

Christian Desjarlais is an experienced professional civil engineer (P. Eng.) with a Master of Applied Science, dedicated to the practice of geotechnical engineering and dam safety. Christian actively provides engineering services throughout British Columbia related to construction management, geotechnical stability assessment, invasive investigation, hydrotechnical assessment, hydrological assessment, quality assurance, and regulatory compliance. Christian's thesis topic involved investigating the interaction between seepage, stratigraphy, and regional groundwater conditions in the abutment of an extreme consequence dam. Previous work experiences have given Christian a strong background in field inspection, quality assurance and management, and material testing. Christian is dedicated to keeping current with regulatory requirements, industry best practices, and current research publications, making him an asset for any project.

RELATED EXPERIENCE

Ideal Lake Dam Safety Review. Christian is the lead geotechnical engineer for the dam safety review of three Very High consequence dams. The geotechnical review includes an invasive investigation, lab testing, seepage and stability analysis using finite element methods, and assessment of internal erosion and liquefaction potential. [Kelowna, in progress]

Inspection of City of Kelowna Dams. Christian completed formal annual inspections of the City of Kelowna dams, including: Browne Lake Dams (2), Long Meadow Lake Dam (3), McCulloch Dams (5), and the Turtle Lake Dams (2). The scope of work included CCTV LLO inspection of the Browne Lake Dam. [Kelowna, 2022]

Inspection of Black Mountain Irrigation District Dams. Christian completed formal annual inspections of the BMID dams, including: Ideal Lake Dams (3), Loch Long Dams (2), Graystoke Lake Dam, Fish Hawk Lake Dam, James Lake Dams, (3), Stevens Dam, and Haddens Dam. The scope of work included CCTV LLO inspection of the Fish Hawk Lake Dam. [Kelowna, 2022]

Inspection of District of Summerland Dams. Christian completed formal annual inspections of the District of Summerland dams, including: Headwaters Dams (5), Whitehead Lake Dam, Crescent Lake Dam, Aeneas Lake Dam, Tsuh Lake Dam, Garnet Dam, Isintok Dam, Thirsk Dam (3), and the Balancing Reservoir Dam. [Summerland, 2022]

Hunter Hills Joint Venture Inundation Study. Christian was the lead hydrotechnical engineer for the inundation study and was responsible for field investigation, hydraulic modelling, and inundation mapping. The work included an assessment of the consequence classification of the dam. [Summerland, 2022]

Fish Hawk Lake Dam Safety Review. Christian is the lead geotechnical engineer for a dam safety review of the Extreme consequence Rose Valley Lake dam. The geotechnical review includes a seepage and stability analysis, liquefaction assessment, and assessment of internal erosion. [West Kelowna, in progress]

Fish Hawk Lake Dam Safety Review. Christian is the lead geotechnical engineer for a dam safety review of the Extreme consequence Fish Hawk dam. The geotechnical review includes an invasive investigation, lab testing, seepage and stability analysis, and assessment of internal erosion. [Kelowna, in progress]

Graystoke Lake Dam Safety Review Christian is the lead geotechnical engineer for a dam safety review of the Extreme consequence Graystoke Lake dam. The geotechnical review includes an invasive investigation, lab testing, seepage and stability analysis, and assessment of internal erosion. [Kelowna, in progress]

Regional District of Okanagan Similkameen Geotechnical stability Assessment. Christian is the lead geotechnical engineer for a stability assessment of three Very High consequence dams. This project includes interpretation of borehole logs, analysis of lab and field-testing data,

a seepage and embankment stability analysis, seismic response and liquefaction analysis, and an assessment of internal erosion. [Naramata, 2022]

2022 Merritt Dike Inspections. For the City of Merritt, Aaron inspected the Coldwater River and dikes. [Merritt, 2022]

McCulloch Lake Dam Safety Review. Christian is the lead geotechnical engineer for a dam safety review of five dams, ranging from High to Extreme consequence. The geotechnical review includes an invasive investigation, lab testing, seepage and stability analysis, and assessment of internal erosion. [Kelowna, 2022]

Turtle Lake Dam Safety Review. Christian is the lead geotechnical engineer for a dam safety review of a High and Very High consequence dam. The geotechnical review includes invasive investigation, lab testing, seepage and stability analysis, and assessment of internal erosion. [Kelowna, 2022]

McCuddy Creek Dam Safety Review. Christian is the lead geotechnical engineer for a dam safety review of two High and two Significant consequence dams. The geotechnical review includes invasive investigation, lab testing, seepage and stability analysis, and assessment of internal erosion. For this project, Christian is also providing support engineering for the hydrotechnical assessment. [Oliver, 2022]

Regional District of Okanagan Similkameen Geotechnical Investigation and Monitoring Equipment Installation. Christian assisted in the drilling, testing, logging of 16 boreholes, and installation of 5 piezometers for three Very High consequence dams. Christian directed the lab testing program, reviewed all testing results, and compiled borehole logs. [Naramata, 2021]

Derenzy Lake Dam Detailed Design and Construction. Christian is the lead geotechnical engineer for the detailed design and construction of a rural high consequence dam. As the dam is only accessible by helicopter, the project and design are unique due to access. [Penticton, In progress]

Dog Creek Debris flood assessment. Christian was responsible for collecting drone imagery and implementing photogrammetric modelling to construct digital elevation models to support the preliminary design of mitigation structures. Christian provided support engineering for the hydrological risk assessment event determination. [Dog Creek, 2021]

BC Parks Dam Inspections. Christian was responsible for collecting drone imagery and GNSS survey to generate georeferenced digital elevation models of three dams in the Chilcotin. Christian additionally completed formal annual inspections of the dams during the site visits. [Churn Creek, 2021]

Black Mountain Irrigation District Mission Creek Intake Hydraulic Modelling. Christian provided support engineering for the modelling study and was responsible for the field survey, flow determination, hydraulic modelling, and result mapping. The work included an assessment of preliminary mitigation works. [Kelowna, 2021]

City of Summerland Crack Investigation and Movement Survey. Christian was responsible for collecting drone photography and the implementation of photogrammetric modelling to construct a point cloud model to better assess crack formation and growth on the upstream and downstream faces of a concrete arch dam. Christian assisted in the monument survey to gauge dam movement during fluctuating temperature and loading conditions. [Summerland, 2021]

Tower Ranch Golf & Country Club Inundation Study. Christian provided support engineering for the inundation studies and was responsible for field investigation, hydraulic modelling, and inundation mapping. The work included an assessment of the consequence classification of the dam. [Kelowna, 2021]

Irrigation Works Inspection and Preliminary Design. Christian completed an emergency response inspection and assessment of a retention pond and associated irrigation works for a cattle ranch. Christian assisted in completing preliminary design works and conceptual next steps for reconstruction. [Clinton, 2021]

City of Enderby Flood Mapping and Risk Mitigation. Christian was responsible for collecting field information, river bathymetry, data analysis, hydraulic modelling, and flood mapping. Additionally, Christian is providing GIS analysis of the impact of the flooding to support risk assessment. The project is scheduled for completion this May. [Enderby, 2021]

Gair Lake Dam Emergency Spillway Construction. Christian assisted in responding to an emergency condition with the spillway on the Gair Lake Dam. The project included in-field design and coordination with available contractors to rectify and re-construct the spillway quickly. [Bridge Lake, 2020]

Black Mountain Irrigation District Inundation Studies. Christian provided support engineering for the BMID inundation studies and was responsible for field investigation and hydraulic modelling. The work included assessing the consequence classification of two dams (resulting in consequence of Extreme for both). [Graystokes, 2021]

Meadow Lake Dam No. 1 and 2 Remedial Construction. Modifications. Christian acted as the field engineer for the construction of various modifications to Meadow Lake Dam No.1 and 2. These modifications included dam spillway modifications, crest levelling, slope regrading, monument installation, and decommissioning of Dam No.2. [150 Mile House, 2020]

Black Mountain Irrigation District Low-level Outlet Assessments and CCTV Inspections. Christian assisted in completing condition assessments of the low-level outlet for four dams (High to Extreme consequence) for the Black Mountain Irrigation District. [Kelowna, 2020]

McCulloch Lake Low-level Outlet Assessment and CCTV Inspection. Christian assisted in completing a condition assessment of the extreme consequence McCulloch Lake Dam's low-level outlet for the City of Kelowna. [Kelowna, 2020]

Meadow Lake Dam No. 1 and 2 Invasive Investigation and Geotechnical Assessment. Christian was the support engineer and assisted in completing the invasive investigation and geotechnical assessment of the Meadow Lake Dam 1 and 2. The project involved completing six (6) boreholes and installing five (5) piezometers, a laboratory testing program, and 2D geotechnical modelling of the dam under various design criteria. [Williams Lake, 2020]

Asahal Lake Dam Safety Review. Christian aided with the Asahal Lake DSR providing hydrotechnical and geotechnical support to the project. The DSR scope includes a hydrotechnical analysis, embankment stability analysis, and re-redetermination of the dam's consequence classification. The project is to be completed in the Spring of 2020. [Williams Lake,]

Gaspard Lake Dam Hydrotechnical Report. As the supporting Hydrotechnical Engineer, Christian supported the project by determining the inflow design flood and assessing the reservoir wind/wave loading. [Gang Ranch, 2020]

Minton Lake Dam Construction. Evergreen Geotechnical Inc contracted Interior Dams to provide resident engineering on-site services for the construction of the Minton Lake Dam. Christian was the field engineer for the Interior Dams team. [Williams Lake, 2019]

Industry Brook Dam Geotechnical Assessment. Christian was the support engineer responsible for assessing seepage and other deficiencies identified in a DSR. This project involved developing an invasive investigation and material sampling plan and conducting geotechnical modelling and dam assessment. The work included the design of remedial

structural stability modifications and the installation of piezometers and seepage monitoring equipment. [Kelowna, 2019]

Boot Lake Dam Failure Consequence Review & Inundation Mapping. Christian acted as the hydrotechnical engineer to conduct a dam failure consequence classification review for the Boot Lake Main and Saddle Dam. The project includes inundation mapping. [Osoyoos, 2019]

Valley (Upper) Dam Emergency Spillway Construction. Christian supported response to an emergency condition with the Valley (Upper) Dam spillway. The project included in-field design, quality control, and coordination with available contractors to rectify and re-construct the spillway quickly. [150 Mile House, 2019]

Derenzy Lake Dam Inspection and Preliminary Design. Christian supported the completion of an emergency response inspection and assessment of the Derenzy Lake Dam. The work involved completing a formal annual inspection and including prescriptive recommendations for implementing temporary emergency works and conceptual next steps for decommissioning or reconstruction. [Okanagan Falls, 2019]

Smith Lake Dam Safety Review. Christian worked on the Smith Lake DSR and provided hydrotechnical and geotechnical support to the project. The DSR scope of work includes a hydrotechnical analysis, embankment stability analysis, and re-determination of the consequence of classification of the dam. [Darfield, 2019]

NSSL and SSL Dam OMS Update. Christian provided updates to the OMS manual for the North and South Silverstar Lake Dams. The manual was updated to meet current regulatory requirements and satisfy deficiencies identified in the most recent DSR. [City of Armstrong 2019]

Meighan Creek Emergency Bypass Design. Christian is the supporting design engineer designing a diversion structure to mitigate flooding along Meighan Creek in Armstrong, BC. Christian has completed a 1D/2D transient flow model in HEC-RAS to analyze optimal channel and road crossing dimensions, ensuring cost efficiency and fish passage. [City of Armstrong, 2019]

Sandhill Mine Environmental Management Plan Update. Christian provided engineering support in creating Sandhill Mine's Surface Water Management Plan. The project included a hydrological assessment of the mine site, determination of design flow events, design of standard drainage and ditches, and assessment of current erosion and sediment control structures. [Kitimat, 2019]

Williams Lake Indian Band Dam Safety Training. Christian assisted in preparing and designing a dam safety workshop delivered to the Williams Lake Indian Band. The training was focused on equipping dam owners to implement a robust dam safety management system. Content included practical examples on how to re-determine the consequence classification of a dam and how to hire qualified professionals. [Williams Lake, 2019]

Merritt Dike Inspections. Christian assisted in the inspection of three dikes under the jurisdiction of the City of Merritt, as per the BC Dike Maintenance Act. [City of Merritt, 2018]

Armstrong Flood Mapping & Mitigation Assessment. Christian acted as the hydrotechnical modeller for the Armstrong Flood Mapping and Mitigation project, creating a 1D/2D transient flow model in HEC-RAS and producing GIS-based Hazard Mapping for the city's flood zones. Assisted in creating a presentation of results to the city council and a public consultation on the City's behalf. [City of Armstrong, 2018]

Park Rill Dam Auxiliary Spillway Construction. Christian acted as the support engineer, responsible for assisting in designing and constructing a new auxiliary spillway for the Park Rill Dam. Christian provided site supervision and completed regular quality control inspections of the works. [Oliver, 2018]

Elliot Creek Dam Modifications. Christian acted as the support engineer for the design and construction of various modifications to the Elliott Creek Dam. These modifications included dam spillway modifications, installation of piezometers, crest raising, and monument installation. [Lake Country, 2019]

BX Creek Dam Decommissioning. Christian acted as the supporting design engineer and field engineer for the decommissioning of the BX Creek Dam. The project involved the temporary diversion of the main BX Creek channel, removal of a 6 m high concrete gravity dam, and the reconstruction and restoration of the stream. [Vernon, 2018]

Boot Lake Dam Safety Review. Christian worked on the Boot Lake DSR and provided hydrotechnical and geotechnical support to the project. The DSR scope of work included a dam break analysis, embankment stability analysis, and re-determination of the consequence of classification of the dam. [Osoyoos, 2018]

Elliot Creek Dam Safety Review. Christian acted as the supporting engineer to assess a High consequence dam for safety under the order of FLNRO. Work included a dam break analysis, re-determination of the consequence classification, survey and inventory of the dam and appurtenant structures, and assessment and preliminary planning to address deficiencies. [District of Lake Country, 2018]

FLNRO Workshops. Christian assisted in preparing and designing dam safety workshops delivered via the Ministry of Lands, Forests, and Natural Resource Operations and Rural Development (FLNRO). The training was focused on equipping dam owners to implement a robust dam safety management system. Content included practical examples on how to re-determine the consequence classification of a dam and how to hire qualified professionals. [Various Locations, 2018]

Strohmann Dam Spillway Design and Construction. Christian acted as field review of the construction of a 15 m wide concrete spillway structure. [South Okanagan, 2018]

Site C Clean Energy Project. Christian acted as a field inspector for the prime contractor during the construction of the Site C Dam. Supervision of the placement of fill materials, geomembranes and textiles, riprap, concrete, shotcrete, grout, and roller compacted concrete was completed. Inspection of foundation preparation, rebar placement and formwork, rock bolt and dowel installation, curtain grouting, bentonite slurry cut-off walls, blasting holes, and instrument installation was performed. Daily field reports were prepared to detail deficiencies, contract specifications, and remedial recommendations and measures. [Fort St. John, 2017]

Site C Clean Energy Project. Christian acted as a lab technician for the prime contractor during the construction of the Site C Dam. Received CCIL certification in Category 0 and 1 for concrete and certification for aggregate testing such as bulk density, sieve, specific gravity, etc. In addition, Christian was trained for testing and inspection of RCC and GEV RCC. Christian developed reports, worksheets, and tracking logs for concrete, aggregate, and soil testing to convey results with various company production divisions. [Fort St. John, 2017]

TransCanada Pipelines and ANG Compression Station upgrades. Christian provided field review and testing in the form of density measurements by the nuclear method. Lab testing was also completed in the form of sieve and proctor analysis. [Creston, 2015]

Stu Bain Subdivision. Christian provided field review and testing in the form of fill density measurements and concrete slump, air entrainment, and strength testing. Lab testing was also completed in the forms of sieve analysis, hydrometer analysis, and proctor analysis. [Cranbrook, 2015]

Montane Subdivision. Christian provided field review and testing in the form of fill density measurements and concrete slump, air entrainment, and strength testing. Lab testing was also

completed in the forms of sieve analysis, hydrometer analysis, and proctor analysis. [Ferne, 2015]

East Kootenay Regional Hospital Upgrades and Expansion. Christian provided field review and testing in the form of fill density measurements and concrete slump, air entrainment, and strength testing. Lab testing was also completed in the forms of sieve analysis, hydrometer analysis, and proctor analysis. [Cranbrook, 2015]

BC Hydro Regional Substation Upgrades. Christian provided field review and testing in the form of concrete slump, air entrainment, and strength testing. Lab testing was also completed in the forms of sieve analysis, hydrometer analysis, and proctor analysis. [Sparwood, 2015]

Shadow Mountain Properties Golf Development. Christian provided field review and testing in the form of fill density measurements and concrete slump, air entrainment, and strength testing. Lab testing was also completed in the forms of sieve analysis, hydrometer analysis, and proctor analysis. [Cranbrook, 2015]

RESEARCH

Analysis of Piezometer Measurements and Stratigraphy at Sugar Lake Dam. This thesis examines the influence of abutment geometry, stratigraphy, reservoir operation, and regional groundwater on the piezometric readings within the abutment. Statistical analyses of historical piezometer measurements were conducted with the open-source software R. Time series decompositions, cross-correlation analysis, spectral decomposition, and Fourier coupled ARIMA modelling were completed. A 3-dimensional finite element seepage model, created within the Rocscience software RS3, was used to validate the physical assumptions of the inter-abutment relationships. [University of British Columbia, 2022]

Determination of Friction Angle by Dynamic Cone Penetration. Researched and analyzed the correlation between dynamic cone penetration testing results and soil's effective friction angle. Field testing and literature reviews were performed; work was supervised by and reported to Dr. Dwayne Tannant, P.Eng, FCIM. [University of British Columbia, 2018]

Orchard Trellis Support Systems. Researched and analyzed different trellis support methods and configurations, along with best practices for construction and management. Work was conducted with Dr. Dwayne Tannant, Ph.D., FCIM, and Keith Duhaime, P.Ag. and results were published by the BC Ministry of Agriculture as a revision to Support Systems for High-Density Orchards. [University of British Columbia, 2018]

EDUCATION

M.A.Sc. Degree, Civil Engineering, University of British Columbia, Kelowna, British Columbia, Canada

B.A.Sc. Degree, Civil Engineering, University of British Columbia, Kelowna, British Columbia, Canada

PROFESSIONAL MEMBERSHIPS AND COMMITTEES

P.Eng, Engineers and Geoscientists of BC, Kelowna, BC, Canada

Member, Canadian Dam Safety Association (CDA), Canada

Member, BC Water Supply Association, Canada

Member, CSCE Canadian Society for Civil Engineering