SHANNON & WILSON
GEOTECHNICAL AND ENVIRONMENTAL CONSULTANTS

September 30, 2022

Mr. Brad Ryan
Municipality of Skagway
PO Box 415
700 Spring Street
Skagway, Alaska 99840

RE: PROPOSAL FOR DESIGN AND CONSTRUCTION SERVICES, SHORT TERM LIFE HEALTH AND SAFETY ROCKFALL MITIGATION, RAILROAD DOCK LANDSLIDE, SKAGWAY, ALASKA

Dear Mr. Ryan:

We are pleased to submit herein our proposal and estimated costs for providing design and construction services for the above referenced project. Based on recent meetings between the Municipality of Skagway (MOS) and the State of Alaska (SOA), we understand that the current direction of the project is to push forward with a design for temporary rockfall mitigation on the main rock slide feature. The goal is to provide rockfall protection for the dock and areas below in the event that full excavation of the slide mass at the top of the slope is not able to be completed in time for opening of the 2023 tourism season.

SCOPE OF SERVICES

In general, our scope of work includes design and construction of temporary rockfall mitigation on the south chute of the main slide feature above the north end of the White Pass & Yukon Route Railway (WPYR) cruise ship dock. heavy scaling on the upper reaches of the slide feature, installation of new rockfall mitigation measures, and testing of those measures. New rockfall mitigation installation will include, at a minimum, a mid-slope attenuator similar to that at the toe of the slope that is intended to remain in place after completion of the full slide mass excavation. The design and construction estimate herein assumes that the project will include heavy scaling on the upper reaches of the slide feature, installation of new rockfall mitigation measures (assumed to consist of a mid-slope attenuator and installation of a draped mesh at the top of the slope), and testing of those measures to confirm effectiveness. Note that our estimate also includes replacing the

5430 Fairbanks Street ▪ Suite 3 ▪ Anchorage, Alaska 99518-1263 ▪ 907 561-2120 ▪ Fax 206 695-6777
▪ www.shannonwilson.com ▪

attenuator at the base of the slope that was damaged during a major, recent slide event on September 24, 2022.

Because the design process has not yet begun, we may discover the need to adjust this approach. If such a situation arises, we will notify you immediately and describe implications to cost and schedule if appropriate.

DESIGN SERVICES

The design effort for this task will be led by Shannon & Wilson. In general our effort will include developing the design specifications of the mid slope attenuator. These specifications will include attenuator location, width, top cable height, tail configuration, and energy rating. Our effort assumes that we will be coordinating the design with Geobrugg and that the mid slope attenuator will be similar to that which was constructed at the toe of the slope. Our attenuator design specifications will be based on rockfall modelling that we will conduct using the survey data collected during our recent site reconnaissance, observations made during several of the recent rock fall events (including video records of these events), and two-dimensional computer modelling tools. Our design effort will also include development of design parameters for rock anchors that will support the attenuator foundations and cable stays as well as the draped mesh. In support of the heavy scaling effort, Shannon & Wilson will define the scaling area extents and work with the contractor to develop a scaling plan.

We have included effort for HDR to assist with the design effort by providing drafting and plan development support. They will work with Shannon & Wilson and Geobrugg to develop the design drawings that will be used to define the scope of construction. We envision that the design package will be relatively small and will consist of a site plan and several drawing sheets presenting design details. We assume that standalone specifications will not be needed and such information will be provided in notes on the project plans. HDR will also provide structural review for attenuator posts and other components to ensure that the specified materials are cable of accommodating anticipated loads.

CONSTRUCTION SERVICES

We have included an estimated cost for construction activities for this project to include heavy hand scaling, installation of a draped mesh at the top of the slope, installation of a mid-slope attenuator, and repair/replacement of the attenuator at the toe of the slope. Our

construction cost includes mobilization/demobilization for a rock stabilization contractor, clearing and vegetation removal at the top of the slope within the work zone, heavy scaling within the upper limits of the slope where the current rockfall sources are located, installation of a draped mesh in the upper portion of the slope in the approximate area where scaling was conducted, and installation of the attenuators. The contractor will provide all equipment, materials and labor to conduct the hand scaling, install the attenuator systems and mesh, as well as the needed ancillary items such as rock anchors and other materials. The contractor's costs do not include hauling of rock material away from the toe of the slope after scaling. Note that items and quantities included on the attached cost estimate are based on preliminary evaluation and experience at the site. It is possible that the quantities and material types may change as the design of the systems progress. Additionally, the contractor has included estimated rates for the work based on their current understanding of the project. Their cost is contingent on finalization of the design and conducting a site visit prior to mobilization to confirm assumptions and conditions. We assume that the contractor will have the opportunity to adjust their cost estimate after the design is complete, prior to mobilization and after their site visit.

We have included scope for survey support during construction. Lounsbury & Associates will provide survey support during installation of the draped mesh and slope attenuators. Services will include setting control and locating attenuator bases and anchor locations in the field. We have assumed a single site visit and five days on site for a one-person survey crew to support the effort. We assume that additional time and additional mobilizations, if needed, will be billed accordingly.

Shannon & Wilson will provide on-site observations continuously during construction. This will include observations during hand scaling, installation of the draped mesh, and installation of the attenuators and their components. We will also provide general management of the construction project and provide updates to the MOS as the work progresses. We will also develop and oversee the rockfall mitigation testing program that will be undertaken after construction is complete. We have included an estimate construction duration of two weeks for the hand scaling, eight weeks for attenuator construction, and one week for testing the system. If longer durations are required, we will notify you as soon as we are able to discuss additional observation effort.

ESTMATED COSTS AND CONDITIONS FOR SERVICES

Estimated costs for the work outlined above are included on the attached *Summary Cost Estimate.* We assume that this work will be conducted on a time and materials basis in accordance with a mutually agreed-upon contract for professional services. We will not exceed the maximum quoted value in our estimate without your prior approval. We assume that if changes to the rockfall mitigation plans are needed as our rockfall analysis and design progresses, we will be able to work with you to negotiate the appropriate changes to our scope of work and fees. We will keep you appraised of our progress and inform you immediately if such changes are needed. Additionally, the proposed construction work includes scaling activities on an unstable slope. We will take care to maintain the slope configuration and not initiate larger scale failures during our work. However, we cannot guarantee that significant slide events won't occur during our efforts. We assume that you and/or the White Pass & Yukon Route Railway will indemnify and hold Shannon & Wilson, and all of our subcontractors harmless to injury and/or damages to the facilities and site below the project that result from this work. We have attached *Important Information About Your Geotechnical Proposal* to help you understand the nature and limitations of our services.

Should you have questions or comments or wish to revise the scope of our services, please call the undersigned. We look forward to working with you on this project and appreciate the opportunity to be of service to you.

Sincerely,

SHANNON & WILSON

Kyle Brennan, PE

Digitally signed by Kyle Brennan, PE
Date: 2022.09.30 16:27:39 -08'00'

Kyle Brennan, PE
Vice President

Enc. Summary Cost Estimate
Important Information about your Geotechnical/Environmental Proposal

SUMMARY COST ESTIMATE

GEOTECHNICAL SERVICES

1. Design Services							**$108,550**
Rockfall Modelling						$15,650	
Vice President (Kyle)	10	hrs. x	$235	/hr.	=	$2,350	
Associate (Rex)	20	hrs. x	$185	/hr.	=	$3,700	
Professional IV	80	hrs. x	$115	/hr.	=	$9,200	
Admin Support	4	hrs. x	$100	/hr.	=	$400	
General Geotechnical Design						$21,300	
Vice President (Kyle)	20	hrs. x	$235	/hr.	=	$4,700	
Associate (Rex)	40	hrs. x	$185	/hr.	=	$7,400	
Professional IV	80	hrs. x	$115	/hr.	=	$9,200	
Design Coordination with Geobrugg						$6,050	
Vice President (Kyle)	10	hrs. x	$235	/hr.	=	$2,350	
Associate (Rex)	20	hrs. x	$185	/hr.	=	$3,700	
Design Development						$48,750	
Vice President (Kyle)	20	hrs. x	$235	/hr.	=	$4,700	
Associate (Rex)	80	hrs. x	$185	/hr.	=	$14,800	
Admin Support	4	hrs. x	$100	/hr.	=	$400	
Reproduction	1	x	$100	each	=	$100	
HDR - Strucrural Review	1	x	$5,000	each	=	$5,000	
HDR - Plan Set Preparation	1	x	$20,000	each	=	$20,000	
		15% Subconsultant Markup			=	$3,750	
Coordination/Meetings						$16,800	
Vice President (Kyle)	40	hrs. x	$235	/hr.	=	$9,400	
Associate (Rex)	40	hrs. x	$185	/hr.	=	$7,400	
2. Construction							**$3,062,468**
Heavy Hand Scaling (Assume 2 Weeks)						$591,085	
Vice President (Kyle)	36	hrs. x	$235	/hr.	=	$8,460	
Associate (Rex)	216	hrs. x	$185	/hr.	=	$39,960	
Airfare (for S&W personnel)	2	x	$1,000	each	=	$2,000	
Lodging (total nights in Skagway for S&W)	24	nights x	$200	/night	=	$4,800	
Perdiem (for S&W crew including travel days)	24	days x	$69	/day	=	$1,656	
Contractor - Mobilization	1	x	$333,270	each	=	$333,270	
Contractor - Tree/Vegetation Clearing	8	days x	$9,750	/day	=	$78,000	
Contractor - Heavy Hand Scaling	2	weeks x	$48,750	/week	=	$97,500	
		5% Contractor Markup			=	$25,439	
Attenuator and Mesh Construction (Assume 8 Weeks)						$2,145,324	
Vice President (Kyle)	36	hrs. x	$235	/hr.	=	$8,460	
Associate (Rex)	36	hrs. x	$185	/hr.	=	$6,660	
Sr. Professional 1	496	hrs. x	$135	/hr.	=	$66,960	
Airfare (for S&W field crew)	3	x	$1,000	each	=	$3,000	
Lodging (total nights in Skagway for S&W)	63	nights x	$200	/night	=	$12,600	
Perdiem (for S&W crew including travel days)	63	days x	$69	/day	=	$4,347	
Contractor - Midslope Attenuator	5,500	sq. ft.	$138	/sq. ft.	=	$758,230	
Contractor - Midslope Attenuator Tail	4,500	sq. ft.	$12	/sq. ft.	=	$52,704	
Contractor - Bottom Attenuator Replacement	6,500	sq. ft.	$138	/sq. ft.	=	$896,090	
Contractor - Bottom Attenuator Replacement Tail	1,800	sq. ft.	$12	/sq. ft.	=	$21,082	
Contractor - Draped Mesh	16,000	sq. ft.	$12	/sq. ft.	=	$187,392	
		5% Contractor Markup			=	$95,775	
Lounsbury - Mobilization	1	x	$9,864	each	=	$9,864	
Lounsbury - Day Rate (1-person crew)	7	days x	$2,569	/day	=	$17,983	
		15% Subconsultant Markup			=	$4,177	
Mitigation Testing						$292,460	
Vice President (Kyle)	36	hrs. x	$235	/hr.	=	$8,460	
Associate (Rex)	76	hrs. x	$185	/hr.	=	$14,060	
Airfare (for S&W field crew)	2	x	$1,000	each	=	$2,000	
Lodging (total nights in Skagway for S&W)	9	nights x	$200	/night	=	$1,800	
Perdiem (for S&W crew including travel days)	9	days x	$69	/day	=	$621	
Contractor - Heavy Hand Scaling	1	weeks x	$48,750	/week	=	$48,750	
Contractor - Demobilization	1	x	$204,125	each	=	$204,125	
		5% Contractor Markup			=	$12,644	
Coordination/Meetings						$33,600	
Vice President (Kyle)	80	hrs. x	$235	/hr.	=	$18,800	
Associate (Rex)	80	hrs. x	$185	/hr.	=	$14,800	
					Total =		**$3,171,018**

Assumptions:

1 Construction cost items contingent on contractor conducting a site visit prior to mobilization. Configuration and material quantities based on assumed design. Configuration of mitigation may change as design progresses and we assume the cost estimate can be changed accordingly.

2 Construction does not include removal of rock debris at base of slide or repairs to dock, infrastructure, or other facilities at the base of the slope.

3 Shannon & Wilson and our subcontractors and construction contractor are not liable for injuries or damages resulting from work on the slope or if work results in slope failure.

4 Assumes that no permitting effort is required to support the project.

5 If disruptions to commercial air or ferry service prevent our field crew from demobilizing from Skagway after field activities, we will bill at the unit rates included above.

6 Field activities will take place during the fall, winter and spring of 2022/2023. Delays caused by weather and resultant costs may be experienced and will be billed on a time and materials basis.

7 Billing will occure monthly on a time and expense basis. We will notify you immediately if we encounter issues or other circumstances that would require an adjustment to our scope.

8 Work will be performed under a mutually agreed upon contract for professional services.

IMPORTANT INFORMATION ABOUT YOUR GEOTECHNICAL/ENVIRONMENTAL PROPOSAL

More construction problems are caused by site subsurface conditions than any other factor. The following suggestions and observations are offered to help you manage your risks.

HAVE REALISTIC EXPECTATIONS.

If you have never before dealt with geotechnical or environmental issues, you should recognize that site exploration identifies actual subsurface conditions at those points where samples are taken, at the time they are taken. The data derived are extrapolated by the consultant, who then applies judgment to render an opinion about overall subsurface conditions; their reaction to construction activity; appropriate design of foundations, slopes, impoundments, and recovery wells; and other construction and/or remediation elements. Even under optimal circumstances, actual conditions may differ from those inferred to exist, because no consultant, no matter how qualified, and no subsurface program, no matter how comprehensive, can reveal what is hidden by earth, rock, and time.

DEVELOP THE SUBSURFACE EXPLORATION PLAN WITH CARE.

The nature of subsurface explorations—the types, quantities, and locations of procedures used—in large measure determines the effectiveness of the geotechnical/environmental report and the design based upon it. The more comprehensive a subsurface exploration and testing program, the more information it provides to the consultant, helping to reduce the risk of unanticipated conditions and the attendant risk of costly delays and disputes. Even the cost of subsurface construction may be lowered.

Developing a proper subsurface exploration plan is a basic element of geotechnical/environmental design, which should be accomplished jointly by the consultant and the client (or designated professional representatives). This helps the parties involved recognize mutual concerns and makes the client aware of the technical options available. Clients who develop a subsurface exploration plan without the involvement and concurrence of a consultant may be required to assume responsibility and liability for the plan's adequacy.

READ GENERAL CONDITIONS CAREFULLY.

Most consultants include standard general contract conditions in their proposals. One of the general conditions most commonly employed is to limit the consulting firm's liability. Known as a "risk allocation" or "limitation of liability," this approach helps prevent problems at the beginning and establishes a fair and reasonable framework for handling them, should they arise.

Various other elements of general conditions delineate your consultant's responsibilities. These are used to help eliminate confusion and misunderstandings, thereby helping all parties recognize who is responsible for different tasks. In all cases, read your consultant's general conditions carefully and ask any questions you may have.

HAVE YOUR CONSULTANT WORK WITH OTHER DESIGN PROFESSIONALS.

Costly problems can occur when other design professionals develop their plans based on misinterpretations of a consultant's report. To help avoid misinterpretations, retain your consultant to work with other project design professionals who are affected by the geotechnical/environmental report. This allows a consultant to explain report implications to design professionals affected by them, and to review their plans and specifications so that issues can be dealt with adequately. Although some other design professionals may be familiar with geotechnical/environmental concerns, none knows as much about them as a competent consultant.

OBTAIN CONSTRUCTION MONITORING SERVICES.

Most experienced clients also retain their consultant to serve during the construction phase of their projects. Involvement during the construction phase is particularly important because this permits the consultant to be on hand quickly to evaluate unanticipated conditions, to conduct additional tests if required, and when necessary, to recommend alternative solutions to problems. The consultant can also monitor the geotechnical/environmental work performed by contractors. It is essential to recognize that the construction recommendations included in a report are preliminary, because they must be based on the assumption that conditions revealed through selective exploratory sampling are indicative of actual conditions throughout a site.

Because actual subsurface conditions can be discerned only during earthwork and/or drilling, design consultants need to observe those conditions in order to provide their recommendations. Only the consultant who prepares the report is fully familiar with the background information needed to determine whether or not the report's recommendations are valid. The consultant submitting the report cannot assume responsibility or liability for the adequacy of preliminary recommendations if another party is retained to observe construction.

REALIZE THAT ENVIRONMENTAL ISSUES MAY NOT HAVE BEEN ADDRESSED.

If you have requested only a geotechnical engineering proposal, it will not include services needed to evaluate the likelihood of contamination by hazardous materials or other pollutants. Given the liabilities involved, it is prudent practice to always have a site reviewed from an environmental viewpoint. A consultant cannot be responsible for failing to detect contaminants when the services needed to perform that function are not being provided.

ONE OF THE OBLIGATIONS OF YOUR CONSULTANT IS TO PROTECT THE SAFETY, PROPERTY, AND WELFARE OF THE PUBLIC.

A geotechnical/environmental investigation will sometimes disclose the existence of conditions that may endanger the safety, health, property, or welfare of the public. Your consultant may be obligated under rules of professional conduct, or statutory or common law, to notify you and others of these conditions.

RELY ON YOUR CONSULTANT FOR ADDITIONAL ASSISTANCE.

Your consulting firm is familiar with several techniques and approaches that can be used to help reduce risk exposure for all parties to a construction project, from design through construction. Ask your consultant, not only about geotechnical and environmental issues, but others as well, to learn about approaches that may be of genuine benefit.

The preceding paragraphs are based on information provided by the
ASFE/Association of Engineering Firms Practicing in the Geosciences, Silver Spring, Maryland