

Proposed Gravel Pit - Onoway Area

Groundwater - Technical Review

06-055-01 W5M

Sureway Construction Management Ltd.

Prepared by
hydrogeological consultants ltd.
1-800-661-7972
Our File No.: **08-913.00**

August 2008

PERMIT TO PRACTICE

HYDROGEOLOGICAL CONSULTANTS LTD.

Signature  _____

Date 14 August 2008

PERMIT NUMBER P 385

The Association of Professional Engineers,
Geologists and Geophysicists of Alberta

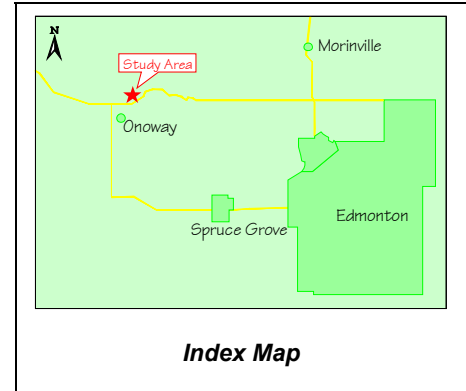
Sureway Construction Management Ltd.
 7331 - 18 Street
 Edmonton, AB T6P 1P9

Our File No.: 08-913.00

Attn: Ben Eustace

Re: Proposed Gravel Pit - Onoway Area

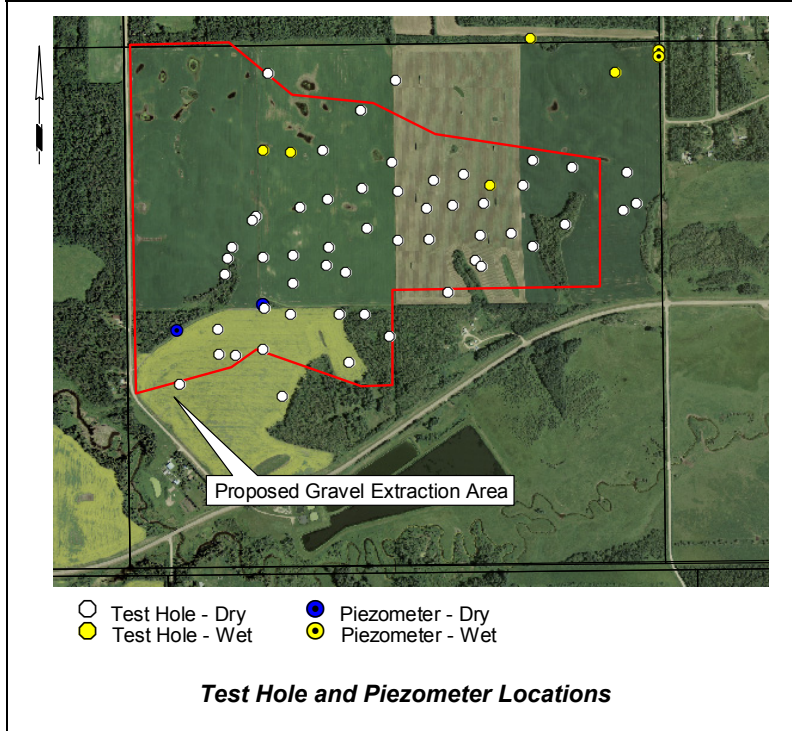
Yellowhead Aggregates (a division of Sureway Construction Management Ltd.) is proposing to develop a gravel pit in the Onoway area within Section 06-055-01 W5M. Local residents have expressed concern over the development of the gravel pit, and the effect the gravel mining will have on the groundwater resources. Hydrogeological Consultants Ltd. (HCL) were retained to review the existing hydrogeological data for the area and offer an opinion on the impact gravel mining would be expected to have on the local groundwater resources.



Index Map

Previous Work

In November 1998, Canadian Geological Augers drilled 58 test holes to depths ranging from 7.9 to 22.3 metres below ground surface, and completed four piezometers in 06-055-01 W5M. The locations are shown on the map below.



Test Hole and Piezometer Locations

Results

Sand or gravel deposits encountered during the drilling of the 58 test holes ranged from 0.6 to 8.5 metres below ground surface.

The bedrock surface was encountered during the drilling of 56 of the 58 test holes. Groundwater was encountered in five of the 58 test holes, and in two of the four piezometers, as shown in yellow on the adjacent map¹. Three of the five test holes where groundwater was encountered are located within the northern part of the proposed gravel extraction

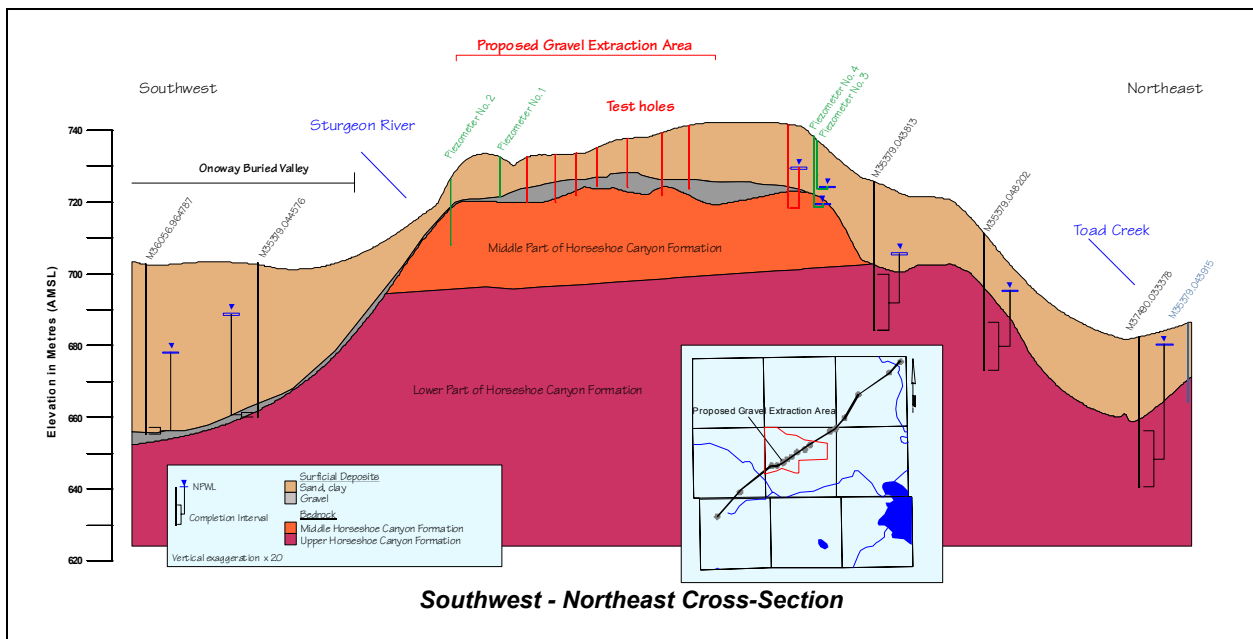
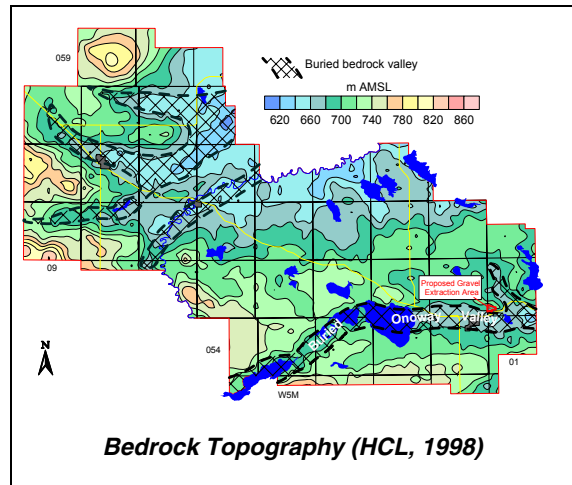
area.

¹ Data are available on-line at www.groundwatercentre.com

The three test holes that report groundwater within the proposed extraction area have a lower permeability material between a sand layer and the gravel to be extracted. The lower permeability material inhibits the downward flow of groundwater to the gravel deposit, allowing groundwater to accumulate in the sand layer. Where the low permeability material is absent, groundwater flows downward to the gravel deposit and flows south out of the proposed extraction area along the bedrock surface.

The Regional Groundwater Assessment prepared for the County of Lac Ste. Anne² shows that the proposed gravel extraction site is located adjacent to the Onoway Buried Valley.

The proposed gravel extraction site is shown on the cross-section below. The cross-section goes through five water wells, **one flowing shot hole**, **four piezometers**, and **eight test holes**. The cross-section identifies the gravel to be extracted on the bedrock high overlying the middle part of the Horseshoe Canyon Formation. The southwestern part of the cross-section passes through the Onoway Buried Valley, a significant regional aquifer. The cross-section shows that the water level in the Onoway Aquifer is more than 30 metres below the elevation of the gravel to be extracted. Two of the five water wells shown on the cross-section are completed in the Onoway Aquifer. At all other places, the gravel was not saturated. The three remaining water wells shown on the cross-section, located northeast of the proposed gravel pit, are completed in the upper bedrock.



² Hydrogeological Consultants Ltd. 1998. Lac Ste. Anne County. Regional Groundwater Assessment - Final. Parts of the North Saskatchewan and Athabasca River Basins. Parts of Tp 053 to 059, R 01 to 09, W5M. — (unpublished contract report -) [97-112.02]

The water level was measured in Piezometer Nos. 3 and 4 on 21 May 08, on 07 Jul 08, and on 06 Aug 08. From 21 May 08 to 06 Aug 08, the water level in Piezometer No. 3 declined a total 0.7 metres; over the same time frame, the water level in Piezometer No. 4 declined a total of 1.0 metres.

Interpretation

Spatially, the proposed gravel pit is on a topographically high area. Based on the local hydrogeology, there are no barriers to drainage of the gravel, as is indicated by the gravel deposit not being saturated. The presence of wet sand overlying a low permeability material causes local capturing of groundwater that can not be rapidly drained by the gravel layer overlying the bedrock surface. The decline of the water level in the piezometers suggests that saturation may be a seasonal phenomenon.

Because the gravel deposit is not saturated, it is unlikely to have a significant effect on groundwater recharge to local aquifers. Therefore, removal of the gravel is not expected to have any negative impact on groundwater availability either locally or regionally.

Conclusion

A review has been made of the hydrogeological information available in and around the proposed gravel pit in parts of 06-055-01 W5M. Based on the review, the gravel extraction is not expected to have a negative impact on the local groundwater resources.

Yours truly,



Gill Poulter, P. Geol.
Project Hydrogeologist