

Appendix G5: Alternatives Evaluation – Aggregate Sources

Alternative Method Design Assumptions		
Use Existing Quarries and/or Pits	Use Mined Waste Rock	Create New Aggregate Sources
<ul style="list-style-type: none"> Use of existing aggregate sources currently established and in operation, but increased activity may be expected to supply the Project. Sites would be selected as close as possible to the Project development area (PDA) to reduce travel times. Sites are being operated in accordance with regulatory requirements, including the application of appropriate mitigation measures to manage environmental effects. 	<ul style="list-style-type: none"> No facilities required, as waste rock would be handled as part of operation. Mitigation measures will be applied for the overall Project to control environmental effects and meet regulatory standards. 	<ul style="list-style-type: none"> Aggregate source development would require vegetation clearing and excavation Aggregate sources would be located in close proximity to or within the PDA to reduce haul times, improve efficiency and reduce footprint and emissions. Sites would meet regulatory requirements and operate based on industry standard mitigation measures to manage effects on the environment.

Alternative Method				
Valued Component (VC)/Criteria	Indicators	Use Existing Quarries and/or Pits	Use Mined Waste Rock	Create New Aggregate Sources
Natural Environment				
Atmospheric Environment	Climate change as measured by change in greenhouse gases (GHGs)	<p>Construction: No change in GHG emissions as aggregate sources are already established.</p> <p>Operation: Increase in GHG emissions from machinery and trucks for extraction and hauling.</p> <p>Closure: No change in GHG emissions at closure because the aggregate sources would no longer be required and would continue to operate as before the Project.</p>	<p>Construction: No change in GHG emissions as waste rock removal is required to establish the open pit.</p> <p>Operation: Limited increase in GHG emissions from machinery and trucks for hauling from source that is in close proximity to Project components. No change for extraction since waste rock removal is required for operation.</p> <p>Closure: No change in GHG emissions at closure because rehabilitation will be required for the open pit as part of the Project.</p>	<p>Construction: Increase in GHG emissions from machinery to establish new sources.</p> <p>Operation: Increase in GHG emissions from machinery and trucks for extraction and hauling; however, the selection of source locations in close proximity to Project components would reduce GHG emissions from hauling.</p> <p>Closure: Increase in GHG emissions from machinery to rehabilitate aggregate source area(s).</p>
	Change in ambient air quality parameters	<p>Construction: No change in ambient air quality parameters because aggregate sources are already established.</p> <p>Operation: Increase in ambient air quality parameters from machinery and trucks for extraction and hauling. Potential dust effects.</p> <p>Closure: No change in ambient air quality parameters at closure because the aggregate sources would no longer be required and would continue to operate as before the Project.</p>	<p>Construction: No change in ambient air quality parameters as waste rock removal is required to establish the open pit.</p> <p>Operation: Increase in ambient air quality parameters from machinery and trucks for hauling. No change for extraction since waste rock removal is required for operation. Potential dust effects.</p> <p>Closure: No change in ambient air quality parameters at closure because rehabilitation will be required for the open pit as part of the Project and waste rock would no longer be required as an aggregate source.</p>	<p>Construction: Increase in ambient air quality parameters from machinery to establish new sources.</p> <p>Operation: Increase in ambient air quality parameters from machinery and trucks for extraction and hauling. Potential dust effects.</p> <p>Closure: Increase in ambient air quality parameters expected from machinery to rehabilitate aggregate source area(s).</p>
Overall Atmospheric Environment Ranking <i>Key differentiating factor – the potential for effects is different between identified alternatives.</i>		Disadvantage Increased atmospheric environment effects from increased extraction activity, depending on volumes taken from existing sites. The overall effect would be comparable whether new or existing sites are used, since the aggregate quantity required does not change.	Advantage Limited incremental atmospheric environment effects since extraction will occur as part of normal mining operations.	Disadvantage Increase in emissions from the establishment and operation of new sites, depending on volumes taken from new sites. The overall effect would be comparable whether new or existing sites are used, since the aggregate quantity required does not change.

Appendix G5: Alternatives Evaluation – Aggregate Sources

		Alternative Method		
Valued Component (VC)/Criteria	Indicators	Use Existing Quarries and/or Pits	Use Mined Waste Rock	Create New Aggregate Sources
Acoustic Environment	Change in noise or vibration levels	<p>Construction: No change in noise and vibration levels expected because existing aggregate sources would already be operating in the area.</p> <p>Operation: Increase in noise and vibration levels from increased extraction activity to supply the Project.</p> <p>Closure: No increase in noise and vibration levels expected at closure because the aggregate sources would no longer be required.</p>	<p>Construction: No change in noise and vibration levels expected because waste rock removal is required to establish the open pit.</p> <p>Operation: Using mined waste rock will not result in any significant changes in noise and vibration levels because waste rock removal required for mine operations.</p> <p>Closure: No change in noise and vibration levels at closure because rehabilitation will be required for the open pit as part of the Project and waste rock would no longer be required as an aggregate source.</p>	<p>Construction: Increase in noise and vibration levels expected from machinery to establish new sources.</p> <p>Operation: New quarries may result in increased noise and vibration within or near the PDA.</p> <p>Closure: Increase in noise and vibration levels expected from machinery to rehabilitate aggregate source area(s).</p>
Overall Acoustic Environment Ranking <i>Key differentiating factor – the potential for effects is different between identified alternatives.</i>		Disadvantage Increased noise and vibration effects from increased extraction activity, depending on volumes taken from existing sites. The overall effect would be comparable whether new or existing sites are used, since the aggregate quantity required does not change.	Advantage No net increase to the acoustic environment is expected, since waste rock removal will be required to establish the open pit and noise will be appropriately mitigated.	Disadvantage Increase in noise and vibration from the establishment and operation of new sites, depending on volumes taken from new sites. The overall effect would be comparable whether new or existing sites are used, since the aggregate quantity required does not change.
Groundwater	Change in groundwater quantity or flow	Construction/Operation/Closure: Existing aggregate sources must operate under a permit or licence approved under the <i>Aggregate Resources Act</i> and potentially a Permit to Take Water (PTTW) and/or Environmental Compliance Approval (ECA) to manage potential effects on groundwater.	Construction/Operation/Closure: Since waste rock would be extracted as part of normal operations and only non-acid generating (NAG) waste rock would be used, there would not be any additional effects on groundwater quantity, flow or quality from using waste rock as an aggregate source.	Construction: New sources may require excavation below the water table, requiring dewatering and the active management of groundwater effects. Operation: New sources may operate below the water table, requiring dewatering and the active management of groundwater effects. Closure: Site would be decommissioned and rehabilitated on closure, returning groundwater to a natural condition.
	Change in groundwater quality			
Overall Groundwater Ranking <i>Key differentiating factor – the potential for effects is different between identified alternatives.</i>		Advantage No additional effects on groundwater are expected from existing aggregate sources, since these sites are already established to operate in a manner that manages effects on groundwater to meet regulatory requirements. No excavation of aggregate sources is planned below the water table.	Advantage Provided only NAG waste rock is used, no effects on groundwater are expected since waste rock would already be extracted as part of normal open pit operation.	Disadvantage Potential need to manage groundwater effects if sites are located below the water table.
Surface Water	Change in surface water quantity or flow	Construction/Operation/Closure: Existing aggregate sources must operate under a permit or licence approved under the <i>Aggregate Resources Act</i> and potentially a PTTW and/or ECA to manage potential effects on surface water to meet regulatory standards.	Construction/Operation/Closure: Since waste rock would be extracted as part of normal operation, there would not be any additional effects on surface water quantity, flow or quality from using waste rock as an aggregate source.	Construction/Operation/Closure: New quarries must operate under a permit or licence approved under the <i>Aggregate Resources Act</i> and potentially a PTTW and/or ECA to manage potential effects on surface water to meet regulatory standards.
	Change in surface water quality			
Overall Surface Water Ranking <i>Not a key differentiating factor – the results are comparable across all identified alternatives.</i>		Neutral No additional effects on surface water are expected from existing aggregate sources, since these sites are already established to operate in a manner that manages effects on meet regulatory requirements.	Neutral No effects on surface water are expected since waste rock would already be extracted as part of normal mine operations.	Neutral No additional effects on surface water are expected from new aggregate sources, since effects must be appropriately managed to meet regulatory requirements.
Fish and Fish Habitat	Change in fish habitat	Construction/Operation/Closure: Existing aggregate sources must operate under a permit or licence approved under the <i>Aggregate Resources Act</i> and potentially a PTTW and/or ECA to manage offsite effects, including related to fish and fish habitat.	Construction/Operation/Closure: Since waste rock would be extracted as part of normal operation, there would not be any additional effects on fish or fish habitat from using waste rock as an aggregate source.	Construction/Operation/Closure: New aggregate sources must operate under a permit or licence approved under the <i>Aggregate Resources Act</i> and potentially a PTTW and/or ECA to manage offsite effects, including related to fish and fish habitat.
	Change in fish			

Appendix G5: Alternatives Evaluation – Aggregate Sources

		Alternative Method		
Valued Component (VC)/Criteria	Indicators	Use Existing Quarries and/or Pits	Use Mined Waste Rock	Create New Aggregate Sources
Overall Fish and Fish Habitat Ranking <i>Not a key differentiating factor – the potential for effects is comparable across all identified alternatives.</i>		Neutral No additional effects on fish or fish habitat are expected from existing aggregate sources, since these effects must be appropriately managed to meet regulatory requirements.	Neutral No effects on fish or fish habitat are expected since waste rock would already be extracted as part of normal operation.	Neutral No effects on fish or fish habitat are expected from new aggregate sources, since these effects must be appropriately managed to meet regulatory requirements.
Vegetation Communities	Change in abundance of vegetation species of interest	Construction/Operation/Closure: No additional change to vegetation species of interest or abundance, condition of upland vegetation communities or wetland function and connectivity expected because obtaining aggregate from existing sources will not require additional vegetation clearing.	Construction/Operation/Closure: No additional change to vegetation species of interest or abundance, condition of upland vegetation communities or wetland function and connectivity expected because the extraction of waste rock is a by-product of normal operation.	Construction: Vegetation clearing would be required to establish new aggregate sources and access roads. Extent of effects on vegetation communities and wetlands would be dependent on the sites selected. Operation: No additional effect on vegetation communities or wetlands expected because no additional clearing would be required once a new aggregate source is established. Closure: Possible increase of vegetation species of interest, abundance and condition of upland vegetation communities and wetlands depending on the rehabilitation plan for the aggregate source(s).
	Change in abundance and condition of upland vegetation communities			
	Change in wetland function or connectivity			
Overall Vegetation Communities Ranking <i>Key differentiating factor – the potential for effects is different between identified alternatives.</i>		Advantage No effects on upland vegetation communities and wetlands expected because obtaining aggregate from existing sources will not require additional vegetation clearing.	Advantage No effects on upland vegetation communities or wetlands are expected, since activities will be limited to the PDA.	Disadvantage Effects on vegetation communities expected from vegetation clearing for aggregate sources and access.
Wildlife and Wildlife Habitat	Change in movement, health or mortality risk of wildlife	Construction/Operation/Closure: Potential increase in mortality risk due to increased traffic from hauling of aggregate; however, this increase is expected to be minimal. No additional change of movement of wildlife expected because obtaining aggregate from existing sources will not involve any new barriers across wildlife movement corridors.	Construction/Operation/Closure: No additional change of movement, health and mortality risk of wildlife expected because activities associated with using mined waste rock would be limited to the PDA and will not involve activities that would result in the direct mortality of wildlife or create barriers across wildlife movement corridors.	Construction: Possible change in wildlife movement because establishing new aggregate sources may create barriers across wildlife movement corridors. Potential increase in mortality risk due to increased traffic from hauling of aggregate; however, effects are expected to be minimal as sites will be chosen in close proximity to the PDA. Operation: No additional change of movement, health and mortality risk of wildlife expected because once the aggregate pit is established, activities would not result in the direct mortality of wildlife or create barriers across wildlife movement corridors. Closure: Potential positive change in wildlife movement as the aggregate pit is rehabilitated access restrictions are removed and wildlife may enter the site. No change in health or mortality risk expected.
	Change in wildlife habitat	Construction/Operation/Closure: No additional change in wildlife habitat expected because obtaining aggregate from existing sources will not require the alteration of habitat.	Construction/Operation/Closure: No additional change in wildlife habitat expected because activities associated with the use of mined waste rock would be limited to the PDA and will not require the alteration of habitat.	Construction: Change in wildlife habitat expected because a direct loss of habitat would occur to establish aggregate sources. Operation: No additional change in wildlife habitat expected because once the aggregate source is established, no additional loss or change of habitat would occur. Closure: Possible increase in wildlife habitat as the site is rehabilitated depending on the rehabilitation plan for the aggregate pit or quarry.
Overall Wildlife and Wildlife Habitat Ranking <i>Key differentiating factor – the potential for effects is different between identified alternatives.</i>		Disadvantage Potential minimal increase in mortality risk from increased truck traffic. No effects on wildlife movement or wildlife habitat are expected since sites are already established.	Advantage No additional effects on wildlife or wildlife habitat are expected, since activities will be limited to the PDA and will not result in additional barriers across wildlife movement corridors, mortality of wildlife or the alteration of habitat.	Disadvantage Potential minimal increase in mortality risk from increased truck traffic. Potential effect on wildlife movement by creating new barriers across wildlife movement corridors and loss of habitat.

Appendix G5: Alternatives Evaluation – Aggregate Sources

		Alternative Method		
Valued Component (VC)/Criteria	Indicators	Use Existing Quarries and/or Pits	Use Mined Waste Rock	Create New Aggregate Sources
Social Environment				
Community Services and Infrastructure	Change in capacity of housing and accommodation	Construction/Operation/Closure: Use of existing aggregate sources is not expected to affect community services or infrastructure as this would not result in local population growth or exceed the rated capacity of the highway, or existing water, sewer and power services and infrastructure.	Construction/Operation/Closure: Use of mined waste rock is not expected to affect community services or infrastructure because this would not result in local population growth and is waste rock removal is already planned as part of the Project. Project operation will be localized and will not affect offsite traffic or existing water, sewer and power services and infrastructure.	Construction/Operation/Closure: Use of new aggregate sources is not expected to affect community services or infrastructure as they would not result in local population growth or exceed the rated capacity of the highway, or existing water, sewer and power services and infrastructure.
	Change in capacity of health and emergency services and infrastructure			
	Change in the capacity of recreation and entertainment services and infrastructure			
	Change in the capacity provincial and municipal services and infrastructure			
Overall Community Services and Infrastructure Ranking <i>Not a key differentiating factor – the potential for effects is comparable across all identified alternatives.</i>		Neutral No effect on community services and infrastructure expected because there will not be an increased demand that would exceed the current capacity.	Neutral No effect on community services and infrastructure expected because there will not be an increased demand that would exceed the current capacity.	Neutral No effect on community services and infrastructure expected because there will not be an increased demand that would exceed the current capacity.
Operational Health and Safety	Health and safety of mine workers	Construction/Operation/Closure: No effect on the health and safety of mine workers because the use of existing aggregate sources would not interact with mine workers.	Construction/Operation/Closure: No effect on the health and safety of mine workers or local residents expected because the Project will be designed in consideration of avoiding the potential for operational failures that could lead to injury of workers.	Construction/Operation/Closure: No effects on the health and safety of mine workers expected as the new aggregate sources will be operated under health and safety standards.
	Health and safety of local residents	Construction: Potential effect on health and safety of local residents due to increased traffic resulting in higher risk of accidents or collisions, but will be along existing haul routes. Operation: Potential effect on health and safety of local residents due to increased traffic resulting in higher risk of accidents or collisions, but will be along existing haul routes. Closure: No effect on health and safety of mine workers because hauling of aggregate would not be required during closure.	Construction/Operation/Closure: No effect on the health and safety of local residents because Project operation will be localized to the PDA. The Project will be designed in consideration of providing a safe environment for local residents outside the PDA.	Construction: Potential effect on health and safety of local residents due to increased traffic resulting in higher risk of accidents or collisions along new haul routes. Operation: Potential effect on health and safety of local residents due to increased traffic resulting in higher risk of accidents or collisions long new haul routes. Closure: No effect on health and safety of mine workers because hauling of aggregate would not be required during closure.
Overall Operational Health and Safety Ranking <i>Key differentiating factor – the potential for effects is different between identified alternatives.</i>		Disadvantage The use of existing aggregate sources may result in increased traffic which creates an increased safety risk for local residents.	Advantage No effects on health and safety expected because the Project will be designed in consideration of avoiding health and safety risks for mine workers and in consideration of providing a safe environment for local residents outside the PDA.	Advantage The use of new aggregate sources may result in increased traffic, but this would be restricted to access road within the PDA.

Appendix G5: Alternatives Evaluation – Aggregate Sources

		Alternative Method		
Valued Component (VC)/Criteria	Indicators	Use Existing Quarries and/or Pits	Use Mined Waste Rock	Create New Aggregate Sources
Economic Environment				
Cost	Capital cost, Operational/maintenance cost, Rehabilitation/closure cost	<p>Construction: No cost to establish aggregate source, since sources and access to sources is already in place, but potentially higher costs if expansion is required.</p> <p>Operation: Existing sources may be owned by Greenstone Gold Mines GP Inc. (GGM) or operated by local or Aboriginal businesses. Comparable operational cost for extraction and material hauling if owned by GGM, or potentially higher costs if sourced from a third party.</p> <p>Closure: Higher cost for rehabilitation if required, or third-party sources may remain in operation.</p>	<p>Construction: No cost to establish new aggregate sources, since waste rock will be mined as part of operation and access to the open pit will already be in place.</p> <p>Operation: Comparable operational cost due to material hauling.</p> <p>Closure: Reduction in closure costs as material is sourced from within open pit.</p>	<p>Construction: Highest potential capital cost to establish new aggregate sources and access.</p> <p>Operation: New sources would be owned by GGM. Comparable operational cost for extraction and material hauling.</p> <p>Closure: Higher cost for rehabilitation of new aggregate sources.</p>
Overall Cost Ranking <i>Key differentiating factor – the potential for effects is different between identified alternatives.</i>		Disadvantage No construction cost to establish aggregate sources since sites and access are already in place, but additional cost to expand sources may be required. Potentially higher operation costs from third-party fees.	Advantage No construction cost to establish aggregate sources since access is already in place. Limited operational cost. Reduces closure costs of outside sources.	Disadvantage Highest construction cost to establish new aggregate sources, but lower operation costs.
Labour and Economy	Change in labour	Construction/Operation/Closure: Sites would be in operation and would be expected to be properly staffed.	Construction/Operation/Closure: Employment opportunities would be limited to those employees required for operation.	Construction/Operation/Closure: Potential need for increased employment for site operation.
	Change in economy	Construction/Operation/Closure: Potential opportunities for local and Aboriginal aggregate businesses, depending on location and resource availability. Increased government revenue from the annual licence/permit fees and royalties paid to the Aggregate Resources Trust.	Construction/Operation/Closure: No licence/permit fees and royalties for an aggregate source would be paid to the government.	Construction/Operation/Closure: Increased government revenue from the annual licence/permit fees and royalties paid to the Aggregate Resources Trust.
Overall Labour and Economy Ranking <i>Key differentiating factor – the potential for effects is different between identified alternatives.</i>		Advantage Potential business opportunities and increased government revenue from the annual licence/permit fees paid to the Aggregate Resources Trust.	Disadvantage No effect on labour or economy as there would be no business or employment opportunities or licence/permit fees for an aggregate source paid to the government.	Advantage Potential employment opportunities and increased government revenue from the annual licence/permit fees paid to the Aggregate Resources Trust.
Technical Feasibility	Ability to implement /commonly used technology in similar applications	Construction/Operation/Closure: The use of existing aggregate sources is a standard and proven approach to source construction material.	Construction/Operation/Closure: The use of NAG mined waste rock is a standard and proven approach to source construction material.	Construction/Operation/Closure: Establishing a new aggregate source is a standard and proven approach to source construction material.
	Effectiveness/reliability	Construction/Operation/Closure: The use of existing aggregate sources may not provide an adequate supply to meet Project needs.	Construction/Operation/Closure: The use of NAG mined waste rock may not provide an adequate supply to meet Project needs.	Construction/Operation/Closure: Establishing new sources provides flexibility in siting locations and having a supply of appropriate material.
Overall Technical Feasibility Ranking <i>Key differentiating factor – the potential for effects is different between identified alternatives.</i>		Major Disadvantage May not meet Project needs for aggregate.	Major Disadvantage May not meet Project needs for aggregate.	Major Advantage Provides the greatest flexibility in having adequate aggregate sources to meet the Project needs.

Appendix G5: Alternatives Evaluation – Aggregate Sources

		Alternative Method		
Valued Component (VC)/Criteria	Indicators	Use Existing Quarries and/or Pits	Use Mined Waste Rock	Create New Aggregate Sources
Cultural Environment				
Heritage Resources	Change in archaeological sites	Construction/Operation/Closure: No archaeological sites would be disrupted where existing aggregate sources are used, since they have already been assessed for archaeological potential prior to establishing the aggregate source.	Construction/Operation/Closure: No archaeological sites would be disturbed since the open pit area has already been assessed for archaeological potential prior to establishing the Project.	Construction: No change in archaeological sites expected because the PDA will be surveyed and cleared of archaeological resources prior to Project development. Operation: No change anticipated because the use of the new aggregate sources would not result in further removal, disruption or displacement of archaeological sites or architectural or historical resources once established. Closure: No change anticipated because the rehabilitation of the new aggregate sources would not result in further removal, disruption or displacement of archaeological sites or architectural or historical resources once established.
	Change in architectural or historical resources			
Overall Heritage Resources Ranking <i>Not a key differentiating factor – the potential for effects is comparable across all identified alternatives.</i>		Neutral No effects on heritage resources are expected because the use of existing aggregate sources would not result in the removal, disruption or displacement of archaeological sites or architectural or historical resources.	Neutral No effects on heritage resources are expected because the use of mined waste rock would not result in the removal, disruption or displacement of archaeological sites or architectural or historical resources.	Neutral No change in archaeological sites expected because the PDA will be surveyed and cleared of archaeological resources prior to Project development.
Traditional Land and Resource Use	Change in Aboriginal communities' cultural practices	Construction/Operation/Closure: No change in Aboriginal communities' cultural practices or traditional land uses expected because existing quarries are already established. Although the area of disturbance may increase if expansion is required, this will not result in any additional restrictions on the use of cultural or spiritual sites or traditional land use areas, since use is not anticipated directly adjacent to active quarries.	Construction/Operation/Closure: No change in Aboriginal community's cultural practices or traditional land uses anticipated because the use of mined waste rock will be localized to the PDA, waste rock removal is already planned as part of the Project, and will not have any additional effects on the use of cultural or spiritual sites or traditional land use areas.	Construction: Traditional land use has been identified by Long Lake #58 First Nation, Métis Nation of Ontario, Eabametoong First Nation, Aroland First Nation, Ginoogaming First Nation and Pays Plat First Nation through traditional knowledge studies, and the area may also be used by other communities. The establishment of new aggregate sources may affect the use of or access to traditional areas, depending on the sites selected. Operation: Ongoing extraction may disrupt the use of adjacent traditional areas, depending on the sites selected. Closure: Sites would be rehabilitated during closure, restoring the potential for traditional uses.
	Change in Aboriginal communities' traditional land uses (including hunting, fishing, trapping and harvesting)			
Overall Traditional Land and Resource Use Ranking <i>Key differentiating factor – the potential for effects is different between identified alternatives.</i>		Advantage No effects on traditional land and resource use are anticipated because existing aggregate sources are already established, and will not result in additional restrictions on the use of cultural or spiritual sites or traditional land use areas.	Advantage No effects on traditional land and resource use are anticipated because the use of mined waste rock will be localized to the PDA, waste rock removal is already planned as part of the Project, and will not result in additional effects on traditional land and resource use.	Disadvantage The establishment of new aggregate sources may affect the use of or access to cultural or spiritual sites or traditional land use areas.

Appendix G5: Alternatives Evaluation – Aggregate Sources

		Alternative Method		
Valued Component (VC)/Criteria	Indicators	Use Existing Quarries and/or Pits	Use Mined Waste Rock	Create New Aggregate Sources
Built Environment				
Land and Resource Use	Change in recreational land and resource use	Construction/Operation/Closure: No changes in recreational or commercially-based land and resource use or navigation because existing aggregate sources are already established, and their use will not result in any additional access restrictions or removal of land and resource use areas.	Construction/Operation/Closure: No change in recreational or commercially-based land and resource use or navigation because the use of mined waste rock will be restricted to the PDA and will not result in any additional access restrictions or removal of land and resource use areas.	Construction: Potential change in recreational or commercially-based land and resource use or navigation because the establishment of new aggregate sources may result in access restrictions or removal of land and resource use areas, depending on the sites selected. Operation: No effect on land and resource use because once the new aggregate source is established, there will be no additional access restrictions to recreational or commercially-based land and resource use areas or navigation. Closure: No effect on land and resource use because once the new aggregate source is established, there will be no additional access restrictions to recreational or commercially-based land and resource use areas or navigation.
	Change in navigation			
	Change in commercially-based land and resource use			
Overall Land and Resource Use Ranking <i>Key differentiating factor – the potential for effects is different between identified alternatives.</i>		Advantage No effects on land and resource use are anticipated because existing aggregate sources are already established and will not result in any additional access restrictions to recreational or commercially-based land and resource use areas or navigation.	Advantage No effects on land and resource use are anticipated because the use of mined waste rock will be restricted to the PDA, waste rock removal is already planned as part of the Project, and will not result in any additional access restrictions to recreational or commercially-based land and resource use areas or navigation.	Disadvantage Potential effect on land and resource use because the establishment of new aggregate sources may result in access restrictions or removal of land and resource use areas.

Appendix G5: Alternatives Evaluation – Aggregate Sources

OVERALL ALTERNATIVE RANKING BASED ON KEY DIFFERENTIATING FACTORS

Key Differentiating Factors	Use Existing Quarries and/or Pits	Use Mined Waste Rock	Create New Aggregate Sources
Atmospheric Environment	Disadvantage - Increased atmospheric environment effects from increased extraction activity, depending on volumes taken from existing sites. The overall effect would be comparable whether new or existing sites are used, since the aggregate quantity required does not change.	Advantage - Limited incremental atmospheric environment effects since extraction will occur as part of normal operation.	Disadvantage - Increase in emissions from the establishment and operation of new sites, depending on volumes taken from new sites. The overall effect would be comparable whether new or existing sites are used, since the aggregate quantity required does not change.
Acoustic Environment	Disadvantage - Increased noise and vibration effects from increased extraction activity, depending on volumes taken from existing sites. The overall effect would be comparable whether new or existing sites are used, since the aggregate quantity required does not change.	Advantage - No net increase to the acoustic environment is expected, since waste rock removal will be required to establish the open pit and noise will be appropriately mitigated.	Disadvantage - Increase in noise and vibration from the establishment and operation of new sites, depending on volumes taken from new sites. The overall effect would be comparable whether new or existing sites are used, since the aggregate quantity required does not change.
Groundwater	Advantage - No additional effects on groundwater are expected from existing aggregate sources, since these sources are already established to operate in a manner that manages effects on groundwater to meet regulatory requirements. No excavation of aggregate sources is planned below the water table.	Advantage - Provided only NAG waste rock is used, no effects on groundwater are expected since waste rock would already be extracted as part of normal open pit operation.	Disadvantage - Potential need to manage groundwater effects if aggregate sources are located below the water table.
Vegetation Communities	Advantage - No effects vegetation communities expected because obtaining aggregate from existing sources will not require additional vegetation clearing.	Advantage - No effects on vegetation communities are expected, since activities will be limited to the PDA.	Disadvantage - Effects on vegetation communities expected from vegetation clearing for aggregate sources and access.
Wildlife and Wildlife Habitat	Disadvantage - Potential minimal increase in mortality risk from increased truck traffic. No effects on wildlife movement or wildlife habitat are expected since aggregate sources are already established.	Advantage - No additional effects on wildlife or wildlife habitat are expected, since activities will be limited to the PDA and will not result in additional barriers across wildlife movement corridors, mortality of wildlife or the alteration of habitat.	Disadvantage - Potential minimal increase in mortality risk from increased truck traffic. Potential effect on wildlife movement by creating new barriers across wildlife movement corridors and loss of habitat.
Operational Health and Safety	Disadvantage - The use of existing aggregate sources may result in increased traffic which creates an increased safety risk for local residents.	Advantage - No effects on health and safety expected because the Project will be designed in consideration of avoiding health and safety risks for mine workers and in consideration of providing a safe environment for local residents outside the PDA.	Advantage - The use of new aggregate sources may result in increased traffic, but this would be restricted to site roads within the PDA.
Cost	Disadvantage - No construction cost to establish aggregate sources since sites and access are already in place, but additional cost to expand sources may be required. Potentially higher operation costs from third-party fees.	Advantage - No construction cost to establish aggregate sources since access is already in place. Limited operational cost. Reduces closure costs of outside sources.	Disadvantage - Highest construction cost to establish new aggregate sources, but lower operation costs.
Labour and Economy	Advantage - Potential business opportunities and increased government revenue from the annual licence/permit fees and royalties paid to the Aggregate Resources Trust.	Disadvantage - No effect on labour or economy as there would be no business or employment opportunities or licence/permit fees and royalties for an aggregate source paid to the government.	Advantage - Potential employment opportunities and increased government revenue from the annual licence/permit fees and royalties paid to the Aggregate Resources Trust.
Technical Feasibility	Major Disadvantage - May not meet Project needs for aggregate.	Major Disadvantage - May not meet Project needs for aggregate.	Major Advantage - Provides the greatest flexibility in having adequate aggregate sources to meet the Project needs.
Traditional Land and Resource Use	Advantage - No effects on traditional land and resource use are anticipated because existing aggregate sources are already established, and will not result in additional restrictions on the use of cultural or spiritual sites or traditional land use areas.	Advantage - No effects on traditional land and resource use are anticipated because the use of mined waste rock will be localized to the PDA, waste rock removal is already planned as part of the Project, and will not result in additional effects on traditional land and resource use.	Disadvantage - The establishment of new aggregate sources may affect the use of or access to cultural or spiritual sites or traditional land use areas.
Land and Resource Use	Advantage - No effects on land and resource use are anticipated because existing aggregate sources are already established and will not result in additional access restrictions to recreational or commercially-based land and resource use areas or navigation.	Advantage - No effects on land and resource use are anticipated because the use of mined waste rock will be restricted to the PDA. Waste rock removal is already planned as part of the Project, and will not result in additional access restrictions to recreational or commercially-based land and resource use areas or navigation.	Disadvantage - Potential effect on land and resource use because the establishment of new aggregate sources may result in access restrictions or removal of land and resource use areas.
OVERALL	PREFERRED - In Combination (provides advantages, but limited technical feasibility)	PREFERRED - In Combination (provides advantages, but limited technical feasibility)	PREFERRED - In Combination (higher potential for environmental effects, but provides the necessary technical flexibility to supplement the other options)