COLE COUNTY DEPARTMENT OF PUBLIC WORKS

LIBERTY ROAD BRIDGE REPLACEMENT
Project No. 2016-801-1

BID DATE: October 7, 2016

BIDDING DOCUMENTS

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ADVERTISEMENT FOR BIDS

NOTICE TO BIDDERS

SEALED PROPOSALS for the Cole County Gravel Road Upgrade Program, consisting of:

LIBERTY ROAD BRIDGE REPLACEMENT
PROJECT NO. 2016-801-1

Located on Liberty Road in Sec 30, T44N, R10W in Cole County, Missouri, and

WILL be received and opened publicly at the office of Cole County Commission, Courthouse Annex, Room 200, 311 East High Street, Jefferson City, Missouri 65101 at

9:00 A.M. on Friday, October 7, 2016

Any and all bids received after the time specified above will be returned unopened.

The proposed work includes removals, grading, excavating, culvert installations, rock blanket, aggregate base, asphalt paving guardrail, seeding/mulching, bridge construction and miscellaneous work associated with the construction of a single span 82'-6" long pre-stressed concrete girder bridge. The work also includes, as an alternate, waterline relocation along the right-of-way within the project limits.

Plans and specifications may be viewed online in the bids section at www.colecounty.org. All contractors wishing to bid on this project shall obtain an official copy of the plans and specifications at the office of the Cole County Department of Public Works, 5055 Monticello Road, Jefferson City, Missouri 65109-9182, (573) 636-3614. A payment of **$25.00** per set of complete plans and specifications will be charged for printing and is not refundable. All checks or money orders for plans and specifications for shall be made payable to Cole County Road & Bridge Fund.

A Pre-Bid Conference will be held on Friday, September 30, 2016, at 9:00 A.M. at the Cole County Fire Protection District "Training & Administration Building" located at 5206 Monticello Road, Jefferson City, MO 65109. All bidders are urged to attend.

The Owner reserves the right to reject any and all bids and to waive informalities therein, to determine the lowest and best bid and to approve the bond. E.O.E.

News Tribune: 09/11/16; 09/18/16 and 09/25/16

NOTICE TO BIDDERS

Sealed proposals will be received at the office of the Cole County Commission, Courthouse Annex, Room 200, 311 East High Street, Jefferson City, Missouri, 65101, until 9:00 A.M., **Friday, October 7, 2016**. The bids will be opened and read aloud at the Cole County Commission, Courthouse Annex, Room 200, 311 East High Street at 9:00 A.M. on that same day.

The proposed work includes removals, grading, excavating, culvert installations, rock blanket, aggregate base, asphalt paving guardrail, seeding/mulching, bridge construction and miscellaneous work associated with the construction of a single span 82'-6" long pre-stressed concrete girder bridge. The work also includes, as an alternate, waterline relocation along the right-of-way within the project limits for:

LIBERTY ROAD BRIDGE REPLACEMENT
PROJECT NO. 2016-801-1

All equipment, material, and workmanship must be in accordance with the plans, specifications, and contract documents on file with the Director of Cole County Public Works, 5055 Monticello Road, Jefferson City, Missouri 65109.

Plans and specifications may be viewed online in the bids section at www.colecounty.org.

Plans and specifications may also be inspected and are available to bidders at the office of the Cole County Department of Public Works, 5055 Monticello Road, Jefferson City, Missouri 65109-9182, (573) 636-3614.

Payment for Plans and Specifications

A payment of **$25.00** per set of complete plans and specifications will be charged for printing and postage and is not refundable. All checks or money orders for plans and specifications shall be made payable to Cole County Road and Bridge Fund.

All wages paid for work under this contract shall comply with requirements of the prevailing wage law of the State of Missouri, Section 290.210 through 290.340, RSMo. 1986.

A certified check on a solvent bank or a bid bond by a satisfactory surety in an amount to five percent (5%) of the total amount of the bid must accompany each proposal.

A one-year Performance and Guarantee Bond is required.

The County reserves the right to reject any or all bids and to waive informalities therein to determine which is the lowest and best bid and to approve the bond.

COUNTY OF COLE

Larry J. Benz, P.E.
Director of Public Works

INSTRUCTIONS TO BIDDERS

2-1 Scope of Work

The proposed work includes removals, grading, excavating, culvert installations, rock blanket, aggregate base, asphalt paving guardrail, seeding/mulching, bridge construction and miscellaneous work associated with the construction of a single span 82'-6" long pre-stressed concrete girder bridge. The work also includes, as an alternate, waterline relocation along the right-of-way within the project limits.

2-2 Inspection of Plans, Specifications, and Site of Work

The bidder is required to examine carefully the site of the proposed work, the proposal, plans, specifications, supplemental specifications, special provisions, and contract forms before submitting a proposal.

2-3 Interpretation of Contract Documents

If the bidder has any questions which arise concerning the true meaning or intent of the Plans, Specifications, or any part thereof, which affect the cost, quality, quantity, or character of the project, he shall request in writing that an interpretation be made and an addendum be issued by the Engineer, which shall then be delivered to all bidders to whom Plans and Specifications have been issued. Failure to have requested an addendum covering any questions affecting the interpretations of the Plans and Specifications shall not relieve the Contractor from delivering the completed project in accordance with the intent of the Plans and Specifications to provide a workable project.

2-4 Qualifications of Bidders

The County of COLE may make such investigations as deemed necessary to determine the ability of the bidder to perform the work and the bidder shall furnish to the County of COLE all such information and data for this purpose as the County of COLE may request. The County of COLE reserves the right to reject any bid if the evidence submitted by the bidder or investigation of such bidder fails to satisfy the County of COLE that such bidder is properly qualified to carry out the obligations of the Contract and to complete the work contemplated therein.

2-5 Equivalent Material

Wherever definite reference is made in these Specifications to the use of any particular material or equipment, it is to be understood that any equivalent material or equipment may be used which will perform adequately the duties imposed by the general design, subject to the approval of the Engineer.

2-6 Bid Security

Each bid must be accompanied by a certified check or bid bond made payable to the

County of COLE for five percent (5%) of the amount of the bid. Bid securities will be returned after award of contract except to the successful bidder.

Should the successful bidder or bidders fail or refuse to execute the bond and the contract required within ten (10) days after he has received Notice of Acceptance of his bid, he shall forfeit to the County of COLE as liquidated damages for such failure or refusal, the security deposited with his bid.

2-7 Preparation of Bids

Bid must be made upon prescribed forms attached at the back of these Specifications. Only sealed bids will be considered, all bids otherwise submitted will be rejected as irregular.

All sales taxes which might lawfully be assessed against the County of COLE are to be paid by the Contractor from the monies obtained in satisfaction of his Contract, it being understood by the bidder that the bid prices submitted shall include the cost of such taxes.

All blank spaces in the bid must be filled in and no change shall be made in the phraseology of the bid or addition to the items mentioned therein. Any conditions, limitation, or provisions attached to bids will render them informal and may be considered cause for their rejection.

2-8 Prices

The price submitted for each item of the work shall include all cost of whatever nature involved in its construction, complete in place, as described in the Specifications.

2-9 Addenda

Addenda may be issued on this project at any time up to 24 hours prior to the bid date and time. Occasionally an addendum may contain information that could affect a contractor's bid. It shall be the responsibility of the contractor to verify if any addenda have been issued prior to submitting their bid. The County assumes no liability if a contractor fails to incorporate addenda into their bid.

2-10 Approximate Quantities

In cases where any part or all of the bidding is to be received on a unit price basis, the quantities stated in the bid will not be used in establishing final payment due the successful Contractor. The quantities stated on which unit prices are so invited are approximate only and each bidder shall make his own estimate from the plans of the quantities required on each item and calculate his unit price bid for each item accordingly. Bids will be compared on the basis of number of units stated in the bid. Such estimated quantities, while made from the best information available, are approximate only. Payment on the Contract will be based on actual number of units installed on the completed work.

2-11 Lump Sum Items

Payment for each lump sum item shall be at the lump sum bid for the item, complete in place, and shall include the costs of all labor, materials, tools, and equipment to construct the item as described herein and to the limits shown on the Plans.

2-12 Submission of Bids

The Bid and the Bid Security guaranteeing the same shall be placed in a sealed opaque envelope and marked **LIBERTY ROAD BRIDGE REPLACEMENT, PROJECT NO. 2016-801-1**. The envelope shall be clearly marked with the project name, project number, and the bidder's name and address.

2-13 Alternate Bids

In making the award of the alternate bid for waterline work, the decision of that award will be in the best interest to Public Water Supply District No. 4.

2-14 Withdrawal of Bids

If a bidder wishes to withdraw his bid, he may do so before the time fixed for the opening, without prejudice to himself. No bidder may withdraw his bid for a period of ninety (90) days after the scheduled closing time for the receipt of bids.

2-15 Right to Reject Bids

The County of COLE reserves the right to reject any or all bids, to waive any informality in the bids received, or to accept the bid or bids that in its judgment will be for the best interest of the County of COLE.

2-16 Award of Contract

The awarded bidder will be chosen by the base bid only. The water district will then have the option of whether to award the waterline based on the cost of the alternate.

If within ten (10) days after he has received Notice of Acceptance of his bid, the successful bidder or bidders shall refuse or neglect to come to the office of the Director of Public Works and to execute the Contract and to furnish the required Contractor's Bond, properly signed by the Contractor and the Surety or Sureties satisfactory to the County of COLE as hereinafter provided, the bidder or bidders shall be deemed to be in default and shall forfeit the deposit.

2-17 Performance Bond

A Performance Bond in an amount equivalent to one hundred percent (100%) of the Contract price, must be furnished and executed by the successful bidder or bidders, this bond to be in the form contained in this Contract.

The Surety shall be a corporate Surety Company or companies of recognized standing licensed to do business in the State of Missouri and acceptable to the County of COLE.

2-18 Indemnification and Insurance

The Contractor agrees to indemnify and hold harmless the County, Public Water Supply District No. 4 and the Engineer from all claims and suits for loss of or damage to property, including loss of all judgments recovered therefore, and from all expense in defending said claims, or suits, including court costs, attorney fees, and other expense caused by any act or omission of the Contractor and/or his subcontractors, their respective agents, servants, or employees.

Certificate of Insurance

All certificates of insurance provided for this project shall be issued directly from the company affording coverage. Certification from a local agent is not acceptable without the necessary paperwork empowering and authorizing the agent to sign the surety's name.

In addition, when an aggregate amount is included, a statement of the amount of that aggregate available to date shall also be attached.

2-19 Bid Security Returned to Successful Bidder

Upon the execution of the Contract and approval of Bond, the Bid Security will be returned to the bidder unless the same shall have been presented for collection prior to such time, in which case the amount of the deposit will be refunded by the County of COLE.

2-20 Nondiscrimination in Employment

Contracts for work under this bid will obligate the Contractor and subcontractors not to discriminate in employment practices.

2-21 Prevailing Wage Law

The principal contractor and all subcontractors shall pay not less than the prevailing wage hourly rate for each craft or type of workman required to execute this contract as determined by the Department of Labor and Industrial Relations of Missouri, pursuant to Sections 290.210 through 290.340, RSMo. 1986. (See Determination herewith included in Section 5.)

2-22 Guarantee

The Contractor guarantees that the equipment, materials, and workmanship furnished under this contract will be as specified and will be free from defects for a period of one (1) year from the date of final acceptance. In addition, the equipment furnished by the Contractor shall be guaranteed to be free from defects in design.

Within the guarantee period and upon notification of the Contractor by the County and/or

Public Water Supply District No. 4, the Contractor shall promptly make all needed adjustments, repairs, or replacements arising out of defects which, in the judgment of the Engineer, or the County, become necessary during such period. The cost of all materials, parts, labor, transportation, supervision, special tools, and supplies required for replacement of parts, repair of parts, or correction of abnormalities shall be paid by the Contractor, or by his surety under the terms of the Bond.

The Contractor also extends the terms of this guarantee to cover repaired parts and all replacement parts furnished under the guarantee provisions for a period of one (1) year from the date of installation thereof.

If within ten (10) days after the County and/or Public Water Supply District No. 4 gives the Contractor notice of a defect, failure, or abnormality of the work, the Contractor neglects to make, or undertake with due diligence to make, the necessary repairs or adjustments themselves or order the work to be done by a third party, the costs of the work shall be paid by the Contractor.

In the event of an emergency where, in the judgment of the County and/or Public Water Supply District No. 4, delays would cause serious loss or damage, repairs or adjustments may be made by the County and/or Public Water Supply District No. 4, or a third party chosen by the County and/or Public Water Supply District No. 4, without giving notice to the Contractor, and the cost of the work shall be paid by the Contractor, or by his surety under the terms of the Bond.

2-23 Notice to Proceed

A written notice to begin construction work will be given to the Contractor by the County of COLE within ten (10) days after the Contractor has executed the Contract Documents. The time for completion of the project shall begin to run on the date established in this notice.

2-24 Work Schedule

To insure that the work will proceed continuously through the succeeding operations to its completion with the least possible interference to traffic and inconvenience to the public, the Contractor shall, at the request of the Engineer, submit for approval a complete schedule of his proposed construction procedure, stating the sequence in which various operations of work are to be performed. The Contractor may not change the work sequence without the prior approval of the Engineer.

2-25 Section 292.675 RSMo. Safety Training Requirements

In 2008 the Missouri General Assembly adopted HB 1549, creating additional requirements affecting public works contracts by requiring all contractors and subcontractors doing work on a project to provide and require their on-site employees to complete a ten (10) hour course in construction safety and health that is approved by the federal Occupational Safety and Health Administration ("OSHA") or a similar program approved by the Missouri Department of Labor and Industrial Relations, which is at least as stringent as an approved OSHA program; and

The following items will be required in this contract:

Section One: Any contractor for Cole County for purposes of construction of public works and any subcontractor to such contractor shall comply with the provisions of section 292.675, RSMo. and provide a ten-hour OSHA construction safety program for the on-site employees which includes a course in construction safety and health approved by OSHA or a similar program approved by the Missouri Department of Labor and Industrial Relations that is at least as stringent as an approved OSHA program, unless such employees have previously completed the required program.

Section Two: All employees who have not previously completed this course must do so within sixty (60) days of beginning work on a Cole County construction project.

Section Three: Any employee found on a work site subject to this ordinance without documentation of successfully completing this course shall have twenty (20) days to produce such documentation before being subject to removal from the project.

2-26 Excessive Unemployment Law and Restrictive States

Bidders are hereby notified that the excessive unemployment law is in effect. During times of high unemployment, state law permits the Department's Division of Labor Standards to declare that excessive unemployment is in effect, allowing only workers from certain states to work on the Missouri's public works projects. Public works projects are construction projects funded wholly or partially from public funds, or are projects that benefit the public such as but not limited to schools, parks, fire houses, and government buildings. The excessive unemployment law does not apply to projects funded in part by Federal Funds.

Restrictive states have laws in place restricting Missouri workers to work on their public works projects. Workers from these states are also not allowed to work on Missouri's public works projects.

Only Missouri laborers and laborers from nonrestrictive states are allowed by law to be employed on Missouri's public works projects when the unemployment rate exceeds **5 percent** for two consecutive months. **(See Sections 290.550 through 290.580 RSMo)**.

Restrictive States- workers from these states are **NOT** allowed to be employed on Missouri public works projects: Alaska, Arizona, California, Colorado, Connecticut, Delaware, District of Columbia, Florida, Idaho, Illinois, Iowa, Maine, Massachusetts, Mississippi, Montana, Nevada, New Jersey, North Dakota, South Dakota, and the U.S. Virgin Islands, West Virginia and Wyoming.

Non-Restrictive States- workers from these states are allowed to be employed on Missouri public works projects: Alabama, Arkansas, Georgia, Hawaii, Indiana, Kansas, Kentucky, Louisiana, Maryland, Michigan, Minnesota, Nebraska, New Hampshire, New Mexico, New York, North Carolina, Ohio, Oklahoma, Oregon, Pennsylvania, Rhode Island, South Carolina, Tennessee, Texas, Utah, Vermont, Virginia, Washington and Wisconsin.

2-27 Contract Time

This contract shall be a completion date contract. The contract shall be completed by no later than **April 15, 2017**.

2-28 Liquidated Damages

Liquidated damages shall be assessed at the rate of **Seven Hundred Dollars ($700.00)** per calendar day until the project is complete, should the project not be completed within the specified time periods.

2-29 Partial Acceptance

The County reserves the right to accept any part or all of the bid for the project.

PROPOSAL FORM

COUNTY OF COLE, MISSOURI

LIBERTY ROAD BRIDGE REPLACEMENT
PROJECT NO. 2016-801-1

Name of Bidder: _____

Address of Bidder: _____

To: Cole County Department of Public Works
5055 Monticello Road
Jefferson City, MO 65109

THE UNDERSIGNED BIDDER, having examined the Plans, Specifications, Regulations of the Contract, Special Conditions and other proposed Contract Documents, and all addenda thereto; and being acquainted with and fully understanding (a) the extent and character of the work covered by this Proposal; (b) the location, arrangement, and specified requirements for the proposed work; (c) the location, character, and condition of existing streets, roads, highways, railroads, pavement, surfacing, walks, driveways, curbs, gutters, trees, sewers, utilities, drainage courses and structures, and other installation, both surface and underground which may affect or be affected by the proposed work; (d) the nature and extent of the excavations to be made, and the type, character, and general condition of materials to be excavated; (e) the necessary handling and re-handling of excavated materials; (f) the location and extent of necessary or probable dewatering requirements; (g) storm and flood water; (h) local conditions relative to labor, transportation, hauling, and rail delivery facilities; and (i) all other factors and conditions affecting or which may be affected by the work.

HEREBY PROPOSED to furnish all required materials, supplies, equipment, tools, and plant; to perform all necessary labor and supervision; and to construct, install, erect, and complete all work stipulated in, required by, and in accordance with the proposed Contract Documents and the drawings, Specifications, and other documents referred to therein (as altered, amended, or modified by addenda), in the manner and time prescribed and that he will accept in full payment sums determined by applying to the quantities of the following items, the following unit prices and/or any lump sum payments provided, plus or minus any special payments and adjustments provided in the Specifications and he understands that the estimated quantities herein given are not guaranteed to be the exact or total quantities required for the completion of the work shown on the drawings and described in the Specifications, and that increases or decreases may be made over or under the Contract estimated quantities to provide for needs that are determined during progress of the work and that prices bid shall apply to such increased or decreased quantities as follows:

LIBERTY ROAD BRIDGE REPLACEMENT
PROJECT NO. 2016-801-1
ITEMIZED PROPOSAL

Item No.	Item Description	Unit	Quantity	$ Unit Price	$ Amount
618-10.00	Mobilization	LS	1		
203-99.01	Earthwork	LS	1		
202-20.10	Removal of Improvements	LS	1		
304-99.05	3" Rolled Stone Base	SY	427		
401-99.05	Bituminous Pavement Mixture, PG64-22, (BP-1)	SY	217		
401-99.25	Bituminous Pavement Mixture, PG64-22, (Base)	SY	217		
401-99.35	5" Asphalt Driveway (1.5" Survace on 3.5" Base)	SY	210		
731-99.02	5' x 5' Area Inlet	EA	1		
726-99.03	18 in. Class III Reinforced Concrete Pipe Culvert	LF	91		
726-99.23	30 in. Class III Reinforced Concrete Pipe Culvert	LF	64		
732-99.02	18 in. Precast Concrete Flared End Section	EA	1		
732-99.22	30 in. Precast Concrete Flared End Section	EA	2		
310-70.03	Gravel (A) or Crushed Stone (B) or Chat (C)	SY	791		
611-99.07	Type 2 Rock Blanket	CY	425		
503-10.11A	Bridge Approach Slab (Minor Road)	SY	119		
216-05.00	Removal of Bridges	LS	1		
702-10.14	Structural Steel Piles (14in.)	LF	172		
702-60.00	Pre-Bore for Piling	LF	160		
702-70.00	Pile Point Reinforcement	EA	8		
703-20.03	Class B Concrete (Substructure)	CY	27.4		
703-42.15	Safety Barrier Curb	LF	213		
703-42.13	Slab on Concrete I-Girder	SY	260		
705-60.02	Type 4 (45 in.), Prestressed Concrete I-Girder	LF	321		
712-33.01	Steel Intermediate Diaphragm for P/S Concrete Girders	EA	3		
712-36.10	Slab Drain	EA	14		
715-10.01	Vertical Drain at End Bents	EA	2		
716-10.00	Plain Neoprene Bearing Pad	EA	8		
606-22.04A	Bridge Anchor Section, 6.5 ft. Posts (Safety Barrier Curb) (New Construction Only)	EA	4		
606-23.03	Asymetrical Transition Section, 6.5 ft. Posts	EA	4		
606-30.15	Type A Crashworthy End Terminal	EA	4		
627-40.00	Contractor Furnished Surveying and Staking	LS	1		
616-99.01	Construction Signage/Traffic Control	LS	1		
805-99.01	Seeding - Cool Season Mixtures	LS	1		
806-99.02	Rock Ditch Check	EA	9		
806-99.02	Inlet Check	EA	1		
806-10.19	Silt Fence	LF	435		
			TOTAL BASE BID:		

ADD ALTERNATE A

WATERLINE UPGRADE

Item No.	Item Description	Unit	Quantity	$ Unit Price	$ Amount
1	Mobilization	LS	1		
2	8" PR200 SDR 21 ASTM D2241 PVC Pipe	LF	360		
3	8" PR250 SDR 17 ASTM D2241 Restrained Joint PVC - Directional Bore (No Casing)	LF	200		
4	8" PR250 SDR 17 ASTM D2241 Restrained Joint PVC - Open Cut	LF	170		
5	Meter and Meter Pit, Complete with Service Tap	EA	1		
6	Water Test Pit (Complete with Gate Valve)	EA	1		
7	Fire Hydrant (Complete with Gate Valve)	EA	1		
8	8" Gate Valve	EA	2		
9	Tie to Existing Water Main	EA	2		
10	8" X 6" Anchor Tee	EA	1		
11	8" X 4" Reducer	EA	1		
12	8" Solid Sleeve	EA	1		
13	8" Anchor Coupling	EA	4		
14	8" 22.5° Bend	EA	2		
15	8" 45° Bend	EA	2		
16	Surface Restoration	LS	1		
17	Close valve and cut valve box	EA	1		
			TOTAL ALTERNATE A:		

BIDDER recognizes and acknowledges the receipt of the following Addenda:

Date	Addendum Number	Date	Addendum Number

If the Bidder intends to use any subcontractor in the course of the construction, he shall list them.
(If necessary, attach additional pages to list all subcontractors.)

Company Name	Address	City, State, Zip	Work To Be Performed	% of Bid

TIME OF COMPLETION:

The undersigned hereby agrees to complete the project by no later than **April 15, 2017,** subject to the stipulations of the regulations of the Contract and the Special Conditions.

It is understood that the specifications governing the construction of the work contemplated are those known and designated as the "Missouri Highway & Transportation Commission Standard Specifications for Highway Construction, 2011" approved by the Missouri Highways & Transportation Commission, together with the special provisions, job and general, if any attached to this proposal.

It is understood and agreed that if this Proposal is accepted, the prices quoted above include all applicable state taxes and that said taxes shall be paid by the Contractor.

The undersigned, as Bidder, hereby declares that the only persons or firms interested in the Proposal as principal or principals is or are named herein and that no other persons or firms than herein mentioned have any interest in this Proposal or in the Contract to be entered into; and this Proposal is made without connection with any other person, company, or parties making a bid or proposal; and that it is in all respects fair and in good faith, without collusion or fraud.

The undersigned agrees that the accompanying bid deposit shall become the property of the County should he fail or refuse to execute the Contract or furnish Bond as called for in the specifications within the time provided.

If written notice of the acceptance of this bid is mailed, telegraphed, or delivered to the undersigned within ninety (90) days after the date of opening of bids, or any time thereafter before this bid is withdrawn, the undersigned will, within ten (10) days after the date of such mailing, telegraphing, or delivering of such notice, execute and deliver a Contract in the form of Contract attached.

The undersigned hereby designates as his office to which such notice of acceptance may be mailed, telegraphed, or delivered:

_____

Contact Person Company Name Mailing Address City, State & Zip Code

It is understood and agreed that this bid may be withdrawn at any time prior to the scheduled time for the opening of bids or any authorized postponement thereof.

Attached hereto is a Bid Bond for the sum of _____

_____

_____ ($_____)

Dollars (cashier's check), made payable to the County of COLE.

SIGNATURE AND IDENTITY OF BIDDER

The undersigned states that the correct LEGAL NAME and ADDRESS of (1) the individual bidder, (2) each partner or joint venturer (whether individuals or corporation, and whether doing business under a fictitious name), or (3) the corporation (with the state in which it is incorporated) are shown below; and that (if not signing with the intention of binding himself to become the responsible and sole contractor) he is the agent of, and duly authorized in writing to sign for the Bidder or Bidders; and that he is signing and executing this (as indicated in the proper spaces below) as the proposal of

---

AN INDIVIDUAL:

Name of Individual	Residence Street Address
Social Security Number	City, State & Zip Code
Firm Name, If Any	Business Address
Business Telephone Number	City, State & Zip Code
Signature	Date

A PARTNERSHIP:

Name of Partnership	(State Names & Addresses of All Partners)
Partner	Residence Address
Partner	Residence Address
Business Address	
City, State & Zip Code	Business Telephone Number
Signature of At Least One Partner	Date

A CORPORATION:

_____
Name of Corporation

_____
Name and Title of Officer

_____
Business Telephone Number

_____
Business Address

_____
Signature of Officer

ATTEST:

_____
Signature of Secretary (SEAL)

Incorporated under the laws of the State of _____

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

_____
City, State & Zip Code

_____
Date

_____
Date

ANTI-COLLUSION STATEMENT

STATE OF _____)
)
)
COUNTY OF _____)

_____

_____

being first duly sworn, deposes and says that he is

_____ of _____
Title of Person Signing Name of Bidder

_____
Address of Bidder

that all statements made and facts set out in the proposal for the above project are true and correct; and that the bidder (The person, firm, association, or corporation making said bid) has not, either directly or indirectly, entered into any agreement, participated in any collusion, or otherwise taken any action in restraint of free competitive bidding in connection with such bid of any contract which result from its acceptance.

Affiant further certifies that bidder is not financially interested in, or financially affiliated with, any other bidder for the above project.

(BY) _____

(BY) _____

Sworn to before me this _____ day of _____, 20_____

_____
Notary Public

My commission expires: _____

CONTRACTOR'S AFFIDAVIT

STATE OF _____)
)
)
COUNTY OF _____)

This affidavit is hereby made a part of the Proposal, and an executed copy thereof shall accompany each Proposal submitted.

The undersigned, _____, of

lawful age, being first duly sworn states upon oath that he is _____

_____

_____

the Contractor submitting the attached proposal, that he knows of his own knowledge and states it to be a fact that neither said proposal nor the computation upon which it is based include any amount of monies, estimate or allowance representing wages, moneys or expenses, however designated, proposed to be paid to persons who are not required to furnish material or actually perform services upon or as a part of the proposed project.

_____
AFFIANT

Subscribed and sworn to before me, a Notary Public, in and for the County and State aforesaid, this _____ day of _____, 20_____.

_____
Notary Public

My commission expires _____

CONSTRUCTION CONTRACT

THIS CONTRACT, made and entered into this _____ day of_____, 2016, by and between **[INSERT CONTRACTOR'S NAME]**, hereinafter called "Contractor," and the **County of Cole, Missouri**, hereinafter called "County."

WITNESSETH: That Whereas, the Contractor has become the lowest responsible bidder for furnishing the supervision, labor, tools, equipment, materials, and supplies and for constructing the following County improvements:

LIBERTY ROAD BRIDGE REPLACEMENT
PROJECT NO. 2016-801-1

NOW, THEREFORE, the parties to this contract agree to the following:

1. **Manner and Time for Completion** The Contractor agrees with the County to furnish all supervision, labor, tools, equipment, materials, and supplies; to perform all necessary labor and supervision; and to construct, install, erect and complete all work stipulated in, required by and in accordance with the contract documents and drawings, specifications and other documents referred therein (as altered, amended or modified by addenda) and with any applicable County regulations and state and federal laws, within ten (10) working days from the date Contractor is ordered to proceed, which order shall be issued by the Director of Public Works within ten (10) working days after the date of this contract.

2. **Prevailing Wages** All labor utilized in the construction of the aforementioned improvements shall be paid a wage of no less than the "prevailing hourly rate of wages" for work of a similar character in this locality, as established by the Department of Labor and Industrial Relations of the State of Missouri. Contractor acknowledges that Contractor knows the prevailing hourly rate of wages for this project because Contractor has obtained the prevailing hourly rate of wages from the contents of **ANNUAL WAGE ORDER NUMBER 23 - COLE COUNTY** in which the rate of wages is set forth. The Contractor further agrees that Contractor will keep an accurate record showing the names and occupations of all workmen employed by Contractor in connection with the work to be performed under the terms of this contract. The record shall show the actual wages paid to the workmen in connection with the work to be performed under the terms of this contract. A copy of the record shall be delivered to the Director of Public Works each week. In accordance with Section 290.250 RSMo., Contractor shall forfeit to the County One Hundred Dollars ($100.00) for each workman employed, for each calendar day or portion thereof that the workman is paid less than the stipulated rates for any work done under this contract, by the Contractor or any subcontractor under the Contractor.

3. **Contract Sum** The County shall pay the Contractor for the prompt, faithful, and efficient performance of the conditions and undertakings of this contract, subject to additions, and deductions as provided, herein, in current funds the sum of **[Insert Construction Amount].**

TOTAL CONTRACT AMOUNT.....$000,000.00

The County hereby accepts and reserves and the Contractor is hereby bound thereby, Unit Prices of the Proposal submitted as follows:

UNIT PRICES:

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

Itemized Quantities shall be place here in awarded contract

4. Insurance Contractor shall procure and maintain at its own expense during the life of this contract:

(a) Workers Compensation Insurance for all of its employees to be engaged in work under this contract.

(b) Contractor's Public Liability Insurance in an amount not less than $1,000,000 for all claims arising out of a single occurrence and $100,000 for any one person in a single accident or occurrence, except for those claims governed by the provisions of the Missouri workers compensation law, Chapter 287, RSMo., and Contractor's Property Damage Insurance in an amount not less than $800,000 for all claims arising out of a single accident or occurrence and $100,000 for any one person in a single accident or occurrence.

(c) Automobile Liability Insurance in an amount not less than $1,000,000 for all claims arising out of a single accident or occurrence and $100,000 for any one person in a single accident or occurrence.

(d) Owner's Protective Liability Insurance The Contractor shall also obtain at its own expense and deliver to the County and Public Water Supply District No. 4 an Owner's Protective Liability Insurance Policy naming the County of Cole and Public Water Supply District No. 4 as the insured, in an amount not less than $1,000,000 for all claims arising out of a single accident or occurrence and $100,000 for any one person in a single accident or occurrence, except for those claims governed by the provisions of the Missouri workmen's compensation law, Chapter 387, RSMo. No policy will be accepted which excludes liability for damage to underground structures or by reason of blasting, explosion, or collapse.

(e) Subcontracts In case any or all of this work is sublet, the Contractor shall require the Subcontractor to procure and maintain all insurance required in Subparagraphs (a), (b), and (c) hereof and in like amounts.

(f) Scope of Insurance and Special Hazard The insurance required under Sub-paragraphs (b) and (c) hereof shall provide adequate protection for the Contractor and its subcontractors, respectively, against damage claims which may arise from operations under this contract, whether such operations be by the insured or by anyone directly or indirectly employed by it, and also against any special hazards which may be encountered in the performance of this contract.

NOTE: Paragraph (f) is construed to require the procurement of Contractor's protective insurance (or contingent public liability and contingent property damage policies) by a general contractor whose subcontractor has employees working on the project, unless the general public liability and property damage policy (or rider attached thereto) of the general contractor provides adequate protection against claims arising from operations by anyone directly or indirectly employed by the Contractor.

5. Contractor's Responsibility for Subcontractors It is further agreed that Contractor shall be as fully responsible to the County for the acts and omissions of its subcontractors, and of persons either directly or indirectly employed by them, as Contractor is for the acts and omissions of persons it directly employs. Contractor shall cause appropriate provisions to be inserted in all subcontracts relating to this work, to bind all subcontractors to Contractor by all the terms herein set forth, insofar as applicable to the work of subcontractors and to give Contractor the same power regarding termination of any subcontract as the County may exercise over Contractor under any provisions of this contract. Nothing contained in this contract shall create any contractual relations between any subcontractor and the County or between any subcontractors.

6. Liquidated Damages The Director of Public Works may, at his discretion, deduct **Seven Hundred Dollars ($700.00)** per day from any amount otherwise due under this contract for every day Contractor fails or refuses to prosecute the work, or any separable part thereof, with such diligence as will insure the completion by the time above specified, or any extension thereof, or fails to complete the work by such time, as long as the County does not terminate the right of Contractor to proceed. It is further provided that Contractor shall not be charged with liquidated damages because of delays in the completion of the work due to unforeseeable causes beyond Contractor's control and without fault or negligence on Contractor's part or the part of its agents.

7. Termination The County reserves the right to terminate this contract by giving at least five (5) days' prior written notice to the Contractor, without prejudice to any other rights or remedies of the County should the Contractor be adjudged as bankrupt, or if Contractor should make a general assignment for the benefit of its creditors, or if a receiver should be appointed for Contractor or for any of its property, or if Contractor should persistently or repeatedly refuse or fail to supply enough properly skilled workmen or proper material, or if Contractor should refuse or fail to make prompt payment to any person supplying labor or materials for the work under the contract, or persistently disregard instructions of the County or fail to observe or perform any provisions of the contract.

8. County's Right to Proceed In the event this contract is terminated pursuant to Paragraph 6, then the County may take over the work and prosecute the same to completion, by contract or otherwise, and Contractor and its sureties shall be liable to the County for any costs over the amount of this contract thereby occasioned by the County. In any such case the County may take possession of, and utilize in completing the work, such materials, appliance, and structures as may be on the work site and are necessary for completion of the work. The foregoing provisions are in addition to, and not in limitation of, the rights of the County under any other provisions of the contract, County regulations, and state and federal laws.

9. Indemnity The Contractor agrees to defend, indemnify, and save the County and/or Public Water Supply District No. 4 harmless from and against all claims, suits, and actions of every description, brought against the County and/or Public Water Supply District No. 4 and from all damage and costs by reason or on account of any injuries or damages received or sustained by any person or persons, or their property, by Contractor, its

servants, agents, or subcontractors in the construction of said work, or by any negligence or carelessness in the performance of the same, or on account of any act or omission of Contractor, its servants, agents, or subcontractors, or arising out of the award of this contract to Contractor.

10. Payment for Labor and Materials The Contractor agrees and binds itself to pay for all labor done, and for all the materials used in the construction of the work to be completed pursuant to this contract. Contractor shall furnish to the County a bond to insure the payment of all materials and labor used in the performance of this contract. The Contractor is aware of, understands and agrees to abide by RSMo. 34.057.

11. Payment The County hereby agrees to pay the Contractor for the work done on a monthly basis pursuant to this contract according as set forth in the Contract Documents upon acceptance of said work by the Director of Public Works and in accordance with the rates and/or amounts stated in the proposal of Contractor dated **October 7, 2016** which are by reference made a part hereof. No partial payment to the Contractor shall operate as approval or acceptance of work done or materials furnished hereunder.

12. Contract Time The project covered under this contract shall be completed by no later than **April 15, 2017**.

13. Contract Documents The contract documents shall consist of the following:

a. This Contract
b. Addenda
c. Notice to Contractors
d. Instructions to Bidders
e. Signed Copy of Bid
f. General Conditions
g. Special Provisions
h. Technical Specifications
i. Drawings and/or Sketches

This contract and the other documents enumerated in this paragraph, form the Contract between the parties. These documents are as fully a part of the contract as if attached hereto or repeated herein.

14. Nondiscrimination The Contractor agrees in the performance of this contract not to discriminate on the ground or because of race, creed, color, national origin, or ancestry, sex, religion, handicap, age, or political opinion, or affiliation, against any employee of Contractor or applicant for employment and shall include a similar provision in all subcontracts let or awarded hereunder.

15. Notices All notices required to be in writing may be given by first class mail addressed to Cole County Commission, Courthouse Annex, Room 200, 301 East High Street, Jefferson City, Missouri 65101, and **[INSERT CONTRACTOR'S NAME AND MAILING ADDRESS]**. The date of delivery of any notice shall be the second full day after the day of its mailing.

16. Jurisdiction This agreement and every question arising hereunder shall be interpreted according to the laws and statutes of the State of Missouri.

IN TESTIMONY WHEREOF, the parties have hereunto set their hands and seals as of the day and year below written.

Executed by the **COUNTY** this ____ day of _____, 2016.

COLE COUNTY COMMISSION, Party of the First Part

_____
Cole County Commission

ATTEST:

_____
County Clerk (SEAL)

_____
County Auditor
"I certify there is a balance otherwise unemcumbered to the credit of the appropriation to which it is to be charged and a cash balance otherwise unencumbered in the treasury to the credit of the fund from which payment is to be incurred."

Executed by the **CONTRACTOR** this _____ day of _____, 2016.

CONTRACTOR, Party of the Second Part

By _____

_____
Title

ATTEST:

_____
Secretary (SEAL)

CERTIFICATE OF INSURANCE

Issued at the request of The County of COLE, Missouri

Address: Cole County Commission
Courthouse Annex, Room 200
311 East High Street
Jefferson City, Missouri 65101

THIS IS TO CERTIFY that the insured named below is at this date insured with as described in the following schedule, and in full compliance with the Contract Documents, including all contractual liability coverage.

DESCRIPTIVE SCHEDULE

Name of Insured: _____

Address of Insured: _____

_____

Locations Covered: _____

_____

Description of Work: _____

_____

PERFORMANCE AND ONE YEAR GUARANTEE BOND

KNOW ALL MEN BY THESE PRESENTS, that we, the undersigned _____ _____, hereinafter referred to as "Contractor" and _____ a Corporation organized under the laws of the State of _____, and authorized to transact business in the State of _____, as Surety, are held and firmly bound unto the County of COLE, Missouri hereinafter referred to as "County" in the penal sum of _____ _____ DOLLARS ($_____), lawful money of the United States of America for the payment of which sum, well and truly to be made, we bind ourselves and our heirs, executors, administrators, successors, and assigns jointly and severally by these presents.

THE CONDITION OF THE FOREGOING OBLIGATION IS SUCH THAT: WHEREAS, the above bounden Contractor has on the _____ day of _____, 2016, entered into a written contract with the aforesaid County for furnishing all materials, equipment, tools, superintendence, labor, and other facilities and accessories, for the construction of certain improvements as designated, defined, and described in the said Contract and the Conditions thereof, and in accordance with the specifications and plans therefore; a copy of said Contract being attached hereto and made a part hereof:

NOW THEREFORE, if the said Contractor shall and will, in all particulars, well, duly, and faithfully observe, perform, and abide by each and every covenant, condition, and part of the said Contract, and the Conditions, Specifications, Plans, Prevailing Wage Law, and other Contract Documents thereto attached or, by reference, made a part thereof, according to the true intent and meaning in each case, and if said contractor shall replace all defective parts, material and workmanship for a period of one year after acceptance by the County, then this Obligation shall be and become null and void; otherwise it shall remain in full force and effect.

PROVIDED FURTHER, that if the said Contractor fails to duly pay for any labor, materials, sustenances, provisions, provender, gasoline, lubricating oils, fuel oils, greases, coal repairs, equipment, and tools consumed or used in said work, groceries and foodstuffs, and all insurance premiums, compensation liability, and otherwise, or any other supplies or materials used or consumed by such Contractor or his, their, or its subcontractors in performance of the work contracted to be done, the Surety will pay the same in any amount not exceeding the amount of this Obligation, together with interest as provided by law:

PROVIDED FURTHER, that the said Surety, for value received, to be performed thereunder, or the specifications accompanying the same, shall in any way affect its obligation on this bond and it does hereby waive notice of any change, extension of time, alteration, or addition to the terms of the Contract, or to the work, or to the specifications:

PROVIDED FURTHER, that if said Contractor fails to pay the prevailing hourly rate of

wages, as shown in the attached schedule, to any workman engaged in the construction of the improvements as designated, defined and described in the said Contract, specifications and conditions thereof, the Surety will pay the deficiency and any penalty provided for by law which the Contractor incurs by reason of (his/its) act or omission, in any amount not exceeding the amount of this obligation together with interest as provided by law:

IN TESTIMONY WHEREOF, the said Contractor has hereunto set his hand, and the said Surety has caused these presents to be executed in its name, and its corporate seal to be hereunto affixed, by it attorney-in-fact duly authorized thereunto so to do, at _____ _____ this the _____ day of _____, 20_____.

_____	_____
SURETY COMPANY	CONTRACTOR
By _____ (SEAL)	By _____ (SEAL)
By _____ (SEAL)	By _____ (SEAL)
Attorney-in-Fact	(State Representative)

(Accompany this bond with Attorney-in-Fact's authority from the Surety Company certified to include the date of the bond.)

Missouri
Division of Labor Standards

WAGE AND HOUR SECTION

JEREMIAH W. (JAY) NIXON, Governor

Annual Wage Order No. 23

Section 026

COLE COUNTY

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

Original Signed by
John E. Lindsey, Director
Division of Labor Standards

This Is A True And Accurate Copy Which Was Filed With The Secretary of State: **March 10, 2016**

Last Date Objections May Be Filed: **April 11, 2016**

Prepared by Missouri Department of Labor and Industrial Relations

OCCUPATIONAL TITLE	** Date of Increase	*	Basic Hourly Rates	Over-Time Schedule	Holiday Schedule	Total Fringe Benefits
Asbestos Worker (H & F) Insulator			$32.36	55	60	$21.41
Boilermaker			$32.76	126	7	$30.10
Bricklayer and Stone Mason			$29.26	59	7	$16.91
Carpenter	6/16		$25.16	60	15	$16.10
Cement Mason			$27.55	9	3	$12.20
Communication Technician	6/16		$31.80	28	7	$12.90 + 13%
Electrician (Inside Wireman)	6/16		$31.80	28	7	$12.90 + 13%
Electrician (Outside-Line Construction\Lineman)			$42.27	43	45	$5.25 + 36%
Lineman Operator			$36.45	43	45	$5.25 + 36%
Groundman			$28.13	43	45	$5.25 + 36%
Elevator Constructor		a	$46.04	26	54	$31.645
Glazier			$33.40	87	31	$23.55
Ironworker			$28.41	11	8	$24.04
Laborer (Building):						
General			$22.36	42	44	$13.19
First Semi-Skilled			$24.36	42	44	$13.19
Second Semi-Skilled			$23.36	42	44	$13.19
Lather			USE CARPENTER RATE			
Linoleum Layer and Cutter	6/16		$25.04	60	15	$16.10
Marble Mason			$21.66	124	74	$12.68
Marble Finisher			$14.14	124	74	$9.08
Millwright	6/16		$26.16	60	15	$16.10
Operating Engineer						
Group I	6/16		$28.86	86	66	$24.98
Group II	6/16		$28.86	86	66	$24.98
Group III	6/16		$27.61	86	66	$24.98
Group III-A	6/16		$28.86	86	66	$24.98
Group IV	6/16		$26.63	86	66	$24.98
Group V	6/16		$29.56	86	66	$24.98
Painter	6/16		$23.24	18	7	$11.78
Pile Driver	6/16		$26.16	60	15	$16.10
Pipe Fitter	7/16	b	$38.00	91	69	$26.93
Plasterer			$26.09	94	5	$12.25
Plumber	7/16	b	$38.00	91	69	$26.93
Roofer \ Waterproofer			$29.30	12	4	$14.87
Sheet Metal Worker	7/16		$31.34	40	23	$17.04
Sprinkler Fitter - Fire Protection	7/16		$33.49	33	19	$19.45
Terrazzo Worker			$28.73	124	74	$14.38
Terrazzo Finisher			$18.68	124	74	$14.38
Tile Setter			$21.66	124	74	$12.68
Tile Finisher			$14.14	124	74	$9.08
Traffic Control Service Driver			$26.415	22	55	$9.045
Truck Driver-Teamster						
Group I			$25.30	101	5	$10.70
Group II			$25.95	101	5	$10.70
Group III			$25.45	101	5	$10.70
Group IV			$25.95	101	5	$10.70

Fringe Benefit Percentage is of the Basic Hourly Rate

**Annual Incremental Increase

OCCUPATIONAL TITLE	** Date of Increase	Basic Hourly Rates	Over-Time Schedule	Holiday Schedule	Total Fringe Benefits

* Welders receive rate prescribed for the occupational title performing operation to which welding is incidental.

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

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

a - Vacation: Employees over 5 years - 8%; Employees under 5 years - 6%
**b - All work over $7 Million Total Mechanical Contract - $38.00, Fringes - $26.93
All work under $7 Million Total Mechanical Contract - $36.66, Fringes - $21.49

COLE COUNTY
BUILDING CONSTRUCTION - OVERTIME SCHEDULE

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

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

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

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

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

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

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

COLE COUNTY
BUILDING CONSTRUCTION - OVERTIME SCHEDULE

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

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

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

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

NO. 40: Means the regular working week shall consist of five (5) consecutive (8) hour days' labor on the job beginning with Monday and ending with Friday of each week. Four (4) 10-hour days may constitute the regular work week. The regular working day shall consist of eight (8) hours labor on the job beginning as early as 6:00 a.m. and ending as late as 5:30 p.m. All full or part time labor performed during such hours shall be recognized as regular working hours and paid for at the regular hourly rate. All hours worked on Saturday and all hours worked in excess of eight (8) hours but not more than twelve (12) hours during the regular working week shall be paid for at time and one-half (1½) the regular hourly rate. All hours worked on Sundays and holidays and all hours worked in excess of twelve (12) hours during the regular working day shall be paid at two (2) times the regular hourly rate. In the event of rain, snow, cold or excessively windy weather on a regular working day, Saturday may be designated as a "make-up" day. Saturday may also be designated as a "make-up" day, for an employee who has missed a day of work for personal or other reasons. Pay for "make-up" days shall be at regular rates.

COLE COUNTY
BUILDING CONSTRUCTION - OVERTIME SCHEDULE

NO. 42: Means eight (8) hours between the hours of 8:00 a.m. and 4:30 p.m. shall constitute a work day. The starting time may be advanced one (1) or two (2) hours. Employees shall have a lunch period of thirty (30) minutes. The Employer may provide a lunch period of one (1) hour, and in that event, the workday shall commence at 8:00 a.m. and end at 5:00 p.m. The workweek shall commence at 8:00 a.m. on Monday and shall end at 4:30 p.m. on Friday (or 5:00 p.m. on Friday if the Employer grants a lunch period of one (1) hour), or as adjusted by starting time change as stated above. All work performed before 8:00 a.m. and after 4:30 p.m. (or 5:00 p.m. where one (1) hour lunch is granted for lunch) or as adjusted by starting time change as stated above or on Saturday, except as herein provided, shall be compensated at one and one-half (1½) times the regular hourly rate of pay for the work performed. All work performed on Sunday and on recognized holidays shall be compensated at double (2) the regular hourly rate of pay for the work performed. When working a five 8-hour day schedule and an Employer is prevented from working forty (40) hours, Monday through Friday, or any part thereof by reason of inclement weather (rain or mud), Saturday or any part thereof may be worked as a make-up day at the straight time rate. The Employer shall have the option of working five eight (8) hour days or four ten (10) hour days Monday through Friday. If an Employer elects to work five (5) eight (8) hour days during any work week, hours worked more than eight (8) per day or forty (40) hours per week shall be paid at time and one-half (1½) the hourly rate Monday through Friday. If an Employer elects to work four (4) ten (10) hour days in any week, work performed more than ten (10) hours per day or forty (40) hours per week shall be paid at time and one-half (1½) the hourly rate Monday through Friday. If an Employer is working ten (10) hour days and loses a day due to inclement weather, they may work ten (10) hours Friday at straight time. All hours worked over the forty (40) hours Monday through Friday will be paid at time and one-half (1½) overtime rate. Overtime shall be computed at half-hour intervals. Shift Work: Two (2) or three (3) shifts shall be permitted, provided such shifts are scheduled for a minimum of three (3) consecutive days. The second shift shall begin at 4:30 p.m. and end at 12:30 a.m. with one-half (1/2) hour for lunch between 7:30 p.m. and 9:00 p.m. and shall received eighty (8) hours' pay. The third shift shall begin at 12:30 a.m. and end at 8:00 a.m. with one-half (1/2) hour for lunch between 3:30 a.m. and 5:00 a.m. and shall received (8) hour's; pay. There shall be at least one (1) foreman on each shift on jobs where more than one shift is employed, provided that there are two (2) or more employees on second and on the third shifts. All shifts shall arrange to interchange working hours at the end of each week. When three shifts are used, the applicable rate must be paid from Saturday at 8:00 a.m. until the following Monday at 8:00 a.m. When three shifts are employed, the second and third shifts shall contain at least one-half (1/2) as many employees as the first shift.

NO. 43: Eight (8) hours shall constitute a work day between the hours of 7:00 a.m. and 4:30 p.m. Forty (40) hours within five (5) days, Monday through Friday inclusive, shall constitute the work week. Work performed in the 9th and 10th hour, Monday through Friday, shall be paid at time and one-half (1½) the regular straight time rate of pay. Contractor has the option to pay two (2) hours per day at the time and one-half (1½) the regular straight time rate of pay between the hours of 6:00 a.m. and 5:30 p.m., Monday through Friday. Work performed outside the regularly scheduled working hours and on Saturdays, Sundays and recognized legal holidays, or days celebrated as such, shall be paid for at the rate of double (2) time.

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

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

COLE COUNTY
BUILDING CONSTRUCTION - OVERTIME SCHEDULE

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

NO. 86: The regular workday shall consist of eight (8) consecutive hours, exclusive of a thirty (30) minute lunch period, with pay at the straight time rate with all hours in excess of eight (8) hours in any one day to be paid at the applicable overtime rate at time and one-half (1½). The regular workday shall begin between the hours of 6:00 a.m. and 8:00 a.m. The Employer may have the option to schedule the work week from Monday through Thursday at ten (10) hours per day at the straight time rate of pay with all hours in excess of ten (10) hours in any one day to be paid at the applicable overtime rate at time and one-half (1½). If the Employer elects to work from Monday through Thursday and is stopped due to inclement weather, holiday or other conditions beyond the control of the Employer, they shall have the option to work Friday at the straight time rate of pay to complete the forty (40) hours for the workweek. All overtime work performed on Monday through Saturday shall be paid at time and one-half (1½) the hourly rate. Fringe benefits shall be paid at the one and one half the hourly rate. All work performed on Sundays and recognized holidays shall be paid at double (2) the hourly rate. Fringe benefits shall be paid at double the hourly rate. Shifts may be established when considered necessary by the Employer. Shift hours and rates will be as follows. If shifts are established, work on the First Shift will begin between 6:00 a.m. and 9:00 a.m. and consist of eight (8) hours of work plus one-half hour unpaid lunch. Hours worked during the first shift will be paid at the straight time rate of pay. The second shift shall start eight hours after the start of the first shift and consist of eight (8) hours of work plus one-half hour unpaid lunch. Work on the second shift will begin between 2:00 p.m. and 5:00 p.m. and be paid the straight time rate plus $2.50 per hour. The third shift shall start eight hours after the start of the second shift and consist of eight (8) hours plus one-half hour unpaid lunch. Work on the third shift will begin between 10:00 p.m. and 1:00 a.m. and be paid the straight time rate plus $3.50 per hour. The additional amounts that are to be paid are only applicable when working shifts. Shifts that begin on Saturday morning through those shifts which end on Sunday morning will be paid at time and one-half these rates. Shifts that begin on Sunday morning through those shifts which end on Monday morning will be paid at double time these rates.

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

COLE COUNTY
BUILDING CONSTRUCTION - OVERTIME SCHEDULE

NO. 126: Means eight (8) hours per day shall constitute a day's work and forty (40) hours per week, Monday through Friday, shall constitute a week's work. The regular starting time shall be 8:00 a.m. If a second or third shift is used, the regular starting time of the second shift shall be 4:30 p.m. and the regular starting period for the third shift shall be 12:30 a.m. These times may be adjusted by the employer. The day shift shall work a regular eight (8) hours shift as outlined above. Employees working a second shift shall receive an additional $0.25 above the regular hourly rate and perform seven and one-half (7½) hours work for eight (8) hours pay. Third shift employees shall be paid an additional $0.50 above the regular hourly rate and work seven (7) hours for eight (8) hours pay. When circumstances warrant, the Employer may change the regular workweek to four (4) ten-hour days at the regular time rate of pay. All time worked before and after the established workday of eight (8) hours, Monday through Friday, and all time worked on Saturday shall be paid at the rate of time and one-half (1½) except in cases where work is part of an employee's regular Friday shift. All time worked on Sunday and recognized holidays shall be paid at the double (2) time rate of pay except in cases where work is part of an employee's previous day's shift. For all overtime hours worked $27.96 of the fringe benefits portion of the prevailing wage shall be paid at the same overtime rate at which the cash portion of the prevailing wage is to be paid. The remaining $1.24 of the fringe benefit portion of the prevailing wage may be paid at straight time.

COLE COUNTY
HOLIDAY SCHEDULE – BUILDING CONSTRUCTION

NO. 3: All work done on New Year's Day, Decoration Day, July 4th, Labor Day, Veteran's Day, Thanksgiving and Christmas shall be compensated at the double (2) time rate of pay. When any of these holidays fall on a Sunday, the following Monday shall be observed.

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

NO. 5: All work that shall be done on New Year's Day, Memorial Day, Independence Day, Labor Day, Veteran's Day, Thanksgiving Day, and Christmas Day shall be paid twice the amount of his or her regular hourly wage rate for each hour of fraction thereof worked on any such day .

NO. 7: The following days are assigned days and are recognized as holidays: New Year's Day, Memorial Day, Independence Day, Labor Day, Veteran's Day, Thanksgiving Day, and Christmas Day. If a holiday falls on a Sunday, it shall be observed on the following Monday. If a holiday falls on a Saturday, it shall be observed on the preceding Friday. No work shall be performed on Labor Day except in case of jeopardy to work under construction. This is applied to protect Labor Day. When a holiday falls during the normal workweek, Monday through Friday, it shall be counted as eight (8) hours toward the forty (40) hour week. However, no reimbursement for these eight (8) hours is to be paid to the workman unless worked. If workman are required to work the above enumerated holidays or days observed as such, or on Sunday, they shall receive double (2) the regular rate of pay for such work.

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

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

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

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

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

COLE COUNTY
HOLIDAY SCHEDULE – BUILDING CONSTRUCTION

NO. 44: All work done on New Year's Day, Decoration Day, Independence Day, Labor Day, Veteran's Day, Thanksgiving Day, and Christmas Day shall be paid at the double time rate of pay. If a holiday falls on a Sunday, it shall be observed on the Monday following. If a holiday falls on a Saturday, it shall be observed on the proceeding Friday. No work shall be performed on these days except in emergency to protect life or property. All work performed on these holidays shall be compensated at double the regular hourly rate for the work performed. Overtime shall be computed at half-hour intervals.

NO. 45: All work performed on New Year's Day, Memorial Day, Independence Day, Labor Day, Veteran's Day, Thanksgiving Day, the day after Thanksgiving, the day before Christmas, and Christmas Day, shall be paid at the double time rate of pay.

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

NO. 55: The following days are recognized as holidays: New Year's Day, Memorial Day, Independence Day, Labor Day, Thanksgiving Day and Christmas Day. If a holiday falls on a Sunday, it shall be observed on the following Monday. No work shall be performed on Labor Day except in case of jeopardy to work under construction. This rule is applied to protect Labor Day. When a holiday falls during the normal work week, Monday through Friday, it shall be counted as eight (8) hours toward the forty (40) hour week; however, no reimbursement for this eight (8) hours is to be paid the workmen unless worked. An Employer working a four (4) day, ten (10) hour schedule may use Friday as a make up day when an observed holiday occurs during the work week. Employees have the option to work that make up day. If workmen are required to work the above enumerated holidays, or days observed as such, they shall receive double (2) the regular rate of pay for such work.

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

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

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

NO. 74: All work performed on New Year's Day, Memorial Day, Fourth of July, Labor Day, Veteran's Day, Thanksgiving Day and Christmas Day, shall be paid at double (2) time of the hourly rate of pay. In the event one of the above holiday's falls on Saturday, the holiday shall be celebrated on Saturday. If the holiday falls on Sunday, the holiday will be celebrated on Monday.

OCCUPATIONAL TITLE	* Date of Increase	Basic Hourly Rates	Over-Time Schedule	Holiday Schedule	Total Fringe Benefits
Carpenter	6/16	$29.45	23	16	$16.10
Electrician (Outside-Line Construction\Lineman)		$42.27	9	12	$5.25 + 36%
Lineman Operator		$36.45	9	12	$5.25 + 36%
Lineman - Tree Trimmer		$24.15	32	31	$9.98 + 3%
Groundman		$28.13	9	12	$5.25 + 36%
Groundman - Tree Trimmer		$17.84	32	31	$7.50 + 3%
Laborer					
General Laborer	6/16	$27.96	2	4	$13.17
Skilled Laborer	6/16	$27.96	2	4	$13.17
Millwright	6/16	$30.83	23	16	$16.10
Operating Engineer					
Group I	6/16	$27.94	21	5	$24.87
Group II	6/16	$27.59	21	5	$24.87
Group III	6/16	$27.39	21	5	$24.87
Group IV	6/16	$23.74	21	5	$24.87
Oiler-Driver	6/16	$23.74	21	5	$24.87
Pile Driver	6/16	$30.83	23	16	$16.10
Traffic Control Service Driver		$26.415	28	27	$9.045
Truck Driver-Teamster					
Group I	6/16	$29.27	25	21	$12.45
Group II	6/16	$29.43	25	21	$12.45
Group III	6/16	$29.42	25	21	$12.45
Group IV	6/16	$29.54	25	21	$12.45

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

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

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

REPLACEMENT PAGE
COLE COUNTY
OVERTIME SCHEDULE - HEAVY CONSTRUCTION

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

NO. 2: Means a regular workweek shall be forty (40) hours and will start on Monday and end on Friday. The Employer shall have the option of working five 8-hour days or four 10-hour days Monday through Friday. If an Employer elects to work five 8-hour days during any workweek, hours worked more than eight (8) per day or 40 per week shall be paid at time and one-half the hourly rate Monday through Friday. If an Employer elects to work four 10-hour days in a week, work performed more than ten (10) hours per day or 40 hours per week shall be paid at time and one-half the hourly rate Monday through Friday. When working a five 8-hour day schedule and an Employer is prevented from working forty (40) hours Monday through Friday, or any part thereof, by reason of inclement weather, Saturday or any part thereof may be worked as a make-up day at the straight time rate. If an Employer is working a four 10-hour day schedule and loses a day due to inclement weather, he may work 10 hours Friday at straight time. All hours worked over the 40 hours Monday through Friday will be paid at 1 ½ overtime rate. A workday shift is to begin at the option of the Employer, between 6:00 a.m. and not later than 9:00 a.m. However, the project starting time may be advanced or delayed if required. If workmen are required to work the enumerated holidays or days observed as such or Sundays, they shall receive double (2) the regular rate of pay for such work. Overtime shall be computed at one-half (1/2) hour intervals. Shift: The Contractor may elect to work one, two or three shifts on any work. When operating on more than one shift, the shifts shall be known as the day shift, swing shift, and graveyard shift as such terms are recognized in the industry. When two shifts are worked on any operation, the shifts will consist of eight (8) or ten (10) hours exclusive of lunchtime. When three shifts are worked the first day or day shift will consist of eight (8) hours exclusive of lunchtime. The second or swing shift shall consist of seven and one-half (7 1/2) hours work for eight hours pay, exclusive of lunchtime, and the third or the graveyard shift shall consist of seven (7) hours work for eight (8) hours pay, exclusive of the lunchtime. All time in excess of normal shifts shall be considered overtime. Multiple shift (the two or three shift) operation will not be construed on the entire project if at anytime it is deemed advisable and necessary for the Employer to multiple shift a specific operation. However, no shift shall be started between midnight and six a.m. except the graveyard shift on a three-shift operation, or except in an unusual or emergency situation. If an Employer starts a shift between midnight and 6 a.m. except the graveyard shift on a three-shift operation, he shall reimburse all employees for the entire shift at the double time rate. Completion of the second shift on a two-shift operation or completion of the graveyard shift on a three-shift operation that carries over into Saturday morning, shall be at the straight time rate. Overtime shall be computed at ½ hour intervals.

NO. 9: Eight (8) hours shall constitute a work day between the hours of 7:00 a.m. and 4:30 p.m. Forty (40) hours within five (5) days, Monday through Friday inclusive, shall constitute the work week. Work performed in the 9th and 10th hour, Monday through Friday, shall be paid at time and one-half (1½) the regular straight time rate of pay. Contractor has the option to pay two (2) hours per day at the time and one-half (1½) the regular straight time rate of pay between the hours of 6:00 a.m. and 5:30 p.m., Monday through Friday. Worked performed in the first eight (8) hours on Saturday shall be paid at the rate of one and eight tenths (1.8) the regular straight time rate. Work performed outside these hours and on Sundays and recognized legal holidays, or days celebrated as such, shall be paid for at the rate of double (2) time.

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

REPLACEMENT PAGE
COLE COUNTY
OVERTIME SCHEDULE - HEAVY CONSTRUCTION

NO. 23: Means the regular workweek shall start on Monday and end on Friday, except where the Employer elects to work Monday through Thursday, (10) hours per day. All work over ten (10) hours in a day or forty (40) hours in a week shall be at the overtime rate of one and one-half (1½) times the regular hourly rate. The regular workday shall be either eight (8) or ten (10) hours. If a job can't work forty (40) hours Monday through Friday because of inclement weather or other conditions beyond the control of the Employer, Friday or Saturday may be worked as a make-up day at straight time (if working 4-10's). Saturday may be worked as a make-up day at straight time (if working 5-8's). An Employer, who is working a four (4) ten (10) hour day work schedule may use Friday as a make-up day when a workday is lost due to a holiday. A workday is to begin at the option of the Employer but not later than 11:00 a.m. except when inclement weather, requirements of the owner or other conditions beyond the reasonable control of the Employer prevent work. Except as worked as a make-up day, time on Saturday shall be worked at one and one-half (1½) times the regular rate. Work performed on Sunday shall be paid at two (2) times the regular rate. Work performed on recognized holidays or days observed as such, shall also be paid at the double (2) time rate of pay. For all overtime hours worked during the week or on Saturday $15.55 of the fringe benefits portion of the prevailing wage shall be paid at time and one-half (1½). For all overtime hours worked on Sundays or recognized holidays $15.55 of the fringe benefits portion of the prevailing wage shall be paid double time. The remaining $.55 of the fringe benefit portion of the prevailing wage shall be paid at straight time.

NO. 25: Means a regular work week of forty (40) hours, starting on Monday and ending on Friday. The regular work day shall be either eight (8) or ten (10) hours. If a crew is prevented from working forty (40) hours Monday through Friday, or any part thereof by reason of inclement weather, Saturday or any part thereof maybe worked as a make-up day at the straight time rate. Employees who are part of a regular crew on a make-up day, notwithstanding the fact that they may not have been employed the entire week, shall work Saturday at the straight time rate. A work day is to begin between 6:00 a.m. and 9:00 a.m. However, the project starting time maybe advanced or delayed if mutually agreed to by the interest parties. All hours worked on recognized holidays, or days observed as such, double (2) time shall be paid.

NO. 28: Means a regular work week of forty (40) hours will start on Monday and end on Friday. The regular work day shall be either eight (8) or ten (10) hours. If a crew is prevented from working forty (40) hours Monday through Friday, or any part thereof by reason of inclement weather, Saturday or any part thereof may be worked as a make-up day at the straight time rate. Employees who are part of a regular crew on a make-up day, notwithstanding the fact that they may not have been employed the entire week, shall work Saturday at the straight time rate. A workday is to begin between 6:00 a.m. and 9:00 a.m. However, the project starting time may be advanced or delayed if mutually agreed to by the interest parties. For all time worked on recognized holidays, or days observed as such, double (2) time shall be paid.

NO. 32: Means the overtime rate shall be time and one-half the regular rate for work over forty (40) hours per week. Sundays and Holidays shall be paid at double the straight time rate.

COLE COUNTY
HOLIDAY SCHEDULE – HEAVY CONSTRUCTION

NO. 4: All work performed on New Year's Day, Memorial Day, Independence Day, Labor Day, Thanksgiving Day, Christmas Day, or observed as such, shall be paid at the double time rate of pay. When a Holiday falls on a Sunday, Monday shall be observed. No work shall be performed on Labor Day, except in case of jeopardy to life or property. This is applied to protect Labor Day.

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

NO. 12: All work performed on New Year's Day, Memorial Day, Fourth of July, Labor Day, Veteran's Day, Thanksgiving Day, Christmas Day, or days celebrated as such, shall be paid at the double time rate of pay. When one of the foregoing holidays falls on Sunday, it shall be celebrated on the following Monday. When one of the foregoing holidays falls on Saturday, it shall be celebrated on the Friday before the holiday.

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

NO. 21: The following days are recognized as holidays: New Year's Day, Memorial Day, Independence Day, Labor Day, Thanksgiving Day and Christmas Day. If a holiday falls on a Sunday, it shall be observed on the following Monday. No work shall be performed on Labor Day except in case of jeopardy to work under construction. This rule is applied to protect Labor Day. When a holiday falls during the normal work week, Monday through Friday, it shall be counted as eight (8) hours toward the forty (40) hour week; however, no reimbursement for this eight (8) hours is to be paid the workman unless worked. An Employer working a four (4) day, ten (10) hour schedule may use Friday as a make-up day when an observed holiday occurs during the work week. Employees have the option to work that make-up day. If workmen are required to work the above enumerated holidays, or days observed as such, they shall receive double (2) the regular rate of pay for such work.

NO. 27: The following days are recognized as holidays: New Year's Day, Memorial Day, Independence Day, Labor Day, Thanksgiving Day and Christmas Day. If a holiday falls on a Sunday, it shall be observed on the following Monday. No work shall be performed on Labor Day except in case of jeopardy to work under construction. This rule is applied to protect Labor Day. When a holiday falls during the normal work week, Monday through Friday, it shall be counted as eight (8) hours toward the forty (40) hour week; however, no reimbursement for this eight (8) hours is to be paid the workmen unless worked. An Employer working a four (4) day, ten (10) hour schedule may use Friday as a make up day when an observed holiday occurs during the work week. Employees have the option to work that make up day. If workmen are required to work the above enumerated holidays, or days observed as such, they shall receive double (2) the regular rate of pay for such work.

NO. 31: All work performed on New Year's Day, Presidents' Day, Veterans' Day, Good Friday, Decoration Day, Fourth of July, Labor Day, Christmas Eve Day, Christmas Day, Thanksgiving Day and Day after Thanksgiving or days celebrated for the same.

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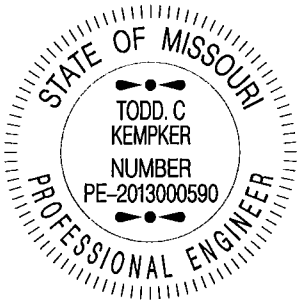

THIS SHEET HAS BEEN SIGNED, SEALED AND DATED ELECTRONICALLY.

COLE COUNTY PUBLIC WORKS
5055 Monticello Road
Jefferson City, MO 65109
Phone (573) 636-3614

BARTLETT & WEST, INC.
1719 Southridge Drive, Suite 100
Jefferson City, MO 65109-4000
Certificate of Authority No. 000167
Phone No. 573-634-3181

Liberty Road over Rising Creek
In Cole County, MO

Date Prepared: 9/7/16

Date: 9/7/16

Only the following items of the Job Special Provisions are authenticated by this seal: All

A. GENERAL

1.0 Except as may be otherwise provided for by the Job Special Provisions and the plans, the work shall be done in accordance with the Missouri Standard Specifications for Highway Construction, dated 2011, and its revisions. Said Specifications are part and parcel of this Contract and are incorporated in this Contract as fully and effectively as if set forth in detail herein.

2.0 The standard drawings for this project shall consist of the latest effective edition of the City of Jefferson Standard Drawings for storm inlets and trenching, except as modified or contradicted by the County's Contract, Special Provisions, General Provisions, and Plans.

2.1 Copies of the City of Jefferson Standard Drawings may be found on the City's website at http://www.jeffcitymo.org/cd/pw/engineering.html and are available upon request from the County.

2.2 The standard drawings for all other items in this project shall consist of the latest effective edition of the Missouri Standard Plans for Highway Construction.

2.3 Copies of the Missouri Standard Plans for Highway Construction can be found at http://www.modot.org/business/standards_and_specs/currentstandardplans.htm and are available upon request from the County.

3.0 The contractor shall familiarize himself with these drawings and specifications prior to bidding. Failure to do so shall not relieve the contractor from delivering the completed project in accordance with the intent of the Plans and Specifications to provide a workable project.

B. WORK ZONE TRAFFIC MANAGEMENT PLAN

1.0 Description. Work zone traffic management shall be in accordance with applicable portions of Division 100 and Division 600 of the Standard Specifications, and specifically as follows.

2.0 Traffic Management Schedule.

2.1 Traffic management schedules shall be submitted to the engineer for review prior to the start of work and prior to any revisions to the traffic management schedule. The traffic management schedule shall include the proposed traffic control measures, hours traffic control will be in place, and work hours.

2.2 The contractor shall notify the engineer **TWO WEEKS** prior to road closures or shifting traffic onto detours.

2.3 The engineer shall be notified as soon as practical of any postponement due to weather, material, or other circumstances.

2.4 In order to ensure minimal traffic interference, the contractor shall schedule road closures for the absolute minimum amount of time required to complete the work. Roads shall not be closed until material is available for continuous construction and the contractor is prepared to diligently pursue the work until the closed road is opened to traffic.

3.0 Work Hour Restrictions.

3.1 There will be no work hour restrictions with this project.

4.0 Detours and Lane Closures.

4.1 Furnishing of Signs and Devices. All traffic control signs and devices for closing the road and marking the detour as shown on the plans shall be furnished by the contractor.

4.2 Installation of Signs and Devices. All traffic control signs and devices for closing the road and marking the detour as shown on the plans shall be installed by the contractor.

5.0 Basis of Payment. All costs incurred for equipment, labor, materials, or time required to fulfill this special provision, except as noted above, shall be considered completely covered by the contract lump sum price for "Construction Signage/Traffic Control."

C. PROJECT CONTACT FOR CONTRACTOR / BIDDER QUESTIONS

All questions concerning this project during the bidding process shall be forwarded to the project contacts listed below.

Eric Landwehr, P.E., Project Contact
County Engineer
Cole County Public Works
5055 Monticello Road
Jefferson City, MO 65109-9182

Telephone Number: (573) 636-3614
Fax Number: (573) 636-8389
Email: elandwehr@colecounty.org

2.0 All questions concerning the plans and specifications can be directed to the contact below.

Todd Kempker, P.E.
Bartlett & West, Inc.
1719 Southridge Drive, Suite 100
Jefferson City, MO 65109-4000

Telephone Number: (573) 659-6734
Fax Number: (573) 634-7904
Email: todd.kempker@bartwest.com

D. EMERGENCY PROVISIONS AND INCIDENT MANAGEMENT

1.0 The contractor shall have communication equipment on the construction site or immediate access to other communication systems to request assistance from the police or other emergency agencies for incident management. In case of traffic accidents or the need for police to direct or restore traffic flow through the job site, the contractor shall notify police or other emergency agencies immediately as needed.

2.0 In addition to the 911 emergency telephone number for ambulance, fire or police services, the following agencies may also be notified for accident or emergency situation within the project limits.

Missouri Highway Patrol	573-751-1000
Cole County Sheriff Department:	573-634-9160
Cole County Fire Protection District.:	911 (emergency)
Non-emergency:	573-634-9011

2.1 This list is not all inclusive. Notification of the need for wrecker or tow truck services will remain the responsibility of the appropriate police agency.

2.2 The contractor shall notify enforcement and emergency agencies before the start of construction to request their cooperation and to provide coordination of services when emergencies arise during the construction at the project site. When the contractor completes this notification with enforcement and emergency agencies, a report shall be furnished to the engineer on the status of incident management.

3.0 No direct pay will be made to the contractor to recover the cost of the communication equipment, labor, materials, or time required to fulfill the above provisions.

E. UTILITIES

1.0 The presence and approximate location of those utility facilities known to exist, as shown on the plans, are based upon the best information available to Cole County at this time. This information is provided by Cole County "as-is" and Cole County expressly disclaims any representation or warranty as to the completeness, accuracy, or suitability of the information for any use. Reliance upon this information is done at the risk and peril of the user and Cole County shall not be liable for any damages that may arise from any error in the information. It is, therefore, the responsibility of the contractor to verify the above listing information indicating existence, location, and status of any facility. Such verification includes direct contact with the listed utilities.

1.1 The contractor agrees that any effects of the presence of the utilities, their relocation, contractor's coordination of work with the utilities, and any delay in utility relocation shall not be compensable as a suspension of work, extra work, a change in the work, as a differing site condition, or otherwise including but, without limitation, delay, impact, incidental, or consequential damages. The contractor's sole remedy for the effects of the presence of utilities, delay in their relocation, or any other effects shall be an excusable delay as provided in Sec. 105.7.3. The contractor waives, for itself, its subcontractors, and suppliers the compensability of the presence of utilities, delay in their relocation, and any cost to the contractor, its subcontractors, and suppliers in any claim or action arising out of or in relation to the work under the contract.

1.2 The contractor shall be solely responsible and liable for incidental and consequential damage to any utility facilities or interruption of the service caused by it or its subcontractor's operation. The contractor shall hold and save harmless Cole County from damages to any utility facility's interruption of service by it or its subcontractor's operation.

2.0 Prior to beginning work, the contractor shall request locates from Missouri One Call.

F. TIME FOR COMPLETION OF WORK

1.0 Description. Completion of this contract shall be in accordance with Sec. 108.7 and will be administered on a completion date as well as a calendar days basis.

1.1 For the entirety of this project, Sec. 108.8.1.3(a) shall not apply.

1.2 Regardless of when the work is begun on this contract, all work shall be completed on or before the date specified below. Completion by this date shall be in accordance with the requirements of Sec. 108.7.

Completion Date: April 15, 2017

2.0 Closure Days. Liberty Road may not be closed to traffic more than the number of calendar days listed below. The County will consider innovative solutions proposed by the Contractor for handling traffic between the bridge completion and asphalt construction.

Closure Days = 90

3.0 Should the contractor, or in case of default, the surety, fail to complete the work within the above specified calendar days or the completion date, whichever occurs first, a deduction of the amount shown below will be made for each day that the contract remains uncompleted in accordance with the requirements of Sec. 108.8. These damages are in addition to any other damages as specified elsewhere in this contract.

Liquidated Damages per Day: $700.00

G. EARTHWORK

1.0 Description. This work shall consist of any grading or excavation work required as part of the project, except as noted.

2.0 Construction Requirements.

2.1 Grading activities shall conform to Sec. 203 and Sec. 207, except as noted.

2.2 The contractor shall clear any objects or obstructions from within the streambanks and return the streambed to the pre-construction condition, except as specified in the plans or per the approval of the engineer.

2.2 All excavation that is required for storm sewer installation shall be included in the unit bid price of pipe per linear foot and also shall be included in the unit bid price of inlet per each. There will be no separate payment for any rock excavation that is encountered.

3.0 Method of Measurement.

3.1 No measurements will be made and contract quantity will be used.

4.0 Basis of Payment. All costs incurred for equipment, labor, materials or time required to fulfill this provision, except as noted above, shall be considered completely covered by the contract unit price for "Earthwork" per lump sum.

H. REMOVAL OF EXISTING BRIDGE

1.0 Description. This work shall consist of complete removal and disposal of the existing bridge.

2.0 Removal Requirements.

2.1 All removals shall be in accordance with Sec. 216 and as approved by the engineer.

2.2 Disposal of materials shall be in accordance with Sec. 202. Concrete from the existing bridge may not be recycled on site and must be disposed of by the Contractor.

3.0 Method of Measurement. No measurement will be made for removals and disposals.

4.0 Basis of Payment. All costs incurred for equipment, labor, materials, or time required to fulfill this special provision, except as noted above, shall be considered completely covered by the contract lump sum price for "Removal of Bridges."

I. CLEARING AND GRUBBING

1.0 There will be no direct payment for clearing and grubbing on this project. Any expenses incurred by the contractor by reason of their compliance with this provision shall be considered as completely covered by Item No. 202-20.10, "Removal of Improvements."

2.0 The contractor will be responsible for removing all trees/stumps encountered and/or noted on the plans.

K. ENTRANCES

1.0 Description. This work consists of constructing residential entrances and tying the driveways into the existing drive along the project length.

2.0 Construction Methods. All entrances shall be constructed according to MoDOT Standard Details.

3.0 Basis of Payment: All expenses incurred by the contractor by reason of their compliance with this provision shall be considered as completely covered by the unit prices bid for:

> Item No. 401-99.35, 5" Asphalt Driveway (1.5" Surface on 3.5" Base) per square yard

L. DRAINAGE

1.0 Description: This work consists of providing a storm sewer consisting of pipes and inlets.

2.0 Requirements: Dimensions and details of the inlets and manholes shall be according to the City of Jefferson Standard Details.

2.1 The construction and materials for the concrete drop inlets shall conform to Section 731. **The inlets may be either precast or cast-in-place.** If precast chosen, lids shall be cast-in-place.

2.2 The construction and materials for all pipe shall be reinforced concrete pipe.

3.0 Basis of Payment: All excavation and backfill shall be included with the price for the pipes and inlets. There will be no direct payment for excavation and backfill for the drainage structures.

3.1 All expenses incurred by the contractor by reason of their compliance with this provision shall be considered as completely covered by the unit prices bid for:

Item No. 726-99.03, 18 in. Class III Reinforced Concrete Pipe Culvert, per linear foot
Item No. 726-99.23, 30 in. Class III Reinforced Concrete Pipe Culvert, per linear foot
Item No. 731-99.02, 5' x 5' Area Inlet, per each
Item No. 732-99.02, 18 in. Precast Concrete Flared End Section, per each
Item No. 732-99.22, 30 in. Precast Concrete Flared End Section, per each

M. SEEDING, FERTILIZING, AND MULCH

1.0 Final grade shall be established and seeded within 10 working days of proposed improvements being completed on a property unless approved otherwise by the Engineer.

1.1 All disturbed areas of the project not paved or concrete shall be seeded, unless noted on the plans. The seed mixture shall be 80% Millennium Fescue, 10% Pizzazz Rye, and 10% Brooklawn Bluegrass. The seeding rate shall be 350 pounds per acre (0.72 pounds per square yard).

1.2 Fertilizer shall be a standard commercial product which, when applied at the proper rates, shall supply the quantity of total nitrogen (N), available phosphoric acid (P2O5), and soluble potash (K2O) to provide a final mixture of 13-13-13. The rate of application shall be 500 pounds per acre of 13-13-13 fertilizer. Material may be accepted on the basis of bag label analysis or supplier's certification, or on the basis of samples tested in the laboratory. For samples tested in the laboratory, tolerances in the nominal composition as shown by label or certification of 10 percent up to the maximum of two units (2% plant food) for the individual constituents, and minus 3 percent for the sum of the constituents, will be permitted. There is no limit on the plus tolerances for such samples.

1.3 Type 1 Mulch (Vegetative) shall be applied at the rate of 1 ½ tons per acre.

2.0 Basis of Payment: Any expenses incurred by the contractor by reason of their compliance with this provision shall be considered as completely covered by Item No. 805-99.01, Seeding Cool Season Mixtures, per lump sum.

N. COOPERATION WITH OTHERS

1.0 The contractor is advised that all permanent signing and striping will be installed by others. Others shall be defined as either County personnel or a separate contractor working for the County.

1.1 The contractor shall cooperate with the others specified above to complete the project within the specified time periods and to ensure that the project is built in accordance with the

specifications. Failure to do so may result in the contractor not completing the project on time and being assessed liquidated damages.

2.0 Basis of Payment: All costs associated with the work specified under this provision shall be considered completely covered by the various items of work in the contract.

O. PERMITS

1.0 MoDNR Land Disturbance Permit. The County of Cole has obtained a General Operating Permit (Permit No. MO-R100034) from the Missouri Department of Natural Resources, Water Protection for construction and land disturbance activity, which covers the work entailed in the project.

1.1 In signing the contract, the contractor obligates himself to follow the provisions of the permit. The Contractor shall obtain a copy of the permit prior to beginning construction. Specifically the contractor shall be responsible for:

a) Developing and maintaining a Stormwater Pollution Prevention Plan
b) All required inspections of erosion control BMP's.
c) Maintaining records of precipitation.
d) Maintaining logs of BMP Inspections, BMP Maintenance, and BMP Corrective Actions taken to correct deficiencies identified during inspections.
e) Documenting any changes made to the Erosion Control Plan.

2.0 Corps of Engineers 404 Permit. The project has been approved for use of the Nationwide Permit 14 from the Corps of Engineers. A copy of the permit is included in the Project Manual, and in signing the contract, the contractor obligates himself to follow the provisions of the permit.

3.0 Basis of Payment. All expenses incurred by the Contractor by reason of their compliance with this provision shall be considered as completely covered by each of the appropriate pay items included in the contract.

P. BITUMINOUS PAVEMENT AND BITUMINOUS BASE

1.0 Description. Bituminous Pavement and Bituminous Base shall be constructed in accordance with Section 401.

2.0 Field Laboratory per 401.6 shall not be required.

3.0 The asphalt binder for the asphalt mixes for this project shall be performance graded. The grade shall be PG 64-22 and shall be in compliance with the Section 1015 of the Specifications.

4.0 The asphalt mix design shall be submitted to the County for verification and approval at least 30 days prior to placing any mixture on the project. The Contractor shall not begin work until approval of the mix design has been given by the County.

5.0 Prior to paving, all bituminous base layers, including those exposed through milling, shall be swept free of all dust, loose material, grease or other foreign material and tacked in accordance with Section 407. All tacked surfaces shall be overlaid with a bituminous mixture within the same

day. At no time shall a tacked surface be left in an unpaved condition overnight. In addition, the tack distribution vehicle shall not tack beyond the limits of the traffic control.

6.0 In accordance with Sec. 401.5 (d), the quantity of asphalt binder introduced into the mixer shall be the quantity specified in the job-mix formula. No changes shall be made to the quantity of asphalt binder without written approval from the engineer. The contractor shall furnish verification of the asphalt binder content in the mixer at any time immediately upon request.

7.0 Reclaimed asphalt shingles will be allowed per MoDOT Specifications with the following exception: No Reclaimed Asphalt Shingles (RAS) shall be included in any Plant Mix Bituminous Pavement (BP-1) mixture used on this project.

8.0 Method of Measurement. The quantities of bituminous pavement and bituminous base are calculated at the top of the final finished surface and will be made to the nearest 0.1 square yard. Any base pavement under the curb and gutter will not be included in the measurement. Final measurement of the completed pavement will not be made except for authorized changes during construction, or where appreciable errors are found in the contract quantity.

9.0 Basis of Payment. All expenses incurred by the Contractor by reason of their compliance with this provision shall be considered as completely covered by the unit prices bid for:

Item No. 401-99.05, Bituminous Pavement Mixture PG64-22, (BP-1), per sq. yd.
Item No. 401-99.25, Bituminous Pavement Mixture, PG64-22 (Base), per sq. yd.

Q. WATERLINE

1.0 The waterline construction for Public Water Service District Number 4 of Cole County is listed as an alternate bid. The low bidder will be chosen by the base bid. The Water District will then have the option of whether to award the waterline based on the cost of the alternate. If the alternate is accepted, the waterline will be paid directly by the Water District as opposed to the County of Cole. Payment will be approved on the 2nd Tuesday of the month at the Board meeting and paid within a week of the approval. Payment will be based on the progress completed by the last Friday of the prior month.

2.0 The waterline construction will be observed by the Water District. Will Humphrey, Water District Manager (573-821-0707), shall be notified by the Contractor one week prior to the start of waterline construction.

3.0 If the alternate is accepted, construction shall be according the standard specifications for the water district, which are included in these bid documents. If the waterline specifications conflict with the Standard Specifications or Job Special Provisions for construction affecting the roadway, the Standard Specifications or Job Special Provisions shall control.

4.0 Payment of the waterline shall be considered to be completely covered by the pay items listed in the alternate bid. There will be no direct pay for any rock excavation if encountered.

GENERAL SPECIAL PROVISIONS

The General Special Provisions for the Cole County shall consist of the currently corrected 1999 version of the Missouri Standard Specifications for Highway Construction, Section 100, except as modified or contradicted herein.

SECTION 101.2 - DEFINITION OF TERMS

Delete definition for "Commission" and substitute the following:

If the words "Commission" or "The Missouri Highway and Transportation Commission" are used in the Missouri Standard Specifications for Highway Construction, the word "Owner" shall be substituted, and shall mean the County of COLE acting by and through any of its authorized representatives.

Delete definition for "Contract" and substitute the following:

Contract. The written agreement between the Owner and the Contractor covering the performance of the work for the proposed construction. The contract shall include Notice to Contractors, Instruction to Bidders, Plans, Proposal, Addenda, Contract Bond, Contract Agreement, Acknowledgment, Special Provisions, Standard Specifications, Notice to Proceed, and all Supplemental Contracts and Change Orders. It may cover a single project, or a combination of projects awarded as a single unit.

Delete definition for "Engineer" and substitute the following:

If the words "Engineer" or "Chief Engineer" are used in the Missouri Standard Specifications for Highway Construction, the word "Engineer" shall be substituted, and shall mean the County Engineer acting by and through any of his authorized representatives.

Delete definition for "Laboratory" and substitute the following:

Laboratory. Any testing laboratory which may be designated by the Engineer, for inspecting and determining the suitability of materials.

Delete definition for "Plans" and substitute the following:

Plans. Drawings or reproductions thereof approved by the Owner, which show the location, character, and details of the work. Plans shall prevail over standard specifications, general special provisions, and job special provisions when in conflict therewith.

Delete "Job Special Provision" and substitute the following:

Job Special Provisions. Directions or requirements, peculiar to the work and not otherwise thoroughly or satisfactorily detailed or set forth in the standard specifications. Job special provisions shall prevail over general special provisions, and general special provisions shall prevail over standard specifications whenever in conflict therewith.

Delete definition for "State" and substitute the following:

If the words "State" or "State of Missouri" are used in such a manner which implies ownership of the project, the word "Owner" shall be substituted and shall mean the County of COLE acting by and through any of its authorized representatives.

SECTION 102 - BIDDING REQUIREMENTS AND CONDITIONS

Delete Sec. 102.1 and substitute the following:

102.1 Notice of Bid Opening. After the date is fixed for the receipt of bids, the Owner may, in addition to the notice required by law, give notice of such date by mail directly to interested Contractors. The Notice of Letting will contain a description of the proposed work, together with instructions and information to the potential bidder regarding proposal forms, plans, specifications, and the reservation of the right of the Owner to reject any and all bids.

Delete Sec. 102.2 thru Sec. 102.2.1 and substitute the following:

102.2 Bidder's Qualifications. To demonstrate his qualifications for the project, each bidder must be prepared to submit within seven calendar days of the Owner's request, written evidence as to the Contractor's financial status, equipment, previous experience and personnel.

Delete Sec. 102.2.2 and substitute the following:

102.2.2 Each prospective bidder shall execute the affidavit of labor standards compliance, stating that such bidder will fully comply with all written requests by the Missouri Department of Labor and Industrial Relations, Division of Labor Standards, to provide information for the purpose of establishing a prevailing wage.

Delete Sec. 102.2.3 and substitute the following:

102.2.3 The prospective bidder, if a corporation, shall submit a copy of its current annual registration report, or initial registration report if a new corporation, on file with the Corporation Division of the Missouri Secretary of State's Office. Each corporation which is a party to a joint venture shall submit the same required report with its joint venture contractor.

Delete 102.6 and substitute the following:

102.5 Sales and Use Taxes. The sales tax exemption for public works contractors of certain entities, enacted in 1994 in Section 144.062 RSMo, may apply to contractors for the Owner or their subcontractors or suppliers. This exemption is for materials consumed in the construction of, or incorporated into this project. The Owner will judge each project and determine if the sales tax exemption of the Owner will apply. If sales tax exemption is allowed on a project, it will be duly noted on the proposal form. The Owner will make the tax exemption certificate available, if applicable, to the successful bidder upon award of this contract. If the Owner does not allow the use of sales tax exemption, the contractor, subcontractor or suppliers shall pay all applicable state and local sales taxes or state use taxes on all material and supplies used on a project and should include those taxes in their bid.

Delete 102.7.2 in its entirety.

Delete Sec. 102.7.3 and substitute the following:

102.7.3 A bid of an individual, including those doing business under a fictitious name, shall include the signature and address of the individual.

Delete Sec. 102.7.4 and substitute the following:

102.7.4 A bid by a partnership or joint venture, including individuals doing business under fictitious names, or corporations, shall be executed by at least one of the partners followed by the title "Partner", or one of the joint venturers followed by the title "Joint Venturer" and the business address of the partnership or joint venturer shown. The true legal name and address of each partner and joint venturer shall also be shown.

Delete Sec. 102.7.5 and substitute the following:

102.7.5 A proposal by a corporation whether acting alone or as a joint venturer, shall show the address and name of the corporation and shall include the signature and title of a person authorized by its board of directors to bind the corporation.

Add Section 102.7.9

102.7.9 All names must be typed or printed in ink below all signatures.

Add Section 102.7.10

102.7.10 The bid shall contain an acknowledgement of receipt of all addenda (the number and dates of which shall be filled in on the Proposal Form).

Add Section 102.7.11

102.7.11 Bidders shall complete and submit with his proposal the following forms included in the bid documents.

(a) Proposal
(b) Signature and Identity of Bidder
(c) Bid Guaranty
(d) Contractor's Affidavit
(e) Anti-Collusion Statement

Delete Sec. 102.9 and substitute the following:

102.9 Proposal Guaranty. No proposal will be considered unless accompanied by a certified check or cashier's check, on any bank or trust company, insured by the Federal Deposit Insurance Corporation, payable to the Owner, for not less than 5 percent of the amount of the bid, or by a bond secured by a qualified surety, or sureties, for not less than 5 percent of the amount of the bid. Surety companies shall furnish a Certificate of Authority in accordance with Section 103.4.2. Bid bonds may be submitted on forms furnished in these Contract documents. The proposal Guaranty shall be attached to the back of the bid proposal form.

Delete Sec. 102.10 and substitute the following:

102.10 Delivery of Proposals. Each proposal shall be submitted in a sealed, opaque envelope marked clearly "Construction Bid" and shall also be clearly marked with project title, bid date, bid time and bidder's name and address. If sent by mail, the sealed bid shall be addressed to the Cole County Commission, Courthouse Annex, Room 200, 311 East High Street, Jefferson City, Missouri, 65101. All proposals shall be filed prior to the time and at the place specified in the Notice To Contractors. Proposals received after the time for opening of bids will be returned to the bidder unopened. No fax bids will be accepted.

SECTION 103 - AWARD AND EXECUTION OF CONTRACT

Delete Sec. 103.2.1 and substitute the following:

103.2.1 The contract will be awarded by the Owner to the lowest responsible bidder as soon as practicable after the opening of the bids. The responsibility of the Contractor will be determined by the Owner based upon, but not limited to the Contractor's previous work, financial standing, and record for the payment of local bills incurred by the Contractor, his employees, and subcontractors. The successful bidder will be notified by letter mailed to the address shown on the proposal that his bid has been accepted and that he has been awarded the contract.

Delete Sec. 103.4.1 and substitute the following:

103.4.1 The successful bidder shall, at the time of the execution of the contract, furnish a contract bond in a sum equal to the contract price. The bond shall be to the Owner, in a form and with surety, or sureties, acceptable to the Owner, to insure the proper and prompt completion of the work in accordance with the provisions of the contract, and to insure payment for all labor performed and materials consumed or used in the work. The bond, if executed by a surety which is a corporation organized in a state other than Missouri, shall be signed by an agent or broker licensed by the Missouri Division of Insurance. All proposals shall be submitted on the basis of furnishing a contract bond executed by an approved surety, or sureties, as herein set out.

SECTION 104 - SCOPE OF WORK

Delete Sec. 104.6.12 and substitute the following:

104.6.12 All proposals shall be submitted to the Engineer. If so desired, the Contractor may submit a conceptual proposal for approval stating the basic proposal and approximate cost savings. The conceptual proposal will give the Contractor the opportunity to submit his idea without large initial development costs should the proposal be rejected.

Delete Sec. 104.11.2 and substitute the following:

104.11.2 The Contractor shall open and clean all existing channels and culverts leaving them free from all excess mud or silt, drift, brush, and debris of any kind. This work shall be considered incidental to the work, and no direct payment shall be made for work covered by this section.

Delete Sec. 104.13 in its entirety and substitute the following:

104.13 Warranty.

104.13.1 The Contractor shall warranty that the equipment, materials, and workmanship furnished under this contract will be as specified and will be free from defects for a period of one (1) year from the date of final acceptance. In addition, the equipment furnished by the Contractor shall be warranted to be free from defects in design.

104.13.2 Within the warranty period and upon notification of the Contractor by the Owner, the Contractor shall promptly make all needed adjustments, repairs, or replacements arising out of defects which, in the judgment of the Engineer, or the County, become necessary during such period.

104.13.3 The cost of all materials, parts, labor, transportation, supervision, special tools, and supplies required for replacement of parts, repair of parts, or correction of abnormalities shall be paid by the Contractor, or by his surety under the terms of the bond.

104.13.4 The Contractor shall extend the terms of this warranty to cover repaired parts and all replacement parts furnished under the guarantee provisions for a period of one (1) year from the date of installation thereof.

104.13.5 If within ten (10) days after the Owner gives the Contractor notice of a defect, failure, or abnormality of the work, the Contractor neglects to make, or undertake with due diligence to make, the necessary repairs or adjustments themselves or order the work to be done by a third party, the Owner may complete the work and the costs of the work shall be paid by the Contractor.

104.13.6 In the event of an emergency where, in the judgment of the Owner, delays would cause serious loss or damage, repairs or adjustments may be made by the Owner, or a third party chosen by the Owner, without giving notice to the Contractor, and the cost of the work shall be paid by the Contractor, or by his surety under the terms of the bond.

104.13.7 No direct payment will be made for complying with the requirements of this section.

SECTION 105 - CONTROL OF WORK

Delete Sec. 105.5 and substitute the following:

105.5 Cooperation by Contractor. The Contractor will be supplied with four (4) sets of approved plans and contract assemblies including special provisions. Additional sets of approved plans and contract assemblies including special provisions may be purchased as provided in the notice to bidders. One (1) set of approved plans and contract documents including special provisions shall be kept available on the job at all times.

Add Sec. 105.5.3:

105.5.3 The Contractor shall notify the Engineer not less than four (4) working days prior to closing the road.

Delete Sec. 105.7.1 and substitute the following:

105.7.1 The Contractor shall cooperate with utility owners and the Engineer in the location and relocation of utility facilities to minimize effects upon Contractor's work, interruption to utility service and duplication of work by utility owners. The Contractor shall perform the necessary clearing and grubbing as soon as practicable after the notice to proceed is issued to allow the utilities to locate or relocate their facilities. Facilities or appurtenances that are to remain in place during construction shall be accounted for and protected by the Contractor's work procedures. Utility location and relocation shall be made in accordance with 7 CSR Division 10, Chapter 3, Utility Location and Relocation.

Add Section 105.7.7

105.7.7 The Contractor shall make suitable and timely verbal and written requests to all utility locating agencies, all railroad and utility owners, all pipe owners, and other parties affected, and endeavor to have all necessary locates and adjustments of public or private utility fixtures, pipe lines, and other appurtenances within or adjacent to the limits of construction, made as soon as practicable. One (1) copy of all requests shall be submitted to the Engineer.

Delete Sec. 105.8 thru Sec. 105.8.3 and substitute the following:

105.8 Construction Stakes, Lines and Grades. The Engineer will set initial field control consisting of bench marks and control monuments.

105.8.1 The Contractor shall be responsible for the preservation of all bench marks and control monuments, and if any of these bench marks or control monuments are carelessly or willfully destroyed or disturbed, the cost of replacing them may be charged to the Contractor.

105.8.2 These bench marks and control monuments will constitute the initial field control by and in accordance with which the Contractor shall establish all other necessary controls and perform the work in the correct position to correspond to the information shown on the plans and given by the Engineer during the progress of the work. Elevations shown on the drawings and referred to in the specifications are based on the bench marks shown.

105.8.3 The Contractor shall employ competent personnel for making position, gradient and alignment determinations and measurements.

Delete Sec. 105.10.2 and substitute the following:

105.10.2 Inspections and job control tests will generally be made by the Engineer on the following items of work. It shall be the responsibility of the Contractor to notify the Engineer by 1:00 P.M. of the day preceding any operation which affects these items.

- Initial Layout
- Removal of Existing Structure
- Pile Driving
- Footing Excavation
- Reinforcing Steel Placement
- All Concrete Operations
- All Asphalt Operations
- Girder Erection
- Requests for Compaction Testing
- All Base Rock Operations
- All Earthwork Operations

- All Roadway Surfacing Operations
- Post-Tensioning Material Placement
- Post-Tensioning Stressing
- Cutting of Tendon Ends
- Grouting of Stressing Pockets

If any operation which affects the above mentioned items is to be performed on a Monday, notification must be made to the Engineer by 1:00 P.M. of the preceding Friday. The lack of supervision or inspection by the Engineer shall not relieve the Contractor of the responsibility to construct the project according to the plans and specifications. Any work performed or materials used without authorization by the Engineer may be ordered removed and replaced at the Contractor's expense.

Delete Sec. 105.11.2 and substitute the following:

105.11.2 All changes in the work or departures from the plans, will be considered unauthorized and at the expense of the Contractor unless, before proceeding with the work, he has a copy of an Order Record signed by the Engineer, or a Change Order signed by all parties whose signatures are provided for, except the Federal Engineer. These forms will contain complete detailed instructions regarding the proposed changes. Any departure from the instructions contained in such written order shall be considered unauthorized.

Delete Sec. 105.11.4 and substitute the following:

105.11.4 All construction and materials which have been rejected or declared unsatisfactory shall be remedied or removed and replaced in an acceptable manner by the Contractor at his expense. All expense incurred by the Engineer due to corrections or removal and replacement of construction and materials shall be born by the Contractor, and will be deducted from any payment which is or may become due the Contractor. Upon failure of the Contractor to remedy or remove and properly dispose of rejected materials or work, or to replace them immediately after receiving written notice from the Engineer, the Engineer may employ labor to rectify the work, and the cost of rectification will be deducted from any payment due or which may become due the Contractor.

Delete Sec. 105.16.5 and substitute the following:

105.16.5 If the claim is against the Owner, the notice of claim shall be personally delivered or sent by certified mail to the Owner. If the claim is against the Contractor, the notice of the claim will be personally delivered or sent by certified mail to the Contractor at the address shown under the signature on the proposal. If the claim is against an assignee, notice of the claim will be personally delivered or sent by certified mail to the assignee at the address shown on the accepted notice of assignment. The party against whom a claim is filed shall file any counter claims within sixty (60) days after receipt of such notice. All notices of claims shall contain an itemized statement showing completely and fully the items and amounts forming the basis of the claim.

SECTION 106 - CONTROL OF MATERIAL

Add Sec. 106.1.4.1:

106.1.4.1 Unless otherwise specified, all materials shall be subject to visual inspection and job control tests, as determined by the Engineer, and shall be certified by the material supplier that the material supplied conforms to the requirements of these specifications. All certifications shall make reference to the specific project, and shall contain the supplier's name and address.

Delete Sec. 106.2.2 and substitute the following:

106.2.2 Contractor Furnished Sources. If sources of material are not designated in the plans or described in the contrast, or if the Contractor desires to use material from sources other than those designated, the Contractor shall acquire the necessary rights to take materials from the sources and shall pay all costs related thereto, including any which may result from testing of samples by an approved laboratory as required by the Engineer and for an increase in length of haul. All costs of exploring, meeting environmental requirements and developing such other sources shall be borne by the Contractor. The use of material from other than designated sources which have not had prior approval of the Engineer shall be used at the Contractor's risk and may be considered as unacceptable and unauthorized and, if so considered, will not be paid for. Where practicable, borrow areas, gravel pits, and quarry sites shall be located so that they will not be plainly visible from the state highway or county road.

Delete Sec. 106.3 and substitute the following:

106.3 Samples, Tests, and Cited Specifications. The Contractor shall submit certifications and substantiating test reports, furnished by the supplier or fabricator, certifying that material and manufacturing procedures conform to the specifications. There shall be no direct charge to the Owner for materials taken as samples, either for field tests or for laboratory tests. If a specification of a recognized national standard agency (ASTM, AASHTO, AWWA, AWS, etc.) is designated, the material may, unless otherwise specified, meet either the designated specification or the latest revision thereof in effect at the time of letting of the contract. Unless otherwise specified, all sampling and testing required by the specifications shall be performed by the supplier or fabricator at no cost to the Owner in accordance with the methods specified in the contract or in accordance with the latest methods in effect at the time of letting of the contact, as prescribed by the national standard agency, and the results shall be signed, sealed and stamped according to laws related to professional Engineers. If appropriate methods have not been so prescribed, tests shall be performed in a manner determined by the Engineer.

Delete Sec. 106.8 and substitute the following:

106.8 Material Furnished by the Owner. If any material is to be furnished by the Owner, special provisions designating such materials and their locations will be included in

the proposal. The cost of handling and placing all materials shall be considered as included in the contract price for the item in connection with which they are used. The Contractor will be responsible for all material provided to him, and deductions will be made from any monies due him to make good any shortages and deficiencies, from any cause whatsoever, and for any damage which may occur, and for any demurrage charges.

106.8.1 Pipe. The pipe supplied by the Owner shall be stored at the Cole County Department of Public Works facilities located at 5055 Monticello Road, Jefferson City, MO. The pipe can be picked during normal working hours of 8:00 A.M. to 4:30 P.M. on Monday through Friday excluding any holidays. Once the pipe is picked up by the Contractor, it shall be his responsibility to protect it against damage and theft.

SECTION 107 – LEGAL RELATIONS AND RESPONSIBILITY TO THE PUBLIC

Delete Sec. 107.13 and substitute the following:

107.13 The Contractor shall procure and maintain at its own expense, until acceptance by the Engineer, liability insurance for all damages and losses imposed by law and assumed under the contract, of the kinds and in the amounts specified in Secs 107.13.1 though 107.13.3. Before the Contractor commences the work, the Contractor shall require the insurance company or companies to furnish to the Engineer evidence of such insurance showing compliance with these specifications. All insurance required in Sec 107.13 shall be occurrence policies in a form acceptable to the Engineer, and shall remain in form until all work required to be performed under the terms of the contract is satisfactorily completed as evidenced by its formal acceptance by the Engineer. Each policy or its declaration pages shall provide that the policy shall not materially changed or canceled until the Engineer has been given at least 30 days advance notice in writing. If any policy is canceled before the contract work is complete, a satisfactory replacement policy must be in force, with notice and evidence of insurance submitted to the Engineer, prior to the effective date of cancellation of the former policy. All evidence of insurance and notices shall be submitted to the Engineer. Upon request, the Contractor shall promptly furnish the Engineer with a complete copy of the policy. Failure to furnish evidence of proper insurance, or complete insurance policies when requested, will result in the temporary suspension of work as provided in Sec 108.6, and may result in order claims or actions for breach of contract or otherwise, as may be recognized at law or in equity.

Delete Sec. 107.13.2.3 and substitute the following:

107.13.2.3 Additional Insureds. Each policy of commercial general liability insurance shall name the Owner, Engineer and its members, agents and employees as additional insureds. Each commercial general liability insurance policy shall also contain a separation of insured conditions. The insurance afforded by the Contractor shall be primary insurance.

Delete Sec. 107.15 and substitute the following:

107.15 Personal Liability of Public Officials. There shall be no personal liability upon the public officials, or any member, employee or agent of the Owner in carrying out any of the provisions of the contract or in exercising any power or authority granted to them, it being understood that in such matters they acted as agents and representatives of the Owner with official and public duty doctrine immunity. If any provision of the contract appears to impose a duty on such an individual, the duty remains exclusively that of the Owner and is not a personal duty or obligation of the individual.

SECTION 108 - PROSECUTION AND PROGRESS

Delete Sec. 108.1.1 and substitute the following:

108.1.1 The Contractor shall not sublet, sell, transfer, assign, or otherwise dispose of the contract or contracts or any portion thereof, or of his right, title, or interest therein, without written consent of the Engineer. Requests for permission to sublet, assign, or otherwise dispose of any portion of the contract shall be in writing and shall be accompanied by evidence that the organization which will perform the work is particularly experienced and equipped for such work. In case such consent is given, the Contractor will be permitted to sublet a portion thereof, but shall perform with his own organization work amounting to not less than fifty percent (50%) of the total contract cost, except that any items designated by the Engineer as specialty items may be performed by subcontract and the contract value of any such specialty items so performed by subcontract may be deducted from the total contract cost before computing the amount of work required to be performed by the Contractor with his own organization. The subcontractor shall not sublet, sell, transfer, assign, or otherwise dispose of the subcontract. Consent to a subcontract shall constitute the Owner's endorsement of the qualifications of the subcontractor.

Delete Sec. 108.4 and substitute the following:

108.4 Progress Schedules. The Contractor shall, if requested by the Engineer, submit a progress schedule for review and approval. The progress schedule shall be submitted to the Engineer within three (3) days of the receipt of the request. The progress schedule shall be used to establish the construction operations and to monitor the progress of the work although the Engineer's determination of the then major operation or controlling item of work shall always prevail. The progress schedule shall be in the form specified in Sec 108.4.1, unless the contract contains a different requirement. The progress schedule shall be based on the number of working days, calendar days or other increments as set forth in the contract that the Contractor expects to require in completing the project recognizing the capabilities of labor, equipment, arrangements for materials, mobilization, shop drawing preparation and approvals, and other relevant items.

Delete Sec. 108.4.2 and substitute the following:

108.4.2 Preparation of Initial Schedule. The Contractor shall, if requested by the Engineer, complete development of the initial activities schedule chart and written narrative and present a copy to the Engineer at least seven (7) days prior to the pre-construction conference.

Delete Sec. 108.7.2.2 and substitute the following:

108.7.2.2 The count of working days will start on the date the Contractor starts construction operations, or the authorization date in the Notice to Proceed, whichever is earlier. The Engineer will be the judge of the number of working days to be charged under the contract. In computing the working days charged against the Contractor in the execution of the work, allowance will be made for days that are not working days and for days during which work is suspended with the written approval of the Engineer. The Engineer may make allowance for working days lost due to causes he deems justified for the elimination of the count of working days. No allowance will be made for delay or suspension of the prosecution of the work due to fault of the Contractor. On or about the first of each month, the Engineer will give the Contractor written notice of the number of working days charged to the contract for the preceding time period. Any objection by the Contractor to the number of working days so charged shall be made in writing within five (5) days, setting forth his objections and specifying the reasons therefore, or those objections shall be forever waived and may not constitute the basis for an excusable or compensable delay.

SECTION 109 - MEASUREMENT AND PAYMENT

Delete Sec. 109.1 and substitute the following:

109.1 Measurement of Quantities. Unless otherwise specified hereinafter, all work performed under the contract will be paid for on contract quantity basis as set forth in these specifications. When the quantity of any item that is to be paid for on a contract quantity basis is found to include errors, or when an authorized revision of the plan is made, the quantity will be corrected before making final payment. The method of measurement and computations to be used in determination of quantities of material furnished and of work performed under the contract will be those methods generally recognized as conforming to good engineering practice.

Add Sec. 109.5.8:

109.5.8 The Contractor shall not begin any work for which price payments are not provided in the contract without first bringing the matter to the attention of the Engineer, and no bills or charges for extra or force account work will be allowed except for that ordered in writing and approved by the Engineer.

Delete Sec 109.6 and substitute the following:

109.6 Method of Payment. Payment to the Contractor for furnishing all material and performing all work under the contract shall be made by check.

Delete Sec. 109.7 in its entirety and substitute the following:

109.7 Partial Payments

109.7.1 The Contractor shall submit for review and approval by the Engineer either monthly or bi-monthly payment requests on or about the 1st and 15th of each month for the work performed and the value thereof at the contract unit prices. The proper percentage with relation to completion will be allowed for all incomplete items.

109.7.2 No payments will be made on account of materials not yet incorporated into the work.

109.7.3 From the total amount of work items of each estimate, there will be deducted five (5) percent. The retained percentage will be released as provided in Sec. 109.9. The net amount due on the estimate will be certified to the Owner for payment. This method of retained percentage does not apply to Sec. 808.6.

109.7.4 Payment may be withheld or nullified in whole or part to such extent as may be necessary to protect the Owner from loss on account of:

a. Failure to properly submit material certifications and substantiating test reports required under Sec. 106.1.4.1 and Sec. 106.3.

b. Failure to properly submit certified copies of labor payrolls required under Sec. 110.

c. Defective work not remedied.

d. Failure of the Contractor to properly make payment to suppliers or subcontractors for material and/or labor (RSMo 34.057)

e. A reasonable doubt that the contract can be completed for the balance then unpaid.

f. Damage to another Contractor.

Delete Sec. 109.9.1 and substitute the following:

109.9.1 Prior to any release of retained percentage, the Contractor shall file with the Owner the following:

a. An affidavit, to the effect that all payments have been made and all claims have been released for all materials, labor, and other items covered by the contract bond;

b. Written consent of the surety to such payment;

c. Certification regarding work performed by and payments made to Disadvantaged Business Enterprises (DBE's);

d. Lien Waivers signed by each supplier furnishing materials to the project and/or each subcontractor providing services/materials for the project releasing all claims to said materials and services;

e. The Contractor and all subcontractors shall file an affidavit stating that each has fully complied with the provisions and requirements of the Prevailing Wage Law;

f. Any other documents which may be required by the contract, or the Engineer.

Add Sec. 109.9.1.2:

109.9.1.2 When the work has been completed and certified by the Owner, a final estimate will be executed and submitted, which will provide payment to the Contractor for the entire sum due him as set forth in these specifications, including the amount previously retained by the Owner. All prior partial estimates and payments shall be subject to correction by the Owner in this final estimate and payment.

SECTION 110 - STATE WAGE RATE REQUIREMENTS

Add Sec. 110.5:

110.5 The Contractor and all subcontractors shall maintain books, accounts, ledgers, invoices, drafts, documents, pages and other business records pertaining to the performance of the contract with such materials available at the Contractor's field or permanent business offices at all reasonable times during the performance of the contract and for four (4) years from the date of final payment under the contract, for inspection by authorized representatives.

Add Sec. 110.6:

110.6 The Contractor and each subcontractor shall be required to submit to the Engineer one certified copy of labor payrolls and a weekly statement of compliance (Form WH-347) for each week that work is in progress, within seven (7) days of the payment date of the payroll. If work is temporarily suspended, the last payroll shall be marked appropriately to note that it will be the last payroll until work is resumed.

Add Sec. 110.7:

110.7 Payrolls to be submitted shall be checked for compliance with the contract requirements and will be retained by the Owner for a period of three (3) years following final audit, during which time they will be open to inspection.

Add Sec. 110.8:

110.8 The Contractor shall be responsible for the submittal of payrolls and certifications for all subcontractors.

Add Sec. 110.9:

110.9 The Owner may check payrolls with the following checks, however, it will still be the Contractor's responsibility to ensure proper labor compliance:

a. The employee's full name as shown on his social security card, his address and social security number shall be entered on each payroll.

b. Check the payroll for correct employee classification.

c. Check the payroll for correct hourly wage and, if applicable, the correct overtime hourly rate.

d. Check the daily and weekly hours worked in each classification including actual overtime hours worked. (Not adjusted hours)

e. All deductions are listed in the net wage shown. The Form WH-347 is to be used if fringe benefits are paid into established programs. However, if fringe benefits are paid in cash to the employee, the amount shall be indicated on the payroll.

f. To assure that the payrolls are arithmetically correct, approximately ten percent (10%) of the extensions on the first three (3) payrolls shall be checked. The Contractor will be advised of any violations noted on the labor payroll. All the errors will be corrected by means of a supplementary payroll.

g. All checking by the Owner will be made in red pencil and initialed by the checker.

h. Final payroll will be marked "Final" or "Last Payroll".

i. A record of all payrolls will be maintained by the Owner.

Add Sec. 110.10:

110.10 The contracts for construction projects require that certain applicable information be displayed in a conspicuous place within the project limits for the duration of the contract. The following is a list of required information to be posted both on the project and in the Owner's office:

a. In the Owner's office:

1. Missouri Equal Employment Opportunity Notice
2. PR-1022, Title 18, Section 1020, Notice on False Statements

b. On the Projects:

1. State and Federal Wage Rates Notice
2. Federal Equal Employment Opportunity Notice (English and Spanish version)
3. PR-1022, Title 18, Section 1020, Notice on False Statements
4. Form FHWA-1495, and FHWA-1495A, Wage Rate Information (Post with Federal Wage Rates, if applicable)
5. Contractor's and Subcontractor's EEO Policy Statements and name, address, and telephone number of designated EEO Officers
6. Notice to Labor Unions of Contractor's commitment to EEO (if applicable)
7. Notice requesting referral of minorities by present employees

Add Sec. 110.11:

110.11 The Owner's personnel will generally conduct one wage rate interview on each project every month. Labor interviews are not required on railroad and other utility adjustments. The interviewer will determine the employee's name, the employer's name, the classification of the employee, the actual wage paid, and the posted wage.

TECHNICAL SPECIFICATIONS

The Technical Specifications for this project shall consist of the currently effective (2011) version of the *Missouri Standard Specifications for Highway Construction*, Sections 201-1092 except as modified or contradicted by the County's Contract, Job Special Provisions, General Provisions and Plans.

COLE PWSD #4

STANDARD SPECIFICATIONS FOR WATER MAIN INSTALLATIONS

Table of Contents

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SECTION 02325

WATER DISTRIBUTION – TRENCHING, EXCAVATION AND BACKFILLING

1 GENERAL

1.1 Scope

The section includes trenching, excavation and backfilling pertaining to water distribution system construction. Contractor shall furnish all material, equipment and labor to complete the work.

1.2 General Description of Work

Materials shall be removed so that the pipe can be laid to the alignment and depth required. This work shall include:

A Removal, handling and disposal of all materials so removed.

B Stripping along the proposed alignment and other excavation sites including stumps, debris and roots.

C Removal of all pavement, road surfacing, junk and structures or parts thereof as required for construction purposes.

D Protection of adjacent property trees and structures; sheeting, shoring and bracing.

E Protection and maintenance of existing pipelines, drains, conduits, sewers, poles and overhead utilities.

F Preparation of subgrades, embedment of pipe, backfilling and disposal of excess excavating as required.

1.3 Water Distribution Specifications

Specification sections beginning with "Water Distribution" are specifically for the materials and construction of water distribution system piping and appurtenances. These specifications section are to be used for all water distribution system construction and supersede any conflicts with other specifications in this project manual when pertaining to water distribution system construction.

1.4 License, Permits, Certificates, Laws and Ordinances

Licenses, permits and certificates as required by law or other regulatory agencies shall be procured and purchased when necessary by the Contractor. The Contractor shall comply with all applicable laws, ordinances, safety provisions, rules and regulations relating to the work. Work done inside the right-of-way of state highways shall be located in the six foot (6') utility corridor.

1.5 Trespass

The Contractor shall inform affected property owners, even though easements have been obtained, before construction occurs on their property. Should the property contain farm crops, at least three days notice shall be given to allow for harvesting. Crops damaged without notice so given shall be paid for by the Contractor at current market value.

The Contractor shall obtain permission, in writing, before cutting fences and repair same to original condition or better. Fences shall be completely repaired the day they are taken apart. Fences left unrepaired may be fixed by the owner and costs deducted from monies due to the Contractor. If a controversy arises over fence cutting and Contractor does not have written

permission, damages may be assessed against Contractor to return fence to original condition. Contractor shall use existing openings, insofar as practical to maneuver equipment.

1.6 Project Quantities

Project quantities shall be measured as the work progresses by the Contractor and Owner's representative. Contractor and Owner's representative shall keep daily logs and compare quantities at the end of the work week. Quantity discrepancies should be worked out between Contractor and Owner's representative. Log sheets signed by the Contractor and Owner's representative shall be provided to the Engineer for payment purposes.

1.7 Shop Drawings and Material List

Before the Contractor begins work, six copies of shop drawings, parts diagrams material specification sheets, outline dimension prints and equipment performance characteristics for all items proposed to be used shall be submitted to the Owner for approval for use on the project. Accompanying this submittal shall be the names and location of the manufacturer and the closest stocking supplier. Products shall not be utilized until written approval is given by the Owner, who shall be the sole determinant of acceptability between similar items as made by different manufacturers. The Contractor shall furnish products which are in complete compliance with the contract requirements; and approval of shop drawings and/or material lists shall not be construed as authorizing any deviations from the contract plans or specifications.

If it is the intent of the Contractor to provide products which deviate from the contract plans or specifications, such intent shall be made in writing accompanying the submittal of products for approval by the Owner. The Contractor shall indicate those characteristics of the product which are in non-conformance, give reasons for said non-conformance and receive written approval of the Owner for deviating from the requirements before utilizing the product in the work.

If subsequent investigation reveals a product was installed which deviated from the requirements without specific written approval for the deviation, then the Contractor at the request of the Owner may be required to remove and replace such product at his expense. If the Contractor fails to act then the Owner may require the change to be made by others and charged against the Contractor. If available, funds withheld from the Contractor may be used to pay necessary removals/replacements.

If the Contractor desires to receive payment for materials stored on the job, he shall submit invoices for the products upon which payment is requested. These invoices shall be on the supplying company's forms and shall show all unit prices, allowable discounts and proposed rebates; all as necessary for the Owner to determine the actual price the Contractor will ultimately pay for the materials.

1.8 Bidding Provisions for Fittings

A Job with No Bid Item for Fittings

Fittings will not be indicated or bid as a separate bid item. It will be the contractor's choice as to how to install the pipe as per the angular change so long as the pipe remains in the right of way or easement. The Contractor will be responsible for the purchase of any and all fittings and shall include these costs in the pipe line unit prices. The Contractor may install a fitting such as a 22½° - 45° bend, etc. with reaction backing as per normal installation of such a fitting (all without a specific bid item compensation) or the contractor may adjust trench depths or angular alignment to keep joint angular alignment in conformance with above stipulated while still maintaining a 42 inch cover. This procedure will be acceptable up to and including a depth of cover over the pipe of 8 feet. The contractor will be required to install a fitting (without added compensation) to maintain cover depth within said tolerance.

In certain instances fittings will be required by the nature of the job i.e. tee, 90° bend, etc. and these will be required as shown on the plans, but extra payment will not be made and the contractor shall include these costs in the pipe line unit prices.

B Job with Bid Item for Fittings

Some jobs will be bid with prices taken for different fittings. Fittings used on this type of job will be paid for at the prices indicated on the bid proposal.

2 RELATED SECTIONS

2.1 Section 02450 – Water Distribution Boring

2.2 Section 02512 – Water Distribution Piping

2.3 Section 02515 – Water Distribution Valves and Appurtenances

2.4 Section 02516 – Water Distribution Testing and Disinfection

3 QUALITY ASSURANCE

If, during the processes involved in the completion of this work, some event happens which would indicate improper workmanship or inadequate materials have been incorporated into the work, then the Owner shall have the right to have tests conducted to determine the adequacy of the products or workmanship and also determine the cause of failures. If inadequacies are detected, the Owner shall deduct costs of said investigations from money due to the Contractor.

4 UTILITIES

The Contractor shall comply with Sec. 319.015 - 319.050 RS MO and shall proceed with caution in the excavation and preparation of the trench so that the exact location of underground structures, both known and unknown, may be determined, and he shall be held responsible for the repair of such structures when broken or otherwise damaged because of carelessness on his part.

The actual location of existing utilities is the sole responsibility of the Contractor. Those shown on the plans are given to call particular attention to areas of special concern. Contractor shall contact Missouri One Call at 1-800-DIG-RITE. Contractor should be aware that not all utilities are listed with One Call. Contractor is responsible to contact all utilities not participating in Missouri One Call.

5 PIPE TRENCH EXCAVATION

5.1 Alignment, Grade and Trench Preparation

Pipelines shall be located as shown on the drawings.

The water lines are, in general, located on air photos, tax maps or plans which have a large magnitude of scale. It is obvious that at this scale the width of the line depicting the water pipe can have a magnitude of 10 feet or more. While such scale distortion exists, the intent is to locate the line in the general area where the plan line is located and at the most desirable point to facilitate long term district advantages through decreased maintenance.

Manufacturers specify a maximum angular change that is allowed for the joining of their specific pipe type joint pipe. Placement on this job shall be such that only 80% of the pipe manufacturer's angular stipulated maximum change will be allowable. The contractor will be allowed the greatest

amount of freedom in the methodology of pipe installation to maintain conformance with said 80% maximum angular change.

5.2 Depth of Pipe

Minimum depth of cover over pipe shall be forty-two inches (42 inches) as measured from the original ground level to the nearest surface of the pipe. Greater depths will be required to make smooth transitions at points of abrupt changes in the ground surface; also extra depths may be required under highways, railroads, and streams. These extra depth conditions will conform to the requirements as shown on the drawings, also those as provided by the agency involved. If overdigging occurs, replaced material shall be thoroughly compacted.

The bottom of the trench shall provide continuous and uniform bearing for the pipe except at the bell or joints at which a hole shall be dug to prevent the end from bearing.

5.3 Trench Width

The width of the trench shall be ample to permit the pipe to be laid and jointed properly, and the backfill to be placed and compacted as specified. Trenches shall be of such extra width, when required, as will permit the convenient placing of timber supports, sheeting and bracing and handling of specials.

Minimum trench width shall be 15 inches in earth and 24 inches in rock. In addition the trench shall be at least 4 inches wider than the maximum dimension of any part of a pipe, a fitting, etc.

5.4 Rock

The proposal form bid items shall indicate the status of rock with respect to payment. A bid form that contains an estimated quantity (of rock as a pay item) will be a classified bid. If no pay item exists the job will be a nonclassified job. For a nonclassified job the Contractor shall inform himself of the amount of rock on the job and adjust his unit prices accordingly.

Rock shall be removed six inches (6 inches) below that which would be required for normal earth excavation and backfilled with gravel to provide uniform and continuous bearing.

Trench width for rock excavation shall be equal to the trench width for the pipe being installed except that a 24-inch width shall be used as a rock trench width for any pipe normally requiring a lesser trench width.

5.5 Poor Soil

Where the bottom of the trench at subgrade is found to be unstable or to include ashes, cinders, refuse, vegetable or other organic material, or large pieces or fragments of inorganic material that will not provide adequate long term support, the Contractor shall excavate any such unsuitable material by under-cutting and over-digging the width. Before the pipe is laid, the subgrade shall be made by backfilling with an approved material in three inch (3 inches) layers. These layers shall be thoroughly tamped to provide uniform and continuous bearing.

5.6 Protection of Excavation

Open cut trenches shall be sheeted and braced as required by any governing state laws and municipal ordinances and as may be necessary to protect life, property, or the work. Where sheeting and bracing are used, the trench width shall be increased accordingly. Water mains shall not be laid in trenches containing water. Trenches shall be kept free from water and pipe shall not be laid in water or on soggy material.

5.7 Protection of Property

All excavated material shall be piled in a manner that will not endanger the work and that will avoid obstructing sidewalks and driveways. Hydrants under pressure, valve pit covers, valve boxes, curb stop boxes, fire and police call boxes, or other utility controls shall be left unobstructed and accessible until the work is completed. Gutters shall be kept clear or other satisfactory provisions made for street drainage, and natural water courses shall not be obstructed.

Trees, shrubbery, fences, poles, and all other property and surface structures shall be protected unless their removal is shown on the drawings or authorized by the Engineer. When it is necessary to cut roots and tree branches, such cutting shall be done under the supervision and direction of the Engineer.

Temporary support, adequate protection, and maintenance of all underground and surface structures, drains, sewers, and other obstructions encountered in the progress of the work shall be furnished by the Contractor at his expense and under the direction of the Engineer. Any structures that have been disturbed shall be restored upon completion of the work.

5.8 Railroad Crossings

Pipe line which passes under railroad tracks shall be constructed as necessary to meet the requirements of the railway company. The Contractor shall notify the railway company before construction on the crossing is started and organize the work to meet the railroad requirements.

5.9 Highway Crossings

A pipe line which passes under a highway shall be constructed as necessary to meet the requirements of the Missouri Department of Transportation (MoDOT), County Highway Dept., Special Road District, or Municipal Street Dept., as the case may be. The Contractor shall notify the appropriate agency before construction on the crossing is started and organize the work to meet the agency's requirements. Only one lane of traffic may be blocked at any time.

5.10 County Road Crossings

The respective county shall be contacted to confirm requirements prior to excavation.

5.11 Stream Crossings

Pipe lines under streams, creeks, outflow lines of culverts and other places which exhibit severe cutting or erosion shall be encased as indicated in the drawings. Encasement shall be placed at such points as located on the drawings. The Engineer may require additional locations to be encased. Extra compensation will be allowed for such additional work.

5.12 Barricades, Guards, and Safety Provisions

To protect persons from injury and to avoid property damage, adequate barricades, construction signs, torches, red lanterns, and guards, as required shall be placed and maintained during the progress of the construction work and until it is safe for traffic to use the highway. All material piles, equipment, and pipe that may serve as obstructions to traffic shall be enclosed by fences or barricades and shall be protected by proper lights when the visibility is poor. Safety rules and regulations of local authorities shall be observed.

5.13 Maintenance of Traffic and Closing of Streets

The Contractor shall carry on the work in a manner that will cause the least interruption in traffic and may close to through travel not more than two consecutive blocks, including the cross street

intersected. Where traffic must cross open trenches, the Contractor shall provide suitable bridges at street intersections and driveways.

The Contractor shall post suitable signs indicating that a street is closed and necessary detour signs for the proper maintenance of traffic.

6 BACKFILLING

6.1 General

All backfill material shall be placed so as to make the earth profile and surface conform as nearly as possible to the original condition. Exceptions to this will be necessary in the case unsuitable material is encountered.

All trenches for water line construction, including service lines, shall be backfilled from 6" below pipe to 12" above top of pipe using 1-inch road rock. When the type of backfill material is not indicated on the drawings or specified, the Contractor may backfill with the excavated material. If, in the opinion of the Engineer, the excavated material is unsuitable for backfill, the Contractor shall be required to obtain additional approved material to refill the trench.

For backfilling on slopes, a dirt check shall be placed to prevent washout of backfill material. The dirt check shall be the width of the trench and 6 to 10 feet in length in intervals as shown on the plans. The depth of the dirt check shall be from the bottom of the trench to the ground surface. Soil used for dirt checks shall be free of rock 2 inches and larger.

For County road crossings use 1¼" rock backfill.

Use 40 foot section of PVC Pipe in all County Road Crossings, and all other roads where no encasement is required. Center the pipe on road bed to eliminate a coupling under road. Where rock has been excavated, the lower six inches (6 inches) of the trench shall be backfilled with either sand or limestone screenings (max. size ¼-inch) or select excavated material. The cost of this material replacement shall be included in the bid - unit prices. Backfilling above this shall proceed as customary.

6.2 Backfill Over Pipe

A To One Foot Over Pipe

From the bottom of the ditch to a depth of one foot above the top of the pipe, the trench shall be backfilled by hand or by approved mechanical methods. The Contractor shall use special care in placing this portion of the backfill so as to avoid injuring or moving the pipe.

Backfilling material shall be deposited in the trench for its full width on each side of the pipe, fittings, and appurtenances simultaneously.

Trench shall be backfilled from 6" below pipe to 12" above top of pipe using 1-inch road rock. If the excavated material consists of sand or loam or clay which has been excavated in a manner to eliminate lumps or clods (e.g. excavation by a trenching machine) backfill may be accomplished by means of a road grader or similar device which will gently roll the material into the trench by multiple passes parallel to the trench. If this procedure is not used or where lumpy material exists or where it is possible to roll stones 2 inches or larger against the pipe, backfill shall be done by hand.

B Backfill From One Foot Over Pipe To Ground Surface

Machine backfill will be allowed.

6.3 Backfilling Where Settlement is Unimportant

Where shown on the drawings or specified, the contractor may backfill the trench from one foot above the pipe to top of the trench with excavation material, and the backfill shall be neatly rounded over the trench to a sufficient height to allow for settlement to grade after consolidation. Locate dirt mound slightly to upgrade side of trench.

6.4 Backfilling Under Permanent Pavement

Where the excavation is made through permanent pavements, curbs, driveways, or sidewalks, or where such structures are undercut by the excavation, the entire backfill to the subgrade of the structures shall be made with sand or limestone screenings. Machine compacted backfill of satisfactory earth materials will be a satisfactory alternate backfill procedure. Compacted backfill will be required around valve boxes, fire hydrants and other items which project to ground surface to insure continuity of proper alignment. Walks and driveways consisting of broken stone, gravel, slag, or cinders shall be backfilled to the ground surface with gravel or rock of the appropriate size.

When trenches have not been properly filled and where settlement occurs, refilling shall be required to bring the surface to conform to the adjacent ground.

6.5 Backfilling in Freezing Weather

Backfilling shall not be done in freezing weather except by permission of the Engineer, and it shall not be made with frozen material. No fill shall be made where the material already in the trench is frozen.

6.6 Excess Material

All completed lines shall be returned as nearly as possible to the original condition, including reseeding or resodding if necessary.

Excess excavated materials from trenches located in open fields shall be uniformly distributed within the construction limits.

Excess excavated materials within streets, driveways, parkways, highways and roads not required for backfilling or grading shall be removed from the site.

7 SPECIAL EXCAVATION AND BACKFILL PROCEDURES

To the maximum extent possible, the contractor shall use a trencher type excavation machine to dig the trench. Except on small jobs, specifically unallowable will be backhoe only excavation and the contractor will be allowed to use the backhoe only at points where a trencher is impractical. The replacement of backfill material into the trench shall be accomplished by running equipment parallel to the trench and a process of backing perpendicular to the trench with subsequent moves sideways along the trench and then pushing into the trench is prohibited. The effect of this will be to require a machine, such as a motor grader or other device with an adjustable angle blade, to be used for backfill. In yards with sod or turf type surfaces, the operator shall take special care and remove excavated materials without removing turf. Following behind this operation shall be manual laborers using a shovel to remove remaining small amounts of earth from turf so that the work areas (not the trench area) will be restored to their original condition the day the excavation occurs.

8 SEPARATION OF WATER MAINS, SANITARY SEWERS AND STORM SEWERS:

8.1 Parallel Installation

Water mains shall be laid at least ten feet horizontally from any existing or proposed line carrying non-potable fluids such as, but not limited to drains, storm sewers, sanitary sewers, combined sewers, sewer service connections, and process waste or product lines. The distance shall be measured edge to edge. In cases where it is not practical to maintain a ten-foot separation, the DNR-Public Drinking Water Branch may allow deviation on a case-by-case basis, if supported by data from the design engineer. Such deviation may allow installation of the water main closer to a non-potable line, provided that the water main is laid in a separate trench or on an undisturbed earth shelf located on one side of the non-potable line and on either case, at such an elevation that the bottom of the water main is at least 18 inches above the top of the non-potable line.

In areas where the recommended separations cannot be obtained, either the waterline or the non-potable line shall be constructed of mechanical or manufactured restrained joint pipe, fusion welded pipe, or cased in a continuous casing. Casing pipe must be a material that is approved for use as water main. Conventional poured concrete is not an acceptable encasement.

8.2 Crossings

Water mains crossing sewers, or any other lines carrying non-potable fluids shall be laid to provide a minimum vertical clear distance of 18 inches between the outside of the water main and the outside of the non-potable pipeline. The water main shall always be installed above the non-potable pipeline. 18-inch separation is a structural protection measure to prevent the sewer or water main from settling and breaking the other pipe. At crossings, the full length of water pipe shall be located so both joints will be as far from the non-potable pipeline as possible but in no case less than ten feet or centered on a 20-foot pipe. In areas where the recommended separations cannot be obtained either the waterline or the non-potable pipeline shall be constructed of mechanical or manufactured restrained joint pipe, fusion welded pipe, or cased in a continuous casing that extends no less than ten feet on both sides of the crossing. Special structural support for the water and sewer pipes may be required. Casing pipe must be a material that is approved for use as water main. Conventional poured concrete is not an acceptable encasement.

8.3 Exception

Any exception from the specified separation distances above (parallel and crossing) must be submitted to the department for approval

8.4 Force Mains

There shall be at least a ten-foot horizontal separation between water mains and sanitary sewer force mains or other force mains carrying non-potable fluids and they shall be in separate trenches. In areas where the recommended separations cannot be obtained, either the waterline or the non-potable line shall be constructed of mechanical joint pipe or cased in a continuous casing, be constructed of mechanical joint pipe, or be jointless or fusion welded pipe. Where possible, the waterline shall also be at such an elevation that the bottom of the water main is at least 18 inches above the top of the non-potable line. Casing pipe must be a material that is approved for use as water main. Conventional poured concrete is not an acceptable encasement.

8.5 Sewer Manholes

No water line shall be located closer than ten feet to any part of a sanitary or combined sewer manhole. Where the separation cannot be obtained, the waterline shall be constructed of mechanical or manufactured restrained joint pipe, fusion welded pipe, or cased in a continuous casing. Casing pipe must be a material that is approved for use as water main. The full length of water pipe shall be located so both joints will be as far from the manhole as possible, but in no

case less than ten feet or centered on a 20-foot pipe. No water pipe shall pass through or come into contact with any part of a sanitary or combined sewer manhole.

8.6 Disposal Facilities

No water main shall be located closer than 25 feet to any wastewater disposal facility, agricultural waste disposal facility, or landfill. Water mains shall be separated by a minimum of 25 feet from septic tanks and wastewater disposal areas such as cesspools, subsurface disposal fields, pit privies, land application fields, and seepage beds.

9 SURFACE WATER CROSSINGS

Surface water crossings present special problems, whether over or under water. The department should be consulted before final plans are prepared. Special detail drawings shall be submitted that are scaled and dimensioned to show the approximate bottom of the stream, the approximate elevation of the low and high-water levels, and other topographic features. Mechanical, restrained, or fusion welded joint pipe shall be required in waterways and wet weather streams.

9.1 Above-Water Crossings

The pipe shall be adequately supported and anchored, protected from damage and freezing and accessible for repair or replacement.

9.2 Underwater Crossings

A. Flowing streams and water body crossings five hundred feet or less in length shall have a minimum cover of four feet over the pipe. When crossing water courses greater than 15 feet in width, the following shall be provided:
   1. The pipe shall be of special construction, having flexible watertight joints. Steel or ductile iron ball-joint river pipe shall be used for open cut crossings. Mechanical or restrained joint or fusion welded pipe may be used for open cut crossings, provided it is encased in a welded steel casing. Mechanical or restrained joint or fusion weld pipe shall be used for bored crossings.
   2. Adequate support and anchorage shall be provided on both sides of the stream.
   3. Valves shall be provided at both ends of water crossings so that the section can be isolated for testing or repair; the valves shall be easily accessible and should not be subject to flooding.
   4. The valve closest to the supply source shall be in an accessible location and installed in a vault, manhole, or meter pit sized to allow the installation of leak detection equipment.
   5. Permanent taps shall be provided on each side of the valve within the manhole, vault, or meter pit to allow insertion of a small meter to determine leakage and for sampling purposes.
   6. Bank erosion is a major cause of stream crossing failures, and erosion protection measures such as rip rap have limited success. Stream movement and the history of bank erosion must be considered when choosing the length that the crossing pipe or casing shall extend beyond the upper edge of the stream channel. The stream crossing pipe or casing shall extend at least 15 feet beyond the upper edge of the stream channel on each side of the stream.
   7. Large river crossings such as those crossing the Missouri or Mississippi River require specialized design and shall be considered on a case-by-case basis.

B. For lake, water body, and flood plain crossings greater than 500 feet in length, the design shall consider the ability to access and repair or replace the pipe in these crossings. Consideration shall also be given to the ability to continue service to areas served by the crossing in the event of a submerged leak or pipe break.

1. Submerged portions of pipe crossing proposed lakes shall not be buried when the submerged pipe is greater than 500 feet in length except for the transition from water to land.
2. Steel or ductile iron ball-joint river pipe or fusion welded pipe shall be used under water during normal flow conditions. Mechanical, restrained joint, or fusion welded pipe shall be used in flood plains.
3. Underwater installations shall be tested for leaks prior to installation.
4. Valves above the high water level shall be provided at both ends of water crossings so that the section can be isolated for testing or repair.
5. The valve closest to the supply source shall be in an accessible location and installed in a vault, manhole, or meter pit sized to allow the installation of leak detection equipment.
6. Permanent taps shall be provided on each side of the valve within the manhole, vault, or meter pit to allow insertion of a small meter to determine leakage and for sampling purposes.

C. Intermittent Flowing Streams
1. Restrained joint or thermal welded pipe shall be used for all stream crossings.
2. The pipe shall extend at least 15 feet beyond the upper edge of the stream channel on each side of the stream.
3. Adequate support and anchorage shall be provided on both sides of the waterway.

END OF SECTION

SECTION 02450

WATER DISTRIBUTION BORING

1 GENERAL

1.1 Scope

This section contains boring for water distribution system construction. Contractor shall furnish all material, equipment and labor to complete the work.

1.2 Water Distribution Specifications

Specification sections beginning with "Water Distribution" are specifically for the materials and construction of water distribution system piping and appurtenances. These specifications section are to be used for all water distribution system construction and supersede any conflicts with other specifications in this project manual when pertaining to water distribution system construction.

1.3 License, Permits, Certificates, Laws and Ordinances

Licenses, permits and certificates as required by law or other regulatory agencies shall be procured and purchased when necessary by the Contractor. The Contractor shall comply with all applicable laws, ordinances, safety provisions, rules and regulations relating to the work. Work done inside the right-of-way of state highways shall be located in the six foot (6') utility corridor.

1.4 Trespass

The Contractor shall inform affected property owners, even though easements have been obtained, before construction occurs on their property. Should the property contain farm crops, at least three days notice shall be given to allow for harvesting. Crops damaged without notice so given shall be paid for by the Contractor at current market value.

The Contractor shall obtain permission, in writing, before cutting fences and repair same to original condition or better. Fences shall be completely repaired the day they are taken apart. Fences left unrepaired may be fixed by the owner and costs deducted from monies due to the Contractor. If a controversy arises over fence cutting and Contractor does not have written permission, damages may be assessed against Contractor to return fence to original condition. Contractor shall use existing openings, insofar as practical to maneuver equipment.

1.5 Project Quantities

Project quantities shall be measured as the work progresses by the Contractor and Owner's representative. Contractor and Owner's representative shall keep daily logs and compare quantities at the end of the work week. Quantity discrepancies should be worked out between Contractor and Owner's representative. Log sheets signed by the Contractor and Owner's representative shall be provided to the Engineer for payment purposes.

1.6 Shop Drawings and Material List

Before the Contractor begins work, six copies of shop drawings, parts diagrams material specification sheets, outline dimension prints and equipment performance characteristics for all items proposed to be used shall be submitted to the Owner for approval for use on the project. Accompanying this submittal shall be the names and location of the manufacturer and the closest stocking supplier. Products shall not be utilized until written approval is given by the Owner, who shall be the sole determinant of acceptability between similar items as made by different manufacturers. The Contractor shall furnish products which are in complete compliance with the

contract requirements; and approval of shop drawings and/or material lists shall not be construed as authorizing any deviations from the contract plans or specifications.

If it is the intent of the Contractor to provide products which deviate from the contract plans or specifications, such intent shall be made in writing accompanying the submittal of products for approval by the Owner. The Contractor shall indicate those characteristics of the product which are in non-conformance, give reasons for said non-conformance and receive written approval of the Owner for deviating from the requirements before utilizing the product in the work.

If subsequent investigation reveals a product was installed which deviated from the requirements without specific written approval for the deviation, then the Contractor at the request of the Owner may be required to remove and replace such product at his expense. If the Contractor fails to act then the Owner may require the change to be made by others and charged against the Contractor. If available, funds withheld from the Contractor may be used to pay necessary removals/replacements.

If the Contractor desires to receive payment for materials stored on the job, he shall submit invoices for the products upon which payment is requested. These invoices shall be on the supplying company's forms and shall show all unit prices, allowable discounts and proposed rebates; all as necessary for the Owner to determine the actual price the Contractor will ultimately pay for the materials.

1.7 Bidding Provisions for Fittings

A Job with No Bid Item for Fittings

Fittings will not be indicated or bid as a separate bid item. It will be the contractor's choice as to how to install the pipe as per the angular change so long as the pipe remains in the right of way or easement. The Contractor will be responsible for the purchase of any and all fittings and shall include these costs in the pipe line unit prices. The Contractor may install a fitting such as a 22½° - 45° bend, etc. with reaction backing as per normal installation of such a fitting (all without a specific bid item compensation) or the contractor may adjust trench depths or angular alignment to keep joint angular alignment in conformance with above stipulated while still maintaining a 42 inch cover. This procedure will be acceptable up to and including a depth of cover over the pipe of 8 feet. The contractor will be required to install a fitting (without added compensation) to maintain cover depth within said tolerance.

In certain instances fittings will be required by the nature of the job i.e. tee, 90° bend, etc. and these will be required as shown on the plans, but extra payment will not be made and the contractor shall include these costs in the pipe line unit prices.

B Job with Bid Item for Fittings

Some jobs will be bid with prices taken for different fittings. Fittings used on this type of job will be paid for at the prices indicated on the bid proposal.

2 RELATED SECTIONS

2.1 Section 02325 – Water Distribution – Trenching, Excavating and Backfilling

2.2 Section 02512 – Water Distribution Piping

2.3 Section 02515 – Water Distribution Valves and Appurtenances

2.4 Section 02516 – Water Distribution Testing and Disinfection

3 QUALITY ASSURANCE

If, during the processes involved in the completion of this work, some event happens which would indicate improper workmanship or inadequate materials have been incorporated into the work, then the Owner shall have the right to have tests conducted to determine the adequacy of the products or workmanship and also determine the cause of failures. If inadequacies are detected, the Owner shall deduct costs of said investigations from money due to the Contractor.

4 BORING

Borings shall meet all requirements of Missouri Department of Transportation (MoDOT), and Contractor shall obtain necessary permits and do all work in accordance with their requirements. Pushers or push-type borings are specifically not allowed. All borings shall be of the bore types specified herein and in the MoDOT requirements.

Borings shall be made so that line and grade of water line may be carried continuously through encasement. Boring encasement to be steel pipe with a wall thickness of a minimum as per table in TS44-9. Encasement to be new, unused steel pipe with yield strength of 35,000 psi conforming to ASTM A53-B. Casing diameter to be as shown in table unless specifically bid differently in bid proposal. Contractor may use larger casing size if he desires, but shall be responsible for any job variations encountered by this choice.

Contractor shall complete bore before other work is started so that slight misalignments can be compensated for in other work.

While quality of work is required, this job is set up with the boring done first as previously stipulated to take advantage of a relaxed specification for casing alignment and grade that is possible within the confinements of the overall project layout.

Casing shall be installed as boring equipment removes material from hole.

Random lengths of steel casing may be used; but all ends must be V grooved-butt welded to adjacent casing pipe around the complete perimeter of the pipe. Welds to be water tight and shall be equal to or stronger than adjacent pipe. Casing joining procedures must be such that concentricity of the entire completed casing will be maintained.

Boring to include all work of digging bore pit, casing and all items associated therewith, for the completed job.

In some layouts, part of the casing may be installed by open cut methods and attached to the ends of the bored casing. This will be shown as a separate bid item where and if included on the job.

Borings on railroads shall follow similar procedures to above and meet railroad requirements.

5 DIRECTIONAL BORING

Directional bores shall be completed using a directional boring machine supplied with an output signal to allow the Contractor to track the location of the drill head at all times. Size of drilling equipment shall be adequate for the job, but not grossly oversized such that an undue amount of thrust or torque is placed on the product pipe. Drilling fluids shall be selected for the site specific soil and ground water conditions. Confine free flowing (escaping) slurry or drilling fluids at the ground surface during pullback or drilling to prevent damage or hazardous conditions in surrounding areas. Remove all residual slurry from the surface and restore the site to pre-construction conditions.

All pipelines provided in the restrained joint area shall be installed to a minimum depth of 4 feet for creek crossings and 10 feet for river crossings. All work associated with installing restrained joint pipe in the designated areas and, if crossing wetlands, creeks, rivers, streams or other waterways, shall conform to all permit requirements and to state and federal regulations. The restrained joint areas depicted on the drawings are not to be considered exact and represent the generalized location of the restrained joint pipe. The actual location, length, and size of the restrained joint area will be determined in the field by the Owner's Representative and may differ from that shown on the drawings. The actual field location, length and size may differ due to, but not limited to, staking the pipelines alignment to avoid or minimize disturbance to surface obstructions, re-routes due to pipeline easement changes, re-routes authorized by the Owner or Owner's Representative based on actual field conditions, and or any other reasons deemed necessary by the Owner or Owner's Representative.

A pilot hole shall be bored first, with an angle of entry not to exceed 20°, and proceed under the obstacle being crossed while maintaining the required soil cover (4-ft. for creek crossings, 10-ft. for river crossings). The pilot hole shall extend to the point of exit, on the other side of the obstacle, maintaining an angle of exit not to exceed 12°. The product pipe shall be restrained joint PVC pipe, as specified in this manual, unless stated otherwise on the plans.

The product pipe shall be assembled on the exit side of the bore, and installed by back-reaming in the reverse direction. Deviations from this method shall be approved by the Engineer. The pull section shall be adequately supported during pullback. Do not drag pipe on the ground. Above-ground pipe assembly shall be checked for suitability of installation before pullback. The borehole shall be reamed to approximately 1.5 times the outside diameter of the product pipe. Use sufficient drilling fluids and monitor pullback pressure to detect any problems before heaving of the bore path surface occurs. Product pipe may be deflected no greater than 80% of the manufacturer's maximum recommended deflection. Maintain the minimum cover required at each restrained joint area. Provide a written statement from the pipe manufacturer as to the minimum pipe bending radius and/or deflection allowed and as to the acceptance/requirements of using their pipe in the Directional Drilling method. Provide this information during the submittal phase of the project.

Use a swivel when back-reaming to prevent rotational torque (torsion) on the product pipe. Cap product pipe as necessary to prevent drilling fluids from entering.

Trace bore path by interpretation of electronic signals sent by a monitoring device. Submit to the Engineer a print out of the bore path with respect to the obstacle crossed for the development of as-built drawings and to exhibit that sufficient cover was achieved during the bore. The bore path print-out must be submitted prior to final pay request.

Fully repair any and all bore/relief pits constructed, including vacuuming drilling fluids and compacting disturbed earth.

Provide the required long-body transition couplings and reducers as necessary to complete the connection to the adjoining pipe. The Contractor shall provide the required depth of cover over the pipe upon tying in the restrained joint pipe with the adjoining pipeline. A factory trained, licensed representative from the Contractor shall be on-site to complete the heat fusing of each section of polyethylene pipe, if used. The Contractor's representative shall be trained and licensed by the pipe manufacturer.

If, at the time of construction, any of the following conditions should appear, the Owner's Representative shall be notified:

- Evidence of recent severe cutting or erosion.

- Crossing of recent channel improvements where new stream location is not stabilized, such as pilot channels, newly constructed pond spillways, etc.

- Crossing of proposed channel improvements.

The Owner's Representative shall review said areas following notification. If, in the opinion of the Owner's Representative, such areas warrant the addition of a restrained joint section, the Owner's Representative shall authorize the addition of the restrained joint area under the provisions of this section.

6 PVC INSTALLATED IN CASINGS

When PVC is installed in casings the following procedures shall be followed:

6.1 The entire casing shall be installed before any pipe is inserted into the casing. Inspection will be by lamping and a full circle shall be required to be seen to prove that the casing is concentric from end to end.

6.2 Except as specifically shown otherwise on the plans, the depth to the top of the casing shall in general be 3 feet -6 inches below the lowest level of surface being crossed. If a ditch lies near to the required casing point such that lowering the casing would allow the PVC carrier pipe to be run on a straight line (rather than introducing multiple bends); then the casing shall be lowered a sufficient amount to allow for the PVC carrier pipe to be run straight.

6.3 A repair style coupling, dresser style coupling or similar device shall be installed on either side of the end of the casing in addition to the regular pipe joints to allow for future removal-repair of the PVC carrier pipe.

6.4 PVC carrier pipe shall be as long as possible (40 feet) to minimize the number of joints contained within the casing. If it is possible to install PVC without a joint in the casing (because of shortness of casing length), it will be unnecessary to place PVC pipe on skids and the pipe may be laid directly on the casing.

6.5 Whenever a PVC carrier pipe joint is required within the casing the PVC shall be placed on skids.

A Skids shall be plastic.

B Skids shall have a toothed male strap on one segment with female strap on other so multiple segments can be banded together.

C Skid thickness to be sufficient to raise pipe bell off of casing so no weight rests on bell.

D Use flux soap or drilling mud to lubricate skids.

E Skids to be Raci by Recon or equal.

F Use double spacers at ends of casing pipe and one each side of a joint. End spacers to be within 2 feet from end of casing pipe.

6.6 Below is a table of pipe sizes and maximum skid support spacing for PVC. In addition to tabular spacing, split skid spacing dimensions so that a skid is located at least one foot from each end of casing.

Nominal Pipe Size Inches	Casing Size Internal Diameter Inches	Casing Wall Thickness Inches		Maximum* ft. Spacing Between Adjacent Skids
		Highway Use	Railroad Use	
2"	8"	3/16	¼	3'
2.5"	8"	3/16	¼	3'
3"	10"	3/16	¼	3'
4"	10"	3/16	¼	4½'
6"	12"	3/16	¼	6'
8"	14"	3/16	5/16	7'
10"	16"	3/16	5/16	7'
12"	18"	¼	5/16	7'
14"	20"	¼	3/8	7'
16"	22"	¼	3/8	7'
18"	24"	3/8	7/16	7'
20"	26"	3/8	7/16	7'
	28"	3/8	½	
	30"	7/16	½	
24"	32"	7/16	½	7'
	34"	7/16	9/16	
30"	36"	7/16	9/16	7'
	40"	½	9/16	
	42"	½	9/16	
	44"	½	9/16	

*Measurement from centerline to centerline of skid. Use at least 3 skids per pipe irrespective of chart values.

6.7 PVC pipe may be installed by using drawn cable or jacking. The force used to install the pipe must spread over the pipe end on which it bears, by use of a flat piece of wood or other similar force sustaining material.

6.8 Casings may be installed by boring or open cut methods as is needed in the specific circumstance. Random lengths of steel casing may be used; but all ends must be V grooved-butt welded to adjacent casing pipe around the complete perimeter of the pipe. Casing joining procedures must be such that concentricity of the entire completed casing will be maintained.

6.9 The ends of casing shall be sealed with 1/8" synthetic rubber wrap around end seal with stainless steel banding straps.

7 DUCTILE IRON INSTALLED IN CASINGS

Procedures similar to PVC installation shall be used with the following additional requirements:

7.1 Minimum 3 skids required per nominal length of pipe irrespective of size.

7.2 Use same wall thickness of casing as per PVC table.

7.3 Table of casing size for DI pipe types.

Casing Size ID Inches	Pipe Size With Slip Joint End	Pipe Size With MJ End
10"	2"	---
10"	2.5"	---
12"	3"	---
12"	4"	---
14"	6"	4"
16"	8"	6"
18"	10"	8"
20"	12"	10"
22"	14"	12"
24"	16"	14"
26"	18"	16"
30"	20"	18"
32"	24"	20"
36"	---	24"
40"	30"	---
44"	---	30"

8 RESTRAINED JOINT DUCTILE IRON

8.1 River Crossing Pipe

Pipe designated as river crossing pipe shall be ductile iron and have a ball and socket type joint to meet severe requirements while in place with the allowance for free turning deflection while still maintaining a restrained joint.

Pipe and fittings shall be equivalent to Clow F-141-River Crossing pipe or US pipe Usiflex boltless flexible joint pipe. Pipe shall be cement lined. Laying length to be about 18 feet. The joint shall have a deflection allowance of 15° but pipe trench shall be dug such that a maximum to 10° deflection or less will be maintained.

Pipe shall conform to the following minimums:

Size	ANSI Class	Nominal weight (lbs/ft)
4	4	21
6	4	25
8	5	34
10	5	45
12	5	56

Pipe end shall be closed as it is placed across river. Fill water, if needed, shall be potable. Pipe shall not leak and be pressure tested in place before remainder of line is joined up. Both ends of pipe shall have a short connecting piece. One end of connecting piece is to be compatible with flex joint and other end shall be push-on joint bell type.

Construct end joint restraint by digging a ditch across connecting piece and filling with concrete. Concrete to be 15 inches wide x 4 feet long x 4 feet high and have 4 sets No. 4 rebars built in a rectangular cage placed in concrete. Pipe to be in center of concrete block.

8.2 Restrained Push on Joint Pipe

Shall be capable of being deflected after assembly, shall provide means to stop pull out such as factory welded bead on the spigot end which is locked into bell, a friction assembly placed around the spigot end which is cinched into the pipe, which assembly is then restrained by being locked

into the bell or devices similar to US Pipe TR Flex. This type joint is acceptable for use with optional restrained joint fittings, valves-wherein concrete thrust blocking is eliminated. Except for above optional use condition this pipe will have a specific bid item when used on the job.

END OF SECTION

SECTION 02512

WATER DISTRIBUTION PIPING

1 GENERAL

1.1 Scope

The section includes piping, fittings and installation pertaining to water distribution system construction. Contractor shall furnish all material, equipment and labor to complete the work.

1.2 Water Distribution Specifications

Specification sections beginning with "Water Distribution" are specifically for the materials and construction of water distribution system piping and appurtenances. These specifications section are to be used for all water distribution system construction and supersede any conflicts with other specifications in this project manual when pertaining to water distribution system construction.

1.3 License, Permits, Certificates, Laws and Ordinances

Licenses, permits and certificates as required by law or other regulatory agencies shall be procured and purchased when necessary by the Contractor. The Contractor shall comply with all applicable laws, ordinances, safety provisions, rules and regulations relating to the work. Work done on state highways shall be located 2 feet away from R/W Line.

1.4 Trespass

The Contractor shall inform affected property owners, even though easements have been obtained, before construction occurs on their property. Should the property contain farm crops, at least three days notice shall be given to allow for harvesting. Crops damaged without notice so given shall be paid for by the Contractor at current market value.

The Contractor shall obtain permission, in writing, before cutting fences and repair same to original condition or better. Fences shall be completely repaired the day they are taken apart. Fences left unrepaired may be fixed by the owner and costs deducted from monies due to the Contractor. If a controversy arises over fence cutting and Contractor does not have written permission, damages may be assessed against Contractor to return fence to original condition. Contractor shall use existing openings, insofar as practical to maneuver equipment.

1.5 Project Quantities

Project quantities shall be measured as the work progresses by the Contractor and Owner's representative. Contractor and Owner's representative shall keep daily logs and compare quantities at the end of the work week. Quantity discrepancies should be worked out between Contractor and Owner's representative. Log sheets signed by the Contractor and Owner's representative shall be provided to the Engineer for payment purposes.

1.6 Shop Drawings and Material List

Before the Contractor begins work, six copies of shop drawings, parts diagrams material specification sheets, outline dimension prints and equipment performance characteristics for all items proposed to be used shall be submitted to the Owner for approval for use on the project. Accompanying this submittal shall be the names and location of the manufacturer and the closest stocking supplier. Products shall not be utilized until written approval is given by the Owner, who shall be the sole determinant of acceptability between similar items as made by different manufactures. The Contractor shall furnish products which are in complete compliance with the

contract requirements; and approval of shop drawings and/or material lists shall not be construed as authorizing any deviations from the contract plans or specifications.

If it is the intent of the Contractor to provide products which deviate from the contract plans or specifications, such intent shall be made in writing accompanying the submittal of products for approval by the Owner. The Contractor shall indicate those characteristics of the product which are in non-conformance, give reasons for said non-conformance and receive written approval of the Owner for deviating from the requirements before utilizing the product in the work.

If subsequent investigation reveals a product was installed which deviated from the requirements without specific written approval for the deviation, then the Contractor at the request of the Owner may be required to remove and replace such product at his expense. If the Contractor fails to act then the Owner may require the change to be made by others and charged against the Contractor. If available, funds withheld from the Contractor may be used to pay necessary removals-replacements.

If the Contractor desires to receive payment for materials stored on the job, he shall submit invoices for the products upon which payment is requested. These invoices shall be on the supplying company's forms and shall show all unit prices, allowable discounts and proposed re-bates; all as necessary for the Owner to determine the actual price the Contractor will ultimately pay for the materials.

1.7 Bidding Provisions for Fittings

A Job with No Bid Item for Fittings

Fittings will not be indicated or bid as a separate bid item. It will be the contractor's choice as to how to install the pipe as per the angular change so long as the pipe remains in the right of way or easement. The Contractor may install a fitting such as a 22½° - 45° bend, etc. with reaction backing as per normal installation of such a fitting (all without a specific bid item compensation) or the contractor may adjust trench depths or angular alignment to keep joint angular alignment in conformance with above stipulated while still maintaining a 42 inch cover. This procedure will be acceptable up to and including a depth of cover over the pipe of 8 feet. The contractor will be required to install a fitting (without added compensation) to maintain cover depth within said tolerance.

In certain instances fittings will be required by the nature of the job i.e. tee, 90° bend, etc. and these will be required as shown on the plans, but extra payment will not be made and the contractor shall include these costs in the pipe line unit prices.

B Job with Bid Item for Fittings

Some jobs will be bid with prices taken for different fittings. Fittings used on this type of job will be paid for at the prices indicated on the bid proposal.

2 RELATED SECTIONS

2.1 Section 02325 – Water Distribution – Trenching, Excavating and Backfilling

2.2 Section 02450 – Water Distribution Boring

2.3 Section 02515 – Water Distribution Valves and Appurtenances

2.4 Section 02516 – Water Distribution Testing and Disinfection

5 PIPE LAYING, PIPE AND FITTINGS

5.1 Ductile Iron Pipe:

A General

Ductile iron pipe and fittings as furnished by the Contractor shall be installed according to the manufacturer's recommendations and the specifications.

Metal thickness class, net weight of pipe without lining, length of pipe and name of manufacturer shall be clearly marked on each length of pipe.

Laying condition will be flat bottom trench, loose back fill Type 1 as per ANSI/AWWA C150/A21.50 with extra excavation for pipe bell so that weight rest on bottom of pipe body and is not elevated on one end by bell.

If the option to provide thrust restraint by use of pipe joint restraint is used, then laying conditions type 2 will apply with consolidation along distance of pipes as indicated in chart for specific restraint required. Consolidation therein is defined as placement of material under haunch and along side and bottom of pipe by shovel slicing or other means so that voids are eliminated and that material is consolidated to 90% Proctor along distances required. Consolidation shall be accomplished in maximum loose fill lifts of 8 inches.

For pipe in rock, placement of select material under pipe as described elsewhere shall be required.

B Ductile Iron Pipe

Shall be ANSI/AWWA C150/A21.50; C151/A21.51; C115/A21.15 Class 50, except where otherwise specified. The pipe shall be cement lined and sealed ANSI/AWWA C104/A21.4.

C Ductile and Gray Iron Fittings

Shall be ANSI/AWWA C110/A21.10, except shorter laying lengths will be acceptable ANSI/AWWA C153/A 21.53. Fittings to be 350 psi rated. All fittings to be cement lined and sealed, ANSI/AWWA C104/A21.4.

D Flanged Joints

(i) Flanges: Shall be ANSI/AWWA C110/A21.10, C115/A21.15, ANSI B16.1, B16.5; or for steel C207 or U.S. Pipe "Flange-Tyte".

(ii) Bolts: Shall be ASTM A307, chamfered or rounded ends projecting ¼ to ½ inch beyond outer face of nut.

(iii) Nuts: Shall be ASTM A307, hexagonal, ANSI B18.2, heavy semi-finished pattern.

(iv) Gaskets: Shall be ANSI/AWWA C111/A 21.11 and ASTM D1330, Grade I, red rubber, ring type, 1/8 inch thick; or U.S. Pipe "Flange-Tyte" 1/8 inch thick.

E Mechanical Joints

Shall be ANSI/AWWA C111/A21.11.

F Push-on Joints

Shall be ANSI/AWWA C111/A21.11, except gaskets shall be neoprene or other synthetic rubber. Natural rubber will not be acceptable.

G Couplings

(i) When plans indicate a coupling is required for jointing pipe without calling out a specific type of coupling, the following shall be used for the various type joints.

(a) DI to DI - Mechanical Joint Solid sleeve

(b) DI to Steel or Galvanized - Mechanical Joint Solid sleeve with sleeve size changed to accommodate pipe OD

(c) DI to PVC - Mechanical Joint Solid sleeve with PVC adaptor with OD built up to correspond to DI pipe size or Flanged

Ductile iron bolted compression couplings may be used in lieu of the above. On 2 inch and under line sizes a ductile iron threaded compression coupling may be used.

(ii) Adaptor Couplings: To insure that slight misalignment will not create distortions in solid pipe runs, a Dresser Style 127 flanged adaptor will be required at locations as indicated on the plans. Large pipe will use Style 128 if 127 is not available.

On smaller lines (2 inches and under) a Dresser style 90 super service fitting with armored style gasket may be called out in lieu of other adaptor couplings.

(iii) Tie backs will be required whenever the continuity of restraint has been made discontinuous by use of a coupling. When equipment is mounted on prefabricated skids, connection of piping to skids may be used in lieu of tie backs. Minimum tie back to be two 3/4 inch dia. all thread rod, bolt both sides of all flanges. Use more or larger tie backs if so indicated on plans.

(iv) When piping run is connected to a pump a vibration suppression attachment is required such as the adaptor couplings above. When pump end is in water an anti-electrolysis kit shall be included to bolt the pump to the piping.

H Pipe Ends

Shall be clean and smooth.

I Pipe Length

Shall be such that a space is left between pipe ends of not less than ¼ inch or more than 1 inch.

J Tapping Saddles

Shall be ductile iron with galvanized steel straps and rubber sealing gasket, 250 psi pressure rating. If tapping saddles are installed on pipe containing polywrap, first place 3 wraps of polyethylene adhesive tape around pipe and then tap through tape and poly film. Repair any damage to wrap with tape and extra film as per ANSI/AWWA C105/A21.5.

After tap has been made, wrap and tape service line to 3 feet from main line and encase saddle with wrap and tape to 1 foot each side saddle on main line. Protect saddle and

Service line in this fashion irrespective of whether main line has been encased with polywrap. Use sintered teflon pipe dope or TFE tape on all screw threads.

K Shop Coating and Lining:

(i) Cement Lining: Shall be ANSI A21.4.

(ii) Bituminous Coating: Shall be manufacturer's standard. Provisions relating to characteristics of bituminous seal coat as to deleterious effect upon the quality, color, taste, or odor imparted to potable water shall be strictly observed. Standard pipe coating outside.

L Pipe Cutting

Cut ends at right angles to pipe axis, cut with a mechanical cutters; dress cuts with a file to remove roughness and to taper end to slip into coupling, oxyacetylene cuts are not permitted.

M Pipe Laying

As per manufacturer's requirements.

5.2 Plastic Pipe

A General

Plastic pipe and fittings as furnished by the Contractor shall be installed in accordance with the manufacturer's recommendations and these specifications.

Pipe shall be Polyvinyl Chloride as manufactured from virgin NSF approved ASTM Type I - Grade 1 impact improved resin and as approved by NSF for use in handling potable water. Pipe shall contain from one to two percent titanium dioxide.

Samples of pipe shall be submitted to the Engineer for his approval. Physical and chemical data sheets shall also be submitted to the Engineer and pipe shall conform to ASTM Specification D1784-60 T. Pipe shall be tested for sustained pressure in accordance with ASTM Specification D1598-63 T and for quick burst in accordance with ASTM Specification D1599-62 T.

All pipe as delivered shall conform with commercial standard CS256-63. Lack of "Marking and Declaration of Compliance" as contained in Sec. 8 thereof shall automatically cause rejection of pipe.

Class 200 pipe shall have a maximum design stress of 2000 psi and conform to SDR-21 as given in CS256-63. Class 160 pipe (SDR26) shall be similar. Note: All water mains installed shall be PR 200 PVC unless otherwise noted on the plans or approved by the Owner and Engineer.

All fittings, couplings and adaptors shall be manufactured out of materials conforming to the same standards as the pipe and having a design strength equal to or better than adjacent pipe. Reducers shall have smooth transition. Bushings reducers will not be allowed unless specifically called out.

All plastic pipe fittings will be NSF approved and marked.

Pipe Size	Ave. Outside Diameter Steel Pipe Size	Wall Thickness SDR 21 CL 200 PSI	wt/ft	Wall Thickness SDR 26 CL 160 PSI	wt/ft
3/4"	0.840	Sch 40 .109	0.21		
1"	1.315	Sch 40 .133	0.31		
1½"	1.900	Sch 40 .145	0.50		
2"	2.375	.113	0.51		
2½"	2.875	.137	0.74		
3"	3.500	.167	1.10	.135	.90
4"	4.500	.214	1.9	.173	1.48
6"	6.625	.316	4.2	.255	3.22
8"	8.625	.410	7.1	.332	5.47
10"	10.750	.511	11.1		
12"	12.750	.606	15.6		
14"	14.000	.665	18.9		
16"	16.000	.760	24.9		
18"	18.000	.857	31.7		
20"	20.000	.952			
24"	24.000	1.143			
30"	30.000	1.428			

MINIMUM DIMENSIONS - ALTERNATE PIPE

Pipe Size	OD Cast Iron Size	Wall Thickness DR 25 167 PSI	wt/ft	Bell OD
14	15.3	0.612	19.24	18.2
16	17.4	0.696	24.95	20.4
18	19.5	0.780	31.52	22.9
20	21.6	0.864	39.17	25.6
24	25.8	1.032	56.05	30.4

MINIMUM DIMENSIONS - ALTERNATE PIPE

Pipe Size	OD Cast Iron Size	Wall Thickness DR 18 235 PSI	wt/ft	Bell OD
14	15.3	0.850	26.24	18.7
16	17.4	0.967	34.19	21.0
18	19.5	1.083	43.08	23.5
20	21.6	1.200	53.92	26.3
24	25.8	1.433	76.99	31.2

Above alternate pipe to conform to AWWA C905 and UNI-B-11. Some casing up sizing may be required with this pipe where used as a carrier as compared to chart these specs.

B Certificate of Conformance

Before pipe may be installed on the job, the pipe supplier shall submit a Certificate of Conformance regarding the type and quality of the pipe to be supplied on the job. The Certificate of Conformance shall in effect state the material is PVC 1120 and meets the requirements of ASTM D2241-65 or latest revision thereof. Also included shall be approximate quantities and sizes to be supplied on the job and a reference to the name of the job in question. Included shall be an explanation of pipe marking code.

The statement shall be sent direct from the manufacturer on their letter head stationary to the following: 1 copy-Owner involved, 1 copy-State Highway Dept., if pipe is being laid on

their right-of-way, and 1 copy-Engineer. Specifically unacceptable will be reproduced copies delivered by the Contractor.

C Field Inspection

Joints may be cut out of the pipeline for inspection and testing. This does not imply that indiscriminate cutting of joints will be allowed. The Engineer may perform various tests at times that he deems necessary or desirable, including pressure tests with his own equipment. Pipe may be cut at such times to facilitate such tests and the Contractor shall perform such cuts and repairs as requested.

D Pipe Jointing and Coupling:

(i) General: Couplings shall conform to ASTM Spec D3139 and Uni Bell B-12. The (coupling-joint system) shall have been tested and approved by the National Sanitation Foundation and certification of said approval shall be submitted.

USE MECHANICAL JOINT DUCTILE IRON FITTINGS FOR 2 INCHES AND ABOVE. USE PVC COUPLINGS FOR PIPE SIZES BELOW 2 INCHES.

Pipe shall have a ring painted around the spigot end in such a manner as to allow field checking of setting depth of pipe in socket.

If manufacturer's design is such that excessive homing of pipe is detrimental, then two rings shall be provided to indicate tolerances required and contractor shall back pipe up to maintain position required.

(ii) Rubber Gasket Joint: The push-on joint shall be a single rubber gasket joint designed to be assembled by the positioning of a continuous, molded, rubber ring gasket in an annular recess in the pipe or fitting socket and the forcing of the plain end of the entering pipe into the socket, thereby compressing the gasket radially to the pipe to form a positive seal. The gasket and the annular recess shall be so designed and shaped that the gasket is locked in place against displacement as the joint is assembled. Details of the joint design and assembly shall be in accordance with the joint manufacturer's standard practice.

Pipe may be furnished with a socket as an integral part of each piece of pipe or a coupling type socket with rubber gasket on each side may be provided. Ends of pipe intended to be inserted into a socket shall be factory beveled. In the event it is necessary to field cut a joint of pipe, the pipe shall be cut with a rotary cutter or with the aid of miter box to provide a square end. The end which will be inserted into a socket shall be beveled with a milled curved-tooth flat file or other approved device. Use a factory pipe end as a guide. Also mark a stop guide on the pipe by use of a pencil or crayon to provide visual observation for proper insertion depth.

The manufacturer shall furnish drawings of the joint and gasket. The coupling system shall be pressure rated equivalent to the pipe or better. The rubber O-ring joints for plastic pressure pipe shall conform with the requirements of ASTM D3139. The joints shall have been tested and approved by the National Sanitation Foundation and certification of said approval shall be submitted.

The dimensions of the bell, socket, and plain end shall be in accordance with the manufacturer's standard design dimensions and tolerances. Such dimensions shall be gauged at sufficiently frequent intervals to assure dimensional control and satisfactory joint assembly.
Gasket dimensions shall be in accordance with the manufacturer's standard design dimensions and tolerances. The gasket shall be of such size and shape as to provide

an adequate compressive force against the spigot and socket after assembly to effect a positive seal under all combinations of joint and gasket tolerances. The trade name or trademark, size, mold number, gasket manufacturer's mark, and year of manufacture shall be molded in the rubber.

Gaskets shall be vulcanized natural or vulcanized synthetic rubber. No reclaimed rubber shall be used. When two hardnesses or rubber are included in a gasket, the soft and hard portions shall be integrally molded and joined in a strong vulcanized bond. They shall be free of porous areas, foreign material, and visible defects.

The required properties of the gasket rubber and the required method of test are given in the following table:

Property	ASTM Test Method	Main Body of Gasket	Harder Portion (if used)
Hardness, Durometer "A"	D676-59T at 76°F±6	45-70	78-90
Min. ultimate Tensile - psi	D412-61T	2,000	1,200
Min. ultimate Elongation - Percent*	D412-61T	300	125
Min. aging - percent +	D572-61°-	60	60

* Of original length.
\+ Of original values of tensile and ultimate elongation.
° Oxygen pressure method; after 96 hr at 70°C±1° at 300 psi ±10.

The gasket manufacturer shall set up such quality control procedures as will insure the gaskets meeting the requirements of this standard.

(iii) Lubrication: Lubrication shall be water soluble, non-toxic, be non-objectionable in taste and odor imparted to the fluid, be non-supporting of bacteria growth, and have no deterioration effect on the PVC or rubber gaskets. Lubricant containers shall be labeled with the trade name or trademark of lubricant manufacturer or pipe manufacturer.

(iv) PVC to Ductile Iron or Steel: Mechanical Joint Solid Sleeves to couple different pipes with respective rubber gaskets. Cover with poly wrap and tape to 1 foot each side coupling.

(v) PVC to Butterfly valves: All tapered ends of PVC pipe shall be cut off square before being placed into butterfly valves.

5.3 Restrained Joint PVC Pipe

Certain applications will require plastic pipe with restrained joints to prevent joints pulling apart. Restrained joint pipe shall be used in locations such as in casings, creek crossings, etc., when specifically listed in the bid proposal form. Installations in casings will be as per ordinary PVC in casings and in creeks without casings, pipe to be laid as ordinary PVC is laid in creeks.

Restrained joint pipe will confirm to standards of ordinary PVC pipe with the following additions and/or differences. (Where difference is noted this will govern.) ASTM D2241, NSF NO14 certification, ASTM F477 Gasket, ASTM D1784 with cell classification 12454-B (PVC 1120). The restrained joint shall be made by machining matching grooves in the pipe and coupling and

inserting a nylon spline into the groove to provide restraint. Pipe to be Certainteed Yelomine or equal. Couplings shall conform to pipe and be Certa-Lok by Certainteed.

WALL THICKNESS

SIZE INCH	PIPE OD	COUPLING OD	PIPE CLASS 160	PIPE CLASS 200	PIPE CLASS 250
2	2.375	3.200	---	.113	.140
3	3.500	4.380	---	.167	.206
4	4.500	5.470	.173	.214	.265
6	6.625	7.840	.255	.316	.291
8	8.625	10.190	.332	.410	.390
10	10.750	12.200	.511	---	---
12	12.750	14.420	.606	---	---

5.4 Copper Pipe

All copper water pipe shall conform with ASTM Specifications B88 "Type K". When a service line to the meter is copper, the size shall be 3/4 inch unless otherwise specified.

5.5 Jacked Copper

Missouri Department of Transportation (MoDOT) encourages copper for water lines 2 inches and under crossing state highways. Contractor to use type K copper in maximum length obtainable and effort shall be made to keep joints from under the paved surface. Joining of copper pipe shall be accomplished by use of Ford pack joint.

Pack joint shall be used to couple plastic pipe with copper. For Pb or Pe pipe use pack joint with stainless steel insert. For PVC pipe use a schedule 80 PVC Nipple 12 inches long which is inserted into the pack joint and the other end is coupled to pipe line pipe with a standard PVC rubber ring coupling.

5.6 Polyethylene Pipe for Service Lines and Highway Crossings

Pipe shall be PE 3408/PE 3608 manufactured from ultra-high molecular weight, high density polyethylene (average molecular weight of 1,750,000) and a minimum cell classification of 345464C as defined by ASTM D3350-05. Polyethylene pipe shall be made of all virgin material and shall conform to Commercial Standard CD-255-63.

Pipe shall be continuously imprinted with manufacturer's brand name, pipe size, Commercial Standard notation, identification of the National Sanitation Foundation approval, recommended working pressure and production code.

Pipe dimensions and tolerances shall correspond with the values listed in U.S. Department of Commerce CS-255-63 for flexible plastic pipe with a standard dimension ratio (SDR) of 9. All pipe shall be copper tube size (CTS) and have the following nominal dimensions:

Nominal Size	OD	ID	Min Wall
3/4"	.875	.675	.097
1"	1.125	.865	.125
1½"	1.625	1.253	.181
2"	2.125	1.629	.236

Pipe shall have working pressure of 200 psi at 73.4°F.

Pipe must be capable of maintaining pressures of 340 psi at 73.4°F for 1000 hours.

Pipe surfaces shall be mirror smooth and shall be free from bumps and irregularities. Workmanship shall be of the highest level compatible with current commercial practice. Material must be completely homogenous and uniform in appearance.

Pipe shall be packaged for protection against dirt and damage during shipment, handling and storage. Pipe package shall be fully labeled with brand name and manufacturer, NSF seal, size, coil length and part number.

Pipe shall be covered by a 50-year guarantee against rot, rust and electrolytic corrosion, and a 25-year cost-of-replacement warranty.

Polyethylene pipe for highway crossings (2" diameter and smaller) shall only be used with approval from MoDOT and Owner. Pipe shall have a minimum cover of 72 inches and shall comply with any additional requirements and specifications from MoDOT.

Highway and road crossings of HDPE main and services lines (2" and smaller) shall be encased in 3-inch diameter pressure rated 200 HDPE following the specifications above.

5.7 Connector - Copper To Brass Fittings

Connect copper line to brass fittings with a pack joint compression fitting. Ford or approved equal.

5.8 Corporation Stop

Corporation stop shall conform to AWWA Specification C800-55. Stops shall be 3/4 inch x 3/4 inch. Corporation stop shall be Ford or approved equal.

5.9 Brass Pipe

Brass pipe shall conform to ASTM Specifications B43 for red brass pipe.

6 CONCRETE AND THRUST BLOCKING

6.1 Concrete

A Cement

Cement shall be ASTM C150 Type 1.

B Aggregate

All coarse aggregate for concrete shall consist of sound durable rock particles, free from objectionable coatings and frozen and cemented lumps.

(i) Gradation Coarse Aggregate

(a)	Passing 2"	100%
(b)	" 1½"	95 - 100%
(c)	" 3/4"	35 - 70%
(d)	" 3/8"	10 - 30%
(e)	" No. 4	0 - 5%

Fine aggregate for Portland Cement concrete shall be a fine granular material naturally produced by the disintegration of rock of a siliceous nature. Fine aggregate shall be free from injurious amounts of organic impurities.

(ii) Gradation Fine Aggregate

(a)	Passing	3/8"	100%
(b)	"	No. 4	95 - 100%
(c)	"	No. 20	40 - 75%
(d)	"	No. 50	5 - 30%
(e)	"	No. 100	0 - 10%

C Water

Water shall be reasonably clean, free from injurious amounts of oil, acid, alkali salt, organic matter, vegetable matter, and other deleterious substances.

D Proportion

One yd^3 shall have 6.5 sacks of cement. Not more than 5.5 gal. of water per sack of cement. Strength - 3000 psi at 28 days.

E Forms

Forms for concrete shall be build true to the lines and grades designated, and be mortar-tight and of sound materials adequate to prevent distortion during the placing and curing of concrete.

F Placing Concrete

Placing concrete in any unit of a structure shall not begin until the forms, bracing, reinforcing steel and preparations for placing and finishing have been approved. Concrete shall be placed with minimum handling to avoid the segregation of aggregates and displacement of reinforcing steel. Walking or working on reinforcing steel protruding through transverse or longitudinal headers will not be permitted until the concrete has reached an age of 24 hours. Each placement shall be completed in a continuous operation with no interruption in excess of 45 minutes between the placing of continuous portions of concrete. Concrete shall be deposited in the forms in horizontal layers as near final position as possible, and shall be consolidated by continuous working with suitable tools and equipment. The concrete shall be vibrated immediately after it has been placed in the forms.

G Reinforcing Steel

Reinforcing steel bars shall meet the requirements of ASTM A15 58T, Billet steel, intermediate and hard grades, or ASTM A16 59T, Rail steel, or ASTM A160 57T, Axle steel, intermediate and hard grades. All bars shall be deformed to conform to ASTM A305 56T. Welded steel wire fabric shall conform to requirements of ASTM A185 58T.

Splice lengths shall be 20 bar diameters. Reinforcing support shall be such that adequate cover is provided over all bars and proper spacing is maintained.

6.2 Thrust Blocking

Thrust blocking shall be built using redi-mix concrete (3,000 psi) or by using premix sacks which are field mixed with water in a portable mixer or other container such as a mud box or wheel-barrow before it is placed in the Trench. Specifically unacceptable is placing bags of premix in the trench in a bag.

Face dimensions (The face against unexcavated earth) shall be as given in "CHART FOR THRUST BLOCKING (hereinbelow)" these specs. The centerline of the Face dimensions shall be located at the centerline of the pipe and ½ of vertical concrete shall be above and below the centerline. Horizontal centerline shall likewise split the distance.

Valves shall have concrete placed below valve and face dimension to be equivalent to TEE sizes. Use hairpin shaped rebars around valves embedded into concrete.

HORIZONTAL THRUST BLOCKING BEARING AREA

Design Pressure = 160 PSI
Soil Bearing Capacity = 2,000 PSF
Factor of Safety = 1.5

Minimum Bearing Area (Square Ft.)
Type of Fitting (Bends in Degrees)
Bend°

Pipe Size	11.25°	22.5°	45°	90°	Tee or Cap	Cross*
4" and Below	1.0	1.0	1.2	2.1	1.6	2.1
6"	1.0	1.3	2.6	4.8	3.8	4.8
8"	1.2	2.4	4.6	8.5	7.0	8.5
10"	1.9	3.7	7.2	13.3	10.6	13.3
12"	2.7	5.3	10.4	19.2	16.0	19.2
14"	3.6	7.2	14.1	26.1	16.0	26.1
16"	4.7	9.4	18.5	34.1	16.0	34.1
20"	7.4	14.7	28.9	53.3	16.0	53.3
24"	10.6	21.2	41.6	76.8	16.0	76.8
30"	16.6	33.1	64.9	120.0	16.0	120.0

This table for concrete thrust blocks all pipe types. Block valves with area required for T. Height of block no greater than ½ total trench depth. Width (1 to 2) x height For vertical compression bends (down thrust) use same values in this table.

For valves on cast iron or concrete pipe, optional restraint is acceptable. Place concrete pad under valve so weight is not borne by adjacent pipe and lay pipes with restrained joints for pipe distances in restrained joint table and no thrust blocking will then be required.

VERTICAL UP THRUST BLOCKING GRAVITY WEIGHT

Design Pressure = 160 PSI
Factor of Safety = 1.5

Minimum Concrete Required (Cubic Ft.)
Type of Fitting (Bends in Degrees)
Bend°

Pipe Size	11.25°	22.5°	45°	90°
4" and Below	4.0	8.0	14.5	20.0
6"	9.0	17.5	32.0	45.0
8"	16.0	31.0	57.0	80.5
10"	24.5	48.0	89.0	126.0
12"	35.5	69.5	128.0	181.0
14"	48.0	94.5	174.0	246.0
16"	63.0	123.0	227.0	322.0
20"	98.0	192.0	355.0	503.0
24"	141.5	277.0	512.0	724.0
30"	221.0	433.0	800.0	1,131.0

Wrap 2 - #6 hairpin rebars around joint and reinforce with 2 - #4 stirrup and 4 - #4 rebars.

PIPE RESTRAINT
In Lieu of Concrete Thrust Block
For Ductile Iron Pipe
Number of Pipe Required Each Direction

Pipe Size	Bend°				
Inches	11¼	22½	45	90	T or End*

4 and Below	1	1	2	2	2
6	1	1	2	2	2
8	1	1	2	3	2
10	1	1	2	3	3
12	1	2	2	4	3
14	1	2	3	5	3
16	2	2	3	6	4
20	2	2	3	7	5
24	2	2	4	8	6
30	2	2	4	10	7

Contractor may install restrained joint pipe at bends and valves in lieu of concrete blocking. General procedure according to DIPRA but specific restraint devices must be approved by Engineer. Set screw retainer glands will not be acceptable. Pipe to be attached to bend and adjacent pipe to total number of pipe shown in table. Contractor must also compact trench for same length to 90 percent Proctor density for material to slightly above pipe centerline. Compact material in maximum loose lifts of 8 inches. Valves on ductile iron pipe may be restrained by using same pipe numbers as in chart for T. Place concrete pad under valve so weight is not borne by adjacent pipe and restrain joints similar to bends.

Material to be shovel sliced under pipe to insure all voids are eliminated and then area compacted as previously stipulated. Should contractor receive approval of this method but not be doing an adequate job the engineer may reject acceptance and contractor shall then use concrete reaction backing (* For T this is branch run).

Tie backs shall be used to hold assemblies together such as at a T which has a valve located on one or various sides and at other places where some type of restraint is required to prohibit movement and thus create a leak. Concrete reaction backing, discussed elsewhere, is required to transmit thrust to undisturbed earth and each specific item such as a T or bend or valve has a specific concrete thrust block requirement for that individual item. When these items have been aggregated and made continuous by use of tie backs some of the concrete reaction backing (that which has been made redundant) may be eliminated. In these cases, the entire aggregated system may be treated as one for the purpose of concrete thrust blocking and the contractor may submit a system, approvable by the engineer, that will do the job with less concrete than would have been required if each item were separate.

Tie backs shall consist of 3/4 inch diameter all thread rods with nuts on both sides of all fittings, bolt holes, etc. which are a part of the aggregated system. The rods shall be run through the bolt holes in fittings, valves, etc. and slightly bowed to traverse around the body of these or devices may be added which hook into said holes so that rods may remain straight or anchor straps, socket clamp assemblies, etc. may be used as suits the contractors normal procedures. When the assembly has been completed a bitumastic coating (25 mils min. thickness) shall be applied to cover all of the rods, nuts, washers, etc. used in the assembly.

Use the following chart for water lines with 150 psi acting pressure and below. Higher operating pressures shall be prorated on the ratio of pressures. Assume area for root thread of rod to be 0.3 inches

Chart for Number of 3/4 inch rods vs. pipe size

Pipe Size	No. of Tie Back Rods
3" and Below	2
4" through 8"	4
10" through 14"	6
16" through 18"	8
20" through 24"	12

7 MISCELLANEOUS APPURTANANCES

7.1 Fittings

Whether a bid item exists for a fitting of not, all fittings above 2 inches and above shall be cement lined ductile iron for both PVC and DI pipe. PVC pipe smaller than 2 inches shall have PVC fittings. All DI pipe shall use DI fittings.

7.2 Cathodic Protection – Poly Wrap

Encase ductile iron pipe, fittings, valves, valve boxes and appurtenances in 8-mil thick polyethylene encasement installed according to ANSI/AWWA C105/A21.5.

Although the polyethylene encasement should prevent contact between the pipe and surrounding backfill and bedding material, it is not intended to be completely airtight or watertight. All lumps of clay, mud, cinders, or other materials that might be on the pipe surface should be removed prior to installation of the polyethylene encasement. Care should be taken to prevent soil or bedding material from becoming trapped between the pipe and the polyethylene.

The polyethylene film should be fitted to the contour of the pipe to effect a snug, but not tight, encasement with minimum space between the polyethylene and the pipe. Sufficient slack should be provided in contouring to prevent stretching the polyethylene when bridging irregular surfaces, such as bell/spigot interfaces, bolted joints, or fittings, and to prevent damage to the polyethylene during backfilling operations. Overlaps and ends should be secured with polyethylene-compatible adhesive tape, tape at least every 4 feet.

For installation below the water table or in areas subject to tidal actions, it is required that both ends of the polyethylene tube be sealed as thoroughly as possible by wrapping circumferentially with adhesive tape or strapping at each joint overlap.

As with all protection methods, proper installation is vital to the success of polyethylene encasement. The actual installation sequence, however, is less important than the quality and care taken during installation.

7.3 Locator Wire

Locator wire shall be #12 gauge solid copper wire with PE-45 solid blue insulation as manufactured by Kris-Tech Wire Company or an approved equal. Alternate manufacturer locator wire must be specified as locator or tracer wire and shall not be conductor wire for other purposes. Locator wire shall be 1,500' (Ft.) rolls and be installed in such a manner to keep splices to an absolute minimum. Rolls of 500' (Ft.) are only acceptable on jobs of less than 500' (Ft.) in length. All connections or splices shall be made with a Splice Kit equal to 3M-DBR-Part Number –054007-09964. Wire to be taped to top of pipe. See detail in plans. Wire to be installed along all lines and outside all valve boxes to extend 48" above ground. Locator wire installation, including signal loss, shall be warranted under the 1-year pipe and workmanship warranty.

Contractor must prove continuity of locator wire after installation is complete. Owner's representative must be present during continuity test.

7.4 Underground Warning Tape

Underground warning tape shall be placed in the trench approximately 12 to 18 inches above all water lines and service lines. Warning tape shall be blue in color and contain the words "CAUTION BURIED WATER LINE BELOW" or similar wording.

END OF SECTION

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SECTION 02515

WATER DISTRIBUTION VALVES AND APPURTENANCES

1 GENERAL

1.1 Scope

The section includes valves and appurtenances pertaining to water distribution system construction. Contractor shall furnish all material, equipment and labor to complete the work.

1.2 Water Distribution Specifications

Specification sections beginning with "Water Distribution" are specifically for the materials and construction of water distribution system piping and appurtenances. These specifications section are to be used for all water distribution system construction and supersede any conflicts with other specifications in this project manual when pertaining to water distribution system construction.

1.3 License, Permits, Certificates, Laws and Ordinances

Licenses, permits and certificates as required by law or other regulatory agencies shall be procured and purchased when necessary by the Contractor. The Contractor shall comply with all applicable laws, ordinances, safety provisions, rules and regulations relating to the work. Work done inside the right-of-way of state highways shall be located in the six foot (6') utility corridor.

1.4 Trespass

The Contractor shall inform affected property owners, even though easements have been obtained, before construction occurs on their property. Should the property contain farm crops, at least three days notice shall be given to allow for harvesting. Crops damaged without notice so given shall be paid for by the Contractor at current market value.

The Contractor shall obtain permission, in writing, before cutting fences and repair same to original condition or better. Fences shall be completely repaired the day they are taken apart. Fences left unrepaired may be fixed by the owner and costs deducted from monies due to the Contractor. If a controversy arises over fence cutting and Contractor does not have written permission, damages may be assessed against Contractor to return fence to original condition. Contractor shall use existing openings, insofar as practical to maneuver equipment.

1.5 Project Quantities

Project quantities shall be measured as the work progresses by the Contractor and Owner's representative. Contractor and Owner's representative shall keep daily logs and compare quantities at the end of the work week. Quantity discrepancies should be worked out between Contractor and Owner's representative. Log sheets signed by the Contractor and Owner's representative shall be provided to the Engineer for payment purposes.

1.6 Shop Drawings and Material List

Before the Contractor begins work, six copies of shop drawings, parts diagrams material specification sheets, outline dimension prints and equipment performance characteristics for all items proposed to be used shall be submitted to the Owner for approval for use on the project. Accompanying this submittal shall be the names and location of the manufacturer and the closest stocking supplier. Products shall not be utilized until written approval is given by the Owner, who shall be the sole determinant of acceptability between similar items as made by different manufacturers. The Contractor shall furnish products which are in complete compliance with the

contract requirements; and approval of shop drawings and/or material lists shall not be construed as authorizing any deviations from the contract plans or specifications.

If it is the intent of the Contractor to provide products which deviate from the contract plans or specifications, such intent shall be made in writing accompanying the submittal of products for approval by the Owner. The Contractor shall indicate those characteristics of the product which are in non-conformance, give reasons for said non-conformance and receive written approval of the Owner for deviating from the requirements before utilizing the product in the work.

If subsequent investigation reveals a product was installed which deviated from the requirements without specific written approval for the deviation, then the Contractor at the request of the Owner may be required to remove and replace such product at his expense. If the Contractor fails to act then the Owner may require the change to be made by others and charged against the Contractor. If available, funds withheld from the Contractor may be used to pay necessary removals/replacements.

If the Contractor desires to receive payment for materials stored on the job, he shall submit invoices for the products upon which payment is requested. These invoices shall be on the supplying company's forms and shall show all unit prices, allowable discounts and proposed rebates; all as necessary for the Owner to determine the actual price the Contractor will ultimately pay for the materials.

1.7 Bidding Provisions for Fittings

A Job with No Bid Item for Fittings

Fittings will not be indicated or bid as a separate bid item. It will be the contractor's choice as to how to install the pipe as per the angular change so long as the pipe remains in the right of way or easement. The Contractor will be responsible for the purchase of any and all fittings and shall include these costs in the pipe line unit prices. The Contractor may install a fitting such as a 22½° - 45° bend, etc. with reaction backing as per normal installation of such a fitting (all without a specific bid item compensation) or the contractor may adjust trench depths or angular alignment to keep joint angular alignment in conformance with above stipulated while still maintaining a 42 inch cover. This procedure will be acceptable up to and including a depth of cover over the pipe of 8 feet. The contractor will be required to install a fitting (without added compensation) to maintain cover depth within said tolerance.

In certain instances fittings will be required by the nature of the job i.e. tee, 90° bend, etc. and these will be required as shown on the plans, but extra payment will not be made and the contractor shall include these costs in the pipe line unit prices.

B Job with Bid Item for Fittings

Some jobs will be bid with prices taken for different fittings. Fittings used on this type of job will be paid for at the prices indicated on the bid proposal.

2 RELATED SECTIONS

2.1 Section 02325 – Water Distribution – Trenching, Excavating and Backfilling

2.2 Section 02450 – Water Distribution Boring

2.3 Section 02512 – Water Distribution Piping

2.4 Section 02516 – Water Distribution Testing and Disinfection

3 QUALITY ASSURANCE

If, during the processes involved in the completion of this work, some event happens which would indicate improper workmanship or inadequate materials have been incorporated into the work, then the Owner shall have the right to have tests conducted to determine the adequacy of the products or workmanship and also determine the cause of failures. If inadequacies are detected, the Owner shall deduct costs of said investigations from money due to the Contractor.

4 VALVES

Valves shall be installed at locations field determined by Owner.

4.1 Butterfly Valves

Valve shall conform to AWWA C504 Rubber-Seated Butterfly Valves and have protective epoxy interior coating according to AWWA C550. Valve to have slip or MJ end, horizontal hex shaft, underground operator with 2 inches nut. Closure turns similar to like size gate valve. M & H style 450 and 4500 or approved equal.

4.2 Gate Valves

Gate valves shall conform to AWWA Specification C509 or AWWA Specification C515. Gate valves shall have: Fully Encapsulated Wedge nonrising stem; double "0" Ring Seal; 2 inches square operating nut opening counter clockwise; Mechanical joint 250 psi design working pressure; 304 Stainless Steel nuts and bolts; C550 epoxy coated inside and out; wall thickness exceeding CI53. Valve shall be set vertical and in true alignment.

All valves to have concrete thrust block placed underneath valve of same face area as shown in restraint chart for tee of similar pipe size; or pipe restraint method may be used in lieu thereof.

4.3 Valves on 1½ Inch and Smaller Lines and Boxes

Valves shall have: full round opening flow way, 2 piece cast brass or bronze body with a closed bottom (no opening), top and port O ring seals, tee head with removable plug for in line repair, top anti friction washer and bottom low friction plastic bearing insert with screwed ends, Mueller Oriseal III; or a ball valve with bronze body and tee head, double O ring stem seals, molded Bura N rubber port seals and ball seats, full round opening ball with screwed ends, Ford B11.

4.4 Air Release Valves and Water Test Pit

A Air Release Valve

Air release valves shall be Apco 3/4 inch No. 65 or approved equal, connected to the top of the main line with a 3/4 inch corporation stop. The vent pipe shall be galvanized pipe as shown on the details with a copper screen soldered over the opening. Valve to be located as shown on the plans.

B Pit

For air release use 18 inch PVC pipe with minimum 3/8 inch wall. For water test pit, use 30-inch PVC. Cover for 18 inches pit to be 4 inches deep cast iron with 11 inches diameter recessed lid, including positive means to prevent sidewise movement of both ring and lid, lid weight 11 pounds, ring 25 pounds. Cover for 30 inches pit to be cast iron, Ford No. 30 Monitor cover, 20 inches lid, 7½ inches deep, weight 131 pounds.

C Water Test Pit

Assembly shall be a 3/4 inch water source on either side of a line size valve. The line size valve price shall not be included in the bid for the test pit as it will be paid for under valves. All other items shall be included in this bid. 3/4 inch water source shall consist of a tap (Saddle) onto the main line with a 3/4 inch corp stop, a short piece of 3/4 inch type K copper pipe to bring the water near the top of the pit and a ball valve shut off there at.

D Tapping Pipe

(i) PVC: Use saddle for all PVC pipe, Ford pack joint or approved equal for sizes including 8 inches. For 10 inches and above use Ford or approved equal.

(ii) Ductile: Tap corp stop directly into pipe or use Ford Ductile Iron Saddle F202. Any saddle placed on Ductile Iron shall be poly wrapped and taped to 1 foot each side of saddle.

If tapping saddles are installed on pipe with polywrap, first place 3 wraps of polyethylene adhesive tape around pipe and then tap through tape and poly film. Repair any damage to wrap with tape and extra film as per ANSI/AWWA C105/A21.5. After tap has been made wrap and tape saddle as above.

(iii) Corp Stop: Use 1-inch Ford or approved equal.

Use sintered teflon pipe dope or TFE tape on all screw threads from main line.

4.5 Valve Boxes

Valve box in grass settings shall be 6-inch CL200 PVC with cast iron ring and lid. Valve boxes shall be set plumb, flush with the ground surface. Valve cover and ring shall be cast iron as per Clay & Bailey No. 2194 or approved equal.

Valve boxes in roadways and other paved areas shall be two piece, screwed type with a 5¼-inch shaft and 8½-inch bell. Box shall be cast iron with cast iron lid. Valve boxes shall be set plumb, flush with the road or paved surface. Valve cover and ring shall be cast iron as per Clay & Bailey No. 2194 or approved equal.

The Contractor shall be prepared to install either type box at the same bid price and to furnish 2 keys - one for the normal setting and one with the extended 3 foot length. Valves shall be installed directly under fences insofar as possible.

5 METERS

5.1 Meter Setter

Meter yokes shall be copper or red brass with a 15 inches riser. The yoke shall be placed so the meter dials will be approximately 12 inches below the top of the meter well. Consumer end of yoke shall be of such length to be outside of meter box and allow hooking up without opening box. End of extended leg shall measure 15 inches from center line of yoke. End shall have a temporary cap.

Immediately adjacent to meter, the inlet side of yoke shall be equipped with a padlock wing with incorporated shut off, and discharge side of yoke shall incorporate a dual spring loaded check valve with full open waterway and be capable of inline repair. Check valve shall be angle type and be Ford HA31-323 or approved equal. Setter shall be Ford VBH72-15W-44-44 (5/8" x 3/4") or Ford VBH74-15W-44-44 (1") with added features as above, also include bracing eye. Insert 12 inches piece of ½ inch Sch. 80 PVC pipe through setter eye for stability. Inlet and outlet end

connection shall normally be pack joint for PE pipe. When copper service line is required, inlet end shall conform to copper pipe.

5.2 Meters

Service meters shall be Badger E-Series® Ultrasonic Meter with ORION® Migratable (ME) two-way water endpoint transmitter and conform to ANSI/AWWA Standard C700 and NSF/ANSI Standard 61, Annex G, or approved equal. Meters shall have a 316 stainless steel, lead-free meter housing, an engineered polymer and stainless steel metering insert, an engineered polymer register housing & lid; measuring element consisting of a pair of ultrasonic sensors located in the flow tube; transducers consisting of piezo-ceramic device with wetted surface of stainless CrNiMo; a meter-control circuit board with associated wiring, LCD, and battery with frost proof construction; 5/8 inch x 3/4 inch openings; easy-to-read 9-digit LCD display (register in US gallons) presents consumption, rate of flow, reverse-flow indication, and alarms; simplified one-piece electronic meter and register that are integral to the meter body and virtually maintenance free; sealed, non-removable, tamper-protected meter and register; corrosion resistant bolts and washers. Wetted elements are limited to the pressure vessel, polymer/stainless steel metering insert and the transducers. The electronic components are housed and fully potted within a molded, engineered polymer enclosure, which is permanently attached to the meter housing. The transducers extend through the stainless steel housing and are sealed by O-rings. The metering insert holds the stainless steel ultrasonic reflectors in the center of the flow area, enabling turbulence-free water flow through the tube and around the ultrasonic signal reflectors. The meter insert's design virtually eliminates chemical buildup on the reflectors, ensuring long-term metering accuracy.

5.3 Meter Wells and Cover

Meter wells shall be 36 inches in depth and have an inside diameter complying with the following:

Meter Size	Meter Well Inside Diameter
5/8" by 3/4"	18"
1"	20"
1½"	30"
2"	36"

In rural and grass settings, 30-inch and 36-inch diameter meter wells shall have a reducing ring (reduce to 18 inches) and a standard cover and lid. Meter wells for double setters shall be 24 inches in diameter.

Meter wells shall be made of PVC and shall be tested in accordance with ASTM D2444 to assure high impact damage resistance. Meter wells shall be Ultra-Rib meter pipe by Uponor ETI Company, or approved equal.

Standard meter covers shall be cast iron 4 inches deep with an 11 inches diameter recessed lid. It shall be provided with a positive means for preventing sidewise movement of both ring and lid. Weight of lid shall be 11 pounds. Weight of ring shall be 25 pounds. The meter cover ring size shall be in accordance with the meter well. Clay-Bailey 2210.

Meter covers for non-grass settings (i.e. concrete, asphalt, etc.) shall be a heavy duty manhole frame and cover with a minimum 24" diameter lid and minimum 22" internal access diameter. Manhole frame and cover material shall be in compliance with ASTM 48 CL 35B and shall be Catalog Number SM 2276 by GCI Castings, or approved equal.

6 HYDRANTS

6.1 Fire Hydrants

Fire hydrants shall be manufactured in accordance with ANSI/AWWA Standard C502. Hydrants shall be 5-1/4" American-Darling B-84-B-5, or approved equal. Hydrants shall have rated working pressure of 250 psig, test pressure of 500 psig, and shall include the following specific design criteria: main valve closure shall be type with compression shutoff valve; traffic model with safety flanges and steel stem coupling, designed for easy 360° rotation of nozzle section; one 4-1/2 inch and two 2-1/2 inch hose nozzles; 6 inch shoe; 4 feet bury; National standard threads; bronze pentagon operating nut; dry-top center stem construction with o-ring sealed lubrication reservoir; main valve opening shall not be less than 5-1/4 inch and be designed so that removal of all working parts can be accomplished without excavating; hydrant barrels shall be made of ductile iron; hydrant upper barrel shall be factory coated with Electrodeposition (E-coat) epoxy primer and catalyzed two-part polyurethane top coating (painted red); base shall be coated with fusion-bonded epoxy; include tamper-proof valve stem; hydrants shall be set vertical and on true alignment; all hydrants shall rest on a stone or concrete bearing pad of at least 300 square inches surface area and 4 inches minimum thickness; the concrete thrust block shall not interfere with the drain opening; seven cubic feet of large aggregate shall be placed around the hydrant base; fire hydrants shall not be installed on waterlines less than six inches in diameter.

6.2 Post Hydrants

Post hydrants shall have: Compression shut off valve; 4" mechanical joint inlet, One 2½" hose nozzle; 4½' bury or equal to adjacent pipe; National standard threads; Open left; Painted red; 1½" pentagon operating nut; Reaction backing and drainage (Same as in Fire Hydrant). Hydrant shall be the Eclipse Model No. 2 as manufactured by the Kupferle Foundary Company, Mueller Co., or approved equal.

6.3 Yard Hydrants

Yard hydrants shall be of frost proof construction. Size shall being equal to adjacent pipe. Hydrant shall be capable of being locked.

7 CLEANOUTS

Cleanouts (both End Cleanouts and In-line Cleanouts) shall be constructed as shown in details on the plans. Cleanouts, piping and fittings shall be ductile iron Schedule 80 PVC for 3" and below. Locate valves as shown on plans or by Engineer's approval. All dead-end waterlines will be outfitted with a flushing device. Cleanouts shall be Kupferle Mainguard 77 or approved equal. Schedule 80 PVC cleanouts may be used only when shown on plans.

8 REGULATORS

8.1 Pressure Regulator Valve

The valve shall maintain a constant downstream pressure regardless of fluctuations in demand. The valve shall be adjustable to vary the outlet pressure from 2-75 psi. It shall have a maximum inlet working pressure of 175 psi. The size shall be as specified on the plans and/or specifications. It shall be a Class 125, flanged, Cla-Val or approved equal.

8.2 Service Line Pressure Regulator

When in the estimation of the Engineer, the line pressure is in excess of that desired for suitable service, a pressure regulator may be required. This regulator shall be placed immediately adjacent to the meter as shown on the plans. The regulator will be a 3/4 inch Mueller H 9300 No. 2 or approved equal.

END OF SECTION

SECTION 02516

WATER DISTRIBUTION TESTING AND DISINFECTION

1 GENERAL

1.1 Scope

The section includes testing and disinfection pertaining to water distribution system construction. Contractor shall furnish all material, equipment and labor to complete the work.

1.2 Water Distribution Specifications

Specification sections beginning with "Water Distribution" are specifically for the materials and construction of water distribution system piping and appurtenances. These specifications section are to be used for all water distribution system construction and supersede any conflicts with other specifications in this project manual when pertaining to water distribution system construction.

1.3 License, Permits, Certificates, Laws and Ordinances

Licenses, permits and certificates as required by law or other regulatory agencies shall be procured and purchased when necessary by the Contractor. The Contractor shall comply with all applicable laws, ordinances, safety provisions, rules and regulations relating to the work. Work done inside the right-of-way of state highways shall be located in the six foot (6') utility corridor.

1.4 Trespass

The Contractor shall inform affected property owners, even though easements have been obtained, before construction occurs on their property. Should the property contain farm crops, at least three days notice shall be given to allow for harvesting. Crops damaged without notice so given shall be paid for by the Contractor at current market value.

The Contractor shall obtain permission, in writing, before cutting fences and repair same to original condition or better. Fences shall be completely repaired the day they are taken apart. Fences left unrepaired may be fixed by the owner and costs deducted from monies due to the Contractor. If a controversy arises over fence cutting and Contractor does not have written permission, damages may be assessed against Contractor to return fence to original condition. Contractor shall use existing openings, insofar as practical to maneuver equipment.

1.5 Project Quantities

Project quantities shall be measured as the work progresses by the Contractor and Owner's representative. Contractor and Owner's representative shall keep daily logs and compare quantities at the end of the work week. Quantity discrepancies should be worked out between Contractor and Owner's representative. Log sheets signed by the Contractor and Owner's representative shall be provided to the Engineer for payment purposes.

1.6 Shop Drawings and Material List

Before the Contractor begins work, six copies of shop drawings, parts diagrams material specification sheets, outline dimension prints and equipment performance characteristics for all items proposed to be used shall be submitted to the Owner for approval for use on the project. Accompanying this submittal shall be the names and location of the manufacturer and the closest stocking supplier. Products shall not be utilized until written approval is given by the Owner, who shall be the sole determinant of acceptability between similar items as made by different manufacturers. The Contractor shall furnish products which are in complete compliance with the

contract requirements; and approval of shop drawings and/or material lists shall not be construed as authorizing any deviations from the contract plans or specifications.

If it is the intent of the Contractor to provide products which deviate from the contract plans or specifications, such intent shall be made in writing accompanying the submittal of products for approval by the Owner. The Contractor shall indicate those characteristics of the product which are in non-conformance, give reasons for said non-conformance and receive written approval of the Owner for deviating from the requirements before utilizing the product in the work.

If subsequent investigation reveals a product was installed which deviated from the requirements without specific written approval for the deviation, then the Contractor at the request of the Owner may be required to remove and replace such product at his expense. If the Contractor fails to act then the Owner may require the change to be made by others and charged against the Contractor. If available, funds withheld from the Contractor may be used to pay necessary removals/replacements.

If the Contractor desires to receive payment for materials stored on the job, he shall submit invoices for the products upon which payment is requested. These invoices shall be on the supplying company's forms and shall show all unit prices, allowable discounts and proposed rebates; all as necessary for the Owner to determine the actual price the Contractor will ultimately pay for the materials.

1.7 Bidding Provisions for Fittings

A Job with No Bid Item for Fittings

Fittings will not be indicated or bid as a separate bid item. It will be the contractor's choice as to how to install the pipe as per the angular change so long as the pipe remains in the right of way or easement. The Contractor will be responsible for the purchase of any and all fittings and shall include these costs in the pipe line unit prices. The Contractor may install a fitting such as a 22½° - 45° bend, etc. with reaction backing as per normal installation of such a fitting (all without a specific bid item compensation) or the contractor may adjust trench depths or angular alignment to keep joint angular alignment in conformance with above stipulated while still maintaining a 42 inch cover. This procedure will be acceptable up to and including a depth of cover over the pipe of 8 feet. The contractor will be required to install a fitting (without added compensation) to maintain cover depth within said tolerance.

In certain instances fittings will be required by the nature of the job i.e. tee, 90° bend, etc. and these will be required as shown on the plans, but extra payment will not be made and the contractor shall include these costs in the pipe line unit prices.

B Job with Bid Item for Fittings

Some jobs will be bid with prices taken for different fittings. Fittings used on this type of job will be paid for at the prices indicated on the bid proposal.

2 RELATED SECTIONS

2.1 Section 02325 – Water Distribution – Trenching, Excavating and Backfilling

2.2 Section 02450 – Water Distribution Boring

2.3 Section 02512 – Water Distribution Piping

2.4 Section 02515 – Water Distribution Valves and Appurtenances

3 QUALITY ASSURANCE

If, during the processes involved in the completion of this work, some event happens which would indicate improper workmanship or inadequate materials have been incorporated into the work, then the Owner shall have the right to have tests conducted to determine the adequacy of the products or workmanship and also determine the cause of failures. If inadequacies are detected, the Owner shall deduct costs of said investigations from money due to the Contractor.

4 LINE CLEANING

To ensure that lines are clean prior to disinfection, a swabbing device (pig) shall be run through the line. The Contractor may do this in segments as suits his construction methodology but as a minimum, the Contractor shall subdivided the pipe quantities into five (5) approximately equal segments and do this work as other work is completed. A smaller number of increments may be used if Contractor can show adequate results. Pigging shall be done before disinfection.

Contractor to install and remove all temporary connections - devices required to perform the task and these shall be removed prior to disinfection. Pig shall be sized for the specific size of the pipe.

5 HYDROSTATIC TESTING OF PIPELINE

Hydrostatic testing of water lines shall be conducted in accordance with AWWA Standard C600 for ductile iron pipe and AWWA Standard C605 for PVC pipe.

Prior to performance of the test, all air shall be expelled from the pipeline to the satisfaction of the Engineer. This may be accomplished by means of air relief valves, blow-off valves, hydrants or other means. If required, taps shall be made at high points where air relief valves are not called for on the plans. Such taps shall be plugged after testing is complete. If possible, corporation stops should be installed before this test.

Apply a test pressure equal to the pipe rated design pressure. After the specified pressure has been reached, the pump shall be stopped and all pipe, fittings, valves, hydrants, joints, and appurtenances examined for leaks. Any visible leaks shall be repaired. After visible leaks are repaired, the pipe line shall be refilled with water and repressurized to the rated working strength of pipe. This pressure shall be maintained for a period of two hours. During this pressure test, a container of water shall be attached to the distribution line in a manner so as to allow the water in the container to flow into the pressurized lines. Water loss in the container shall be measured after the test. The installation will not be accepted if the amount of makeup water is greater than that determined by the following formulas.

For Ductile Iron Pipe (AWWA Standard C600):
$L = (SD \times SQRT [P] / 133{,}200)^*$

Where: L=testing allowance, gallons per hour
S=length of pipe tested, feet
D=nominal diameter of pipe, inches
P=average test pressure, PSI

For PVC Pipe (AWWA Standard C605):
$L = (ND \times SQRT [P] / 7{,}400)^*$

Where: L=testing allowance, gallons per hour
N=number of joints in the length of line tested
D=nominal diameter of pipe, inches
P=average test pressure, PSI

* Formulas are based on allowable leakages of 11.65 gpd/mi/in of nominal diameter for ductile iron and 10.5 gpd/mi/in of nominal diameter for PVC at a test pressure of 150 PSI.

Tables containing the testing allowances are provided in AWWA Standards C600 and C605.

The system may be tested in whole or part as suits the Contractor's need; however, the Engineer may request the Contractor to complete the test on a portion of the system if he so desires.

6 DISINFECTING WATER MAINS

Standard of reference shall be the latest revision of AWWA C651.

6.1 Preventive Measures During Construction:

A Keeping Pipe Clean and Dry

Precautions shall be taken to protect pipe interiors, fittings, and valves against contamination. Pipe delivered for construction shall be strung so as to minimize entrance of foreign material. When pipe laying is not in progress, as, for example, at the close of the day's work, all openings in the pipeline shall be closed by water tight-plugs. Joints of all pipe in the trench shall be completed before work is stopped. If water accumulates in the trench, the plugs shall remain in place until the trench is dry.

NOTE: Delay in placement of delivered pipe invites contamination. The more closely the rate of delivery is correlated to the rate of pipe laying, the less this delay.

If dirt that, in the opinion of the purchaser's engineer or job superintendent, will not be removed by the flushing operation (See Note 2 in Section 6.2) enters the pipe, the interior of the pipe shall be cleaned and swabbed as necessary, with a 5 percent hypochlorite disinfection solution.

B Packing Materials and Joints

No contaminated material or any material capable of supporting prolific growth of microorganisms shall be used for sealing joints. Packing material shall be handled in such a manner as to avoid contamination.

Where applicable, packing materials must conform to AWWA Standards.

TABLE 1
Required Openings to Flush Pipelines*
(40 psi Residual Pressure)

Pipe Size (Inches)	Flow Required to Produce 2.5 fps Velocity (gpm)	Orifice Size (Inches)	Hydrant Outlet Nozzles	
			Number	Size (Inches)
4	100	15/16	1	2½
6	220	1-3/8	1	2½
8	390	1-7/8	1	2½
10	610	2-15/16	1	2½
12	880	2-13/16	1	2½
14	1,200	3-1/4	2	2½
16	1,565	3-5/8	2	2½
18	1,980	4-3/16	2	2½

*With 40 psi residual pressure, a 2½ inches hydrant outlet nozzle will discharge approximately 1,000 gpm and a 4½ inches hydrant nozzle will discharge approximately 2,500 gpm.

Packing material for cast iron pipe must conform to AWWA C600. Yarning or packing material shall consist of molded or tubular rubber rings, rope of asbestos or treated paper. Materials such as jute or hemp shall not be used.

The lubricant used in the installation of sealing gaskets shall be suitable for use in potable water. It shall be delivered to the job in enclosed containers and shall be kept clean.

6.2 Preliminary Flushing

The main shall be flushed prior to disinfection. The velocities of flushing shall be as nearly to the above as possible.

NOTE 1: It is recommended that the flushing velocity be not less than 2.5 ft/sec. The rate of flow required to produce this velocity in various diameters is shown in Table 1. No site for flushing should be chosen unless it has been determined that drainage is adequate at that site.

NOTE 2: Flushing is no substitute for preventive measures taken before and during pipe laying (See Note 1). Certain contaminants, especially in caked deposits, resist flushing at any velocity. Furthermore, with diameters of 16 in. or more, even the minimum recommended flushing velocity of 2.5 ft/sec is sometimes difficult to achieve.

6.3 Form of Chlorine for Disinfection

The most common forms of chlorine used in the disinfecting solution are liquid chlorine (gas at atmospheric pressure), calcium hypochlorite granules, sodium hypochlorite solutions, and calcium hypochlorite tablets.

A Liquid Chlorine:

(i) Packaging: Liquid chlorine is packaged in steel cylinders usually of 100 lb, 150 lb, or 1 ton capacity.

(ii) Use: Liquid chlorine shall be used only when suitable equipment is available and only under the direct supervision of a person familiar with the physiological, chemical, and physical properties of this element and who is properly trained and equipped to handle any emergency that may arise. Introduction of chlorine-gas directly from the supply cylinder is unsafe and shall not be permitted.

NOTE: The preferred equipment consists of a solution feed chlorinator in combination with a booster pump for injecting the chlorine-gas water mixture into the main to be disinfected. Direct feed chlorinators are not recommended because their use is limited to situations where the water pressure is lower than the chlorine cylinder pressure.

B Hypochlorites:

(i) Calcium Hypochlorite: Calcium hypochlorite contains 70 percent available chlorine by weight. It is either granular or tabular in form. The tablets, 6-8 to the ounce, are designed to dissolve slowly in water (See 4-C). Calcium hypochlorite is packaged in containers of various types and sizes ranging from small plastic bottles to 100 lb. drums.

A chlorine-water solution is prepared by dissolving the granules in water in the proportion requisite for the desired concentration.

(ii) Sodium Hypochlorite: Sodium hypochlorite is supplied in strengths from 5.25 to 16 percent available chlorine. It is packaged in liquid form in glass, rubber, or plastic

containers ranging in size from 1 qt bottles to 5 gal carboys. It may also be purchased in bulk for delivery by tank truck.

The chlorine-water solution is prepared by adding hypochlorite to water. Product deterioration must be reckoned with in computing the quantity of sodium hypochlorite required for the desired concentration.

(iii) Application: The hypochlorite solutions shall be applied to the water main with a gasoline or electrically-powered chemical feed pump designed for feeding chlorine solutions. For small applications the solutions may be fed with a hand pump, for example, a hydraulic test pump. Feed lines shall be of such material and strength as to withstand safely the maximum pressures that may be created by the pumps. All connections shall be checked for tightness before the hypochlorite solution is applied to the main.

6.4 Methods of Chlorine Application:

A Continuous Feed Method: This method is suitable for general application and is the method that shall be used for small lines and only used after flushing. The Owner will consider the slug method for lines above 12 inches.

TABLE 2
Chlorine Required to Produce 50 Mg/L Concentration
In 100 Feet of Pipe by Diameter

Pipe Size (Inches)	100 Percent Chlorine Solution	1 Percent Chlorine Solution
4	0.027	0.33
6	0.061	0.73
8	0.108	1.30
10	0.170	2.04
12	0.240	2.88

(i) Water from the existing distribution system or other approved sources of supply shall be made to flow at a constant, measured rate into the newly-laid pipeline. The water shall receive a dose of chlorine, also fed at a constant, measured rate. The two rates shall be proportioned so that the chlorine concentration in the water in the pipe is maintained at a minimum of 50 mg/l available chlorine. To assure that this concentration is maintained, the chlorine residual should be measured at regular intervals in accordance with the procedures described in the current edition of "Standard methods and AWWA M12-Simplified Procedures for Water Examination" (see Appendix).

NOTE: In the absence of a meter, the rate may be determined either by placing a pitot gage at the discharge or by measuring the time to fill a container of known volume.

Table 2 gives the amount of chlorine residual required for each 100 ft of pipe of various diameters. Solutions of 1 percent chlorine may be prepared with sodium hypochlorite or calcium hypochlorite. The latter solution requires approximately 1 lb of calcium hypochlorite in 8.5 gal of water.

(ii) During the application of the chlorine, valves shall be manipulated to prevent the treatment dosage from flowing back into the line supplying the water. Chlorine application shall not cease until the entire main is filled with the chlorine solution. The chlorinated water shall be retained in the main for at least 24 hr, during which time all valves and hydrants in the section treated shall be operated in order to disinfect the

appurtenances. At the end of this 24 hr period, the treated water shall contain no less than 25 mg/l chlorine throughout the length of the main.

B Slug Method: This method is suitable for use with mains of large diameter for which, because of the volumes of water involved, the continuous feed method is not practical.

(i) Water from the existing distribution system or other approved source of supply shall be made to flow at a constant, measured rate (See 4-a, Note) into the newly laid pipeline. The water shall receive a dose of chlorine, also fed at a constant, measured rate. The two rates shall be proportioned so that the concentration in the water entering the pipeline is maintained at no less than 300 mg/l. The chlorine shall be applied continuously and for a sufficient period to develop a solid column or "slug" of chlorinated water that will as it passes along the line, expose all interior surfaces to a concentration of at least 300 mg/l for at least 3 hr. The application shall be checked at a tap near the upstream end of the line by chlorine residual measurements made according to the procedures described in the Appendix.

(ii) As the chlorinated water flows past tees and crosses, related valved and hydrants shall be operated so as to disinfect appurtenances.

C Granular Compounds: The owner will allow the contractor to install granular chlorine (No Tablets) in the pipe line as installation proceeds but the contractor will still be required to chlorinate after preliminary flushing as herein outlined.

6.5 Final Flushing

After the applicable retention period, the heavily chlorinated water shall be flushed from the main until the chlorine concentration in the water leaving the main is no higher than that generally prevailing in the system, or less than 1 mg/l. Chlorine residual determination shall be made to ascertain that the heavily chlorinated water has been removed from the pipeline.

6.6 Bacteriologic Tests

A After final flushing, and before the water main is placed in service, a sample or samples shall be collected from the end of the line and tested for bacteriologic quality and shall show the absence of coliform organisms. If the number and frequency of samples is not prescribed by the public health authority having jurisdiction, at least one sample shall be collected from chlorinated supplies where a chlorine residual is maintained throughout the new main. From unchlorinated supplies at least two samples shall be collected at least 24 hr apart.

NOTE: In the case of extremely long mains, it is desirable that samples be collected the length of the line as well as at its end.

B Samples for bacteriologic analysis shall be collected in sterile bottles treated with sodium thiosulphate. No hose or fire hydrant shall be used in collection of samples. A suggested sampling tap consists of a standard corporation cock installed in the main with a copper tube gooseneck assembly. After samples have been collected the gooseneck assembly may be removed, and retained for future use.

6.7 Repetition of Procedure

If the initial disinfection fails to produce satisfactory samples, disinfection shall be repeated until satisfactory samples have been obtained. The tablet method cannot be used in these subsequent disinfections. When the samples are satisfactory, the main may be placed in service.

6.8 Procedure After Cutting into or Repairing Existing Mains

The procedures outlines in this section apply primarily when mains are wholly or partially dewatered. Leaks or breaks that are repaired with clamping devices while the mains remain full of water under pressure present little danger of contamination and require no disinfection.

A Trench "Treatment"

When an old line is opened, either by accident or by design, the excavation will likely be wet and badly contaminated from nearby sewers. Liberal quantities of hypochlorite applied to open trench areas will lessen the danger from such pollution. Tablets have the advantage in such a situation because they dissolve slowly and continue to release hypochlorite as water is pumped from the excavation.

B Main Disinfection:

(i) Swabbing and Flushing: The following procedure is considered as a minimum that may be used.

(a) Swabbing with Hypochlorite Solution: The interior of all pipe and fittings used in making the repair (particularly couplings and tapping sleeves) shall be swabbed with a 5 percent hypochlorite solution before they are installed.

(b) Flushing: Thorough flushing is the most practical means of removing contamination introduced during repairs. If valving and hydrant locations permit, flushing from both directions is recommended. Flushing shall be started as soon as the repairs are completed and continued until discolored water is eliminated.

(ii) Slug Method: Where practicable, in addition to the procedures of 6.8-B-(i), a section of main in which the break is located shall be isolated, all service connections shut off, and the section flushed and chlorinated as described in 6.4-B, except that the dose may be increased to as much as 500 mg/l, and the contact time reduced to as little as ½ hr. After chlorination, flushing shall be resumed and continued until discolored water is eliminated.

C Sampling

Bacteriologic samples shall be taken after repairs to provide a record by which the effectiveness of the procedures used can be determined. If the direction of flow is unknown, samples shall be taken on each side of the main break.

7 CHLORINE RESIDUAL-DROP DILUTION METHOD

The drop dilution method of approximating total residual chlorine is suitable for concentrations above 10 mg/L, such as are applied in the disinfection of water mains or tanks. It is taken from AWWA M12 "Simplified Procedures for Water Examination", page 29.

7.1 Apparatus:

A A graduated cylinder for measuring distilled water.

B An automatic or safety pipet.

C A dropping pipet that delivers a 1 mL sample in 20 drops. This pipet is for measuring the water sample and should not be used for any other purposes.

D A comparator kit containing a suitable range of standards.

7.2 Procedure:

A Ascertain the volume of the comparator cell, and using an automatic or safety pipet, add 0.5 mL of orthotolidine for each 9.5 mL of distilled water to be added.

B Using a graduated cylinder, add a measured volume of distilled water.

C With the dropping pipet, add the water sample, a drop at a time, allowing mixing, until a yellow color is formed that matches one of the color standards.

D Record the total number of drops used and the final chlorine value obtained.

E Calculate the milligrams per liter residual chlorine as follows:

(i) Multiply by 20 the number of milliliters of distilled water used in Step 2.

(ii) Multiply this product by the final chlorine value in milligrams per liter recorded in Step 4.

(iii) Divide the product found in Step (b) by the total number of drops of water sample recorded in Step 4.

END OF SECTION

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STATE OF MISSOURI
DEPARTMENT OF NATURAL RESOURCES
MISSOURI CLEAN WATER COMMISSION

MISSOURI STATE OPERATING PERMIT

General Operating Permit

In compliance with the Missouri Clean Water Law, (chapter 644 R.S. Mo as amended, hereinafter, the Law), and the Federal Water Pollution Control Act (Public Law 92-500, 92nd Congress) as amended,

Permit No:	MOR100034
Owner:	Cole County
Address:	301 E High Street Jefferson City, MO 65101
Continuing Authority:	Cole County Road and Bridge Department 5055 Monticello Rd. Jefferson City, MO 65109
Facility Name:	Cole Co Road and Bridge Department
Facility Address:	5055 Monticello Rd JEFFERSON CITY, MO 65109
Legal Description:	Sec. 04, T43N, R12W, Cole County
UTM Coordinates:	565135.257/4262453.883
Receiving Stream:	Tributary to Moreau R. (U)
First Classified Stream - ID#:	Moreau R. (P) 941.00
USGS# and Sub Watershed#:	10300102 - 1206

is authorized to discharge from the facility described herein, in accordance with the effluent limitations and monitoring requirements as set forth herein.

FACILITY DESCRIPTION All Outfalls SIC #1629

All Outfalls - Construction or land disturbance activity (e.g., clearing, grubbing, excavating, grading and other activity that results in the destruction of the root zone and/or land disturbance activity that is reasonably certain to cause pollution of waters of the state)

This permit authorizes only wastewater, including storm water, discharges under the Missouri Clean Water Law and the National Pollutant Discharge Elimination System. it does not apply to other regulated areas. This permit may be appealed in accordance with RSMo. Section 644.051.6 and 621.250, 10 CSR 20-6.020, and 10 CSR 20-1.020.

June 29, 2012
Issue Date

Sara Parker Pauley
Sara Parker Pauley, Director
Department of Natural Resources

May 30, 2017
Expiration Date

John Madras
John Madras
Director, Water Protection Program

A. APPLICABILITY

1. This general permit authorizes the discharge of stormwater and certain non-stormwater discharges from land disturbance sites that disturb one or more acres of land or disturb less than one acre when part of a larger common plan of development or sale that will disturb a cumulative total of one or more acres over the life of the project.

   This general permit also authorizes the discharge of stormwater and certain non-stormwater discharges from smaller projects where the Missouri Department of Natural Resources (Department) has exercised its discretion to require a permit [10 CSR 20-6.200 (1)(B)].

   This general permit is issued to a city, county, state or federal agency or other governmental jurisdiction for land disturbance projects performed by or under contract to the permittee. A stormwater control plan or stormwater pollution prevention plan (SWPPP) must be developed prior to issuance of this permit. These plans must include a narrative of the types and appropriate uses of Best Management Practices (BMPs) for erosion and sediment control and stormwater management.

   All water pollution controls on land disturbance sites shall conform to the storm water control program and/or SWPPP of the city, county or other governmental jurisdiction in which the land disturbance activity is occurring. These storm water control programs and/or SWPPPs shall be developed prior to permit issuance. The requirements of the stormwater control program and/or SWPPP must be at least as stringent as those described in this permit and 10 CSR 20-6.200. If the permittee is a regulated municipal separate stormwater system (MS4), the stormwater program and/or SWPPP must comply with the permittee's MS4 permit. The Department may enforce the requirements of the stormwater program and/or SWPPP.

   All projects covered under this permit must also be identified as part of the Missouri State Operating Permit covered area and must have a SWPPP developed specific to the project site. The site specific SWPPP shall be developed prior to removal of any vegetation or site disturbance. This SWPPP must contain all the SWPPP requirements of this permit.

   Any site owner/operator subject to these requirements for stormwater discharges and who disturbs land *prior* to permit issuance from the Department or prior to the development of the SWPPP is in violation of both State and Federal Laws.

   The legal owner of the property, the right-of-way or the easement on which the site is located and the operator are responsible for compliance with this permit.

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2. This permit authorizes discharges from construction support activities (e.g., concrete or asphalt batch plants, equipment staging yards, material storage areas, excavated material disposal areas, borrow areas) provided that appropriate stormwater controls are designed, installed, maintained and provided:
   a. The support activity is directly related to the construction site required to have permit coverage for stormwater discharges;
   b. The support activity is not a commercial operation; and
   c. The support activity does not continue to operate beyond the completion of the construction activity at the project it supports.

   It is the permittee that is responsible for compliance with this permit for any construction support activities.

3. This permit authorizes non-stormwater discharges from the following activities provided that these discharges are addressed in the SWPPP required by this general permit:
   a. De-watering activities if there are no contaminants other than sediment present in the discharge, and the discharge is treated as specified in Requirements, Section C.10.1. of this permit;
   b. Flushing water hydrants and potable water lines;
   c. Water only (i.e., without detergents or additives) rinsing of streets and buildings; and
   d. Site watering to establish vegetation.

4. This general permit does not authorize the placement of fill materials in flood plains, the obstruction of stream flow, directing stormwater across private property not owned or operated by the permittee, or changing the channel of a defined drainage course. This general permit addresses only the quality of the stormwater runoff and the minimization of off-site migration of sediments and other water contaminants.

5. This general permit does not authorize any discharge to waters of the state of sewage or pollutants including but not limited to:
   a. Any hazardous material, oil, lubricant, solid waste or other non-naturally occurring substance from the site, including fuels, oils, or other pollutants used in vehicle and equipment operation and maintenance;
   b. Soaps or solvents used in vehicle and equipment washing;
   c. Hazardous substances or petroleum products from an on-site spill or handling and disposal practices,
   d. Wash and/or rinse waters from concrete mixing equipment including ready mix concrete trucks, unless managed by an appropriate control. Any such pollutants must be adequately treated and addressed in the SWPPP, and cannot be discharged to waters of the state;
   e. Wastewater from washout and cleanout of stucco, paint, form release oils, curing compounds and other construction materials;
   f. Wastewater generated from air pollution control equipment or the containment of scrubber water in lined ponds;
   g. Domestic wastewaters, including gray waters; or
   h. Industrial stormwater runoff.

6. The Department reserves the right to revoke or deny coverage under this general permit to applicants for stormwater discharges from land disturbance activities at sites that have contaminated soils that will be disturbed by the land disturbance activity or where such materials are brought to the site to use as fill or borrow. A site-specific permit may be required to cover such activities.

7. If Department may require any person authorized by a general permit to apply for and obtain an individual operating permit [10 CSR 20-6.010 (13) (C)]:

   The Department may require the permittee to apply for and obtain a site-specific or different general permit if:
   a. The permittee is not in compliance with the conditions of this general permit;
   b. The discharge no longer qualifies for this general permit due to changed site conditions and/or regulations; or
   c. Information becomes available that indicates water quality standards have been or may be violated.

8. The permittee will be notified in writing of the requirement to apply for a site-specific permit or a different general permit. When a site-specific permit or different general permit is issued to the authorized permittee, the applicability of this general permit to the permittee is automatically terminated upon the effective date of the site specific or different general permit.

9. Any owner/operator authorized by a general permit may request to be excluded from the coverage of the general permit and apply for a site-specific permit [10 CSR 20-6.010 (13)(D)].

10. This permit does not authorize land disturbance activity in jurisdictional waters of the United States as defined by the Army Corps of Engineers, unless the permittee has obtained the required 404/401 permit. Land disturbance activities may not begin in the affected portions of the site until the required 404/401 permits have been obtained.

11. This permit does not supersede compliance with the Historic Preservation Act or the Endangered Species Act.

12. This permit does not supersede any requirement for obtaining project approval under an established local authority.

13. This permit is not transferable to other owners or operators.

B. EXEMPTIONS FROM PERMIT REQUIREMENTS

1. Facilities that discharge all stormwater runoff directly to a combined sewer system are exempt from stormwater permit requirements.

2. Land disturbance activity as described in [10 CSR 20-6.200 (1) (B)] and [10 CSR 20-6.010 (1) (B)] where water quality standards are not exceeded.

3. Linear, strip, or ribbon construction (as described in [10 CSR 20-6.200 (1) (B) 8]) where water quality standards are not exceeded.

4. Sites that disturb less than one acre of total land area as described in [10 CSR20-6.200 (1)(B)7], that are not part of a common plan or sale and that do not cause any violations of water quality standards, and are not otherwise designated by the Department as requiring a permit.

5. Agricultural stormwater discharges and irrigation return flows as described in [10CSR 20-6.200 (1) (B) 6].

C. REQUIREMENTS

These requirements do not supersede nor remove any requirement to comply with county or other local ordinances [10 CSR20-6.010(14) (D)]:

1. This permit is to ensure the design, the installation and the maintenance of effective erosion controls and sediment controls to minimize the discharge of pollutants. At minimum, such controls must be designed, installed and maintained to:
   a. Control stormwater volume and velocity within the site to minimize soil erosion;
   b. Control stormwater discharges, including both peak flow rates and total stormwater volume, to minimize erosion at outlets and to minimize downstream channel and stream bank erosion;
   c. Minimize the amount of soil exposed during construction activity;
   d. Minimize the disturbance of steep slopes;

e. Minimize sediment discharges from the site. The design, installation and maintenance of erosion and sediment controls must address factors such as the amount, frequency, intensity and duration of precipitation, the nature of resulting stormwater runoff, and soil characteristics, including the range of soil particle size expected to be present on the site.;
f. Provide and maintain natural buffers around surface waters, direct stormwater to vegetated areas to increase sediment removal and maximize stormwater infiltration, unless infeasible; and
g. Minimize soil compaction and, unless infeasible, preserve topsoil.

2. The primary requirement of this permit is the development and implementation of a SWPPP which incorporates site specific practices to best minimize the soil exposure, soil erosion, and the discharge of pollutants. The permittee shall fully implement the provisions of the SWPPP required under this part as a condition of this general permit throughout the term of all land disturbance projects covered under this permit.

3. The permittee must inspect all land disturbance sites as described in C.13 of this permit.

4. The permittee shall provide a list of active land disturbance sites to the Department on a quarterly basis. The list shall contain the name of the project, location (including the County), name of the primary receiving water(s) for each project, description of the project, number of acres disturbed, percent completion of the project and projected date of completion. The permittee shall submit quarterly reports each January, April, July and October. The Department must receive reports by the end of the specified month.

5. The permittee is required to keep a current copy of the SWPPP at an easily accessible location so that it can be made available at the time of an onsite inspection by the Department or local agency approving stormwater management plans.

   The SWPPP must:
   a. List and describe all outfalls or primary receiving water(s) for the project;
   b. Incorporate required practices identified below;
   c. Incorporate erosion control practices specific to site conditions;
   d. Provide for maintenance and adherence to the plan;
   e. Discuss whether or not a 404/401 Permit is required for the project; and
   f. Name the person responsible for inspection, operation and maintenance of BMPs.

   The purpose of the SWPPP is to ensure; the design, implementation, management and maintenance of Best Management Practices (BMPs) in order to prevent sediment and other pollutants in stormwater discharges associated with the land disturbance activities; compliance with the Missouri Water Quality Standards; and compliance with the terms and conditions of this general permit.

   The permittee shall select, install, use, operate and maintain appropriate BMPs for the permitted site. The following manuals are acceptable resources for the selection of appropriate BMPs.

   Developing Your Stormwater Pollution Prevention Plan: A Guide for Construction Activities (Document number EPA 833-R-06-004) published by the United States Environmental Protection Agency (USEPA) in May 2007. This manual as well as other information, including examples of construction SWPPPs, is available at the USEPA internet site at http://cfpub1.epa.gov/npdes/stormwater/swppp.cfm; and

The latest version of *Protecting Water Quality: A field guide to erosion, sediment and stormwater best management practices for development sites in Missouri,* published by the Missouri Department of Natural Resources. This manual is available on the Department's internet site at: http://www.dnr.mo.gov/env/wpp/wpcp-guide.htm.
The permittee is not limited to the use of these guidance manuals. Other guidance publications may be used to select appropriate BMPs. However, all BMPs should be described and justified in the SWPPP.

6. SWPPP Requirements: The following information and practices shall be provided for in the SWPPP:

   a. Nature of the Construction Activity: The SWPPP briefly must describe the nature of the construction activity, including:
      1) The function of the project (e.g., low density residential, shopping mall, highway, etc.);
      2) The intended sequence and timing of activities that disturb the soils at the site;
      3) Estimates of the total area expected to be disturbed by excavation, grading, or other construction activities including off-site borrow and fill areas; and
      4) A general map (e.g., United States Geological Survey quadrangle map, a portion of a city of county map, or other map) with enough detail to identify the location of the construction site and waters of the United States within one mile of the site.

   b. Site Map: The SWPPP must contain a legible site map showing the site boundaries and outfalls and identifying:
      1) Direction(s) of stormwater flow and approximate slopes anticipated after grading activities;
      2) Areas of soil disturbance and areas that will not be disturbed (or a statement that all areas of the site will be disturbed unless otherwise noted);
      3) Location of major structural and non-structural BMPs identified in the SWPPP;
      4) Locations where stabilization practices are expected to occur;
      5) Locations of off-site material, waste, borrow or equipment storage areas;
      6) Locations of all waters of the United States (including wetlands);
      7) Locations where stormwater discharges to a surface water; and
      8) Areas where final stabilization has been accomplished and no further construction-phase permit requirements apply.

   c. Site Description: In order to identify the site, the SWPPP shall include facility and receiving water(s) information. The SWPPP shall have sufficient information to be of practical use to contractors and site construction workers to guide the installation and maintenance of BMPs.

   d. Effluent Limits: The permittee must select control measurements (e.g., BMPs, controls, practices, etc.) to meet effluent limits found in Section E.1. of this permit. All control measures must be properly selected, installed and maintained in accordance with any relevant manufacturer specifications and good engineering practices to ensure stormwater outfall discharges do not cause water quality problems. The permittee must implement the control measures from commencement of the construction activity until final stabilization is complete unless the exception noted in Section C.6.i. of this permit applies.

   e. Selection of Temporary and Permanent Non-Structural BMPs: The permittee shall select appropriate non-structural BMPs for use at the site and list them in the SWPPP. The SWPPP shall require existing vegetation to be preserved where practical. For surface waters located on or immediately adjacent to the site, the permittee must provide at minimum a 25-foot buffer of undisturbed natural vegetation between the disturbed portions of the site and the surface water unless infeasible or where there is a more stringent local requirement. The buffer is measured perpendicularly from the ordinary high water mark or the bank edge, whichever is further landward from the water. The time period for disturbed areas to be without vegetative cover is to be minimized to the maximum extent practicable.
   Examples of non-structural BMPs which the permittee should consider specifying in the SWPPP include preservation of trees and mature vegetation, protection of existing vegetation

for use as buffer strips, mulching, sodding, temporary seeding, final seeding, geotextiles, stabilization of disturbed areas, preserving existing stream channels as overflow areas when channel straightening or shortening is allowed, soil stabilizing emulsions and tackifiers, mulch tackifiers, stabilized site entrances/exits and other appropriate BMPs.

f. Selection of Temporary and Permanent Structural BMPs: The permittee shall select appropriate structural BMPs for use at the site and list them in the SWPPP. Examples of structural BMPs that the permittee should consider specifying in the SWPPP include diverting flows from undisturbed areas away from disturbed areas, silt (filter fabric and/or straw bale) fences, earthen diversion dikes, drainage swales, sediment traps, rock check dams, subsurface drains (to gather or transport water for surface discharge elsewhere), pipe slope drains (to carry concentrated flow down a slope face), level spreaders (to distribute concentrated flow into sheet flow), storm drain inlet protection and outlet protection, reinforced soil retaining systems, gabions, temporary or permanent sediment basins and other appropriate BMPs.

g. Description of BMPs: The SWPPP shall include a description of both structural and non-structural BMPs that will be used at the site.

The SWPPP shall provide the following general information for each BMP which will be used one or more times at the site:

1) Physical description of the BMP;
2) Site and physical conditions that must be met for effective use of the BMP;
3) BMP installation/construction procedures, including typical drawings; and
4) Operation and maintenance procedures for the BMP.

The SWPPP shall provide the following information for each specific instance where a BMP is to be installed:

1) Whether the BMP is temporary or permanent;
2) Where, in relation to other site features, the BMP is to be located;
3) When the BMP will be installed in relation to each phase of the land disturbance procedures to complete the project; and
4) Site conditions that must be met before removal of the BMP if the BMP is not a permanent BMP.

h. Disturbed Areas: Slopes for disturbed areas must be defined in the SWPPP. A site map or maps defining the sloped areas for all phases of the project must be included in the SWPPP.

Temporary stabilization is to take place where soil disturbing activities will cease on any portion of the site and are not planned to resume for a period exceeding 14 calendar days. Temporary stabilization must be initiated immediately upon knowing the duration is more than 14 days. Temporary stabilization must be completed within 7 calendar days. Temporary stabilization shall consist of well-established and maintained BMPs that are reasonably certain to protect waters of the state from sediment pollution over an extended period of time. This may require adding more BMPs to an area than is normally used during daily operations. These BMPs may include a combination of sediment basins, check dams, sediment fences and mulch. The types of BMPs used must be suited to the area disturbed, taking into account the number of acres exposed and the steepness of the slopes. If the slope of the area is greater than 3:1 (3 feet horizontal to one foot vertical) or if the slope is greater than 3% and greater than 150 feet in length, then the permittee shall establish temporary stabilization within seven days of ceasing operations on that part of the site.

Final stabilization of disturbed areas must be initiated immediately and completed within 7 calendar days whenever any clearing, grading, excavating or other earth disturbing activities have permanently ceased on any portion of the site.

Allowances to the 7 day completion period for temporary and final stabilization may be made due to weather and equipment malfunctions. The use of allowances shall be documented in the SWPPP.

i. Installation: The permittee shall ensure the BMPs are properly installed at the locations and relative times specified in the SWPPP. Peripheral or border BMPs to control runoff from disturbed areas shall be installed or marked for preservation before general site clearing is started. Note that this requirement does not apply to earth disturbances related to initial site clearing and establishing entry, exit and access of the site, which may require that stormwater controls be installed immediately after the earth disturbance. Stormwater discharges from disturbed areas which leave the site shall pass through an appropriate impediment to sediment movement such as a sedimentation basin, sediment traps and silt fences prior to leaving the land disturbance site. A drainage course change shall be clearly marked on a site map and described in the SWPPP. The location of all BMPs must be indicated on a site map, included in the SWPPP.

j. Sedimentation Basins: The SWPPP shall include a sedimentation basin for each drainage area with ten or more acres disturbed at one time. The sedimentation basin shall be sized to contain a volume of at least 3,600 cubic feet per each disturbed acre draining thereto. Accumulated sediment shall be removed from the basin when basin is 50% full. When discharging from basins and impoundments, utilize outlet structures that withdraw water from the surface unless infeasible. Discharges from the basin shall not cause scouring of the banks or bottom of the receiving stream. The SWPPP shall require the basin be maintained until final stabilization of the disturbed area served by the basin.

Where use of a sediment basin is impractical, the SWPPP shall evaluate and specify other similarly effective BMPs to be employed to control erosion and sediment delivery. These similarly effective BMPs shall be based on good engineering practices. The BMPs must provide equivalent water quality protection to achieve compliance with this permit. The SWPPP shall require both temporary and permanent sedimentation basins to have a stabilized spillway to minimize the potential for erosion of the spillway or basin embankment.

k. Pollution Prevention Measures: The SWPPP shall include BMPs for pollution prevention measures. At minimum such measures must be designed, installed, implemented and maintained to:

1) Minimize the discharge of pollutants from equipment and vehicle washing, wheel wash water, and other wash waters. Wash waters must be treated in a sediment basin or alternative control that provides equivalent or better treatment prior to discharge ;
2) Minimize the exposure of building materials, building products, construction wastes, trash, landscape materials, fertilizers, pesticides, herbicides, detergents, sanitary waste, and other materials present on the site to precipitation and to stormwater; and
3) Minimize the discharge of pollutants from spills and leaks and implement chemical spill and leak prevention and response procedures. Included but not limited to the installation of containment berms and use of drip pans at petroleum product and liquid storage tanks and containers.

l. Dewatering: Discharges from dewatering activities, including discharges from dewatering of trenches and excavations, are prohibited unless managed by appropriate controls. The SWPPP shall include a description of any anticipated dewatering methods including the anticipated volume of water to be discharged and the anticipated maximum flow discharged from these dewatering activities expressed in gallons per minute. Maximum flow may be stated in the SWPPP as an estimate based on the type and capacity of equipment being used for dewatering. The SWPPP shall call for specific BMPs designed to treat water pumped from trenches and excavations and in no case shall this water be pumped off-site without being treated by the specified BMPs. When discharging from basins and impoundments utilize outlet structures that withdraw water from the surface, unless infeasible.

m. Roadways: Where applicable, upon installation of or connection to roadways, all efforts should be made to prevent the deposition of earth and sediment onto roadways through the use of proper BMPs. Stormwater inlets susceptible to receiving sediment from the permitted land disturbance site shall have curb inlet protection. Where stormwater will flow off the end of where a roadway terminates, a sediment catching BMP such as gravel berm or silt fence shall be provided. Roadways and curb inlets shall be inspected weekly or following a rainfall that generates a run-off and cleaned as necessary to maintain a clean roadway and drainage system. Where practicable, construction entrance BMP controls shall be used to prevent sediment track-out.

7. Good housekeeping practices shall be maintained at all times to keep waste from entry into waters of the state. Solid and hazardous waste management include providing trash containers and regular site clean-up for proper disposal of solid waste such as scrap building material, product/material shipping waste, food containers and cups, and providing containers and proper disposal of waste paints, solvents and cleaning compounds. The provision of portable toilets for proper disposal of sanitary sewage and the storage of construction materials should be kept away from drainage courses and low areas.

8. All fueling facilities present shall at all times adhere to applicable federal and state regulations concerning underground storage, above ground storage and dispensers.

9. Hazardous wastes that are transported, stored, or used for maintenance, cleaning, or repair shall be managed according to the provisions of the Missouri Hazardous Waste Laws and Regulations.

10. All paint, solvents, petroleum products, petroleum waste products and storage containers such as drums, cans, or cartons shall be stored according to BMPs. The materials exposed to precipitation shall be stored in watertight, structurally sound, closed containers. All containers shall be inspected for leaks or spillage during the once per week inspection of BMPs.

11. Amending/Updating the SWPPP: The permittee shall amend and update the SWPPP as appropriate during the term of the land disturbance activity. The permittee shall amend the SWPPP at a minimum whenever the:
    a. Design, operation, or maintenance of BMPs is changed;
    b. Design of the construction project is changed that could significantly affect the quality of the stormwater discharges;
    c. Permittee's inspections indicate deficiencies in the SWPPP or any BMP;
    d. The Department notifies the permittee in writing of deficiencies in the SWPPP;
    e. SWPPP is determined to be ineffective in minimizing or controlling erosion and sedimentation (e.g., there is visual evidence of excessive site erosion or excessive sediment deposits in streams or lakes);
    f. Settleable Solids from a stormwater outfall exceed 2.5 ml/L; and
    g. The Department determines violations of water quality standards may occur or have occurred.

12. An individual shall be designated by the permittee as responsible for environmental matters. The individual responsible for environmental matters shall have a thorough and demonstrable knowledge of the site's SWPPP and sediment and erosion control practices in general. The individual responsible for environmental matters or a designated inspector knowledgeable in erosion, sediment and stormwater control principles shall inspect all structures that function to prevent pollution of waters of the state including those for material, waste, borrow, or equipment storage and maintenance areas that are covered by this permit. These inspections shall be conducted in accordance with No. 13 of these requirements.

13. Site Inspection Reports: The permittee (or a representative of the permittee) shall conduct regularly scheduled inspections at least once per seven calendar days. These inspections shall be conducted by a qualified person, one who is responsible for environmental matters at the site, or a person trained by and directly supervised by the person responsible for environmental matters at the site. For disturbed areas that have not been finally stabilized, all installed BMPs and other pollution control measures shall be inspected for proper installation, operation and maintenance. All stormwater outfalls shall be inspected for evidence of erosion or sediment deposition. When practicable the receiving stream shall also be inspected for 50 feet downstream of the outfall. Any structural or maintenance problems shall be noted in an inspection report and corrected within seven calendar days of the inspection. If a rainfall causes stormwater runoff to occur on-site, the BMPs must be inspected. These inspections must occur within 48 hours after the rain event has ceased during a normal work day and within 72 hours on the next business day if the rain event ceases during a non-work day such as a weekends or holiday. The total rainfall measured for that day must be recorded. A properly maintained rain gauge must be kept on site or the storm event information may be obtained from a weather station that is representative of your location.

    The SWPPP must explain how the person responsible for erosion control will be notified when stormwater runoff occurs. If weather conditions prevent correction of BMPs within 7 calendar days, the reasons for the delay must be documented (including pictures) and there must be a narrative explaining why the work cannot be accomplished within the 7 day time period. The documentation must be filed with the regular inspection reports. The permittee shall correct the problem as soon as weather conditions allow.

    A log of each inspection and a current copy, of all the inspection reports shall be kept at the site or at an easily accessible location so that it can be made available at the time of an on-site inspection or at the request of the Department. The inspection report shall be signed by the permittee or by the person performing the inspection if duly authorized to do so. The inspection report is to include the following minimum information:
    a. Inspector's name;
    b. Date of inspection;
    c. Observations relative to the effectiveness of the BMPs;
    d. Actions taken or necessary to correct the observed problem; and
    e. Listing of areas where land disturbance operations have permanently or temporarily stopped.

14. Proper Operation and Maintenance: The permittee shall at all times maintain all pollution control measures and systems in good order to achieve compliance with the terms of this general permit.

15. Notification to All Contractors: The permittee shall be responsible for notifying each contractor or entity (including utility crews and city employees or their agents) that will perform work at the site of the existence of the SWPPP and what action or precautions shall be taken while on-site to minimize the potential for erosion and the potential for damaging any BMP. The permittee is responsible for any damage a subcontractor may do to established BMPs and any subsequent water quality violation resulting from the damage.

16. Public Notification: The permittee shall post a copy of the public notification sign described by the Department at the main entrance to the site. The public notification sign must be visible from the public road that provides access to the site's main entrance. An alternate location is acceptable provided the public can see it and it is noted in the SWPPP. The public notification sign must remain posted at the site until the permit has been terminated.

D. OTHER DISCHARGES

1. Hazardous Substance and Oil Spill Reporting: Refer to Section B, #14 of Part I of the Standard Conditions that accompany this permit.

2. Removed substances: Refer to Section B, #6 of Part I of the Standard Conditions that accompany this permit.

3. Change in discharge: In the event soil contamination or hazardous substances are discovered at the site during land disturbance activities, the permittee shall notify the Department's regional office by telephone as soon as practicable but no later than 24 hours after discovery. The permittee must also notify the Department's regional office in writing no later than 14 calendar days after discovery.

E. SAMPLING REQUIREMENTS AND EFFLUENT LIMITATIONS

1. Settleable Solids discharging from a stormwater outfall shall not exceed 2.5 ml/L per Standard Method 2540 F for storm events up to but not exceeding the local 2-year, 24-hour storm. The Settleable Solids limit does not apply during storm events that exceed the local 2-year, 24-hour storm.

2. The Department may require sampling and reporting as a result of illegal discharges, compliance issues, complaint investigations, or other such evidence of contamination from activities at the site. If such an action is needed, the Department will specify in writing any sampling requirements, including such information as location, extent and parameters.

F. RECORDS

1. The permittee shall retain copies of this general permit, the SWPPP and all amendments for the site named in the State Operating Permit, results of any monitoring and analysis and all site inspection records required by this general permit. The records shall be accessible during normal business hours. The records shall be retained for a period of at least three years from the date of the Letter of Termination.

2. The permittee shall provide a copy of the SWPPP to the Department, USEPA, or any local agency or government representative if they request a copy in the performance of their official duties.

3. The permittee shall ensure a copy of the SWPPP to those who are responsible for installation, operation, or maintenance of any BMP. The permittee, their representative, and/or the contractor(s) responsible for installation, operation and maintenance of the BMPs shall have a current copy of the SWPPP with them when on the project site.

G. LAND PURCHASE AND CHANGE OF OWNERSHIP

1. Federal and Missouri stormwater regulations [10 CSR 20-6.200] require a stormwater permit and erosion control measures for all land disturbances of one or more acres. These regulations also require a permit for less than one acre lots if the lot is part of a common plan of development or sale where that plan is at least one acre in size. If the permittee sells less than one acre of the permitted site to an entity for, commercial, industrial, or residential use, (unless sold to an individual for the purpose of building his/her own private residence and in accordance with No. 3 of this section) this land remains a part of the common sale and regulated by this permit. Therefore, the permittee is still responsible for erosion control on the sold property until termination of the permit.

2. If the permittee sells one or more acres of the permitted site to an entity, the new owner of the property must obtain a land disturbance permit for the purchased property. The original permittee must amend the SWPPP to show that the property (one acre or more) has been sold and therefore no longer under the original permit jurisdiction.

3. If the permittee has stabilized the less than one acre lot which is part of a larger common plan of development and the lot is sold to an individual for purposes of building his/her own private residence, the permittee is no longer responsible for erosion control on the lot.

4. Property of any size which is part of a larger common plan of development where the property has been stabilized and the original permit terminated will require application of a new land disturbance permit for any future land disturbance activity.

5. If the entire tract is sold to a single entity, then this permit shall be terminated when the new owner obtains a new land disturbance permit for the site.

H. TERMINATION

This permit may be terminated when the project is stabilized. The project is considered to be stabilized when perennial vegetation, pavement, buildings, or structures using permanent materials cover all areas that have been disturbed. With respect to areas that have been vegetated, vegetation cover shall be at least 70% plant density over 100% of the site. In order to terminate the permit, the permittee shall notify the Department.

The Cover Page (Certificate Page) of the Master General Permit for Land Disturbance specifies the "effective date" and the "expiration date" of the Master General Permit. The "issued date" along with the "expiration date" will appear on the State Operating Permit issued to the applicant. This permit does not continue administratively beyond the expiration date.

If the project or development completion date will be after the expiration date of this general permit, then the permittee must reapply to the Department for a new permit. The applicant must file a request to the Department for a new permit 180 days prior to the expiration of this permit.

If the permittee has not terminated the permit and the permit expires, and the permittee has not applied for a new permit the permittee will be consider "operating without a permit" if the site does not meet the requirements for termination.

I. MODIFICATION, REVOCATION, AND REOPENING

1. The U.S. Environmental Protection Agency (EPA) has proposed stormwater requirements that may direct the State to reopen this permit. The EPA is proposing to change its construction general permit (CGP) with more prescriptive requirements and design standards for buffers to prevent stormwater runoff, increased monitoring requirements and more frequent inspections. While the EPA permit is only effective in areas where EPA has permitting authority these requirements are likely to act as a template, setting a baseline for the agency's approval of state plans for permitting sites.

2. If at any time the Missouri Department of Natural Resources determines that the quality of waters of the state may be better protected by reopening this permit, or revoking this permit and requiring the owner/operator of the permitted site to apply for a site-specific permit, the Department may revoke a general permit and require any person to obtain such an operating permit as authorized by 10 CSR 20-6.010 (13) and 10 CSR 20-6.200(5).

3. If this permit is re-opened, modified or revoked pursuant to this Section, the permittee retains all rights under Chapter 536 and 644 Revised Statutes of Missouri upon the Department's reissuance of the permit as well as all other forms of administrative, judicial, and equitable relief available under law.

J. DUTY TO COMPLY

The permittee must comply with all conditions of this general permit. Any noncompliance constitutes a violation of the Clean Water Act and is grounds for enforcement action; for permit termination, revocation and reissuance, or modification; or denial of a permit renewal application.

STANDARD CONDITIONS FOR NPDES PERMITS
ISSUED BY
THE MISSOURI DEPARTMENT OF NATURAL RESOURCES
MISSOURI CLEAN WATER COMMISSION
Revised
October 1, 1980

PART I - GENERAL CONDITIONS
SECTION A - MONITORING AND REPORTING

1. Representative Sampling
   a. Samples and measurements taken as required herein shal be representative of the nature and volume, respectively, of the monitored discharge. All samples shall be taken at the outfall(s), and unless specified, before the effluent joins or is diluted by any other body of water or substance.
   b. Monitoring results shall be recorded and reported on forms provided by the Department, postmarked no later than the 28th dayof the month following the completed reporting period. Signed copies of these, and all other reports required herein, shal be submitted to the respective Department Regional Office, the Regional Office address is indicated in the cover letter transmitting the permit.

2. Schedule of Compliance
   No later than fourteen (14) calendar days following each date identified in the "Schedule of Compliance", the permittee shall submit to the respective Department Regional Office as required therein, either a repot of progress or, in the case of specific actions being required by identified dates, a written notice of compliance or noncompliance. In the latter case, the notice shall include the cause of noncompliance, any remedial actions taken, and the probability of meeting the next scheduled requirements, or if there are no more scheduled requirements, when such noncompliance will be corrected. The Regional Office address is indicated in the cover letter transmitting he permit.

3. Definitions
   Definitions as set forth in the Missouri Clean Water Law and Missouri Clean Water Commission Definition Regulation 10 CSR 20-2.010 shall apply to terms used herein.

4. Test Procedures
   Test procedures for the analysis of pollutant shall be in accordance with the Missouri Clean Water Commission Effluent Regulation 10 CSR 20-7015.

5. Recording of Results
   a. For each measurement or sample taken pursuant to the requirements of this permit, the permittee shall record the following information:
      (i) the date, exact place, and time of sampling or measurements;
      (ii) the individual(s) who performed the sampling or measurements;
      (iii) the date(s) analyses were performed;
      (iv) the individual(s) who performed the analyses;
      (v) the analytical techniques or methods used; and
      (vi) the results of such analyses.
   b. The Federal Clean Water Act provides that any person who falsifies, tampers with, or knowingly renders inaccurate anymonitoring device or method required to be maintained under this permit shall, upon conviction, be punished by a fine of not more than $10,000 per violation, or by imprisonment for not more than six (6) months per violation, or both.
   c. Calculations for all limitations which require averaging of measurements shall utilize an arithmetic mean unless otherwise specified by the Director in the permit.

6. Additional Monitoring by Permittee
   If the permittee monitors any pollutant at the location(s) designated herein more frequently than required bythis permit, using approved analytical methods as specified above, the results of such monitoring shall be included in the calculation and reporting of the values required in the Monitoring Report Form. Such increased frequencyshall also be indicated.

7. Records Retention
   The permittee shall retain records of all monitoring information, including all calibration and maintenance records and all original strip chart recording for continuous monitoring instrumentation, copies of all reports required by this permit, and records of all data used to complete the application for this permit, for a period of at least three (3) years from the date of the sample, measurement, report or application. This period may be extended byrequest of the Department at any time.

SECTION B - MANAGEMENT REQUIREMENTS

1. Change in Discharge
   a. All discharges authorized herein shal be consistent with the terms and conditions of this permit. The discharge of any pollutant not authorized by this permit or any pollutant identified in this permit more frequently than or at a level in excess of that authorized shal constitute a violation of the permit.
   b. Any facility expansions, production increases, or process modifications which will result in new, different, or increased discharges of pollutants shall be reported by submission of a new NPDES application at least sixty (60) days before each such changes, or, if they will not violate the effluent limitations specified in the permit, by notice to the Department at least thirty (30) days before such changes.

2. Noncompliance Notification
   a. If, for any reason, the permittee does not comply with or will be unable to comply with any daily maximum effluent limitation specified in this permit, the permittee shall provide the Department with the following information, in writing within five (5) days of becoming aware of such conditions:
      (i) a description of the discharge and cause of noncompliance, and
      (ii) the period of noncompliance, including exact dates and times or, if not corrected, the anticipated time the noncompliance is expected to continue, and steps beingtaken to reduce, eliminate and prevent recurrence of the noncomplying discharge.
   b. Twenty-four hour reporting. The permittee shall report any noncompliance which may endanger health or the environment. Any information shall be provided orally with 24 hours from the time the permittee becomes aware of the circumstances. A written submission shall also be provided with five (5) days of the time the permittee becomes aware of the circumstances. The Department may waive the written report on a case-by-case basis if the oral report has been received within 24 hours.

3. Facilities Operation
   Permittees shall operate and maintain facilities to comply with the Missouri Clean Water Law and applicable permit conditions. Operators or supervisors of operations at publicly owned or publicly regulated wastewater treatment facilities shall be certified in accordance with 10 CSR 209.020(2) and any other applicable law or regulation. Operators of other wastewater treatment facilities, water contaminant source or point sources, shall, upon request by the Department, demonstrate that wastewater treatment equipment and facilities are effectively operated and maintained bycompetent personnel.

4. Adverse Impact
   The permittee shall take all necessary steps to minimize any adverse impact to waters of the state resulting from noncompliance with any effluent limitations specified in this permit or set forth in the Missouri Clean Water Law and Regulations (hereinafter the Law and Regulations), including such accelerated or additional monitoring as necessary to determine the nature and impact of the noncomplying discharge.

Missouri
Department of
Natural Resources

STORMWATER DISCHARGES FROM THIS LAND DISTURBANCE SITE ARE AUTHORIZED BY THE MISSOURI STATE OPERATING PERMIT NUMBER:

_____

IF YOU HAVE QUESTIONS OR CONCERNS ABOUT STORMWATER DISCHARGES FROM THIS SITE, PLEASE CONTACT THE MISSOURI DEPARTMENT OF NATURAL RESOURCES AT

1-800-361-4827

FACT SHEET

MOR100000 LAND DISTURBANCE GENERAL PERMIT
2012 Reissue

The purpose of this fact sheet is for permit clarity. It is not an enforceable part of the permit.
The Federal Water Pollution Control Act ("Clean Water Act" Section 402 Public Law 92-500 as amended) established the National Pollution Discharge Elimination System (NPDES) permit program. This program regulates the discharge of pollutants from point sources into the waters of the United States, and the release of stormwater from certain point sources. All such discharges are unlawful without a permit (Section 301 of the "Clean Water Act"). After a permit is obtained, a discharge not in compliance with all permit terms and conditions is unlawful. Missouri State Operating Permits (MSOPs) are issued by the Director of the Missouri Department of Natural Resources (Department) under an approved program, operating in accordance with federal and state laws (Federal "Clean Water Act" and "Missouri Clean Water Law" Section 644 as amended). MSOPs are issued for a period of five (5) years unless otherwise specified.
As per [40 CFR Part 124.8(a)] and [10 CSR 20-6.020(1)2.] a Fact Sheet shall be prepared to give pertinent information regarding the applicable regulations, rationale for the development of effluent limitations and conditions, and the public participation process for the Missouri State Operating Permit (operating permit) listed below.

PART I. NPDES Stormwater General Permit

The vast majority of discharges associated with construction activity are covered under NPDES general permits. General permits cover a group of similar dischargers under one permit. General permits simplify the process for dischargers to obtain authorization to discharge, provide permit requirements for any discharger that applies for coverage, and reduce the administrative workload for NPDES permitting authorities.

This General Permit is for regulating stormwater discharge at land disturbance construction sites in Missouri. This program requires the owner or operator of a construction site disturbing land of one acre or greater, or less than one acre but part of a larger common plan of development, to obtain this permit prior to conducting any land disturbance activity.

PART II. The Need for Stormwater Regulations at Construction Sites

Stormwater runoff is a major source of urban water pollution endangering humans by polluting the water resources used for drinking, household purposes, recreation and fishing. Stormwater discharges often contain pollutants in amounts that could reduce water quality. The primary pollutants of concern from construction activities are silt and sediment, but other pollutants such as oils and grease, vehicle fluids, and debris are present as well.

Stormwater runoff from construction activities can have a significant impact on water quality. As stormwater flows over a construction site, it can pick up pollutants like sediment, debris, and chemicals and transport these to a nearby storm sewer system or directly to a river, lake, or coastal water. Polluted stormwater runoff can harm or kill fish and other wildlife. Sedimentation can destroy aquatic habitat, and high volumes of runoff can cause stream bank erosion. Debris can clog waterways and potentially reach the ocean where it can kill marine wildlife and impact habitat.
Construction activities increase pollutant loads in runoff. The volume and rate of runoff are typically increased, providing a larger capacity to transport pollutants to rivers and lakes. In addition, the removal of vegetation leaves bare soil which is much more vulnerable to erosion, resulting in sediment moving into receiving waters.

Additional stormwater information and requirements including application for a land disturbance permit can be found at http://dnr.mo.gov/env/wpp/stormwater/sw-land-disturb-permits.htm.

PART III. Key Component and Primary Requirement of this Permit

The key component of this permit are effluent limitations that require the permittee to minimize discharge of pollutants in stormwater by using control measures that reflect best engineering practices base on federal and state government best professional judgment. Dischargers must minimize their discharge of pollutants in stormwater using appropriate erosion and sediment controls and control measures for other pollutants such as litter, construction debris, and construction chemicals that could be exposed to stormwater and other wastewater. The primary requirement of this general permit is the development and implementation of a stormwater pollution prevention plan (SWPPP) to document the steps they will take to comply with the terms, conditions and effluent limitations of the permit. Note that the SWPPP is not an effluent limitation, nor does it include effluent limitations. Information including examples of a SWPPP can be found at the following http://cfpub.epa.gov/npdes/stormwater/swppp.cfm#model. These examples should be used for educational or training purposes only. Construction site SWPPPs must be developed following the requirements of Missouri's land disturbance permit and describe the specific conditions of the site and plans for development.

PART IV. Additional Information for the Purpose of Permit Clarity

Applicability

- **"Industrial stormwater run-off"** are activities that take place at industrial facilities, such as material handling and storage, that are often exposed to the weather. As runoff from rain or snowmelt comes into contact with these activities, it can pick up pollutants and transport them to a nearby storm sewer system or directly to a river, lake, or coastal water. To

  minimize the impact of stormwater discharges from industrial facilities, the NPDES program includes an industrial stormwater permitting component that covers 10 categories of industrial activity that require authorization under an NPDES industrial stormwater permit for stormwater discharges. More information on industrial permit requirements can be found at http://dnr.mo.gov/env/wpp/stormwater/sw-industrial-permits.htm.

- A **"larger common plan of development or sale"** is a contiguous area where multiple separate and distinct construction activities may be taking place at different times on different schedules under one plan. For example, if a developer buys a 20-acre lot and builds roads, installs pipes, and runs electricity with the intention of constructing homes or other structures sometime in the future, this would be considered a larger common plan of development or sale. If the land is parceled off or sold, and construction occurs on plots that are less than one acre by separate, independent builders, this activity still would be subject to stormwater permitting requirements if the smaller plots were included on the original site plan. Other than the less than one acre property sold to the individual for construction of their personal residence, property of any size which is part of a larger common plan of development where the property has been stabilized and the original permit terminated will require application of a new land disturbance permit for any future land disturbance activity. The larger common plan of development or sale also applies to other types of land development such as industrial parks or well fields. A permit is required if one or more acres of land will be disturbed, regardless of the size of any of the individually-owned or developed sites.

- The **SWPPP** required for permit issuance is a general document written in a manner that can be utilized for any project throughout the governmental jurisdiction as each individual project is planned and designed. Individual projects covered under this permit must have a SWPPP developed specific to the project site prior to any remove of any vegetation or site disturbance. Individual projects must be identified in the quarterly report.

- Documentation of Permit Eligibility Related to **Endangered Species:** The SWPPP must include documentation supporting a determination of permit eligibility with regard to Endangered Species.
  For more information please visit the following links:

  For information on understand what critical habitat is, please go to the following link, www.fs.fed.us/r9/wildlife/tes/docs/esa_references/critical_habitat.pdf.

  For information on listed species by State & County, please go to the following link, http://cfpub.epa.gov/npdes/stormwater/esa.cfm.

  The Missouri Department of Conservation's internet site for the Natural Heritage Review may be very helpful and can be found at the following link, http://mdcgis.mdc.mo.gov/heritage/newheritage/heritage.htm. Also helpful are the local offices of the U.S. Fish and Wildlife Service (FWS) and the National Marine Fisheries Service (NMFS), these centers often maintain lists of federally listed endangered or threatened species on their internet sites.

  If there are listed species in the county or township, check to see if critical habitat has been designated and if that area overlaps or is near the project area. Critical habitat designations and associated requirements may also be found at 50 CFR Parts 17 and 226. For additional information, use the mapview tool at http://criticalhabitat.fws.gov/crithab/ to find data specific to your state and county.

- A Clean Water Act **Section 404 Department of the Army Permit** and the Department's Clean Water Act Section 401 Water Quality Certification (certification) are needed when placing material or fill into jurisdictional waters of the United States. Any impacts to jurisdictional streams or wetlands would require an application to be sent to the appropriate US Army Corps of Engineers District Regulatory Branch. A map of the district offices and contact information can be located online at: http://www.dnr.mo.gov/env/wpp/401/corps-map3.gif). Not all land disturbance projects will require a 404 permit; however, if a 404 permit is required, land disturbance activities are not to be conducted in the jurisdictional area of the project until the 404 permit has been obtained. A discussion on the need for a 404/401 permit as a requirement of this permit and is to be included in the SWPPP.

Exemptions from Permit Requirements

- The USEPA defines **linear projects** to include the construction of roads, bridges, conduits, substructures, pipelines, sewer lines, towers, poles, cables, wires, connectors, switching, regulating and transforming equipment and associated ancillary facilities in a long, narrow area. Missouri regulation 10 CSR 20-6.200 (1)(B) 8 exempts linear project construction from stormwater permit regulations which meet one of the following: A. Grading of existing dirt or gravel roads which does not increase the runoff coefficient and the addition of an impermeable surface over an existing dirt or gravel road; B. Cleaning or routine maintenance of roadside ditches, sewers, waterlines, pipelines, utility lines or similar facilities; C. Trenches two (2) feet in width or less; or D. Emergency repair or replacement of existing facilities as long as best management practices are employed during the emergency repair.

Permit Requirements

- The permit requires that the **"sequence and timing"** of activities for disturbing soils at the site be addressed in the SWPPP. For purposes of this requirement and to allow flexibility for contractors, "sequence and timing" can be replaced with "intended start and completion date" of activities.

- The requirement of a **buffer area** applies only to surface water as defined by the Environmental Protection Agency. The Department does not consider stormwater control features (e.g. stormwater conveyance channels, storm drain inlets, sediment basins) to constitute "surface waters" for the purpose of triggering the buffer area requirement. Areas that the permittee does not own or that are otherwise outside operational control may be considered areas of undisturbed natural buffer for purposes of compliance with this requirement.

- Areas that are no longer being disturbed, **stabilization of the area must be initiated immediately**. For purposes of this permit the following types of activities will constitute the initiation of stabilization:
  a) prepping the soil for vegetative or non-vegetative stabilization;
  b) applying mulch or other non-vegetative product to the exposed area;
  c) seeding or planting the exposed area;
  d) starting any of the activities in # 1 – 3 on a portion of the area to be
  e) stabilized, but not on the entire area; and
  f) finalizing arrangements to have stabilization product fully installed in compliance with the applicable deadline for completing stabilization. This list of examples is not exhaustive.

  The term "immediately" is used to define the deadline for initiating stabilization measures. In the context of this requirement, "immediately" means as soon as practicable, but no later than the end of the next work day, following the day when the earth-disturbing activities have temporarily or permanently ceased.

- The permit requires the submittal of a **quarterly report**. The required quarterly report should be sent to the Department by post mail to P.O. Box 176, Jefferson City MO 65102, and/or by email to wpsc401cert@dnr.mo.gov.

- The permittee is required to conduct inspections of the site. The person(s) inspecting the site may be a staff person or a hired third party to conduct such inspections. The permittee is responsible for ensuring that the person who conducts inspections is a "qualified person or personnel." A **"qualified person"** is a person knowledgeable in the principles and practice of erosion and sediment controls and pollution prevention, who possesses the skills to assess conditions at the construction site that could impact stormwater quality, and the skills to assess the effectiveness of any stormwater controls selected to control the quality of stormwater discharges from the construction activity.

- A sample **inspection report** has been developed as a helpful tool to aid in completing site inspections. This sample inspection report was created consistent with USEPA's Developing Your Stormwater Pollution Prevention Plan and can be found at http://www.epa.gov/npdes/pubs/sw_swppp_inspection_form.doc. Both the guide and the sample inspection report (formatted in Microsoft Word) can be found at http://cfpub.epa.gov/npdes/stormwater/swppp.cfm.

- For common drainage locations that serve an area with 10 or more acres disturbed at one time, a temporary (or permanent) **sediment basin** that provides storage for a calculated volume of runoff from the drainage area from a 2-year, 24-hour storm, or equivalent control measures, must be provided where attainable until final stabilization of the site. Where no such calculation has been performed, a temporary (or permanent) sediment basin providing 3,600 cubic feet of storage per acre drained, or equivalent control measures, must be provided where attainable until final stabilization of the site. When computing the number of acres draining into a common location, it is not necessary to include flows from offsite areas and flows from on-site areas that are either undisturbed or have undergone final stabilization where such flows are diverted around both the disturbed area and the sediment basin. In determining whether installing a sediment basin is attainable, the operator may consider factors such as site soils, slope, available area on-site, etc. In any event, the operator must consider public safety, especially as it relates to children, as a design factor for the sediment basin, and alternative sediment controls must be used where site limitations would preclude a safe design.
- Public Notification: A public notification sign has been added to the permit. If a different sign is to be used it should be one of the same size sign and lettering and containing the same information as that of the one supplied with the permit. The required information includes a statement for those with questions or concerns, the permit number and the Department's toll free phone number. The permittee shall post a copy of the public notification sign described by the Department at the main entrance to the site. An alternate location is acceptable provided the public can see it and it is noted in the SWPPP. The public notification sign must remain posted at the site until the permit has been terminated.

Other Discharges

- Machinery should be kept out of the waterway as much as possible. Fuel, oil and other petroleum products, equipment and any solid waste should not be stored below the ordinary high water mark at any time or in the adjacent floodway beyond normal working hours. All precautions are to be taken to avoid the release of wastes or fuel as a result of this operation. Petroleum products spilled should be immediately cleaned up and disposed of properly. Any such **spills of petroleum or other chemicals** are to be reported as soon as possible to the Department's 24-hour Environmental Emergency Response number at (573) 634-2436.

Sampling Requirements and Other Effluent Limitations

- 40 CFR 450.21 Subpart B - Construction and Development (C&D) Effluent Guidelines are **non-numeric effluent limits** and are structured to require construction operators to first prevent the discharge of sediment and other pollutants through the use of effective planning and erosion control measures; and second, to control discharges that do occur through the use of effective sediment control measures. Permittees are also required to implement a range of pollution prevention measures to limit or prevent discharges of pollutants including those from dry weather discharges. The C&D rule's non-numeric effluent limits are available at the following internet site: http://www.gpo.gov/fdsys/pkg/CFR-2010-title40-vol29/xml/CFR-2010-title40-vol29-sec450-21.xml. The associated fact sheet can be found at: http://www.epa.gov/npdespub/pubs/cgp_proposedfs.pdf.

- The USEPA has proposed numeric **effluent limitation guidelines** (ELGs) to control the discharge of pollutants from construction sites of a certain size. The Department may modify this permit upon finalization of the USEPA effluent limitation guidelines. The proposed Effluent limitation guidelines can be view at the following website http://water.epa.gov/scitech/wastetech/guide/construction/.

Land Purchase and Change of Ownership

- A person having **operational control over only a portion of a larger project** (e.g., one of four homebuilders in a subdivision), is responsible for compliance with all applicable effluent limits, terms, and conditions of the permit as it relates to the activities on that portion of the construction site, including protection of endangered species, critical habitat, and historic properties, and implementation of control measures described in the SWPPP. This person must ensure either directly or through coordination with other permittees, that these activities do not render another party's pollutant discharge controls ineffective. This person must either implement their own portion of a common SWPPP or develop and implement their own SWPPP. For more effective coordination of BMPs and opportunities for cost sharing, a cooperative effort by the different operators at a site to prepare and participate in a comprehensive SWPPP is encouraged. Individual operators at a site may, but are not required to, develop separate SWPPPs that cover only their portion of the project provided referenced is made to other operators at the site. In instances where there is more than one SWPPP for a site, cooperation between the permittees is encouraged to ensure stormwater discharge control measures are consistent with one another (e.g., provisions to protect listed species and critical habitat).

- The Department does not allow the transfer of a land disturbance permit from one owner to another; however, to facilitate the change in the ownership status of a property the Department developed the "Application for Change of Ownership" form. This form will allow the new owner to receive a new permit and number. The form may also be used to terminate the original permit if all the property included in the original permit is no longer the responsibility of the original owner. The "Application for Change of Ownership" (form MO780-2051) can be found online at http://www.dnr.mo.gov/forms/#StormWater.

Termination

- To begin the process of terminating this permit, the permittee should submit Form H – "Request for Termination" (MO780-1409) to the Department. The form can be found at the following web location: http://www.dnr.mo.gov/forms/#StormWater.

PART V. Addendums to Fact Sheet

Addendum #1

Individual Lot Certification

This form is not a requirement of the permit, but may be used by the permittee when selling individual lots that are part of the property that has been authorized by a Missouri Water Pollution Control General Permit under the NPDES for stormwater discharged associated with construction activity. This is a certification between the purchaser and the seller to cooperatively implement the SWPPP and the conditions of the NPDES permit and does not constitute a transfer of the permit. The permittee shall maintain this form on-site, or in a readily available location. The permittee shall provide individual lot certification forms or a copy of the contract for land sale having the equivalent wording to the Missouri Department of Natural Resources.

Addendum #2

Response to Comments

The 30-day public notice period for this permit expired on May 30, 2012. These are the responses to comments received through the public notice comment process.

ADDENDUM #1
INDIVIDUAL LOT CERTIFICATION

For Storm Water Discharges Associated with Construction Activity Authorized by a Missouri Water Pollution Control General Permit under the National Pollutant Discharge Elimination System

TO BE COMPLETED BY THE NEW LOT OWNER

I certify, under penalty of law, that I have received a copy of the general NPDES permit referenced below, which authorized the original lot owner or developer to discharge storm water runoff from construction activities, and the Storm Water Pollution Prevention Plan (SWPPP) prepared by the original lot owner or developer. I have reviewed the terms and conditions of the general permit and the SWPPP. I accept responsibility for erosion and sediment control during construction of the home or building for each of the lot(s) listed below. In the event the Missouri Department of Natural Resources notifies the undersigned of water quality violations due to conditions at any lot listed below and I am unable or unwilling to take action within 30 days to further reduce erosion or control sediment, then I agree to allow the original lot owner or developer to have reasonable access to the site to implement erosion and sediment control measures. I understand this certification is an agreement between the purchaser and seller to cooperatively implement the SWPPP and the conditions of the general NPDES permit.

Facility Name: _____
(as listed on permit)

Permit Number: MOR _____

Lot Number(s): _____

New Owner's Signature: _____

Name (typed or printed): _____

Phone Number: _____

Complete Only if New Owner is a Corporation and not an Individual:

Company Name: _____

Company Address: _____

Company Phone #: _____

TO BE COMPLETED BY THE PERMIT HOLDER

As permittee for the overall tract wherein the above listed lot(s) are located, I certify that I have provided the above named lot purchaser with a copy of the general NPDES permit and the Storm Water Pollution Prevention Plan (SWPPP) for the project, and I have informed the lot purchaser of their responsibility to minimize erosion and control sedimentation. I understand this certification does not constitute a transfer of the permit and understand this certification is an agreement between the purchaser and seller to cooperatively implement the SWPPP and the conditions of the general NPDES permit.

Signature: _____

Name (typed or printed): _____

Phone Number: _____

The permittee shall maintain this form on-site, or in a readily available location. The permittee shall provide individual lot certifications forms or a copy of the contract for land sale having the equivalent wording to the Missouri Department of Natural Resources upon request.

Addendum #2

MOR100 Land Disturbance Permit
Response to Public Notice Comments

(The Missouri Department of Natural Resources' public notice comment period for this permit expired on May, 30, 2012.)

GENERAL COMMENT RESPONSES

STANDARD LAND DISTURBANCE PERMIT - MORA

The Department received comments related to earlier drafts of the Standard Land Disturbance Permit (MORA) and/or comparisons between the MORA and the current draft MOR100 permit. Until there is one land disturbance permit, the two permits will have differences. The Department will as much as possible keep the number of differences at a minimum. There has been no change to the permit as a result of these comments.

FEDERAL REGULATION 40 CFR 450.21

As the NPDES authorized permitting authority, the Department is required to incorporate into the permit the federal regulation 40 CRF 450.21. These are non-numeric effluent limitations reflecting the best practicable technology currently available (BPT). The Department received a few comments regarding these requirements. These requirements will remain stated in the permit as required by the Environmental Protection Agency (EPA). An additional comment was to replace the word "prevent" located throughout the permit with the word "minimize" in order to be consistent with federal regulation. The draft permit's use of the word "minimize" is consistent with the federal regulation. There has been no change to the permit as a result of these comments.

TYPOS/DEFINITIONS/REFERENCES

The Department received comments regarding typos and similar items in the proposed permit. These entries have been corrected in the final permit. The Department received comments suggesting definition and clarification to several areas of the proposed permit. All suggestions were considered and many have been added to the permit Fact Sheet.

SPECIFIC COMMENT RESPONSES

SECTION A. APPLICABILITY

PERMIT ISSUANCE REQUIRMENT - DEVELOPMENT OF SWPPP

Section A.1. - The Department received a comment on the development of a Stormwater Pollution Prevention Plan (SWPPP) prior to the issuance of the permit. The SWPPP required for permit issuance is a general document written in a manner that can be utilized for any project throughout the governmental jurisdiction as each individual project is planned and designed. Project specific plans, maps, etc. as part of the SWPPP must be developed prior to any land disturbance conducted at the site. The Permit Fact Sheet will include more clarity on this section of the permit. Language has been changed to clarify the requirements.

PERMIT LANGUAGE & STORMWATER REGULATION

Section A.1. - The Department received a few comments regarding the applicability of permit coverage when compared to state stormwater regulations. The Department understands the issue of varying language between the draft permit and the state stormwater regulations. The Department is currently reviewing the stormwater regulations for revision. There has been no change to the draft permit as a result of this comment.

PROJECTS COVERED UNDER THIS PERMIT

Section A.1. - The Department received comments that suggested revisions to paragraph five of this section of the draft permit. The Department has revised the draft permit as suggested in order to better clarify this requirement.

OWNER/OPERATOR

Section A.1. - The Department received comments regarding the owner/operator statement and asked for clarification of primary responsibility for compliance with the permit. All parties are responsible. If there are enforcement actions the Department has the authority to involve all parties as necessary and to the extent possible. There has been no change to the permit as a result of this comment.

SECTION C. REQUIREMENTS

STORMWATER VOLUME

Section C.1. - The Department received a comment regarding this section of the draft permit which requires the permittee to minimize soil erosion through control of stormwater volume. As the NPDES authorized permitting authority, the Department is required to incorporate into the permit the federal regulation 40 CFR 450.21. For additional related discussion please refer to the earlier section of this document titled "General Comment Responses". The commenter questions the maximizing of infiltration in order to control stormwater volume at a land disturbance site. There are ways to reduce volume other than infiltration. The regulation and the permit do not prescribe one BPT over another. The language and goal of these provisions are to reduce

erosion. For example, one way to minimize the stormwater volume at a site is to reduce or eliminate run on to the site from up-hill off-site sources. This effectively reduces the volume of stormwater to be managed on-site. Another example is to reduce volume at individual outlet structures by having multiple outlet structures. This effectively reduces the volume at each individual outlet structure. By managing/directing the flow of runoff at the site you can also reduce the volume of water at individual outlet points. There has been no change to the draft permit as a result of this comment.

QUARTERLY REPORT

Section C.4., - The Department received comments regarding the quarterly report. To accommodate the complexity and number of outfalls associated with transportation projects language was changed to simplify reporting requirements. Instead of identifying each individual outfall, reports can simply refer to the receiving water.

ACCESSIBILITY OF THE SWPPP

Section C.5. The Department received a comment regarding onsite accessibility of the SWPPP. The permit will be revised to include additional wording regarding the SWPPP availability for inspections.

RECEIVING STREAMS & OUTFALL INFORMATION

Section C.5.a., and C.6.e. – The Department received comments concerning the use of outfall as the primary reference point. Often projects have a multitude of outfalls, particularly projects related to road construction. In these cases most outfalls have very similar BMPs, so listing individual outfalls is often not necessary. It was suggested that the Department add the word "primary" when naming the receiving streams in the SWPPP and remove the outfall information from the SWPPP requirement. Language in the permit was changed to simplify the requirements.

SEQUENCING & TIMING

Section C.6.a.2. - The Department received a couple of comments regarding the requirement found in this section of the draft permit. There has been no change as a result of this comment; however the Department will add clarification in the Permit Fact Sheet that "sequencing and timing" can also mean start and completion dates of intended activities.

BUFFER AREA

Section C.6.e. – The Department received a request to define "infeasible" when requiring the construction of a buffer area. The commenter referred to EPA's Construct General Permit (CGP) as guidance. EPA's permit defines what is not considered "surface water" and therefore would not require a buffer area. If a buffer area is infeasible, EPA's permit requires the implementation of other sediment controls which must achieved the same sediment load reduction as a buffer area would have. The Department will add a similar note to the Permit Fact Sheet regarding what is not "surface water". There has been no change to the permit as a result of these comments.

DISTURBED AREAS

Section C.6.h. – The Department received a comment to remove the word "immediately" from the requirement to initiate temporary and final stabilization of disturbed areas. This requirement is part the federal regulation which are non-numeric effluent limitations reflecting the best practicable technology currently available (BPT). As the NPDES authorized permitting authority, the Department is required to incorporate into the permit the federal regulation 40 CFR 450.21. For additional related discussion please refer to the earlier section of this document titled "General Comment Responses". The Department also received a suggestion to include guidance as to what constitutes "initiation" of stabilization. The Department will include in the Permit Fact Sheet information similar to EPA's regarding the context of this provision. There has been no change to the draft permit as a result of this comment.

GOOD ENGINEERING PRACTICES

Section C.6.j. – The Department received a comment to reword this section of the draft permit to include "... similar effective BMPs shall be based on good engineering practices." The Department will revise the permit accordingly.

ROADWAYS & CURB INLETS

Section C.6.m. - The Department received a couple of comments regarding this section and has made a revision to the draft permit but did not include the additional language regarding the cleaning of inlet protection devices.

RESPONSBLE PERSON

Section C.12. – The department received a comment noting an incorrect reference; and the language was changed to point correctly to the requirements of paragraph 13.

SITE INSPECTION REPORTS

Section C.13. - It was suggested that the Department consider revising this section of the draft permit to include an inspection requirement following a rainfall event of 0.25 inches or greater. The Department currently requires an inspection of BMPs anytime rainfall causes stormwater runoff to occur onsite. Further discussion and review of any proposal to change this requirement will be needed before considering a change to permit. There has been no change to the permit as a result of this comment.

Section C.13. - The Department received a couple of comments regarding site inspection reports kept on site. The Department will include a similar option in the permit, just as EPA has with the GCP that all site inspection reports can be kept at the site or at an easily accessible location so that it can be made available at the time of an onsite inspection or upon request by the Department.

Section C.13. – The Department received a comment suggesting that language be changed so that inspections are only required to occur during a project's normal hours, so that inspections can occur on the next business day following a long holiday weekend. The language was changed to reflect this suggestion.

SECTION E. SAMPLING REQUIREMENTS AND EFFLUENT LIMITATIONS

Section E. - The Department received a couple of comments suggesting language to better clarify wording in Section E., 1 of the draft permit. The Department has revised the draft permit for better clarity.

SECTION F. RECORDS

Section F.3. – The Department received a comment requesting that the word "provide" be replaced with the word "ensure" in this section of the permit. The Department has made this change to the permit.

DEPARTMENT OF THE ARMY
CORPS OF ENGINEERS, KANSAS CITY DISTRICT
MISSOURI STATE REGULATORY OFFICE
515 EAST HIGH STREET, #202
JEFFERSON CITY, MISSOURI 65101

July 20, 2016

Missouri State Regulatory Office
(NWK-2016-01039)
(Cole County, MO NWP14)

Eric Landwehr
Cole County Public Works
5055 Monticello Road
Jefferson City, MO 65109

Dear Mr. Landwehr:

This letter pertains to an application received on July 12, 2016, submitted by your agent, Bartlett & West, for a Department of the Army (DA) permit. The proposed work concerns the replacement of an existing bridge with a new 79-foot single span bridge. Additionally, 92 linear feet of rock rip rap will be placed along both streambanks for the purpose of bridge protection/bank stabilization. The project is located in Rising Creek, along Liberty Road in Section 30, Township 44 North, Range 10 West, Cole County, Missouri.

Based upon a review of the information furnished, we have made a preliminary jurisdictional determination that Rising Creek is a jurisdictional water of the United States. Therefore, the placement of dredged or fill material below the ordinary high water elevation, as proposed by your project requires permit authorization from this office. The Corps of Engineers has jurisdiction over all waters of the United States. Discharges of dredged or fill material in waters of the United States, including wetlands, require prior authorization from the Corps under Section 404 of the Clean Water Act (33 USC 1344). The implementing regulations for these Acts are found at 33 CFR 320-332.

We have reviewed the information furnished and have determined that your project is authorized by nationwide permit **(NWP) 14, Linear Transportation Projects,** provided you ensure that the conditions listed in the enclosed copy of excerpts from the February 21, 2012 Federal Register, Issuance of Nationwide Permits, are met. You must also comply with the Kansas City District Regional NWP Conditions posted at:
http://www.nwk.usace.army.mil/Missions/RegulatoryBranch/NationWidePermits.aspx

The Missouri Department of Natural Resources has certified that this NWP will not violate existing state water quality standards provided you comply with the conditions included in their attached certification document. All conditions included in the water quality certification become conditions of the NWP authorization. Please review all conditions associated with this NWP. If you have any questions concerning state water quality standards or compliance issues with the associated certification conditions, please contact the Missouri Department of Natural Resources, Water Protection Program, P.O. Box 176, Jefferson City, Missouri 65102-0176. You may also contact the office at 573-526-3589 or by email at wpsc401cert@dnr.mo.gov.

General condition 30 requires you to sign and submit the enclosed "Compliance Certification" upon completion of the authorized work and any required mitigation.

This NWP verification is valid until March 18, 2017, which is the expiration date for this NWP. Should your project plans change, or if your activity is not complete by March 18, 2017, you must contact this office in writing for another permit determination. We will issue a public notice when the NWPs are reissued. Furthermore, if you commence or are under contract to commence the authorized activity before March 18, 2017, you will have twelve (12) months from that date to complete the activity under the present terms and conditions of this NWP. If you need more than one additional year to complete the authorized activity, or if work has not commenced and is not under contract to commence, you will need to get a new verification under the 2017 NWPs or have the remaining work authorized by another type of DA Permit.

Although an individual DA permit is not required, other Federal, state and/or local permits may be required. You should verify this yourself.

We are interested in your thoughts and opinions concerning your experience with the Kansas City District, Corps of Engineers Regulatory Program. Please feel free to complete our Customer Service Survey form on our website at: http://corpsmapu.usace.army.mil/cm_apex/f?p=regulatory_survey. You may also call and request a paper copy of the survey which you may complete and return to us by mail.

James Reenan, Regulatory Specialist, reviewed the information furnished and made this determination. If you have any questions concerning this matter, please feel free to contact Mr. Reenan at (816) 389-3832, or by email, james.s.reenan@usace.army.mil. Please reference Permit No. NWK-2016-01039 in all comments and/or inquiries relating to this project.

Copies Furnished (electronically w/o enclosures):

Environmental Protection Agency
Missouri Department of Natural Resources
Missouri Department of Conservation
U.S. Fish & Wildlife Service

COMPLIANCE CERTIFICATION

General condition 30 of this Nationwide Permit requires that you submit a signed certification regarding the completed work and any required mitigation. This certification page satisfies this condition if it is provided to the Kansas City District at the address shown at the bottom of this page upon completion of the project.

APPLICATION NUMBER: NWK-2016-01039

APPLICANT: Eric Landwehr
Cole County Public Works
5055 Monticello Road
Jefferson City, MO 65109

PROJECT LOCATION: The project is located in Rising Creek, along Liberty Road in Section 30, Township 44 North, Range 10 West, Cole County, Missouri.

Latitude: 38.528714 – Longitude: -92.06640

a. I certify that the authorized work was done in accordance with the Corps authorization, including any general or specific conditions.

b. I certify that any required mitigation was completed in accordance with the permit conditions.

c. Your signature below, as permittee, indicates that you have completed the authorized project as certified in paragraphs a and b above.

_____ _____

(PERMITTEE) (DATE)

Return this certification to:

U.S. Army Corps of Engineers
Missouri State Regulatory Office
515 East High Street, Suite 202
Jefferson City, Missouri 65101-3261

Excerpts from the February 21, 2012 Federal Register
Nationwide Permit General Conditions

1. Navigation.

(a) No activity may cause more than a minimal adverse effect on navigation.

(b) Any safety lights and signals prescribed by the U.S. Coast Guard, through regulations or otherwise, must be installed and maintained at the permittee's expense on authorized facilities in navigable waters of the United States.

(c) The permittee understands and agrees that, if future operations by the United States require the removal, relocation, or other alteration, of the structure or work herein authorized, or if, in the opinion of the Secretary of the Army or his authorized representative, said structure or work shall cause unreasonable obstruction to the free navigation of the navigable waters, the permittee will be required, upon due notice from the Corps of Engineers, to remove, relocate, or alter the structural work or obstructions caused thereby, without expense to the United States. No claim shall be made against the United States on account of any such removal or alteration.

2. Aquatic Life Movements. No activity may substantially disrupt the necessary life cycle movements of those species of aquatic life indigenous to the waterbody, including those species that normally migrate through the area, unless the activity's primary purpose is to impound water. All permanent and temporary crossings of waterbodies shall be suitably culverted, bridged, or otherwise designed and constructed to maintain low flows to sustain the movement of those aquatic species.

3. Spawning Areas. Activities in spawning areas during spawning seasons must be avoided to the maximum extent practicable. Activities that result in the physical destruction (e.g., through excavation, fill, or downstream smothering by substantial turbidity) of an important spawning area are not authorized.

4. Migratory Bird Breeding Areas. Activities in waters of the United States that serve as breeding areas for migratory birds must be avoided to the maximum extent practicable.

5. Shellfish Beds. No activity may occur in areas of concentrated shellfish populations, unless the activity is directly related to a shellfish harvesting activity authorized by NWPs 4 and 48, or is a shellfish seeding or habitat restoration activity authorized by NWP 27.

6. Suitable Material. No activity may use unsuitable material (e.g., trash, debris, car bodies, asphalt, etc.). Material used for construction or discharged must be free from toxic pollutants in toxic amounts (see Section 307 of the Clean Water Act).

7. Water Supply Intakes. No activity may occur in the proximity of a public water supply intake, except where the activity is for the repair or improvement of public water supply intake structures or adjacent bank stabilization.

8. Adverse Effects From Impoundments. If the activity creates an impoundment of water, adverse effects to the aquatic system due to accelerating the passage of water, and/or restricting its flow must be minimized to the maximum extent practicable.

9. Management of Water Flows. To the maximum extent practicable, the pre-construction course, condition, capacity, and location of open waters must be maintained for each activity, including stream channelization and storm water management activities, except as provided below. The activity must be constructed to withstand expected high flows. The activity must not restrict or impede the passage of normal or high flows, unless the primary purpose of the activity is to impound water or manage high flows. The activity may alter the pre-construction course, condition, capacity, and location of open waters if it benefits the aquatic environment (e.g., stream restoration or relocation activities).

10. Fills Within 100-Year Floodplains. The activity must comply with applicable FEMA-approved state or local floodplain management requirements.

11. Equipment. Heavy equipment working in wetlands or mudflats must be placed on mats, or other measures must be taken to minimize soil disturbance.

12. Soil Erosion and Sediment Controls. Appropriate soil erosion and sediment controls must be used and maintained in effective operating condition during construction, and all exposed soil and other fills, as well as any work below the ordinary high water mark or high tide line, must be permanently stabilized at the earliest practicable date. Permittees are encouraged to perform work within waters of the United States during periods of low-flow or no-flow.

13. Removal of Temporary Fills. Temporary fills must be removed in their entirety and the affected areas returned to pre-construction elevations. The affected areas must be revegetated, as appropriate.

14. Proper Maintenance. Any authorized structure or fill shall be properly maintained, including maintenance to ensure public safety and compliance with applicable NWP general conditions, as well as any activity-specific conditions added by the district engineer to an NWP authorization.

15. Single and Complete Project. The activity must be a single and complete project. The same NWP cannot be used more than once for the same single and complete project.

16. Wild and Scenic Rivers. No activity may occur in a component of the National Wild and Scenic River System, or in a river officially designated by Congress as a "study river" for possible inclusion in the system while the river is in an official study status, unless the appropriate Federal agency with direct management responsibility for such river, has determined in writing that the proposed activity will not adversely affect the Wild and Scenic River designation or study status. Information on Wild and Scenic Rivers may be obtained from the appropriate Federal land management agency responsible for the designated Wild and Scenic River or study river (e.g., National Park Service, U.S. Forest Service, Bureau of Land Management, U.S. Fish and Wildlife Service).

17. Tribal Rights. No activity or its operation may impair reserved tribal rights, including, but not limited to, reserved water rights and treaty fishing and hunting rights.

18. Endangered Species. (a) No activity is authorized under any NWP which is likely to directly or indirectly jeopardize the continued existence of a threatened or endangered species or a species proposed for such designation, as identified under the Federal Endangered Species Act (ESA), or which will directly or indirectly destroy or adversely modify the critical habitat of such species. No activity is authorized under any NWP which "may affect" a listed species or critical habitat, unless Section 7 consultation addressing the effects of the proposed activity has been completed.

(b) Federal agencies should follow their own procedures for complying with the requirements of the ESA. Federal permittees must provide the district engineer with the appropriate documentation to demonstrate compliance with those requirements. The district engineer will review the documentation and determine whether it is sufficient to address ESA compliance for the NWP activity, or whether additional ESA consultation is necessary.

(c) Non-federal permittees must submit a pre-construction notification to the district engineer if any listed species or designated critical habitat might be affected or is in the vicinity of the project, or if the project is located in designated critical habitat, and shall not begin work on the activity until notified by the district engineer that the requirements of the ESA have been satisfied and that the activity is authorized. For activities that might affect Federally-listed endangered or threatened species or designated critical habitat, the pre-construction notification must include the name(s) of the endangered or threatened species that might be affected by the proposed work or that utilize the designated critical habitat that might be affected by the proposed work. The district engineer will determine whether the proposed activity "may affect" or will have "no effect" to listed species and designated critical habitat and will notify the non-Federal applicant of the Corps' determination within 45 days of receipt of a complete pre-construction notification. In cases where the non-Federal applicant has identified listed species or critical habitat that might be affected or is in the vicinity of the project, and has so notified the Corps, the applicant shall not begin work until the Corps has provided notification the proposed activities will have "no effect" on listed species or critical habitat, or until Section 7 consultation has been completed. If the non-Federal applicant has not heard back from the Corps within 45 days, the applicant must still wait for notification from the Corps.

(d) As a result of formal or informal consultation with the FWS or NMFS the district engineer may add species-specific regional endangered species conditions to the NWPs.

(e) Authorization of an activity by a NWP does not authorize the "take" of a threatened or endangered species as defined under the ESA. In the absence of separate authorization (e.g., an ESA Section 10 Permit, a Biological Opinion with "incidental take" provisions, etc.) from the U.S. FWS or the NMFS, The Endangered Species Act prohibits any person subject to the jurisdiction of the United States to take a listed species, where "take" means to harass, harm, pursue, hunt, shoot, wound, kill, trap, capture, or collect, or to attempt to engage in any such conduct. The word "harm" in the definition of "take" means an act which actually kills or injures wildlife. Such an act may include significant habitat modification or degradation where it actually kills or injures wildlife by significantly impairing essential behavioral patterns, including breeding, feeding or sheltering.

(f) Information on the location of threatened and endangered species and their critical habitat can be obtained directly from the offices of the U.S. FWS and NMFS or their world wide web pages at http://www.fws.gov/ or http://www.fws.gov/ipac and http://www.noaa.gov/fisheries.html respectively.

19. Migratory Birds and Bald and Golden Eagles. The permittee is responsible for obtaining any "take" permits required under the U.S. Fish and Wildlife Service's regulations governing compliance with the Migratory Bird Treaty Act or the Bald and Golden Eagle Protection Act. The permittee should contact the appropriate local office of the U.S. Fish and Wildlife Service to determine if such "take" permits are required for a particular activity.

20. Historic Properties. (a) In cases where the district engineer determines that the activity may affect properties listed, or eligible for listing, in the National Register of Historic Places, the activity is not authorized, until the requirements of Section 106 of the National Historic Preservation Act (NHPA) have been satisfied.

(b) Federal permittees should follow their own procedures for complying with the requirements of Section 106 of the National Historic Preservation Act. Federal permittees must provide the district engineer with the appropriate documentation to demonstrate compliance with those requirements. The district engineer will review the documentation and determine whether it is sufficient to address section 106 compliance for the NWP activity, or whether additional section 106 consultation is necessary.

(c) Non-federal permittees must submit a pre-construction notification to the district engineer if the authorized activity may have the potential to cause effects to any historic properties listed on, determined to be eligible for listing on, or potentially eligible for listing on the National Register of Historic Places, including previously unidentified properties. For such activities, the pre-construction notification must state which historic properties may be affected by the proposed work or include a vicinity map indicating the location of the historic properties or the potential for the presence of historic properties. Assistance regarding information on the location of or potential for the presence of historic resources can be sought from the State Historic Preservation Officer or Tribal Historic Preservation Officer, as appropriate, and the National Register of Historic Places (see 33 CFR 330.4(g)). When reviewing pre-construction notifications, district engineers will comply with the current procedures for addressing the requirements of Section 106 of the National Historic Preservation Act. The district engineer shall make a reasonable and good faith effort to carry out appropriate identification efforts, which may include background research, consultation, oral history interviews, sample field investigation, and field survey. Based on the information submitted and these efforts, the district engineer shall determine whether the proposed activity has the potential to cause an effect on the historic properties. Where the non-Federal applicant has identified historic properties on which the activity may have the potential to cause effects and so notified the Corps, the non-Federal applicant shall not begin the activity until notified by the district engineer either that the activity has no potential to cause effects or that consultation under Section 106 of the NHPA has been completed.

(d) The district engineer will notify the prospective permittee within 45 days of receipt of a complete pre-construction notification whether NHPA Section 106 consultation is required. Section 106 consultation is not required when the Corps determines that the activity does not have the potential to cause effects on historic properties (see 36 CFR §800.3(a)). If NHPA section 106 consultation is required and will occur, the district engineer will notify the non-Federal applicant that he or she cannot begin work until Section 106 consultation is completed. If the non-Federal applicant has not heard back from the Corps within 45 days, the applicant must still wait for notification from the Corps.

(e) Prospective permittees should be aware that section 110k of the NHPA (16 U.S.C. 470h-2(k)) prevents the Corps from granting a permit or other assistance to an applicant who, with intent to avoid the requirements of Section 106 of the NHPA, has intentionally significantly adversely affected a historic property to which the permit would relate, or having legal power to prevent it, allowed such significant adverse effect to occur, unless the Corps, after consultation with the Advisory Council on Historic Preservation (ACHP), determines that circumstances justify granting such assistance despite the adverse effect created or permitted by the applicant. If circumstances justify granting the assistance, the Corps is required to notify the ACHP and provide documentation specifying the circumstances, the degree of damage to the integrity of any historic properties affected, and proposed mitigation. This documentation must include any views obtained from the applicant, SHPO/THPO, appropriate Indian tribes if the undertaking occurs on or affects historic properties on tribal lands or affects properties of interest to those tribes, and other parties known to have a legitimate interest in the impacts to the permitted activity on historic properties.

21. Discovery of Previously Unknown Remains and Artifacts. If you discover any previously unknown historic, cultural or archeological remains and artifacts while accomplishing the activity authorized by this permit, you must immediately notify the district engineer of what you have found, and to the maximum extent practicable, avoid construction activities that may affect the remains and artifacts until the required coordination has been completed. The district engineer will initiate the Federal, Tribal and state coordination required to determine if the items or remains warrant a recovery effort or if the site is eligible for listing in the National Register of Historic Places.

22. Designated Critical Resource Waters. Critical resource waters include, NOAA-managed marine sanctuaries and marine monuments, and National Estuarine Research Reserves. The district engineer may designate, after notice and opportunity for public comment, additional waters officially designated by a state as having particular environmental or ecological significance, such as outstanding national resource waters or state natural heritage sites. The district engineer may also designate additional critical resource waters after notice and opportunity for public comment.

(a) Discharges of dredged or fill material into waters of the United States are not authorized by NWPs 7, 12, 14, 16, 17, 21, 29, 31, 35, 39, 40, 42, 43, 44, 49, 50, 51, and 52 for any activity within, or directly affecting, critical resource waters, including wetlands adjacent to such waters.

(b) For NWPs 3, 8, 10, 13, 15, 18, 19, 22, 23, 25, 27, 28, 30, 33, 34, 36, 37, and 38, notification is required in accordance with general condition 31, for any activity proposed in the designated critical resource waters including wetlands adjacent to those waters. The district engineer may authorize activities under these NWPs only after it is determined that the impacts to the critical resource waters will be no more than minimal.

23. Mitigation. The district engineer will consider the following factors when determining appropriate and practicable mitigation necessary to ensure that adverse effects on the aquatic environment are minimal:

(a) The activity must be designed and constructed to avoid and minimize adverse effects, both temporary and permanent, to waters of the United States to the maximum extent practicable at the project site (i.e., on site).

(b) Mitigation in all its forms (avoiding, minimizing, rectifying, reducing, or compensating for resource losses) will be required to the extent necessary to ensure that the adverse effects to the aquatic environment are minimal.

(c) Compensatory mitigation at a minimum one-for-one ratio will be required for all wetland losses that exceed 1/10-acre and require pre-construction notification, unless the district engineer determines in writing that either some other form of mitigation would be more environmentally appropriate or the adverse effects of the proposed activity are minimal, and provides a project-specific waiver of this requirement. For wetland losses of 1/10-acre or less that require pre-construction notification, the district engineer may determine on a case-by-case basis that compensatory mitigation is required to ensure that the activity results in minimal adverse effects on the aquatic environment. Compensatory mitigation projects provided to offset losses of aquatic resources must comply with the applicable provisions of 33 CFR part 332.

(1) The prospective permittee is responsible for proposing an appropriate compensatory mitigation option if compensatory mitigation is necessary to ensure that the activity results in minimal adverse effects on the aquatic environment.

(2) Since the likelihood of success is greater and the impacts to potentially valuable uplands are reduced, wetland restoration should be the first compensatory mitigation option considered.

(3) If permittee-responsible mitigation is the proposed option, the prospective permittee is responsible for submitting a mitigation plan. A conceptual or detailed mitigation plan may be used by the district engineer to make the decision on the NWP verification request, but a final mitigation plan that addresses the applicable requirements of 33 CFR 332.4(c)(2) – (14) must be approved by the district engineer before the permittee begins work in waters of the United States, unless the district engineer determines that prior approval of the final mitigation plan is not practicable or not necessary to ensure timely completion of the required compensatory mitigation (see 33 CFR 332.3(k)(3)).

(4) If mitigation bank or in-lieu fee program credits are the proposed option, the mitigation plan only needs to address the baseline conditions at the impact site and the number of credits to be provided.

(5) Compensatory mitigation requirements (e.g., resource type and amount to be provided as compensatory mitigation, site protection, ecological performance standards, monitoring requirements) may be addressed through conditions added to the NWP authorization, instead of components of a compensatory mitigation plan.

(d) For losses of streams or other open waters that require pre-construction notification, the district engineer may require compensatory mitigation, such as stream rehabilitation, enhancement, or preservation, to ensure that the activity results in minimal adverse effects on the aquatic environment.

(e) Compensatory mitigation will not be used to increase the acreage losses allowed by the acreage limits of the NWPs. For example, if an NWP has an acreage limit of 1/2-acre, it cannot be used to authorize any project resulting in the loss of greater than 1/2-acre of waters of the United States, even if compensatory mitigation is provided that replaces or restores some of the lost waters. However, compensatory mitigation can and should be used, as necessary, to

zone management consistency concurrence must be obtained, or a presumption of concurrence must occur (see 33 CFR 330.4(d)). The district engineer or a State may require additional measures to ensure that the authorized activity is consistent with state coastal zone management requirements.

27. Regional and Case-By-Case Conditions. The activity must comply with any regional conditions that may have been added by the Division Engineer (see 33 CFR 330.4(e)) and with any case specific conditions added by the Corps or by the state, Indian Tribe, or U.S. EPA in its section 401 Water Quality Certification, or by the state in its Coastal Zone Management Act consistency determination.

28. Use of Multiple Nationwide Permits. The use of more than one NWP for a single and complete project is prohibited, except when the acreage loss of waters of the United States authorized by the NWPs does not exceed the acreage limit of the NWP with the highest specified acreage limit. For example, if a road crossing over tidal waters is constructed under NWP 14, with associated bank stabilization authorized by NWP 13, the maximum acreage loss of waters of the United States for the total project cannot exceed 1/3-acre.

29. Transfer of Nationwide Permit Verifications. If the permittee sells the property associated with a nationwide permit verification, the permittee may transfer the nationwide permit verification to the new owner by submitting a letter to the appropriate Corps district office to validate the transfer. A copy of the nationwide permit verification must be attached to the letter, and the letter must contain the following statement and signature:

"When the structures or work authorized by this nationwide permit are still in existence at the time the property is transferred, the terms and conditions of this nationwide permit, including any special conditions, will continue to be binding on the new owner(s) of the property. To validate the transfer of this nationwide permit and the associated liabilities associated with compliance with its terms and conditions, have the transferee sign and date below."

_____

(Transferee)

_____

(Date)

30. Compliance Certification. Each permittee who receives an NWP verification letter from the Corps must provide a signed certification documenting completion of the authorized activity and any required compensatory mitigation. The success of any required permittee-responsible mitigation, including the achievement of ecological performance standards, will be addressed separately by the district engineer. The Corps will provide the permittee the certification document with the NWP verification letter. The certification document will include:

(a) A statement that the authorized work was done in accordance with the NWP authorization, including any general, regional, or activity-specific conditions;

(b) A statement that the implementation of any required compensatory mitigation was completed in accordance with the permit conditions. If credits from a mitigation bank or in-lieu fee program are used to satisfy the compensatory mitigation requirements, the certification must include the documentation required by 33 CFR 332.3(l)(3) to confirm that the permittee secured the appropriate number and resource type of credits; and

(c) The signature of the permittee certifying the completion of the work and mitigation.

31. Pre-Construction Notification. (a) Timing. Where required by the terms of the NWP, the prospective permittee must notify the district engineer by submitting a pre-construction notification (PCN) as early as possible. The district engineer must determine if the PCN is complete within 30 calendar days of the date of receipt and, if the PCN is determined to be incomplete, notify the prospective permittee within that 30 day period to request the additional information necessary to make the PCN complete. The request must specify the information needed to make the PCN complete. As a general rule, district engineers will request additional information necessary to make the PCN complete only once. However, if the prospective permittee does not provide all of the requested information, then the district engineer will notify the prospective permittee that the PCN is still incomplete and the PCN review process will not commence until all of the requested information has been received by the district engineer. The prospective permittee shall not begin the activity until either:

(1) He or she is notified in writing by the district engineer that the activity may proceed under the NWP with any special conditions imposed by the district or division engineer; or

(2) 45 calendar days have passed from the district engineer's receipt of the complete PCN and the prospective permittee has not received written notice from the district or division engineer. However, if the permittee was required to notify the Corps pursuant to general condition 18 that listed species or critical habitat might be affected or in the vicinity of the project, or to notify the Corps pursuant to general condition 20 that the activity may have the potential to cause effects to historic properties, the permittee cannot begin the activity until receiving written notification from the Corps that there is "no effect" on listed species or "no potential to cause effects" on historic properties, or that any consultation required under Section 7 of the Endangered Species Act (see 33 CFR 330.4(f)) and/or Section 106 of the National Historic Preservation (see 33 CFR 330.4(g)) has been completed. Also, work cannot begin under NWPs 21, 49, or 50 until the permittee has received written approval from the Corps. If the proposed activity requires a written waiver to exceed specified limits of an NWP, the permittee may not begin the activity until the district engineer issues the waiver. If the district or division engineer notifies the permittee in writing that an individual permit is required within 45 calendar days of receipt of a complete PCN, the permittee cannot begin the activity until an individual permit has been obtained. Subsequently, the permittee's right to proceed under the NWP may be modified, suspended, or revoked only in accordance with the procedure set forth in 33 CFR 330.5(d)(2).

(b) Contents of Pre-Construction Notification: The PCN must be in writing and include the following information:

(1) Name, address and telephone numbers of the prospective permittee;

(2) Location of the proposed project;

(3) A description of the proposed project; the project's purpose; direct and indirect adverse environmental effects the project would cause, including the anticipated amount of loss of water of the United States expected to result from the NWP activity, in acres, linear feet, or

other appropriate unit of measure; any other NWP(s), regional general permit(s), or individual permit(s) used or intended to be used to authorize any part of the proposed project or any related activity. The description should be sufficiently detailed to allow the district engineer to determine that the adverse effects of the project will be minimal and to determine the need for compensatory mitigation. Sketches should be provided when necessary to show that the activity complies with the terms of the NWP. (Sketches usually clarify the project and when provided results in a quicker decision. Sketches should contain sufficient detail to provide an illustrative description of the proposed activity (e.g., a conceptual plan), but do not need to be detailed engineering plans);

(4) The PCN must include a delineation of wetlands, other special aquatic sites, and other waters, such as lakes and ponds, and perennial, intermittent, and ephemeral streams, on the project site. Wetland delineations must be prepared in accordance with the current method required by the Corps. The permittee may ask the Corps to delineate the special aquatic sites and other waters on the project site, but there may be a delay if the Corps does the delineation, especially if the project site is large or contains many waters of the United States. Furthermore, the 45 day period will not start until the delineation has been submitted to or completed by the Corps, as appropriate;

(5) If the proposed activity will result in the loss of greater than 1/10-acre of wetlands and a PCN is required, the prospective permittee must submit a statement describing how the mitigation requirement will be satisfied, or explaining why the adverse effects are minimal and why compensatory mitigation should not be required. As an alternative, the prospective permittee may submit a conceptual or detailed mitigation plan.

(6) If any listed species or designated critical habitat might be affected or is in the vicinity of the project, or if the project is located in designated critical habitat, for non-Federal applicants the PCN must include the name(s) of those endangered or threatened species that might be affected by the proposed work or utilize the designated critical habitat that may be affected by the proposed work. Federal applicants must provide documentation demonstrating compliance with the Endangered Species Act; and

(7) For an activity that may affect a historic property listed on, determined to be eligible for listing on, or potentially eligible for listing on, the National Register of Historic Places, for non-Federal applicants the PCN must state which historic property may be affected by the proposed work or include a vicinity map indicating the location of the historic property. Federal applicants must provide documentation demonstrating compliance with Section 106 of the National Historic Preservation Act.

(c) Form of Pre-Construction Notification: The standard individual permit application form (Form ENG 4345) may be used, but the completed application form must clearly indicate that it is a PCN and must include all of the information required in paragraphs (b)(1) through (7) of this general condition. A letter containing the required information may also be used.

(d) Agency Coordination: (1) The district engineer will consider any comments from Federal and state agencies concerning the proposed activity's compliance with the terms and conditions of the NWPs and the need for mitigation to reduce the project's adverse environmental effects to a minimal level.

(2) For all NWP activities that require pre-construction notification and result in the loss of greater than 1/2-acre of waters of the United States, for NWP 21, 29, 39, 40, 42, 43, 44, 50, 51, and 52 activities that require pre-construction notification and will result in the loss of greater than 300 linear feet of intermittent and ephemeral stream bed, and for all NWP 48 activities that

require pre-construction notification, the district engineer will immediately provide (e.g., via e-mail, facsimile transmission, overnight mail, or other expeditious manner) a copy of the complete PCN to the appropriate Federal or state offices (U.S. FWS, state natural resource or water quality agency, EPA, State Historic Preservation Officer (SHPO) or Tribal Historic Preservation Office (THPO), and, if appropriate, the NMFS). With the exception of NWP 37, these agencies will have 10 calendar days from the date the material is transmitted to telephone or fax the district engineer notice that they intend to provide substantive, site-specific comments. The comments must explain why the agency believes the adverse effects will be more than minimal. If so contacted by an agency, the district engineer will wait an additional 15 calendar days before making a decision on the pre-construction notification. The district engineer will fully consider agency comments received within the specified time frame concerning the proposed activity's compliance with the terms and conditions of the NWPs, including the need for mitigation to ensure the net adverse environmental effects to the aquatic environment of the proposed activity are minimal. The district engineer will provide no response to the resource agency, except as provided below. The district engineer will indicate in the administrative record associated with each pre-construction notification that the resource agencies' concerns were considered. For NWP 37, the emergency watershed protection and rehabilitation activity may proceed immediately in cases where there is an unacceptable hazard to life or a significant loss of property or economic hardship will occur. The district engineer will consider any comments received to decide whether the NWP 37 authorization should be modified, suspended, or revoked in accordance with the procedures at 33 CFR 330.5.

(3) In cases of where the prospective permittee is not a Federal agency, the district engineer will provide a response to NMFS within 30 calendar days of receipt of any Essential Fish Habitat conservation recommendations, as required by Section 305(b)(4)(B) of the Magnuson-Stevens Fishery Conservation and Management Act.

(4) Applicants are encouraged to provide the Corps with either electronic files or multiple copies of pre-construction notifications to expedite agency coordination.

D. District Engineer's Decision

1. In reviewing the PCN for the proposed activity, the district engineer will determine whether the activity authorized by the NWP will result in more than minimal individual or cumulative adverse environmental effects or may be contrary to the public interest. For a linear project, this determination will include an evaluation of the individual crossings to determine whether they individually satisfy the terms and conditions of the NWP(s), as well as the cumulative effects caused by all of the crossings authorized by NWP. If an applicant requests a waiver of the 300 linear foot limit on impacts to intermittent or ephemeral streams or of an otherwise applicable limit, as provided for in NWPs 13, 21, 29, 36, 39, 40, 42, 43, 44, 50, 51 or 52, the district engineer will only grant the waiver upon a written determination that the NWP activity will result in minimal adverse effects. When making minimal effects determinations the district engineer will consider the direct and indirect effects caused by the NWP activity. The district engineer will also consider site specific factors, such as the environmental setting in the vicinity of the NWP activity, the type of resource that will be affected by the NWP activity, the functions provided by the aquatic resources that will be affected by the NWP activity, the degree or magnitude to which the aquatic resources perform those functions, the extent that aquatic resource functions will be lost as a result of the NWP activity (e.g., partial or complete loss), the

duration of the adverse effects (temporary or permanent), the importance of the aquatic resource functions to the region (e.g., watershed or ecoregion), and mitigation required by the district engineer. If an appropriate functional assessment method is available and practicable to use, that assessment method may be used by the district engineer to assist in the minimal adverse effects determination. The district engineer may add case-specific special conditions to the NWP authorization to address site-specific environmental concerns.

2. If the proposed activity requires a PCN and will result in a loss of greater than 1/10-acre of wetlands, the prospective permittee should submit a mitigation proposal with the PCN. Applicants may also propose compensatory mitigation for projects with smaller impacts. The district engineer will consider any proposed compensatory mitigation the applicant has included in the proposal in determining whether the net adverse environmental effects to the aquatic environment of the proposed activity are minimal. The compensatory mitigation proposal may be either conceptual or detailed. If the district engineer determines that the activity complies with the terms and conditions of the NWP and that the adverse effects on the aquatic environment are minimal, after considering mitigation, the district engineer will notify the permittee and include any activity-specific conditions in the NWP verification the district engineer deems necessary. Conditions for compensatory mitigation requirements must comply with the appropriate provisions at 33 CFR 332.3(k). The district engineer must approve the final mitigation plan before the permittee commences work in waters of the United States, unless the district engineer determines that prior approval of the final mitigation plan is not practicable or not necessary to ensure timely completion of the required compensatory mitigation. If the prospective permittee elects to submit a compensatory mitigation plan with the PCN, the district engineer will expeditiously review the proposed compensatory mitigation plan. The district engineer must review the proposed compensatory mitigation plan within 45 calendar days of receiving a complete PCN and determine whether the proposed mitigation would ensure no more than minimal adverse effects on the aquatic environment. If the net adverse effects of the project on the aquatic environment (after consideration of the compensatory mitigation proposal) are determined by the district engineer to be minimal, the district engineer will provide a timely written response to the applicant. The response will state that the project can proceed under the terms and conditions of the NWP, including any activity-specific conditions added to the NWP authorization by the district engineer.

3. If the district engineer determines that the adverse effects of the proposed work are more than minimal, then the district engineer will notify the applicant either: (a) That the project does not qualify for authorization under the NWP and instruct the applicant on the procedures to seek authorization under an individual permit; (b) that the project is authorized under the NWP subject to the applicant's submission of a mitigation plan that would reduce the adverse effects on the aquatic environment to the minimal level; or (c) that the project is authorized under the NWP with specific modifications or conditions. Where the district engineer determines that mitigation is required to ensure no more than minimal adverse effects occur to the aquatic environment, the activity will be authorized within the 45-day PCN period, with activity-specific conditions that state the mitigation requirements. The authorization will include the necessary conceptual or detailed mitigation or a requirement that the applicant submit a mitigation plan that would reduce the adverse effects on the aquatic environment to the minimal level. When mitigation is required, no work in waters of the United States may occur until the district

engineer has approved a specific mitigation plan or has determined that prior approval of a final mitigation plan is not practicable or not necessary to ensure timely completion of the required compensatory mitigation.

MISSOURI
NATIONWIDE PERMIT REGIONAL CONDITIONS

For All Nationwide Permits:

1. **Stream Crossings.** In addition to requirements of General Condition (2) and General Condition (9) of the Nationwide Permits, the following guidelines for stream crossings apply for regulated activities in waters of the United States. The guidelines are available at: http://www.nwk.usace.army.mil/Portals/29/docs/regulatory/nationwidepermits/2012/MORC1Streams.pdf.

2. **Seasonal Restrictions for Activities Proposed in Spawning Areas.** In addition to the requirements of General Condition (3) of the Nationwide Permits, the following specific seasonal restrictions apply for regulated activities in waters of the United States. Between the closed dates listed in the Missouri Combined Stream Spawning List, the permittee must not excavate from or discharge into the listed waters. The list of waters with seasonal restrictions is available on request from the Corps or at: http://www.nwk.usace.army.mil/Portals/29/docs/regulatory/nationwidepermits/2012/SpawningList.pdf

3. **Invasive and Exotic Species.** Plant species listed at http://www.nwk.usace.army.mil/Portals/29/docs/regulatory/nationwidepermits/2012/MOInvasivePlants.pdf shall not be used for revegetation unless this requirement is waived by the district engineer based on a case specific analysis of the revegetation plan. Best management practices should be used to reduce the risk of transferring invasive plant and animal species to or from the project site. Best management practices can be found at: http://www.invasivespeciesinfo.gov/toolkit/prevention.shtml. Known zebra mussel waters within Missouri can be found at: http://nas.er.usgs.gov/queries/zmbyst.asp.

4. **Suitable Material.** In addition to the specific examples in General Condition (6) of the Nationwide Permits, the following materials are not suitable for fill activities in waters of the United States: vehicle bodies, construction or demolition debris, garbage, tires, treated lumber (chromated copper arsenate (CCA), creosote, and pentachlorophenol), liquid concrete not poured into forms, grouted riprap, bagged cement, and sewage or organic waste.

   Broken concrete used as bank stabilization must be reasonably well graded, consisting of pieces varying in size from 20 pounds up to and including at least 150 pound pieces to withstand expected high flows. Applicants must break all large slabs to conform to the well graded requirement. Generally, the maximum weight of any piece should not be more than 500 pounds. Gravel and dirt should not exceed 15% of the total fill volume when using broken concrete as fill. All protruding reinforcement rods, trash, asphalt, and other extraneous materials must be removed from the broken concrete prior to placement in waters of the United States.

5. **Priority Watersheds.** The applicant must provide preconstruction notification to the District Engineer for any regulated activity in a priority watershed. The list of priority watersheds requiring notification is available on request from the Corps or at http://www.nwk.usace.army.mil/Portals/29/docs/regulatory/nationwidepermits/2012/PriorityWatersheds.pdf

6. **Special Aquatic Resources.** The applicant must provide preconstruction notification to the District Engineer for any regulated activity which may impact a jurisdictional fen, seep or bog of any size.

7. **Sensitive Aquatic Species.** The applicant must provide preconstruction notification to the District Engineer for any regulated activity in waters listed at: http://www.nwk.usace.army.mil/Portals/29/docs/regulatory/nationwidepermits/2012/MORC7AquaticSpecies.pdf. The submitted preconstruction notification will be coordinated in accordance with General Condition 31(d) with the U.S. Fish and Wildlife Service as determined appropriate by the Corps.

For Specific Nationwide Permits:

8. **NWP 12 – Utility Line Activities.** The applicant must provide preconstruction notification to the District Engineer prior to commencing the activity if the discharge is in a special aquatic site or when new utility line construction activities have multiple crossings of the same stream and/or parallel a stream. The preconstruction notification must include a revegetation plan for impacted wetlands and riparian areas in accordance with Regional Condition 3. Where preconstruction notification is required for utility line activities within streams, the submittal must include site-specific plans for the stabilization of disturbed channel bed and bank areas.

9. **NWP 23 - Approved Categorical Exclusions.** The applicant must provide preconstruction notification to the District Engineer for all regulated Nationwide Permit 23 activities in waters of the United States. In addition to information required by General Condition 31, the applicant must identify the approved categorical exclusion that applies and provide documentation that the project fits the categorical exclusion.

10. **NWP 27 – Stream and Wetland Restoration Activities.** The applicant must provide preconstruction notification to the District Engineer prior to commencing the activity if the discharge is associated with impacts to forested wetlands.

11. **NWP 44 – Mining Activities.** Nationwide Permit 44 cannot be used to authorize in-stream mining projects, including in-stream sand and gravel mining operations.

12. **Requirements for Waiver of 300 Linear Foot Limit Associated with NWPs 21, 29, 39, 40, 42, 43, 44, 50, 51, 52.** The applicant must request the waiver in writing and provide documentation and environmentally based reasons to support the waiver request in accordance with the requirements of General Condition (31)(e) for making waiver determinations.

13. **Lake of the Ozarks**: The applicant must provide a preconstruction notification to the District Engineer for any regulated activity associated with Nationwide Permits 3, 7, 12, 14, 15, 18, 22, 27, 33, and 45 within Lake of the Ozarks. A copy of this notification must also concurrently be sent to Ameren Missouri. Nationwide Permits 2, 13, 16, 19, 25, 29, 31, 35, 36, 39, 41, and 44 are revoked in the Lake of the Ozarks. NWPs 1, 9, 10, 11 and 28 are only valid when both Ameren Missouri and the Missouri State Water Patrol have approved the activity. The Corps and Ameren Missouri, regardless of the request to use any Nationwide Permit, may verify the activity under the provisions of Regional General Permit 38M http://www.nwk.usace.army.mil/Portals/29/docs/regulatory/permits/GP-38M.pdf. Additional information on Ameren Missouri and Lake of the Ozarks permit requirements can be found at the following webpage: http://www.ameren.com/sites/aue/lakeoftheozarks/Pages/Home.aspx

Note: Preconstruction Notification to the District Engineer must be in accordance with General Condition (31) of the Nationwide Permits.

STATE OF MISSOURI
CLEAN WATER ACT SECTION 401 WATER QUALITY CERTIFICATION
2012 GENERAL AND SPECIFIC CONDITIONS

These conditions ensure that activities carried out under Nationwide Permits (NWPs) do not violate the Water Quality Standards of the State of Missouri resulting in permanent damage to habitat, increased turbidity, reduced bank and channel stability, and/or impacts to the biological and chemical integrity of the waters. These conditions are in addition to, not a replacement for, those conditions included by the federal authorities. These conditions apply to NWPs 3, 4, 5, 6, 7, 12, 13, 14, 15, 16, 18, 19, 20, 21, 22, 23, 25, 27, 29, 30, 31, 33, 36, 39, 40, 41, 42, 43, 45 and 46. Proposed projects authorized by the NWPs listed above that cannot be conducted within the conditions listed below must apply for individual Clean Water Act Section 401 Water Quality Certification (certification). NWPs 17, 32, 34, 37, 38, 44, 48, 49, 50, 51 and 52 require individual certification by the Missouri Department of Natural Resources (Department).

Applications for certification should be sent to the Missouri Department of Natural Resources, Water Protection Program, P.O. Box 176, Jefferson City, MO 65102-0176, or electronically to wpsc401cert@dnr.mo.gov. A complete application consists of the application submitted to the U.S. Army Corps of Engineers (Corps) as well as additional information necessary for a complete review of the project. This may include but is not limited to topographical maps, locational maps, engineering plans, project diagrams and where applicable mitigation plans (10 CSR 20-6.060(5)).

An issued certification becomes part of the 404 Permit and; therefore, expires with the 404 Permit unless explicitly stated in the certification. Not all permit modifications require the certification to be modified and/or reissued. An example would be when a permit expiration date is extended or the permit is reissued and there are no changes to the original project, the certification may remain valid for that project.

The Department encourages, but does not require, the permittee to consider environmentally-friendly design techniques to include stormwater management strategies that maintain or restore the original site hydrology through infiltration, evaporation or reuse of stormwater. Designs might include creating vegetated swales or rain gardens, or using porous pavement. More information can be found at these websites: http://www.epa.gov/owow/NPS/lid/ and www.lid-stormwater.net/lid_techniques.htm.

GENERAL CONDITIONS

1. NWPs shall not allow the filling of jurisdictional springs.

2. Acquisition of a NWP(s) and the attendant certification(s) shall not be construed or interpreted to imply the requirements for other permits are replaced or superseded, including Clean Water Act Section 402 National Pollutant Discharge Elimination System (NPDES) Permits for land disturbance or return water from material deposition. Permits or any other requirements shall remain in effect. Applicants with questions are encouraged to contact the Missouri Department of Natural Resources' Regional Office in the project area. A regional office map with contact information can be located at www.dnr.mo.gov/regions/regions.htm.

3. Care shall be taken to keep machinery out of the waterway as much as possible. Fuel, oil and other petroleum products, equipment, construction materials and any solid waste shall not be stored below the ordinary high water mark at any time or in the adjacent floodway beyond normal working hours. All precautions shall be taken to avoid the release of wastes or fuel to streams and other adjacent waters as a result of this operation.

4. Petroleum products spilled into any water or on the banks where the material may enter waters of the state shall be immediately cleaned up and disposed of properly. Any such spills of petroleum shall be reported as soon as possible, but no later than 24 hours after discovery to the Missouri Department of Natural Resources' Environmental Emergency Response number at (573) 634-2436.

5. Only clean, nonpolluting fill shall be used. The following materials are not suitable for bank stabilization and shall not be used due to their potential to cause violations of the general criteria of the Water Quality Standards (10 CSR 20-7.031 (3)(A)-(H)):
   a. Earthen fill, gravel, broken concrete where the material does not meet the specifications stated in the Missouri NWP Regional Conditions (http://www.nwk.usace.army.mil/Portals/29/docs/regulatory/MORegCon.pdf) and fragmented asphalt, since these materials are usually not substantial enough to withstand erosive flows;
   b. Concrete with exposed rebar;
   c. Tires, vehicles or vehicle bodies, construction or demolition debris are solid waste and are excluded from placement in the waters of the state;
   d. Liquid concrete, including grouted riprap, if not placed as part of an engineered structure; and
   e. Any material containing chemical pollutants (including but not limited to creosote or pentachlorophenol).

6. Clearing of vegetation/trees shall be the minimum necessary to accomplish the activity. A vegetated corridor shall be maintained from the high bank on either side of the jurisdictional channel to protect water quality and to provide for long-term stability of the stream channel, unless physical barriers prevent such a corridor. For purposes of this NWP, lack of ownership or control of any portion of this corridor may be considered a legitimate and discretionary cause to waive this requirement on that portion.

7. This certification is not valid for any Section 404 Permit issued on a water that is:
   a. Listed as impaired by inorganic sediment, aquatic habitat alteration or unknown impairment as listed in the most current Water Quality Report (Section 305(b) Report). For convenience a table of these impaired waters is provided at the following website: http://www.nwk.usace.army.mil/Portals/29/docs/regulatory/nationwidepermits/2012/MOWQC_Con7.pdf
   b. Located in or occur within two miles upstream of a designated outstanding state or national resource water; or
   c. Located in a designated metropolitan no-discharge stream.

   The most current Water Quality Report can be found at http://www.dnr.mo.gov/env/wpp/waterquality/305b/.

A listing of *Outstanding National and State Resource Waters and Metropolitan No-Discharge Streams* can be found in 10 CSR 20-7.031, Tables D, E and F or at http://www.sos.mo.gov/adrules/csr/current/10csr/10c20-7a.pdf.

The Department's geospatial data is available upon request, and all published data is available on the Missouri Spatial Data Information Services website at http://msdis.missouri.edu/.

Additional information to identify the project location may be obtained from the program at (573) 751-1300.

8. Streambed gradient shall not be permanently altered during project construction.

9. NWPs issued by the Corps for which the 300 linear foot threshold for stream impacts is waived by the district engineer shall require individual certification by the state. This is applicable to all NWPs where the permit has a 300 linear foot threshold including NWPs 21, 29, 39, 40, 42, 43, 44, 50, 51 and 52.

10. No project under a NWP shall accelerate bed or bank erosion.

11. Representatives from the Department shall be allowed on the project property to inspect the authorized activity at any time deemed necessary to ensure compliance with permit conditions.

12. You must submit a copy of the signed "Compliance Certification" referenced in NWP General Condition No. 30 as proof of project completion when the original is submitted to the Corps. This document is to be sent to the Missouri Department of Natural Resources, Water Protection Program, P.O. Box 176, Jefferson City, MO 65102-0176 or electronically to wpsc401cert@dnr.mo.gov.

13. After avoidance and minimization for the project, unavoidable stream impacts shall be mitigated appropriately. Mitigation for loss of aquatic resources shall be in conformance with the currently approved "Missouri Stream Mitigation Method" and the "State of Missouri Wetland Assessment Method" as well as other mitigation guidance located on-line at http://www.nwk.usace.army.mil/Missions/RegulatoryBranch/StateofMissouri.

14. Best Management Practices shall be used during all phases of the project to limit the amount of discharge of water contaminants to waters of the state. The project shall not involve more than normal stormwater or incidental loading of sediment caused by construction disturbances.

15. Pursuant to Chapter 644.038, RSMo, the Department certifies all NWPs for impacts in all waters of the state without the above-stated or any other conditions for the construction of highways and bridges approved by the Missouri Highway and Transportation Commission. The Memorandum of Understanding of 2009 and any subsequent modifications between the two agencies outline the requirements by which the Missouri Department of Transportation will design and construct projects in order to protect the water quality of waters of the state.

SPECIFIC CONDITIONS

16. NWP 3 *Maintenance*
    a. Silt, sediment and debris removal shall be limited to a maximum of 100 linear feet upstream and 100 linear feet downstream of structures.
    b. During dewatering, water shall not be returned directly to the waterway but shall be pumped upland and filtered through an appropriate treatment device as prescribed in any existing separate permit authorizing the discharge of return water. If, however, instream flow is 1 cubic foot per second (cfs) or greater and the return rate is set at 1 cfs or less, return may be made directly to the stream.

17. NWP 4 *Fish and Wildlife Harvesting, Enhancement, and Attraction Devices and Activities*
    a. Any inorganic or extraneous debris such as may be found on Christmas trees shall be removed to qualify as clean, nonpolluting fill.

18. NWP 6 *Survey Activities*
    a. Water, fines and excavated materials displaced by activities such as borings, shall not be returned directly to the waterway, but shall be pumped upland and filtered through an appropriate treatment device as prescribed in any existing separate permit authorizing the discharge of return water.

19. NWP 7 *Outfall Structures and Associated Intake Structures*
    a. Water quality certification does not replace or negate the need to obtain any required state permits under the Missouri Clean Water Law (Chapter 644, RSMo) for construction of wastewater treatment facility components including outfall structures; permits to release wastewater effluents; or for the construction of components related to public water supplies including intake structures as may be required by the Missouri Safe Drinking Water Law (Chapter 640, RSMo).

20. NWP 12 *Utility Line Activities*
    a. Material resulting from activity may not be temporarily sidecast into waters of the state for more than one month.
    b. Directional boring under the streambed to avoid impacts to waters of the state is recommended.
    c. For utility crossings that must disturb the streambed, work shall be conducted in such a manner as to seal off the work area from flow and minimize sediment transport.
    d. Utility line crossings shall be placed as close to perpendicular as possible, and be limited to a maximum crossing length of no more than one and one-half times the width of the stream.

21. NWP 13 Bank Stabilization
    a. Channelization of streams is not allowed under this NWP. Bank stabilization activities along one bank of a stream are permitted, including bank sloping and/or riprapping.
    b. The redirection of flow by excavation of the opposite bank of a stabilization project or a stream channel bed is considered a channel modification and is prohibited.

c. NWPs issued by the Corps for which the 500 linear feet threshold for stream impacts is waived by the district engineer shall require individual certification.
d. Invite the Corps and the Department as well as the other state and federal resource agencies to examine innovative approaches.

22. NWP 14 *LinearTransportationProjects*
    a. The permittee must propose and employ measures to mitigate the removal of impounded gravel in the unstable area upstream of the low water crossing to prevent it from being transported downstream and/or constructing a notched weir to slow the release of impounded gravel from upstream of the low water crossing.
    b. Where this NWP is used to authorize bridge and culvert structures, stream channel work is limited to a maximum of 100 feet upstream and a maximum of 100 feet downstream of the bridge or culvert. For purposes of this condition, a channel modification is any activity that alters the width, depth, length and/or sinuosity of a waterway.

23. NWP 16 *ReturnWaterfromUplandContainedDisposalAreas*
    a. These activities could have specific tasks or processes involved which may require the acquisition of separate general or site specific permits. All applicants shall contact the Water Protection Program at (573) 751-1300 to determine any specific requirements which may or may not require an individual certification.

24. NWP 17 *HydropowerProjects*
    a. This NWP requires an individual certification by the Department. In addition to applying for an individual certification the applicant must confer with the Department, the Missouri Department of Conservation and the U.S. Fish and Wildlife Service regarding potential impacts to mussel beds and other critical habitats and species.

25. NWP 19 *MinorDredging*
    a. These activities could have specific tasks or processes involved which may require the acquisition of separate general or site specific permits. All applicants shall contact the Water Protection Program at (573) 751-1300 to determine any specific requirements which may or may not require an individual certification.

26. NWP 20 *ResponseOperationsfor OilandHazardousSubstances*
    a. These activities could have specific tasks or processes involved which may require the acquisition of separate general or site specific permits. All applicants shall contact the Water Protection Program at (573) 751-1300 to determine any specific requirements which may or may not require an individual certification.
    b. Oil and hazardous substance releases are to be reported to the Missouri Department of Natural Resources' Environmental Emergency Response number at (573) 634-2436. Continue to report updates with regard to the containment and clean-up of releases.

27. NWP 22 *Removal of Vessels*
    a. Use of this NWP in Missouri is limited to removal actions only and shall not be used for any disposal of vessels.

28. NWP 33 *Temporary Construction, Access and Dewatering*
    a. The use of this NWP shall be limited to impacts of six months or less in duration.
    b. Any removal of accumulated gravel upstream of a bridge or crossing shall be limited to the quantity necessary to relieve any obstruction or to protect downstream habitat.

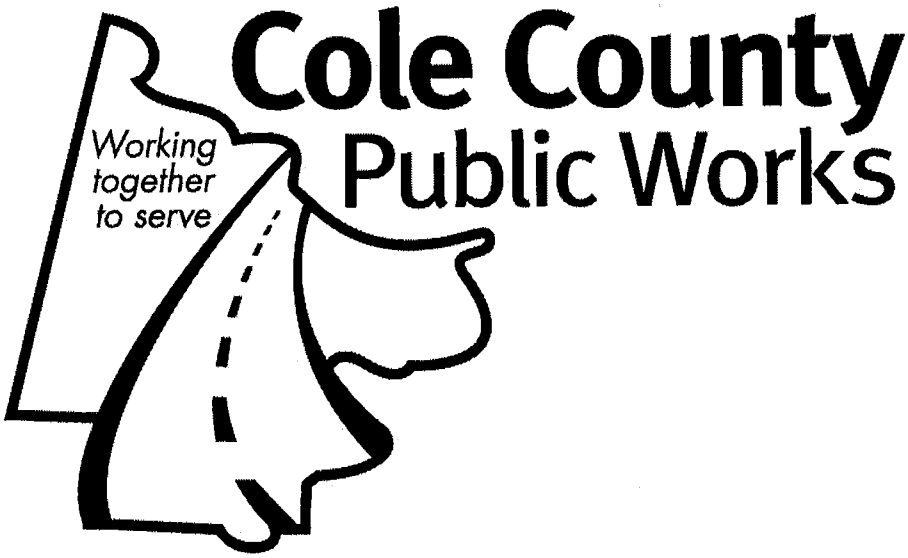
29. NWP 36 *Boat Ramps*
    a. No project shall be constructed in, or immediately upstream of, any known mussel beds. The Missouri Department of Conservation shall be consulted at (573) 882-9880 to determine if any known beds are present.
    b. Any waste concrete or concrete rinsate shall be disposed of in a manner that does not result in any discharge to the jurisdictional waterways.

30. NWP 41 *ReshapingExistingDrainageDitches*
    a. Material from the reshaping activities shall not be sidecast into any jurisdictional waters for more than one month.

31. NWP 42 *RecreationalFacilities*
    a. The vegetated corridor to be maintained from the high bank on either side of the jurisdictional channel may be used in part for the construction of public recreational trails, including those constructed to standards set by the Americans with Disabilities Act (ADA).

32. NWP 43 *StormwaterManagementFacilities*
    a. No new or expanded stormwater management facilities may be constructed under this NWP unless the water storage facilities are located off-channel.

Storm Water Pollution Prevention Plan



Cole County, Missouri
Unincorporated Areas

July 2012

Site Description

COLE COUNTY is located in central Missouri. It is bordered on the east by Osage County, the north by the Missouri River, the west by Moniteau County and the south by Miller County.

Population and Land Use

Cole County is 250,240 acres in size with an unincorporated urbanized area of 5,346 Acres. The county has a population of 72,757. The largest city is Jefferson City, with a population of 39,636. Approximately 8,796 people live in the urbanized area of unincorporated Cole County. (US Census, 2000).

Jefferson City is the home of the Lincoln University with 3,349 students. Other towns in Cole County include Wardsville (1,506), St. Martins (1,140), Taos (878), Russellville (807), Centertown (278), St. Thomas (263), and Lohman (163). (US Census 2010).

According to the 2007 US Agriculture Census, there are over 1,100 farms in Cole County with an average size of 164 acres. The total land used for farming is almost 180,840 acres.

Water Supply

Missouri-American Water Company – Missouri River; Cole County Public Water Supply District 1 – Wells; Cole County Public Water Supply District 2 – Wells; Cole County Water Supply District 3 – Wells; and Privately Owned Wells

Waste Water Treatment

City of Jefferson – Treatment Plant; Aqua-Missouri – Lagoons and Small Treatment Plants; and Individual On-Site Septic Systems

Watershed

North Moreau Creek to Moreau River to Missouri River; Grays Creek to Missouri River; and Wears Creek to Missouri River

Geologic Setting

Northern Edge of the Ozark Plateau – Bedrock is shallow bedded consisting of Ordovician carbonates

Average Rainfall

39.59 inches per year

Manufacturing

The County has the following manufacturing plants located with the urbanized areas:

1. Capital Quarries – Limestone Quarry Operations
2. Menu Maker Foods, Inc. – Food Packaging
3. Wren Enterprises – Security Hardware
4. J C Mattress Factory – Bedding Manufacturing

Best Management Practices

Temporary and Permanent Structural and Non-Structural BMPs

See Appendix A for a table outlining the temporary and permanent structural and non-structural best management practices that may be used in land disturbance activities.

Description of Best Management Practices

See Appendix B for descriptions of the best management practices that may be used in land disturbance activities.

Discharges to Valuable Resource Waters

Storm water discharges as described below shall be considered discharges to "valuable resource waters" and will not be allowed to have Total Settleable Solids in excess of 0.5 mg/L/hr.

- Storm water discharges within 1000 stream feet of:
  - Streams identified as a losing stream
  - Streams or lakes listed as an outstanding national or state resource water
  - Reservoirs or lakes used for public drinking water supplies
  - Streams, lakes, or reservoirs identified as critical habitat of endangered species
  - Streams, lakes, or reservoirs listed as impaired for sediment and/or unknown pollutants by standard MDNR methodology
- Storm water discharges:
  - Within 100 stream feet of a permanent stream (class P) or major reservoir (class L2)
  - Within two stream miles upstream of biocriteria reference locations
- Storm water discharges where:
  - Any of the disturbed area is defined as a wetland (class W), by CSR 20-7.031(1)(F)7
  - The storm water discharges to a sinkhole or other direct conduit to groundwater.

For the purpose of this SWPPP, the term "stream feet" shall mean the distance in feet following the nearest drainage channel from the land disturbance to the valuable resource water.

Disturbed Areas

- Slopes for disturbed areas must be defined for all projects.
- A site map or maps, defining the sloped areas must be included with all SWPPPs.
- Where soil disturbing activities cease in an area for 14 days or more, the contractor shall construct BMPs to establish interim stabilization
    - Interim stabilization consists of well established and maintained BMPs that are reasonable certain to protect waters of the state from sediment pollution.
- BMPs must be suited to the area disturbed, taking into account the drainage area, surfaces of drainage area, and steepness of slope.
- If the slope of the disturbed area is greater than 3:1 (H:V) or if the slope is greater than 3% and greater than 150 feet in length, then the contractor must establish interim stabilization within 7 days of ceasing operations on that part of the site.
- Delays in work caused by inclement weather or equipment malfunctions are not considered ceasing operations for the purpose of this section, as long as work resumes as soon as possible.

Installation

- Installation of all BMPs shall in accordance with the descriptions and details of that BMP as shown in Appendix B.
- Cole County will ensure the BMPs are properly installed at the locations are relative times specified in the SWPPP specific to that site.
- Peripheral or border BMPs to control runoff from disturbed areas shall be installed or marked for preservation before general site clearing is started. Storm water discharges from disturbed areas, which leave the site, shall pass through and appropriate impediment to sediment movement, such as a sedimentation basin, sediment traps, silt fences, etc. prior to leaving the land disturbance site.
- A drainage course change shall be clearly marked on a site map, included in the SWPPP specific to that site.

Sedimentation Basins

- The SWPPP for a specific site will require a sedimentation basin for each drainage area with 10 or more acres disturbed at one time.
- Sedimentation Basins shall be sized to contain a volume of at least 3600 cubic feet per each disturbed acre draining thereto.
- Accumulated sediment shall be removed from the basin as needed to ensure the minimum volume of 3600 cubic feet is maintained.
- Discharges from the basin shall not cause scouring of the banks or bottom of the receiving stream.

- The basin shall be maintained until final stabilization of the disturbed area served by the basin.
- Where the use of a sediment basin of this size is impractical, the SWPPP for a specific site will be allowed to use other similarly effective BMPs to be used to control erosion and sediment delivery. These similarly effective BMPs must:
    - Be selected from BMPs allowed by this SWPPP
    - Provide equivalent protection
- Both temporary and permanent sedimentation basins shall have a stabilized spillway to minimize the potential for erosion of the spillway or basin embankment.

Dewatering

Any dewatering practices that are to be employed on a specific site shall state in that site's SWPPP:

- Description of the method used
- Anticipated volume of water to be discharged
- Anticipated maximum flow rate of discharge (gpm)
- Method for treatment of the water from dewatering operations
    - For no reason shall water from discharging operations be discharged off site without treatment.

Roadways

- All efforts shall be made to prevent deposition of earth and sediment onto roadways through the use of proper BMPs.
- Where sediment is present on roadways, all storm water inlets shall have inlet protection.
- Where storm water will flow off the end of where a roadway terminates, a sediment catching BMP shall be provided
- Roadways and curb inlets shall be cleaned weekly or following a rainfall that generates runoff.
- Stabilized construction entrances shall be used to prevent sediment track out.

Amending/Updating the SWPPP

The SWPPP manager for the site shall amend and update the SWPPP as appropriate during the term of the land disturbance activity. The SWPPP manager shall amend the SWPP, at a minimum, whenever the:

- Design, operation, or maintenance of BMPs is changed
- Design of the construction project is changed that could significantly affect the quality of the storm water discharges
- SWPPP manager's inspections indicate deficiencies in the SWPPP or any BMP

- MDNR notifies Cole County in writing of deficiencies in the SWPPP
- The SWPPP is determined to be ineffective in significantly minimizing or controlling erosion and sedimentation
- Total Settleable Solids from a storm water outfall exceed 2.5 mg/L/hr (or 0.5 mg/L/hr if discharged to a valuable resource water)
- MDNR determines violations of Water Quality Standards may occur or have occurred

Site Inspection Reports

- Inspections of the site of land disturbance activities shall occur at a minimum of:
    - Once per 7 calendar days
    - Within 48 hours of any rainfall that produces runoff on the site.
- For sites that have not been final stabilized, the following must occur for each inspection:
    - All installed BMPs and other pollution control measures shall be inspected for proper installation, operation and maintenance
    - All storm water outfalls shall be inspected for evidence of erosion or sediment deposition.
    - Receiving streams shall be inspected for 50 feet downstream of the outfall.
    - Any problems shall be noted in an inspection report and corrected within seven calendar days of inspection.
- The SWPPP Manager will be responsible for being aware of rain events that cause runoff on the site. Local weather reports should be viewed, or crews in the vicinity of the site should be consulted if the SWPPP manager does not report to the site regularly.
- If weather conditions make it impossible to correct the problems within seven days, a detailed report of the problem (including pictures), must be filed with the regular inspection reports.
- BMP malfunctions shall be corrected as soon as the weather conditions allow.
- Parts of the site that have been finally stabilized may be inspected once per month. (A once per month inspection schedule may be implemented for a site with interim stabilization if Boone County makes a written request for the schedule and it is approved by the Department)
- A log of each inspection shall be kept.
- The inspection report is to include the following minimum information:
    - Inspector's name
    - Date of inspection
    - Observations relative to the effectiveness of the BMPs
    - Actions taken or necessary to correct the problems
    - Listing of areas where land disturbance operations have permanently or temporarily stopped.
    - Signature of inspector

Proper Operation and Maintenance

Cole County shall at all times maintain all pollution control measures and systems in good order to achieve compliance with the terms of the general permit.

Typical Activities

The following are activities that are typically conducted by Cole County that may require a SWPPP. Some of these activities may need to meet additional requirement of MoDNR and/or other agencies.

Street/Road Construction/Removal
Land Clearing and Grading
Tree Clearing
Storm Sewer Construction/Removal
Bank Stabilization
Drainage Channel Construction/Rehab.
Building Construction/Removal
Parking Lot Construction/Removal
Bridge Construction/Removal
Fill Material Stockpiling (Soil and Rock)

SWPPP Management Personnel

The following Cole County Public Works personnel may be in charge of the management of the SWPPP for projects in Cole County. Other people not listed below may also be involved with the SWPPP of a specific project as employment conditions change. Please see the SWPPP for each particular site for details.

Larry Benz	Greg Block	Spencer Coonce
Larry Bishop	Bill Rademan	Tom Kliegel
Eric Landwehr	Doug Bubach	Kevin Light
Cliff Lepper	Dennis Bushjost	Brad Wyss

Appendix A

Temporary and Permanent Structural and Non-Structural BMPs

The following table lists the BMPs that can be expected to be used on projects requiring a Land Disturbance Permit

Appendix B

BMP Descriptions and Details

(Taken from Chapter 8 of the Boone County Storm Water Manual)

Appendix A

Temporary and Permanent Structural and Non-Structural BMPs

The following table lists the BMPs that can be expected to be used on projects requiring a Land Disturbance Permit

Construction Site Best Management Practices (BMPs)

BMP No	Title	Environmental Category					Use	
		Erosion Control	Pollution Prevention	Runoff Management	Sediment Capture	Tracking Control	Temporary	Permanent
EC-1	Scheduling*	S	P				X	
EC-2	Preservation of Existing Vegetation*	S	P	S	S		X	
EC-3	Dust Control*	P					X	
EC-4	Hydraulic Mulch-bonded Fiber Matrix	P					X	
EC-5	Mulching*	P					X	X
EC-6	Seeding/Mulching*	P					X	X
EC-7	Sodding*	P						X
EC-8	Rolled Erosion Control Products	P					X	X
EC-9	Geotextiles and Plastic Covers	P					X	
EC-10	Outlet/Energy Dissipation Devices	P			S		X	X
EC-11	Temporary Stream Crossings	P					X	
RM-1	Check Dams			P	S		X	X
RM-2	Earth Berms/Drainage Swales			P				X
RM-3	Terracing	S		P	S			X
RM-4	Slope Drains	S		P			X	
RM-5	Soil Roughening*	S		P			X	
RM-6	Fiber Rolls/Wattles	S		P	S		X	
SC-1	Vegetated Filter Strip*	S		S	P			X
SC-2	Silt Fence	S		S	P		X	
SC-3	Straw Bale Dike	S		S	P		X	
SC-4	Compost Filter Socks				P		X	
SC-5	Compost Filter Berms				P		X	X
SC-6	Sediment Basins				P		X	
SC-7	Sediment Traps				P		X	
SC-8	Curb and Gutter Inlet Protection				P		X	
SC-9	Drop Inlet Protection				P		X	
TC-1	Construction Entrance/Exit		S			P	X	
TC-2	Washdown Station*		S			P	X	
PP-1	Non-Sediment Pollution Control*		P				X	

P - Primary BMP function; S - Secondary function *Non-Structural

BMP Guidelines

Erosion and Sediment Control Measures

BMP	Definition	Purpose	Where Applicable	Planning	Design Criteria
Construction Sequence and Scheduling	A specified work schedule that coordinates the timing of land-disturbing activities and the installation of erosion and sedimentation control measures. The objective is to disturb only the immediate work areas.	To reduce on-site erosion and off-site sedimentation by performing land-disturbing activities and installing erosion and sediment control practices in accordance with a planned schedule.	All land-development projects that will disturb more than one contiguous acre.	The general order of construction and planning is: • Plan disturbances to coincide with work progress, • Order materials to avoid delays, • Build construction site access, • Implement sediment traps and barriers, • Apply runoff control (diversions), • Implement main runoff conveyance system, • Build stream crossings, • Land clearing and grading, • Surface stabilization, • Building construction, • Landscaping and final stabilization.	At a minimum, the construction sequence should include: • Erosion and sedimentation control practices to be installed, • Principal development activities, • What measures should be in place before other activities begin, • Compatibility with the general construction schedule of the contract. When changes in construction activities are needed, amend the sequence schedule as necessary to fit the changes.

Adapted from IECAs Tools for Rules: How to Select, Install and Inspect Construction Site BMPs for NPDES Compliance

BMP Guidelines

Erosion and Sediment Control Measures

BMP	Definition	Purpose	Where Applicable	Planning	Design Criteria
Protect Existing Vegetation	A construction management tool that retains site vegetation where possible by designating areas on which vegetation will not be disturbed.	Vegetation helps prevent soil erosion in the following ways: • Roots hold soil together • Leaves and stems break up rainfall impact • Ground cover slows down runoff and filters sediment out of water • Plants evapotranspirate water from soil.	All land-development projects that will disturb more than one contiguous acre.	Conduct field survey to determine extent of development. Delineate areas of project where existing vegetation will be preserved. Provide a map outlining these areas to grading personnel.	At a minimum, areas of vegetation preservation should be shown on the grading map and instructions presented as to construction procedures to be followed in and around these sensitive areas, including: • Placement of safety fence along the perimeter of protected zones • Routine inspection schedule for compliance • Remedial measures for repair and maintenance

Adapted from IECAs Tools for Rules: How to Select, Install and Inspect Construction Site BMPs for NPDES Compliance

BMP Guidelines

Erosion Control Measures

BMP	Definition	Purpose	Where Applicable	Planning	Design Criteria
Surface Roughening	Preparing the soil topography for the designed construction purpose while taking erosion and sediment control factors into consideration.	To leave the surface soil in a roughened condition to provide temporary soil stabilization and augment future erosion and sediment control practices.	To some extent, on most construction sites that require land disturbing activities, and in particularly where there are critical, erodible slopes.	Designate surface roughening practice based on site conditions and well as equipment availability.	Designing surface roughening techniques into the project is determined by: 1. Site conditions 2. Available equipment (i.e. bulldozers, tractors, etc.) 3. Supplemental BMP application (i.e. hydraulic mulch, erosion control blanket, etc.) 4. Final landscape design. Types of surface roughening techniques include: • Track walking • Sheepsfoot rolling • Ripping • Imprinting

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BMP Guidelines

Erosion Control Measures

BMP	Definition	Purpose	Where Applicable	Planning	Design Criteria
Bench Terracing	Erosion control accomplished by constructing benches or large steps across the land slope.	Reduce the length of slope and thereby the potential for soil erosion.	On steep slopes where erosive factors are very high and gully erosion is likely to take place.	Terrace spacing and slope maintenance need to be considered.	Reduce slope length proportional to the steepness of the slope. Control outlets from terraces so erosion is eliminated.
Slope Interrupter Devices	Tube-like devices composed of a mesh or netting enclosing a biodegradable plant fiber that are installed on the slope contour.	To reduce runoff water velocities and trap sediment particles, thereby ameliorating the impact of slope length and steepness on erosion.	On slopes steeper than 5:1	Follow manufacturer's instructions as to design and specification, particularly in terms of spacing.	Employ slope interrupter devices as a complimentary practice to supplement: • Surface roughening techniques • Revegetation • Surface mulches, including hydraulic applications and rolled erosion control products • Removal after slope stabilized is optional

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BMP Guidelines

Erosion Control Measures

BMP	Definition	Purpose	Where Applicable	Planning	Design Criteria
Temporary Seeding	Planting fast growing vegetation to provide temporary erosion control.	To provide stabilization on bare soil areas that will not be brought to final grade for a period of more than 30 working days.	May be used on cleared unvegetated areas where temporary erosion control is needed.	Selection of appropriate plant species, use of quality seed, proper bed preparation, and seed application method are important.	The area to be seeded should be uniform an loosened to a minimum depth of 3 inches. The area should be cleared of stones, roots and other debris.
Turf Reinforcement Materials (TRM)	Three-dimensional fabrics of synthetic materials placed in areas of concentrated flow to provide plant reinforcement.	To provide increased shear strength to allow plant material usage in drainage channels as a functional substitute for hard armoring.	Drainage channels, swales, slope drains and as separators between rip rap and underlying soil.	Follow manufacturer's recommendation as to design, specification and suitability of material for site.	Installation of TRMs is critical to their performance in the field. Follow manufacturer's recommendation as to design, specification and installation of the material in conjunction with its vegetative component.
Permanent Seeding/Planting of Grasses	Control of runoff and erosion with permanent vegetation.	To economically control erosion and sedimentation.	Used on graded or cleared areas where soil is unstable because of texture, structure, high water table, or slope.	Selection of appropriate plant species, use of quality seed, and proper bed preparation are important.	Planting should occur within 14 days of final grading.

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BMP Guidelines

Erosion Control Measures

BMP	Definition	Purpose	Where Applicable	Planning	Design Criteria
Topsoiling	Stropping off, storing, and spreading the upper layers of soil over disturbed areas.	To provide a suitable medium for vegetation establishment and growth.	Wherever it is economically practical, this technique should be considered. Recommended for use in areas where subsoil is infertile and other methods will not produce or maintain a desirable stand of vegetation.	Recommended for placement on soils that do not have a deep rooting zone to support pants, and that may contain material toxic to plant growth, and where exposed subsoil is not suitable to produce adequate vegetation.	Should be applied on slopes 2:1 or flatter. Sample topsoil or duff material and apply lime and fertilizer as appropriate.
Permanent Ground Cover Plants	Control of runoff and erosion with trees, vines and shrubs by stabilizing soils in areas where vegetation other than grasses or legumes is preferred.	To economically control erosion and sedimentation.	Used on steep banks, graded cleared areas, and shady areas where turf maintenance is difficult. Also, can be used between terraces.	Selection of species should match soil characteristics. Quality stock should be selected and kept moist form time of receipt and planted as soon as possible.	Usually more effective when planted in clumps or blocks. Competitive vegetation should be pulled out of the areas where the plants are to be planted.

Adapted from IECAs Tools for Rules: How to Select, Install and Inspect Construction Site BMPs for NPDES Compliance

BMP Guidelines

Erosion Control Measures

BMP	Definition	Purpose	Where Applicable	Planning	Design Criteria
Mulching	Use of a protective layer of straw, hay, wood chips, wood fibers, gravel, or synthetic materials on the soil surface to reduce rainfall impact and dislodgement of soil particles.	To protect the soil surface from the erosive forces of raindrop impact and overland or sheet flows. A secondary benefit of surface mulch is to retain soil moisture and moderate soil temperatures, aiding plant establishment.	As a temporary, non-vegetative surface erosion control treatment and/or in conjunction with a temporary or permanent re-vegetation technique, such as aerial or hydraulic seeding.	Application of temporary or permanent mulch materials should be planned to coincide with schedule of disturbance and final landscape design.	Organic mulches are most effective when uniformly spread and secured to the soil structure. • Cost • Longevity • Ease of installation • Erosion control effectiveness • Runoff vs. infiltration characteristics • Compatibility with revegetation strategy • Water quality impact Types of surface mulch materials/techniques include: • Straw or hay fibers • Paper or wood fibers • Gravel • Wood chips • Compost • Hydraulic matrices of cellulose fiber and tackifying agent • Bonded fiber matrices • Rolled erosion control products

Adapted from IECAs Tools for Rules: How to Select, Install and Inspect Construction Site BMPs for NPDES Compliance

BMP Guidelines

Erosion Control Measures

BMP	Definition	Purpose	Where Applicable	Planning	Design Criteria
Sodding	Use of grass sod to permanently stabilize an area.	To rapidly prevent erosion and sedimentation.	May be used in areas requiring immediate and permanent vegetative cover, particularly in landscaping applications.	More costly than seeding, but can be established during times of the year when grass seed may fail. Irrigation may be necessary.	On slopes, sod should be applied with the long dimension perpendicular to the slope and pegged or stapled sufficiently to prevent movement.
Riprap or Aggregate	Permanent layers of loose angular stones or aggregate with a filter fabric or granular underlining placed over an erodible soil surface.	To protect the soil surface from the erosive flow of water, slow water flow velocity, and stabilize slopes.	Used when soil may erode under design flow conditions and cannot be protected by vegetative cover or other means. Riprap can be used at: • Storm drain outlets, • Channel banks and bottoms, • Roadside ditches, • Drop structures, • Toe of slopes, • Channel transitions	Graded riprap contains a mixture of stone sizes while uniform riprap is made up of stones of similar sizes. The size of stone used is directly related to the design flow velocity of the channel. Typically should be used for velocities in excess of 15 ft/sec.	The minimum riprap thickness is 2 times the maximum stone diameter but not less than 6 inches. The specific gravity of the individual stones should be at least 2.5. Maxim bank slope for application should not be steeper than 1.5:1.

Adapted from IECAs Tools for Rules: How to Select, Install and Inspect Construction Site BMPs for NPDES Compliance

BMP Guidelines

Erosion Control Measures

BMP	Definition	Purpose	Where Applicable	Planning	Design Criteria
Outlet Protection	Structurally lined aprons or other acceptable energy dissipation devices placed at the outlets of pipes or paved channel sections.	To protect the soil surface from the erosive flow of water, slow the water flow velocity, and stabilize slopes or channels.	Used where the flow velocity at the design capacity will exceed the velocity of the receiving channel or area.	Geotextile fabrics in conjunction with vegetation create a natural outlet protection. Riprap aprons are relatively low cost and easy to install. Riprap stilling basins or plunge pools are used where overfalls exit the ends of popes where high flows would require excessive apron lengths.	Capacity: 10-year peak runoff or design discharge of conveyance, whichever is greater. Geotextile fabrics should be designed to handle peak flow rates and tractive forces. The depth of a riprap apron should be 2 times the max. stone diameter but not less than 6 inches.
Dust Control	Actions or methods which reduce the erosive effects of wind on dry soils.	To prevent soil particles in the form of dust from becoming airborne.	Used where open dry areas of soil, particularly in dryer climates or during the dry season, are exposed to the erosive factors of the wind.	The direction of the prevailing winds and careful planning of clearing activities are important.	Minimize the period of soil exposure through use of temporary ground cover and other stabilization practices. Some possible dust control measures are: • Vegetative cover, • Mulch or Stone • Spray-on adhesive • Calcium chloride • Sprinkling

Adapted from IECAs Tools for Rules: How to Select, Install and Inspect Construction Site BMPs for NPDES Compliance

BMP Guidelines

Sediment Control Measures

BMP	Definition	Purpose	Where Applicable	Planning	Design Criteria
Sediment Basins	A suitably located temporary or permanent earthen embankment, barrier, dam, or excavated basin designed to capture sediment.	To retain sediment on the construction site and prevent sedimentation to off-site waterbodies, properties, etc.	Used where erosion control measures are not adequate to prevent off-site sedimentation on sites with disturbed area of 5 acres or more.	Hazard class must be considered so failure does not jeopardize property or lives. The location of the basin must be able to collect all of the site runoff.	Drainage area is between 5 and 150 acres. The flow length through the basin length to width ratio should be 2:1 or greater.
Temporary Sediment Trap	A small temporary ponding basin formed by constructing an embankment across a drainage swale, by excavating a pond or by rock fill.	To detain sediment-laden runoff form small, disturbed areas long enough to allow the majority of the sediment to settle out.	Used at the outlets of drains, diversions, channels, and other runoff conveyances. May be installed during early site development.	Access to trap must be maintained to periodically removed sediment for proper disposal. Structure life is limited to 18 months.	Used for drainage areas of 5 acres or less. Minimum storage area is fixed to meet 80% removal efficiency. Side slopes of the excavated trap should be 2:1 or flatter. Maximum height is 5 ft.
Silt Fence	Sediment barrier consisting of synthetic filter fabric stretched across posts with the bottom of the fabric being entrenched. In most cases the fabric should be reinforced with the support of a wire fence.	To catch and hold small amounts of sediment from disturbed areas by reducing the velocity of sheet flow to allow sediment deposition.	Used below small, disturbed areas less than 1/4 acre per 100 ft. of fence, and where runoff can be stored behind the fence without damaging the fence or the area behind it.	Should be located where shallow pools can be formed. Sediment deposition should be periodically removed and properly disposed of. Breaks in the fence should be used to minimize drainage areas.	Fence should be stable for the 10-yr storm. The slope should be no longer than 100 ft. and have a gradient of 2:1 or flatter. The minimum fabric height is 18 in. Maximum post spacing is 6 ft. Minimum post burial depth is 12 in.

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BMP Guidelines

Sediment Control Measures

BMP	Definition	Purpose	Where Applicable	Planning	Design Criteria
Rock Ditch Checks	Small temporary dams constructed across a swale or drainage ditch to reduce the velocity of concentrated storm flows.	To reduce erosion of the channel by restricting the velocity of flow in the channel. Not to be installed in live channels or waters of the commonwealth.	Used as a temporary or emergency measure to limit erosion by reducing flow in a small open channel.	Ditch checks should not be used in live streams but are intended for temporary ditches and swales. Checks in grass channels may kill the vegetation. Ditch checks shall be promptly removed when their useful live has been completed.	Drainage area should not exceed 10 acres. The maximum height is 2 ft. at the center. The center should be at least 6 in. lower than the outer edges. The maximum spacing between checks should be such that the toe of the upstream check is at the same elevation as the top of the downstream check. The maximum size of stone used should be no greater than 8 in. in diameter.
Stabilized Construction Entrance	A gravel driveway or pad located at a point where vehicle enter and exit a construction site.	To reduce the amount of mud and soil transported onto public roads by traffic leaving the construction site.	Used wherever traffic leaves a construction site and enters a public right-of-way, street, alley, sidewalk, parking lot or other paved area.	Construction plans should limit all traffic to properly constructed entrances and exits.	Stone should be KTC #3 or larger. Pad thickness has a 6 in. minimum with a required geotextile fabric underlying the stone. The minimum width of the entrance shall be 24 ft. while the minimum length shall be 100 ft.

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BMP Guidelines

Sediment Control Measures

BMP	Definition	Purpose	Where Applicable	Planning	Design Criteria
Storm Drain Inlet Filters	A sediment filter or an excavated impounding area surrounding a storm drain inset.	To retain sediment on the construction site by slowing and filtering runoff before it enters the storm drainage system.	Used where storm drain inlets are to be made operational before permanent stabilization of the disturbed area occurs.	Must not be used near the edge of fill material and must not divert water over cut or fill slopes. • Filter Fabric Inlet Protection • Stone Bag Inlet Protection • Block and Gravel Drop Inlet • Protection • Gravel and Wire Mesh Inlet Sediment Filter	The drainage area must be no greater than 1 acre with a slope less than 5%.
Vegetated Filter Strips	Zones of vegetation through which sediment and pollutant-laden runoff are directed before being discharged to a concentrated flow channel.	Filter strips are used to remove sediment from overland sheet flow but are not effective in removing sediment from concentrated flows.	Used where runoff from land undergoing development needs to be filtered to reduce sediment damage to adjacent properties, streams or sinkholes.	Effectiveness can vary depending on vegetation, height, type and density, season of the year, soil eroded particle size characteristics, size of disturbed area, and site topography.	The General Design Criteria are: Min. Width = 15 ft. Max. Ground Slope = 1% Max. Ground Slope = 10%.

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BMP Guidelines

Temporary Flow Control and Conveyance Measures

BMP	Definition	Purpose	Where Applicable	Planning	Design Criteria
Temporary Pipe Slope Drains	Flexible tubing or conduit extending temporarily from the top to the bottom of a cut or fill slope.	To convey concentrated runoff down the face of a cut or fill slope to a protected stable area without causing erosion.	Used on sites before permanent stormwater drainage structures are installed and where stormwater runoff above a cut or fill slope will cause severe erosion if allowed to flow over the slope.	Must be sized, installed, and maintained properly because failure results in slope gully erosion. The entrance must be securely entrenched with watertight connections , with securely staked conduit.	Should handle peak runoff from the 10-yr storm. The maximum drainage area per pipe is 10 acres. The entrance should be constructed of a standard flared end section of pipe or equivalent. Reinforced hold-down garments should be spaced at 10 ft. or less intervals.
Runoff Control Measures	A temporary ridge, excavated channel, or combination ridge and channel constructed across sloping land at a pre-determined grade.	To divert clean water around work sites to stable outlets and to divert sediment-laden water to sediment control structures such as sediment traps and basins.	• Above slopes to prevent clean runoff from flowing over unprotected soil, • Across unprotected slopes to reduce flow lengths, • Below slopes to divert runoff to a stable outlet, and • Within and below disturbed areas to direct sediment-laden water to control structures.	Design as a stable channel with a mild bed slope. Use of either uniform or a gradually increasing grade is preferred over sudden decreases or increases in grade. A permanent vegetative covering is required where the channel grade is between 0.2% and 3%.	Design drainage area is 5 acres or less based on the peak runoff from the 10-yr. storm. A channel lining is required if the average velocity is greater than 2 ft/sec. Channel side slopes are 2:1 or flatter. The berm must have side slopes of 2:1 or flatter, with a minimum top width of 2 ft. and a designed freeboard of at least 4 in.

Adapted from IECAs Tools for Rules: How to Select, Install and Inspect Construction Site BMPs for NPDES Compliance

BMP Guidelines

Permanent Flow Control and Conveyance Measures

BMP	Definition	Purpose	Where Applicable	Planning	Design Criteria
Subsurface Drains	A perforated pipe or conduit placed beneath the surface of the ground at a designated depth and grade.	Used to drain saturated soils by lowering the water table.	Used in areas free from tree roots where the soil layer depth is deep enough to allow proper installation.	Not recommended in areas where the drain will pass under heavy vehicle crossings.	Should be designed for required capacity. The minimum diameter should be 6 in. The line should be graded to achieve at least a velocity of 2.4 ft/sec to prevent silting.
Level Spreader	Structure that converts sediment-free channel flow and uniformly releases it over a stabilized area.	Provides stable outlets for diversion channels, basins, dikes and other structures.	Used where sediment free storm runoff can be released as sheet flow over a stable area.	Install in areas where the level lip can be constructed without using fill material. The discharge area should have a maximum 10% slope and be well-vegetated and stable for design flow conditions. There should be no traffic across a level spreader.	Capacity determined by peak flow from the 10-yr. storm. The maximum desirable flow into the spreader should not exceed 30 cfs. Spreader length, width and depth are designed based on flow. There should be a 20 ft. long transition section between the channel entrance and the design width of the spreader. The grade of the spreader invert and lip must be 0.

Adapted from IECAs Tools for Rules: How to Select, Install and Inspect Construction Site BMPs for NPDES Compliance

Appendix B

BMP Descriptions and Details

(Taken from Chapter 8 of the Boone County Storm Water Manual)

CHAPTER 8
EROSION AND SEDIMENT CONTROL

8.1 Introduction

These guidelines are intended to provide the designer, contractor and builder with design criteria and minimum standards for the installation of erosion and sediment controls to comply with the Erosion and Sediment Control Regulations. The regulations were enacted to protect the health, safety, and property of the citizens and to help protect area water resources from pollution due to erosion and transportation of sediment. The regulations are applicable to all land development and land disturbance activity within the regulated MS4 area where the area of disturbance is more than one acre. The regulations require that no person cause or allow sediment to be deposited in any public street, public land, or on any property not under their control as a result of land disturbance from construction activities.

You can comply with the regulations by meeting the following objectives:

a. Minimize the area disturbed by construction and development;
b. Provide for containment of sediment until areas are stabilized;
c. Stabilize disturbed areas as soon as practical after project completion; and
d. Provide permanent erosion, drainage, and detention controls.

8.2 General Design Guidelines

Erosion is a natural process where soil and rock are loosened and removed. Natural erosion normally occurs at a very slow pace, but when land is disturbed by vegetation removal, grading and other construction activities, the erosion rate often increases dramatically. When erosion occurs on a construction site the sediment is available for transport by either wind or stormwater runoff. The discharge of sediment and other construction site pollutants can negatively impact downstream water quality.

The purposes of erosion and sediment controls are to minimize the amount of erosion that occurs as a result of construction activities and to prevent the sediment from leaving the property. Effective erosion and sediment control requires that the soil surface be protected from the erosive forces of wind, rain, and runoff and that the eroded soil be captured and retained onsite.

When designing sediment and erosion controls, it is necessary to determine whether there is **sheet flow** or **concentrated flow** of stormwater on the property. Sheet flow occurs on gently sloping land without defined drainage ways. The stormwater tends to disperse evenly across the property, although the drainage may be in one direction due to the overall slope. Concentrated flow occurs where there are defined drainage ways that may range from gentle swales to clearly defined waterways. It is possible to have a combination of sheet flow and concentrated flow on the same property.

1. Erosion Protection

Proper planning will help identify potential erosion problems, particularly highly susceptible areas, such as areas of concentrated flow. Removing the vegetative cover and altering the soil structure by clearing, grading and compacting the surface increases an area's susceptibility to erosion. Scheduling can be a very effective means of reducing erosion by minimizing both the exposed area and the duration of exposure. Apply stabilizing measures as soon as possible after the land is disturbed. Plan and implement temporary or permanent vegetation, mulches, or other protective practices to correspond with construction activities. Protect channels from erosion forces by using protective linings and the appropriate channel design. Consider possible future repairs and maintenance of these practices in the design. In scheduling, take into account the season and the weather forecast.

Clearing existing vegetation reduces the surface roughness and infiltration rate and increases runoff velocities and volumes. This is particularly a concern in areas of concentrated flow. Use measures that break the slopes to reduce the problems associated with concentrated flow volumes and runoff velocities. Practical ways to reduce velocities include conveying stormwater runoff away from steep slopes to stabilized outlets, preserving natural vegetation where possible, and mulching and vegetating exposed areas immediately after construction.

2. Sediment Containment

Even with careful planning some erosion is unavoidable, and the resulting sediment must be trapped on the site. In areas where runoff occurs primarily as sheet flow, containment of sediment is relatively simple. In these areas, temporary containment devices may be sufficient. Where concentrations of flow occur, containment of sediment becomes more difficult as the rate and volume of flow increase. In these areas, more extensive or permanent control devices need to be provided. Areas of steep topography and cut or fill slopes need to be given special consideration. Due to the environmental sensitivity of streams, rivers, losing streams, sinkholes, and other Karst topographic features, special consideration also needs to be given to these areas. Plan the location where sediment deposition will occur and maintain access for periodic removal of accumulated sediment. Protect low points below disturbed areas by building barriers to reduce sediment loss. Sediment traps and basins should be constructed before other land-disturbing activities occur.

3. Temporary versus Permanent Controls

Temporary controls, such as straw bale dikes, silt fences, erosion control blankets, etc., are provided for the purpose of controlling erosion and containing sediment until construction is complete. Temporary controls are not needed after the area is stabilized.

Permanent controls consist of riprap, detention basins, etc., which will remain in place through the life of the development. It is possible for the same facility to serve both a temporary and permanent purpose.

4. Maintenance

Regular inspection and maintenance of Best Management Practices (BMPs) are vital to the performance of erosion and sedimentation control measures. If not properly maintained, some practices may cause more damage than they prevent. Always evaluate the consequences of a measure failing when considering which control measure to use, since failure of a practice may be hazardous or damaging to both people and property. For example, a failure of a large sediment basin can have disastrous results, and low points in dikes can cause major gullies to form on a fill slope. It is essential to inspect all practices to determine that they are working properly and to ensure that problems are corrected as soon as they develop.

8.3 BMP Descriptions and Design Guidance

The following principles are effective when they are integrated into a system of control practices and management techniques to control erosion and prevent sedimentation offsite. As a matter of practicality, proprietary erosion and sediment control products are not specifically identified herein. However, the County encourages the use of these products when designed, specified and installed in accordance with manufacturer's recommendations. Sufficient details related to these products should be supplied to facilitate the review of the plans to ensure the suitability of the practice. The following is not meant to provide an exhaustive list of all acceptable erosion and sediment control practices accepted by the county, only as a general guidance document.

There may be instances where certain erosion control designs are beyond the scope of general civil engineering knowledge. Specifically, natural stream stabilization and/or restoration should only be done with specific expertise and experience with these systems. This manual is not intended to convey such a level of knowledge and therefore will not address this level of complexity.

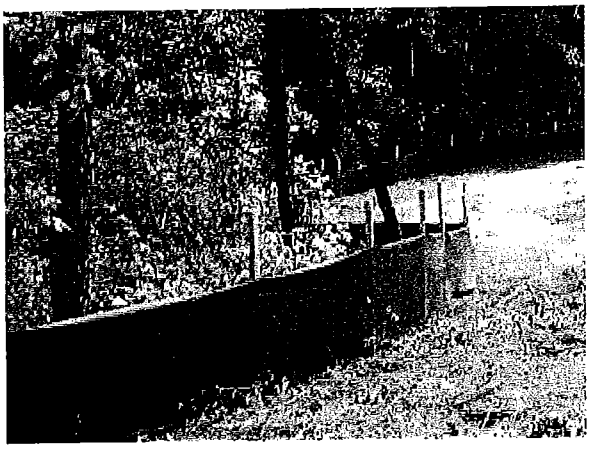


Figure 1. Silt Fences are placed at the perimeter of the job site to capture and prevent sediment from leaving the site.
Figure 2. Rock Check dams can reduce water velocities in areas of channelized flow.

EC-1 SCHEDULING

This BMP involves developing, a schedule that includes sequencing of construction activities with the implementation of construction site BMPs such as temporary soil stabilization (erosion control) and temporary sediment control measures for every project. The purpose is to reduce the amount and duration of soil exposed to erosion by wind, rain, runoff and vehicle tracking, and to perform the construction activities and control practices in accordance with the planned schedule.

APPROPRIATE APPLICATIONS:

Construction sequencing shall be scheduled to minimize land disturbance for all projects at all times.

CONDITIONS FOR EFFECTIVE USE:

All land disturbing activities.

WHEN BMP IS TO BE INSTALLED:

Scheduling should take place during the planning stages and be modified throughout the duration of the project.

STANDARDS AND SPECIFICATIONS:

Developing a schedule and planning the project are the very first steps in an effective storm water program. The construction schedule shall be incorporated into the SWPPP. Develop the sequencing and timetable for the start and completion of each item such as site clearing and grubbing, grading, excavation, paving, pouring foundations, installing utilities, etc., to minimize the active construction area during the rainy season. Schedule major grading operations for the non-rainy season when practical. Incorporate staged seeding and re-vegetation of graded slopes as work progresses. Consider the appropriate planting time for specified vegetation when establishing permanent vegetation.

OPERATION AND MAINTENANCE PROCEDURES:

Verify that work is progressing in accordance with the schedule. If progress deviates, take corrective actions. Amend the schedule when changes are warranted.

EC-2 PRESERVATION OF EXISTING VEGETATION

Preservation of existing vegetation is the identification and protection of desirable vegetation that provides erosion and sediment control benefits and includes establishing setbacks to protect stream banks according to the County stream buffer regulations.

APPROPRIATE APPLICATIONS:

Preserve existing vegetation at areas on a site where no construction activity is planned or will occur at a later date.

CONDITIONS FOR EFFECTIVE USE:

Protection of existing vegetation requires planning, and may limit the area available for construction activities.

WHEN BMP IS TO BE INSTALLED:

Existing vegetation to be preserved shall be identified on the plans. Measures to protect said vegetation (such as construction fencing and signage) should be installed prior to the commencement of clearing and grubbing operations or other soil-disturbing activities.

STANDARDS AND SPECIFICATIONS:

Minimize the disturbed areas by locating temporary roadways to avoid stands of trees and shrubs and to follow existing contours to reduce cutting and filling. Mark areas to be preserved with temporary fencing at least 3.2 ft. tall. The fence post spacing and depth shall be adequate to completely support the fence in an upright position. Construction materials, equipment storage, and parking areas shall be located where they will not cause root compaction. Keep equipment away from trees to prevent trunk and root damage. Employees and subcontractors shall be instructed to honor protective devices. No heavy equipment, vehicular traffic, or storage piles of any construction materials shall be permitted within the drip line of any tree to be retained. Trenching shall be as far away from tree trunks as possible, usually outside of the tree drip line or canopy. The ends of damaged or cut roots shall be cut off smoothly.

OPERATION AND MAINTENANCE PROCEDURES:

During the construction phase(s), limits of disturbance shall remain clearly marked at all times. If damage to protected trees occurs, the injured tree shall be attended to by an arborist.

SITE CONDITIONS FOR REMOVAL:

Temporary fencing shall be removed after final stabilization of the site has occurred.

EC-3 DUST (WIND EROSION) CONTROL

Wind erosion control consists of applying water and/or other dust palliatives as necessary to prevent or alleviate erosion by the forces of wind. Alternatives to applying water or other dust palliatives include mulch or vegetative cover, wind barriers, and minimization of soil disturbance.

APPROPRIATE APPLICATIONS:

This practice is implemented on all exposed soils subject to wind erosion.

CONDITIONS FOR EFFECTIVE USE:

Effectiveness depends on soil, temperature, slope, aspect, humidity and wind velocity.

WHEN BMP IS TO BE INSTALLED:

Dust control should be performed routinely, especially in advance of and during periods of dry weather.

STANDARDS AND SPECIFICATIONS:

Water shall be applied by means of pressure-type distributors or pipelines equipped with a spray system or hoses and nozzles that will ensure even distribution. Phase work to the extent practical to minimize concurrent areas of soil disturbance. For areas not subjected to traffic, vegetation provides the most practical method of dust control and should be established as early as possible. Wind barriers such as solid board fences, snow fences, burlap fences, crate walls, and similar materials can be used to control air currents and blowing soil. Barriers placed at right angles to prevailing wind currents at intervals of about 10 times their height are effective in controlling soil blowing. Paved areas that have soil on them from construction sites should be cleaned regularly. Mulching offers a fast and effective means of controlling dust when properly applied. Binders and tackifiers may need to be used on organic mulches. NOTE: If calcium chloride or spray-on adhesives are used for dust control, a permit may be required from MoDNR.

OPERATION AND MAINTENANCE PROCEDURES:

Check areas that have been protected to ensure coverage.

SITE CONDITIONS FOR REMOVAL:

Dust control should be implemented when soils are exposed until cover is established.

EC-4 HYDRAULIC MULCH-BONDED FIBER MATRIX

Hydraulic mulch consists of applying a mixture of shredded wood fiber or a hydraulic bonded fiber matrix (BFM) and a stabilizing emulsion or tackifier with hydroseeding equipment, which temporarily protects exposed soil from erosion by raindrop impact or wind. BFMs adhere directly to the soil, eliminating gaps between the product and the soil. A water-insensitive crust does not form; therefore plant growth is not inhibited. Mulch and BFMs will biodegrade completely into material beneficial to plant growth. Seed may be applied simultaneously with mulching.

APPROPRIATE APPLICATIONS:

Hydraulic mulch and BFMs are applied to disturbed areas requiring temporary protection until permanent vegetation is established or disturbed areas that must be re-disturbed following an extended period of inactivity.

CONDITIONS FOR EFFECTIVE USE:

Type of Flow: Sheet flow only.

Wood fiber hydraulic mulches and BFMs are generally short-lived (only last part of a growing season) and need 24 hours to dry before rainfall occurs to be effective.

WHEN BMP IS TO BE INSTALLED:

Hydraulic mulch or bonded fiber matrix should be applied immediately after completion of a phase of grading.

STANDARDS AND SPECIFICATIONS:

Follow manufacturer's recommendations to maximize usefulness. Avoid mulch over-spray onto the traveled way, sidewalks, and lined drainage channels. Materials for wood fiber-based hydraulic mulches and bonded fiber matrices shall meet environmental quality standards and not be a detriment to stormwater discharges from the site.

OPERATION AND MAINTENANCE PROCEDURES:

Inspect at least every week and after every storm until vegetation is fully established. Repair eroded areas and reapply product and vegetation.

SITE CONDITIONS FOR REMOVAL:

Typically these materials are left in place to degrade naturally.

EC-5 MULCHING

A layer of organic material designed to protect exposed soil or freshly seeded areas from erosion by eliminating direct impact of precipitation and slowing overland flows. Mulch materials may include, but are not limited to, grass, hay, straw, wood chips, wood fibers, and shredded bark.

APPROPRIATE APPLICATIONS:

Typically used for soil stabilization as a temporary surface cover on disturbed areas until soils can be prepared for revegetation and permanent vegetation is established. Mulch can also be installed in land--scape areas for permanent use.

CONDITIONS FOR EFFECTIVE USE:

Type of Flow: Sheet flow only

The use of appropriate mulch will help ensure the vegetation is established under normal conditions and is essential to seeding success under harsh site conditions. General mulch recommendations to protect from raindrop splash and sheet flow include: straw applied at 2-2.5 tons/acre, wood fiber or wood cellulose applied at 0.5-1 ton/acre, wood chips applied at 5-6 tons/acre, and bark applied at 35 yd3/acre. Where slopes are 25 percent (4:1) or greater, hydromulch, bonded fiber matrix, or erosion control blankets are required.

WHEN BMP IS TO BE INSTALLED:

Mulch should be applied immediately after grading landscaped areas or seeding other areas.

STANDARDS AND SPECIFICATIONS:

Install upstream BMPs to protect area to be mulched. Rough grade area and remove all debris larger than 1 inch if area is to be vegetated and mowed in the future, larger than 2 inches if area is to be permanently mulched. If area is to be seeded, follow requirements of Seeding BMP. Spread mulch evenly.

OPERATION AND MAINTENANCE PROCEDURES:

Inspect at least every week and after every storm until adequate vegetation is established; annually for permanent mulch. Protect from vehicular and foot traffic. Repair damaged, degraded or eroded areas-reseed as needed and replace mulch.

EC-6 SEEDING/MULCHING

Establishment of vegetation by spreading grass seed designed to protect exposed soil from erosion by eliminating direct impact of precipitation and slowing overland flow rates. Once established, the vegetative cover will also filter pollutants from the runoff.

APPROPRIATE APPLICATIONS:

Exposed soil after a phase of rough or finish grading has been completed, or areas where no activity will occur for 14 days.

CONDITIONS FOR EFFECTIVE USE:

Type of Flow: Sheet flow and concentrated flow (additional stabilization is necessary).

Minimum Rates: Permanent seeding should consist of 90% tall fescue and 10% annual ryegrass. Seed mixture should be applied at 400 pounds/acre. Temporary seeding shall consist of any combination of tall fescue, annual ryegrass, millet, wheat or oats. Seed mixture should be applied at 200 pounds/acre. Dormant season seeding, seed mix should consist of 80% tall fescue, 10% annual ryegrass and 10% spring oats. Seed mixture is to be applied at 600 pounds/acre.

Acceptable Dates: Permanent seeding may be done March 1 to June 1 and August 15 to November 1. Temporary seeding can occur during any season, however winter is the least tolerant. Dormant season seeding includes December 15 to February 29.

WHEN BMP IS TO BE INSTALLED:

Seed and mulch should be applied immediately after rough or finished grading is completed.

STANDARDS AND SPECIFICATIONS:

Install upstream BMPs to prevent erosion and protect the area to be seeded. Complete grading and remove all debris larger than 1 inch. Loosen compacted soils to a depth of 4 inches. Groove or furrow on the contour if necessary. Spread loose topsoil at a depth of 4 inches.

Soil amendments should be applied per soil tests. When these are not available, lime shall be applied at the rate of 1500 pounds effective neutralizing material per acre. Soils with a pH of six

or higher need not be limed. When soil tests are not available, a 13-13-13 grade fertilizer shall be appled at a rate of 500 pounds/acre for permanent seeding and a 10-10-10 grade fertilizer shall be applied at the rate of 200 pounds/acre. Mix soil amendments (lime, fertilizer, etc.) into the top 4 inches of soil.

Plant seed ¼ to ½ inches deep using a cyclone seeder, drill, cultipacker seeder, or hydro-seeder. Roll lightly to firm surface. Cover seeded area with mulch. Install additional stabilization (erosion control blankets, netting, bonded fiber matrix, etc.) on slopes steeper than 3:1 and in areas of concentrated flow. Water seeded area immediately. Provide enough water to soak 4 inches into the soil without causing runoff.

OPERATION AND MAINTENANCE PROCEDURES:

Inspect at least weekly and after every storm. Protect seeded areas from vehicular and foot traffic. Reseed and mulch areas that have not sprouted within 21 days of planting. Repair damaged or eroded areas and reseed/mulch and stabilize as needed. Do not mow until 4 inches of growth occurs. During the first 4 months, mow no more than 1/3 the grass height.

EC-7 SODDING

Sod consists of a ¾ inch to 1 inch mat of vigorous turf, free from disease, insects and weeds. Sod prevents raindrops from disrupting the soil structure and causing erosion. Sod slows water runoff and acts as a filter when sediment laden runoff crosses over the sodded area.

APPROPRIATE APPLICATIONS:

Typically installed in areas requiring immediate erosion protection, such as swales or detention ponds and as filter strips, around inlets, and adjacent to curbs. Also installed in areas requiring immediate aesthetic appearance or function such as entrances to new subdivisions and off site construction areas.

CONDITIONS FOR EFFECTIVE USE:

Type of Flow: Sheet flow and low concentrated flows with velocities less than 5 fps.

WHEN BMP IS TO BE INSTALLED:

Sod should be installed immediately after finish grading, installation of area inlets, and installation of underground services and foundations of new homes.

STANDARDS AND SPECIFICATIONS:

Rough grade area and remove all debris larger than ½ inch in diameter and concentrated areas of smaller debris. Soil preparation of area to be sodded shall be determined by tests to determine lime and fertilizer requirements. Scarify soil and level to provide an even grade. Soil should not be excessively wet or dry. Lay first row of sod perpendicular to the slope or direction of flow. Butt subsequent rows tight against previous rows with strips staggered in brick-like pattern. Fill minor gaps with good soil and roll entire surface to ensure contact. Stake, staple and/or net

corners and centers of sod strips as required, especially areas of concentrated flow. Water should be applied immediately after installation of sod. Provide enough to soak 4 inches into the soil without causing runoff.

OPERATION AND MAINTENANCE PROCEDURES:

Water sod daily for 3 weeks, enough to soak 4 inches into the soil without causing runoff. Reposition areas of sod that have moved along the slope. Remove sediment accumulations, replace sod if necessary. Repair any eroded areas, replace sod, and stabilize as needed. Do not mow until 3 inches of new growth occurs. During the first 4 months, mow no more than 1/3 the grass height.

EC-8 ROLLED EROSION CONTROL PRODUCTS

Rolled erosion control products include erosion control blankets and turf reinforcement mats. Erosion control blankets are pre-formed protective blanket of plastic fibers, wood fibers, straw or other plant residue designed to protect soil from the impact of precipitation and overland flow, and retain moisture to facilitate establishment of vegetation. Turf reinforcement mats include netting designed to anchor the root system of the vegetation growing through it.

APPROPRIATE APPLICATIONS:

These products may be installed on seeded areas for temporary or permanent use.

CONDITIONS FOR EFFECTIVE USE:

Several factors, such as soil conditions, steepness and length of slope, depth of flow, runoff velocities, and time required to establish desired vegetation, influence the choice of product. Manufacturer's recommendations should be followed. Products are available for a variety of uses: Netting-synthetic or natural fiber mesh installed over disturbed areas to hold organic mulch and/or seed in place, Biodegradable Erosion Control Blanket-natural fiber blanket held together by netting to provide temporary erosion protection on slopes and channels, and Permanent Erosion Control Blanket-synthetic blanket material which provides permanent erosion control on slopes and channels with increased water flow velocities.

WHEN BMP IS TO BE INSTALLED:

Rolled erosion control products should be installed immediately after completion of a phase of grading or installation of vegetation.

STANDARDS AND SPECIFICATIONS:

Follow manufacturer's recommendations and specifications, particularly noting requirements for check slots, fastening devices and need for firm contact with soil.

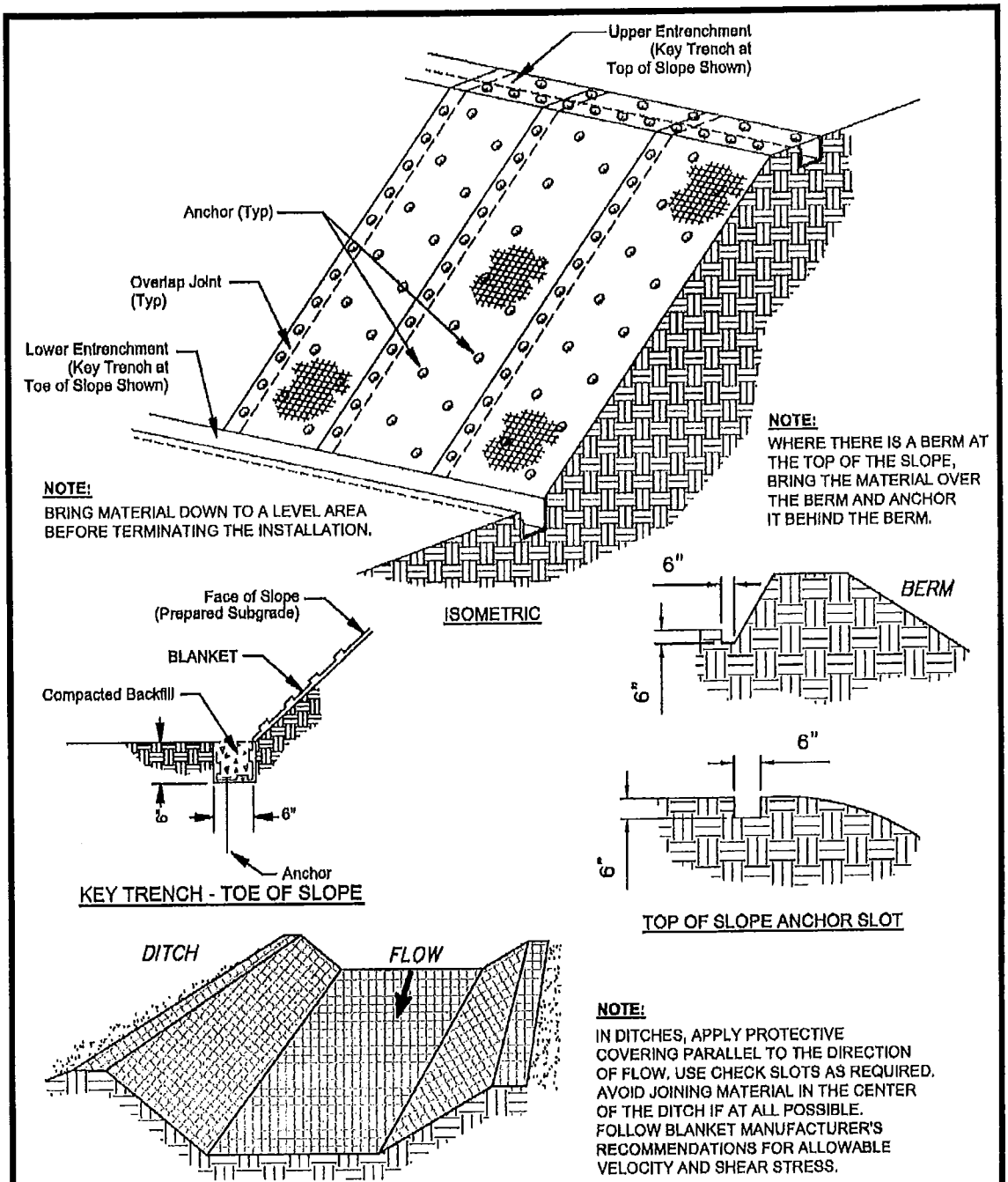
OPERATION AND MAINTENANCE PROCEDURES:

Inspect at least every week and after every storm until adequate vegetation is established. Repair erosion and/or undermining at top of slope. Repair undermining beneath blankets-pull back the blanket(s), fill compact eroded area, re-vegetate and then firmly secure the blanket(s). Reposition or replace blanket(s) that have moved along the slope or have been damaged.

SITE CONDITIONS FOR REMOVAL:

Temporary blankets will generally degrade naturally; permanent blankets remain in place.

STANDARD DRAWING: EC-8a and EC-8b


Upper Entrenchment
(Key Trench at
Top of Slope Shown)
Anchor (Typ)
Overlap Joint
(Typ)
Lower Entrenchment
(Key Trench at
Toe of Slope Shown)
NOTE:
BRING MATERIAL DOWN TO A LEVEL AREA
BEFORE TERMINATING THE INSTALLATION.
NOTE:
WHERE THERE IS A BERM AT
THE TOP OF THE SLOPE,
BRING THE MATERIAL OVER
THE BERM AND ANCHOR
IT BEHIND THE BERM.
ISOMETRIC
Face of Slope
(Prepared Subgrade)
BLANKET
Compacted Backfill
6"
6"
Anchor
KEY TRENCH - TOE OF SLOPE
6"
BERM
6"
6"
TOP OF SLOPE ANCHOR SLOT
DITCH
FLOW
NOTE:
IN DITCHES, APPLY PROTECTIVE
COVERING PARALLEL TO THE DIRECTION
OF FLOW. USE CHECK SLOTS AS REQUIRED.
AVOID JOINING MATERIAL IN THE CENTER
OF THE DITCH IF AT ALL POSSIBLE.
FOLLOW BLANKET MANUFACTURER'S
RECOMMENDATIONS FOR ALLOWABLE
VELOCITY AND SHEAR STRESS.
9/03/2008
Approved
Date
Revisions
PUBLIC WORKS
ROLLED EROSION
CONTROL PRODUCTS
EC-8A

EROSION CONTROL BLANKET NOTES:

A) SITE PREPARATION:
AFTER SITE HAS BEEN SHAPED AND GRADED, PREPARE A FRIABLE SEEDBED RELATIVELY FEE FROM CLODS AND ROCKS MORE THAN 1 1/2 INCHES IN DIAMETER AND ANY FOREIGN MATERIAL THAT WILL PREVENT UNIFORM CONTACT OF THE BLANKET WITH THE SOIL SURFACE.

B) PLANTING:
LIME, FERTILIZE, AND SEED IN ACCORDANCE WITH SEEDING OR PLANTING PLAN. WHERE GROUND COVERS ARE TO BE PLANTED, LAY THE PROTECTIVE COVERING FIRST AND THEN PLANT THROUGH THE MATERIAL AS PER PLANTING PLAN.

C) LAYING AND STAPLING:
1. START LAYING THE BLANKET FROM THE TOP OF THE CHANNEL OR SLOPE AND UNROLL DOWN-GRADE. ALLOW TO LAY LOOSELY ON SOIL; DO NOT STRETCH.
2. UPSLOPE ENDS OF THE BLANKET SHOULD BE BURIED IN AN ANCHOR SLOT NO LESS THAN 6-INCHES DEEP. TAMP EARTH FIRMLY OVER THE MATERIAL.
3. WHERE MULTIPLE WIDTHS ARE LAID SIDE BY SIDE, THE ADJACENT EDGES SHALL BE OVERLAPPED A MINIMUM OF 6 INCHES AND STAPLED TOGETHER.
4. STAPLES SHALL BE PLACED PER MANUFACTURER'S RECOMMENDATIONS.

D) TROUBLESHOOTING:
CONSULT WITH THE ENGINEER, IF ANY OF THE FOLLOWING OCCUR:
1. MOVEMENT OF THE BLANKET OR EROSION UNDER THE BLANKET IS OBSERVED.
2. VARIATIONS IN TOPOGRAPHY ON SITE INDICATE EROSION CONTROL MAT WILL NOT FUNCTION AS INTENDED; CHANGES IN PLAN MAY BE NEEDED, OR A BLANKET WITH A SHORTER OR LONGER LIFE MAY BE NEEDED.
3. DESIGN SPECIFICATIONS FOR SEED VARIETY, SEEDING DATES, OR EROSION CONTROL MATERIALS CANNOT BE MET; SUBSTITUTION MAY BE REQUIRED. UNAPPROVED SUBSTITUTIONS COULD RESULT IN FAILURE TO ESTABLISH VEGETATION.

E) MAINTENANCE & INSPECTION:
INSPECT CONTROLS AFTER EACH RAIN EVENT OF 1/2 INCH OR GREATER, AND EVERY 7 DAYS UNTIL VEGETATION IS ESTABLISHED. LOOK FOR EROSION OR UNDERMINING BENEATH THE NETTING, BLANKETS, OR MATS. IF ANY AREA SHOWS EROSION, PULL BACK THAT PORTION OF THE MATERIAL, ADD SOIL, AND RESEED; RESECURE THE MATERIAL IN PLACE. IF NETTING, BLANKETS OR MATS BECOME DISLOCATED OR DAMAGED, REPAIR OR REPLACE AND RESECURE IMMEDIATELY.

F) JOINING BLANKETS:
OVERLAP THE END OF THE PREVIOUS ROLL A MINIMUM OF 6 INCHES AND STAPLE. STAPLE ACROSS THE END OF THE ROLL JUST BELOW THE ANCHOR SLOT AND ACROSS THE MATERIAL EVERY 6 INCHES.

G) TERMINAL END:
AT THE POINT AT WHICH THE MATERIAL IS DISCONTINUED, OR WHERE THE BLANKET MEETS A STRUCTURE OF SOME TYPE, STAPLE A MINIMUM OF EVERY 12 INCHES.

H) FINAL CHECK:
THESE INSTALLATION CRITERIA MUST BE ADHERED TO:
1. ALL DISTURBED AREAS ARE SEEDED.
2. PROTECTIVE BLANKET IS IN UNIFORM CONTACT WITH THE SOIL.
3. ALL LAP JOINTS ARE SECURE.
4. ALL STAPLES ARE DRIVEN FLUSH WITH THE GROUND.

9/03/2008 Approved Date Revisions	PUBLIC WORKS	**ROLLED EROSION CONTROL PRODUCTS**	**EC-8B**

EC-9 GEOTEXTILES AND PLASTIC COVERS

This Best Management Practice (BMP) involves the placement of geotextiles or plastic covers to stabilize disturbed soil areas and protect soils from erosion by wind or water.

APPROPRIATE APPLICATIONS:

Limited applications include very small graded areas and stockpiles.

CONDITIONS FOR EFFECTIVE USE:

Type of Flow: Sheet and concentrated flows.

Geotextiles and plastic covers have maximum flow rate limitations; consult the manufacturer for proper selection. The use of plastic shall be limited to very short periods of time. The use of plastics and impermeable geotextiles results in 100% runoff, which may cause serious erosion problems in the areas receiving the increased velocities and flow. Use these products with caution. Plastic sheeting is easily vandalized, easily torn, and photodegradable.

WHEN BMP IS TO BE INSTALLED:

Geotextiles and plastic covers should be installed immediately after completion of a phase of grading or while the stockpile is in place.

STANDARDS AND SPECIFICATIONS:

Geotextile blankets shall be secured in place with wire staples or sandbags and by keying into tops of slopes and edges to prevent infiltration of surface water under the geotextile. Plastic sheeting shall be keyed in at the top of the slope and firmly held in place with sandbags or other weights placed no more than 10 feet apart. Seams are typically taped or weighted down their entire length. Anchoring the sheeting is crucial to keeping it in place during windy weather.

OPERATION AND MAINTENANCE PROCEDURES:

All geotextile and plastic sheeting shall be inspected on a weekly basis and after storms to check for erosion, undermining, and anchorage failure. Any failures shall be repaired immediately. If washout or breakages occur, the material shall be re-installed after repairing the damage to the slope.

SITE CONDITIONS FOR REMOVAL:

Upon establishment of other temporary stabilizations or after permanent stabilization has occurred.

EC-10 OUTLETS/VELOCITY DISSIPATION DEVICES

These devices are placed at pipe outlets to prevent scour and reduce the velocity and/or energy of storm water flows. These devices protect the receiving area from erosion.

APPROPRIATE APPLICATIONS:

These devices may be used at the following locations: outlets of pipes, drains, culverts, slope drains, diversion ditches, swales, conduits or channels, outlets located at the bottom of mild to steep slopes, discharge outlets that carry continuous flows of water, outlets subject to short, intense flows of water, such as flash floods, points where lined conveyances to unlined conveyances, and at emergency overflows or outlet pipes of a sediment basin.

CONDITIONS FOR EFFECTIVE USE:

Type of Flow: Concentrated flow

WHEN BMP IS TO BE INSTALLED:

Energy dissipation devices should be installed with the construction of the upstream BMP or pipe that creates a concentrated discharge.

STANDARDS AND SPECIFICATIONS:

Install riprap, concrete apron, etc. at selected outlet. Riprap aprons are best suited for temporary use during construction. Carefully place riprap to avoid damaging the filter fabric. Align the apron with the receiving stream and keep straight throughout its length. If a curve is needed to fit site conditions, place it in the upper section of the apron. If the size of the apron riprap is comprised of large rocks, protect the underlying filter fabric with a gravel blanket. Outlets on slopes steeper than 10% need additional protection.

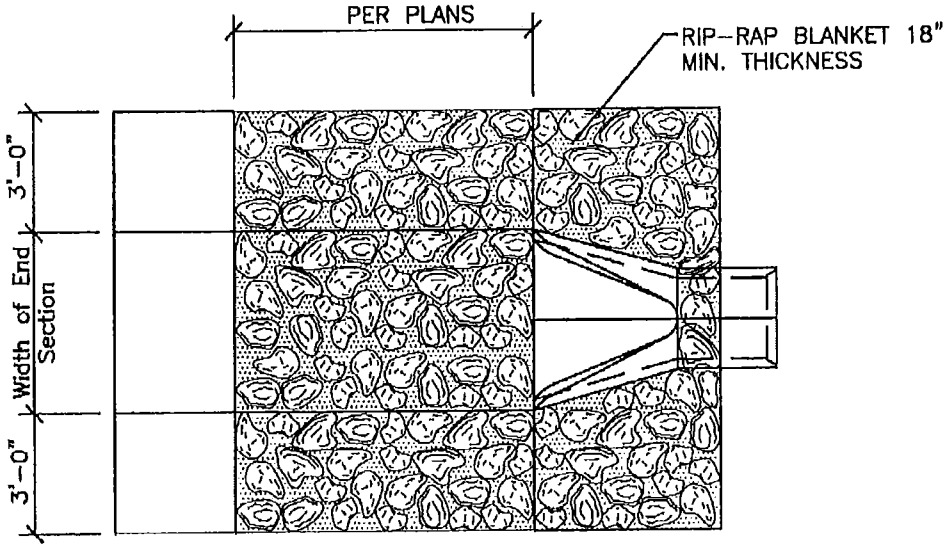
OPERATION AND MAINTENANCE PROCEDURES:

Inspect at least every week and after every storm during construction. Remove sediment and trash accumulation. Inspect apron for displacement of the riprap and/or damage to the underlying fabric. Repair fabric and replace riprap that has washed away. Inspect for scour beneath the riprap and around the outlet. Repair damage to slopes immediately, extend the pad or place larger rock, as needed.

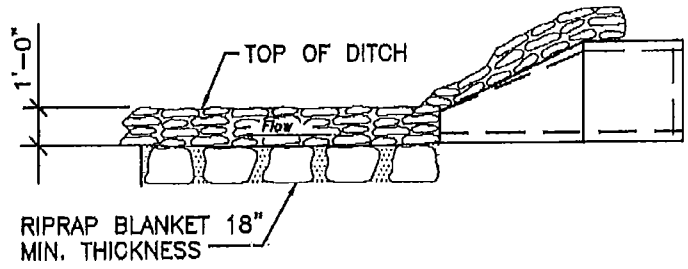
SITE CONDITIONS FOR REMOVAL:

Temporary devices need to be completely removed as soon as the surrounding drainage area has been stabilized, or at the completion of construction.

STANDARD DRAWING: EC-10



PLAN



ELEVATION

9/03/2008 Approved Date Revisions	COUNTY OF BOONE MISSOURI PUBLIC WORKS	**OUTLET/ENERGY DISSIPATION DEVICES**	**EC-10**

EC-11 TEMPORARY STREAM CROSSING

A temporary stream crossing is a structure placed across a waterway that allows vehicles to cross the waterway during construction, minimizing, reducing, or managing erosion and downstream sedimentation caused by the vehicles. Use of temporary stream crossings is discouraged. Crossings are a direct source of pollution and should be avoided if alternatives are feasible.

APPROPRIATE APPLICATIONS:

Temporary stream crossings are installed at sites: where appropriate permits have been secured (404, 401, etc.), where construction equipment or vehicles need to frequently cross a waterway, when alternate access routes impose significant constraints, and where construction activities will be less than 1 year.

CONDITIONS FOR EFFECTIVE USE:

Design considerations include: current and proposed watershed conditions, average and peak discharge (2 year, 24 hour storm), effect on water surface elevation off-site, velocity, sediment removal, and protection of fish and trees. Criteria for a Low Water Crossing includes: any constant flow less than 3" deep, light traffic, bank height less than 5 feet, and perpendicular to flow or with a slight upstream arc. Criteria for a culvert crossing includes: sized for 2 year, 24 hour storm with 1 foot freeboard and no flooding of offsite areas, pipe parallel to flow, embankment perpendicular to channel or with a slight upstream arc, riprap on exposed faces sized for overtopping during a peak storm period.

WHEN BMP IS TO BE INSTALLED:

The temporary stream crossing should be constructed during dry periods and may require dewatering or temporary diversion of the stream.

STANDARDS AND SPECIFICATIONS:

Procedures are specific to the type of crossing used. Generally, provide a stable means to bypass normal channel flow prior to disturbing channel, stabilize channel bottom, install culvert (if used), grade and compact access ramps and soil embankment, install fabric, stone, and riprap according to design.

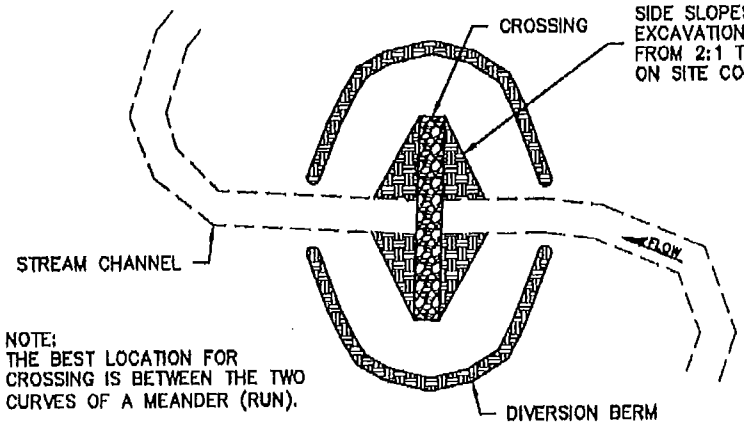
OPERATION AND MAINTENANCE PROCEDURES:

Inspect every week and after every storm-checking for: blockage in the channel, debris buildup, erosion of abutments, channel scour, riprap displacement, piping of soil, and structural weakening. Remove sediment and trash accumulation. Repair and stabilize eroded areas-extend riprap if necessary.

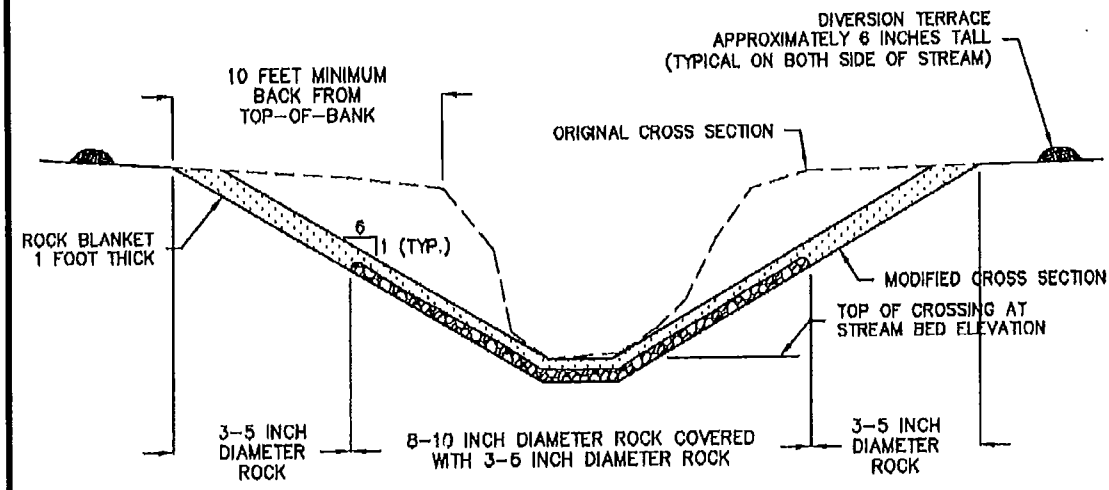
SITE CONDITIONS FOR REMOVAL:

Remove as soon as alternative access is available. All foreign materials should be removed from creek. The streambed/banks should be returned to the original contour and stabilized if necessary.

STANDARD DRAWING: EC-11a and EC-11b



REINFORCED STREAM CROSSING LAYOUT
NOT TO SCALE



REINFORCED STREAM CROSSING PROFILE
NOT TO SCALE

9/03/2008 Approved Date Revisions	COUNTY OF BOONE MISSOURI PUBLIC WORKS	**REINFORCED STREAM CROSSING**	**EC-11A**

GENERAL NOTES AND SPECIFICATIONS FOR TEMPORARY (REINFORCED) STREAM CROSSINGS:

1. THE STREAM BED FOR 0.5 MILE BELOW THE PROPOSED CROSSING MUST BE VERTICALLY STABLE. THE CHANNEL SHOULD NOT BE DOWNCUTTING (NO HEADCUTS DOWNSTREAM) OR RAPIDLY FILLING WITH SEDIMENT.
2. LOW FLOW WATER DEPTH SHALL BE LESS THAN SIX INCHES.
3. STREAM BANKS IN THE VICINITY (0.25 MILES UPSTREAM AND DOWNSTREAM) MUST BE STABLE.
4. THE CROSSING SHOULD BE LOCATED IN THE STRAIGHT REACH BETWEEN TWO BENDS.
5. APPROACHES SHOULD BE NO STEEPER THAN 6:1.
6. THE APPROACHES AND CROSSING SHOULD BE OVER EXCAVATED ONE FOOT THAN THE DESIRED SURFACE.
7. THE CROSSING AND THE APPROACHES FOR 10 FEET ON EITHER SIDE OF THE CROSSING SHOULD BE BACKFILLED WITH 8–10 INCH DIAMETER ROCK OR QUARRY RUN SHOT–ROCK TO WITHIN THREE TO FIVE INCHES OF THE DESIRED SURFACE. THE LARGE ROCK SHOULD BE COMPACTED INTO THE STREAM BED AND THE APPROACHES.
8. AFTER THE LARGE ROCK IS COMPACTED, THREE TO FIVE INCH DIAMETER ROCK SHOULD BE PLACED IN THE REMAINDER OF THE APPROACHES AND OVER THE LARGE ROCK TO PROVIDE A RELATIVELY SMOOTH SURFACE.
9. FINAL ELEVATION OF THE PORTION OF THE CROSSING SUBMERGED AT LOW FLOW SHALL NOT BE MORE THAN THREE INCHES ABOVE STREAM BED ELEVATION.
10. SIDE SLOPES OF THE APPROACH CAN RANGE FROM 2:1 TO 3:1 DEPENDING ON CONDITIONS AT THE SITE.
11. SIX INCH TALL DIVERSION BERM SHOULD BE BUILT AROUND THE CROSSING TO PREVENT OVERLAND FLOW FROM ERODING THE APPROACHES. THE DIVERSIONS SHOULD OUTLET AT STABLE LOCATIONS.
12. GROUTING (POURING CONCRETE OVER ROCK) IS PROHIBITED.
13. THE CROSSING SHOULD BE INSPECTED AFTER EACH FLOOD. BE ALERT FOR SIGNIFICANT SCOUR DOWNSTREAM OF THE CROSSING. THE SMALL DIAMETER ROCK MAY HAVE TO BE REPLACED OVER TIME. FREQUENT CLEARING OF SEDIMENT AND DEBRIS FROM THE APPROACHES WILL BE NECESSARY.

9/03/2008 Approved Date Revisions	PUBLIC WORKS	**REINFORCED STREAM CROSSING**	**EC-11B**

RM-1 CHECK DAMS

Check dams reduce scour and channel erosion by reducing flow velocity and encouraging sediment settlement. A check dam is a small device constructed of rock, gravel bags, sandbags, fiber rolls, or other proprietary product placed across a natural or man-made channel or drainage ditch.

APPROPRIATE APPLICATIONS:

Check dams can be placed at intervals along drainage swales or channels. The top of the downstream check dam should be level with the base of the upstream check dam. Check dams can also be used during the establishment of grass linings in drainage ditches or channels or in temporary ditches where the short length of service does not warrant establishment of erosion-resistant linings. Not to be used in streams.

CONDITIONS FOR EFFECTIVE USE:

Type of Flow: Moderate concentrated flow.

WHEN BMP IS TO BE INSTALLED:

Check dams can be installed prior to disturbance of natural vegetation in the contributing drainage area or immediately after construction of a drainage way.

STANDARDS AND SPECIFICATIONS:

Check dams should be placed at a distance and height to allow small pools to form behind them. Install the first check dam approximately 16 feet from the outfall device and at regular intervals based on slope gradient and soil type. For multiple check dam installation, backwater from the downstream check dam should reach the toe of the upstream dam. High flows (typically a 2-year storm or larger) should safely flow over the check dam without an increase in upstream flooding.

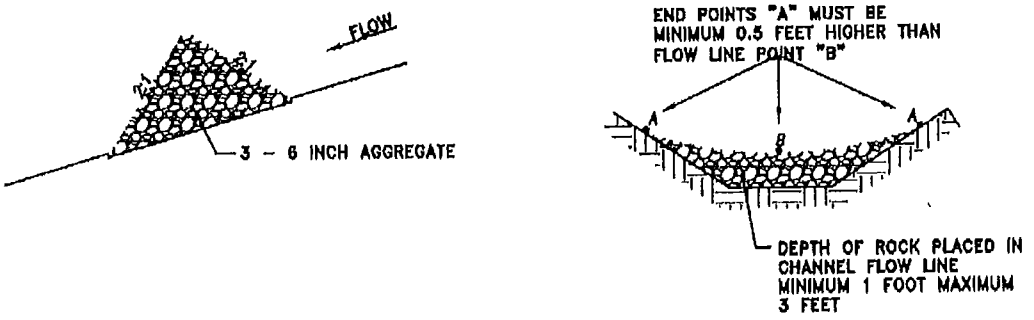
OPERATION AND MAINTENANCE PROCEDURES:

Inspect at least every week and after every storm. Remove trash and leaf accumulation. Remove sediment when depth reaches one-half of the check dam height. Repair/restore dam structure, if necessary, to original configuration to protect the banks.

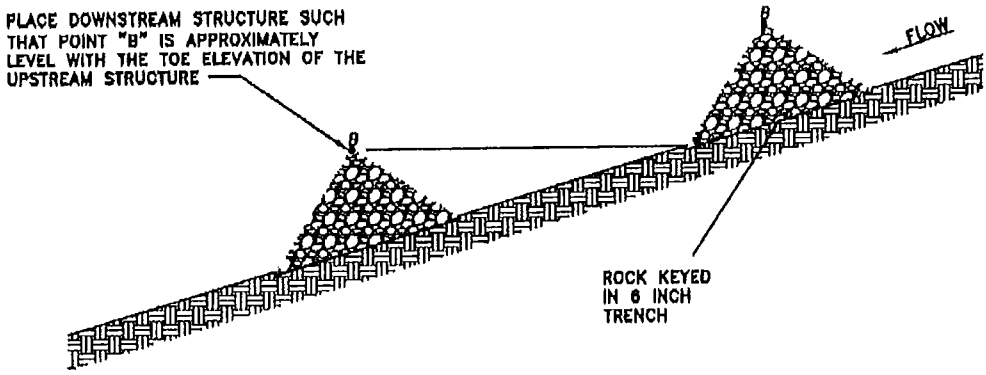
SITE CONDITIONS FOR REMOVAL:

Remove after contributing areas have been adequately stabilized and vegetation is adequately established in drainage way. Regrade and vegetate the area.

STANDARD DRAWING: RM-1



FRONT VIEW



SIDE VIEW

NOTE:

ROCK CHECK DAMS SHALL BE USED ONLY FOR DRAINAGE AREAS LESS THAT 10 ACRES UNLESS APPROVED BY THE ENGINEER.

9/03/2008 Approved Date Revisions	COUNTY OF BOONE MISSOURI PUBLIC WORKS	**CHECK DAMS**	**RM-1**

RM-2 EARTH BERMS AND DRAINAGE SWALES

A compacted earth, compost or gravel ridge, excavated channel or a combination of ridge and channel designed to direct runoff away from or around disturbed areas. Diversions built on a level contour are used in combination with temporary slope drains to provide adequate conveyance. Diversions built with positive drainage slopes release runoff into additional BMPs, such as sediment traps or level spreaders.

APPROPRIATE APPLICATIONS:

These features may be used to: convey surface runoff down sloping land, intercept and divert runoff to avoid sheet flow over sloped surfaces, divert and direct runoff towards a stabilized watercourse, drainage pipe or channel, intercept runoff from paved surfaces. Berms, swales, and lined ditches also may be used: below steep grades where runoff begins to concentrate, along roadways and facility improvements subject to flood drainage, at the top of slopes to divert run-off from adjacent or undisturbed slopes and at bottom and mid-slope locations to intercept sheet flow or to convey concentrated flows.

CONDITIONS FOR EFFECTIVE USE:

Type of Flow: Sheet flow and low-volume concentrated flows.
Contributing Area: Contributing slope length-300 feet maximum; 100 feet for slopes greater than 5%.

WHEN BMP IS TO BE INSTALLED:

Berms and/or swales should be installed prior to disturbance of natural vegetation on slopes and at intervals during construction of fill slopes.

STANDARDS AND SPECIFICATIONS:

Care must be applied to correctly size and locate berms, swales, and ditches. Excessively steep, unlined berms and swales are subject to gully erosion. Grade and compact the channel and/or ridge. Provide stabilized outfall areas. Conveyances should be stabilized with vegetation or a protective lining. Other BMPs, such as check dams and erosion control blankets, may be necessary to prevent scour and erosion.

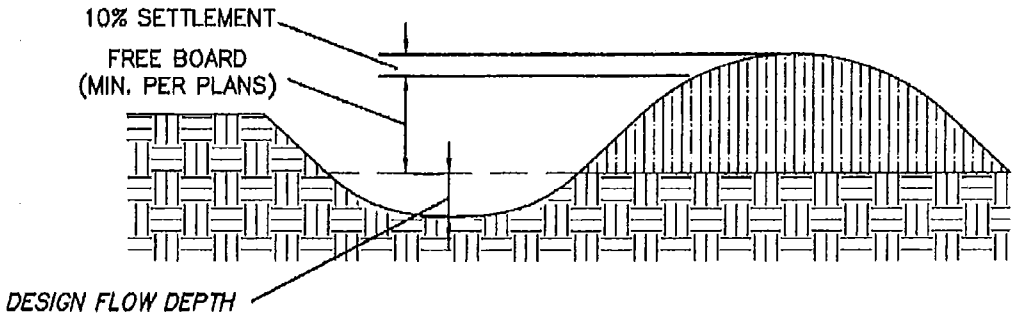
OPERATION AND MAINTENANCE PROCEDURES:

Inspect at least every week and after every storm. Inspect channel linings, embankments, and beds of ditches and berms for erosion and accumulation of debris and sediment. Remove debris and sediment, repair linings and embankments as needed-replace riprap, linings or soil stabilizers as needed.

SITE CONDITIONS FOR REMOVAL:

Temporary diversions should be removed as soon as the surrounding drainage area has been stabilized.

STANDARD DRAWING: RM - 2



NOTES:

1. TEMPORARY DIVERSION BERMS MUST BE INSTALLED AS A FIRST STEP IN THE LAND-DISTURBING ACTIVITY AND MUST BE FUNCTIONAL PRIOR TO LAND DISTURBANCE.

2. THE OUTLET OF THE DIVERSION SHALL BE LOCATED IN AN UNDISTURBED OR STABILIZED AREA.

3. TEMPORARY OR PERMANENT SEEDING AND MULCH SHALL BE APPLIED TO THE BERM IMMEDIATELY FOLLOWING ITS CONSTRUCTION.

4. ALL TREES, BRUSH, STUMPS, OBSTRUCTIONS, AND OTHER OBJECTIONABLE MATERIAL SHALL BE REMOVED AND DISPOSED OF SO AS NOT TO INTERFERE WITH THE PROPER FUNCTIONING OF THE DIVERSION.

5. THE DIVERSION SHALL BE EXCAVATED OR SHAPED TO LINE, GRADE, AND CROSS-SECTION AS REQUIRED AND FREE OF IRREGULARITIES WHICH WILL IMPEDE FLOW.

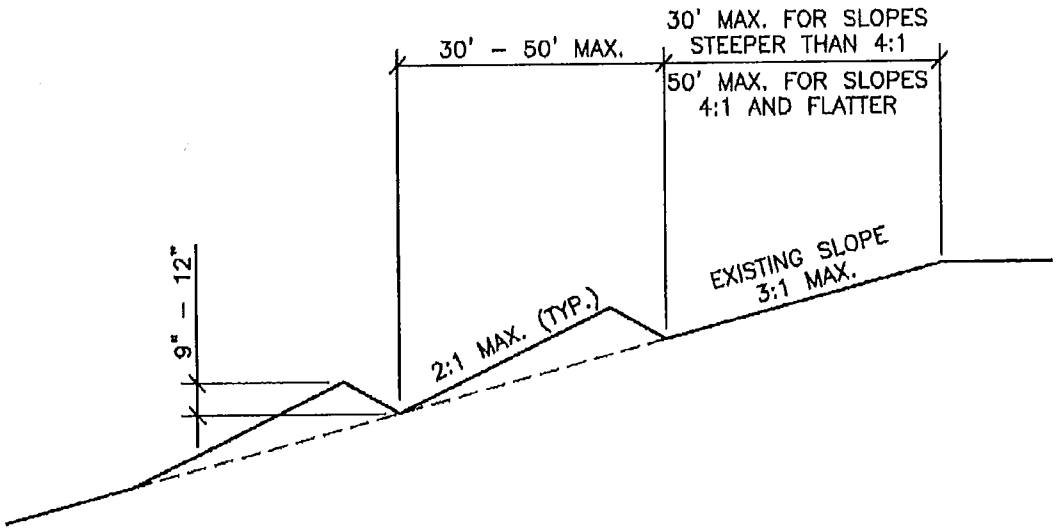
6. FILLS SHALL BE COMPACTED AS NEEDED TO PREVENT UNEQUAL SETTLEMENT THAT WOULD CAUSE DAMAGE IN THE COMPLETED DIVERSION. FILL SHALL BE COMPOSED OF SOIL WHICH IS FREE FROM EXCESSIVE ORGANIC DEBRIS, ROCKS, OR OTHER OBJECTIONABLE MATERIALS.

7. ALL EARTH REMOVED AND NOT NEEDED IN CONSTRUCTION SHALL BE SPREAD OR DISPOSED OF SO THAT IT WILL NOT INTERFERE WITH THE FUNCTIONING OF THE DIVERSION.

8. THE BERM SHOULD BE ADEQUATELY COMPACTED TO PREVENT FAILURE.

9. THE BERM SHOULD BE LOCATED TO MINIMIZE DAMAGES BY CONSTRUCTION OPERATIONS AND TRAFFIC.

9/03/2008 Approved Date Revisions	PUBLIC WORKS	**EARTH BERMS/ DRAINAGE SWALES**	**RM-2**



NOTES:
1. MAXIMUM CONTINUOUS LENGTH OF 2:1 SLOPE SHALL BE 15'.
2. TERRACE SHALL HAVE A TRANSVERSE SLOPE AT 1% TO 3% AND DRAIN TO AN ADEQUATELY PROTECTED OUTLET.
3. TERRACES MAY ONLY BE FORMED BY CONSTRUCTION OF A BERM.

9/03/2008 Approved Date Revisions	COUNTY OF BOONE MISSOURI PUBLIC WORKS	**TERRACING**	**RM-3**

RM-4 SLOPE DRAINS

A slope drain is a flexible or rigid pipe which extends from the top to the bottom of a cut or fill slope. These structures are designed to protect exposed slopes from upstream runoff and can be used with other BMPs to intercept and direct surface flow away from disturbed slope areas. Slope drains typically extend beyond the toe of the slope to a stable area or outlet.

APPROPRIATE APPLICATIONS:

Slope drains may be used on construction sites where slopes may be eroded by surface runoff.

CONDITIONS FOR EFFECTIVE USE:

Type of Flow: Sheet flow and concentrated flow. Contributing Area: Maximum of 5 acres per slope drain; pipe sized for 15 year, 20 minute storm.

WHEN BMP IS TO BE INSTALLED:

Slope drains should be installed concurrently with diversion devices as soon as cut and fill operations have occurred.

STANDARDS AND SPECIFICATIONS:

Slope drains must be installed and maintained properly because failure will usually result in severe erosion of the slope. Other points of concern are failure from overtopping due to inadequate pipe inlet capacity or blockage, and lack of maintenance of the upstream diversion device capacity. Generally install slope drain down the slope-perpendicular to slope contours, extending beyond toe of slope. Install flared end or t-section at pipe inlet. Section should be well entrenched and stable so water can enter freely. Place compacted fill over and around pipe in the area of diversion device. Ensure that all pipe connections are secure. Securely anchor the exposed section of the drain with stakes. Install flared end section at pipe outlet-discharge into a sediment trap or other stabilized outlet. Protect area around inlet with filter fabric. Protect outlet with riprap or other energy dissipation device.

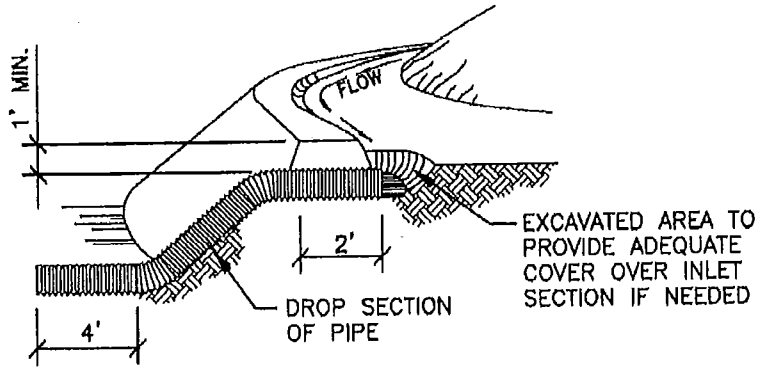
OPERATION AND MAINTENANCE PROCEDURES:

Inspect at least every week and after every storm during construction. Remove sediment and trash accumulation at inlet. Repair settlement, cracking, or piping holes. Repair leaks or inadequate anchoring along pipe. Remove sediment and stabilize eroded areas at outlet-extend if necessary.

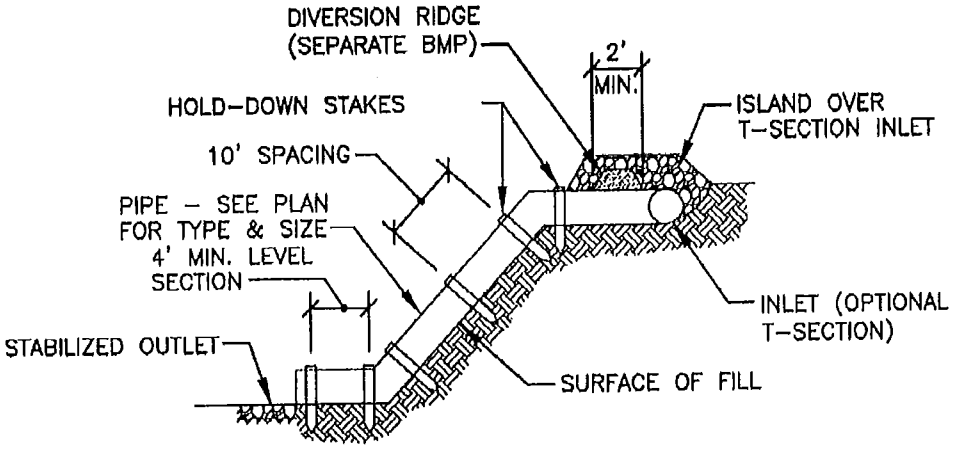
SITE CONDITIONS FOR REMOVAL:

Remove concurrently with upstream diversion device after slope has been stabilized. Stabilize the exposed areas where the slope drain and diversion device were removed.

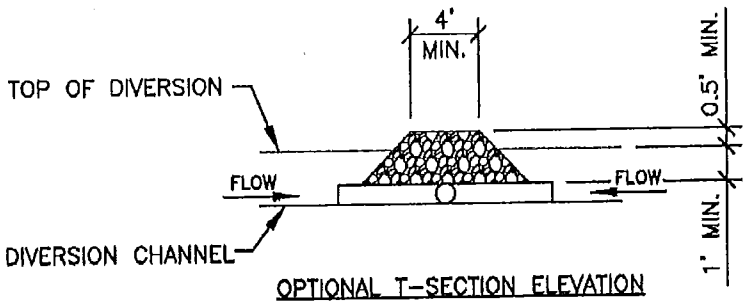
STANDARD DRAWING: RM - 4



PERSPECTIVE



PROFILE



OPTIONAL T-SECTION ELEVATION

Approved 9/03/2008 Date Revisions	COUNTY OF BOONE MISSOURI PUBLIC WORKS	**SLOPE DRAINS**	**RM-4**

RM-5 SOIL ROUGHENING

Soil roughening is a temporary erosion control practice often used in conjunction with grading. Soil roughening involves increasing the relief of a bare soil surface with horizontal grooves by either stair-stepping (running parallel to the contour of the land) or using construction equipment to track the surface. Slopes that are not fine graded and left in a roughened condition can reduce erosion by reducing runoff velocity, increasing infiltration, trapping sediment and preparing the soil for seeding and planting by giving seed an opportunity to take root and grow.

APPROPRIATE APPLICATIONS:

Soil roughening is appropriate for all slopes, but works especially well on slopes greater than 3:1, on piles of excavated soil, and in areas with highly erodable soils. This technique is especially appropriate for soils that are frequently disturbed, because roughening is relatively easy.

CONDITIONS FOR EFFECTIVE USE:

Type of Flow: Sheet flow.

Contributing Area: Unlimited on slopes <10%, slopes >10% require additional BMPs

WHEN BMP IS TO BE INSTALLED:

Soil roughening should be done immediately after rough grading; prior to seeding or mulching.

STANDARDS AND SPECIFICATIONS:

Methods for roughening soil differ depending on the type of slope and the available equipment. These methods include stair-step grading, grooving, and tracking. When choosing a method, consider factors such as slope steepness, mowing requirements, whether the slope is formed by cutting or filling, and available equipment. Soil roughening is not appropriate for rocky slopes. Tracked machinery can excessively compact the soil, therefore lightweight machinery should be used.

OPERATION AND MAINTENANCE PROCEDURES:

Inspect at least every week and immediately after every storm. Rework the slope and regroove after sediment buildup is deeper than ½ the groove depth, or if rills have formed across the roughened surface.

SITE CONDITIONS FOR REMOVAL:

The slope should be reworked to the design grades prior to final stabilization.

RM-6 FIBER ROLLS/WATTLES

Fiber rolls (also called fiber logs or straw wattles) are tube-shaped erosion-control devices filled with straw, flax, rice, coconut fiber material, or composted material. Each roll is wrapped with UV-degradable polypropylene netting for longevity or with 100 percent biodegradable materials like burlap, jute, or coir. These devices reduce erosion on long or steep slopes by breaking up the slope length.

APPROPRIATE APPLICATIONS:

Fiber rolls can be used in areas of low shear stress such as; along the toe, top, face, and at-grade breaks of exposed and erodible slopes to shorten slope length and spread runoff as sheet flow, at the end of a downward slope where it transitions to a steeper slope, along the perimeter of a project or stockpile, as check dams in unlined ditches, and downslope of exposed soil areas.

CONDITIONS FOR EFFECTIVE USE:

Type of Flow: Sheet flow and concentrated flow.

WHEN BMP IS TO BE INSTALLED:

Wattles should be installed immediately after rough grading; prior to seeding or mulching.

STANDARDS AND SPECIFICATIONS:

On slopes, install fiber rolls along the contour with a slight downward angle at the end of each row to prevent ponding at the midsection. Turn the ends of each fiber roll upslope to prevent runoff from flowing around the roll. Determine the vertical spacing for slope installations on the basis of the slope gradient and soil type. A good rule of thumb is: 1:1 slopes=10 feet apart, 2:1 slopes=20 feet apart, 3:1 slopes=30 feet apart, and 4:1 slopes=40 feet apart. Stake fiber rolls securely into the ground and orient them perpendicular to the slope. Fiber rolls can also be used at projects with minimal slopes. Typically, the rolls are installed along sidewalks, on the bare lot side, to keep sediment from washing onto sidewalks and streets and into gutters and storm drains.

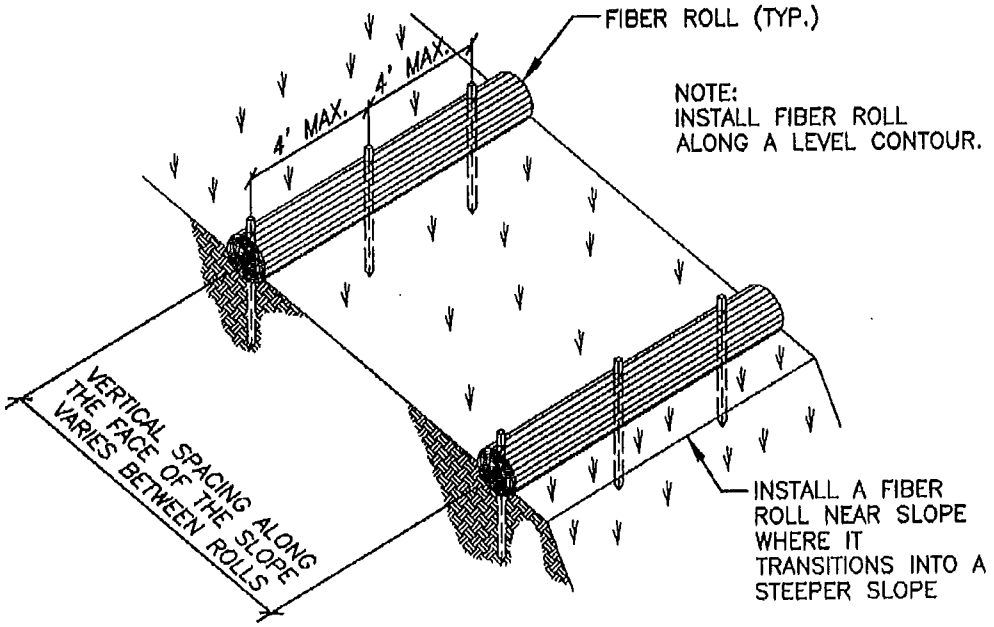
OPERATION AND MAINTENANCE PROCEDURES:

Inspect at least every week and after every storm. Remove sediment accumulation when it reaches ½ the height of the roll/wattle. Repair or replace split, torn, unraveled, or slumping fiber rolls.

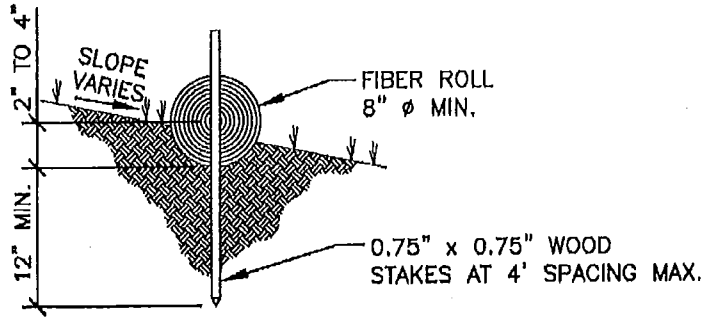
SITE CONDITIONS FOR REMOVAL:

Fiber rolls are typically left in place on slopes. If they are removed after stabilization has been achieved, collect and dispose of the accumulated sediment.

STANDARD DRAWING: RM-6



TYPICAL FIBER ROLL INSTALLATION



ENTRENCHMENT DETAIL

9/03/2008 Approved Date Revisions	COUNTY OF BOONE MISSOURI PUBLIC WORKS	**FIBER ROLLS/WATTLES**	**RM-6**

SC-1 VEGETATED FILTER STRIP

Vegetated filter strips or buffers are areas of natural or established vegetation maintained to protect the water quality of neighboring areas. Buffer zones slow stormwater runoff, provide an area where runoff can permeate the soil, contribute to ground water recharge, and filter sediment. Slowing runoff also helps to prevent soil erosion and streambank collapse.

APPROPRIATE APPLICATIONS:

Vegetated buffers can be used in any area able to support vegetation. They are most effective and beneficial on floodplains, near wetlands, along streambanks, and on unstable slopes. Filter strips can be used adjacent to low or medium density residential areas on gently sloping ground.

CONDITIONS FOR EFFECTIVE USE:

Type of Flow: Overland sheet flow only-cannot treat high velocity flows.

WHEN BMP IS TO BE INSTALLED:

Filter strips can be established immediately after rough grading to trap sediment during construction and/or immediately after final grading as a permanent measure to control surface runoff.

STANDARDS AND SPECIFICATIONS:

Determine buffer widths after carefully considering slope, vegetation, soils, depth to impermeable layers, runoff sediment characteristics, type and amount of pollutants, and annual rainfall. Make sure buffer widths increase as slope increases. In areas where flows are more concentrated and fast, combine buffer zones with other practices such as level spreaders, infiltration areas, or diversions to prevent erosion and rilling. Fence off any undisturbed vegetated strips to be preserved. No activity, including parking/storing vehicles or equipment, shall be permitted in the vegetated/woody strip. If a grass filter strip is constructed, it must be completed and vegetated before construction in a contributing area is started.

OPERATION AND MAINTENANCE PROCEDURES:

Inspect at least every week and after every storm. Remove sediment accumulation once it reaches 6" in depth. Fill and compact eroded areas and reseed, mulch and fertilize or establish other vegetation in the affected areas. After improvements are complete, regrade and reseed the top edge of the filter strip to remove sediment trapped during construction and prolong the effective use of the filter strip.

SC-2 SILT FENCE

A silt fence is a length of filter fabric stretched between anchoring posts spaced at regular intervals along the site at low/downslope areas. The filter fabric should be entrenched in the ground at least 6". When installed correctly and inspected frequently, silt fences encourages the ponding of runoff and can be an effective barrier to sediment leaving the site.

APPROPRIATE APPLICATIONS:

Installed along slopes, at base of slopes, and around the perimeter of a site as a final barrier to sediment being carried off site. Silt fence should not be used in areas of concentrated flow or as check dams.

CONDITIONS FOR EFFECTIVE USE:

Type of Flow: Sheet flow only

Contributing Area: Drainage area should not exceed 0.25 acres per 100-foot fence length.

Slope Length: The slope length above the fence should not exceed 100 feet.

WHEN BMP IS TO BE INSTALLED:

Silt fence should be installed prior to disturbance of natural vegetation and at intervals during construction of fill slopes.

STANDARDS AND SPECIFICATIONS:

If a standard-strength fabric is used, it can be reinforced with wire mesh behind the filter fabric. This increases the effective life of the fence. The maximum life expectancy for synthetic fabric silt fences is about 6 months, depending on the amount of rainfall and runoff. The fence should be designed to withstand the runoff from a 10-year peak storm event. Generally, drive posts for fence line, dig trench to required dimensions in front of posts for fabric burial, attach wire mesh to posts (if necessary), attach fabric to posts-allowing required length below ground level to run fabric along bottom of trench, and backfill and compact soil in trench to protect and anchor fabric. Alternate (and actually preferred) construction procedures include installing the fence by slicing it into the ground with specialized equipment.

OPERATION AND MAINTENANCE PROCEDURES:

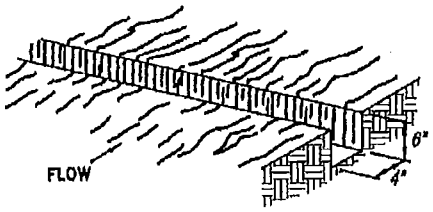
Inspect at least every week and after every storm. Monitor and remove sediment buildup that is deeper than ½ the fence height. Replace torn/clogged fabric; repair loose fabric. Repair unstable or broken posts. Stabilize any areas susceptible to undermining. Add additional fencing if necessary to provide adequate protection.

SITE CONDITIONS FOR REMOVAL:

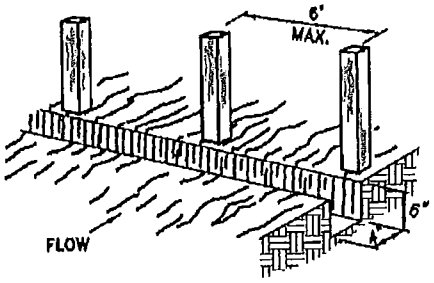
After permanent vegetation of slope is established, remove fence, regrade trench area and vegetate.

STANDARD DRAWING: SC-2a and SC-2b

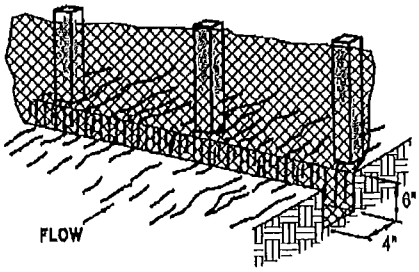
1. EXCAVATE A 6"x4" TRENCH



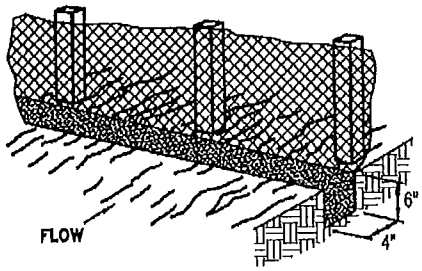
2. SET THE STAKES ALONG THE DOWN SLOPE SIDE OF THE TRENCH.



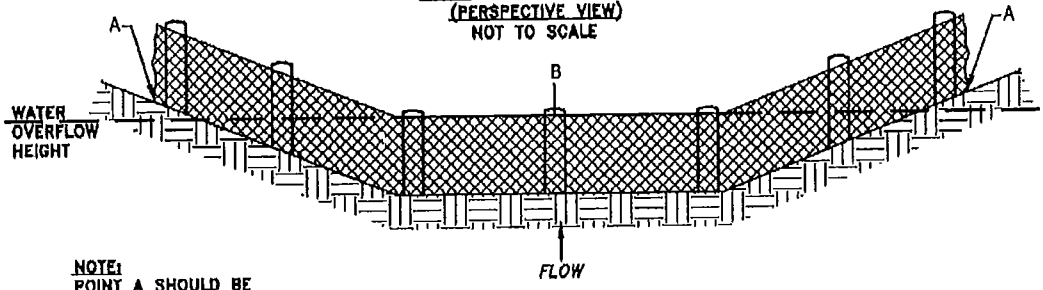
3. STAPLE GEOTEXTILE MATERIAL TO STAKES AND EXTEND IT INTO AND AROUND THE BOTTOM OF THE TRENCH.



4. BACK FILL AND COMPACT THE EXCAVATED SOIL OVER THE GEOTEXTILE IN THE TRENCH.



SHEET FLOW INSTALLATION
(PERSPECTIVE VIEW)
NOT TO SCALE



NOTE:
POINT A SHOULD BE HIGHER THAN POINT B.

DRAINAGE WAY INSTALLATION
(FRONT ELEVATION)
NOT TO SCALE

9/03/2008 Approved Date Revisions	COUNTY OF BOONE MISSOURI PUBLIC WORKS	**SILT FENCE**	**SC-2A**

SILT FENCE NOTES:

A) INSTALLATION

1. THE HEIGHT OF SILT FENCE SHALL BE A MINIMUM OF 16 INCHES ABOVE THE ORIGINAL GROUND SURFACE AND SHALL NOT EXCEED 34 INCHES ABOVE THE GROUND SURFACE.
2. THE FABRIC SHALL BE PURCHASED IN A CONTINUOUS ROLL CUT TO LENGTH OF THE BARRIER TO AVOID THE USE OF JOINTS. WHEN JOINTS ARE UNAVOIDABLE, FILTER CLOTH SHALL BE SECURELY SPLICED TOGETHER ONLY AT SUPPORT POSTS, WITH A MAX 6 INCH OVERLAP.
3. DIG A TRENCH AT LEAST 6 INCHES DEEP AND 4 INCHES WIDE ALONG THE TRENCH ALIGNMENT.
4. DRIVE POSTS AT LEAST 24 INCHES INTO THE GROUND ON THE DOWNSLOPE SIDE OF THE TRENCH. SPACE POSTS A MAXIMUM OF 6 FEET APART.
5. THE SEDIMENT FABRIC SHALL BE FASTENED SECURELY TO THE UPSLOPE SIDE OF THE POSTS USING A MINIMUM OF ONE INCH LONG, HEAVY-DUTY WIRE STAPLES OR TIE-WIRES, AND EIGHT INCHES OF THE FABRIC SHALL BE EXTENDED INTO THE TRENCH. THE FABRIC SHALL NOT BE STAPLED TO EXISTING TREES.
6. PLACE THE BOTTOM 1 FOOT OF FABRIC IN THE MINIMUM-OF-6-INCH DEEP TRENCH, LAPPING TOWARD THE UPSLOPE SIDE. BACK FILL WITH COMPACTED EARTH OR GRAVEL.
7. IF A SILT FENCE IS TO BE CONSTRUCTED ACROSS A DITCH LINE OR SWALE, IT MUST BE OF SUFFICIENT LENGTH TO ELIMINATE ENDFLOW, AND THE PLAN CONFIGURATION SHALL RESEMBLE AN ARC OR HORSESHOE, PLACED ON A CONTOUR, WITH THE ENDS ORIENTED UPSLOPE. EXTRA-STRENGTH SEDIMENT FABRIC SHALL BE USED WITH A MAXIMUM 3-FOOT SPACING OF POSTS.
8. TO REDUCE MAINTENANCE, EXCAVATE A SHALLOW SEDIMENT STORAGE AREA IN THE UPSLOPE SIDE OF THE FENCE. PROVIDE GOOD ACCESS IN AREA OF HEAVY SEDIMENTATION FOR CLEAN OUT AND MAINTENANCE.
9. SILT FENCES SHALL BE REMOVED WHEN THEY HAVE SERVED THEIR USEFUL PURPOSE, BUT NOT BEFORE THE UPSLOPE AREA HAS BEEN PERMANENTLY STABILIZED.
10. INSTALLATION WITH SLICING METHOD IS PREFERRED.

B) TROUBLESHOOTING:

1. DETERMINE THE EXACT LOCATION OF UNDERGROUND UTILITIES, BEFORE FENCE INSTALLATION SO UTILITIES ARE NOT DISTURBED.
2. GRADE ALIGNMENT OF FENCE NEEDED TO PROVIDE A BROAD, NEARLY LEVEL AREA UPSTREAM OF FENCE TO ALLOW SEDIMENT COLLECTION AREA.

C) INSPECTION MAINTENANCE:

1. INSPECT SILT FENCES AT LEAST ONCE A WEEK AND AFTER EACH 1/2" OF RAINFALL. MAKE ANY REQUIRED REPAIRS IMMEDIATELY.
2. SHOULD THE FABRIC OF A SEDIMENT FENCE COLLAPSE, TEAR, DECOMPOSE, OR BECOME INEFFECTIVE, REPLACE IT PROMPTLY.
3. REMOVE SEDIMENT DEPOSITS AS NECESSARY TO PROVIDE ADEQUATE STORAGE VOLUME FOR THE NEXT RAIN AND TO REDUCE PRESSURE ON THE FENCE. AVOID DAMAGING OR UNDERMINING THE FENCE DURING CLEANOUT. SEDIMENT ACCUMULATION SHOULD NOT EXCEED 1/2 THE HEIGHT OF THE FENCE.
4. REMOVE ALL FENCING MATERIALS AND UNSTABLE SEDIMENT DEPOSITS, AND BRING THE AREA TO GRADE AND STABILIZE IT AFTER THE CONTRIBUTING DRAINAGE AREA HAS BEEN PROPERLY AND COMPLETELY STABILIZED.

9/03/2008 Approved Date Revisions	COUNTY OF BOONE MISSOURI PUBLIC WORKS	**SILT FENCE NOTES**	**SC-2B**

SC-3 STRAW BALE DIKE

A straw bale dike consists of a series of straw (or hay) bales butted firmly end to end and anchored in place with stakes placed along the low/downslope areas of a site. The straw bales should be entrenched in the ground. When installed correctly and inspected frequently, straw bale dikes encourage the ponding of runoff and can be an effective barrier to prevent sediment from leaving the site in stormwater runoff.

APPROPRIATE APPLICATIONS:

Installed along slopes, at base of slopes, and around the perimeter of a site as a final barrier to sediment being carried off site. Straw bale dikes should not be used in areas of significant concentrated flow as check dams.

CONDITIONS FOR EFFECTIVE USE:

Type of Flow: Sheet flow and minimal concentrated flow.

Contributing Area: Drainage area should not exceed 0.25 acres per 100-foot fence length. For minor swales where the dike will serve as a ditch check, the drainage area shall not exceed 2 acres.

Slope Length: The slope length above the fence should not exceed 100 feet. Reduce this as the area above the dike steepens.

WHEN BMP IS TO BE INSTALLED:

Straw bale dikes should be installed prior to disturbance of natural vegetation and at intervals during construction of fill slopes.

STANDARDS AND SPECIFICATIONS:

The maximum life expectancy for straw bale dikes is about 3 months, depending on the amount of rainfall and runoff. The dike should be designed to withstand the runoff from a 10-year peak storm event. The dike should be installed on level ground at least 10 feet from the toe of the slope. Excavate a trench at least 4" deep and a bale width wide and long enough that the end bales are upslope of the sediment pool. Anchor bales by driving two 36" long 2"x2" hardwood stakes through each bale until nearly flush with the top. Drive the first stake toward the previously laid bale to force the bales together. Wedge loose straw into any gaps between the bales. Backfill and compact the excavated soil against the bales to ground level on the downslope side and to 4" above ground level on the upslope side.

OPERATION AND MAINTENANCE PROCEDURES:

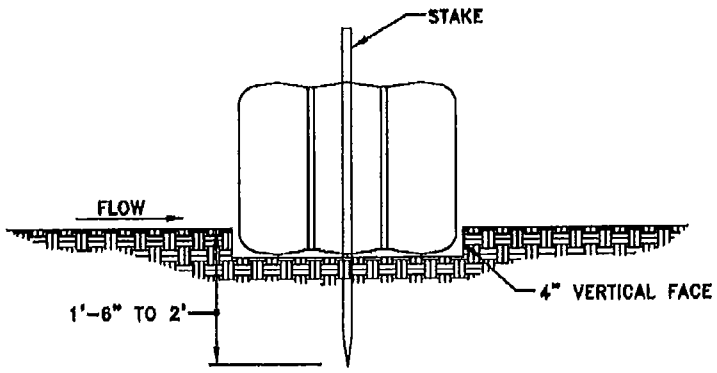
Inspect at least every week and after every storm. Remove sediment buildup that is deeper than ½ the dike height. Replace deteriorated or damaged bales. Repair unstable or broken stakes.

Stabilize any areas susceptible to undermining. Add additional bales if necessary to provide adequate protection.

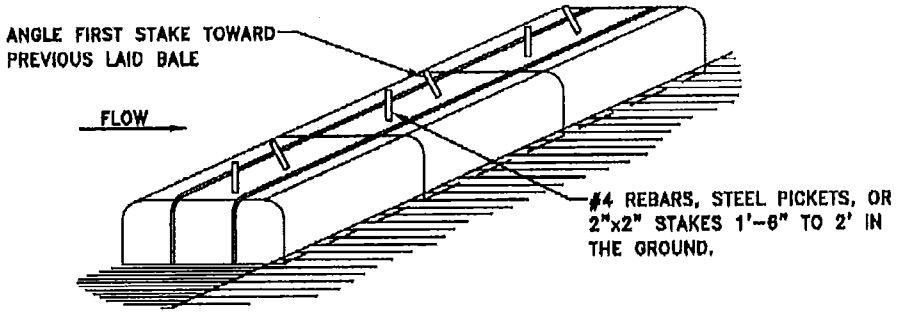
SITE CONDITIONS FOR REMOVAL:

After permanent vegetation of slope is established, remove the dike, regrade trench area and vegetate.

STANDARD DRAWING: SC-3



EMBEDDING DETAIL



ANCHORING DETAIL

1. BALES SHALL BE PLACED IN A ROW WITH ENDS TIGHTLY ABUTTING THE ADJACENT BALES.
2. EACH BALE SHALL BE EMBEDDED IN THE SOIL A MINIMUM OF 4".
3. BALES SHALL BE SECURELY ANCHORED IN PLACE BY STAKES OR RE-BARS DRIVEN THROUGH THE BALES. THE FIRST STAKE IN EACH BALE SHALL BE ANGLED TOWARD PREVIOUSLY LAID BALE TO FORCE BALES TOGETHER.
4. INSPECTION SHALL BE AT LEAST ONCE A WEEK AND AFTER EACH 1/2" RAIN. REPAIR OR REPLACEMENT SHALL BE MADE PROMPTLY.
5. BALES SHALL BE REMOVED BY THE OWNER WHEN THEY HAVE SERVED THEIR USEFULNESS SO AS NOT TO BLOCK OR IMPEDE STORM FLOW OR DRAINAGE.

9/03/2008 Approved Date Revisions	COUNTY OF BOONE MISSOURI PUBLIC WORKS	**STRAW BALE DIKE**	**SC-3**

SC-4 COMPOST FILTER SOCKS

A compost filter sock is a type of contained compost filter berm. It is a mesh tube filled with composted material that is placed perpendicular to sheet-flow runoff to control erosion and retain sediment in disturbed areas.

APPROPRIATE APPLICATIONS:

Compost filter socks are generally placed along the perimeter of a site, or at intervals along a slope, to capture and treat stormwater that runs off as sheet flow. Filter socks can also be used on pavement as inlet protection for storm drains and as small check dams to slow water flow in small ditches. Filter socks used for erosion control are usually 12 inches in diameter, although 8 inch, 18 inch, and 24 inch– diameter socks are used in some applications.

CONDITIONS FOR EFFECTIVE USE:

Type of Flow: Sheet flow and small concentrated flow

Contributing Area: Drainage area should not exceed 0.25 acres per 100-foot fence length.

Slope Length: The slope length above the fence should not exceed 100 feet.

WHEN BMP IS TO BE INSTALLED:

Filter socks can be used prior to disturbance of natural vegetation and at intervals during construction of fill slopes.

STANDARDS AND SPECIFICATIONS:

The diameter of the filter sock will vary depending upon the steepness and length of the slope. In areas of concentrated flow, filter socks are sometimes placed in an inverted V going up the slope, to reduce the velocity of water running down the slope. The project engineer may also consider placing filter socks at the top and base of the slope or placing a series of filter socks every 15 to 25 feet along the vertical profile of the slope. Generally, the filter sock is filled, put in place, and anchored using stakes, so no trenching is required. During installation, the ends of the sock should be directed upslope

OPERATION AND MAINTENANCE PROCEDURES:

Inspect at least every week and after every storm. Remove sediment buildup that is deeper than ½ the filter sock height. Repair unstable or broken posts. Stabilize any areas susceptible to undermining. Add additional socks if necessary to provide adequate protection.

SITE CONDITIONS FOR REMOVAL:

Remove the sock after permanent vegetation of slope is established. Regrade trench area and vegetate.

SC-5 COMPOST FILTER BERMS

A compost filter berm is a dike of compost or a compost product that is placed perpendicular to sheet flow runoff to control erosion in disturbed areas and retain sediment. It can be used in place of a traditional control tool such as a silt fence or compost filter socks.

APPROPRIATE APPLICATIONS:

Vegetated compost filter berms are generally placed along the perimeter of a site, or at intervals along a slope. A filter berm also can be used as a check dam in small drainage ditches.

CONDITIONS FOR EFFECTIVE USE:

Type of Flow: Sheet flow and small concentrated flow.

Contributing Area: Drainage area should not exceed 0.25 acres per 100-foot fence length.

WHEN BMP IS TO BE INSTALLED:

Install the compost berm prior to disturbance of natural vegetation and at intervals during construction of fill slopes.

STANDARDS AND SPECIFICATIONS:

The compost filter berm dimensions should be modified based on site-specific conditions, such as soil characteristics, existing vegetation, site slope, and climate, as well as project-specific requirements. Generally the berms are trapezoidal in cross section with the base twice the height of the berm. The compost should be uniformly applied to the soil surface, compacted, and shaped to into a trapezoid. Compost filter berms can be installed on frozen or rocky ground. The filter berm may be vegetated by hand, by incorporating seed into the compost prior to installation, or by hydraulic seeding following berm construction.

OPERATION AND MAINTENANCE PROCEDURES:

Inspect at least every week and after every storm. Remove sediment buildup deeper than ½ the filter berm. Any areas that have been washed away should be replaced. If the berm has experienced significant washout, the filter berm alone may not be the appropriate BMP for the area or the size of the berm may need to be increased.

SITE CONDITIONS FOR REMOVAL:

Vegetated filter berms are normally left in place and provide long-term filtration of stormwater as a post-construction best management practice (BMP). If temporary, break down the berm once construction is complete and spread the compost around the site as a soil amendment or mulch.

SC-6 SEDIMENT BASIN

A temporary settling basin designed to slowly release runoff, detaining it long enough to allow most of the sediment to settle out. Basins should be used in conjunction with additional BMPs, such as temporary seeding, to reduce the total amount of sediment washing into the structure. Sediment basins may also be designed to be converted from a temporary basin to a permanent storm water detention basin after construction has ended.

APPROPRIATE APPLICATIONS:

Should be located as close to the sediment source as possible. A sediment basin should not be used in areas of continuously running water (live streams) nor areas where failure of the embankment will result in loss of life, damage to homes or structures, or prevent the use of roadways or utilities.

CONDITIONS FOR EFFECTIVE USE:

Type of Flow: Sheet flow and concentrated flow.

Basin Volume: Volume of 10 year, 20 minute storm plus silt load of 1800 cf/acre below riser top.

WHEN BMP IS TO BE INSTALLED:

Sediment basins should be placed prior to the disturbance of natural vegetation.

STANDARDS AND SPECIFICATIONS:

For permanent structures, a qualified professional engineer experienced in designing dams should complete the basin design. Excavate basin to length, width, depth and slopes specified on plans. Place and compact fill to construct dam to elevation at least 1 foot above crown of outlet pipe. Install outlet pipe and compact clay soil around pipe. Install the perforated riser pipe, wrap with fabric, and surround with uniformly graded gravel. Install energy dissipation at downstream end of outlet pipe. Complete installation of dam to an elevation 10% above design height to allow for settling. Grade and stabilize spillway. Install monitoring post near outlet of basin. Mark maximum allowable sediment depth.

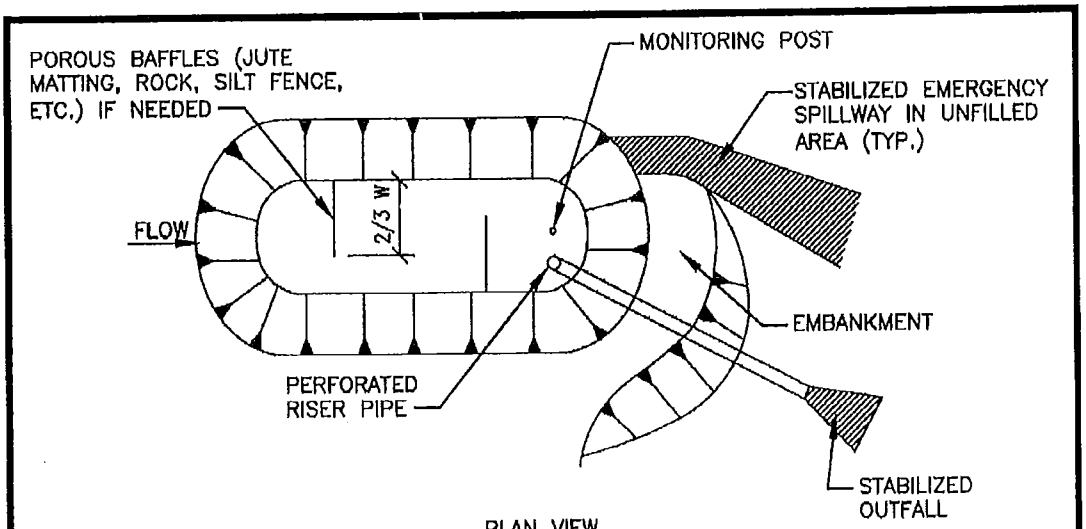
OPERATION AND MAINTENANCE PROCEDURES:

Inspect at least every week and after every ½" storm. Remove trash accumulation at outlet. Remove sediment accumulations once sediment reaches design depth, as indicated on monitoring posts. Repair and re-vegetate any erosion damage on spillway. Repair settlement, cracking, piping holes, or seepage at embankment. Replace gravel around riser if basin does not drain properly.

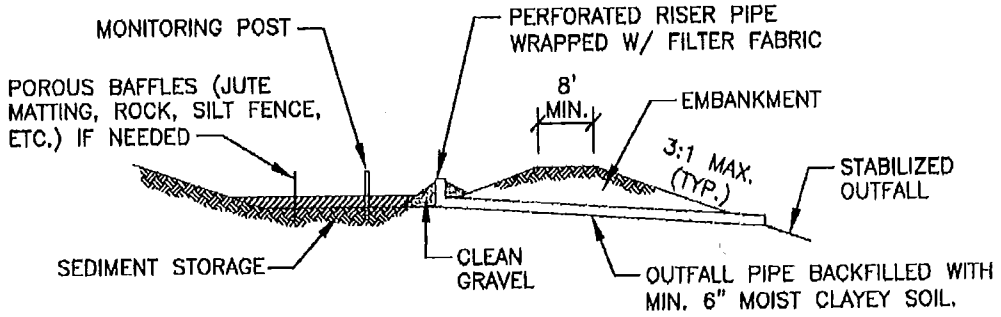
SITE CONDITIONS FOR REMOVAL:

Remove after upstream areas are stabilized. Regrade as appropriate and vegetate immediately.

STANDARD DRAWING: SC-6



PLAN VIEW



PROFILE

GENERAL NOTES:

1. TOP OF RISER SHOULD BE A MIN. OF 1' BELOW THE TOP OF THE EMBANKMENT AND 6" BELOW THE FLOW LINE OF ANY EMERGENCY SPILLWAY.
2. IF NO EMERGENCY SPILLWAY IS PROPOSED THERE SHALL BE A MINIMUM OF 1.5' OF FREEBOARD.
3. BAFFLE HEIGHT SHOULD BE GREATER THAN TOP OF RISER PIPE AND LESS THAN TOP OF EMBANKMENT.
4. SILT MONITORING POSTS SHALL BE INSTALLED NEAR THE OUTLET OF BASIN AND BE MARKED WITH MAXIMUM PERMISSABLE LEVEL OF SEDIMENT.

9/03/2008 Approved Date Revisions	PUBLIC WORKS	SEDIMENT BASINS	SC-6

SC-7 SEDIMENT TRAP

A sediment trap is a temporary containment area that allows sediment in collected storm water to settle out during infiltration or before the runoff is discharged.

APPROPRIATE APPLICATIONS:

Sediment traps are commonly used at the outlets of stormwater diversion structures, channels, slope drains, construction site entrances, vehicle wash areas, or other runoff conveyances.

CONDITIONS FOR EFFECTIVE USE:

Type of Flow: Sheet flow and concentrated flow.

Contributing Area: Maximum of 5 acres.

Trap Volume: Silt load of 1800 cf/acre.

WHEN BMP IS TO BE INSTALLED:

Install sediment traps prior to disturbance of natural vegetation.

STANDARDS AND SPECIFICATIONS:

Take care to situate sediment traps for easy access by maintenance crews. Excavate an area for the sediment trap, making sure the side slopes are no steeper than 2:1 and the embankment height no more than 5 feet from the original ground surface. Install dewatering pipe, if necessary. Place and compact fill to construct embankments and the spillway. To reduce flow rate from the trap, line the outlet with rip rap and gravel over the dewatering pipe, if necessary. The spillway weir for each temporary sediment trap should be at least 4 feet long for a 1-acre drainage area and increase by 2 feet for each additional drainage acre added, up to a maximum drainage area of 5 acres. Install monitoring posts in the trap which mark ½ the design depth for sediment accumulation.

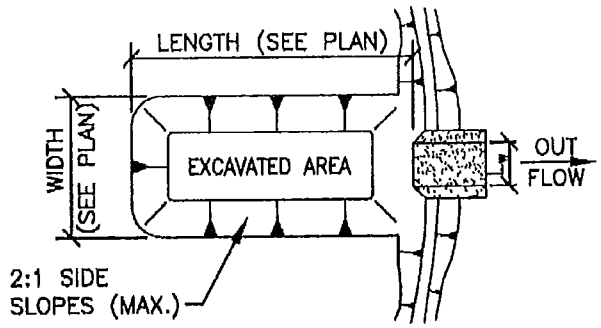
OPERATION AND MAINTENANCE PROCEDURES:

Inspect at least every week and after every ½" storm. Remove trash accumulation. Remove sediment accumulations once sediment reaches design depth, as indicated on monitoring posts. Repair and revegetate any erosion damage. Repair settlement, cracking, piping holes, or seepage at embankment.

SITE CONDITIONS FOR REMOVAL:

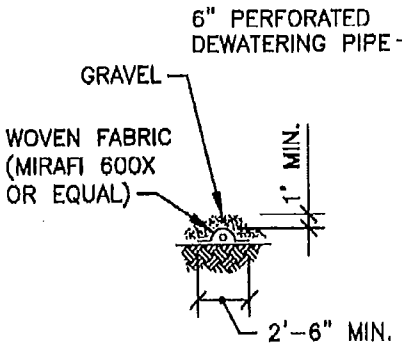
Remove after upstream areas are stabilized. Regrade as appropriate and vegetate immediately.

STANDARD DRAWING: SC-7a and SC-7b

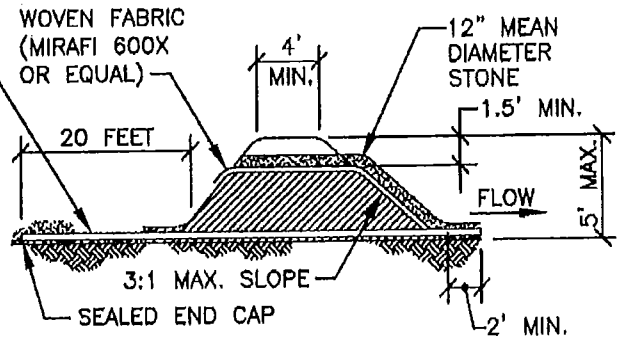


PLAN VIEW

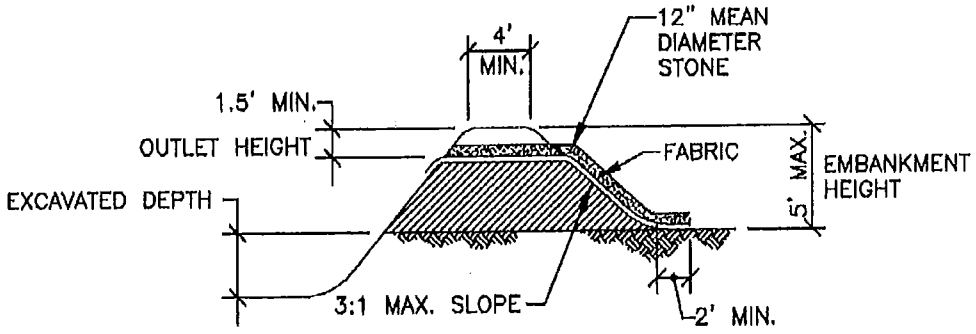
TRIBUTARY AREA (ACRES)	LENGTH OF SPILLWAY WEIR L_w (ft)
0–1.0	4
1.01–2.0	6
2.01–3.0	8
3.01–4.0	10
4.01–5.0	12



DEWATERING PIPE



OUTLET PROFILE



ALTERNATE OUTLET PROFILE

9/03/2008 Approved Date Revisions	COUNTY OF BOONE MISSOURI PUBLIC WORKS	**SEDIMENT TRAPS**	**SC-7A**

TEMPORARY SEDIMENT TRAP NOTES:

A) CONSTRUCTION SPECIFICATIONS:

1. THE AREA UNDER THE EMBANKMENT SHALL BE CLEARED, GRUBBED, AND STRIPPED OF ANY VEGETATION AND ROOT MAT.

2. FILL MATERIAL FOR THE EMBANKMENT SHALL BE FREE OF ROOTS OR OTHER WOODY VEGETATION, ORGANIC MATERIAL, LARGE STONES, AND OTHER OBJECTIONABLE MATERIAL. THE EMBANKMENT SHOULD BE COMPACTED IN 6-INCH LAYERS BY TRAVERSING WITH CONSTRUCTION EQUIPMENT.

3. THE EARTHEN EMBANKMENT SHALL BE SEEDED WITH TEMPORARY OR PERMANENT VEGETATION IMMEDIATELY AFTER INSTALLATION

4. CONSTRUCTION OPERATION SHALL BE CARRIED OUT TO MINIMIZE EROSION AND WATER POLLUTION.

5. ALL CUT AND FILL SLOPES SHALL BE 2H:1V OR FLATTER EXCEPT FOR EXCAVATED, WET STORAGE AREAS WHICH MAY BE AT A MAXIMUM 1H:1V GRADE.

B) INSPECTION AND MAINTENANCE

1. INSPECT THE TEMPORARY SEDIMENT TRAP WEEKLY AND AFTER EACH STORM EVENT OF 1/2-INCH OR GREATER.

2. REMOVE AND PROPERLY DISPOSE OF SEDIMENT WHEN IT ACCUMULATES TO ONE-HALF THE DESIGN VOLUME.

3. PERIODICALLY CHECK THE EMBANKMENT, SPILLWAY, AND OUTLET APRON FOR EROSION DAMAGE, SETTLING SEEPAGE, OR SLUMPING ALONG THE TOE AND REPAIR IMMEDIATELY.

4. REPLACE THE SPILLWAY GRAVEL FACING IF IT BECOMES CLOGGED.

5. INSPECT VEGETATION AND RESEED IF NECESSARY.

6. REPLACE ANY DISPLACED RIPRAP SO THAT NO REPLACEMENT ROCK IS ABOVE THE DESIGN GRADE.

7. REMOVE THE TEMPORARY SEDIMENT TRAP AFTER THE DRAINAGE AREA HAS BEEN PERMANENTLY STABILIZED, INSPECTED, AND APPROVED. DO SO BY DRAINING ANY WATER, REMOVING THE SEDIMENT TO A DESIGNATED DISPOSAL AREA, AND GRADING THE SITE TO BLEND WITH THE SURROUNDING AREA; THEN STABILIZE.

9/03/2008 Approved Date Revisions	COUNTY OF BOONE MISSOURI PUBLIC WORKS	**SEDIMENT TRAPS**	**SC-7B**

SC-8 CURB AND GUTTER INLET PROTECTION

A temporary sediment control barrier consisting of a filter media, such as compost filter socks, gravel and mesh, sandbags, gravel bags, etc., around a curb and gutter inlet designed to prevent sediment from entering the storm sewer. Shallow temporary ponding may occur during and after rainfall events.

APPROPRIATE APPLICATIONS:

Place protection at inlets where runoff may contain sediment-laden water.

CONDITIONS FOR EFFECTIVE USE:

Type of Flow: Sheet flow and concentrated flow.

Contributing Area: Maximum of 1 acre.

WHEN BMP IS TO BE INSTALLED:

Install inlet protection immediately after installation of the inlet, or prior to land disturbing activities beginning on the contributing upstream area to the inlet.

STANDARDS AND SPECIFICATIONS:

Typical types of curb and gutter inlet protection include: fabricated inlet filters (follow manufacturer's instructions), compost filter sock (make sure that both ends of the sock are anchored accordingly), gravel and wire mesh (construct and anchor wood frame, fasten wire mesh and fabric to frame and place the gravel on top of the entire structure), sandbags and gravel bags (may be placed either as a j-hook on the upstream end of the inlet or as a full barrier, sometimes stacked 2 bags high, across the entire opening of the inlet). Incorporate an overflow bypass into the inlet protection structure in areas, such as heavy traffic streets, where excessive ponding of water around the inlet may become a safety issue. Sediment controls behind the curb will be necessary to prevent the discharge of sediment in these bypasses.

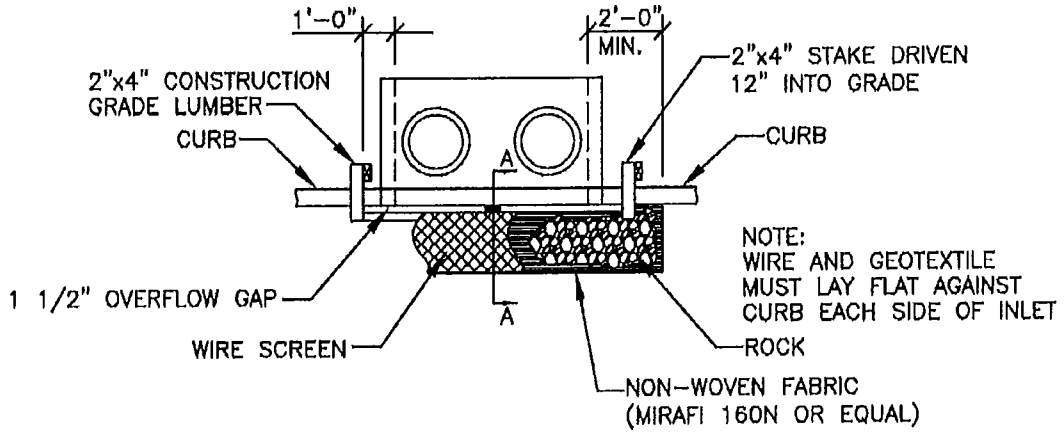
OPERATION AND MAINTENANCE PROCEDURES:

Inspect inlet protection of all media types weekly and after each ½" rainfall event to make sure they are functioning properly. Remove trash and debris. Remove sediment from the inlet protection when half of the protection structure height has been filled. Repair elements to original configuration as needed.

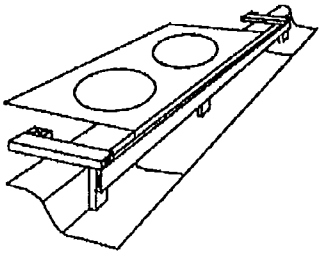
SITE CONDITIONS FOR REMOVAL:

Remove after contributing drainage areas have been adequately stabilized.

STANDARD DRAWING: SC-8

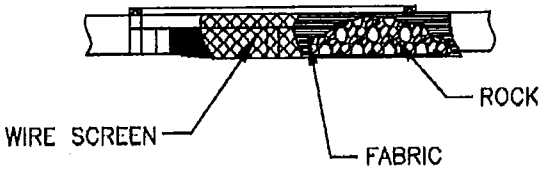


PLAN

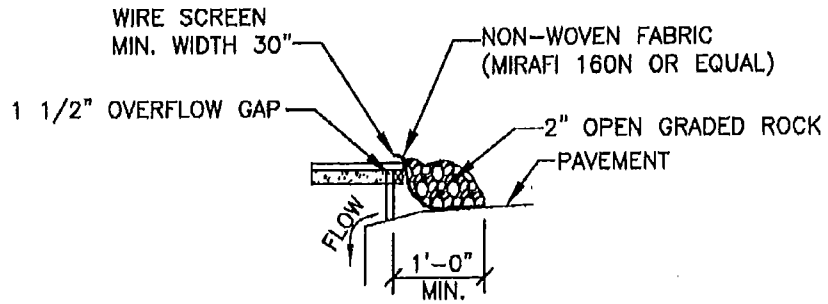


WOODEN FRAME ON VERTICAL CURB

NOTE: ALTERNATIVELY, ROCK CAN BE PLACED IN A FILTER FABRIC BAG (SIMILAR TO SANDBAG) AND PLACED IN THE OPENING WITHOUT THE WOODEN FRAME.



ELEVATION



SECTION A-A

Approved 9/03/2008 Date Revisions	COUNTY OF BOONE MISSOURI PUBLIC WORKS	**CURB and GUTTER INLET PROTECTION**	**SC-8**

SC-9 DROP INLET PROTECTION

A temporary sediment control barrier consisting of a filter fabric around a recessed area inlet designed to prevent sediment from entering the storm sewer. Shallow temporary ponding may occur during and after rainfall events.

APPROPRIATE APPLICATIONS:

At recessed area or yard inlets where runoff may contain sediment-laden water.

CONDITIONS FOR EFFECTIVE USE:

Type of Flow: Sheet flow and concentrated flow.

Contributing Area: Maximum of 1 acre.

WHEN BMP IS TO BE INSTALLED:

Place inlet protection immediately after installation of the inlet, or prior to land disturbing activities beginning on the contributing upstream area to the inlet.

STANDARDS AND SPECIFICATIONS:

Typical types of drop inlet protection include: manufactured filtering product or silt fence frames. Follow the manufacture's instruction for placement of proprietary products. For the silt fence protection, install a wood frame, dig a trench around the inlet for fabric to be buried, fasten fabric tightly to frame, backfill and compact trench. Alternatively, a sod filter can be installed by preparing and fertilizing the soil around the inlet and installing sod for a distance of at least 4 feet in each direction. The sod should be staked, stapled and/or netted at the corners and center of sod strips as required and then watered immediately. For safety, inlet protection structures which pond water onto streets, parking lots or driveways should be designed to have some method for allowing excess water from large storms to bypass or overflow.

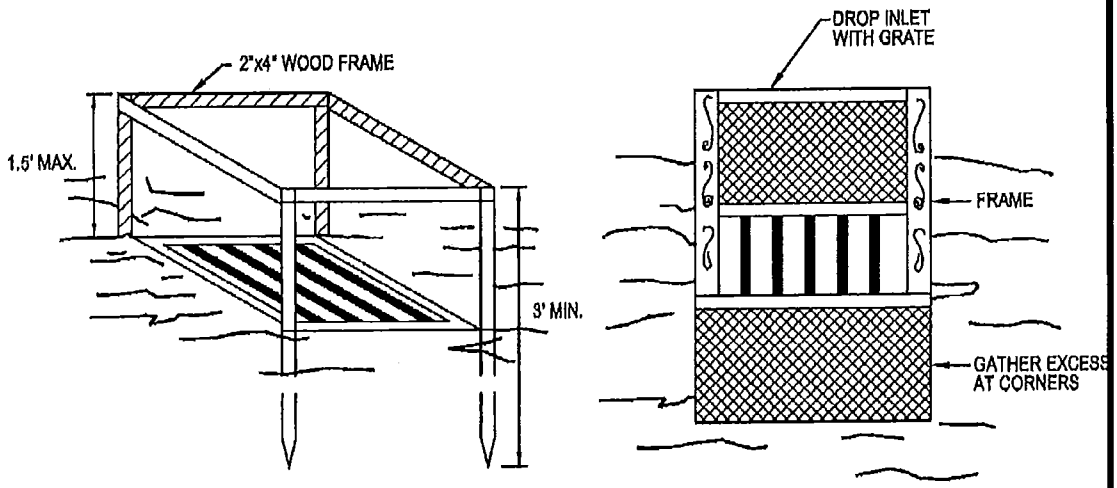
OPERATION AND MAINTENANCE PROCEDURES:

Inspect inlet protection of all media types weekly and after each significant rainfall event to make sure they are functioning properly. Remove trash and debris. Remove sediment from the inlet protection when half of the protection structure height has been filled. Repair elements to original configuration as needed.

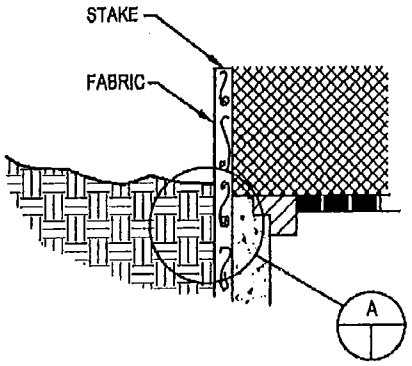
SITE CONDITIONS FOR REMOVAL:

Remove after contributing drainage areas have been adequately stabilized.

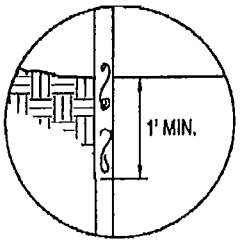
STANDARD DRAWING: SC-9a and SC-9b



PERSPECTIVE VIEWS
NOT TO SCALE



ELEVATION OF STAKE AND
FABRIC ORIENTATION



DETAIL A
NOT TO SCALE

Approved 9/03/2008 Date Revisions	COUNTY OF BOONE MISSOURI PUBLIC WORKS	**DROP INLET PROTECTION (SILT FENCE)**	**SC-9A**

SEDIMENT FENCE DROP INLET PROTECTION NOTES:

A) CONSTRUCTION SPECIFICATIONS:

1. SEDIMENT FENCE SHALL BE CUT FROM A CONTINUOUS ROLL TO AVOID JOINTS.
2. FOR STAKES, USE 2X4 WOOD OR EQUIVALENT METAL WITH A MINIMUM LENGTH OF 3 FEET.
3. SPACE STAKES EVENLY AROUND THE PERIMETER OF THE INLET A MAXIMUM OF 3 FEET APART, AND SECURELY DRIVE THEM INTO THE GROUND, APPROXIMATELY 18 INCHES DEEP.
4. TO PROVIDE NEEDED STABILITY TO THE INSTALLATION, FRAME WITH 2X4 WOOD STRIPS AROUND THE CREST OF THE OVERFLOW AREA AT A MAXIMUM OF 1.5 FEET ABOVE THE DROP INLET CREST.
5. PLACE THE BOTTOM 12 INCHES OF THE FABRIC IN A TRENCH AND BACK FILL THE TRENCH WITH 12-INCHES OF COMPACTED SOIL.
6. FASTEN FABRIC SECURELY BY STAPLES, OR WIRE IT TO THE STAKES AND FRAME. JOINTS MUST BE OVERLAPPED TO THE NEXT STAKE.

B) INSPECTION AND MAINTENANCE:

1. THE STRUCTURE SHALL BE INSPECTED WEEKLY AND AFTER EACH RAIN EVENT OF 1/2 INCH OR GREATER AND REPAIRS MADE AS NEEDED.
2. SEDIMENT SHALL BE REMOVED AND THE TRAP RESTORED TO ITS ORIGINAL DIMENSIONS WHEN THE SEDIMENT HAS ACCUMULATED TO ONE HALF THE DESIGN DEPTH OF THE TRAP. REMOVED SEDIMENT SHALL BE DEPOSITED IN A SUITABLE AREA AND IN SUCH A MANNER THAT IT WILL NOT ERODE.
3. STRUCTURES SHALL BE REMOVED AND THE AREA STABILIZED WHEN THE REMAINING DRAINAGE AREA HAS BEEN PROPERLY STABILIZED.

9/03/2008 Approved Date Revisions	PUBLIC WORKS	**DROP INLET PROTECTION (SILT FENCE) NOTES**	**SC-9B**

TC-1 CONSTRUCTION ENTRANCE/EXIT

A stabilized entrance to a construction site which is designed to minimize the amount of sediment tracked from the site on vehicles and equipment. Mud and sediment fall off of tires as they travel along the stabilized entrance.

APPROPRIATE APPLICATIONS:

At locations where it is safe for construction vehicles and equipment to access existing streets, preferably at the location of future streets or drives.

CONDITIONS FOR EFFECTIVE USE:

Site conditions will dictate design and need. Ditches or pipes, if needed, sized for 15 year, 20 minute storm; HGL 6" below surface of entrance.

WHEN BMP IS TO BE INSTALLED:

Install stabilized construction entrance/exit prior to vehicles or equipment accessing unpaved areas. This will most likely the first BMP to be installed on the site.

STANDARDS AND SPECIFICATIONS:

Limit the points of entrance/exit to the construction site. Properly grade and compact each construction entrance/exit to prevent runoff from leaving the site. Install culvert under entrance if needed to maintain positive drainage. Place fabric and cover with aggregate, forming a diversion across the entrance, if needed, to direct runoff away from the roadway. Require all employees, subcontractors, and suppliers to utilize the stabilized construction access.

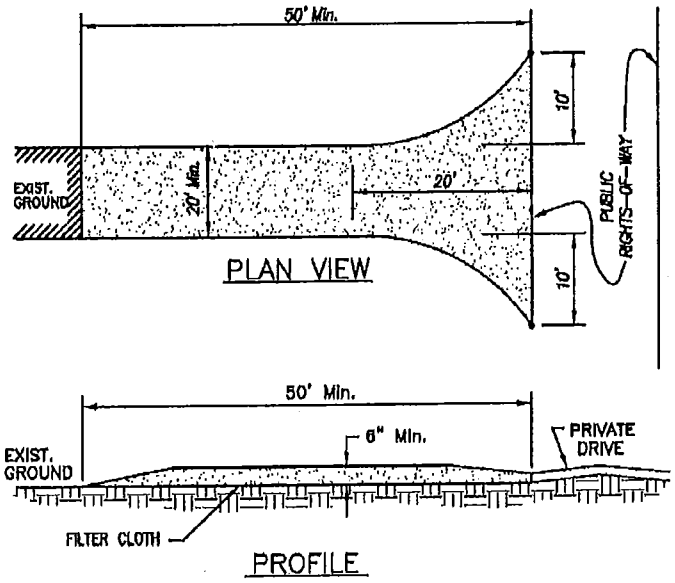
OPERATION AND MAINTENANCE PROCEDURES:

Inspect routinely for damage and assess effectiveness of the BMP. Remove sediment and clods of dirt from construction entrance continuously. Replace rock, as necessary, to maintain a clean surface for traffic. Repair any areas that have settled. Keep all temporary roadway ditches clear. Immediately remove any mud or debris tracked onto paved surfaces.

SITE CONDITIONS FOR REMOVAL:

Remove when vehicles and equipment will no longer require access to unpaved areas.

STANDARD DRAWING: TC-1



CONSTRUCTION SPECIFICATIONS

1. STONE SIZE – USE 2" STONE.
2. LENGTH – AS REQUIRED, BUT NOT LESS THAN 50 FEET.
3. THICKNESS – NOT LESS THAN SIX (6) INCHES.
4. WIDTH – TWENTY (20) FOOT MINIMUM, BUT NOT LESS THAN THE FULL WIDTH AT POINTS WHERE INGRESS OR EGRESS OCCURS.
5. FILTER CLOTH – WILL BE PLACED OVER THE ENTIRE AREA PRIOR TO PLACING OF STONE.
6. SURFACE WATER – ALL SURFACE WATER FLOWING OR DIVERTED TOWARD CONSTRUCTION ENTRANCES SHALL BE PIPED ACROSS THE ENTRANCE. IF PIPING IS IMPRACTICAL, A MOUNTABLE BERM WITH 5:1 SLOPES WILL BE PERMITTED.
7. MAINTENANCE – THE ENTRANCE SHALL BE MAINTAINED IN A CONDITION WHICH WILL PREVENT TRACKING OR FLOWING OF SEDIMENT ONTO PUBLIC RIGHTS-OF-WAY. THIS MAY REQUIRE PERIODIC TOP DRESSING WITH ADDITIONAL STONE AS CONDITIONS DEMAND AND REPAIR AND/OR CLEANOUT OF ANY MEASURES USED TO TRAP SEDIMENT. ALL SEDIMENT SPILLED, DROPPED, WASHED OR TRACKED ONTO PUBLIC RIGHTS-OF-WAY MUST BE REMOVED IMMEDIATELY.
8. PERIODIC INSPECTION AS NEEDED MAINTENANCE SHALL BE PROVIDED WEEKLY AND AFTER EACH RAIN EVENT GREATER THAN 1/2".

9/03/2008 Approved Date Revisions	COUNTY OF BOONE MISSOURI PUBLIC WORKS	**CONSTRUCTION ENTRANCE/EXIT**	**TC-1**

TC-2 WASHDOWN STATION

An area located at stabilized construction access points to remove sediment from tires and undercarriages, and to prevent sediment from being transported onto public roadways.

APPROPRIATE APPLICATIONS:

Tire washes may be used on construction sites where dirt and mud tracking onto public roads by construction vehicles may occur.

CONDITIONS FOR EFFECTIVE USE:

A downstream sediment trapping BMP is needed to treat dirty runoff from the washdown station. These stations require a supply of wash water and a turnout or doublewide exit to avoid having entering vehicles drive through the wash area.

WHEN BMP IS TO BE INSTALLED:

Washdown stations should be installed along with the stabilized construction entrance/exit, prior to vehicles or equipment accessing unpaved areas.

STANDARDS AND SPECIFICATIONS:

Grade and compact area for drainage under washdown pad. Install wash rack, which should be designed and constructed/manufactured for anticipated traffic loads. Provide a drainage ditch, grade that will convey the runoff from the wash area to a sediment trapping device. The drainage ditch should be of sufficient grade, width, and depth to carry the wash runoff. Install water supply and hose. Post signs in advance of the station indicating that all muddy vehicles and equipment must use the station prior to exiting the site.

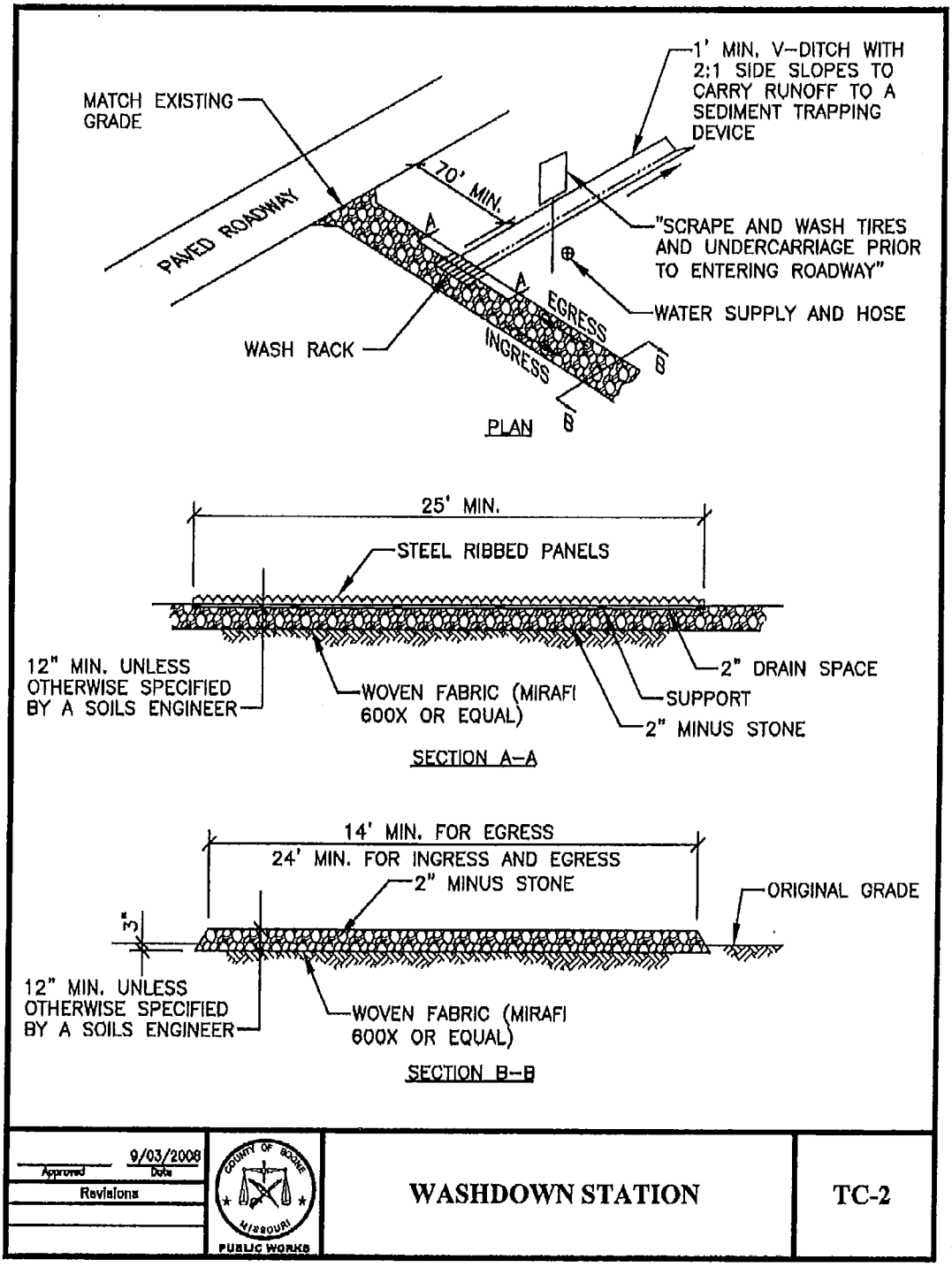
OPERATION AND MAINTENANCE PROCEDURES:

Remove accumulated sediment in wash rack and/or sediment trap on a daily basis or as needed to maintain system performance. Repair any areas that have settled. Replace rock if necessary to maintain a clean surface.

SITE CONDITIONS FOR REMOVAL:

Remove when vehicles and equipment will no longer access unpaved areas.

STANDARD DRAWING: TC-2


1' MIN. V-DITCH WITH 2:1 SIDE SLOPES TO CARRY RUNOFF TO A SEDIMENT TRAPPING DEVICE
MATCH EXISTING GRADE
70' MIN.
PAVED ROADWAY
"SCRAPE AND WASH TIRES AND UNDERCARRIAGE PRIOR TO ENTERING ROADWAY"
WATER SUPPLY AND HOSE
EGRESS
INGRESS
WASH RACK
PLAN
25' MIN.
STEEL RIBBED PANELS
12" MIN. UNLESS OTHERWISE SPECIFIED BY A SOILS ENGINEER
WOVEN FABRIC (MIRAFI 600X OR EQUAL)
2" DRAIN SPACE
SUPPORT
2" MINUS STONE
SECTION A-A
14' MIN. FOR EGRESS
24' MIN. FOR INGRESS AND EGRESS
2" MINUS STONE
ORIGINAL GRADE
12" MIN. UNLESS OTHERWISE SPECIFIED BY A SOILS ENGINEER
WOVEN FABRIC (MIRAFI 600X OR EQUAL)
SECTION B-B
Approved 9/03/2008
Date
Revisions
PUBLIC WORKS
WASHDOWN STATION
TC-2

PP-1 NON-SEDIMENT POLLUTION CONTROL

These control measures are designed to prohibit chemicals, hazardous materials, solid waste, human waste and construction debris from polluting stormwater. Pollutants carried in solution or as surface films on runoff will be carried through most erosion control and sediment capture BMPs. Keeping substances like fuel, oil, asphalt, paint, solvents, fertilizer, soil additives, concrete wash water, solid waste, human waste and construction debris from polluting runoff can be accomplished to a large extent through good housekeeping on the site and following the manufacturer's recommendations for disposal.

APPROPRIATE APPLICATIONS:

Temporary sanitary facilities, collection, storage and fueling areas should be located onsite in an area that does not receive a substantial amount of runoff from upland areas and does not drain directly to lakes, creeks, streams, rivers, sewers, groundwater, wetlands, or road ditches.

CONDITIONS FOR EFFECTIVE USE:

An effective management system requires training and signage to promote proper storage, handling and disposal of materials, and follow up observations of actions and inspection of storage areas by management. Plans should contain notes clearly stating requirements for addressing potential pollutants.

WHEN BMP IS TO BE INSTALLED:

Pollution control practices should begin immediately and continue throughout the project.

STANDARDS AND SPECIFICATIONS:

Place waste receptacles near area of work. All fueling facilities present on the site shall adhere to applicable federal and state regulations concerning underground storage, above ground storage, and dispensers. Hazardous wastes shall be managed according to Missouri Hazardous Waste Laws and Regulations. Install appropriate signage. Post guidelines for proper handling, storage and disposal of materials, and emergency spill cleanup on site. Provide sufficient temporary toilet facilities to serve the number of workers on the site.

OPERATION AND MAINTENANCE PROCEDURES:

Inspect activities on a regular basis. Inspect storage areas and control devices at least every week and after every storm. Maintenance of temporary toilet facilities should be frequent and thorough. Make necessary corrections and repairs.

SITE CONDITIONS FOR REMOVAL:

Remove after contributing drainage areas have been adequately stabilized.

STANDARD NOTES:

General pollution notes:

1. Handling and disposal of hazardous materials:

DO: Prevent spills
Use up products completely
Follow label directions for disposal
Remove lids from empty bottles and cans when disposing in trash
Recycle wastes whenever possible

DON'T: Don't pour waste into sewers or waterways on the ground
Don't pour waste down the sink, floor drain or septic tanks
Don't bury chemicals or containers, or dispose of them with other waste
Don't burn chemicals or containers
Don't mix chemicals together

2. Containers shall be provided for collection of all waste material including construction debris, trash, petroleum products and any hazardous materials to be used onsite. All waste material shall be disposed of at facilities approved for that material.

3. No waste materials shall be buried on-site.

4. Mixing, pumping, transferring or otherwise handling construction chemicals such as fertilizer, lime, asphalt, concrete drying compounds, and all other potentially hazardous materials shall be performed in an area away from any watercourse, ditch or storm drain.

5. Equipment fueling and maintenance, oil changing, etc., shall be performed only in an area designated for that purpose. The designated area is equipped for recycling oil and catching spills.

6. Concrete wash water shall not be allowed to flow directly to storm sewers, streams, ditches, lakes, etc without being treated. A sump or pit shall be constructed to contain concrete wash water.

7. All paint, solvents, petroleum products and petroleum waste products, and storage containers (such as drums, cans, or cartons) shall be stored according to BMPs. The materials exposed to precipitation shall be stored in watertight, structurally sound, closed containers. All containers shall be inspected for leaks or spillage during the once per week inspection of BMPs. If substances such as oil, diesel fuel, hydraulic fluid, antifreeze, etc. are spilled, leaked, or released onto soil, the soil shall be dug up and properly disposed of. Spills on pavement shall be absorbed with sawdust, kitty litter or product designed for that purpose and disposed of at a licensed sanitary landfill. Hazardous or industrial wastes such as most solvents, gasoline, oil-based paints, and cement curing compounds require special handling. These materials will be removed from the site and recycled or disposed of in accordance with MoDNR requirements.

8. State law requires the party responsible for a petroleum product spill in excess of 50 gallons to report the spill to MoDNR (537-634-2436) as soon as practical after discovery.

Federal law requires the responsible party to report any release of oil if it reaches or threatens a sewer, lake, creek, stream, river, groundwater, wetland, or area, like a road ditch, that drains into one of the above.

9. Sufficient temporary toilet facilities to serve the number of workers on the site shall be provided. The facilities shall be serviced frequently to maintain a sanitary condition.