

Self-Screening Registration Criteria

P14: Earthworks Investigation and Design

Mandatory Knowledge Requirements

The Ministry of Forests and Range will only contract with qualified professional engineers (PEngs) to carry out services for earthworks investigation and design related to Forest Service roads and bridge and major culvert structures. Professional engineers providing this service must:

1. be members in good standing with the Association of Professional Engineers and Geoscientists of British Columbia (APEGBC);
2. have appropriate education, training and experience within the discipline of engineering that are congruent with the services required by the ministry;
3. have considerable recognized specialization in forest hydrology; airphoto interpretation; forest road construction, maintenance, and deactivation techniques; soil mechanics; reinforced earth and other types of retaining wall design and construction; slope stability analysis; landslide avoidance; geohazard identification; mitigation and remediation; best management practices for soil erosion and sediment control;
4. have thorough knowledge about: geomorphology, forest road route planning, geologic hazard and risk identification and analysis; adverse gully processes and fan destabilization processes; and harvesting and silviculture methods;
5. be thoroughly familiar with Provincial legislation such as the *Forest Practices Code of British Columbia Act* and *Forest and Range Practices Act*, and associated regulations under those acts including the Forest Road Regulation and the Forest Planning and Practices Regulation, among other legislation specific to the project;
6. have a comprehensive working knowledge and understanding of the principles and best management practices provided in the following government publications, among others as required:
 - Forest Practices Code of BC Mapping and Assessing Terrain Stability Guidebook (August 1999)
 - Forest Practices Code of BC Gully Assessment Procedure (February 2001)
 - Forest Practices Code of BC Forest Road Engineering Guidebook (June 2002)
 - Forest Practices Code of BC Soil Rehabilitation Guidebook
 - Best Management Practices Handbook: Hillslope Restoration in British Columbia (November 2001)
7. have a comprehensive working knowledge and understanding of the principles, best management practices, and standards (as applicable) provided in the following publications:

- Jacob, M. and O. Hungr (eds). 2005. Debris-flow Hazards and Related Phenomena. Springer, Chichester, UK: In association with Praxis Pub.
 - Fell, R., K.K.S. Ho, S. Lacasse, and E. Leroi. 2005. A framework of landslide risk assessment and management – State of the Art Paper. In *Landslide Risk Management: Proceedings of the International Conference on Landslide Risk Management*, Vancouver, Canada, 31 May – 3 June, 2005. Hungr, O., R. Fell, R. Couture, and E. Eberhardt (eds). A.A. Balkema Publishers, Great Britain.
 - IUGS Working Group on Landslides, Committee on Risk Assessment. 1997. Quantitative risk assessment for slopes and landslides – the state of the art. In *Landslide Risk Assessment: Proceedings of the International Workshop on Landslide Risk Assessment*, Honolulu, Hawaii, February 19-21, 1997. Edited by Cruden, D.M. and Fell, R. A.A. Balkema Publishers. Netherlands.
 - Australian Geomatics Society Sub-committee on Landslide Risk Management. Landslide Risk Management Concepts and Guidelines.
 - Wise, M.P., G.D. Moore and D.F. VanDine (eds). 2004. Landslide risk case studies in forest development planning and operations. B.C. Min. For., Res. Br., Victoria, B.C. Land Manage. Handb. No. 56. Web site: <http://www.for.gov.bc.ca/hfd/pubs/Docs/Lmh/Lmh56.htm>
8. in the case of projects that come under the control and administration of BC Timber Sales (BCTS), obtain BCTS Environmental Management System (EMS) Level 3 training prior to commencing work on any BCTS Worksite.

Mandatory Experience Requirements

All registered professionals providing earthworks investigation and design services require a minimum of 5 years of demonstrated relevant professional experience in forestry or related resource industries in British Columbia. Registered professional engineers must have specific work experience in the following activities related to forest roads:

1. Field investigation of site conditions, subsurface investigation and geotechnical testing, and engineering design for earthworks;
2. Design review and analysis of existing earthworks, and recommendations for repair and rehabilitation where needed.
3. Preparation of detailed reports, drawings, specifications and cost estimates for earthworks.
4. Field reviews of construction activities to provide quality assurance and confirmation of conformance to design, including:
 - field monitoring of construction activities during critical phases
 - reviewing and interpreting design and shop drawings
 - assessing actual field conditions for consistency with design assumptions and recognized “changed conditions”
 - assessing alternatives, and providing revisions to designs for “changed conditions”
 - preparing as-built drawings, and providing statements of construction conformance.