

CAPITAL PAVING INC.

P.O. Box 815, Guelph, Ontario N1H 6L8

COPY

March 2, 2009

MINISTRY OF NATURAL RESOURCES
GUELPH DISTRICT
1 STONE RD. WEST
GUELPH, ON
N1G 4Y2

ATTENTION: MR. MIKE STONE, DISTRICT PLANNER

**REFERENCE: APPLICATION FOR CATEGORY 1, CLASS "A" LICENCE
CAPITAL PAVING INC., MONTROSE PIT
PARTS OF LOTS 71, 74 & 75 CONCESSION G.C.T
TOWNSHIP OF WOOLWICH, REGION OF WATERLOO**

Dear Mr. Stone,

This letter is our response to the comments and questions that have been raised in your letter dated October 15, 2008 by the Ministry's staff, reviewing the above noted application, which is being considered under the Aggregate Resources Act.

Attached please find two letters, from our consultants addressing your comments.

1. Groundwater Science Corp., letter dated February 17, 2009 (response to hydrogeological comments)
2. Stantec Consulting Ltd., letter dated February 18, 2009 (response to level 2 natural environment concerns)

We trust the information provided in the above two letters addresses your comments.

Should you have any other questions or require further clarification concerning the application, please let us know and we will address it promptly.

Also enclosed with this letter:

- Site plan(sketch) showing the revised flood line
- Site plan(sketch) showing the revised extraction limits
- A copy of a "memo" from Groundwater Science Corp., dated January 23, 2009, with additional information, and monitoring update, which was circulated to M.N.R (Art Timmerman) and to G.R.C.A (Melissa Larion) during the site visit on January 28, 2009.

In addition, for your information, we are attaching a copy of the response letters from our consultants with respect to the G.R.C.A comments in their letter dated October 17, 2008.

1. Letter from GRCA dated October 17, 2008.
2. Stantec Consulting Ltd., letter dated February 18, 2009(response to natural environment comments)
3. Groundwater Science Corp., letter dated February 24, 2009(response to hydrogeological comments)

We appreciate your review and comments. If you require any further clarification, please let us know.

Yours truly,

CAPITAL PAVNG INC.



Nick Toth
C.E.T

CC.	Diane Schwier	M.N.R
	Art Timmerman	M.N.R
	David Webster	M.N.R
	Melissa Larion	G.R.C.A
	Jeremy Vink	Township of Woolwich
	Sylvia Rafalski-Misch	Region of Waterloo
	Glenn Harrington	Harrington & Hoyle Ltd.



Groundwater Science Corp.

24 Erb Street East
Waterloo, ON N2J 1L6
Phone: (519) 746-6916
Fax: (519) 884-5996

February 17, 2009

Mr. Nick Toth
Capital Paving Inc.
P.O. Box 815,
Guelph, Ontario
N1H 6L8

Dear Mr. Toth:

**RE: Technical Response
Ministry of Natural Resources comment letter dated Oct. 15, 2008
Proposed Capital Paving Inc. Montrose Pit.**

As requested, this letter provides a technical response to the comments provided by the Ministry of Natural Resources (MNR) in their letter dated October 15, 2008 regarding the Aggregate Resource Act Licence application for the proposed Montrose Pit.

Comments provided by MNR related to groundwater conditions at the site and/or the hydrogeologic assessment included as part of the Licence application. A Memo dated January 23, 2009 with additional information, and a monitoring program update, was circulated to MNR during the site visit completed on January 28, 2009. A copy of the Memo is attached to this letter. Some of the information in the Memo is referenced by the technical responses provided below.

The MNR comments relate to questions of clarification or requests for additional information. Each comment is summarized below in *italics*, followed by the technical response.

Hydrogeologic Assessment

Clarification of purpose of drain and affect on groundwater flow to the riverine wetland.

The purpose of the gravel conduit, analogous to an agricultural tile drain, will allow local groundwater flow to move freely from east to west across the "till ridge". The water movement will be from the "pocket" of saturated gravel located east of Letson Road (south of the farm buildings), across the area of the till ridge and into the gravel layer within the western portion of the site (west of BH6). Conditions within this general area are shown on Section B-B' within the attached memo. The conduit will not alter the overall volume of water moving from east to west, it will simply provide a "preferential pathway" to allow the movement to occur at a lower elevation near the south edge of the site. This local movement of groundwater is currently restricted by the till ridge.

The western end of the gravel conduit will intercept the water table aquifer near BH6. Groundwater moving through the conduit will enter the water table aquifer flow system at this point, and will continue to move westward toward the Grand River and associated riverine wetland. The distance between the conduit and the wetland is approximately 550 m. Any local change in groundwater flow patterns associated with the conduit is expected to dissipate within the overall groundwater flow system over this distance. Therefore the conduit is not expected to have a significant effect on groundwater flow patterns at the riverine wetland. In addition, the drain will not direct groundwater "away" from the wetland.

Clarification on potential impacts of gravel removal on flow to the wetland, infiltration into the till and siltation within the wetland. Comment on need for infiltration gallery.

The proposed gravel extraction will remain above the established water table over most of the site. To clarify, after extraction operations are complete, the 1 to 2 m of saturated sand and gravel that forms the water table aquifer within the western portion of the site will remain in place, overlain by 0.5 m of native sand and gravel left in place. Once the site is rehabilitated and additional 0.5 m of subsoil and topsoil will be replaced, leaving the final ground surface 1 m or more above the established water table.

Therefore the extraction would not disrupt or interfere with the water table elevation or groundwater flow within the western portion of the site. In addition, the extraction is not expected to have any significant effect on groundwater discharge at the wetland, or the movement of water from the water table aquifer to the underlying till. The removal of gravel from above the water table will not change the ability of water to infiltrate (as recharge into the sand and gravel unit, or, from the sand and gravel unit into the till) and will not result in an increase (or change) in any potential movement of silt through the groundwater system toward the wetland.

An infiltration gallery will not be required to induce groundwater flow into the till.

Clarification regarding extraction of till and impact to groundwater flow to north creek. Verification of the north creek catchment area.

Although till elevations may be altered in the area west of Letson Road, no significant change in the flow of groundwater toward the creek is expected. As shown in the attached memo, currently the water table elevation within the extraction area west of Letson Road is consistently lower than the water table at the creek. (i.e. groundwater within the extraction area does not flow toward the creek). All extraction in this area is to remain above the water table, therefore no disruption in pattern of groundwater flow is expected.

MNR requested that the surface flow patterns be reviewed for the northern creek catchment, specifically the use of Regional Road 23 as a local divide. The flow patterns have been reviewed through field inspection and discussions with the landowners. The landowners report that flow through the culvert at Regional Road 23 is from east to west. This was confirmed during the January 28, 2009 site visit with MNR. The landowners also indicate that flow within this creek actually originates within the wetland located east of Regional Road 23. This expands the surface water catchment further east.

In addition, the catchment boundaries near the site and within extraction areas were reviewed. It is reported that no culvert crosses Letson Road north of the site. This implies that any surface water runoff from the site in this area would flow within the roadside ditch along the west side of the road and toward the small "park" at the corner of Rivers Edge Road and Letson Road. Therefore this surface water flow would therefore not contribute directly to the northern creek. In this area the catchment divide is now estimated to be the centerline of Letson Road.

The topography at the northeast corner of the site was also inspected, and based on field observations the catchment boundary was revised slightly.

The revised catchment area delineation, based on the above observations, is attached to this letter. As shown, the total catchment area is now estimated to be 70.7 ha (approximately 5.7 ha larger than previously estimated), and the potentially disturbed area is estimated to be 0.6 ha (2.1 ha smaller than previously estimated). Therefore the potentially disturbed area represents approximately 0.9% of the total northern creek catchment area.

Clarification of groundwater-surface water interaction along northern creek.

The interaction of the groundwater system with the creek in this area was reviewed during the site visit. The description in Section 5 of the hydrogeologic report is an overview of conditions at the creek based on both the observations at specific monitoring points and the overall geologic and topographic setting. Recharge conditions are observed at DP2, however that does not preclude some discharge occurring just upstream or just downstream (as indicated by the presence of flow and watercross).

During high water table conditions groundwater likely begins to enter the creek at about the elevation of the lane (above and upstream of DP2), likely "forced" to surface by the underlying till. During low water table conditions the portion of the creek upstream of DP2 is observed to be "dry", and flow within the creek begins at an elevation lower than DP2. Therefore the elevation that groundwater enters the stream varies with the water table elevation, i.e. on a seasonal basis.

However, observations at DP2 indicate that the creek is a "loosing stream" throughout the year. Here the till unit is likely lower and overlain by creek sediments, allowing the surface water to move back into the ground. This can be considered a type of "interflow" along the creek bottom, with water moving into or out of the creek sediments (hypoheric zone interactions) depending on the local topography, type of underlying sediments, and, water table elevation.

Downstream of DP2 the channel is lower in elevation, and has "cut into" the till unit. Here, based on local groundwater elevations and the upward gradient observed at DP3, groundwater discharge occurs on a more permanent basis. Because this portion of the stream is within the till unit total discharge volumes are relatively low. Further downstream, at the concrete lined pond and channelized (concrete lined) outlet to the Grand River, we expect flow conditions to be similar. The effect this concrete lining has on discharge potential is unknown, however it may reduce the amount of water that can move from the water table system into the creek.

Comment on observation record with respect to "average" conditions.

The monitoring record is ongoing and includes a variety of conditions including the very dry summer/fall of 2007 and very wet conditions in 2008. Conditions used to establish the water table at the site represent relatively wet conditions, and therefore are conservative. The only use of "average conditions" within the assessment are the use of climate normals within the water balance. The water balance illustrates the small potential for change (increase) in recharge for the site on a year to year basis. This potential increase in recharge would apply to both dry and wet annual conditions.

Provide more detailed discussion of potential for thermal impacts and comment on 0.5 m separation.

The potential thermal impact of extraction will be limited by the groundwater travel time between the extraction area and the river. The distance between the proposed extraction and the river is 110 m or more. Based on the setting, shallow groundwater within this area will flow through a combination of sand/gravel (resource), fluvial sediments associated with the river and floodplain, and, the underlying till unit (see report Figure 9).

The average groundwater velocity is estimated using the following equation:

$$v = Ki/n$$

where

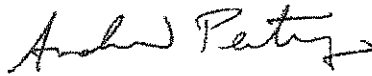
- v = average linear velocity
- K = hydraulic conductivity
- i = hydraulic gradient (water table slope)
- n = porosity

The water table slope between the site and the river under seasonal high water table conditions (i.e. maximum flow potential) is estimated to be 0.01 (see memo). The porosity of the sediments within the flow system is estimated to be 0.3. The hydraulic conductivity of the sediments with the flow system will vary, however on average are expected to be less than 1.0×10^{-4} m/s (i.e. less than observed in the sand and gravel unit). The groundwater velocity estimated using a hydraulic conductivity of 1.0×10^{-4} m/s is approximately 0.29 m/day or 105 m/year. Within the flow distance between the extraction area and the river, any small potential thermal change associated with the extraction will have dissipated. Therefore no thermal impact is expected at the river.

The Site Plan was developed to maintain a specified separation between the pit floor (and/or rehabilitated ground surface) elevation and a seasonal high water table elevation ("established water table"). Therefore as the water table fluctuates (declines) through the year the separation will increase. During extraction the 0.5 m separation between the water table and the pit floor interior to the site will be confirmed using occasional test pits as extraction proceeds.

We trust that the responses provided address the MNR comments adequately. If you have any questions, or require further information, please do not hesitate to contact us.

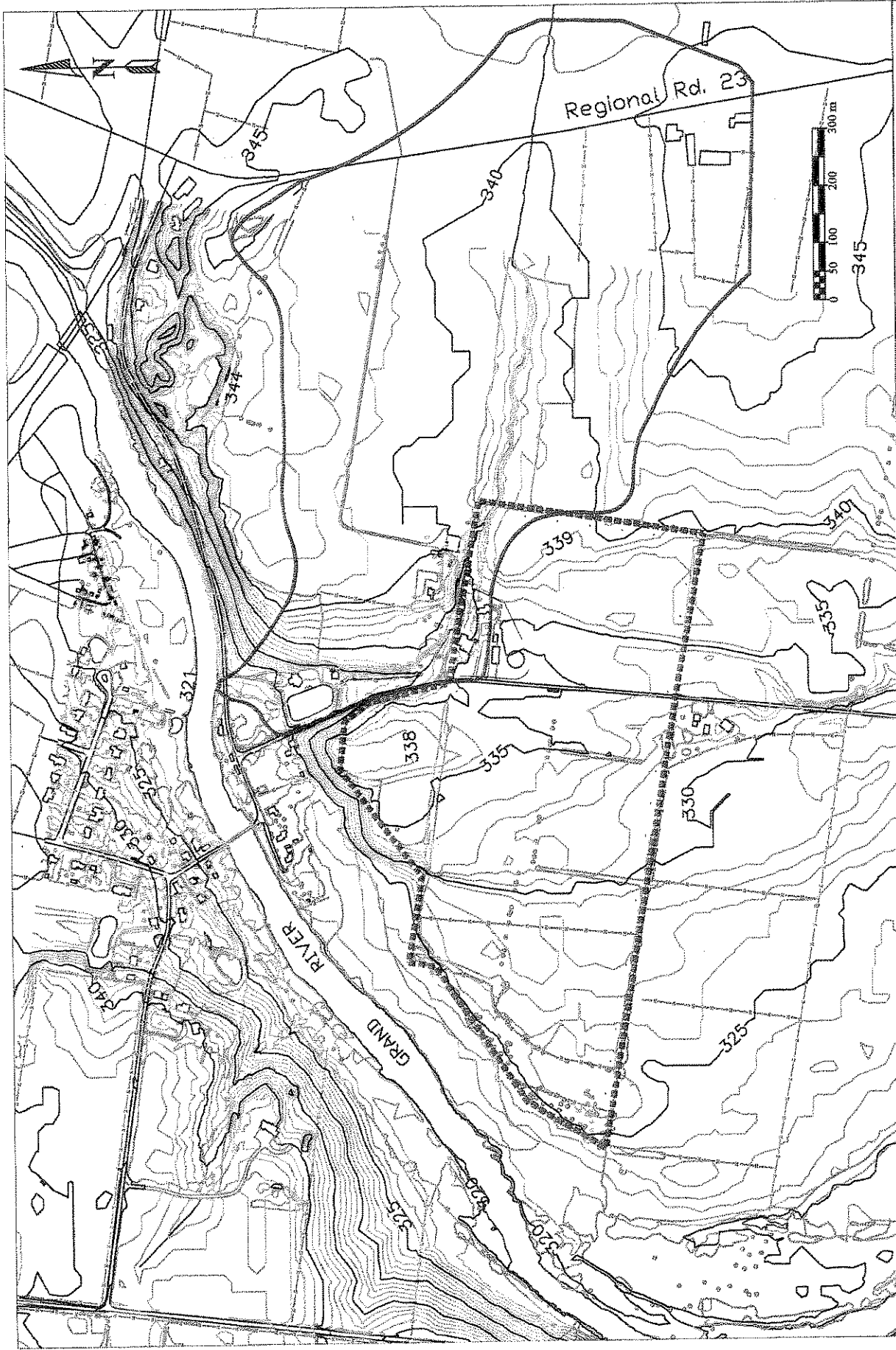
Sincerely,



Andrew Pentney, P.Geol.
Hydrogeologist

Cc: Bernie Janssen, Harrington and Hoyle Ltd.

Enclosed: Revised North Creek Catchment
January 23, 2009 Memo



<p>Scale: as shown Date: February 2009</p>		<p>Revised North Creek Catchment</p>	
<p>Hydrogeologic Assessment</p>		<p>Capital Paving Inc. Proposed Montrose Pit Part of Lots 74 and 75, Concession GCT</p>	
<p>Groundwater Science Corp.</p>		<p>Township of Woolwich, Region of Waterloo</p>	

— northern creek catchment (approximate)

⊞ Site location

modified from: Site Plan (Harrington Hoyt Ltd.), and 1:10,000 OBM Mapping UNDER LICENSE, WITHOUT PREJUDICE OR ENDORSEMENT FROM THE QUEEN'S PRINTER OF ONTARIO



Stantec

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February 18, 2009
File: 160960196

Capital Paving Inc.
P.O. Box 815
Guelph, Ontario
N1H 6L8

Attention: Mr. Nick Toth

Dear Mr. Toth:

**Reference: Capital Paving Inc., Montrose Pit
Part of Lots 71, 74 & 75, Concession G.C.T.
Township of Woolwich, Region of Waterloo
MNR Response Letter (October 15, 2008)
Stantec Consulting Ltd. Technical Response**

Stantec Consulting Ltd. is in receipt of the October 15, 2008 letter to Capital Paving Inc., which provides technical comments from the Ministry of Natural Resources (MNR) regarding the Category 1, Class "A" pit licence application for the above-referenced proposed development. We have prepared the following commentary to address the MNR's stated concerns.

LEVEL II NATURAL ENVIRONMENT TECHNICAL REPORT

MNR Comment #1 (pg. 2)

As noted above, Ministry staff has observed regular flow in the north creek downstream of the constructed pond to the Grand River. In section 4.3, it is stated that this portion of the creek is considered intermittent but likely offers seasonal fish habitat. Further discussion on this section of the creek should be provided, including a discussion on where the water (regular flow) originates if the creek upstream of the pond is intermittent. An illustration showing the habitat features described here would be helpful in understanding where the stream is dry and where it is not.

Response

Stantec confirms that the lower portion of the tributary does appear to offer regular flow, albeit low flow, as observed in DP#2. The low flow volumes observed to date suggests that this creek could be intermittent (or have no flow) in dry years.

Stantec provides the following additional site information and clarification with respect to the potential fisheries resources in the tributary East of Letson Drive. The reach of the watercourse below the pond appears to have been channelized having extensive lengths of its banks lined with concrete and stone. There is little cover offered over the stream in this area and limited natural diversity (riffles, pools, runs, meanders, or in-stream cover). Nonetheless, the stream is directly connected to the Grand River and could provide direct

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Mr. Nick Toth

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**Reference: Capital Paving Inc., Montrose Pit
Part of Lots 71, 74 & 75, Concession G.C.T.
Township of Woolwich, Region of Waterloo
MNR Response Letter (October 15, 2008)
Stantec Consulting Ltd. Technical Response**

fish habitat as noted throughout the natural environment, or, at a minimum, indirect contributions to fish habitat during various periods of the year.

Further upstream the tributary flows through a constructed on-line pond that is sided with concrete. The pond does not exhibit good quality fisheries characteristics and likely contributes to the warming of water exiting from the pond. The pond could be considered low quality fish habitat and is significantly limited with respect to fisheries.

The lower reaches of the tributary, upstream of the pond and downstream of the proposal, is isolated from a direct colonization source for fish by migratory barriers found at the inlet and outlet of the pond. The tributary upstream of the pond between sampling point DP2 and DP3 (see hydrological report) show progressively lower seasonal flows and the area upstream of D3 exhibits regular drying during warm dry summer months. This reach of the creek exhibits little overhead cover, poorly defined banks, very shallow depth, no refuge pools, periods of dryness and is heavily impacted by livestock activity. Collectively these factors minimize its potential as good fish habitat. However, despite these limiting factors to direct fish habitat it may be argued that this lower reach of the tributary may be considered to offer indirect allochthonous contributions to fish habitat downstream.

In conclusion, the tributary above the pond could be considered as contributing indirectly to fish habitat taking a very conservative approach, and based on DFO sensitivity matrix, could be considered at best low quality fish habitat. The area below the pond could be considered direct fish habitat. The entire length of tributary downstream of the proposed development should be dealt with under the appropriate assessment and permitting requirements in consideration of the indirect contribution to fish habitat. Regardless of fish habitat potential, no impacts to this creek are anticipated.

MNR Comment #2 (pg. 3)

Under section 4.3.1, Ministry staff notes that Rainbow Mussel has also been collected both upstream and downstream of the site in the Grand River. This species is considered Threatened in Ontario.

Response

Stantec receives "Distribution of Mussels Species at Risk" mapping from the Grand River Conservation Authority, as distributed by DFO. This species was not included on the noted data source. It will now be added to the appropriate species list associated with the background data information for this project.

MNR Comment #3 (pg. 3)

In the project description provided in section 6.0, it is indicated that two 'protrusions' of the woodland on the west side of the site occur within the proposed extraction area. Ministry staff notes that these two areas appear very small relative to the overall extraction area and would appreciate further comments from the consultant on the rationale for their inclusion in the extraction area. Similarly, staff would like clarification on the proposed filling of the cattle pond in the northwest of the property, recognizing that this feature is not within the extraction area and that the pond provides some habitat for amphibians and adds diversity to the nearby wetland area.

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**Reference: Capital Paving Inc., Montrose Pit
Part of Lots 71, 74 & 75, Concession G.C.T.
Township of Woolwich, Region of Waterloo
MNR Response Letter (October 15, 2008)
Stantec Consulting Ltd. Technical Response**

Response

As noted the greater majority of the woodland in the area of the proposed site will remain intact. Two small protrusions <0.5 ha are being considered for extraction, however the intent is to replant an area greater than the area covered by the two small woodland protrusions. The reasoning for adopting this management option at this location encompasses a number of considerations, as discussed below.

Capital Paving requested that Stantec review the magnitude of potential impacts associated with proposed removal of the noted two woodland protrusions (<0.5 ha) and provide potential mitigation that could minimize any long term impacts. Capital understands that two woodland protrusion are part of a more extensive forest system and also that the Region of Waterloo and MNR are interested in the long term maintenance of forest cover in the Municipality, Township and watershed. The interest in the protrusions was directly related to the available aggregate at these locations and the desire to provide a more linear agricultural edge for the landowner to facilitate farming.

Stantec reviewed the site for important wildlife and botanical interest and has noted that there are no notable species or specialized habitat associated with these two protrusions. These protrusions, along with other forest edges, exhibit a greater number of non-native species relative to the remainder of the woodland. Stantec also notes that such protrusions can be beneficial as they provide more and variable predator-prey interactions at the limits where they extend into agricultural lands.

In consideration of the characteristics of the two areas and habitat provided, Stantec supports the removal of the protrusions with the condition that replanting be completed along the entire post rehabilitation slope with tree plantings that will provide more overall forest cover than the existing area covered by the two protrusions. The new wooded area provides a valuable warm, south facing slope habitat for wildlife. South facing slopes tend to grow rapidly and can provide good habitat for specialized activities such as denning or snake hibernacula. The extent of the added replanting zone is illustrated on Figure 7.0 of the Level II Natural Environment Technical Report.

The landowner has requested that the existing pond be filled in and a new pond be created in the southwest corner of the property. The request was made given that the existing pond is small, has extremely steep sides (a potential hazard to cattle), and has little or no outflow during dry summer conditions (i.e., the existing pond is not ideal for livestock). The filling of the existing livestock pond at the upstream end of Tributary 2 would be completed using granular fill to allow for continued groundwater flow and discharge downstream of the pond. This would maintain any associated potential contributions to downstream fisheries or wetlands. The on-line livestock watering area would be taken off-line under the proposal. Livestock waste would be removed from the water that presently enters the wetland and, in some cases, reaches the Grand River. Also, by filling the existing pond, this area would be made safer for humans and livestock. The new proposed pond would be off-line, and designed to facilitate livestock use.

The existing pond, located within amphibian breeding Station C, consists of a dug livestock watering pond (approximately 12m X 25m). Beyond the 100m semi-circle station are coniferous and mixed swamp communities within the flood plain of the Grand River. Within the dug pond, 1-2 green frogs were observed during the June survey. Four additional species (including spring peeper, northern leopard frog, American toad and grey treefrog) were observed calling beyond the dug pond in the coniferous and mixed swamp communities. There is in fact a low number of individuals of a single species, green frog, using the pond. Groundwater outflow from this area, and any associated downstream amphibian habitat, would be maintained.

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**Reference: Capital Paving Inc., Montrose Pit
Part of Lots 71, 74 & 75, Concession G.C.T.
Township of Woolwich, Region of Waterloo
MNR Response Letter (October 15, 2008)
Stantec Consulting Ltd. Technical Response**

MNR Comment #4 (pg. 3)

Under the discussion of impacts provided in section 7.1 it is indicated that the changes in groundwater levels that will result from extraction will not affect the north creek (intermittent tributary east of Letson Drive). From statements provided earlier in the report and in the hydrogeologic report, the Ministry understands that some groundwater discharge occurs at various locations along the creek. As such, the Ministry would like the consultant to provide further discussion on the potential impacts to this feature as a result of the expected changes in the groundwater regime.

Response

Groundwater Sciences Corp. has provided a detailed response to this concern in the technical hydrogeological response letter to Capital Paving, dated February 17, 2009.

MNR Comment #5 (pg. 3)

*During a site visit, Ministry staff observed American (Common) Hackberry (*Celtis occidentalis*) in a portion of vegetation community FOD2-5 that is to be removed during extraction of the site. This species was not identified in the report. This species is ranked S4, and its occurrence on the site may be of local significance and interest to the Township or Woolwich and/or Regional Municipality of Waterloo.*

Response

This species has been noted and added to the plant list. The common hackberry (*Celtis occidentalis*) occurs predominantly on the edges of the farm lane and edges of unit FOD2-5. This is an S4 species, "Apparently Secure - Uncommon but not rare" in the Province, according to NHIC rankings. It is identified as locally rare in Waterloo Region and is also noted to occur in the neighboring counties of Wellington, Perth and Oxford. The presence of common hackberry will be noted in communications to the township and Region. It is not considered to be of a level of importance in the local landscape to be assigned protection for individual specimens. However, considering its local rarity, it is recommended that American (Common) Hackberry (*Celtis occidentalis*) be included in the proposed replanting plan and will be added to the list of trees to be planted at the site.

Stantec

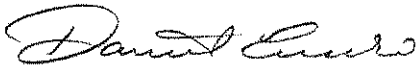
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**Reference: Capital Paving Inc., Montrose Pit
Part of Lots 71, 74 & 75, Concession G.C.T.
Township of Woolwich, Region of Waterloo
MNR Response Letter (October 15, 2008)
Stantec Consulting Ltd. Technical Response**

Stantec Consulting Ltd. respectfully provides the foregoing response comments for the MNR's consideration with regard to the proposed development. We trust this addresses the concerns expressed by MNR, however, should there be additional questions please do not hesitate to contact the undersigned at your convenience.

Sincerely,

STANTEC CONSULTING LTD.



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Senior Environmental Planner
Tel: (519) 836-6050
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dan.eusebi@stantec.com

c.c. Bernie Janssen, Harrington & Hoyle Ltd.
Andrew Pentney, Groundwater Science Corp.

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Memo

To : Nick Toth	Date : 23/01/09
Capital Paving Inc.	Re. : Hydrogeologic Monitoring Update
From : Andrew Pentney	And Additional Analysis
CC : Harrington and Hoyle Ltd.	Project : Proposed Montrose Pit

This memo provides an update regarding the on-going groundwater monitoring program results for the proposed Montrose Pit site. In addition, this memo also provides some additional analysis that clarifies the relative positions of the water table and the till unit on-site and the hydrogeologic relationship between the proposed extraction area and the northern creek.

Groundwater level monitoring is occurring on a monthly basis at present in order to compile a detailed set of background condition data. Monitoring began in June 2006, there are currently 2.5 years of water level data for the site. The monitoring period includes very dry periods, such as the summer and fall of 2007; very wet periods, such as the spring of 2008; and, more "average" conditions, such as fall/winter 2006. The monitoring data update is attached to this memo as an elevation summary table and hydrographs (Figure 5 Update and Figure 6 Update). The ongoing monitoring results are consistent with the data presented in the March 2008 assessment report.

Based on the monitoring results we have compiled water table elevation maps showing both low water table conditions (Fall 2007) and high water table conditions (Spring 2008). The maps are attached to this memo. Note that for the purposes of the Site Plan the established water table is based on the December 2006 groundwater elevations, which were the highest on record at the time of the application report. The groundwater elevations in December 2006 were similar to those measured in Spring 2008 (difference of between 0.01 and 0.17 m within the above water table extraction zones).

Comparing the low and high water table elevations and the elevation of the till unit (as shown on Figure 4 in the March 2008 report) we have delineated the areas on-site where the water table is within the till unit and where the water table is within the sand and gravel unit. The areas are shown on the water table maps. The comparison shows that over the eastern portion of the site groundwater flow is largely within, and controlled by, the till unit. Within this area the water table elevation and slope is higher. Groundwater flow will be relatively slow, controlled by the fine-grained nature of the till unit.

West of this area, where the water table is within the sand and gravel unit, the water table slope is lower and groundwater moves more "freely" toward the river. The figures also illustrate that during dry periods (e.g. in the summer and fall) the sand and gravel (water table) unit has a saturated thickness of less than 1 m over a significant portion of the site. This indicates the limited nature of the water table unit at the site and the overall low flow volume toward the river and associated wetland. During dry periods the water table near the southwest corner of the site is also significantly lower than the wetland along the Grand River. The water table elevation in this area likely creates very dry conditions at surface. The wetland occurs along the river north of this area, where both the till unit and the water table is at a higher elevation.

In order to illustrate conditions near the northern creek we have constructed two local schematic cross-sections (B - B' and C - C'), as shown on the attached figure. The cross-sections are also included with this memo.

The cross-sections show the relative positions of the till unit and high and low water table elevations with respect to the extraction area and the creek channel between DP1 and DP2. Note that the till sequence includes both the Port Stanley (sandy to silty) Till near the surface and the Maryhill (clay) till at depth. Near the creek the till surface rises up to, or above, the creek channel bottom. The creek channel at DP2, and downstream to the north, is developed within the till unit. The till unit effectively captures local recharge and directs local flow along the channel and limits the amount of water that moves from the creek to the sand and gravel unit on-site.

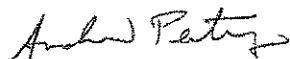
Within this reach of the creek the water table at the creek (and to the south) is constantly lower than the creek level (i.e. the creek is a losing stream). In fact, during the summer when the water table is well below the channel bottom this reach of the creek dries out and most of the stream channel is used as pasture. During these conditions the till unit limits the hydraulic connection between the flow system along the creek and the sand and gravel unit. In the spring streamflow within this reach of the creek is a combination of snowmelt, rainfall and agricultural tile discharge (east of the site). During these conditions the creek channel acts to enhance local recharge, feeding some water "over" the till ridge and into the sand and gravel unit. This can also be seen on the Spring 2008 water table map, as the area along the creek identified as having less than 1 m of saturated sand and gravel.

The water table position between the creek and the proposed extraction area east of Letson road depends on the amount of water recharging the channel (e.g. spring snowmelt) and the occurrence/elevation of the till unit, not the elevation of the water table within the extraction area. In other words, the controlling factors for the water table along the creek in this area are: 1) the amount of water infiltrating into the ground; and, 2) the elevation of the till south of the creek. Water will enter into the groundwater system along the creek, but in order to move southward toward the extraction area that water must move over or through the till unit. This directs most water along the channel and maintains the seasonal water table elevations in this area.

The water table within the extraction area is controlled by the inflow of water from the till unit to the east and (through or over) the till unit along the creek; and, the limit on outflow imposed by the till ridge west of Letson Road. The extraction proposal includes a drain system that will allow groundwater to flow west across the ridge. However, the amount of water available to flow westward will be limited by the inflow of water into the sand and gravel unit from the surrounding till unit. Therefore, overall groundwater flow volumes from east to west are not expected to change. Although some water table lowering is expected within the sand and gravel unit, this change is not expected to affect the water table near the creek significantly. The spring water table along the creek will still be controlled primarily by the seasonal influx of recharge water and the position of the till unit along the channel. During summer conditions the water table is currently well below the stream channel along this reach and therefore at that time the creek is not sensitive to any potential small water table changes that may propagate through the till in this area.

In addition, the till unit that occurs to the east will also limit the extent of water table change. As noted in the March 2008 assessment report, the agricultural fields located immediately east of the site are reported to consist of till soils and the seasonal high water table is controlled by tile drains (that discharge into the northern creek).

Sincerely,



Andrew Pentney, P. Geo.
Hydrogeologist

Attached: Monitoring Update January 2009 (table, 2 pages)
 Figure 5 Update
 Figure 6 Update
 Interpreted Water Table - Fall 2007
 Interpreted Water Table - Spring 2008
 Local Cross-Section Locations
 Schematic Section B-B'
 Schematic Section C-C'

Date	Location / Water Level Elevation						
	DP2 GW	DP2 SW	DP3 GW	DP3 SW	DP4 GW	DP4 SW	Dug Well
TOC:	331.89	331.89	328.54	328.54	323.21	323.21	335.66
13-Jun-06	330.68	330.98	#N/A	#N/A	#N/A	322.49	334.03
26-Jul-06	330.44	330.98	327.73	327.53	322.40	322.39	333.99
17-Aug-06	330.38	330.98	327.69	327.53	322.31	322.31	#N/A
11-Sep-06	330.41	330.98	327.79	327.56	322.35	322.33	#N/A
25-Nov-06	330.86	331.03	328.08	327.62	322.50	322.52	#N/A
13-Dec-06	330.99	331.09	328.23	327.74	322.69	322.68	334.07
18-Jan-07	330.75	331.01	327.98	327.64	322.60	322.57	#N/A
12-Feb-07	330.65	330.96	327.93	327.57	322.51	322.51	#N/A
13-Mar-07	330.58	330.95	327.76	327.56	322.43	322.41	#N/A
25-Apr-07	330.77	330.98	328.12	327.59	322.96	322.94	#N/A
24-May-07	330.60	330.95	327.99	327.54	322.68	322.66	#N/A
29-Jun-07	330.40	330.95	327.74	327.53	322.41	322.39	#N/A
27-Jul-07	330.52	330.96	327.62	327.53	322.34	322.32	#N/A
31-Aug-07	330.40	330.97	327.56	327.54	322.24	322.24	#N/A
25-Sep-07	330.38	330.97	327.52	327.52	322.17	dry	#N/A
17-Oct-07	330.44	330.97	327.49	327.49	322.12	dry	#N/A
28-Nov-07	330.50	330.98	327.47	327.49	322.05	dry	#N/A
27-Dec-07	330.59	330.97	327.49	327.49	322.08	dry	#N/A
29-Jan-08	330.79	330.99	327.56	327.53	322.56	322.58	#N/A
25-Feb-08	330.94	331.04	fr	fr	322.71	322.69	#N/A
28-Mar-08	331.05	330.95	328.09	327.61	322.97	322.97	#N/A
23-Apr-08	330.90	331.05	328.27	327.59	323.08	310.21	#N/A
27-May-08	#N/A	331.02	327.93	327.57	322.75	322.73	#N/A
26-Jun-08	330.45	331.00	327.71	327.54	322.52	322.53	#N/A
24-Jul-08	330.65	331.02	327.70	327.56	322.36	322.38	#N/A
26-Aug-08	330.36	330.98	327.59	327.53	322.29	322.33	#N/A
24-Sep-08	330.48	330.98	327.59	327.53	322.31	322.33	#N/A
23-Oct-08	330.48	330.98	327.54	327.55	322.27	322.28	#N/A
20-Nov-08	330.89	331.05	327.71	327.64	322.27	322.29	#N/A
17-Dec-08	330.97	331.07	327.88	327.68	322.45	322.48	#N/A
Notes: GW = groundwater, SW = surface water #N/A = not available, not yet installed, no measurement possible or none taken fr = frozen							

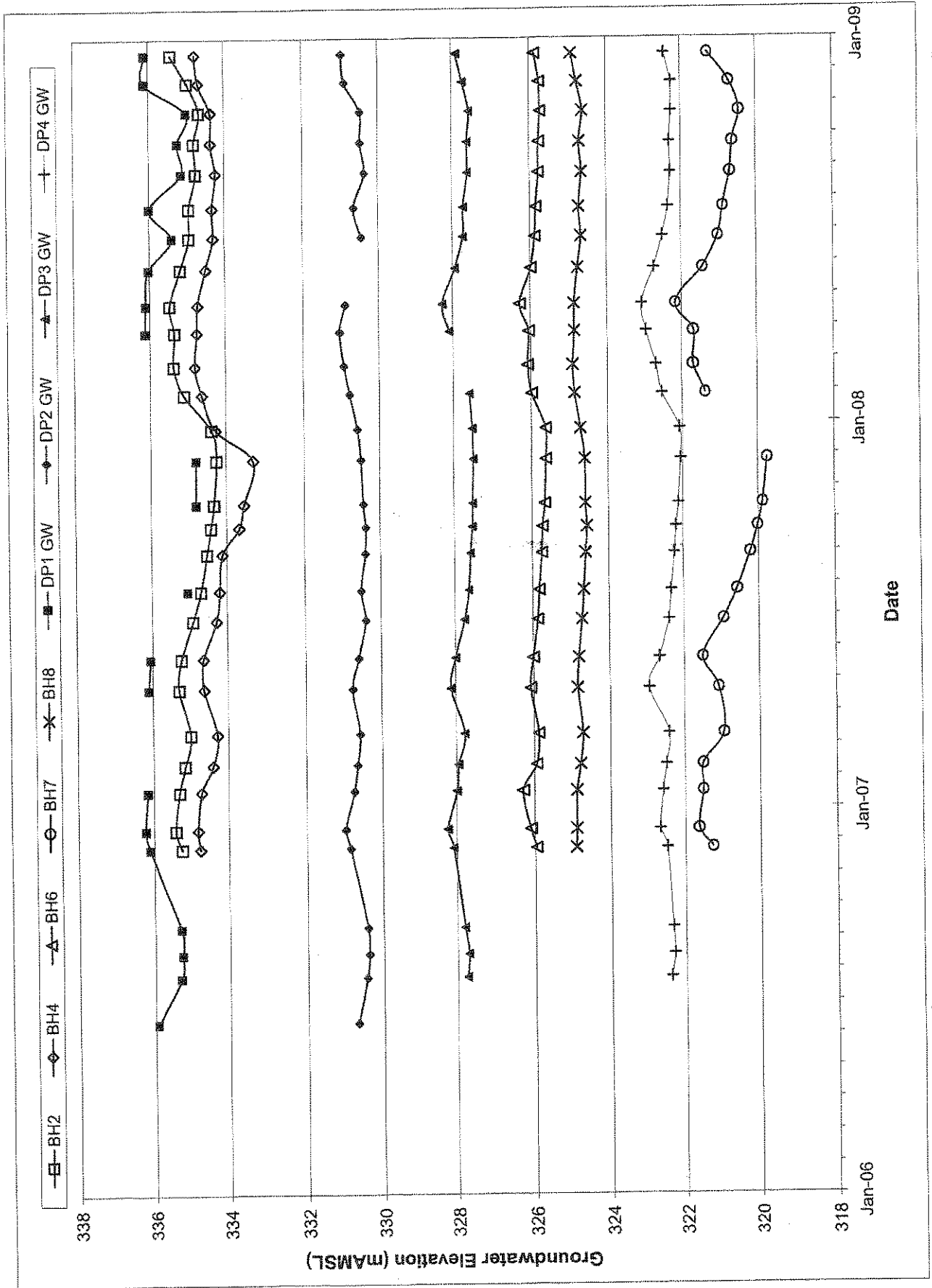
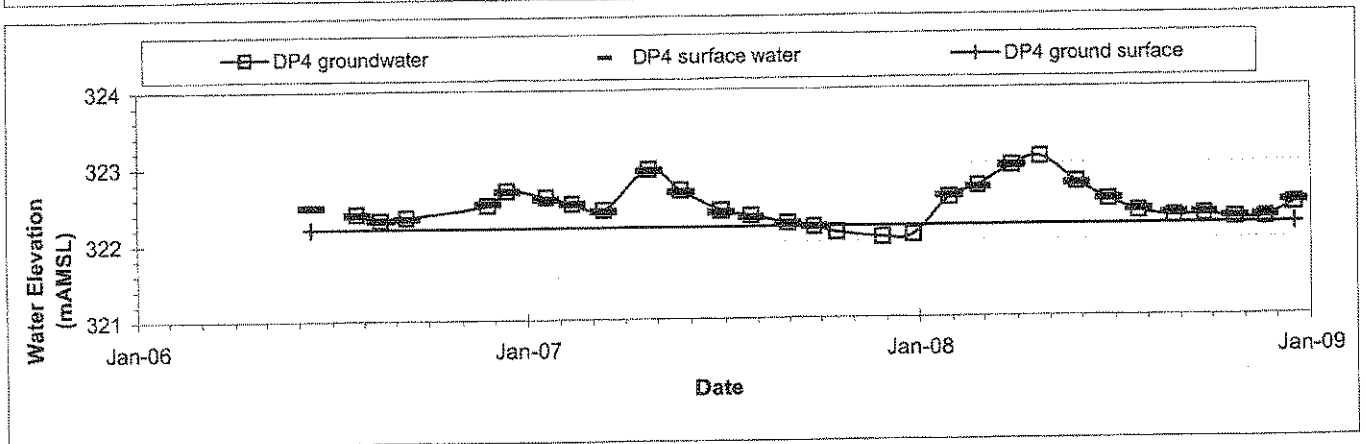
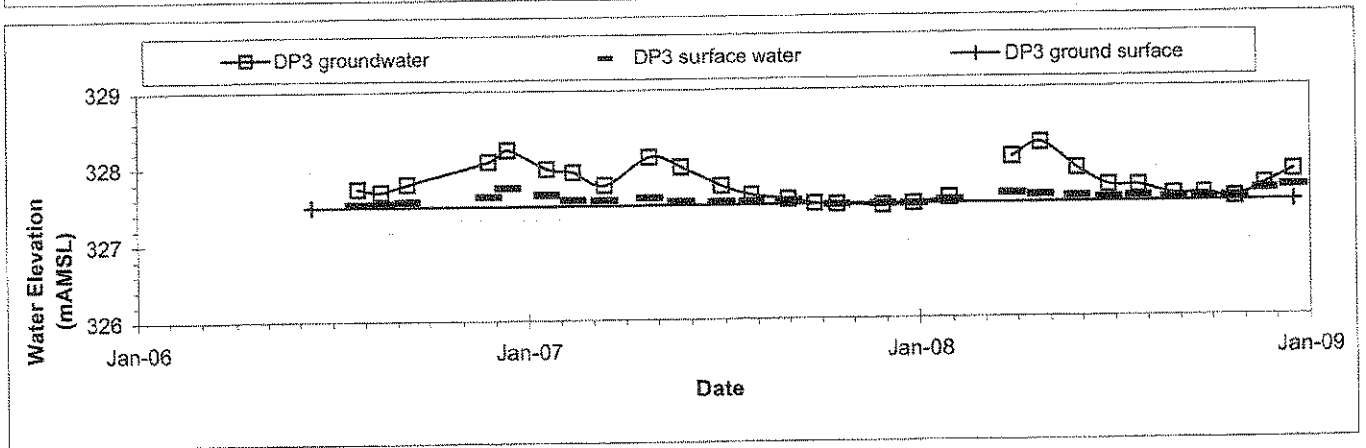
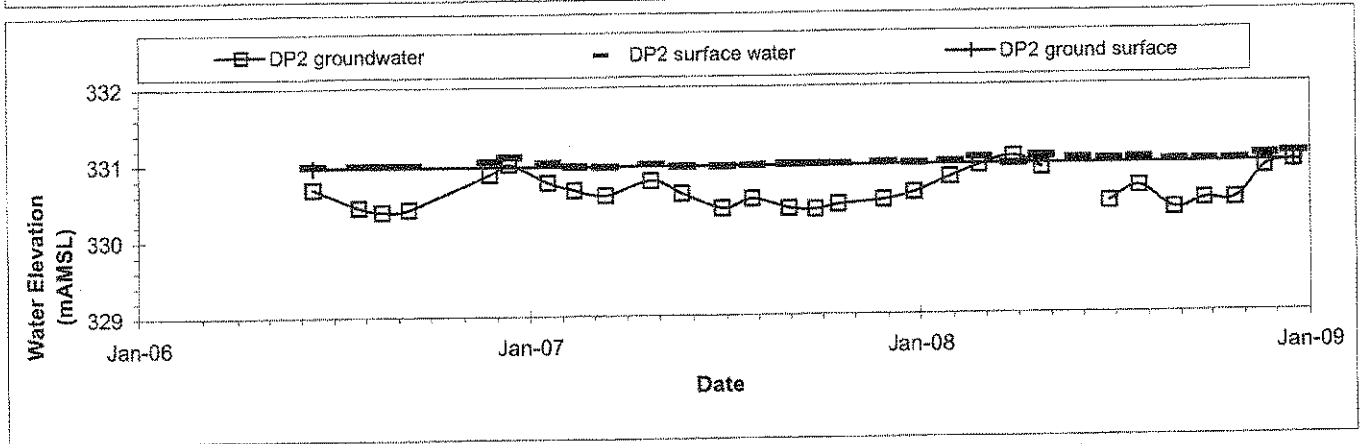
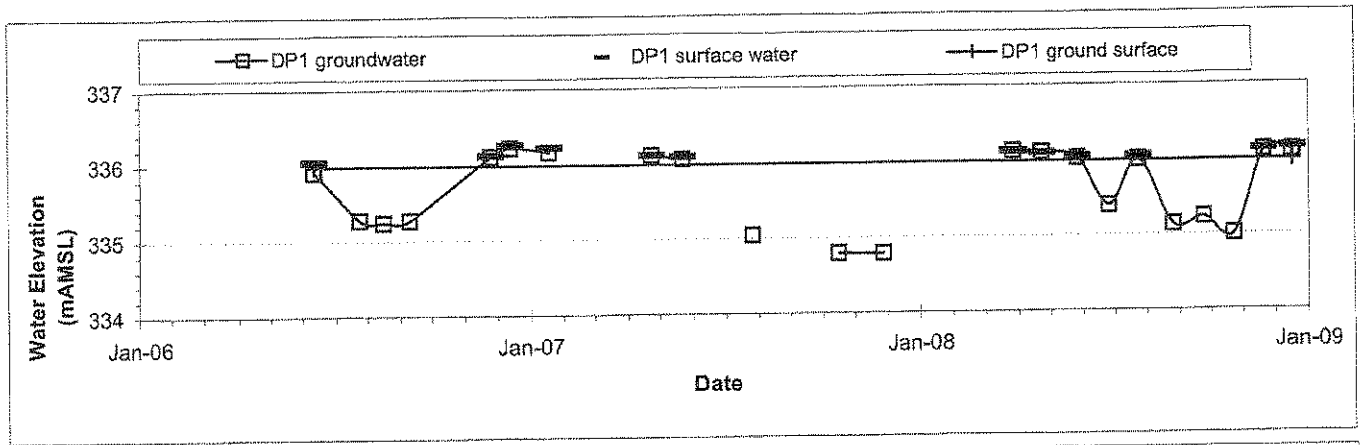
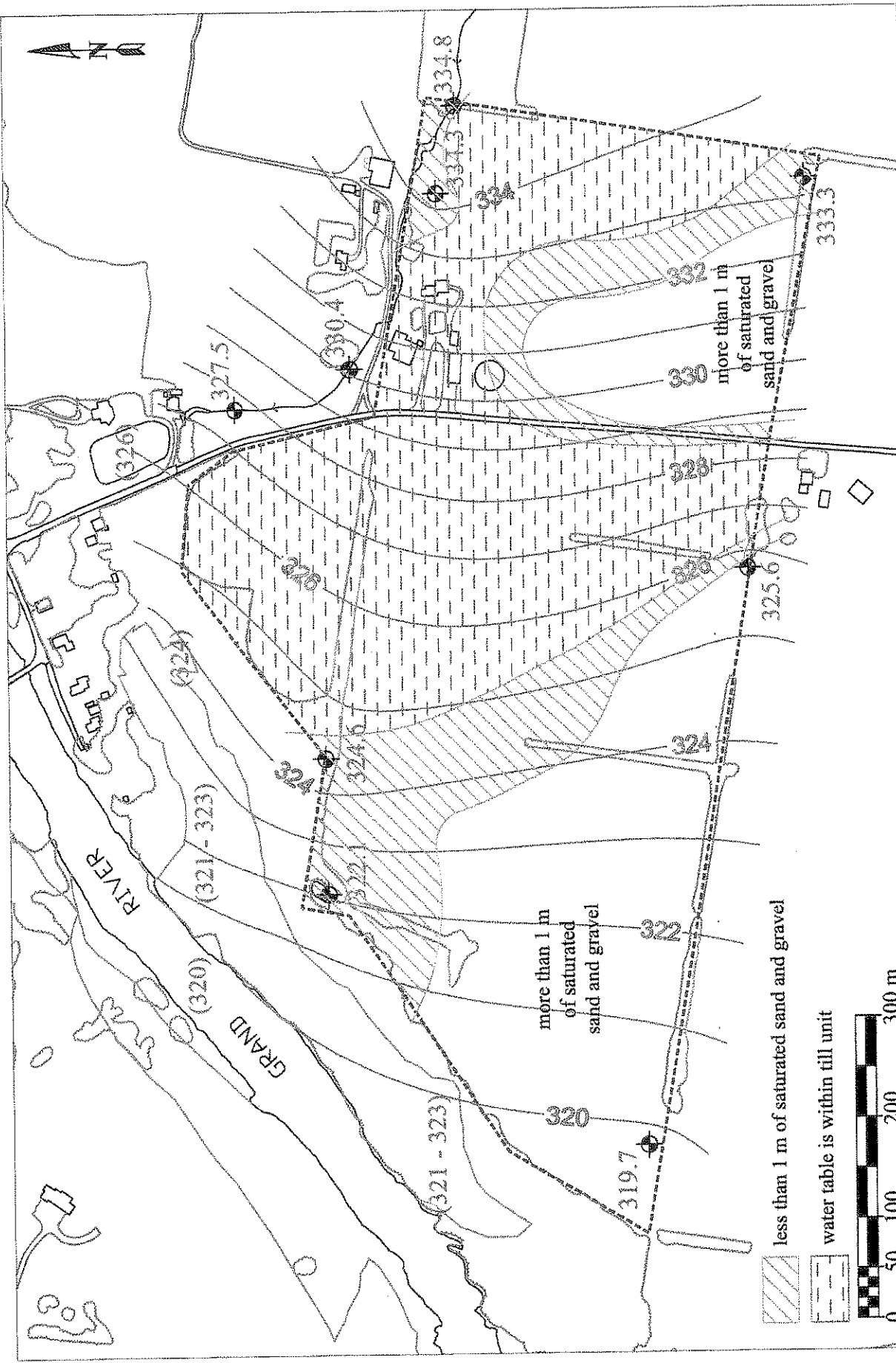
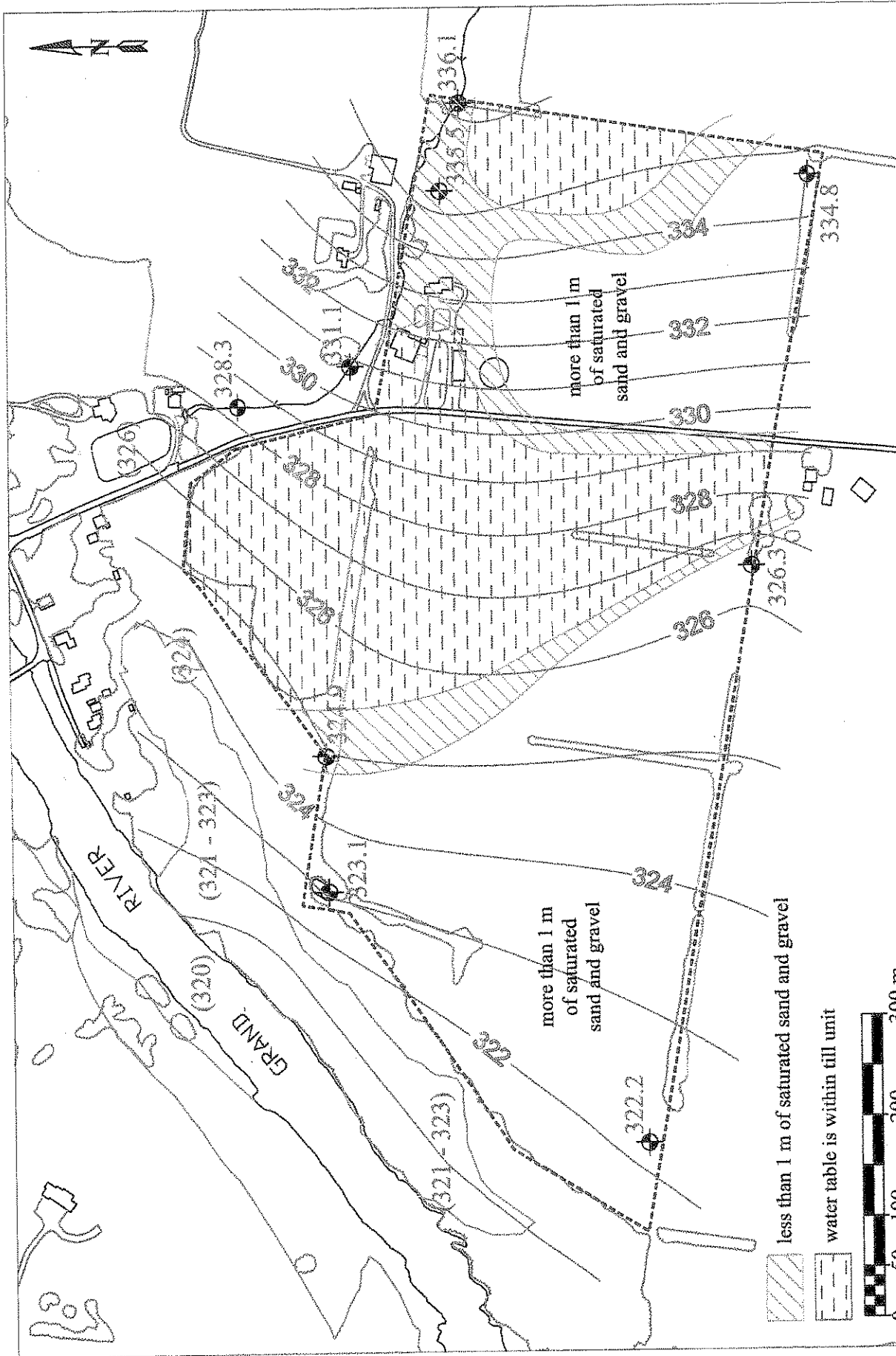


Figure 5 Update: Water Level Hydrograph



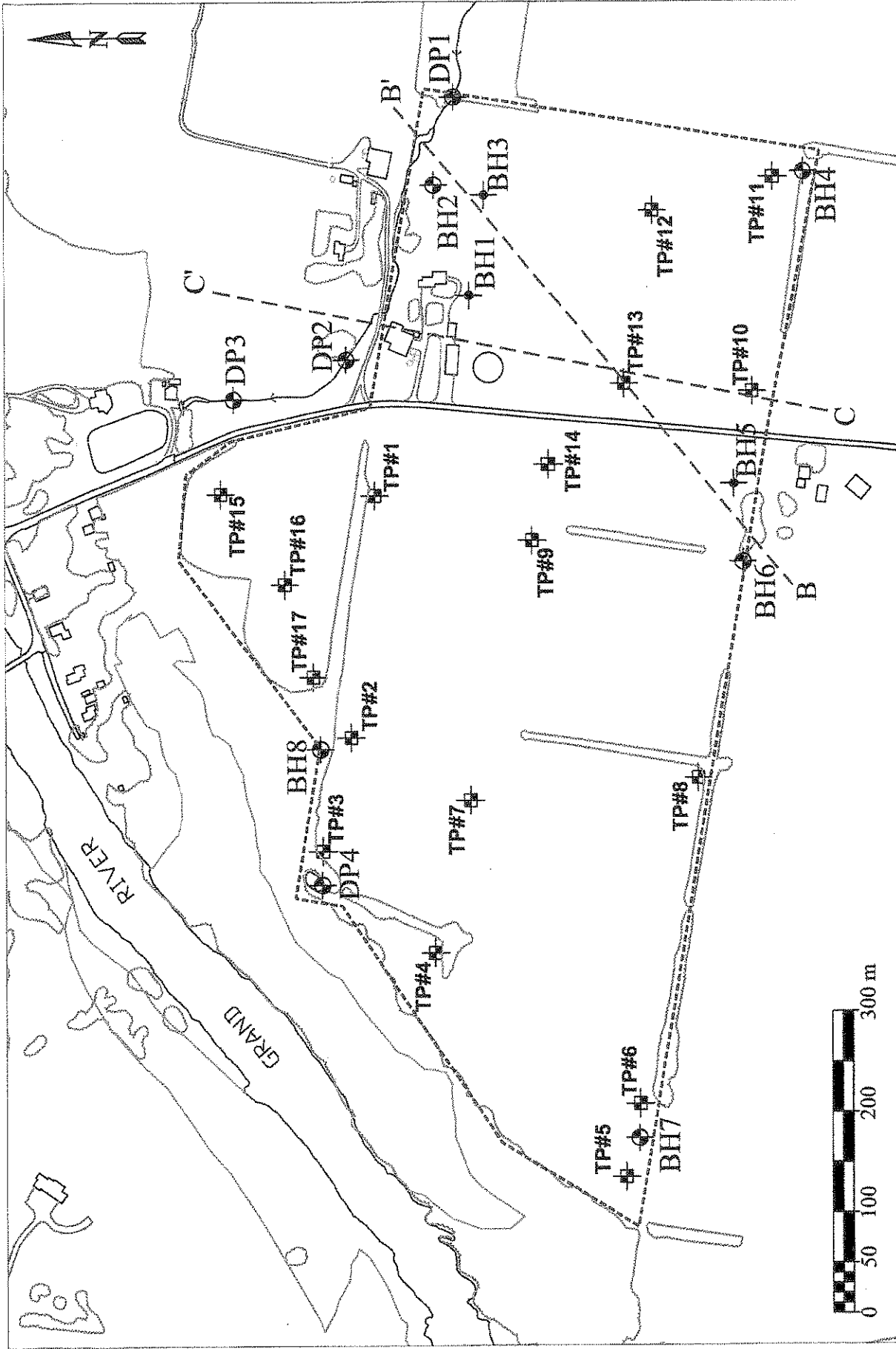


<p>data point location</p> <p>Fall 2007 (low) water table elevation (mAMSL)</p> <p>estimated surface water elevation (mAMSL)</p> <p>interpreted water table elevation contours (interval shown, mAMSL)</p> <p><small>modified from: Site Plan (Harrington Hoyle Ltd.), and, 1:10,000 OBM Mapping UNDER LICENSE, WITHOUT PREJUDICE OR ENCROACHMENT FROM THE QUEEN'S PRINTER OR OFFICER</small></p>		<p>Scale: as shown</p> <p>Date: January 2009</p> <p>Hydrogeologic Assessment</p> <p>Groundwater Science Corp.</p>
<p>Interpreted Water Table Elevation - Fall 2007</p> <p>Capital Paving Inc. Proposed Montrose Pit</p> <p>Part of Lots 74 and 75, Concession GCT</p> <p>Township of Woolwich, Region of Waterloo</p>		



<p>data point location</p> <p>Spring 2008 (high) water table elevation (mAMSL)</p> <p>estimated surface water elevation (mAMSL)</p> <p>interpreted water table elevation contours (interval shown, mAMSL)</p>		<p>Scale: as shown</p> <p>Date: January 2009</p> <p>Hydrogeologic Assessment</p> <p>Groundwater Science Corp.</p>		<p>Interpreted Water Table</p> <p>Elevation - Spring 2008</p> <p>Capital Paving Inc. Proposed Montrose Pit</p> <p>Part of Lots 74 and 75, Concession GCT</p> <p>Township of Woolwich, Region of Waterloo</p>	
<p>320.4</p> <p>(324)</p>	<p>less than 1 m of saturated sand and gravel</p>	<p>0 50 100 200 300 m</p>	<p>more than 1 m of saturated sand and gravel</p>	<p>320.4</p> <p>(324)</p>	<p>328.3</p>
<p>322.2</p>	<p>water table is within till unit</p>		<p>more than 1 m of saturated sand and gravel</p>	<p>323.1</p>	<p>330</p>
<p>324.3</p>			<p>more than 1 m of saturated sand and gravel</p>	<p>326.3</p>	<p>332</p>
<p>326.3</p>			<p>more than 1 m of saturated sand and gravel</p>	<p>328.3</p>	<p>334</p>
<p>328.3</p>			<p>more than 1 m of saturated sand and gravel</p>	<p>331.1</p>	<p>336.1</p>
<p>331.1</p>			<p>more than 1 m of saturated sand and gravel</p>	<p>335.5</p>	
<p>335.5</p>			<p>more than 1 m of saturated sand and gravel</p>	<p>336.1</p>	

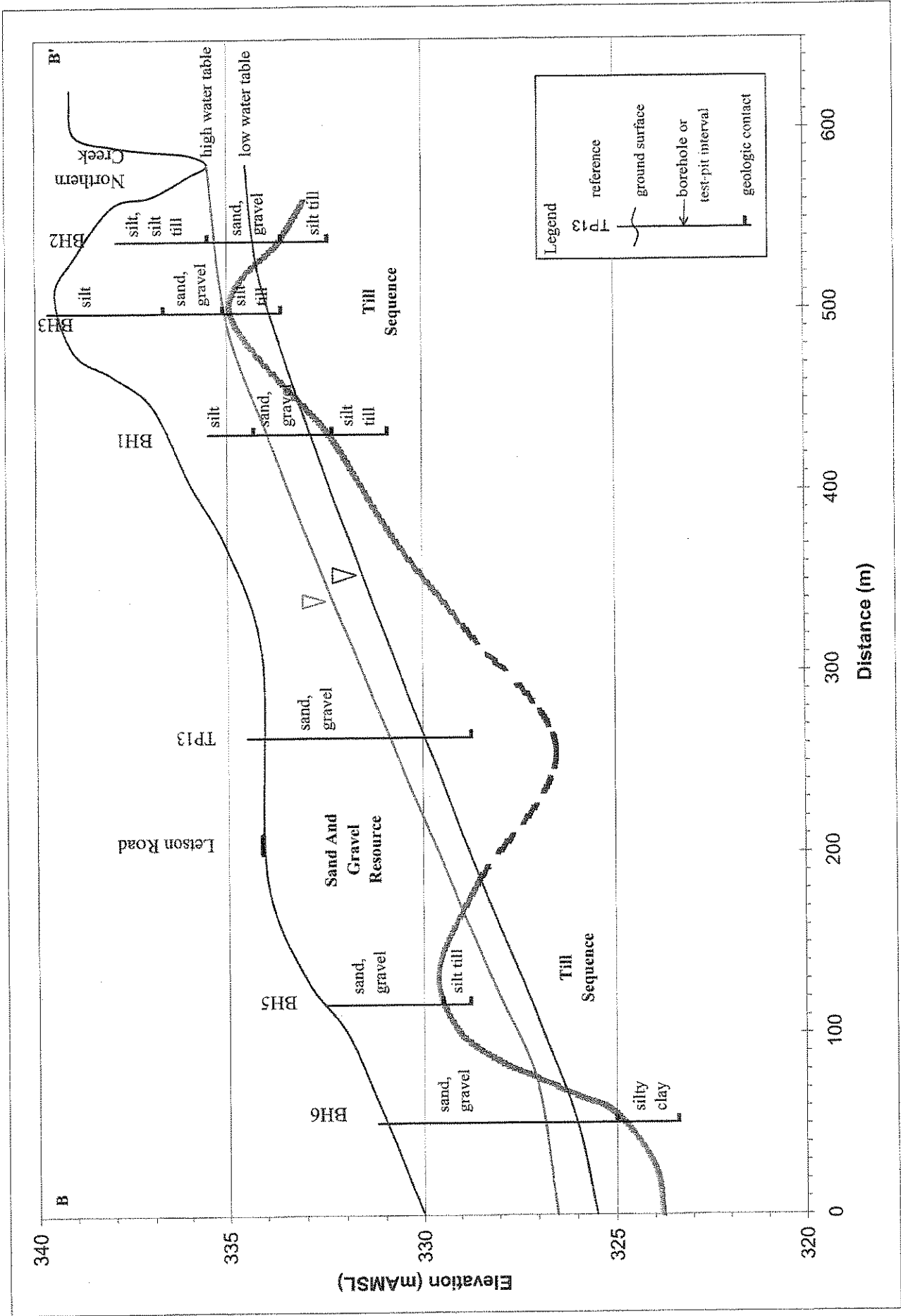
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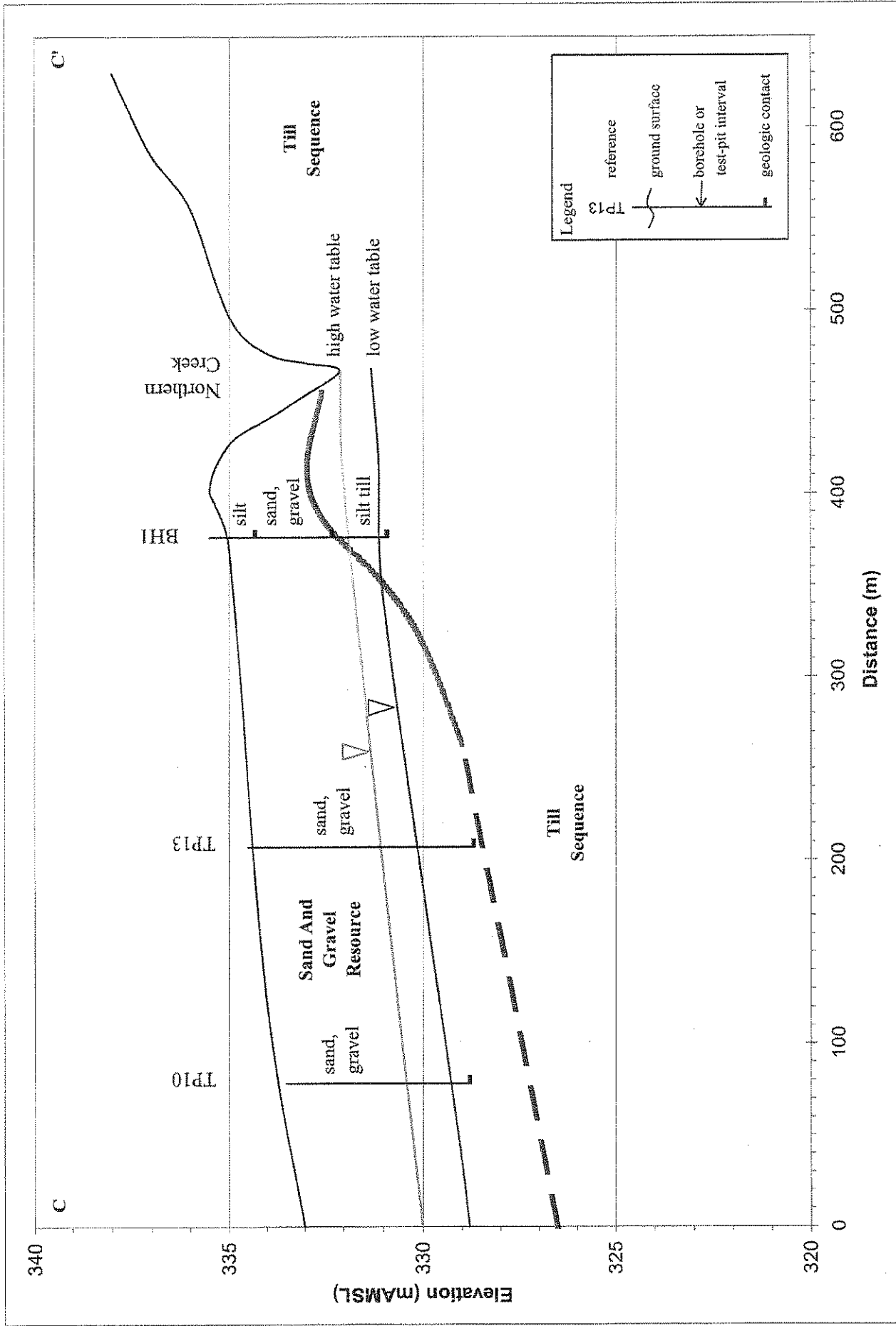


Scale: as shown Date: January 2009		Local Cross-Section Locations	
		Capital Paving Inc. Proposed Montrose Pit Part of Lots 74 and 75, Concession GCT Township of Woolwich, Region of Waterloo	
Hydrogeologic Assessment		<i>Groundwater Science Corp.</i>	

- data point location
- cross-section location
- cross-section location

modified from: Site Plan (Harrington Hoyle Ltd.) and 1:10,000 OBM Mapping
 UNDER LICENSE, WITHOUT PREJUDICE OR ENCROACHMENT FROM THE QUEEN'S PRINTER OF ONTARIO





Ministry of
Natural Resources

Ministère des
Richesses naturelles

Guelph District
1 Stone Road West
Guelph, Ontario
N1G 4Y2

Telephone: (519) 826-4855
Facsimile: (519) 826-4929



October 15, 2008

COPY

Capital Paving Inc.
P.O. Box 815
Guelph, ON
N1H 6L8

Dear Mr. Toth:

**Re: Application for Category 1, Class "A" Pit License
Capital Paving Inc., Montrose Pit
Part of Lots 71, 74 & 75, Concession G.C.T.
Township of Woolwich, Region of Waterloo**

Ministry staff has completed their technical review of Capital Paving Inc.'s application for a Category 1, Class A (pit below water) licence under the *Aggregate Resources Act* and offer the following comments for consideration.

Hydrogeologic Assessment

The report states that the till underlying the gravel/sand deposit controls the local water table elevation and overall pattern of shallow groundwater flow; the till surface directs the groundwater flow towards the river and wetland, as well as towards the north creek. Although the till layer is not to be extracted, the report does discuss the installation of a drain (gravel conduit) in the vicinity of BH6 that will involve the removal of some till. Ministry staff would like clarification on the purpose of this drain and whether or not it will markedly change the groundwater flow pattern such that water will be directed away from the riverine wetland.

Although no direct evidence of groundwater discharge in the riverine wetland was documented by the consultant, Ministry staff note that the wetland is down gradient of the cattle pond which does receive water from groundwater flow. It is therefore likely that discharge to the wetland occurs, although this discharge may be quite diffuse. Recognizing that groundwater flows to the river on top of the till or in the till and that there could be a significant groundwater contribution to the wetland, the Ministry would like clarification on the potential impacts of gravel removal on the flow regime to the wetland. This should include discussion of the potential for a reduction in infiltration into the till, which could result in a lack of water to be held in the till and less water flowing to the wetland in times of low water. The potential for increased siltation in the wetland as a result of a reduced impediment to infiltrating water after the gravel has been removed should also be discussed.

Ministry staff would like the consultant to comment on whether or not an infiltration gallery may be required between the site and the river to induce groundwater into the till.

Extraction at the site will remove approximately 4% of the catchment area for the north creek. Staff would like clarification on whether or not the till elevation will be altered and if groundwater will continue to flow on top of the till to the north creek after extraction. Staff also suggests that the catchment for the north creek should be verified; further comments on this issue are provided below.

The report indicates that Regional Road 23 is a drainage divide. A review of ortho-photos shows that the intermittent tributary at the north end of the site is continuous with a tributary of Cox Creek that appears to flow from west to east. This watercourse is conveyed through a culvert under Regional Road 23 east of the site. The Ministry suggests that flow patterns should be reviewed to ensure the drainage divide and resulting catchment area(s) have been accurately identified. An illustration to show the surface catchment of the north creek (tributary east of Letson Dr.) before and after extraction would be helpful. If the catchment area for this creek has been calculated improperly a much greater percent of the overall catchment may be affected by the re-grading plan.

Ministry staff suggests the report seems to contain some conflicting statements about hydraulic gradients along the north creek. In section 4.2 it is noted that some groundwater discharge indicators were observed between the lane and DP2. In section 4.4 it is stated that the hydraulic gradient at DP2 is downward, indicating recharge conditions. In section 5.0, it is noted that some groundwater discharge occurs seasonally between DP2 and DP3.

The report also states that continuous flow in the tributary likely only occurs near the confluence with the Grand River, downstream of the concrete line pond. Based on personal observations of Ministry staff of the channel downstream of the pond, it is suggested that this section of creek normally contains flow. Staff would appreciate some clarification on the consultant's interpretation of conditions along the north the creek.

Ministry staff notes that very dry summer conditions occurred in 2007. Staff would like the consultant to comment on whether or not the water level/flow measurements taken in 2006/2007 and used in the analysis can reasonably be considered to represent 'average' conditions for the site.

Under section 8.1.6, the report comments on thermal impacts. Staff notes that the fact that the Grand River adjacent to the site is not classified as 'coldwater', does not necessarily mean there will be no thermal impacts to surface water features. Cold and coolwater tributaries and groundwater discharge that enter the Grand River downstream help to modify river water temperatures which in turn contribute to the health of the aquatic environment. In this regard, maintenance of the existing conditions of groundwater leaving the site is important. The Ministry would like the consultant to provide a more detailed discussion on the potential for thermal impacts on surface water features to occur as a result of extraction to within 0.5 m of the water table over most of the site. This should also include comments on how a 0.5 m separation will be maintained recognizing that the water table fluctuates.

Level II Natural Environment Technical Report

As noted above, Ministry staff has observed regular flow in the north creek downstream of the constructed pond to the Grand River. In section 4.3, it is stated that this portion of the creek is

considered intermittent but likely offers seasonal fish habitat. Further discussion on this section of the creek should be provided, including a discussion on where the water (regular flow) originates if the creek upstream of the pond is intermittent. An illustration showing the habitat features described here would be helpful in understanding where the stream is dry and where it is not.

Under section 4.3.1, Ministry staff notes that Rainbow Mussel has also been collected both upstream and downstream of the site in the Grand River. This species is considered Threatened in Ontario.

In the project description provided in section 6.0, it is indicated that two 'protrusions' of the woodland on the west side of the site occur within the proposed extraction area. Ministry staff notes that these two areas appear very small relative to the overall extraction area and would appreciate further comments from the consultant on the rationale for their inclusion in the extraction area. Similarly, staff would like clarification on the proposed filling of the cattle pond in the northwest of the property, recognizing that this feature is not within the extraction area and that the pond provides some habitat for amphibians and adds diversity to the nearby wetland area.

Under the discussion of impacts provided in section 7.1 it is indicated that the changes in groundwater levels that will result from extraction will not affect the north creek (intermittent tributary east of Letson Drive). From statements provided earlier in the report and in the hydrogeologic report, the Ministry understands that some groundwater discharge occurs at various locations along the creek. As such, the Ministry would like the consultant to provide further discussion on the potential impacts to this feature as a result of the expected changes in the groundwater regime.

During a site visit, Ministry staff observed American (Common) Hackberry (*Celtis occidentalis*) in a portion of vegetation community FOD2-5 that is to be removed during extraction of the site. This species was not identified in the report. This species is ranked S4, and its occurrence on the site may be of local significance and interest to the Township or Woolwich and/or Regional Municipality of Waterloo.

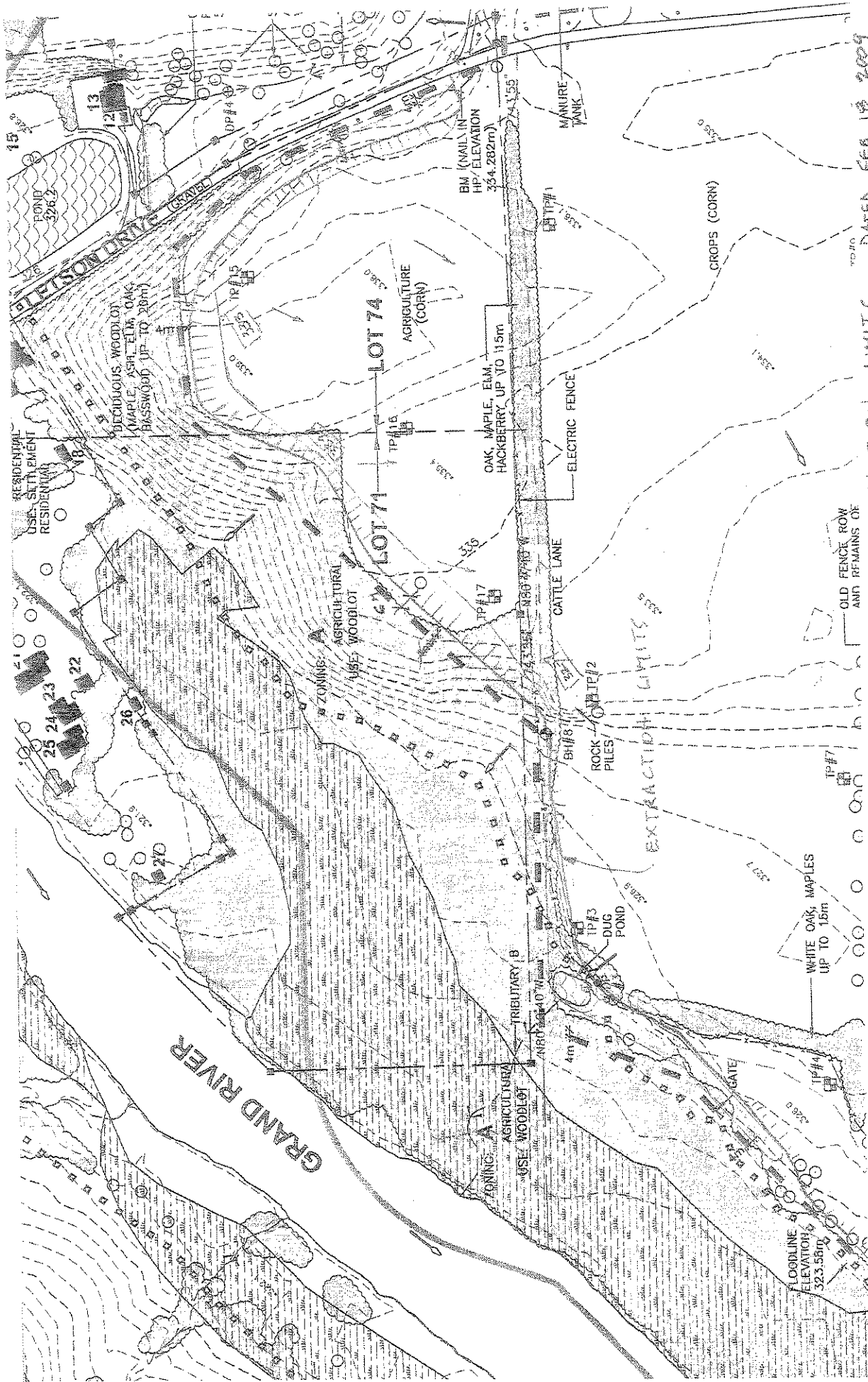
In light of the comments provided above, the Ministry is not in a position to support the proposed licence at this time. Staff would appreciate a receiving a response to the issues raised above. Please contact the undersigned if you have questions or if any clarification is required.

Sincerely,



Mike Stone
District Planner

Cc: Diane Schwier, MNR



DATED FEB. 18 2009

REVISION EXTRACTION LIMITS