

From: [Humphrey, Melanie \(DEQ\)](#)
To: [David Anderson](#)
Subject: RE: Aquila Resources - MPAA - Response to questions
Date: Wednesday, March 6, 2019 11:45:31 AM

Dave,

Thank you for providing responses to our questions.

In consideration of Aquila's responses, I have the following comments/questions:

#1: Figure 4-1 does not specifically list the ore storage facilities under Construction. Since some ore will be excavated during Mine Year -1 (Table 4-1), it is expected the ore storage facilities will be constructed during Mine Year -2.

#6: While the predicted overburden shortfall may be minor compared to the total material balance for the project, the cost to import clean material from off-site to account for the predicted overburden shortfall shall be included in the financial assurance estimates.

#7: It is explained in the response that the financial assurance estimates include 25 years of postclosure water treatment. The removal of the closure WWTP is scheduled in Mine Year 20 (Figure 4-1), which would be 10 years of water treatment upon commissioning of the closure WWTP. I agree with conservative contingencies in the cost estimates. However, please clarify how long water treatment is expected to be required after project closure.

#15: Aquila's plan to continue collect and treat leachate if the project is idled meets the requirements of R425.409 (ii). However, be advised that the MDEQ may require a temporary cover to be employed on any reactive material on the surface should mining and milling cease for a continuous period of more than 90 days, and Phase 3 of reclamation does not commence according to the project timeline (Figure 4-1). The cover may consist of a geo-membrane, low-permeability soil, or an approved alternative. Measures to neutralize leachate may be considered as well.

#18: As a contingency, should snowfall amount exceed available area for storage, is it feasible to place snow on the waste rock facilities?

#21: Upon further consideration, please provide a Figure 1-2 with an overlay of the groundwater contours and divide.

#41: Since MSG-9 is not the Menominee River but a tributary, and therefore should not be considered background conditions for the Menominee River, Phase 2 of the postclosure monitoring plan shall include the new location of the upstream monitoring location referenced in item#35 (AQ1). In addition, a reduction in environmental monitoring after closure is contingent on written approval of completed reclamation.

#45: Has surface water monitoring conducted since permit issuance indicated any notable

or significant changes in baseline conditions?

#47: It is recommended this information be provided/communicated to Water Resources Division.

#48: The MPAA, Volume I, appendix C indicates that the perimeter wall of the TMF will be raised in the upstream construction method. Why is this the preferred method for perimeter wall construction?

The DEQ is processing the applications (Part 632 Mining Permit Amendment, PTI, and Part 315 Dam Safety) in a coordinated fashion to the extent feasible given procedural requirements applicable to individual permits as authorized by Part 632, which may include consolidating hearings. At this time, the following is pending regarding the mining application review and proposed decision:

- A response to the above follow up comments/questions;
- Submittal of the updated contingency plan (#10);
- Completion of public comment review and consideration; and
- Completion of the dispersion modeling review for the PTI, which will initiate the deposition model review.

Please contact me to discuss a reasonable extension to reach a proposed decision.

Thank you for your consideration in this regard.

Sincerely,

*Melanie Humphrey
Michigan Department of Environmental Quality
Oil, Gas, and Minerals Division
UP District
906-250-7564*

From: David Anderson <danderson@aquilaresources.com>
Sent: Sunday, March 3, 2019 1:34 PM
To: Humphrey, Melanie (DEQ) <HUMPHREYM@michigan.gov>
Subject: Aquila Resources - MPAA - Response to questions

Melanie,

Please find attached response document in response to recent questions from the agency received February 15, 2019. Please confirm receipt and feel free to contact me if you have any additional questions.

Dave Anderson

Director of Environment and Regulatory Affairs

danderson@aquilaresources.com

Office 906-753-9602

Cell 906-290-2100



Aquila Resources, Inc.

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March 13, 2019

Melanie Humphrey
Michigan Department of Environmental Quality,
Oil, Gas and Minerals Division

Melanie,

On behalf of Aquila Resources, we offer the following responses to answer questions from MDEQ (email, M. Humphrey, rcvd 3/8/19) regarding the MPAA and MPAA "Response to questions".

#1: All on-site mine related infrastructure, specifically including ore storage facilities, will be completed prior to mining ore. Currently that is by mid-year Year -1 per Figure 4-1 – Overall Project Timeline.

#6: Predicted overburden shortfall may or may not fully represent actual volumes and respective qualities. It is recommended that upon completed overburden removal, sorting and evaluation the financial assurance be adjusted to reflect any final material needs and respective available commercial sources/costs at that time.

#7: The current projection for wastewater treatment after project closure is for 13 years. The conservative financial assurance estimate is based on 25 years of postclosure wastewater treatment. It is also our understanding the closure of the treatment plant will only be initiated for decommissioning with MDEQ concurrence and supporting environmental information at that time.

#15: The company understands and agrees with MDEQ regarding the rule(s) and associated management requirements if extended shut down periods occur.

#18: All snow removal from the facilities will be stored in areas that allows for containment (treated as contact stormwater) and diverted for subsequent water use/wastewater treatment. Storage of excess snow removal at waste rock facilities is likely feasible and may serve as an additional storage area if needed and warranted.

#21: A revised MPAA Figure 1-2 is attached with the groundwater contours and divide included.

#41: Aquila will propose a new location for AQ1 below the dam as directed in Comment #35 of the MDEQ Comment letter of February 15, 2019. The new location will be provided to MDEQ when surveying activities and observations can be more accurately accomplished this spring. Additional information and clarification of the new location during the Phase 2 postclosure monitoring plan will be addressed in a consolidated EMP satisfying MP 01 2016 SPC K4, M1, and the anticipated amended permit. Aquila acknowledges that a reduction in monitoring is contingent on written approval from MDEQ.

#45: Two surface water quality monitoring events took place in 2018. A high-level review of those data shows no significant or notable changes relative to baseline conditions presented in the EIA or EIAA. A more thorough trend analysis will be performed in future monitoring report submittals.

#48: A zoned waste rock and thickened tailings co-disposal concept was preferred for the project to reduce the environmental footprint of the project and to leave behind a stable post-closure landform. The use of this design concept in an area with limited footprint area, as the project site, requires raising the waste rock zone of the co-disposal facility in the upstream direction. Unlike traditional upstream raised tailings facilities which use coarse tailings as containment structure, the waste rock zone of the co-disposal facility provides stability as it is strong, free draining, non-liquefiable and erosion resistant. The design also increases compaction of thickened tails, improves dewatering and results in optimal closure time and reclamation.

If you have any additional questions please feel free to contact me at your convenience.

Dave Anderson

Director of Environment and Regulatory Affairs

From: [Humphrey, Melanie \(DEQ\)](#)
To: ["David Anderson"](#)
Subject: RE: Aquila Resources - Response to 3/8 email
Date: Wednesday, March 27, 2019 3:17:02 PM

Dave,

Thank you for your prompt response to my questions/comments.

Upon review and further consideration, I have the following comments:

1. In further consideration of the requirements for compliance monitoring well placement and the predicted groundwater gradient, the proposed monitoring well locations that were submitted in Aquila's response to the February 15 letter are acceptable with the following modifications, for inclusion in the final EMP/SAP:
 - a. Add monitoring well location in proximity of initial CW-6 proposed in the MPAA (east side of the NWRF: 5033645N, 436678 E)
 - b. Relocate CW-3 back to north of LLCS1, as close to LLCS1 as practicable
2. Section 2.1.1 of the Contingency Plan should include mitigation of risk specific to potential overtopping of LLCS3 and LLCS4, including back up for pumping. Also in this section, the last bulleted sentence on page 4 should specifically reference NWRF.

Also, I have the following additional questions for clarification:

3. Will the Eastern corridor road be a private or public road?
4. The updated cutoff wall design calls for it to be keyed 1.6 ft to 6.6 feet into bedrock. How was this range of depth determined as a design criteria, and what are the site conditions that will determine the necessary depth into bedrock during construction? How was the extension of the cut off wall to 427m determined?

I look forward to your response.

Thank you,

Melanie Humphrey

*Michigan Department of Environmental Quality
Oil, Gas, and Minerals Division
UP District
906-250-7564*

From: David Anderson <danderson@aquilaresources.com>
Sent: Wednesday, March 13, 2019 4:28 PM
To: Humphrey, Melanie (DEQ) <HUMPHREYM@michigan.gov>
Subject: Aquila Resources - Response to 3/8 email

Mel,

Please find attached: response to questions (3/8), Amended Contingency Plan and Rev. Fig 1-2, as requested. Feel free to contact me to discuss or address any additional questions.

Dave Anderson
Director of Environment and Regulatory Affairs
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From: [Humphrey, Melanie \(EGLE\)](#)
To: [David Anderson](#)
Subject: Back Forty Project - MPAA MP 01 2016
Date: Wednesday, May 1, 2019 1:05:10 PM

Dave,

Following up, I have a few remaining questions/considerations:

- It would be preferable to reference an updated Figure 1-2 showing the revisions specified in following proposed permit condition (from 3/29 email):

SPC K2A: The permittee shall monitor groundwater quality and elevations at the existing and proposed monitoring well locations specified in the 3/19 revised Figure 1-2 and Table 1-1 of the MPAA/EMP, including the following additions/modifications:

- a. Reinstatement leachate/compliance monitoring well east side of the NWRF: 5033645N, 436678 E, NAD 1982, 16N
- b. Relocate CW-3 north and in proximity to LLCs-1

- Will the Eastern corridor road be a private or public road? (3/27 email)
- The updated cutoff wall design calls for it to be keyed 1.6 ft to 6.6 feet into bedrock. How was this range of depth determined as a design criteria, and what are the site conditions that will determine the necessary depth into bedrock during construction? How was the extension of the cut off wall to 427m determined? (3/27 email)
- As we discussed, please provide a reference(s) to industry standard for minimum FoS for slope stability of the WRFs and OS.

Please let me know if you have any questions.

Melanie Humphrey

Geologist

Oil, Gas, and Minerals Division

Department of Environment, Great Lakes, and Energy

906-250-7564

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May 3, 2019

Ms. Melanie Humphrey
District Geologist
Michigan Department of Environment, Great Lakes and Energy
Upper Peninsula District Office
410 W State Highway M-35
Gwinn, MI 49841

Dear Ms. Humphrey

RE: Response to questions (email 5/1) for Mining Permit Amendment Application
Aquila Resources Inc. – Back Forty Project

Question # 1 - Update Fig. 1-2

Attached

Question # 2 – Eastern corridor ownership

The eastern corridor alternative has been included in the application to evaluate the possible development of a multi-purpose utility corridor that could serve as an additional access to the site for power and road transport that could serve to lessen overall impacts of the project, improve emergency services response time, lower carbon footprint, diffuse traffic patterns and avoid routing traffic through areas of public recreational/natural interests (Shakey Lakes).

The alternative was evaluated within the MPAA at the request of MDEQ as the new power line and road would primarily serve the project. The ownership of the property lies with the State of Michigan. No changes in ownership are projected at this time, and, the final decision to develop the corridor still requires approval/concurrence with the Michigan Public Service Commission, utility provider(s), Michigan Department of Natural Resources and the Menominee County Road Commission. The road development expense and maintenance would be the responsibility of the company, however, the preference at this time would be to allow for public use of road to allow for enhanced access to public lands for recreation and timber management, pending further agency and public input. The eastern corridor road would also likely remain in place after mine closure to allow for continued public access to MDNR lands, and, access to River Road (to be replaced after LOM/pit reclamation), again pending agency determinations.

Question # 3 – Cutoff wall design criteria and basis of design

The minimum and maximum penetrations depths of the CSM wall into the bedrock were determined based on the site geotechnical data. The minimum penetration depth was determined to ensure that the slightly weathered bedrock at the interface with the overburden is sealed to reduce the risk of preferential flow path. The CSM wall will continue deeper if the bedrock is soft. These penetration depth criteria would be refined during construction to suite site conditions.

The length of the cut-off wall was determined using the site hydrogeological model. Various lengths of the cut-off wall were incorporated in the model. The cut-off wall length was chosen as increasing the length further was not reducing the seepage reporting to the open pit.

Question # 4 – FOS / industry standards for temporary rock storage

Waste rock(s) piles are inherently less susceptible to slope failure, liquefaction and erosion compared to generally accepted tailing facilities earthen dam materials used in accordance with industry standards. Final disposition of reclamation of two facilities is also inherently different (waste rock piles back to open pit (temporary storage to backfill – environmentally preferred alternative) vs. tailings facility cap/cover/revegetate (permanent)). Because of temporary nature of a waste rock pile, significant increase in size and the diversity of size/geometry of the material, porous nature and increase in stability factors, waste rock piles have different FOS per industry standards.

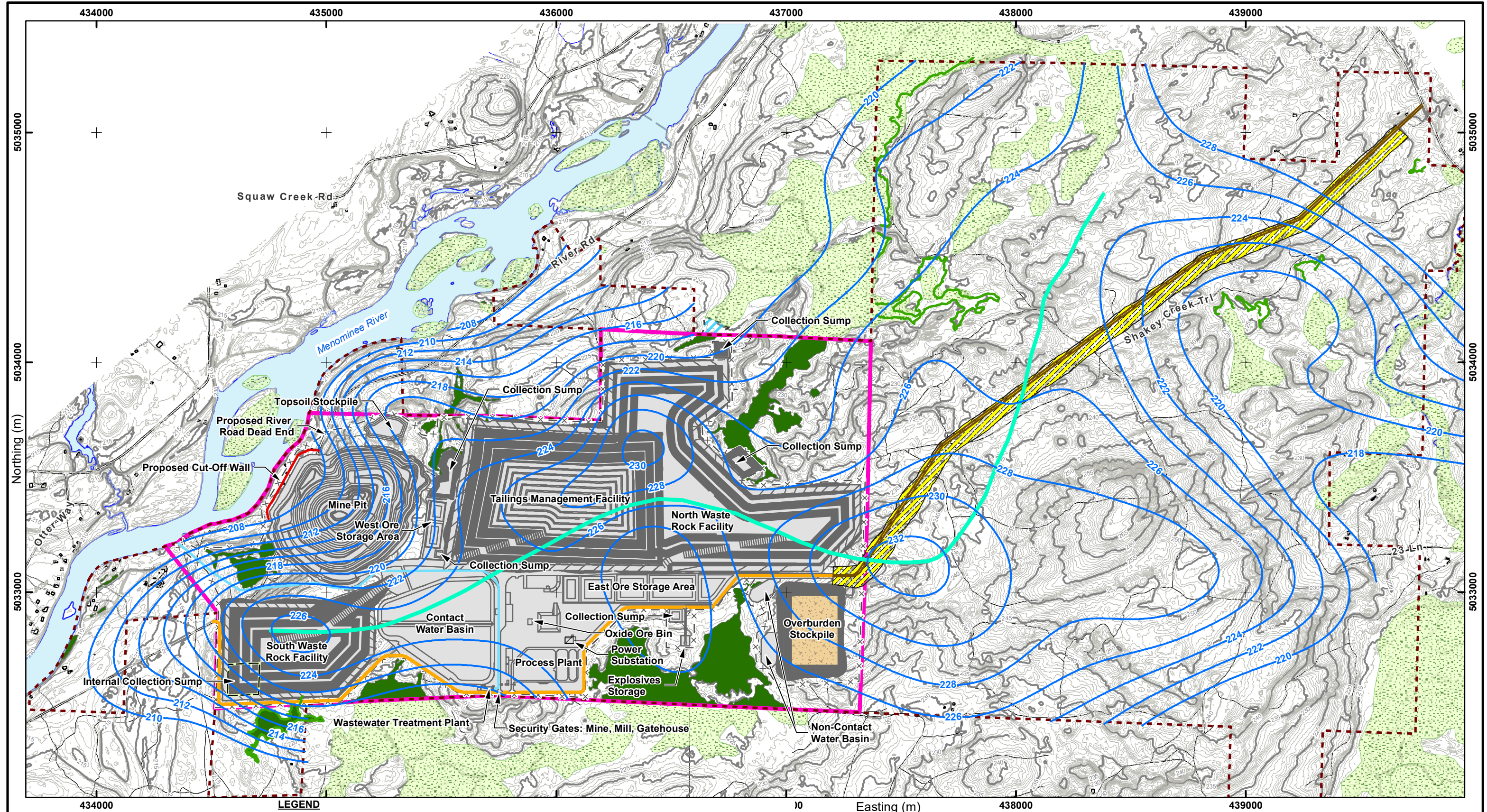
As such, the industry standard applicable to the WRF is less than that of the standard used in TMF evaluation. The Canadian dam association dam safety guidelines were used to set the minimum FOS of the TMF. The Guidelines for Mine Waste Dump and Stockpile design by Hawley and Cuning were used to set the minimum FOS of the WRF. Both facilities meet/exceed industry standards and regulatory requirements.

Thank you for your inquiry and time on this matter. If you need additional information or have questions, please contact me at phone number

Sincerely,

David Anderson
Director, Environment and Regulatory Affairs

cc: Mike Welch, Aquila Resources Inc.
Steve Donohue, Foth Infrastructure & Environment, LLC
Kabreab Habte, Golder Associates
Dennis Donohue, Warner Norcross & Judd, LLP



- NOTES**
1. Topographic and planimetric data provided by Aero-Metric, Inc., Sheboygan, WI.
Date of Acquisition: LiDAR-October 31, 2007 and Imagery-May 14, 2008.
 2. Horizontal datum based on NAD 1983.
Horizontal coordinates based on UTM Zone 16 North.
Topographic contours in meters.
 3. Wetlands created from June 2017 field surveys supplied by King and MacGregor.
 4. Update site layout and pit design supplied by Aquila in September 2018.
 5. Proposed Eastern Transportation and Utility Corridor supplied by Coleman Engineering in October 2018.

- LEGEND**
- Groundwater Contours (M AMSL) - May 2012
 - Site Access Road
 - Groundwater Divide
 - Delineated Wetland Boundary
 - Proposed Eastern Corridor Road Alignment
 - Proposed Fence
 - Proposed Cut-Off Wall
 - Treated Water Discharge Pipeline

- Overburden Stockpile
- Regulated Wetland within Project Boundary
- Proposed Eastern Transportation and Utility Corridor
- WL- 40/41 Inferred Wetland
- NWI outside Project Boundary
- Mineral Property Boundary
- Project Boundary



Foth Infrastructure & Environment, LLC			
REVISED	DATE	BY	DESCRIPTION
	MAR. '19	AKM	Added Groundwater Contours
	MAR. '19	AKM	Added Groundwater Divide
PREPARED BY: AKM		DATE: OCT. '18	
REVIEWED BY: MJV2		DATE: OCT. '18	
APPROVED BY: SVD1		DATE: OCT. '18	

BACK FORTY PROJECT

FIGURE 1-2
PROJECT AREA DEVELOPMENT PLAN
SHOWING EASTERN CORRIDOR
MINING PERMIT AMENDMENT APPLICATION
STEPHENSON, MICHIGAN

Scale: 0 650 1,300 Feet

Date: OCTOBER 2018

Project No: 17A021

