

Self-Screening Registration Criteria

P04: General Arrangement Design of Major Culverts

Mandatory Knowledge Requirements

The Ministry of Forests and Range will only contract with qualified professional engineers (PEngs) to provide professional services for general arrangement design of Forest Service road major culverts. 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 major culvert design services required by the ministry;
3. be familiar with forest road and major culvert planning, major culvert design and construction techniques, design vehicle configuration assessment, fluvial geomorphology, river engineering, shop and field welding principles and techniques, major culvert component fabrication, and necessary aspects of geotechnical engineering for soil/steel structure interaction;
4. have considerable recognized specialization in the layout and conceptual design of major culverts for forest roads;
5. be thoroughly familiar with the “Guidelines for Professional Services in the Forest Sector – Crossings” (Crossing Guidelines) prepared by the Association of Professional Engineers and Geoscientists of British Columbia and the Association of BC Forest Professionals available at http://www.apeg.bc.ca/library/library/guidelines/guides_psf_crossings.pdf, and sign and seal drawings as the Coordinating Registered Professional, Engineer of Record or both;
6. be thoroughly familiar with culvert materials and configurations including open bottom arch systems, hydraulics, open channel flow, scour and scour protection, design flood estimation, cost effective culvert options and alternatives, forest road design and construction techniques, debris assessment and management, and considerations for fish passage;
7. have a working knowledge of related riparian and aquatic environmental issues (such as stream classification and fish passage requirements) and associated construction mitigation techniques
8. be thoroughly familiar with stream crossing requirements and procedures of the Department of Fisheries and Oceans Canada and the British Columbia Ministry of Environment, and knowledgeable about Federal legislation such as the *Fisheries Act* and about Provincial legislation such as the *Forest Practices Code of British Columbia Act*, *Forest and Range Practices Act*, and *Water Act*, and associated regulations under those acts, including the Water Regulation, Forest Road Regulation, and the Forest Planning and Practices Regulation, among other legislation relevant to specific forest road major culvert projects;
9. have a comprehensive working knowledge and understanding of the principles and best management practices provided in the following government publications:
 - Forest Practices Code of BC Forest Road Engineering Guidebook (June 2002)
 - Forest Practices Code of BC Fish-stream Crossing Guidebook (March 2002)

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- Forest Practices Code of BC Riparian Management Area Guidebook
- Forest Practices Code of BC Fish-stream Identification Guidebook

10. 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 professional engineers providing services for general arrangement design of Forest Service road major culverts require a minimum of 5 years of demonstrated relevant professional engineering experience in major culvert projects. This experience must include major culvert design work in forestry or related resource industries in British Columbia and acting as the “Engineer of Record” for this work.

Registered professional engineers must have specific work experience in the following major culvert design and construction activities:

1. Development of general major culvert arrangement drawings with consideration for:
 - design flood estimation
 - design flood and debris management
 - culvert configuration alignment in relation to the road and stream
 - road approach and alignment considerations
 - crossing alignment to the stream
 - scour and scour protection
 - geotechnical conditions, bedding requirements, backfill requirements, compaction requirements and construction parameters
 - cost effectiveness of crossing
 - related riparian and aquatic environmental issues (such as stream classification and fish passage requirements) and mitigation strategies and options
 - construction equipment and practices in the forest sector
2. Site assessment, determination of site plan and other information requirements for assessment and development of culvert alternatives.
3. Preparation of conceptual and/or detailed forest road crossing structure designs for culverts or culvert alternatives.
4. Preparation of detailed engineering general arrangement drawings, design recommendations, specifications, and cost estimates.
5. Field reviews during construction of major culverts 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.