

D7 - On The Road: Issues & Opportunities With Major Highway & Transportation Infrastructure Development

Presentation # 1 title: Geotechnical Challenges along the Test Section of the Sea-to-Sky Highway

Presenters:

Brian Mylleville - Golder Associates Ltd
Paul Schlotfeldt - Golder Associates Ltd

Abstract

The Sea-to-Sky Highway is the primary transportation link between the communities of Vancouver, Squamish and Whistler, BC. Major upgrading of the highway is being carried out in preparation for the Vancouver 2010 Winter Olympics and Paralympic Games. In 2003, the British Columbia Ministry of Transportation committed to design and construction of an 800-m-long test section located about 5 km north of Horseshoe Bay. The primary objective of the test section was to demonstrate that the proposed upgrade of the highway to a four-lane template could be achieved across very difficult terrain with minimal impacts to the travelling public. The terrain along the Sea-to-Sky Highway at the test section presented significant spatial and topographic constraints for construction activities. Near-vertical rock cuts along the upslope edge and vertical to overhanging cuts immediately below the highway leading to CN Railway's Right-of-Way required innovative foundation design solutions. These methods paved the way for the subsequent Sea-to-Sky Highway upgrades currently in progress. Retaining walls and structures (half-bridges) were used extensively to support the southbound lanes of the new highway. Several retaining wall systems were used, including Mechanically Stabilized Earth (MSE) walls such as the ARES® and Sierrascape® retaining wall systems and conventional cast-in-place reinforced concrete retaining walls. The foundation conditions for the retaining walls were highly varied and included existing rockfill, engineered rockfill and fractured and faulted bedrock. Two structures (half-bridges) had to be founded on or cantilevered over pre-existing potentially unstable rock slopes, and this required designing for highly variable ground conditions with the use of deep-seated anchorage systems to counter overturning and seismic loads in structures and wall to support the southbound lanes of the highway. This presentation will describe the geotechnical challenges and design considerations for several types of structures that were used to widen the highway alignment to a four-lane template along the test section

Presentation # 2 title: Land use and highway development: challenges and opportunities

Presenter:

Malcolm Smith - Hemmera Envirochem Inc.

Abstract

The relationship between the development of transportation infrastructure and land use is a dynamic one. Such infrastructure development affects changes in land use, and in some cases is planned in order to compliment and facilitate land use objectives. At the same time, existing land use can influence the way that new infrastructure is planned and advanced by posing both constraints and opportunities. The development of transportation infrastructure, especially through areas with diverse land uses, must consider and where possible integrate with existing land uses. At a minimum, a primary objective during infrastructure development is to ensure that adverse impacts to adjacent land uses are minimized. However, in some cases, the development of such infrastructure can also represent an opportunity to address existing land use considerations that otherwise would not occur or would take much longer to materialize. The South Fraser Perimeter Road has been a component of regional transportation plans for over the past 20 years. In 1999, the Ministry of Transportation began planning of the SFPR corridor. In

2004, an environmental impact assessment for the Project was initiated with project approval being granted in 2008. SFPR construction is currently underway and is expected to be complete by 2012. Planning of the Project encountered numerous areas where the alignment was modified to avoid or minimize impacts to adjacent land uses. With the general alignment of the Project now confirmed, the development of detailed design, construction and operation of the Project, represents an opportunity to pursue some positive outcomes with respect to addressing existing land use and land management considerations within the Project corridor. Specifically, the development phase of the Project provides opportunities to address land management issues within the corridor including those related to: contaminated sites, wildlife use of agricultural land; archaeological resources; and environmentally sensitive (protected) areas. The presentation will explore: examples of Project related activities that can make positive contributions to addressing existing land use considerations on adjacent lands; and challenges that will need to be addressed to ensure that potential benefits are realized.

Speaker Biography

Malcolm Smith is a professional biologist who has worked extensively, within the public and private sectors, in a diverse range of fields including environmental assessment (EA), environmental and sustainability planning, and facilitation of multi-stakeholder planning processes. Malcolm started his career with Environment Canada where he developed State of Environment reporting publications focusing on climate change and transportation issues. From 1993-2001, Malcolm worked as a Senior Program Coordinator with the Fraser Basin Council where he facilitated multi-stakeholder planning processes focusing on land and resource issues. For the past 10 years, Malcolm has been actively involved in the environmental assessment and construction of large capital projects including transportation infrastructure, water and waste water infrastructure and energy projects.