



SP 5308-28
TH 91

Erosion Control Rules and Tools

What's The Big Deal?

Topeka Shiner

- Federally Endangered Specie
- US Fish and Wildlife Service Requirements
- DNR Requirements
- Bottom line- No sediment into streams during any stage of construction



Topeka Shiner



- Finger-long minnow
- Looks like a streamlined goldfish
- Sediment buries the shiner's eggs
- Prefers small, quiet prairie streams with cool temperatures and **good water quality**.
- Occupies a variety of habitats, such as runs, pools, and backwater areas.
- Preferred stream types tend to have clean gravel or sand substrates with vegetated banks of grasses and forbs. Groundwater flow into streams is especially important to Topeka shiners and other stream fish during late summer months to maintain cool, perennial flows.



Agenda

- Specifications
- Special Provisions
- Permits
- Individual Site Characteristics

1701 Laws to be Observed

The Contractor shall keep fully informed of all Federal and State laws; all local laws, ordinances, and regulations; and all orders and decrees of bodies and tribunals having any jurisdiction or authority, which in any manner affect those engaged or employed on the work, or which in any way affect the conduct of the work. The Contractor shall at all times observe and comply with all applicable laws, ordinances, regulations, orders, and decrees; and shall protect and indemnify the Department and its representatives against all claims and liabilities arising from or based on violations committed by the Contractor or the Contractor's employees.

The Contractor shall immediately report to the Engineer in writing any provisions in the Contract that are contrary to or inconsistent with any law, ordinance, regulation, order, or decree.

1717 Air, Land, and Water Pollution

1717.1 GENERAL

The Contractor shall schedule and conduct construction operations in a manner that will prevent, control, minimize, or abate pollution of air, land, and water in accordance with 1701. The Contractor shall obtain all necessary permits in accordance with 1702 and for temporary work not shown in the Contract.

B Water Protection

The Contractor shall take all necessary precautions and actions to prevent pollution of ground, flowing, and impounded waters of the State with any particulate or liquid matter that may be harmful to fish and wild life or detrimental to public use of the water.

The Contractor shall prevent siltation and the resulting turbidity of public waters. Water containing sediment shall not be allowed to enter public waters until its sediment content has been reduced by filtration, settlement, or other means to the appropriate standard. When turbidity standards have not been established for a public water, the turbidity of the effluent shall be not more than that of the water into which it is discharged or will eventually enter. Wash water or waste from concrete mixing operations shall not be allowed to enter streams and public waters.

The Contractor shall minimize the crossing of streams and rivers with hauling equipment. Temporary bridging shall be used where an appreciable number of crossings are necessary. The Contractor shall clear the crossings of temporary construction as soon as practical after the purpose has been fulfilled. The Contractor shall prevent water pollution from haul roads, work platforms, temporary earth fills, and other temporary construction used to facilitate bridge or culvert construction.

Also See Added Special Provisions and Bridge Special Provisions



Management Tools

- Managing storm water until permanent conveyance systems are installed
 - Down drainage
- Access protection methods
 - Timber work pads
 - Rock pads
- Weekly erosion control schedule
- Site plan

Tools for Compliance

- 2105.5 **Basis of Payment:** \$3000/ac erodible acres
- 1803.5L **Withholding of Payment--Noncompliance**
 - Related work
 - If the Contractor fails to install erosion or sediment control measures ordered by the Engineer, the **Engineer may withhold payment from related work** until the control measures are undertaken by the Contractor.
 - Written Work Order
 - When the contractor fails to conduct the quality control program, doesn't conduct the inspections required in the NPDES permit, or fails to take action ordered by the Engineer to remedy erosion or sediment control problems: The Engineer **shall issue a written order** to the Contractor. The Contractor shall respond within 24 hours with sufficient personnel, equipment and/or materials and conduct the required work or be subject to a \$500 per calendar day deduction for noncompliance.

Tools for Compliance

2573.3B Temporary Erosion Control Measures

- **The Contractor is responsible for contacting all local, regional, state, and Federal authorities before working in surface waters and obtaining applicable permits. The Contractor's restoration work to restore property outside of the Right of Way shall be at no expense to the Department.**

2573.3 H Mobilization, Emergency Erosion Control

- The Contractor shall mobilize with sufficient personnel, equipment, materials and incidentals on the job site within 24 hours of a written order by the Engineer to conduct temporary erosion control work on an emergency basis. **An emergency shall be considered to be a sudden occurrence of a serious and urgent nature, which is beyond normal maintenance of erosion control items and which requires immediate mobilization and movement of necessary personnel, equipment and materials to the emergency site.** The emergency will require immediate corrective work followed by installation of erosion control measures.
- If the Contractor fails to mobilize within the 24 hour period, a deduction of \$500.00 per calendar day will be made from money due under the contract. The deduction will apply to each calendar day of delay beyond the time period, except when the time period is extended by the Engineer, for delays not the fault of, and beyond the control of the Contractor.

Tools for Compliance

2573.3 M Workmanship and Quality Control

- The Contractor is **responsible for maintaining quality control on the project** by ensuring that all work performed and all materials furnished are in conformance with the dimensions, installation requirements and material specifications shown in the Plans or indicated in the Specifications. **Quality workmanship shall be used in all aspects of the work and shall be uniform in character throughout the project.**

2573.3 N Workmanship Rework Schedule

- **Performance of the work shall be controlled by the Contractor** so that the materials installed and the workmanship practices are of good quality. When the quality falls below the threshold level defined in Table 2573-1, the Contractor shall take immediate action to correct the situation and prevent it from reoccurring.



The Goal

- Minimize erosion and sediment impacts
- Close areas (permanent erosion control) as project progresses
 - Take advantage of the best seeding dates
 - Minimize costs by minimizing temporary erosion control due to tight scheduling



1803 Prosecution of Work

-Also See Added Special Provisions

The Contractor shall prepare and submit a weekly schedule of proposed erosion control activities for the Engineer's approval. The Engineer may require schedules to be submitted orally or in writing.

The schedule shall provide a discussion of:

1. Proposed erosion control installations and when they will be installed.
2. Areas ready for permanent turf establishment and when it will be accomplished.
3. Grading operations and how erosion control will be incorporated into the work.
4. Repair or maintenance required on erosion control installations and when it will be accomplished.
5. Proposed erosion control measures during periods of suspension of work.

Erosion Control Schedule

- Anticipated locations and durations of de-watering sites
- Anticipated locations of Project stock piles
- Certain construction activities such as final slope shaping, application of temporary mulch, topsoil or slope dressing, rip rap installations, etc.
- All primary construction functions, such as clearing and grubbing, grading, construction of bridges and culverts, paving and other miscellaneous construction.



Erosion / Sediment Control Schedule week of 9/02/02

TH100 NB

- Maintain current protection devices

Glenwood Avenue

- Street Sweeping – As needed

Lilac Drive (Under 54 Bridge)

- Street Sweeping – As Needed
- Maintain current protection devices
- Finish & Seed/Sod blvds.
- Place Sidewalk under bridge

TH55

- Street Sweeping – As Needed
- Maintain current protection devices

West Frontage Road

- Street Sweeping – As Needed

East Frontage Road

- Street Sweeping – As Needed
- Maintain current protection devices
- Clean SW corner of St. Croix Pond and stabilize slope

Breck Pond / Slope

- Clean out pond
- Repair Slope failure

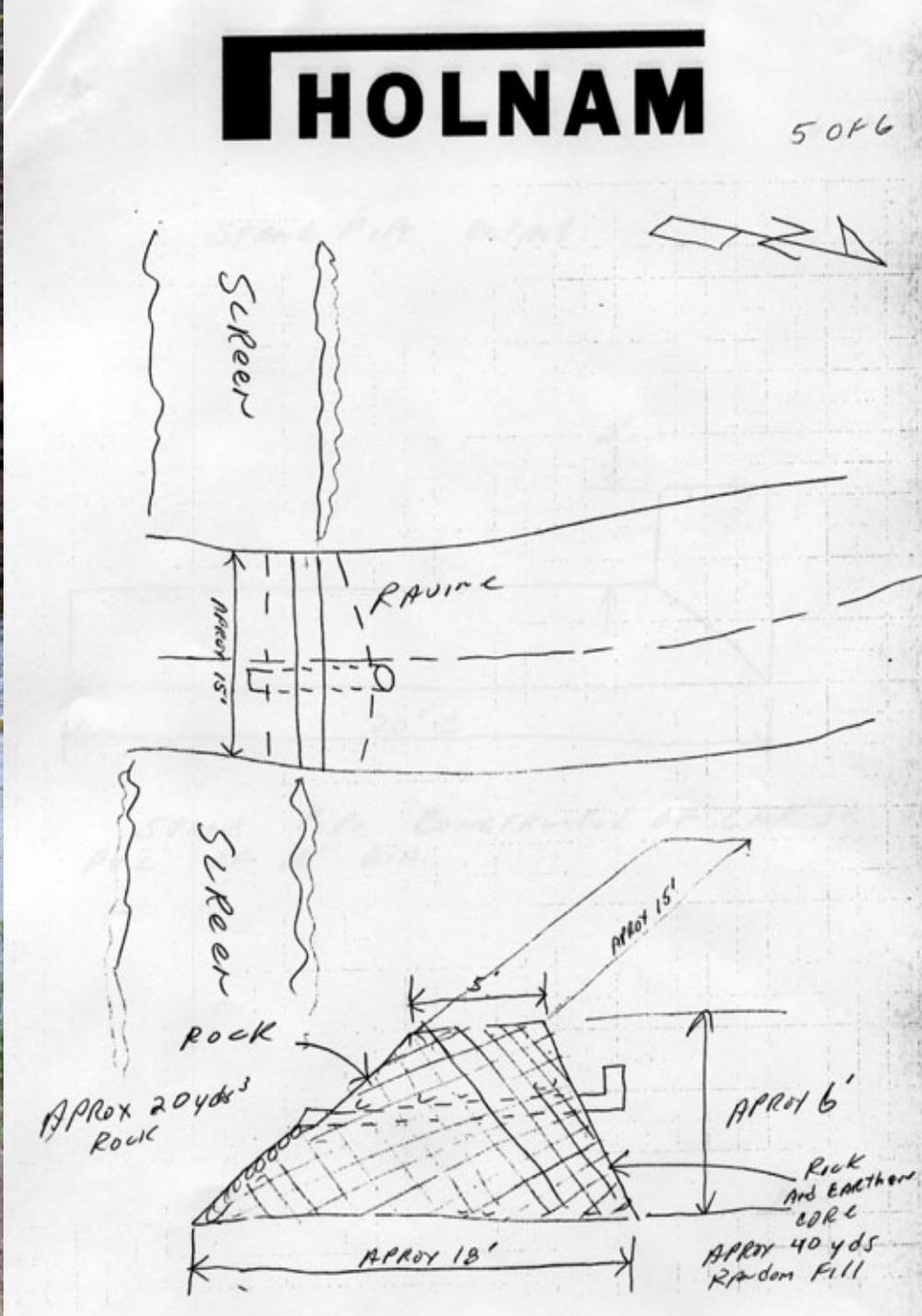
Other Items to Address (from meeting)

-
-
-
-

1803.5 I Site Plans

The Engineer may require the Contractor to submit a site plan detailing proposed erosion control and sediment control measures and a schedule indicating starting and completion times for construction operations working in water bodies and/or in direct proximity to waters of the state.

Contractor shall not start work in the affected areas until the schedule and site plan have been accepted by the Engineer.



Permits

- DNR Public Waters
 - Authorizes Bridge removals and replacements
- DNR Water Appropriations
- MPCA NPDES
- COE

US Fish & Wildlife Approval

1. Work prohibited during spawning periods.
2. Removal of bridge/culverts conducted in a manner to prevent materials from falling into the water.
3. Prevention of erosion and introduction of sediments and other materials into the creeks will receive the utmost attention by Mn/DOT and the Contractor.
4. Strict adherence to the NPDES permit.
5. Site inspected Spring, 2004 to assess erosion control measures and take any corrective actions.
6. Silt and fish will be prevented from being sucked into trash pumps.

DNR Permits

- All 3 sites have individual permits.
- Must notify the area hydrologist at least 5 days before beginning work and within 5 days of its completion.
- Area Hydrologist:
Jim Sehl (507-831-2900 ext. 224)
- No temporary stream crossings are authorized until design plans have been submitted to Jim Sehl and written authorization to proceed has been received.

Site #1: Southern bridge

- In-stream work allowed on or after July 1st to remove the bridge deck and cut off the old piers above the water.
- Contractor must build coffer dams around the area of the new piles/piers to minimize turbidity. Drive piles and encase piers for the time it takes to complete that stage of the operation.
- Pile driving equipment utilizes the old abutments and stream banks for their stable area, staying at least 15' upslope from the new pier setting (min. 50' from centerline of stream)
- Use appropriate erosion control measures to minimize stream sedimentation.
- Grade stream banks and roadway slopes after July 15th.

Sites #2 and #3

- No work affecting the bed until after August 15th.

Dewatering

- Pumping water
- DNR permit needed when pumping water for construction activities.



Dewatering Permits (DNR)

General Permit 97-0005

This general permit authorizes temporary water appropriations for construction dewatering, landscaping, dust control, and hydrostatic testing of pipelines, tanks, and wastewater ponds.

To be included under General Permit 97-0005 the project must meet the following criteria:

- Projects must have minimal potential for causing adverse environmental impacts,
- Water appropriations cannot exceed 50 million gallons,
- Water appropriations must be completed within one year from the start of pumping,
- **The Area Hydrologist for the county in which the project is located must be notified five days prior to the start of pumping.** The information packet below has a form that can be used to satisfy notification requirements,
- Water volumes must be measured and reported upon completion of the project. A \$50 water use report processing fee is required for projects that exceed 15 million gallons.

- 9. CONSERVATION:** All practical and feasible water conservation methods and practices must be employed to promote sound water management and use the least amount of water necessary, such as reuse and recycling water, saving devices, and water storage.
- 10. CONSERVATION PLAN:** The Permittee shall implement adequate soil and water conservation measures in order to protect water quality and prevent erosion and sedimentation and must comply with conservation plans and best management practices that may be required by the local Soil and Water Conservation District.
- 11. DISCHARGE EROSION AND SEDIMENTATION CONTROL:** The Permittee shall ensure that discharge points are adequately protected from erosion and scour. The discharge shall be dispersed over sand bags, plastic sheeting, natural rock riprap, or other approved energy dissipation measures. Adequate sedimentation control measures are required for discharge water that contains suspended solids. Sediment control devices can be bypassed when the discharge water appears clear.
- 14. ENVIRONMENTAL IMPACTS:** **This permit is not valid in areas or locations where trout streams, calcareous fens, or other significant environmental resources may be adversely impacted.** In such areas or locations, a separate water appropriation application and permit may be required. The Area Hydrologist must be contacted for permit application requirements.

NPDES Permit

Storm Water Only

NOT:

- Concrete washouts
- Hazardous Waste
- Sediment laden water



5/2000





NPDES Permit

The **owner** who signs the **application** is responsible for compliance with all terms and conditions of this **permit**. The operator (**general contractor**) who signs the **application** is a Co-Permittee for Parts I.B through I.E (*application for coverage, Records, Erosion/Sediment Control and Inspections and Maintenance*), Appendix C, and Appendix D of the permit and is responsible for compliance with those portions of the permit.

Termination of Coverage

1. **Permittee(s)** wishing to terminate coverage under this permit must submit a **Notice of Termination (NOT)** to the MPCA.

Compliance with this permit is required until a **NOT** is submitted. The **Permittee(s)** authorization to discharge under this permit terminates at midnight of the day the NOT is signed.

2. All **Permittee(s)** must submit a NOT within thirty (30) days after one or more of the following conditions have been met:

- a. **Final stabilization** has been achieved on all portions of the site for which the **Permittee** is responsible (including the removal of all temporary measures such as silt fence, and if applicable, return in agricultural land to its pre-construction



Notice of Termination

Termination of Coverage Under The National Pollutant Discharge Elimination System (NPDES) General Permit (MNR110000) for Storm Water Discharges Associated With A Construction Activity



Minnesota Pollution Control Agency

520 Lafayette Road North
St. Paul, MN 55155-4194

I. Construction Site Information

1. Name of project: _____
For the following questions, please refer to the NPDES General Storm Water Permit (MNR110000).
2. Has the entire construction site undergone final stabilization? Yes No
3. Are all maintenance activities required in Part I.E. of the Permit complete? Yes No
4. Have all **Permanent Erosion and Sediment Control Best Management Practices** (to be used after construction is complete) been installed in accordance with Appendix B of the Permit? Yes No

A "No" to any of the above will result in this request for termination being denied.

IV. General Contractor Certification

"I understand that, as a permittee, I am legally accountable under the Clean Water Act to ensure compliance with the terms and conditions of the NPDES General Storm Water Permit (MNR110000)."

"I understand that by signing this Notice of Termination I am no longer authorized to discharge storm water associated with the construction activity identified on this form under the terms and condition of the NPDES General Storm Water Permit (MNR110000), and that discharging storm water associated with a construction activity to waters of the state is unlawful under the Clean Water Act unless the discharge

is authorized by an NPDES permit. I understand the submittal of this Notice of Termination does not release my company from liability for any violations of the NPDES General Storm Water Permit (MNR110000) or the Clean Water Act."

"I certify under penalty of law that the answers to the questions in Section I, 'Construction Site Information', above, are true and correct, and this information is based on my own assessment, or on my inquiry of the person or persons responsible for gathering the information."

Company or Firm

Telephone

Printed Name

Title (Manager, CEO, etc.)

Authorized Signature

Date

Address

City

State

Zip Code

Contact Person

Telephone

Construction Requirements

- Implement the Erosion and Sediment Control Plans
- Make necessary changes and document- Keep documented changes for 3 years after Notice of Termination
- Horizontal slope grading and phasing
- Inspections
 - Once every 7 days and within 24 hours of rainfall
- Maintenance

Sediment Control Installation Timing

Before upgradient land disturbing begins

- Silt Fence
- Inlet Protection
- Temporary Sediment Basin

Erosion Control Installation Timing

Within 100 feet of a Surface Water:

- If work temporarily stops on a slope

<u>Steeper than 1:3</u>	<u>7 days</u>
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<u>1:10 - 1:3</u>	<u>14 days</u>
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<u>Flatter than 1:10</u>	<u>21 days</u>
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- Normal Wetted Perimeter of ditch within 24 hours
- Energy Dissipation on Pipe Outlets within 24 hours





Record of Inspections

- Date and Time
- Name of Person
- Findings, Including Recommendations for Corrective Action
- Corrective Actions Taken: Date, Time, Who
- Date and Amount of all Rainfall $\geq \frac{1}{4}$ " in 24 hours
- Documentation of Changes to Erosion/Sediment Control Plan

Inspections

- **All** Erosion and Sediment Control BMPs
- Ensure Integrity and Effectiveness
- Repair, Replace or Supplement



Inspectors Log for MPCA Storm Water Permit

Initials of Inspector	Type of Inspection	Date of Inspection			Insufficient rainfall, no inspection needed.	Time of Inspection		Areas to be Inspected*								
		Routine weekly	24 hours after a rain event	Month		Day	Year	AM	PM	All erosion and sediment control BMPs	Temporary Sedimentation basins	Drainage ditches and other waters of the state	Construction site exits			
WSE	✓		5	14	02		7	✓	✓	✓	✓	✓	✓	✓	OK	(SUNNY WARM)
WSE	✓		5	15	02		1	✓	✓	✓	✓	✓	✓	✓	(2) SILTFENCE DITCHBLOCKS + WOODCHIPS SB100	(SUNNY WARM)
WSE	✓		5	15	02		1	✓	✓	✓	✓	✓	✓	✓	(6) CB'S INSTALL SILT BAGS SB100	(SUNNY WARM)
WSE	✓		5	15	02		10	✓	✓	✓	✓	✓	✓	✓	INSTALL SILT FENCE AROUND TOPSOIL PILE DULUTH STELLACOR	(SUNNY WARM)
WSE	✓		5	23	02		5	✓	✓	✓	✓	✓	✓	✓	PREMIER SEEDED TEMP DULUTH NORTH + DULUTH PONDS	(SUNNY WARM)
WSE	✓		5	24	02		11	✓	✓	✓	✓	✓	✓	✓	FIX SILT FENCE S-SIDE DULUTH + TEMP BRIDGE	(SUNNY WARM)
WSE	✓		5	28	02		6:30	✓	✓	✓	✓	✓	✓	✓	EROSION CONTROL OK	(SUNNY WARM)
WSE	✓		6	3	02		2:00	✓	✓	✓	✓	✓	✓	✓	FIX SILT FENCE, TOPSOIL PILE, DULUTH + LILAC	(CLOUDY COOL)
WSE	✓		6	4	02		7:00	✓	✓	✓	✓	✓	✓	✓	EVERYTHING OK	(RAINING COOL)
WSE	✓		6	5	02		7:00	✓	✓	✓	✓	✓	✓	✓	CHECK ALL SILT FENCE, EMPTY SILT BAGS	(SUNNY WARM)
WSE	✓		6	6	02		7	✓	✓	✓	✓	✓	✓	✓	SILT FENCE + WOODCHIP DITCH CURB WALL #2. REPLACE SILT FENCE	
WSE	✓		6	6	02		1	✓	✓	✓	✓	✓	✓	✓	N. SIDE TEMP BRIDGE, ALSO DIG SUMP WALL #2. FIX	
WSE	✓		6	6	02		2	✓	✓	✓	✓	✓	✓	✓	SLOPE DULUTH N. POND (MORE TOPSOIL + MULCH)	(SUNNY WINDY WARM)
WSE	✓		6	6	02		2	✓	✓	✓	✓	✓	✓	✓	SAND BAG CB'S WALL #2 + MULCH HYDRANT AT PED BRIDGE	
WSE	✓		6	6	02		5	✓	✓	✓	✓	✓	✓	✓	INSTALL FLOK SOK WALL #2	
WSE	✓		6	7	02		7	✓	✓	✓	✓	✓	✓	✓	CLEAN ALL CB BAGS, STAINEL CURB 2" RAD	(SUNNY WINDY WARM)
WSE	✓		6	10	02		7	✓	✓	✓	✓	✓	✓	✓	OK	
WSE	✓		6	11	02		7	✓	✓	✓	✓	✓	✓	✓	CLEAN SILT BAGS, STAINEL X SIDES CURB + TEMP SILT FENCE +	
WSE	✓		6	11	02		7	✓	✓	✓	✓	✓	✓	✓	FIX SMALL WASHOUTS + MULCH. (CLOUDY, BREEZY, + WARM)	311
WSE	✓		6	11	02		1	✓	✓	✓	✓	✓	✓	✓	DOUBLE SILT FENCE PITCH BLOCK NE QUAD (DULUTH N. POND)	
WSE	✓		6	12	02		11	✓	✓	✓	✓	✓	✓	✓	FIX SILT FENCE N+S SIDE UNDER TEMP BRIDGE	(CLOUDY WARM)
WSE	✓		6	13	02		7	✓	✓	✓	✓	✓	✓	✓	OK	(CLOUDY, COOL)
WSE	✓		6	14	02		7	✓	✓	✓	✓	✓	✓	✓	OK	10 th of an inch rain (SUNNY, WARM)

Inspectors should enter their initials, date, and time of inspection in the blanks provided. After inspecting each area, inspectors should check each box, and make any necessary comments regarding their findings in the blanks provided below and on the back of this sheet.

* Refer to the MPCA's Compliance Guide for Erosion and Sediment Control during inspection of these areas at the construction site.

Comments:

OK

(2) SILTFENCE DITCHBLOCKS + WOODCHIPS SB100

(6) CB'S INSTALL SILT BAGS SB100

INSTALL SILT FENCE AROUND TOPSOIL PILE DULUTH STELLACOR

PREMIER SEEDED TEMP DULUTH NORTH + DULUTH PONDS

FIX SILT FENCE S-SIDE DULUTH + TEMP BRIDGE

EROSION CONTROL OK

FIX SILT FENCE, TOPSOIL PILE, DULUTH + LILAC

EVERYTHING OK

CHECK ALL SILT FENCE, EMPTY SILT BAGS

SILT FENCE + WOODCHIP DITCH CURB WALL #2. REPLACE SILT FENCE

N. SIDE TEMP BRIDGE, ALSO DIG SUMP WALL #2. FIX

SLOPE DULUTH N. POND (MORE TOPSOIL + MULCH)

SAND BAG CB'S WALL #2 + MULCH HYDRANT AT PED BRIDGE

INSTALL FLOK SOK WALL #2

CLEAN ALL CB BAGS, STAINEL CURB 2" RAD

OK

CLEAN SILT BAGS, STAINEL X SIDES CURB + TEMP SILT FENCE +

FIX SMALL WASHOUTS + MULCH. (CLOUDY, BREEZY, + WARM)

DOUBLE SILT FENCE PITCH BLOCK NE QUAD (DULUTH N. POND)

FIX SILT FENCE N+S SIDE UNDER TEMP BRIDGE

OK

OK

Inspections/Maintenance

- Silt Fence
 - Nonfunctional or 1/3 of height reached
 - Within 24 hours of discovery
- Sediment Basins- Temp Traps
 - 1/2 the Storage Volume
 - Within 72 hours of discovery
- Surface Waters
 - Remove sediment within 7 days



Corps of Engineers Permit

Section 404 of the Clean Water Act (33 USC § 1344) establishes the authority of the Environmental Protection Agency (EPA) and the U.S. Army Corps of Engineers (Corps) to regulate the discharge of dredged and fill material, and mechanized land clearing in waters of the United States, including wetlands. The basic premise of the Section 404 program is that no discharge of dredged or fill material can be permitted if there is a practicable alternative that is less damaging to the aquatic environment or if the discharge would result in significant degradation of our nation's waters. Different types of Section 404 permits are required depending on the size and nature of the project.

Section 10 of the Rivers and Harbors Act of 1899 also authorizes the Corps to regulate work in, over, or under navigable waters of the United States. **A Corps permit is required for all work (structures, etc.) below or beyond the ordinary high water line of any navigable water.**

In addition to general and special conditions, this permit is subject to the following standard conditions, as applicable:

1. All work or discharges to a watercourse resulting from permitted construction activities, particularly hydraulic dredging, must meet applicable Federal, State, and local water quality and effluent standards on a continuing basis.
2. Measures must be adopted to prevent potential pollutants from entering the watercourse. Construction materials and debris, including fuels, oil, and other liquid substances, will not be stored in the construction area in a manner that would allow them to enter the watercourse as a result of spillage, natural runoff, or flooding.
3. If dredged or excavated material is placed on an upland disposal sight (above the ordinary high-water mark), the site must be securely diked or contained by some other acceptable method that prevents the return of potentially polluting materials to the watercourse by surface runoff or by leaching. The containment area, whether bulkhead or upland disposal sight, must be fully completed prior to the placement of any dredged material.

6. If cultural, archaeological, or historical resources are unearthed during activities authorized by this permit, work must be stopped immediately and the State Historic Preservation Officer must be contacted for further instruction.

8. A contingency plan must be formulated that would be effective in the event of a spill. This requirement is particularly applicable in operations involving the handling of petroleum products. If a spill of any potential pollutant should occur, it is the responsibility of the permittee to remove such material, to minimize any contamination resulting from this spill, and to immediately notify the State Department of Natural Resources and the U.S. Coast Guard at telephone number (800) 424-8802.

•Spill Kit

- Fuels

- Oils

- Hydraulic lines



Site Construction

- Access
- Dewatering
- Silt Curtain
- Riprap
- Sheet Pile
- Stockpiles
- Deck Drainage

Working with flow

- Site Plan
- Schedule
- Quality of fill material must meet Specifications and DNR requirements
- Length of time
- Make sure DNR is notified
- Sediment cleanup plan









ANDERSON
CRANE
SERVICE
320-235-5898
WILLMAR, MN.

ANDERSON
CRANE
SERVICE
235-5898
WILLMAR, MN.

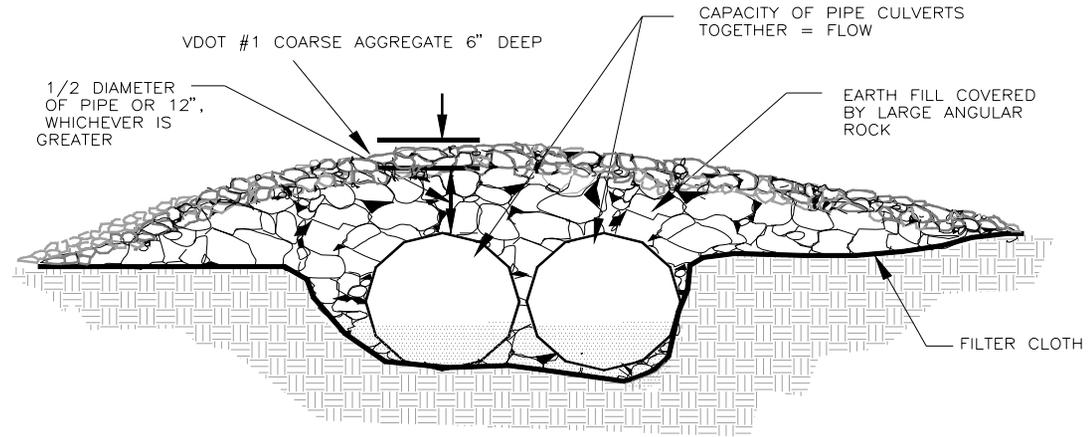
ANDERSON CRANE SERVICE
235-5898
WILLMAR, MN.
AMERICA



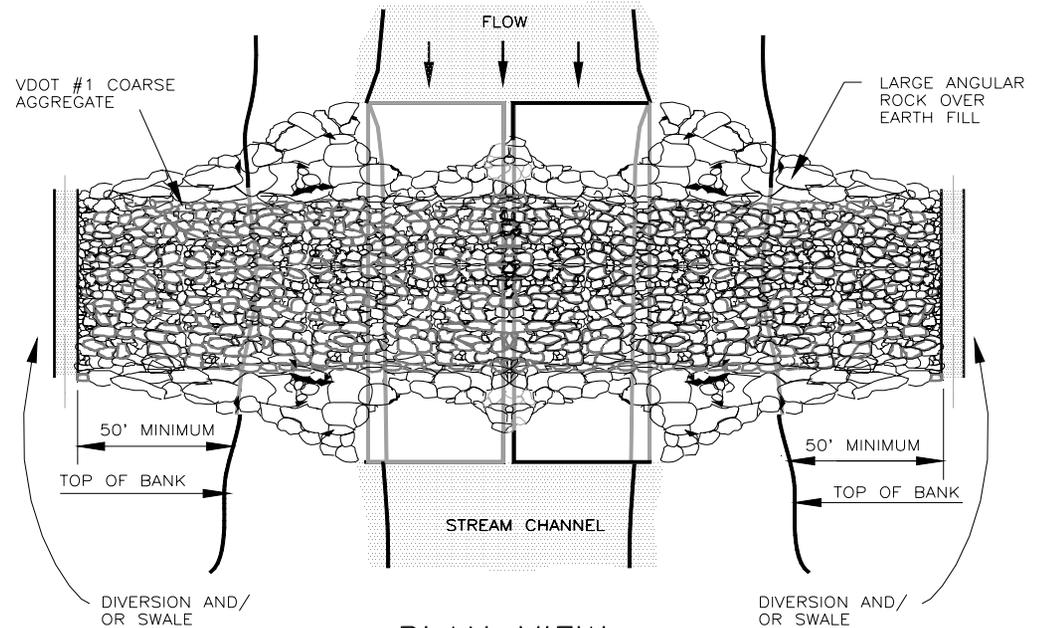




TEMPORARY CULVERT CROSSING



ELEVATION



PLAN VIEW

Dewatering













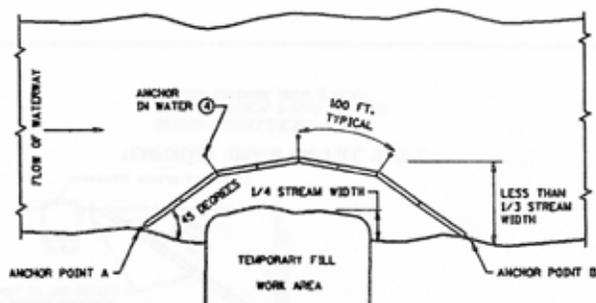




Floatation Silt curtain, 3887

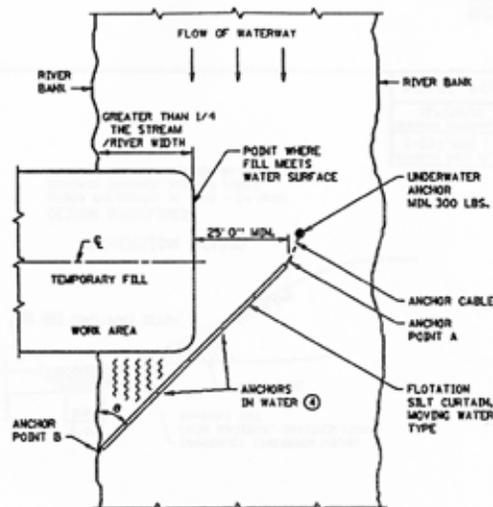
Standard Sheet

- 5-297.405 Temporary Erosion Control
- Floatation Silt Curtain
 - Stillwater
 - Moving water
 - Enclosing a work area



PLAN VIEW OF SILT CURTAIN ENCLOSING A WORK AREA FOR CONTAINING OVERFLOWS FROM WEIRS, STANDPIPES, SETTLING PONDS

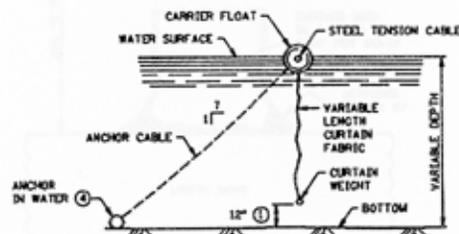
DESIGN GUIDELINES:
 WHEN TEMPORARY FILL ENCROACHES LESS THAN 1/4 OF THE WIDTH OF STREAM,
 MAXIMUM FLOW VELOCITY: 5 FT./SEC.
 MAXIMUM FLOW DEPTH: 4 FT.



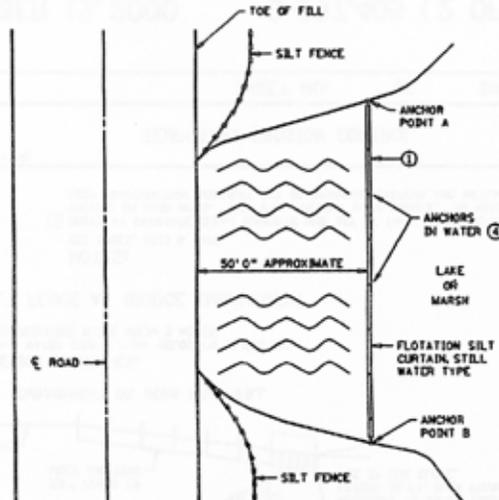
∠ #	RIVER VELOCITY
45°	SLOW, LESS THAN 5 FT./SEC.
35°	MODERATE, 5 - 7 FT./SEC.

PLAN VIEW OF SILT CURTAIN - MOVING WATER

DESIGN GUIDELINES:
 WHEN TEMPORARY FILL ENCROACHES MORE THAN 1/4 BUT LESS THAN 1/3 WIDTH OF THE STREAM,
 MAXIMUM WATER DEPTH: 12 FT.
 MINIMUM WATER DEPTH: 3 FT.
 MAXIMUM WATER VELOCITY: 7 FT./SEC.

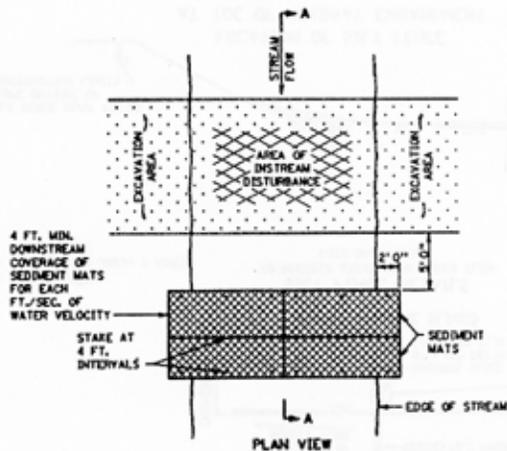


FLOTATION SILT CURTAIN DETAIL (SEE SPEC. 3887)



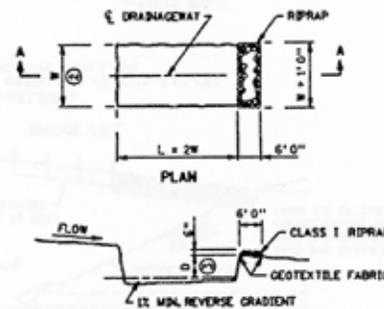
PLAN VIEW OF SILT CURTAIN - STILL WATER

DESIGN GUIDELINES:
 MAXIMUM WATER DEPTH: 12 FT.
 MINIMUM WATER DEPTH: 3 FT.



SECTION A-A
 SEDIMENT MAT
 TYPICAL STREAMBED INSTALLATION

DESIGN GUIDELINES:
 MAXIMUM FLOW VELOCITY: 5 FT./SEC.
 MAXIMUM FLOW DEPTH: 2 FT.



TEMPORARY SEDIMENT TRAP DETAIL

NOTES:
 SEE SPECS. 2573, 3887 & 3894.
 ① CURTAIN 1 FT. FROM BOTTOM
 ② W = 10 FT. MDL 20 FT. MAX.
 ③ D = 2 FT.
 ④ 100 FT. MAXIMUM SPACING BETWEEN ANCHORS, MINIMUM 40 LBS.

STANDARD SHEET NO.
 S-297.405 (1 OF 4)

STANDARD APPROVED
 SEPTEMBER 19, 2000

TITLE

TEMPORARY EROSION CONTROL

STATE PROJ. NO.

SHEET NO. OF SHEET

Silt curtain issues

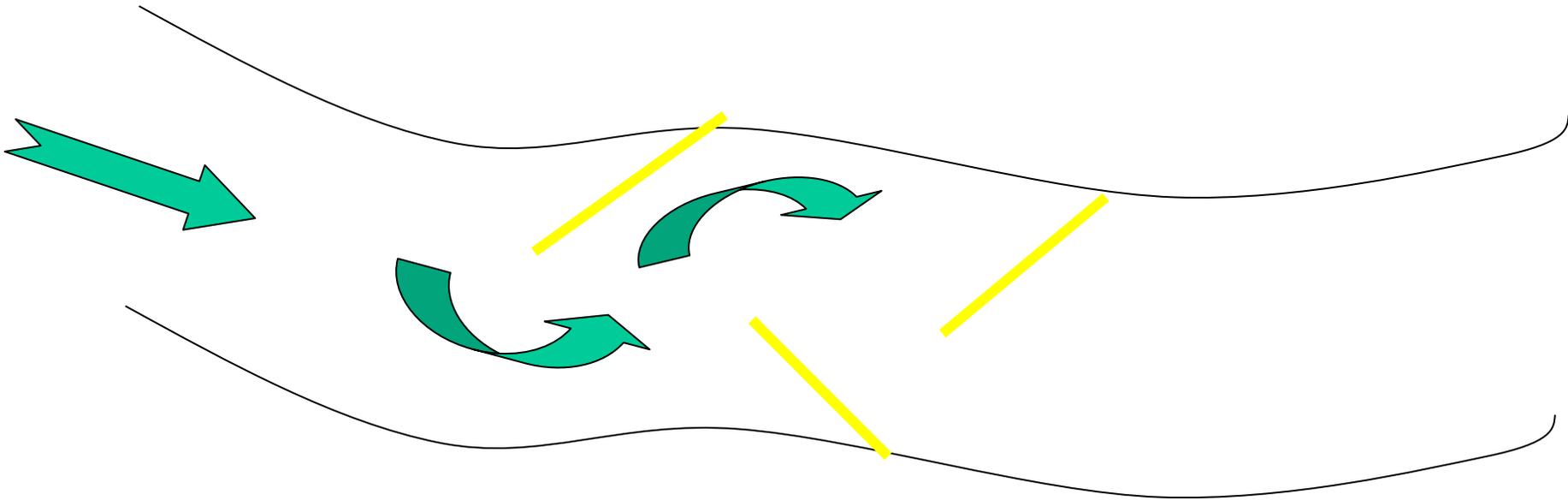
	Still water	Work Area	Moving water
Distance from work	6* to 50 ft	1/3 stream width	Angled
Flow velocity	---	5 ft/s	<5ft/s: 45deg <7ft/s: 35deg
Depth	3' < D < 12'	Max 4 ft	3' < D < 12'











Angle based on flow



Riprap





CHETAX-1
9 13 01

CHETAX-1
9 13 01

CHETAX-1
9 13 01

Sheet Pile





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SERVICE
320-235-5898
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WILLMAR, MN.
AMERICAN





Stockpiles







Pillager 8
Road 21







Temporary Sediment Traps

- Location, location, location
- Size
 - Should be 2 to 3 times longer than wider
- Stabilized Outflow
- Cleanout

Sediment Trap



Sediment Trap





