Conditional Use Permit
Zavoral Mining and Reclamation Project
Scandia, Minnesota

Public Comment Period through December 12, 2012

#	Comments from:
1.	Karen Field (e-mail karen.e.field@gmail.com), 1838 Big Lake Drive, Osceola, WI 54020
2.	Christine R. Goepfert, Upper Midwest Program Manager, National Parks Conservation Association, 546 Rice Street, Suite 100, St. Paul, MN 55103
3.	Teresa W. Wolfe, 1 St. Croix Lofts Drive, Unit #201, St. Croix Falls, WI 54024
4.	Edmund K. Summersby, 20457 Quinnell Avenue, Scandia, MN 55073
5.	Take Action – Conserve Our Scandia, Scott C. Alexander of the Department of Earth Sciences, University of Minnesota

(1)

Kristina Handt

From: Karen Field [karen.e.field@gmail.com]
Sent: Tuesday, December 04, 2012 5:54 PM
To: k.handt@ci.scandia.mn.us
Subject: Proposed Gravel Mine

Hello Ms. Handt,

I am a resident of Osceola, Wisconsin and a long time lover and canoe/wildlife enthusiast of our beautiful St. Croix River. I recently received in the mail a letter from the National Parks Conservation Assoc., informing me that you are considering issuing a Conditional Use Permit for the operation of a gravel mine next to the St, Croix River at the intersection of Hwy 95 and 97. Although I cannot attend either the Dec 4 or Dec 12 hearings, I wanted to write to you to tell you that I do not support this mine. I am concerned that this mine will create air, water and noise pollution and that it will have a negative impact on the St. Croix River.

Thank you for taking my views into consideration.

Karen Field
1838 Big Lake Drive
Osceola, Wisc 54020

(2)

Testimony of Christine R. Goepfert
National Parks Conservation Association
Scandia Planning Commission, December 4, 2012

Madame Chair and members of the Planning Commission, my name is Christine Goepfert, and I am the Upper Midwest Program Manager with the Minnesota office of the National Parks Conservation Association, an advocacy organization for all of our national parks.

NPCA has more than 7,000 members in Minnesota who love and want to protect our national parks. I am here today to speak on behalf of these members who want to make sure our national treasures are protected for future generations.

Before you is consideration of a Conditional Use Permit for operation of a gravel mine right next to the St. Croix National Scenic Riverway, a beautiful unit of our national park system that is protected by the Wild and Scenic Rivers Act and is one of the last undisturbed, large floodplain rivers in the upper Mississippi River System.

The proposed mine will damage the recreational use and enjoyment of this River, which is criteria this Commission must take into consideration pursuant to Ch. 1, Section 8.4, Subd. (3) of the City's Development Code for CUPs. Because of this negative impact, **I request that you recommend denial of the Conditional Use Permit for the Zavoral gravel mine**.

The Environmental Impact Statement acknowledges that operation of this mine will generate commercial noise that will be heard by users of the River. We are talking about boaters, kayakers, hikers, picnickers and wildlife watchers who come to enjoy the tranquility of the St. Croix River but who will instead have to listen to the noise of excavation machinery from the mine. The National Park Service also shares these concerns and has indicated that this industrial noise will negatively impact the visitor experience on the river.

Furthermore, we are concerned about Tiller and its ability to operate this mine without further damaging the river. Tiller is the entity responsible for the frac sand mine operation near Grantsburg, WI, in which sediment from that mine seeped into the St. Croix River. They did not even notice this until apparently a hiker happened upon the damage. Given the history of this very site and the fact there was previously a blow-out during mining operations there that led to sediment reaching the River, operation of a mine so close to this special resource is risky and should not be allowed.

Our national parks are iconic places that have long been recognized for their scenic, recreational, historic and cultural values, and in order to ensure future generations can experience these places in as pristine condition as possible, we must take actions today to protect them. Allowing the operation of a gravel mine right next to this scenic river is contrary to this duty.

For the foregoing reasons, I ask that you recommend to the City Council that the Conditional Use Permit for the Zavoral gravel mine be denied in the interest of protecting the St. Croix National Scenic Riverway.

Thank you.

Submitted by:
Christine R. Goepfert
Upper Midwest Program Manager
National Parks Conservation Association
546 Rice Street, Suite 100
St. Paul, MN 55103
(612) 270-8564

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To: Scandia City Planning Commission: Christine Maefsky- Chair, Peter Schwartz, Thomas Krinke- Vice Chair, Steven Philippi, Jan Hogle

Regarding: Zavoral Mine Proposal

December 8, 2012

Good day,

I attended the public hearing last Tuesday at the Scandia Town Hall regarding the Zavoral Mine proposal. I am not a resident of Scandia, but consider myself a steward of the St. Croix River Valley.

My goal was to listen with a mind as open as possible. This allowed me to 'hear' some things that perhaps others, with a more focused agenda may not. I noticed a few themes that prevailed and I'd like to share them with you.

I heard the city planner speak of the laws and regulations that the Tiller Corporation must comply with and that these criteria had been met, or there would be provisions in the permit structure to ensure that they were met. I heard the Tiller Corporation speak of the years of planning regarding this proposal and the hoops and obstacles they have had to endure to bring the proposal to where it stands today. I heard them speak of their designed plan that they felt would ensure that the negative impacts the community and others feared would not happen. I heard health and economic concerns from residents whose property borders on the Zavoral property. I heard concerns regarding the environmental impact of the Zavoral on the community and the riverway, - sound and air quality impacts as well as potential for land and water pollution.

But, below these voiced community concerns, I heard a lack of trust on the part of the community residents. I 'heard' that the residents - and others that oppose the project - do not *trust* that the Tiller Corp will follow through on what it promises. (This was best represented in the comments by Tom Triplett and Lisa Schlingerman.) Some of the comments I 'heard' reflected that the speaker felt that the board did not have the best interests of the city/community/riverway in mind. One of the comments referenced an unspoken motive (at least unspoken that night) of the city to find a way to accomplish reclamation of the site, which the city could not afford to do in its own, implying that the Zavoral proposal was an improper method of choice to achieve that goal.

I propose that if you wrestle with the trust issue, you may be able to come up with a workable solution. It is my experience that it is absolutely necessary to address the underlying fears if one wishes to come to a successful solution in conflict issues such as this. I would be happy volunteer more insight for this perspective if you are interested. Though this is not my career field, I have a lot of experience in working this way with people.

In addition, there are a few questions that I was left with that I would like to ask:

- How many gravel trucks drive on the roads by that site per day now?
- What would the new number be if the proposal goes through? It was not clear to me the difference between the current number of vehicles/day and the new number/day, which was around 600-800.

- What is the need for gravel for the state of MN and how is it currently being met? Does the state have a great need for more gravel at this time? Is it essential to the state of MN for Scandia to be the resource to fill that need (any more than it already is?) Is it essential to Scandia economically to have the Zavoral Mine re-opened?

Thank you for taking the time to read and consider my thoughts.

Respectfully submitted,

/s/ Teresa W. Wolfe

Teresa W. Wolfe
Founder/President
Welcome Harvest
1 St. Croix Lofts Drive, Unit #201
St. Croix Falls, WI 54024
715-733-0229
welcomeharvest@hotmail.com

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DEC 11 2012
CITY OF SCANDIA

Edmund K. Summersby
20457 Quinnell Avenue
Scandia, MN 55073

11 December 2012

City of Scandia Minnesota
Attn: Ms. Kristina Handt
City Administrator
14727 209th Street N.
Scandia, MN 55073

Subject: Proposed Tiller-Zavoral Gravel Mine

To the Scandia City Council and City Planning Commission:

I write in support of the position taken by TA-COS and by the November 30th 2012 letter from legal counsel Kieran Dwyer of Dorsey & Whitney LLP urging that the City deny Tiller Corporation's application for a conditional use permit (CUP) to reopen the long-dormant gravel mine on the Zavoral property. There are four principal reasons why that course of action is the only responsible action the City may take in this matter.

1. Gravel mining at the Zavoral location is an incompatible use in direct violation of the Scandia Comprehensive Plan. Granting such a permit contrary to current zoning would establish an unacceptable precedent that would undermine the intent of the Comprehensive Plan now and for the years to come.

2. A gravel mine at this location would endanger public safety because the resulting significant increase in truck traffic would cause a clear danger of severe traffic collisions at the Highway 95-97 intersection, where trucks entering or leaving the mine would greatly exacerbate the already congested intersection.

3. The noise generated by a gravel mine at this location would cause an unacceptable impairment to the public's enjoyment of the St. Croix River, in contravention of the National Park Service's mission to protect this nationally protected river.

4. Property values in the surrounding area would be significantly diminished by the presence of a gravel mine at the Zavoral site, with all the concomitant noise and traffic that would result from an operation of this nature.

These four reasons are set forth in the Scandia City Code and in Minnesota law, and to disregard any of them would be a clear violation of the City's responsibilities and obligations to the citizens of Scandia. Thank you for your consideration; I trust and hope the City of Scandia will do the right thing.

Yours sincerely,

Edmund K. Summersby

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A LiDAR Based Review of the Tiller/Zavoral Mining and Reclamation Project
A Report to TA-COS, 12 December 2012

Scott C. Alexander, Dept. of Earth Sciences, University of Minnesota

The recent release of LiDAR (Light Distance And Ranging) data from the Minnesota Elevation Mapping Project has allowed a renewed analysis of the geology and hydrology of projects across Minnesota. This new data allows a better understanding of the sand and gravel deposits at the Zavoral site, near Scandia, Minnesota and new insights to potential risks. This analysis of the Tiller/Zavoral site was undertaken for the TA-COS citizen group. The high resolution of this data, at 1 meter horizontally and 10 centimeter vertically, allows definition of landscape features and evolution at unprecedented scales. Washington County LiDAR data were published on October 13th, 2012. LiDAR data, and project description, are available at: http://www.mngeo.state.mn.us/committee/elevation/mn_elev_mapping.html.

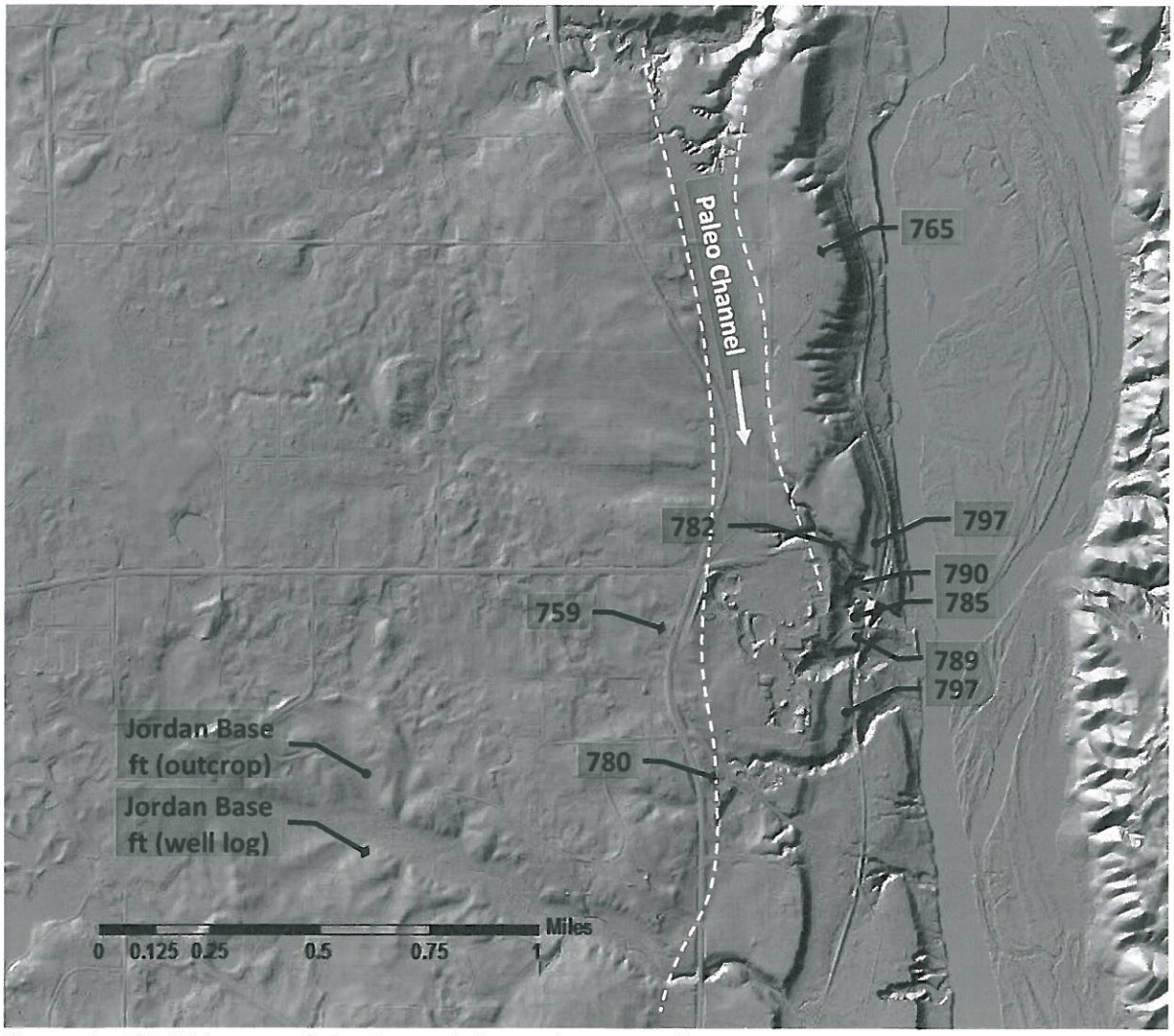


Figure 1. LiDAR image of the Zavoral site and surrounding areas.

The Zavoral property lies along a former channel of the St. Croix River. The stream gravels and sands of this paleo channel were deposited before the St. Croix was cut down into its current deep valley by the retreat of Taylor's Falls. This abandoned, or paleo, channel shows up in Figure 1 as smooth surface running north to south roughly parallel to the current St. Croix River valley. The smooth channel surface is in contrast to the "lumpy" Superior Lobe till terrain covering the western half of Figure 1. This incised channel creates a remnant bedrock ridge running north from the eastern edge of the Zavoral property. The east wall of this incised channel is lost where it meanders eastward intersecting the current St. Croix River valley. There are, however, no wells located in within the boundaries of the paleo channel other than unique well 210498. Well 210498 is the existing water supply at the Zavoral site and has inconsistencies in the surface elevation and sediment depths (the well was drilled in 1969 and the driller's log was based on the ground surface elevation at that time).

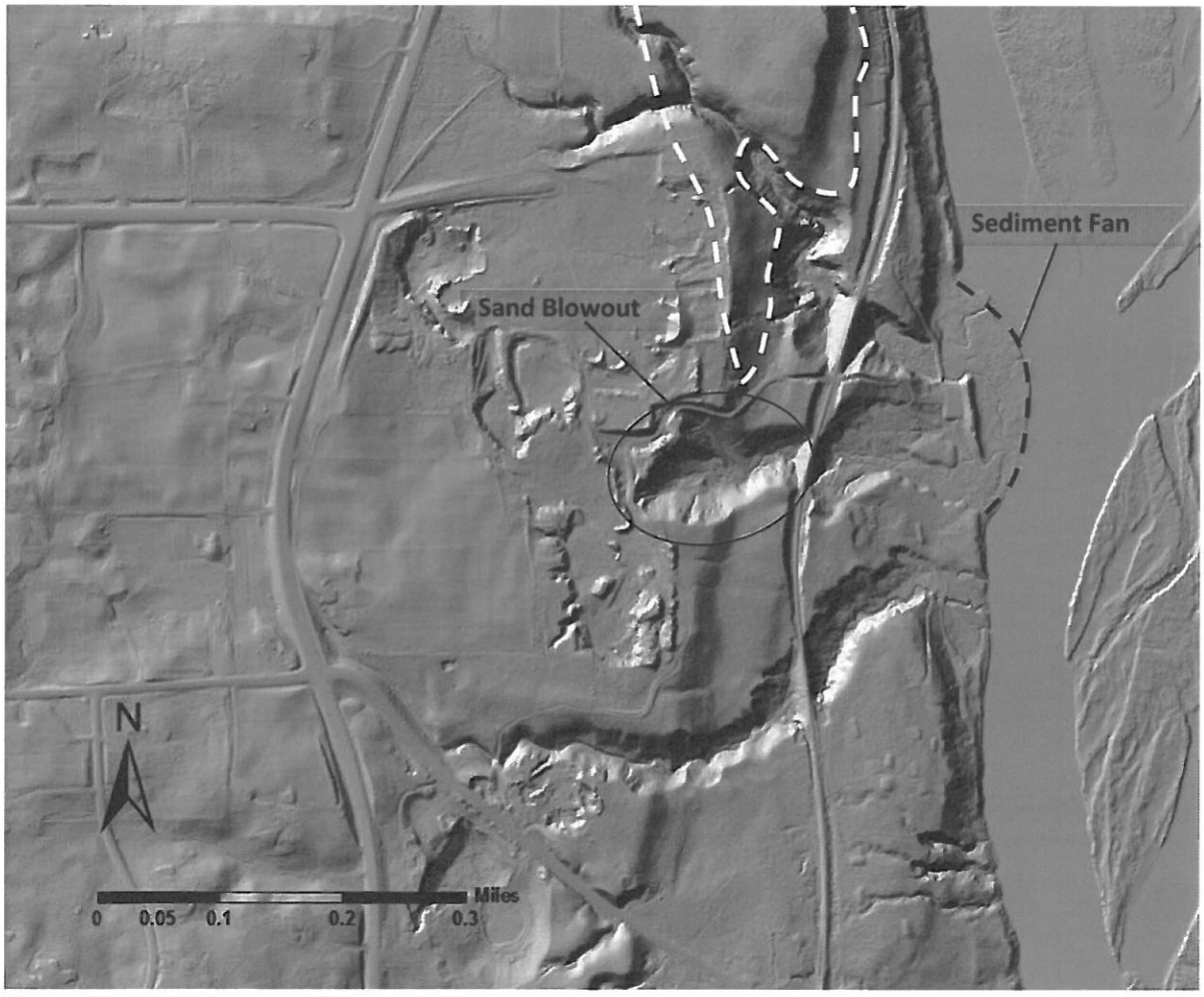


Figure 2. LiDAR image of Zavoral site.

Many significant springs found along the St. Croix River in Washington County, Minnesota emerge near the base of the Jordan Sandstone. Crystal Spring, located on the Page property, is typical of these springs emerging from the base of the Jordan Sandstone where it contacts the underlying St. Lawrence Formation. The location of springs often correlates with flexures in the bedrock with the springs

emerging along low points that help focus the flow. Note that this site is about 1 mile south of the Falls Creek Scientific and Natural Area where vertical faults with more than 300 feet of offset have been mapped. Flexures, folds, and faults should be common in this area; in contrast to large portions of southeastern Minnesota where there is limited bedrock topography.

Figure 2 shows an enlargement of the Figure 1 area showing the location of the remnant valley wall (white dashed line) separating the east side of the paleo channel from the current St. Croix River Valley. Where the paleo channel from Figure 1 turns back into the present valley of the St. Croix the bedrock ridge ends. Without the support of the east bedrock wall the unconsolidated sands and gravels in the paleo channel can spill down into the much deeper present day valley forming a sediment fan. Focused recharge due to mining operations can raise the water table in the surficial sands and gravels creating saturated sediments with little strength. The loss of cohesive strength can lead to large scale catastrophic collapse of sediments as exemplified by the sand blowout area and corresponding sediment fan.

Figure 3 applies the colored point data on top of the gray-scale LiDAR hillshade image with contour lines drawn every 3 meters. Crystal Springs emerges on a shallow bench at the base of a vertical cliff just below the 240 meter contour or at 782 feet above mean sea level (msl). This Jordan/St. Lawrence contact often forms a break in the slope of the river bluff due to the higher resistance of the St. Lawrence. Note that a ravine is beginning to form on the side of the current sand mine berm. With the steep slopes in the area this incipient ravine will only get larger.

Additional springs are found below the St. Lawrence Shale where they emerge from the Mazomanie Formation of the Tunnel City Group. In this area, near Scandia, the Jordan springs provide the majority of the spring water feeding trout streams. Additional water emerging in numerous seeps from the Mazomanie creates a two tiered ground water discharge system, feeding additional cool, clear water into the stream channels. This supplemental ground water flow from the Mazomanie is a key component in creating and maintaining high quality trout streams. The addition of cold ground water along the length of the channel helps maintain cool stream temperatures throughout the warm summer months creating long stream reaches with nearly ideal trout habitats. The Mazomanie springs emerge below the 225 meter contour (below 740 feet msl).

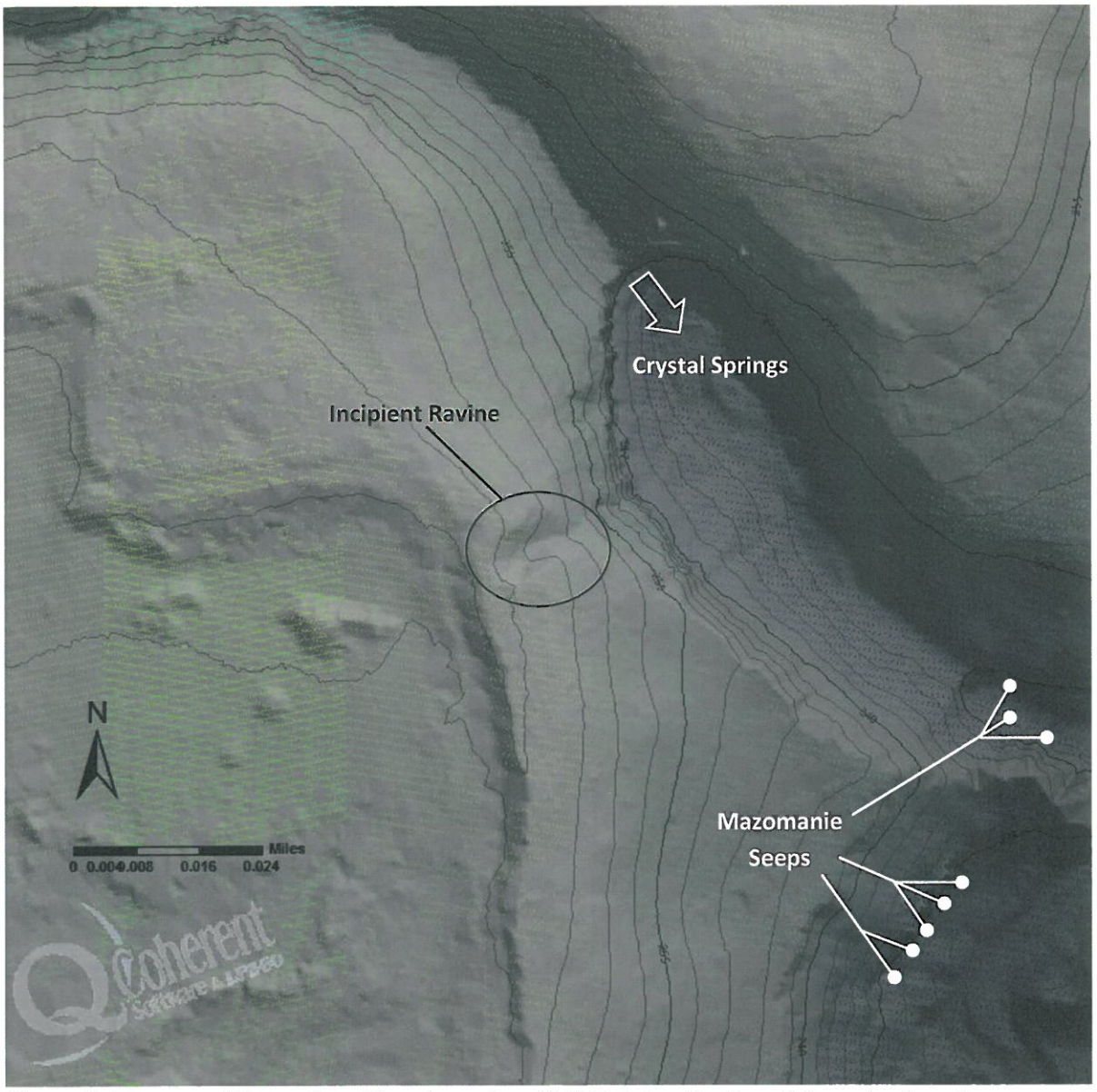


Figure 3. Topographic contour lines based on LiDAR data. Contour interval = 3 meters.

In Figure 4 the land and surface is represented by the continuous array of points with sparse data from the tree canopies forming a haze of points. Crystal Spring occurs at the Jordan/St. Lawrence contact. Crystal Spring has been cutting north and west following the downward dip of the bedrock surfaces. The Zavoral sands and gravels are deposited in an abandoned channel of the paleo St. Croix River as schematically shown in the Figure 3 cross-section.

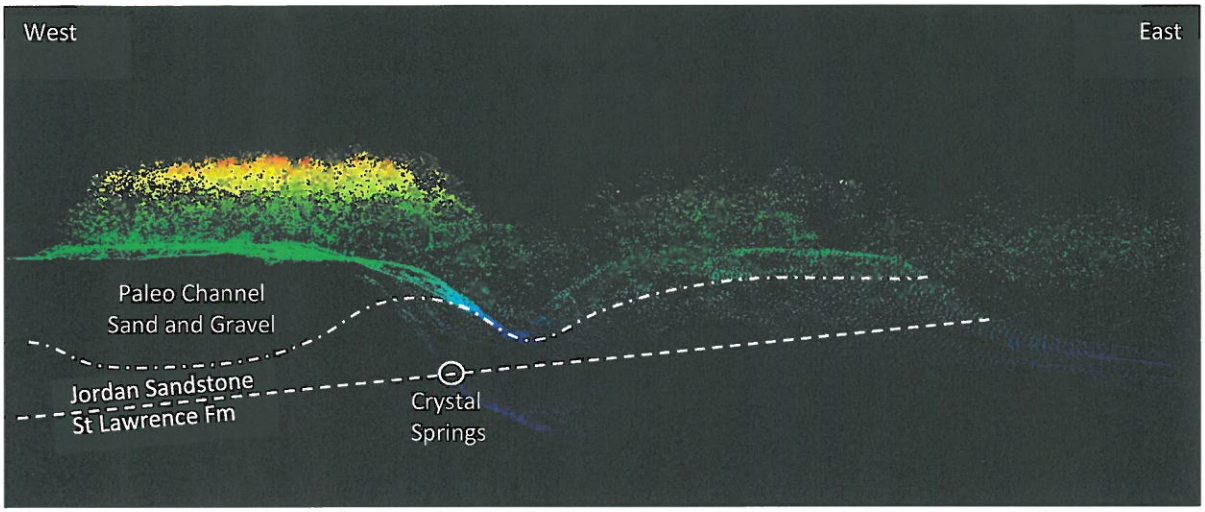


Figure 4. Cross-sectional view of Crystal Spring using point cloud data color coded by elevation.

The water table in the surficial sands and gravels is likely interconnected with the Jordan Sandstone. This water table is very poorly constrained by the current distribution of water wells. Most of the local water wells are completed into the Tunnel City (formerly Franconia Formation) or the deeper Wonewok Formation (formerly Ironton-Galesville Sandstone). These deeper aquifers are not directly connected to the surficial aquifer system.

Figure 5 shows the bare earth LiDAR point data. Areas with no returns are due to loss of signal from vegetatative cover and very steep slopes. Crystal Springs occurs at a low point in the Jordan/St. Lawrence contact, as this surface slopes down to the west. Additional Jordan springs and seeps are found along the base of the Jordan Sandstone. Springs from the Mazomanie Formation emerge lower in the stratigraphic section.

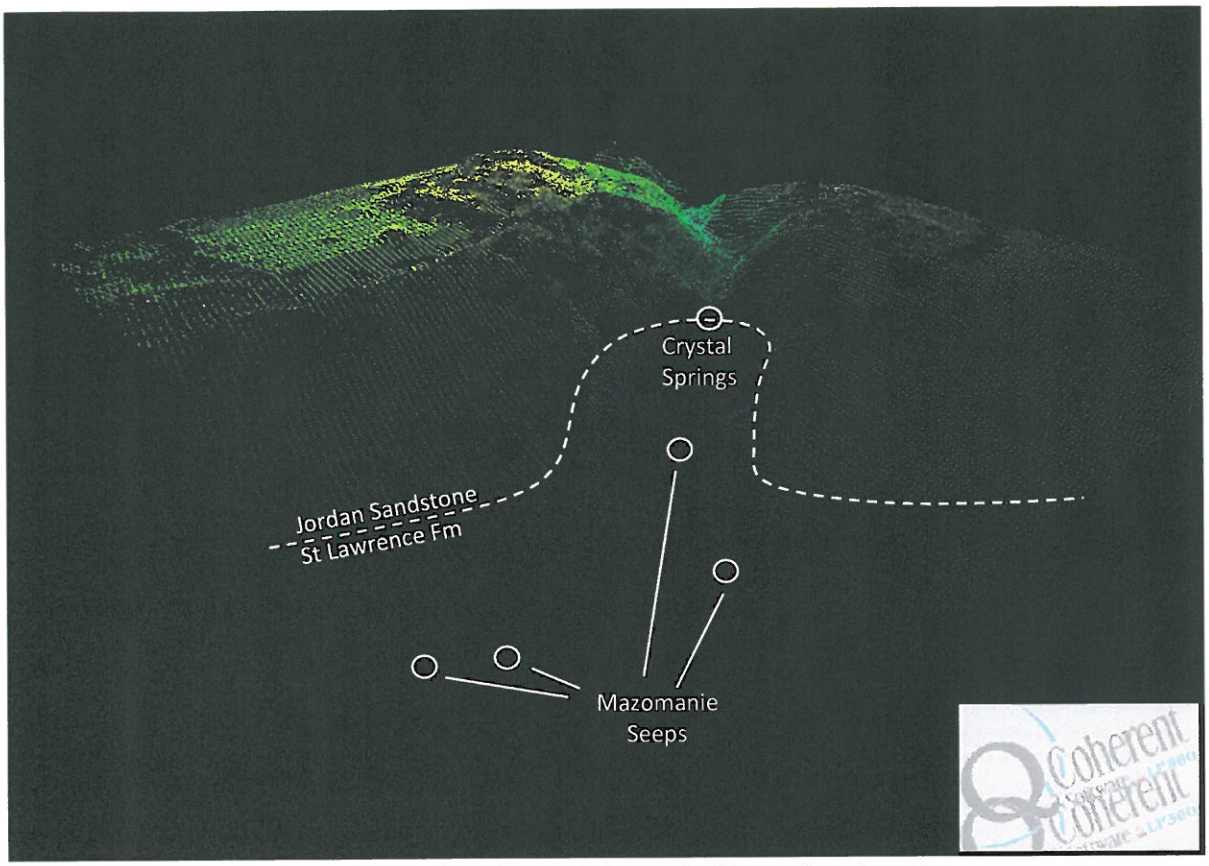


Figure 5. 3D view of LiDAR ground surface. Color coded by point elevation.

Figure 6 is a conventional photograph of Crystal Springs. The contacts of the bedrock units are highlighted showing the control of Crystal Springs by the underlying St. Lawrence formation. The vertical cliffs in Figure 6 show up in the Figure 5 LiDAR image as a lack of data points where there are no returns.

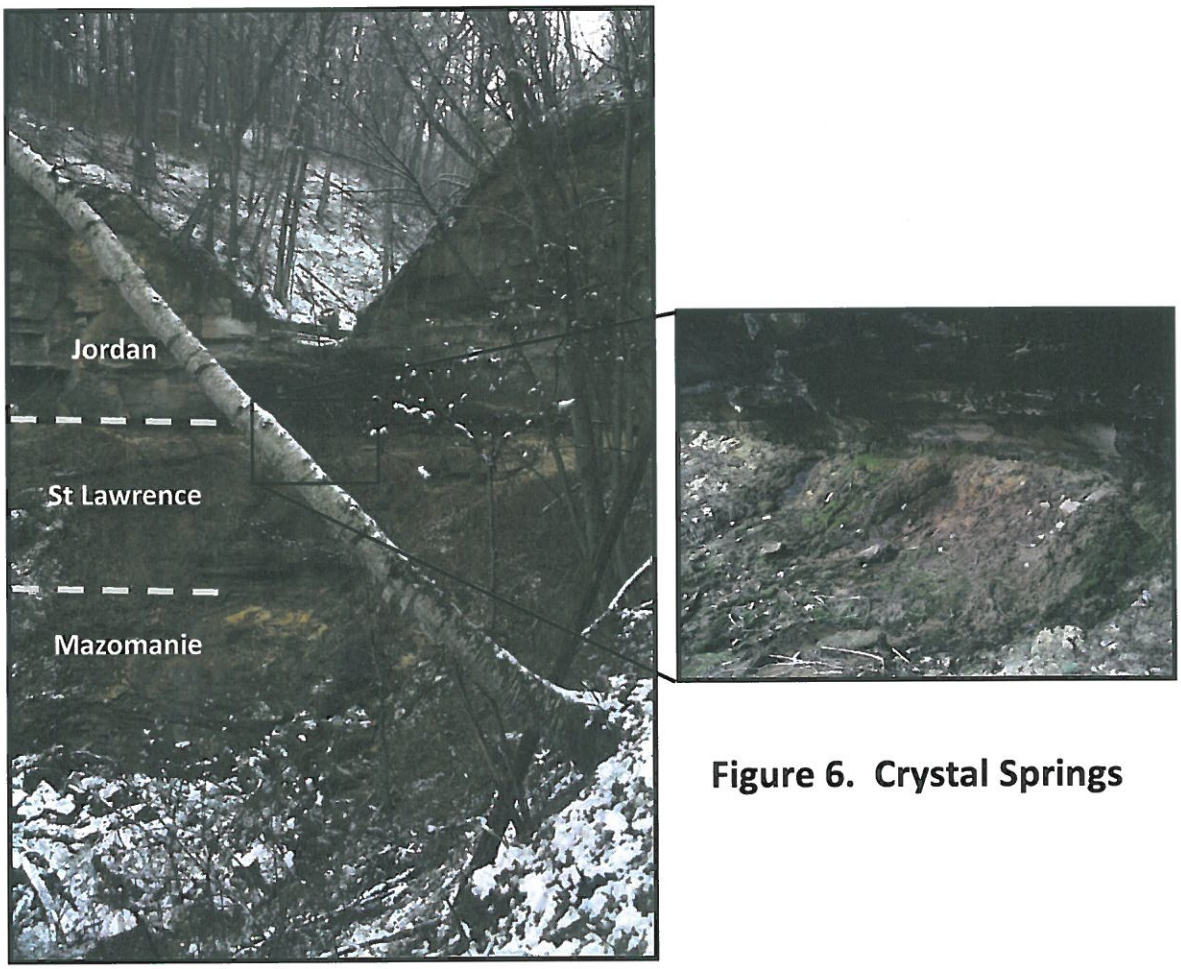


Figure 6. Crystal Springs

Figures 7 and 8 present some of the thermal imaging done by A.W. Research Laboratory as part of a Groundwater Intrusion study for the Marine WMO in April 2002. In early April the spring water shows up as warm compared to the surrounding ground surface. *[Springs in Minnesota provide cool water through the summer months but also provide warm water in the winter preventing freezing in the channel].* The Figure 7 inset in particular shows bright white springs coming from the Jordan Sandstone, as at Crystal Springs. Where there are additional inflows from the lower Mazomanie springs the stream line re-brightens. The thermal imaging insets are overlain on pictometric photos using the "Bird's Eye View" tool from www.bing.com/maps.

Figure 7. Pictometric photo of Crystal Springs gorge with thermal imaging inset.

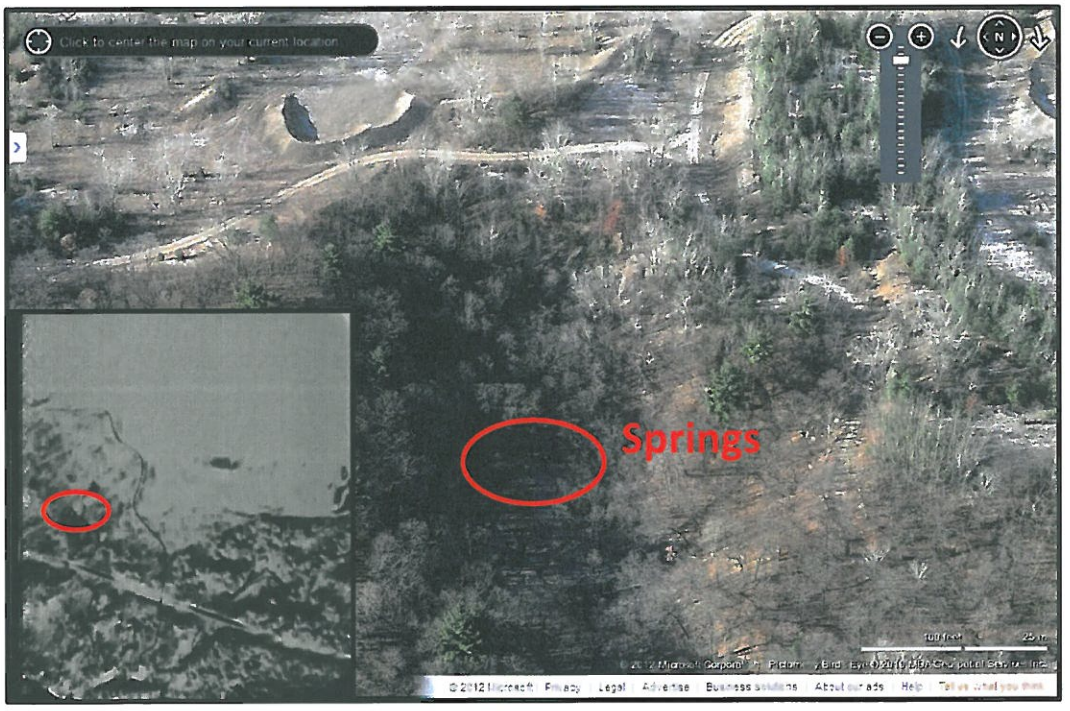


Figure 8. Pictometric photo of sand blow area and associated springs.

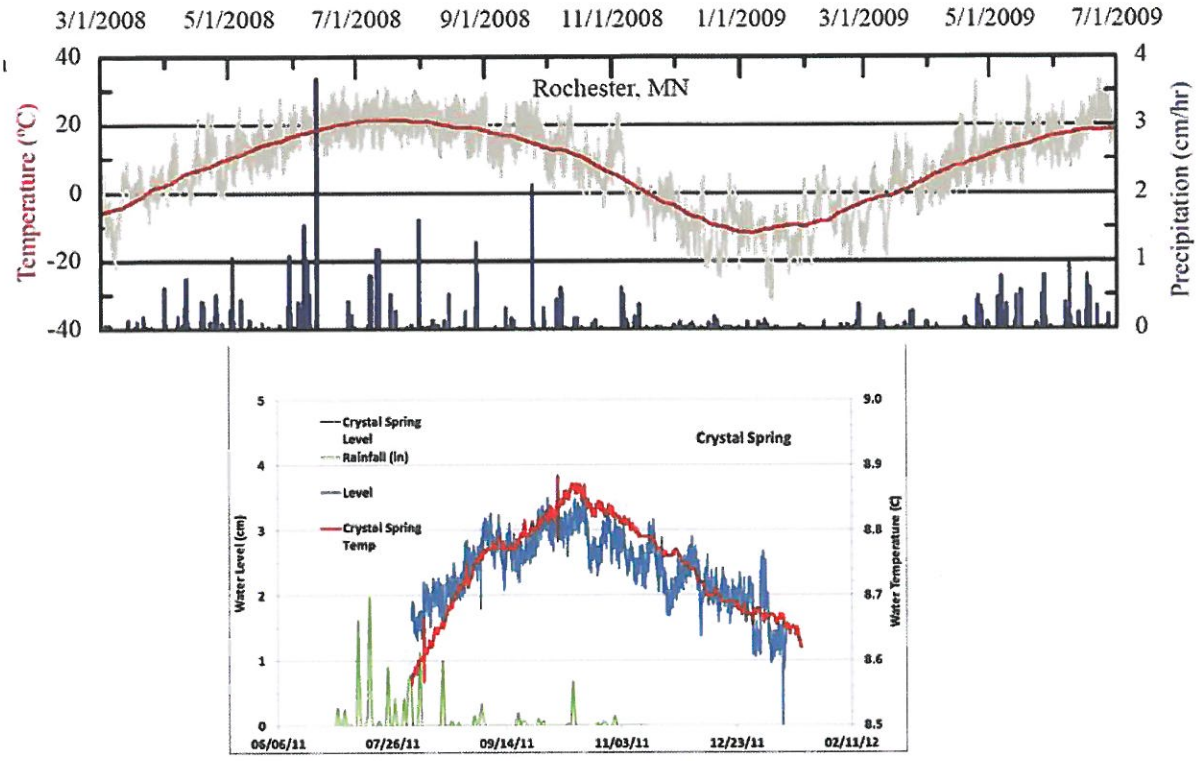


Figure 9. Temperature logger data from Crystal Springs compared to seasonal air temperatures.

The data presented in Figure 9 show a small seasonal fluctuation in temperature at Crystal Springs. The rate of ground water flow and distance from its recharge areas damp out most of the seasonal temperature swings keeping spring temperatures within 0.5 degrees Celsius (about 1 degree Fahrenheit). Given the thick unconsolidated sediments within the paleo channel these temperature variations should not significantly increase with the proposed mining operations. Previous conceptual models of the site assumed ground water flow would dominantly be in the Jordan Sandstone. Within the bedrock units ground water flow can be greatly accelerated along fractures, particularly along deeply incised river valleys. In these previous models removal of surficial sands and gravel almost to the bedrock surfaces would have greatly impacted the seasonal temperature variation at nearby springs.

Recharge of ground water by precipitation events is an important consideration at the Zavoral site. Work by the Intergovernmental Panel on climate Change (IPCC) points to a large increase in the frequency of extreme precipitation events. In Minnesota a 20 year storm event, one that would only occur once every 20 years on average, is about 3.5 inches of rain. This 20 year-on-average is becoming a once in 10 to 12 year event. Large events like the June 14-15, 2012 Goodhue County event with 8.9 inches in 24 hours and the June 19-20, 2012 Duluth event with more than 10 inches of rain in 24 hours

exemplify the near misses. There should be a very real expectation of a 10 inch storm event during period of mining operations at the Zavoral site.

Conclusions

1) The paleo channel extending northward from the Zavoral site is likely a dominant hydrogeologic feature. Ground water flow may be concentrated along the length of this sand and gravel filled channel. However, there is a complete lack of wells in the paleo channel making any suppositions about it difficult. The surface of the paleo channel should also be an important ground water recharge area with sands and gravels extending to the land surface. Current plans for the Zavoral site indicate one new monitoring well in the surficial water table aquifer. Determination of ground water flow direction and gradients are based on two wells located outside of the paleo channel and in more heterogeneous Superior Lobe glacial tills are unreliable.

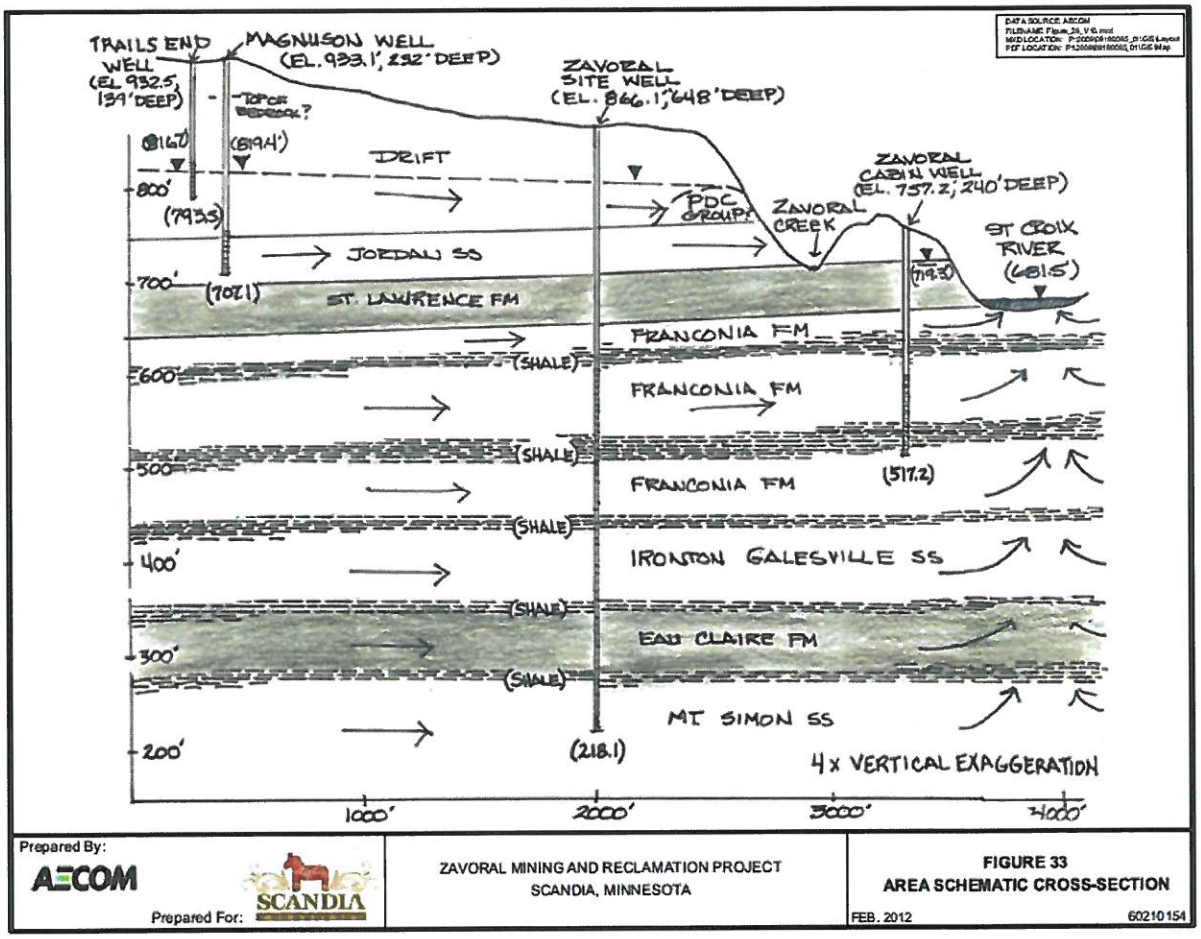
Recommendation 1: To determine the ground water flow directions and gradients there should be a minimum of 3 monitoring wells located within the paleo channel deposits. These monitoring wells should be installed prior to excavation at the site as discussed in Recommendation 2 below.

2) Existing water table measurements may not be representative of flow in the paleo channel. None of the surficial sand or Jordan sandstone wells are located within the paleo channel. The Trail's End and Magnuson wells are located outside the paleo channel. The sands and gravels of the paleo channel extend to the surface creating an area of high recharge. Additionally the limited vegetation presently on the Zavoral site, and during mining operations, should further enhance ground water recharge. This focused recharge is consistent with the observed water levels, from Figure 33, at the Trail's End and Magnuson wells which show a gradient away from the paleo channel. While there are no wells, at present, to confirm this hypothesis this focused recharge should create elevated ground water levels under the site.

Recommendation 2: Mining operations should maintain a minimum separation above the existing water table. Current plans maintain a 25 to 30 foot separation between the water table and maximum excavation depth. Given the highly permeable sands and gravels at the site this thick unsaturated zone helps insure the quality of ground water recharge. Once contaminants reach the water table, and are protected from atmospheric oxygen, they can move laterally with ground water flow to springs with little additional water quality improvement. Current plans to limit depth of mining to 840 foot msl may not meet the proposed 25 to 30 foot separation since they are not based on any well data from the paleo channel. Water levels, particularly during periods of high recharge following rainfall events will be higher than anticipated. ***Once there is actual monitoring well data within the paleo channel the applicants may need to reassess proposed depths of excavation.***

Documents presented in the Draft EIS pertaining to surficial and bedrock geology appear to be based largely on the Washington County Geologic Atlas with some supplemental information from the County Well Index. While the data and mapping techniques used to construct the County Atlas were the best available in 1990 many significant improvements have occurred. Further, the County Atlas

programs maps at a large 1:100,000 scale to show an entire county on one map plate. At the scale of an individual site, like the Zavoral site, the specific geologic and hydrologic details will not be clearly resolved leading to unintentional errors. Figure 33 from the DEIS, reproduced below, highlight some of the issues.



The application of county scale maps to a relatively small site may explain the absence of the paleo channel from the Draft and Final EIS. Without this paleo channel the sloping water table in Figure 33 would be reasonable giving water elevations of 815 down to 800 feet msl. Adding the focused recharge and collected ground water flow within the paleo channel water table elevations may be above 820 feet msl.

3) Based on LiDAR elevations Crystal Springs has an elevation of 782 ft msl. The use of the county scale bedrock geologic map has created confusion as to the stratigraphy at Crystal Springs. Crystal Springs clearly emerges at the base of the Jordan Sandstone where the underlying St. Lawrence formation creates a low permeability layer as shown in Figure 6.

This is higher than elevations estimated from USGS topographic maps and is more consistent with water table elevations at the Trail's End and Magnuson wells. The water table may be higher in

between Crystal Springs and the Trail's End and Magnuson wells, as discussed above, with ground water flow outward from the paleo channel.

4) The existing blow out area may be related to the end of the paleo channel where it intersects the St. Croix River valley. The paleo channel gathers recharge water along its length conducting ground water to its southern end on the Zavoral site. ***Increased recharge on the Zavoral site, during mining operations, could reactivate the blow area by raising the local water table, saturating the surficial sediments and weakening their cohesive strength. Highly focused, or point recharge, will raise water levels in a concentrated area following storm events increasing localized risk.*** Periods of high rainfall could conceivably raise the water table into the base of the excavation allowing surficial contaminants, like fuel products and bacteria, to reach the water table.

Recommendation 3: Improve the distribution of storm water, spreading it over as large an area as possible and increasing evapotranspiration by re-vegetation. Avoid concentrated recharge areas. This should reduce, but will not eliminate, the potential for additional blow outs.