

**Monticello Utility Commission  
Monticello, Kentucky**

**June 2008**

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**Regulations and Specifications  
Pertaining to Materials and Construction of New  
Water System Facilities of the  
Monticello Utility Commission**



*Prepared by*



**Regulations and Specifications Pertaining to Materials  
and Construction of New Water System Facilities of the  
Monticello Utility Commission  
Monticello, Kentucky**

**Standard Specifications, Details and Illustrations  
for Water System Construction**

**June 2008**

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**REGULATIONS AND SPECIFICATIONS PERTAINING TO  
MATERIALS AND CONSTRUCTION OF NEW WATER SYSTEM FACILITIES  
MONTICELLO UTILITY COMMISSION  
MONTICELLO, KENTUCKY**

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**DIVISION O**  
**GENERAL CONDITIONS**

**July 2008**

1. PURPOSE OF SPECIFICATIONS

These specifications, and the Standard Construction Details accompanying them, are provided by the Monticello Utility Commission, Monticello, Kentucky, to govern and control the materials and installation of water facilities that are, or will become, the responsibility of the Monticello Utility Commission, Monticello, Kentucky to operate and maintain as a portion of its system. They are intended to require facilities of such quality, and to the appropriate design criteria, such that will satisfy the requirements of the Monticello Utility Commission, the Wayne County Health Department, the Kentucky State Health Department and the Kentucky Environmental and Public Protection Cabinet, and any other agencies exercising control, such as the City of Monticello, the State Transportation Cabinet, or various railway companies. They are intended primarily for the use of subdivision or other property developers who desire to construct the water facilities within the confines of or adjacent to their development.

These specifications may from time to time be changed by Addendum. Any items of construction not covered by these specifications or construction details will be provided by the Monticello Utility Commission when the need or necessity is brought to their attention.

2. STANDARD PROCEDURE

If the Developer elects to perform the construction of water facilities within and adjacent to his development, as required to connect his system to the Monticello Utility Commission existing system, the following is to be performed by the Developer:

a. Employ a Registered Professional Engineer, experienced in water utility work to prepare plans for the proposed work, and submit the plans to the Monticello Utility Commission for their review and approval. The Developer shall pay the Monticello Utility Commission a non-refundable plan review fee of \$100.00 for each set of drawings and specifications proposed to be reviewed by the commission. The name, address and telephone number of the proposed Engineer shall be submitted to the Monticello Utility Commission for review and approval. The prospective Engineer shall provide a list of similar projects, with references, to the Monticello Utility Commission. The Monticello Utility Commission reserves the right to reject any proposed Engineer. Further, the Monticello Utility Commission reserves the right to have the proposed drawings reviewed by their consulting engineer at the expense of the Developer. The plans to be submitted shall consist of the following:

(1) A Project Map, or plan of the development, showing thereon all lots to be served; contours, on USGS Datum, at not greater than 2 foot intervals; location of all main water lines (does not include service line to lots); valves and fire hydrants and easements, if required, for those mains where off the street.

(2) For water lines there shall also be provided separate plan and profile sheets showing the water line elevations and other utility crossings with valves, air relief, fire hydrant, and other appurtenances with pipe material indicated. Scale of the plan view shall be no smaller than 1" = 100', and vertical scale of profile shall be no smaller than 1" = 10'.

(3) A vicinity Map shall also be provided, showing the location of the development in relation to other areas of the city or county.

(4) The Monticello Utility Commission's standard sheet size is 24" x 36", and plans submitted shall be on this size sheet, except for the Project Map, which may be larger, if necessary.

(5) Initial submittal shall be 2 sets of paper prints of the above required plans. The Commission will review the plans for conformance with their Standards and with their overall plans for their water system. If changes are required in the plans, the Developer will cause the changes to be made and resubmit the plans in 3 sets. The Developer shall then submit the proposed drawings to the appropriate review agencies for approval. All fees associated with such submittals shall be paid by the Developer. After agency approvals are received and the project is fully constructed, the Developer shall provide 1 paper copy and 1 digital copy in pdf format of "as constructed" plans to the Monticello Utility Commission for their files.

(6) It should specifically be noted that developers proposing the construction of restaurants and/or other commercial, industrial or institutional facilities shall assure the Monticello Utility Commission that all requirements will be addressed in their final site design, including the installation of meters with size shown.

(7) The Developer's Engineer shall prepare, and the Developer secure, all necessary permits or easements required from the State Transportation Cabinet, railway companies and private properties, in the name of the Monticello Utility Commission for the benefit of the Monticello Utility Commission, Monticello, Kentucky, and deliver them to the commission. All private property easements and state highway and railroad encroachment permits shall be delivered to the Monticello Utility Commission prior to acceptance of the completed project by the Monticello Utility Commission.

b. Employ an experienced Utility Contractor to perform the necessary construction work. The Contractor shall keep on the work, during its progress, a competent superintendent and any necessary assistants, all satisfactory to the commission. Equipment and tools shall be of adequate size and in proper condition to perform the work.

c. The name, address and telephone number of the proposed Contractor shall be submitted to the Monticello Utility Commission for review and approval. The prospective Contractor shall provide a list of similar projects, with references to the Monticello Utility Commission. The Monticello Utility Commission reserves the right to reject any proposed Contractor.

### 3. DEFINITIONS

Unless otherwise noted, the terms "OWNER," "CONTRACTOR," and "ENGINEER" as used in these specifications, shall mean the following.

- a. "OWNER" shall mean the Monticello Utility Commission, Monticello, Kentucky.
- b. "CONTRACTOR" shall mean the Developer.
- c. "ENGINEER" shall mean the Consulting Engineer of the Monticello Utility Commission.

The term "Subcontractor" as employed herein, includes only those having a direct contract with the CONTRACTOR, such as the Developer's Engineer, or the Utility Contractor employed by the Developer.

The term "work" of the CONTRACTOR or Subcontractor includes labor or material or both, equipment, transportation or other facilities necessary to complete the project.

The law of the place of building shall govern the construction.

### 4. DESIGN CRITERIA

All water facilities shall be designed to conform with the Kentucky Division of Water regulations, which includes conformance with "Ten States Standards." All materials used for construction of water facilities shall be new. Used materials are specifically prohibited.

All water mains shall be designed to include 12 gauge copper tracer wire. The following design criteria shall also be utilized:

- a. Water Mains and Appurtenances
  - (1) All water lines greater than 3 inches shall be ductile iron pipe. PVC pipe may be approved by the Monticello Utility Commission on a case by case basis.
  - (2) Minimum pressure class for ductile iron pipe shall be 350 Class.
    - (a) Minimum pressure class for PVC shall be 250 psi and PE pipe shall be 200 psi and the working pressure rating of all PVC piping shall be derated to 0.67% of the pressure class. (Working pressures above 13+ psi shall require an increased pressure class of pipe.)
  - (3) Valves shall be resilient seat gate units and shall be located at all pipe junctions.

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(4) Fire hydrants shall be located such that any residential lot is within 250 feet of a hydrant. Hydrant branches shall be 6 inches in diameter and equipped with a separate valve.

(5) Minimum depth of bury for water mains shall be 36 inches, unless otherwise approved in writing by the OWNER.

(6) Water services shall be minimum 1 inch in diameter and utilize copper or SDR 9, PE with stainless steel stiffeners and installed in 1-1/2 inch PVC cover pipe. If PE pipe is utilized, the pipe must be properly bedded and backfilled with Class I sand. PE pipe shall not be allowed under roadways.

(7) Meter set details shall comply with Monticello Utility Commission standards.

(8) Fire protection systems shall provide isolation and backflow prevention as directed by Monticello Utility Commission.

### 5. INSPECTION AND TESTING OF MATERIALS

Attention is called to the portions of the specifications requiring various testing of materials.

### 6. SECOND HAND AND SALVAGED MATERIALS

The use of second hand and/or salvaged materials will not be permitted, unless specifically approved by the OWNER.

### 7. PERIOD OF LIABILITY

The CONTRACTOR shall return to the site of the work at any time within a period of one year from date of final acceptance of the work, and shall repair any defect due to faulty workmanship or materials which may occur within this period. This guarantee shall include, but not be limited to, damage done by settlement of backfills, such damage and sinking of fills being considered as defective workmanship.

### 8. SHOP DRAWINGS

The CONTRACTOR shall submit 3 copies of all shop drawings required for the work to the OWNER for approval before ordering material or equipment.

### 9. OWNERSHIP OF SPECIFICATIONS

All plans, specifications and copies thereof furnished by the OWNER are the property of the OWNER, and are to be returned to the OWNER at completion of the work.



10. PERMITS AND REGULATIONS

Permits, easements, and licenses necessary for the prosecution of the work shall be secured and paid for by the CONTRACTOR.

The CONTRACTOR shall give all notices and comply with all laws, ordinances, rules and regulations bearing on the conduct of the work as drawn and specified. If the CONTRACTOR observes that the plans and specifications are at variance therewith, he shall promptly notify the OWNER in writing, and any necessary changes shall be adjusted. The CONTRACTOR shall not perform any work knowing it to be contrary to such laws, ordinances, rules, and regulations.

11. PROTECTION OF PUBLIC, WORKMEN, WORK AND PROPERTY

The CONTRACTOR shall continuously maintain adequate protection of all his work from damage and shall protect the OWNER'S property from injury or loss arising in connection with this work. He shall make good any such damage, injury, or loss. This shall not include completed portions of work taken over by OWNER for use and operation, where protection is the responsibility of the OWNER'S operating forces and where the damage was not caused by the CONTRACTOR'S operation on this or other portions of the work but only by lack of protection on the part of the OWNER'S forces. He shall also adequately protect adjacent property as provided by law.

The CONTRACTOR shall take all necessary precautions for the safety of the public and employees and others engaged on the work and shall comply with all applicable provisions of federal, state, and municipal safety laws, traffic regulations and building codes, to prevent accidents or injury to persons on, about or adjacent to the premises where the work is being performed. He shall erect and properly maintain at all times, as required by the conditions and progress of the work all necessary safeguards for the protection of workmen, survey parties and the public, and shall post danger signs at proper places (in case of streets, as far out as one block beyond), or to the requirements stated in the approved encroachment permit where state highways are involved, warning against the hazards created by such features of construction as survey instruments, ditches, protruding nails, falling materials, machinery, equipment and other hazards. Barricades and signs shall be kept clearly painted with applicable designations. All barricades, holes and obstructions shall be illuminated from sunset to sunrise.

12. INSPECTION OF WORK

The OWNER, the ENGINEER, and their representatives shall at all times have access to the work wherever it is in preparation or progress and the CONTRACTOR shall provide proper facilities for such access and for inspection.

If the specifications, the OWNER'S instructions, laws, ordinances, or any public authority require any work to be specially tested or approved, the CONTRACTOR shall give the OWNER'S timely notice of its readiness for inspection, and, if the inspection is by another authority than the OWNER, of the date fixed for such inspection. Inspections by the OWNER shall be promptly made and where practicable at the source of supply. If any work shall be covered up without approval or consent of the OWNER, it

must, if required by the OWNER, be uncovered for examination at the CONTRACTOR'S expense.

The OWNER will furnish a Construction Inspector for the project. Materials and construction must at all times have his approval. Cost for this inspection will be reimbursed to the OWNER by the CONTRACTOR on a monthly basis, or at such other times as is mutually agreed upon.

The OWNER will also be reimbursed for other costs related to the project, such as costs in review and approval of plans, review and approval of shop drawings, preparation of "As Built" drawings, and other similar items.

### 13. CORRECTION OF WORK AFTER FINAL ACCEPTANCE

The final acceptance shall not relieve the CONTRACTOR of responsibility for faulty materials or workmanship and, unless otherwise specified, he shall remedy any defect due thereto and pay for any damage to other work resulting therefrom, which shall appear within a period of one year from the date of final acceptance of the work by the OWNER. The OWNER shall give notice of observed defects with reasonable promptness. If replacements are not made within 10 days after notice is given of such defects in workmanship, or 30 days in case of materials, then the OWNER shall have the right to make replacements and charge cost of same to the CONTRACTOR or his bondsman.

### 14. LIENS

Before the work is finally accepted by the OWNER, the CONTRACTOR, if required, shall deliver to the OWNER a complete release of all liens arising out of this project, or receipts in full in lieu thereof and, if required in either case, an affidavit that so far as he has knowledge or information, the releases and receipts include all the labor and material for which a lien could be filed; but the CONTRACTOR may, if any Subcontractor refuses to furnish a release or receipt in full, furnish a bond satisfactory to the OWNER, to indemnify him against any lien. If any lien remains unsatisfied after all payments are made, the CONTRACTOR shall refund to the OWNER all moneys that the latter may be compelled to pay in discharging such a lien, including all costs and a reasonable attorney's fee.

### 15. SUBCONTRACTORS

The CONTRACTOR agrees that he is as fully responsible to the OWNER for the acts and omissions of his Subcontractors and of persons either directly or indirectly employed by them, as he is for the acts and omissions of persons directly employed by him.

Nothing contained in the specifications shall create any contractual relation between any Subcontractor and the OWNER.

The name of each Subcontractor proposed for work shall be submitted to the OWNER for approval prior to starting the work, together with such information as may be required to prove his ability to handle the work involved.

16. ENGINEER'S STATUS

In rendering general engineering service and resident engineering and inspection on construction, in either case, the ENGINEER and the OWNER shall not be in charge of or be responsible for the methods of construction, construction forces and equipment, their safety procedures, or knowledge of status of CONTRACTOR'S payment of his bills for labor and materials on the project.

17. FINAL INSPECTION

Prior to acceptance by the Monticello Utility Commission, an inspection shall be made of all facilities included in the construction. All noted defective items shall be corrected before final acceptance.

18. COST OF CONSTRUCTION

Unless otherwise agreed by the OWNER, the CONTRACTOR shall bear all costs incidental to installation of all facilities within and extending to the development. However, the OWNER may participate in the cost of "oversizing" the facilities to serve additional areas, if the larger facilities are required by the OWNER'S master plan for the system. Each application for cost participation shall be considered on its own merits, and the OWNER reserves the right to approve or reject any application, as it may see fit.

19. FACILITIES FOR LAYING OUT WORK

a. General

The CONTRACTOR'S personnel engaged in the layout work described herein and the aides furnished to his Engineer shall be fully capable of performing the duties and shall be fully qualified chiefs of party, instrumentmen, chainmen and/or axemen, as required.

b. Water Mains

Trench line stations shall be set at least every hundred feet by the CONTRACTOR'S Engineer ahead of trenching. Lines shall be laid out according to approved plans and to avoid obstacles as far as possible, consistent with maintenance of alignment necessary to finding pipeline in the future and avoiding obstruction to future utilities.

20. "AS BUILT" DRAWINGS AND RECORDS

The CONTRACTOR shall assist the OWNER'S Inspector in making measurements to properly locate all facilities, including tee service lines on valves, fittings and appurtenances on water main. The OWNER will provide his own "as built" record drawings from the information gathered.

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21. PERFORMANCE AND PAYMENT BOND

The CONTRACTOR will be required to furnish a Performance and Payment Bond, acceptable to the OWNER, to run for a period of one year after date of acceptance of the work, in an amount equal to 100 percent of the value of the work.

**END OF SECTION**

# KPDES



## STORM WATER

## GENERAL

## PERMIT

PERMIT NO.: KYR10

### GENERAL KPDES PERMIT FOR STORM WATER POINT SOURCE DISCHARGES

#### CONSTRUCTION ACTIVITIES

In compliance with the provisions of the Kentucky Revised Statutes Chapter 224 and pursuant to 401 KAR 5:055, Section 5, the following discharges are authorized:

All new and existing storm water discharges associated with construction activity that are required to have a permit pursuant to 401 KAR 5:055, Section 1 and KRS 224.16-050.

Specifically excluded from authorization under this permit are operations that:

1. Are subject to an existing individual KPDES permit or application,
2. Are subject to a promulgated storm water effluent guideline or standard,
3. The Director has determined to be or may reasonably be expected to be contributing to a violation of a water quality standard or to the impairment of a 303(d) listed water, or
4. Are into a surface water that has been classified as an Exceptional or Outstanding or National Resource Water.

The receiving water for any discharge authorized by this permit is located within the political boundaries of the Commonwealth of Kentucky. Such authorization is in accordance with the effluent limitations and other conditions set forth in PARTS I, II, III, and IV hereof. This permit consists of this cover sheet, PART I 1 page, PART II 1 page, PART III 1 page, and PART IV 4 pages.

This permit shall become effective on October 1, 2002.

This permit and the authorization to discharge shall expire at midnight, September 30, 2007.

9/13/02  
Date Signed

Jeffrey W. Pratt  
Jeffrey W. Pratt, Director  
Division of Water

Robert W. Logan  
Commissioner

**A. Effluent Limitations and Monitoring Requirements**

No monitoring is required.

**B. Schedule of Compliance**

The permittee shall achieve compliance with all requirements upon notification of coverage under this general permit.

**STANDARD CONDITIONS FOR KPDES PERMIT**

The permittee is also advised that all KPDES permit conditions in KPDES Regulation 401 KAR 5:065, Section 1 will apply to all discharges authorized by this permit.

This permit has been issued under the provisions of KRS Chapter 224 and regulations promulgated pursuant thereto. Issuance of this permit does not relieve the permittee from the responsibility of obtaining any other permits or licenses required by this Cabinet and other state, federal, and local agencies.

## PART III

### OTHER REQUIREMENTS

#### A. Retention of Records:

The permittee shall keep the Best Management Practices (BMP) plan developed in accordance with PART IV of this permit one (1) year after coverage under this permit ends. This period may be extended by request of the Director at any time.

#### B. Reopener Clause:

This permit shall be modified, or alternatively revoked and reissued, to comply with any applicable effluent standard or limitation issued or approved under 401 KAR 5:050 through 5:080 and KRS 224 if the effluent standard or limitation so issued or approved:

1. Contains different conditions or is otherwise more stringent than any effluent limitation in this permit; or
2. Controls any pollutant not limited in this permit.

The permit as modified or reissued under this paragraph shall also contain any other requirements of KRS Chapter 224 when applicable.

#### C. Other Discharges:

All discharges covered by this permit shall be composed entirely of storm water except for discharges from fire fighting activities, fire hydrant flushing, potable water sources, waterline flushing, irrigation or lawn watering, detergent free building or pavement washing where spills or leaks of toxic materials have not occurred or have been completely removed, air conditioning condensation, natural springs, and uncontaminated ground water sources.

This permit can only authorize storm water discharges from construction activity that are mixed with storm water discharges from other industrial activity, including dedicated asphalt and concrete plants, if the other industrial activity discharge is in compliance with a different KPDES permit.

#### D. Releases in Excess of Reportable Quantities:

The presence of hazardous substances or oil in the storm water discharge shall be minimized in accordance with the BMP plan. Coverage under this permit does not relieve the permittee of the reporting requirements of 40 CFR Part 117 and 40 CFR Part 302.



## **PART IV**

### **BEST MANAGEMENT PRACTICES**

A storm water Best Management Practices (BMP) plan shall be developed in accordance with good engineering practices for each site covered by this permit. The BMP plan shall identify potential sources of pollution that may reasonably be expected to affect the quality of storm water discharges from the site. The BMP plan shall describe and ensure the implementation of practices that are to be used to reduce the pollutants in storm water discharges and to assure compliance with the terms and conditions of this permit. Facilities must implement the BMP plan required by this PART as a condition of this permit.

The BMP plan shall:

1. Be completed before submittal of the NOI for coverage under this permit.
2. Be implemented beginning with the initiation of construction activities.

#### **Signature and Plan Review:**

The BMP plan shall be signed in accordance with PART II and shall be kept onsite.

The permittee shall make the BMP plan available upon request to the Director, to a state or local agency approving sediment, erosion, grading or storm water management plans, or in the case of a storm water discharge to a MS4 with a KPDES permit, to the operator of the system.

After a review, the permittee may be notified that the BMP plan does not meet the minimum requirements of this PART. In that case, the permittee shall modify the BMP plan within seven (7) days of notification and shall submit a written certification that the requested changes have been made.

BMP plans required by this permit are considered reports that shall be made available to the public, upon written request by the public, in accordance with Section 308(b) of the Clean Water Act (CWA). However, the permittee may claim any portion of the BMP plan as confidential, in accordance with 40 CFR Part 2.

#### **Plan Modification:**

The permittee shall modify the BMP plan when there is a change in design, construction, operation, or maintenance of the site which has a significant effect on the potential for the discharge of pollutants to waters of the Commonwealth and shall implement the changes within seven (7) days.

#### **Modification for Ineffectiveness:**

The permittee shall amend the BMP plan if it proves to be ineffective in controlling the discharge of pollutants to waters of the Commonwealth and shall implement the changes within seven (7) days.

#### **Minimum Requirements:**

The BMP plan shall include, as a minimum, Items A through H.

**A. Site Description:**

The BMP plan shall include a clear description of the nature of the construction activity, the order of major soil disturbing activities, estimates of the total project area and the total disturbed area, the post construction runoff coefficient, any existing data describing soil condition or discharge quality, receiving water name, and a site map. The site map shall indicate drainage patterns and show approximate slopes after grading, areas of disturbance, the location of control measures, surface waters or wetlands, and storm water discharge locations.

**B. Sediment and Erosion Control Measures:**

The BMP plan shall include a clear description of what sediment and erosion control measures will be used and when they will be implemented. (For example, perimeter controls for one (1) portion of the site will be installed after the necessary clearing and grubbing, but before clearing and grubbing the remaining portions of the site. Perimeter controls will be actively maintained until upward portions of the site are stabilized). The following control measures shall be used as a minimum.

1. Soil Stabilization Practices - Existing vegetation shall be preserved where possible. All disturbed areas of the site shall be stabilized. Stabilization shall begin within 14 days on areas of the site where construction activities have permanently or temporarily (for 21 days or more) ceased. When snow cover causes delays, stabilization shall begin as soon as possible.

Stabilization practices include seeding, mulching, placing sod, planting trees or shrubs, and using geotextile fabrics and other appropriate measures.

2. Perimeter Structural Practices - Silt fences or other equivalent structural practices shall be used on all side and down slope borders of the site. Alternatively, a sediment basin shall be used that provides 3,600 cubic feet of storage capacity per disturbed acre drained. For common drainage locations that serve more than ten (10) disturbed acres at one time, a sediment basin must be used if possible.

Structural practices include protecting drain inlets and outlets and using silt fences, earthen dikes, drainage swales, sediment traps, check dams, subsurface drains, pipe slope drains, reinforced soil retaining systems, gabions, sediment basins and other appropriate measures. The installation of these devices may be subject to Section 404 of the CWA.

3. Storm Water Management Devices - Management devices shall be installed during construction to control the pollutants in storm water discharges that will occur after construction has been completed. Velocity dissipation devices shall be placed at discharge locations and along the length of any outfall channel as necessary to provide a non-erosive flow so that the original physical and biological characteristics and functions of the receiving waters, such as the hydroperiod and hydrodynamics, are maintained and protected. When considering storm water management devices, the goal should be 80% removal of Total Suspended Solids that exceed predevelopment levels. If this goal is not met, the permittee shall provide justification for refusing each device based on site conditions.

Management devices include velocity dissipation devices, storm water retention and detention basins, wet ponds, vegetated swales and natural depressions used for flow reduction, runoff infiltration devices, sequential systems that combine several devices and other appropriate measures. The installation of these devices may be subject to Section 404 of the CWA.

The permittee is not responsible for the maintenance of these devices once discharges associated with construction activity have been eliminated.

**C. Other Control Measures:**

No solid materials, including building materials, shall be discharged to waters of the Commonwealth, except as authorized by a Section 404 permit.

Off-site vehicle sediment tracking and dust generation shall be minimized.

Waste disposal methods and sanitary sewer or septic systems shall comply with applicable state or local regulations.

**D. Other State or Local Plans:**

The BMP plan shall include any requirements specified in sediment and erosion control plans, storm water management plans or permits that have been approved by other state or local officials. Upon submittal of the NOI, other requirements for surface water protection are incorporated by reference into and are enforceable under this permit (even if they are not specifically included in the BMP plan required by this permit). This provision does not apply to master or comprehensive plans, non-enforceable guidelines or technical guidance documents that are not identified in a specific plan or permit issued for the construction site by state or local officials.

**E. Maintenance:**

The BMP plan shall include a clear description of the maintenance procedures necessary to keep the control measures in good and effective operating condition.

**F. Inspections:**

Qualified personnel shall inspect all storm water control measures, discharge locations, vehicle exits, disturbed areas of the construction site and material storage areas at least once every seven (7) days (and within 24 hours of the end of a storm that is 0.5 inches or greater) and areas that have been temporarily or finally stabilized at least once a month. Revisions to the BMP plan based on the results of the inspection shall be implemented within seven (7) days.

Control measures shall be inspected to ensure correct operation. Accessible discharge locations shall be inspected to ensure that velocity dissipation devices are effective in preventing significant impacts to receiving waters. Vehicle exits shall be inspected for evidence of, or the potential for, off-site sediment tracking. Disturbed areas and material storage areas that are exposed to precipitation shall be inspected for evidence of, or the potential for, pollutants entering the drainage system.

A report summarizing the scope of the inspection, names and qualifications of personnel making the inspection, the date of the inspection, major observations relating to the implementation of the BMP plan, and any corrective actions taken shall be made and kept as part of the BMP plan for at least three (3) years after the date of inspection, or until one (1) year after coverage under this permit ends. The report shall be signed in accordance with Part II of this permit.

**G. Non-Storm Water Discharges:**

The BMP plan shall identify and ensure the implementation of appropriate pollution prevention measures for any non-storm water component of a discharge as listed in PART III C, except for flows from fire fighting activities.

**H. Contractors and Subcontractors:**

The BMP plan shall clearly state the contractor or subcontractors that will implement each control measure identified in the BMP plan. All contractors and subcontractors identified in the BMP plan must sign a copy of the certification statement below in accordance with PART II of this permit before conducting any professional service at the site:

"I certify under penalty of law that I understand the terms and conditions of the general National Pollutant Discharge Elimination System (NPDES) permit that authorizes the storm water discharges associated with industrial activity from the construction site identified as part of this certification."

The certification must include the name and title of the person providing the signature, the name, address, and telephone number of the contracted firm, the address, or other identifying description of the site and the date the certification is made. All certification statements must be included in the BMP plan.



COMMONWEALTH OF KENTUCKY  
**NATURAL RESOURCES AND ENVIRONMENTAL PROTECTION CABINET**  
DEPARTMENT FOR ENVIRONMENTAL PROTECTION  
FRANKFORT OFFICE PARK  
14 REILLY RD  
FRANKFORT KY 40601

**FACT SHEET**

**GENERAL KPDES PERMIT FOR STORM WATER POINT SOURCE DISCHARGES  
CONSTRUCTION ACTIVITIES**

KPDES No.: KYR10  
Date: July 22, 2002

**1. COVERAGE UNDER THIS GENERAL PERMIT**

**Area of Coverage:**

This permit covers all areas of the Commonwealth of Kentucky.

**Discharges Eligible for Coverage:**

This permit covers all new and existing storm water discharges associated with construction activity. Only construction activities that disturb five (5) acres or more are required to have coverage under this permit. Beginning in March 2003, construction activities that disturb one (1) acre or more are also required to have coverage under this permit.

**Limitations on Coverage:**

This permit does not authorize discharges that:

1. Are subject to an existing individual KPDES permit or application,
2. Are subject to a promulgated storm water effluent guideline or standard,
3. The Director has determined to be or may reasonably be expected to be contributing to a violation of a water quality standard or to the impairment of a 303(d) listed water, or
4. Are into a surface water that has been classified as an Exceptional or Outstanding or National Resource Water.

**2. REQUIREMENTS FOR GENERAL PERMIT COVERAGE**

**Notice of Intent:**

A signed copy of a Notice of Intent (NOI) form must be submitted to the following address 48 hours before construction activity begins:

Kentucky Division of Water  
KPDES Branch  
Inventory and Data Management Section  
14 Reilly Road  
Frankfort, Kentucky 40601



Unless notified by the Director to the contrary, owners or operators who submit the above notification are authorized to discharge storm water associated with construction activity under the terms and conditions of this permit. Discharge may begin 48 hours after the NOI is postmarked, even if the permittee has not yet received a copy of the general permit from the Division of Water.

**Notice of Termination:**

When all storm water discharges associated with construction activity are eliminated and the site has been finally stabilized, the owner or operator must submit a signed copy of a Notice of Termination (NOT) form in order to end coverage under this general permit and nullify its requirements. NOTs are to be sent to the above address.

**Change of Ownership:**

When the owner or operator of a site covered by this permit changes, the new owner or operator must submit a notice 48 hours before the change in order to transfer coverage under this general permit. Change of ownership notices are to be sent to the above address.

**3. ADDITIONAL INFORMATION**

**Municipal Notification:**

Sites which discharge storm water associated with construction activity to a municipal separate storm sewer system (MS4) shall submit a signed copy of the NOI to the operator of the MS4 48 hours before construction activity begins.

**Other Storm Water Discharges:**

Storm water discharges authorized by this permit may be combined with other sources of storm water that are not associated with construction activity if the resulting discharge is in compliance with this permit.

**4. EFFLUENT LIMITATIONS AND MONITORING REQUIREMENTS**

No monitoring is required.

**5. JUSTIFICATION OF PERMIT CONDITIONS**

The following regulations are pursuant to KRS 224.10-100, 224.70-100, and 224.70-110.

**Best Management Practices:**

This requirement is consistent with 401 KAR 5:065, Section 2(10).

**Antidegradation:**

The conditions of 401 KAR 5:029, Section 1(1) will be satisfied by coverage under this permit. A review under Section 1(2), (3), and (4) will not be applicable.

**6. COMPLIANCE SCHEDULE**

The permittee shall achieve compliance with all requirements upon notification of coverage under this general permit.

**7. PERMIT DURATION**

This permit is valid for five (5) years. Upon issuance of a new general permit, the permittee will have coverage automatically renewed. A new NOI or other notification is not necessary.

**8. PERMIT INFORMATION**

The application, draft permit, fact sheet, public notice, comments received, and additional information is available from the Division of Water at 14 Reilly Road, Frankfort Office Park, Frankfort, Kentucky 40601.

**9. REFERENCES AND CITED DOCUMENTS**

All material and documents referenced or cited in this fact sheet are part of the permit information as described above and are readily available at the Division of Water Central Office. Information regarding these materials may be obtained from the person listed below.

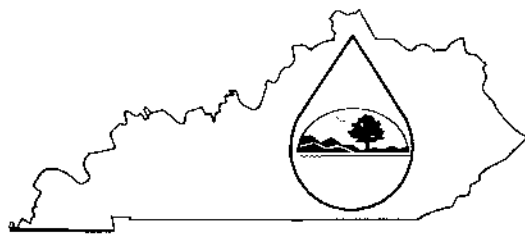
**10. CONTACT**

Additional information concerning this permit may be obtained from Ronnie Thompson at the address noted in Item 8 or at (502) 564-2225, extension 423.

**11. PUBLIC NOTICE INFORMATION**

Please refer to the attached Final Permit Decision Cover Letter or Public Notice for details regarding the procedures for a final permit decision, deadline for comments, and other information required by 401 KAR 5:075, Sections 12 and 4(2)(e).

# KPDES FORM NOI-SW



Kentucky Pollutant Discharge Elimination System  
(KPDES)

**Notice of Intent (NOI)  
for Storm Water Discharges  
Associated with Industrial Activity Under the  
KPDES General Permit**

Submission of this Notice of Intent constitutes notice that the party identified in Section I of this form intends to be authorized by a KPDES permit issued for storm water discharges associated with industrial activity. Becoming a permittee obligates such discharger to comply with the terms and conditions of the permit.

**ALL NECESSARY INFORMATION MUST BE PROVIDED ON THIS FORM (See Instructions on back)**

### I. Facility Operator Information

Name:		Phone:	
Address:		Status of Owner/Operator:	
City, State, Zip Code:			

### II. Facility/Site Location Information

Name:			
Address:			
City, State, Zip Code:			
County:			
Site Latitude: (degrees/minutes/seconds)		Site Longitude: (degrees/minutes/seconds)	

### III. Site Activity Information

MS4 Operator Name:				
Receiving Water Body:				
Are there existing quantitative data?	Yes <input type="checkbox"/>	If Yes, submit with this form.		
	No <input type="checkbox"/>			
SIC or Designated Activity Code Primary	2nd	3rd	4th	
If this facility is a member of a Group Application, enter Group Application Number:				
If you have other existing KPDES Permits, enter Permit Numbers:				

### IV. Additional Information Required FOR CONSTRUCTION ACTIVITIES ONLY

Project Start Date:		Completion Date:	
Estimated Area to be disturbed (in acres):			
Is the Storm Water Pollution Prevention Plan in Compliance with State and/or Local Sediment and Erosion Plans?	Yes <input type="checkbox"/>	No <input type="checkbox"/>	

**V. Certification:** I certify under penalty of law that this document and all attachments were prepared under my direction or supervision in accordance with a system designed to assure that qualified personnel properly gather and evaluate the information submitted. Based on my inquiry of the person or persons who manage the system, or those persons directly responsible for gathering the information, the information submitted is, to the best of my knowledge and belief, true, accurate, and complete. I am aware that there are significant penalties for submitting false information, including the possibility of fine and imprisonment for knowing violations.

Printed or Typed Name:			
Signature:		Date:	



**Kentucky Pollutant Discharge Elimination System (KPDES)  
Instructions  
Notice of Intent (NOI) for Storm Water Discharges Associated with Industrial Activity  
To Be Covered Under The KPDES General Permit**

**WHO MUST FILE A NOTICE OF INTENT (NOI) FORM**

Federal law at 40 CFR Part 122 prohibits point source discharges of stormwater associated with industrial activity to a water body of the Commonwealth of Kentucky without a Kentucky Pollutant Discharge Elimination System (KPDES) permit. The operator of an industrial activity that has such a storm water discharge must submit a NOI to obtain coverage under the KPDES Storm Water General Permit. If you have questions about whether you need a permit under the KPDES Storm Water program, or if you need information as to whether a particular program is administered by the state agency, call the **Storm Water Contact, Industrial Section, Kentucky Division of Water at (502) 564-3410.**

**WHERE TO FILE NOI FORM**

NOIs must be sent to the following address:

**Section Supervisor  
Inventory & Data Management Section  
KPDES Branch, Division of Water  
Frankfort Office Park  
14 Reilly Road  
Frankfort, KY 40601**

**COMPLETING THE FORM**

Type or print legibly in the appropriate areas only. If you have any questions regarding the completion of this form call the **Storm Water Contact, Industrial Section, at (502) 564-3410.**

**SECTION I - FACILITY OPERATOR INFORMATION**

Give the legal name of the person, firm, public organization, or any other entity that operates the facility or site described in this application. The name of the operator may or may not be the same as the name of the facility. The responsible party is the legal entity that controls the facility's operation, rather than the plant or site manager. Do not use a co-equal name. Enter the complete address and telephone number of the operator.

Enter the appropriate letter to indicate the legal status of the operator of the facility:

F = Federal                      M = Public (other than federal or state)  
S = State                        P = Private

**SECTION II - FACILITY/SITE LOCATION INFORMATION**

Enter the facility's or site's official or legal name and complete street address, including city, state, and ZIP code.

**SECTION III - SITE ACTIVITY INFORMATION**

If the storm water discharges to a municipal separate storm sewer system (MS4), enter the name of the operator of the MS4 (e.g., municipality name, county name) and the receiving water of the discharge from the MS4. (A MS4 is defined as a conveyance or system of conveyances (including roads with drainage systems, municipal streets, catch basins, curbs, gutters, ditches, man-made channels, or storm drains) that is owned or operated by a state, city, town, borough, county, parish, district, association, or other public body which is designed or used for collecting or conveying storm water.)

If the facility discharges storm water directly to receiving water(s), enter the name of the receiving water.

Indicate whether or not the owner or operator of the facility has existing quantitative data that represent the characteristics and concentration of pollutants in storm water discharges. If data is available submit with this form.

List, in descending order of significance, up to four 4-digit standard industrial classification (SIC) codes that best describe the principal products or services provided at the facility or site identified in Section I of this application.

If the facility listed in Section II has participated in Part 1 of an approved storm water group application and a group number has been assigned, enter the group application number in the space provided.

If there are other KPDES permits presently issued for the facility or site listed in Section I, list the permit numbers.

**SECTION IV - ADDITIONAL INFORMATION REQUIRED FOR CONSTRUCTION ACTIVITIES ONLY**

Construction activities must complete Section V in addition of Sections I through III. Only construction activities need to complete Section IV.

Enter the project start date and the estimated completion date for the entire development plan.

Provide an estimate of the total number of acres of the site on which soil will be disturbed (round to the nearest acre).

Indicate whether the storm water pollution prevention plan for the site is in compliance with approved state and/or local sediment and erosion plans, permits, or storm water management plans.

**SECTION V - CERTIFICATION**

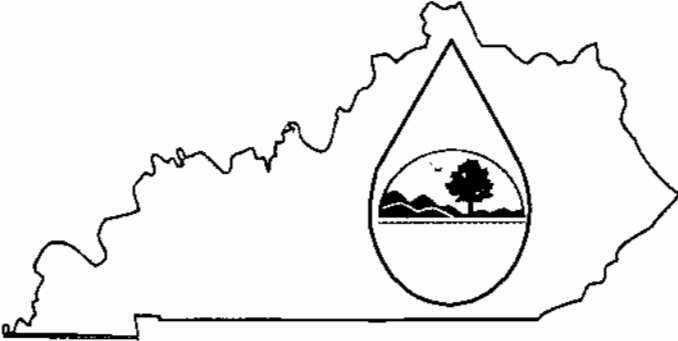
Federal statutes provide for severe penalties for submitting false information on this application form. Federal regulations require this application to be signed as follows:

*For a corporation*, by a responsible corporate officer, which means: (i) president, secretary, treasurer, or vice-president of the corporation in charge of a principal business function, or any other person who performs similar policy or decision-making functions, or (ii) the manager of one or more manufacturing, production, or operating facilities employing more than 250 persons or having gross annual sales or expenditures exceeding \$25 million (in second quarter 1980 dollars) if authority to sign documents has been assigned or delegated to the manager in accordance with corporate procedures.

*For a partnership or sole proprietorship*, by a general partner or the proprietor, or

*For a municipality, state, Federal, or other public facility*, by either a principal executive officer or ranking elected official.

**KPDES FORM NOT-SW**

	<p style="text-align: center;">Kentucky Pollutant Discharge Elimination System (KPDES)</p> <p style="text-align: center;"><b>NOTICE OF TERMINATION (NOT)</b> of Coverage Under the KPDES General Permit for Storm Water Discharges Associated with Industrial Activity</p>
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Submission of this Notice of Termination constitutes notice that the party identified in Section II of this form is no longer authorized to discharge storm water associated with industrial activity under the KPDES program.

ALL NECESSARY INFORMATION MUST BE PROVIDED ON THIS FORM.  
(Please see instructions on back before completing this form.)

<b>I. PERMIT INFORMATION</b>
KPDES Storm Water General Permit Number:
Check here if you are no longer the Operator of the Facility: <input type="checkbox"/>
Check here if the Storm Water Discharge is Being Terminated: <input type="checkbox"/>
<b>II. FACILITY OPERATOR INFORMATION</b>
Name:
Address:
City/State/Zip Code:
Telephone Number:
<b>III. FACILITY/SITE LOCATION INFORMATION</b>
Name:
Address:
City/State/Zip Code:

**Certification:** I certify under penalty of law that all storm water discharges associated with industrial activity from the identified facility that are authorized by a KPDES general permit have been eliminated or that I am no longer the operator of the facility or construction site. I understand that by submitting this Notice of Termination, I am no longer authorized to discharge storm water associated with industrial activity under this general permit, and that discharging pollutants in storm water associated with industrial activity of waters of the Commonwealth is unlawful under the Clean Water Act and Kentucky Regulations where the discharge is not authorized by a KPDES permit. I also understand that the submittal of this Notice of Termination does not release an operator from liability for any violations of this permit or the Kentucky Revised Statutes.

NAME (Print or Type)	TITLE
SIGNATURE	DATE

**INSTRUCTIONS**  
**NOTICE OF TERMINATION (NOT) OF COVERAGE UNDER THE KPDES GENERAL PERMIT**  
**FOR STORM WATER DISCHARGES ASSOCIATED WITH INDUSTRIAL ACTIVITY**

**Who May File a Notice of Termination (NOT) Form**

Permittees who are presently covered under the Kentucky Pollutant Discharge Elimination System (KPDES) General Permit for Storm Water Discharges Associated with Industrial Activity may submit a Notice of Termination (NOT) form when their facilities no longer have any storm water discharges associated with industrial activity as defined in the storm water regulations at 40 CFR 122.26 (b)(14), or when they are no longer the operator of the facilities.

For construction activities, elimination of all storm water discharges associated with industrial activity occurs when disturbed soils at the construction site have been finally stabilized and temporary erosion and sediment control measures have been removed or will be removed at an appropriate time, or that all storm water discharges associated with industrial activity from the construction site that are authorized by a KPDES general permit have otherwise been eliminated. Final stabilization means that all soil-disturbing activities at the site have been completed, and that a uniform perennial vegetative cover with a density of 70% of the cover for unpaved areas and areas not covered by permanent structures has been established, or equivalent permanent stabilization measures (such as the use of riprap, gabions, or geotextiles) have been employed.

**Where to File NOT Form**

Send this form to the following address:

**Section Supervisor**  
**Inventory & Data Management Section**  
**KPDES Branch, Division of Water**  
**14 Reilly Road, Frankfort Office Park**  
**Frankfort, KY 40601**

**Completing the Form**

Type or print legibly in the appropriate areas and according to the instructions given for each section. If you have questions about this form, call the Storm Water Contact, Industrial Section, at (502) 564-3410.

**Section I - Permit Information**

Enter the existing KPDES Storm Water General Permit number assigned to the facility or site identified in Section III. If you do not know the permit number, **call the Storm Water Contact, Industrial Section at (502) 564-3410.**

Indicate your reason for submitting this Notice of Termination by checking the appropriate box:

If there has been a change of operator and you are no longer the operator of the facility or site identified in Section III, check the corresponding box.

If all storm water discharges at the facility or site identified in Section III have been terminated, check the corresponding box.

**Section II - Facility Operator Information**

Give the legal name of the person, firm, public organization, or any other entity that operates the facility or site described in this application. The name of the operator may or may not be the same name as the facility. The operator of the facility is the legal entity which controls the facility's operation, rather than the plant or site manager. Do not use a colloquial name. Enter the complete address and telephone number of the operator.

**Section III - Facility/Site Location Information**

Enter the facility's or site's official or legal name and complete address, including city, state and ZIP code. If the facility lacks a street address, indicate the state, the latitude and longitude of the facility to the nearest 15 seconds, or the quarter, section, township, and range (to the nearest quarter section) of the approximate center of the site.

**Section IV - Certification**

Federal statutes provide for severe penalties for submitting false information on this application form. Federal regulations require this application to be signed as follows:

*For a corporation:* by a responsible corporate officer, which means: (i) president, secretary, treasurer, or vice-president of the corporation in charge of a principal business function, or any other person who performs similar policy or decision making functions, or (ii) the manager of one or more manufacturing, production or operating facilities employing more than 250 persons or having gross annual sales or expenditures exceeding \$25 million (in second-quarter 1980 dollars), if authority to sign documents has been assigned or delegated to the manager in accordance with corporate procedures;

*For a partnership or sole proprietorship:* by a general partner or the proprietor; or

*For a municipal, State, Federal, or other public facility:* by either a principal executive

SECTION 01500

CONSTRUCTION FACILITIES AND TEMPORARY CONTROLS

PART 1 GENERAL

1.01 SANITARY FACILITIES

- A. The CONTRACTOR shall construct and maintain, in a sanitary condition, sanitary facilities for the CONTRACTOR'S employees and also employees of the Subcontractors. The CONTRACTOR shall, at completion of the Contract Work, properly dispose of these sanitary facilities.

1.02 UTILITIES

- A. The obtaining of all utilities for construction, including power and water, shall be the responsibility of the CONTRACTOR.

1.03 MAINTENANCE OF SERVICE IN EXISTING UTILITIES

- A. Where the existing utilities must be disturbed during construction, their operation and function shall be maintained by the CONTRACTOR to such a degree that service to customers will be interrupted for minimum time periods only. **The CONTRACTOR shall notify the OWNER of interruptions in sufficient time to prepare for them and shall agree to the hour, date, and duration of them before they are undertaken.**
- B. Digging through services with trenching machines will not be permitted. Upon damage to utility services, such services shall be repaired immediately and tested to the satisfaction of the OWNER. The CONTRACTOR shall notify all utility users of impending interruption of service and shall be responsible for all damage resulting from same.
- C. The locations and sizes of existing mains cannot be guaranteed. It shall be the responsibility of the CONTRACTOR to locate and uncover existing lines, to which new mains are to be connected, and provide all connecting fittings of the correct size and type for each connection.

1.04 PROPERTY PROTECTION

- A. Care is to be exercised by the CONTRACTOR in all phases of construction, to prevent damage and/or injury to the OWNER's and/or other property.

1.05 CONSTRUCTION WARNING SIGNS

- A. The CONTRACTOR shall provide construction warning signs for each location where he is working in the State highway right-of-way or in City streets. He will further provide flagmen as required and shall abide by all Kentucky Transportation Cabinet, Department of Highways safety rules, including size.

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type and placement of construction signs. All signs shall be of professional quality.

1.06 RESPONSIBILITY FOR TRENCH SETTLEMENT

- A. The CONTRACTOR shall be responsible for any settlement caused by the construction, that occurs within 1 year after the final acceptance of this Contract by the OWNER. Repair of any damage caused by settlement shall meet the approval of the OWNER.

1.07 WASTE DISPOSAL

- A. The CONTRACTOR shall dispose of waste, including any hazardous waste, off-site in accordance with all applicable laws and regulations.

**END OF SECTION**

## SECTION 01561

### EROSION AND SEDIMENT CONTROL DURING CONSTRUCTION

#### PART 1 GENERAL

##### 1.01 STATE AGENCY REQUIREMENTS

- A. Construction activities disturbing more than one acre of land require coverage under the General KPDES Permit for Storm Water Point Source Discharges Construction activities (KPDES No. KYR10). The CONTRACTOR will be required to apply for the KPDES permit, including the preparation of a Best Management Practices (BMP) Plan.
- B. KYR10 forms, including Notice of Intent and Notice of Termination, and KPDES regulations follow this section.

##### 1.02 SCOPE OF WORK

- A. Furnish all labor, materials and equipment required for erecting, maintaining and removing temporary erosion and sedimentation controls as shown on the Drawings and as specified herein.
- B. Temporary erosion controls include, but are not limited to, grassing, mulching, seeding, watering, and reseeded on all disturbed surfaces, including waste area surfaces and stock-pile and borrow area surfaces; scheduling work to minimize erosion; and providing interceptor ditches at those locations which will ensure that erosion during construction will be either eliminated or maintained within acceptable limits.
- C. Temporary sedimentation controls include, but are not limited to, check dams, silt fences, and diversion channels, which will ensure that sedimentation pollution will be either eliminated or maintained within acceptable limits.
- D. The CONTRACTOR is responsible for providing and maintaining effective temporary erosion and sediment control measures during construction or until final controls become effective. CONTRACTOR shall certify that all necessary measures will be taken to protect water quality in and adjacent to the project by signing the sediment control plan, as included herein, as the responsible party. These include measures to:
  - 1. Reduce by the greatest extent practicable the area and duration of exposure of readily erodible soils.
  - 2. Protect the soils by use of straw protection or temporary vegetation as rapidly as is consistent with construction schedules.
  - 3. Provide dust control as specified.
  - 4. Use temporary bridges or culverts for construction crossings.

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5. Provide temporary measures for the control of erosion in the event construction operations are suspended for any appreciable length of time.
6. Provide protection against discharge of pollutants such as chemicals, fuel, lubricants, sewage, etc., into any stream.
7. Locate sanitary facilities away from streams, wells or springs.

### 1.03 STORM WATER POLLUTION CONTROL

- A. The CONTRACTOR shall exercise every reasonable precaution at all times to prevent water pollution by the erosion and disposition of sediment in streams, lakes, and reservoirs. He shall conduct and schedule his operations so as to avoid or minimize the muddying or siltation of areas adjacent to the construction site including streets, storm sewers, vacant lots, etc. No partially completed area of work shall be left in a manner that will contribute to erosion during the period in which work is suspended. The CONTRACTOR shall comply with all applicable state and local statutes relating to the prevention or abatement of water pollution.
- B. All sediment and erosion control facilities shall be maintained until construction is completed and final controls are effective.

### 1.04 SUBMITTALS

- A. Sediment and Erosion Control Plan
  1. The CONTRACTOR shall develop and implement a Storm Water Pollution Prevention (BMP) Plan, providing and maintaining erosion and sediment control for work under this Contract. The CONTRACTOR shall specify the construction sequence before beginning construction, and shall follow the plan for the duration of the Contract, and shall remove all temporary erosion and sediment control devices once final controls become effective.
  2. The CONTRACTOR shall comply with all necessary measures that need to be taken to protect water quality in and adjacent to project. This will be done through the submission of a Kentucky Pollutant Discharge Elimination System (KPDES) Form NOI-SW (Notice of Intent for Storm Water Discharge), which is provided in these Specifications. The CONTRACTOR will sign the completed form as the responsible party. The CONTRACTOR'S plan and revisions, if applicable, shall be on the construction site at all times.
  3. The CONTRACTOR shall certify the plan completion of the Project and shall submit a Kentucky Pollutant Discharge System (KPDES) Form NOT-SW (Notice of Termination of Coverage Under the KPDES). The CONTRACTOR will be required to sign the completed plan as the responsible party. This

form is to be completed and submitted to the Kentucky Division of Water upon completion of construction.

4. All features of the BMP plan and methods of erosion and pollution control shall meet the requirements as shown in the Kentucky Erosion Prevention and Sediment Control, Field Guide. Copies of this publication can be obtained at the Kentucky Division of Conservation, 663 Teton Trail, Frankfort, Kentucky 40601, and/or the Kentucky Division of Water, 14 Reilly Road, Frankfort, Kentucky 40601.

**PART 2 PRODUCTS**

Not used.

**PART 3 EXECUTION**

Not used.

**END OF SECTION**



**SECTION 02235**

**CRUSHED STONE AND DENSE GRADED AGGREGATE (DGA)**

**PART 1 GENERAL**

**1.01 SCOPE OF WORK**

- A. Furnish and install crushed stone aggregates and DGA as indicated on the Drawings and/or required in the Specifications for such uses as surfaces and/or bases of roads, parking areas and walkways; temporary and permanent traffic bound surfacing over trenches; permanent traffic bound roadway surface maintenance; replacement of unsuitable material; and other miscellaneous applications required in the work.
- B. Various sizes, types and quality of crushed stone aggregates are specified in this Section depending on applicability which may be specified in detail in other sections of these Specifications.
- C. The Monticello Utility Commission may require the use of crushed stone aggregates for purposes other than those specified in this or other Specification sections if such use is advisable in his opinion.

**PART 2 PRODUCTS**

**2.01 MATERIALS**

- A. Crushed stone aggregate shall meet the applicable requirements for the intended use in accordance with Section 805 of the Kentucky Transportation Cabinet, Department of Highways, Standard Specifications for Road and Bridge Construction.
- B. Unless otherwise referred to on the Drawings or in these Specifications, crushed stone aggregate shall be graded size No. 57 according to the table below.
- C. When referred to on the Drawings or in these Specifications, dense graded aggregate (DGA) shall have a sand equivalent value of not less than 25 and shall be graded according to the table below.
- D. Coarse aggregate gradations referred to by number size on the Drawings or in these Specifications shall conform to the following table (as copied from the above Kentucky Transportation Cabinet Specifications, Table 805.07, 1994 Edition):

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TABLE 1 - SIZES OF COARSE AGGREGATES - KENTUCKY

Size	Max. Size Square Openings (1)	AMOUNTS FINER THAN EACH LABORATORY SIEVE (SQUARE OPENINGS); PERCENTAGE BY WEIGHT																	
		120 (4)	50 (3 1/2)	75 (3)	80 (2 1/2)	90 (2)	37.5 (1 1/2)	25 (1)	19 (3/4)	12.5 (1/2)	9.5 (3/8)	4.75 (No. 4)	2.35 (No. 8)	2 (No. 10)	1.18 (No. 16)	600 (3)	425 (3)	150 (3)	75 (3)
1	90 (3 1/2)	100	96-100		25-50		0-15		0-5										
2	63 (2 1/2)			100	90-100	35-70	0-15		0-5										
2 1/2	63 (2 1/2)			100		40-90		0-15		0-5									
3	50 (2)				100	30-100	35-70	0-15		0-5									
3 1/2	50 (2)				100	35-100		35-70		10-30		0-5							
4	37.5 (1 1/2)					100	90-100	20-55	0-15		0-5								
4 1/2	37.5 (1 1/2)					100	95-100		35-70		10-30	0-5							
5	25 (1)						100	90-100	20-55	0-10	0-5								
5 1/2	25 (1)						100	95-100		25-60		0-10	0-5						
6 1/2	25 (1)						100	65-100		40-75		15-40							
6 3/4	19 (3/4)							100	90-100		20-55	0-10	0-5						
7 1/4	19 (3/4)							100	90-100		30-65	5-25	0-10		0-5				
7 1/2	19 (3/4)							100	80-100		30-75	0-30							
7 3/4	12.5 (1/2)								100	90-100	40-75	5-25	0-10		0-5				
8	9.5 (3/8)									100	85-100	10-30	0-10		0-5				
8 1/2	9.5 (3/8)										100	75-100	0-25	0-5					
10	4.75 (No. 4)											100	85-100						10-30
11	4.75 (No. 4)												100	40-90	10-40				0-5
1 1/2 (2)	19 (3/4)							100	70-100		50-80	30-65				10-40			2-10
GRAVELL SAND (1)	37.5 (1 1/2)					100												0-30	5-75
CSR (2)	50 (2)				100		90-100		60-95		30-70	15-55				5-20			0-8

(1) Nominal size in millimeters, unless otherwise shown. (2) Gradation performed by wet sieve KM 54-420. (3) micrometers

**PART 3 EXECUTION**

**3.01 INSTALLATION**

**A. Compacted Crushed Stone Aggregate**

1. Crushed stone shall be placed in uniform layers not greater than 6 inches deep and shaped by power equipment to required lines, grades, cross connections, and depths. No minimum compacted density, method of compaction, or compaction equipment is required since a nominal amount of compaction effort with vibration can establish the desired intergranular locking of the aggregate under controlled placement depth. Acceptable compaction can be achieved with pneumatic-tired and tracked equipment and rollers.
2. All compaction operations shall be performed to the satisfaction of the Monticello Utility Commission.
3. Crushed stone shall be placed in those areas as shown on the Drawings and as may be directed by the Monticello Utility Commission.

**B. Compacted Dense Graded Aggregate (DGA)**

1. Dense graded aggregate shall be plant mixed with water, transported in such a manner as to deliver the mix to the project without loss or

segregation, spread, and compacted to produce a density throughout not less than 84 percent of solid volume. Minimum dry density for compacted limestone DGA shall be 139 pounds per cubic foot when S.G. of limestone is 2.65.

2. Density tests shall be required in such number as determined by the Monticello Utility Commission. Density tests shall be made by the sand cone method or by nuclear gauges. The CONTRACTOR shall furnish all necessary labor, equipment and materials for making the density tests under observations of the Monticello Utility Commission.
3. In the event compacted material does not meet the required density of an area, the CONTRACTOR shall either continue compaction efforts or rework the entire area until the required density is obtained. If material has to be removed and reworked, the Monticello Utility Commission shall determine if removed material can be remixed and used again for fill.

**END OF SECTION**

\*\*\*

**SECTION 02326**

**STEEL COVER PIPE**

**PART 1 GENERAL**

1.01 SCOPE OF WORK

- A. Steel cover pipe shall be furnished and installed per the following Specifications.

1.02 RELATED WORK

- A. Water pipe is specified in Section 02610.

**PART 2 PRODUCTS**

2.01 STEEL COVER PIPE

- A. Steel cover or jack pipe shall be plain end steel pipe with minimum yield strength of 35,000 psi and tensile strength of 60,000 psi per API-5L Grade B material. The steel pipe supplied shall be manufactured by the seamless, electric-weld, submerged-arc weld or gas metal-arc weld process as specified in API-5L. Certification of 35,000 psi minimum yield strength shall be furnished by the supplier through the CONTRACTOR to the Monticello Utility Commission in sufficient copies before pipe is shipped to job to permit the Monticello Utility Commission to retain 3 copies.
- B. Used pipe shall be acceptable if it meets the minimum requirements for size, thickness and strength for new pipe. Supplier shall furnish through the CONTRACTOR to the Monticello Utility Commission 3 copies of certification of test results of strength tests conducted on the used pipe prior to shipment to job site. Used pipe with excessive corrosion and pitting present shall not be supplied.
- C. The inside diameter of steel cover pipe shall be at least 2 inches greater than the largest outside diameter of the carrier pipe, joints or couplings, except for carrier pipe 6 inches or greater in diameter under railroads, the difference shall be 4 inches instead of 2 inches.
- D. Cover pipe shall have a **minimum** wall thickness as shown in the following table:

Nominal Diameter Inches	Nominal Thickness Inches	Nominal Diameter Inches	Nominal Thickness Inches
Under 10	0.188	24	0.438
10 & 12	0.250	26	0.438
14 & 16	0.281	28 & 30	0.500
18	0.312	32	0.500
20	0.344	34 & 36	0.562
22	0.375	38 & 42	0.562

**PART 3 EXECUTION**

**3.01 BORING OR JACKING**

- A. Boring or jacking as specified herein will be allowed at locations other than those noted on the Drawings, where advantageous to lay pipe under streets, driveways, and sidewalks, without their monolithic structure being destroyed.
- B. Boring or jacking under highways, railroads, sidewalks, pipelines, etc., shall be done at the locations shown on the Drawings. It shall be performed by mechanical means and accurate vertical and horizontal alignment must be maintained. When shown on the Drawings, cover pipe shall be used and shall be installed inside bored holes concurrently with boring, or jacking.

**3.02 STEEL COVER PIPE INSTALLATION**

- A. Steel cover pipe shall be of the size and wall thickness as shown on the Drawings.
- B. When cover pipe is jacked, concurrent with boring, all joints shall be solidly welded. The weld shall be such that the joint shall be of such strength to withstand the forces exerted from the boring and jacking operation as well as the vertical loading imposed on the pipe after installation. The weld shall also be such that it provides a smooth, nonobstructing joint in the interior of the pipe which will allow easy installation of the carrier pipe without hanging or abrasion to the carrier pipe upon installation.
- C. When cover pipe is installed in open trench, it shall be bedded and backfilled per Specifications applying to water pipe in such locations.
- D. Cover pipe in open trench shall be joined in such manner that they will not be moved out of alignment or grade and that will prevent backfill material from entering joint.

3.03 CARRIER PIPE IN COVER PIPE INSTALLATION

A. Pipeline Spacers

1. Pipes installed inside cover pipes shall be centered throughout the length of cover pipe. Centering shall be accomplished by the installation of bolt on style spacers with a 2 piece solid shell made from T-304 stainless steel of a minimum 14 gauge thickness. The shell shall be lined with a ribbed PVC sheet of a 0.090 inch thickness that overlaps the edges. Runners, made from UHMW polymer, shall be attached to the pipe in such a manner as to prevent the dislodgement of the spacers as the carrier pipe is pulled or pushed through the cover pipe. Risers shall be made from T-304 stainless steel of a minimum 14 gauge thickness and shall be attached to the shell by MIG welding. All welds shall be fully passivated. All fasteners shall be made from T-304 stainless steel.
2. Spacers shall be of such dimensions to provide 1) full supportive load capacity of the pipe and contents; 2) of such thickness to allow installation and/or removal of the pipe; and 3) to allow no greater than 1/2 inch movement of the carrier pipe within the cover pipe after the carrier pipe is installed.
3. Spacers shall be located immediately behind each bell and at a maximum spacing distance as shown below unless a lesser maximum spacing distance is recommended by the pipe manufacturer:

<u>Pipeline Diameter (in.)</u>	<u>Maximum Spacing (ft.)</u>
2 - 2-1/2	4
3 - 8	7
10 - 26	10
28	9
30	8
32	7
34	6
36 - 38	5.5
40 - 44	5
46 - 48	4

The materials and spacing to be used shall be accepted by the Somerset Water Department prior to installation. The pipeline spacers shall be manufactured by Cascade Waterworks Manufacturing Co., of Yorkville, Illinois, Pipeline Seal and Insulator, Inc., of Houston, Texas, or equal. Installation shall be in accordance with manufacturer's recommendations.

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- B. Upon completion of installation of the carrier pipe, the annular space at the ends of the cover pipe shall be sealed to prevent the entrance of groundwater, silt, etc., into the cover pipe. The seal shall be a manufactured product specially made for this purpose. The seal shall be Link Seal - PL as manufactured by the Thunderline Corporation, Wayne, Michigan, or equal.

**END OF SECTION**

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02326-4

**SECTION 02500**  
**ASPHALT PAVING**

**PART 1 GENERAL**

1.01 SCOPE OF WORK

- A. The CONTRACTOR shall be required to supply all materials and equipment and perform all work for the placement of the base and/or surface course for restoring to the preconstruction condition the surface of the existing streets, roads, drives and parking areas to the depths as shown in the detailed Drawings and as specified herein.

1.02 REFERENCES

- A. Unless noted, all Specifications designations denoted KTCSSRBC refer to the Kentucky Transportation Cabinet Department of Highways Standard Specification for Road and Bridge Construction. Appropriate technical portions of the referenced sections of the Specifications shall apply, but all work shall be as described herein unless otherwise specified or shown on the Drawings.

1.03 WORK DESCRIPTION

- A. Asphalt paving shall be used for surfacing new roads and parking areas, for replacement of city streets, drives, parking areas and state highways of asphalt construction and for resurfacing existing roads and state highways at locations shown on the Drawings or specified.

1.04 QUALIFICATIONS

- A. The pavement design mixture shall be used as determined by local plant mix availability. The design mixture shall have been approved recently by the Kentucky Transportation Cabinet Department of Highways and used recently on a state paving project.

1.05 SUBMITTALS

- A. The design mix shall be submitted to the Monticello Utility Commission or its representative for review and acceptance. The submittal shall include the following:
  - 1. The last date the mixture was approved by the Kentucky Transportation Cabinet Department of Highways for use on a state road project.
  - 2. The location where the mixture was recently used, and the name and address of the paving contractor.



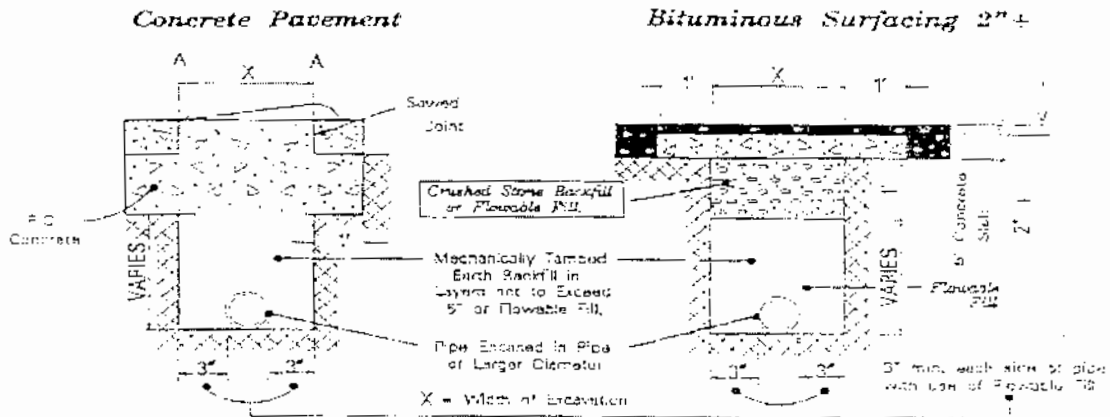
1.06 TRENCH WIDTH REPAVING - CITY AND COUNTY STREETS, ROADS AND PARKING AREAS

- A. The cut edges of the existing paving surface shall be trimmed a depth of at least 2 inches to straight lines for uniform appearance and clean surface at joints. The area between the cut edges of the paving shall be removed to a depth of 2 inches (minimum) or to the bottom of the existing paving. All unstable material in the trench shall be removed and replaced with compacted dense graded aggregate and dense graded aggregate added as needed to bring the base surface to the bottom of existing paving or 2 inches below the existing surface, whichever is the lower.
- B. The paving subgrade shall be compacted under the wheel of a roller, until there is no observed settlement of the subgrade.
- C. The sides of existing pavement shall be covered with a tack coat and asphalt paving shall be hot applied as previously described. Final surface shall be finished to 1/4-inch above existing paving surface at edges and crowned to ½ inch above existing surface at the center.
- D. The CONTRACTOR shall maintain repaving up to grade of existing street surface until final completion and acceptance of work. During the guarantee period of one year, the CONTRACTOR will be responsible for defective materials or workmanship, and natural settlement.
- E. In case additional paving is to be added due to settlement, surface to be built up shall have all dirt removed and surface swept clean with a stiff wire brush or broom. A tack coat shall be applied to clean surface and additional paving placed in quantity required. Traffic shall be prevented from passing over the treated surface before the additional paving materials are placed.

**END OF SECTION**

Attachment: Kentucky Department of Highways Drawing No. TC99-13 or latest TC9913 details as required by the Kentucky Department of Highways.

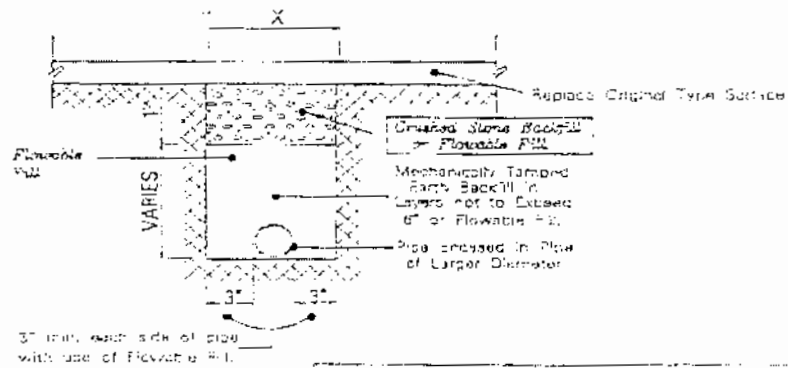
**SURFACE RESTORATION METHODS**



*Replace Concrete Pavement with new pavement same thickness of existing pavement.*

*Replace Bituminous Pavement with same type and depth as existing pavement.*

*Bituminous Surface Less Than 2" & Traffic Bound Macadam*



NOTE:

1. Distance from joints "A" (Concrete Pavement) to nearest joint or break in pavement must be six (6) feet or more. If less than six (6) feet, remove pavement to joint or break and replace entire s.d.
2. Concrete slab under Bituminous Surface to extend twelve (12) inches on each side of trench.
3. An approved joint sealer to be applied between new and existing pavement.

KENTUCKY TRANSPORTATION CABINET

Department of Highways

Methods of Surface Restoration Due to Open Trench Pipe Installation

**SECTION 02610**

**WATER MAINS**

**PART 1 GENERAL**

1.01 SUMMARY

- A. For Cover Pipe and Boring and/or Jacking see Section 02326.
- B. Ductile iron piping is required for all water lines greater than 3 inches. PVC piping may be approved by the Monticello Utility Commission on a case by case basis.

1.02 SUBMITTALS

- A. The CONTRACTOR shall submit to the Monticello Utility Commission three (3) copies of the bills of material, manufacturer's descriptive literature for all piping.
- B. Supplemental Submittal Requirements

**PART 2 PRODUCTS**

2.01 MATERIALS - PRESSURE PIPE

- A. Ductile Iron Pipe - Mechanical and Rubber Slip Joint Type

- 1. Pipe

- a. General

- (1) Ductile iron pipe shall be furnished for all piping 3 inches and over in size designated "D.I." on Drawings and shall be designed in accordance with ANSI/AWWA C150/A21.50-02 and ANSI/AWWA C151/A21.51-02 specifications and supplements thereto, and for pressures and conditions as stated in Article b.(1) below.

- b. Design Conditions

- (1) Pressure: Minimum 350 psi operating pressure, plus 100 psi water hammer allowance.
- (2) Trench Loading: Laying Condition Type 3, depth of cover as shown on Drawings.

c. Lengths

- (1) Pipe may be furnished in 18 or 20 foot nominal laying lengths.

d. Marking

- (1) The net weight, class or nominal thickness, and casting period shall be shown on each pipe. The manufacturer's mark, the year in which the pipe was produced, and the letters "DI" or "DUCTILE" shall be cast or stamped on the pipe.

e. Spigot End of Pipe

- (1) The spigot end of the pipe shall be free of blemishes and defects which might be responsible for a poor fit with the rubber ring gasket and result in leakage.

2. Fittings

a. General

- (1) Ductile iron compact fittings, meeting the requirements of ANSI/AWWA C153/A21.53-06, will be accepted through 24-inch diameter. Fittings larger than 24-inch diameter shall meet the requirements of ANSI/AWWA C110/A21.10-03.
- (2) Fittings shall be 350 psi pressure rated for all sizes through 24 inches.

b. Lining and Coating

- (1) All fittings shall be lined and coated the same as adjacent pipe.

3. Joints

a. General

- (1) Pipe joints shall be mechanical joint, rubber ring slip joint or restrained joint as shown on the Drawings.
- (2) All items used for jointing pipe shall be furnished with the pipe. The joints shall be made with tools and lubricant in strict conformity with the manufacturer's instructions. Copies of the instructions shall be delivered to the Monticello Utility Commission at start of construction in sufficient numbers that will permit the Monticello Utility Commission to retain 3 copies.

b. Mechanical Joints

- (1) Mechanical joints are to be furnished according to ANSI/AWWA C111/A21.11-00. All pipe joints must be furnished complete with all accessories. Mechanical joint bolts and nuts shall be of alloy cast iron or alloy steel (Corten type such as U.S. Alloy) or equal. Rubber gaskets shall be made of plain first grade rubber, free of imperfections and porosity. Hardness shall be 75 ± 5 durometer.

c. Rubber Ring Slip Joint (Push On)

- (1) Rubber ring slip joint shall be equal to ANSI/AWWA C111/A21.11-00. The joints shall be of the following materials and assembled in the sequence outlined below:
  - (a) Rubber ring gasket compressed in groove in bell of pipe.
  - (b) Beveled spigot end of pipe for initial centering into rubber gasket in bell.

d. Restrained Joints

(1) For Pipe

- (a) Restrained joint for push-on type bell with rubber O-ring shall meet the applicable requirements of ANSI/AWWA C111/A21.11-90. The bell/spigot configuration for the restrained joint shall be such that restraint shall be provided for the joint based on a sustained pressure equal to the pressure class of the pipe without separation.
- (b) The restrained joint shall allow the same deflection as standard push-on joint pipe.
- (c) Where field welding is required for restrained field cut pipe, the welder shall be properly instructed in the methods and materials for use on ductile iron pipe by the manufacturer, on site.

(2) For Fittings

- (a) Where restrained joint fittings are called for, the bell configuration for the fitting shall be the same as for the pipe.

- (b) Where fittings with restrained joint bell configurations are not available, restraint materials for use with mechanical joint bell configurations shall be as follows:
  - (i) Connect mechanical joint bell assemblies with stainless steel, all thread rods.
  - (ii) Install restraint glands on each side of the fitting. The restraining glands shall be "Meg-A-Lug," as manufactured by EBAA Iron Sales, Inc., of Eastland, Texas; "Grip Ring," as manufactured by Romac Industries, Inc. of Seattle, Washington; or equal.

e. Special Gaskets

- (1) Where a water main is located within a 200-foot radius of an underground storage tank (UST), ductile iron pipe with special rubber gaskets shall be provided for the water main joints. Service lines within this 200-foot radius shall be copper with brass compression fittings.
- (2) These gaskets shall be manufactured of "nitrile rubber" material or other acceptable material possessing superior resistance to deterioration from petroleum based products.
- (3) This requirement will apply to the gaskets supplied for mechanical joints and push-on joints when located within the 200-foot radius of a UST.

4. Lining and Coating

- a. All ductile iron pipe for water service shall have manufacturer's standard outside bituminous or asphaltic base coating and a cement lining and bituminous seal coat on the inside. Cement mortar lining and bituminous seal coat inside shall conform to ANSI/AWWA C104/A21.4-95.

B. Ductile Iron Pipe - Flanged

1. Pipe

a. Flanged Pipe

- (1) Flanged pipe shall be made in accordance with ANSI/AWWA C115/A21.15-99 Specifications, and shall be thickness Class 53.

2. Fittings

a. Flanged Pipe

- (1) Flanged joint fittings shall conform to ANSI/AWWA C110/A21.10-03 Standard for Gray Iron and Ductile Iron Fittings - 3 inch through 48 inch.
- (2) Fittings shall be 250 psi pressure rating for all sizes.
- (3) Fittings shall be ductile iron meeting the above requirements and shall be furnished complete with all joint accessories.

3. Joints

a. General

- (1) All items used for jointing pipe shall be furnished with the pipe. The joints shall be made with tools and lubricant in strict conformity with the manufacturer's instructions. Copies of the instructions shall be delivered to the Monticello Utility Commission at start of construction in sufficient numbers that will permit the Monticello Utility Commission to retain 3 copies.

b. Flanged Pipe

- (1) All ductile iron flanged pipe shall have flanges faced and drilled, 125 pound in accordance with ANSI/AWWA C110/A21.10-03 unless otherwise specified.
- (2) Flanges may be cast integrally with the pipe or they may be screwed on specially designed long hub flanges, refaced across both face of flange and end of pipe.
- (3) Flanged joints are to be furnished according to ANSI/AWWA C115/A21.15-99 and shall be ductile iron only. Flanged joints shall have 1/8 inch rubber full face gaskets made especially for water pipe use. Bolts for ductile iron flanged pipe must be of standard sizes for pipe to be fitted, and must be black steel, machine bolts with heavy hexagon heads and nuts meeting ANSI B18.2.1 and ANSI B18.2.2, respectively. In unheated vaults, submerged and/or damp locations, bolts and nuts for ductile iron flanged pipe shall be stainless steel.

C. Polyvinyl Chloride (PVC) Pipe (ASTM)

1. Pipe

- a. This Specification covers rigid polyvinyl chloride pipe and fittings, hereinafter called PVC pipe and PVC fittings, for sizes 3/4 inch through 12 inch.
- b. PVC pipe shall be extruded from Class 12454-B polyvinyl chloride material with a hydrostatic design stress of 2000 psi for water at 73.4 degrees Fahrenheit, designated as PVC 1120, meeting ASTM Specifications D 1784-81 for material. Three-fourths inch through 1-1/2 inch water service piping shall be PVC Schedule 40 as specified in ASTM D 1785-76. Two inch through 12-inch pipe for water service shall be SDR 17 for 250 psi allowable working pressure at 73.4 degrees Fahrenheit and a safety factor of 2.0, as specified in ASTM D 2241-80.
- c. The pipe shall be homogeneous throughout and free from cracks, holes, foreign inclusions or other defects. The pipe shall be as uniform as commercially practical in color.
- d. The workmanship, pipe dimensions and tolerances, outside diameters, wall thickness, eccentricity, sustained pressures, burst pressures, flattening, extrusion quality, marking and all other requirements of ASTM D 2241-80 shall be conformed with in all respects.
- e. Pipe shall be furnished in 20 foot lengths. The pipe may be double plain end or with bell on one end. Male ends of pipe must be beveled on the outside.
- f. Pipe shall have a ring painted around the male end or ends in such a manner as to allow field checking of setting depth of pipe in the socket. This requirement is made to assist construction superintendents and inspectors in visual inspection of pipe installation.
- g. Pipe must be delivered to job site by means which will adequately support it, and not subject it to undue stresses. In particular, the load shall be so supported that the bottom rows of pipe are not damaged by crushing. Pipe shall be unloaded carefully and strung or stored as close to the final point of placement as is practical.
- h. Pipe must not be exposed to the direct rays of the sun for an extended period of time. If pipe is not to be installed shortly after delivery to the job site, it must be stored in a shaded location.



2. Fittings

a. Ductile Iron

- (1) Ductile iron mechanical joint or push-in type fittings with appropriate adapters may be used with exterior PVC pipe. All such fittings shall be approved by the pipe manufacturer, and complete data submitted to the Monticello Utility Commission, including the manufacturer's approval, for review. Use of transition gaskets will not be allowed unless specifically approved by the pipe manufacturer.

3. Joints

a. Exterior Buried Pipe - Slip Joint Type

- (1) Exterior buried pipe shall be jointed with slip-type joints with rubber gaskets.
- (2) Pipe with bells shall have all parts of the bell, including the gasket groove, made from the same extruded piece, integral with the pipe, and shall be thickened to meet standard dimension ratios of wall thickness to outside diameter. The gasket groove shall be constructed such that gasket rollout will not occur. Rubber gasketing shall conform to ASTM D 3139-77.

b. Interior - Solvent Weld

- (1) Interior pipe shall be joined by solvent welds.
- (2) Since PVC welding solvent is engineered and formulated to perform with a given joint design, all solvent must be purchased from the manufacturer of the pipe.
- (3) The PVC welding solvent shall be compounded to conform with the socket fit and the weather conditions at the time of installation and be such as to assure minimum installation cost and a weld of maximum strength.

c. Couplings

- (1) Couplings shall be of the same material as the pipe and may be of the molded or extruded type. They shall have a beveled entrance to prevent the wiping off of the lubricant from the male end of the pipe.
- (2) PVC couplings shall have a minimum rating of 200 psi for continuous operation at 73.4 degrees Fahrenheit.

- (3) The couplings shall have a positive pipe stop that will automatically and accurately position the pipe ends within the couplings. The pipe stop shall also permit the thermal expansion or contraction of the pipe ends.

#### D. Copper Pipe and Fittings

##### 1. Inside, Rigid with Solder Joint Connections

- a. Small piping inside structures shall consist of standard copper tubing for water; Type "L" for general plumbing purposes. All fittings shall be "solder joint connection" cast or wrought bronze for water service for inside diameter of pipe sizes given. All stops, valves, hose bibbs, and unions shall be made with same joints or threaded iron pipe standard, and be of brass or copper.

##### b. Outside, Underground Tubing with Compression Joints

- (1) Buried piping shall be of standard soft copper tubing for water service pipe, ASTM Specifications B 88-81, Type "K," with bronze fittings, stops, and valves having compression connections for flared copper tubing.

#### E. Polyethylene Pipe for Water Service

##### 1. Pipe

- a. Polyethylene flexible pipe (copper pipe O.D.) for sizes 1/2 inch through 2 inch water service piping shall be PE 3408, Type III, Grade P34 Class C, DR-9, OD Based for 200 psi working pressure at 73.4 degrees Fahrenheit, meeting ASTM Specification D 1248-81a for material, D 3350-84 for cell classification and AWWA C901-02 Specification for pipe.

#### F. Service Connections

1. All service connections shall be made by means of tees, factory tapped couplings, or bronze service clamps manufactured specifically for use with PVC pipe, with Mueller threads, Mueller Catalog No. H-13000, or equal. Whenever possible, corporation stops shall be placed in plastic lines before conducting hydrostatic tests.

### 2.03 SOURCE QUALITY CONTROL

#### A. Ductile Iron Pipe (Mechanical Joint and Rubber Slip Joint Type)

1. Hydrostatic and physical properties acceptance tests shall be in accordance with ANSI/AWWA Specification C151/A21.51-02 for ductile iron pipe centrifugally cast in metal molds or sand lined molds for water or other liquids.

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2. The Monticello Utility Commission shall be provided with sufficient copies of each of the tests for each Contract to permit the retainage of 3 copies.
3. All items used for jointing pipe shall be tested before shipment.

### B. Polyvinyl Chloride (PVC) Pipe (ASTM)

1. Samples of pipe and physical and chemical data sheets shall be submitted to the Monticello Utility Commission for review and acceptance before pipe is delivered to job.
2. Samples of solvents and the recommended instruction for their use must be submitted for the commission's review and acceptance before delivery of solvent to the job.

### C. Polyethylene Pipe for Water Service Lines

1. Results of tests on the raw materials and the polyethylene pipe in accordance with ASTM standards and the Plastic Pipe Institute shall be furnished along with catalogs and other descriptive literature in the number of copies required before the materials are sent to the job site.

## **PART 3 EXECUTION**

### 3.01 TRENCH EXCAVATION - PRESSURE PIPE

#### A. General

1. Trenching includes such items as railroad, street, road, sidewalk, pipe and small creek crossings: cutting, moving or repairing damage to fences, poles or gates and other surface structures, regardless of whether shown on the Drawings. The CONTRACTOR shall protect existing facilities against danger or damage while pipeline is being constructed and backfilled or from damage due to settlement of the backfill.
2. All excavation shall be open trenches, except where the Drawings call for boring or jacking under structures, railroads, sidewalks, roads or highways.

#### B. Trees and Shrubs

1. Where pipelines run through wooded terrain, cutting of trees within limits of maximum permissible trench widths, as set forth in this article, will be permitted. However, cutting of additional trees on sides of trench to accommodate operating of trenching machine will not be permitted. The CONTRACTOR shall obtain specific permission of the Monticello Utility Commission before cutting any tree larger than 4 inches in diameter.

C. Highways, Streets and Railroads

1. Construction equipment injurious to paving encountered shall not be used. Curbs, sidewalks, and other structures shall be protected by the CONTRACTOR from damage by his construction equipment.
2. Where trenching is cut through paving which does not crumble on edges, trench edge shall be cut to at least 2 inches deep to straight and neat edges, before excavation is started, and care taken to preserve the edge to facilitate neat repaving.
3. The CONTRACTOR shall so coordinate his work as to produce a minimum of interference with normal traffic on highways and streets. He may, with the approval of the governing agency, close a street to traffic for such length of time considered necessary, provided persons occupying property abutting the street have an alternate route of access to the property which is suitable for their needs during the time of closure. It shall be the responsibility of the CONTRACTOR to give 24 hours advance notice to fire and police departments and to occupants of a street which will be closed, in a manner approved by the governing body.
4. The CONTRACTOR shall maintain road crossings in a passable condition for traffic until the final acceptance of the work.
5. Kentucky Transportation Cabinet permits shall be obtained by the CONTRACTOR prior to any work on state maintained roads and rights-of-way. Highway Department requirements in regard to trenching, boring and jacking shall take precedence over the foregoing general specifications and the following boring or jacking specifications, where they are involved.

D. Existing Utilities

1. The CONTRACTOR shall determine, as far as possible in advance, the location of all existing sewer, culvert, drain, water, electric, telephone conduits, and gas pipes, and other subsurface structures and avoid disturbing same in opening his trenches. In case of sewer, water and gas services and other facilities easily damaged by machine trenching, same shall be uncovered without damage ahead of trenching machine and left intact or removed without permanent damage ahead of trenching and restored immediately after trenching machine has passed. The CONTRACTOR shall protect such existing facilities, including power and telephone poles and guy wires, against danger or damage while pipeline is being constructed and backfilled, or from damage due to settlement of his backfill. It shall be the responsibility of the CONTRACTOR to inform the customers of utilities of disruption of any utility service as soon as it is known that it has been or will be cut off.

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2. The CONTRACTOR shall, at all times during trenching operations, carry a stock of pipe and fittings likely to be needed for replacement of pipelines to facilitate immediate repair.

E. Pipelines in Same Trench

1. Pipelines, force mains, and sewers laid in same trench shall, in all cases, be bedded on original earth, or other specified bedding materials, regardless of divergence in their elevations, unless otherwise specified. They shall never be laid in unsupported backfill or one above the other.

F. Trench Requirements

1. All trenches must be dug neatly to lines and grades.
2. The opening of more than 500 feet of trench ahead of pipe laying and more than 500 feet of open ditch left behind pipe laying, before backfilling, will not be permitted, except upon written consent of the OWNER. No trench shall be left open or work stopped on same for a considerable length of time. In case of objectionable delay trench shall be refilled according to backfill specifications.
3. Where subgrade of trench has insufficient stability to support the pipeline and hold it to its original grade, the Monticello Utility Commission may order stabilization by various means, exclusive of dewatering normally required for construction.
4. Excavation for pipe laying must be made of sufficient width to allow for proper jointing and alignment of the pipe, but not greater than the maximums permitted in the following table:

MAXIMUM TRENCH WIDTH AT TOP OF PIPE

<u>Nominal Pipe Size (Ins.)</u>	<u>Trench Width (Ins.)</u>	<u>Nominal Pipe Size (Ins.)</u>	<u>Trench Width (Ins.)</u>
4	28	20	44
6	30	24	48
8	32	30	54
10	34	36	60
12	36	42	66
14	38	48	72
16	40	54	78
18	42		

5. Trenches in earth or rock shall be dug as shown on the Drawings and be sufficiently deep to insure a 30 inch or 36 inch minimum cover over water mains, as noted on the Drawings. Depths of trenching shall also be adequate for at least 1 foot minimum cover over valve nuts. In order to

eliminate the necessity for digging bell holes into the trench subgrade by hand and to insure an earth cushion under the pipe for uniform bearing, trench depth shall be the cover requirement plus outside diameter of barrel of pipe plus the required bedding cushion.

6. Trench line stations and locations of accessories will be set ahead of the trenching. These will be set at least each 100 feet of pipeline. Trenches must be dug true to alignment of stakes. Alignment of trenches or pipes in trench must not be changed to pass around obstacles such as poles, fences and other evident obstructions without the permission of the Monticello Utility Commission. Lines will be laid out to avoid obstacles as far as possible, contingent with maintenance of alignment necessary to finding pipeline in the future and avoiding obstruction to future utilities.

#### G. Damage to Existing Structures

1. Hand trenching is required, at no extra payment, where undue damage would be caused to existing structures and facilities by machine trenching.
2. In case of damage to any existing structures, repair and restoration shall be made at once and backfill shall not be replaced until this is done. In all cases, restoration and repair shall be such that the damaged structure will be in as good condition and serve its purpose as completely as before. Where there is the possibility of damage to existing utility lines by trenching machine, the CONTRACTOR shall make hand search excavation ahead of machine trenching, to uncover same.

#### H. Dewatering of Trenches

1. Dewatering of trenches shall be considered a part of trenching. Dewatering of trenches shall include groundwater and storm or sanitary sewage. Suitable pumping and other dewatering equipment is to be provided by the CONTRACTOR, to insure the installation of the pipeline structure in a dewatered trench and under the proper conditions. Dewatering shall include all practical means available for prevention of surface runoff into trenches and scouring against newly laid pipe. Dewatering shall be in accordance with the Best Management Practices (BMP) plan.
2. Piles of excavated materials shall be trenched or temporarily piped to prevent, as far as practical, blockage of drainage ditches and gutters, and water carriage of excavated materials over street and highway surfaces.

### 3.02 LAYING PRESSURE PIPE

#### A. General

##### 1. Inspection of Materials

- a. All pipe, fittings and accessories shall be subject to an inspection by the Monticello Utility Commission at the job site. Any damaged materials shall be repaired or replaced to the satisfaction of the Monticello Utility Commission. Should repairs to the piping materials be necessary, then same shall be made in the presence of the Monticello Utility Commission using proven methods prescribed by the pipe manufacturer.
- b. The Monticello Utility Commission's inspection of materials shall in no way relieve the CONTRACTOR of his responsibility.

##### 2. Laying Requirements

- a. Pressure pipe shall be laid to lines, cover or grades shown on the Drawings.
- b. Pipes must be swabbed out before lowering into trench. In the case of pipelines 4 inch through 20 inch, a swab must also be dragged through the pipe after it is in place. Larger size pipe shall be visually inspected for cleanliness and proper jointing.
- c. The points insisted upon in the laying of pipe will be: Proper alignment, evenness of width and depth of joints, perfection in jointing, and care of the pipe in handling.
- d. Precautions must be taken to prevent flotation of the pipe should water enter the trench prior to putting the pipeline into operation.
- e. In wet, yielding and mucky locations where pipe is in danger of sinking below grade or floating out of grade or alignment, or where the backfill materials are of such a fluid nature that such movements of the pipe might take place during the placing of the backfill, the pipe must be weighted or secured permanently in place by such means as will prove effective.
- f. Whenever pipe laying is stopped, the end of the pipe shall be securely plugged with the manufacturer's standard plug held in place by bracing or backing as required.
- g. Elbows, plugs, dead end valves, and tees shall be firmly blocked to prevent internal pressure from springing the pipe from the intended alignment, with permanent materials solidly placed without covering pipe joints. Restrained type pipe joints may be

substituted for thrust blocks with the Monticello Utility Commission's permission.

- h. Pipe shall not be laid resting on solid rock, blocking or other unyielding objects. Jointing before placing in the trench and subsequent lowering of more than one section jointed together may be allowed, subject to the Monticello Utility Commission's permission.

3. Installing Water Pipe in Cover Pipe

- a. Installation of water pipe in cover pipe is covered in Section 02326 of these specifications.

B. Laying Ductile Iron Pipe

1. Bedding and Backfilling

- a. The pipe shall be bedded in 4 inches minimum loose soil and the hand placed loose soil backfill lightly consolidated to the top of the pipe. "Loose soil" or "select material" is defined as native soil excavated from the trench, free of rocks, foreign materials and frozen earth.
- b. The selected material shall be hand placed to a point 12 inches above the barrel of the pipe. After the specified backfill is hand placed, rock may be used in machine placed backfill in pieces no larger than 8 inches in any dimension and to an extent not greater than one-half the volume of the backfill materials used.
- c. The top 12 inches of backfill shall contain no rock over 1-1/2 inches in diameter or pockets of crushed rock.
- d. Larger rock fill will be allowed in wide trenches where side slopes are low enough to prevent rock from dropping over pipeline. If additional earth is required, it must be obtained and placed by the CONTRACTOR. Filling with rock and earth shall proceed simultaneously, in order that all voids be filled with earth.
- e. If select material is not available from the trench excavation, or if the CONTRACTOR so desires, he may use crushed stone bedding and backfill to the top of the pipe.
- f. Sufficient space, limited to a maximum of 2 feet length, shall be left out of the specified earth or crushed stone bedding to facilitate proper jointing of the pipe.



2. Installation of Pipe

- a. Ductile iron pipe shall first be thoroughly cleaned at joints, then joined according to instructions and with tools recommended by the pipe manufacturer. Sufficient copies of the manufacturer's installation instructions shall be furnished to permit the Monticello Utility Commission to retain 3 copies. One copy shall be available at all times at the site of the work.
- b. All pipes must be forced and held together or "homed" at the joints before bolting. Pipe must be aligned as each joint is placed, so as to present as nearly true, straight lines and grades as practical, and all curves and changes in grades must be laid in such manner that one-half of the maximum allowable deflection shown in the pipe manufacturer's catalog is not exceeded.
- c. Concrete blocking of fittings shall be as specified hereinafter in this Specification Section 02610.
- d. Cutting of pipe may be done by special pipe cutters as the CONTRACTOR may elect, but the CONTRACTOR will be held responsible for breakage or damage caused by careless cutting or handling. Cut edges of the pipe shall be made smooth and a bevel formed on the exterior of the pipe barrel when using rubber gasket type pipe.

C. Installation of Flanged or Threaded Pipe and Fittings (Interior)

1. Installation - General

- a. The CONTRACTOR shall thoroughly clean the pipe and fittings before starting erection. All scale, rust and dirt shall be removed by power brushing and/or solvent cleaning.
- b. The erection of piping requires that it progress from the equipment it is connected to, after the equipment has been accurately leveled and aligned, without putting a strain on same. The pipe shall be erected in a workmanlike manner with runs in the true horizontal or vertical plane or as shown on the Drawings.
- c. The piping shall be supported by standard pipe hangers or piers rather than by the equipment. The pipe shall be free of all openings in walls and slabs when the final position of the piping is attained and before sealing the annular space about the pipe.

2. Flanged Joint Connection

- a. All flanged type connections shall be made using an acceptable gasket and bolts. The bolts shall be tightened evenly to compress

the gasket. Care is to be taken not to distort the flanges and/or piping by overtightening the bolts.

3. Threaded Joint Connection

- a. All threads shall be full, complete and made with sharp dies. The ends of the pipe shall be reamed to remove all burrs and all threads must be free of rust and other foreign matter at the time the thread compound is applied. The thread compounds used must be approved by the Monticello Utility Commission before use.
- b. Pipe threads shall be tapered and in accordance with API Standard 5B. Not more than 3 threads at each joint may be exposed after the connection is made.
- c. Unions shall be included to allow for proper assembly and disassembly of each run of pipe. Provide a union on each run of pipe connecting to threaded valves, devices and equipment.

D. Laying Plastic Pipe

I. Bedding and Backfill

- a. The pipe shall be bedded in 4 inches minimum depth (for pipe sizes through 16 inches) of "loose soil" or "select material" meeting the requirements of Class II or III of ASTM D 2321-75 (1980). For pipe sizes greater than 16 inches in diameter, the pipe bedding shall be a minimum depth of one-fourth the pipe diameter or 6 inches minimum.
- b. Similar material shall be used for haunching up to the spring line of the pipe and it shall be worked under the haunch of the pipe to provide adequate side support. The same material shall then be hand placed to a point 12" above the top of the pipe.
- c. After the placement of each lift of the Class II or III bedding, haunching and initial backfill material, the material shall be compacted to 85 percent and 90 percent Standard Proctor Density, respectively.
- d. The remaining backfill, except for the top 12" which shall contain no rock over 1-1/2" diameter nor pockets of crushed rock, may be excavated material containing no rock over 8" in any dimension. Larger rock will be allowed in wide trenches where side slopes are low enough to prevent rock from dropping over pipeline. If additional earth is required, it must be obtained and placed by the CONTRACTOR. Filling with rock and earth shall proceed simultaneously, in order that all voids may be filled with earth.

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- e. In trenches in solid rock or where flowing water is present, crushed stone bedding and backfill to 12" above the top of the pipe shall be substituted for the select material. Kentucky Department of Highways No. 8 stone shall be used for pipe up to 16 inches in diameter.
- f. If select material is not available from the trench excavation, or if the CONTRACTOR so desires, he may use crushed stone bedding and backfill to a point 12 inches above the top of the pipe.
- g. Sufficient space, limited to a maximum of 2 feet length, shall be left out of the bedding to facilitate proper jointing of the pipe.
- h. Pipe shall not be laid resting on solid rock, blocking, or other unyielding objects. Jointing before placing in the trench and subsequent lowering of more than one section may be allowed subject to the permission of the Monticello Utility Commission.

### 2. Installation of Polyvinyl Chloride (PVC) Pressure Pipe

- a. Prior to laying, all PVC pipe shall be stored in a shaded place for protection from the direct rays of the sun. Pipe shall be distributed from storage as the work progresses as permitted by the Monticello Utility Commission.
- b. The pipe, fittings, and valves shall be placed in the trench with care. Under no circumstances shall pipe or other materials be dropped or dumped into the trench. The pipe shall not be dragged in a manner which would cause scratching of the pipe surface. An excessive amount of scratching on the surface of the pipe will be considered cause for rejection.
- c. Sufficient copies of the pipe manufacturer's instructions for installing the pipe and accessories shall be furnished the Monticello Utility Commission by the CONTRACTOR to permit the retainage of 3 copies. A copy is to be available at the job site at all times.
- d. Concrete blocking of fittings, as hereinafter specified, shall be required for PVC pipe with slip joints and rubber gaskets.
- e. All dirt, dust and moisture shall be removed from the bell and spigot ends of pipes to be jointed. Insert gasket in bell. Apply the lubricant to spigot and gasket being careful to keep both ends free of dirt. The joint shall be homed to stop mark on spigot end of pipe. All jointing shall be done in accordance with pipe manufacturer's recommendations.
- f. All cutting of the pipe shall be done in a neat and workmanlike manner with the least amount of waste of pipe involved and

without damage to existing or new lines. A fine tooth saw, tubing cutter or similar tool can be used to cut the pipe. Cut must be square and ragged edges removed with a cutting tool and/or file. A bevel or taper on the exterior of each spigot is required.

#### E. Laying Copper Pipe and Fittings

##### 1. Bedding and Backfilling

- a. The pipe shall be bedded in 4 inches minimum of loose soil and the hand placed backfill lightly consolidated to a depth of 12 inches above the top of the pipe. "Loose soil" or "select material" is defined as native soil excavated from the trench, free of rocks, foreign materials and frozen earth. The machine placed backfill may contain rock no larger than 8 inches in any dimension and to an extent no greater than  $\frac{1}{2}$  the volume of backfill materials used. The top 12 inches of backfill shall contain no rocks over 1-1/2 inches in diameter or pockets of crushed rock.

##### 2. Installing Copper Pipe and Fittings

- a. Exterior copper pipe shall be laid of type K pipe, with brass compression fittings. Joints shall be neatly reamed and flared and joints drawn up firmly. Pipe shall have at least 30 inch cover. Joints shall be tested and all leakage stopped before backfilling the pipe trench.
- b. All copper pipe shall be installed by experienced workmen.

#### F. Installing Polyethylene Pipe for Water Service

##### 1. Bedding and Backfilling

- a. The pipe shall be bedded in 4 inches minimum of No. 8 crushed stone and the hand placed backfill lightly consolidated to a depth of 12 inches above the top of the pipe. The machine placed backfill may contain rock no larger than 8 inches in any dimension and to an extent no greater than  $\frac{1}{2}$  the volume of backfill materials used. The top 12 inches of backfill shall contain no rocks over 1-1/2 inches in diameter or pockets of crushed rock.

##### 2. Installing Polyethylene Service Pipe

- a. Polyethylene pipe for water services shall have the same outside diameter as copper tubing and shall be compatible for flared compression fittings. The joints to brass fittings shall be made by cutting the pipe with a tube cutter, keeping it clean and square, thence flaring the pipe and completing the joining in accordance with the manufacturer's instructions (a copy of the instructions

shall be at the job site at all times). All joints shall be tested and all leakage stopped before backfilling the pipe trench.

- b. The pipe shall be snaked into the trench, employing the natural snaking tendency of the pipe. All short radius bends shall be made with fittings rather than with the pipe alone. The pipe shall be bent to a radius of not less than 12 inches.
- c. The pipe will be rejected if it contains kinks and gouges.

#### G. Installation of Water Service Accessories

##### 1. Water Service Meters

- a. Water service meters and accessories shall be installed as shown on the Drawings, with meter box centered over the meter.
- b. The location of water service connections shall be shown on the Drawings. Earth backfill shall be thoroughly tamped around meter boxes to prevent subsequent movement.

##### 2. Air Valves and Corporation Stops

- a. The location of air valve assemblies, while being noted on the Drawings, could possibly be shifted in actual construction. For this reason, the same statements relative to the methods of installation of meters and water service connections apply to the installation of air valve assemblies. Air valve assembly boxes shall be installed in the same manner as water meter boxes except that the box will be located slightly off center of the air valve, in order to give better access to the stopcock between the valve and water main.
- b. Corporation stops, as shown on the Drawings, are required between the water main and the meter, and between the main and the air valve assembly.

#### H. Installation of Fire Hydrants

1. Fire hydrants shall be installed in the general location as shown on the Drawings. Exact location shall be determined in the field. Hydrants shall be set such that the breakaway of the hydrant flange is at ground level.
2. Hydrant drainage pits shall be excavated below the hydrant to the depth shown on the Drawings. Crushed stone drainage media shall be of the size shown on the Drawings. Hydrant shall be set vertical and anchored as hereinafter specified.
3. Hydrants installed on this project shall be anchored to prevent the hydrant from blowing off the feeder line when suddenly opened or closed. Likewise, the hydrant pilot valve shall be anchored to prevent blow-off

when the hydrant is removed. The CONTRACTOR shall anchor the hydrant and pilot valve utilizing one of the following procedures:

- a. Where the hydrant is located immediately adjacent to the water main, install all stainless steel thread rods from the main line branch tee to the valve inlet and from the valve outlet to the mechanical joint of the hydrant inlet piece.
- b. Provide locked mechanical joint or restrained joint piping from the main to the hydrant including the main line tee.
- c. Use method a or b from the water main to the pilot valve and provide a concrete thrust block on the hydrant.
- d. Provide 1 hydrant wrench per hydrant.

I. Blocking of Pipe at Bends and Ends

1. Horizontal Bends

- a. Concrete backing and/or blocking required at bends in the horizontal plane shall be accomplished per detail on the Drawings. The square footage of blocking area shall be obtained from Tables "A" and "B" through the following procedure:

Step No. 1 - From Table "A," select type soil and bearing area factor for particular fitting to be blocked.

Step No. 2 - From Table "B," select multiplier to be used for the size pipe being blocked and its test pressure.

Step No. 3 - Calculate actual bearing area required by multiplying bearing area factor from Table "A" by multiplier from Table "B" (e.g. - 16 inch tee with 250 psi test pressure in sandy clay -  $9.42 \times 1.78 = 16.7$  S.F. of bearing area required). Bearing area shall in no case be less than the minimum shown in Table "B."

**TABLE "A"**

Type Soil	Soil Bearing Pressure (PSF)	Bearing Area Factor for Degree of Bend (Square Feet)				
		90	45	22 1/2	11 1/4	Plug/Tee
Sandy Clay	3,000	13.33	9.42	7.21	3.68	1.85
Hard Clay	6,000	6.66	4.71	3.61	1.84	0.92
Shale	12,000	3.33	2.36	1.80	0.92	0.46
Solid Rock	16,000	2.50	1.77	1.35	0.69	0.35

**TABLE "B"**

Pipe Dia. (In.)	Min. Bearing Area (S.F.)	Multiplier for Pipe Test Pressure (TP)						
		(TP) 350 psi	(TP) 300 psi	(TP) 250 psi	(TP) 200 psi	(TP) 150 psi	(TP) 100 psi	(TP) 50 psi
4	1.0	0.16	0.13	0.11	0.09	0.07	0.04	0.02
6	1.0	0.35	0.30	0.25	0.20	0.15	0.10	0.05
8	1.0	0.62	0.53	0.44	0.36	0.27	0.18	0.09
10	1.0	0.97	0.83	0.69	0.56	0.42	0.28	0.14
12	1.3	1.40	1.20	1.00	0.80	0.60	0.40	0.20
14	1.5	1.91	1.63	1.36	1.09	0.82	0.54	0.27
16	1.8	2.49	2.13	1.78	1.42	1.07	0.71	0.36
18	2.3	3.15	2.70	2.25	1.80	1.35	0.90	0.45
20	2.5	3.89	3.33	2.78	2.22	1.67	1.11	0.56
24	3.6	5.60	4.80	4.00	3.20	2.40	1.60	0.80
30	5.2	8.75	7.50	6.25	5.00	3.75	2.50	1.25
36	7.0	12.60	10.80	9.00	7.20	5.40	3.60	1.80
42	9.1	17.15	14.70	12.25	9.80	7.35	4.90	2.45
48	11.4	22.40	19.20	16.00	12.80	9.60	6.40	3.20
54	13.5	28.35	24.30	20.25	16.20	12.15	8.10	4.05
60	16.0	35.00	30.00	25.00	20.00	15.00	10.00	5.00

- b. Consideration will be given to the use of restrained type pipe and fittings in lieu of concrete blocking. Use of the restrained joint pipe and fittings is subject to review and acceptance by the Monticello Utility Commission of the locking-method and adequacy of design for pressures involved.

2. Vertical Bends

- a. The use of vertical bends in lieu of extra depth trenching shall be subject to permission by the Monticello Utility Commission.
- b. Where the CONTRACTOR elects to use vertical bends, or where vertical bends are called for on the Drawings, the CONTRACTOR shall submit the blocking design, including calculations, to the Monticello Utility Commission for review and acceptance. Anchorages shall be designed to resist thrusts caused by the internal test pressure in the pipe. Protection against corrosion shall be inherent in the design.

J. Supplemental Backfilling Information

1. General

- a. Excavated materials from trenches, in excess of quantity required for trench backfill, shall be disposed of by the CONTRACTOR. It shall be the responsibility of the CONTRACTOR to obtain location or permits for its disposal.
- b. Where sod is destroyed in areas maintained equivalent to residence yards, it shall be replaced on slightly ridged backfill on trench, and where destroyed in areas adjacent to the trench, it shall be replaced by the CONTRACTOR with fresh sod.
- c. Where pastures, thin grass or cover crops are destroyed by trenching, laying, backfilling, or tunneling operations, surface shall be prepared by disking, fertilizing, and seeding.
- d. Before completion of the project, all backfills shall be reshaped, holes filled, and surplus materials hauled away and all permanent walks, street, driveways, and highway paving and sod replacement.
- e. Backfill material must be uniformly ridged over trench, and excess hauled away. Ridged backfill shall be confined to the width of the trench and not allowed to overlap onto firm original earth, and its height shall not be in excess of needs for replacement of settlement of backfill. Ridge shall not create ponding of rainwater runoff.
- f. All rock, including crushed rock or gravel from construction, must be removed from yards and fields. Streets and walks shall be broomed to remove all earth and loose rock immediately following backfilling.

2. Special Requirements

- a. In case of street, highway, railroad, sidewalk and driveway crossings or within any roadway paving, or about valve and meter boxes located in such paving, the following backfill material and procedure is required.
- b. The pipe shall be bedded in 4 inches minimum depth (for pipe sizes through 16 inches) of crushed rock meeting the requirements of the Kentucky Department of Highways standard size No. 8. For pipe sizes greater than 16 inches in diameter, the pipe bedding shall be a minimum depth of 1/4 the pipe diameter and be of the material and gradation specified previously.



- c. Similar material shall be used for haunching up to the spring line of the pipe, and it shall be worked under the haunch of the pipe to provide adequate side support. The crushed rock shall then be hand placed to a point 12 inches above the top of the pipe.
- d. After the above bedding and selected backfill have been placed, fill trench to within 6 inches of the surface with Kentucky Department of Highways No. 57 crushed stone, uniformly distributed, or other gradation acceptable to the Monticello Utility Commission. In order to accommodate compacted temporary surfacing it may be necessary to bulkhead or otherwise confine the stone fill at the open end of the trench.
- e. Temporary surfacing of street, highway, railroad, sidewalk and driveway crossings, or within any roadway paving, or about valve and meter boxes located in such paving, shall consist of 6 inches compacted depth of dense graded aggregate as specified under Section 02235 for temporary walkway or road surfacing, placed and compacted in the trench. Compaction shall be accomplished by methods which shall be sufficient to confine stone to the trench under normal traffic. Backfills shall be maintained easily passable to traffic at original paving level until acceptance of project or replacement of paving or sidewalks.
- f. Department of Highways requirements in regard to backfilling will take precedence over the above general specifications where they are involved.

K. Cut-Ins, Tie-Ins, and Cutting and Plugging

- 1. The Monticello Utility Commission shall not be responsible for extra costs of cut-ins, tie-ins, cutting and plugging, due to water not being entirely cut off by the existing water main valves. In some cases the Monticello Utility Commission may require the use of line stoppers for tie-ins. If necessary, the use of line stoppers shall be at the CONTRACTOR'S expense.
- 2. A cut-in is defined as the removal of one section of existing pipeline (2 cuts of pipe) and insertion of one or more new pipeline connections therein.
- 3. A tie-in is defined as the removal of an existing plug or cap and the connecting of the new pipeline into the existing pipeline or fitting or valve at the joint opened by such removal.
- 4. A cutting and plugging is defined as the cutting and installation of a plug in an existing line.

### 3.03 FIELD QUALITY CONTROL

#### A. Testing Pressure Pipe for Leakage

1. The CONTRACTOR will be required to test all pipelines and appurtenances with water. The maximum test pressure, measured at the lowest elevation of the pipeline being tested, shall be the pressure class of the pipe unless a specific test pressure is requested by the Monticello Utility Commission.
2. When the line or section being tested is pumped up to the required pressure, it shall be valved off from the pump and a pressure gauge placed in the line. The pressure drop in the line, if any, shall be noted. If there is no pressure drop noted in 4 hours, the Monticello Utility Commission, at its discretion, may accept the line or section as being tested, or he may require the test run the full 24 hours.
3. At the end of the 24 hour test period, the pressure shall be recorded. If there is a drop in pressure, the CONTRACTOR will be required to pump the section being tested up to initial test pressure and maintain that pressure for 24 hours, measuring the amount of water required to accomplish this. The line will not be accepted until the leakage shall prove to be less than 10 gallons per inch diameter per mile of pipe per 24 hours.
4. Should there be leakage, the CONTRACTOR will be required to locate and repair the leaks and retest the section.
5. During the pressure test, all fire hydrant isolation valves must be open in order to test all piping and connections.
6. The CONTRACTOR shall furnish meter or suction tank, pipe test plugs, and bypass piping, and make all connections for conducting the above tests. The pumping equipment used shall be centrifugal pump, or other pumping equipment which will not place shock pressures on the pipeline. Power plunger or positive displacement pumps will not be permitted for use on closed pipe system for any purpose.
7. Inspection of pipe laying shall in no way relieve the CONTRACTOR of the responsibility for passing tests or correcting poor workmanship.

#### B. Disinfection of Water Mains

1. Upon completion of the work and cleaning up, and prior to final acceptance, the CONTRACTOR shall disinfect all water lines constructed which are to carry treated water.
2. Prior to starting disinfection, all water mains must be thoroughly flushed to remove mud, rocks, etc. Disinfection will then be accomplished by the adding of a chlorine solution while filling the main to obtain the initial 50 ppm of chlorine. The CONTRACTOR shall supply all equipment, labor,

etc., necessary for flushing and disinfecting the mains. The CONTRACTOR shall submit, in writing, to the Monticello Utility Commission, the method he proposes to use for adding the chlorine.

3. The placing of calcium hypochlorite granules or tablets in the end of each joint of pipe during construction shall not be allowed.
4. Disinfection shall be accomplished by filling the new and/or repaired portions of the system with water having a chlorine content of at least 50 parts per million and at the end of a 24 hour contact time a residual of at least 25 parts per million shall remain. At the end of the 24 hour contact period, all the sterilized surfaces and areas shall be thoroughly flushed from the water system. Chlorinated water shall be disposed of in accordance with 401 KAR 5:031 and 8:020, which state that the allowable in stream concentration of chlorine is 10 ug/l, which is equal to 0.01 mg/l. The CONTRACTOR shall submit, in writing to the Monticello Utility Commission, the method he proposes for dechlorinating. Recommended chemicals, as given in AWWA C651-05, are sulfur dioxide, sodium bisulfate, sodium sulfite, and sodium thiosulfate.
5. For tie-ins to an existing system such as tapping valves where keeping the main out of service would restrict service to existing customers, disinfection shall, at the Monticello Utility Commission's discretion, consist of thoroughly cleaning the new part with a solution containing not less than 200 mg/l (ppm) chlorine.
6. After initial disinfection and flushing, the Monticello Utility Commission will collect water samples for bacteriological testing. A core zone, which includes up to the first ½ mile, shall be established. Two samples shall be taken from the core zone. Additionally, 1 sample taken from each mile of new distribution main shall be submitted. A new or routine replacement main shall not be placed in service until negative laboratory results are obtained on the bacteriological analyses. Sample bottles shall be clearly identified as "special" construction tests. If any of the samples are found to be positive or contain confluent growth, the CONTRACTOR shall repeat the disinfection procedure until the required numbers of negative samples are obtained.

**END OF SECTION**

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**SECTION 03300**  
**CAST-IN-PLACE CONCRETE**

**PART 1 GENERAL**

1.01 SCOPE OF WORK

A. Work Included:

1. All concrete work shown on Drawings.
2. Exterior concrete pavements and walks.
3. Reinforcing steel and welded wire fabric.
4. Concrete accessories.
5. Built-in work furnished under other Sections, including setting and placing unless otherwise specified.
6. Construction, contraction (control) and expansion joints.
7. Forming, finishing, curing and patching.
9. Moisture barrier under interior slabs-on-grade as specified.

1.02 RELATED WORK

- A. Precast structural concrete - Section 03400.
- B. Precast concrete hollow core planks Section 03400.
- C. Modifications to existing concrete.

1.03 CODES AND STANDARDS

A. Conform to the following:

1. ACI 318-89, "Building Code Requirements for Reinforced Concrete."
2. Governing Building Code. Comply with all requirements of the governing building code that are more stringent than the above-referenced codes, standards and Specifications.
3. ACI SP-15 (89), Field Reference Manual. A copy of this publication must be kept in the field office at all times during concrete construction.
4. ACI 304, Recommended Practice for Measuring, Mixing, Transporting and Placing Concrete.
5. ACI 311, Recommended Practice for Concrete Inspection.
6. ACI 211.1, Recommended Practice for Selecting Proportions for Normal and Heavyweight Concrete.
7. ACI 214, Recommended Practice for Evaluation of Compression Test Results of Field Concrete.
8. ACI 305, Recommended Practice for Hot Weather Concreting.
9. ACI 306, Recommended Practice for Cold Weather Concreting.
10. ACI 308, Recommended Practice for Curing Concrete.
11. ACI 309, Recommended Practice for Consolidation of Concrete.
12. AASHTO M 182, Burlap Cloth Made from Jute or Kenaf.

B. All work shall be performed to secure for the entire job homogeneous concrete having required strength, durability and weathering resistance, without planes of weakness and other structural defects and free of pronounced honeycombs, air pockets, voids, projections, offsets of plane, and other defacements on exposed surfaces.

C. Standard Specifications

1. The "Specifications for Structural Concrete for Buildings" ACI 301-89 including all modifications as hereinafter specified, are hereby incorporated as a part of these Specifications and are as much a part of the contract documents as if reproduced herein. Modifications shall take precedence over items specified in ACI 301 and as incorporated in Part III are preceded by the relative ACI 301 designation. All ACI 301 items unless so modified below are incorporated as written. When any part of any item is modified or voided by these modifications, the unaltered provisions of that part shall apply as written. Copy of ACI 301 shall be kept in the project field office at all times. No work shall proceed until persons directly responsible for the project representing the contractors, subcontractors, suppliers and testing agencies have a copy of this Specification and an understanding of the provisions therein.

**PART 2 PRODUCTS**

Not Used.

**PART 3 EXECUTION**

Not Used.

**END OF SECTION**

**SECTION 03301**

**CAST-IN PLACE CONCRETE  
(MINOR STRUCTURES)**

**PART 1 GENERAL**

**1.01 SUMMARY**

- A. This specification delineates the requirements for cast-in place concrete for minor structures including concrete kickers for pipe blocking, sidewalks, collars, manholes, manhole bottoms, pipe cradles, piers and other areas where small quantities of concrete are required. It shall not be used for major structures such as floor slabs, structure or basin walls, roof slabs, or other structural components.

**1.02 SCOPE OF WORK**

- A. Provide all labor, material, equipment and services to complete all cast-in-place concrete work required by the Project as shown on the Drawings or specified herein.

**1.03 REFERENCES**

- A. The publications listed below form a part of this specification to the extent referenced. The publications are referred to in the text by the basic designation only.

**AMERICAN SOCIETY FOR TESTING AND MATERIALS (ASTM)**

ASTM A 185	Specification for Steel, Welded Wire, Fabric, Plain, for Concrete Reinforcement
ASTM A 497	Specification for Welded Deformed Steel Wire Fabric for Concrete Reinforcement
ASTM A 615/A615M	Specification for Deformed and Plain Billet-Steel Bars for Concrete Reinforcement
ASTM A 616/A616M	Specification for Rail-Steel Deformed and Plain Bars for Concrete Reinforcement
ASTM A 617/A617M	Specification for Axle-Steel Deformed and Plain End Bars for Concrete Reinforcement
ASTM A 706/A706M	Specification for Low-Alloy Steel Deformed Bars for Concrete Reinforcement
ASTM C 33	Specification for Concrete Aggregates

## 568-STD Water (6/08)

- ASTM C 150      Specification for Portland Cement
- ASTM C 260      Specification for Air-Entraining Admixtures for Concrete
- ASTM C 494      Specification for Chemical Admixtures for Concrete

### 1.04 SUBMITTALS

- A. Copies of all materials required to establish compliance with these Specifications shall be submitted in accordance with the provisions of the General Conditions.

### 1.05 QUALITY ASSURANCE

- A. All work shall be performed to secure for the entire job homogeneous concrete having required strength, durability and weathering resistance, without planes of weakness and other structural defects and free of pronounced honeycombs, air pockets, voids, projections, offsets of plane and other defacements on exposed surfaces.

### 1.06 DELIVERY, STORAGE AND HANDLING

- A. Do not deliver ready-mixed concrete to job site until ready for placement.
- B. All materials used for on-site mixed concrete shall be kept clean and free from all foreign matter during transportation and handling and kept separate until measured and placed in the mixer.
- C. Store concrete aggregates to prevent contamination or segregation. Store reinforcement of different sizes and shapes in separate piles or racks raised above the ground to avoid excessive rusting.
- D. Protect from contaminants such as grease, oil and dirt. Provide for accurate identification after bundles have been broken and tags removed.

### 1.07 PROJECT/SITE CONDITIONS

#### A. Cold Weather

Provide and maintain 50 degrees F minimum concrete temperature. Do not place concrete when ambient temperature is below 40 degrees F. Cover concrete and provide with a source of heat sufficient to maintain 50 degrees F minimum while curing.

#### B. Hot Weather

- 1. Concrete temperature from initial mixing through final cure shall not exceed 90 degrees Fahrenheit. Cool ingredients before mixing, or substitute chip ice for part of required mixing water or use other suitable means to control concrete temperature to prevent rapid drying of newly

placed concrete. Shade the fresh concrete and start curing as soon as the surface is sufficiently hard to permit curing without damage.

## PART 2 PRODUCTS

### 2.01 CONCRETE

#### A. Mix Design

The concrete mix shall conform to the requirements of the following table according to the class of concrete required. The number in the "Class" column refers to the 28-day compressive strength of the concrete in pounds per square inch (psi).

Class	Minimum Cement Content (Lbs./Cu. Yd.)	*Maximum Slump (Inches)
3000	470	3 to 4
3500	520	3 to 4
4000	550	3 to 4

\* Maximum slump unless high range water reducing admixture is used.

#### B. Area of Application

1. Unless otherwise noted on the Drawings, concrete mixes shall be used as follows:

Class 3000 - kickers for pipe, fittings

Class 3500 - non-reinforced portions of manholes, pipe cradles

Class 4000 - reinforced portions of manholes, sidewalks, piers

### 2.02 MATERIALS

#### A. Cement

1. Portland cement for concrete and mortar shall conform to ASTM C 150, Type I or II.

#### B. Water

1. Water shall be potable.

#### C. Aggregates

1. Aggregates shall conform to ASTM C 33. Obtain aggregates from one source. Aggregates shall not contain any substance which may be deleteriously reactive with the alkalis in the cement.



D. Admixtures

1. Admixtures for air-entrained concrete shall conform to ASTM C 260, for water reducing (Type A, D or E) accelerating (Type C) and retarding (Type B or D) ASTM C 494. Calcium chloride shall not be used as an admixture. Admixtures shall not be used without prior written approval of the Monticello Utility Commission.

E. Reinforcement

1. Reinforcing Bars

- a. Reinforcing bars shall conform to ASTM A 615/A615M Grade 60, ASTM A 616/A616M Grade 60, ASTM A 617/A617M Grade 60 or ASTM A 706/A706M Grade 60 as applicable.

2. Welded Wire Fabric

- a. Welded wire fabric shall conform to ASTM A 497 or ASTM A 185.

**PART 3 EXECUTION**

3.01 FORMS

- A. Forms shall be used to confine concrete and shape it to the required dimensions. Set forms true to line and grade and make mortar tight. Chamfer above grade exposed joints, edges and external corners 3/4 inch, unless otherwise indicated. Earth cuts may be used as forms for footing vertical surfaces, if sides are sharp and true, and not exposed in finished structure.

3.02 PLACING REINFORCEMENT AND MISCELLANEOUS MATERIALS

- A. Provide bars, wire fabric and other reinforcing materials, including wire ties, supports and other devices necessary to install and secure the reinforcement.

3.03 CONTROL AND CONSTRUCTION JOINTS

- A. For sidewalks, provide control joints spaced at an interval equal to the width of the sidewalk, the minimum spacing of 5 feet. Cut joints 1 inch deep with a jointing tool after the surface has been finished. Provide 0.5 inch thick transverse expansion joints at changes in direction, where sidewalk abuts curb, steps, rigid pavement or other similar structures; space joints not more than 40 feet apart. Limit variation in cross section to 1/4 inch in 5 feet.

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### 3.04 CURING AND PROTECTION

- A. Protect concrete from injurious action by sun, wind, rain, flowing water or mechanical injury. Do not allow concrete to dry out from time of placement until the expiration of the curing period. Forms may be removed 48 hours after concrete placement.

**END OF SECTION**

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**SECTION 05540**

**CASTINGS**

**PART 1 GENERAL**

1.01 SCOPE OF WORK

- A. Included in this section are valve boxes.

1.02 RELATED WORK NOT INCLUDED

- A. Concrete work is included in Division 3.
- B. Valves are included in Division 15, Section 15101.

1.03 SUBMITTALS

- A. The CONTRACTOR shall submit to the Monticello Utility Commission, in accordance with Division 1, Section 01300, copies of construction details of castings proposed for use.

**PART 2 MATERIALS**

2.01 GENERAL

- A. All castings shall be gray iron, conforming to the requirements of the ASTM Standards, Designation A 48-83, Class 35-B for manhole casting and class 20 for valve boxes.

2.02 VALVE BOXES

- A. Screw Type for Iron Body Gate Valves
  - 1. Valve boxes for sizes thru 12-inch valves shall be the cast iron screw type, of sufficient length to allow for 30 inches of cover over the top of the pipe. The inner section shall have a minimum inside diameter of 5-1/4 inches with a hood type base that will cover the packing gland on valves through 12 inches in size (minimum of 8 inches inside diameter). The base of the top section shall be flanged at least 1-1/4 inches. The caps shall be circular with a corrugated surface and have pick holes in the periphery and be marked "Water." The valve boxes shall be Russco Products, 562-S, or equal.

**PART 3 EXECUTION**

Not Used.

**END OF SECTION**

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## SECTION 11213

### PACKAGED WATER BOOSTER PUMPING STATION

#### PART 1 GENERAL

##### 1.01 SCOPE OF WORK

- A. The CONTRACTOR shall furnish and install factory built, factory delivered, above ground water booster pump station, with all the necessary internal piping, pumps, motors, valves, and controls and other necessary appurtenances installed on a fabricated steel base and enclosed in a structure as shown on the Drawings and as specified herein. The water booster station shall be complete when delivered and will not require internal CONTRACTOR construction except to install the power service through the service conduit provided for that purpose.

##### 1.02 RELATED WORK

- A. Special requirements for materials and equipment are provided in Sections 01300 and 01600.
- B. Fencing is specified in Section 02830.
- C. Sodding and Seeding is specified in Section 02930.
- D. Cast In Place Concrete is specified in Section 03301.
- E. Castings are specified in Section 05540.
- F. Valves are specified in Section 15102.
- G. Electrical work is specified in Division 16.

##### 1.03 QUALIFICATIONS

- A. The equipment and materials covered by these Specifications are intended to be standard equipment of proven reliability and as manufactured by reputable manufacturers having experience in the production of such equipment. The equipment furnished shall be designed, constructed, and installed in accordance with the best practices and methods and shall operate satisfactorily when installed as shown on the Drawings and operated per manufacturer's recommendations.
- B. It is intended that the manufacturer of the selected equipment shall be a business regularly engaged in the manufacture, assembly, construction, start-up and maintenance of water distribution equipment of the type required for the project. The manufacturer shall have at least 10 years of successful experience in providing stations of the type, design, function and quality as required for the project. As such, the pump station manufacturer shall be required to affix an

Underwriter's Laboratories (UL) label attesting to the compliance of the assembled equipment under the packaged pumping systems (QCZJ) UL listing category. This label shall be inclusive of the entire station with enclosure so as to demonstrate compliance with the National Electrical Code requirements for working clearances and wiring procedures.

#### 1.04 SUBMITTALS

- A. Equipment submittals to the Monticello Utility Commission shall be bound and shall contain a minimum of 6 copies. The submittals shall contain a minimum of 2 full size drawings, size 24 inches by 36 inches, one each covering the booster pump station and the electrical control schematic. The booster pump station drawing shall be specific to the Project, in at least 3 different views, be to scale and illustrate the National Electrical Code (NEC) clearances per Section 110-16 of the Code. The submittal booklets will complete with data sheets covering all individual components that make up the booster pump station and the UL file number under which the manufacturer is listed, service department personnel statement as detailed in the Specifications, and be complete with the manufacturer's formal warranty policy. The submittal booklets shall be complete with a full size photocopy of the manufacturer's combination UL/manufacturer logo packaged pumping systems label.

## **PART 2 PRODUCTS**

#### 2.01 EQUIPMENT ENCLOSURE

- A. The equipment enclosure size as shown on the Drawings for the project is appropriate for National Standard mandated clearances and for proper clearances above, below and around equipment to provide for safe servicing, removal and reinstallation of that equipment.
- B. The drawing for this equipment shall illustrate centerline and clearance/maintenance dimensions about major equipment items.

#### 2.02 PREFABRICATED STRUCTURE

- A. The booster pump station will be complete with a factory assembled prefabricated building affixed to the steel deck structure supporting the booster pump as shown on the Drawings. The completed booster station shall be 1 piece when delivered and require only off loading, installation on the prescribed foundation, pipeline hookup and electrical service to complete the installation.
  - 1. The prefabricated building shall be designed to withstand wind load of 80 mph, a roof live load of 30 psf.
  - 2. All exposed outside surfaces shall be fiberglass, including the underside, with an exterior finish as selected by the Monticello Utility Commission.
  - 3. All exterior surfaces have a minimum of 1/8" of fiberglass reinforced polyester resin applied over AC fir exterior grade plywood.

4. All structural joints between the wall sections and the floor and the wall sections and the roof, both inside and out, shall be secured with polyester resin adhesive and stainless steel bolts.
5. All joints and cracks in the exterior sheathing shall be filled with polyester resin filler prior to fiberglassing.
6. The exterior surface shall be 25 and 30 percent chopped glass.
7. All exterior hardware shall be attached with stainless steel bolts or screws.
8. The walls and roof of the building shall be insulated with Flame Spread insulation material with a rating of 200 or less. The insulation of the roof shall be R-19 and the walls shall be R-11.
9. The roof shall be fully insulated and fabricated with 2x6 (or larger) rafters that are sloped from one side to prevent water accumulation and to form a building with a "shed" roof.
10. Interior walls shall be a sandwich construction of 2x4 at 16" on center with a minimum thickness of 4".
11. The interior walls and ceiling shall be finished as follows:
  - a. 15/32" AC plywood with fiberglass textured laminate (FR) in white color with matching trim.
12. All openings in walls shall be fiberglass from the outside in for a complete seal.
13. Door frames shall be constructed of heavy extruded aluminum sections with anchors. Sections shall be extruded from 6063-T5 aluminum alloy, thickness of 1/8" or greater. All screws, nuts and anchors shall be stainless steel. The finish shall be in accordance with the "Alumilite" Specification No. 204-A1R1. All joints shall be cut to fit flush. All hardware preparation shall be accomplished in a workmanlike manner, accurately milled and properly reinforced.
14. The pump room door shall be copper free aluminum. The door shall be a heavy-duty aluminum door with 3-point latch, safety chain with weather stripping and fully insulated. Two coats of clear colorless lacquer shall be applied to the door. The doors shall be installed with non-rusting hinges, wedge locks and backup plates for closures and doorstops. Three sets of keys shall be provided. The entrance openings shall be double doors with a clear opening size of 72" x 84". The main passage door shall include a 12" x 12" plexiglass window.

B. Building Substructure

1. The base/floor system substructure shall be made up of steel plate and standard structural steel shapes of the sizes and weights as shown on the Drawings. The substructure shall be designed to support the building live and dead loads plus the burden imposed by loading, transporting and unloading of the equipment. All steel plate and shapes used in the substructure shall meet or exceed the requirements of ASTM-A36.

C. The station shall have floor drains as shown on the Drawings.

D. Piping Penetrations

1. Where suction and discharge piping, or any other pressure piping, passes through the station base/floor system substructure, that area of the floor shall be reinforced with an additional 1/4" steel plate. The total thickness at each pipe junction with the floor shall be a minimum of 1/2" (1/4" plus 1/4") to a floor area of three (3) times the area of the piping being passed through the floor.

E. Safety Floor Matting

1. The walkway areas (that space from the entrance to the control panel and the entire NEC clearance area) shall be covered with a Nyracord industrial safety matting. The mat shall be a heavy duty, 1/2 inch minimum thickness Nyracord compound (rubber blend with fiber reinforcement) of open slot design with a ribbed safety pattern (ribbed in two directions) to promote sure footing. The underside of the safety mat shall also be ribbed (in one direction only) to permit aeration and drainage. The safety mat shall not be glued to the floor surface.

F. Delivery - Lifting Device

1. An adjustable spreader type lifting device, built to lift the building structure **without** impinging the lifting chains/cables on the building sidewalls, shall be provided by the pumping station manufacturer for use by the installing contractor for the purpose of unloading station from trailer.

## 2.03 CORROSION PROTECTION

- A. All surfaces of the exposed steel structure, interior and exterior, shall be gritblasted equal to commercial blast cleaning (SSPC-SP6).
- B. The protective coating shall take place immediately after surface preparation. The protective coating shall be Tnemec Series 66 Hi Build Epoxoline consisting of a two-component, high solids, amide-cured epoxy system formulated for high build application having excellent chemical and corrosion resistant properties. The epoxy system shall be self-priming and require no intermediate coatings.

The protective coating shall provide, in 2 applications, a total dry mil thickness of 8.0 mils.

- C. The floor area of the completed station, not protected by the floor matting, shall receive an additional top of "non-skid" Tnemec Series 66 Hi-Build Epoxoline. The total dry mil thickness on the unprotected floor area shall provide a 14.0 mil coverage.

#### 2.04 OPERATING CONDITIONS

- A. The pump station shall be capable of delivering the volume required at the discharge heads specified for the individual application. The following data shall be submitted to the Monticello Utility Commission for review.

Design GPM	@	feet TDH;
Maximum GPM	@	feet TDH;
Efficiency at design GPM		%.

#### 2.05 BOOSTER PUMPS – CENTRIFUGAL DIFFUSER TYPE, MULTI-STAGE VERTICAL

- A. The booster pumps employed within the booster pump station shall be of the vertical centrifugal diffuser type, multi-stage, designed specifically for low flow - high head operation. The pumps shall conform to the detailed specifications as set forth below:

- B. Pump

- 1. The pump suction/discharge chamber, motor stool and pump shaft coupling shall be constructed of cast iron. The impellers, pump shaft, diffuser chambers, outer discharge sleeve and impeller seal rings or seal ring retainers shall be constructed of stainless steel. The impellers shall be secured directly to the pump shaft by means of a stainless steel tapered split cone and locking nut or by a splined shaft arrangement. Intermediate and lower shaft bearings shall be Tungsten Carbide and Ceramic or Tungsten Carbide and Bronze. Pumps shall be equipped with a high temperature mechanical seal assembly with Tungsten Carbide/Carbon or Tungsten Carbide/Tungsten Carbide seal faces mounted in stainless steel seal components.

- B. Motor

- 1. The pump motor shall be sized to insure the pump is non-overloading when operating on the specified pump curve. The motor shall be of the horsepower, voltage, phase and cycle as shown on the drawings. Motor design shall be Open Drip Proof with a NEMA C face design operating at a nominal 3450 rpm with a minimum service factor of 1.15. Lower motor bearings shall be adequately sized to insure long motor life.



## 2.06 PUMP/MOTOR VIBRATION ISOLATION PADS

- A. The pump/motor assembly shall be mounted to a fabricated steel base built specifically for the pump/motor to be mounted. Each mounting or attachment point shall be complete with a vibration isolation pad. The pad will be in two (2) parts, a 1/4" base layer followed by a 5/8" upper layer and be a nominal 2" x 2" square size for pump/motor combinations weighing up to 1500 pounds.

## 2.07 PIPING

- A. Piping shall be steel and conform to material specification ASTM A-53(CW) for nominal pipe size four (4) inch and smaller and ASTM A-53(ERW) Grade B for nominal pipe size five (5) inches and larger. Steel butt-welding fittings shall conform to material specification ASTM A-234 Grade WPB and to the dimensions and tolerances of ANSI Standards B16.9 and B16.28 respectively.
- B. Forged steel flanges shall conform to material specification ASTM A-105 Class 60 and/or ASTM A-181 for carbon steel forgings and to the dimensions and tolerances of ANSI Standards B16.5 as amended in 1992 for Class 150 and Class 300 flanges.
- C. All pipe welds shall be performed by certified welders employed by the pump station manufacturer. As part of the equipment submittal, the pump station manufacturer shall provide copies of the welding certificates of the employees who are to perform the pipe welds.
- D. All piping surfaces shall be prepared by gritblasting, or other abrasive blasting, prior to any welds taking place. Piping of 5" diameter and smaller may be cut by saw. Piping of 6" diameter and larger shall be bevel cut, and Oxyfuel or Plasma-arc cutting techniques shall be used to assure and facilitate bevel pipe cuts. No saw cuts or other form of abrasive cut-offs shall be allowed on 6" and larger diameter pipe.
- E. In all cases, short circuit transfer, spray transfer or pulse-arc transfer modes of the gas metal arc welding process shall be applied semi-automatically. When utilizing the short circuit mode, shielding gas consisting of 50% carbon dioxide and 50% argon gas shall be used. When utilizing the spray or pulse-arc transfer modes, a shielding gas consisting of 5% carbon dioxide and 95% argon shall be used. In all cases, welding wire with a minimum tensile strength of 70,000 psi shall be employed. All flange welds and butt welds of equal size pipe shall be a single continuous nonstop weld around the complete circumference of the pipe. Whenever possible, vertical up weld passes will be applied to all pipe welds. No vertical down weld passes will be allowed. Completed welding assemblies shall create no internal obstruction, restriction or create any unintended sources of water deflection.
- F. Piping of 6 inch diameter and larger shall require a minimum of 2 weld passes to complete each weld. The first pass, or root pass, shall be applied at the bottom of the bevel cut using the short circuit transfer welding mode, and the second pass, or cap pass, shall be applied over the root pass using the spray or

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pulse arc transfer welding modes to insure that at a minimum the total weld thickness shall be equal to thinnest of the two pieces being welded together.

### 2.08 PIPE SUPPORTS

#### A. Pipe supports by minimum sizing for:

- 4" and smaller piping shall be 2" x 2" x 3/16" wall rectangular tubing;
- 6" through 12" piping shall be 3" x 3" x 1/4" wall rectangular tubing;
- 14" through 24" piping shall be 4" x 4" x 1/4" wall rectangular tubing and, also; 6" and larger piping shall be provided with "kick" bracing projecting fully from the underside of the pipe to the floor at an angle of no less than 15' from vertical out at a right angle to the run of the pipe being supported. These "kick" braces shall be in addition to the vertical pipe supports called out above.

#### B. Pipe supports are to be fully welded at both end points to the pipe and steel floor where required.

#### C. Simple pipe stands made of pipe welded only at the floor and upholding a bracket with or without a threaded jack bolt or a U-bolt are not acceptable, as lateral or transverse support is not provided.

### 2.09 FUSION BONDED EPOXY COATING - STEEL PIPING

#### A. Steel piping shall have applied to it a Fusion Bonded Epoxy Coating on the interior pipe surface that conforms to AWWA C-213-91 for steel water pipelines. The powder coating product shall be National Sanitation Foundation (NSF) Standard 61 certified material. The final product shall be capable of meeting Salt Spray Resistance ASTM B117 (1000 hour) with no blistering, undercutting or rust bleed; Humidity Resistance ASTM D2247 (1000 hour) with no blistering, undercutting or rust bleed; and Impact Resistance of ASTM G14-72 (160 in. lbs.). The Fusion Bonded Epoxy Coating shall provide a total dry mil thickness of 12.0 to 14.0 mils.

#### B. Prior to shipment of the station, the station manufacturer shall provide in writing to the Monticello Utility Commission certification that the fusion bonded epoxy coating has been applied to all internal surfaces of the steel piping using the proper method. Said certification shall show under the station manufacturer's letterhead:

- Date of application;
- Material manufacturer and product designation including a product data sheet for the coating;
- Notarized signature of an officer of the station manufacturing company stating the fusion bonded epoxy coating was applied to AWWA Standard C213-91 or the latest revision.

## 2.10 SERVICE CONNECTIONS ON INTERNAL PIPING

- A. All plumbed devices within the station eventually requiring service, such as meters, control valves, pumps and like equipment, shall be easily removed from the piping by the presence of appropriately placed and sufficient quantity of adaptors and couplings as shown on the drawings; no less than the quantity of couplings and adaptors shown shall be allowed.

## 2.11 RESTRAINING POINTS

- A. The main inlet and outlet piping to the station shall each be provided with two (2) or four (4) restraining points as welded on "eyes" or similar device welded to the framing to facilitate the attachment of joint restraint tie rods or other device to be used in retarding any pipe movement at the connections.

## 2.12 COMPRESSION COUPLINGS

- A. The booster station piping shall include a compression type, flexible coupling to prevent binding and facilitate removal of associated equipment where shown on the plans for this item. In lieu of a compression coupling, a Uni-Flange or a flanged coupling adapter (FCA) may be used.
- B. All compression couplings, Uni-Flanges, flanged coupling adapters (FCA), and flexible connectors/expansion joints shall include a minimum of two (2) control joint rods with appropriate restraining points.

## 2.13 COMBINATION PRESSURE GAUGES

- A. Combination pressure gauges shall be glycerine filled with a built-in pressure snubber and have 4-1/2 inch minimum diameter faces and be turret style, black phenolic case with clear glass face. The movement shall be rotary, of 400 Series stainless steel with teflon coated pinion gear and segment. The gauge shall be bottom connected and accept a 1/4" NPT female thread. Combination pressure gauge range and scale graduations shall be in psi and feet of water as follows:
  - B. Suction Pressure - 0 to 200 psi, 20 psi figure intervals, with graduating marks every 2 psi (0-460 feet).
  - C. Discharge Pressure - 0 to 600 psi, 50 psi figure intervals, with graduating marks every 5 psi (0-1380 feet).
- D. All gauges will be panel mounted off the pipeline and be flexible connected to their respective sensing point. The gauge trim tubing shall be complete with both isolating and vent valves and the tubing shall be so arranged as to easily vent air and facilitate gauge removal. Gauges mounted directly to the pipeline or at the sensing point **will not** be accepted.
- E. Gauges shall be Ashcroft Model 1279ASI , or equal.

#### 2.14 HYDRO-PNEUMATIC STORAGE

- A. The equipment capsule shall be complete with 2 diaphragm type hydro-pneumatic ASME coded storage tanks.
- B. The hydro-pneumatic storage tank shall feature deep drawn steel upper and lower domes with side shell construction specifically designed for diaphragm type storage tanks. Storage tank welding shall be carefully done to eliminate rough spots and sharp edges. The storage tank base shall be designed so as to permit free airflow to prevent moisture from accumulating beneath the storage tank.
- C. The hydro-pneumatic storage tank internals shall include 2 separate pieces. The first piece shall be a heavy-duty butyl diaphragm that effectively separates the air chamber from the water chamber. The shape of the diaphragm shall conform exactly to the shell configuration and shall be of seamless construction meeting FDA requirements for potable water.
- D. The second piece shall be a polypropylene liner that conforms exactly to the lower dome and acts as the water receptacle. Water shall never touch steel.
- E. The polypropylene liner shall be 100% non-corrosive and will not be bonded to the steel shell wall or lower dome. A mechanical clamping ring shall permanently affix the diaphragm and the liner to the shell groove. The polypropylene liner shall be tested and accepted by the National Sanitation Foundation.
- F. The hydro-pneumatic storage vessel shall be as manufactured by Wessels Company, Model FXA-HP600, or equal. Storage tanks without either or both diaphragm and liner will not be accepted.

#### 2.15 SAMPLE TAP

- A. A single, right angle outlet, smooth nose, brass sample tap shall be affixed to the manual vent ball valve for the low suction lockout and suction pressure gauge assembly.

#### 2.16 BUTTERFLY VALVES

- A. Valve body shall be wafer style and meet ANSI Class 125/150 flange standards. Metal reinforced dovetail seat shall ensure drop tight, bi-directional shutoff. The stem shall be one piece. The disc and stem shall be connected by a stainless steel torque plug which shall provide positive engagement. The valve shall have upper and lower RTFE inboard stem bearings, isolated from the line media, and a heavy-duty upper stem bushing.
- B. The valve body shall be cast iron; aluminum bronze disc; stainless steel stem; FPDM seat; acetal upper stem bushing; BUNA-N V-cup stem seal.

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- C. Valve size 6 inches and smaller shall be equipped with lever operator and 10 degree increment throttling plate. Valve sized 8 inches and larger shall be equipped with a weather-proof, heavy-duty, gear operator complete with a position indicator.
- D. Butterfly valves shall be Keystone Model 221-784, or equal.

2.17 GATE VALVES

- A. Isolating valves where shown and as sized on the Drawing sheet covering this item shall be gate valves meeting or exceeding ASTM Spec B283 No. C37700. The gate valves will be forged brass body, integral seat, NRS (non-rising stem) solid wedge disc. The valves will be NPT threaded pattern complete with handwheel operators (counter-clockwise). Maximum working pressure shall be 200 psi.
- B. The gate valves shall be Hammond Model #8901, or equal.

2.18 BALL VALVES

- A. Isolating valves where shown and as sized on the plan sheet covering this item shall be ball valves meeting or exceeding ASTM Spec B124 No. C37700. The ball valves will be 2-piece forged brass body, blow out proof stem, TFE seats, TFE packing with adjustable stem packing gland. The valves will be NPT threaded pattern complete with lever operators. Maximum working pressure shall be 600 psi.
- B. Ball valves shall be Hammond Model #8901, or equal.

2.19 CHECK VALVES

- A. Each pump discharge pipe run shall include a Y-pattern, NPT, horizontal swing check valve. The check valve shall be constructed with bronze body and disc to meet ASTM B-61. The valve shall conform to MSS SP-80. The valve shall be rated for 300 psi working pressure. The check valve shall be designed to prevent water hammer by returning the valve plug to the seat before reversal of flow occurs. The check valves shall be designed so as to be easily repaired in the field.
- B. The pump check valves shall be Nibco Model T-136, or equal.

2.20 SUCTION LINE STRAINERS

- A. Each pump suction header shall include a "Y" type strainer of a size as shown on the plans for this item. The strainer body and cover material shall be high grade cast iron equal to ASTM specification A126 Class B. The machined seal shall be self-aligning and at the same time hold the screen securing in place by a straight threaded and gasketed cap. The screen shall be 20 mesh stainless steel screens.
- B. Strainers shall be Metraflex Type TS, or equal.

## 2.21 PRESSURE TESTING

- A. When the station plumbing is completed, the pressure piping within the station (including valves, pumps, control valves, and fittings), connections as make up the entire system shall be hydrostatically tested at a pressure equal to the test pressure rating of the item of equipment within the lowest pressure rating with in the system. The test pressure shall be applied for a minimum of 30 minutes, during which time all joints, connections and seams shall be checked for leaking. Any deficiencies found shall be repaired and the system shall be retested.
- B. The results of this testing shall be transmitted in writing to the Monticello Utility Commission prior to shipment of the station and shall note test pressure, time at full pressure and be signed by the Quality Control Manager or test technician.

## PART 3 ELECTRICAL APPARATUS

### 3.01 DESIGN, ASSEMBLY & TEST

- A. The electrical apparatus and control panel design, assembly, and installation, and the integration of component parts will be the responsibility of the manufacturer of record for the booster pumping equipment. That manufacturer shall maintain at his regular place of business a complete electrical design, assembly and test facility to assure continuity of electrical design with equipment application.

### 3.02 CONFORMANCE TO BASIC ELECTRICAL STANDARDS

- A. The manufacturer of electrical control panels and their mounting and installation shall be done in strict accordance with the requirements of UL Standard 508 and the National Electrical Code (NEC) latest revision. No exceptions to the requirements of these codes and standards will be allowed; failure to meet these requirements will be cause to remove the equipment and correct the violation.

### 3.03 UL LISTING

- A. All service entrance, power distribution, control and starting equipment panels shall be constructed and installed in strict accordance with Underwriter's Laboratories (UL) Standard 508 "Industrial Control Equipment." The UL label shall also include an SE "Service Entrance" rating stating that the main distribution panel is suitable for use as service entrance equipment. The panels shall be shop inspected by UL, or constructed in a UL recognized facility. All panels shall bear a serialized UL label indicating acceptance under Standard 508 and under Enclosed Industrial Control Panel or Service Equipment Panel.

### 3.04 E.T.L. LISTING

- A. All control panels shall be E.T.L. Listed by Interek Testing Services (ITS) under Category 4 - Industrial Control Equipment. Each completed panel shall bear an E.T.L. listing label. The listing label shall include the station manufacturer's

name, address and telephone number. The station manufacturer shall have quarterly inspections performed by ITS at the manufacturer's facilities to ensure that the products being listed comply with the report and procedural guide for that product.

### 3.05 EQUIPMENT GROUNDING

- A. Each electrical equipment item in the station shall be properly grounded per Section 250 of the National Electrical Code. Items to be grounded include, but are not limited to, pump motor frames, control panel, transformer, convenience receptacles, dedicated receptacle for heater, air conditioner, dehumidifier, lights, light switch, exhaust fans and pressure switches.
- B. All ground wires from installed equipment shall be in conduit and shall lead back to the control panel to a plated aluminum ground buss specific for grounding purposes and so labeled. The ground buss shall be complete with a lug large enough to accept the installing electrician's bare copper earth ground wire. The bus shall serve as a bond between the earth ground and the equipment ground wires.

### 3.06 PANEL MOUNTING HARDWARE

- A. Metal framing channel shall be used exclusively for mounting of all electrical panels and electrical components except for those specifically designated otherwise.
- B. Mount one 24-inch by 24-inch, 3/4-inch plywood panel 2-1/2 inches from wall for the telemetry controls.

### 3.07 CONTROL PANEL

- A. All circuit breakers, motor starters, time delay relays and control relays shall be incorporated into 1 NEMA 1 control panel.
- B. There shall be provided, thermal-magnetic trip circuit breakers as necessary.
- C. Six (6) Auxiliary Circuit Breakers, as follows:

- |             |                        |
|-------------|------------------------|
| 1. Controls | 4. Dehumidifier        |
| 2. Lights   | 5. Convenience Outlets |
| 3. HVAC     | 6. Spare               |

### 3.08 PUMP STARTING EQUIPMENT

- A. Pump starting equipment shall be 3 phase, full voltage non-reversing magnetic starters connecting the pump motor directly across the line. The relay shall be complete with a manually reset overload relay. The relay shall be complete with a correctly sized heater element on each line. Starters and overloads shall be UL listed.

### 3.09 PUMP ALTERNATOR

- B. An alternating relay shall be provided to assure equal run time on all loads. The relay provides equal run time on 2 loads by alternating the sequence in which the loads are allowed to start. Control voltage will initiate the alternating action. The LED indicator will show the position of the output relay. The relay will have automatic sequencing feature plus the option of locking it into one sequence. A three-position switch permits the field selection of normal duplexing action, locking in the A-B sequence, or B-A sequence. The relay shall be enclosed in a plastic cover and shall plug into an 8 terminal socket. Control wiring for the sequence relay shall terminate at the socket. Replacement of the alternator shall not disturb control wiring. Automatic start of the backup pump upon lead pump failure shall be provided. Relay will be UL recognized.

### 3.10 RUNNING TIME METER

- A. A running time meter shall be supplied for each pump to show the number of hours of operation. The meter shall be enclosed in a dust and moisture proof molded plastic case, suitable for flush mounting on the main control panel. The meter dial shall register in hours and tenths of hours up to 99999.9 hours before repeating. The meter shall be suitable for operation from a 115 volt, 60 cycle supply.

### 3.11 ELECTRICAL APPARATUS - PHASE MONITOR

- A. A phase monitor shall be supplied to protect three-phase equipment against phase loss, undervoltage and phase reversal conditions. When a fault is sensed, the monitor output relay opens within two seconds or less to turn the equipment off and/or cause an audio or visual alarm. Both Delta and Wye systems shall be monitored. The monitor shall have an automatic reset and shall also include an adjustable voltage delay. The monitor shall have an indicator LED (glows when all conditions are normal and shall monitor phase sequence: ABC operate (will not operate CBA). The phase monitor shall be UL approved and CSA certified.

### 3.12 SURGE ARRESTOR

- A. A secondary surge arrestor shall be provided. Housing shall be Noryl and be ultrasonically sealed. Valve blocks shall be metal oxide with an insulating ceramic collar. Gap design shall be annular. The lead wire shall be permanently crimped to the upper electrode forming part of the gap structure. Arrestors shall be UL and CSA listed Lightning Protective Devices.

### 3.13 POWER TRANSFORMER

- A. Balanced 115/230 single phase power for the auxiliary circuits within the scope of the booster station shall be obtained by use of a 7.5 KVA dry, step down transformer. The transformer shall be wall mounting type, in a NEMA 3R non-ventilated weatherproof enclosure. Transformer shall operate with noise levels equal to or less than ANSI and NEMA standards. Transformer insulation



shall be Class 180c. The unit shall be "UL" approved for indoor/outdoor application.

### 3.14 SUCTION PRESSURE CONTROL

- A. Suction control of the pumping operation shall be provided by a bellows type, adjustable differential pressure switch. The switch shall be complete with a single pole, double throw contact block with 5 amp non-inductive rated contacts at 230 volts AC. The set points of the on/off cycle shall be independently adjustable through the full range of the switch rating.
  - 1. Low Suction Cut-out, 4-150 psi.
    - 1A. Adjustable Differential, 2-25 psi.
- B. A pressure gauge shall be sub-panel mounted adjacent to the low suction pressure switch. The gauge and switch shall be so plumbed with the suction header sensing line that a common blow-off valve can relieve pressure in both simultaneously for purposes of checking and calibrating the low suction lock-out.

### 3.15 LOCAL PRESSURE CONTROL

- A. Control of the pumps shall be provided by bellows type, adjustable differential pressure switches. Each switch assembly will be complete with a single pole, double throw contact block with 5 amp non-inductive rated contacts at 230 volts AC. The set points of the on/off cycle shall be independently adjustable through the full range of the switch rating.
  - 1. Start Lead Pump, 4-150 psi control range.
    - 1A. Adjustable Differential, 2-25 psi.
  - 2. Start Back-up Pump, 4-150 psi control range.
    - 2A. Adjustable Differential, 2-25 psi.
- B. A pressure gauge shall be sub-panel mounted adjacent to the discharge pressure switches. The gauge and switches shall be so plumbed with the discharge header sensing line that a common blow-off valve can relieve pressure in all simultaneously for purposes of checking and calibrating the start-stop functions of the pumps.
- C. Pressure switch shall be set at a maximum 250 psi discharge pressure.

### 3.16 DEVICES

- A. Five (5) solid state time delay relays shall be provided to perform the following functions:
  - 1. Low Suction Timer
  - 2. Start Control Timer Pump #1
  - 3. Stop Control Timer Pump #1
  - 4. Start Control Timer Pump #2

5. Stop Control Timer Pump #2
- B. The solid state time delay relay shall have an adjustable time range of 10 seconds to 10 minutes. The relays shall be constructed to use a DIN rail mount socket so that the relays can be replaced without disturbing the wiring. The relay shall be complete with LED indicators for output and power.
- C. Hand-Off-Automatic switches shall be oil tight, 3-position maintained and be located on the main control panel door.
- 1. Pump #1
  - 2. Pump #2
- D. Indicating lights shall be oil tight, with a full voltage pilot light and be provided:
- 1. Red - Low Suction Pressure
  - 2. Green - Pump #1 in Operation
  - 3. Green - Pump #2 in Operation
- E. Nameplates shall be furnished on all panel front mounted switches and lights.
- F. The control panel door shall be complete on the interior with a stick-on transparency containing an "as-built" reproduction of the electrical control panel schematic. The wiring diagram shall be a corrected "as-built" copy and contain individual wire numbers, circuit breaker numbers, switch designations and control function explanations.
- G. Add the following contacts:
- 1. Four control outputs as follows:

Qty.	Description
1	Pump #1 fail output and lamp
1	Pump #2 fail output and lamp
  - 2. Sixteen discreet inputs as follows:

Qty.	Description
1	Pump #1 called for (contact)
1	Pump #2 called for (contact)
1	Pump #1 running (contact)
1	Pump #2 running (contact)
1	Pump #1 fail (scripted)
1	Pump #2 fail (scripted)
1	Power fail alarm
  - 3. Four analog inputs as follows:

Qty.	Description
1	Analog Input #1: System Pressure

1 Analog Input #2:

4. Two pulse (flow) inputs as follows:

Qty.	Description
1	Pulse Input #1
1	Pulse Input #2

### 3.17 CONDUIT AND WIRING

- A. The service entrance conduits shall be rigid steel conduit, individually sized to accept the inbound service conductors and telemetry/telephone/radio cables, and shall be installed from the main power or control panel through the equipment enclosure floor and terminate exterior to the equipment enclosure. The service entrance exterior conduit connection points shall be capped or plugged for shipment. Add 1 service entrance bushing for a 1-inch conduit in the floor below the plywood panel for the telemetry.
- B. All wiring within the equipment enclosure and outside of the control panel or panels shall be run in conduit except for the watertight flexible conduit and fittings properly used to connect pump drivers, fan motors, solenoid valves, limit switches, etc., where flexible connections are best utilized. Only the dehumidifier where furnished by the original manufacturer with a UL approved rubber cord and plug, may be plugged into a receptacle.
- C. Equipment Enclosure Conduit - Rigid, heavy wall, Schedule 40 PVC with solvent weld moisture-proof connections, in minimum size 3/4" or larger, sized to handle the type, number and size of equipment conductors to be carried - in compliance with Article 347 of the National Electrical Code and NEMA TC-2, Federal WC-1094A and UL-651 Underwriter's Laboratory Specifications.
- D. Flexible Connections - Where flexible conduit connections are necessary, the conduit used shall be liquid-tight, flexible, totally nonmetallic, corrosion resistant, nonconductive, U.L. listed conduit sized to handle the type, number and size of equipment conductors to be carried - in compliance with Article 351 of the National Electrical Code.
- E. Motor Circuit Conductors - Sized for load. All branch circuit conductors supplying a single motor of one (1) horsepower or more shall have an ampacity of not less than 125 percent of the motor full load current rating, dual rated type THHN/THWN, as set forth in Article 310 and 430-B of the National Electrical Code, Schedule 310-13 for flame retardant, heat resistant thermoplastic, copper conductors in a nylon or equivalent outer covering.
- F. Control and Accessory Wiring - Sized for load, type MTW/AWM (Machine tool wire/appliance wiring material) as set forth in Article 310 and 670 of the National Electrical Code, Schedule 310-13 and NFPA Standard 79 for flame retardant, moisture, heat and oil resistant thermoplastic, copper conductors in compliance with NTMA and as listed by Underwriter's Laboratories (AWM), except

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where accessories are furnished with a manufacturer supplied UL approved rubber cord and plug.

### 3.18 RECEPTACLES

- A. Two duplex, ground fault circuit interrupter type receptacles shall be furnished about the periphery of the equipment enclosure, with 1 receptacle adjacent to the main control panel.

### 3.19 CONVENIENCE GROUP - LIGHTING

- A. There shall be one or more two-tube, 32 watt per tube, electronic start, enclosed and gasketed, 48 inch minimum length fluorescent light fixtures installed within the equipment enclosure, as shown on the plan for this item. One (1) light fixture shall be located directly over the main control panel. The light switch shall be of the night glow type and be located conveniently adjacent to the door. Open fluorescent or incandescent fixtures **will not** be accepted.

### 3.20 HEATING/COOLING/EXHAUST UNIT

- A. The unit shall be one piece, wall mounted, factory assembled, precharged, prewired, tested and ready to operate. The unit shall have a limited warranty of five years on parts and five years on the compressor. The unit shall be approved and listed by Underwriters' Laboratories, Inc., and Canadian Underwriters' Laboratories (CUL). Unit performance shall be certified in accordance with Air Conditioning and Refrigeration Institute Standard 210/240-89 for Unitary Air-Source air conditioners or latest standard.

1. One (1) each exterior wall mounted, hard-wired as shown;
2. Enclosed weatherproof casing constructed of 20 gauge galvanized steel, finished with baked-on polyester enamel paint;
3. One (1) washable filter;
4. Remote adjustable thermostat;
5. Cooling capacity in tons: 1;
6. Cooling Capacity: 11,100 BTUH at 230 volts, single phase;
7. Amps: 30;
8. Twin indoor blowers, SCFM maximum/minimum: 325/300 at 0.2" static pressure;
9. Electrical supplemental heater: 3 kW;
10. Unit shall include built-in economizer system with exhaust air damper providing up to 100% outside air through the air inlet opening. The economizer is designed to provide "free cooling" when the outside air temperature is cool enough to provide needed cooling without running the compressor.

### 3.21 DEHUMIDIFIER

- A. One (1) each.
- B. Capacity 25 pints per 24 hours (AHAM Standard DH-1).

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- C. Compressor rated 1/5 HP, 4.1 amps, 400 watts.
- D. Condensate piped direct to sump.
- E. 120 volt A.C. operation by dial-controlled adjustable humidistat.
- F. UL listed rubber cord.

**PART 4 EXECUTION**

4.01 FACTORY START-UP SERVICE

- A. Refer to Section 01600 of these Specifications.

4.02 EQUIPMENT OR SYSTEM WARRANTY

- A. Refer to Section 01600 for warranty requirements.

**END OF SECTION**

**SECTION 15100**

**SMALL PLUMBING VALVES, PLUMBING SPECIALTIES  
AND SERVICE ACCESSORIES**

**PART 1 GENERAL**

**1.01 WORK INCLUDED**

- A. Furnish all valves and appurtenances as shown on the Drawings and as specified herein.

**1.02 SYSTEM DESCRIPTION**

- A. All of the equipment and materials specified herein is intended to be standard for use in controlling the flow of water.

**1.03 QUALITY ASSURANCE**

- A. All of the types of valves and appurtenances shall be products of well established firms who are fully experienced, reputable and qualified in the manufacture of the particular equipment to be furnished. All materials of construction shall be of an acceptable type and shall be designated for the pressure and temperatures at which they are to be operated, for the materials they are to handle and for the use for which they are intended. The materials shall meet established technical standards of quality and strength necessary to assure safe installations and conform to applicable standards. The equipment shall be designed, constructed and installed in accordance with the best practices and methods and shall comply with these Specifications as applicable.

**1.04 REFERENCES**

- A. Kentucky Building Code.

**1.05 SUBMITTALS**

- A. Copies of all materials required to establish compliance with these Specifications shall be submitted in accordance with the provisions of the General Conditions. Submittals shall include at least the following:
  - 1. Certified drawings showing all important details of construction and dimensions.
  - 2. Descriptive literature, bulletins, and/or catalogs of the equipment.
  - 3. The total weight of each item.
  - 4. A complete total bill of materials.
  - 5. A list of the manufacturer's recommended spare parts.

## 1.06 OPERATING INSTRUCTIONS

- A. Operating and maintenance instructions shall be furnished to the Monticello Utility Commission. The instructions shall be prepared specifically for the individual installation and shall include all required cuts, drawings, equipment lists, descriptions, etc., that are required to instruct operating and maintenance personnel unfamiliar with such equipment.

## PART 2 PRODUCTS

### 2.01 GENERAL

- A. All valves and appurtenances shall be of the size shown on the Drawings and as far as possible all equipment of the same type shall be from one manufacturer.
- B. All valves and appurtenances shall have the name of the maker, flow directional arrows, and the working pressure for which they are designed cast in raised letters upon some appropriate part of the body.

### 2.02 GATE VALVES

- A. Gate valves shall be used in shut-off applications and where the valves are scheduled for infrequent use.
  1. Gate Valves for Water
    - a. Gate valves for water service 3 inches and smaller shall be rated for safe operation at 125 psi saturated steam and 200 psi non-shock cold water, oil or gas (WOG).
    - b. The valves shall be of the rising stem, inside screw, screw-in bonnet, solid wedge disc type.
    - c. The body, bonnet, disc, packing nut and stem shall be bronze construction. Packing shall be the TFE non-asbestos suitable for a maximum temperature of 200 degrees Fahrenheit.
    - d. Gate valves with threaded end connections shall be Milwaukee 148, Hammond IB640 or equal.

### 2.03 MISCELLANEOUS COCKS

- A. Gauge Cocks
  1. Gauge cocks for water service shall be 316 stainless steel construction rated for safe operation at 10,000 psi at 100 degrees Fahrenheit. The valve shall be nitrogen tested for seat leakage, maximum allowable leak rate 0.1 scc./min.

2. Gauge cocks shall be Whitey Co. "BV" series bleed valves or equal.

### **PART 3 EXECUTION**

#### **3.01 INSTALLATION**

- A. All valves and appurtenances shall be installed in the locations shown, true to alignment and rigidly supported. Any damage to the above items shall be repaired to the satisfaction of the Monticello Utility Commission before they are installed.
- B. Control valves in all locations shall be so grouped and located that they may be easily operated, through access panels, doors, or adjacent to equipment.
- C. After installation, all valves and appurtenances shall be tested at least one hour at the working pressure corresponding to the class of pipe, unless a different test pressure is specified. If any joint proves to be defective, it shall be repaired to the satisfaction of the Monticello Utility Commission.
- D. All materials shall be carefully inspected for defects in workmanship and materials; all debris and foreign material cleaned out of valve openings, etc.; all operating mechanisms operated to check their proper functioning, and all nuts and bolts checked for tightness. Valves and other equipment which do not operate easily, or are otherwise defective, shall be repaired or replaced.
- E. Yard hydrants shall be set at the locations as shown on the Drawings and bedded on a firm foundation. A drainage pit as detailed on the Drawings shall be filled with screened gravel and satisfactorily compacted.
- F. During backfilling, additional screened gravel shall be brought up around and 6 inches over the drain port. Each hydrant shall be set in true vertical alignment and properly braced. Concrete thrust blocks shall be placed between the back of the hydrant inlet and undisturbed soil at the end of the trench. Minimum bearing area shall be as shown on the Drawings. Felt roofing paper shall be placed around hydrant elbow before placing concrete. CARE SHALL BE TAKEN TO INSURE THAT CONCRETE DOES NOT PLUG THE DRAIN PORTS.
- G. If directed, the hydrant shall be tied to the pipe with suitable rods or clamps, galvanized, painted, or otherwise rustproof treated. Concrete used for backing shall be no leaner than 1 part cement, 2-1/2 parts sand, and 5-1/2 parts stone. Hydrant paint shall be touched up as required after installation.
- H. Buried valves and valve boxes shall be set with the stem vertically aligned in the center of the gate box. Valves shall be set on a firm foundation and supported by tamping selected excavated material under the sides of the valve. The valve box shall be supported during backfilling and maintained in vertical alignment with the top flush with finish grade.

**END OF SECTION**

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## SECTION 15102

### VALVES

#### PART 1 GENERAL

##### 1.01 SCOPE OF WORK

- A. Furnish all materials, equipment, and incidentals required and install complete and ready for operation all valves and appurtenances as shown on the Drawings and specified herein.
- B. The equipment shall include but not be limited to, the following:
  - 1. Butterfly valves
  - 2. Gate valves
  - 3. Check valves
  - 4. Tapping valves, sleeves and crosses
  - 5. Fire hydrants

##### 1.02 RELATED WORK

- A. Excavation, backfill and grading is included in Division 2.
- B. Piping is included in the respective sections of Division 2.
- C. Valves and service accessories on all plumbing systems are included in this Division, Section 15100.

##### 1.03 DESCRIPTIONS OF SYSTEMS

- A. All of the equipment and materials specified herein is intended to be standard for use in controlling the flow of water.

##### 1.04 QUALIFICATIONS

- A. All of the types of valves and appurtenances shall be products of well established firms who are fully experienced, reputable and qualified in the manufacture of the particular equipment to be furnished. The equipment shall be designed, constructed and installed in accordance with the best practices and methods and shall comply with these specifications as applicable.
- B. Acceptable Manufacturers
  - 1. Butterfly Valves - Mueller or equal.
  - 2. Gate Valves - Kennedy, Clow, Mueller or equal.
  - 3. Check Valves - Mueller or equal.
  - 4. Tapping Sleeves - Mueller or equal.
  - 5. Fire Hydrants - Mueller Supercenturion.

## 1.05 SUBMITTALS

- A. Complete shop drawings of all valves and appurtenances shall be submitted to the Monticello Utility Commission.
- B. The commission shall be furnished 2 certified copies of reports covering the required leakages, hydrostatic and proof-of-design tests on the valves.
- C. Gate Valves
  - 1. The Monticello Utility Commission shall be furnished 2 copies of affidavit of compliance stating that the valves and materials used in their construction conform to the applicable requirements of ANSI/AWWA C500-93, and that all tests specified therein have been made and that the test requirements have been met.
- D. Check Valves
  - 1. The Monticello Utility Commission shall be furnished 2 copies of affidavit of compliance stating that the valves and materials used in their construction conform to the applicable requirements of ANSI/AWWA C508-93, and that all tests specified therein have been made and that the test requirements have been met.

## 1.06 OPERATING INSTRUCTIONS

- A. Manufacturer's operating and maintenance instructions shall be furnished to the Monticello Utility Commission.

## PART 2 PRODUCTS

### 2.01 MATERIALS AND EQUIPMENT

- A. General
  - 1. All valves and appurtenances shall be of the size shown on the Drawings and as far as possible all equipment of the same type shall be from one manufacturer.
  - 2. All valves and appurtenances shall have the name of the maker, flow-directional arrows, and the working pressure for which they are designed cast in raised letters on some appropriate part of the body.
  - 3. All valves shall open left (counter clockwise).
  - 4. All bolts and studs shall be in accordance with ASTM A-307 Grade B and nuts shall be in accordance with ASTM A-563. Bolts, studs and nuts shall be electrogalvanized according to ASTM B-633.

5. All bolts, studs and nuts in contact with water, in any moist atmosphere or damp area such as occurs above water, or exposed to weather shall be stainless steel.
6. All bolts delivered to the job shall be free of rust and dirt and shall be stored in a manner to protect them from rust and dirt. All bolts shall be tightened to the proper torque. They shall be of the size recommended for the pipe and fittings they are to be used on and shall be in the recommended quantity. Tightening of bolts shall be alternated, so as to not produce undue stress on the valves and fittings.

## 2.02 BUTTERFLY VALVES

### A. Rubber Seated Butterfly Valves

#### 1. General

- a. Unless otherwise noted in these Specifications or on the Drawings, all butterfly valves shall meet the requirements of ANSI/AWWA Specification C504-94. All future reference to section and paragraph numbers will be those of ANSI/AWWA C504-94.
- b. Unless otherwise shown on the Drawings, the maximum nonshock shutoff pressure will not exceed those specified for the various valve classes.
- c. Unless otherwise noted on the Drawings or called for in these Specifications, flow through the valves will be:

Normal:	Not more than 6 feet/second maximum
When Opening:	10 feet/second
When Closing:	16 feet/second

#### 2. General Design

##### a. Valve Bodies

- (1) Valve bodies shall be of cast iron or ductile iron. They shall be short body flanged ends, mechanical joint ends or nonstandard end. Wafer type valves are not acceptable.

##### b. Valve Shafts

- (1) Valve shafts shall be in accordance with the requirements of Section 3, paragraph 3.3, and subparagraphs 3.3.1 thru 3.3.4, except that carbon steel shafts are not acceptable.

c. Valve Discs

- (1) Valve disc shall be in accordance with Section 3, paragraph 3.4, and subparagraphs 3.4.1 thru 3.4.4, except that cast steel and fabricated steel disc are not acceptable.
- (2) The manufacturer shall furnish the Monticello Utility Commission dimensions of the clearance required for the valve disc.

d. Valve Seals

- (1) Valve shaft seals shall be standard split V type packing, standard O-ring seals or for a pull down packing.

e. Valve Actuators

(1) General

- (a) Valve actuators shall be of type as shown on the Drawings. They shall be equipped with adjustable mechanical stop-limiting devices to prevent over-travel of the valve disc in the open and closed positions. Actuator housings, supports, and connections to the valve shall be designed with a minimum safety factor of 5, based on the ultimate strength, or 3, based on the yield strength of the materials used.
- (b) Valve actuators shall be in accordance with Section 3, paragraph 3.8, subparagraphs 3.8.1 thru 3.8.5.9.
- (c) Certification for the proof of design test of the valve actuator shall be submitted in accordance with Sections 00820 and 01300.

(2) Buried Actuators

- (a) Buried valve actuators shall be lubricated for life of the valve and be designed for satisfactory operation in groundwater conditions. (They shall be designed for operation of Class 150 B butterfly valves.) They shall also be nut and key type of 30 inch bury over top of pipe. All valves with nuts over 30 inches below top of valve box shall have extension stems to within 12 inches of top of boxes.

f. Workmanship and Painting

- (1) Workmanship and painting shall be in accordance with Section 4, paragraphs 4.1 and 4.2, and subparagraphs 4.2.1 thru 4.2.2, except that non-buried or submerged valves inside plants shall be prepared for and given a prime coat only.

2.03 GATE VALVES

A. Resilient-Seated Gate Valve (AWWA Type)

1. General

- a. Resilient-seated gate valves shall conform in all respects to ANSI/AWWA C509-94 with non-rising or rising stems, in sizes 3, 4, 6, 8, 10, and 12 inch NPS except as otherwise noted below. They shall be designed for a working water pressure of 200 psi.
- b. Valves shall have a clear unobstructed water way, without pockets or ridges in the seating area of the valve body. When fully open the water way shall be at least as large as the pipe diameter to which it is connected.
- c. All future references to section and paragraph numbers shall be those of ANSI/AWWA C509-94.

2. Materials

a. Physical and Chemical Properties

- (1) Physical and chemical characteristics of the valve components shall be in accordance with Section 2.2, except that carbon steel castings for valves are not acceptable. Paint shall be as hereinafter specified under "Valve Protection."

3. Detailed Design

a. Valve Ends

(1) General

- (a) Valve ends shall be mechanical joint as shown on the Drawings and/or as listed in the resilient seat valve schedule.
- (b) In resilient seated tapping valves, end connections may be a combination of flanged and mechanical joint.

- b. Stem Seal
  - (1) Stem seals shall be O-rings in accordance with Section 4.8, paragraph 4.8.2 and subparagraph 4.8.2.1, and materials shall be in accordance with paragraph 4.8.3.
- c. Wrench Nuts and Handwheels
  - (1) Wrench nuts shall be in accordance with Section 4.11 and subparagraphs 4.11.1 through 4.11.5.
- d. Gaskets
  - (1) Gaskets where used shall be in accordance with Section 4.15. O-rings of Buna-N or equal material.
  - (2) Within 200 feet of a petroleum product storage tank gaskets that are inert to product deterioration will be used.
- e. Valve Seats
  - (1) Valve seats shall be in accordance with Section 4.16, except that seats applied to the valve body are not acceptable.
- 4. Valve Boxes
  - a. Valve boxes shall be provided for each buried valve.
- 5. Fabrication
  - a. Valve Protection (Painting and Coating)
    - (1) Exterior
      - (a) Exterior painting of the valve may be in accordance with section 2.2.7, or it may be the same as that specified for interior painting of the valves.
    - (2) Interior
      - (a) The interior of the valve shall be prepared for and painted in accordance with AWWA C550-90. The coating may be a fusion bonded epoxy, in 8 to 10 mil thickness or it may be a two-part thermosetting epoxy having the same mil thickness. After application the interior coating shall be visually examined and holiday tested in accordance with AWWA C550-90.

## 2.04 TAPPING VALVES AND TAPPING SLEEVES AND CROSSES

### A. Tapping Valves

1. Tapping valves for use with tapping sleeve and crosses shall be in accordance with the specifications for resilient seated gate valves, except that one end shall have a flanged connection and the other end a mechanical joint connection.
2. They shall be for 250 psi in sizes 2 inch thru 24 inch.
3. Valves shall open by turning counterclockwise.
4. Inlet flanges of valves shall meet ANSI B16.1, Class 125 standard.

### B. Tapping Sleeves and Tapping Crosses

1. Tapping sleeves and tapping crosses shall have heavy cross sections to strengthen the existing water main at the point of installation.
2. Mainline end connections to existing pipeline shall be mechanical joint with large and small gaskets.
3. Mechanical joint tapping sleeves and crosses shall have a maximum working pressure of 250 psi.
4. Outlet end of tapping sleeves and crosses shall have ANSI B16.1, Class 125 flanges.

### C. Quality Standard

1. All tapping valves, tapping sleeves and tapping crosses shall be in features and quality equal to those of American Valve and Hydrant Company, Mueller Company or Dresser Manufacturing Company.

### D. Test and Certification

1. Tests on tapping valves shall be in accordance with these Specifications for resilient seated gate valve or in accordance with C-500-93 for double disc parallel seat gate valves.

### E. Protection

#### I. Tapping Valves

- a. Protection of tapping sleeves and valves shall be in accordance with these Specifications.

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### 2. Tapping Sleeves and Crosses

- a. Protection for tapping sleeves and crosses shall be in accordance with these Specifications for ductile iron pipe fittings.

## 2.05 CHECK VALVES

### A. General

1. Non-automatically operated check valves shall be of the swing type with outside lever and weight (OL&W). Complete catalogues, drawings, and other descriptive matter giving complete details and dimensions of the valves, to be furnished to the Monticello Utility Commission prior to shipment to the job site.
2. Valve bodies may be of cast iron, ductile iron or brass. Carbon steel bodies are not acceptable.

## 2.06 DRY-BARREL FIRE HYDRANTS

### A. General

1. This standard covers post-type dry barrel fire hydrants with compression type valves, operating against pressure. They shall meet all requirements of ANSI/AWWA Specification C502-94.
2. They shall have two 2 1/2 inch hose connection nozzles and one 4 1/2 inch steamer connection nozzle, all with caps and drains and have national standard threads.
3. Main valve opening size shall be 5 1/4 inch which must remain closed when the above ground breakable safety section of the hydrant barrel is broken off.
4. All hydrants shall have 6 inch mechanical joint bell connection designed for 200 pounds working water pressure, in accordance with ANSI/AWWA C110/A21.10-93. Joint accessories are to be furnished with the hydrant.
5. Finish paint color of the hydrant barrel above ground line shall be red.
6. All hydrants shall have an automatic drain feature providing positive barrel drainage after hydrant use.
7. Hydrants shall be set such that the breakaway of the hydrant flange is at ground level. One standard hydrant wrench is to be provided. All hydrants shall open by turning counterclockwise.
8. Monticello Utility Commission will only accept Mueller-SuperCenturion fire hydrants.



## **PART 3 EXECUTION**

### **3.01 INSTALLATION**

#### **A. Exterior**

1. Buried valves shall be installed with operating stems vertical, unless otherwise shown on the Drawings or called for in these Specifications. Tops of operating nuts shall be not more than 30 inches below ground surface. Where valve operating nuts are more than 30 inches below tops of valve boxes, stems shall be provided to bring the operating nut to within 12 to 24 inches of box tops.
  2. Valve boxes shall be accurately centered over valve operating nuts and the backfill shall be mechanically tamped about them, to prevent subsequent movement. Tops of boxes shall be flush with ground surface, paving, walk, or road surface.
  3. All valves shall be installed as shown on the Drawings. Any valve or stand found to be binding unduly shall be made to operate freely.
- B. For butterfly valves, installation shall be in accordance with Appendix A, Sections A.1 through A.5 of ANSI/AWWA C504-94.
- C. For gate valves, installation shall be in accordance with Appendix A, Sections A.5.1 through A.5.7 of ANSI/AWWA C509-94.

### **3.02 SHOP PAINTING**

- A. Interior surfaces of all valves, the exterior surfaces of buried valves and miscellaneous piping appurtenances shall be given a shop finish of an asphalt varnish conforming to Federal Specification TT-V51e for Varnish Asphalt.

### **3.03 INSPECTION AND TESTING**

- A. The various pipelines in which the valves and appurtenances are to be installed are specified to be field tested. During these tests any defective valve or appurtenance shall be adjusted, removed and replaced, or otherwise made acceptable to the Monticello Utility Commission.
- B. Testing shall be done in accordance with Section 02610 "TESTING" with no visible leaks allowed on valves.

**END OF SECTION**

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**SECTION 15104**  
**SPECIALTY VALVES (WATER)**

**PART 1 GENERAL**

**1.01 SCOPE OF WORK**

- A. Furnish all labor, materials, equipment, and incidentals required and install complete and ready for operation all valves and appurtenances as shown on the Contract Drawings and as specified herein.
- B. The equipment shall include but not be limited to, the following:
  - 1. Altitude valves.
  - 2. Air and vacuum valves.
  - 3. Air release valves.
  - 4. Surge relief valves.
  - 5. Pressure reducing valves.

**1.02 RELATED WORK**

- A. Excavation, backfill and grading is included in Division 2.
- B. Piping is included in Division 2.
- C. Valves and service accessories on all plumbing systems are included in Division 15.
- D. Electrical work is in Division 16.
- E. Valves and service accessories on all plumbing systems are included in this Division, Section 15100.

**1.03 DESCRIPTIONS OF SYSTEMS**

- A. All of the equipment and materials specified herein are intended to be standard for use in controlling the flow of water.

**1.04 QUALIFICATIONS**

- A. All types of valves and appurtenances shall be products of well established firms who are fully experienced, reputable, and qualified in the manufacture of the particular equipment to be furnished. The equipment shall be designed, constructed and installed in accordance with the best practices and methods and shall comply with these Specifications as applicable.
- B. Acceptable Manufacturers
  - 1. Altitude Valves - Golden Anderson, Ross, or equal.

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2. Air and Vacuum Valves - Valve and Primer Corp., APCO, Golden Anderson, or equal.
3. Air Release Valves - Valve and Primer Corp., APCO, Golden Anderson, or equal.
4. Surge Relief Valves - APCO, Golden Anderson, Ross, or equal.
5. Pressure Reducing Valves - APCO, Golden Anderson, Ross, or equal.

### 1.05 SUBMITTALS

- A. Complete shop drawings of all valves and appurtenances shall be submitted to the Monticello Utility Commission for review and approval prior to shipment to the Project.
- B. The manufacturer shall furnish to the Monticello Utility Commission 2 copies of written certification that the valves have been tested hydrostatically and tested for proper performance, and that the materials of construction conform to the appropriate ASTM specifications.

## PART 2 PRODUCTS

### 2.01 MATERIALS AND EQUIPMENT

#### A. General

1. All valves and appurtenances shall be of the size shown on the Drawings and as far as possible all equipment of the type shall be from one manufacturer.
2. All valves and appurtenances shall have the name of the maker, flow-directional arrows, and the working pressure for which they are designed cast in raised letters on some appropriate part of the body.
3. All buried valves shall open left (counterclockwise). Insofar as possible, all valves shall open counterclockwise.
4. All valves must be provided with suitable operating devices and adapted for operation in the position in which they are shown on the Drawings.

### 2.02 AIR AND VACUUM VALVES (FOR PIPELINES AND PUMPS)

#### A. General

1. Air and vacuum valves shall be designed to allow large quantities of air to escape out of the orifice when filling a pipeline and to close watertight when water enters the valve. To break a vacuum, the air and vacuum valve shall also permit large quantities of air to enter through the orifice, when a pump is stopped or the pipeline is being drained. The discharge orifice area shall be equal to or greater than the inlet of the valve. The valve shall consist of a body, cover, baffle, float, seat and where called for, a water diffuser. The baffle will be designed to protect the float from direct

contact of the rushing air and water to prevent the float from closing prematurely in the valve. The seat shall be fastened into the valve cover without distortion and shall be easily removable. The float shall be of stainless steel designed to withstand 1,000 psi. The float shall be center guided for positive seating.

2. Air and vacuum valves for installation on pump discharge lines, where the water working pressure is 150 psi or less, in sizes 3 inch and under, shall be provided with water diffuser and throttling devices and have screw connections. In sizes 4 inch and over they shall be provided with surge check units and have flanged connections.
3. Air and vacuum valves for installation on pump discharge lines, where the water working pressure is over 150 psi, in sizes 3 inch and under, shall be provided with diffuser and throttling devices and have screw connections. In sizes 4 inch and over they shall be provided with surge check units and have flanged inlet and outlet connections.
4. Air and vacuum valves on water transmission mains, at change of downward gradient and drastic change in gradient (not peaks), in sizes 2 inch and under, shall have water diffusers and screw connections. In sizes 3 inch and over they shall be provided with surge check units and have flanged inlet connection and protection hoods on outlet.
5. Air and vacuum valves on water transmission mains at peak changes in grade (highest point between adjacent low points) with the auxiliary (small) air release valve meeting requirement of these Specifications for Air Release Valves.

#### B. Materials of Construction

1. Body, Cover and Baffle
  - a. Valve bodies, covers and baffles shall be of cast iron, ASTM A48, Class 30.
2. Float
  - a. Valve floats shall be of stainless steel, ASTM A240.
3. Seat
  - a. Valve seats shall be of Buna-N, nitrile rubber.
4. Bushings, Screws and Float Guides
  - a. Bushings, screws and float guides shall be stainless steel or bronze, with selection being best to avoid galvanic action.

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### 5. Water Diffuser

- a. Water diffuser shall be bronze.

### C. Throttling Device

1. Throttling devices shall be of cast iron or malleable iron with screw connections, Valve and Primer Corp., APCO, or equal.

### D. Surge Check Unit

1. The surge check unit shall be iron body, bronze mounted, Valve and Primer Corp., APCO Model 1600, Surge Check Valve, or equal. Surge check units shall have flanged ends.

### E. Flanged Ends

1. Unless otherwise noted on the Drawings all flanged connections (inlet and outlet) shall be ANSI B1.6.1, 125 pound standard.

### F. Drainage Provision

1. All valve bodies shall be provided with drain plugs.

### G. Painting

1. Valves shall receive a heavy coat of red lead TTP86, Type IV, or equal.

### H. Testing

1. All air and vacuum valves shall be hydrostatically and shop tested for proper performance prior to shipment.

### I. Marking

1. Cast markings shall appear on the valve body showing valve size, manufacturer's name or trade mark, water working pressure and model number.

## 2.03 AIR RELEASE VALVES (FOR PIPELINES AND PUMPS)

### A. General

1. Air release valves shall be designed with a small orifice to serve as a venting port wherever air is entrained in water under pressure. They shall be capable of automatic intermittent release of accumulated air in the valve and closing tight when water enters the valve.
2. Air release valves for installation (along with air and vacuum valves) on vertical turbine and deep well pumping units, where pump operation is

continuous or nearly so, and water working pressure does not exceed 150 psi, shall be simple lever type and have screw connections. If operating water pressure exceeds 150 psi, the valves shall have compound levers and screw connections.

3. Air release valves on water transmission mains, regardless of whether they are used in conjunction with air and vacuum valves (as custom combination air release valves) or whether they are used alone on long stretches of transmission main without a summit, shall be compound lever type with screw connections.

B. Material of Construction

1. Materials of construction for Air Release Valves shall be the same as specified for Air and Vacuum Valves.

C. Other Features and Requirements

1. Drainage and/or blowoff provisions, painting, testing and marking shall be the same as specified for Air and Vacuum Valves.

## 2.04 ALTITUDE VALVE

A. General

1. The altitude control valve shall be of the single acting type functioning to close off at maximum water level in the water elevated tank and opening to refill the tank. It is intended for use only in situations where there is a separate discharge line from the reservoir or there is a check valve bypass around the altitude valve.
2. When it is desired to maintain a uniform water level in the reservoir or tank to within plus or minus 6" to 12", a standard single acting altitude valve, equal to Golden-Anderson Industries, Inc. Figure 3200D should be used.
3. When it is desired to shut off the flow of water to the reservoir when it is full, and to allow water to flow from the reservoir until a predetermined low level is reached (in excess of 14.4" drop), the altitude valve should be equal to Golden-Anderson Industries, Inc. Figure 3200E, differential altitude valve.
4. The valves shall be furnished with all hydraulic control piping and other necessary operating accessories.
5. Cut off valves shall be provided at each connection to the body of the main valve.

B. Standard Single Acting Altitude Valve

1. General

- a. The main valve shall operate on the differential principle such that the area of the underside of the piston is no less than the pipe area, and the area on the upper surface of the piston is of greater area than the underside of the piston.
- b. Throttling of the valve shall be accomplished by valve vee ports and not the valve seating surfaces.
- c. The valve shall be capable of operating in the position as shown on the Drawings. All internal parts shall be readily accessible without removing the main valve body from the pipeline. There shall be no stems, stem guides or spokes within the water way. There shall be no springs to assist in the valve operation.
- d. A visual valve position indicator shall be provided.
- e. It shall be possible to adjust the spring above the diaphragm for water level control 20 percent above or below factory setting.

2. Materials of Construction

- a. Valve bodies shall be of cast iron ASTM A-126B. The interior body trim shall be bronze ASTM B-62.
- b. The main valve piston shall be bronze ASTM B-62.
- c. Piston cups, liner cups and seat washers shall be of renewable leather and rubber. The renewable parts shall absorb all wear and eliminate metal to metal contact in the valve.
- d. The valve internal pilot shall be of all bronze construction.
- e. The three way pilot valve shall be of bronze or stainless steel.
- f. All other controls and piping shall be of non corrosive materials.
- g. Unless otherwise noted on the Drawings, flanges shall conform to dimensions and drilling of ANSI B16.1.1 for cast iron flanges and flanged fittings, Class 125.

3. Function

- a. The altitude valve shall be tight closing to prevent reservoir overflow, and shall open to full pipeline area upon drop in water level of the reservoir within plus or minus 6" of water level.

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- b. A hand operated valve in the power water line to the top of the piston shall be provided to control speed of valve closing.
- c. The reservoir or tank water level control shall be by means of a diaphragm operated, spring loaded, three way pilot valve.

### C. Testing

1. The valve shall be factory tested to prove satisfactory performance.

## 2.05 SURGE RELIEF VALVES

### A. General

1. The surge relief valve shall function to open to the atmosphere where the system pressure exceeds the pressure for which the pilot is set. It shall open rapidly, and close slowly at a predetermined rate of speed. Provision shall be made to regulate the closing speed of the valve.
2. The valve shall be of the globe body design with the inlet pressure entering the valve under the piston.
3. It shall be possible to install the valve in any position without impairing its functional value.
4. The valve shall be hydraulically operated, designed with a differential type piston, such that the piston will expose a greater area to the closing bore than to the opening force. A vent to the atmosphere from the side of the rake body shall produce the differential piston area and also serve to provide shock absorption preventing hammer and shock.
5. All wear on the valve shall be absorbed by the cups and seat ring, and there shall be no metal to metal contacts within the main valve.
6. The valve shall be GA Industries, Pittsburgh, PA Figure 6700-D, or equal.
7. The pilot valve shall be of the diaphragm operated, spring loaded type, single seated, balanced design.
8. Adjustment of the opening pressure of the main valve shall be accomplished by regulation of the handwheel on the pilot, and shall provide for a range of 20 psi.
9. The valve shall provide full pipeline opening when opened to full stroke, and it shall be drop tight when closed.
10. It shall be possible to open the relief valve at any time by exhausting the pressure above the piston to the atmosphere.
11. The valve shall come completely piped, ready for installation.



B. Materials of Construction

1. The body and lids of the valve shall be constructed of high grade cast iron, ASTM A-126, Class B.
2. Interior parts of the valve, including the piston, liner and seat shall be of bronze conforming to ASTM B-62.
3. The liner and piston shall be equipped with renewable elastomer cups and the piston shall also have a leather or elastomer seat ring.
4. The pilot valve shall be of cast bronze conforming to ASTM B-62.

C. Testing

1. The body shall be hydraulically tested at a pressure of not less than 50 percent above the normal working pressure of the valve.
2. The testing of the valve for tight seating shall be conducted at a pressure equal to the maximum pressure of the valve.
3. The purchaser reserves the right to witness any or all tests, and must be given free access to the place of manufacture at all times.

D. Painting

1. After testing, the valve and parts shall be cleaned and all surfaces, except machined surfaces, shall receive 2 coats of manufacturer's standard shop coat paint. Machined surfaces receive a coating of water repellent, rust inhibitive compound.

E. Marking

1. Cast marking on valve bodies or covers shall show: manufacturer's name or trademark, valve size and figure number.

2.06 PRESSURE REDUCING VALVES

A. General

1. The reducing valve shall function to maintain a uniform valve downstream pressure preadjusted on the control pilot handwheel or adjusting screw. The control pilot shall be capable of field adjustments from near zero psi to 10 percent above the factory preset pressure, which shall be 30 psi.
2. The valve shall be completely piped ready for installation.

B. Description

1. The main valve shall operate on the differential piston principle such that the area of the underside of the piston is no less than the pipe area, and the area on the upper surface of the piston is of a greater area than the underside of the piston.
2. The valve piston shall be guided on its outside diameter by long stroke stationary Vee ports which shall be downstream of the seating surface to minimize the consequences of throttling. Throttling shall be done by the valve Vee ports and not the valve seating surfaces.
3. The valve shall be capable of operating in any position and shall incorporate only one flanged cover at the valve top from which all internal parts shall be accessible. There shall be no stems, stem guides, or spokes within the waterway. There shall be no springs to assist the valve operation.

C. Materials of Construction

1. The valve body shall be of cast iron ASTM A-126 with flanges conforming to the latest ANSI Standards. The valve shall be extra heavy construction throughout. The valve interior trim shall be bronze B-62 as well as the main valve operation.
2. The valve seats shall be easily renewable while no diaphragm shall be permitted within the main valve body.
3. All controls and piping shall be of non-corrosive construction.
4. A visual valve position indicator shall be provided for observing the valve piston position at any time.

D. Figure Number

1. The valve shall be as manufactured by GA Industries of Mars, Pennsylvania, 12 inch size and shall be their Fig. 4500-d (globe), or equal.

E. Painting

1. After testing, the valve and parts shall be cleaned and all surfaces, except machined surfaces, shall receive 2 coats of manufacturer's standard shop coat paint. Machined surfaces shall receive a coating of water repellent, rust inhibitive compound.

F. Marking

1. Cast marking on valve bodies or covers shall show: manufacturer's name or trademark, valve size and figure number.

## PART 3 EXECUTION

### 3.01 INSTALLATION (IN STRUCTURES, VAULTS AND BASINS)

#### A. Interior

1. All valves and appurtenances shall be installed at the locations shown on the Drawings. All necessary materials, parts, operators and gaskets shall be furnished and installed per the Drawings.
2. All valves shall be installed with their operators located in such a plane that it will not interfere with pedestrian traffic.
3. Particular attention shall be paid to the location and orientation of all valve operators to provide an accessible installation. Should any valve be located with the operator inaccessible and simple re-orientation of the valve would make it accessible, the valve shall be moved at the direction of the Monticello Utility Commission.
4. All pipe and valves shall be supported by pipe hangers, concrete piers or other special supports as required to prevent undue stress being placed on the pipe, any fitting, valve or item of equipment. Equipment shall not be used to support pipe and fittings. The pipe shall be free of all openings in walls and slabs when the final position of the piping is attained and before sealing the annular space about the pipe.
5. The CONTRACTOR shall thoroughly clean the valves and fittings before starting erection. All scale, rust and dirt shall be removed by power brushing and/or solvent cleaning.

#### B. Exterior

1. Buried valves shall be installed with operating stems vertical, unless otherwise shown on the Drawings or called for in these Specifications. Tops of operating nuts shall be no more than 30 inches below ground surface. Where valve operating nuts are more than 30 inches below tops of valve boxes, stems shall be provided to bring the operating nut to within 12 to 24 inches of box tops.
2. Valve boxes shall be accurately centered over valve operating nuts and the backfill shall be mechanically tamped about them, to prevent subsequent movement. Tops of boxes shall be flush with ground surface, paving, walk, or road surface.
3. Valves located in other than hard paved areas shall have a reinforced concrete collar placed around the valve box. The concrete collar shall be poured in place. Precast concrete collars are not acceptable.
4. All valves, valve stands, extension stems, and floor boxes, on or in structures, shall be installed as shown on the Drawings. Valve stands shall

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be set plumb and level and shall be anchored as shown on Drawings. Stands shall be properly centered over valve stems or operating mechanism. Any valve or stand found to be binding unduly shall be made to operate freely.

### 3.02 SHOP PAINTING

- A. Interior surfaces of all valves, the exterior surfaces of buried valves and miscellaneous piping appurtenances shall be given a shop finish of an asphalt varnish conforming to Federal Specification TT-V51e for Varnish Asphalt.
- B. The exterior surface of various parts of valves, operators, floorstands and miscellaneous piping shall be thoroughly cleaned of all scale, dirt, grease, or other foreign matter and thereafter a shop coat of an approved rust-inhibitive primer shall be applied.
- C. Ferrous surfaces obviously not to be painted shall be given a shop coat of grease or other suitable rust-resistant coating.

### 3.03 INSPECTION AND TESTING

- A. The various pipelines in which the valves and appurtenances are to be installed are specified to be field tested. During these tests any defective valve or appurtenance shall be adjusted, removed and replaced, or otherwise made acceptable to the Monticello Utility Commission.
- B. Various regulating valves, strainer, or other appurtenances shall be tested to demonstrate their conformance with the specified operational capabilities and any deficiencies shall be corrected or the device replaced or otherwise made acceptable to the Monticello Utility Commission.

### 3.04 TOOLS AND SPARE PARTS

- A. All special tools required for normal operation and maintenance shall be furnished to the Monticello Utility Commission by the valve manufacturer.

**END OF SECTION**

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## SECTION 15107

### WATER METERS, SERVICE VALVES, STOPS AND MISCELLANEOUS APPURTENANCES FOR WATER LINES

#### PART 1 GENERAL

##### 1.01 WORK INCLUDED

- A. Furnish all labor, materials, and accessories to install equipment as shown on the Drawings or specified herein, including the following:
  - 1. Water service meters and accessories
  - 2. Backflow preventers
  - 3. Pressure regulating and relief valves for water services
  - 4. Blow-off hydrants
  - 5. Miscellaneous cocks and stops for water service

##### 1.02 RELATED WORK

- A. Excavation, backfill, and grading are included in Division 2.
- B. Piping is included in Division 2.
- C. Large plumbing valves and appurtenances are included in this Division, Section 15102.
- D. Plumbing piping and fittings are included in Division 2.

##### 1.03 QUALITY ASSURANCE

- A. All equipment and appurtenances shall be products of well established firms who are fully experienced, reputable, and qualified in the manufacture of the particular equipment to be furnished. All materials of construction shall be of an acceptable type and shall be designated for the pressure and temperatures at which they are to be operated, for the materials they are to handle and for the use for which they are intended. The materials shall meet established technical standards of quality and strength necessary to assure safe installations and conform to applicable standards. The equipment shall be designed, constructed, and installed in accordance with the best practices and methods and shall comply with these Specifications as applicable.

##### 1.04 SUBMITTALS

- A. Copies of all materials required to establish compliance with these Specifications shall be submitted in accordance to the Monticello Utility Commission for review and approval prior to delivery to the job site.

## **PART 2 PRODUCTS**

### 2.01 GENERAL

- A. All meters, valves, stops, and appurtenances shall be of the size shown on the Drawings and as far as possible all equipment of the same type shall be from one manufacturer.

### 2.02 MISCELLANEOUS COCKS

#### A. Air Release Cocks

- 1. Air release cocks shall be for 125 pound pressure, 1/2 inch, bronze plug and body, with handle operator. Air cocks shall be Crane No. 256 Tee Head, Lunkenheimer No. 1571, or equal.

### 2.03 MISCELLANEOUS STOPS

#### A. Corporation Stops and Accessories

- 1. Corporation stops shall be attached to water lines by use of a tapping saddle. For connection to cast iron, ductile iron, and AWWA Specification PVC piping (C-900), provide Mueller bronze double strap saddle, BR 2 B Series. For connection to ASTM Specification PVC pipe, provide 2 piece bronze saddles for 2-inch through 8 inch mains and 3-piece bronze saddles for 10-inch and 12-inch mains, Mueller H-13000 Series. All saddles shall be tapped for AWWA I.P. thread.
- 2. Corporation stops shall be provided for use with copper or copper tube size polyethylene tubing for either flared or compression type fittings. Corporation stops shall be of bronze material, ground key type. Stops shall be Mueller H-15000 Series.
- 3. Corporation stops shall be factory tested to 250 psi to be compatible with the pipes in which they are installed.
- 4. Connecting fittings between the corporation stop and service piping shall be as manufactured by the Mueller Co.

#### B. Curb Stops and Accessories

- 1. Curb stops, where used, shall be bronze, inverted key round way for connection to flared or compression fittings, copper or copper tube size polyethylene service pipe. Curb stops shall be those as manufactured by the Mueller Co.
- 2. Furnish and install with each curb stop, a cast iron curb valve box, cast iron extension type with arch pattern base, with lid marked "WATER." Also furnish 2 tee wrenches, 4 feet in length, for operation of curb stops.

## 2.04 PRESSURE REGULATING VALVES

### A. Water Pressure Reducing Valves

1. Pressure reducing valves for water service 1 inch and smaller shall be of the bronze body, with integral bypass check valve and strainer for flared copper connections. The device shall be rated for initial pressure up to 400 psi with an adjustable discharge pressure range of 25 to 150 psi. The pressure reducing valves shall be Wilkins Model BR4.

## 2.05 SPECIALTIES AND ACCESSORIES

### A. Water Service Accessories

1. Blow-Off Hydrant
  - a. Blow-off hydrant shall be a preassembled unit consisting of a cast iron, lockable box at ground level, housing the valve operating nut, and 2 inch NST outlet for hose connection. Hydrant shall be fitted with 3 inch ductile iron barrel of sufficient length to allow 30 inch bury. Inlet shall be 3 inch as shown on plans.
  - b. Blow-off hydrant assembly shall be Eclipse No. 85 by the John C. Kupferle Foundry Co., or equal.

### B. Water Meters

1. General
  - a. The Monticello Utility Commission has standardized on one particular make and model meter, and desires that they be furnished for use on the Monticello System. That make, namely Sensus SR11 with iron bottom, will govern.
2. Service Meters
  - a. Service meters for connection to small service lines, 5/8-inch through 1 inch, shall be bronze case, hermetically sealed, magnetic driven with standard register, including a straight reading odometer type totalization display, a 360° test circle with center sweep hand, and a low flow (leak) detector. Meters shall be capable of operation to 150 psi. Registration shall be in gallons with accuracy of  $\pm 1.5$  percent of actual flow through the meter.
  - b. The meters shall be the Sensus SR11 water meters, with cast iron bottoms/bases.

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3. Commercial Service Meters
  - a. Commercial service meters 1-1/2 inch and 2-inch sizes shall be equipped with the same accessories and function as the residential meters, except that the end connections shall be flanged.
  - b. The commercial service meters shall be Sensus SR11 water meters with cast iron bottoms/bases.
4. Meter Setters
  - a. Copper Meter Yoke (For Normal Pressure Zones)
    - (1) Meter setters shall be copper riser-type with stabilizing rod, vertical inlet and outlet with ball angle meter valve/stop on the inlet. These setters shall be used in pressure zones with 75 psi or less operating pressure. Setters shall be Mueller H-1404 or equal.
  - b. Copper Meter Yoke (For High Pressure Zones)
    - (1) Meter setters for high pressure operating zones (75 psi or greater) shall be copper riser-type tandem setter equipped with stabilizing rod, vertical ball angle meter valve/stop on the inlet, pressure reducer and vertical angle ball valve type check valve on the outlet side. Setters shall be Mueller B-2404R2-6 tandem, or equal.
  - c. Meter Yokes for Commercial Meters
    - (1) Meter setters for commercial meters with flanged connections shall be copper riser-type with angle meter valve with meter flange and lock wing ground key valve with meter flange. Setter shall have elevated bypass with ball valve with locking device and single check valve. Setters shall be Mueller M-2423-2-99000, or equal.
5. Meter Box and Cover
  - a. The meter box shall be high density polyethylene, all white, capable of withstanding 1,200 pounds of compression. The box shall be 18-inch diameter for standard meters, and 24-inch diameter for tandem meter setters. Meter box shall be of such depth to provide 18-inch minimum cover over the meter.
  - b. Meter boxes for commercial meters shall be 20-inch by 30-inch minimum size. Box depth shall be sized to allow 24 inch cover over the meter, including the height of the meter box lid and cover.



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- c. The meter box cover shall be cast iron with raised pattern with locking lid, Tyler Model 6150 for residential meter settings. Commercial meters shall be equipped with Tyler Model 6005.

**PART 3 EXECUTION**

**3.01 INSTALLATION**

- A. All water meters, miscellaneous water service valves, stops, and appurtenances shall be installed in locations shown, true to alignment and rigidly supported. Any damage to the above items shall be repaired to the satisfaction of the Monticello Utility Commission before they are installed.
- B. All meters in boxes or vaults shall be located so that they may be easily read and serviced.
- C. After installation, all valves and appurtenances shall be tested at least 1 hour at the working pressure corresponding to the class of pipe, unless a different test pressure is specified. If any joint proves to be defective, it shall be repaired to the satisfaction of the Monticello Utility Commission.
- D. All materials shall be carefully inspected for defects in workmanship and materials; all debris and foreign material cleaned out of openings, etc.; all operating mechanisms operated to check their proper functioning, and all nuts and bolts checked for tightness. Equipment which does not operate easily, or is otherwise defective, shall be repaired or replaced.
- E. Blow-off hydrants shall be set at the locations as shown on the Drawings and bedded on a firm foundation.
- F. If directed, the hydrant shall be tied to the pipe with suitable rods or clamps, galvanized, painted, or otherwise rustproof treated. Concrete used for backing shall be no leaner than 1 part cement, 2-1/2 parts sand, and 5-1/2 parts stone.

**3.03 INSPECTION AND TESTING**

- A. The various pipelines in which the specified equipment is to be installed is specified to be field tested. During these tests any defective equipment shall be adjusted, removed and replaced, or otherwise made acceptable to the Monticello Utility Commission.
- B. Various meters regulating valves, strainers, or other appurtenances shall be tested to demonstrate their conformance with the specified operational capabilities and any deficiencies shall be corrected or the device replaced or otherwise made acceptable to the Monticello Utility Commission.

**END OF SECTION**

## SECTION 16050

### ELECTRICAL WORK

#### PART 1 GENERAL

##### 1.01 SCOPE

- A. The CONTRACTOR shall furnish all labor and materials and shall install complete and ready for use the lighting, power, signal and control systems as shown on the Drawings and specified herein.

##### 1.02 SUBMITTALS

- A. Shop drawings, clearly marked to show only items applicable to this specific contract, shall be submitted for review and shall include complete sizing of components and control schematics.

##### 1.03 GUARANTEE

- A. The CONTRACTOR shall refer to the article on Guarantees and Warranties in the General Conditions to determine the extent of his guarantee periods.

##### 1.04 DIMENSION VERIFICATION AND DOCUMENTATION

- A. Scale dimensions as shown on the Drawings shall be considered as approximate. The CONTRACTOR shall be responsible for making field verifications. Specific attention shall be given to the exact location of any underground lines installed under this contract. These lines shall be dimensioned to easily identifiable points on permanent building structures for location and elevation and these dimensions shall be entered and shown on the record drawings.

##### 1.05 CODES AND STANDARDS

- A. All electrical equipment and details of installations shall comply with the requirements of the latest editions of the National Electrical Code (NFPA 70), the National Electrical Safety Code (ANSI C2) and all applicable State and Local Codes.

##### 1.06 APPROVAL AND MARKING OF EQUIPMENT

- A. Electrical devices and materials shall be listed and/or labeled by the Underwriters' Laboratories, Inc.

##### 1.07 EQUIPMENT SPECIFIED ELSEWHERE

- A. Certain items of control and other equipment are indicated on the Electrical Drawings for connection, but are specified in other sections of these documents. Such items are not furnished as part of the electrical work.

1.08 PROTECTION OF ELECTRICAL EQUIPMENT

- A. Electrical equipment shall be protected from the weather, especially from water dripping or splashing upon it, at all times during shipment, storage, and construction. Equipment shall not be stored outdoors even if its enclosure is rated as weatherproof, watertight, etc. Where equipment is installed or stored in moist areas, such as unheated buildings, etc., it shall be provided with an acceptable means of preventing moisture damage such as a uniformly distributed source of heat to prevent condensation.

1.09 DEFECTIVE OR DAMAGED EQUIPMENT

- A. Should it be determined by the CONTRACTOR or the Monticello Utility Commission that any equipment or material has been subjected to possible damage by water, it shall be thoroughly dried and put through a dielectric test as directed by the manufacturer, at the expense of the CONTRACTOR or shall be replaced by the CONTRACTOR. Any equipment found to be marginal or that fails to meet manufacturer's standards shall be replaced.
- B. Any equipment damaged during shipment, while stored, or during construction shall be replaced at the Contractor's expense. Minor scratches on equipment cabinets, etc. may be repaired on site. Any current carrying parts, switch blades, operators, coils, contacts, etc. which are damaged, shall be replaced.

1.10 PERMITS AND APPROVALS

- A. The CONTRACTOR shall obtain all permits necessary. The CONTRACTOR shall furnish inspection by an agency licensed or otherwise qualified to perform electrical inspections in the Commonwealth of Kentucky.
- B. All costs incidental to the electrical inspection shall be borne by the CONTRACTOR.
- C. The CONTRACTOR shall furnish certificates of final approval by the Electrical Inspector and **final approval by the OWNER will be withheld until he has provided the aforementioned certificate of approval.**
- D. When it is determined by the Electrical Inspector that materials, equipment or installations shown on the drawings or specified herein are in violation of the National Electrical Code, the CONTRACTOR shall contact the OWNER immediately. The CONTRACTOR shall be prepared to tell the OWNER the Articles of the National Electrical Code that are violated by the project requirements.
- E. Deviations from the Drawings based on suggestions from and/or approval by the Electrical Inspector will not be allowed without also obtaining the concurrence of the OWNER before the work begins

### 1.11 CONTRACT DOCUMENTS

- A. These Specifications and the associated Drawings have been prepared with the intention of their yielding, through construction, electrical installations that are fully operable, safe, complete and in full compliance with the latest editions of the National Electrical Code, local codes and ordinances, and any other authority having jurisdiction over the work. The omission of miscellaneous electrical items or accessories not specifically called for in these Specifications which would detract from this intention shall not relieve the CONTRACTOR of the responsibility of furnishing and installing these items and accessories.

### 1.12 CIRCUIT LOADS

- A. The CONTRACTOR shall verify the total load to be placed on the circuits as well as voltage, phase, frequency and connections required to equipment before rough-in and if they differ from the Plans and Specifications, he shall contact the OWNER immediately for further instructions before the work commences.
- B. Motor horsepowers and apparatus wattage ratings indicated on the drawings are estimated values, and corresponding sizes of feeders and other electrical equipment indicated to serve them are minimum sizes. Motors of greater horsepower and apparatus with larger wattage ratings may be provided if necessary to meet the requirements of various sections of specification(s) in which they are specified. Where different motors or apparatus with different wattage ratings or different voltage or phase requirements are provided, feeders and other electrical equipment serving them shall be adjusted to correspond.

### 1.13 TESTS AND INSPECTIONS

- A. The CONTRACTOR shall provide all tests as specified herein and all additional tests necessary to establish the adequacy, quality, safety, completed status and suitable operation of each system and components thereof. The final inspection will be made after the OWNER is satisfied that the work has been completely installed and that complete preliminary tests were made which indicate the adequacy, quality, completion and satisfactory operation of the system.

### 1.14 RECEIPTS

- A. Some sections of the Specifications may call for equipment, materials, accessories, etc. to be provided and "turned over to the OWNER" or like requirements. The CONTRACTOR shall obtain a receipt for each item turned over, signed by the OWNER or his representative. A copy of this receipt shall be transmitted to the OWNER for his files.
- B. When a question arises concerning whether items have been turned over to the OWNER, and there is no signed receipt, it will be assumed that the items were not provided.

## **PART 2 PRODUCTS**

### 2.01 GENERAL

- A. All materials and equipment installed shall be new and unused and shall be of the latest design of manufacturers regularly engaged in the manufacture of such products that conform with the requirements of these Specifications.

### 2.02 CONDUIT

- A. No conduit smaller than 3/4-inch shall be used.
- B. Rigid Conduit: Rigid conduit shall be standard weight, mild steel pipe. The conduit shall receive a protective zinc coating both inside and outside by means of hot-dip galvanizing. Threads shall not have any coating which will reduce the conductivity of the joint. Couplings, bends, elbows, fittings, etc., shall be subject to the same requirements as for the straight lengths. All conduit and fittings shall be UL approved. Rigid conduit shall be delivered with plastic protectors on the threads.
- C. Liquid tight flexible metallic conduit shall be constructed of flexible or spirally wound galvanized steel enclosed in light gray colored PVC outer jacket. Liquid tight flexible metallic conduit shall be equal to American Brass "Sealtite" Type "UA." Connectors shall be equal to Midwest Type LT.

### 2.03 WIRE AND CABLE

- A. All conductors shall be insulated so that they are rated at 600 volts.
- B. No conductors smaller than AWG No. 12 shall be used except for signal or control systems, or where otherwise indicated.
- C. All conductors shall be soft drawn, 98 percent conductivity copper conforming to the latest ASTM Specifications and the requirements of the National Electrical Code.
- D. Single conductors shall be insulated with THWN or THHN insulation and all conduits shown on the Drawings are sized accordingly. THHN insulated conductors shall be used in dry locations only. At the Contractor's option, THWN insulation may be substituted.

### 2.04 GROUNDING

- A. All feeder and branch circuits shall contain a separate grounding conductor in the raceway with the other circuit conductors. Size of the grounding conductor shall be as indicated or as required by Article 250 of the NEC. All metal electrical equipment cabinets (wireways, panels, switchgear, device boxes, junction and pull boxes, motor control panels, etc.) shall be securely bonded to a grounding conductor running through any conduit terminating at the cabinet or enclosure by use of a grounding lug bushing and jumper wire to the enclosure wall. Junction boxes and other enclosures shall utilize and equipment

ground bus or lug as required to securely bond the equipment grounding conductor to the enclosure. The grounding conductor shall be connected with pressure connectors at the main switchgear to the main grounding system. Where screw terminals or set screw lugs are used, sufficient lugs shall be provided such that not more than one conductor is installed into each lug or terminal.

- B. No conduit shall serve as a grounding conductor.
- C. The grounding conductor serving motor circuitry shall be connected inside the entrance compartment to the motor frame with a bolted solderless pressure connector. Bolts, nuts, washers and other assorted hardware shall be bronze, cadmium plated steel, or other corrosion resistant material. The motor ground connection shall be to the motor frame and independent of the mounting bolts or sliding base.
- D. Ground Rods: Ground Rods shall be the copper clad steel type and shall be a minimum of 10 feet in length, 3/4-inch in diameter. Ground rods shall be equal to those as manufactured by Copperweld Steel Co.
- E. Grounding electrode conductors shall be bare copper. Equipment grounding conductor shall be copper, THHW insulated, green (or green with yellow tracer) in color, and rated at 600 volts.
- F. Ground clamps for use on metallic pipes shall be of copper, brass or silicon bronze with a rigid metal base providing good contact by proper seating on the pipe. Strap type clamps shall not be used.
- G. The resistance value of the main grounding conductor measured between the main switchgear and a good earth ground shall not exceed 5 ohms.

## 2.05 POWER DISTRIBUTION

- A. Safety switches shall be heavy-duty, load break type with a quick-make, quick-break, switch mechanism, in a NEMA rated enclosure as indicated on the drawings. Padlocking capability shall be provided for locking the switch either in the closed (On) position or open (Off) position. Fuse clips shall be rejection type. Switches shall be provided with a cover-blade interlock so that the cover cannot be opened when the switch blades are closed, nor can the switch blades be closed with the cover open. Interlock bypassing devices shall be included for use by authorized personnel.
- B. The CONTRACTOR shall provide fuses as called for on the Drawings. Where the fuse size is not indicated, the CONTRACTOR shall size the fuse for actual load installed. Where the fuse size is indicated on the Drawings, the CONTRACTOR shall verify the actual load installed and provide fusing accordingly. Unless otherwise indicated on the Drawings, all fuses shall be rejection type, non renewable, current limiting, dual element, time-lag type. The fuses shall have an interrupting capacity of at least 100,000 amperes RMS symmetrical.

- C. The service pole(s) shall be southern pine, pressure creosote treated, roofed and gabled before treatment and of the length and class as shown on the Drawings. Pole hardware shall be galvanized steel.
- D. Equipment as manufactured by the Square D Company, General Electric Company, Westinghouse Electric Company or equal, will be accepted for use by the Monticello Utility Commission.

## **PART 3 EXECUTION**

### **3.01 INSTALLATIONS**

#### **A. Excavation, Backfilling and Grading**

- 1. The CONTRACTOR shall perform all earth and rock excavation, backfilling and grading required for this part of the work. Rock excavation shall be made to a depth of 4 inches below pipe and filled to subgrade with dense grade aggregate limestone.
- 2. Trenches shall be maintained free of water until backfilling is completed.
- 3. Below Grade Outside Building Wall Line
  - a. Rock excavation shall be made to a depth of 4 inches below pipe and filled to subgrade with dense graded limestone. Backfilling material in earth excavation shall be clean earth to a line at least 12 inches above the top of the conduit. From this line upward, rock not more than 6 inches in diameter may be used provided it is spaced at least 12 inches apart. Filling between rock shall be of clean earth, thoroughly tamped in 6 inch layers to the finished grade. All surplus rock and earth shall be removed from the site.
- 4. Below Slab-On-Grade Inside or Outside Building Wall Line
  - a. Rock excavation shall be made to a depth of 4 inches below pipe. All backfilling material shall be #9 stone or equivalent non-compacting stone fill.
- 5. Depth of bury for all conduit shall be a minimum of 24 inches below finished grade.

#### **B. Conduit**

- 1. Concrete encasements of underground conduit shall be installed where conduit passes under roadways, where shown on the Drawings or specified herein. Concrete shall be 3000 psi in strength, dyed red throughout and shall be sized as shown and/or detailed on the Drawings.
- 2. Rigid steel conduit shall be used for emergence from underground, or from below slab-on-grade and where exposed in mechanical rooms and

such areas. Conduits shall have supports spaced not more than five feet apart and shall be installed with runs parallel or perpendicular to walls, structural members or intersections of vertical planes and ceilings with right-angle turns consisting of cast metal fittings or symmetrical bends. Conduit shall be installed so as to insure against trouble from the collection of trapped condensation. Conduit bushings shall have insulating material which has been permanently fastened to the fittings. Bushings for conduit 1-1/2 inches trade size and larger shall be complete with grounding lug and shall be bonded to the box by means of bare copper wire. All field bends shall be made with standard tools and bending equipment manufactured especially for this purpose. Bends in metallic conduit shall be made while cold and in no case shall the conduits be heated. Conduits shall not be bent through more than 90 degrees. Size of conduits shall not be less than that required by the National Electrical Code.

### C. Wire and Cable

1. Cable outside raceways shall not be buried directly in the earth.
2. Wire shall not be installed until all work of any nature that may cause injury to the wire is completed. Mechanical means shall not be used in pulling in wires No. 8 or smaller. Approved wire pulling lubricant shall be used as required to prevent insulation damage and overstressing of the wire while pulling through conduit. In no case shall conductors be greased or coated with any substance injurious to the conductor insulation or sheath.
3. All wires connected to terminal boards, terminal blocks, or to other similar terminals shall terminate by means of pressure terminals. Where terminal boards, terminal blocks, etc. are designed and manufactured to accept bare wire and have a pressure plate on each side of the wire, no pressure terminals on the wire will be required. Where the wire would have to encircle the holding screw to make a proper connection, the wire terminals are required.
4. Where the wire is shown larger than that required for the load, it is done so for voltage drop or other purposes and must be installed as shown. Where the wire is stranded, the removal of strands in order to install the wire into a lug provided on any equipment will not be permitted. A larger lug shall be installed which will accept the wire size indicated.
5. Insulation on ungrounded conductors larger than AWG #10 and on grounded (neutral) and grounding (equipment ground) conductors larger than AWG #6 may be black with color coding accomplished with the use of colored plastic tape. Tape shall be installed on the conductors whenever they are visible and shall be wrapped at least 3 turns around the conductor.



6. All wiring, except control wiring, shall reflect the phase relationship as follows:

208Y/120 or 240/120 volt system:      black, red and blue for un-grounded conductors, white for neutral conductors.

#### D. Grounding

1. Ground rods shall be driven vertically into the earth to at least one foot below finished grade.
2. Connections to ground rods and all other ground connections below grade shall have a MINIMUM mechanical contact surface area between the conductor and the ground rod of not less than 3 square inches. All connections made below finished grade shall be exothermic. Installation of grounding conductors shall be such that they are not exposed to physical damage. All connections shall be firm and tight.
3. Installation of grounding conductors shall be such that they are not exposed to physical damage. All connections shall be firm and tight. Conductors and connectors shall be so arranged and provided so that there is no strain upon the connection. Buried equipment grounding conductors shall be buried at least 24 inches below finished grade and shall not be buried below concrete pads, or paving, except where running a tap to the grid or where shown on the Drawings. Where buried below concrete or paving, grounding conductors shall be in rigid conduit unless shown on the Drawings as a part of a grid.
5. Resistance measurements shall be made between the main grounding bar in the switchgear and a good earth ground. If this resistance is not equal to or less than the value stated in the National Electric Code, an additional grounding electrode system in the form of ground rods installed and connected together in a 10 foot by 10 foot grid shall be added. The rods shall be connected together and this grid connected to the system with AWC #3/0 bare tinned copper. The number of rods shall be as required to register the resistance value as stated in the National Electric Code. Measurements shall be made in normally dry conditions and, in no case, less than 48 hours after rainfall.
6. Where a bare conductor is the only conductor installed in conduit or other raceway, and this conductor is serving as a grounding conductor, it shall be bonded to the raceway that contains it at each end of the raceway. The bond shall be made using a grounding type bushing and bonding jumper. The size of the jumper shall be the maximum size that the grounding bushing lug will accept and it shall be connected to the bushing with the lug and to the grounding conductor with a split bolt connector.

## **PART 4 ELECTRICAL FIELD ACCEPTANCE TESTS**

### **4.01 WORK INCLUDED**

- A. After the electrical installation is complete, tests shall be made to demonstrate that the entire system is in proper working order and in accordance with the Drawings and these Specifications. The tests outlined herein shall be in addition to, and not substitution for, the tests of the individual items at the manufacturer's plant. Insulation and ground resistance tests shall be made before operating tests.

### **4.02 DEFECTIVE EQUIPMENT**

- A. All wiring and equipment found defective or failing to meet the specified requirements shall be replaced by the CONTRACTOR, unless written permission for repair is given by the OWNER.

### **4.03 OPERATING TESTS**

- A. Switches, Circuit Breakers, Control Devices: All switches, circuit breakers and control devices shall be operated to show correct and satisfactory operation.
- B. Controls
  - I. Controls circuits shall be fully operated with the power circuits to the motors de-energized to assure proper sequence and operation before the system is energized.
- C. Each motor and its associated equipment shall be operated as nearly as possible under normal operating conditions for as long as reasonable and for a length of time sufficient to demonstrate correct alignment, temperature rise, speed, and satisfactory operation. The motors shall be loaded to full capacity or as near thereto as possible.

### **4.04 GROUND RESISTANCE TESTS**

- A. The CONTRACTOR shall test each grounding system for continuity of connections and for resistance. The ground resistance of conduits, equipment cases, and supporting frames shall not vary appreciably from that of the system as a whole and shall not exceed 5 ohms.

### **4.05 WITNESS**

- A. The OWNER shall be notified at least 7 calendar days in advance of each of the tests covered in this section of the Specifications so that he may arrange to witness the tests.

568-SID Water (6/08)

#### 4.06 TEST RECORDS

- A. A record of all tests shall be delivered to the OWNER before final acceptance by the Monticello Utility Commission.

**END OF SECTION**

## SECTION 16150

### REPLACEMENT PUMP MOTORS

#### PART 1 GENERAL

##### 1.01 REQUIREMENTS

- A. Motors are to be furnished with driven equipment except where otherwise noted on the Drawings or elsewhere in this division of the Specifications. All motors shall conform to the following Specifications and any special requirements of the driven equipment. Special requirements of the driven equipment shall take precedence over these Specifications should a discrepancy occur. Starting torque and slip ratings shall conform to the requirements of the driven equipment.
- B. Polyphase motors shall be of the squirrel cage induction type. Conduit boxes shall be tapped for the size of the existing conduit.
- C. All motors shall be manufactured and installed in accordance with applicable NEMA standards and NEC provisions, latest revisions.
- D. The replacement pump motors shall be premium efficient type.

##### 1.02 DELIVERY, STORAGE, HANDLING

- A. All electric motors shall be protected against the accumulation of moisture, dust and debris and physical damage during the course of installation.

#### PART 2 PRODUCTS

##### 2.01 ACCEPTABLE MANUFACTURERS

- A. Motors - "General Electric," "Westinghouse," "U.S. Motors," "Lincoln," "Baldor," "Marathon," "Reliance," "Siemens," or equal.

##### 2.02 EQUIPMENT

- A. Motors 200 Horsepower and Under for Service Under 600 Volts

###### *1. Ratings and Electrical Characteristics*

- a. Time: All motors shall be rated for continuous duty.
- b. Temperature: Based on NEMA standards for a maximum ambient temperature of 40 degrees Celsius and an altitude of 3,300 feet or less, according to service factor and insulation class employed.

- c. Voltage: All single phase motors shall be rated 115/208/230 volts and all polyphase motors 230/460 volts. All motors shall be capable of normal operation at balanced voltages in the range of  $\pm 10$  percent from rated winding voltage.
- d. Frequency: All a-c motors shall be rated for 60 Hz. operation. All motors shall be capable of normal operation at frequencies 5 percent above or below the nominal rating of 60 Hz.
- e. Horsepower: Horsepower of the replacement motors shall be the same as the existing motors as they will be started with the existing starters.
- f. Locked Rotor Current: Locked rotor current shall be in accordance with NEMA standards.
- g. Efficiency and Power Factor: Efficiency and power factor shall be given consideration during shop drawing review. The ratings at full, 3/4, and 1/2 load shall be compared to similar motors manufactured by acceptable suppliers listed in these Specifications. Excessive variation shall be considered grounds for rejection.
- h. Speed: Synchronous speed of motors shall correspond to standard NEMA ratings. Actual speed shall be as given in the specification division on the driven equipment. Slip shall not exceed 5 percent at full load.
- i. Service Factor: The service factor shall be 1.0 unless requirements of the driven load necessitate a higher service factor.
- j. Insulation Class: Insulation shall be NEMA Class B, except as otherwise noted.
- k. Design Level: Motors shall be NEMA design B, except as otherwise noted.
- l. Enclosure: Motors for process equipment 2 HP and smaller shall be totally enclosed. All motors for process equipment larger than 2 HP shall be TEFC (totally enclosed fan cooled), suitable for use indoors or outdoors, except as otherwise noted.
- m. Frame Size: Frame designations shall be in accordance with NEMA standards.
- n. Winding Overtemperature Sensors: All motors 15 horsepower and over shall be provided with motor winding thermostats. The devices shall be hermetically sealed, snap-acting thermal switches, actuated by a thermally responsive bi-metallic disk. A minimum of 1 per phase is required, with switches wired into the control cir-

cuit of the starter to provide de-energization should overheating threaten.

## 2. Mechanical Characteristics

### a. Integral Horsepower Motor Construction

- (1) Motor frames for vertical motors shall be cast iron, heavy fabricated steel, or extruded aluminum (alloy 6063-T4 or 6063-T6). Endshields for vertical motors **must** be cast iron.
- (2) If an aluminum frame is used, the endshields and/or all other steel hardware must be plated with zinc or cadmium and coated with grease before assembly to minimize the galvanic action between the steel and aluminum.
- (3) Motor frames and endshields shall be of such design and proportions as to hold all motor components rigidly in proper position and provide adequate protection for the type enclosure employed. Lifting lugs of all motors shall conform to NEMA standards.
- (4) Windings shall be random or form wound, adequately insulated and securely braced to resist failure due to electrical stresses and vibration. If the windings are aluminum, there shall be a cold welded aluminum-copper transition joint at the termination of the windings to permit the use of standard copper to copper connection techniques by the electrician and to prevent galvanic action between the copper power wires and the aluminum windings.
- (5) The motor shaft shall be made of high grade machine steel or steel forging of size and design adequate to withstand the load stresses normally encountered in motors of that particular rating. Bearing journals shall be ground and polished.
- (6) Rotors shall be made from high grade steel laminations adequately fastened together and to the shaft. Rotor cage windings may be cast aluminum of bar type construction with brazed end rings.
- (7) Integral horsepower motors shall be equipped with cone, roller, or ball bearings made to AFBMA standards, Grade 1 and shall be of ample capacity for the motor ratings. The bearing housing shall be large enough to hold sufficient lubricant to minimize the need for frequent relubrication (ten years normal operation without lubrication), but facilities shall be provided for adding new lubricant and draining out old lubricant without motor disassembly. The bearing

housing shall have long, tight running fits or rotating seals to protect against the entrance of foreign matter into the bearings or leakage of lubricant out of the bearing cavity.

- (8) See the Specification division relating to each piece of motor driven equipment for additional motor requirements to those listed above.

### 3. Tests, Nameplates and Shop Drawings

#### a. Tests

- (1) Tests shall be required on integral horsepower motors only. A factory certified test report of "electrically duplicate motors previously tested" shall be supplied on all motors under 200 horsepower. The test shall be certified by the factory and shall contain a statement to the effect that complete tests affirm the guaranteed characteristics published in the manufacturer's catalogs or descriptive literature.

- (2) Tests will be in accordance with IEEE test procedures.

#### b. Nameplates

- (1) Each motor shall have a permanently affixed nameplate of brass, stainless steel, or other metal of durability and corrosion resistance. The data contained on the nameplate shall be in accordance with NEMA standards.

#### c. Shop Drawings

- (1) Shop drawings shall consist of motor dimensions, nameplate data from each motor and tests as outlined above. Also included shall be efficiency and power factor at 100, 75, and 50 percent load. Operation, maintenance, and lubrication information (including bearing catalog numbers) shall be submitted with shop drawings for review.

4. Efficiency Requirements

- a. Where indicated on the Drawings or in these Specifications, motors shall be of the energy efficient line offered by the motor manufacturer, having comparable performance characteristics to their standard line as far as torque and horsepower are concerned. Efficiency and power factor however, shall be higher than the manufacturer's standard line of motors and shall be documented in the shop drawings submittal in sufficient detail to allow the OWNER complete review of what is offered. Motors shall be referred to simply as "premium efficient" in Specifications and Drawings.

**END OF SECTION**



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MISCELLANEOUS DETAILS - WATER

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DATE	BY	REVISION
MONTICELLO UTILITY COMMISSION MONTICELLO, KENTUCKY		
INDEX OF STANDARD DRAWINGS		
		DWG. NO. W0

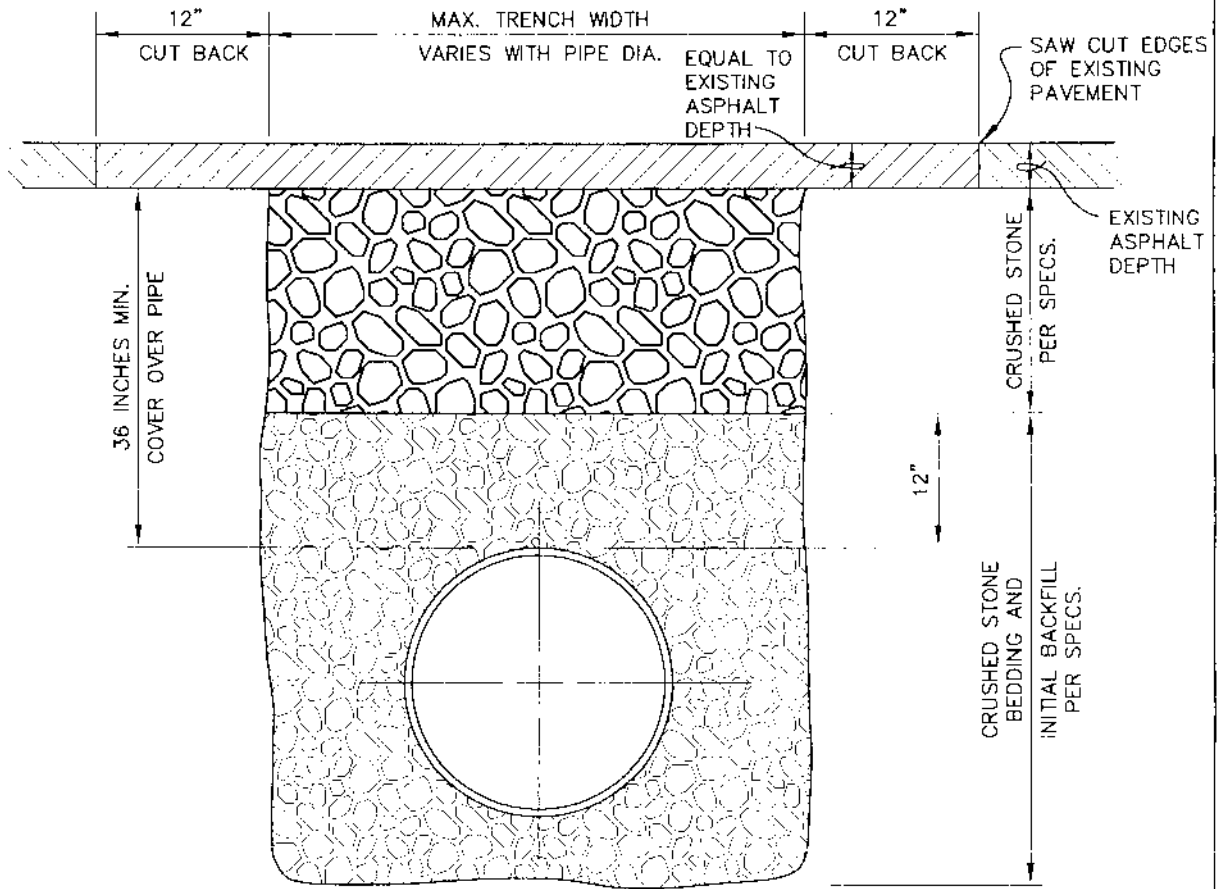
GENERAL NOTES FOR WATER MAINS:

- MINIMUM COVER OVER WATER LINES TO BE 30 INCHES UNLESS OTHERWISE NOTED.
- MINIMUM COVER OVER WATER LINES ON STATE RIGHT-OF-WAY TO BE 42 INCHES.
- ALL BORES UNDER STATE HIGHWAYS RIGHT-OF-WAY: SHALL BE A MINIMUM OF 42 INCHES DEPTH UNDER BOTTOM OF DITCH LINE TO TOP OF PROPOSED BORE AND/OR CASING PIPE ON BOTH SIDES OF THE HIGHWAY.
- MINIMUM COVER OVER VALVE NUT TO BE 12 INCHES (NO PAYMENT FOR EXTRA DEPTH). MAXIMUM COVER OVER VALVE NUTS TO BE 30 INCHES (NO EXTRA PAYMENT FOR REQUIRED EXTENSIONS).
- CONCRETE BLOCKING OF FITTINGS REQUIRED AT NO EXTRA COST.
- THE CONTRACTOR SHALL HAVE THE OPTION OF USING FITTINGS OR EXTRA DEPTH TRENCHING AT ALL LOCATIONS WHERE VERTICAL BENDS ARE SHOWN. EITHER METHOD WILL BE AT NO EXTRA COST TO OWNER ABOVE THAT BID FOR FURNISHING, TRENCHING, LAYING AND BACKFILLING PIPE AND FITTINGS, AND SHALL BE APPROVED BY THE ENGINEER PRIOR TO INSTALLATION.
- LAY NEW LINES UNDER EXISTING WATER, GAS AND TELE. LINES, EXCEPT AS OTHERWISE NOTED OR DETERMINED IN THE FIELD.
- ALL PVC PIPE TO BE ASTM SDR-17 CLASS 250.
- ANY SALVAGED MATERIALS WHICH HAVE NOT BEEN SPECIFIED TO BE REUSED SHALL BE REMOVED FROM THE JOB SITE BY THE CONTRACTOR AND PLACED AT AN OWNER DESIGNATED AREA AT NO EXTRA COST TO OWNER.
- LOCATION, SIZE AND MATERIAL SHOWN FOR EXISTING UTILITIES ARE APPROXIMATE ONLY, EXACT LOCATION, SIZE AND MATERIAL MUST BE DETERMINED BY CONTRACTOR BEFORE EXCAVATING FOR NEW FACILITIES AT NO ADDITIONAL COST TO THE OWNER.
- LINE MARKERS TO BE LOCATED AT PROPERTY AND OR FENCE LINES AS DIRECTED BY THE ENGINEER.
- ALL TIE-IN LOCATIONS SHALL BE UNCOVERED PRIOR TO CONSTRUCTION TO MAINTAIN PROPER ALIGNMENT AND ELEVATION OF NEW CONNECTIONS.
- ALL WATER MAINS SHALL BE INSTALLED AT LEAST 5 FEET FROM EDGE OF PAVEMENT.
- INSTALLATION OF WATER MAINS SHALL BE IN SEPARATE TRENCH FROM THE PROPOSED ELECTRIC FACILITIES. IT MAY BE NECESSARY, FROM TIME TO TIME TO INSTALL THE WATER AND ELECTRIC IN THE SAME TRENCH. WHEN SAME TRENCH INSTALLATION IS NECESSARY, A MINIMUM OF 5 FEET HORIZONTAL CLEARANCE SHALL BE MAINTAINED.
- WHEN IT IS NECESSARY TO INSTALL WATER AND ELECTRIC IN THE SAME TRENCH, THE WATER MAIN SHALL BE INSTALLED ON THE SIDE OF THE PROPOSED RESIDENCE.
- DEVELOPER SHALL BE RESPONSIBLE FOR INSTALLATION OF 2 INCH SCHEDULE 80 OR SDR 21 PVC COVER PIPE TO SERVE EACH LOT. THE COVER PIPE SHALL BE LOCATED AT EACH PROPERTY LINE AND INSTALLED TO A POINT 5 FEET BEYOND THE ELECTRIC SERVICE. THE COVER PIPE SHALL INCLUDE TRACER WIRE AND BE CAPPED ON EACH END. MINIMUM COVER SHALL BE 30 INCHES.
- CONTRACTOR SHALL INVENTORY REQUIRED MATERIALS, TRENCH DEWATERING EQUIPMENT, AND ASSEMBLE IF NECESSARY ALL REQUIRED FITTINGS PRIOR TO CUT-INS OR TIE-INS TO INSURE MINIMUM "DOWN TIME" FOR CONNECTION.
- SURFACE DRAINAGE SHALL BE MAINTAINED ON A DAY-BY-DAY BASIS.
- THE OWNER SHALL BE NOTIFIED A MINIMUM OF 48 HOURS IN ADVANCE OF ANY SCHEDULED "DOWN-TIME" AS IT RELATES TO WATER SERVICE.
- METERS SHALL BE AS SHOWN ON PLAN SHEET.
- ALL FITTINGS FOR PVC PIPE SHALL BE D.I.M.J. AND SHALL BE CONSIDERED INCIDENTAL TO THE COST OF THE WATER LINE OR APPURTENANCES.
- ALL/ANY REMOVED WATER LINES AND APPURTENANCES SHALL BE DEEMED THE PROPERTY OF THE CITY OF MONTICELLO AND SHALL BE REMOVED, CLEANED AND RETURNED UPON REQUEST.
- THE CONTRACTOR SHALL PROFILE ALL ROAD CROSSINGS AND CREEK CROSSINGS AND SUBMIT GATHERED SURVEY DATA TO THE ENGR. FOR REVIEW AND APPROVAL PRIOR TO THE COMMENCEMENT OF ANY DRILLING, BORING OR OPEN CUTTING ACTIVITIES.
- CALL BUD BEFORE ANY CONSTRUCTION TO LOCATE EXISTING UTILITIES.
- CITY OF MONTICELLO: 606- 348-0167
- MONTICELLO UTILITY COMMISSION: 506- 348-8473

DATE	BY	REVISION
MONTICELLO UTILITY COMMISSION MONTICELLO, KENTUCKY		
GENERAL NOTES FOR WATER MAINS		
		DWG. NO. W1



MONTICELLO UTILITY COMMISSION 308-V3 OPEN CUT.dwg, 6/25/2009 10:06:44 AM, Dmu



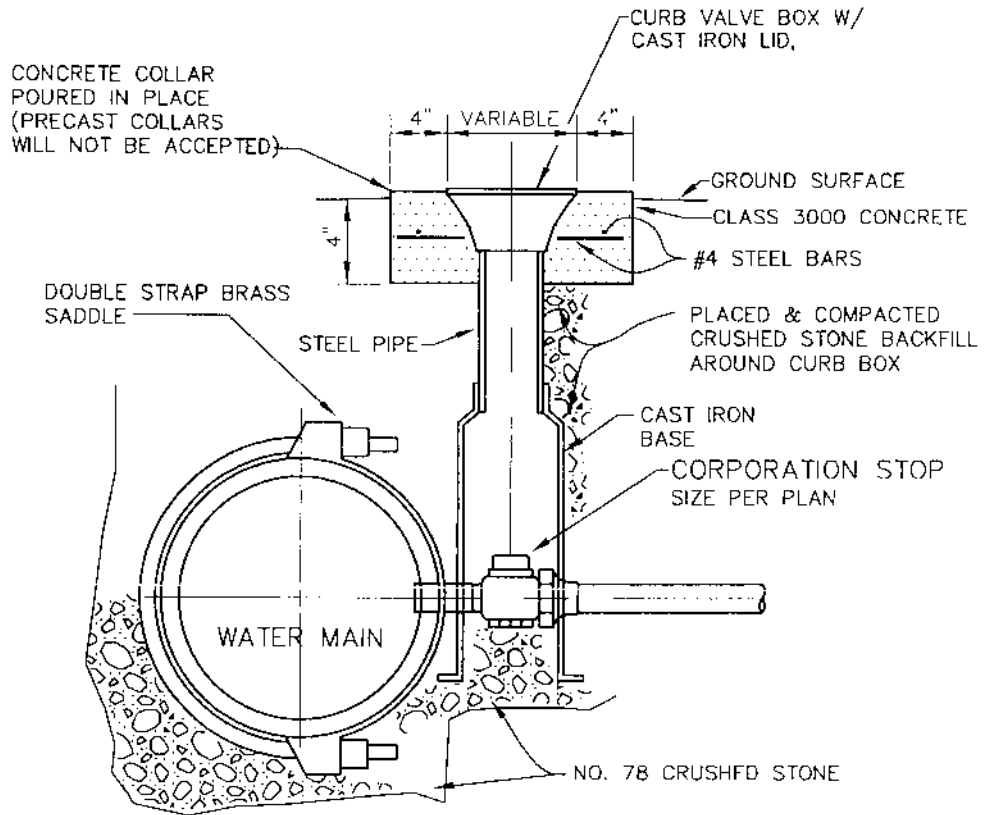
## TRENCH DETAIL TYPICAL OPEN CUT CROSSING OF COUNTY ROADS, STREETS AND ASPHALT PAVED DRIVES

NO SCALE

**NOTE:**

WHERE EXISTING ROAD/DRIVE SURFACE IS CONCRETE,  
INSTALL CONCRETE OF DEPTH EQUAL TO EXISTING  
CONCRETE DEPTH.

DATE	BY	REVISION
MONTICELLO UTILITY COMMISSION MONTICELLO, KENTUCKY		
TRENCH DETAILS OPEN-CUT CROSSING OF COUNTY ROADS, STREETS AND ASPHALT PAVED DRIVES		
		DWG. NO. W3



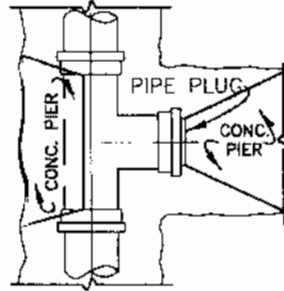
# TAP FOR SERVICE LINE

NOT TO SCALE

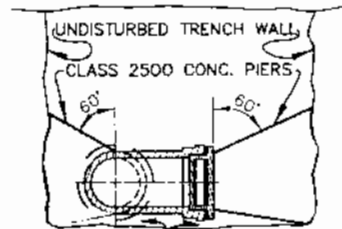
DATE	BY	REVISION
MONTICELLO UTILITY COMMISSION MONTICELLO, KENTUCKY		
TAP FOR SERVICE LINE		
		DWG. NO. W4

C:\MONTICELLO\569\water\standards\508-W5- CONCRETE BACKING AT TEE'S BENDS AND PLUGS.rws, 6/25/2008 1:09:02 PM, 2009

NOTE:  
 IF MECHANICAL JOINT PLUG IS USED ON THE BRANCH,  
 NO BLOCKING WILL BE REQUIRED ON THE PLUG. THE  
 SIDE OF THE TEE SHALL BE BLOCKED IN ALL CASES.



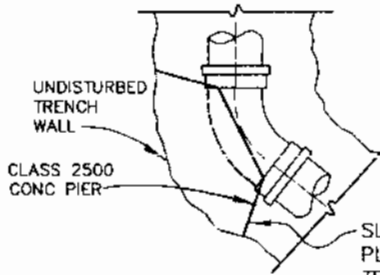
**PLAN**



REFER TO DETAIL-  
 BEDDING AND BACKFILL

**SECTION**

## TYPICAL DETAIL OF CONCRETE BLOCKING AT TEES & PLUGS



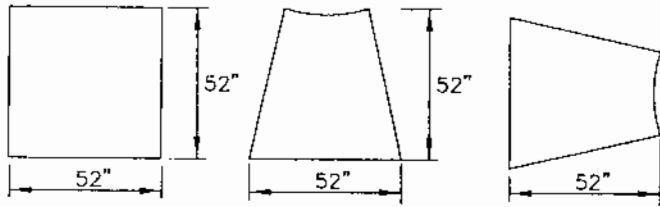
SLOPE PIER IN VERTICAL  
 PLANE SAME AS FOR  
 TEE- DO NOT ENCASE  
 JOINTS.

**PLAN**

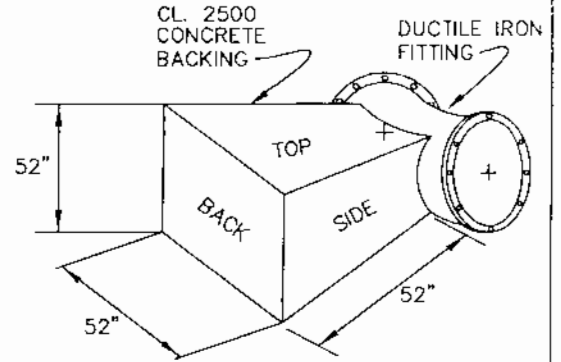
## TYPICAL DETAIL OF CONCRETE BLOCKING AT BENDS VERTICAL AND HORIZONTAL

NOT TO SCALE

DATE	BY	REVISION
MONTICELLO UTILITY COMMISSION MONTICELLO, KENTUCKY		
CONCRETE BLOCKING AT TEES, BENDS AND PLUGS		
		DWG. NO. W5



BACK VIEW TOP VIEW SIDE VIEW



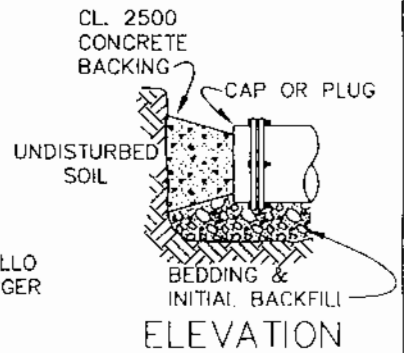
ISOMETRIC VIEW

**TABLE 1**  
TEST PRESSURE: 150 PSI ALL TYPES SOIL

PIPE DIA. INCHES	90°	PLUG/TEE	45°	22 1/2°	11 1/4°
4	14	12	12	12	12
6	20	18	18	18	18
8	28	22	20	18	18
10	34	28	24	18	18
12	40	34	30	24	24

① TO OBTAIN THE NUMBER IN INCHES - MEASURE THE LENGTH, WIDTH AND DEPTH THE THRUST BLOCK TO BE INSTALLED SEE APPROPRIATE PRESSURE AND SOIL TYPE TO READ DOWN TO CORRECT PIPE DIAMETER AND ACROSS TABLE TO CORRECT FITTING.

② REINFORCEMENT STEEL RODS MAY BE NEEDED BY MONTICELLO UTILITY COMMISSION FOR LARGER THRUST BLOCK.



**TABLE 2**  
TEST PRESSURE: 350 PSI SANDY CLAY SOIL

PIPE DIA. INCHES	90°	PLUG/TEE	45°	22 1/2°	11 1/4°
4	18	18	18	18	18
6	26	22	20	18	18
8	35	30	24	18	18
10	44	36	32	32	24
12	52	44	38	28	24
14	62	52	46	32	24
16	70	58	52	36	26
18	78	66	58	42	30
20	88	72	64	46	32
24	104	88	76	56	40

**TABLE 3**  
TEST PRESSURE: 350 PSI HARD CLAY SOIL

PIPE DIA. INCHES	90°	PLUG/TEE	45°	22 1/2°	11 1/4°
4	18	18	18	18	18
6	18	18	18	18	18
8	24	22	18	18	18
10	32	26	24	18	18
12	38	32	28	20	20
14	44	36	32	24	24
16	50	42	36	26	26
18	56	46	42	30	30
20	62	52	46	32	32
24	74	62	54	40	40

**TABLE 4**  
TEST PRESSURE: 350 PSI SHALE SOIL

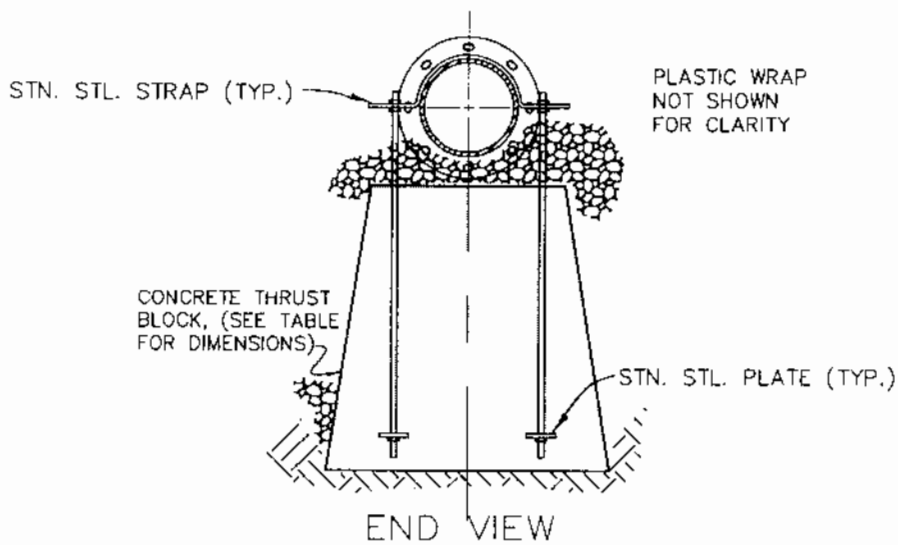
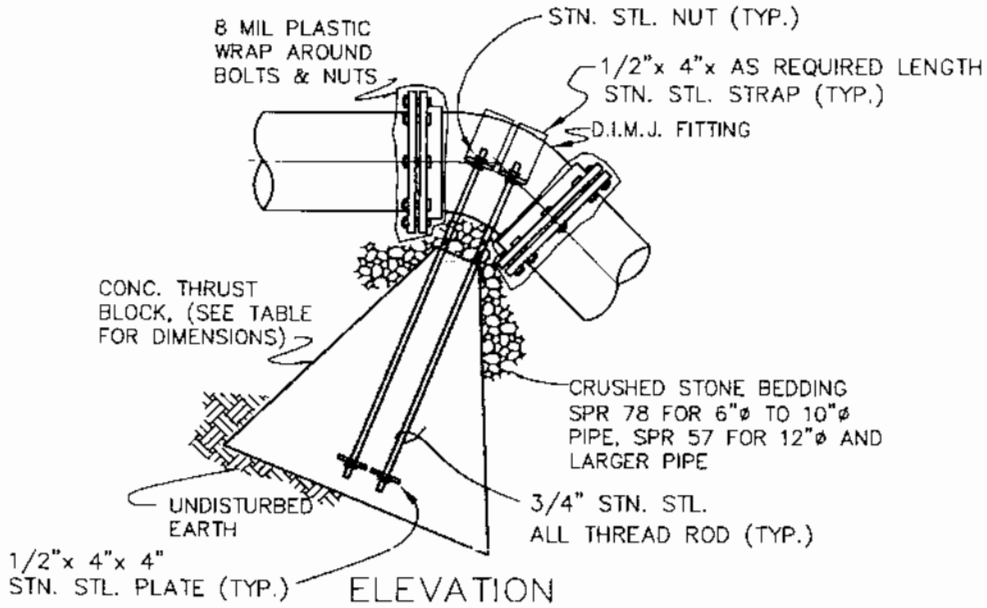
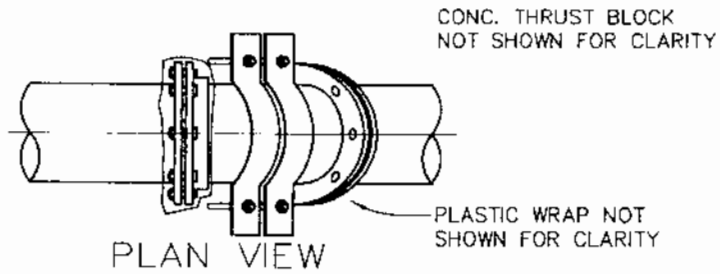
PIPE DIA. INCHES	90°	PLUG/TEE	45°	22 1/2°	11 1/4°
4	18	18	18	18	18
6	18	18	18	18	18
8	18	18	18	18	18
10	22	18	18	18	18
12	26	22	20	18	18
14	30	26	24	18	18
16	36	30	21	18	18

**TABLE 5**  
TEST PRESSURE: 130 PSI SOLID ROCK

PIPE DIA. INCHES	90°	PLUG/TEE	45°	22 1/2°	11 1/4°
4	18	18	18	18	18
6	18	18	18	18	18
8	18	18	18	18	18
10	20	18	18	18	18
12	24	20	18	18	18
14	26	22	20	18	18

DATE	BY	REVISION
MONTICELLO UTILITY COMMISSION MONTICELLO, KENTUCKY		
CONCRETE THRUST BLOCK TABLES		
		DWG. NO. W6

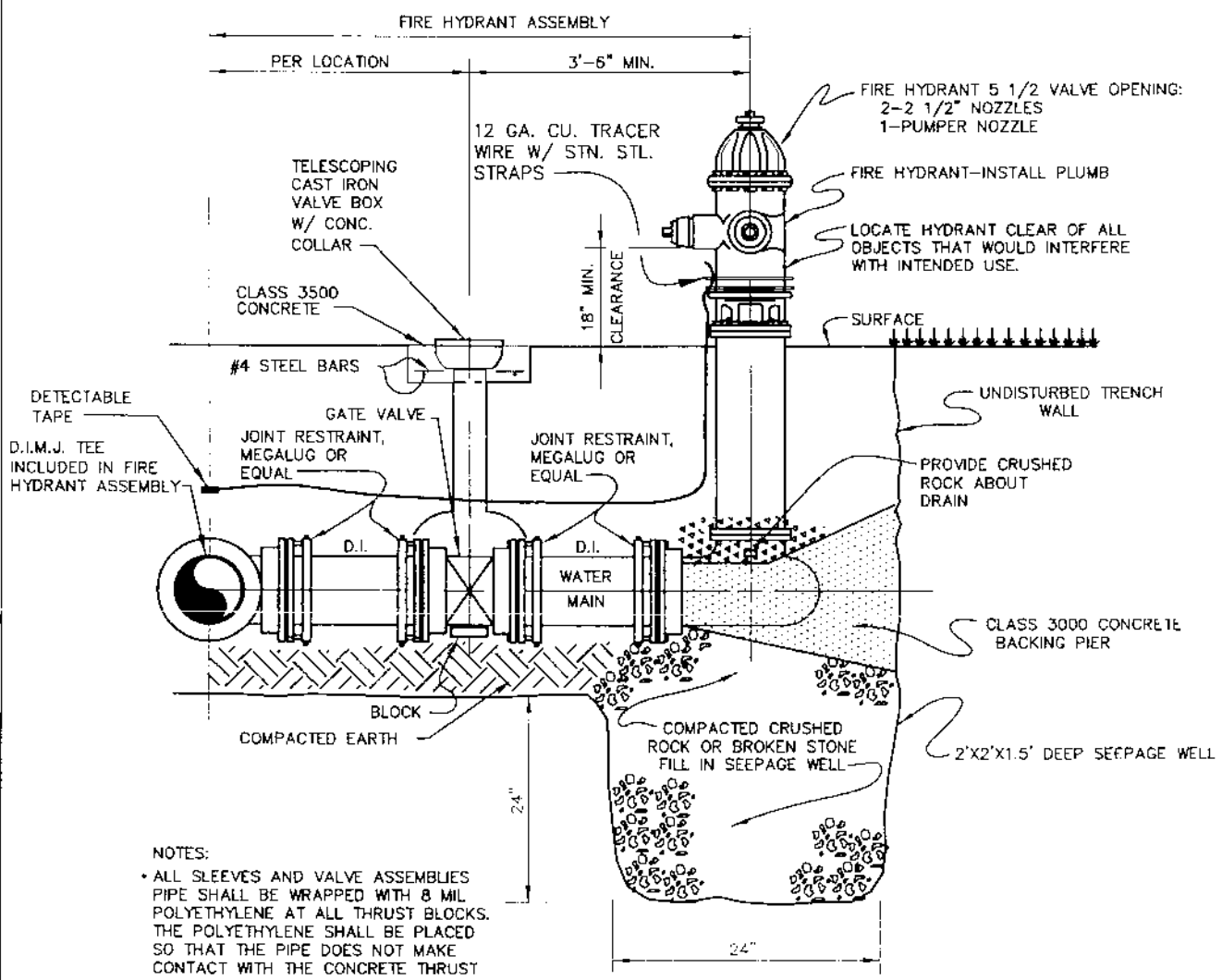
J:\MONTICELLO\GIS\water\_standards\pos-w\VERTICAL OVERBEND.dwg, 07/25/2008 10:45:07 AM, Dwg



DATE	BY	REVISION
MONTICELLO UTILITY COMMISSION MONTICELLO, KENTUCKY		
VERTICAL OVERBEND AND THRUST BLOCK		
		DWC. NO. W7



MONTICELLO WATER STANDARDS DEPT. FIRE HYDRANT SETTING WITH MEGALUGS.dwg. 05/20/08 10:52:19 AM, DMS



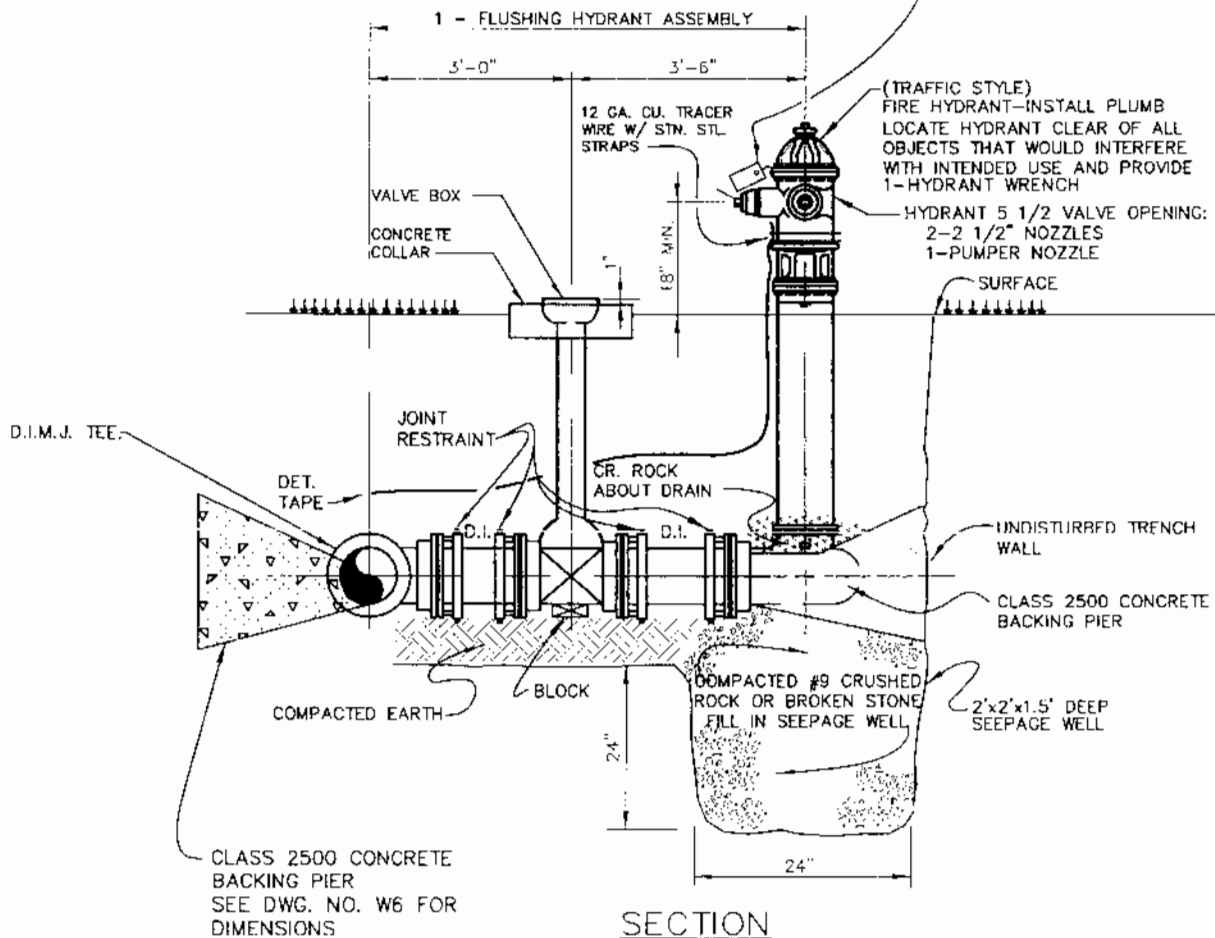
- NOTES:**
- ALL SLEEVES AND VALVE ASSEMBLIES PIPE SHALL BE WRAPPED WITH 8 MIL POLYETHYLENE AT ALL THRUST BLOCKS. THE POLYETHYLENE SHALL BE PLACED SO THAT THE PIPE DOES NOT MAKE CONTACT WITH THE CONCRETE THRUST BLOCK.
  - CONTRACTOR MAY USE ALL THREAD RODS, DUC-LUGS OR MEG-A-LUGS TO RESTRAIN TEE TO VALVE & VALVE TO FIRE HYDRANT (SEE SPECIFICATIONS)

**FIRE HYDRANT ASSEMBLY AND SETTING**  
N T S

DATE	BY	REVISION
MONTICELLO UTILITY COMMISSION MONTICELLO, KENTUCKY		
FIRE HYDRANT ASSEMBLY AND SETTING WITH MEGALUGS		
		DWG. NO. W8

MONTICELLO UTILITY WATER STANDARDS 2008 W9 FLUSHING HYDRANT SETTING.dwg, 05/20/08 10:59:40 AM, DMB

CONTRACTOR SHALL ATTACH A TAG ON ALL FLUSHING HYDRANTS. THE TAG SHOULD BE LABELED TO READ "FOR FLUSHING PURPOSES ONLY". MINIMUM SIZE OF TAG SHALL BE 2" X 3". TAG SHALL BE PLACED ABOVE THE PUMPER NOZZLE ATTACHED TO A BONNET BOLT.

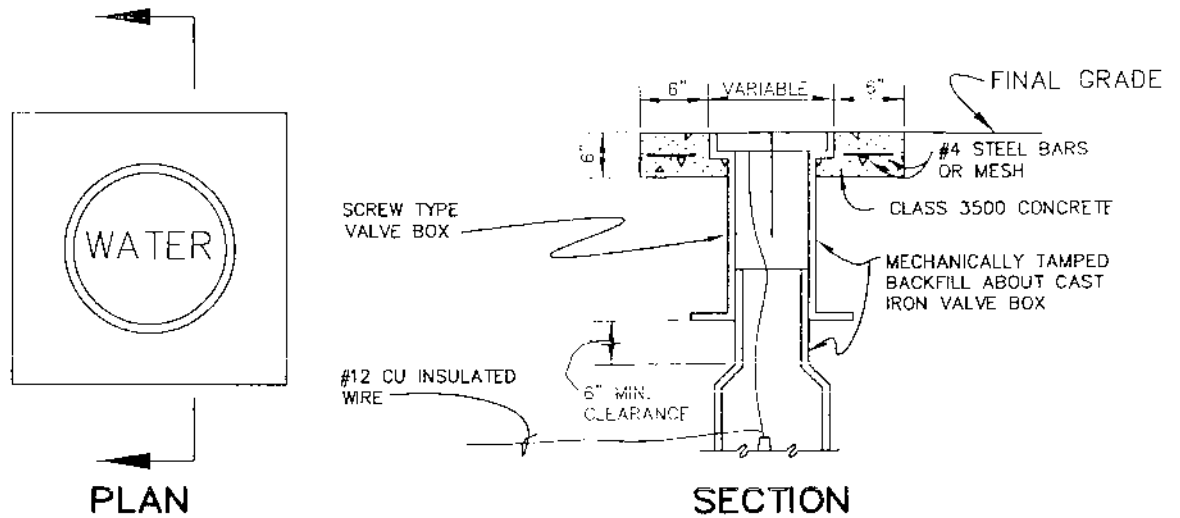


**SECTION  
DETAIL  
FLUSHING HYDRANT  
ASSEMBLY AND SETTING**

NOTE:  
ALL SLEEVES AND VALVE ASSEMBLIES PIPE SHALL BE WRAPPED WITH 8 MIL POLYETHYLENE AT ALL THRUST BLOCKS. THE POLYETHYLENE SHALL BE PLACED SO THAT THE PIPE DOES NOT MAKE CONTACT WITH THE CONCRETE THRUST BLOCK.

DATE	BY	REVISION
MONTICELLO UTILITY COMMISSION MONTICELLO, KENTUCKY		
FLUSHING HYDRANT ASSEMBLY AND SETTING		
		DWG. NO. W9

10001 CELLO CONCRETE COLLAR VALVE BOX CONCRETE COLLAR, 7/23/2003 11:41:16 AM, D.m.d



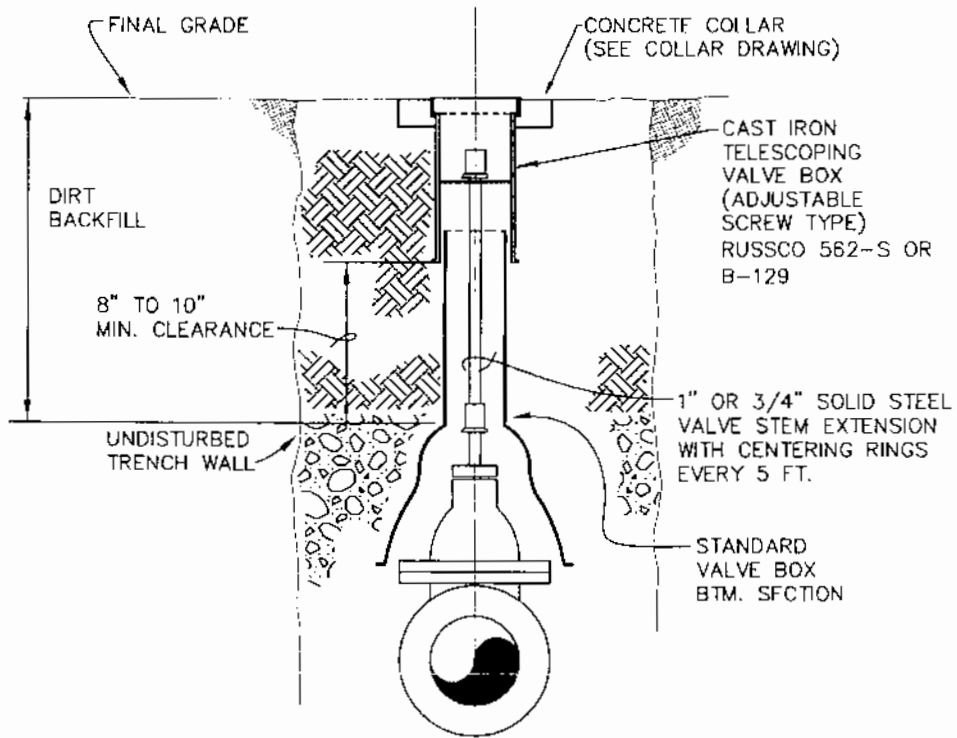
## VALVE BOX CONCRETE COLLAR

(REQUIRED ON ALL VALVES)  
NOT TO SCALE

**NOTE:**

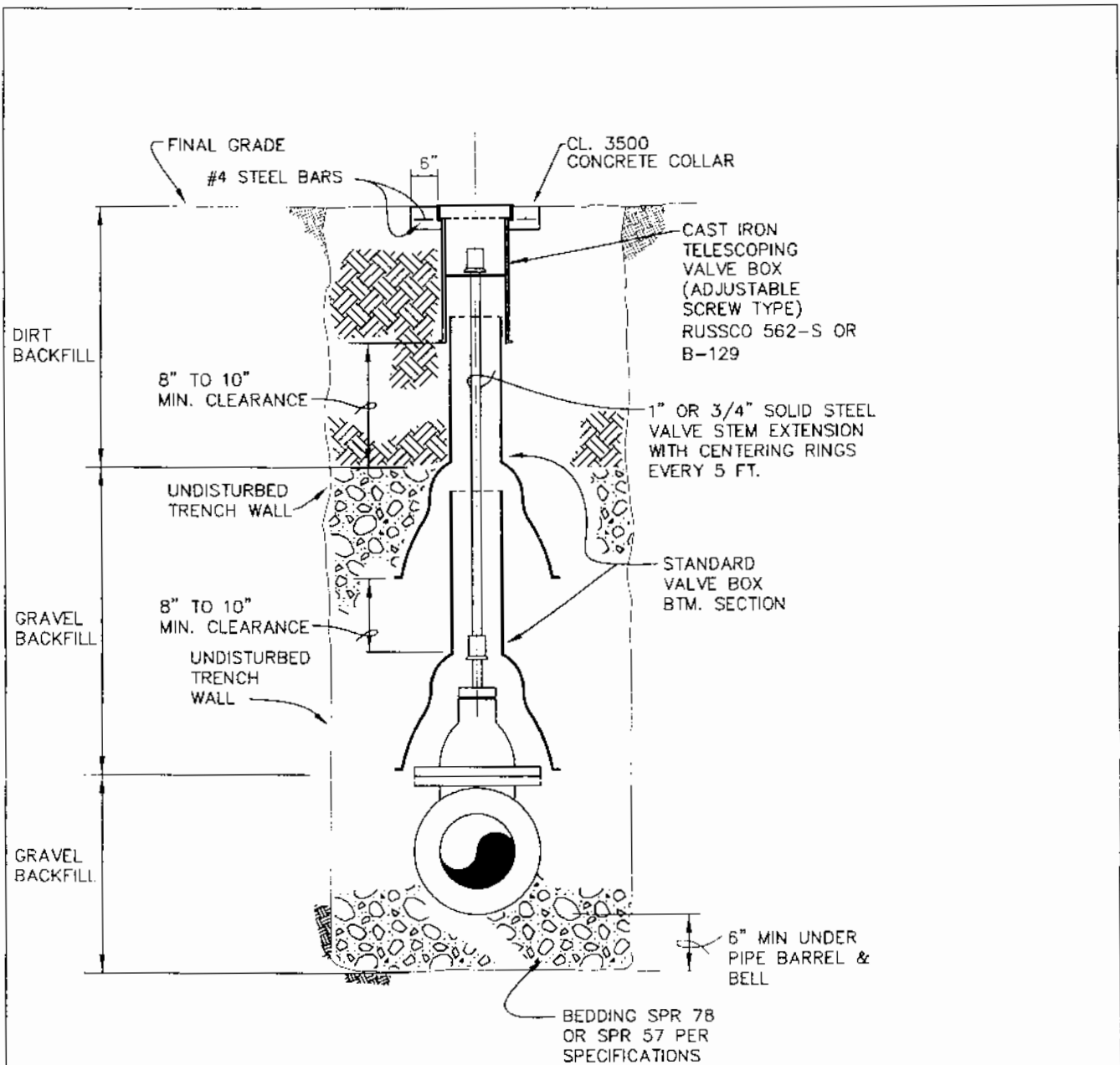
- \* PRECAST CONCRETE COLLARS  
NOT ACCEPTABLE.

DATE	BY	REVISION
MONTICELLO UTILITY COMMISSION MONTICELLO, KENTUCKY		
VALVE BOX CONCRETE COLLAR		



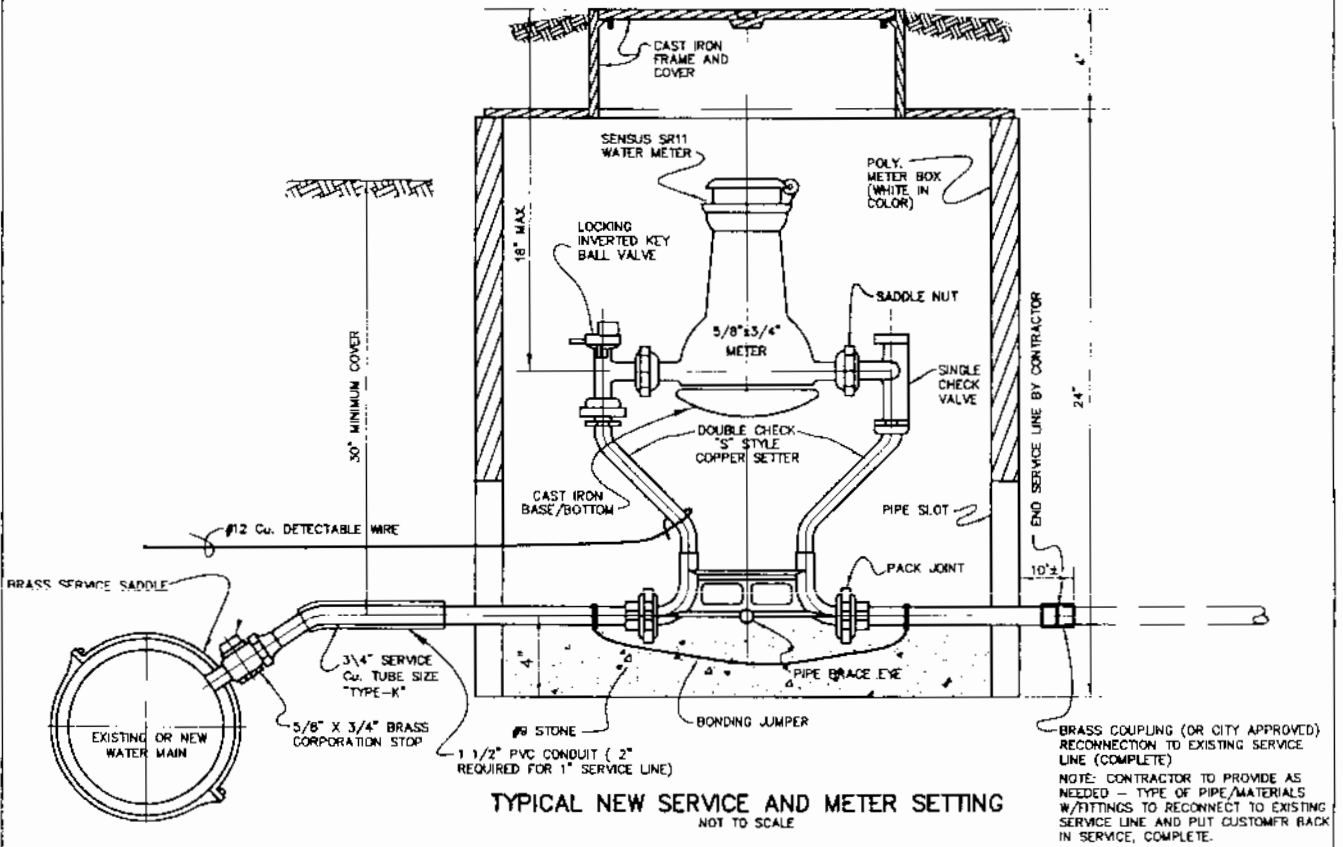
DATE	BY	REVISION
MONTICELLO UTILITY COMMISSION MONTICELLO, KENTUCKY		
VALVE BOX		
		DWG. NO. W11

I:\PROJECTS\CL 558\W12\STANDARD\W12 VALVE STEM EXTENSIONS.dwg, 11/23/2008 11:09:21 AM, UMD



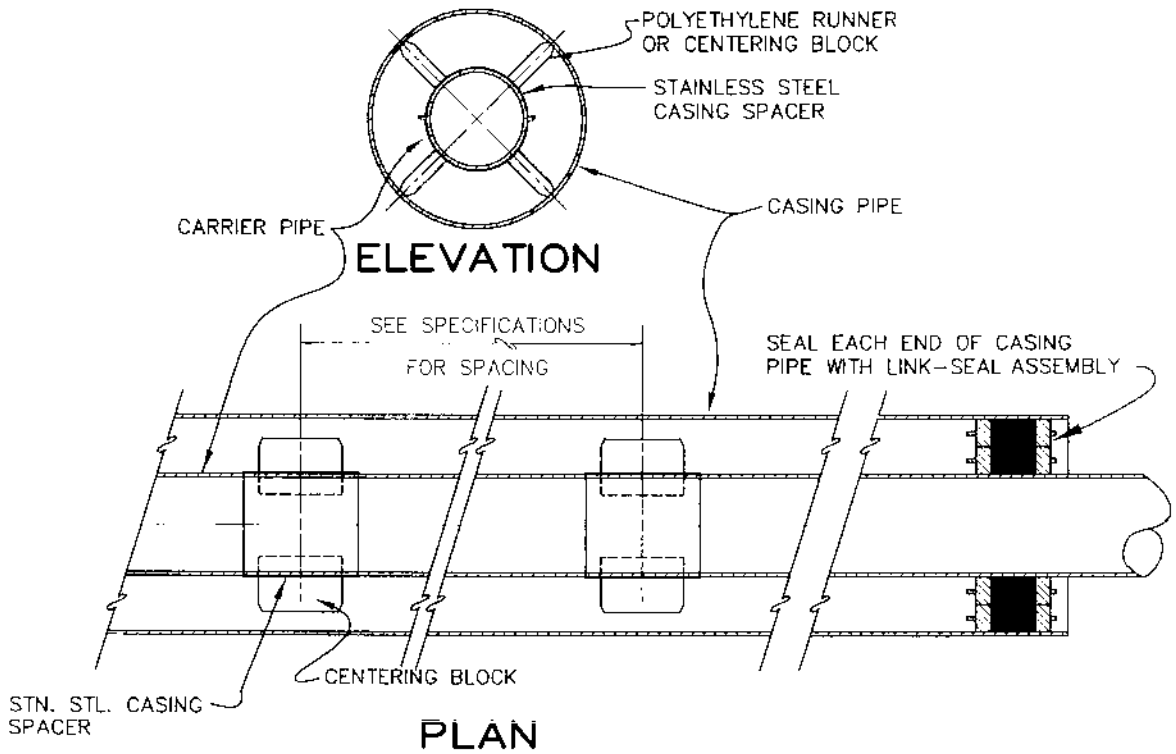
VALVE STEM EXTENSIONS  
AND  
VALVE BOX STACKING  
NOT TO SCALE

DATE	BY	REVISION
MONTICELLO UTILITY COMMISSION MONTICELLO, KENTUCKY		
VALVE STEM EXTENSIONS AND VALVE BOX STACKING		
		DWG. NO. W12



DATE	BY	REVISION
<b>MONTICELLO          UTILITY COMMISSION          MONTICELLO, KENTUCKY</b>		
<b>SERVICE METER          SETTING</b>		
		DWG. NO. W13

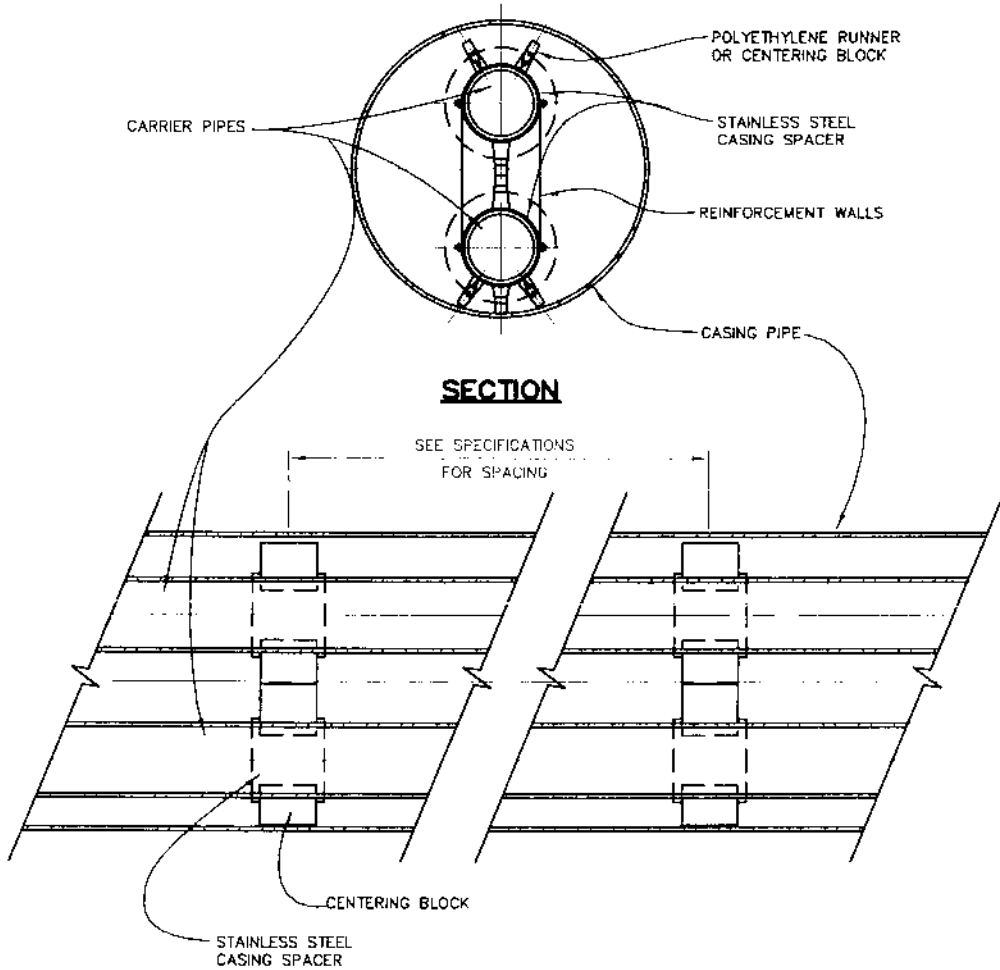
J:\MONTICELLO 568\w... or slant\util\568-W14 CARRIER PIPE POSITIONING.dwg, 6/25/2008 11:28:17 AM, Dmb



**DETAIL**  
**CARRIER PIPE POSITIONING**  
**IN CASING PIPE**  
NOT TO SCALE

DATE	BY	REVISION
MONTICELLO UTILITY COMMISSION MONTICELLO, KENTUCKY		
CARRIER PIPE POSITIONING IN CASING PIPE		
		DWG. NO. W14

J:\MONTICELLO\water\stencards\3008 W15 DUAL CARRIER PIPE POSITIONING.dwg, 6/25/2008 11:50:11 AM, DHP



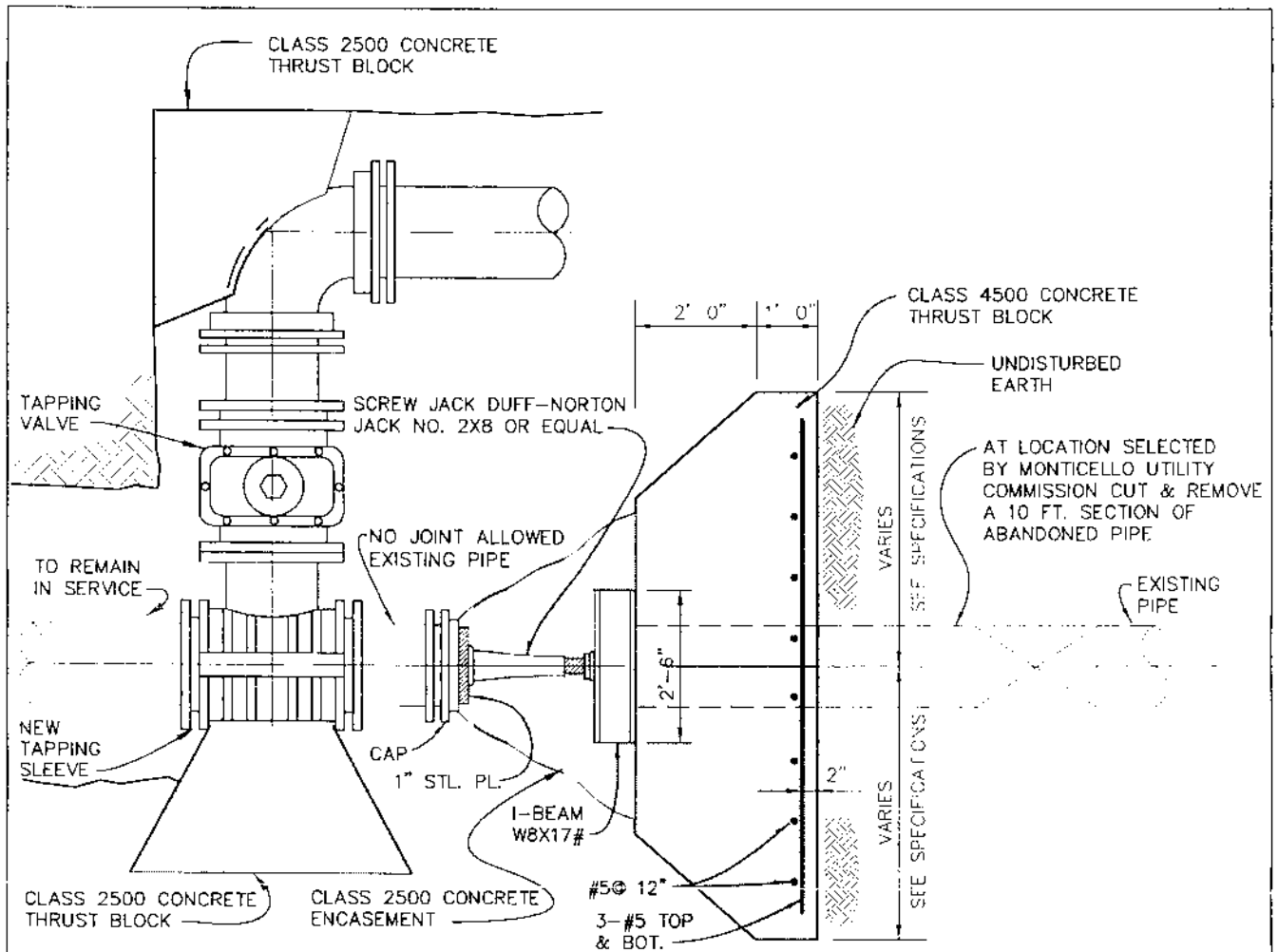
**SIDE ELEVATION**

DETAIL  
DUAL CARRIER PIPE POSITIONING  
IN CASING PIPE

NOT TO SCALE

DATE	BY	REVISION
MONTICELLO UTILITY COMMISSION MONTICELLO, KENTUCKY		
DUAL CARRIER PIPE POSITIONING IN CASING PIPE		
		DWG. NO. W15





**NOTES**

- \* THRUST BLOCK SHALL BE 4'-0" HIGH & CENTERED ABOUT THE EXISTING PIPE.
- \* SCREW JACK CAPACITY OF 20 TONS FOR 16 INCH AND SMALLER PIPE

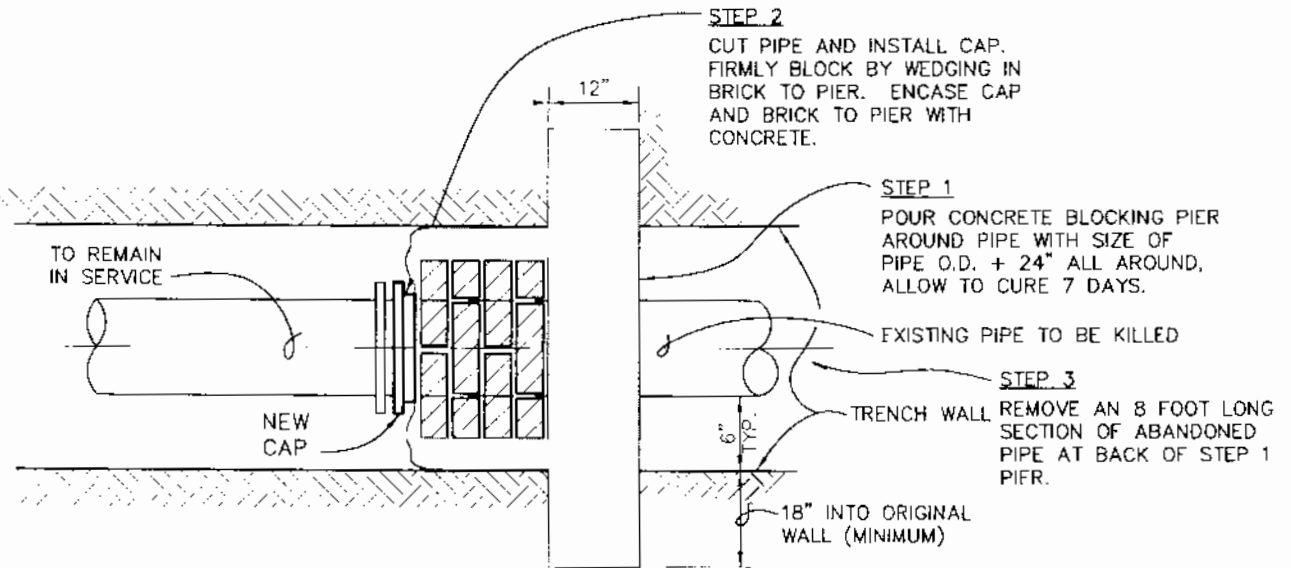
# KILL MAIN LINE

NOT TO SCALE

DATE	BY	REVISION
MONTICELLO UTILITY COMMISSION MONTICELLO, KENTUCKY		
KILL MAIN LINE		
		DWC. NO. W16

**NOTE:**

ONLY DOWN TIME ALLOWED IS FOR CUTTING AND CAPPING PIPE



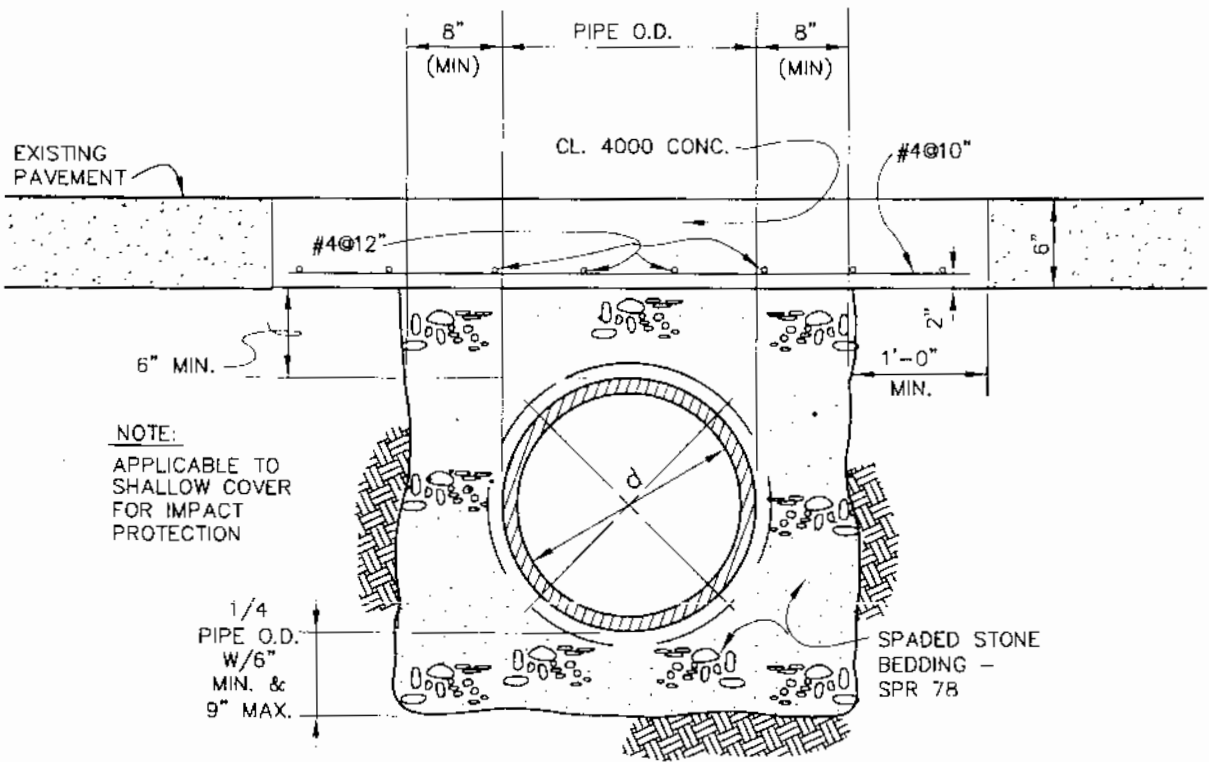
# DETAIL - CUT & BLOCK

(FOR 12" & SMALLER LINES)

N T S

DATE	BY	REVISION
MONTICELLO UTILITY COMMISSION MONTICELLO, KENTUCKY		
CUT AND BLOCK 12" AND SMALLER PIPE		
		DWG. NO. W17

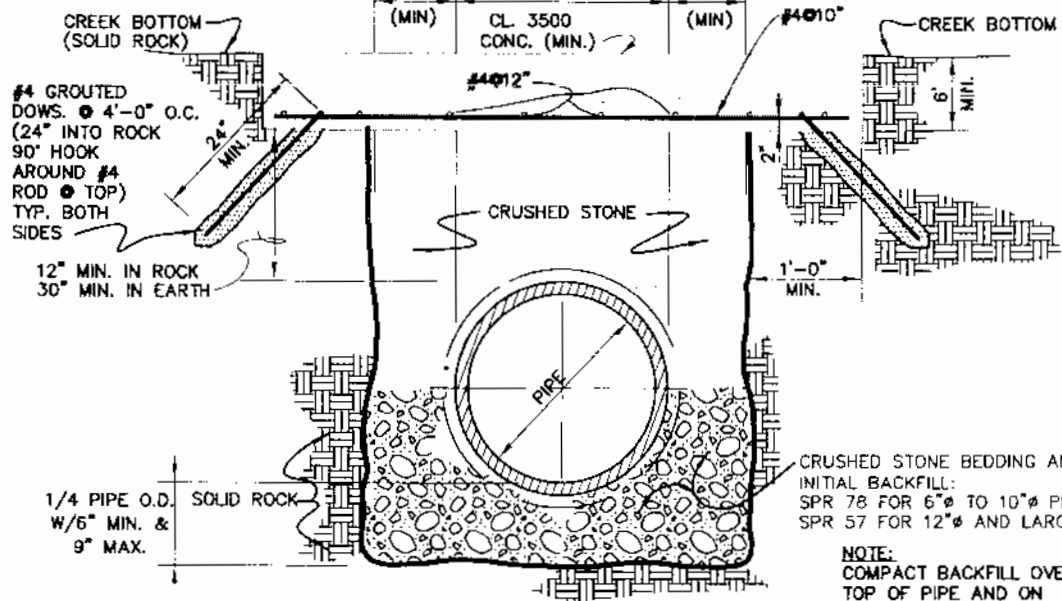
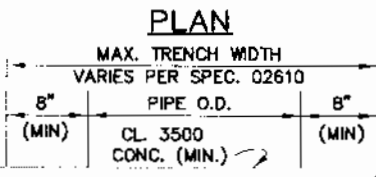
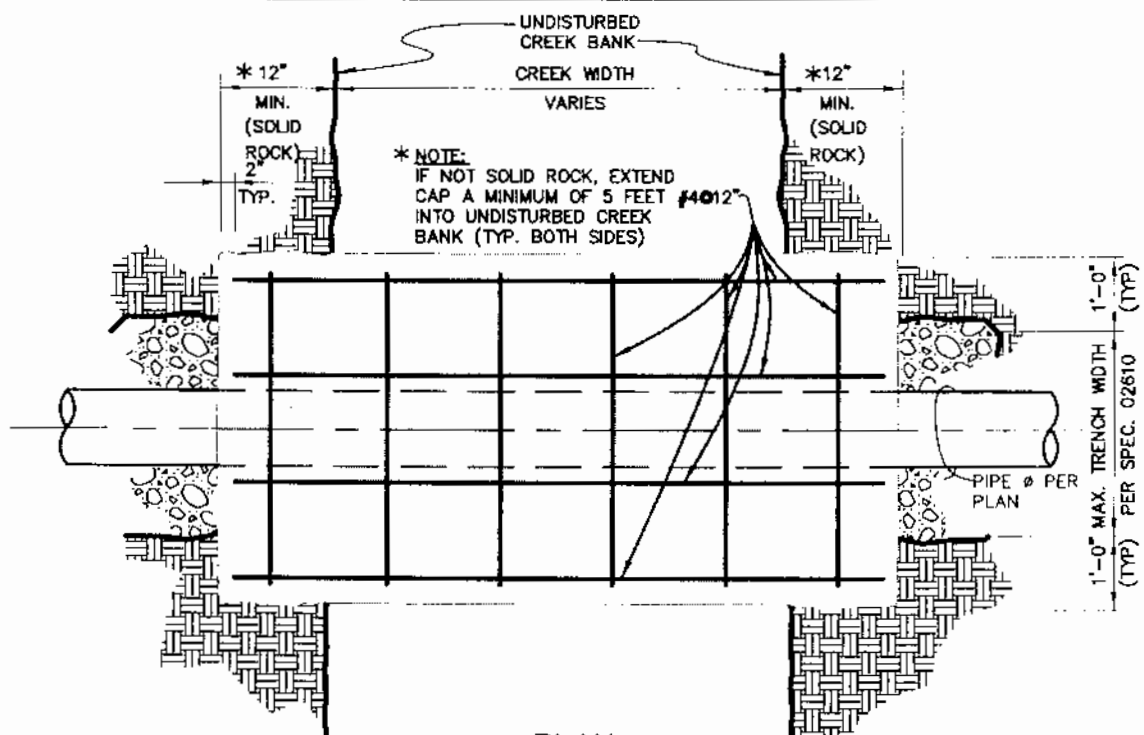
D:\Projects\2008\20080810\20080810.dwg



CLASS "A" BEDDING -  
CONCRETE CAP  
ON FIRM EARTH -  
OR IN SOLID ROCK  
ALL SIZE PIPE  
N T S

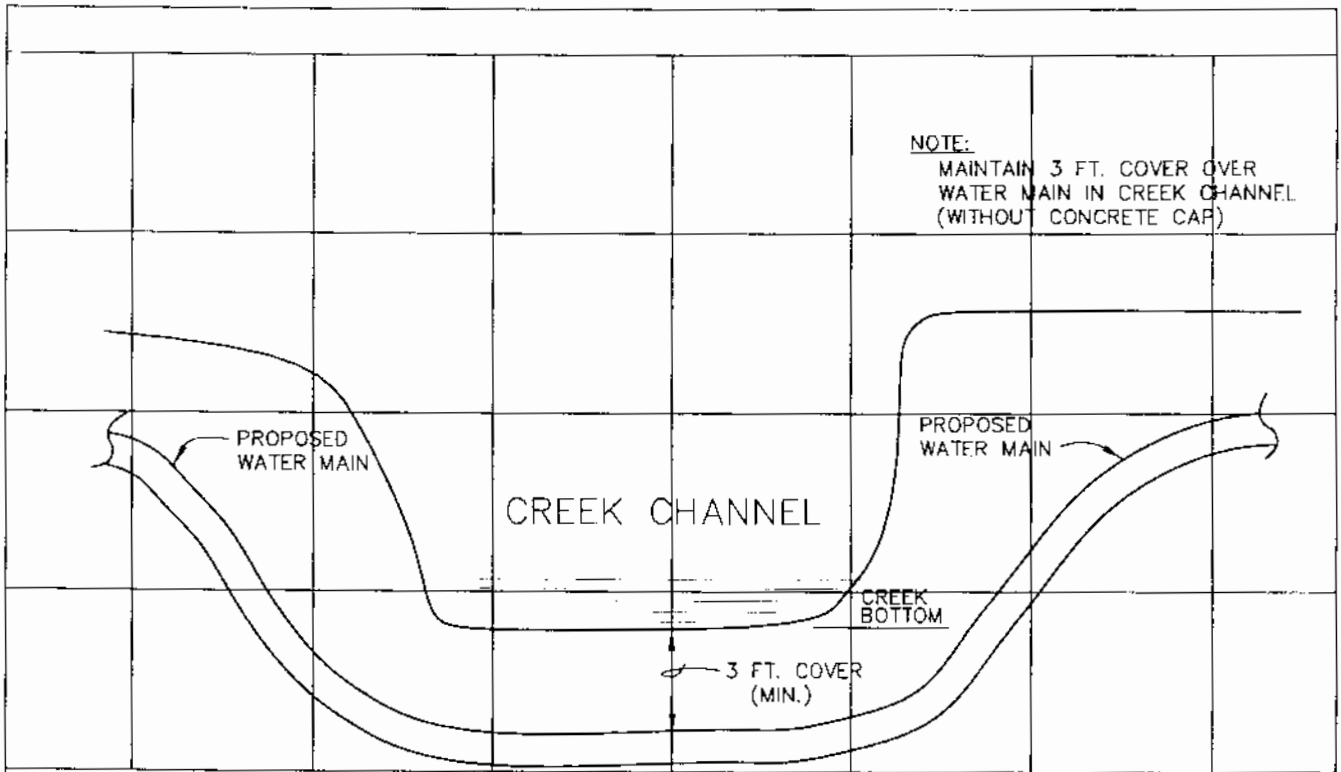
DATE	BY	REVISION
MONTICELLO UTILITY COMMISSION MONTICELLO, KENTUCKY		
CONCRETE CAP IMPACT PROTECTION		
		DWG. NO. W18

2025 RELEASE UNDER E.O. 14176 - ORIGINAL SOURCE: W111-0002-AR0111-CREEK OR STREAM CROSSING, 6/7/2008 11:37:01 AM, DIME



**CONCRETE ARCH (CAP)  
 AT CREEK OR STREAM CROSSING**  
 ALL SIZE PIPE  
 N T S

DATE	BY	REVISION
MONTICELLO UTILITY COMMISSION MONTICELLO, KENTUCKY		
CONCRETE CAP AT CREEK OR STREAM CROSSING		
		DWC. NO. W19



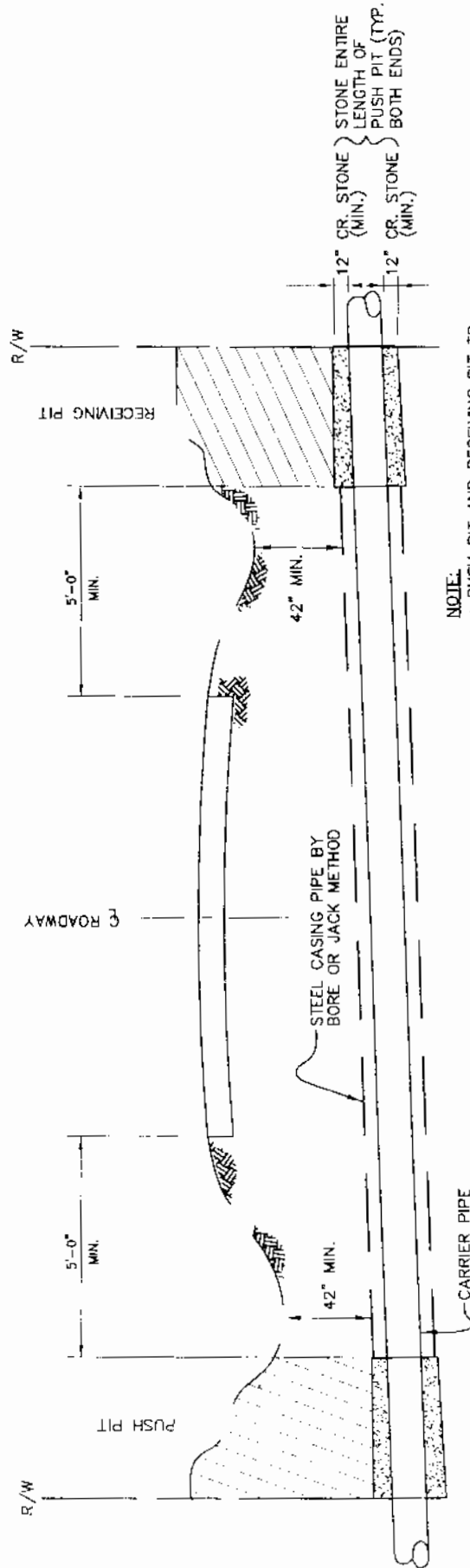
**TYPICAL SECTION  
WATER MAIN AT  
CREEK CROSSING**  
NO SCALE

**NOTES:**

- VERTICAL BENDS MAY BE REQUIRED AT CREEK CROSSINGS.
- CONTRACTOR TO INSTALL WATER MAIN EXTRA DEPTH, AS NECESSARY TO FIT CREEK CHANNEL.
- DURING THE CONSTRUCTION OF THE CROSSING, NO MATERIAL MAY BE PLACED IN THE STREAM OR IN THE FLOOD PLAIN OF THE STREAM TO FORM CONSTRUCTION PADS, COFFER DAMS, ACCESS ROADS, ETC.
- THE TRENCH SHALL BE BACKFILLED AS CLOSELY AS POSSIBLE TO THE ORIGINAL CONTOUR. ALL EXCESS MATERIAL FROM CONSTRUCTION OF THE TRENCH SHALL BE DISPOSED OF OUTSIDE OF THE FLOOD PLAIN.
- FOR SUBFLUVIAL CROSSINGS OF ERODIBLE CHANNELS, THERE SHALL BE AT LEAST THIRTY (30) INCHES CLEAR TO THE TOP OF THE PIPE OR CONDUIT AT ALL POINTS.
- FOR SUBFLUVIAL CROSSINGS OF NONERODIBLE CHANNELS, THERE SHALL BE AT LEAST SIX (6) INCHES OF CLEAR COVER ABOVE THE TOP OF THE PIPE OR CONDUIT AT ALL POINTS, AND THE PIPE OR CONDUIT SHALL BE ENCASED ON ALL SIDES BY AT LEAST SIX (6) INCHES OF CONCRETE.
- THE WEIGHT OF A PIPE AND ITS CONTENTS DURING NORMAL OPERATING CONDITIONS AT ALL POINTS MUST EXCEED THAT OF AN EQUAL VOLUME OF WATER.

DATE	BY	REVISION
<b>MONTICELLO UTILITY COMMISSION MONTICELLO, KENTUCKY</b>		
<b>WATER MAIN AT CREEK CROSSING</b>		
		DWG. NO. W20

2025/05/20 10:34:59 AM C:\Users\G.D.Kay\OneDrive\Documents\W20 - WATER MAIN AT CREEK CROSSING.dwg



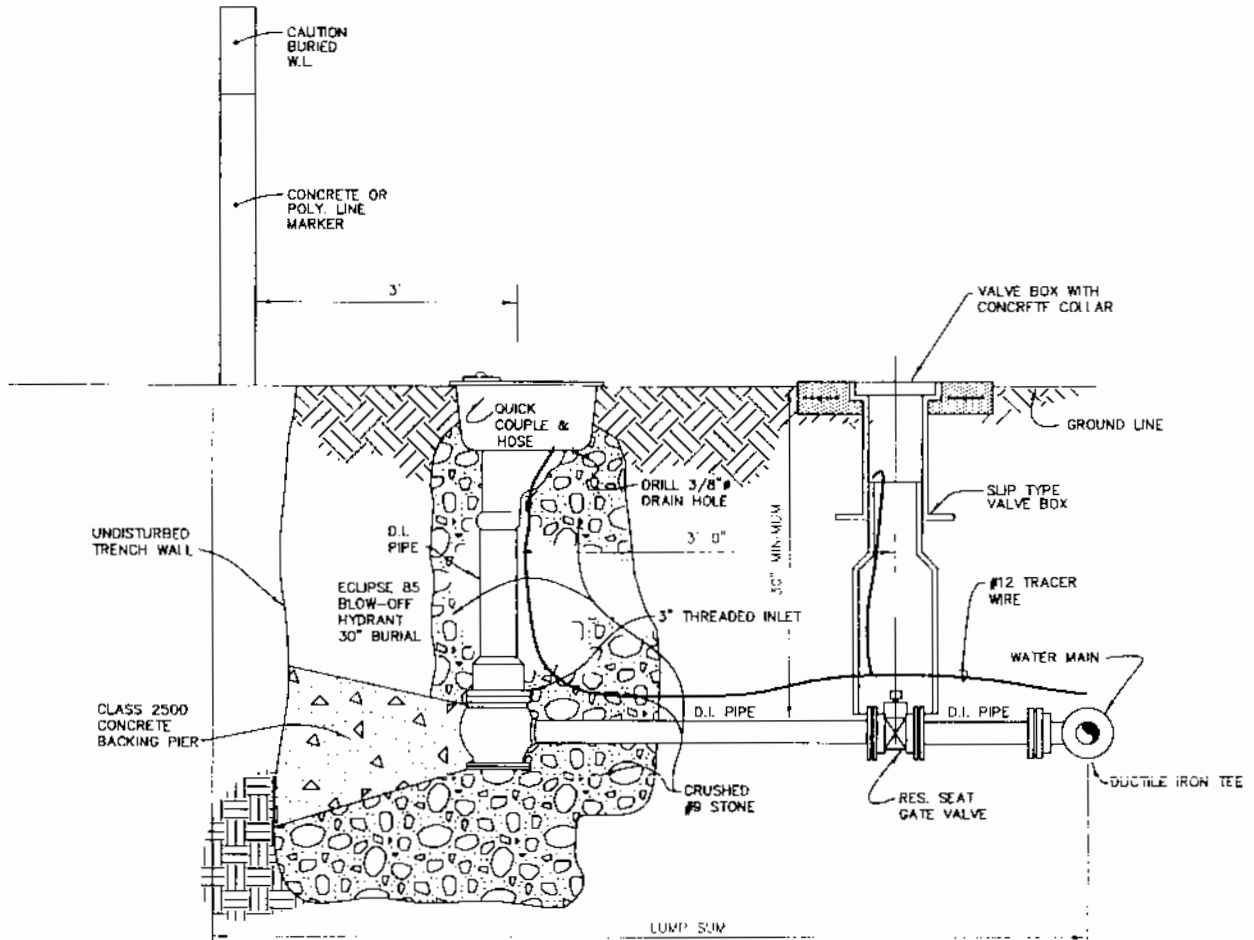
**NOTE:**

- PUSH PIT AND RECEIVING PIT TO BE BACKFILLED AND THOROUGHLY COMPACTED.
- ALL DITCH LINES TO BE LEFT OPEN.
- SEED AND STRAW ALL AREAS DISTURBED BY THIS WORK.

**TYPICAL HIGHWAY BORING CROSSING DETAIL**

NTS

DATE	BY	REVISION
MONTICELLO UTILITY COMMISSION MONTICELLO, KENTUCKY		
HIGHWAY BORING CROSSING		
		DWG. NO. W21

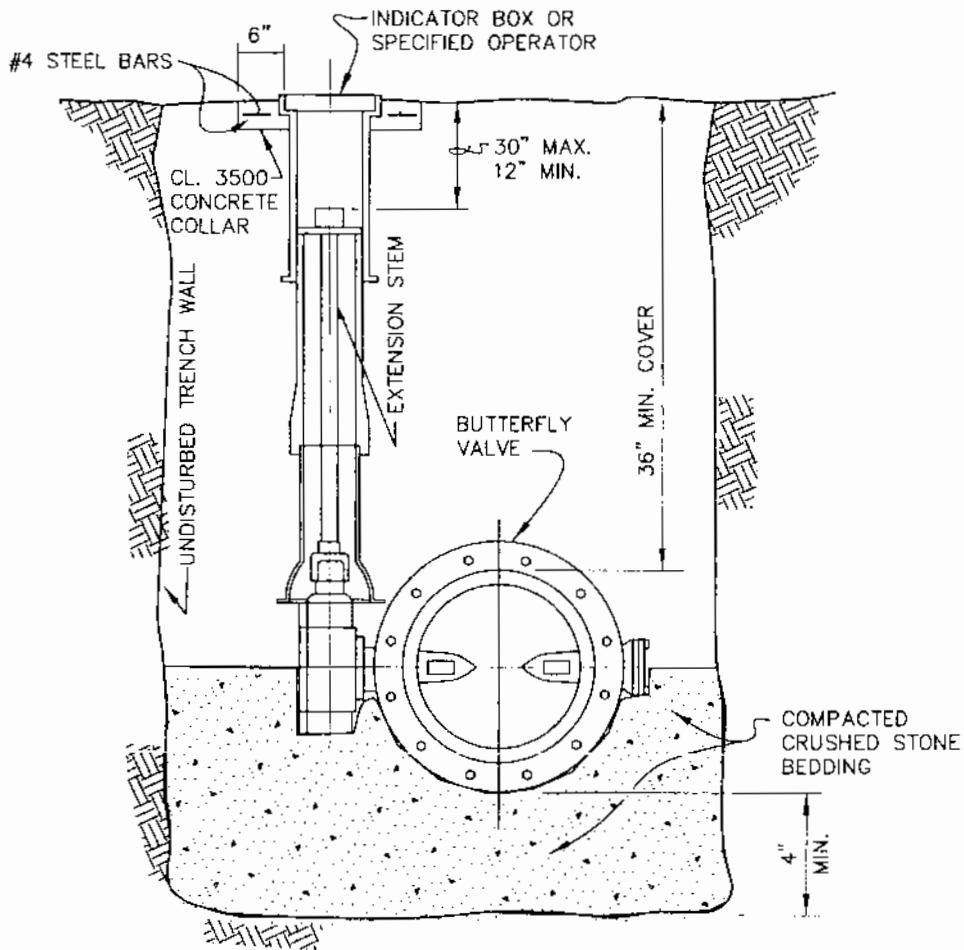


- NOTES:
- \*THE UNIT PRICE FOR A BLOW OFF ASSEMBLY INCLUDES THE FURNISHING AND INSTALLING OF ALL COMPONENTS INCLUDING THE TEE, ITEMS SHOWN ON DETAIL.
  - \*THE BLOW OFF ASSEMBLY SHALL BE INSTALLED ACCORDING TO THE MANUFACTURERS RECOMMENDATIONS. IF THERE IS A CONFLICT BETWEEN THE SPECIFICATIONS AND THE MANUFACTURERS RECOMMENDATIONS, THE MORE STRINGENT REQUIREMENT SHALL BE USED.
  - \*DRILL 3/8" DIA HOLE IN BOTTOM OF BOWL TO ALLOW DRAINAGE

DETAIL - BLOW-OFF ASSEMBLY  
N T S

DATE	BY	REVISION
MONTICELLO UTILITY COMMISSION MONTICELLO, KENTUCKY		
3" BLOW OFF HYDRANT		
		DWG. NO. W22

J:\PHOTO\MONTICELLO\water\_standards\51500-W23\_BFLY\_VALVE.DWG FALLATION.dwg, 07/27/2008 4:45:26 PM, DIMD

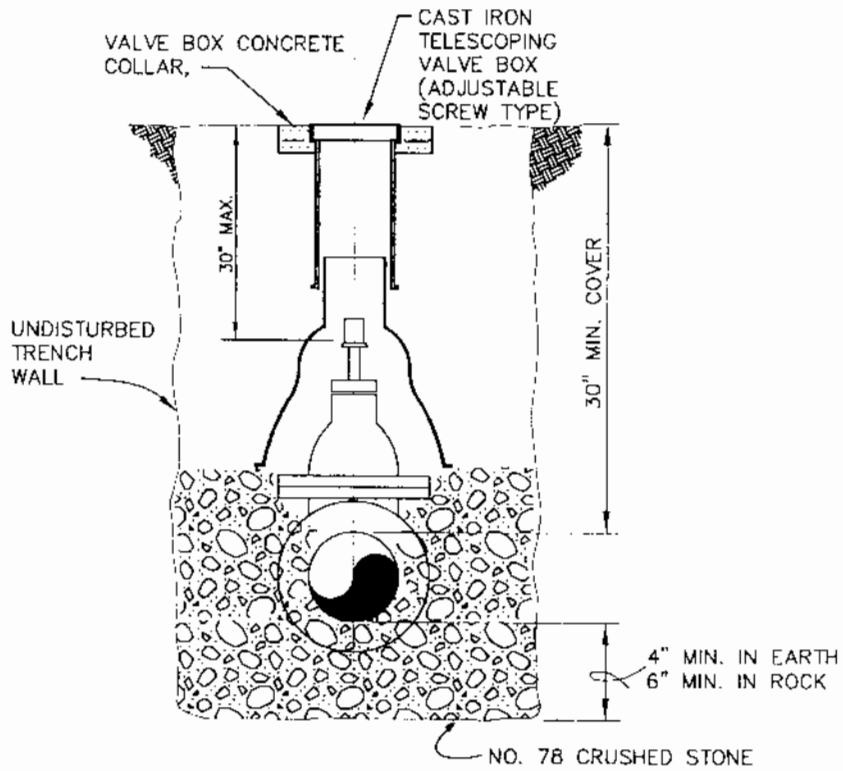


DETAIL  
BURIED SERVICE  
B'FLY VALVE  
INSTALLATION  
NOT TO SCALE

DATE	BY	REVISION
MONTICELLO UTILITY COMMISSION MONTICELLO, KENTUCKY		
BUTTERFLY VALVE INSTALLATION		
		DWG. NO. W23



J:\proj\H1C\10000\10000.dwg, 0.24, 2005 1.12.18 Pt , Dms

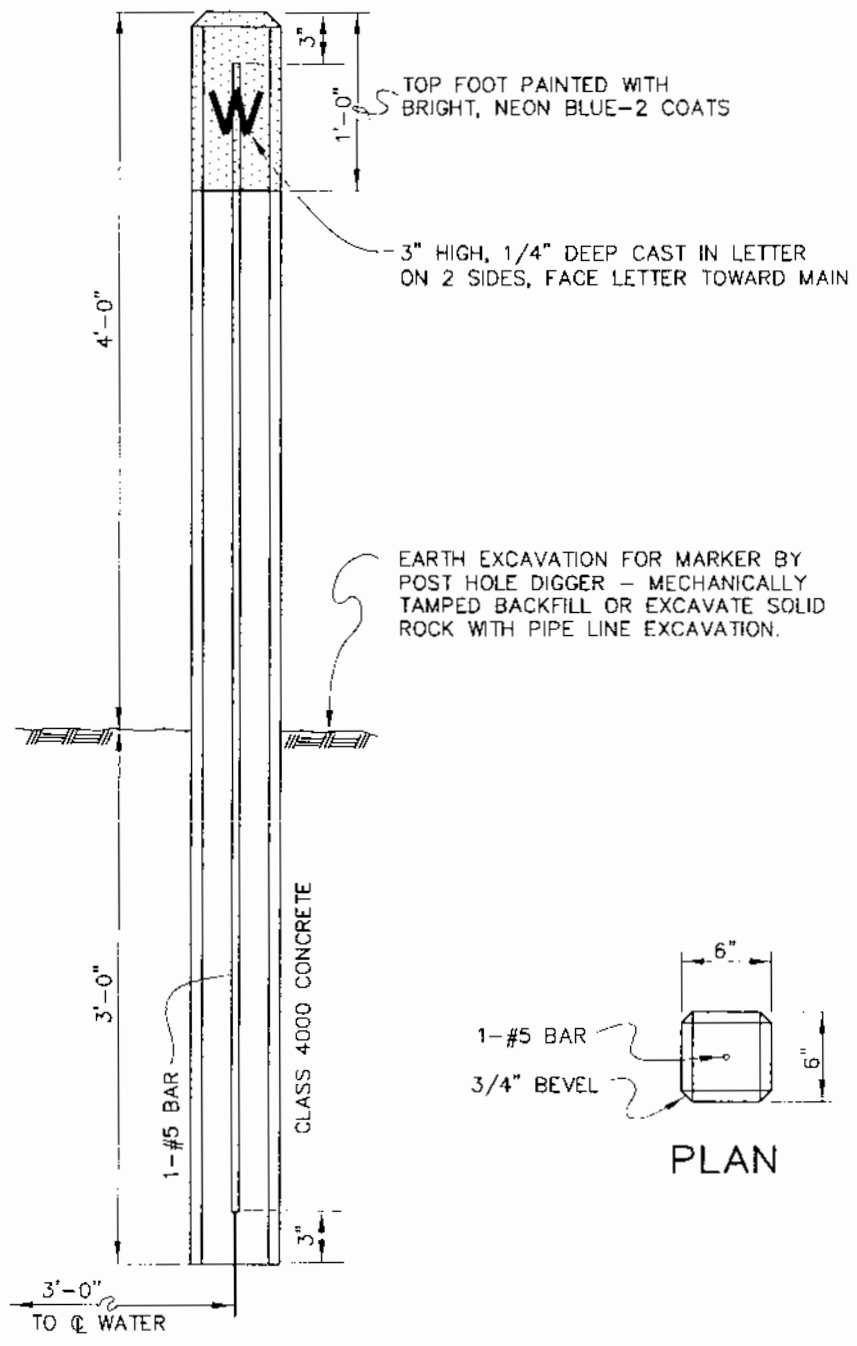


# DETAIL BURIED SERVICE GATE VALVE INSTALLATION

NOT TO SCALE

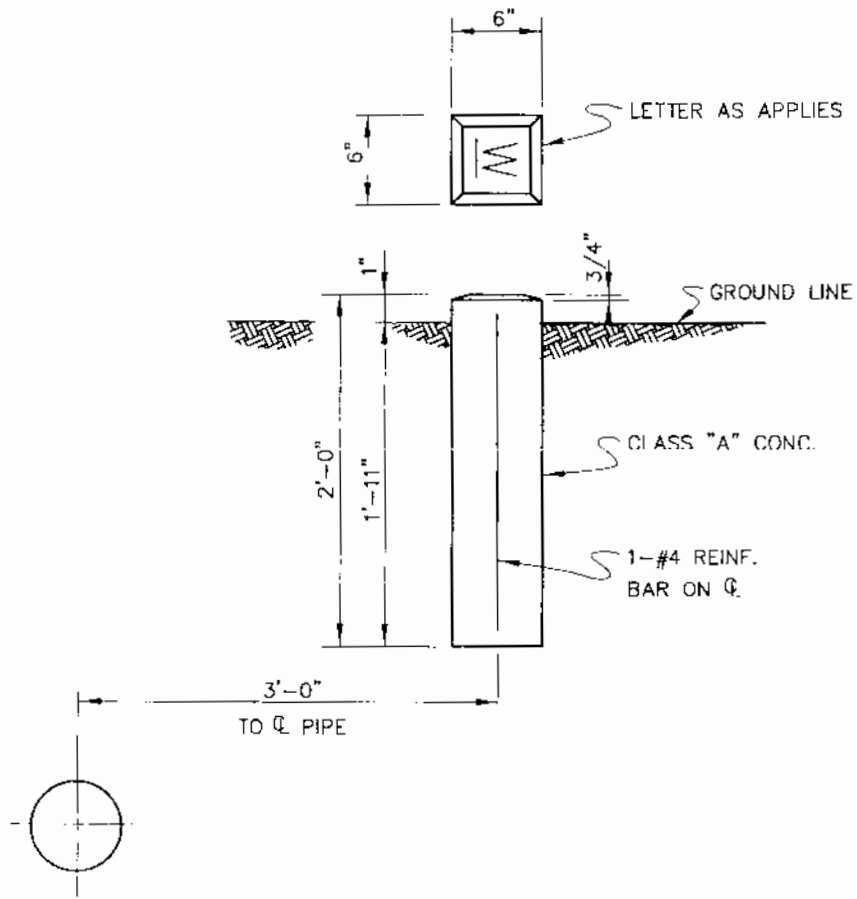
DATE	BY	REVISION
MONTICELLO UTILITY COMMISSION MONTICELLO, KENTUCKY		
GATE VALVE INSTALLATION		
		DWG. NO. W24

MONTICELLO WATER SANITARIUM-M1 CONCRETE LINE MARKER TALL DWG. NO. M1



ELEVATION  
 DETAIL  
 CONCRETE LINE MARKER  
 NOT TO SCALE

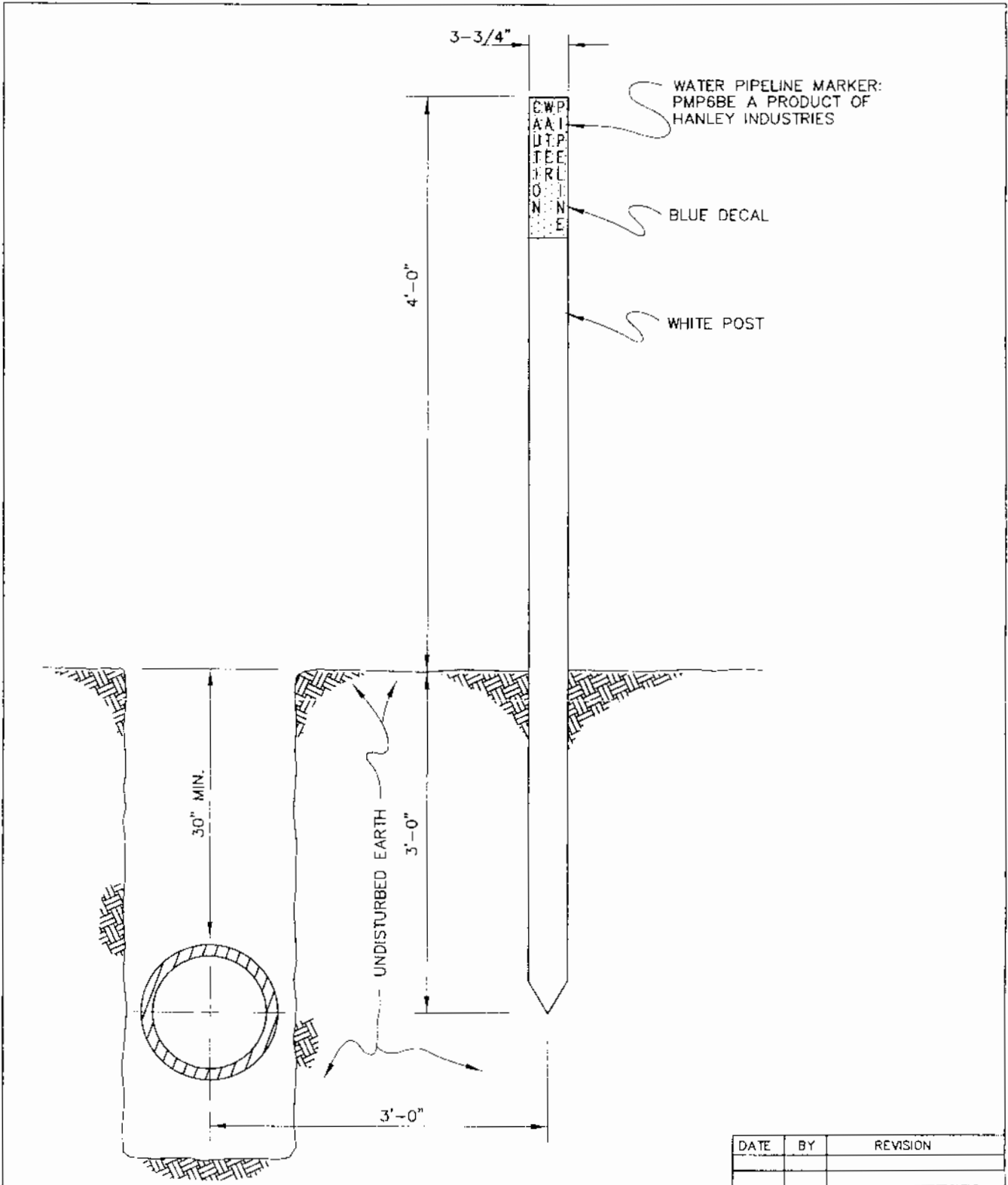
DATE	BY	REVISION
MONTICELLO UTILITY COMMISSION MONTICELLO, KENTUCKY		
CONCRETE LINE MARKER TALL		
		DWG. NO. M1



**CONCRETE LINE MARKER**  
 N.T.S.

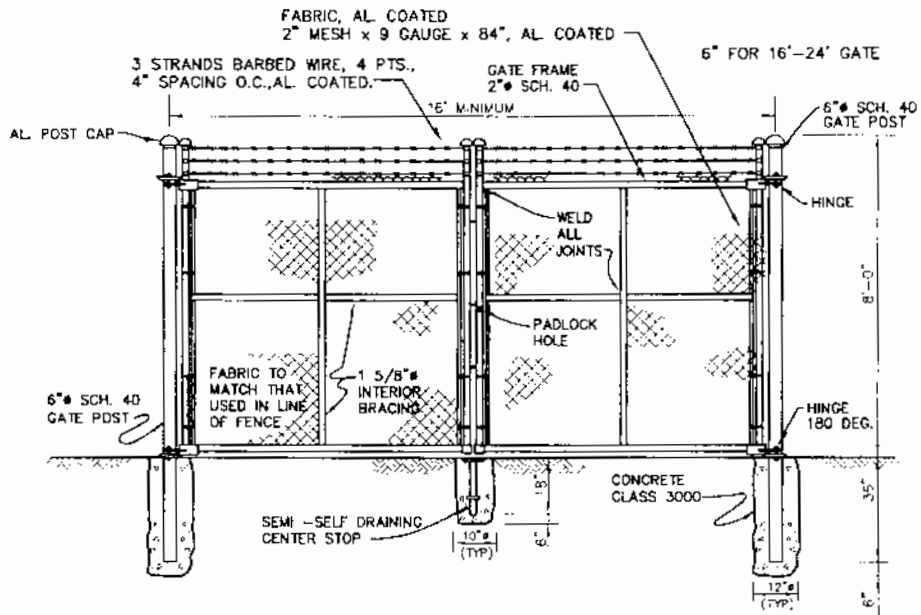
DATE	BY	REVISION
MONTICELLO UTILITY COMMISSION MONTICELLO, KENTUCKY		
CONCRETE LINE MARKER SHORT		
		DWG. NO. M2

MONTICELLO UTILITY COMMISSION MONTICELLO, KENTUCKY DWG. NO. M3



DETAIL  
 FLEXIBLE FIBERGLASS  
 COMPOSITION LINE MARKER  
 N.T.S.

DATE	BY	REVISION
MONTICELLO UTILITY COMMISSION MONTICELLO, KENTUCKY		
FIBERGLASS LINE MARKER		
		DWG. NO. M3



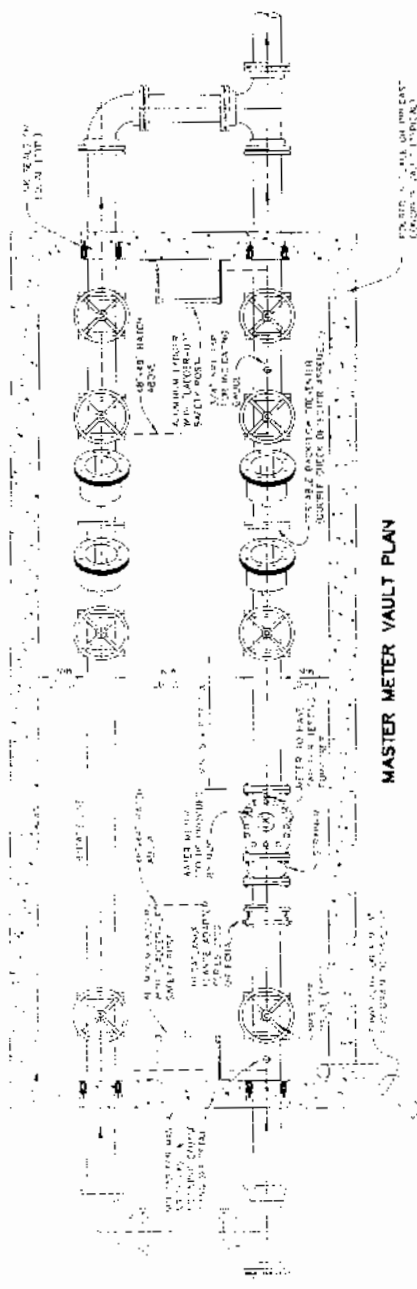
DETAIL — SECURITY DOUBLE GATE  
 NOT TO SCALE

MONTICELLO UTILITY COMMISSION, 108 M4 SECURITY GATE, 10/21/2008 2:10:21 PM, LINDA

DATE	BY	REVISION
MONTICELLO UTILITY COMMISSION MONTICELLO, KENTUCKY		
SECURITY FENCE AND GATES		
		DWG. NO. M4



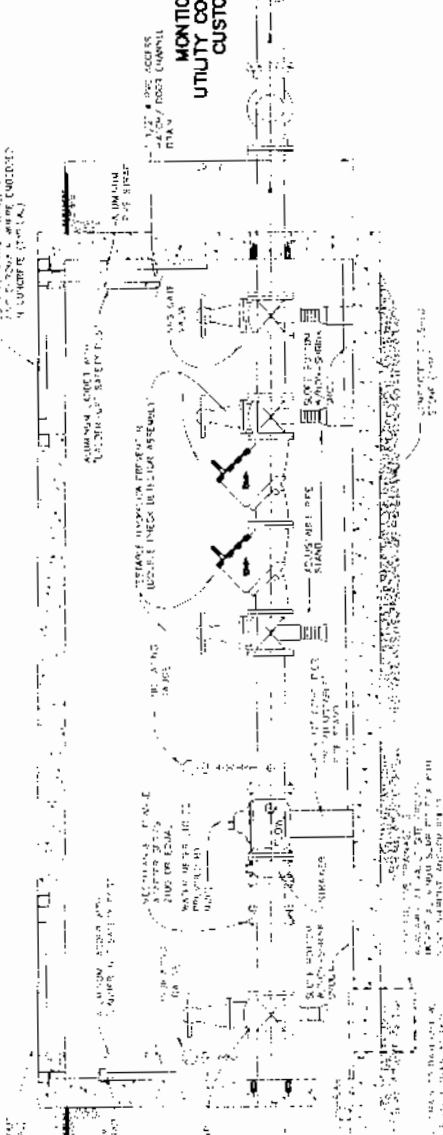




MASTER METER VAULT PLAN

ALL COMPONENTS OF THE MASTER METER VAULT SHALL BE PROVIDED MAINTENANCE AND OPERATED BY THE WATER AND GAS UTILITIES DEPARTMENT. ALL MATERIALS AND COMPONENTS SHALL BE PROVIDED AND APPROVED BY THE MONTICELLO UTILITY COMMISSION.

ALL PIPING ON EXHAUSTION TRENCH SHALL BE APPROXIMATELY 12" DIA. AND SHALL BE INSTALLED IN A CONCRETE TRENCH. EACH WORKMAN PRESENT MUST BE TRAINED AS PER THE UTILITY CODE, WHICH WILL BE WITH THE CONTRACT.



MASTER METER VAULT SECTION

MASTER METER VAULT OPTION 2

ALL COMPONENTS OF THE MASTER METER VAULT SHALL BE PROVIDED MAINTENANCE AND OPERATED BY THE WATER AND GAS UTILITIES DEPARTMENT. ALL MATERIALS AND COMPONENTS SHALL BE PROVIDED AND APPROVED BY THE MONTICELLO UTILITY COMMISSION.

ALL PIPING ON EXHAUSTION TRENCH SHALL BE APPROXIMATELY 12" DIA. AND SHALL BE INSTALLED IN A CONCRETE TRENCH. EACH WORKMAN PRESENT MUST BE TRAINED AS PER THE UTILITY CODE, WHICH WILL BE WITH THE CONTRACT.

DATE	DESCRIPTION

DRAWN BY  
 CHECKED BY  
 PROJECT NO.  
 SHEET NO.  
 MOUNTAIN STATE UTILITY COMMISSION  
 MONTICELLO, NEVADA  
 MASTER METER VAULT  
 OPTION 2  
 DATE: 7/23/08