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D1. GENERAL

Permanent or temporary erosion and sediment control is required in all areas under construction. Method, application and duration to be determined as site conditions dictate based on approval of the Engineer and Lacombe County.

D2. OBJECTIVE

The main objective of erosion and sediment control is to prevent sediment pollution in the various watercourses and other bodies of water, excluding storm water management works. Secondly, it is to prevent nuisance airborne dust or dirt tracked onto county roadways and surrounding areas. The majority of these concerns related to subdivision development are as result of construction activities. An Erosion and Sediment Control (ESC) Plan is to be approved by the County prior to the start of any site clearing and grading.

Erosion and sediment control techniques are part of Best Management Practices (BMPs). BMPs operate by trapping storm-water runoff and detaining it until unwanted pollutants, such as sediment, phosphorous and other harmful contaminants are allowed to settle out or be filtered through underlying soils. The trapped pollutants are then removed through regularly scheduled maintenance.

Therefore, any preventative measures that will reduce erosion and sedimentation are beneficial.

D3. REFERENCE MATERIAL

The following reference materials (current editions) have been used in preparing this section and should be referred to for further details:

1. *Alberta Transportation – Design Guidelines for Erosion and Sediment Control for Highways*
2. *Alberta Transportation – Fish Habitat Manual*
3. *Alberta Transportation – Navigable Water Protections Act Manual*

D4. REGULATORY REQUIREMENTS

Erosion from land surfaces can contribute large quantities of sediment to watercourses. There are a number of federal and provincial acts and regulations governing activities that cause, or can cause harm to the environment, including construction projects that

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result in erosion and/or sedimentation. Regulatory agencies also publish codes of practice, guidelines and standards that set out requirements for undertaking certain types of activities. Most legislation and other types of regulatory tools make reference to preventing the release of harmful or deleterious substances, including silt, to the environment.

All applicable Federal and Provincial legislation must be adhered to at all time including, but not limited to, the *Navigable Water Protection Act*, and the *Fisheries Act*, the *Environmental Protection and Enhancement Act*.

D5. EROSION AND SEDIMENT CONTROL (ESC) PLANS

D5.1 Goals and Objectives

The main objective of erosion and sediment control is to protect our waterways and other bodies of water (e.g. lakes) from pollution, primarily sediment pollution.

Dust control reduces the disturbance to residents and is an effective aid in reducing sediment pollution in water bodies.

D5.2 Responsibility

Erosion and sediment control is the responsibility of the Developer.

D5.3 Elements of an Effective ESC Plan

The following elements are to be considered in the preparation of an effective ESC plan:

- 1. Minimize needless clearing and grading**

Some areas of a development site should never be cleared or graded, or these activities should be restricted. This includes stream buffers, wetlands, springs, highly erodible soils, steep slopes and environmental areas.

- 2. Protect Waterways and Stabilize Drainage Ways**

Streams and waterways are particularly susceptible to sedimentation. Clearing adjacent to a waterway should not be permitted. If works are located in close proximity to a waterbody a silt fence should be installed along the perimeter of the buffer. Existing drainage ways should be identified as these will likely be the major routes that eroded sediments will take to the reach streams, rivers, etc. Drainage ways are also prone to erosion due to the high velocity of runoff.

AEP must be notified prior to disturbances along waterways or if waterways are damaged. Compensation through the AESRD Wetland Compensation Program must be carried out.

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3. **Phase Construction to Limit Soil Exposure**

Large areas of grading should be avoided since this maximizes erosion potential. Construction phasing, where only a portion of the site is disturbed at one time, minimizes sediment load potential. Dust suppression measures such as water application or dust suppressants should be used on all areas of exposed soil.
4. **Stabilize Exposed Soils Immediately**

To provide soil stabilization, it is important to establish ground cover over the denuded area within a short period of time with the soils being exposed. Covers such as grass, mulch, erosion control blankets, hydro seeding and/or plastic sheeting can be used to achieve this.
5. **Protect Steep Slopes and Cuts**

Steep slopes are the most highly erodible surfaces within construction sites. Steep slopes are generally defined as 6:1 or greater. Where possible, clearing and grading of steep slopes should be avoided. Special techniques, such as uphill flow diversion and silt fencing, should be used to prevent uphill runoff from flowing down the slopes.
6. **Install Perimeter Controls to Filter Sediment**

Perimeter controls should be implemented at the edge of the construction site to retain or filter runoff before it leaves the site. Silt fences and earth dikes or diversion are two of the more common control methods.
7. **Employ Advance Sediment Settling Controls**

Even when the best ESC measures are employed, high concentrations of sediment may be discharged during larger storms. Therefore, the ESC plan should include some sediment traps or basins to allow captured sediments to settle out. To improve the trapping efficiency, these basins should be designed to incorporate such features as larger storage volumes, use of baffles, skimmers and other outlet devices. Regular inspection and maintenance is also critical to the operation of these measures.
8. **Ensure Contractors are Trained on ESC Plan, Implementation, Inspection, Maintenance and Repairs**

The most important element in the implementation of an ESC Plan is the training and experience of the contractors, as they are usually responsible for the installation and maintenance of the control mechanisms.

9. Adjust the ESC Plan at the Construction Site

For an ESC Plan to be effective, it may have to be modified due to discrepancies between planned and as-constructed grades, weather conditions, altered drainage and unforeseen requirements. Regular inspections by the Engineer are needed to ensure the ESC controls are working properly. Inspections should be conducted every seven days and following heavy rainstorm or snowfall events. Any change must have the approval of the County prior to implementing.

D6. DESIGN OF AN EROSION AND SEDIMENT CONTROL PLAN

An ESC Plan must be prepared for all construction projects. Best Management Practices (BMPs) should be indicated on the construction drawings.

General principles should consider the following:

1. Prevent pollutant release. Source control BMPs should be selected as the first line of defense.
2. Erosion and sediment control measures, or other BMPs should be selected based on the site characteristics and the construction plan.
3. Site drainage and soil conditions should be reviewed to determine the most significant factors for the site and planned construction.
4. Runoff should be diverted away from exposed areas where possible.
5. Existing vegetation should be preserved.
6. The extent of clearing should be limited and phased construction implemented.
7. Natural drainage features should be incorporated when possible. Adequate buffers should be used to protect areas where flows enter the drainage system.
8. Minimize slope length and steepness.
9. Runoff velocities should be reduced to prevent channel erosion.
10. Prevent tracking of material off-site.

11. Select appropriate control measures for the control of pollutants other than sediment.

D7. CONCERNS

There are many erosion and sedimentation concerns that arise due to construction activities. These include, but are not limited to the following:

1. Mud tracking from construction sites onto adjacent roadways and properties.
2. Silt and debris washed into existing drainage systems.
3. Silt and debris transported to receiving watercourse by surface runoff.
4. Windblown dust.

D8. PRACTICES

Good maintenance practices will help to minimize erosion and sediment concerns, and should be considered when preparing the construction schedule. While some may be impractical under certain conditions, others should be considered based on suitability, practicality and cost effectiveness.

1. Stockpiles should be located away from watercourses, environmentally sensitive areas, drainage courses, and existing adjacent developments. The stockpiles should be stabilized against erosion immediately following stripping operations. Stabilization can include, but is not limited to, the establishment of a cover crop or hydro seed matrix consisting of seed, fiber bond and tackifier.
2. All construction traffic should leave the site at a designated point or points. Graveling or paving (where practical) of frequently used access roads will help ensure that minimal material such as mud is tracked off-site. The access road should consist of a bed of non-erodible material (i.e. gravel) of sufficient length to ensure that a minimum of material (mud) is tracked off-site onto adjacent roadways. Internal haul roads and/or track packs can also be designated and maintained to help reduce off-site tracking.
3. Where on-site or downstream detention facilities are provided, use can be made of quality control facilities (through placing temporary weirs or check dams) for sediment control during construction. All temporary and permanent detention facilities must be constructed prior to the installation of any services to the site or the commencement of earth moving operations.

4. Dust control measures should be implemented to prevent wind transport of dust from disturbed soil surfaces. This may be accomplished several ways:
 - a) Vegetate, hydro seed, or mulch areas that will not receive vehicular traffic.
 - b) Construct windbreaks or screens.
 - c) Site may be sprinkled with water or a chemical dust suppressant to control dust. Care must be taken to prevent tracking of mud that may result.
 - d) A combination of the above noted methods.
5. All accumulated sediment and debris should be removed as required. Once construction activities are complete, all related materials and temporary structures must be removed and properly disposed of.

D9. BEST MANAGEMENT PRACTICES (BMPS)

Best Management Practices for erosion and sediment control are various methods that have been proven to work on past construction sites when they are properly planned and constructed.

These measures reduce erosion potential by stabilizing exposed soil or reducing surface runoff flow velocities. As well as minimizing the amount of sedimentation entering water flows.

BMPs are described in detail in Appendix C of the Alberta Transportation – Design Guidelines for Erosion and Sediment Control for Highways manual.