SECTION 7
EROSION AND SEDIMENTATION CONTROL

7.1 Overall Requirements.

The objective of the erosion and sediment control standards is to minimize erosion of disturbed areas during the construction of a project. Erosion and subsequent sediment transport can have a significant impact on the water quality of receiving surface waters. Sediment loads to surface waters increase turbidity, increase water temperatures, degrade fish habitat and spawning areas, and depress dissolved oxygen concentrations. Moreover, toxic substances, trace metals and nutrients which are absorbed to soil particles can be transported into surface waters as well. The addition of these substances to surface waters degrades the existing water quality.

No runoff containing sediment shall be permitted to flow off of any construction site. Sediment shall not be discharge into storm drainage systems, waterways or wetlands. The contractor shall provide and maintain the required sediment control barriers. The control barriers shall not be removed until all roadways have been paved and a permanent and stable vegetation cover has been established.

An erosion and sediment control plan (ESCP) is required for most types of development within the City of Whitefish. The use of source control BMPs to control erosion before it starts is the preferred method of long-term sediment control. However, the best protection on active construction sites is generally obtained through simultaneous application of both source control and sediment containment BMPs. This combination of controls is effective because it prevents most erosion before it starts and has the ability to capture sediments that become suspended before the transporting flows leave the construction site.

BMPs for erosion and sediment control are selected to meet the BMP objectives based on specific site conditions, construction activities, and cost-effectiveness. Since construction site conditions are constantly changing, different BMPs may be needed at different times during construction.

In most cases permanent BMPs can be implemented most effectively when they can be integrated into other aspects of the project design. This requires that stormwater control be considered early in the design process. Stormwater detention is required for most types of development within the City of Whitefish. Some BMPs can be incorporated into stormwater detention facilities with modest design refinements and limited increases in land area and cost.

7.2 Minimum Criteria for Requiring an Erosion Control Plan.

An ESCP is required for land-disturbing activities which include, but are not limited to, excavation, planting, tilling, and grading, which disturbs the natural or improved vegetative ground cover so as to expose soil to the erosive forces of rain, stormwater runoff or wind. The following land-disturbing activities require an ESCP: (Most projects requiring building permits exceed these quantities.)
• Any activity where the total volume of material disturbed, stored, disposed of or used as fill exceeds five (5) cubic yards; or,
• Any activity where the area disturbed exceeds one thousand (1000) square feet provided it does not obstruct a watercourse, and is not located in a floodplain.

7.3 **Erosion And Sediment Control Plan.**

A professional with a good working knowledge of hydrology and ESCP practices, must prepare the ESCP. A copy of the ESCP must be located on the construction site or within reasonable access to the site. As site construction progresses, the ESC plan may require modification to reflect changes in site conditions.

In general, the ESCP will consist of a narrative and a drawing. The project designer may choose to have the narrative included on a drawing or issued as a report. The Montana Department of Transportation is a good source for erosion control details (the Montana Department of Transportation Erosion and Sediment Control Best Management Practices Manual). The following documents are useful BMP references:

- City of Knoxville BMP Manual [www.ci.knoxville.tn.us/engineering/bmp_manual](http://www.ci.knoxville.tn.us/engineering/bmp_manual)

The ESCP must accompany the road and drainage plans, grading plan, or permit request and should be integrated into the grading plan whenever possible. It must contain sufficient information to demonstrate to the City Engineer that potential problems associated with erosion, sediment, and pollution have been adequately addressed for the proposed project. The drawings and notes should be clear and concise and describe when and where each BMP is to be implemented.

The first step for selecting BMPs is to compare the project layout and schedule with onsite management measures that, where appropriate, can limit the exposure of the project site to erosion and sedimentation. Scheduling and planning considerations are the least expensive way to limit the need for erosion and sediment control measures.

At a minimum, all ESC plans must be legible, reproducible and on good quality 24” x 36” bond paper, and must contain the following information:

- Description of project, list of the locations of any existing water bodies and/or stormwater systems;
- Summary description of BMPs utilized;
- ESCP Standard Notes (see section 7.9 for suggestions); and,
- Construction Sequence.

The erosion control plans for a proposed construction site should include the following

Section 7 - 2
information:
  a) Location of the property development;
  b) Construction schedule, including when sediment and erosion control measures will be
     implemented (phasing of any erosion and sedimentation control work shall be clearly
     indicated in the plan);
  c) A site map indicating areas of total development and all areas of soil disturbance, areas of
     cut and fill, drainage patterns, areas used for the storage of soils or wastes, location of all
     erosion and sediment control measures, areas where vegetation practice are to be
     implemented, the location of impervious structures after construction is completed, and
     springs, wetlands and other surface waters;
  d) Topography (with approximate slope anticipated after major grading activities);
  e) Vegetation and re-seeding practices;
  f) Maintenance and inspection procedures required to ensure continued effectiveness.

**Best Management Practices For an ESCP.** At a minimum, the following items shall be
addressed in the ESCP:

1. **Construction Sequence**
   • Install temporary ESC BMPs; constructing sediment trapping BMPs as one of the first
     steps prior to grading;
   • Clear, grub and rough grade for roads, temporary access points and utility locations;
   • Stabilize roadway approaches and temporary access points with the appropriate
     construction entry BMP;
   • Temporarily stabilize, through re-vegetation or other appropriate BMPS, lots or groups
     of lots in situations where substantial cut or fill slopes are a result of the site grading;
   • Protect all permanent stormwater facilities utilizing the appropriate BMPs;
   • Phasing sequence for land disturbance of 30 acres or more.
   • Install permanent ESC controls, when applicable; and,
   • Remove temporary ESC controls when:
     o Permanent ESC controls, when applicable, have been completely
       installed;
     o All land-disturbing activities that have the potential to cause erosion or
       sedimentation problems have ceased; and,
     o Vegetation had been established in the areas noted as requiring vegetation
       on the accepted ESC plan on file with the City Engineer.

2. **Clearing Limits**
   • Distinctly mark all clearing limits, both on the plans and in the field taking precaution to
     visibly mark separately any flood plain areas, and trees that are to be preserved prior to
     beginning any land-disturbing activities, including clearing and grubbing; and,
   • If clearing and grubbing has occurred, there is a window of 14 days in which construction
     activity must begin, otherwise the cleared area must be stabilized.

3. **Construction Access Route**
   • Limit access for construction vehicles to one route whenever possible;
   • Stabilize the construction access routes to minimize the tracking of sediment onto
roadways;
• Install temporary vehicle tracking approach at site entrance locations;
• Inspect all roadways, at the end of each day, adjacent to the construction access route. If it is evident that sediment has been tracked offsite and/or beyond the roadway approach, removal and cleaning is required;
• If sediment removal is necessary prior to street washing, it shall be removed by shoveling or sweeping and transported to a controlled sediment disposal area;
• If street washing is required to clean sediment tracked offsite, once sediment has been removed, street wash wastewater shall be controlled by pumping back on-site or otherwise prevented from discharging into systems tributary to waters of the state; and,
• Locate wheel washes or tire baths, if applicable to ESCP, on site. Dispose of wastewater into a separate temporary on-site treatment facility in a location other than where a permanent stormwater facility is proposed.

4. **Install Sediment Controls**
   • Retain the duff layer, native topsoil, and natural vegetation in an undisturbed state to the maximum extent practical;
   • Pass stormwater runoff from disturbed areas through a sediment pond prior to leaving a construction site or discharging to an infiltration facility;
   • Keep sediment on the project site, to the maximum extent practical, in order to protect adjacent properties, water bodies, and roadways;
   • Stabilize earthen structures such as dams, dikes, and diversions with either quarry spalls, seed or mulch, or a combination thereof;
   • Locate sediment facilities such that they will not interfere with natural drainage channels or streams; and,
   • Inspect sediment control BMPs bi-weekly at a minimum, daily during a storm event, and after any discharge from the site (stormwater or non-stormwater). The inspection frequency may be reduced to once a month if the site is stabilized and inactive.

5. **Soil Stabilization**
   • Select appropriate BMPs to protect the soil from the erosive forces of raindrop impact, flowing water and wind, taking into account the expected construction season, site conditions and estimated duration of use;
   • Control fugitive dust from construction activity in accordance with state and local air quality Ordinances;
   • Stabilize exposed unworked soils (including stockpiles), whether at final grade or not, within 14 days;
   • Soils must be stabilized and seeded by October 15 of every year; and,
   • Stabilization practices include, but are not limited to, temporary and permanent seeding, sodding, mulching, plastic covering, erosion control fabric and mats, soil application of polyacrylamide (PAM) and the early application of gravel base on areas to be paved, and dust control.

6. **Protection of Inlets**
   • Protect inlets, drywells, catch basins and other stormwater management facilities from sediment, whether or not facilities are operable, so that stormwater runoff does not enter the Section 7 - 4
conveyance system (both on and off site) without being treated or filtered to remove sediment;
• Keep roads adjacent to inlets clean; sediment and street wash water shall not be allowed to enter the conveyance system (both on and offsite) without prior treatment; and,
• Inspect inlets weekly at a minimum and daily during storm events. Inlet protection devices shall be cleaned or removed and replaced before 6 inches of sediment can accumulate.

Suggested BMPs:
• Inlet protection-products manufactured for grate inlet protection. Placing silt fence fabric or other drain fabric over an inlet grate is an unacceptable practice and will not be allowed.

7. Runoff from Construction Sites
• Protect down-gradient properties, waterways, and stormwater facilities from possible impacts due to increased flow rates, volumes, and velocities of stormwater runoff from the project site that may temporarily occur during construction;
• Runoff from the construction site through the detention/retention storage pond or swales shall be addressed in the construction sequence. No sediment laden water shall pass through the flow control system and discharge to an offsite storm conveyance systems;
• Construct stormwater control facilities (detention/retention storage pond or swales) before grading begins. These facilities shall be operational before the construction of impervious site improvements; and,
• Protect permanent infiltration facilities that are used for flow control during construction.

8. Washout Site for Concrete Trucks and Equipment
• Designate the location of a slurry pit where concrete trucks and equipment can be washed out. Slurry pits are not to be located in or upstream of a swale, drainage area, stormwater facility or water body, or in an area where a stormwater facility is existing or proposed.

9. Material Storage/Stockpile
• Identify locations for storage/stockpile areas, within the proposed ESCP boundaries, for any soil, earthen and landscape material that is used or will be used on-site;
• Stockpile materials (such as topsoil) on-site, keeping off roadway and sidewalks; and,
• Maintain on-site, as feasible, items such as gravel and a roll of plastic, for emergency soil stabilization during a heavy rain event, or for emergency berm construction.

10. Cut and Fill Slopes
• Consider soil type and its erosive properties;
• Divert any off-site stormwater run-on or groundwater away from slopes and disturbed areas with interceptor dikes, pipes or temporary swales. Off-site stormwater shall be managed separately from stormwater generated on-site;
• Reduce slope runoff velocities by reducing the continuous length of slope with terracing and diversion, and roughening the slope surface;
• Place check dams at regular intervals within ditches and trenches that are cut into a slope; and,
• Stabilize soils on slopes, where appropriate.

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11. Stabilization of Temporary Conveyance Channels and Outlets
   • Stabilize outlets of all conveyance systems adequately to prevent erosion of outlets, adjacent streambanks, slopes and downstream reaches.

12. Control of Pollutants Other Than Sediment on Construction Sites
   • Control on-site pollutants, such as waste materials and demolition debris, in a way that does not cause contamination of stormwater or groundwater. Woody debris may be chopped or mulched and spread on-site;
   • Cover, contain and protect all chemicals, liquid products, petroleum products, and non-inert wastes present on-site from vandalism use secondary containment for on-site fueling tanks;
   • Conduct maintenance and repair of heavy equipment and vehicles involving oil changes, hydraulic system repairs, solvent and de-greasing operations, fuel tank drain down and removal, and other activities that may result in discharge or spillage of pollutants to the ground or into stormwater runoff using spill prevention measures, such as drip pans. Clean all contaminated surfaces immediately following any discharge or spill incident. If raining, perform on-site emergency repairs on vehicles or equipment using temporary plastic over and beneath the vehicle; and,
   • Locate pH-modifying sources, such as bulk cement, cement kiln dust, fly ash, new concrete washing and curing waters, waste streams generated from concrete grinding and cutting, exposed aggregate processes, and concrete pumping and mixer washout waters, downstream and away from any stormwater facilities or location of proposed stormwater facilities.

13. Permanent BMPs
   • Include permanent BMPs, if necessary, in the ESCP to ensure the successful transition from temporary BMPs to permanent BMPs; and,
   • Restore and rehabilitate temporary BMPs that are proposed to remain in place after construction as permanent BMPs.

14. Maintenance of BMPs
   • Inspect on a regular basis (at a minimum bi-weekly, and daily during/after a runoff producing storm event) and maintain all ESC BMPs to ensure successful performance of the BMPs. Conduct maintenance and repair in accordance with individual ESC BMPs outlined in this section; and,
   • Remove temporary ESC BMPs within 30 days after they are no longer needed. Permanently stabilize areas that are disturbed during the removal process.

7.4 Stormwater Pollution Prevention Plan (SWPPP).

Construction site disturbing greater than or equal to an acre in the in the City are generally required to follow two sets of guidelines. The guidelines are from the Montana Department of Environmental Quality (MDEQ) and the City of Whitefish. In order for a construction project to begin follow the steps below regarding stormwater permits and requirements.

MDEQ Requirements for the General Permit for Stormwater Discharges Associated with Construction Activity:
   1. Develop a Stormwater Pollution Prevention Plan (SWPPP)
      Section 7 - 6
• The SWPPP is a document that is developed to direct and assist operators in identifying sources of potential pollutants at the construction activity site and Best Management Practices (BMPs) to be used to help ensure pollutants do not impact receiving surface water through stormwater runoff.

• The SWPPP must contain a narrative description of the project and a drawing of the site with proposed improvements and BMPs.

• The plan is to be kept on site and available for inspection by MDEQ and the City of Whitefish.

2. Review and submit a Notice of Intent (NOI)

• To obtain the forms necessary to complete the NOI refer to the MPDES General Permit for Stormwater Discharges Associated with Construction Activity, which can be downloaded from www.deq.state.mt.us.

3. Post a copy of the complete NOI and SWPPP at the construction site until completion of construction activity.

4. Implement SWPPP prior to beginning land disturbance activity.

5. Inspect and maintain BMPs outlined in Permit MTR100000

6. At the completion of the project submit a Notice of Termination (NOT) following permit requirements.

7.5 **Maintenance Responsibility.**

The owner or owner agent is responsible to ensure that BMPs are used, maintained, and repaired so that the performance standards continue to be met. After all land-disturbing activity is complete and the site has been permanently stabilized, maintenance and the prevention of erosion and sedimentation is the responsibility of the property owner.

Inspection and maintenance are the key elements in controlling erosion and sediment. Erosion and sediment control devices are installed as necessary and moved around the project site. Inspection should be performed after each rainfall and at least weekly. Maintenance must be performed immediately whenever deficiencies are noted. Checklists can help to document the inspection and maintenance process.

All projects require a pre-construction meeting with the city inspector prior to commencing clearing and grading. The city inspector will visit the project periodically and will also be involved in the final inspection checklists and approval.

7.6 **Inpections And Records.**

An example erosion and sediment control inspection form is included in Appendix 7B. Flexibility it key. Be ready to modify the plan as needed throughout the construction phases.

**Site Inspections**

• A site inspection is required every 14 days and after major storm events to ensure all BMPs have been constructed and are functioning properly.

• All inspections shall be documented in written form, kept on the project site, and made available for review by the City.
7.7 **Enforcement And Appeals Process.**

If any violation is found, a notice will be issued to the Responsible Party. The notice will state the nature of the alleged violation(s), the action required to fix the violation(s), and a time limit to fix the violation(s). The City has the authority to issue a stop work order, clean the public way and bill the owner directly for the actual cost of cleanup plus an administrative fee, and issuing a civil citation. Any person, firm, or corporation violating any of the provisions or terms may be subject to penalties as a municipal infraction pursuant of Section 1-4-1 of the Whitefish City Code. Each day of continued violation shall constitute a separate, additional offence.

7.8 **Typical Checklist for Preparing Erosion and Sediment Control Plan.**

A typical checklist for preparing an erosion and sediment control plan is included in Appendix 7A at the end of this section.

7.9 **Typical General Notes for Erosion and Sediment Control Plans.**

The following list contains general notes for a typical small project:

1. As a minimum, all erosion and sediment control practices will be constructed and maintained according to these standards and the Montana Department of Transportation Erosion and Sediment Control Best Management Practices Manual. Detailed examples and descriptions of these BMPs are included in the MDT manual.

2. A copy of the approved erosion and sediment control plan shall be maintained at the project site at all times. This copy shall be made available to the City of Whitefish Public Works Department upon request.

3. Prior to commencing land-disturbing activities in any area not on the approved erosion and sediment control plan, the contractor shall submit a supplementary erosion control plan to the City of Whitefish Public Works Department for review and approval.

4. All erosion and sediment control measures are to be placed prior to or as the first step in clearing and grading. The contractor is responsible for any additional erosion control measures necessary to prevent erosion and sedimentation as determined by the City of Whitefish Public Works Department.

5. The City of Whitefish Public Works Department must be notified prior to dewatering operations. Water must be pumped through an approved filtering device. The City of Whitefish may suspend dewatering operations if pollution is observed.

6. The contractor shall inspect all erosion and sediment control devices at least once a week and at least once a day during rainfall events. The contractor shall perform any repairs or maintenance immediately in order to ensure effective erosion and sediment control.
7. The contractor shall maintain a record of all inspections and maintenance activities at the project site. This record shall be made available to the City of Whitefish Public Works Department upon request.

8. Unless confined in a pre-defined, bermed containment area, the cleaning of cement truck delivery chutes is prohibited at the job site. The discharge of water containing waste cement to the storm sewer is prohibited.

9. All disturbed, exposed, unworked soil areas must be stabilized within 14 days.

10. BMPs shall be left in place and maintained by the contractor until adequate vegetation has been established to protect the areas from erosion.
Typical Checklist for Preparing Erosion and Sediment Control Plan, Sheet 1

Project: _______________________
Reviewer: _______________________
Date: _______________________

Narrative

_____ Basic report format – Site name and address, author of report, legibility, page numbers, correct spelling.

_____ Project description – Purpose of grading or construction activity, total area to be disturbed.

_____ Existing site conditions – Describe vegetation, drainage patterns, topography.

_____ Proposed site conditions – Types of ground cover, drainage patterns, site grading.

_____ Adjacent property and uses.

_____ Types of soils – Soil names and descriptions, erodibility, permeability, depth, texture, shrink/swell potential, hydrologic soil group.

_____ Critical or sensitive areas – Steep slopes, streams, wetlands, sinkholes, etc.

_____ Construction scheduling – Duration of clearing, open grading, installation of permanent stormwater controls.

_____ Inspection and maintenance schedule for BMPs and erosion control devices.

_____ Supporting calculations for BMPs and erosion control devices. In general, detention basins and stormwater conveyance systems will have separate calculations.
Typical Checklist for Preparing Erosion and Sediment Control Plan, Sheet 2

Project: ____________________________
Reviewer: ____________________________
Date: ____________________________

Site Plan

____ Basic drawing format – North arrow, scale, engineer stamp, site name and address, legibility, drawing legend, typical abbreviations.

____ Vicinity map – A small map showing the surrounding area, including landmarks, streams, and roads.

____ Existing vegetation and trees.

____ Limits of clearing and grading.

____ Existing and proposed contours – Appropriate interval, contours match together.

____ Site development – Show all buildings, roads, parking lots, and other structures.

____ Construction access routes, borrow areas, spoil areas.

____ Existing and proposed drainage structures – Sizes, materials, slopes, other important dimensions.

____ Drainage patterns and watershed boundaries – Indicate drainage area for each watershed.

____ Property boundaries and easements.

____ Location of critical or sensitive areas.

____ Location of BMPs and erosion control devices – Typical placement as construction work progresses.

____ Details for BMPs and erosion control devices.
EROSION AND SEDIMENT CONTROL INSPECTION FORM

Inspector: ___________________________ Inspection Date: ___________________________
Company: ___________________________ Project #: ___________________________
Prime Contractor: ____________________ Project Name: ___________________________
Reason for Inspection: Weekly Rain Other (circle one) Weather: _______________________

Areas to be Inspected
Inspect all individual locations of a control practice type before checking boxes

% Estimated percentage of project area devoid of cover
☐ No area devoid of cover has been left inactive for more than 7 days without stabilization
☐ There is no visible sign of sediment leaving the construction site (Street / Storm Sewer / Overland)

* Modifications are required if control practices are not prohibiting sediment from leaving the site
* Maintenance is required when a best management practice is nearing it’s useful life
* Manholes and downstream lines (creeks if required by MPCA/DNR) will be cleaned, not flushed, if inlet protection fails

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Inspection Comments / Recommendations
Any Control Practice Effective box checked “NO” must have comments and recommendations
Any Maintenance / Modification Required box checked “YES” must have comments and recommendations

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General recommendations to increase the effectiveness of erosion and/or sediment control program

☐ See back of sheet for additional comments and recommendations

Communication Notes
To Whom       Type of Communication (circle one)                      Comments
              Direct  Email  Phone  Fax  Written  Diary

☐ Copied to Project Manager - Facilities Management, 241 DAdB 1049 University Drive, Duluth MN, 55812

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