

5.0 SITE ASSESSMENT

5.1 General

Background information for the proposed construction site should be assembled to permit a preliminary assessment of the drainage and erosion potential of the site as well as for identification of environmentally sensitive areas. Identifying these areas will assist in evaluating the erosion and sediment control measures to be implemented on and downstream of the proposed construction site.

Various sources of information for use in preparing a site assessment are discussed in the following sections. This section is not intended to be an exhaustive list of information sources. Therefore, it is the responsibility of the individual or firm preparing an erosion control strategy to ensure they have considered the appropriate relevant information.

5.1.1 Review of Construction Drawings

Design drawings will provide some of the information necessary for the preparation of an erosion and sediment control plan. This information includes, but is not limited to, the location, size and gradient of grubbing areas and stripping areas, vertical and horizontal road alignments, cut slopes and embankment slopes, ditchlines, culverts, bridges and watercourse crossings, riparian zones, and special sites such as borrow pits, gravel pits, and spoil areas.

5.1.2 Geotechnical Investigation Reports

Geotechnical information such as borehole logs, test pit logs, and accompanying reports are available for the majority of highway construction projects in Alberta. This information will likely indicate the type of soils encountered in the area, detailed soil descriptions, the thickness of each unit, moisture contents, soil strength values, and water table levels from discrete locations. In some cases, topsoil assessments or slope stability assessments may have been conducted.

Geotechnical investigation for highway design usually includes aerial photo review, terrain assessment and soil survey investigation for both gradeline and borrow sources. An assessment of difficult/adverse site conditions (i.e., unstable slope, soft subgrade, high groundwater, highly erodible soils) may also be provided. Current AT geotechnical investigation requirements are provided in Engineering Consultant Guidelines for Highway and Bridge Projects Volume 1, Design and Tender (AT, 2002). In general, the depths of soil sampling should extend beneath the design grade for cut slopes, ditch bottoms, and to the maximum depths of proposed borrow source areas. Site assessment of riparian and other sensitive areas of water bodies, floodplains and river crossings may be undertaken to evaluate stability of fills as well as to identify possible erosion and sediment control concerns.

For a typical earthwork grading project, the following soil testing information is provided on the design drawings:

- Plasticity index (PI);
- Soil classification according to USCS;

- Moisture content (%);
- Estimated optimum moisture content (%); and
- Estimated maximum dry density from moisture density relationship testing (kg/m³).

Depending on the scope of work, the geotechnical report may include the following additional information related to erosion and sediment control concerns:

- A review of the gradeline design from a geotechnical as well as an erosion perspective;
- Hydrometer (gradation) and Atterberg Limit testing results for fine-grained soils;
- Soil permeability; and
- Stability of large cuts and high fill areas.

Furthermore, additional reports prepared for environmental and hydrotechnical aspects of the project may contain the following information:

- Identification of possible environmentally sensitive areas including riparian zones, wetlands and fish bearing watercourses;
- Identification of obvious watercourses and assessment for fish habitat; and
- Construction timing restrictions related to fish and wildlife considerations.

5.1.3 Aerial Photography/Imagery

A review of available aerial photographs can provide an overview of landforms and surface features in and adjacent to the construction site. Overlaying the proposed highway alignment on the aerial photos will allow an assessment of conditions such as slope instability. A review of aerial photos will be useful in evaluating drainage patterns, such as drainage catchment size, historic drainage features, ephemeral streams, and lowlands.

Web-based aerial image technology can provide additional information such as type and extent of soil cover, and type and extent of vegetation.

Sources of aerial photographs in Alberta include the following:

- Alberta Environment;
- William C. Wonders Map Collection, University of Alberta;
- Municipalities;
- Alberta Sustainable Resource Development; and
- Alberta Transportation.

5.1.4 Surficial Geology Maps

Surficial geology maps are another source of information regarding the soils that may be encountered during construction. These maps may be used to interpolate soil conditions between drill holes or test pits (with inherent uncertainty) and may also assist in the delineation of the boundaries of various soil types.

The type of information found on surficial geology maps may include type and extent of soil, thickness and bedding characteristics of each soil type, soil stratigraphy, depth to bedrock, and in some instances, the erodibility rating.

Sources for surficial geology maps include:

- Alberta Geological Survey;
- Alberta Research Council;
- Alberta Environment; and
- Geological Survey of Canada.

5.1.5 Vegetative Cover Maps

Vegetative cover maps are typically developed through the analysis of moisture and nutrient regimes. They can provide information about the type and extent of vegetation, the drainage class and soil texture.

Information on vegetative cover will help identify the rooting conditions that may be encountered during grubbing and stripping operations. Furthermore, the existing vegetation will provide the best model for success of revegetation efforts by defining the biogeoclimatic zones and indicating the advantages and limitations of the site for revegetation (for example, arid versus wet conditions).

Vegetative cover maps come in various forms. Some are developed to address specific concerns such as new development and others are developed for inventory purposes. For the purpose of erosion and sediment control planning, site level vegetative cover maps (scale 1:10,000 or less) are the most useful and provide the level of detail required for characterizing a construction site and developing specific erosion and sediment control measures. Overview maps of larger scale may not provide enough detail to plan specific measures, but may be useful for characterizing general site conditions.

Sources for vegetative cover maps include:

- Alberta Environment;
- Environment Canada; and
- Agriculture and Agri-Food Canada.

5.1.6 Floodplain Information

Floodplain information is important data to identify siltation processes associated with natural flooding as opposed to sedimentation caused by construction activities.

Sources for floodplain information include:

- Alberta Environment;
- Environment Canada;
- Agriculture and Agri-Food Canada; and
- Local Municipalities.

Floodplain information should be shown on the drawings that accompany the documentation for an erosion and sediment control strategy.

5.1.7 Site Inspection

A site inspection of the proposed construction site is a fundamental step in the preparation of an erosion and sediment control strategy. Observations of the site conditions will provide the greatest level of detail for characterizing potential erosion and sediment control concerns. A site inspection should be conducted at the appropriate time of year with no snow cover and/or after a rainfall event if possible.

Site inspections should be conducted after the aforementioned sources of information are reviewed. A site inspection should involve a reconnaissance of the highway alignment route to assess and document the following information:

- Soil Types: The soil types in an area to be disturbed by construction activities should be described according to the USCS in conjunction with Agriculture Soil Structure Code in the Soil Erodibility Rating table as presented in Figure 4.2. This information may be assessed by inspecting existing soil exposures or by conducting shallow test pits in the area. The focus should be on areas of anticipated high erosion potential.
- Watercourses: Potential areas of concentrated drainage and areas of surface or groundwater concentration should be noted on the site plans. The field inspection should focus on determining the potential for sedimentation and consequences downstream of the construction site. Depending on the nature of the construction an estimate of the bank full elevation may be required.
- Water Crossings: Water crossings, including watercourses and drainage ditches, should be noted.
- Riparian Zones: The location, size, and general descriptions of riparian zones should be noted. Furthermore, the presence of watercourses originating from or passing through the construction site that are buffered by these zones and their respective gradients should be noted.
- Vegetation: Existing and adjacent vegetation should be noted in terms of location, type and extent.
- Slope Failures: Signs of recent or historic slope failures or evidence of instability should be noted. Assessment by a geotechnical engineer may be required to determine the cause of slope failure.
- Erosion Sites: Areas of recent or past erosion and sedimentation events should be noted.
- Sensitive Sites: Potentially sensitive sites such as drinking water supplies, wildlife habitat, private property, utilities, and recreational areas should be noted.

5.1.8 Referrals with Regulatory Agencies

Various regulatory agencies may have specific and/or detailed information about the construction site. Therefore, consultation is an important step in conducting a site assessment. Information from regulatory agencies may include detailed fish and wildlife

habitat information, historical data such as rainfall records or past slope failures, revegetation limitations or requirements, information on previously implemented erosion and sediment control measures and permitting requirements.

Where applicable, site specific information should be obtained from the appropriate regulatory agencies. These agencies may include the following:

- Alberta Environment;
- Alberta Agriculture and Rural Development; and
- Alberta Sustainable Resource Development.