

COLE COUNTY DEPARTMENT OF PUBLIC WORKS



RAILROAD SPUR EXTENSION PROJECT

Project No. 2016-701-1

BID DATE: March 29, 2019

BIDDING DOCUMENTS

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ADVERTISEMENT FOR BIDS

NOTICE TO BIDDERS

SEALED PROPOSALS consisting of:

**RAILROAD SPUR EXTENSION PROJECT
PROJECT NO. 2016-701-1**

Located in Sec 24, T44N, R11W in Cole County, Missouri,

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, March 29, 2019

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

The proposed work consists of construction of railroad track and ballast, excavating and grading, seeding and mulching, erosion control and miscellaneous work near Militia Drive and Algoa Road in Jefferson City.

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 Thursday, March 21, 2019, at 9:00 A.M. at the Cole County Department of Public Works located at 5055 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: 03/03/19; 03/10/19 and 03/17/19

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. on Friday, March 29, 2019**. 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 consists of construction of railroad track and ballast, excavating and grading, seeding and mulching, erosion control and miscellaneous work near Militia Drive and Algoa Road in Jefferson City for:

RAILROAD SPUR EXTENSION PROJECT PROJECT NO. 2016-701-1

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 inspected and are available to bidders at the office of the Director 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 consists of construction of railroad track and ballast, excavating and grading, seeding and mulching, erosion control and miscellaneous work near Militia Drive and Algoa Road in Jefferson City.

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 base 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 **RAILROAD SPUR EXTENSION PROJECT, PROJECT NO. 2016-701-1**. 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 if alternate bids have been requested, that alternate bid will be used which will be to the best interest of the County of COLE.

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

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 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

The Contractor shall be required to provide the County of COLE with a "Certificate of Insurance."

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, 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 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, delays would cause serious loss or damage, repairs or adjustments may be made by the County, or a third party chosen by the County, 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 unless funding agreements have not been approved between Jefferson City and Cole County. The contractor will be advised if there is a delay that would cause a later notice to proceed.

Consideration for a possible notice to proceed delay has been included in the time for completion of the project. No extension will be granted in the event of a delay.

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 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. Additional detailed information can be found in the job special provisions.

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 **October 31, 2019**.

2-28 Liquidated Damages

Liquidated damages shall be assessed at the rate of **Five Hundred Dollars (\$500.00)** per calendar day until the project is complete, should the project not be completed within the specified time period. Additional information pertaining to the liquidated damages can be found in the Job Special Provisions.

2-29 Pre-Construction Meeting

A pre-construction meeting will be scheduled before construction begins. The contractor's project manager and foreman shall be required to attend.

PROPOSAL FORM

COUNTY OF COLE, MISSOURI

**RAILROAD SPUR EXTENSION PROJECT
PROJECT NO. 2016-701-1**

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:

ITEMIZED PROPOSAL

BASE BID					
Item No.	Item Description	Unit	Quantity	\$ Unit Price	\$ Amount
1	Mobilization	LS	1		
2	Clearing and Grubbing	LS	1		
3	Erosion Control	LS	1		
4	Earthwork	LS	1		
5	Stablized Subgrade	SY	550		
6	Subballast	NT	1,566		
7	Construct Railroad Track	TF	1,258		
8	No. 9 Turnout	EA	1		
9	Flop Over Derail With Wheel Crowder	EA	1		
10	Earthen Bumper	EA	2		
TOTAL BASE BID:					

ALTERNATE BID - ALPLA TRACK EXTENSION					
Item No.	Item Description	Unit	Quantity	\$ Unit Price	\$ Amount
1	Mobilization	LS	1		
2	Clearing and Grubbing	LS	1		
3	Erosion Control	LS	1		
4	Earthwork	LS	1		
5	Stablized Subgrade	SY	550		
6	Subballast	NT	173		
7	Construct Railroad Track	TF	237		
8	Earthen Bumper	EA	1		
TOTAL ALTERNATE BID:					

TOTAL BASED BID + ALTERNATE BID:	
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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.)

<u>Company Name</u>	<u>Address</u>	<u>City, State, Zip</u>	<u>Work To Be Performed</u>	<u>% of Bid</u>

TIME OF COMPLETION:

The undersigned hereby agrees to complete the project by no later than **October 31, 2019**, 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, 2018" 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:

_____	(State Names & Addresses of All Partners)
Name of Partnership	
_____	_____
Partner	Residence Address
_____	_____
Partner	Residence Address

Business Address	
_____	_____
City, State & Zip Code	Business Telephone Number
_____	_____
Signature of At Least One Partner	Date

A CORPORATION:

_____	Incorporated under the laws of the State of _____
Name of Corporation	
_____	Corporate License No. _____
Name and Title of Officer	(If a corporation organized in state other than Missouri, attach Certificate of _____ Authority to do business in the State of Missouri.)

Business Telephone Number	
_____	_____
Business Address	City, State & Zip Code
_____	_____
Signature of Officer	Date
ATTEST:	
_____	_____
Signature of Secretary (SEAL)	Date

CONSTRUCTION CONTRACT

THIS CONTRACT, made and entered into this _____ day of _____, 2019, 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:

RAILROAD SPUR EXTENSION PROJECT PROJECT NO. 2016-701-1

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 in accordance with the contract documents.

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 25 - 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.....\$0,000,000.00

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 placed 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 a Owner's Protective Liability Insurance Policy naming the County of Cole 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 Subparagraphs (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 **Five Hundred Dollars (\$500.00)** 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 below, 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 harmless from and against all claims, suits, and actions of every description, brought against the County 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 **March 29, 2019**, 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 **October 31, 2019**.

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

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

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 _____, 2019.

COLE COUNTY COMMISSION, Party of the First Part

Cole County Commission

ATTEST:

County Clerk (SEAL)

County Auditor

"I certify there is a balance otherwise unencumbered 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 _____, 2019.

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 _____, 2019,
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) Attorney-in-Fact	By _____ (SEAL) (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



ERIC R. GREITENS, Governor

Annual Wage Order No. 25

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

Matt Cowell, Director
Division of Labor Standards

Filed With Secretary of State: _____ **March 9, 2018**

Last Date Objections May Be Filed: **April 9, 2018**

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			\$32.70	55	60	\$23.17
Boilermaker	6/18		\$36.41	126	7	\$30.81
Bricklayer and Stone Mason	6/18		\$30.00	59	7	\$18.19
Carpenter	6/18		\$26.15	60	15	\$17.10
Cement Mason	6/18		\$28.53	9	3	\$12.92
Communication Technician	6/18		\$32.50	28	7	\$13.50 + 13%
Electrician (Inside Wireman)	6/18		\$32.50	28	7	\$13.50 + 13%
Electrician (Outside-Line Construction/Lineman)			\$44.56	43	45	\$5.75 + 36%
Lineman Operator			\$38.35	43	45	\$5.75 + 36%
Groundman			\$29.48	43	45	\$5.75 + 36%
Elevator Constructor	6/18	a	\$48.54	26	54	\$34.395
Glazier	6/18		\$27.56	122	76	\$12.74
Ironworker			\$29.49	11	8	\$25.96
Laborer (Building):						
General			\$23.71	42	44	\$13.84
First Semi-Skilled			\$25.71	42	44	\$13.84
Second Semi-Skilled			\$24.71	42	44	\$13.84
Lather			USE CARPENTER RATE			
Linoleum Layer and Cutter	6/18		\$26.03	60	15	\$17.10
Marble Mason			\$22.24	124	74	\$13.05
Marble Finisher			\$14.35	124	74	\$9.52
Millwright	6/18		\$27.17	60	15	\$17.10
Operating Engineer						
Group I	6/18		\$29.16	86	66	\$27.17
Group II	6/18		\$29.16	86	66	\$27.17
Group III	6/18		\$27.91	86	66	\$27.17
Group III-A	6/18		\$29.61	86	66	\$27.17
Group IV	6/18		\$26.93	86	66	\$27.17
Group V	6/18		\$29.86	86	66	\$27.17
Painter	6/18		\$23.93	18	7	\$12.74
Pile Driver	6/18		\$27.17	60	15	\$17.10
Pipe Fitter		b	\$39.25	91	69	\$27.18
Plasterer	6/18		\$27.02	94	5	\$12.97
Plumber		b	\$39.25	91	69	\$27.18
Roofer \ Waterproofer			\$29.55	12	4	\$16.04
Sheet Metal Worker			\$31.55	40	23	\$17.88
Sprinkler Fitter - Fire Protection	6/18		\$35.84	33	19	\$21.42
Terrazzo Worker			\$29.55	124	74	\$14.76
Terrazzo Finisher			\$19.22	124	74	\$14.76
Tile Setter			\$22.24	124	74	\$13.05
Tile Finisher			\$14.35	124	74	\$9.52
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

**REPLACEMENT PAGE
COLE COUNTY
BUILDING CONSTRUCTION - OVERTIME SCHEDULE**

FED: Minimum requirement per Fair Labor Standards Act means time and one-half (1½) 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.

**REPLACEMENT PAGE
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.

**REPLACEMENT PAGE
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 receive eight (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 receive (8) hours 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.

**REPLACEMENT PAGE
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. 91: Means eight (8) hours shall constitute a day's work commencing at 7:00 a.m. and ending at 3:30 p.m., allowing one-half (½) hour for lunch. The option exists for the Employer to use a flexible starting time between the hours of 6:00 a.m. and 9:00 a.m. The regular workweek shall consist of forty (40) hours of five (5) workdays, Monday through Friday. The workweek may consist of four (4) ten (10) hour days from Monday through Thursday, with Friday as a make-up day. If the make-up day is a holiday, the employee shall be paid at the double (2) time rate. The employees shall be paid time and one-half (1½) for work performed on Saturdays, before the regular starting time or after the regular quitting time or over eight (8) hours per work day (unless working a 10-hour work day, then time and one-half (1½) is paid for work performed over ten (10) hours a day) or over forty (40) hours per work week. Work performed on Sundays and recognized holidays shall be paid at the double (2) time rate of pay. **SHIFT WORK:** When it is necessary for the project to operate in shifts, there will be three (3) eight (8) hour shifts commencing at 8:00 a.m. Shift work must continue for a period of not less than three (3) consecutive work days, two (2) days which must be regular work days (Monday through Friday). In the event the second or third shift of any regular work day shall fall into a Saturday or a holiday, such extension into a Saturday or holiday shall be considered as part of the previous workday and employees shall be paid at the regular shift rate. The first day shift shall work a regular eight (8) hour day at regular rates. The second shift shall be eight (8) hours regular time pay plus \$2.50 per hour premium for eight (8) hours work. Third shift will be for eight (8) hours regular time pay plus \$3.00 per hour premium for eight (8) hours work.

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

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

NO. 122: Means the regular workday shall be (8) hours. The regular work week shall be forty (40) hours, beginning 6:00 a.m. on Monday and ending 6:00 p.m. on Friday. Saturday will be time and one-half (1½). Sunday and Holidays shall be double (2) time. Saturday can be a make-up day if weather has forced a day off.

NO. 124: Means eight (8) hours shall constitute a day's work on all classes of work between the hours of 6:00 a.m. and 5:30 p.m., Monday through Friday. The pay for time worked during these hours shall be at the regular wage rate. The regular workweek shall be Monday through Friday. Employment from 4:30 p.m. to 12:00 midnight, Monday through Friday, shall be paid for at one and one-half (1½) times the regular hourly rate. From 12:00 midnight until 8:00 a.m. on any day shall be paid for at twice the regular hourly rate. All time worked on Sundays and the recognized holidays shall be paid at the rate of double (2) time. It is understood that forty (40) hours shall constitute a regular workweek, (5-8's) Sunday Midnight through Friday Midnight, understanding anything over eight (8) hours is one and one-half (1½) times the hourly wage rate.

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 \$29.15 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 \$1.66 of the fringe benefit portion of the prevailing wage may be paid at straight time.

**COLE COUNTY
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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, Veterans' Day, Thanksgiving Day 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, it will be celebrated on Saturday.

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 or 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 work week, 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. 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 preceding 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.

**COLE COUNTY
BUILDING CONSTRUCTION - HOLIDAY SCHEDULE**

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 makeup 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.

NO. 76: The following days are recognized as holidays: New Year's Day, Memorial Day, Independence Day, Labor Day, Veterans Day, Thanksgiving Day, and Christmas. No work of any pretense shall be performed on Charismas Day or Independence Day. Any work performed on the other holidays shall be paid for at least two (2) times the regular rate of pay. If a holiday falls on a Sunday, the following Monday will be observed. If a holiday falls on a Saturday, the preceding Friday will be observed.

OCCUPATIONAL TITLE	* Date of Increase	Basic Hourly Rates	Over-Time Schedule	Holiday Schedule	Total Fringe Benefits
Carpenter	6/18	\$31.73	23	16	\$17.10
Electrician (Outside-Line Construction\Lineman)		\$44.56	9	12	\$5.75 + 36%
Lineman Operator		\$38.35	9	12	\$5.75 + 36%
Lineman - Tree Trimmer	6/18	\$24.53	32	31	\$11.44 + 3%
Groundman		\$29.48	9	12	\$5.75 + 36%
Groundman - Tree Trimmer	6/18	\$18.14	32	31	\$8.42 + 3%
Laborer					
General Laborer	6/18	\$29.26	2	4	\$13.82
Skilled Laborer	6/18	\$29.26	2	4	\$13.82
Millwright	6/18	\$31.73	23	16	\$17.10
Operating Engineer					
Group I	6/18	\$28.34	21	5	\$27.06
Group II	6/18	\$27.99	21	5	\$27.06
Group III	6/18	\$27.79	21	5	\$27.06
Group IV	6/18	\$24.14	21	5	\$27.06
Oiler-Driver	6/18	\$24.14	21	5	\$27.06
Pile Driver	6/18	\$31.73	23	16	\$17.10
Traffic Control Service Driver		\$26.415	28	27	\$9.045
Truck Driver-Teamster					
Group I		\$29.87	25	21	\$12.85
Group II		\$30.03	25	21	\$12.85
Group III		\$30.02	25	21	\$12.85
Group IV		\$30.14	25	21	\$12.85

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.

COLE COUNTY HEAVY CONSTRUCTION - OVERTIME SCHEDULE

FED: Minimum requirement per Fair Labor Standards Act means time and one-half (1½) 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. Work performed in the first eight (8) hours on Saturday shall be paid at the rate of one and eight tenths (1.8) the regular straight time rate. Work performed outside these hours and on Sundays and recognized legal holidays, or days celebrated as such, shall be paid for at the rate of double (2) time.

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.

**COLE COUNTY
HEAVY CONSTRUCTION - OVERTIME SCHEDULE**

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 \$16.25 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 \$16.25 of the fringe benefits portion of the prevailing wage shall be paid double time. The remaining \$.60 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
HEAVY CONSTRUCTION - HOLIDAY SCHEDULE**

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.

JOB SPECIAL PROVISIONS TABLE OF CONTENTS

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- J. Stabilized Subgrade
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- L. Topsoil, Seeding, Fertilizing and Mulch

Paul Samson, PE
PE-2002016730

Central Missouri Professional Services, Inc.
2500 E. McCarty St.
Jefferson City, MO 65101
573-634-3455
Certificate of Authority: 0001558

JOB SPECIAL PROVISIONS

A. GENERAL

1.0 The Technical Specifications for this project shall consist of the Union Pacific Railroad (UPRR) Technical Specifications for Construction of Industrial Tracks. These specifications can be downloaded at:

https://www.up.com/cs/groups/public/@uprr/@customers/@industrialdevelopment/@operations/specs/@specifications/documents/up_pdf_natedocs/pdf_up_ind_ind-trk-const.pdf

2.0 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 Plans and Specifications to provide a workable project.

B. PROJECT CONTACT FOR CONTRACTOR/BIDDER QUESTIONS

1.0 All bidding related questions concerning this project shall be forwarded to the project contact 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
e-mail elandwehr@colecounty.org

C. ALTERNATE BID – ALPLA RAILROAD SPUR EXTENSION

1.0 The ALPLA Railroad Spur Extension is listed on the Bid Form as an alternate bid. The low bidder will be chosen by the base bid. ALPLA will then have the option of whether to award the ALPLA Railroad Spur Extension based on the cost of the alternate by the awarded contractor. If the alternate is accepted, the Contractor will execute a separate Construction Contract with ALPLA for the railroad spur extension. The ALPLA Construction Contract will be in the same form as the contract with the County for the Base Bid work.

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 accidents, the Contractor shall notify police or other emergency agencies immediately as needed. The project contact's office shall also be notified when the Contractor requests emergency assistance.

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.

Jefferson City Police (573) 634-6400

JOB SPECIAL PROVISIONS

Cole County EMS	(573)-634-2616
Jefferson City Fire	(573) 634-6401
Missouri State Highway Patrol	(573) 751-1000

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 Basis of Payment: 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. 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) All required inspections of erosion control BMP's.
- b) Maintaining records of precipitation.
- c) Maintaining logs of BMP Inspections, BMP Maintenance, and BMP Corrective Actions taken to correct deficiencies identified during inspections.
- d) Documenting any changes made to the Erosion Control Plan.

2.0 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.

F. QUALITY CONTROL (QC)

1.0 The County will provide all Quality Control (QC) of the work and material to ensure that it is in compliance with the contract requirements. The Contractor shall provide to the County all the necessary access to the site and materials needed to accomplish this task.

G. CONTRACTOR FURNISHED CONSTRUCTION STAKING

1.0 Construction staking for this project shall be the responsibility of the Contractor. The Contractor shall provide the necessary surveying and staking necessary for the successful prosecution of the work.

JOB SPECIAL PROVISIONS

2.0 The Contractor shall preserve all monuments, control points and reference points set by the engineer. If any monumentation is damaged, destroyed or disturbed by the contractor, the cost of replacement will be at the contractor's expense and will be deducted from the payment for the work.

3.0 The County will furnish and set control points with known coordinates. The engineer will furnish all coordinate data to lay out the job and locate benchmarks as shown on the plans.

4.0 All surveying shall be documented by the contractor in a form acceptable to the engineer.

5.0 The engineer will furnish electronic CAD files to the contractor to assist in calculating lay out point coordinates. The contractor shall be required to sign the engineer's Electronic Media Release prior to receiving CAD files.

6.0 Basis of Payment: All costs incurred by the Contractor for labor, equipment and materials in compliance with the above requirements, shall be considered completely covered by the unit price for Contractor Furnished Construction Staking, per lump sum.

H. UTILITIES

1.0 Utilities Shown On Plans. The location and extent of the existing underground utilities and other utilities shown on the plans have been determined by field surveyed visible above ground evidence and Missouri One-Call Markings, and available plans. The County and their consultant make no guarantee that the utilities shown on the plans area totally accurate or all inclusive. It shall be the sole responsibility of the Contractor to locate, protect, and restore all existing utilities encountered on the project. Notify Missouri One Call (1-800-DIG-RITE) for location of the utilities at least five days prior to the construction.

1.1 The Contractor shall be aware of the presence of utilities above and/or below the ground or in the vicinity of this project that may interfere with their operations. The Contractor expressly acknowledges and assumes this risk even though the nature and extent is unknown to both the Contractor and the County at the time of bidding and award of the contract. The effect in cost or time of the presence of utilities above, below or in the vicinity of the Contractor's work under this contract shall not be compensable.

1.2 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. 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.

1.3 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 subcontractors operation. The Contractor shall hold and save harmless the County from damages to any utility facilities interruption of service by it or its subcontractor's operation.

JOB SPECIAL PROVISIONS

1.4 The Contractor shall coordinate with utility companies to allow the utilities to inspect any exposed lines that are to remain in place before being backfilled. Any damage to the utilities that occurred during construction shall be repaired or replaced at the expense of the Contractor.

2.0 Utility Company Contacts.

2.1 Ameren Missouri – Electric

Dave Hagan
Office: 573-681-7513
Cell: 573-690-0301
dhagan@ameren.com

2.2 Ameren Missouri – Natural Gas

Mark Brandt
Office: 573-681-7550
Cell: 573-286-1800
mbrandt2@ameren.com

2.3 CenturyLink – Telephone, Fiber Optic, Television

Allen Groner
Office: 573-634-1692
Cell: 573-681-2503
allen.t.groner@centurylink.com

2.4 City of Jefferson – Sanitary Sewer

Eric Seaman
Office: 573-634-6443
eseaman@jeffcitymo.org

2.5 Public Water Supply District #4 - Water

Will Humphrey
573-821-0707
will@colepwsd4.com

3.0 Basis of Payment: 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.

I. EARTHWORK

1.0 See UPRR Industrial Track Specifications Sections 8.13 through 8.16.

2.0 The contractor shall be responsible disposing of excess material off site, and shall be responsible for obtaining imported material.

J. STABILIZED SUBGRADE

1.0 Description. This work shall consist of replacing existing unsuitable subgrade material with a stabilized subgrade prior to placing railroad subballast. Stabilized subgrade shall consist of over excavating existing subgrade 18” below bottom of subballast and replacing with 18” of compacted shot rock fill.

JOB SPECIAL PROVISIONS

1.1 Stabilized Subgrade shall be constructed in locations where the proposed bottom of Subballast is below existing grade, or is less than 18" above existing grade. The engineer reserves the right to reduce the quantity of stabilized subgrade.

2.0 Method of Measurement. The quantity of Unsuitable Subgrade shall be measured for payment by the County to the nearest square yard. An estimated quantity of Unsuitable Subgrade is listed on the Bid Form.

3.0 Basis of Payment. All expense incurred by the Contractor by reason of their compliance with these requirements shall be considered as being included in and completely covered by the contract unit price for Stabilized Subgrade, per square.

K. EROSION CONTROL

1.0 Description. The Contractor shall employ all necessary erosion control Best Management Practices (BMP) necessary to limit the amount of sediment entering drop inlets, pipes, streams, and adjacent properties.

2.0 The Contractor shall provide erosion control in accordance with Std. 806.10 of the Missouri Standard Plans for Highway Construction and the Missouri Department of Natural Resources field guide Protecting Water Quality which can be found at <http://www.dnr.mo.gov/env/wpp/wpcp-guide.htm>.

3.0 The erosion control measures may be subject to inspection by MoDNR and/or the County at any time. Any deficiencies noted during inspection shall be fixed immediately by the contractor subject to approval by the engineer.

4.0 Any silt material that enters the inlets and/or pipes from the construction site shall be the responsibility of the contractor to remove prior to project completion. No direct payment shall be made since silt should not be allowed to enter based on the provisions of this bid item.

5.0 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 price bid for Erosion Control, per lump sum.

L. TOPSOIL, SEEDING, FERTILIZING, AND MULCH

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

1.1 Seedbed preparation: The top six (6) inches of all areas of the project to be vegetated shall be free of rocks, stones, and clods prior to seeding. This may require the contractor to utilize a mechanical rock rake, hand picking of stones, and/or placement of six (6) inches of clean topsoil in those areas to be vegetated. All areas to be vegetated shall be inspected prior to seeding and any deficiency shall be corrected prior to application.

1.2 All disturbed areas of the project not paved or concrete shall be seeded. The seed mixture shall be 80% Millennium Fescue, 10% Pizzazz Rye, and 10% Brooklawn Bluegrass. The seeding rate shall be 350 lbs/acre (0.72 lb/sy).

JOB SPECIAL PROVISIONS

1.3 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.

1.4 Vegetative Mulch shall be applied at the rate of 2 ½ tons per acres.

1.5 Payment for seeding work will be made on the following schedule:

- 50% paid after seeding and mulch is placed.
- 50% paid after seeding has been established and County accepts it.

2.0 Temporary Seeding and Mulch. In areas directed by the engineer, where grading operations have ceased, but have not been brought to final grade, temporary seeding and mulch shall be placed to provide a quick ground cover to reduce erosion until such time that grading operations resume.

2.1 Temporary seeding mixtures of cereal grains shall be applied at a rate of 100 pounds per acre. Vegetative Mulch placed over temporary seed mixtures shall be applied at a rate of 1 ½ tons per acre. Fertilizer shall be applied at a rate of 40 pounds nitrogen (N) per acre. Lime will not be required for temporary seeding.

3.0 Basis of Payment. All costs incurred by the Contractor for labor, equipment and materials in compliance with the above requirements including seedbed preparation, liming, furnishing and placing fertilizer and mulch, shall be considered completely covered by the unit price for Seeding and Mulch, per lump sum, or Temporary Seeding, per lump sum.

END OF JOB SPECIAL PROVISIONS

GENERAL SPECIAL PROVISIONS

The General Special Provisions for this particular Cole County project shall consist of the currently corrected (2004) version of the *Missouri Standard Specifications for Highway Construction*, Sections 101 through 110, 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.

Insert the following definition for “Job Special Provision” where none currently exists:

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 (7) 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:

102.6 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 bid 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 All bidders shall complete and submit with their 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 Bid 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, project number, 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 Bidders. Proposals received after the time for opening of bids will be returned to the bidder unopened. No bids which are submitted by fax 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

Add Sec. 104.6.3.5

104.6.3.5 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. 105.8.2 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 the Engineer may order such work removed and replaced at the expense of the Contractor unless, before proceeding with the work, the Contractor 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. 105.11.3 and substitute the following:

105.11.3 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 Sec. 105.16.6 and substitute the following:

105.16.6 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.

SECTION 107 – LEGAL RELATIONS AND RESPONSIBILITY TO THE PUBLIC

Delete Sec. 107.13 and substitute the following:

107.13 Insurance Requirements. 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 through 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 be 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 forty percent (40%) 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. 109.5.9:

109.5.9 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 engineer will make semi-monthly payment estimates in writing for the material in place and the work performed during the semi-monthly interval and the value thereof at the contract bid prices. For partially complete items, the proper percentage with relation to completion will be allowed.

109.7.2 The contractor may request in any payment estimate that the engineer include the value of any non-perishable material that will be finally incorporated in the completed work. The engineer shall make the final decision whether to allow a partial payment.

Provisions shall be in accordance with Sec. 109.7.2 of the *Missouri Standard Specifications for Highway Construction*.

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.

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 Withholding of Retained Percentage 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. 109.9.1.3:

109.9.1.3 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 AND FEDERAL WAGE RATES AND OTHER 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 UPRR Industrial Track Specifications on the following pages.

Any specifications not covered by UPRR shall be covered by the currently effective (2018) 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.



Preface

The following information is provided to help guide you through the planning and construction process of developing a rail-served facility. Union Pacific is committed to working with you to develop the most efficient, cost-effective rail plan to meet your transportation needs.

The time required for rail spur construction depends largely on the magnitude of your project; averages presented below represent typical situations. Additional time may be necessary if your project involves road crossings, utilities or requires State permitting approval.

- Track construction without addition of a Union Pacific turnout averages eleven (11) months.
- Addition of a Union Pacific turnout averages fifteen (15) months.
- Addition of a Union Pacific turnout and signal facilities averages seventeen (17) months.

This technical manual, “Checklist for Industry Track Submittals”, sample plan exhibits and UPRR’s Standard Drawings are revised periodically. It is the responsibility of the user to update his/her copy with the most current information.

If you have any questions concerning this guideline or require further assistance, please contact the appropriate Manager-Industry and Public Projects (MIPP). A list of MIPP’S for each region can be found on the following web site:

http://www.up.com/real_estate/roadxing/mipps/index.htm



NEW TRACK CONSTRUCTION OVERVIEW

Procedures for Development of Track Plans

The first step is for the customer to submit the Service Feasibility Questionnaire. This provides Union Pacific with the information necessary to evaluate your proposed project. If the customer is unable to process this online form, please contact the appropriate Marketing and Sales representative for assistance. If the customer has not already done so, the customer will need to select a qualified rail engineering consultant for the project. A list of consultants with experience in railroad construction projects is available for customer review at the following web site:

http://www.up.com/customers/ind-dev/contractor-list_construction/index.htm

Please note this list is only a compilation of available vendors, not a list of approved or endorsed vendors. Union Pacific makes no representation as to the qualifications or expertise of any of the vendors listed.

To begin the Location Analysis phase, the Regional Manager of Industrial Development (RMID) will contact the Customer to evaluate the proposed project, review Union Pacific's Industry Access Guidelines and establish an on-site meeting plan. If the customer has a consultant on board at the time of the on-site meeting, the consultant should attend the meeting with the customer. The Manager of Industrial and Public Projects (MIPP) and representatives from UPRR's local operating, maintenance, and signal departments should also attend the on-site meeting.

At this meeting, the project site will be reviewed, field data will be collected and UPRR's design requirements will be explained to the Customer. Track layout will be discussed along with operating, maintenance and signal issues and recommendations. The MIPP will provide the Customer with a Milepost (MP) and engineering station (ES) tie in point to help the Customer's consultant establish MP and ES ties to switches and other required locations on their drawings.

Drawings of Proposed Track Plans

All of the required plan sets (10% Concept Plan, 30% Track Plan, Construction Drawings and Exhibit 'A' Print) are to be submitted to UPRR through UPRR's Engineering Document Exchange System (EDS) website. After review and approval by the UPRR Engineering Dept, the plans will be distributed to other UPRR departments for review/approval as needed. It is important that the Customer, or Customer's consultant, submit documents into the proper queue (10% Concept Plan, 30% Track Plan, etc.) in the EDS system - failure to do so may result in project delays. After all design issues are resolved, the EDS system will send notification of approval for each document to the Customer via the email address provided by the Customer. Following is the address of UPRR's EDS Website:

http://www.up.com/customers/ind-dev/document_exchange/index.htm

Following the onsite meeting, the Customer, or Customer's consultant, will prepare a 10% Concept Plan (see **Section 2.01** below) for review and approval.



If the project's 10% Concept Plan receives UPRR's inter-departmental approval and the project will involve modifying UPRR's signal facilities, the Customer or Customer's consultant will prepare and submit a 30% Track Plan (see **Section 2.02** below) for review and approval. This step in the process will allow signal design to begin. **UP's Signal Department will do all signal design work.**

Regardless of whether signal work is involved and dependant on UPRR inter-departmental approval, the Customer, or Customer's consultant, will prepare and submit a detailed and complete set of Construction plans for the proposed project (see **Section 2.03** below) for review and approval.

The Customer or Customer's consultant will also need to prepare and submit an Exhibit 'A' print (see **Section 2.04** below) for review and approval. The Exhibit 'A' print is a legally binding document that will be inserted into the Industrial Track Agreement (ITA).

Any other documents submitted (pictures, construction schedules, reports, etc.) are to be loaded into the "Other" category in the EDS. Comment section should note the type of document being loaded.

After all design issues are resolved and the project documents have been approved, a cost estimate will be generated and both parties will sign an Industry Track Agreement (ITA).

Construction Guidelines

Prior to performing any track construction on Union Pacific property, the following must occur:

- a) A fully executed Industry Track Agreement (ITA) is in effect.
- b) The designated Railroad representative must be notified in writing at **least fifteen working days** prior to start of construction so that appropriate safety precautions may be taken. Any flagging protection provided by Union Pacific will be at customer's expense.
- c) Union Pacific's Telecommunications Operation Center must be contacted at 1-800-336-9193 for fiber optic information prior to track construction on Union Pacific property. The Contractor is also responsible for securing dig permits for any other utility work within the work limits from the appropriate call before you dig service.

The industrial track(s) must be constructed per approved plans; written approval for any changes must be obtained prior to construction. The rail contractor must abide by the **Minimum Safety Requirements for Customer Contractors Entering Railroad Property** set forth in **Section 1.00**. Upon completion of the entire rail project, the MIPP must be contacted for inspection and final approval of all grading and track work. On the rare occasion that the actual track construction differs from the originally approved design, the Railroad may request "as built" drawings of the industrial track from the customer. The "as built" drawings will show the corrected stationing, geometry, structures and clearances. The Industry Track Agreement will then be amended if necessary.

Costs Associated with Track Construction

All design, engineering, and construction are at the Customer's expense, **including flagging protection**. Grading construction includes overhead or underground utility adjustments, the installation of drainage facilities or structures under or along the proposed track(s), clearing, grubbing, any required fill or excavation, compaction, stabilization, and placement of subballast both on and off Union Pacific



property. Private track construction will include but is not limited to rail, ties, ballast, turnouts, road crossings, miscellaneous track material and labor.

Signal Work for Track Connection

Any signal work associated with connecting a new industry track to an existing Union Pacific owned track will be constructed by Union Pacific labor forces, at the Customer's expense. If the portion of track owned and operated by the Customer crosses public streets, all signal construction and maintenance work will be completed by the Customer per Union Pacific Railroad specifications and American Railway Engineering and Maintenance-of-Way (AREMA) guidelines.

Road Crossings

As a general policy, Union Pacific prohibits the construction of new public or private roadways across its tracks. If a project requires the construction of a new grade crossing across Union Pacific owned or operated tracks, written approval will be required from Union Pacific management and any applicable State Regulatory Agency. If approved, a separate crossing agreement will be required. The industry will be responsible for obtaining all permits. Crossings may require the installation of automated crossing signals. All costs for both the crossing surfaces and signals will be at the customer's expense.

Portion of Track to be Constructed by Union Pacific

Typically, Union Pacific constructs, owns, and maintains the connection to any existing Union Pacific owned tracks from the switch connection (point of switch) to the 13-foot clearance point. The 13 foot clearance point is defined as the point on the track where the centerline of two tracks are separated by 13 feet such that a rail car either being moved or stored on the track will not interfere with the movement of other rail cars on adjacent main, branch or lead tracks owned by Union Pacific. On projects where the turnout and derail are powered and connected to the signal system Union Pacific will construct, own and maintain to the point 50' past the switch connection of the power operated derail.

Materials For Track Construction

All materials used for the construction of the proposed track must meet Union Pacific standards as outlined in **Section 10.0**. Union Pacific prefers that our customer have their rail contractor furnish Union Pacific's track material. Once Union Pacific has approved the track design, a turnout with connecting rods, switch stand, and any other required track materials can be purchased from one of Union Pacific's approved vendors. The terms associated with the assembly and installation of this material will be outlined in the Industrial Track Agreement. Use of this option may be restricted depending on the location of the project and is subject to Union Pacific approval.



1.00 - MINIMUM SAFETY REQUIREMENTS FOR CUSTOMERS OR CONTRACTORS ENTERING UNION PACIFIC RAILROAD PROPERTY

1.01 GENERAL SAFETY - Safety of personnel, property, rail operations and the public is of paramount importance in the prosecution of the work pursuant to the project. As reinforcement and in furtherance of overall safety measures to be observed (and not by way of limitation), the following special safety rules shall be followed. The Industry shall keep the job site free from safety and health hazards and ensure that its employees are competent and adequately trained in all safety and health aspects of the job. The Industry shall have proper first aid supplies available on the job site so that prompt first aid services can be provided to any person that may be injured on the job site. The Industry shall promptly notify the Union Pacific Railroad (UP) of any U.S. Occupational Safety and Health Administration reportable injuries occurring to any person that may arise during the work performed on the job site. The Industry shall have a non-delegable duty to control its employees, while they are on the job site or any other property of the UP, to be certain they do not use, be under the influence of, or have in their possession any alcoholic beverage or illegally obtained drug, narcotic or other substance that may inhibit the safe performance of work by an employee.

1.02 ATTIRE AND PERSONAL PROTECTIVE EQUIPMENT - The employees of the Industry shall be suitably dressed to perform their duties safely and in a manner that will not interfere with their vision, hearing or free use of their hands or feet. Only waist length shirts with sleeves and trousers that cover the entire leg are to be worn. If flare-legged trousers are worn, the trouser bottoms must be tied to prevent catching. The employees should wear sturdy and protective footwear. Employees shall not wear boots (other than work boots), sandals, canvas-type shoes or other shoes that have thin soles or heels that are higher than normal. In addition, the Industry shall require its employees to wear personal protective equipment as specified by UP rules, regulations or UP officials overlooking the work at the job site. In particular, the protective equipment to be worn shall be:

- a) Protective headgear that meets American National Standard-Z89.1-latest revision, it is suggested that all hardhats be affixed with Industry's or industry's contractor's company logo or name.
- b) Eye protection that meets American National Standard for occupational and educational eye and face protection, Z87.1-latest revision. Additional eye protection must be provided to meet specific job situations such as welding, grinding, burning, etc.
- c) Hearing protection which affords enough attenuation to give protection from noise levels that will be occurring on the job site.

1.03 EQUIPMENT - All heavy equipment provided or leased by the Industry shall be equipped with audible backup warning devices. If in the opinion of the UP representative any of the Industry's, or any of its subcontractors equipment, is unsafe for use on the UP's right-of-way, the Industry, at the request of the UP representative, shall remove such equipment from the UP's right-of-way.



2.00 - REQUIRED INFORMATION TO BE SHOWN ON SUBMITTALS

These requirements cover the following submittals:

- 1.) 10% design print submittal: After the initial onsite meeting with the Regional Manager of Industrial Development (RMID) and the Manager of Industry and Public Projects (MIPP) this “plan view only” print can be developed using the information collected at the onsite meeting, property plats, aerial photos, UP valuation maps etc., without the need of a formal site survey. This 10% drawing shall be used by the Union Pacific Railroad (UP) to determine the feasibility of proceeding with the project.
- 2.) 30% design print submittal. This submittal is required only if the industry track project affects the UP’s signal system. The need for this step will be determined during the review process of the 10% design print. **UP’s Signal Department will do all signal design work.**
- 3.) Construction plans and specifications. These plans and specifications should include all plan and profile drawings, material specifications, design calculations, etc. required to gain the UP’s final approval and to construct the project.
- 4.) Exhibit ‘A’ print. This drawing is a simplified track plan that is included as an exhibit in the Industry Track Agreement (ITA). Because the ITA is a legally binding document, the Exhibit ‘A’ print must be accurate and easy to interpret.

NOTE: The FES # must be identified on each of the plan submittals.

Sample exhibits for the 10%, 30% and Exhibit “A” submittals along with the “Checklist for Industry Track Submittals” are located at the following web site:

<http://www.up.com/customers/ind-dev/operations/specs/track/index.htm>

These exhibits represent UPRR’s required format for each submittal and include information typically required for each submittal. To provide for uniformity and expedite the review process, it is important that all track plans submitted use the appropriate format, line styles, colors, etc. CAD files are available to assist the designer and include MicroStation seed files, sheet borders, etc. These files can be obtained by contacting the local MIPP.



2.01.00 - REQUIREMENTS FOR A 10% INDUSTRIAL TRACK DESIGN PRINT SUBMITTAL

The sample 10% submittal print (see UP **Exhibit ‘10% Design’**) and the Industry Track Submittal Checklist (see UP **Exhibit ‘A-1’**) should be used as guidelines for preparing the 10% submittal. **The preferred 10% submittal should show the proposed track layout information plotted on a scaled aerial photographic map.** The aerial map background must be light enough so that any track arrangement drawn over it is visible on the required 11”x17” print. The following are minimum requirements. If additional information is deemed beneficial, that information should be included on this submittal as well.

2.01.01 TURNOUTS - Show all existing turnout (within 1500’ of the limits of the construction area) and proposed turnouts, including size (No. 11, No. 15, etc). Show the Engineering Station (ES) of each point of switch. On all proposed single ended tracks, this shall be ES 0+00. If the proposed track is double ended, the turnout located closest to the UP’s lesser Milepost (MP) shall be designated as ES 0+00. Each point of switch in a UP track shall also be identified by UP’s ES and MP with a station equation for the proposed industry track (i.e., UPRR ES 23+42/MP 46.90 = ES 0+00 Track ‘A’). The MIPP can help you determine turnout sizes, ES and MP locations.

2.01.02 TRACKS - Show a plan view of all track arrangements including existing tracks, proposed tracks, and future tracks. All existing tracks are to be designated by their unique track identification, Zone Track Spot (ZTS) number; (the RMID or the MIPP can provide these track numbers). All proposed or future tracks should be designated as Track ‘A’, Track ‘B’, etc. On all proposed tracks, show the ES of the thirteen-foot (13’) clearance point, the ES of the derail (describe the type of derail), the ES of the point where the track centerline crosses UP R/W, if applicable, and the ES of the end of track (EOT), including the type of EOT device. On all proposed tracks, show the right-angled center to center distances between all tracks. In addition, note the ES of the “End of UPRR Maintenance” sign. Typically this is at the 13 ft. clearance point for a non-controlled/hand-thrown turnout. For powered turnouts/derails this point is located 50 ft. beyond the derail switch point.

2.01.03 TRACKS – PROPOSED SALE OR LEASE - Show any proposed sale or lease of an existing UP owned track (or portion thereof) that is required as part of the construction plan, including the ES for the beginning and end of the proposed sale or lease.

2.01.04 RIGHT OF WAY (R/W) - Show the existing UP R/W, if applicable, and the right-angled distance to the track the R/W is tied to. This information is shown on UP’s R/W maps. Use the appropriate UP R/W line style.

2.01.05 ROAD CROSSINGS - Show the ES/MP location of the centerline of all existing and proposed roads crossing UP tracks, the type of crossing material (concrete, wood, etc.), the length of crossing, type (public/private), and the type of crossing warning device. All road crossings within fifteen hundred feet (1500’) of a proposed turnout that has any type of electric warning device must be located and shown on the print. **Be advised, if a new road crossing is proposed near an existing one, the crossing warning devices may have to be upgraded.**



2.01.06 BUILDINGS - Show all existing and proposed buildings adjacent to any existing or proposed tracks, including any unloading doors, ramps, docks, etc. Show the right-angled distance from any track within fifty-foot (50') of these buildings, doors, ramps, and docks, etc.

2.01.07 HORIZONTAL CURVES - Horizontal curves are defined using the 100-foot chord definition method. Show a short line perpendicular to the beginning/end of curve points. Show the Degree of Curve and the ES of these curve points (PC and PT).

2.01.08 OPERATING PLAN - Provide an explanation of the proposed operating plan for the project. Operating plan should include number of cars delivered and released and the proposed timing of these movements. Plan should also include any additional movements (if necessary) planned within the facility. Include any other details as necessary. This information will be used by UP's Transportation Department to determine if your plan is workable with existing UP operations.

2.01.09 SCOPE OF WORK - Provide a Scope of Work showing work to be performed by the UP and the Industry. Specifically define turnouts to be installed and length of track to be constructed by UP. In addition, define all work to be done by the Industry. Total track footage of industry track to be built on UPRR right-of-way and the distance from mainline must be noted on the scope of work.

2.01.10 DRAWING STANDARDS - Plans should have the approved UP drawing border and use UP Standard Legend and Abbreviations Drawing (see UP **Exhibit 'GL001' Drawing**) as a guideline. Acceptable plan scale: 1" = 100' or 1" = 200' in an 11"x17" Adobe Acrobat PDF format only. All pages constituting your 10% plan should be loaded as a single PDF file, with the exception that file size should not exceed 20 mg. If the file size exceeds 20 mg it should be split into pieces, not to exceed 20mg. Show a directional north arrow, subdivision name, track name/ZTS number, the Timetable direction of the track and the next timetable station in both directions. The MIPP can help with getting this information. Plan scale of 1" = 400' is also acceptable for the 10% Plan only.

2.01.11 INDUSTRIAL TRACK STANDARDS CHECKLIST - Include the Checklist for Industry Track Submittals (**Exhibit 'A-1'**) with the 10% submittal, complete with the Industry's Name, Project Location, and the Design Firm's Name, Address, and Phone Number. Also, include the FES # in the space provided.

2.01.12 ROADS OR ROADWAY MODIFICATIONS - Show all proposed access roads or roadway modifications etc. not crossing UP tracks that would affect the amount of traffic crossing UP tracks. Include location, width, and type of roadway surface.



2.02.00 - REQUIREMENTS FOR A 30% INDUSTRIAL TRACK DESIGN PRINT SUBMITTAL

The 30% submittal (see UP **Exhibit '30% Design'**) is required only if the industry track project will impact UPRR's signal system. The need for this step will be determined during the review process of the 10% design print. **UP's Signal Department will do all signal design work.** Similar to the 10% design print, the 30% submittal should show the proposed track layout information plotted on a scaled aerial photographic map. The aerial map background must be light enough so that any track arrangement drawn over it is visible on the required 11"x17" print.

After the 10% print approval, the process of preparing the design plans begins. The purpose of the 30% print is to establish the exact location of the turnout in UP's track, at this point a signal design can begin. This "exact location" can be affected by a number of factors. Each project has its own particular circumstances that will affect the final turnout placement. **If the location of a turnout in UP's mainline has to be moved after the 30% Plan approval, the signal design will have to start over, causing delays and increased costs.** Following is information needed by UP's Signal Department to complete their design work. Some of this information will already be on the 10% submittal.

2.02.01 TURNOUTS - Show all existing turnouts (within 1500' of the limits of the construction area) and proposed turnouts, including size (No. 11, No. 15, etc). Show the Engineering Station (ES) of each point of switch. On all proposed single ended tracks, this shall be ES 0+00. If the proposed track is double ended, the turnout located closest to the UP's lesser Milepost (MP) shall be designated as ES 0+00. Each point of switch in a UP track shall be identified by UP's ES and MP with a station equation for the proposed industry track (i.e., UPRR ES 23+42/MP 46.90 = ES 0+00 Track 'A'). The MIPP can help you determine turnout sizes, ES, and MP locations.

2.02.02 TRACKS - Show a plan view of all track arrangements including existing tracks, proposed tracks, and future tracks. All existing tracks are to be designated by their unique track identification, Zone Track Spot (ZTS) number; (the RMID or the MIPP can provide these track numbers). All proposed or future tracks should be designated as Track 'A', Track 'B', etc. On all proposed tracks, show the ES of the thirteen-foot (13') clearance point, the ES of the derail (describe the type of derail), the ES of the point where the track centerline crosses UP R/W, if applicable, and the ES of the end of track (EOT), including the type of EOT device. On all proposed tracks, show the right-angled center to center distances between all tracks. In addition, note the ES indicating placement of the "End of UPRR Maintenance" sign. Typically this is at the 13 ft. clearance point for a non-controlled/hand-thrown turnout. For powered turnouts/derails this point is located 50 ft. beyond the derail switch point.

2.02.03 TRACKS - PROPOSED SALE OR LEASE - Show any proposed sale or lease of an existing UP owned track (or portion thereof) that is required as part of the construction plan, including the ES for the beginning and end of the proposed sale or lease.

2.02.04 RIGHT OF WAY (R/W) - Show the existing UP R/W, if applicable, and the right-angled distance to the track the R/W is tied to. This information is shown on UP's R/W maps.



2.02.05 ROAD CROSSINGS - Show the ES/MP location of the centerline of all existing and proposed roads crossing UP tracks, the type of crossing material (concrete, wood, etc.), the length of crossing, type (public/private), and the type of crossing warning device. All road crossings within fifteen hundred feet (1500') of a proposed turnout that has any type of electric warning device must be located and shown on the print. **Be advised, if a new road crossing is proposed near an existing one, the crossing warning devices may have to be upgraded.**

2.02.06 BUILDINGS - Show all existing and proposed buildings adjacent to any existing or proposed tracks, including any unloading doors, ramps, docks, etc. Show the right-angled distance from any track within fifty-foot (50') of these buildings, doors, ramps, docks, etc.

2.02.07 HORIZONTAL CURVES - Horizontal curves are defined using the 100-foot chord definition method. Show a short line perpendicular to the beginning/end of spiral and curve points. Show the Degree of Curve and the ES of these curve points.

2.02.08 OPERATING PLAN – **The proposed operating plan is to be included ONLY on the 10% design submittal.** An Operating Plan should not be included for this submittal.

2.02.09 SCOPE OF WORK - Provide a detailed Scope of Work showing work to be performed by the UP and the Industry. Specifically define turnouts to be installed and length of track to be constructed by UP. In addition, define all work to be done by the Industry. Total track footage of industry track to be built on UPRR right-of-way and the distance from mainline must be noted on the scope of work.

2.02.10 DRAWING STANDARDS - Plans should have the approved UP drawing border and use UP Standard Legend and Abbreviations Drawing (see UP **Exhibit 'GL001' Drawing**) as a guideline. Acceptable plan scale: 1" = 100' or 1" = 200' in an 11"x17" Adobe Acrobat PDF format only. All pages constituting your 30% plan should be loaded as a single PDF file, with the exception that file size should not exceed 20 mg. If the file size exceeds 20 mg it should be split into pieces, not to exceed 20mg. Show a directional north arrow, subdivision name, track name/ZTS number, the Timetable direction of the track and the next timetable station in both directions. The MIPP can help with getting this information.

2.02.11 INDUSTRIAL TRACK STANDARDS CHECKLIST - Include the Checklist for Industry Track Submittals (**Exhibit 'A-1'**) with the 30% submittal, complete with the Industry's Name, Project Location, and the Design Firm's Name, Address, and Phone Number. Also, include the FES # in the space provided.

2.02.12 ROADS OR ROADWAY MODIFICATIONS - Show all proposed access roads or roadway modifications etc. not crossing UP tracks that would affect the amount of traffic crossing UP tracks. Include location, width, and type of roadway surface.

2.02.13 SIGNAL INFORMATION REQUIRED - Show all signal houses, bungalows, cases, etc. within fifteen hundred feet (1500') of any proposed turnout. A minimum seven hundred fifty feet (750') beyond the project limits must be shown on the 30% submittal, regardless of signal



facilities present. Show the location of any overhead or underground signal lines in the project area. The MIPP can help with getting the above signal information.

2.02.14 TRACKS (Additional Information) - On all tracks, show the total length, the ES of the thirteen-foot (13') clearance point, the ES of the derail (describe the type of derail), the ES of the point where the track centerline crosses UP R/W (if applicable) and the ES of the EOT including the type of EOT device. Show the right-angled center to center distances between all tracks.

2.02.15 EXISTING AND PROPOSED TRACK PROFILE - Provide a top of rail profile of the proposed industry track and the UP's existing track where the new turnout(s) will be installed. Maximum interval is one hundred foot (100'). The profile shall extend a minimum of two hundred feet (200') ahead of the point of switch and two hundred feet (200') behind the end of the long switch ties. For proposed vertical curves, refer to **UP Std Dwg 0016**. Provide ES and elevation information at vertical curve points (PVC, PVI and PVT).

2.02.16 UP STATIONING AND BENCHMARK - Provide a description and ES of the point that UP stationing was established from (existing turnout, bridge backwall, CL of road crossing, etc.); the MIPP can help with getting this information. Also provide a description and location of the benchmark used to establish elevations for the project.

2.02.17 CONSTRUCTION SCHEDULE - Provide a construction schedule showing planned duration of major activities along with a proposed phasing plan.



2.03.00 - REQUIRED INFORMATION TO BE SHOWN ON CONSTRUCTION PLANS

The following information is to be provided on the complete construction plan set. Some of the following required information will already be shown on the 10% and 30% (if applicable) Industrial Track Design Prints. The sample Exhibit 'A-1' (see UP **Exhibit 'A-1' Drawing**) should be used as guideline for preparing the complete plan set. The use of aerial photographic imagery is not recommended for the complete construction plan set.

2.03.01 TURNOUTS - Show all existing turnout (within 1500' of the limits of the construction area) and proposed turnouts, including size (No. 11, No. 15, etc). Show the Engineering Station (ES) of each point of switch. On all proposed single ended tracks, this shall be ES 0+00. If the proposed track is double ended, the turnout located closest to the UP's lesser Milepost (MP) shall be designated as ES 0+00. Each point of switch in a UP track shall also be identified by UP's ES and MP with a station equation for the proposed industry track (i.e., UPRR ES 23+42/MP 46.90 = ES 0+00 Track 'A'). The MIPP can help you determine turnout sizes, ES, and MP locations.

2.03.02 TRACKS - Show a plan view of all track arrangements including existing tracks, proposed tracks, and future tracks. All existing tracks are to be designated by their unique track identification, Zone Track Spot (ZTS) number; (the RMID or the MIPP can provide these track numbers). All proposed or future tracks should be designated as Track 'A', Track 'B', etc. On all proposed tracks, show the ES of the thirteen-foot (13') clearance point, the ES of the derail (describe the type of derail), the ES of the point where the track centerline crosses UP R/W, if applicable, and the ES of the end of track (EOT), including the type of EOT device. On all proposed tracks, show the right-angled center to center distances between all tracks. In addition, note the ES indicating placement of the "End of UPRR Maintenance" sign. Typically this is at the 13 ft. clearance point for a non-controlled/hand-thrown turnout. For powered turnouts/derails this point is located 50 ft. beyond the derail switch point.

2.03.03 TRACKS - PROPOSED SALE OR LEASE - Show any proposed sale or lease of an existing UP owned track (or portion thereof) that is required as part of the construction plan, including the ES for the beginning and end of the proposed sale or lease.

2.03.04 RIGHT OF WAY (R/W) - Show the existing UP R/W, if applicable, and the right-angled distance to the track the R/W is tied to. This information is shown on UP's R/W maps.

2.03.05 ROAD CROSSINGS - Show the ES/MP location of the centerline of all existing and proposed roads crossing UP tracks, the type of crossing material (concrete, wood, etc.), the length of crossing, type (public/private), and the type of crossing warning device. All road crossings within fifteen hundred feet (1500') of a proposed turnout that has any type of electric warning device must be located and shown on the print. **Be advised, if a new road crossing is proposed near an existing one, the crossing warning devices may have to be upgraded.**

2.03.06 BUILDINGS - Show all existing and proposed buildings adjacent to any existing or proposed tracks, including any unloading doors, ramps, docks, etc. Show the right-angled distance from any track within fifty-foot (50') of these buildings, doors, ramps, docks, etc.



2.03.07 HORIZONTAL CURVES - Horizontal curves are defined using the 100-foot chord definition method. Show a short line perpendicular to the beginning/end of curve points. Show the Degree of Curve and the ES of these curve points (PC and PT).

2.03.08 OPERATING PLAN - The proposed operating plan is to be included ONLY on the 10% design submittal.

2.03.09 SCOPE OF WORK - Provide a Scope of Work showing work to be performed by the UP and the Industry. Specifically define turnouts to be installed and length of track to be constructed by UP. In addition, define all work to be done by the Industry. Total track footage of industry track to be built on UPRR right-of-way and the distance from mainline must be noted on the scope of work.

2.03.10 DRAWING STANDARDS - Your plans should have the approved UP drawing border and use UP Standard Legend and Abbreviations Drawing (see UP **Exhibit 'GL001' Drawing**) as a guideline. Acceptable plan scale: 1" = 100' or 1" = 200' in an 11"x17" Adobe Acrobat PDF format only. All pages constituting your complete plans should be loaded as a single PDF file, with the exception that file size should not exceed 20 mg. If the file size exceeds 20 mg it should be split into pieces, not to exceed 20mg. Show a directional north arrow, subdivision name, track name/ZTS number, the Timetable direction of the track and the next timetable station in both directions. The MIPP can help with getting this information.

2.03.11 INDUSTRIAL TRACK STANDARDS CHECKLIST - Include the Checklist for Industry Track Submittals (**Exhibit 'A-1'**) complete with the Industry's Name, Project Location, and the Design Firm's Name, Address, and Phone Number. Also, include the FES # in the space provided.

2.03.12 ROADS OR ROADWAY MODIFICATIONS - Show all proposed access roads or roadway modifications etc. not crossing UP tracks that would affect the amount of traffic crossing UP tracks. Include location, width, and type of roadway surface.

2.03.13 SIGNAL INFORMATION REQUIRED - Show all existing insulated joints within five hundred feet (500') of any proposed turnout. Show all signal houses, bungalows, cases, etc. within fifteen hundred feet (1500') of any proposed turnout. Show the location of any overhead or underground signal lines in the project area. The MIPP can help with getting the above signal information.

2.03.14 TRACKS (Additional Information) - On all tracks, show the total length, the ES of the thirteen-foot (13') clearance point, the ES of the derail (describe the type of derail), the ES of the point where the track centerline crosses UP R/W (if applicable) and the ES of the EOT including the type of EOT device. Show the right-angled center to center distances between all tracks.

2.03.15 EXISTING TRACK PROFILE - Provide a top of rail profile of the UP's existing track where the new turnout(s) will be installed. Maximum interval is one hundred foot (100'). The profile shall extend a minimum of two hundred feet (200') ahead of the point of switch and two hundred feet (200') behind the end of the long switch ties



2.03.16 UP STATIONING AND BENCHMARK - Provide a description and ES of the point that UP stationing was established from (existing turnout, bridge backwall, CL of road crossing, etc.); the MIPP can help with getting this information. Also provide a description and location of the benchmark used to establish elevations for the project.

2.03.17 CONSTRUCTION PLAN - Provide a construction schedule showing planned duration of major activities along with a proposed phasing plan.

2.03.18 WEIGHT OF RAIL - Show the weight of rail of all existing and proposed tracks and turnouts (MIPP can help with finding this information).

2.03.19 TRACK MATERIALS - UP's standard rail and tie configurations are to be used (see **Section 10.00**). If any other type of track support system is to be used detailed structural plans and calculations must be provided for review and approval.

2.03.20 TRACK CULVERTS - Show the ES (to centerline), the MP location (if UP track), the size, length and type of all existing and proposed culverts (or culvert modifications or extensions) under all existing and proposed tracks (see **Section 7.00** and UP **Bridge Standard Plan No. 680000, Sheets 1 and 2, Plan No. 680020, Sheets 1 and 2 and Plan No. 680030, Sheets 1 of 1**). The minimum culvert size allowed under UP owned or maintained track is thirty inches (30"). A detailed set of plans shall be submitted to UP's EDS system. The plans will then be distributed to the Structures Department for their review and comment.

2.03.21 TRACK BRIDGES - Show the ES (at each backwall), the MP location (if UP track), the length and type of all existing and proposed bridges (or bridge modifications or extensions) in all existing and proposed tracks (see **Section 7.00**). Also show the T/R to flowline distance. Ensure that all existing UP bridges within five hundred foot (500') of any turnout are shown on the print. A detailed set of bridge (or bridge modification) plans (stamped and sealed by a registered Professional Engineer) shall be submitted to UP's EDS system. The plans will then be distributed to the Structures Department for their review and comment

2.03.22 OTHER DRAINAGE STRUCTURES - Show all existing and proposed drainage structures under all existing and proposed roads and in the construction area that would affect drainage on UP property. Show the Direction of runoff across the project and in the vicinity of all tracks to indicate water flow after construction (see **Section 7.00**).

2.03.23 UNDER TRACK STRUCTURES - Show the ES of any existing or proposed under track structure. Provide detailed drawings of any proposed under track structures to UP's Structures Department for their approval. These drawings should include type of construction, placement and size of reinforcing steel in concrete, thickness of walls and floor, type and size of rail supporting beams, weight of rail to be used over the structure, and method of fastening the rail to the beams. All structural plans shall be stamped and sealed by a registered Professional Engineer.

2.03.24 OVERHEAD STRUCTURES - Show the ES of any existing or proposed overhead loading devices, clearance envelope must show the minimum clearances when the device is in use and in the retracted position for train movement (see UP **Standard Drawing No. 0038**). Detailed drawings of any proposed overhead loading devices, including side-unloading racks with



retractable platforms shall be submitted to UP's Structures Department for their approval. Drawings should include size and location of supports, footings, vertical and horizontal clearance.

2.03.25 UTILITIES - All existing or proposed utilities that cross or run within close proximity of any existing or proposed track must be located. Typical utility location requirements are:

- 1.) Overhead wireline crossings, including location of poles and vertical clearance above top of rail, voltage of line, if applicable, and owner.
- 2.) Underground utility line crossings, including location and type of line, depth below base of rail, proposed encasement details and owner.
- 3.) Any underground or overhead utilities within close proximity of any existing or proposed track, including the track's right-angled centerline distance to line (and poles if applicable), type of utility and owner.

Be advised that no UP underground facilities will be located by the "One Call" service. The MIPP can help arrange for the UP's underground utility location.

Please note that fiber optic cable systems may be buried on UP Property within the limits of your project. UP's Telecommunications Operation Center must be contacted at 1-800-336-9193 prior to construction.

2.03.26 TRACKSIDE DEVICES - Show all car pulling or indexing devices including stationing and clearance.

2.03.27 ELECTRICAL SERVICE - The Customer shall provide electrical service when the proposed track project requires power for facilities such as wayside signals, active warning devices, illumination, impaired clearance signs, or other facilities. Show location, indicate overhead or underground, and the size of proposed electrical service. Show location of poles and size of wireline for any overhead lights, etc.

2.03.28 FENCES - Show the ES and distance to all existing or proposed fences in the vicinity of any proposed or existing track; including the location of gates crossing tracks (see **Section 8.24** for UPRR fence specifications). Also, show the clearance from center of track when gate is open.

2.03.29 TRACK GROUNDING - Show any track, or segment of track, that will be used for loading or unloading of flammable commodities. This track, or segment of track, on which a tank car may stand while a flammable liquid or flammable compressed gas is being loaded or unloaded shall be bonded at each rail and grounded (see UP **Standard Drawing No. 6003**).

2.03.30 CLEARANCES - Show all horizontal clearances, at right angle from the track, to any obstruction within 12 feet (12') of the centerline of all proposed or existing tracks. Also show the above top of rail distance to all overhead crossings of any existing or proposed tracks (see UP **Standard Drawing No. 0038**).

2.03.31 PROPOSED TRACK PROFILES - Provide a top of rail profile for the entire length of all proposed tracks. Maximum interval is one hundred foot (100'). Refer to UP **Std Dwg 0016**. Provide ES and elevation information at vertical curve points (PVC, PVI and PVT).



2.03.32 ROAD AND DITCH PROFILES - A top of road profile is required (at a maximum of fifty foot (50') intervals) of any proposed road that crosses UP tracks. A top of road profile is also required (at a maximum of fifty foot (50') intervals) of any existing road that the number of tracks crossing it is increased (existing and proposed elevations). The ES and elevation (existing and proposed) of all existing or proposed at grade crossings must be shown on the road profile. If applicable, show any drainage structures with invert elevations and ditch profiles (at a maximum of one hundred foot (100') intervals).

2.03.33 TYPICAL CROSS-SECTIONS - Provide typical cross-sections showing proposed track sections, any side ditches and all areas requiring a walkway.

2.03.34 CROSS SECTIONS – Provide cross sections for the entire project and 200 ft. past the end of project. Individual sections are required at roadway crossings, utility crossings, drainage structures and other key points. Show UPRR ROW & any construction easements. Top of rail elevations must be shown and be consistent with track profile elevations.

2.03.35 TURNOUT CONSTRUCTION PAD - Show details of the construction pad (see UP Exhibit 'T.O.PAD' Drawing) used to assemble and install any turnout installed in UP track.



2.04.00 - REQUIREMENTS FOR THE EXHIBIT 'A' PRINT SUBMITTAL

The sample Exhibit 'A' (see UP **Exhibit 'A' Drawing**), UP standard drawing border and UP Standard Legend and Abbreviations Drawing (see UP **Exhibit 'GL001' Drawing**) should be used as a guide preparing the Exhibit 'A' print.

NOTE: The use of digital aerial imagery is generally not recommended on the Exhibit 'A' drawing. If digital imagery is used on the Exhibit 'A', authorization is required (see **Exhibit "A" – Digital Imagery Authorization**). The authorization form must be signed by the INDUSTRY and included with the Exhibit 'A' submittal.

All industry tracks operated by UP are covered by an Industry Track Agreement (ITA) that specifies each party's responsibility for construction, maintenance and operations of the industry tracks. The Exhibit 'A' print is a simplified track plan inserted into the ITA, and because the ITA is a legally binding agreement, the Exhibit 'A' print must be accurate, easy to interpret and include the following:

2.04.01 TURNOUTS - Show all existing turnout (within 1500' of the limits of the construction area) and proposed turnouts, including size (No. 11, No. 15, etc). Show the Engineering Station (ES) of each point of switch. On all proposed single ended tracks, this shall be ES 0+00. If the proposed track is double ended, the turnout located closest to the UP's lesser Milepost (MP) shall be designated as ES 0+00. Each point of switch in a UP track shall also be identified by UP's ES and MP with a station equation for the proposed industry track (i.e., UPRR ES 23+42/MP 46.90 = ES 0+00 Track 'A'). The MIPP can help you determine turnout sizes, ES, and MP locations.

2.04.02 TRACKS - Show a plan view of all track arrangements including existing and proposed tracks. Future tracks and/or any work not associated with the current project shall not be included on the Exhibit "A". All existing tracks are to be designated by their unique track identification, Zone Track Spot (ZTS) number; (the RMID or the MIPP can provide these track numbers). All proposed tracks should be designated as Track 'A', Track 'B', etc. On all proposed tracks, show the ES of the thirteen-foot (13') clearance point, the ES of the derail (describe the type of derail), the ES of the point where the track centerline crosses UP R/W, if applicable, and the ES of the end of track (EOT), including the type of EOT device. On all proposed tracks, show the right-angled center to center distances between all tracks. In addition, note the ES indicating the "End of UPRR Maintenance." Typically this is at the 13 ft. clearance point for a non-controlled/hand-thrown turnout and 50 ft. beyond the derail for controlled/powered turnout.

2.04.03 TRACKS - PROPOSED SALE OR LEASE - Show any proposed sale or lease of an existing UP owned track (or portion thereof) that is required as part of the construction plan, including the ES for the beginning and end of the proposed sale or lease.

2.04.04 RIGHT OF WAY (R/W) - Show the existing UP R/W, if applicable, and the right-angled distance to the track the R/W is tied to. This information is shown on UP's R/W maps.

2.04.05 ROAD CROSSINGS - Show the ES/MP location of the centerline of all existing and proposed roads crossing UP tracks, the type of crossing material (concrete, wood, etc.), the length of crossing, type (public/private), and the type of crossing warning device. All road crossings within fifteen hundred feet (1500') of a proposed turnout that has any type of electric warning



device must be located and shown on the print. **Be advised, if a new road crossing is proposed near an existing one, the crossing warning devices may have to be upgraded.**

2.04.06 BUILDINGS - Show all existing and proposed buildings adjacent to any existing or proposed tracks, including any unloading doors, ramps, docks, etc. Show the right-angled distance from any track within fifty-foot (50') of these buildings, doors, ramps, docks, etc.

2.04.08 OPERATING PLAN -An Operating Plan should not be included for this submittal. **The proposed operating plan is to be included ONLY on the 10% design submittal.**

2.04.09 SCOPE OF WORK - Provide a Scope of Work showing work to be performed by the UP and the Industry. Specifically define turnouts to be installed and length of track to be constructed by UP. In addition, define all work to be done by the Industry. Total track footage of industry track to be built on UPRR right-of-way and the distance from mainline must be noted on the scope of work.

2.04.10 DRAWING STANDARDS - Your plans should have the approved UP drawing border and use UP Standard Legend and Abbreviations Drawing (see UP **Exhibit 'GL001' Drawing**) as a guideline. Acceptable plan scale: 1" = 100' or 1" = 200' in an 11"x17" Adobe Acrobat PDF format only. All pages constituting your Exhibit 'A' print should be loaded as a single PDF file, with the exception that file size should not exceed 20 mg. If the file size exceeds 20 mg it should be split into pieces, not to exceed 20mg. Show a directional north arrow, subdivision name, track name/ZTS number, the Timetable direction of the track and the next timetable station in both directions. The MIPP can help with getting this information.

2.04.11 INDUSTRIAL TRACK STANDARDS CHECKLIST - Include the Checklist for Industry Track Submittals (**Exhibit 'A-1'**) complete with the Industry's Name, Project Location, and the Design Firm's Name, Address, and Phone Number. Also, include the FES # in the space provided.

2.04.14 TRACKS (Additional Information) - On all tracks, show the total length, the ES of the thirteen-foot (13') clearance point, the ES of the derail (describe the type of derail), the ES of the point where the track centerline crosses UP R/W (if applicable) and the ES of the EOT including the type of EOT device. Show the right-angled center to center distances between all tracks.

2.04.20 TRACK CULVERTS - Show the ES (to centerline), the MP location (if UP track), the size, length and type of all existing and proposed culverts (or culvert modifications or extensions) under all existing and proposed tracks (see **Section 7.00** and UP **Bridge Standard Plan No. 680000, Sheets 1 and 2, Plan No. 680020, Sheets 1 and 2 and Plan No. 680030, Sheets 1 of 1**). The minimum culvert size allowed under UP owned or maintained track is thirty inches (30"). A detailed set of plans shall be submitted to UP's EDS system. The plans will then be distributed to the Structures Department for their review and comment

2.04.21 TRACK BRIDGES - Show the ES (at each backwall), the MP location (if UP track), the length and type of all existing and proposed bridges (or bridge modifications or extensions) in all existing and proposed tracks (see **Section 7.00**). Also show the T/R to flowline distance. Ensure



that all existing UP bridges within five hundred foot (500') of any turnout are shown on the print. A detailed set of bridge (or bridge modification) plans (stamped and sealed by a registered Professional Engineer) shall be submitted to UP's EDS system. The plans will then be distributed to the Structures Department for their review and comment.

2.04.23 UNDER TRACK STRUCTURES - Show the ES of any existing or proposed under track structure. Provide detailed drawings of any proposed under track structures to UP's Structures Department for their approval. These drawings should include type of construction, placement and size of reinforcing steel in concrete, thickness of walls and floor, type and size of rail supporting beams, weight of rail to be used over the structure, and method of fastening the rail to the beams. All structural plans shall be stamped and sealed by a registered Professional Engineer.

2.04.24 OVERHEAD STRUCTURES - Show the ES of any existing or proposed overhead loading devices, clearance envelope must show the minimum clearances when the device is in use and in the retracted position for train movement (see **UP Standard Drawing No. 0038**). Detailed drawings of any proposed overhead loading devices, including side-unloading racks with retractable platforms shall be submitted to UP's Structures Department for their approval. Drawings should include size and location of supports, footings, vertical and horizontal clearance.

2.04.26 TRACKSIDE DEVICES - Show all car pulling or indexing devices including stationing and clearance.

2.04.28 FENCES - Show the ES and distance to all existing or proposed fences in the vicinity of any proposed or existing track; including the location of gates crossing tracks (see **Section 8.24** for UPRR fence specifications). Also, show the clearance from center of track when gate is open

2.04.30 CLEARANCES - Show all horizontal clearances, at right angle from the track, to any obstruction within 12 feet (12') of the centerline of all proposed or existing tracks. Also show the above top of rail distance to all overhead crossings of any existing or proposed tracks (see **UP Standard Drawing No. 0038**).

2.04.33 TYPICAL CROSS-SECTIONS - Provide typical cross-sections showing proposed track sections, any side ditches and all areas requiring a walkway.



3.00 - TRACK ALIGNMENT SPECIFICATIONS

3.01 - Tracks should be designed with the minimum degree of curvature that is practicable and attainable. Horizontal curves of 10° 00' (Chord Definition) (Radius = 573.69 feet) or less, any curvatures greater than 10° will require the approval of the Manager of Industry and Public Projects (MIPP), up to a maximum of 12° 30' (Radius = 459.28 feet). Curves greater than 12° 30' must have approval of Union Pacific Railroad's AVP Engineering – Design/Construction or designated representative. Industry should provide justification to the MIPP when minimum design criteria for curvature cannot be met. For Unit Train Operations, more conservative design criteria may be required. Use the American Railway Engineering and Maintenance of Way Association (AREMA) chapter 14 Section 4.4.2.6.1 Track Geometry – Unit Trains for Guidance. Consult MIPP prior to design to determine if more stringent design criteria will be required.

3.02 - The minimum tangent distance between curves greater than 07° 30' shall be at least one car length (60 feet to 100 feet), use UP **Standard Drawing No. 0018** for guidance. For the minimum distance between facing point turnouts use UP **Standard Drawing No. 0017** for guidance.

3.03 - Industry track center minimums are as follows (Please note that proposed Industry track centers are subject to Union Pacific's review to ensure that proposed industry tracks will not have impacts on future projects):

- a) 15 feet preferred on tangent track between industry owned tracks.
- b) 15 feet if industry owned track is adjacent to an industry owned lead track or on a curve track
- c) 20 feet if industry owned track is adjacent to an industry owned switching lead.
- d) 25 feet if industry owned track is adjacent to a UPRR track **not** considered a main or branch line track
- e) 45 feet if industry owned track is adjacent to a UPRR main or branch line track.

NOTE: Other than required connections, customer tracks and facilities will be designed to be separate from UPRR right-of-way property. All customer tracks must be at least 45 feet away from any UPRR mainline.

3.04 - Horizontal curves must not begin on the long ties of a turnout.

3.05 - Turnouts: Consult MIPP prior to design to determine if more stringent design criteria will be required.

For proposed turnouts, refer to UPRR Std Dwg 0080 to determine the proper turnout applications for the project. UPRR Standard Drawings can be found at the following web site:

<http://www.up.com/customers/ind-dev/operations/specs/track/index.htm>

No. 7, No. 8, No. 8-1/2 or No. 10 turnouts will be considered where site conditions warrant in lieu of No. 9 turnouts on privately owned and maintained track, they must meet the latest edition of the AREMA Manual. UP will not own or maintain turnouts of these sizes.



All turnouts in UP owned or maintained track will be equipped with a new standard switch stand and target supplied by a UP approved vendor. Turnouts in UP owned or maintained track will be insulated. Type of switch stand to be designated by UP's AVP Engineering – Design/Construction or a designated representative (See UP **Standard. Drawing No. 2111, 2020 & 2050**).

If a new turnout is located within 500 feet of a bridge that does not have a footwalk with handrail on both sides, then its installation will be required. (See **Section 15**)

For bridges equipped with handrails and footwalks, proposed turnouts must be located a minimum of 100 ft. from the abutment backwall.

For new turnouts installed on a UP mainline, the point of switch must be no closer than 200 ft. to a horizontal curve.

Any turnout placed within three hundred foot (300') of the edge of a road crossing's surface needs the prior approval of Union Pacific's VP Engineering, or his representative.

Transition zones, associated with turnouts, are required on all tracks where maximum authorized speed is 20 MPH or greater (see UP **Standard Drawing No. 0220**).

If turnout is to be Power Operated Turnout (POTO), special ties and components might be required. Power Operated Derails may be required if POTO are used. NOTE: Special ties on Derail components are required if it is Power Operated.

3.06 - Stationing of each track should begin with 0+00 at the proposed point of switch for each new track.



4.00 - TRACK PROFILE SPECIFICATIONS

4.01 - Vertical curves should have a minimum length of 100 feet and be designed for the longest curve practical, with a V/L not to exceed 1.2 for Sags and 2.00 for Summits, in which V = (Grade 1) minus (Grade 2) and L = Length of Curve in Stations. Rate of change V/L = Algebraic difference in grades divided by the length of the vertical curve in 100 foot stations. The track should be designed to minimize the number of grade changes and use the smallest V/L as practical (See Union Pacific (UP) **Standard Drawing No. 0016**). For Unit Train Operations, more conservative design criteria may be required. Use the American Railway Engineering and Maintenance of Way Association (AREMA) Chapter 14 Section 4.4.2.6.1 Track Geometry – Unit Trains for Guidance. Consult with the Manager of Industry and Public Projects (MIPP) prior to design to determine if more stringent design criteria will be required.

4.02 - Track Grade shall be designed for the least grade practical, but shall not exceed 2.00%. Grades on track at location used for spotting rail cars are not to exceed 0.4%. For Unit Train Operations, more conservative design criteria may be required. Use the AREMA Chapter 14 Section 4.4.2.6.1 Track Geometry – Unit Trains for Guidance. Consult with the MIPP prior to design to determine if more stringent design criteria will be required.

4.03 - Vertical curves must not begin on the long ties of a turnout. The grade from the point of switch through the long switch ties must be the same as the existing track that the turnout is coming out of.

4.04 - Top of rail of the existing track must be shown for a minimum of 200 feet in prior to the proposed point of switch and 200 feet from the last long switch tie.

4.05 - Description and location of benchmark used in determining elevations.

4.06 - All drainage devices including invert elevations will be shown on the profile and referenced to the top of rail. Show type and size of drainage device. (See UP **Bridge Standard Plan No. 680000, Sheets 1 and 2, Plan No. 680020, Sheets 1 and 2 and Plan No. 680030, Sheets 1 of 1 and Section 7.00**).

4.07 - Any underground utility crossings under UPRR owned track(s) (see **Section 6.0**) will be shown and referenced to the top of rail. Show the type of utility and size of casing/pipeline being crossed by proposed and existing tracks.

4.08 - Typical cross section showing subgrade, walkway and ditch details (See UP **Standard Drawing No. 0003** and UP **Exhibit 'E' Drawing**).

4.09 - Stationing of proposed track should begin with 0+00 at the proposed point of switch for each new track.



5.00 - CLEARANCE REQUIREMENTS

5.01 - Horizontal: The minimum clearance shall be 9 feet at a right angle from the centerline tangent track to nearest obstruction, including car floor height loading docks. Clearances are to be increased (1 1/2") per degree of curve where facility is located adjacent to or within 80 feet of a turnout or curve limits (See Union Pacific Railroad (UP) **Standard Drawing No. 0038 & 0035**).

5.02 - Vertical: The minimum clearance shall be 23 feet from top of rail to nearest overhead obstruction (See UP **Standard Drawing No. 0038 & 0035**).

For overhead wirelines see UPRR Web Site to find the "Wireline Clearance Chart" and/or refer to current National Electric Safety Code manual for wireline clearances. UPRR's wireline specifications can be found at the following site:

http://www.up.com/real_estate/utilities/wireline/wirespecs/index.htm

In some instances, certain states may accept vertical or horizontal clearances slightly less than UP standards. In these instances, Management normally will accept the State's lesser clearance requirements, although the Industry will be required to sign an Impaired Clearance Agreement with the UP. In any instance, when either horizontal or vertical clearance is less than those of the State Railway or Public Service Commission are, as the case may be, the Industry shall secure necessary approval from the appropriate State Authority for each impaired clearance. The agreement covering service to the Industry's track will include the specific reference to the substandard clearance involved. When state law requires clearances that are more restrictive, such laws will govern. Impaired Clearance Warning Signs shall be illuminated at night (See UP **Standard Drawing No. 0513**).

5.03 - Clearances with respect to installation of loading or unloading facilities for handling Liquefied Petroleum Gas (LPG), anhydrous ammonia, ethanol, or other Hazardous Materials as described under Sec. 172.101-Hazardous Materials Table, of the U.S. Dept. of Transportation's hazardous materials regulations.

Loading and unloading devices should not be closer than 9 feet from centerline of tangent track. Loading and unloading tracks, storage tanks and other permanent installations should be governed by the following table:

ACTIVITY	CLASS 3 (Combustible. Liquid) CLASS 8 (Corrosive Material) CLASS 9	ALL OTHER CLASSES OF HAZARDOUS MATERIALS
Loading and unloading	50 Feet	100 Feet
Storage of loaded tank cars	25 Feet	50 Feet
Storage in tanks	50 Feet	100 Feet

Exceptions to this clearance will require the approval of UP's Executive Vice President - Operations. Tracks on which tank cars of flammable liquids are spotted must be bonded, protected by insulated joints and grounded in accordance with UP's current standard for bonding tracks. Such insulated rail



joints must not be bridged by rail equipment or other means during transfer operations (see UP **Standard Drawing 6003**).



6.00 - UNDERGROUND AND OVERHEAD PIPELINE AND WIRELINE CROSSINGS

Please refer to the Union Pacific Railroad Web Site for specifications for underground and overhead utilities. Site Address is:

http://www.up.com/real_estate/utilities/index.htm



7.00 - DRAINAGE SYSTEMS

Union Pacific Railroad (UP) Hydraulic Design Criteria: A complete hydrology study is required when either additional drainage is added to the UP's right of way, or a drainage structure is being added, removed or its size changed.

7.01 - The hydrology study for UP owned or maintained track must include, but is not limited to:

- a.) Top of rail elevation.
- b.) The 50-year and 100-year water surface elevations for both the existing and proposed conditions.
- c.) Flow rates for both events.
- d.) Location map of drainage area including UP mileposts and Engr. stations.
- e.) Size of the drainage area.
- f.) Location of the water flowing along the right of way.
- g.) Location where the water leaves the right of way.

7.02 - The following UP criteria for sizing bridges and culverts on UPRR owned or maintained track is used to determine the adequacy of the existing structure and proposed structure:

- a) The 50-year flood elevation should not come into contact with the crown of the culvert or the low chord of the bridge whichever is applicable.
- b) The 100-year flood elevation should not exceed the track subgrade elevation at the structure.
- c) Both the UP's criteria and local criteria shall be evaluated, and the more restrictive shall be adopted in sizing the drainage structure or replacement.
- d) If the existing structure opening more than satisfies the foregoing criteria, a smaller section which satisfies the criteria set forth above may be recommended.
- e) Minimum culvert size allowed under UP owned or maintained track is 30".
- f) The use of any drainage culverts other than annular corrugated steel (CSP) will require prior approval by UPRR before installation.
- g) The use of elliptical or arch pipe is strictly prohibited.

See **UP Bridge Standard Plan No. 680000, Sheets 1 and 2, Plan No. 680020, Sheets 1 and 2 and Plan No. 680030, Sheets 1 of 1**

7.03 - If the existing bridge or culvert does not meet the design criteria, an enlarged opening will be considered. To the extent possible, this enlargement will be made laterally. If it is found that the criteria cannot be met with maximum widening, the UP will be contacted to discuss consideration of relief bridges on the overbank floodplain, raising track grades, or other alternatives which should be evaluated. All structures shall be designed, at a minimum, to meet the latest edition of the American Railway Engineering and Maintenance of Way Association (AREMA) Manual. The link to the AREMA site is www.arena.org. If the bridge structures are in a FEMA designated floodplain, the water surface elevation for a 100-year event shall be determined regardless of line classification

7.04 - The hydrology study for Industry owned or maintained track must include, but not limited to:

- a) Top of rail elevation.



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- b) The 25-year and 50-year water surface elevations for both the existing and proposed conditions.
 - c) Flow rates for both events.
 - d) Location map of drainage area including UP mileposts and Engr. stations.
 - e) Size of the drainage area.
 - f) Location of the water flowing along the right of way.
 - g) Location where the water leaves the right of way.

7.05 - The following UP criteria for sizing bridges and culverts on Industry owned or maintained track is used to determine the adequacy of the existing structure and proposed structure:

- a) The 25-year flood elevation should not come into contact with the crown of the culvert or the low chord of the bridge whichever is applicable.
- b) The 50-year flood elevation should not exceed the track subgrade elevation at the structure.
- c) Both the UP's criteria and local criteria shall be evaluated, and the more restrictive shall be adopted in sizing the drainage structure or replacement.
- d) If the existing structure opening more than satisfies the foregoing criteria, a smaller section which satisfies the criteria set forth above may be recommended.
- e) Minimum culvert size allowed under UP owned or maintained track is 30".
- f) The use of any drainage culverts other than annular corrugated steel (CSP) will require prior approval by UPRR before installation.
- g) The use of elliptical or arch pipe is strictly prohibited.

See UP **Bridge Standard Plan No. 680000, Sheets 1 and 2, Plan No. 680020, Sheets 1 and 2 and Plan No. 680030, Sheets 1 of 1**



8.00 - TRACK ROADBED CONSTRUCTION SPECIFICATIONS

These Specifications are to be followed for all construction on Union Pacific Railroad (UP) property, for all tracks operated over by UP and as a guideline for all other construction. The term Engineer used in this section is defined as the UP's Manager of Industry and Public Projects (MIPP) or his authorized representative. For any specifications not covered here contact the local MIPP.

8.01 SAFETY AND HEALTH - At all times during the performance of the Work, the Industry shall exercise precaution for the protection of persons and property. The safety provisions of applicable laws, building, and construction codes shall be observed. Machinery, equipment, and other hazards shall be guarded in accordance with the safety provisions of the Manual of Accident Prevention in Construction, published by the Associated General Contractors of America; to the extent such provisions are not inconsistent with applicable law or regulations. Also see **Section 1.0** "Minimum Safety Requirements for Industry's contractor(s) Entering UP Property" contained in these "Technical Specifications for Construction of Industrial Tracks".

8.02 FIRE PROTECTION - Only work procedures which minimize fire hazards to the extent practicable shall be used. Combustible debris and waste materials shall be collected and removed from the site each day. Fuels, solvents, and other volatile or flammable materials shall be stored in separate areas in well-marked, safe containers. Good housekeeping is essential to fire prevention and shall be practiced by the Industry throughout the construction period. The Industry shall follow the recommendations of the Associated General Contractors of America's "Manual of Accident Prevention in Construction" regarding fire hazards and prevention.

8.03 SECURITY - The Industry shall be responsible for all materials and equipment in its custody or placed in construction by it. Security methods shall be employed as required to ensure the protection of UP Property, of all materials, equipment, and construction work from theft, vandalism, fire, and all other damage and loss.

8.04 UTILITIES – The Industry has the responsibility to locate and protect all utilities on UP property within the limits of construction.

Please note that fiber optic cable systems may be buried on UP Property within the limits of this project. UP's Telecommunications Operation Center must be contacted at 1-800-336-9193 prior to construction.

8.05 CROSSINGS - Except as authorized by the Engineer, the Industry will not construct crossings over any track at any location on UP property. Where crossings are needed or desired, the Industry shall make arrangements directly with the Engineer. If a crossing or crossings are required to complete the Work as set forth in the Specifications, the Drawings, and the Agreement, such crossings shall be constructed by the UP unless the UP specifically authorizes the Industry to construct such crossings.

8.06 ACCESS ROADS - Industry shall ensure that any access roads used by the Industry or their contractor on UP property are maintained during construction and left in pre-construction condition when project is complete



Access roads and parking areas which the Industry needs to construct on the UP's Right of Way or property, which the UP has easement or interest in, shall be approved by the Engineer before such roads or parking areas are built. All access roads and parking areas constructed by the Industry that the Engineer deems unsuitable for future UP use shall be removed at Industry expense upon completion of the Work. The areas shall be stabilized with gravel or put back to preexisting conditions where required.

8.07 DUST CONTROL - Industry shall provide equipment for dust control during construction to provide for the safety of UP personnel and UP operations.

8.08 CLEAN UP - Upon completion of work, the Industry shall clean the location of the Work and all ground on UP property occupied by him in connection with the Work. The Industry shall remove all rubbish; excess materials, temporary structures, and equipment, leaving the location of the Work cleaned to the satisfaction of the Engineer.

8.09 ROADBED WIDTH - Roadbeds shall be constructed per UP's Engineering **Standard Drawing No. 0003**. On UP owned or maintained tracks, a twenty four foot roadbed will be required. Although a twenty-four foot roadbed is preferred, tracks not owned or maintained by UP may have a twenty two foot roadbed (with permission of UP's Engineering Department). **Additional roadbed width will be required along all turnouts and derails to provide adequate room for placement of walkways** (see UP **Exhibit 'E' Drawing**). In addition, if proposed ballast depth beneath the ties will exceed 8 inches, the subballast width must be increased accordingly to maintain a minimum 3 ft. wide walkway on each side.

8.10 CONSTRUCTION PAD - Industry shall provide a construction pad adjacent to the location where a turnout will be installed in UPRR track. The pad should be sufficiently sized to facilitate the assembly and installation of the turnout. At the direction of the Manager Track Maintenance or MIPP, the pad may have to be removed to facilitate proper drainage after the switch is installed. Construction Pad details should be included with the Construction Plans (see UP **Exhibit 'T.O.PAD Drawing'**).

8.11 CLEARING AND GRUBBING - Areas required for embankment or excavation shall be cleared and grubbed. On areas required for excavation, all stumps, roots, etc., shall be removed to a minimum depth of two feet (2') below the sub-grade elevation. On areas required for embankment, all stumps, roots, etc., shall be removed to a minimum of two feet (2') below the existing ground. All holes remaining after clearing and grubbing shall be backfilled and compacted and the entire area bladed to provide drainage, except, in areas to be immediately excavated, the Engineer may direct that the holes not be backfilled. On areas required for borrow sites and material sources, all stumps and roots, (except for designated trees and shrubs) shall be removed to prevent such objectionable matter becoming mixed with the material to be used in construction.

Areas requiring minimal grubbing, as designated by the Engineer, shall have a minimum of six inches (6") of vegetation and topsoil removed from the construction area.

All cleared and grubbed material shall be either:

- a) Stockpiled to be used as topsoil after grading is complete, if the Engineer has approved the material for this use.



- b) Properly disposed of in a manner satisfactory to the Engineer and in compliance with Federal, State and Local regulations.

Some existing UP embankment slopes are very steep (1.5' : 1' or less). **These slopes can not be cleared and grubbed along with the foundation of embankment areas.** These slopes must be cleared in steps (see **Section 8.14**, last paragraph) immediately ahead of placing embankment lifts and the cleared material wasted over the side of the new embankment. **No steps will be left uncovered overnight.**

8.12 UNSUITABLE MATERIALS - If unsuitable materials are encountered below the foundation of embankments, below subgrade elevation in excavation areas, or in excavated material to be used in embankments, such materials shall be disposed of properly.

Unsuitable material removed from below subgrade elevation in excavation areas and from under embankment foundations shall be replaced to proposed grade elevation with suitable materials, compacted to specification.

The Engineer shall identify such unstable materials, the limits of removal, and shall approve the replacement material.

8.13 EXCAVATION - Before excavation begins, the area shall be cleared and grubbed (see **Section 8.11**). The Industry shall perform all excavation to the elevations and grades shown on the Drawings and as staked in the field. This work shall consist of excavating the material from roadbed areas, or the borrow areas, and placing the material as embankment, shaping and sloping necessary for the construction, preparation and completion of roadbeds and other earthwork.

The Industry shall excavate all materials including rock and common materials that must be removed to accomplish the excavation as shown on the Drawings. All excavated materials will be used in the formation of embankments, roadbeds, and other earthwork so long as such excavation material is satisfactory for such use. **Materials must be tested by an independent testing laboratory and/or approved by the Engineer prior to placement.**

Where excess excavation materials or unsatisfactory material exists, such materials will be disposed of in areas on the Right of Way, approved by the Engineer, or off the Right of Way in a legal and proper manner. Industry shall provide the Engineer with a copy of agreements made with any landowner.

Excavation shall be done in a manner and sequence that will provide proper drainage at all times.

No blasting will be allowed without sufficient advanced notice given to the Engineer. This time will permit the safe and continuous operation of the UP.

The Industry shall construct intercepting ditches above the cut slopes where natural ground slopes toward the track (see UP Engineering **Standard Drawing No. 0003**).

After cut has been completed, the Industry shall scarify the top six inches (6") of material below the top of proposed subgrade, adjust moisture content, and compact such scarified material (see **Section 8.15**).



In cut sections where the material to be excavated is solid rock, the Industry shall excavate twelve inches (12”) below the subgrade elevations as shown on the Drawings and shall replace such excavated twelve inches (12”) of solid rock with embankment material approved by the Engineer. This twelve inches (12”) of embankment shall have the moisture content adjusted and be compacted to specifications (see **Section 8.15**).

8.14 EMBANKMENT - Embankments shall be constructed and compacted to the elevations and grades set forth in the Drawings and as staked in the field.

After the required clearing and grubbing, the foundations for embankments shall be prepared by scarifying the top six inch (6”) layer of existing ground, adjusting moisture content, and compacting such scarified material (see **Section 8.15**).

If the quantity of materials required for construction of embankments exceeds the quantity of materials removed from excavation necessary to complete the project, additional embankment material will be obtained by:

- a) Widening cuts in the grading area. The Industry shall consult with the Engineer before widening any cuts. Cuts shall be cleared and grubbed and widened in such a manner as to:
 - 1.) Be at least as stable as the original cut
 - 2.) Provide adequate drainage for the roadbed
 - 3.) Retain the same, or lesser degree of, slope lines as original cut

- b) Establishing borrow areas within the right-of-way, if available, or from areas outside of the right-of-way, provided by the Industry, to obtain the additional embankment materials. All borrow areas shall be cleared and grubbed. **All imported materials shall be clean and free of any contaminated and hazardous materials. Materials are to be tested at the source by the Industry and approved by the Engineer prior to placement. Copies of laboratory tests are to be given to the Engineer.**

The Industry shall not place any material that is to be used in the construction of an embankment on top of a frozen surface. With the prior approval of the Engineer, the Industry shall remove all layers of frozen ground and frozen materials in order to prepare a proper foundation for construction of embankments. Furthermore, the material being placed for embankment shall contain no frozen material.

Wherever an embankment is placed on or against an existing embankment, the existing embankment side slope will be cut in steps to tie the new embankment into the existing side slope. These steps should not be over one foot (1’) vertically and can not be cut until embankment material will be placed immediately following the cutting of these steps. **No steps will be left uncovered overnight.**

8.15 MOISTURE AND DENSITY REQUIREMENTS - In cut sections, after cut has been completed, the Industry shall scarify the six inches (6”) of material below the top of proposed subgrade, adjust moisture content and compact the scarified material to a dense and unyielding condition and to a minimum of 95% (Modified Proctor) of maximum density. **After cut sections are**



excavated to subgrade, scarified and recompacted the Engineer shall observe and approve (by proof rolling or other methods) these areas before any subballast is placed.

In cut sections where the material to be excavated is solid rock the Industry shall excavate twelve inches (12") below the Subgrade elevations as shown on the Drawings. The Industry shall replace such excavated twelve inches (12") of solid rock with embankment material approved by the Engineer, adjust the moisture content of this material and compact to a dense and unyielding condition and to a minimum of 95% (Modified Proctor) of maximum density.

After the required clearing and grubbing, the foundations for embankments shall be prepared by scarifying the top six inch (6") layer of existing ground, adjusting moisture content, and compacting such scarified material to a dense and unyielding condition and to a minimum of 95% (Modified Proctor) of maximum density. **After the foundation areas are scarified and recompacted the Engineer shall observe and approve (by proof rolling or other methods) these foundation areas before any embankment material is placed.**

Embankments and backfills of less than three foot (3') of fill shall be compacted to a dense and unyielding condition and to a minimum of 95% (Modified Proctor) of maximum density.

When embankments and backfills are composed of more than three foot (3') of fill, the materials within three feet (3') of the established subgrade (top of fill) elevation shall be compacted to a dense and unyielding condition and to a minimum of 95% (Modified Proctor) of maximum density. Material below said three foot (3') from subgrade (top of fill) elevation shall be compacted to not less than 90% of maximum density.

Unless otherwise directed by the Engineer, the moisture content of the soil at the time of compaction shall be at the optimum moisture content or within minus four percentage points (4%) of the optimum moisture content as stated in ASTM D 1557 Modified and as determined by tests taken by the Engineer in accordance with ASTM standards.

Each embankment lift shall be tested for compaction compliance before the next lift is placed.

All compaction shall be determined using ASTM D 1556 for field tests and ASTM D 1557 for moisture and density.

Copies of all soils tests and observations shall be provided to the Engineer, the Engineer will not approve placing subballast before these tests are received.

8.16 FINISH GRADING - The Roadbed shall be finished to the lines and grades shown on the Drawings and as staked. The Industry shall protect finished roadbeds from damage, from all causes, until accepted by the UP.

Blue Tops (finished grade stakes) are required at one hundred foot (100') intervals and are to be set at the shoulders and at the centerline. If the distance between the shoulder stake and the centerline stake is over one hundred foot (100'), an intermediate Blue Top will be required.

8.17 TOPSOIL - A minimum of six inches (6") of topsoil consisting of friable, fertile soil of loamy character, containing an amount of organic matter normal to the region, capable of sustaining healthy plant life, and reasonably free from subsoil, roots, heavy or stiff clay, stones larger than two inches



(2") in greatest dimension, noxious weeds, sticks, brush, litter and other deleterious matter will be placed on all excavation and embankment slopes and any disturbed soils that will not support plant life and/or will cause or allow soil erosion. After placement of topsoil, all slopes over three foot (3') high shall be cat walked.

8.18 SLOPE PROTECTION AND EROSION CONTROL - This work shall consist of installing silt fence and ditch checks for controlling stormwater erosion during construction. A copy of the Industry's Storm Water Pollution Prevention Plan will be given to the Engineer before the beginning of construction.

8.19 SEEDING - This work shall consist of the preparing and seeding roadbed slopes, disturbed areas and areas designated by the Engineer. The areas involved will be comprised of cut and fill slopes and other areas disturbed by the construction, exclusive of rock slopes. Seedbed preparation, seeding rates and mixtures, fertilizer rates and mulching requirements shall conform to the state DOT specification for the region.

8.20 RIPRAP - Riprap shall be hard, durable, angular in shape and shall be free of cracks, seams, expansive materials or other defects that would cause accumulated deterioration from exposure to climatic conditions.

RIP RAP CLASS	AVERAGE WEIGHT PER STONE (LBS.)	DIMENSION (INCHES)	LAYER THICKNESS	TYPICAL VELOCITIES
I	50 to 200	9 to 14	1'-6"	6 – 8 fps
II	400 to 1,000	17 to 24	2'-0"	8 – 12 fps
III	1,000 to 4,000	24 to 38	3'-0"	> 12 fps
IV	> 4,000	> 38	4'-0"	SPECIAL CASES

The Engineer shall specify the Class of riprap. Riprap shall be placed in such a manner as to avoid segregation of various sizes of rock and distributed so that there will be no large accumulation of either the larger or smaller sizes of stone. Individual rocks shall be placed in tight contact with one another in such a way as to produce the least amount of void spaces and providing adequate embankment protection and erosion control. The entire mass of riprap shall be well distributed within the limits specified. However, the following allowances shall be acceptable to produce the required riprap protection:

Riprap Class I	No allowances are permitted
Riprap Class II	15% of Riprap Class I
Riprap Class III	15% of Riprap Class I and 15% of Riprap Class II
Riprap Class IV	15% of Riprap Class I, 15% of Riprap Class II and 15% of Riprap Class III

8.21.00 CULVERTS – CORRUGATED STEEL AND CORRUGATED ALUMINUM ALLOY

These pipe culvert specifications cover the assembly and installation of:

- a) Corrugated Steel Pipes - (CSP)



- b) Corrugated Structural Plate Pipe - (SPP)
- c) Corrugated Aluminum Alloy Pipe - (CAAP)

The above are hereinafter referred to as "pipe culverts". Pipe culverts shall be assembled and installed in accordance with these Specifications and Chapter 1, Part 4 of the current American Railway Engineering and Maintenance of Way Association (AREMA) Specifications for culvert installation and UP **Bridge Standard Plan No. 680000, Sheets 1 and 2, Plan No. 680020, Sheets 1 and 2 and Plan No. 680030, Sheets 1 of 1**. The most restrictive provisions shall govern when there are differences in the requirements.

8.21.01 PIPE CULVERT MATERIAL - All pipe culverts will be furnished with annular corrugations and the exposed ends of all corrugated pipes shall be square. 3" x 1" annular corrugations shall be used for all CSP pipes with 36" diameters and larger; 2-2/3" x 1/2" or 3" x 1" annular corrugations shall be used for 30" diameter CSP pipes. 3" x 1" annular corrugations shall be used for all CAAP pipes. CSP and CAPP material furnished by the Industry, must meet the standards for pipe culverts set forth in Chapter 1, Part 4 of the current AREMA Manual for Railway Engineering, and UP Company **Bridge Standard Plan No. 680000, Sheets 1 and 2 and Plan No. 680020, Sheets 1 and 2**, or as required and approved by the Engineer. 6" x 2" annular corrugations and a Minimum of 4 bolts per foot shall be used for all SPP pipes. SSP material and connecting material shall be per the current AREMA Manual of Railway Engineering, chapter 1, part 4, Section 6 and UP Company **Bridge Standard Plan No. 680030, Sheets 1 of 1**. Any deviations of these Specifications are to be submitted to the Engineer for approval prior to starting construction.

8.21.02 HANDLING OF PIPE CULVERT MATERIAL - The Industry shall handle pipe culverts and the pipe culvert material carefully in order to prevent damage, including, but not limited to, distortion of the pipes, injury to bituminous and other pipe culvert coatings. Pipe culverts shall never be dragged over the ground, but shall be handled with skids, rolling slings, or cranes. The Industry shall promptly repair, to the satisfaction of the Engineer; any damage to the pipe culvert or pipe culvert material. In the event such damaged pipe culverts or pipe culvert material cannot be repaired to the satisfaction of the Engineer, replacement pipe culverts or pipe culvert material must be provided by the Industry.

8.21.03 EXCAVATION AND LOCATION - Pipe culverts shall be placed in excavations at the location, elevation and alignment shown on the Drawings and as staked. The Industry shall preserve all stakes until pipe culvert installation is complete.

Prior to pipe culvert excavation, embankment must be constructed to a height no less than two feet (2') above the top of the proposed pipe culvert. When embankment is placed, alternate methods may be used if approved by the Engineer. Pipe culvert excavations shall be wide enough to permit thorough compaction of the backfill under and around the pipe culvert as required by **Section 8.21.10**. The BASE WIDTH of the pipe culvert excavation shall not exceed the external width of the pipe culvert plus:

- a) 12 inches on each side for pipes less than 48 inches in diameter
- b) 18 inches on each side for pipes 54-78 inches in diameter
- c) 24 inches on each side for pipes 84 inches in diameter or larger



Pipe culvert excavation shall be deep enough to permit compliance with **Section 8.21.05**. Care shall be taken to insure drainage is diverted away from the pipe bed during preparation. The Industry shall repair any damage to, or deterioration of, pipe bedding prior to installation, to the satisfaction of the Engineer.

The Industry shall comply with all current and applicable Federal, State and local rules and regulations governing the safety of men and materials during pipe culvert excavation, installation and backfilling operations. The Industry shall observe requirements of the Occupational Safety and Health Administration relating to excavations, trenching and shoring as set forth in Title 29, Part 1926, Subpart Paragraph P, Sections 1926.650 through 1926.653, Code of Federal Regulations, and any subsequent revisions. See also **Section 8.21.04** below.

8.21.04 SHORING - When working near UP tracks, temporary shoring may be required. UP's "Guidelines for Temporary Shoring" can be found at the following site:

<http://www.up.com/customers/ind-dev/operations/specs/>

Also see Union Pacific Railroad/ Burlington Northern Railroad **Common Standard Plan No. 710000, Sheet 1 of 1 and Plan No. 710001, Sheet 1 of 1.**

Before beginning any work that would require shoring, as determined by the above standards, the Industry shall provide detailed plans of the intended shoring. If the shoring falls within Zones A or B, the plans shall include design calculations. Plans and calculations must be signed and stamped by a Professional Engineer; licensed in the state the work will be done.

8.21.05 FOUNDATION, BEDDING, AND COMPACTION - Pipe culverts shall be placed at the flowline grade and elevation established by the Drawings and Specifications on a uniform bed of stable earth or granular material such as gravel or sand, (see UP **Bridge Standard Plan No.680000, Sheet 2 of 2**) and such bedding shall be compacted to not less than 95% (Modified Proctor) of maximum density determined by ASTM D 1557 with moisture content adjusted. The compacted bed shall contain the camber required by the Engineer or as covered by the Specifications listed below in **Section 8.21.06**. Where the granular material is used for bedding, the ends of the pipe culvert in embankment shall be sealed to prevent leaking and infiltration of water along the pipe culvert. Such sealing can often be accomplished by blanketing the ends of the pipe culvert embankment with well tamped clay. In all cases, the ends of pipe culverts shall be protected by riprap as outlined in **Section 8.21.07** and the UP Company **Bridge Standard Plan No. 680000, Sheet 2 of 2.**

Where the flowline grade crosses areas of soft soil, which will not provide a suitable uniform foundation for the pipe culvert bed, the Industry shall excavate eighteen inches (18") below the flowline grade for a width equal twice the outside width of the pipe culvert. Prior to backfilling, the Engineer shall inspect the excavation and the Industry shall perform any additional excavation required by the Engineer. Upon completion of the excavation, the Industry will backfill such excavation with granular material which shall be compacted and tested as required.

When the flowline grade passes over rock, the Industry shall excavate such rock to a depth, which is at least twelve inches (12") below the flowline grade. Excavations in rock shall maintain



sufficient area so that the pipe culvert will not rest on rock at any point. The Industry will backfill excavation in rock with granular material which shall be compacted and tested as required.

8.21.06 CAMBER - Camber shall be placed in all culverts where it is anticipated that the culvert will settle as the result of high embankment construction or compressible foundation soils below the culvert bedding. Unless otherwise specified by the Engineer, all culverts shall be cambered in accordance with the following:

- a) The culvert shall not be cambered so high in the center that water will be pocketed at the inlet end of the pipe.
- b) Culverts resting on rock foundations need not be cambered, refer to **Section 8.21.04**, last paragraph.
- c.) Embankments up to 8 feet high (measured base of rail to flowline) require a 1-1/2 inch camber.
- d) Embankments 8 feet to 12 feet high require a 2 - 1/2-inch camber.
- e) Embankments 12 feet to 24 feet high require a 4-inch camber.
- f) Embankments 24 feet to 36 feet high require a 6-in. camber.

The above camber standards, based on the height of embankments, may be adjusted in the field, where at the discretion of the Engineer a greater or lesser amount of camber should be built into pipe to adjust for soil conditions encountered at the site. For fills higher than 36 feet, the AVP Design will provide the camber requirements.

8.21.07 RIPRAP PROTECTION - Both the inlet and outlet ends of all culverts shall be protected by riprap. The riprap shall be installed per detail on UP Company **Bridge Standard Plan No. 680000, Sheet 2 of 2**, or as shown on the Drawings and Specifications.

8.21.08 ASSEMBLY - Pipe culverts shall be jointed with locking coupling bands in accordance with the provisions of the AREMA Manual for Railway Engineering Chapter 1, Part 4, Section 4.3.4. Coupling bands shall be of the same base material and finish as the pipe. Coupling bands for thirty inch (30") or larger culvert pipe shall be two foot (2') wide. The inside of the corrugated coupling bands and the outside of pipe culverts to be joined by corrugated coupling bands shall be kept clean and free of all dirt or gravel to ensure that the corrugations on the coupling bands and the pipe culvert fit snugly as the coupling bands are tightened. They should be tapped with a mallet or hard rubber hammer to ensure a tight joint. Coupling bands and the outside surface of the culvert pipe under the coupling bands often need to be lubricated with fuel oil or similar solvent to allow the coupling bands to be drawn firmly into place.

Corrugated structural plate pipe shall be assembled in accordance with the manufacturer's detailed assembly instructions and UP Company **Bridge Standard Plan No. 680030, Sheet 1 of 1**. Bolts shall be tightened progressively and uniformly, starting at one end of the corrugated structural plate pipe after all plates are in place. Tightening shall be repeated to ensure all bolts are tight.

When a power wrench is used for tightening bolts, the Industry shall check the tightening of the bolts with one handled structural or socket type torque wrench. Bolts shall be torqued uniformly



to a minimum of 100 ft. lb. and a maximum of 300 ft. lb. or as specified in the manufacturer's detailed assembly instructions.

Where field cutting of culvert pipes is required, the Industry shall make saw cuts, torch burning will not be permitted.

8.21.09 LAYING CULVERT PIPE - Installation of culvert pipe shall conform to the current AREMA Manual for Railway Engineering, Chapter 1, Part 4 and UP Company **Bridge Standard Plan No. 680020, Sheet 1 of 2** for CSP and UP Company **Bridge Standard Plan No. 680030, Sheet 1 of 1** for SPP. Each pipe culvert shall be laid true to the flowline grade. The minimum gradient for any pipe culvert shall be zero point five percent (0.5%) or as directed by the Engineer. If two or more pipe culverts are to be laid parallel to each other, such parallel pipe culverts shall be spaced to permit thorough compaction of the backfill as required by **Section 8.21.10** below. Parallel culverts shall be separated by a distance of at least one-half (1/2) of the nominal diameter of the pipe culverts, but not less than twelve inches (12") nor shall it exceed forty eight inches (48"). Riveted corrugated metal pipe culverts must be placed with the inside circumferential laps pointing downstream. The Industry shall cover exposed metal on the surface of any bituminous coated pipe culvert before backfilling is commenced. Such exposed metal must be covered with material which is approved by the Engineer and which includes:

- a) Fiber Bonded Bituminous (composite) coating ASTM A-825 (steel only)
- b) Polymeric Coating - ASTM A762 or AASHTO M245 (steel only)
- c) Galvanized - AASHTOM218 or Aluminum (Type 2) - AASHTO M274 (steel only)
- d) Asphaltic Coating - AASHTO M190 (steel and aluminum) (only 3 and 4 for structural plate pipe)

Such material shall be applied to a thickness of approximately one sixteenth (1/16) of an inch.

All pipe culverts with a nominal diameter of 48 inches or greater shall be provided with a five percent (5%) vertical elongation. Field strutting shall be required only on very large structural steel pipes, ten foot (10') or greater, or as specified on Drawings or Specifications.

8.21.10 BACKFILLING AND COMPACTION - Backfill materials shall be placed simultaneously on both sides of the pipe culvert in uniform layers not to exceed six inches (6") in thickness. For multiple pipes the backfill shall be placed simultaneously in uniform six inch (6") layers between and outside of pipes. Each successive layer shall be compacted to not less than 95% (Modified Proctor) of maximum density as determined by ASTM D 1557 with moisture content adjusted if necessary, and each six inch (6") layer shall be properly compacted before the next layer is placed.

Backfilling shall be started and completed as quickly as possible after the pipe culvert has been assembled and placed on its bed.

Special care must be taken to obtain adequate compaction under the pipe culvert haunches; however, care must be exercised to avoid lifting of the pipe culvert as the result of tamping to compact material under the haunch. Where pipe culvert is placed in a confined area, making it difficult to obtain adequate compaction under the pipe culvert haunches though tamping, a



Controlled Low-Strength Material (CLSM) fill may be used, see UP **Bridge Standard Plan No. 680000, Sheet 2 of 2.**

All backfilling material placed around and adjacent to pipe culverts and to a point at least one foot above the top of the pipe culvert shall consist of sand, gravel, sandy clay, or a combination thereof, free from all vegetation and rock or lumps greater than one and one-half inches (1-1/2") diameter in their greatest dimension. Granular material containing a small amount of silt or clay is an ideal backfill material because it makes a dense, stable fill.

Where granular material is used for backfill, the ends of the pipe culvert embankment shall be sealed with well tamped clay to prevent leaking and infiltration of water along the pipe culvert.

Materials used to complete the embankment over the pipe culvert should be essentially the same as the materials used for the pipe culvert backfill and should be placed and compacted in the same manner as pipe culvert backfill materials are placed. Such material must be used to complete the embankment at least to a height over the top of the pipe culvert equal to the nominal diameter of the pipe culvert, or if the height of the completed embankment over the top of the pipe culvert is less than the nominal diameter of the pipe culvert, then such material must be used to complete the embankment. The pipe culvert must be protected from damage during the entire construction period, especially if heavy compaction and/or construction equipment is used. Heavy equipment shall not be operated over the pipe culvert until it has been covered with compacted backfill material to a depth of twenty four inches (24").

Copies of all compaction tests shall be supplied to the Engineer.

8.21.11 RETIGHTENING OF BOLTS - As soon as possible after completion of the embankment over corrugated structural plate pipes, all bolts in the corrugated structural pipe must be retightened to the standards set forth in **Section 8.21.08** above. Such retightening must be started at one end of the pipe culvert and all bolts must be tightened progressively through the length of the pipe culvert.

8.21.12 REMOVAL OF EXISTING HEADWALLS OR CULVERTS IN PREPARATION FOR EXTENSION OF EXISTING PIPE CULVERTS - The Industry shall remove existing headwalls and/or culverts in whole or in part as shown on the Drawings and in the Specifications. The Industry shall perform all work called for, as shown on the Drawings and in the Specifications, which may be necessary to adapt existing pipe culverts for extension or reconstruction, including required excavation and backfilling. Except as otherwise provided for in these Specifications, the Industry will determine the method of extending existing pipe culvert structures by consulting with the Engineer. See also **Section 8.21.04.**

8.22.00 CULVERTS - REINFORCED CONCRETE PIPE (RCP)

These pipe culvert specifications cover the fabrication and installation of:

- a) Round reinforced concrete pipes
- b) Reinforced concrete manhole riser
- c) Reinforced concrete flared end pipes



Each of which will be referred to as "pipe culverts". Pipe culverts may be for culverts, siphons, drains, and conduits as shown on the Plans or directed by the Engineer in accordance with these Specifications and in all accordance with Chapter 8, Part 10 of the current AREMA Specifications for culverts. The most restrictive provisions shall govern when there are differences in the requirements.

8.22.01 PIPE CULVERT MATERIAL - Pipe culvert material must meet the standards set forth in Chapter 8, part 10 of the current AREMA Specifications. RCP pipe culvert materials shall be furnished in lengths not less than 4 feet. Material is to be new material. All pipe material shall be designed for Cooper E80 loading and no pipe lighter than Class IV will be permitted. The minimum factor of safety against formation of a 0.01 inch crack shall be 1.0. In lieu of design analysis, the Industry may furnish Class V pipe for installations with 14 feet maximum cover.

8.22.02 HANDLING OF PIPE CULVERT MATERIAL - The Industry shall handle pipe culverts, and the pipe culvert material, carefully in order to prevent damage including, but not limited to, injury to pipe culvert coatings, chipping or breaking culvert ends. The pipe culverts shall never be dragged over the ground but shall be handled with skids, rolling slings, or crane. The Industry shall promptly repair, to the satisfaction of the Engineer; any damage to the pipe culverts or culvert material which the Industry causes. In the event that such damage to culverts or pipe culvert material cannot be repaired to the satisfaction of the Engineer, replacement of pipe culvert and/or pipe culvert material must be provided by the Industry.

8.22.03 EXCAVATION AND LOCATION - Pipe culverts shall be placed in excavations at the location, elevation and alignment shown on the Drawings and as staked. The Industry shall preserve all stakes established until installation is complete.

Prior to pipe culvert excavation, embankment must be constructed to a height no less than two feet (2') above the top of the proposed pipe culvert. When embankment is placed, alternate methods may be used if approved by the Engineer. Pipe culvert excavations shall be wide enough to permit thorough compaction of the backfill under and around the pipe culvert as required by **Section 8.22.10**. The BASE WIDTH of the pipe culvert excavation shall not exceed the external width of the pipe culvert plus:

- a) 12 inches on each side for pipes less than 48 inches in diameter.
- b) 18 inches on each side for pipes 54-84 inches in diameter) 24 inches on each side for pipes 84 inches in diameter or larger.

Pipe culvert excavations shall be deep enough to permit compliance with **Sections 8.22.05**. Care shall be taken to insure drainage is diverted away from the pipe bed during preparation. The Industry shall repair any damage or deterioration of, pipe bedding prior to installation, to the satisfaction of the Engineer.

The Industry shall comply with all current applicable Federal, State and local rules and regulations governing the safety of men and materials during pipe culvert excavation, installation, and backfilling operations. The Industry shall comply with all requirements of the Occupational Safety and Health Administration relating to excavations, trenching and shoring as set forth in Title 29, Part 1926, Subpart Sections 1926.650 through 1926.653, Code of Federal Regulations, and any subsequent revisions. See also **Section 8.22.04** below.



8.22.04 SHORING - When working near UP tracks, temporary shoring may be required. UP's "Guidelines for Temporary Shoring" can be found at the following web site:

<http://www.up.com/customers/ind-dev/operations/specs/>

Also see Union Pacific Railroad/ Burlington Northern Railroad **Common Standard Plan No. 710000, Sheet 1 of 1 and Plan No. 710001, Sheet 1 of 1.**

Before beginning any work that would require shoring, as determined by the above standards, the Industry shall provide detailed plans of the intended shoring. If the shoring falls within Zones A or B the plans shall include design calculations. Plans and calculations must be signed and stamped by a Professional Engineer; licensed in the state the work will be done.

8.22.05 FOUNDATION, BEDDING AND COMPACTION - Pipe culverts shall be placed at the flowline grade and elevation established by the Drawings and Specifications on a uniform bed of stable earth or granular material such as sand or gravel (see UP Company **Bridge Standard Plan No. 680000, Sheet 2 of 2**, this plan refers to steel pipe, but the Pipe Bedding section shall also apply to concrete pipe). Such bedding shall be compacted to not less than 95% (Modified Proctor) of maximum density as determined by ASTM D 1557, with moisture content adjusted as necessary. The compacted bed shall contain the camber required by the Engineer or as covered by the Specifications listed below in **Section 8.22.06**. The compacted bed shall be shaped to fit the bottom of the pipe and shall conform to Class A, B or C bedding (see Table 10.33.4 bedding factors) AREMA Specifications chapter 8-10. Where granular material is used for bedding, the ends of the pipe culvert excavation shall be sealed to prevent leaking and infiltration of water along the pipe culvert. Such sealing can often be accomplished by blanketing the ends of the pipe culvert embankment with well tamped clay. In all cases the ends of pipe culverts shall be protected by riprap as outlined in **Section 8.22.07** and the UP Company **Bridge Standard Plan No. 680000, Sheet 2 of 2**, this plan refers to steel pipe but the riprap section shall also apply to concrete pipe.

Where the flowline grade crosses areas of soft soil, which will not provide a suitable uniform foundation for the pipe culvert bed, the Industry shall excavate eighteen inches (18") below the flowline grade for a width equal to twice the outside width of the pipe culvert. Prior to backfilling, the Engineer shall inspect the excavation and the Industry shall perform any additional excavation required by the Engineer. Upon completion of the excavation, the Industry will backfill such excavation with granular material, which shall be compacted and tested as required.

When the flowline grade passes over rock, the Industry shall excavate such rock to a depth which is at least six inches (6") below the flowline grade. The pipe culvert will not rest on rock at any point. The Industry will backfill excavations in rock with granular material, which shall be compacted and tested as required.



8.22.06 CAMBER - Camber shall be placed in all culverts where it is anticipated that the culvert will settle as the result of high embankment construction or compressible foundation soils below the culvert bedding. Unless otherwise specified by the Engineer, all culverts shall be cambered in accordance with the following:

- a) The culvert shall not be cambered so high in the center that water will be pocketed at the inlet end of the pipe.
- b) Culverts resting on rock foundations need not be cambered. Refer to **Section 8.22.05**, last paragraph.
- c) Embankments up to 8 feet high (measured base of rail to flowline) require 1-1/2 inch camber.
- d) Embankments 8 feet to 12 feet high require a 2-1/2 inch camber.
- e) Embankments 12 feet to 24 feet high require a 4-inch camber.
- f) Embankments 24 feet to 36 feet high require a 6-inch camber.

The above camber standards, based on the height of embankments, may be adjusted in the field where, at the discretion of the Engineer, a greater or lesser amount of camber should be built into pipe to adjust for soil conditions encountered at the site. For fills higher than 36 feet, the AVP Design will provide the camber requirements.

8.22.07 RIPRAP PROTECTION - Both the inlet and outlet ends of all culverts shall be protected by riprap. The riprap shall be installed per detail on UP Company **Bridge Standard Plan No. 680000, Sheet 2 of 2** (this plan refers to steel pipe but the riprap section shall also apply to concrete pipe) or as shown on the Drawings and Specifications.

8.22.08 ASSEMBLY - Pipe may be bell and spigot or tongue and groove unless otherwise specified. When bell pipe is used, a shallow excavation shall be made underneath the bell of sufficient depth so the bell does not rest on the bedding material. Ends of reinforced concrete pipe shall be of such design that when properly laid, they shall have a smooth and uniform interior surface. In areas where the pipe will tend to separate, suitable ties shall be installed.

Joints shall be made with either mortar, grout, rubber gaskets, plastic mastic compounds, or by a combination of these types. Any joint system must be approved by the Engineer prior to installation.

In general, mild bends, no more than a fifteen (15) degree change in either vertical or horizontal alignment at fifty foot (50') intervals, should be used. Pipes used on curves shall have both ends beveled to provide a smooth curve. In no case shall any pipe end be beveled greater than seven and one-half (7-1/2) degrees, and suitable ties shall be installed. If the resulting gap is less than one inch, the resulting space is to be filled with mortar concrete. For gaps of one inch or greater, a reinforced concrete collar shall be poured around the joint as directed by the Engineer.

8.22.09 LAYING CULVERT PIPE - Installation of culvert pipe shall conform to the current AREMA Manual for Railway Engineering, Chapter 1, Part 4, each pipe culvert shall be laid true to the flowline grade. The minimum gradient for any pipe culvert shall be zero point five percent (0.5%) or as directed by the Engineer. If two or more pipe culverts are to be laid parallel to each other, such parallel pipe culverts shall be spaced to permit thorough compaction of the backfill as



required by **Section 8.21.10** below. Parallel culverts shall be separated by a distance of at least one-half (1/2) of the nominal diameter of the pipe culverts, but not less than twelve inches (12") nor shall it exceed forty eight inches (48").

Pipe laying shall begin at the downstream end of the culvert. The bell or groove end of the pipe shall be placed facing upstream. No culvert shall be placed in service until a suitable outlet is provided.

8.22.10 BACKFILLING AND COMPACTION - Backfill materials shall be placed simultaneously on both sides of the pipe culvert in uniform layers not exceeding six inches (6") in thickness. For multiple pipes the backfill shall be placed simultaneously in uniform layers between and outside of the pipes. Each successive layer shall be compacted to not less than 95% (Modified Proctor) of maximum density as determined by ASTM D 1557, with moisture content adjusted if necessary, and each six inch (6") layers shall be properly compacted before the next layer is placed.

Backfilling shall be started and completed as quickly as possible after the pipe culvert has been assembled and placed on its bed.

Special care must be taken to obtain adequate compaction under the pipe culvert haunches; however, care must be exercised to avoid lifting of the pipe culvert as the result of tamping to compact material under the haunches. Where pipe culvert is placed in a confined area, making it difficult to obtain adequate compaction under the pipe culvert haunches through tamping, a Controlled Low-Strength Material (CLSM) fill may be used, see **UP Bridge Standard Plan No. 680000, Sheet 2 of 2** (this plan refers to steel pipe but the CLSM fill section shall also apply to concrete pipe. All backfill material placed around and adjacent to pipe culverts to a point at least one foot above the top of the pipe culvert shall consist of sand, gravel, sandy-clay, or a combination thereof, free from all vegetation and rock or lumps greater than one and one-half inches (1-1/2") in diameter in their greatest dimension. Granular material containing a small amount of silt or clay is an ideal backfill material because it makes a dense, stable fill. Where granular material is used for backfill, the ends of the pipe culvert embankment shall be sealed with well-tamped clay to prevent leaking and infiltration of water along the pipe culvert.

Materials used to complete the embankment over the pipe culvert should be essentially the same as the materials used for the pipe culvert backfill and should be placed and compacted in the same manner as pipe culvert backfill materials are placed. Such material must be used to complete the embankment at least to a height over the top of the pipe culvert equal to the nominal diameter of the pipe culvert, or if the height of the completed embankment over the top of the pipe culvert is less than the nominal diameter of the pipe culvert, then such material must be used to complete the embankment. The pipe culvert must be protected from damage during the entire construction period, especially if heavy compaction and/or construction equipment is used. Heavy equipment shall not be operated over the pipe culvert until it has been covered with compacted backfill material to a depth of twenty-four inches (24").

Copies of all compaction tests shall be supplied to the Engineer.

8.22.11 REMOVAL OF EXISTING HEADWALLS OR CULVERTS IN PREPARATION FOR EXTENSION OF EXISTING PIPE CULVERTS - The Industry shall remove existing



headwalls and/or culverts in whole or in part as shown on the Drawings and in the Specifications. The Industry shall perform all work called for, as shown on the Drawings and in the Specifications, which may be necessary to adapt existing pipe culverts for extension or reconstruction, including required excavation and backfilling. Except as otherwise provided for in these Specifications, the Industry will determine the method of extending existing pipe culvert structures by consulting with the Engineer. See also **Section 8.22.04**.

8.23.00 CULVERTS - SMOOTH STEEL PIPE (SSP) – JACK AND BORED

These pipe culvert specifications cover the assembly and installation of Smooth Steel Pipe.

Where conditions warrant the installation of pipe culverts by jacking and/or earth boring can be a viable alternative to more standard methods of installation. Smooth Steel Pipe shall be assembled and installed in accordance with these Specifications and Chapter 1, Part 4 of the current AREMA Specifications for culvert installation and UP Company **Bridge Standard Plan No. 680000, Sheets 1 and 2 and Plan No. 680010, Sheets 1 of 1**.

8.23.01 SAFETY - Trenching is one of the most dangerous situations in construction, since a jacking operation generally involves some form of trenching or pit construction, the jacking Industry shall strictly conform to all Federal, State and local regulations and in particular, the requirements of the Occupational Safety and Health Administration (OSHA).

8.23.02 JACKING AND BORING - Pipe boring and jacking operations shall be performed by an experienced specialty Industry normally engaged in performing this type of service. Excavation should not be carried more than a few inches ahead of the pipe. Jacking and boring shall be done continuously to minimize the tendency of the material to “freeze” around the pipe. However, lubricants such as bentonite slurry are available to minimize the freezing tendency. The bore hole diameter shall be essentially the same as the outside diameter of the pipe. Boring operations shall not be stopped if such a stoppage would be detrimental to the UP. A survey crew shall continually monitor the elevation and alignment of the UP track(s) during the jacking procedure and if there is track movement work must stop and the UP immediately notified. The Industry shall submit a corrective action plan to the Engineer for his approval and the approved repairs shall be completed as soon as possible.

8.23.03 JACKING AND BORING TOLERANCE - The tolerance from a true line is +/- 2” or less. Adjustments to the line and level shall be gradual to ensure that the pipe manufacture’s stated angular deflection is not exceeded.

8.23.04 BORING PIT - The approach trench should be properly sheeted and braced on the sides and working face. Wet sandy soils can be de-watered by various means including well points. **A detailed plan of the bore pit, including shoring proposals, shall be approved by the Engineer before the Work is started.** See also **Section 8.21.04**.

8.23.05 FIELD WELDING - Smooth steel pipe sections shall be welded per UP **Bridge Standard Plan No. 6800100, Sheet 1 of 1**. Welders must possess valid certification.

8.23.06 PIPE CULVERT MATERIALS - Smooth steel pipe culvert material shall be in accordance with ASTM International A139. Pipe to be Grade B and steel shall have a minimum yield strength of 35 ksi. Smooth steel pipe shall have welded straight longitudinal seams. The



ends of each section of pipe shall be square cut and one shall be suitably beveled for field welding sections together.

8.23.07 RIPRAP PROTECTION - Both the inlet and outlet ends of all culverts shall be protected by riprap. The riprap shall be installed per detail on UP Company **Bridge Standard Plan No. 680000, Sheet 2 of 2** or as shown on the Drawings and Specifications.

8.23.08 SMOOTH STEEL PIPE (SSP) - NOT JACK AND BORED - When smooth steel pipe is to be extended, by normal methods, from the end of the jack and bored sections, or is placed entirely by normal methods **Sections 8.21.00** through **Sections 8.21.10** shall be followed for any items not specifically covered by **Sections 8.23.00** to **Sections 8.23.06**.

8.24.00 RIGHT OF WAY FENCES AND GATES

The extent of the Standard Right of Way fence and gates is as indicated on the Drawings and Specifications or as designated by the Engineer and in accordance with typical details shown on UP Engineering **Standard Drawing No. 0075**.

8.24.01 MATERIALS

Hog tight, woven wire - A twenty six inch (26") woven wire galvanized steel fabric is to be used with seven horizontal bars of No. 9 galvanized wire and stays on six inch (6") centers. Weight is approximately 266 pounds per 20 rod roll.

Line Posts - Use painted studded tee steel fence posts seven foot (7') long, with anchor plate, spaced as shown on UP **Standard Drawing NO. 0075**. Approximate weight 9.98 pounds each.

Corner Post - Use five percent (5%) solution penta treated wood posts, six inches (6") in diameter by nine foot (9') long or 7" x 9" second hand wood ties.

Brace Panel Posts - Use five percent (5%) solution penta treated wood posts, six inches (6") in diameter by nine foot (9') long or 7" x 9" second hand wood ties.

Horizontal Brace Posts - Use five percent (5%) solution penta treated wood posts, four inches (4") in diameter or 4" x 4" by nine foot (8') long.

Gate Posts - Use 7" x 9" x 9' second hand ties. Each side of gate shall have a brace panel constructed to support gate.

Barbed Wire - Shall be two-strand 12.5 galvanized wire, twisted, with 14-gauge 4-point barbs spaced not more than 5 inches center to center. Metal and finish to match fabric (galvanized).

Diagonal Tie Wire - Use double number 8 galvanized steel wire twisted.

Wire Clips - Use 12 gauge galvanized wire clips.

Wire Staples - Use 1.5 inch 9 gauge galvanized steel wire staples.



Gates - Gate frames shall be constructed of 1.625 in. diameter steel tube with .066 wall. Rails shall be high strength 16 gauge S-bend shape. Stays shall be roll-formed 12 gauge welded in pairs. Latch shall be double pin 1/2" x 1" steel with lock and saddle horse type handle. Hinge shall be full wrap omega style 1/4' steel with bottom in fixed position and top will adjust vertically 5" between rails.

8.24.02 INSTALLATION

Do not begin installation and erection until timely notice has been given to the Engineer. The area along with the fence line shall be cleared enough to permit proper construction. Fence shall be installed per the Drawings and Specifications or as shown on UP **Standard Drawing No. 0075**.



9.00 - INDUSTRY SUBBALLAST/BASE MATERIAL REQUIREMENTS

9.01 Subballast - This item shall consist of a foundation course for Union Pacific Railroad (UP) ballast and shall be constructed in one or more courses in conformity with the typical sections shown on plans.

9.02 Material Requirements - Materials shall be 100% crushed stone produced from oversized quarried aggregate, sized by crushing and produced from a naturally occurring single source. Aggregate retained on a No. 10 sieve shall consist of hard, durable particles or fragments of stone. The subballast material shall have:

- a) No more than approximately 10% freeze-thaw loss when tested in accordance with ASTM C 88-90, Standard Test Method for Soundness of Aggregate by Use of Sodium Sulfate (under 5 cycles of freeze-thaw with sodium sulfate solution)
- b) No more than 50% loss when tested in accordance with ASTM C 131-89, Standard Test Method for Resistance to Degradation of Small-Size Coarse Aggregate by Abrasion and Impact in the Los Angeles Machine.

Industry's Contractor shall provide certification that the subballast/base material meets UP's Specifications.

9.03 Gradation - Subballast shall consist of gradations as set forth in UP **Standard Drawing No. 0010**.

9.04 Design Requirements - Subballast and its minimum depth is set forth in UP **Standard Drawing No. 0013**.



10.00 - TRACK MATERIAL

10.01 Rail - 112 lb. to 141 lb. relay rail is required. Rail must meet or exceed AREMA Class I Specifications if greater than three hundred (300) per year are anticipated. If less than three hundred (300) cars per year are anticipated Class II rail can be used.

Class 1		
Rail Weight	Max. Vert. Wear	Max. Hor. Wear
141	5/16"	1/8"
133-136	1/4"	1/8"
131-132	3/16"	1/8"
119	5/32"	1/16"
112-115	1/8"	1/16"
Corrugation up to .010 allowed		
Class 2		
Rail Weight	Max. Vert. Wear	Max. Hor. Wear
141	7/16"	1/4"
133-136	3/8"	1/4"
131-132	1/4"	1/4"
119	1/4"	1/8"
112-115	3/16"	1/8"
Two dime sized engine burns per 39' corrugation up to .020 and 1/4" field size lip allowed		

10.02 Fastenings:

- a) Angle or Joint Bars, new or certified, to match rail section used. Industry to provide compromise joint bars or compromise welds to match Union Pacific's (UP) rail section at 13-foot clearance point or location designated by UP representative (See UP **Standard Drawing No. 0904 and 0948**).
- b) Tie Plates, new or secondhand, and double shouldered plates no smaller than 2 times the base of the rail. Track to be fully plated. The use of single shoulder tie plates is prohibited.
- c) Track Bolts, new or secondhand, appropriately sized for the boltholes in the rail section with length sufficient for a full nut and heavy-duty spring washers (new) (See UP **Standard Drawing No. 0438, 0439, 0440, 0441 & 0442**).
- d) Track Spikes, new 5/8" x 6" or 5/8" x 6 1/4" installed per UP **Standard Drawing No. 130005 and 0453**.
- e) Rail Anchors, new or reformed, box anchored every other tie. All switch ties will be completely box anchored. For crossties that use elastic fasteners, rail anchors are not required (See UP **Standard Drawing No. 0460**).
- f) Compromise Joint Bars or Compromise Field Welds shall be utilized when rails of dissimilar rail sections are connected. Turnouts will use the same rail section on the running rail, closure rails, and turnout components through the body of the turnout. It is the Industry's responsibility to furnish, install and maintain compromise joint bars connecting to UP owned track. All rail joints and welds should be kept out of grade crossings, where possible (See UP **Standard Drawing No. 0948**).



- g) Insulated Joints/I Bonds to be furnished by Industry and shall be all new material. Insulated joints/I bonds will be installed by industry at locations designated by UP's authorized representative (See UP **Standard Drawing No. 0960**).
- h) Field Welding will be done in accordance with current UPRR or AREMA procedures (See **Section 16.00**).

10.03 Timber Ties (See UP Standard Drawing No. 0210):

Light Traffic	<1000 cars per year	7" x 9" x 8' Ties @ 20 Ties per 39 ft. rail (24" on center)
Medium Traffic	>1000 & <2000 cars per year	7" x 9" x 8'6" Ties @ 22 Ties per 39 ft. rail (21.25" on center)
Heavy Traffic	>2000 cars per year	7" x 9" x 8'6" Ties @ 24 Ties per 39 ft. rail (19.5" on center)

- a) New creosoted Oak or Douglas fir ties only for new construction.
- b) Only new creosoted Oak or Douglas fir switch ties will be used to accommodate turnout pattern.

10.04 Concrete Ties:

Light Traffic	<1500 cars per year	8' 3", 600 lb. tie at 26" centers 8' 6", 525 lb. Tie at 24" centers 8' 6", 720 lb. tie at 28" centers
Medium/Heavy Traffic	>1500 cars per year	8' 3", 600 lb. tie at 24" centers 8' 6", 720 lb. tie at 26" centers

- a) Continuous Welded Rail is recommended for use with Concrete Ties.
- b) Concrete switch ties may be used where concrete standard ties are used.
- c) Concrete ties must be new ties produced in accordance with UP's Concrete Tie Specifications for Construction.
- d) See UP **Standard Drawing No. 0204** as an example of a 720 lb. Tie.

10.05 Steel Ties (See UP Standard Drawing No. 0237, No. 0238 and No. 0241):

Levels of Traffic	10 mm thickness	8' 6" ties @ 20 ties per 39 ft. rail @ 24" centers
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10.06 Composite Ties (See UP Standard Drawing No. 0210):

Light Traffic	<1000 cars per year	6" x 8" x 8' Ties @ 20 ties per 39 ft. rail @ 24" centers
Medium Traffic	>1000 & <2000 cars per year	7" x 9" x 8' 6" Ties @ 22 ties per 39 ft. rail @ 21.25" centers



Heavy Traffic	>2000 cars per year	7" x 9" x 8'6"" Ties @ 24 ties per 39' rail @ 19.5" centers

10.07 Turnout Components - All turnout components shall be new or certified reconditioned material. All turnout components in UP owned or maintained track shall be new material supplied by UP or a UP approved vendor. The Industry and/or its Contractor need to provide verification that the turnout(s) are from a UP approved vendor.

10.08 Turnout Assembly - The Industry and/or its Contractor need to verify with the Manager Track Maintenance or the Manager Industry & Public Projects that the turnout(s) to be installed on the UP owned portion of the track will be provided loose or assembled. Turnouts to be provided must meet provisions of the local collective bargaining agreements. If the assembly of the Turnouts is by the Industry's Contractor, the assembly in all cases must occur off of UP right of way.



11.00 - BALLAST REQUIREMENTS

Under light traffic, crushed rock ballast or equivalent material, per AREMA Standard 5 gradation must be utilized. Under heavy traffic, crushed rock ballast, main line quality, AREMA Standard 4A gradation must be utilized. Refer to Union Pacific Railroad (UP) **Standard Drawing No. 0010**. The allowable wear based on the Los Angeles Abrasion Test, not greater than 35%, per ASTM C-535. Minimum depth is 15" between top of subballast and top of timber, composite or concrete ties. The minimum depth for steel ties is 8" from top of subballast to top of tie. The full ballast section extends 9" beyond ends of tie for jointed rail and 12" for welded rail and thence to subgrade on not less than 3:1 slope. Ballast shall be quarried rock, crushed to proper gradation, with fully fractured faces. Industry's Contractor shall provide certification that the ballast meet UP's Specifications.



12.00 TRACK CONSTRUCTION SPECIFICATIONS

12.01 - Experienced personnel skilled in railroad track construction shall supervise track laying and surfacing.

12.02 - Ties shall be uniformly spaced center to center of tie. Ties shall be laid at right angles to the rail and at least one will be located at the joint location as required in the FRA track standards for the class of track it is intended for.

12.03 - When handling or spacing ties care shall be taken not to damage them with picks or hammers. Tie tongs shall be used for this purpose.

12.04 - The pulling of spikes, once driven, shall be avoided insofar as possible. When spikes are pulled, the holes shall be immediately plugged with creosoted tie plugs of the proper size to completely fill the hole, or an approved form of plugging compound must be used.

12.05 - The bottom of the rail, the tie plate and the wearing surface of the tie shall be cleaned before the rail is laid.

12.06 - Tie plates shall be applied at the time the rail is laid to avoid unnecessary spiking. Plate shoulder shall bear against the outside base of the rail.

12.07 - Rails shall be unloaded, stored or distributed along the roadbed in such a manner as to prevent damage.

12.08 - For jointed track rails should be laid with a 12-foot staggered joint arrangement.

12.09 - If a determination is made to stagger rail, then rails of miscellaneous lengths less than 39 feet shall be used at suitable intervals for maintaining the proper stagger of joints on curves.

12.10 - Rails less than 15 feet long shall not be used except for temporary closures.

12.11 - Expansion shims of hardwood or fiber shall be used to control expansion. The following table prescribes the correct thickness for the expansion shim for various ambient temperatures:

RAIL TEMPERATURE	33 FT. RAIL OPENING	39 FT. RAIL OPENING	78 FT. RAIL OPENING
Below 25° F.	1/4"	1/4"	1/2"
25° to 50° F.	1/8"	3/8" every other joint	3/8"
51° to 75° F.	1/8" every other joint	1/8"	1/4"
76° to 100° F.	1/8" every third joint	1/8" every other joint	1/8"
Above 100° F.			1/8" every other joint



12.12 - Rails shall be laid to ensure good alignment, and the rail ends must be brought squarely together against expansion shims and shall be bolted before spiking.

12.13 - Rails shall be cut square and clean by means of rail saws. Holes for complete bolting of cut rails shall be drilled according to Union Pacific Railroad's (UP) Specifications. Under no circumstances shall new holes be drilled between two holes already drilled. Cutting rails or drilling holes in cut rails by means of acetylene or electric torch will not be permitted.

12.14 - The appropriate number of bolts shall be applied according to the rail joint used. The nuts of all bolts shall alternate uniformly inside and outside of each joint. Each bolt shall be equipped with a spring washer of size required to fit the diameter of the bolts used.

12.15 - The right-hand rail going away from the switch points or the outside rail on curves shall first be spiked in position in its proper relation to the lined end of ties. The opposite rail shall then be spiked to true gage (4'-8 1/2"). Curved track shall be gauged as follows:

- a) Lay track to standard gauge on tangents and curves of less than 6 degrees.
- b) Lay track to a gauge of 56-3/4" on curves of 6 degrees or greater.

12.16 - On tangent track and on curves up to 4 degrees, two spikes (one inside and one outside the base of rail) shall be used to fasten each rail to each tie. On curves at least 4 degrees and less than 8 degrees, two spikes inside and two spikes outside, shall be used on each rail. On curves of 8 degrees or more, use three spikes inside and two spikes outside shall be used on each rail (See UP **Standard Drawing No. 0453**).

12.17 - Spikes shall be staggered so that the outside spikes shall be on the same side of the tie and the inside spikes on the opposite side (See UP **Standard Drawing No. 0453**).

12.18 - Rail shall not be struck with maul or heavy tool when spiking, gauging or lining.

12.19 - Spikes shall be started vertically and square and be driven straight with full bearing against the base of the rail. Straightening with maul or spikes started crooked will not be permitted. Spikes started crooked shall be pulled, the holes plugged and spikes re-driven. Immediately after completion of track surfacing, spikes shall be settled in place with the underside of the head of the spike contacting the top of base with a minimum of pressure (See UP **Standard Drawing No. 0453**).

12.20 - Rail anchors control longitudinal rail movement on ties from temperature variations, traffic, grade, and train braking. Anchors are not required on ties with elastic fastening systems unless additional restraint is necessary to control undesired rail movement. Anchors should be new or reformed. On all tracks, apply rail anchors out-of-face along each rail, directly across from each other on the same tie. Use Standard Box Pattern (every other tie) or Solid Box Pattern (See UP **Standard Drawing No. 0460**).

12.21 - When the track has been raised to within 4 inches of final grade and properly compacted, the final lift shall be made by jacking the track up to the exact elevation provided by the grade stakes. The ballast shall then be tamped under the ties. The space extending from 15 inches inside either rail to the ends of the ties shall be thoroughly tamped. The tie centers shall be left untamped. Unless



otherwise authorized, this final lift shall be tamped with tamping bars, tamping picks or by approved tamping machines. In making the finishing lift, the spot board and level board shall be used with care and the track brought to a true surface and required elevation.

12.22 - After track has been brought to true surface, elevation and grade, it shall be given a final lining and placed in true alignment.

12.23 - Turnouts shall be constructed of all new or certified reconditioned rail and other track material. Unless otherwise approved by the UP's AVP Design/Construction, all turnouts must be fabricated to UP standards. **Turnouts in UP owned or maintained track will be constructed with all new rail and other track material supplied by a UP approved vendor.**

12.24 - Road crossings on industry-owned trackage may be constructed with plank and asphalt or entirely with asphalt. Maintain the flangeway opening along the gage side of the running rail at no less than 3 inches. All crossings on UP owned trackage will be constructed with UP precast concrete crossing material, per UP **Standard Drawing No. 0304, and 200100 through 200903**. Curved Concrete Panels, per UP **Standard Drawing No. 200902**, must be utilized as conditions warrant.

12.25 - Timber crossing materials shall conform to UP **Standard Drawing No. 0301** and shall be square-edged and of sound creosoted planks of fir or hemlock, or equal, with the height of plank equal the distance from top of tie to top of rail. The planks are to be fastened with countersunk 3/4" x 12" galvanized Lewis washer head drive spikes, in predrilled holes.

12.26 - Each crossing location will be evaluated individually by the UP (and Road Authority if applicable) to determine minimum crossing surface material requirements. Crossings may require the use of precast concrete materials. Determination of and type of warning devices on public roadways will be made by a joint recommendation of UP, Road Authority, and/or Government Regulatory Body.

12.27 - Earthen bumpers shall be used whenever possible. If Industry chooses to use other than an earthen bumper, they must submit to the UP the proposed device for review and approval. If bumping posts are used, they shall be Hayes Type WD with Shock Free Head, or equal. (See UP **Standard Drawing No. 0030**).



13.00 - DERAILS

13.01 - Derails must be clearly visible. A derail is required for all new construction or modifications of any existing trackage, and it shall be appropriately sized for the designated rail section, complete with proper length connecting rod and operating stand with target. The type of derail required, its placement, and type of switch stand to be used shall be determined by the Union Pacific's AVP Engineering – Design/Construction or his authorized representative, and will be dependent on track gradient, independent movement of cars by the customer, and anticipated track use, refer to Union Pacific Railroad (UP) **Standard Drawing No. 2000, 2005, 2006, 2007, 2020, and 2050**.

13.02 - Derails in signaled territory are to be placed at a point sufficiently ahead of insulated joints so equipment is derailed before fouling track circuit. Derails may require signal insulation material as required by UP. If insulation material is required, it will be installed by industry at locations designated by the UP. Walkways conforming to UP **Exhibit 'E' Drawing** must be installed around all derail switch stands.

13.03 - Consideration should be given for placement of derail to avoid conflicts with adjacent tracks, railroad signal installations, communication lines, power lines, pipelines (overhead or underground), roadways, ditches, waterways, storage tanks, buildings, or other structures.

13.04 - Power Operated Derails may be required if Power Operated Turnouts (POTO) are used.
NOTE: Special ties on Derail components are required if it is Power Operated.



14.00 - WALKWAY REQUIREMENTS

14.01 Safety - Walkways shall be constructed and maintained to provide a reasonable regular surface and shall be maintained in a safe condition clear of vegetation, debris, standing water, and other obstruction, which constitute a hazard.

14.02 Grades and Slopes - Walkways shall not have a grade and slope in excess of approximately 1 inch of elevation per each 8 inches of horizontal length in any direction. Excess slope is permissible where the proximity of adjacent tracks so long as the slope between tracks is constant.

14.03 Construction - For walkway standards refer to Union Pacific Railroad (UP) **Exhibit 'E' Drawing**. Walkways shall be constructed to a minimum width of 8' 6", as measured from the centerline of track. Walkways shall be constructed and maintained in such a manner that the elevation of its surface is at least level with the top of ties, but not higher than the top of rail. Walkways are to be constructed per AREMA Standard 57 ballast unless prior approval by UP's Chief Engineer is granted for alternate size material.

14.04 Requirements - Walkways shall be located along both sides of the track for a minimum distance of 125 feet on each side of every switch stand or other trackside switch-throwing mechanism. Walkways are required around all derail switch stands, in accordance with UP **Exhibit 'E' Drawing**.

14.05 Minimum Distances - Walkways shall be continuous and maintained from the switch stand through the switch frog and along the diverging track. An additional 3 feet of walkway width shall extend for a minimum distance of 4 feet in each direction from the switch stand or other trackside switch-throwing mechanism on the side of the track where said mechanism is located. This additional 3 feet of width shall be gradually tapered back to the 8' 6" minimum width, as measured from the centerline of track, a distance of not less than 20 feet.

14.06 Guideline - These specifications are provided only as a guideline for design and should not be taken as authority to construct walkways. All walkway construction must conform to the UP specifications or the federal, state or local specifications whichever is the most protective from the standpoint of public safety. All walkway construction shall comply with current and applicable federal, state and local laws. Industry shall be responsible for the proper construction of all walkways. In some areas, the Industry will be required to stockpile sufficient walkway ballast at a location designated by UP's authorized representative, for installation by UP forces.



15.00 - BRIDGE FOOT WALK AND HANDRAIL

Any bridge located within **500 feet** of a proposed or existing point of switch shall have a footwalk and handrail on both sides of the structure.

If the Structure is owned or maintained by the Union Pacific Railroad (UP), the design and installation of the walkway and handrail system shall be completed by the UP at Industry's Expense.

If the structure is owned or maintained by the Industry, the Industry will design and install the walkway and handrail system. The design of the walkway and handrail system must be approved by UP prior to construction. Detailed Construction Plans for walkway and handrail system must be stamped and sealed by a Registered Professional Engineer. Prior to designing the walkway and handrail system, contact the Manager of Industry and Public Projects for guidance.



16.0 - FIELD WELDING

Union Pacific Railroad (UP) approved welds must be installed. The welds currently approved are Railtech Boutet one shot kits and Orgo-Thermit single use kits. The Industry and the individual installing the welds must be qualified by the manufacturer of the kits being used and have documentation to support such qualification. All welds must conform **at a minimum, to meet the latest edition of the American Railway Engineering and Maintenance of Way Association (AREMA) Manual. The link to the AREMA site is www.arema.org.**

It is UP's policy that Field Welds made on UP owned or maintained track be inspected by the Director of Track Maintenance or his designated representative.

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, Director
Department of Natural Resources

May 30, 2017

Expiration Date

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.I. 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 or 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.

1. 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

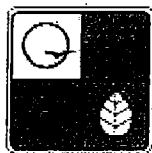
**PART I - GENERAL CONDITIONS
SECTION A - MONITORING AND REPORTING**

1. **Representative Sampling**
 - a. Samples and measurements taken as required herein shall 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 day of the month following the completed reporting period. Signed copies of these, and all other reports required herein, shall 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 report 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 the 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 any monitoring 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 by this 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 frequency shall 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 by request of the Department at any time.

SECTION B - MANAGEMENT REQUIREMENTS

1. **Change in Discharge**
 - a. All discharges authorized herein shall 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 shall 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 change, 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 being taken 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 by competent 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 based 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 REQUIREMENT - 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.c. – 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.

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 SWPPP, 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	Joe Braun	Kevin Light
Eric Landwehr	Jimmy Rademann	Brad Wyss
Cliff Lepper	Gene Berhorst	Andy Myers

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	X
EC-8	Rolled Erosion Control Products	P						X	X
EC-9	Geotextiles and Plastic Covers	P						X	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	
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
<p>Construction Sequence and Scheduling</p>	<p>A specified work schedule that coordinates the timing of land-disturbing activities and the installation of erosion and sedimentation control measures.</p> <p>The objective is to disturb only the immediate work areas.</p>	<p>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.</p>	<p>All land-development projects that will disturb more than one contiguous acre.</p>	<p>The general order of construction and planning is:</p> <ul style="list-style-type: none"> • 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. 	<p>At a minimum, the construction sequence should include:</p> <ul style="list-style-type: none"> • 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. <p>When changes in construction activities are needed, amend the sequence schedule as necessary to fit the changes.</p>

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.	<p>Vegetation helps prevent soil erosion in the following ways:</p> <ul style="list-style-type: none"> • Roots hold soil together • Leaves and stems break up rainfall impact • Ground cover slows down runoff and filters sediment out of water • Plants evapotranspire water from soil. 	All land-development projects that will disturb more than one contiguous acre.	<p>Conduct field survey to determine extent of development.</p> <p>Delineate areas of project where existing vegetation will be preserved.</p> <p>Provide a map outlining these areas to grading personnel.</p>	<p>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:</p> <ul style="list-style-type: none"> • 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: <ol style="list-style-type: none"> 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: <ul style="list-style-type: none"> • Track walking • Sheepsfoot rolling • Ripping • Imprinting

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
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 complementary practice to supplement: <ul style="list-style-type: none"> • Surface roughening techniques • Revegetation • Surface mulches, including hydraulic applications and rolled erosion control products • Removal after slope stabilized is optional

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
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.

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
Topsoiling	Stripping 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 plants, 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. <ul style="list-style-type: none"> • 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: <ul style="list-style-type: none"> • 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: <ul style="list-style-type: none"> • 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. <p>The size of stone used is directly related to the design flow velocity of the channel.</p> <p>Typically should be used for velocities in excess of 15 ft/sec.</p>	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. <p>Maxim bank slope for application should not be steeper than 1.5:1.</p>

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 pipes 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: <ul style="list-style-type: none"> • 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 from 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.

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
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 life 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.

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
Storm Drain Inlet Filters	A sediment filter or an excavated impounding area surrounding a storm drain inlet.	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.	<p>Must not be used near the edge of fill material and must not divert water over cut or fill slopes.</p> <ul style="list-style-type: none"> • 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.	<p>The General Design Criteria are:</p> <p>Min. Width = 15 ft. Max. Ground Slope = 1% Max. Ground Slope = 10%.</p>

Adapted from IECAs Tools for Rules: How to Select, Install and Inspect Construction Site BMPs for NPDES Compliance

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.	<ul style="list-style-type: none"> 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.

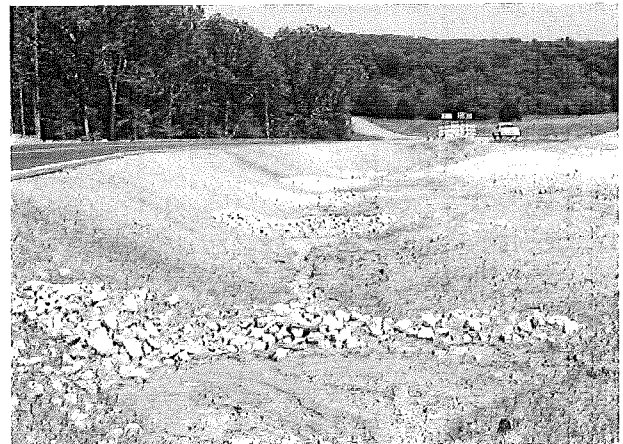
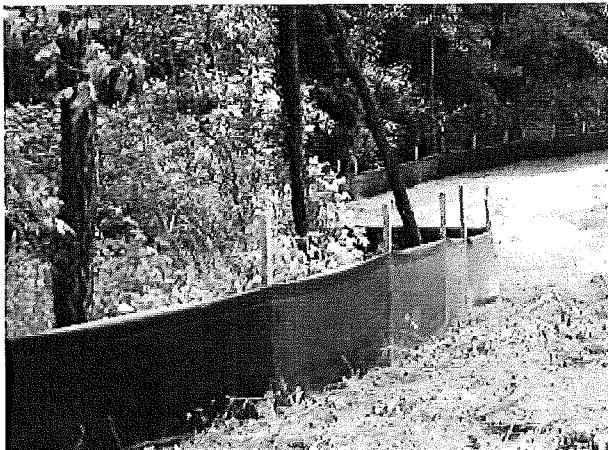


Figure 1. Silt Fences are placed at the perimeter of the job site to capture and prevent sediment from leaving the site.

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 applied 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 $\frac{1}{4}$ to $\frac{1}{2}$ 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 $\frac{1}{3}$ the grass height.

EC-7 SODDING

Sod consists of a $\frac{3}{4}$ 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 $\frac{1}{2}$ 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:

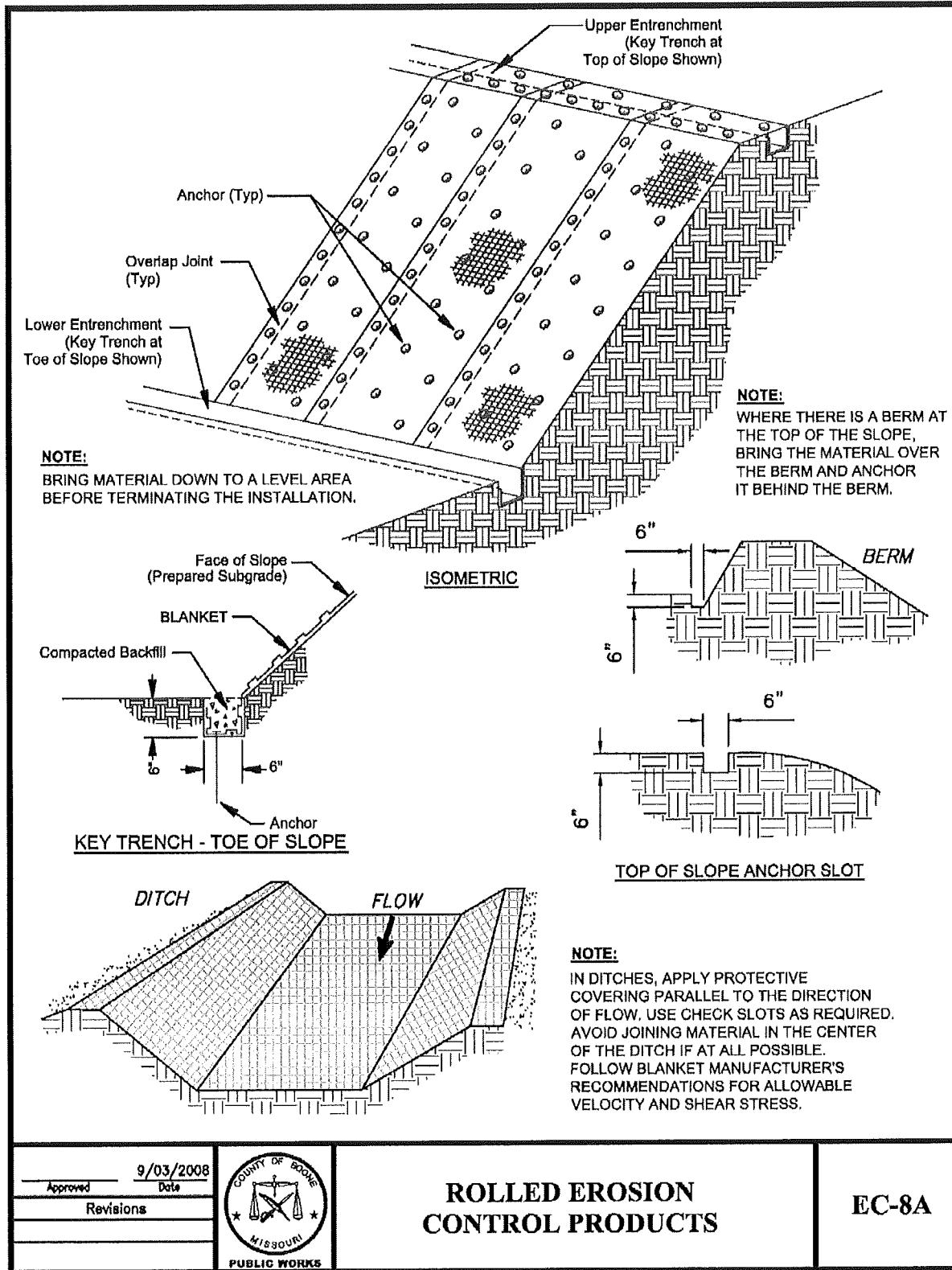


Inspect at least every week and after every storm until adequate vegetation is established. Repair erosion and/or undermining at top of slope. Repair undermining beneath blankets-pull back the blanket(s), fill compact eroded area, re-vegetate and then firmly secure the blanket(s). Reposition or replace 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





EROSION CONTROL BLANKET NOTES:

A) SITE PREPARATION:

AFTER SITE HAS BEEN SHAPED AND GRADED, PREPARE A FRIABLE SEEDBED RELATIVELY FREE 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.

<p>Approved <u>9/03/2008</u> Date</p>		<p>ROLLED EROSION CONTROL PRODUCTS</p>	<p>EC-8B</p>
<p>Revisions</p>			



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.

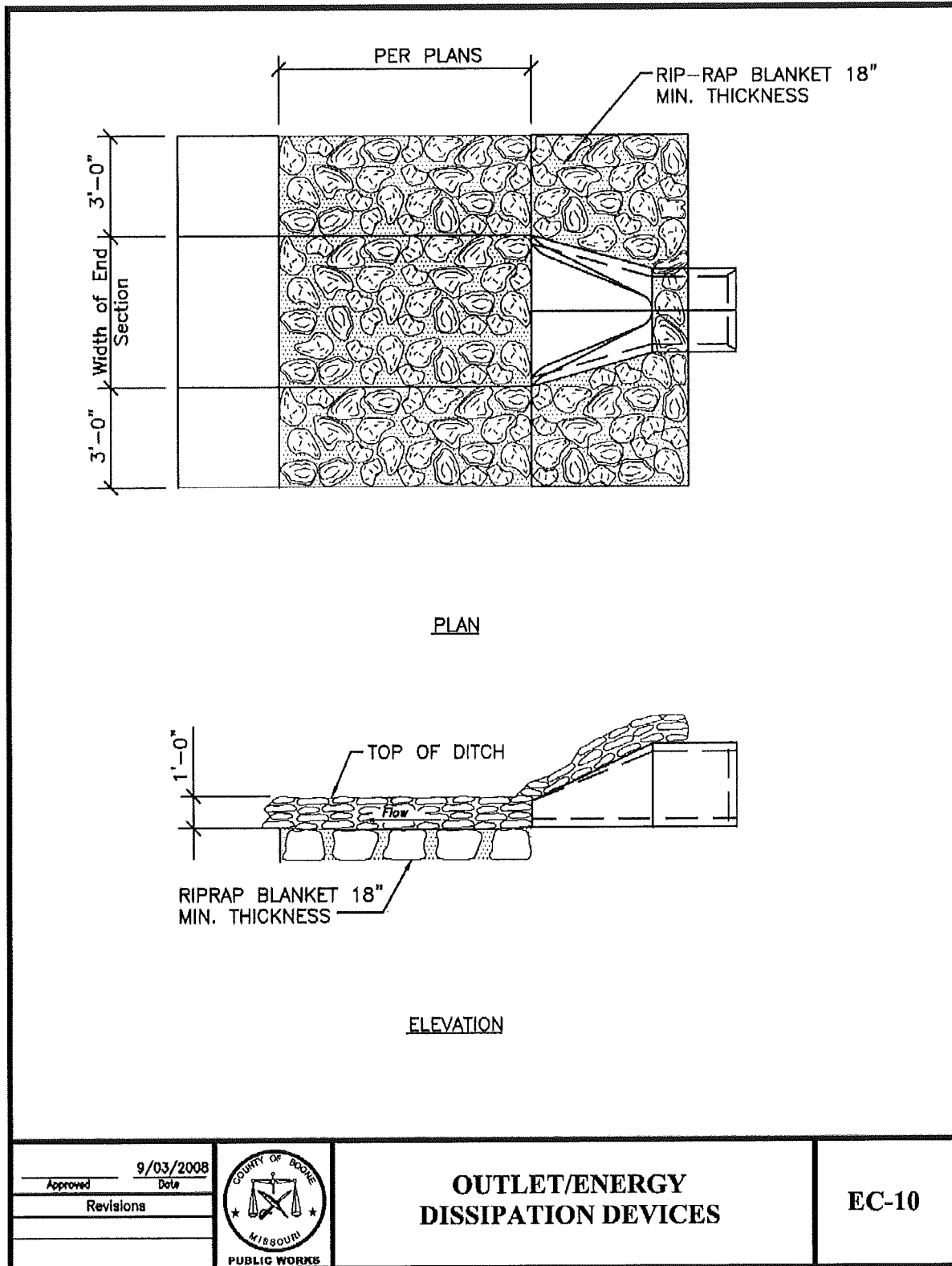
OPERATION AND MAINTENANCE PROCEDURES:

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





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:

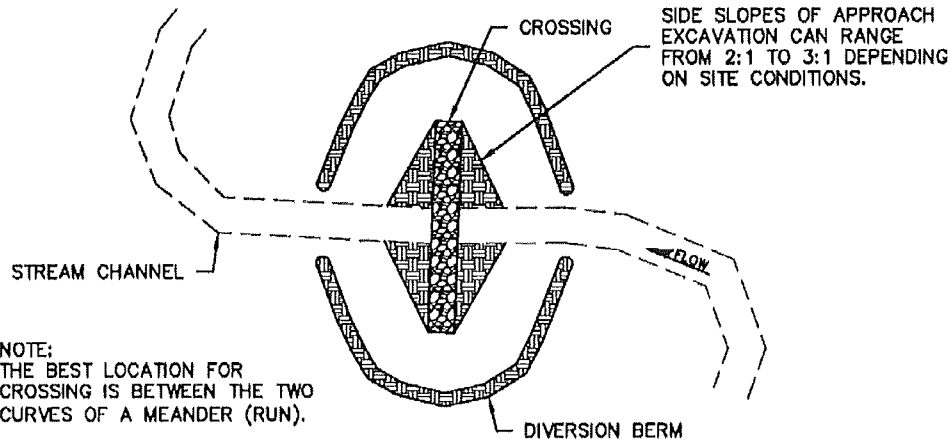
Inspect every week and after every storm-checking for: blockage in the channel, debris buildup, erosion of abutments, channel scour, riprap displacement, piping of soil, and structural weakening. Remove sediment and trash accumulation. Repair and stabilize eroded areas-extend riprap if necessary.

SITE CONDITIONS FOR REMOVAL:

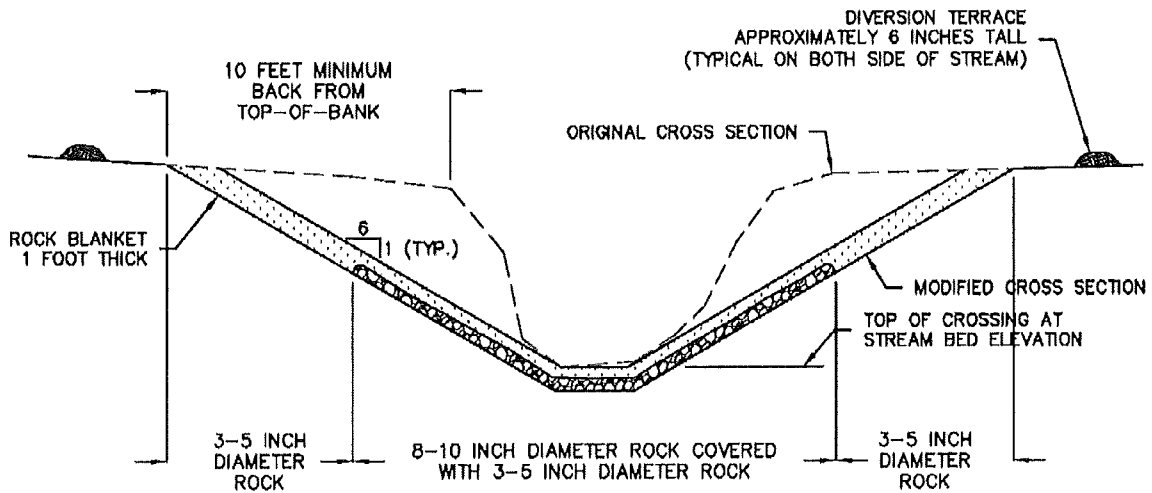


Remove as soon as alternative access is available. All foreign materials should be removed from creek. The streambed/banks should be returned to the original contour and stabilized if necessary.

STANDARD DRAWING: EC-11a and EC-11b



REINFORCED STREAM CROSSING LAYOUT
NOT TO SCALE



REINFORCED STREAM CROSSING PROFILE
NOT TO SCALE

Approved _____ Date 9/03/2008		REINFORCED STREAM CROSSING	EC-11A
Revisions _____			



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 <small>Approved Date</small>	 REINFORCED STREAM CROSSING	EC-11B
	Revisions		



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.

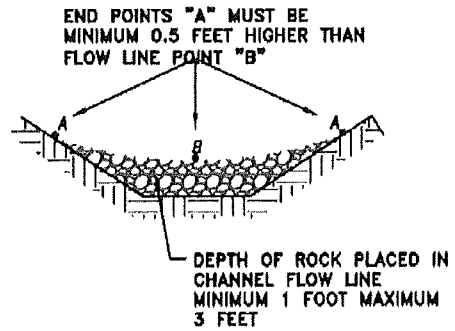
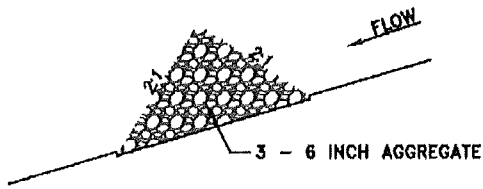
OPERATION AND MAINTENANCE PROCEDURES:

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:

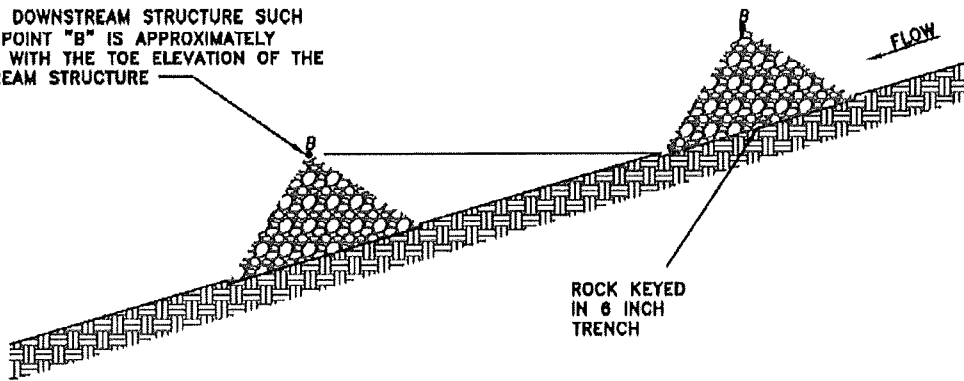
Remove after contributing areas have been adequately stabilized and vegetation is adequately established in drainage way. Regrade and vegetate the area.

STANDARD DRAWING: RM-1



FRONT VIEW

PLACE DOWNSTREAM STRUCTURE SUCH THAT POINT "B" IS APPROXIMATELY LEVEL WITH THE TOE ELEVATION OF THE UPSTREAM STRUCTURE



SIDE VIEW

NOTE:

ROCK CHECK DAMS SHALL BE USED ONLY FOR DRAINAGE AREAS LESS THAT 10 ACRES UNLESS APPROVED BY THE ENGINEER.

<p>9/03/2008 Approved Date</p> <p>Revisions</p>	<p>PUBLIC WORKS</p>	<p>CHECK DAMS</p>	<p>RM-1</p>
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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 runoff 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



10% SETTLEMENT

FREE BOARD
(MIN. PER PLANS)

DESIGN FLOW DEPTH

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.

<table border="1" style="width: 100%; border-collapse: collapse;"> <tr> <td style="width: 50%; text-align: center;">9/03/2008</td> <td style="width: 50%; text-align: center;">Date</td> </tr> <tr> <td style="text-align: center;">Approved</td> <td></td> </tr> <tr> <td style="text-align: center;">Revisions</td> <td></td> </tr> <tr> <td style="text-align: center;"> </td> <td></td> </tr> <tr> <td style="text-align: center;"> </td> <td></td> </tr> </table>	9/03/2008	Date	Approved		Revisions							<h2 style="margin: 0;">EARTH BERMS/ DRAINAGE SWALES</h2>	<h2 style="margin: 0;">RM-2</h2>
9/03/2008	Date												
Approved													
Revisions													



RM-3 TERRACING

Terracing involves defined swales constructed at regular intervals along the face of a slope designed to reduce erosion by capturing surface runoff and directing it to an adequate, stable outlet.

APPROPRIATE APPLICATIONS:

Typically installed on long steep slopes on which erosion is a concern. Terraces should not be constructed in sandy or rocky soil.

CONDITIONS FOR EFFECTIVE USE:

Type of Flow: Sheet flow.

Slope Characteristics: Maximum of 3:1 slope.

Contributing Slope Length: Maximum of 30 feet for slopes steeper than 4:1; maximum for 50 feet for 4:1 and flatter.

WHEN BMP IS TO BE INSTALLED:

Terracing should be installed as fill is constructed. On existing slopes, terraces should be graded prior to removal of vegetation.

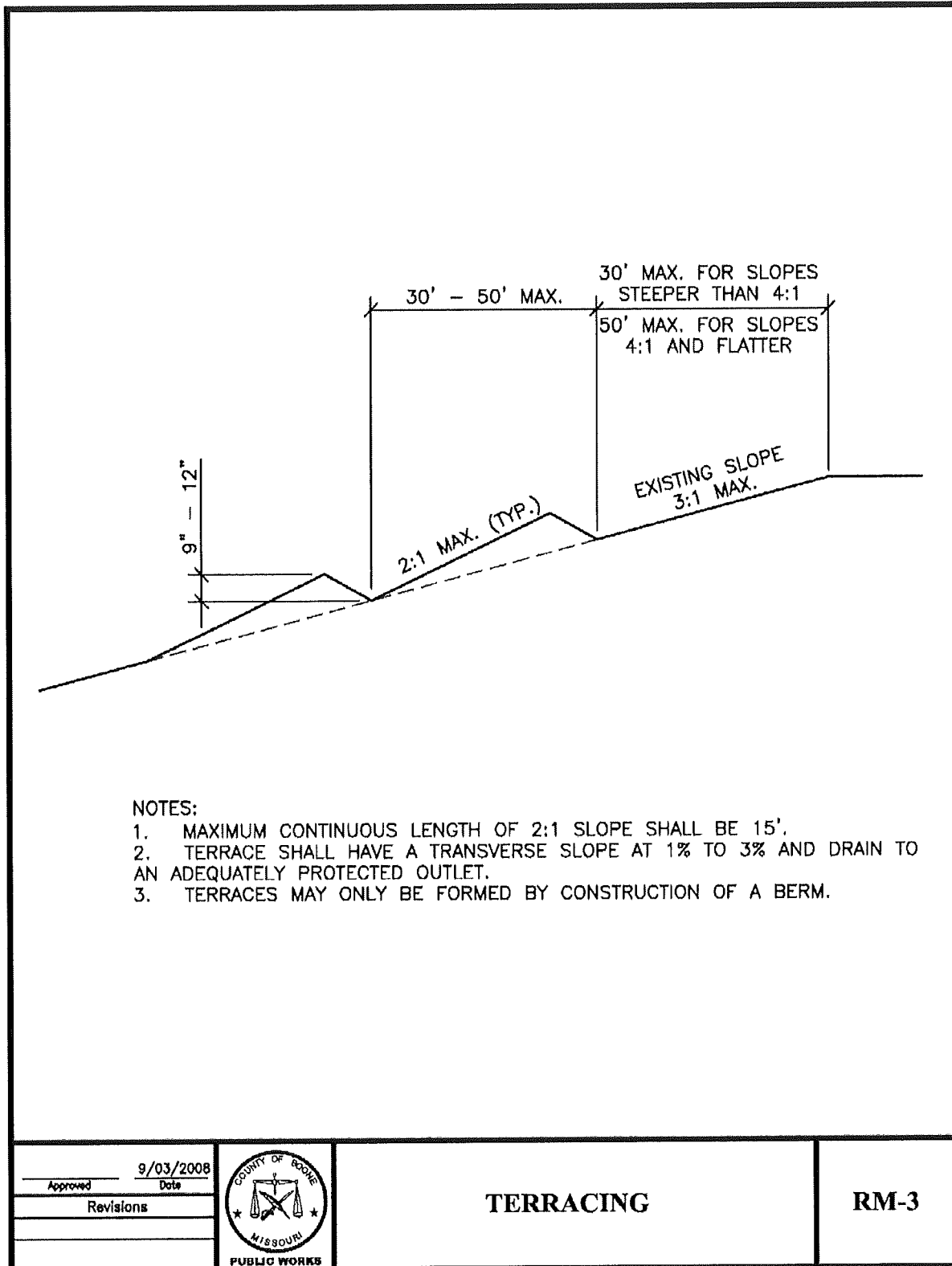
STANDARDS AND SPECIFICATIONS:

Grade terraces as required by the design. Construct the stable outfall as designed. Vegetate the slope and terraces immediately after BMP installation.

OPERATION AND MAINTENANCE PROCEDURES:

Inspect at least every week and after every storm during construction. Remove sediment accumulations along terraces. Repair settled and eroded areas. Remove sediment and stabilize eroded areas at outlet. Revegetate as needed

STANDARD DRAWING: 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.

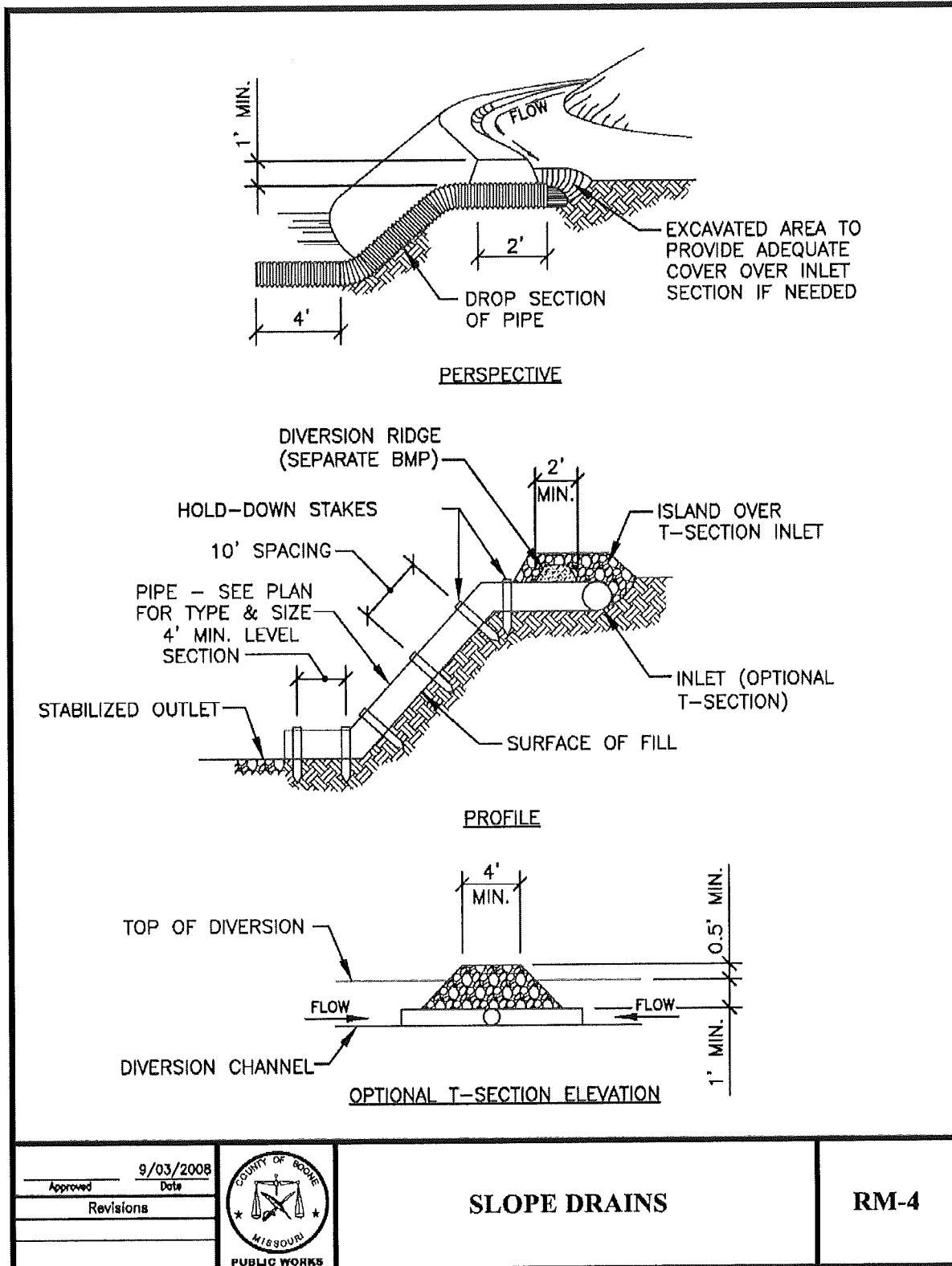
OPERATION AND MAINTENANCE PROCEDURES:

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



Approved	9/03/2008
	Date
Revisions	



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 erodible 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.

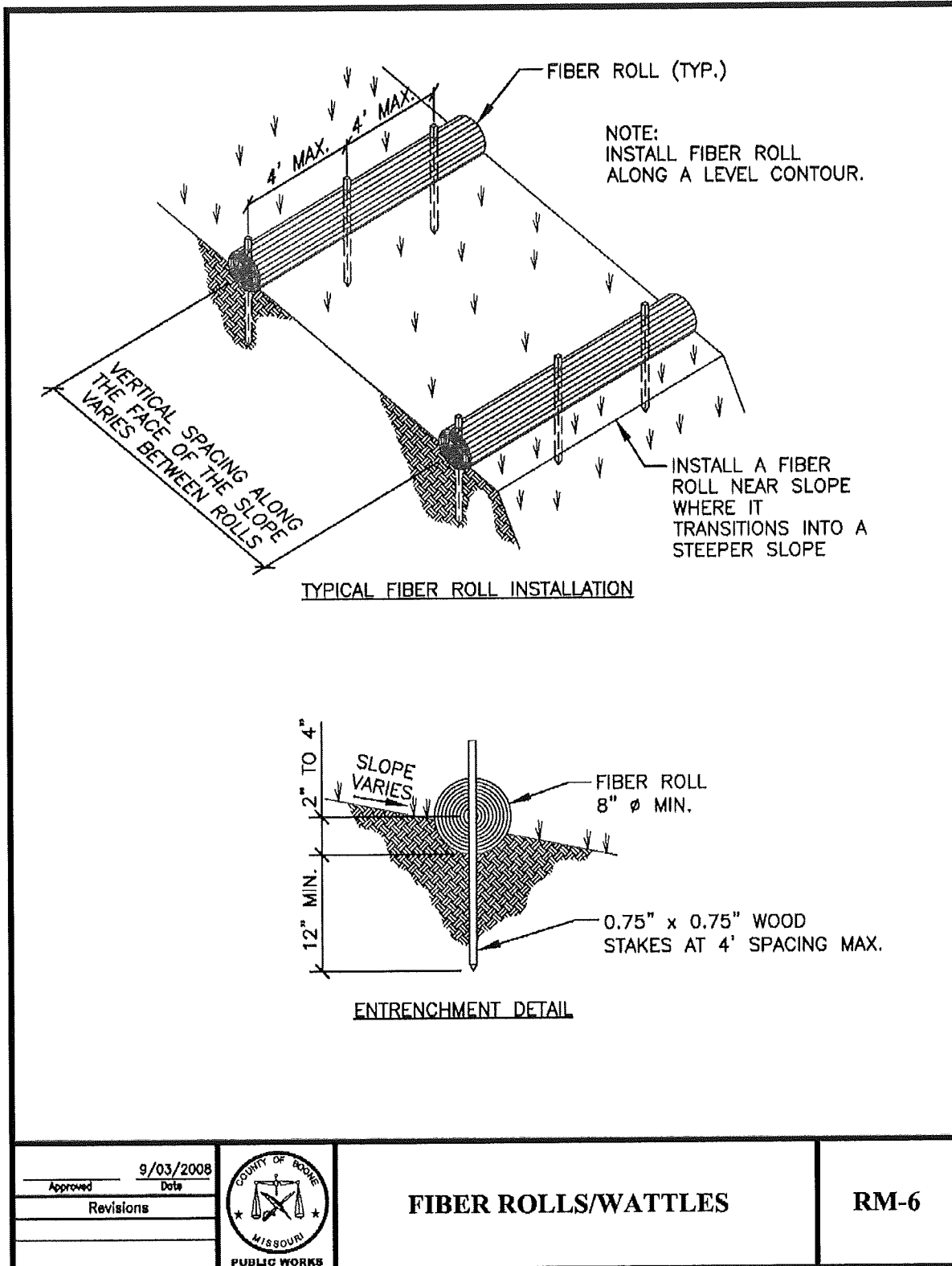
OPERATION AND MAINTENANCE PROCEDURES:

Inspect at least every week and after every storm. Remove sediment accumulation when it reaches $\frac{1}{2}$ 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





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.

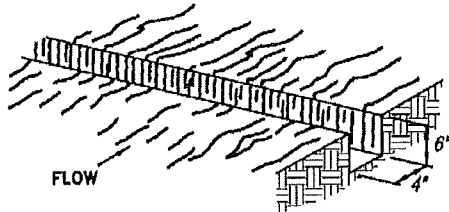
SITE CONDITIONS FOR REMOVAL:

After permanent vegetation of slope is established, remove fence, regrade trench area and vegetate.

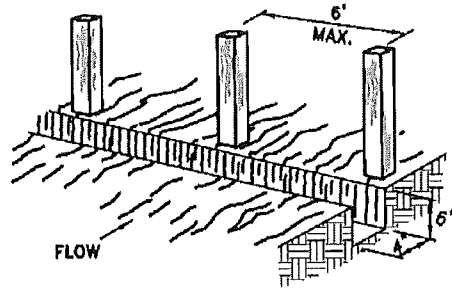


STANDARD DRAWING: SC-2a and SC-2b

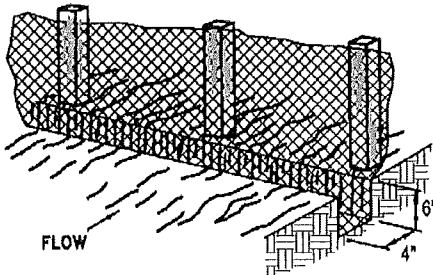
1. EXCAVATE A 6"x4" TRENCH



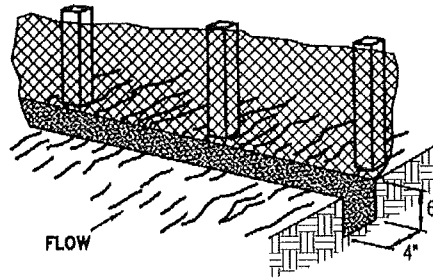
2. SET THE STAKES ALONG THE DOWN SLOPE SIDE OF THE TRENCH.



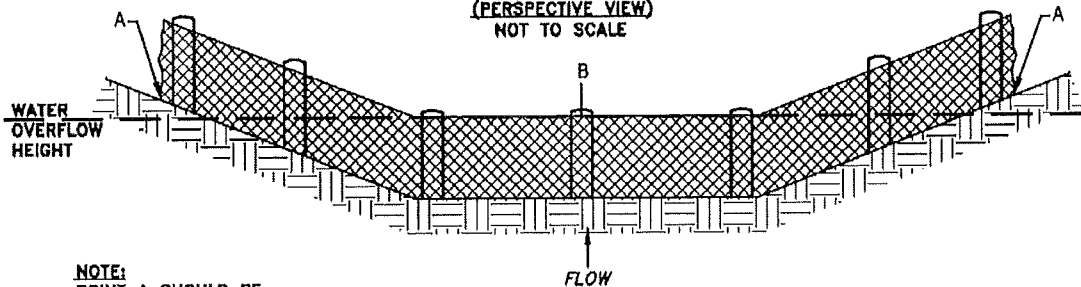
3. STAPLE GEOTEXTILE MATERIAL TO STAKES AND EXTEND IT INTO AND AROUND THE BOTTOM OF THE TRENCH.



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**

<p>Approved _____ Date <u>9/03/2008</u></p>		<p>SILT FENCE</p>	<p>SC-2A</p>
<p>Revisions _____</p>			



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.

<p>9/03/2008 Approved _____ Date</p> <p>Revisions _____</p>		<p>SILT FENCE NOTES</p>	<p>SC-2B</p>
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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.

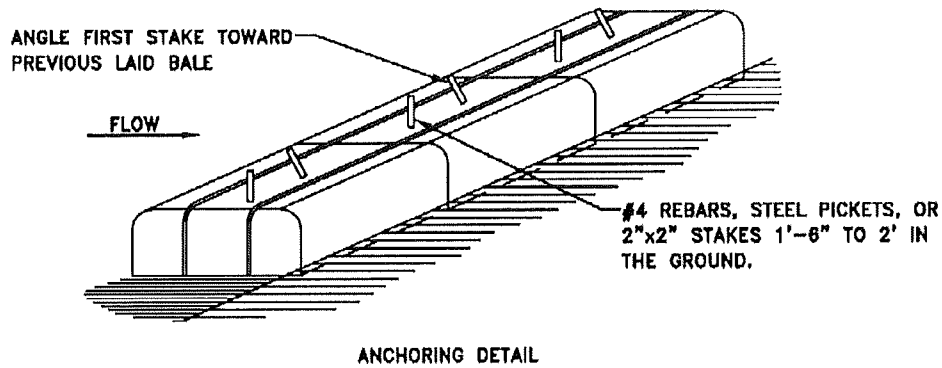
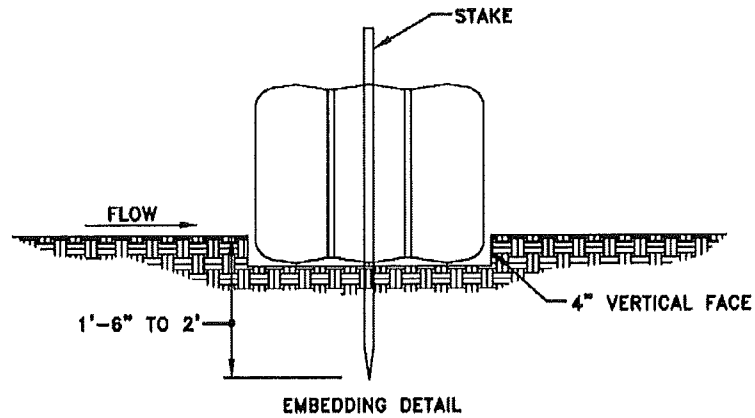


Stabilize any areas susceptible to undermining. Add additional bales if necessary to provide adequate protection.

SITE CONDITIONS FOR REMOVAL:

After permanent vegetation of slope is established, remove the dike, regrade trench area and vegetate.

STANDARD DRAWING: SC-3



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 Date		STRAW BALE DIKE	SC-3
Approved	Revisions			



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 $\frac{1}{2}$ 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:

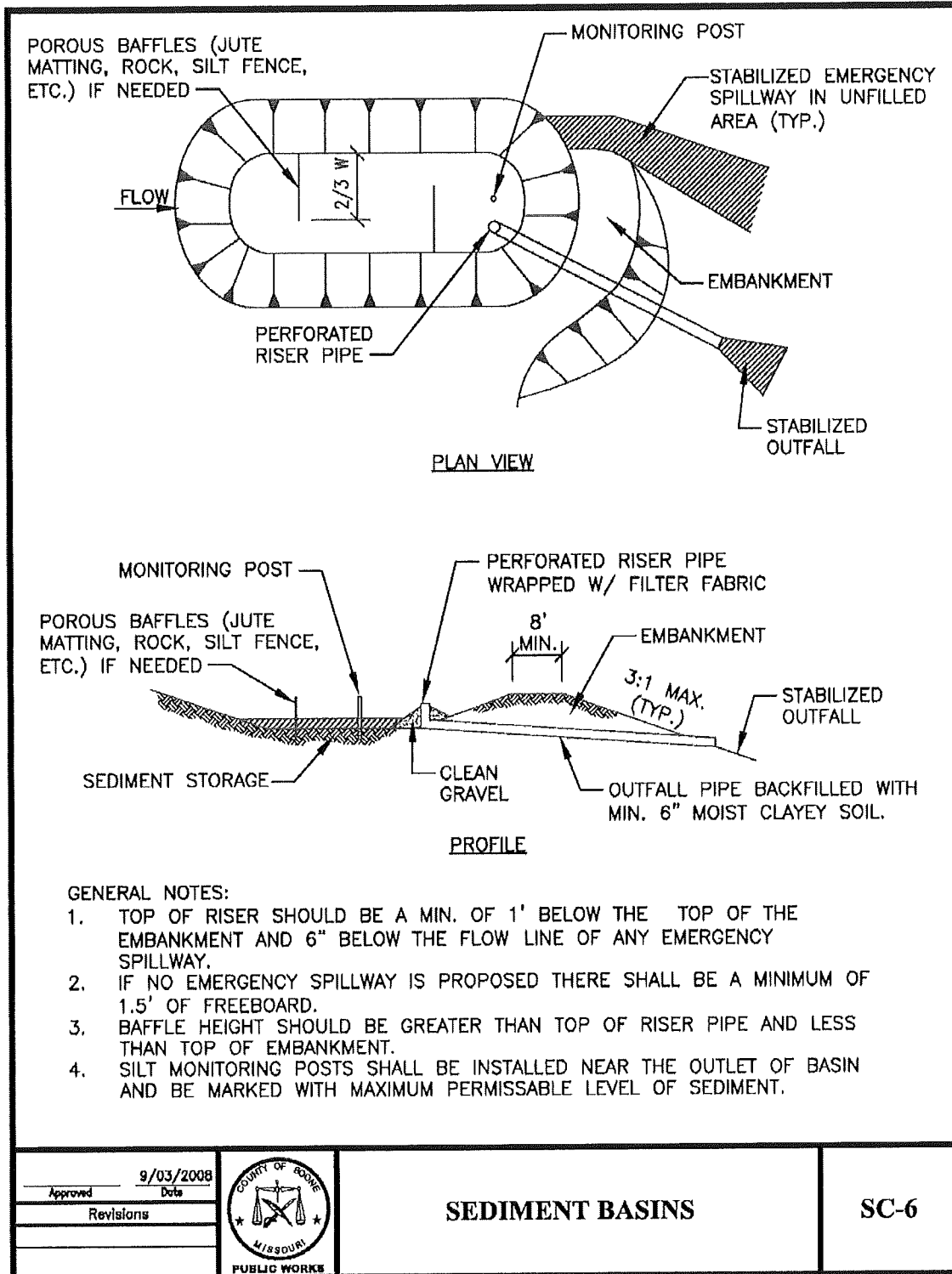
Inspect at least every week and after every ½” storm. Remove trash accumulation at outlet. Remove sediment accumulations once sediment reaches design depth, as indicated on monitoring posts. Repair and re-vegetate any erosion damage on spillway. Repair settlement, cracking, piping holes, or seepage at 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





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 $\frac{1}{2}$ the design depth for sediment accumulation.

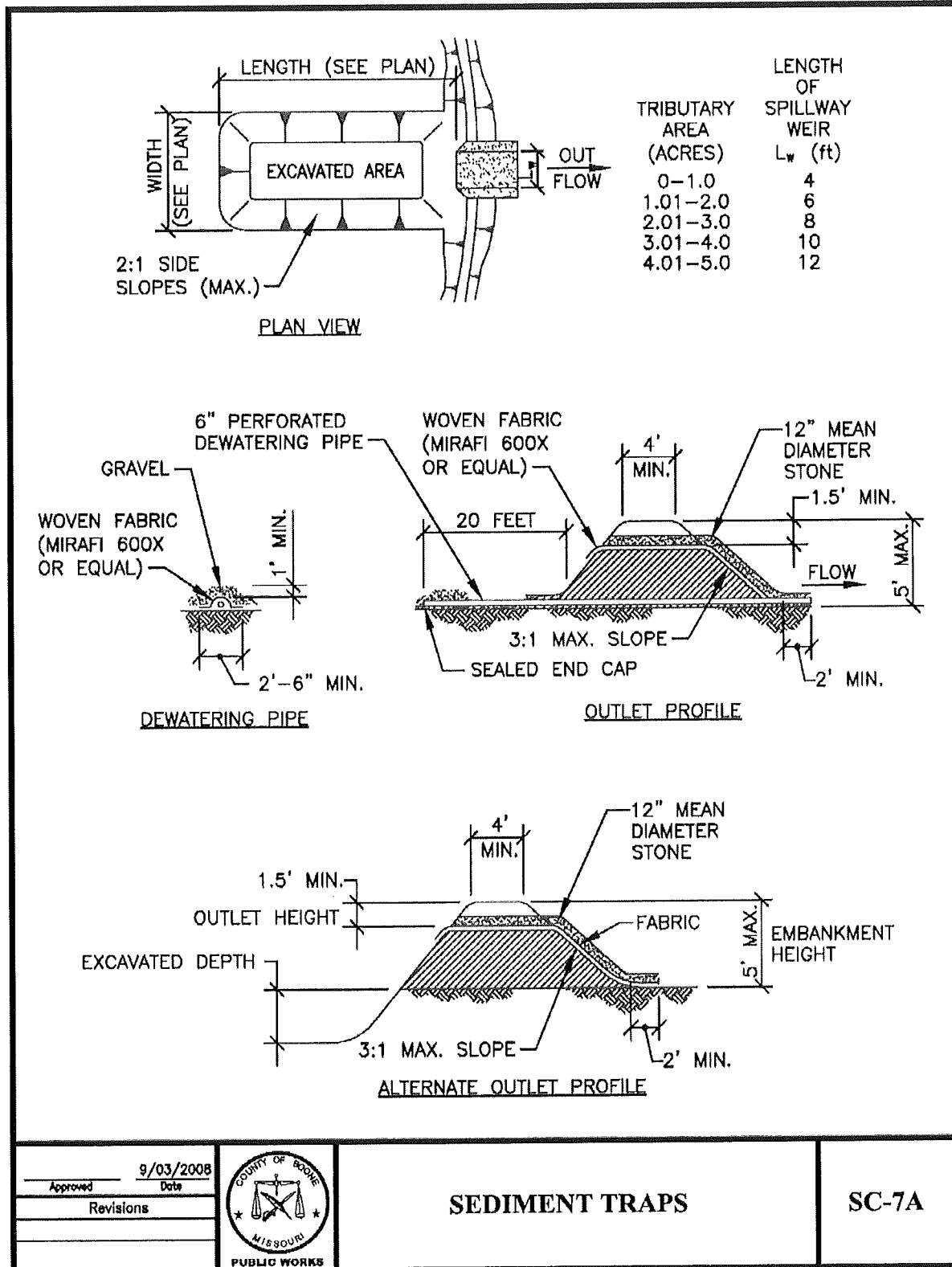
OPERATION AND MAINTENANCE PROCEDURES:

Inspect at least every week and after every $\frac{1}{2}$ " 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



Approved 9/03/2008 Date
Revisions



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.

<u>Approved</u>	9/03/2008 <small>Date</small>	 SEDIMENT TRAPS	SC-7B
<u>Revisions</u>			



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.

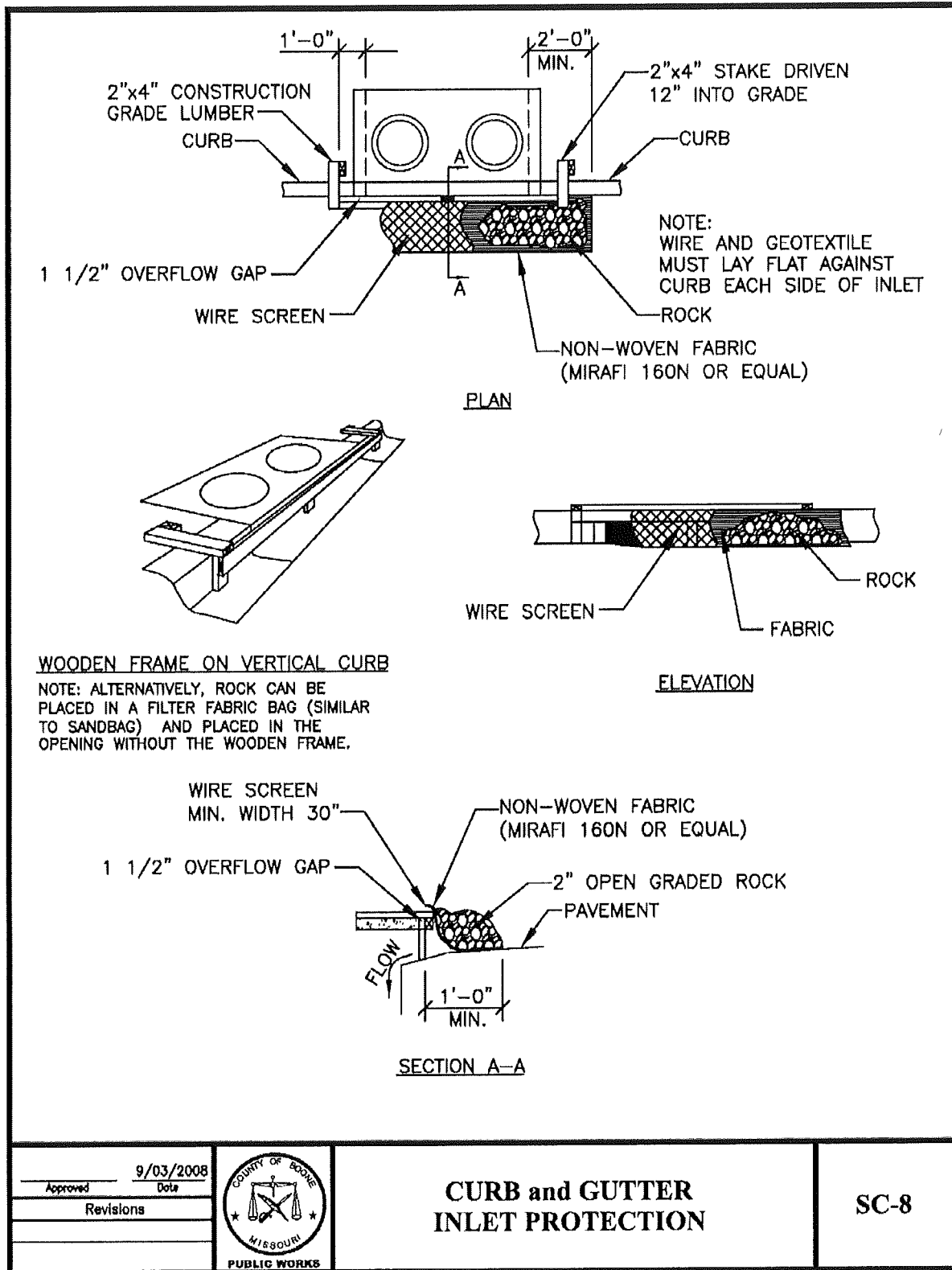
OPERATION AND MAINTENANCE PROCEDURES:

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





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.

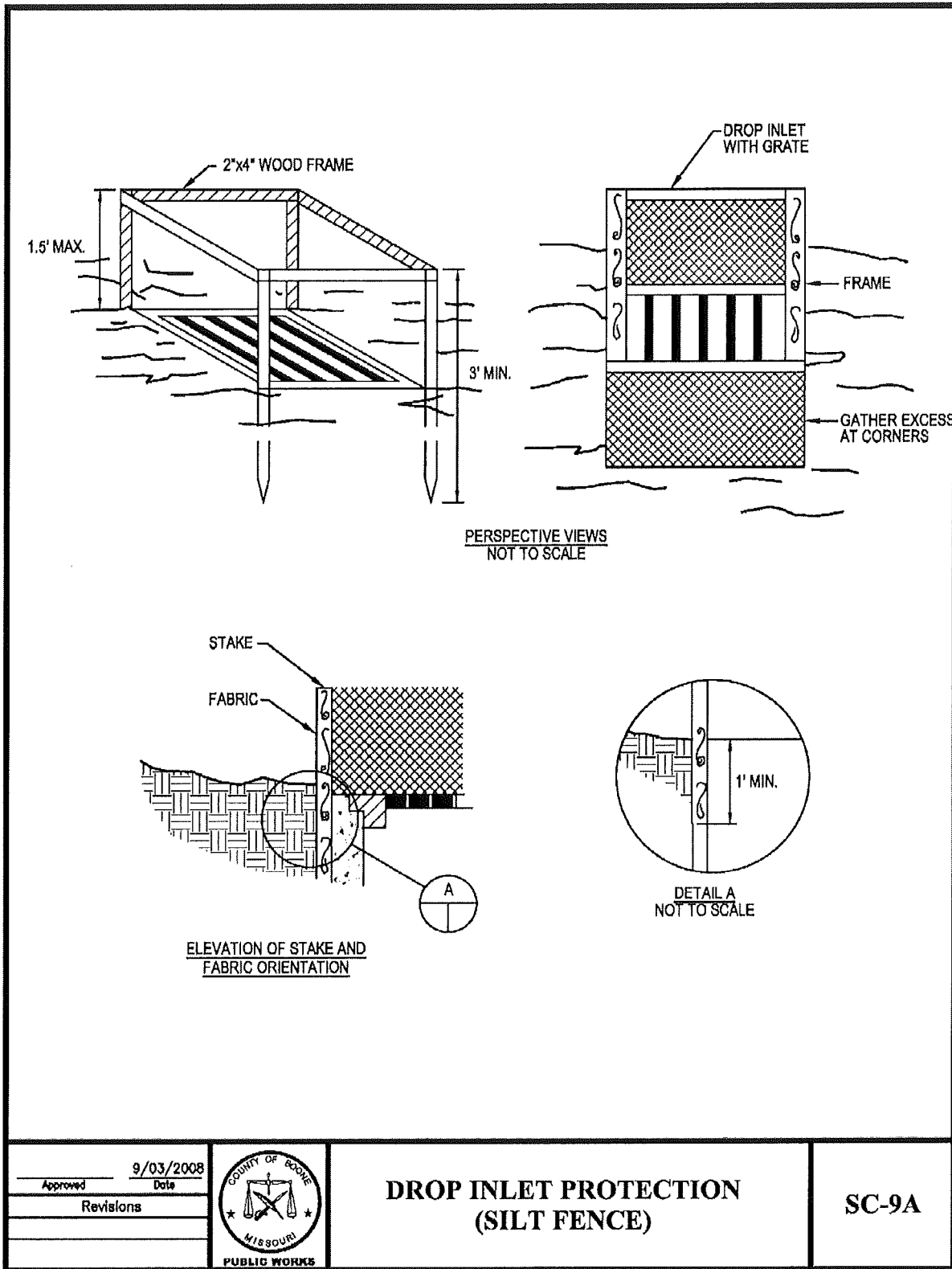
OPERATION AND MAINTENANCE PROCEDURES:

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.

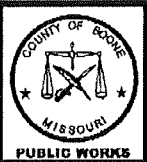
SITE CONDITIONS FOR REMOVAL:

Remove after contributing drainage areas have been adequately stabilized.

STANDARD DRAWING: SC-9a and SC-9b



Approved	9/03/2008
Date	
Revisions	



DROP INLET PROTECTION (SILT FENCE)

SC-9A



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 be 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.

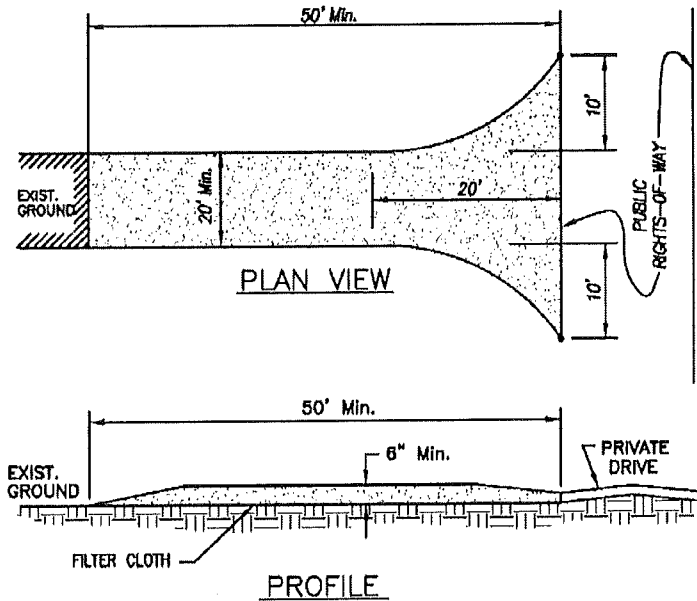
OPERATION AND MAINTENANCE PROCEDURES:

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 3:1 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".

<p>Approved _____ 9/03/2008 Date</p> <p>Revisions _____</p>		<p>CONSTRUCTION ENTRANCE/EXIT</p>	<p>TC-1</p>
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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.

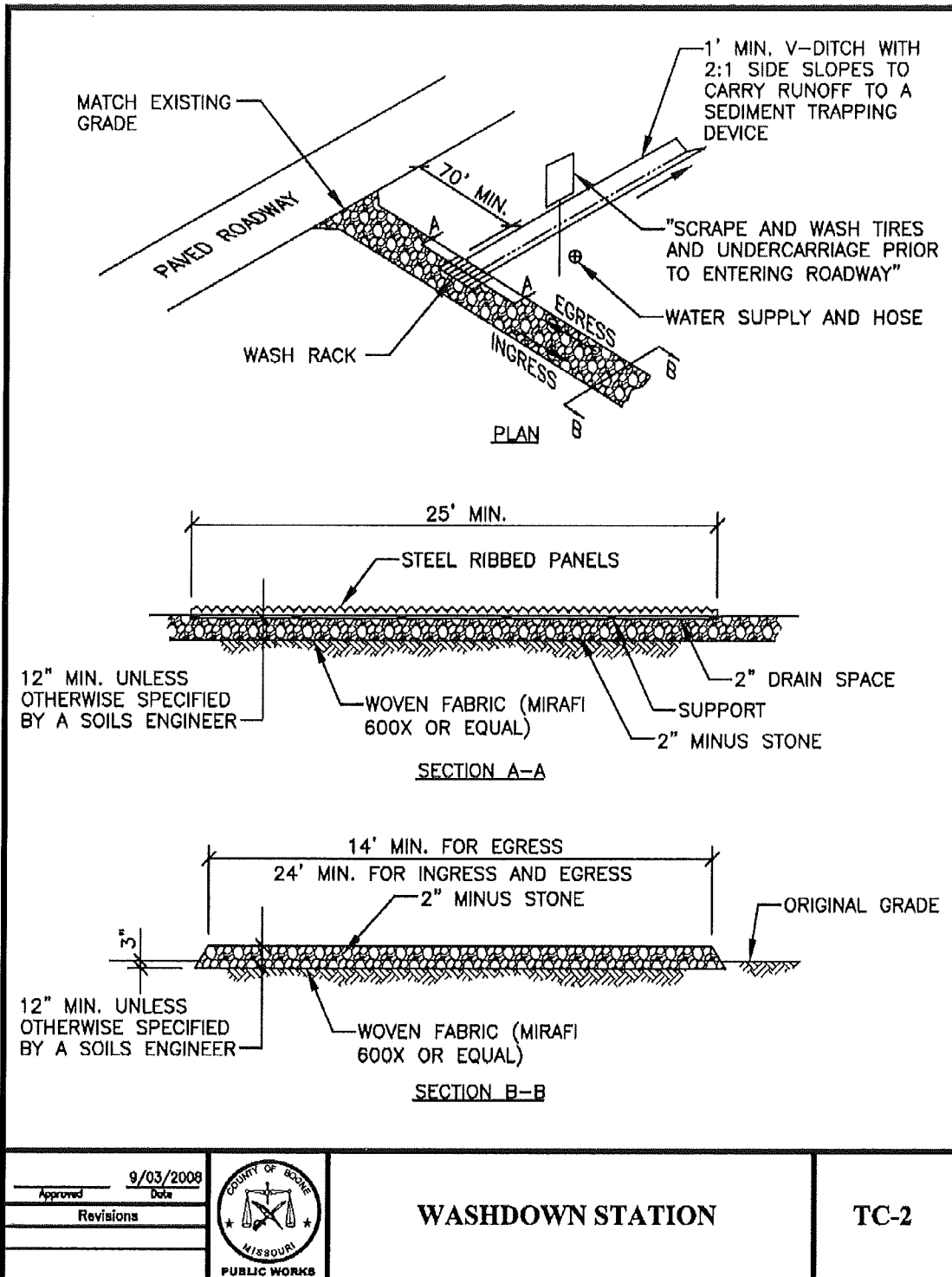
OPERATION AND MAINTENANCE PROCEDURES:

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





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.