

## CHRIS BRODIE. R.P.BIO.

### MANAGER, ENVIRONMENTAL SERVICES

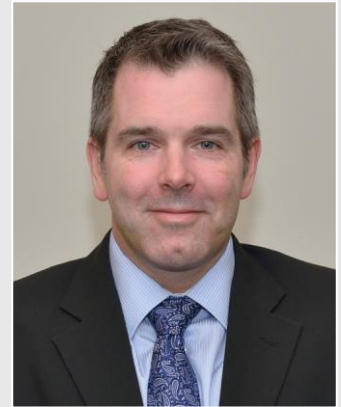
Mr. Chris Brodie is Manager, Environmental Services at Knight Piésold's Vancouver office. He joined Knight Piésold in 1996, and currently manages the Vancouver Environmental Department and is the Global Environmental Sector Lead. He regularly coordinates multidisciplinary teams in the production of Environmental Impact Assessments for mining and hydroelectric projects. He has successfully permitted projects to conform to Canadian, US EPA, and World Bank/Equator Principle regulations and is familiar with the other global jurisdictional requirements. Mr. Brodie is often called upon to undertake stakeholder engagement programs on behalf of project components, and has developed specific skills in First Nation relationship building. As a fluent Spanish speaker, he frequently coordinates specialists and locals for Latin American projects, and provides stakeholder liaison.

#### KEY SKILLS / QUALIFICATIONS

- Experience in strategic environmental planning for baseline studies, impact assessment, and regulatory issues associated with large development projects.
- Expertise in consultation with Governments, First Nations groups and the public.
- Demonstrated excellence in identification of mitigation measures to address project related environmental impacts.
- Advanced experience in environmental impact assessment reporting.
- Extensive professional experience in the management of specialist sub-consultants.

#### SPECIFIC RELEVANT EXPERIENCE

- **Casino Copper-Gold Project, YT, Canada** – Supervision and Coordination of a multidisciplinary team of consultants in the preparation of a Yukon Environmental and Social Assessment Board Proposal for a heap leach and open pit operations with an estimated throughput of 120,000 tonnes per day.
- **Ajax Copper-Gold Project, BC, Canada** – Supervision and coordination of baseline studies, analysis and submission of a Project Application Report to the BC Environmental Assessment Office and Canadian Environmental Assessment Agency for a 60,000 tonne per day open pit mine in near Kamloops, BC.
- **Spanish Mountain Gold Project, BC, Canada** – Supervision and coordination of baseline studies, analysis and submission of a Project Application Report to the BC Environmental Assessment Office and Canadian Environmental Assessment Agency for a 40,000 tonne per day open pit gold mine in near Williams Lake, BC.
- **Betmai Hydroelectric Project, Africa** – Coordination and review of permitting studies and reporting for a run of river hydroelectric project and transmission corridor in central Sierra Leone.
- **Monterde Gold Silver Project, Mexico** - Environmental work coordination to support EIA and permitting. Work completed in association with a local Mexican sub-consultant firm.
- **Campo Morado Mine Project, Mexico** – Development and implementation of baseline environmental data collection for the project pre-feasibility phase in association with a local Mexican sub-consultant firm and development of environmental assessment strategy for project feasibility phase.
- **Pitarrilla Project, Mexico** - Environmental work coordination to support EIA and permitting; work completed in association with a local Mexican sub-consultant firm.
- **Snap Lake Project, NT, Canada** – Development and implementation of baseline meteorological, hydrological, water quality, wildlife, vegetation, and fisheries data collection; liaison with regulatory agencies and First Nations to allow advanced diamond exploration in the Northwest Territories.



**Knight Piésold Ltd.**  
**Canada**

#### EDUCATION

B.Sc. (Honours) Biology  
University of Guelph  
Canada, 1993

#### SPECIALIZATIONS

- Impact Assessment
- Project Permitting
- Stakeholder Engagement
- Aquatic Biology
- Terrestrial Biology
- Automated Instrumentation
- Project management

## DOUG GRIMES, P.GEO., PMP

### PROJECT MANAGER | ASSOCIATE

Mr. Doug Grimes is a Project Manager at Knight Piésold's Vancouver office. He has a Master's degree in Geological Sciences with 25+ years of experience in technical and project management roles in hydropower, dam safety, mining, water supply, reclamation and closure, and contaminated sites. Mr. Grimes has pursued specialized training in Project Management, leading to his Project Management Professional designation.

#### KEY SKILLS / QUALIFICATIONS

- Expertise in the area of project management.
- Developing and leading multi-disciplinary project teams on complex assignments.
- Hydropower, mining and hydrogeology.

#### SPECIFIC RELEVANT EXPERIENCE

- **Groundhog Anthracite Project, BC, Canada** – Project manager responsible for leading the Knight Piésold team responsible for baseline studies (climate, hydrology, hydrogeology and water quality), water balance modelling, water quality modelling, waste management (tailings and waste rock) disposal facility design, sediment and erosion control, and closure and reclamation in support of a proposed underground anthracite coal mine located in the Bowser Basin, approximately 150 km northeast of Stewart and 240 km north of Smithers.
- **Casino Copper and Gold Project, YT, Canada** – YESAB Proposal Studies and Compilation, Project Manager - Knight Piésold lead a multi-consultant team to complete baseline studies, effects assessment and preparation of a Yukon Environmental and Socio-Economic Assessment Board (YESAB) Project Proposal in support of the Casino Copper-Gold Mine Project in the Yukon. The project scope is broad in terms of disciplines, geographic areas and consulting companies. This requires a strong, centralized Project Management strategy which is also adaptive to changes in design, schedule and regulatory requirements.
- **Udokan Project, Russia** – Task manager responsible for leading the Knight Piésold team responsible for well field/groundwater supply review, and closure and reclamation for the tailings storage facilities. The Udokan Copper Project is one of the world's largest copper deposits, located in the Kalar District of the Transbaikal Territory in Eastern Siberia, Russia. This remote mountainous area has extreme climatic conditions, continuous permafrost and high seismicity.
- **Eagle Gold Mine Project, YT, Canada** – Project manager responsible for leading the Knight Piésold team responsible for hydrology, water balance modelling, sediment and erosion control and closure and reclamation in support of Quartz Mining and Water Use Licenses. The mine is an open pit, heap leach facility.
- **Hat Creek Reclamation Project, BC, Canada** – Project Manager - Reclamation of the BC Hydro Hat Creek properties which were once the subject of a proposed open pit coal mine and thermal generation facility. Responsible for regulatory liaison (BC Mines Branch and BC Archaeology Branch permitting), engineering, environmental coordination, archaeology and First Nations consultations. The scope of work included: backfilling, capping and re-vegetation of bulk excavation trenches; decommissioning of large diameter wells; remediation of contaminated soil; and archeological investigation and compensation studies. The project budget was \$1.5M. The project was successfully completed in 2004.



**Knight Piésold Ltd.  
Canada**

#### EDUCATION

M.Sc. Geological Sciences  
Queen's University  
Canada, 1987

B.Sc. Earth Science  
University of Manitoba  
Canada, 1984

#### SPECIALIZATIONS

- Project Management
- Hydropower
- Dam Safety
- Mining
- Hydrogeology
- Reclamation and Closure
- Contaminated Sites

## JAMES HALEY, P.ENG., C.ENG., C.GEOL.

### SENIOR GEOTECHNICAL ENGINEER

Mr. James Haley is a Senior Geotechnical Engineer at Knight Piésold's Vancouver office. He is a Professional Engineer with 24 years of work experience, and is also qualified as a British Chartered Engineer and Geologist. Before moving to Canada, he worked in offices in Hong Kong, Malaysia and the UK. He has worked on mining projects, hydropower and water/wastewater schemes, large highway and railway schemes, a major site formation project, landslide investigations and many natural terrain hazard and risk studies. He is experienced in the design and construction supervision of slope stabilization works and hard rock tunnelling. Mr. Haley has extensive experience in Aerial Photograph Interpretation (API), desk studies, field mapping and site investigation procedures.

#### KEY SKILLS / QUALIFICATIONS

- Terrain hazards and risk studies – API, terrain hazards assessment, terrain and terrain stability mapping, Terrain Stability Assessments, Quantitative Risk Assessments, debris flow run-out assessments design of mitigation works.
- Rock slope stability assessments – Discontinuity surveys, engineering geological mapping, data interpretation; designing and prescribing stabilization measures, assessing effect of blasting vibrations on slope stability.
- Assessment of tunnel support requirements and groundwater inflow
- Descriptions of soils and rocks for engineering purposes.
- Engineering geological mapping and geological interpretation.

#### SPECIFIC RELEVANT EXPERIENCE

- **Macobre S.A.C, Mina Justa Project, Peru** – Preliminary assessment of tunnel support requirements for the first 80 m of the proposed access and ventilation tunnels for the mine.
- **Taseko Mines Limited, New Prosperity Project, B.C., Canada** – Detailed geomorphological mapping of the mine site using hill shade rendered bare earth Digital Elevation Model imagery within the *Global Mapper* software.
- **Candente Copper Corporation, Canariaco Norte Project, Peru** – Terrain Hazards Assessment for the Mine Access Road.
- **Casino Mining Corporation, Casino Project, YT, Canada** – Terrain hazards assessment for the mine site, the air strip and approximately 150 km of proposed access roads. The project involved the identification of potentially hazardous permafrost features and consideration of the engineering implications. Assessment of potential borrow areas for the road construction. Reviewed the 'soils and terrain' section of the Project Proposal for submission to the YESAB Executive Committee.
- **Newgold Inc, Blackwater Project, BC, Canada** – Terrain mapping and terrain stability mapping for the mine site and transmission line corridor. Detailed geomorphological mapping of the mine site using hill shade rendered bare earth Digital Elevation Model imagery.
- **Yellowhead Mining Corporation, Harper Creek Project, BC, Canada** - Terrain and terrain stability mapping of the mine site.
- **Avanti Mining Inc., Kitsault Project, BC, Canada** – Terrain, terrain stability and erosion potential mapping of the mine site and mine access road. Rockfall risk assessment. Landslide risk analysis for surface water quality monitoring field program.
- **First Coal Corporation, Central South Project, BC, Canada** – Terrain and terrain stability mapping of the mine site and Mine Access Road; terrain stability assessment for proposed roads.
- **Baffinland Iron Mines, Mary River Project, NU, Canada** – API to investigate for potentially hazardous permafrost features along the proposed rail alignment and at the mine site.



**Knight Piésold Ltd.  
Canada**

#### EDUCATION

M.Sc. Engineering Geology  
University of Leeds  
UK, 1989

B.Sc. Geology  
University of Hull  
UK, 1988

#### SPECIALIZATIONS

- Landslide hazard and risk studies
- Permafrost hazards
- Rock Mechanics
- Tunnelling
- Engineering geological interpretation

## CRAIG NISTOR, M.Sc., P.GEO.

### SENIOR GEOSCIENTIST

Mr. Craig Nistor is a Senior Geoscientist at Knight Piésold's Vancouver office. Mr. Nistor holds a Master's degree from the University of British Columbia and specializes in hydrology and fluvial geomorphology. He has practiced for over 20 years as a consultant in the mining, hydroelectric, forestry, transportation and municipal development industries. He has extensive experience in the assessment and mitigation of hydrologic and geomorphic impacts to aquatic habitat, and the assessment and mitigation of geomorphic hazards to infrastructure.

#### KEY SKILLS / QUALIFICATIONS

- Hydrometric and Sediment Transport Data Collection – Design and operation of automated stations for hydrometric and/or sediment transport monitoring.
- Hydrologic Analyses – Application of statistical methods and tools for characterizing mean and extreme streamflow conditions for design basis and environmental impact assessment.
- Environmental Impact Assessment – Assessment of altered hydrologic and geomorphic conditions on aquatic habitat.
- Assessment and Mitigation of Geomorphic Hazards – Assessment of geomorphic hazards, including channel erosion, avulsion, sedimentation and outburst flooding; input to engineering design of hazard mitigation works, including flood protection, bank protection, and sediment exclusion structures.

#### SPECIFIC RELEVANT EXPERIENCE

- **Pebble Limited Partnership, Pebble Project, AK, USA** – Managed the compilation and analysis of hydrometric data collected over an 8-year period at more than 30 streamflow gauging stations in the vicinity of the proposed mine site and transportation corridor. Prepared hydrology and physiography chapters of the environmental baseline report, and performed hydrologic analyses in support of engineering design and aquatic habitat impact assessment. The project is a gold-copper-molybdenum porphyry deposit located near pristine salmon streams that drain into Bristol Bay, Alaska. The Project is located in an area of glacial outwash and moraine materials and has a complex surface water / groundwater regime.
- **Casino Mining Corp., Casino Copper-Gold Project, YT, Canada** – Reviewed the compilation and analysis of climatic and streamflow data for use in engineering design and environmental permitting. Led the identification and screening of suitable sites for fish habitat compensation works. Assessed fluvial geomorphic hazards to the proposed access road. The proposed Project is located in the Bonanza Range, southwestern Yukon Territory, and consists of a mine site, airstrip, access road, and barge landing site.
- **Copper Fox Metals Inc., Schaft Creek Project, BC, Canada** – Assessed long-term channel dynamics of a rapidly aggrading stream downstream of a large glacier in northwestern British Columbia, and provided input on the layout and design of mine infrastructure in the stream valley.
- **BHP Minerals Indonesia, Sepapah and Batulicin Projects, Indonesia** – Supervised the collection and analysis of baseline hydrology and meteorology data to support impact assessments for the expansion of the existing Sepapah coal mine, and the development of five new coal mines in the Batulicin area, both located in Kalimantan, Indonesia.
- **Yukon Placer Mining Implementation Review Committee, Yukon Placer Mines Review, YT, Canada** – Maintained a network of suspended sediment monitoring stations and substrate sampling sites to support an impact assessment of placer mining operations throughout the Mayo-Klondike region, central Yukon.



**Knight Piésold Ltd.  
Canada**

#### EDUCATION

M.Sc. Geography  
University of British Columbia  
Canada, 1996

B.Sc. Geography  
University of British Columbia  
Canada, 1990

#### SPECIALIZATIONS

- Hydrometric Data Collection
- Sediment Transport Monitoring
- Hydrologic Analyses
- Characterization of Baseline Geomorphic Processes
- Environmental Impact Assessment
- Substrate Monitoring
- Hazard Assessment and Mitigation



## RYAN STINSON, R.P.BIO.

### SENIOR ENVIRONMENTAL SCIENTIST

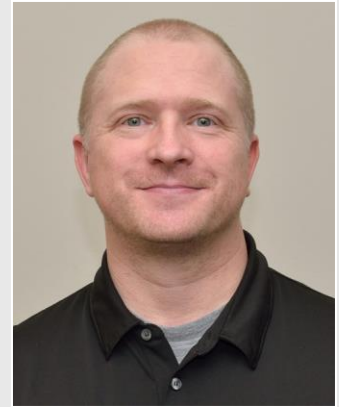
Mr. Ryan Stinson is a Senior Environmental Scientist at Knight Piésold's Vancouver office. He regularly serves as an EIA Project Manager and/or Environmental Science Specialist on mining and hydropower projects and as a Client Representative during consultations with government agencies and stakeholder groups. The focus of his experience has been in the fields of social and environmental impact assessments, environmental monitoring, environmental audits, and environmental site investigations, with projects conducted across British Columbia, Saskatchewan, and the United States. Mr. Stinson has an excellent understanding of the construction and operations aspects of large development projects and incorporates this knowledge to strategic environmental planning and impact mitigation. He is a Registered Professional Biologist and a member of the Association of Professional Biologists of British Columbia.

#### KEY SKILLS / QUALIFICATIONS

- Strategic environmental planning for baseline studies, impact assessment and regulatory issues associated with large development projects.
- ISO 14001 and environmental auditing.
- Government, First Nations and public consultation.
- Identification of mitigation measures to address project related environmental impacts.
- Environmental impact assessment reporting.
- Construction and operations related environmental monitoring programs.
- Contaminated site investigations.

#### SPECIFIC RELEVANT EXPERIENCE

- **Asmara Mine Project, Eritrea** – Led the environmental assessment of the proposed 57.3 Mt polymetallic deposits (copper, zinc, gold) to be mined as three open pit mines and one underground mine. Role as the Lead Assessor, responsible for organizing, authoring and senior reviewing the socio-economic and environmental effects assessment.
- **Casino Project, YT, Canada** – Ryan provided senior review for sections of the Environmental Assessment Report for a 965M tonnes mill + 157 M tonnes heap, open pit Gold, copper and molybdenum mine on behalf of Western Copper and Gold Corporation.
- **Harper Creek Project, BC, Canada** – Ryan provided senior review for sections of the Environmental Assessment Report for a 700,000 tpd open pit copper mine on behalf of Yellowhead Mining Inc.
- **Bute Inlet Hydro Project, BC, Canada** – Completed a Project Description and EIS Guidelines for a 1,027 MW hydroelectric project currently being developed in the BC Coast Range north of Vancouver; currently developing an Environmental Impact Statement/Application document for submission to federal and provincial regulatory agencies.
- **Upper Toba Valley Hydro Project, BC, Canada** – Participated in the completion of an Application Report for a 135 MW hydroelectric project development in the BC Coast Range north of Vancouver.
- **Turnagain Project, BC, Canada** – Completed a Project Description for a proposed surface mined bulk tonnage nickel-cobalt deposit with significant platinum group element mineralization; located approximately 70 km east of the community of Dease Lake.
- **Golden Ears Bridge, BC, Canada** – Performed senior environmental monitoring during construction of the bridge and arterial roadways; developed environmental management plans for the design and construction of the project; liaised and reported to regulators, owner, proponent and other stakeholders on environmental matters regarding the project.



**Knight Piésold Ltd.  
Canada**

#### EDUCATION

M.Sc. Environmental Engineering  
University of Saskatchewan  
Canada, 1999

B.Sc. Biology  
University of Saskatchewan  
Canada, 1995

#### SPECIALIZATIONS

- Regulatory Review and Permitting
- Environmental Impact Assessments
- Environmental Impact Management
- Environmental Monitoring
- ISO 14001 and Environmental Auditing
- Contaminated Site Investigation

**EXPERTISE**

Project Management  
Hydrology/Hyrotechnical Design  
Municipal Engineering  
Information Technology Management

**EMPLOYMENT HISTORY**

**McElhanney Consulting Services Ltd.**  
Project Manager/Branch Manager  
Prince George BC, 12 years

**HCJB World Radio**  
Director of Internet Ministries  
Department  
Quito, Ecuador, 4 years

**McElhanney Consulting Services Ltd.**  
Project Engineer  
Prince George BC, 8 years

**Sigma Engineering Ltd.**  
Design Engineer  
Vancouver BC, 2 years

**Western Canada Hydraulic  
Laboratories**  
Design Engineer  
Coquitlam BC, 1 year

**EDUCATION**

University of British Columbia,  
Vancouver BC. Bachelor's Degree in  
Applied Science in Civil Engineering  
(Honours)

Engineering Software:  
HEC-2 and HEC-RAS water surface  
profiling software

**PROFESSIONAL AFFILIATIONS**

Association of Professional Engineers  
and Geoscientists of BC  
Association of Professional Engineers  
and Geoscientists of Alberta  
Association of Professional Engineers  
and Geoscientists of Saskatchewan  
BC Water and Waste Association

**LANGUAGES**

English – (fluent – written and spoken)  
Spanish – (fluent – written and spoken)  
Cantonese – (spoken)

**EXPERIENCE**

Bill Cheung has over 27 years' experience as a civil engineer. His experience is in design of hydrology and hydraulic projects such as bridges, culverts, and erosion protection works and also the design and project management of transportation and municipal engineering projects. Bill has also been involved in several emergency response projects including the South Alberta Flood of 2013, 2011 South Peace Flood Recovery and 2008 Nechako River Ice Jam Flood.

**RELEVANT PROJECTS*****WATER RESOURCES ENGINEERING*****Toboggan Creek Culvert Rehabilitation, Smithers, BC**

Conceptual and detailed design, coordination of environmental and field construction supervision staff for the successful rehabilitation of a perched culvert under Highway 16. This work included detailed HEC-RAS modelling to determine design levels, assessment of required design flows for specific species, and planning for diversion of the creek during construction. Completed January 2015.

**Moore Creek Flood Risk Assessment, Rio Tinto Alcan**

Coordination of topographic survey and HEC-RAS modelling for flood risk assessment of Moore Creek which passes through RTA's Kitimat operation. Report included sensitivity analysis and review of flood hydrology.

**Stream Crossing Hydrotechnical Design, Prince Rupert Gas Transmission Pipeline**

Senior review and coordination for stream flow analysis and crossing preliminary design of approximately 800 crossings for pipeline corridor and road access. Management of water resources production team, quality control and status tracking for progress reporting.

**Erosion Protection Design, Rocky Mountain House National Historic Site**

Review of options and detailed design for rock riprap protection on the North Saskatchewan River at Rocky Mountain House. Work included coordination of bathymetric survey, estimate of 1 in 100 year flood elevations, required rock sizing, detailed design geometry and preparation of specifications. Coordination with environmental professionals.

**Spray River and Cascade River Bridge Hydrotechnical, Banff National Park**

Determination of design flood water levels and crossing requirements for replacement of bridges damaged during the 2013 flooding in Southern Alberta. Calculations for erosion protection and scour. Liaison with bridge designers.

**Erosion Protection Recommendations, Wyndham-Carseland Provincial Park**

Site visit, options analysis, and recommendations for erosion protection works at Wyndham-Carseland Provincial Park. Completion of detailed design.

**City of Prince George Water Well PW605 Erosion Protection**

Development of conceptual and detailed design for erosion protection of critical municipal infrastructure. Design consisted of a combination of rock riprap on the banks of the Nechako River as well as two rock spurs with associated large woody debris for habitat enhancement.

**Flood Mitigation Options Report, Sundre, Alberta**

Site visit and report preparation including estimates for potential damage and response costs and review of flood mitigation options such as diversion channels and diking. Incorporation of environmental aspects.

**Flood Damage Assessment and Mitigation Options, Fish Creek Provincial Park**

Site visit, options analysis, cost estimates and report preparation for flood and erosion damage mitigation at Fish Creek Provincial Park in Calgary, Alberta. Completion of detailed erosion protection design.

**Hydrotechnical Advisor, Town of Canmore**

Assistance with hydraulic and hydrological engineering support during the June 2013 flood event in Canmore, Alberta.

**Hydrotechnical Project Manager, BC Ministry of Transportation and Infrastructure**

Project management of field investigation and construction works for highway and structure repairs due to the summer of 2011 flooding in the South Peace Region.

**Flood Damage Assessments, Peace River Regional District**

Field inspection and recommendations/costing for damaged sites after the June 2011 flood event near Chetwynd BC

**Flood Damage Assessment Reporting Tweedsmuir West Provincial Park**

Report preparation and determination of Disaster Financial Assistance program eligibility for repair items for flood damage in Tweedsmuir Park from September 2010 flood event.

**Emergency Response Technical Support, Nechako Ice Jam, Prince George**

Coordination of emergency flood response measures and technical support for the City of Prince George. Management of recovery operations including inspections for disaster financial assistance, repairs to public and private property.

**Dutch Valley Dike Study, Terrace, BC**

Preliminary diking study for flood and erosion protection on the Kitsumkalum River.

**University Way, Prince George BC**

Hydrology and drainage design for roadworks and culverts.

**Callazon-Clearwater Road Design Hydrology**

Detailed hydrology analysis and drainage structure design for new forest service road in Northern BC.

**Loreto Hydroelectric Project, Papallacta, Ecuador**

Wireless radio LAN design for communication and data systems for a remote dam and powerhouse location. Included repeater node location, antenna installation and system testing. Research into remote streamflow and monitoring systems including power supplies.

**TRANSPORTATION ENGINEERING**
**Grizzly Creek Crossing Design, BC Ministry of Transportation and Infrastructure**

Engineer of Record for the design and installation of a large structural plate CSP pipe including innovative abrasion-resistant features, debris barriers and energy dissipating outlet. Coordination with road design, traffic management and site safety.

**Hydrotechnical Review for Bridge Installations and Erosion Protection, Parks Canada**

Site review and recommendations for the erosion protection and bridge locations for flood-related damage along the Banff Parkway in Banff National Park after the June 2013 flood event.

**Fisher Creek Bridge Replacement, BC Ministry of Transportation and Infrastructure**

Project management for conceptual and detailed design for the replacement of the Fisher Creek Bridge on Highway 97. Coordination of specialist subconsultants (Geotechnical, Environmental) and implementation of recommendations for sediment and erosion control. In progress as of February 2013

**Boundary Road Intersection Project, City of Prince George**

Project management for detailed design of Highway 97 and Highway 16 intersections with Boundary Road including liaison with Ministry of Transportation and Infrastructure and the City of Prince George. Coordination of roundabout assessment, design briefs, control of project budget and schedule. Engineer of Record services for BC MoT documentation.

**Recreation Place Road and Services, City of Prince George**

Preliminary and detailed design and project management for a new road servicing a commercial development.

**Highway 16 Cycling and Pedestrian Underpass, City of Prince George**

Functional and detailed design of concrete box culvert underpass.



***MUNICIPAL ENGINEERING***

**Prince George Air Tanker Base Water Main**

Study into causes of water main break and detailed design of main replacement including cross-connection and backflow prevention.

**Banzer Drive PRV Station, Prince George, BC**

Design and project management of pressure reducing valve station including building design, piping and mechanical design, and on-site detention pond.

**Telkwa Sewer System, Telkwa BC**

Design and project management of sanitary sewer upgrade. Gravity sewer, force main and lift station design. Liaison with municipal officials and public meeting presentations