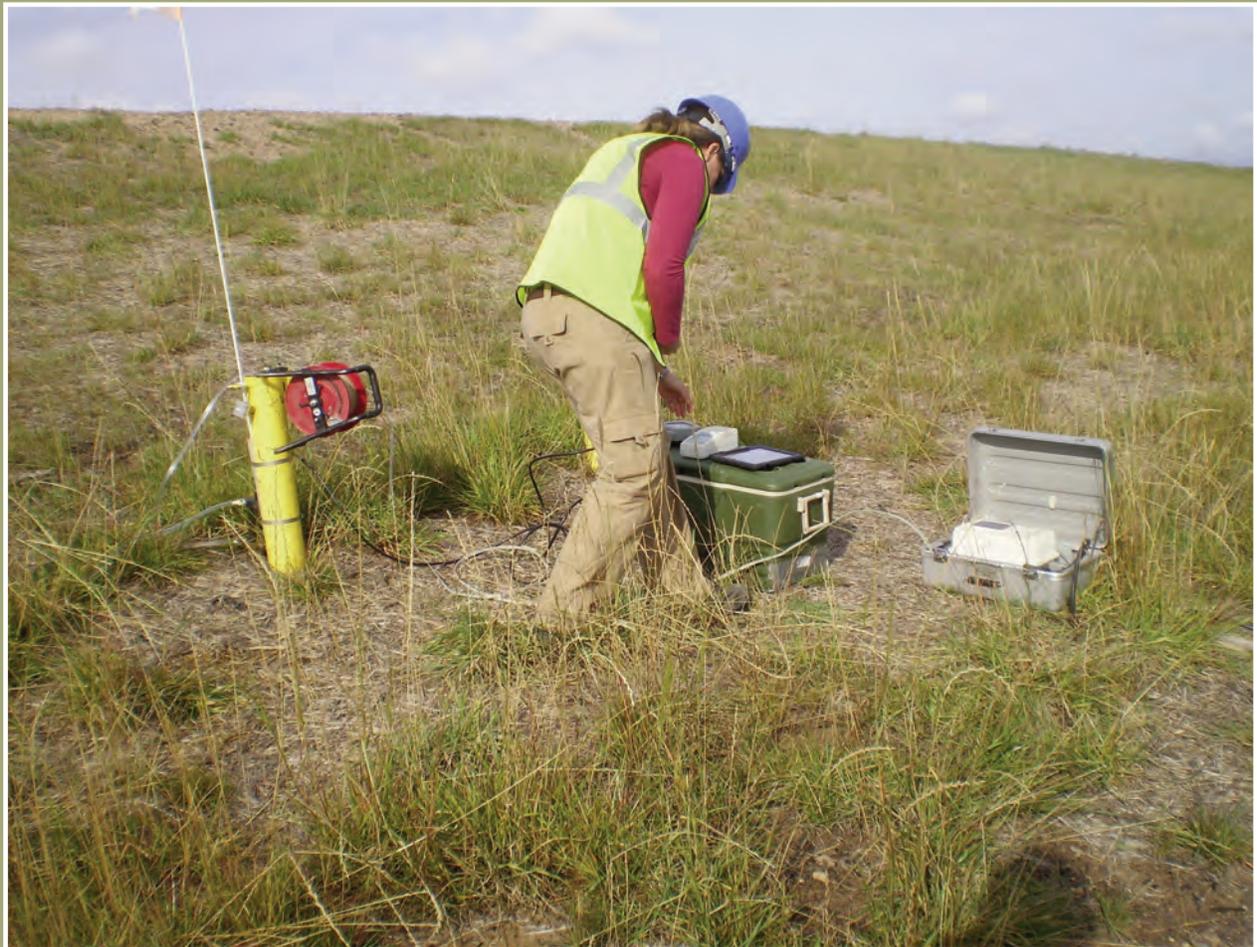


# 2016 WORK PLAN

for the  
**COMMUNITY ENVIRONMENTAL MONITORING PROGRAM**  
of the Eagle Mine  
June 1, 2016



Submitted by



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**Commonly Used Acronyms and Abbreviations**

CEMP	Community Environmental Monitoring Program
CWB	Contact Water Basins
DEQ	Michigan Department of Environmental Quality
Eagle	Eagle Mine
EPA	U.S. Environmental Protection Agency
GW	Groundwater
GWDP	Groundwater Discharge Permit
HTDF	Humboldt Tailings Disposal Facility
Foundation	Community Foundation of Marquette County
MP	Mine Permit
PM	Particulate Matter (dust) measured in microns
SWP	Superior Watershed Partnership
TBD	To Be Determined
TDRSA	Temporary Development Rock Storage Area
TWIS	Treated Water Infiltration System
WTP	Water Treatment Plant

Diagram of Eagle Mine Facilities



Eagle Mine Layout

- |                                     |  |                               |
|-------------------------------------|--|-------------------------------|
| 1 Guard House                       | 7 Truck Wash                               | 12 Aggregate Storage Building |
| 2 Non-Contact Water Basin           | 8 Underground Mobile Equipment Shop        | 13 Backfill Plant             |
| 3 Power House                       | 9 Coarse Ore Storage Area                  | 14 Portal                     |
| 4 Treated Water Infiltration System | 10 Contact Water Basins                    | 15 Mine Services Building     |
| 5 Cold Storage                      | 11 Temporary Development Rock Storage Area | 16 County Road AAA            |
| 6 Water Treatment Plant             |  |                               |

**Diagram of Humboldt Mill Facilities**



**Humboldt Mill Layout**

- |                                   |                          |                         |
|-----------------------------------|--------------------------|-------------------------|
| 1 Coarse Ore Storage Area         | 4 Mill Services Building | 7 Administrative Office |
| 2 Secondary and Tertiary Crushers | 5 Concentrator           | 8 Tailings Facility     |
| 3 Transfer Conveyor               | 6 Concentrate Load Out   |                         |

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## **Introduction**

The Community Environmental Monitoring Program (CEMP) of the Eagle Mine is implemented by two community-based organizations; the Superior Watershed Partnership (SWP) and the Community Foundation of Marquette County (Foundation). The CEMP is defined and governed by formal agreements between these organizations and Lundin Mining, who purchased the Eagle Mine from Rio Tinto during 2013. The CEMP is designed to build a comprehensive and accurate picture of any environmental impacts that may be a result of Eagle Mine’s operations at the mine site, the Humboldt Mill, and along the designated Transportation Route. The CEMP is independent, transparent, and based on the highest scientific standards.

The CEMP consists of four main components: 1) Verification Monitoring, which includes verifying the environmental monitoring done by Eagle Mine as required by its permits 2) Additional monitoring, which includes environmental monitoring done by SWP over and above the monitoring that Eagle Mine is required to do under its permits; and 3) Publication of results and ratings of Eagle Mine’s environmental performance; and 4) Community Outreach, to inform the public and provide opportunities for the community to provide input regarding CEMP activities.

During 2015-2016, the SWP, Lundin Mining, and the Foundation negotiated renewal of the CEMP Agreement to allow for continued environmental monitoring of Eagle Mine’s operations through 2018. The 2016 Work Plan marks the fifth year of CEMP monitoring and the third year of monitoring under the “operational” phase of production. The Work Plan is organized into three sections that describe CEMP activities 1) Annual Monitoring Objectives, 2) Monitoring Results and Performance Ratings, and 3) Community Input and Public Outreach. A summary of the annual monitoring objectives including work plan tasks, standards and frequency of activities is provided in Table 1. Community Environmental Monitoring Program monitoring locations and parameters for laboratory analyses are provided in Figures 1-7 and Tables 2-12 respectively.

## **1. Annual Monitoring Objectives**

### ***1.1. Verification Monitoring and Data Review***

#### *1.1.1. Baseline Data Review*

The SWP will continue to review and evaluate pre-mining (baseline) environmental data as it relates to data generated during monitoring of mining operations. The SWP recognizes that baseline data in and around the Eagle Mine includes data collected prior to September 2011. Data collected from the Humboldt Mill, Powell Township Air, and along the transportation route will be considered baseline through September 2014.

#### *1.1.2. Operations Data Review*

Eagle Mine will continue to provide SWP with environmental monitoring data in the form of reports, a data base or summary reports. SWP will review this data from three perspectives. The first is to verify the validity (precision, accuracy representativeness) of the data. The second is to analyze data for indications of impacts from mining operations. The last is to analyze data from background (including upgradient, baseline and reference monitoring points) for indications of local (e.g., logging), regional (e.g., atmospheric deposition) or global (e.g., climate change) impact related to other non-mine activity.

#### *1.1.3. Procedures Review/Observations*

SWP will continue to review and observe data collection at Eagle Mine and the Humboldt Mill during 2016. The objective is to verify that the procedures used are appropriate and will result in the generation of data sets that are representative of environmental conditions.

#### *1.1.4. Interpretations Review*

SWP will continue to interpret results of Eagle Mine's permit required environmental monitoring data. The interpretations review will focus primarily on assigning likely root cause (mine impacts, data quality issues or unrelated impacts) to monitoring point values that exceed permit specified benchmarks or thresholds. The SWP will utilize relevant baseline and secondary data (data from other sources) where appropriate to document interpretations of results and/or make comparisons to other local or regional environmental data.

### *1.1.5 Split Sampling*

SWP will carry out split sampling at permit required monitoring sites at the Eagle Mine site and the Humboldt Mill (groundwater, surface water, and facilities) in conjunction with Eagle Mine's scheduled monitoring. Split sampling is when a sample taken from a single source (e.g. a groundwater well) is divided in two, with each sample analyzed by a different certified laboratory. The objective of the split sampling is to verify that the laboratories used are appropriate and the results are representative of environmental conditions. Split samples will be conducted at Eagle Mine and the Humboldt Mill at the locations shown in Figures 1-6. The frequency and number of samples collected at each site are described in Table 2. Samples will be submitted to an independent laboratory for analyses. Analytical parameters, methods and reporting limits for split sampling are presented in Tables 3-10. The samples may be analyzed for the full parameter list or a subset of the parameters specified for that monitoring point. Results will be compared to baseline data and applicable permit benchmarks and limits.

## ***1.2 Additional Monitoring***

### *1.2.1 Powell Township Air Quality*

During November of 2012, an air quality and meteorological station was installed in Powell Township per the *CEMP Agreement*. The station is located in the community of Big Bay behind Crams General Store (Figures 7 and 8). The objective of the Powell Township air quality monitoring station is to generate data that can be used to identify potential air quality impacts in the community that may be a result of mining operations. During 2016, CEMP monitoring will measure particulate matter (dust) in the 10 micron size range (PM10) on a continuous basis. Particulate matter filters will also be sent to a laboratory for analysis of metal concentrations (Table 11) on a quarterly basis. Air quality data are compared to National Ambient Air Quality Standards and Michigan Air Toxic Screening Levels. The meteorological station measures wind speed and direction, temperature, barometric pressure, precipitation, solar radiation, and relative humidity on a continuous basis.

### *1.2.2 Edible/Traditional Plant Tissue Monitoring*

Edible/traditional plant tissue monitoring began in 2015 to evaluate concerns voiced by the Keweenaw Bay Indian Community and other community members regarding potential impacts from mining activities on native plant species of high cultural value. The monitoring includes collection and analysis of berries, leaves and roots of important native plant species (including but not limited to: blueberry, Juneberry, chokecherry, pin cherry, raspberry, blackberry, strawberry, thimbleberry, cranberry, juniper berry, and wild rice). A list of parameters for analysis are provided in Table 12. Collections include plant tissue in the form of berries, leaves, and/or roots collected from sites located within a two-mile radius of the Eagle Mine and Humboldt Mill as well as a control location (Figure 7). Plant tissue samples will be collected and sent out for analysis at a certified laboratory and compared to guidelines and daily intake recommendations including the US Environmental Protection Agency's oral Tolerable Intake Values (TDI) and the Food and Drug Administration's recommended Daily Values (DV). A Year Two Technical Report will document any preliminary elemental discrepancies between test samples and control samples and will provide recommendations for further evaluation, if applicable.

### *1.2.3 Install New Groundwater Monitoring Well*

As a result of community concerns regarding potential impacts to the Salmon Trout River from Eagle Mine's operations, an additional groundwater monitoring well cluster will be installed near the Eagle Mine site; outside of the mine perimeter (fence) between the Treated Water Infiltration System (TWIS) and headwaters of tributaries to the Salmon Trout River (TBD). The objective of the new monitoring well cluster is to expand the existing monitoring infrastructure to further evaluate potential groundwater impacts as a result of Eagle Mine's Water Treatment Facility discharge. Groundwater data will be collected on a quarterly basis and compared to results from Eagle Mine's permit required groundwater monitoring sites.

### *1.2.4 Other Based on Results or New Activities*

The SWP may also collect additional data near the mine, mill, and along the transportation route during 2016 based on results or new information, community input, and/or new

activities. SWP will provide Eagle Mine with a plan (including locations, procedures, methodologies and standards) for any additional monitoring prior to commencing with monitoring activities.

## **2 Monitoring Results and Performance Ratings**

### ***2.1 Data Processing/Publication***

#### *2.1.1 Data Processing*

SWP laboratory(s) will deliver monitoring results in electronic format to SWP no later than 45 days of receipt of samples and the data will be processed by SWP within 5 working days of receipt from the laboratory. Data processing procedures will be conducted in a manner consistent with the *CEMP Agreement*, the *CEMP Notification Plan* and other agreed upon standards/operating procedures. Primary processing consists of verification that samples, parameters, analytical methods, and detection limits were completed as requested. Secondary processing will consist of the evaluation of laboratory quality control data and duplicate data for evidence of quality control issues. Tertiary processing consists of comparison of data to appropriate baseline data, permit specified criteria/benchmarks, or other agreed upon state or federal criteria. The final data processing step follows receipt of Eagle data and consists of the assessment of data precision by comparison Eagle's laboratory derived values with values produced by SWP's laboratory(s).

#### *2.1.2 Data Publication/Notification*

Data publication and notification processes are defined in the *CEMP Agreement*, as amended, and the *CEMP Notification Plan*. This includes procedures for 1) data sharing; 2) data anomalies and/or other events; 3) serious risks and/or breaches of permits or other applicable environmental regulations; and 3) release of data/information. Once data has been received from the laboratory and processed according to the procedures described above, SWP will make results available to the public on the CEMP website ([www.swpcemp.org](http://www.swpcemp.org)) in the form of quarterly summaries.

## **2.2 Performance Ratings**

### **2.2.1 CEMP Report Card**

The CEMP Report Card is located on the CEMP website and includes a red light, orange light, yellow light, and green light system used by SWP to rate Eagle Mine on its environmental performance on a quarterly basis. Performance ratings, based on environmental monitoring results, will be completed on a quarterly basis or more frequently by location (Mine, Mill, or Transportation Route) and type of monitoring (facilities, groundwater, surface water, flora/fauna, etc.). The red light used in the rating indicates potential harm to the environment/potential permit violation; an orange light indicates an area of concern and/or potential impact to the environment, a yellow light indicates an area that is being tracked but currently poses no threat to the environment; and a green light indicates no known risks to the environment. A white or blank light indicates an area that was not rated.

### **2.2.2 CEMP Monitoring Reports**

At a glance, the CEMP Report Card indicates if there is an area of concern related to Eagle Mine's environmental performance with either yellow or red light ratings. These "lights" also serve as links (via a click and a pop-up box) to an explanation or summary of the reason(s) for the concern/color rating(s) or a more detailed Monitoring Report. During 2016, CEMP Monitoring Reports will be developed on a quarterly basis using language that is easy to understand for a broad audience. The quarterly monitoring reports will describe any issues, potential risks to the environment or human health, and measures taken by the CEMP program and Eagle Mine to address the situation. Quarterly monitoring reports will also be distributed via CEMP mail lists and social media.

## **3. Community Outreach**

### **3.1. Increased Emphasis Related to Risk Communication**

The SWP community outreach will incorporate information regarding potential human health risks and potential environmental risks related to Eagle Mine's operations. During 2016, the CEMP website will be updated and serve as the primary way to convey risk information to the public via quarterly summaries of results including trends analyses; and deviations from

benchmarks and permits limits. Additional risk communication will be provided through the Work Plan elements below.

### ***3.2 Regional, Great Lakes and International Outreach***

The SWP will participate in broad distribution of the CEMP *Case Studies* and other program information and findings to other communities and interested parties. This includes, but is not limited to, other communities in the Upper Peninsula, other states (ie; Minnesota, Wisconsin) and Canada. In addition, the SWP will identify opportunities to share relevant CEMP information on a Great Lakes level, national level and international level.

### ***3.3 Community Meetings and Forums***

During 2016, the SWP will continue to host community forums as deemed necessary in the City of Marquette, Powell Township (Big Bay), Humboldt Township, and Michigamme Township to inform the public about the CEMP and to gather input regarding community concerns and suggestions for additional monitoring activities. The community forum meeting dates/times will be determined in cooperation with the CEMP Technical Committee and Policy Group and will be publicized on the CEMP website, and through local media outlets and notification lists. The SWP will also present CEMP information upon request to local schools and university departments, community groups, and at other public events/forums.

### ***3.4 Continued Public Outreach Activities***

During 2016, the SWP will continue to conduct public outreach using the CEMP website, local news/media outlets, social media (Facebook and Twitter), printed materials, and publications to inform the public about CEMP activities. The SWP will respond to questions and inquiries and gather public input from public meetings and the CEMP website (via email).

### ***3.5 Performance Metrics for Community Outreach***

Performance metrics will be used to track community outreach and overall program success in informing the public about CEMP activities. Metrics including number of contacts made, number of hits to the CEMP website, number of press releases/news articles, etc. will be summarized quarterly and posted to the CEMP website.

## COMMUNITY ENVIRONMENTAL MONITORING PROGRAM 2016 BUDGET (June - December 2016)

Community Foundation of Marquette County - Management Fee	\$	15,000
<b>TOTAL MANAGEMENT FEE</b>	<b>\$</b>	<b>15,000</b>

### PROJECT MANAGEMENT AND STAFFING

Executive Director (118 hrs @ \$118.75/hr Fee for Service Rate*)	\$	14,013
Senior Planner (382 hrs @ \$90.25/hr Fee for Service Rate)	\$	34,426
Field Technican (711 hrs @ \$42.75/hr Fee for Service Rate)	\$	30,396
Field Technican/Public Outreach (493 hrs @ \$42.75/hr Fee for Service Rate)	\$	21,063
Administrator (155 hrs @ \$38/hr Fee for Service Rate)	\$	5,905
<b>TOTAL PROJECT MANAGEMENT AND STAFFING</b>	<b>\$</b>	<b>105,803</b>

\*Fee for Service Rates for SWP staff, reduced 5% from 2015, include 10-40% in fringe benefits (health insurance, social security, workers compensation, retirement, etc.) and approximately 35% in overhead costs (lease, utilities, office equipment, etc.).

### CONTRACTUAL

	<i>Samples</i>	
Lab Analysis - Eagle Mine - Mine Permit Surface Water	<i>0 addtl</i>	\$ -
Lab Analysis - Eagle Mine - Mine Permit Groundwater	4	\$ 1,800
Lab Analysis - Eagle Mine - Temporary Development Rock Storage Area	2	\$ 1,030
Lab Analysis - Eagle Mine - Groundwater Discharge Permit	4	\$ 1,800
Lab Analysis - Eagle Mine - Discharge Permit - Water Treatment Facility	2	\$ 1,045
Lab Analysis - Humboldt Mill - Mine Permit Groundwater	2	\$ 1,095
Lab Analysis - Humboldt Mill - Mine Permit Surface Water	2	\$ 1,285
Lab Analysis - Humboldt Mill - Discharge Permit - Water Treatment Facility	2	\$ 1,045
Lab Analysis - Edible/Traditional Plant Study	9	\$ 3,590
Lab Analysis - Air Station - Metals	<i>3 addtl</i>	\$ 841
Property Lease Fee Air/Met Station		\$ 900
Consultant - Data Portal Updating/Maintenance (discontinue 5/31/16)		\$ -
Consultant - Data Portal Hosting (discontinue 5/31/16)		\$ -
Training/Certifications		\$ 450
Website Updates		\$ 1,870
Air/Met Station Modem/Website Setup		\$ -
Eagle Mine - New Well Cluster/Sampling		\$ 61,000
<b>TOTAL CONTRACTUAL</b>		<b>\$ 77,751</b>

### SUPPLIES AND MATERIALS

Printing (educational materials, reports, etc.)	\$	864
Public Meetings (media announcements, room rental, etc.)	\$	400
Field and Office supplies/materials	\$	882
FedEx Shipping	\$	1,282
<b>TOTAL SUPPLIES AND MATERIALS</b>	<b>\$</b>	<b>3,428</b>

### TRAVEL

Travel to meetings, field sites, etc.	\$	1,291
<b>TOTAL TRAVEL</b>	<b>\$</b>	<b>1,291</b>

**TOTAL 2016 BUDGET \$ 203,273**

### RESERVE FUND

2015 Carry Over - toward Air/Met Station Modem/Website set up	\$	7,798
<b>TOTAL 2016 FUNDING</b>	<b>\$</b>	<b>211,071</b>



**Mine Permit  
Surface Water  
Monitoring Locations**

**Legend**

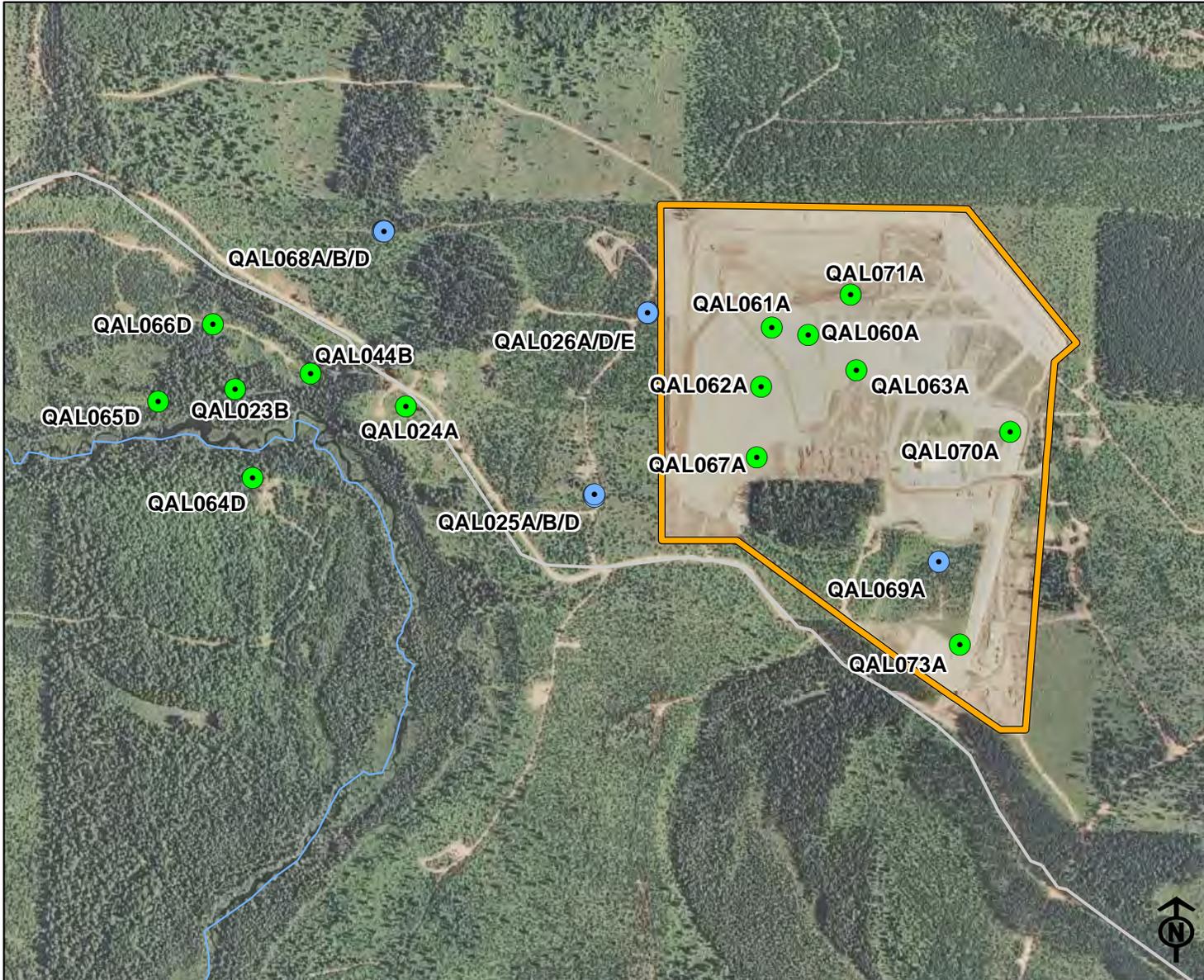
-  SW Monitoring Station
-  Mine Facilities
-  Road
-  Hydrography
-  Watershed Boundary

Reference  
Projection & Datum: UTM NAD 83 Zone 16N

0 1.25 2.5 5 Miles

1:200,000

 Community Environmental  
Monitoring Program  
**Figure: 1**



**Mine Permit  
Groundwater  
Monitoring Locations**

**Legend**

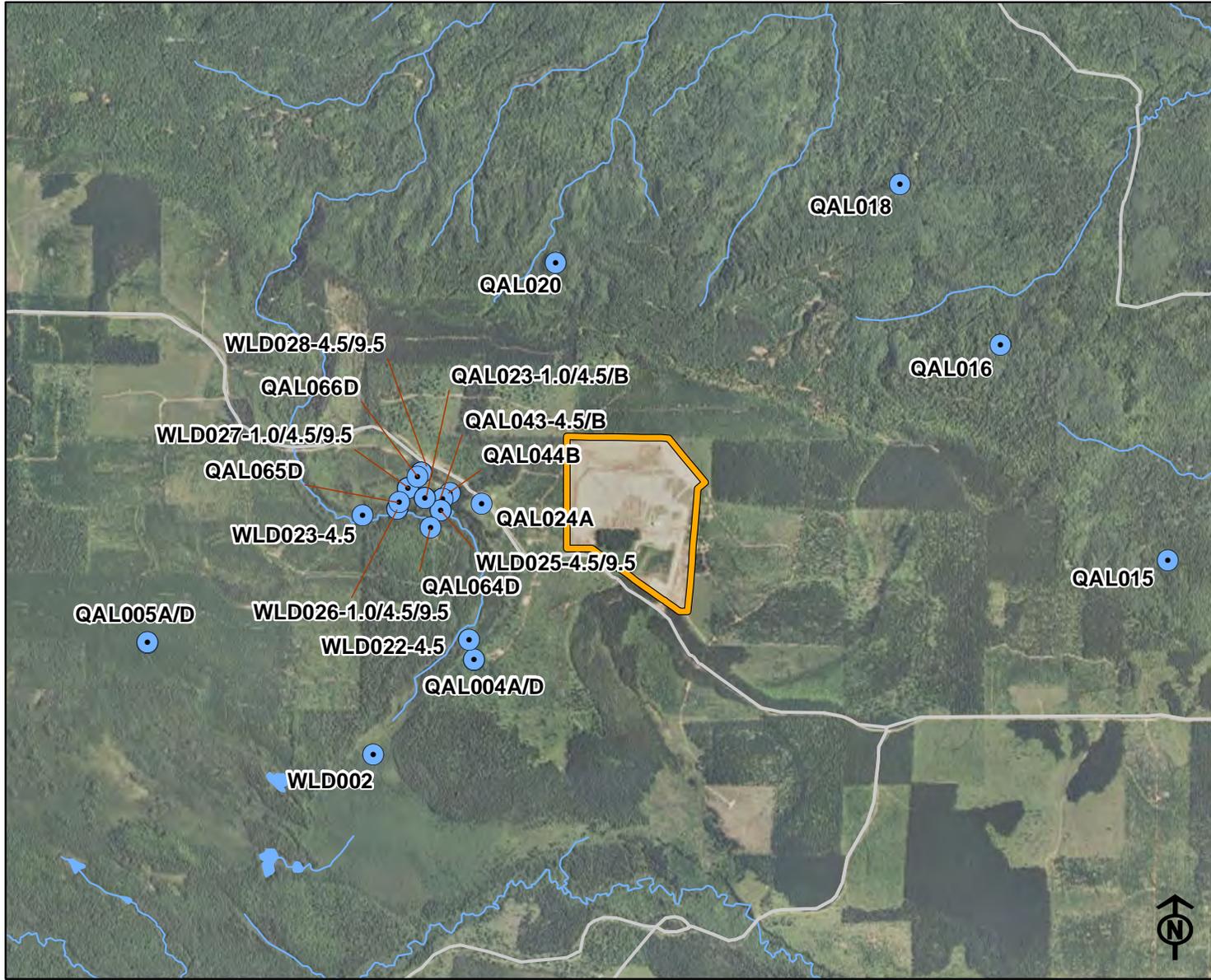
- Background Well
- Compliance Well
- Mine Facilities
- Road
- ~ Hydrography

Reference  
Projection & Datum: UTM NAD 83 Zone 16N

0 0.05 0.1 0.2 Miles

1:12,000


 Community Environmental  
Monitoring Program  
**Figure: 2**



**Mine Permit  
Groundwater Elevation  
Monitoring Locations**

**Legend**

-  GW Elevation Monitoring Well
-  Mine Facilities
-  Road
-  Hydrography

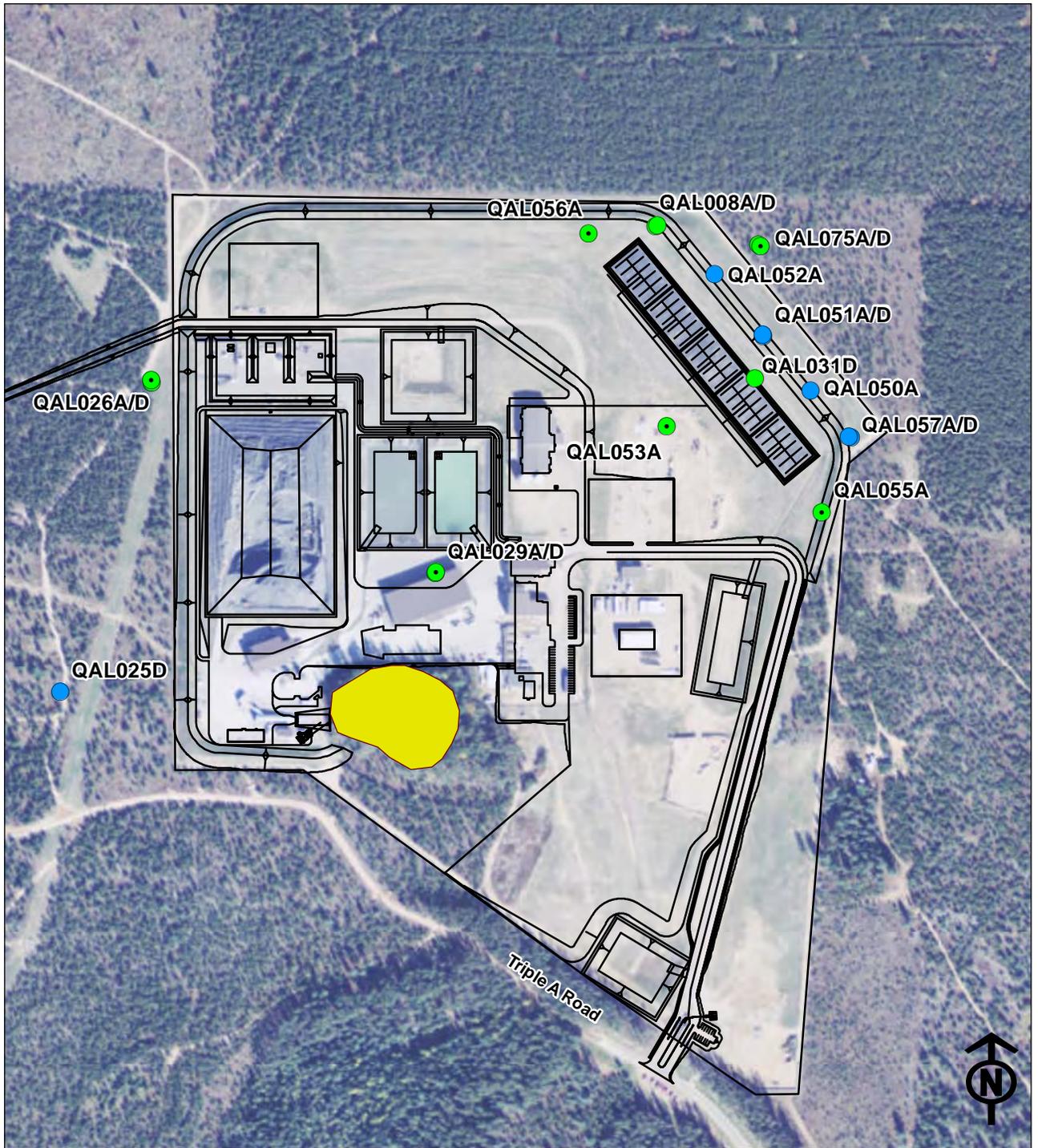
Reference  
Projection & Datum: UTM NAD 83 Zone 16N

0 0.2 0.4 0.8 Miles

1:36,000

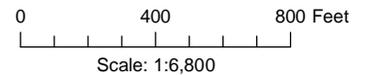
 Community Environmental  
Monitoring Program

**Figure: 3**



**GROUNDWATER DISCHARGE PERMIT  
GROUNDWATER MONITORING LOCATIONS**

- COMPLIANCE WATER QUALITY
- BACKGROUND WATER QUALITY
- ELEVATION
- *Instrumented for continuous monitoring*
- MINE FACILITIES
- OUTCROP



**Eagle Mine**  
a subsidiary of **Iron Ore Mining**

Eagle Mine  
Groundwater Discharge Permit  
GW1810162

**Reference**

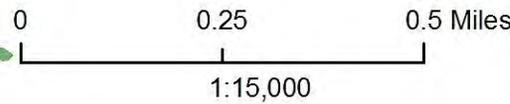
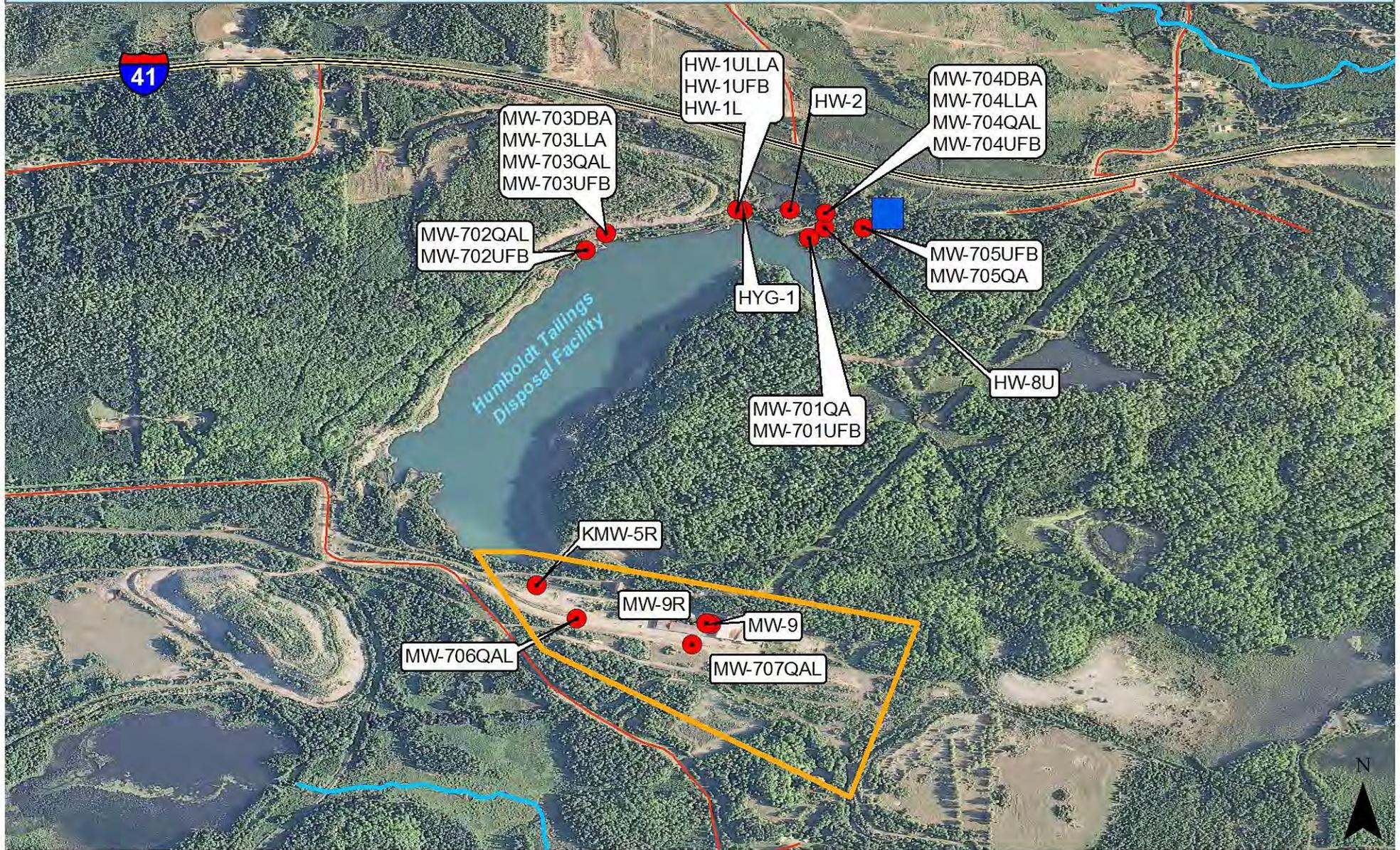
Data provided by Eagle Mine and North Jackson Company  
Projection & Datum: UTM NAD 83 Zone 16N

**North Jackson Company**  
ENVIRONMENTAL SCIENCE & ENGINEERING

**Figure: 4**

Figure: 5

# Humboldt Mill Mine Permit Groundwater Monitoring Locations

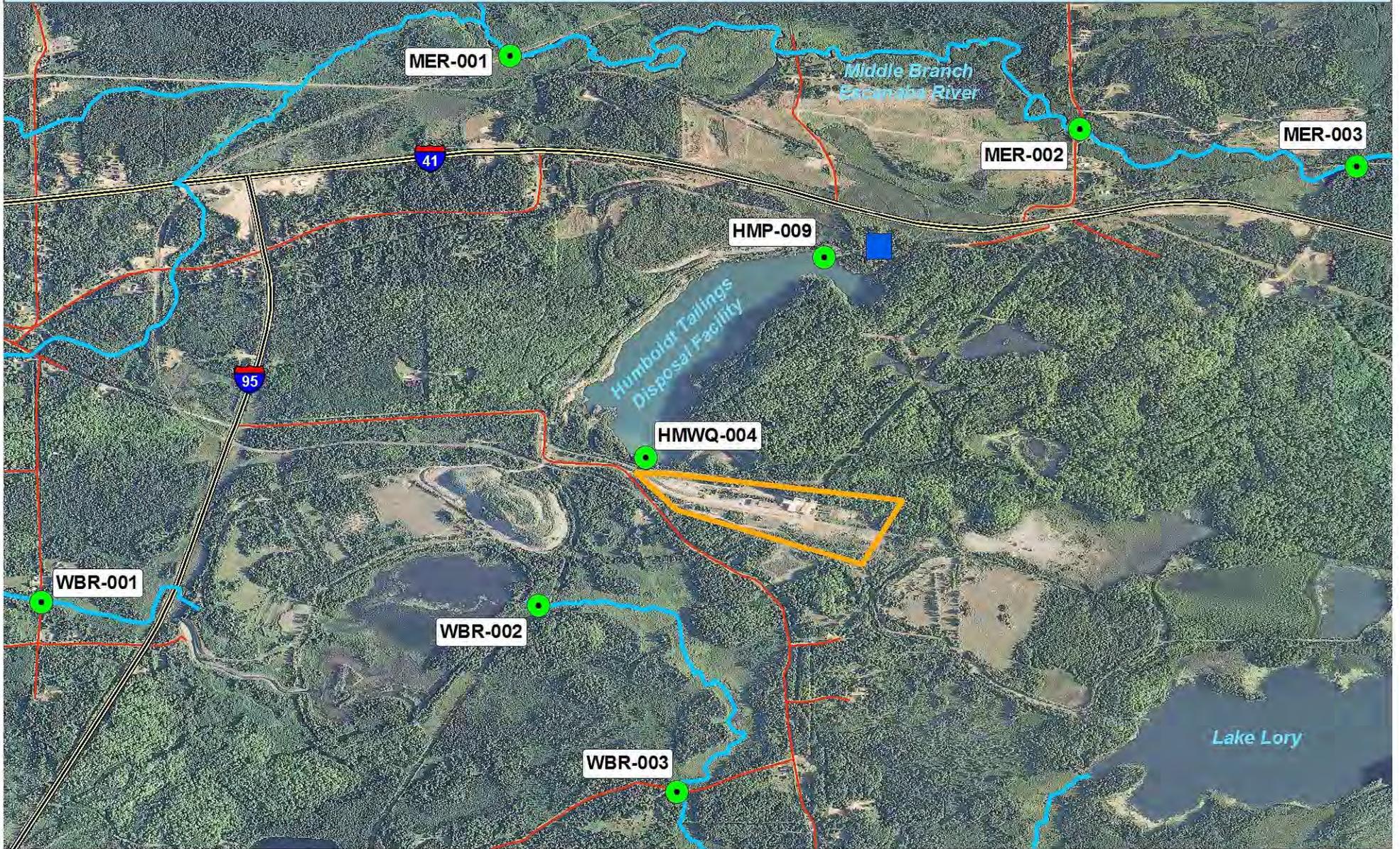


- All Roads
- River
- == State Roads
- Groundwater Monitoring Sites
- Humboldt Mill Water Treatment Plant
- Humboldt Mill



Figure: 6

# Humboldt Mill Mine Permit Surface Water/Sediment Monitoring Locations



0 0.25 0.5 Miles  
1:24,000

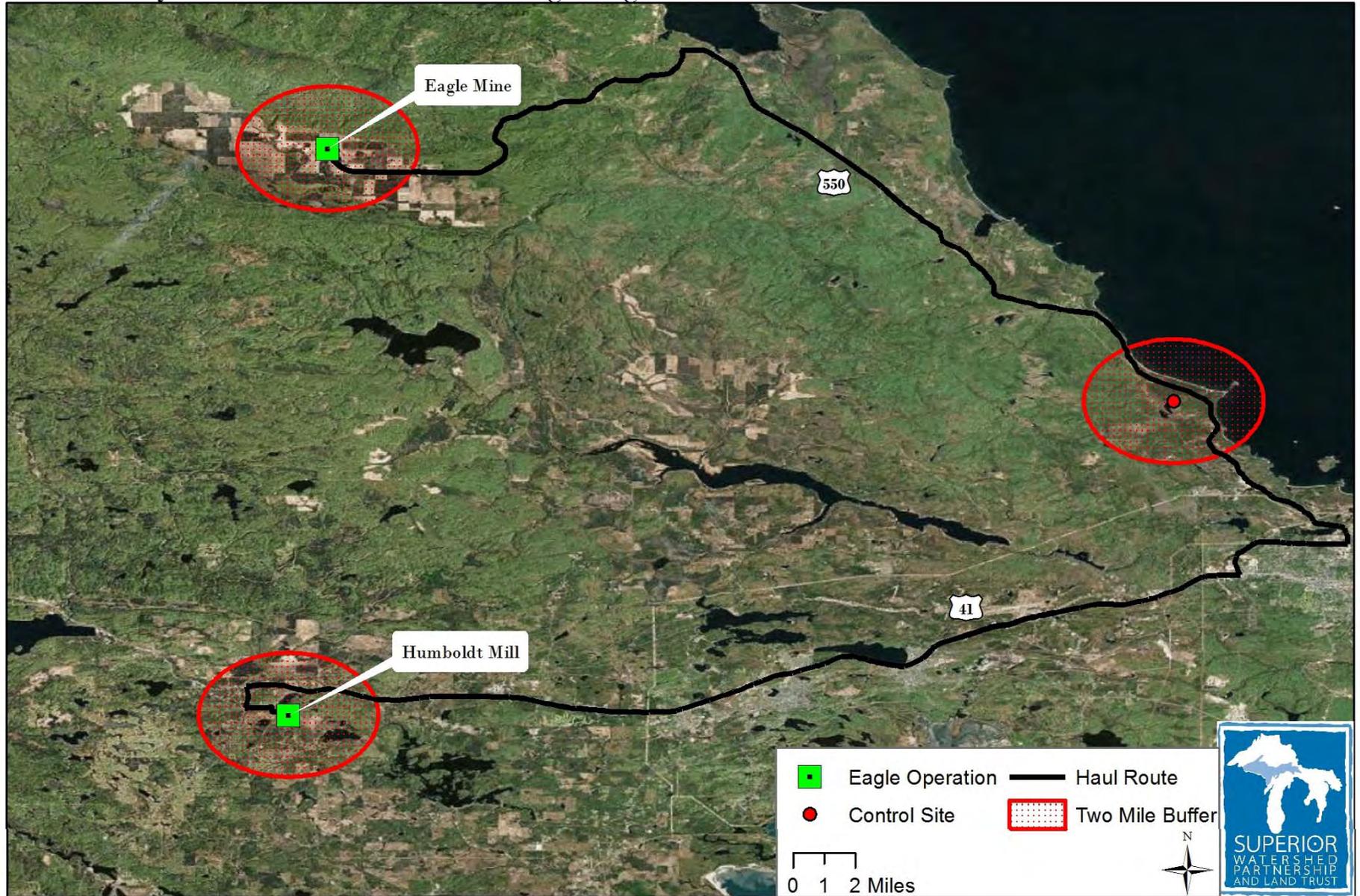
- All Roads
- River
- State Roads
- Surface Water/Sediment Sites
- Humboldt Mill Water Treatment Plant
- Humboldt Mill



Figure: 7

# Plant Tissue Analysis

## Community Environmental Monitoring Program



**Table 1.  
Summary of 2016 Annual Monitoring Objectives**

<b>WORK PLAN TASK</b>	<b>SITE(S)</b>	<b>PARAMETERS</b>	<b>STANDARDS</b>	<b>PERIOD</b>	<b>FREQUENCY</b>
<b>Verification Monitoring and Data Review</b>					
Baseline Data Review	Permit compliance and background monitoring sites (Mine and Mill)	Review of pre-mining data (groundwater, surface water, air, aquatics, and flora and fauna)	Part 632 Rule and Applicable Permits (Mining, Groundwater Discharge, Inland Lakes and Streams, and NPDES)	Mine data collected prior to September 2011, Mill data through September 2014	Ongoing
Operations Data Review	Permit compliance and background monitoring sites (Mine and Mill)	Review of operations data (groundwater, surface water, and wastewater, solid waste, air, aquatics, flora and fauna)	Part 632 Rule and Applicable Permits (Mining, Groundwater Discharge, Inland Lakes and Streams, and NPDES)	Mine data collected after September 2011, Mill data collected after September 2014	Ongoing, based on Eagle Mine scheduled monitoring
Procedures Review/Observations	Permit compliance and background monitoring sites (Mine and Mill)	Review of procedures and field data collection (groundwater, surface water, and wastewater, solid waste, air, aquatics, flora and fauna)	Part 632 Rule and Applicable Permits (Mining, Groundwater Discharge, Inland Lakes and Streams, and NPDES)	2016	Ongoing, based on Eagle Mine scheduled monitoring
Interpretation Review	Permit compliance and background monitoring sites (Mine and Mill)	Interpretation of results: groundwater, surface water, and facilities wastewater (quantity, elevation, flow, and quality)	Part 632 Rule and Applicable Permits (Mining, Groundwater Discharge, Inland Lakes and Streams, and NPDES)	2016	Ongoing, based on Eagle Mine scheduled monitoring
Split Sampling	Permit compliance and background monitoring sites (Mine and Mill)	Groundwater, surface water, and facilities wastewater quality	Part 632 Rule and Applicable Permits (Mining, Groundwater Discharge, Inland Lakes and Streams, and NPDES)	2016	Ongoing, based on Eagle Mine scheduled monitoring
<b>Additional Monitoring</b>					
Powell Township Air Quality	Stationary Air/Meteorological Station in Big Bay	PM10, metals analysis; wind speed and direction, air temperature, relative humidity, and solar radiation	National Ambient Air Quality Standards and Michigan Air Toxic Screening Levels	2012-2016	Continuous (PM10 and meteorological data) and Quarterly (Metals)
Eagle Mine Air Quality	Stationary Air/Meteorological Station near Eagle Mine	PM10; wind speed and direction, air temperature, relative humidity, and solar radiation	National Ambient Air Quality Standards	2007-2016	Continuous (PM10 and meteorological data)
Edible/Traditional Plant Study	Eagle Mine, Humboldt Mill, and Control Area	Metals analysis plant tissue and fruit	US Environmental Protection Agency's (US EPA) oral tolerable intake values (TDI) and the Food and Drug Administration's (FDA) recommended Daily Values (DV)	2015-2016	Annually
Install New Groundwater Monitoring Well	Eagle Mine - between TWIS and Salmon Trout River	Groundwater quality	Comparison with Eagle Mine Part 632 Mining Permit and Groundwater Discharge Permit Monitoring Sites	2016	Quarterly

**Table 1.  
Summary of 2016 Annual Monitoring Objectives**

<b>WORK PLAN TASK</b>	<b>SITE(S)</b>	<b>PARAMETERS</b>	<b>STANDARDS</b>	<b>PERIOD</b>	<b>FREQUENCY</b>
Other Based on Community Input, Results and/or New Activities	Sites (TBD) near Eagle Mine, Humboldt Mill, and/or Transportation Route	TBD	TBD	2016	TBD
<b>Monitoring Results and Performance Ratings</b>					
Data Processing/Publication	N/A	Process results from CEMP/Eagle Mine Monitoring; post summaries of results on CEMP website (www.swpcemp.org)	CEMP Agreement and Notification Plan	2016	Quarterly
Performance Ratings	N/A	Report Card ratings of environmental performance on CEMP website (www.swpcemp.org)	CEMP Agreement and Notification Plan	2016	Quarterly
<b>Community Outreach</b>					
Community Meetings/Forums	N/A	Community Forums, other meetings/presentations to community groups, etc.	CEMP Agreement and Notification Plan	2016	Ongoing
Public Outreach Activities	N/A	CEMP website, local news/media, email updates, social media, CEMP hotline, etc.	CEMP Agreement and Notification Plan	2016	Ongoing

**Table 2**  
**Summary of Permit Required “Split Sampling” Monitoring Sites at**  
**Eagle Mine and the Humboldt Mill**

<b>Monitoring Location/Type</b>	<b>Data Range (years)</b>	<b>Permit</b>	<b>Frequency</b>	<b>Number of Monitoring Sites</b>	<b>Eagle Mine Samples/Year</b>	<b>2016 CEMP Samples/Year</b>
<b>EAGLE MINE</b>						
Surface Water	2002-2015	Mine Permit	Quarterly	11	44	2
Surface Water	2011-2015	Mine Permit	Continuous	4	NA	NA
Groundwater	2011-2015	Mine Permit	Quarterly	24 (10 background and 14 compliance)	96	4
Facilities: Temporary Development Rock Storage Area (TDRSA) Contact Water Sump and Leak Detection Sump, Contact Water Basins/WTP Influent, and Underground	2012-2015	Mine Permit	Quarterly (Varies)	4	16	2
Groundwater Elevation	2004-2015	Mine Permit	Continuous/Discrete	24 (10 background and 14 compliance)	NA	NA
Facilities: Water Treatment Facility	2012-2015	Groundwater Discharge Permit	Monthly	1	12	2

Monitoring Location/Type	Data Range (years)	Permit	Frequency	Number of Monitoring Sites	Eagle Mine Samples/Year	2016 CEMP Samples/Year
Groundwater	2008-2015	Groundwater Discharge Permit	Quarterly	15 (7 background and 8 compliance)	60	4
<b>Total Eagle Mine</b>				<b>55</b>	<b>228</b>	<b>14</b>
<b>HUMBOLDT MILL</b>						
Groundwater	2014-2015	Mine Permit	Quarterly	23	96	2
Surface Water	2014-2015	Mine Permit	Quarterly	8	32	2
Facilities: Water Treatment Facility	2014-2015	Surface Water Discharge Permit	Monthly	1	12	2
<b>Total Humboldt Mill</b>				<b>39</b>	<b>140</b>	<b>6</b>

**Table 3**  
**Eagle Mine - Mine Permit Surface Water Monitoring**  
**Parameters, Frequency, Analytical Method and Laboratory Reporting Limits**

Parameters	Frequency	Analytical Method <sup>1</sup>	Laboratory Reporting Limit	Units
<b>Field</b>				
Temperature	Quarterly	Field	na	°C
Dissolved Oxygen	Quarterly	Field	na	mg/L
pH	Quarterly	Field	na	SU
Specific Conductance	Quarterly	Field	na	umhos/cm
Flow	Quarterly	Field	na	cfs
<b>Anions</b>				
Alkalinity, Bicarbonate	Annual	310.1/SM 2320 B	2.0	mg/L
Alkalinity Carbonate	Annual	310.1/SM 2320 B	2.0	mg/L
Chloride	Annual	EPA-325.2/4599-CL E	1.0	mg/L
Flouride	Annual	SM 4500 F-C	0.10	mg/L
Nitrate Nitrogen	Annual	EPA-353.2/4500 NO3F	0.050	mg/L
Sulfate	Quarterly	EPA-375.4/9038	1.0	mg/L
<b>Cations</b>				
Calcium	Annual	EPA-200.7/6010B	0.50	mg/L
Potassium	Annual	EPA-200.7/6010B	0.50	mg/L
Magnesium	Annual	EPA-200.7/6010B	0.50	mg/L
Sodium	Annual	EPA-200.7/6010B	0.50	mg/L
Total Dissolved Solids	Quarterly	EPA-160.1	50	mg/L
<b>Metals</b>				
Aluminum	Annual	EPA-200.7/6010B	50	ug/L
Lithium	Annual	EPA-200.7/6010B	10	ug/L
Antimony	Annual	EPA-200.8/6020	2.0	ug/L
Arsenic	Quarterly	EPA-200.8/6020	1.0	ug/L
Barium	Annual	EPA-200.8/6020	10	ug/L
Iron	Quarterly	EPA-200.7/6010B	20	ug/L
Beryllium	Annual	EPA-200.8/6020	1.0	ug/L
Boron	Quarterly	EPA-200.8/6020	50	ug/L
Cadium	Annual	EPA-200.8/6020	0.20	ug/L
Chromium	Annual	EPA-200.8/6020	1.0	ug/L
Copper	Quarterly	EPA-200.8/6020	1.0	ug/L
Cobalt	Quarterly	EPA-200.8/6020	10	ug/L
Lead	Annual	EPA-200.8/6020	1.0	ug/L
Manganese	Quarterly	EPA-200.8/6020	10	ug/L
Molybdenum	Annual	EPA-200.8/6020	10	ug/L
Nickel	Quarterly	EPA-200.8/6020	1.0	ug/L
Selenium	Quarterly	EPA-200.8/6020	2.0	ug/L
Silver	Annual	EPA-200.8/6020	0.20	ug/L
Zinc	Quarterly	EPA-200.8/6020	10	ug/L
Mercury <sup>1</sup>	Quarterly	EPA-1631E	0.00025	ug/L

<sup>1</sup> Acceptable by MDEQ to use 0.005 ug/L as reporting limit for mercury.

**Table 4**  
**Eagle Mine - Mine Permit Groundwater Monitoring**  
**Parameters, Frequency, Analytical Methods, and Laboratory Reporting Limits**

Parameters	Frequency of Analysis	Analytical Method <sup>2</sup>	Laboratory Reporting Limit	Units
<b>Field</b>				
Static Water Elevation	Quarterly	Field	--	ft/msl
Redox	Quarterly	Field	--	meV
Temperature	Quarterly	Field	--	°C
Dissolved Oxygen	Quarterly	Field	--	mg/L
pH	Quarterly	Field	--	su
Specific Conductance	Quarterly	Field	--	umhos/cm
<b>Anions</b>				
Alkalinity, Bicarbonate	Quarterly	310.1	2.0	mg/L
Alkalinity Carbonate	Quarterly	310.1	2.0	mg/L
Nitrate Nitrogen	Quarterly	EPA-353.2	0.050	mg/L
Sulfate	Quarterly	EPA-375.4	2.0-5.0	mg/L
Flouride	Annual	SM 4500 F-C	0.10	mg/L
Chloride	Quarterly	EPA-325.2	1.0	mg/L
<b>Cations</b>				
Calcium	Annual	EPA-6010B	0.50	mg/L
Sodium	Quarterly	EPA-6010B	0.50	mg/L
Magnesium	Annual	EPA-6010B	0.50	mg/L
Potassium	Annual	EPA-6010B	0.50	mg/L
<b>Metals</b>				
Aluminum	Annual	EPA-6010B	50	ug/L
Antimony	Annual	EPA-6020	5.0	ug/L
Arsenic	Quarterly	EPA-6020	2.0	ug/L
Barium	Annual	EPA-6020	20	ug/L
Beryllium	Annual	EPA-6020	1.0	ug/L
Boron	Quarterly	EPA-6010B	100	ug/L
Cadmium	Annual	EPA-6020	0.50	ug/L
Chromium	Annual	EPA-6020	5.0	ug/L
Cobalt	Annual	EPA-6010B	10	ug/L
Copper	Quarterly	EPA-6020	5.0	ug/L
Iron	Quarterly	EPA-6010B	20	ug/L
Lead	Annual	EPA-6020	1.0	ug/L
Lithium	Annual	EPA-6010B	8.0	ug/L
Manganese	Quarterly	EPA-6010B	20	ug/L
Mercury <sup>1</sup>	Quarterly	EPA-1631E	0.00025	ug/L
Molybdenum	Annual	EPA-6020	10	ug/L
Nickel	Quarterly	EPA-6020	25	ug/L
Selenium	Quarterly	EPA-6020	1.0	ug/L
Silver	Annual	EPA-6020	0.20	ug/L
Strontium	Annual	EPA-6010B	50	ug/L
Thallium	Annual	EPA-200.8/6020	2.0	ug/L
Vanadium	Annual	EPA-200.8/6020	10	ug/L
Zinc	Quarterly	EPA-6020	10	ug/L

<sup>1</sup> Acceptable by MDEQ to use 0.005 ug/L as reporting limit for mercury.

<sup>2</sup> Acceptable to use equivalent or improved analytical methods.

-- Indicates the permit does not specify this information.

**Table 5**  
**Eagle Mine - Mine Permit Facilities (TDRSA and CWB) Monitoring**  
**Parameters, Frequency, Analytical Methods, and Laboratory Reporting Limits**

Parameters	Frequency of Analysis	Analytical Method <sup>1</sup>	Laboratory Reporting Limit	Units
Static Water Elevation	Quarterly	Field	0.01	ft
Alkalinity, Bicarbonate	Quarterly	310.1/SM 2320 B	2	mg/L
Alkalinity Carbonate	Quarterly	310.1/SM 2320 B	2	mg/L
Nitrate Nitrogen	Annual	EPA-353.2/4500 NO3F	0.05	mg/L
pH	Quarterly	Field	--	su
Specific Conductance	Quarterly	Field	--	umhos/cm
Sulfate	Quarterly	EPA-375.4/9038	1	mg/L
Chloride	Quarterly	EPA-325.2/4599-CL E	1	mg/L
Sodium	Annual	EPA-200.7/6010B	0.5	mg/L
Antimony	Annual	200.8/6020	2	ug/L
Arsenic	Quarterly	200.8/6020	1	ug/L
Barium	Annual	200.8/6020	10	ug/L
Beryllium	Annual	200.8/6020	1	ug/L
Boron	Quarterly	200.8/6020	50	ug/L
Cadium	Annual	200.8/6020	0.2	ug/L
Calcium	Annual	200.7/6010B	0.5	mg/L
Chromium	Annual	200.8/6020	1	ug/L
Cobalt	Annual	200.8/6020	10	ug/L
Copper	Quarterly	200.8/6020	1	ug/L
Flouride	Annual	SM 4500 F-C	0.1	mg/L
Iron	Quarterly	200.7/6010B	20	ug/L
Lead	Annual	200.8/6020	1	ug/L
Lithium	Annual	200.7/6010B	10	ug/L
Magnesium	Annual	200.7/6010B	0.5	mg/L
Manganese	Quarterly	200.8/6020	10	ug/L
Mercury	Quarterly	1631/----	0.00025	ug/L
Molybdenum	Annual	200.8/6020	10	ug/L
Nickel	Quarterly	200.8/6020	1	ug/L
Potassium	Annual	200.7/6010B	0.5	mg/L
Selenium	Quarterly	200.8/6020	2	ug/L
Silver	Annual	200.8/6020	0.2	ug/L
Strontium	Annual	200.8/6020	50	ug/L
Thallium	Annual	200.8/6020	2	ug/L
Vanadium	Annual	200.8/6020	10	ug/L
Zinc	Quarterly	200.8/6020	10	ug/L

<sup>1</sup> Acceptable to use equivalent or improved analytical methods.

-- Indicates the permit does not specify this information.

**Table 6**  
**Eagle Mine - Groundwater Discharge Permit WTP Effluent Monitoring**  
**Parameters, Frequency, Analytical Methods, and Laboratory Reporting Limits**

Parameters	Frequency of Analysis	Analytical Method <sup>1</sup>	Laboratory Reporting Limit	Units
Influent Flow	Daily	--	--	GPD
Effluent Flow	Daily	--	--	GPD
Biochemical Oxygen	Weekly	--	--	mg/l
Dissolved Oxygen	Monthly	--	--	mg/l
Ammonia Nitrogen	Monthly	--	--	mg/l
Nitrate Nitrogen	Monthly	--	--	mg/l
Nitrite Nitrogen	Monthly	--	--	mg/l
pH (Minimum)	Continuous Measurement	--	--	S.U.
pH (Maximum)	Continuous Measurement	--	--	S.U.
Total Phosphorus	Monthly	--	--	mg/l
Specific Conductance	Continuous Measurement	--	--	umhos/cm
Total Aluminum	Monthly	--	--	mg/l
Total Antimony	Monthly	200.8/6020	1	ug/l
Total Arsenic	Weekly	200.8/6020	1	ug/l
Total Barium	Monthly	200.8/6020	5	ug/l
Total Beryllium	Monthly	200.8/6020	1	ug/l
Total Boron	Weekly	200.8/6020	20	ug/l
Total Cadmium	Weekly	200.8/6020	0.2	ug/l
Total Chloride	Monthly	--	--	mg/l
Total Chromium	Monthly	200.8/6020	1	ug/l
Total Cobalt	Monthly	200.8/6020	15	ug/l
Total Copper	Weekly	200.8/6020	1	ug/l
Total Fluoride	Monthly	--	--	ug/l
Total Iron	Monthly	--	--	ug/l
Total Lead	Monthly	200.8/6020	1	ug/l
Total Lithium	Monthly	200.8/6020	8	ug/l
Total Manganese	Monthly	200.8/6020	5	ug/l
Total Mercury	Weekly	1631/----	0.0005	ug/l
Total Molybdenum	Monthly	200.8/6020	25	ug/l
Total Nickel	Monthly	200.8/6020	2	ug/l
Total Potassium	Monthly	--	--	ug/l
Total Selenium	Weekly	200.8/6020	1	ug/l
Total Silver	Weekly	200.8/6020	0.2	ug/l
Total Sodium	Monthly	--	--	mg/l
Total Strontium	Monthly	200.8/6020	5	ug/l
Total Sulfate	Monthly	--	--	ug/l
Total Thallium	Monthly	200.8/6020	2	ug/l
Total Vanadium	Monthly	200.8/6020	2	ug/l
Total Zinc	Monthly	200.8/6020	10	ug/l

<sup>1</sup> Acceptable to use equivalent or improved analytical methods.

-- Indicates the permit does not specify this information.

**Table 7**  
**Eagle Mine - Groundwater Discharge Permit Groundwater Monitoring**  
**Parameters, Analytical Methods, and Laboratory Reporting Limits**

Parameters	Frequency of Analysis	Analytical Method	Maximum Daily Limit	Units
<b>Field</b>				
Static Water Elevation	Quarterly	Field	Report	USGS-Ft
Dissolved Oxygen	Quarterly	Field	Report	mg/l
pH (Minimum)	Quarterly	Field	6.5	S.U.
pH (Maximum)	Quarterly	Field	9.7	S.U.
Specific Conductance	Quarterly	Field	Report	umhos/cm
<b>Anions</b>				
Bicarbonate	Quarterly	--	Report	mg/l
Chloride	Quarterly	--	Report	mg/l
Ammonia Nitrogen	Quarterly	--	10.0	mg/l
Nitrate Nitrogen	Quarterly	--	10.0	mg/l
Nitrite Nitrogen	Quarterly	--	Report	ug/l
Total Phosphorus	Quarterly	--	Report	mg/l
Sulfate	Quarterly	--	250	mg/l
<b>Cations</b>				
Calcium	Quarterly	--	Report	mg/l
Sodium	Quarterly	--	Report	mg/l
Magnesium	Quarterly	--	Report	mg/l
Potassium	Quarterly	--	Report	mg/l
<b>Metals</b>				
Aluminum	Quarterly	--	150	ug/l
Antimony	Quarterly	200.8/6020	5.0	ug/l
Arsenic	Quarterly	200.8/6020	6.0	ug/l
Barium	Quarterly	200.8/6020	1000	ug/l
Beryllium	Quarterly	200.8/6020	3	ug/l
Boron	Quarterly	200.8/6020	285	ug/l
Cadium	Quarterly	200.8/6020	3.0	ug/l
Chromium	Quarterly	200.8/6020	52	ug/l
Cobalt	Quarterly	200.8/6020	23	ug/l
Copper	Quarterly	200.8/6020	10	ug/l
Fluoride, Total	Quarterly	--	1000	ug/l
Iron	Quarterly	--	Report	ug/l
Lead	Quarterly	200.8/6020	3.0	ug/l
Lithium	Quarterly	200.8/6020	88	ug/l
Manganese	Quarterly	200.8/6020	50	ug/l
Mercury	Quarterly	1631/----	Report	ug/l
Molybdenum	Quarterly	200.8/6020	22	ug/l
Nickel	Quarterly	200.8/6020	57	ug/l
Selenium	Quarterly	200.8/6020	5.0	ug/l
Silver	Quarterly	200.8/6020	0.4	ug/l
Strontium	Quarterly	200.8/6020	2300	ug/l
Thallium	Quarterly	200.8/6020	1	ug/l
Uranium	Quarterly	--	Report	ug/l
Vanadium	Quarterly	200.8/6020	3.1*	ug/l
Zinc	Quarterly	200.8/6020	1200	ug/l

\* MWs QAL008A, QAI051A are report only for vanadium

Table 8

**Humboldt Mill - Mine Permit Groundwater Monitoring  
Parameters, Frequency of Analysis, Analytical Methods, and Laboratory Reporting Limits**

Parameters	Frequency of Analysis	Sample Type	Analytical Method	Laboratory Reporting Limit	Units
<b>Field</b>					
Static Water Elevation	Quarterly	Measured	Field	NA	ft/msl
Redox	Quarterly	Measured	Field	NA	meV
Temperature	Quarterly	Measured	Field	NA	°C
Dissolved Oxygen	Quarterly	Measured	Field	NA	mg/L
pH	Quarterly	Grab	Field	NA	su
Turbidity	Quarterly	Grab	Field	NA	NTU
Specific Conductance	Quarterly	Grab	Field	--	umhos/cm
<b>Anions</b>					
Alkalinity, Bicarbonate	Quarterly	Grab	310.2/SM 2320 B	2	mg/L
Alkalinity Carbonate	Quarterly	Grab	310.2/SM 2320 B	2	mg/L
Nitrate Nitrogen	Quarterly	Grab	353.2/4500 NO3F	0.05	mg/L
Nitrite Nitrogen	Quarterly	Grab	354.1/4500 NO3F or 353.2	0.05	mg/L
Nitrogen, Ammonia	Quarterly	Grab	350.1/4500 NH3 G	0.025	mg/L
Sulfate	Quarterly	Grab	ASTMD516-90(02)	100	mg/L
Sulfide	Quarterly	Grab	376.1/4500 S2-D	0.2	mg/L
Fluoride	Quarterly	Grab	SM 4500 F-C	1	mg/L
Chloride	Quarterly	Grab	325.2/4500-CLE	1	mg/L
<b>Cations</b>					
Sodium	Quarterly	Grab	EPA-6010B	0.5	mg/L
Calcium	Quarterly	Grab	EPA-6010B	0.5	mg/L
Potassium	Quarterly	Grab	EPA-6010B	0.5	mg/L
Magnesium	Quarterly	Grab	EPA-6010B	0.5	mg/L
<b>Other</b>					
Hardness (calculated) as CaCO3	Quarterly	Grab	SM2340B	NA	mg/L
<b>Metals</b>					
Aluminum	Annual	Grab	EPA-6010B	50	ug/L
Antimony	Annual	Grab	EPA-6020	2	ug/L
Arsenic	Quarterly	Grab	EPA-6020	2	ug/L
Barium	Annual	Grab	EPA-6020	20	ug/L
Beryllium	Annual	Grab	EPA-6020	1	ug/L
Boron	Annual	Grab	EPA-6010B	100	ug/L
Cadium	Annual	Grab	EPA-6020	0.5	ug/L
Chromium	Annual	Grab	EPA-6020	5	ug/L
Cobalt	Annual	Grab	EPA-6010B	10	ug/L
Copper	Quarterly	Grab	EPA-6020	4	ug/L
Iron	Quarterly	Grab	EPA-6010B	200	ug/L
Lead	Quarterly	Grab	EPA-6020	1	ug/L
Lithium	Annual	Grab	EPA-6010B	8	ug/L
Manganese	Quarterly	Grab	EPA-6020	20	ug/L
Mercury	Quarterly	Grab	EPA-1631E	0.0005	ug/L
Molybdenum	Annual	Grab	EPA-6020	10	ug/L
Nickel	Quarterly	Grab	EPA-6020	20	ug/L
Selenium	Annual	Grab	EPA-6020	1	ug/L
Silver	Annual	Grab	EPA-6020	0.2	ug/L
Thallium	Annual	Grab	EPA-200.8/6020	2	ug/L
Vanadium	Annual	Grab	EPA-200.8/6020	4	ug/L
Zinc	Quarterly	Grab	EPA-6020	10	ug/L

**Table 9**  
**Humboldt Mill - Mine Permit Surface Water Monitoring**  
**Parameters, Frequency of Analysis, Analytical Methods, and Laboratory Reporting Limits**

Parameter	Frequency of Analysis	Sample Type	Analytical Method	Laboratory Reporting Limit	Units
<b>Field</b>					
Flow	Quarterly	Grab	Field	NA	cfs
Temperature	Quarterly	Grab	Field	NA	°C
Dissolved Oxygen	Quarterly	Grab	Field	NA	mg/L
Specific Conductance	Quarterly	Grab	Field	NA	µmhos/cm
pH	Quarterly	Grab	Field	NA	S.U.
Turbidity	Quarterly	Grab	Field	NA	NTU
<b>Metals</b>					
Aluminum	Quarterly	Grab	EPA 6010	50	µg/l
Antimony	Quarterly	Grab	EPA 6020	2.0	µg/l
Arsenic	Quarterly	Grab	EPA 6020	1.0	µg/l
Barium	Quarterly	Grab	EPA 6020	10.0	µg/l
Beryllium	Quarterly	Grab	EPA 6020	1.0	µg/l
Boron	Quarterly	Grab	EPA 6020	50.0	µg/l
Cadmium	Quarterly	Grab	EPA-1638	0.01	µg/l
Chromium	Quarterly	Grab	EPA 6020	1.0	µg/l
Cobalt	Quarterly	Grab	EPA-1638	0.10	µg/l
Copper	Quarterly	Grab	EPA-1638	0.05	µg/l
Iron	Quarterly	Grab	EPA 6010	20.0	µg/l
Lead	Quarterly	Grab	EPA-1638	0.05	µg/l
Lithium	Quarterly	Grab	EPA 6010	10.0	µg/l
Manganese	Quarterly	Grab	EPA 6020	10.0	µg/l
Mercury (low level)	Quarterly	Grab	EPA-1631C	0.0005	µg/l
Molybdenum	Quarterly	Grab	EPA 6020	10.0	µg/l
Nickel	Quarterly	Grab	EPA-1638	0.20	µg/l
Selenium	Quarterly	Grab	EPA-1638	0.05	µg/l
Silver	Quarterly	Grab	EPA 6020	0.2	µg/l
Thallium	Quarterly	Grab	EPA 6020	2.0	µg/l
Vanadium	Quarterly	Grab	EPA 6020	2.0	µg/l
Zinc	Quarterly	Grab	EPA-1638	0.20	µg/l
<b>Anions</b>					
Alkalinity, Bicarbonate	Quarterly	Grab	310.2/SM 2320 B	2.0	mg/l
Alkalinity, Carbonate	Quarterly	Grab	310.2/SM 2320 B	2.0	mg/l
Chloride	Quarterly	Grab	325.2/4500-CLE	1.0	mg/l
Fluoride	Quarterly	Grab	SM 4500 F-C	0.1	mg/l
Nitrate	Quarterly	Grab	353.2/4500 NO3F	0.5	mg/l
Nitrite	Quarterly	Grab	354.1/4500 NO3F or 353.2	0.5	mg/l
Nitrogen, Ammonia	Quarterly	Grab	350.1/4500 NH3 G	0.5	mg/l
Sulfate	Quarterly	Grab	ASTMD516-90(02)	1.0	mg/l
Sulfide	Quarterly	Grab	376.1/4500 S2-D	5.0	mg/l
<b>Cations</b>					
Calcium (Total)	Quarterly	Grab	EPA-200.7/6010B	0.50	mg/l
Sodium (Total)	Quarterly	Grab	EPA-200.7/6010B	0.50	mg/l
Magnesium (Total)	Quarterly	Grab	EPA-200.7/6010B	0.50	mg/l
Potassium	Quarterly	Grab	EPA-200.7/6010B	0.50	mg/l
<b>General Chemistry</b>					
Hardness, (calculated) as CaCO3	Quarterly	Grab	Freeze and Cherry, 1979	NL	mg/l
Total Dissolved Solids	Quarterly	Grab	EPA-160.2/SM 2540 C	50.0	mg/l
Total Suspended Solids	Quarterly	Grab	EPA-160.2/SM 2540 D	1 / 3.3	mg/l

**Table 10**  
**Humboldt Mill - NPDES Permit Water Treatment Plant Effluent Monitoring**  
**Parameters, Frequency of Analysis, Analytical Methods, and Laboratory Reporting Limits**

WTP Effluent	Frequency of Analysis	Sample Type	Analytical Methods	Laboratory Reporting Limit	Units
<b>Field</b>					
Dissolved Oxygen	Daily	Grab	Field	NA	mg/l
pH	Daily	Grab	Field	NA	S.U.
Outfall Observation	Daily	Grab	Field	NA	NA
<b>Other</b>					
Total Suspended Solids	Weekly	Grab	2540D	NA	mg/L
Total Dissolved Solids	Weekly	Grab	2540C	NA	mg/L
Biochemical Oxygen Demand (BOD)	2 x Month	Grab	5210B	NA	mg/l
Acute Toxicity	Monthly	Grab		NA	TU <sub>A</sub>
Chronic Toxicity	Monthly	Grab		NA	TU <sub>C</sub>
<b>Anions</b>					
Ammonia Nitrogen	2 x Month	Grab	4500-NH3 G	0.05	mg/l
Total Phosphorus	Weekly	Grab	4500-P E	0.01	mg/l
Fluoride	2 x Month	Grab	4500-F C	100	ug/l
Sulfate	Weekly	Grab	ASTMD516-90(02)	5	mg/l
<b>Metals</b>					
Total Antimony	2 x Month	Grab	200.7/200.8	1.0	ug/l
Total Arsenic	Weekly	Grab	200.7/200.8	1.0	ug/l
Total Barium	2 x Month	Grab	200.7/200.8	5.0	ug/l
Total Boron	2 x Month	Grab	200.7/200.8	20.0	ug/l
Total Cadmium	Weekly	Grab	200.7/200.8	0.2	ug/l
Total Chromium	2 x Month	Grab	200.7/200.8	1.0	ug/l
Total Cobalt	Weekly	Grab	200.7/200.8	15.0	ug/l
Total Copper	Weekly	Grab	200.7/200.8	1.0	ug/l
Total Lead	Weekly	Grab	200.7/200.8	1.0	ug/l
Total Lithium	2 x Month	Grab	200.7/200.8	8.0	ug/l
Total Manganese	Weekly	Grab	200.7/200.8	5.0	ug/l
Total Mercury	Weekly	Grab	1631E	0.5	ng/L
Total Molybdenum	2 x Month	Grab	200.7/200.8	25.0	ug/l
Total Nickel	Weekly	Grab	200.7/200.8	2.0	ug/l
Total Selenium	Weekly	Grab	200.7/200.8	1.0	ug/l
Total Strontium	2 x Month	Grab	200.7/200.8	5.0	ug/l
Total Zinc	Weekly	Grab	200.7/200.8	10.0	ug/l

**Table 11**  
**Powell Township Air Station – Air Metals Monitoring**  
**Parameters, Analytical Methods, and Laboratory Reporting Limits**

Eastern Research Group  
 601 Keystone Park Drive  
 Suite 700  
 Morrisville, NC 27560



**2013 Metals MDL - Compendium Method IO-3.5**

Element	47 mm Teflon		8x10" Quartz	
	ng/filter	ng/m3 (assuming 24.04m3)	ng/filter	ng/m3 (assuming 2000 m3)
Aluminum	1481	61.6	41816	20.9
Antimony	1.14	0.048	30.0	0.015
Arsenic	4.77	0.198	140	0.070
Barium	3.14	0.130	5839	2.92
Beryllium	0.374	0.016	5.17	0.003
Cadmium	0.340	0.014	19.4	0.010
Calcium	2539	106	394287	197
Chromium	408	17.0	4912	2.46
Cobalt	0.560	0.023	31.4	0.016
Copper	10.2	0.424	2866	1.43
Iron	376	15.6	33496	16.7
Lead	2.44	0.102	241	0.121
Magnesium	193	8.05	79243	39.6
Manganese	3.25	0.135	260	0.130
Mercury	0.60	0.025	8.91	0.004
Molybdenum	2.44	0.102	278	0.139
Nickel	6.01	0.250	2481	1.24
Rubidium	0.241	0.010	22.4	0.011
Selenium	7.27	0.302	54.9	0.027
Strontium	2.02	0.084	475	0.238
Thallium	0.036	0.001	0.867	0.0004
Thorium	0.354	0.015	3.79	0.002
Uranium	0.020	0.001	11.6	0.006
Zinc	222	9.25	14372	7.19

**2013 Hexavalent Chromium MDL - ASTM D7614**

Element	ng/filter	ng/m3 (assuming 21.6 m3)
Hexavalent Chromium	0.0083	0.00384

**Table 12**  
**Parameters and Analytical Methods for Edible/Traditional Plant Tissue Monitoring**

<b>Parameter</b>	<b>Method</b>
Aluminum	200.7
Antimony	200.8/6020
Arsenic	200.8/6020
Barium	200.7
Beryllium	200.7
Boron	200.7
Cadmium	200.8/6020
Calcium	200.7
Chromium	200.7
Cobalt	200.7
Copper	200.7
Iron	200.7
Lead	200.8/6020
Lithium	200.7
Magnesium	200.7
Manganese	200.7
Mercury	245.1/7470A
Molybdenum	200.7
Nickel	200.7
Potassium	200.7
Selenium	200.8/6020
Sodium	200.7
Strontium	200.7
Thallium	200.8/6020
Vanadium	200.8/6020
Zinc	200.7
Ammonia	350.1
Nitrate/Nitrite Nitrogen	4500-NO3- F
Total Organic Nitrogen - TKN	351.2
Sulfate	4500-SO4- E
Sulfur	200.7
Total Phosphorus	4500-P
Uranium	200.8