Optimization Report – Table 2-1 Addendum

Greenstone Gold Mines (GGM) produced a Detailed Engineering Design Optimizations (Optimization Report; GGM, 2019) which followed up of GGM's commitment to continual improvement and described certain minor refinements to Project components that have occurred through the detailed design process since publication of the Final Environmental Impact Statement/Environmental Assessment (EIS/EA). This report is intended to provide additional information to demonstrate that the optimizations do not result in any environmental effects that were not previously identified in the EIS/EA and therefore no new mitigation measures are required and there are no changes to the conclusions of the assessment. More specifically the Project remains consistent with the general descriptions set out in the EIS/EA and the optimizations have generally resulted in further minimizing environmental effects consistent with GGM's commitment to continual improvement. While none of the continual improvement optimizations represent material changes to the Project, Section 5.10 of the EIS/EA discussed the expectation of how the Project is likely to be refined with ongoing Project planning and engineering design and to address potential refinements, a conservative approach regarding Project activities and components was incorporated in the EIS/EA. By taking a conservative approach, potential changes to the Project were not anticipated to alter the overall conclusions of the EIS/EA. The Optimization Report was also reviewed and is supported by the Indigenous communities.

Project Component	Description of Optimization (From Optimization Report – Submitted to MECP and IAA October 2019)	Additional Information on How Potential Effects Were Considered in the Final EIS/EA including Mitigation Measures.
Optimizations Made as a Result of EIS/EA Commitments		
Pond M1 **(Figure 2-1)**	Detailed engineering has optimized the sizing siting of Pond M1 with the goal of increasing the setback from the Goldfield Creek diversion. This design refinement was undertaken in response to comments from government agencies and Aboriginal communities on the EIS/EA, primarily relating to the proximity of the creek floodplain. The function of the pond remains unchanged from information presented in the EIS/EA. The pond continues to be the central water management pond in which contact water is directed towards for the site. The optimized location of Pond M1 is approximately 350 m to the northeast of the original location.	Water Management Facilities were identified as a Project component in the EIS/EA and Project-Valued Component (VC) interactions that would result in a potential effect were identified. A description of Water Management Facilities, including Pond M1, was provided in Section 5.4.8 in the Project description chapter (Ch.5) of the EIS/EA. Potential environmental effects from Water Management Facilities were considered in the following VC chapters: Atmospheric Environment (Ch.7), Acoustic Environment (Ch.8), Groundwater (Ch.9), Surface Water (Ch.10), Fish and Fish Habitat (Ch.11), Vegetation Communities (Ch.12), Wildlife and Wildlife Habitat (Ch.13), Land and Resource Use (Ch.16), Heritage Resources (Ch.17), Traditional Land and Resource Use (Ch.18), and Human and Ecological Health (Ch.19). In each of these chapters, where a potential adverse effect was identified, mitigation measures have been identified and will be implemented as part of the Project. Mitigation measures identified in the EIS/EA that apply to the potential effects of the construction and use of water management facilities remain unchanged and include: • Reduce Project effluent discharge by reusing contact water in Project processes. • Maintain existing drainage patterns with the use of culverts. • Attenuate peak discharges to the environment through use of Project water storage features (i.e., historical underground workings, and contact water collection ponds). • Construction and use of perimeter runoff and contact water collection ditches to collect overland flow, seepage, and intercept shallow groundwater flow, and divert freshwater away from Project components. • Contact water collection ditches designed to convey the 1:100 year storm event. • Contact water collection ponds designed to provide onsite storage of local runoff with the size and residence times designed to provide sediment removal. • Contact water collection ponds designed to contain (without discharge) flows resulting from the 1:100 year, 24-hour storm event • Contact water collection ponds designed with active water storage that considers ice thickness during winter. • Excess water will be pumped to pond M1 and then to the Southwest Arm of Kenogamisis Lake following treatment as needed. • Recycling of contact water for ore processing. • Taking process water, in order of preference, from the TMF, pond M1, and excess water from the historical underground workings and open pit dewatering. • Balancing the timing of recycling from sources, which will relieve storage pressures on contact water collection ponds, provide a more sustainable, seasonally attenuated mill demand system, and moderate the flows to the ETP. • Promote the collection, storage and reuse of contact water (runoff and seepage), only discharging excess water after reuse and treatment as necessary. • Building and operating an ETP to collect and treat (as required) surplus contact water before discharge to the environment, with effluent to meet MMER/O.Reg. 560/94 effluent criteria and ECA effluent criteria requirements. As noted in the Design Optimization Report, the Pond M1 detailed design was undertaken to increase the setback from the Goldfield Creek diversion. This was a commitment made in the EIS/EA that has been successfully completed by GGM.
Access to the Southwest Arm of Kenogamisis Lake (East Access Road) (**Figure 2-2)**	GGM committed in the EIS/EA to maintaining public access to the Southwest Arm of Kenogamisis Lake. Maintaining this access is important for Aboriginal communities and the public to continue using the lake for fishing, harvesting and recreation. The holder of mineral exploration claims on the peninsula between the Central	In addition to the initial discussion provided noting GGM's commitment to maintain alternate access, GGM notes that the development of alternate access was a requirement mitigation in accordance with Federal Environmental Assessment Decision Statement condition 6.1 which has now been satisfied without the need to alter the Project footprint. It's implementation through the detailed engineering process is consistent with the EIS/EA.

Project Component	Description of Optimization (From Optimization Report – Submitted to MECP and IAA October 2019)	Additional Information on How Potential Effects Were Considered in the Final EIS/EA including Mitigation Measures.
	Basin and Southwest Arm of Kenogamisis Lake also expressed a desire for road access through the Project site to access the claimed area. An access road from Highway 11, located along the EIS/EA Project development area (PDA) boundary, is included to provide access to the lake during all phases of the Project. The entrance to Highway 11 will be designed in discussion with MTO in accordance with MTO design criteria and will be an uncontrolled intersection, subject to applicable MTO permits/approvals. The access road will run from Highway 11 along the east side of waste rock storage areas A and B. The road is approximately 4.5 km long, 20 m wide and will be a gravel surface.	As noted in the Design Optimization Report, the alternate access is an important mitigation for Indigenous communities and the public to continue using the lake for fishing, harvesting and recreation.
Goldfield Creek Diversion Optimizations (**Figure 2-3**)	The Project's Independent TMF Review Board (ITRB) was established by GGM to review and advise on the design, construction, operation, performance, and closure planning for the TMF, with the objective of long-term safety and environmental protection. As a result of an ITRB recommendation and during progression of the TMF detailed design, the Goldfield Creek Diversion Dike detailed design was improved addressing geotechnical and constructability considerations related to the slurry cutoff wall. The optimized diversion dike has been adjusted by approximately 100 m to the south that provides better foundations for the dike itself, and improved isolation of subsurface flows between the fresh water diversion and the TMF. The optimized dike location has resulted in detailed design optimizations to the associated components, including: • refinements to the Goldfield Creek Diversion Pond (GFDP) design including area, depth and location. The GFDP is now offers greater fish habitat offsetting area (approximately 19 ha) under normal water level conditions with water depths of up to 10 m • the TMF north dam and Pond T2 were adjusted by approximately 100 m to the south to accommodate the diversion dyke optimization and improve foundation conditions. Another detailed design improvement associated with the Goldfield Creek Diversion is related to the haul road crossing of the Southwest Arm Tributary, which has been integrated into grade control structure #2 to minimize the number of cross valley structures built. This design optimization improves constructability and minimizes construction disturbance within the existing floodplain.	All of these Project components were previously included in the EIS/EA and Project-Valued Component (VC) interactions that would result in a potential effect were identified. A description of the Goldfield Creek Diversion was provided in Section 5.4.19 in the Project description chapter (Ch.5) of the EIS/EA and a Draft Fish Habitat Offset Plan was provided as Appendix F10. Potential environmental effects from the Goldfield Creek Diversion were considered in the following VC chapters: Atmospheric Environment (Ch.7), Acoustic Environment (Ch.8), Groundwater (Ch.9), Surface Water (Ch.10), Fish and Fish Habitat (Ch.11), Vegetation Communities (Ch.12), Wildlife and Wildlife Habitat (Ch.13), Land and Resource Use (Ch.16), Heritage Resources (Ch.17), Traditional Land and Resource Use (Ch.18), and Human and Ecological Health (Ch.19). In each of these chapters, where a potential adverse effect was identified, mitigation measures have been identified and will be implemented as part of the Project. Mitigation measures identified in the EIS/EA that apply to the potential effects of the construction and resulting Goldfield Creek Diversion remain unchanged and include: • Use standard management practices throughout the Project, including drainage control and excavation and open pit dewatering. • Design and construction of the Goldfield Creek diversion channel extending easterly from the north end of the TMF into the Southwest Arm Tributary to convey the peak flow from the EDF (the more severe of a 100 year 24-hour rainfall event and a 100 year 30-day freshet). The diversion channel floodplain has been sized to accommodate the flows from the TMF spillway and Goldfield Creek in events greater than the 100 year storm, and has the capacity to pass flows up to and including the PMF event. The diversion dam will be constructed on Goldfield Creek south of Lake GFP4 and north of the ultimate TMF dam. The diversion channel design accounts for the post-closure condition when runoff from the TMF will be directed (through the closure spillway) into the diversion. • Habitat offsetting for the loss of fish habitat that cannot be avoided or mitigated will employ a natural channel design and incorporate habitat attributes as provided in the Fisheries Offset Plan. • Habitat offsetting through natural channel design for changes in drainage alignment for the Goldfield Creek diversion and to accommodate increased flows in the Southwest Arm Tributary from the Goldfield Creek diversion. • Limit duration of in-water work. • Conduct instream work during periods of low flow (e.g., summer, fall, or winter) to further reduce the risk to fish and their habitat or to allow work in water to be isolated from flows. • Design and plan activities and works in waterbodies such that loss or disturbance to aquatic habitat is limited and sensitive habitats are avoided. • Comply with timing windows for in-water work. • Design and construct approaches to waterbodies such that they are perpendicular to the watercourse to reduce loss or disturbance to riparian vegetation. • Undertake all in-water activities, or installation of associated in-water structures, such that interference with fish passage, reduction in channel width, or reduction in flows is limited. • Retain a qualified environmental professional to confirm that applicable permits for relocating fish are obtained and to capture fish trapped within an isolated/enclosed area at the work site and relocate them to an appropriate location in the same waters. Fish may need to be relocated again, should flooding occur in the PDA. • Follow the Water Management and Monitoring Plan, which has been developed to divert non-contact water around Project components and to collect and manage contact water. As noted in the Design Optimization Report, the design optimizations improve constructability and minimizes construction disturbance within the existing floodplain.
Optimizations Made As A Result of Detailed Design and Engineering		

Project Component	Description of Optimization (From Optimization Report – Submitted to MECP and IAA October 2019)	Additional Information on How Potential Effects Were Considered in the Final EIS/EA including Mitigation Measures.
Aggregate Source T2 (**Figure 2-4**)	Detailed design and engineering since the EIS/EA has refined the footprint of the T2 aggregate extraction site. The refined boundary is entirely within GGM mineral claims, and is now 29 ha in size compared to the 72 ha identified in the EIS/EA. This includes an approximately 0.86 ha area immediately adjacent to the EIS/EA PDA. Of the 0.86 ha, the area proposed for extraction is 0.5 ha, with the remaining 0.36 ha comprising a setback buffer from the permit boundary. A terrestrial review of the 0.86 ha area adjacent to the PDA identified that the vegetation community in this area is upland forest habitat (ecosite B040, dry sandy aspen-birch hardwood), a community common within the ecoregion and previously identified in the PDA.	The overall footprint of T2 has been reduced compared to the EIS/EA. Aggregate Sources were identified as a Project component in the EIS/EA and Project-Valued Component (VC) interactions that would result in a potential effect were identified. A description of Aggregate Sources was provided in Section 5.4.22 in the Project description chapter (Ch.5) of the EIS/EA. Potential environmental effects from Linear and Ancillary Facilities were considered in the following VC chapters: Atmospheric Environment (Ch.7), Acoustic Environment (Ch.8), Groundwater (Ch.9), Surface Water (Ch.10), Fish and Fish Habitat (Ch.11), Vegetation Communities (Ch.12), Wildlife and Wildlife Habitat (Ch.13), Land and Resource Use (Ch.16), Heritage Resources (Ch.17), Traditional Land and Resource Use (Ch.18), and Human and Ecological Health (Ch.19). In each of these chapters, where a potential adverse effect was identified, mitigation measures have been identified and will be implemented as part of the Project. Mitigation measures identified in the EIS/EA that apply to the potential effects of aggregate source development and extraction remain unchanged and include: • Limit construction footprint to the extent possible. • Implementation of a best management plan (BMP) to control fugitive dust from the Project. • Use of dust suppressants (e.g., water) during situations that have an increased potential to generate airborne dust. • Fugitive dust emission control from roads, material handling and storage areas/stockpile may include, application of water sprays, use of surfactants (as a contingency), dust sweeping, gravel application, truck wheel washing stations, and enclosure of dust sources. The site roads will be maintained in good condition, with regular inspections and maintenance to limit the loose dust on the roads. • Noise mitigation measures will be installed on construction and other mobile equipment and equipment will be properly maintained. • Potential mitigation for changes in groundwater discharge and flow in surface water features near the aggregate source areas can be mitigated by directing dewatering water to the receiving environment to augment any changes in flows. • Implement progressive rehabilitation and closure plan, including progressive rehabilitation (placement of soil cover and vegetation) to reduce infiltration by increasing the evapotranspiration capacity and control runoff. • Incorporating plant species of interest to local Aboriginal communities into the Closure Plan as feasible. • If an active bald eagle nest occurs within 800 m of Project construction or operation activities, develop protection measures. • Prior to construction flag environmentally sensitive areas adjacent to work areas (e.g., key habitat features such as dens, roosts, stick nests, beaver dams, hibernacula) prior to clearing and construction, and evaluate the features for additional mitigation measures (e.g., timing windows and/or setbacks). • Initiate revegetation as soon as practical after Project components are no longer needed. • Implementation of the Soil Management Plan. In addition, other mitigation identified in the EIS/EA for general construction activities would apply. As noted in the Design Optimization report, the refined boundary of Aggregate Source T2 is now 29 ha in size compared to the 72 ha identified in the EIS/EA, resulting in a reduced Project footprint.
Aggregate Source T2 Access Road (**Figure 2-4**)	A significantly improved access road to aggregate source T2 was identified during the detailed design phase as a result of constructability considerations. The optimized access road has multiple benefits including avoidance of topographic constraints (safer gradient) and avoidance of an existing wetland, and a reduced footprint (0.7 km shorter than the original access road). A field assessment of watercourse crossings has been completed and identified one stream (Goldfield Creek Tributary North Branch) and one low point that is an ephemeral surface drainage feature with no defined channel at the crossing location (WC-S), where culvert installation will be required. A terrestrial assessment of the optimized access road was conducted to identify potential constraints associated with the proposed route. The area investigated included the access route as well as 120 m on either side. The optimized access road is located within upland forest habitat (ecosites B040, dry sandy aspen-birch hardwood; B034 jack pine-black spruce dominated and B104 fresh, silty to fine loamy	Site roads were identified as a Project component (referred to as Linear and Ancillary Facilities) in the EIS/EA and Project-Valued Component (VC) interactions that would result in a potential effect were identified. A description of site roads was provided in Section 5.4.17 in the Project description chapter (Ch.5) of the EIS/EA. Section 5.10 of the EIS/EA also states how the Project is likely to be refined with ongoing Project planning and engineering design and to address potential refinements, a conservative approach regarding Project activities and components was incorporated in the EIS/EA. By taking a conservative approach, potential changes to the Project were not anticipated to alter the overall conclusions of the EIS/EA. Potential environmental effects from Linear and Ancillary Facilities were considered in the following VC chapters: Atmospheric Environment (Ch.7), Acoustic Environment (Ch.8), Groundwater (Ch.9), Fish and Fish Habitat (Ch.11), Vegetation Communities (Ch.12), Wildlife and Wildlife Habitat (Ch.13), Community Services and Infrastructure (Ch.15), Land and Resource Use (Ch.16), Heritage Resources (Ch.17), Traditional Land and Resource Use (Ch.18), and Human and Ecological Health (Ch.19). In each of these chapters, where a potential adverse effect was identified, mitigation measures have been identified and will be implemented as part of the Project. Mitigation measures identified in the EIS/EA that apply to the potential effects of the construction and use of roads remain unchanged and include: • Implementation of a best management plan (BMP) to control fugitive dust from the Project. • Use of dust suppressants (e.g., water) during situations that have an increased potential to generate airborne dust. • Limit vehicle speeds. • Effective and timely equipment maintenance to maintain mining equipment in good working condition. • Where possible, reduce haul routes to and within the PDA (Note: the length of the access road has been further reduced/improved through GGM's detailed engineering and continual improvement process).

Project Component	Description of Optimization (From Optimization Report – Submitted to MECP and IAA October 2019)	Additional Information on How Potential Effects Were Considered in the Final EIS/EA including Mitigation Measures.
	aspen-birch hardwood). No terrestrial constraints were identified as a result of the field investigation. The vegetation community types are common within the ecoregion and all were previously identified in the PDA; none of these vegetation communities are designated as provincially rare; and no distinct wildlife habitat features (e.g. hibernacula, animal dens, raptor nests) were identified.	• Administrative controls, including a no idling policy to reduce mobile equipment and other-use vehicle emissions. • New mobile equipment onsite will meet applicable Transport Canada off-road vehicle emission requirements. Tier 4 emissions standards are anticipated to come into effect in 2018, coinciding with early Project construction. GGM will look to acquire equipment that meets the new standard where available and feasible. • Fugitive dust emission control from roads, material handling and storage areas/stockpile may include, application of water sprays, use of surfactants (as a contingency), dust sweeping, gravel application, truck wheel washing stations, and enclosure of dust sources. The site roads will be maintained in good condition, with regular inspections and maintenance to limit the loose dust on the roads. • Noise mitigation measures (e.g., muffler systems) will be installed on construction and other mobile equipment and equipment will be properly maintained. • Limit construction footprint (i.e., PDA) to the extent possible to reduce the potential for reductions in groundwater recharge, and limit the number of watersheds overprinted by the PDA. • Use standard management practices throughout the Project, including drainage control. • Various mitigation for in water work (refer to Table 11-9 of the EIS/EA). • Implement an ESCP for the site to reduce risk of sedimentation of waterbodies during all phases of the Project. ESC measures will be maintained until all disturbed ground has been permanently stabilized, suspended sediment has resettled to the bed of the waterbody or settling basin and runoff water is clear. The ESCP will be based on standard specifications such as Ontario Provincial Standard Specifications (OPSS), in particular, OPSS 805 (Construction Specification for temporary ESC measures), OPPS, PROV 182 (General Specification for Environmental Protection for construction in Waterbodies and on Waterbody Banks) and OPSS 206 (Grading). • Managing vegetation cover along the boundaries of high activity areas (e.g., access roads) where adjacent to wildlife habitat to reduce sensory (noise and visual) disturbance. • Report wildlife-vehicle collisions, near misses or observations of a wildlife road mortality on Project roads to the Environmental Department. Implement adaptive management measures where high frequency locations of wildlife-vehicle interactions are identified. • Implement road safety measures (e.g., speed limits and signage) and yield the right of way to wildlife on Project roads to reduce wildlife road mortality. • Where Project site roads occur through forest or treed wetland communities, a regular vegetation cutting regime will occur along the edges of project site roads both to increase driver visibility and to reduce the attractiveness of the area for moose to browse. As noted in the Design Optimization Report, the access road to aggregate source T2 has multiple benefits including avoidance of topographic constraints (safer gradient) and avoidance of an existing wetland, and a reduced footprint (0.7 km shorter than the original access road).
Aggregate Source S1 (**Figure 2-5**)	Detailed design and engineering since the EIS/EA has refined the extraction plan of the S1 aggregate extraction site. The boundary is entirely within GGM mineral claims that have been taken to a Mining Lease (CLM 535), including an approximately 1.7 ha area immediately adjacent to the EIS/EA PDA. The 1.7 ha area will accommodate a surface water diversion ditch to keep non-contact water away from the extraction site; no aggregate extraction will occur in the area outside of the PDA. The requirement for a diversion ditch was identified in the EIS/EA and the location updated based on detailed engineering input.	Section 5.4.22.2 of the EIS/EA describes the surface water diversion ditch required to intercept and direct runoff to Goldfield Creek. During detailed engineering, the exact location and space requirements were determined and resulted in the boundary of the S1 pit being refined. Refer to the information presented for the *Aggregate Source T2* above for how aggregate sources were assessed and mitigated in the EIS/EA.
Temporary Effluent Treatment Plant (ETP) Discharge Pipeline (**Figure 2-6**)	Detailed engineering has identified an opportunity to improve the temporary Construction ETP discharge (also referred to as Temporary ETP). The enhanced design consists of an effluent pipeline, with the addition of a diffuser at the end of the pipeline. The discharge location has been optimized to an outlet location approximately 340 m from the shoreline at a lake depth of approximately 2.75 m. Benefits of the updated design include avoidance of shoreline habitat and increased effectiveness of mixing and dispersion of effluent, particularly during the winter months when there is ice buildup. The diffuser will be 5 m long and secured to a concrete block placed on the bottom of the lake.	Discharge from the temporary ETP was identified as part of the Site Preparation Project component in the EIS/EA (defined as *Site Preparation (removal of existing buildings and associated infrastructure, timber harvesting, vegetation clearing, earthworks, overburden and topsoil stockpiling, temporary effluent treatment and discharge*)) and Project-VC interactions that result in a potential effect between them and the VCs were identified. Where a potential adverse effect was identified, mitigation measures have been identified. A description of the Temporary ETP, including the discharge location was provided in Section 5.4.15.2 in the Project description chapter (Ch.5) of the IS/EA. The quantity and quality of effluent discharge from the temporary ETP has not changed from the EIS/EA. Potential environmental effects from Site Preparation were considered in the following VC chapters: Atmospheric Environment (Ch.7), Acoustic Environment (Ch.8), Groundwater (Ch.9), Surface Water (Ch.10), Fish and Fish Habitat (Ch.11), Vegetation Communities (Ch.12), Wildlife and Wildlife Habitat (Ch.13), Labour and Economy (Ch.14), Community Services and Infrastructure (Ch.15), Land and Resource Use (Ch.16), Heritage Resources (Ch.17), Traditional Land and Resource Use (Ch.18), and Human and Ecological Health (Ch.19). In each of these chapters, where a potential adverse effect was identified, mitigation measures have been identified and will be implemented as part of the Project.

Project Component	Description of Optimization (From Optimization Report – Submitted to MECP and IAA October 2019)	Additional Information on How Potential Effects Were Considered in the Final EIS/EA including Mitigation Measures.
		Mitigation measures identified in the EIS/EA that apply to the potential effects of the construction and operation of the temporary ETP discharge remain unchanged and include: • Treat effluent discharge to the receiving water environment where required to effluent criteria developed through the receiving water Assimilative Capacity Study. • Water from the seepage collection ponds will be pumped to the construction ETP for treatment prior to discharge during construction. • Limit duration of in-water work. • Design and plan activities and works in waterbodies such that loss or disturbance to aquatic habitat is limited and sensitive habitats are avoided. • Plan activities near water such that materials such as paint, primers, blasting abrasives, rust solvents, degreasers, grout, or other chemicals do not enter the watercourse. • Follow the Water Management and Monitoring Plan, which has been developed to divert non-contact water around Project components and to collect and manage contact water. • Implement a Spill Prevention and Contingency Plan immediately in the event of a sediment release or spill of a deleterious substance and an emergency spill kit will be kept onsite. • Design the ETP to treat effluent to levels that will not be acutely toxic in the effluent, will not have chronic toxicity outside the mixing zone, and will meet applicable guidelines outside the mixing zone. • Implement an Erosion and Sedimentation Control Plan for the site to reduce risk of sedimentation of waterbodies during all phases of the Project. • Treat and handle building material used in water in a manner to prevent the release or leaching of substances into the water that may be deleterious to fish. • Design water intake and treated effluent discharge location to prevent entrainment or impingement of fish and to prevent scour erosion. • Keep clearing of riparian vegetation to a minimum. • Promptly stabilize shoreline or banks disturbed by activities associated with the Project to prevent erosion and/or sedimentation. As described in the Optimization Design Report, benefits of the optimized design include avoidance of shoreline habitat and increased effectiveness of mixing and dispersion of effluent, particularly during the winter months when there is ice buildup.
Sand Washer - Seasonal Water Taking and Water Line (**Figure 2-7**)	Detailed design has determined that a sand washer will likely be required to remove fine silt-sized material from sand and gravel collected from S1 and S4 aggregate sources. The sand washer will source water seasonally from Kenogamisis Lake. The sand washer is anticipated to require approximately 900 m^3 per day and is consistent with the volume of water taking estimated in the EA.	A freshwater intake is required in Kenogamisis Lake at the south side of the Project development area to ensure aggregate material specifications are met for the TMF construction. The effects of surface water taking from Kenogamisis Lake were evaluated as part of the EIS/EA including a maximum predicted water taking of 24,024,000 L/day. The EIS/EA concluded that there is no significant effect to surface water quantity as a result of the water withdrawal on the Southwest Arm and Kenogamisis Lake as a whole. Even with the addition of this freshwater intake for the sandwasher washer/south side of the PDA during construction of the TMF, the combined water taking being requested for permitting is an order of magnitude less than what was assessed in the EA. Onsite Pipelines (referred to as Linear and Ancillary Facilities) and Water Management infrastructure and activities were identified in the EIS/EA and Project-VC interactions that result in a potential effect between them and the VCs were identified. Where a potential adverse effect was identified, mitigation measures have been identified in the EIS/EA. A description of Onsite Pipelines was provided in Section 5.4.20 in the Project Description Chapter. Freshwater taking from the Southwest Arm of the Kenogamisis Lake was assessed in the Assessment of Potential Environmental Effects on Surface Water (Ch.10) in the EIS/EA. Mitigation measures identified in the EIS/EA that apply to the potential effects of the construction and operation of the Water Taking and Water Line remain unchanged an include: • Limit duration of in-water work. • Design and plan activities and works in waterbodies such that loss or disturbance to aquatic habitat is limited and sensitive habitats are avoided. • Plan activities near water such that materials such as paint, primers, blasting abrasives, rust solvents, degreasers, grout, or other chemicals do not enter the watercourse. • Follow the Water Management and Monitoring Plan. • Implement a Spill Prevention and Contingency Plan immediately in the event of a sediment release or spill of a deleterious substance and an emergency spill kit will be kept onsite • Implement an Erosion and Sedimentation Control Plan for the site to reduce risk of sedimentation of waterbodies during all phases of the Project. • Treat and handle building material used in water in a manner to prevent the release or leaching of substances into the water that may be deleterious to fish. • Design water intake and treated effluent discharge location to prevent entrainment or impingement of fish and to prevent scour erosion. Water intake structures will be designed following the Freshwater Intake End-of-Pipe Fish Screen Guideline (DFO 1995). Designs will be based on site-specific parameters including anticipated fish use and resident fish species.

Project Component	Description of Optimization (From Optimization Report – Submitted to MECP and IAA October 2019)	Additional Information on How Potential Effects Were Considered in the Final EIS/EA including Mitigation Measures.
		• Keep clearing of riparian vegetation to a minimum. • Promptly stabilize shoreline or banks disturbed by activities associated with the Project to prevent erosion and/or sedimentation.
Operational ETP Discharge Pipeline and Access Road (**Figure 2-8**)	Detailed engineering has identified an improved routing for the operational ETP discharge pipeline reducing the length within the shoreline Surface Rights Reservation. The discharge location (end of pipe) is the same as presented in the EIS/EA.	Refer to the information presented for the *Aggregate Source T2 Access Road* and *Temporary Effluent Treatment Plant (ETP) Discharge Pipeline* above.
Fresh Water Intake Pipeline and Access Road (**Figure 2-9**)	Detailed engineering has identified an improved routing for the fresh water intake pipeline, which avoids wetlands surrounding the Southwest Arm Tributary. The water intake location remains the same as shown in the EIS/EA.	The freshwater intake pipeline and road were included in the EIS/EA. Please refer to the additional information presented for the *Aggregate Source T2 Access Road* and *Temporary Effluent Treatment Plant (ETP) Discharge Pipeline* above which contain appropriate mitigation measures from the EIS/EA.
Power Line and Transformer Station Access Road (**Figure 2-10**)	The access road alignment to the Longlac Transformer Station is required to the east side of the MTO Patrol Yard. Highway 11 is designated as a controlled access highway and as such, permitted access must meet specific spacing requirements. The updated access point is required to accommodate these spacing requirements. Existing access points will remain including the existing Mosher access point for the Transmission Station access road. The access road corridor will continue to be used for utilities including the Project power lines.	For clarification, the access point has only been shifted by approximately 0.45 km to the other side of the MTO Patrol yard. In the EIS/EA GGM committed to meet MTO design standards as a mitigation measure for the highway re-alignment and this optimization is has been carried out to meet that mitigation commitment.
Liquid Sulphur (SO_2) Dioxide Storage Tanks	As detailed engineering has progressed, an opportunity has been identified to simplify operations related to sourcing the SO_2 used in the cyanide detoxification process. Rather than undertaking the solid to liquid sulphur transformation process on site, liquid SO_2 will be delivered and stored in two above ground storage tanks located within the process plant. Delivery and storage of SO_2 is considered to provide a more reliable source for the cyanide destruction process, and is commonly used at most other gold mines in Ontario.	Ore Processing was identified as a Project component in the EIS/EA and Project-Valued Component (VC) interactions that would result in a potential effect were identified. A description of Ore Processing was provided in Section 5.7.3 in the Project description chapter (Ch.5) of the EIS/EA. Potential environmental effects from Ore Processing were considered in the following VC chapters: Atmospheric Environment (Ch.7), Acoustic Environment (Ch.8), Groundwater (Ch.9), Surface Water (Ch.10), Vegetation Communities (Ch.12), Wildlife and Wildlife Habitat (Ch.13), Land and Resource Use (Ch.16), Traditional Land and Resource Use (Ch.18), and Human and Ecological Health (Ch.19). In each of these chapters, where a potential adverse effect was identified, mitigation measures have been identified and will be implemented as part of the Project. The refinement in source of SO_2 does not alter the emissions or potential environmental effects from ore processing and cyanide detoxification will occur as described in the EIS/EA. Mitigation measures identified in the EIS/EA that apply to the potential effects of Ore Processing remain unchanged and include: • Using a wet scrubber (or equivalent) on the induction furnace to control emissions. • Implementation of cyanide detoxification technology to reduce cyanide concentrations and precipitate metals in the process plant, resulting in an improvement in water quality within the TMF. • Cyanide detoxification within the mill using the SO2/air oxidation process resulting in the degradation of cyanide and precipitation of metals, iron, arsenic and antimony in particular, to the extent practical. • Mill reagents will be delivered to the Project in accordance with Transportation of Dangerous Goods Regulations and stored onsite in secure locations.