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May 6, 2025

Bernie Janssen
Harrington McAvan Ltd.
41 Main Street, Unit 102,
Unionville, Ontario
L3R 2E5

sent by email: bernie@harringtonmcavan.com

Dear Mr. Janssen:

RE: Aggregate Resources Act Application – Proposed Harrington Pit
Comments Provided by Dr. Larry Jensen, November 8, 2024

This letter provides information and analysis to respond to groundwater related comments provided by Dr. Larry Jensen in his email package directed to Harrington McAvan Ltd , ARA Approvals and, MNR hydrogeologist (Oleg Ivanov), dated November 8, 2024.

Qualifications

Dr. Jensen's email states "*I have analyzed the hydrogeology of the Harrington area.*", and in commentary provided to both Harrington McAvan (Ltd) and MNR states "*I would like all the points made in my hydrogeological assessment report commented on, in particular those that point out changes to the water table, water flow and their potential impact on Harrington and Harrington Creek and on what mitigation can be applied to ensure there is no impact. I suspect there could be a lot of damage to Harrington's infrastructure as documented or alluded to in the attached Hydrogeological Assessment.*" Further, in Dr. Jensen's undated "*Peer Review - Hydrogeologic Conditions of 1000394952 Ontario Inc. Proposed Harrington Pit Part Lot 30, Concession 1 Township of Zorra, County of Oxford*" he states "*This experiential understanding and knowledge is augmented by my education and fieldwork as a geoscientist in Ontario for 30 years. I am now retired for the past few years.*" As part of his "Hydrogeologic Assessment" Dr. Jensen provides considerable analysis, review commentary and opinion regarding groundwater conditions at the site and with respect to the proposed extraction.

As a point of information, we note that anyone in Ontario using the title of Geoscientist and providing geoscientific analysis and opinion as part of a public process must meet the requirements of the *Professional Geoscientists Act, 2000, S.O. 2000, c. 13* (Act). The Act requirements, as made available through the Professional Geoscientists of Ontario website at: https://www.pgo.ca/about/act--regulations-and-governance, states:

> *Practice of professional geoscience*
>
> *2 (1) An individual practises professional geoscience when he or she performs an activity that requires the knowledge, understanding and application of the principles of geoscience and that concerns the safeguarding of the welfare of the public or the safeguarding of life, health or property including the natural environment. 2000, c. 13, s. 2 (1).*

And,

Practice

3 (1) An individual shall not practise professional geoscience unless he or she is a member of the Association and practises in accordance with the terms, conditions and limitations imposed on his or her membership. 2000, c. 13, s. 3 (1).

Same

(2) An individual shall not imply or represent that he or she is qualified to practise professional geoscience unless he or she is a member of the Association. 2000, c. 13, s. 3 (2).

We have searched the Professional Geoscientists of Ontario public register (available at: https://www.pgo.ca/search/registered-members) and Dr. Jensen does not appear to be a registered Professional Geoscientist in the Province of Ontario.

Commentary Response

Depth of Extraction

Dr. Jensen asserts repeatedly that the proposed Harrington Pit will extend below water to create a permanent pond, and this assertion is the basis for most of his contention that the pit operation could impact the groundwater system. This assertion is unsubstantiated.

The Harrington Pit application is for above water table extraction only and must remain 1.5 m or more above the established (high) water table at the site as would be specified by the requested licence (when issued). Controls on the depth of extraction are incorporated into the Site Plan, including specifying depths of extraction and rehabilitation relative to the established high water table, and monitoring requirements intended to confirm water table conditions through the initial extraction period. No below water extraction ponds are proposed, and operations in accordance with the Licence and Site Plan requirements would not create any ponds through below water extraction.

Dr. Jensen references two sources to suggest that in order to be viable the pit would need to extract below water. One reference, a generic statement within the June 27, 2023 Englobe Corp. geotechnical (resource evaluation) report that indicates in order to extract below water at the site a below water licence would be required. It is true that in order to extract below water a below water licence application would be required. However, most of the resource at the Harrington Pit site is situated above water. The applicant has made a decision to limit proposed extraction to above water, allowing both resource recovery, and, minimizing potential for groundwater impact.

The second reference suggesting that one cross-section in our June 2024 Hydrogeologic Report indicates that in order to recover sufficient aggregate at the site a below water licence would be required. The reference is incorrect, see particularly Figure 10 of that report. When considering all of the on-site information, including borehole logs, water level measurements and both cross-sections as presented, it is clear that the majority of the resource at the site is above water.

Monitoring Network

Dr. Jensen questions the number and location of monitoring wells constructed at the site and suggests the monitoring network is insufficient. We note that two additional monitoring wells were installed at the site in January 2025 at the request of MNR. The wells were requested to improve the interpretation of groundwater – surface water relationship between the site and the western valley and drainage system, and, provide additional confirmation of water table elevations across the proposed extraction area.

The new monitoring well locations, referenced as MW-05 and MW-06, are shown on the attached figure. The wells were drilled by SD Hopper Drilling using the reverse (air) rotary method, which is typically used for water supply or geothermal well installations. This method was chosen to overcome the difficult drilling conditions (interpreted presence of boulders at depth) encountered with previous environmental (hollow stem auger) drilling programs.

Borehole log summaries, based on the MECP Water Well Records as submitted, for each well are also attached for reference. As indicated by the drilling records, the gravel resource extends to considerable depth at MW-05 and MW-06. The vast majority of the established resource at these two locations is above water, consistent with most other drilling locations at the site.

Initial monitoring completed at the two new monitoring wells confirms the overall hydrogeologic interpretation at the site. Water level measurements at MW-06 indicate that the water table within the sand/gravel at the site is approximately 8 m below the "upper" wet area. This indicates that groundwater system within the proposed extraction area does not contribute to discharge or flow within the upper portion of the west valley drainage system. That flow must originate from the immediate vicinity of the "upper" wet area and/or lands to the west. Water level measurements at MW-05 to date indicate that the water table within the sand/gravel at the site is approximately 0.5 m above the pond at DP1. This indicates that the groundwater system within the proposed extraction area contributes to the wetland/pond system and supports/maintains water availability within the lower portion of the valley drainage system.

Based on the new monitoring wells and monitoring completed to date a revised high water table projection is now available, as shown on the attached figure. This projection no longer relies on estimated water table elevations at the southwest corner of the site (water table elevation measurements in that area are now available) and is considered representative of observed site conditions.

The number and distribution of monitoring locations at the site is sufficient to both establish water table conditions within the proposed extraction area and characterize the local groundwater flow system. The proposed extraction and rehabilitation plan has been revised to reflect the updated water table projection, and ensure that the extraction will remain 1.5 m or more above the projected water table.

Surface Water Conditions

Dr. Jensen asserts that the only pathway for an entire regional groundwater flow system to feed springs, creeks and local water wells in this area is the surficial sand and gravel unit at the proposed Harrington Pit. This ignores the important role both the bedrock system would have (see Dr. Jensen's description of a number of potentially uncontrolled flowing bedrock wells near the Harrington Dam, such as the *early 1900's an exploration hole for oil* with an estimate flow that would likely exceed 2 L/s and 1961 well *that spilled over to flood out several properties* estimated to flow at 1.51 L/s) and the series of interconnected extensive ice-contact and glaciofluvial deposits in the area (June 2024 report, Figure 4), in addition to any deeper overburden aquifers that may be present below the mapped till units (see June 2024 report, Figure 9: Schematic Section A, WWR#4707996).

Further, Dr. Jensen provides estimates of total flow volumes (unsubstantiated by any reported measurements or measurement methodology), while misrepresenting the water balance analysis results (June 2024). The water balance shows that on-site recharge volumes, and therefore local groundwater availability, will be maintained or enhanced. The water balance does not seek to represent regional scale groundwater flow volumes that may feed the surface water system in, and around, Harrington. If Dr. Jensen's estimates are correct, the Harrington Pit water balance clearly indicates that the amount of water recharging at the site represents only a small proportion of the regional scale flow system. Most of Mr. Jensen's projected water volume must originate off-site, and to a large degree would be contributed to by recharge in the existing pit properties to the south and southwest. The existing licenced properties, in

operation for many years, serve as an example of how the proposed above water extraction would not interfere with the local groundwater system.

With regard to the groundwater flow system at the site the drilling and monitoring results clearly indicate that the water table resides within the surficial sand/gravel deposit. The water table follows the till unit elevation, and the unconfined aquifer saturated thickness appears limited. Water table mapping indicates a groundwater flow divide along the west site edge, with flow moving off-site primarily westward toward the adjacent valley/wetland system or eastward toward the Harrington Creek and associated wetland system. There appears to be very little water flowing through the water table system onto the site. Based on the information available, the unconfined aquifer (water table) system represents local flow, recharged on-site and on adjacent properties to the southwest (i.e. not representative of a regional flow system). Regional flow systems may occur at depth below the site, for example in the bedrock system or any confined aquifer. The proposed Harrington Pit above water extraction has no potential to interfere with any deeper flow systems.

Furthermore, Dr. Jensen states that "*The problem with this pit – it will excavate the front hill leaving no barrier for a possible huge amount of water to flow outward. The site plans call for final excavation level to the water table in the southeast corner of the pit, leaving a catchment area where water is to theoretically seep back into the ground. Instead, water will likely flow out of the aquifer located there*." The proposed extraction is for above water only, and there are sufficient monitoring wells and an appropriate monitoring program, to ensure that extraction remains above the water table. There is no potential for …*a possible huge amount of water to flow outward*… Infiltration will occur in on the pit floor and in the infiltration area (i.e. above the water table) and therefore does not have the potential to "release" groundwater. Based on the rehabilitation plan, because water well be retained and internal slopes reduced, an increase in site groundwater recharge is expected (distributed over the entire pit floor) which will ensure water availability at the site boundary is maintained.

Comments regarding water table definition (Monitoring Wells and Boreholes) have recently been addressed by drilling two additional monitoring wells at the request of MNR to better define groundwater conditions at the site. Water level monitoring is ongoing. Modifications to the Site Plan (including Extraction and Rehabilitation Plan sheets) reflect updated conditions. The proposed licence conditions will ensure that extraction is to remain 1.5 m or more above the water table.

Dr. Jensen additionally describes from personal experience a series of tile drains, including:

> *…water now issues out under the east side of 31st line roadway and has been tiled down to the intersection and across Rd. 96 where it meets the water from the marshy aquifer. The strong continuous (almost gushing) flow of water can be seen at the intersection through the grate that allows the 31st line road runoff to flow with this water into a culvert under Rd. 96. Tens of liters /min of water flow…*
>
> and,
>
> *…large drainage tile installed to drain the slew northward as well as dry up the ravine valley floor for cropping shortly after the hill sides and valley were logged for hardwood in the late 19th – early 20th centuries. The clay tile was buried between 1 and 2 meters deep lower than the slew floor (344 to 343m ASL). It extends north to Rd. 96 and across the road farther north for about 20m where it emerges at 337m ASL - a drop of about 6-7 meters from its starting point. The clay tile is still functioning except in sections all the way to Rd. 96. Marshy areas show where the clay tile has collapsed in some stretches of the drain. Dance reports the marshy areas being wildlife habitats - see Dance's Natural Environment Report. The 6 to 8 inch clay tile opens and adds water to the stream of water from a double aquifer issuing 10's of liters of water. A strong, year-round flow of water issues out of the tile. Wildlife in the tile include cray fish. The*

normal flow of water from the tile is about 1 liter/second. Of course it flows faster in the spring with a larger flow.

This drainage tile from Lot 30, Con 1 was untouched during upgrades to Rd. 96. During the first upgrade in1952, the old small culvert above the tile was replaced by a larger culvert before the road was raised to near its present grade to cross the valley. Clay fill from cutting down the hill on Lot 30 to the immediate west was used to raise the road. With silt washing down from the hill and road banks the culvert was soon plugged-up and it had to be replaced in the 1960's. Recently, the culvert was again replaced and location shifted. Only during spring runoff and during heavy and torrential rainfalls does water flow through the culvert. If silt escapes from the planned aggregate pit to the west (which could happen in a rain event as occurred on Aug 17th 2024) it will plug the tile again and it will be an expensive proposition for the pit owner to repair. Harrington witnessed two torrential rains on Aug 17, 2024 nearing a total of 12 inches of rain. No erosion occurred but the culvert roared with water flowing through it with runoff from the hill and ravine valley. Silt barriers would not have held.

Almost all of the water entering the ravine is from the east bottom of the hill and from the south/southwest end of the valley. There are no aquifers or little to no seepage along the west side of the valley, west of the drainage tile. The water table appears to be securely confined by a thick layer of till. The hill-top to the west, cut partly down by the County in 1952 for fill, was dense boulder clay.

In the flats of the ravine, the last attempt to till a few hectares of the bottom of the valley was east of the buried field tile in the early 1940's. The land remained wet and cropping was quickly stopped because of seepage from the hill to the east where the pit is planned.

In summary, although there are no artesian springs, considerable ground water does seep from the west base of the hill for the length of the ravine. This is shown by the continuous flow of water in the old tile crossing Rd. 96 exceeding what can be considered rain runoff.

The first tile drain, as described, would control the water table elevation and groundwater flow along that section of the east border of the site, consistent with the water table mapping provided. This tile drain would essentially cut-off any potential direct connection from the site to shallow wells in the village. The second tile drain, as described, would control the water table elevation and groundwater flow within the valley immediately west of the site, again consistent with the NETR and Hydrogeological report descriptions, and water table mapping provided.

The extraordinary work reported to have occurred to establish these tile drains (along with the reported flowing wells) is essentially a description of historical activities in the area that have significantly impacted the natural groundwater conditions, and function, in this area. What Dr. Jensen describes is an existing man-made active groundwater control system with unregulated discharge that has most likely changed groundwater flow, and groundwater – surface water interaction, in this area. Wetlands have been drained and natural flow systems interrupted. Old wells are reported to flow in an uncontrolled manner, potentially depressurizing aquifers.

The water related systems as described, including current groundwater flow, groundwater discharge, and associated natural environment feature development, have apparently all reached an equilibrium with this man-made control system. The natural systems are accurately described in their current condition by site studies completed to date.

The conditions reported by Dr. Jensen are consistent with conditions observed at the site, and, as the extraction is to remain above water there will be no significant effect on the tile drain systems, or their

associated groundwater controls, due to the proposed pit. There will be no additional diversion of groundwater (beyond was is described as having historically occurred). Based on the rehabilitation contours on-site recharge will be distributed over the pit floor (1% slope through the interior of the site) and serve to maintain the localized flow system at the site. In addition, shallow wells in Harrington would be protected from any potential extraction related impact concerns, as expressed by some residents, due to the interception of shallow groundwater by the tile drain as described along the 31st Line.

Groundwater and Wells

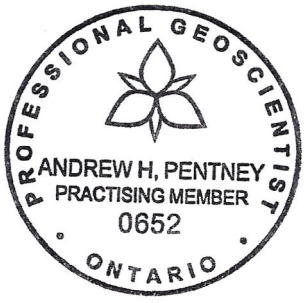
We can confirm that the farm house well at the site is a drilled well. The steel well casing was observed at the time of monitoring well drilling, completed below ground surface in a well "pit" within a small well house. Access is difficult due to the location and given the observed condition, the well head should not be disturbed unless for repair or maintenance. No well record has been located for this well and no other information is available from the previous owner. However, the number and location of water table observation wells is sufficient and appropriate to characterize site conditions.

Dr. Jensen states that the proposed extraction …*would certainly cut the water of the water table that continues flowing east into Lot 30, Con 2 and Harrington…* There is no such proposal, the extraction will remain 1.5 m or more above the water table, overall recharge volumes will be maintained or enhanced, and, the distribution of recharge at the site will be maintained. Further Dr. Jensen states …*The Hydrogeological Report maintains that the water from the seepage pond at the northeast corner of the property, at the corner of Rd. 96 and the 31st line road, will be used to maintain the normal water supply from Lot 31, Con.1*…, which is a misrepresentation of the study methods and findings. Distributed recharge is expected to occur over the entire site, with the infiltration area simply containing and infiltrating any runoff that may occur under the specific conditions noted above.

In summary, based on the detailed site characterization, monitoring, extraction planning and proposed Site Plan controls, no impacts to water wells or water supply are expected. Observations and monitoring at the adjacent Robinson Pit (and others) substantiate the findings related to the proposed Harrington Pit, and exemplify the lack of water table impact associated with above water extraction.

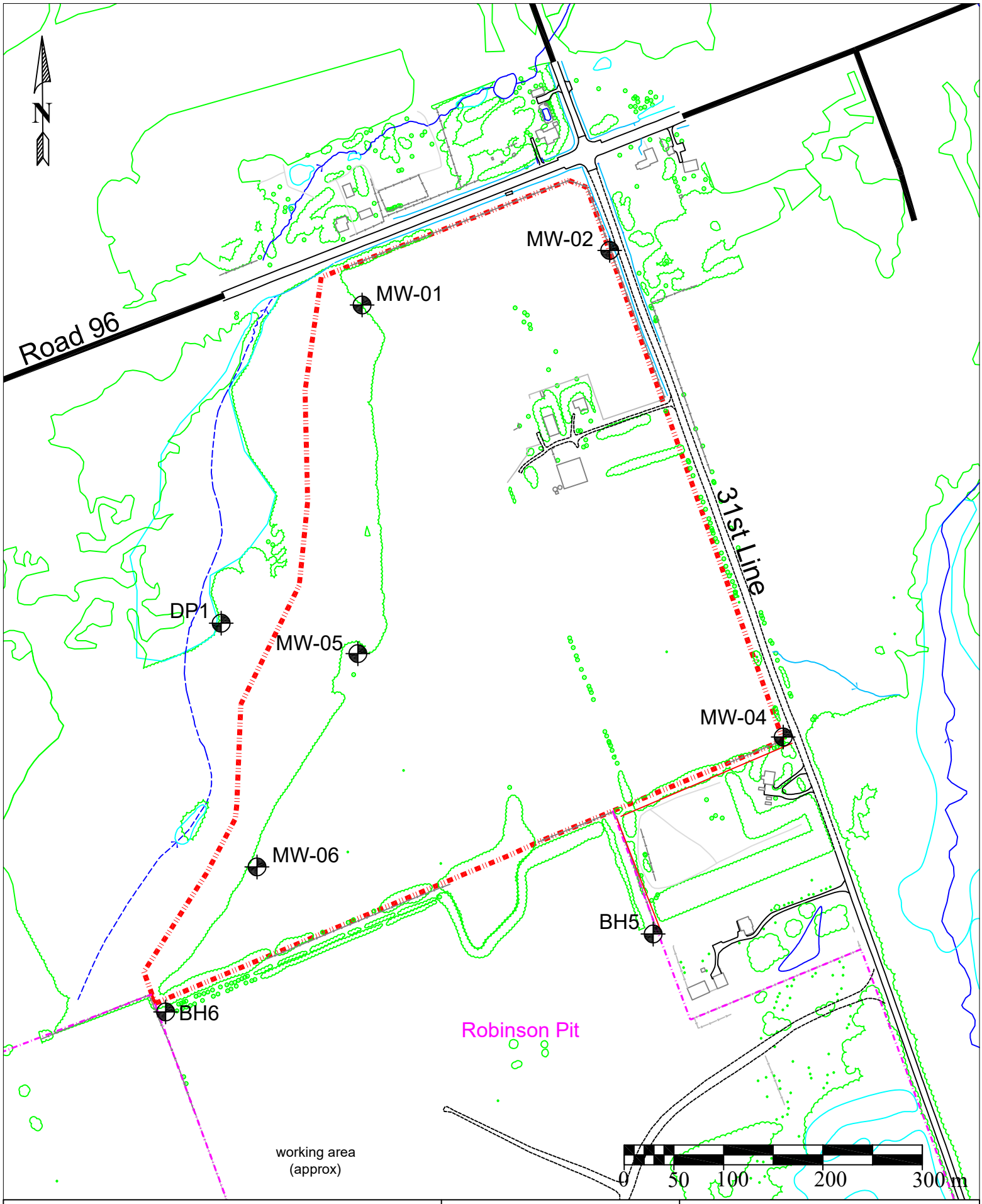
We hope this response addresses all of Dr. Jensen's concerns. If you have any questions, or require further information, please do not hesitate to contact me.

Sincerely,



Andrew Pentney, P.Geo.
Hydrogeologist

Attached: Figure 1: Drilling Locations
Borehole Logs – MW-05 and MW-06
Figure 2: Projected High Water Table



Site (approx.)
existing licenced pits (approx)
monitor, reference
vegetation lines, wetlands, water bodies & watercourses, roads, etc. as shown

Modified from: geographic data obtained through Land Information Ontario

March 2025
Scale: as shown

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Figure 1: Drilling Locations

1000394952 Ontario Inc.
Proposed Harrington Pit

BOREHOLE LOG

Borehole: MW-05

Project: Harrington Pit
Location: west field edge, near DP1
Method: air rotary (SD Hopper Drilling)
Samples: drill cuttings / return

Date: January 10, 2025
Supervisor: Driller, site check AP
Elevations TOC: 365.58 mASL
GS: 364.88 mASL

Depth ft.	Depth m.	Sample type	Sample no.	Sample Interval (m)	rec.%	Description	Monitor Installation
0	0			continuous		**Clay Topsoil**	protective casing
				samples			
				monitored		**Sand, Gravel**	
	4			by driller		- brown sand, gravel	
20							bentonite (holeplug) seal
				as reported			
	8			see water			
				well record			
				well tag			
40	12			#A417724			nominal 5.1 cm diameter PVC riser and slotted screen
						- grey coarse sand, gravel, stones	
	16					- grey, gravel and stones	screen length 3.0 m
60							
	20						
							water level 23.9 mBGS January 14, 2025
80	24					- grey medium to coarse gravel	
						End of Hole at 28.7 m	silica sand pack
	28						
100							
	32						
						note - identifed by SD Hopper as MW1 on well log	
120	36						

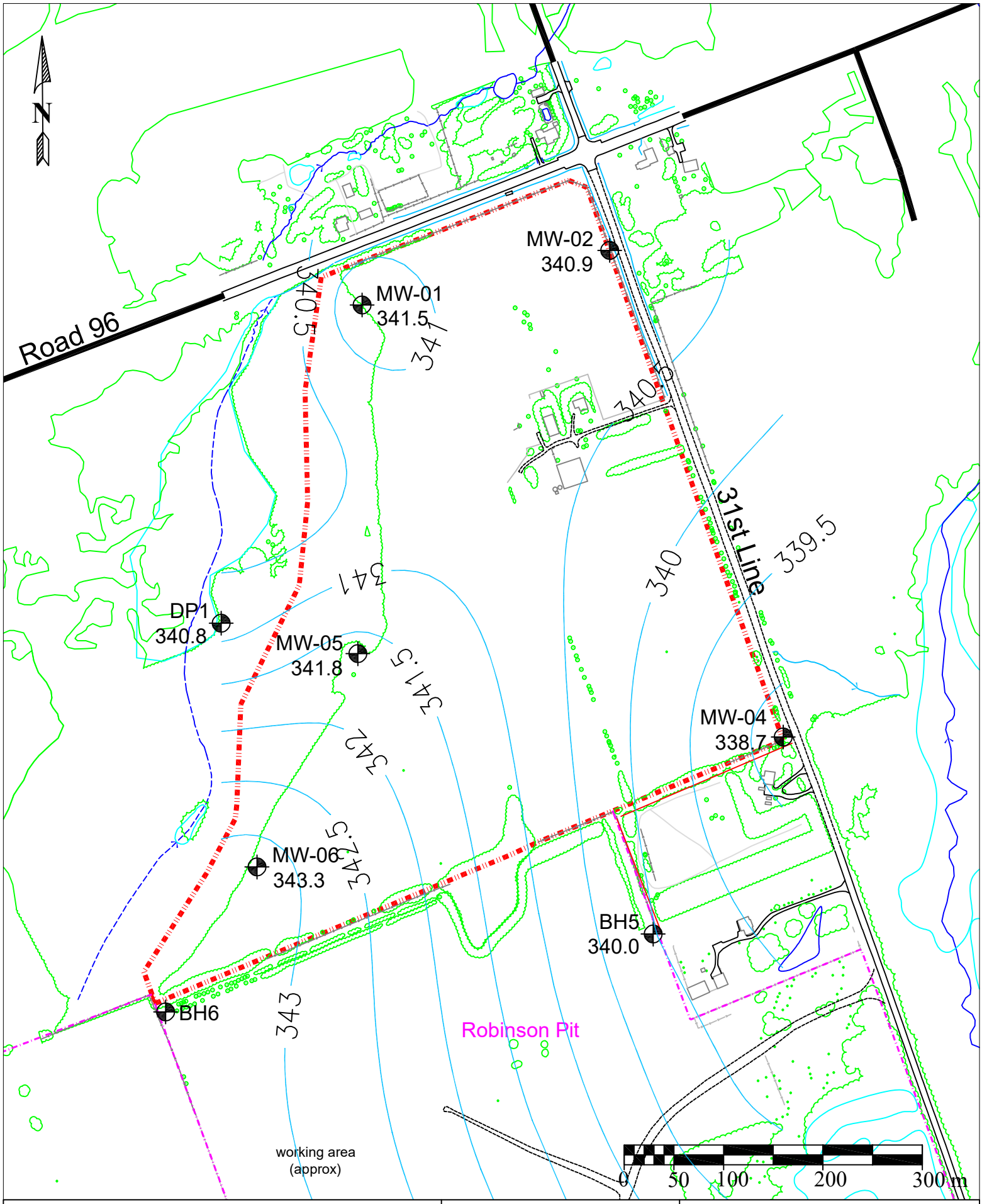
BOREHOLE LOG

Borehole: MW-06

Project: Harrington Pit
Location: west field edge, near DP1
Method: air rotary (SD Hopper Drilling)
Samples: drill cuttings / return

Date: January 10, 2025
Supervisor: Driller, site check AP
Elevations TOC: 370.85 mASL
GS: 370.16 mASL

Depth ft.	Depth m.	Sample type	Sample no.	Sample Interval (m)	rec.%	Description	Monitor Installation
0	0			continuous		**Topsoil**	protective casing
				samples		**Sand, Gravel** - brown sand and gravel	
				monitored		- grey gravel	
	4			by driller		- grey sand, gravel, stones	
20							bentonite (holeplug) seal
				as reported			
	8			see water			
				well record			
				well tag			
				#A417725			
40	12					- grey coarse sand, gravel	nominal 5.1 cm diameter PVC riser and slotted screen
	16						
60						- grey sand, gravel	screen length 3.0 m
	20						
	24						
80							water level 27.6 mBGS January 14, 2025
	28						
100						- grey gravel, sand	
	32						silica sand pack
						End of Hole at 32.3 m	
120	36						
						note - identifed by SD Hopper as MW2 on well log	



Site (approx.)
existing licenced pits (approx)
monitor, reference, high water table elevation
vegetation lines, wetlands, water bodies & watercourses, roads, etc. as shown

Modified from: geographic data obtained through Land Information Ontario

March 2025
Scale: as shown

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Figure 2: Projected High Water Table

1000394952 Ontario Inc.
Proposed Harrington Pit