Appendix H.2

Preliminary Fish Compensation Plan

EXECUTIVE SUMMARY

CertainTeed Canada Inc. (CertainTeed), a subsidiary of Saint-Gobain Group, proposes to develop the Antrim Gypsum Project (the Project) located near Gays River, along Lake Egmont Road in Cooks Brook, Nova Scotia (NS). The Project consists of a conventional surface mining operation including an open pit, overburden stockpile, topsoil stockpiles, processing plant, and water management infrastructure. The mined material will be sized, screened, and conveyed based on the gypsum purity and stockpiled during processing, before transportation to the Port of Sheet Harbour for shipment. Pending release from the provincial EA process and obtaining all applicable permits, construction is expected to start in 2025, operation starting in 2027, and initiation of closure activities by 2050.

The purpose of this Conceptual Offsetting Plan (the Plan) is to describe unavoidable losses of fish habitat as a result of the Project and to demonstrate to DFO that offsetting of these unavoidable losses is achievable. At the conceptual stage, the intent of the Plan is to provide a quantification of fish habitat affected by the Project after all avoidance and mitigation measures have been considered, and to outline appropriate and achievable approaches to offset unavoidable HADD. CertainTeed has commenced and will continue early engagement with DFO to identify requirements for Authorization under the Fisheries Act, and to identify the scope of the offsetting requirements. Engagement with the Mi'kmaq of Nova Scotia has commenced and will continue through the selection and implementation processes for offsetting projects. The impacts and offsetting concepts described will serve as the basis for ongoing engagement with the Mi'kmaq of Nova Scotia and stakeholders and to ultimately support an application for authorization of HADD of fish habitat as required by the Fisheries Act.

As a result of the Project, the total predicted HADD to offset after the implementation of avoidance and mitigation measures is 468 habitat units of watercourse and open water features. No adjustments were made to habitat loss areas to account for reduced habitat suitability (i.e., habitat indexing was not used to decrease the offset area requirements). The fish community that occupies these habitats are typical of small streams and ponds within the southern uplands of Nova Scotia, consisting of American eel, brook trout, yellow perch, and other common, small-bodied fishes. Additionally, chain pickerel (an invasive species to Nova Scotia) was observed in one watercourse within the ASA.

A multi-step review process has been undertaken to identify potential offsetting concepts in priority watersheds. Conceptual offsetting projects presented within this Plan have been developed using DFO guidelines and include locations where offsets may be both technically and logistically feasible while being primarily beneficial for fish species impacted by the Project.

Offsetting investigations for the Project are ongoing. Additional offsetting locations or complementary measures may be identified through the completion of the desktop analysis, and future engagement with the Mi'kmaq of Nova Scotia, community groups, and landowners.

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ACCDC	Atlantic Canadian Conservation Data Centre
ASA	Aquatic Study Area
COSEWIC	Committee on the Status of Endangered Wildlife in Canada
DFO	Fisheries and Oceans Canada
DO	Dissolved Oxygen
EARD	Environmental Assessment Registration Document
HADD	Harmful Alteration, Disruption, or Destruction
NS	Nova Scotia
NSDAF	Nova Scotia Department of Aquaculture and Fisheries
NSDFA	Nova Scotia Department of Fisheries and Aquaculture
NSECC	Nova Scotia Environment and Climate Change
NSSA	Nova Scotia Salmon Association
ROM	Run of mine
PA	Project Area
SAR	Species at risk
WC	Watercourse
WL	Wetland

LIST OF SCIENTIFIC NAMES

American eel	*Anguilla rostrata*
Atlantic salmon	*Salmo salar*
blacknose dace	*Rhinichthys atratulus*
brook trout	*Salvelinus fontinalis*
brown bullhead	*Ameiurus nebulosus*
chain pickerel	*Esox niger*
golden shiner	*Notemigonus crysoleucas*
ninespine stickleback	*Pungitius pungitius*
northern redbelly dace	*Chrosomus eos*
threespine stickleback	*Gasterosteus aculeatus*
white sucker	*Catostomus commersonii*

1.0 INTRODUCTION

CertainTeed Canada Inc. (CertainTeed), a subsidiary of Saint-Gobain Group, proposes to develop the Antrim Gypsum Project (the Project) located near Gays River, along Lake Egmont Road in Cooks Brook, Nova Scotia (NS), 50-kilometers (km) northeast of Halifax and 82 km northwest of Sheet Harbour.

For the purpose of the Environmental Assessment (EA), a Project Area (PA) was defined as the footprint of Project related infrastructure and includes private and Crown lands (see PIDs listed in Table 2.2-1 of the EARD). The Project consists of a conventional surface mining operation including an open pit, overburden stockpile, topsoil stockpiles, processing plant, and water management infrastructure. The mined material will be sized, screened, and conveyed based on the gypsum purity and stockpiled during processing, before transportation to the Port of Sheet Harbour for shipment. Pending release from the provincial EA process and obtaining all applicable permits, construction is expected to start in 2025, operation starting in 2027, and initiation of closure activities by 2050.

The scope of the Project includes activities associated with construction, operation, and closure. Project construction activities will include clearing and grubbing the topsoil stockpiles, overburden, and waste rock stockpile, mine pit, run-of-mine (ROM) stockpile, construction of the processing facility l (i.e. sizer buildings, conveyor, screening building, etc.,) access roads, fueling infrastructure, surface water management and other Project infrastructure. The operation phase will include extraction (surface miner, loading, and hauling), processing, and waste management. Blasting may be used for extraction if required. Gypsum will be screened while stockpiled. Waste rock, not used for construction or backfill, will be stockpiled. The closure phase will include earthworks and demolition required to return the Project Area to a safe, stable, and vegetated state, and all monitoring and treatment, if required. Reclamation and Closure Plan requirements are governed by the *Nova Scotia Mineral Resources Act*.

To facilitate development of the Project, there is a need to overprint or otherwise impact aquatic features that contain fish and/or provide fish habitat after all avoidance, minimization, and mitigation measures have been considered. As a result, the implementation of measures to offset these impacts are required.

The purpose of this Conceptual Offsetting Plan (the Plan) is to describe CertainTeed's proposed approach to fisheries offsetting to counterbalance the harmful alteration, disruption , or destruction (HADD) of fish habitat and/or incidental death of fish. At the conceptual stage, the intent of the Plan is to support the Environmental Assessment Registration Document (EARD) through providing a preliminary quantification of fish habitat affected by the Project after all avoidance and mitigation measures have been considered, and to outline CertainTeed's approach to offset unavoidable impacts to fish and fish habitat that are appropriate and achievable.

The Plan aims to:

- Describe the existing fish community and habitat predicted to be affected by the Project (detailed in Section 6.7 of the EARD);
- Summarize how the Project will affect fish and fish habitat (detailed in Section 6.7.4 of the EARD); and,
- Introduce a proposed approach and concepts to offset impacts to fish and fish habitat.

The impacts and offsetting concepts described herein will serve as the basis for ongoing engagement with Mi'kmaq, DFO, and other identified stakeholders. This engagement program has already been initiated and will continue through development of a final offsetting plan to accompany an application for authorization under the *Fisheries Act*.

1.1 Regulatory Context

Before construction of certain works can commence, the Project requires authorization under Sections 34.4(2)(b) and 35(2)(b) of the *Fisheries Act*. The *Fisheries Act* prohibits the carrying out of any work, undertaking or activity, other than fishing, that results in the death of fish (other than fishing) and/or HADD of fish habitat. If a project cannot avoid, or is likely to cause, death of fish and/or HADD, then a Fisheries Act Authorization (FAA) is required.

1.2 Regulatory Consultation and Mi'kmaq of Nova Scotia Engagement Efforts

CertainTeed has commenced and will continue early engagement with DFO to identify requirements for an FAA, and to identify the scope of the offsetting requirements.

Engagement with the Mi'kmaq of Nova Scotia has commenced and will continue through the selection and implementation processes for offsetting projects. The nearest Mi'kmaq community is the Sipekne'katik First Nation, located approximately 13 km northwest of the Project, and just west of the town of Shubenacadie.

2.0 EXISTING FISH AND FISH HABITAT

An Aquatic Study Area (ASA) was designed to serve as the spatial boundary for fish and fish habitat assessments to assist in determining potential Project-related effects to fish and fish habitat beyond (i.e., downstream of) the boundary of the PA. The ASA incorporates the entirety of the PA, an extension along the entirety of Annand Brook, two extensions to the east of the PA, and one extension to the south. The ASA is approximately 698 hectares - 97 hectares larger than the PA - and extends into several additional PIDs: 40229759, 00522615, 40291452, 00522623, 40034779, 00553248, 40212557, and 00553446.

2.1 Fish Community

During the fish and fish habitat field program, a total of 10 species and 754 individual fish

were captured through fish efforts across 19 survey locations within the ASA. These species include northern redbelly dace (Chrosomus eos), golden shiner (Notemigonus crysoleucas), American eel (Anguilla rostrata), threespine stickleback (Gasterosteus aculeatus), brook trout (Salvelinus fontinalis), ninespine stickleback (Pungitius pungitius), chain pickerel (Esox niger), white sucker (Catostomus commersonii), brown bullhead (Ameiurus nebulosus) and blacknose dace (Rhinichthys atratulus). Of these documented fishes, American eel (COSEWIC Threatened; S3N) and brook trout (S3) are considered priority species.

Although this species diversity is considered relatively high within the context of Nova Scotia, the highest species diversity recorded within a single aquatic feature was four species. Most aquatic features with confirmed fish presence only had one or two species observed. Fish captured are predominantly cool-warm water species, with the exception of northern redbelly dace and brook trout as cold-water species. Chain pickerel, an aquatic invasive species and known predator of salmonids, was confirmed in WC11. Confirmed brook trout presence was limited to WC11 and WC1, and overall abundance was low at only nine individuals. Northern redbelly dace accounted for the vast majority of individuals captured as a direct result of hundreds (567) of the dace found within two isolated ponds. With the exception of northern redbelly dace, overall fish abundance throughout the ASA was low with the majority of features fished resulting in no capture.

2.2 Fish Habitat

The ASA is largely comprised of smaller, first and second order intermittent streams as a result of multiple topographical highs generating several flow divides. Larger, named systems, located within the ASA include Annand Brook (in the northwest) and Gay River (in the northeast).

In total, 60 watercourses were mapped within the ASA during baseline delineation. A total of 79 wetlands have been identified and delineated throughout the PA. Wherever fish habitat extends into wetlands, it is described in the context of contiguous watercourses, open water bodies and/or mosaics. Seven wetland (WL) mosaics, three upland (UP) mosaics, and two watercourse (WC) mosaics were identified: WL Mosaics A, E, F, G, H, I, and J; UP Mosaics B, C, and D; and WC Mosaics A and B. In addition, six open water features (Open Water A through Open Water F) were identified within the ASA. Detailed descriptions of Project watercourses and associated fish habitat are provided in Section 6.7.2 of the EARD.

Overall, the aquatic ecosystem within the ASA is characterized as slightly acidic, but within the tolerable range of the local fish community. Elevated summer temperatures within select watercourses (e.g., the Gays River) may temporarily limit fish habitat quality for cold-water species like brook trout within these systems, but overall water quality is not expected to be limiting to the local fish community. While moderate-high to high habitat suitability was observed for Brook floater, no mussels or evidence of mussels were observed.

Detailed fish habitat assessments revealed that overall fish habitat viability and accessibility

within select aquatic systems are limited due to naturally poor connectivity. Suitable habitats are restricted within these watercourses to localized systems, but some resident populations of fish are nevertheless supported. WC11, WC12 (and those watercourses with direct connectivity to these systems), as well as Annand Brook are considered to provide the most diverse habitat for the local fish community within the ASA.

Throughout the entirety of the ASA, 20 of the 60 watercourses identified are described as first order ephemeral or intermittent watercourses with no surface water connections to any downgradient, fish-bearing features. Of these 20 watercourses, five watercourses were fished using either qualitative or quantitative electrofishing methods to identify fish presence (WC21, WC23, WC31, WC35 and WC47). No fish were caught or observed within any of these watercourses. Although these watercourses may indirectly support fish habitat through hydrological contributions, they are not considered to directly support one or more life stages of fish.

3.0 EFFECTS ASSESSMENT SUMMARY

3.1 Measures to Avoid

Measures to avoid impacts to fish and fish habitat are the highest priority in the mitigation sequence. Throughout the iterative process of developing the current Project infrastructure layout, avoidance of effects to fish habitat was attained through several key design considerations.

Initial delineation of wetlands and watercourses within the ASA was completed to allow for detailed fish and fish habitat to help inform an optimized site layout and reduce potential impacts to fish habitats. Additionally, the PA was defined to be larger than infrastructure would require, especially to the south on the crown land portion, allowing for micro-sighting of infrastructure to avoid sensitive features, including watercourses and wetlands, wherever possible. This delineation of wetlands and watercourses and increased PA, facilitated infrastructure planning; and as a result, the following Project components have been planned to avoid direct impacts to fish and fish habitat:

- Topsoil stockpile west of the overburden stockpile
- ROM pad
- Process reject stockpile
- Parking lot
- Ponds (two out of three)
- Multiple staging areas
- Multiple unassigned buildings

Construction of the haul road, overburden stockpile, topsoil stockpile west of the pit, and pit will result in unavoidable impacts to fish and fish habitat. The open pit and overburden stockpile were actively sited in areas of lower overall wetland and watercourse presence,

reducing the overall direct impacts and specifically avoiding WSS and their catchments as is possible. In earlier iterations of the Project design, the open pit would have impacted the north-western portion of the Project Area and multiple WSS triggered by avian SAR observations and notably a significant amount of black ash observations. Relocating the pit further to the south, three WSS (WL35, WL67, WL72) and the majority of their contributing catchments, have been completely avoided. Infrastructure has been designed to stay compact to avoid the southern portion of the crown land parcels where significant wetland habitat was delineated.

Throughout the design of the Project, priority was placed on avoiding WL41 after initial designs included proposed direct alteration. WL41 contains multiple SAR observations and habitat including Canada warbler, olive-sided flycatcher, eastern wood-peewee, frosted glass whiskers, and blue felt lichen. WL41 has been entirely avoided by direct impacts through Project micro-siting.

Early in the design process, Scotia Mine Polishing Pond (Annand Bog) and Gays River were identified as two priority aquatic features for avoidance. It was identified that a decrease (>10%) in flow to the Scotia Mine Polishing Pond (Annand Bog) could result in significant effects to the downgradient habitats (Gays River). Reduction in water within the Scotia Mine Polishing Pond could have adverse effects to this surface water system, which is an active component of the Scotia Mine located west of the PD. Earlier iterations of the Project infrastructure resulted in flow decreases throughout WC11 and concurrently the Scotia Mine Polishing Pond (Annand Bog). The new Project infrastructure increases streamflow into the polishing pond helping improve fish passage through the two culverts that help drain the pond and allow fish passage from Annand Brook to the polishing pond.

Gays River was additionally identified as an aquatic feature to avoid adverse effects based on the ecological role the river plays for many SAR species such as brook floater, wood turtle, snapping turtle and historical presence of Atlantic salmon.

3.2 Measures to Mitigate

Where avoidance of impacts to fish and fish habitat are not possible, mitigation measures must be employed to further reduce impacts to fish and fish habitat. Standards and best practices for working in and near water are well understood and will be followed (DFO 2024). Standard mitigation measures will include, but are not limited to, fish rescues, site water management, adherence to timing windows to protect sensitive life cycle periods, and maintenance of riparian and wetland habitats (where possible).

Fish rescues are the key method to avoid death of fish where direct impact to fish habitat is unavoidable. The specific plan for each individual fish rescue must be developed on a site-specific basis; however, the primary goal of fish rescue work is to capture and relocate as many fish as is reasonably practical, with habitat area and complexity, water temperature and turbidity, access, and safety considerations as the key constraints. It is expected that a

small proportion of fish present may not be successfully rescued. The Proponent commits to a reasonable level of effort to rescue as many fish as practical, and that the details surrounding reasonable depletion targets will be completed at the permitting phase in consultation with DFO.
CertainTeed will develop and implement a detailed Erosion and Sediment Control (ESC) Plan which is proactive and protective of fish and fish habitat. Contact water will be collected and treated prior to release. Release of contact water from Project ponds will only be permitted if monitoring indicates compliance with all regulatory guidelines.

In-stream works will only be completed where approved, adhering to all Approval conditions. In-stream works will be completed with minimal disturbance to riparian habitat, which provide shade and erosion protection that is protective of fish habitat. CertainTeed will avoid refueling, fuel storage, and servicing of equipment within 30-m of a watercourse or water body, to prevent accidental release of deleterious substances to fish habitat. If this is not possible (e.g., non-mobile equipment like cranes), additional mitigation measures will be implemented. Diligent spill prevention, preparedness and response measures will be key components of construction, operations and reclamation works completed within the ASA.

To minimize effects of blasting on fish (should it be required for extraction), a Blast Management Plan will be developed and strictly adhered to. Appropriate blast designs will be developed to limit blasting impacts (vibration, fly-rock and overpressure). All required information for each blast will be documented including hole-depth and the quantity of explosive used, blast timing, and monitoring data. All blasting will adhere to guidelines outlined by Wright and Hopky (1998) and will adhere to Nova Scotia Blasting Regulations.

3.3 Residual Impacts to Fish and Fish Habitat

A summary of Project-related impacts is provided in Table 3.1.

Table 3.1: Summary of Impacts to Fish and Fish Habitat

Impact	Area (m^2)	Area (habit units)
Change in Habitat Quantity	25,573	255.7
Flow Disruption	19,010	190.1
Totals	**44,583**	**445.8**
Total (Hectares) = 4.46		

As a result of Project-related impacts, CertainTeed will be seeking authorization under both Paragraphs 34.4(2)(b) (death of fish) and 35(2)(b) (HADD) of the *Fisheries Act*. Though Project activities may result in death of fish, this loss is expected to be largely non-quantifiable and incidental. The death of fish as a result of Project activities will be minimized through fish rescues, isolating in-water work areas, implementation of sediment and erosion control measures, water treatment (TSS), and in-water work timing windows.

Indirect effects related to surface and ground water quantity are, however, based on

predictive modelling. While predictive modelling has been completed with layers of explicitly stated contingencies and conservatism, models do inherently involve a level of uncertainty, given their predictive nature. To support future permitting under the *Fisheries Act*, model outputs will be further refined, calibrated, and validated against site specific data, which will be used to update and adjust model predictions and mitigative measures as required.

4.0 OFFSETTING CONCEPTS

The following sections provide preliminary information on the strategies to offset residual impacts to fish and fish habitat after measures to avoid and mitigation have been accounted for. Preferred offsetting options will be further refined based on discussions with relevant stakeholders, Mi'kmaq communities and DFO during the detailed offset planning process. The offsetting strategies described herein have been developed to be consistent with DFO's Policy for Applying Measures to Offset Adverse Effects on Fish and Fish Habitat Under the *Fisheries Act* (DFO, 2019).

4.1 Approach

Offsetting investigations for the Project are ongoing. A multi-step review process has been initiated to identify potential offsetting concepts. Initial steps have included:

- Desktop review of watersheds containing aquatic Species-at-Risk, with an emphasis on those containing Atlantic salmon (particularly the inner Bay of Fundy (iBoF) population).
- Desktop review of watersheds that are known to have been anthropogenically degraded and where fish habitat restoration projects could potentially exist.
- Preliminary field assessments of potential offsetting locations by restoration specialists to determine overall feasibility.

As offsetting investigations continue, the review process will comprise engagement with the Mi'kmaq of Nova Scotia, community-based watershed groups, and landowners to discuss fish habitat restoration priorities.

Conceptual offsetting strategies presented within this Plan have been developed using DFO guidance and include measures that are well-proven, are technically and logistically feasible, and primarily beneficial for local fish species of conservation or recreational interest, and/or species of cultural significance to the Mi'kmaq of Nova Scotia.

While salmonids, particularly Atlantic Salmon, are commonly a focus of offsetting efforts, no salmon were observed through all fishing efforts in the ASA. Fish abundance throughout the ASA was relatively low and largely dominated by forage and warm temperature tolerant species. Brook trout were only observed in WC1 and WC11 (n=9, 2% catch rate). While WC11, WC12 (and those watercourses with direct connectivity to these systems), and Annand Brook are considered to provide the most diverse habitat, Chain pickerel have been

observed in WC11.

Offsetting approaches presented herein strongly consider benefits to salmonid species as per DFO guidance and Project location within an inner Bay of Fundy watershed, however, based on field assessment results, it is proposed that the species present and abundance within the ASA be a consideration during offset ratio determination.

4.2 Goals and Objectives

Preliminary offsetting identification and selection have been guided by the principles from DFO's Policy for Applying Measures to Offset Adverse Effects on Fish and Fish Habitat (2019):

- Principle 1: Measures to offset should support fisheries management objectives and give priority to the restoration of degraded fish habitat.

  DFO gives priority to offsetting measures that focus on the restoration of degraded fish habitat. Measures to offset should be designed to contribute to the restoration of degraded fish habitat provided within existing fisheries management plans, or to consult with Indigenous groups, fisheries managers, local organizations, and stakeholders to help identify areas that would benefit from restoration or enhancement (DFO, 2019). Ongoing offsetting scoping for the Project is prioritizing measures that involve restoration and enhancement of degraded habitat (see Section 4.4).

- Principle 2: Benefits from measures to offset should balance the adverse effects resulting from the works, undertakings of activities.

  The second principle describes how measures to offset should be scaled such that they are proportional to the residual effects. Measures are most likely to balance the residual effects when they benefit the specific local fish population and fish habitat, and it is therefore preferable that offsetting projects be located within the vicinity of the works or within the same waterbody or watershed (DFO, 2019). However, there is flexibility in the selection of measures to locations outside of the immediate project area provided the measures are supported by clear fisheries management objectives and regional restoration priorities (DFO, 2019). In keeping with the second principle, the location of offsetting opportunities was first considered within the local watershed, then in consideration of the regional context, expanded to other inner Bay of Fundy draining watersheds. Rationale for the selection of priority watersheds, including those located away from the project site, is provided in Section 4.3.

  The second principle also provides flexibility in offsetting forms, differentiating between "in-kind" and "out-of-kind" approaches. Priority for offsetting concepts was given to in-kind measures to offset, through which fish and fish habitat that is

adversely affected is replaced by the same quantity or quality of the same type of fish or fish habitat (DFO, 2019). Offsetting concepts may also employ an "out-of-kind" approach, by which fish habitat that is adversely affected is replaced by an appropriate quantity and quality of a different type of fish or fish habitat than was adversely affected. Though it can be more difficult to measure and compare the residual effects with fish and fish habitat benefits associated with out-of-kind approaches, in some cases the resulting habitat has greater capability to produce and sustain fish (DFO, 2019). The offsetting strategies proposed herein are anticipated to result in greater habitat complexity and more productive habitat than fish habitat predicted to be impacted by the Project.

- Principle 3: Measures to offset should provide additional benefits to the ecosystem.

  Under the third principle, any coincidental positive benefits of the Project have not been considered as measures to offset. Furthermore, the restoration of degraded sites for which CertainTeed, or another person or organization is responsible for (e.g., public road crossings), have not been considered in the overall quantification of offsetting measures. The restoration of orphaned sites (i.e., those with no known responsible party or owner or with no possibility of restoration due to company closure, bankruptcy, or other similar circumstance) may be considered as a potential measure during offset identification and selection.

- Principle 4: Measures to offset should generate self-sustaining benefits over the long term.

  The fourth and final principle states that measures to offset should strive to generate self-sustaining benefits to fish and fish habitat conservation and protection, wherein the benefits of offsetting should last at least as long as the adverse effects from the project (DFO, 2019). Therefore, offsetting measures that would require continuous intervention to sustain fish were not considered.

4.3 Priority Watersheds

DFO's guiding principles clarify a preference for offsetting measures located within the vicinity of a Project, as measures to benefit local fish populations and fish habitat are most likely to balance residual effects (DFO, 2019).

Anticipated Project impacts to fish and fish habitat are confined to aquatic features located within the Shubenacadie River secondary watershed (1DG-1), which is the largest secondary watershed of Nova Scotia. This secondary watershed is contained within the second largest primary watershed– the Shubenacadie/Stewiacke watershed (1DG). The secondary watershed comprises two major drainage features: the Shubenacadie Canal Waterway and associated lakes from the southwest and the Stewiacke River from the east. Both feed the Shubenacadie River which empties into the Bay of Fundy at Cobequid Bay. The Project lies

entirely within the 1DG-1-WW tertiary watershed. The primary drainage feature of this sub-watershed is the Gays River, which flows in a general northwest direction and empties into the Shubenacadie River, just south of the village of Shubenacadie. The Gays River is fed by numerous named tributaries, including but not limited to the South Branch Gays River, Far Brook, Ervin Brook, and McLean Brook. Lake Egmont and Lower Lake Egmont form the largest waterbody within the sub-watershed.

Several drivers have guided the selection of priority watersheds for offsetting investigation outside of the immediate vicinity of the Project, including:

- Location within the broader ecological region (i.e., inner Bay of Fundy watersheds).
- Watersheds that support Atlantic salmon or other species of conservation concern, recreational interest, and/or contain species significant to the Mi'kmaq of Nova Scotia
- Watersheds with proportionally higher rates of anthropogenic disturbance.
- Watersheds where previous restoration activities have taken place or have been identified by local groups, or where previous landowner relationships have been established.

Rationale behind these drivers is provided in Sections 4.3.1 through 4.3.3. Based on these drivers, the Shubenacadie River secondary watershed was selected as the principal watershed for offsetting investigation. Additional inner Bay of Fundy draining watersheds in close proximity to the Project Area have also been selected for offsetting investigation, including Salmon River (1DH-6), Cornwallis River (1DD-2), and Kennetcook River (1DF-10).

4.3.1 Fish Species of Interest

Supported by previous consultation with DFO, Atlantic Salmon have generally been identified as a priority species for offsetting projects. Atlantic Salmon populations are categorized into several Designatable Units within Nova Scotia, including the iBoF population (Schedule 1 – Endangered, COSEWIC – Endangered). Atlantic Salmon require several different habitats to complete a life cycle including both marine and freshwater habitat. The major freshwater habitat types for Atlantic salmon are used for feeding, overwintering, spawning, early life-stage nursery, and rearing habitats (DFO, 2010).

Freshwater salmon habitat is threatened by the effects of agriculture, urbanization, poor forestry practices, road building, and other factors related to human activities. Decreased smolt production due to habitat degradation, low pH, and temperature increases have been observed. The main historical threats to this sub-population of salmon are loss and degradation of habitat. However, these historical threats are not considered to be the leading cause of their decline as marine survival is very low due to interactions with farmed and hatchery salmon, ecological community and environmental shifts, and fisheries by-catch (DFO, 2021). Other threats are interbreeding with escaped farm fish, barriers to fish passage and environmental changes, such as contaminants and warmer water (DFO, 2021). The persistence of iBoF Salmon currently requires maintaining existing populations through an

ongoing live gene bank program (Jones et al., 2020). The Shubenacadie River has been identified as an important river for long-term population self-sustainability for the iBoF population of Atlantic salmon (DFO, 2021).

Recovery actions for iBoF salmon have focused on Live Gene Banking (LGB), a captive breeding program used to maintain genetic diversity of iBoF salmon populations for future recovery actions (DFO, 2008). Without the LGB program, low population size of iBoF salmon have are expected to persist long term, however, without the program, iBoF salmon are expected to go extinct (DFO, 2008). Recommended iBoF salmon recovery targets include an abundance of approximately 25% of its past abundance (~9919 spawning adults) distributed among as many of the 32 rivers known to have supported iBoF salmon as possible (DFO, 2008).

Resident brook trout have been confirmed present within the PA and will be impacted by Project development. Brook trout are the provincial fish of Nova Scotia and the most highly preferred and targeted species of the local sportfishing industry (NSDFA, 2024), but are currently assessed in the province as “vulnerable to extirpation” (S3; ACCDC). Current challenges to the health of provincial trout fisheries include habitat loss (due to instream habitat degradation, warm water temperatures, low flow conditions, lack of healthy riparian zones, hydroelectric and other impoundments, nutrient loading, and acid rain), overexploitation, and competition and illegal introductions of invasive species (NSDAF, 2005).

Management strategies identified to bolster the fishery include freshwater habitat enhancement and restoration (NSDAF, 2005). Habitat enhancement, along with population enhancement in the form of stocking programs, are considered the two most recommended methods of improving fisheries among anglers in Nova Scotia (Economic and Policy Analysis Directorate, 2003). This, along with their presence in the PA, make the targeting of this species for offsetting measures in line DFO’s offsetting principles (DFO, 2019).

American eel is also a fish species of interest for offsetting measures as the species possesses strong conservation and cultural interest. The Mi’kmaq share a long cultural history with eel (*Ka’t*) dating back thousands of years, and continue to harvest eel for food, ceremonial settings, and for medicinal purposes (Davis et al., 2004). American eel is considered nationally threatened, with the reason for designation being dramatic declines over a significant portion of its distribution (COSEWIC, 2012). Mi’kmaq communities have expressed concerns regarding the decline of eel as a result of migration barriers, chemical contamination, seaweed harvesting, introduction of foreign species, loss of habitat due to deforestation, agricultural practices, decline of eelgrass, and overfishing (Prosper, 2002; Prosper and Paulette, 2003a; Davis et al., 2004).

The Shubenacadie River watershed is known to support all three species of offsetting interest. Additional species may be considered for targeting based on the results of ongoing

offsetting investigations. While offsetting approaches presented herein strongly consider benefits to salmonid species as per DFO guidance and Project location within an inner Bay of Fundy watershed, based on field assessment results, it is proposed that the species present and abundance within the ASA be a consideration during offset ratio determination.

4.3.2 Anthropogenic Disturbance

Anthropogenic disturbance poses a multitude of threats to fish habitat and its ability to support fish species. Watersheds with higher rates of anthropogenic disturbance were prioritized for review, as the potential for opportunities for restoration of degraded habitats are expanded.

The Nova Scotia Watershed Assessment Program (NSE, 2011) provides information on the current state of watersheds in the province by evaluating watershed impact indices including human land use, acidification, surface and groundwater usage, and road density.

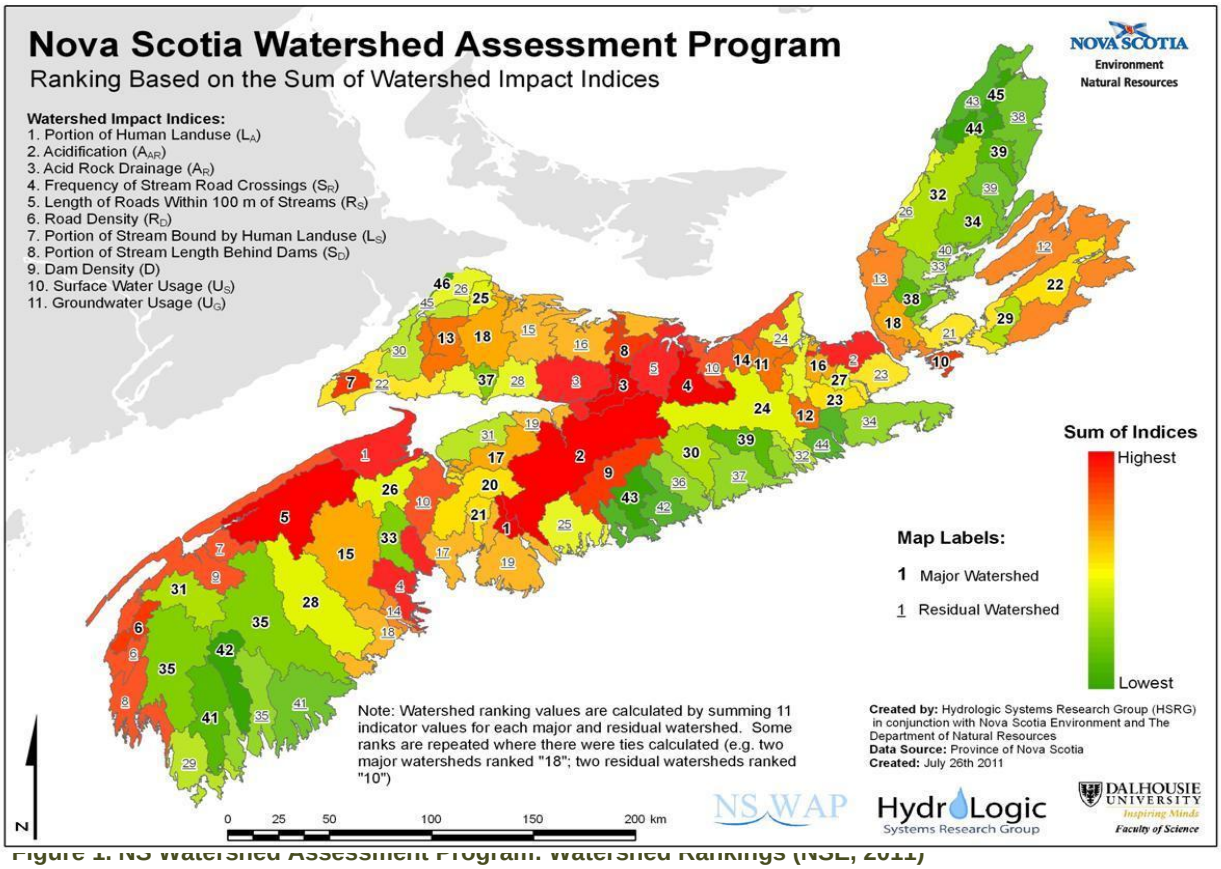

Figure 1: NS Watershed Assessment Program: Watershed Rankings (NSE, 2011)

As noted in Figure 1, watersheds concentrated along the inner Bay of Fundy are some of the highest ranking watersheds for impact in the province. In other words, these watersheds are proportionally more impacted than other watersheds in the province, which may increase

options for habitat restoration.

The Shubenacadie River secondary watershed (#2) is ranked 2nd, with dominant impact types including forestry and road density (NSE, 2011). As such, this watershed may provide ample opportunities for habitat restoration for a variety of fish species including species-at-risk.

4.3.3 Local Restoration Activity and Landowner Relations

Landowner collaboration is essential to the viability of fisheries offsetting projects. Strum has demonstrated productive, working relationships with landowners across NS through completed and ongoing wetland and fisheries offsetting projects. Strum and CertainTeed are currently working to foster these relationships as it relates specifically to the Project.

Previous restoration activity within the watershed has been conducted by the Shubenacadie Watershed Environmental Protection Society (SWEPS) in collaboration with the Nova Scotia Salmon Association (NSSA) Adopt-a-Stream Project, via the Bennery & Fish Lake Brooks Restoration Projects (NSSA Adopt A Stream, 2020).

4.4 Offsetting Options Under Consideration

Potential offsetting concepts have been developed with preliminary regulatory consultation and Mi'kmaq engagement. Preferred offsetting options will be further refined based on discussions with DFO, the Mi'kmaq of Nova Scotia, and relevant stakeholders during the planning process.

4.4.1 Instream Habitat Restoration and Enhancement

Instream habitat restoration and enhancement measures are proposed to be completed in degraded streams and rivers in inner Bay of Fundy priority watersheds. CertainTeed has retained fish habitat restoration specialists to initiate reconnaissance of stream systems to identify potential habitat improvement locations and structure/stabilization options, identification of potential feasibility constraints (i.e., access, beaver activity, or adjacent land use) and evaluate overall constructability.

In general, instream habitat restoration and enhancement measures involve the installation of instream structures to enhance and create functional fish habitat components (i.e., remedy over-widened channels through creation of gravel bars, pool creation and down-stream deposition of spawning substrate, creation of meandering channels). This will be achieved through installation of well-established and proven techniques such as digger logs, deflectors and rock sills (DFO, 2006). These structures are designed to mimic the natural ecosystem functions of large woody debris and large substrate within the channel. When properly designed and installed, the structures can:

- produce pool habitat for rest and cover
- sort spawning gravels and form of suitable salmonid spawning habitat
- narrow over-widened channels

- produce meander patterns in straightened streams

In some instances, the installation of instream structures may be accompanied by other restoration techniques such as bank stabilization, debris removal, breach repair, and culvert remediation to address additional habitat degradation issues including bank erosion, braided channels, and barriers to fish passage. Any sites that include bank or culvert works are proposed to be implemented in combination with permanent, instream structures. All structures will be designed and field-fit by experienced professionals in instream restoration techniques.

Examples of potential instream restoration structures are shown in Figures 2 – 4. Deflectors (Figure 2), rock sills (Figure 3) and digger logs (Figure 4) have been successfully used to restore fish habitat throughout Nova Scotia when they are designed and installed properly. Rock sills can be used when the instream bottom substrate is not suitable for installing diggers, which require rebar to hold the log in place.

Digger logs are typically installed as stand-alone structures in smaller streams (<10 m wide) to create pool habitat. When installed in succession and on alternating sides of the bank, straightened channels can adjust back to a stable, natural meander pattern, which is associated with improved salmonid productivity. Deflectors are installed in channels that are over-widened to concentrate flow, narrow and deepen the channel, and encourage meandering of the stream by deflecting currents toward to center of the stream.

Rock sills can be used when the instream bottom substrate is not suitable for installing diggers, which require rebar to hold the log in place. All structures encourage the scouring of pool habitat, which promotes the downstream deposition of spawning substrate and the formation of gravel bars which are critical for narrowing the channel and encouraging the establishing riparian vegetation. Typically, these structures are installed using hand tools by a restoration crew.

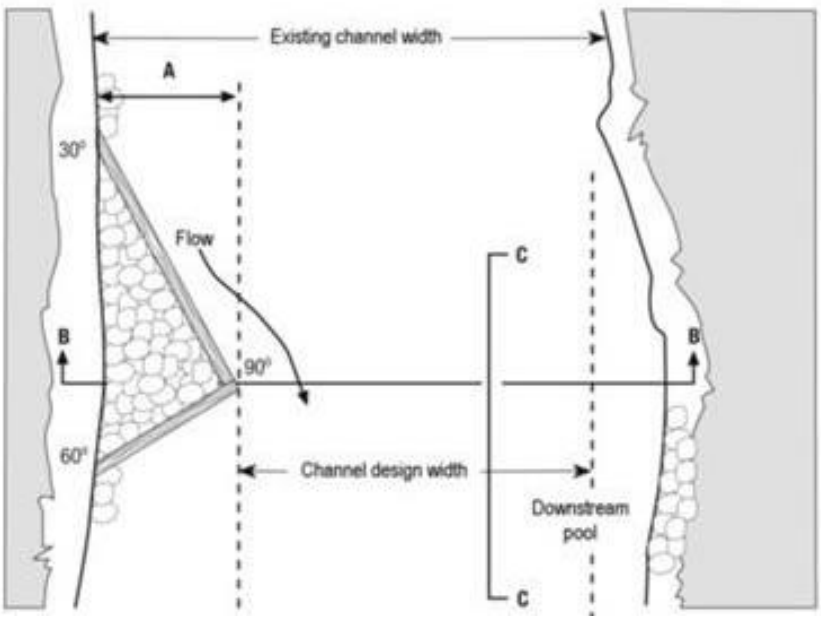

Figure 2: Conceptual design of deflector (source DFO, 2006)

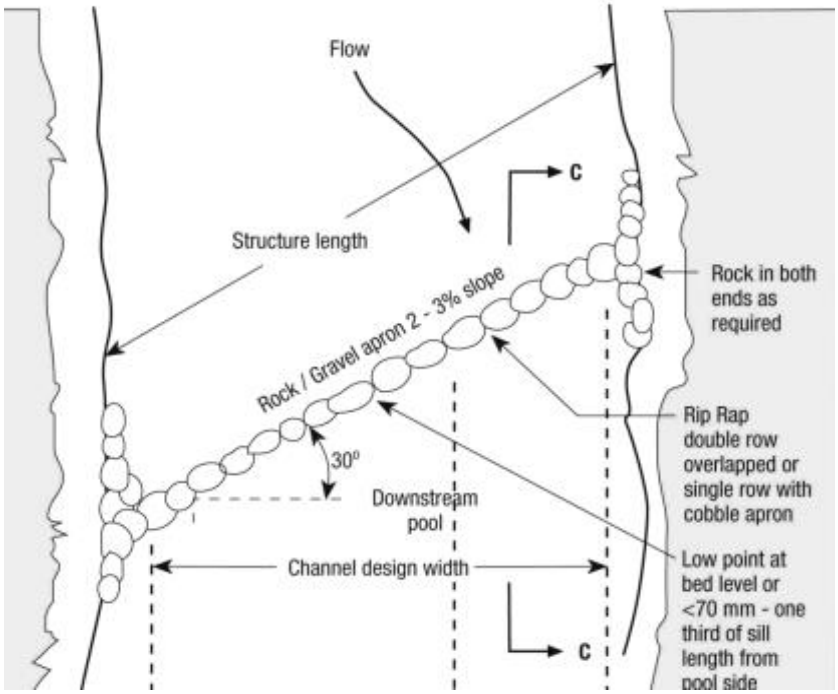

Figure 3: Conceptual design of rock sill (DFO, 2006).

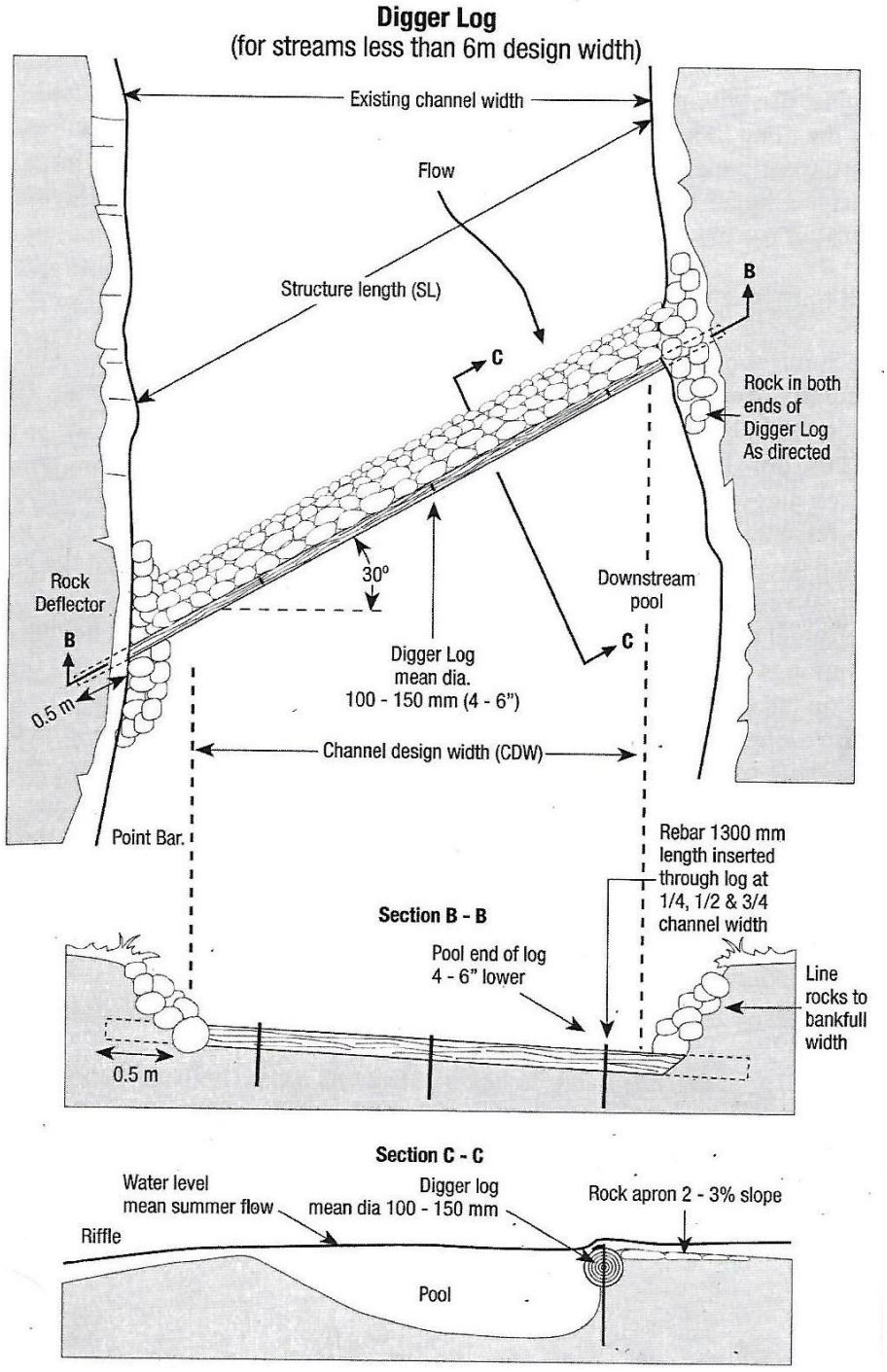

Figure 4: Conceptual design of digger log structure (DFO, 2006)

4.5 Offset Summary

The habitat characterization and HADD quantification process identified fish habitat that will be directly and indirectly impacted by the Project. As a result of Project-related impacts,

CertainTeed will be seeking to compensate for 44,583 m^2 of fish and fish habitat (proposed offset area 445.8 Habitat Units [HU]). Expected destruction of fish habitat is proposed at a standard 2:1 ratio notwithstanding the limited abundance of fish, lack of Atlantic salmon and low abundance of trout and presence of chain pickerel. The proposed offsetting ratio for predicted indirect impacts will be determined through consultation with DFO and rightsholders and stakeholders during permitting.

4.5.1 Next Steps

The proposed offsetting concepts require further engagement with the Mi'kmaq of Nova Scotia, consultation with DFO, and relevant stakeholders on preliminary options. Preferred offsetting options will be further refined based on these discussions as CertainTeed begins the detailed offset planning process. It is also possible that alternative approaches not described herein will be integrated into any Final Authorization Application (via an Offset Plan) if required.

Once preliminary options for offsetting have been selected, baseline field evaluations will commence to support detailed design and supplement existing baseline data gaps. Detailed designs of offsetting measures will be informed through ongoing engagement with the community, the Mi'kmaq of Nova Scotia, and DFO.

4.6 Implementation

Time lags between the adverse effects from Project impacts and benefits from measures to offset may contribute to loss of fish or fish habitat; therefore, it is the preferred approach that measures to offset are implemented before HADD of habitat or death of fish is realized. DFO's guidance policy on offsetting (DFO, 2019) specifies that proponents should make all reasonable efforts to avoid time lags between the adverse effects and the implementation of the measures to offset. Though exact timelines for both permitting and fisheries offsetting are unknown, the construction and establishment of the selected offset projects will be scheduled to occur prior to Project impact to the greatest extent possible. If time lags are unavoidable, the proposed offsetting concepts will include measures that account for the time delay to make up for the lost fish or fish habitat (i.e., by increasing the gain-to-loss ratio).

A monitoring program will be developed as part of detailed offsetting planning. The monitoring plan will be clearly defined at the permitting stage and included in the final offset plan and FAA. To ensure that the offsetting measures are implemented as proposed, qualified personnel will monitor construction and implementation of selected works. Monitoring will clearly be defined in the final offset plan and be reported to DFO in an "as constructed" report following the works being completed. The "as constructed" monitoring report will document the construction of the offset and works as per the approved plans, and a summary of the mitigation measures and any contingency measures implemented to prevent further impacts to fish habitat. A detailed photographic record will be taken during implementation of the plan using consistent vantage points prior to, during and post

construction.

As outlined in DFO's guidance policy (DFO, 2019), monitoring should be designed to confirm that measures to offset are effective in counterbalancing the HADD and identify corrective actions or contingency measures if deficiencies are found. The monitoring program design will integrate guidance from Smokorowski et al. (2015), reflecting the hierarchy of monitoring components for compliance, functionality, and effectiveness. It is anticipated that an adaptive management approach will be adopted to periodically identify the need for any further mitigation or compensation measures if deficiencies are detected.

5.0 CONCLUSION

The total predicted HADD to offset as a result of Project losses to fish and fish habitat is 468 habitat units of watercourse and open water features. The fish community that occupies these habitats are typical of small streams and ponds within the inner Bay of Fundy area of Nova Scotia, consisting of brook trout, American eel, and other common, small-bodied fishes.

A desktop review of potential offsetting sites resulted in multiple potential opportunities within priority watersheds and will be investigated as offset planning continues

Offsetting options were scored across multiple criteria assessing overall feasibility. Ranking was completed without input from Mi'kmaq, stakeholder, or regulatory consultation and is therefore considered preliminary, but will serve as a discussion for future engagement efforts. Additional offsetting locations or complementary measures may be identified through the completion of the desktop analysis, and future engagement with the Mi'kmaq of Nova Scotia, community groups, and landowners. Based on the nature of the habitat losses and alterations, fisheries offsetting that counterbalances Project impacts can be achieved.

6.0 STATEMENT OF QUALIFICATIONS AND LIMITATIONS

This Report (the "Report") has been prepared by Strum Consulting ("Consultant") for the benefit of Certain Teed Inc. ("Client") in accordance with the agreement between Consultant and Client, including the scope of work detailed therein (the "Agreement").

The information, data, recommendations, and conclusions contained in the Report (collectively, the "Information"):

- is subject to the scope, schedule, and other constraints and limitations in the Agreement and the qualifications contained in the Report (the "Limitations")
- represents Consultant's professional judgement in light of the Limitations and industry standards for the preparation of similar reports
- may be based on information provided to Consultant which has not been independently verified
- has not been updated since the date of issuance of the Report and its accuracy is limited to the time period and circumstances in which it was collected, processed, made or issued
- must be read as a whole and sections thereof should not be read out of such context
- was prepared for the specific purposes described in the Report and the Agreement
- in the case of subsurface, environmental, or geotechnical conditions, may be based on limited testing and on the assumption that such conditions are uniform and not variable either geographically or over time

Consultant shall be entitled to rely upon the accuracy and completeness of information that was provided and has no obligation to update such information. Consultant accepts no responsibility for any events or circumstances that may have occurred since the date on which the Report was prepared and, in the case of subsurface, environmental, or geotechnical conditions, is not responsible for any variability in such conditions, geographically or over time.

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- as required by law
- for use by governmental reviewing agencies

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This Statement of Qualifications and Limitations forms part of the Report and any use of the Report is subject to the terms hereof.

Should additional information become available, Strum requests that this information be brought to our attention immediately so that we can re-assess the conclusions presented in this report. This report was prepared by Lucas Bonner, M.Sc., Environmental Scientist, and was reviewed by Sarah Scarlett, M.Sc.,

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