



**CONESTOGA-ROVERS
& ASSOCIATES**

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June 26, 2009

Reference No. 002012

Mr. Nile Fellows
MINNESOTA POLLUTION
CONTROL AGENCY
Superfund Unit 1
520 Lafayette Road
St. Paul, Minnesota 55155-4194

Mr. Frederick K. Campbell
MINNESOTA POLLUTION
CONTROL AGENCY
Superfund Unit 1
520 Lafayette Road
St. Paul, Minnesota 55155-4194

Dear Sirs:

Re: Response to MPCA Comments
2008 Annual Monitoring Report
Highway 96 Site
White Bear Township, Minnesota

Conestoga-Rovers & Associates (CRA), on behalf of Reynolds Metals Company and Whirlpool Corporation (Highway 96 Group), submits the following responses to comments set forth in the Minnesota Pollution Control Agency's (MPCA) letter, dated May 26, 2009, regarding the 2008 Annual Monitoring Report (CRA; March 2009) for the Highway 96 Site in White Bear Township, Minnesota (Site).

MPCA's and Wenck Associate's comments are set forth in italics below, followed by the Highway 96 Group's responses in standard type.

A compact disc (CD) is attached with an updated 2008 Annual Monitoring Report that addresses the comments presented below.

MPCA COMMENTS

Comment 1:

Page 8, It should be noted that as part of the Long Term Monitoring Program, directional boring under Gilfillan Lake was approved and is dependent on receiving access from the property owners. A current status report on obtaining access should be given.

Response

On June 1, 2009, CRA sent a letter to the MPCA, on behalf of the Highway 96 Group, that summarizes the Group's effort to obtain access for the angle well installation. Despite these efforts, the Highway 96 Group has been unable to obtain access from the property owners.

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Comment 2:

Page 14, Add "eliminating this well from further sampling" to the last sentence on the page.

Response:

The phrase will be added to this sentence.

Comment 3:

Page 19, 2nd bullet; The text refers to two total Volatile Organic Compounds (VOCs) peaks on Figure 3.8 (EW1/EW1A) in 2006 and 2008; however, according to the horizontal time scale, the two peaks appear to be in 2007 and 2009. The report indicates that the peaks are due to increased Trichloroethylene (TCE) concentrations, and interprets that "(t)he increased TCE concentrations are attributed to delayed migration from the CWA." CRA should provide more detailed explanation for these peaks and for the concept of "delayed migration".

Response:

The two TVOC peaks for EW1/EW1A are for the sample dates of October 18, 2006 and December 22, 2008. Please note, the tick marks for each particular year represent the starting point (i.e., January) for that year.

As mentioned in the text, these peaks are attributed to increased TCE concentrations brought on by delayed migration from the CWA. The concept of delayed migration refers to a later release of VOCs to the water table aquifer. The CWA is located above a perched groundwater unit that is hydraulically isolated from the regional water table aquifer such that the downward migration of VOCs to the water table aquifer occurs through a zone of partially saturated soil.

The rate of downward migration through this partially saturated zone is substantially less than under saturated soil conditions and is dependent on several variable parameters, such as moisture content, soil permeability, and pressure head. Hence, the downward migration rate and time required to reach the water table aquifer can vary both spatially and temporally underneath the CWA. Once the VOCs reach the water table aquifer, they are captured by the Highway 96 groundwater extraction wells EW1A and EW2.

The text has been revised to provide further explanation on the term delayed migration.

Comment 4:

Page 19, 3rd bullet; The report discusses the total VOCs results for MW12D, but does not mention a sharp peak (400 ug/L) in 1997, or a possible explanation for that peak. This peak seems unusual, given the fact that total VOC concentrations since 1997 have remained below 3 ug/L. Perhaps the lower total VOC concentrations since 1997 are due to the operation of the extraction system.



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Response:

The single TVOC peak observed at MW-12D occurred in October 1996. CRA has no explanation for this TVOC peak except that the data are considered anomalous, because those levels have never been reported at that location before or after that sample date. The text will be revised to identify that data peak as an anomalous value.

Comment 5:

Pages 26 and 27, New Residential Well Installations; The text does not mention the residents' requests for new wells in the Jordan aquifer. The report only indicates that installation of new residential wells at 13 West Shore Road and 2 Hummingbird Hill is currently in progress (March 2009). It should be noted that agreements were reached with the homeowners at 2 Hummingbird Hill and 13 West Shore Road to install Jordan aquifer wells.

Response:

The text for both of the new residential wells will be revised as follows:

In January 2009, the homeowners at 13 West Shore Road agreed to allow installation of a new residential well. Installation of the new residential well at 13 West Shore Road was conducted in February and March 2009. As part of that well installation, the homeowners decided, at their own expense, to have the new residential well advanced into the underlying Jordan Sandstone aquifer for their drinking water source.

In January 2009, the homeowners at 2 Hummingbird Hill accepted Whirlpool's and Reynolds' voluntary offer to install a new residential well. Installation of the new residential well at 2 Hummingbird Hill was conducted in March 2009. As part of that well installation, the homeowners decided, at their own expense, to have the new residential well advanced into the underlying Jordan Sandstone aquifer for their drinking water source.

WENCK ASSOCIATES COMMENTS

Comment 1:

Since the MPCA did not select a remedy for Operable Unit 4 (OU4) that eliminates the concerns of affected and potentially affected homeowners (i.e., municipal water supply), there is renewed interest in the effectiveness of the dump site groundwater extraction system (Groundwater System) to eliminate the migration of contamination. The City and its residents desire, and are interested to see proof, that the Groundwater System is preventing the migration of contamination (especially vinyl chloride) that could lengthen the time of concern for potential impacts to downgradient residential wells. Please explain how or where the different cleanup levels apply for vinyl chloride. With a lack of historical knowledge, it is



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unknown why the 1993 Minnesota Decision Document (MDD), and Amended Table 1, October 1994, selected a cleanup level of 2 µg/L for vinyl chloride versus the Health Risk Limit (HRL) of 0.2 µg/L. The MDD does not explain and Amended Table 1 merely notes that "the cleanup level for vinyl chloride was adjusted for Site specific reasons. It is not MCL based." The "Site specific reasons" are not explained. The MDD Amendment (2008) states that the "HRL is the cleanup standard used by the MPCA for vinyl chloride for OU4," which is defined by Figure 1 of the MDD Amendment as residential areas without municipal water. The footnotes for Appendix D in the 2008 AMR state that the "Site Cleanup Goals (SCGs) apply to on-Site monitoring wells and compliance wells in the Lower Sand and St. Peter Sandstone aquifers only." For vinyl chloride, the SCG is 2 µg/L. Thus, it could be interpreted that it is acceptable to have vinyl chloride concentrations less than 2 µg/L migrate past the Groundwater System towards residential wells to the west. Theoretically, the Groundwater System could be turned off when vinyl chloride concentrations are still above the HRL of 0.2 µg/L, but below the SCG of 2 µg/L. It is in the best interests of the City and its residents to have no vinyl chloride (or any contamination) migrate beyond this extraction system, but certainly no levels above the HRLs. The City and its residents are not happy to have to deal with contamination issues and have expressed the desire that the timeframe for dealing with the matter is as short as possible. Allowing vinyl chloride above HRL to migrate past the Groundwater System will extend the timeframe for concern about impacts to downgradient homes. If it is not already the case, it is recommended that the MPCA clarify (and enforce) that the HRL for vinyl chloride applies to the dump site groundwater extraction wells and compliance monitoring wells. Furthermore, it is recommended that the vinyl chloride analytical method be revised for the compliance wells to lower the reporting limit from 1 µg/L to 0.2 µg/L in order to demonstrate that vinyl chloride is not being allowed to migrate beyond the Groundwater System at concentrations above the HRL. The current data (see Appendix D.1 of the 2008 AMR) does not allow such a conclusion to be made.

Response:

The question was directed to the MPCA and, as such, CRA will let the MPCA provide the response. However, to add some background information on this issue, the SCG considered the role of natural attenuation on vinyl chloride migration, which included mechanical (e.g., dispersion) and biological (e.g., reductive dechlorination) processes as well as the distance to possible drinking water receptors.

As for changing the groundwater analytical method for vinyl chloride to a lower detection limit, this can be done if so directed by the MPCA. However, it should be noted that while the reporting limit (RL) for on-site monitoring well samples was 1.0 µg/L, the method detection limit (MDL) was 0.22 µg/L, which is just above the HRL value of 0.2 µg/L. Hence, any vinyl chloride detection between the RL and MDL would have been reported by the laboratory as an estimated (J) value. This analytical information shows that the Highway 96 groundwater extraction system is capturing vinyl chloride prior to leaving the site.



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Comment 2:

Page 14 of the 2008 AMR reports that "the sharp increase in TVOC concentrations at EW1A in 2006 and 2008 is due almost entirely to increased trichloroethene (TCE) concentrations. The TCE was not seen downgradient of the extraction system. Increased TCE concentrations are attributed to delayed migration from the CWA (Consolidated Waste Area)." Note that a similar increase is observed at perched groundwater well MW4U with TCE concentrations going from 4.9 µg/L in 1998 to 230 µg/L in 2006 (Appendix D.2). Please explain what is meant by "delayed migration" and the data used to support this statement. Since the 2008 AMR only shows TCE detections, and not all TCE data, it is difficult to verify the statement regarding downgradient wells (see Comment #4 below). The increasing TCE concentrations at and near the extraction system are not themselves a concern, but they place greater importance on the effectiveness of the extraction system to prevent further migration.

Response:

Please note the observed increase at MW4U was for vinyl chloride and not TCE.

The term delayed migration refers to the time required for VOCs to migrate from the perched groundwater unit to the regional groundwater table via unsaturated flow conditions (see our response to MPCA comment No. 2). The cause for this observed TCE increase at EW1A is uncertain as this is the only location to show high TCE concentrations. TCE will continue to be monitored and the effectiveness of the capture system will also continue to be evaluated.

WENCK ASSOCIATES SUGGESTIONS

Comment 3:

It is recommended that future AMRs include a brief discussion explaining the cleanup levels and where they apply, especially for vinyl chloride since there are two different cleanup levels and this contaminant represents the biggest concern to North Oaks residents (see Comment #1 above).

Response:

This discussion of clean-up levels and where they apply can be added to future AMR reports.

Comment 4:

It would be helpful if the report included a CD with the historical water quality data in a database or spreadsheet format. This would enable reviewers to search, sort, and evaluate the data. This could be as simple as providing Appendices D.1 to D.3 on a CD in addition to, or instead of, the current hard copy tables. It is recommended that the CD include all reported analytical parameters from the lab reports, not just selected parameters as presented in Appendices D.1 to D.3.



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Response:

CRA can submit to the MPCA a CD with the historical groundwater quality data. CRA requests that the MPCA tell us what particular format they would like the data submitted.

Comment 5:

While water quality data from downgradient wells is the best evidence for evaluating the effectiveness of the dump site groundwater extraction system, it would be helpful if the report included a table summarizing monthly average flow rates for the two extraction wells as another indicator of system performance. This would be further evidence to support conclusions that the Groundwater System is effectively preventing migration of contamination towards residential homes.

Response:

A table (Table 3.3) summarizing the monthly pumping rates for 2008 is attached and will be included in future AMRs.

Comment 6:

Since vinyl chloride is the primary chemical of concern beyond the dump site groundwater extraction system, it would be helpful if the report included a figure showing the vinyl chloride results for the entire area from the dump site to west of Gilfillan Lake. This would help homeowners to understand what levels of contamination may be migrating toward their homes. Wells at different depths could be color-coded, or there could be separate figures for different depths. Figure 4.16 only shows vinyl chloride results for residential wells west and north of Gilfillan Lake. Likewise, it would be helpful if vinyl chloride concentrations were plotted on a geologic cross section across the entire area to help see the vertical distribution. Figure 3.10 only shows a cross section closer to the dump site, which does not show the residual plume beyond the capture zone of the groundwater extraction system. The vinyl chloride concentrations could be plotted on the cross sections in Appendix A. [Note that while total volatile organic compounds (TVOCs) may be a good indicator of contaminant mass near the dump site for evaluating mass removal, it is less useful as an indicator of downgradient water quality since it does not directly convey what locations have an exceedance of a cleanup level. Perhaps these TVOC maps could be replaced by vinyl chloride maps for areas beyond the dump site so as not to create additional work for the report. The vinyl chloride maps could note any other VOCs that are above a cleanup level, since there are few, if any.]

Response:

October 2008 vinyl chloride analytical results have been added to the two geologic cross-sections in Appendix A. The revised cross sections are attached.



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Comment 7:

Similar to the previous comment, it would be helpful if the report included trend graphs of vinyl chloride concentrations for select wells with detections. This would help readers understand changes over time, especially as related to predicting potential impacts to residential wells west of Gilfillan Lake. It is suggested that the report discuss such predictions based on the available data, while recognizing that there is uncertainty. Homeowners would like to know what they should expect, and the AMRs are an appropriate vehicle to carry this message.

Response:

If requested by the MPCA these graphs can be prepared for future AMRs. Please note that in Appendix D.2 historical results for vinyl chloride, as well as other VOCs, are presented for all the monitoring and residential wells and are segregated based on location and aquifer, such as *Downgradient Compliance Wells-- Lower Sand Aquifer*. A review of this table provides the reader the actual concentrations over time at various locations across the study area.

Comment 8:

Figure 3.9 shows a graph of TVOCs for 7 Robb Farm Road; a well that was sealed in 1994, so it is of limited value in the report and could be deleted.

Response:

This graph is a required submittal for the AMR. However, CRA can remove this graph from future AMRs, if the MPCA agrees.

Comment 9:

It would be helpful if Figure 3.10 showed elevations for the cross section.

Response

A revised Figure 3.10 is attached to include the elevations for the cross-section.

Comment 10:

It is suggested to add monitoring well MW20B to Figure 3.1 showing the locations of cross sections and to Cross Section A-A' in Appendix A.

Response:

MW-20B has been added to the Figure 3.1 and Geologic Cross Section A-A'. The revised figures are attached.



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Should you have any questions regarding this matter, please do not hesitate to call.

Sincerely

CONESTOGA-ROVERS & ASSOCIATES

A handwritten signature in black ink, appearing to read 'Brian Sandberg', is written over a faint, larger version of the same signature.

Brian Sandberg, P.G.

BS/ma/9

Encl.

cc: Carmen Netten, MN Attorney General's Office w/o encl.
Highway 96 Group w/encl.
John Schaaf, City of North Oaks w/encl. and hard copy
Lugene Olson, NOHOA w/o encl.
Jim Kelly, MN Department of Health w/o encl.
Keith Benker, Wenck Associates, Inc. w/o encl.
Ron Frehner, CRA w/o encl.
Sarah Illi, CRA w/o encl.

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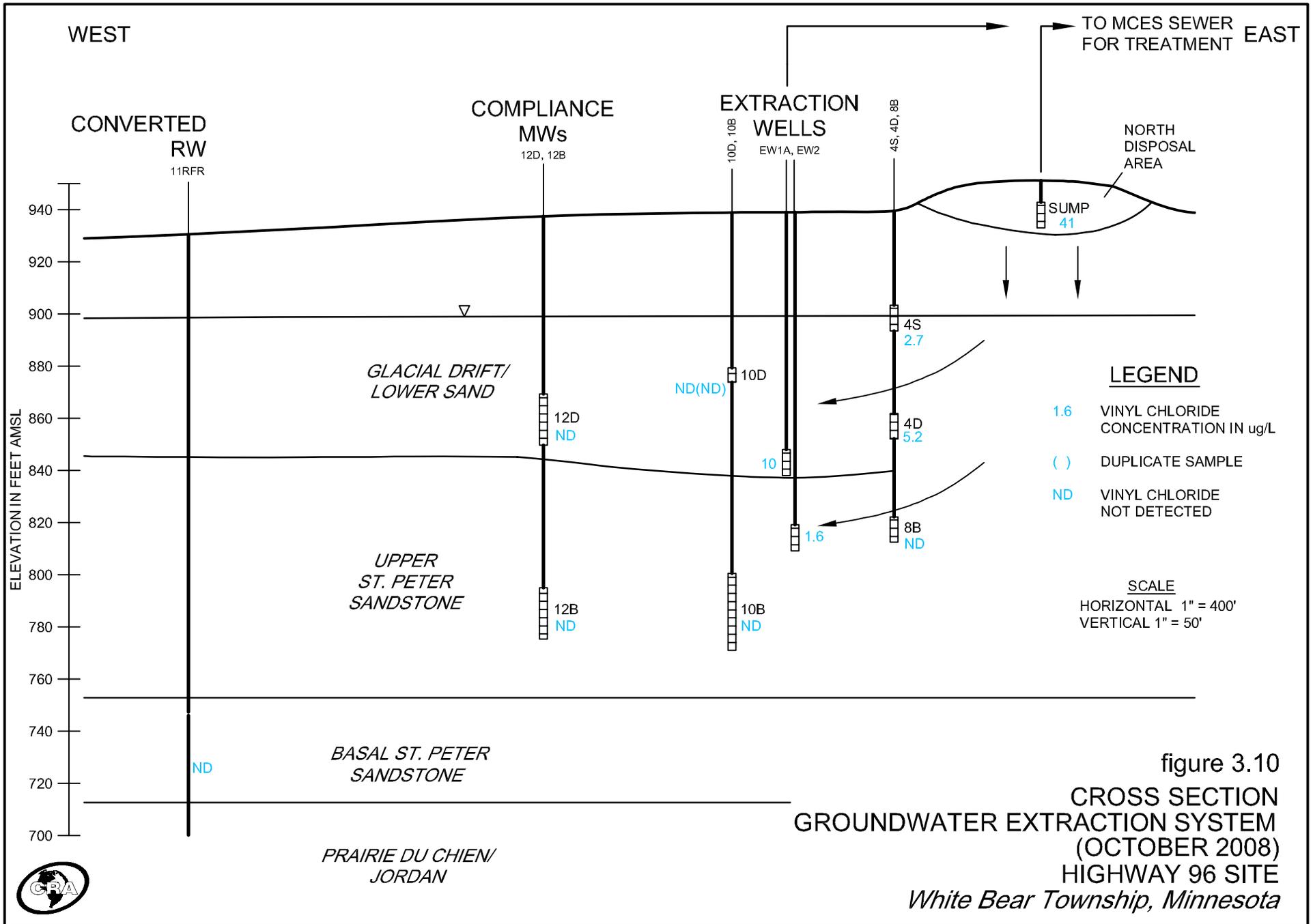


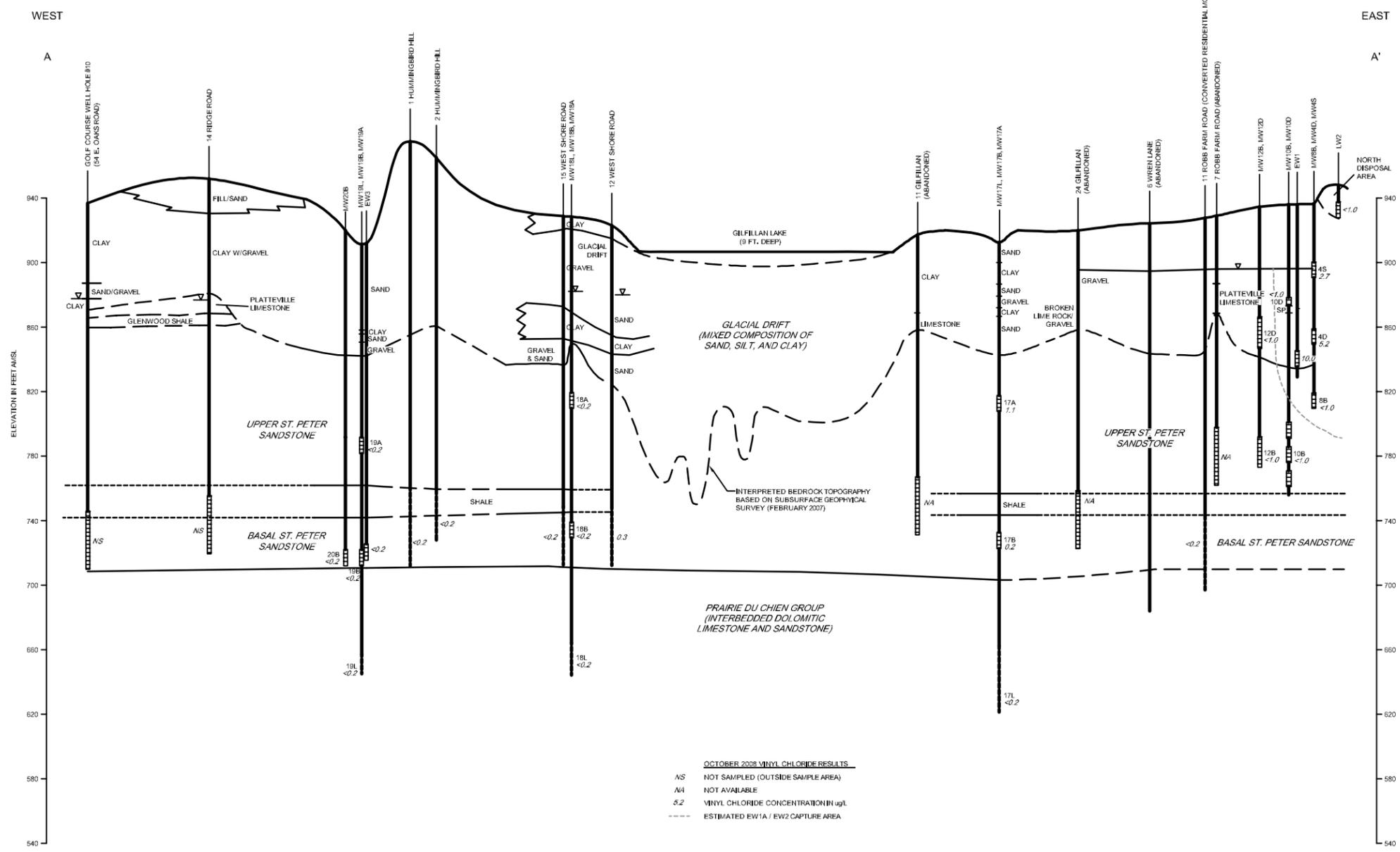
TABLE 3.3

**2008 AVERAGE MONTHLY GROUNDWATER EXTRACTION RATES
HIGHWAY 96 SITE
WHITE BEAR TOWNSHIP, MINNESOTA**

<i>Month</i>	<i>EW - 1A* Flowrate (gpm)</i>	<i>EW -2 (gpm)</i>	<i>Sump Flowrate (gpm)</i>
January	12.27	15.70	3.76
February	11.65	16.57	3.90
March	10.62	16.15	3.88
April	10.97	16.15	4.41
May	10.11	16.33	2.43
June	9.71	15.50	1.18
July	8.41	15.88	2.18
August	6.50	16.05	3.83
September	4.15	15.22	4.03
October	4.11	15.58	4.01
November	3.18	15.16	4.00
December	3.89	14.96	3.97
2008 Avg Monthly Flow Rate (gpm)	8.0	15.8	3.5

Note:

EW-1A was rehabilitated in January 2009 and its current pumping is approximately 8.7 gpm.



OCTOBER 2008 VINYL CHLORIDE RESULTS
 NS NOT SAMPLED (OUTSIDE SAMPLE AREA)
 NA NOT AVAILABLE
 5.2 VINYL CHLORIDE CONCENTRATION IN ug/L
 --- ESTIMATED EW1A / EW2 CAPTURE AREA

N2	Revision	Date	Initial

SCALE VERIFICATION
 THIS BAR MEASURES 1" ON ORIGINAL, ADJUST SCALE ACCORDINGLY.

Approved

DRAWING STATUS

Status	Date	Initial

HIGHWAY 96 SITE
 GEOLOGIC CROSS SECTION A-A'



Source Reference:

Project Manager: R. FREHNER	Reviewed By: B. SANDBERG	Date: MARCH 2008
Scale: 1"=400' HOR. 1"=40' VER.	Project N#: 002012-00	Report N#: 058 Drawing N#: PLAN 1

