MUNICIPALITY OF SKAGWAY
ROCKSLIDE ASSESSMENT

Proposal to provide Professional Services
June 28, 2022

SHANNON & WILSON

TITLE PAGE

Municipality of Skagway

ROCKSLIDE ASSESSMENT
REQUEST FOR PROPOSALS

Proposal to provide professional services by:

Shannon & Wilson, Inc.
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June 28, 2022

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SHANNON & WILSON, INC.
GEOTECHNICAL AND ENVIRONMENTAL CONSULTANTS

June 24, 2022

Municipality of Skagway
P.O. Box 415
700 Spring Street
Skagway, AK 99840

RE: MUNICIPALITY OF SKAGWAY ROCKSLIDE ASSESSMENT REQUEST FOR PROPOSALS

Dear Members of the Selection Committee:

We appreciate the responsibility placed on you to select the engineering firm that will best support the Municipality of Skagway (MOS) by providing geotechnical engineering services under this contract. These services will be rendered to assess the growing hazard of rockfall at the Railroad Dock. The dock represents infrastructure to the MOS and its safe operation is paramount to the community. The importance and urgency around the project is accentuated by a recent failure on June 23, 2022 which damaged the dock and forced a closure to allow for assessment and cleanup.

Shannon & Wilson's proven record of successful projects for Alaskan municipalities is based on our firm and personnel qualifications, as detailed in this proposal. We recognize that experience and qualifications must be combined with superior client service to ensure project success. We value our client relationships, and work hard to maintain open lines of communication, understand client goals, and develop mutual trust. We will place the highest priority on close coordination with the MOS and timely responses of our dedicated, qualified professional staff. We are committed to performing the services described in your Request for Proposal and have vetted the availability of all proposed staff.

We have the technical expertise, experience, and staff to perform the slope stability assessments and provide the necessary stabilization and rockfall mitigation recommendations. We have been providing geotechnical services for Skagway area projects for decades. This extensive knowledge and experience will benefit the MOS throughout this contract.

As a Vice-President of the firm, Office Manager of Shannon & Wilson's Anchorage office, and Contract Manager for our proposed team, I am authorized to make representations on behalf of Shannon & Wilson. My contact information is listed below my signature in this letter of transmittal. I will also serve as Project Manager and Lead Geotechnical Engineer. Together with our proposed team of highly experienced technical staff, we will provide geotechnical analysis and recommendations for solutions to the challenges of the Skagway Rockslide project.

We thank you for this opportunity to present our qualifications for this contract and look forward to further discussion regarding how we can assist you with your project needs.

Sincerely,
SHANNON & WILSON, INC.

Kyle Brennan, PE - Vice President / Contract Manager
Office: 907.561.2120
Direct: 907.433.3219
Email: KLB@shanwil.com

TECHNICAL PROPOSAL

Photo: Debris pile at the base of the Burro Creek slide during site reconnaissance in June 2021.

A. PROJECT UNDERSTANDING & APPROACH

The Municipality of Skagway (MOS) is seeking to procure geotechnical and geological services to address a growing slope stability hazard above the Railroad Dock located on the southeast side of Skagway Harbor. We understand the importance of this growing issue as the facilities below it serve a vital purpose to the economic viability of the MOS and its residents. Skagway is a primary port of call for the cruise industry in Southeast Alaska and Skagway is projected to see nearly 500 voyages with the potential for over one million passengers to pass across this dock over the course of a summer. Providing a reliable and safe dock facility for the cruise ship operators is essential for the MOS so that the cruise passengers are able to visit the City and provide patronage to the many businesses that cater to them.

Our objective in this project is to leverage our significant experience in geology and slope stability evaluation and design for the benefit of the MOS in addressing this hazard. We will provide an objective and comprehensive evaluation of the existing conditions that make definitive statements regarding site stability and highlight areas of relative risk. This assessment will guide the development of recommendations for mitigating that risk to provide a long-term solution that the MOS and other stakeholders can rest assured will provide reliably safe conditions for users and the railroad dock in general. Throughout the process, we will be efficient with MOS funding to optimize the benefit you will receive.

We have assembled a team of engineers and geologists that have extensive experience in evaluating, characterizing, and designing solutions for complex soil and rock slope stability issues throughout Alaska and the Pacific Northwest. We believe that we have a project team that is rooted in Alaska with local experience, backed by technically superior subject matter experts within our organization. Because of the complex nature of this project, we will strive to inform and educate you throughout the process so that you can understand what we are doing and why we are doing it. This will allow you to play an integral role in the project and make informed decisions to manage cost and risk. We can also assist you with engaging other stake holders such as the White Pass & Yukon Route (WPYR) Railway to ensure that they understand the steps the MOS is taking to evaluate the site and create a stable and safe condition.

This proposal and our cost estimate specifically address the large, progressive slope failure feature that has been active for several years. Given our experience in the area and as demonstrated by the very recent slide that occurred on June 23, 2022 south of the existing slide path, it is likely that similar features could exist along the ridge line that parallels the dock. While we will focus on the primary slide feature, we are prepared to expand our analysis to other areas and take a wider look to detect areas that may be at risk of developing similar instabilities and threaten other portions of the dock.

The Challenge: We understand that the issue at hand is a progressive rock fall failure that currently threatens the safety of the railroad dock. Based on observations from the site (while in Skagway for other work), conversations with WPYR staff in prior years, and other accounts that have made the news, we understand that the feature began as a minor rockfall issue and has progressed to expose a significant slide path with most material appearing to originate near the top of the slope nearly 600 to 700 feet above the dock. Two significant slides occurred within two weeks of each other at the feature in the fall of 2017. The slides impacted the dock by causing damage and depositing rock and soil material on the dock surface.

In response to the failures of 2017, engineering studies were performed to evaluate the risks at the slide and provide recommendations for stabilization and protecting the dock. As a result, an attenuation feature was installed near the base of the main chute and a fabric reinforced catchment feature was constructed at the tidewater near the base of the slide feature. We understand that the slide feature continues to produce rockfall and that the catchment requires frequent maintenance to remove rock and soil deposited from the slope.

The failures have exposed a significant swath of rock and unconsolidated soils along the slide path and has interrupted the natural root matting on the ground surface. Soils appear to be fairly thin over much of the slide path and rock material appears to consist of typical granitic rock found in the Skagway area, though some irregular fracturing or weathering may exist near the mid elevations of the slide path. Relatively massive outcrops exist near the initiation zones at the top of the slope and appear to be becoming more exposed as slide activity progresses.

Our preliminary assessment of the area suggests that two separate but related risks exist. The most immanent risk is associated with continued and progressive raveling and rockfall from the slide path. This risk exists from toppling failures at the crest of the slope and release of fractured rock that is now exposed along the slide path. The rockfall presents the continued risk of impacting the railroad dock by deposition of rock onto the dock and the potential for personal injury or damage. The secondary risk is associate with the stability of the very large rock masses near the top of the slope which, if released, could result in catastrophic damage to the dock and anything on or attached to the structure. While this does not appear to be an immanent risk, progressive raveling and rock fall from the slope could potentially create an unstable condition for these very large rock masses.

Our Approach: We plan to take a phased approach to evaluate the issues at the site and develop recommendations for mitigation. At the completion of each step, we will apprise the MOS of the results of our work and evaluate the plans for next step of the process to ensure that the path forward is appropriate

based on our evolving understanding of the project. We will work with the MOS to identify changes to our approach if they are needed and include them on the decision-making process before moving forward. Our experience is that strong public involvement/communication on these types of projects is essential. We assume that the MOS will handle these duties but are prepared to bring on a subcontractor for these services if needed.

Data Review: An extensive amount of work has been conducted at the site by others to evaluate the site conditions and assess risk. The first step in our process will be to perform an exhaustive review of the existing data. We assume that the bulk of this data will be provided by the MOS, but assume that other sources like the WPYR and DOT&PF may also have information that would be valuable in our review. We will focus our review on sources that reveal information about soil overburden thickness and nature, bedrock type and controlling rock structure orientation, and kinematic analysis that has been conducted. We will also review data collected from prior explorations and any instrumentation that has been installed. We assume that the MOS will also provide any as-built information from rock slope mitigation measures that have been installed on the slope and the geotechnical analysis/reports, engineering studies, and surveys that were generated to support their design. We will also review maintenance records and accounts of past failures to determine if there are patterns or other mechanisms that can advance our understanding of the instability.

The data review will allow us to develop a framework for our early understanding of the slope and the issues that we will be dealing with during the project. At the completion of our review, we will create a summary document that includes a list of available information reviewed and a narrative of our understanding of the conditions. We will identify data gaps and additional information needs as well as a refined evaluation of the site conditions and risks. We will also begin the discussion of likely mitigation measures to provide context and justification for the field activities that will follow.

Field Activities: Prior to conducting field activities, we will develop an exploration plan for review, comment, and approval by the MOS. The plan will provide a detailed description of the activities to take place and who will do them. The following description includes a summary of the likely field activities that will take place based on our current understanding of the project. We assume that adjustments to this approach will be accommodated per the results of our data review and as the project evolves. We also assume that we will procure all permits needed for conducting our explorations.

Our work will begin with a site survey to provide detailed topographic information to support slope stability analysis, kinematic analysis, and rockfall analysis. Lounsbury & Associates, Inc. will begin their survey effort by coordinating with the project team to ensure that the proposed survey scope sufficiently captures the area of interest and will produce a comprehensive dataset that will be of the greatest value in designing potential mitigation efforts. They will mobilize a one-person survey crew to Skagway to conduct the field survey and collect airborne LiDAR (with point cloud density greater than 10 points per square meter) and imagery data (with pixel resolution of 0.25-foot or less) of the area of interest using their Quantum Systems Trinity F90+ fixed-wing drone. The limits of data collection will extend well outside of the reaches of the existing scarp to ensure adequate site characteristics are captured. To ground-truth the LiDAR data, Lounsbury will establish survey control on the existing dock within line-of-sight of the scarp and use a robotic total-station shooting reflector-less, red-laser measurements spread evenly throughout the scarp. All survey data will go through a thorough field quality control process prior to leaving the site to ensure data integrity, then the full processing will occur in their Anchorage office, where they will create a point cloud from the LiDAR data utilizing only bare-ground returns. Lounsbury will create an orthophoto with the arial imagery obtained and deliver an AutoCAD Civil 3D surface of the LiDAR point cloud with an orthophoto overlaid for use in mitigation design. The purpose of the survey will be to. The collected survey information will be of sufficient quality to support future final design of the mitigation project.

Geologic and geotechnical field activities will consist of surface mapping and reconnaissance. The RFP references field efforts that may include excavations, drilling, and geophysical methods such as ground penetrating radar. It is our opinion that such invasive approaches would not be favorable for this project for myriad reasons. Due to recent landslides, there is a significant amount of rock exposure at the top of the slope, throughout the slide path, and in area adjacent to the slide feature. The conditions visible in these exposures will be significantly more valuable and revealing about the conditions than could be gained from isolated borings or excavations. Furthermore, additional disturbance to the ground surface and covering vegetation needed to facilitate such investigations would have a detrimental effect on the overall site stability. In addition, mobilizing equipment to the site to conduct such explorations would incur significant costs that would provide minimal benefit to the project, and potentially cause a less-stable slope condition. Similarly, we believe that geophysical methods would likely yield unreliable results and would be difficult to perform within the project limits. Note that we will re-evaluate these opinions after completion of our data review.

Surface-based field work will consist of traversing the site and surface mapping of soil and rock conditions. We are prepared to access the site using roped access where needed. Areas of interest will include the margins of the slide zone scar, the slide zone itself, and the areas adjacent to and above the slide zone. The marginal areas will allow us to observe the thickness and nature of soil deposits over bedrock. The areas adjacent to and above the

slide zone will be examined for signs of instability (surface strain, tension cracking, slumping, etc.) so that we can determine if the slide feature will grow in extent laterally or vertically. Exposure in the slide zone will allow us to determine how much soil is still remaining over the bedrock and provide the opportunity to characterize the type of rockfall that will be produced over time. We will also identify starting zones or areas where continued progressive instability exists. Depending on site safety conditions, we may initiate artificial, small (less than 6-inch diameter) single rock fall events for video recording at various starting zones on the slope. This action will be recorded with high-definition video and will allow us to evaluate rockfall paths, trajectories, and velocities to calibrate our rockfall analysis. Rock structure mapping will also be conducted on all rock exposures that are accessible to our crew. We utilize a systematic station mapping approach described by Hustrulid and others (2000) to provide all of the structural details that will be required for kinematic analysis, stability analysis, and engineering solutions for stabilization and rockfall mitigation. Our observations will be complemented through review and comparison to high-definition aerial imagery that will be collected by Lounsbury during the topographic survey.

The culmination of our field effort will be a summary report that presents all the data collected during our fieldwork. Our report will include a narrative description of our activities and field methods for collecting the data and a description of our findings. We will generate a geologic base map that presents all the surface mapping results showing slide limits, areas of relative risk of future slides, soil overburden type and distribution, rock type and distribution, and the location and limits of all rock structure mapping stations. Rock structure mapping results for each station will be presented in stereo plots that will be used in subsequent kinematic analyses. All figures and maps will be georeferenced and cataloged in ArcGIS format for presentation and analysis purposes. We will provide a draft version of our report for review and comment by the MOS and a final report will be prepared addressing comments. Electronic source files for all figures and maps will be provided to the MOS with the final report.

Engineering Analysis:

Engineering analyses will be conducted to support the evaluation of the site stability and development of mitigation recommendations. We will conduct kinematic analysis for the slope/rock structure geometry to detect the presence of potentially kinematically admissible planar and wedge failure mechanisms. This analysis will allow us to evaluate the risk of failure of the large rock masses from the top of the slope in their current condition as well as after additional raveling. We will also be able to detect the presence of similar terrain features if they exist lower in the slope or areas adjacent to the slide path. We will use the computer software programs Dips, RocPlane, and Swedge by RocScience to aid us in our kinematic analysis. The results of kinematic analysis will allow us to determine if slope reshaping or pinning in place should be conducted to mitigate potential failure risks.

Two-dimensional rockfall analysis will be conducted using the topography data collected during our explorations, collected rockfall video if conducted, and the computer modelling software RocFall by RocScience. This effort will allow us to evaluate various barrier, catchment, and attenuation configurations that can be considered for risk mitigation.

Final Geological Assessment and Recommendations:

The results of our engineering analysis will feed development of final recommendations for mitigating the slope instability risks. We envision that the MOS will be an integral part of this process to provide guidance on the risk balance for various levels of protection. We will work with the MOS to inform you on the relative effectiveness and costs associated with a wide array of protection approaches. This will allow you to provide us with parameters within which we will develop our final recommendations, providing the level of protection and reliability that will meet your expectations.

Our recommendations will address the two primary concerns for this area previously mentioned: the large apparent rock masses high in the slope and the continuing rockfall hazards along the slide path. If our analyses suggests that the large rock masses are unstable, we will provide recommendations on solutions ranging from reshaping, removal, or stabilizing in place. For the continued rockfall hazard, we will evaluate the available attenuation methods that area appropriate for this site and determine which type and/or combination of types will meet the needs of the MOS and provide a reliably safe environment for the users of the dock. Given the size of the slope, attenuation solutions will likely need to include multiple levels of mid-slope energy dissipaters, catchment, and structural solutions (like fencing or arresters) at the dock.

We may determine that instrumentation solutions should be implemented to complement existing instrumentation and provide early warning of impending failures. Such solutions could include installation of automatic survey points at the surface to monitor surface displacements, tiltmeters, or downhole inclinometers to detect movements. Because of the location of the slide and difficult access, these solutions would need to be set up to collect data continuously and linked for remote access and alert notifications in real time if displacement thresholds are exceeded. Such solutions will be described and specified in detail in our mitigation plan.

The completion of this task will be marked by the delivery of a draft report that summarizes all the work conducted for the project. The report will also include a detailed rockfall mitigation program that includes all aspects of the plan and a site layout showing the various components that comprise the plan. We will include geotechnical design recommendations for the components included in the rockfall mitigation plan. If the plan

includes regular maintenance activities, they will be described in detail in our report in terms of what actions they consist of and how often they should be conducted. We will also include recommendations for monitoring slope conditions. Our report will be submitted in draft form for review and comment by the MOS. A final report will be delivered after addressing comments, along with electronic source files for all our analyses and drawings.

B. PROPOSED PROJECT MANAGER

Shannon & Wilson's project manager for this work will be Kyle Brennan, PE. Kyle has 22 years of experience performing geological and geotechnical engineering related work on projects throughout the State of Alaska. Kyle is fully committed to leading this important project. Given his uninterrupted longevity with Shannon & Wilson, the MOS can rest assured that Kyle will be with the project through it's conclusion and no change to project management will take place.

General Qualifications: Since joining Shannon & Wilson in May 2000 as a staff-level geotechnical engineer, Kyle has advanced to his current position as Shannon & Wilson's lead geotechnical engineer in Alaska and the Anchorage Office Manager. Kyle's education and experience makes him uniquely qualified to lead this project. Prior to joining Shannon & Wilson in May 2000, Kyle attended the University of Alaska, Fairbanks and obtained Bachelor's and Master's Degrees in Geological Engineering. His academic experience in those years was broad ranging from studying pipelines through discontinuous permafrost and characterizing offshore gold deposits to in depth study in rock mechanics and slope stability. Since joining Shannon & Wilson, Kyle has provided geotechnical engineering services for a wide variety of projects, both large and small. His responsibilities have included geotechnical engineering support and project management for projects including road and rail infrastructure, airports, seaports, utilities, power generation/distribution, communications towers, and building development. Kyle has provided all these services to both private and public clients in Alaska's population centers as well as its rural communities. Kyle's education and work experience marries an in-depth knowledge of geology and rock mechanics and broad geotechnical engineering knowledge that is perfectly suited for this project.

Southeast Alaska Experience: Among Kyle's hundreds of Alaska projects, many have been in Southeast Alaska, including in Skagway. He is very familiar with the geology of the region and the geotechnical and environmental conditions that projects in the area need to accommodate. Kyle's Southeast Alaska experience includes work at airports in Juneau, Petersburg, and Sitka; waterfront facilities in Skagway, Haines, Ketchikan, and Hoonah; slope stability evaluations in Thorne Bay, Sitka, and Skagway; and dam/hydroelectric projects in Wrangell, Elfin Cove, Hydaberg, and Tenakee Springs. He has been part of many other infrastructure and development projects throughout the region.

Kyle's slope evaluation experience extends throughout the State of Alaska, but he has recent experience conducting this work in Southeast Alaska and in Skagway. His first slope stability evaluation work in Southeast was in Thorne Bay for the Sandy Beach Road Improvement project over 20 years ago. The nearly 30-mile project alignment traversed typically diverse terrain north of Thorne Bay on Prince of Wales Island. Several segments traversed steep side slopes where the existing road was supported on a partial bench with over-steepened side-cast fill slopes. Kyle evaluated these areas for widening by determining stability of rock slope cuts on the uphill side of the road and loose cobble and boulder fill on the downslope side. More recently, Kyle provided senior oversight for projects in Sitka for the South Kramer and Gary Paxton Industrial Park (GPIP) Debris Flows as well as the Gavan Hill Debris Flow. Kyle assisted with the risk evaluations and runout analyses for these projects conducted for the City and Borough of Sitka (CBS) in response to deadly landslides that occurred after a major rain event. Kyle recently provided an evaluation of the Burro Creek Slide near Skagway. The slide occurred after an extended period of rain in the region, which triggered landslides in many other locations in December 2020. Slide debris temporarily blocked Burro Creek and damaged a small hydroelectric intake. Kyle conducted site reconnaissance and worked with the property owner to assess the risk of additional slides occurring on the feature as well as evaluating risk of future slides in other locations upstream.

Kyle's recent Skagway experience includes the aforementioned Burro Creek Slide evaluation and the Bridge 15A replacement project for the White Pass & Yukon Route Railway. He provided geotechnical support and senior oversight for the design of what is likely the tallest commercial/non-industrial earth retaining structure in the State of Alaska. Kyle's technical responsibilities for this project included evaluating the stability of the steep rock slope on which the wall is located and developing stabilization measures to provide a stable foundation for the over 80-foot tall retaining structure. The wall was designed as a hybrid system with an anchored concrete wall at the base and a mechanically stabilized earth structure in the upper elevations. Kyle provided design recommendations for the anchored portion of the wall, developing design criteria, capacity/displacement parameters, and installation/testing criteria for the rock anchors.

Municipal Government Experience: Kyle has extensive experience working with local municipal governments. He takes service to his community seriously and has volunteered his time for over 12 years on the Municipality of Anchorage (MOA) Geotechnical Advisory Commission where he is currently serving as Vice-Chair. He has also been contract manager for 14 years on Shannon & Wilson's multiple term contracts with the MOA and Anchorage Water and Wastewater Utility. Much of the work that he performs throughout Alaska is directly for local municipal governments and he has developed strong working relationships with many of these clients including the CBS, the City and Borough of Wrangell (CBW), the City of Valdez, and the Matanuska/Susitna

Borough. Through his volunteer service and extensive work for local municipal governments, Kyle understands the important role that local governments play to maintain the local economy, maintaining public safety and services, and working with the constituency's best interest in mind. The local government must do all these things while using budget resources, which are often quite limited, effectively and responsibly.

C. PROPOSED PROJECT TEAM

We have assembled a highly skilled technical team to conduct the work requested by the RFP. Kyle will work with these project team members to leverage their full depth of experience and ensure that the MOS receives technically sound and well-considered work products. Kyle will facilitate open and consistent communications between our team members and the MOS project leadership so that the MOS is kept current with project developments throughout the life of the project.

Municipality of Skagway
Project Manager

Proposed Project Staff

CONTRACT MANAGER, PROJECT MANAGER, LEAD GEOTECHNICAL ENGINEER
Kyle Brennan, PE (Shannon & Wilson)
Registered Professional Civil Engineer, AK CE-11122

ROCK MECHANICS/ ROCK SLOPE TECHNICAL LEAD
Rex Whistler, PE (Shannon & Wilson)
Registered Professional Civil Engineer, OR 93750

FIELD GEOLOGY LEAD
Erik Scott, LEG (Shannon & Wilson)
Licensed Geologist, WA 2829;
Licensed Engineering Geologist, WA 2829;
Professional Geologist, NY 000937

INSTRUMENTATION LEAD
Kevin Myers (Shannon & Wilson)

SURVEY LEAD
Josh Varney, PLS (Lounsbury & Associates)
Registered Professional Land Surveyor, AK LS-106379

Lead Geotechnical Engineer

Kyle Brennan, PE, will serve as the project's Lead Geotechnical Engineer. This role is key to the success of the project and will need to receive input from each of our technical experts. Filling both lead geotechnical engineer and project manager roles will allow for Kyle to be fully immersed in the project and will provide a significant cost savings reducing redundancy in our team's structure and leadership. As mentioned in Section B, Kyle's experience in performing project management, geotechnical, and geological engineering makes him uniquely qualified to fill this role. As lead geotechnical engineer, he will fill the role of Engineer in Responsible Charge for all engineering work conducted for this contract. Kyle's geotechnical experience is described above in Section B.

Rock Mechanics & Rock Slope Technical Lead

Rex Whistler, PE, will perform as technical lead for rock mechanics and rock slope work on this project. He will lead the review of existing data, lead the development of the exploration program, review data gained through explorations, guide the selection of analyses to be performed, perform or oversee analyses, and provide input on mitigation alternatives.

Qualifications/Experience: Rex joined Shannon & Wilson in 2014 after completing his master's degree at the Colorado School of Mines and three years of work with Fisher and Strickler Rock Engineering, LLC. His technical experience encompasses geological site characterization, rock slope stability analysis, rockfall analysis, empirical mine design, slope stability analysis, liquefaction analysis, instrumentation analysis, and geotechnical report preparation. He has been involved in construction observation, including foundation subgrades, micropile foundation installations, and rock bolt installation and testing. He has also been involved with subsurface field exploration and characterization in soil and rock, piezometers, and extensometers. He has experience on more than 30 projects with Shannon & Wilson's rock mechanics team. Specifically, Rex provided geological engineering services for the BNSF Railway Katka Siding Rock Slope Stabilization project in Bonners Ferry, Idaho. Rex evaluated rock fall hazards and rock slope stability along two miles of railroad and developed mitigation measures to address these conditions. Rex also provided geological engineering for the Lower Baker Dam Seepage Reduction and Abutment Stability Evaluation in Concrete, Washington. For this project, Rex provided a wide range of analysis using complex two and three dimensional modelling techniques to evaluate rock slope stability at the abutments of a major dam structure.

How Rex's experience benefits your contract/services: Rex has accumulated a deep well of experience in the specialized field of rock mechanics through his work internationally with Fisher and Strickler Rock Engineering and domestically with Shannon & Wilson. He has the proven ability to work in remote areas in the Pacific Northwest and has the experience to provide effective and efficient solutions for complex slope issues including large, progressive rock fall areas, rock slope instability, and tight locations.

Field Geology Lead

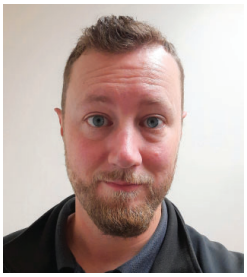
Erik Scott, LEG, will perform as Field Geology Lead for this project. He will work with Rex and Kyle to develop the field exploration plan and will ensure that the data needed from the site is collected in a complete and systematic manner.

Qualifications/Experience: Erik is a Project Geologist with experience in diverse geotechnical, geological, and environmental projects. Erik specializes in the acquisition and interpretation of subsurface data, detailed engineering geological mapping and instrumentation data acquisition and evaluation. His work experience includes geologic and geotechnical evaluations for dam, large diameter tunnel, highway, bridge, landslide, and rail line corridor projects. He is part of Shannon & Wilson's rope access team that use specialized industrial grade gear to safely access steep slopes cliffs, overhangs, and shafts. Erik has performed extensive reconnaissance and detailed engineering geological mapping, aerial photo interpretation, rock discontinuity mapping and subsurface explorations for diverse geotechnical and geological projects. One of Erik's ongoing projects is the Chehalis River Dam in Ell, Washington, a roller-compacted concrete (RCC) dam design project where he has overseen large scale exploration programs with a wide variety of components. Along with significant subsurface explorations for this project, he has conducted extensive surface mapping of the geology and mapping in landslide areas to determine if the landslides would be remobilized once inundated with water. Erik is also performing geological engineering for the Sound Transit West Seattle to Ballard Link Extension in Seattle. Another very large exploration project overseen by Erik, it includes mapping and slope stability evaluation in soil and rock slopes along the alignment and above a portal location.

"Shannon & Wilson has primarily worked as our contracted engineering firm on the Shotgun Cove Road Project. They have been informative, accurate and cost-effective, working on this 30 year project since 2004. We have contracted with them for a potential new harbor and they were outstanding in their performance and cost effectiveness. Whittier is a town of 220 people and limited funds and Shannon & Wilson has always found a way to make projects work." ~ Scott Korbe, Director of Public Works, Whittier, Alaska

How Erik's experience benefits your contract/services: Erik has over 15 years of leading complex geological and geotechnical explorations programs in the Pacific Northwest. Erik has a keen eye in identifying small features that have big consequences, understands what engineers need to perform their analysis, and is able to see the big picture with complex geology and structure. Our clients benefit from having trained and experienced engineering geologists like Erik make close-up observations and measurements even in hard-to-reach places.

Instrumentation Lead



Kevin Myers will perform as Instrumentation Technical Lead for this project. He will review existing instrumentation and collected data and he will also work with Rex and Kyle to develop instrumentation monitoring programs for slope mitigation.

Qualifications/Experience: Kevin Myers is an Instrumentation Specialist, with more than 20 years of professional experience in the field of geotechnical instrumentation. Kevin's background includes remote field exploration, site supervision, ADAS system design and installation, remote data monitoring, inclinometer data analysis, sensor installation schedule coordination, and web-based data management. Field experience includes the installation of various geotechnical instruments, such as VWPs, Shape Accel Arrays, in-place inclinometers, and wireless tiltmeters. Kevin also has experience in the design, programming, and implementation of automated datalogger systems using radio, cellular, and satellite telemetry communication protocols. Kevin has designed and implemented these systems across the US, Central America, and Canada. His Alaska experience includes designing and implementing instrumentation for numerous monitoring programs at multiple locations along the Trans-Alaska Pipeline. The field investigations have included: readings from existing equipment, decommissioning old equipment, installing new equipment, and automating data collection from existing equipment. Kevin assisted with the installation and programming of data acquisition systems, creating universal programs to be used across all station locations along the pipeline. He also assisted with the design and installation of a vertical Shape Accel Array monitoring displacement in a potential landslide along the pipeline. Prior to joining S&W, Kevin worked at Durham Geo Slope Indicator (DGSI) for 20 years in many roles, including advanced support, ADAS programming, data analysis, web-based monitoring and product design.

How Kevin's experience benefits your contract/services: Kevin knows instrumentation and has the experience to provide effective, innovative, and efficient designs for monitoring systems that the MOS will be able to access from the comfort of their office chairs.

Survey Lead

Josh Varney, PLS, will perform as Lead Surveyor for this project. Josh will work with Kyle and Rex to understand project limits and survey data needs, develop the surveying plan, oversee all field survey and data reduction work for this project.

Qualifications/Experience: Josh has over 15 years of experience working in the surveying, engineering and GIS fields. Josh began his surveying career at DOT&PF and after moving into the private sector has provided surveying services for various Municipalities throughout the State of Alaska. He is an expert at applying state-of-the-art remote sensing technologies to accomplish demanding surveying tasks in remote environments and has a reputation for getting work done efficiently. Josh's most recent experience directly related to the proposed contract includes completing a volumetric survey of the quarry in Togiak, Alaska utilizing airborne LiDAR and conducting multiple land-slide topographic surveys on the Chiniak Highway in Kodiak, Alaska. He is an expert at collecting remote-sensing data in demanding environments.

How Josh's experience benefits your contract/services: Josh is an expert at collecting remote-sensing data in demanding environments and will develop and carry out efficient survey activities to ensure that high-quality topographic and imagery data is collected.

D. FIRM RESOURCES & EXPERIENCE

Shannon & Wilson operates 16 primary and satellite offices in ten U.S. states and has a staff of over 300. Our three Alaska offices located in Anchorage, Fairbanks and Palmer have over 60 staff, including Alaska-registered civil (geotechnical) and environmental engineers, geologists, hydrogeologists, environmental scientists, chemists, lab technicians, and administrative staff. We often utilize specialized technical staff from our offices in the contiguous U.S. We have had an office in Anchorage since 1982, in Fairbanks since 1974, and have worked in Alaska since the 1950s from our headquarters office in Seattle.

We choose the individuals who work on our projects carefully. Prior to adding members to our team, we look for depth of relevant experience, history of providing skilled service, and realistic schedule availability to provide the client with the highest level of commitment. Shannon & Wilson technical staff are managed by highly knowledgeable leadership personnel and supported by professional administrative staff. We use project management software that organizes project information, job status and staffing resources. As a specialty geotechnical and environmental firm, our typical workload consists of multiple projects running simultaneously. While most of our projects have a life span of approximately three to four months, we also handle occasional projects that span multiple years. Our project managers and staff are accustomed to running several projects at one time. The MOS can be assured that your project will receive our full attention.

Shannon & Wilson maintains state of the art software for geotechnical engineering analyses, adeptly utilized by our technically-excellent staff. We maintain up-to-date software licenses for seismic and slope stability analyses. **We have been providing geotechnical engineering services for projects in the Skagway area for many decades, encompassing over 32 projects including an analysis of the Standard Oil Company Facility Rockfall in 1962.** Selecting Shannon & Wilson for this project will mean that the MOS will be engaging with a company with deep roots in Alaska, putting Alaskans to work solving Alaskan problems.

Featured relevant projects are listed below.

White Pass and Yukon Route Railroad, Wall 15A Replacement, Skagway, Alaska

Project Date(s): 2020-2022
Project Owner/Client: White Pass & Yukon Route Railway
Staff: Kyle Brennan
Relevance: location, rock slope stability

Shannon & Wilson provided geotechnical engineering services for a project to replace Bridge 15A on the White Pass & Yukon Route Railway north of Skagway. The project is located on a section of the railroad that traverses a high, steep mountain slope in alpine terrain and the prior bridge structure spanned a near 200-foot wide gap in the slope created by resistive bedrock on either side of the bridge with a zone of more fractured and weathered bedrock between the abutments. Shannon & Wilson was brought into the project early in the design phase to oversee drilling explorations after access work triggered the failure of a large boulder that dropped into the gap and took out the center pier of the bridge.

Installation of rock anchors during construction of Wall 15A on White Pass & Yukon Route Railway.

Shannon & Wilson technical staff travelled to the site and assisted with evaluating the site stability for continued explorations and oversaw drilling which included downhole optical and acoustical televiewer surveys on the borings. Using this information, we developed a geologic model of the site and evaluated several replacement alternatives with the railroad, the lead designer, and the contractor performing the work.

Eventually, it was determined that a retaining wall structure consisting of an anchored, cast-in-place section near the bottom of the gap with a mechanically stabilized earth wall in the upper elevations was the most efficient approach to replacing the bridge. Shannon & Wilson conducted slope stability analysis to evaluate site stability during various stages of construction and for the final wall configuration. We provided recommendations for an anchored toe slab to help improve global stability of the rock mass and provide a base for the retaining structure to be constructed. We assisted the structural engineer to provide design and installation/testing criteria for tensioned rock anchors at the base of the wall and full design of the MSE portion of the wall. We also provided general design recommendations for grading, wall drainage, and rockfall catchment along the new rail alignment.

We worked with the railroad, designers, and contractor throughout the construction process to address field changes in the design to accommodate difficult working conditions and harsh wintertime construction activities. We also provided on-site inspections of the construction activities for installation of the rock anchors and MSE wall components. The retaining wall was completed in the spring of 2022 and the railway is currently running trains over the newly constructed structure.

Burro Creek Landslide, Burro Creek, Alaska

Project Date(s): 2021
Project Owner/Client: Burro Creek Holdings
Staff: Kyle Brennan
Relevance: location, landslide evaluation, land ownership issues

Shannon & Wilson was hired by Burro Creek Holdings, to investigate a major landslide at Burro Creek during a heavy rainfall event on December 2, 2020, a landslide occurred on the slopes above Burro Creek, on the west side of Taiya Inlet west of Skagway. The slide initiated in Federal Bureau of Land Management (BLM) land and terminated in privately held property on Burro Creek. The debris from the slide impacted a hydroelectric intake structure on the north side of the creek and caused severe temporary flooding upstream of the slide area. On January 9, 2021, Shannon & Wilson mobilized to the site to conduct reconnaissance of the area. The site visit included flying up the Burro Creek Valley in a helicopter to observe the general slope conditions on either side of the valley in the vicinity of the slide as well as upstream of the slide. During the flight, we viewed the upper expression of the slide as well as the ground conditions in the slopes above the slide. After completion of the aerial observations, the toe of the slide was accessed on foot.

Debris pile below Burro Creek Slide, summer 2021

A second site visit was made to the site during the Summer of 2021 to determine if changes had occurred to the slide area since the first site visit and observe the upper reaches of the slide zone on foot. During this site visit, we were able to observe ground conditions and determine if signs of instability (such as tension cracking, slumping, etc.) existed in zones adjacent to the slide path. Based on the site observations, our engineer developed a summary report that described observations during our site visits and provided a detailed description of the trigger mechanism and nature of the landslide. Further discussion was provided that described the relative risk of additional landslide debris to be produced by the feature and risks of future landslides further up the valley and what impacts those risks could have on future potential hydroelectric developments in the area and redevelopment of the existing hydroelectric facilities.

South Kramer and Gary Paxton Industrial Park (GPIP) Debris Flows, Sitka, Alaska

Project Date(s): 2015-2016
Project Owner/Client: City and Borough of Sitka
Staff: Kyle Brennan
Relevance: landslide, municipal client

On August 18, 2015, a debris flow occurred at the south end of Kramer Avenue in Sitka, killing three people. The City and Borough of Sitka (CBS) retained Shannon & Wilson to evaluate the debris flows and advise them on the practical aspects of zoning the area

for this geologic hazard. Shannon & Wilson performed a LiDAR hillshade analysis, field reconnaissance, debris flow runout analysis, risk zonation, and a report. Shannon & Wilson met with the CBS Assembly and staff, and then the Chamber of Commerce to present the results of the study.

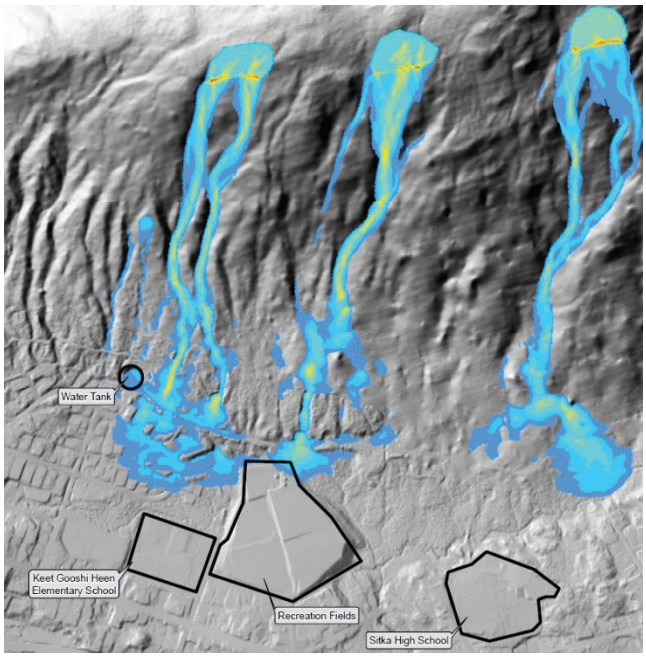
On August 18, 2015, another debris flow impacted the northern side of the Administration Building at the Gary Paxton Industrial Park, which is near Sawmill Cove. Before reoccupying the building, CBS requested that Shannon & Wilson evaluate potential future landslide and debris flow hazards to the building and other CBS properties on the slopes to the west. We mapped potential debris flow chutes and characterized their hazards using LiDAR hillshade images, and a three-day reconnaissance of the slopes. We then performed debris flow runout analyses to estimate the length of runout and the volume of material that could be entrained and deposited at the toe of the hillside. Using the analysis results, we formulated risk zones at the toe of the hillside for assessing potential damage to downslope structures, and develop site-specific remedial strategies for the identified potential debris flow chutes.

Gavan Hill Debris Flow Study, Sitka, Alaska

Project Date(s): 2015-2016
Project Owner/Client: City and Borough of Sitka
Staff: Kyle Brennan
Relevance: landslide, municipal client

Shannon & Wilson evaluated the debris flow hazard to the Keet Gooshi Heen Elementary School, Sitka High School and a City water tank. These facilities are near the base of Gavan Hill, which has geologic and topographic similarities to the deadly 2015 South Kramer Avenue debris flow area. We performed a geologic reconnaissance of the slopes above these facilities, during which we identified and characterized recent debris flow deposits.

Gavin Hill Hillshade debris flow modeling analysis



We then modelled potential debris flows to evaluate the hazard to each facility. Our modelling showed the schools were not at risk from a debris flow; however, the City water tank could be impacted. We worked with Coffman Engineers to analyze the effects of a possible debris flow impact to the water tank. Our finding showed the water tank has sufficient sliding and overturning resistance, and that the tank walls have sufficient strength to resist impact loads.

Katka slide stabilization

BNSF Railway, Katka Siding Rock Slope Stabilization, Bonners Ferry, Idaho

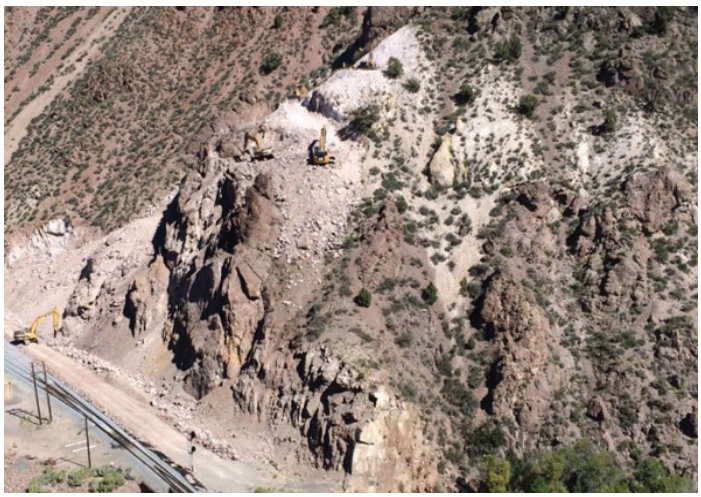
Project Date(s): 2015-2017
Project Owner/Client: BNSF Railway
Staff: Rex Whistler
Relevance: rural, environmentally sensitive, rock slope mitigation

Shannon & Wilson was retained to assess slope conditions and rock fall hazards along a an approximately 2-mile long portion of railway track in northern Idaho. Using light detection and ranging (LiDAR) survey and conventional geologic mapping methods, we identified slope failure modes and designed slope stabilization measures to mitigate further rock slides and reduce the rock fall hazard of the steeply inclined, thinly bedded meta-argillite rock slopes. Assessed slopes ranged in height from approximately 20 to 150 feet in height. Shannon & Wilson conducted managed laboratory testing, performed engineering analyses, designed mitigation alternatives, developed of plans and specifications, and provided construction observation. Site work included rock scaling from roped rappels, dental blasting of isolated rock blocks, installation of approximately 32,000 linear feet of cement-grouted rock dowels (up to 40 feet in length), drilling of 10,000 linear feet of weep drain holes (up to 45 feet in length), application of 200 cubic yards of steel fiber-reinforced shotcrete to construct reaction blocks and shotcrete facing systems. In addition, slope stabilization and protection systems included the installation of approximately 20,000 SF of anchored and 10,000 SF of draped mesh.

Union Pacific Railroad, Caliente Clover Creek Rockslide, Caliente, Nevada

Project Date(s): 2011-2015
Project Owner/Client: Union Pacific Railway
Staff: Rex Whistler
Relevance: rural, environmentally sensitive, rock slope mitigation

The Caliente Canyon Rockslide project involved evaluating the potential for an active rockslide impact to the UPRR main track through the Caliente Canyon. Shannon & Wilson conducted a full scale geological field reconnaissance and characterization of the active rockslide and performed slope stability analyses and provided recommendations for slope design. The complex rockslide was approximately 300 feet wide and 200 feet tall and had toppling and smaller rockfall occurrences without the bounds of the larger rock slide. This hazard prevented characterization with geotechnical drilling and the rockmass was instead characterized through structural cell mapping and surficial sample collection. Shannon & Wilson also performed construction observation of the removal of the complex rockslide to verify design assumptions and provide real-time recommendations on reducing potential rockfall during slide removal.



Caliente slide stabilization

Lower Baker Dam Seepage Reduction and Abutment Stability Evaluation, Concrete, Washington

Project Date(s): 2016-2022
Project Owner/Client: Puget Sound Energy
Staff: Rex Whistler
Relevance: major infrastructure

Shannon & Wilson is providing geotechnical engineering services for a dam seepage reduction and abutment stability evaluation at the Lower Baker Dam in Concrete, Washington. Our geotechnical exploration program included extensive explorations consisting of drilling, rock mass characterization and stability analyses of the dam abutments. Our geology and engineering team was retained by Puget Sound Energy to develop a 3D geologic model using Leapfrog 3D, hydrogeologic model of the abutments and foundations using FEFLOW, and stability analyses of the abutments and foundation at Lower Baker Dam, a thin arch gravity dam on the Baker River. Field tasks performed included rock core logging, pressure packer, falling head and dye tracing testing, and rockmass characterization. Engineering tasks included evaluating the stability of key blocks in the abutments, beneath the foundation and spillway and downstream of the spillway and a suite of stability analyses, including two-dimensional and three-dimensional limit equilibrium analyses of abutments and the foundation. Three-dimensional analyses of the left abutment incorporated the thrust from the dam, as evaluated from a suite of finite element analyses, for low pool, normal pool, and probable maximum flood conditions under static and post-earthquake reduced shear strength scenarios. We performed a suite of analyses to evaluate the stability of the abutments and footprint under the dam to determine grout pressure thresholds during construction of the proposed grout cut-off curtain.

Lower Baker Dam

E. REFERENCES

Mark Taylor, Superintendent of Rail Operations
White Pass & Yukon Route Railway; (907) 983-9800
Representative Project: Wall 15A Replacement

Jan Wrentmore, Owner
Burro Creek Holdings; (907) 612-0702
Representative Project: Burro Creek Slide Evaluation

Michael Harmon, Public Works Director
City and Borough of Sitka; (907) 747-1804
Representative Projects: Recent Slope Stability work in Sitka

Mitch McDonald, Regional Engineering Geologist
Alaska DOT&PF, South Coast Region; (907) 465-4454
Representative Projects: Various Projects in Southeast AK

Curtis Heinsen, Manager, Geotechnical Engineering
BNSF Railway Company; (913) 551-4190
Representative Project: Katka Siding Rock Slope Stabilization

CERTIFICATE OF LIABILITY INSURANCE

DATE (MM/DD/YYYY): 3/18/2022

THIS CERTIFICATE IS ISSUED AS A MATTER OF INFORMATION ONLY AND CONFERS NO RIGHTS UPON THE CERTIFICATE HOLDER. THIS CERTIFICATE DOES NOT AFFIRMATIVELY OR NEGATIVELY AMEND, EXTEND OR ALTER THE COVERAGE AFFORDED BY THE POLICIES BELOW. THIS CERTIFICATE OF INSURANCE DOES NOT CONSTITUTE A CONTRACT BETWEEN THE ISSUING INSURER(S), AUTHORIZED REPRESENTATIVE OR PRODUCER, AND THE CERTIFICATE HOLDER.

IMPORTANT: If the certificate holder is an ADDITIONAL INSURED, the policy(ies) must have ADDITIONAL INSURED provisions or be endorsed. If SUBROGATION IS WAIVED, subject to the terms and conditions of the policy, certain policies may require an endorsement. A statement on this certificate does not confer rights to the certificate holder in lieu of such endorsement(s).

PRODUCER	CONTACT NAME: Gail Scott	
Arthur J. Gallagher Risk Management Services, Inc. P.O. Box 367 Bellevue WA 98009-0367	PHONE (A/C, No, Ext): 425-586-1031	FAX (A/C, No): 425-451-3716
	E-MAIL ADDRESS: gail_scott@ajg.com	
	INSURER(S) AFFORDING COVERAGE	NAIC #
	INSURER A : National Union Fire Insurance Company of Pittsburg	19445
INSURED Shannon & Wilson, Inc. 400 N. 34th Street, Suite 100 Seattle, WA 98103	INSURER B : New Hampshire Insurance Company	23841
	INSURER C :	
	INSURER D :	
	INSURER E :	
	INSURER F :	

COVERAGES **CERTIFICATE NUMBER:** 139112140 **REVISION NUMBER:**

THIS IS TO CERTIFY THAT THE POLICIES OF INSURANCE LISTED BELOW HAVE BEEN ISSUED TO THE INSURED NAMED ABOVE FOR THE POLICY PERIOD INDICATED. NOTWITHSTANDING ANY REQUIREMENT, TERM OR CONDITION OF ANY CONTRACT OR OTHER DOCUMENT WITH RESPECT TO WHICH THIS CERTIFICATE MAY BE ISSUED OR MAY PERTAIN, THE INSURANCE AFFORDED BY THE POLICIES DESCRIBED HEREIN IS SUBJECT TO ALL THE TERMS, EXCLUSIONS AND CONDITIONS OF SUCH POLICIES. LIMITS SHOWN MAY HAVE BEEN REDUCED BY PAID CLAIMS.

INSR LTR	TYPE OF INSURANCE	ADDL INSD	SUBR WVD	POLICY NUMBER	POLICY EFF (MM/DD/YYYY)	POLICY EXP (MM/DD/YYYY)	LIMITS	
A	X **COMMERCIAL GENERAL LIABILITY** CLAIMS-MADE X OCCUR GEN'L AGGREGATE LIMIT APPLIES PER: POLICY X PRO-JECT LOC OTHER:			5180256	3/1/2022	3/1/2023	EACH OCCURRENCE DAMAGE TO RENTED PREMISES (Ea occurrence) MED EXP (Any one person) PERSONAL & ADV INJURY GENERAL AGGREGATE PRODUCTS - COMP/OP AGG 	$ 1,000,000 $ 300,000 $ 10,000 $ 1,000,000 $ 2,000,000 $ 2,000,000 $
A	**AUTOMOBILE LIABILITY** X ANY AUTO OWNED AUTOS ONLY HIRED AUTOS ONLY SCHEDULED AUTOS NON-OWNED AUTOS ONLY			2961686	3/1/2022	3/1/2023	COMBINED SINGLE LIMIT (Ea accident) BODILY INJURY (Per person) BODILY INJURY (Per accident) PROPERTY DAMAGE (Per accident) 	$ 1,000,000 $ $ $ $
	UMBRELLA LIAB OCCUR **EXCESS LIAB** CLAIMS-MADE DED RETENTION $						EACH OCCURRENCE AGGREGATE 	$ $ $
A B	**WORKERS COMPENSATION AND EMPLOYERS' LIABILITY** ANYPROPRIETOR/PARTNER/EXECUTIVE OFFICER/MEMBER EXCLUDED? Y / N: N **(Mandatory in NH)** If yes, describe under DESCRIPTION OF OPERATIONS below	N / A		012016021 (CA) 012016020 (AOS)	3/1/2022 3/1/2022	3/1/2023 3/1/2023	X PER STATUTE OTH-ER E.L. EACH ACCIDENT E.L. DISEASE - EA EMPLOYEE E.L. DISEASE - POLICY LIMIT	 $ 1,000,000 $ 1,000,000 $ 1,000,000

DESCRIPTION OF OPERATIONS / LOCATIONS / VEHICLES (ACORD 101, Additional Remarks Schedule, may be attached if more space is required)

Re Workers' Comp- in Monopolistics, Employers' Liability only

Evidence of Insurance.

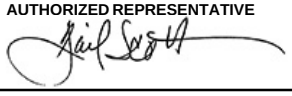
CERTIFICATE HOLDER

Shannon & Wilson, Inc.
400 N 34th Street, Suite 100
Seattle WA 98103

CANCELLATION

SHOULD ANY OF THE ABOVE DESCRIBED POLICIES BE CANCELLED BEFORE THE EXPIRATION DATE THEREOF, NOTICE WILL BE DELIVERED IN ACCORDANCE WITH THE POLICY PROVISIONS.

AUTHORIZED REPRESENTATIVE



CERTIFICATE OF LIABILITY INSURANCE

DATE (MM/DD/YYYY): 2/17/2022

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IMPORTANT: If the certificate holder is an ADDITIONAL INSURED, the policy(ies) must have ADDITIONAL INSURED provisions or be endorsed. If SUBROGATION IS WAIVED, subject to the terms and conditions of the policy, certain policies may require an endorsement. A statement on this certificate does not confer rights to the certificate holder in lieu of such endorsement(s).

PRODUCER
AssuredPartners Design Professionals Insurance Services, LLC
3697 Mt. Diablo Blvd Suite 230
Lafayette CA 94549

License#: 6003745
SHAN&WI-03

CONTACT NAME: Maurice Thornton
PHONE (A/C, No, Ext): | **FAX (A/C, No):**
E-MAIL ADDRESS: DesignProCerts@AssuredPartners.com

INSURER(S) AFFORDING COVERAGE	NAIC #
INSURER A : Underwriters at Lloyd's, London	32727
INSURER B :	
INSURER C :	
INSURER D :	
INSURER E :	
INSURER F :	

INSURED
Shannon & Wilson, Inc.
400 North 34th Street, Suite 100
Seattle WA 98103

COVERAGES **CERTIFICATE NUMBER:** 864457581 **REVISION NUMBER:**

THIS IS TO CERTIFY THAT THE POLICIES OF INSURANCE LISTED BELOW HAVE BEEN ISSUED TO THE INSURED NAMED ABOVE FOR THE POLICY PERIOD INDICATED. NOTWITHSTANDING ANY REQUIREMENT, TERM OR CONDITION OF ANY CONTRACT OR OTHER DOCUMENT WITH RESPECT TO WHICH THIS CERTIFICATE MAY BE ISSUED OR MAY PERTAIN, THE INSURANCE AFFORDED BY THE POLICIES DESCRIBED HEREIN IS SUBJECT TO ALL THE TERMS, EXCLUSIONS AND CONDITIONS OF SUCH POLICIES. LIMITS SHOWN MAY HAVE BEEN REDUCED BY PAID CLAIMS.

INSR LTR	TYPE OF INSURANCE	ADDL INSD	SUBR WVD	POLICY NUMBER	POLICY EFF (MM/DD/YYYY)	POLICY EXP (MM/DD/YYYY)	LIMITS	
	COMMERCIAL GENERAL LIABILITY						EACH OCCURRENCE	$
	☐ CLAIMS-MADE ☐ OCCUR						DAMAGE TO RENTED PREMISES (Ea occurrence)	$
							MED EXP (Any one person)	$
							PERSONAL & ADV INJURY	$
	GEN'L AGGREGATE LIMIT APPLIES PER:						GENERAL AGGREGATE	$
	☐ POLICY ☐ PRO-JECT ☐ LOC						PRODUCTS - COMP/OP AGG	$
	OTHER:							$
	AUTOMOBILE LIABILITY						COMBINED SINGLE LIMIT (Ea accident)	$
	☐ ANY AUTO						BODILY INJURY (Per person)	$
	☐ OWNED AUTOS ONLY ☐ SCHEDULED AUTOS						BODILY INJURY (Per accident)	$
	☐ HIRED AUTOS ONLY ☐ NON-OWNED AUTOS ONLY						PROPERTY DAMAGE (Per accident)	$
								$
	☐ **UMBRELLA LIAB** ☐ OCCUR						EACH OCCURRENCE	$
	☐ **EXCESS LIAB** ☐ CLAIMS-MADE						AGGREGATE	$
	☐ DED ☐ RETENTION $							$
	WORKERS COMPENSATION AND EMPLOYERS' LIABILITY Y / N						☐ PER STATUTE ☐ OTH-ER	
	ANYPROPRIETOR/PARTNER/EXECUTIVE OFFICER/MEMBER EXCLUDED? ☐ **(Mandatory in NH)**	N / A					E.L. EACH ACCIDENT	$
	If yes, describe under DESCRIPTION OF OPERATIONS below						E.L. DISEASE - EA EMPLOYEE	$
							E.L. DISEASE - POLICY LIMIT	$
A	Professional Liability Contractors Pollution Liability			B0146LDUSA2204579	1/1/2022	1/1/2023	$1,000,000 $1,000,000	per Claim Annual Aggregate

DESCRIPTION OF OPERATIONS / LOCATIONS / VEHICLES (ACORD 101, Additional Remarks Schedule, may be attached if more space is required)
For Proposed Purposes Only

CERTIFICATE HOLDER

SAMPLE

CANCELLATION 30 Day Notice of Cancellation

SHOULD ANY OF THE ABOVE DESCRIBED POLICIES BE CANCELLED BEFORE THE EXPIRATION DATE THEREOF, NOTICE WILL BE DELIVERED IN ACCORDANCE WITH THE POLICY PROVISIONS.

AUTHORIZED REPRESENTATIVE