
April 15, 2024



Brian David LaCas, P. Eng., FEC, Intl PE, Sr. Hydrotechnical/Water Resources International Engineer, founder, and President LaCas Consultants Inc. (since 1991), a hydrotechnical consulting engineering company. His main area of expertise is natural hydrological hazard assessment, hydrological and hydraulic modeling, and hydraulic structure design, with over 40 years of experience since his registration with Engineers and Geoscientists BC in 1983. He is enlisted as a Water Resources Engineer on Engineers Canada's Mobility Register in accordance with the International Professional Engineers Agreement (IPEA) and the APEC Engineering Agreement.

Scope of experience includes: flood protection works, land and road drainage, creek restoration, river gravel deposition assessment and removal programs, forestry road bridge and culvert hydraulics design and construction review, urban bridge and culvert hydraulics design/construction review, dike design, instream weirs, multiple pipeline creek crossings, shoreline protection works, wave modelling, flood construction level determination for watercourses, lakes and oceans, aerial photography interpretation, dam spillway design, side cast weir design, channel assessment of logged watersheds, large scale flow measurement weir design, dike inspection/manual, selection of creek flow monitoring station locations, channel stabilization works, mine water management plans, hydraulic mine pond design, mine ditch designs, mining conduit design, mine dump drainage design, PAG rock storage ponds, review of intake works, hydrological and hydraulic numerical computer modeling (1-D and 2-D modelling) of clear-water and debris floods, channel relocation, channel geomorphology, creek erosion control works.

These projects have been performed for a broad range of clients including legal firms, government, mining industry, First Nations, and land developers. Brian has been called upon to provide hydrotechnical engineering expert witness services on numerous cases dealing with drainage and flooding and to provide opinions on proposed land development.

Licences

Registered Professional Engineer (P.Eng.) Engineers and Geoscientists British Columbia (APEGBC Registration No. 14240), since 1983.

Education

Bachelor of Applied Science degree (B.A.Sc.) in Civil Engineering (Water Resources Option) from the University of Waterloo, Waterloo, Ontario, Canada, in 1981.

During the University of Waterloo Co-op Program, Brian worked for IBM as a computer programmer, for the City of Hamilton Wentworth on road design, CP Rail on drainage and the BC Ministry of Environment as a creek surveyor for riverbank protection works.

Work Experience

1981-1982: Junior Engineer, for Willis Cunliffe Tait/DELSCAN in Victoria, BC, on engineering projects involving drainage, potable water system (numerical computer 371 modeling), creek design and sanitary works.

1982-1988: Water Allocation Engineer (hydrotechnical engineer) for the BC Water Management Branch, BC Ministry of Environment (various ministry name changes) in Nanaimo, BC and was designated as an Engineer pursuant to the Water Act, and adjudicated applications pursuant to the Act. Responsibilities included: river engineering design and construction supervision of river erosion control projects, water rights investigations of

water intake works and water systems, hydrological calculations, small dam inspections, creek crossing investigations, and review Water Act approval applications to carry out work in and about a stream.

1988-1989: Design Engineer, UMA Engineering Ltd., Burnaby, B.C. Work involved storm water design calculations and numerical computer modeling.

1989-1991: Hydrotechnical Engineer, Sigma Engineering Ltd., Vancouver, B.C., in which work involved numerical computer modeling for flood control, hydrology for mine site planning, aerial photograph interpretation, preparation of operation and maintenance manuals for BC Hydro dams, and flood control and drainage design for land development projects.

1991-Present: President and Senior Hydrotechnical Engineer, LaCas Consultants Inc. Brian has been responsible, in a hands-on role, for the completion of hundreds of projects relating to hydrotechnical engineering.

PFC Training

In 1999, graduated from the Proper Functioning Condition (US Bureau of Land Management) and in 2004, graduated from the Trainer Program. The Proper Functioning Condition (PFC) is a qualitative method for assessing the condition of both creeks (lotic) and wetlands (lentic).

Awards & Recognition

In 2010, Brian received the 2010 Recognition from the Vancouver 2010 Olympic Committee including the Prime Minister of Canada and the Premier of British Columbia for LaCas Consultants Inc. work on Callahan Valley, Cypress Bowl, and Whistler, BC.

In 2018, he received the Environmental Award from Engineers and Geoscientists BC (jointly with EXP Services Inc. and Aqua-Tex Scientific Consultants Ltd.) for LaCas Consultants Inc. work on the Mark Creek Restoration Project, Kimberley, BC. The work included numerical computer modeling, channel restoration design and construction review of a 500 meter long urban stream with three lakes replacing a narrow concrete flume built in the 1950's through the City of Kimberley.

In 2019, Brian received the Certificate of Fellowship (FEC) from Engineers Canada in honour of exceptional contributions to the engineering profession in Canada.

Professional Activities

2002-Present: Hydrotechnical Engineering Reviewer, Engineers & Geoscientists BC

2021-Present: Independent Engineering Review Panel, Mount Polley Mining Corporation

2017-2018: Committee Member, Environment and Social Responsibility Society, CIM

2017-2018: Member Institute of Corporate Directors

2014-2018: BC Director, Canadian Water Resources Association

2004-2018: National Director, Canadian Water Resources Association

2014-2104: BC Vice-President, Canadian Water Resources Association

1994-1994: Forest Industry Liaison Committee: Consulting Engineers of BC

1995-1997: BC Director, Canadian Water Resources Association

1992-1993: BC President, Canadian Society of Hydrological Sciences

1992-1993: Professional Practice Committee, Engineers & Geoscientists BC

1991-1992: Editorial Board, BC Professional Engineer Magazine

Experience - Engineering Expert Legal Opinion

HYDROLOGY, FLOODS, DRAINAGE, FORENSIC FLOOD DAMAGE ASSESSMENT/ MVA EXPERT WITNESS

Specialization

Brian is a court recognized Expert Witness Hydrologist and Hydrotechnical Engineer (Water Resources Engineering Consultant) providing expert opinions, review, rebuttal reports, court expertise specializing in the analysis of floods, flooding and floodplains, stormwater and drainage, dams and reservoirs, rivers, streams, and Motor Vehicle Accident (MVA) road flooding. He is an expert in, and is qualified to testify on, the meteorology and hydrology of flood events for the range of types of watershed and river systems, as well as the hydraulics of bridges, culverts, agricultural land drainage, pump stations, mine tailings pond failures, flood frequency analysis, watershed numerical modeling, water surface profile modeling, flood construction levels, floodplain mapping, ocean wave modeling, ocean flood construction levels, river pipeline crossings, drowning and forensic engineering flood damage assessment.

Engineering Expert Legal Opinions

Miller Thomson, Barristers & Solicitors, 2004

Expert opinion as part of legal team on bridge hydraulics, flooding including review of memoranda and site visit for a MVA in Langley, BC (Defendant).

Whitelaw Twinning, Barristers & Solicitors, 2007

Expert opinion regarding land drainage issues at Westwood Plateau Golf Course, Coquitlam, BC (Defendant).

Scarlett Manson Angus, Barristers & Solicitors, 2001

Expert opinion relating to the alleged flooding of 6092-224th Street in Langley, BC for Alantic Contractors Ltd. (Defendant).

Bellamy & Long, Barristers & Solicitors, 1998

Expert opinion on debris flow and flooding on Arnold Creek in Chilliwack, BC (Plaintiff).

Murdy & McAllister, Barristers & Solicitors, 2003

Expert opinion regarding land drainage at #24-35060 Clayburn Road, Abbotsford, BC for the City of Abbotsford (Defendant).

Lindsay Kenny, Barristers & Solicitors, 2003

Expert opinion on drainage at Westwood Plateau Golf Course in Coquitlam, BC (Defendant).

Alexander, Holburn Beaudin + Lang LLP – Langley, BC, 2012

Expert opinion relating to the alleged flooding of a business on the Langley Bypass (Defendant).

Shapiro & Hankinson, Barristers & Solicitors, 1997

Expert opinion for ENCON insurers after detailed review of rainfall runoff calculations of a Vancouver based engineering firm (Defendant).

George Kincaid and Sharon Radcliffe, West Vancouver, BC, 2002

Expert opinion regarding drainage onto the Kincaid/Radcliffe property (Plaintiff).

Lindsay Kenny, Barristers & Solicitors, 2003

Expert opinion on impact of fill on Brohm Lake levels near Squamish, BC for local contractor (Defendant).

Alexander Holburn Beaudin & Lang, LLP, Barristers & Solicitors, 2013

Expert opinion for the Tyson Creek Hydroelectric Project, Sechelt, BC relating to hydrology, lake taps, turbidity, sediment, and responsibilities of hydrologists. (Defendant).

Harper Grey, LLP, Barristers & Solicitors, 2015

Expert opinion for a drainage problem in Comox, BC, including a hydrological analysis (Defendant).

Morelli Chertkow, LLP, 2019

Millard v. Village of Cache Creek, Cache Creek, BC, (Plaintiff) [on-going].
Expert opinion on flooding on Lopez Creek.

Morelli Chertkow, LLP, 2020

Kuipers v. City of Kamloops et. al., Jorgensen v. City of Kamloops et. al., Kamloops, BC, (Plaintiff). Expert opinion on flooding on unnamed gully.

Rush, Ihas, Hardwick, LLP, 2018

Waterway Houseboats Ltd. et. al. v. HMTQ et. al. (Plaintiff), Sicamous, BC. Expert opinion on flooding on Sicamous Creek.

Whitelaw Twinning, Barristers & Solicitors, 2018

Expert opinion regarding flooding and land drainage issues near Silver star Mountain, BC (Defendant). **Alexander**

Holburn Beaudin + Lang LLP, 2020

Fletcher v. Wallberg, Victoria Registry (Defendant).
Expert opinion on road and land drainage issues in Saanich, BC.

Bernard LLP, 2017

Bandrova Farms Ltd. v. District of Kent, Vancouver Registry, (Plaintiff).
Expert opinion on flooding and pumping issues along Fraser River within District of Kent.

Branch McMaster, LLP, Barristers & Solicitors, 2019

Expert opinion for road drainage issues for MVA in Chilliwack, BC Cache Creek, BC, including a hydrological analysis (Defendant).

Branch McMaster, LLP, Barristers & Solicitors, 2020

Expert opinion for a flooding issue in Cache Creek, BC, including a hydrological analysis (Plaintiff)

Edwards, Kenny & Bray LLP 2019

Expert Opinion on restoration of Brooklyn and Pup Creeks in Brooklyn, BC, including a hydrological assessment (Plaintiff).

Harper Grey, LLP, Barristers & Solicitors, 2019

Expert opinion for a flooding issue in Naramata, BC, including a hydrological analysis (Defendant).

Kwasnicki Law Corporation, 2019

Expert opinion for a land drainage issue in West Kelowna, BC (Plaintiff).

Kahn Zack Ehrlich Lithwick LLP 2019

Expert opinion for Commotion Creek flooding issue, Chetwynd, BC (Plaintiff).

Baker Newby, LLP 2020

Expert opinion for stormwater issue, Chilliwack, BC (Defendant).

Joseph M Prodor, Law Corporation, 2021

Expert opinion for Serpentine River Dike flooding issue, Surrey, BC (Plaintiff).

Drysdale, Bacon, McStravick, LLP, 2021

Expert opinion for Salamander Creek flooding issue, Burnaby, BC (Plaintiff) [On-going].

Paul A. Hildebrand Law Corporation, LLP, 2021

Review of watershed boundaries for Coquitlam River Watershed, BC (Defendant).

Slater Vecchio, LLP, 2022

Expert opinion for Sumas Prairie flooding issue, Abbotsford, BC (Plaintiff) [On-going].

Killian Cordell Barristers 2022

Expert opinion for Anderson Creek flooding issue, Township of Langley, BC (Defendant)

Cox Taylor Barristers, Solicitors Notaries, 2022

Expert opinion for Tseycum Creek (Wsikem Creek) flooding issue, North Saanich, BC (Plaintiff).

Lakes, Whyte LLP, 2022

Expert opinion for Kilmer Creek flooding issue, District of North Vancouver, BC (Plaintiff)

McQuarrie Hunter LLP 2023

Expert opinion for 232nd Street Flooding, Langley, BC (Defendant) [On-going].

Boyle & Company Lawyers 2023

Expert opinion for Prairie Creek Flooding, Summerville, BC (Plaintiff) [On-going].

Kia Law Firm 2023,

Expert opinion drowning and lake currents at a beach in Georgian Bay, District of Tiny, Ontario (Plaintiff) [On-going].

Wagners 2023

Preliminary verbal opinion regarding Nalcor Energy's Muskrat Falls Dam (now folded into Newfoundland and Labrador Hydro) with respect to Churchill River flooding of Mud Lake, Newfoundland/Labrador in May 2017, (Plaintiff) [On-going].

Hydroelectric Dams and Reservoirs

BC Hydro Whatshan Dam, and Reservoir Operation/Maintenance Manual

Responsible for carrying out site visits and preparation of official manual for the dam and reservoir operations.

BC Hydro Falls River Dam, and Reservoir Operation/Maintenance Manual

Responsible for carrying out site visits and preparation of official manual for the dam and reservoir operations.

BC Hydro Clayton Falls Dam and Reservoir Operation/Maintenance Manual

Responsible for carrying out site visits and preparation of official manual for the dam and reservoir operations.

BC Hydro John Hart Lake Dam Reservoir Rehabilitation Project, Campbell River, BC

Responsible for coordination of government environmental monitoring and approval for large suction dredge operations to remove debris from reservoir.

River Flood Hazard Assessments

Colwood, BC, Flood Hazard Assessment, 2022 [on-going]

Flood control report for a subdivision on Wishart Creek.

North Vancouver, BC, Flood Hazard Assessment, 2022 [on-going]

Flood control report for a women's centre near Mackay Creek.

Coquitlam, BC, Minnehada Project, 2022 [on-going]

Flood control scheme for agricultural/commercial/residential project on Pitt River.

Mission, BC, Flood Construction Level, 2022 [on-going]

Flood control report for a proposed dwelling on the Fraser River.

Langford Heights Development, Strand/Bastion Development, 2020 [on-going]

Hydrological and hydraulic analysis for flood control on Millstream Creek. Trudy Creek relocation and Millstream Creek flood channel hydraulic design.

Squamish BC, Paul Wood Development Project, 2021

Flood control review and recommendation of open surface garage in floodway.

Whistler BC, Cameron Wallin Flood Control, 2021

Hydraulic analysis for flood control on River of Golden Dreams.

Bowser BC, Quest Homes Development Project, 2021

Hydrological and hydraulic analysis for flood control on Unnamed Creek.

Langley, BC, Agricultural Ditch Design, 2021

Hydrological and hydraulic analysis for flood control on ditch in proposed farm on 64th Avenue.

City of Chilliwack, BC, Hope Slough Hydrology 2021

Hydrological and hydraulic analysis for fish habitat enhancement on the Hope Slough.

District of Hope, Hope, BC, 2017-2022 [on-going]

Hydrological and hydraulic analysis for flood control on the lower Coquihalla River.

Fraser River, Mission, BC 2016

Preparation of spur dike designs along Fraser River for erosion/scour protection for the Fraser Pacific industrial lands.

Seymour River, District of North Vancouver, BC, 2015

Flood control engineering for a proposed dwelling along the Seymour River.

Gavles Creek, District of North Vancouver, BC, 2016

Responsible for hydraulic modeling of Gavles Creek and recommendations for flood control for a private property owner.

Waldorf School, Whistler, BC, 2013

Flood control review of school located on Fitzsimmons Creek floodplain.

Whistler Listel Hotel, Whistler, BC, 2007

Flood control design with flood control door and floodproofing for wine room.

Horstman Creek, Whistler, BC, 1997

Flood control design of a river training berm.

Crabapple Creek, Whistler, BC, 2017

Flood control design for a floodwall along Whistler Golf Course.

Fraser River, Maple Ridge, BC, 2015

Recommendations for flood control for a warehouse/office project for MC Freight.

Aava Hotel, Whistler, BC, 2009

Flood control design for facilities in underground parking area.

District of Mission, Mission, BC, 1999

Preparation of flood control designs for temporary diking structures along the Fraser River. **City of**

Merritt, BC, 1999

Preparation of flood control and erosion control designs for Nicola River including hydrological analysis and hydraulic modeling.

Sundial Hotel, Whistler, BC, 2008

Flood control design for hotel office entrance and vent.

Steele Properties, Hope, BC, 2017

Responsible for the hydrological and hydraulic analysis for flood control on the lower Coquihalla River and flood control engineering for a subdivision.

Green Lakes Golf Course Project, Whistler, BC, 1990

Review of 1990 Flood on Fitzsimmons Creek and Green Lake impacts the proposed Green Lake Golf Course, (renamed the Nicklaus North Golf Course).

Paradise Trails Project, District of Squamish, BC, 2012

Responsible for hydrological and hydraulic analysis including a dam break analysis of a natural landslide dam on the Cheakamus River.

Resort Municipality of Whistler, Whistler, BC 2017

Responsible for the hydraulic design of a flood bypass channel design for Twenty-One Creek.

Three Points Development, Colwood, BC 2014

Flood control for land development project.

Resort Municipality of Whistler, Whistler, BC, 2017

Responsible for hydraulic design of the Fitzsimmons Creek Dry Channel and bike park.

Resort Municipality of Whistler, Whistler, BC, 2016

Review of floodbox damage in White Gold Estates along White Gold Dike on Fitzsimmons Creek.

White Glacier Project, Whistler, BC, 2017

Responsible for the flood control for several areas of habitation including 1-D modeling and 2-D modeling as well as a transfer of risk assessment.

Nesters Crossing Project, Whistler, BC, 2017

Responsible for flood control for several areas of habitation including 1-D modeling and 2-D modeling as well as a transfer of risk assessment.

Whistler Creek Flood and Debris Flow Mitigation Project, Whistler, BC, 1997 Flood control and for Whistler Creek base for Whistler Mountain Ski Corporation.

Panorama Ridge Project, Whistler, BC, 2015

Responsible for hydrology and flood control for an unnamed drainage on Whistler Mountain, work included the design of a stepped flood channel.

Glencoe Stream and Tavern Creek, Mount Cook, New Zealand, 1996

International Project working with a consortium of engineers on a hazard assessment to road and infrastructure of The Hermitage Ski Resort.

Bridge, Dike (Levee), Hydraulic Design

Stensen Creek Bridge Project, Retallack, BC, 1995

Hydrological analysis and bridge hydraulic design for a cat ski road.

Frederick Creek Bridge Project, Port Alberni, BC, 1995

Hydrological analysis and bridge hydraulic design for a logging road including the determination of the 50 and 100-year return period flood levels, bridge scour depth calculations, bridge waterway sizing and erosion control works.

Carol Creek Bridge Project, Revelstoke, BC, 1996

Hydrological analysis and bridge hydraulic design for a logging road including the determination of the 100-year return period flood levels, bridge scour depth calculations, bridge waterway sizing and erosion control works.

South Main 25KM Creek Bridge Project, Port Alberni, BC, 1995 – hydrological analysis and bridge hydraulic design for a logging road including the determination of the 50 and 100-year return period flood levels, bridge scour depth calculations, bridge waterway sizing and erosion control works.

Stephanie Creek Bridge Project, Port Alberni, BC, 1995

Hydrological analysis and bridge hydraulic design for a logging road including the determination of the 50 and 100-year return period flood levels, bridge scour depth calculations, bridge waterway sizing and erosion control works.

Tenas Creek Bridge Project, Port Alberni, BC, 1995

Hydrological analysis and bridge hydraulic design for a logging road including the determination of the 50 and 100-year return period flood levels, bridge scour depth calculations, bridge waterway sizing and erosion control works.

Corter Creek Bridge Project, Port Alberni, BC, 1995

Hydrological analysis and bridge hydraulic design for a logging road including the determination of the 50 and 100-year return period flood levels, bridge scour depth calculations, bridge waterway sizing and erosion control works.

Nadira Creek Bridge Project, Port Alberni, BC, 1995

Hydrological analysis and bridge hydraulic design for a logging road including the determination of the 50 and 100-year return period flood levels, bridge scour depth calculations, bridge waterway sizing and erosion control works.

Barbara Creek Bridge Project, Port Alberni, BC, 1995

Hydrological analysis and bridge hydraulic design for a logging road including the determination of the 50 and 100-year return period flood levels, bridge scour depth calculations, bridge waterway sizing and erosion control works.

Birch Creek Bridge Project, Creston, BC, 1995

Hydrological analysis and bridge hydraulic design for a logging road including the determination of the 100-year return period flood levels, bridge scour depth calculations, bridge waterway sizing and erosion control works.

Little Moyie Creek Bridge Project, Creston, BC, 1995

Hydrological analysis and bridge hydraulic design for a logging road including the determination of the 100-year return period flood levels, bridge scour depth calculations, bridge waterway sizing and erosion control works.

O'Brien Creek Bridge Project, Creston, BC, 1995

Hydrological analysis and bridge hydraulic design for a logging road including the determination of the 100-year return period flood levels, bridge scour depth calculations, bridge waterway sizing and erosion control.

Spider Creek Bridge Project, Creston, BC, 1995

Hydrological analysis and bridge hydraulic design for a logging road including the determination of the 100-year return period flood levels, bridge scour depth calculations, bridge waterway sizing and erosion control works.

Rogers Creek Bridge Project, Lillooet Lake, BC, 2005

Hydrological review and construction review for the Lillooet Lake Road 36 m long bridge replacement across Rogers Creek hydraulic design for a logging road including the determination of the 200-year return period flood levels, bridge waterway sizing with 1.5 metres freeboard and erosion control works.

Britannia Creek and Mineral Creek Bridge Review Project, Britannia, BC, 2004 Hydrological analysis and bridge hydraulic design for a two existing vehicle bridges including the determination of the 200-year return period flood levels, design velocity, bridge waterway sizing and review of existing erosion control works.

Wood River Trib 'A' Bridge Project, Revelstoke, BC, 1996

Hydrological analysis and bridge hydraulic design for a logging road including the determination of the 100-year return period flood levels, bridge scour depth calculations, bridge waterway sizing and erosion control works.

Misery Creek Audit of Bridge Failure, West Coast of BC, 1999

Carried out a forensic review of the Misery Creek logging road bridge (designed and built by others). Work included a site investigation, key hydraulic data collection, video and photo record, on-site construction inspection of emergency works, and preparing an emergency action plan to mitigate potential damage to fisheries habitat and to stabilize the crossing.

Nicklaus North Golf Course Fairway 1 & 3 Bridge Project, Whistler, BC, 1992

Hydrological analysis and bridge hydraulic design for a construction road including the determination of the 200-year return period flood levels, bridge scour depth calculations, bridge waterway sizing and erosion control works.

Resort Municipality of Whistler - Lorimer Road Bridge Project, Whistler, BC, 1989,

Project Engineer - bridge hydraulics study of the proposed \$3 Million, 40 m long concrete bridge crossing Fitzsimmons Creek. Design included erosion protection works along the main channel and a side channel of Fitzsimmons Creek.

Klaskish River Road Alignment Design, INTERFOR, Port Hardy, BC, 1998

Design of road encroaching into riverbed. Hydraulic design of road berm and erosion and scour protection works.

Cheam Creek, Cheam First Nation, BC 2016

Responsible for hydrology and hydraulics and scour protection of a pipeline crossing Cheam Creek.

Horstman Creek Flood & Debris Torrent Control, Whistler BC, 1997

Design of a 140 m long river training berm with erosion control works to provide protection for development to be constructed on the slopes of Blackcomb Mountain. Work included an assessment of the upper watershed and channels of Horstman Creek to investigate potential sediment loading.

Venture Pacific Development Corporation, Pemberton, BC, 1994

Carried out a hydrological assessment and river training berm design on Pemberton Creek for a 54-townhouse development.

White Glacier Project, Whistler, BC, 2016

Design of river training berm along Nineteen-Mile Creek.

Klaskish River Bridges, Port Hardy Operations, BC, 1996

Carried out a hydrological review of 3 bridge crossings on the Klaskish River including the determination of the 100-year return period flood levels, bridge scour depth calculations, bridge waterway opening, and erosion control works.

Island Highway Nanaimo By-pass Project, Nanaimo, BC, 1982-1988

Water Management Engineer-review of highway bridge crossings and impact on the water resources of numerous creeks.

River Restoration

Mark Creek Restoration, Kimberley, BC, 2015

Preparation of riparian restoration design and flood control modeling for Mark Creek flume project. 2017 Environmental Award, Engineers Geoscientists British Columbia.

Mosquito Creek Restoration, District of North Vancouver, BC, 1997

Design of a compensatory backwater channel works refuge, fish habitat restoration within Mosquito Creek Park. Design and construction review.

Fitzsimmons Creek Restoration, Whistler, BC, 1991

Carried out review and prepared designs for the restoration of Fitzsimmons Creek after the 1991 Flood.

Hobbs Creek Restoration, University of Victoria, BC, 2001

Provided design and construction inspection services for the installation of over 30 log weirs within Hobbs Creek at Mystic Vale. The weirs were specially designed to create riffle pool geomorphology, hydraulic diversity, floodplain utilization, reduce head-cutting and energy dissipation within the stream channel to enhance the existing stream channel geomorphology.

Swan Creek Restoration, Victoria, BC, 2000

Preparation of riparian restoration design and flood control modeling.

Langdale Creek Restoration, Gibsons BC

Preparation of a channel design and fish refuge channel for BC Ferries Inc.

Boyd Creek Relocation, Whistler BC, 2007

Preparation of a channel design and construction review of the relocation of Boyd Creek for the 2010 Olympics.

Maple Creek, Surrey, BC, 2016

Review of bank erosion and instream weir with recommendations for stream restoration.

Colquitz Creek, Saanich, BC, 2002

Provided the preliminary hydrological studies, finger channel design and construction supervision services for the restoration for Quick's Bottom wetland, within the Colquitz Creek watershed.

Millar Creek Erosion Control Works & Fisheries Corridor, Whistler, BC, 1992

Design of 300 m of erosion control works and the provision of a fisheries corridor for riparian vegetation. Work site description and photograph published in BC Professional Magazine.

River Channel and Watershed Assessment

2010 Vancouver Olympics, Whistler, BC, 2004

Responsible for Phase I & II, Hydrology Study of the proposed cross-country, biathlon and ski jump venues at the Callaghan Valley.

Ministry of Environment, Penticton, BC, 1996

Carried out a Level 1 & 2 Interior Watershed Assessment of the Keremeos Creek watershed. Work included training local persons in hydrology and the Channel Assessment Procedure.

Twin Creek Watershed Assessment, Revelstoke, BC, 1996

Hydrological assessment to determine potential hydrological impact of future logging within the watershed.

Silver Star Mountain Watershed Assessment, Vernon, BC, 1997

Responsible for hydrological assessment of a proposed golf course, channel assessments on the headwaters of Coldstream Creek and Vance Creek, helicopter reconnaissance of watershed, hydrological analysis of rainfall, snowpack and peak stream flows, stream gauging and establishing wetland water level monitoring sites was carried out.

Gold Creek Reservoir Watershed Assessment, Cranbrook, BC, 1998

Carried out a channel assessment as part of a team for both Gold and Joseph Creeks which feed the Phillips Reservoir for Cranbrook, BC.

Jennis Lake Fish Habitat Restoration, Jennis Lake, BC, 1999

Work carried out included an on ground and helicopter video reconnaissance, collection of habitat information and dam site measurements, low-intensity fish survey, measurement of DO levels, sedimentation source identification, hydrometric survey, dam removal scenarios and restoration designs for fish habitat.

River of Golden Dreams, Hydrological Assessment, 1989

A hydrological study of the River of Golden Dreams (Alta Creek), for the Environmental Impact Assessment for the Green Lakes Golf Course project.

Ministry of Environment, Lillooet River Watershed, BC, 2001

Operational Inventory of Douglas Creek, Gowan Creek and Rogers Creek requiring the selecting of a suitable stream gauging and Hydrometric/Climate station site within the Squamish River watershed.

Ministry of Environment, Penticton, BC, 1996

Carried out a Level 1 & 2 Interior Watershed Assessment of the Shingle Creek watershed, including training local persons in hydrology and the Channel Assessment Procedure.

Ministry of Environment, Squamish, and BC, 1997

Carried out a Level 1 Coastal Watershed Assessment of the Squamish River watershed, including training local persons in hydrology and channel assessment procedure.

River Erosion and Scour Protection**Maple Ridge BC, Fraser Riverbank Review, 2021**

Field review and recommendations for general riverbank protection works.

Fraser River, Mission, BC 2016

Preparation of preliminary spur dike designs along Fraser River for erosion/scour protection for the Fraser Pacific industrial lands.

Fitzsimons Creek Erosion Control, Whistler, BC, 1999

Design and construction review of 300 m of erosion control works and the provision of a fisheries corridor for riparian vegetation.

Blenkinsop Creek Restoration Design, Saanich, BC, 2004

Designed a new 600m long meandering channel using specialized techniques and a multi-disciplinary approach to provide the farmer with a contiguous field simplifying access, irrigation, and farm management.

Avalon Creek & Shoreline, Langdale, BC

Provided a hydrological assessment of Avalon Creek and river/shoreline engineering design to protect sediment basin facilities for the Avalon Dry Land Sort facility

Market Creek & Reedville Creek, Surrey, BC, 2017

Responsible for the review of scour depths and hydraulic modeling of natural landslide damming of the creeks.

West Kettle River, Beavertell, BC, 1995

Review of flood/erosion requirements for a development site along the West Kettle River.

Water Licencing

Water Licencing Investigations, Vancouver Island, BC, 1982-1988

Water resource investigations of several watercourses to determine water availability for licencing under the BC Water Act.

Water Development Plan for Farm, Surrey, BC, 2016

Responsible for a water resource investigation of the Nicomekl River a blueberry farm's short term use of water for crop irrigation.

Ocean Shoreline Engineering

BC Ferry Corporation, Langdale, BC, 2010

Preparation of the design of shoreline remedial works for the Langdale Ferry Terminal.

374 Seashell Lane, North Vancouver, BC, 2020 [on-going]

Preparation of the design of coastal flood construction level based on ocean wave modelling.

382 Seashell Lane, North Vancouver, BC, 2020 [on-going]

Preparation of the design of coastal flood construction level based on ocean wave modelling. Recommending innovative self-raising flood barrier.

5293 Indian River Road, North Vancouver, BC, 2020 [on-going]

Preparation of the design of coastal flood construction level based on ocean wave modelling. Recommending innovative self-raising flood barrier and specialized flood glass barrier.

524 Lawry Lane, North Vancouver, BC, 2020 [on-going]

Preparation of the design of coastal flood construction level based on ocean wave modelling.

Mining Water Management

Trend Mine Expansion – Tumbler Ridge, BC, 2006

Prepared a surface water study for the environmental assessment and permit application for the expansion of the Trend Mine for Northern Energy & Mining Inc. The work included rainfall runoff modeling and pond sizing for 10 sub-catchment areas. In addition, a preliminary design was carried out for a diversion channel to divert a stream channel around an open pit operation. Hydrological and hydraulic review of weirs.

Perry Creek Mine Expansion – Tumbler Ridge, BC, 2007

Prepared a surface water study for the environmental assessment for Western Canada Coal Corporation. The work included rainfall runoff modeling and pond sizing for sub-catchment areas.

Efemcukuru Mine, Turkey, 2013

General hydrological review. Review of outlet channel profile and recommendation for channel design based on hydraulic modeling results

Ajax Mine, Kamloops, BC, 2015

Responsible for hydrological modeling for the 200-year and PMF for Jacko Lake. Determination of the PMF storage volume for Jacko Lake.

Peace River Coal Mine, Tumbler Ridge, BC, 2014

Hydrological modeling for the 10-year, 200-year and PMF for the mine site. Open channel hydraulic modeling to determine ditch sizing and Roman Pond 1 and 2 for the 10-year volume and 200-year inlet/outlet works, plus construction drawings and reviews. Outlet work design and construction inspection included a measurement weir for both Roman Pond 1 and 2 spillway outlet channels. Design of several ditches and design of two PMF kick out lateral weirs.

Suncor, Fort McMurray, AB, 2005

Detailed hydrological modeling and river engineering design for artificial watershed on cap over Suncor pond with several channels and waterfalls. Modeling included using Proper Functioning Condition principles in the design as well as channel equilibrium design principles.

Questa Mine, Taos, New Mexico, 2006

Hydraulic sizing of tailings pond spillways. Special design of steep rock lined spillways.

Kisladag Mine, Turkey, 2013

Hydrological modeling of the North Dump for 100-year flood. Preliminary sizing of construction, phased and full mine ditching for EIA. Special preliminary design of drop structures. Review of 100-year flood storage requirements for ponds. Review and preliminary design of terrace ditch structures. Review of construction methods applicable to the mine site in Turkey.

Willow Creek Mine, Chetwynd, BC, 2009

Ditch sizing and North Pond 10-year volume and 200-year inlet/outlet works, plus construction drawings and reviews. Outlet work design and construction inspection included a concrete culvert constructed under the CN Rail. Design of a 3.6m dia. 90m long inlet pipe with an articulated concrete block spill pad design to prevent damage to the pond liner. Design of a 3m dia. culvert for ND2 including concrete cloth design of channel. Design of the emergency spillway for the North Pond with an articulated block spillway pad design. Recommendations for a decant pipeline flow monitoring device. Design of a spillway outlet works channel.

Quinsam Coal, Campbell River, BC, 2009

Hydrological modeling and hydraulic modeling for ditches, inlets, and outlets. Evaporation and evapotranspiration model for 100-year time period to determine the variation in potential inundation of PAG in two ponds.

Chu Chua Mine Project – Barriere, BC, 1988-1991

Prepared a detailed regional hydrological study for the Stage 1 Environmental Assessment of the proposed Chu Chua Mine.

Mount Milligan Mine Project – Mackenzie, BC, 1988-1991

Prepared a detailed regional hydrological study for the Stage 1 Environmental Assessment of the proposed Mount Milligan Mine.

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