain true alignment until completion of erection and installation of permanent attachments.

### 3.03 QUALITY CONTROL

A. Set rails parallel to slope of the stairs, ramp, or other pavement surface within 1/8 inch in 12 feet.

**END OF SECTION 055200**

**SECTION 061000**
**ROUGH CARPENTRY**

## PART 1 GENERAL

1.1 Section Includes

A. Structural dimension lumber framing.

1.2 Reference Standards

A. ASTM A153/A153M - Standard Specification for Zinc Coating (Hot-Dip) on Iron and Steel Hardware; 2023.

B. ASTM A653/A653M - Standard Specification for Steel Sheet, Zinc-Coated (Galvanized) or Zinc-Iron Alloy-Coated (Galvannealed) by the Hot-Dip Process; 2025.

C. AWC (WFCM) - Wood Frame Construction Manual for One- and Two-Family Dwellings; 2024, with Errata.

D. PS 20 - American Softwood Lumber Standard; 2025.

1.3 Submittals

A. See Section 013300 - Administrative Requirements for submittal procedures.

1.4 Delivery, Storage, and Handling

A. General: Cover wood products to protect against moisture. Support stacked products to prevent deformation and to allow air circulation.

## PART 2 PRODUCTS

2.1 General Requirements

A. Dimension Lumber: Comply with PS 20 and requirements of specified grading agencies.
   1. Species: Douglas Fir-Larch, unless otherwise indicated.
   2. If no species is specified, provide species graded by the agency specified; if no grading agency is specified, provide lumber graded by grading agency meeting the specified requirements.
   3. Grading Agency: Grading agency whose rules are approved by the Board of Review, American Lumber Standard Committee at www.alsc.org, and who provides grading service for the species and grade specified; provide lumber stamped with grade mark unless otherwise indicated.

2.2 Dimension Lumber

A. Sizes: Nominal sizes as indicated on drawings, match existing size or larger.

B. Moisture Content: S-dry or MC19.

2.3 Accessories

A. Metal and Finish of Fasteners:
   1. Preservative-Treated Wood:
      a. Nails, timber rivets, wood screws, and lag screws - general use: Hot-dip galvanized steel complying with ASTM A153/A153M Class D.
   2. Untreated Wood: Unfinished steel.

B. Die-Stamped Connectors: Hot dipped galvanized steel, sized to suit framing conditions.
   1. For contact with preservative treated wood in exposed locations, provide minimum G185 (Z550) galvanizing complying with ASTM A653/A653M.
   2. Products:
      a. Simpson Strong Tie.

## PART 3 EXECUTION

3.1 Preparation

3.2 Installation - General

A. Select material sizes to minimize waste.

B. Reuse scrap to the greatest extent possible; clearly separate scrap for use on site as accessory components, including: shims, bracing, and blocking.

3.3 Framing Installation

A. Set structural members level, plumb, and true to line. Discard pieces with defects that would lower required strength or result in unacceptable appearance of exposed members.

B. Make provisions for temporary construction loads, and provide temporary bracing sufficient to maintain structure in true alignment and safe condition until completion of erection and installation of permanent bracing.

C. Install structural members full length without splices unless otherwise specifically detailed.

D. Comply with member sizes, spacing, and configurations indicated, and fastener size and spacing indicated, but not less than required by applicable codes and AWC (WFCM) Wood Frame Construction Manual.

E. Construct double joist headers at floor and ceiling openings and under wall stud partitions that are parallel to floor joists; use metal joist hangers unless otherwise detailed.

F. Frame wall openings with two or more studs at each jamb; support headers on cripple studs.

3.4 Blocking, Nailers, and Supports

A. Provide framing and blocking members as indicated or as required to support finishes, fixtures, specialty items, and trim.

3.5 Tolerances

A. Framing Members: 1/4 inch (6 mm) from true position, maximum.

B. Variation from Plane, Other than Floors: 1/4 inch in 10 feet (2 mm/m) maximum, and 1/4 inch in 30 feet (7 mm in 10 m) maximum.

3.6 Cleaning

A. Waste Disposal: See Section 017400 - Cleaning
   1. Comply with applicable regulations.
   2. Do not burn scrap on project site.
   3. Do not burn scraps that have been pressure treated.
   4. Do not send materials treated with pentachlorophenol, CCA, or ACA to co-generation facilities or “waste-to-energy” facilities.

B. Do not leave wood, shavings, sawdust, etc. on the ground or buried in fill.

C. Prevent sawdust and wood shavings from entering the storm drainage system.

**END OF SECTION 061000**

# SECTION 311000
# SITE CLEARING

## PART 1 - GENERAL

### 1.1 SECTION INCLUDES

A. Work necessary to clear the site of existing vegetation and other items indicated within the limits of the proposed improvements.

B. Drawings and General Provisions of Contract, including General and Special Conditions, apply to this section.

### 1.2 BENCHMARKS AND CONTROL

A. Maintain and protect benchmarks, monuments, and other reference points.

B. If disturbed or destroyed, replace as directed by Owner's Representative.

### 1.3 RELATED SECTIONS

A. Section 312300 – Excavation and Fill

B. Section 312333 – Trenching and Backfilling

## PART 2 – PRODUCTS

### 2.1 BACKFILL

A. Backfill excavations resulting from removal in accordance with these Specifications.

## PART 3 – EXECUTION

### 3.1 CLEARING AND GRUBBING

A. Clearing shall consist of the satisfactory disposal of the vegetation in areas designated for construction.

B. Grubbing shall consist of the removal and disposal of roots larger than 3" in diameter, matted roots, and other organic material from the construction areas. Excavate and remove this material, together with other debris not suitable for foundation purposes, to a depth of not less than 18" below the level of paved surfaces.

### 3.2 CLEAN UP AND DISPOSAL

A. Removed materials shall be promptly disposed of off the site and not allowed to accumulate on the premises.

B. Remove and transport debris in a manner as to prevent spillage on streets or adjacent areas.

**END OF SECTION 311000**

**SECTION 312300**
**EXCAVATION AND FILL**

## PART 1 - GENERAL

### 1.1 SECTION INCLUDES

A. Providing labor, materials, equipment, and supervision necessary to:

1. Remove topsoil and stockpile on site for later use
2. Grade subsoil and reform to grades, contours, and levels
3. Rough grade (excavation and compaction) for roadways, walks, curbs, gutters, parking areas, and landscaped areas
4. Cut Compact
5. Finish grade subsoil
6. Place, level, and compact topsoil

B. Drawings and General Provisions of Contract, including General and Special Conditions, apply to this section.

### 1.2 RELATED SECTIONS

A. Section 013300 – Submittals

### 1.3 REFERENCES

A. Standards of construction shall conform to MoDOT 203.3 through 203.7 as modified herein.

### 1.4 DEFINITIONS

A. Subgrade: The uppermost surface of an excavation or the top surface of a fill or backfill immediately below subbase, drainage fill, or topsoil materials.

B. Unstable Subgrade is subgrade softened, eroded by flooding or placement during unfavorable weather, or other Contractor controlled actions.

C. Unsuitable Subgrade is natural material that cannot be compacted to the requirements of this section.

D. Maximum Density: Maximum dry weight in pounds per cubic foot of a specific material, as determined by ASTM D698, Standard Proctor Density

E. Optimum Moisture: Percentage of water at maximum density

F. Rubble: Buried concrete foundations, beams, walls, and other material, which requires blasting or jack hammering for its practical and effective removal

G. Rock Excavation: Material that requires blasting or jack hammering for its practical and effective removal

1. Materials include sandstone, limestone, flint, granite, quartzite, or similar material, in masses measuring more than one (1) cubic yard in volume or in ledges 4" or more in thickness.
2. Rock encountered in two or more ledges, being 3" or thicker, with interlaying earth strata ≤ 12" thick, the entire volume from the top of the top ledge to the bottom of the bottom ledge is classified as rock.

H. Subbase Course: The layer placed between the subgrade and base course in a paving system or the layer placed between the subgrade and surface of a pavement or walk.

I. Base Course: The layer placed between the subbase and surface pavement in a paving system.

J. Drainage Fill: Course of washed granular material supporting slab-on grade placed to cut off upward capillary flow of pore water.

K. Unauthorized excavation consists of material removal beyond indicated subgrade elevations or dimensions without direction by the Owner's Representative. Unauthorized excavation, as well as remedial work shall be at the Contractor's expense.

L. Structures: Buildings, footings, foundations, retaining walls, slabs, tanks, curbs, mechanical and electrical appurtenances, or other man-made stationary features constructed above or below ground surface.

M. Utilities include on-site underground pipe, conduits, ducts, and cables, as well as underground services within building lines.

## 1.5 SAMPLES

A. Submit samples under provisions of Section 013300.

B. Submit 1.0-lb. sample of imported fill to testing laboratory in airtight containers.

C. Disregard sample submission if recent test results are available for type of fill.

## 1.6 JOB CONDITIONS

A. Control dust caused by the Contractors operations during performance of the work or if resulting from the conditions in which the Contractor leaves the site, on and near the work including off-site areas.

B. Protection:

1. Protect trees, shrubs and lawn, rock outcroppings, and other features remaining as part of final landscaping.

2. Protect benchmarks, existing structures, fences, roads, sidewalks, paving, and curbs not scheduled for removal from damage.

3. Protect aerial, surface, or underground utility lines or appurtenances, which are to remain.

4. In the event of damage, immediately make repairs and replacements necessary to the approval of the Owner's Representative and at no additional cost to the Owner.

## 1.7 SITE COMPACTION TESTING

A. The Contractor will perform testing of compacted fill materials.

B. When work under this Section or portions of work are completed, the Contractor or their Representative shall perform density tests. Do not proceed with additional portions of work until verifying results.

C. If, during progress of work, tests indicated that compacted materials do not meet specified requirements, remove defective work and replace at no cost to Owner.

D. Ensure testing of compacted fills before proceeding with placement of surface materials.

## PART 2 - PRODUCTS

### 2.1 GENERAL FILL MATERIAL

A. Fill material shall be subject to approval of the Owner's Representative.

B. Fill material shall be soil or soil rock mixture, which is free from organic matter, broken concrete, broken asphalt, building debris, and other deleterious substance. Material shall contain no rocks or lumps over six inches in greatest dimension. Not more than 15% of the rocks or lumps shall be larger than 2-1/2 inches in greatest dimension.

C. Additional Fill Material: Material shall meet ASTM D2487, soil classification groups GW, GP, GM, and CL. The Contractor may use soil classification CH in areas greater than 2 feet from pavements.

### 2.2 UNSUITABLE SOIL REPLACMENT FILL MATERIAL

A. Fill placed in depressions resulting from the removal of unsuitable material shall be an aggregate material with 100% passing the 3" sieve, 70%-90% passing the 2" sieve, and 40%-70% passing the 1" sieve.

### 2.3 TOPSOIL

A. Reused native material from the site, if available.

B. Imported: friable loam; free of subsoil, roots, grass, excessive amount of weeds, stone, and foreign matter; acidity range (pH) of 5.5 to 7.5; containing a minimum of 4% and a maximum of 25% organic matter.

## PART 3 - EXECUTION

### 3.1 GENERAL

A. Prior to work under this section, become thoroughly familiar with the site, the site conditions, and all portions of the work falling within this section.

B. Backfilling Prior to Approvals

1. Do not allow or cause covering or enclosing any of the performed or installed work of this section prior to all required inspections, tests, and approvals.

2. Should any of the work be so enclosed or covered up before it has been approved, uncover all such work at no additional cost to the Owner

C. Excavation includes the removal of materials indicated on the Drawings. It also includes shaping and slope construction necessary for the facility's construction in conformance with the grades shown on the Drawings.

D. Beginning work under this Section means acceptance of existing conditions.

### 3.2 PREPARATION

A. Establish and identify required lines, levels, contours, and datum.

B. Maintain benchmarks, monuments, and other reference points. Re-establish disturbed or destroyed monuments at no cost to Owner.

C. Before start of grading, establish the location and extent of utilities in the work areas. Notify utilities to remove and relocate lines, which are in the way of construction.

## 3.3 TOPSOIL EXCAVATION

A. Remove topsoil of horticultural value from areas to be excavated, regraded, or paved. Remove from site or stockpile. Remove a minimum depth of six inches.

B. Do not permit mixing of topsoil with subsoil.

C. Do not strip topsoil when wet.

D. Do not stockpile topsoil to depths exceeding 8'-0". Do not drive heavy equipment over stockpiled topsoil.

## 3.4 EXCAVATING

A. Depressions Resulting from Removal of Obstruction

1. Where depressions result from, or have resulted from the removal of surface or subsurface obstructions, open the depression to equipment working width and remove all debris and soft material as directed by the Owner's Representative.

B. Other Areas

1. Excavate to grades shown on the Drawings.

2. Where the drawings do not include excavation grades, excavate as required to accommodate the installation.

C. Overexcavation: Backfill and compact all overexcavated areas and unauthorized excavation areas, at no additional cost to the Owner.

## 3.5 ROCK EXCAVATION

A. The Owner does not anticipate rock excavation on this project. Notify the Owner’s Representative if you encounter rock during excavation.

## 3.6 EXCESS WATER CONTROL

A. Unfavorable Weather

1. Do not place, spread, or roll any fill material during unfavorable weather conditions.

2. Do not resume operations until moisture content and fill density are satisfactory.

B. Flooding: Provide dikes or channels to prevent flooding of subgrade; promptly remove all water collecting in depressions.

C. Remove Unstable Subgrade and compact as specified for fill and compaction at the Contractor’s expense.

D. Dewatering

1. Provide and maintain at all times during construction ample means and devices with which to promptly remove and dispose of all water from every source entering the excavations or other parts of the work.

2. Dewater by means that will ensure dry excavations and the preservation of the final lines and grades of bottoms of excavations.

## 3.7 WASTE EXCAVATION

A. Disposal of excess material will be the responsibility of the Contractor at no additional cost to the Owner.

## 3.8 FILLING

A. Fill areas to drawing contours and elevations with unfrozen materials.

B. Granular Fill: Place and compact materials in continuous layers not exceeding 8" compacted depth, compacted to 95%.

C. Subsoil Fill: Place and compact material in continuous layers not exceeding 8" compacted depth, compacted to 95% areas to be paved and 85% in lawn areas.

D. For cohesive soils, maintain –2% to +4% of optimum moisture content. For cohesionless soils, maintain moisture at less than +4% of optimum moisture content.

E. Slope grade away from building minimum 2 in. in 10 ft. unless otherwise noted.

F. Make grade changes gradual. Blend slope into level areas.

## 3.9 SUBSOIL PREPARATION

A. Eliminate uneven areas and low spots. Remove debris, roots, branches, and stones, in excess of 1/2" in size. Remove subsoil contaminated with petroleum products.

B. Scarify subgrade to depth of 6 in. Scarify in areas where equipment used for hauling and spreading topsoil has compacted subsoil.

## 3.10 PLACING TOPSOIL

A. Place topsoil in areas where seeding or sodding is scheduled.

B. Use topsoil in relatively dry state. Place during dry weather.

C. Fine grade the topsoil eliminating rough or low areas. Maintain levels, profiles, and contours of subgrade.

D. Remove stone, roots, grass, weeds, debris, and foreign material while spreading

E. Manually spread topsoil around trees, plants, and buildings to prevent damage

F. Lightly compact topsoil

G. Remove surplus subsoil and topsoil from site

H. Leave stockpile area and site clean and raked, ready to receive landscaping

## 3.11 TOLERANCES

A. Top Surface of Subgrade: Plus or minus 0.1 foot

B. Top of Topsoil: Plus or minus 1/2 inch

C. Grade all areas to have positive drainage.

## 3.12 FIELD QUALITY CONTROL

A. Perform tests and analysis of subgrade fill material in accordance with ASTM D698.

B. Perform compaction testing of subgrade material in accordance with ASTM D698.

C. If tests indicate work does not meet specified requirements, remove work, replace, and retest at no cost to Owner.

## 3.13 SCHEDULE OF TOPSOIL LOCATIONS

A. Compact topsoil with thickness as follows:

1. Seeded Grass: 6 in

2. Sod: 4 in
3. Shrub Beds: 18 in

**END OF SECTION 312300**

# SECTION 312313
# SUBGRADE PREPARATION

## PART 1 - GENERAL

### 1.1 SECTION INCLUDES

A. Preparation of subgrade under areas prior to surfacing

B. Drawings and General Provisions of Contract, including General and Special Conditions, apply to this section.

### 1.2 RELATED SECTIONS

A. Section 312300 – Excavation and Fill

B. Section 321123 - Aggregate Base Course

### 1.3 DEFINITIONS

A. The subgrade is the portion of the graded base under surfacing.

## PART 2 – PRODUCTS NOT USED

## PART 3 - EXECUTION

### 3.1 GENERAL

A. Construct the subgrade with uniform in density through the entire width and conforming to the line, grade, and cross section shown on the drawings.

B. At all times there shall be at least 50' of prepared subgrade ahead of the point at which pavement is being placed.

### 3.2 CUT COMPACTION

A. Cut areas under proposed asphaltic or portland cement concrete pavements shall be cut compacted.

B. After grading to subgrade elevation, scarify the top 6-inches of the base and compact as follows:

C. Cohesive soils: compact to 95% of its maximum dry density at a moisture content within –2% to +4% of optimum

D. Cohesionless soils: compact 95% of its maximum dry density at a moisture content dryer than +4% of optimum

E. Optimum determined by ASTM D698

### 3.3 FINISHING

A. After excavation, embankment, and cut compaction are completed, bring the subgrade to true shape with a subgrade planer. Compact any loose material on the subgrade behind the planer with a self propelled roller weighing not less than five tons for portland cement concrete pavement and a three-wheeled roller weighing not less than ten (10) tons for flexible pavements (asphaltic concrete, seal and chip, or granular).

B. Use care shaping the subgrade, so that no portion of the completed pavement varies from the specified thickness.

C. Contractor shall proof roll prepared subgrade under road and parking lot pavements by running a tandem dump truck, loaded with gravel, across the subgrade.

D. Remove all soft and yielding spots to a depth not to exceed 1.5-feet. Remove all vegetative substances or unsuitable material. Fill the resulting space with approved material per section 312300 of these specifications.

E. All large rocks or boulders encountered shall be removed or broken off to a depth not less than 6" below the finished surface of the subgrade. Fill the space with approved material.

F. Re-roll the subgrade until no depressions occur. In narrow strips or repair areas, where rolling is not practical, other methods of compaction may be used.

## 3.4 RESTORING SUBGRADE TO ACCEPTABLE CONDITION

A. If subgrade is disturbed, eroded, or inundated with water prior to the placement of paving, restore the surface to acceptable condition by reshaping and rolling at no additional cost to the Owner.

## 3.5 QUALITY CONTROL

A. Proof Rolling

1. In addition to compaction testing, and prior to the placement of aggregate base course(s), the Contractor shall proof roll the subgrade.
2. Proof rolling shall consist of passing / driving a loaded 20-ton tandem dump truck over the prepared subgrade soil. The maximum allowable yield or displacement is 1”.
3. Areas that yield or displace more than 1” shall be recompacted until the area meets this criteria or excavated, to a depth not to exceed 1.5-feet, and replaced with compacted 3-inch minus material per specification section 312300.
4. Perform proof rolling in the presence of the Owner’s Representative.

**END OF SECTION 312313**

**SECTION 312319**
**DEWATERING**

## PART 1 - GENERAL

### 1.1 SUMMARY

A. Provide and maintain means for removal of water entering all structural and trenching excavations.

B. Dispose of water in a manner not causing damage, pollution, or unsafe conditions to adjacent land and water areas.

## PART 2 - PRODUCTS (Not Applicable)

## PART 3 - EXECUTION

### 3.1 PROTECTION

A. Surface runoff: Control grading around the excavation to prevent surface water from running into the excavations for the structure and trenches.

B. Protect adjacent and/or downstream property and structures from damage due to water removal and disposal.

### 3.2 PREPARATION

A. Provide for safe disposal of removed water.

### 3.3 DEWATERING

A. Install and maintain dewatering system.

B. Maintain water level within the excavation at or below the surface of the excavation, trench bottom, or base of the bedding course, until all Work to be performed therein is completed.

C. Carry out dewatering operation so the strength of the soil under or alongside of the excavation is not weakened or destroyed.

D. After completion of the structure or conduit installation, restore the normal water table in a manner not to disturb the foundation or the pipe or its foundation.

E. Provide de-silting devices or basins if necessary to protect adjacent property or structures or downstream property or structures.

F. Saturated foundations: Prior to placing any concrete for foundations, remove soils in footing excavation that have become saturated with surface water. Backfill areas to contours and elevations with unfrozen materials.

**END OF SECTION 312319**

**SECTION 312333**
**TRENCHING AND BACKFILLING**

## PART 1 - GENERAL

### 1.1 SECTION INCLUDES

A. This section encompasses the work required for excavation of trenches, structures, appurtenances, bedding, and backfilling for the installation of utilities.

B. Drawings and General Provisions of Contract, including General and Special Conditions, apply to this section.

### 1.2 DEFINITIONS

A. Maximum Density: Maximum dry weight in pounds per cubic foot of a specific material, as determined by ASTM D698, Standard Proctor Density

B. Optimum Moisture: Percentage of water at maximum density

C. Rock Excavation: Material that requires blasting or jack hammering for its practical and effective removal

1. Materials include sandstone, limestone, flint, granite, quartzite, or similar material, in masses measuring more than one (1) cubic yard in volume or in ledges 4" or more in thickness.

2. Rock encountered in two or more ledges, being 3" or thicker, with interlaying earth strata ≤ 12" thick, the entire volume from the top of the top ledge to the bottom of the bottom ledge will be classified as rock.

D. Rubble: Buried concrete foundations, beams, walls, and other material which requires blasting or jack hammering for its practical and effective removal.

E. Earth Excavation: Earth excavation will include all material not otherwise classified. Decomposed or disintegrated shale, which can be effectively plowed, spaded, or removed with power drive excavation equipment, and gravel base will be classified as earth excavation.

F. Unstable Subgrade is subgrade softened, eroded by flooding or placement during unfavorable weather, or other Contractor controlled actions.

G. Unsuitable Subgrade is natural material that cannot be compacted to the requirements of this section.

H. Over excavation of Unsuitable Material: Removal of material that is too soft to provide adequate support as determined by the Owner’s Representative for pipe being placed in the bottom of the trench.

I. Granular Material Backfill and Bedding: Coarse sand, crushed rock or gravel, free from dust, clay, organic, and other undesirable materials.

J. Payment Line: Used for over excavation of unsuitable material. The payment line shall be considered the lower of the bottom of the bedding material or a line 6" below and parallel to the pipe flow line. Width of over excavation shall be 2-feet greater than the outside diameter of the pipe.

### 1.3 JOB CONDITIONS

A. Blasting: Blasting is not permitted on this project.

B. Length of open trench.

1. The maximum length of open trench shall be 200 feet in public right-of-way and 400 feet elsewhere.
2. The Contractor shall not leave an unattended open trench without fencing.

C. Protection of existing underground utilities.

1. The location of existing utilities shown on the drawings is based upon information and data supplied to the Owner or Engineer by the owner of the utility. The utilities are shown for information only. The information is not guaranteed to be either complete or accurate. It is the Contractor's responsibility to contact all utilities and obtain utility staking prior to construction.
2. Any damage to existing utilities shall be reported to the utility and repaired in accordance with the utility's standards.
3. The cost of repairs to damaged utilities shall be borne by the Contractor.
4. If utility service must be interrupted to complete a construction operation, the Contractor shall obtain permission from the utility.
5. The Contractor shall provide affected residents or businesses written notice at least 48 hours in advance of the time of the interruption and the expected duration of the interruption.
6. Notice shall be hand delivered to each affected structure.
7. If the utility requires standby service, it shall be provided at the Contractor's expense.
8. If a non-scheduled interruption of utility service results from accidental damage, the Contractor shall take immediate steps as necessary to notify the utility and restore service. The Contractor's personnel shall not leave the site until the interruption has been restored.

D. Work within Highway, Railroad, or Utility Right of Way

1. When the Contractor performs work within the right-of-way of other jurisdictions such as railroads, highways, or utilities, such work shall comply with applicable permits or regulations of such jurisdiction in addition to the requirements of this section.

E. Scheduling

1. Clean up shall be performed promptly following utility installation backfill.
2. Repair of trench settlement shall be performed promptly.

F. Erosion Control

1. The Contractor shall comply with the Drawings, Specifications, and all applicable Federal, State, or Local erosion control regulations.
2. The Contractor shall perform regular maintenance of all erosion control devices until time of final acceptance.

G. Maintenance

1. The Contractor is responsible for repair of trench settlement up to the level of the adjacent grade that occurs during construction, as well as the warranty period. This shall include restoration of the finish surface as appropriate.

H. Driveway Closing

1. Driveway closing will be limited to a maximum of 12 hours, except during reconstruction of the driveway or main line paving in front of a residence. Provisions shall be made for alternate parking and pedestrian access.
2. Access shall be continuously maintained to non-residential properties.

I. Costs associated with construction phasing shall be considered incidental to the Project, unless noted otherwise.

### 1.4 SITE COMPACTION TESTING

A. The Contractor will be responsible for the testing of compacted fill materials.

B. Notify the Owner's Representative when work or portions of work under this Section are completed.

C. If, during progress of work, tests indicate that compacted materials do not meet specified requirements, remove defective work. Replace at no cost to Owner.

D. Allow the Owner's Representative the opportunity to test compacted fills before proceeding with placement of surface materials.

E. Absence of compaction testing shall not relieve the Contractor of his obligation to satisfy the compaction requirements of this section.

### 1.5 PROTECTION

A. Protect trees, shrubs and lawns, areas to receive planting, rock outcroppings, and other features remaining as part of final landscaping.

B. Protect benchmarks and existing structures, roads, sidewalks, paving, and curbs against damage from equipment and vehicular or foot traffic.

C. Protect excavations by shoring, bracing, sheet piling, underpinning, or other methods, as required to prevent cave-ins or loose dirt from falling into excavations.

D. Underpin adjacent structure(s), which may be damaged by excavation work, including service lines and pipe chases.

E. Notify the Owner's Representative of unexpected subsurface conditions and discontinue work in area until the Owner's Representative provides notification to resume work.

F. Grade around excavations to prevent surface water runoff into excavated areas.

## PART 2 - PRODUCTS

### 2.1 MATERIALS

A. Backfill

1. Suitable Excavated Material: Free of cinders, ashes, refuse, sod, vegetative, or organic matter, boulders, rocks, or pavement fragments.
2. Do not use sand backfill unless specifically called out on the drawings.
3. Granular backfill: Crushed limestone or gravel with 100% passing a 1" sieve, 20-75% passing a No. 4 sieve, 20-40% passing a No. 8 sieve, and 6-16% passing a No. 200 sieve

B. Trench Stabilization

1. Trench stabilizing material shall consist of crushed rock or other approved material with 100% passing the 3" sieve and 25-95% passing the 1" sieve.

C. Concrete

1. Concrete shall be a commercial grade with a minimum 28-day compressive strength of 4,000 psi.

D. Bedding

1. Gravity Storm Sewer or Sanitary Sewer Pipe Bedding Material:

a. Rigid Pipe: Clean gravel or crushed rock shall meet the following gradation for rigid sewer pipe (RCP, DIP, VCP).

| Pipe Size | 95% Passing | 95% Retained | Maximum Size |
|---|---|---|---|
| Up to 18" | ½ - inch | No. 4 | ¾ - inch |
| 20”- 30” | 1 - inch | No. 4 | 1-½ inch |
| Over 30" | 2 - inch | No. 4 | 3 - inch |

b. Non-Rigid Pipe (PVC or CMP): Gravel or crushed rock meeting the following gradation; 100% passing a 3/4" sieve, 50-80% passing a No. 4 sieve, and 25-60% passing a No. 8 sieve.

2. Water Main and Force Main Bedding Material

a. Not required except for trench bottoms carried below required grade. Use compacted sewer pipe bedding or gravel for trench bottoms carried below required grade.

## PART 3 - EXECUTION

### 3.1 GENERAL

A. Replace or reinstall obstructions removed to accommodate construction equipment or to facilitate excavation after construction.

B. Do not remove trees unless noted on the drawings. Exercise care in operating equipment beneath the drip line or adjacent to trees to prevent damage. If damage occurs, the Contractor shall retain a Professional Arborist at the Contractor’s expenses to repair the damage.

C. Pile excavated material suitable for backfill in an orderly manner a sufficient distance from the edge of excavation to avoid rollbacks, slides, or cave-ins.

D. Excavate by open-cut method for utilities and structures except as noted on Drawings.

E. The Contractor shall be responsible for providing barricades and protection around excavation and work areas.

F. The Contractor shall be responsible for removing and replacing fences that are disturbed by construction operations. Materials shall be new and type shall match existing.

G. Work in areas containing crops, where practical, shall be started after the crops have been harvested or before the crops are planted. Compensation for crop damage outside the easement limits shall be the responsibility of the Contractor.

### 3.2 SAFETY

A. The means of the work and the safety of the Contractor's employees are solely the responsibility of the Contractor. The Contractor has a contractual obligation to comply with all applicable laws and regulations including those of OSHA. At no time will either the Owner or Owner's Representative take responsibility for either the means of the work or the safety of the Contractor's employees.

## 3.3 SHEETING, SHORING, AND BRACING

A. Construct sheeting, shoring, and bracing required to hold walls of excavation, provide a safe area for workmen, protect existing utilities and structures, and to permit construction in the dry.

B. Sheeting may be wood or steel.

C. Wood Sheeting Driven below Level of Utility: Leave in place to a level of 5' below finished grade.

D. Pull steel sheeting.

E. When using a moveable trench box, below the spring line of pipe, it shall be lifted prior to any forward movement to avoid pipe displacement.

F. Sheeting, shoring, and bracing shall not be paid for separately, but is considered incidental to the project.

G. Sheeting and shoring shall be in accordance with OSHA and other applicable governmental regulations. The Contractor shall be solely responsible for complying with the regulations.

H. Provide the Owner's Representative with shop drawings of proposed sheeting or shoring, signed and sealed by a registered Professional Engineer, licensed to practice in the state that the project is in.

## 3.4 PREPARATION

A. Clearing

1. Remove vegetative material and obstructions as necessary for construction.
2. The Contractor shall properly dispose of removed material off the project site.

B. The greater of the existing topsoil layer or the top 6" of native material shall be removed and stockpiled for the finish surface of backfill, except in areas of existing or proposed pavement or noted otherwise on the Drawings.

## 3.5 PERFORMANCE

A. General

1. General: Surplus and rejected unsuitable excavated material becomes property of the Contractor for disposal.

B. Excavation for Utility Structures

1. Stockpile topsoil for later distribution on the finished grade.
2. Remove rubble or rock to 12" below the bottom of the foundation and 12" horizontally from any vertical surface.
3. Subgrade: The subgrade below each major portion of a structure shall be inspected by the Owner's Representative prior to placing stone base course or placing reinforcing bars.

4. Excavation shall be to firm undisturbed soil. If excavation is carried below the bottom of foundations, the Contractor shall fill with concrete or compacted granular material in accordance with this Specification.

C. Trench Excavation

1. Excavated material shall be stored in such a manner as to avoid property damage. Repair any damage at the Contractor's expense.
2. Excavate the base of the trench to provide a uniform and continuous bearing and support on solid and undisturbed material.
3. The minimum trench width shall be sufficient to allow space for jointing and bedding. The maximum allowable trench width at a point 12" above the top of the pipe (pipe envelope) shall be 30" for pipes 6-10" in diameter. For pipes 12" in diameter or larger, the maximum trench width shall be the outside diameter plus 24". For elliptical or arch pipes, it shall be the outside dimension at the spring line plus 24".
4. If rubble or rock is encountered, the trench shall be excavated to provide clearance of at least 6" below and 12" on each side of the utility line and fittings.
5. Remove and repair Unstable Subgrade at the Contractor's expense.
6. Over excavation of Unsuitable Material: When the Contractor encounters material that is not suitable for supporting the pipe line or structure being constructed, the Contractor shall notify the Owner's Representative to obtain written instructions on how to proceed. Material removed prior to authorization of the Owner's Representative will not be eligible for payment. The over excavation will be backfilled to the payment line with granular material.

D. Bedding

1. Provide rigid gravity storm or sanitary sewer pipe with compacted granular bedding having a minimum thickness of 4" or 1/8th of the outside pipe diameter, whichever is greater.
2. Provide non-rigid gravity storm or sanitary sewer pipe with compacted granular bedding having a minimum thickness of 4" or 1/4th of the outside pipe diameter, whichever is greater.
3. Water mains or sanitary sewer force mains may be installed with undisturbed or compacted soil bedding provided the subgrade is consistent and the Contractor provides hand excavation for bells such that the pipe barrel bears evenly on the subgrade.

E. Dewatering

1. Excavation, installation of bedding, pipes, structures, and backfilling shall be done in dry conditions. If the subgrade is saturated or standing water exists, the work area shall be dewatered prior to installation or backfilling operations.
2. The Contractor shall make provisions to handle water encountered during construction. The Contractor shall obtain approval from the Owner's Representative of the proposed method of dewatering.
3. The Contractor shall prevent surface water from flowing into the excavated area. Divert or pump stream flow past the area of construction. Remove water accumulating in the area of construction.

4. Do not pump water onto adjacent property without approval of the Owner's Representative and adjacent property owner.

F. Backfill for Structures

1. Do not place backfill, adjacent to concrete structures, until the concrete has achieved at least 75% of its design strength.
2. Backfill simultaneously on all sides of structure. Protect structures from damage.
3. Place backfill in lifts of 8" or less prior to compaction.
4. Compact backfill areas to 95% of maximum Standard Proctor Density or 75% Relative Density (ASTM D4253 or ASTM D4254) for clean granular material.

G. Trench Backfill

1. Trenches shall be backfilled only after the locations of connections and appurtenances have been recorded by the Contractor on the drawing set. This information is to be submitted to the Owner's Representative with other construction record information.
2. Place backfill in lifts of 8" or less prior to compaction.
3. Carefully place backfill in the pipe envelope (top of bedding to a point 12" above the pipe). Material shall be of even consistency and free of clumps and boulders, finely divided. Compact material to 95% maximum Standard Proctor Density. Material within the pipe envelope shall be the same as specified for trench backfill, unless noted otherwise on the Drawings.
4. Place backfill simultaneously on both sides of pipe to prevent displacement.
5. Place backfill into the trench at an angle so that impact on installed pipe is minimized.
6. Install a 3' minimum cushion of backfill above pipe envelope before using heavy compacting equipment. If pipe is damaged, replace the section of damaged pipe and provide additional depth of cushion.

H. Backfill Above the Pipe Envelope

1. Under and within 5' of pavement and undercut structures or right of way, compact suitable excavated material to 95% of maximum Standard Proctor Density. The Contractor may substitute granular backfill with no additional cost to the Owner.
2. Under landscaped and lawn areas, compact suitable excavated material to 90% of maximum Standard Proctor Density. The top 12" of the backfill shall be soil equal to the stockpiled topsoil.
3. Under all other areas, unless noted otherwise on the plans, compact suitable, native material to 85% of maximum density. The top 12" of the backfill shall be soil equivalent to the stockpiled topsoil. Round the surface neatly, 2-4" above the original surface.
4. Sand backfill shall be used only if specifically called out in the Drawings or authorized by the Owner's Representative. If utilized the Contractor shall:
    a. Backfill with sand up to bottom of specified surface restoration.
    b. Compact to 75% Relative Density (ASTM D4253) under and within 5' of pavement; 70% Relative Density (ASTM D4253) in other areas.

5. Place sidewalk and pavement base and/or surface above compacted backfill as noted on the Plans.
6. Place top 12" of soil equivalent to stockpile topsoil in all other locations.

## 3.6 FIELD QUALITY CONTROL

A. The Contractor shall furnish and provide equipment and personnel to provide access for the Owner’s Representative to any test location and test depth necessary, in the Owner’s Representative's opinion, to properly evaluate compaction effort.

B. If specified compaction rates are not attained, the Owner’s Representative may require the Contractor to utilize different compaction methods or lift thickness.

C. Compaction Testing

1. The Contractor will perform compaction testing, unless noted otherwise.
2. The moisture density relation to be used in establishing compaction will be ASTM D698 (Standard Proctor) or ASTM D4253 (Relative Density).
3. Compaction effort may be evaluated by the use of any of the following standard test methods:
    a. ASTM D-2937 (drive cylinder)
    b. ASTM D-2167 (rubber balloon)
    c. ASTM D-1 556 (sand cone)
    d. ASTM D-2922 (nuclear)
    e. The Owner’s Representative will determine the Compaction Testing Frequency.

**END OF SECTION 312333**

**SECTION 312500**
**EROSION CONTROL**

## PART 1 - GENERAL

### 1.1 SECTION INCLUDES

A. Installation of temporary water pollution control measures to prevent discharge of pollutants such as chemicals, fuels, lubricants, bitumen, raw sewage, or other harmful material from the project.

B. Drawings and General Provisions of Contract, including General and Special Conditions, apply to this section.

### 1.2 GENERAL

A. The Contractor shall manage his operations to control water pollution in accordance with this specification and applicable State regulations. Construction of permanent drainage facilities and other contract work, contributing to control of erosion, shall be scheduled at the earliest practicable time.

B. The Contractor shall furnish, install, maintain, and remove temporary erosion control measures. The Contractor shall prevent discharging silt or polluted storm water from the site.

C. The Owner's Representative may require installation of additional erosion control facilities, by the Contractor, if in the sole opinion of the Owner's Representative the Contractor's efforts are inadequate.

### 1.3 DEFINITIONS

A. Temporary Berm: A temporary ridge of compacted soil, with or without a shallow ditch, constructed at the top of slopes or transverse to the centerline of a slope. The berm diverts storm runoff to temporary outlets to discharge water with minimal erosion.

B. Temporary Slope Drain: A temporary facility used to carry water down a slope.

C. Ditch Check: An obstruction placed at frequent intervals across ditches, creating small ponds to cause sediment to settle and be contained.

D. Sediment Basin: An excavated or dammed storage area to trap and store sediment and prevent the discharge of silt.

E. Temporary Seeding and Mulching: Placement of a quick ground cover to reduce erosion in areas expected to be re-disturbed.

F. Straw Bales: Standard agricultural bales used to filter the flow of water trap, deposit sediment, and/or divert water.

G. Silt Fence: A geotextile barrier fence to contain sediment by removing suspended particles from water passing through the fence.

H. Temporary Pipe: Conduit utilized to carry water under haul roads, silt fences, etc., and prevent equipment from direct contact with water when crossing an active or intermittent stream.

I. Sediment Removal: Removal of accumulated sediment to restore the efficiency of sediment control features.

J. Concrete Washout: Cementitious material washed out of the chutes of ready mixed concrete trucks and hoppers of concrete pump trucks, and off of wheelbarrows, crane concrete bins, and hand tools.

## 1.4 SUBMITTALS

A. The Contractor shall submit his proposed “Erosion Control Plan” for review and approval by the Owner’s Representative. Approval of the plan does not relieve the Contractor of his contractual responsibility to prevent the discharge of pollutants into the receiving drainage ways.

## 1.5 RELATED SECTIONS

A. Section 329200 – Turf Restoration

# PART 2 - PRODUCTS

## 2.1 MATERIALS

A. Temporary slope drains: Stone, concrete or asphalt gutters, half-round pipe, metal pipe, plastic pipe or flexible rubber pipe.

B. Ditch Checks:

1. Rock ditch checks: 2" to 3" clean gravel or limestone.
2. Straw bale ditch checks: Rectangular wheat straw bales in good condition. Other foliage may be substituted for straw in accordance with MoDOT 802.2.1.
3. Silt fence ditch checks: Geotextile meeting the requirements of this specification.

C. Riprap for Temporary Erosion Control: Type 1 Rock Blanket conforming to MoDOT 611.30.2.

D. Pipe: Corrugated metal (16 Ga.) or ADS N12 Corrugated Plastic.

E. Temporary Seeding:

1. December 1 to March 1: 50 lbs. oats/acre
2. March 1 to December 1: 50 lbs. cereal rye or wheat

F. Mulch shall be wheat straw.

G. Wire Supported and Self Supporting Silt Fence:

1. Geotextile Fabric
    a. Fibers used in geotextiles shall consist of longchain synthetic polymers, composed of at least 85 percent by weight polyolefins, polyesters, or polyamides. They shall be formed into a network such that the filaments or yarns retain dimensional stability relative to each other, including selvages.
    b. The geotextile shall be free of any treatment or coating which might adversely alter its physical properties after installation.
    c. Geotextile shall be furnished in 36" width rolls.
    d. Geotextile rolls shall be furnished with suitable wrapping for protection against moisture and extended ultraviolet exposure.
    e. Each roll shall be labeled or tagged to provide product identification sufficient for inventory.
    f. Rolls shall be stored in a manner, which protects them from the elements.

g. Geotextile shall conform to the following:

**TABLE 1**

**PHYSICAL REQUIREMENTS[1] FOR**

**TEMPORARY SILT FENCE GEOTEXTILES**

| Property | Test Method | Wire Fence Supported Requirements | Self Supported Requirements |
|---|---|---|---|
| Tensile Strength, Lbs. | ASTM D4632 | 90 Minimum[2] | 90 Minimum[2] |
| Elongation at 50% Minimum | | | |
| Tensile Strength (45 Lbs.) | ASTM D4632 | N/A | 50 Maximum |
| Filtering Efficiency, % | VTM-51[3] | 75 | 75 |
| Flow Rate gal/ft/min | VTM-51[3] | 0.3 | 0.3 |
| Ultraviolet Degradation at 500 hrs. | ASTM D4355 | Minimum 70% Strength Retained | Minimum 70% Strength Retained |

1. Notes: All numerical values represent minimum average roll value. When tested in any principal direction. Virginia DOT test method.

2. Posts: Wood, steel, or synthetic posts may be used. Posts shall have a minimum length of 36" plus embedment depth (24” min.). Posts shall have sufficient strength to resist damage during installation and to support applied loads.

3. Support Fence: Wire or other support fence shall be at least 24" high and strong enough to support applied loads.

4. Prefabricated Fence: Prefabricated fence systems may be used provided they meet all of the above material requirements.

H. Concrete Washout Containers

1. Hay Bale and Plastic Washout Pit

a. Pit dug into ground or built above grade.

b. Plastic lining free of tears or holes. Repair and/or replace as required after removal of hardened concrete.

2. Vinyl Washout Container w/ Filter Bag

3. Metal Washout Container

## 2.2 CERTIFICATION AND SAMPLING:

A. The Contractor shall furnish a manufacturer’s certification, stating the material conforms to the requirements of these specifications.

B. The certification shall include, or have attached, typical results of tests for the specified properties, representative of the materials supplied.

C. The Owner’s Representative reserves the right to sample and test any material offered for use.

# PART 3 - EXECUTION

## 3.1 GENERAL REQUIREMENTS

A. The Owner's Representative may limit the surface area of erodible earth material exposed by clearing and grubbing, excavation, borrow, or fill operations.

B. The Owner's Representative may direct the Contractor to provide immediate permanent or temporary pollution control measures to prevent contamination of adjacent streams, other watercourses, lakes, ponds, or other areas of water impoundment. Work may involve the construction of temporary berms, dikes, dams, sediment basins, slope drains, use of temporary mulches, seeding or other control devices or methods to control erosion.

C. The Contractor shall incorporate permanent erosion control features at the earliest practicable time.

D. The Contractor shall provide, at no additional cost to the Owner, temporary pollution control measures needed to control erosion during normal construction practices.

**3.2 LIMITATION OF AREA DISTURBED**:

A. The Contractor's operations shall be scheduled to install permanent erosion control features immediately after clearing and grubbing, and grading.

B. The surface area of erodible earth material exposed at one time by clearing and grubbing, excavating, fill, or borrow shall not exceed 200,000 square feet without written approval of the Owner's Representative.

C. The Owner's Representative may limit the area of clearing and grubbing, excavation, borrow, and embankment operations commensurate with the Contractor's capability and progress in completing the finish grading, mulching, seeding, and other such permanent pollution control measures current.

D. The Contractor shall respond to seasonal variations. If required by weather, temporary erosion control measures shall be taken immediately.

**3.3 RIVERS, STREAMS, AND IMPOUNDMENTS:**

A. Construction operations in rivers, streams, and impoundments shall be restricted to areas, which must be entered for the construction of temporary or permanent structures.

B. Rivers, streams, and impoundments shall be promptly cleared of falsework, piling, debris, or other obstructions as soon as practical.

C. Frequent fording of live streams with construction equipment will not be permitted.

D. Temporary bridges or other structures shall be used when the Contractor's operations include cycling of equipment across streams, rivers, or impoundments.

E. Mechanized equipment shall not be operated in flowing streams except as required to construct channel changes and temporary or permanent structures.

**3.4 BORROW AND WASTE AREAS**

A. Material pits other than commercially operated sources and material spoil areas shall be subject to pollution control measures of this specification. An offsite location does not relieve the Contractor of his contractual obligation to prevent the introduction of silt or other pollutants into receiving waterways.

**3.5 CONFLICT WITH FEDERAL, STATE OR LOCAL LAWS, RULES OR REGULATIONS**

A. In case of conflict between these requirements and pollution control laws, rules, or regulations or other Federal, State or local agencies, the more restrictive laws, rules, or regulations shall apply.

## 3.6 TEMPORARY BERMS

A. Temporary berms shall be constructed at the top of newly constructed slopes and / or transverse to grade to divert runoff and prevent erosion until permanent controls are installed and / or slopes are stabilized. Two types of temporary berms will be utilized under conditions listed below:

1. Type “A” Berm: At the end of each day’s operations on embankments.
2. Type “B” Berm: At shut down of embankment operations for the winter season or discontinuation of work at the direction of, or with concurrence of the Owner’s Representative.
3. Interceptor berms transverse to centerline may be used when temporary berms are installed on grades in excess of 1 percent and at locations where water is to be carried down the fill slope by temporary or permanent slope drains.

B. Construction Requirements:

1. Type “A” Berms shall be constructed to the approximate dimensions indicated on the drawings. Berms shall be machine compacted with a minimum of one pass over the entire width with a bulldozer tread, grader wheel, or other approved method.
2. Type “B” Berms shall be constructed to the approximate dimensions indicated on the drawings. These berms shall be machine compacted with a minimum of three passes over the entire width with a bulldozer tread, grader wheel, or other approved method.
3. Type “A” and Type “B” Berms must drain to a compacted outlet at a slope drain. The top width of these berms may be wider and the side slopes flatter on transverse berms to allow equipment to pass over these berms with a minimal disruption.

## 3.7 TEMPORARY SLOPE DRAINS

A. General:

1. Temporary slope drains are required to concentrate water flowing down a slope prior to installation of permanent facilities. Slope drains shall be placed at approximately 500-foot intervals or as directed by the Owner’s Representative.

B. General Requirements

1. The Contractor shall install a temporary silt fence in locations shown on the drawings, around inlets that accept flow carrying silt, and other locations necessary to prevent the discharge of silt from the site.
2. Installation shall conform to the drawing detail.
3. Fence construction shall be adequate to handle the stress from hydraulic and sediment loading.

C. Construction Requirements:

1. Temporary slope drains shall be anchored to prevent disruption by the force of the water flowing in the drain.
2. The inlet end shall be constructed to channel water into the drain.
3. The outlet ends of these temporary slope drains shall have some means of dissipating the energy of this water to reduce erosion downstream.

4. Unless otherwise directed by the Owner's Representative, temporary slope drains shall be removed when no longer necessary and the site restored to match the surroundings.

## 3.8 DITCH CHECKS

A. General:

1. Rock ditch checks may be used on ditches with grades of 4 percent or less.
2. Straw bale ditch checks may be used on all ditches with a fabric silt fence.
    a. The silt fence fabric may be eliminated for ditch grades of 2 percent or less.
3. Silt fence ditch check may be used on all ditches.
4. A straw bale ditch check or a silt fence ditch check may be used in lieu of a sediment basin for drainage areas less than two acres. The basin shall have a volume of 1,815 CF per acre of contributing drainage area.

B. Construction Requirements:

1. Construct rock ditch checks in accordance with the drawing detail.
2. Achieve complete coverage of the ditch or swale and insure the center of the check is lower than the edges.
3. Construct straw bale ditch checks in accordance with the drawing detail.
4. Construct silt fence ditch checks in accordance with the drawing detail.

C. Maintenance:

1. Inspect ditch checks for sediment accumulation after each rainfall.
2. Sediment shall be removed when it reaches one-half of the original height.
3. Regular inspections shall insure that the center of a rock check is lower than the edges. Correct erosion caused by high flows around the edges of the check immediately.

## 3.9 SEDIMENT BASIN

A. General

1. Sediment basins are used for drainage areas of two (2) to five (5) acres or for a roadway ditch exceeding 1,000 consecutive feet in length. Break larger drainage areas or longer ditches into smaller areas.

B. Construction Requirements:

1. The area where a sediment basin is to be constructed shall be cleared of vegetation.
2. Construct the inlets of sediment basins with a wide cross-section and a minimum grade to prevent turbulence and allow deposition of soil particles.
3. The minimum depth is 2'; the maximum depth is 6'.
4. The minimum width is 5'; the maximum width is 20'.
5. The minimum length is 25'; the maximum length is 200'.
6. The minimum volume shall be 1,815 CF per acre of drainage area.
7. Sediment basins shall remain in service until all disturbed areas draining into the structure have been stabilized.

8. When use of sediment basin is discontinued, backfill all excavations and compact fill. Fill material shall be removed and the existing ground restored to the original or plan grade.

C. Maintenance

1. When the depth of sediment reaches 1/3 of the depth of structure in any part of the pool, all accumulation shall be removed.
2. Removed sediment shall be disposed of in locations that the sediment will not erode into the construction areas or into natural waterways. The same holds true for excavated material removed during construction of the sediment basin.

## 3.10 TEMPORARY SEEDING AND MULCHING

A. General

1. This item is applicable to all projects.
2. Seeding and/or mulching shall be a continuous operation on all cut slopes, fill slopes, and borrow pits during the construction process. All disturbed areas shall be seeded and mulched within five (5) working days after the last construction activity in all locations where necessary to eliminate erosion.

B. Construction Requirements:

1. Permanent seeding and mulching following temporary seeding will be performed during the favorable seeding seasons only.
2. Temporary seeding mixtures and planting season:
   a. December 1 to March 1: 50 lbs. oat grain per acre
   b. March 1 to December 1: 50 lbs. (cereal rye or wheat) per acre
3. Temporary mulch, fertilizer, and lime for seeding:
4. Fertilizer and mulch for temporary seed mixtures shall be applied in accordance with Section 329200.
5. Fertilizer shall be applied at the rate specified for permanent seeding.
6. Lime will not be required for temporary seeding.

## 3.11 STRAW BALES

A. General

1. Install at the bottom of embankment slopes less than 10' high to divert runoff from sheet flow and intercept some of the sediment in the sheet flow.
2. Install as ditch checks in small ditches and drainage areas.
3. Install on the lower side of cleared areas to catch sediment from sheet flow.

B. Construction Requirements:

1. Bales of straw shall be utilized to control erosion, trap sediment, and divert runoff.
2. Bales must be adequately braced from behind.

## 3.12 SILT FENCE

A. General

1. Install along the toe of fills over 10' in height, along the right-of-way line, parallel to streams or around an inlet to prevent sediment from entering the pipe system.

B. General Requirements:

1. The Contractor shall install a temporary silt fence in locations shown on the drawings, around inlets that accept flows containing silt, and other locations necessary to prevent the discharge of silt from the site.
2. Installation shall conform to the detail at the end of this section.
3. Fence construction shall be adequate to handle the stress from hydraulic and sediment loading.

C. Installation

1. Geotextile at the bottom of the fence shall be buried as indicated on the detail.
2. The trench shall be backfilled and the soil compacted over the geotextile. The geotextile shall be spliced together as indicated on the detail.

D. Post Installation

1. Post spacing shall not exceed 8' for wire support fence installation or 5' for self-supported installations.
2. Posts shall be driven a minimum of 24" into the ground. Where rock is encountered, posts shall be installed in a manner approved by the Owner's Representative.
3. Closer spacing, greater embedment depth and/or wider posts shall be used in low areas, soft, or swampy ground to ensure adequate resistance to applied loads.
4. When support fence is used, the mesh shall be fastened securely to the upstream side of the post.
5. The mesh shall extend into the trench a minimum of 2" and extend a maximum of 36" above the original ground surface.
6. When self-supported fence is used, the geotextile shall be securely fastened to fence posts.

E. Maintenance

1. The Contractor shall maintain the integrity of silt fences as long as they are necessary to contain sediment runoff.
2. The Contractor shall inspect all temporary silt fences immediately after each rainfall. Inspect daily during prolonged rainfall.
3. The Contractor shall immediately correct deficiencies.
4. The Contractor shall make a daily review of the location of silt fences in areas where construction activities have changed the natural contour and drainage runoff to ensure that the silt fences are properly located for effectiveness.
5. Where a single fence is not adequate to handle the volume of silt or flows are not completely intercepted, additional silt fences shall be installed.
6. The Contractor shall remove and dispose of sediment deposits when the deposit approaches one-half the height of the fence.

7. The silt fence shall remain in place until the upstream surface is stabilized. Upon removal, the Contractor shall remove the silt fence, dispose of excess silt, and restore the disturbed area in accordance with Section 329200.

## 3.13 TEMPORARY PIPE

A. General:

1. The Contractor shall install temporary pipes and fill at locations, to be crossed by the Contractor's equipment, which carry a concentrated flow during rain events.

B. Construction Requirements:

1. All temporary pipes shall be installed in the same manner as permanent pipe is installed on the project to assure that the water does not cause erosion around the pipe.
2. Material to backfill the pipe should be placed in 6" lifts and mechanically compacted. Compaction testing will not be required.

## 3.14 SEDIMENT REMOVAL

A. General

B. Sediment deposits shall be removed when:

1. The deposits reach approximately one-half the height of a ditch check, straw bale barrier or silt fence.
2. The sediments have reduced the ponded volume of sediment basins to one-third of the original volume.
3. Requested by the Owner's Representative.

C. Sediment removed from erosion control features shall be deposited in a location where it will not erode into construction areas or watercourses.

## 3.15 CONCRETE WASHOUT

A. Inspect concrete washout containers to be inspected daily and after heavy rains for leaks, plastic lining and sidewall damage.

B. When washout container is filled to over 75% of its capacity, vacuum off washwater or allow it to evaporate. Remove cementitious solids after they have hardened.

C. Damage to washout containers should be repaired promptly.

D. Before heavy rains, lower liquid levels by vacuuming off or cover container to avoid overflows.

**END OF SECTION 312500**

# SECTION 321123
# AGGREGATE BASE COURSE

## PART 1 - GENERAL

### 1.1 SECTION INCLUDES

A. Section includes placing an aggregate base course consisting of a uniform mixture of graded materials on a prepared subgrade. The drawings specify the type of aggregate.

B. Drawings and General Provisions of Contract, including General and Special Conditions, apply to this section.

### 1.2 RELATED SECTIONS

A. Section 312313 – Subgrade Preparation

### 1.3 GENERAL

A. Work shall be in conformance with MoDOT 304.1 through 304.3.6.

## PART 2 - PRODUCTS

### 2.1 MATERIALS

A. Aggregate material shall conform to the following:

1. Type 1 Aggregate (Rolled Stone) MoDOT 1007.2
2. Type 5 Aggregate MoDOT 1007.3
3. Aggregate for Surfacing – Grade A or B MoDOT 1006
4. Non-Penetrated Macadam Base:
   a. Non-penetrated macadam base shall consist of sound, durable particles of limestone or dolomite, and shall not contain deleterious material such as shale or disintegrated stone in excess of 15 percent.
   b. The crushed stone shall have a percent of wear not to exceed 50 when tested in accordance with AASHTO 96-58(c) (Los Angeles Abrasion). Stone shall meet the following gradation requirements:

| | Percent |
|---|---|
| Passing 3" Square Sieve | 100 |
| Passing 2½" Square Sieve | 90 -100 |
| Passing 2" Square Sieve | 35 - 70 |
| Passing 1½" Square Sieve | 0 -15 |
| Passing ¾" Square Sieve | 0 - 5 |

B. Water shall be clean and free from acid, salt, oil, and other organic matter.

## PART 3 - EXECUTION

### 3.1 GENERAL

A. Placement of Aggregate for base shall be in accordance with MoDOT 304.3.3 through 304.3.6.

B. Placement of Aggregate for surfacing shall be in accordance with MoDOT 310.3 through 310.3.4.

**END OF SECTION 321123**

**SECTION 321300**
**PORTLAND CEMENT PAVING**

## PART 1 - GENERAL

### 1.1 SECTION INCLUDES

A. Construction of Portland Cement Concrete Flatwork

B. Drawings and General Provisions of Contract, including General and Special Conditions, apply to this section.

### 1.2 RELATED SECTIONS

A. Section 321373 – Concrete Pavement Joint Sealant

B. Section 032000 – Concrete Reinforcing

### 1.2 SUBMITTALS

A. Certifications

1. Manufacturer's Certification that materials meet specification requirements.
2. Ready Mix delivery tickets: ASTM C94

### 1.4 QUALITY ASSURANCE

A. Compressive strength testing per ASTM C94: by Owner

B. Thickness Tolerance per MoDOT 502.10: by Owner if desired

## PART 2 - PRODUCTS

### 2.1 MATERIALS

A. Forms and equipment shall conform to MoDOT 502.3 through 502.3.6

B. Curing compound shall conform to MoDOT 1055.

C. Joint Sealer for pavements shall conform to MoDOT 1057.5.

D. Joint Sealer for sidewalks and driveways shall conform to Section 32 13 73, Concrete Pavement Joint Sealer.

E. Detectable warning pads for sidewalk ramps shall be #2448REP (for 48" width), Safety Red Color as manufactured by ADA Solutions Inc., or approved equal.

F. Pre-formed fiber expansion joint filler shall conform to AASHTO M213

G. Portland cement concrete shall conform to MoDOT 501 and 1005 with the following modifications:

1. All portland cement concrete shall be air entrained with 6% (± 1%) minimum air content.
2. Do not use or include calcium chloride.
3. The allowable slump for pavement shall be 2.5 in.; for sidewalk shall be 2-4 in.; and for storm drainage structures shall be 4 in.
4. The minimum 28-day compressive strength requirements shall be 4,000 psi for Class A-1, B, B-1, B-2, and Pavement. Compressive strength shall be 3,000 psi for Seal Class.
5. Aggregate:

a. The combined maximum weight of flint and chert shall be 1% of the weight of coarse aggregate.

b. The maximum weight of lignite shall be 0.07% of the weight of the fine aggregate.

### 2.2 USE OF FLY ASH IN CONCRETE – MR SP-31

A. The Contractor may use fly ash in the concrete production in accordance with this specification.

B. General: Approved Class C fly ash may be used to replace a maximum of 25 percent of Type I or II cement on a pound for pound basis in all concrete, except concrete designed for high early strength. Fly ash shall not exceed 25 percent by weight of the total cementitious material (fly ash and cement).

C. Fly ash may replace Type III, IP, or I (PM) cement, provided the various classes of concrete meet or exceed the strength requirements.

D. All proportioning, air entraining, slump, maximum mixing water requirements, mixing, sampling, measurement of materials, transporting of concrete, and all materials except fly ash shall be in accordance with MoDOT 501.

E. All fly ash shall conform to MoDOT 1018, Fly Ash for Concrete.

F. When fly ash is used, an adjustment in design mix proportions will be required to correct the volume yield of mixture. The Contractor shall submit a copy of the mix design and a certification from the supplier the concrete meets the requirements of this specification and MoDOT 501 for all classes of concrete. Obtain the Owner's Representative approval prior to changing a mix design or proportions.

G. Base the maximum mixing water as specified in MoDOT 501 on total cementitious material. A sack or bag of cementitious material is ninety-four pounds. The quantity of mixing water in the concrete after proper allowance for aggregate absorption is the net quantity.

H. Special Requirements for the use of Fly Ash

1. Fly ash shall be stored in a separate enclosed storage silo during batching operations.

2. Measure the fly ash in the same manner and with the same accuracy as cement. If weighing the fly ash on the same scale beam with the weigh the cement separately first.

3. Consider fly ash in the same manner as cement when measuring mixing time.

4. When using an allowed commercial mixture of concrete that includes fly ash, the contractor shall notify the Owner's Representative of the class, source, and quantity of fly ash proposed in addition to the other requirements of MoDOT 501. The fly ash shall be from an approved source and the quantity shall not exceed 25%, by weight, replacement of cement.

## PART 3 - EXECUTION

### 3.1 GENERAL

A. Surface finish for pavement patches shall match the adjacent pavement. Sidewalks and driveways shall generally receive a light broom finish.

B. Control Joints:

1. Saw joints to the depth shown on the drawings and outlined in these specifications.

2. Saw control joints as soon as possible after the concrete has set, but no greater than 18 hours. Raveled joints are not acceptable.
3. Seal all driveway, parking lot, and sidewalk joints per Section 321373, Concrete Pavement Joint Sealant.
4. Seal street and highway pavement joints per MoDOT 502.5.4.

## 3.2 PAVEMENTS

A. Construction of pavements shall conform to MoDOT 502.4.1 through 502.7 and 502.9.

## 3.3 SIDEWALKS

A. Construction of sidewalks shall conform to MoDOT 608.1 through 608.3.8.

## 3.4 FIELD QUALITY CONTROL OF ROADWAYS (Not applicable to small patches)

A. As soon as practicable, thoroughly test the pavement surface by straightedging. The contractor in the presence of the Owner's Representative shall perform Straightedging.

B. Take pavement profiles 3 feet from and parallel to each edge of pavement, for pavements 11 feet wide. If pavement placement is greater than 11 feet wide, take profile 3 feet from and parallel to each edge and 3 feet to one side of each plan longitudinal joint.

C. All variations exceeding 1/8 inch in 10 feet will be plainly marked. Correct all areas more than 1/8 inch high.

## 3.5 SURFACE CORRECTIONS

A. Bump correction, smoothness correction, or both may be required.

B. Accomplish the corrective action to improve the average profile index by longitudinally diamond grinding or use of an approved device designed for that purpose. Do not use a bush hammer or other impact device.

C. The final surface of the corrected concrete pavement shall have a texture comparable to adjacent sections that do not require correcting. Satisfactory longitudinal grinding is acceptable as the final surface of the corrected pavements.

**END OF SECTION 321300**

# SECTION 321373
# CONCRETE PAVEMENT JOINT SEALANT

## PART 1 - GENERAL

### 1.1 SECTION INCLUDES

A. Section includes sealing control and expansion joints in concrete sidewalks, parking lots, and driveways.

B. Drawings and General Provisions of Contract, including General and Special Conditions, apply to this section.

### 1.2 WORK INCLUDED

A. Work under this section includes providing all labor, material, and equipment to seal the contraction, control, and expansion joints in concrete sidewalk, parking lot, and driveway pavements.

## PART 2 - PRODUCTS

### 2.1 EXPANSION JOINT MATERIAL

A. Expansion joint material shall be 1/2” thick, full depth, pre-molded non-bituminous joint material, with the top 1/2" perforated for removal prior to sealing operations.

### 2.2 JOINT FILLER

A. One or two component polysulfide polymer sealant or a one or two component polyurethane prepolymer sealant

B. Color: Gray

### 2.3 BACKER ROD

A. Closed cell polyethafoam sealant backer rod; sized as required

## PART 3 - EXECUTION

### 3.1 PREPARATION

A. Saw control joints in accordance with the drawings and specifications.

B. Seal joints following the sawing operation or as soon as possible thereafter.

### 3.2 GENERAL

A. Manufacturer's recommendations on the joint sealer shall be strictly adhered to with the following additions:

1. Leave joint sealant approximately 1/16" below the pavement surface level to prevent tracking.
2. Sprinkle fine silica sand, as needed, to reduce tracking of the joint sealer.

B. Maintain pedestrian traffic on sidewalks unless the Owner’s Representative authorizes closure. Prevent ANY tracking of the joint material.

1. The Contractor may close off one-half the sidewalk width to pedestrian traffic while sealant cures.
2. Contractor may place a board, notched on the bottom side, with the notch centered over the joint, and held securely in place with sandbags.

## 3.3 INSTALLATION

A. Remove the perforated portion of the expansion joint material prior to placing joint sealant.

B. Clean all loose material from the joints with compressed air.

C. In contraction joints, place a polyethylene foam sealant backer rod of 5/16" to 3/8" below the surface elevation of the sidewalk. Install the backer rod at uniform depth.

D. Install expansion and construction joint sealant to approximately 1/16" below the pavement's surface level.

**END OF SECTION 321373**

# SECTION 321723
# PAVEMENT MARKINGS

## PART 1 - GENERAL

### 1.1 SECTION INCLUDES

A. Section includes painting pavement marking of all types.

B. Drawings and General Provisions of Contract, including General and Special Conditions, apply to this section.

### 1.2 WORK INCLUDED

A. Cleaning and preparation of surfaces to receive paint striping with a high pressure water sprayer. Only the surfaces for striping require cleaning.

B. Painting in parking lines, safety zones, handicap zones, loading zones, no parking zones, in parking lots indicated on drawings.

C. Protecting adjacent surfaces from paint drips, spatters and over spray

D. Protect wet paint from vehicular and pedestrian traffic.

## PART 2 - PRODUCTS

### 2.1 PAINT

A. Paint for temporary striping shall be preformed pavement marking tape conforming to MoDOT 1048.4 or approved equal.

B. Paint shall be manufactured by Pratt and Lambert, Glidden, Cook, Sherwin-Williams, Pittsburgh, Benjamin Moore, or approved equal

C. Epoxy Pavement Marking material conforming to MoDOT 1048.60 or approved equal.

D. Acrylic Copolymer paint shall conform to MoDOT 1048.80 or 1048.90.

E. Latex Paint shall meet or exceed Federal Specification #1952B.

F. Paint type must be compatible with the surfaces to be painted.

### 2.2 COLORS

A. The Owners Representative will select color and finish from Contractor's submittal. Paint shall be applied per the following color code:

1. White: Parking space lines, stop bars, curbs, cross walks, and directional arrows
2. Yellow: Loading zones, safety zones, no parking zones, curbs, and median edges
3. Blue: Accessible parking lines and symbols
4. Red: Fire Lanes

### 2.3 MATERIALS

A. Materials shall include standard commercial grade masking materials, scrapers, cleaning solvents, and other materials required for the work.

B. Use only materials specified by manufacturer's direction label on container.

### 2.4 DELIVERY AND STORAGE

A. Deliver materials to the site in original containers with seals unbroken and labels intact.

B. Protect all paint from freezing.

C. Do not allow paint to settle, cake, or thicken in the container. Readily stir with a paddle to a smooth consistency.

D. Paint shall arrive on the job color-mixed except for tinting of undercoats and possible thinning.

E. The Contractor shall insure that all colors match the color selected by the Owner's Representative prior to application.

## PART 3 - EXECUTION

### 3.1 PROTECTION

A. Prior to beginning cleaning or painting operations, Contractor shall protect all items or surfaces not included in area to be painted. Protect vehicles, equipment, structures, or other items from paint spatters, over spray, or damage.

B. Contractor shall provide fencing, barricades, signage, and other devices to protect all painted areas from pedestrian and vehicular traffic until achieving sufficient drying time.

### 3.2 JOB CONDITIONS

A. Paint immediately after final surfacing for concrete pavements and no earlier than 30 days after on asphaltic concrete paving unless instructed otherwise by the Owner’s Representative.

B. Adequate illumination shall be available.

C. Carefully examine surfaces to receive paint for defects, which might prevent satisfactory striping results.

D. Do not paint over rust, scale, grease, oil, fuel, dust, moisture, or conditions otherwise detrimental to paint adhesion.

E. Remove grease, oil, or fuel on any surface before painting.

F. Correct all surface defects before painting.

G. Contractor shall examine areas to be painted. Notify the Owner's Representative in writing of conditions that might delay timely completion of the work.

### 3.3 WEATHER CONDITIONS

A. Painting shall not be performed when the ambient temperature is less than 55°F., while the surface is damp, or in rain.

B. The surface must be five degrees or more above the dew point temperature during painting operations **and** while paint is drying.

C. Avoid painting surfaces exposed to direct sunlight.

### 3.4 APPLICATION

A. Concrete areas to be painted shall receive one coat of paint not less than 20 mils thickness wet per MoDOT 620.9 through 620.9.3.4.2.

1. Fresh asphalt shall receive an initial coat of 8 mils at 30-days and a second coat of 12 mils after 60-days.

2. In locations requiring multiple coats, prior coat shall be dry to manufacturer's recommendations before applying succeeding coat.

B. Installation of Preformed Pavement marking tape shall conform to MoDOT 620.10

1. Finished work shall be uniform, of approved color, free of runs, drips, defective brushing, spraying, and clogging.

2. Parking lines and symbols shall be neat and well defined.

3. Only skilled applicators shall apply paint.

C. Installation of Thermoplastic Decorative Crosswalks shall conform to the Manufacturer’s Instructions

D. Owner’s Representative shall approve application techniques.

## 3.5 QUALITY CONTROL

A. Remove paint splatter from adjacent areas or areas not designated to receive paint.

B. Contractor shall repair or touch up any surfaces if exposed to vehicular and pedestrian traffic, to the satisfaction of the Owner's Representative, at no additional cost to the Owner.

C. When color, dirt, stains, existing paint, etc., show through the final coat, repaint the surface until the film is uniform in finish, coverage, color, and appearance.

**END OF SECTION 321723**

# SECTION 323113
# CHAIN LINK FENCES AND GATES

## PART 1 - GENERAL

### 1.1 SECTION INCLUDES

A. Fence framework, fabric, and accessories

B. Excavation for post bases, concrete foundation for posts, and center drop for gates

C. Manual gates and related hardware

D. Drawings and General Provisions of Contract, including General and Special Conditions, apply to this section.

### 1.2 REFERENCES

A. ASTM A121 - Zinc-coated (galvanized) steel barbed wire

B. ASTM A123 - Zinc (hot dip galvanized) coatings on iron and steel products

C. ASTM A153 - Zinc coating (hot dip) on iron and, steel hardware

D. ASTM A392 - Zinc-coated steel chain link fence fabric

E. ASTM A428 - Weight of coating on aluminum-coated iron or steel articles

F. ASTM A446 - Steel sheet, zinc-coated (galvanized) by the hot-dip process, structural (physical quality)

G. ASTM A491 - Aluminum-coated steel chain link fence fabric

H. ASTM A569 - Steel, carbon (015 maximum percent), hot-rolled sheet and strip commercial quality

I. ASTM C94 - Ready-mixed concrete

J. ASTM F567 - Installation of chain link fence

K. ASTM F668 - Poly vinyl chloride (PVC) coated steel chain link fence fabric

L. ASTM F669 - Strength requirements of metal posts and rails for industrial chain link fence

M. ASTM F1083 - Pipe, steel, hot-dipped zinc-coated (galvanized) welded, for fence structures

N. ASTM F1234 - Protective coatings in steel framework for fences

O. Chain Link Fence Manufacturer's Institute (CLFMI) - Product manual

### 1.3 SYSTEM DESCRIPTION

A. Fence Height: As Provided by Owner

B. Line Post Spacing: At intervals not exceeding 10 feet

C. Fence Post and Rail Strength: Conform to ASTM F669 Light Industrial Fence quality

### 1.4 METHOD OF MEASUREMENT AND BASIS OF PAYMENT

A. Fencing under this project shall be measured and paid for by the linear foot including all posts, rails, tension wire, fabric, gates, accessories, and attachments.

## PART 2 - PRODUCTS

### 2.1 MATERIALS

A. As Provided by Owner

### 2.2 COMPONENTS

A. As Provided by Owner

### 2.3 FINISHES

A. As Provided by Owner

### 2.4 ACCESSORIES

A. As Provided by Owner

## PART 3 - EXECUTION

### 3.1 INSTALLATION

A. Install framework, fabric, accessories, and gates in accordance with ASTM F567 and manufacturer's instructions

B. Place fabric on inside of posts and rails

C. Set intermediate, terminal, and gate posts plumb, in concrete footings with top of footing 6 inches below finish grade. Slope top of concrete for water runoff.

D. Line Post Footing Depth Below Finish Grade: ASTM F567 3 feet.

E. Corner, Gate and Terminal Post Footing Depth below Finish Grade: ASTM F567 3.5 feet

F. Brace each gate and corner post to adjacent line post with horizontal center brace rail and diagonal truss rods Install brace rail one bay from end and gate posts.

G. Provide top rail through line post tops and splice with 6-inch long rail sleeves.

H. Install center and bottom brace rail on corner gate leaves.

I. Do not stretch fabric until concrete foundation has cured 28 days or to a minimum of 2,500 psi.

J. Stretch fabric between terminal posts or at intervals of 100 feet maximum, whichever is less.

K. Position bottom of fabric 2 inches above finished grade.

L. Fasten fabric to top rail, line posts, braces, and bottom tension wire with tie wire at maximum 15 inches on centers.

M. Attach fabric to end, corner, and gate posts with tension bars and tension bar clips.

N. Install bottom tension [wire] or [strap] stretched taut between terminal posts.

O. Install support arms sloped outward and attach barbed wire; tension and secure.

P. Do not attach the hinged side of gate from building or structure wall; provide gate posts.

Q. Install gate with fabric and barbed wire overhang to match fence. Install two L< 60" height, 3 for > 60" height) hinges per leaf, latch, catches, drop bolt retainer and locking clamp.

R. Provide concrete center drop to footing depth and drop rod retainers at center of double gate openings.

## 3.2 ERECTION TOLERANCES

A. Maximum Variation from Plumb: 1 inch.

B. Maximum Offset from True Position: 2 inch.

C. Components shall not infringe abutting property lines.

**END OF SECTION 323113**

# SECTION 329200
# TURF RESTORATION

## PART 1 - GENERAL

### 1.1 WORK INCLUDED

A. Work includes providing material, labor, and equipment necessary to restore all disturbed areas to original or better than original condition, including soil preparation, fertilizing, liming, seeding, and mulching.

B. Drawings and General Provisions of Contract, including General and Special Conditions, apply to this section.

### 1.2 GENERAL

A. Fertilize, seed, and mulch all disturbed areas except surfaced areas, solid rock, and slopes consisting primarily of broken rock.

B. Protect all disturbed or regraded swales and ditch lines with Type 2 Erosion Blanket, whether or not noted on the plan drawings.

1. Bank slope of 3:1 or flatter: Protect to 1' above flow line.

2. Bank slopes greater than 3:1: Protect to the top of bank.

C. Protect other areas with Erosion Control Blanket as noted on the plan drawings. Type 2 Erosion Control Blanket shall be the default if not otherwise identified.

### 1.03 SUBMITTALS

A. Erosion Control Blanket: Submit Product Data Sheets, Product Netting Information, Staple Pattern Guidelines, Manufacturing Material Specifications, and Manufacturing Certifications.

## PART 2 - PRODUCTS

### 2.1 LIME

A. Material for soil neutralization shall be agricultural lime with not less than 90 percent passing the No. 8 sieve and containing at least 65 percent calcium carbonate equivalent.

B. Lime application rate shall provide at least 800 pounds per acre. The quality of material required to provide the specified pounds of effective neutralizing material per acre shall be determined from the producer or distributor’s certification of analysis furnished by the Director of the Missouri Agriculture Experiment Station, Columbia, Missouri in accordance with the Missouri Agricultural Liming Materials Act.

### 2.2 FERTILIZER

A. Fertilizer shall be a standard commercial product. Material shall supply 9-12 pounds of actual nitrogen (N), per 1,000 square feet with 10-13 percent phosphorous and 7-12 percent potassium, by weight.

B. Owner may accept material based on bag label analysis, supplier’s certification, or based on samples tested in the laboratory.

C. Tolerances for samples tested in the laboratory: Nominal composition shown by label or certification of –10 percent up to the maximum of two units (2% plant food) for the individual constituents, and –3 percent for the sum of the constituents.

D. There is no limit on the plus tolerances for such samples.

## 2.3 SEED

A. U.S. Department of Agriculture rules and regulations under the Federal Seed Act apply to seed labeling. Seed shall comply with the requirements of the Missouri Seed Law. The following percentages for purity and germination will be the minimum requirements in the acceptance of seed, unless otherwise permitted by the Owner's Representative.

| | Purity | Germination Including Hard Seed | Maximum % Weed Seed |
|---|---|---|---|
| Perennial Rye | 98% | 85% | 1.00 |
| Redtop | 92% | 85% | 2.00 |
| Bluegrass | 98% | 85% | 1.00 |
| Turf Type Tall | 97% | 85% | 2.00 |
| Red Fescue | 97% | 85% | 1.00 |

Does not apply if unhulled or unscarified seed is specified

B. No reduction will be permitted in the specified quantity of seed if the purity or germination, or both, are higher than the minimum required by the specifications.

C. Inoculate or treat Red Clover seed with the proper quantity of cultures approved for the legume seed.

D. The inoculant for treating leguminous seed shall be a pure culture of nitrogen-fixing bacteria. The containers of the inoculant shall be plainly marked with the expiration date for use and the manufacturer's directions for inoculating seed.

E. The process for inoculation shall be in accordance with the manufacturer's directions for the particular species of legume. The time lapse for sowing the seed following inoculation shall not exceed 24 hours.

1. If using hydraulic slurry seeding, use a quantity of inoculant equal to five times the normal rate required to inoculate only the legume seed. Place inoculant directly into the slurry and thoroughly mixed immediately before seeding.
2. If other than the hydraulic slurry method is used, the Contractor may inoculate the legume seed at the normal rate if sowing alone or if inoculating the legume seed prior to mixing with other seed.
3. Inoculate a seed mixture, which contains a legume not inoculated prior to mixing and not seeded by the slurry method, with sufficient inoculant to cover all seed.

F. Seed Mixture: The pure live grass seed mixture:

| Type | Rate (# per 1,000-sf) | Percent by Weight |
|---|---|---|
| Turf Type Tall Fescue | 10 | 67.67 |
| Bluegrass | 3 | 20 |
| Redtop | 1 | 6.67 |
| Red Fescue | 1 | 6.66 |
| TOTAL | 15 | 100 |

Use the following formula to determine the amount of commercial seed required to provide in each kind of seed the specified quantities of pure live seed

$$\frac{\text{Pure Live Seed} \times 100 \times 100}{\text{Purity} \times \text{Germination}} = \text{Pounds Seeds Required}$$

## 2.04 TYPE 1 MULCH

A. Type 1 Mulch (vegetative mulch) shall be the cereal straw from stalks of oats, rye, wheat, or barley.

B. The straw shall be free of prohibited weed seed defined in the Missouri Seed Law. Straw shall be relatively free of all other noxious and undesirable seed.

C. The straw shall be clean and bright, relatively free of foreign material, and be dry enough to spread properly.

D. If the Contractor cannot meet the above straw specification, the Owner's Representative may approve substituting the foliage of the following plants.

1. Smooth brome, timothy, orchard grass, reed canary grass, tall fescue, red top, millet, blue stem, Indian grass, alfalfa, birdsfoot trefoil, and vetch.

2. Take the foliate from areas of current season's growth with relatively pure stands of plants.

E. The straw shall be relatively free of noxious and undesirable seed and foreign material.

## 2.05 EROSION CONTROL BLANKET

A. Type 1 Erosion Control Blanket: S150BN by North American Green, AEC Premier Straw Double Net by American Excelsior Co., or approved equal.

B. Type 2 Erosion Control Blanket: SC150BN by North American Green, AEC Premier Straw/Coconut by American Excelsior Co., or approved equal.

C. Type 3 Erosion Control Blanket: C125BN by North American Green, Curlex II (.98) by American Excelsior Co., or approved equal.

D. Staples: Staples for erosion control blanket shall meet the installation requirements of the manufacturer.

1. Type 1, Type 2, Type 3 Erosion Control Blanket: Staples shall be at least No. 11 gage, or heavier, ungalvanized steel wire, "U"-shaped, with approximately a 1" or larger crown, and have a length of not less than 6".

2. Type 1 Erosion Control Blanket: 6" BioStake (North American Green), 6" E-Staple (American Excelsior Co.) or equal may be substituted for wire staples.

# PART 3 - EXECUTION

## 3.1 FERTILIZING

A. The seedbed shall be prepared by placing lime and fertilizer. The area shall have a uniform surface free from rills, washes, and depressions.

B. The soil shall be thoroughly broken up, worked, tilled, and loosened to a minimum depth of two inches.

C. The seedbed shall be prepared by loosening the existing soil on the slope, rather than by the addition of loose soil.

D. Lime and fertilizer shall be applied evenly and only when the soil is in a tillable condition.

E. After application, mix the lime and fertilizer into the soil by disking, harrowing, or raking to a minimum depth of two inches unless applied hydraulically on slopes steeper than 2:1.

F. Apply the lime and fertilizer separately or incorporate into the soil in one operation.

G. Apply lime and fertilizer not more than 48 hours before sowing the seed.

## 3.2 SEEDING

A. The seedbed shall be prepared, to provide a firm but uncompacted condition with a relatively fine texture at the time of seeding.

B. During the months of March through May, and September apply all lime, fertilizer, seed, and mulch at the specified rates. During the months of January, February, June, July, August, October, November, and December, modify the rates as follows:

1. Lime: 100 percent of the specified quantity.
2. Fertilizer: 75 percent of the specified quantity.
3. Seed: 50 percent of the specified quantity.
4. Mulch: 100 percent of the specified quantity.

C. Seeding shall be done before the proposed seedbed becomes eroded, crusted over, or dried out and shall not be done when the ground is in a frozen condition or covered with snow.

D. When making partial application during January, February, June, July, August, October, November, or December, apply the remainder of the fertilizer plus 75 percent of the specified quantity of seed by over seeding during September or March.

E. Uniformly apply seed at the rates specified. Make provisions by markers or other means to insure that the successive seeded strips will overlap or separated by a space no greater than the space left between the rows planted by the equipment used.

F. If inspection during the seeding operations indicate strips wider than the space between rows planted are unplanted, plant additional seed on these areas.

G. Hydraulic Seeding and Fertilizing:

1. In lieu of mechanical application of seed and fertilizer, hydraulic application may be used.
2. On slopes steeper than 2:1, or when applying seeding to a previously seeded and mulched area, apply the seed and fertilizer hydraulically and in a single operation. Incorporation into the soil is not required.
3. On all other slopes, the Contractor may apply seed and fertilizer hydraulically provided the seed and fertilizer incorporated into the soil in separate operations.
4. Raking will not be required when seeding a previously seeded and mulched area.
5. Mix seed and fertilizer, separately or in combination with water, constantly agitated, so hydraulically applying a uniform mixture to the specified areas.

6. Calculate the ratio of seed and fertilizer to water by determining the number of square feet covered by a given quantity of water.
7. Do not add the seed to the water more than four hours before application.

H. Dry Seeding: Install dry seed mechanically with equipment designed for even distribution. The equipment may be hand operated, such as knapsack seeder, or be tractor-drawn, such as seed drill. On previously seeded and mulched area do not use tractor-drawn equipment.

1. Cover seed scattered on the surface with approximately ¼" of soil by raking or other approved methods. Raking will not be required when seeding a previously seeded and mulched area.
2. Seed placed in the soil shall be approximately ¼" below the surface.
3. If the seedbed is loose or contains clods which would reduce the germination of the seed, the Contractor shall firm the area by rolling
    a. When rolling is required, use a lawn-type roller and avoid over-compaction of the soil.

## 3.3 TYPE 1 MULCHING

A. Apply Type 1 Mulch (vegetative) at the rate of 2½ tons per acre.

B. Distribute mulch evenly over the required area within 24 hours of the seeding operation.

C. Following the mulching operation, take precautions to prohibit foot or vehicular traffic over the mulched area.

D. Replace displaced mulch at once.

1. Repair damaged limed, fertilized, or seedbed prior to mulching.

## 3.4 EROSION CONTROL BLANKET

A. Site Preparation:

1. Install erosion control blanket on subgrade that has been properly compacted, graded smooth, has no depressions, voids, soft or uncompacted areas, is free from obstructions such as tree roots, protruding stones or other foreign matter, and is seeded and fertilized according to this specification.
2. Contractor shall fine grade the subgrade by hand dressing where necessary to remove local deviations.
3. No vehicular traffic shall be permitted directly on the erosion control blanket.

B. Slope Installation

1. Install erosion control blanket in accordance with the manufacturer’s instructions.
2. Erosion control blanket shall be orientated in vertical strips and anchored with staples. Adjacent strips shall be overlapped to allow for installation of a common row of staples that anchor through the nettings of both blankets. Horizontal joints between erosion control blankets shall be sufficiently overlapped with the uphill end on top for a common row or staples so that the staples anchor through the nettings of both blankets.
3. Where exposed to overland sheet flow, a trench shall be located at the uphill termination. Erosion control blanket shall be stapled to the bottom of the trench. The

trench shall be backfilled and compacted. Where feasible, the uphill end of the blanket shall be extended three feet over the crest of the slope.

4. Slope erosion control blanket shall be overlapped by the channel erosion control blanket sufficiently for a common row of staples to anchor through the nettings of both blankets when terminating into a channel.

C. Channel Installation

1. Install erosion control blanket in accordance with the manufacturer's instructions.
2. Erosion control blanket shall be installed parallel to the flow of water. The first roll shall be centered longitudinally in mid-channel and anchored with staples. Subsequent rolls shall follow from channel center outward and be overlapped to allow installation of a common row of staples so that the staples anchor through the nettings of both blankets.
3. Successive lengths or erosion control blanket shall be overlapped sufficiently for a common row of staples with the upstream end on top. Staple the overlap across the end of each of the overlapping lengths so that staples anchor through the netting of both blankets.
4. A termination trench shall be located at the upstream termination. Erosion control blanket shall be stapled to the bottom of the trench. The trench shall be backfilled and compacted.

**END OF SECTION 329200**

# SECTION 330513
# GRADE ADJUSTMENT OF STRUCTURES

## PART 1 – GENERAL

### 1.1 SECTION INCLUDES

A. Adjustment of manhole frames and lids, catch basin and inlet frames and grates, valve boxes, and other structures designated to remain.

B. Drawings and General Provisions of Contract, including General and Special Conditions, apply to this section.

### 1.2 GENERAL

A. Adjust manhole and catch basin frames and covers, catch basin openings and drop inlets to match new, finished grades in accordance with the drawing details.

B. The quality of materials and workmanship shall conform to the applicable section of these specifications for each class of work necessary.

C. It is the intent of the Drawings and Specifications that the work will not conceal any storm drainage inlet, manhole, cleanout, valve box, or other utility structure unless specifically noted on the drawings.

D. All items under this section are to be adjusted to match the finished surfaces whether noted or not on the drawings.

E. If the Contractor finds a structure not addressed by the drawings, he shall request instructions from the Owner's Representative.

## PART 2 - PRODUCTS

### 2.1 MATERIALS

A. Materials used to adjust structures shall include grade adjustment rings as manufactured by Neenah, Deeter, or Clay and Bailey.

B. Utilize materials as specified in the applicable specification for new construction for other types of adjustment.

## PART 3 - EXECUTION

### 3.1 INSTALLATION

A. Install cast iron grade adjustment rings in accordance with the manufacturer's instructions.

B. Make adjustment of other structures in accordance with the applicable specification for new construction.

**END OF SECTION 330513**

**SECTION 330516**
**MANHOLES AND STUCTURES**

## PART 1 - GENERAL

### 1.1 SECTION INCLUDES

A. Provisions and installation of formwork, reinforcing steel, and cast-in-place concrete detailed and described on the drawings and hereinafter specified for exterior site and utility structures.

B. Provision and installation of all related items described on the drawings or hereinafter specified.

C. Drawings and General Provisions of Contract, including General and Special Conditions, apply to this section.

### 1.2 QUALITY ASSURANCE

A. Standards and Codes: Comply with the provisions of the following Codes, Specifications, and Standards except as otherwise indicated.

1. ACI 211.1 - Recommended Practice for Selecting Proportions for Normal Weight Concrete
2. ACI 301 - Specification for Structural Concrete for Buildings
3. ACI 304 - Recommended Practice for Measuring, Mixing, Transporting, and Placing Concrete
4. ACI 305 - Recommended Practice for Hot Weather Concreting
5. ACI 306 - Recommended Practice for Cold Weather Concreting
6. ACI 318 - Building Code Requirements for Reinforced Concrete
7. ACI 347 - Recommended Practice for Concrete Formwork
8. CRSI - Manual of Standard Practice
9. CRSI - Recommended Practice for Placing Reinforcing Bars
10. CRSI - Recommended Practice for Placing Bar Supports, Specifications, and Nomenclature
11. CRSI - Recommended Practice for Reinforcing Bar Splices
12. ASTM A82 - Standard Specifications for Cold-Drawn Steel Wire for Concrete Reinforcement
13. ASTM A185 - Welded Steel Wire Fabric for Concrete Reinforcement
14. ASTM A615 - Deformed and Plain Billet Steel Bars for Concrete Reinforcement
15. AWS D12.1 - Welding Reinforcing Steel, Metal Inserts, and Connections in Reinforced Concrete Construction
16. ASTM C33 - Concrete Aggregates
17. ASTM C94 - Ready-Mixed Concrete
18. ASTM C150 - Portland Cement
19. ASTM C171 - Sheet Materials for Curing Concrete

20. ASTM C231 - Test Method for Air Content of Freshly Mixed Concrete by the Pressure Method
21. ASTM C260 - Air Entraining Admixtures for Concrete
22. ASTM C309 - Liquid Membrane - Forming Compounds for Curing Concrete
23. ASTM C494 - Chemical Admixtures for Concrete
24. AASHTO M 182 - Specification for Burlap Cloth made for Jute or Kenaf

B. Workmanship: The Contractor is responsible for correction of concrete work, which does not conform to the specified requirements, including strength, tolerances, and finishes.

C. Tests for Concrete Materials
   1. The Owner’s Representative may perform concrete material evaluation testing at any time during the process of the work.
   2. The Contractor shall allow the Owner's Representative free access to material stockpiles and facilities at all times.

D. Concrete Quality Control Testing During Construction
   1. The Owner or his representative may retain an independent certified testing laboratory to perform quality control tests.
   2. Concrete will generally be sampled and tested for quality control during the placement of concrete as follows:
      a. Sampling Fresh Concrete: Secure composite samples in accordance with ASTM C172
      b. Slump: One test on concrete taken at point of discharge, per ASTM C143, for each set of compressive strength test specimens
      c. Air Content: One for each set of compressive strength test specimens per ASTM C231, pressure method
      d. Compressive Test Specimen: ASTM C31, one set of three standard cylinders for each compressive strength test, unless otherwise directed
      e. Compressive Strength Tests: ASTM C39, one set for each 100 cubic yards or fraction thereof, of each concrete class placed in any one day or for each 5,000 sq. ft. of surface area placed.
      f. One specimen tested at seven days and two specimens tested at 28 days.
   3. When the strength of field-cured cylinders is less than 85% of companion laboratory-cured cylinders, evaluate current operations and provide corrective procedures for protecting and curing the in-place concrete.
   4. The Contractor shall notify the Owner's Representative 48 hours in advance of each placement of concrete in order that concrete tests may be scheduled.
   5. Additional Tests: Additional tests of in-place concrete may be required when test results indicate the structure has not attained the specified concrete strengths and other characteristics.
      a. Tests to determine the adequacy of the concrete shall be by cored cylinders complying with ASTM C42 or by other methods as directed.

b. If testing verifies unacceptable concrete, the Contractor shall pay for such tests conducted, and any other additional testing as may be required.

### 1.3 SUBMITTALS

A. Manufacturer's Data: For information only, submit manufacturers data and instructions for proprietary materials and items, including reinforcement and accessories, admixtures, patching compounds, joints systems, and others.

B. Submit shop drawings for precast structures.

1. Submit shop drawings for fabrication, bending, and placement of concrete reinforcement. Comply with the CRSI Manual of Standard Practice showing bar schedules, stirrup spacing, diagrams of bent bars, and arrangements of concrete reinforcement. Include special reinforcement required at openings through concrete.

2. Accompanying the shop drawings, submit steel producers certificates of mill analysis, tensile and bend tests for reinforcing steel.

C. Certificates of Compliance: Submit certificates of material properties and compliance with specified requirements to the Owners Representative. Materials producer and the Contractor must sign certificates of compliance.

## PART 2 - PRODUCTS

### 2.1 FORM MATERIALS

A. Forms may be of wood, plywood, concrete-form-grade hardboard, metal, or other acceptable material, which will produce smooth, true surfaces.

1. Provide lumber dressed on at least two edges and one side of tight fit.

2. Metal forms shall have smooth surfaces free from any pattern, irregularities, dents, and sags.

B. Provide commercial form-coating compounds that will not bond with, stain, or adversely affect concrete surfaces. Compound may not impair subsequent treatments of concrete surfaces requiring bond or adhesion, nor impede wetting of surfaces to be cured with water or curing compound.

C. Form Ties

1. Factory-fabricated, adjustable-length, removable or snap-off metal form ties, designed to prevent form deflection, and to prevent spalling concrete surfaces upon removal

2. For concrete that will be exposed, provide ties so portion remaining within concrete after removal is at least 1-½" inside concrete

3. Unless otherwise shown, provide form ties that will not leave holes larger than one inch in diameter in concrete surfaces

### 2.2 REINFORCING MATERIALS

A. Reinforcing bars

1. ASTM A615: 60-ksi yield grade, plain finish

2. ASTM A36 - For tie rods, turn buckles, plates, and nuts

B. Steel Wire: ASTM A82, plain, cold-drawn steel

C. Welded Wire Fabric (WWF): ASTM A185, plain finish; 12” maximum wire spacing

1. Use WWF 6x6-W4.0xW4.0 unless otherwise noted.

D. Supports for Reinforcement: Provide wire bar-type supports for reinforcement including bolsters, chairs, spacers, and other devices for spacing, supporting, and fastening reinforcing bars and welded wire fabric in place. All devices shall be plastic-coated or hot-dipped galvanized steel, sized and shaped as required.

## 2.3 CONCRETE MATERIALS

A. Portland Cement: ASTM C150, Type 1

B. Aggregate: Fine and coarse aggregate for concrete shall comply with ASTM-33 (Concrete Aggregate).

1. Maximum aggregate size: Not larger than one-fifth of the narrowest dimension between sides of forms, one-third of the depth of slabs, nor three-fourths of the minimum clear spacing between individual reinforcing bars or bundles of bars.

2. The combined maximum weight of flint and chert shall be 1% of the weight of coarse aggregate.

3. The maximum weight of lignite shall be 0.07% of the weight of the fine aggregate.

C. Water: Clean, potable, and free from injurious amount of oil, acid, alkali, organic matter or other deleterious substances.

D. Admixtures

1. Air-entraining: ASTM C260

2. Water-reducing: ASTM C494, Type A

3. Apply water-reducing agents at the dosage rates recommended by the manufacturer. Absolutely no chlorides are permitted.

## 2.4 RELATED MATERIALS

A. Curing compound shall meet the moisture retention requirements of ASTM C309. The compound shall be Kure-N-Seal, produced by Sonneborn Building Products Division, or Masterseal, produced by Master Builders, or approved equal

B. Concrete repair compound: Sonopatch, produced by Sonneborn Building Products Division, or Embeco 411 Mortar, produced by Master Builders, or approved equal

C. Preformed joint filler shall be Sonoflex F, produced by Sonneborn, or approved equal

D. Joint sealant compound for slab control joints shall be Brutem 93, produced by Master Builders, or approved equal

E. Joint sealant compound for interior expansion joints shall be Brutem 92, produced by Master Builders, or approved equal

F. Non-shrink grout shall be Embeco 636, produced by Master Builders, or approved equal

G. Vapor barrier 6-mil polyethylene film

H. Sealer / Hardner: Surface Hardner shall be natural aggregate type and be Master Cron, produced by Master Builders, or approved equal

## 2.5 PROPORTIONING AND DESIGN OF MIXES

A. Proportion mixes by the Laboratory Trial Batch Method. Use materials employed on the project for each class of concrete required. Comply with ACI 211.

1. Required 28-day compressive strength of all concrete is 4000 psi.
2. Slump: 2" to 4"

B. Laboratory Trial Batches:

1. The Contractor shall retain an independent testing facility or concrete plant, accepted by the Owner's Representative, to select concrete mix proportions.
2. Test specimens shall be prepared in accordance with ASTM C192.
3. Conduct strength tests in accordance with ASTM C39, specified in ACI 301.

C. Submit written test reports, to the Owner's Representative, for each proposed mix for each class of concrete, at least 15 days prior to start of work. Do not begin concrete production until the Owner's Representative has accepted mixes.

D. Adjustment to Concrete Mixes: The Contractor may propose mix design adjustments when characteristics of materials, job conditions, weather, test results or other circumstances, warrant. The Owner's Representative must accept the test data for revised mix designs and strength results before using in the work.

E. Use air-entraining admixture in exterior exposed concrete or structures and slabs exposed to freezing and thawing. Add air-entraining admixture at the manufacturers prescribed rate to result in concrete at the point of placement having air content within the following limits:

1. 1" Aggregate Concrete Mix: 4% to 5%
2. ¾" Aggregate Concrete Mix: 6% to 7%
3. ½" Aggregate Concrete Mix: 7% to 8%

F. The Contractor may use water-reducing agents as determined by the mix design organization subject to the approval of the Owner's Representative.

## 2.6 CONCRETE MIXING

A. Ready-Mix Concrete: Comply with the requirements of ASTM C94, and as specified herein. Do NOT add water to the batch.

B. During hot weather or under conditions contributing to rapid setting of concrete, a shortened mixing time than specified in ASTM C94 may be required.

C. When the air temperature is between 85°F and 90°F, reduce the mixing and delivery time, from 90 minutes to 75 minutes. When the air temperature is above 90°F, reduce the mixing and delivery time to 60 minutes.

# PART 3 - EXECUTION

## 3.1 FORMS

A. Design, erect, brace, and maintain formwork to support the applied vertical and lateral loads. Maintain until the concrete structure can support the loads. Construct formwork

so the concrete members and structures are the correct size, shape, alignment, elevation, and position.

B. Design formwork to be readily removable without impact, shock, or damage, to the cast-in-place concrete surfaces and adjacent materials.

C. Chamfer exposed corners and edges using wood, metal, PVC, or rubber chamfer strips, fabricated to produce uniform smooth lines and tight edge joints.

D. Accurately place and secure in position, prior to placing concrete, all anchors, bolts, inserts, and other items to be embedded in concrete; including items furnished under other sections of the Specification and for other contractors on the project.

E. Provide openings in concrete formwork to accommodate work of other trades. Determine size and location of openings, recesses, and chases from those trades involved.

F. Do not use earth cuts as a form for vertical surfaces, without the written approval of the Owner's Representative.

G. Thoroughly clean forms and adjacent surfaces to receive concrete. Remove chips, wood, sawdust, dirt, or other debris just before placing concrete.

H. Retighten forms after concrete placement if required to eliminate mortar leaks.

## 3.2 PREPARATION OF FORM SURFACES

A. Coat the contact surfaces of forms with a form-coating compound before placing reinforcement.

B. Thin form coating compounds only within thinning agent of type, and in amount, and under the conditions of the form-coating compound manufacturers directions. Do not allow excess form-coating material to accumulate in the forms or contact concrete surfaces against, which fresh concrete is to be placed. Apply in compliance with manufacturer's instructions.

C. Coat steel forms with non-staining, rust preventative form oil or otherwise protect the surfaces against rusting. Rust-stained steel formwork is not acceptable.

## 3.3 REMOVAL OF FORMS AND TEMPORARY BRACING

A. Formwork not supporting concrete, such as sides of wall, beams, and similar parts of the work, may be removed after curing at not less than 50°F for 24 hours after placing, provided:

1. Concrete is sufficiently hard to not be damaged by form removal operations.

2. Maintain curing and protection operations

B. Formwork supporting weight of concrete, such as beams and slabs, shall not be removed until:

1. The concrete has attained 75% of the minimum 28-day strength, or

2. 14 days has passed since pouring the concrete.

## 3.4 REUSE OF FORMS

A. Clean and repair surfaces of forms to reuse in the work. Split, frayed, delaminated, or otherwise damaged form facing material is not acceptable. Apply new form coating compound material to concrete contact form surfaces as specified for new formwork.

B. When extending forms for successive concrete placement, thoroughly clean surfaces, remove fins and laitance, and tighten forms to close joints. Align and secure joints to avoid offsets. Do not use patched forms for exposed concrete surfaces.

## 3.5 REINFORCING

A. Fabricate and place to shapes and dimensions indicated or required to carry out intent of the drawings and Specifications.

B. Clean off rust, ice, or other coatings that would reduce bond. Do not use reinforcing steel reduced in section.

C. The Contractor may NOT field bend bars without the Owner's Representative permission.

D. Tagging shall be with metal, linen, or rope fiber tags filled in with machine or waterproof ink. Do NOT use paper tags.

## 3.6 PLACEMENT OF REINFORCING

A. Accurately place all reinforcing steel as shown on the drawings. Fasten rigidly so that the construction operation cannot displace the steel.

B. The minimum cover of concrete for all reinforcement shall conform to the drawing dimensions. Cover is the clear distance from the edge of the reinforcement to the concrete surface. Where not otherwise specified, the minimum coverage of the concrete over the steel shall be as follows:

| | |
|---|---|
| 1. Concrete cast against and permanently exposed to earth | 3 inches |
| 2. Formed concrete exposed to earth or weather | 2 inches |
| 3. Concrete in beams and columns not exposed to ground or weather | 1-½ inches |
| 4. Concrete slabs and walls not exposed to weather | 1 inch |

C. Lap splices as shown on the drawings. Those not shown shall have a minimum lap of 30 bar diameters.

D. All reinforcing steel, including welded wire mesh, shall be accurately located and held in position by the use of proper reinforcing steel supports, spacers, and accessories. Work shall conform to the drawings and Manual of Standard Practice for Detailing Reinforced Concrete Structures ACI 315. Tie bars securely at intersections.

## 3.7 EMBEDDED ITEMS

A. The Contractor shall provide for the installation of all items embedded in the concrete such as coil rod inserts, anchor bolts, etc., shown on the drawings or as provided for in other Divisions of this Specification.

## 3.8 DRILLED AND GROUTED DOWEL INSTALLATION

A. Drill hole in existing concrete of size that is ¾ inch in diameter larger than diameter of dowel bar. Incline the hole in the concrete so the non-shrink grout stays in the hole.

B. Fill hole with non-shrink grout.

C. Immediately place dowel bar into grouted hole.

D. Allow grout to take initial set before disturbing dowel bar.

## 3.9 CONCRETE PLACEMENT

A. Inspection: Before placing concrete, inspect and complete the formwork installation, reinforcing steel, and items to be embedded or cast in. Notify other crafts to permit the installation of their work; cooperate with other trades in setting such work, as required. Thoroughly wet wood forms immediately before placing concrete, as required where form coatings are not used.

B. General: Comply with ACI 304 and as herein specified.

1. Concrete shall be deposited continuously, in layers of such thickness that no concrete will be deposited on concrete that has hardened sufficiently to cause the formation of seams and planes of weakness within the section.

    a. If, due to emergency conditions, the Contractor cannot place a section continuously between planned construction joints, introduce a field joint and additional reinforcement to preserve the structural continuity.

1. Deposit concrete as nearly as practicable to its final location to avoid segregation due to rehandling or flowing.

2. Deposit concrete in forms in horizontal layers no deeper than 24 inches, avoiding inclined construction joints.

3. Where placement consists of several layers, place each layer while the preceding layer is still plastic to avoid cold joints.

4. Control rate of placement so as not to exceed structural capacity of forms.

5. Consolidate placed concrete by mechanical vibrating equipment supplemented by hand spading, rodding, or tamping. Use equipment and procedures for consolidation of concrete in accordance with the recommended practices of ACI 309, to suit the type of concrete and project conditions.

6. Do not use vibrators to transport concrete inside of forms. Insert and withdraw the vibrators vertically at uniformly spaced locations not farther than the visible effectiveness of the machine.

    a. Place the vibrator rapidly penetrating the placed layer of concrete and at least six inches into the preceding layer.

    b. Do not insert vibrators into lower layers of concrete that have begun to set.

    c. At each insertion limit the duration of vibration to the time necessary to consolidate the concrete and complete embedment of reinforcement and other embedded items without causing segregation of the mix.

7. Deposit and consolidate concrete slabs in a continuous operation, within the limits of construction joints, until the placing of a panel or section is complete.

8. Consolidate concrete during placing operations to thoroughly work around the reinforcement, other embedded items, and into corners.

9. Bring slab surfaces to the correct level with a straightedge and strike off. Use bull floats or barbies to smooth the surface, leaving it free of humps or hollows. Do not sprinkle water on the plastic surface.

10. Maintain reinforcing in the proper position during concrete placement operations.

C. Cold Weather Placing

1. Protect concrete from physical damage or reduced strength caused by frost, freezing actions, or low temperatures.
2. Follow cold weather concrete placement procedures when the surrounding air temperature is below 40°F or if freezing temperatures are likely during the specified curing period.
3. Do NOT use frozen materials or materials containing ice or snow. Do not place the concrete on frozen subgrade or on subgrade containing frozen materials.
4. Do not use calcium chloride, salt, and other materials containing antifreeze agents or chemical accelerant, unless otherwise accepted in writing by the Owner's Representative.

D. Hot Weather Placing

1. When hot weather conditions exist that would impair the quality and strength of concrete, place the concrete in compliance with ACI 305 and as herein specified.
2. Cool the ingredients before mixing to maintain the concrete temperature at time of placement below 90°F. The supplier may chill the mixing water, or chopped ice used to control the concrete temperature, provided the ice's water equivalent is calculated and deducted from the total amount of mixing water.
3. Cover reinforcing steel with water-soaked burlap if it becomes too hot. Maintain the steel temperature at or below the ambient air temperature immediately before embedment in concrete.
4. Do not use retarding admixtures unless otherwise accepted in mix designs.

## 3.10 PLACING CONCRETE BY PUMPING

A. Contractor may place cast-in-place concrete by pumping in accordance with ACI 304.

B. Design Mix

1. Submit separate design mix for pumped concrete.
2. Note, the fine aggregate gradation, and water and cement content are more critical and different from the regular concrete mix.
3. The supplier may increase the slump 1-in. for individual batches at point of discharge.

B. Pumping Equipment and Placement

1. Do not convey through aluminum or aluminum alloy pipes.
2. The loss of slump in pumping equipment shall not exceed two inches.
3. Discard the mortar used for lubricating the pumping equipment. Do not incorporate in the work.
4. Take slump and air tests at both points of delivery to pump equipment and at point of discharge from the line.
5. Take concrete cylinders at the point of discharge from the line.

## 3.11 JOINTS IN SLABS

A. Construction Joints

1. Provide construction joints as indicated on the drawings or as to least impair the structure's strength.
2. Provide beveled keyways at construction joints.
3. Thoroughly clean the face of joint before placing adjacent slabs. Wet the surface and coat with a neat cement grout immediately before placing the second slab.

B. Control Joints

1. Provide control joints as indicated on the drawings, as necessary to least impair the strength of the slab, or as otherwise directed by the Owners Representative.
2. Provide ¼-inch wide saw-cut control joints to a depth equivalent to ¼$^{th}$ of the slab thickness.
3. Cut not less than eight hours or more than 18 hours after placing the slab.
4. Clean joint slot and fill with sealant.

C. Expansion Joints

1. Provide where exterior pavements abut exterior walls and where shown on the drawings.
2. Install ¾-inch thick expansion strip the full depth of the slab. Set the top of the joint material 3/8-inch below the surface of the concrete. Install in strict accordance with the manufacturer's recommendations.

## 3.12 FINISHING AND CURING OF EXTERIOR SLABS

A. Float, trowel, and fiber broom finish the surface of slabs. Tool the edges.

B. Seal concrete slabs with a curing membrane as soon as the finishing operation is completed. Application shall be in strict compliance with the recommendations of the manufacturer.

## 3.13 CONCRETE SURFACE REPAIRS

A. Repair surface defects, including tie holes and honeycomb, unless otherwise specified by the contract documents immediately after form removal.

B. Remove all honeycombed areas and other defective concrete down to sound concrete with edges perpendicular to the surface or slightly undercut. Do NOT feather the edges.

1. Dampen the patch area and an area of at least six inches wide surrounding to prevent absorption of water from the patching mortar.
2. A bonding grout shall be prepared using a mix of approximately one part cement to one part fine sand passing No. 30 mesh sieve, mixed to the consistency of thick cream, and then well brushed into the surface.

C. The patching mixture shall be made of the same materials and of approximately the same proportions as used for the concrete, except as follows:

1. The coarse aggregate shall be omitted
2. The mortar shall consist of not more than 1 part cement to 2-1/2 parts sand by damp loose volume
3. Substitute white portland cement for a part of the gray portland cement on exposed concrete. Match color by a trial patch.

4. Quantity of mixing water shall be no more than necessary for handling and placing.
5. Mix the patching mortar in advance. Allow mortar to stand with frequent manipulation with a trowel, without addition of water, until it has reached the stiffest consistency that will permit placing.

D. After evaporation of the surface water from the patched area, brush the bond coat into the surface.
1. When the bond coat begins to lose the water sheen, apply the premixed patching mortar.
2. Thoroughly consolidate into place and strike off the mortar.
3. Leave the patch slightly higher than the surrounding surface.
4. To permit initial shrinkage, leave the patch undisturbed for at least one hour before final finishing.
5. Keep the patched area damp for seven days. In a formed, exposed wall, do NOT use metal tools to finish a patch.

E. After cleaning and thoroughly dampening, fill the tie holes solid with patching mortar.

F. Repair concrete slab surfaces that contain defects that adversely affect durability, strength, or appearance, by an Owner’s Representative approved method or replace.

## 3.14 PATCHING EXISTING CONCRETE

A. Clean surface to patch of all loose particles, oils, grease, etc., and roughen surface as required.

B. Pre-dampen surfaces before application of patching compound.

C. Mix, apply, finish, and cure the patching compound in strict compliance with the manufacturer's instructions.

**END OF SECTION 330516**

# SECTION 333000
# SANITARY SEWERAGE

## PART 1 - GENERAL

### 1.1 SECTION INCLUDES

A. Gravity sanitary sewers and appurtenances including submittals, materials, material tests, manholes, pipe, installation of pipe and appurtenances, and testing

B. Drawings and General Provisions of Contract, including General and Special Conditions, apply to this section.

### 1.2 RELATED SECTIONS

A. Section 013300 – Submittals

B. Section 312333 – Trenching and Backfilling

C. Section 330516 – Manholes and Structures

### 1.3 SUBMITTALS

A. Manufacturer’s specifications and/or catalog data listing for pipe, manhole steps, covers and frames, and other special items.

B. Shop drawings showing reinforcing steel details, structural steel details, structural steel supports, and mechanical details for structures and specialty items.

C. Pipe manufacturer’s installation instructions.

D. Material and pressure test certifications.

E. Such other information as the Owner's Representative may request.

### 1.4 PRESENCE OF UNDERGROUND UTILITIES

A. If utility services are encountered, the Contractor is responsible to have the services relocated if necessary or repaired if damaged.

B. If a main line utility is in direct conflict to the proposed work, the Contractor shall report the conflict to the Owner's Representative immediately. The Owner's Representative will advise the Contractor how the conflict will be resolved.

1. A direct conflict is defined as the existing utility occupying the exact location that the sewer is to be laid.

2. Relocation and/or support of utilities which are near the sewer location, but not in direct conflict, shall be considered incidental to the sewer work. It is the Contractor’s responsibility to arrange and pay for such relocation or support.

C. Separation from Water Lines:

1. Sanitary sewer lines shall be a minimum of 10' from a water line when running parallel.

2. At water line crossings, provide a minimum of 18" between pipes. Sewer line shall have a full length of pipe centered over or under the crossing water line.

3. If the separation requirements are not available, immediately notify the Owner's Representative.

D. Service Line Witnesses: Promptly record the location of wyes along the sewer line. Distance from the downstream manholes may be used or record the actual station along the sewer line. Wyes shall be shown on the Contractor’s Record Drawing Set.

## 1.5 JOB CONDITIONS

A. Existing Wastewater System: The Contractor shall maintain operation of the existing wastewater system during construction.

B. Scheduling:

1. Backfill, grading, and clean up shall be no more than 200 feet behind the location of the pipe placement.
2. The Contractor shall maintain trenches for settling.

# PART 2 - PRODUCTS

## 2.1 MATERIALS

A. Pipe:

1. The Contractor may select particular pipe material for a project from the below listed table, unless specified on the Drawings or in the Bid Documents. These pipe specifications shall govern when cover is 16' or less.
2. Service Lead Piping: Minimum 4" diameter.
3. Plastic Pipe: Provide seating marks where couplings are used for jointing.

**PIPE CLASSIFICATION TABLE**
Design Classification by Depth of Cover

| Type and Size | Size Limitations | Pipe Material Spec | Joint Spec |
|---|---|---|---|
| Reinforced Concrete | 18" Min | ASTM C76, Class III | ASTM C361 |
| Plastic PVC | 4”-6” | ASTM D2665 | ASTM D3212 or D2672 |
| Plastic PVC | 8”-15” | ASTM D3034-SDR35 | ASTM D3034, Type 1, Grade 1 |
| Plastic (PE) | 6”- 24” | ASTM D3034-SR100 | ASTM D2239 |
| Ductile Iron | None | ANSI / AWWA C151 / A21.51 Pressure Class 350 | ANSI / AWWA C111 / A21.11 |

B. Poly Wrap shall conform to ANSI / AWWA C105 / A21.5 and ASTM A674.

C. Manholes:

1. Manholes will be precast units and shall conform to ASTM C478 or ASTM C76 Class III.
   a. Joints shall meet ASTM C361 or ASTM C443.
   b. Pipe openings shall be provided with flexible connectors designed to produce a positive watertight connection for pipes entering the manhole. These connectors shall be A-LOK produced by A-LOK Products Inc. or equal.
2. Grade rings shall conform to ASTM C478.
3. Waterproofing will be required for all manholes. The bitumen shall consist of two coats of asphaltic pitch. Asphalt shall conform to the requirements of ASTM D449.
4. Prior to backfilling, lift holes shall be fully grouted and/or plugged. Waterproofing shall be field applied in accordance with Item 3 above.
5. Manhole Castings:
   a. Standard frame and lid shall be Neenah R-1764, Deeter 1270, or equal.

b. Watertight frame and lid shall be Neenah R-1916-F, Deeter 1247 B, or equal.

6. Manhole steps shall be Neenah R-1980-J, Deeter 1606, M. A. Industries PS2-PF, or equal.

## PART 3 - EXECUTION

### 3.1 ALIGNMENT AND GRADE

A. Before installation of new sewer facilities, verify sizes, measurements, type, and location of existing piping, and appurtenances at points of connection to existing system. If a deviation from the Drawings is found, the Contractor shall notify the Owner's Representative and obtain instruction on how to proceed.

B. Line and grade control shall be done with a laser beam. The Contractor shall spot check the accuracy of the laser beam in accordance with the following requirements:

1. Elevation shall be checked at the set up point, 25' point, 50' point, 100' point, and 100' intervals thereafter to the next set up point.
2. Projector shall be advanced and reset at each manhole with 600' maximum distance prior to advancement.
3. Grade shall be checked with a rod and level at each checkpoint.
4. Pipe ventilation shall be provided, to prevent beam refraction.

### 3.2 BEDDING

A. Bedding shall be provided to the spring-line for concrete and ductile iron pipe. Bedding for PVC, plastic, and ABS shall be to 6" above the top of the pipe. Bedding shall be uniformly placed and hand tamped below the haunch area of the pipe.

B. Granular material for pipe bedding shall be crushed rock or 3/4" clean stone extending 6" below and to the spring line for concrete and ductile iron pipe and to the top of all other pipe materials.

C. The entire length of the pipe barrel shall be supported evenly.

D. In a casing pipe, the carrier pipe shall be supported in accordance with Section 330523, Boring and Jacking Casing Pipe.

### 3.3 PIPE INSTALLATION

A. Work shall be done in accordance with the following standards: ASTM D2321; Underground Installation of Flexible Thermal Plastic Sewer Pipe, AWWA C600; Installation of Cast Iron Water Mains.

B. Pipe shall be laid commencing at downstream end of line and install pipe with spigot or tongue end downstream. Provide bell holes at each pipe joint to allow barrel of pipe to support trench load.

C. Use no defective pipe; check each length for defects and hairline cracks at ends prior to lowering into trench.

D. Place pipe in trench in sound, undamaged condition using chains or straps. Lifting holes will not be allowed except for the manholes.

E. Clean the interior of all pipefittings and joints prior to installation. Exclude entrance of foreign matter during installation. Close open ends of pipe with snug fitting closures.

Include provisions to prevent flotation should trench fill with water. Remove water, sand, mud, and other undesirable materials from trench before removal of cap.

F. Install pipe only when conditions are suitable. Do not lay pipe in water or water filled trench.

G. Pipe shall not be placed on frozen subgrade. Backfill material shall not be frozen.

H. Except where pipe sections are being encased in concrete, no pipe is to be supported by blocks or other means.

I. Pipes installed on grades in excess of 20% shall be anchored securely with concrete anchors spaced as follows:

| Grade | Maximum Anchor Spacing |
|---|---|
| 20% - 35% | 36' |
| 35% - 50% | 24' |
| Greater than 50% | 16' |

J. Cutting Pipe:

1. Pipe shall be cut in a neat and workmanlike manner to provide an even surface, perpendicular to the pipe centerline.
2. All bumps and irregularities shall be removed prior to pipefitting.
3. Bevel ends of push-on type pipe.

K. Jointing:

1. The gasket position shall be verified prior to compressing the pipe joint together.
2. Only those solvents, adhesives, and lubricants furnished by the pipe manufacturer shall be permitted.
3. Perform push-on joint installation per manufacturer's instructions.
4. Junctions with other materials shall require the use of adapter type and technique recommended by pipe manufacturer.

L. All ductile or cast iron pipe and fittings shall be poly-wrapped.

## 3.4 MANHOLES

A. Manholes shall be constructed in accordance with the drawing detail.

B. Bases:

1. A cast-in-place base may be poured on undisturbed, frost-free, dry subgrade.
2. If a precast base is utilized, it shall be placed on crushed limestone with a full and even bearing.
3. If unsuitable base material exists, the contractor shall remove the unsuitable material and replace it with 3/4" clean rock or other suitable material compacted to provide a bed with full and even bearing.

C. Casting Setting:

1. Existing Pavement: In asphalt or concrete pavements, or gravel drives / parking areas, set the manhole ring and lid to match the finished grade.

2. Gravel Roadway Surfaces: Set the ring and lid 4" below finished grade surface.
3. Unpaved Areas: Match finished ground elevation, unless otherwise noted.

D. Waterproof the outside surface of manholes with two coats of bitumen material. The bitumen wall shall consist of asphaltic pitch conforming to the requirements of ASTM D449.

## 3.5 CONNECTIONS

A. Existing Wastewater System:

1. Connection of new pipe to an existing structure shall be made as follows:
    a. Prepare the existing structure by making an opening with at least a 2" clearance all around the pipe to be connected.
    b. Insert the pipe so that the end of the pipe is flush with the inside wall.
    c. Fill the opening between pipe and manholes wall with an expansive grout in such a manner that watertight condition will result.
2. Connection to an existing line:
    a. Manholes to be built on an existing sewer shall be constructed without damaging the existing sewer.
    b. The manhole base, walls, and invert shall be completed before the top half of the existing sewer pipe is cut or broken away.
    c. Rough edges of the pipe shall be covered with an expansive grout to produce a smooth finish.
    d. The Contractor shall repair any existing sewer line damaged by his work, at no expense to the Owner.
3. Connections between different pipe materials shall be made using Fernco transition couplings or equal meeting the specifications of the pipe manufacturer.

B. Existing system carrying wastewater may be bypassed using pumping when necessary. Discharge directly to closest downstream manhole on normal line of flow.

C. Provisions for future wastewater extensions, where indicated on the Plans, shall include extending a short section of pipe from the manhole and plugging with a standard disc for pipes 21" or smaller.

## 3.6 SERVICE LINES

A. Line and Grade:

1. Horizontal Alignment: Service lines shall be constructed at right angles to the sewer.
2. Grade: Service lines shall be laid at a minimum uniform grade of 1/8" per foot.
3. Depth: The service elevation, at the property or easement line, shall allow a minimum 1/8" per foot grade from the existing building service. If a service is to be provided for a vacant lot, the service shall be kept at the lowest possible elevation.

B. Connection Fittings:

1. Location of the connection fitting shall match an existing service or as directed by the Owner's Representative.

2. 45° or 60° wyes shall be utilized for connection of the service leads to the sanitary sewer. Wye tees and tees will not be permitted.

C. Main Risers: Where the cover is excessive at the main, a riser may be placed to bring the service to a reasonable depth to match an existing service except as follows:

1. Service leads under street or parking lot pavements shall be constructed at minimum grade from the main to a point 10’ outside the pavement.

D. Vertical bends greater than 45° are not permitted for service lines.

E. Horizontal bends 45° degrees or less will be permitted in service lines, provided a cleanout is provided immediately upstream of the bend.

F. Standard plugs or caps shall be securely placed and blocked at the end of all service leads.

G. Markers shall be placed at the end of service leads left for future connections. Markers shall conform to the following:

1. Material Markers: A 12" long x 2" x 4" horizontal member nailed to a vertical 2" x 4" at the terminus of the service lateral.

2. The vertical 2" x 4" shall be placed extending from the lateral end to 18" above grade.

3. The vertical 2" x 4" shall be provided with four wraps of #9 iron wire placed 6" below finished grade.

H. Witnesses:

1. Wyes and tees shall be witnessed to the nearest downstream manhole. Contractor shall measure the distance from the center of the downstream manhole to the wye and maintain an accurate log of these locations.

2. At the end of the service lead Contractor shall take three measurements to permanent surface features and place this information in a log. Permanent surface features shall be defined as items such as building corners, fence corners, etc.

3. The Contractor shall provide a copy of all witness data to the Owner's Representative prior to backfilling.

## 3.7 FIELD QUALITY CONTROL

A. General:

1. The Contractor shall maintain his work site in a manner that will be fully accessible by the Owner's Representative for observation of the work.

2. The Contractor shall conduct the leakage test promptly following installation of wastewater pipe. This test shall include services that have been constructed.

3. The Contractor shall notify the Owner's Representative 48 hours before conducting the leakage test so that the Owner's Representative can schedule inspection and observation of the test.

4. The Contractor shall provide all equipment and conduct the test.

B. The following drift from proposed alignment between structures is as follows:

1. Horizontal Alignment:

a. Through 36" Diameter Pipe: 0.20'

b. Over 36" Diameter Pipe: 0.40'

2. Grade:

a. Through 36" Diameter Pipe: 0.02'

b. Over 36" Diameter Pipe: 0.05'

C. Plastic Pipe Deformation: In addition to leakage tests, a deformation test will be done as follows:

1. The test shall be conducted not less than one month (30 days) after backfill has been properly installed.

2. The maximum allowable deflection shall not exceed 5% of the pipe's internal diameter.

3. Mandrel testing shall be performed on 100% of the pipeline.

4. Mandrels shall be “Wortco 9-Arm Mandrel” (5% deflection) for flexible or semi-rigid pipe or approved equal.

5. Gauge shall be pulled through the pipe by hand. Mechanical pulling assistance is not permitted.

6. If any section of pipe does not conform to this requirement, the Contractor shall replace it at no cost to the Owner. Leakage re-testing and mandrel re-testing shall take place 30 days after backfilling.

7. The Owner may, prior to the end of warranty (guarantee period), conduct another deflection test. The Contractor at no cost to the Owner shall replace any pipe not conforming to this requirement. The Contractor shall provide an additional warranty (guarantee) of one year for that portion of the replaced pipeline.

D. Leakage:

1. General:

a. Contractor shall clean pipe of excess mortar, joint sealant, and other dirt and debris prior to inspection.

b. Sewer will be inspected by flashing a light (lamping) between manholes and/or by physical passage where space permits.

c. The Owner's Representative will determine from illumination and/or physical inspection the presence of visible infiltration or other defects.

d. Defects shall be corrected prior to conducting leakage tests.

2. Leakage test shall be done either by a water exfiltration test or air exfiltration test.

a. For water tests, the allowable exfiltration shall be less than 100 gallons per inch of ID per day per mile per 24 hours (0.08 gallons per inch of internal diameter per hour per 100' of pipe length).

b. For air exfiltration tests, the holding time shall not be less than that listed in the table at the end of this Section.

c. The Contractor may use air exfiltration testing for pipes of all sizes.

d. The Contractor shall perform water exfiltration tests on manholes and may perform water exfiltration tests on sewer pipe larger than 18" ID.

3. Any sections of pipe not meeting the test requirements shall be repaired and the test shall be repeated until work is acceptable.
    a. The Contractor is encouraged to pretest the pipes prior to notifying the Owner's Representative and formal testing.
    b. For any section of pipe not passing the test when requested by the Contractor, the Contractor shall be responsible for the total cost of re-inspection. The Owner reserves the right to deduct the cost of re-inspection from the Contractor's payment for the work.

E. Exfiltration Test (Water)
1. The Contractor shall furnish all labor, equipment, tools, and materials required including bulkheads, water, and miscellaneous items to perform the test.
2. Perform all tests for lines at a minimum water depth 2' above the high point of the system or 2' above ground water elevation, whichever is higher. Perform tests at a minimum water depth of 2' above casting elevation for manholes.
3. Tests shall be maintained to locate all leaks, but not less than two hours. The Owner's Representative shall confirm measurement of exfiltration amounts.
4. Tests shall be repeated after repair of leaks and defects, until leakage meets the requirements of this specification.
5. Manholes and other structures shall be protected by means of bulkheads to prevent bursting pressure from being applied inside the structure.
6. Pipe shall be de-watered upon completion of the successful test.

F. Exfiltration Test (Air)
1. In the areas where ground water is known to exist, the Contractor shall install a 1/2" diameter capped pipe nipple approximately 10" long through the manhole wall on top of one of the sewer lines entering the manhole.
    a. Install at the time the sewer line is installed.
    b. Immediately prior to the line acceptance test, determine the ground water level. Remove the pipe cap, blow air through the pipe nipple into the ground to clear it, and then connect a clear plastic tube to pipe nipple.
    c. The hose shall be held vertically and measurement of height of water, in feet, shall be taken after the water stops rising in this plastic tube.
    d. The height shall be divided by 2.3 to establish the pounds of pressure that will be added to all readings.
2. Contractor shall furnish all facilities required including necessary piping connections, test pumping equipment, pressure gauges, bulkheads, regulators to avoid over-pressurization, and all miscellaneous items required.
    a. The pipe plug for introducing air to the sewer pipe shall be equipped with two taps. One tap will be used to introduce air into the line being tested, through suitable valves and fittings, so that the input air may be regulated. The second tap will be fitted with valves and fittings to accept a pressure test gauge indicating internal pressure in the sewer pipe. An additional valve and fitting will be incorporated on the tap used to check internal pressures so that a second test gauge may be

attached to the internal pressure tap. Pressure test gauge will also be used to indicate loss of air pressure due to leaks in the sewer line.

b. The pressure test gauge shall meet the following minimum specifications:

(1) Size (diameter) -- 4-1/2".

(2) Pressure Range -- 0 to 15 psi.

(3) Figure Intervals 1 psi. increments.

(4) Minor Subdivisions -- 0.05 psi.

(5) Pressure Tube Bourdon 2 or diaphragm; Accuracy -- +/- 0.25% of maximum scale reading.

(6) Dial white coated aluminum with black lettering, 270° arc and mirror edge.

(7) Pipe Connection - low male, 1/2" NPT.

c. Calibration data will be supplied with all pressure test gauges. Certification of pressure test gauge will be required from the gauge manufacturer. This certification and calibration data will be available to the Owner's Representative whenever air tests are performed.

3. Test each reach of sewer pipe between manholes. Test at the completion of the installation of pipe and appurtenances and the backfill of the sewer trench.

4. Plug ends of line, cap, or plug all connections to withstand internal pressure. One of the plugs provided must have two taps for connecting equipment.

a. After connecting air control equipment to air hose; monitor air pressure so that the internal pressure does not exceed 5 psig.

b. After reaching 4 psig, throttle the air supply to maintain between 4 and 3.5 psig for at least two minutes in order to allow equilibrium between air temperature and pipe walls. During this time, check all plugs to detect any leakage.

c. If plugs are found to leak, bleed off air, tighten plugs, and re-pressurize. After the temperature has stabilized, the pressure is allowed to decrease to 3.5 psig.

d. At 3.5 psig, begin timing. Measure the time for air pressure to drop to 2.5 psig. If the time in seconds for the air pressure to decrease from 3.5 psig to 2.5 psig is greater than the time shown in the table at the end of this section, the pipe shall be presumed free of defects.

G. If the air test fails to meet the above requirements, repeat test as necessary after all leaks and defects have been repaired. Prior to acceptance, all constructed sewer lines shall satisfactorily pass the low-pressure air test or the exfiltration test.

## 3.8 ADJUSTING AND CLEANING

A. General: Pipe and structures shall be kept clean as work progresses.

**TABLE 1**
**MINIMUM TIME REQUIRED FOR A 1.0 psig PRESSURE DROP FOR SIZE AND LENGTH OF PIPE INDICATED FOR Q = 0.0015 (CFM/SF INTERNAL SURFACE AREA)**

| Pipe Diameter, (in.) | Minimum Time, (min:sec) | Length for Minimum Time, (ft) | Time for Longer Length, (sec) | Specification Time for Length (L) Shown, (min:sec) | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | 100 ft | 150 ft | 200 ft | 250 ft | 300 ft | 350 ft | 400 ft | 450 ft |
| 4 | 3:46 | 597 | 0.380 L | 3:46 | 3:46 | 3:46 | 3:46 | 3:46 | 3:46 | 3:46 | 3:46 |
| 6 | 5:40 | 398 | 0.854 L | 5:40 | 5:40 | 5:40 | 5:40 | 5:40 | 5:40 | 5:42 | 6:24 |
| 8 | 7:34 | 298 | 1.520 L | 7:34 | 7:34 | 7:34 | 7:34 | 7:36 | 8:52 | 10:08 | 11:24 |
| 10 | 9:26 | 239 | 2.374 L | 9:26 | 9:26 | 9:26 | 9:53 | 11:52 | 13:51 | 15:49 | 17:48 |
| 12 | 11:20 | 199 | 3.418 L | 11:20 | 11:20 | 11:24 | 14:15 | 17:05 | 19:56 | 22:47 | 25:38 |
| 15 | 14:10 | 159 | 5.342 L | 14:10 | 14:10 | 17:48 | 22:15 | 26:42 | 31:09 | 35:36 | 40:04 |
| 18 | 17:00 | 133 | 7.692 L | 17:00 | 19:13 | 25:38 | 32:03 | 38:27 | 44:52 | 51:16 | 57:41 |
| 21 | 19:50 | 114 | 10.470 L | 19:50 | 26:10 | 34:54 | 43:37 | 52:21 | 61:00 | 69:48 | 78:31 |
| 24 | 22:40 | 99 | 13.674 L | 22:47 | 34:11 | 45:34 | 56:58 | 68:22 | 79:46 | 91:10 | 102:33 |
| 27 | 25:30 | 88 | 17.306 L | 28:51 | 43:16 | 57:41 | 72:07 | 86:32 | 100:57 | 115:22 | 129:48 |
| 30 | 28:20 | 80 | 21.366 L | 35:37 | 53:25 | 71:13 | 89:02 | 106:50 | 124:38 | 142:26 | 160:15 |
| 33 | 31:10 | 72 | 25.852 L | 43:05 | 64:38 | 86:10 | 107:43 | 129:16 | 150:43 | 172:21 | 193:53 |
| 36 | 34:00 | 66 | 30.768 L | 51:17 | 76:55 | 102:34 | 128:12 | 153:50 | 179:29 | 205:07 | 230:46 |

**TABLE 2**
**MINIMUM TIME REQUIRED FOR A 0.5 psig PRESSURE DROP FOR SIZE AND LENGTH OF PIPE INDICATED FOR Q = 0.0015 (CFM/SF INTERNAL SURFACE AREA)**

| Pipe Diameter, (in.) | Minimum Time, (min:sec) | Length for Minimum Time, (ft) | Time for Longer Length, (sec) | Specification Time for Length (L) Shown, (min:sec) | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | 100 ft | 150 ft | 200 ft | 250 ft | 300 ft | 350 ft | 400 ft | 450 ft |
| 4 | 1:53 | 597 | 0.190 L | 1:53 | 1:53 | 1:53 | 1:53 | 1:53 | 1:53 | 1:53 | 1:53 |
| 6 | 2:50 | 398 | 0.427 L | 2:50 | 2:50 | 2:50 | 2:50 | 2:50 | 2:50 | 2:51 | 3:12 |
| 8 | 3:47 | 298 | 0.760 L | 3:47 | 3:47 | 3:47 | 3:47 | 3:48 | 4:26 | 5:04 | 5:42 |
| 10 | 4:43 | 239 | 1.187 L | 4:43 | 4:43 | 4:43 | 4:57 | 5:56 | 6:55 | 7:54 | 8:54 |
| 12 | 5:40 | 199 | 1.709 L | 5:40 | 5:40 | 5:42 | 7:08 | 8:33 | 9:58 | 11:24 | 12:50 |
| 15 | 7:05 | 159 | 2.671 L | 7:05 | 7:05 | 8:54 | 11:08 | 13:21 | 15:35 | 17:48 | 20:02 |
| 18 | 8:30 | 133 | 3.846 L | 8:30 | 9:37 | 12:49 | 16:01 | 19:14 | 22:26 | 25:38 | 28:51 |
| 21 | 9:55 | 114 | 5.235 L | 9:55 | 13:05 | 17:27 | 21:49 | 26:11 | 30:32 | 34:54 | 39:16 |
| 24 | 11:20 | 99 | 6.837 L | 11:24 | 17:57 | 22:48 | 28:30 | 34:11 | 39:53 | 45:35 | 51:17 |
| 27 | 12:45 | 88 | 8.653 L | 14:25 | 21:38 | 28:51 | 36:04 | 43:16 | 50:30 | 57:42 | 64:54 |
| 30 | 14:10 | 80 | 10.683 L | 17:48 | 26:43 | 35:37 | 44:31 | 53:25 | 62:19 | 71:13 | 80:07 |
| 33 | 15:35 | 72 | 12.926 L | 21:33 | 32:19 | 43:56 | 53:52 | 64:38 | 75:24 | 86:10 | 96:57 |
| 36 | 17:00 | 66 | 15.384 L | 25:39 | 38:28 | 51:17 | 64:06 | 76:55 | 89:44 | 102:34 | 115:23 |

**END OF SECTION 333000**

**SECTION 334000**
**STORM DRAINAGE**

## PART 1 - GENERAL

### 1.1 SECTION INCLUDES

A. Section includes gravity storm sewers and appurtenances, including submittals, materials and material tests, manholes, pipe, manhole, and service installation.

B. Drawings and General Provisions of Contract, including General and Special Conditions, apply to this section.

### 1.2 RELATED SECTIONS

A. Section 312333 – Trenching and Backfilling

B. Section 330516 – Manholes and Structures

### 1.3 SUBMITTALS

A. Manufacturer’s specifications and/or catalog data listing for pipe, steps, covers and frames, castings, and other special items.

B. Shop drawings showing reinforcing steel details, structural steel details, structural steel supports, and mechanical details for structures and specialty items.

C. Pipe manufacturer's installation instructions

D. Material and pressure test certifications

E. Such other information as the Owner’s Representative may request

### 1.4 PRESENCE OF UNDERGROUND UTILITIES

A. If the Contractor encounters utility services in conflict with the work, the Contractor is responsible to have the services relocated to clear the proposed improvement. If damaged the Contractor shall repair at no cost to the Owner.

B. If a main line utility is in direct conflict with the proposed work, the Contractor shall immediately report the conflict to the Owner’s Representative.

1. The Owner’s Representative will advise the Contractor how the conflict will be resolved.
2. A direct conflict is the existing utility occupying the exact location of the proposed sewer.
3. Relocation and/or support of utilities, which are near the sewer location, but not in direct conflict, are incidental to the sewer work.

C. Separation from Water Lines: Storm sewer lines shall be a minimum of 10' from a water line when running parallel with the water line. At water line crossings, there shall be a minimum of 18" between pipes with a full length of pipe centered over or under the crossing water line.

### 1.5 JOB CONDITIONS

A. Scheduling

1. Backfill, grading, and material clean up shall be no more than 400' behind the location of the pipe placement.
2. The Contractor shall maintain trenches for settling.

## PART 2 - PRODUCTS

### 2.1 REINFORCED CONCRETE PIPE (RCP)

A. Pipe

1. RCP shall conform to ASTM C76 or AASHTO M 170.
2. Elliptical RCP shall conform to ASTM C507 or AASHTO M207.
3. Arch RCP shall conform to ASTM C506 or AASHTO M206.
4. RC end sections (aprons) shall conform to the requirements of ASTM C76, Class II. End sections shall be provided with a poured in place toewall.
5. Lift holes are **NOT** permitted in concrete pipe.

B. Provide joints shown on Drawings or noted in the Bid Document. If joint type is not specified the Contractor may utilize any of the following types.

1. Flexible rubber gasket joint shall conform to ASTM C443 or ASTM C361.
2. Coldmastic Bituminous
   a. Manufactured from asphalt, liquefiers, mineral fillers, and fibers, free from moisture.
   b. Plastic and workable with trowel
   c. Quality Standard: Federal Specification SS-S-158

C. Generally, concrete pipe shall conform to the following, unless noted otherwise:

1. Pipe with 0’ to 12’ of cover shall be Class 3
2. Pipe with 12’ to 16’ of cover shall be Class 4
3. See drawings for Class of pipe with 16’ or more feet of cover. If drawings do not note class, submit manufacturer’s shop drawing with class and design calculations.

### 2.2 CORRUGATED METAL PIPE (CMP)

A. Corrugated galvanized metal culvert pipe, pipe arches, end sections, and band shall conform to AASHTO M36.

B. Coatings:

1. Bituminous coatings shall conform to AASHTO M190.
   a. Repair bituminous coating damaged or displaced during delivery or installation by application of hot bituminous material of the same type as that originally used.
2. Polymer precoating shall conform to AASHTO M245, Type 1 and to Federal Specification WW-P-405B. Coat pipe uniformly, inside and outside, to a minimum thickness of 0.05" measured on the crest of the corrugations.

C. Joints:

1. Bands shall conform to Section A above
2. Waterproof bands shall use 3/8" thick neoprene, solid and shall be 7" wide for pipe to 36" in diameter and 12" wide for pipes greater than 36" in diameter.

## 2.3 POLYETHYLENE PIPE

A. Pipe shall conform to AASHTO M294, Type S. The pipe shall have annular corrugations. It shall be manufactured from high density polyethylene (HDPE) meeting the requirements of ASTM 3350, cell class 324420C or the requirements of ASTM D1248, Type III, Category 4, Grade P33, Class C.

B. Joints:

1. Field joints of polyethylene pipe shall provide circumferential and longitudinal strength to maintain the pipe alignment, prevent separation of pipe, and prevent infiltration of side fill material.
2. Coupling bands, if used, shall be of the same base material as the pipe. Corrugations in the bands shall have the same configuration as the corrugations at the pipe end connection.
3. Self-Locking Joints: self-locking integral bell portion shall permanently affix to the pipe and shall be the same material as the pipe.
4. Gaskets shall be factory installed inside the bell and conform to ASTM D1056.

## 2.4 INLETS AND JUNCTION BOXES

A. Cast-in-place structures shall conform to Drawing details and Section 330516.

B. Precast structures shall conform to ASTM C478.

C. Mortar:

1. The mortar shall be composed of 1 part Portland cement plus 10%, by volume, of hydrated lime and of two parts approved clean sand by volume.
2. Hydrated lime shall be Type N, conforming to the requirements of ASTM C207.
3. After thoroughly mixing the dry materials, add the water, and turn and chop by hand or mechanical methods the mixture until stiff mortar results.
4. Do not mix mortar more than 30 minutes in advance of use. Do not retemper the mortar.
5. Mortar for pointing shall be mixed in the proportions of one part portland cement to one part sand by volume.

D. Standard frame and lid shall be Neenah R-1764, Deeter 1270, or equal. Grates and castings shall be as noted on the Drawings.

E. Manhole steps shall be Neenah R1980-J, Deeter 1606, M. A. Industries PS2-PF or approved equal.

# PART 3 - EXECUTION

## 3.1 CONFLICT WITH EXISTING UNDERGROUND UTILITIES AND SERVICES

A. Provide temporary support for existing water, gas, telephone, steam, sewer, and power utility services crossing the trench until completing backfilling, unless Drawings require relocation.

B. Construct permanent support for existing sewer main or service crossing the trench.

C. Reconnect all unknown field tiles in similar fashion to their construction.

## 3.2 CONNECTIONS BETWEEN PIPES OF DISSIMILAR MATERIALS

A. Use special adapters or couplings. Bands or hardware shall be stainless steel.

## 3.3 INLET AND JUNCTION BOX INSTALLATION

A. Poured in place concrete structures shall conform to Section 330516 and the Drawing details.

B. Carefully place precast concrete structures with true to line and grade, and joints sealed with mastic.

C. Base and Invert: Construct the structure's base and invert of concrete as specified under Section 33 05 16. Pour all bases and inverts individually in one continuous pour for each, unless otherwise specified and particular care taken to make channels smooth. All structure inverts and bases shall conform to the Drawing detail.

1. Construct bases for cast-in-place structures on undisturbed frost-free dry subgrade.
2. Precast structures may use precast bases. Place precast bases on a minimum of 6" of crushed limestone with full and even bearing.
3. If unsuitable base material exists, the Contractor shall remove the unsuitable material and replace it with sand, rock, gravel, or other suitable material compacted to provide a bed with full and even bearing.

D. Manhole Rings and Covers: The rings and covers of all structures shall be set at the elevation shown on the Drawings and solidly built into place, and grouted with cement mortar. If no elevation is specified, set casting as follows:

1. Manhole lids and frames shall match finished grade in existing pavements or yard areas, and 4" below grade for gravel surfaces.
2. Catch basin grates shall be set 1/2" below finished grade in paved areas and 6" below finished grade in unpaved areas.

## 3.4 PIPE INSTALLATION

A. General:

1. For pipe installed below the existing ground line, excavate a trench to the required depth. Excavate adequate width to permit thorough tamping of the backfill under the haunches and around the pipe.
2. Remove and relay any pipe which is not in true alignment or which shows any undue settlement before placing backfill at the Contractor’s expense.
3. If shown on the Drawings, lay pipe with sufficient camber to allow for settlement from fill loads.
4. Seal all non-gasket RCP joints with an approved plastic compound or cement mortar.
5. The Contractor may use rubber gasket joint RCP in lieu of standard pipe at no additional cost to the Owner.
6. Do not provide RCP with lift holes. Finish the mortar flush on the inside of the pipe and be properly cured on the outside. Lifting devices shall have sufficient bearing on the inside of the pipe to avoid damage resulting from a concentration of stresses around the lift holes.

7. If there is a grade discrepancy or any obstruction not shown on the Drawings, the Contractor shall notify the Owner's Representative and obtain instructions.

B. Do line and grade control with a laser beam.

1. Check grades with a level and rod at the set up point, at 25', 50', 100', and then at 100' intervals to the next set up point.
2. Advance and reset the projector at each manhole or at 600' centers; whichever is shorter.
3. Provide pipe ventilation as necessary to prevent beam refraction.

C. Install rubber gasket type pipe in accordance with the manufacturer's recommendations to ensure the rubber gaskets are not displaced.

D. In sealing rigid pipe with mortar, the mortar contact areas of all pipe ends shall be damp when mortar is applied.

1. After applying mortar to the entire interior surface of the bell or groove, force the spigot or tongue end into position.
2. Fill any remaining void in the bell or groove with a hub of mortar built up adjacent to the bell, or a bead of mortar built up around a groove type joint.
3. The interior joints of either type of pipe shall be finished flush with the surface of the pipe.
4. Cure the outside surface of mortar joints with a membrane curing compound.

E. In sealing rigid pipe with plastic joint compound, apply trowel grade compound to the mating surfaces of both the tongue and groove or to the entire interior of the bell and the upper portion of the spigot.

1. Apply rope or tape type plastic compound in accordance with the manufacturer's recommendations.
2. Force the joints together with excess compound extruding both inside and outside the joint.
3. Remove the excess compound from the interior surface where accessible.
4. The joint between the bell and spigot shall be uniform for the full circumference and take care to prevent the bell from supporting the spigot.

F. Excavation, pipe bedding, and backfill shall be done in accordance with Section 312333.

G. Begin pipeline construction at lowest point in line. Lay bell or groove ends pointing upstream.

1. Lower pipe carefully into trench; lay true to line and grade, per Drawings.
2. Keep pipe free of all dirt and foreign material.
3. Use no defective pipe; check each length for defects and hairline cracks at ends prior to lowering into trench.
4. Carefully protect pipe and joints from injury while handling and storing pipe.
5. Clean bell and spigot surfaces of dirt and foreign matter before jointing pipe.
6. Lay and join pipe in strict accordance with manufacturer's recommendations.

7. Check alignment and grade of each installed pipe segment. Correct misalignment, displacement, or otherwise defective sewer pipe at Contractor's expense.
8. Provide bell holes at each pipe joint to allow barrel of pipe to support trench load.

## 3.5 PIPE CONNECTIONS

A. Trim the pipe flush with the inside surface of the structure.

B. Grout pipe securely in place with no voids around the pipe.

C. Existing Drainage System:

1. Structures: Relay and repoint loose blocks and bricks.
2. System Carrying Water: Provide bypass pumping as necessary to assure continued system operation during connection process.

D. Future Drainage System: Seal the ends of all pipe stubs for future connections at inlet and manhole structures and all pipe installed as a portion of future sewers with suitable plugs. Install the plugs in a manner to prevent infiltration of dirt into the pipe. There is no direct payment for furnishing and installing plugs.

1. Plug pipes 4" through 21" with standard disc.
2. Construct bulkheads in pipe 24" and larger with bricks and mortar with 1/2" plaster outside.
   a. 24" to 36" - 4" thick
   b. 42" to 60" - 9" thick
   c. 60" and Larger - 12" thick

## 3.6 INSPECTION

A. After construction is complete, and before final acceptance of the project, inspect all pipe culverts. Seal any separation at joints sealed with either cement mortar or plastic joint compound with like material.

## 3.7 FIELD QUALITY CONTROL

A. The allowable drift between structures from the proposed alignment is as follows:

1. The maximum allowable horizontal drift for pipes through 36" diameter is 0.40' and 0.75' for pipes greater than 36" in diameter.
2. The maximum allowable vertical drift for pipes through is 0.10'.

**END OF SECTION 334000**

**SECTION 334600**
**SUBDRAINAGE**

## PART 1 - GENERAL

### 1.1 SECTION INCLUDES

A. Subdrains and appurtenances, including submittals, materials, quality control, and installation

B. Drawings and General Provisions of Contract, including General and Special Conditions, apply to this section.

### 1.2 RELATED SECTIONS

A. Section 312333 – Trenching and Backfilling

### 1.3 SUBMITTALS

A. Manufacturer's specifications and / or catalog data listing for pipe and other special items.

B. Pipe manufacturers installation instructions.

C. Material and pressure test certifications.

D. Such other information as the Owner's Representative may request.

### 1.4 PRESENCE OF UNDERGROUND UTILITIES

A. If utility services are encountered, the Contractor is responsible to have these services relocated if necessary or repaired if damaged.

B. If a main line utility is in direct conflict to the proposed work, the Contractor shall report the conflict to the Owner's Representative immediately.

1. The Owner's Representative will advise the Contractor how the conflict will be resolved.

2. A direct conflict is defined as the existing utility occupying the exact location that the sewer is to be laid.

3. Relocation and/or support of utilities which are near the sewer location, but not in direct conflict, shall be considered incidental to the sewer work. It is the Contractor's responsibility to arrange and pay for such relocation or support.

C. Separation from Water Lines: Storm sewer lines shall be a minimum of 10' from a water line when running parallel with the water line. At water line crossings, there shall be a minimum of 18" between pipes, and a full length of pipe shall be centered over or under the crossing water line.

### 1.5 JOB CONDITIONS

A. Scheduling

1. Backfill, grading, and material clean up shall be no more than 400' behind the location of the pipe placement.

2. The Contractor shall maintain trenches for settling.

## PART 2 - PRODUCTS

### 2.1 SUBDRAIN PIPE

A. Pipe for subdrains shall conform to one of the following:

| TYPE | SIZE LIMITATIONS | PIPE MATERIAL SPEC. | JOINT SPEC. |
|---|---|---|---|
| Corrugated Polyethylene (PE) | 4” - 6" | AASHTO M252 | ASTM D2239 |
| Plastic (PVC) | 4”- 6” | ASTM 1785 | ASTM D3033/D3034 |
| Plastic (PVC) | 8”- 15” | ASTM D3034-SDR35, Type 1, Grade 1 | ASTM D3033/D3034 |
| A2000 (PVC) | None | ASTM F949 | ASTM D3132 |
| Corrugated Steel CMP) | None | AASHTO M36 | AASHTO M36 |

B. Corrugated metal pipe shall be used for any pipe subject to daylight (outlet pipe).

C. Pipe shall be provided with two rows of holes, 3/16" in diameter or slots not more than 1/8" wide and 1-1/4" long. The centerline of the slots shall be not less than 30 degrees or more than 65-1/2 degrees from the pipe centerline. Perforations shall be at 3" maximum centers.

### 2.2 FILTER FABRIC

A. Fabric envelope material shall conform to AASHTO M288 for Class B subsurface drainage geotextile.

### 2.3 AGGREGATE

A. Granular material inside the filter envelope shall be 1” clean rock.

## PART 3 - EXECUTION

### 3.1 EXAMINATION

A. Examine areas to receive underdrains for:

1. Completion of excavation to elevations and slopes indicated.
2. Obstructions which would interfere with subdrainage system installation.

B. Begin work only when conditions are corrected to the satisfaction of the Owner's Representative.

### 3.2 INSTALLATION

A. General

1. Begin at the outlet and proceed continuously upgrade.
2. Minimum slope is 0.5%.
3. Minimum laying depth is 3 ft. from ground surface, unless otherwise specified.
4. Construct subdrains in accordance with the details shown on the Drawings.

5. Place drain tile with perforations facing downwards.

B. Joints

1. Complete joints in accordance with pipe manufacturer's instructions.
2. All joints are to be constructed with manufactured fittings.
3. Blind ends to be capped and locations marked.

C. Outlet

1. The end of the subdrain outlet shall be corrugated pipe.
2. Outlet includes 2 ft. of 6-in. diameter corrugated metal pipe connected to subdrain pipe. Insert 1’-6” of subdrain into the pipe.
3. Provide a rodent guard on outlet. Support outlet on precast concrete block or connect to drainage structure as indicated on the Drawings.
4. The outlet covering shall be 1/2-in. mesh, galvanized hardware cloth screen, or other rodent guard approved by the Owner's Representative.
5. The covering shall be securely attached, in a manner approved by the Owner's Representative such that it is readily removable for cleaning.

**END OF SECTION 334600**