



MISSOURI
HIGHWAYS and TRANSPORTATION
COMMISSION
JEFFERSON CITY, MISSOURI
SPECIFICATIONS
FOR
CONSTRUCTING OR IMPROVING

DISTRICT 5
Sanitary Sewer Connection
Ashland, Missouri

9-080731

TABLE OF CONTENTS

DIVISION		PAGE
DIVISION 0 - BIDDING AND CONTRACT INFORMATION		
	BIDDER CHECKLIST FINAL CHECKLIST BEFORE SUBMITTING PROPOSAL	1
	NEWSPAPER ADVERTISEMENT Notice to Contractors	2
00020	INVITATION TO BID	3
00100	INSTRUCTIONS TO BIDDER	4
00301	BID FORM	9
00430	SUBCONTRACTOR LISTING	11
00600	BID BOND	12
DIVISION 1 - GENERAL REQUIREMENTS (BROAD SCOPE)		
01010	GENERAL CONDITIONS	13
01011	SUPPLEMENTARY CONDITIONS	16
01019	CONTRACT CONSIDERATIONS	17
01039	COORDINATION AND MEETINGS	19
01300	SUBMITTALS	22
01400	QUALITY CONTROL	25
01500	CONSTRUCTION FACILITIES AND TEMPORARY CONTROLS	27
01600	MATERIAL AND EQUIPMENT	30
01650	STARTING OF SYSTEMS	31
01700	CONTRACT CLOSEOUT	34
DIVISION 2 - SITEWORK		
02100	CONSTRUCTION LAYOUT	1
02240	EROSION CONTROL	6
02530	SANITARY SEWER	5
02535	SEWAGE FORCE MAINS	6
02921	SURFACE RESTORATION	5
DIVISION 11 - EQUIPMENT		
11310	GRINDER PUMP/LIFT STATION	7
DIVISION 16 - ELECTRICAL		
16010	BASIC ELECTRICAL REQUIREMENTS	6
16050	BASIC ELECTRICAL MATERIALS AND METHODS	4
16060	GROUNDING AND BONDING	3
16120	CONDUCTORS AND CABLES	3
16130	RACEWAYS AND BOXES	6

BIDDER CHECKLIST

FINAL CHECKLIST BEFORE SUBMITTING PROPOSAL

- _____1. The orange bound Request for Proposal includes a complete set of bidding forms, specifications, and appendices which are made part of the proposal by reference. It is for the bidders information and convenience only and is not to be returned with the proposal.

- _____2. The blue bound Proposal contains a complete set of bidding forms only. It is to be completed, executed and submitted in a sealed envelope marked "**Sanitary Sewer Connection – Ashland, Missouri**"
 - _____ a. Complete the Bid Form by filling in the total dollar amount of the bid; listing any addenda which may have been issued; filling in the dollar amount of the bidder's check or Bid Bond, sign the proper signature line, and supply the required information in connection with the signature for the individual bidder, joint adventurer, or corporation.

 - _____ b. Submit Bid Bond executed by the bidder and surety. The bidder may use the Bid Bond furnished by the Commission or AIA Document A310 or approved equivalent or attach cashier's check to Bid Bond form. Personal checks are not accepted.

 - _____ c. Complete Subcontractor section by listing major subcontractor(s) and general supervisor(s), sign as required.

 - _____ d. Complete Certification Regarding Missouri Domestic Products Procurement Act section, if applicable.

- _____3. If addenda are issued attach to the back of the blue bound Proposal. Copy addenda and add to the appropriate section of the orange bound Request for Proposal and retain for your records.

NEWSPAPER ADVERTISEMENT

Notice to Contractors

Bids for constructing "Sanitary Sewer Connection, Ashland, MO will be received by the Missouri Department of Transportation at its One Stop Central Office Building, 1320 Creek Trail Drive, PO Box 270, Jefferson City, MO until 1:00 P.M., July 31, 2008. Contact Clayton Hanks at 573-522-9565 or Clayton.Hanks@modot.mo.gov to obtain plans, forms, and information or download them at no charge from http://modot.org/business/contractor_resources/FacilitiesConstructionandMaintenance.htm. A pre-bid conference is scheduled for July 23, 2008, at the District 5, Ashland Maintenance Facility located at 815 East Broadway, Ashland, Missouri, at 10:00 A.M.

SECTION 00020

INVITATION TO BID

Notice is given hereby that the Missouri Department of Transportation will accept bids for construction of the proposal marked "**Sanitary Sewer Connection, Ashland**", according to Drawings and Specifications, and described in general as:

The construction of sanitary sewer extension, consisting of one 1,000 gallon oil-water separator, approximately 60 linear feet of 4-inch diameter PVC gravity sewer, one single-unit grinder pump station, approximately 630 linear feet of 2-inch diameter PVC force main, approximately 12 linear feet of 2-inch DIP force main, and all apparatuses to make a complete and usable system.

Sealed bids will be received by the Missouri Department of Transportation **until 1:00 P.M., July 31, 2008**. Bids delivered by US Mail should be mailed to: Missouri Highways and Transportation Commission, Attention: Bid/Bid Bond, P.O. Box 270, Jefferson City, MO 65102. Bids delivered by parcel delivery services, (such as UPS, Fed Ex, DHL, etc), should be shipped to Missouri Highways and Transportation Commission, Attention: Bid/Bid Bond, 1320 Creek Trail Drive, Jefferson City, MO 65109.

Bids will be opened and read aloud at that time and that place. Bids received after that time will not be accepted.

Bidders may secure copies of the Proposal, contract forms, specifications, plans and information from **One Stop Facility located at 1320 Creek Trail Drive, P.O. Box 270, Jefferson City, MO 65102.**

Prevailing wages as established by the Missouri Department of Labor and Industrial Relations, for **Boone County**, as shown in the Proposal, will apply.

Bid securities in the amount of 5% of the bid will be required to accompany bids.

Proposals must be made on forms provided by the Commission. The Commission reserves the right to reject any or all bids and to waive irregularity in the bids and the bidding. **No bid may be amended or withdrawn after the bid is opened.**

A pre-bid conference is scheduled for **July 23 2008**, at the **District 5, Ashland Maintenance Facility located at 815 East Broadway, Ashland, Missouri, at 10:00 A.M.**

MISSOURI HIGHWAY AND TRANSPORTATION COMMISSION

Building Design Supervisor

SECTION 00100

INSTRUCTIONS TO BIDDER

1. SCOPE OF WORK

The construction of sanitary sewer extension, consisting of one 1,000 gallon oil-water separator, approximately 60 linear feet of 4-inch diameter PVC gravity sewer, one single-unit grinder pump station, approximately 630 linear feet of 2-inch diameter PVC force main, approximately 12 linear feet of 2-inch DIP force main, and all apparatuses to make a complete and usable system.

2. BID FORM

In order to receive consideration, bids must be made in strict accordance with the following.

- A. Make bids, upon the forms provided herein, properly signed and with all items filled out. Do not change the wording of the bid form and do not add words to the bid form. Unauthorized conditions, limitations or provisions attached to the bid will be cause for rejection of the bid.
- B. No telegraphic bid or telegraphic modification of a bid will be considered. No bids received after the time fixed for receiving them will be considered. Late bids will be returned to the bidder unopened.
- C. Address bids to the Missouri Department of Transportation, and deliver to the address given in the Invitation to Bid, on or before the day and hour set for opening the bids. Enclose each bid in a sealed envelope bearing the title of the Work, the name of the bidder, and the date and hour of the bid opening. Submit only the original signed copy of the bid. It is the sole responsibility of the bidder to see that the bid is received on time.

3. BONDS

- A. Bid securities, a cashiers check, a Bank Money Order, or a Certified Check made payable to "Director of Revenue, Credit Road Fund", in the amount stated in the invitation to bid must accompany each bid. The successful bidder's security will be retained until he has signed the Contract and has furnished the required Certificates of Insurance.
- B. The Owner reserves the right to retain the security of all bidders until the successful bidder enters into the Contract. Other bid securities will be returned as soon as practical. If any bidder refuses to enter into a Contract, the Owner may retain his bid security as liquidated damages but not as a penalty.
- C. Prior to signing the Contract, the successful bidder will secure a Performance Bond in the amount of 100% of the Contract Sum. Surety, acceptable to the Owner, shall issue the bond. Costs of such bonds will be the responsibility of the bidder.

4. EXAMINATION OF DOCUMENTS AND SITE OF WORK

Before submitting a bid, each bidder shall examine the Drawings carefully, read the Specifications and all other proposed Contract Documents, and visit the site of the work. Each bidder shall fully inform himself, prior to bidding, as to existing conditions and limitations under which the Work is to be performed and shall include in his bid a sum to cover the cost of items necessary to perform the Work, as set forth in the proposed Contract Documents. No allowance will be made to a bidder because of lack of such examination or knowledge. The submission of a bid will be considered conclusive evidence that the bidder has made such examination.

5. INTERPRETATION

No oral interpretations will be made to any bidder as to the meaning of the plans and specifications or the acceptability of alternate products, materials, form or type of construction. Every request for interpretation

shall be made in writing and submitted with all supporting documents not less than ten (10) calendar days before opening of bids. The request shall be sent directly to the project Designer. Every interpretation made to a bidder will be in the form of an addendum and will be sent as promptly as is practicable to all persons to whom plans and specifications have been issued. All such addenda shall become part of the contract documents.

6. PROOF OF COMPETENCY OF BIDDER

A bidder may be required to furnish evidence, satisfactory to the Commission, that he and his proposed subcontractor(s) have sufficient means and experience in the types of work called for to assure completion of the Contract in a satisfactory manner.

7. WITHDRAWAL OF BIDS

- A. A bidder may withdraw his bid, either personally or by written request, at any time prior to the scheduled time for opening bids.
- B. No bid may be amended or withdrawn after the bid is opened.

8. AWARD OR REJECTION OF BIDS

- A. The Contract, if awarded, will be awarded to the responsible bidder who has proposed the lowest Contract Sum, subject to the Commission's right to reject any or all bids and to waive informality and irregularity in the bids and in the bidding.
- B. Award of alternates, if any, will be made in numerical order to result in the maximum amount of work being accepted within available construction funds.
- C. MoDOT is exempt from paying Missouri Sales Tax, Missouri Use Tax and Federal Excise Tax. An Exemption From Missouri Sales and Use Tax on Purchases letter and a Project Exemption Certificate (Form 5060 Rev. 10-2006) for tax-exempt purchases at retail of tangible personal property and materials for the purpose of constructing, repairing or remodeling facilities for the Missouri Highways and Transportation Commission, only if such purchases will "are related to the Commission's exempt functions and activities be furnished to the successful Bidder upon request.

9. EXECUTION OF CONTRACT

- A. The Contract, which the successful bidder will be required to execute, will be included in the Contract Documents.
- B. The bidder to whom the Contract is awarded shall, within fourteen calendar days after notice of award and receipt of Contract Documents from the Commission, sign and deliver required copies to the Commission.
- C. Upon delivery of the signed Contract, the bidder to whom the Contract is awarded shall deliver to the Commission those Certificates of Insurance required by the Contract Documents and Performance Bond, as required by the Commission.
- D. Execution of the Contract by the Commission must be done before the successful bidder may proceed with the work.

10. CONSTRUCTION TIME AND LIQUIDATED DAMAGES

- A. Time of Completion - If this proposal is accepted, it is hereby agreed that work will begin not later than the date specified in the "Notice to Proceed" and will diligently be prosecuted in order to complete the work and billing within **90 working days** from the date specified. Completion of work will be based on FINAL ACCEPTANCE of the building; "SUBSTANTIAL COMPLETION" will not be accepted as basis for completion.
- B. Liquidated Damages - It is agreed that time is of the essence. Because failure to complete the contract within the time fixed herein will cause serious inconvenience, loss, and damage to the state, liquidated damages will be assessed in the amount of **\$100.00** per working day, for each working day after the agreed completion date that the Work is not fully completed.

11. NONDISCRIMINATION

- A. The Bidder/Offeror understands that this project involves state funds and the Bidder/Offeror awarded the contract will be required to comply with the Executive Order 05-30 of the Governor of the State of Missouri dated September 8, 2005. This order stipulates that there shall be no discriminatory employment practices by the Contractor or his subcontractors, if any, based on race, sex, religion, national origin, age, color, disability, or veteran status. The undersigned Contractor or his subcontractors, if any, shall give written notice of their commitments under this clause to any labor union with which they have bargaining or other agreements.
- B. The Contractor shall comply with the Regulations relative to nondiscrimination in federally-assisted programs of the Department of Transportation, Title 49, Code of Federal Regulations, Part 21, as they may be amended from time to time, (hereinafter referred to as the Regulations), which are herein incorporated by reference and made a part of this contract.
- C. All solicitations either by competitive bidding or negotiation made by the Contractor for work to be performed under a subcontract, including procurements of materials or leases of the Contractor's obligations under this contract and the Regulations, will be relative to nondiscrimination on the grounds of race, color, or national origin.
- D. Sanctions for Noncompliance: In the event of the Contractor's noncompliance with the nondiscrimination provisions of this contract, MoDOT shall impose such contract sanctions as it or the Federal Highway Administration may determine to be appropriate, including, but not limited to: (i) withholding of payments to the Contractor under the contract until the Contractor complies, and/or, (ii) cancellation, termination or suspension of the contract, in whole or in part.

12. EXECUTIVE ORDER

- A. The Contractor shall comply with all the provisions of Executive Order 07-13, issued by the Honorable Matt Blunt, Governor of Missouri, on the sixth (6th) day of March, 2007. This Executive Order, which promulgates the State of Missouri's position to not tolerate persons who contract with the state engaging in or supporting illegal activities of employing individuals who are not eligible to work in the United States, is incorporated herein by reference and made a part of this Agreement.
- B. "By signing this Agreement, the Contractor hereby certifies that any employee of the Contractor assigned to perform services under the contract is eligible and authorized to work in the United States in compliance with federal law."
- C. In the event the Contractor fails to comply with the provisions of the Executive Order 07-13, or in the event the Commission has reasonable cause to believe that the contractor has knowingly employed individuals who are not eligible to work in the United States in violation of federal law, the Commission reserves the right to impose such contract sanctions as it may determine to be appropriate, including but not limited to contract cancellation, termination or suspension in whole or in part or both.
- D. The Contractor shall include the provisions of this paragraph in every subcontract. The Contractor shall take such action with respect to any subcontract as the Commission may direct as a means of enforcing such provisions, including sanctions for noncompliance.

13. BIDDERS CERTIFICATION

- A. Preference in Purchasing Products: - Sections 34.073 and 34.076 RSMo 1994 give preference to Missouri corporations, firms, and individuals, when letting contracts or purchasing products. All bids will be evaluated on the basis of Sections 34.073 and 34.076 RSMo 1994. Any successful bidder which is a corporation organized in a state other than Missouri shall furnish to the owner, attached to the Proposal, a properly certified copy of its current Certificate of Authority to do business in the State of Missouri, such certificate to remain on file with the Commission. The Commission will award no Contract unless the bidder furnishes such certificate.
- B. Any successful bidder which is a corporation organized in the State of Missouri shall furnish, at its own cost, if requested, a Certificate of Good Standing issued by the Secretary of State, such certificate to remain on file with the owner.
- C. If the successful bidder is doing business in the State of Missouri under a fictitious name, he shall furnish to the Commission, attached to the Proposal, a properly certified copy of the certificate of Registration of Fictitious Name from the State of Missouri, such certificate shall remain on file with the Commission. The Commission will award no contract until the bidder furnishes such certificate.
- D. Certification Regarding Missouri Domestic Products Procurement Act: - The bidder's attention is directed to the Missouri Domestic Products Procurement Act, Sections 34.350 to 34.359, RSMo. which requires all manufactured goods or commodities used or supplied in the performance of this contract or any subcontract to be manufactured or produced in the United States. Section 34.350, RSMo, does not apply if the total contract is less than One Thousand Dollars (\$1,000.00). Section 34.355, RSMo, requires the vendor or contractor to certify his compliance with Section 34.353 and, if applicable, Section 34.359, RSMo, at the time of bidding and prior to payment. Failure to comply with Section 34.353, RSMo, during performance of the contract and to provide certification of compliance prior to payment will result in nonpayment for those goods or commodities.

Failure to complete this document will cause the State to presume the manufactured goods or products listed in the bid are not manufactured or produced in the United States, and the bid will be evaluated on that basis.

If all the goods or products specified in the attached bid which the bidder proposes to supply to the State shall be manufactured or produced in the "United States" as defined in Section 34.350, RSMo, check the box at left.

If only one line of any particular goods or products specified in the attached bid is manufactured or produced in the "United States" as defined in Section 34.350, RSMo, check the box at left and list the item(s) here:

If any or all of the goods or products specified in the attached bid which you proposed to supply to the State are not manufactured or produced in the "United States" as defined in Section 34.350, RSMo, then: (a) check the box at left; (b) list below by item number the country other than the United States where each goods or product you propose to furnish is manufactured or produced; and (c) check the box(es) at left of the paragraphs below if applicable, and list the corresponding item numbers in the spaces provided.

Item	Location Where Manufactured or Produced
_____	_____
_____	_____
_____	_____
_____	_____
_____	_____
_____	_____
_____	_____

(use additional sheet if necessary)

- [] The following specified goods or products cannot be manufactured or produced in the United States in sufficient quantities or in time to meet the contract specifications.

Item	Location Where Manufactured or Produced
------	---

_____	_____
_____	_____

- [] The following specified goods or products must be treated as manufactured or produced in the United States, in accordance with an existing treaty, law, agreement or regulation of the United States, including a treaty between the United States and any foreign country regarding export-import restrictions or international trade.

Item	Location Where Produced or Manufactured
------	---

_____	_____
_____	_____

CERTIFICATION

By submitting this document, completed as directed above, with a bid, the bidder certifies under penalty of making a false declaration (Section 575.060, RSMo) that the information contained in this document is true, correct and complete and may be relied upon by the State in determining the bidders qualifications under and compliance with the Missouri Products Procurement Act.

The bidder's failure to complete this document as directed above would cause the State to presume the manufactured goods or products listed in the bid are not manufactured in the United States and the bid will be evaluated on that basis pursuant to section 34.353.3(2), RSM

IF A PARTNERSHIP

Name of Partnership

(State Name and Residence Address of All Partners)

Partner

Residence Address

Partner

Residence Address

Address for Communications

Signature of Either Partner

Telephone Number

Federal Tax I.D. Number

IF A CORPORATION

Name of Corporation

Incorporated under the laws of the
State of _____

Name and Title of Officer

Corporate License No. _____
(If a corporation organized in a state other than
Missouri, attach Certificate of Authority to do
business in the State of Missouri.)

Signature of officer

Federal Tax I.D. Number

Address for Communications

(ATTEST)

Telephone Number

(SEAL) Secretary

(Each bidder must complete the Bid Form by signing in the proper signature line above and by supplying the required information called for in connection with the signature. The information called for is necessary in the proper preparation of the contract and performance bond.)

SECTION 00430

SUBCONTRACTOR LISTING

1. For portions of Work equaling or exceeding 1% of the total proposed Contract Sum, the undersigned proposes to use the following subcontractors. Except as otherwise approved by the Owner, the undersigned proposes to perform all other portions of the Work with his own forces.

2. Portion of the Work:	Subcontractor name and address:
_____	_____

_____	_____

_____	_____

_____	_____

_____	_____

USE ADDITIONAL SHEETS
IF REQUIRED

BIDDER:

PROVIDE SIGNATURE
IDENTICAL TO THAT
SHOWN ON THE BID FORM

by _____

SECTION 00600

BID BOND

KNOW ALL MEN BY THESE PRESENTS, that we _____,
as Principal, and _____,
as Surety, are held firmly bound unto the State of Missouri (acting by and through the Missouri Highway and
Transportation Commission) in the penal sum of _____ Dollars (\$ _____),
to be paid to the State of Missouri, or the Missouri Highway and Transportation Commission, to be credited to the
State Road Fund and Principal and Surety binding themselves, their heirs, executors, administrators, successors and
assigns, jointly and severally, firmly by these presents.

Sealed with our seals and dated this _____ day of _____, 20_____

THE CONDITION OF THIS OBLIGATION is such that:
WHEREAS, the Principal is submitting herewith a bid to the Missouri Highway and Transportation Commission on
Route(s) _____,
in _____ County(ies), Project(s) _____,
for construction or improvement as set out in said proposal.

NOW THEREFORE, if the Missouri Highway and Transportation Commission shall accept the bid of the Principal,
and if said Principal shall properly execute and deliver to the Missouri Highway and Transportation Commission the
Contract, Contract Bond, Specifications and evidence of insurance coverage in compliance with the requirements of
the Proposal, to the satisfaction of the Missouri Highway and Transportation Commission, then this obligation shall
be void and of no effect, otherwise to remain in full force and effect.

In the event the said Principal shall, in the judgment of the Missouri Highway and Transportation Commission, fail to
comply with any requirement as set forth in the preceding paragraph, then the State of Missouri, acting through the
Missouri Highway and Transportation Commission, shall immediately and forthwith be entitled to recover the fees,
and any other expense of recovery.

Principal

Surety

By _____

Attorney in Fact (SEAL)

Attest: (CORPORATE SEAL)

Corporate Secretary

Note: This bond must be executed by the Principal and by a Corporate Surety authorized to conduct
surety business in the State of Missouri.

SECTION 01010
GENERAL CONDITIONS

1. General. The contractor shall do all things necessary to the performance of the contract in a substantial and acceptable manner in accordance with the specifications and plans.
2. Employer's Liability. Contractor shall furnish evidence to the Commission that with respect to the operations it performs, it either carries employers' liability or worker's compensation insurance or is qualified as self-insured under the provisions of law of the state relating to worker's compensation.
3. The Contractor shall purchase and maintain such insurance as will protect him from claims under workmen's compensation acts and other employee benefit acts, from claims for damages because of bodily injury, including death, and from claims for damages to property which may arise out of or result from the Contractor's operations under this Contract, whether such operations be by himself or by any Subcontractor or anyone directly or indirectly employed by any of them.
4. This insurance shall be written for not less than any limits of liability specified as part of this contract, or required by law, whichever is the greater, and shall include contractual liability insurance as applicable to the Contractor's obligations under this contract. Unless otherwise specified, insurance limits shall be as follows:
 - A. Workmen's Compensation: Workers Compensation Insurance, including "Occupational Disease Act" requirements, must be maintained if required by law.
 - B. Public Liability (includes property damage and personal injury):
 - i Not less than \$400,000 for any one person in a single accident or occurrence.
 - ii. Not less than \$2,500,000 for all claims arising out of a single occurrence.
5. Duration of Insurance. The evidence of insurance required by sections 2, 3, and 4 above shall be furnished to the Commission prior to the effective date of the Notice to Proceed. All insurance herein before specified shall be carried until all work required to be performed under the terms of the contract is satisfactorily completed as evidenced by the formal acceptance by the Commission and in the event that the limits of coverage for property damage are depleted or decreased by the payment of claims, the contractor shall procure a reinstatement of the limits. The cost of all insurance required to be carried by the contractor shall be considered as completely covered by the contract price.
6. Inspection of Work. Commission's engineer shall be permitted to inspect all work, materials, payrolls, records of personnel, invoices of materials and other data and records relating to the work. If requested by Commission's engineer, the contractor shall at any time before final acceptance of the work uncover any portion of the finished work as directed for inspection. After examination, the contractor shall restore said portions of the work to the standards required by the contract. Should the work thus exposed and examined prove acceptable, the actual cost of uncovering, removing and replacing shall be paid by the Commission. Should the work so exposed and examined prove unacceptable, the uncovering, removing and replacing shall be at the expense of the contractor.
7. Change Orders. All departures from the plans and specifications will be considered unauthorized unless, before proceeding with the work, the contractor has had delivered to it a change order, signed by the Commission's engineer, authorizing and directing such changes or departures. All unauthorized work shall be at the contractor's expense and the engineer may order such unauthorized work removed and replaced at the contractor's expense.
8. Defective Work. All work which has been rejected shall be remedied, or if necessary, removed and replaced in an acceptable manner by the contractor at its expense. If the contractor fails to remedy or replace such defective work immediately after receiving written notice from the Commission's engineer, Commission may employ labor to correct the defective work, and the cost incurred in making such corrections shall be deducted from the payment due or to become due the contractor under this contract.

9. Contractor's Responsibility for Work. Until Commission's engineer accepts the work, it shall be in the custody and under the charge and care of the contractor. Contractor shall rebuild, repair, restore or make good at its own expense any lost or stolen Commission-owned material and all injuries or damages to any portion of the work caused by action of the elements or from any other reason before its completion and final acceptance. Issuance of a payment estimate on any part of the work done will not be considered as final acceptance of any work completed up to that time.
10. Preservation of Utilities and Monuments. The contractor shall be responsible for the preservation of all public and private utilities, wires, lines, pipes, poles, cables, and conduit at the site of the work and shall use every precaution necessary to prevent damage or injury thereto. The contractor shall not disturb or damage any land monument or property landmark until an authorized agent has witnessed or otherwise referenced, their location and shall not remove them until directed by Commission's engineer.
11. Cooperation with Other Contractors. The contractor shall arrange its work so as not to interfere with the operations of other contractors of the Commission which might be engaged in performing adjacent or nearby work. Whenever work being done by other contractors is contiguous or related to the work involved in this contract, the respective rights of the various contractors will be determined by the Commission's engineer in order to secure the completion of the work under all contracts in general harmony.
12. Temporary Suspension of Work. Commission's engineer shall have authority to suspend work, wholly or in part, for such period or periods of time as he may deem necessary when weather or other conditions are such that in the opinion of the engineer the work may be done at a later time with advantage to the Commission or for failure on the part of the contractor to comply with any of the provisions of the contract. The contractor may suspend work for reasonable cause with written approval of the engineer. Liquidated damages shall not accrue during the period in which work is suspended with the approval of the engineer, however, if the suspension is because of the contractor's failure to comply to any of the provisions of the contract, the contractor shall not be entitled to an extension of completion time nor to a waiver of liquidated damages. In the event work is suspended, the contractor shall store all materials in a manner that will protect them from damage, and shall take every precaution to prevent damage or deterioration of, the portions of the work completed. If work has been discontinued for any reason, the contractor shall give Commission's engineer written notice at least forty-eight (48) hours before resuming operations.
13. Contractor's Procedure for Claims. If the contractor considers additional compensation may be due for work or material not clearly covered in the contract or ordered in writing by the engineer as extra work, or if additional compensation may be requested beyond the scope of such provisions, the contractor shall notify the engineer in writing of the intention to make a claim before beginning the work in question. If notification is not given and the engineer is not afforded proper facilities by contractor to provide necessary inspection and for keeping strict account of actual cost, the contractor agrees to waive any claims for additional compensation. Notice by the contractor, and the fact that the engineer has kept account of the cost shall not be construed as substantiating the validity of the claim. The contractor shall file a written notice of claim for additional compensation in triplicate within 60 days after completing the work in question.

If the claim is against the Commission, the notice of claim shall be personally delivered, or sent by certified mail to the office of the Secretary of the Commission in Jefferson City, Missouri. All notices of claims shall contain an itemized statement showing completely and fully the items and amounts forming the basis of the claim.

Any claim or an item of any claim, not included in the notice and statement, or any claim included but not clearly defined and specifically set out and itemized or any claim not filed within the time and in the manner provided, shall be forever waived and shall neither constitute the basis of nor be included in any legal action, counterclaim, set-off, or arbitration.

All claims filed with Missouri Highway and Transportation Commission's Secretary will be forwarded to the Missouri Department of Transportation's Claims Committee.

14. Overhead and Profit on Change Orders. The percentages for overhead and profit charged on Change Orders and Field Work Authorizations shall be negotiated and may vary according to the nature, extent and complexity of the work involved. However, the overhead and profit for the contractor or subcontractor actually performing the work shall not exceed 15%. When one or more tiers of subcontractors are used, in no event shall any contractor or subcontractor receive as overhead and profit more than 7% of the cost of the work performed by any of his subcontractors. In no case shall the total overhead and profit paid by the owner on any change order exceed twenty five percent (25%) of the cost of materials, labor and equipment necessary to put the change order work in place.
15. Review of Submittals. The architect's review of submittals is only for the limited purpose of checking for conformance with information given and seeing if they conform to design intent. The architect is not responsible for determining the accuracy of measurements and completeness of details, for verifying quantities, or for checking fabrication or installation procedures. The architect's review does not relieve the contractor of his or her responsibilities under the contract documents.
16. A working day. Is defined as any day when, soil and weather conditions would permit the major operation of the project for six hours or more unless other unavoidable conditions prevent the contractor's operation. If conditions require the contractor to stop work in less than six hours, the day will not be counted as a working day. Working days will begin as soon as notice to proceed is issued. In order for MoDOT not to change a workday due to unavoidable conditions, the contractor must have enough forces, equipment, and materials on site to begin the project. The contractor must notify MoDOT inspector before 12:00 noon of said working day if forces will not be present.

END OF SECTION

SECTION 01011

SUPPLEMENTARY CONDITIONS

- A. The following supplements modify, change, delete from or add to the "General Conditions."
1. The proposed work includes the furnishing of all materials, equipment and labor for the work as set forth in the plans, proposal and specifications.
 2. The contractor will be required to remove from the Highway and Transportation Commission's property all debris.
 3. The contract price shall include any necessary permits and licenses required by law incidental to the work. Local ordinances requiring building permits are not applicable to the state. Contractor will comply with local laws involving safety in the prosecution of the work.
 4. Contractor will provide a one-year warranty for parts and labor on all building material, and equipment or a standard manufacturer's warranty which ever is greater. All warranties, including extended service agreements shall begin on the date of Final Acceptance of this project.
 5. The plans holders list may be obtained from the One Stop Facility located at 1320 Creek Trail Dr., Jefferson City, Mo 65102 , by calling 573/522-5591 or electronically down-loaded from http://www.modot.org/business/contractor_resources/FacilitiesConstructionandMaintenance.htm
- B. DEFINITIONS
1. Architect/Engineer: When the term "Architect/Engineer" is used herein, it shall refer to Kraig Spence or Larry Black, Project Solutions Engineering, (573) 443-7100, FAX (573) 443-7181.
 2. Construction Inspector: When the term "Construction Inspector" is used herein, it shall refer to Kevin Griep, Missouri Department of Transportation, General Services Division, (573) 526-4860, FAX (573) 526-6948.

END OF SECTION

SECTION 01019

CONTRACT CONSIDERATIONS

PART 1 GENERAL

1.1 SECTION INCLUDES

- A. Schedule of values.
- B. Application for payment.
- C. Change procedures.
- D. Alternatives.

1.2 RELATED SECTIONS

- A. Section 01600 - Material and Equipment: Product substitutions.

1.3 SCHEDULE OF VALUES

- A. Submit a printed schedule on Contractor's standard form. Electronic media printout will be considered.
- B. Submit Schedule of Values in duplicate within 20 days after date of Owner-Contractor Agreement.
- C. Revise schedule to list approved Change Orders, with each Application For Payment.

1.4 APPLICATIONS FOR PAYMENT

- A. Submit four copies of each application on Contractor's electronic media driven form.
- B. Content and Format: Utilize Schedule of Values for listing items in Application for Payment.
- C. Payment Period: 30 days.
- D. Submit waiver of liens from vendors.
- E. Include an updated construction progress schedule.
- F. Certified payroll records.

1.5 CHANGE PROCEDURES

- A. The Architect/Engineer may issue a Notice of Change that includes a detailed description of a proposed change with supplementary or revised Drawings and specifications, a change in Contract Time for executing the change with a stipulation of any overtime work required.
- B. The Contractor may propose changes by submitting a request for change to the Architect/Engineer, describing the proposed change and its full effect on the Work. Include a statement describing the reason for the change, the effect on the Contract Sum/Price and Contract Time, and a statement describing the effect on Work by the MoDOT District or other Contractors.
- C. Stipulated Sum/Price Change Order: Based on Notice of Change and Contractor's fixed price quotation or Contractor's request for a Change Order as approved by Architect/Engineer.
- D. Construction Change Directive: Architect/Engineer may issue a directive instructing the Contractor to proceed with a change in the Work, for subsequent inclusion in a Change Order. Document will describe changes in the Work, and designate method of determining any change in Contract Sum/Price or Contract Time. Promptly execute the change.

- E. Time and Material Change Order: Submit itemized account and supporting data after completion of change, within time limits indicated in the Conditions of the Contract. Architect/Engineer will determine the change allowable in Contract Sum/Price and Contract Time as provided in the Contract Documents.
- F. Maintain detailed records of work done on Time and Material basis. Provide full information required for evaluation of proposed changes, and to substantiate costs for changes in the Work.
- G. Execution of Change Orders: Architect/Engineer will issue Change Orders for signatures of parties as provided in the Conditions of the Contract.

1.6 DEFECT ASSESSMENT

- A. Replace the Work, or portions of the Work, not conforming to specify requirements.
- B. If, in the opinion of the Architect/Engineer, it is not practical to remove and replace the Work, the Architect/Engineer will direct an appropriate remedy or adjust payment.

1.7 ALTERNATIVES

- A. Accepted Alternatives will be identified in Owner-Contractor Agreement.

END OF SECTION

SECTION 01039

COORDINATION AND MEETINGS

PART 1 GENERAL

1.1 SECTION INCLUDES

- A. Coordination and project conditions.
- B. Preconstruction meeting.
- C. Progress meetings.
- D. Preinstallation meetings.
- E. Equipment electrical characteristics and components.
- F. Examination.
- G. Preparation.
- H. Cutting and Patching.
- I. Alteration project procedures.

1.2 COORDINATION AND PROJECT CONDITIONS

- A. Coordinate scheduling, submittals, and Work of the various sections of the Project Manual to ensure efficient and orderly sequence of installation of interdependent construction elements.
- B. Verify utility requirements and characteristics of operating equipment are compatible with building utilities. Coordinate work of various sections having interdependent responsibilities for installing, connecting to and placing in service, such equipment.
- C. Coordinate space requirements, supports, and installation of mechanical and electrical Work, which are indicated diagrammatically on Drawings. Follow routing shown for pipes, and conduit, as closely as practicable; place runs parallel with lines of building. Utilize spaces efficiently to maximize accessibility for other installations, for maintenance, and for repairs.
- D. In finished areas, except as otherwise indicated, conceal wiring within the construction.
- E. Coordinate completion and clean up of Work of separate sections in preparation for Substantial Completion.

1.3 PRECONSTRUCTION MEETING

- A. Architect/Engineer will schedule a meeting after Notice of Award.
- B. Attendance Required: District engineer or representative, Architect/Engineer and Contractor.
- C. Record minutes and distribute copies within 5 days after meeting to participants, with two copies to District Engineer, Architect/Engineer, participants and those affected by decisions made.

1.4 PROGRESS MEETINGS

- A. Schedule and administer meetings throughout progress of the Work at when arranged by architect/engineer.
- B. Architect/Engineer will make arrangements for meetings, prepare agenda with copies for participants, and preside at meetings.
- C. Attendance Required: Job superintendent, major Subcontractors and suppliers, District engineer representative, Architect/Engineer, as appropriate to agenda topics for each meeting.

- D. Agenda:
 - 1. Review of Work progress.
 - 2. Field observations, problems, and decisions.
 - 3. Identification of problems, which impede planned progress.
 - 4. Maintenance of progress schedule.
 - 5. Corrective measures to regain projected schedules.
 - 6. Coordination of projected progress.
 - 7. Effect of proposed changes on progress schedule and coordination.
- E. Record minutes and distributes copies within 5 days after meeting to participants and those affected by decisions made.

1.5 PREINSTALLATION MEETING

- A. When required in individual specification sections, convene a pre-installation meeting at the site prior to commencing work of the section.
- B. Notify Architect/Engineer seven days in advance of meeting date.
- C. Prepare agenda and preside at meeting:
 - 1. Review conditions of installation, preparation and installation procedures.
 - 2. Review coordination with related work.
- D. Record minutes and distributes copies within 5 days after meeting to participants and those affected by decisions made.

PART 2 PRODUCTS

Not used

PART 3 EXECUTION

3.1 CUTTING AND PATCHING

- A. Employ skilled and experienced installer to perform cutting and patching.
- B. Submit written request in advance of cutting or altering elements, which affect:
 - 1. Structural integrity of element.
 - 2. Integrity of weather-exposed or moisture-resistant elements.
 - 3. Work of Owner or separate contractor.
- C. Execute cutting, fitting, and patching to complete Work, and to:
 - 1. Uncover Work to install or correct ill-timed Work.
 - 2. Remove and replace defective and non-conforming Work.
 - 3. Provide openings in elements of Work for penetrations of mechanical and electrical Work.
- D. Cut masonry and concrete materials using masonry saw or core drill.
- E. Fit Work tight to pipes, sleeves, ducts, conduit and other penetrations through surfaces.
- F. Maintain integrity of wall, ceiling, or floor construction; completely seal voids.
- G. Refinish surfaces to match adjacent finishes. For continuous surfaces, refinish to nearest intersection; for an assembly, refinish entire unit.
- H. Identify hazardous substances or conditions exposed during the Work to the Architect/Engineer for decision or remedy.

3.2 ALTERATION PROJECT PROCEDURES

- A. Materials: As specified in Product sections; match existing Products and work for patching and extending work.
- B. Close openings in exterior surfaces to protect existing work from weather and extremes of temperature and humidity.
- C. When finished surfaces are cut so that a smooth transition with new Work is not possible, terminate existing surface along a straight line at a natural line of division and submit recommendation to Architect/Engineer for review.
- D. Patch or replace portions of existing surfaces that are damaged, lifted, discolored or showing other imperfections.
- E. Finish surfaces as specified in individual Product sections.

END OF SECTION

SECTION 01300

SUBMITTALS

PART 1 GENERAL

1.1 SECTION INCLUDES

- A. Submittal procedures.
- B. Construction progress schedules.
- C. Proposed Products list.
- D. Product Data.
- E. Shop Drawings.
- F. Certificates.
- G. Manufacturer's instructions.

1.2 RELATED SECTIONS

- A. Section 01300 - Submittals
- B. Section 01400 - Quality Control: Manufacturers' field services and reports.
- C. Section 01700 - Contract Closeout: Contract warranties, bonds, manufacturers' certificates and closeout submittals.

1.3 REFERENCES

- A. AGC Associated General Contractors of America publication "The Use of CPM in Construction - A Manual for General Contractors and the Construction Industry".

1.4 SUBMITTAL PROCEDURES

- A. Transmit each submittal with Architect/Engineer accepted form.
- B. Identify Project, Contractor, Subcontractor or supplier; pertinent drawing and detail number and specification section number, as appropriate.
- C. Apply Contractor's stamp, signed or initialed certifying that review, approval, 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 Architect/Engineer at business address. Coordinate submission of related items.
- E. For each submittal for review, allow 15 days excluding delivery time to and from the contractor.
- F. Identify variations from Contract Documents and Product or system limitations, which may be detrimental to successful performance of the completed Work.
- G. Submittals not requested will not be recognized or processed.

1.5 CONSTRUCTION PROGRESS SCHEDULES

- A. Submit initial schedule in duplicate within 15 days after date established in Notice to Proceed.
- B. Revise and resubmit as required.
- C. Submit revised schedules with each Application for Payment, identifying changes since previous version.

- D. Submit a horizontal bar chart with separate line for each major portion of Work or operation, identifying first workday of each week.

1.6 PROPOSED PRODUCTS LIST

- A. Within 15 days after date of Notice to Proceed, submit 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.

1.7 PRODUCT DATA

- A. Product Data For Review:
 - 1. Submitted to Architect/Engineer for review for the limited purpose of checking for conformance with information given and the design concept expressed in the contract documents.
 - 2. After review, provide copies and distribute in accordance with SUBMITTAL PROCEDURES article above and for record documents purposes described in Section 01700 - CONTRACT CLOSEOUT.
- B. Product Data For Information:
 - 1. Submitted for the Architect/Engineer's knowledge as contract administrator or for the Owner.
- C. Product Data For Project Closeout:
 - 1. Submitted for the Owner's benefit during and after project completion.
- D. Submit the number of copies, which the Contractor requires, plus two copies that will be retained by the Architect/Engineer.
- E. Mark each copy to identify applicable products, models, options and other data. Supplement manufacturers' standard data to provide information specific to this Project.
- F. After review distribute in accordance with the Submittal Procedures article above and provide copies for record documents described in Section 01700 - CONTRACT CLOSEOUT.

1.8 SHOP DRAWINGS

- A. Shop Drawings For Review:
 - 1. Submitted to Architect/Engineer for review for the limited purpose of checking for conformance with information given and the design concept expressed in the contract documents.
 - 2. After review, produce copies and distribute in accordance with SUBMITTAL PROCEDURES article above and for record documents purposes described in Section 01700 - CONTRACT CLOSEOUT.
- B. Shop Drawings For Information:
 - 1. Submitted for the Architect/Engineer's knowledge as contract administrator or for the Owner.
- C. Shop Drawings For Project Closeout:
 - 1. Submitted for the Owner's benefit during and after project completion.

- D. Indicate special utility and electrical characteristics, utility connection requirements and location of utility outlets for service for functional equipment and appliances.
- E. Submit in the form of one reproducible transparency and one opaque reproduction.

1.9 CERTIFICATES

- A. When specified in individual specification sections, submit certification by the manufacturer, installation/application subcontractor, or the Contractor to Architect/Engineer, in quantities specified for Product Data.
- B. Indicate material or Product conforms to or exceeds specified requirements. Submit supporting reference data, affidavits and certifications as appropriate.
- C. Certificates may be recent or previous test results on material or Product but must be acceptable to Architect/Engineer.

1.10 MANUFACTURER'S INSTRUCTIONS

- A. When specified in individual specification sections, submit printed instructions for delivery, storage, assembly, installation, and start-up, adjusting and finishing, to Architect/Engineer for delivery to owner in quantities specified for Product Data.
- B. Indicate special procedures, perimeter conditions requiring special attention and special environmental criteria required for application or installation.
- C. Refer to Section 01400 - Quality Control, Manufacturers' Field Services article.

END OF SECTION

SECTION 01400
QUALITY CONTROL

PART 1 GENERAL

1.1 SECTION INCLUDES

- A. Quality assurance - control of installation.
- B. Tolerances
- C. References and standards.
- D. Inspecting and testing laboratory services.
- E. Manufacturers' field services.

1.2 RELATED SECTIONS

- A. Section 01300 - Submittals: Submission of manufacturers' instructions and certificates.
- B. Section 01600 - Material and Equipment: Requirements for material and product quality.
- C. Section 01650 - Starting of Systems.

1.3 QUALITY ASSURANCE - CONTROL OF INSTALLATION

- A. Monitor quality control over suppliers, manufacturers, Products, services, site conditions and workmanship, to produce Work of specified quality.
- B. Comply with manufacturers' instructions, including each step in sequence.
- C. Should manufacturers' instructions conflict with Contract Documents, request clarification from Architect/Engineer before proceeding.
- D. Comply with specified standards as minimum quality for the Work except where more stringent tolerances, codes or specified requirements indicate higher standards or more precise workmanship.
- E. Perform Work by persons qualified to produce required and specified quality.
- F. Verify that field measurements are as indicated on shop drawings or as instructed by the manufacturer.
- G. Secure Products in place with positive anchorage devices designed and sized to withstand stresses, vibration, physical distortion, or disfigurement.

1.4 TOLERANCES

- A. Monitor fabrication and installation tolerance control of Products to produce acceptable Work. Do not permit tolerances to accumulate.
- B. Comply with manufacturers' tolerances. Should manufacturers' tolerances conflict with Contract Documents, request clarification from Architect/Engineer before proceeding.
- C. Adjust Products to appropriate dimensions; position before securing Products in place.

1.5 REFERENCES AND STANDARDS

- A. For Products or workmanship specified by association, trade or other consensus standards, comply with requirements of the standard, except when more rigid requirements are specified or are required by applicable codes.

- B. Conform to reference standard by date of issue current on date for receiving bids or date specified in the individual specification sections, except where a specific date is established by code.
- C. Neither the contractual relationships, duties or responsibilities of the parties in Contract nor those of the Architect/Engineer shall be altered from the Contract Documents by mention or inference otherwise in any reference document.

1.6 TESTING SERVICES

- A. Contractor to provide all testing services as called out in these specifications.
- B. Testing and source quality control may occur on or off the project site. Perform off-site testing as required by the Architect/Engineer or the Owner.
- C. Testing does not relieve Contractor to perform Work to contract requirements.
- D. Re-testing required because of non-conformance to specified requirements shall be performed by the same MoDOT personnel on instructions by the Architect/Engineer.

1.7 INSPECTION SERVICES

- A. Owner will employ MoDOT Personnel to perform inspection.
- B. Inspecting may occur on or off the project site. Perform off-site inspecting as required by the Architect/Engineer or the Owner.
- C. Inspecting does not relieve Contractor to perform Work to contract requirements.

1.8 MANUFACTURERS' FIELD SERVICES

- A. When specified in individual specification sections, require material or Product suppliers or manufacturers to provide qualified staff personnel to observe site conditions, conditions of surfaces and installation, quality of workmanship, start-up of equipment, test, adjust and the balancing of equipment as applicable and to initiate instructions when necessary.
- B. Report observations and site decisions or instructions given to applicators or installers that are supplemental or contrary to manufacturers' written instructions.
- C. Refer to Section 01300 - SUBMITTALS, MANUFACTURERS' FIELD REPORTS article.

PART 2 EXECUTION

2.1 EXAMINATION

- A. Verify that existing site conditions and substrate surfaces are acceptable for subsequent Work. Beginning new Work means acceptance of existing conditions.
- B. Verify that existing substrate is capable of structural support or attachment of new Work being applied or attached.

2.2 PREPARATION

- A. Clean substrate surfaces prior to applying next material or substance.
- B. Seal cracks or openings of substrate prior to applying next material or substance.
- C. Apply manufacturer required or recommended substrate primer, sealer or conditioner prior to applying any new material or substance in contact or bond.

END OF SECTION

SECTION 01500

CONSTRUCTION FACILITIES AND TEMPORARY CONTROLS

PART 1 GENERAL

1.1 SECTION INCLUDES

- A. Temporary Utilities: Sanitary Facilities.
- B. Temporary Controls: enclosures and fencing, protection of the Work and water control.
- C. Construction Facilities: Access roads, parking, progress cleaning and project signage.

1.2 TEMPORARY SANITARY FACILITIES

- A. Provide and maintain required facilities and enclosures. Provide at time of project mobilization.

1.3 FENCING

- A. Construction: Use plastic mesh safety fencing or better.
- B. Provide 48" high fence around construction site; equip with vehicular and pedestrian gates with locks.
- C. Provide protection for plant life designated to remain. Replace damaged plant life.

1.4 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.

1.5 EXTERIOR ENCLOSURES

- A. Provide temporary weather tight closure of exterior openings to accommodate acceptable working conditions and protection for Products, to allow for temporary heating and maintenance of required ambient temperatures identified in individual specification sections, and to prevent entry of unauthorized persons. Provide access doors with self-closing hardware and locks.

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 prevent damage.
- C. Provide protective coverings at walls, projections, jambs, sills and soffits of openings.
- D. Protect finished floors, stairs, and other surfaces from traffic, dirt, wear, damage or movement of heavy objects, by protecting with durable sheet materials.
- E. Prohibit traffic or storage upon waterproofed or roofed surfaces. If traffic or activity is necessary, obtain recommendations for protection from waterproofing or roofing material manufacturer.
- F. Prohibit traffic from landscaped areas.

1.7 SECURITY

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

1.8 ACCESS ROADS

- A. Provide and maintain access to fire hydrants, free of obstructions.
- B. Provide means of removing mud from vehicle wheels before entering streets.
- C. Designated existing on-site roads may be used for construction traffic.

1.9 PARKING

- A. Temporary parking areas for construction personnel shall be gravel or other hard-surfaced areas of the existing facility.
- B. When site space is not adequate, provide additional off-site parking.

1.10 PROGRESS CLEANING AND WASTE REMOVAL

- A. Maintain areas free of waste materials, debris and rubbish. Maintain site in a clean and orderly condition.
- B. Broom and vacuum clean interior areas prior to start of surface finishing and continue cleaning to eliminate dust.
- C. Collect and remove waste materials, debris and rubbish from site periodically and dispose off-site.

1.11 REMOVAL OF UTILITIES, FACILITIES, AND CONTROLS

- A. Remove temporary utilities, equipment, facilities and materials prior to Final Application for Payment inspection.
- B. Clean and repair damage caused by installation or use of temporary work.
- C. Restore existing facilities used during construction to original condition. Restore permanent facilities used during construction to specified condition.

PART 2 PRODUCTS

Not Used.

PART 3 EXECUTION

Not Used.

END OF SECTION

SECTION 01600

MATERIAL AND EQUIPMENT

PART 1 GENERAL

1.1 SECTION INCLUDES

- A. Products.
- B. Transportation and handling.
- C. Storage and protection.
- D. Product options.
- E. Substitutions.

1.2 RELATED SECTIONS

- A. Instructions to Bidders: Product options and substitution procedures.
- B. Section 01400 - Quality Control: Product quality monitoring.

1.3 PRODUCTS

- A. Do not use materials and equipment removed from existing premises, except as specifically permitted by the Contract Documents.
- B. Provide interchangeable components of the same manufacture for components being replaced.

1.4 TRANSPORTATION AND HANDLING

- A. Transport and handle Products in accordance with manufacturer's instructions.
- B. Promptly inspect shipments to ensure that Products comply with requirements, quantities are correct and products are undamaged.
- C. Provide equipment and personnel to handle Products by methods to prevent soiling, disfigurement or damage.

1.5 STORAGE AND PROTECTION

- A. Store and protect Products in accordance with manufacturers' instructions.
- B. Store with seals and labels intact and legible.
- C. For exterior storage of fabricated Products, place on sloped supports above ground.
- D. Provide bonded off-site storage and protection when site does not permit on-site storage or protection.
- E. Cover Products subject to deterioration with impervious sheet covering. Provide ventilation to prevent condensation and degradation of Products.
- F. Store loose granular materials on solid flat surfaces in a well-drained area. Prevent mixing with foreign matter.
- G. Provide equipment and personnel to store Products by methods to prevent soiling, disfigurement or damage.
- H. Arrange storage of Products to permit access for inspection. Periodically inspect to verify Products are undamaged and are maintained in acceptable condition.

1.6 PRODUCT OPTIONS

- A. Products Specified by Reference Standards or by Description Only: Any Product meeting those standards or description is acceptable.
- B. Products Specified by Naming One or More Manufacturers with a Provision for Substitutions: Submit a request for substitution for any manufacturer not named in accordance with the following article.

1.7 SUBSTITUTIONS

- A. Architect/Engineer will consider requests for Substitutions only within 15 days after date established in Notice to Proceed.
- B. Substitutions may be considered when a Product becomes unavailable through no fault of the Contractor.
- C. Document each request with complete data substantiating compliance of proposed Substitution with Contract Documents.
- D. A request constitutes a representation that the Contractor:
 - 1. Has investigated proposed Product and determined that it meets or exceeds the quality level of the specified Product.
 - 2. Will provide the same warranty for the Substitution as for the specified Product.
 - 3. Will coordinate installation and make changes to other Work that may be required for the Work to be complete with no additional cost to Owner.
 - 4. Waives claims for additional costs or time extension that may subsequently become apparent.
 - 5. Will reimburse Owner for review or redesign services associated with re-approval by authorities.
- E. Substitutions will not be considered when they are indicated or implied on shop drawing or product data submittals, without separate written request or when acceptance will require revision to the Contract Documents.
- F. Substitution Submittal Procedure:
 - 1. Submit three copies of request for Substitution for consideration. Limit each request to one proposed Substitution.
 - 2. Submit shop drawings, product data and certified test results attesting to the proposed Product equivalence. Burden of proof is on proposer.
 - 3. The Architect/Engineer will notify Contractor in writing of decision to accept or reject request.

PART 2 PRODUCTS

Not Used.

PART 3 EXECUTION

Not Used.

END OF SECTION

SECTION 01650

STARTING OF SYSTEMS

PART 1 GENERAL

1.1 SECTION INCLUDES

- A. Starting systems.
- B. Demonstration and instructions.
- C. Testing, adjusting and balancing.

1.2 RELATED SECTIONS

- A. Section 01400 - Quality Control: Manufacturers field reports.
- B. Section 01700 - Contract Closeout: System operation and maintenance data and extra materials.

1.3 STARTING SYSTEMS

- A. Coordinate schedule for start-up of various equipment and systems.
- B. Notify Architect/Engineer seven days prior to start-up of each item.
- C. Verify that each piece of equipment or system has been checked for proper lubrication, drive rotation, belt tension, and control sequence and for conditions that may cause damage.
- D. Verify tests, meter readings, and specified electrical characteristics agree with those required by the equipment or system manufacturer.
- E. Verify that wiring and support components for equipment are complete and tested.
- F. Execute start-up under supervision of applicable manufacturer's representative or Contractors' personnel in accordance with manufacturers' instructions.
- G. When specified in individual specification Sections, require manufacturer to provide authorized representative to be present at site to inspect, check and approve equipment or system installation prior to start-up and to supervise placing equipment or system in operation.
- H. Submit a written report in accordance with Section 01300 that equipment or system has been properly installed and is functioning correctly.

1.4 DEMONSTRATION AND INSTRUCTIONS

- A. Demonstrate operation and maintenance of Products to Owner's personnel two weeks prior to date of Final Completion.
- B. For equipment or systems requiring seasonal operation, perform demonstration for other season within six months.
- C. Utilize operation and maintenance manuals as basis for instruction. Review contents of manual with Owners' personnel in detail to explain all aspects of operation and maintenance.
- D. Demonstrate start-up, operation, control, adjustment, trouble-shooting, servicing, maintenance and shutdown of each item of equipment at agreed time, at equipment location.

- E. Prepare and insert additional data in operations and maintenance manuals when the need for additional data becomes apparent during instruction.
- F. The amount of time required for instruction on each item of equipment and system that's specified in individual sections.

PART 2 PRODUCTS

Not Used.

PART 3 EXECUTION

Not Used.

END OF SECTION

SECTION 01700

CONTRACT CLOSEOUT

PART 1 GENERAL

1.1 SECTION INCLUDES

- A. Closeout procedures.
- B. Final cleaning.
- C. Adjusting.
- D. Project record documents.
- E. Operation and maintenance data.
- F. Spare parts and maintenance Products.
- G. Warranties.

1.2 RELATED SECTIONS

- A. Section 01500 - Construction Facilities and Temporary Controls: Progress cleaning.
- B. Section 01650 - Starting of Systems: System start-up, testing, adjusting and balancing.

1.3 CLOSEOUT PROCEDURES

- A. Submit written certification that Contract Documents have been reviewed, Work has been inspected, and that Work is complete in accordance with Contract Documents and ready for Architect/Engineer's review.
- B. Provide submittals to Owner that is required by governing or other authorities.
- C. Submit final Application for Payment identifying total adjusted Contract Sum, previous payments and sum remaining due.

1.4 FINAL CLEANING

- A. Execute final cleaning prior to final project assessment.
- B. Clean site; sweep paved areas, rake clean landscaped surfaces.
- C. Remove waste and surplus materials, rubbish and construction facilities from the site.

1.5 ADJUSTING

- A. Adjust operating Products and equipment to ensure smooth and unhindered operation.

1.6 PROJECT RECORD DOCUMENTS

- A. Store record documents separate from documents used for construction.
- B. Record information concurrent with construction progress.
- C. Record Drawings and Shop Drawings: Legibly mark each item to record actual construction including:
 - 1. Measured horizontal and vertical locations of underground utilities and appurtenances, referenced to permanent surface improvements.
 - 2. Field changes of dimension and detail.
 - 3. Details not on original Contract drawings.
- D. Submit documents to Architect/Engineer with claim for final Application for Payment.

1.7 OPERATION AND MAINTENANCE DATA

- A. Submit data bound in 8-1/2 x 11 inch (A4) text pages, three D side ring binders with durable plastic covers.
- B. Prepare binder cover with printed title "OPERATION AND MAINTENANCE INSTRUCTIONS", title of project and subject matter of binder when multiple binders are required.
- C. Internally subdivide the binder contents with permanent page dividers, logically organized; with tab titling clearly printed under reinforced laminated plastic tabs.
- D. Submit 1 draft copy of completed volumes 15 days prior to final inspection. This copy will be reviewed and returned with Architect/Engineer comments. Revise content of all document sets as required prior to final submission.
- E. Submit two sets of revised final volumes, within 10 days after final inspection.

1.8 WARRANTIES

- A. Execute and assemble transferable warranty documents from Subcontractors, suppliers and manufacturers.
- B. Submit prior to final Application for Payment.
- C. For items of Work delayed beyond date of Final Completion, provide updated submittal within 10 days after acceptance, listing date of acceptance as start of the warranty period.

PART 2 PRODUCTS

Not Used.

PART 3 EXECUTION

Not Used.

END OF SECTION

**SECTION 02100
CONSTRUCTION LAYOUT**

PART 1 - GENERAL

1.01 SECTION INCLUDES

- A. Construction layout and staking.

1.02 GENERAL

- A. The Contractor will provide construction staking as herein described.
- B. The Owner will provide control information for construction staking. The cost of additional control stakes or replacement of control stakes shall be the responsibility of the Contractor.

PART 2 – PRODUCTS NOT USED

PART 3 - EXECUTION

3.01 GENERAL

- A. Contractor shall retain the services of a Professional Land Surveyor, licensed to practice in the state of the construction site, to install construction stakes.
- B. The Contractor shall have the following construction staking installed. The Contractor may install additional stakes for their use.
- C. Contractor is responsible to protect control points. The Owner's Representative will provide re-establishment of control. The Contractor may be responsible for the cost of re-establishment.

3.02 STAKING REQUIRED

- A. Gravity Sewers: Line and grade points and two offsets at each structure and the tie-in points at the City's force main.
- B. Pressure Pipeline (Water Lines & Force Mains): Line points at each structure or appurtenance, and at 200' centers. Provide grades where required by Owner's Representative.

END OF SECTION 02100

**SECTION 02240
EROSION CONTROL**

PART 1 - GENERAL

1.01 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.

1.02 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 or Engineer may require installation of additional erosion control facilities, by the Contractor, if in the sole opinion of the Owner's Representative or Engineer that the Contractor's efforts are inadequate.

1.03 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.

1.04 SUBMITTALS

NOT USED

1.05 RELATED SECTIONS

- A. Section 02921 – Surface Restoration

1.06 METHOD OF MEASUREMENT AND BASIS OF PAYMENT

**SECTION 02240
EROSION CONTROL**

- A. No measurement of Erosion Control Facilities will be made. The Contractor will include all labor and material costs in the Lump Sum bid or unit price for "Erosion Control".

PART 2 - PRODUCTS

2.01 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.
 3. Mulch shall be wheat straw.
- F. 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 REQUIREMENTS¹ FOR
TEMPORARY SILT FENCE GEOTEXTILES

**SECTION 02240
EROSION CONTROL**

<u>Property</u>	<u>Test Method</u>	<u>Wire Fence Supported Requirements</u>	<u>Self Supported Requirements</u>
Tensile Strength, Lbs. Elongation at 50% Minimum	ASTM D4632	90 Minimum ²	90 Minimum ²
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

- Notes:
1. All numerical values represent minimum average roll value.
 2. When tested in any principal direction.
 3. 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.

2.02 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

3.01 GENERAL REQUIREMENTS

- A. The Owner's Representative or Engineer may limit the surface area of erodible earth material exposed by clearing and grubbing, excavation, borrow, or fill operations.

- B. The Owner's Representative or Engineer 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 as required.

**SECTION 02240
EROSION CONTROL**

- C. The Contractor shall incorporate permanent erosion control features at the earliest practicable time.
- D. The Contractor at no additional cost shall provide temporary pollution control measures needed to control erosion during normal construction practices to the Owner.

3.02 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 Contractor shall respond to seasonal variations. If required by weather, temporary erosion control measures shall be taken immediately.

3.03 RIVERS, STREAMS, AND IMPOUNDMENTS:

NOT USED

3.04 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.

3.05 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.

3.06 TEMPORARY BERMS

NOT USED

3.07 TEMPORARY SLOPE DRAINS

NOT USED

3.08 DITCH CHECKS

NOT USED

3.09 SEDIMENT BASIN

NOT USED

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 that were covered with grass in their pre-construction condition 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. Seeding guidelines are listed in Section 02921

**SECTION 02240
EROSION CONTROL**

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 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.
3. Post Installation
 - a. Post spacing shall not exceed 8' for wire support fence installation or 5' for self-supported installations.
 - b. 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.
 - c. 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.
 - a. The mesh shall extend into the trench a minimum of 2" and extend a maximum of 36" above the original ground surface.
5. When self-supported fence is used, the geotextile shall be securely fastened to fence posts.
6. Maintenance
 - a. The Contractor shall maintain the integrity of silt fences as long as they are necessary to contain sediment runoff.

**SECTION 02240
EROSION CONTROL**

- b. The Contractor shall inspect all temporary silt fences immediately after each rainfall. Inspect daily during prolonged rainfall.
 - c. The Contractor shall immediately correct deficiencies.
 - d. 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.
 - e. 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.
7. The Contractor shall remove and dispose of sediment deposits when the deposit approaches one-half the height of the fence.
8. 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 02921.

3.13 TEMPORARY PIPE

NOT USED

3.14 SEDIMENT REMOVAL

A. General

- 1. Sediment deposits shall be removed when:
 - a. The deposits reach approximately one-half the height of a ditch check, straw bale barrier or silt fence.
 - b. The sediments have reduced the ponded volume of sediment basins to one-third of the original volume.
 - c. Requested by the Owner's Representative.

- B. Sediment removed from erosion control features shall be deposited in a location where it will not erode into construction areas or watercourses.

END OF SECTION 02240

**SECTION 02530
SANITARY SEWERS**

PART 1 - GENERAL

1.01 SECTION INCLUDES

- A. Gravity sanitary sewers and appurtenances including submittals, materials, material tests, manholes, pipe, installation of pipe and appurtenances, and testing.

1.02 RELATED SECTIONS

- A. Section 01320 - Submittals
- B. Section 02315 - Utility Excavation and Fill

1.03 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 manufacturers installation instructions.
- D. Material and pressure test certifications.
- E. Such other information as the Owner's Representative may request.

1.04 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 main 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.

1.05 JOB CONDITIONS

- A. Existing Wastewater System: The Contractor shall maintain operation of the existing wastewater system during construction. The existing septic tank shall not be abandon for a minimum of seven (7) days after the new force man and grinder pump station have been installed and that system has been verified to be working correctly.

**SECTION 02530
SANITARY SEWERS**

1.06 METHOD OF MEASUREMENT AND BASIS OF PAYMENT

- A. Grinder pump will be counted and paid for by the unit
- B. Wastewater Pipe will be measured to the nearest foot along the ground surface from center of manhole, to center of manhole. Payment for all labor and materials, including bedding, shall be made per the linear foot bid price.
- C. Cleanouts are constructed from wastewater pipe material for access to a sewer line at the end of a main. Cleanouts will be counted and paid for by the unit.
- D. Service Lines: Service lines shall include the main wye, lines, risers as required, and fittings. The length of the service line shall be to the right-of-way line of the street or easement, or to the limits shown on the Drawings. Service lines will generally be bid per each basis. If noted in the bid documents, service lines may be bid on a per linear foot basis. The length of the service line is measured from the centerline at the main to the reconnection point or termination point of the service line. No direct payment will be made for reconnection of existing services.
- E. Precast oil-water separator will be counted and paid for by the unit.
- F. Fittings: No direct payment will be made for any fittings, including wyes. Fittings will be considered incidental to pipe installation.
- G. Existing utility service or main line utilities that require adjustment to construct the sewer main shall be the responsibility of the Owner of the utility. The Contractor shall be responsible for any damage by the Contractor to the utility.

PART 2 - PRODUCTS

2.01 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
Plastic PVC	4"-6"	ASTM D1785	ASTM D3033 / D3034
Plastic PVC	8"-15"	ASTM D3034-SDR35	ASTM D3033 / D3034 Type 1, Grade 1
Plastic (PE)	6"- 24"	ASTM D3034-SR100	ASTM D2239
PS-46 (PVC)	None	ASTM F789	ASTM D3132
A2000 PVC	None	ASTM F949	ASTM D3132
Ductile Iron	None	ANSI / AWWA C151 / A21.51 Pressure Class 350	ANSI / AWWA C111 / A21.11
Hancor Sure-Lok	4"-60"	AASHTO M252, Type S M294, Type S; MP-7	ASTM F477

**SECTION 02530
SANITARY SEWERS**

PART 3 - EXECUTION

3.01 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.

3.02 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, or as described in Section 02315. 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, or as described in Section 02315.
- C. The entire length of the pipe barrel shall be supported evenly.

3.03 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.
- E. Clean the interior of all pipe fittings 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. Cutting Pipe:

**SECTION 02530
SANITARY SEWERS**

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.

J. 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.

3.04 MANHOLES

NOT USED

3.05 CONNECTIONS

A. Existing Wastewater System:

1. Connection to an existing line:
 - a. Pipe shall be cut in a neat and workman-like manner to provide an even surface perpendicular to the pipe centerline.
 - b. Rough edges of the pipe shall be covered with an expansive grout to produce a smooth finish.
 - c. The Contractor shall repair any existing sewer line damaged by his work, at no expense to the Owner.
2. 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.

3.06 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.

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. Vertical bends greater than 45° are not permitted for service lines.

D. Horizontal bends 45° degrees or less will be permitted in service lines, provided a cleanout is provided immediately upstream of the bend, pr as shown in the drawings.

**SECTION 02530
SANITARY SEWERS**

- E. Standard plugs or caps shall be securely placed and blocked at the end of all service leads.
- F. 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.

3.07 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'

3.08 ADJUSTING AND CLEANING

- A. General: Pipe and structures shall be kept clean as work progresses.

END OF SECTION 02530

**SECTION 02535
SEWAGE FORCE MAINS**

PART 1 - GENERAL

1.01 SECTION INCLUDES

- A. Sewage Force Mains and appurtenances.
- B. Submittals.
- C. Product delivery, storage and handling.
- D. Installation of pipe and appurtenances.
- E. Joint restraint.
- F. Testing.

1.02 SUBMITTALS

- A. Submit shop drawings, project data, and manufacturer's installation instruction in accordance with Section 01320.
- B. Manufacturer's specifications and/or catalog data listing for pipe, valves, and other special items.
- C. Shop drawings showing reinforcing steel details, structural steel, supports, and mechanics defined for structures and specialty items.
- D. Material and pressure test certifications.
- E. Other information Owner's Representative may request.
- F. Locations of connections to existing lines, valves, and appurtenances shall be submitted as a drawing with measurements to Owner's Representative for construction record purposes.

1.03 JOB CONDITIONS

- A. Interrupting Service:
 - 1. Approval required by the utility owner in advance of any interruption.
 - 2. A 24-hour notice to affected occupants of the time and duration of interruption will be provided by hand delivered notice.
 - 3. Stand By Service shall be provided. Outages not to exceed 4 hours, or as directed by the city of Ashland. All arrangements to be made by the Contractor.
- B. Scheduling:
 - 1. Install connecting lines after successful testing of the main.
 - 2. Backfill, grading, and material clean up shall be no more than 400' behind the location of the pipe placement.

1.04 QUALITY ASSURANCE

- A. Install no material until mill and/or factory test certifications, showing material complies with Specifications, has been furnished, and approved by the Owner's Representative.
- B. Field-tests for force mains shall be in accordance with this Specification.

**SECTION 02535
SEWAGE FORCE MAINS**

1.05 PRODUCT DELIVERY, STORAGE, AND HANDLING

- A. During loading, transporting, unloading, and storage, the Contractor shall exercise care to prevent damage to materials.
- B. Do not telescope small pipe inside larger pipe for shipment or storage.
- C. Handle by use of slings, hoist, skids, or other approved means. Dropping or rolling of pipe and fittings is not permitted.
- D. Material shall be stored on site, or a location subject to Owner's Representative approval. Material may not be stored directly on the ground. Material shall be stored in enclosures or under protective coverings to keep clean and dry.

1.06 METHOD OF MEASUREMENT AND BASIS OF PAYMENT

- A. Pipe: Will be measured along the centerline and paid for by the linear foot. Fittings, excavation, backfill, clean up, and required bedding are incidental to the pipe cost.
- B. Valves and Box or Chamber: Will be counted and paid for as a unit.
- C. Air Release Valves and Chambers: Will be counted and paid for as a unit.

PART 2 - PRODUCTS

2.01 DUCTILE-IRON PIPE (DIP)

- A. Pipe: ANSI / AWWA C151 / A21.51
 - 1. Minimum thickness shall be Pressure Class 350 for 2" to 12" pipe or called out on the Bid Form.
 - 2. Standard Cement Linings.
 - a. Coat the inside of the pipe with standard thickness cement lining in accordance with ANSI / AWWA C104 / A21.4, and provide seal.
 - b. Coat inside and out with bituminous coating in conformance to ANSI / AWWA C110 / A21.10.
- B. Push-on joints for DIP or CIP shall be provided with thermite welded sockets and cable or approved conductivity strap.

2.02 RESTRAINED JOINT DUCTILE IRON PIPE (RJ-DIP)

NOT USED

2.03 FITTINGS FOR DIP PIPE

- A. Fittings (Tees, Bends, etc.)
 - 1. ANSI / AWWA C110 / A21.10 or ANSI / AWWA C153 / A21.53 mechanical or push-on joint, ANSI / AWWA C111 / A21.11, Class 250 for underground piping. All underground joints shall be push-on except where mechanical joints are shown on Drawings.
- B. Flanged fittings ANSI / AWWA C110 / A21.10 or ANSI / AWWA C153 / A21.53, Class 250 for above ground piping or as shown on Plans.
- C. Rubber gaskets, lubricant, glands, bolts, and nuts; ANSI / AWWA C111 / A21.1 1.

**SECTION 02535
SEWAGE FORCE MAINS**

2.04 POLYVINYL CHLORIDE PIPE (PVC)

- A. Use for PVC pipe 2" to 24".
- B. Pipe:
 - 1. ASTM D2241, PVC 1120, DR 26, PR 200
 - 2. Markings on pipe must include nominal pipe size, material code designation, standard dimension ratio, pressure rating, manufacturers name or trademark, National Sanitation Foundation Seal, and appropriate ASTM designation numbers.
- C. Joints: ASTM D3139 with rubber gasket per ASTM 477; or ASTM D2672, solvent weld.
- D. Fittings: PVC pipe shall use DIP fittings.

2.05 VALVES

- A. Gate Valves
 - 1. Sizes 2 inches through 12 inches.
 - a. Valves shall be manufactured in accordance with AWWA C509, non-rising stem, opening counterclockwise, mechanical joint flanges, and o-ring stuffing boxes.
 - b. A 2-inch operating nut shall be provided for below ground applications and a hand-wheel for above ground.

2.06 VALVE BOXES

- A. Use 3-section cast iron valve box for valves 12 inches and smaller.
- B. Lid shall **not** be marked "Water".
- C. Upper Section: Screw on adjoining center section and full diameter throughout.
- D. Center Section: Minimum 5 inches inside diameter.
- E. Base Section: Fit over valve bonnet and shaped round for valves through 10 inches and oval for 12 inches and over.

2.07 VALVE MANHOLES

NOT USED

2.08 JOINT RESTRAINING DEVICE

NOT USED

2.09 MISCELLANEOUS

- A. Tracer Wire: Insulated, 12 Ga., solid, copper wire.

PART 3 - EXECUTION

3.01 PREPARATION

- A. Alignment:
 - 1. Deviations: Notify Owner's Representative and obtain instruction to proceed where there is an alignment discrepancy or an obstruction not shown on the Drawings.
 - 2. Depth of Pipe: Finished grade to top of pipe shall be a minimum of 3'-6".

**SECTION 02535
SEWAGE FORCE MAINS**

3. Before installation, verify sizes, measurements, type, and location of existing piping and appurtenances at points of connection to existing system.
4. Before installation, visually inspect for cracks or defect. Damaged or unsound pipe will be rejected.
5. High Points in Pipeline: Locate at air release valves or discharge point.
6. Separation with Water Lines: The line shall be a minimum of 10' from a water line when running parallel. 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.

B. Bedding:

1. Method: See drawing details.
2. Bearing: Support entire length of pipe barrel evenly.

C. Cleaning Pipe and Fittings:

1. General: Interior of the pipe shall be free of all foreign materials and the joint surfaces shall be free of lumps and blisters.

3.02 INSTALLATION

A. Laying Pipe:

1. General:
 - a. Clean pipe interior of foreign material before lowering into trench.
 - b. Keep clean at all times by securely closing open ends of pipe and fittings with watertight plug to prevent ingress of foreign material at all times when pipe jointing operation is not in progress.
 - c. If water is in the trench, the seal shall remain in place until the trench is pumped dry.
 - d. Place in trench in sound, undamaged condition; do not injure pipe coating or lining; do not use end hooks to install or move pipe.
 - e. Make necessary field measurements to determine piping-laying lengths; work pipe into place without forcing or springing.
 - f. Lay pipe in the dry, frost-free trench, and install to a minimum of 3'-6" of cover over the top of the main or as shown on the Drawings.
2. Tracer wire to be installed with all plastic pipes.
3. Deflection: Pipe may be deflected at joints by an amount less than or equal to the manufacturers maximum recommendation.

B. 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 burrs and irregularities shall be removed prior to pipe fitting.
3. Bevel ends of push-on type pipe.

C. Jointing

**SECTION 02535
SEWAGE FORCE MAINS**

1. Perform mechanical joint installation per manufacturer's instructions. Bolts shall be tightened evenly to 75-90 foot-pounds with a torque wrench.
2. Perform push-on joint installation per manufacturer's instructions.
3. Junctions with other materials shall require the use of adapter type and technique recommended by pipe manufacturer.

D. Pipe Laying/Connections

1. Install pipe in accordance with best construction practices as specified in AWWA Standard C600 and manufacturers recommendations.
2. During the PVC pipe-laying operation, the temperature of the pipe must be such that when the pipe cools to ground temperature, the pipe joints will not separate.
3. Attach tracer wire to plastic pipe with two full wraps of duct tape, at 5-7 foot centers.
 - a. Daylight wire at each air release chamber, valve chamber, or outside of building or structure.
 - b. Bring to surface with 1" PVC pipe and cap.
 - c. Extend wire 1-2 feet above the top of the PVC pipe. Loop wire back into the pipe. Secure cap.

3.03 FIELD QUALITY CONTROL

A. Testing and Inspection:

1. General:
 - a. Testing will be observed by the Owner's Representative.
 - b. Testing will be completed prior to connection to existing facilities.
 - c. Pretest line first, than arrange with Owner's Representative for inspection and observation of test.
 - d. The Contractor will supply all equipment and personnel required to correctly perform the tests.
 - e. The Contractor shall arrange for supply of water required for test.
2. Electrical Continuity: Test ductile iron pipe and tracer wire for continuity. Repair breaks.

B. Pressure Testing:

1. Condition: Air or air water methods of applying pressure prohibited.
2. Range: 100 to 110 psi at lowest elevation.
3. Duration: 1 hour and until completion of inspection.
4. Procedure: Fill system slowly. Expel air through air release valve at high points. Apply pressure. Install air release valve after test.
5. Inspection: Examine line and appurtenances for leaks and movement.
6. Corrections: Repair defects, visible leaks, and repeat test until acceptable.

C. Leakage:

1. Check for leakage as soon as practical after the pressure test.

**SECTION 02535
SEWAGE FORCE MAINS**

2. Pressure will be maintained within the pressure test range.
3. Test will be for a period not less than 2 hours.
4. Procedure:
 - a. Filling: As in pressure test.
 - b. Make Up Water Supply: Measurable source.
 - c. Leakage: Quantity of water supplied to maintain test pressure.
5. Allowable Leakage: Less than $L = ND(P)^{1/2} / 3700$ where,
L= Leakage (Gallons Per Hour)
N= Number of Joints
D= Nominal Pipe Diameter (inches)
P= Average Test Pressure (Pounds per Square Inch Gauge)
Note: Formula equals 0.8 gallons per hour per mile per inch diameter at 100 psi for 18' lengths.
6. Valve Testing: Maintain pressure on main and check all valves as follows.
 - a. Vent extreme ends of main and briefly check each valve progressively back towards test point.
 - b. Allowable pressure drop is less than 10 psi in five minutes, with test pump off.
7. Correction: Repair defect and repeat test until acceptable.

END OF SECTION 02535

**SECTION 02921
SURFACE RESTORATION**

PART 1 - GENERAL

1.01 WORK INCLUDED

- A. 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.

1.02 GENERAL

- A. All disturbed areas shall be fertilized, seeded, and mulched, except surfaced areas, solid rock, and slopes consisting primarily of broken rock.
- B. All disturbed or regraded swales and ditch lines shall be netted.
1. Bank slope of 3:1 or flatter: Net to 1' above flow line.
 2. Bank slopes greater than 3:1: Net to the top of bank.

1.03 METHOD OF MEASUREMENT AND BASIS OF PAYMENT

- A. Measurement of restored areas will not be made unless a change in project limits is authorized.
- B. Compensation for all work under this section will be made in accordance with the contract bid price.

PART 2 - PRODUCTS

2.01 LIME

NOT USED

2.02 FERTILIZER

NOT USED

2.03 SEED

- A. Seed shall be labeled in accordance with US Department of Agriculture rules and regulations under the Federal Seed Act. 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	Germination (a) Excluding Hard Seed	Maximum % Weed Seed
Perennial Rye	98%	85%		1.00
Redtop	92%	85%		2.00
Rye Grain	98%	80%		1.00
K31 Fescue	97%	85%		2.00
Red Fescue	97%	85%		1.00

**SECTION 02921
SURFACE RESTORATION**

Red Clover	98%	85%	55%	1.00
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(a) 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. Red Clover seed shall be inoculated or treated 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 hydraulic slurry seeding is used, a quantity of inoculant equal to five times the normal rate required to inoculate only the legume seed shall be used. The inoculant shall be placed directly into the slurry and thoroughly mixed immediately before seeding.
 - 2. If other than the hydraulic slurry method is used, the legume seed may be inoculated at the normal rate if it is to be sown alone or if the legume seed is inoculated prior to mixing with other seed.
 - 3. A seed mixture, which contains a legume that was not inoculated prior to mixing and is not to be seeded by the slurry method, shall be inoculated with sufficient inoculant to cover all seed.

Seed Mixture: The pure live grass seed mixture:

Type	Rate (# per acre)	Percent by weight
K31 Fescue	36	40
Bluegrass	27	30
Redtop	9	10
Red Fescue	9	10
Red Clover	<u>9</u>	<u>10</u>
TOTAL	90	100

The following formula shall be used 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.

**SECTION 02921
SURFACE RESTORATION**

- 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 above straw specifications cannot be met, the foliage of the following plants may, with the Owner's Representative's approval, be substituted.
 - 1. Smooth brome, timothy, orchard grass, reed canary grass, tall fescue, red top, millet, blue stem, Indian grass, alfalfa, birdsfoot trefoil, and vetch.
 - 2. The foliage shall be taken 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 NETTING

- A. North American Green SS150BN or approved equal.
- B. Excelsior Blanket:
 - 1. Excelsior blanket shall consist of a machine-produced mat of wood excelsior with approximately 80 percent of the fibers having a minimum length of 6".
 - 2. The wood from which the excelsior is cut shall be properly cured to achieve adequately curled and barbed fibers.
 - 3. The blanket shall be of consistent thickness, with the fibers evenly distributed over the entire area of the blanket.
 - 4. The blanket shall be covered on the top side with a netting having a maximum mesh size of 1½ x 3", composed of cotton cord, twisted Kraft paper yard, or degradable extruded plastic.
 - 5. The netting shall be entwined with the excelsior mat for maximum strength and ease of handling.
 - 6. The blanket shall be made smolder resistant with a treatment that shall be non-leaching, non-toxic to vegetation, and shall not be toxic or injurious to humans.
 - 7. The blanket shall meet the following requirements:
 - a. Weight: 0.75 pound per square yard, minimum.
 - b. Smolder Resistance: Blanket in air-dry condition shall not flame or smolder, from a lighted cigarette, for a distance along the surface of more than 12".
- C. Staples: Staples for plastic netting or excelsior blanket shall be of 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".

PART 3 - EXECUTION

3.01 FERTILIZING

NOT USED

**SECTION 02921
SURFACE RESTORATION**

3.02 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 December through May, August and September, seed and mulch shall be applied at the specified rates. During the months of June, July, October, and November, the rates shall be modified as follows:
 - 1. Seed: 50 percent of the specified quantity.
 - 2. 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 the partial application has been made during June, July, October, or November, the remainder of the fertilizer plus 75 percent of the specified quantity of seed shall be applied by over seeding during August, September, December, January, or February.
- E. Seed shall be uniformly applied at the rates specified. Provisions shall be made by markers or other means to insure that the successive seeded strips will overlap or be separated by a space no greater than the space left between the rows planted by the equipment being used.
- F. If inspection during the seeding operations indicates that strips wider than the space between rows planted have been left unplanted, additional seed shall be planted on these areas.
- G. Dry Seeding: Dry seeding shall be done mechanically with equipment designed for even distribution. The equipment may be either hand operated, such as knapsack seeder, or be tractor-drawn, such as seed drill. Tractor-drawn equipment will not be permitted on previously seeded and mulched area.
 - 1. Seed scattered on the surface shall be covered 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, a lawn-type roller shall be used and care shall be taken to avoid over-compaction of the soil.

3.03 TYPE 1 MULCHING

- A. Type 1 Mulch (vegetative) shall be applied at the rate of 2½ tons per acre.
- B. All mulch shall be distributed evenly over the area to be mulched within 24 hours following the seeding operation.
- C. Following the mulching operation, precautions shall be taken to prohibit foot or vehicular traffic over the mulched area.
- D. Displaced mulch shall be replaced at once.

**SECTION 02921
SURFACE RESTORATION**

1. If the liming, fertilizing, or seedbed are damaged, repair prior to mulching.

3.04 NETTING

- A. The area to be covered shall be fertilized and seeded.
- B. Any areas disturbed by the installation of the netting shall be repaired at the Contractor's expense.
- C. Erosion Control Blanket:
 1. Blankets, such as North American Green SC150BN shall be installed in accordance with the manufacturer's instructions. Excelsior Blankets shall be installed as follows.
 2. The blanket shall be unrolled in the direction of water flow, with the netting on top and the fibers in contact with the soil.
 3. A longitudinal joint of adjoining blankets shall not be placed on the centerline of the ditch.
 4. The blanket shall not be stretched or pulled tight.
 5. Successive rolls shall be snugly butted at ends and edges.
 6. The blanket shall be stapled as follows:
 - a. Along each edge and along the center of each blanket with staples at 6' centers.
 - b. Across each end of each roll with four staples.
 - c. The center row of staples shall be staggered 3' from the edge staple spacing.
 - d. Place a row of staples, at 6" centers and right angles to the ditch line, across the blanket, at 50' centers on ditch grades of 4 percent or less. Place staple rows at 25' centers on ditch grades greater than 4 percent.

END OF SECTION 02921

**SECTION 11310
GRINDER PUMP/LIFT STATION**

PART 1 - GENERAL

1.01 SECTION INCLUDES

- A. Work under this section includes supplying all labor and materials to install a submersible singel grinder pump lift station.
- B. Main items of equipment include:
 - 1. Submersible Grinder Pump
 - 2. Piping, Valves, and Accessories
 - 3. Chambers and Hatches

1.02 RELATED SECTIONS

- A. Section 02320 – Structure Excavation and Backfill
- B. Section 02530 – Sanitary Sewerage

1.03 SUBMITTALS

- A. Shop Drawings: Submit the following items in accordance with Section 01320.
 - 1. Pump, Motor, and Seals
 - 2. Guide Bars and Supports, Including Dimensional Coordination for Each Installation
 - 3. Discharge Connections
 - 4. Piping and Valves
 - 5. Access Hatches
 - 6. Chambers
 - 7. Inlet and Outlet Connections
- B. Installation instructions:
 - 1. Furnish two sets to the Owner's Representative upon delivery of equipment and before installation begins.
- C. Operation and Maintenance Manuals: Submit to the Owner's Representative upon completion.
 - 1. Required:
 - a. "As built" data on lift station equipment.
 - b. Operation and maintenance instructions.
 - c. Parts list.
 - d. Sources for replacement parts.
 - e. Spare part recommendation list.
 - f. Electrical circuit diagram and equipment descriptions.
 - 2. Four copies to be furnished.

**SECTION 11310
GRINDER PUMP/LIFT STATION**

D. Pump Curves:

1. Performance Curves: Submit to the Owner's Representative with shop drawings. **Do not order pumps until shop drawings and pump curves are approved by Engineer or Owner's Representative.**
 - a. Flow in gallons per minute.
 - b. Total dynamic head in feet.
 - c. Brake horsepower.
 - d. Efficiency in percent.
2. Certified Performance Curves: Submit to the Owner's Representative before pump shipment.
 - a. Actual factory test data for the specified pump to be shipped.
 - b. Flow in gallons per minute.
 - c. Total dynamic head in feet.
 - d. Efficiency in percent.

1.04 SCHEDULING

- A. Station Start Up: When system is approved by the Owner's Representative to accept wastewater.

1.05 METHOD OF MEASUREMENT AND BASIS OF PAYMENT

- A. The grinder pump/ lift station will be bid as a single lump sum unit.

PART 2 - PRODUCTS

2.01 SUBMERSIBLE GRINDER PUMP

A. General

1. The pump shall be capable of grinding and pumping raw sewage. The design shall be such that the pump unit will be automatically and firmly connected to the discharge piping when lowered into place on its mating discharge connection. The pump shall be easily removable for inspection and service, requiring no bolts or nuts to be disconnected for pump removal. There shall be no need for personnel to enter the wet well for pump installation, removal or repair.
2. The pump shall meet the minimum requirement as to head, capacity, rpm, and horsepower as stated in the pump schedule in this section.
3. The pump shall be provided by Aurora / Hydromatic, Myers, Flygt, or an approved equal.

B. Pump Construction

1. The pump shall be of the sealed submersible type. All external mating parts shall be machined and Buna N Rubber O-ring sealed on a beveled edge. Gaskets shall not be acceptable. All fasteners exposed to the pumped liquids shall be 300 series stainless steel.
2. The pump shall be automatically connected to the discharge connection by a single downward motion, guided by at least two stainless steel guide rails. The pump shall

**SECTION 11310
GRINDER PUMP/LIFT STATION**

have a stainless steel lifting chain of sufficient length to extend 3 feet above the top of the wet well when attached to the lift ring on the pump in operating position.

3. The stator, rotor, and bearings shall be mounted in a sealed submersible type housing. The pumps shall operate on single-phase, 230 volt, 60 Hertz power.
4. The pump and motor shall be specifically designed so that they may be operated partially dry or completely submerged in the liquid being pumped.
5. Stators shall be securely held in place with a removable end ring and threaded fasteners or held by a heat shrink fit and must be capable of being repaired or rewound by a local motor service station. No special tools shall be required for pump and motor disassembly.
6. Pump shall be equipped with heat sensors. The heat sensors (two on three phase) shall be a low resistance, bi-metal disc that is temperature sensitive. They shall be mounted directly in the stator and sized to open at 120°C to 125°C. The sensor shall be connected in series with the motor starter coil so that the starter is tripped if a heat sensor opens. The motor starter shall be equipped with overload heaters so all normal overloads are protected by external heater block. Thermal protection shall have an automatic reset.
7. Electrical power cord shall be sized according to NEC standards and be water resistant 600V, 60°C., UL approved dependent on amperage draw size. It shall be of sufficient length to reach the junction box without the need of any splices.
8. The cable entry water seal design shall insure a watertight and submersible seal.
9. An upper radial bearing and a lower thrust bearing shall be required. These shall be permanently lubricated by oil or grease.
10. The shaft shall be machined from solid 416 or 420 stainless steel and be a design which is of large diameter with minimum overhang to reduce shaft deflection and prolong bearing life.
11. The rotor and stator in the motor housing shall be separated and protected from the pumped liquid by an oil filled seal housing incorporating two tungsten carbide or carbon/ceramic mechanical seals. This seal housing shall be equipped with at least one moisture sensing probe installed between the seals, and the sensing of moisture in the seal chamber shall be automatic, continuous, and not require the pump be stopped or removed from the wet well.
12. Impeller shall be bronze or cast iron multi-vane, semi-open, non-overloading design. They can either be factory or field trimmed to meet specific performance conditions. Impellers shall be hydraulically and statically balanced at the factory, and machined for threading onto the pump shaft. Wear or field trimming shall not deter the factory balance.
13. The combination centrifugal pump impeller and grinder unit shall be attached to the common motor and pump shaft made of 416 or 420 stainless steel. The grinder unit shall be on the suction side of the pump impeller and discharge directly into the impeller inlet leaving no exposed shaft to permit packing of ground solids. The grinder shall be capable of grinding all materials found in normal domestic sewage, including plastics, rubber, sanitary napkins, disposable diapers, and wooden articles.

**SECTION 11310
GRINDER PUMP/LIFT STATION**

14. The stationary cutter shall consist of 316 "L" or 440C stainless steel hardened to Rockwell 60C and ground to close tolerance. The rotary cutter shall consist of chrome cast iron or 440C stainless steel hardened to Rockwell 60C. The upper (axial) cutter and stationary cutter shall be reversible to provide new cutting edges to double life.
15. The pump system including the pump, motor, and power cable shall be approved for use in areas classified as hazardous locations in accordance with NEC Class 1, Division 1, Group D service as determined and approved by a U.S. nationally recognized testing agency (UL, FM).

C. Pump Schedule

No. of pumps	1
Pump HP, each	1.6
Duty Point (feet)	40
Duty Point (gpm)	16.7
Speed, RPM	3,430
Pump Discharge, Inches	2
Pump Type	Submersible Grinder

2.02 PIPING AND VALVES

A. Piping: Shall be as shown on the drawings.

1. Joints shall be threaded.

B. Eccentric Plug Valves:

1. Valves shall be equipped with resilient faced plugs and be of permanently lubricated type capable of handling sludge. The plug valves shall have screwed, flanged, or mechanical joint ends as shown on the plans. Valves shall be furnished with manual operators. Each valve plug shall rotate 90 degrees from fully open to the tightly shut position and shall seat at an angle of 90 degrees from the pipe axis in which the valve is installed. Valves shall be satisfactory for applications, involving throttling service and/or frequent operation and for application involving valve operation after long periods of inactivity. Valves shall be non-lubricated and rated for 150 psi W.O.G. non-shock pressure differential acting in either direction; at this pressure differential the valve shall provide drip tight shutoff.
2. End styles shall be threaded.

C. Check Valves

1. 150-pound, wafer type with adjustable outside weight and lever.
2. Valves shall meet the requirements of AWWA C508.
3. Body material shall be cast iron or cast steel.
4. Cushion chamber shall be non-corrosive and attached to the outside of the valve. The shock absorption shall be air and shall be so arranged that the closing speed is adjustable for the intended application.
5. Disc, arm, seat, seat studs, and bolts shall be constructed of corrosion resistant material.

**SECTION 11310
GRINDER PUMP/LIFT STATION**

2.03 PRECAST CONCRETE CHAMBERS - LIFT STATION

- A. Valve chamber shall conform to ASTM C76, Class III and wet well shall conform to ASTM C76, Class IV, with 4'- 0" inside diameter.
- B. Base and lid may be precast or cast in place as per the plans. Cast in place shall be constructed with ASTM A615, Grade 60 bars and a commercial grade of concrete having a minimum 28-day strength of 4,000 psi.
- C. Joints shall meet ASTM C361 or ASTM C443.
- D. 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.
- E. Grade rings shall conform to ASTM C478.
- F. Waterproofing will be required for all manholes. The bitumen shall consist of two coats of asphalt or coal-tar pitch. Asphalt shall conform to the requirements of ASTM D449. Coal-tar pitch shall conform to the requirements of ASTM D450.
- G. Prior to backfilling, lift holes shall be fully grouted and/or plugged. Waterproofing shall be field applied in accordance with Item F above.
- H. Approved fiber glass or steel chamber may be used in place of precast concrete

2.04 SINGLE AND DOUBLE LEAF ALUMINUM HATCH - LIFT STATION

- A. Frame shall be ¼-inch extruded aluminum with built-in neoprene cushion and strap anchors bolted to exterior. Door leaf shall be 1/4-inch aluminum diamond plate reinforced with stiffeners as required, Doors shall withstand a live load 300 pounds per square foot and shall be watertight.
- B. Hinges shall be forged brass with stainless steel pins, bolted to underside, and pivot on torsion bars. Door shall open 90 degrees and lock automatically in position. Provide vinyl grip handle to release cover and snap lock with removable handle. Hatches shall be lockable.
- C. Mill finish with bituminous coating applied to frame on the underside where it contacts concrete.
- D. All access hatches shall be provided with integral built-in locks. All hatches shall be keyed alike. Four sets of keys shall be provided to the Owner at substantial completion. Each key should be labeled and identified. Locking devise shall be spring-loaded, capable of unlocking from the interior without a key.
- E. The hatch should be by Bilco Company or an approved equal.
- F. Provide stainless steel hardware throughout.
- G. Manufacturer shall guarantee against defects in materials and workmanship for a period of 5 years.

**SECTION 11310
GRINDER PUMP/LIFT STATION**

PART 3 - EXECUTION

3.01 GENERAL

- A. Equipment and appurtenances shall be installed in accordance with the manufacturers recommendations, approved shop drawings, and the contract drawings.

3.02 INSTALLATION

- A. Chambers, piping and valves shall be installed in accordance with Section 02530.
1. Installation of valves and accessories shall be properly scheduled with the entire project.
 2. Valves and valve boxes shall be set in true alignment and grade in accordance with the procedures submitted with the shop and erection drawings, and the valves mounted as shown. All adjustments and operating settings of valves and appurtenances shall be made in accordance with procedures and detailed instruction furnished with the erection drawings.
- B. Pumping equipment shall be installed in accordance with the manufacturer's recommendations.
- C. Access Hatches
1. Hatches shall be installed in accordance with the manufacturers instructions.

3.03 TESTING

- A. Valves:
1. Test all valves and appurtenances for proper operating adjustments and settings and for freedom from vibration, binding, scraping, and other defects. The testing of the hydraulically controlled valves shall be supervised by the Owner's representative or Engineer who will verify proper installation, adjustments, and performance. The adequacy of all pipe hangers and supports and valve supports to meet specified requirements shall be verified. All defects found shall be corrected as approved.
 2. All valves and appurtenances shall be flushed clean of all foreign matter together with the piping as specified in other section.
- B. Pump
1. During the draw down and field test, observations shall be made of head, capacity, and motor input. All defects or defective equipment revealed by or noted during the tests shall be corrected or replaced promptly at the expense of the contractor, and if necessary, the tests shall be repeated until results acceptable to the Owners representative or Engineer are obtained.
 2. The contractor shall furnish all labor, piping, equipment, and materials necessary for conducting the tests.
 3. All adjustments necessary to place the equipment in satisfactory working order shall be made at the time of the above tests.
 4. Water for testing shall be obtained at the existing facility,

**SECTION 11310
GRINDER PUMP/LIFT STATION**

5. In the event that the contractor is unable to demonstrate to the satisfaction of the Owners representative that the units will satisfactorily perform the service required and that they will operate free from vibration and heating, the pumping units may be rejected. The contractor shall then remove and replace the equipment at his or her own expense.
6. The field verification shall determine that the pump is drawing down and running efficiently.

3.04 START UP

- A. Notification: To Owner's Representative 72 hours prior to test.
- B. Supervision: Factory-trained representative for instrumentation and controls if required by Owner's Representative.
- C. Attendance: Owner, Owner's Representative, and Contractor.
- D. Equipment and Assistance: Provide.
- E. Required Water: Provide.
- F. Performance: All pumps, controls, and systems operating properly and satisfactorily.
- G. Corrections: Repair and repeat testing until acceptable to Owner and Owner's representative.
- H. Connection to System: Immediately following successful start up.

3.05 FIELD SERVICE

- A. The contractor shall arrange for the services of qualified service representatives from the companies manufacturing or supplying the grinder pump station equipment within two months of successful start up.

END OF SECTION 11310

SECTION 16010

BASIC ELECTRICAL REQUIREMENTS

PART 1 - GENERAL

1.1 SUMMARY

- A. This section applies to all other Division 16 Sections. Contractor shall furnish all labor and material required to complete the Work indicated on the Drawings and in the Specifications, including all accessories, fittings, auxiliaries and components required for proper operation, testing, balancing, and start-up of systems.
- B. General Conditions
 - 1. The provisions of Division 1, General Conditions and Special Conditions shall be considered part of this Division.

1.2 SUBMITTALS

- A. General: Submit each item in this Article according to the Conditions of the Contract and Division 1.
- B. Product substitutions.
- C. Installation coordination Drawings.

1.3 ABBREVIATIONS/DEFINITIONS

- A. All work shall be performed by the respective contractors. The following abbreviations are used in the specifications and on the Drawings. Reference to the Contractor refers to the applicable subcontractor.
- B. "Provide" shall mean furnish and install, complete and ready for the intended use.
 - 1. "Furnish": The term "furnish" means supply and deliver to the Project Site, ready for unloading, unpacking, assembly, installation, and similar operations.
 - 2. "Install": The term "install" describes operations at the Project Site including the actual unloading, unpacking, assembly, erecting, placing, anchoring, applying, working to dimension, finishing, curing, protecting, cleaning, and similar operations.

1.4 REGULATORY REQUIREMENTS

- A. Contractor shall pay for all required permits, licenses, tap fees, etc. which must be obtained for Work performance.
- B. Submit copies of all permits, licenses, and similar permission obtained with receipts for fees paid, directly to the General Contractor, and send a copy of each to the Owner.
- C. All work shall be performed in strict accordance with the governing codes and ordinances, rules, regulations, and other legal requirements of public authorities which bear on performances and completion of Work.

- D. Furnish to Owner certificates of inspection or approval from authorities having jurisdiction, upon completion of work.
- E. Contractor shall assume all costs for labor and materials to conduct all acceptance tests required by local jurisdiction.

1.5 GENERAL REQUIREMENTS

- A. All quantities shown are not exact. Contractor must compute quantities and be responsible for the correctness of same. No extra charge shall be allowed on account of difference between actual quantities and those contained herein.
- B. Promptly submit written notice to Engineer of observed variance of Contract Documents from legal or code requirements.
- C. Field conditions may vary due to undocumented additions, modifications or alterations. Field verify all dimensions and conditions prior to executing work; notify the Engineer in writing of any Work differing from that shown on Drawings.
- D. Any discrepancies which are observed between the Drawings and Specifications shall be brought to the attention of the Engineer for clarification, prior to proceeding with the Work.
- E. Do not scale off the Drawings. Written dimensions have precedence over scale. Any discrepancies shall be reported to the Engineer prior to proceeding with Work.
- F. All materials and products shall be installed in strict accordance with manufacturer's specifications, recommendations and printed installation instructions. No materials or products shall be installed in a manner that would void any manufacturer's guarantees, or impair the performance of the material, product, work and guarantees of other trades.
- G. The building structure is designed for supporting equipment at its permanent location. Any necessary shoring or other protection necessary for moving heavy equipment to the permanent location is the responsibility of each Contractor.

1.6 COORDINATION

- A. Each Contractor shall carefully examine all Drawings and Specifications and coordinate the work with others. Each contractor shall determine that the Work installed will not interfere with the Work of other Contractors. If Work is installed which does interfere, it shall be corrected at no additional cost to the Owner. Occupation of space by any Contractor or Subcontractor does not give him the right of priority to the space.
- B. Prepare coordination drawings where required to coordinate installation of products fabricated off-site by separate entities, and where limited space available may cause conflicts in the locations of installed products.
- C. Each Contractor shall coordinate his equipment delivery with construction progress in order that installation may be made in an orderly and safe manner.

1.7 PUBLIC UTILITIES

- A. Utility services shall be installed in strict accordance with standards of Utility Companies or Public Utility Agencies. Customer/Owner charges or tap fees if required shall be assumed by Contractor.
- B. Coordinate utility taps with local Utility Companies, Public Utility Agencies and local jurisdiction. Make no connections/taps prior to obtaining approval from governing agency. Deviations between Drawings, Specifications and local utility requirements shall be brought to the attention of the Engineer prior to construction. Improper utility taps/connections are solely the responsibility of the Contractor.
- C. Any connections to or relocations of any existing utility lines, requiring temporary disconnection of utility services which are in active use, shall be scheduled and coordinated with the utility companies and the representatives of the Owner.

1.8 SITE INSPECTION

- A. The location of the underground utilities, such as sewers, electrical power, water piping, gas piping, manholes, etc., as indicated on the Drawings have been determined from information available and its accuracy cannot be guaranteed. Exact location and elevation of these services shall be verified by the Contractor prior to excavation or installation of any portion of the work indicated. Contractor shall exercise special care when excavating at or near the general location of underground utilities to avoid damage to the utility services, as well as to insure worker safety.

1.9 QUALITY ASSURANCE

- A. Contractor shall provide a written system guarantee for a minimum of one year covering all material and labor.

1.10 PROJECT CONDITIONS

- A. Interruption of Existing Electrical Service: Do not interrupt electrical service to facilities occupied by Owner or others unless permitted under the following conditions and then only after arranging to provide temporary electrical service according to requirements indicated:
 - 1. Notify Construction Manager no fewer than two days in advance of proposed interruption of electrical service.
 - 2. Do not proceed with interruption of electrical service without Construction Manager's written permission.

PART 2 - PRODUCTS

2.1 MATERIALS AND EQUIPMENT

- A. All materials and equipment shall be new and shall bear the manufacturer's name, trade name, and the UL label in every case where such standard applies. The equipment to be furnished under each section of the Specifications shall be standard products of the manufacturer regularly engaged in the production of the required type of equipment, and shall be the manufacturer's latest approved design. Equipment of the same general type shall be of the same make throughout the job.

2.2 FIRST NAMED PRODUCTS

- A. The design reflected in the construction documents is based on the use of the first named products specified. Space allocations, system performance, equipment quality, hookups and associated equipment compatibility is based on the use of these products.

2.3 PRODUCT SUBSTITUTION

- A. The requirements as specified within this subsection are in addition to those specified in Division 1.
- B. Reference to specific manufacturer, model number, or catalog number shall not be construed as limiting competition. Contractor may at his option use other products which he has judged to be equal in quality and performance, meeting or exceeding the specifications, and suitable for this project provided the requirements and procedure of either paragraph C. "Listed Approved Equals" or paragraph D. "Other Manufacturers Products Not Listed:" as specified below are satisfied.
 - 1. It is noted that delivery time and schedule is an additional requirement of this work. Any substitutions must meet stringent delivery requirements.
- C. Listed Approved Equals:
 - 1. Other manufacturer's products listed as "approved equals" within the construction documents are approved in quality only. It is the Contractor's responsibility to determine the specific model, type, size, quantity, etc. of product to meet or exceed the specifications and performance requirements. Contractor shall also determine and account for changes required in space allocations, associated products compatibility, hookups, coordination with other trades and any other changes required to meet the original functional intent of the total engineered system as specified. This will be done without additional cost to the Owner. Written approval from the Engineer to use "approved equal" products will not be required, however, submittal of shop drawings will be required even if submittals were not required for the associated first named product. Shop drawings must include equipment layouts, etc., showing any and all space allocation changes and equipment changes, and must prove the substitute product to be sound in design, strength, durability, usefulness and convenience for the purpose intended.
- D. Other Manufacturer's Products Not Listed:
 - 1. The Contractor may at his choice submit a written request to use manufacturer's products which are not named in the construction documents which he has judged to be equal in quality, function, and suitability, and will meet or exceed the specifications herein. Contractor will be allowed to use such products only with the written approval of the Engineer. Adjustment to the bid will not be allowed for the failure to obtain such approval. If the Engineer is not familiar with submitted products, the Contractor shall supply samples and/or information as required by the Engineer so he can evaluate submitted products. This shall be accomplished at no cost to the Owner or Engineer. The Engineer reserves the right to reject any submitted product based on his professional opinion of the product's quality or suitability for this project, the Owner's wishes and/or due to the lack of time to adequately evaluate said product. Contractor shall be responsible for changes caused by this substitution as specified in the above paragraph for listed "approved equals". If the Contractor wishes approval of substitute product prior to bidding, the written request and required information and/or samples shall be delivered to the Engineer at least ten (10) working days prior to bid date.

2.4 QUANTITY

A. Singular number:

1. In all cases where a device or part of the equipment is referred to in the singular number (such as lavatory) it is intended that such reference shall apply to as many such items as are required to complete the project.

2.5 OTHER MATERIALS

- ### A.
- Provide other material, not specifically described but required for a complete and proper installation, as selected by the Contractor subject to the approval of the Engineer.

2.6 COLOR

- ### A.
- Color of all devices exposed in finished areas shall be by Engineer from manufacturer's standard colors and finishes.

PART 3 - EXECUTION

3.1 NATIONAL ELECTRIC CODE

- ### A.
- The installation shall conform to the requirements of the latest edition of the National Electrical Code, except where the requirements in excess thereof are specified herein, or by local jurisdiction.

3.2 SAFETY

- ### A.
- Safety of personnel and property shall be the responsibility of the Electrical Contractor concerning electrical items. Posting of signs regarding High Voltage, using personnel familiar with electrical work, including live work if required, securing panelboards and equipment from inadvertent access, providing power for night lights, etc. are part of the Electrical Contractor's responsibilities.

3.3 COORDINATION

- ### A.
- Coordinate with other contractors regarding the location and size of pipes, raceways, ducts, openings and devices, so that there may be no construction interferences between trades, and so that progress of any contractor is not delayed by another. Likewise coordinate, if necessary, with the Owner's work force.
- ### B.
- If conflict arises in the installation or Work, the following preference schedules shall be followed:
1. Lighting fixtures.
 2. Sanitary drainage piping.
 3. Low pressure ductwork.
 4. Domestic water, storm water and vent lines.
 5. Electric conduits.
- ### C.
- When work is to be installed above ceiling, adequate clearance must be maintained to allow for access, repairs and removal of all devices. Each Contractor shall be responsible for protecting his installation

from being obstructed by others. Should a conflict occur, he shall bring the matter to the attention of the other Contractor and, if necessary, the Engineer for resolution, **prior to installation.**

- D. Electrical equipment shall not be installed directly under piping carrying fluids.
- E. Coordination with the local electric utility company shall be done by the Electrical Contractor prior to beginning work. The Electrical Contractor shall fully coordinate construction operations with the Utility Company's authorized representative by notifying them of the scheduled service requirement dates, service modification dates, and provide notification to the Engineer of any required Owner authorizations involving the Utility Company.

3.4 LOCATION OF EQUIPMENT AND DEVICES

- A. The approximate location of all equipment and devices is shown on the Drawings. The Engineer reserves the right to change the location of all equipment or devices up to ten (10) feet in any direction, at no additional cost to the Owner, provided such changes are requested before final installation/placement.
- B. Install all equipment with ample space allowed for removal and repair. Provide ready accessibility to removable parts of equipment and to all wiring, without moving equipment which is installed or which is already in place. Notify Engineer of any field obstructions which inhibit such installation prior to final placement.
- C. Equipment or devices which are installed in such a manner that they must be removed in order to service or remove other equipment or devices shall be relocated per Engineer's instructions at no additional cost to the Owner.
- D. In mechanical and electrical equipment spaces, exposed ceiling outlets and conduit shall be installed with due consideration to the location of ventilation ductwork and mechanical piping. Where numerous ducts occur, install conduits and outlets after the ventilation ductwork. Puncturing of ductwork or hanging equipment such as light fixtures, ceiling hangers and conduits from ductwork is prohibited, unless specifically noted otherwise.
- E. Electrical equipment shall be installed to maintain minimum clearances per Article 110 of NEC and ANSI C2 (National Electrical Safety Code).

3.5 CLEANING AND ADJUSTING

- A. Contractor shall protect all equipment during construction and shall clean exterior and interior panels after completion. Where dust or dirt has accumulated in enclosures, the Contractor shall blow out accumulations or otherwise clean all that are dirty.
- B. Cover plates, fixture housings, lenses, and reflectors shall be clean and polished when turned over to the Owner.

END OF SECTION 16010

SECTION 16050

BASIC ELECTRICAL MATERIALS AND METHODS

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

- A. This Section includes the following:
 - 1. Electrical equipment coordination and installation.
 - 2. Sleeves for raceways and cables.
 - 3. Sleeve seals.
 - 4. Common electrical installation requirements.
 - 5. Electrical demolition.

1.3 DEFINITIONS

- A. ATS: Acceptance Testing Specifications.
- B. EPDM: Ethylene-propylene-diene terpolymer rubber.
- C. NBR: Acrylonitrile-butadiene rubber.

1.4 SUBMITTALS

- A. General: Submit each item in this Article according to the Conditions of the Contract and Division 1. Product Data: For each type of product indicated.

1.5 QUALITY ASSURANCE

- A. Test Equipment Suitability and Calibration: Comply with NETA ATS, "Suitability of Test Equipment" and "Test Instrument Calibration."

1.6 COORDINATION

- A. Coordinate arrangement, mounting, and support of electrical equipment:
 - 1. To allow maximum possible headroom unless specific mounting heights that reduce headroom are indicated.
 - 2. To provide for ease of disconnecting the equipment with minimum interference to other installations.

3. To allow right of way for piping and conduit installed at required slope.
 4. So connecting raceways, cables, wireways, cable trays, and busways will be clear of obstructions and of the working and access space of other equipment.
- B. Coordinate installation of required supporting devices and set sleeves in cast-in-place concrete, masonry walls, and other structural components as they are constructed.
 - C. Coordinate location of access panels and doors for electrical items that are behind finished surfaces or otherwise concealed. Access doors and panels are specified in Division 8 Section "Access Doors and Frames."
 - D. Coordinate electrical testing of electrical, mechanical, and architectural items, so equipment and systems that are functionally interdependent are tested to demonstrate successful interoperability.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

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

2.2 SLEEVES FOR RACEWAYS AND CABLES

- A. Steel Pipe Sleeves: ASTM A 53/A 53M, Type E, Grade B, Schedule 40, galvanized steel, plain ends.
- B. Cast-Iron Pipe Sleeves: Cast or fabricated "wall pipe," equivalent to ductile-iron pressure pipe, with plain ends and integral waterstop, unless otherwise indicated.
- C. Sleeves for Rectangular Openings: Galvanized sheet steel with minimum 0.052- or 0.138-inch (1.3- or 3.5-mm) thickness as indicated and of length to suit application.
- D. Coordinate sleeve selection and application with selection and application of firestopping specified in Division 7 Section "Through-Penetration Firestop Systems."

2.3 TOUCHUP PAINT

- A. For Equipment: Equipment manufacturer's paint selected to match installed equipment finish.
- B. Galvanized Surfaces: Zinc-rich recommended by item manufacturer.

PART 3 - EXECUTION

3.1 COMMON REQUIREMENTS FOR ELECTRICAL INSTALLATION

- A. Comply with NECA 1.
- B. Measure indicated mounting heights to bottom of unit for suspended items and to center of unit for wall-mounting items.
- C. Headroom Maintenance: If mounting heights or other location criteria are not indicated, arrange and install components and equipment to provide maximum possible headroom consistent with these requirements.
- D. Equipment: Install to facilitate service, maintenance, and repair or replacement of components of both electrical equipment and other nearby installations. Connect in such a way as to facilitate future disconnecting with minimum interference with other items in the vicinity.
- E. Right of Way: Give to raceways and piping systems installed at a required slope.

3.2 DEMOLITION

- A. Protect existing electrical equipment and installations indicated to remain. If damaged or disturbed in the course of the Work, remove damaged portions and install new products of equal capacity, quality, and functionality.
- B. Accessible Work: Remove exposed electrical equipment and installations, indicated to be demolished, in their entirety.
- C. Abandoned Work: Cut and remove buried raceway and wiring, indicated to be abandoned in place, 2 inches below the surface of adjacent construction. Cap raceways and patch surface to match existing finish.
- D. Remove demolished material from Project site.
- E. Remove, store, clean, reinstall, reconnect, and make operational components indicated for relocation.

3.3 CUTTING AND PATCHING

- A. Cut, channel, chase, and drill floors, walls, partitions, ceilings, and other surfaces required to permit electrical installations. Perform cutting by skilled mechanics of trades involved.
- B. Repair and refinish disturbed finish materials and other surfaces to match adjacent undisturbed surfaces. Install new fireproofing where existing firestopping has been disturbed. Repair and refinish materials and other surfaces by skilled mechanics of trades involved.

3.4 FIELD QUALITY CONTROL

- A. Inspect installed components for damage and faulty work, including the following:
 - 1. Raceways.
 - 2. Building wire and connectors.

3. Supporting devices for electrical components.
4. Electrical identification.
5. Electricity-metering components.
6. Concrete bases.
7. Electrical demolition.
8. Cutting and patching for electrical construction.
9. Touchup painting.

3.5 REFINISHING AND TOUCHUP PAINTING

- A. Refinish and touch up paint. Paint materials and application requirements are specified in Division 9 Section "Painting."
 1. Clean damaged and disturbed areas and apply primer, intermediate, and finish coats to suit the degree of damage at each location.
 2. Follow paint manufacturer's written instructions for surface preparation and for timing and application of successive coats.
 3. Repair damage to galvanized finishes with zinc-rich paint recommended by manufacturer.
 4. Repair damage to paint finishes with matching touchup coating recommended by manufacturer.

3.6 CLEANING AND PROTECTION

- A. On completion of installation, including outlets, fittings, and devices, inspect exposed finish. Remove burrs, dirt, paint spots, and construction debris.
- B. Protect equipment and installations and maintain conditions to ensure that coatings, finishes, and cabinets are without damage or deterioration at time of Substantial Completion.

END OF SECTION 16050

SECTION 16060

GROUNDING AND BONDING

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

- A. This Section includes methods and materials for grounding systems and equipment.

1.3 SUBMITTALS

- A. General: Submit each item in this Article according to the Conditions of the Contract and Division 1.
- B. Product Data: For each type of product indicated.

PART 2 - PRODUCTS

2.1 CONDUCTORS

- A. Insulated Conductors: Copper wire or cable insulated for 600 V unless otherwise required by applicable Code or authorities having jurisdiction.
- B. Bare Copper Conductors:
 - 1. Solid Conductors: ASTM B 3.
 - 2. Stranded Conductors: ASTM B 8.
 - 3. Tinned Conductors: ASTM B 33.
 - 4. Bonding Cable: 28 kcmil, 14 strands of No. 17 AWG conductor, 1/4 inch (6 mm) in diameter.
 - 5. Bonding Conductor: No. 4 or No. 6 AWG, stranded conductor.
 - 6. Bonding Jumper: Copper tape, braided conductors, terminated with copper ferrules; 1-5/8 inches (41 mm) wide and 1/16 inch (1.6 mm) thick.
 - 7. Tinned Bonding Jumper: Tinned-copper tape, braided conductors, terminated with copper ferrules; 1-5/8 inches (41 mm) wide and 1/16 inch (1.6 mm) thick.

2.2 CONNECTORS

- A. Listed and labeled by a nationally recognized testing laboratory acceptable to authorities having jurisdiction for applications in which used, and for specific types, sizes, and combinations of conductors and other items connected.

- B. Bolted Connectors for Conductors and Pipes: Copper or copper alloy, bolted pressure-type, with at least two bolts.
 - 1. Pipe Connectors: Clamp type, sized for pipe.
- C. Welded Connectors: Exothermic-welding kits of types recommended by kit manufacturer for materials being joined and installation conditions.

PART 3 - EXECUTION

3.1 APPLICATIONS

- A. Conductors: Install solid conductor for No. 8 AWG and smaller, and stranded conductors for No. 6 AWG and larger, unless otherwise indicated.
- B. Underground Grounding Conductors: Install bare tinned-copper conductor. Sizes shown on drawings.
 - 1. Bury at least 24 inches below grade.
 - 2. Duct-Bank Grounding Conductor: Bury 12 inches above duct bank when indicated as part of duct-bank installation.
- C. Conductor Terminations and Connections:
 - 1. Pipe and Equipment Grounding Conductor Terminations: Bolted connectors.

3.2 EQUIPMENT GROUNDING

- A. Install insulated equipment grounding conductors with all feeders and branch circuits.
- B. Install insulated equipment grounding conductors with the following items, in addition to those required by NFPA 70:
 - 1. Three-phase motor and appliance branch circuits.

3.3 INSTALLATION

- A. Grounding Conductors: Route along shortest and straightest paths possible, unless otherwise indicated or required by Code. Avoid obstructing access or placing conductors where they may be subjected to strain, impact, or damage.

3.4 CONNECTIONS

- A. General: Make connections so galvanic action or electrolysis possibility is minimized. Select connectors, connection hardware, conductors, and connection methods so metals in direct contact will be galvanically compatible.
 - 1. Use electroplated or hot-tin-coated materials to ensure high conductivity and to make contact points closer to order of galvanic series.
 - 2. Make connections with clean, bare metal at points of contact.
 - 3. Make aluminum-to-steel connections with stainless-steel separators and mechanical clamps.

4. Make aluminum-to-galvanized steel connections with tin-plated copper jumpers and mechanical clamps.
 5. Coat and seal connections having dissimilar metals with inert material to prevent future penetration of moisture to contact surfaces.
- B. Tighten screws and bolts for grounding and bonding connectors and terminals according to manufacturer's published torque-tightening values. If manufacturer's torque values are not indicated, use those specified in UL 486A-B.
- C. Compression-Type Connections: Use hydraulic compression tools to provide correct circumferential pressure for compression connectors. Use tools and dies recommended by connector manufacturer. Provide embossing die code or other standard method to make a visible indication that a connector has been adequately compressed on grounding conductor.
- D. Moisture Protection: If insulated grounding conductors are connected to ground rods or grounding buses, insulate entire area of connection and seal against moisture penetration of insulation and cable.

END OF SECTION 16060

SECTION 16120
CONDUCTORS AND CABLES

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

- A. This Section includes the following:
 - 1. Building wires and cables rated 600 V and less.
 - 2. Connectors, splices, and terminations rated 600 V and less.

1.3 DEFINITIONS

- A. EPDM: Ethylene-propylene-diene terpolymer rubber.
- B. NBR: Acrylonitrile-butadiene rubber.

1.4 QUALITY ASSURANCE

- A. Electrical Components, Devices, and Accessories: Listed and labeled as defined in NFPA 70, Article 100, by a testing agency acceptable to authorities having jurisdiction, and marked for intended use.
- B. Comply with NFPA 70.

PART 2 - PRODUCTS

2.1 CONDUCTORS AND CABLES

- A. Available Manufacturers: Subject to compliance with requirements, manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:
 - 1. Alcan Products Corporation; Alcan Cable Division.
 - 2. American Insulated Wire Corp.; a Leviton Company.
 - 3. General Cable Corporation.
 - 4. Senator Wire & Cable Company.
 - 5. Southwire Company.
- B. Aluminum and Copper Conductors: Comply with NEMA WC 70.
- C. Conductor Insulation: Comply with NEMA WC 70 for Types THHN-THWN and SO.

- D. Multiconductor Cable: Comply with NEMA WC 70 for metal-clad cable, Type MC Type SO and with ground wire.

2.2 CONNECTORS AND SPLICES

- A. Available Manufacturers: Subject to compliance with requirements, manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:
 - 1. AFC Cable Systems, Inc.
 - 2. Allied Wire & Cable, Inc.
 - 3. Hubbell Power Systems, Inc.
 - 4. O-Z/Gedney; EGS Electrical Group LLC.
 - 5. 3M; Electrical Products Division.
 - 6. Tyco Electronics Corp.
- B. Description: Factory-fabricated connectors and splices of size, ampacity rating, material, type, and class for application and service indicated.

PART 3 - EXECUTION

3.1 CONDUCTOR MATERIAL APPLICATIONS

- A. Feeders: Copper for feeders smaller than No. 4 AWG; copper or aluminum for feeders No. 4 AWG and larger. Solid for No. 10 AWG and smaller; stranded for No. 8 AWG and larger.
- B. Branch Circuits: Copper. Solid for No. 10 AWG and smaller; stranded for No. 8 AWG and larger.

3.2 CONDUCTOR INSULATION AND MULTICONDUCTOR CABLE APPLICATIONS AND WIRING METHODS

- A. Exposed Feeders: Type THHN-THWN, single conductors in raceway.
- B. Feeders Concealed in Ceilings, Walls, Partitions, and Crawlspace: Type THHN-THWN, single conductors in raceway.
- C. Feeders Concealed in Concrete, below Slabs-on-Grade, and Underground: Type THHN-THWN, single conductors in raceway.

3.3 INSTALLATION OF CONDUCTORS AND CABLES

- A. Conceal cables in finished walls, ceilings, and floors, unless otherwise indicated.
- B. Use manufacturer-approved pulling compound or lubricant where necessary; compound used must not deteriorate conductor or insulation. Do not exceed manufacturer's recommended maximum pulling tensions and sidewall pressure values.
- C. Use pulling means, including fish tape, cable, rope, and basket-weave wire/cable grips, that will not damage cables or raceway.
- D. Install exposed cables parallel and perpendicular to surfaces of exposed structural members, and follow surface contours where possible.

- E. Support cables according to Division 16 Section "Electrical Supports and Seismic Restraints."
- F. Identify and color-code conductors and cables according to Division 16 Section "Electrical Identification."

3.4 CONNECTIONS

- A. Tighten electrical connectors and terminals according to manufacturer's published torque-tightening values. If manufacturer's torque values are not indicated, use those specified in UL 486A and UL 486B.
- B. Make splices and taps that are compatible with conductor material and that possess equivalent or better mechanical strength and insulation ratings than unspliced conductors.
- C. Wiring at Outlets: Install conductor at each outlet, with at least 12 inches of slack.

3.5 FIELD QUALITY CONTROL

- A. Perform tests and inspections and prepare test reports.
- B. Tests and Inspections:
 - 1. After installing conductors and cables and before electrical circuitry has been energized, test for compliance with requirements.
 - 2. Perform each visual and mechanical inspection and electrical test stated in NETA Acceptance Testing Specification. Certify compliance with test parameters.

END OF SECTION 16120

SECTION 16130
RACEWAYS AND BOXES

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

- A. This Section includes raceways, fittings, boxes, enclosures, and cabinets for electrical wiring.
- B. Related Sections include the following:
 - 1. Division 2 Section "Underground Ducts and Utility Structures" for exterior ductbanks, manholes, and underground utility construction.

1.3 DEFINITIONS

- A. EMT: Electrical metallic tubing.
- B. ENT: Electrical nonmetallic tubing.
- C. EPDM: Ethylene-propylene-diene terpolymer rubber.
- D. FMC: Flexible metal conduit.
- E. IMC: Intermediate metal conduit.
- F. LFMC: Liquidtight flexible metal conduit.
- G. LFNC: Liquidtight flexible nonmetallic conduit.
- H. NBR: Acrylonitrile-butadiene rubber.
- I. RNC: Rigid nonmetallic conduit.
- J. GRS: Galvanized Ruid steel conduit.

1.4 QUALITY ASSURANCE

- A. Electrical Components, Devices, and Accessories: Listed and labeled as defined in NFPA 70, Article 100, by a testing agency acceptable to authorities having jurisdiction, and marked for intended use.
- B. Comply with NFPA 70.

PART 2 - PRODUCTS

2.1 METAL CONDUIT AND TUBING

- A. Available Manufacturers: Subject to compliance with requirements, manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:
1. AFC Cable Systems, Inc.
 2. Alflex Inc.
 3. Allied Tube & Conduit; a Tyco International Ltd. Co.
 4. Anamet Electrical, Inc.; Anaconda Metal Hose.
 5. Electri-Flex Co.
 6. Manhattan/CDT/Cole-Flex.
 7. Maverick Tube Corporation.
 8. O-Z Gedney; a unit of General Signal.
 9. Wheatland Tube Company.
- B. Rigid Steel Conduit: ANSI C80.1.
- C. IMC: ANSI C80.6.
- D. EMT: ANSI C80.3.
- E. FMC: Zinc-coated steel.
- F. LFMC: Flexible steel conduit with PVC jacket.
- G. Fittings for Conduit (Including all Types and Flexible and Liquidtight), EMT, and Cable: NEMA FB 1; listed for type and size raceway with which used, and for application and environment in which installed.
1. Conduit Fittings for Hazardous (Classified) Locations: Comply with UL 886.
 2. Fittings for EMT: Steel or die-cast, set-screw or compression type.
 3. Coating for Fittings for PVC-Coated Conduit: Minimum thickness, 0.040 inch (1 mm), with overlapping sleeves protecting threaded joints.

2.2 NONMETALLIC CONDUIT AND TUBING

- A. Available Manufacturers: Subject to compliance with requirements, manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:
1. AFC Cable Systems, Inc.
 2. Anamet Electrical, Inc.; Anaconda Metal Hose.
 3. Arco Corporation.
 4. CANTEX Inc.
 5. CertainTeed Corp.; Pipe & Plastics Group.
 6. Condux International, Inc.
 7. ElecSYS, Inc.
 8. Electri-Flex Co.
 9. Lamson & Sessions; Carlon Electrical Products.
 10. Manhattan/CDT/Cole-Flex.
 11. RACO; a Hubbell Company.
 12. Thomas & Betts Corporation.

- B. ENT: NEMA TC 13.
- C. RNC: NEMA TC 2, unless otherwise indicated.
- D. LFNC: UL 1660.
- E. Fittings for ENT and RNC: NEMA TC 3; match to conduit or tubing type and material.
- F. Fittings for LFNC: UL 514B.

2.3 BOXES, ENCLOSURES, AND CABINETS

- A. Available Manufacturers: Subject to compliance with requirements, manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:
 - 1. Cooper Crouse-Hinds; Div. of Cooper Industries, Inc.
 - 2. EGS/Appleton Electric.
 - 3. Erickson Electrical Equipment Company.
 - 4. Hoffman.
 - 5. Hubbell Incorporated; Killark Electric Manufacturing Co. Division.
 - 6. O-Z/Gedney; a unit of General Signal.
 - 7. RACO; a Hubbell Company.
 - 8. Robroy Industries, Inc.; Enclosure Division.
 - 9. Scott Fetzer Co.; Adalet Division.
 - 10. Spring City Electrical Manufacturing Company.
 - 11. Thomas & Betts Corporation.
 - 12. Walker Systems, Inc.; Wiremold Company (The).
 - 13. Woodhead, Daniel Company; Woodhead Industries, Inc. Subsidiary.
- B. Sheet Metal Outlet and Device Boxes: NEMA OS 1.
- C. Cast-Metal Outlet and Device Boxes: NEMA FB 1, ferrous alloy or aluminum, Type FD, with gasketed cover.
- D. Nonmetallic Outlet and Device Boxes: NEMA OS 2.
- E. Nonmetallic Floor Boxes: Nonadjustable, round.
- F. Small Sheet Metal Pull and Junction Boxes: NEMA OS 1.
- G. Cast-Metal Access, Pull, and Junction Boxes: NEMA FB 1, cast aluminum or galvanized, cast iron with gasketed cover.
- H. Hinged-Cover Enclosures: NEMA 250, Type 1, with continuous-hinge cover with flush latch, unless otherwise indicated.
 - 1. Metal Enclosures: Steel, finished inside and out with manufacturer's standard enamel.
 - 2. Nonmetallic Enclosures: Plastic.
- I. Cabinets:
 - 1. NEMA 250, Type 1, galvanized-steel box with removable interior panel and removable front, finished inside and out with manufacturer's standard enamel.
 - 2. Hinged door in front cover with flush latch and concealed hinge.

3. Key latch to match panelboards.
4. Metal barriers to separate wiring of different systems and voltage.
5. Accessory feet where required for freestanding equipment.

PART 3 - EXECUTION

3.1 RACEWAY APPLICATION

- A. Outdoors: Apply raceway products as specified below, unless otherwise indicated:
 1. Exposed Conduit: IMC.
 2. Concealed Conduit, Aboveground: EMT.
 3. Underground Conduit: RNC, Type EPC-40-PVC, direct buried.
 4. Connection to Vibrating Equipment (Including Transformers and Hydraulic, Pneumatic, Electric Solenoid, or Motor-Driven Equipment): LFMC.
 5. Boxes and Enclosures, Aboveground: NEMA 250, Type 3R.
- B. Comply with the following indoor applications, unless otherwise indicated:
 1. Exposed, Not Subject to Physical Damage: EMT.
 2. Exposed, Not Subject to Severe Physical Damage: EMT.
 3. Exposed and Subject to Severe Physical Damage: IMC. Includes raceways in the following locations:
 4. Concealed in Ceilings and Interior Walls and Partitions: EMT.
 5. Connection to Vibrating Equipment (Including Transformers and Hydraulic, Pneumatic, Electric Solenoid, or Motor-Driven Equipment): FMC, except use LFMC in damp or wet locations.
 6. Damp or Wet Locations: IMC.
- C. Minimum Raceway Size: 1/2-inch trade size.
- D. Raceway Fittings: Compatible with raceways and suitable for use and location.
 1. Rigid and Intermediate Steel Conduit: Use threaded rigid steel conduit fittings, unless otherwise indicated.
- E. Do not install aluminum conduits in contact with concrete.

3.2 INSTALLATION

- A. Comply with NECA 1 for installation requirements applicable to products specified in Part 2 except where requirements on Drawings or in this Article are stricter.
- B. Keep raceways at least 6 inches away from parallel runs of flues and steam or hot-water pipes. Install horizontal raceway runs above water and steam piping.
- C. Complete raceway installation before starting conductor installation.
- D. Support raceways as specified in Division 16 Section "Electrical Supports and Seismic Restraints."
- E. Arrange stub-ups so curved portions of bends are not visible above the finished slab.

- F. Install no more than the equivalent of three 90-degree bends in any conduit run except for communications conduits, for which fewer bends are allowed.
- G. Conceal conduit and EMT within finished walls, ceilings, and floors, unless otherwise indicated.
- H. Raceways Embedded in Slabs:
 - 1. Run conduit larger than 1-inch trade size, parallel or at right angles to main reinforcement. Where at right angles to reinforcement, place conduit close to slab support.
 - 2. Arrange raceways to cross building expansion joints at right angles with expansion fittings.
 - 3. Change from ENT, rigid steel conduit, or IMC before rising above the floor.
- I. Threaded Conduit Joints, Exposed to Wet, Damp, Corrosive, or Outdoor Conditions: Apply listed compound to threads of raceway and fittings before making up joints. Follow compound manufacturer's written instructions.
- J. Raceway Terminations at Locations Subject to Moisture or Vibration: Use insulating bushings to protect conductors, including conductors smaller than No. 4 AWG.
- K. Install pull wires in empty raceways. Use polypropylene or monofilament plastic line with not less than 200-lb tensile strength. Leave at least 12 inches of slack at each end of pull wire.
- L. Install raceway sealing fittings at suitable, approved, and accessible locations and fill them with listed sealing compound. For concealed raceways, install each fitting in a flush steel box with a blank cover plate having a finish similar to that of adjacent plates or surfaces. Install raceway sealing fittings at the following points:
 - 1. Where conduits pass from warm to cold locations, such as boundaries of refrigerated spaces.
 - 2. Where otherwise required by NFPA 70.
- M. Flexible Conduit Connections: Use maximum of 72 inches of flexible conduit for recessed and semirecessed lighting fixtures, equipment subject to vibration, noise transmission, or movement; and for transformers and motors.
 - 1. Use LFMC in damp or wet locations subject to severe physical damage.
 - 2. Use LFMC or LFNC in damp or wet locations not subject to severe physical damage.
- N. Recessed Boxes in Masonry Walls: Saw-cut opening for box in center of cell of masonry block, and install box flush with surface of wall.
- O. Set metal floor boxes level and flush with finished floor surface.
- P. Set nonmetallic floor boxes level. Trim after installation to fit flush with finished floor surface.

3.3 INSTALLATION OF UNDERGROUND CONDUIT

- A. Direct-Buried Conduit:
 - 1. Excavate trench bottom to provide firm and uniform support for conduit. Prepare trench bottom as specified in Division 2 Section "Earthwork" for pipe less than 6 inches in nominal diameter.
 - 2. Install backfill as specified in Division 2 Section "Earthwork."
 - 3. After installing conduit, backfill and compact. Start at tie-in point, and work toward end of conduit run, leaving conduit at end of run free to move with expansion and contraction as temperature changes during this process. Firmly hand tamp backfill around conduit to provide

maximum supporting strength. After placing controlled backfill to within 12 inches of finished grade, make final conduit connection at end of run and complete backfilling with normal compaction as specified in Division 2 Section "Earthwork."

4. Install manufactured duct elbows for stub-ups at poles and equipment and at building entrances through the floor, unless otherwise indicated. Encase elbows for stub-up ducts throughout the length of the elbow.
5. Install manufactured rigid steel conduit elbows for stub-ups at poles and equipment and at building entrances through the floor.
 - a. Couple steel conduits to ducts with adapters designed for this purpose, and encase coupling with 3 inches of concrete.
 - b. For stub-ups at equipment mounted on outdoor concrete bases, extend steel conduit horizontally a minimum of 60 inches from edge of equipment pad or foundation. Install insulated grounding bushings on terminations at equipment.
6. Warning Planks: Bury warning planks approximately 12 inches above direct-buried conduits, placing them 24 inches o.c. Align planks along the width and along the centerline of conduit.

3.4 PROTECTION

- A. Provide final protection and maintain conditions that ensure coatings, finishes, and cabinets are without damage or deterioration at time of Substantial Completion.
 1. Repair damage to galvanized finishes with zinc-rich paint recommended by manufacturer.
 2. Repair damage to PVC or paint finishes with matching touchup coating recommended by manufacturer.

END OF SECTION 16130

Missouri

Division of Labor Standards

WAGE AND HOUR SECTION



MATT BLUNT, Governor

Annual Wage Order No. 15

Section 010
BOONE 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

Paul Buckley, Director
Division of Labor Standards

This Is A True And Accurate Copy Which Was Filed With The Secretary of State: **March 10, 2008**

Last Date Objections May Be Filed: **April 9, 2008**

Prepared by Missouri Department of Labor and Industrial Relations

OCCUPATIONAL TITLE	**Effective Date of	*	Basic Hourly Rates	Over-Time Schedule	Holiday Schedule	Total Fringe Benefits
Asbestos Worker			\$32.83	FED		\$7.81
Boilermaker			\$31.00	57	7	\$18.75
Bricklayers - Stone Mason			\$26.98	59	7	\$11.20
Carpenter			\$23.23	60	15	\$9.96
Cement Mason			\$22.34	9	3	\$10.09
Electrician (Inside Wireman)			\$28.18	28	7	\$10.96 + 13%
Communication Technician			USE ELECTRICIAN (INSIDE WIREMAN) RATE			
Elevator Constructor		a	\$37.115	26	54	\$16.23
Operating Engineer						
Group I	5/08		\$25.52	86	66	\$17.35
Group II	5/08		\$25.52	86	66	\$17.35
Group III	5/08		\$24.27	86	66	\$17.35
Group III-A	5/08		\$25.52	86	66	\$17.35
Group IV	5/08		\$23.29	86	66	\$17.35
Group V	5/08		\$26.22	86	66	\$17.35
Pipe Fitter		b	\$32.25	91	69	\$19.18
Glazier			\$29.48	87	31	\$16.13 + 13.2%
Laborer (Building):						
General			\$18.92	110	7	\$9.43
First Semi-Skilled			\$20.92	110	7	\$9.43
Second Semi- Skilled			\$19.92	110	7	\$9.43
Lather			USE CARPENTER RATE			
Linoleum Layer & Cutter			USE CARPENTER RATE			
Marble Mason			\$26.98	59	7	\$11.20
Millwright			\$24.23	60	15	\$9.96
Iron Worker			\$24.65	11	8	\$15.87
Painter			\$20.40	18	7	\$8.77
Plasterer			\$21.36	94	5	\$9.88
Plumber		b	\$32.25	91	69	\$19.18
Pile Driver			\$24.23	60	15	\$9.96
Roofer			\$25.75	12	4	\$10.69
Sheet Metal Worker			\$26.12	40	23	\$11.93
Sprinkler Fitter			\$30.59	33	19	\$14.30
Terrazzo Worker			\$26.98	59	7	\$11.20
Tile Setter			\$29.79	25	4	\$10.26
Truck Driver - Teamster						
Group I	3/08		\$22.50	101	5	\$8.30
Group II	3/08		\$23.15	101	5	\$8.30
Group III	3/08		\$22.65	101	5	\$8.30
Group IV	3/08		\$23.15	101	5	\$8.30
Traffic Control Service Driver						
Welders - Acetylene & Electric		*				

Fringe Benefit Percentage is of the Basic Hourly Rate

Attention Workers: If you are not being paid the appropriate wage rate and fringe benefits contact the Division of Labor Standards at (573) 751-3403.

**Annual Incremental Increase

REPLACEMENT PAGE
BOONE COUNTY
OVERTIME SCHEDULE - BUILDING CONSTRUCTION

FED: Minimum requirement per Fair Labor Standards Act means time and one-half (1 ½) shall be paid for all work in excess of forty (40) hours per work week.

NO. 9: Means the regular workday starting time of 8:00 a.m. (and resulting quitting time of 4:30 p.m.) may be moved forward to 6:00 a.m. or delayed one hour to 9:00 a.m. All work performed in excess of the regular work day and on Saturday shall be compensated at one and one-half (1½) times the regular pay. In the event time is lost during the work week due to weather conditions, the Employer may schedule work on the following Saturday at straight time. All work accomplished on Sunday and holidays shall be compensated for at double the regular rate of wages. The work week shall be Monday through Friday, except for midweek holidays.

NO. 11: Means eight (8) hours shall constitute a day's work, with the starting time to be established between 6:00 a.m. and 8:00 a.m. from Monday to Friday. Time and one-half (1½) shall be paid for first two (2) hours of overtime Monday through Friday and the first eight (8) hours on Saturday. All other overtime hours Monday through Saturday shall be paid at double (2) time rate. Double (2) time shall be paid for all time on Sunday and recognized holidays or the days observed in lieu of these holidays.

NO. 12: Means the work week shall commence on Monday at 12:01 a.m. and shall continue through the following Friday, inclusive of each week. All work performed by employees anywhere in excess of forty (40) hours in one (1) work week, shall be paid for at the rate of one and one-half (1½) times the regular hourly wage scale. All work performed within the regular working hours which shall consist of a ten (10) hour work day except in emergency situations. Overtime work and Saturday work shall be paid at one and one-half (1½) times the regular hourly rate. Work on recognized holidays and Sundays shall be paid at two (2) times the regular hourly rate.

NO. 18: Means the regular work day shall be eight (8) hours. Working hours are from six (6) hours before Noon (12:00) to six (6) hours after Noon (12:00). The regular work week shall be forty (40) hours, beginning between 6:00 a.m. and 12:00 Noon on Monday and ending between 1:00 p.m. and 6:00 p.m. on Friday. Saturday will be paid at time and one-half (1½). Sunday and Holidays shall be paid at double (2) time. Saturday can be a make-up day if the weather has forced a day off, but only in the week of the day being lost. Any time before six (6) hours before Noon or six (6) hours after Noon will be paid at time and one-half (1½).

NO. 25: Means regular working hours of eight (8) hours shall constitute a working day between the hours of 8:00 a.m. to 4:30 p.m. in a forty (40) hour working week of Monday through Friday. Employment on Saturday, Sunday and legal holidays, and employment before or after the regular working hours shall be considered overtime. Employment on Saturday, Sunday and legal holidays shall be paid for at twice (2) the regular hourly rate. Employment from 4:30 p.m. to 12:00 midnight, Monday through Friday, shall be paid for at one and one-half (1½) times the regular hourly rate. From 12:00 midnight until 8:00 a.m. on any day shall be paid for at twice (2) the regular hourly rate.

NO. 26: Means that the regular working day shall consist of eight (8) hours worked between 6:00 a.m., and 5:00 p.m., five (5) days per week, Monday to Friday, inclusive. Hours of work at each jobsite shall be those established by the general contractor and worked by the majority of trades. (The above working hours may be changed by mutual agreement). Work performed on Construction Work on Saturdays, Sundays and before and after the regular working day on Monday to Friday, inclusive, shall be classified as overtime, and paid for at double (2) the rate of single time. The employer may establish hours worked on a jobsite for a four (4) ten (10) hour day work week at straight time pay for construction work; the regular working day shall consist of ten (10) hours worked consecutively, between 6:00 a.m. and 6:00 p.m., four (4) days per week, Monday to Thursday, inclusive. Any work performed on Friday, Saturday, Sunday and holidays, and before and after the regular working day on Monday to Thursday where a four (4) ten (10) hour day workweek has been established, will be paid at two times (2) the single time rate of pay. The rate of pay for all work performed on holidays shall be at two times (2) the single time rate of pay.

REPLACEMENT PAGE
BOONE COUNTY
OVERTIME SCHEDULE - BUILDING CONSTRUCTION

NO. 28: Means a regular workday shall consist of eight (8) hours between 7:00 a.m. and 5:30 p.m., with at least a thirty (30) minute period to be taken for lunch. Five (5) days a week, Monday through Friday inclusive, shall constitute a work week. The Employer has the option for a workday/workweek of four (4) ten (10) hour days (4-10's) provided:

- The project must be for a minimum of four (4) consecutive days.
- Starting time may be within one (1) hour either side of 8:00 a.m.
- Work week must begin on either a Monday or Tuesday: If a holiday falls within that week it shall be a consecutive work day. (Alternate: If a holiday falls in the middle of a week, then the regular eight (8) hour schedule may be implemented).
- Any time worked in excess of any ten (10) hour work day (in a 4-10 hour work week) shall be at the appropriate overtime rate.

All work outside of the regular working hours as provided, Monday through Saturday, shall be paid at one & one-half (1½) times the employee's regular rate of pay. All work performed from 12:00 a.m. Sunday through 8:00 a.m. Monday and recognized holidays shall be paid at double (2) the straight time hourly rate of pay. Should employees work in excess of twelve (12) consecutive hours they shall be paid double time (2X) for all time after twelve (12) hours. Shift work performed between the hours of 4:30 p.m. and 12:30 a.m. (second shift) shall receive eight (8) hours pay at the regular hourly rate of pay plus ten (10%) percent for seven and one-half (7½) hours work. Shift work performed between the hours of 12:30 a.m. and 8:00 a.m. (third shift) shall receive eight (8) hours pay at the regular hourly rate of pay plus fifteen (15%) percent for seven (7) hours work. A lunch period of thirty (30) minutes shall be allowed on each shift. All overtime work required after the completion of a regular shift shall be paid at one and one-half (1½) times the shift hourly rate.

NO. 33: Means the standard work day and week shall be eight (8) consecutive hours of work between the hours of 6:00 a.m. and 6:00 p.m., excluding the lunch period Monday through Friday, or shall conform to the practice on the job site. Four (4) days at ten (10) hours a day may be worked at straight time, Monday through Friday and need not be consecutive. All overtime, except for Sundays and holidays shall be at the rate of time and one-half (1½). Overtime worked on Sundays and holidays shall be at double (2) time.

NO. 40: Means the regular working week shall consist of five (5) consecutive (8) hour days' labor on the job beginning with Monday and ending with Friday of each week. Four (4) 10-hour days may constitute the regular work week. The regular working day shall consist of eight (8) hours labor on the job beginning as early as 7:00 a.m. and ending as late as 5:30 p.m. All full or part time labor performed during such hours shall be recognized as regular working hours and paid for at the regular hourly rate. All hours worked on Saturday and all hours worked in excess of eight (8) hours but not more than twelve (12) hours during the regular working week shall be paid for at time and one-half (1½) the regular hourly rate. All hours worked on Sundays and holidays and all hours worked in excess of twelve (12) hours during the regular working day shall be paid at two (2) times the regular hourly rate. In the event of rain, snow, cold or excessively windy weather on a regular working day, Saturday may be designated as a "make-up" day. Saturday may also be designated as a "make-up" day, for an employee who has missed a day of work for personal or other reasons. Pay for "make-up" days shall be at regular rates.

NO. 55: Means the regular work day shall be eight (8) hours between 6:00 a.m. and 4:30 p.m. The first two (2) hours of work performed in excess of the eight (8) hour work day, Monday through Friday, and the first ten (10) hours of work on Saturday, shall be paid at one & one-half (1½) times the straight time rate. All work performed on Sunday, observed holidays and in excess of ten (10) hours a day, Monday through Saturday, shall be paid at double (2) the straight time rate.

NO. 57: Means eight (8) hours per day shall constitute a day's work and forty (40) hours per week, Monday through Friday, shall constitute a week's work. The regular starting time shall be 8:00 a.m. The above may be changed by mutual consent of authorized personnel. When circumstances warrant, the Employer may change the regular workweek to four (4) ten-hour days at the regular time rate of pay. It being understood that all other pertinent information must be adjusted accordingly. All time worked before and after the established workday of eight (8) hours, Monday through Friday, all time worked on Saturday, shall be paid at the rate of time and one-half (1½) except in cases where work is part of an employee's regular Friday shift. All time worked on Sunday and recognized holidays shall be paid at the double (2) time rate of pay.

REPLACEMENT PAGE
BOONE COUNTY
OVERTIME SCHEDULE - BUILDING CONSTRUCTION

NO. 59: Means that except as herein provided, eight (8) hours a day shall constitute a standard work day, and forty (40) hours per week shall constitute a week's work. All time worked outside of the standard eight (8) hour work day and on Saturday shall be classified as overtime and paid the rate of time and one-half (1½). All time worked on Sunday and holidays shall be classified as overtime and paid at the rate of double (2) time. The Employer has the option of working either five (5) eight hour days or four (4) ten hour days to constitute a normal forty (40) hour work week. When the four (4) ten-hour work week is in effect, the standard work day shall be consecutive ten (10) hour periods between the hours of 6:30 a.m. and 6:30 p.m. Forty (40) hours per week shall constitute a weeks work, Monday through Thursday, inclusive. In the event the job is down for any reason beyond the Employer's control, then Friday and/or Saturday may, at the option of the Employer, be worked as a make-up day; straight time not to exceed ten (10) hours or forty (40) hours per week. When the five day (8) hour work week is in effect, forty (40) hours per week shall constitute a week's work, Monday through Friday, inclusive. In the event the job is down for any reason beyond the Employer's control, then Saturday may, at the option of the Employer, be worked as a make-up day; straight time not to exceed eight (8) hours or forty (40) hours per week. The regular starting time (and resulting quitting time) may be moved to 6:00 a.m. or delayed to 9:00 a.m. Make-up days shall not be utilized for days lost due to holidays.

NO. 60: Means the Employer shall have the option of working five 8-hour days or four 10-hour days Monday through Friday. If an Employer elects to work five 8-hour days during any work week, hours worked more than eight (8) per day or forty (40) per week shall be paid at time and one-half (1½) the hourly wage rate plus fringe benefits Monday through Friday. **SATURDAY MAKE-UP DAY:** If an Employer is prevented from working forty (40) hours, Monday through Friday, or any part thereof by reason of inclement weather (rain or mud), Saturday or any part thereof may be worked as a make-up day at the straight time rate. It is agreed by the parties that the make-up day is not to be used to make up time lost due to recognized holidays. If an Employer elects to work four 10-hour days, between the hours of 6:30 a.m. and 6:30 p.m. in any week, work performed more than ten (10) hours per day or forty (40) hours per week shall be paid at time and one half (1½) the hourly wage rate plus fringe benefits Monday through Friday. If an Employer is working 10-hour days and loses a day due to inclement weather, the Employer may work ten (10) hours on Friday at straight time. Friday must be scheduled for no more than ten (10) hours at the straight time rate, but all hours worked over the forty (40) hours Monday through Friday will be paid at time and one-half (1½) the hourly wage rate plus fringe benefits. All Millwright work performed in excess of the regular work day and on Saturday shall be compensated for at time and one-half (1½) the regular Millwright hourly wage rate plus fringe benefits. The regular work day starting of 8:00 a.m. (and resulting quitting time of 4:30 p.m.) may be moved forward to 6:00 a.m. or delayed one (1) hour to 9:00 a.m. All work accomplished on Sundays and recognized holidays, or days observed as recognized holidays, shall be compensated for at double (2) the regular hourly rate of wages plus fringe benefits. **NOTE:** All overtime is computed on the hourly wage rate plus an amount equal to the fringe benefits.

NO. 86: Means the regular work week shall consist of five (5) days, Monday through Friday, beginning at 8:00 a.m. and ending at 4:30 p.m. The regular work day beginning time may be advanced one or two hours or delayed by one hour. However, the Employer may have the option to schedule his work week from Monday through Thursday at ten (10) hours per day at the straight time rate of pay with all hours in excess of ten (10) hours in any one day to be at the applicable overtime rate. If the Employer elects to work from Monday through Thursday and is stopped due to circumstances beyond his control, inclement weather or holiday, he shall have the option to work Friday at the straight time rate of pay to complete his forty (40) hours. If an employee declines to work Friday as a make-up day, he shall not be penalized. All overtime work performed on Monday through Saturday shall be paid at time and one-half (1½) of the hourly rate plus an amount equal to one-half (½) of the hourly Total Indicated Fringe Benefits. All work performed on Sundays and recognized holidays shall be paid at double (2) the hourly rate plus an amount equal to the hourly Total Indicated Fringe Benefits.

NO. 87: Means eight (8) hours starting between 6:00 a.m. and 8:00 a.m. and ending between 2:30 p.m. and 4:30 p.m. at the Employers discretion shall constitute a day's work. Any work prior to 6:00 a.m. or after eight (8) hours shall be paid at the overtime rate. Five (5) days from Monday through Friday inclusive shall constitute a regular work week. All hours before and after these regular hours shall be considered overtime and shall be paid for at the rate of double (2) time. All work on Saturday and Sunday shall be paid at double (2) the prevailing scale of wages.

REPLACEMENT PAGE
BOONE COUNTY
OVERTIME SCHEDULE - BUILDING CONSTRUCTION

NO. 91: Means eight (8) hours shall constitute a day's work commencing at 8:00 a.m. and ending at 4:30 p.m., allowing one-half (½) hour for lunch. The option exists for the Employer to use a flexible starting time between the hours of 6:00 a.m. and 9:00 a.m. The regular workweek shall consist of forty (40) hours of five (5) workdays, Monday through Friday. The workweek may consist of four (4) ten (10) hour days from Monday through Thursday, with Friday as a make-up day. If the make-up day is a holiday, the employee shall be paid at the double (2) time rate. The employees shall be paid time and one-half (1½) for work performed before the regular starting time or after the regular quitting time or over eight (8) hours per work day (unless working a 10-hour work day, then time and one-half (1½) is paid for work performed over ten (10) hours a day) or over forty (40) hours per work week. Work performed on Saturdays, Sundays and recognized holidays shall be paid at the double (2) time rate of pay.

NO. 94: Means eight (8) hours shall constitute a days work between the hours of 8:00 a.m. and 5:00 p.m. The regular workday starting time of 8:00 a.m. (and resulting quitting time of 4:30 p.m.) may be moved forward to 6:00 a.m. or delayed one (1) hour to 9:00 a.m. All work performed in excess of the regular work day and on Saturday shall be compensated at one and one-half (1½) times the regular pay. In the event time is lost during the work week due to weather conditions, the Employer may schedule work on the following Saturday at straight time. All work accomplished on Sunday and holidays shall be compensated at double the regular rate of wages.

NO. 101: Means that except as provided below, eight (8) hours a day shall constitute a standard work day, and forty (40) hours per week shall constitute a week's work, which shall begin on Monday and end on Friday. All time worked outside of the standard work day and on Saturday shall be classified as overtime and paid the rate of time and one-half (1½) (except as herein provided). All time worked on Sunday and recognized holidays shall be classified as overtime and paid at the rate of double (2) time. The regular starting time of 8:00 a.m. (and resulting quitting time of 4:30 p.m.) may be moved forward to 6:00 a.m. or delayed one (1) hour to 9:00 a.m. The Employer has the option of working either five (5) eight-hour days or four (4) ten-hour days to constitute a normal forty (40) hour work week. When a four (4) ten-hour day work week is in effect, the standard work day shall be consecutive ten (10) hour periods between the hours of 6:30 a.m. and 6:30 p.m. Forty (40) hours per week shall constitute a week's work Monday through Thursday, inclusive. In the event the job is down for any reason beyond the Employer's control, then Friday and/or Saturday may, at the option of the Employer, be worked as a make-up day; straight time not to exceed ten (10) hours per day or forty (40) hours per week. Starting time will be designated by the employer. When the five (5) day eight (8) hour work week is in effect, forty (40) hours per week shall constitute a week's work, Monday through Friday, inclusive. In the event the job is down for any reason beyond the Employer's control, then Saturday may, at the option of the Employer, be worked as a make-up day; straight time not to exceed eight (8) hours per day or forty (40) hours per week. Make-up days shall not be utilized for days lost due to holidays.

NO. 110: Means eight (8) hours between the hours of 8:00 a.m. and 4:30 p.m. shall constitute a work day. The starting time may be advanced one (1) or two (2) hours. Employees shall have a lunch period of thirty (30) minutes. The Employer may provide a lunch period of one (1) hour, and in that event, the workday shall commence at 8:00 a.m. and end at 5:00 p.m. The workweek shall commence at 8:00 a.m. on Monday and shall end at 4:30 p.m. on Friday (or 5:00 p.m. on Friday if the Employer grants a lunch period of one (1) hour), or as adjusted by starting time change as stated above. All work performed before 8:00 a.m. and after 4:30 p.m. (or 5:00 p.m. where one (1) hour lunch is granted for lunch) or as adjusted by starting time change as stated above or on Saturday, except as herein provided, shall be compensated at one and one-half (1½) times the regular hourly rate of pay for the work performed. All work performed on Sunday and on recognized holidays shall be compensated at double (2) the regular hourly rate of pay for the work performed. If an Employer is prevented from working forty (40) hours, Monday through Friday, or any part thereof by reason of inclement weather (rain and mud), Saturday or any part thereof may be worked as a make-up day at the straight time rate. The Employer shall have the option of working five eight (8) hour days or four ten (10) hour days Monday through Friday. If an Employer elects to work five (5) eight (8) hour days during any work week, hours worked more than eight (8) per day or forty (40) hours per week shall be paid at time and one-half (1½) the hourly rate Monday through Friday. If an Employer elects to work four (4) ten (10) hour days in any week, work performed more than ten (10) hours per day or forty (40) hours per week shall be paid at time and one-half (1½) the hourly rate Monday through Friday. If an Employer is working ten (10) hour days and loses a day due to inclement weather, they may work ten (10) hours Friday at straight time. Friday must be scheduled for at least eight (8) hours and no more than ten (10) hours at the straight time rate, but all hours worked over the forty (40) hours Monday through Friday will be paid at time and one-half (1½) overtime rate.

**REPLACEMENT PAGE
BOONE COUNTY
HOLIDAY SCHEDULE – BUILDING CONSTRUCTION**

NO. 3: All work done on New Year's Day, Decoration Day, July 4th, Labor Day, Veteran's Day, Thanksgiving Day and Christmas Day shall be paid at the double time rate of pay. Whenever any such holidays fall on a Sunday, the following Monday shall be observed as a holiday.

NO. 4: All work done on New Year's Day, Memorial Day, Independence Day, Labor Day, Thanksgiving and Christmas Day shall be paid at the double time rate of pay. If any of the above holidays fall on Sunday, Monday will be observed as the recognized holiday. If any of the above holidays fall on Saturday, Friday will be observed as the recognized holiday.

NO. 5: All work that shall be done on New Year's Day, Memorial Day, Fourth of July, Labor Day, Veteran's Day, Thanksgiving Day, and Christmas Day shall be paid at the double (2) time rate of pay.

NO. 7: All work done on New Year's Day, Memorial Day, Independence Day, Labor Day, Veteran's Day, Thanksgiving Day, and Christmas Day shall be paid at the double time rate of pay. If a holiday falls on a Sunday, it shall be observed on the following Monday. If a holiday falls on a Saturday, it shall be observed on the preceding Friday.

NO. 8: All work performed on New Year's Day, Memorial Day, Independence Day, Labor Day, Veteran's Day, Thanksgiving Day, and Christmas Day, or the days observed in lieu of these holidays, shall be paid at the double time rate of pay.

NO. 15: All work accomplished on the recognized holidays of New Year's Day, Decoration Day (Memorial Day), Independence Day (Fourth of July), Labor Day, Veteran's Day, Thanksgiving Day and Christmas Day, or days observed as these named holidays, shall be compensated for at double (2) the regular hourly rate of wages plus fringe benefits. If a holiday falls on Saturday, it shall be observed on the preceding Friday. If a holiday falls on a Sunday, it shall be observed on the following Monday. No work shall be performed on Labor Day, Christmas Day, Decoration Day or Independence Day except to preserve life or property.

NO. 19: All work done on New Year's Day, Memorial Day, July 4th, Labor Day, Thanksgiving Day, and Christmas Day shall be paid at the double time rate of pay. The employee may take off Friday following Thanksgiving Day. However, the employee shall notify his or her Foreman, General Foreman or Superintendent on the Wednesday preceding Thanksgiving Day. When one of the above holidays falls on Sunday, the following Monday shall be considered a holiday and all work performed on either day shall be at the double (2) time rate. When one of the holidays falls on Saturday, the preceding Friday shall be considered a holiday and all work performed on either day shall be at the double (2) time rate.

NO. 23: All work done on New Year's Day, Memorial Day, Independence Day, Labor Day, Veteran's Day, Thanksgiving Day, Christmas Day and Sundays shall be recognized holidays and shall be paid at the double time rate of pay. When a holiday falls on Sunday, the following Monday shall be considered a holiday.

NO. 31: All work done on New Year's Day, Presidents Day, Good Friday, Memorial Day, Fourth of July, Labor Day, Veteran's Day, Thanksgiving Day, Friday after Thanksgiving Day, Christmas Day, and Employee's Birthday shall be paid at the double time rate of pay. If a holiday falls on Sunday, the following Monday will be observed as the recognized holiday. If a holiday falls on Saturday, the preceding Friday will be observed as the recognized holiday.

NO. 54: All work performed on New Year's Day, Memorial Day, Independence Day, Labor Day, Veteran's Day, Thanksgiving Day, the Friday after Thanksgiving Day, and Christmas Day shall be paid at the double (2) time rate of pay. When a holiday falls on Saturday, it shall be observed on Friday. When a holiday falls on Sunday, it shall be observed on Monday.

NO. 60: All work performed on New Year's Day, Armistice Day (Veteran's Day), Decoration Day (Memorial Day), Independence Day (Fourth of July), Thanksgiving Day and Christmas Day shall be paid at the double time rate of pay. No work shall be performed on Labor Day except when triple (3) time is paid. When a holiday falls on Saturday, Friday will be observed as the holiday. When a holiday falls on Sunday, the following Monday shall be observed as the holiday.

**REPLACEMENT PAGE
BOONE COUNTY
HOLIDAY SCHEDULE – BUILDING CONSTRUCTION**

NO. 66: All work performed on Sundays and the following recognized holidays, or the days observed as such, of New Year's Day, Decoration Day, Fourth of July, Labor Day, Veteran's Day, Thanksgiving Day and Christmas Day, shall be paid at double (2) the hourly rate plus an amount equal to the hourly Total Indicated Fringe Benefits. Whenever any such holidays fall on a Sunday, the following Monday shall be observed as a holiday.

NO. 69: All work performed on New Year's Day, Decoration Day, July Fourth, Labor Day, Veteran's Day, Thanksgiving Day or Christmas Day shall be compensated at double (2) their straight-time hourly rate of pay. Friday after Thanksgiving and the day before Christmas will also be holidays, but if the employer chooses to work these days, the employee will be paid at straight-time rate of pay. If a holiday falls on a Sunday in a particular year, the holiday will be observed on the following Monday.

OCCUPATIONAL TITLE	*Effective Date of Increase	Basic Hourly Rates	Over-Time Schedule	Holiday Schedule	Total Fringe Benefits
CARPENTER					
Journeymen	5/08	\$28.31	7	16	\$9.96
Millwright	5/08	\$28.31	7	16	\$9.96
Pile Driver Worker	5/08	\$28.31	7	16	\$9.96
OPERATING ENGINEER					
Group I	5/08	\$24.60	21	5	\$17.25
Group II	5/08	\$24.25	21	5	\$17.25
Group III	5/08	\$24.05	21	5	\$17.25
Group IV	5/08	\$20.40	21	5	\$17.25
Oiler-Driver	5/08	\$20.40	21	5	\$17.25
LABORER					
General Laborer	5/08	\$23.97	2	4	\$8.88
Skilled Laborer	5/08	\$24.57	2	4	\$8.88
TRUCK DRIVER - TEAMSTER					
Group I	5/08	\$25.82	22	19	\$8.65
Group II	5/08	\$25.98	22	19	\$8.65
Group III	5/08	\$25.97	22	19	\$8.65
Group IV	5/08	\$26.09	22	19	\$8.65

For the occupational titles not listed on the Heavy Construction Rate Sheet, use Rates shown on the Building Construction Rate Sheet.

**BOONE COUNTY
OVERTIME SCHEDULE – HEAVY CONSTRUCTION**

NO. 2: Means a regular workweek shall be forty (40) hours and will start on Monday and end on Friday. The regular work day shall be either eight (8) or ten (10) hours. If a crew is prevented from working forty (40) hours Monday through Friday, or any part thereof, by reason of inclement weather, Saturday or any part thereof may be worked as a make-up day at the straight time rate. Employees who are part of a regular crew on a make-up day, notwithstanding the fact that they may not have been employed the entire week, shall work Saturday at the straight time rate. A workday shift is to begin at the option of the Employer, between 6:00 a.m. and not later than 9:00 a.m. However, the project starting time may be advanced or delayed if required. If workmen are required to work the enumerated holidays or days observed as such or Sundays, they shall receive double (2) the regular rate of pay for such work.

NO. 7: Means the regular work week shall start on Monday and end on Friday, except where the Employer elects to work Monday through Thursday, ten (10) hours per day. All work over ten (10) hours in a day or forty (40) hours in a week shall be at the overtime rate of one and one-half (1½) times the regular hourly rate. The regular work day shall be either eight (8) or ten (10) hours. If a job can't work forty (40) hours Monday through Friday because of inclement weather or other conditions beyond the control of the Employer, Friday or Saturday may be worked as a make-up day at straight time (if working 4-10's). Saturday may be worked as a make-up day at straight time (if working 5-8's). Make-up days shall not be utilized for days lost due to holidays. A workday is to begin at the option of the Employer but not later than 11:00 a.m. except when inclement weather, requirements of the owner or other conditions beyond the reasonable control of the Employer prevent work. Except as worked as a make-up day, time on Saturday shall be worked at one and one-half (1½) times the regular rate. Work performed on Sunday shall be paid at two (2) times the regular rate. Work performed on recognized holidays or days observed as such, shall also be paid at the double (2) time rate of pay.

NO. 21: Means the regular workday for which employees shall be compensated at straight time hourly rate of pay shall, unless otherwise provided for, begin at 8:00 a.m. and end at 4:30 p.m. However, the project starting time may be advanced or delayed at the discretion of the Employer. At the discretion of the Employer, when working a five (5) day eight (8) hour schedule, Saturday may be used for a make-up day. If an Employer is prohibited from working on a holiday, that employer may work the following Saturday at the straight time rate. However, the Employer may have the option to schedule his work from Monday through Thursday at ten (10) hours per day at the straight time rate of pay with all hours in excess of ten (10) hours in any one day to be paid at the applicable overtime rate. If the Employer elects to work from Monday through Thursday and is stopped due to circumstances beyond his control, he shall have the option to work Friday or Saturday at the straight time rate of pay to complete his forty (40) hours. If an Employer is prohibited from working on a holiday, that Employer may work the following Friday or Saturday at the straight time rate. Overtime will be at one and one-half (1½) times the regular rate. If workmen are required to work the enumerated holidays or days observed as such, or Sundays, they shall receive double (2) the regular rate of pay for such work.

NO. 22: Means a regular work week of forty (40) hours will start on Monday and end on Friday. The regular work day shall be either eight (8) or ten (10) hours. If a crew is prevented from working forty (40) hours Monday through Friday, or any part thereof by reason of inclement weather, Saturday or any part thereof may be worked as a make-up day at the straight time rate. Employees who are part of a regular crew on a make-up day, notwithstanding the fact that they may not have been employed the entire week, shall work Saturday at the straight time rate. A workday is to begin between 6:00 a.m. and 9:00 a.m. However, the project starting time may be advanced or delayed if mutually agreed to by the interested parties. For all time worked on recognized holidays, or days observed as such, double (2) time shall be paid.

**BOONE COUNTY
HOLIDAY SCHEDULE – HEAVY CONSTRUCTION**

NO. 4: All work performed on New Year's Day, Memorial Day, Independence Day, Labor Day, Thanksgiving Day, Christmas Day, or days observed as such, shall be paid at the double time rate of pay. When a holiday falls on a Sunday, Monday shall be observed.

NO. 5: The following days are recognized as holidays: New Year's Day, Memorial Day, Fourth of July, Labor Day, Thanksgiving Day and Christmas Day. If a holiday falls on a Sunday, it shall be observed on the following Monday. If a holiday falls on a Saturday, it shall be observed on the preceding Friday. No work shall be performed on Labor Day except in case of jeopardy to work under construction. This rule is applied to protect Labor Day. When a holiday falls during the normal work week, Monday through Friday, it shall be counted as eight (8) hours toward a forty (40) hour week; however, no reimbursement for this eight (8) hours is to be paid the workman unless worked. If workmen are required to work the above recognized holidays or days observed as such, or Sundays, they shall receive double (2) the regular rate of pay for such work. The above shall apply to the four 10's Monday through Friday work week. The ten (10) hours shall be applied to the forty (40) hour work week.

NO. 16: The following days are recognized as holidays: New Year's Day, Memorial Day, Fourth of July, Labor Day, Thanksgiving Day and Christmas Day. If a holiday falls on Sunday, it shall be observed on the following Monday. If a holiday falls on Saturday, it shall be observed on the preceding Friday. No work shall be performed on Labor Day except in case of jeopardy to work under construction. This rule is applied to protect Labor Day. When a holiday falls during the normal work week, Monday through Friday, it shall be counted as eight (8) hours toward the forty (40) hour week; however, no reimbursement for this eight (8) hours is to be paid to the worker unless worked. If workers are required to work the above recognized holidays or days observed as such, they shall receive double (2) the regular rate of pay for such work.

NO. 19: The following days are recognized as holidays: New Year's Day, Memorial Day, Independence Day, Labor Day, Thanksgiving Day and Christmas Day. If a holiday falls on a Sunday, it shall be observed on the following Monday. No work shall be performed on Labor Day except in case of jeopardy to work under construction. This rule is applied to protect Labor Day. When a holiday falls during the normal work week, Monday through Friday, it shall be counted as eight (8) hours toward the forty (40) hour week; however, no reimbursement for this eight (8) hours is to be paid the workmen unless worked. An Employer working a four (4) day, ten (10) hour schedule may use Friday as a make up day when an observed holiday occurs during the work week. Employees have the option to work that make up day. If workmen are required to work the above enumerated holidays, or days observed as such, they shall receive double (2) the regular rate of pay for such work.

OUTSIDE ELECTRICIAN

These rates are to be used for the following counties:

Adair, Audrain, Boone, Callaway, Camden, Carter, Chariton, Clark, Cole, Cooper, Crawford, Dent, Franklin, Gasconade, Howard, Howell, Iron, Jefferson, Knox, Lewis, Lincoln, Linn, Macon, Maries, Marion, Miller, Moniteau, Monroe, Montgomery, Morgan, Oregon, Osage, Perry, Phelps, Pike, Pulaski, Putnam, Ralls, Randolph, Reynolds, Ripley, St. Charles, St. Francois, St. Louis City, St. Louis County, Ste. Genevieve, Schuyler, Scotland, Shannon, Shelby, Sullivan, Texas, Warren, and Washington

COMMERCIAL WORK

Occupational Title	Basic Hourly Rate	Total Fringe Benefits
Journeyman Lineman	\$32.38	\$4.75 + 41.55%
Lineman Operator	\$27.96	\$4.75 + 41.55%
Groundman	\$21.62	\$4.75 + 41.55%

OVERTIME RATE: Eight (8) hours shall constitute a work day between the hours of 7:00 a.m. and 4:30 p.m. Forty (40) hours within five (5) days, Monday through Friday inclusive, shall constitute the work week. Work performed in the 9th and 10th hour, Monday through Friday, shall be paid at time and one-half (1½) the regular straight time rate of pay. Contractor has the option to pay two (2) hours per day at the time and one-half (1½) the regular straight time rate of pay between the hours of 6:00 a.m. and 5:30 p.m., Monday through Friday. Work performed outside the regularly scheduled working hours and on Saturdays, Sundays and recognized legal holidays, or days celebrated as such, shall be paid for at the rate of double (2) time.

HOLIDAY RATE: All work performed on New Year's Day, Memorial Day, Fourth of July, Labor Day, Veteran's Day, Thanksgiving Day, Christmas Day, or days celebrated as such, shall be paid at the double time rate of pay. When one of the foregoing holidays falls on Sunday, it shall be celebrated on the following Monday.

UTILITY WORK

Occupational Title	Basic Hourly Rate	Total Fringe Benefits
Journeyman Lineman	\$32.38	\$4.75 + 37.55%
Lineman Operator	\$27.96	\$4.75 + 37.55%
Groundman	\$21.62	\$4.75 + 37.55%

OVERTIME RATE: Eight (8) hours shall constitute a work day between the hours of 7:00 a.m. and 4:30 p.m. Forty (40) hours within five (5) days, Monday through Friday inclusive, shall constitute the work week. Work performed in the 9th and 10th hour, Monday through Friday, shall be paid at time and one-half (1½) the regular straight time rate of pay. Contractor has the option to pay two (2) hours per day at the time and one-half (1½) the regular straight time rate of pay between the hours of 6:00 a.m. and 5:30 p.m., Monday through Friday. Work performed in the first eight (8) hours on Saturday shall be paid at the rate of one and eight tenths (1.8) the regular straight time rate. Work performed outside these hours and on Sundays and recognized legal holidays, or days celebrated as such, shall be paid for at the rate of double (2) time.

HOLIDAY RATE: All work performed on New Year's Day, Memorial Day, Fourth of July, Labor Day, Veteran's Day, Thanksgiving Day, Christmas Day, or days celebrated as such, shall be paid at the double time rate of pay. When one of the foregoing holidays falls on Sunday, it shall be celebrated on the following Monday.