



*Treasury Metals
Revised EIS Report
Goliath Gold Project
April 2018*



APPENDIX LL

IMPACT FOOTPRINTS AND EFFECTS

NOTE TO READER APPENDIX LL

In April 2015, Treasury Metals submitted an Environmental Impact Statement (EIS) for the proposed Goliath Gold Project (the Project) to the Canadian Environmental Assessment Agency (the Agency) for consideration under the Canadian Environmental Assessment Act (CEAA), 2012. The Agency reviewed the submission and informed Treasury Metals that the requirements of the EIS Guidelines for the Project were met and that the Agency would begin its technical review of the submission. In June 2015, the Agency issued a series of information requests to Treasury Metals regarding the EIS and supporting appendices (referred to herein as the Round 1 information requests). The Round 1 information requests included questions from the Agency, other federal and provincial reviewers, and members of Indigenous communities, as well as interested stakeholders. As part of the Round 1 information request process, the Agency requested that Treasury Metals consolidate the responses to the information requests into a revised EIS for the Project.

Appendix LL to the revised EIS (Impact Footprints and Effects) provides a series of figures with a minimal amount of text to provide an illustration of the potential effects of the Goliath Gold Project on the environment. Appendix LL was produced to aid in stakeholder engagement activities.

As part of the process to revise the EIS, Treasury Metals has undertaken a review of the status for the various appendices. The status of each appendix to the revised EIS has been classified as one of the following:

- **Unchanged:** The appendix remains unchanged from the original EIS, and has been re-issued as part revised EIS.
- **Minor Changes:** The appendix remains relatively unchanged from the original EIS, and has been re-issued with relevant clarification.
- **Major Revisions:** The appendix has been substantially changed from the original EIS. A re-written appendix has been issued as part of the revised EIS.
- **Superseded:** The appendix is no longer required to support the EIS. The information in the original appendix has been replaced by information provided in a new appendix prepared to support the revised EIS.
- **New:** This is a new appendix prepared to support the revised EIS.

The following table provides a listing of the appendices to the revised EIS, along with a listing of the status of each appendix and their description.

List of Appendices to the Revised EIS		
Appendix	Status	Description
Appendix A	Major Revisions	Table of Concordance

List of Appendices to the Revised EIS		
Appendix	Status	Description
Appendix B	Unchanged	Optimization Study
Appendix C	Unchanged	Mining Study
Appendix D	Major Revisions	Tailings Storage Facility
Appendix E	Minor Changes	Traffic Study
Appendix F	Major Revisions	Water Management Plan
Appendix G	Superseded	Environmental Baseline
Appendix H	Minor Changes	Acoustic Environment Study
Appendix I	Unchanged	Light Environment Study
Appendix J	Minor Changes	Air Quality Study
Appendix K	Minor Changes	Geochemistry
Appendix L	Superseded	Geochemical Modelling
Appendix M	Minor Changes	Hydrogeology
Appendix N	Unchanged	Surface Hydrology
Appendix O	Superseded	Hydrologic Modeling
Appendix P	Unchanged	Aquatics DST
Appendix Q	Major Revisions	Fisheries and Habitat
Appendix R	Major Revisions	Terrestrial
Appendix S	Major Revisions	Wetlands
Appendix T	Unchanged	Socio-Economic
Appendix U	Minor Changes	Heritage Resources
Appendix V	Major Revisions	Public Engagement
Appendix W	Unchanged	Screening Level Risk Assessment
Appendix X	Major Revisions	Alternatives Assessment Matrix
Appendix Y	Unchanged	EIS Guidelines
Appendix Z	Unchanged	TML Corporate Policies
Appendix AA	Major Revisions	List of Mineral Claims
Appendix BB	Unchanged	Preliminary Economic Assessment
Appendix CC	Unchanged	Mining, Dynamic And Dependable For Ontario's Future
Appendix DD	Major Revisions	Indigenous Engagement Report
Appendix EE	Unchanged	Country Foods Assessment
Appendix FF	Unchanged	Photo Record Of The Goliath Gold Project
Appendix GG	Minor Changes	TSF Failure Modelling
Appendix HH	Unchanged	Failure Modes And Effects Analysis
Appendix II	Major Revisions	Draft Fisheries Compensation Strategy and Plans
Appendix JJ	New	Water Report
Appendix KK	New	Conceptual Closure Plan
Appendix LL	New	Impact Footprints and Effects



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Goliath Gold Project**

Impact Footprints and Effect Areas

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1.0 INTRODUCTION

During the life of the Project there will be a number physical, biological and access effects associated with the Project that could have the potential to impact the ability of Aboriginal peoples to practice traditional uses of the land. It is the purpose of this report to provide a visual representation of the areas where potential impacts to traditional land uses could occur. The report distinguishes between the areas impacted during the active Project life (up to the point when closure activities are completed), and those areas where impacts will persist well after the site has been closed and rehabilitated. These areas are referred to herein as “impact footprints”.

The identified impact footprints represent areas where it was determined that traditional uses of the land would not likely be possible. In determining the impact footprints, the discipline experts who completed the assessment have identified those areas where they concluded that changes as a result of the Project would be sufficient to preclude traditional uses of the land. However, the impact footprints do not take into consideration whether the land is currently used for traditional uses. It is hoped that this document can serve as a useful tool to help understand where the identified impacts of the Project coincide with areas that are used by Aboriginal people for traditional land uses.

When identifying the impact footprints, those areas where the Project will likely cause noticeable, albeit relatively small changes to the environment, but that would not alter the ability of Aboriginal people to practice traditional used of the land (e.g., watercourses where flows will change as a result of the Project, but where the altered flows would not impact the fish populations present). These areas were classified as “affected areas”, and have been included to provide a comprehensive picture of the expected impacts and effects to traditional land users.

For clarity, the impact footprints and affected areas have been described for each of the individual disciplines that could affect the ability of Aboriginal peoples to practice traditional uses of the land. These impact areas are then combined to yield an overall impact footprint.



2.0 IMPACT AREAS DURING THE ACTIVE PROJECT LIFE

The assessment completed to support the EIS, as well as the work done in supporting the responses to the Round 1 information requests have confirmed that the effects of the Project will be most noticeable during the active life of the Project. The active Project life is considered to include the site preparation and construction phase, the operations phase, and the closure phase. Treasury Metals also acknowledges that there will also be a period of time following the completion of the closure activities when effects will persist as the site is progressing to the long-term, post-closure conditions (e.g., filling of the open pit and groundwater levels returning to near pre-disturbance conditions).

The following sections describe the impact footprints during the active life of the Project for each of the disciplines likely to influence the ability of Aboriginal peoples to practice traditional uses of the land. Impact figures are present at the end of the report for each discipline and then combined together to provide an overall impact footprint for the active Project life. Where relevant, the affected areas are also identified for each of the disciplines. For clarity, the impact footprints and affected areas are summarized in a text box prior to them being described. These text boxes are shaded to match the colouring on the impact figures (i.e., gold for the impact footprints and green for the affected areas).

2.1 Terrain and Soils

The operations area is considered impacted

During site preparation and construction, overburden and soils will be stripped from the mine footprint and stockpiled in the overburden stockpiles. During operations, waste rock from the open pit mine will be placed in the waste rock storage area (WRSA). A portion of the ore mined from the open pit will be stored in the low-grade ore (LGO) stockpile to balance the feedstock during underground mining. Tailings from the process facility will be deposited into the tailings storage facility (TSF). Given the compact footprint of the Project, all of the operations area is considered to be impacted for terrain and soils. The predicted impact areas associated with physical disturbances to terrain and soils are shown as gold shaded areas on Figure 2.1-1.

Portions of Thunder Lake where WRSA visible considered affected

The WRSA will be the most prominent feature on site, and could be visible from areas on the western half of Thunder Lake. This would not alter the ability of Aboriginal peoples to practice traditional land uses in these areas; however, the Project could be noticeable. Therefore, the areas where the WRSA may be visible are considered to be affected by the Project, not impacted. The other features such as the overburden stockpile, LGO stockpile and the TSF would not be visible off-site. Within the operations area, any soils affected by activities at the site will be remediated or removed from the site in accordance with the Emergency and Spill response Management Plan. The green shading on the Figure 2.1-1 illustrates the affected areas where the WRSA could be visible. The affected areas would still be available for practicing traditional uses of the land by Aboriginal people.



2.2 Noise

Areas above 50 dBA considered impacted

Activities and equipment operating at the Project will generate noise emissions and affect ambient noise levels. Published literature, including data published by Environment Canada, suggest high levels of environmental noise levels (i.e., greater than 50 dBA) would be disruptive to wildlife, especially migratory birds, causing changes in behaviour or avoidance of affected areas. As a result, areas with high noise levels would likely not be suitable for traditional harvesting as species could be displaced or behave abnormally. The areas above 50 dBA during operations are shown on Figure 2.2-1 with gold shading.

Areas above 40 dBA considered affected

In addition to the potential for high levels of noise to affect wildlife behaviour, noise from Project activities could be noticeable to individuals practicing traditional land uses in the vicinity of the Project. In identifying those areas where noise from the Project might be noticeable, the MOECC guideline for nighttime noise levels in remote and rural areas (i.e., 40 dBA) was used. Although the MOECC guidelines only apply for points of reception (e.g., residential dwellings), the areas above 40 dBA shown with green shading on Figure 2.2-1 indicates those areas considered to be affected by the Project. As levels above 40 dBA will not impact wildlife, there should be no impact on the ability of Aboriginal peoples practicing traditional uses of the land in these areas.

Blasting effects captured within 40 dBA area

During the life of the Project, blasting will occur to support the mining activities. While mining is underway in the open pit, these activities could result in effects that are noticeable offsite. However, a review of the predicted noise and vibration from blasting shows they will affect a smaller area than is affected by the ambient noise levels. Therefore, the areas shaded in green on Figure 2.2-1 (i.e., areas with noise above 40 dBA) would include those areas where blasting effects would be noticeable. There were no predicted impacts of blasting on wildlife or fish.

2.3 Light

Areas with light trespass greater than 0 lux considered impacted

During operations, artificial, exterior lighting will be used at the process plant for safety and security reasons. Light from the Project that escapes from the processing area is considered light trespass, and may potentially affect traditional uses of the land. Conservatively, the impacted areas were classified as those areas where there was any predicted light trespass as a result of the Project, which is to say those areas where light trespass is predicted to be greater than 0 lux. This area is shown with gold shading on Figure 2.3-1.

2.4 Air Quality

Areas above health-based AAQC are considered impacted

Areas where predicted maximum concentrations exceed the relevant health-based ambient air quality criteria (AAQC) were considered as being impacted by the Project. Only annual total suspended particulate (TSP), 24-hour inhalable particulate matter (PM₁₀), 24-hour respirable



particulate matter (PM_{2.5}), 1-hour nitrogen dioxide (NO₂) and 24-hour NO₂ had maximum concentration that were predicted to exceed relevant health-based criteria. The impacted areas shown with gold shading on Figure 2.4-1 include the combined impact areas of each of the individual compounds and averaging periods illustrated on the left side of the figure. These impact areas also include the contribution of the background concentrations for each compound. It should be noted that predicted concentrations in excess of these health-based criteria do not indicate that health impacts will occur as the criteria are established with margins of safety to protect the public. Additionally, areas in excess of the criteria do not indicate that vegetation would be affected, or that wildlife would avoid the areas.

Areas with 24-hour TSP above AAQC are considered to be affected

In addition to establishing AAQC to be protective of human health, the MOECC has established a number of aesthetic criteria designed to protect against nuisance effects. One such criteria is the 24-hour AAQC for TSP, which is established to protect against visibility effects. The areas where 24-hour TSP was predicted to exceed the AAQC based on nuisance effects were considered to be affected, and are shown with green shading on Figure 2.4-1.

2.5 Surface Water Quality

The operations area is considered impacted

Treasury Metals will construct perimeter ditching to capture all surface water within the operations area. During operations, the open pit and underground mine will need to be dewatered to create a safe working environment, resulting in a drawdown zone where all groundwater will flow towards the open pit. The water from runoff and dewatering will be used in the process, with excess water treated to meet PWQO before being discharged into Blackwater Creek. As a result, the impacts of the Project on surface water quality would not extend beyond the operations area, shown with gold shading on Figure 2.5-1.

2.6 Surface Water Quantity

Watercourses with most flow diverted are considered impacted

The construction of the perimeter ditching around the operations area will impact surface water quantity within the operations area. The construction of the open pit and perimeter ditching will divert most of the flow from Blackwater Creek Tributary 1 for the life of the Project. Similarly, the construction of the TSF and minewater pond will divert most of the flow from the lower reaches of Blackwater Creek Tributary 2. Additionally, there is an unnamed tributary between Blackwater Creek Tributaries 1 and 2 that would also lose most of its flow as a result of the Project. Although these watercourses are considered intermittent, the diversion of most of the flows in from these areas would be considered an impact on surface water quantity. Therefore, the areas considered to be impacted for surface water quantity are the operations area as well as those downstream sections of Blackwater Creek Tributaries 1 and 2, and the unnamed tributary, shown with gold shading on Figure 2.6-1.



Watercourses with altered flow considered affected

The perimeter ditching will divert a portion of runoff from Little Creek and Hoffstrom's Bay Tributary to the operations area, reducing the flows slightly in these watercourses. Periodically during operations, freshwater would be required from the irrigation ponds on Thunder Lake Tributaries 2 and 3. When withdrawals occur, they would be limited to 5% of the measured flows into the irrigation ponds. Groundwater modelling identifies that dewatering will create a drawdown zone that could reduce the flows in Thunder Lake Tributaries 2 and 3 by approximately 1% on average. Water collected in the operations area and from dewatering will be used to support the process, with excess water treated and discharge to Blackwater Creek, altering flows in the watercourse. None of these potential effects on flow were predicted to be of sufficient magnitude to cause an impact to either the function of the watercourses, or fish within them. However, they will alter flows in the receiving waters and are shown as affected areas using green shading on Figure 2.6-1.

2.7 Groundwater

Groundwater impacts restricted to operations area

During operations, the open pit and underground mine will need to be dewatered to create a safe working environment. This dewatering will result in a drawdown zone within the groundwater that will extend beyond the operations area. Groundwater modelling identifies that this drawdown will not affect wetlands, and most water courses surrounding the Project. The limited affects identified in Thunder Lake Tributaries 2 and 3 are captured in the surface water quantity discussion in Section 2.6. Within the drawdown zone, all groundwater will flow towards the open pit, capturing any seepage from the potentially acid generating (PAG) materials stored in the WRSA and TSF. This captured water will be treated prior to discharge as discussed in Section 2.5. As a result, there will be no off-site effects on groundwater quality while there is a drawdown zone. Therefore, the impact area for groundwater will not extend beyond the operations area shown with gold shading on Figure 2.7-1.

Although the drawdown zone created by the dewatering of the open pit and underground mine will extend beyond the operations area for the Project, this area is not considered to cause either an impact, or have an effect, on the ability of Aboriginal peoples to practice traditional uses of the land. As discussed previously, the potential effects of the groundwater drawdown on surface water flows and wetlands was evaluated as part of the modelling prepared to support the EIS. The groundwater modelling concluded that the dewatering activities would affect the flows slightly in Thunder Lake Tributaries 2 and 3 (about a 1% decrease on average). This effect was considered as part of the surface water quantity discussion in Section 2.6. The groundwater modelling also concluded that the dewatering activities would not impact the remaining watercourses or the wetlands in the vicinity of the Project.

2.8 Geochemistry

Areas with PAG materials impacted

The material to be mined at the Project have been identified as being PAG, which could result in acid rock drainage (ARD) and metal leaching (ML) over time. The areas where the PAG material



is located during operations are the WRSA, the TSF and open pit, and are shaded in gold on Figure 2.8-1. The effects of ARD/ML are also important as they contribute to effects on surface water and groundwater quality, which are discussed in Sections 2.5 and 2.7, respectively.

The LGO stockpile was not included as part of the impact footprint as this will be lined to isolate the materials, and will be equipped with ditching and a seepage collection system. The LGO stockpile will also be a temporary feature that will only exist while the plant is operating. Following operations, any remaining materials in the LGO stockpile will be removed and disposed of in the open pit prior to flooding.

2.9 Fish

Watercourses no longer able to support fish considered impacted

The construction of the open pit, perimeter ditching, and TSF will divert most of the flow from Blackwater Creek Tributaries 1 and 2, as well as the small unnamed tributary between these watercourses. These surface water effects are also described in Section 2.5. As a result, Blackwater Creek Tributaries 1 and 2 would no longer be suitable to support fish populations. These watercourses are considered impacted, from the perspective of fish, and are shown with gold shading on Figure 2.9-1.

Watercourses with altered flow considered affected

During the active life of the Project, there will be several watercourses around the Project where flows will be altered, but the changes in flow would not be sufficient to cause an impact to the fish within them. These affected areas include Little Creek and Hoffstrom's Bay Tributary, which will experience slightly decreased flow as a result of diverting a portion of the catchments by the perimeter ditching. Periodically during operations, freshwater would be required from the irrigation ponds on Thunder Lake Tributaries 2 and 3. When withdrawals occur, they would be limited to 5% of the measured flows into the irrigation ponds. Groundwater modelling also identifies that dewatering will create a drawdown zone that could reduce the flows in Thunder Lake Tributaries 2 and 3 by approximately, 1% on average. The water collected in the operations area and from dewatering will be used to support the process, with excess water treated and discharge to Blackwater Creek, altering flows in that watercourse. The areas where flows are altered and fish may be affected are shown with green shading on Figure 2.9-1.

2.10 Wetlands

Drained wetland areas considered impacted

As part of the mining activities, several wetlands that overlap, or are adjacent to, the operations area will be drained. As a result, these drained wetlands would lose their biological function and would not be available for traditional land uses. The wetlands anticipated to be impacted as a result of the Project are depicted on Figure 2.10-1 by the gold shaded area. Groundwater modelling identifies that no other wetlands (including the Lola Lake Provincial Nature Reserve) will be affected by groundwater changes due to the dewatering of the mine.



2.11 Vegetation

The operations area and drained wetland areas considered impacted

All of the vegetation within the compact footprint of the Project would be cleared. As a result, there would be no vegetation within the operations area to support traditional land uses. In addition, vegetation would be lost in those wetlands areas drained as a result of the Project. The gold shaded area on Figure 2.11-1 shows the areas where vegetation is considered to be impacted as a result of the Project.

2.12 Wildlife

Impact areas for wildlife include operations area, noise impacts, wetlands impacts and vegetation impacts

In an effort to minimize the potential affect of the Project, Treasury Metals has defined a compact Project footprint. As a result, it is assumed that all of the operations area would be cleared of habitat and would not be readily accessible to wildlife. In addition, noise levels above 50 dBA can also affect wildlife, causing changes in behaviour or avoidance of those areas. Areas where wetlands are drained as a result of the Project would impact wildlife that use these areas. Finally, areas where vegetation will be impacted (see Section 2.10) are likely to be areas that would be avoided or used less frequently by wildlife. Therefore, the impact areas for wildlife shown with gold shading on Figure 2.12-1 includes a combination of the operations area, the area with noise above 50 dBA (see Section 2.2), the areas of wetlands impact (see Section 2.10) and the areas where vegetation is impacted (see Section 2.11). It has conservatively been assumed that wildlife would not habituate the isolated areas between the noise impacts and the operation areas.

2.13 Access

The operations area is considered impacted

For safety and security reasons, access to the operations area would be restricted throughout the active life of the Project. No traditional uses of the lands would be allowed in these areas until after the closure and reclamation activities are complete. The impacted footprint would extend down from the operations area to include the security gate, currently planned at the intersection of Tree Nursery Road and Norman's Road. The impact area would include the discharge pipeline from the Project to the discharge structure, and the discharge structure located in Blackwater Creek. The impact footprint would also include a buffer around the pipeline, as well as around the administration buildings and emulsion storage areas within the former MNR tree nursery. The impact footprint is shown with gold shading on Figure 2.13-1.

Access to the former MNR tree nursery would be affected

Additionally, a planned security gate on Tree Nursery Road would restrict access to the former MNR tree nursery, which is now owned by Treasury Metals. However, Treasury Metals is open to allowing Aboriginal peoples access to the portions of the former MNR tree nursery for traditional purposes with prior consent and notification. For safety reasons, Treasury Metals would need to escort interested Aboriginal peoples to those areas, allowing them controlled access. Additionally, only those practices that do not require the use of firearms would be allowed in these



areas in order to ensure the safety of workers. The affected areas with controlled access during the active life of the Project are shown with green shading on Figure 2.13-1.

2.14 Combined Impact Footprint

By combining the impact footprints identified for each of the individual disciplines it is possible to identify a combined impact footprint. These areas are shown with gold shading on Figure 2.14-1. In a similar manner, the affected areas for the individual disciplines were combined and are shown with green shading on Figure 2.14-1. It should be noted that there are no identified technical reasons why traditional uses of the lands by Aboriginal peoples could not proceed in those affected areas identified with green shading on the figure.



3.0 25-YEARS FOLLOWING CLOSURE

Although the EIS and the work done in responding to the Round 1 information requests identified that impacts of the Project will be most noticeable during the active life of the Project, some impacts will continue beyond closure. To identify how the ability of Aboriginal peoples to practice traditional uses of the land after the closure and reclamation of the Project, impact footprints and affected areas were identified for a point in time approximately 25-years following the completion of closure activities. At that point in the future, the open pit will have been fully flooded and allowed to release water through an engineered spillway, the revegetation of the Project area will have been fully established, and the Project area will have taken on the characteristics that will remain in perpetuity. At that point in time there will be areas of the Project site where the types of traditional uses of the land available to Aboriginal people will have changed from the pre-development conditions. For example, the area where the open pit was located and a pit lake will have formed would no longer be available for traditional uses such as the collection of berries and medicinal plants, but would be available for other traditional land uses such as the collection of bait fish, trapping of aquatic mammals such as muskrat and beaver, and hunting waterfowl.

3.1 Terrain and Soils

The WRSA, TSF and open pit are considered impacted

As part of the closure activities, the facilities and infrastructure associated with the Project would be decommissioned, scarified, re-vegetated and return to a natural functioning state. Following closure, the WRSA will remain in place, but will be vegetated to look like a natural feature on the landscape. Once the open pit fills with water it will be allowed to discharge through a spillway into the former stream bed of Blackwater Creek Tributary 1. At closure, the process water present in the TSF will be withdrawn, treated and used to help fill the open pit. The tailings will be physically isolated using a cover of granular material, then chemically isolated with either a low-permeability dry cover or a wet cover of non-process water. These areas are considered to be impacted in terms of terrain and soils as they will be altered from the pre-development conditions, and not all of the traditional land use opportunities available prior to the development would be available. However, these reclaimed areas would offer the opportunity for other forms of traditional land use.

3.2 Noise

The activities with a potential to cause noise impacts will cease at the end of the closure phase. There will be no noise sources during post-closure, and therefore no noise impact areas.

3.3 Light

The artificial lighting will be decommissioned at the end of operations. There will be no sources of light during post-closure, and therefore no light impact areas.

3.4 Air Quality

The activities with a potential to cause air quality impacts will cease at the end of the closure phase. There will be no air emissions sources during post-closure, and therefore no air quality impact areas.



3.5 Surface Water Quality

Following the end of mining operations, all of the PAG materials will be located in the WRSA, the TSF, or stored within the open pit. To limit potential ARD/ML effects from the PAG materials, the WRSA will be covered with a low-permeability cover at closure, then covered with overburden and revegetated. The process water present in the TSF will be withdrawn at closure, treated and used to help fill the open pit. The tailings will then be covered with a granular material to physically isolate the tailings, and either a low permeability dry cover or a wet cover of non-process water to chemically isolate the tailings. Although the WRSA and the TSF will be covered following closure, groundwater modelling shows that there would be seepage from these facilities, and that seepage could leave the site once the open pit fills and the groundwater levels return to near pre-development levels. This seepage would report to surface waters around the Project, and has been considered in water quality modelling completed as part of the process to respond to the Round 1 information requests. The results of the water quality model show that, with a wet cover over the TSF, surface water quality in the receiving waters around the Project would be comparable to or improved from pre-development conditions, or would meet the PWQO.

The PAG materials placed within the open pit, as well as the exposed mine faces will be isolated to prevent ARD/ML by allowing the pit to fill with water following closure, creating a pit lake. As the open pit is filling, Treasury Metals will monitor the quality of the water, and if necessary, use batch treatment to ensure the quality of water in the pit lake will meet PWQO prior to the pit being completely filled. Once the open pit has been filled, and the water has been determined to meet PWQO, water will be allowed to leave the site through a spillway into the former bed of Blackwater Creek Tributary 1.

Since the water quality in the watercourses around the Project would be comparable to or improved from pre-development conditions, or would meet the PWQO, and the water quality of the open pit will meet PWQO prior to release into Blackwater Creek, there would be no impact footprint or affects areas for surface water quality.

3.6 Surface Water Quantity

Blackwater Creek Tributary 2 and unnamed tributary considered impacted

During the active Project life, most of the flows were diverted for Blackwater Creek Tributary 1, Blackwater Creek Tributary 2, and the unnamed tributary between these watercourses. Once the pit lake is filled, water will be allowed to leave the site through a spillway into the former bed of Blackwater Creek Tributary 1, restoring flow to this watercourse. However, the site will be graded at closure to direct all of the flows from the former operations area to the open pit, which means that the flows will continue to be diverted from Blackwater Creek Tributary 2 and the small unnamed tributary. These areas are considered to be remain impacted in the long-term.

Watercourses with altered flows are considered to be affected

At closure, the site will be graded to direct the runoff from the former operations area to the open pit. This means that runoff will continue to be diverted from both Little Creek and Hoffstrom's Bay Tributary. The diverted runoff would be directed towards the open pit, which would also continue



to experience an inflow of groundwater even after the pit lake is filled. Excess water flowing into the open pit would leave the site through a spillway into Blackwater Creek Tributary 1, and downstream into Blackwater Creek. The flows in both of the watercourses would be altered from pre-development conditions as a result. Although the changes in flows in Little Creek, Hoffstrom's Bay Tributary, Blackwater Creek Tributary 1, and Blackwater Creek would not be of sufficient magnitude to cause an impact to either the function of these watercourses, or the fish within them, these watercourses are considered to be areas affected by the Project.

During the active life of the Project, flows in Thunder Lake Tributaries 2 and 3 were affected as a result of the Project. Once the operation of the Project end, there would no longer be a need to withdraw freshwater from the irrigation ponds at the former MNRF tree nursery. Additionally, the effects of the groundwater drawdown caused by dewatering activities will be reversed once the open pit fills and the groundwater levels slowly return to near pre-development levels. Therefore, there would be no affected areas along either Thunder Lake Tributaries 2 and 3 in the long-term.

3.7 Groundwater

Following the end of operation, dewatering activities will cease and the groundwater levels will slowly return to near pre-development levels. Once the groundwater levels recover, seepage from on-site facilities will be able to leave the site and potentially affect surface water quality. These effects were considered in the surface water quality discussion in Section 3.5.

3.8 Geochemistry

Following closure, PAG material will be located in the WRSA, the TSF and the open pit. To limit the effects of ARD/ML, the WRSA will be covered with a low-permeability cover during closure activities. At closure, the process water present in the TSF will be withdrawn, treated and used to help fill the open pit. The tailings will be physically isolated using a cover of granular material, then chemically isolated with either a low-permeability dry cover or a wet cover of non-process water to limit or avoid ARD/ML. Finally, the open pit be allowed to fill with water following the completion of operations, isolating any PAG materials and avoiding ARD. Although the WRSA and the TSF will be covered during closure, groundwater modelling has identified the potential for seepage from these facilities to leave the site once the open pit fills and the groundwater levels return to near pre-development levels. The effects of this seepage on surface water quality was considered in the post-closure water quality modelling and the effects considered in the surface water quality discussion (see Section 3.5).

WRSA and TSF are considered impacted

Although the WRSA and the TSF will be covered during closure, these areas are considered to be impacted in terms of geochemistry as the PAG material will remain there. As a result, there would be a limitation to the types of traditional uses that could be conducted in these areas. For example, reclamation activities would include re-vegetation of the areas with species that would not offer opportunities for traditional land use practices such as berry picking and harvesting of traditional plants. However, these reclaimed areas could offer the opportunity for other forms of traditional land uses, such as hunting.



3.9 Fish

Watercourses with most flow diverted are considered impacted

During the active Project life, most of the flows were diverted for Blackwater Creek Tributary 1, Blackwater Creek Tributary 2, and the unnamed tributary between these watercourses. Once the pit lake is filled, water will be allowed to leave the site through a spillway into the former bed of Blackwater Creek Tributary 1, restoring flow to this watercourse, and providing opportunities for fish to return to the watercourse. However, the site will be graded at closure to direct all of the flows from the former operations area to the open pit, which means that the flows will continue to be diverted from Blackwater Creek Tributary 2 and the small unnamed tributary. These areas are considered to remain impacted for fish in the long-term.

Watercourses with altered flows are considered to be affected

At closure, the site will be graded to direct the runoff from the former operations area to the open pit. This means that runoff will continue to be diverted from both Little Creek and Hoffstrom's Bay Tributary. The diverted runoff would be directed towards the open pit, which would also continue to experience an inflow of groundwater even after the pit lake is filled. Excess water flowing into the open pit would leave the site through a spillway into Blackwater Creek Tributary 1, and downstream into Blackwater Creek, altering the flows in both watercourses from pre-development conditions. Although flows would change in Little Creek, Hoffstrom's Bay Tributary, Blackwater Creek Tributary 1, and Blackwater Creek, the changes would not be sufficient to impact fish populations. Therefore, these watercourses are considered to be areas affected by the Project.

During the active life of the Project, flows in Thunder Lake Tributaries 2 and 3 were affected as a result of the Project. Once the operation of the Project ends, there would no longer be a need to withdraw freshwater from the irrigation ponds at the former MNRF tree nursery. Additionally, the effects of the groundwater drawdown caused by dewatering activities will be reversed once the open pit fills and the groundwater levels slowly return to near pre-development levels. Therefore, there would be no affected areas for fish along either Thunder Lake Tributary 2 or Thunder Lake Tributary 3 in the long-term.

Following the operations phase, dewatering activities will cease and the open pit will be allowed to fill with water. To aid in the filling of the open pit, all of the former operations area will be graded to direct the runoff to the open pit. As the open pit is filling, Treasury Metals will monitor the quality of the water, and if necessary, use batch treatment to ensure the quality of water in the pit lake will meet PWQO prior to the pit being completely filled. Once the open pit has been filled, and the water has been determined to meet PWQO, water will be allowed to leave the site through a spillway into the former bed of Blackwater Creek Tributary 1. Although there are no plans to introduce aquatic species into the pit lake, this body of water would provide a suitable habitat to support aquatic species in the long-term. As a result, the pit lake could provide opportunities for traditional practices such as trapping aquatic mammals (e.g., beaver and muskrat), along with activities such as collecting bait fish.



3.10 Wetlands

Drained wetland areas are considered impacted

During the active life of the Project, several wetlands that overlap, or are adjacent to, the operations area will have been drained. As part of the closure activities, the former operations area will be graded to direct the runoff towards the open pit. As a result, most of the drained wetlands will remain impacted in the long-term. In addition, the wetland in the upper reaches of Blackwater Creek Tributary 1 will be overprinted by the pit lake that will form when the open pit is filled with water. This wetland is considered to be impacted in the long-term, as it will be inundated and would not offer wetland functions.

Once the open pit has been filled, water will be allowed to leave the site through a spillway into the former bed of Blackwater Creek Tributary 1. Once flow is returned to this watercourse, there is the potential for the wetland impacted when the flow was diverted to re-establish itself. Additionally, one of the closure options being considered for the TSF involves withdrawing the process water present, physically isolating the tailings using a cover of granular material, then placing a wet cover of non-process water to avoid ARD/ML. In the long-term, the water covered TSF would offer many wetland functions, and could be available to support traditional land use opportunities such as hunting waterfowl.

3.11 Vegetation

The WRSA, TSF and open pit are considered to be impacted

As part of the closure activities, the facilities and infrastructure associated with the Project would be decommissioned, scarified, re-vegetated and return to a natural functioning state. The WRSA will be covered with a low-permeability cover and the TSF will be physically isolated using a cover of granular material, then chemically isolated with either a low-permeability dry cover or a wet cover of non-process water. If a dry cover is chosen for the TSF, both these structures would be vegetated with native species to appear as a natural landscape feature. However, the species that would be planted on the WRSA and TSF would not be ones traditionally used for medicinal purposes, or for consumption, and would deter these types of plants from growing. Therefore, the WRSA and TSF are considered to be impacted from the perspective of vegetation available for traditional uses. In addition, the open pit will be allowed to fill with water following the end of operations, creating a pit lake. The area of the pit lake is considered to be impacted from a vegetation perspective as it would no longer be available for traditional land uses such as harvesting traditional plants and picking berries. However, the pit lake could provide opportunities for traditional practices such as trapping aquatic mammals (e.g., beaver and muskrat), along with activities such as collecting bait fish.

3.12 Wildlife

Drained wetland areas are considered impacted for wildlife

Most of the wetlands drained as a result of the Project, will remain impacted in the long-term as the former operations area will be graded to direct runoff towards the open pit, which means the



drained wetlands will remain impacted in the long-term. The impacted wetlands (see Section 3.10) would be considered the impact footprint for wildlife in the long-term.

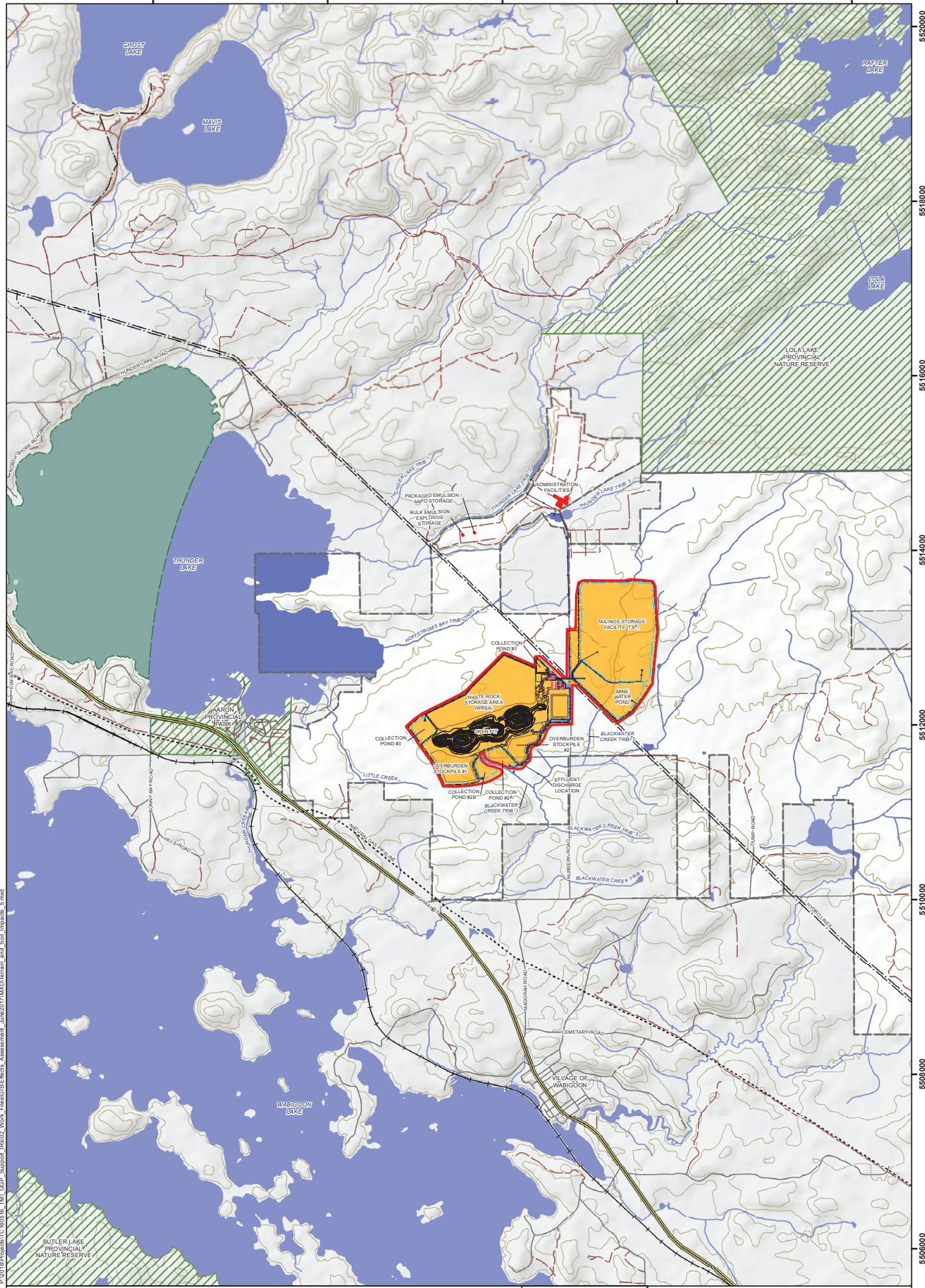
As part of the closure activities, the facilities and infrastructure associated with the Project would be decommissioned, scarified, re-vegetated and return to a natural functioning state. The noise and light impacts from the Project would cease, and suitable habitat for wildlife would be available over most of the former operations area. However, the open pit will be allowed to fill with water following the end of operations, creating a pit lake. While the pit lake would remove terrestrial wildlife habitat, it could provide enhanced habitat for aquatic wildlife such as beaver and muskrat. Most of the reclaimed area would be suitable for use by wildlife, and afford opportunities for traditional uses associated with wildlife.

3.13 Access

Following closure, there would be a period of care and maintenance when Treasury Metals would continue to be responsible for controlling access, monitoring and maintaining of the site. There would continue to be no access to the operations area during this period, and access to the area to the former MNR tree nursery would be difficult as there would be no Treasury Metals personnel present to escort people through the area. In the long term (i.e., 25-years after closure) it is expected that the appropriate agencies will have determined that the closure implemented by Treasury Metals has been successful in re-establishing a functioning ecosystem and a closure landscape that will not cause impacts on the environment. Therefore, there would no longer be a need to prevent access to the operations area. However, government agencies responsible may wish to see some form of access restrictions implemented for the TSF and the WRSA.

3.14 Combined Impact Footprint

By combining the impact footprints identified for each of the individual disciplines it is possible to identify an overall combined impact footprint. The areas shown with gold shading on Figure 3.14-1 correspond to those watercourses and wetlands impacted as a result of the Project, which will recover following the closure activities. The green shaded areas on Figure 3.14-1 correspond with those watercourses whose flows will remain altered after the closure of the Project. The areas with hatched shading correspond to those areas where there are notable traditional land use opportunities available following closure, but the types of opportunities would be markedly different than those available in the pre-development conditions.



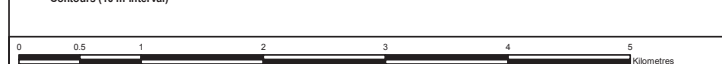
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LEGEND	
Railway	Property Boundary of Claims and Dispositions
Hydro Line	Area Beyond Property Boundary
Natural Gas Pipeline	
Highway	
Local Street	
Resource / Recreation Trail	
Provincial Park	
Watercourse	
Waterbody	
Contours (10 m interval)	
Access Haul Roads	Operations Area
Pipeline	Terrain and Soil Impact Footprint
Ditching	Terrain and Soil Affected Area
Emergency Spillway	
Processing Plant and Ancillary Facilities	
Security Fence	
Stockpile	

NOTES:
 - Topographic data extracted from Land Information Ontario (LIO), MNRP.
 - Watercourses represent pre-development conditions based on LIO database, as modified by KBM.

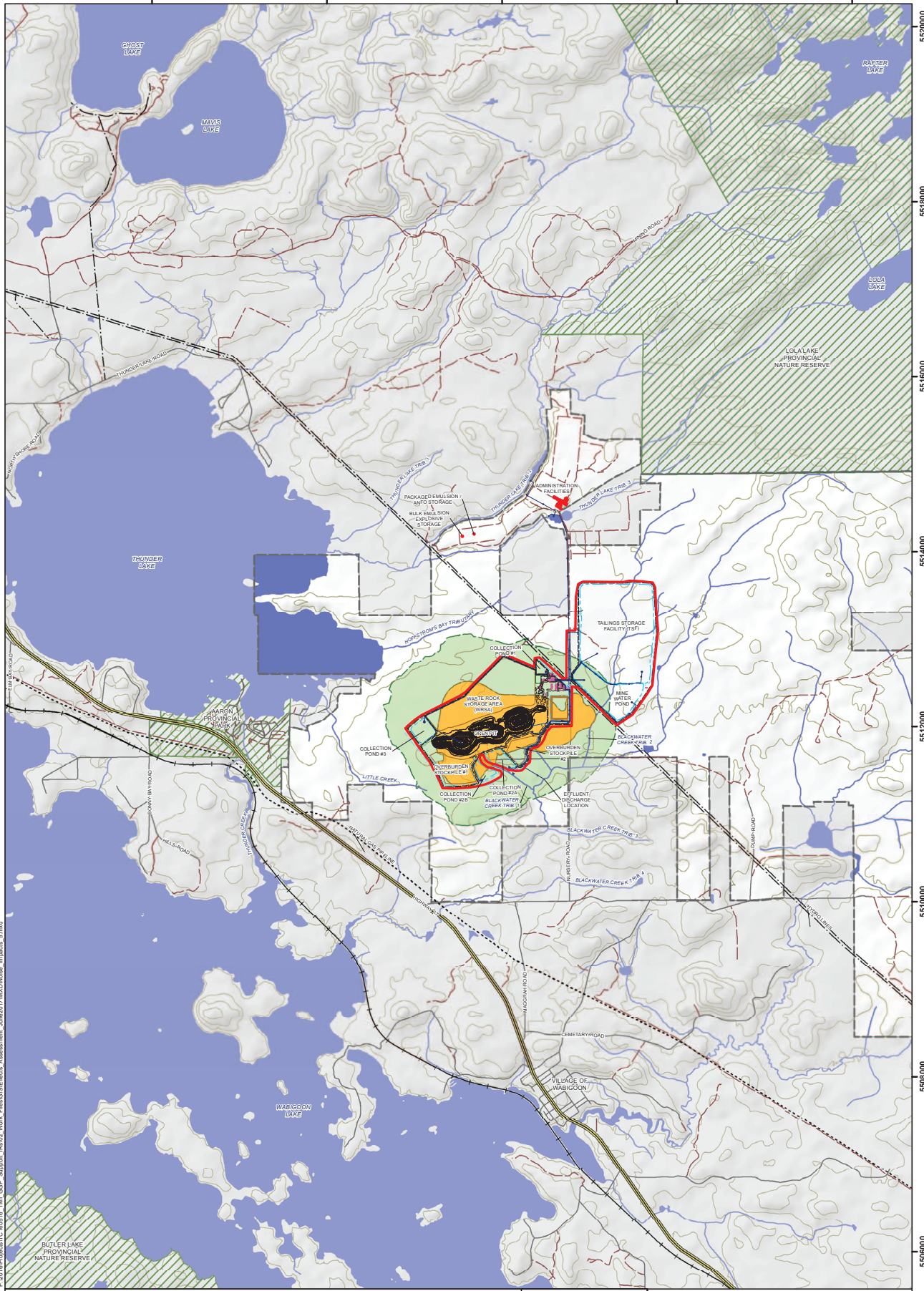
GOLIATH GOLD PROJECT

Terrain and Soil Impact Footprint



Datum: NAD83
 Projection: UTM Zone 15N

PROJECT N°: TC160516	FIGURE: 2.1-1
SCALE: 1:40,000	DATE: July 2017



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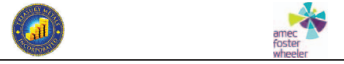
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LEGEND

<ul style="list-style-type: none"> — Railway - - - Hydro Line --- Natural Gas Pipeline — Local Street — Resource / Recreation Trail ▨ Provincial Park ■ Waterbody — Contours (10 m interval) 	<ul style="list-style-type: none"> ▭ Property Boundary of Claims and Dispositions ▭ Area Beyond Property Boundary 	<ul style="list-style-type: none"> — Site Infrastructure — Access Haul Roads — Pipeline — Ditching — Emergency Spillway — Processing Plant and Ancillary Facilities — Security Fence — Stockpile 	<ul style="list-style-type: none"> ■ Operations Area ■ Noise Impact Footprint ■ Noise Affected Area
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NOTES:
 - Topographic data extracted from Land Information Ontario (LIO), MNRFP.
 - Watercourses represent pre-development conditions based on LIO database, as modified by KBM.

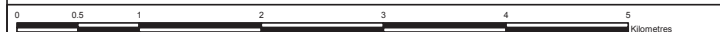
Datum: NAD83
 Projection: UTM Zone 15N

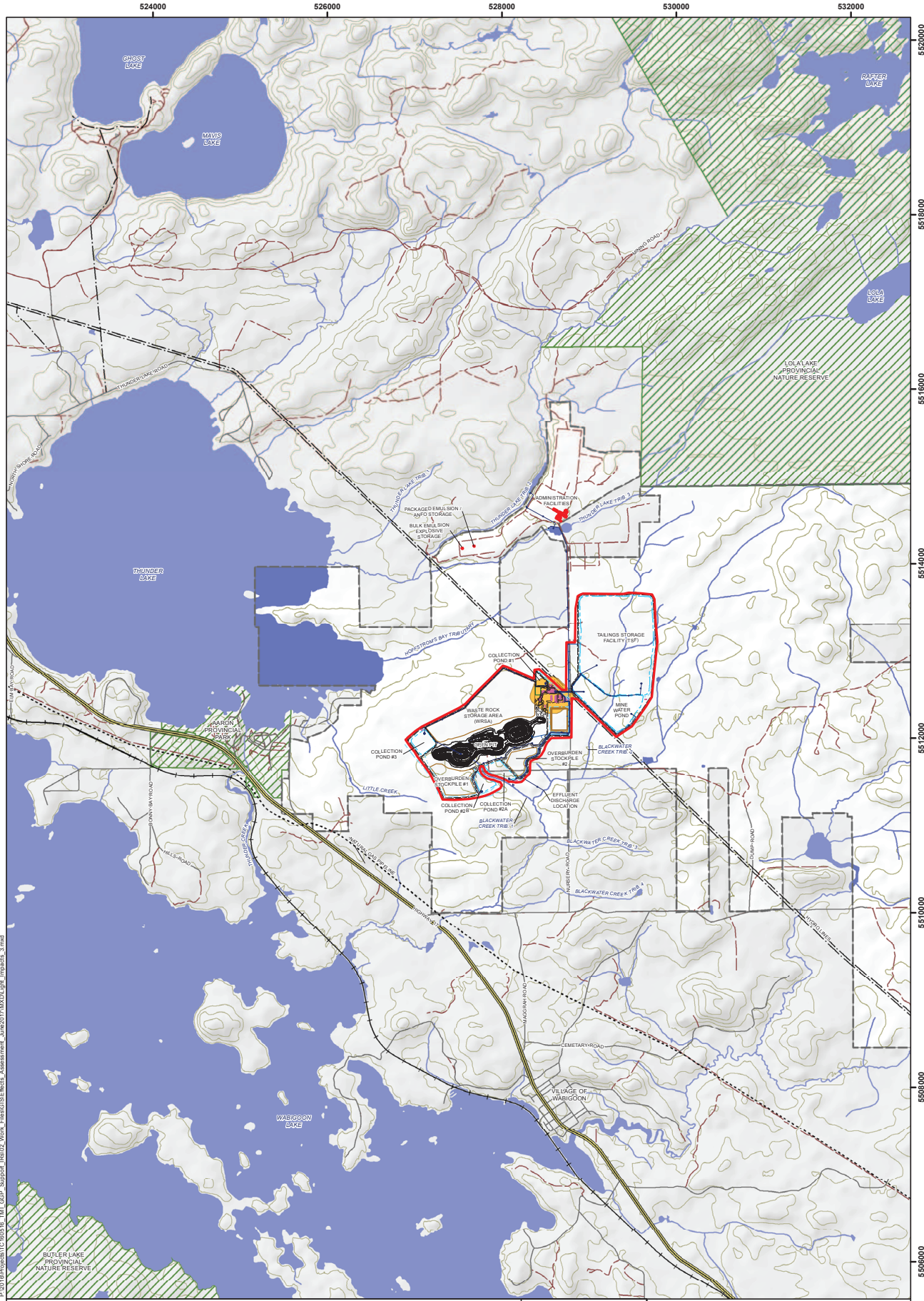


GOLIATH GOLD PROJECT

Noise Impact Footprint

PROJECT N°: TC160516	FIGURE: 2.2-1
SCALE: 1:40,000	DATE: July 2017





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LEGEND

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|--|---|--|---|
| <ul style="list-style-type: none"> — Railway — Hydro Line — Natural Gas Pipeline — Highway — Local Street — Resource / Recreation Trail — Provincial Park — Watercourse — Waterbody — Contours (10 m interval) | <ul style="list-style-type: none"> □ Property Boundary of Claims and Dispositions □ Area Beyond Property Boundary | <ul style="list-style-type: none"> — Site Infrastructure — Access Haul Roads — Pipeline — Ditching — Emergency Spillway — Processing Plant and Ancillary Facilities — Security Fence — Stockpile | <ul style="list-style-type: none"> — Operations Area — Light Impact Footprint |
|--|---|--|---|

NOTES
 - Topographic data extracted from Land Information Ontario (LIO), MNR/E
 - Watercourses represent pre-development conditions based on LIO database, as modified by KBM.



GOLIATH GOLD PROJECT

Light Impact Footprint

Datum: NAD83
 Projection: UTM Zone 15N

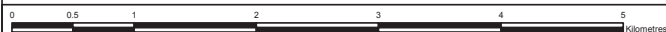


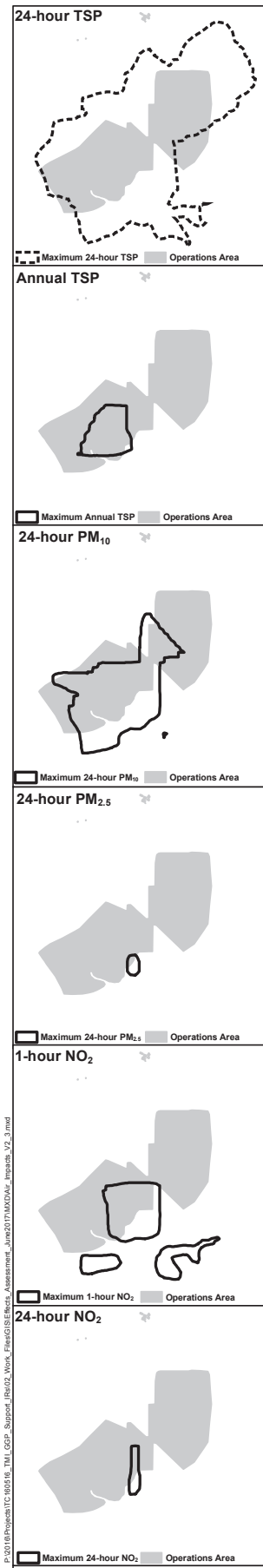
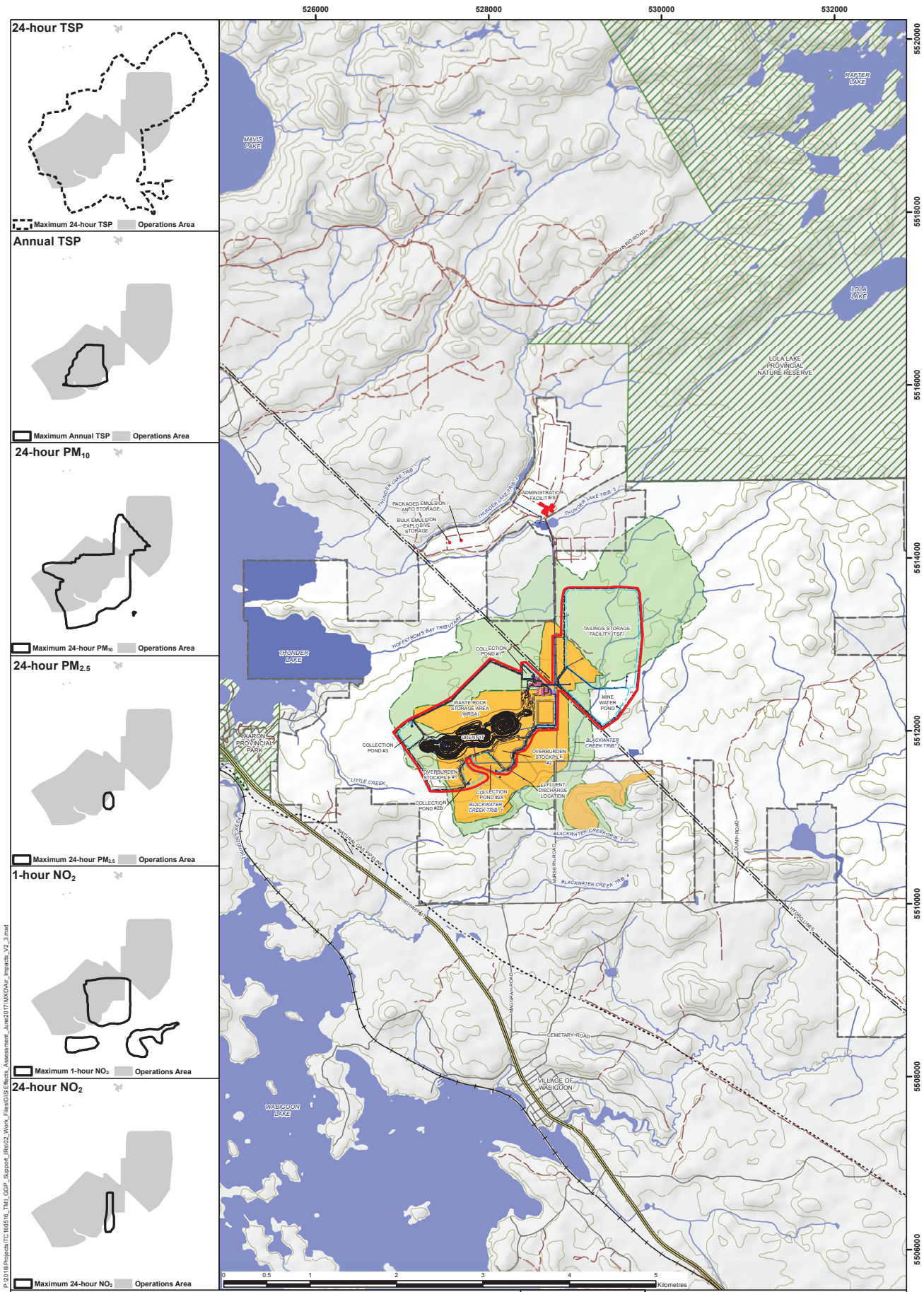
PROJECT N°: TC160516

FIGURE: 2.3-1

SCALE: 1:40,000

DATE: July 2017





LEGEND

— Railway	▭ Property Boundary of Claims and Dispositions	— Site Infrastructure	▭ Operations Area
- - - Hydro Line	▭ Area Beyond Property Boundary	— Access Haul Roads	▭ Air Quality Impact Footprint
- - - Natural Gas Pipeline		— Pipeline	▭ Air Quality Affected Area
— Highway		— Ditching	
— Local Street		— Emergency Spillway	
— Resource / Recreation Trail		— Processing Plant and Ancillary Facilities	
▨ Provincial Park		— Security Fence	
— Watercourse		— Stockpile	
— Waterbody			
— Contours (10 m interval)			

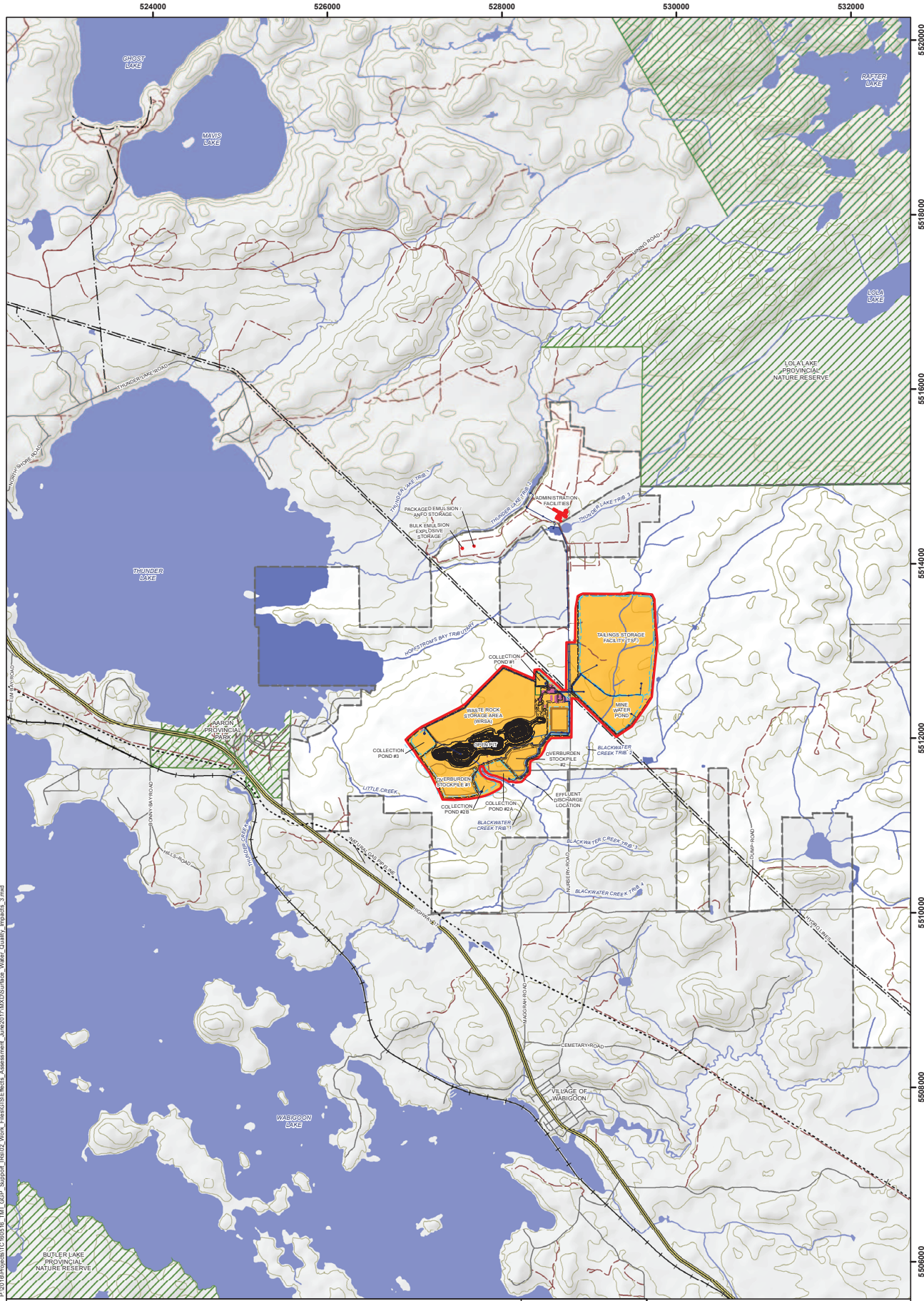
NOTES:

- Topographic data extracted from Land Information Ontario (LIO), MNRP.
- Watercourses represent pre-development conditions based on LIO database, as modified by KBM.

Datum: NAD83
Projection: UTM Zone 15N

GOLIATH GOLD PROJECT	
Air Quality Impact Footprint	
PROJECT N°: TC160516	FIGURE: 2.4-1
SCALE: 1:40,000	DATE: July 2017

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LEGEND

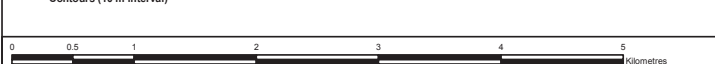
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|---|---|--|---|
| <ul style="list-style-type: none"> — Railway - - - Hydro Line --- Natural Gas Pipeline == Highway — Local Street — Resource / Recreation Trail ▨ Provincial Park Watercourse Waterbody — Contours (10 m interval) | <ul style="list-style-type: none"> ▭ Property Boundary of Claims and Dispositions ▭ Area Beyond Property Boundary | <ul style="list-style-type: none"> Site Infrastructure — Access Haul Roads — Pipeline — Ditching — Emergency Spillway — Processing Plant and Ancillary Facilities — Security Fence — Stockpile | <ul style="list-style-type: none"> Operations Area Surface Water Quality Impact Footprint |
|---|---|--|---|

NOTES:
 - Topographic data extracted from Land Information Ontario (LIO), MNRIF.
 - Watercourses represent pre-development conditions based on LIO database, as modified by KBM.



GOLIATH GOLD PROJECT

Surface Water Quality Impact Footprint



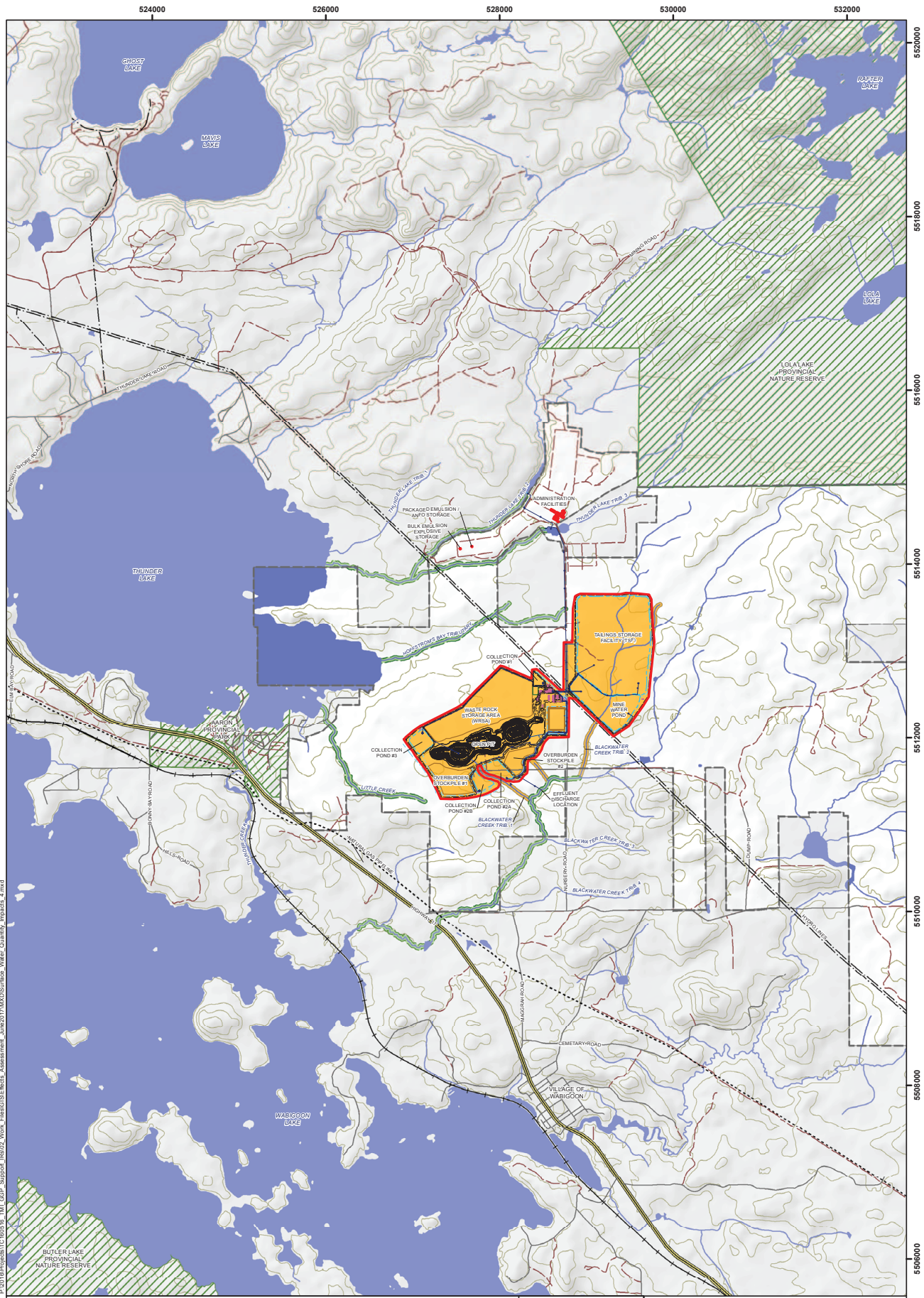
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 Projection: UTM Zone 15N



PROJECT N°: TC160516
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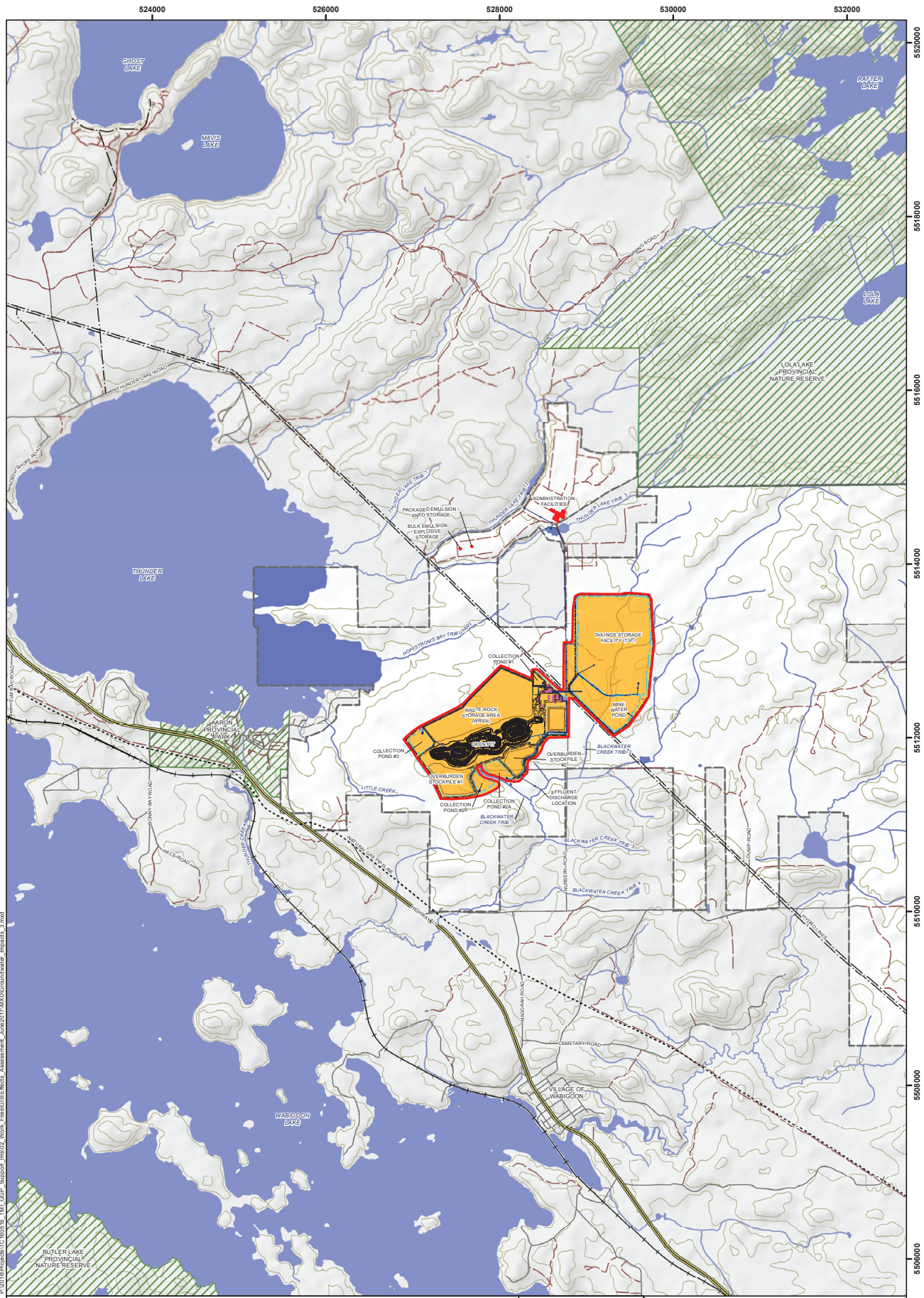
FIGURE: 2.5-1
 DATE: July 2017





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LEGEND <ul style="list-style-type: none"> Railway Hydro Line Natural Gas Pipeline Local Street Highway Resource / Recreation Trail Provincial Park Watercourse Waterbody Contours (10 m interval) 		<ul style="list-style-type: none"> Property Boundary of Claims and Dispositions Area Beyond Property Boundary 		Site Infrastructure <ul style="list-style-type: none"> Access Haul Roads Pipeline Ditching Emergency Spillway Processing Plant and Ancillary Facilities Security Fence Stockpile 		<ul style="list-style-type: none"> Operations Area Surface Water Quantity Impact Footprint Watercourse or Altered Flows 	
NOTES: - Topographic data extracted from Land Information Ontario (LIO), MNRFP. - Watercourses represent pre-development conditions based on LIO database, as modified by KBM.							
Datum: NAD83 Projection: UTM Zone 15N							
		GOLIATH GOLD PROJECT Surface Water Quantity Impact Footprint		PROJECT N°: TC160516 FIGURE: 2.6-1			
SCALE: 1:40,000		DATE: July 2017					



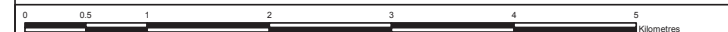
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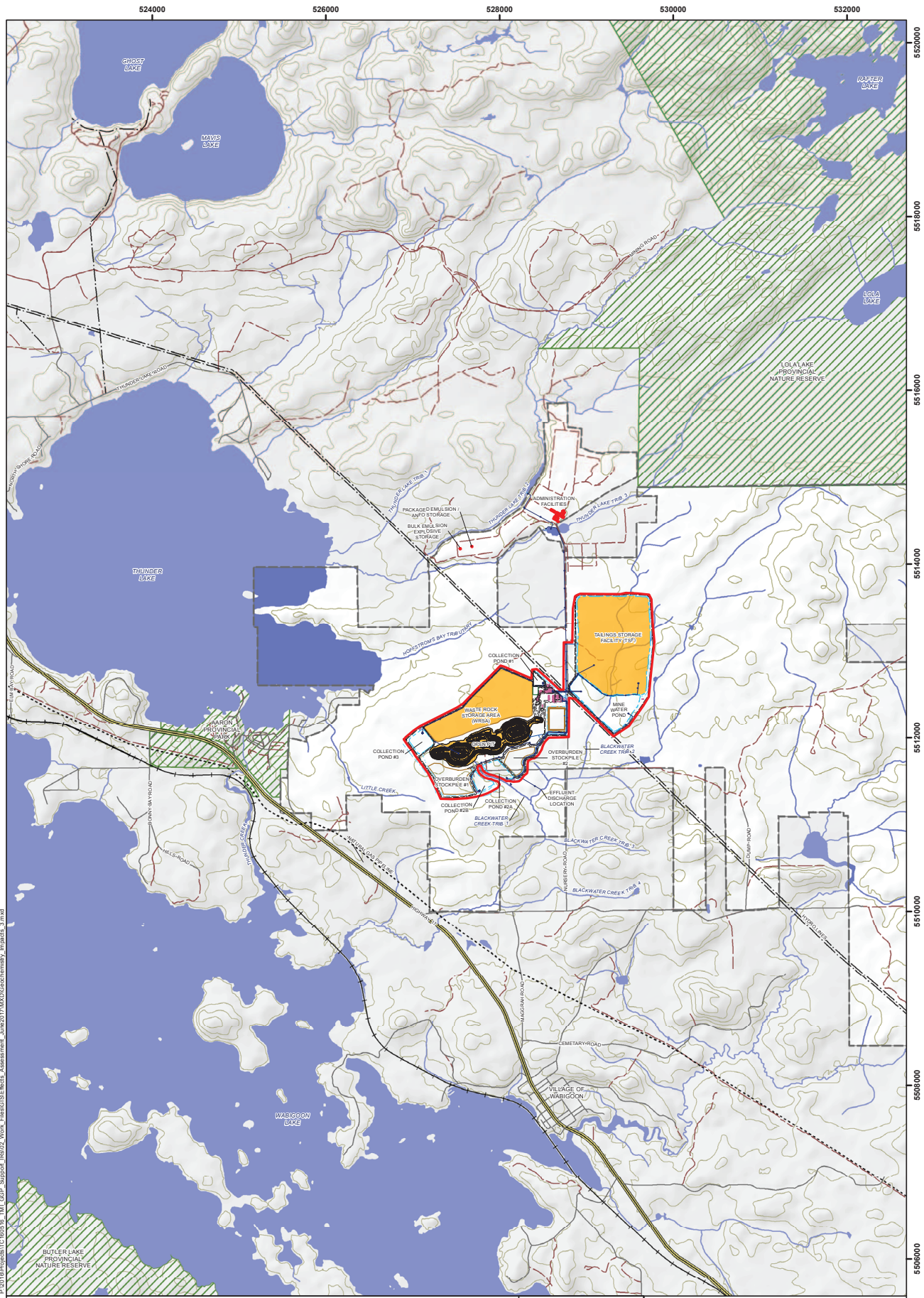
LEGEND - - - Railway - - - Hydro Line - - - Natural Gas Pipeline - - - Local Street - - - Resource / Recreation Trail Provincial Park Watercourse Waterbody Contours (10 m interval)	Property Boundary of Claims and Dispositions Area Beyond Property Boundary	Site Infrastructure - - - Access Haul Roads - - - Pipeline - - - Ditching Emergency Spillway Processing Plant and Ancillary Facilities Security Fence Stockpile	Operations Area Groundwater Impact Footprint
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NOTES:
 - Topographic data extracted from Land Information Ontario (LIO).
 - MNRFE: Watercourses represent pre-development conditions based on LIO database, as modified by KBM.

Datum: NAD83
 Projection: UTM Zone 15N

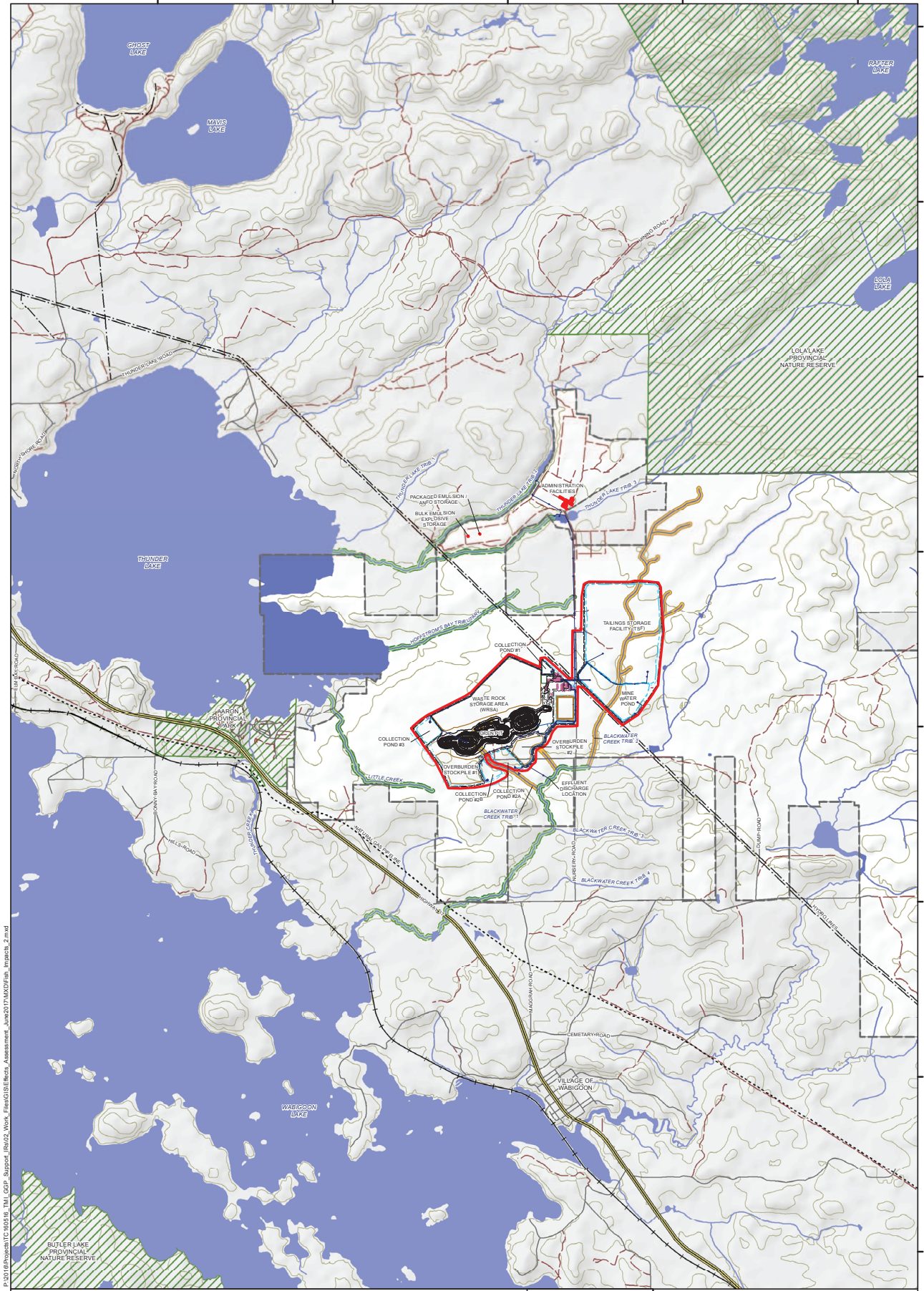
GOLIATH GOLD PROJECT	
Groundwater Impact Footprint	
PROJECT N°: TC160516	FIGURE: 2.7-1
SCALE: 1:40,000	DATE: July 2017





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LEGEND <ul style="list-style-type: none"> Railway Hydro Line Natural Gas Pipeline Highway Local Street Resource / Recreation Trail Provincial Park Watercourse Waterbody Contours (10 m interval) 		<ul style="list-style-type: none"> Property Boundary of Claims and Dispositions Area Beyond Property Boundary 		Site Infrastructure <ul style="list-style-type: none"> Access Haul Roads Pipeline Ditching Emergency Spillway Processing Plant and Ancillary Facilities Security Fence Stockpile 		<ul style="list-style-type: none"> Operations Area Geochemistry Impact Footprint 	
NOTES - Topographic data extracted from Land Information Ontario (LIO), MNR/E - Watercourses represent pre-development conditions based on LIO database, as modified by KBM.							
GOLIATH GOLD PROJECT				Geochemistry Impact Footprint			
Datum: NAD83 Projection: UTM Zone 15N				PROJECT N°: TC160516 FIGURE: 2.8-1			
				SCALE: 1:40,000 DATE: July 2017			





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LEGEND

<ul style="list-style-type: none"> — Railway — Hydro Line — Natural Gas Pipeline — Highway — Local Street — Resource / Recreation Trail — Provincial Park — Watercourse — Waterbody — Contours (10 m interval) 	<ul style="list-style-type: none"> □ Property Boundary of Claims and Dispositions □ Area Beyond Property Boundary 	<ul style="list-style-type: none"> — Site Infrastructure — Access Haul Roads — Pipeline — Ditching — Emergency Spillway — Processing Plant and Ancillary Facilities — Security Fence — Stockpile 	<ul style="list-style-type: none"> — Operations Area — Fish Impact Footprint — Fish Affected Areas
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NOTES:
 - Topographic data extracted from Land Information Ontario (LIO), MNRF.
 - Watercourses represent pre-development conditions based on LIO database, as modified by KBM.

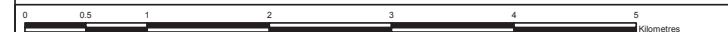
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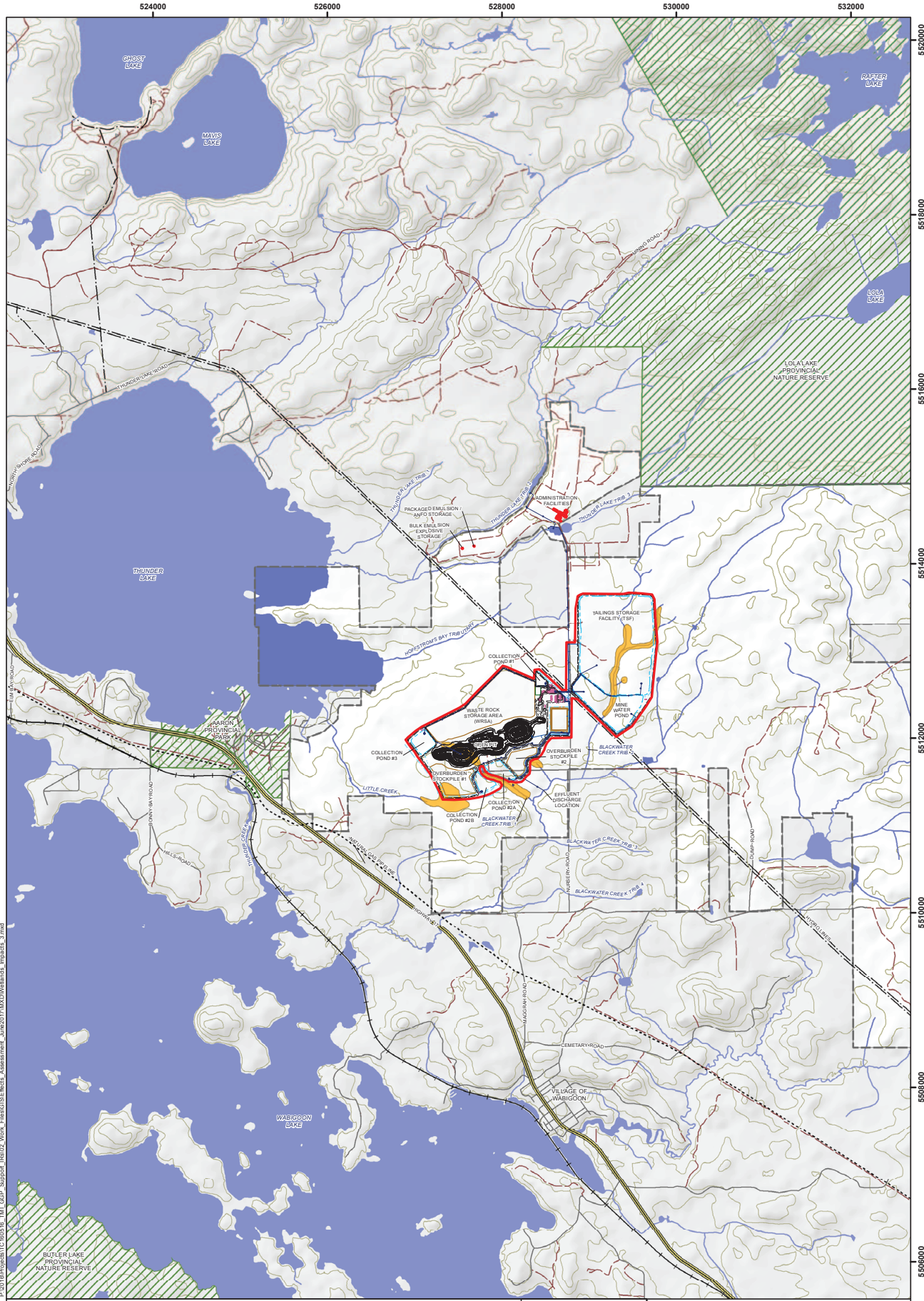



GOLIATH GOLD PROJECT

Fish Impact Footprint

PROJECT N°: TC160516	FIGURE: 2.9-1
SCALE: 1:40,000	DATE: July 2017







LEGEND

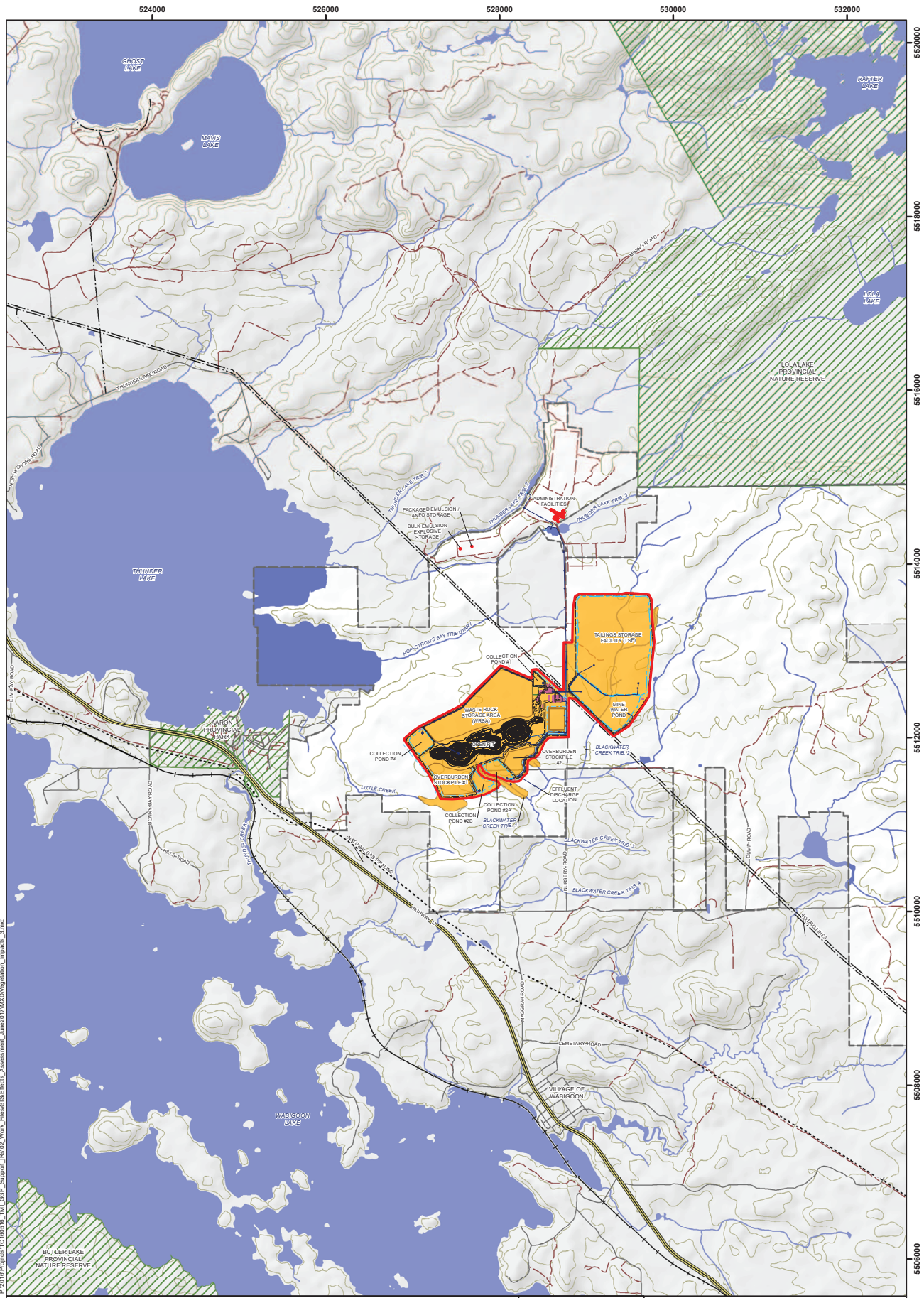
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NOTES:
 - Topographic data extracted from Land Information Ontario (LIO), MNRIF.
 - Watercourses represent pre-development conditions based on LIO database, as modified by KBM.

Datum: NAD83
 Projection: UTM Zone 15N

 	
GOLIATH GOLD PROJECT	
Wetland Impact Footprint	
PROJECT N°: TC160516	FIGURE: 2.10-1
SCALE: 1:40,000	DATE: July 2017





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- LEGEND**
- Railway
 - Hydro Line
 - Natural Gas Pipeline
 - Local Street
 - Resource / Recreation Trail
 - Provincial Park
 - Watercourse
 - Waterbody
 - Contours (10 m interval)
 - Property Boundary of Claims and Dispositions
 - Area Beyond Property Boundary
 - Access Haul Roads
 - Pipeline
 - Ditching
 - Emergency Spillway
 - Processing Plant and Ancillary Facilities
 - Security Fence
 - Stockpile
 - Operations Area
 - Vegetation Impact Footprint

NOTES:

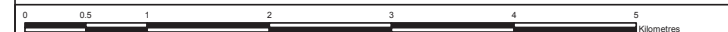
- Topographic data extracted from Land Information Ontario (LIO), MNRFP.
- Watercourses represent pre-development conditions based on LIO database, as modified by KBM.

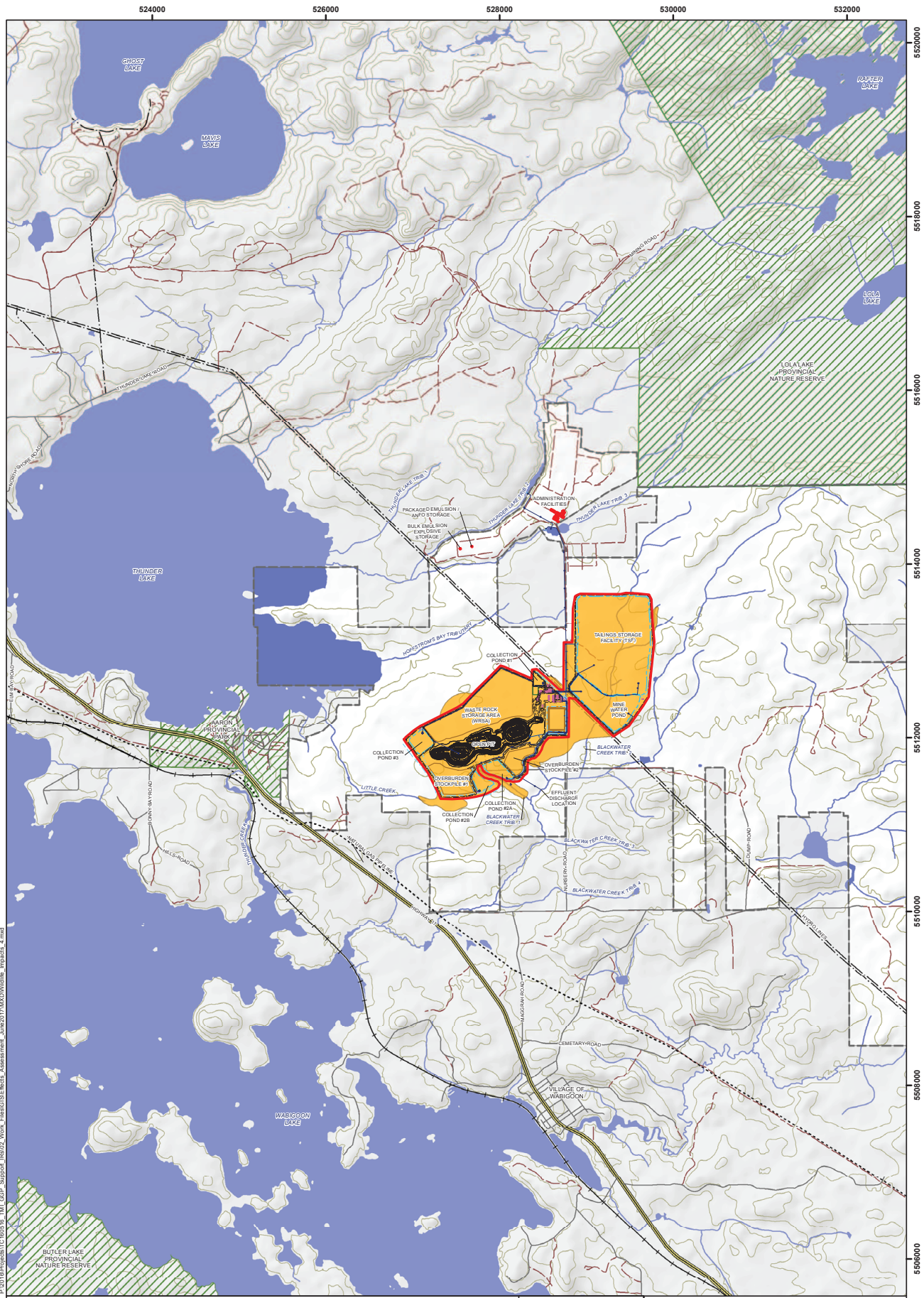
Datum: NAD83
Projection: UTM Zone 15N

GOLIATH GOLD PROJECT

Vegetation Impact Footprint

	<p>PROJECT N^o: TC160516 FIGURE: 2.11-1</p>
<p>SCALE: 1:40,000</p>	<p>DATE: July 2017</p>





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LEGEND

— Railway	▭ Property Boundary of Claims and Dispositions	— Site Infrastructure	▭ Operations Area
- - - Hydro Line	▭ Area Beyond Property Boundary	— Access Haul Roads	▭ Wildlife Impact Footprint
- - - Natural Gas Pipeline		— Pipeline	
— Highway		— Ditching	
— Local Street		— Emergency Spillway	
— Resource / Recreation Trail		— Processing Plant and Ancillary Facilities	
▨ Provincial Park		— Security Fence	
— Watercourse		— Stockpile	
— Waterbody			
— Contours (10 m interval)			

NOTES:

- Topographic data extracted from Land Information Ontario (LIO), MNRIF.
- Watercourses represent pre-development conditions based on LIO database, as modified by KBM.

Datum: NAD83
Projection: UTM Zone 15N

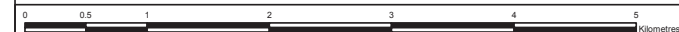
GOLIATH GOLD PROJECT

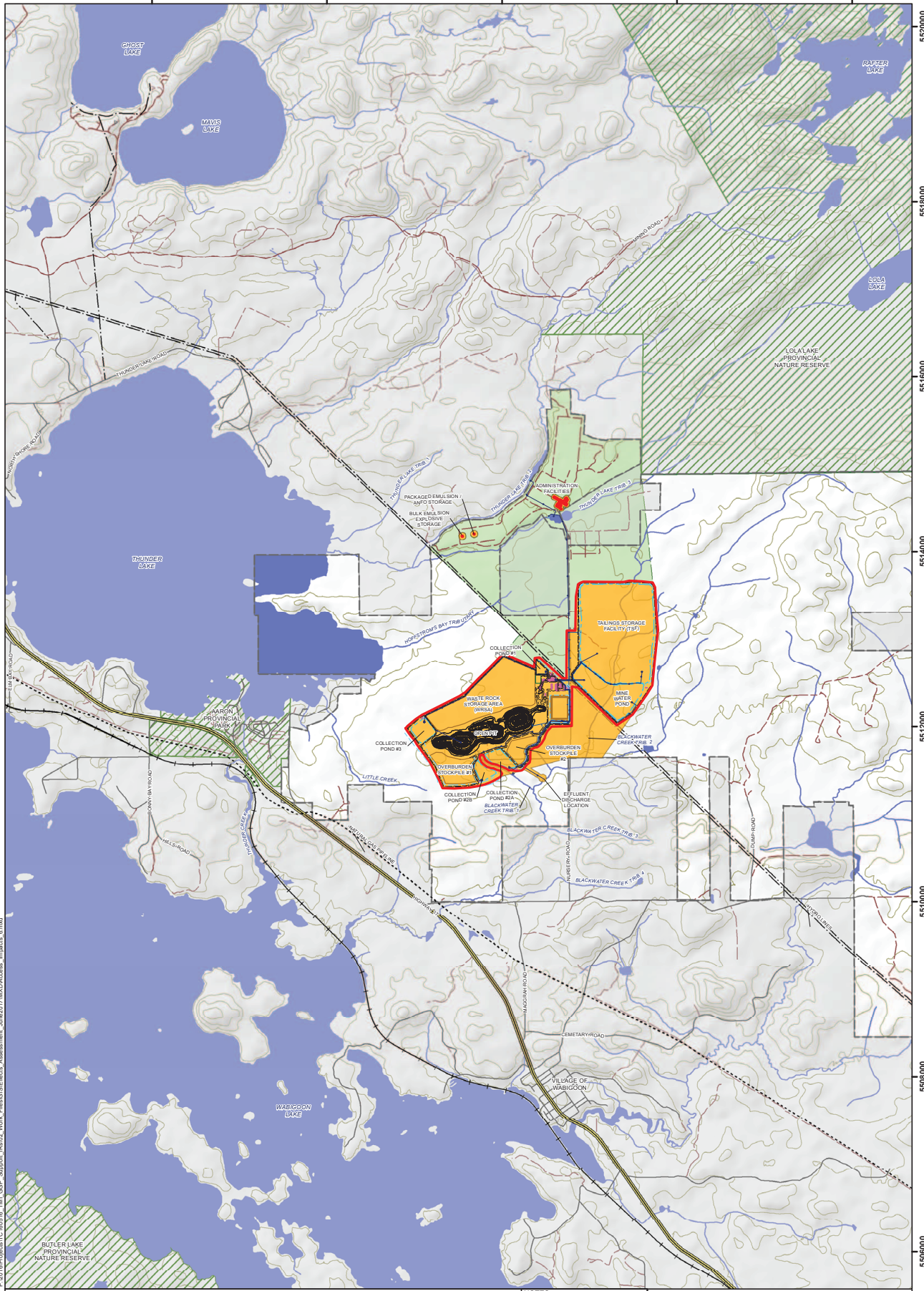
Wildlife Impact Footprint

PROJECT N°: TC160516 **FIGURE: 2.12-1**

SCALE: 1:40,000 DATE: July 2017

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LEGEND

<ul style="list-style-type: none"> — Railway - - - Hydro Line - - - Natural Gas Pipeline — Local Street — Highway — Resource / Recreation Trail ▨ Provincial Park ■ Waterbody — Contours (10 m interval) 	<ul style="list-style-type: none"> ▭ Property Boundary of Claims and Dispositions ▭ Area Beyond Property Boundary 	<ul style="list-style-type: none"> — Site Infrastructure — Access Haul Roads — Pipeline — Ditching — Emergency Spillway — Processing Plant and Ancillary Facilities — Security Fence — Stockpile 	<ul style="list-style-type: none"> ■ Operations Area ■ Access Impact Footprint ■ Access Affected Areas
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Datum: NAD83
Projection: UTM Zone 15N

0 0.5 1 2 3 4 5 Kilometres

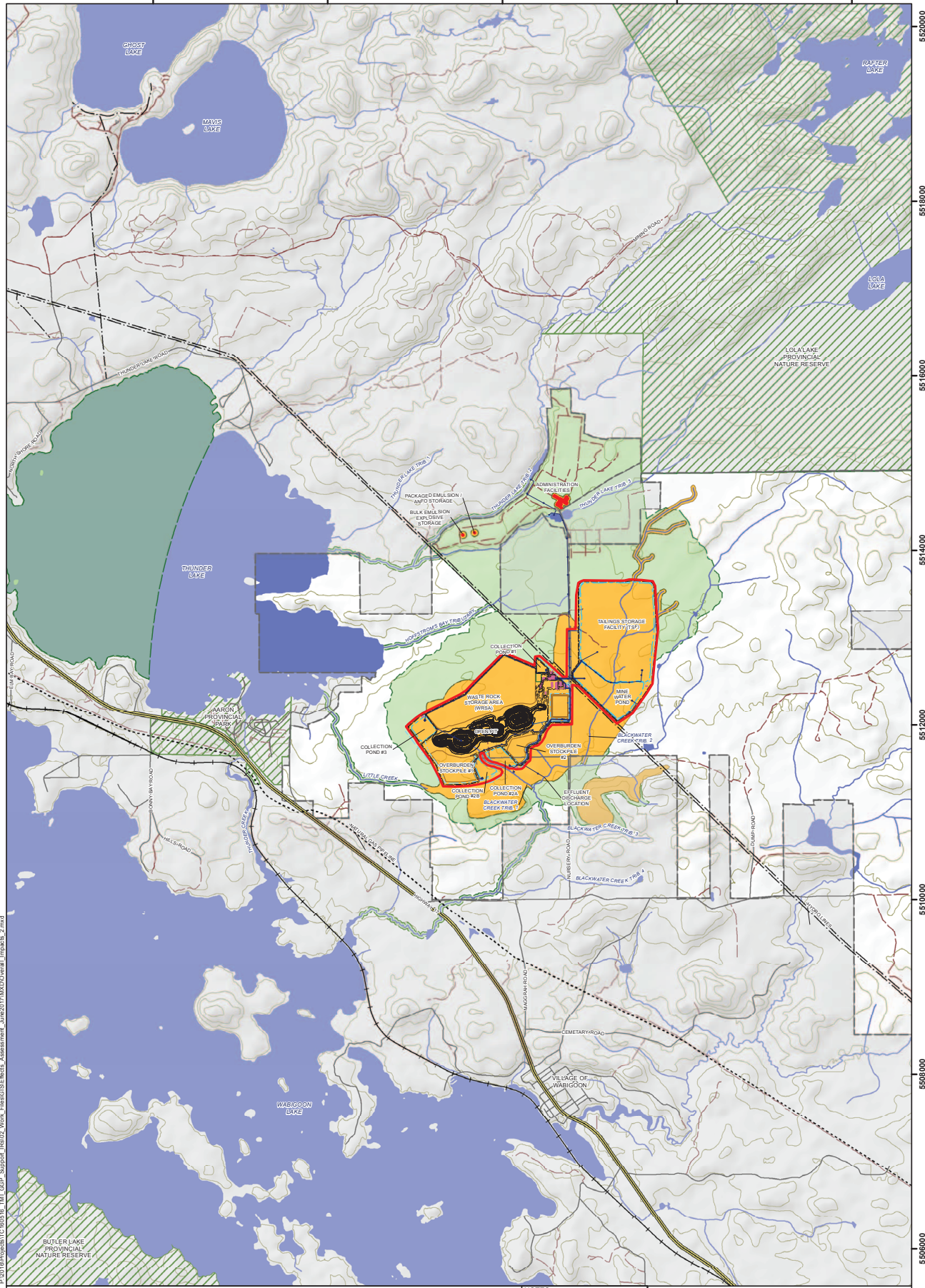
NOTES:

- Topographic data extracted from Land Information Ontario (LIO), MINRF.
- Watercourses represent pre-development conditions based on LIO database, as modified by KSM.

GOLIATH GOLD PROJECT

Access Impact Footprint

PROJECT N°: TC160516	FIGURE: 2.13-1
SCALE: 1:40,000	DATE: July 2017



P:\2016\Projects\TC 160516_TML_LGFP_Support\160516_Work_Files\GIS\Effects_Assessment_June2017\MXD\Output\Impact_2.mxd

LEGEND

<ul style="list-style-type: none"> —+— Railway - - - Hydro Line - - - Natural Gas Pipeline — Local Street — Highway — Resource / Recreation Trail Provincial Park Watercourse Waterbody Contours (10 m interval) 	<ul style="list-style-type: none"> Property Boundary of Claims and Dispositions Area Beyond Property Boundary 	<ul style="list-style-type: none"> Site Infrastructure Access Haul Roads Pipeline Ditching Emergency Spillway Processing Plant and Ancillary Facilities Security Fence Stockpile 	<ul style="list-style-type: none"> Operations Area Combined Impact Footprint Combined Affected Areas
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0 0.5 1 2 3 4 5 Kilometres

NOTES:

- Topographic data extracted from Land Information Ontario (LIO), MNRIF.
- Watercourses represent pre-development conditions based on LIO database, as modified by KDM.

Datum: NAD83
Projection: UTM Zone 15N

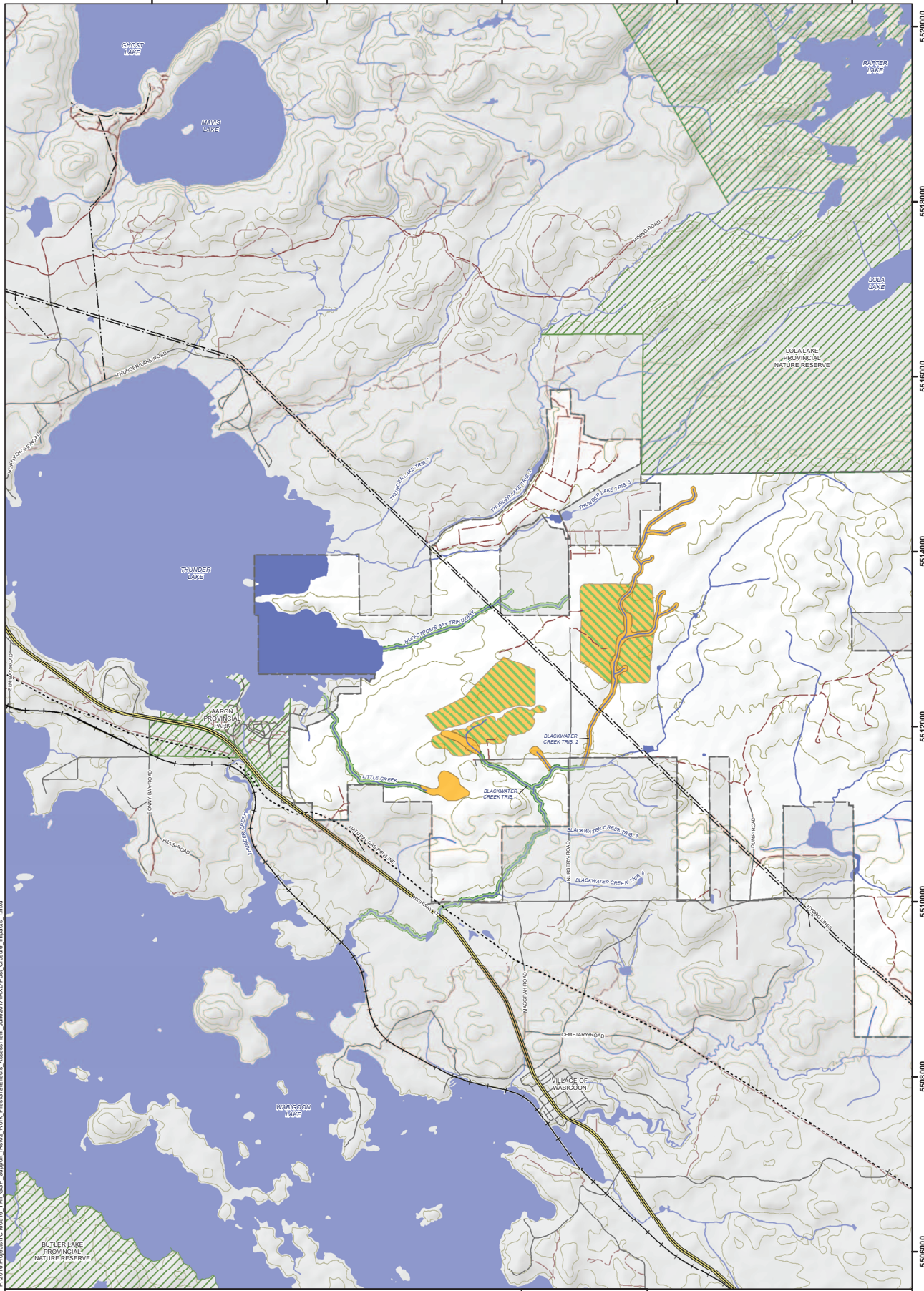
GOLIATH GOLD PROJECT

Combined Impact and Affects During Active Project Life

PROJECT N°: TC160516 **FIGURE: 2.14-1**

SCALE: 1:40,000 DATE: July 2017

524000 526000 528000 530000 532000



520000
5518000
5516000
5514000
5512000
5510000
5508000
5506000
5504000

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- LEGEND**
- +— Railway
 - - - Hydro Line
 - - - Natural Gas Pipeline
 - Local Street
 - Resource / Recreation Trail
 - Provincial Park
 - Watercourse
 - Waterbody
 - Contours (10 m interval)

- Property Boundary of Claims and Dispositions
- Area Beyond Property Boundary

- Impact Footprint
- Affected Areas
- Areas Impacted for Some Traditional Uses But Offering Opportunity for Other Traditional Uses

NOTES:
 - Topographic data extracted from Land Information Ontario (LIO), MNRFP.
 - Watercourses represent pre-development conditions based on LIO database, as modified by KBM.



GOLIATH GOLD PROJECT

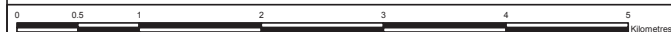
**Impact and Affects
25 Years Following Closure**

Datum: NAD83
 Projection: UTM Zone 15N



PROJECT N°: TC160516

FIGURE: 3.14-1



SCALE: 1:40,000

DATE: July 2017