DRT Sands, Inc.

# Reclamation Plan
# Non-Metallic Mining

Town of Auburn
Chippewa County, WI

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DRT Sands, Inc.
Reclamation Plan
Non-metallic Mining
Town of Auburn, Chippewa County, WI

# 1.0 INTRODUCTION

DRT Sands, Inc. (DRT Sands) is seeking to obtain a non-metallic mining reclamation permit from Chippewa County for a proposed industrial sand mining and wet processing facility in the Town of Auburn, Wisconsin ("Site" or "Mine Site"). The Site is located in the northwest quadrant of the intersection of State Highway 64 and Highway DD and encompasses approximately 244.4 acres. (See Sheet C1, *General Location Map.*) Proposed activities on the Site include clearing and grubbing, stripping topsoil and overburden, extraction of the sand, wet processing, stockpiling, loading, hauling and Mine Site reclamation activities.

This Reclamation Plan has been prepared in accordance with Wisconsin statute 295, Wisconsin Administrative Code NR135 and Chippewa County Ordinance 30, Article II. Information in this Reclamation Plan follows the general format of Chippewa County guidance documents and requirements including Appendix II Plan Specifications for Non-Metallic Mines in Chippewa County, Appendix B Siting and Development Standards, and Plan Content, Specifications and Engineering Requirements for Non-Metallic Mine Construction in Bedrock.

This Reclamation Plan outlines the post-mining land use for the Site based on available soil resources as well as general stormwater management during mining and post-mining so that mining and reclamation activities do not cause surface or groundwater pollution. Site specific designs for individual components of the stormwater management system will be fully developed as site design is finalized and WPDES permits are applied for including the development and approval of stormwater pollution prevention plans for both construction activities and nonmetallic mineral mining and processing activities.

# 2.0 PLAN SPECIFICATIONS FOR NON-METALLIC MINES IN CHIPPEWA COUNTY

## 2.1 Initial Site Plan

The Initial Site Plan describes existing conditions of the Site and surrounding area though text and plan sheets. Supporting information is provided in Section 2.1. A description of Initial Site Maps is provided in Section 2.2. All plan sheets are included in the back section of this report.

Supporting Information for Initial Site Description:

2.1.1 Name, address and telephone number of the applicant and mine operator:

| | |
|---|---|
| Applicant/Operator: | DRT Sands, Inc |
| Contact Name: | Donnie Rihn |
| Address: | 7140 State Hwy 40<br>Bloomer, Wisconsin 54724 |
| Telephone: | (715) 828-9352 |

Email: Donnie@drtsands.com

2.1.2 Name, address and telephone number of the land owners:

The proposed Mine Site is located on seven separate but contiguous parcels of property located in portions of Section 27 and Section 28, Township 31 N, Range 10W. The project includes seven separate parcels with three individual property owners. The Parcel Identification Numbers (PINs), names, addresses and phone numbers of all owners of the property on which the Site is located are indicated on Table 1, *Property Owner Information*.

*Table 1 Property Owner Information*

| | |
|---|---|
| Clark, Lori A et al.<br>PINs: 23110-2821-00000000<br>23110-2822-00000000<br>23110-2823-00020000<br>23110-2824-00020000 | Name: Lori A. Clark et al.<br>Address: c/o John and Marie Clark<br>3266 State Hwy 64<br>Bloomer, Wi 54724<br>(715) 568-3667 |
| Tony Rihn<br>PINs: 23110-2811-00000000<br>23110-2812-00000000 | Name: Tony Rihn<br>Address: 706 28th St<br>Chetek, Wi 54728<br>(715) 924-3749 |
| Rosella Rihn<br>PIN: 23110-2722-000-20000 | Name: Rosella Rihn<br>Address: 20839 County Hwy DD<br>Bloomer, WI 54724<br>(715) 568-5409 |

Sheet C2, *Project Parcels*, illustrates the parcels, PID numbers and parcel ownership. Contiguous parcels of land owned by any of the land owners identified above which are not included in the project boundaries are identified on this figure as well as property owners within 660 feet of the Mine Site.

2.1.3 Lease(s):

Copies of the fully executed lease and/or agreements between the landowners of the Site and the Operator are included as Appendix A. Proof that all property taxes on the proposed Site are current is included as Appendix B.

2.1.4 Legal Description:

The legal description on which the mine is proposed to be located is as follows:

The NW ¼ and the N ½ of the NE ¼ of Section 28, Township 31 North, Range 10 West and the NW ¼ of the NW ¼ of Section 27, lying west of County Road DD, except Lot 1 of CSM #2552,

Township 31 North, Range 10 West. Tax parcel numbers are indicated on Table 1, *Property Owner Information*, above.

2.1.5 Parties of Interest:

Names and addresses of all property owners within 660 feet of the proposed Mine Site are included on Table 2, *Adjacent Property Owners.*

*Table 2 Adjacent Property Owners*

| | |
|---|---|
| 1. John P. and Amy M. Weber<br>2732 State Hwy 64<br>Bloomer, WI 54724 | 2. Preferred Sands of Minnesota LLC<br>100 Matsonford Rd.<br>Radnor PA 19087 |
| 3. Mortgage Association Federal National<br>P.O. Box 650043<br>Dallas, TX 75265 | 4. William E. and Lucretia C. Waldbuesser<br>20991 30th St.<br>Bloomer, WI 54724 |
| 5. Chippewa County Forest<br>711 N Bridge St. Room 011<br>Chippewa Falls, WI 54729 | 6. George B. and Carol M. Belgarde<br>P.O. Box 365<br>Chetek, WI 5472 |
| 7. Dorothy E. Conrad Trust<br>1403 15th Ave.<br>Bloomer, WI 54724 | 8. Clyde and Janet Allison<br>20454 County Hwy DD<br>Bloomer, WI 54724 |
| 9. Kevin Pietz<br>3991 State Hwy 64<br>Bloomer, WI 54724 | 10. William E. and Lucretia C. Waldbuesser<br>20991 30th St.<br>Bloomer, WI 54724 |
| 11. Rosella Rihn<br>20839 County Hwy DD<br>Bloomer, WI 54724 | 12. Wisconsin Dept. of Transportation<br>4802 Sheboygan Ave.<br>P.O. Box 7910<br>Madison, WI 53707-791 |

2.1.6 Soil Information:

There are several soil types on the proposed Site. The Plainbo Loamy sand (PdD) 12%-20% slopes and the Boone Fine Sand (BoE) 20-45% slopes are the most prominent soil types within the proposed mining area. Most of the soil types have formed over sandstone parent material on bedrock controlled uplands and outwash plains with just over 50% of the soils in Hydrologic Soil Group A. Table 3, *Site Soils,* lists the soil types found on the Mine Site and includes information on the depth of topsoil (A horizon soils) and subsoil (B horizon soils) and the volumes of A and B horizon soils based on an average thickness associated with each soil type. If an E Horizon is present in the profile between the A and B horizons, it is combined with the B horizon thickness/volume. Thickness or range of thickness information was taken from the NRCS Soil Series descriptions. Appendix C, Soil Series Descriptions, includes copies of the descriptions. Sheet C5, *Soils Map*, illustrates the aerial distribution of the Site soils. Additional information detailing the handling storage and reuse of topsoil and subsoil is included in Section 4.2.

Topsoil and subsoil will be used to construct temporary berms along the operational boundary of the Mine Site. A horizon soils will be stripped and stockpiled separately from B horizon soils, and both A and B horizon soils will be stockpiled separately and not mixed with other soil materials such as C horizon soils, Tunnel City overburden, unconsolidated overburden, soil amendment materials and wash plant reject materials.

Table 4, *Volumes by Phase*, in Section 3.1.3 lists the volume of A and B horizon soils on a phase by phase basis. As mine development continues to be refined, some modification to phasing and therefore Table 4 is anticipated, but the phase by phase breakdown will assist in materials management at the Mine Site. Between phases, soils will be stockpiled separately and managed as a whole amongst all of the property owners for the entire duration of the life of the Mine Site. A and B horizon soils as well as overburden used to achieve reclamation grades will be used throughout the Mine Site as needed to achieve reclamation grades and without respect to individual properties.

Initially, topsoil, subsoil (A and B horizon soils) and overburden will be stockpiled on the Mine Site. Some of these materials will be utilized in the construction of screening berms and others will be stockpiled for later use in reclamation. See Sheet C6, *Operations Plan* for the general location of topsoil, subsoil and overburden stockpiles. Progressive reclamation will be adopted as mining progresses and a large enough area has been mined of the sandstone resource. A description of this process is further detailed in Section 4.2. It is estimated that 20-30 acres of area will need to be mined before a large enough working area is available and progressive reclamation can begin. 20-30 acres of mined area corresponds to 1-2 years of mining activity, depending upon the start-up rate of mining and processing.

*Table 3 Site Soils*

| Map Unit Symbol | Map Unit Name | Acres | A Horizon Thickness Avg (in) | A Horizon Volume (cy) | B Horizon Thickness Avg (in) | B Horizon volume (cy) |
|---|---|---|---|---|---|---|
| ApC2 | Arland sandy loam, 6% to 12% slopes, eroded[2] | 4.6 | 8 | 4,948 | 28 | 17,316 |
| ApD2 | Arland sandy loam, 12% to 20% slopes, eroded[2] | 11.4 | 08 | 12,261 | 28 | 42,915 |
| BlB | Billett sandy loam, 2% to 6% slopes[1] | 14.3 | 7 | 13,458 | 21 | 40,374 |
| BoE | Boone fine sand, 20% to 45% slopes[1] | 42.5 | 4 | 22,856 | 14 | 79,994 |
| CkC2 | Chetek sandy loam, 6% to 12% slopes, eroded | 11.0 | 8 | 11,831 | 10 | 14,789 |
| CkD2 | Chetek-Mahtomedi complex, 12% to 25% | 0.5 | 8 | 538 | 10 | 672 |

| | | | | | | |
|---|---|---|---|---|---|---|
| | slopes, eroded | | | | | |
| ElB | Eleva sandy loam, 2% to 6% slopes[2] | 11.5 | 4 | 6,184 | 18 | 27,830 |
| ElC2 | Eleva sandy loam, 6% to 12% slopes, eroded[2] | 4.3 | 4 | 2,312 | 18 | 10,406 |
| ElD2 | Eleva sandy loam, 12% to 20% slopes, eroded[2] | 18.4 | 4 | 9,895 | 18 | 44,528 |
| EmE | Elkmound loam, 20% to 45% slopes | 3.7 | 8 | 3,980 | 8 | 3,980 |
| HuB | Humbird sandy loam, 2% to 6% slopes[1] | 13.6 | 2 | 3.657 | 36 | 65,824 |
| MbB | Magnor silt loam, 1% to 6% slopes[2] | 5.1 | 4 | 2,743 | 45 | 30,855 |
| MlB | Meridian loam, 2% to 6% slopes | 7.6 | 8 | 8,174 | 25 | 25,544 |
| PdD | Plainbo loamy sand, 12% to 20% slopes[3] | 44.8 | 2 | 12,046 | 18 | 108,416 |
| Rb | Rib silt loam, 0% to 2% slopes[1] | 0.2 | 8 | 215 | 26 | 699 |
| RpB | Rosholt loam, 2% to 6% slopes[2] | 5.3 | 6 | 4,275 | 36 | 25,652 |
| SdA | Scott lake loam, 0% to 3% slopes[1] | 10.3 | 4 | 5,539 | 12 | 16,617 |
| SeB | Seaton silt loam, 2% to 6% slopes[2] | 1.5 | 4 | 807 | 42 | 8,470 |
| SeC2 | Seaton silt loam, 6% to 12% slopes[2] | 20.3 | 4 | 10,917 | 42 | 114,627 |
| SeD2 | Seaton silt loam, 12% to 25% slopes, eroded[2] | 0.2 | 4 | 108 | 42 | 1,129 |
| So | Shiffer loam, 0% to 2% slopes | 12.2 | 8 | 13,122 | 12 | 19,683 |
| | Total | 243.3 | | 149,865 | | 700,321 |

[1] An E horizon exists between the A and B horizons. The E Horizon is not included in the A or B horizon ca12lculations.
[2] A portion of the B horizon is combined with E horizon; e.g. E/B or B/E. The E horizon in t42his instance is included in the B horizon calculations.42
[3] 0-10 in. of BC horizon 42exist that are not included in the B Horizon Calculations.

## 2.2 Initial Site Maps

### 2.2.1 Location map to indicate general location of the project in the county or township;

Sheet C1, *General Location Map* illustrates the location of the Mine Site with respect to Chippewa County and the Town of Auburn.

2.2.2 Topographic map of affected lands;

The topography of the proposed Mine Site is illustrated using two foot contour intervals on Sheet C3, *Existing Conditions Plan.* The contour data extends for 660 feet from the proposed Mine Site. The contour data was obtained from Chippewa County GIS Department and was generated from 2011 LiDAR data.

2.2.3 Property boundaries showing the land under consideration and neighboring parcels located within 660 feet of the project site;

Sheet C2, *Project Parcels,* illustrates the property boundaries of the Mine Site and adjoining properties within 660 feet of the Site.

2.2.4 Roads located on or within 660 feet of the project site, with road names indicated;

The Site is located just north of State Highway 64, west of County Rd DD and east of 30th Street. Roads within or within 660 feet of the Site are illustrated on Sheet C3, E*xisting Conditions Plan*.

2.2.5 Road right-of-way lines;

Road right-of-way lines are illustrated on Sheet C3, E*xisting Conditions Plan*.

2.2.6 Locations of all structures within 660 feet of the site and the use of each structure;

The locations and uses of all structures within 660 feet of the Site are illustrated on Sheet C3, E*xisting Conditions Plan*. Existing structures include home sites/farmsteads and associated outbuildings. Sheet C3-A, *Existing Land Use*, is an aerial photograph that identifies the current land use of the Site and surrounding area.

2.2.7 Locations and names of all intermittent and perennial streams and lakes as indicated on USGS 7.5 min topographic maps;

The USGS 7.5 minute topographic map indicates that there is one unnamed intermittent stream that runs through the western half of the property. The location of the intermittent stream is illustrated on Sheet C3, E*xisting Conditions Plan*.

2.2.8 Areas which convey concentrated flows to or from the site;

Areas which convey concentrated flows to and from the property are limited to the intermittent stream described above. This stream enters the Site from the north and flows through the Site, leaving along the southern boundary through a set of culverts running under State Trunk Hwy 64.

There is also a culvert that directs surface water from the very southwest corner of the Site under 30th Street towards the west. General Site drainage is from the north to the south. There are other areas of less concentrated flow into the property primarily from the north to the south. The direction of surface water drainage is indicated by flow arrows on Sheet C3, E*xisting Conditions Plan*.

2.2.9 Locations of all wetlands within 660 feet of the site;

The Wisconsin Wetland Inventory (WWI) indicates that there is one wetland located on the proposed Mine Site that is associated with a portion of the intermittent stream that runs through the Site. The wetland as mapped on the WWI, encompasses approximately 5.0 acres and is classified as emergent/wet meadow: grazed (E1Kg). The WWI indicates that there are two other wetland basins located within 660 feet of the Mine Site. One of these basins is located west of the Site, west of 30th Street. This wetland is classified as emergent/wet meadow; grazed (EK2g). The other basin is a complex of two wetland types: forested, emergent/wet meadow: grazed (T3/E1Kg) and Forested: grazed (T3/8Kg). Wetland locations, based on data from the WWI map are illustrated on Sheet C3, *Existing Conditions Plan.* The Wisconsin data base also indicated three areas of wetland indicators; one around the wetland, one in the southern portion of the Site and one in the very southwest corner of the Site.

A wetland delineation was performed by Wisconsin Wetland Specialists to ensure that that surface waters and wetlands are protected during mining and reclamation as required by NR 135.07. Field work was completed on October 15, 16, and 31, 2014. At the time of the delineation there was still vegetation that was growing and flowering. A copy of the wetland delineation report, dated October 31, 2014, can be found in Appendix D. A copy of the delineation report was also submitted to Daniel Munson at the United Sates Army Corps of Engineers for concurrence.

The wetland determination was made based on an evaluation of soils, hydrology (surface and subsurface) and vegetation at a number of sample points. Areas identified as wetlands and wetland indicators were evaluated as part of the field delineation work. The main wetland area identified in the WWI was verified as wetland. The area in the southwest corner of the Site, indicated as wetland indicator on the WWI was also determined to be wetland.

The main wetland area is centrally located on the western half of the Site and is associated with a drainageway that runs north to south through the property. Based on the results of the report, the wetland area extends beyond the area indicated on the WWI. Wetlands on the Site are considered Wet Meadow, Sedge Meadow, and Hardwood Wetland. The delineated wetland basins are indicated on Sheet C3, E*xisting Conditions Plan*. Mining setbacks and reclamation grades have been revised to reflect the delineated wetland boundaries to ensure protection of surrounding surface waters and wetlands.

A “desktop” determination on the unnamed stream’s navigability designation was received and based on the results of the desktop evaluation, the unnamed stream is not considered navigable by the Wisconsin Department of Natural Resources (WDNR). However a final determination will not be made until they can visit the Site without snow cover (See Appendix E). The applicant may

decide, after concurrence and final determination of navigability to pursue applicable permits for wetland impact and mitigation. However, at this point in time, the project is designed to avoid any direct impacts to wetlands, to implement stormwater controls to protect the quality of the wetland and to restore surface water drainage patterns to the wetland post reclamation to ensure long term viability of the wetland complex.

2.2.10 Biological Information

The WDNRs Natural Heritage Inventory was reviewed and there are no state listed threatened or endangered species listed for Township 31N, Range 10W. A follow up conversation with WDNRs assistant zoologist and mapping specialist was made to confirm this information. A formal WDNR NHI review has been requested as part of the NPDES permit work. The Site consists of fallow pasture land, wooded areas and a wetland basin located along an intermittent drainageway. The wooded areas are contiguous with Chippewa County forest lands to the north of the Site.

A Wisconsin Historic Preservation Database GIS request was made. The area was surveyed with no sites found.

2.2.11 Boundaries of previous excavations on the site;

There are no known previous excavations on the proposed Mine Site.

2.2.12 Wells within 660 feet of the site;

The Wisconsin Well Index indicates contains one well constructor record for the Site associated with the homestead on the Clark parcel. There are 4 well constructor records for wells associated with residences located within 660 feet of the Site. There are two additional residences located within 660 feet of the Site that do not have well constructor records available, however it is assumed that there is a well located near each of these residences. The locations of the wells are illustrated on Sheet C3, *Existing Conditions Plan.*

2.2.13 Groundwater elevation at the site and source of the information (boring, county groundwater map, well data, etc.);

The elevation of the groundwater beneath the Site is estimated to range between approximately 1050-1085 feet above mean sea level based on the Generalized Water-Table Map for Chippewa County1, well constructor's reports for on-site and adjacent water wells, and preliminary findings of the five year groundwater study commissioned by Chippewa County Groundwater Study presented in a 3/18/2014 power point, extrapolating data from the Superior Sands site located approximately

[1] Lippelt. Miscellaneous Map Series Generalized Water-Table Elevation of Chippewa County. Wisconsin Geological and Natural History Survey Map 88-1. 1988

½ mile south of the proposed Mine Site. The groundwater is expected to be below the base of the Wonewoc with the general direction of groundwater flow towards the south.

It is possible that there are local areas within the Site of perched water conditions where precipitation falling on and entering into the subsoils eventually hits a relatively impermeable layer within the overburden (tunnel city and/or colluvium). This water would be expected to travel horizontally to the face of a bluff and seep out or continually work its way downward to the saturated bedrock aquifer.

Sheet C4, *Water Table Conditions*, is an excerpt from the generalized Water-Table Map illustrating generalized groundwater elevations at the Site. Sheet C-4A, *Mine Site Water Table Map*, is a close up of the Site with the contours from the generalized Water Table Map indicated as well as groundwater elevation information from adjacent water well records. The wells were not field located or surveyed so the water level data is approximate only. The water level data from the water wells is consistent in and around the vicinity of the Site and in general with the regional water table map. Copies of the well construction reports are included as Appendix F, *Well Contractor Reports*.

A groundwater monitoring network will be installed at the Site. The groundwater monitoring network will be utilized to establish the existing groundwater elevation and gradient in and around the vicinity of the Site and to monitor groundwater quantity and quality. Appendix G, *Groundwater Monitoring Plan*, contains information regarding the proposed groundwater monitoring network. The Groundwater Monitoring Plan includes a map indicating the locations of proposed monitoring wells. A total of three monitoring well locations are proposed. If a test well is drilled during the process of establishing the high capacity well, that is not abandoned; it will be added to the monitoring well network. Water level data will also be obtained from the production well. Well locations have been selected to allow triangulation of water levels, flow direction and calculation of gradients across the Site and establish a water quality monitoring point down gradient of the plant site.

The Groundwater Monitoring Plan includes a table that lists the proposed wells, approximate surface elevations and depths of wells. This information is approximate only. Ultimately the well locations will be guided by accessibility and final depths guided by the elevation at which groundwater is encountered. The Groundwater Monitoring Plan includes a table that indicates the proposed frequency of groundwater monitoring and groundwater quality parameters. After the groundwater monitoring wells have been installed and the first round of water level data collected, a site specific groundwater map will be prepared and submitted to the County.

The groundwater monitoring well network will help to demonstrate compliance with NR 135.08 Groundwater Protection, which requires that nonmetallic mines are reclaimed in a manner that does not cause a permanent lowering of the water table that results in adverse effects on surface waters or a significant reduction in the quantity of groundwater reasonably available for future users of groundwater. Mining reclamation shall be conducted in a manner which does not cause a violation of groundwater quality standards.

2.2.14 Locations of all utilities at the Site.

There is a private well and septic system associated with the residence located on site. There is overhead electric serving the site.

## 3.0 SITE OPERATIONS PLAN

The Site Operations Plan describes proposed operating conditions of the Mine Site. Supporting information is provided in narrative form in Section 3.1. A description of Site Operation Maps is provided in Section 3.2. All plan sheets are included in the back section of this report.

### 3.1 Description of Site Operations:

Mining will occur in 8 phases, with the area of each phase ranging in size between 16 and 22 acres. Mining will progress sequentially through each phase. The general phasing will consist of the preparation and construction of the processing site, including construction of screening berms and stormwater management system for the processing plant site. Preparation of the Phase 1 mining area will begin with stripping and segregation of A horizon and B horizon soils, removal and stockpiling of overburden, and then excavation of the sandstone. Phase 1 is located immediately north of the processing plant site. Mining will continue in a northerly direction and then progress easterly. Reclamation backfilling will begin in the western portions of both Phases 1 and 2 and continue to progress easterly at a sufficient distance behind the mining to allow room for safe mining operations.

The mine life is estimated to be 8-16 years, with each phase lasting approximately one to two years. Reclamation will be completed within 12 months of the completion of mining operations. The actual rate of mining and reclamation is a function of market demands and may occur faster or slower at different times over the life off the mine. While the lower portion of the Wonewoc (below 1105 feet above msl) may be too fine grained to be marketable, the minimum mine floor elevation will be established at 1075 feet above msl, just below the base of the Wonewoc, to account for potential variations in quality and/or future product specifications that may make it feasible to mine to this elevation in some locations of the mine.

A Reclamation and Construction Inspection Plan is included as Appendix H, *Reclamation and Construction Inspection Plan*. The purpose of this plan is to ensure that structured communication between the operator and the Chippewa County Land Conservation and Forest Management Department (LCFM) during key points in mine development and reclamation is maintained.

3.1.1 Description or list of the type of materials to be extracted.

The material of interest to be excavated at the proposed Mine Site is sandstone from the Wonewoc Formation. The sand will be processed and sold as industrial sand, primarily for use in the oil and gas industry as a component of the hydraulic fracturing process. In addition to the

Wonewoc, topsoil and overburden will also be extracted in order to expose the Wonewoc Formation. Overburden consists of both unconsolidated materials and consolidated bedrock. Consolidated bedrock overburden is composed of the Tunnel City Group and consists of a fine grained dolomitic sandstone. Sheet C8, *Cross Sections*, illustrates the general relationship of materials to be excavated.

3.1.2 Description or list of the type of extraction and processing activities to be conducted at the site.

The type of extraction will consist of surface mining using excavators and backhoes. The sandstone and consolidated overburden may need to be blasted using a low energy blast or "bump" to loosen the material and facilitate excavation procedures. Processing activities will include crushing as needed of the more consolidated sections of the Wonewoc. The material will then be screened and wet processed to clean the sand and remove the finer sand grains or waste sand from the coarser sand grains. The coarser sand will be stockpiled, then loaded and transported from the Site for further processing (drying and screening) at various off-site locations.

Wet processing will typically occur on a seasonal basis, although some winter wet processing operations may occur with enclosure of the plant if future product demand requires. The plant will be built to produce up to 2 million tons of wet processed sand annually. The wet plant will use a combination of attrition scrubbers, hydrosizers and dewatering screens which separate clay, shale and fine sand (tailings) from the coarse marketable sand. The clean sand is dewatered and then stockpiled into two separate dry plant feed stockpiles based on sand sizes. These dry plant feed stockpiles will begin to be built during the spring, reaching maximum capacity in the fall and then will be depleted throughout the course of the winter months.

A non-potable high capacity well will be installed to serve the wash plant. A high capacity well permit has been applied for from the WDNR and must be issued prior to wet plant operation. The well will be cased from the surface through the Eau Claire sandstone formation so that water will be drawn from the Mt. Simon aquifer. This will limit the potential for impacts on nearby streams and wetlands. Process water will be treated in a water treatment plant that will utilize a clarifying/thickening tank where process water will be treated with flocculants to promote settling of solids. Sediment falling to the bottom of the water treatment tank will be collected and dewatered utilizing a belt or filter press.

Stormwater in the plant area will be collected and used for dust control. Excess stormwater will be pumped to the water clarifier to supplement the water required for operation of the wet plant as soon as the plant is operational. During the construction period, there may be discharge of treated stormwater from the Site in accordance with the WPDES permit. Because washing will typically be conducted on a seasonal basis, there may also be times, for example during spring snowmelt, when stormwater is discharged from the plant site in accordance with the WPDES permit. Discharge will be controlled to pre-mining 2, 10 25, and 100 year-24 hour events during mining activities and for the reclaimed mine site.

Water decanting from the wet sand stockpile and from the clarifier will be collected in process water ponds for final settling treatment. Process water will be pumped from the final pond in the series to the wet plant for reuse. A low permeability soil liner will be used to limit the potential for leaching process water. The specifications for construction of the liner are included as Appendix I, *Alternative Settling Pond Liner Specification*. Reuse of stormwater and process water will decrease the demand on the high-capacity well. The processing plant will operate in accordance with the high cap well permit and the amount of process water and stormwater that is reused on site will be maximized to help to ensure that the Site operates in accordance with NR 135.08 (1). The Site will be operated in a manner that does not cause a permanent lowering of the water table that results in adverse effects on surface waters, or a significant reduction in the quantity of groundwater reasonably available for future users of groundwater.

Stormwater management practices will be developed on a phase by phase basis as mining progresses through the Site. Stormwater management will be utilized to minimize erosion and sedimentation from the Site. Stormwater Management is described in Section 4.4 and Appendix J, *Stormwater Management Plan*.

Tailings, composed of fine sand that is too small to be further processed and used to make final desired gradations, is separated from the coarser sand in the wet processing plant. The fine sands are dewatered and along with the filter cake or muds from the belt press, are returned back to the mine site to be used in reclamation. Overburden removed in the initial stages of mining will also be used as reclamation backfill. The upper portion of the backfill will be composed of clay or shale rich soils to the extent practical to maximize the moisture holding capacity of the subsoils. Once final grades in an area are achieved, B horizon subsoil will be respread over the area followed by A horizon topsoil and the area seeded and mulched to establish vegetation. Soil amendments may be added to the topsoil to improve revegetation success.

3.1.3 Estimated volume of materials to be extracted during the operation of each cell, during the permit period, and during the full life of the operation.

Table 4 indicates the volumes of material to be removed by phase and provides site totals as well.

*Table 4 Volumes by Phase*

| Phase | A Horizon Topsoil (cy) | B Horizon Subsoil (cy) | Unconsolidated Overburden (cy) | Tunnel City (cy) | Sandstone (cy) |
|---|---|---|---|---|---|
| 1 | 6,913 | 40,427 | 115,442 | 25,270 | 1,834,791 |
| 2 | 9,736 | 42,214 | 60116 | 1,174,266 | 1,553,716 |
| 3 | 13,692 | 51,834 | 50,744 | 1,565,496 | 2,245,199 |
| 4 | 13,665 | 95,447 | 141,567 | 256,426 | 2,211,783 |
| 5 | 7,873 | 74,869 | 111,197 | 493,312 | 2,209,379 |
| 6 | 12,194 | 49,418 | 114,618 | 937,940 | 2,188,586 |
| 7 | 12,314 | 57,737 | 160,677 | 300,004 | 2,699,614 |
| 8 | 9,782 | 59,004 | 8,815 | 392,411 | 2,683,270 |
| Plant Area | 17,886 | 115,121 | 95,911 | 66,356 | 944,892 |

| | | | | | |
|---|---|---|---|---|---|
| Total | 104,056 | 586,072 | 713,498 | 5,211,481 | 18,571,230 |

3.1.4 Methods for site dewatering and effluent discharge. Discharges may require a Wisconsin Pollution Discharge Elimination System permit.

The elevation of the groundwater is estimated to range from 1060-1085 feet above mean sea level with a maximum excavation elevation based on preliminary data of 1075. Resource drilling indicates that the base of the sandstone is at approximately 1105. Based on available data, all excavations will take place above the regional water table. There will be no mine site dewatering. Occurrences of locally perched water conditions may be encountered which may require pumping and management but will not involve the regional groundwater system.

3.1.5 Stormwater permits required by other agencies.

A WPDES Construction Site Stormwater Runoff General Permit will be required to cover initial site construction activities associated with the processing plant, stockpile and loadout area. The mining and processing operations will also require a WDNR General Permit to discharge under the Wisconsin Pollutant Discharge Elimination System for Nonmetallic Mining Operations (WPDES Nonmetallic Mining General Permit). This permit authorizes the discharge of wastewater and stormwater from nonmetallic mining operations to surface or ground waters. This permit requires that stormwater contaminant control measures are implemented at the Site, annual Site compliance inspections, preparation and implementation of a stormwater pollution prevention plan (SWPPP), quarterly inspections, and monitoring for compliance with limitations for groundwater and surface water discharges.

The SWPPP will be prepared prior to applying for a WPDES Permit. The SWPPP will include structural and non-structural best management practices. There will be several stormwater sedimentation ponds constructed to treat stormwater runoff from active mining phases and the wet plant areas. These ponds will be designed to retain stormwater and to have the ability to retain and treat the stormwater with flocculants if necessary prior to discharge off-site. As the mine develops stormwater will be directed internally to the extent practical, however, based on the low permeability of the sandstone, the ability to infiltrate all of the stormwater internally may not be practical.

Section 4.4 outlines general stormwater management practices to be adopted at the Site and Appendix J, *Stormwater Management Plan,* outlines the general stormwater management practices that will be incorporated into the final SWPPP. The stormwater management plan will be amended as needed to accommodate final plant design and mine plan details.

3.1.6 Erosion control permits required by other agencies:

A WPDES Construction Site Stormwater Runoff General Permit will require a site specific Erosion Control and Stormwater Management Plan that is implemented before mobilizing the construction equipment. The plan will detail the installation, maintenance and inspection of best management

practices (BMPs) used to avoid or minimize soil, sediment and/or pollutants carried in runoff to waters of the state.

BMPs that may be specified in the plan include sediment ponds, tracking pads, silt fences, and temporary and permanent seeding. Sequencing, inspection and maintenance of BMPs will be included in the Erosion Control Plan. Some of the elements of the Erosion Control Plan BMPs to be incorporated include:

- Minimize open area by phasing or sequencing construction and preserving existing vegetation where possible.
- Divert stormwater away from disturbed or exposed areas when possible.
- Divert stormwater internally and promote infiltration where feasible.
- Install BMPs to control erosion and sediment and manage stormwater.
- Inspect the site regularly and properly maintain BMPs, especially after rainstorms.
- Revise the plan as site conditions change during construction and operation and improve the plans if BMPs are not effectively controlling erosion and sediment.
- Keep the construction site clean by putting trash in trash cans, keeping storage bins covered, and preventing or removing excess sediment on roads and other impervious surfaces.

## 3.2 Site Operations Maps:

### 3.2.1 Location and description of mining site boundary

The proposed mining limits are illustrated on Sheet C6, *Operations Plan.* Mining limits are setback from various physical features as described below.

### 3.2.2 Locations of separation boundaries and separation dimensions, as referenced in Mine Siting Standards

Setbacks as referenced in the Mine Siting Standards and in the Town of Auburn Nonmetallic Mine Operators Licenses buffer requirements, mining limits have been established with minimum separation distances from noted structures and land features are as follows:

| Point of Concern | Separation Distance (ft) |
|---|---|
| property line | 50 feet |
| public road right of way | 50 feet |
| vision clearance (see county code) | 50 feet |
| private well | 250 feet |
| dwelling | 300 feet |
| commercial, industrial, or agricultural structure | 50 feet |
| wetlands, streams, lakes | 100 feet* |

The proposed mine limits along with separation distances for the above structures and land features are illustrated on Sheet C6, *Site Operations.*

3.2.3 Planned cell boundaries

Planned cell boundaries are illustrated as phases on Sheet C6, *Operations Plan.* The phases are each approximately 20 acres in size and represents approximately 1-2 years of mining activity.

3.2.4 Location and extent of disturbed areas including the area of excavation, spoils piles, topsoil stock-piles, wash ponds, and/or sediment basins.

Sheet C6 *Site Operations*, illustrates the excavation limits, topsoil stockpiles, the wetplant processing area. This plan is subject to revision as plant design and the stormwater pollution prevention plan are finalized.

3.2.5 Processing facilities

Sheet C6, *Operations Plan,* illustrates a concept layout of the processing facilities, stockpiles and ponds.

3.2.6 Location and discharge point of site dewatering systems

There are no dewatering systems planned for the Mine Site.

3.2.7 Arrows indicating the directions of flow of surface runoff internal and external to the site

See Sheet C6, *Operations Plan*

3.2.8 Vegetative and structural measures to be taken to screen the operation from view of surrounding land uses, where required

See Sheet C6, *Operations Plan*

3.2.9 Roads, culverts, and all points of public road access

See Sheet C6, *Operations Plan*

3.2.10 Practices to limit onsite erosion and offsite sediment delivery during excavation. Temporary measures may include but need not be limited to the following: water diversions, grassed waterways, sediment basins, filter strips, silt fencing, bale check dams, sod strips, rock riprap, temporary seeding and mulching. Appendix J, *Stormwater Management Plan* describes these practices in further detail.

## 4.0 RECLAMATION ACTIVITIES

The following section describes reclamation activities to be conducted during mining operation. This includes but is not limited to: a description of topsoil stripping, stabilization and conservation methods to be used during operations. Reclamation activities are to be conducted on an ongoing and progressive basis.

## 4.1 Post Mining Land Use

The post mining land use of the Mine Site will consist predominantly of Conservation Land/Wildlife Habitat with passively managed native prairie and minor amounts of woodlands along perimeters of the native prairie plantings. A small area of post mining land may be established as Working Land with managed agricultural production. This area would be developed as pasture and serve limited grazing land use, recreating the current land use based upon the landowners' wishes. In addition, the existing farmhouse and out buildings on the Clark property will remain throughout the mining operation and into the post-mining condition.

## 4.2 General Description of Reclamation Activities

The Project will be mined and reclaimed in phases. At any given time, there may be an area that is undergoing stripping and overburden removal operations in preparation of a subsequent phase of mining, an area of active sandstone excavation and mining activity, and an area of active backfilling and establishment of final grade. Final grades will be constructed to generally reestablish pre-mining surface water drainage patterns to the extent possible. Final grades are indicated on Sheet C7, *Reclamation Grades*. As areas are brought up to final grade, subsoil and topsoil will be placed and vegetation established to provide long term stabilization of the area.

The mine operator will follow a typical mining sequence throughout the life of the mine that progressively mines and reclaims on a continual basis. This sequence will include clearing and grubbing, stripping and removal of topsoil, temporary berming/stockpiling of topsoil, removal of overburden from the subsequent mining phase and placement in prior years mining area, placement of fines from wet processing plant in prior years mine area, final grading, placement of topsoil, and seeding and mulching to provide long term stabilization. At the onset of mining operations and the construction of the wet processing plant area, some modifications to this general sequence will occur while long term screening berms are established and a large enough mining area is opened up to allow concurrent mining and reclamation activities. The general process along with modifications during the initial mining activity is detailed below.

4.2.1 Clearing and grubbing: Stumps, roots, and slash that remain following the logging process of the wooded portions of the mine will be re-used during reclamation. These materials will be chipped and composted on site during mining and subsequently used as a soil amendment upon reclamation. Perimeter erosion control measures will be established prior to clearing and grubbing operations begin.

4.2.2 Topsoil Removal and Temporary Storage: A combination of scrapers, bulldozers, excavators and haul trucks will be used to remove topsoil (A horizon soils) and subsoil (B horizon soils) from each phase to be mined. Removal will be performed with the goal of recovering as much of the A and B horizon soils as possible. The A horizon and B horizon soils will be removed and stockpiled

separately. The depths of A and B horizon soils will vary according to soil type and location, as indicated on Table 3, *Site Soils*. All A horizon and B horizon soils will be stockpiled on site. During the initial construction of the plant area and stripping of Phase 1, A horizon topsoil will be shaped into the screening berm that will be constructed along Highway 64. A portion of the B horizon subsoil will be used to construct the remainder of the berm as indicated on Sheet C6, *Operations Plan.*

The toe of the screening berms will begin a minimum of ten feet from property line or the setback from the wetland/intermittent stream. The berms will extend as illustrated along key viewing points where existing wooded areas do not provide adequate screening. Berms will have side slopes no steeper than 3:1, unless a geotechnical study demonstrates stability of steeper slopes. They will have a height of 8-12 feet. Berms will be seeded and mulched to increase stability and prevent erosion. The screening berms will remain in place throughout the life of the site but will be removed and the materials utilized as part of final site reclamation activities for the final mining phase/ wet plant area.

The remainder of B horizon soils and overburden removed from the grading associated with the construction of the plant area and preparation of Phase 1 for mining will be stockpiled in the southwestern quadrant of the Site as indicated on the Operations Plan. This stockpile area will be graded and stabilized with vegetation and used as final reclamation fill material in Phases 7 and 8. All berms and stockpiles will be seeded and mulched according to Section 4.5 in order to reduce the potential for erosion, sedimentation and soil loss.

4.2.3 Contemporaneous Use of Topsoil:

As mining progresses into Phase 3, A and B horizon soils will be removed separately and stockpiled on a temporary basis while overburden is removed and backfilled in the completed Phase 1 and 2 excavation area. Reclamation filling will begin in the western portion of Phases 1 and 2 and move easterly towards Phase 3. A working area of approximately 300-400 feet will remain between reclamation filling and the mine face to provide sufficient room for excavation activity and transport of raw sand to the processing area. As mining progresses across the site, topsoil removal will be performed to minimize the area of disturbance at any given time.

4.2.4 Overburden and Sandstone Removal:

Blasting may be required to assist in removing any consolidated material. If blasting is required, the blasting contractor will monitor the vibrations at the closest residence using seismograph equipment and operate in accordance with all state, county, and township regulations. The mining operator is responsible for ensuring slope stability for the active mining area.

4.2.5 Final Grades and Slopes:

Overburden materials will be removed and used as reclamation backfill. During the initial phases of mining (anticipated to be Phases 1 and 2), overburden will be removed and stockpiled south in the southwest portion of the site. The overburden stockpile will be stabilized with seeding and mulching as described in Section 4.5, revegetation Plan. After a sufficient area has been mined out to allow

progressive reclamation, overburden will be excavated and placed as reclamation backfill in one operation without intermediate storage or stockpiling requirements.

Waste sand and soils from the dry plant may be hauled back to the Site to be used in reclamation backfills. The waste sand from the dry plant is typically sand that is too fine to meet specifications that is screened out during the dry plant process and chunks of soil that get picked up from the sand storage pile pad. The waste sand is material that originated on-site or from a similar mine site. CH. NR 500.08(2)(b), Wisconsin Administrative Code, exempts facilities for the exclusive disposal of spoils from sand, gravel, or stone and crushed quarry operations and similar non-metallic earth materials. However, DRT Sands will conduct annual testing of the waste fines from any off-site processing facility in accordance with NR 518.06 in order to characterize the waste material. Testing will include;

Nutrient content including Kjeldahl-nitrogen, ammonia-nitrogen, nitrate and nitrate-nitrogen, phosphorous and potassium;

Metals including aluminum, barium, boron, calcium, copper, iron, manganese, magnesium, sodium, strontium and zinc; and

Salt content including chlorides, fluorides and sulfates.

Additional constituents may be required by the County, including arsenic, lead and acrylamide.Fines from the wet plant, dry plant and belt press will be incorporated into the overburden prior to placement as reclamation backfill. These fine materials will not be placed as individual lifts. Where possible, belt press material may be incorporated with subsoil as a soil amendment to increase the moisture holding capacity and fertility of the subsoil. After backfilling and grading of an area is completed, the area will be scarified prior to redistribution of A and B horizon soils to limit compaction promote integration of subsoil and topsoil and recondition the mine soil to improve overall infiltration.

Backfilling and grading will result in a surface that does not pond water and is in general conformance with the grades indicated on the Sheet C7, *Reclamation Grades*. Reclamation grades were established to recreate pre-mining drainage patterns to the extent possible. The materials balance developed in the design of the reclamation grades requires a number of conservative assumptions about the deposit and percent of unmarketable sand. Final grades may be adjusted depending upon how the resource varies across the Mine Site. Typically adjustments are expected to increase the elevation of the final condition, but the same drainage divides, minimum and maximum slopes and general typography would remain consistent with the reclamation grades depicted on Sheet C7. Cross sections through the Site depicting final reclamation grades are indicated on Sheets C7-A and C7-B, *Reclamation Cross Section*.

4.2.6 Safety:

Highwalls will be backfilled and sloped as part of final reclamation backfilling and grading, Slopes will be established at a maximum of 3:1 allowing safe operation of equipment for the mowing etc. on the slopes. Ponding areas will be filled in to eliminate created water bodies. Once graded to

final reclamation grades the site will not pose safety concerns related to the mining process that was conducted on the property.

4.2.7 Topsoil Amendments:

Composted stumps, roots, and slash that were salvaged from the clearing and grubbing process, will be mixed into A and B horizon soils to increase organic content, structure and depth of soil profile.

4.2.8 Topsoil Reuse:

Once the reclamation grades have been established over the western portion of Phases 1 and 2, the temporary stockpile of B horizon soils will be placed, followed by the A horizon soils. This "immediate" reuse of topsoil will continue where practical as the mine progresses. When compaction of soil is found, the area will be further prepared by disking, chisel plowing, ripping and/or scarification. In addition, driving vehicles or operating equipment will be limited and after the placement of the subsoil and topsoil layers. All topsoil will be redistributed onto a prepared site. Redistribution will only occur during dry conditions using appropriate equipment to minimize compaction. Clods or clumps present after the topsoil has been placed will be broken down by harrows or disking to provide a uniform soil texture. By incorporating these measures, the estimated soil loss during striping and storage is 5%.

4.3 Plant and Stockpile Area:

The wet plant processing area will be constructed at the onset of mining operations. Although plant design has not been finalized, the general process will be as follows. Excavated sandstone will be loaded into a grizzly feeder, screen and impact crusher. This portable equipment will be set up near the active mine phase to size the material for transport to the plant. The screen separates out oversized pieces of sandstone from smaller pieces of sandstone. The oversized materials are conveyed to a surge pile and sent to the impact crusher. The crushed material is returned to the initial screen. Oversized materials that remain after this process are returned to the crusher. Materials that pass through the screen continue on to the wet plant. The sand will be conveyed or trucked to the processing plant from the active mining area.

The screened sandstone will be placed into a sump at the wet plant that feeds separator cyclones to make an initial cut of fine material, and then onto non-motorized density separators where two different sized streams are produced. The first stream is composed of fine sand. This stream is sent to the fine sand circuit where additional sizing takes place in a series of cyclones and dewatering screens. The fine sand is dewatered and hauled or conveyed back to the quarry for reclamation. Process water is sent to the water treatment portion of the plant where it enters a clarifier or thickener tank.

The thickener tank separates waste material from the water using flocculants and/or coagulants. Waste material from the thickener tank will be sent to a belt press that removes excess water. The filter cakes coming out of the belt press will be used as reclamation backfill, primarily in the upper portion of the backfills. Clarified water from the thickener tank is returned to the fresh water tank of the wet plant and is recycled back through the plant.

The coarse sand stream may be sent to attrition mill cells and then to additional separator cyclones to further size the sand. The coarse sand is sent though dewatering screens and on to the wet processed sand stockpile where it will be loaded into haul trucks and transported from the Site.

The wet processed sand stockpile will be built up over the course of the mining and wet processing season and depleted over the winter months as the material is hauled out and to dry plants on a year round basis. The winter stockpile is fed by a conveyor system and will increase in size throughout the mining season to a maximum capacity of approximately 600,000 cubic yards. The stockpile will be nearly depleted at the end of winter and the beginning of spring mining and wet plant operation. The wet plant will have the capacity to produce up to 2 million tons of wet processed sand per year.

Upon final reclamation, all equipment and structures at the site, including buildings, will be removed from the site within 12 months of cessation of mining activity. The areas disturbed any demolition activity will be reclaimed and revegetated described in the revegetation section (Section 4.5). The paved portion of the access road will be removed in its entirety as part of final Site reclamation.

4.4 Stormwater:

The Site will operate under a WPDES Permit and a Stormwater Pollution Plan (SWPPP) will be prepared for the Site which will describe specific stormwater Best Management Practices (BMPs) to be constructed and maintained at the Site. The SWPPP and all stormwater BMP designs for the mine will be submitted to the LCFM for review and approval prior to their installation. General stormwater management practices will involve the installation of silt fence and or diversion berms around the perimeter of areas that will subsequently be cleared and grubbed, stripped and undergo overburden and sandstone removal. Temporary sedimentation ponds will be constructed in areas that drain to points of concentrated flow into the wetland basin or off-site. The stormwater ponds will be maintained until the floor of the mining area that contributes to the temporary sedimentation pond has been established at a low enough elevation to allow stormwater to be directed to interior areas of the mine floor. Reclamation backfilling will reestablish pre-mining drainage patterns. Reestablishment of vegetation and other best management practices as described in Section 4.4

Stormwater basins will be constructed at appropriate locations within the wet plant processing area and within active mining phases. For the most part, surface water drainage flows from north to south and stormwater management basins will be constructed in the southern portion of a phase. These basins will collect and treat stormwater and each will have an outlet control structure to regulate flows. Ponds will be designed with a capacity to contain a ten year storm event and to control discharges to maintain pre-mining peak runoff flow rates for the 2, 10, 25 and 100 year 24 hour storm events. Each outlet will have a control structure to allow detained water sufficient treatment time to adequately remove sediments, using flocculants if necessary. Accumulated stormwater will be used for dust control or excess will be released at controlled rates, allowing the restoration of stormwater storage capacity. Each pond will have an emergency spillway and inlet and outlet protection.

Stormwater collected in Pond 1 adjacent to the processing plant will be pumped and used for dust control; watering internal haul roads and supplying water to the spay gun system on the trip conveyor. Excess water within this basin will be pumped to the clarifier/thickener tank for treatment and use in the wet plant.

Routine maintenance will be performed to assure that stormwater ponds will continue to function as designed. A stormwater basin will be considered inadequate if sediment has decreased the wet storage volume by 50 percent or dry storage volume by 25 percent of its original design volume. Based on this inspection, if a stormwater basin requires sediment cleanout, the basin will be restored to its original design contours and vegetated state within one year of the inspection date. Sediment and erosion control measures, including , outlet structures, culverts, outfall structures, all reclaimed areas and/or stabilized areas will be routinely inspected and after each major storm event. Within 30 days of the inspection date, all accumulated sediment and debris will be removed such that each control measure operates as designed and permitted. Contributing drainage areas must be kept clear of litter and vegetative debris, inflow pipes and overflow spillways kept clear, inlet areas kept clean, and undesirable vegetation removed. Erosion impairing the function or integrity of the facilities, if any, will be corrected, and any structural damage impairing or threatening to impair the function of the facilities must be repaired. This will also include repairing areas where requiring work to ensure the long term success and establishment of vegetative cover including additional fertilizer, soil amendments, weed or pest control, mulching seeding, etc.

As overburden and sandstone are removed within an active phase, the elevation of the floor of the mine will be lowered sufficiently to internally drain the active mine area to the extent practical. Hydrologic computations, including watershed areas, siting of stormwater ponds, sizing of stormwater ponds, and runoff rate and volume calculations are included in Appendix K, *Hydrologic Computations*. A copy of the SWPPP will be submitted to the County for review. (See Appendix J, *Stormwater Management* Plan, for additional detail on stormwater management.) Stormwater ponds will be inspected to assure that these ponds continue to function as designed. If at any point, the depth of sediment collected in the basin reaches 1/2 of the storage volume, the pond will be drained and have the sediment removed.

Progressive reclamation will begin once a large enough area has been mined out within Phases 1 and 2 to accommodate both mining and reclamation activities. Overburden from stripping operations as well as fine sand (tailings) generated from wet processing will be placed in the completed portions of Phases 1 and 2 working west to east to reclaim the area adjacent to the wetlands and restore drainage area temporarily impacted by the mining operations.

## 4.5 Revegetation Plan

### 4.5.1 Goals and Intent:

The intent of this revegetation plan is to establish temporary and permanent vegetation in order to stabilize all newly backfilled and graded areas, and to provide stable soil conditions and slopes following each phase of mining activity on the Site. The Revegetation Plan describes timing and methods of seed bed preparation, rates and kinds of soil amendments, seed application timing, methods and rates, mulching, netting, and any other techniques needed to accomplish soil and slope stabilization upon reaching final reclamation grades.

As reclamation progresses the following revegetation plan may be modified to allow test plots and adoption of variations in revegetation procedures that maximize the success of revegetation based on site specific conditions that are encountered.

The project will be mined and reclaimed in phases. At any given time, there may be an area that is undergoing stripping and overburden removal operations in preparation of a subsequent phase of mining, an area of active sandstone excavation and mining activity, and an area of active backfilling and establishment of final grade. Final grades will be constructed to generally reestablish pre-mining surface water drainage patterns. As areas are brought up to final grade, topsoil will be placed and vegetation established in accordance with the methods described in the following sections.

4.5.2 Planned Vegetation:

Reclamation will result in a mix of land use. The majority of the Site will be revegetated with a native prairie seed mix to support a passive recreational/wildlife habitat post mining land use. Portions of the Site may be revegetated to establish a pasture/grazing post-mining land use consistent with current land use over a portion of the Clark property. In addition to prairie and pasture, woodland areas will be planted in pockets along the perimeter of prairie plantings.

The seed mix summarized in Table 5*, Passive Recreation Native Seed Mix*, will be used in areas to be revegetated with a native prairie seed mix. The seed mix summarized in Table 6, *Grazing/Pasture Seed Mix*, will be used in areas to be reclaimed as pasture and grazing land. Test plots may be utilized to determine the appropriate seed mixture given the appropriate soil conditions created upon final reclamation. Fertilizing, seeding and mulching will consist of incorporating the fertilizing material into the soil; preparing seedbeds and furnishing and sowing the seed mixture as described in the following sections. Adjustments to these seed mixes may be required based on availability of seed species, test plot results and site specific conditions with approval from Chippewa County.

A nurse crop may be used at the time of seeding to protect the more permanent plantings, to stabilize the site against erosion in early stages, to decrease competition from weeds and to provide some shade and cover for the perennial seedlings. For nurse crop, use annual oats at 65 pounds per acre for spring seeding prior to June 15. Use annual ryegrass at 5 pounds per acre or winter wheat at 70 pounds per acre for fall seeding after October 15.

The areas to be established as woodlands will be planted with a mix of seedlings. Species will include a mix of red oak, white oak, maple, aspen, red pine and white pine. Species and mixes will be developed in coordination with individual property owners taking into consideration specific reclamation conditions affecting the potential success of establishment of the species such as soil, moisture, and sun.

*Table 5 Passive Recreation Native Seed Mix*

| | | |
|---|---|---|
| Grasses, sedges and similar plants | | |

| Common Name | Scientific Name | Pounds per acre* |
|---|---|---|
| Big Bluestem | Andropogon gerardi | 1 |
| Canada Wild Rye | Elymus canadensis | 3 |
| Switchgrass | Panicum virgatum | 1 |
| Indiangrass | Sorghastrum nutans | 3 |
| | | 8 pounds total |
| Forbs and Legumes | | |
| Common Name | Scientific Name | Ounces per acre* |
| Purple Prairie Clover** | Dalea purpurea | 2 |
| Canada Tick-trefoil** | Desmodium canadensis | 5 |
| New England Aster | Aster novae-angliae | 0.2 |
| Purple cone flower | Echinacea purpurea | 4 |
| Dotted Mint | Monarda punctata | 4 |
| Bergamot | Monarda fistulosa | 5 |
| Yellow coneflower | Ratibida pinnata | 3 |
| Blackeyed Susan | Rudbeckia hirta | 0.5 |
| Blue Vervain | Verbena hastada | 1 |
| | | 24.7 ounces total |

*Seeding rates assume broadcast seeding and may be multiplied by 0.5 to approximate required rates if drilled.
**Denotes legumes, which must be inoculated according to the seed provider's instructions prior to seeding.

*Table 6 Grazing/Pasture Seed Mix*

| Common Name | Scientific Name | Pounds per acre* |
|---|---|---|
| Agricultural Rye | Secale cereale | 4 |
| Timothy | Phleum pratense | 2 |
| Tall Fescue | Festuca arundinaceae | 3 |
| Switchgrass | Panicum virgatum | 1 |
| Big Bluestem | Andropogon gerardi | 1 |
| Canada Wild Rye | Elymus canadensis | 3 |
| Alsike Clover** | Trifolium hybridum | 4 |
| Red clover** | Trifolium repens | 4 |
| Alfalfa** | Medicago sativa | 5 |
| | | 27 pounds total |

*Seeding rates assume broadcast seeding and may be multiplied by 0.5 to approximate required rates if drilled.
**Denotes legumes, which must be inoculated according to the seed provider's instructions prior to seeding.

All seed will conform to the Wisconsin statutes and Wisconsin administrative code chapter ATCP 20 regarding noxious weed seed content and labeling and will originate only from Minnesota, Wisconsin, Iowa or Illinois. Seed will be used within one year of the test date appearing on the label. Seed will be stored before use in a way that protects it from damage by heat, moisture, rodents, or other causes. Any seed that becomes damaged will be discarded.

4.5.3 Placement of Topsoil:

Where practical, the upper portion of backfilled materials will be composed of a blend of clays and shale from overburden and filter cake material to increase the moisture holding capacity of the

subsoil. Once a backfill area has attained to the final grade and slope, loamy material (B Horizon topsoil) with an average thickness of about 18 inches will be used on the upper most layer of reclamation backfill where practical. Areas where pasture will be reestablished will be brought to final grade using A and B horizon soils suitable for establishment of pasture. These may include the original soil types for the current pasture area, including Chetek, Elva and Billet Series soils, all describing pastureland as a suitable use. Alternatively, test plots may be used to demonstrate the suitability of other sol types when combined with soil amendments such as from the composting of stumps or filter cake materials.

Subsoils will be covered with three to six inches of A Horizon topsoil. Topsoil placement will be in accordance with Wisconsin Department of Transportation (WiDOT) Standard Specification 625.3.3, *Placing*. The topsoil will be placed and spread to a minimum depth of 3 inches. Clods and lumps will be broken down using the appropriate equipment to provide a uniformly textured soil. Rocks, twigs, foreign material, and clods that cannot be broken down will be removed from the site and properly disposed at an offsite location. Dress the entire area to present a uniform appearance. The site soils will not require rolling.

The seed bed will be prepared in accordance with WiDOT specifications 630.32.2. Grading, topsoiling, and fertilizing will be conducted prior to permanent seeding. Prior to seeding, the area will be prepared using discs, harrows, or other appropriate equipment to obtain a reasonably even and loose seedbed in accordance with WiDOT Standard Specifications 630.3.2 *Preparation of Seed Bed*.

4.5.4 Fertilizer:

Use of fertilizer and the application of other soil amendments (lime, organic matter, compost, etc.) will be based on soil testing for nutrient content, pH and organic matter of the topsoil in the area to be reclaimed and on the requirements of the proposed vegetation. Native prairie seed mixes typically do not require fertilizer. Soil sampling will be performed by an accredited laboratory for analysis at least 30 days prior to initial reseeding activities. Based on the results of the analysis, amendments will be applied to the soil prior to seeding. When contemporaneous placement of topsoil is performed as part of progressive reclamation, results from the previous testing and/or test plots will be considered when adding fertilizer and/or soil amendments.

If fertilizer is used on the site, it will meet the general requirements of WiDOT Section 629 Fertilizer and Agricultural Limestone. Fertilizers to be used on the site for seeding or other planting will be standard, commercial, packaged or bulk products, in granular or liquid form conforming to Wisconsin statutes and the Wisconsin administrative code chapter ATCP 40. The fertilizer containers will be required to be plainly marked with the analysis of the contents showing minimum percentages of total nitrogen, available phosphoric acid and soluble potash. If furnishing the fertilizer in bulk, an invoice will be included in each shipment indicating the minimum percentages of total nitrogen, available phosphoric acid, and soluble potash in the contents.

If using fertilizer with a total of nitrogen, phosphoric acid, and potash greater than 32 percent, it will be applied at a rate that provides equal nitrogen, phosphoric acid and potash. Fertilizer will conform to the following minimum requirements unless applying fertilizer in areas that are deemed critical. Total nitrogen will at least equal the sum of the phosphoric acid and soluble potash.

Nitrogen, not less than ..... 16%
Phosphoric Acid, not less than ..... 6%
Potash, not less than ..... 6%

Critical areas (those areas located within 75 feet of wetlands, streams, rivers, or lakes; slopes, ditches, and swales that drain directly to a wetland, stream, river, or lake are also deemed critical) will be fertilized with phosphorus-free fertilizer with a nitrogen-phosphorous–potash content of 16-0-6 or 10-0-10 or other as otherwise approved by the engineer.

Fertilizer will be applied uniformly and incorporated in the soil by light discing or harrowing. Granular fertilizer will be pulverized and free from lumps when applied.

4.5.5 Planting:

Planting will be conducted in conformance with WiDOT's Standard Specifications for Highway Construction. Select the method of sowing from Method A or Method B.

Method A: Sow the selected seed mixture using equipment adapted to the purpose, or by scattering it uniformly over the areas to be seeded. Lightly rake or drag to cover the seed with approximately 1/4 inch of soil. After seeding, lightly roll or compact the areas using suitable equipment, preferably the cultipacker type, when the engineer judges the seedbed too loose, or if the seedbed contains clods that might reduce seed germination. The contractor shall not roll slopes steeper than 3:1. If scattering seed by hand, this work will be performed with satisfactory hand seeders and only when the air is calm enough to prevent seeds from blowing away.

Method B: Sow or spread the seed upon the prepared bed using a stream or spray of water under pressure and operated from an engineer-approved machine designed for that purpose. Place the selected seed mixture and water into a tank, provided within the machine, in sufficient quantities that when spraying the seed on a given area it is uniformly spread at the required application rate. During this process, keep the tank contents stirred or agitated to provide uniform distribution. Spread the tank contents within one hour after adding the seed to the tank. The engineer will reject seed that remains mixed with the water for longer than one hour. The engineer will not require dragging or rolling.

Mulching:

In seeded areas with slopes equal to or flatter than 4:1, mulch will be applied in accordance with WiDOT Standard Spec. 627 Mulching. Mulching material will consist of straw or hay in an air-dry condition, wood excelsior fiber, wood chips, or other suitable material of a similar nature that the

engineer approves, and is substantially free of noxious weed seeds and objectionable foreign matter. The mulch will be applied uniformly over the soil surface by hand or machine within 24 hours after seeding in accordance with WiDOT Standard Spec. 627.3.2, Method A or B. Mulch will be applied at a rate of 2 tons per acre. Immediately after placement, all mulch material will be anchored into the soil by crimping (straight disking) in a direction perpendicular to that of the overland stormwater flow. The mulch will be punched into the soil to a depth of 2 to 3 inches with a disk spacing of 8" or less. The mulch will not be placed during periods of excessively high winds that might preclude proper mulch placement. The mulch will be applied loosely enough to allow some sunlight to penetrate and air to slowly circulate, but thick enough to shade the ground, conserve soil moisture and prevent or reduce erosion. The mulched area will be maintained and all areas damaged by wind, erosion, traffic, or other causes before final establishment of vegetation and acceptance or partial acceptance of work will be repaired.

In seeded areas with slopes steeper than 4:1, biodegradable erosion control blankets will be installed uniformly over the soil surface by hand within 24 hours after seeding in accordance with manufactures recommendations. Mats that meet WiDOT Standard Spec 628.2 ECRM Class 1 Type B Mat will be used.

Method A: Uniformly spread the mulching material over the designated areas to a loose depth of 1/2 to 1 1/2 inches. Use a specific rate of application; dependent on the character of the material, that results in a cover conforming to the requirements specified above in 627.3.1. Loosen or make fluffy the mulch material from compacted bales before spreading in place. Unless directed otherwise, begin mulching at the top of the slopes and proceed downward. Securely anchor straw or hay mulch by using engineer-approved netting anchored to the ground with pegs or staples to prevent it from floating as the vegetation grows. Instead of this anchorage, the contractor may secure mulch by heavy biodegradable twine fastened by pegs or staples to form a grid with 6 to 10 feet spacing. The contractor may use department-approved erosion control mats, listed in the erosion control product acceptability list (PAL), instead of separately applying mulch and netting.

Method B: Treat straw or hay with a tackifier, blow from a machine, and uniformly deposit over designated areas in one operation. Place straw or hay uniformly over the area 1/2 to 1 inch deep, using 1/2 to 3 tons of mulch per acre. Mix and place tackifier according to the PAL. Within the above limits, the engineer will determine, on the job, the application rate of the mulch and the tackifier, and the engineer may vary the rates during mulching to produce the desired results. Use an engineer-approved machine to place the mulch that blows or ejects by constant air stream a controlled amount of mulch and applies a spray of tackifier to partially coat the straw or hay, sufficient to hold together and keep in place the deposited straw or hay. The contractor may apply the tackifier as an overspray in a separate operation after placing the straw or hay. Apply wood fiber, wood chips, or similar material with engineer-approved blowing machines, or other engineer-approved methods, that place a controlled amount of mulch uniformly over the area 1/2 to 1 1/2 inches deep. Treat areas receiving wood chip mulch, with one pound of available nitrogen per 1000 square feet before or after applying the chips. Throughout the process, feed the mulch material into

the blowing machine to produce a constant and uniform ejection from the discharge spout, and operate in a position to produce mulch of uniform depth and coverage.

4.5.6 Seeding Dates:

Areas may be seeded at any time temperature and moisture conditions are are suitable, except between July 1 and August 15 unless approved by LCFM. The optimum time for seeding in a native prairie is from spring to early summer (April 15th to June 20th) when temperatures become warm enough for germination of warm season grasses and forbs. For warm season plant species to germinate the mean soil temperature needs to be above 65 degrees Fahrenheit. Planting native seed at this time of the year allows the warm season plant species to begin establishing early in the growing season. When seeding in the fall, this same type of seed mix will lie dormant until the following spring when germination takes place.

Reclamation activities will be scheduled to accommodate spring or fall seeding. When this is not possible, a cover crop of warm season annual grasses may be used to reduce erosion, runoff, and potential pollution of surface waters, and add organic matter to the soil. The cover crop will consist of a oats at a high seeding rate to prevent soil erosion as indicated in Table 7 below. Modifications to the cover crop may be made depending upon the time of seeding and nature of the area to be seeded. Any modifications to the cover crop species or rate will be in accordance with Wisconsin Agronomy Technical Note 7, *Cover and Green Manure Crop*, included as Appendix L and be submitted to the LCFM for approval prior to seeding.

Cover crops may be drilled, no-tilled, slurry applied, broadcast or over-seeded with or without incorporation depending on field conditions. Incorporation of seed following planting by light shallow tillage, or use of a ring roller, culti-packer or similar tool to embed the seed will result in a more uniform seedling emergence.

*Table 7 Cover Crop*

| Species | % by Weight | Rate #/acre |
|---|---|---|
| Oats (Avena sativa) | 100 | 96-128 |
| | | |
| | | |

4.5.7 Protection/Maintenance:

Short term and long term monitoring and management of the land will be required to establish and maintain the post-mining land uses. The applicant will prepare a Soil Rehabilitation and Vegetative Management Plan for each post-mining land use and land cover type to be reviewed by the County prior to initial reclamation activities. The plan will include a description of the management practices, methods and techniques that will be used to:

1. Recondition the disturbed mine soil to assure the success of the vegetative planting and the sustainability of selected plant communities and associated wildlife habitat;
2. Monitor and control noxious weeds and invasive species to target levels; and

3. Limit or otherwise actively manage the reclaimed area for anticipated plant species that will occur through natural succession.

Fertilized, seeded and/or mulched areas shall be maintained until a uniform grass stand has developed to meet or exceed the 70% vegetative cover standard. This may require incidental watering or touching up minor areas of erosion that may occur between seeding and establishment of and acceptance of vegetation. If erosion problems occur (in the event of ineffective mulch or mats), check dams, diversion swales, riprap, terracing or other grade control practices will be added to ensure sheet flow and prevent rills.

During the growing season, seeded areas will be mowed two times per year. Vegetation will be cut to 6 inches when it has reached a height of at least 12 inches. Noxious weeds listed below will be eradicated from the seeded areas as soon as they become evident. Noxious weeds on the site will be eradicated by hand pulling or by applying a post-emergence herbicide. The herbicide will be a water-soluble herbicide that deactivates on contact with soil, and leaves no harmful residue.

| SPECIES COMMON NAME | SPECIES BOTANICAL NAME |
|---|---|
| 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 |

4.5.8 Revegetation Standard:

Revegetation success will be a function of the land use and seed mix used and will be determined using a combination of percent cover and plant diversity. Upon reclaiming any portion of the site the post-mining land use will be maintained while the mine site is still operating under the reclamation permit. The applicant understands that the County is in the process of developing performance measures to be used on sites throughout the County in order to standardize evaluation of reclamation success in an objective manner. DRT Sands will defer to the guidance that the County develops for reclamation performance measures for each post-mining land use and understands that ultimately the County must make the determination of success for each planted cover type. If the development of these performance standards is not complete at the time of permit approval, a condition that requires DRT sands to further develop a success standard in accordance with the County guidelines once they are available is acceptable to the applicant. Percent Cover: The percentage of area that is covered, shaded or intercepted by vegetation will be used as one criterion for successful revegetation. Revegetation will be considered successful for both native prairie mix and pasture land when vegetation covers more than 70% of the surface averaged over the revegetated area. A number of quadrats, 1 meter by 1 meter, will be photo

documented and used to represent the vegetative cover over the Site. Documentation will occur during the peak period of vegetative growth, generally in August.

Diversity:

Goals for plant diversity will remain flexible to accommodate microenvironments created as part of final reclamation and revegetation. In general for areas planted with native prairie grasses will initially have a higher prevalence of cool season grasses (Canadian rye) that by the third year will transition to warm season grasses (Big Bluestem, Indian Grass, and Switchgrass). In general, diversity goals will be considered met when there are two warm season grasses and three species of forbs and or legumes present over the planted area. Diversity for pasture will not apply.

Compliance with the reclamation measures described in Section 4.0 shall be determined by on-site inspections conducted by the LCFM or its agent. Once areas have achieved the reclamation measures, the areas will be considered successfully reclaimed. No further reclamation activities shall be required after the LCFM inspects the area and signs a County Certification of Reclamation.

## 5.0 REPORTING:

An Annual Reclamation Report & Activities Plan will be completed at the end of each year by the operator and submitted to the LCFM. The annual report will assure structured communication between the operator and the LCFM at the end of each year. The report will be developed in accordance with NR 135.36. The information to be included in this report can be found in Appendix M, *Annual Reclamation Report & Activities Plan.*

## 6.0 STANDARDS

The site will operate in accordance with standards established by Chippewa County.

1. The Site will be subject to Part II-Standards of the Chippewa County Ordinance for Non-metallic Mining Reclamation will be reclaimed in conformance with the general performance standards contained in Subchapter II of Chapter NR 135, Wisconsin Administrative Code, and the technical guidance and standards for site reclamation as established in Reclamation Standards for Non-metallic Mines in Chippewa County Appendix J.

2. Refuse and other solid wastes. Nonmetallic mining refuse will be reused in accordance with a reclamation plan. Other solid wastes will be disposed of in accordance with applicable rules of the department adopted pursuant to chapters. 289 and 291, Stats.

3. Area disturbed and contemporaneous reclamation. Nonmetallic mining reclamation will be conducted, to the extent practicable, to minimize the area disturbed by nonmetallic mining and to provide for nonmetallic reclamation of portions of the nonmetallic mining site while nonmetallic mining continues on other portions of the nonmetallic mining site.

4. Public health, safety and welfare. All nonmetallic mining sites will be reclaimed in a manner so as to comply with federal, state and local regulations governing public health, safety and welfare.

5. Habitat restoration. When the land use required by the reclamation plan approved pursuant to an applicable reclamation ordinance requires plant, fish or wildlife habitat, it will be re-stored, to the extent practicable, to a condition at least as suitable as that which existed before the lands were affected by nonmetallic mining operations.

6. Compliance with environmental regulations. Reclamation of nonmetallic mining sites will comply with any other applicable federal, state and local laws including those related to environmental protection, zoning and land use control. Note: other applicable environmental, zoning or land use regulations may include chapters. NR 103, 115, 116, 117, 205, 216, 269, 105, 106, 140, 150, 340, 500, 590, and 812, chapters 30 and 91, Stats., and Section 404 of the Clean Water Act (33 USC s. 1344), which may be applicable to all or part of either an existing or proposed nonmetallic mining project. History: Cr. Register, September, 2000, No. 537, effective 12/1/2000.

7. Surface water and wetlands protection. Nonmetallic mining reclamation will be conducted and completed in a manner that assures compliance with water quality standards for surface waters and wetlands contained in chapters NR 102 through 105. Before disturbing the surface of a nonmetallic mining site and removing topsoil, all necessary measures for diversion and drainage of runoff from the site to prevent pollution of waters of the state will be installed in accordance with the reclamation plans approved pursuant to an applicable reclamation ordinance. Diverted or channelized runoff resulting from reclamation may not adversely affect neighboring properties.

8. Groundwater protection.
    1. Groundwater Quantity. A nonmetallic mining site will be reclaimed in a manner that does not cause a permanent lowering of the water table that results in adverse effects on surface waters or a significant reduction in the quantity of groundwater reasonably available for future users of groundwater.
    2. Groundwater Quality. Nonmetallic mining reclamation will be conducted in a manner, which does not cause groundwater quality standards in chapter NR 140 to be exceeded at a point of standards application.

## 7.0 CERTIFICATION

The operator of the proposed DRT Sands Nonmetallic Mineral Facility hereby certifies that it is there intent to comply with:

1. The statewide nonmetallic mining reclamation standards established by NR 135 Subchapter II;

2. The Chippewa County nonmetallic mining reclamation standards established by the County's nonmetallic mining reclamation ordinance Part II Standards; and

3. The Town of Auburn's Nonmetallic mining standards established in the Town's Ordinance Chapter 46 Nonmetallic Mine Operator's License, Section 46.07 General Standards.

Donnie Rihn, President DRT Sands, Inc. _____

Printed Name, Title Signature

_____

Date