Hidden Quarry Comment Documentation

Agency	#	Comment	Response	Action Item	Who
Public Works Guelph/Eramosa	1	The drawings show that there possibly two entrance/exits off of the Sixth Line. 2 entrance permits would be required	Agree. The Southerly Entrance is the only entrance proposed for trucks. We would specify that only property maintenance use of northerly Entrance. North Entrance is existing.	Modify Site Plan-Truck Traffic only at south entrance Get entrance permits post approval.	Stovel
	2	Truck traffic on this road during ½ load season. The Public Works Department is concerned if the Sixth Line is structurally sound for truck traffic being a gravel road or should this road be rebuilt to Township Road Standards (minimum length of property) by the developer to permit the truck traffic?	Agree. Road from Highway 7 will be reconstructed to full load standard at JDCL expense subject to township approval.	Enter into road improvement agreement with Township	JDC Town
	3	The upward vertical slope of the road going northerly is quite severe and may pose problems for trucks going north from Hwy # 7 and also going south on Sixth Line approaching the stop sign at Hwy # 7.	Agree. Road from Highway 7 will be reconstructed as above and vertical alignments to be improved. Residents have also commented that there is an opportunity to improve current situation.	Provide draft vertical alignment profile to Township for comment.	Cole
Burnside General Comments	4	Details of private water and wastewater services required to service the scale house or Shop/Office/Lab building should be provide on the drawing showing location and size/footprint. CBO to confirm adequacy of services.	Agree.	PEng to provide conceptual Septic design	Keewatin
	5	A residential unit exists within the proposed site. Details regarding the intended use or removal of this residence and the associated services and entrance should be provided.	Agreed. The intention is to maintain the residential unit. The tennant will be employed as a site watchman. The residence will be maintained in a neat and tidy condition.	No Action Required	
	6	Details should be provided for the driveway apron and should adhere to Township Design Standards within the ROW.	Agreed	A note will be added to the site plan to clarify this. Include in proposed road works in Comments 2 and 3	Stovel Cole
	7	A high point at the property limit of the right of way should be provided in the New Entrance/Exit to the site to ensure additional surface runoff is not being directed towards ath Line.	Agreed	A note will be added to the site plan to clarify this. Include in proposed road works in Comments 2 and 3	Stovel Cole
	8	The proposed entrance to be paved from the scale house to the public road.	Agree.	Already noted. See note 13 page 2 of 5 of the Site Plan	
	9	Will the existing service entrance shown on the Operations Plan remain or be removed?	The existing service entrance located will be maintained as a field entrance for such activities as fence repair and monitoring.	Entrances are shown on page 2 of 5 of the Site Plan. Note in Comment 1 to be added to clarify not a truck entrance	
	10	Fence/Gate geometry to be such that one full truck length can be off the travelled portion of the public road with the gate closed.	Agreed.	Show as detail or note on site plan.	Stovel
	11	Note 5 on the Operations Plan indicates that the existing property limits are fences although also indicates that fencing and repairs will be undertaken once extraction is initiated. An inspection of the existing fence condition is recommended to confirm the condition of existing fence and to establish the municipality's requirements in this regard.	Agreed	Inspection of existing fencelines will be conducted and existing condition of fences to be noted on site plan.	JDCL Stovel
	12	Top of rock elevation should be added to the Operations Plan.	Agreed	Bedrock elevations are currently shown on Page 3 of 5.	
	13	The Township's By-law Enforcement Officer should confirm the activities noted below conform to the Township's Noise Control by-law: extraction operations may occur between the hours of 7 a.m. and 7 p.m., Monday to Friday and 7 a.m. until1 p.m. on Saturday; hauling operations may occur between 6 a.m. and 6 p.m. Monday to Friday and 6 a,m, to 1 p.m. on Saturday; and, 6 a,m, to 1 p.m. on Saturday; and, drilling and blasting will occur between 8 a.m. and 5 p.m. Monday to Friday.	Agreed. Operations on site are restricted to after 7:00 am. Shipping hours are proposed to begin at 6:00 am. In the event shipping hours between 6:00 am and 7:00 am are found not comply, there are two remedies. 1. An exemption application can be made to council for permission to ship between 6 am and 7 am, this to be issued at council's discretion, or; 2. Shipping would be restricted to after 7:00 am. Shipping with commercal vehicles may be permitted under the by-law.	Contact Township By-Law Enforcement regarding the applicability of Noise By-Law to shipping with commercial vehicles.	JDCL
	14	It is understood that a small pond will be constructed for Wash water. Additional details should be provided on washing operations.	Agreed	Location of Wash water pond to be indicated on site plan	Stovel
	15	Additional details should be provided outlining how the stripped overburden will be dealt with.	Agreed	A note dealing with stripping and placement of overburden in screening berms and rehabilitation sites will be added to plans	Stovel Harden
Burnside Archaeological Comments	16	It is noted that a significant cultural heritage feature has been identified in the northwest portion of the site. The technical recommendations of the archaeologist (York North Archaeological Services) have been included on the site operational plan.	Agreed	No Action Required	
	17	It is understood that a Stage lll assessment will be undertaken prior to any works being completed on site. This assessment should be completed to the satisfaction of the Ministry of Tourism, Culture and Sport.	The Stage III Assessment only impacts areas depicted on the site plan. We have committed to doing this work, however, work may proceed on unaffected areas of the site prior to complation of Phase III Study. (Discussed Burnside Feb 1/13)	Complete Phase III on identified farmstead post approval.	YorkNorth
Air Quality Comments	18	The Emissions Summary and Dispersion Modelling (ESDM) as prepared by RWDI was reviewed. Although the documentation took some time to interpret, there was nothing in the ESDM to indicate that the site could not request and receive an Environmental Compliance Approval ("ECA").	Agreed	No Action Required	

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Burnside Traffic Impact Comments	19	The Traffic Impact Study (TIS) for the proposed quarry was prepared by Cole Engineering Limited (2012) and generally considers traffic operations at the access onto the 6th Line as wellas the intersection of Highway 7/6th Line and Highway 7/Sth Line. Our comments in this regard are as follows:			
	20	The TIS notes that 5th Line is under the jurisdiction of the Township of Guelph/Eramosa, however it is actually under the jurisdiction of the Town of Milton.	Agreed.We acknowledge that 5th Line should be labelled under the jurisdiction of the Town of Milton.	Cole Engineering to provide correction via addendum	Cole
	21	Comments should be obtained from the Ministry of Transportation (MTO), for operations affecting Highway 7, and from the Town of Milton, for operations affecting 6th Line.	Agreed. We are awaiting comments from MTO at this time and will respond accordingly.	Respond to MTO commnets once recieved	Cole
	22	No information is provided on the anticipated lifespan of the quarry, which would provide context into the potential for longer term impacts.	Agreed. Lifespan of Quarry is estimated to be 20 years.	No Action Required	
	23	The forecast of background traffic is based on traffic counts taken in February 2012. The MTO clas.sifies Highway 7 as a commuter road, which is also confirmed by the strong directional distribution of traffic on a daily basis (i.e., high eastbound traffic in a.m. peak period and high westbound traffic in p.m.peak period). On a seasonal basis, MTO's commuter roads typically have 20 to 25% higher traffic volumes in the summer months, when compared to winter traffic (i.e., February counts). Traffic volumes should be increased to account for these seasonal variations.	Agreed. Cole has run an additional simulation (attached) which shows acceptable conditions at the peak seaonal level.The future (2022) total traffic is expected to operate with a volume to capacity ratio(v/c) of under 0.30. The shared southbound left-right turn lane at the Highway 7 / 6th Line intersection is expected to operate with levels of service of E and F (delay of 54 seconds) during the a.m. and p.m. peak periods, respectively; however, the volume to capacity remains well under 1.00, and as such, there is significant capacity remaining to complete this maneuver.	No Action Required	
	24	The forecast of trip generation from the proposed quarry is based on data from a proxy site (i.e., Erin Pit). On a weekly basis, the calculation assumes consistent traffic over a Monday to Saturday period, inclusive. Information should be provided to confirm this assumption. The number of working days assumed for the critical month (i.e., August) also does not appear to take into account holiday period, or reduced operations due to weather, over the monthly period. Also the trip generation is based on average loads· which are typical of tractor trailers, whereas actual trip volumes may be higher if the fleet is comprised of higher numbers of tandem or triaxle trucks. Based on the above factors, the estimates for peak period traffic may be low.	Agree. Trip generation for the site was derived using information from the Erin Gravel pit and provides the number of vehicles per hour for the entire month of August (the peak month) and is provided in Appendix A for reference. The analysis in the April 2012 study assumed an average day during the peak month during both the a.m. and p.m. roadway peak periods. This would be typical of quarry operations. In addition to the trip calculations, the 33 tonne average load used to estimate the number of truck trips took into account tractor-trailers, tandem and tri-axle trucks expected to serve the site. During the busiest month of August 2011, there were 2,826 trucks that loaded at the quarry with the peak hour being 23 vehicles and represented 0.814% of the monthly traffic at the Erin Pit. Based on the 33 tonne per load figure and as documented in the April 2012 study, at the Eramosa Quarry, there will be a total of 21,213 trucks per year, of which there will be 2,989 trips during the peak month. Applying the 0.814% peak hourly factor results in a total of 24 trucks per hour or 1 truck every 2 minutes and 30 seconds. It should be noted that this assumption is based on a level of activity that will rarely take place and this calculation simply provides an upper limit of trips generated by the site. However, under this worst case scenario, trips added to the road network would still have minimal impact.	No Action Required	
	25	No analysis was provided on the requirements for turning lanes at the intersection of Highway 7/6th Line and at the intersection of Highway 7/6th Line. It is recommended that turning lane warrants and requirements be reviewed for these intersections.	Agree. Cole Engineering has provided an analysis (attached) showing that left hand turn lane is warrranted under the 2022 peak period condition. This condition is related to background traffic levels. The traffic generated by the quarry does not trigger the warrants. Eastbound Hwy. 7 to the 6th Line is a turning movement that will only rarely be performed by quarry traffic.	Review calculations with MTO once MTO comments received.	Cole
	26	The TIS does not provide any review of the need to upgrade 6th Line to accommodate the increased truck traffic. It is recommended that a geotechnical study be provided to confirm the road base and road surface requirements. Road widths should also be reviewed, to confirm sufficiency to allow two lanes.	Agree. We met with the Township Engineering Consultant to confirm the timing of the preliminary design study and the Geotechnical study. We have directed a Preliminary Design Report and Geotechnical to proceed once the weather breaks, subject to township road superintendant granting occupancy permit.	Prepare Geotechnical study and Preliminary Design.	Cole
	27	Analysis of stopping sight distances have been provided for the proposed access onto 6th Line, based on an assumed 50 km/h operating speed. However, since speeds are not posted, thelegal speeds on this rural road should be assumed to be 80 km/h, in accordance with the Highway Traffic Act. The required stopping sight distance should be revised accordingly.80 km/h, in accordance with the Highway Traffic Act. The required stopping sight distance should be revised accordingly.	Agree. We will propose that the posted speed limit be reduced to 50 km for the short section of the 6th line between the quarry entrance and Highway. Cole Engineering advises that road design improvements will increase sight lines to the appropriate design speed.	See Comment 26 above.	
	28	The TIS does not analyze the available sight distances at the intersection of Highway 7/6tta Line. It should be confirmed that sufficient stopping sight distances and turning sight distances are available to accommodate the significant increase in truck turning movements at this location.	Agree. Cole Engineering has reviewed this and comments that Highway 7 is considered a straight road and we do not anticipate issues with sight distances. Photographs of the intersection confirm sight distances of over 500m in each direction.	No Action Item	
	29	The visibility triangles (daylighting) are limited at the intersection of Highway 7/6th Line, by encroachment of existing trees. Considering the down gradient on the sth Line approach and the type of traffic (i.e., large trucks}, visibility triangles should be provided for the approaches, in accordance with the · requirements of the Geometric Design Manual for Ontario Highways.	Agree. Cole Enginnering adds that trees that limit visivbility can be removed as part of the road design.	See Comment 26 above.	
	30	The design and placement of truck entrance warning signs should meet the requirements of the Ontario Traffic Manual, based on a design speed of 100 km/h on Highway 7 and 80 kmlh on 6th Line.	Agree, Cole Engineering's review (attached) of the OTM shows that truck entracnce warning signs should be placed 335 meters in advance of the intersection.	Include note on site plan that Truck Entrance Warning Signs be installed as per OTM.	Stovel

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Burnside Natural Environment Technical Report Comments	31	Development and site alteration are not permitted within a Provincially Significant Wetland ("PSW"). The boundary of the Eramosa River-Blue Springs Creek PSW should be staked in the field with the Ministry of Natural Resources ("MNR") or the Grand River Conservation Authority ("GBCA") with MNR's approvat. The report notes that the boundary wiU be staked at a later date but we strongly suggest that this exercise should occur prior to acceptance of the Level II report as it could have significant implications on the limit of extraction.	Agree, the boundary of the Provincially Significant Wetland (PSW) will be staked/flagged by GWS staff in the spring after the leaves have flushed and it will be subsequently confirmed in the field by GRCA staff prior to having it surveyed and plotted on the Operational Plan.	GWS to flag PSW boundary in spring and have GRCA confirm.	GWS
	32	Development and site alteration are not permitted adjacent to a PSW unless it can be demonstrated that no negative effects will result. As such, additional information is required to confirm that the proposed quarry will not affect the hydrology of the wetland. Specifically, the Level II report notes that a hydraulic barrier will be required to prevent the loss of water from the wetland into the quarry bottom. However, there is no discussion of potential effects based on changes to the amount of water entering the wetland. Will the drainage area to the wetland be reduced as a result of the quarry?	Based on the topographic mapping provided in Figure 8 and our field observations, the 30 m buffer which is proposed adjacent to the PSW (MAS2-1) closely approximates the wetland's catchment area. Consequently, there should be no noticeable reduction in surface water input to this wetland. Groundwater will continue to flow into the wetland from the northwest at current rates. As a result, we do not anticipate any significant change in the amount of water entering the wetland.	No Action Required	
	33	Development and site alteration are also not permitted within or adjacent to Significant Wildlife Habitat unless it can be demonstrated that no negative effects will result. It is not clear that all Sign"ificant Wildlife Habitats have been identified and, as such, it is not clear that adequate protection will be provided. We.specifically note that the follwing types of habitats have not been discussed or addressed: - According to Section 4.5.5 of the report, Little Brown Bat was recorded on the property. This species is listed as Endangered federally but not provincially. As a result, its habitat would qualify as a type of Habitat for Species of Conservation Concern, in accordance with the Under the Natural Heritage Reference Manual (MNR, 2005) and the Significant Wildlife Habitat Technical Guide (MNR, 2000). The latest guidance for the MNR is that habitat may exist in naturally occurring forest stands (FOD communities) but not in plantations (CUP). It is suggested that the MNR be contacted for further guidance on identifying the significant habitat of this species and the type of protection required.	Agree, with respect to concerns raised about little brown bat habitat, this species had no special status when the wildlife inventories and Natural Environment Technical Report were completed. Since the review of the report by Burnside, the province has designated the little brown bat endangered and it is now afforded protection under the Endangered Species Act, 2007. We concur that discussions are required with MNR to identify the significant habitat for this species and the level of protection that is required.	Review endangered species habitat with MNR.	GWS

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Burnside Hydrogeological Comments	34	"We raise some caution with respect to the water level information provided from standpipes installed in open pit excavations"	Agree. We concur that water levels obtained from test pit monitors are not ideal, however, where water levels are obtained, the pattern of seasonal variation appears to be reasonable in comparison to nearby monitoring wells installed with hydraulic seals. The test pit monitors without hydraulic seals include TP1, TP2, TP5 (removed), TP8 and TP9. Please find included a graph (Figure R1) of recent water levels obtained from TP1 and TP2 compared to nearby overburden drilled wells. The pattern and magnitude of change match very well suggesting that despite not having a seal, the standpipes provide a good representation of the water table.	No Action Required	
Burnside Hydrogeological Comments	35	"TP9 has no description of the dolostone rock. Since the basal till layer has been removed, it is possible that the rock could be acting as an underdrain. Many intervals in the test pit logs do not include descriptions of soil colour and, as a result, it is not clear whether there was any evidence of colour changes associated with saturated conditions."	Agree. Please find below the requested detail. TP8 Depth- 3.8m Colour- 2.5Y5/4 Light olive brown TP8 Depth- 4.5m Colour 10YR6/2 light brownish grey TP8 Depth- 5.8m Colour 3.5 5/3 Light Olive Brown TP9 Depth-1m Colour 10YR6/3 Light olive brown TP9 Depth 4m Colour- 2.5 6/3 Light yellowish Brown TP9 Depth 4.6m Colour-2.5Y7/1 Light Grey (Rock) The basal till thickness was very thin at TP9, less than the length of the drive point (0.30 m). The excavation was made in February 2012, a time when infiltration should have been observed to perch on top of the till layer. I supervised the excavation and observed that there was no saturated soil above the till layer. The bedrock beneath the test pit was competent and did not break up as the teeth of the back hoe scraped along It is my opinion that if saturated conditions occur above the till in this area it is for a short duration.	No Action Required	
Burnside Hydrogeological Comments	36	"Borehole logs for M5 to M10 were missing from the report."	Agree. There are no borehole records for these monitors. They are drive points installed from the ground surface.	No Action Required	
Burnside Hydrogeological Comments	37	"It is noted that wells M1D to M4 do not include a surface seal and, as a result, the water levels reported may not be accurate."	Seals were installed above the screen in each of the monitors and although water may penetrate along the outside of the casing from the ground surface, the bentonite seals prevent movement to the screened portion of the well. At M1D, there is a consistent difference in hydraulic potential of approximately 1.5 metres between M1D and M1S. This suggests the hydraulic seal is working. AT M2, there is no saturated soil above the bedrock as confirmed at MW12. This monitor accurately reflects bedrock levels. At M3 there is a bentonite seal at the bedrock/overburden interface. Water levels verify that there is an unsaturated thickness of rock below the till. There is no indication from seasonal data that the absence of a full hydraulic seal is affecting static water levels. M4 has a seal to prevent water moving along the borehole annulus into the screened portion. There is no indication that seasonal infiltration events are affecting the water level in any of the bedrock wells.	No Action Required	
Burnside Hydrogeological Comments	38	"Multi-level wells are located only on the west side of the site. The overburden geology changes from primarily sand at M3 to primarily silty sand till at M11. An understanding of the change in geology and variations in water levels between M3/M9 and M11 is needed so that the impacts of extraction on Tributary B can be fully understood."	No extraction will be occurring in the vicinity of M9, but at both M3 and M11 located at the edge of the proposed extraction, the entire thickness of overburden is unsaturated. Mini piezometers were installed beside Tributary B to determine whether or not there was any contribution of groundwater to Tributary B. As seen from MP3 and MP4, there is none along the northern property boundary. As seen from MP1 and 2, there is no groundwater contribution mid way through the site. Thus the proposed extraction cannot reduce water input to Tributary B. Every year Tributary B ceases to flow from the site in late spring or early summer and thus every year when flow commences in early spring the hydraulic gradient between the dry bottom of Tributary B and the water table is at a maximum. As water exfiltrates from Tributary B, flow will take the path of least resistance and in the northern portion of the site, as evidenced at MP3 and MP4, the infiltration occurs nearly vertically. At MP1 and MP2 located midway through the site, there is evidence of lateral movement governed by sediments immediately below the streambed. As well, TP5 excavated within the water course has fine-grained material at the surface. However, at MW11 and M3 the overburden is unsaturated, indicating that this low permeability condition does not persist laterally from the stream. Not only will extraction remain a minimum of 20-30 metres away from Tributary B, there will be a 2:1 slope in the overburden thus it is unlikely that water exfiltrating from Tributary B will be encountered. Other points for your consideration are; · The hydraulic potential in the bedrock aquifer will rise in the southern halves of both the East and West Pond as a result of the hydraulic potential levelling effect of the open body of water. Therefore, there will be no greater hydraulic gradient between Tributary B and the potentiometric surface, post extraction. · The Tributary has been altered significantly prior to JDCL ownership. Much of the Tributary is channelized to promote drainage. · The flow in Tributary B is governed largely by the state of the berms at the edge of the De Grandis ponds. We have observed two breaches in the berms resulting in two separate streams exiting the De Grandis pond. The state of repair of this berm affects water flow in Tributary B, the Allen Wetland and the De Grandis Ponds. Ms. Degrandis has approached the GRCA to deepen her ponds, thus changing the flow conditions into Tributary B. · In the unlikely event that significant seasonal seepage occurs into the excavation, silty material can be used to prevent an increase in the rate of loss of water from Tributary B.	No Action Required	
Burnside Hydrogeological Comments	39	"Table C1 provides flow data. It is not clear from the table whether data with no values are due to no measurement being taken or whether flows were below the sensitivity of the flow meter. The data should be compared with precipitation data. This should be clarified. Continuous flow measurements would provide an additional level of understanding since spit flows are highly variable."	Blank cells indicate that no data was obtained. The intention of the streamflow data is to confirm the role that the site plays in terms of stream hydrology. It is clear Tributary B is a losing stream and that at no time does the streamflow at SW3 exceed that of SW4 indicating that even during spring freshet there is not a significant component of runoff from this site. A comparison of streamflow measured at SW4 to rainfall is provided in Figures R2 and R3. There is no recognizable correlation between monthly precipitation and the spot stream flow measurements. . Although highly variable in magnitude, the relationship between streamflow upstream and downstream is consistently showing a loss of water through the site.	No Action Required	

Burnside Hydrogeological Comments	40	"An in-situ hydraulic assessment was completed using falling head testing and using a pump to remove water at constant rate (M2, M4). Table D1 indicates that a falling head test was completed at M2 and a short term pumping test was completed in both M2 and M4. A comparison of hydraulic conductivity values obtained with the two methods at M2 should be provided."	Agreed. A copy of the t/t' data obtained for the pumping test at M2 is attached as Figure R4. The estimated transmissivity of the aquifer is 2.7 m2/day. M2 is essentially an open hole (filled with coarse sand) through the complete thickness of the dolostone aquifer approximately 42 metres. Using k = T/b relationship, the estimated hydraulic conductivity is 7 x 10-7 m/s. This is not dissimilar to the slug test value of 1.8 x 10-6 m/s.	No Action Required	
Burnside Hydrogeological Comments	41	"Both MW 1D, M2 and M4 have a silica sand pack above the lower bentonite seal whereas the other two bedrock wells (M13-D, M14-D) have a bentonite seal above the sand pack to surface. Wells M1D and M13D have lower hydraulic conductivity values. Is it possible that the minimal annular seal and substantial sand pack in M2 and M4 is impacting the results of hydraulic conductivity testing?"	Ageed. It is my opinion that the bentonite seal is preventing direct leakage through the borehole annulus into the screened portion of the well. It is possible in the fractured rock environment for vertical fractures to exist and thus allow for a connection to the borehole annulus above the seal through the aquifer around the hydraulic seal. This would provide a pathway from the test section to aquifer above the seal. If the borehole was the only vertical connection above the hydraulic seal, then the hydraulic conductivity measured in the test will be falsely higher than otherwise would occur. However, vertical fractures necessary to circumvent the hydraulic seal, if present, also have the potential to connect the test section to the aquifer above the seal and thus have the same effect as the unsealed borehole annulus.	No Action Required	
Burnside Hydrogeological Comments	42	A good job was done in documenting wells near the site. The two nearby overburden wells are either no longer used (No. 6) or are used occasionally for cleaning purposes (No. 2). Well No. 2 is shallow (3.97 mbtoc) and should be monitored.	The adjacent land owner discharges water from his cooling system at the location of W2, thus monitoring this location will not provide useful information.	No Action Required	
Burnside Hydrogeological Comments	43	Viewlog and Modflow were used to create a model of groundwater potentials for the bedrock aquifer - How does the model consider overburden at the site?	The model does not consider overburden at the site. Much of the site overburden is dry and where it is saturated, it is so because of relatively thin layers of lower permeable material. The overburden geology within the moraine is highly variable from layered silt, unweathered till, sand and gravel etc.. making accurate simulation of actual conditions very difficult. The model concentrates on more predictable geological conditions in the rock to address the potential impact on private wells which rely upon bedrock aquifer water and to estimate the area of influence of the quarry. The model is also used to estimate the potential gradients beneath the northwest wetland and this outcome is used in the water balance of the northwest wetland.	No Action Required	
Burnside Hydrogeological Comments	44	- Hydraulic conductivity values of 5.8 x 10-7 m/sec (M1D) and 4.0 x 10-7 m/sec (M13D). How were these lower k values utilized in the model?	The final hydraulic conductivities used in the model were based on comparing model results with regional data . This included the pattern of northwest to southwest groundwater flow across the site. Ultimately, a hydraulic conductivity more than an order of magnitude greater than estimated at M1D and M13D was used. Lower hydraulic conductivity values in the bedrock also could simulate the heads, however, an unrealistically low recharge value would then be needed to mimic actual observed conditions. Thus, through the model calibration process, a value of hydraulic conductivity of greater value than observed at M1D and M13D was arrived at.	No Action Required	
Burnside Hydrogeological Comments	45	- Appendix D does not contain any hydraulic conductivity data for M3 and the highest k value is 2.0 x 10-4 m/sec at MpN-1. What is the rationale for assigning a value of 1.8x10-4 m/sec to the bedrock and what is the thickness of this layer?	The rationale for this was that there is a bend in the regional groundwater flow pattern based on measured hydraulic heads from on-site wells and private wells (Figure R5). The only way to simulate this bending is to include a zone of higher hydraulic conductivity as shown. Brydson Spring occurs at the southern end of this zone and is a significant point discharge, confirming that enhanced permeability likely exists. This zone also accounts for the relatively low hydraulic potential observed at M3. In this same area, Tributary B and Tributary C both infiltrate indicating the ability of the bedrock unit to accept water as there is no discharge of water from the overburden in areas of lower elevation north or south of Hwy. 7 on the Brydson Farm.	No Action Required	
Burnside Hydrogeological Comments	46	- Is the recharge value of 150 mm realistic given the hummocky nature of the site, the relatively coarse grained deposits that overlie the bedrock in some areas and the closed drainage areas (D5, D6 and D7)	We included an area of slightly higher recharge where till was absent and closed depressions tend to enhance recharge. A value of 150 mm/year may be low given the estimated surplus water value of greater than 300 mm/year. The model is able to simulate the hydraulic head and pattern of groundwater flow to a reasonable degree. Altering small sections of the model to include depression focused recharge in small areas is unlikely to have a significant effect on this outcome. The purpose of the model is to provide an estimate of the gradients beneath the Northwest wetland and estimate the area of influence of the quarry such that potential impacts to natural heritage features and wells within that area of influence can be considered. It is my opinion that the model provides a reasonable estimate of gradients beneath the northwest wetland and area of influence.	No Action Required	
Burnside Hydrogeological Comments	47	- How does the recharge used in the model created for the site compare to values used in the Source Water Protection work completed for the area by Golder and Aqua Resource?	The direct recharge to the bedrock aquifer in the Harden Model will be somewhat lower than recharge on other models such as the Gartner Lee Model and the Aqua Resource Model in that the Harden Model does not model the overburden layer and thus does not have any active drains in the overburden as other models will have. We have observed and measured significant volumes of groundwater flow in Tributaries A, B and C that emerge from the overburden along the southern edge of the Paris Moraine. This groundwater will have originated as infiltration, encountered a layer of lower permeability and emerged along the flank of the moraine from overburden sediments. A portion of this water re-emerges between the original spring source and Blue Springs Creek and where this occurs near to the site, we have increased recharge along the Tributary corridor commiserate with the measured loss of streamflow.	No Action Required	
Burnside Hydrogeological Comments	48	- Figure H10 provides the predicted groundwater flow in the bedrock. How does this compare to the current flow direction?	The calibration of hydraulic potentials is provided in our report on Figure H8, confirming a good correlation to observed water levels. The static water levels available from the water well data base were kriged and the result is shown on the attached Figure R6 for an area near to the site and on Figure R7 in a regional perspective. A similar pattern of groundwater flow occurs in the model simulation.	No Action Required	

Burnside Hydrogeological Comments	49	- The model is used to predict changes in bedrock water levels as a result of extraction in two areas of the site. What will the impacts be in the overburden?	The groundwater model was used to estimate the potential change in hydraulic potential in the bedrock aquifer only. This allows for a prediction of the potential impact to nearby water supplies, all reliant upon the bedrock aquifer. The Paris Moraine upgradient of the site is an area of regional groundwater recharge. A lower water level in the bedrock aquifer may depress the water table in the overburden as well, depending on the permeability of sediments overlying the bedrock. The significant heritage features that are related to water levels in the overburden are the Northwest wetland, the Rockwood Farm spring and the De Grandis Spring. The potential impact to the Northwest Wetland is addressed in a detailed water balance and mitigation is provided by way of an hydraulic barrier. The groundwater model predicts changes to bedrock water levels beneath the perennial Rockwood Farm spring and the ephemeral De Grandis Farm spring. Our reason for suggesting that there will not be a significant change in spring discharge is that the evidence available suggests that the spring discharge originates from permeable moraine sediments and not the bedrock. The overburden features are isolated from the bedrock water by the presence of a persistent low permeability silt layer The evidence includes; · Observations of groundwater seepage at the toe of slope on the Degrandis farm in an area of surficial silt till deposits. · Observation of significant elevation rise in the source area of the Rockwood Farm spring attributed to increased thickness of overburden · Observation of permeable surficial sediment conditions north of the De Grandis farm. · Loss of streamflow in the Allen Wetland · Presence of silt beneath Allen Wetland · Relatively low hydraulic head measured in the Allen Farm house well proximal to the spring · Permeable conditions measured in the De Grandis dug well · Anecdotal descriptions of clay encountered during excavation of DeGrandis Pond.	No Action Required	
Burnside Hydrogeological Comments	50	- Many of the figure do not have legends and as a result the significance of the colours used is not always apparent.	Provided	Include modified figures into report via addendum.	Harden
Burnside Hydrogeological Comments	51	- Tributary B is an ephemeral stream which was assigned a recharge value of 0.154 m/day. How was this value calculated? How was limited flow data for SW5/SW7 considered in the calculation?	The loss of water in Tributary B has been documented and varies between zero and 24 L/s over the site. The recharge was modelled at a constant rate of 5 L/s for Tributary B. Essentially all of the flow in Tributaries A and C infiltrates and losses of 8.5 L/s for Tributary C and 10 L/s for Tributary A were assigned to these streams. Thus, the annual recharge to the aquifer was calculated and distributed equally over the year along the model area representing the losing portions of the streams. The more complete data set from SW4 and SW3 were used for this calculation.	No Action Required	
Burnside Hydrogeological Comments	52	- Burnside recommends that a thorough review of the model be completed by a groundwater modeller with experience in fractured rock geology.	There is limited potential for water level change in the bedrock let alone the overburden arising from the proposed mining activities. A maximum change of three metres can occur in the bedrock as there will be no dewatering of the site. The model uses an equivalent porous media model and not a fractured rock model in order to predict changes in the hydraulic potential of the bedrock aquifer. Complexities of a fractured aquifer are not considered in the model, and are not relevant to our analysis. To this end we have recommended a detailed water well survey prior to below water table extraction and ongoing monitoring in the nearby PSW's. Streamflow at RS1 will continue and if necessary a staff gauge in the De Grandis ponds will be added. Rather than undergoing a rigorous fractured rock modelling exercise, we have used a porous media model to project estimated changes in water levels. Ultimately, trends observed in monitoring data will be analysed and if it appears that an impact could occur to any natural heritage feature, mitigation of impacts including possible cessation of extraction could occur.	No Action Required	
Burnside Hydrogeological Comments	53	The infiltration rates used in the groundwater model are less than the rates in the Gartner Lee Model (2004) which seems reasonable given the till layer overlying the bedrock. However, it is not clear if higher recharge rates in micro drainage area D7 would affect the interpretation of future impacts. Based on the 1m contours in Figure 3.4 it is also not clear why D5 and D6 are not considered as one micro-drainage area.	D6 is used to represent surface water drainage to the Northwest Wetland. D5 is a separate drainage area to a closed depression. Higher recharge rates could be used for micro drainage area D7. However, in the scale of the model, it will not affect the outcome.	No Action Required	
Burnside Hydrogeological Comments	54	The bedrock surface is shown in Figure 3.5. The proposed extraction area should be added to this map. It appears that there are few (if any) bedrock monitoring wells within the two extraction areas. Given the heterogeneity of the bedrock, it is recommended that monitoring wells be installed within the extraction areas.	The extraction area has been added to Figure 3.5 and attached. We do not recommend additional bedrock monitoring wells in the extraction area as the pattern of hydraulic potentials is reasonably straightforward.	No Action Required pending further discussion with Burnside	Harden
Burnside Hydrogeological Comments	55	The report indicates that in general the basal silt till is thin or absent above the bedrock near Tributary B. It is our opinion that there is insufficient information to conclude that the basal till is thin or absent near Tributary B. TP3, TP5 and TP11 did not encounter bedrock but did have finer grained materials. There is no discussion about the difference in effective "k" values between the till and the finer grained materials. This suggest that the water "lost" by Tributary B may be remaining in the overburden and may not reach the bedrock.	Monitoring Well MW11 is dry and is located 20 metres from Tributary B. Mini piezometers MP3 and MP4 are installed adjacent to Tributary B and have always been dry. Mini piezometers MP1 and MP2 have water in them and always indicate a losing stream. There are no fish in Tributary B and the flow of water in Tributary B is derived mainly from off-site sources. Tributary B has been channelized and originally did not flow from the site except under extreme flood conditions. Extraction will not occur within 20-30 metres of Tributary B and water loss by Tributary B is governed by the soils immediately below and adjacent to the Tributary. The only potential for loss will occur during the months that there is water in the tributary with the effect of causing the Tributary to cease flowing somewhat earlier than presently occurs. There is already a significant annual range in the period of time that Tributary B is dry .	No Action Required pending further discussion with Burnside	
Burnside Hydrogeological Comments	56	It is noted in the report that the Brydon Spring likely represents discharge directly from the bedrock and can be considered to be the re-emergence of Tributaries B and C. There are limited bedrock wells on the proposed quarry site and there is no data that confirms that the tributary loses water to the bedrock. Tracer testing should be considered to confirm this statement.	The Brydson Spring emerges some 400 metres from the proposed quarry and downstream from areas of measured losses of streamflow in Tributaries B and C. All of the lands farther downgradient of the Brydson Spring have numerous exposures of bedrock. There are no springs emerging from the side slopes along Hwy 7 nor are there springs in the Tributary B watercourse other than Brydson Spring. The water level in the bedrock well at the residence beside Tributary B is below the bedrock overburden contact as is observed at M4. The water level in the private residence across from M7 is also below the overburden/bedrock contact observed at M4. M7 was installed to an elevation just above the bedrock/overburden contact observed at M4 and a water table has never been measured at that location. Thus, it is reasonable to assume that recharge occurring in Tributaries B and C contribute to the bedrock aquifer. There is no reason to verify this opinion with a tracer test as water levels at the Brydson Spring will increase if anything as a result of the quarry.	No Action Required pending further discussion with Burnside	

March 13 2013 no comments received from County of Wellington, Novus Environmental

Burnside Hydrogeological Comments	57	It is indicated that some monitors have up to 17 years of records and provides groundwater potentials for overburden and bedrock in Figures 3.16 and 3.17…..There also appears to be limited data to support the contours between MW1 and M7. Similarly there does not appear to be sufficient data presented in the report to support the assertion that "groundwater occurring within the overburden does so above the silt till as a silt layer generally in the northern portion of the site and percolates into the bedrock within the southern portion of the site. An isopach map of silt thickness would assist in demonstrating the limit of the till unit.	We have attached a map of basal silt/till thicknesses derived from the same data as presented in the borehole and test pits logs. From this we conclude that a silt/ till layer generally occurs throughout the site, although absent at M2, M11 and M12. The hydraulic potential of water levels in the bedrock aquifer are greater than the elevation of the overburden/bedrock contact only at stations M13D, M14D and M1D. At all other stations the potentiometric surface in the bedrock aquifer falls below the overburden/bedrock contact. M7 was installed to address the potential for water perched above a till layer near to M4. The bottom of monitor M7 has an elevation of 349.42 m AMSL and the till observed at M4 has an upper elevation of 350.46 m AMSL. Thus, proximal to M4 along the southern property boundary, there is no indication of a saturated condition above the bedrock. Also, monitors M11 and M12 installed to the top of the bedrock have never had water in them indicating that conditions allowing water to percolate into the bedrock exist at the site. The top of rock at W1 is 347 m AMSL. Test pit TP7 was excavated to a depth of 348.2 m AMSL with dry sand and gravel overlying a silty sand. Again, this provides limited opportunity for a saturated condition to occur above the bedrock.	Include Map of basal silt/till thicknesses in Report via addendum	Harden
Burnside Hydrogeological Comments	58	An estimate of hydraulic conductivity and transmissivity based on data collected during short term pumping tests and falling head tests is provided. Based on the mapping provided, it appears that none of the bedrock wells tested are within the two proposed extraction areas. Onsite in-situ testing was completed in wells with limited screened intervals. The lack of data within the extraction areas results in several concerns: - Given the heterogeneity of the bedrock, is there the potential for zones of higher or lower k to be present. There are significant variations in flow (400 l/min at mushroom farm vs. 82 l/min at TW2	There is potential for areas of higher and lower hydraulic conductivity at this site as occurs throughout the dolostone bedrock aquifer in this area. The mandate of our study was to determine what the potential impact of developing an open water body at this site has on nearby water wells and Provincially Significant Wetlands. The maximum water level drawdown that can occur along the northern edge of the site is estimated to be three metres. This is based on a six metre overall difference in potentiometric elevation across the proposed extraction area. The potential impact to the nearest water well is estimated to be 1.6 metres. Given that the neighbour is withdrawing 400 litres per minute and drawing down his well by some 40 metres, a change of 1.6 metres will not have an effect on the nearest well's ability to obtain water from the bedrock. The groundwater model uses a hydraulic conductivity at the higher end of the spectrum resulting in a greater area of predicted impact than would occur with a lower hydraulic conductivity (see Freeze and Cherry, Figure 8.6). The maximum drawdown in a hydrostratigraphic unit will be approximately three metres at the edge of the quarry. There will not be a significant impact on any private water well.	No Action Required Pending discussion with Burnside	
Burnside Hydrogeological Comments	59	- The excavation will behave as a large diameter well open through the bedrock sequence. The onsite wells are screened over discrete intervals and hydraulic testing will not be representative of the entire bedrock sequence.	The on-site testing suggests a range in hydraulic conductivity in the bedrock of almost two orders of magnitude and in general represents hydraulic conductivities that occur near to the bedrock/overburden contact. The two wells that extend the full depth of the quarry (W1 and TW-2) as discussed in Section 3.6.2.1 of the report do not suggest a zone of significant hydraulic conductivity. The fact that the 60 m deep neighbour's well can only run intermittently at a rate of 400 litres per minute (88 imperial gallons per minute) indicates that a zone of high hydraulic conductivity is not present. The maximum drawdown from the extraction is in the order of three metres at the edge of the quarry and will be less at the nearest wetland and water well. The water levels in the wetlands are seasonally perched above and isolated from the bedrock water level by underlying silty soils.		
Burnside Hydrogeological Comments	60	The Guelph/Eramosa Study used significantly higher hydraulic conductivity values. Since the bedrock is heterogeneous significant variations in hydraulic conductivity can be expected. Additional data from within the extraction areas is needed to confirm on-site conditions.	The Guelph Eramosa Study used the following values: Upper Amabel 1 x 10-5 m/s Production Zone 5 x 10-4 Lower Amabel 1 x 10-5 m/s This was based on model calibration and pumping tests indicating transmissivity of 1368 m2/day. This high level of transmissivity is not observed in on-site wells tested (M2, W1) nor TW-2 in adjacent lot. As dewatering will not be occurring at this site, the presence/absence of heterogeneity in the bedrock aquifer is immaterial.	No Action Required pending further discussion with Burnside	Harden
Burnside Hydrogeological Comments	61	Add stratigraphy to Figure 3.18	All monitors in this figure are drive points and as such, no stratigraphy is available.The geological information from nearby TP5 suggests that the soils in this area are a silty sand. No significant permeability contrast occurred in TP5 until a depth of 348.68 m AMSL where a gravel layer was encountered. The Figure 3.18 in the report shows graphically that there is a constant loss of water from Tributary B during both high and low water conditions.	No Action Required	
Burnside Hydrogeological Comments	62	It is agreed that there does not appear to be any groundwater contribution to the Northwest wetland from the bedrock. The water level data in Fig. 3.19 and information in cross section B-B suggest that upward gradients in the overburden west of the wetland may provide discharge to the wetland in the spring when water levels are highest.	We concur that there is the potential for overburden groundwater to contribute water to the wetland during spring conditions. It is our opinion that this will not change. Although the potential exists, the actual movement of water into the wetland may not be occurring. I have attached Figure R9 with newly obtained water levels from the wetland and nearby monitors in 2012. The figure confirms that during the drought conditions, the water in the wetland was perched above the overburden groundwater in all directions. The retention of water in the wetland must be facilitated by the presence of a lower permeability layer along the base of the wetland. This shows the independence of the wetland from the shallow overburden system. Thus, even if minor changes in the shallow overburden system arise, an impact to the wetland will not necessarily occur.	No Action Required	

Burnside Hydrogeological Comments	63	The water level in bedrock well 6707545 on cross section A-A is in the overburden. This well appears to be unconfined. There do not appear to be any bedrock wells in the vicinity of the De Grandis Property. If similar conditions exist on the De Grandis property, is there the potential that the maximum predicted drawdown of 0.6 m shown in Figure 4.3 could impact the Pond?	The same condition occurs at nearby on-site wells MW13D, MW14D and M1-D which have good geological profiles. The shallow wells adjacent to these deep wells confirm that a layer of lower permeability till or silt separate the bedrock from the overburden, allowing for saturated conditions to occur in the overburden. It is our interpretation that similar conditions occur at 6707545. The Rockwood Farm spring is located significantly closer to Well 6707545 than the De Grandis spring. Harden measured the water level at the Rockwood Farm well to be 354.80 m AMSL (slightly above the bedrock surface) and the elevation of the spring emergence is at approximately 361 m AMSL. This is more than a six meter difference in hydraulic potential over a relatively short lateral distance. Northward of the spring the ground elevation increases by almost twenty metres and the indication from nearby water well records is that this increase not reflected in the bedrock surface, thus the overburden thickness increases significantly north of the spring. Springs occur at the base of this topographical feature on both the De Grandis and Rockwood farm properties. It remains our opinion that the Rockwood Farm and De Grandis springs arise from an overburden source. Although there is not a drilled well at the De Grandis farm, there is a shallow dug well which provides an adequate water supply for the farm. In addition, on two occasions, the water level in the well and in the pond were identical…..In the fall of 2012 we worked with Ms. De Grandis on obtaining a permit to dig her pond deeper as the water levels were abnormally low. According to Ms. De Grandis, over the years sediment buildup in the pond has decreased spring discharge into the pond. The GRCA investigated the site and upon presenting an application will grant a deepening of the De Grandis Pond. Ms.De Grandis was present during the excavation of the ponds (originally a spring at the ground surface with a stone crock) and her recollection was that much of the pond was dug into “clay” and only along the northern edge was a significant spring encountered. We asked if bedrock was encountered and she did not observe rock at the bottom of the ponds. There are very stony fields northerly of the De Grandis farmstead providing ample opportunity for recharge and southerly movement of water in the overburden.	No Action Required	
Burnside Hydrogeological Comments	64	Elevated nitrate concentrations (> 5 mg/l) were present in samples from bedrock wells M2 and M3. Both M2 and M3 are bedrock wells located at the north end of the hidden Quarry Site. The top of screen at M3 is near the bedrock/till contact and the top of screen at M2 is about 7 m below the bedrock/till contact. Neither well has a surface seal. As a result, it is not certain if there was a conduit created through the till when the wells were constructed. The current level of information does not allow the following concerns to be addressed: - What is the source of the nitrate?	M2 and M3 are located in the midst of a pine plantation downgradient of active farms. M2 is physically located at a superior elevation than the farms and overland flow to M2 will not occur. The only reasonable source of nitrate is the adjacent farm. M3 is also located in a surface water catchment that derives surface water from the pine plantation. The only reasonable source of nitrate in the aquifer is from the adjacent farm fields located upgradient of the site.	No Action Required	
Burnside Hydrogeological Comments	65	- If the elevated nitrate is currently present in only the shallow bedrock, excavation of the bedrock will create a vertical connection between the shallow and deep fracture systems. What will be the impact to nearby domestic well quality?	A water sample was obtained from W1 which penetrates the entire thickness of the proposed quarry. The nitrate value for this well is 0.13 mg/L. Thus, there does not appear to be an overall issue with elevated nitrates at this site. Any bedrock water well in this area already presently mixes water from the entire exposed aquifer within the well, similar to the proposed quarry. When established, aquatic plant life in the quarry ponds will remove nutrients such as nitrogen and phosphorous contained in inflowing groundwater from beneath agricultural fields north of the site.	No Action Required	
	66	- The final depth of extraction is not indicated. What are the impacts of mixing water from the underlying shale with the water from the dolostone?	The proposed quarry will be a minimum elevation of 320 m AMSL and shale was encountered in M2 at an elevation of 308.8 m AMSL, thus the bottom of the quarry will be at least 10 metres from the underlying shale unit. There will be no mixing of water from the shale unit arising from the proposed quarry activities.	No Action Required	
	67	The proposed depth of extraction should be shown on all the cross sections with an additional cross section created to show the extraction area east of Tributary 5.	The proposed depth of extraction is to an approximate elevation of 320 m AMSL. Figure R10 is attached as a cross-section on the east side of Tributary B.	No Action Required	
	68	The construction of a hydraulic barrier along the downgradient side of the onsite wetland is proposed. - It is not clear from Fig. 4.2 how the location of the proposed barrier corresponds to the limits of micro drainage areas on Fig. 3.4. The scale of the contours on Fig 3.4 suggest that D5 and D6 are connected. The addition of the limits of extraction and the location of the proposed barrier to this Fig. would assist in confirmation that runoff to the wetland will not change.	The hydraulic barrier is a buried feature and in itself will not affect surface water flow.	No Action Required	
	69	The addition of wells and water level data to Figure 5.1 along with observed lithology is needed to ensure that the barrier is placed at the optimal location	Figure 5.1 is a schematic diagram of the various hydrologic components considered in the development of the water balance of the wetland and is not intended to represent on-the-ground conditions. Lithology has been observed at MW1-S, MW13S, MW14S and TP2 and suggest similar geological conditions of sandy sediments overlying a silt or till. Construction of the barrier will be supervised to key the barrier into the top of the silt/till unit. It is proposed that the barrier be installed as shown on Figure 4.2 of the Hydrogeology report. The location of the barrier was discussed with the biologist and was located as near to the wetland as possible to maximize barrier effectiveness without physically altering conditions within the wetland.	No Action Required	
	70	Additional detail on how the width of the barrier was calculated should be provided.	The effectiveness of the barrier is a function of width and hydraulic conductivity. The width of the barrier is restricted along the southern edge of the wetland. Based on discussions with an excavation contractor, a trench with a 2.5 metre base was deemed to be the minimum size in order to minimize disturbance near to the wetland. The hydraulic conductivity then needed to be sufficiently low to retard the flux of water through the overburden.	No Action Required	
	71	The statement that the creation of a waterbody will result in increased storage and will benefit downstream wells, springs, ponds or streams during drier conditions suggests that there is a connection between the bedrock beneath the site and downstream resources. As a result, any decrease in available water onsite or changes in water quality will potentially impact downgradient features.	The quarry will create a vertical connection within the bedrock aquifer just as every bedrock well presently does. The water quality tested at W1 which penetrates the entire thickness of the proposed quarry suggests that vertically integrated water quality is good. The same good quality water was obtained from nearby wells TW-1 and TW-2 which also penetrated the entire thickness of the proposed quarry to be extracted. Significant changes in water quality and quantity are not expected to occur at this site and JDCL has committed to conducting a pre-quarry survey of water quantity and quality of neighbouring wells to obtain baseline conditions.	Conduct Water Well Survey post approval.	Harden

Burnside Hydrogeological Comments	72	There is not sufficient information on the bedrock in the extraction areas to allow for a reliable prediction of drawdown to be made. The vertical spacing and contribution of the water bearing fractures is not known and as a result, inflow into the pit may result in temporary dewatering of shallow fractures. The length of time for water levels to stabilize is not estimated. There is also a potential that bedrock water quality will be affected if cascading occurs within the extraction area.	There will be no active dewatering at this site and the potential impact of 'lake leveling effect' and aggregate removal from the site have been addressed in our report. There will be a dewatering of fractures near to the north quarry face and a depressurization of fractures within the area of influence of the quarry. The opposite will occur on the south face where water levels are expected to increase. This will be a small but permanent change in the groundwater system. The change will occur over several years, increasing as the quarry expands southward. There will be ample opportunity to observe and record water level changes in the bedrock aquifer, northwest wetland and private wells. Once quarrying has ceased, the final lake level equilibrium will be established within months. Extending the required monitoring for a period of one year will allow for verification of water level changes.	No Action Required Pending Discussion with Burnside	Harden
	73	The report indicates that there is downgradient of the Northwest Wetland groundwater flow in the silty sand layer and sand and gravel layer ceases and there is only groundwater found in the bedrock. There are no overburden monitoring wells downgradient of M1S/D and as a result, there is no evidence to confirm that there is no water in the overburden.	See Till Isopach Map response. It is our opinion that any water occurring above the till/silt layer near the southern portion of the site, does so intermittently. There are no natural heritage features or water wells reliant upon a perched water table.	No Action Required	
	74	Northwest Wetland water balance should address the following:	On a year over year basis, our observation over almost two decades is that there is little water remaining in the wetland by September/October. Thus, a water balance prepared for the wetland should not show a year over year increase or decrease of water. Starting with observed hydraulic gradients, measured water levels and hydraulic conductivities obtained from wetland monitors, a water balance representing the aforementioned observation was prepared. The groundwater flux for the saturated sand and gravel upgradient of the wetland is somewhat different than down gradient of the wetland due to differences in hydraulic conductivity. Upgradient of the wetland, the hydraulic conductivity is estimated to be 5 x 10-5 m/s and downgradient it is estimated to be 3 x 10-5 m/s. These small differences are the main reason for groundwater flux differences in the water balance.	No Action Required	
	75	- There is a difference between the flux of groundwater upgradient and downgradient of the wetland			
	76	- Is the increase unsaturated thickness due to variations in the elevations of the top of the till or is it a result of contribution by the wetland?	There is some variation in the elevation of the top of the till near to the wetland. The top of till elevation north of the wetland is 352.18 m AMSL at M13, 351.59 m AMSL at M14 and 351.64 m AMSL at M1. Thus the top of the till layer is approximately 0.5 metres higher north of the wetland resulting in lesser saturated thickness of sand and gravel to the north and greater thickness of saturated sand and gravel to the south of the wetland. The ground elevation south of the wetland rises and the elevation of the water table falls, thus there is an increase in the unsaturated thickness south of the wetland.	No Action Required	
	77	- The design k of the barrier 1x10-7 m/s is Section 5.1.1.2 which is different than the value of 5 x 10-8 m/s in section 4.2.1.	The design hydraulic conductivity is 1 x 10-7 m/s. The statement in Section 4.2.1 is incorrect.	Correct Section 4.2.1 via Addendum	Harden
	78	The predicted water level change in the aquifer for the nearest well will be 1.6 m. However, there are no wells within the proposed extraction areas that penetrate to the proposed depth of the quarry. As a result, the potentials for a connection with nearby domestic wells is not known.	There will be no dewatering at this site and thus the potential change in water level at the quarry will not be significant. The estimated water level change at the nearest water well is based on the model using a hydraulic conductivity of 1 x 10-5 m/s. Groundwater monitors M13D and M14D are located between the extraction area and the nearest neighbour. These monitors will be used to verify changes in the hydraulic potential.	No Action Required	
	79	The extraction of the bedrock has the potential to connect shallow fractures with deeper fractures and as a result, there is the potential to cause changes in water quality in nearby domestic wells. Please comment.	Every water well constructed in the bedrock presently connects shallow aquifer water with deep aquifer water. The water sample obtained from the on-site well (W1) shows that the water quality, integrated over the proposed depth of the quarry, is good.	No Action Required	
	80	There are no wells that provide an indication of water levels in the bedrock within the extraction areas. The monitoring network needs to be modified to provide additional information on water levels in the overburden south of the wetland and to provide a better understanding of where the significant water bearing fractures occur in the bedrock. We concur with the need to compete a well survey. Contingency measures should be tied into trigger levels for both water levels and water quality.	There are six groundwater monitors on the site that provide water levels in the bedrock aquifer. The potentiometric surface behaves in a predictable manner (northwest to southeast flow). Overburden water levels south of the wetland are measured in M6, M5, M1S, M14S and confirm the presence of water in the overburden. The potentiometric surface of the bedrock is also above the overburden/bedrock contact in those wells where there is water in the overburden. This is not the case for M4 or W1 and the fact that M7 is always dry and no water was observed at TP7 indicates that there is unlikely to be water above the bedrock in those areas. M4 is located immediately downgradient of the proposed extraction area and will be used as a long term monitor. Trigger levels with respect to water levels and water quality will be established.	Establish Trigger Levels for specific monitors	Harden
	81	Wells in test pits not accurate	See response to Comment 34.	No Action Required	
	82	Additional water levels in overburden south of wetland	There are no natural heritage features or wells associated with overburden water south of the wetland and there is no indication from existing monitoring network, testpit program, geological sampling that a significant amount of water exists in the overburden. See section on Till isopach.	No Action Required	
	83	Significant Water Bearing Features in Bedrock	We understand that the Gasport Aquifer can have have significant permeability differences and thus there may be differences in the response in the bedrock aquifer to the 'lake-levelling' effect on the hydraulic potential in the aquifer. The maximum change in hydraulic potential is approximately three metres at the quarry edge and even if there are significant water bearing fractures, the maximum impact will not be greater than three metres at the quarry edge. We understand that if this were a pumping well or a dewatered quarry that there could be a significantly greater drawdown in the significant water bearing fractures, however, the passive nature of this quarry can only result in a muted response in the aquifer.	No Action Required	

GRCA Comments	84	**1**. As of January 2011, the GRCA is requesting that all below-water sand and gravel operations in priority subwatersheds conduct a cumulative effects assessment in accordance with Cumulative Effects Assessment (Water Quality and Quantity) Best Practices Paper for Below-Water Sand and Gravel Extraction Operations in Priority Subwatersheds in the Grand River Watershed- September 2010. This document was jointly authored by the Ministry of Natural Resources, the Ontario Stone, Sand, and Gravel Association, the Ministry of the Environment, and the GRCA. While the assessment was not specifically intended to address quarry operations, it is in a priority subwatershed (the Eramosa River subwatershed). As such, we request that the Best Practices document be applied as part of this application.	Agree, we have reviewed the Best Practices Document and have created a response paper.	Provide Best Practices as new Appendix to Report	Harden
GRCA Comments	85	**2**. We note that no mention is made of the floodplain mapped on this property in the Hydrogeological Investigation. Mapping available from ORCA's WebGIS outlines a 40m wide estimated floodplain along the Blue Springs Creek tributary (Tributary B) that passes through the property (20m on each side). Estimated floodplains were identified for rural areas having drainage areas of about 100 hectares or more, which, based on water course delineation provided on MNR mapping at the time of estimation (1995-2000) was the case for the subject property. Since this tributary combines with another at Highway 7, just downstream of the property, there is a need to confirm the elevation of a backwater floodplain from that point and to demonstrate that the proposed excavation boundaries remain outside of the creek buffers. Please map this and confirm that excavation boundaries and proposed buffers are beyond this elevation. If this results in conflict, the boundaries can be moved accordingly or alternatively a hydrologic analysis may be carried out to generate a regulatory event runoff rate and volume. This can be compared to available storage stages and vol umes within the landscape above Highway 7 in order to evaluate a possibly lower backwater elevation. The main concern here is that a severe storm of Hurricane Hazel's magnitude should not result in the tributary creating a new path into excavated areas that are proposed at much lower elevations than the nearby creek bed.	The elevation of Tributary B where it crosses beneath Hwy 7 is approximately 351 m AMSL. The elevation of Tributary B where it leaves the Hidden Quarry site is approximately 357 m AMSL similar to the elevation of Hwy 7. On the Hidden Quarry site, the top-of-bank elevation along Tributary B ranges from 359 to 360 m AMSL. Thus, in the extreme event, water will flow over Highway No. 7 prior to overtopping natural banks on the Hidden Quarry site.	No Action Required	Harden
GRCA Comments	86	3. In the Natural Environment Technical Report, the limit of the creek and its associated floodplain that was identified in the report needs to be determined. A fluvial geomorphologic assessment is typically required by the GRCA to establish the meander belt width and setback requirements. This study should also provide recommendations to minimize the impact associated with the proposed stream crossing.	We believe that this feature can be discussed during the site visit with GRCA.	Meet with GRCA in Field to discuss requirement for Fluvio Assessment.	Harden
GRCA Comments	87	4. According to the groundwater model in the Natural Environment Technical Report (see page 7), "the maximum magnitude of water level change in the bedrock aquifer is a decline of 1.8 metres at the northern Site boundary and a rise of 1.5 metres at the southern Site boundary. The magnitude of groundwater drawdown at the northwest wetland ranges from 1.1 to 1.9 metres for the maximum extraction scenario. The average drawdown value of 1.53 metres should be used to estimate the increase in groundwater flux beneath the wetland and area up-gradient of the proposed hydraulic barrier." This potentially represents a significant hydrologic impact that has not been fully assessed in the report and further details can be included in the updated EIS.	The potential impact of a 1.53 metre drawdown beneath the Northwest Wetland has been fully assessed in the Level I and II Hydrogeology Report. The findings of the report were that there is the potential to increase groundwater recharge from the wetland into the underlying aquifer as a result of increasing the hydraulic gradient between the wetland and the bedrock aquifer. In order to militate against this, we have recommended that a hydraulic barrier be installed downgradient of the wetland. The barrier will decrease the recharge of water from the wetland to the shallow groundwater system, thus maintaining the water balance of the wetland. Additional groundwater monitoring during the droughty period in 2012 revealed that the water level in the wetland acted independently of the groundwater system. It was observed that although the water level in all of the groundwater monitors adjacent to the wetland were more than half a metre below the water level in the wetland, the water level in the wetland rose in response to rainfall events in the fall of 2012. This observation and the fact that there remained to be perched water in the wetland, suggests that the influence of shallow groundwater levels on the wetland hydro period are not significant. This further suggests that the water level in the underlying bedrock aquifer is also insignificant relative to the hydro period of the wetland. We have attached Figure 6 showing a graph of water levels around the Northwest Wetland. There are eight mini-piezometers (MP's) and they are named for their approximate cardinal bearing (north, south, east and west) relative to the wetland and proximity (e.g. MPN-1 is closer to the wetland than MPN-2). From the period of June 2012 to October 2012 the groundwater flow direction was radially outward from the wetland in all directions. Thus, following the spring freshet, in 2012 the wetland did not obtain any hydrological support from the groundwater system. It is thus our conclusion that although the quarry will increase hydraulic gradients between the shallow overburden groundwater system and the bedrock aquifer, it is unlikely to have an effect on water levels in the wetland.	No Action Required	
GRCA Comments	88	5. According to the groundwater model in the Natural Environment Technical Report (see page 7),"extraction of the north half of the west pond will result in a maximum predicted change of 0.7 metres at the northern property line, a maximum change of 0.35 metres below the northwest wetland and less than five centimeter change beneath the Rockwood Farm or Degrandis springs. The commencement of extraction in the north half of the west pond will allow for several years of monitoring to verify predicted impacts prior to extracting the south half of the west pond ." We agree that monitoring is necessary and further suggest the need for groundwater triggers and contingencies to prevent significant adverse impacts before they occur. The impacts of the groundwater levels below the wetlands need to be assessed and the EIS updated accordingly.	The potential impact to groundwater levels beneath the wetland have been detailed in the Level I and II Hydrogeology Report and have not been fully replicated in the EIS document prepared by GWS Ecological and Forestry Services. We concur with the need for groundwater triggers and the many years of data provide an opportunity to set trigger levels on a seasonal basis.	Establish Trigger levels as per comment 80	Harden
GRCA Comments	89	6. Impacts on flow volume, peak rates, and water temperature along the intermittent creek (Tributary B) on site and other permanently flowing, cold water creeks further downstream are a major concern. On site measures to maintain or improve creek hydrology should be implemented in accordance with existing policy.	Data from more than a decade of streamflow measurements confirm that there is a loss of water in Tributary B as it passes through the Hidden Quarry site, therefore all of the flow in Tributary B originates from the area upstream from the Hidden Quarry site and flow conditions will not change. There will be no discharge of water from the site and thus peak flow rates will not change. There are no groundwater contributions to Tributary B from the site, thus temperatures will not be affected.	No Action Required	

GRCA Comments	90	7. We note that groundwater will be monitored for water quality impacts resulting from quarry activities at one upgradient monitor and one downgradient monitor. Our recommendation is that the proponent considers additional monitoring locations.	The greatest potential for water quality changes will occur in the quarry pond. The quarry pond will be excavated southwards from the northern edge of the quarry. Presently there are no suitable groundwater monitors downgradient of the proposed ponds other than located along the southern property boundary. It is not unreasonable to install two additional groundwater quality monitoring wells between the quarry pond and the southern property boundary. These wells will act as sentry wells in regards to water quality changes in the aquifer. The groundwater flow direction through the site is southeasterly, thus dedicated groundwater quality monitors can be installed in the Tributary B corridor and south of the East Pond. These are shown on Figure 7.	Add two Water Quality Monitoring Locations to site plan and Monitoring Plan.	Harden Stovel
GRCA Comments	91	8. It is requested that the limit of the PSW on this property be flagged at the appropriate time of year by the consultant and verified infield by the GRCA, using the protocols outlined in the Ontario Wetland Evaluation System, Southern Manual. It is also requested that the wetland boundary be surveyed and plotted on the Operational P*lan.*	8. The boundary of the Provincially Significant Wetland (PSW) will be staked/flagged by GWS staff in the spring after the leaves have flushed. Subsequent to GRCA field verification the wetland boundary will be surveyed and plotted on the Operational Plan.	Stake wetland prior to GRCA visit.	GWS
GRCA Comments	92	9. It is proposed to remove 0.2 ha of artificially-created wetland. As indicated above, additional field review with GRCA staff is required to verify the limit of the PSW on this site and to confirm that wetland removal is in accordance with Section 2.1 of the Provincial Policy Statement and Section 8.4.5 of the GRCA's Wetlands Policy.	9. With respect to the removal of 0.2 ha of artificially established wetland, we anticipated that this matter would require a site meeting with GRCA staff in order to verify the limit of the PSW and confirm acceptance of proposed wetland removal and enhancement work.	Review Wetland enhancement proposal in the old pit area in the field with GRCA Staff	GWS
GRCA Comments	93	10. We agree that erosion, sediment, and dust control will be necessary on this site but suggest that the wetlands and intermittent stream would be more vulnerable than adjacent woodland areas. Consequently, the retention of 30 m treed buffers adjacent to all wetlands and the intermittent stream is warranted for this reason alone.	10. Treed buffers 30 m in width have been recommended adjacent to the PSW and the southern portion of the intermitted stream. However, in the northern reach of the intermittent stream and adjacent to the unevaluated meadow marsh (MAM3-2), a 20 m buffer was considered sufficient for the following streams. • The small wetland feature has not been previously mapped as part of the PSW and it does not exhibit any characteristics that would warrant its inclusion. Many PSWs on other development sites have been effectively protected by buffers less than 30 m in width (i.e. 10 to 25 m) and the subject wetland is not a PSW. • Although the entire catchment area of the wetland has not been retained the resulting loss of surface run-off is considered minimal. Furthermore, the wetland does not receive any significant input of groundwater because the water table is about 2 m below the elevation of the streambed during the growing season. The moisture regime in the wetland is therefore mostly maintained by spring snowmelt, precipitation and periodic inputs of surface water from the stream, all of which will be maintained in proposed post development conditions. • The land adjacent to the northern reach of the intermittent stream is mostly densely forested with gentle to moderate slopes. There is no protective advantage in extending the from 20 m to 30 m. In our experience, intermittent warm/cool water streams do not warrant a setback of more than 15 m, even when they occur in open, non-forested habitats. The proposed 20 m treed buffer already exceeds the normal requirements of Conservation Authorities and municipalities. We feel a site meeting with GRCA staff will help to resolve this concern. (GWS)	Review areas where 20m buffer is proposed with GRCA staff in the field.	GWS
GRCA Comments	94	11. The location of the proposed hydraulic barrier/silt curtain is questionable as it appears to traverse an existing wetland . It is suggested that the location be determined after the wetland boundaries have been verified in the field by the GRCA.	11. The proposed location for the hydraulic barrier/silt curtain appears to traverse a wetland feature according to GRCA mapping. This area is actually an opening in a conifer plantation (CUP3-12b) and this will become evident during the site meeting with GRCA staff.	As per comment 91 this issue will be resolved during site visit.	GWS
GRCA Comments	95	12. The use of forest inventory reporting standards and codes to describe vegetation communities is of limited use. The apparent lack of vegetation and soils information is especially problematic and provides only a limited understanding of the wetland communities on this site. The checklist of plant species in Appendix B provides information for the entire property and is also of limited use at the individual community level.	12. The subject property is almost entirely forested and this tree cover was established for forestry purposes and is currently managed for forestry purposes. It would therefore have been inappropriate to have described this vegetation in non-forestry terms. In any event, all vegetation communities have also been described in accordance with Ecological Land Classification (ELC) procedures which include considerations of soil characteristics so we are somewhat confused by this GRCA comment. With respect to our plant list in Appendix B, details provided on coefficients of conservatism and wetness readily indicate whether plants recorded may be found in upland or wetland communities. In any event, no significant vegetation communities or vascular plants were found on the property.	No Action Required	
GRCA Comments	96	13. Were the soil descriptions contained in the Hydrogeological Assessment considered when classifying vegetation communities?	13. The vegetation communities were classified according to the surface soil conditions encountered during GWS fieldwork. Soil descriptions based on ELC procedures and the Field Manual for Describing Soils (OIP, 1985) do not always correspond to the terminology used to describe soil materials in hydrogeological investigations.	No Action Required	
GRCA Comments	97	14. The Natural Environment Report confirms that the woodland on this site is approximately 33.5 ha in size, therefore is considered Significant Woodlands within the County of Wellington. The GRCA recommends that a site visit be scheduled with the County of Wellington and GRCA staff to verify the limit of the significant woodland on the subject property. The portions of the woodland that merit protection should be clearly distinguished from portions that will not be protected.	We agree that a site visit with GRCA and County staff would be most helpful to verify the limit of retained woodland on the property and also discuss the proposed buffer to be applied to the stream. As recommended on page 64 it was our intention to flag and/or stake the limits of natural features to be retained and protected and this can be done in advance of the required site meeting in order to facilitate the review process.	Stake limits of natural features to be retained in advance of site meeting with GRCA staff.	GWS
GRCA Comments	98	15. As noted in Section 7.1 of the Natural Environment Report- "The woodland also lies in close proximity to other woodlands and wetlands north and east of the subject lands. As such, they provide an important linkage to these natural features." The author speculates, however, that "these functions will not be significantly affected by the proposed loss of conifer plantation from part of the site." Please provide details on how the woodlands and wetlands on adjacent lands will not be affected by the loss of the conifer plantation from the subject lands.	15. The woodland to the north of the site is a narrow extension from the northeastern corner of the subject lands. Connections to this area will be maintained with the retention of the setback along the eastern property line and the riparian corridor along the creek. Similarly, linkage to the eastern property will be maintained in the setback along this boundary. The setback at the southern end of the eastern extraction parcel will allow wildlife access to the deciduous forest and riparian corridor along the watercourse.	No Action Required	
GRCA Comments	99	16. GRCA staff supports the retention of mature deciduous (FOD5-7) and mixed forest (FOM2-2 FOM4-2) stands on the subject property, but recommends the full retention of the mature cedar stand (FOC2-2), which currently buffers the interm ittent stream. It is further suggested that plantation areas adjacent to the stream provide a buffer and wildlife corridor function, and should be retained and enhanced where practicable. Additional rationale should be provided to support the recommended 20-30 stream buffer width.	Wish to discuss this with GRCA staff based on site visit. The Amabel is a provincially significant aggregate resource. Its use needs to be balanced with preservation of the onsite features. We agree that a site visit with GRCA and County staff would be most helpful to verify the limit of significant woodland on the property and also discuss the proposed buffer to be applied to the stream. As recommended on page 64 it was our intention to flag and/or stake the limits of natural features to be retained and protected and this can be done in advance of the required site meeting in order to facilitate the review process.	See Comment 97 .	

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GRCA Comments	100	17. An intermittent creek and floodplain traverses the woodland area and ultimately connects two large natural areas offsite. According to the Significant Wildlife Habitat Technical Manual, animal movement corridors exist at different scales and encompass a wide variety of landscape features, including riparian zones, stream and river valleys, wetlands, and woodlands. Therefore, a wildlife movement corridor may exist across the subject property. It is recommended that the OMNR's Draft Ecoregion Criteria Schedules be consulted to determine whether or not the woodland provides significant wildlife habitat and the EIS updated accordingly.	According to the draft eco-regional criteria, significant animal movement corridors exist only for amphibians and white-tailed deer. Significant corridors for deer are to be identified only if significant wildlife habitat has been identified for deer wintering areas. The intermittent creek and floodplain do not support significant amphibian populations and therefore no significant corridor function should be ascribed to this area. The on-site and adjacent marshes do support significant amphibian breeding populations. The buffers that will be established around these will suffice to protect the upland habitat requirements of these species. The eco-regional criteria are in draft form and went through the EBR process in 2012. As a result of that review, it was determined that the thresholds for significance were too low for many of the criteria. Consequently, the thresholds for significance will have to be updated (John Boos, pers. comm. to A. Sandilands, 2012), but this has not occurred yet. Mr. Boos is the Renewable Energy Field Advisor for MNR and was in charge of developing the eco-regional criteria. Given that the final thresholds for significance are unknown, the eco-regional criteria cannot be used at present. The Natural Heritage Reference Manual states on page 84 that the finalized eco-regional criteria will provide additional information, but that the Significant Wildlife Habitat Technical Guide (SWHTG) "is still the authoritative source for the identification and evaluation of significant wildlife habitat". Under these circumstances, the eco-regional criteria as they exist now should not be used and the SWHTG should be used to define significant wildlife habitat. In deciding which habitats should be considered significant, the SWHTG uses a representative approach and recommends designating the best 2 or 3 examples of a particular habitat within a planning jurisdiction as significant wildlife habitat. For habitats that are poorly represented in a planning area, all examples of habitats may be considered significant, but only the best examples of well-represented habitats should be identified as significant wildlife habitat. This is the approach that has been taken within the EIS.	No Action Required	
GRCA Comments	101	18. The Natural Environment Report demonstrates that the following Significant Wildlife Habitat is present on the subject property: a. Amphibian Woodland Breeding Ponds- comprise a diverse frog community, formerly consisting of the provincially rare (S3) and nationally threatened Western Chorus Frog b. Habitat for a Species of Conservation Concern-breeding and foraging habitat for Snapping Turtle. c. Breeding Habitat for area-sensitive bird species (i.e.. Ruffed Grouse, Hairy Woodpecker, and Pileated Woodpecker) d. Winter Habitat for Deer and Wild Turkey The presence of these species indicates that the property contain a Significant Wildlife Habitat and the OMNR should be consulted regarding direct, indirect and induced impacts to the Significant Wildlife Habitat and the EIS updated accordingly.	18. We agree that there is significant habitat on the subject lands for breeding amphibians and snapping turtles and have considered them within the EIS. We are of the opinion that there is no significant habitat present for area-sensitive breeding birds within the site. Low numbers of species and pairs were present and there are certainly better examples of habitat for area-sensitive breeding birds within the township and county. This is one of the more poorly done eco-regional criteria as the threshold is a mere 3 pairs of area-sensitive birds to qualify as significant wildlife habitat. This same threshold is applied throughout Eco-regions 6 and 7. Consequently, the same threshold for significance is used for heavily forested areas such as the Norfolk Sand Plain, Niagara Escarpment, Bruce Peninsula, and Manitoulin Island as for sparsely forested areas such as Essex and Chatham-Kent. If the original threshold for significance were applied to these areas, virtually every woodland in the heavily forested areas would qualify as significant wildlife habitat while many significant woodlands in the sparsely forested areas would not qualify because the threshold may be too high in some of these cases. This eco-regional criterion for area-sensitive breeding birds will have to be revised significantly before it is useful. We disagree that there is significant winter habitat for deer. According to the SWHTG, all significant deer wintering areas are identified by the MNR. Given that MNR has not identified any significant deer wintering areas within the vicinity of the subject lands, this component of significant wildlife habitat may be considered absent. The site also does not support significant Wild Turkey winter habitat. Winter wildlife surveys have confirmed that there are few turkeys using the area in winter. We concur that the OMNR will review the EIS with respect to impacts on significant wildlife habitat.	No Action Required	

GRCA Comments	102	19. We do not agree that "the subject property is not considered important for water protection as it does not represent a sensitive recharge, discharge or headwater area". Information in this office indicates that there are strong upward gradients on and adjacent to this site. A lowering of the groundwater table on this site could further reduce or eliminate groundwater inputs to these features and could potentially result in the loss of amphibian breeding areas. Please clarify what the context of this comment was indended to address.	There are three multi-level groundwater monitors on the site and all three have downward hydraulic gradients between the shallow overburden groundwater system and the underlying bedrock aquifer. Tributary B is a losing stream throughout the site confirmed by streamflow measurements and groundwater monitors installed to determine the relationship of the stream to the groundwater system. The Ministry of the Environment does not have any 'flowing' wells registered in the vicinity of the site. The report Integrated Water Budget Report, Grand River Watershed prepared by Aqua Resources, 2009 identifies the area around this site as a recharge area (Figure 8). Thus, there are no upward gradients at this site let along strongly upward gradients at this site. Based on this evidence, the site is not an area of sensitive groundwater discharge. Groundwater recharge occurs at the site, however, other than along the Tributary B corridor which will not be altered, groundwater recharge at this site is not significant relative to the surrounding area. In addition, the creation of an excavation will result in the continued recharge of the bedrock aquifer. Thus there is no change in hydrologic function in regards to groundwater recharge. The site is not located in the headwater area of Blue Springs Creek. Blue Springs Creek originates several kilometers to the east of this site. Tributaries A, B and C near to the Hidden Quarry Site contribute runoff to Blue Springs Creek during the spring freshet and this function of the tributaries will not change as a result of the quarry activities. Thus, it is our conclusion that the site does not represent a sensitive recharge, discharge or headwater area.	No Action Required	
GRCA Comments	103	20. The GRCA is supportive of the progressive and final rehabilitation plans (Section 7.6) and supports the recommended wetland restoration and enhancement plans for this site. Although the restoration or creation of additional marsh habitat on the site is supported, it will be necessary to demonstrate that the alteration of an existing wetland could be consistent with the GRCA Wetlands Policy.	Agree. The wetland area which is proposed to be altered is entirely the result of past aggregate extraction and we believe the site meeting with GRCA staff will help to clarify this matter, particularly with respect to Section 6.2.7.5 of the GRCA's Wetland Policy.	See Comment 92	GWS
GRCA Comments	104	21. Staff discourage the planting of ash species, which are increasingly susceptible to outbreaks of the Emerald Ash Borer.	21. We agree that ash trees should not be used for replanting purposes due to anticipated future mortality caused by Emerald Ash Borer. This species will be deleted from the Site Plan notes.	Remove Ash from Site Plan Notes	Stovel
GRCA Comments	105	22. A detailed assessment of potential impacts associated with the construction and maintenance of the proposed stream crossing and recommended mitigation measures are required. Additional detail regarding culvert length, diameter, depth, and type (CSP or box culvert) are required.	22. To facilitate aggregate extraction from the east side of the property it is necessary to install a culvert in the stream. To minimize potential aquatic impacts, culvert installation must be carried out when there is no flow in the stream which typically occurs during late summer/early fall. Silt screen and/or straw bales should nonetheless be installed on the downstream side prior to culvert installation in order to prevent possible downstream sedimentation caused by a flash flood during a major storm event. Detail will be provided for review by GRCA staff.	Prepare culvert detail for review by GRCA staff and subsequent inclusion onto site plan.	Stovel
GRCA Comments	106	23. Figures 10, 11, and 12 are missing from the Level 2 report and should be forwarded to this office for our review.	Agree - the Figures mentioned in the Natural Environment Report are the Site Plans Pages 2,3,4 - which accompany the submittal package but are not in the Level 2 report.	No Action Required	