COOKS VALLEY PROPERTIES
NONMETALLIC MINE RECLAMATION PLAN
PURFRAC, LLC
TOWN of COOKS VALLEY
CHIPPEWA COUNTY, WISCONSIN

Prepared for:

PurFrac, LLC
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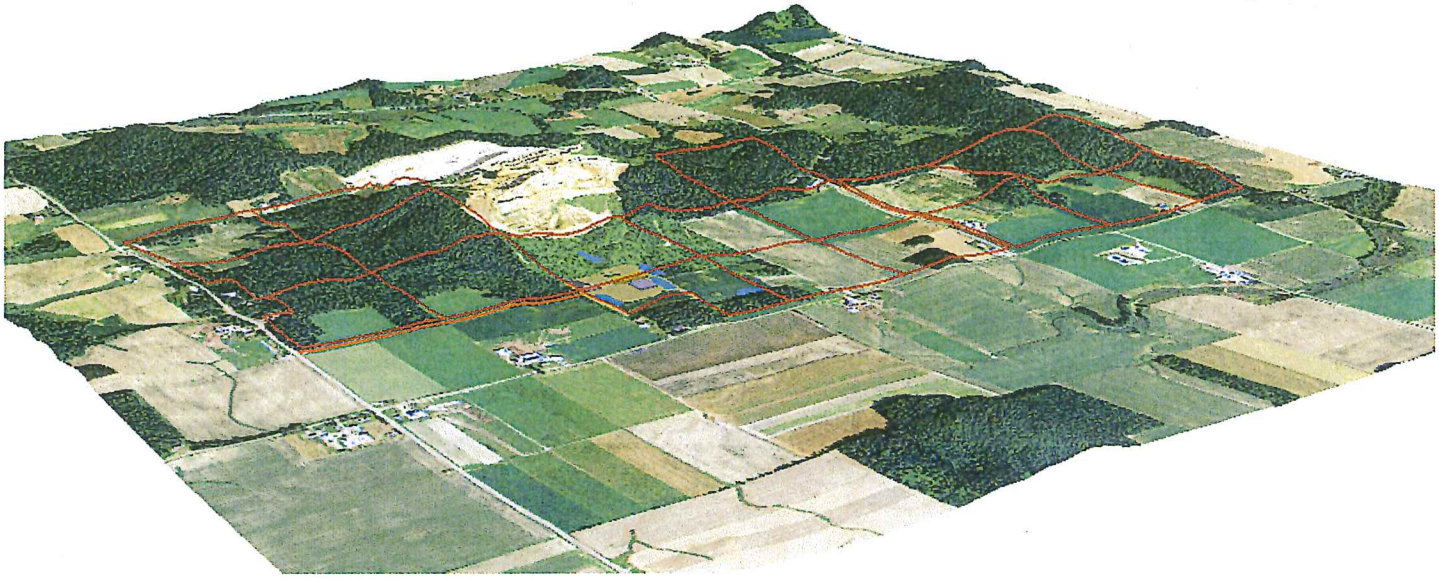
Bloomer, Wisconsin 54724



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Introduction

This Nonmetallic Mine Reclamation Plan is prepared for the proposed PurFrac, LLC (PurFrac) project located in the Town of Cooks Valley, Wisconsin. This plan has been prepared by Summit Envirosolutions, Inc. (Summit) on behalf of PurFrac in general accordance with Wisconsin Statute Chapter 295, Wisconsin Administrative Code Chapter NR 135, and Chippewa County Non-Metallic Mining Reclamation Ordinance Chapter 18. The Chippewa County Non-Metallic Mining Reclamation Permit Application is included in Appendix I.

PurFrac is proposing a nonmetallic mine in Cooks Valley Township, Chippewa County, Wisconsin. The site consists of approximately 685 acres, and the area of proposed excavation is approximately 430 acres. The current property owners will continue to be the titled landowners. The sand resource on the properties has been leased to PurFrac, which will operate the mine.

Twenty-six phases of mining are planned within four areas of the site, with an estimated production of approximately 29.5 million tons of raw sandstone. Mine operations will begin in Phase 1 once permitting is complete for Area I. The quantity of raw sandstone that will be mined per phase ranges between 0.5 and 2.4 million tons. The mine lifetime is expected to be approximately 25 years.

Prior to mining, erosion control and stormwater Best Management Practices (BMPs) will be installed. An access road and a wet plant processing facility will be constructed on-site as part of Phase I. Sandstone material will be excavated and transported via overhead conveyor to the on-site wet plant facility. Moist sand will be loaded in trucks for transport to an off-site dry-processing facility. Non-marketable material will be returned to the proposed mine site and utilized as reclamation material.

Contemporaneous reclamation with an adaptive management process will be used throughout the life of the project. The post-mining land uses will be primarily designated Chippewa County Conservation Lands, reclaimed to prairie grasslands with oak savannah (70%); in addition, there will be areas of Working Lands, reclaimed to pasture. Standard performance criteria based on[NB1] soil characteristics and documentation of revegetation will be used to evaluate the success of the reclamation to each specified post-mining land use.

The following site information and reclamation plan are submitted on behalf of PurFrac to supply information regarding reclamation as required by the Chippewa County Non-Metallic Mining Ordinance.

1.0 Site Information

1.1 Site Location

The site occupies approximately 685 acres, of which approximately 430 acres are proposed for excavating sandstone, processing areas, and reclamation. The proposed mine site is located in the Town of Cooks Valley, southwest of Bloomer, Wisconsin. The site is located between 135th and 155th Avenues, and between 20th Street and County Highway DD, within Sections 20, 29, and 30 of Township 30N, Range 10W, Chippewa County, Wisconsin (Figure 1).

The proposed mine site will be owned by the property owners listed in Table 1 below; parcel boundaries are depicted on Figure 2. The *Lease and Lifting Agreement* between PurFrac and the property owners, plus a letter of agreement with one landowner, are presented in Appendix II.

Table 1. Property Owners

Property Tax Parcel ID	Owner Name	Owner Address	Approx. Area (Acres)	Figure 2 Label	Legal Description (all in T30N R10W)
23010-2041-05010000	William J Schindler III	15204 County Hwy DD, Bloomer, WI 54724	19	10	NE 1/4 of SE 1/4, the S 1/2, Sec. 20
23010-2042-05010000	William J Schindler III	15204 County Hwy DD, Bloomer, WI 54724	20	11	NW 1/4 of SE 1/4, the S 1/2 Sec. 20
23010-2044-00000000	William J Schindler III	15204 County Hwy DD, Bloomer, WI 54724	38	13	SE 1/4 of SE 1/4, Sec. 20
23010-2043-00000000	William J Schindler III	15204 County Hwy DD, Bloomer, WI 54724	39	14	SW 1/4 of SE 1/4, Sec. 20
23010-2911-00000000	William J Schindler III	15204 County Hwy DD, Bloomer, WI 54724	38	18	NE 1/4 of NE 1/4, Sec. 29
23010-2912-00000000	William J Schindler III	15204 County Hwy DD, Bloomer, WI 54724	38	19	NW 1/4 of NE 1/4, Sec. 29
23010-2914-00000000	Kevin J Zwiefelhofer	14746 County Hwy DD, Bloomer, WI 54724	37	25	SE 1/4 of NE 1/4, Sec. 29
23010-2913-00000000	William J Schindler III	15204 County Hwy DD, Bloomer, WI 54724	39	27	SW 1/4 of NE 1/4, Sec. 29
23010-2924-00000000	Thomas J & Karen M Schindler	2473 - 148th Ave., Bloomer, WI 54724	40	28	SE 1/4 of NW 1/4, Sec. 29
23010-2941-00000000	Loran B Zwiefelhofer	14411 County Hwy DD, Bloomer, WI 54724	38	34	NE 1/4 of SE 1/4, Sec. 29
23010-2942-00000000	Loran B Zwiefelhofer	14411 County Hwy DD, Bloomer, WI 54724	39	35	NW 1/4 of SE 1/4, Sec. 29
23010-2944-00020000	Loran B Zwiefelhofer	14411 County Hwy DD, Bloomer, WI 54724	31	41	SE 1/4 of SE 1/4, Ex the S 656' of the E 560', Sec. 29
23010-2943-00000000	Loran B Zwiefelhofer	14411 County Hwy DD, Bloomer, WI 54724	39	43	SW 1/4 of SE 1/4, Sec. 29
23010-3212-00000000	Louis W Jr & Jane M Sonnentag	13522 County Hwy DD, Bloomer, WI 54724	40	52	NW 1/4 of NE 1/4, Sec. 32
23010-3221-00000000	LA Property Acquisition LLC	14411 County Hwy DD, Bloomer, WI 54724	40	53	NE 1/4 of NW 1/4, Sec. 32
23010-3222-00000000	LA Property Acquisition LLC	14411 County Hwy DD, Bloomer, WI 54724	40	54	NW 1/4 of NW 1/4, Sec. 32
23010-3213-00020000	Donald G & Judith M Sarauer	2615 - 135th Ave., Colfax, WI 43730	35	56	SW ¼ of NE ¼, EX COM @ INTER of S LN & W LN fence of NW SE extended, E 589', N 310', W 589', S 310' TO POB., Sec. 32
23010-3224-00020000	LA Property Acquisition LLC	14411 County Hwy DD, Bloomer, WI 54724	36	57	SE ¼ of NW ¼, ex the S 233' of the E 33 rds, Sec. 32
23010-3223-00000000	LA Property Acquisition LLC	14411 County Hwy DD, Bloomer, WI 54724	38	58	SW 1/4 of NW 1/4, Sec. 32

Adjacent properties within 660 feet of the proposed mine site boundary are shaded in blue on Figure 2. A listing of the adjacent properties, owners, and property descriptions is included in Appendix III.

1.2 Topography and Drainage

Currently, the mine site is made up of agriculture fields and forested land, and is located in the Pine Creek and Red Cedar Watershed of the Lower Chippewa River Basin. Figure 3 presents a topographic map of the area. Figure 4 presents five-foot topographic contours of the site based on the United States Geological Survey (USGS) National Elevation Dataset, 2013. Existing drainage patterns, which trend generally toward the east (except in the southwest corner of the site), reflect regional flow patterns based on the topography (Figure 4).

1.3 Geology

According to the *Bedrock Geology of Wisconsin, Northwest Sheet,* originally published by the Wisconsin Geological and Natural History Survey (WGNHS), the local bedrock geology is comprised of Cambrian-aged sandstone consisting primarily of the Tunnel City Group and Wonewoc Formation. A generalized bedrock geology map adapted from the *Bedrock Geology of Wisconsin, Northwest Sheet* is presented on Figure 5.

According to *Pleistocene Geology of Chippewa County, Wisconsin,* originally published by the WGNHS, Pleistocene geological features are not identified within the site (Figure 6).

Summit advanced seven test borings across the site (Figure 7). The majority of the test borings encountered rocks of the Tunnel City Group overlying sediments of the Wonewoc Formation; the remainder had the Wonewoc as the first bedrock encountered. The contact between these two formations appears to be at an elevation of approximately 1185 feet above mean sea level (AMSL) based on the test boring program. Test boring logs are included in Appendix IV.

1.4 Wetlands

Two areas of potential wetlands appear on the Wisconsin Wetland Inventory (WDNR) or are Wetland Indicated Soils as described by the National Resource Conservation Service (NRCS) (Figure 8). The WDNR additionally depicts one intermittent stream within the site. However, the specified area is currently in agricultural use; it appears to be an intermittent drainage swale that is currently being farmed.

Mining at the site will be limited to the higher elevations where desirable sandstone materials are present. A wetland delineation will be completed prior to the commencement of mining in each of the four areas. PurFrac will provide the County with a copy of the wetland delineations, including a map depicting the delineated boundary of any wetlands, upon their completion and concurrence with state and federal agencies. Potential wetlands will be avoided during mining; if wetlands cannot be avoided, PurFrac will work with state and federal agencies to obtain

appropriate permits for allowed wetland disturbances and will forward all permit paperwork to the County upon approval.

1.5 Structures

Houses, outbuildings, and farm buildings located on the proposed mine site will be isolated from mining activities and are generally within the buffer area. No known utilities are located within the proposed mining area.

An area water well inventory was completed using the WDNR Drinking Water System Well Construction Report database. According to this database, two water wells are located within the proposed site and seven water wells are located on adjacent properties within 660 feet of the mine property boundaries. These are presented on Figure 2 and are summarized in the table below. The associated Well Construction Reports are included in Appendix V.

Additional water wells are assumed to exist for the residences on Parcels 13, 18, 25, and 62, but a search of the WDNR database did not discover associated Well Construction Reports.

Table 2. Water Well Locations and Owners

Unique Well No.	Tax Parcel ID	Figure 2 Label	Owner	Owner Address
AX473	23010-3242-00000000	64	Donald Sarawen	Route 1, Colfax, WI 54730
AY716	23010-3232-00000000	65	Lawrence Larson	Route 1, Colfax, WI 54730
CM017*	23010-2924-00000000	28	Thomas Schindler	Route 2, Bloomer, WI 54724
KM832*	23010-3213-00020000	56	Steve Sarauer	Route 2, Bloomer, WI 54724
LF684	23010-3111-00000000	55	Dennis Schindler	Route 1, 20th St. Bluff, Colfax, WI 54730
OM293	23010-2132-00020000	8	Scott and Tammy Loew	14138 County Hwy Q, Bloomer, WI 54724
UL643	23010-2832-00000000	33	Loran Zwiefelhofer	14411 Highway DD, Bloomer, WI 54724
WL224	23010-3114-00020000	59	Scott Johnson	129 Princeton Dr., Elk Mound, WI 54739
YE603	23010-2921-02000000	16	Chris Harmon	N9265 County Hwy M, Colfax, WI 54730

* CM017 and KM832 are located on the proposed mining site; other wells are on adjacent properties.

1.6 Soils

According to the NRCS soil database, 25 soil types are present on the site, as shown and listed on Figure 9. These soil types are described in the Custom Soil Resource Report, included as Appendix VI.

The NRCS descriptions indicate that these soils have A and B horizons comprised of silty or sandy loam with a total average thickness ranging from three to forty-two inches. Summit conducted a limited soil survey to confirm the descriptions of the NRCS Soil Resource Report for this location. The survey was conducted by digging 15 test pits, as depicted on Figure 7. The test pits were located to include soil types that represented a high percentage of the area on the site.

The A and B soil horizons were identified by their distinct characteristics, and the depth of each horizon was recorded along with its geographic coordinates. In cases where topography could cause a change in soil depths, both extremes were examined and their results averaged. The test pits were dug in locations that gave representative coverage within the access limits to properties. The Summit field soil survey results from October 2014 are presented in the Table 3. The results confirm the results of the Soil Resource Report and provide more site-specific information.

Table 3. October 2014 Soil Survey Results

Test Hole ID	NRCS Soil Series	A Horizon Depth (in.)	B Horizon Depth (in.)
TH-1	PdD	5	19
TH-2	BoE	3	0
TH-3	EmD2	3	27
TH-4	GaD2	6	16
TH-5	SeC2	18	45
TH-6	SeC2	6	16
TH-7	GaC2	6	42
TH-8	PdD	6	17
TH-9	SeB	11	32
TH-10	EmC2	8	21
TH-11	SgB	18	28
TH-12	ElC2	6	58
TH-13	ElC2	3	11
TH-14	SeD2	5	16
TH-15	SeD2	3	16

See Appendix VI for NRCS Soil Series descriptions.

Volume estimates were calculated using data collected during the Summit soil survey, along with the NRCS Soil Resource Report. The recorded field results were compared to Soil Resource Report and were confirmed to be within a reasonable range in each site-specific location. The acreage of each soil type was determined. The volumes of A and B soil horizons were calculated

using depths from the field survey. Data from the Soil Resource Report were used for soil types not sampled in the field.

The A and B soil horizon volume estimates included site locations considered for mining. Setbacks and non-viable areas were removed from the volume estimates before calculation. Based on Summit soil survey results and the NRCS Soil Resource Report, it is estimated that there are 400,000 cubic yards of A horizon soils and 1 million cubic yards of B horizon soils within the proposed area of disturbance. A and B horizon soils will be used for contemporaneous reclamation, or will be isolated and stockpiled.

1.7 Groundwater

The regional water table aquifer appears to be present beneath the site at an elevation of approximately 1040 feet AMSL, based on the Generalized Water-Table Elevation Map of Chippewa County, Wisconsin (Lippet, I.D. 1998), presented on Figure 10. The site appears to be in the low to mid-level susceptibility category for groundwater contamination, based on the Chippewa County Aquifer Susceptibility Map, 2007.

A high-capacity well is proposed to be located on the mine property as part of the wash plant construction (Figure 11). Summit has completed a Non-Potable High Capacity Well Approval Request on behalf of PurFrac. A copy of this request is included as Appendix VII. The proposed high capacity well will be drilled into the Mt. Simon aquifer, and will be isolated by the confining Eau Clair Formation from the regional water table, which is in the Lower Wonewoc and Upper Eau Claire Formations. The well will be cased through the Eau Claire Formation into the Mt. Simon aquifer to limit potential impacts to the base flow of nearby streams. See Section 2.2 for a discussion of regional water table quantity and quality monitoring.

1.8 Threatened and Endangered Species

The Wisconsin DNR Natural Heritage Inventory (NHI) database was reviewed on January 22, 2015 for the occurrence of threatened and endangered species specific to the proposed PurFrac project site. The NHI database review indicated there are no species targeted for concern on the proposed project site.

A biological resource assessment, using the "Wisconsin Forest Habitat Type Classification System" (FHTCS), or alternative system approved by the WDNR, will be completed prior to site disturbance in each of the four areas. In an FHTCS the composition of the plant community is used as an integrated indicator of the environmental factors that affect species reproduction, growth, completion, and community development.

1.9 Landscape

The site is located within the Western Coulees and Ridges Ecological Landscape (WDNR), an area in southwestern and west central Wisconsin which supports forest, agricultural, and

grassland areas. This is a highly-eroded, unglaciated landscape with broad bedrock-controlled ridge tops and steep-sided river valleys.

The ecological landscape of the site is currently agricultural and mixed deciduous forest habitat, with two stands of planted conifers.

1.10 Cultural or Historical Resources

The Wisconsin Historic Preservation Database (WHPD) houses and allows users to access the most up-to-date information within the Wisconsin Historical Society's Archaeological Sites Inventory (ASI), Architecture and History Inventory (AHI), and the Bibliography of Archaeological Reports (BAR). The WHPD database was accessed on October 3, 2014, in order to research any previously identified archaeological and architecturally historic cultural resources within or adjacent to the project area, which includes Sections 19, 20, 21, 28, 29, 30, 31, 32, and 33 in Township 30 North, Range 10 West, Chippewa County.

Based on the current ASI, AHI, and ARI information, no archaeological sites or architectural history properties have been identified in the project area, nor have any archaeological surveys been conducted. The ASI database identified three archaeological sites in Sections 30 and 33, sections which are located adjacent to the proposed project area. These sites are not significant to the proposed project since ground-disturbing activities will not take place in the vicinity of the site boundary.

2.0 Mine Plan

2.1 Area, Setbacks, and Hours of Operation

The site consists of approximately 685 acres; mining and contemporaneous reclamation is proposed for approximately 430 acres in four main areas and 26 phases. Numbering of the phases identify their estimated operational sequence. The phases represent smaller manageable parcels that will isolate and limit site disturbance at any one time. This approach will accelerate the reclamation in a measured and managed manner for the life of the mine.

The remaining 255 acres on the site include setbacks, a wet processing plant location (approximately 20 acres total, with approximately 13.5 acres in unmined area), areas set aside for stormwater ponds, and areas without mineable resource.

Buffers and setbacks include: 50 feet from property boundaries; 83 feet from road center lines; and 250 feet from off-site residential buildings. Delineated wetlands will have a 100-foot buffer unless specific documentation is provided indicating that the wetland protection requirements of NR 135.07 can be met with a reduced buffer. Access to the mine processing area will be by a paved road constructed south of the processing area to 135th Avenue, along the eastern edges of parcels 52 and 56 on Figure 2.

Sand storage and processing will take place within an enclosed space, allowing for four-season processing. Hours of operation will be limited to between 6 a.m. and 9 p.m., Monday through Friday, and between 6 a.m. and 3 p.m. on Saturday. Site operation will not be conducted on Sundays or legal holidays.

A clarification tank and filter press will be used to process wastewater from the wet processing plant, preventing the need for settling ponds. In addition, water from the filter press will be reused in the processing plant, reducing the volume of water pumped from the on-site high-capacity well.

2.2 Groundwater Management

The regional water table aquifer is predicted to be present beneath the site at an elevation of approximately 1040 feet AMSL, based on the Generalized Water-Table Elevation Map of Chippewa County, Wisconsin (Lippelt, I.D. 1998). The proposed final mine floor elevation at the site is 1100 feet AMSL, which will generally maintain a separation from the water table of approximately 60 feet. Mining will not take place below the water table.

Prior to the commencement of mining, baseline groundwater elevation and groundwater base flow will be collected from a network of groundwater monitoring wells Summit will install at the mine site (Figure 11). Proposed monitoring well locations on Figure 11 were selected to optimize the evaluation of up-gradient and down-gradient groundwater conditions. The monitoring wells will be instrumented with pressure transducers and telemetry to enable remote access to continuous, 15-minute data. Additional wells will be installed based on the actual gradients, flow direction, and groundwater velocities that are calculated using the continuous data stream.

If a test well is drilled during the process of establishing a high capacity well, the test well will be added to the monitoring well network. A map depicting the mine site groundwater elevation data will be prepared, using the baseline hydrogeological data recorded from the monitoring well network. This map will be provided to the County prior to project commencement. A revision of the mine site groundwater elevation map will be made annually as mining progresses and as additional data are recorded; this map will be included in the annual site report.

Baseline samples from the monitoring wells will be collected and tested for pH, TDS, TSS, turbidity, acrylamide, aluminum, antimony, arsenic, bacteria, barium, beryllium, boron, cadmium, calcium, chromium, cobalt, copper, iron, lead, manganese, magnesium, mercury, molybdenum, nickel, nitrate, potassium, selenium, silver, sodium, strontium, thallium, titanium, vanadium, and zinc.

Groundwater samples from the monitoring wells will be collected and analyzed for the same list of parameters on an annual basis. Results of the groundwater monitoring analysis will be included in the annual site report.

Groundwater chemistry will be analyzed for the above listed analytes for a period of two years. It is proposed that after the second year of testing (and in all subsequent years) Chippewa County will consider reducing the number of analytes tested and/or the frequency of testing based on the results of waste materials and groundwater testing performed over time. Strong consideration will be given to reducing groundwater testing for analytes for which: concentrations in waste materials and groundwater are under the detection limits of analysis; or concentrations in groundwater have not increased over time, and are below the Preventative Action Limit (PAL) as listed in Wis. Admin. Code Ch. NR 140. The Operator will test for analytes in accordance with a final list approved by the County.

Owners of potable wells within ¼ mile of the mine site will be offered groundwater sample collection and analysis for the same list of parameters as part of the baseline testing. Owners of potable wells included in the baseline sampling will be offered comparable testing on an annual basis. Testing of neighborhood wells will require approval of the property owners. Results of the groundwater monitoring analysis will be included in the annual site report.

2.3 Surface Water and Stormwater Management

A comprehensive Stormwater Management Plan for each Area of the mine site, including engineering design computations, will be prepared to supplement this Reclamation Plan and will be submitted to the County for review prior to the commencement of mine site development in that Area. A *Hydrology and Hydraulics Summary* of the processing area and Area I for a 100-year, 24-hour rainfall event has been completed by Cooper Engineering. Included in Appendix VIII, this summary documents the type and size of stormwater controls that will be installed to prevent pollution of the waters of the state.

Stormwater designs for each mine area (Areas II through IV) will be submitted to the County for review and approval in advance of their implementation (prior to commencement of mine activities) for that area. The general approach to stormwater management is summarized in the text below.

Stormwater on the proposed project site is regulated by the WDNR and Chippewa County. Mine operations shall be conducted in a manner that assures compliance with applicable water quality and stormwater management requirements. Erosion control and stormwater management will be implemented in accordance with the conditions of the State Construction Site Stormwater Runoff General Permit No. WI-S067831-4 (or revised General Permit in place at the time of approval). Specific erosion control devices utilized will be determined by referencing the Channel Erosion Control Matrix and Slope Erosion Matrix from the Wisconsin Department of Transportation Facilities Development Manual (Appendix IX, or current edition).

Prior to clearing, construction, or mining within a drainage area, potential off-site receiving areas will be protected by the installation and construction of the appropriate erosion control BMPs

and stormwater facilities. Erosion control BMPs and stormwater ponds will be installed according to the guidelines provided in the current WDNR Conservation Practice Standards (Appendix IX).

2.3.1 General Stormwater Design Approach

It is the intent of the Operator and Site Manager to maximize infiltration and evaporation of stormwater on-site, and to use stormwater as part of the make-up processing water. Stormwater from areas of active mine operation will be internally drained onsite. In addition to the internally-drained stormwater management system for the site, stormwater controls will be installed to prevent discharge of runoff to the waters of the state. Multiple, multi-stage stormwater treatment ponds will be located on site (for example, see Figure 11), with the ability to control a 100-year, 24-hour rainfall event, keeping off-site discharges consistent with pre-mining conditions (see Appendix VIII).

Stormwater ponds will be sited at lower elevations across the project and are not expected to penetrate the bedrock surface. Additionally, the ponds will be located a minimum of 500 feet from navigable waters.

2.3.2 Mining Site

The following WDNR Conservation Practice Standards will be followed in managing stormwater on the mine site (a copy of each can be found in Appendix IX, or current edition):

- Wet Detention Pond (1001)
- Infiltration Basin (1003) along with Site Evaluation for Stormwater Infiltration (1002)
- Vegetated Infiltration Swale (1005).

Stormwater facilities will be built in advance of site disturbance. Diversion channels will be utilized to route off site stormwater runoff away from the mine and stormwater treatment where possible**.** The stormwater runoff permitted by EOG Resources – DS Mine to be discharged onto the proposed PurFrac – Cooks Valley mine site will be managed internally through stormwater evaporation and infiltration structures. Stormwater treatment facilities will be constructed at approximately the lowest part of each Area, enabling runoff to flow into the facilities either through natural methods or via man-made swales to direct flow. Facilities will be sized considering the amount of land disturbed to accept and treat the runoff from the 100-year, 24-hour event.

Infiltration basins will be the primary treatment, with wet pond pre-treatment integrated into the stormwater management plan. The discharge from the wet ponds is proposed to be regulated through a two-stage outlet. In small events, a pipe will allow small flows to leave the pond, not

cutting off flow to the receiving stream but slowing down and treating runoff for suspended solids. As events get larger, release rates will increase and a secondary weir will engage to allow flow to discharge to the infiltration basin.

Infiltration basins will also employ a staged outlet that slowly releases smaller storm events and gradually increases release rates through orifices, pipes, and weirs. The runoff for the 100-year, 24-hour event will pass safely through both the wet ponds and infiltration basins with freeboard. Automatic pAutomatic pressure transducers (instead of staff gauges) (instead of the staff gauges)will be installed in stilling wells in the infiltration basin to collect continuous water level data. These data will be used to calculate infiltration rates within each infiltration infiltration basin. In the event that the expected rate of infiltration in any given basin decreases, the Site Manager will work with the County to implement changes to increase the infiltration rates to the original prescribed levels. This may include removal of sediment build-up in ponds, weirs, and piping. Records of measurements from the pressure transducers will be submitted to the County within the annual site report, or upon written request.

With a wet pond pretreatment and infiltration basin combination for stormwater management, runoff is slowed down and treated, infiltration is provided, and flow is not cut off to the tributary streams.

2.3.3 Wash Plant and Transload Site

The wash plant site will have a stormwater facility with infiltration as the primary treatment with wet pond pretreatment integrated into the stormwater management plan. The system will be designed to capture the runoff from the 100-year, 24-hour rainfall event, with two wet ponds discharging through staged outlets to infiltration basins with another staged outlet, similar to the ponds that will be constructed for the mine sites (see *Hydrology and Hydraulics Summary* in Appendix VIII). The wash plant will operate as a closed loop system; process water will not be discharged on-site.

2.3.4 Temporary Erosion Control Measures

Temporary erosion control measures employed at the site will follow current BMPs (WDNR Conservation Practice Standards are in parentheses; a copy of each is included in Appendix IX).

- Erosion bales and sediment logs will be placed as ditch checks in swales and ditches (Sediment Bale Barrier - 1055, Ditch Checks - 1062).
- Silt fence will be installed at the edges of berms and stockpiles and outside the active mine area, where it may not be protected by previously installed erosion control measures (Silt Fence - 1056).

- Seed and mulch will be applied on berms, permanent stockpiles, diversions, and channels, located outside the active mine area, and mine area that is no longer active (Seeding - 1059, Mulching - 1058).
- Temporary erosion control seeding is discussed in Section 2.5.
- Final reclamation seeding is discussed in Section 3.4.
- Erosion mats will be placed in concentrated flow channels and on slopes greater than 4:1 (Channel Erosion Mat - 1053, Non-Channel Erosion Mat - 1052).
- Rock rip-rap will be placed where necessary as ditch checks, channel liners, and at inlet/outlet structures (Ditch Checks - 1062).
- Stone tracking pads will be used at the site access point. (Stone Tracking Pad - 1057).

Erosion control BMPs will be inspected weekly and within 24 hours after rainfall events of one-half inch or greater during a 24-hour period until the drainage area has been either temporarily or permanently reclaimed. In the event of slope failures, failed seeding, or persistent erosion problems, additional BMPs will be assessed and applied where practicable. BMPs may include hydro seeding, silt fence, erosion control mats, turf reinforcement mats, water diversions, rock-lined chutes, slope breaks, soil stabilizers, and inlet protection.

2.4 Mineable Resource, Soil, and Overburden Management

A conceptual mine plan is presented on Figure 11. Mining and contemporaneous reclamation is proposed to begin in Area I, Phase 1, and continue sequentially through the areas and phases as numbered.

The total estimated tonnage for raw sandstone to be mined is approximately 29.5 million tons. The total overburden volume is estimated at 6.9 million cubic yards. Sandstone and overburden thicknesses were estimated using data from the test boring logs (Appendix IV). The tonnage of material available for reclamation includes the waste from raw sand processing plus the stockpiled overburden, and is estimated to be 10.4 cubic yards of material.

Table 4 provides the estimated volumes for A horizon, B horizon, sandstone overburden, mineable sandstone resource, and process reject for each phase of mining. The Operator will decide the product specifications of mineable sandstone based on current market conditions (generally, U.S. Standard Sieve sizes 20 to 140). This decision may impact the volume and characteristics of the process reject at any specific time during mining.

Table 4. Estimated Volumes by Phase

Phase	Acres	A Horizon (yd^3)	B Horizon (yd^3)	Sandstone Overburden (yd^3)	Raw Sandstone Resource (tons)	Process Reject (yd^3)
1	22.0	20,742	53,338	-	548,090	65,771
2	21.1	19,841	51,021	219	1,188,629	142,635
3	19.8	18,629	47,904	34,518	1,676,237	201,148
4	15.8	14,880	38,262	-	351,729	42,207
5	29.2	27,468	70,633	45,493	1,970,561	236,467
6	13.0	12,270	31,551	-	416,118	49,934
7	15.2	14,307	36,789	-	845,721	101,486
8	15.8	14,895	38,302	116,052	2,138,073	256,569
9	15.2	14,281	36,723	-	1,035,968	124,316
10	16.2	15,200	39,086	-	1,328,221	159,387
11	9.8	9,186	23,621	15	738,895	88,667
12	13.8	12,975	33,364	900,022	1,383,575	166,029
13	18.1	17,033	43,800	1,000,403	1,218,883	146,266
14	13.4	12,593	32,383	1,324,567	1,467,020	176,042
15	17.9	16,819	43,248	-	552,163	66,260
16	14.6	13,708	35,250	12,316	1,013,577	121,629
17	9.9	9,315	23,954	390,998	714,588	85,751
18	9.8	9,179	23,604	524,331	749,022	89,883
19	14.4	13,506	34,730	60,112	971,365	116,564
20	21.4	20,102	51,692	23,778	1,321,707	158,605
21	15.0	14,161	36,414	509,992	2,434,672	292,161
22	17.1	16,073	41,331	921,000	2,092,916	251,150
23	15.9	14,951	38,446	928,398	648,933	77,872
24	19.9	18,718	48,132	11,707	649,228	77,907
25	18.3	17,267	44,402	55,017	1,185,130	142,216
26	17.7	16,620	42,738	368	830,516	99,662
Total	**430.0**	**404,723**	**1,040,715**	**6,859,306**	**29,471,537**	**3,536,584**

Notes: These estimates were prepared using the Spatial Analyst tools in ArcGIS. The volume of space between two rasters is represented, converted to tons of sand, based on 1.4 imperial tons per cubic yard.

Other assumptions include:

- Uniform two feet of unconsolidated material is lying atop the sandstone bedrock.
- Marketable sandstone is present in bedrock between the elevations of 1,100 and 1,185 feet AMSL.
- Mineable area of the property extends to 50 feet from property lines, 83 feet from road center lines, and 250 feet from residences.
- 3:1 slopes from the boundary of the mineable area will be maintained during and after mining.
- Process reject was calculated based on laboratory results from sandstone samples collected between elevations 1,100 and 1,185 feet AMSL. Eighty-three percent of this material by weight was sized between U.S. Standard Sieve sizes 20 and 140.
- A horizon and B horizon volumes were calculated based on soil probes performed by Summit. The average A horizon thickness measured was 7 inches; the average B horizon thickness measured was 18 inches.

The life of the Cooks Valley Properties mine is estimated to be 25 years. An approximate condensed timetable for mining operations appears in Table 5.

Table 5. Approximate Mine Timetable, Sandstone Excavation

Year (approx.)	Phase	Acres	
1	1	22.0	Area I
	2	21.1	
	3	19.8	
	4	15.8	
4	5	29.2	Area II
	6	13.0	
	7	15.2	
7	8	15.8	
	9	15.2	
	10	16.2	
10	11	9.8	
	12	13.8	
	13	18.1	
13	14	13.4	
	15	17.9	
15	16	14.6	Area III
	17	9.9	
	18	9.8	
	19	14.4	
18	20	21.4	Area IV
	21	15.0	
	22	17.1	
22	23	15.9	
	24	19.9	
	25	18.3	
24	26	17.7	

Notes:

- Table 5 assumes continuous mining and processing at approximately 1.2 million tons of raw sandstone resource per year.
- Reclamation on Phase 1 will begin as soon as Phase 1 mining is complete, and will continue contemporaneously throughout the life of the mine. The area of mine property unreclaimed at any one time during the estimated 25-year life of the mine would be the area of the active phase plus the wet processing plant site (approximately 20 acres) and related stormwater basins.

The Operator will contact the County two days prior to any site disturbance outlined in the Chippewa County Reclamation and Construction Inspection Plan (Appendix X).

Prior to beginning each phase, the timber (if present) on that area will be harvested. The slash material from timber harvest will be placed in composting windrows on site. Tree stumps will be ground and added to the composting material. This compost will be used as a soil supplement during the reclamation process.

Phase 1 will begin with construction of the access road, wet processing plant (hydrosizer and clarifier), sand storage area, scale and office building, and stormwater ponds. The processing area, approximately 20 acres, will be located on the southeastern portion of the Mine Area I. A conceptual layout is depicted on Figure 12. The processing area footprint will include space for the wet processing equipment, storm water ponds, stockpiles, an office/scale building, access road, and parking. Wet processing equipment may include conveyors, screeners, crushers, a hydrosizer, a water tank, a clarifier tank, a makeup water pond, and belt or plate presses. The processing area and processing procedures are described below:

- The processing area will be prepared by grading top soil into separate A- and B-horizon berms, stabilized by seeding and mulching.
- Erosion and storm water BMPs will be installed (depicted on Figure 12), including A-horizon and B-horizon berms and silt fencing.
- Stormwater ponds and detention areas capable of managing a 100-year, 24-hour precipitation event, will be constructed at the lower elevations of the processing area (Figure 12).
- The wet processing facilities, sand stockpiles, and the water tank will be constructed on concrete slab. The remainder of the processing area will be surfaced with crushed aggregate (likely Prairie du Chien dolomite).
- A high-capacity well will be drilled and installed to fill the water tank.
- Excavation of the overburden and sandstone will begin once stormwater BMPs are installed and material storage areas are constructed. An elevated conveyor system will be used to move excavated material from the mine face to the wet processing plant, thereby avoiding the construction of haul roads and allowing reclamation of each phase to proceed contemporaneously.
- Sand will be screened to remove over-size material, which will be sent to a crusher and rescreened. Non-marketable material will be returned to the site, stored, and utilized in the reclamation process of that phase.
- Screened/crushed sand will be loaded into the hydrosizer via conveyor.
- Water from a storage tank will be pumped through the hydrosizer to sort the sand into various products.

- Sand at the desired size range will emerge from the hydrosizer and be piled via conveyor; excess water in the sand will gravity-drain into the make-up water pond system and be pumped back into the water tank.
- Sand, silt, and clay that is finer than the desired sand size (fines) will flow out of the hydrosizer to the clarifier.
- Food-grade flocculants may be used in the clarifier tank to separate the water and the fines.
- The intent of the settling pond/clarifier system will be to recirculate water for re-use to minimize the amount of groundwater pumping. The system will be designed to exceed 95% reuse, not including water contained in the material prior to evaporation.
- The fines will be mechanically moved from the clarifier to the press, where remaining water will be squeezed from the fines and then gravity-drained into the make-up water pond.
- Non-marketable materials that have been wet-treated in the processing operations (including fines from the filter or belt press) will be will be stockpiled for reuse as reclamation material as needed. These materials will be tested annually for acrylamide, pH, total Kjedahl nitrogen, phosphorus, potassium, chloride, fluoride, sulfate, aluminum, antimony, arsenic, barium, beryllium, boron, cadmium, calcium, chromium, cobalt, copper, iron, lead, magnesium, mercury, molybdenum, nickel, selenium, silver, sodium, strontium, thallium, titanium, vanadium, and zinc. Test results will be included in the annual site report. No off-site wastes will be received at this facility.
- The moist sand will then be loaded in trucks for transport to an off-site dry processing facility.

A and B horizon soils and excavated overburden from Phase 1 will be used to create berms around the processing and storage facilities. Berms will be constructed with a 3:1 exterior slope and an anticipated height of twelve feet. To the extent possiblepraticable, the A and B soil horizons will be isolated during the stripping operation and placed in separate berms. The berms will be labeled and stabilized with a protective starter vegetative cover. These berms will serve as both site screening and material storage for final reclamation.

Based on Summit soil survey results and the NRCS Soil Survey Report, it is estimated that there are approximately 21,000 cubic yards of A horizon soil in Phase 1, and approximately 53,000 cubic yards of B horizon soil. These volumes will be adequate to create berms to screen the processing area from 135th Avenue and from neighbors and County Road DD to the east, as well as provide screening of the mine site from County DD along the northeast edge of Phase 1.

Based on the test soil borings, Phase 1 has minimal overburden, averting the need to create overburden stockpiles for the initial mining phase. As Phase 1 progresses, an area will be used for the creation of addition stormwater ponds associated with the wet processing plant, conceptually illustrated on Figure 12.

A and B horizon soils from Phase 2 will be excavated and temporarily stockpiled (isolated and labeled by horizon, to the extent practicable) while the overburden material is excavated. Sandstone material excavated from Phase 2 will be transported via overhead conveyor system to the wet processing facility. Once processed through liberation, screening, washing, and sizing, processed material will be transported by haul trucks to an off-site dry plant facility. The overburden and non-marketable material from Phase 2 will be utilized to create the reclaimed surface of Phase 1. The temporary A and B horizon soil stockpiles from Phase 2 will then be disked and raked onto Phase 1, with the A horizon soil returned to the uppermost position.

Mining and contemporaneous reclamation will continue in this sequence throughout the remaining phases of the project; overburden material from each subsequent phase will be used with the non-marketable materials to create the reclaimed surface of the previous phase, and temporarily-stockpiled A and B horizon soils from each phase will be layered by soil horizon onto the reclaimed surface of the previous phase. The use of equivalent areas of stripping for application of soils to reclaimed areas will be utilized to the extent practicable.

For the final phase, stockpiled overburden will be mixed with non-marketable material from the final phase to create the reclaimed surface. Stockpiled, labeled, and bermed A and B horizon soils from Phase 1 will be layered by soil horizon onto the reclaimed surface of the final phase.

A more complete depiction of mine Area II, III, and IV, including approximate stormwater flow paths, wetlands, setbacks, monitoring wells, and approximate stormwater pond locations, will be presented to the County prior to the beginning of mining in an Area.

2.5 Temporary Erosion Control Vegetation Plan

A temporary stabilization seed mix will be used to provide erosion control where disturbed areas require vegetation and are not at final reclamation grade. Hay/straw mulch may be applied using a conventional blower and then seeded with a quick-cover annual grass. Seeding for each disturbed area will be performed using drill seeding or hand spreading and will follow procedures described in Section 630 of the Wisconsin Department of Transportation Standard Specification for Highway and Structure Construction (2016 Edition WisDOT Standard Specifications, Appendix XI, or current edition). The seed will be spread at a rate of up to 50 pounds per acre, consistent with the manufacturer's recommendations. Areas will be mulched following procedures described in Section 627 of the WisDOT Standard Specifications (Appendix XI).

2.6 Proposed Elevations

The excavation of each mining phase will be completed to an approximate elevation of 1100 feet AMSL. Conceptual post-mining (reclamation) surface contours for the site are indicated on Figure 13. Figures 13a, 13b, and 13c present the conceptual post-mining surface contours of Areas I through IV in greater detail. Expected concentrated flow paths, based on the proposed

final topography, are also included on Figures 13a through 13c. The majority of the site will consist of gently rolling land reclaimed to prairie grasslands and forest savannah, with some areas reclaimed to pasture. Mine boundaries will have a maximum final grade of 3:1 slope, and will have a post-mining land use of prairie grasslands and forest savannah.

Transect lines for Areas I through IV are depicted as A-A', B-B', C-C', and D-D' on Figure 13. Figures 14a through 14d illustrate transect cross-sections for each Area. Included on Figures 14a-14d are the existing ground surface elevations, proposed final mining elevations, and the proposed reclaimed land use types and elevations.

2.7 Methods of Resource Removal

Mining will be accomplished to the extent practicable using earthmoving equipment such as skid steers, excavators, dozers, backhoes, front-end loaders, conveyors, and trucks. Machinery will utilize white noise back-up alarms. In general, conventional excavation will be used to facilitate the extraction of the sandstone and blasting is not currently anticipated; however, blasting may be necessary if tightly cemented sandstone deposits are encountered. Blasting, if required, will be completed in compliance with Federal, State, and local laws and ordinances. Blasting will be limited to between the hours of 10:00 a.m. and 2:00 p.m. and notice will be given to residents within half a mile of the mine site a minimum of 48 hours prior to blasting.

Dust control will be implemented consistent with NR 415.075. Air quality will be monitored at several locations considering prevailing up- and down-wind conditions. A full-time on-site water truck will be utilized to control potential dust produced during mining operations. Off-site sand tracking will be minimized to the extent practicable; haul trucks will cross a stone tracking pad prior to exiting the processing area, and then will drive out the ½-mile paved site road before turning onto 135th Avenue.

2.8 Site Safety

Measures that address public safety on and off site, such as warning signs and fencing will be implemented according to United States Department of Labor Mine Safety and Health Administration (MSHA). The property lines of the site will be clearly identified and posted with warning signs at 50-foot intervals. The entrance will be posted and locked.

The Cooks Valley Properties mine site will not pose any unusual safety concerns once it has been graded to final reclamation grades. Unauthorized access will be prevented as it would for other private property.

2.9 Provision for Intermittent Mining

Intermittent mining may be conducted on the project site. In the event of intermittent cessation of mining operations, the Operator and Site Manager will implement provisions to monitor and manage open mining and processing areas using the BMPs applied during regular mine

operation. Provisions will include maintenance of a reclamation financial insurance, stormwater facilities and systems, erosion controls, stockpiles, and monitoring of open mining areas. If a system failure occurs during an intermittent mining period, (e.g., structural failure of stormwater ponds or major erosion control failure with sediment deposition off site or into surface waters), the County will be notified within 24 hours of the observed failure.

2.9.1 Financial Assurance

The Operator will maintain financial assurance during any period of intermittent mining for all disturbed areas of the mine site that have not been reclaimed to their final land use.

2.9.2 Stormwater Management

Wet ponds and infiltration basins will be visually inspected monthly, and within 24 hours of precipitation events that produce one-half inch of rain or more during a 24-hour period, to ensure that basin volumes supply adequate storage for stormwater runoff. Water level Ddata from automatic will be continuously recorded using pressure transducers installed in the infiltration basins will be continuously recorded, allowing for real-time calculation of infiltration rates. If the calculated infiltration rate in any given basin decreases, the Operator and Site Manager will work with the County to implement changes to increase infiltrations rates to the original prescribed levels.

Pipes, weirs, channel inlets, skimmer grates, and spillways will be inspected to ensure that they are free from blockage. Sediment will be removed from these areas as necessary.

Wet pond water quality inspections will be completed quarterly, using WDNR Quarterly Visual Inspection- Field Sheet Form 3400-176A (Appendix X, or current edition). Diversion channels, man-made swales, and culverts will also be inspected quarterly to ensure they are free from blockage and/or adequately vegetated to control on-site water flow. Records of inspections and measurements from pressure transducers will be submitted to the County within the annual site report or upon written request.

2.9.3 Erosion Control

Erosion control BMPs will be inspected quarterly and within 24 hours of precipitation events that produce one-half inch of rain or more during a 24-hour period. Required maintenance on observed erosion controls (re-application, refinement, and/or replacement) will be implemented within two weeks of observation. Disturbed areas requiring vegetation maintenance will be stabilized in accordance with Section 2.5. Observations documented during inspections will be recorded and submitted to the County within the annual site report or upon written request.

Inspections will include observations of the following erosion controls:

- Erosion bales in swales and ditches;
- Silt fencing installed at the edges of berms, stockpiles, and outside of the active mine area;
- Seed and mulch applied on berms, stockpiles, diversion channels, and disturbed and inactive areas of the mine;
- Erosion matting on slopes and other concentrated flow areas; and
- Rock rip-rap used as ditch checks, channel liners, and at inlet/outlet structures.

2.9.4 Stockpiles and Berms

Mining and reclamation will be conducted contemporaneously, minimizing the stockpiling of sand on site. Temporary stockpiles on site will be processed and stored during intermittent mining periods. Raw product stockpiles will be processed and stored or re-shaped and re-positioned in a manner that will minimize potential runoff. Stockpiles and berms remaining on site during inactive mining periods will be inspected quarterly and within 24 hours of precipitation events that produce one-half inch of rain or more during a 24-hour period, to ensure mulched and/or vegetated areas meet the requirements of Section 627 of the WisDOT Standard Specifications (Appendix XI). Observations documented during inspection will be recorded and submitted to the County within the annual site report, or upon written request.

3.0 Post-Mining Land Use

The final site reclamation land use will consist of: Conservation Lands restored to grassland/prairie/forest savannah land cover type (70%); and Working Lands - Agricultural Production, restored to pasture land cover. These reclamation land uses correspond to Chippewa County's *Standardized Categories of Post-Mining Land Uses and Associated Cover Types*, draft August 2015 (Appendix X, or revised version from Chippewa County). Sidewalls of the mine areas will be reclaimed to a maximum 3:1 gradient with the grassland/prairie/forest savannah land cover type.

Table 6 (following page) details the planned post-mining land uses on the mining site by parcel, with notes regarding landowner requests and slope treatment. A map of the conceptual post-mining land uses and land cover types appears on Figure 15. Figures 15a through 15c illustrate the proposed post-mining land uses and land cover types for each Area in greater detail, and include the parcel boundaries and labels described in Table 6.

Site reclamation and revegetation will follow an adaptive management process throughout the life of the mine and reclamation program. Adaptive management involves the continuous refinement of the reclamation process in order to achieve success against the performance criteria. This allows PurFrac the option to take advantage of the latest scientific and technological techniques for accomplishing successful reclamation.

Table 6. Post-Mining Land Use by Parcel

	Working Lands: Agricultural Production – Pasture	140 acres	Total Reclaimed Acreage (Areas I-IV): 430
	Conservation Lands: Grasslands/ Prairie/Forest Savannah	290 acres	

Tax Parcel ID	Owner Name	Fig. 2 & 15 Label	Approx. acreage	Reclaimed acreage	Notes
23010-2041-05010000	William J Schindler III	10	19	19 (see Notes)	Area IV. 3:1 slope (6 acres) in Conservation Lands: grasslands/ prairie/forest savannah
23010-2042-05010000	William J Schindler III	11	20	20 (see Notes)	Area IV. 3:1 slope (16 acres) in Conservation Lands: grasslands/ prairie/forest savannah
23010-2044-00000000	William J Schindler III	13	38	15	Area IV
23010-2043-00000000	William J Schindler III	14	39	39 (see Notes)	Area IV. 3:1 slope (7 acres) in Conservation Lands: grasslands/ prairie/forest savannah
23010-2911-00000000	William J Schindler III	18	38	22	Area IV
23010-2912-00000000	William J Schindler III	19	38	22	Area IV
23010-2914-00000000	Kevin J Zwiefelhofer	25	37	0	
23010-2913-00000000	William J Schindler III	27	39	9	Area III
23010-2924-00000000	Thomas J & Karen M Schindler	28	40	40	Area III
23010-2941-00000000	Loran B Zwiefelhofer	34	38, 39, 31, 39	73 out of 147	Area I
23010-2942-00000000	Loran B Zwiefelhofer	35			Area I
23010-2944-00020000	Loran B Zwiefelhofer	41			Area I
23010-2943-00000000	Loran B Zwiefelhofer	43			Area I. Leave a pond on south side
23010-3212-00000000	Louis W Jr & Jane M Sonnentag	52	40	32	Area II. Prairie on S and E; woods toward NW.
23010-3221-00000000	LA Property Acquisition LLC	53	40 40 36 38	116 out of 154	Area II
23010-3222-00000000	LA Property Acquisition LLC	54			Area II
23010-3224-00020000	LA Property Acquisition LLC	57			Area II
23010-3223-00000000	LA Property Acquisition LLC	58			Area II. Leave a pond in SW corner (current pot. wetland)
23010-3213-00020000	Donald G & Judith M Sarauer	56	35	23	Area II

It is the intent of the Site Operator to prepare a *Soil Rehabilitation and Vegetative Management Plan* for each planned post-mining land use and land cover type: 1) Conservation Lands – Grassland/Prairie/Forest Savannah; and 2) Working Lands – Agricultural Production, Pasture. The *Soil Rehabilitation and Vegetative Management Plans* will supplement this Reclamation Plan, and at a minimum, will describe the management practices, methods, and techniques that will be used to:

- Recondition disturbed soil to assure the success of plantings and the sustainability of selected plant communities and associated wildlife habitat.
- Monitor and control noxious weeds and invasive species to target levels.
- Actively manage the reclaimed area for anticipated plant species that occur due to natural succession.

3.1 Soil Management Plan[NB2]

Successful reclamation of a post-mining site to a desired land use and cover type is based on the protection and careful handling of the site's soil resources. The ability of the land to support a specific post-mining cover type is related to the characteristics of the replaced soil horizons, including soil bulk density, chemistry, fertility, and organic matter content.

A soil survey will be conducted prior to commencement of mining activities on each mine Area; the survey will document and characterize soil profiles within each mine phase. Soil A macrocore Macro Core® or equivalent samples will be used to collect soil samples collected on at 100-foot centers to a depth of 60 inches (or to bedrock contact, whichever comes first) across the Area. Sample site locations will be recorded using a GPS unit with sub-meter accuracy accuracy GPS unit.

Sampled soil profiles will be characterized by type, thickness, and arrangement of soil horizons; their structure, color, and texture; and NRCS soil series description. After the profile has been described, representative continuous 2-quart (top to bottom of each horizon) samples will be collected from each specified horizon. Horizons less than three inches thick may be combined with an adjacent layer; horizons greater than 24 inches will be split so that no sample represents a layer over 24 inches thick.

Soil samples will be prepared and analyzed for the following parameters using standard procedures: pH, phosphorus, potassium, organic matter, bulk density, and others if required by Chippewa County. Results from soil profiles and sample analysis will be provided to Chippewa County in the annual site report, or upon written request.

Based on the soil sampling data, proposed depths, acreage, and volumes of soil to be salvaged within a mining Area will be summarized and provided to the County prior to site disturbance of that Area. Soil replacement depth(s) will be calculated and adjusted for each mine phase within

an Area for the purpose of determining the mass balance between soil salvage and soil replacement on equivalent-sized reclaimed areas.

Soil salvage and equivalent area replacement will be used as practicable to promote the reestablishment of specified post-mining land use plant communities and to minimize erosion and stability issues. If there is a documented shortage of soil materials with attributes essential to the establishment of a particular plant community (e.g., oak openings in prairie), mixing and/or borrowing from phases that may have excess, and using overburden and clean processing materials as soil substitution, may be implemented.

Direct haul of soil materials (via raised conveyor belt or dump truck) to graded areas will be preferred to stockpiling, and will be implemented whenever practicable as part of contemporaneous reclamation. Direct haul results in fewer impacts to soil aggregation, organics, and microorganism populations, enhancing the establishment of plant communities.

Stockpiles of suitable reclamation soils, including A horizon, B horizon, overburden, and clean processing materials, will be maintained in clearly marked segregated piles on stable ground clear of drainageways and depressions. Stockpiles will be treated as necessary to prevent the establishment of weeds and may be temporarily stabilized by seeding with native prairie seeds and an innocuous cover crop.

Soil management and reconstruction will be implemented to minimize the compaction of soil and regraded areas. Operations will not be conducted under wet conditions. Vehicle traffic on replaced soil will be minimized. Low pressure bulldozers will be preferred for soil grading on reclaimed surfaces.

A and B horizon soils will be returned to the reclaimed elevation with the A horizon soils returned to the uppermost position. The top of the reclaimed surface will be graded to a slightly rolling surface, designed to mimic the stable pre-mining drainage pattern. High walls or other steep slopes will not be part of the reclamation effort. Side slopes will have a gradient no steeper than 3:1.

The final reclamation surface will be tilled or scarified to a depth of at least 24 inches to reduce compaction, promote rooting depth, prevent abrupt textural boundaries, and create surface stability. Scarification must penetrate the soil beneath the A and B horizons.

A combination of non-channel erosion mat, channel erosion mat, silt fencing, sediment bale barriers and ditch checks will be placed around areas with newly-laid A and B soil horizons to minimize loss of soil and to protect on-site surface water. The soil may be watered, but not otherwise compacted.

3.2 Soil Reclamation Performance Criteria

Mine phases that have been reclaimed to their final surface elevation will have soil macrocore samples collected on 100-foot centers to a depth of 24 inchescollected using the same methodology as the pre-mining soil survey, to a depth of 24 inches. Sampled soil profiles will be characterized by type, thickness, and arrangement of soil horizons; their structure, color, and texture. After the profile has been described, representative continuous 2-quart (top to bottom of each horizon) samples will be collected from each discernable soil horizon 3 or more inches thick.

Soil samples will be prepared and analyzed for the following parameters using standard procedures: pH, phosphorus, potassium, organic matter, bulk density, and others if required by Chippewa County. Results from soil profile and sample analysis will be provided to Chippewa County in the annual site report, or upon written request.

Soil bulk density gives a strong indication of the ability of plant roots to penetrate a soil; soil bulk densities of ≤ 1.6 g/cm^3 generally do not inhibit root penetration. Therefore, soil density measurements of ≤ 1.6 g/cm^3 for the post-mining samples will indicate adequate conditions for plant root development.

Acceptable performance measures for post-mining soil chemistry and fertility will be:

- pH between 5 and 7
- 10 ppm extractable phosphorous
- 60 ppm extractable potassium
- Organic matter content for A horizon sandy soils (incl. fine sand, loamy sand, etc.) of $\geq$ 0.5 percent[NB3].
- Organic matter content for A horizon loamy soils (incl. sandy loam, silt loam, etc.) of $\geq$ 2.0 percent.

Additionally, areas with the final land use of Working Lands - Agricultural Production (restored to pasture land cover type) will be required to have an established post-mining soil profile with a minimum of 6 inches of A horizon and 18 inches of B horizon[NB4]. Working Lands should be established on loamy soils, with organic matter content of the A horizon $\geq$ 2.0 percent.

3.3 Site Stability

Erosion will be prevented and site stability will be promoted mechanically through the design of the final surface contours, which will simulate the natural and stable pre-mining drainage pattern and density.

Site stability will be further safeguarded through successful revegetation of reclaimed land. Forage grasses, annual ryegrass, and prairie plant seeding (as outlined in Section 3.4-3.6) will be completed into graded and tilled areas within 72 hours of A and B horizon soil reapplication as

practicable, prior to the next growing season. Mulch may be applied to all seeded areas in accordance with WisDOT Standards (Appendix XI). Sodding, rip-rap, or other appropriate measures may be used in drainage-ways or critical erosion areas. Stabilization treatments requiring ongoing maintenance (e.g., silt fence) will not be used during final reclamation activities.

At a minimum, inspections will take place within 24 hours after every precipitation event that produces one-half inch of rain or more during a 24-hour period. Until vegetation is densely established, the stabilization treatments will be inspected weekly during the growing season. In the event of slope failures, failed seeding, or persistent erosion problems, additional BMPs will be assessed and applied. Mitigation of erosion damage, dependent on its severity, may include tillage operations, re-grading, placement of additional soil and re-seeding, or anchored straw bales.

3.4 Site Revegetation

The objective of site revegetation will be to reclaim disturbed acreage to Conservation Lands with a grassland/prairie/forest savannah land cover type (70%) and to Working Lands with a pasture land cover type.

Mulching, seeding, and planting of trees and will be done in accordance with appropriate WisDOT Standards (Appendix XI, or current edition). The establishment of permanent vegetation will follow the NRCS Critical Area Planting Code 342 and Wisconsin Agronomy Technical Note 5, *Establishing and Maintaining Native Grasses, Forbs and Legumes* (Appendix XI, or current edition). See Section 3.6 for criteria to be used to analyze successful reclamation.

Rocks and brush piles may be utilized in the revegetation plan. These structures will be used to create more of a natural diversity in habitats for wildlife.

Based on the suitability of the soil to assure viable seed germination and survivability, an organic mat of hay/straw will be applied prior to seeding. Typically, depending on the site conditions, up to 5 tons of mulch per acre could be used. Mulching operations will begin at the top of the slope and proceed downward. The mulch cover will be applied so as to be loose enough to allow some sunlight to penetrate yet thick enough to provide shade and protection from desiccation and raindrop impact and erosion.

3.4.1 Seeding Conservation Lands - Grassland/Prairie/Forest Savannah

Areas with Conservation Lands – Grassland/Prairie/Forest Savannah as post-mining land use (including 3:1 sidewall slopes) will be revegetated following the final grading by a prairie grass and forb seed mix based on *Wisconsin NRCS Authorized Native Plant Lists*, Tables 4 and 5 in Wisconsin Agronomy Technical Note 5 (Appendix XI, or current edition). See Table 7 for a Conceptual Seed Mix.

Table 7. Conceptual Seed Mix for Prairie Grass and Forb Species

	Common Name	Scientific Name	Approx. Seeding Rate in ounces/acre PLS
Grasses	Big Bluestem	*Andropogon gerardii*	8.0
	Canada Wild Rye	*Elymus Canadensis*	16.0
	Indiangrass	*Sorghastrum nutans*	12.0
	Little Bluestem	*Schizachyrium scoparium*	16.0
	Sideoats Grama	*Gouteloua curtipendula*	8.0
	Switchgrass	*Panicum virgatum*	8.0
Forbs	Black-eyed Susan	*Rudbeckia hirta*	1.0
	Butterflyweed	*Asclepias tuberosa*	3.0
	Flowering Spurge	*Euphorbia corollata*	2.0
	Hoary Vervain	*Verbena stricta*	3.0
	Partridge-pea	*Chamaecrista (Cassia) fasciculate*	3.0
	Prairie Cinquefoil	*Potentilla argute*	1.0
	Prairie Dock	*Silphium terebinthinaceum*	0.5
	Prairie Smoke	*Geum triflorum*	1.0
	Prairie Tickseed	*Coreopsis palmate*	0.5
	Purple Coneflower	*Echinacea purpurea*	1.0
	Purple Prairie Clover	*Dalea (Petalostemum) purpurea*	3.0
	Rough Blazing Star	*Liatris aspera*	3.0
	Silky Aster	*Symphyotrichum sericeum*	3.0
	Spiderwort	*Tradescantia ohiensis*	3.0
	Spotted Mint	*Monarda punctate*	2.0
	Stiff Goldenrod	*Oligoneuron rigidum*	3.0
	Western Sunflower	*Helianthus occidentaalis*	2.0
	Yellow Coneflower	*Ratibida pinnata*	3.0

PLS: Pure Live Seed

The native prairie species will benefit from the effect of the annual Canada Wild Rye on stabilization, weed competition, and improved root structure soil profile, and will become more prevalent in subsequent years.

Baseline requirements for prairie restoration include:

1. The seed mix shall contain a minimum of 25 species, including 20 native prairie forbs and 5 native prairie grasses.
2. The seed mix shall consist of at least 25% forbs by weight, with a maximum of 75% grasses by weight.
3. No individual forb species shall consist of more than 5% of the total seed mix by weight without written approval from the County Conservationist.
4. No individual grass species shall consist of more than 25% of the seed mix by weight without written approval from the County Conservationist.

5. All seed shall be provided on a Pure Live Seed (PLS) basis.
6. Prairie seed mixes will be selected to match the soil conditions on the site to be planted. Seed mixes shall be approved by the County Conservationist for each individual planting site.
7. Prairie shall be seeded using seeders designed for handling native prairie seeds and planting them evenly and efficiently.
8. All prairie seed shall be from genetic stock originating in Wisconsin or Minnesota to ensure adaptability to the local climatic conditions.
9. Prairie seeding shall take place between February 15 and June 15 or between September 15 and December 15. A temporary stabilization seed mix (per Section 2.5) may be used as a cover crop if a mine phase reaches reclamation grade before or after the prairie seeding dates. The cover crop must be plowed under prior to seeding with the prairie mix.

Following prairie seeding on the Conservation Lands, woody seedlings will be planted in copses. Baseline planting specifications for planting of woody seedlings include:

1. At least five of the following species shall be planted in mixed copses at a rate of approximately 50 trees/shrubs per acre.
   Bur Oak (*Quercus macrocarpa)*
   White Oak *(Quercus alba)*
   Red Oak *(Quercus rubra)*
   Shagbark Hickory (*Carya ovata)*
   Black Cherry (*Prunus serotina)*
   American Hazelnut *(Corylus Americana)*
2. All tree and shrub material shall be from genetic stock originating in Wisconsin or Minnesota to ensure adaptability to the local climatic conditions.
3. Tree stock shall be a minimum of six-foot tall whips.
4. Trees and shrubs shall be protected from damage by deer, rabbits, voles, etc. by installing 4-foot tall plastic tree tubes at the time of planting.
5. Trees and shrubs shall be planted in early spring (April) or late summer (early September) for maximum opportunity of success.
6. Trees shall be watered in thoroughly at the time of planting.

3.4.2 Seeding of Working Lands - Agricultural Production, Pasture

Pasture is a land use type having vegetation cover comprised primarily of introduced or enhanced native forage species, and may be used for livestock grazing. Pastures may receive periodic renovation and cultural treatments such as tillage, fertilization, mowing, and weed control.

A seed mix including Canada Wild Rye and forage grasses (see Table 8) will be used for acreage designated with a post-mining land use of Working Lands - Agricultural Production, Pasture. If broadcast seeding is necessary due to site conditions, rate of seeding will be doubled.

Table 8. Conceptual Seed Mix for Cover and Forage Crop Species

Common Name	Scientific Name	Approx. Seeding Rate in pounds/acre PLS
Canada Wild Rye	*Elymus Canadensis*	2
Annual Rye Grass	*Lolium multiflorum*	6
Timothy	*Phleum pretense*	2
Tall Fescue	*Festuca aundinaceae*	2
Alsike Clover*	*Trifolium hybridum*	2
Red Clover*	*Trifolium praetense*	2
White Clover*	*Trifolium repens*	2
Alfalfa*	*Medicago sativa*	2

PLS: Pure Live Seed
* Must be inoculated according to the seed provider's instruction prior to seeding.

Canada Wild Rye will act as nurse crop in the first year to stabilize the site against erosion, to decrease competition from weeds, and to provide shade and cover for perennial seedlings. The forage grasses will act in Years 2 through 4 to build the plant root structure and improve the soil profile.

3.5 Vegetative Management Plan

In order result in successful vegetative reclamation, mManagement activities must be performed on a regular schedule for the first ten years to assure vegetative reclamation. Records of management activities will be documented by the Operator and will be submitted to Chippewa County in the annual site report, or upon written request.

3.5.1 Conservation Lands - Grassland/Prairie/Forest Savannah

Years 1 and 2:

Mow reclamation grassland/prairie areas to a height of approximately 6 inches at least twice per year. Avoid mowing tree copses.

Conduct invasive species survey/removal. Invasive species may include, but not be limited to: Garlic mustard (*Alliaria petiolate)*
Musk thistle (*Carduus nutans)*
Spotted knapweed (*Centaurea maculosa)*

Canada thistle (*Cirsium arvense)*
Bull thistle (*Cirsium vulgare)*
Field bindweed (*Convolvulus arvensis)*
Leafy spurge (*Euphorbia esula)*
Sweetclover (*Melilotus species)*
Wild parsnip (*Pastinaca sativa)*
Common buckthorn (*Rhamnus cathartica)*

Invasive species removal may be accomplished through hand-pulling of all above- and below-ground stems, roots, and flower masses prior to seed development. Herbicide appropriate for target species may be applied by a licensed applicator, trained in plant identification.

Weeds and grasses around planted trees and shrubs shall be controlled either through weed-whipping an area of two feet in diameter around each tree on a monthly basis or by applying a broad spectrum herbicide (e.g., glyphosate) around the trees twice a year (one in late spring and once in late summer).

Year 3:

Mow reclamation grassland/prairie areas once to a height of approximately 6 inches. Avoid mowing tree copses.

Conduct invasive species removal as necessary by hand-pulling and/or selective herbicide application.

Years 4-10:

Conduct invasive species removal through selective herbicide application.

Evaluate fuel loads and, as necessary, develop and initiate a prescribed burn plan. Avoid burning woody species copses.

Ongoing prairie maintenance requirements between the sixth and tenth growing seasons, including mowing, burning, and spot herbicide treatment, shall be at the discretion of the County to ensure continued success of the prairie restoration.

3.5.2 Working Lands – Agricultural Production, Pasture

Years 1 and 2:

Mow reclamation pasture once per growing season.

Conduct invasive species survey/removal. Invasive species may include, but not be limited to: Garlic mustard (*Alliaria petiolate)*

Musk thistle (*Carduus nutans)*
Spotted knapweed (*Centaurea maculosa)*
Canada thistle (*Cirsium arvense)*
Bull thistle (*Cirsium vulgare)*
Field bindweed (*Convolvulus arvensis)*
Leafy spurge (*Euphorbia esula)*
Sweetclover (*Melilotus species)*
Wild parsnip (*Pastinaca sativa)*
Common buckthorn (*Rhamnus cathartica)*

Invasive species removal may be accomplished through hand-pulling of all above- and below-ground stems, roots, and flower masses prior to seed development. Herbicide appropriate for target species may be applied by a licensed applicator, trained in plant identification.

Years 3-10:

Conduct invasive species removal as necessary by hand-pulling and/or selective herbicide application.

Grazing may be introduced in Year 3 if performance criteria have been met. The maximum stocking rate will be based on the net crop productivity per acre, and may be defined in the supplemental *Soil Rehabilitation and Vegetative Management Plans.*

Ongoing pasture maintenance requirements between the third and tenth growing seasons, including seeding, mowing, tilling, fertilizing, and spot herbicide treatment, shall be at the discretion of the County in consultation with the landowner, based on the results of required monitoring (see Section 3.6.2).

Pasture management will meet the NRCS standards in Code 590, Nutrient Management, (Appendix XI, or current edition).

3.6 Monitoring Requirements and Success Criteria

Annual vegetative monitoring will begin in the first year after substantial completion of the reclamation activities in each designated phase and will continue periodically (as described in each cover type) for five years. Monitoring requires the measurement of specific ecological indicators of plant community recovery, in order to check the response of revegetated plant communities. Records of monitoring activities and results will be documented by the Operator and will be submitted to Chippewa County in the annual site report, or upon written request.

All vegetation monitoring and data analysis shall be done by independent firms not associated with the mining company. Individuals performing the grassland/prairie sampling shall be experienced prairie ecologists who can identify prairie species vegetatively as seedling and small

plants. Chippewa County may conduct a closed book test of the samplers' ability to identify prairie and weed species as seedlings and small plants as part of the vendor selection process. All applicants must be able to identify 100% of all prairie species as seedlings or small plants, except those that cannot be differentiated as young plants (e.g., Canada Wild Rye and Virginia Wild Rye).

Chippewa County shall have the right to review all field data collected by the vendor and review it for consistency and accuracy to the degree possible.

Vegetation sampling transects locations for collection of monitoring data will be field located. The transect end points will be GPS surveyed by GPS and permanently marked with ground flush steel rebar rod.

3.6.1 Conservation Lands - Grassland/Prairie/Forest Savannah

Grassland/Prairie (area not in woody copses)

Two sampling techniques will be used for the prairie acreage during the monitoring period of five years.

First two growing seasons: Sampling will measure Presence (the occurrence of a given species within a defined area) using a transect grid to record all species, both prairie and non-prairie, using a 1/10 square meter quadrat. A quadrat is a square box or circular hoop that can be laid above or around the vegetation to be measured.

This sampling will be used to determine the early success of germination and seedling survival. If the results of the early vegetation sampling indicates poor germination, re-seeding will be done either at the fall of the first growing season or in the spring or fall of the second growing season.

Third through fifth growing seasons: Sampling will measure the Estimated Cover (proportion of ground covered by an individual species as a percentage of the total area) by the transect point method. A measuring tape will be strung along the transect and records will be made of species occurring at defined intervals along the tape. All species encountered at that exact point along the transect shall be documented. Multiple species may be present due to overlapping leaves at the same point.

The following criteria will be used to evaluate the success of the prairie/grasslands cover type:

First and Second Growing Seasons

1. The number of quadrats to be sampled shall be 500 per each ten acres of prairie seeding.
2. At least 75% of all quadrats must have at least one prairie species present in the first growing season; 85% of all quadrats must have at least one prairie species present in the second growing season.

3. At least 60% of all individual prairie species in the prairie seed mix must be detected during sampling in the first growing season; 75% of all individual prairie species in the prairie seed mix must be detected in the second growing season.
4. Perennial prairie species must outnumber perennial weed species by at least a three-to-one ratio, calculated by adding up the total occurrences of all prairie species and comparing it to the total occurrences of all perennial weed species.

If the above criteria are not met in the first and second growing seasons, the County Conservationist will work with the Operator to take the appropriate action to over-seed or re-seed the planting. Over-seeding will be the preferred action if seeding density is below standards, but weeds are not dominant. Re-seeding after killing all vegetation on the site shall be the preferred action if perennial weeds are dominant and are deemed to be sufficiently established as to compromise the potential for a successful prairie restoration.

Third through Fifth Growing Seasons

1. Using the transect point Estimated Cover method, a total of 500 transect points shall be sampled each year per each ten acres of prairie seeding in the third, fourth, and fifth growing seasons.
2. At least 50% Cover of prairie species shall be present in the third growing season.
3. At least 60% Cover of prairie species shall be present by the fourth growing season.
4. At least 75% Cover of prairie species shall be present by the fifth growing season.

In the fifth year, if the above criteria have been met, the prairie planting shall be considered successful, and shall be accepted by the County as complete.

Woody Copses

The measurement of success for the woody copses will be based on tree/shrub survival and health in the first five years after revegetation. The following standards shall be applied to evaluate the success of tree/shrub planting:

1. Twenty percent of the trees and shrubs planted (10 trees per acre) shall be sampled at the end of Years 1, 2, and 5.
2. There will be a minimum of 75% tree/shrub survival at the end of the first full growing season.
3. There will be a minimum of 60% tree and shrub survival at the end of the second growing season.
4. There will be a minimum of 50% tree and shrub survival at the end of the fifth growing season.
5. Trees must have strong leaders and vigorous growth along the stem to be evaluated as "survived". Trees with damaged leaders, serious wounds on their stems, and less than 50% of their original leaf canopy shall not be considered to have survived.

6. Shrubs must have vigorous growth along multiple stems and at least 50% of their original leaf canopy to be evaluated as "survived".

The goal is to achieve 25 healthy trees and shrubs of the planted species per acre in mixed copses. In the fifth year, if the above criteria have been met, the tree and shrub plantings shall be considered successful, and shall be accepted by the County as complete.

3.6.2 Working Lands – Agricultural Production - Pasture

The measurement of reclamation success for land reclaimed to pasture will be based on monitoring of soil characteristics (chemistry, fertility, and bulk density, and organic content) as well as vegetative success criteria.

At all times lands reclaimed to pasture cover type must meet the Runoff Management standards contained in Wisconsin State Administrative Code NR 151.

Soil monitoring will occur in Years 3, 6, and 10. Soil samples will be collected along a transect, at the density of 10 samples per acres at soil surface. Soil samples will be analyzed for: pH, phosphorus, potassium, organic matter, bulk density, and others if required by Chippewa County. Results from soil profiles and sample analysis will be provided to Chippewa County in the annual site report, or upon written request.

The following criteria will be used to evaluate the success of the soil reclamation for pasture cover type:

- pH between 5 and 7
- 10 ppm extractable phosphorous
- 60 ppm extractable potassium
- Organic matter content for A horizon loamy soils (incl. sandy loam and silt loam) of $\geq$ 2.0 percent.
- Soil bulk density of $\leq$ 1.6 g/cm^3

Vegetation monitoring for final land use Agricultural Production, Pasture will occur during the growing season in Years 2, 4, 6, and 10. Results from vegetation analysis will be provided to Chippewa County in the annual site report, or upon written request.

Sampling will measure the Estimated Cover (proportion of ground covered by an individual species as a percentage of the total area) by the transect point method. A measuring tape will be strung along the transect and records will be made of which species occur at defined intervals along the tape. All species encountered at that exact point along the transect shall be documented. Multiple species may be present due to overlapping leaves at the same point.

The following criteria will be used to evaluate the success of the vegetation for an Agricultural Lands, Pasture cover type:

1. Using the transect point Estimated Cover method, a total of 500 transect points shall be sampled each year per each ten acres of pasture seeding during the second, fourth, sixth, and tenth growing seasons.
2. A minimum of 80% ground cover during the growing season.
3. All species of the planted seed mix are present.
4. No more than one plant species accounts for greater than 50% of the vegetation.
5. Noxious and/or invasive species account for 5% or less of the vegetation.
6. Net crop productivity of ≥ 1 ton per acre per year (dry weight).

3.7 Contingency Plans

The Operator will prepare contingency plan for areas in final land use that are in substantial non-compliance with the performance criteria established for soil management or land cover type. Substantial non-compliance is defined to occur when the measured performance of the monitored variable for which quantitative performance criteria have been established are not being met or anticipated to be met for the Soil Management and Vegetation Management Plans specified in this Reclamation Plan, or specified in the . Contingency plans will be delivered to Chippewa County after poor and non-performance areas are acknowledged during annual monitoring reviews and a non-performances trend is shown in the monitoring data. Additional monitoring and reporting will be provided to document the resolution of vegetation or soil management non-performance.

3.8 Landscape Restoration Costs

Landscape restoration costs and overall reclamation estimates for Year 1 are summarized in Table 9 (following page). Landscape restoration for the approximately 36 acres of Conservation Lands - Grassland/Prairie/Forest Savannah in Phase 1 and the processing area—including soil preparation, mulch, seed mixes, drill planting, tree and shrub planting, erosion control, invasive species control, and monitoring—is estimated to total $239,400 Additional reclamation costs, including replacing A horizon and B horizon soils, overburden, and non-marketable material, plus building demolition, mine road demolition, storm water pond reclamation, and high capacity well abandonment, are estimated to be $376,830. The total proposed financial assurance for Year 1, including Chippewa County's administrative fee, is estimated to be $624,350.

Estimated reclamation costs for Phases 2 through 4 of Area I are included in Appendix XII. These estimates are based on current material costs and are to be used only as a general guideline for determining reclamation financial assurance. Accurate assessment of the necessary financial assurance will need to be done annually as mine activity proceeds, and will depend on mine progress, potential updated reclamation requirements, and market costs for materials and labor.

Table 9. Proposed Reclamation Financial Assurance – Year 1: Phase 1 plus Processing Area and Mine Road Removal

Reclamation Item	Item Description	Item Unit Cost	Units	Number of Units	Reclamation Cost
Earthwork	A Horizon (Phase 1 berms)	$1.90	cubic yard	20,400	$38,760
	B Horizon (Phase 1 berms)	$1.90	cubic yard	53,300	$101,270
	Overburden	$1.90	cubic yard	0	$0
	Process Reject (Phase 1)	$1.90	cubic yard	65,800	$125,020
Revegetation Phase 1 + Processing Area = 36 acres reclaimed to Conservation Lands – Grassland/Prairie/Forest Savannah	Revegetation (soil prep and discing)	$600	Acre	36	$21,600
	Weed-free mulch, approx. 5 tons/acre	$150	Ton	36	$5,400
	Prairie Seed Mix (with nurse crop)	$1,400	Acre	36	$50,400
	No-till drill seeding	$200	Acre	36	$7,200
	Mowing (twice in Years 1 and 2, once in Year 3)	$500	Acre	36	$18,000
	Saplings/Shrubs, installed, approx. 50 per acre	$60	Each	1800	$108,000
	Invasive species removal	$300	Acre	36	$10,800
	Vegetation Monitoring[NB5]	$500	Acre	36	$18,000
Abandon High Capacity Well		$4,300	Each	1	$4,300
Removal of Processing Plant and Office Building	Approximately 54,000 square feet	$58,000	Each	1	$58,000
Access Road Demolition	½-mile paved road	52,800	square feet	.35	$18,480
Storm Water Ponds	Landowner would like 2 ponds left on Phase 1	$3,400	Each	7	$23,800
Erosion Control Materials	Silt Fencing, Sediment Bale Barriers	$200	Acre	36	$7,200
				Total Proposed Reclamation Cost:	**$616,230**
				Chippewa County Administration Fee (8% of Reclamation Cost):	**$49,300**
				Total Proposed Financial Assurance:	**$624,350**

An annual reclamation report and activities plan will be prepared and submitted 90 days from end of year. The report will be developed to meet the requirements of NR 135.36 and will include information to document:

- The extent of current mine development.
- The existing groundwater elevations, as recorded quarterly at the groundwater monitoring wells.
- An updated mine site groundwater elevation map.
- The results of the following items, as completed during the reporting period:
    - Groundwater and storm water monitoring analysis
    - Reclamation and stormwater site inspections period (including intermittent mining periods)
    - Soil management and monitoring activities
    - Vegetation management and monitoring activities
- The reclamation and stormwater management activities planned during the next calendar year.
- Reevaluation of financial assurance based on past year's operation.

This report and activity plan will be used by the Mine Operator and regulatory authorities to: systematically record, plan, and schedule construction activities that will be used to meet reclamation performance standards; schedule operational inspections and maintenance activities; and systematically document for the public site conditions and current compliance with permit conditions.

These proposed final post mine land uses comply with applicable current federal, state and local laws.

4.0 Certification of Reclamation Plan

The owner hereby certifies that reclamation will be carried out in accordance with the reclamation plan and that the post mining land use complies with federal, state, and local laws in effect at the time of the submittal.

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Bruce Durand
Agent for Site Owners/Operator