Certified Inspector of Sediment and Erosion Control Training Manual

(2018 Revised Edition V6 – Canada)

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ACKNOWLEDGEMENTS

Funding support for this program was generously provided by:

Fisheries and Oceans Canada

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Ontario Ministry of the Environment

Ontario

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CISEC, Inc.

Introduction

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WHAT IS THE CISEC PROGRAM?

The Certified Inspector of Sediment and Erosion Control (CISEC) Program is a training program administered by the non-profit organization CISEC, Inc., based in Parker, Colorado. The program was introduced in 2005 and recognizes the abilities, skills, experience, and knowledge of inspectors who have demonstrated their proficiency in observing, inspecting, and reporting on the implementation of Storm Water Pollution Prevention Plans (SWMPP), as they are known in the United States, or Erosion and Sediment Control Plans (ESC Plans) as they are referred to here in Canada.

CISEC Mission Statement

To provide an inspector certification program for individuals that:

- Demonstrate comprehensive knowledge in the principles and practices of sediment and erosion control and their applicability to the development of erosion and sediment control plans.
- Demonstrate the necessary skills to observe onsite and offsite conditions that impact the quality of storm water discharges from active construction sites.
- Demonstrate the ability to inspect installed best management practices and their ongoing maintenance to determine if the mitigation measures will minimize the discharge of sediment and other pollutants from active construction sites.
- Demonstrate the ability to communicate and report on their inspection of active construction sites as to whether compliance issues may exist with federal, provincial and/or local regulators.

Who can become a CISEC?

CISEC Inc. defines a Certified Inspector of Sediment and Erosion Control as an individual who has demonstrated his or her proficiency in observing, inspecting, and reporting on the implementation of ESC Plans or SWMPPs.

In the CISEC Program, a candidate wishing to write the CISEC exam must have the requisite education and work background and be able to provide proof of such in the form of documentation and references. The current background criteria are:

- Two or more years of construction site field experience involving erosion and sediment control;
- A complete understanding of erosion and sedimentation processes and how they impact the environment;
- A complete understanding of key federal, provincial and local regulations;
- The ability to read and understand construction site stormwater management and ESC plans; and
- The ability to communicate and write complete and accurate inspection reports.

Certification Renewal Requirements

Once an inspector is certified, an annual certification fee of $90.00 + HST CDN is payable to Toronto and Region Conservation Authority. Annual fees are due by September 30 each year. A notification will be sent out to all members in August. Certification, or contract renewal, occurs every year by demonstrating the completion of at least 12 continuing development hours within the 1-year period, by adhering to the CISEC Code of Ethics, and by remaining current with the annual certification fee.

UNDERSTANDING THE POTENTIAL IMPACTS OF CONSTRUCTION ACTIVITIES

Soil erosion and deposition are natural geomorphic processes that give shape to landforms and provide new parent material for the development of soil profiles.

Erosion is in fact responsible for the formation of some of the most beautiful and well known geographical features in the world (e.g. Grand Canyon).

Accelerated Erosion These processes become soil conservation issues when the rate of erosion greatly exceeds the rate expected in the absence of human land use —a situation referred to as accelerated erosion. Rates of normal soil erosion have been estimated from measurements of sediment transport and accumulation and mass movement on hill slopes.

Environmental Impacts

It can be easily forgotten that the construction activity humans perform every day can impact the natural environment in varying degrees. No matter how minimal one impact is, it must be considered and it is the cumulative effect of multiple impacts that can have detrimental consequences for the natural environment.

Here are a few examples of the kinds of environmental impacts that can occur:

- Eroded soil and other construction site pollutants (e.g. concrete wash) degrade water quality, impact fish, fish habitat, invertebrates and overall stream ecology;
- Channelization and infilling of watercourses can reduce navigation, by both humans and aquatic species;
- Increased hardened surfaces increase runoff to natural features and in turn increase the potential for flooding;
- Scouring, erosion and undercutting of watercourse banks can occur due to additional flows received from hardened surfaces resulting from development and construction activity; and
- Fish and fish habitat can be damaged due to the release of deleterious substances into local receiving watercourses. This can be directly from a spill or breach in ESC measures, or indirectly through storm water management pond release.

These are just some of the potential impacts associated with construction and/or development activities. The source material released from a construction site to a natural feature determines the type of impact that results.

Source materials that can be released from construction sites include eroded soils (coarse and/or fine material), hydro carbons, paint wash, concrete slurry, garbage, fertilizers, solvents etc. Remember how many trades work on these sites and what they bring in with them, or what they require to complete their work. It isn't just about grading and excavating activities, but also road, side walk, house and utility construction.

Release of materials from a construction/development site to a local watercourse can have significant, long-term impacts. Once a material is released it will eventually deposit.

Potential Impacts to Fish and Fish Habitat

Once this material is deposited in a watercourse, the effects on fish and fish habitat can be as follows:

- The material may cover the substrate that is used by particular fish species for spawning beds, leaving that reach of the watercourse now unsuitable for spawning;
- The material can smother and eventually destroy aquatic vegetation, which is relied upon by many species that make up the ecology of the watercourse;
- The material may cover used spawning beds, smothering any eggs that are present, and thus reducing their chances of survival;
- The material, while still in solution, can clog the gills of fish and damage fish membranes; and
- The material, while still in solution, reduces the ability of many fish to hunt, as water quality is impaired and many fish feed by sight (e.g. Redside Dace).

The accumulation of all of the potential effects noted above results in the overall reduction of the diversity and abundance of aquatic organisms and increases physiological stress on all entities of the system. By impacting the overall ecology of the watercourse, many species can be lost as the food for which they depend, disappears, and a chain reaction occurs.

Some fish species are more sensitive to water clarity than others. As mentioned above, Redside Dace (we hear so much about) is a sight feeder and therefore if the water is turbid it cannot see prey to eat. This species is protected by Provincial legislation in some provinces (i.e. Endangered Species Act, in Ontario).

Impacts to Wetlands and Woodlots

Impacts are not only seen in watercourses, but in wetlands and woodlots as well. Wetlands are often described as nature's filter. This is true, and wetlands are home to thousands of vegetation, bird, aquatic and mammal species. Not unlike a watercourse, disruption to one portion of the ecosystem has a chain reaction. An example of disruption is the release of sediment from a construction/development site into a wetland, which will smother the vegetation and can fill in water pockets. Wetlands mature and become less saturated over time (a very, very long time) and deposition of soils can accelerate this natural process, resulting in the immediate displacement of species due to loss of habitat.

Woodlots can also experience severe damage resulting from sedimentation. Should the sediment being deposited be foreign in nature, there can be introduction of non-native or invasive species of plants and insects. Additionally, if large volumes of sediment are released, roots can become compressed resulting in tree fatality; or rodents and small mammals that nest and forage in the forest floor will lose the use of these areas as they are destroyed and filled in.

Essentially, it is important to remember what sensitive environmental features need protecting from activities on your construction site. You are inspecting sediment and erosion controls, for the purpose of protecting the surrounding natural features and their function.

Economic Impacts

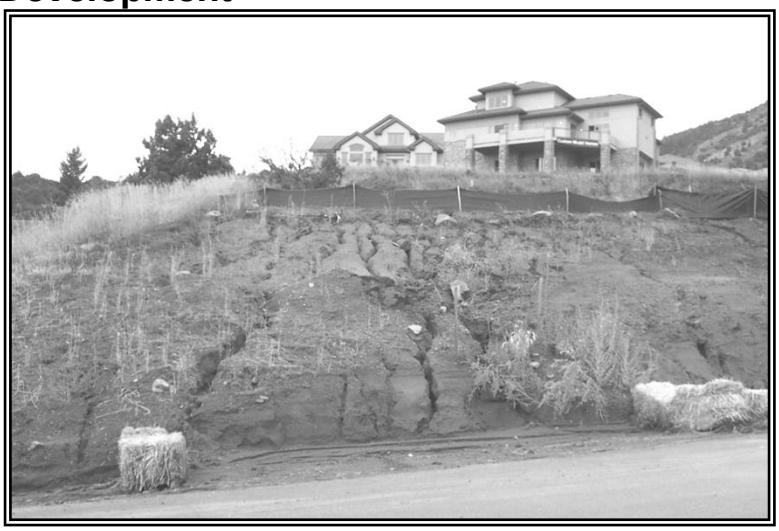
The economic impacts associated with site material release cannot be forgotten. Should any of the environmental or fish-related impacts described above occur, there will be a requirement for restoration or remediation.

Watercourses, wetlands and woodlots that experience deposition and are impacted, must be restored. In addition to charges and fines that may be issued, additional costs can be incurred as a result of:

- Requirements for sediment removal;
- Requirements for restoration and stabilization;
- Construction delays and stop work orders;
- Charges and fines; and
- Ecosystem habitat reconstruction.

INSPECTION EXERCISES

Large Land Development



Detail Report:	Identify the problem and its location. If appropriate, describe (in general terms) what needs to be completed. However, only if qualified (e.g., you are a designer) should you be mandating specific BMPs to install.	Date done (with initials) by contractor
1.		
2.		
3.		
4.		
5.		

Commercial/Industrial Projects

Detail Report: Identify the problem and its location. If appropriate, describe (in general terms) what needs to be completed. However, only if qualified (e.g., you are a designer) should you be mandating specific BMPs to install.	Date done (with initials) by contractor
1.	
2.	
3.	
4.	
5.	

Residential Development

Detail Report:	Identify the problem and its location. If appropriate, describe (in general terms) what needs to be completed. However, only if qualified (e.g., you are a designer) should you be mandating specific BMPs to install.	Date done (with initials) by contractor
1.		
2.		
3.		
4.		
5.		

Linear Projects

Detail Report:	Identify the problem and its location. If appropriate, describe (in general terms) what needs to be completed. However, only if qualified (e.g., you are a designer) should you be mandating specific BMPs to install.	Date done (with initials) by contractor
1.		
2.		
3.		
4.		
5.		

Module 1

Background Information for Inspectors

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OBJECTIVES OF MODULE 1

To review:

- Key definitions
- Types of erosion
- Factors affecting erosion rates
- Topographic maps
- Basic hydrology
- Understanding BMPS
- ESC reports & plans
- Define the roles and responsibilities of an inspector
- Define the purpose of and the components of inspection reports
- Discuss the importance of good documentation and communication
- Review the CISEC Code of Ethics

TYPES OF CONSTRUCTION ACTIVITIES

Large Land Development

1. Topsoil stripping
2. Grading
3. Utilities
4. Preparing for future construction activities
5. Phased construction

Residential Development

1. Town homes and single family residence construction projects
2. Multiple homebuilders
3. Multiple contractors
4. Small sites with lots going on

Commercial/Industrial

1. Commercial buildings
2. Mass grading
3. Complete site development at one time
4. High profile (highly visible)

Linear

1. Roadways, utilities and stream corridors
2. Long narrow sites
3. Limited site access control (traffic passing through)
4. Active portion of the site is constantly changing (moving)

ASSESSING YOUR BACKGROUND

POP QUIZ

Circle the correct answer

1. Sediment is a major pollutant of our national rivers and streams and excessive amounts have a direct impact on aquatic life.	**True or False**
2. Sediment control BMPs (e.g., silt fence barriers) remove all suspended particles found in runoff waters.	**True or False**
3. Inspectors should always tell contractors what type of BMPs to install on a project when noncompliance problems are found.	**True or False**
4. Good sediment control results in good erosion control.	**True or False**
5. Storm drain inlet protection practices remove all sediment in runoff waters and allow clean water to flow into the drainage system.	**True or False**
6. Saltation is a form of wind erosion.	**True or False**
7. The most effective method for sediment control involves containing sediment laden runoff waters for sufficient time to allow heavier suspended particles to settle.	**True or False**
8. It is not cost effective to implement erosion control methods while construction activities are occurring.	**True or False**
9. Inspectors do not need to know much about hydrology.	**True or False**
10. The motto of an inspector is to observe, inspect, and report, but never to mandate.	**True or False**

KEY DEFINITIONS

Erosion

The processes by the action of water, wind, or other weather conditions in which soil particles are displaced

Natural Versus Accelerated Erosion

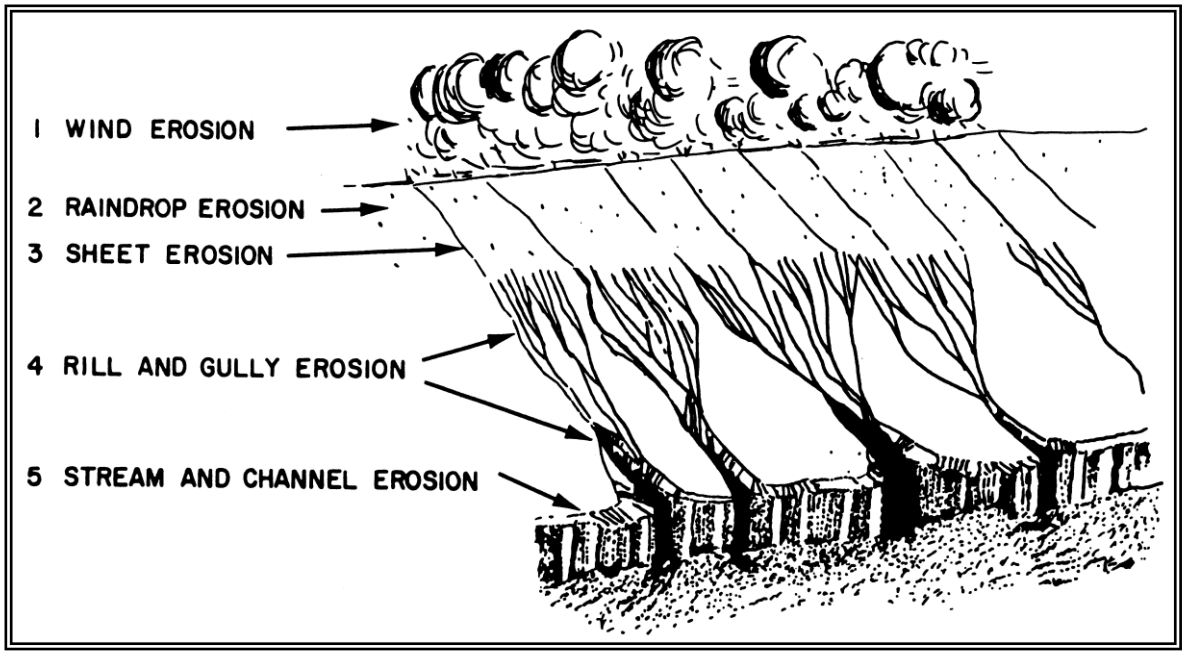
Soil erosion and deposition are natural geomorphic processes that give shape to landforms and provide new parent material for the development of soil profiles.

Erosion is in fact responsible for the formation of some of the most beautiful and well known geographical features in the world (e.g. Grand Canyon).

These processes become soil conservation issues when the rate of erosion greatly exceeds the rate expected in the absence of human land use—a situation referred to as accelerated erosion. Rates of normal soil erosion have been estimated from measurements of sediment transport and accumulation, mass movement on hill slopes.

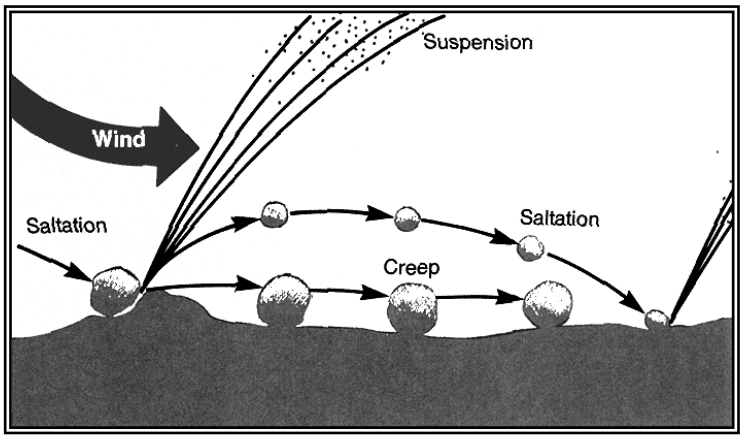
Types of Erosion

From SCS, 1978



1. ***Raindrop or splash erosion***: The dislodging of particles by the impact of raindrops
2. ***Sheet erosion:*** Occurs when rain drops and surface flows cause shallow stripping of soil.
3. ***Rill erosion***: Very small channels occurring when sheet erosion begins to concentrate forming small rivulets up to 3-inches deep.
4. ***Gully erosion:*** Larger and deeper channels than rills that occur when concentrated flows of water scouring along flow routes cause sharp-sided entrenched channels.
5. ***Stream bank and channel erosion:*** Occurs when streams begin cutting deeper and wider channels as a consequence of increased peak flows or the removal of local protecting vegetation.
6. ***Shoreline erosion –*** occurs along shorelines due to wind set up, wave action and ice movement
7. ***Mass Wasting:*** Is the downhill movement of soil and or rock under the influence of gravity
8. ***Wind erosion***: The movement of soil particles by the impact of wind.

Wind erosion occurs when soil particles are physically moved by the mass of air or after disturbance by other particles. Surface creep, saltation, or suspension can transport soil particles once they are detached from the ground.



1. ***Surface creep*** is the rolling and sliding movement of particles across a surface.
   a) These particles generally have a diameter in excess of 1,000 μm (0.04 in.)
   b) Can represent about 5% to 25% of total soil loss from a construction site
2. ***Saltation*** is the hopping and bouncing movement of particles.
   a) These particles typically have diameters ranging from 80 μm to 1,000 μm (0.003 to 0.04 in.) and are lifted by the wind. However, their larger mass results in their returning to the ground, which causes additional dislodging of particles.
   b) Can represent approximately 50% to 80% of total soil loss by wind.
3. ***Suspension*** occurs when particles smaller than 80 μm (0.003-in.) in diameter are carried great distances by the wind.
   a) Because of their low mass, these particles can remain suspended for long durations and can travel great distances.
   b) Can represent less than 10% of total soil loss.

Factors That Impact Water Erosion

1. Climate
2. Soil erodibility (based upon percent of silt & very fine sand, percent of 0.10 – 2.0 mm sand, percent organic matter, soil structure, and permeability)

Possible Hierarchy of Soil Erodibility (from RUSLE2)

Soil Type	Erodibility Classification
Silt	Most Erodible (K ≈ 0.57)
Silt Loam	
Loam	
Sandy Loam	
Silty Clay Loam	
Clay Loam	
Loamy Sand	
Silty Clay	
Sandy Clay Loam	
Sand	
Sandy Clay	
Clay	Least Erodible (K ≈ 0.10)

3. Length of flow
4. Slope of the land
5. Erosion control BMPs
6. Sediment control BMPs

Sediment

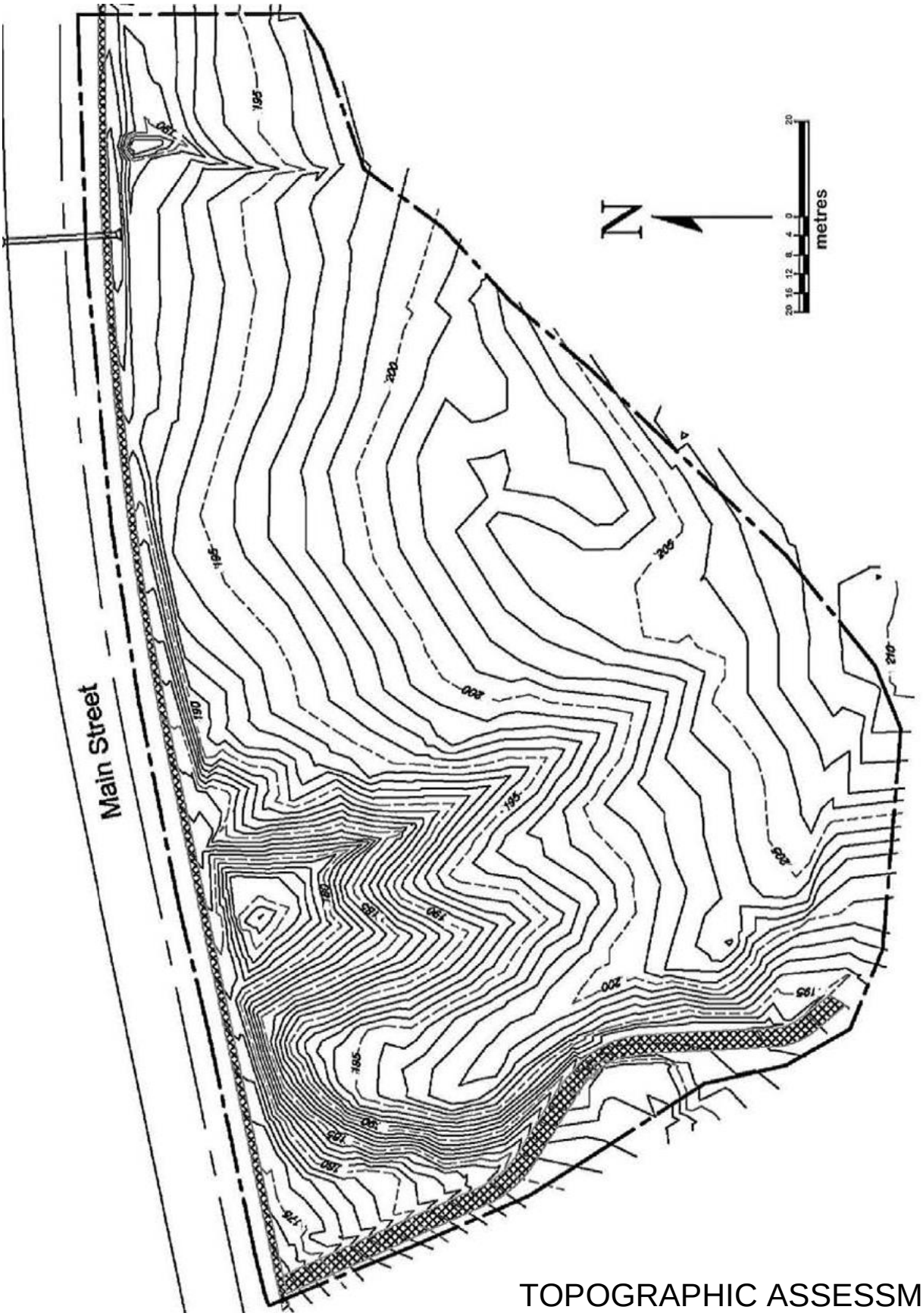
Eroded material suspended in water or in air

1. Sediment loading can be 10 to 20 times greater from bare ground construction sites than soil particles lost from lands where vegetation exists.
2. Sediment loading causes reservoirs, streams, and harbors to clog with soil material.
3. Sediment loading causes loss of recreational areas and wildlife habitat.
4. Sediment loading reduces the beneficial uses of water from humans and can harm plants, animals, and fish that live in the water.
5. Sediment loading from construction areas may increase the amount of nutrients in water.

Sedimentation

The deposition of eroded material

1. Dependent upon particle size
2. Dependent upon flow velocity
3. Basis for how sediment containment systems function



TOPOGRAPHIC ASSESSMENTS

HYDROLOGY

The study of the waters of the earth: their occurrence, circulation, and distribution; their chemical and physical properties; and their reaction with the environment, including their relation to living things.

Precipitation

1. Rain

   Intensity often characterized regionally
   - Pounding – usually high intensity, short duration
   - Light drizzle – usually long duration, low intensity
2. Snow
3. Hail
4. Sleet

Factors Affecting Runoff and Rate of Flow

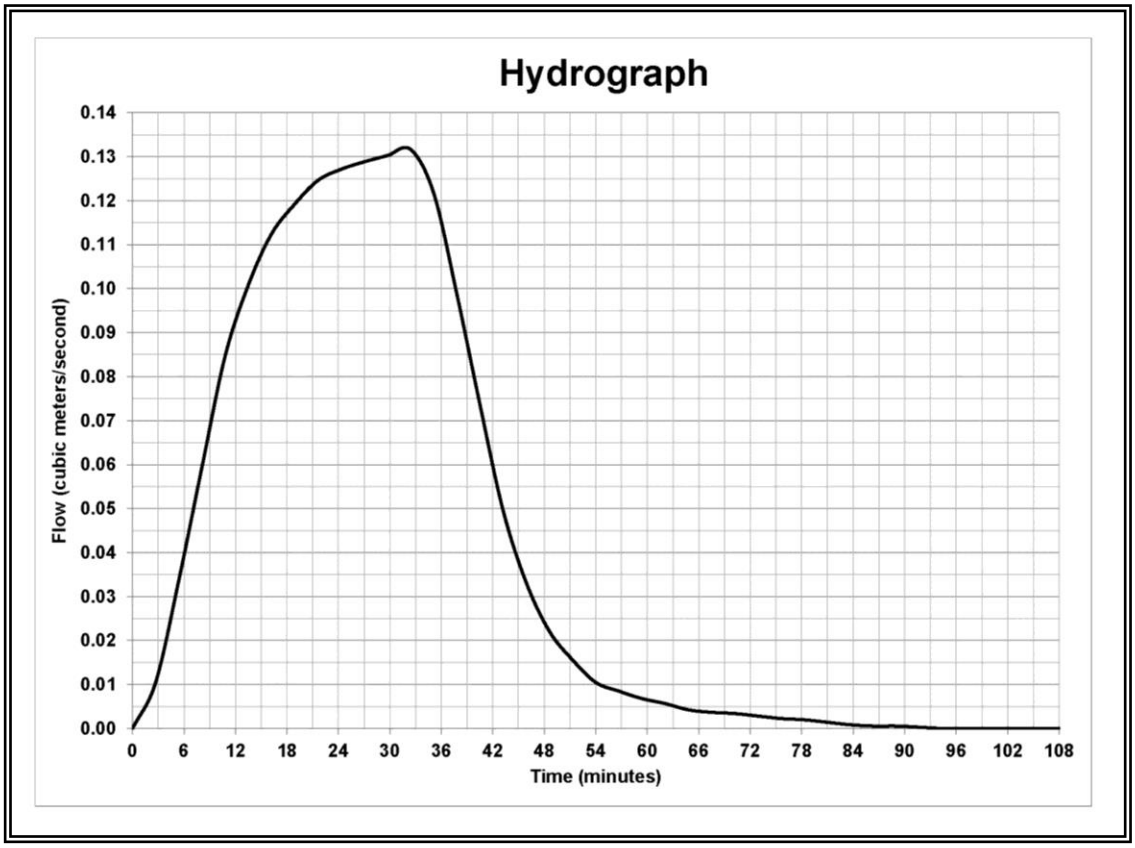
1. Soil types and roughness
2. Storm intensity
3. Contributing area
4. Steepness of the terrain
5. Length of slope
6. Vegetative cover
7. Storm duration

What is a Hydrograph?

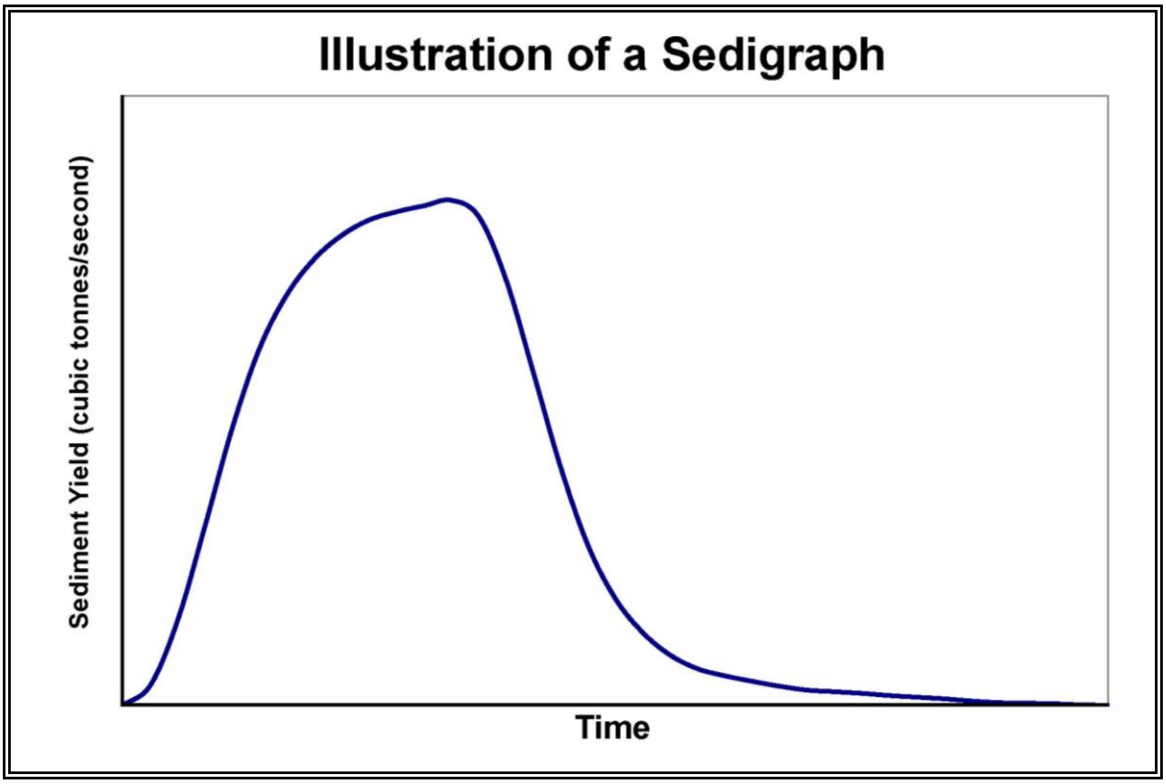
A graph of stage or discharge versus time

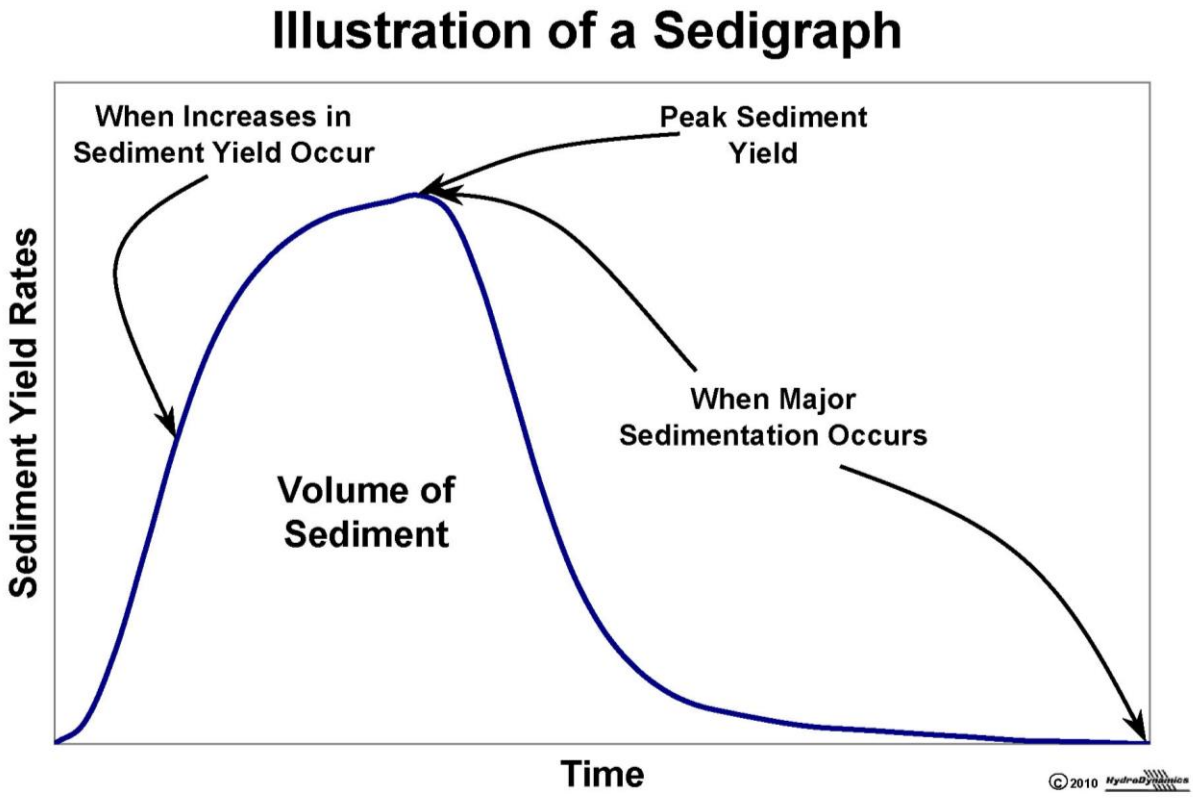
- A picture of runoff

Hydrograph

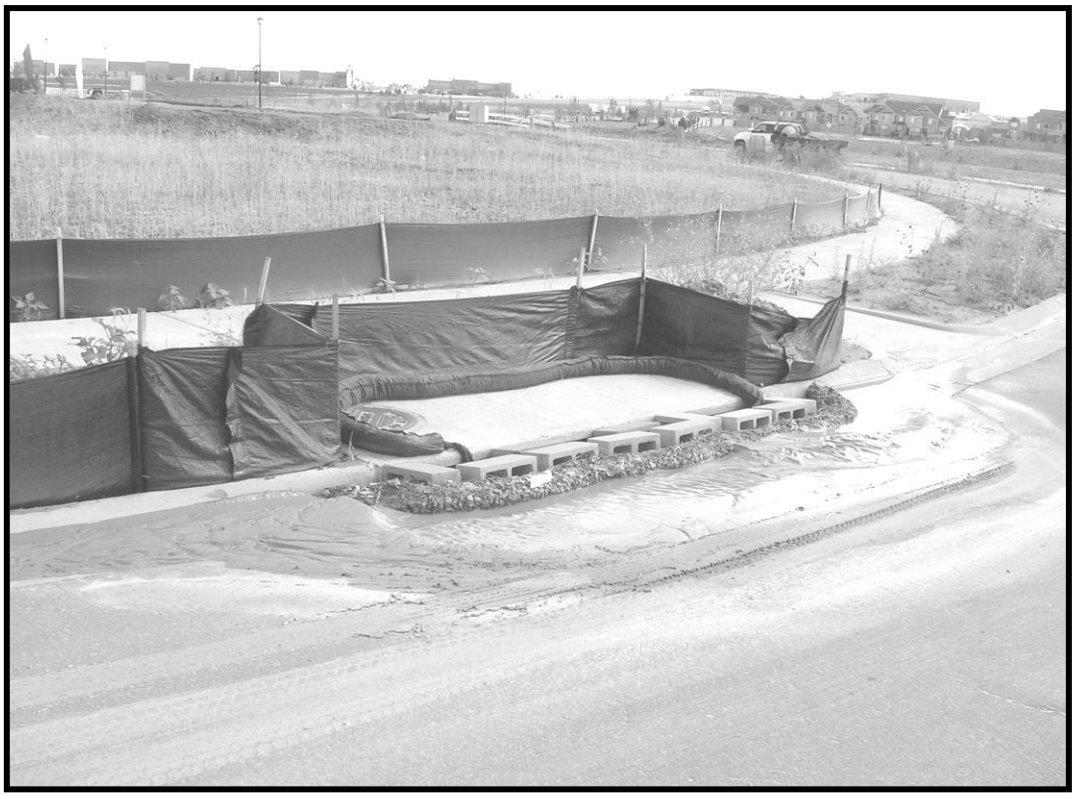


How a Hydrograph can Represent Sediment Discharge





Assessing Sedimentation in Front of a Curb Inlet



WATER QUALITY SAMPLING

Water quality sampling should be conducted during every inspection.

Sampling should occur:

- Upstream
- Site Outlets
- Downstream

What to Sample:

- Nephelometric Turbidity Units (NTU)
  - Instantaneous results using portable equipment
- Totals Suspended Solids (TSS)
  - Must be analyzed in a lab

BEST MANAGEMENT PRACTICES

What is a Best Management Practice (BMP)?

Any measure, practice, or device used to minimize erosion or the release of sediment from a construction site.

About BMPs

1. Don't always consider local site needs when selecting BMPs
2. Know limitations
3. Unlimited types and numbers
4. Drainage areas
5. Soil type and sediment size
6. Availability
7. Ability to maintain
8. Room to install
9. Cost
10. Interference – BMP must be compatible with objectives of development
11. Type of expected storms and the resulting flows
12. Duration of the project
13. Season of construction
14. Environmentally Sensitive Areas
15. Maintenance – A BMP that is not maintained often causes more damage than if it had never been installed
16. Target Pollutants

Pop Quiz

Identify which of the following BMPs is Erosion Control (EC), Sediment Control (SC), Wind Erosion Control (WEC), or None (N). There may be more than one answer for each of the BMPs.

BMP	Treatment	BMP	Treatment
Fiber Roll Barrier		Silt Fence Barrier	
Hillside ECB		Hydraulic or Straw Mulch	
Soil Binder		Earthen Diversion Berm	
Rock Check Dam		Rock Barrier in front of a 2% grade street inlet opening	
Established vegetation		Turbidity Barrier	
Inlet Insert		Vehicle Tracking Pad	
Sediment Pond		Slope Drain	
Channel TRM		Planted seed (with no mulch) that has not yet germinated	

ROLES AND RESPONSIBILITIES OF AN INSPECTOR

Qualities of a good Inspector

- An unbiased entity
- Knowledgeable
- Appropriate ESC training and experience
- Consistent and proactive

Motto of a CISEC

Observe, inspect, and report on what you found.
Avoid mandating your requirements (unless you are qualified).

The ultimate goal of an inspector is to work with the contractor to minimize the amount of pollution leaving a construction site to the maximum extent practical.

And prevent prohibited discharges from leaving a site (e.g. concrete washout, fuel, etc.).

Inspector Responsibilities Before Construction Activities

An inspector's responsibilities begin before the first site inspection. The inspector should know the project and the construction site. Even before attending a pre-construction meeting (if one is held), the following items should occur:

Attend Pre-Construction Meetings

1. **Attend a pre-construction meeting with the contractor and designer to ensure coordination of issues and concerns are addressed. During this session, the inspector will:**

a) Identify where posting of permits, drawings and contact names and telephone numbers will occur
b) Identify (any) concerns found during the ESC Plan review,
c) Work with the designer to determine if the ESC Plan meets permit requirements, and
d) Announce the frequency of inspections. A 'walk-through' inspection of the site should be undertaken in anticipation of large storm events (or a series of rainfall and/or snowmelt days) that could potentially yield significant runoff volumes. The regular inspections should occur during all construction stages and should be based on, at a minimum, the requirements identified in the permits and approvals. Commonly this frequency is:
    i. On a weekly basis
    ii. After every rainfall event

iii. After significant snowmelt events; and,
iv. Daily during extended rain or snowmelt periods
v. During inactive construction periods, where the site is left alone for 30 days or longer, a monthly inspection should be conducted.

e) Review the chain-of-command and open the lines of communication between the contractor and the regulating agency.

Understand Contract Documents

2. **Understand the contract documents**

a) Does the contract only allow for certain BMPs?
b) Who gives who direction?

Understand Erosion and Sediment Control Plan

3. **Review the ESC Plan (report and drawings) before attending the meeting**.

a. Identify concerns and issues,
b. Determine if the ESC Plan is complete,
c. Determine if high risk areas are identified on the drawings (i.e. areas adjacent to stockpile locations, dewatering locations, protected features, receiving watercourses, etc.) and appropriately protected or are contingency plans in place
d. Determine if some additional items may need to be addressed, and
e. Some general guidelines

i. Review applicable permits
ii. Legends – Know what the symbols mean
iii. Topography – Get a feel for the "lay of the land"
iv. Photograph site to document existing conditions
v. Pre-construction – Understand what is to occur before construction activities begin for minimizing the discharge of sediment when excavation activities happen. Usually BMP installation should occur before other construction activities begin.
vi. During Construction – Understand what is to occur during construction activities to minimize the discharge of sediment from the site.
vii. After construction – Understand the type of erosion control practices that are to be implemented.
viii. Identify BMPs and locations – Does the location seem to make sense
ix. Identify purpose of the BMP – In this application what was the designer trying to accomplish with this BMP? The way it is implemented, does it achieve the original goal?

Understanding Erosion and Sediment Control Plans

Designing and implementing an effective Erosion and Sediment Control (ESC) Plan is essential for minimizing the potentially adverse environmental effects originating from a construction site. An effective ESC Plan comprises both an ESC Plan Report and the ESC Plan drawings.

Basic Principles of ESC

As an inspector, keep these principles in mind when familiarizing yourself with the ESC Plan for a site. Has the designer incorporated these principles into the plan?

- Multi-barrier approach
- Retain existing vegetation
- Minimize land disturbance area,
- Slow down and detain runoff to promote settling
- Divert runoff from problem areas
- Minimize slope length and gradient of disturbed areas
- Maintain overland sheet flow and avoid concentrated flows
- Store/stockpile soil away from
    - watercourses
    - drainage features
    - top of steep slopes
- ESC Plan is dynamic
- Plan will be continually updated based on the results of site inspections

Stages of Construction

Separate ESC drawings should be developed for each stage of construction to ensure that the most effective controls are in place throughout the construction process.

1. Earthworks – topsoil stripping and grading
2. Servicing
3. Building construction & stabilization

"MORE" Effective ESC

Multi-Barrier Approach

Ongoing Process

Regular Inspection, Monitoring & Maintenance

Education and Training

Assessing Risk

Bad ESC practices can result in:

- *Ecological consequences*
- *Project consequences*
- *Legal consequences*

Assessing the environmental risk is important to demonstrate reasonable care was taken for erosion and sediment control.

Understanding ESC Plan Reports

An ESC Plan Report is strongly recommended in addition to the ESC Plan drawings in order to effectively summarize the base information, descriptions, and calculations upon which the ESC Plan was formulated. For example, A Stormwater Management Design Brief or similar type report typically includes documentation of the ESC requirements not listed or effectively illustrated on the ESC Plan drawings. The following table lists the recommended information that should be provided in the ESC Plan report. As an inspector, this report will provide valuable background information about the site.

ESC Plan Report - Recommended Requirements
Project Descriptions: Brief description of the nature and purpose of the land disturbing activity. Also include the legal description of the property and a reference to adjacent properties and landmarks.
Condition of Existing Site: Description of the land use, site topography, vegetation, and drainage of the site under existing conditions.
Condition of Existing Receiving Water: Description of local receiving waters such as watercourses and lakes (e.g. warm water fisheries, cold water fisheries; aquatic habitat use, confined or unconfined valley).
Adjacent Areas and Features: Description of neighbouring areas, such as residential and commercial areas, reserves, natural areas, parks, storm sewers, and roads that might be affected by the land disturbance.
Soils: A description of soils on the site, including erodibility, and grain size analysis. This description should include a summary of the soils/geotechnical report for the site.
Critical Areas: Description of areas within the development site that have potential for serious erosion or sediment problems.
Permanent Stabilization: Description of how the site will be stabilized after construction is completed. This will require a phasing plan (to be provided on the ESC Plan drawing) of the stripped area to be reseeded and the expected time of stabilization.
Design Details of Erosion and Sediment Control Measures: The supporting calculations and design details of the sediment control measures. Specifically for ESC ponds - calculations and details include permanent pool and extended detention volumes, pond sizing volume, and calculations for the pond outlet and emergency overflow outlet.
Record Keeping Procedure: Include sample inspection and maintenance forms. Maintenance Record keeping procedure including name/designate of the personal who will keep the inspection and maintenance record.
Stockpile Details: Stockpile details to include the height and volume at each proposed location.
Emergency Contact: Provide a list of emergency and non-emergency contacts (e.g. owner, site supervisor)
Stamped and Signed: ESC document/report must be stamped and signed by a Professional Engineer.

Source: GGHCA Erosion & Sediment Control Guideline for Urban Construction, 2006

Understanding ESC Plan Drawings

General Information

1. Legends – Know what the symbols mean
2. Topography – Get a feel for the “lay of the land”
   a) Understand that this is a very dynamic process that ranges from historic, interim, and post construction conditions.
3. Pre-construction drawings
   a) Identify what is happening when
4. During construction drawings
   a) Understand what is needed and why this phase requires both sediment control AND erosion control
5. After construction drawings
   a) Predominately erosion control
6. Post construction conditions
7. For all stages of construction, review the proposed BMPs.
   a) Do their proposed locations make sense?
   b) Will this application achieve what the designer was trying to accomplish?
   c) Inspectors can “suggest” changes, but not mandate changes.

Classroom Example ESC REPORT

Introduction

This is an Erosion and Sediment Control report for the Example Development in _____ of the _____ Province of Canada.

Project Site and Activity Description

Permittee: Example Development
12345 First Street
Any Town, Any Province Postal Code
(XXX) 123- 4567

Contact Information: I. M. Aperson
Example Development
12345 First Street
Any Town, Any Province Postal Code
(XXX) 123- 4567

Person Responsible for Plan: Mr. Loman Onthetotempol

Project Name: Example Development

Project Location: Northwest of the Intersection of XYZ Boulevard and ABC Road
Any Town Any Province Postal Code

Receiving Waters: Storm waters discharge into the Lake via local tributaries to major drainage ways.

Nature of Construction Activity

➢ Function of the Project: This project consists of developing land for a subdivision and commercial area.

Construction activities on the site will consist of removing existing vegetation, grading of the land, installing utilities, paving, and development of the land for a subdivision and commercial area.

➢ Sequence for Major Activities: Construction tasks to be completed will include the following sequential activities.

- Removal of existing vegetation,
- Clearing and grubbing of the land,
- Grading,
- Installing utilities,
- Development and paving of roads, and
- Construction of commercial and single family homes.

➢ Amount of Land to be Disturbed: This project will disturb approximately 37.1 acres (15 ha) out of a total of 42.1 acres (17 ha) due to construction activities.

➢ General Location Map: A map has been included with this ESC report.

➢ **Soils** on the project have the following characteristics:

Symbol	Type of Soil Material	Percent of Site	Rainfall Erodibility	Comments
A5b5	Sandy Loam	100%	3	Low to moderate water erosion and wind hazards and moderate to high runoff potential.

Predominate soils of the site are moderately deep and well drained.

➢ Vegetation Characteristics: Historic vegetation for this area is pasture grass.

Site Map

See the attached sediment and erosion control drawings for information related to the project and placement of mitigation measures.

Construction and Waste Materials

It will be the responsibility of the contractor to take appropriate actions to ensure pollution of storm water does not occur. Fueling areas will be at least 30 m (100 ft.) from drainage channels and/or storm sewer systems. The contractor will be responsible for protecting the soil from contamination due to any hydrocarbon or other hazardous spills associated with his contractual obligations.
Contractors will also be responsible for preventing soil contamination where building materials, fertilizers, chemicals, waste piles or other potential hazardous materials may exist.
No dedicated concrete or asphalt batch plants will exist on this site.

Other Industrial Stormwater Discharges

None

Description of Best Management Practices

Reduction of sediment in runoff waters will occur in the following manner (see the S&E Control drawings for more detail illustrations).

1. Before major overlot grading activities begin, the following BMPs will be installed:
   a) Installation of a storm sewer pipe to convey offsite flows away for the project site.
   b) Silt fence barriers as illustrated on the drawings.
   c) Vehicle tracking pads at major entrances into the site.
2. During initial overlot grading activities, one or more of the following BMPs will occur:
   a) As soon as feasible, complete a rough installation of the detention ponds (with outlet structures) and convert them into sediment containment systems.
   b) Install additional silt fence barriers as necessary to minimize discharge of sediment into waterways.
   c) Application of erosion control materials.

3. During major overlot grading activities, installation of one or more of the following will occur.

    a) Diversion structures to ensure the discharge of runoff into an SCS,
    b) Maintenance of all sediment control BMPs,
    c) Installation of utilities,
    d) Barrier protection of inlet openings while grading operations occur,
    e) Installation of barrier protection for culverts that discharge runoff,
    f) Application of erosion control materials

4. After grading activities are completed, BMPs will consist of the following:

    a) Paving roads,
    b) Construction of homes,
    c) Installation of landscaping material,
    d) Maintenance of SCSs until 80% full build out.
    e) Sediment and erosion control methods

Sediment and Erosion Control Methods

Sediment control measures will include one or more following techniques with installation of additional methods occurring as deemed necessary by the designer.

- Silt fence and/or diversion barriers
- Barriers in front of “sump” inlets
- Vehicle tracking pads
- Sediment containment systems

Offsite tacking of soil will be minimized by at least weekly removal of accumulated sediment in access streets. More frequent sediment removal will occur when significant buildup is evident.

Erosion control measures will include one or more of the following methods:

- Construction of homes
- Installing landscaping materials
- Placement of pavement
- Applying erosion control materials

Final stabilization of the site will occur by placement of pavement, planting temporary and/or perennial grass seed on disturbed lands, and installing landscape material on the lots and in common areas.

Non-Storm Water Components of Discharge

There is no non-storm water components of discharge associated with this project.

Endangered Species

There are no known endangered species on this project.

Permit Requirements

Operator has the responsibility to acquire and include all required documentation with this ESC Plan.

Inspection and Maintenance

Inspections of sediment and erosion control measures will occur after any significant wind or precipitation causes runoff. As a minimum, inspection of all sediment and erosion control facilities will occur at least every 14 days while construction activities occur.

Inspections will occur until final stabilization of the site has occurred, which is defined as vegetative cover of at least 70% of historic conditions, completion of 100% of the commercial area, and completion of 100% of the homes sites.

Inspection of sediment and erosion control measures will include at least the following.

- Removal of accumulated sediment collected by SCSs or barriers once a 50% reduction of the storage capacity for the structures becomes evident,
- Repairing damage to sediment control structures,
- Adding or eliminating sediment and/or erosion control measures as deemed necessary,
- Immediate repair and/or replacement of BMPs when failure occurs or the mitigation measures are ineffective.

Records of each inspection will reside with the contractor, developer, or their representative.

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Sediment and Erosion Control Drawings

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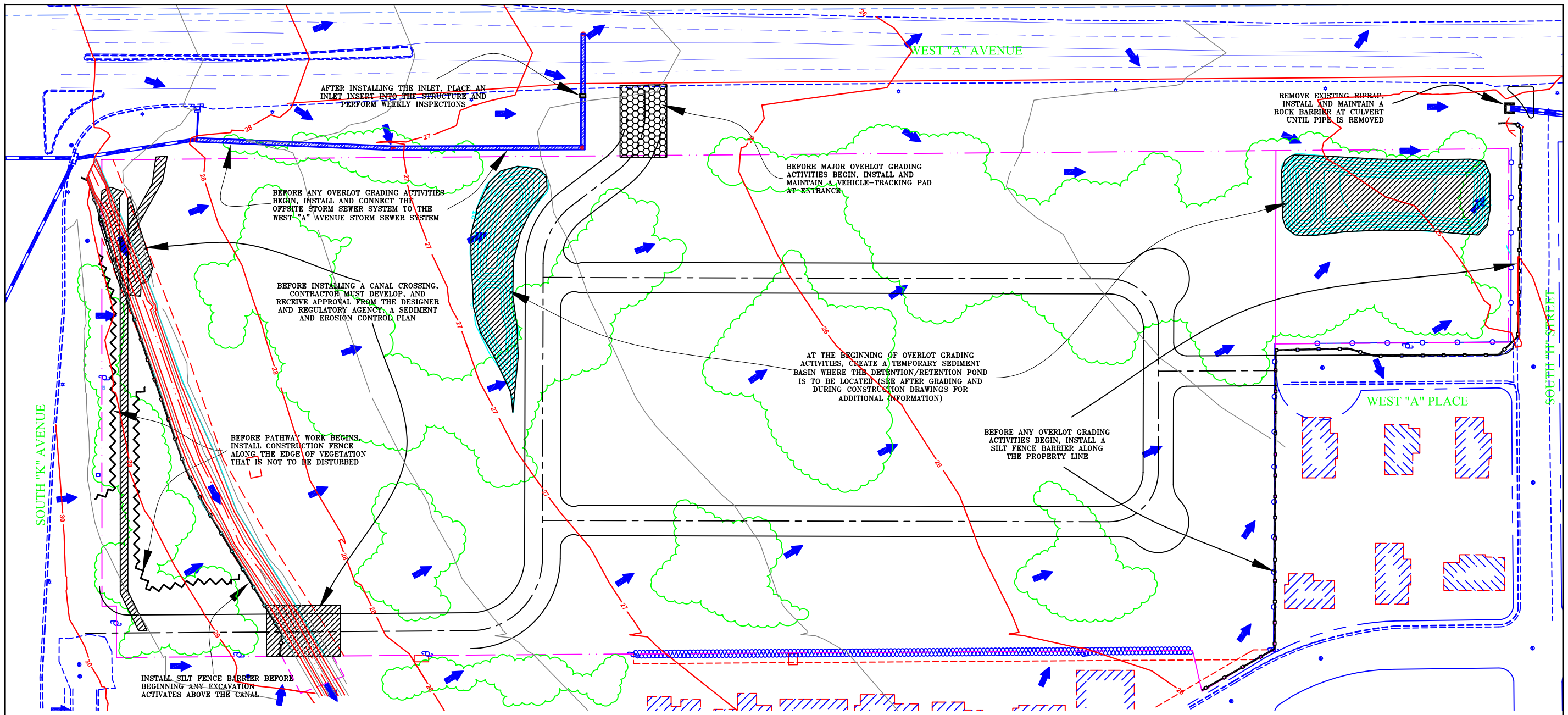


RESIDENTIAL PRE-GRADING & DURING CONSTRUCTION SEDIMENT CONTROL PLAN

NOTES:

1. INSTALLATION OF THE OFFSITE STORM SEWER PIPE WITH A CONNECTION TO WEST "A" AVENUE SYSTEM MUST BE COMPLETED BEFORE BEGINNING ANY GRADING ACTIVITIES.
2. PRIOR TO OVERLOT GRADING ACTIVITIES, INSTALL AND MAINTAIN SEDIMENT CONTROL BARRIERS, AS ILLUSTRATED.
3. AT THE BEGINNING OF OVERLOT GRADING, ROUGH GRADE PROPOSED DETENTION AND RETENTION PONDS AND COVERT THEM INTO A SEDIMENT BASINS WITH OUTLET STRUCTURES.
4. UPON COMPLETION OF INLETS ALONG WEST "A" AVENUE, INSTALL AND MAINTAIN INLET INSERT UNTIL APPROXIMATELY 80% OF THE SITE HAS BEEN BUILT OUT.
5. GENERAL MAINTENANCE OF SEDIMENT CONTROL STRUCTURES WILL INCLUDE ENSURING THAT ROCKS ARE NOT CLOGGED WITH SEDIMENT, MAINTAINING THE INTEGRITY OF ROCK BARRIERS, REPAIRING DAMAGED BARRIERS, REPLACEMENT OF SEDIMENT FILLED ROCK, REMOVAL OF SEDIMENT FROM INLET INSERTS, AND REMOVING SEDIMENT WHEN HALF THE STRUCTURE VOLUME IS LOST (E.G. BEHIND SILT FENCE BARRIERS).
6. SEDIMENT TRACKED ONTO OFFSITE STREETS WILL BE REMOVED WEEKLY OR AS NEEDED.
7. SOIL STOCKPILES AREA WILL BE LOCATED BY THE CONTRACTOR AND PROTECTED WITH SEDIMENT AND EROSION CONTROL BMPS AS DIRECTED BY THE DESIGNER OR ENGINEER.
8. INSPECTION OF ALL BMPS IS TO OCCUR AT LEAST ONCE EVERY 14 DAYS AND AFTER PRECIPITATION EVENTS THAT ARE 12 MM (0.50-INCHES) OR MORE. ALL NECESSARY MAINTENANCE AND REPAIRS SHALL BE COMPLETED WITHIN SEVEN DAYS, UNLESS OTHERWISE AGREED.
9. EROSION CONTROL MEASURES (SEE THE AFTER GRADING AND DURING CONSTRUCTION DRAWINGS) WILL BE INSTALLED, INSPECTED, AND MAINTAINED WHILE CONSTRUCTION AND DEVELOPMENT ACTIVITIES OCCUR.
10. MODIFICATIONS TO THIS SEDIMENT CONTROL PLAN MUST RECEIVE APPROVAL BY THE DESIGNER.
11. THESE PLANS ARE SUBJECT TO CHANGE, WITH ALL CHANGES TO BE AGREED UPON BY THE DESIGNERS (OR HIS/HER REPRESENTATIVE) AND THE APPROPRIATE REGLATORY OFFICIAL.

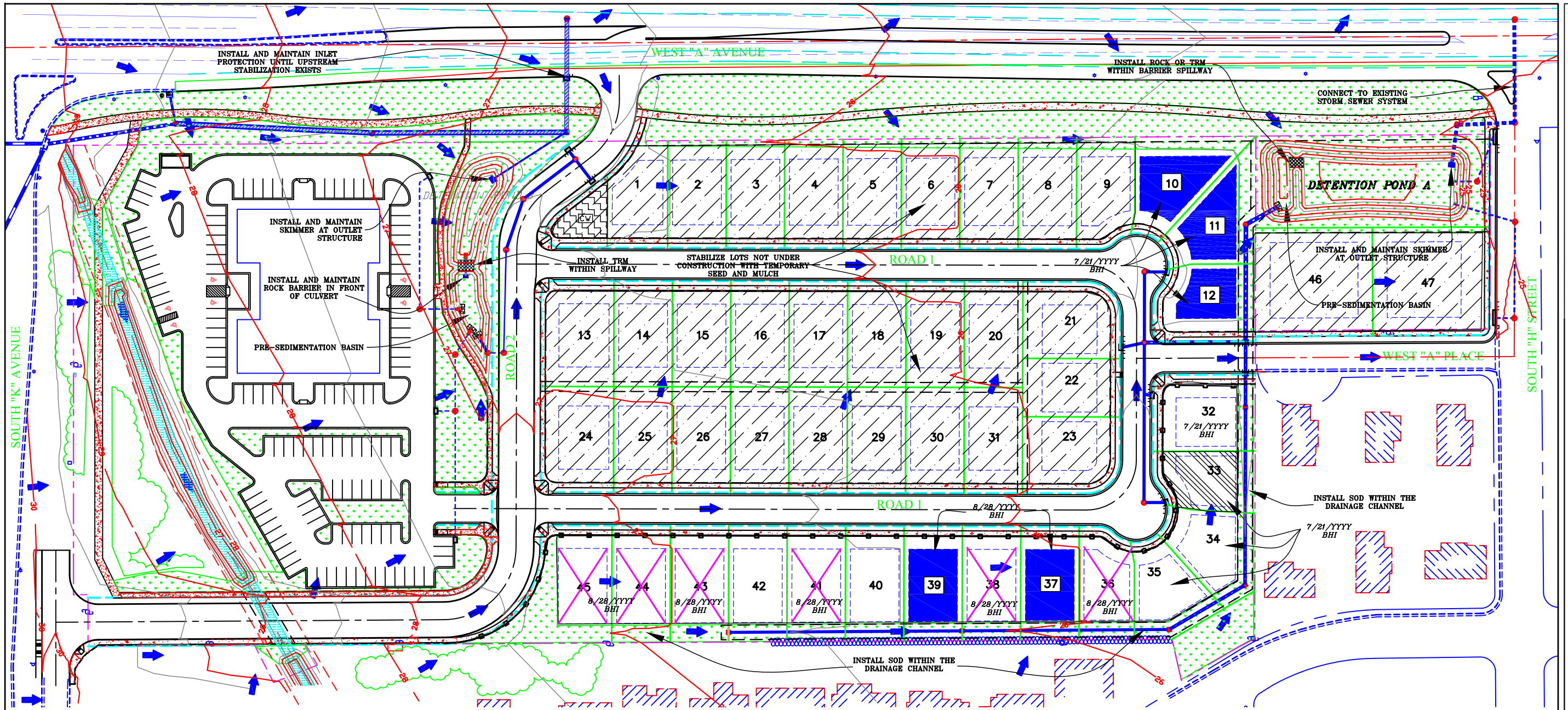
LEGEND

- FLOW ARROW
- SILT FENCE BARRIER
- VEHICLE-TRACKING PAD
- ROCK BARRIER
- CONSTRUCTION FENCE
- EXISTING VEGETATION
- PROPERTY BOUNDARY
- EXISTING WOOD FENCE
- EXISTING STORM SEWER
- PROPOSED STORM SEWER
- PROPOSED CATCH BASIN/AREA DRAIN

N

20 15 10 5 0

METRES



NOTES:

1. SEDIMENT CONTROL STRUCTURES ARE NOT TO BE REMOVED UNTIL 80% OR MORE OF THE SITE IS COVERED WITH VEGETATION, FORMAL LANDSCAPING, STRUCTURES, AND PAVEMENT, OR APPROVAL IS GIVEN BY THE DESIGNER.
2. THE DETENTION/RETENTION PONDS ARE TO REMAIN FUNCTIONAL AS SEDIMENT CONTAINMENT SYSTEMS, WHICH INCLUDES MAINTENANCE ON ALL OUTLET STRUCTURES, WHILE VERTICAL/BIG BOX CONSTRUCTION ACTIVITIES OCCUR.
3. LOTS UNDER CONSTRUCTION MUST HAVE SEDIMENT CONTROL BMPS INSTALLED ON DOWNSTREAM PROPERTY BOUNDARIES AS DETERMINED BY THE BUILDER.
4. PLANTING SEED AND APPLYING MULCH OR INSTALLING SOD WILL OCCUR WHILE CONSTRUCTION ACTIVITIES OCCUR AND AS DIRECTED BY THE DESIGNER.
5. UNLESS INSTRUCTED BY THE DESIGNER, TOTAL BLOCKAGE OF INLET OPENINGS BY FABRIC MATERIAL WILL NOT BE PERMITTED.
6. THE BUILDER IS RESPONSIBLE FOR GOOD HOUSEKEEPING ACTIVITIES TO ENSURE THE STREETS AND LOTS ARE KEPT RELATIVELY CLEAN WHILE CONSTRUCTION ACTIVITIES OCCUR.
7. THE BUILDER IS RESPONSIBLE FOR INSPECTIONS EVERY 14 DAYS AND AFTER PRECIPITATION EVENTS OF 12 MM (0.50-INCHES) OR MORE. THE BUILDER IS ALSO RESPONSIBLE FOR MAINTENANCE OF THEIR PROJECT SITE, INLETS AND OTHER SEDIMENT CONTAINMENT SYSTEMS IMMEDIATELY DOWNSTREAM OF THEIR PROPERTY.
8. THESE PLANS ARE SUBJECT TO MODIFICATIONS, WITH ALL CHANGES TO BE AGREED UPON BY THE DESIGNER (OR HIS/HER REPRESENTATIVE) AND APPROPRIATE REGLATORY OFFICIAL.

UPDATES

- Lot Under Construction
- Home Occupied
- Staging Area
- Concrete Washout
- Silt Fence Barrier

LEGEND

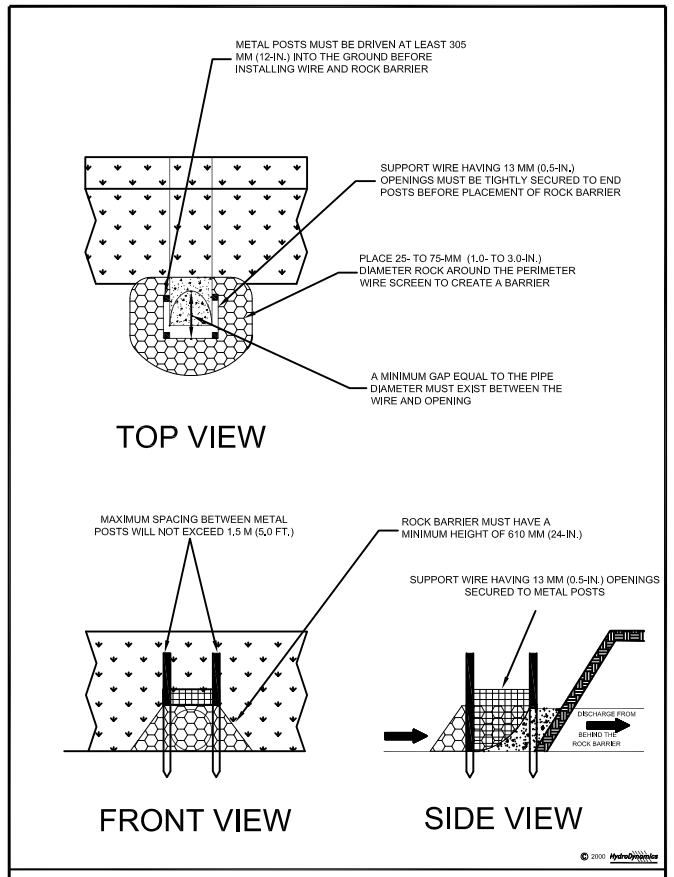
- FLOW ARROW
- SEED AND MULCH/LANDSCAPE
- TEMPORARY VEGETATION
- TURF REINFORCEMENT MAT
- EXISTING WOODEN FENCE
- EXISTING VEGETATION
- PROPERTY BOUNDARY
- EXISTING STORM SEWER
- PROPOSED INLET
- PROPOSED STORM SEWER
- PROPOSED RIPRAP

N

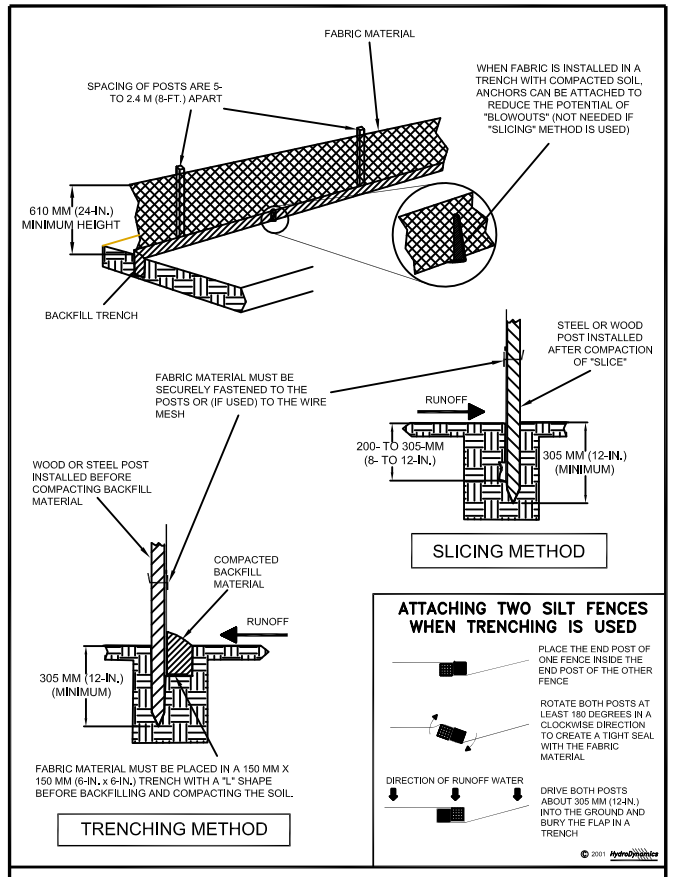
25 20 15 10 5 0

METRES

RESIDENTIAL AND COMMERCIAL AFTER GRADING AND DURING CONSTRUCTION SEDIMENT AND EROSION CONTROL PLAN



ROCK BARRIER OUTLET STRUCTURE FOR CULVERTS



SILT FENCE BARRIER INSTALLATION

INSPECTION REQUIREMENTS FOR ALL INSTALLED BMPS

1. AT LEAST ONCE EVERY 14 DAYS, INSPECT AND REPAIR ANY DAMAGE FOUND.
2. WITHIN 24 HOURS AFTER PRECIPITATION EVENTS OF 12 MM (0.50-INCHES) OR MORE.

MAINTENANCE NOTES FOR THE BMPS SHOWN

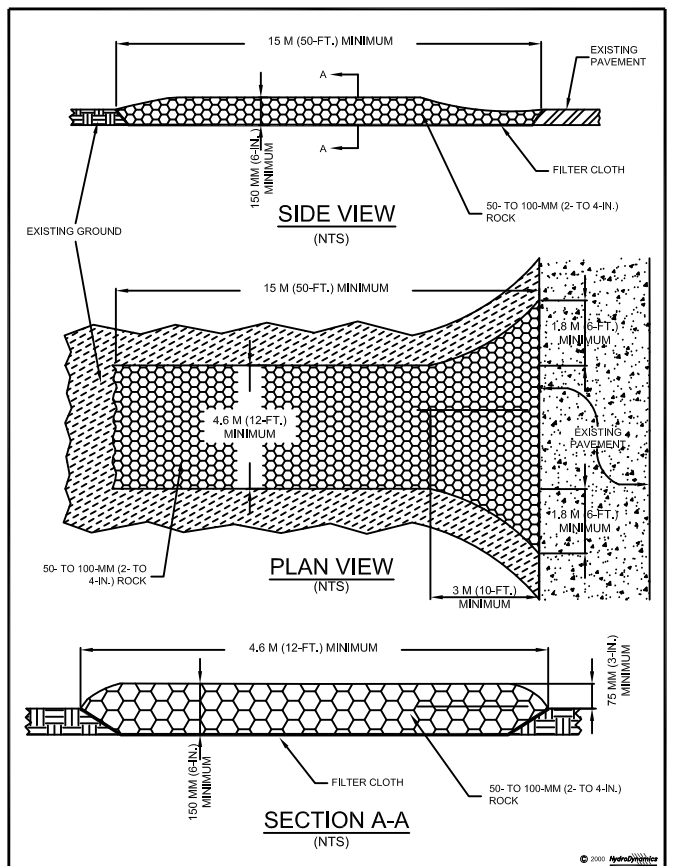
ROCK BARRIER:
- REMOVE ACCUMULATED SEDIMENT FROM BEHIND THE ROCK BARRIER WHEN IT IS WITHIN 150 MM (6-IN.) OF THE TOP OF THE ROCK.
- REMOVE ROCK BARRIER, POSTS, AND WIRE ONCE EROSION CONTROL PRACTICES ARE INSTALLED.

SILT FENCE BARRIER:
- REMOVE ACCUMULATED SEDIMENT FROM BEHIND THE SILT FENCE WHEN IT IS OVER 460 MM (18-IN.) DEEP.
- REMOVE SILT FENCE FABRIC AND POSTS ONCE EROSION CONTROL PRACTICES ARE INSTALLED.

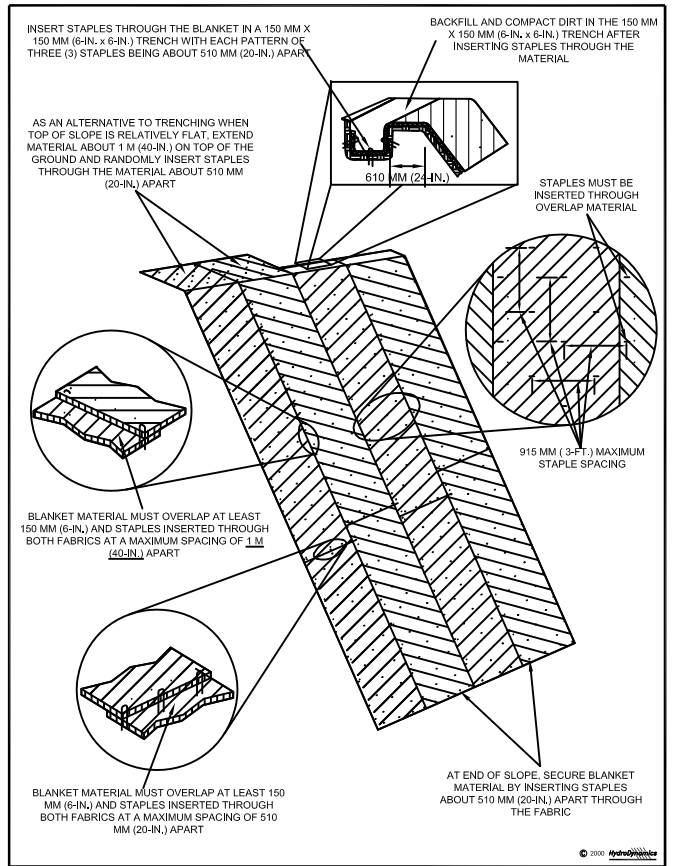
VEHICLE-TRACKING PAD:
- REPLACE ROCK IN TRACKING PAD IF IT BECOMES CLOGGED WITH SEDIMENT.
- REMOVE SEDIMENT ON ADJACENT STREETS, IF TRACKING IS OCCURRING.

HILLSIDE ROLLED EROSION CONTROL PRODUCT:
- REPAIR DAMAGED BLANKET MATERIAL.
- REPAIR RILLS AND GULLIES IF FORMING BENEATH BLANKET.

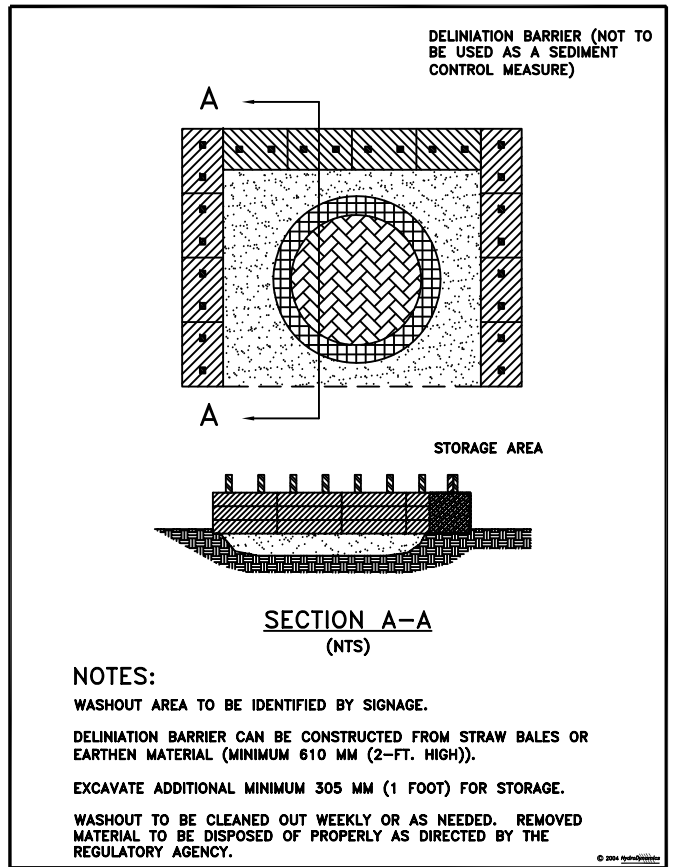
CONCRETE WASHOUT:
- REPAIR DAMAGED STRAW BALES.
- REMOVE ACCUMULATED MATERIAL WEEKLY OR AS NEEDED.



SOIL TRACKING PREVENTION DEVICE



INSTALLING A DISTURBED SLOPE RECP



CONCRETE WASHOUT

DRAWN BY T. D. EVANS 6/04

RESIDENTIAL AND COMMERCIAL
TYPICAL DETAILS

Inspector Responsibilities During Construction Activities

1. Review the ESC Plan to see if it is current
   a) Have BMPs have been installed as illustrated?
   b) Have updates occurred?
   c) Do sediment and erosion control drawings match field conditions or are modifications required?
2. Review site conditions to see if BMPs are functional
   a) Evidence of, or the potential for, sediment leaving from disturbed areas and material storage areas.
   b) Installed sediment and erosion control measures to ensure they are operating correctly.
   c) Locations where vehicles enter or exit the site.
   d) Discharge points to assess whether erosion control measures are effective in preventing impacts to receiving waters.
   e) Observe if BMPs are being maintained
   f) Assess whether new BMPs are needed
   g) Assess whether BMPs can be removed
   h) Collect samples, if appropriate
3. Document findings
   a) Communicate findings to contractor, designer or other interested parties
   b) Don't be confrontational to the contractor
4. Ensure that BMPs are effective in storm events – one of the best times to do an Erosion and Sediment Control inspection is during a storm
5. Do **not** redesign the ESC Report or the accompanying sediment and erosion control drawings
   a) Do **not** to tell the contractor what to do. The primary responsibilities of the inspector are to observe and report, not direct the activities.
   b) Do **not** mandate. This is a liability issue. You must protect yourself and the entity you work for.
      i. **The inspector is not responsible if BMPs are not working properly**
      ii. **The inspector is not responsible to fix BMPs that need to be fixed**

   Know your limitations!
6. Be prepared to inspect for winter shut down conditions
   a) It is important that mitigation measures be in place to ensure they will provide the needed protection when spring conditions result in snowmelt.
7. Be prepared to require temporary suspension of construction activities

PURPOSE OF INSPECTIONS – TO CREATE A SNAPSHOT IN TIME

- To assess the BMPs on site and to understand their limitations and effectiveness – are they functioning properly?
- To ensure that the ESC Plan is being implemented
- To observe what is happening on the site
- To determine if additional measures are warranted
- To accurately document site conditions
- To maintain communication and work toward the ultimate goal of environmental protection

INSPECTION REPORTS

A sample copy of an inspection report is included on the following pages. While the report itself can be modified to suit individual site conditions, certain key information should be included on every report.

Key pieces of information to provide on every inspection report include:

- Permit information
- Inspector name and qualifications
- Reason for inspection (weekly, after precipitation event)
- Who was informed/notified about the observations/findings of the inspection
- Observations made regarding BMPs on site
- Actions required

Erosion and Sediment Control Inspection Report
(SAMPLE)

Project: _____

Permit No.: _____

Prime Contractor: _____

Inspector: _____

Inspector Qualifications: _____

Verbal/Written Notification given to: _____

Stage of Construction: _____

Construction Activities on Site: _____

Site Area (ha.): _____

Receiving Water (i.e. creek, lake): _____

Inspection:

Date: _____

Time: _____

Duration (hours): _____

Date of Last Inspection: _____

Reason for Inspection:

Weekly _____

Rainfall Event _____

Snowmelt Event _____

Current Weather Conditions: _____

Previous Weather Conditions for site: _____

Rainfall amount (mm): _____

Rainfall duration (hours): _____

Snowmelt amount (mm): _____

Information	Yes	No	N/A	Inspector's Comments and Action(s)
1. Do (or can) offsite flows enter the site?				
2. Is there evidence of, or the potential for, increased pollutant (e.g., sediment, fuel, concrete waste, portable toilet waste, etc.) discharging from the site?				If yes, see attached detail sheet for comments.
3. Do installation, repair and/or maintenance of sediment control BMPs need to occur?				If yes, see attached detail sheet for comments.
4. Do installation, repair and/or maintenance of erosion control BMPs need to occur?				If yes, see attached detail sheet for comments.
5. Do installation, repair and/or maintenance of in-stream control BMPs need to occur?				If yes, see attached detail sheet for comments.
6. Is there evidence of sediment discharging off the construction site and onto downstream location?				If yes, see attached detail sheet for comments.
7. Are vehicles tracking sediment off the construction site?				If yes, see attached detail sheet for comments.
8. If applicable, is soil, construction material, landscaping items, or other debris evident on the streets?				If yes, see attached detail sheet for comments.
9. Do locations exist where consideration of installing additional BMPs not found in the ESC plan should occur?				If yes, see attached detail sheet for comments.
10. Do location exist where consideration of removing existing BMPs identified and shown in the ESC plan can occur?				If yes, see attached detail sheet for comments.
11. Is a photo inventory provided?				If yes, see attached detail sheet for comments.
12. Does you site evaluation indicate a need to possibly update and document the ESC plan within the next seven (7) days?				If yes, see attached detail sheet for comments.
13. Have all previous inspection items been addressed and documented by the close of the next full work day or within seven (7) calendar days after an inspection?				If yes, see attached detail sheet for comments.

Erosion and Sediment Control Inspection Report
(SAMPLE)

Project:_____ Date:_____ Page ____ of ____

Inspector:_____

Detail Report: Identify the problem and its location. If appropriate, describe (in general terms) what needs to be completed. However, only if qualified (e.g., you are a designer) should you be mandating specific BMPs to install.	Date done (with initials)
1.	
2.	
3.	
4.	
5.	
6.	
7.	
8.	
9.	
10.	
11.	
12.	

_____ Date: _____

(Print Inspector Name) (Signature)

Title/Qualification of the Inspector:_____

DOCUMENTATION

An inspection report is one form of documentation. The purpose of an inspection is to create "a snapshot in time," capturing what is happening on a construction site at the time the inspection occurred. Many different techniques and tools can be used to help create the snapshot. Appropriate methods of creating the snapshot might include:

1. Log books of completed inspection reports and notes on maintenance and repairs.
2. Photographs (or Videos) – Inspectors should take photographs during ***every*** inspection. When taking photographs, a few basic guidelines can make the photographs more useful.
    a) Make sure the lighting allows the viewer to see what is being photographed,
    b) Use proper scale. Include items in the photograph that define size and space,
    c) Define extent of subject matter. Try to record the subject matter in context.
        i. Use different angles to document three dimensional aspects of the subject matter
        ii. Take large scale photographs that show how the subject matter ties in to the surroundings
        iii. Take close up photographs to show the detail of the subject matter
        iv. Use multiple shots to create a panorama if it is not possible to include all the information in one picture
    d) You can never take too many photographs
    e) Ensure photos are date-stamped
    f) Take photos of what is ***good*** on the site, not just what is bad.
    g) A picture is worth a thousand words
3. Field Notes and Sketches – some things are difficult to capture with pictures. Taking field notes and drawing sketches are other appropriate methods of documenting what is happening on a construction site. Using a set of plans with notes is a great way to record your findings on a construction site. It is best if these notes are made in the field while you are making the observations.
4. Interviews – because a site is changing constantly, it is not possible for an inspector to see and record everything that happens on a site. If there is evidence of problems, and you are not sure what has happened or how it happened, it is good to ask questions. It is appropriate for an inspector to interview workers, neighbors or other potential witnesses to help them better understand what is happening. These interviews should be included in the inspection reports.

COMMUNICATION

For any construction site inspection to be effective, the inspector must communicate what he or she has observed with someone else. Communication comes in many forms and styles. The style that an inspector uses is personal and needs to be one that he or she is comfortable with. The form used is more standard.
Some of the basic communications skills that can be used on almost any construction site include:

1. **Making observations** – as an inspector, your primary role is to observe – not dictate, not boss, not fine, not fix, not design – but simply observe. Learn to observe carefully. Learn to look for clues and evidences that help you understand what it is that you are actually observing. Sharp eyes and a clear mind are two of the best observation tools that you have. Use them.
2. **Verbalize** – while it is important to clearly and concisely state what you have observed, you must be careful what you say. Remember it is not your role to dictate or fix problems. Don't be afraid to ask questions. If you do not understand why something is being done a certain way, ask. Question workers and others on the site.
3. **Write** – much has already been discussed relative to inspection reports. This will be the primary method of communication on most construction sites. All verbal communications should be followed up with written correspondence to solidify and document these communications. As with verbalization, written communications should be clear and concise. They should also be direct. If your handwriting is difficult to read, have reports and correspondence typed.
4. **Listen** – this method of communication is often abused and overlooked, but it is one of the keys to affective communication. A good rule of thumb in listening is, there are two ears for every mouth. You should listen twice as much as you talk.
5. **Documentation** – this form of communication has been discussed previously. Written documentation should be kept for at least three years from the time that the Notice of Termination is filed.

On most construction sites, the inspector is required to communicate with at least two entities; the contractor and the regulating agency. In most cases, the inspector will be working for one of these entities. The inspector needs to make sure that both the contractor and the regulator are getting the same picture of what is happening on the site. The temptation may be there to represent one side or the other. An inspector is expected to be neutral and simply make and report observations, regardless of what the observations are. Copies of the inspection report should be kept on file at the construction site and with the regulating agency.

WORKING WITH CONTRACTORS

For any project to be successful, it requires cooperation and working together. The relationship between a contractor and an inspector can greatly affect the outcome of a project. An inspector can make a contractor's life miserable and a contractor can make an inspector's life miserable.
Realize that you are both on the same team. You don't necessarily have to like one another, but you need to respect each other. The contractor has a big job with many responsibilities. Here are a few pointers to help in building a good working relationship:

1. **Build a trusting relationship** – follow through. When you say something, do it. The contractor may not like it, but he will learn to respect you when you are honest with him.
2. **Realize you are both on the same team** – the goal is to successfully complete the project. In order for it to be a success it needs to be completed on time and in budget. Understand this. Work with the contractor to help him stay on task, while still addressing the pollution prevention needs of the project.
3. **Show respect for other opinions** – if you see something that you don't understand or that you are concerned with, talk to the contractor. Get their input. Give the inspector a chance to explain what is going on before jumping to conclusions. Let him be a part of solving the problems.
4. **Don't be a bully** – it is not your place as an inspector to "run" the project. Sometimes you might be tempted to exercise a little muscle and let the contractor know you mean business. You do have authorities, but don't abuse them. Maintain a professional relationship. Give the contractor time to react to situations on site. If pollutants are being discharged, bring it to his attention and work together to get things stabilized. Then take a step back and let him work on a solution.
5. **Don't assume you know his job** – things are not always what they appear to be. Quite often there are situations and circumstances that you are not aware of as the inspector. This is where asking questions can help you understand what is really happening. You may see silt fence that is being placed up and down a slope and think that it is not being installed properly. If you ask what is happening, you might find out that the contractor has decided to use silt fence to delineate a boundary. When you understand, it makes more sense.
6. **Work together** – working as a unit will make the project a better project.

ETHICS

1. A system of moral principles.
2. The branch of philosophy dealing with right and wrong of certain actions and with the good and bad of such actions.

Review the CISEC Code of Ethics on Page 43

A compromise of ethics is often thought of as an extreme situation.

- Inspections can place inspectors in potential situations that may violate their ethics.

You may experience the following:

- Using your “friendship” to not document a finding or to “give him another chance.”
- “Can’t we just settle this between the two of us?”
- Requested to look the other way and let it go this time.

As an inspector, you may be:

- Pressured or intimidated by someone in a position of authority.
- Challenged about a finding if it is insignificant to harming the environment.
- Pressured to find violations for the purpose of generating revenue.

A compromise of ethics will:

- Undermine the credibility of an inspector,
- Eventually destroy relationships of trust and respect,
- Could mean trouble if your site is subject to an enforcement inspection, and
- Could lead to legal or criminal action, loss of CISEC status, and employment loss.

CISEC CODE OF ETHICS

Article I. General Principles

1. The privilege of professional practice imposes obligations of morality and responsibility as well as professional knowledge.
2. Each Certified Inspector of Sediment and Erosion Control (hereafter called CISEC) agrees to be guided by the highest standards of ethics, personal honor, and professional conduct.

Article II. Relation of Professional to the Public

1. A CISEC shall not give a professional opinion or make a recommendation without being as thoroughly informed as might reasonably be expected of a similarly situated professional.
2. A CISEC shall not knowingly permit the use of his or her reports or other documents for any unsound or illegitimate undertaking.
3. A CISEC shall not issue a false statement or false information at any time.
4. A CISEC shall not make any sensational, exaggerated, and/or unwarranted statements in any professional opinion or in the course of performing any professional services.
5. A CISEC may publish dignified business, professional, or announcement cards, but shall not advertise his or her work or accomplishments in a self-laudatory, exaggerated, or unduly conspicuous manner.

Article III. Relation of Professional to Employer and Client

1. A CISEC shall not use, directly or indirectly, any employer or client's information in any way that would violate the confidence of the employer or client.
2. A CISEC shall protect, to the fullest extent possible, the interest of their employer or client insofar as such interest is consistent with the law and his or her professional obligations and ethics.
3. A CISEC who finds that his or her obligations to their employer or client conflict with his or her professional obligation or ethics should address such objectionable conditions or resign.
4. A CISEC who has performed an investigation for any employer or client shall not seek to profit economically from the information gained.
5. A CISEC shall not divulge any information given in confidence.
6. A CISEC shall engage, or advise his employer or client to engage, and cooperate with other industry specialists whenever the employer or client's interests would be best served by such service.

Article IV. Relation of Professionals to Each Other

1. A CISEC shall not falsely or maliciously attempt to damage the reputation of another.
2. A CISEC shall refrain from plagiarism in oral and written communications.
3. A CISEC shall endeavor to cooperate with others in the profession and encourage the ethical dissemination of technical knowledge.

Article V. Duty to the Profession

1. A CISEC shall uphold this Code of Ethics by example and encourage other CISECs to do the same.

Article VI. Conflicts of Interest

1. A CISEC shall not inspect properties under contingent arrangements whereby any compensation or future referrals are dependent on reported findings.
2. A CISEC shall not receive compensation for an inspection from more than one party unless agreed to by the client(s).
3. A CISEC shall not accept compensation, directly or indirectly, for recommending contractors, services, or products to inspection clients or other parties having an interest in inspected properties.

Module 2

Inspecting Best Management Practices

TABLE OF CONTENTS

Objectives of Module 2

To provide a detailed overview of inspection requirements for various types of BMPS

Review of Construction Site BMPs

Sediment Control BMPs

The purpose of sediment controls is to **minimize** eroded soil from being carried off the site by a mobile agent.

This is accomplished by:

- Reducing runoff velocities
- Dissipating energy
- Providing an opportunity for sediments to settle

Methods that remove sediment from runoff waters are generally identified as “structural” methods

1. Barriers
   a) Silt fence
   b) Fiber rolls
   c) Rock
   d) Geosynthetic
   e) Bales (Often not recognized to be an “appropriate” measure to remove sediment from runoff waters)
2. Sediment Containment Systems
   a) Sediment basins/ponds
   b) Sediment traps
   c) Inlet inserts
3. Others
   a) Vehicle tracking pads
   b) Vegetative buffer strips
4. Uses
   a) Perimeter control
   b) Controlling runoff from vertical construction sites
   c) Storm drain inlets
   d) Check dams
   e) Outlet structures

Sediment control does not control erosion

Erosion control minimizes sediment

Inspecting Barriers

Straw Bale Barrier

WHEN SHOULD IT BE INSTALLED?

- Before construction activities begin.
- While construction activities are occurring.

WHEN SHOULD IT NOT BE INSTALLED?

- After construction activities are completed.

WHAT NEEDS TO BE INSPECTED?

- Are the bales in a trench?
- Are wood stakes used?
- Will runoff flow over the bales?
- Does runoff flow between bales?
- Does upstream backfill material exist?
- Is the twine or wire above the ground?
- Will runoff flow around the bales?
- Does runoff flow under the bales?

WHAT MAINTENANCE ACTIVITIES CAN BE EXPECTED?

- Repair and replacement of bales.
- Repair of eroded ground
- Removal of the bales.
- Removal of sediment.

➢ General Information

√ Bale barriers are nearly 100% ineffective in reducing sediment in runoff waters.

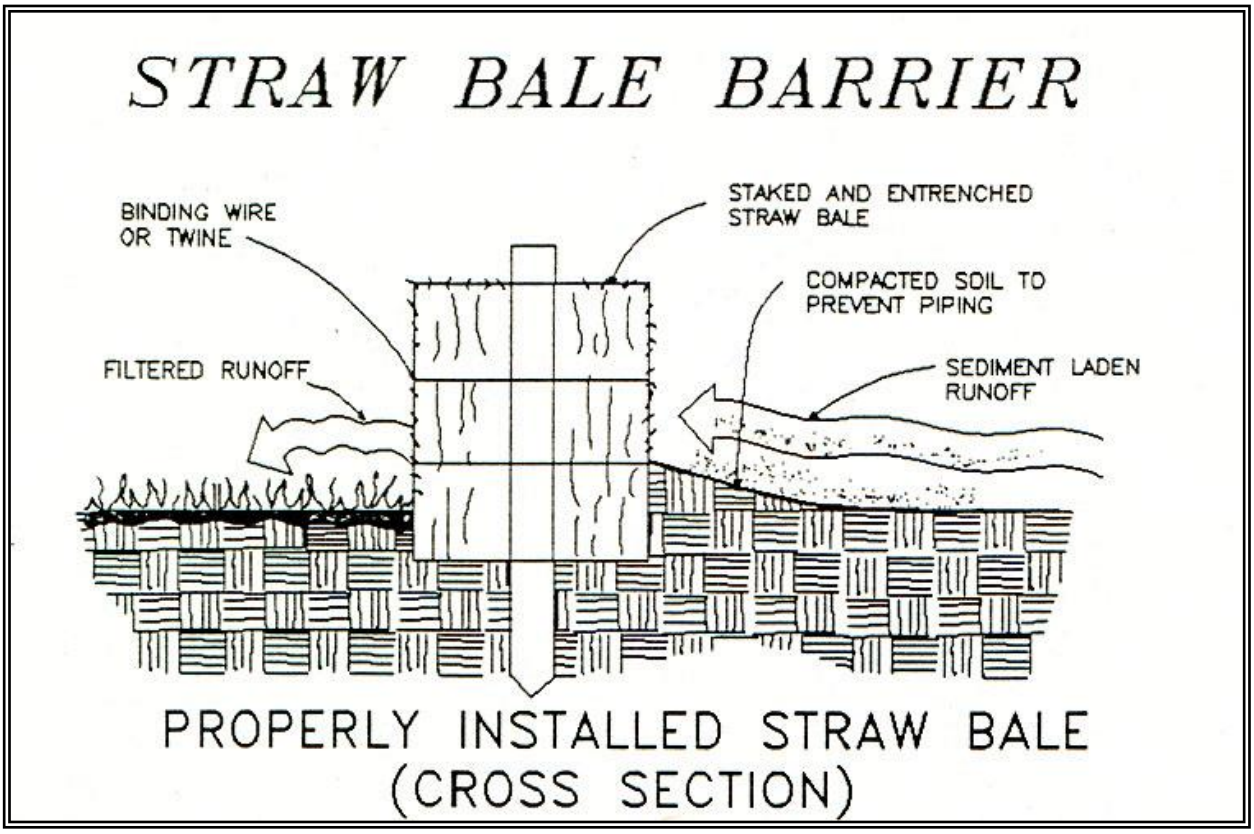
√ Bale barriers experience more failures than successes.

√ Bale barriers do not filter runoff waters.

√ Bale barriers are expensive to install and maintain.

Bales

➢ One of the more expensive BMPs to implement and maintain



Inspecting Best Management Practices

Record the location, inspection time, and corrective action items. If discharges are occurring, identify the point of discharge and document the visual quality (color, odor, floating, settled, or suspended solids, foam, oil sheen, etc.) and whether the stormwater controls are operating effectively.		Date Corrected (with initials)
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Location No. 1 Time:_____ ☐ Discharges are Occurring		
Location No. 2 Time:_____ ☐ Discharges are Occurring		
Location No. 3 Time:_____ ☐ Discharges are Occurring		

Writing Inspection Reports

- **Be Clear and concise**
- **Write Legibly**
- **Use proper English**
- **Share your results with the superintendent or contractor**
- **Write reports as if an attorney will use them in court (it might happen).**

Perimeter Control Barriers
Silt Fence

Silt Fence Barrier

WHEN SHOULD IT BE INSTALLED?

- Before construction activities begin.
- While construction activities are occurring.

WHEN SHOULD IT NOT BE INSTALLED?

- Where concentrated flows are expected unless properly supported.
- After construction activities are completed.

WHAT NEEDS TO BE INSPECTED?

- Are stakes on the downstream side?
- Is the fabric embedded in the ground?
- Does runoff flowed under the fabric?
- Is the fabric attached to posts?
- Has runoff "flattened" the structure?
- Will runoff flow around the fence?
- Is the fabric torn or UV degraded?
- Has wind destroyed the fence?

WHAT MAINTENANCE ACTIVITIES CAN BE EXPECTED?

- Repair and replacement of material.
- Removal of sediment.
- Removal of fence material.

➢ General Information

√ Silt fence barriers do not filter small-suspended particles from runoff waters.

√ Using wire backing for support is discouraged due to disposal problems.

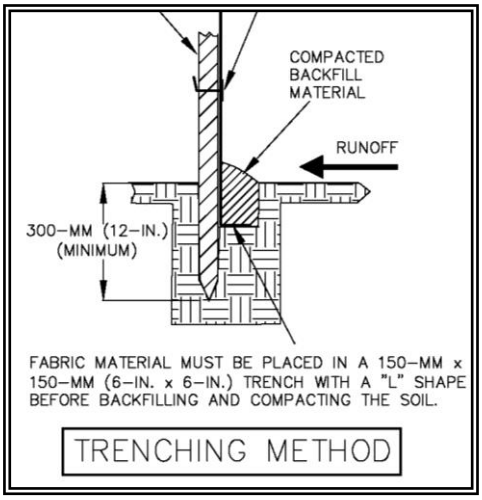
√ Compacting trench fill material is very critical.

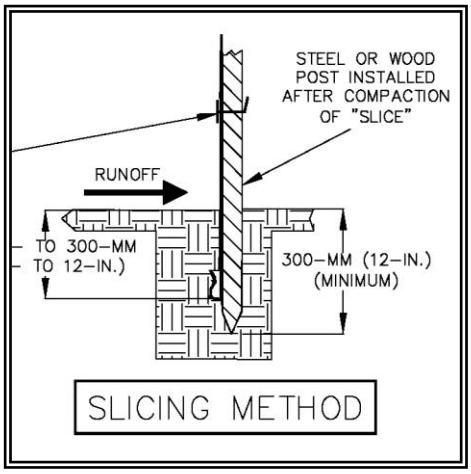
Silt Fence Barriers

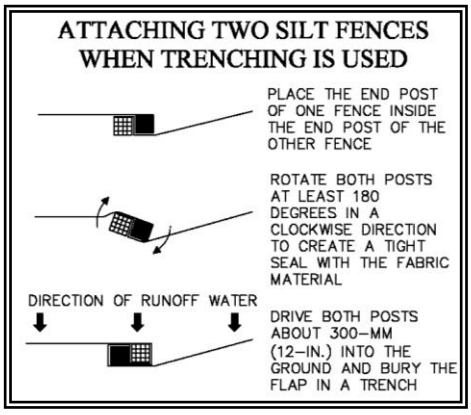
- ➢ Widely used on construction sites
- ➢ Do not remove sediment by “filtration” through fabric material
  - √ *However, they do cause ponding to allow for deposition of sediments*
- ➢ •Should not be used where concentrated flows occur unless properly supported

Inspecting Silt Fence Barriers

- ➢ Trenching
  - √ *Are posts on the downstream side?*
  - √ *Will containment of runoff occur?*
  - √ *Is fabric embedded in the ground?*
  - √ *Does compaction of backfill material exist?*
  - √ *Does UV degradation of material exist?*
- ➢ Slicing
  - √ *Has “slicing” of material into the soil occurred?*
  - √ *Has compaction of the soil occurred?*
  - √ *Is the material attached to a stake?*
  - √ *Does UV degradation of material exist?*







Perimeter Control Barriers

Fiber Rolls/Logs, Compost Berms & Socks

Fiber Log/Roll for Individual Lots

WHEN SHOULD IT BE INSTALLED?

- Before construction activities begin.
- While construction activities are occurring.

WHEN SHOULD IT NOT BE INSTALLED?

- Where concentrated flows are expected such as in drainage ditches, around inlets, and above/below where culverts discharge.
- After stabilization is completed.

WHAT NEEDS TO BE INSPECTED?

- Is the material staked properly?
- Is the fiber log/roll placed within a depression and backfilled?
- Does runoff flow under the fiber log/roll?
- Is the fiber log/roll “pinned” on the upstream side?
- Has traffic "flattened" the structure?
- Will runoff flow around the fiber log/roll?

WHAT MAINTENANCE ACTIVITIES CAN BE EXPECTED?

- Repair and replacement of the fiber log/roll.
- Removal of sediment.

➢ General Information

√ Fiber logs/rolls should not to be used where concentrated flows of runoff are anticipated such as in drainage ditches, around inlets, or above/below where culverts discharge.

√ Fiber logs/rolls can create a very small sediment containment system to allow for deposition of suspended particles on vertical and big box construction sites.

√ Fiber logs/rolls do not filter small-suspended (e.g., clay) particles from runoff waters.

Fiber Logs/Rolls

- ➢ Is the barrier within a depression?
- ➢ Is the correct size installed?
  - √ *Check the specifications.*
- ➢ Are stakes holding the barrier in place?
- ➢ Will the barrier contain runoff?
- ➢ Will the barrier divert runoff and cause downstream problems?

Compost Socks

- ➢ Ensure compost material is adequate
- ➢ Fill the fabric material in a correct manner
- ➢ Install the sock so that runoff does not flow under the material

Compost Berms

- ➢ Does an adequate base and height exist?
  - √ *Base width = 2 x height*
  - √ *For slopes up to 3H:1V, height should be 1- to 2-feet (300- to 600-mm)*
- ➢ Are the ends upslope to contain runoff?
- ➢ Has damage occurred after runoff?
- ➢ Is the berm becoming vegetated?
  - √ *May not be successful in arid and semi-arid climates due to limitations of consist moisture*

Inspecting Check Structure Barriers

Check Dams

Bale Barrier Check Structure

When should it be installed?

- While construction activities are occurring.

WHEN SHOULD IT NOT BE INSTALLED?

- After construction activities are completed.

WHAT NEEDS TO BE INSPECTED?

- Are the bales in a trench?
- Are wood stakes used?
- Is the spacing correct for erosion control?
- Will runoff flow over the bales?
- Does runoff flow between bales?
- Does upstream backfill material exist?
- Is the twine or wire above the ground?
- Will runoff flow around the bales?
- Does runoff flow under the bales?

What maintenance activities can be expected?

- Repair and replacement of bales.
- Repair of eroded ground
- Removal of the bales.
- Removal of sediment.

➢ General Information

√ Bale check structures are nearly 100% ineffective in reducing sediment in runoff waters.

√ Bale check structures experience more failures than success and often cause extensive downstream and side slope erosion

√ Bale check structures do not filter runoff waters.

√ Bale check structures are expensive to install and maintain.

Rock Check Structure

WHEN SHOULD IT BE INSTALLED?

- While construction activities are occurring.

WHEN SHOULD IT NOT BE INSTALLED?

- After construction activities are completed and if they are to be the only method used for stabilizing drainage ditches.

WHAT NEEDS TO BE INSPECTED?

- Are the correct rock diameters used?
- Is there a depression for runoff to flow over?
- Will runoff flow over the rocks?
- Will runoff flow around the rocks?
- Is channel erosion occurring between structures?
- Is the spacing correct?

WHAT MAINTENANCE ACTIVITIES CAN BE EXPECTED?

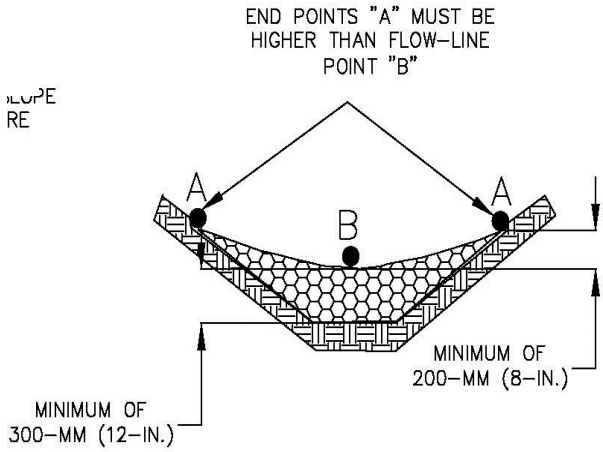
- Repair and replacement of rock.
- Removal of sediment.
- Repair of eroded ground.
- Removal of rock.

➢ General Information

√ Proper rock selection is very important.

√ Flows must discharge through a depression within the rocks and not around the structure.

√ If not properly spaced, erosion will occur between the structures.



Check Structures

Bale

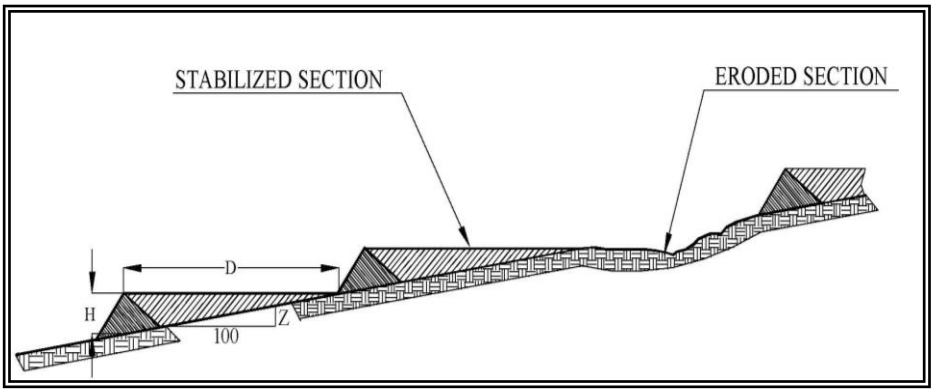
- Can be one of the more expensive, yet least, effective BMPs.

Silt Fence

- Not designed for concentrated flows
- Avoid using in drainage channels unless properly installed

Rock

- •Must have a low flow line for runoff
- •Edges must be higher than flow line
- •Rock must be properly sized
  - √ *Check the specifications*
  - √ *Does a mixture exist?*
- When used for erosion control
  - √ *Spacing is critical between check structures for erosion protection*
  - √ *Top of the downstream structure must be in line with the bottom of the upstream structure to minimize erosion*
  - √ *Spacing is dependent upon the channel slope and barrier height*



Geosynthetic Check Structure

WHEN SHOULD IT BE INSTALLED?

BEFORE CONSTRUCTION ACTIVITIES BEGIN.

- While construction activities are occurring.

WHEN SHOULD IT NOT BE INSTALLED?

- After construction activities are completed.

WHAT NEEDS TO BE INSPECTED?

- Is the structure installed per manufacturer specifications?
- Is it properly stapled?
- Will runoff flow over the structure?
- Will runoff flow around the structure?
- Does runoff flow between the structures?
- Does runoff flow under the structure?

WHAT MAINTENANCE ACTIVITIES CAN BE EXPECTED?

- Repair and replacement of structures.
- Removal of sediment.
- Repair of eroded ground.
- Removal of structures.

Inspecting geosynthetic barriers is not much different from inspecting any check structure

A variety of products exist:

- Rigid
- Flexible

Follow manufacturer's installation requirements

Check structures do not create "clean" water

Geosynthetic Check Structure

WHEN SHOULD IT BE INSTALLED?

- Before construction activities begin.
- While construction activities are occurring.

WHEN SHOULD IT NOT BE INSTALLED?

- After construction activities are completed.

WHAT NEEDS TO BE INSPECTED?

- Is the structure installed per manufacturer specifications?
- Is it properly stapled?
- Will runoff flow over the structure?
- Will runoff flow around the structure?
- Does runoff flow between the structures?
- Does runoff flow under the structure?

WHAT MAINTENANCE ACTIVITIES CAN BE EXPECTED?

- Repair and replacement of structures.
- Removal of sediment.
- Repair of eroded ground.
- Removal of structures.

Inspecting Best Management Practices

What about using fibre logs, compost socks, or rock bags in drainage channels?

Shallow barriers:

- 150- to 300-mm (6- to 12-in.)
- Provide minimal reduction in flow velocities
- Provide minimal capturing of sediment
- Have a high chance for failure
- Should be replaced by a more effective BMP

Taller barriers:

- > 300-mm (12-in.)

- All barriers in drainage channels must have a low point for runoff
- All barriers must have the outside edges higher than the flow line elevation

Wattles and Socks:

- Must be in a trench and backfilled
- Must be staked
- No damage to container material (e.g., compost sock)

Silt Fence:

- Trenched and backfilled or Sliced
- Staked

Rock Bag:

- No damage to the wire container
- Use 40- to 75-mm (1.5- to 3-in.) diameter rock

Maintenance

- Removal of accumulated sediment as required
- Repair/replacement of damaged areas

Inspecting Best Management Practices

Record the location, inspection time, and corrective action items. If discharges are occurring, identify the point of discharge and document the visual quality (color, odor, floating, settled, or suspended solids, foam, oil sheen, etc.) and whether the stormwater controls are operating effectively.		Date Corrected (with initials)
Inspection Time and Location	Corrective Action Needed	
Location No. 1 Time:_____ ☐ Discharges are Occurring		
Location No. 2. Time:_____ ☐ Discharges are Occurring		
Location No. 3 Time:_____ ☐ Discharges are Occurring		

Inspecting Best Management Practices

Record the location, inspection time, and corrective action items. If discharges are occurring, identify the point of discharge and document the visual quality (color, odor, floating, settled, or suspended solids, foam, oil sheen, etc.) and whether the stormwater controls are operating effectively.		Date Corrected (with initials)
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Inspecting Best Management Practices

Record the location, inspection time, and corrective action items. If discharges are occurring, identify the point of discharge and document the visual quality (color, odor, floating, settled, or suspended solids, foam, oil sheen, etc.) and whether the stormwater controls are operating effectively.		Date Corrected (with initials)
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Location No. 2. Time:_____ ☐ Discharges are Occurring		
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Remember, when writing reports

- Be Clear and concise
- Write Legibly
- Use proper English
- Share your results with the superintendent or contractor
- Write reports as if an attorney will use them in court (it might happen).

Avoid Making Statements Like

Erosion is evident!
This is too general. Need to specify where on the site erosion is occurring.

Need to stop runoff from the bare soil.
This is impossible. Need to recommend that erosion protection is needed to stabilize soil.

Replace the fiber roll with a silt fence barrier.
Specifying a specific BMP may create more problems – don't mandate!

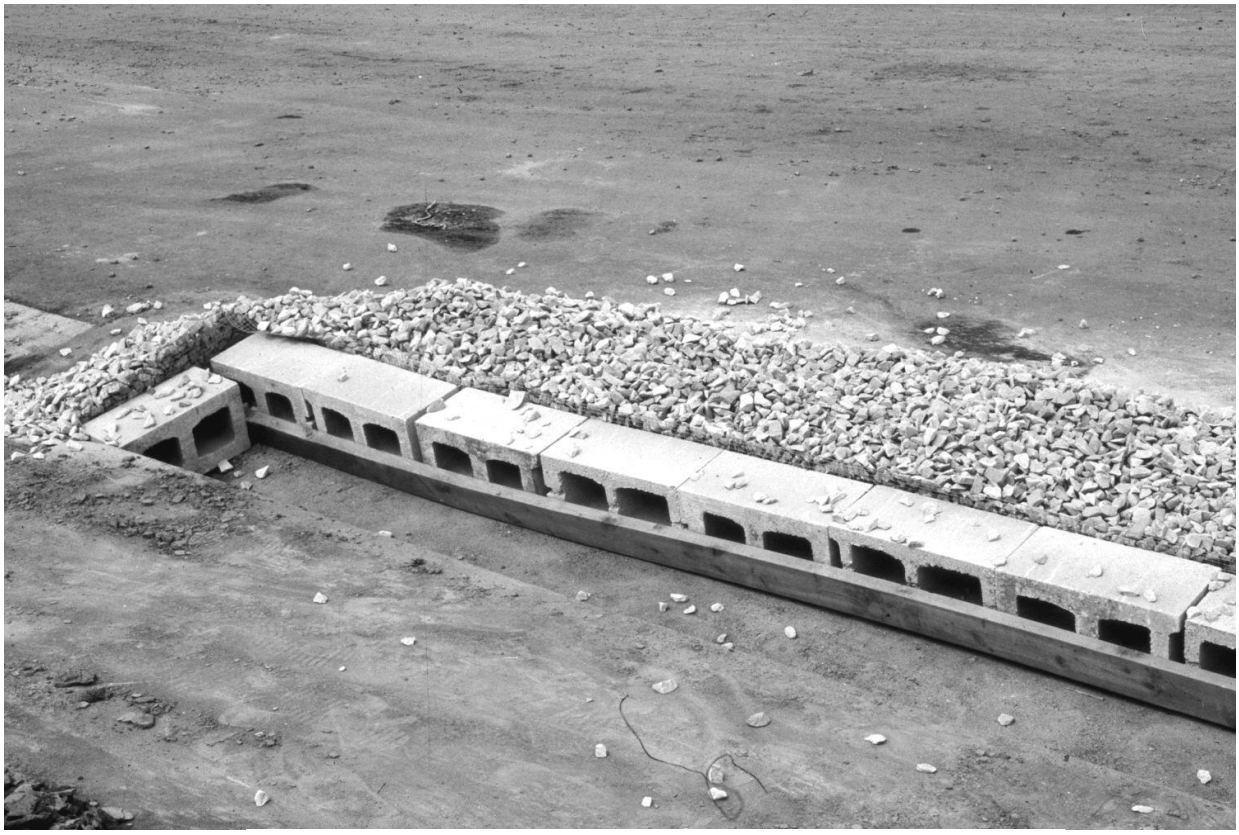
Plant seed and apply mulch.
How do you know this is the best solution.

Inspecting Inlet Barriers

Curb and Gutter Sediment Containment Systems

Area Drains

Inlet Inserts



Curb Inlet "Sump" Barrier

WHEN SHOULD IT BE INSTALLED?

- While construction activities are occurring.
- Only where sump conditions exist.

WHEN SHOULD IT NOT BE INSTALLED?

- After construction activities are completed.
- Where sump conditions do not exist.

WHAT NEEDS TO BE INSPECTED?

√ Is at least 25-mm (1.0-in.) diameter rock used?
√ Does runoff flow through the rock?
√ Does the rock need "raking?"
√ Can runoff flow over the rock?
√ Will runoff be diverted downstream?
√ Should the rock be replaced?
√ Have vehicles destroyed the structure?

WHAT MAINTENANCE ACTIVITIES CAN BE EXPECTED?

- Repair and replacement of rock.
- Removal of sediment.
- Removal of rock.

➢ General Information

√ Rock barriers are to be installed in "sump" conditions only.
√ Rock barriers in front of inlets provide little filtering effect and capture little sediment from runoff waters.
√ Warning signs should be used to alert drivers of the structures.
√ Rock barriers in front of inlets may cause destruction of the pavement due to excess seepage of runoff or freezing conditions.
√ If placed on a grade, the structure will divert runoff downstream and may cause flooding

Inlet Barriers

Curb Opening

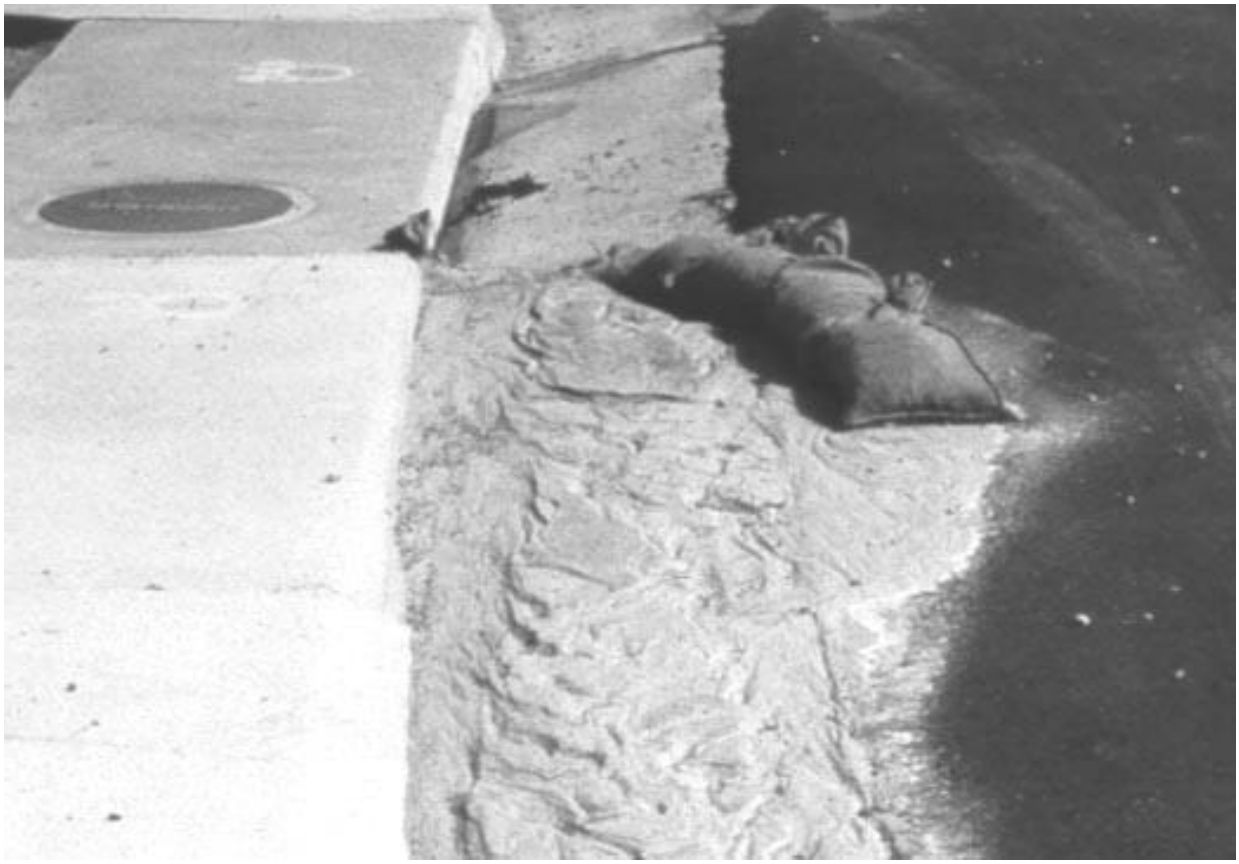
- Are barriers placed in front of an inlet where “sump” conditions exist?
  - √ *Downstream flooding may occur if sump conditions do not exist.*
  - √ *Downstream deposits of sediment may occur if sump conditions do not exist.*
- Does a gap exist between the barrier and curb in front of the opening?
- Will runoff enter the inlet from behind the structure?
- Will the barrier divert runoff around an inlet?
- Remember, inlets are designed to capture runoff.
- When can the barriers be removed?
  - √ *When contributing lands are stabilized*

Curb and Gutter Systems

- ➢ Use when an inlet is on a grade
  - √ *Install upstream of the opening*
- ➢ Subject to vehicular damage
  - √ *May need signage*
- ➢ Effectiveness to remove sediment from runoff waters is relatively small
  - √ *Usually only larger diameter sediments*

Rock Bags

- ➢ Are rock diameters 1.5 inches (40 mm) or smaller?
- ➢ Is the bag “over packed?”
- ➢ Does runoff flow under the bag?
  - √ *Caused by “over packing” by rock*
- ➢ Are the bags properly install and maintained to solve problems?



Curb and Gutter Containment System

WHEN SHOULD IT BE INSTALLED?

- While construction activities are occurring.
- Where street grades exist.

WHEN SHOULD IT NOT BE INSTALLED?

- After construction activities are completed and stabilization is completed.
- As the only method for controlling sediment from construction sites.

WHAT NEEDS TO BE INSPECTED?

- Are the bags about 2/3 full?
- Is deposited sediment being removed?
- Is the spacing correct (see table)?
- Have vehicles destroyed the bags?

WHAT MAINTENANCE ACTIVITIES CAN BE EXPECTED?

- Repair and replacement of bags.
- Removal of sediment.
- Removal of bags.

➢ General Information

√ Vehicles will destroy the bags.

√ Warning signs should be used to alert drivers of the structures

√ Deposited sediment must be removed after every runoff event.

√ Runoff waters should not be allowed to remain behind the bags.

Inlet Barriers

Area Drains (i.e. catch basins)

Area Drain Bale Barrier

WHEN SHOULD IT BE INSTALLED?

- Only where sump conditions exist
- While construction activities are occurring.

WHEN SHOULD IT NOT BE INSTALLED?

- After construction activities are completed.
- Where sump conditions do not exist.

WHAT NEEDS TO BE INSPECTED?

- Are the bales in a trench?
- Are wood stakes used?
- Will runoff flow over the bales?
- Does runoff flow between bales?
- Does upstream backfill material exist?
- Is the twine or wire above the ground?
- Will runoff be diverted downstream?
- Does runoff flow under the bales?

WHAT MAINTENANCE ACTIVITIES CAN BE EXPECTED?

- Repair and replacement of bales.
- Removal of the bales.
- Removal of sediment.

➢ General Information

√ Bale barriers are nearly 100% ineffective in reducing sediment in runoff waters.

√ Bale barriers experience more failures than successes.

√ Bale barriers do not filter runoff waters.

√ Bale barriers are expensive to install and maintain.

√ Bale barriers are to be installed in sump conditions only.

Area Drain Rock Barrier

WHEN SHOULD IT BE INSTALLED?

- While construction activities are occurring.
- Only where sump conditions exist.

WHEN SHOULD IT NOT BE INSTALLED?

- After construction activities are completed.
- Where sump conditions do not exist.

WHAT NEEDS TO BE INSPECTED?

- Is at least 25-mm (1.0-in.) diameter rock used?
- Does runoff flow through the rock?
- Has wire mesh been used?
- Does the rock need "raking?"
- Can runoff flow over the rock?
- Will runoff be diverted downstream?
- Should the rock be replaced?

WHAT MAINTENANCE ACTIVITIES CAN BE EXPECTED?

- Repair and replacement of rock.
- Removal of sediment.
- Removal of rock.

➢ General Information

√ Rock barriers around area drains will allow runoff to drain.

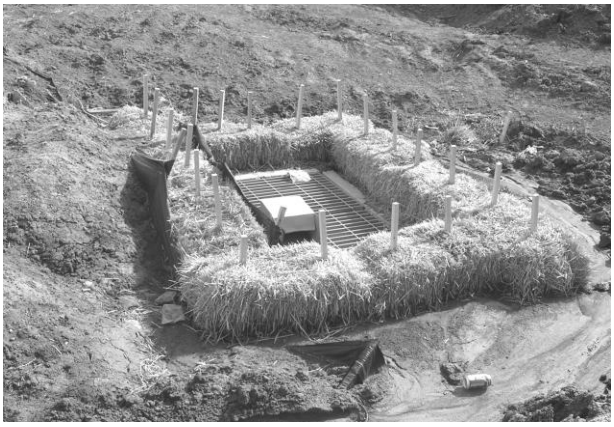
√ Use only wire mesh should be used instead of materials such as chicken wire.

√ Rock barriers are to be installed in "sump" conditions only. Rock barriers in front of inlets on a grade will divert runoff to downstream locations.

√ Rock barriers in front of inlets provide little filtering and capture little sediment from runoff waters for large frequency storm events.

Bale Barrier

- Does sump conditions exist?
- Are the bales installed correctly?
- Is maintenance necessary?
- Is sedimentation occurring?

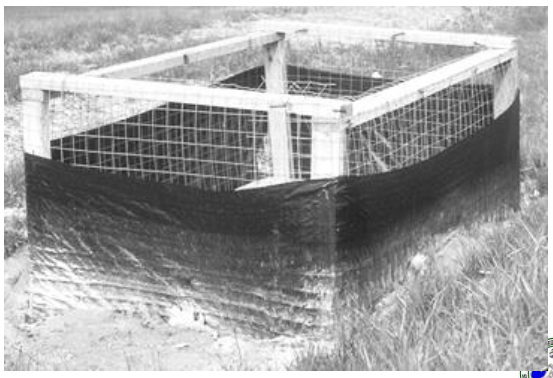


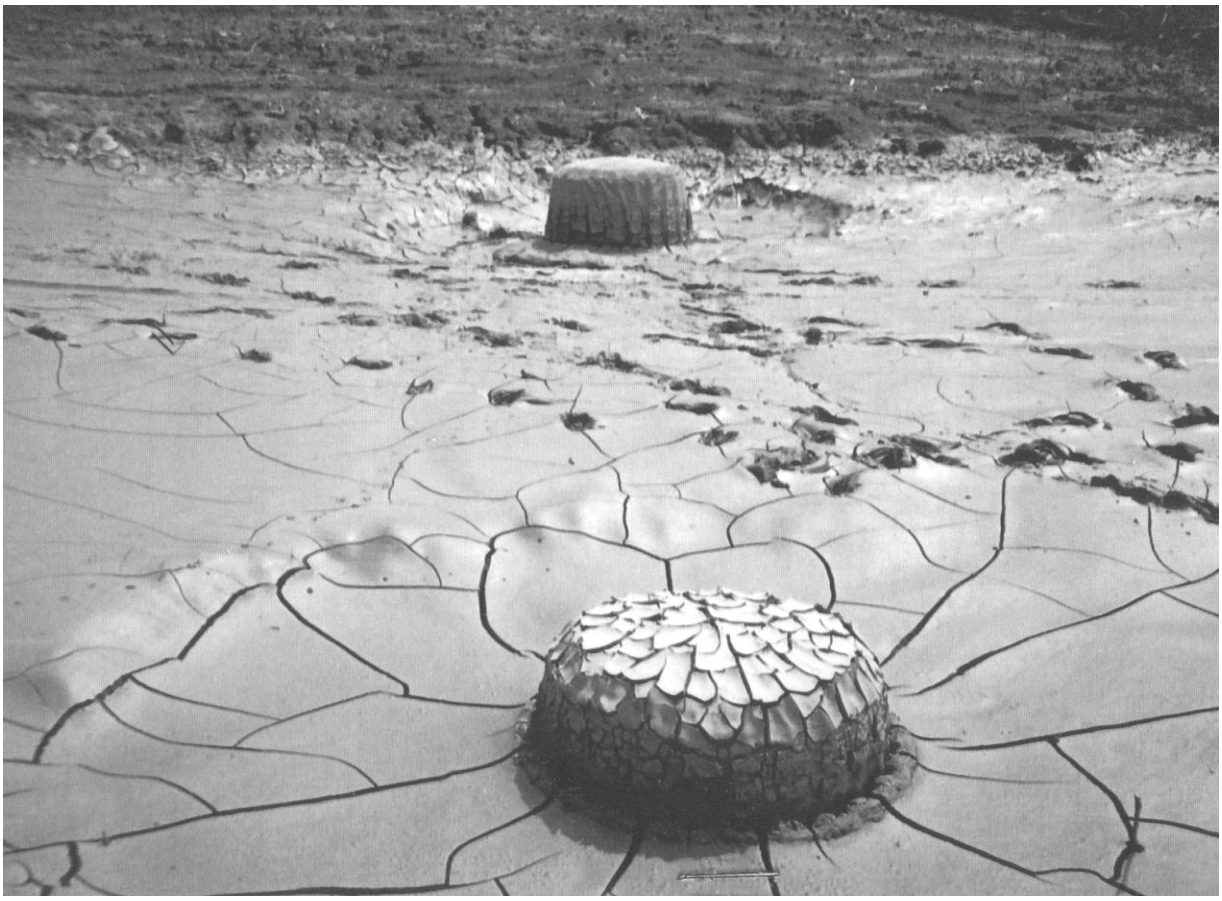
Rock barrier

- Allows water to drain
- Does sump conditions exist?
- Must have an internal support
- Rock diameter is very important
  - √ *Does 1½- to 2-inch (40- to 50-mm) diameter rock exist?*
  - √ *Does the "raking" of the rock need to occur?*
- Is sedimentation occurring?

Silt Fence Barriers

- Subject to failure.
- Not meant for concentrated flows unless adequately supported.
- High maintenance.
- Silt fence barriers are for "sheet" flow conditions
- Concentrated flows will usually destroy the barrier
- Must be adequately supported





Area Drain Frame and Filter Barrier

WHEN SHOULD IT BE INSTALLED?

- While construction activities are occurring.
- Only where sump conditions exist.

WHEN SHOULD IT NOT BE INSTALLED?

- After construction activities are completed.
- Where sump conditions do not exist.

WHAT NEEDS TO BE INSPECTED?

- Has the unit been placed over the grate?
- Does “sump” conditions exist?
- Is there sufficient soil or gravel to seal the cover?
- Is the fabric material torn?
- Does accumulated sediment cover 2/3 of the filter barrier height?
- Is the frame still supporting the fabric material?
- Does it appear that runoff is flowing under the fabric material?
- Does runoff drain through the fabric material?

WHAT MAINTENANCE ACTIVITIES CAN BE EXPECTED?

- Repair and replacement of gravel in the pocket that creates a seal with the ground.
- Removal of sediment around the unit.
- Replacement of fabric material.

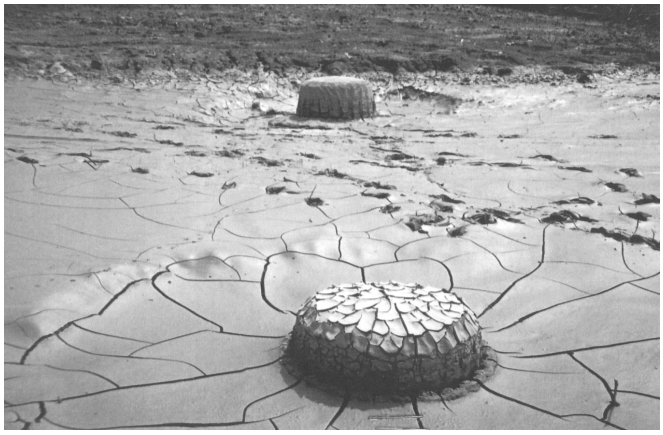
➢ General Information

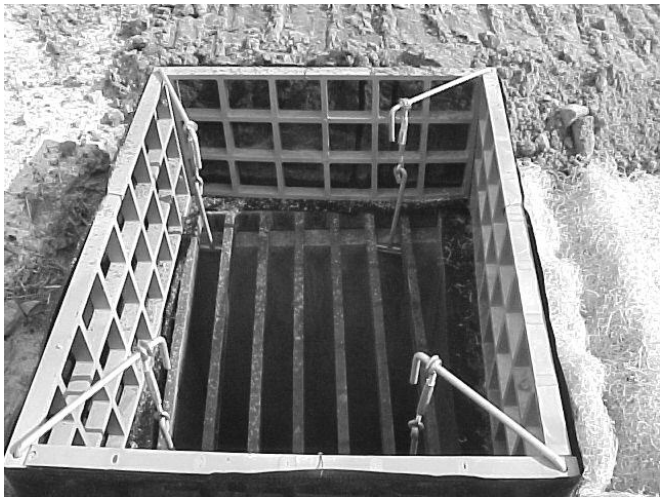
√ These barriers are to be installed in "sump" conditions only. If placed in front of inlets on a grade, runoff will be diverted to downstream locations and could cause flooding.

√ It is critical that a good seal exist between the ground and fabric material

Rigid Frame

- •Provide a rigid frame over the inlet
- •Provide a geotextile barrier with a seal at the base
  - √ *Usually small rock around the base*
- Must be in a “sump” location
- Attach a rigid frame around the inlet
- Provide a geotextile barrier with a base seal
- Must be in a “sump” location





Inlet Barriers

Inlet Inserts

Inlet Inserts

WHEN SHOULD IT BE INSTALLED?

- While construction activities are occurring.
- Within inlets that on a grade or in a sump.

WHEN SHOULD IT NOT BE INSTALLED?

- At a location to serve as the only sediment containment system

WHAT NEEDS TO BE INSPECTED?

√ Is the fabric material torn?
√ Will runoff flow onto the material?
√ Is the containment bag over ½ full?

WHAT MAINTENANCE ACTIVITIES CAN BE EXPECTED?

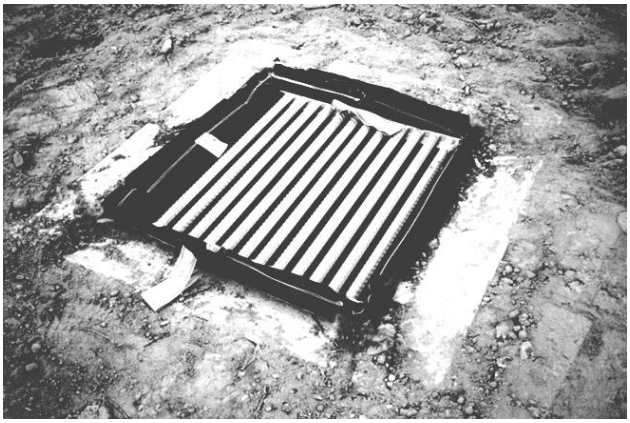
- Repair and replacement of fabric material.
- Removal of sediment.
- If freezing conditions occur, removal of sediment as part of the winterizing procedure.

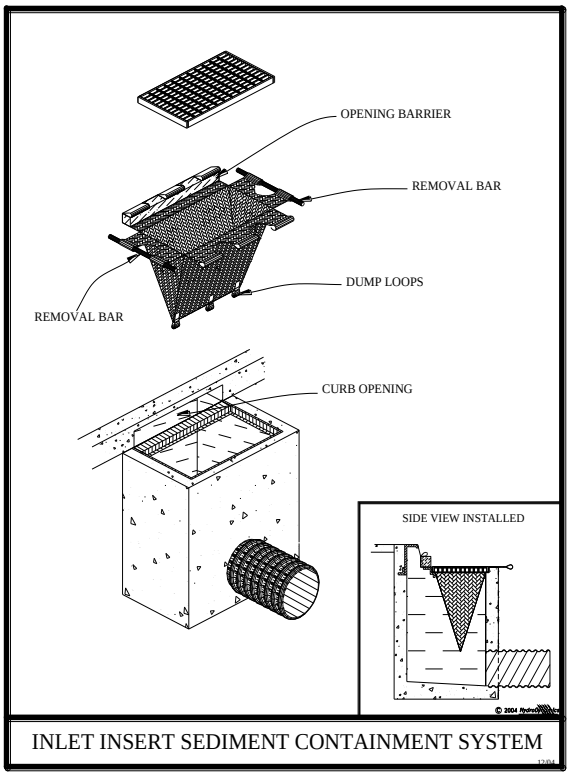
➢ General Information

√ Be sure to empty the units before winter freezing conditions occur.
√ Do not rely on these units to be the only sediment control device on a construction site.

Inlet Insert

- Are flaps on the outside?
- Is contained material significantly reducing the containment volume?
- Has “winterizing” occurred by emptying the bag?





INLET INSERT SEDIMENT CONTAINMENT SYSTEM

Instream Controls

The purpose of in-stream BMPs is to **isolate** the work area from the rest of the water body.

Accomplished by:

- Trapping suspended sediment in the work area
- Restricting the work area to as small a footprint as possible

Turbidity Barrier

When should it be installed?

Before construction activities begin.

- While construction activities are occurring.

WHEN SHOULD IT NOT BE INSTALLED?

- Where water currents move the curtain and dislodge collected sediments.
- After construction activities.

WHAT NEEDS TO BE INSPECTED?

- Does the curtain move?
- Does the curtain capture sediment?
- Does the barrier float?

WHAT MAINTENANCE ACTIVITIES CAN BE EXPECTED?

- Repair and replacement of material.
- Removal of sediment from curtain.
- Removal of curtain material.

➢ General Information

√ Do not install turbidity barriers where the flow of water will remove accumulated sediment and/or significantly move the curtain (e.g., in areas where tidal flows exist).

√ When used in a live stream, turbidity barriers must be installed parallel, not perpendicular, to the flow.

√ Removal of captured sediment behind the curtain may need to occur prior to removing the barrier.

Inspecting Best Management Practices

Record the location, inspection time, and corrective action items. If discharges are occurring, identify the point of discharge and document the visual quality (color, odor, floating, settled, or suspended solids, foam, oil sheen, etc.) and whether the stormwater controls are operating effectively.		Date Corrected (with initials)
Inspection Time and Location	Corrective Action Needed	
Location No. 1 Time:_____ ☐ Discharges are Occurring		
Location No. 2. Time:_____ ☐ Discharges are Occurring		
Location No. 3 Time:_____ ☐ Discharges are Occurring		

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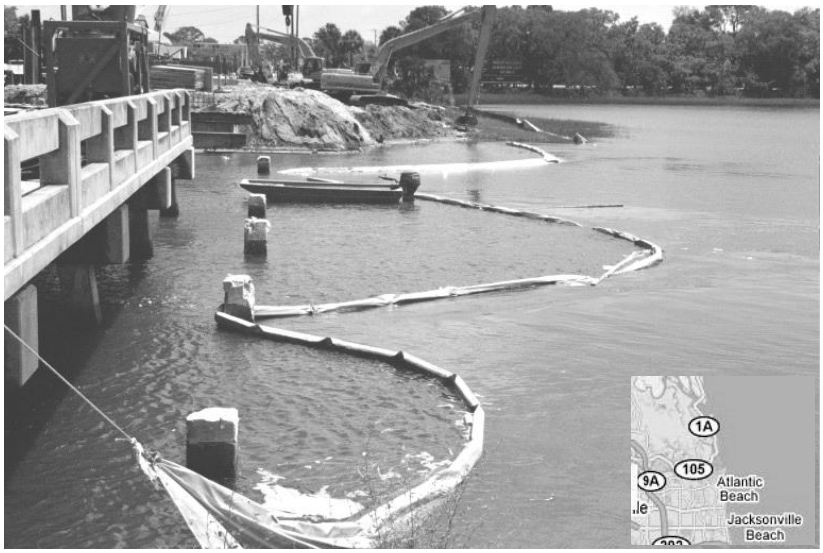
Inspecting Best Management Practices



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Location No. 2. Time:_____ ☐ Discharges are Occurring		
Location No. 3 Time:_____ ☐ Discharges are Occurring		

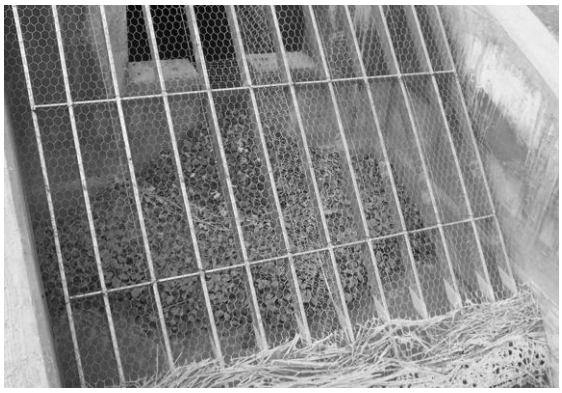
Inspecting Sediment Containment Systems

Sediment Containment Systems

- Sediment Basin/Pond: Contains runoff from more than 5 acres (2.0 ha) of contributing lands
- Sediment trap: Contains runoff from less than 5 acres (2.0 ha) of contributing land
- Inspecting Sediment Containment Systems
  - √ *Does sufficient storage volume exist for inflow waters?*
    - Need confirmation by the contractor, surveyor, or designer
  - √ *Do the embankments have erosion control?*
  - √ *Is the outlet structure functioning in a correct manner?*
    - Most critical part of an SCS
  - √ *Is there a method to discharge overflow waters*

Rock Barrier Outlet Structure

- Can replace troublesome outlet structure openings
- Can be part of a drainage system
- Need to minimize clogging of rock material
  - √ *Does 1 ½ - to 2-inch rock exist?*
  - √ *Does raking of the rock need to occur?*
  - √ *Does the rock barrier have sufficient height?*



Water Quality Plate Outlet Structure

- Openings control the discharge of contained waters
- Often covered with a stainless steel screen that becomes clogged
- Are the holes in becoming clogged?

Perforated Riser Pipe Outlet Structure

- Do perforations exist?
- Is 1- to 2-inch rock placed around the pipe?
- Is the height of the rock barrier adequate?
- Avoid wrapping perforated pipe with fabric material

Skimmer Outlet Structure

- Removes water from the upper 3-inches (75-mm) of contained waters
- More effective than rock barriers or riser pipes
- Is it installed correctly?
- Will the structure rise as runoff enters the pond?
- Is the vent pipe on top?

Skimmer Outlet Structure

WHEN SHOULD IT BE INSTALLED?

- Immediately after sediment containment systems are constructed.
- Before construction activities begin.
- While construction activities are occurring.

WHEN SHOULD IT NOT BE INSTALLED?

- No limitations

WHAT NEEDS TO BE INSPECTED?

- Overall appearance of the skimmer?
- Is the trash screen clogged?
- Are there any cracks or broken pieces?
- Is the skimmer draining properly?

WHAT MAINTENANCE ACTIVITIES CAN BE EXPECTED?

- Removal of trash from orifice.
- Repair of unit due to vandalism.

➢ General Information

√ Unless advised otherwise, resident time of contained waters within a Sediment Containment System should be at least 48 hours.

Inspecting Best Management Practices

Record the location, inspection time, and corrective action items. If discharges are occurring, identify the point of discharge and document the visual quality (color, odor, floating, settled, or suspended solids, foam, oil sheen, etc.) and whether the stormwater controls are operating effectively.		Date Corrected (with initials)
Inspection Time and Location	Corrective Action Needed	
Location No. 1 Time:_____ ☐ Discharges are Occurring		
Location No. 2. Time:_____ ☐ Discharges are Occurring		
Location No. 3 Time:_____ ☐ Discharges are Occurring		

Inspecting Stabilized Construction Entrances

Vehicle Tracking Pad

WHEN SHOULD IT BE INSTALLED?

- While construction activities are occurring.
- Before major overlot grading activities begin.

WHEN SHOULD IT NOT BE INSTALLED?

- When only impervious surfaces exist.
- After all construction activities cease.

WHAT NEEDS TO BE INSPECTED?

- Are the correct rock diameters used?
- Is there a depression for runoff?
- Is rock being carried out into a street?
- Does rock need to be replaced?

WHAT MAINTENANCE ACTIVITIES CAN BE EXPECTED?

- Replacement of rock.
- Removal of sediment on adjacent streets.
- Removal of structure.

➢ General Information

√ When small diameter rock is used, it will be tracked onto streets and could create liability problems with vehicles.

√ The purpose of a filter cloth is to ensure minimal movement of rock into the earthen material.

Rock Vehicle Tracking Pad

- Pad of rock-like material on top of filter cloth at site entrance/exit
- Causes removal of mud from construction equipment
- Can be expensive to install and maintain
- Must use sufficiently large diameter rock
  - √ *2- to 4-in. (50- to 100-mm)*
  - √ *Avoid 6-inch or larger rocks since they can get lodge between the dual tires of trucks*
- Are bare spots within the rock pad becoming evident?

Grates or Ridges

- Does sufficient length exist?
- Are the grooves clean?
- Does a rock pad exist and is it functional?
- Look for new and innovative methods

Tire washing

- Labor intensive
- Need to recycle the waste water
- Continual cleanup is necessary
  - √ *Is sediment being tracked away from the washing facility?*
  - √ *Is polluted water being discharged from the system?*

Inspecting Polymers

Use of Polymers Causes Flocculation

- **Creates large particles that fall rapidly**
- **Classification of Polymers**
  - **Cationic**
    - **Treated sediments attach to the gills of fish, which can cause suffocation**
  - **Anionic**
    - **Treated sediments do not attach to the gills of fish**

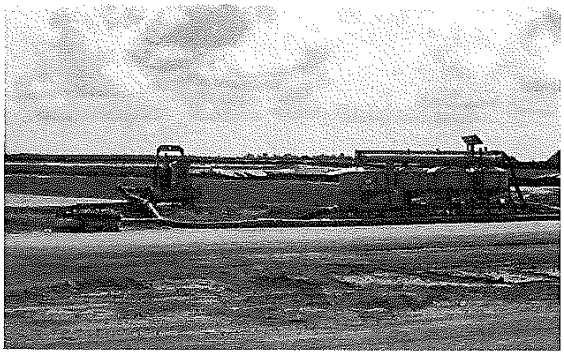
Polymers

Inspector's Responsibilities

- *Understand the designer's plan for implementation*
- *Collect records from whoever applied the products*
  - √ Record dates and location of product used
  - √ Obtain delivery tags of products used
  - √ Check and verify specifications

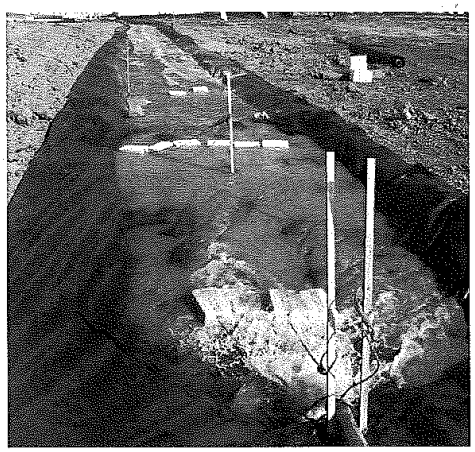
Liquid Treatment System

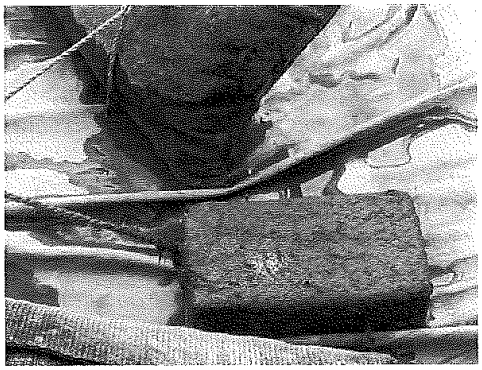
- *Is water being removed near the pond surface?*
- *Is injection of polymer occurring?*
- *Are the hoses leaking?*
- *Are problems with the filters evident?*



Solid Treatment System

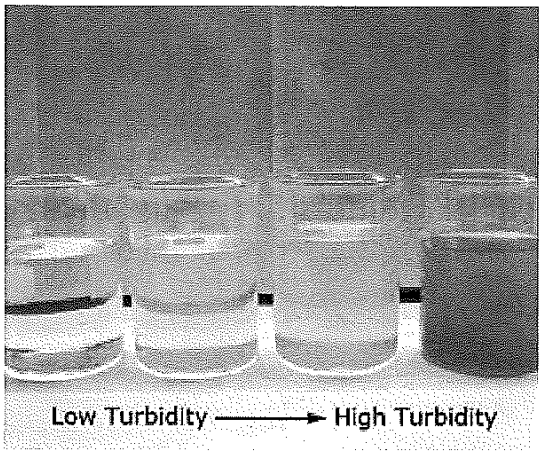
- *Are inflows in contact with the polymer blocks?*
- *Is "bridging" of the blocks occurring?*
  - √ Blocks are coated with deposited sediments
- *Is deposition occurring in the collection chamber?*
- *Do discharges have an odor or appear to contain large amounts of sediment?*





Do discharges meet specifications?

- *Is the treatment method functional?*
- *Has sediment rendered the polymer source ineffective?*
- *Is deposition of sediment evident?*
- *Compile records and reports*
  - √ Information on inflow and outflow waters
  - √ Qualifications of personnel collecting samples
  - √ Turbidity of inflow and outflow waters
  - √ Water quality parameters
- *Maintain contact with the designer and regulatory agencies?*



Inspecting Erosion Control BMPs

Erosion Control BMPs

Erosion controls generally perform one of two functions:

- dissipate energy
- divert surface runoff

Erosion controls are the most important line of defense!

1. Methods that minimize erosion
   a) Generally identified as “non-structural” methods
2. Diversion structures
   a) Slope drains
   b) Diversion berms
   c) Conveyance channels
   d) Stream crossings
3. Erosion control methods
   a) Soil Roughening
   b) Planting seeding or installing sod
   c) Applying mulch
   d) Soil binders
   e) Rolled Erosion Control Products (RECP)
   f) Riprap

Erosion Control BMPs

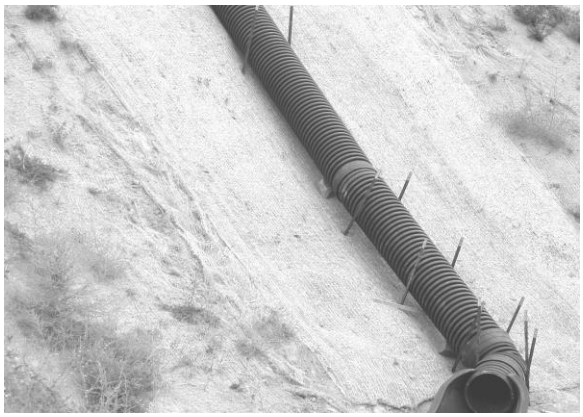
Diversion Structures

Earthen Dike/Berm Diversion Structure

- ➢ Used to direct runoff (e.g., toward an SCS)
- ➢ Inspection requirements
  - √ *Will runoff remain within the diversion channel?*
  - √ *Are the embankments stabilized?*
  - √ *Is the discharge area stabilized?*

Slope Drains

- ➢ Inspection Requirements
  - √ *Correct pipe diameter?*
  - √ *Does an adequate method to capture runoff exist?*
  - √ *Is the pipe held in place down the hillside?*
  - √ *Do proper discharge methods exist?*



Slope Drains

WHEN SHOULD IT BE INSTALLED?

- While construction activities are occurring.
- After construction activities are finished.

WHEN SHOULD IT NOT BE INSTALLED?

- When contributory basins are large.

WHAT NEEDS TO BE INSPECTED?

- Are there areas where the earthen berm has been breached?
- Will runoff flow into the drainpipe?
- Is runoff flowing around the slope drainpipe?
- Is runoff discharging into an embankment?
- Is the pipe secured to the hillside?
- Is there protection (i.e. riprap) at the end of the slope drainpipe?

WHAT MAINTENANCE ACTIVITIES CAN BE EXPECTED?

- Repair or replacement of slope drain.
- Replacement of riprap.
- Repair breached sections of earthen berm.
- Removal of pipe.

Erosion Control BMPs

Rolled Erosion Control Products (RECP)
Turf Reinforcement Mats (TRMs)

RECP for Disturbed Hillsides

WHEN SHOULD IT BE INSTALLED?

- While construction activities are occurring.
- After construction activities are finished.

WHEN SHOULD IT NOT BE INSTALLED?

- Over very rough ground having extensive amounts of rock, rills, or gullies.
- On slopes where weeds are established.

WHAT NEEDS TO BE INSPECTED?

- Does the RECP have any damage?
- Did planting of seed occur before installing the RECP?
- Is runoff flowing under the blanket and causing erosion?
- Is the material secured to the slope with a sufficient number of staples?
- Was the RECP installed correctly?
- Was the top of material secured in a trench or by some other method?

WHAT MAINTENANCE ACTIVITIES CAN BE EXPECTED?

- Repair and replacement of material.
- Repair of eroded ground.

➢ General Information

√ RECPs are composed of natural material including straw, straw-coconut, coconut (or coir), wood excelsior, and so forth. They must be held in place with netting sewn on both sides of the material.

√ Material must be placed in an uphill trench or adequately stapled at the top of a slope.

√ Additional information on RECPs can be found at www.ectc.org.

TRM for a Drainage Channel

WHEN SHOULD IT BE INSTALLED?

- While construction activities are occurring.
- After construction activities are finished.

WHEN SHOULD IT NOT BE INSTALLED?

- Over impervious surfaces.
- On very rough ground.

WHAT NEEDS TO BE INSPECTED?

- Does the RECP display any damage?
- Was the channel bed smooth before the RECP was installed?
- Have check structures (staple, trench, or other) been installed?
- Is runoff flowing under the blanket and causing erosion?
- Are sufficient numbers of staples used?
- Is the correct material used?
- Was seed planted before installing the RECP?
- Should straw mulch be used?

WHAT MAINTENANCE ACTIVITIES CAN BE EXPECTED?

- Repair and replacement of material.
- Repair of eroded ground.

➢ General Information

√ Erosion Control Blankets (ECBs) are composed of natural material including straw, straw-coconut, coconut (or coir), wood excelsior, and so forth held in place with netting sewn on both sides of the material.

√ Turf Reinforcement Mats (TRMs) are composed of 100% polypropylene or nylon straw-coconut or coconut matter reinforced with strands of polypropylene threads and held in place with netting sewn on both sides of the material.

RECPs and TRMs

- RECP = Rolled Erosion Control Products
- TRM = Turf Reinforcement Mat
- Organic and inorganic material
- Net and net less material
- Inspecting hillside RECP installations
  - √ *Is material anchored?*
  - √ *Do sufficient staples exist down the hill to ensure maximum soil contact?*
  - √ *How good is the vegetation establishment?*
  - √ *Is "tenting" occurring?*

- Inspecting channel TRM installations
  - √ *Is the material anchored at the top?*
  - √ *Is there good contact with the channel?*
  - √ *Do sufficient number of staples exist?*
  - √ *Is the overlap correct?*
  - √ *Do adequate check structures/slots exist?*
  - √ *Was grass seed planted before installing the TRM?*

Erosion Control BMPs

Vegetation

Erosion Control and Vegetation

Maintain Existing Vegetation

One of the most effective methods for minimizing erosion is to only disturb areas immediately needed for construction. By "staging" land-disturbance activities, existing vegetation reduces the potential for sediment generation due to erosion of bare ground. Existing vegetation also provides “buffer strips” to remove suspended particles from sheet flows. This is important when construction activities occur near a watercourse.

WHAT NEEDS TO BE INSPECTED?

- Inspect the area prior to start of construction activities to ensure vegetated areas to be avoided are properly marked and protected.
- Inspect area periodically during construction for encroachment of construction activities into protected areas and for any breach in fencing or other barrier.
- Are construction activities impacting historic vegetation areas?
- Does sediment really need to be removed from the existing vegetation area?

WHAT MAINTENANCE ACTIVITIES CAN BE EXPECTED?

- Maintain fencing and barriers as needed.
- Inspect existing vegetation for signs of stress. If needed, apply seed or transplant vegetation to maintain natural vegetative covering where possible.
- Possible removal of deposited material.

➢ General Information

√ After areas to be protected are marked, area available for construction activities may be limited.

√ When possible, existing vegetated drainage channels should not be disturbed during initial land clearing stages of a project.

The most efficient and economical method for controlling erosion and minimizing sediment yields is to establish a vegetative cover. Two common methods are used: placing and establishing sod on disturbed lands or planting and establishing seed.

Installing Sod

Sod provides a quick and relatively inexpensive method for establishing vegetation, but can be very labor intensive. While sod planted on a disturbed slope provides nearly instantaneous vegetation establishment, it cannot be classified as being a success within drainage channels until root establishment is a reality.

WHAT NEEDS TO BE INSPECTED FOR INSTALLING SOD?

- Has a proper soil bed been prepared?
- Is the sod "live" and viable?
- If on a hillside, has the sod been "pegged" in place?
- Has the sod been installed in a correct manner?
- Is the sod becoming established?

WHAT MAINTENANCE ACTIVITIES CAN BE EXPECTED?

- Replacement of sections where, if in drainage channels, "rolling" of sod occurs after experiencing flows.
- Replacement of sections due to lack of establishment, perhaps due to lack of moisture.

Planting Seed

When topsoil material is reapplied on disturbed lands, it usually contains abundant amounts of grass (and hopefully minimal amounts of weed) seeds that existed before construction activities began. Sometimes this is all that is needed to re-establish vegetation. However, planting of seed is often necessary.

Methods for planting of seed include using a drill, broadcasting seed on the ground, or hydraulically applying seed.

Advantages of planting seed include low initial costs, reduction of expenses associated with sediment control, low labor requirements, and ease of establishing vegetation.

Some disadvantages of planting seed include the potential for erosion during the establishment stage, limited time period for planting during the year, inadequate soil nutrients, and not having sufficient soil moisture conditions for germination of the seed.

WHAT NEEDS TO BE INSPECTED FOR PLANTING SEED?

- Is the correct seed mixture being used?
- Has the drill been calibrated?
- Is the correct application rate of seed occurring depending upon the planting methods?
- Is there a need for a “two step” process for planting seed and applying mulch by hydraulic methods?
- Where are the seed tags to ensure correct seed is used?
- Will soil amendments be required and, if so, when will they be applied?

WHAT MAINTENANCE ACTIVITIES CAN BE EXPECTED?

- Repair coverage and re-apply seed material as needed.
- If plant seeds fail to germinate, or established plants die, area may have to be re-planted.

Fertilizer Requirements

When limited topsoil material is available, it may be necessary to apply soil amendments such as fertilizers. Fertilizers are compounds given to plants to promote growth and can be organic (e.g., manure, topsoil, compost) or inorganic (i.e., chemicals or minerals). They typically provide major plant nutrients (nitrogen, phosphorus, and potassium), secondary plant nutrients (calcium, sulfur, and magnesium), and sometimes trace elements (boron, chlorine, manganese, iron, zinc, copper, and molybdenum).

It is important that inspectors confer with contractors responsible for vegetation establishment to determine whether they are testing the soil for nutrients (this may be a requirement of the ESC plan or specifications) and/or are applying a “standard major plant nutrient” mixture. If fertilizer is to be applied, inspectors should record the nutrient composition, method of treatment, the amount per unit area, and date applied.

Erosion Control BMPs

Mulches

Mulches

Mulches are applied over the soil surface to reduce erosion from rainfall and wind. They are also used to aid the establishment of vegetation. Some typical uses for mulches include:

- Reduce soil erosion by wind and raindrop impact through temporary soil stabilization,
- Providing cover until vegetation can be established,
- Adding soil amendments such as organic matter and fertilizers,
- Improving soil structures, and
- Decrease the velocity of runoff over exposed soil areas, which increase the infiltration of runoff.

Successful use of dry or hydraulic mulches is dependent upon a rapid establishment of vegetation. Once vegetation becomes well established, and minimal amounts of weeds are present, erosion protection is provided by the vegetation root system and canopy cover.

Dry Mulches

Mulches can be classified as “dry” or “wet” products. Dry mulches usually consist of organic materials, whereas wet mulches are applied with hydraulic equipment and also consist of organic materials.

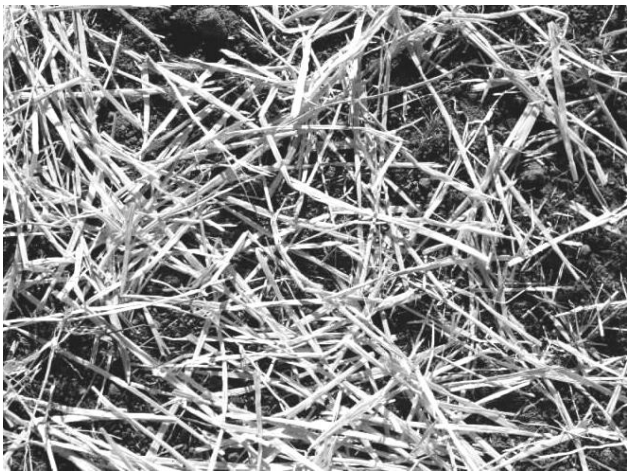
Dry mulches can be:

- ➢ Straw or Hay
- ➢ Compost materials
- ➢ Rolled Erosion Control Products (RECPs)
- ➢ Rock

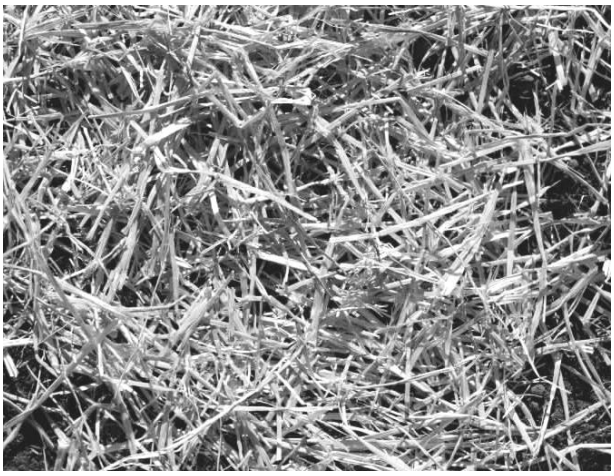
The standard application rate of straw mulch is about 2.0 tons/acre (4.5 tonnes/ha) with 80% to 100% ground coverage of material having minimum fiber lengths of 6.0- to 8.0-inches (150- to 200–mm). Dry mulches must be held in place, usually by crimping or applying a tackifier.

The action of crimping forces, or punches, fibers into the ground by use of a weighted disk. When straw mulch fibers are short, anchoring mulch material by crimping usually will not occur and removal by wind happens. A tackifier can overcome some wind removal problems by “gluing” the fibers together. However, strong winds could still remove sections of tackified dry mulches.

- ➢ Inspecting dry mulches
  - √ *Are the fibers at least 6-in. (150-mm) in length?*
  - √ *Is there at least 80% coverage of the soil?*
  - √ *Is the material held in place by crimping or applying a tackifier?*
- ➢ Removal of mulch by wind requires replacement



0.5 tons/acre of straw mulch



1.0 ton/acre of straw mulch

1.5 tons/acre of straw mulch

2.0 tons/acre of straw mulch

WHAT NEEDS TO BE INSPECTED FOR MULCHES?

- Is there coverage of 80% to 100%?
- Is the fiber length of straw mulch sufficient?
- Has anchoring of dry mulch occurred
- Has wind removed dry mulch?
- Has runoff removed hydraulic mulch?
- Is mulch being applied immediately after planting of seed?
- Will soil amendments be required and, if so, when will they be applied?

WHAT MAINTENANCE ACTIVITIES CAN BE EXPECTED?

- Apply additional mulch when wind or runoff removes the material.

Hydraulic Mulches

Hydraulic mulches have an advantage in that they can cover the ground but do not have to be crimped as with dry mulches. They are a mixture of shredded wood, paper, or corn stalk fiber and often include a stabilizing emulsion, tackifier, or polymer that can be applied with specialized equipment. However, without a "tackifier" to help bind the material, hydraulic mulches are susceptible to removal by precipitation and runoff.

- Inspecting hydraulic applications of mulch
  - √ *Is the amount of material applied per specifications?*
  - √ *Did you count the number of bags?*
  - √ *Is the specified mulch being used?*
  - √ *Is the cover uniform?*
  - √ *After applying mulch material, do "shadows" exist*
  - √ *Does 100% coverage exist?*

Controlling Wind Erosion

Physical Barriers

- ✓ *Need openings for wind to "flow" through*
- ✓ *Every foot in elevation results in about 8- to 10-foot deposition zone on the leeward side*
- ✓ *High maintenance*
- ✓ *Problems with deposition impacting downwind properties*
- ✓ *Susceptible to damage*
- ✓ *Silt fence barriers are not designed to be wind barriers*

Soil Roughening

- ✓ *Can temporarily reduce wind erosion by up to 80%*
- ✓ 6-inches (150-mm in height)
- ✓ *Avoid smooth ground*
- ✓ Enhances saltation
- ✓ *High maintenance*
- ✓ Ridges fill in with wind borne soil

Liquid Applications

- ✓ Water
  - High maintenance
  - Rapid evaporation
- ✓ Chemical
  - Soil binders
  - Magnesium Chloride
  - Creates a crust
  - Will be destroyed by vehicular traffic

Long Term Solutions

- – Maintain non-erodible material
  - Keep existing vegetation
- – Root system minimizes erosion
- – Stabilize disturbed areas after final grading
  - Planting seed and applying hydraulic mulch

BMPs for Hazardous & Waste Materials

Inspection Guidelines for Hazardous and Waste Material BMPs

While inspectors usually associate BMPs with sediment and erosion control methods, they also need to be ready to assess methods that prevent spillage on potential hazardous waste sites. Usually, the general contractor or builder provides BMP methods for these areas.

Criteria for storage of hazardous waste material (e.g., petroleum products, pesticides, paints, etc.) are stringent and inspections should include (but are not limited to) the following items:

1. Determining whether temporary facilities are away from water bodies and include sufficient spill containment areas and impervious surfaces,
2. Assessing whether maintenance of temporary containment facilities (e.g., concrete washouts) are adequate to protect against problems associated with rainfall and spills,
3. Providing secondary containment and/or covering,
4. Ensuring that proper drum storage facilities and labeling exists,
5. Identifying locations where cleaning of paint related equipment occurs,
6. Locating refueling and maintenance of equipment areas to ensure any hydrocarbon spills are properly addressed,
7. Ensuring that portable toilets are located away from storm sewer systems, off paved roads, and properly anchored to the ground,
8. Assessing whether proper disposal procedures for waste material (e.g., metal bins with covers, regular trash removal, removal of concrete waste, etc) exists, and
9. Procedures are in place by the contractor for addressing and reporting hazardous and non-hazardous spills.

Inspecting Concrete Washouts

- Do temporary concrete containment facilities exist?
  - √ *Are signs posted?*
  - √ *Is the washout material contained?*
  - √ *Is there a vehicle-tracking pad at the facility?*
- •Alternatives
  - √ √*Small containment*
  - √ √*No separate temporary containment facilities*
  - √ *Portable stations*

Inspecting BMPs for Hazardous and Waste Materials

While inspectors usually associate BMPs with sediment and erosion control methods, they also need to be ready to assess methods that prevent spillage on potential hazardous waste sites. Usually, the general contractor or builder provides BMP methods for these areas.

Criteria for storage hazardous waste material (e.g., petroleum products, pesticides, paints, etc.) are stringent and inspections include (but are limited to) the following items:

10. Determining whether temporary facilities are away from water bodies and include sufficient spill containment areas and impervious surfaces,
11. Assessing whether maintenance of temporary containment facilities (e.g., concrete washouts) are adequate to protect against problems associated with rainfall and spills,
12. Ensuring that proper drum storage facilities and labeling exists,

13. Identifying locations where cleaning of paint related equipment occurs,
14. Locating refueling and maintenance of equipment areas to ensure any hydrocarbon spills are properly addressed,
15. Ensuring that portable toilets are located away from storm sewer systems, off paved roads, and properly anchored to the ground,

16. Assessing whether proper disposal procedures for waste material (e.g., metal bins with covers, regular trash removal, removal of concrete waste, etc) exists, and
17. Procedures are in place by the contractor for addressing and reporting hazardous waste spills.

Inspection Summary for Sediment Control BMPs

Sediment Containment Systems	• Has sediment filled to within 50% of the height needed to discharge runoff through the outflow structure? • Is the outflow structure installed as illustrated in the plans? • Are the embankments protected against erosion?
Barriers	
Bales	• Are they installed in trenches? • Are they tightly abutting, with material stuffed between bales? • Are they staked? • Has backfill material been placed on the upstream side? • Is runoff water running around, below, or between the bales?
Silt Fence	• Is the material buried in a trench and backfilled? • Are the stakes installed correctly with proper spacing? • Is the fabric on the upstream side of the stakes? • Has deposited sediment removed 50% of the containment volume? • Is runoff water running around, below, or between the fabric materials?
Continuous Berm	• Has the berm been installed correctly? • Is the berm large enough to contain the necessary flows? • Are there signs of erosion on the berm itself?
Other	• Are barriers causing local flooding problems? • Are barriers creating problems in other locations?

Inspection Summary for Sediment Control BMPs (continued)

Check Structures	
Bales	• Are the bales staked and tight with each other? • Have the bales been installed in a trench and backfilled? • Will water be forced to run over a center bale and not around the end bales? • Is the ground below where water flows over the bales eroding?
Crushed Rock	• Is the correct-size rock being used? • Will water flow over the middle instead of around the edges? • Has movement of rock occurred?
Other	• If other materials are used, are they properly anchored in place? • Does the structure need to be maintained? • Does sediment need to be removed?
Drains/Inlet Protection	
Bales	• Are bales used? If so, they might have to be removed.
Rock	• Does rock cover the inlet opening? • Are rock diameters about 25 to 50 mm (1.0 to 2.0 in.)? • Is the rock barrier installed correctly? • Has the rock barrier been installed in front of an inlet that is a “sump”?
Inserts	• Has the structure been installed correctly? • Will the structure prevent runoff water from entering the storm sewer system? • Has sediment filled up the structure? When will the sediment be removed?
Other	• Are freezing conditions impacting the protection measures?

Inspection Summary for Erosion Control BMPs

Drainage Control	
Diversion and Containment Dikes	• Are they protected against erosion? • Have they been constructed to control and divert anticipated flows? • Should the bottom be lined with any material to prevent erosion?
Slope Drains	• Will runoff water be diverted into the pipe? • Does sufficient protection exist to prevent failure from piping? • Is the pipe anchored? • Does erosion protection exist where water discharges? • Are they functioning in a manner for which they were designed?
Vegetation	
Staging of Construction Activities	• Does all the ground need to be disturbed? • How much land is being disturbed and how much can remain in vegetation? • If activities in one area are complete, can the area be re-vegetated or otherwise stabilized?
Planting of Perennial Seed	• Have soils been prepared to receive seed? • Are drill marks evident that are parallel or perpendicular to land contours? • Has the seed tag been checked and the mixture verified? • If seed was applied hydraulically, how much was used? • If seed was broadcast, was the ground raked? • What time of year was the seed planted? • Are weeds becoming established? • Is supplemental watering required? • Will the seed stay in place?
Planting of Temporary, Nursery, or Cover Crop	• What type of seed was used? • How long will the vegetation be in place before planting of perennial grass occurs? • When was the seed planted?

Inspection Summary for Erosion Control BMPs (continued)

Mulches and Binders	
Dry/Hydraulic Mulch	• Does the mulch cover 80% to 100% of the bare ground? • If dry mulch is applied, how is it held in place? • Has wind removed the dry mulch, and is this a problem?
Soil Binder	• What type of material was used? • When was it applied? • Does the material still control erosion?
Hillside Protection by RECP	• Is the material properly installed at the top? • Are sufficient staples used? • Does the material overlap along the edges? • Does the material need to be repaired? • Does the material cover all the exposed areas?
Channel Protection by ECBs and TRMs	• Is the material properly installed at the top? • Are sufficient numbers of staples used? • Is the material properly stapled or trenched along the edges? • Should a rock check structure be installed on top of the material?

Inspection Summary for Wind-Borne Particles

Soil Roughening	• How deep are the furrows? • Are the furrows filling up with soil? • Are the furrows perpendicular to the prevailing wind?
Wind Barriers	• Have they been installed perpendicular to what is accepted as the "prevailing" wind direction? • Are they in need of repair or replacement? • Have the structures been placed where maximum deposition of wind-borne particles can occur?
Vegetation	• Is the ground bare? • How tall and/or dense is the vegetation?
Hydraulic Mulch/ Soil Binder	• Has sufficient material been applied? • How long will the material be expected to control erosion? • Has the material broken down, and is it still effective?
Other	

Module 3

Regulations and Compliance

Table of Contents

MODULE 3 OBJECTIVES

- To provide an overview of the regulatory agencies and applicable legislation that relates to the protection of aquatic environments
- To provide a clear understanding of the potential penalties that exist for non-compliance

INTRODUCTION

There are extensive environmental legislation and regulations that have been enacted to guide construction activities away from natural environmental impacts. It is from within these regulatory boundaries that a construction project must be considered at the beginning through to completion. Understanding the regulatory environment in which an undertaking is developed and implemented is critical in ensuring that every effort is made to acquire and comply with all the necessary approvals and permits.

The potential consequences of non-compliance with any such applicable legislation are extensive. These might include, but are not limited to:

- Increased regulatory scrutiny;
- Tarnished professional reputations;
- Construction shutdowns;
- Costs of additional assessments/restoration;
- Substantial legal costs;
- Monetary fines;
- Relinquished work permits; and/or,
- Imprisonment – in some cases.

Under Canadian law, there are two categories of offences: **common law offences** and **regulatory offences**. Common law offences are based on previous court decisions rather than written law. Regulatory offences are those offences that are created by statutes, such as the *Fisheries Act* or the *Canadian Environmental Protection Act (CEPA)*.

Statutes are passed by Federal and Provincial legislatures. Federal statutes apply across the entire country, while statutes passed provincially only apply within the respective Provincial jurisdiction. Most environmental statutes contain provisions for enforcement inspections and investigations, as well as penalties that may be levied against individuals and companies.

It is important to note that the specific details provided below are not meant to be exhaustive as the intricacies of each undertaking are matched equally to the regulatory requirements. It is highly recommended that practitioners familiarize themselves with the specific details of all applicable legislation.

References to the Federal legislation discussed in this module are found at the end of this module. The Acts pertaining to erosion and sediment control are not limited to those listed in this module.

DUE DILIGENCE

The defence of due diligence is commonly available to an accused person charged with an offence, including charges laid under statutes, such as the *Fisheries Act*. The primary means of demonstrating due diligence is to demonstrate that "all reasonable steps" to prevent the offence from occurring were taken.

These "reasonable steps" is referred to as the "standard of care", and must be more than that expected of an ordinary citizen and at the very least, that of a professional with expertise in the area. The requirement to take "all reasonable steps" places a significant responsibility on the erosion and sediment control designer and inspector.

*Exercising **due diligence** means:*

- demonstrating every reasonable effort was made;
- addressing any problems that are foreseeable and preventable;
- addressing problems in a timely manner to minimize environmental impacts; and,
- Ensuring required actions have been carried out.

REGULATORY REQUIREMENTS

Federal Legislation

Federal Environmental legislation includes:

- Fisheries Act;
- Species at Risk Act;
- Canadian Environmental Protection Act;
- Navigation Protection Act

FEDERAL LEGISLATION

Fisheries Act

The *Fisheries Act* is administered by Fisheries and Oceans Canada (DFO) and established to manage and protect Canadian fish and fish habitats. The Act applies to all Canadian fisheries waters (public or private) and may apply to both permanently wetted areas and intermittently wetted habitat features. Through this legislation, management of physical, chemical and biological attributes, which are required by fish to carry out their life processes, can occur.

DFO is responsible for developing and implementing policies and programs in support of Canada's economic, ecological and scientific interests in oceans and inland waters. The Act Legislates fish and fish habitat protection in two primary ways: Fisheries Protection and Pollution Prevention Provisions.

The Act requires that fish and fish habitat are protected during construction. Commonly, undertakings will intrude into this realm where there is:

- Realignment or intrusion into a stream channel;
- Restrictions to fluvial processes;
- Impacts to riparian corridors;
- Infilling of habitats, wetlands and coastal marshes;
- Channelizing and piping headwater inputs;
- Inputs of substances from construction deemed deleterious (harmful) to aquatic life; and,
- Dewatering operations.

Along with DFO, Environment Canada may also enforce pollution provisions of the *Fisheries Act* (s.36.3). Common construction site pollutants that could have a negative effect on fish or fish habitat include sediment, concrete wash water and fuel spills.

KEY DEFINITIONS

Fish – “parts of fish; shellfish, crustaceans, marine animals and any parts of shellfish, crustaceans or marine animals; and the eggs, sperm, spawn, larvae, spat and juvenile stages of fish, shellfish, crustaceans and marine animals”

Fish Habitat – “spawning grounds and nursery, rearing, food supply and migration areas on which fish depend directly or indirectly in order to carry out their life processes”

Deleterious Substance – “A substance or water containing substance in such quantity or concentration, or that has been so treated, processed or changed, by heat or other means, from a natural state that it degrades or alters water quality to the detriment of fish, fish habitat or use by man of fish found in the receiving water”

Canadian fisheries waters – “all waters in the fishing zones of Canada, all waters in the territorial sea of Canada and all internal waters of Canada”

Water frequented by fish – “means Canadian fisheries waters”.

APPLICABLE PROVISIONS

Section 34.4 (1): No person shall carry on any work, undertaking or activity that results in the death of fish

Section 35(1): No person shall carry on any work, undertaking or activity that results in the harmful alteration, disruption or destruction of fish habitat.

Section 35(2): A person may carry on a work, undertaking or activity without contravening the Act.

Section 36(3): Prohibits anyone depositing or permitting the deposit of a deleterious substance in an area frequented by fish or where water may enter such an area.

Section 38(4): Creates a duty to notify death of fish or harmful alteration, disruption or destruction of fish habitat

Section 38(5): Creates a duty to notify the deposit of a deleterious substance

Section 38(6) requires any person responsible to prevent an occurrence or to counteract, mitigate or remedy any adverse effects that results or may result from an occurrence.

Section 38(7.1): An inspector or fishery officer has the authority to take all reasonable measures and direct action if immediate action is deemed necessary

Section 78(6): No person shall be convicted of an offence under this Act if the person:

- Exercised all due diligence to prevent the commission of the offence; or
- Reasonably and honestly believed in the existence of facts that would render the person's conduct innocent

Projects near water

Fisheries act requires that projects avoid causing death to fish (unless by fishing) or harmful alteration, disruption or destruction to fish habitat unless authorized.

Transitional Provisions related to the issuance of authorizations (Clause 52 and 53):

Paragraph 35(2)(b): any authorization issued by the Minister under Paragraph 35(2)(b) are subject to Clause 52 and Clause 53 of Bill C-68 to ensure an orderly transition:

Clause 52: Any authorization issued by the Minister under paragraph 35(2)(b) of the Fisheries Act before the day on which section 22 of this Act comes into force and that is still valid on the day on which that section comes into force is deemed to have been issued under paragraphs 34.4(2)(b) and 35(2)(b), as those paragraphs read after that day.

Clause 53: (1) If an application for the issuance of an authorization under paragraph 35(2)(b) of the Fisheries Act is made in accordance with the Applications for Authorization under the paragraph 35(2)(b) of the Fisheries Act Regulations before the on day on which section 22 of the Act comes into force, and the applicant has received notification from the Minister that the application is complete in accordance with the requirements of those regulations, then the Fisheries Act as it read immediately before the day on which this Act receives royal assent, applies to the exercise of the Minister's power under the Act to authorize the carrying on of the work, undertaking or activity that is referred to in the application. Any authorization issued by the Minister is deemed to be an authorization that was issued under paragraphs 34.4(2)(b) and 35(2)(b) of that Act, as those paragraphs read after the day on which section 22 of this Act comes into force.

Deposit of a Deleterious Substance

Section 36(3) prohibits the deposit of deleterious substances (including sediment) into water frequented by fish, and includes both intentional or unintentional releases

The authorized deposit of a deleterious substance can only occur if authorized by a regulation. It is important to take all reasonable measures to prevent violations by designing, implementing, inspecting and maintaining appropriate ESC measures.

Section 38(5) has a duty to notify a deposit of a deleterious substance in water frequented by fish, or if a serious and imminent danger of a deposit may be expected to result. It is the responsibility of the person, who at any time:

- owns the deleterious substance or has the charge, management or control thereof, or
- causes or contributes to the deposit or danger thereof

Duty to Take Corrective Measures

Section 38(6) states “any person shall, as soon as feasible, take all reasonable measures consistent with public safety and with the conservation of fish and fish habitat to:

- Prevent any occurrence, or
- To counteract, mitigate or remedy any adverse effects that results or may reasonably be expected to result”

Fishery Officers and other DFO designates have the power of inspection and can direct works through an Inspector’s Direction Order s.38 (7.1)

Fishery (General) Regulations

Section 62(1) states that charges laid by a person (other than a Fishery Officer or Guardian) relating to an offence under the *Fisheries Act*. Payment of the proceeds of any penalty imposed from a conviction shall be made:

- One half to the person (who laid the charge), and
- One half to the minister (Provincial or Federal)

Table 1 – FEDERAL LEGISLATION – FISHERIES ACT - Offences and Penalties

RELEVANT SECTIONS	APPLICABLE PROVISION	PENALTIES – PERSONS AND CORPORATIONS
Section 34.4(1)	No person shall carry on any work, undertaking or activity that results in death to fish.	□ $100,000 TO $4,000,000 (first summary offence) □ $200,000 to $8,000,000 (subsequent offences)
Section 35(1)	No person shall carry on any work, undertaking or activity that results in harmful alteration, disruption or destruction of fish habitat.	□ $500,000 to $6,000,000 (first indictable offence) □ $1,000,000 to $12,000,000 (subsequent indictable offences)
Section 36(3)	*No person shall deposit or permit the deposit of a deleterious substance of any type in water frequented by fish or in any place under any conditions where the deleterious substance or any other deleterious substance that results from the deposit of the deleterious substance may enter any such water.*	*minimum sentences * other penalty provisions established for individuals and small revenue corporations
Section 38 (4), (5),(6) and (7)	*(4) Duty to notify of death to fish or harmful alteration, disruption, destruction of fish habitat, (5) Duty to notify of deleterious substance, (6) Person responsible for substance deposited shall remedy or mitigate any adverse effects and (7.1) Inspectors may take remedial measures or direct that they be taken.*	□ Up to $200,000 (first offence) □ Up to $200,000 and/or 6 months imprisonment (subsequent offences)
Sections 34.4(2), 35(2), 37(1), 38(7)	*Other Offences: Fail to comply with a prescribed conditions of an authorization; Fail to provide material, information or report; Fail to comply with a direction of Inspector of Fishery Officer*	

Application of fines

- All fines received by the Receiver General in respect of the commission of an offence under this section are to be credited to the Environmental Damages Fund and used for purposes related to the conservation and protection of fish or fish habitat or the restoration of fish habitat, or for administering that Fund.

FEDERAL LEGISLATION

Species at Risk Act (SARA)

Environment Canada is the lead federal government department responsible for issues concerning species at risk, however, Fisheries and Oceans Canada is responsible for the protection of aquatic species and habitat at risk.

The Act is designed to meet one of Canada's key commitments under the International Convention on Biological Diversity. The goal of the Act is to protect endangered or threatened organisms and their habitats. It also manages species which are not yet threatened, but whose existence or habitat is in jeopardy.

SARA defines a method to determine the steps that need to be taken in order to help protect existing relatively healthy environments, as well as recover threatened habitats. It identifies ways in which governments, organizations, and individuals can work together to preserve species at risk and establishes penalties for failure to obey the law.

The Act applies on federal lands, including national parks, and other protected heritage areas administered by Parks Canada, species protected under the *Migratory Birds Convention Act*, or aquatic species as defined in the *Fisheries Act*, SARA applies automatically on provincial and territorial lands and waters as well.

KEY DEFINITIONS

Aquatic Species - a wildlife species that is a fish, as defined in the *Fisheries Act*, or a marine plant, as defined in that Act.

Critical Habitat - the habitat that is necessary for the survival or recovery of a listed wildlife species and that is identified as the species' critical habitat in the recovery strategy or in an action plan for the species.

Endangered Species - means a wildlife species that is facing imminent extirpation or extinction.

Extirpated Species - means a wildlife species that no longer exists in the wild in Canada, but exists elsewhere in the wild.

Threatened Species - means a wildlife species that is likely to become an endangered species if nothing is done to reverse the factors leading to its extirpation or extinction.

APPLICABLE PROVISIONS

Section 58: no person shall destroy any part of the critical habitat of any listed endangered species or of any listed threatened species — or of any listed extirpated species if a recovery strategy has recommended the reintroduction of the species into the wild in Canada — if:

(*a*) the critical habitat is on federal land, in the exclusive economic zone of Canada or on the continental shelf of Canada;

(*b*) the listed species is an aquatic species; or

(*c*) the listed species is a species of migratory birds protected by the *Migratory Birds Convention Act*, 1994.

FEDERAL LEGISLATION

Canadian Environmental Protection Act

The *Canadian Environmental Protection Act* (CEPA) is administered by Environment Canada and Health Canada and is "An Act respecting pollution prevention and the protection of the environment and human health in order to contribute to sustainable development."

The goal of the renewed *Canadian Environmental Protection Act* (CEPA) is to contribute to sustainable development through pollution prevention and to protect the environment, human life and health from the risks associated with toxic substances.

CEPA also recognizes the contribution of pollution prevention and the management and control of toxic substances and hazardous waste to reducing threats to Canada's ecosystems and biological diversity.

APPLICABLE PROVISIONS

Section 64 of CEPA states “a substance is toxic if it is entering or may enter the environment in a quantity or concentration or under conditions that:

a) Have or may have an immediate or long-term harmful effect on the environment or its biological diversity;
b) Constitute or may constitute a danger to the environment on which life depends; or
c) Constitute or may constitute a danger in Canada to human life or health.”

Section 95 states that when a toxic substance is released into the environment, the person responsible must report the release, take measures to prevent the release, and mitigate any danger to the environment or public safety.

Particulate Matter is typically produced through the burning of fossil fuels and other industrial processes; however, dust from construction sites also contributes to Particulate Matter in the air, and in specified quantities, is identified in the “List of Toxic Substances” under Schedule 1 of CEPA.

FEDERAL LEGISLATION

Navigation Protection Act

The *Navigation Protection Act (NPA)* is administered by Transport Canada and is designed to protect the public right of navigation in Canadian waters. The Act prohibits unauthorized "work" involving construction or placement in, on, over, under, through, or across any navigable water.

Recent amendments to the Act are intended to clarify when approval in navigable waters will be required. The name was changed to the *Navigation Protection Act* to reflect its historic intent and lists the major waterways for which approval is required and apply the common law to protect navigation in unlisted waterways; allow proponents to work in unlisted waters, such as municipalities and provinces; and expand the list of low risk works (like minor repairs on bridges) to be pre-approved because they pose very little impact on safe navigation.

KEY DEFINITIONS

Navigable water - "a canal and any other body of water created or altered as a result of the construction of any work".

Works - Any man-made structure, device or thing, whether temporary or permanent, that may interfere with navigation and any dumping of fill in any navigable water, or any excavation of materials from the bed of any navigable water, that may interfere with navigation.

APPLICABLE PROVISIONS

Section 21 states "no person shall throw or deposit or cause, suffer or permit to be thrown or deposited any sawdust, edging, slabs, bark or like rubbish or any description whatever that is liable to interfere with navigation in any water, any part of which is navigable or that flows into any navigable water".

Table 2 – FEDERAL LEGISLATION - Offences and Penalties

LEGISLATION	RELEVANT SECTIONS	APPLICABLE PROVISION	PENALTIES
NAVIGATION PROTECTION ACT	**Section 21**	*No person shall throw or deposit or cause, suffer or permit to be thrown or deposited any sawdust, edging, slabs, bark or like rubbish of any description whatever that is liable to interfere with navigation in any water, any part of which is navigable or that flows into any navigable water.*	• $50,000 and/or six month imprisonment per offence • Separate offence for each day on which it is committed or continues
CANADIAN ENVIRONMENTAL PROTECTION ACT	**Section 64** **Section 95**	*Defines a toxic substance.* *Releases of toxic substances must be reported, prevented and mitigated to prevent any danger to the environment or human life or health.*	• Up to $300,000 and/or six month imprisonment (summary offence) • Up to $1,000,000 and/or three years imprisonment (indictable offence)
SPECIES AT RISK ACT	**Section 58**	*No person shall destroy any part of the critical habitat of any listed endangered species or of any listed threatened species*	• Up to $50,000 and /or one year imprisonment for an individual or non-profit organization. • Up to $300,000 for corporation (summary offence) • Up to $250,000 and/or five years imprisonment for an individual or non-profit organization. Up to $1,000,000 for corporation. (indictable offence)

Federal References

Government of Canada, Canadian Environmental Protection Act (S.C. 1999, c. 33)

Government of Canada, Fisheries Act (R.S.C., 1985, c. F-14)

Government of Canada, Navigation Protection Act (R.S.C., 1985, c. N-22)

Government of Canada, Species at Risk Act (S.C. 2002, c. 29)

Greater Golden Horseshoe Conservation Authorities, “Erosion and Sediment Control Guidelines for Urban Construction”, 2006

City of Calgary “Environmental Regulatory Review and Responsibilities: Calgary Construction Sites”, 2009

Internet References

FISHERIES ACT - Fisheries & Oceans Canada, www.dfo-mpo.gc.ca, accessed January 2019

CANADIAN ENVIRONMENTAL PROTECTION ACT - Environment Canada, www.ec.gc.ca, accessed January 2018

SPECIES AT RISK ACT - Environment Canada, www.ec.gc.ca, accessed January 2019

NAVIGATION PROTECTION ACT - Transport Canada, www.tc.gc.ca, accessed January 2019

ENVIRONMENTAL PROTECTION

Whose job is it?

Environmental protection is everyone's responsibility.

- Ultimate responsibility lies with the owner
- Liability shared with project team
- Inspectors have critical responsibilities

LEGAL LIABILITY

- directly tied to legislation
- requires permits and/or authorizations
- requires certain actions be taken
- prohibits certain activities from occurring
- compliance is often measured through the demonstration of ***due diligence***

NON-COMPLIANCE

*Consequences of **non-compliance**:*

- increased expense
- regulatory scrutiny
- tarnished reputations
- costs - impact assessments and restoration
- charges - legal costs and monetary fines
- relinquished work permits and shutdowns

Module 4

Conducting Construction Site Inspections

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MAINTENANCE OF BMPS

Contractors should follow the I2M rule for effective BMPs:

- **I**nstall BMPs in a correct manner.
- **I**nspect BMPs frequently.
- **M**aintain BMPs.

If sediment and erosion control measures are to remain effective, they must be installed correctly, inspected in a timely manner, *and* maintained. Repairing barriers, removing accumulated sediment from containment systems, and evaluating whether vegetation is established are a few of the many items that need to be considered.

Maintenance completed on sediment and erosion control measures must be recorded on inspection forms. Completed inspection reports be kept at the construction site and available for review by regulatory (federal, state, and local) agencies. It is recommended that all inspection forms be retained by the applicant for three years.

The following tables provide suggested minimal inspection and maintenance requirements of sediment and erosion control measures found on construction sites. Space has been provided for the reader to add additional requirements that may be necessary due to local regulations, specific site conditions, personnel preferences, and so forth.

TABLE 1: INSPECTION AND MAINTENANCE OF BMPS

BMP	INSPECTION	POSSIBLE MAINTENANCE
Sediment Containment Systems	Constructed to specifications?	List what action is required.
	Functional outlet structure?	Repair or replace.
	Accumulated sediment?	Remove, place upstream, and stabilize.
	Long flow-path length?	Install baffles.
Bale Barriers	Installed in a trench?	If not, reinstall.
	Backfilled?	If not, backfill the bales.
	Staked?	At least two per bale are needed.
	Destroyed?	Replace.
	Accumulated sediment?	Remove, place upstream, and stabilize.

Table 1: Inspection and Maintenance of BMPS

BMP	INSPECTION	POSSIBLE MAINTENANCE
Silt-Fence Barriers	Proper placement of stakes?	If not, reinstall.
	Material in a trench?	If not, reinstall.
	Accumulated sediment?	Remove, place upstream, and stabilize.
	Used in a drainage ditch	Remove the structure
	Used around inlets	Remove the structures
Other Barriers	Improper installation?	Install another method.
Bale Check Structures	Installed in a trench?	If not, reinstall.
	Side slopes steeper than 7H:1V?	Look for other measures.
	End bales above flow line bales?	If not, reinstall to force runoff over the flow line bales.
Rock Check Structures	Correct rock diameter?	If wrong diameter, replace.
	Water flowing around the end?	Extend rock.
Other Check Structures		
Inlet Protection	Cover over structure?	Create an opening.
	Bale barrier on concrete?	Replace with rock.
Diversion Dikes	Erosion of the structure?	Complete repairs and stabilize.
	Improper location?	Remove and relocate.

Table 1: Inspection and Maintenance of BMPS

BMP	INSPECTION	POSSIBLE MAINTENANCE
Slope Drains	Runoff not flowing into the structure?	Repair the containment system. Check to see if runoff is being diverted to the structure.
	Runoff flowing into and past the pipes?	Install a larger-diameter pipe. Contact the designer to determine whether the design storm event was exceeded. Add more drains.
	"Tunneling" of the containment Dike is evident?	Repair the embankment with sandbags.
Controlling Wind-Borne Particles	Is the ground smooth?	Develop furrows perpendicular to the prevailing wind direction.
	Do barriers exist?	Install barriers perpendicular to the prevailing wind direction.
Vegetation Establishment	Has the specified mixture been used?	If not, reseed.
	Inadequate growth?	Evaluate time of year; plant again.
	Spotty growth?	Soil conditions, excess moisture, or need to apply more seed.
	Intrusion of noxious weeds?	Implement weed control.
Dry Mulch	Coverage 80% to 100%?	If not, reapply.
	Movement of material?	Need to anchor to the ground by crimping or tackifier.
Hydraulic Mulch and Other Products	Adequate coverage?	If not, reapply.

Table 1: Inspection and Maintenance of BMPS

BMP	INSPECTION	POSSIBLE MAINTENANCE
Hydraulic Mulch and Other Products (con't)	Deterioration?	If not evident, do nothing. If evident and vegetation is not evident, repair and reapply. If evident but vegetation is occurring, wait and complete another inspection at a later date.
	Is vegetation becoming established?	If no, evaluate whether climatic conditions have been adequate for establishment. If no, reapply. If yes, do nothing.
RECP for Slope Protection	Improper installation at top?	Put in trench or extend onto flat area.
	Inadequate number of staples?	Add more staples.
	Sides not in trench or stapled?	Install staples or place in a trench.
	Has seeding been completed?	If not, remove product and plant seed.
ECB and TRM for Channel Protection	Proper material used?	Work with the designers to ensure proper selection has occurred
	Improper installation at top?	Repair or use riprap check.
	Lack of staple checks?	Install staple or riprap checks.
Additional Techniques		
Wind Erosion Control	Use of cover crops?	Timing of planting, type of grass.
	Use of hydraulic mulch?	Increase application rate.

MATERIAL FOR SCENARIO 1

ESC Report, ESC Drawings and Records

ESC Plan Report

INTRODUCTION

This is an Erosion and Sediment Control report for the Example Development in Any Town of the Any Province of Canada.

Project Site and Activity Description

Permittee: Example Development
12345 First Street
Any Town, Any Province Postal Code
(XXX) 123- 4567

Contact Information: I. M. Aperson
Example Development
12345 First Street
Any Town, Any Province Postal Code
(XXX) 123- 4567

Person Responsible for Plan: Mr. Loman Onthetotempol

Project Name: Example Development

Project Location: Northwest of the Intersection of XYZ Boulevard and ABC Road
Any Town, Any Province

Receiving Waters: Storm waters discharge into the Lake via local tributaries to major drainage ways.

Nature of Construction Activity

- **Function of the Project:** This project consists of developing land for a subdivision and commercial area.
- **Construction activities** on the site will consist of removing existing vegetation, grading of the land, installing utilities, paving, and development of the land for a subdivision and commercial area.
- **Sequence for Major Activities:** Construction tasks to be completed will include the following sequential activities.
  - Removal of existing vegetation,
  - Clearing and grubbing of the land,
  - Grading,
  - Installing utilities,
  - Development and paving of roads, and
  - Construction of commercial and single family homes.
- **Amount of Land to be Disturbed:** This project will disturb approximately 37.1 acres (15 ha) out of a total of 42.1 acres (17 ha) due to construction activities.
- **General Location Map:** A site map has been included with this ESC Plan

- **Soils** on the project have the following characteristics:

Symbol	Type of Soil Material	Percent of Site	Rainfall Erodibility	Comments
A5b5	Sandy Loam	100%	3	Low to moderate water erosion and wind hazards and moderate to high runoff potential.

Predominate soils of the site are moderately deep and well drained.

- **Vegetation Characteristics:** Historic vegetation for this area is pasture grass.

Site Map:

See the attached sediment and erosion control drawings for information related to the project and placement of mitigation measures.

Construction and Waste Materials:

It will be the responsibility of the heavy equipment contractor to take appropriate actions to ensure pollution of storm water does not occur. Fueling areas will be at least 30 meters (100 feet) from drainage channels and/or storm sewer systems. The heavy equipment contractor will be responsible for protecting the soil from contamination due to any hydrocarbon or other hazardous spills associated with his contractual obligations.

Contractors will also be responsible for preventing soil contamination where building materials, fertilizers, chemicals, waste piles or other potential hazardous materials may exist.

No dedicated concrete or asphalt batch plants will exist on this site.

Other Industrial Stormwater Discharges

None.

Description of Best Management Practices

Reduction of sediment in runoff waters will occur in the following manner (see the ESC drawings for more detail illustrations).

1. Before major overlot grading activities begin, the following BMPs will be installed:
   a) Installation of a storm sewer pipe to convey offsite flows away from the project site.
   b) Silt fence barriers as illustrated on the drawings.
   c) Vehicle tracking pads at major entrances into the site.
2. During initial overlot grading activities, one or more of the following BMPs will occur:
   a) As soon as feasible, complete a rough installation of the detention ponds (with outlet structures) and convert them into sediment containment systems.
   b) Install additional silt fence barriers as necessary to minimize discharge of sediment into waterways.
   c) Application of erosion control materials.
3. During major overlot grading activities, installation of one or more of the following will occur.

a) Diversion structures to ensure the discharge of runoff into an SCS,
b) Maintenance of all sediment control BMPs,
c) Installation of utilities,
d) Barrier protection of inlet openings while grading operations occur,
e) Installation of barrier protection for culverts that discharge runoff,
f) Application of erosion control materials

4. After grading activities are completed, BMPs will consist of the following:

a) Paving roads,
b) Construction of homes,
c) Installation of landscaping material,
d) Maintenance of SCSs until 80% full build out.
e) Sediment and erosion control methods

Sediment and Erosion Control Methods

Sediment control measures will include one or more following techniques with installation of additional methods occurring as deemed necessary by the designer.

- Silt fence and/or diversion barriers
- Barriers in front of "sump" inlets
- Vehicle tracking pads
- Sediment containment systems

Offsite tacking of soil will be minimized by at least weekly removal of accumulated sediment in access streets. More frequent sediment removal will occur when significant buildup is evident.

Erosion control measures will include one or more of the following methods:

- Construction of homes
- Installing landscaping materials
- Placement of pavement
- Applying erosion control materials

Final stabilization of the site will occur by placement of pavement, planting temporary and/or perennial grass seed on disturbed lands, and installing landscape material on the lots and in common areas.

Non-Storm Water Components of Discharge

There are no non-storm water components of discharge associated with this project.

Endangered Species

There are no known endangered species on this project.

Permit Requirements

Operator has the responsibility to acquire and include all required documentation with this ESC plan.

Inspection and Maintenance

Inspections of sediment and erosion control measures will occur after any significant wind or precipitation causes runoff. As a minimum, inspection of all sediment and erosion control facilities will occur at least every 14 days while construction activities occur.

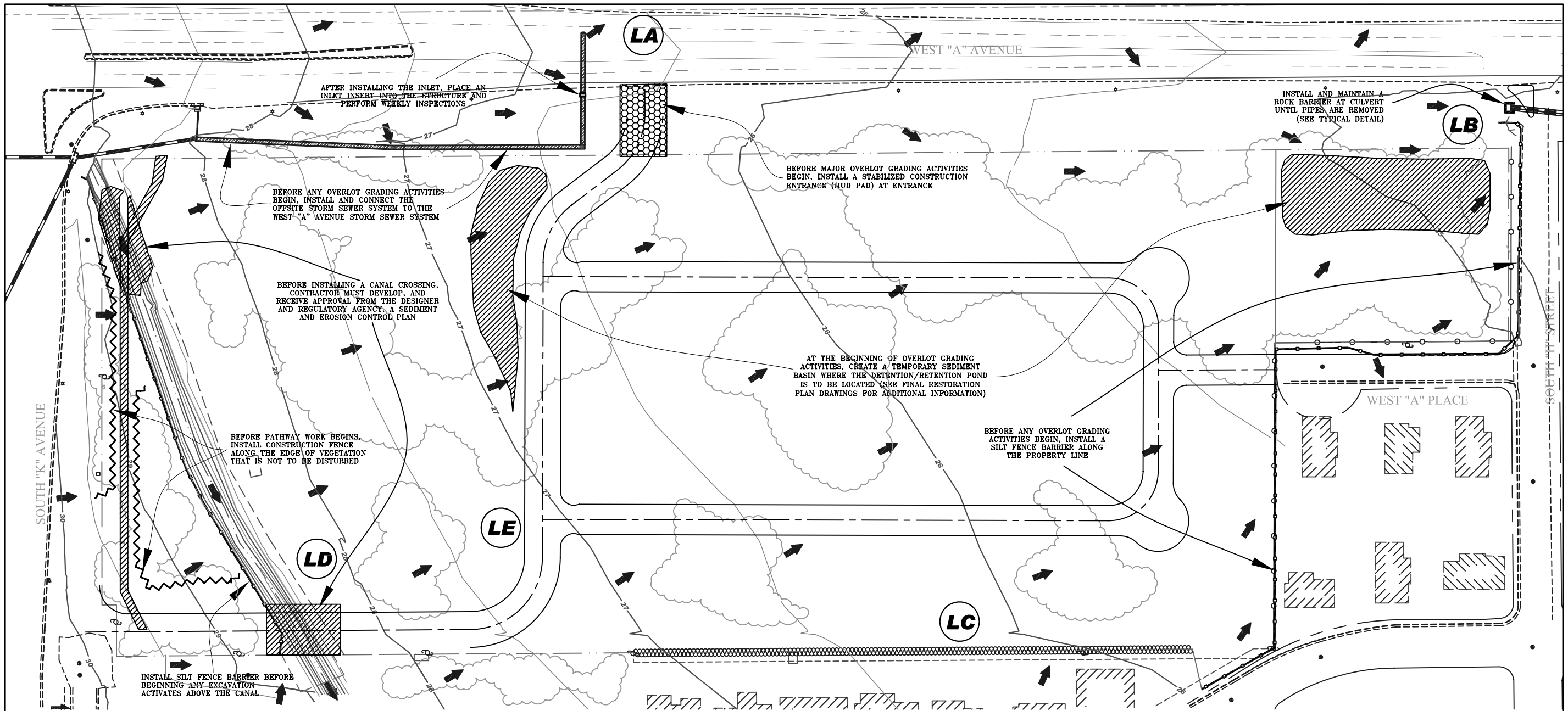
Inspections will occur until final stabilization of the site has occurred, which is defined as vegetative cover of at least 70% of historic conditions, completion of 100% of the

commercial area, and completion of 100% of the homes sites.

Inspection of sediment and erosion control measures will include at least the following.

- Removal of accumulated sediment collected by SCSs or barriers once a 50% reduction of the storage capacity for the structures becomes evident,
- Repairing damage to sediment control structures,
- Adding or eliminating sediment and/or erosion control measures as deemed necessary,
- Immediate repair and/or replacement of BMPs when failure occurs or the mitigation measures are ineffective.

Records of each inspection will reside with the contractor, developer, or their representative.



NOTES:

1. INSTALLATION OF THE OFFSITE STORM SEWER PIPE WITH A CONNECTION TO WEST "A" AVENUE SYSTEM MUST BE COMPLETED BEFORE BEGINNING ANY GRADING ACTIVITIES.
2. PRIOR TO OVERLOT GRADING ACTIVITIES, INSTALL AND MAINTAIN SEDIMENT CONTROL BARRIERS, AS ILLUSTRATED.
3. AT THE BEGINNING OF OVERLOT GRADING, ROUGH GRADE PROPOSED DETENTION AND RETENTION PONDS AND COVERT THEM INTO A SEDIMENT BASINS WITH OUTLET STRUCTURES.
4. UPON COMPLETION OF INLETS ALONG WEST "A" AVENUE, INSTALL AND MAINTAIN INLET INSERT UNTIL APPROXIMATELY 80% OF THE SITE HAS BEEN BUILT OUT.
5. GENERAL MAINTENANCE OF SEDIMENT CONTROL STRUCTURES WILL INCLUDE ENSURING THAT ROCKS ARE NOT CLOGGED WITH SEDIMENT, MAINTAINING THE INTEGRITY OF ROCK BARRIERS, REPAIRING DAMAGED BARRIERS, REPLACEMENT OF SEDIMENT FILLED ROCK, REMOVAL OF SEDIMENT FROM INLET INSERTS, AND REMOVING SEDIMENT WHEN HALF THE STRUCTURE VOLUME IS LOST (E.G. BEHIND SILT FENCE BARRIERS).
6. SEDIMENT TRACKED ONTO OFFSITE STREETS WILL BE REMOVED WEEKLY OR AS NEEDED.
7. SOIL STOCKPILES AREA WILL BE LOCATED BY THE CONTRACTOR AND PROTECTED AGAINST EROSION AS DIRECTED BY THE DESIGNER.
8. INSPECTION OF ALL BMPS IS TO OCCUR AT LEAST ONCE EVERY SEVEN DAYS AND AFTER PRECIPITATION EVENTS THAT ARE 5-MM OR MORE. ALL NECESSARY MAINTENANCE AND REPAIRS SHALL BE COMPLETED WITHIN SEVEN DAYS, UNLESS OTHERWISE AGREED.
9. EROSION CONTROL MEASURES (SEE THE FINAL RESTORATION PLAN DRAWING) WILL BE INSTALLED, INSPECTED, AND MAINTAINED WHILE CONSTRUCTION AND DEVELOPMENT ACTIVITIES OCCUR.
10. MODIFICATIONS TO THIS SEDIMENT CONTROL PLAN MUST RECEIVE APPROVAL BY THE DESIGNER.
11. THESE PLANS ARE SUBJECT TO CHANGE, WITH ALL CHANGES TO BE AGREED UPON BY THE DESIGNERS (OR HIS/HER REPRESENTATIVE) AND THE APPROPRIATE REGLATORY OFFICIAL.

LEGEND

- FLOW ARROW
- SILT FENCE BARRIER
- STABILIZED CONSTRUCTION ENTRANCE (MUD PAD)
- ROCK BARRIER
- CONSTRUCTION FENCE
- EXISTING VEGETATION
- PROPERTY BOUNDARY
- EXISTING WOOD FENCE

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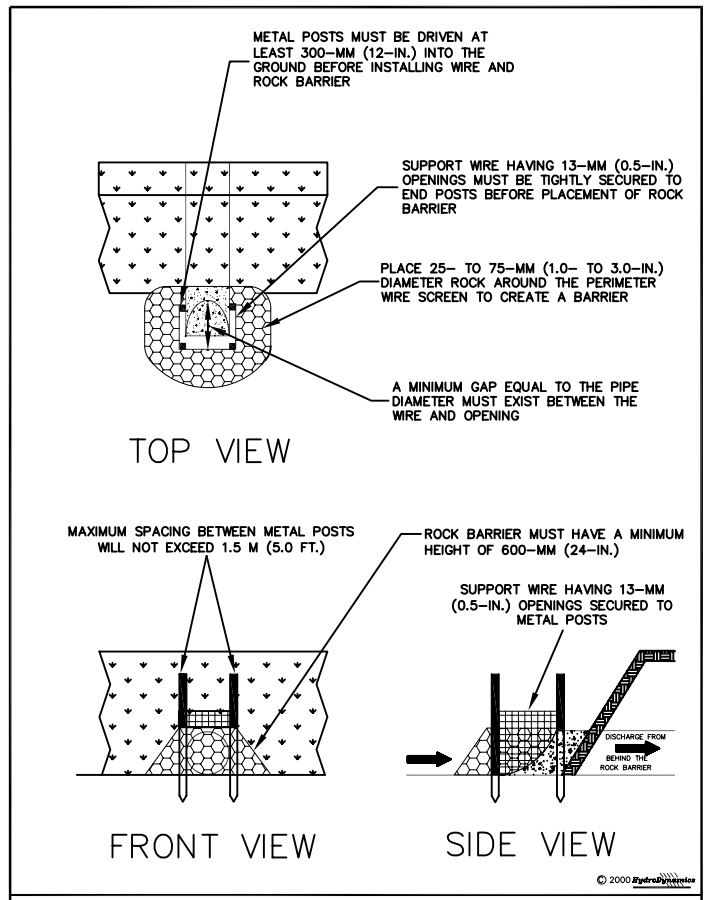
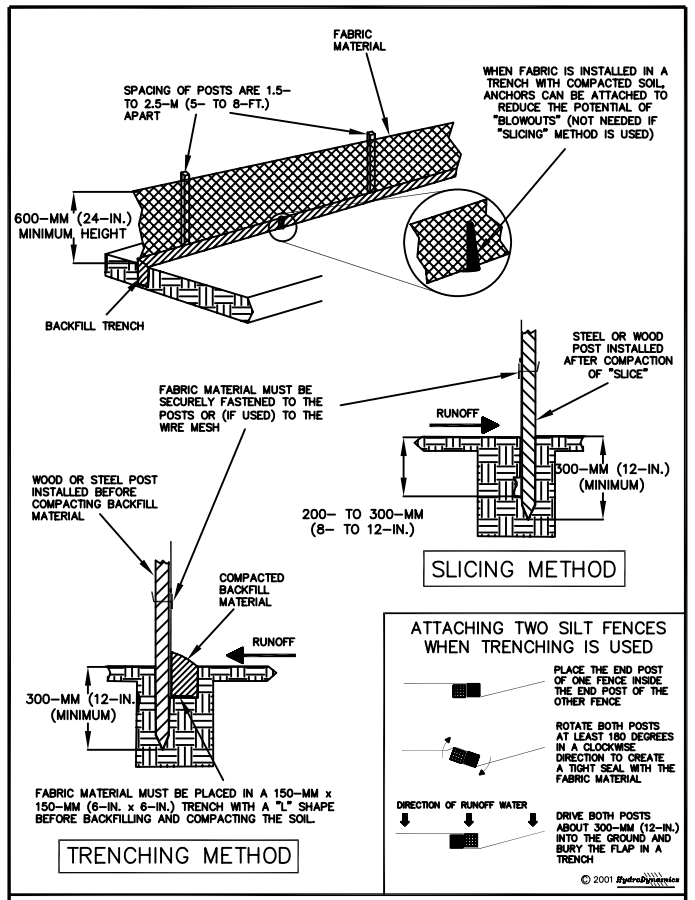
METRES

RESIDENTIAL PRE-GRADING & DURING CONSTRUCTION SEDIMENT CONTROL PLAN



ROCK BARRIER OUTLET STRUCTURE FOR CULVERTS



SILT FENCE BARRIER INSTALLATION

INSPECTION REQUIREMENTS FOR ALL INSTALLED BMPS

1. AT LEAST ONCE EVERY 7 DAYS, INSPECT AND REPAIR ANY DAMAGE FOUND.
2. WITHIN 24 HOURS AFTER PRECIPITATION EVENTS OF 0.13–MM (0.50–INCHES) OR MORE, INSPECT AND REPAIR ANY DAMAGE FOUND.

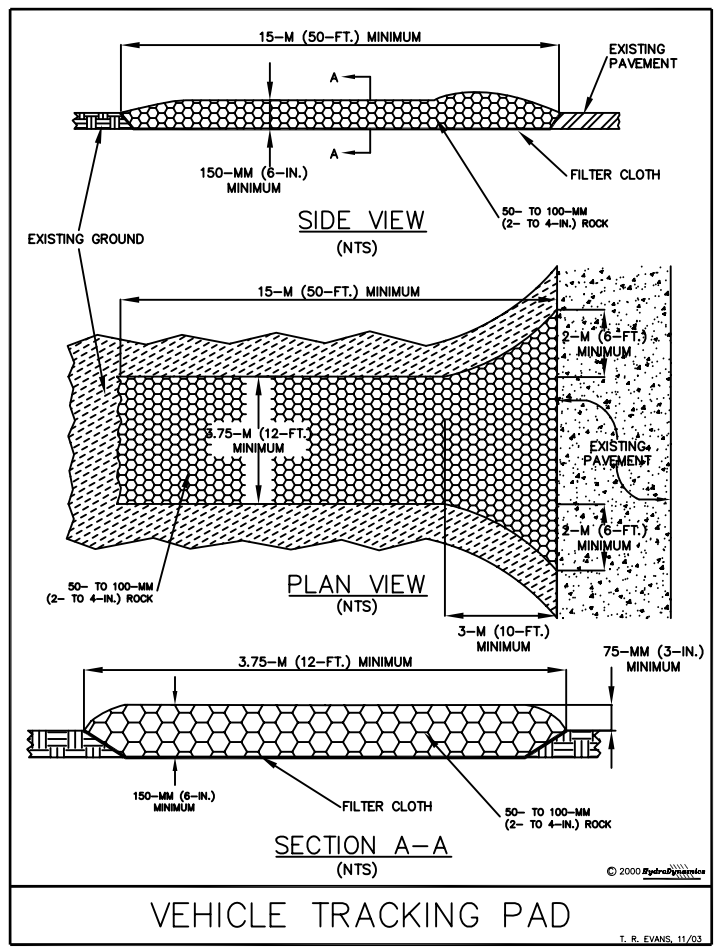
MAINTENANCE NOTES FOR THE BMPS SHOWN

ROCK BARRIER:
- REMOVE ACCUMULATED SEDIMENT FROM BEHIND THE ROCK BARRIER WHEN IT IS WITHIN 50–mm (6–IN.) OF THE TOP OF THE ROCK.
- REMOVE ROCK BARRIER, POSTS, AND WIRE ONCE EROSION CONTROL PRACTICES ARE INSTALLED.

SILT FENCE BARRIER:
- REMOVE ACCUMULATED SEDIMENT FROM BEHIND THE SILT FENCE WHEN IT IS OVER 60–mm (24–IN.) DEEP.
- REMOVE SILT FENCE FABRIC AND POSTS ONCE EROSION CONTROL PRACTICES ARE INSTALLED.

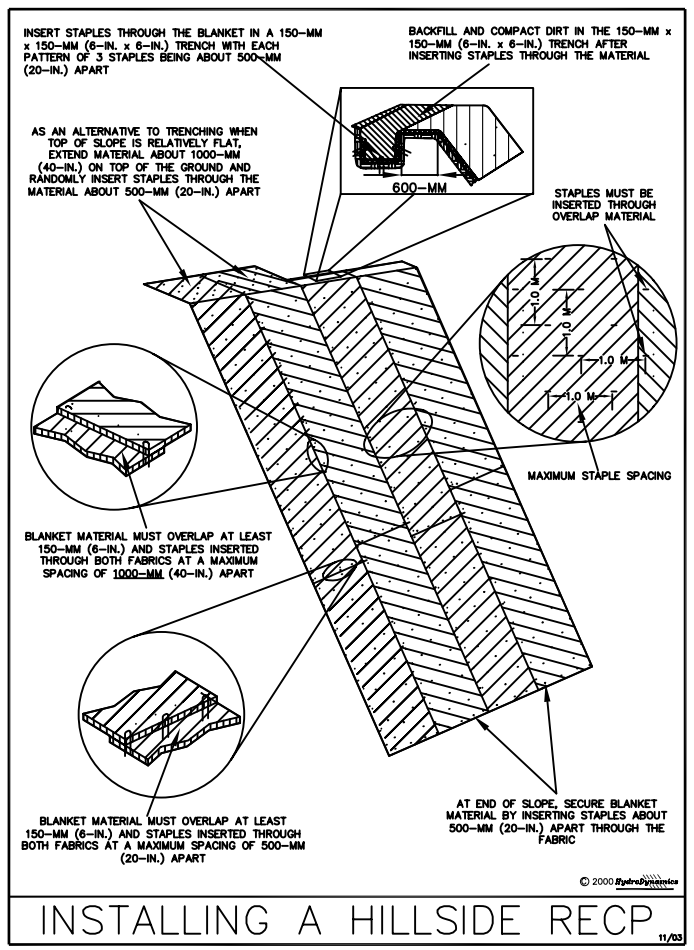
VEHICLE–TRACKING PAD:
- REPLACE ROCK IN TRACKING PAD IF IT BECOMES CLOGGED WITH SEDIMENT.
- REMOVE SEDIMENT ON ADJACENT STREETS, IF TRACKING IS OCCURRING.

HILLSIDE ROLLED EROSION CONTROL PRODUCT:
- REPAIR DAMAGED BLANKET MATERIAL.
- REPAIR RILLS AND GULLIES IF FORMING BENEATH BLANKET.



VEHICLE TRACKING PAD

T. R. EVANS, 11/03



INSTALLING A HILLSIDE RECP

11/03

RESIDENTIAL AND COMMERCIAL
TYPICAL DETAILS PAGE 2

Permit and Inspection Records

Permit cannot be found and no inspections are needed

MATERIAL FOR SCENARIO 2

ESC Drawings, Permit and Inspection Forms

INSTALL AND MAINTAIN INLET INSERT UNTIL UPSTREAM STABILIZATION EXISTS

WEST "A" AVENUE

CONNECT TO EXISTING STORM SEWER SYSTEM

INSTALL AND MAINTAIN SKIMMER OR RISER PIPE AT OUTLET STRUCTURE

INSTALL AND MAINTAIN ROCK BARRIER IN FRONT OF CULVERT

PRE-SEDIMENTATION BASIN

SOUTH "K" AVENUE

ROAD 2

INSTALL TRM WITHIN SPILLWAY

STABILIZE LOTS NOT UNDER CONSTRUCTION WITH TEMPORARY SEED AND MULCH

ROAD 1

INSTALL ROCK OR TRM WITHIN BARRIER SPILLWAY

DETENTION POND J

DETENTION POND K

INSTALL AND MAINTAIN SKIMMER OR RISER PIPE AT OUTLET STRUCTURE

PRE-SEDIMENTATION BASIN

WEST "A" PLACE

SOUTH "H" STREET

INITIAL LOTS UNDER CONSTRUCTION (SEE DETAIL SHEET NO. 1)

INSTALL SOD WITHIN THE DRAINAGE CHANNEL

NOTES:

1. SEDIMENT CONTROL STRUCTURES ARE NOT TO BE REMOVED UNTIL 80% OR MORE OF THE SITE IS COVERED WITH VEGETATION, FORMAL LANDSCAPING, STRUCTURES, AND PAVEMENT, OR APPROVAL IS GIVEN BY THE DESIGNER.
2. THE DETENTION/RETENTION PONDS ARE TO REMAIN FUNCTIONAL AS SEDIMENT CONTAINMENT SYSTEMS, WHICH INCLUDES MAINTENANCE ON ALL OUTLET STRUCTURES, WHILE RESIDENTIAL/COMMERCIAL CONSTRUCTION ACTIVITIES OCCUR.
3. LOTS UNDER CONSTRUCTION MUST HAVE SEDIMENT CONTROL BMPS INSTALLED ON DOWNSTREAM PROPERTY BOUNDARIES AS DETERMINED BY THE BUILDER (SEE DETAIL SHEET NO. 1).
4. PLANTING SEED AND APPLYING MULCH OR INSTALLING SOD WILL OCCUR WHILE CONSTRUCTION ACTIVITIES OCCUR AND AS DIRECTED BY THE DESIGNER.
5. UNLESS INSTRUCTED BY THE DESIGNER, TOTAL BLOCKAGE OF INLET OPENINGS BY FABRIC MATERIAL WILL NOT BE PERMITTED.
6. THE BUILDER IS RESPONSIBLE FOR GOOD HOUSEKEEPING ACTIVITIES TO ENSURE THE STREETS AND LOTS ARE KEPT RELATIVELY CLEAN WHILE CONSTRUCTION ACTIVITIES OCCUR.
7. THE BUILDER IS RESPONSIBLE FOR INSPECTIONS AT LEAST ONCE EVERY SEVEN DAYS AND MAINTENANCE OF THEIR PROJECT SITE, INLETS AND OTHER SEDIMENT CONTAINMENT SYSTEMS IMMEDIATELY DOWNSTREAM OF THEIR PROPERTY.
8. MODIFICATIONS TO THIS SEDIMENT AND EROSION CONTROL PLAN MUST RECEIVE APPROVAL BY THE DESIGNER.
9. THESE PLANS ARE SUBJECT TO MODIFICATIONS, WITH ALL CHANGES TO BE AGREED UPON BY THE DESIGNER (OR HIS/HER REPRESENTATIVE) AND THE CITY OF APPROPRIATE REGLATORY OFFICIAL.

LOT UNDER CONSTRUCTION

HOME OCCUPIED

STAGING AREA

CONCRETE WASHOUT

SILT FENCE BARRIER

LEGEND

FLOW ARROW

SEED AND MULCH/LANDSCAPE

TEMPORARY VEGETATION

TURF REINFORCEMENT MAT

EXISTING VEGETATION

PROPERTY BOUNDARY

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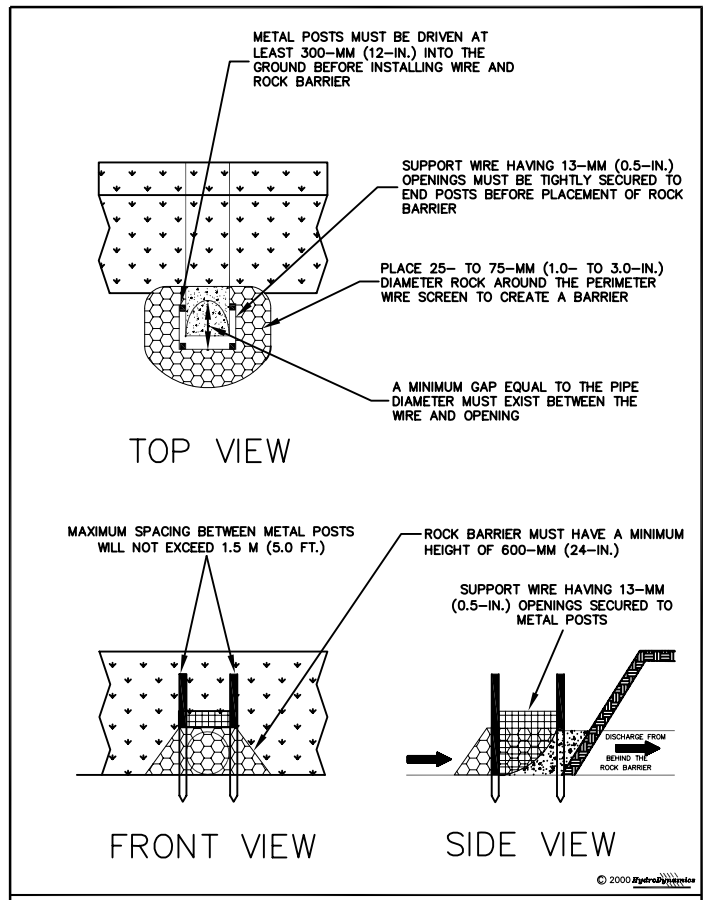
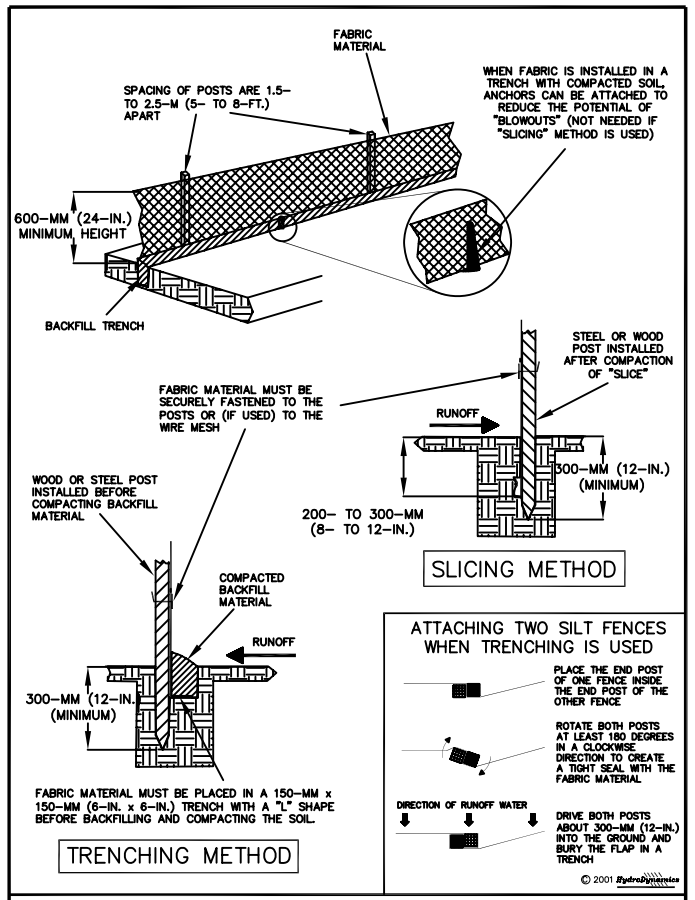
METRES

RESIDENTIAL AND COMMERCIAL AFTER GRADING AND DURING CONSTRUCTION SEDIMENT AND EROSION CONTROL PLAN



ROCK BARRIER OUTLET STRUCTURE FOR CULVERTS



SILT FENCE BARRIER INSTALLATION

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- REMOVE SEDIMENT ON ADJACENT STREETS, IF TRACKING IS OCCURRING.

HILLSIDE ROLLED EROSION CONTROL PRODUCT:
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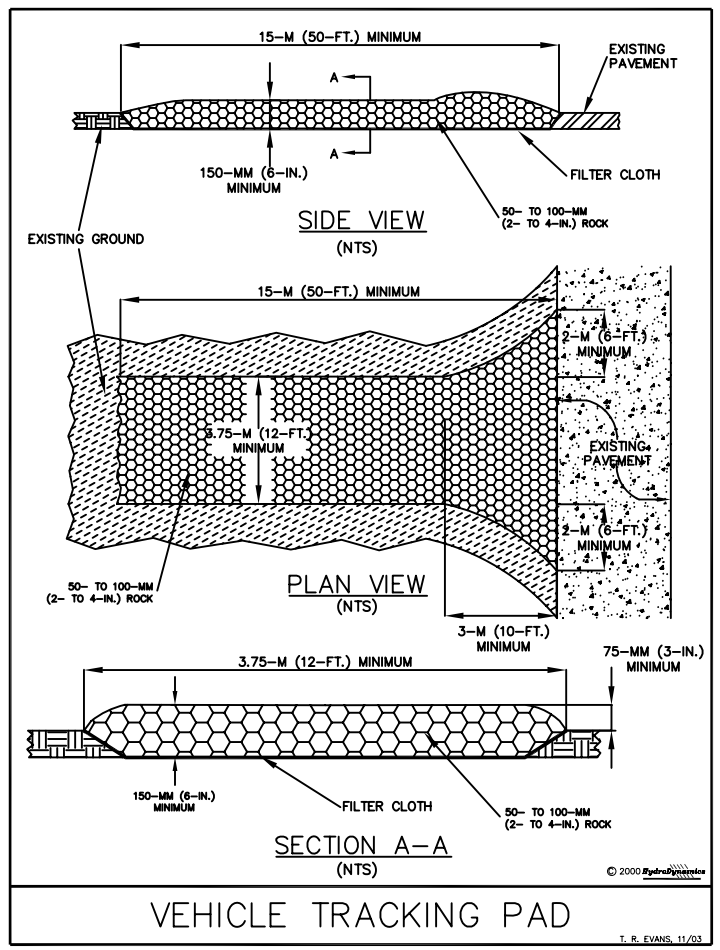
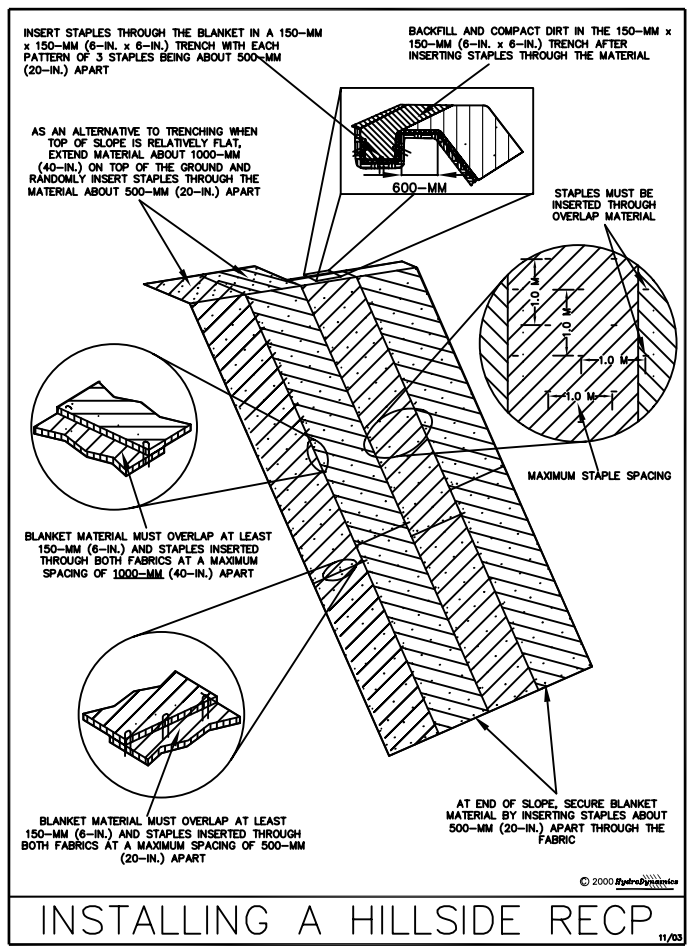
- REPAIR RILLS AND GULLIES IF FORMING BENEATH BLANKET.



VEHICLE TRACKING PAD

T. R. EVANS, 11/03



INSTALLING A HILLSIDE RECP

11/03

RESIDENTIAL AND COMMERCIAL
TYPICAL DETAILS PAGE 2

Permit and Inspection Records

BLANK INSPECTION FORMS

Inspection Report

Site Name/Permit No. _____Inspection Date: _____

Existing Weather Conditions:_____ Inspector's Name: _____

Record the location, inspection time, and corrective action items. If discharges are occurring, identify the point of discharge and document the visual quality (color, odor, floating, settled, or suspended solids, foam, oil sheen, etc.) and whether the stormwater controls are operating effectively.		Date Corrected (with initials)
Inspection Time and Location	Corrective Action Needed	
Location No. 1 Time:_____ ☐ Discharges are Occurring		
Location No. 2 Time:_____ ☐ Discharges are Occurring		
Location No. 3 Time:_____ ☐ Discharges are Occurring		
Location No. 4 Time:_____ ☐ Discharges are Occurring		

Title of the Inspector: ☐ **CISEC** ☐ Other_____

_____

Print Name Signature of Inspector Date

Inspection Report

Site Name/Permit No. _____Inspection Date: _____

Existing Weather Conditions:_____ Inspector's Name: _____

Record the location, inspection time, and corrective action items. If discharges are occurring, identify the point of discharge and document the visual quality (color, odor, floating, settled, or suspended solids, foam, oil sheen, etc.) and whether the stormwater controls are operating effectively.		Date Corrected (with initials)
Inspection Time and Location	Corrective Action Needed	
Location No. 5 Time:_____ ☐ Discharges are Occurring		
Location No. 6 Time:_____ ☐ Discharges are Occurring		
Location No. 7 Time:_____ ☐ Discharges are Occurring		
Location No. 8 Time:_____ ☐ Discharges are Occurring		

Title of the Inspector: ☐ **CISEC** ☐ Other_____

Print Name Signature of Inspector Date

Inspection Report

Site Name/Permit No. _____Inspection Date: _____

Existing Weather Conditions:_____ Inspector's Name: _____

Record the location, inspection time, and corrective action items. If discharges are occurring, identify the point of discharge and document the visual quality (color, odor, floating, settled, or suspended solids, foam, oil sheen, etc.) and whether the stormwater controls are operating effectively.		Date Corrected (with initials)
Inspection Time and Location	Corrective Action Needed	
Location No. 9 Time:_____ ☐ Discharges are Occurring		
Location No. 10 Time:_____ ☐ Discharges are Occurring		
Location No. 11 Time:_____ ☐ Discharges are Occurring		
Location No. 12 Time:_____ ☐ Discharges are Occurring		

Title of the Inspector: ☐ **CISEC** ☐ Other_____

_____

Print Name Signature of Inspector Date

Inspection Report

Site Name/Permit No. _____Inspection Date: _____

Existing Weather Conditions:_____ Inspector's Name: _____

Record the location, inspection time, and corrective action items. If discharges are occurring, identify the point of discharge and document the visual quality (color, odor, floating, settled, or suspended solids, foam, oil sheen, etc.) and whether the stormwater controls are operating effectively.		Date Corrected (with initials)
Inspection Time and Location	Corrective Action Needed	
Location No. 13 Time:_____ ☐ Discharges are Occurring		
Location No. 14 Time:_____ ☐ Discharges are Occurring		
Location No. 15 Time:_____ ☐ Discharges are Occurring		
Location No. 16 Time:_____ ☐ Discharges are Occurring		

Title of the Inspector: ☐ **CISEC** ☐ Other_____

_____

Print Name Signature of Inspector Date

Appendix A – Federal Legislation

1. Fisheries Act

Fish and Fish Habitat Protection Provisions

- **34.4** (1) No person shall carry on any work, undertaking or activity, other than fishing, that results in the death of fish
- **35** (1) No person shall carry on any work, undertaking or activity that results in the harmful alteration, disruption or destruction of fish habitat

Exception

(2) A person may carry on a work, undertaking or activity without contravening subsection (1) if

- (*a*) is prescribed or carried on in or around Canadian fisheries waters, and in accordance with the prescribed conditions;
- (*b*) is authorized by the Minister and carried on in accordance with conditions established;
- (*c*) is authorized by a prescribed person or entity and carried on in accordance with the prescribed conditions;
- (*d*) the death of fish or harmful alteration, disruption and/or destruction of fish habitat is produced as a result of doing anything that is authorized, otherwise permitted or required under this Act; or
- (*e*) is carried on in accordance with the regulations.

Authorization — Paragraph 35(2)(b)

52 Any authorization issued by the Minister under paragraph 35(2)(b) of the *Fisheries Act* before the day on which section 22 of this Act comes into force and that is still valid on the day on which that section comes into force is deemed to have been issued under paragraphs 34.4(2)(b) and 35(2)(b), as those paragraphs read after that day.

Application — Paragraph 35(2)(b)

53 (1) If an application for the issuance of an authorization under paragraph 35(2)(b) of the *Fisheries Act* is made in accordance with the *Applications for Authorization under Paragraph 35(2)(b) of the Fisheries Act Regulations* before the day on which section 22 of this Act comes into force, and the applicant has received notification from the Minister that the application is complete in accordance with the requirements of those regulations, then the *Fisheries Act* as it read immediately before the day on which this Act receives royal assent, applies to the exercise of the Minister's power under that Act to authorize the carrying on of the work, undertaking or activity that is referred to in the

application. Any authorization issued by the Minister is deemed to be an authorization that was issued under paragraphs 34. 4(2)(b) and 35(2)(b) of that Act, as those paragraphs read after the day on which section 22 of this Act comes into force.

Incomplete application

(2) If the Minister notifies the applicant in accordance with the *Applications for Authorization under Paragraph 35(2)(b) of the Fisheries Act Regulations*, that the application is incomplete, then the applicant shall provide the Minister with the required information or documentation

a. no later than 180 days after the day on which section 22 of this Act comes into force, if the applicant receives the notice before that day;
b. no later than 180 days after the day on which the applicant received the notice, if the applicant receives the notice on or after the day on which section 22 of this Act comes into force.

Regulations

(3) If the Minister notifies the applicant, in accordance with the *Applications for Authorization under Paragraph 35(2)(b) of the Fisheries Act Regulations*, following the receipt of any required information or documentation from the applicant within the time period referred to in subsection (2), that the application is complete, the *Fisheries Act* as it read immediately before the day on which this Act received royal assent applies to the exercise of the Minister's power under that Act to authorize the carrying on of the work, undertaking or activity that is referred to in the application. Any authorization issued by the Minister is deemed to be an authorization that was issued under paragraphs 34.4(2)(b) and 35(2)(b) of that Act, as those paragraphs read after the day on which section 22 of this Act comes into force. However, if the Minister notifies the applicant that the application is still incomplete, then the authorization that was applied for is deemed to have been refused.

Deposit of deleterious substance prohibited

36. (3) Subject to subsection (4), no person shall deposit or permit the deposit of a deleterious substance of any type in water frequented by fish or in any place under any conditions where the deleterious substance or any other deleterious substance that results from the deposit of the deleterious substance may enter any such water.

Deposits authorized by regulation

(4) No person contravenes subsection (3) by depositing or permitting the deposit in any water or place of

o (*a*) waste or pollutant type, in a quantity and under conditions authorized by regulations made by the Governor in Council under any Act other than this Act;

- (*b*) a deleterious substance of a class and under conditions — which may include conditions with respect to quantity or concentration — authorized under regulations made under subsection (5)
- (*c*) a deleterious substance the deposit of which is authorized by regulations made under subsection (5.2) and that is deposited in accordance with those regulations.

Regulations for authorizing certain deposits

(5) The Governor in Council may make regulations prescribing

- (*a*) deleterious substances or classes authorized to be deposited
- (*b*) waters or places where any deleterious substances authorized to be deposited
- (*c*) works or undertakings or conduct of which deleterious substances are authorized to be deposited;
- (*d*) the quantities or concentrations of deleterious substances authorized to be deposited;
- (*e*) the conditions or circumstances subject to which any deleterious substances are authorized to be deposited; and
- (*f*) the persons who may authorize the deposit of any deleterious substances and the conditions or circumstances under which requirements subject to which those persons may grant the authorization.

Regulations — Minister

(5.2) the Minister may make regulations

- (*a*) authorizing the deposit of deleterious substances specified in the regulations, or substances falling within a class of deleterious substances specified in the regulations;
- (*b*) authorizing the deposit of deleterious substances into waters or places falling within a class of waters or places;
- (*c*) authorizing the deposit of deleterious substances resulting from a work, undertaking or activity falling within a class of works, undertakings or activities;
- (*d*) establishing conditions, which may include conditions with respect to quantity or concentration, for the deposit of deleterious substances referred to in paragraphs (*a*) to (*c*); and
- (*e*) establishing, for the purposes of paragraphs (*a*) to (*c*), classes of
  - (i) deleterious substances,
  - (ii) waters and places, and
  - (iii) works, undertakings and activities.

Directions by the Minister

(6) A person authorized to deposit a deleterious substance shall, when directed by the Minister, conduct any sampling, analyses, tests, measurements or monitoring, install or operate any equipment or comply with any procedures, and report any information, required by the Minister to determine the deposit is in the manner authorized.

Minister may require plans and specifications

37. (1) If a person carries on or proposes to carry on any work, undertaking or activity or to deposit a deleterious substance, the Minister can require plans, specifications, studies, procedures, schedules, analyses, samples, evaluations and other information to determine

- (*a*) the potential to result in death to fish or harmful alteration, disruption, destruction of fish habitat that constitutes or would constitute an offence and what measures, if any, would prevent that result or mitigate its effects; or
- (*b*) the deposit of a deleterious substance constitutes or would constitute an offence and what measures, if any, would prevent that deposit or mitigate its effects.

Ecologically significant areas

(1.1) a proposal in any ecologically significant area, the Minister may request— in the manner and circumstances prescribed by regulations, any prescribed material and other information relating to the habitat that likely to be affected

Marginal note: Powers of Minister

(2) If, it is of the opinion that an offence is being or is likely to be committed, or likely to result in harm to fish in an ecologically significant area, the Minister or the designated person may, by order,

(*a*) require modifications or additions to the plans, specifications, procedures or schedules considered necessary in the circumstances, or

- (*b*) restrict the carrying on of the work, undertaking or activity.

The Minister or the designated person may also direct the closing of the work or undertaking or the ending of the activity for any period that the Minister or the designated person considers necessary in the circumstances.

Authority to enter

38.(3) An inspector may, for a purpose of compliance, enter any place or premises, other than a private dwelling in which the inspector believes on reasonable grounds that

- (*a*) there is anything that is detrimental to fish habitat; or
- (*b*) there has been carried on, is being carried on or is likely to be carried on any work, undertaking or activity resulting or likely to result in

- (i) death of fish (other than fishing)
- (ii) harmful alteration, disruption, destruction of fish habitat
- (iii) the deposit of a substance in water frequented by fish

Powers on entry

(3.1) The inspector may, for a purpose related to verifying compliance with this Act, examine any substance or product in the place or premises, take samples of it and conduct tests and measurements.

Duty to notify — death/HADD

(4) Every person shall without delay notify an inspector, a fishery officer or an authority prescribed by the regulations of an occurrence that results in death to fish (other than fishing) or harmful alteration, disruption or destruction to fish habitat, that is not authorized under this Act, or of a serious and imminent danger of such an occurrence, if the person at any material time

- (*a*) owns or has the charge, management or control of the work, undertaking or activity that resulted in the occurrence or the danger of the occurrence; or
- (*b*) causes or contributes to the occurrence or the danger of the occurrence.

Duty to notify — deleterious substance

(5) If there occurs a deposit of a deleterious substance in water frequented by fish that is not authorized under this Act, or if there is a serious and imminent danger of such an occurrence, and detriment to fish habitat or fish or to the use by humans of fish results or may reasonably be expected to result from the occurrence, then every person shall without delay notify an inspector, a fishery officer or an authority prescribed by the regulations if the person at any material time

- (*a*) owns or has the charge, management or control of
  - (i) the deleterious substance, or
  - (ii) the work, undertaking or activity that resulted in the deposit or the danger of the deposit; or
- (*b*) causes or contributes to the occurrence or the danger of the occurrence.

Duty to take corrective measures

(6) Any person shall, as soon as feasible, take all reasonable measures consistent with public safety and with the conservation and protection of fish and fish habitat to prevent the occurrence or to counteract, mitigate or remedy any adverse effects that result from the occurrence or might reasonably be expected to result from it.

Report

(7) As soon as feasible after the occurrence or after learning of the danger of the occurrence, the person shall provide an inspector, fishery officer or an authority prescribed by the regulations with a written report on the occurrence or danger of the occurrence.

Corrective measures

(7.1) An inspector or fishery officer, on reasonable grounds that immediate action is necessary in order to take any measures, take any measures at the expense of any person or direct such a person to take them at that person's expense.

Regulations

(9) The Governor in Council may make regulations prescribing

- (*a*) the manner in which the notification is to be made, the information to be contained in the notification and the circumstances in which no notification need be made;
- (*b*) the manner in which the report under that subsection is to be made, the information to be contained in the report and the circumstances in which no report need be made;
- (*c*) the manner in which inspectors and fishery officers may take any measures or give any directions
- (*d*) the manner and circumstances in which any measures taken or directions given under may be reviewed, rescinded or varied; and
- (*e*) any other matters necessary for or incidental to carrying out the purposes and provisions of this section.

Assistance to inspectors

(10) The owner or person in charge of any place or premises entered by an inspector shall give the inspector all reasonable assistance to enable the inspector to carry out their duties and functions and shall provide the inspector with any information with respect to verifying compliance with this Act.

Offence and punishment

40. (1) Every person who contravenes subsection 34.4 (1), 35(1), 36(1) or (3) is guilty of an offence

Indictable Offence

- Individual
  - not less than $15,000 and not more than $1,000,000
  - not less than $30,000 and not more than $2,000,000, or to imprisonment for a term not exceeding three years, or to both, for a subsequent offence
- corporation (person)
  - not less than $500,000 and not more than $6,000,000
  - not less than $1,000,000 and not more than $12,000,000 for a subsequent offence
- small revenue corporation
  - not less than $75,000 and not more than $4,000,000
  - not less than $150,000 and not more than $8,000,000 for a subsequent offence

Summary Offence,

- individual
  - not less than $5,000 and not more than $300,000
  - not less than $10,000 and not more than $600,000, or to imprisonment for a term not exceeding six months, or to both, for a subsequent offence
- corporation (person)
  - not less than $100,000 and not more than $4,000,000,
  - not less than $200,000 and not more than $8,000,000, for a subsequent offence
- small revenue corporation
  - not less than $25,000 and not more than $2,000,000
  - not less than $50,000 and not more than $4,000,000 for a subsequent offence.

Small revenue corporation status

(2.1) a court may determine a corporation to be a small revenue corporation if the court is satisfied that the corporation's gross revenues for the 12 months immediately before the day on which the proceedings arose— were not more than $5,000,000.

Relief from minimum fine

(2.2) The court may impose a fine that is less than the minimum amount provided if the minimum fine would cause undue financial hardship.

Other offences

- fail to comply with a prescribed condition of an authorization
- fail to provide material or information requested by the Minister or within a reasonable time after the request is made
- fail to provide or submit any material, information or report that is to be provided or submitted under regulations
- fail to provide notification that is required (death/HADD or deleterious substance)
    - carries on any work, undertaking or activity other than in accordance with material or information provided to the Minister
    - other than in accordance with material or information required to be modified by any order of the Minister, or
    - contrary to any order made by the Minister
- fail to take any reasonable measures required to take under or fails to take measures in the required manner
- fail to provide a report that he or she is required to provide
- fails to comply with the whole or any part of a direction of an inspector or a fishery officer
- fail to comply with a request of the Minister made under section 20????

First Offence - not exceeding two hundred thousand dollars

Subsequent Offence - not exceeding two hundred thousand dollars or to imprisonment for a term not exceeding six months, or to both.

Matters of proof

- a “deposit” takes place whether or not any act or omission resulting in the deposit is intentional; and
- no water is “water frequented by fish”, where proof is made that the water is not, has not been and is not likely to be frequented in fact by fish.

Application of fines

(6) All fines received by the Receiver General in respect of the commission of an offence under this section are to be credited to the Environmental Damages Fund and

used for purposes related to the conservation and protection of fish or fish habitat or the restoration of fish habitat, or for administering that Fund.

Recommendations of court

(7) The court imposing the fine may recommend to the Minister that all or a portion of the fine credited to the Environmental Damages Fund be paid to a person or an organization specified by the court for a purpose referred to in subsection (6).

42. (1) Where there occurs a deposit of a deleterious substance in water frequented by fish that is not authorized under section 36 or a serious and imminent danger thereof by reason of any condition, the persons who at any material time

- owns the deleterious substance or have the charge, management or control over, or
- who cause or contribute to the causation of the deposit or danger thereof,

are jointly and severally liable for all costs and expenses incurred by Her Majesty in right of Canada or a province, to the extent that those costs and expenses can be established to have been reasonably incurred in the circumstances, of and incidental to the taking of any measures to prevent any such deposit or condition or to counteract, mitigate or remedy any adverse effects that result or may reasonably be expected to result therefrom.

Recovery

(2) All the costs and expenses are recoverable by Her Majesty in right of Canada or a province with costs in proceedings brought or taken therefor in the name of Her Majesty in any such right in any court of competent jurisdiction.

Liability to fishermen

(3) Where, as a result of a deposit that is not authorized under section 36, a deleterious substance enters water frequented by fish, the persons described in paragraphs (1)(*a*) and (*b*) jointly and severally liable for all loss of income incurred by any licensed commercial fisherman, and costs in proceedings taken in any court of competent jurisdiction.

Due diligence defence

78.6 No person shall be convicted of an offence under this Act if the person establishes that the person

(*a*) exercised all due diligence to prevent the commission of the offence; or

(*b*) reasonably and honestly believed in the existence of facts that, if true, would render the person’s conduct innocent

Fishery (General) Regulations
To Persons

62. (1) Where an information is laid by a person in circumstances relating to an offence under the Act, the payment of the proceeds of any penalty imposed arising from a conviction for the offence shall be made

- (*a*) one half to the person; and
- (*b*) one half to the Minister or, where all of the expenses incurred in the prosecution of the offence are paid by a provincial government, to that provincial government.

Fisheries Act

Definitions:

2. (1) In this Act,

fish

"fish" includes

- (*a*) parts of fish,
- (*b*) shellfish, crustaceans, marine animals and any parts of shellfish, crustaceans or marine animals, and
- (*c*) the eggs, sperm, spawn, larvae, spat and juvenile stages of fish, shellfish, crustaceans and marine animals;

fishery

"fishery" includes the area, locality, place or station in or on which a pound, seine, net, weir or other fishing appliance is used, set, placed or located, and the area, tract or stretch of water in or from which fish may be taken by the said pound, seine, net, weir or other fishing appliance, and also the pound, seine, net, weir, or other fishing appliance

fish habitat

"fish habitat" means spawning grounds and any other areas, including nursery, rearing, food supply and migration areas, on which fish depend directly or indirectly in order to carry out their life processes

“**deleterious substance”** means

- (*a*) any substance that, if added to any water, would degrade or alter the quality of that water so that it is, or is likely to be, deleterious to fish or fish habitat or to the use by man of fish that frequent that water, or
- (*b*) any water that contains a substance in such quantity or concentration, or that has been so treated, processed or changed, by heat or other means, from a natural state that it would, if added to any other water, degrade or the quality of that water so that it is, or is likely to be, deleterious to fish or fish habitat or to the use by man of fish that frequent that water,

“**water frequented by fish**”

“water frequented by fish” means Canadian fisheries waters.

2. Species at Risk Act (SARA)

Overview:

The *Species at Risk Act* is designed to meet one of Canada's key commitments under the International Convention on Biological Biodiversity. The goal of the Act is to protect endangered or threatened organisms and their habitats. It also manages species which are not yet threatened, but whose existence or habitat is in jeopardy.

SARA defines a method to determine steps that need to be taken in order to help protect existing healthy environments, as well as recover threatened habitats. It defines ways in which governments, organizations and individuals can work together to preserve species at risk.

Key Definitions:

"**Aquatic species**" means a wildlife species that is a fish, as defined in section 2 of the *Fisheries Act*, or a marine plant, as defined in section 47 of that Act.

"**Critical habitat**" means the habitat that is necessary for the survival or recovery of a listed wildlife species and that is identified as the species' critical habitat in the recovery strategy or in an action plan for the species.

"**Federal land**" means

(*a*) land that belongs to Her Majesty in right of Canada, or that Her Majesty in right of Canada has the power to dispose of, and all waters on and airspace above that land;

(*b*) the internal waters of Canada and the territorial sea of Canada; and

(*c*) reserves and any other lands that are set apart for the use and benefit of a band under the *Indian Act*, and all waters on and airspace above those reserves and lands.

"**Endangered species**" means a wildlife species that is facing imminent extirpation or extinction.

"**Extirpated species**" means a wildlife species that no longer exists in the wild in Canada, but exists elsewhere in the wild.

"**Threatened species**" means a wildlife species that is likely to become an endangered species if nothing is done to reverse the factors leading to its extirpation or extinction.

Destruction of critical habitat

58. (1) Subject to this section, no person shall destroy any part of the critical habitat of any listed endangered species or of any listed threatened species — or of any listed

extirpated species if a recovery strategy has recommended the reintroduction of the species into the wild in Canada — if

(*a*) the critical habitat is on federal land, in the exclusive economic zone of Canada or on the continental shelf of Canada;

(*b*) the listed species is an aquatic species; or

(*c*) the listed species is a species of migratory birds protected by the *Migratory Birds Convention Act, 1994*.

Protected areas

(2) If the critical habitat or a portion of the critical habitat is in a national park of Canada named and described in Schedule 1 to the *Canada National Parks Act*, a marine protected area under the *Oceans Act*, a migratory bird sanctuary under the *Migratory Birds Convention Act, 1994* or a national wildlife area under the *Canada Wildlife Act*, the competent Minister must, within 90 days after the recovery strategy or action plan that identified the critical habitat is included in the public registry, publish in the *Canada Gazette* a description of the critical habitat or portion that is in that park, area or sanctuary.

Application

(3) If subsection (2) applies, subsection (1) applies to the critical habitat or the portion of the critical habitat described in the *Canada Gazette* under subsection (2) 90 days after the description is published in the *Canada Gazette*.

Application

(4) If all of the critical habitat or any portion of the critical habitat is not in a place referred to in subsection (2), subsection (1) applies in respect of the critical habitat or portion of the critical habitat, as the case may be, specified in an order made by the competent minister.

Due diligence

100. Due diligence is a defence in a prosecution for an offence.

3. Canadian Environmental Protection Act (CEPA)

Overview:

The *Canadian Environmental Protection Act* is “an Act respecting pollution prevention and the protection of the environment and human health in order to contribute to sustainable development”.

The goal of CEPA is to contribute to contribute to sustainable development through pollution prevention and to protect the environment and human health from the risks associated with toxic substances.

CEPA also recognizes the contribution of pollution prevention and the management and control of toxic substances and hazardous waste to reducing threats to Canada’s ecosystems and biological diversity.

In determining whether a substance should be declared "toxic" under CEPA the likelihood and magnitude of releases into the environment and the harm it may cause to human health or ecosystems at levels occurring in the Canadian environment are taken into account. If a substance is found to be "toxic," the Ministers recommend that the substance be added to the List of Toxic Substances (Schedule 1). The federal government then works with the provinces, territories, industry, non-government organizations and other interested parties to develop a management plan to reduce or eliminate the harmful effects the substance has on the environment and the health of Canadians.

Key Definitions:

“**pollution prevention**” means the use of processes, practices, materials, products, substances or energy that avoid or minimize the creation of pollutants and waste and reduce the overall risk to the environment or human health.

“**sustainable development**” means development that meets the needs of the present without compromising the ability of future generations to meet their own needs.

Toxic substances

64. For the purposes of this Part and Part 6, except where the expression “inherently toxic” appears, a substance is toxic if it is entering or may enter the environment in a quantity or concentration or under conditions that

(*a*) have or may have an immediate or long-term harmful effect on the environment or its biological diversity;

(*b*) constitute or may constitute a danger to the environment on which life depends; or

(*c*) constitute or may constitute a danger in Canada to human life or health.

Report and remedial measures

95. (1) Where there occurs or is a likelihood of a release into the environment of a substance specified on the List of Toxic Substances in Schedule 1 in contravention of a regulation made under section 92.1 or 93 or an order made under section 94, any person described in subsection (2) shall, as soon as possible in the circumstances,

(*a*) subject to subsection (4) and any regulations made under paragraph 97(*b*), notify an enforcement officer or any other person designated pursuant to the regulations and provide a written report on the matter to the enforcement officer or other person;

(*b*) take all reasonable measures consistent with the protection of the environment and public safety to prevent the release or, if it cannot be prevented, to remedy any dangerous condition or reduce or mitigate any danger to the environment or to human life or health that results from the release of the substance or may reasonably be expected to result if the substance is released; and

(*c*) make a reasonable effort to notify any member of the public who may be adversely affected by the release or likely release.

Application

(2) Subsection (1) applies to any person who

(*a*) owns or has the charge, management or control of a substance immediately before its release or its likely release into the environment; or

(*b*) causes or contributes to the release or increases the likelihood of the release.

Report by property owner

(3) Where there occurs a release of a substance as described in subsection (1), any person, other than a person described in subsection (2), whose property is affected by the release and who knows that it is a substance specified on the List of Toxic Substances in Schedule 1 shall, as soon as possible in the circumstances and subject to subsection (4), report the matter to an enforcement officer or to any person that is designated by regulation.

Defence:

283. No person shall be found guilty of an offence under this Act, other than an offence under section 273 if the offence is committed knowingly or under section 228 or 274, where the person establishes that the person exercised all due diligence to prevent its commission.

4. Navigation Protection Act (NPA)

Overview:

The NPA is administered through Transport Canada and is designed to protect the public right of navigation in Canadian waters. At the same time, the Act allows individuals and agencies to proceed with projects that interfere with navigation, provided they obtain approval from the Minister. In this sense, the Act both reinforces the historic common right to navigation for Canadians and creates a legal process for limiting or interfering with this right.

Recent amendments to the Act have been approved with changes aimed at simplifying the process of building and maintaining bridges or other infrastructure, providing greater certainty in planning for works, and reducing time and project costs.

Key Definitions:

"**Navigable water**" includes a canal and any other body of water created or altered as a result of the construction of any work.

"**Work**" includes

(*a*) any man-made structure, device or thing, whether temporary or permanent, that may interfere with navigation; and

(*b*) any dumping of fill in any navigable water, or any excavation of materials from the bed of any navigable water, that may interfere with navigation.

Throwing or depositing sawdust, etc., prohibited

21. No person shall throw or deposit or cause, suffer or permit to be thrown or deposited any sawdust, edgings, slabs, bark or like rubbish of any description whatever that is liable to interfere with navigation in any water, any part of which is navigable or that flows into any navigable water.