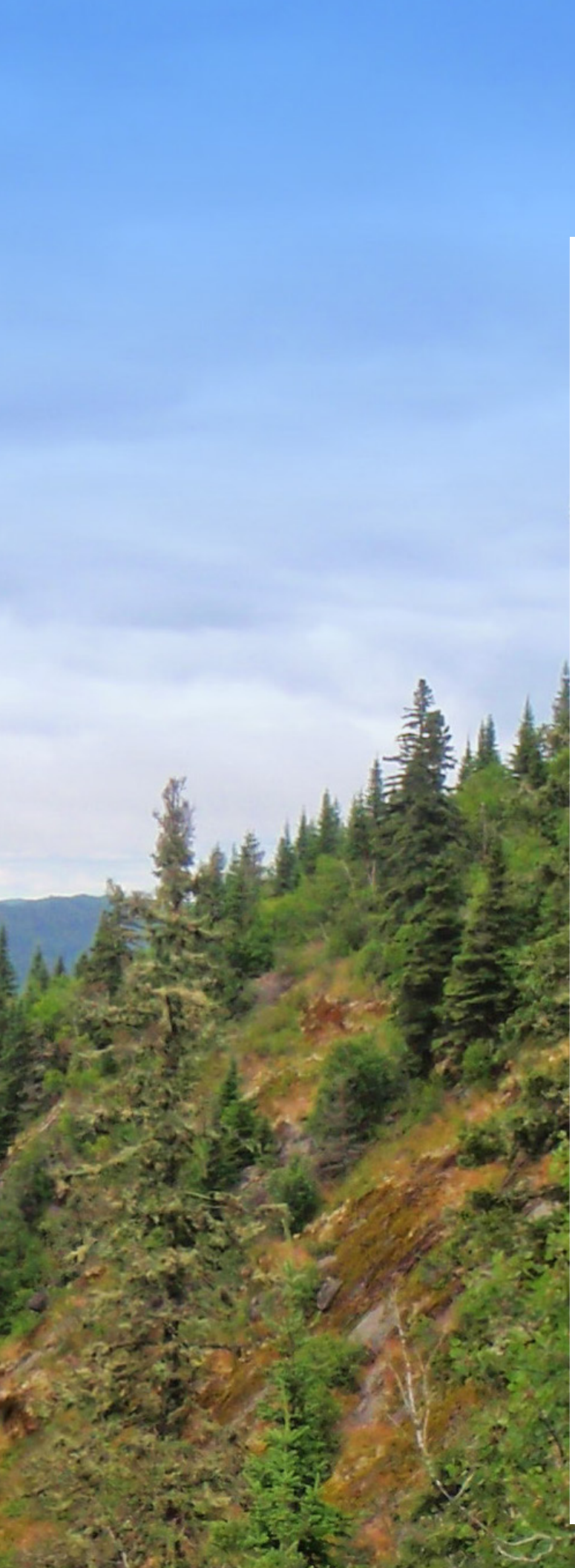

Marathon Palladium Project Environmental Impact Statement Addendum

VOLUME 2 OF 2

6.2.11 Physical and Cultural Heritage Resources

Prepared for:

GENERATIONPGM

Prepared by:

Stantec

Ecometrix | Environmental INTELLIGENCE

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Knight Piésold CONSULTING

Date: April 2021
Environmental Assessment by Review Panel under CEAA 2012
Reference Number 54755

Table of Contents

LIST OF TABLES

LIST OF FIGURES

Abbreviations

AA	Archaeological Assessment
AIR	Additional information requests
CEAA 2012	*Canadian Environmental Assessment Act, 2012*
CHVI	Cultural Heritage Value or Interest
CIAR	Canadian Impact Assessment Registry
EIS	Environmental Impact Statement
EMMP	Environmental Monitoring and Management Plan
GenPGM	Generation PGM Inc.
IR	Information Request
LSA	Local Study Area
MHSTCI	Ministry of Heritage, Sport, Tourism and Cultural Industries
MRSA	Mine Rock Storage Area
PSMF	Process Solids Management Facility
ROM	Run of Mill
RSA	Regional Study Area
SID	Supporting Information Documents
SIR	Supplemental Information Requests
SSA	Site Study Area
Stage 2AA	Stage 2 Archaeological Assessment
VEC	Valued Ecosystem Component

6.2.11 Physical and Cultural Heritage Resources

6.2.11.1 Summary of Original Physical and Cultural Heritage Resources Assessment

6.2.11.1.1 Assessment of Residual Effects in Original EIS

Section 6.2.10 of the original EIS (2012) and subsequent responses to information requests from the Panel provided an assessment of the following effects to Physical and Cultural Heritage Resources as a result of the Project:

- change to archaeological resources
- change to built and cultural heritage resources

Additional information on the assessment of effects on Physical and Cultural Heritage Resources was provided in responses to the following IRs and supplemental information:

- Response to IR16.6.1 (CIAR # 377)

No potential interactions between the Physical and Cultural Heritage Resources VEC and project activities were identified in the original EIS (2012) and as a result no changes to archaeological or built and cultural heritage resources were predicted.

Through response to IR16.6.1 (CIAR #377), additional information was requested regarding the potential for the Project to adversely affect high potential archaeological sites identified within the 2008 and 2009 archaeological reports (Woodland Heritage Services Ltd., 2008 (SID#27) and Ross Archaeological Research Associates, 2009 (SID #28), respectively) (CIAR # 227). The response clarified that the Stage 2 Archaeological Assessment (AA) (Ross Archaeological Research Associates, 2009) identified Hare Lake and Bamoos Lake as areas having a high potential for archaeological resources. As noted in the response, these sites are located outside of the footprint of the mine and associated infrastructure, and water levels of Hare Lake would have to rise by more than 1 m as a result of the Project before being potentially affected. Predicted worst-case levels of discharge from the PSMF at the time were predicted to result in a water level increase of not more than several centimeters at any given time, and therefore below levels that could potentially affect these areas having a high potential for archaeological resources. Water levels of Bamoos Lake will not be affected by the Project.

Key mitigation measures originally proposed to avoid, reduce and/or offset potential effects of the Project on Physical and Cultural Heritage Resources include:

- Implementation of a work protocol for the protection of archaeological resources. All employees engaged in activities that have the potential to unearth such resources will receive training related to this protocol. The protocol provides means of identification and recovery of potentially deeply buried artifacts or enigmatic local site areas not typically identified in Stage 1 or Stage 2 assessments.

- Should archaeological resources be identified, all work in the vicinity of the discovery will be suspended immediately and the MHSTCI and representatives of Indigenous communities will be contacted. Work will not resume until a qualified person can determine the significance of the discovery and apply any mitigation, as required. In the instance that human remains are identified, all work in the vicinity of the discovery will be suspended immediately and notification will be made to the Ontario Provincial Police, or local police, who will conduct a site investigation and contact the district coroner. Notification will also be made to the MHSTCI and the Registrar of Cemeteries, Ministry of Consumer and Commercial Relations (now Ministry of Government and Consumer Services) as well as representatives of Indigenous peoples.
- As part of its routine response to the identification of archaeological resources, stakeholders and local Indigenous communities of interest will be notified, as appropriate, given the nature of any discovery that is made.

An automated water level gauge was installed at Hare Lake to provide continuous water level data. Based on measurements to be taken while the Project is operational and while the PSMF is discharging to Hare Lake, should water levels exceed predicted worst-case levels, further assessment and mitigation measures will be developed as appropriate.

No residual effects to Physical and Cultural Heritage Resources were predicted in the original EIS (2012). Based on the response to IR#16.6.1 (CIAR #377), the findings of the original EIS (2012) were unchanged.

6.2.11.1.2 Determination of Significance in Original EIS

For physical and cultural heritage resources, the original EIS (2012) concluded that there would be no significant adverse effect. Further support of this conclusion was offered in responses to comments from the then Ministry of Tourism, Culture and Sport (now MHSTCI) (CIAR #310) and to IR16.6.1 (CIAR #377).

6.2.11.2 Approach to Update the Assessment

The following subsections provide an update to the assessment of residual environmental effects of the Project, including a determination of their significance based on the following:

- Updated environmental conditions within the SSA, LSA, and RSA, as appropriate.
- Recognition of updated standards, criteria, guidelines, or other thresholds that inform the determination of significance.
- Consideration and recognition of project refinements, including changes to the project components and project activities, that may affect potential project interactions, mitigation measures and residual effects.

Any changes to the results of the previous assessment have been highlighted and discussed below, as appropriate. Supplementary rationale and explanation for the conclusions of the assessment have been

provided based on the previous responses to the information requests (IRs, SIRs, AIRs) and additional input from the various technical discipline leads based on the current assessment.

6.2.11.3 Scope of the Assessment

6.2.11.3.1 Regulatory and Policy Setting

CEAA 2012 and the EIS Guidelines (Appendix B of this EIS Addendum [Vol 2]) state that consideration be given to any potential effects that the Project may have on physical and cultural resources, including non-archaeological resources. The EIS guidelines specified that such an assessment be carried out in accordance with the *Reference Guide: Assessing Environmental Effects on Physical and Cultural Heritage Resources* (Canadian Environmental Assessment Agency, 1996). In 2015, the Canadian Environmental Assessment Agency released the *Technical Guidance for Assessing Physical and Cultural Heritage or any Structure, Site or Thing that is of Historical, Archaeological, Paleontological or Architectural Significance under the Canadian Environmental Assessment Act, 2012*. This guidance document replaced the reference guide identified within the EIS guidelines. These guidance documents outline considerations that should be taken when assessing effects of a project on cultural heritage resources.

For archaeological resources, although the original archaeological assessments were not completed under the MHSTCI' current 2011 *Standards and Guidelines for Consultant Archaeologists*, the MHSTCI has confirmed that they will accept the findings and conclusions of the 2008 and 2009 archaeological assessments (Paige Campbell, Archaeology Review Officer, MHSTCI, Email to Stantec, September 2, 2020).

For built heritage resources and cultural heritage landscapes, these are addressed through different legislation depending on the scope of value or interest identified, which could include federal, provincial, or municipal legislation. With regards to the CEAA, 2012 requirements and EIS Guidelines, the MHSTCI *Criteria for Evaluating Potential for Built Heritage Resources and Cultural Heritage Landscapes* (MHSTCI Checklist) (MHSTCI, 2016) provides a framework to consider the potential for identification of built heritage resources and cultural heritage landscapes that aligns with the requirements of CEAA, 2012 and the EIS Guidelines. As described in the Cultural Heritage Baseline Update Report (Stantec 2020a) (CIAR #722), the MHSTCI Checklist has been completed to satisfy regulatory requirements. Where heritage resources are determined to be situated within the SSA based on the MHSTCI Checklist, potential project effects would be evaluated according MHSTCI's *Information Bulletin 3: Heritage Impact Assessment (Information Bulletin 3)* (MHSTCI 2017).

6.2.11.3.2 Influence of Consultation and Engagement on the Assessment

Consultation for the Project has been ongoing since 2004 and will continue throughout the life of the Project. Chapter 4 of the original EIS (2012) and Chapter 5 of this report covers the consultation process and activities undertaken by GenPGM and formerly by Stillwater. Comments and feedback received

throughout the consultation process pertaining to the Physical and Cultural Heritage Resources are summarized below:

- Information was requested on the protocols and procedures that will be put in place to protect cultural and archaeological resources should they be discovered as a result of Project activities.

Section 6.2.11.6.1 of this report provides further details on mitigation measures that will be applied should cultural and archaeological resources be discovered as a result of Project activities.

6.2.11.3.3 Potential Effects, Pathways and Measurable Parameters

Consistent with the original EIS (2012), two potential effects on Physical and Cultural Heritage Resources have been considered, including “change to archaeological resources” and “change to built and cultural heritage resources”. A summary of potential environmental effects, effects pathways and measurable parameters for Physical and Cultural Heritage Resources is presented in Table 6.2.11-1.

Table 6.2.11-1: Potential Effects, Effects Pathways and Measurable Parameters for Physical and Cultural Heritage Resources

Potential Effect	Effect Pathway	Measurable Parameter(s) and Units of Measurement
Change to archaeological resources	• Potential removal or alteration of archaeological sites or resources	• Number of known archaeological resources
Change to built and cultural heritage resources	• Potential removal or alteration of historic sites, structures or landscapes	• Number of known built and cultural heritage resources

There have been no changes to the potential effects, effects pathways or measurable parameters for Physical and Cultural Heritage Resources since the original EIS (2012).

Generally, the primary environmental effects on archaeological resources of projects occur during construction activities that cause disturbances to the soil matrix that contain an archaeological site, and thus removing artifacts and/or features from their horizontal and/or vertical context. Construction activities that can cause such effects include clearing and grubbing of trees or brush, removal of soils, grading, soil compaction from vehicular traffic, and excavation of soils for infrastructure. Secondary effects are associated with any increased access to archaeological sites that may result in unauthorized artifact collection by people (i.e., construction workers, general public) and vandalism to sites. The measurable parameter for archaeological resources is the number of known archaeological resources within the SSA. The number of known sites within the SSA is a quantitative measure of sites identified prior to Project related archaeological assessment and those sites identified during the field component of the Project related assessment.

Potential effects to built and cultural heritage resources is based on a project’s direct and indirect effects. Direct effects include destruction and alteration of an existing heritage resource, while indirect effects include shadows, isolation, land disturbance, change in land use, and obstruction. There is also the potential for indirect effects resulting from vibration due to construction and operation activities and the

transportation of Project components and personnel. The measurable parameter for built and cultural resources is the number of known built and cultural resources within the SSA.

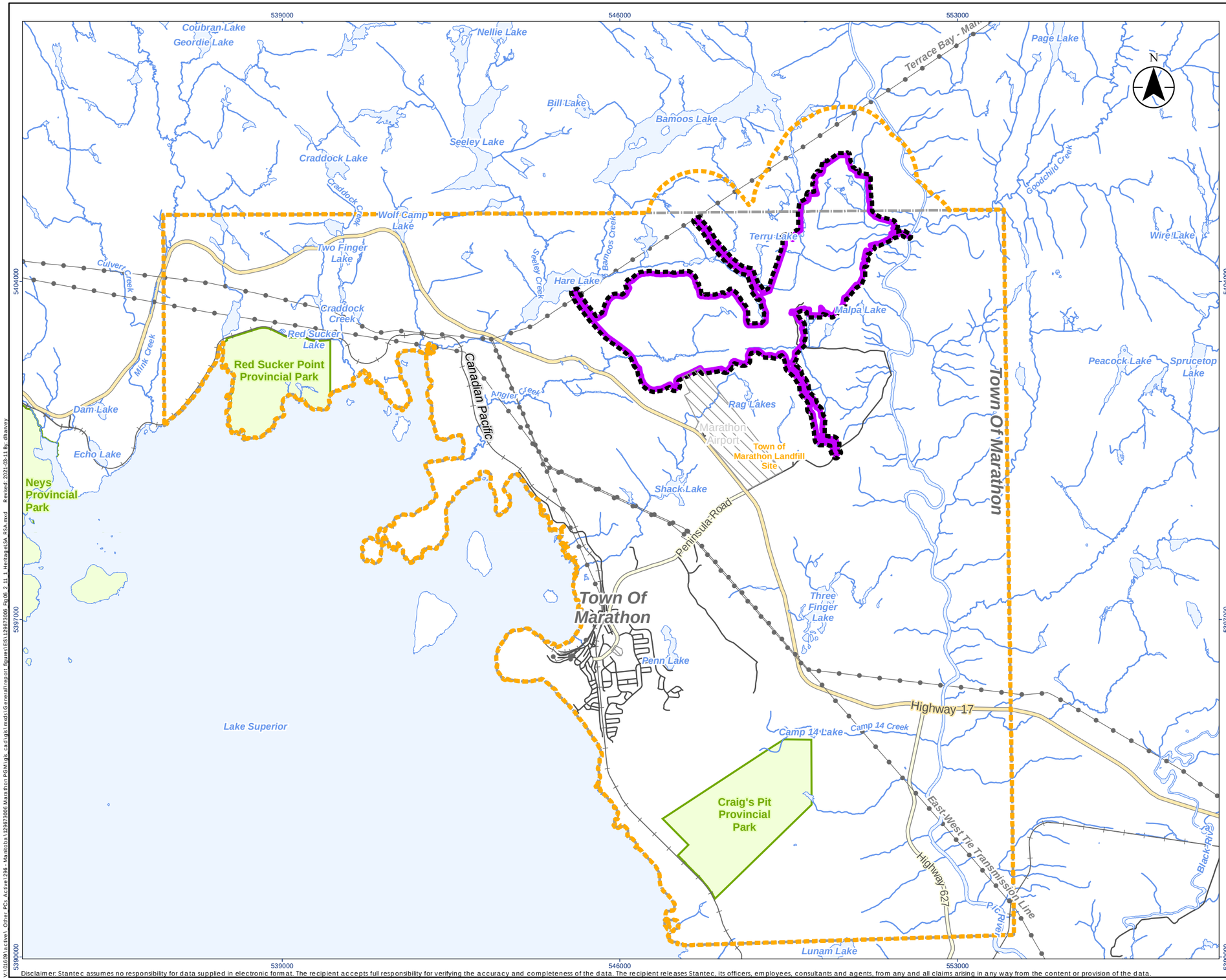
6.2.11.3.4 Assessment Boundaries

In general, the spatial boundaries for the assessment of environmental effects are presented in Section 2.4 of the EIS Addendum (Vol 1) (CIAR #727), while the LSA and RSA are defined based on the extent of potential effects specific to each VEC.

- **Site Study Area**: The SSA is the direct footprint of the Project, and is consistent across all VECs. The SSA has been revised from the original EIS to reflect changes and refinements to the Project design.
- **Local Study Area**: The Physical and Cultural Heritage Resources LSAs represent the maximum area within which disturbance from Project activities and components can be predicted or measured with a reasonable degree of accuracy and confidence. The LSA consists of the SSA and adjacent areas where Project-related environmental effects are reasonably expected to occur based on available information and professional judgment. For the purpose of the Physical and Cultural Heritage Resources VEC, this area has been defined by a 50 metre buffer around the SSA based on the potential for vibration-related effects.
- **Regional Study Area**: The Physical and Cultural Heritage Resources RSA is the area within which residual environmental effects from Project activities and components may interact cumulatively with the residual environmental effects of other past, present and future (i.e., certain or reasonably foreseeable) physical activities. The RSA is based on the potential for interactions between the Project and other existing or future potential projects in regard to cultural and archaeological resources. For the purpose of the Physical and Cultural Heritage Resources VEC, the RSA was defined as the municipal limits of the Town of Marathon. Where the municipal boundary does not encompass the SSA, a one kilometre buffer was used.

The Physical and Cultural Heritage Resources LSA and RSA boundaries are included on Figure 6.2.11-1.

The temporal boundaries for the Project that have been considered in the determination of environmental effects are described in Section 2.5 of the EIS Addendum (Vol 1) (CIAR #727). The temporal boundaries considered during the assessment of potential effects on the Physical and Cultural Heritage Resources VEC focused on Phase 1 (Site Preparation and Construction) and Phase 2 (Operations). These are based on the timing and duration of Project activities as well as the nature of those interactions with archaeological and built and cultural heritage resources.



Legend

- Site Study Area Boundary
- Heritage LSA
- Heritage RSA
- Highway
- Major Road
- Minor Road
- Hydro Line
- Railway
- Watercourse
- Airport
- Municipal Boundary, Lower Tier
- Provincial Park
- Waterbody

0 1 2 km

1:80,000 (At original document size of 11x17)

Notes
1. Coordinate System: NAD 1983 UTM Zone 16N
2. Base features produced under license with the Ontario Ministry of Natural Resources and Forestry © Queen's Printer for Ontario, 2018.

Project Location
Marathon

129673006 REVA
Prepared by SW on 2021-03-11
Technical Review by DH on 2021-03-11
Independent Review by ABC on yyyy-mm-dd

Client/Project
GENERATION PGM INC.
MARATHON PALLADIUM PROJECT

Figure No.
6.2.11-1

Title
Physical and Cultural Heritage Resources
Spatial Boundaries

6.2.11.3.5 Residual Effects Characterization

Table 6.2.11-2 summarizes how residual environmental effects are characterized in terms of direction, magnitude, geographic extent, timing, duration, frequency, reversibility, and ecological / societal value. The characterization of residual effects is consistent with the original EIS, which were qualitative definitions, and have been further defined to include quantitative measures, where applicable, as part of this EIS Addendum.

Table 6.2.11-2: Characterization of Residual Effects on Physical and Cultural Heritage Resources

Characterization	Description	Quantitative Measure or Definition of Qualitative Categories
Direction	The long-term trend of the residual effect	**Positive** – Effect moves measurable parameters in a direction beneficial to Physical and Cultural Heritage Resources relative to baseline conditions. **Adverse** – Effect moves measurable parameters in a direction detrimental to Physical and Cultural Heritage Resources relative to baseline conditions.
Magnitude	The amount of change in measurable parameters of the VEC relative to existing conditions	**Negligible –** no measurable change **Low –** a change in access to or change in cultural heritage value or interest (CHVI) of a heritage resource but with full retrieval of the resource and associated information with all necessary regulatory approvals in place **Medium –** a loss of, change in access, or change in CHVI of a heritage resource but with retrieval of a portion of the heritage resource and associated information **High –** a loss of, change in access, or change in CHVI of a heritage resource with no retrieval of heritage resource and associated information
Geographic Extent	The geographic area in which a residual effect occurs	**Negligible (SSA) –** residual effects are limited to SSA **Low –** residual effects are restricted to the SSA or immediate surroundings **Medium (LSA) –** residual effects extend into the LSA **High (RSA) –** residual effects extend into the RSA
Timing	Considers when the residual effect is expected to occur, where relevant to the VEC.	**Not Applicable** — seasonal aspects are unlikely to affect physical and cultural heritage resources. **Applicable** — seasonal aspects may affect physical and cultural heritage resources.
Duration	The time required until the measurable parameter or the VEC returns to its existing condition, or the residual effect can no longer be measured or otherwise perceived	**Negligible –** residual effect is limited to a single event **Low (short-term) –** the residual effect is limited to short term events (a few years or less) **Medium –** the residual effect is limited to the operational/decommissioning phases (years to decades) **High (Long-term) –** the residual effect extends beyond the life of the project (centuries)

Table 6.2.11-2: Characterization of Residual Effects on Physical and Cultural Heritage Resources

Characterization	Description	Quantitative Measure or Definition of Qualitative Categories
Frequency	Considers whether the residual effect is expected to occur once, at regular or irregular intervals or continuously	**Negligible –** the condition of phenomena causing the effect rarely occurs **Low (Multiple irregular event) –** occurs at no set schedule and are unlikely to occur **Medium (Multiple regular event) –** occurs at regular intervals (i.e. >1% of the time) **High (Continuous) –** occurs continuously
Reversibility	Considers whether the residual effect is reversible or irreversible.	**Negligible –** effect ceases immediately once source or stressor is removed **Low –** effect ceases once source or stressor is removed **Medium –** effect persists for some time after source or stressor is removed **High (Irreversible) –** the residual effect is unlikely to be reversed
Ecological/Societal Value	Considers the magnitude that the residual effect is expected to have on the ecological or societal community, as determined through consultation and engagement.	**Negligible –** the VEC has no value from a cultural or societal context **Low –** the VEC is common in the LSA and/or has little to no value from a cultural or societal context **Medium –** the VEC is abundant in the RSA, though may be less so in the LSA, and/or has moderate cultural or societal value **High –** the VEC is rare and/or of high cultural or societal value

Note: Timing was not included in the original EIS.

6.2.11.3.6 Significance Definition

A significant residual adverse environmental effect of a change in Physical and Cultural Heritage Resources is defined as a Project-related environmental effect that results in the loss of, change in, or change in access to, archaeological resources or the CHVI of heritage resources, where no appropriate assessment or mitigation of the resource has been undertaken and no prior approval from the appropriate agency has been obtained.

This significance threshold considers all of the characterizations described in Table 6.2.11-2 when making a determination of significance. Direction of the residual environmental effect is important because it indicates whether a positive change or negative change will occur. Magnitude is addressed when considering whether a heritage resource is lost, the access to or the CHVI of a heritage resource has changed, and whether that action has been documented. Reversibility is addressed when assessing whether the heritage resource can return to its baseline condition once the residual effect has ceased. The existing ecological/societal value context is addressed by establishing the CHVI of heritage resources.

The remaining characterizations (i.e., geographic extent, timing, frequency, and duration) inform the determination of significance in terms of understanding where and when, how often, and the length of time the residual effect is anticipated to occur.

6.2.11.4 Existing Conditions for Physical and Cultural Heritage Resources

An update on the existing Physical and Cultural Heritage Resources are described in Section 4.13 of EIS Addendum (Vol 1) (CIAR #727).

Based on the Stage 1 and 2 AA (CIAR #227), as well as responses to IR16.6 (CIAR #377), sites with high archaeological potential occur on Hare Lake and Bamoos Lake. Four sites were identified as having high potential on the shores of Hare Lake, including one within the SSA. The end of the Hare Lake discharge pipeline is situated in proximity to an area identified as having a high potential for archaeological resources (as identified in Woodland Heritage Services Ltd., 2008 (SID#27) (CIAR #227) which was identified for further Stage 2 archaeological investigation. Areas identified as having high archaeological potential on Bamoos Lake are outside of the SSA. No other areas having a high potential for archaeological resources have been identified within the SSA.

The *Environmental Cultural Heritage Updated Baseline Report* (Stantec, 2020a) (CIAR #722) provides an update on baseline conditions related to built and cultural heritage. This information was based on the findings of the MHTSCI Checklist completed by Stantec (2020a) (CIAR #722), which identified no indicators for potential built heritage resources or cultural heritage resources within the SSA. This finding is consistent with the previously completed *Assessment of Non-Aboriginal Cultural Heritage/Built Environment/Cultural Landscape Values for the Marathon PGM-CU Project Environmental Impact Statement* (Ross Archaeological Research and Hamilton Archaeological Consulting, 2013) (provided as Appendix B of Stantec, 2020a) (CIAR #722).

The 2013 study was prepared in response to the Ministry of Tourism, Culture and Sport (now the MHSTCI) request for additional information regarding cultural heritage resources requested in their letter to the Joint Review Panel on the Environmental Impact Statement (CIAR # 310). It was also completed in accordance with and to satisfy requirements provided in the MHSTCI Checklist, based on a review of the 2008 and 2009 archaeological assessments and completion of supplementary research in the form of interviews. The 2013 study found that during the course of preparing both archaeological assessments (2008 and 2009), including field work and historical research, no potential built heritage resources or cultural heritage landscapes were identified. The results of interviews conducted with site experts determined that no potential built heritage resources or cultural heritage landscapes were identified. Therefore, the 2013 assessment concluded that there were no built heritage resources or cultural heritage landscapes within the SSA, consistent with the original EIS (2012).

Based on the findings of the MHTSCI Checklist (Stantec, 2020a) (CIAR #722), and previous work by Ross Archaeological Research and Hamilton Archaeological Consulting (2013), no indicators for potential built heritage resources or cultural heritage resources were identified. These findings are consistent with the previously completed studies prepared in support of the original EIS (2012), specifically Woodland

Heritage Services Ltd. (2008) and Ross Archaeological Research Associates (2009). No change to the previous conclusions on built and cultural heritage resources are required.

6.2.11.5 Determining Project Interactions with Physical and Cultural Heritage Resources

Table 6.2.11-3 identifies, for each potential effect, the project's physical activities that might interact with the VEC and result in the identified effect. This table is based on a similar table from the original EIS (2012) and has been updated to reflect changes to the Project.

Table 6.2.11-3: Project Interactions with Physical and Cultural Heritage Resources

Physical Activities	Effects	
	Change to archaeological resources	Change to built and cultural heritage resources
Site Preparation/ Construction		
Clearing, grubbing and stripping of vegetation, topsoil and other organic material	✓	–
Grading with topsoil	✓	–
Drilling and blasting to develop the open pits and plant site area	✓	–
Excavation and pre-stripping to remove mine rock and overburden	✓	–
Preparation of construction surfaces and installation of temporary construction facilities	✓	–
Site preparation for waste management	✓	–
Construction of administration buildings, storage buildings, other ancillary structures and site services such as parking lots, area fencing, and security systems	✓	–
Construction of explosives facilities	✓	–
Construction of PSMF containment dams and MRSA	✓	–
Management of surface water and groundwater on the site, including seepage and run-off	✓	–
Maintenance and management of mine rock stockpiles, overburden, and PSMF	✓	–
Construction of water management facilities and drainage works (including but not limited to pipelines, dewatering facilities, stormwater management, control ponds, and water management pond)	✓	–
Dewatering of natural water bodies in the project area	✓	–
Construction of new mine site access and haul roads, including any water crossings and water body shoreline works or undertaking	✓	–
Upgrading of the existing mine access road(s) and entrance(s) to the project area including any water crossings and water body shoreline works or undertakings	✓	–

Table 6.2.11-3: Project Interactions with Physical and Cultural Heritage Resources

Physical Activities	Effects	
	Change to archaeological resources	Change to built and cultural heritage resources
Construction of a 115kV electrical transmission line within a new right-of-way from the M2W transmission corridor	✓	–
Aggregate sources and amounts	✓	–
Management of waste	–	–
Any works or undertakings associated with upgrading a rail load-out facility for mine concentrate and off-site accommodations complex	✓	–
Operating vehicles	–	–
Hiring and management of workforce	–	–
Taxes, contracts and purchases	–	–
Operation		
Drilling, blasting, loading, and hauling of mine rock from the pits to the ROM stockpile pad, crusher or the MRSA	–	–
Operation of explosives facilities	–	–
Handling, transportation, use and disposal of explosives	–	–
Transportation of crushed material to coarse ore stockpile	–	–
Transportation of mill feed (ore) to the Process Plant	–	–
Process Plant operation	–	–
Transportation of filtered concentrate	–	–
Management and maintenance of the entire mine waste stream, including but not limited to process solids and mine rock	–	–
Decommissioning of the temporary process water pond (proposed during mine operations), including removal or breaching of dams	–	–
Dewatering activities (e.g. open pit)	–	–
Management of surface water and groundwater on the site; including seepage, run-off, contact water, process water and storm water	–	–
Management of surface water on site during dam removal or breaching	–	–
Management of domestic waste from the mine site	–	–
Management of hazardous waste	–	–
Environmental safety procedures	–	–
Operating vehicles	–	–
Hiring and management of workforce	–	–
Taxes, contracts and purchases	–	–

Table 6.2.11-3: Project Interactions with Physical and Cultural Heritage Resources

Physical Activities	Effects	
	Change to archaeological resources	Change to built and cultural heritage resources
Decommissioning and Closure/Post-Closure		
Installation of barriers around the pit perimeters	–	–
Management of inputs from groundwater and surface water run-off into pits	–	–
Decommissioning, dismantling and/or disposal of equipment	–	–
Demolition/removal of surface buildings and associated infrastructure and disposal of resulting rubble	–	–
Decommissioning/removal of explosives facilities	–	–
Removal of power lines and electrical equipment	–	–
Decommissioning of the potable water and sewage treatment systems (e.g water treatment plant and membrane bioreactor)	–	–
Maintenance and management of mine rock stockpiles and PSMF	–	–
Following removal of infrastructure, soil, groundwater, and surface water testing for residual contamination, and disposal of contaminated soils and treatment of groundwater and surface water, as required	–	–
Reclamation and restoration of landscape (including water bodies) to productive capacity including management and monitoring	–	–
Management of flooded pits to protect groundwater and surface water quality during flooding and pit overflow	–	–
Operating vehicles	–	–
Hiring and management of workforce	–	–
Taxes, contracts and purchases	–	–

Notes:

✓ = Potential interaction

– = No interaction

* minor wording changes to the physical activities list have been made to better align with the updated Project description covered in Chapter 1 (EIS Addendum [Vol 1])

Although no archaeological resources have been documented within the SSA to date, potential interactions between the Project and archaeological resources remains. The possibility exists that archaeological resources could be recovered during the Stage 2 archaeological field work program to be completed prior to construction near the area of high archaeological potential identified on the shore of Hare Lake near the discharge pipeline alignment, or elsewhere encountered within the SSA during ground site preparation and construction activities (i.e., unidentified resources that may be encountered during ground disturbance). Opportunities to avoid potential interactions will be informed by the results of the Stage 2 AA work in this area through siting of the discharge pipeline to Hare Lake during detailed

design. Interactions that do not involve physical ground disturbance, soil compaction, and/or landscape modification during construction will not change archaeological resources within the SSA.

While the key Project components (the open pits, MRSA and the PSMF) will be expanding throughout the operation phase of the Project, most of the potential interactions with archaeological resources will take place during site preparation and construction. Site preparation activities within the open pits and PSMF are assessed as construction activities, even though they may take place during the operation phase.

Archaeological resources within the SSA that may be affected during the operation phase have already been assessed for environmental effects during the construction phase. Therefore, effects during the operation phase that were already assessed during the construction phase will not interact further with archaeological resources. Similarly, there are no interactions with archaeological resources during closure because associated activities will not include ground disturbance outside the SSA.

As identified in Section 6.2.11.1.1 of this report, a rise in water levels of more than 1 m in Hare Lake as a result of mine-related activities could affect potential archaeological sites. Based on the findings of the Surface Water Hydrology Updated Effects Assessment Report (Appendix D3 of this EIS Addendum [Vol 2]), the net change in flow is expected to account for a 0.25 cm decrease during construction and a 1.16 cm increase during operation in water level for Hare Lake, a change from the baseline stage of 0.309 m to 0.306 m and 0.321 m, respectively. As such, no interaction with the potential archaeological sites around the perimeter of Hare Lake are anticipated.

Based on the findings of the MHTSCI Checklist (refer to Stantec, 2020a) (CIAR #722), no indicators for potential built heritage resources or cultural heritage resources were identified within the SSA. The site preparation, construction, operation, and decommissioning and closure phases of the Project will be well removed from any area of cultural significance; therefore, built and cultural heritage landscapes will not be affected by the Project. As there is no potential for the physical activities associated with the Project to interact with built and cultural heritage resources, this potential effect has not been carried forward for further evaluation in this assessment.

6.2.11.6 Assessment of Residual Effects on Physical and Cultural Heritage Resources

6.2.11.6.1 Change to Archaeological Resources

Analytical Assessment Techniques

Baseline data established for archaeological resources was used to qualitatively assess if resources could be affected by Project activities through removal or alteration of archaeological sites or resources. If a Project component or physical activity potentially affected an archaeological resource, mitigation procedures were considered, followed by characterization of the residual effect, and determination of significance.

Project Pathways

During the construction phase, the SSA will be subject to soil removal (including site preparation of the open pit areas) and other activities that, in the absence of any mitigation, could affect existing archaeological resources. Without mitigation, these activities would cause the loss of the archaeological resource by removing the resource from its original context and destroying it without any recovery of the associated archaeological artifacts or by removing the resource from its original context but still retaining the associated archaeological artifacts. The Stage 1 and 2 AA (Woodland Heritage Services Ltd., 2008 and Ross Archaeological Research Associates, 2009) did not identify any archaeological resources within the SSA. However, the Stage 1 and 2 AA by Ross Archaeological Research Associates, 2009 identified four sites on the perimeter of Hare Lake of high archaeological potential, one in proximity to where the Hare Lake discharge pipeline is proposed to be located. Further archaeological assessment (i.e., Stage 2 AA) was recommended for this area prior to construction.

It is possible that archaeological resources could be found during the additional field work and chance finds or deeply buried archaeological resources could be uncovered during the site preparation and construction phase. Mitigation to address these previously undocumented archaeological resources is discussed in the section below.

Avoidance of high potential sites on the perimeter of Hare Lake is preferred. Opportunities to adjust the location of the discharge pipeline will be explored through detailed design. Since areas of high archaeological potential that may experience ground disturbance in the SSA will be investigated prior to the construction phase and any chance finds or deeply buried archaeological resources (if they exist) will be documented during construction activities, it is not anticipated that archaeological resources will be affected during the operation or closure phases.

Mitigation and Enhancement Measures

An additional area of Stage 2 AA may be undertaken prior to construction, if the final alignment of the discharge pipeline remains in close proximity to the area of high archaeological potential on Hare Lake, however avoidance of this area is the preferred mitigation measure. Further refinement of the discharge pipeline alignment may occur during detailed design. If the discharge pipeline remains in its current alignment and a Stage 2 AA is conducted, if any archaeological resources are documented, the MHSTCI's *Standards and Guidelines for Consultant Archaeologists* will be followed in order to address follow-up Stage 3 archaeological assessment and, if required, Stage 4 archaeological mitigation. Local Indigenous communities will be invited to participate in these field programs (i.e., as field monitors) and to review and inform the assessment of findings resulting from this work.

Effects on archaeological resources will be avoided since the archaeological assessment programs have (or will be) conducted in the SSA prior to ground disturbance activities. Mitigation measures outlined in the original EIS (2012), which are described in Section 6.2.11.1.1 of this report, remain valid for the purposes of the EIS Addendum, with the addition of the above noted additional Stage 2 AA work for the Hare Lake discharge pipeline.

An archaeological and heritage resource follow-up and monitoring program will form part of the Project EMMP (refer to Chapter 7 of this EIS Addendum [Vol 2]), outlining the responsive action and process of documentation regarding the unexpected discovery of additional archaeological resources.

Project Residual Effect

To date, no archaeological resources have been identified that would be affected by the Project. Therefore, no residual adverse effect on archaeological resources is anticipated. Following implementation of the proposed mitigation measures, effects on archaeological resources will be reduced, having carried out archaeological assessment programs in areas of archaeological potential prior to ground disturbance activities in these areas during the construction phase. Furthermore, protocols to protect archaeological resources will be implemented in the event of a chance find.

Determination of Significance

The significance of residual effects was not assessed as no residual effects were identified. This prediction is the same as that of the original EIS (2012).

6.2.11.6.2 Change to Built and Cultural Heritage Resources

As there are no potential interactions between Project and built or cultural heritage resources, no residual adverse environmental effects were identified or predicted. The significance of residual effects was not assessed as no residual effects were identified. This prediction is the same as that of the original EIS (2012).

6.2.11.7 Prediction Confidence

This prediction of significance of potential residual effects on Physical and Cultural Heritage Resources is made with a moderate level of confidence due to:

- the comprehensive background research and field work program for physical and cultural heritage resources.
- the archaeological assessments conducted to date not having identified the presence of any archaeological resources to be affected by the Project, acknowledging the potential for additional resources or chance finds to be encountered within the SSA prior to or during ground disturbance activities for which additional investigation and/or mitigation may be required.
- the implementation of procedures to mitigate the discovery of any previously undocumented archaeological resources.
- well-established government prescribed standards and procedures used for a wide variety of projects in Ontario which will allow architectural and/or historical resources to be either avoided or documented prior to removal.

6.2.11.8 Summary of Project Residual Effects

With the proposed mitigation measures, no residual effects on Physical and Cultural Heritage Resources for all phases of the Project are anticipated.

6.2.11.9 References

Ministry of Heritage, Tourism, Sport, and Culture Industries. 2016. *Criteria for Evaluating Potential for Built Heritage Resources and Cultural Heritage Landscapes*. Electric document: http://www.mtc.gov.on.ca/en/heritage/tools.shtml. Last accessed: September 11, 2020.

Ministry of Heritage, Tourism, Sport, and Culture Industries. 2017. *Information Bulletin 3: Heritage Impact Assessment (Information Bulletin 3)* (approved January 31, 2017).

Stantec Consulting Ltd. (Stantec). 2020a. Marathon Palladium Project Environmental Cultural Heritage Updated Baseline Report. Prepared for Generation PGM Inc. 13 November 2020.