

NDDOT Erosion & Sediment Control – Construction Course

Module 4: Stormwater Pollution
Prevention Plan (SWPPP)



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What is a SWPPP?

Definition:

A document, a plan that describes who and what will control erosion and keep sediment from leaving the project site, and when, where and how this will be done. The plan is the common link between the owner, designer, contractor, and inspector.



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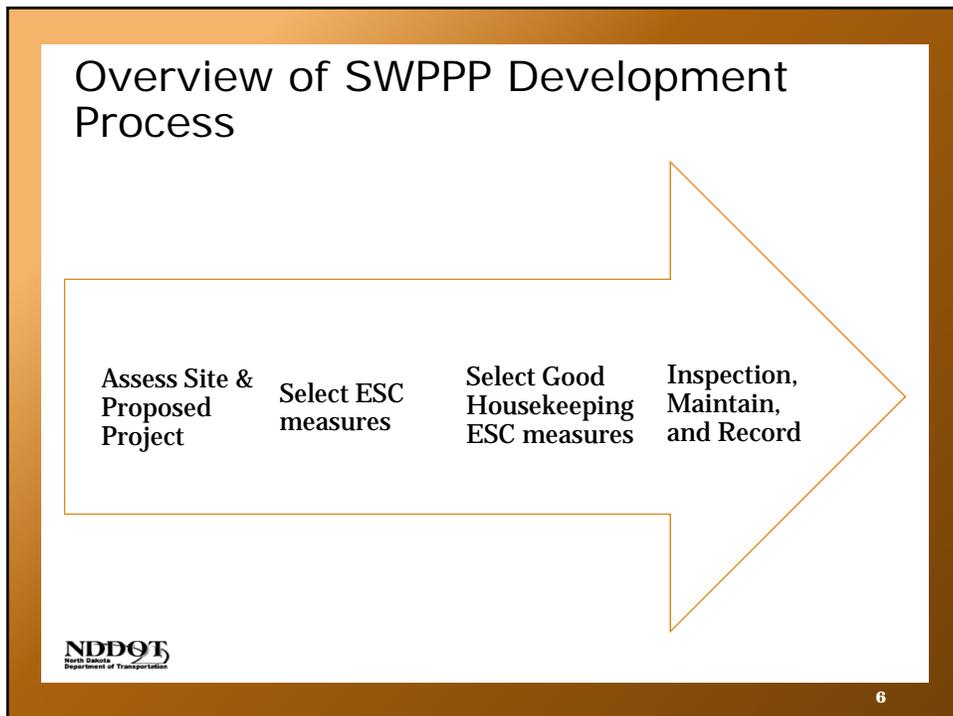
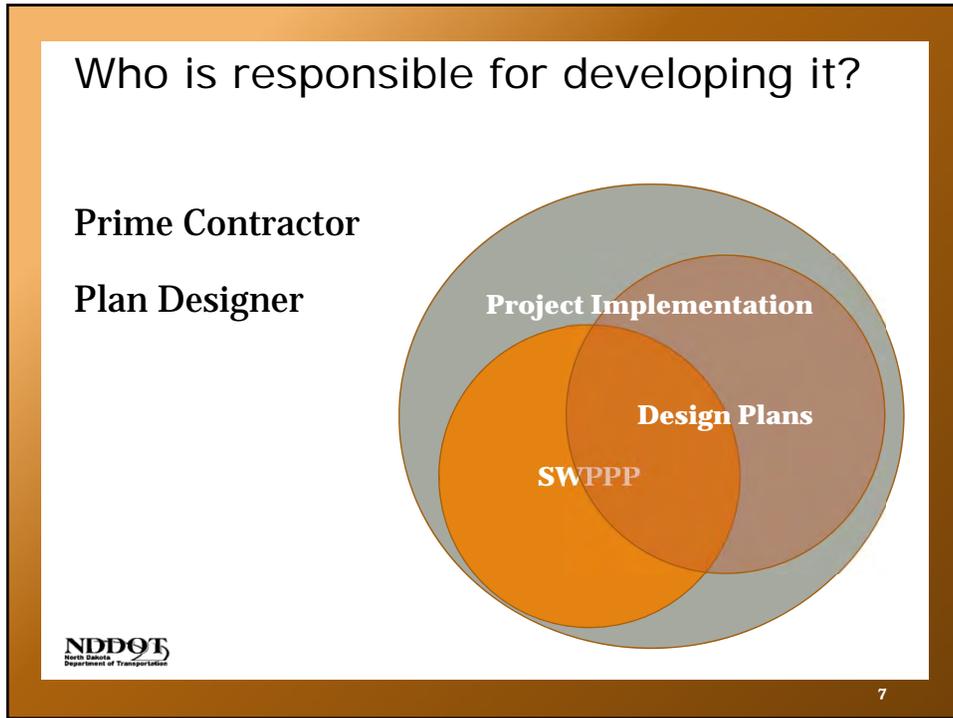
What is a SWPPP?

A SWPPP is a site-specific, written document.

- Identifies potential pollution
- Describes practices
- Identifies procedures

Why is a SWPPP important?

1. Required by the permits
2. Powerful tool to assist erosion and sediment control



Initial Considerations

1. Existing conditions
2. Outfalls
3. Waterbodies
4. Project boundaries

Initial Considerations

5. Environmentally sensitive areas
6. Permanent stormwater controls
 - a. Ponds
 - b. Infiltration
7. Project phasing

Existing Conditions

Soils

Hydrology

Topography



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Outfalls and Waterbodies

Considerations:

- Where does it drain to?
- How close will the disturbance be?
- What protections are required?
- Is it impaired? What for? Total Maximum Daily Load (TMDL)?

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Project Boundaries

Considerations:

- Slopes
- Proximity to right of way lines
- What is coming into the project?
- Points of egress – trackout, etc.
- Impacts from or to outside



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Environmentally Sensitive Areas

Rivers, Lakes, Streams:

- Spawning times

Threatened and Endangered Species

Wetlands:

- Impacts
- Mitigation

Cultural sites and other avoidance areas



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Permanent Stormwater Controls

What permanent structures are required?

- MS4
- City
- Are there any existing?

Permanent Stormwater Controls

Placement

Sizing

Maintenance

Project Phasing

What will be done first?

What should be done first?

Environmental commitments

Should things be required due to the nature of the work?



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What are the components of a SWPPP?

1. Illustrative:
 - a. Map/site plan
 - b. Details
 - c. Drawings
2. Narrative:
 - a. Contractors means and methods
 - b. Plan notes
 - c. Environmental commitments
3. Calculations and other supporting documents



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What are the parts of the illustrative section in the SWPPP?

1. Site map
2. Erosion and Sediment Control Measure (ESCM) installation drawings
 - a. Standard drawings
 - b. Plan details
 - c. Manufacturer's drawings/details
3. Other visual aids

What are the parts of a map/site plan in the SWPPP?

1. Vicinity map
2. North arrow
3. Existing contours
4. Preliminary and final design contours
5. Existing vegetation
6. Soils

What are the parts of a map/site plan in the SWPPP?

7. Critical areas
8. Existing and final drainage patterns
9. Limits of clearing and grading
10. Outfalls
11. Surface waters (including wetlands)

What are the parts of a map/site plan in the SWPPP?

12. Temporary ESCMs
13. Permanent ESCMs
14. Permanent stormwater management practices
15. Off site areas (if applicable)
16. Legend

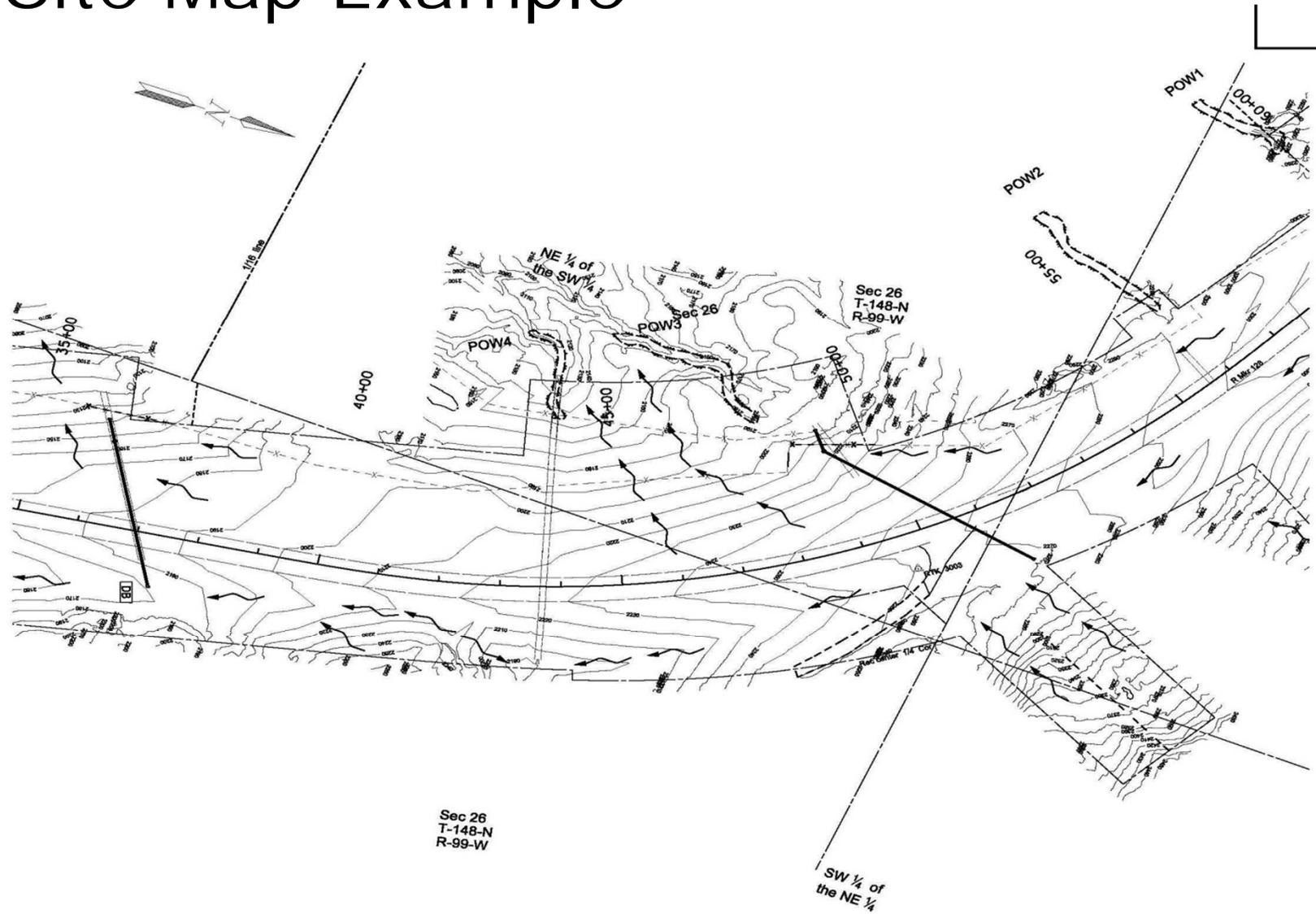
Plan Sections

Section 75 – Wetlands

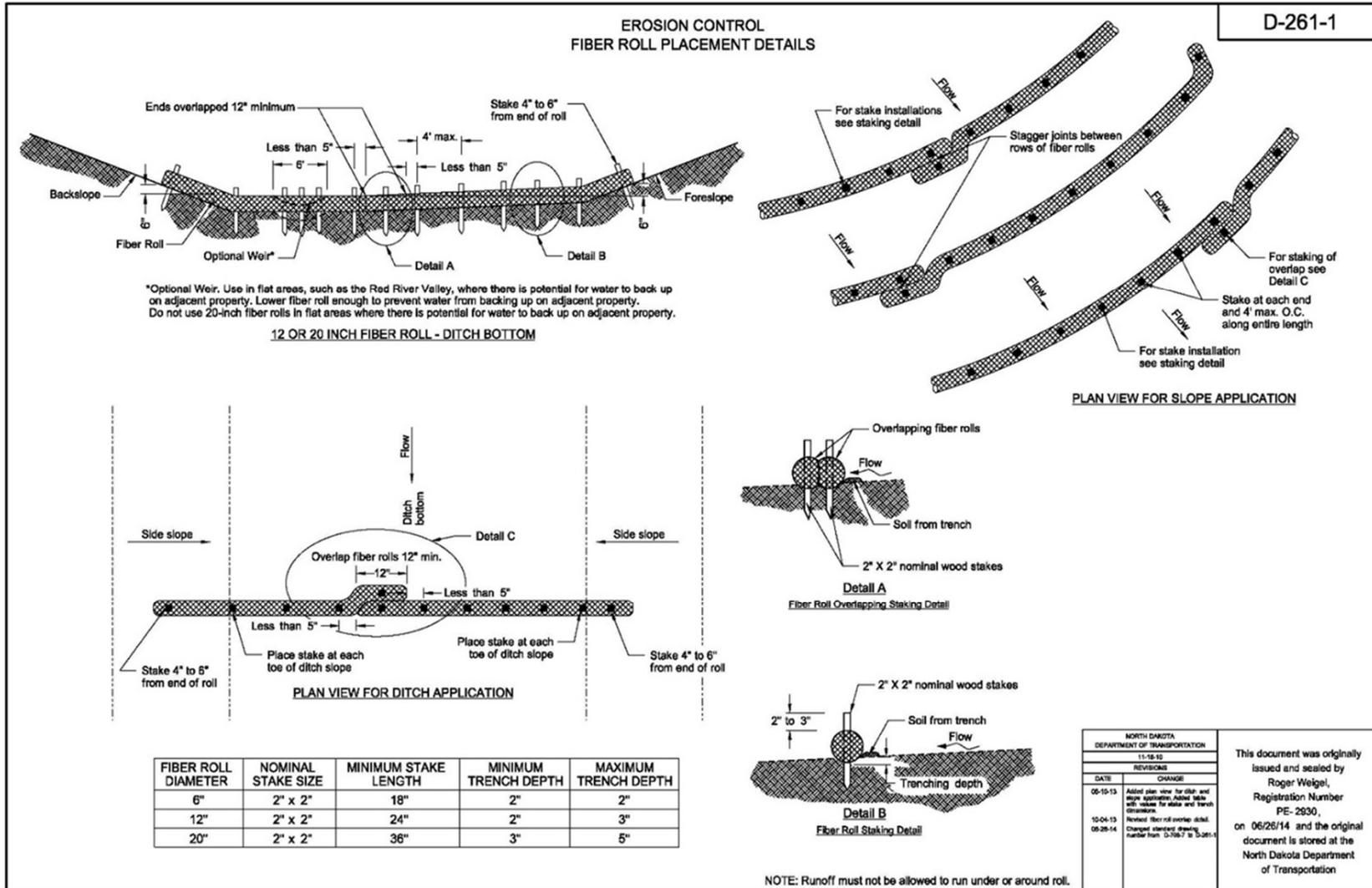
Section 76 – Temporary ESCMs

Section 77 – Permanent ESCMs

Site Map Example



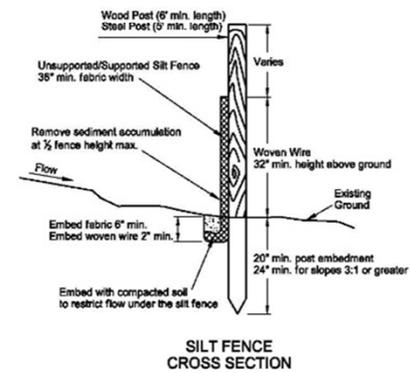
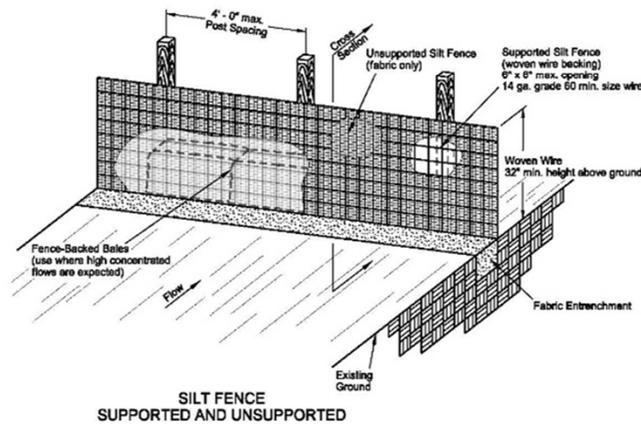
ESCM Installation Drawings



ESCM Installation Drawings

EROSION AND SILTATION CONTROLS - SILT FENCE

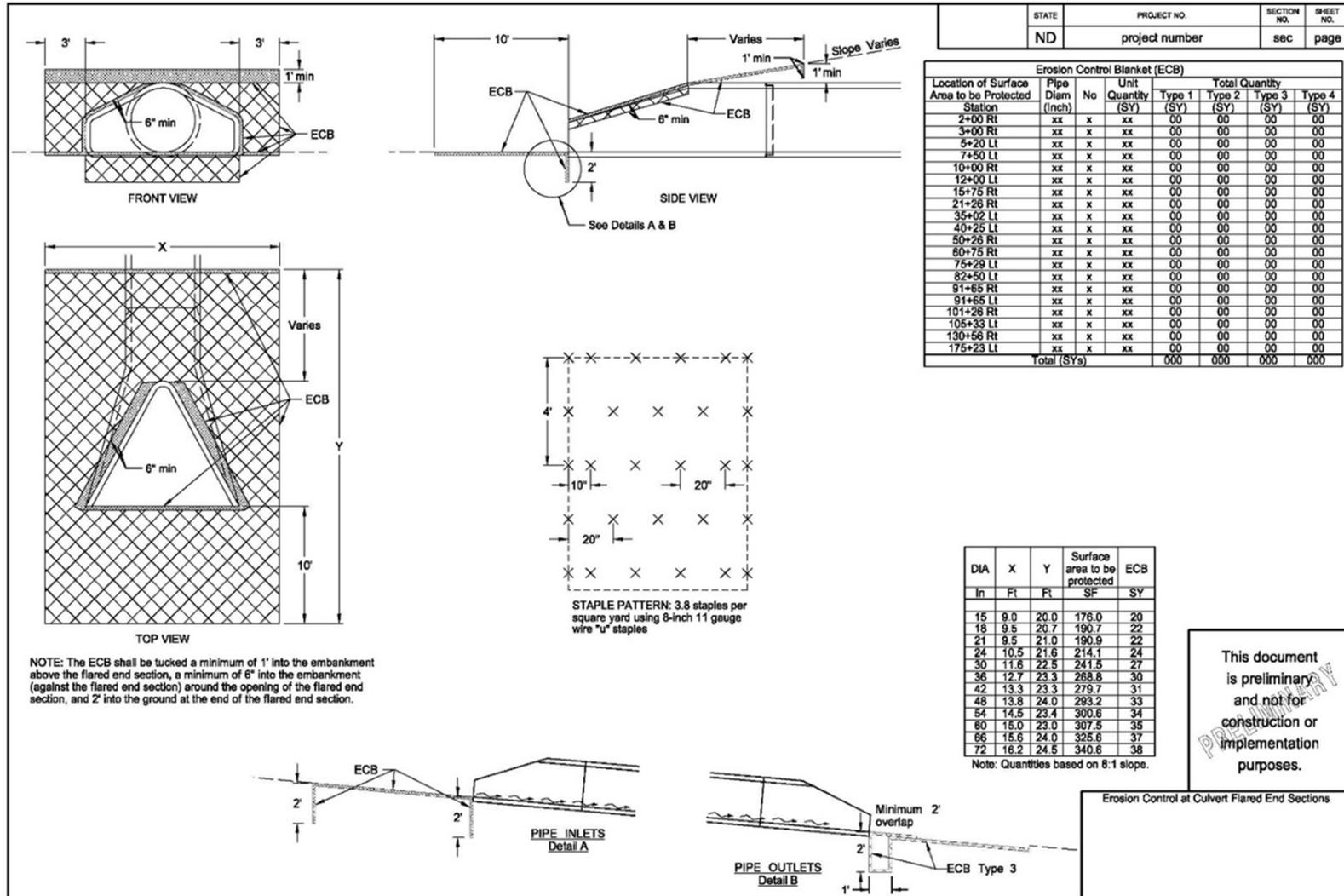
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NORTH DAKOTA DEPARTMENT OF TRANSPORTATION	
10-08-13	
REVISIONS	
DATE	CHANGE
06-26-14	Standard drawing revised from existing standard D-708.2.

This document was originally issued and sealed by
Roger Weigel
 Registration Number
 PE- 2930,
 on 06/26/14 and the original document is stored at the
 North Dakota Department
 of Transportation

ESCM Installation Drawings



STATE	PROJECT NO.	SECTION NO.	SHEET NO.
ND	project number	sec	page

Erosion Control Blanket (ECB)						
Location of Surface Area to be Protected Station	Pipe Diam (Inch)	No	Unit Quantity (SY)	Total Quantity		
				Type 1 (SY)	Type 2 (SY)	Type 3 (SY)
2+00 Rt	xx	x	xx	00	00	00
3+00 Rt	xx	x	xx	00	00	00
5+20 Lt	xx	x	xx	00	00	00
7+50 Lt	xx	x	xx	00	00	00
10+00 Lt	xx	x	xx	00	00	00
12+00 Lt	xx	x	xx	00	00	00
15+75 Rt	xx	x	xx	00	00	00
21+26 Rt	xx	x	xx	00	00	00
35+02 Lt	xx	x	xx	00	00	00
40+25 Lt	xx	x	xx	00	00	00
50+26 Rt	xx	x	xx	00	00	00
60+75 Rt	xx	x	xx	00	00	00
75+28 Lt	xx	x	xx	00	00	00
82+50 Lt	xx	x	xx	00	00	00
91+65 Rt	xx	x	xx	00	00	00
91+65 Lt	xx	x	xx	00	00	00
101+26 Rt	xx	x	xx	00	00	00
105+33 Lt	xx	x	xx	00	00	00
130+56 Rt	xx	x	xx	00	00	00
175+23 Lt	xx	x	xx	00	00	00
Total (SY)				000	000	000

DIA	X	Y	Surface area to be protected SF	ECB SY
In	Ft	Ft		
15	9.0	20.0	176.0	20
18	9.5	20.7	190.7	22
21	9.5	21.0	190.9	22
24	10.5	21.6	214.1	24
30	11.8	22.5	241.5	27
36	12.7	23.3	268.8	30
42	13.3	23.3	279.7	31
48	13.8	24.0	283.2	33
54	14.5	23.4	300.8	34
60	15.0	23.0	307.5	35
66	15.6	24.0	325.6	37
72	16.2	24.5	340.6	38

Note: Quantities based on 8:1 slope.

This document is preliminary and not for construction or implementation purposes.

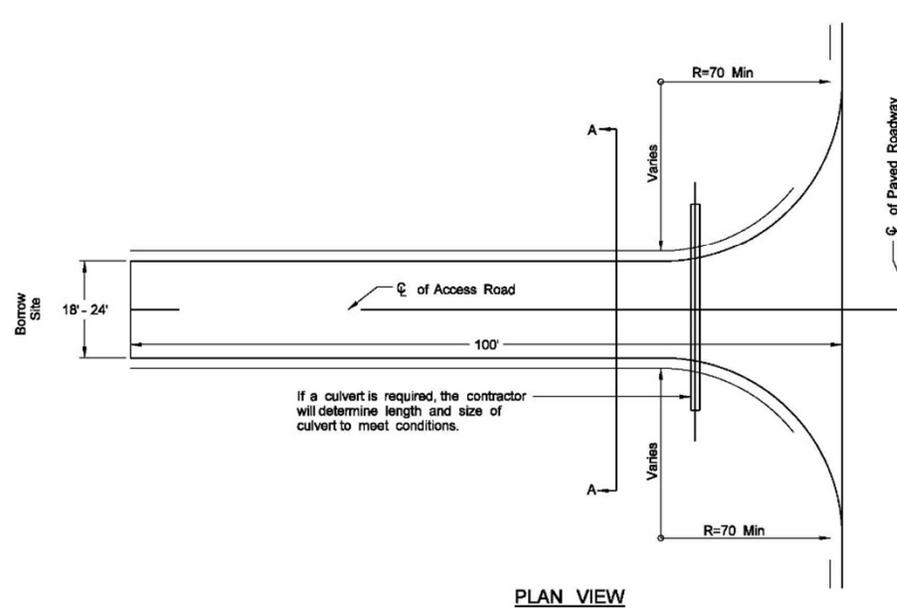


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ESCM Installation Drawings

STATE	PROJECT NO.	SECTION NO.	SHEET NO.
ND	project number	20	page

Stabilized Construction Access
Cass County Route 20 1 EA



This document is preliminary and not for construction or implementation purposes.

Stabilized Construction Access
Project Description
Project Location

What are the parts of the narrative section in a SWPPP?

1. Site description
2. Operational controls
3. Erosion and sediment control measures
4. Stormwater management
5. Maintenance

What are the parts of the narrative section in a SWPPP?

6. Inspections
7. Plan review and revisions
8. Signatory requirements
9. Local requirements
10. Final stabilization

Site Description

1. Project description
2. Existing site conditions
3. Adjacent areas
4. Estimates of areas
5. Proposed timetable
6. Soils
7. Critical areas
8. Surface waters
9. 303(d) list information



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Project Description, Existing Site Conditions, Adjacent & Estimated Areas

Who

What

Existing issues

Land uses



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A proposed timetable of activities that disturb soils for major portions of the site



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Example Erosion and Sediment Control Staging Chart

	Project Stage	BMP Plan Ref No.	BMP Description	Remove after Stage:	Notes:		
Phase I	A - Prior to Land Disturbance/Sanitary Sewer Installation	1	Construction Entrance and Staging Area	D			
		2	Construction Fencing	D	Place at edge of designated stream corridor.		
		3	Curb Inlet Protection	E	Install filter bags on existing curb inlets.		
		4	Perimeter Sediment Fence	E			
		5	Temporary Diversion Dike	E	Remove only when graded areas south of berm have permanent stabilization established.		
Phase II	B - Mass Grading	6	Temp Sediment Basin	E	To be installed prior to disturbing entire site.		
		7	Stockpile Topsoil	D	Install sediment fence a minimum of 5' beyond toe of slope for all stockpile areas.		
		8	Sediment Fence	D	Install on contour for intermediate sediment control.		
		9	Check Dams	D			
		10	Concrete Washout	D	To be installed prior to pouring any concrete.		
	C - Storm Sewer Installation	11	Phase I Area Inlet Protection	D	Install excavated area and sediment fence around all area inlets and open junction boxes.		
		12	Phase I Curb Inlet Protection	D	Install excavated area and throat protection on all curb inlets.		
		13	Stabilize Borrow Area with Perennial Vegetation	NA	Seed and mulch future development area. Temporarily stabilize with hydromulch if out of seeding season.		
		Phase III	D - Construction of Streets and Buildings	14	Phase II Area Inlet Protection	E	At time of final grading, concurrent with stabilization of site, install stabilized buffer and filter bag.
				15	Phase II Curb Inlet Protection	E	Following installation of curb and gutter, install inlet filter bag.
16	Sediment Log/Wattle			E	Where indicated adjacent to street - place at back of curb. Install per manufacturer's instructions.		
E - Final Stabilization	17	Erosion Control Blanket (Curlex II)	NA	To be installed in swale per manufacturer's instructions.			
	18	Establish Perennial Vegetation	NA	Redistribute topsoil and seed and mulch all disturbed areas. Sod right-of-way. Stabilization complete when 100% of disturbed area is established with perennial vegetation with a density of 70%.			

Soils

What types of soil?

Soil properties

Specific ESCMs due to soils



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Critical Areas

Environmentally sensitive – Not only within ROW

Highly erosive

High flow

Time sensitive



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Surface Waters and 303(d) list

Where does the site drain?

Multiple receiving waters

Impaired waters and the 303(d) list

[Integrated Report](#)

TMDLs



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Operational Controls

1. Chain of responsibility
2. Good housekeeping practices
3. Preventative measure practices
4. Spill prevention and response procedures



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Operational Controls

5. Training
6. Concrete waste control
7. Dewatering

Chain of Responsibility

Identify who will oversee:

- SWPPP
- ESCM installation, inspection, maintenance and removal

Develop a Chain of Responsibility:

- NOT JUST DOT and PRIME CONTRACTOR

Good Housekeeping Practices

Litter

Construction debris

Chemicals

Human waste

Vehicle fueling/maintenance

Vehicle washing



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Trackout and Dust Control

Soils

Particular ESCMs

Practices

Locations

Plan for cleaning



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Preventative Measure Practices

Stormwater control devices

- Operation
- Inspection
- Maintenance

Preventative Measure Practices

Equipment and vehicles

- Operation
- Inspection
- Maintenance

Spill Prevention and Response Procedures

Specific handling procedures

Storage requirements

Spill containment

Cleanup procedures

Use Spill Prevention, Control and
Countermeasure (SPCC) Plans



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Training

Annual training

As new employees are hired

Erosion and sediment control practices

Spill response

Good housekeeping

The SWPPP



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Training Subcontractors

Include specific contract language requiring subcontractors to implement appropriate stormwater controls.

Concrete Waste Control

Concrete wash water

Grindings

Slurries



Dewatering

Only stormwater or groundwater

Cannot discharge sediment

Inspected daily

Includes stream diversions

Erosion and Sediment Control Measures

Erosion Control (keeping the dirt in place)

1. Minimize disturbed area and protect natural features and soil
2. Phase construction activity
3. Control stormwater flowing onto and through the project
4. Stabilize soils promptly
5. Protect slopes



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Sediment Controls (the second line of defense)

6. Protect storm drain inlets
7. Establish perimeter controls
8. Retain sediment on-site and control dewatering practices
9. Establish stabilized construction exits
10. Inspect and maintain controls



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Erosion and Sediment Control Measures

Perimeter control

Temporary or permanent cover

Required maintenance

Off-site accumulations removed

Withstand a 2yr, 24 hour rain event

TMDL requirements

Appendix 1



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Perimeter Control

All down slope boundaries

Side slope boundaries



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Temporary or Permanent Cover

Where activities have been completed or temporarily ceased

Include graded slopes, pond embankments, ditches, berms and soil stockpiles



Required Maintenance

All control measures must be properly selected,
installed, and **maintained**

Required maintenance must be outlined for each
device

Justification required if against guidelines



Off-site Accumulations

Must be removed

Minimize off-site impacts

Plan must be modified

Have a plan in place for this



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2 Year, 24 Hour Rain Event

Controls are expected to withstand and function properly

Visible erosion should be minimal

Ranges from about 1.9 inches in the west to 2.3 inches in the east

Rain Gauge



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Must Comply with TMDL Requirements

Patterson Lake

WLA = 0
Tons/year



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Appendix 1 Specific Requirements for ESCMs



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Permanent Stormwater Management

SWPPP must identify:

- Ponds
- Flow reduction devices
- Infiltration areas
- Energy dissipation at discharge locations
- Erosion protection for outfalls and ditches



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What are the environmental considerations?

Wetland impacts

Mitigation

404 Permit

Temporary/permanent impacts

Executive Order 11990



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What are the environmental considerations?

Wildlife

Threatened and Endangered

Fish passage

Spawning seasons



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What are the environmental considerations?

Environmental documents

Environmental commitments

SWPPP must indicate the maintenance intervals for all ESCMs



Inspections

Must provide for site inspections

Including a copy of the inspection report being used

May have to revise SWPPP based upon findings of the inspections

Plan Review and Revisions

Signatory Requirements

SWPPP must be made available upon request

Plan Review and Revisions

**Must amend the SWPPP when there is a change
in Design, Construction, Operation, Maintenance,
or if found to be ineffective**



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Signatory Requirements

SWPPP must be signed

**Signed by a responsible corporate officer, a
general partner, or a principal executive officer**

Can be someone authorized by the above

Permit contains certification language



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Local Requirements

Some Cities and Counties have their own requirements

Must comply with the most stringent requirement



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Final Stabilization

SWPPP must show how the site will be stabilized.

Three methods:

- 1. 70% Vegetation**
- 2. Farmland**
- 3. Arid exemption (3 year rule)**



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What are the components of the calculation section in the SWPPP?

Calculations – > data

Common SWPPP Mistakes and Violations

Not developing a SWPPP

Missing required sections

Inadequate maps/illustrations

ESCMS not designed to 2 year 24 hour storm

Common SWPPP Mistakes and Violations

Weak chain of responsibility section

No signature/certification

No Inspection Report

Cookie cutter SWPPP



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Art of Writing A SWPPP

Clear and concise

Avoid “as needed” or “when required”

Be specific, but not too specific



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Trackout

Trackout will be cleaned up everyday using a scoop shovel and bucket.



What are some improvements we can make?

The exits will be inspected weekly and after storm events or heavy use. The exits will be maintained in a condition that will prevent tracking or flowing of sediment onto Sixth Avenue. This could require adding additional crushed stone to the exit. All sediment tracked, spilled, dropped, or washed onto Sixth Avenue will be swept up immediately and hauled off-site for disposal at Middletown Landfill. Sediment will be swept from the anti-tracking pad at least weekly, or more often if necessary. If excess sediment has clogged the pad, the exit will be topdressed with new crushed stone.

Replacement of the entire pad might be necessary when the pad becomes completely filled with sediment. The pad will be reshaped as needed for drainage and runoff control. Broken road pavement as a result of construction activities on roadways immediately adjacent to the project site will be repaired immediately. The stone anti-tracking pad will be removed before the subgrade of pavement is applied to the parking lot. The removed stone and sediment from the pad will be hauled off-site and disposed of at Middletown Landfill.

Questions?