Basic Impact Assessment

Parks Canada
Version IAA 2019

1. PROJECT TITLE & LOCATION

Western Brook Bridge Replacement
Gros Morne National Park, Western Newfoundland and Labrador Field Unit
Latitude: 49˚49' 45.31" N
Longitude: 57 ˚51' 18.24" W

2. PROPONENT INFORMATION

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3. PROPOSED PROJECT DATES

Planned commencement: 2022-08-01

Planned completion: 2023-12-31

4. NOTICES ON REGISTRY

Two notices must be posted on the Impact Assessment Registry of Canada (Registry) Internet site:

1) A project notice indicating the intent to make a determination regarding whether the carrying out of the project is likely to cause significant adverse environmental effects. This will include a title and a short project description to invite the public to provide comments. Comments received from the public during this period must be considered in the determination of whether the carrying out of the project is likely to cause significant adverse environmental effects.
2) A notice of determination must be posted after the determination is made, no sooner than 30 days after the day the project notice is posted. It will also indicate whether the project is on hold, was cancelled, or was determined to be likely to cause significant adverse effects and the project did not proceed.

Registry Title: Western Brook Bridge Replacement

Project notice posted on Registry: 2020-07-15

BIA sign off or any permit approvals cannot take place before: 2020-08-15
(minimum of 30 calendar days after the project notice is posted on the Registry)

5. PROJECT FILE NUMBER (Internal/Registry)

GMNP-2020-003

6. PROJECT DESCRIPTION

Project objective:

The existing bridge at Western Brook, along highway Route 430, is nearing the end of its intended life span. The existing bridge is a double span structure with concrete girders, a concrete pier at mid-span, and a concrete deck (DesignPoint Engineering, 2019). Rehabilitation is required and was the first option considered, however a cost/ life analysis determined that replacing the bridge was the best option as bridge repairs would have required an intensive, costly process that would only provide short term improvement before the inevitable replacement.

The replacement bridge will be built in the same location as the existing bridge, and will be a 54-meter single span, concrete-steel composite structure, and 11.4 meters wide. Other bridges in the park have recently been replaced using similar designs and construction techniques. The highway, from 400 meters south of the bridge to 200 meters north of the bridge, will also be upgraded with new asphalt in sections. The highway will maintain it's two lane access at 3.75 meters wide per lane, with 1.5-meter-wide shoulders on either side. The bridge and highway are designed to meet guidelines for 90 km/h speed. A temporary diversion immediately west of the bridge will be required to allow traffic to detour around the site during the demolition and construction phases. The location of the temporary diversion is adjacent to an existing parking and day-use area, and a 61-meter pre-fabricated steel panel bridge complete with removable piles and concrete abutments will be used as a temporary crossing structure (Figure 1). Asphalt will be placed along either approach, approximately 80 and 60 meters, north and south of the detour bridge, respectively.

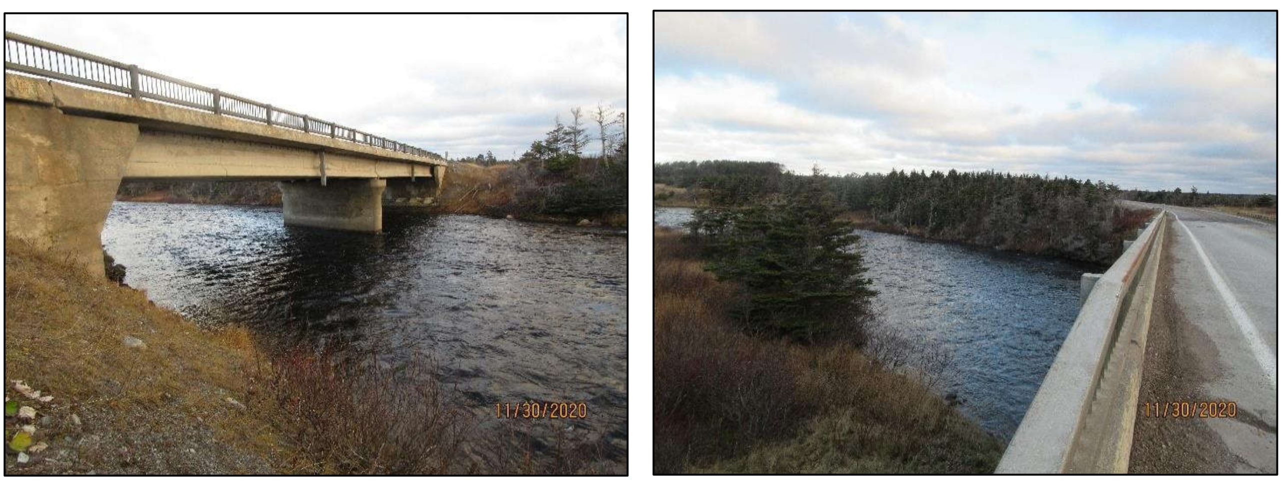

Figure 1. (Left) Existing bridge structure at Western Brook, photo taken upstream on the southern shoreline; (Right) Area west of the existing bridge where the detour structure will be constructed.

<u>Project location:</u>
Highway Route 430- Western Brook Bridge. Approximately 30 km north of Rocky Harbour and 5 km south of St. Paul's. The bridge occurs approximately 1 kilometer upstream from the river mouth as it enters into the Gulf of St. Lawrence.

The footprint size, including the area required for the detour structure, is estimated to be 16.2 hectares. There is a day-use area adjacent to the bridge, which will be used as a lay down site for the contractor. The new bridge will replace the existing structure in its current location, however some vegetation (e.g., alders and coniferous species) along the highway will be cleared to maintain a 10-20-meter distance from the highway's center line (Figure 2). The area proposed for the detour bridge will require some vegetation removal, and excavation and placement of fill material to accommodate the temporary structure (Figure 3). The southern abutment of the detour bridge will, for the most part, overlap with the limits of the day-use area, which has a landscape that is managed to facilitate visitor experience and is mowed regularly during the summer months (Figure 4).

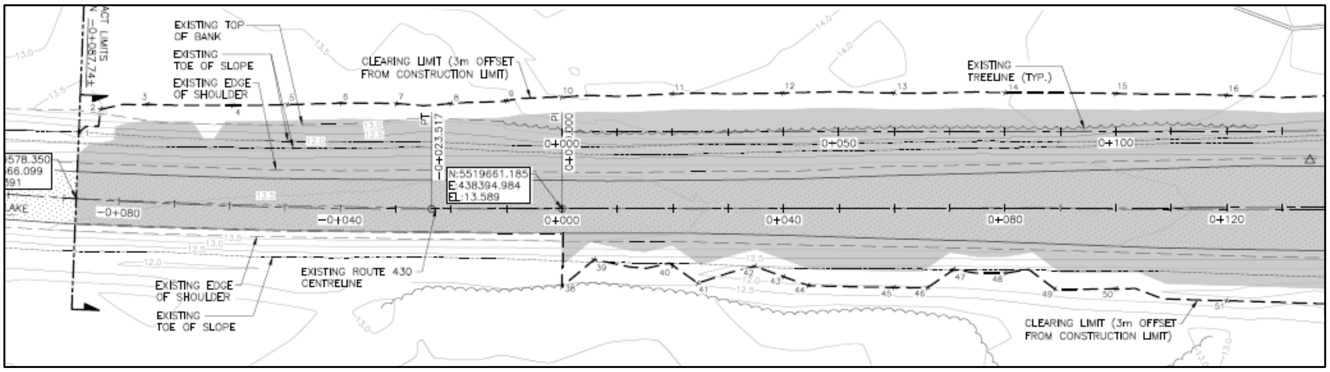

Figure 2. Construction and clearing limits south of Western Brook.

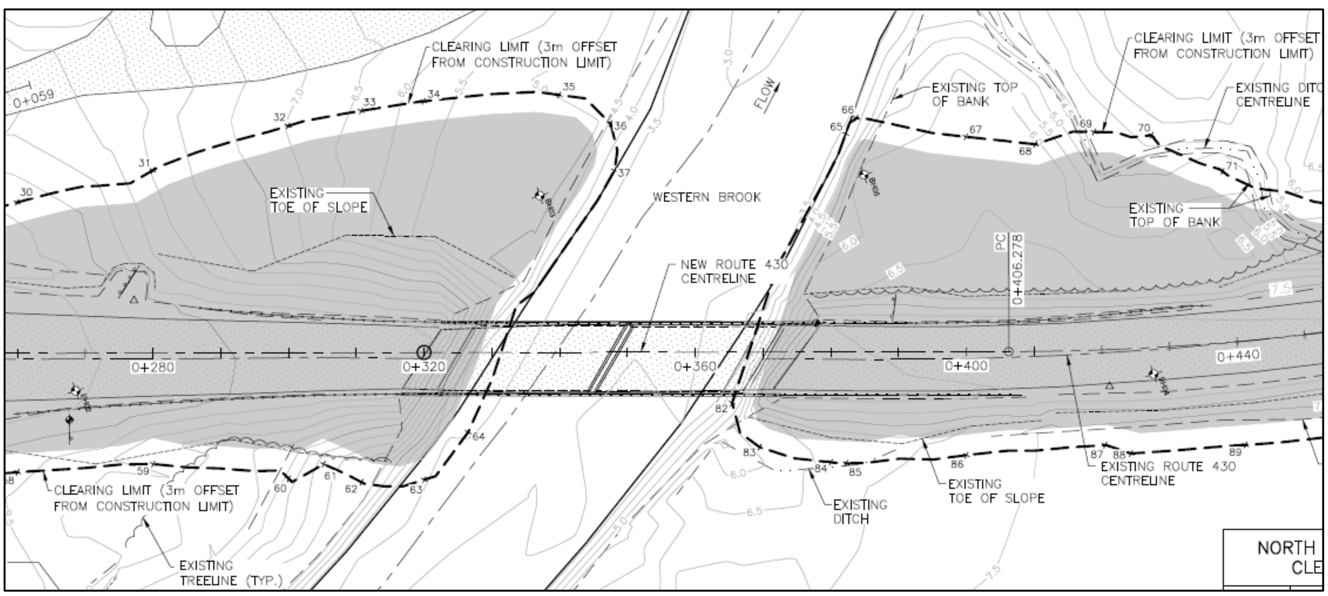

Figure 3. Clearing limits adjacent to Western Brook. The area to be cleared downstream of the bridge is for the construction of the detour bridge.

Figure 4. The area adjacent to the Western Brook day-use area and highway Route 430, downstream of Western Brook Bridge. Vegetation is characterized as riparian, consisting of alders and common grass species on the southern shoreline. Mature coniferous and a mix of common grass species occur on the northern shoreline.

<u>Project phases and activities:</u>

1. *Construction of detour bridge:*
   The diversion bridge will be constructed first, to maintain traffic flow while the bridge replacement activities are underway. The diversion structure will be constructed approximately 20 meters west of the existing bridge. The detour bridge will require some vegetation to be removed, approximately 1400m^2 on the northern bank. Some grubbing, to remove rootmat, topsoil and other soft/ loose soils, may be required prior to the placement and compaction of fill material. This material shall be stockpiled separately (topsoil and subsoils) for use during site restoration. 1500 mm rip rap will be placed along the shoreline of each abutment. Eight piles for each abutment will be driven, approximately 15 meters, until refusal by bedrock, concrete abutments will be poured, and the temporary bridge will be assembled. Both north and south approaches will be covered by asphalt. All materials associated with the detour bridge, including the piles, abutments, deck and bridge railings, will be removed once the new bridge is open for traffic. A culvert at station 0+480 will be extended at its outtake end, to maintain water flow while the detour bridge is being constructed and operational.

2. *Demolition and construction of the bridge:*
   Demolition of the existing bridge will occur when the temporary bridge is in place and traffic is diverted. Demolition may occur once approval is granted from a departmental representative. The contractor is responsible for all existing foundations to be removed to a minimum of 1000 mm below finished grade. The contractor shall provide a demolition plan and is not permitted to proceed with demolition until approval is granted from a departmental representative and

Fisheries and Oceans Canada (DFO). Construction of the new bridge can commence after the existing structure has been demolished and removed to specifications. Construction includes: excavation and placement of fill material (i.e., armour stone) to prepare the slopes, pile driving until refusal by bedrock, construction of abutments (e.g., forms, pouring concrete), placement of girders, building forms and pouring concrete for the deck, and placement of asphalt.

3. *Highway upgrades:*
   Highway upgrades along Route 430, 400 meters south and 200 meters north of the bridge, will require vegetation cleared back 5-10 meters from the road shoulder, ditching to reduce the slope along the shoulder, and asphalt replaced in places. Vegetation cleared for the purpose of this project shall be stockpiled, and either used for (a) mulch as an erosion control; (b) mulch for site restoration; or (c) Salvageable timber not used for the aforementioned options shall remain the property of the park, and will be used for park operations or distributed to local residents through Gros Morne National Park's Domestic Timber Harvest permitting system.

4. *Site rehabilitation and restoration:*
   The detour bridge and all associated components, including asphalt for the approaches, will be removed upon completion of the new bridge and when traffic is re-diverted. Landscaping is required for the entire area disturbed by the detour structure, this shall make use of stockpiled material, sourced from the original excavation of the site, or from a certified supplier free of invasives, from the gravel shoulder and ditch to the existing vegetation line.

   Equipment required for the aforementioned activities include: trailers, generators, portable washrooms, excavators, dump trucks, dozers, concrete trucks, compressors, cranes/ boom trucks, piling equipment and equipment for placing granular and laying asphalt.

Project timing:

This project is expected to be start on September 30th, 2022. The timing of project activities shall occur in accordance with the Environmental Table, that presents critical timing windows of certain natural resources (Table 1). Work occurring below the high water mark is limited to October 1 to April 30. Vegetation cutting, which requires a permit signed by the Field Unit Superintendent, may occur from August 16 to April 30.

A BIA fulfills Park's Canada's obligations under the Impact Assessment Act (2019) where adverse effects are predictable and well understood; adverse effects are confined to the project site or immediate surroundings; and mitigation measures and impact management techniques are familiar. Approximately five other bridges, with similar designs and construction methods have been replaced in Gros Morne National Park in the past 5 years. Therefore, the BIA pathway is considered appropriate since potential effects are localized, well understood, and predictable. Additionally, none of the recently replaced bridge projects generated significant public interest.

Zoning:

Parks Canada uses a zoning system to classify land and water areas according to protection needs and the opportunities they offer park visitors. These zones ensure a range of visitor opportunities are provided in areas best suited for those activities, while protecting the attributes essential to a memorable visitor experience. Zone IV, Outdoor Recreation, are areas where visitor opportunities and related services and facilities are provided in ways that place minimal impact on the ecological integrity of the park. The defining feature of this zone is direct access by motorized vehicles. Highway Route 430, Western Brook Bridge and Day-Use Area, all fall within Zone IV, therefore replacing the bridge and improving highway conditions is in line with the designated uses of this area.

7. VALUED COMPONENTS LIKELY TO BE AFFECTED

Air

In addition to ambient air quality and natural noise levels (e.g., wind, waves, and stream flow), the project area is subject to emissions and noise from highway traffic.

Soil and Landforms

The work associated with replacing the existing bridge structure will occur within the existing disturbed area of the highway Route 430 right-of-way. The construction and operation of the detour bridge will occur to the west of this right-of-way. A portion of the southern shoreline is managed as a Day-Use area, where a parking lot and mowed grass field with a shelter and bathroom facility exist, the area adjacent to the highway is considered to be saturated or water logged. The shoreline on either side of the brook is covered with layer of topsoil and rootmatting. Surficial geology mapping near the bridge indicates the principal overburden soils to consist of marine deposits of clay, silt, and gravel, on the southwest corner of the bridge, and east of the highway route 430 the surface is primarily peat and bog (Harbourside Engineering, 2020). Below the surface, conditions are characterized as silty-sand and clay. Some excavation along the shoreline may be required to place armour stone for the detour structure, shallow excavations below the ordinary high-water mark may be required (Harbourside Engineering, 2020). Further west, beyond the site limits, large sand dunes are present.

Water Quality and Aquatic Habitat

Western Brook flows from Western Brook Pond, an ultra-oligotrophic freshwater fjord, which is described to have extremely low productivity, demonstrated by the high concentration of oxygen throughout the water column (Kerekes 1994). The location of the bridge is approximately 1 kilometer from where the brook enters the Gulf of St. Lawrence and approximately 8 kilometres from the pond. Western Brook is gradually sloped, and there are a number of steadies and small ponds over the 9 kilometers it travels. The elevation of the riverbed where the highway Route 430 bridge crosses is approximately 3.3 meters above sea level (DesignPoint Engineering, 2019). There are no steadies or ponds below the work site, the last kilometer of the river as it flows into the ocean is considered the most turbulent. Dietrich (2001) reported the mean width of the brook to be 35 meters, and composed of substrate ranging from bedrock and boulders to gravel and cobble. From the bridge, the downstream reach of the river is approximately 28 meters wide with a slope of 0.4% and the upstream channel 26 meters and 0.2%, respectively (DesignPoint Engineering, 2019). Immediately adjacent to the site the stream bed is composed of medium sized stones with some cobbles and boulders (DesignPoint Engineering, 2019). Fish species that are present in Western Brook include Atlantic salmon (*Salmo salar*), Brook Trout (*Salvelinus fontinalis*), American eel (*Anguilla rostrata*) (COSEWIC Listed: Special Concern), and threespine stickleback (*Gasterosteus aculeatus*). Other species reported to occur in the system include alewife (*Alosa pseudoharengus*), rainbow smelt (Osmerus mordax), and Arctic charr (*Salvelinus alpinus*) (Dietrich, 2001). In Western Brook juvenile anadromous fish species, Atlantic salmon and Brook trout, migrate down stream to transition into the marine environment around May

15 until the end of June. Over the span of a few months to a year they will mature into adults and migrate back into the river between June 1 and September 15. American eels, which are catadromous, may have juveniles that migrate into freshwater or remain in the brackish water starting in May and continue to do so until the summer (COSEWIC, 2006). Additionally, waterfowl such as Harlequin Ducks (*Histrionicus histrionicus*) (SARA listed Special Concern) and Common Mergansers do nest along Western Brook, and forage on aquatic invertebrates within Western Brook (COSEWIC, 2013; Gerrow, 2008). Harlequin ducks are on their nests starting in mid-may until mid-June, broods appear approximately 28 days later and fledge by September (Gerrow 2008; Robertson and Goudie, 2020). Other waterbirds such as Common Loons, Common Goldeneyes, and American Black Ducks may be found in the lake or river. Invertebrate species, including molluscs and arthropods, specifically the Eastern Pearlshell (*Margitifera margitifera),* also occur in Western Brook. Potential effects are primarily limited to the freshwater environment adjacent to the work site, but could also include downstream effects in the nearshore marine environment. Water levels downstream of the bridge are affected by water levels (i.e., tides and storm surges) in the Gulf of St. Lawrence.

Flora
The area outlined within the clearing limits of the project is typified by scrub woodland/ boreal forest vegetation and riparian boreal forest vegetation, with balsam fir, alders, eastern larch, and white spruce comprising most of the forest/ scrub woodland on the northern shoreline. Riparian vegetation is characterised by alders, common grass species and other woody shrubs as well as the aforementioned tree species.

Fauna
Various terrestrial fauna typical of Newfoundland's boreal forests may be in the area, including land birds (e.g. Canada Jay, Black-capped Chickadee, Boreal Chickadee, Golden-crowned Kinglets, and various woodpeckers, sparrows, and warblers), and mammals such as moose, coyotes and snowshoe hare. An old beaver dam is presented on the drawings north east of the bridge, a site inspection was completed and identified that no beaver actively inhabits the area, however they are commonly found throughout the park. Caribou frequent bogs along the coastal plain, and are often seen along roadsides at locations near the bridge.

Species at Risk
This project requires tree clearing in the vicinity of the only site where wrinkled shingle lichen (threatened) has been observed on Newfoundland. The 2016 COSEWIC Status Report describes the observation to have occurred near the mouth of Western Brook, in a coastal wind-exposed balsam fir forest, attached to a white spruce, behind sand dunes with an elevation of 6 meters. A lichen durvey was completed in 2021 with a report provided to Parks Canada in December 2021. The sites covering the project area was surveyed and the results stated that the surveyors were confident that they did not occur in within the project area and have cleared the area with respects to SARA-listed lichens. However, if the project footprint expands then additional surveys may be required. Though some mobile species such as Little Brown Myotis (Endangered) and American marten (Threatened) may pass through the area, it is not classified as critical habitat (marten) and no species at risk have been observed on the proposed site during site visits for the assessment. Harlequin ducks (Special Concern) do nest along Western Brook, typically upstream of the bridge, but have been observed downstream in the brackish water with their young. Additionally, Piping plover (Endangered) critical habitat exists along the beach adjacent to Western Brook as it enters into the Gulf of St. Lawrence, approximately 1 kilometer from the work site.

Visitor Experience
Highway Route 430 is the only transportation corridor for vehicle traffic along the Northern Peninsula. Traffic counters placed at Cow Head, approximately 10 kilometers from Western Brook, from 2017 to 2020 captured traffic usage that ranged from 150 000 to 3500 000 in a given year. The project will cause some effect to the visitor experience by way of traffic interruptions, reduced highway speeds and a temporary closure of the Day-use area and associated facilities in the area. This will be limited to the demolition and construction phases of the project. The area will be rehabilitated by planting trees and applying erosion controls, so that visitors may be able to continue to enjoy and appreciate the park's natural and cultural heritage. Visitor access to the trailhead that leads to the beach from the parking lot may be limited and inaccessible at times, as the entrance to the parking area is within the work site outlined for this project.

Cultural Resources
The Archaeology Overview Assessment (AOA) presents the potential for impacts on the ground surface and subsurface, due to the excavation and ground disturbance required to construct the temporary bridge, remove the existing structure, construct the new bridge, and to remove the detour bridge and rehabilitate the area. The AOA (Appendix 6) states: "While most archaeological sites in Newfoundland are coastal, it is important to note that adjoining interior areas would have been utilized to access inland fish resources and caribou herds […] The project area is located approximately 43 km north of Rocky Harbour, 6 km southwest of St. Paul's and less than 2 km from Broom Point. The latter is particularly significant, as the largest Paleo-Inuit site is located on the point, as is a late 19th / early 20th century historic occupation of Broom Point associated with the cod, lobster and salmon fishery… It is conceivable that the occupants of the point would have accessed this river to fish for salmon or sea trout, but also as a route to the interior. Construction of the temporary detour bridge and roadway may have the greatest potential impact on cultural resources, as this activity will impact areas that have not been previously disturbed or tested archaeologically. These areas specifically include the flat/ gently sloped areas to the west of the bridge and existing highway."

Outstanding Universal Value (OUV)
In 1987 Gros Morne National Park was inscribed on the World Heritage List under natural world heritage criteria vii and viii. Sites that are included on the World Heritage List are considered to be of outstanding interest on a global scale and therefore need to be conserved as part of the heritage of humanity as a whole.

- GMNP Criterion vii – *Gros Morne National Park, an outstanding wilderness environment of spectacular landlocked, freshwater fjords and glacier-scoured headlands in an ocean setting, is an area of exceptional natural beauty*. The interpreted OUV components resulting from designation under Criterion VII are scenic value linked to landlocked freshwater fiords and glacier-scoured headlands, as well as the wilderness environment.
- GMNP Criterion viii - *The rocks of Gros Morne National Park collectively present an internationally significant illustration of the process of continental drift along the eastern coast of North America and contribute greatly to the body of knowledge and understanding of plate tectonics and the geological evolution of ancient mountain belts. In glacier-scoured highlands and spectacular fjords, glaciation has made visible the park's many geological*

features. The interpreted OUV components resulting from designation under Criterion VIII are geological elements in GMNP, and the geological processes illustrated by these elements.

8. EFFECTS ANALYSIS

Air

- Construction activities will often lead to an increase in noise and vehicle emissions.
- Dust may come from disturbance of soils or transportation of soil/ rock material. However, this is considered to be of low potential due to the saturation of soil material and the requirement of placing clean fill/ stone materials, free of fines. Dust may also occur at above normal concentrations where vehicles and machinery operate on dry soils.
- Air quality may also diminish when asphalt is being placed during the final stages of the project, however this will be temporary, approximately 600 meters of highway requires paving.

Soil and Landforms

- Excavation of undisturbed soils will be minimal however soil disturbance due to construction activity could destabilise soils, increasing the risk of erosion, though the potential for erosion is limited due to the site's level or gently sloping terrain;
- The use of heavy equipment and placement of temporary fill can cause soil compaction and rutting, and effect soil drainage patterns;
- Loss of topsoil and exposure of subsoil;
- Soil contamination from wastes, equipment leaks, or accidental spills (e.g., fuels, hydraulic lines).

Water Quality and Aquatic Habitat

- Accidental leaks or spills from the operation and/ or storage of equipment, heavy machinery and associated materials (e.g., fuels, concrete, etc.) could significantly impact water quality in Western Brook and the near shore marine environment, and could impact the health and survival of fish and other aquatic organisms in the freshwater and marine ecosystems downstream from the construction site;
- Disturbance of the stream bed; removal of riparian and upland vegetation; stripping, handling and transport of soils and aggregate material, could lead to sedimentation and increased turbidity in Western Brook and the near shore marine environment, which could impact the health and survival of fish and other aquatic organisms in the freshwater and marine ecosystems downstream from the construction site;
- Debris from construction and bridge demolition may result in deleterious material entering the estuary thereby affecting water quality and aquatic organisms;
- Construction activities causing disturbance to migratory behaviours or critical life stages of aquatic organisms;
- Using Fisheries and Oceans Canada's (DFO) Fish and Fish Habitat Protection Program's (FFHPP) mapping decision tool, it was determined that this project should be reviewed by this department;
    - DFO's Measures to Protect Fish and Fish Habitat were reviewed and do apply to the construction of the bridge and the detour structure. However, the process to demolish the bridge will likely require the placement of temporary fill and/ or works and activities below the high water mark which may potentially impact fish and fish habitat. Therefore, the measures do not apply and the project shall be reviewed by DFO officials.

Flora

- Introduction of invasive species, or expansion of existing populations (e.g., coltsfoot);
- Damage to and disturbance of adjacent natural areas, root exposure and physiological distress;

- Vegetation (riparian and forest) removal is required for the detour bridge and highway upgrades/ traffic sightlines, but restoration specifications include planting of balsam fir, tamarack and white birch species adjacent to the day-use-area to naturalize the disturbed area;

Fauna (including migratory birds)

- Wildlife sensory disturbance causing displacement/habitat avoidance, disrupt feeding and breeding/ nesting activity of wildlife in the area during critical life stages;
- Wildlife habituation/attraction to artificial food sources;
- Impeded/altered wildlife movement;
- Potential safety hazard for wildlife;
- Habitat destruction or alteration;
- Injury or mortality from project activities;
- Accidental fuel or oil spills from construction equipment may negatively affect wildlife and habitat quality through contamination of vegetation or water sources used by wildlife.

Species at Risk

- The project area does not intersect species at risk critical habitat. However, project activities could disturb, damage, or destroy habitat components or food sources considered necessary for species at risk (e.g., migratory birds, bats, American marten, lichens).
- Critical timing windows outline when certain construction activities shall not occur.
- Prior to the commencement of construction, a lichen survey was completed by Miawpukek First Nation Natural Resource Technicians.

Cultural Resources

- Impacts to archaeological resources (known or potential) from displacement or destruction, resulting in loss of heritage value. The AOA summarizes the area's potential for cultural and archaeological resources (Appendix 6). The area within the construction limits of the detour bridge are considered to be of moderate archaeological potential, thus requiring further archaeological investigations in the form of an Archaeological Impact Assessment. The actual construction of the new bridge and highway upgrades, which will occur within previously disturbed areas, are considered to have minimal impact on cultural resources and rated to be of low archaeological potential.
- An Archaeological Impact Assessment (AIA) was undertaken in 2021 to determine the archaeological potential of the detour bridge and related areas. Three areas were determined to be of low archaeological potential with cultural material found to the northeast of the current bridge.

  "The 2021 AIA draft Final Report interpreted the site as possibly isolated or possibly pertaining to a larger pre-contact site elsewhere in the vicinity. A general survey conducted by the Principal Investigator (PI) in 2021 noted two nearby areas of high archaeological potential to the west and these were referred to in the draft Final Report as a "Forested Knoll" and "Level Terrace"." Recommendations from the 2021 AIA indicated little to be gained from further testing or monitoring, and that a controlled excavation of the archaeological site may need to be considered. In addition, it was also recommended that the Forested Knoll and Level Terrace be identified and managed as areas of high archaeological potential" (Stantec 2022:2).

  Controlled Excavations and systematic testing of the knoll and terrace area were undertaken in the summer of 2022. "Archaeological excavation of the pre-contact site, Operation 583A1, yielded meagre results in terms of the recovery of additional archaeological resources. No features or deposits of archaeological significance were encountered and the limited lithic debitage that was collected represents a continuation of those initial resources recovered from the previous year… Due to the limited and generic nature of the archaeological material and data recovered, cultural affiliation of the archaeological site cannot be determined." Systematic testing suggests an "isolated and transitory tool sharpening activity area, as opposed to being considered an outlier of another pre-contact site in the vicinity of the project area" (Stantec 2022:9).

Visitor Experience

- Visitors are likely to experience reduced travel speeds, traffic delays, and diversions from the existing highway during bridge demolition and construction;
- Reduced quality of visitor experience due to noise and presence of construction equipment;
- Temporary closures to the day-use-area and parking lot, and limited access to the trail that travels to the beach area at the mouth of Western Brook, can be expected at various stages of the work.

9. MITIGATION MEASURES

General Mitigations

1) The contractor will prepare an Environmental Protection Plan (EPP) in accordance with Parks Canada Environmental Procedures, a minimum of 7 business days before the start of construction. This EPP should address all mitigations listed here, and prior to work beginning the EPP must be approved by Parks Canada. Note that though this Basic Impact Analysis (BIA) specifies that the contractor must prepare an Environmental Protection Plan, if these two documents are not consistent the most rigorous with regard to environmental stewardship shall be followed. The EPP will include, but not be limited to:
    a. A Work Area Plan showing proposed activity in each portion of area and including details on how the work limits will be marked and procedures to keep operations within the clearing boundaries to minimize damage to adjacent vegetation and soils. **Consultation with Parks Canada staff will be required before establishing refueling.**
    b. An overall site Erosion and Sedimentation Control (ESC) Plan which outlines areas where erosion and sedimentation are likely to occur and the means by which the Contractor proposes to prevent or control these issues. In addition, a localised ESC plan which directs specific mitigation for in-water work is required for culvert installations and any in-water work in Western Brook (e.g. installation of bridge abutments or armour stone). Erosion and sediment control measures must be maintained until all disturbed ground has been permanently stabilized or suspended sediment has resettled to the bed of the waterbody. The plan must include:
        i. Installation of effective erosion and sediment control measures before starting work to prevent sediment from entering the water body;
        ii. In-water work areas must be isolated using temporary cofferdams and in-stream work done in the dry;

iii. Measures for containing and stabilizing material (e.g. stockpiled topsoil, stockpiled riprap) above the high water mark of nearby waterbodies to prevent re-entry;
iv. Regular inspection and maintenance of erosion and sediment control measures and structures during the course of construction;
v. Repairs to erosion and sediment control measures and structures if damage occurs;
vi. Removal of non-biodegradable erosion and sediment control materials once site is stabilized.

2) A Hazardous Materials and Spill Contingency Plan (HMSCP) that details the containment and storage, handling, use, and disposal of empty containers, surplus fuels, or other hydrocarbon products to the satisfaction of the Parks Canada and in accordance with all applicable federal and provincial legislation. The HMSCP will include a list of products and materials to be used or brought on site that are considered or defined as hazardous or toxic to the environment. Such products may include, but are not limited to, fuels, lubricants, sealants and cement based products. The Safety Data Sheets (SDS) for all chemicals used will be made available onsite. Appropriately sized and stocked spill kits will be on site and capable of handling 125% of the largest potential spill. All contractor's staff will be made aware of their location(s) on site and will be trained on spill response procedures. **Given the site proximity of the laydown site to water, additional protection measures maybe require around re-fueling.**
3) A waste management plan (including industrial waste, domestic waste, and human waste), which among other things identifies methods and locations for solid waste disposal.
4) Waste Water Management Plan identifying methods and procedures for management and/or discharge of waste waters which are directly derived from construction activities, such as clean-up water, dewatering of ground water, disinfection water, and hydrostatic test water.
5) Prior to starting work all personnel working on site will be required to attend an environmental briefing led by Parks Canada's Environmental Protection Officer to review the mitigation measures required by Parks Canada and highlighted within this Basic Impact Analysis. Contacts for Parks Canada include:

   Holly Lightfoot, A/Park Ecologist, Parks Canada, Rocky Harbour, NL. Email: holly.lightfoot@pc.gc.ca Phone: 709-458-8492
6) Inform Parks Canada's Impact Assessment Officer of any changes to the project plan and/or scheduling.
7) Work will be conducted in a manner that minimizes impacts to existing landscaped and natural areas. Keep disturbance footprint within the limits of the tender drawings and equipment staging areas shall be limited to existing hardened areas.
8) Clearing of vegetation requires a Restricted Activity Permit from Gros Morne National Park. This shall be obtained prior to any cutting and can be done so through communication with Park's Canada's Impact Assessment Officer.
9) This region has frequent extreme weather events with high winds and heavy precipitation. Certain operations such as excavation exposing soil, replacement of culverts, or the application of asphalt, may pose an environmental risk if carried out during extreme wind or rain events. As a result, work shall be scheduled around adverse weather events.
10) Salvageable timber will be piled on site or at an alternate, location identified by Parks Canada, so that, following the completion of this project, it can be scaled by Parks Canada staff and used either to support park operations or distributed to local residents under Gros Morne National Park Domestic Timber Harvest permitting system.

Equipment

11) Prior to arrival on site equipment must be properly tuned, cleaned and free of contaminants, in good operating order, free of leaks (e.g., fuel, hydraulic fluid, coolant, oil or grease), and fitted with standard air emission control devices, spill pans, and spark arrestors. Equipment must also be free of invasive species, plant seeds (e.g., noxious weeds), and soils.
12) Project staff must inspect equipment daily for fuel, hydraulic fluid, and other leaks, and for structural integrity, and inspections will be recorded. This documentation is required to be kept open to site audit. Detected leaks will be addressed immediately.
13) Equipment maintenance (e.g., oil changes, etc.) is not permitted within Park boundaries.
14) Equipment operators must be fully trained and experienced.
15) Fuelling heavy equipment shall be carried out on a level impermeable roadside surface or at a pre-determined location in the staging area with spill catchment countermeasures in place. Fuelling sites should not drain towards water bodies or wetlands.
16) Fuelling of small engines (e.g., generators, chainsaws) will not be permitted within 30 meters of open water and portable containment pads must be used to prevent ground contact by accidental fuel spills.
17) Storage and movements of heavy equipment and workers' private vehicles shall be restricted to the 'footprint' of the construction and staging area only. Staging area layout shall be established in consultation with Parks Canada including the location of appropriate parking and fuelling locations.
18) To prevent materials (e.g., soil, rock, construction material, etc.) from escaping dump trucks, loads must not exceed the safe transport capacity specified by the Department of Transportation. Dump trucks must use appropriate covers when necessary (i.e., when transporting topsoil and subsoils for stockpiling).
19) Ensure careful machine operation to prevent damage to surrounding vegetation and soil disturbance. To prevent this, equipment must remain on existing right of ways wherever possible and, where this is not possible make use of rig mats or swamp mats wherever warranted.
20) Operate machinery on land above the high water mark. No stream fording will be permitted.

Hazardous materials and contaminants

21) As part of the Environmental Protection Plan, the Contractor must submit and then comply with a Hazardous Materials Management and Spill Contingency Plan (see EPP, above).
22) **Storage of large amounts of fuel (more than 200 L) is not permitted in the Park.**
23) Handle and store hazardous materials as per applicable federal legislation/regulations. The contractor must have all relevant and current Safety Data Sheets available onsite.
24) Hazardous or toxic products (e.g., fuels, lubricants, paint, sealants, etc.) must be (i) securely stored, (ii) **storage locations must be pre-approved by Parks Canada**, and (iii) shall not be disposed of in the national park.
25) Fuels, gases, or other deleterious substances will be contained within the appropriate and approved containers, and tanks, hoses and connections will be inspected prior to use.
26) Secondary containment and spill kits must be available on site during all periods of work. These must be able to handle 110% of the largest potential spill, and workers must be trained in their use and aware of their location. Spill containment may require a cover or lid or be regularly checked

for accumulated water, as the region is prone to high precipitation which could reduce the 110% capture capacity if the container collects water.

27) **Due to the proximity of the site to a water body, in-water spill kits (i.e. containing absorbent containment booms, etc.) and staff trained to respond to in-water spills and experienced in their use must be on site at all times.**
28) Following the cleanup of any spill larger than 5 liters the spill site will be inspected to ensure there is complete containment and disposal to the satisfaction of Parks Canada.
29) If potentially hazardous materials (e.g. cement-based products, sealants or paints) are used on site ensure raw material, mixed compounds and wash water are not released to any watercourse or soils.
30) Drip trays and/ or berms made of piled sand bags, lined with occlusive material such as plastic and a layer of sand, shall be built similar to the specifications listed below and presented in Appendix 3, to collect excess concrete or waste water.
    a. This temporary isolated area shall be 30 meters from any watercourse.
    b. An enclosed area of the appropriate size (approximately 4 feet long x 2 feet wide and deep), shall be constructed by creating a berm with sand bags or other materials, surrounded by an impermeable layer. It shall be maintained to provide a holding capacity with a minimum freeboard of 100 mm (4 inches).
    c. The impermeable layer shall be a minimum of 10-mil polyethylene sheeting, and shall be free of holes, tears or other defects that compromise the impermeability of the material.
    d. This enclosed area will be the designated wash out and/ or collection area for excess concrete.
    e. Once concrete wastes are washed into the designated area and allowed to harden, the concrete shall be removed and disposed of to the appropriate waste facility.
31) Rolling concrete mixers with surplus concrete in amounts less than one cubic metre of wet concrete may waste this concrete in the grade right-of-way as directed by the Parks Canada Representative in areas that drain well away from watercourses. Surplus amounts in excess of one cubic metre are to be returned to the batching yard.

Waste

32) Clean tools and equipment off-site to prevent the release of wash water that may contain deleterious substances.
33) Burning of any vegetation or worksite materials is prohibited in the park.
34) Sanitary facilities, such as a portable container toilet, shall be provided at the work site, maintained in good working order, and emptied outside the park at an approved waste treatment facility. Portable sanitary facilities shall be situated/ anchored to prevent being upended by winds, thereby preventing waste contaminating the environment.
35) To prevent habituation of wildlife, human wildlife conflict, and risk of wildlife being struck by vehicles, garbage that includes food waste or other wildlife attractants must be securely stored so that it is not accessible to wildlife, and should be disposed of daily.
36) Waste containers will have lids, be wildlife proof if there are attractants, and waste loads shall be covered while being transported. Waste shall be disposed of outside of the park at the appropriate waste management facility when the container is 90% full.

Grading, Asphalt Handling and Paving

37) An asphalt plant is not permitted to be set up in the park.
38) Where possible within engineering constraints, milled asphalt materials should be recycled to reduce the need for new gravel.
39) If gravel is obtained from a borrow pit within the park, the following specifications apply:
    a. Gravel will not be crushed within 30 meters of any water body;
    b. If gravel requires cleaning by water extracted from a watercourse within the park, a permit to do so is required and mitigations listed under *Water Quality and Aquatic Habitat* apply*;*
    c. The water used for washing will not return directly to any water course. Water free of contaminants will be discharged into the ground where further erosion and runoff into surface water is prevented. Contaminated waste water will be transported outside the park to an approved facility.
40) If gravel is sourced from outside the park, ensure gravel or road bed material is free of weeds and comes from an approved operational gravel source free of other contaminates.
41) Asphalt works are preferably undertaken during periods of dry weather as this allows easier control of contaminated runoff and sediment.
42) If the work schedule requires working in the rain, the area of work must be isolated and appropriate sediment controls must be installed to prevent the release of sediment-laden water or any other deleterious substances into surface waters, particularly for surface repair works requiring the application of patching and sealing compounds, tar, asphalt, and chemical surface sealants.
43) During grade construction conducted close to any watercourse, water body, or wetland ensure materials are not pushed, fall or are eroded into the water or wetlands.
44) Retain a 30 metre vegetated buffer around water bodies or install runoff/ sedimentation management structures.
45) Spoil piles and stock piles will be at least 30 meters from the edge of any water body.

Decommissioning of old bridge

46) When infilling to allow excavator access to remove the center pier place clean ground protection mats on river bed before placing clean rock fill.

<u>Additional Mitigations specific to the Valued Components:</u>

Soil and Landforms

47) Do not travel or operate equipment outside of designated areas as outlined in project drawings.
48) Erosion control measures shall be implemented if required to prevent sediment transport into any waterway, water body or wetland. Measures include the dispersal of vegetation cut for the purpose of the detour structure (e.g., branches, tree trunks, or wood chips), or erosion control fabric that is certified to reduce potential wildlife entanglement and 100% biodegradable. If erosion control fabric is applied it shall be installed based on the specifications presented in Appendix 2, Figure 9.
49) Use of hay or straw for erosion and sediment control is not permitted.
50) Sediment controls shall be implemented where erosion controls have not been completely effective and/ or where soils have been mobilized by erosion. A sediment fence can be applied, and shall be installed based on the specifications presented in Appendix 2, Figure 10 and 11. Rock check dams may be applied, based on the Newfoundland and Labrador Transportation and Works Check Dam specifications.

51) Maintain effective erosion and sediment control measures until any required re-vegetation of disturbed areas is achieved, then remove temporary erosion and sediment control products, especially non-biodegradable materials, when they are no longer required.
52) Topsoil (top 20 cm of soil material) shall be excavated and stockpiled separated from sub soil material, in a two lift process.
    a. Stockpiles shall be no taller than 2 meters in height;
    b. There shall be at least 1 meter between stockpiles of topsoil and subsoil;
    c. If topsoil is stockpiled for greater than 4 months it shall either be: (i) seeded with native seed or, (ii) covered with a geotextile/ landscape fabric, to prevent weed growth and erosion.
    d. Stockpiles shall be stored more than 30 meters from water and in an area protected from wind erosion;
    e. Location must be pre-approved by Parks Canada;
    f. All material shall maintain all organic matter. When replacing soils, reserve clumps, rocks, twigs, etc., do not screen salvaged soil. Retain root balls and larger debris along the edge of the right-of-way, to provide additional habitat diversity.

Water Quality and Aquatic Habitat

53) Construction equipment is not permitted to operate in water.
54) Waterway beds are not to be used for borrow material.
55) In-water work is not permitted during the critical timing window of May 1 to September 30 (Table 1).
56) If in-water work is required temporary cofferdams (or Aqua Dams) or an approved method to isolate the site must be in place before any in-water work can take place. De-watering will be necessary to prevent suspended sediments, construction debris and other foreign materials from entering the stream (e.g., during installation or modification of a culvert). A site specific plan that includes details on how and/or where the water will be diverted or discharged is required prior to the completion of work.
57) Where dewatering, withdraw, and/ or diversion of a stream or waterbody is required, a specific plan for this activity and location shall be addressed in the Work Plan (see mitigation 1(a))
58) Where dewatering of fish-bearing waters is necessary to isolate a work area for culvert installation or extension (see drawing C01 station 0+480), or for water withdraw, the following conditions for the pump screen, as per DFO's Interim code of practice: End-of-pipe fish protection screens for small water intakes in freshwater (https://www.dfo-mpo.gc.ca/pnw-ppe/codes/screen-ecran-eng.html), which applies to intake velocities of up to 150 L/ second, shall be applied to prevent entrainment or impingement of fish:
    a. Locate screen in areas and depths of water with low concentrations of fish, and away from natural or artificial structures that may attract fish.
    b. Orient the screen face in the same direction as the flow of water.
    c. Ensure openings in the guides and seals are less than the opening criteria to make "fish tight".
    d. Screens should be located a minimum of 300 mm (12 in.) above the bottom of the watercourse to prevent entrainment of sediment and aquatic organisms associated with the bottom area.
    e. The maximum opening design shall not exceed 2.54 mm (0.1 inches).

f. Provide structural support to the screen panels to prevent sagging and collapse of the screen. Large cylindrical and box type screens should have a manifold installed to ensure even water velocity distribution across the screen surface. The end of the structure should be made of solid materials and the end of the manifold capped.
g. Heavier cages or trash racks can be fabricated out of bar or grating to protect the finer fish screen, especially where debris loading (woody material, leaves, algae mats, etc.) is a concern. A 150 mm (6 in.) spacing between bars is typical.
h. Provision must be made for the removal, inspection, and cleaning of screens.
i. Ensure regular maintenance and repair of cleaning apparatus, seals, and screens to prevent debris fouling and impingement of fish.
j. Pumps must be shut down when fish screens are removed for inspection and cleaning.

59) A fish exclusion or salvage is required where site isolation or stream diversion is necessary. Fish shall be salvaged by a qualified aquatics professional from within the exclusion area.
60) Noise-generating construction activities (e.g. jack hammering, bulldozing etc.) should be scheduled during daylight hours (i.e. 0700h and 1900h) to avoid peak periods of daily migration of Atlantic Salmon between May 1 and September 30th
61) Maintenance and/ or replacement of culverts requiring instream work shall be completed during periods of low flow. Schedule work to avoid wet, windy and rainy periods that may increase erosion and sedimentation.
62) Armour stone or rip-rap material placed adjacent to the stream shall be clean and free of fines.
63) All construction materials must be securely contained at the work site and kept from entering waterbodies.
64) **If a chainsaw is required for vegetation cutting, regular chainsaw bar lubricant shall be replaced with BioLube or a similar non-toxic, vegetable-based chain oil.**
65) Do not clean or drain equipment in waterways. All equipment cleaning and maintenance shall occur outside park boundaries.
66) Ensure that all in-water activities, or associated in-water structures, do not interfere with fish passage, cause excessive constriction of channel width, reduce flows, or result in the stranding or death of fish.
67) Consider potential use of bubble curtains during in-water works and hammering activities.
68) Maintain complete isolation of all cast-in-place concrete and grouting from fish-bearing waters for a minimum of 48 hours if ambient air temperature is above 0 °C and for a minimum of 72 hours if ambient air temperature is below 0 °C or until significantly cured to allow the pH to reach neutral levels.

Table 1: Environmental Timing Windows Table

<table>
<tr><th></th><th>Jan</th><th>Feb</th><th>Mar</th><th>Apr</th><th>May</th><th>Jun</th><th>Jul</th><th>Aug</th><th>Sep</th><th>Oct</th><th>Nov</th><th>Dec</th></tr>
<tr><td>**Fish[1] (Estuaries and Main Stems)**</td><td colspan="4">Reduced risk for work in estuaries and main stems.</td><td colspan="5">Avoid in-water work (e.g., placing temporary or permanent fill): Estuaries and Main Stem May 1 to September 30</td><td colspan="3">Reduced risk for work in estuaries and main stems</td></tr>
<tr><td>**Fish (Tributaries and Headwaters)**</td><td colspan="5">Avoid in-water work (e.g., placing temporary or permanent fill) Tributaries and headwaters. October 1 to May 31</td><td colspan="4">Reduced risk window for work in tributaries and headwaters.</td><td colspan="3">Avoid in-water work (e.g., placing temporary or permanent fill): Tributaries and headwaters. October 1 to May 31</td></tr>
<tr><td>**Birds[2]**</td><td colspan="5">Reduced risk for harm to birds.</td><td colspan="3">Avoid Vegetation clearing during the bird nesting period: May 15 to August 15.</td><td colspan="4">Reduced risk for harm to birds</td></tr>
<tr><td>**Bats (SAR: Little Brown Myotis and Northern Myotis)**</td><td colspan="3">Bats in Hibernacula.</td><td colspan="5">Avoid work that could disturb bat roosts or maternal colonies (e.g., felling of snags): April 15 to August 31.</td><td colspan="4">Reduced risk for harm to bats.</td></tr>
<tr><td>**American marten, Newfoundland population[3]**</td><td colspan="3">Reduced risk for harm to marten.</td><td colspan="3">Avoid disturbing potential den sites during marten natal and maternal denning period: April 1 to June 30.</td><td colspan="6">Reduced risk for harm to marten.</td></tr>
</table>

[1] This timing window includes the breeding period for Harlequin Duck (listed as Special Concern un SARA).
[2] This timing window includes the breeding period for Olive-sided Flycatcher and Red Crossbill, for which SARA protections apply, as well as Rusty Blackbird, Evening Grosbeak, and Short-eared owl (listed as Special Concern under SARA).
[3] Marten den sites are described as rock piles, squirrel middens, fallen logs, openings at bases of trees, cavities in snags and woodpecker holes.

Fauna

69) Vehicles associated with this project and travelling on public roads must respect posted speed limits and yield to wildlife.
70) The contractor(s) must immediately report to Parks Canada any wildlife discovered nesting, roosting, or denning on or near the worksite. If an active wildlife nest, roost, or den is found, the vegetated area will be left intact and a suitable sized buffer of shrubs/trees around it will be clearly marked until the nest, roost, or den is no longer in use. The appropriate size of buffer is species dependent, and will be determined in consultation with Parks Canada's Resource Conservation section.
71) To prevent incidental destruction of bird nests and nestlings, all vegetation cutting and grubbing must be completed either before or after the primary songbird nesting season. Therefore, this work must not occur between May 15 and after August 15.
72) To prevent habituation of wildlife, human-wildlife conflict, and risk of wildlife being struck by vehicles, feeding of wildlife is strictly prohibited and all potential wildlife attractants, including gasoline, garbage, and food, must be securely stored so that they are not accessible to wildlife. Particular vigilance is required when workers are leaving at the end of the work day so that attractants are not accessible outside working hours and during days of rest.

73) The contractor(s) must immediately report to Parks Canada any instances of potential problem wildlife (e.g., foxes, coyotes, bears, caribou) becoming habituated to people in the vicinity of the worksite. A written record of any problem wildlife encounter must be submitted to the Parks Canada Environmental Protection Officer within 24 hours of the incident.
74) If wildlife is observed during work, give animals the opportunity to leave the work area and go into the surrounding forest or elsewhere to seek new shelter, etc.

Flora

75) Vegetation cutting will be limited to drawing specifications (see Harbourside Engineering, 2019). If salvageable timber is cut it shall remain the property of Parks Canada and shall be piled in a location directed by a Parks Canada representative.
76) Vegetation clearing must be minimized and wherever possible roots shall be left in the ground during vegetation clearing in order to protect soils and prevent erosion and sedimentation.
77) Limbs and branches, and unsalvageable timber shall be (i) dispersed naturally throughout the surrounding landscape, or (ii) use or chipped in areas that require protection from erosion.

Species at Risk

78) While the project area has been cleared with respects to SARA-listed lichens, if the project footprint expands then additional surveys may be required. Please notify Parks Canada of any expansions of footprint immediately.

Cultural Resources

79) If the scope of work changes, the project team will provide updates/new information and the appropriate documentation describing the change(s) so that a follow-up CRM analysis can be completed.
80) If needed, the Terrestrial Archaeologist and the CRM advisors (and other expertise) will continue to be involved in the project's next phases.
81) An Archaeological Impact Assessment (AIA) was conducted for the following four (4) areas, (See the AOA for more details - Appendix 6).
    a. Flat / gently sloped area to the north west of the existing bridge and west of the existing highway. The area to the north of the bridge measures approximately 23m x 67m and extends from the toe of the existing slope westward to the existing ditch. This general area is of moderate archaeological potential and should be subject to archaeological survey and test pitting, as needed.
    b. Flat / gently sloped area to the south west of the existing bridge and west of existing highway. This approximately 21m x 100m area is bound by the Western Brook to the north, the toe of the existing highway slope to the east, the parking lot access road to the south and, and the eastern extent of the clearing limits to the west, 90m east of the existing parking lot. This general area is of moderate archaeological potential and should be subject to archaeological survey and test pitting, as needed.
    c. Located to the north of the bridge, this 7m x 96m corridor is bound by the toe of the existing highway slope to the east and the proposed clearing limits to the west. While this area is of low archaeological potential, survey is required to determine whether or not test pitting is required.

   d. Located to the south of the bridge and parking lot, this 10m x 300m corridor is bound by the toe of the existing highway slope to the east and the proposed clearing limits to the west. While this area is of low archaeological potential, survey is required to determine whether or not test pitting is required.

82) Archaeological Impact Assessments (AIA) work were undertaken in 2021 and 2022 by a qualified archaeologist with an approved Research and Collections Permit issued by the FU coordinator and in consultation with the Parks Canada Terrestrial Archaeologist.

   In 2021, an AIA was conducted for the four areas discussed in the AOA. Survey and testing revealed that only the area to the northwest of the bridge, as having archaeological potential. Some cultural material was found in this area, resulting in the recommendation of complete excavation of the potential site and further testing to the west to determine if the cultural material found was related to a larger site. In 2022, a contractor was engaged to completely excavate the site and test the area to the west. The resultant Technical Memorandum for the Western Brook Bridge Replacement AIA indicated that:

   With respect to further assessment for the Project, no additional investigations or mitigations are recommended. As Parks Canada is aware, shovel testing is a sampling of a given location and as a result, there is still some limited potential for sub-surface archaeological resources to be present within the Project footprints. It is therefore recommended that in the unlikely event that potential archaeological resources are discovered during Project-related activities, contractors or Parks Canada should contact the PCTAR to assess the discovery and develop appropriate mitigation (Stantec 2022:9).

83) An Archaeological Impact Assessment (AIA) and/or Archaeological Monitoring is not required for excavations taking place in previously disturbed areas, this includes areas associated with the existing roadways, ditches and sloped embankments. These areas are noted in the AOA.

84) There could be a chance, however low, that cultural resources, such as features or artifact concentrations may be encountered during construction activities. If cultural resource features, are encountered, work should cease in the immediate area. The work area in relation to the findings photo documented and geo-referenced, and the Parks Canada project manager informed. The project manager should then contact Parks Canada's Terrestrial Archaeology section for advice and assessment of significance, which will in turn determine what actions will be required to mitigate the chance find.

Visitor Experience

85) Maintain the project area in as tidy a condition as is practical for the duration of work.

86) Appropriate signage warning the public of work in the area should be in place on Highway 430 and/or Western Brook Day Use Area and/or the access trail to the beach whenever needed. All such signage and associated materials (e.g., sandbags used to ballast signs) must be removed from the park after the completion of work.

87) Highway traffic must be controlled when work trucks, heavy machinery, and other potentially hazardous vehicles are turning onto or off of the public highway.

88) Human wildlife interaction must be promptly reported to Parks Canada. Workers are prohibited from feeding of disturbing wildlife.

89) Any onsite stockpiling area for construction materials must be barricaded from public access.

10. OTHER CONSIDERATIONS

☐ Comments received from public/stakeholder engagement

☐ Indigenous peoples engagement or consultation

☒ Surveillance

Surveillance will be required throughout the duration of this project. The person(s) involved with surveillance will be in the role of the Environmental Monitor. The Environmental Monitor will provide confidence that project construction activities comply/ conform with environmental provisions as defined in project approvals and permits; applicable legislation, regulations and guidelines; and, contract specifications. The Environmental Monitor may provide advice or educate the proponent or contractor in certain situations, however the Monitor's primary role will be to observe and report compliance/ conformance or non-compliance/ non-conformance. The Environmental Monitor will report to the Project Manager.

The Environmental Monitor will regularly (daily to weekly) visit site for surveillance, however for construction activities that are considered to be more intensive or more likely to cause an environmental impact (e.g., pouring of cement, bridge demolition, etc.,), the Environmental Monitor shall be on site. After each site visit the Environmental Monitor will complete an Environmental Surveillance Form (Appendix 4) and prior to every progress meeting an Environmental Monitoring Progress Report (Appendix 5), which will summarize all construction activities; environmental management efforts, issues and resolutions; highlight environmental requirements (e.g. legislation, contract specifications) associated with upcoming construction activities. The Progress Report will be sent to all project parties.

☐ Follow-up monitoring

☐ SARA Follow-up monitoring

11. SIGNIFICANCE OF RESIDUAL ADVERSE EFFECTS

Natural Resources

Given the magnitude of effects, and application of mitigation measures, the proposed work is unlikely to result in significant residual adverse effects to natural resources.

Cultural Resources

In considering residual adverse effects to cultural resources, the Terrestrial Archaeologist (and the CRM advisors) supporting this analysis will evaluate the degree of change:

- Negligible to minor change (Very minor changes/Slight changes to the resource, but heritage value retained). The proposed intervention will take place in low to moderate archaeological potential areas. As long as the archaeological requirements and recommendations are followed, the heritage value will be retained through documentation.

Visitor Experience
Given the magnitude of effects, the fact that a two lane detour will be put in place prior to closing the existing roadway and, and application of mitigation measures, the project is unlikely to result in significant residual adverse effects to visitor experience.

12. EXPERTS CONSULTED

Include all experts. Add as many entries as necessary for the project.

Department/Agency /Institution: Miawpukek First Nation	Date of Request: 2020-11-23
Expert's Name & Contact Information: Gregory Jeddore	Title: Forestry Manager
Expertise Requested: Species at Risk lichen survey	
Response: The site area was surveyed and although potential suitable habitat was found for these species throughout the park, none of the four targeted species were found.	

Department/Agency /Institution: Department of Fisheries and Oceans	Date of Request: 2020-02-14
Expert's Name & Contact Information: Melanie Irvine	Title: Acting Senior Biologist – Hydro, Flows & Linear Development
Expertise Requested: Species at Risk lichen survey	
Response: With appropriate mitigations, the Program is of the view that your proposal is not likely to result in the contravention of the above mentioned prohibitions and requirements.	

13. DECISION

Taking into account implementation of mitigation measures outlined in the assessment, the project is:

- ☒ not likely to cause significant adverse environmental effects.
- ☐ likely to cause significant adverse environmental effects.

<u>FOR SARA REQUIREMENTS</u>:

- ☒ Residual adverse effects to species at risk are not likely, and therefore, the SARA Permit Decision Tool was not required

OR, the SARA Permit Decision Tool was used and determined:

- ☐ This activity does not require a SARA permit
- ☐ This activity requires a SARA permit and one can be issued
- ☐ This activity requires a SARA permit but one cannot be issued

14. RECOMMENDATION AND APPROVAL

Prepared by: **Sarah Kennedy-Dyson** Environmental Protection Officer **Holly Lightfoot** A/Park Ecologist	Date: 12 August 2022 Holly Lightfoot
Recommended by: **Janet Feltham** A/Resource Conservation Manager	Date: 15 August 2022 Feltham, Janet Digitally signed by Feltham, Janet DN: C=CA, O=GC, OU=PCA-APC, CN="Feltham, Janet" Reason: I am the author of this document Location: your signing location here Date: 2022.08.15 15:28:22-02'30' Foxit PDF Editor Version: 11.2.2
Approval Signature: Julie LeBlanc A/Field Unit Superintendent	Date: 16 August 2022 Julie LeBlanc

15. ATTACHMENTS

References

COSEWIC. 2006. Assessment and Status Report on the Aermican Eel (*Anguilla rostrata*).

DeignPoint Engineering. 2019. Western Brook Bridge Hydrology and Hydraulics Report. *Draft*.

Dietrich, J. 2001. The Behaviour, Survival and Production of Atlantic Salmon (*Salmo salar*) Smolts in the Western Brook River System. University of New Brunswick. Masters of Science Thesis.

Gerrow, S. 2009. Harlequin Duck Abundance in Gros Morne National Park: Breeding and Brood Survey 2008. Western Newfoundland and Labrador Field Unit. Parks Canada.

Kerekes, J.J. 1994. Western brook Pond. Pp. 284-293. *In:* Allan, R.J. et al. (eds). The Book of Canadian Lakes.

Robertson, G.J. and R.I. Goudie (2020). Harlequin Duck (*Histrionicus histrionicus*), version 1.0. in Birds of the World. Cornell Lab of Ornithology. https://birdsoftheworld.org/bow/species/harduc/cur/introduction. Site accessed February 2021.

Appendix 1: Effects Identification Matrix (optional)

Table A: Direct effects.

	Valued components potentially directly affected by the proposed project phases (Preparation (P) / Construction (C) / Operation (O) / Decommissioning (D)				
	Natural Resources				
	Air	Soil & landforms	Water (surface, ground, crossings, etc.)	Flora	Fauna (migratory birds, fish, ungulates)
Associated Activities					
Supply and storage of materials		C			
Vegetation clearing		P			P
Demolition		P C D			
Waste disposal		P C O D			
Drilling/ Vibration	C	C D			C
Drainage		P C			
Excavation		C			
Grading		C			
Backfilling		C			
Use of machinery/ generators		P C O D	C		C
Transport of materials/ equipment			P C		P C O D
Set up/Use/ Removal of temporary facilities		P C		P C	P C D
Demolition/Use of concrete		C D	C D		C
Water Pumping/ Dewatering		C	C		C
Wastewater disposal		C	C	C	C
Paving	C		C		
Use of treated wood		C O	C O		
Use of cofferdams			C O D		
Planting/Seeding		D			D
Vehicle Traffic	P C O D				P C O D

Table B: Indirect effects *(Should be used to identify potential indirect effects that may result from impacts of the project to components of the environment you have identified on the preceding pages (see Table A - direct effects to natural resources). Consideration of indirect effects is required under the Impact Assessment Act and by the Parks Canada mandate.*

Revise the associated activities and the valued components for the specific project being reviewed	Valued components potentially directly affected by the proposed project phases (Preparation (P) / Construction (C) / Operation (O) / Decommissioning (D)								
	With respect to non-Indigenous peoples:	With respect to Indigenous peoples:				With respect to visitor experience			
	Health, social and economic conditions	Health, social and economic conditions	Physical & Cultural heritage	Current use of lands & resources for traditional purposes	Any structure, site or thing that is of historical, archaeological, paleontological or architectural significance	Access & services	Recreation & accommodation opportunities	Safety	Viewscapes and essence of place
Natural resource components affected by the project									
Could impacts to <u>air</u> lead to adverse effects on…									C
Could impacts to <u>soils and landforms</u> lead to adverse effects on…						P C	P C		P C
Could impacts to <u>water</u> (e.g. surface, ground water and water crossings) lead to adverse effects on…									
Could impacts to <u>flora</u> (including SAR) lead to adverse effects on…									C
Could impacts to <u>fauna</u> (including SAR) lead to adverse effects on…									
Other…									

Appendix 2. Specifications for installation of erosion and sediment controls.

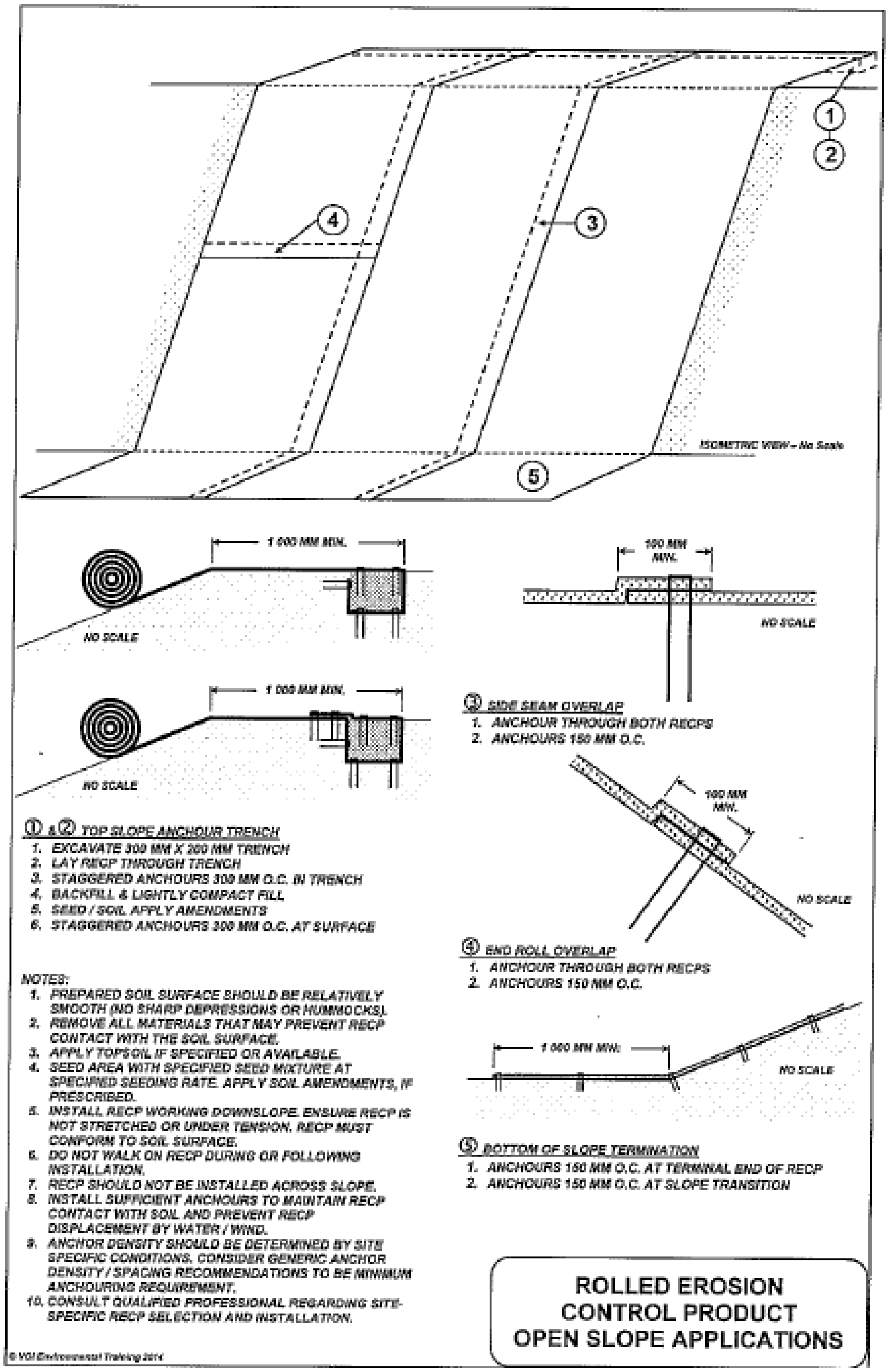

Figure 5. Specifications for the installation of erosion control fabric. (Van Osch Innovations Ltd., 2020)

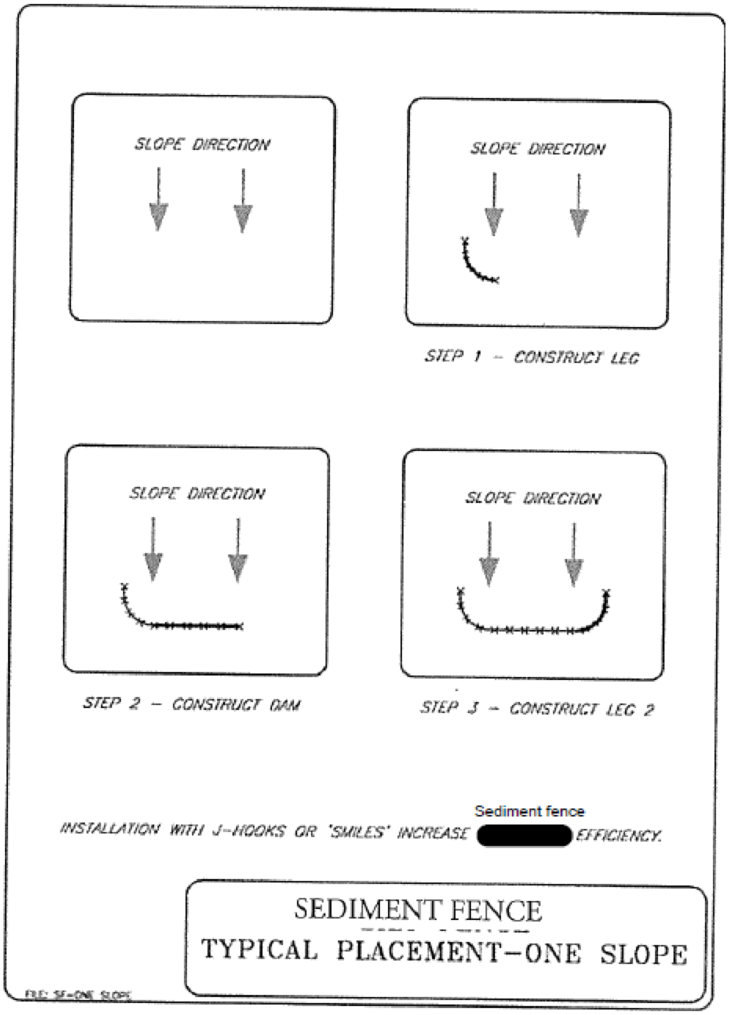

Figure 6. Specified placement of sediment fence perpendicular to the slope. (Van Osch Innovations Ltd., 2020)

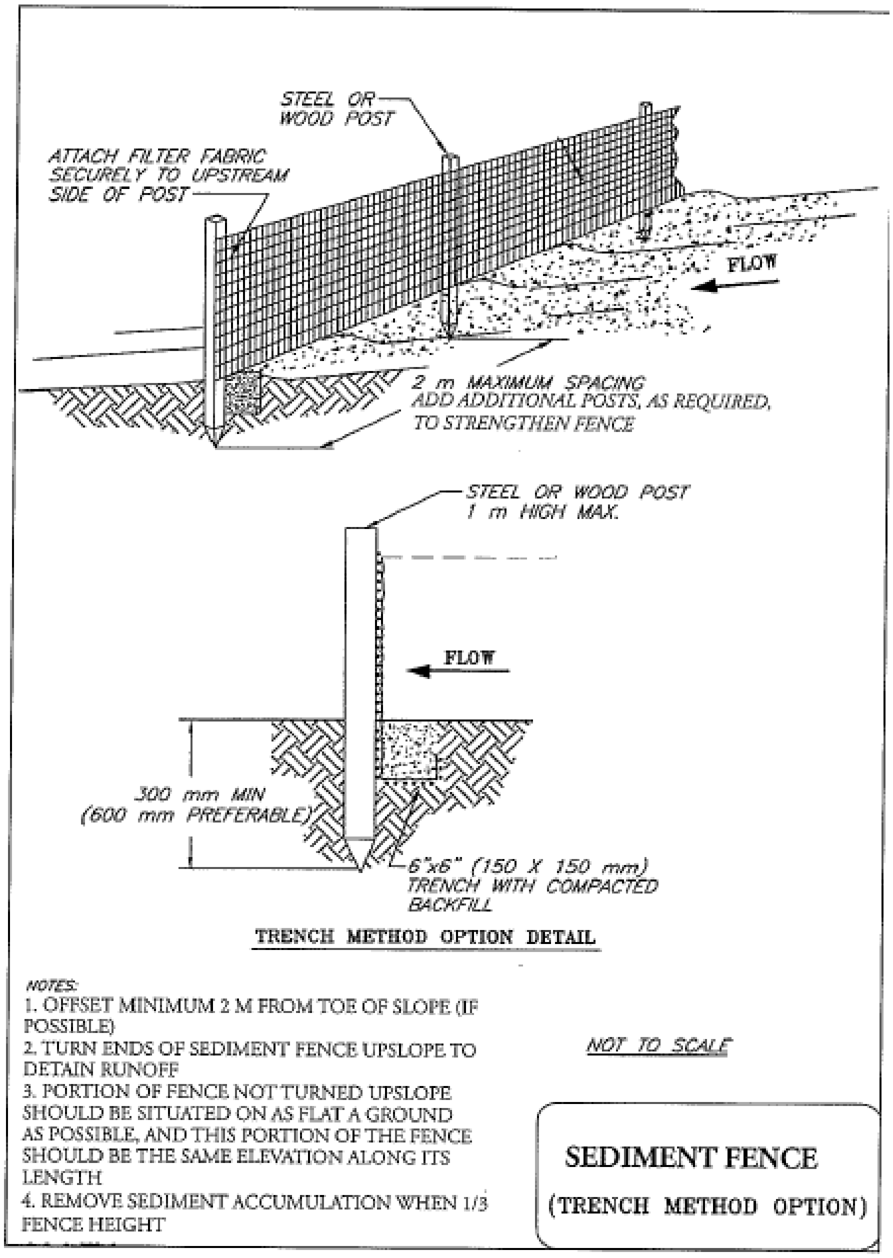

Figure 7. Specifications for the installation of a sediment fence using the trench method. (Van Osch Innovations Ltd., 2020)

Appendix 3. Specifications for the collection of excess concrete, and wash or waste water.

An encircled area of approximately 4 feet long, by 2 feet wide and 2 feet deep, shall be constructed by creating a berm with sand bags or other materials, surrounded by an impermeable layer, such as a plastic liner. After excess concrete or waste water has been collected it shall be left until materials harden, any remaining waste water/ fluid shall be collected and sent to the appropriate waste facility, and the hardened concrete can also be disposed off, at the appropriate facility.

Appendix 4. Environmental Surveillance Form

Environmental Surveillance Form

Parks Canada

Version IAA 2019

Surveillance Record			
Project:	**Date:**		**Time:**
IA File /Permit No.:	**Location:**		**Weather:**
Client:			**Prepared By:**
Contractor:			
Project Stage: ☐planning	☐ **Start-up**	☐ **Site Preparation**	☐ **Construction**
☐ **Restoration**	☐ **Construction Complete**	☐ **Follow-up**	☐ **Project Closure**

Equipment On-site	**Personnel On-site**

Contractor Activities

Observations / Issues / Concerns (e.g. mitigations, wildlife, cultural, SAR, safety, communication)

Images	
Images Downloaded to IA Folder: Y / N	Report Scanned / Added to IA Folder: Y / N
Schedule of Contractor Action Items Updated: Y / N	Date:
Surveillance Officer:	

Images:

Schedule of Contractor Action Items				
Item No.	Date Identified	Item to be Addressed	By Who	Date Addressed

Appendix 5. Environmental Progress Report

Environmental Progress Report

Date:	**Time:**	
Project:		
IA File /Permit No.:	**Location:**	**Weather:**
Client:		**Prepared By:**
Contractor:		
Progress of Recent Construction and Environmental Activities		
Description of Environmental Issues and Corrective Actions		
Communications with Environmental Authorities by Monitor		
Anticipated Construction and Environmental Activities		
Summary of Assessment Data/ Information		

Appendix 6. Archeological Overview Assessment

(starts on next page)

Archaeological Overview Assessment
Western Brook Bridge Replacement (Amended for Construction)

FII – RPA 1268.05
John Higdon, Terrestrial Archaeology, IACH Directorate
June 8, 2020
Updated April 7, 2021 (Select Figures Only)

1.0 Reason for Assessment

To conduct an archaeological overview assessment (AOA) of the project area associated with the Western Brook Bridge Replacement Project (RPA 1268.05) (Parks Canada 2020), in order to evaluate potential impacts to archaeological resources (Figures 1 and 2). Provided funding for the project becomes available, construction is tentatively scheduled for Fall 2020 to minimize impact on the salmon river (Darren Fitzgerald. Pers. Comm. 2020).

This assessment evaluates the archaeological potential of the project area and determines if these activities will require an archaeological impact assessment (AIA). It is based on information provided by the Field Unit and existing archaeological documentation located at the Parks Canada Collections Facility in Dartmouth, Nova Scotia.

Please note that an initial archaeological overview assessment (AOA) for the geotechnical investigation associated with the design phase of the Western Brook Bridge Replacement Project (RPA 1268.05) was completed in November 2019 (Figures 4, 5, Parks Canada 2019a, Higdon 2019). Given the project's proximity to the salmon river, an archaeological impact assessment was recommended at that time. The project scope was subsequently amended and test pits in specific areas removed to allow for the geotechnical sampling to take place while the weather was still amenable. This resulted in two amendments to the original AOA. The geotechnical investigation took place in December 2019 (Harbourside 2020b).

2.0 Project Objectives

2.1 Overall Project Objectives

According to the Project's RPA, Project Scope:

> The purpose of the [Western Brook Bridge Replacement] project is to rehabilitate one 2-span concrete bridge located at Western Brook. It goes onto mention that this structure plays an integral function of the overall highway systems of Highway 430…The Western Brook Bridge is on Highway 430 and was built in 1978. It's 44m in length with 6 AASHTO girders, concrete abutments on spread footings and pier both on piles with concrete deck and curbs.

The initial RPA indicated that "Based on the findings of the RD-2 study prepared by WSP the preferred option is a 28m long bridge designed for 80km/hr speed limit" (Parks Canada 2019a:1).

Amendment #5

> Revise[d the] scope of work to replace Western Brook Bridge based on PCA's Bridge Inspection Report (WSP 2016) and by an RS-2 report findings completed by Harbourside Engineering. Based on the RS-2 report

> and coating of repair versus replacement., HES determined that Canada would have a much greater return moving forward with a replacement structure than rehabilitation. The new proposed bridge would consist of 2-53m steel trapezoidal girders complete with a concrete deck and asphalt riding surface.
>
> Parks Canada 2019a:1

See RPA for additional information concerning reasons and justifications for the project (Parks Canada 2019a).

2.2 Impacts on Ground Surface and Subsurface

The construction activities that will have an impact on the ground surface and subsurface are as follows:

1) Construction of Temporary Detour Bridge and Roadway
2) Removal of Existing Bridge and Construction of Causeway
3) Construction of New Bridge and Highway Upgrades
4) Removal of Temporary Bridge, Roadway and Causeway
5) Rehabilitation of Area Disturbed by Temporary Bridge and Roadway
6) Access to Project Areas

2.2.1 Construction of Temporary Detour Bridge and Roadway

Construction of the temporary detour bridge and roadway "will require clearing of trees/scrubs and limited removal of existing vegetation to that which will not support temporary roadway embankment construction. At the end of construction, with the removal of the detour, the areas can be reshaped and landscaped with vegetation" (Harbourside 2020b:15).

This includes areas to the west of the current roadways, on either side of the existing bridge. This includes an area approximately 30m x 100m to the northwest of the bridge and an area 45m x 130m to the southwest of the bridge, between the current roadway and the current Western Brook Day Use Parking Lot (Figures 2, 3, 8, 9, 10 & 11).

Without getting into specifics concerning degree of landscaping, depth of excavations, etc. these actions will result in the complete removal / disturbance of anything within this footprint. While some of this work will occur within previously landscaped / disturbed areas, ie. shoulder and sloped areas along either side of the existing highway, much of this construction phase will impact areas flat areas adjacent to the current river. These flat areas adjacent to the river do not to appear to have been impacted by construction activities during the construction of the existing bridge, highway, and parking lot area or the former roadway that originally ran through the current parking lot bridge (Figures 2, 3, 8, 9, 10 & 11)

2.2.2 Removal of Existing Bridge and Construction of Causeway

According to Harbourside 2020a Drawing C02, the "Existing bridge structure to be removed once detour bridge is operational." This will require the construction of a causeway and infilling of a portion of the river to access the central support post of the existing bridge It is my understanding that the access to the river will be along the southern shores of the river, within the existing project footprint (Pers. Comm. Darren Fitzgerald, Feb 2020).

2.2.3 Construction of New Bridge and Highway Upgrades

Construction of the New Bridge will largely occur within the footprint of the existing bridge and highway and/or within the areas disturbed by the construction of the temporary detour bridge and roadway. While new ditches will be excavated along either side of the current highway, this work is set to largely occur within areas that have been previously landscaped / disturbed (Harbourside 2020a, Drawings C03-C05) (Figure 2, 3, 8 & 10).

2.2.4 Removal of Temporary Detour Bridge, Roadway and Causeway

The temporary detour bridge, roadway causeway will be removed following the construction of the new bridge. No areas outside the project footprint will be will be disturbed as a result of these activities.

2.2.5 Rehabilitation of Area Disturbed by Temporary Detour Bridge and Roadway

According to the Landscape Finish Treatment Plan (Harbourside 2020a, Drawings L01 & L02), the areas impacted by the construction of the temporary detour bridge and roadway will be rehabilitated with landscaping and the planning of trees and shrubs. While these activities will require excavations and landscaping, they will occur in the area previously disturbed by the detour bridge and roadway construction, they too have the potential to impact the subsurface of these areas (Figure 2, 3, 8 & 10).

2.2.6 Access to Project Areas

While not explicitly outlined in the Harbourside 2020a, Civil Landscape Drawings, the routes taken by heavy machinery to access the project area may have an impact on surface and subsurface cultural resources. In order to reduce this impact, Project Engineer, Darren Fitzgerald, indicated that,

> Vehicles will be limited to the bridge site for the most part as we wish not to increase our footprint or damage the existing asphalt. The Contractor will have to follow the existing highway/access road to gain access to the site. There will be no transverse movement from the parking lot to the bridge site.
>
> Pers. Comm. May 2020

3.0 Background

Gros Morne National Park is located on the west coast of Newfoundland and has a cultural history stretching back more than 5000 years. Gros Morne National Park Reserve was established in 1973, as part of a Federal-Provincial Agreement (Parks Canada 2019b:2) and officially became a National Park in October 2000 (Bourdages and Craig 2000). There are ten known archaeological sites located within the park boundaries and 29 within a 5km radius of the park. These include archaeological sites at Cow Head and along the beach at Shallow Bay. The known sites are primarily located along low-lying coastal areas, these sites show evidence of indigenous (Paleoeskimo) and historic occupations, including numerous 19th century related sites containing building foundations, a shipwreck and a cemetery (Krol and Tuck 1985, Krol 1986, Stopp 1990, Stopp 1989, Renouf 1992, Tuck 1972 & Tuck 1982).

While most archaeological sites in Newfoundland are coastal, it is important to note that adjoining interior areas would have also been utilized to access inland fish resources and caribou herds (Renouf 1992:2). Renouf goes onto note that,

> Western Brook Pond is a large freshwater fiord not far from the coast, to which it is connected by Western Brook. According to Schwartz (1992) Western Brook supports anadromous fish, and caribou have been known to frequent the area around Stag Brook. In theory any or all of the island's prehistoric or historic peoples could have used the Western Brook Pond area.
>
> Renouf 1992:2

While Western Brook is one of the many well-known salmon rivers located within the park, Resource Management Officer, Courtney King, indicated that that the Western Brook has been closed to salmon fishing since the 1980s (Pers. Comm. 2019).

4.0 Potential for Archaeological Resources

The project area is located approximately 43km north of Rocky Harbour, 6km southwest of St. Pauls and less than 2 km away from Broom Point. The latter is particularly significant, as the largest Paleoeskimo site is located on the point, as is a late 19^{th} / early 20^{th} century historic occupation of Broom Point associated with the cod, lobster and salmon fishery. Candow indicates that "salmon traps, as well as cod traps, were used to catch salmon as they returned to their natal brooks and rivers to spawn. Western Brook, south of Broom Point, was such a place" (1999:10). It is conceivable that the occupants of the point would have accessed this river to fish for salmon or sea trout, but also as a route to the interior.

Palmer's 1928 book "The Salmon Rivers of Newfoundland" provides descriptions, maps and sketches of various salmon rivers throughout the island. Assessing the fishing potential of the Western Brook, Palmer notes that

> This river [Western Brook] is approximately 3 miles long and winds its way through flat lying country from its source in West Pond to the sea. It carries a nice run of salmon, of average weight of 7 lbs., and is noted for its sea-trout fishing, many large catches (sea trout) having been taken from numerous pools, fish as large as 7 and 8 lbs., being caught.
>
> Palmer 1928:84

Palmer's 1928 sketch of the river denotes various pools (S) and Torrents/Rapids (T) (Palmer 1928:85, (Figure 6). Comparison of the sketch with the current Google Satellite imagery, suggest that the current bridge and project area appears adjacent to a torrent or fast flowing section of the brook and a pool, where salmon probably rest, as they make their way up stream. Given that the sketch was made base on observations taken on the ground, it is understandable that the topography doesn't match completely. That being said, the course and intensity of the river may have changed over time, as was the case with the Lomond River, a salmon river located in east Bonne Bay. Parks Canada staff member and avid salmon angler, Danny Major indicated that pools and course of the Lomond River had been severely impacted by an intense rainstorm in January 2018. Comparison of the sketch with a satellite photo, suggests that Western Brook may have also changed overtime (Figure 2). June 2019 archaeological investigation of a chance find (chert flakes and possible biface) along the Lomond River reinforces the high archaeological potential of areas associated with salmon rivers.

Initial discussions suggested that the previous bridge may have intersected a portion of the project area. A review of the 1978 and 1981 plans and profiles suggest that the area was previously undisturbed and that the road may have went through the current day use area (Parks Canada 1982, Public Works Canada 1978a & 1978b) (Figures 2, 4, & 7). As such, it was determined that the former road did not intersect this project's construction footprint.

4.1 Potential Impacts on Archaeological Resources

4.1.1 Construction of Temporary Detour Bridge and Roadway

Construction of the temporary detour bridge and roadway will have the greatest potential impact on cultural resources, as this activity will impact areas that have not been previously disturbed or tested archaeologically. These areas specifically include the flat / gently sloped areas to the west of the bridge and existing highway. Geotechnical Borehole investigations conducted in December 2019 revealed much about the stratigraphy of these areas.

BH03 revealed 50cm Rootmat / topsoil level and 1.0m thick compact brown sand with silt and gravel (Figures 2, 4, & 5). BH05 revealed approximately 30cm rootmat / topsoil with 1.2m thick layer of soft brownish-grey sandy silt, with occasional clay seems. TP04 revealed 80cm of rootmat / topsoil with 70cm of loose brown sand with silt and gravel. The thick rootmat/topsoil in this area may be because of the test pits proximity to the existing forest. The lack of gravel fill and other infill suggests that these areas have not been previously disturbed. Note that TP02 and TP03 were not excavated in 2019 as planned, as excavations in these areas would have required an archaeological impact assessment (Higdon 2019).

While on the cusp of the flat / gently sloped area, the thin 20cm topsoil layer and approximately 4m deep layer of Brown Gravel with silt and sand gravel with sand and frequent cobbles suggests that this area was disturbed with the excavations and adding of fill associated with the construction of the existing road and bridge. This suggests that the sloped area on either side of the roads have also already been disturbed.

These areas fall within Assessment Areas AA-1 and AA-2. Both are of moderate archaeological potential and thus should be subject to archaeological survey and test pitting, as needed (Figures 2, 8 & 10).

4.1.2 Removal of Existing Bridge and Construction of Causeway

This work will occur within previously disturbed contexts and areas disturbed as part of the construction of the causeway. **These areas fall within Assessments Area AA-1 and AA-2. Both are of moderate archaeological potential and thus should be subject to archaeological survey and test pitting, as needed (Figures 2, 8 & 10).**

4.1.3 Construction of New Bridge and Highway Upgrades

The actual construction of the new bridge and highway upgrades will have minimal impact on cultural resources, as these project activities are slated to occur within previously disturbed contexts. Two areas to the west of the highway and on either side of the bridge may not have been previously disturbed. Noted as Assessment Areas AA-3 and AA-4 in Figures 2, 12, 14 & 15), these areas are essentially bound by the base of the existing slope associated with the construction of the existing roadway to the east and the limits of the proposed clearing limit to the west. Assessment Area AA-4 (Figures 14, 15 & 16) has additional archaeological potential due to its proximity to the Western Brook. **While these areas are of low archaeological potential, they should be surveyed to determine whether or not further archaeological test pitting is needed.**

4.1.4 Removal of Temporary Detour Bridge, Roadway and Causeway

Removal of the temporary detour bridge, roadway and causeway has the potential to impact cultural resources, if those areas were not previously impacted by their initial construction. The areas of highest potential are the flat / gently sloped areas to the west of the bridge and existing highway. **These areas fall within Assessment Area AA-1 and AA-2. Both are of moderate archaeological potential and thus should be subject to archaeological survey and test pitting, as needed (Figures 2, 8 & 10).**

4.1.5 Rehabilitation of Area Disturbed by Temporary Bridge and Roadway

While the rehabilitation of the areas disturbed by the temporary bridge and roadway should occur in disturbed areas, there is potential that the landscaping and planting of trees could also have an impact on subsurface cultural resources. The areas of highest potential are the flat / gently sloped areas to the west of the bridge and existing highway. **These areas fall within Assessment Areas AA-1 and AA-2. Both**

are of moderate archaeological potential and thus should be subject to archaeological survey and test pitting, as needed (Figures 2, 8 & 10).

4.1.6 Access to Project Areas

In order to reduce the project footprint, vehicle traffic will be limited to the footprint of the bridge site and access to the site will be via existing highway / access roads. "There will be no transverse movement from the parking lot to the bridge site" (Darren Fitzgerald, Pers. Comm. 2020). **These areas fall within Assessment Areas AA-1 and AA-2. Both are of moderate archaeological potential and thus should be subject to archaeological survey and test pitting, as needed (Figures 2, 8 & 10).**

5.0 Archaeological Requirements

5.1 **An Archaeological Impact Assessment (AIA) and/or Archaeological Monitoring is not required for excavations taking place in previously disturbed areas, this includes areas associated with the existing roadways, ditches and sloped embankments (Figure 2 - Road 1 and Road 2). Exceptions are outlined in Section 5.2.** Work can proceed as planned, as long as the project stays within the proposed project footprint and that the contractor abides by the conditions outlined below.

5.2 **An Archaeological Impact Assessment is required for the following areas:**

5.2.1. <u>**Assessment Area #1 (AA-1) (Figures 2, 8 & 9, Table 1)**</u> **- Flat / gently sloped area to the north west of the existing bridge and west of the existing highway. The area to the north of the bridge measures approximately 23m x 67m and extends from the toe of the existing slope westward to the existing ditch.** ***This general area is of moderate archaeological potential and should be subject to archaeological survey and test pitting, as needed.***

5.2.2 <u>**Assessment Area #2 (AA-2) (Figures 2, 10 & 11, Table 1)**</u> **- Flat / gently sloped area to the south west of the existing bridge and west of existing highway. This approximately 21m x 100m area is bound by the Western Brook to the north, the toe of the existing highway slope to the east, the parking lot access road to the south and, and the eastern extent of the clearing limits to the west, 90m east of the existing parking lot.** ***This general area is of moderate archaeological potential and should be subject to archaeological survey and test pitting, as needed.***

5.2.3 <u>**Assessment Area #3 (AA-3) (Figures 2, 12 & 13, Table 1**</u>**) – Located to the north of the bridge, this 7m x 96m corridor is bound by the toe of the existing highway slope to the east and the proposed clearing limits to the west.** ***While this area is of low archaeological potential, survey is required to determine whether or not test pitting is required.***

5.2.4 <u>**Assessment Area #4 (AA-4) (Figures 2, 14, 15 & 16, Table 1**</u>**) – Located to the south of the bridge and parking lot, this 10m x 300m corridor is bound by the toe of the existing highway slope to the east and the proposed clearing limits to the west.** ***While this area is of low archaeological potential, survey is required to determine whether or not test pitting is required.***

Table 1: Assessment Area Summary with Approximate Areas.

Assessment Area	Assessment Type	Area (Approximate Meters Square)
AA-1	Archaeological Survey and Test Pitting	1,500
AA-2		1,700
AA-3	Archaeological Survey to verify if test pitting is required	270
AA-4		1,200

The AIA work must be undertaken by a qualified archaeologist with an approved Research and Collections Permit issued by the FU coordinator and in consultation with the Parks Canada Terrestrial Archaeologist for the field unit. The work will be completed in two phases.

The first phase of archaeological assessment is field reconnaissance to delineate high potential areas within the study area. This involves a pedestrian survey of the designated areas discussed in Section 5.2 to determine high and low probably areas based on field observation. Probability may be determined based on visible disturbance of area, slope and other factors. High potential zones will be “flagged" and geo-referenced in order to develop, if necessary, the phase two strategy of shovel testing.

Shovel testing will consist of 0.50m tests excavated to a sterile (undisturbed glacial soil) level. While the focus will be on areas AA-1 and AA-2, some test pitting may be required in areas AA-3 and AA-4 to determine the nature of these areas, whether or not they have been previously disturbed and whether or not additional testing may be required.

Depending on the results of the test excavations, the project may continue as planned or may have to be modified to take into account any cultural resources uncovered during the course of the testing.

Any cultural resources found within the project limits as a result of the AIA will be documented and flagged before construction begins. This is to include a buffer of 5 m out from the resource, which will be deemed a no-go zone for vehicular traffic and machinery. If cultural resources are encountered, i.e. artifacts, hearths, alignments of stone, etc. work would need to be postponed pending further assessment. This could include more intensive test pitting of the project area to determine the nature and extent of the site and potential the systematic excavation of the site, if the project is deemed critical and the resources could not otherwise be avoided.

5.3 Project activities are restricted to the areas presented in the Harbourside Engineering Documents provided (Harbourside 2020a). If landscaping or excavations are required beyond these excavation limits, please consult with Parks Canada's Terrestrial Archaeology section to determine if an additional AOA is required for these activities. Based on the AOA, an AIA and/or additional mitigation measures may be required prior to the continuation of excavation activities.

5.4 Staging for the excavation and related equipment should take place on previously disturbed areas, such as road side or perhaps within the day use area parking lot to minimize impact on undisturbed areas.

5.5 There could be a chance, however low, that cultural resources, such as features or artifact concentrations may be encountered during construction activities. <u>If cultural resource features, are encountered, work should cease in the immediate area.</u> The work area in

relation to the findings photo documented and geo-referenced, and the Parks Canada project manager informed. The project manager should then contact Parks Canada's Terrestrial Archaeology section for advice and assessment of significance, which will in turn determine what actions will be required to mitigate the chance find.

6.0 Contacts

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8.0 Figures

April 7, 2021 - Figures 2, 4, 8, 10, 12, 14, 15. Updated to fix error with scale (WGS83 to NAD 83 (UTM 21).

Figure 1: Western Brook bridge project area (red star) in relation to archaeologically rich Broom Point, the mouth of Western Brook and the park boundaries, highlighted in green.

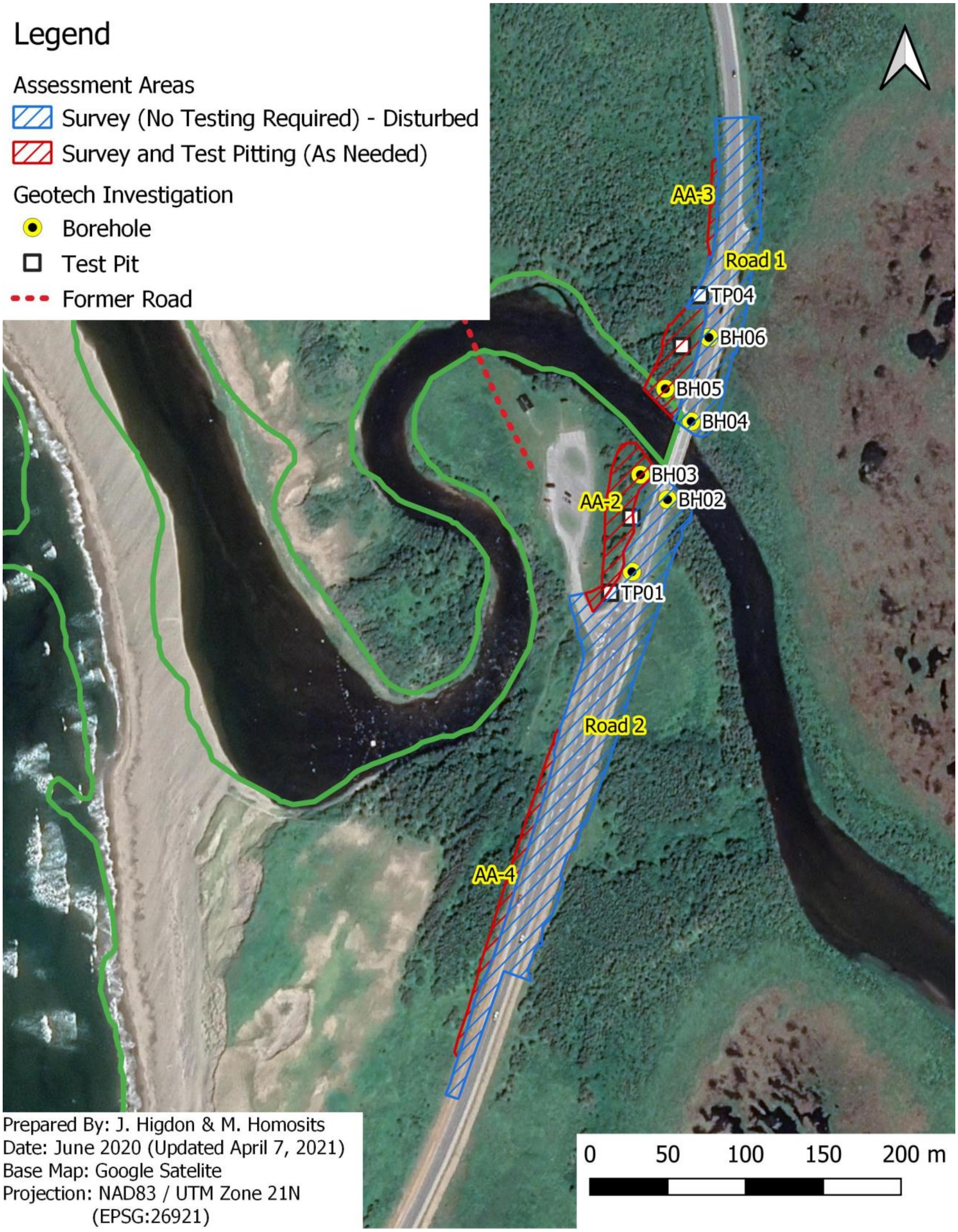

Figure 2: Western Brook Bridge Replacement Project Footprint, Assessment Areas and Geotechnical Investigations.

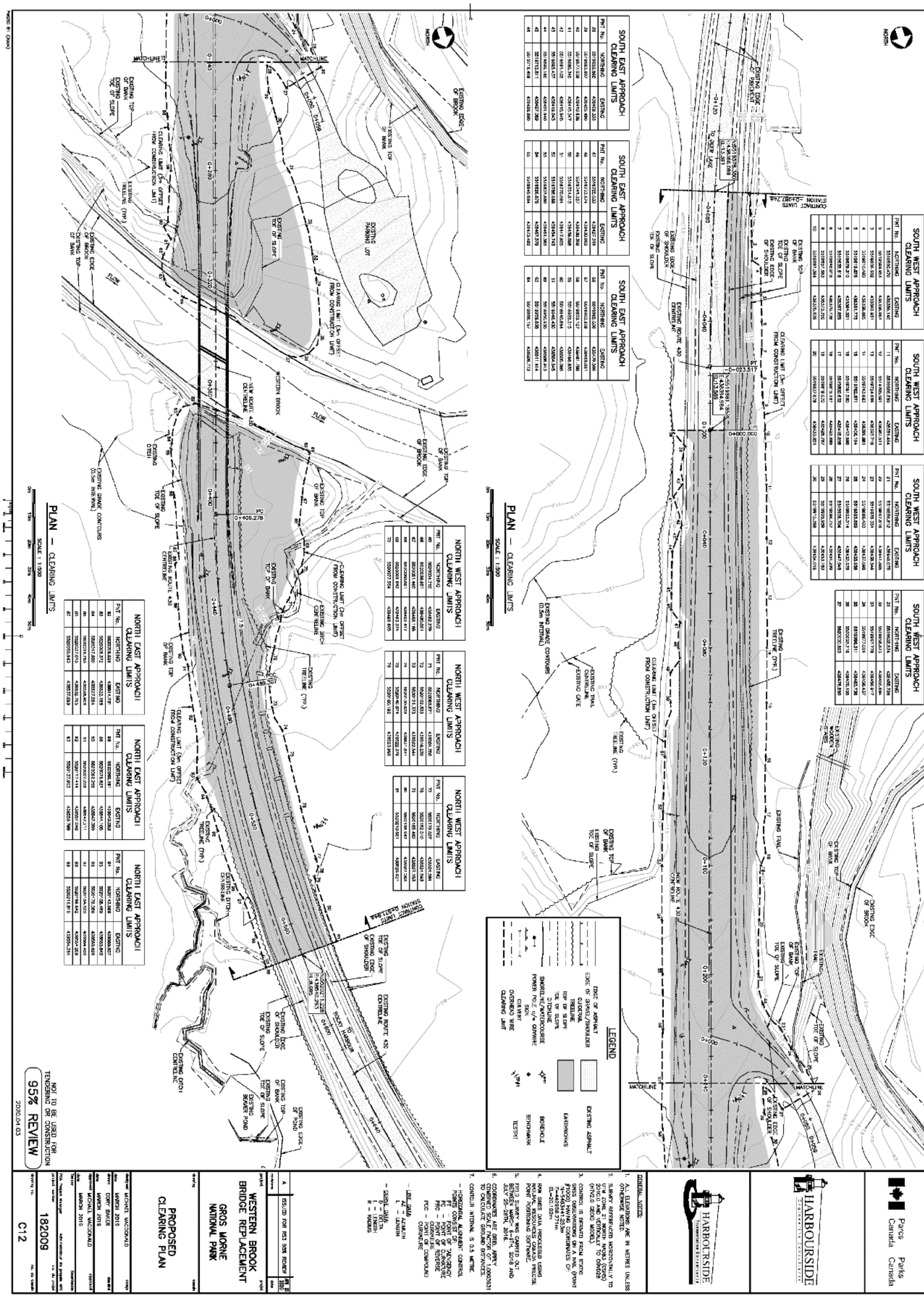

Figure 3 : Western Brook Bridge Replacement, Proposed Clearing Area Plan (Harbourside 2020a:C12).

Figure 4: Borehole and test pit locations provided by Harbourside Engineering, as well as location of former road / access road, as indicated in Public Works 1981 Note Test Pits TP02 and TP03 were not tested following Dec 2019 discussions with Field Unit (Higdon 2019, Harbourside 2020b).

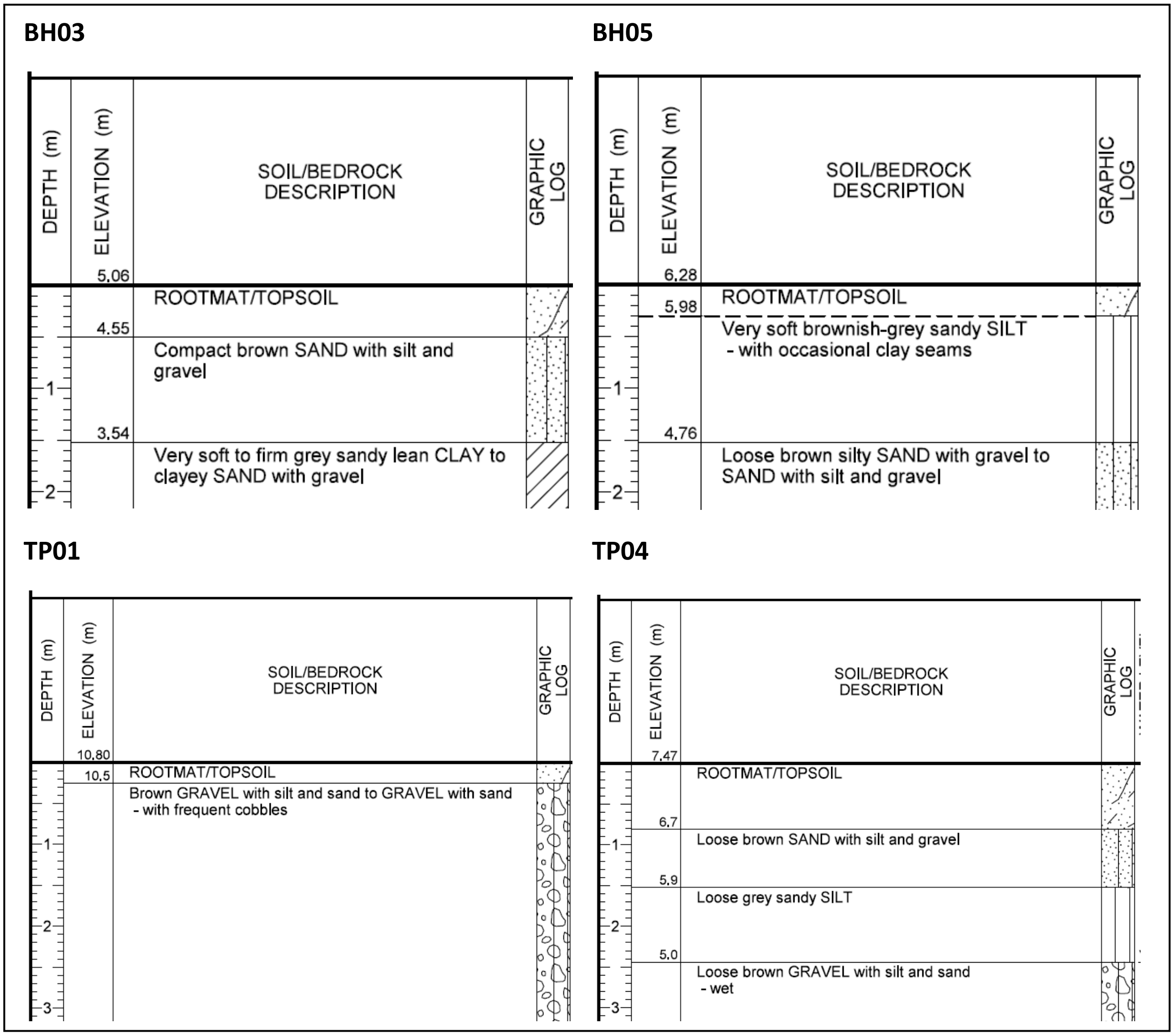

Figure 5: Borehole data excerpts from relevant Harbourside Engineering Geotechnical Investigations (Harbourside 2020b).

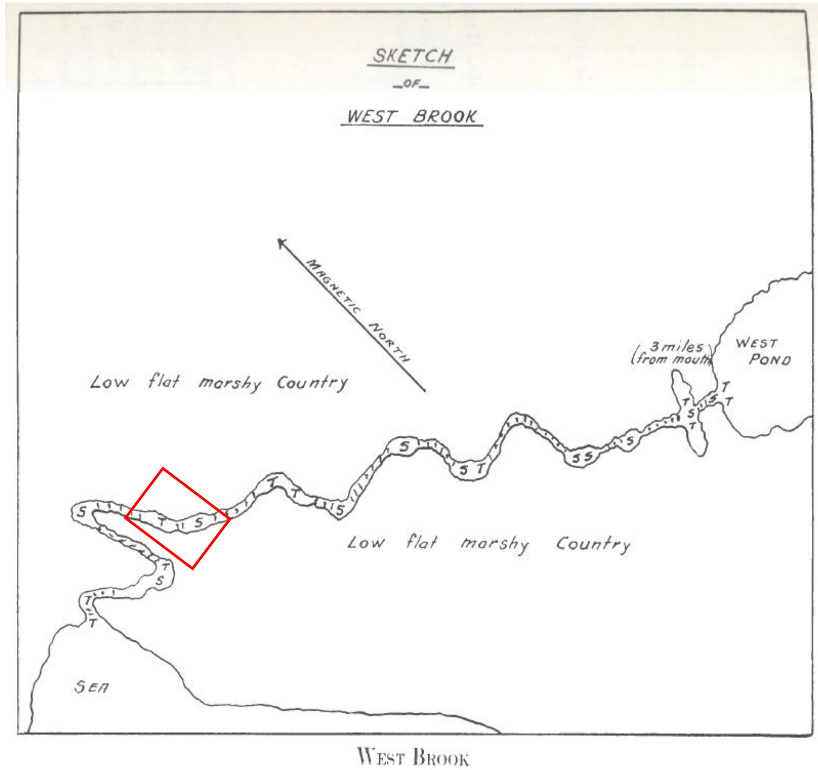

Figure 6: Sketch of West[ern] Brook with red rectangle showing the approximate location of project area. It is my understanding that S means pool (ideal for salmon fishing) and T may refer to a torrent (Palmer 1928: 85).

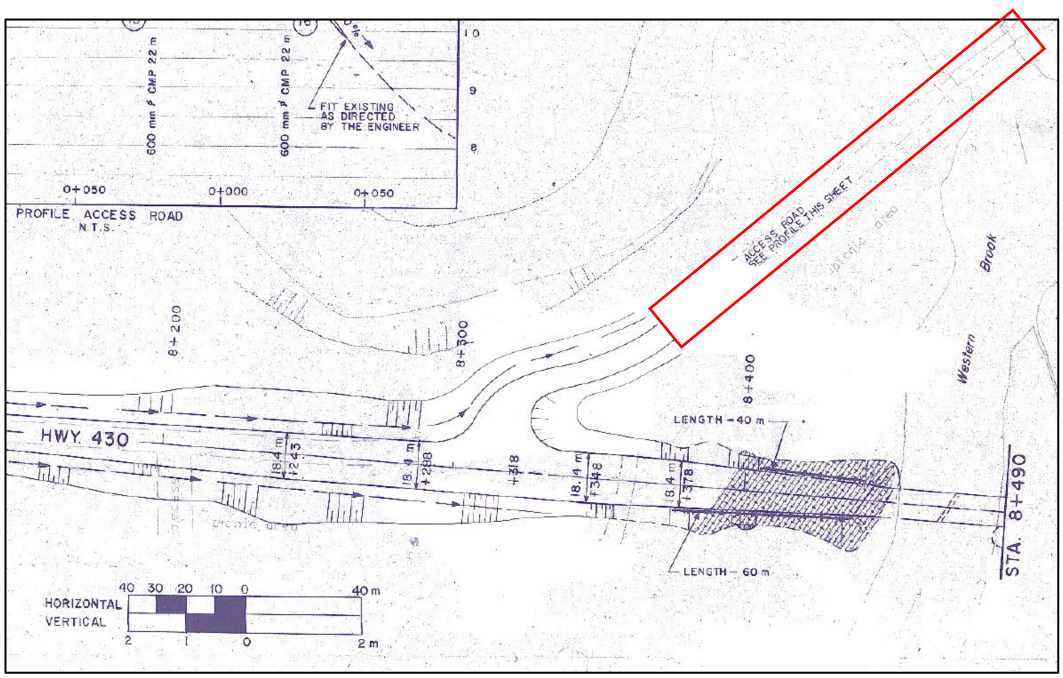

Figure 7: Portion of plan showing location of former access road through current day use area (red triangle), current bridge and potential disturbances (Parks Canada 1981).

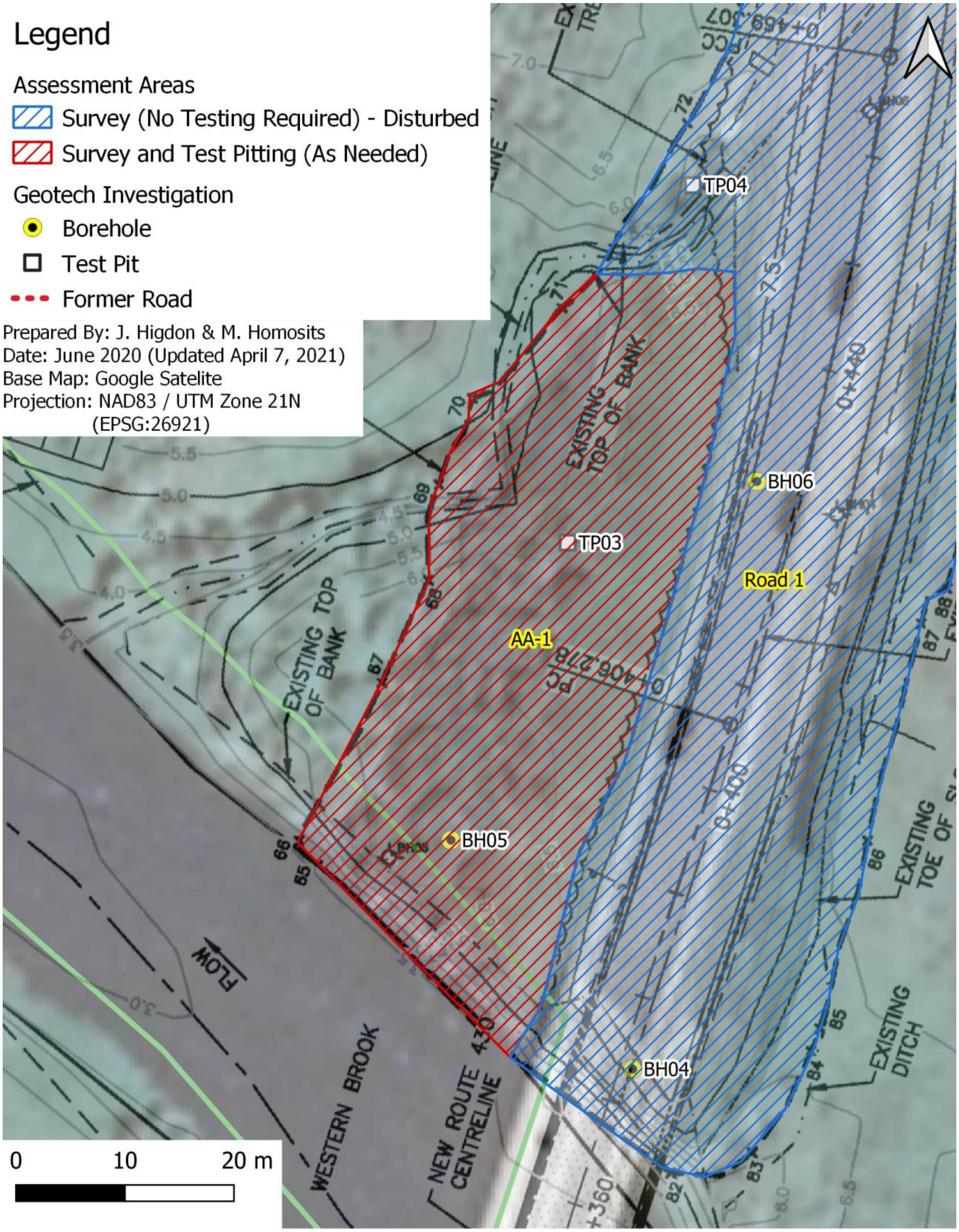

Figure 8: Assessment Area AA-1, proposed clearing area to the west of highway and north of Western Brook. Harbourside 2020a:C12 Overlaid atop Google Earth Image.

Figure 9: Assessment Area AA-1 Images. A) southern extent of assessment area, facing northwest from bridge; B) northern extent of assessment area, facing southwest; C) southern extent of assessment area, facing northeast from parking lot.

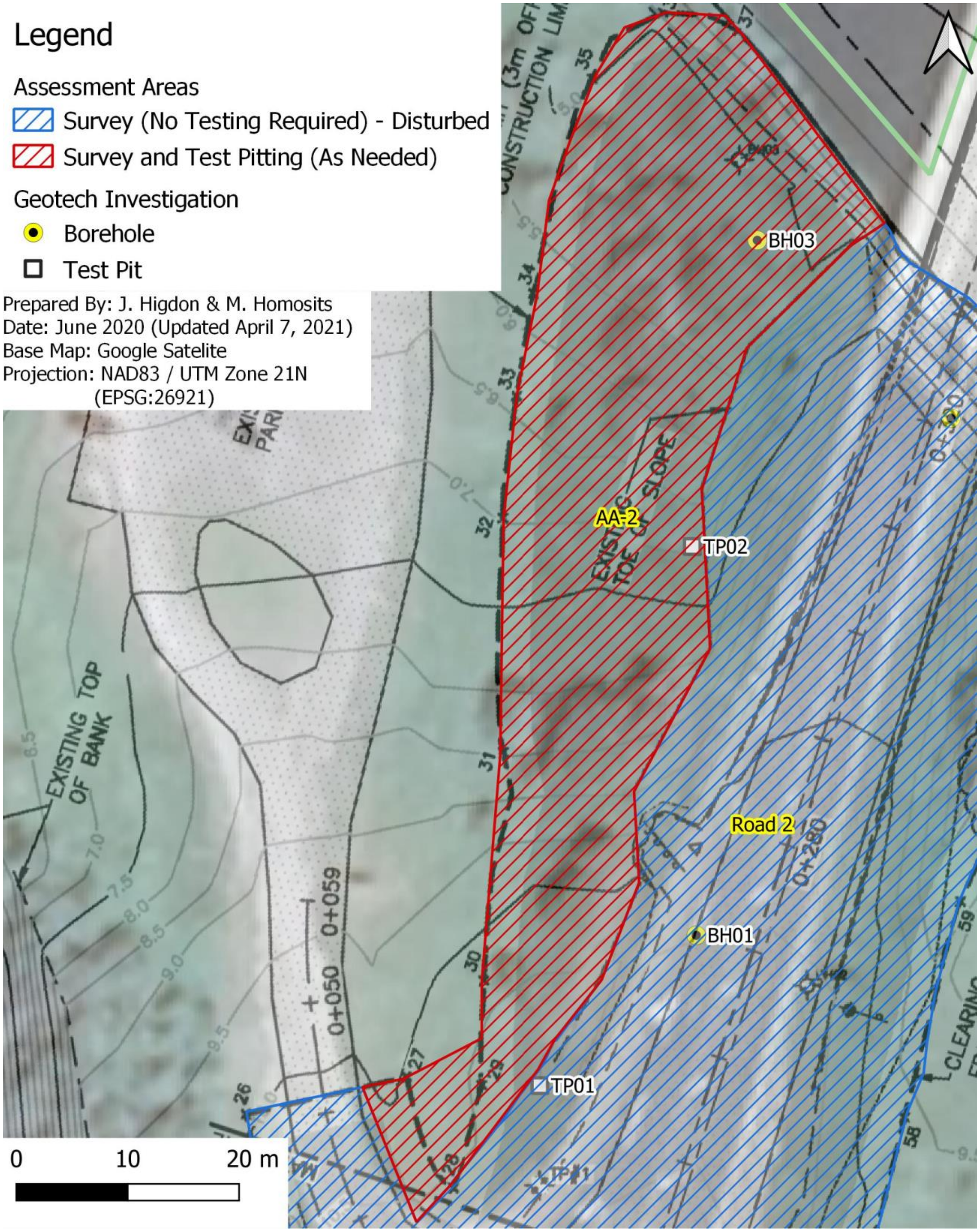

Figure 10: Assessment Area AA-2, proposed clearing area to the west of highway and south of Western Brook. Harbourside 2020a:C12 Overlaid atop Google Earth Image.

Figure 11: Assessment Area AA-2 Images. A) Assessment area facing southwest from bridge; B) View of shoulder of road and previously disturbed slope, facing north; C) western extent of assessment area, facing north from parking lot; D) western extent of assessment area, facing east from northern extent of parking; E) assessment area, facing east from parking lot.

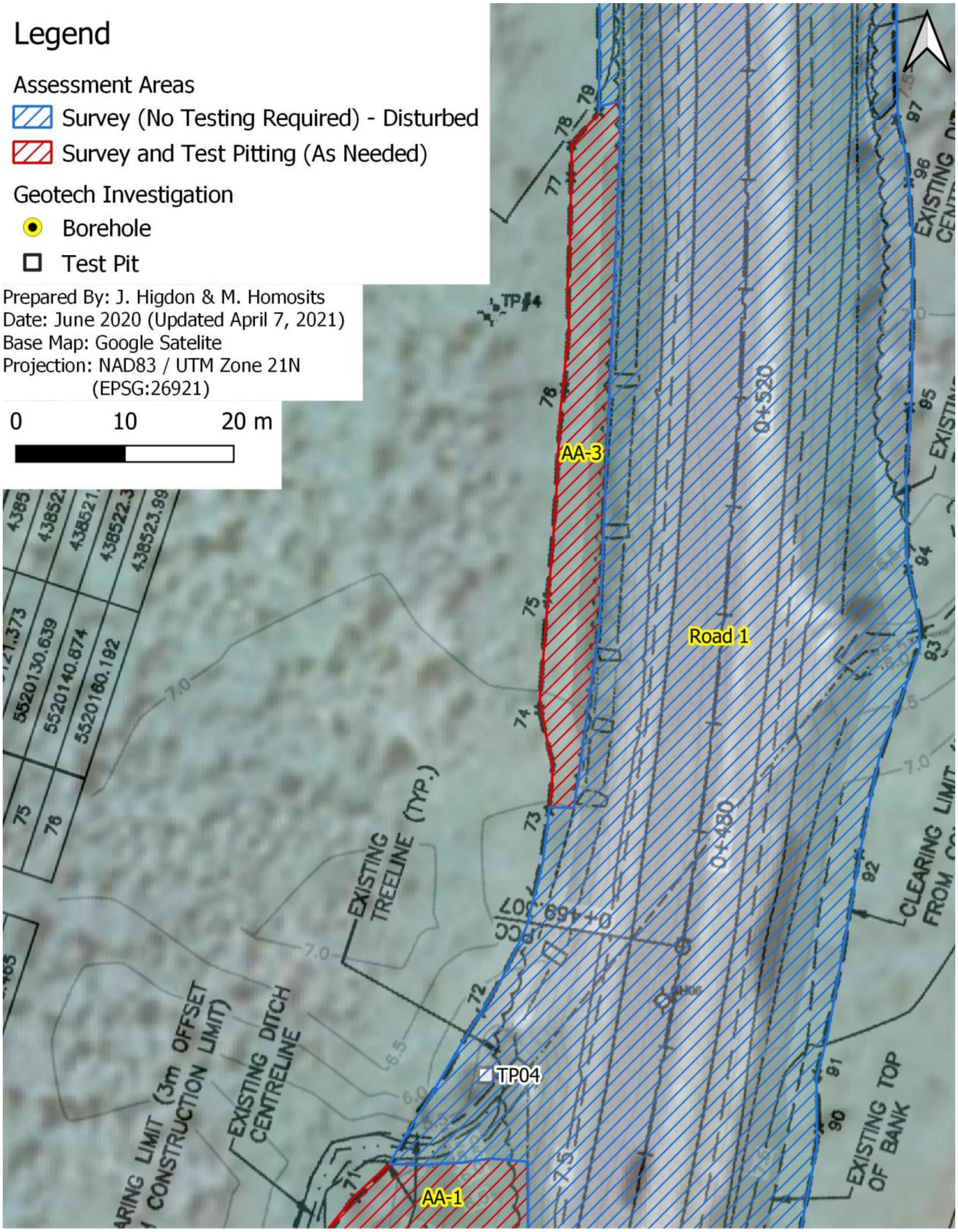

Figure 12: Assessment Area AA-3, proposed clearing area to the west of highway and north of Western Brook Bridge. Harbourside 2020a:C12 Overlaid atop Google Earth Image.

Figure 13: Assessment Area AA-3 Images. A) Northern extent of assessment area, facing southwest; B) Southern extent of assessment area, facing northwest.

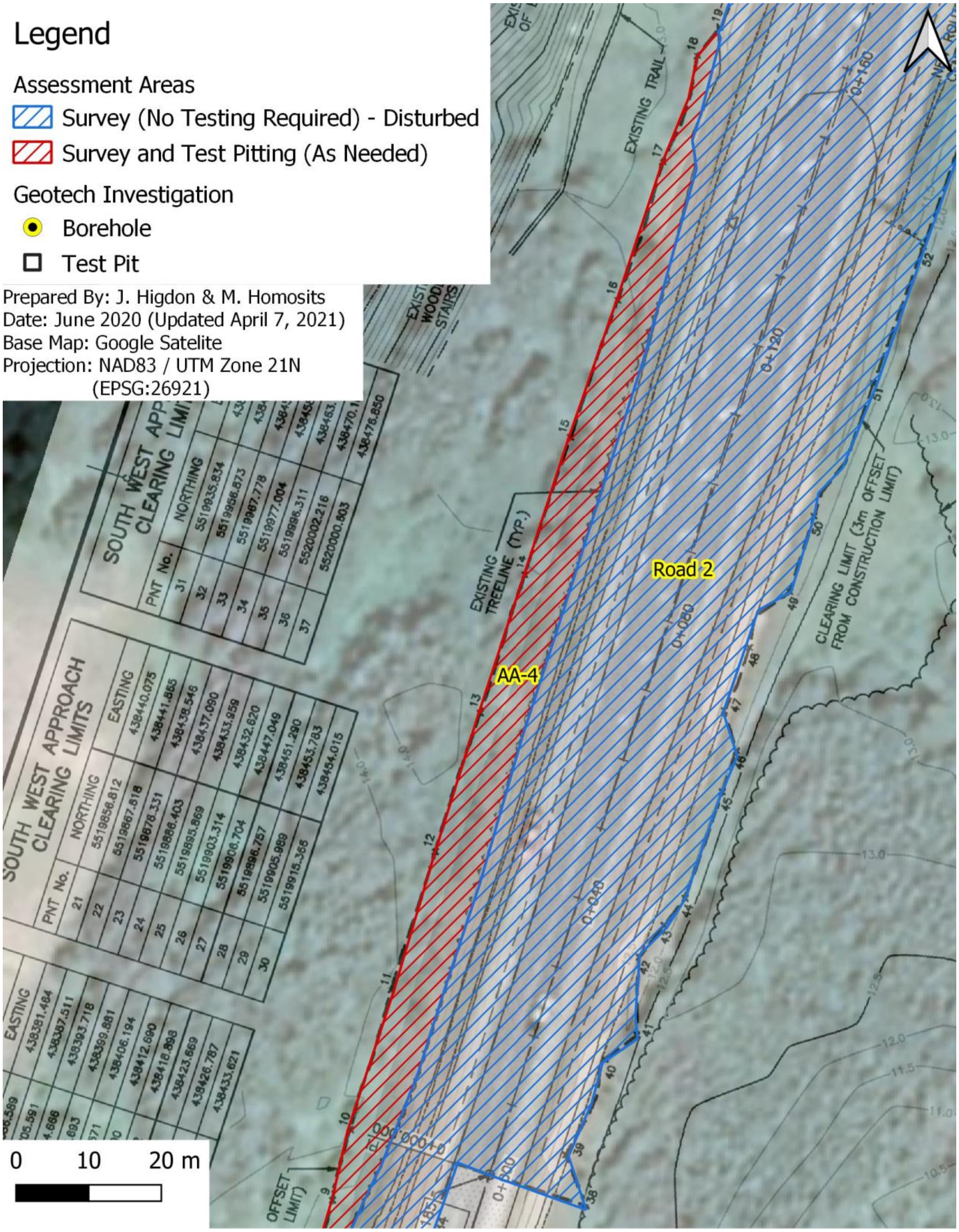

Figure 14: Northern Portion of Assessment Area AA-4, proposed clearing area to the west of highway and south of Western Brook Bridge. Harbourside 2020a:C12 Overlaid atop Google Earth Image.

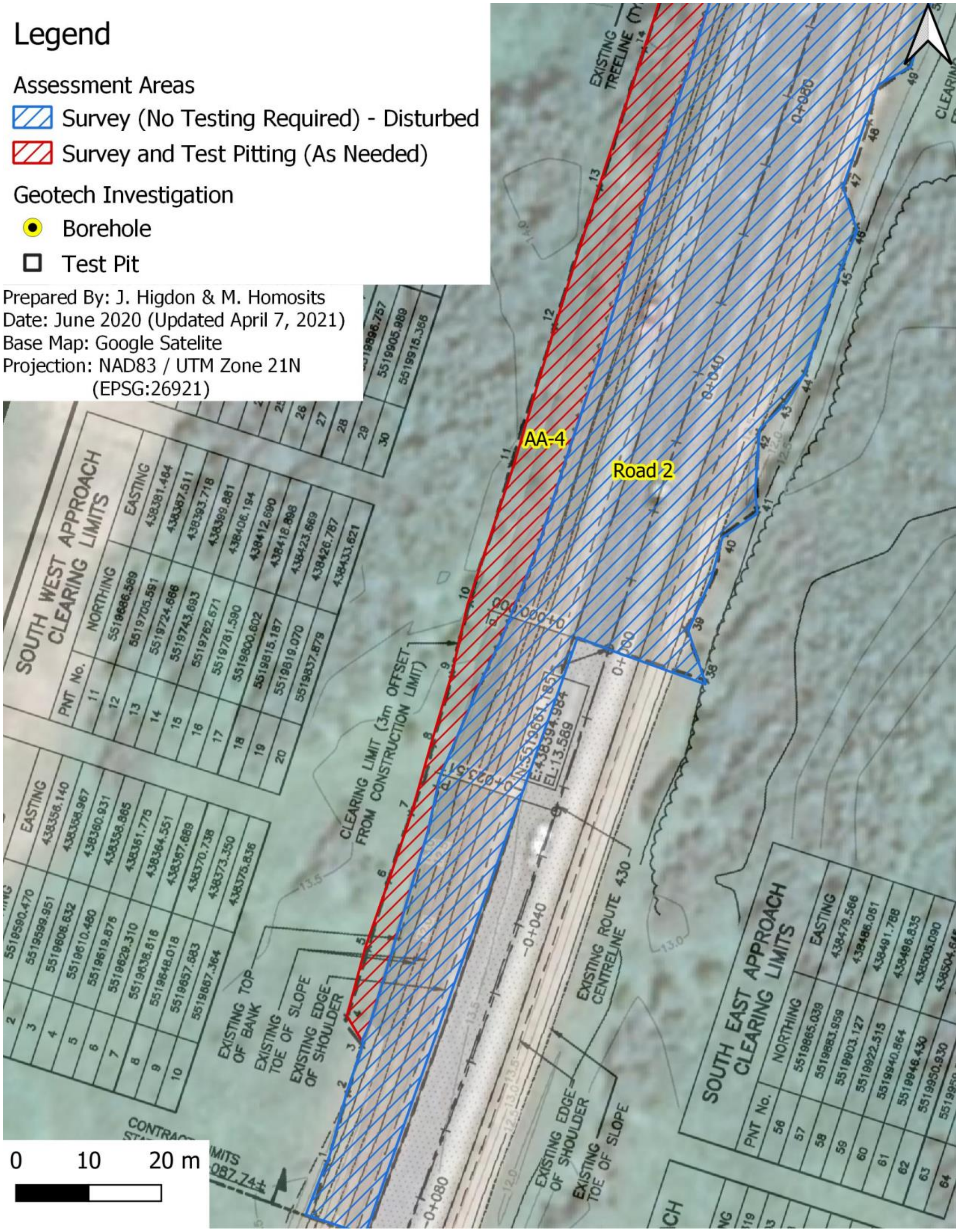

Figure 15: Southern Portion of Assessment Area AA-4, proposed clearing area to the west of highway and south of Western Brook Bridge. Harbourside 2020a:C12 Overlaid atop Google Earth Image.

Figure 16: Assessment Area AA-4 Images. A) Northern extent of assessment area, facing southwest; B) Southern extent of assessment area, facing northwest.