

MERRIAM JUNCTION SANDS, LLC RECLAMATION PLAN

LOUISVILLE TOWNSHIP
SCOTT COUNTY, MINNESOTA
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1.0 Introduction:

Merriam Junction Sands, LLC (Proposer) is proposing mining and processing operations on approximately 682 acres of land (Project). The Project involves the continuation of mining and processing construction aggregates (limestone and sand and gravel) as well as further developing the Site to mine and process silica sand. The Project is located in Louisville Township, Scott County, MN (Site or Project Area), situated between U.S. Highway 169 (US 169) and the Minnesota River. The Union Pacific (UP) mainline runs through the Site. Trunk Highway 41 (TH 41) is located along the northern limits of the Site and 145th Street West (145th Street) is located near the southern boundary of the Site. The Site consists of several parcels owned by two separate property owners: Malkerson Sales, Inc. (Malkerson Sales), and Bryan Rock Products, Inc. (Bryan Rock). Figure 1 - Site Map, illustrates the location and ownership of the Site.

2.0 Reclamation Plan Purpose:

The objective of the Reclamation Plan is to allow for an orderly transition from mining land use to a reclamation condition that provides a safe and stable condition that does not endanger public health, safety and welfare, and that allows for future development compatible with surrounding land use. The Reclamation Plan addresses slope stabilization, revegetation, establishment of natural areas, and development of future buildable areas. With a long history of mining activity located on the Site, the Reclamation Plan provides significant enhancement opportunity to improve the overall quality, long-term sustainability, and habitat diversity of the previously mined area. Reclamation will leave the Site in a mix of uplands and waterbodies. Portions of the Site will be reclaimed to allow future development and other portions of the Site will become permanent open space and wildlife habitat. Figure 2: Concept Reclamation Plan, illustrates the overall reclamation condition of the Site.

3.0 Plan Applicability:

This plan establishes final reclamation condition of the Site with respect to silica sand mining activity. There are existing sand and gravel and limestone mining operations on the Malkerson Sales property and Bryan Rock property. Prior to the onset of silica sand mining on each individual property, reclamation requirements associated with only the sand and gravel mining and or expanded limestone quarry activity may be approved by the County.

4.0 Site History:

The Site has been mined for sand and gravel and quarried for limestone for the past several decades. Mining activity on the Malkerson Sales property began prior to permitting requirements and as a result is not currently subject to an approved reclamation plan. Some areas of the Malkerson Sales property have been mined, backfilled, sloped, and vegetated. Some of the backfilled areas are used for parking during

the Renaissance Festival (and agricultural production when not used for parking) and other backfilled areas are in agricultural production. Some areas continue to be actively mined and currently contain near vertical limestone faces with processing and stockpiling occurring on the quarry floor.

Mining activity on the Bryan Rock property is operating under Conditional Use Permit 406-C-8 originally issued in 1993 and most recently amended in 2010. There is an approved grading, phasing and development plan for the quarry (Approved Plan) which illustrates final reclamation grades of the existing limestone quarry. The Approved Plan includes a terraced limestone face with a 10 foot by 20 foot initial bench followed by 20 foot by 20 foot benches to the floor of the quarry along the east property boundary, adjacent to US 169, and along the west property boundary, adjacent to the Union Pacific (UP) Railroad. Reclamation slopes along the northern and southern boundary of the quarry where unconsolidated material is present vary from 3:1 to 4:1 (H:V) slope in the Approved Plan. The Approved Plan assumes 145 acres of non-vegetated quarry floor at the conclusion of reclamation and an additional access to US 169 from the southern portion of the quarry to accommodate final development. The permit acknowledges that the development or end use plan including internal roadway layout is conceptual and will require future review. Since the original reclamation plan was approved, the potential for an additional access to US 169 has been eliminated, the need for a frontage road through the Bryan Rock property has been eliminated, and the unavailability of suitable SSTS sites has been confirmed, all of which require changes to the Approved Plan.

The Site is situated on a glacial river terrace, approximately 50 feet above the floodplain of the Minnesota River. Over most of the Site, a thin layer of unconsolidated material (a mix of sand and gravel and clay) rests on top of bedrock. In the northern portion of the Site, the unconsolidated material is much thicker where underlying bedrock has been carved out by past glacial meltwater and subsequently filled with unconsolidated glacial material. Past mining activity on the Malkerson Sales property has removed sand and gravel from portions of the property. Future sand and gravel mining activity will remove sand and gravel from beneath the stable area and the triangular shaped parcel on the east side of the railroad tracks in the very northern portion of the Site, and in random pockets encountered as any remaining overburden is removed from the process of continued limestone and future sandstone mining. Throughout the majority of the Site, the first bedrock contact is the Prairie du Chien Group (PDC). Past quarry activity has involved the mining and processing of bedrock from the PDC. The Jordan Sandstone underlies the PDC and is the target of the proposed sandstone mining.

Mining has occurred over much of the Site. Interim reclamation has been performed over some previously mined areas of the Site. Topsoil and overburden have been stockpiled around the perimeter of the Site in perimeter screening berms to be used in future reclamation activities. Perimeter berms have been vegetated to control erosion and sedimentation. Vegetative cover in previously mined areas that have been stabilized and revegetation is dominated by non-native grassland, cropland, saplings and shrubs, and second growth forest. Areas that are still being actively mined or used for stockpiling and processing lack vegetation.

5.0 Future Mining Activity:

The Project will continue sand and gravel mining and limestone quarry activity along with additional sandstone mining to lower elevations than current mine operations, including mining below the water table. Topsoil will be removed from new areas to be mined. Care will be taken not to mix topsoil with overburden. Topsoil will be stockpiled and/or placed as perimeter berms. Perimeter berms will be seeded and mulched to minimize the potential for erosion and sedimentation. Topsoil originating from the Site will not be removed from the Site.¹ Stockpiled topsoil will be used in final reclamation activities as described below.

The Site will be mined and reclaimed in phases in order to minimize the areas disturbed by silica sand mining. Limestone will be mined and processed ahead of sandstone mining. As sandstone mining progresses through the phase, the excavation will be backfilled with a blend of reject sand, overburden and transition material. The reject sand will be placed as it is generated so that reclamation activities will be ongoing with the advancement of mining.

Sand and gravel mining and reclamation in the northern portion of the Malkerson Sales property will be independent of the limestone and sandstone quarry activity. Sand and gravel mining and reclamation will occur in phases and to the final grades designed to accommodate future development.

This Reclamation Plan establishes the general parameters of Site reclamation recognizing that the vegetative communities that establish over time will be a reflection of the Site conditions encountered during mining that may impact ultimate depth and extent of mining and final soils balance of the Site. Reclamation will leave the Site in a mix of upland and waterbodies. The end use lakes will be groundwater fed. These reclamation features are consistent with the Minnesota Department of Natural Resources' (MDNR) Big Woods ecological subsection which is described as having over 100 lakes greater than 160 acres in size, many of which are groundwater controlled with no inlets or outlets². Reclamation will involve construction of edge treatments, backfilling and slope stabilization, followed by application of topsoil, seeding and mulching and establishment of vegetation in upland areas resulting in stable Site conditions. Grades will be established sufficiently above the water table and floodplain elevations in areas to be reclaimed for potential future development. Vegetation will be established around the perimeters of the end use lakes. The end use lakes will have varying depths and shoreline features to provide a diversity of wildlife habitat and plant communities. The relative size and depths of the end use lakes will be determined by the final soils balance but will not exceed and will generally conform to the layout shown on Figure 2: Concept Reclamation Plan.

¹ There is an existing topsoil and mulching operation on the Malkerson Sales property which imports black dirt and mulch materials, pulverizes and screens the materials and then sells the material for off-site use. The importation and exportation of these materials will continue during the Project.

² Mn DNR retrieved digitally from <http://www.dnr.state.mn.us/ecs/222Mb/index.html>

6.0 Reclamation Plan Goals:

The primary goals of the Reclamation Plan are as follows:

- Progressive reclamation as mining advances across the Site;
- Establishment of safe and stable final slope configurations across the different geologic units that consider long term slope stability considerations, such as along US 169 and the UP mainline;
- Establishment of grades and final elevations in upland areas that will be suitable for future development;
- Protection of areas identified as suitable for SSTS sites to serve future end uses;
- Establishment of vegetative cover in upland areas appropriate to future planned end use, (open space or developable); and
- Accommodate regional stormwater flow patterns specifically from the watershed area east of US 169 that flows onto the Bryan Rock property, under the railroad right-of-way, across the Malkerson Sales property to the Minnesota River.

6.1 Progressive Reclamation:

Reclamation will follow as sand mining progresses across a given area. Reclamation will be phased in order to minimize the area disturbed by mining. Phased reclamation will allow the direct placement of overburden and topsoil materials from new phases opened for mining onto completed mine areas, creating efficient and progressive reclamation. Overburden, transition material, and reject sand will be utilized as backfill in the reclamation process. Backfilling can begin as soon as a large enough area has been excavated to allow the placement of reclamation fill within the waterbody without fill materials comingling and interfering with the continued advancement of sand mining. This is estimated to be in approximately two or three mining seasons depending upon production rates. Backfill will be used to fill portions of the waterbody created from the sandstone quarry activity and to create slopes that will extend from the mining limits to the end use grades.

As sandstone mining progresses to a subsequent phase, reclamation backfilling will continue in the previous phase until the current mining activity creates a large enough excavation to allow reclamation activities to move into the active phase. As transition material is removed, it will be used either as general backfill or to buttress the final outer portion of the below water slopes of the Jordan Sandstone. During the initial phase of mining, transition material and reject sand may be stockpiled until mining of an area is complete to allow the transition material to be placed into the excavation.

Reclamation of the sand and gravel mining area in the northern portion of the Malkerson Sales property will occur independently of the reclamation of the limestone and sandstone mining. This is because there are no bedrock resources in the area proposed for sand and gravel mining. The sand and gravel mining area is located on both the east and west side of the railroad tracks, with approximately 20 acres located east of the tracks and 50 acres located west of the tracks. Due to the small size of the area east of the tracks as well as its irregular shape, this area will be mined

and then reclaimed in a single phase. The area west of the tracks will be mined and reclaimed in two phases.

6.2 Final Slope Configurations:

Final slope configurations incorporated into the Reclamation Plan have been developed based on the results of the slope stability analysis conducted for the Project by Barr Engineering³ (Slope Stability Report). Some modifications to the pit high walls and ultimate reclamation slopes described below are anticipated as a result of observational monitoring throughout mining and upon additional final analysis as mining progresses, on-site material balances and field conditions are verified, and final development plans for future uses in backfilled areas are considered.

Scott County Zoning Ordinance has a reclamation standard that requires that finished slopes not exceed twenty (20%) percent grade, or 5:1 horizontal to vertical (H:V) slope but allows modification of this standard to provide for unique conditions. Consolidated bedrock associated with the mineral resources targeted by the Project create a unique condition. Reclamation slopes are typically treated differently for bedrock quarries than for unconsolidated sand and gravel mines. In sand and gravel mining operation overburden and interburden can be used to backfill perimeter slopes. If a site is to be reclaimed for immediate redevelopment, a 3:1 (H:V) minimum slope is a more common grading standard, resulting in a stable slope that can be vegetated, mowed and maintained and maximizes developable area. Slopes of 3:1 or less steep are considered stabilized and not subject to excessive erosion once vegetation on has become established. The 5:1 (H:V) standard allows the reclaimed area to return to agricultural production which often is characterized by less vegetative cover and periods of exposed soils. The nature of a rock quarry is unique in that the mined material is composed of consolidated bedrock. The bedrock face is stable at a near vertical slope. Oftentimes, as is the case with the Project Area, there is little to no overburden on top of the shallow bedrock deposits that can be used to construct backfilled slopes to a 5:1 (H:V) condition. Backfilling to a 5:1 slope is not feasible. Reclamation plans for limestone quarries in Minnesota typically incorporate highwalls with some safety benching or perimeter berms at the top of the highwall. An example of this is the currently approved reclamation plan for Bryan Rock's quarry.

The unique reclamation condition of bedrock excavation is addressed in the MDNRs Proposed Permanent Rule Related to Silica Sand Mining on September 6, 2017. Part 6126.0120 Grading and Slopes which proposes reclamation slopes not greater than 3:1 except where unmined, natural, solid, bedrock highwalls and highwalls created by mining are located. If requested by the RGU the operator must provide a test plot in the field to demonstrate the stable and safe end use condition or provide a site specific engineering analysis performed by a professional engineer that demonstrates that an acceptable slope stability factor is attainable. MJS has provided the County with a slope stability analysis that addresses both mining conditions and post reclamation land term stability conditions.⁴

³ Barr Engineering Company, Pit High Wall Stability Analysis. Prepared for Merriam Junction Sands, January 2017 Minneapolis, MN.

⁴ 2017 Barr Engineering Company Pit High Wall Stability Analysis *Merriam Junction Sands* Prepared for

Final slope configurations vary depending upon the type and depth of geologic material encountered at various locations throughout the Site. There are three main geologic layers that are considered in the analysis: unconsolidated overburden, PDC limestone, and Jordan Sandstone. For the purposes of this analysis, slopes within the Coon Valley Member of the Oneota Dolomite (referred to as transition material in the DEIS) are conservatively assigned to the slopes of the Jordan Sandstone due to the presence of weaker layers of sandy carbonate rock and sandstone within the Coon Valley Member. In general, reclamation slopes along the entire western boundary of the Project Area will be fairly short and the slopes along the eastern boundary of the Project Area will be more substantial. This is because the original topography of the Site sloped from approximately 810 feet above mean sea level (msl) along the eastern boundary of the Project Area to 720-740 feet above msl along the western boundary of the Project Area.

Typically, mining unconsolidated materials and sandstone will be to steeper slopes that will be backfilled to the final reclamation slope. In the case of sandstone mining, if mining is conducted to steeper interim slopes, reclamation slopes will be constructed using backfill composed of transition rock material to buttress and stabilize the final reclamation slopes at and below the water table.

In addition to different geologic layers, there are different external loads expected during mining and after Site reclamation at different locations throughout the Site. Primary external loads considered in the development of the edge treatments include the rail, highway, loaded mine haul trucks and future development areas. The reclamation slopes anticipated around the perimeters of the two properties are described below.

6.2.1 Bryan Rock Property:

The Bryan Rock property is characterized by an active limestone quarry in the northern two thirds of the property and unmined property in the southern one third of the property. For the most part, limestone is near the surface with zero to five feet of topsoil and overburden. Perimeter areas where unconsolidated materials are present will be sloped to a maximum of 3:1 (H:V). Upon encountering bedrock, slopes will transition into the proposed benching described in the following paragraphs. These areas are shown conceptually on the reclamation plan and will be subject to the final conditions encountered during mining.

Reclamation of the Bryan Rock property will leave a single end use lake in the central portion of the property. The normal water level in the end use lake will be approximately 718 feet above msl. The northern and southern shorelines will be shaped to promote visual interest and habitat variation. Safe exit ramps will be established at both the north and south ends of the end use lake. The safe exit ramps are designed in accordance with the Minnesota Department of Natural Resources (MDNR) Draft Silica Rule. The safe exit ramps will consist of areas that have slopes not exceeding 3:1 (H:V) constructed to the water and extending below the normal water table for a minimum of six

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vertical feet. The sandstone excavation will be backfilled in both the northern and southern portions of the property to five to ten feet above the water table.

Created upland areas will be backfilled with engineered backfill that will be monitored and tested in backfill areas identified for future development. Areas identified as suitable for SSTS sites along the southern boundary of the Bryan Rock property will be preserved to serve future development.

Edge treatments around the perimeter of the property will vary to match geologic conditions encountered across the property, ranging from 3:1 (H:V) slopes in unconsolidated materials to benched and terraced limestone high walls. Cross Sections have been developed to illustrate the reclamation conditions of the various perimeters of the Bryan Rock Property described below. Figure 3, *Bryan Rock Cross Section Locations*, illustrates the locations of the cross sections across the perimeters of the Bryan Rock property.

Results of the slope stability analysis contained in the Slope Stability Report were used to develop the reclamation grades. In some instances, the report provides a range of final slopes depending upon the competency of the limestone. As described in the Slope Stability Report, final slope configurations will be determined by a soils engineer based on additional data collected and field observations made during the mining and reclamation process.

Cross Section A-A'

Cross Section A-A' (Figure 4) illustrates a north-south section of the reclamation through the northern portion of the Bryan Rock property. The northern portion of the Bryan Rock property is subject to drainage and utility easements. Mining and reclamation will be set back between 70 and 150 feet from the property line to accommodate stormwater drainage as discussed in Section 6.5 below. Limestone has been eroded away in the northern perimeter of the Bryan Rock quarry, which is characterized by 0-50 feet of unconsolidated overburden. Reclamation of the northern slope will consist of unconsolidated overburden backfilled to a 3:1 (H:V) slope, or limestone benched to an overall 0.5:1 equivalent. Grades in the northern portion of the property will be backfilled to an elevation approximately five to ten feet above the water table. The reclamation grade will slope to the end use lake. At the water line, the slope in the Jordan Sandstone will be established at a slope of approximately 1.5:1 to 2:1(H:V) and buttressed with transition material. The reclamation section assumes a passive end use in the area north of the end use lake due to lack of suitable septic sites to serve development. Development of this area would require a slope stability analysis that considers proposed loads.

In the upland areas that are backfilled along the base of the high walls to the east and west, a rockfall catchment area will be constructed along the perimeter of the high walls. The width of the catchment will be 11-13 feet wide depending upon the height of the high wall.

Cross Section B-B'

Cross Section B-B' (Figure 5) illustrates the reclamation section through the eastern perimeter of the Bryan Rock property. Along the eastern perimeter of the property, limestone is located near the

surface. The 3:1 slopes in the unconsolidated overburden will transition to a series of benches rounding the northeastern corner of the Site. The eastern perimeter of the Site is characterized by the thickest deposit of limestone, ranging from approximately 810 feet above msl to 720 feet above msl. The eastern perimeter of the quarry borders the US 169 corridor. During mining, a twenty foot high berm will be located along the property line. This berm will be reduced to three to four feet in height during final reclamation and establishment of the final bench configuration. The final bench configuration will include a ten foot flat area on the inside of the berm that will include a fence, a 10 foot high by 20 foot wide primary safety bench, a 20 foot high by 20 foot wide secondary safety bench, a high wall to the water or base of the limestone and a 2:1 to 2.6:1 slope of Jordan Sandstone beneath the water to the final depth of the end use lake. If the slope is over excavated and backfilled, the reclamation slope will be buttressed with rock transition material. (Final slope and configurations will depend upon the competency of the limestone along the highwall and final recommendations from a soil engineer).

Cross Section C-C'

Cross Section C-C' (Figure 6) illustrates the reclamation section through the southern perimeter of the Bryan Rock property. This area is characterized by a relatively thin layer of limestone with the base of the limestone rising in elevation to the south and thinning along the southern property line. The southern portion of the mine will be setback to protect the area identified as suitable for SSTS site development. The mined area will be backfilled to approximately 728 feet above msl to accommodate future development. This corresponds to five to ten feet above the water table. The upland area will be sloped to the end use lake. At the water line, the slope in the Jordan Sandstone will be established to approximately 2:1 to 2.6:1 (H:V) and buttressed with transition material. The transition to end use lake will also accommodate a safe exit ramp.

Along the eastern and western portion of the backfilled area, the limestone deposit thickens towards the north and the 3:1 (H:V) slope will transition into limestone benches. Where the depth of limestone is less than 45 feet, a primary safety bench will be constructed. In areas where the limestone is greater than 45 feet, two benches will be constructed in the same manner as along the eastern perimeter.

Cross Section D-D'

Cross Section D-D' (Figure 7) illustrates the reclamation section through the western perimeter of the Bryan Rock property, extending through the UP railroad right of way and the eastern perimeter of the Malkerson Sales property. The western perimeter of the Bryan Rock property is located adjacent to the UP Mainline. Rail traffic was considered in the slope stability analysis. In general, the top of the limestone along the western property line is 35-40 feet lower than along the eastern property line. The edge treatment along the perimeter of the western boundary of the Bryan Rock quarry will be a primary safety bench, 10 feet high by 20 feet wide, and limestone high wall to the end use lake. Sandstone will be sloped at approximately 1.5:1 to 2.3:1 to the bottom of the end use lake.

6.2.2 Malkerson Sales Property:

Reclamation of the Malkerson Sales property will result in upland areas and two separate end use lakes. A corridor will be established for a possible future access along the eastern perimeter of the Malkerson Sales property from TH 41 to 145th Street. The end use lakes will be separated by upland that will allow the conveyance of stormwater from the east side of US 169 through the Malkerson Sales property to the current discharge location. This will keep stormwater separate and out of the end use lakes. This regional stormwater currently passes through the quarry floor in a ditch system that discharges to the large wetland complex located west of the Malkerson Sales property. Upland areas will also be created on the southern and northern portions of the sandstone excavation although no suitable septic site locations exist in either of these areas to serve future development. Edge treatments around the perimeter will vary as the geologic conditions vary across the property, ranging from 3:1 (H:V) slopes in unconsolidated materials to benched and terraced limestone high walls. The edge treatments are described below. Figure 9, Malkerson Sales Cross Section Locations, illustrates the locations of the cross sections across perimeters of the Malkerson Sales property.

The thickness of the limestone deposit thins to the west across the Malkerson Sales property and in general across the Site itself.

Cross Section D-D'

Cross Section D-D' (Figure 7) illustrates the reclamation section through the eastern perimeter of the Malkerson Sales property along the southern portion of the sandstone mining area. The eastern perimeter of the Malkerson Sales property is characterized by zero to five feet of overburden with the top of limestone at an elevation of approximately 760 feet above msl. In the southern portion of the property, mining will be setback a minimum of 30 feet from the property line with a high wall extending down to a rock catchment area at an elevation of 716-720 feet above mean sea level. Sufficient room will be reserved to develop an access road along the eastern property line. The grade will slope from the access road into and below the water table at approximately 1.5:1 to 2.3:1 (H:V). The normal water level of the end use lakes on the Malkerson Sales property is estimated to be approximately 715 feet above msl.

Cross Section E-E'

Cross Section E-E' (Figure 8) illustrates the reclamation section through the eastern perimeter of the Malkerson Sales property along the northern portion of the sandstone mining area. An access corridor will be preserved along the eastern property line. This area is characterized by up to approximately ten feet of overburden which will be sloped at 3:1 from the access road to the top of the limestone. The limestone, which for the most part has already been mined along this area, will extend to a bench around the end use lake.

Cross Section F-F'

Cross Section (Figure 10) illustrates reclamation along the northern portion of the mining area. This area will be backfilled five to ten feet above the water table ranging from 720 to 730 feet above msl. The backfilled area will slope to the water at a 3:1(H:V) slope. The slope at and below the water line will be established at Approximately 1.5:1 to 1.6:1 (H:V) assuming open space development and

buttressed with transition material. A safe exit ramp will be established at the northern end of the lake. Cross Section F-F' (Figure 11) illustrates the northwest–southeast reclamation section the northern mining limits, backfill area, and edge of the northern end use lake.

Cross Section G-G' and H'H'

Cross Section G-G' and H-H' (Figures 11 and 12) illustrates reclamation along the western perimeter of the Malkerson Sales property. Reclamation of this area will consist of a 3:1 (H:V) slope through any unconsolidated material to the top of the limestone at approximately 725 feet above msl followed by a short vertical limestone wall to approximately 718 feet above msl. A ten foot wide bench along the edge of the end use lake will be established with the vertical slope continuing to the top of the transition material at approximately 710 feet above msl. The sections will transition to an approximately 1.5:1 to 1.6:1 (H:V) final reclamation slope to the final depth of the end use lake. A berm or natural grade along the perimeter of the western mining limit will be maintained at an elevation of 725 feet above msl or higher to keep the mined area out of the 100 year floodplain. This edge treatment along the southern half of the western boundary of the Malkerson Sales property provides a buffer area between the existing wetland complex and the end use lake. The open water feature has been designed upgradient of the wetland complex to maintain or even increase groundwater flows to the wetland complex.

Cross Section G-G' and H'H'

Cross Section I-I' (Figure 13) illustrates reclamation along the southern perimeter of the Malkerson Sales property. The southern portion of the Malkerson Sales property will be backfilled to five to ten feet above the water table. The reclamation grade will slope to the end use lake. At the water line, the slope in the Jordan Sandstone will be established at a slope of approximately 1.5:1 to 2:1 (H:V) and buttressed with transition material. The reclamation grades will also accommodate a safe exit ramp. The reclamation section assumes a passive end use in the area south of the end use lake due to lack of suitable septic sites to serve development. Development of this area would require a slope stability analysis that considers proposed loads.

Cross Section J-J' Stormwater conveyance Channel

The two end use lakes on the Malkerson Sales property will be separated by an upland area that will be composed of unmined area and mined and backfilled area. An open channel will be constructed across this area to allow the conveyance of regional stormwater channel and access road through the Malkerson Sales property to the wetland complex. The backfilled area will be constructed entirely of rock transition material. Slopes to the adjacent end use lake will be constructed to approximately 1.6:1 to 1.9:1 (H:V) depending upon whether or not the channel is lined or unlined. The backfilled area will be approximately 100 feet wide to accommodate the stormwater channel and access road. Cross Section J-J' (Figure 14) illustrates the reclamation section through the fill area between the two end use lakes.

6.3 Establishment of grades and final elevations in upland areas that will be suitable for future development:

Once mining and reclamation is complete, portions of the landscape will be left in a self-sustaining condition that will enhance diversity in vegetation and wildlife habitat. Other portions of the Site will be reclaimed to grades and final elevations that will accommodate future development. End use development will be consistent with Scott County plans and ordinances in effect at that time. The extent of end use development is limited due to the lack of suitable SSTS sites currently existing on the Site. Post reclamation buildable areas will be located in the northern portion of the Malkerson Sales property and in the southern portion of the Bryan Rock property. These are the only locations that currently have soils that are suitable for SSTS development.

6.3.1 Malkerson Sales Property

Potential future buildable area on the Malkerson Sales property is limited to the northern portion of the Site where areas have been identified that are suitable for SSTS sites to serve future development. Mining limits will protect those areas identified as suitable for SSTS sites needed to serve future development. Excavation will remain above the water table in this area. Reclamation will involve backfilling and compaction of areas to elevations that allow future buildings to be constructed at a minimum of two feet above the regional flood elevation (724 ft above msl in this area).

Access will be provided from TH 41. Mining limits will be setback 30 feet from the property line, but reclamation activity may include sloping within the setback area. Slopes along the perimeter of the parcel east of the railroad tracks will tie into the perimeter slopes of the MnDOT gravel pit located adjacent to the parcel.

6.3.2 Bryan Rock Property

Potential future buildable area on the Bryan Rock property is limited to the very southern portion of the Site where areas have been identified that are suitable for SSTS sites to serve future development. Mining limits will protect those areas identified as suitable for SSTS sites needed to serve future development. Portions of this area will be mined below the water table and backfilled. Backfill below the water table will consist of engineered fill composed of granular material including a blend of overburden, transition material, and reject sands to form an interlocking backfill. Once backfilling has proceeded at least two feet above the water table, filter cake (dewatered fine sediment from the water treatment plant) will be mixed with general overburden, fine sands, and transition material to bring designated areas up to final grade. In the backfill areas intended to be used for future building pads and roadways, soil types to be used as backfill will be reviewed and approved by a qualified geotechnical engineer. Backfilled areas may be subject to surcharging and monitoring of settlement prior to placing structures in the area. Final grade of areas to be built upon will be of sufficient height to accommodate first floor openings a minimum of two feet above the regional flood elevation or to standards in place at the time of development.

Areas to remain as end use lakes will be contoured around the perimeters of the end use lakes to create a shoreline that provides for variation in the shoreline contour, vegetation, and habitat created around the end use lakes.

6.4 Establishment of vegetative cover in upland areas appropriate to future planned end use:

Vegetation will be established over areas that have been reclaimed to final grade. Upland areas will be covered with sufficient topsoil from on-site sources to provide for vegetation. The topsoil will be seeded and mulched to establish vegetation. Seed mixes consisting of native grasses will be utilized to establish ground cover throughout the reclaimed areas within the Site that are to remain as upland open space areas and around the end use lakes. The native vegetation will provide for a buffer between the Project and native plant communities to the west and south of the Site.

Seed mixes are expected to vary based on the planned end uses, specific slopes, drainage characteristics, and anticipated moisture conditions of the reclaimed areas. Seed mixes may vary over time as test plots are developed and as reclamation progresses to determine seed mixes suitable to the local conditions of the reclaimed upland open space areas. Diverse native plant species from the Minnesota Department of Natural Resources' (MnDNR) ecological subsection, Big Woods (222Mb), will be used whenever practical. This will allow a variation in the vegetation across the Site and establish diversity in flora and the promotion of diverse wildlife habitats. Once established, native grasses can provide a self-sustaining, low maintenance long-term cover. Under reclaimed conditions, this Site will be more integrated with the regional landscape of the area and provide more ecological diversity than currently exists. Vegetation around the open end use lakes will help to filter and remove nutrients and pollutants, providing protection for water resources associated with the open water areas and the adjacent wetland complex.

Non-native temporary covers/cover crops for soil health and soil stabilization may be used throughout the Site as a Best Management Practice for controlling erosion and sedimentation. Areas that will be converted to future development will be backfilled, seeded, and mulched using a standard non-native seed mix appropriate for the area. State listed noxious weeds and invasive species will be controlled within the mine area through spot application of herbicides and routine mowing.

6.4.1 Site Preparations: Grading and Topsoil

Reclamation will consist of backfilling, sloping, and buttressing to create final slopes, grades, and edge treatments as described above. Once final grades have been achieved, topsoil from on-site sources will be applied over the upland areas to provide a seed bed for vegetation. Topsoil from previously mined areas has been used to create perimeter berms. As future areas of topsoil is stripped or removed, it will be set aside for spreading over the reclamation areas. Adequate site preparation that provides a firm weed free seed bed will be provided to ensure successful establishment of vegetation. Depth of topsoil will be tailored to the seed mix being utilized in any given area.

6.4.2 Installation of Seed Mix

Seed mix will be placed by broadcasting and/or drilling the seed directly into the topsoil layer. After seeding, the area will be dragged with a rake or harrow and packed. Hand seeding may be utilized

in small areas. Hydroseeding may be utilized on steep slopes or other areas inaccessible to a seed drill. Hydroseeding will not be performed when the weather is hot and dry.

Cover Crops

To compensate for slow establishment of certain seed mixes, a cover crop of wheat or oats may be planted along with the seed mix. This is particularly relevant in areas to be established with native grasses. Cover crops are fast growing and provide protection while the slower growing native species become established. Cover crops tend to die off rapidly, within one or two years, and therefore do not compete with more permanent native cover on a long term basis. The type of cover crop to be used will depend on the timing of seeding. Some possible cover crops are oats at a rate of 20 lbs/acres in the spring planting, winter wheat at 20 lbs/acre for fall plantings, or annual rye grass at 10 lbs/acre for dormant seedings.

6.4.4 Timing for Seeding

Optimum time for seeding is from spring to early summer when temperatures become warm enough for germination. Reclamation activity will be planned accordingly to accommodate optimum seeding times and typically, native grasses will be planted from April 15 to July 20 and general grasses will be planted from April 1 to June 1. Areas may be seeded in the fall and the seeding rates increased to account for seed mortality over the winter. If final grading does not occur during the optimal seeding time, then these areas will be seeded with a temporary cover crop until general and native seeding is appropriate.

6.4.5 Dormant Seeding

Dormant seeding is not as reliable of a method for seed installation due to factors such as weather, snow cover, predation, and soil erosion. If dormant seeding is necessary, timing for dormant seeding will take place in late fall whenever possible.

6.4.6 Temporary Erosion Control

Mulch will be applied over seed beds to protect and enhance seed germination and to provide temporary erosion control. In general, clean grain straw or native grass mulch may be applied at a rate to achieve 90% coverage of an exposed soil surface. In areas of steep slopes, erosion control blankets may be used for mulching newly seeded areas. Monitoring for any soil erosion will be an ongoing task. For areas with poor vegetation establishment, additional seeding may be required.

6.4.7 Vegetation Management of Reclamation Areas

Regular maintenance of areas where vegetation has been established will take place during the initial growing seasons following planting. During the first growing season, if the cover crop or annual weeds reach 18 inches or more in height, the area will be mowed to a height not less than 6 inches with a rotary mower.

Year One Maintenance of Reclamation Areas

Conduct a complete mowing of all seeded areas at least twice the first growing season. The first mowing should take place in June. Mow seeded areas to a height of 5-6 inches before seed is allowed to set (as weeds reach 12-14 inches). Conduct a second complete mowing in August. Mow planted areas to a height of 6-10 inches depending on native seedling height. Spot spray problem weed species using an appropriate herbicide following label directions.

Year Two Maintenance of Reclamation Areas

Conduct complete mowing of all seeding areas in June or before weed species go to seed. Mow planted areas to a height of 6-10 inches depending on native seedling height. Conduct a second complete mowing in August, if necessary. Spot spray problem weed species using an appropriate herbicide following label directions.

Year Three Maintenance of Reclamation Areas

Conduct one mowing (if needed) to problem areas just before weed species set seed. Mow to a height of 6-10 inches. Conduct one spot herbicide application (if needed) to persistent problem species just before weed species flower. Use an appropriate herbicide and follow label directions.

6.5 Regional Stormwater Management

The Reclamation Plan accommodates existing stormwater flow patterns from the upstream watershed. The Reclamation Plan prevents the comingling of the regional stormwater flow and the end use lakes. This protects the water quality of the end use lakes and the groundwater to which they are connected.

Regional stormwater flow patterns include a 1,200 acre watershed that drains lands located east of US 169 through culverts under the highway and through the northern portion of the Bryan Rock property. Stormwater flows across the Site entrance at US 169 and into an established ditch along the north property line located between Bryan Rock and the Anchor Block and Dem-Con Landfill properties. The ditch enters the southern stormwater pond for the Dem-Con Landfill. The outlet to the Dem-Con stormwater pond flows onto the Louisville Landfill property and into another stormwater pond located in the northwest corner of the Bryan Rock property. This pond discharges into the railroad right-of-way, and then through a culvert under a railroad trestle. Currently stormwater passing through the culvert from the Bryan Rock property to the Malkerson Sales property flows across the limestone quarry floor on the Malkerson Sales property into a drainage ditch system and into a stormwater pond at the edge of the wetland complex on the west side of the Project Area.

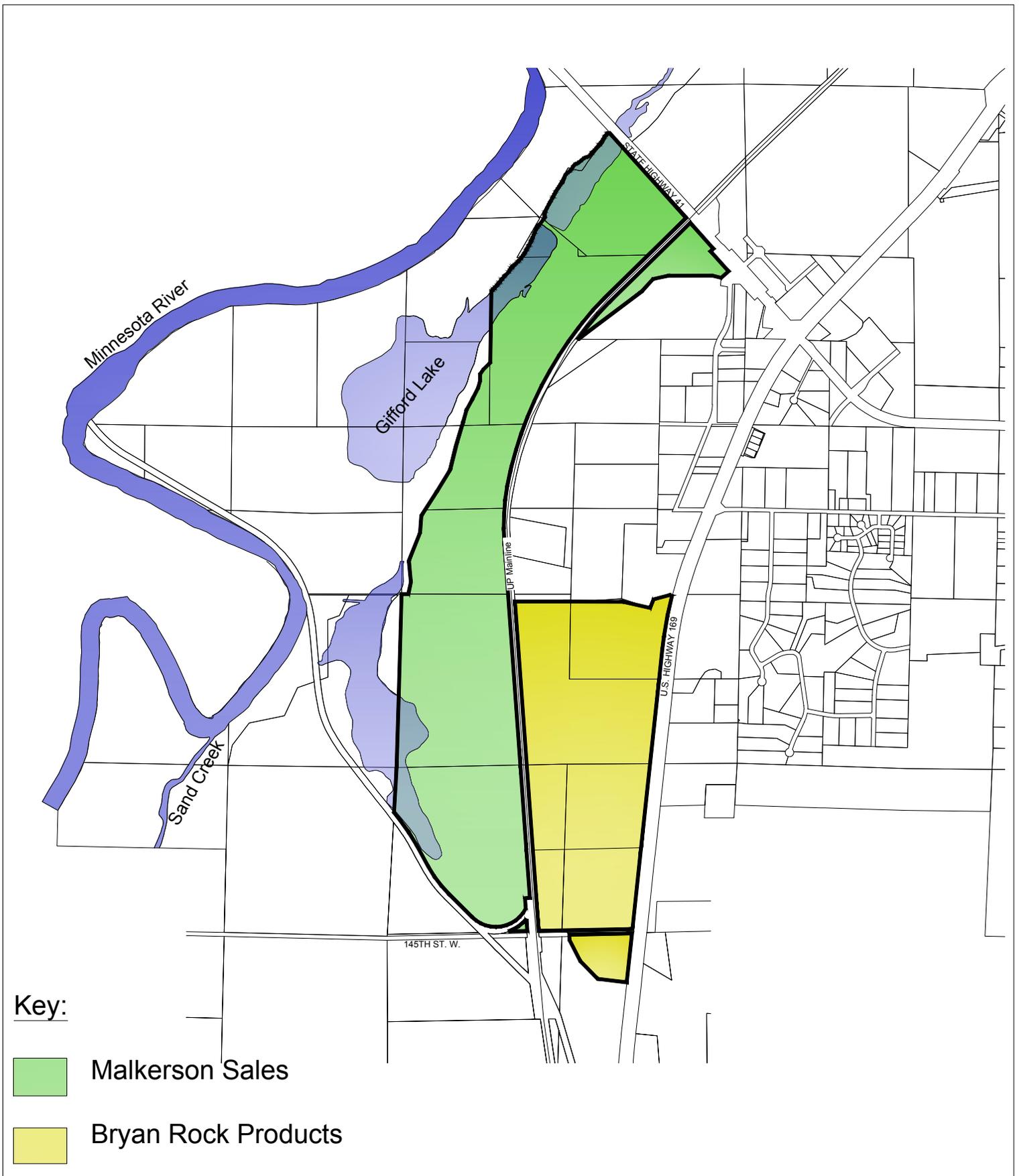
The current drainage pattern will be maintained throughout the mining operation. Temporary ditches and drainageways may be utilized to divert stormwater around open water areas as mining of sandstone progresses through the Site. Reclamation along the northern portion of the Bryan Rock property will include improvements to the existing ditch system, which is currently located on the property line between Dem-Con Landfill and the Bryan Rock property. The capacity of the ditch will be designed to convey the 24-hour 100-year rainstorm event. (7.32 inches based on NOAA

Atlas 14). As a result of changing climatic conditions, Atlas 40 represents an increase in the amount of rainfall associated with a 100 year event in this area. As a result, a higher capacity stormwater drainage ditch is required to convey the 100 year event. A 10 foot wide maintenance road will be constructed along the south side of the ditch to allow access to the ditch in the long term. The drainage ditch will continue on the Malkerson Sales property, aligned over the upland area that will separate the two open end use lakes on this property. The channel will flow to the same stormwater pond that currently receives this runoff that is located at the edge of the wetland complex on the west side of the Project Area. This stormwater management system will result in maintaining regional stormwater drainage patterns.

7.0 Summary:

The Reclamation Plan has been developed to allow the successful transition from mining dominated land uses to future development and open space. Reclamation will leave the Site with a variety of habitats and vegetative cover types providing diversity and continuity with adjacent public lands to the west and south. Portions of the Site will be suitable for future development consistent with the Scott County Comprehensive Plan and land use zoning in place at the time of development. Reclamation will leave the Site in a safe and stable condition that will minimize erosion and sedimentation, protect adjacent wetlands and native plant communities, and provide for more diverse habitat and plant communities than exists on the Site today while establishing future buildable land areas suitable for future development.

FIGURES



Key:

- Malkerson Sales
- Bryan Rock Products

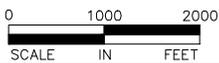


Figure 1
Site Map
 Merriam Junction Sands
 Reclamation Plan



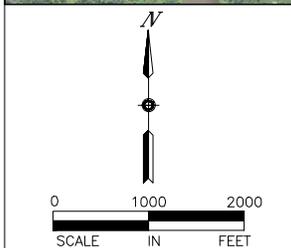
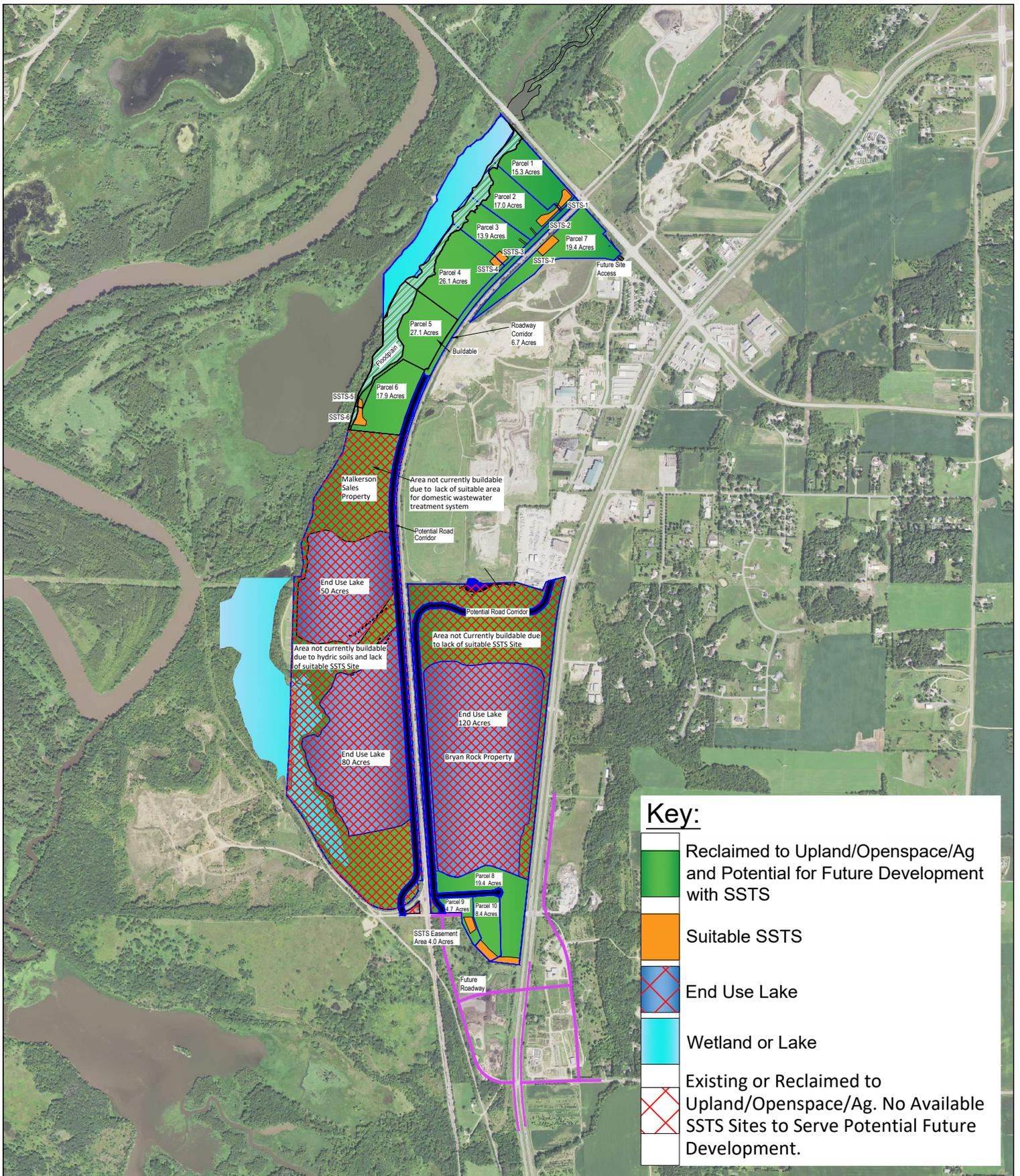


Figure 2
Concept Reclamation Plan
 Merriam Junction Sands
 Reclamation Plan



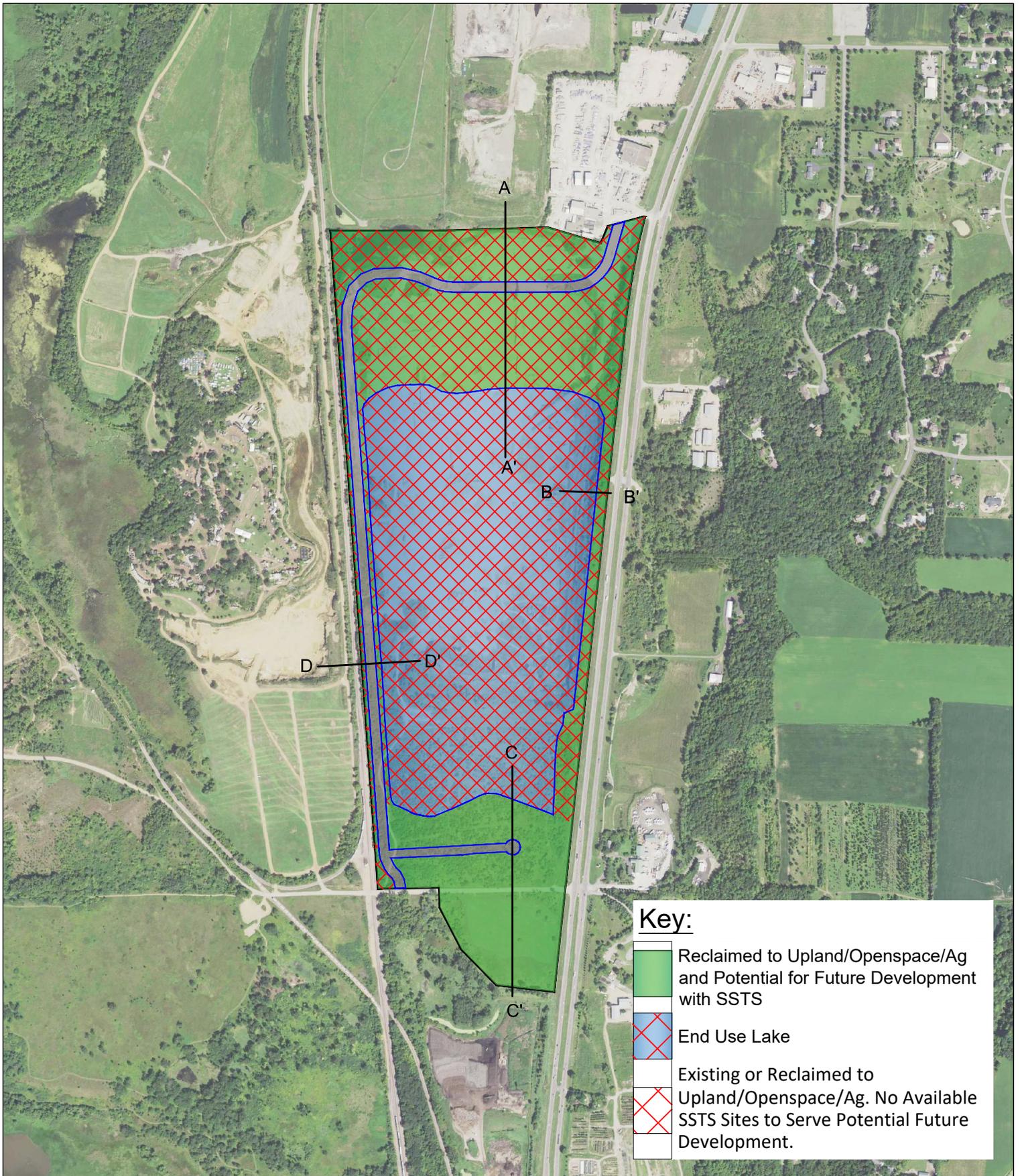
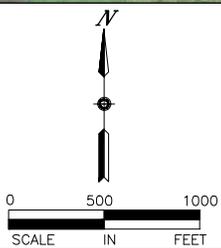
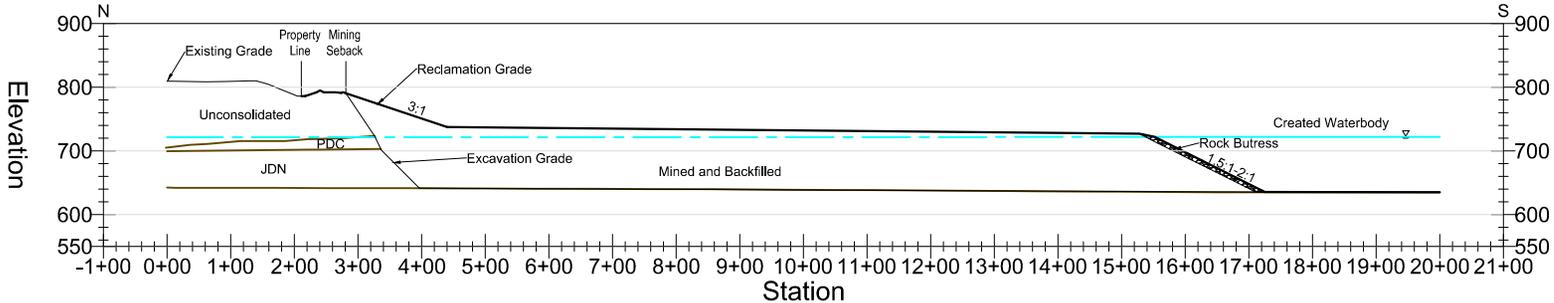


Figure 3
Bryan Rock Products Section Locations
 Merriam Junction Sands
 Reclamation Plan



Cross Section A-A'



Key:

PDC = Prarie du Chien

JDN = Jordan Sandstone

Section demonstrates preliminary design of reclamation slope. Final reclamation slope to be determined based on field verification of competency of PDC, future observation during mining, and proposed development loads by qualified geotechnical engineer.

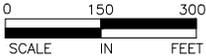
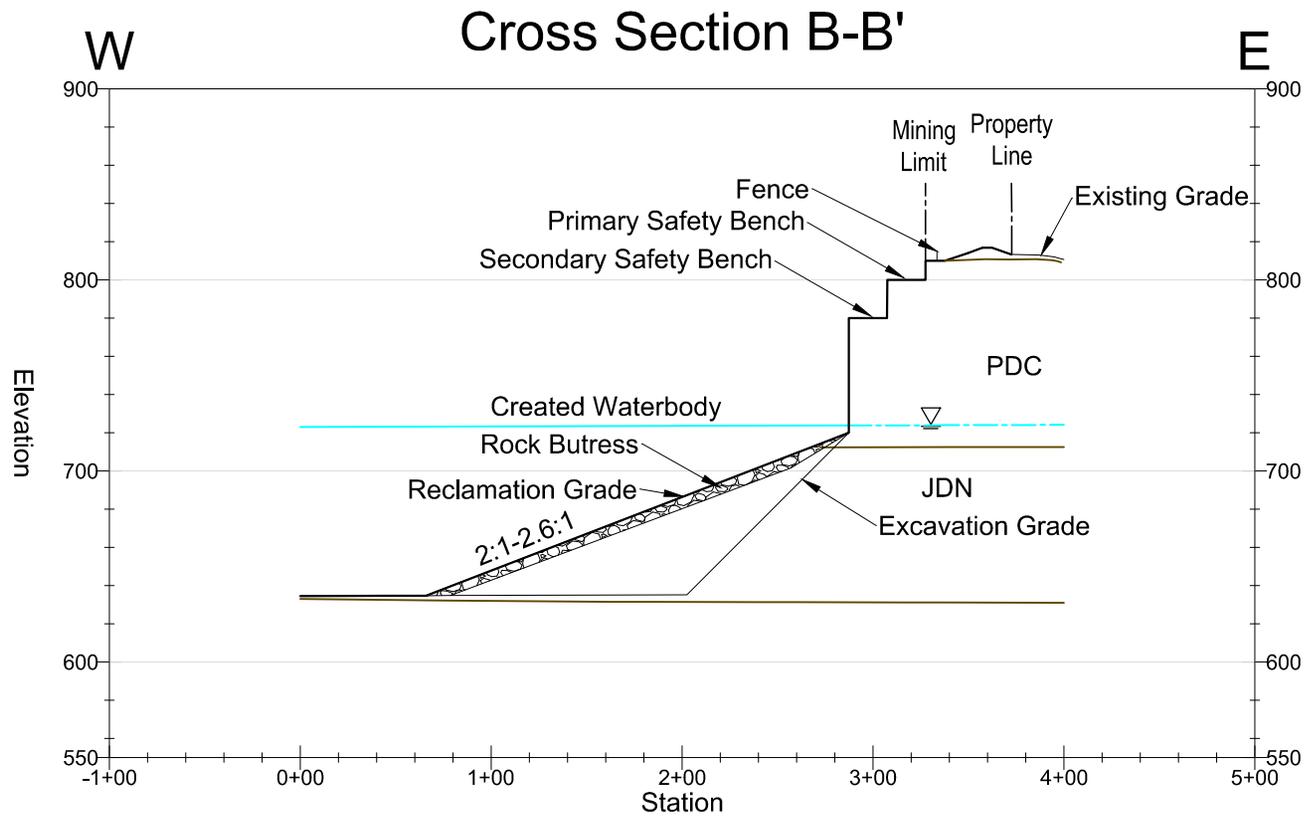


Figure 4
Cross Section A-A'
Merriam Junction Sands
Reclamation Plan





Key:
 PDC = Prarie du Chien
 JDN = Jordan Sandstone

Section demonstrates preliminary design of reclamation slope. Final reclamation slope to be determined based on field verification of competency of PDC, future observation during mining, and proposed development loads by qualified geotechnical engineer.

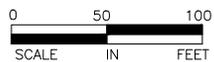
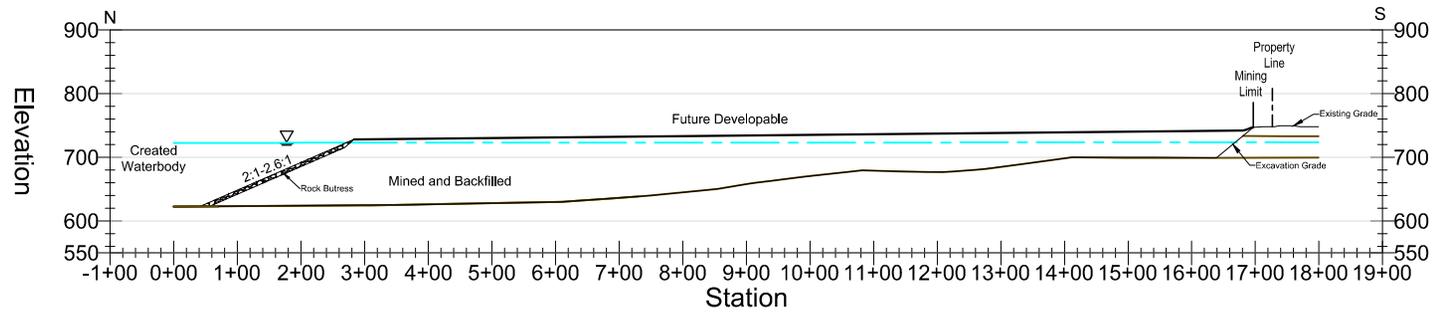


Figure 5
Cross Section B-B'
 Merriam Junction Sands
 Reclamation Plan



Cross Section C-C'



Key:

PDC = Prarie du Chien

JDN = Jordan Sandstone

Section demonstrates preliminary design of reclamation slope. Final reclamation slope to be determined based on field verification of competency of PDC, future observation during mining, and proposed development loads by qualified geotechnical engineer.

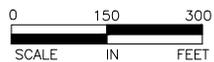
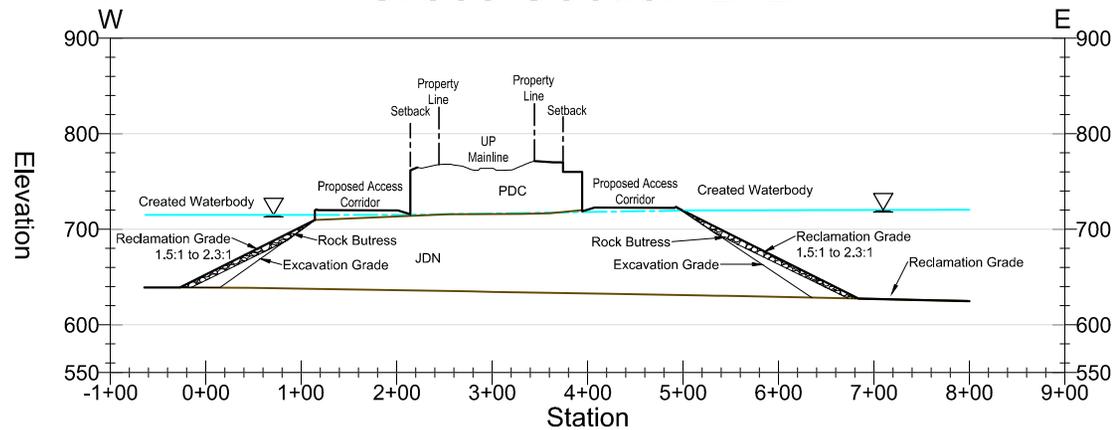


Figure 6
Cross Section C-C'
Merriam Junction Sands
Reclamation Plan



Cross Section D-D'



Key:

PDC = Prarie du Chien

JDN = Jordan Sandstone

Section demonstrates preliminary design of reclamation slope. Final reclamation slope to be determined based on field verification of competency of PDC, future observation during mining, and proposed development loads by qualified geotechnical engineer.

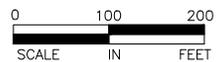


Figure 7
Cross Section D-D'
Merriam Junction Sands
Reclamation Plan



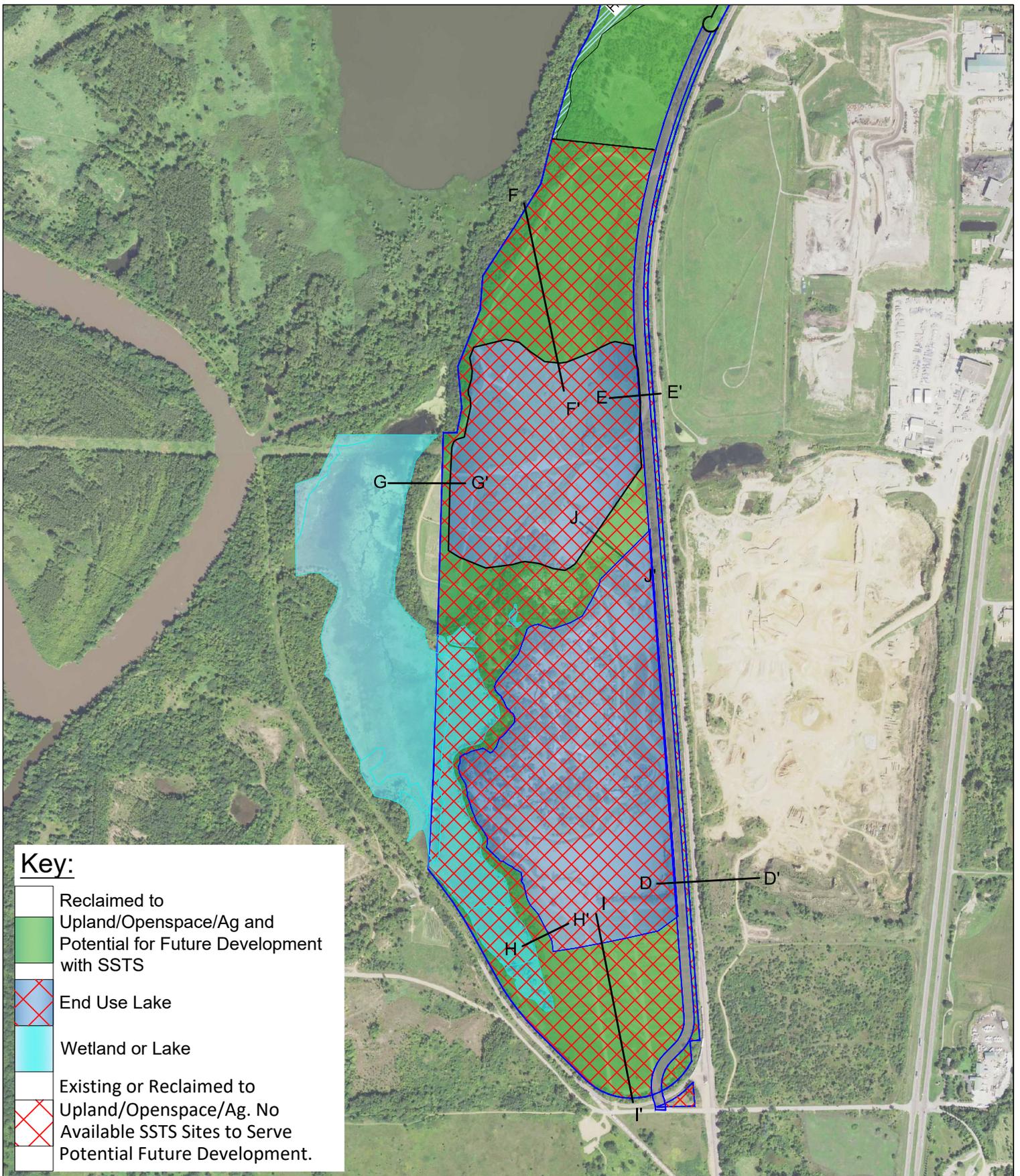
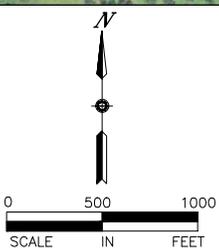
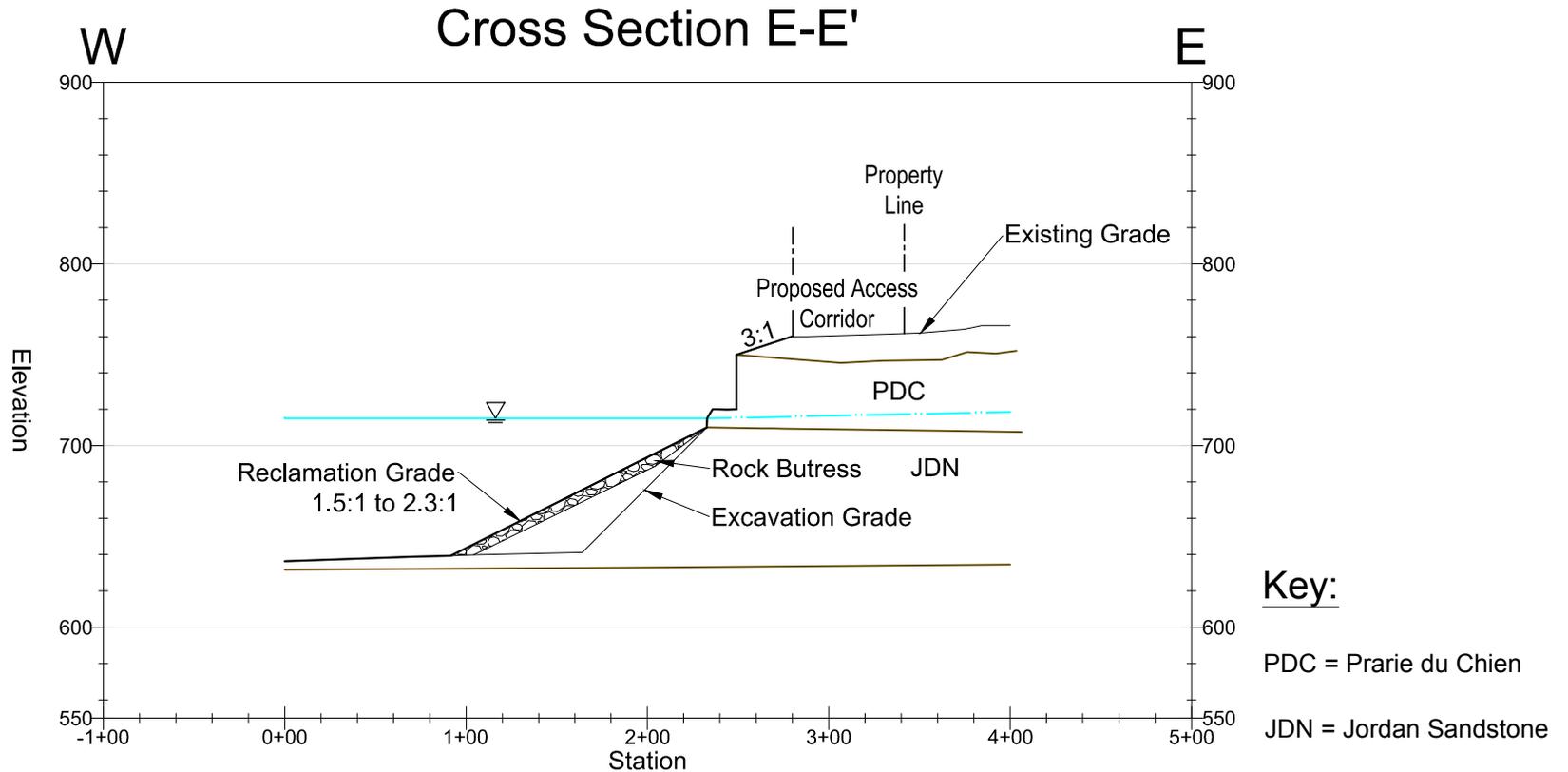


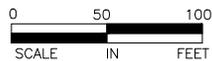
Figure 8
Malkerson Sales Section Locations
 Merriam Junction Sands
 Reclamation Plan



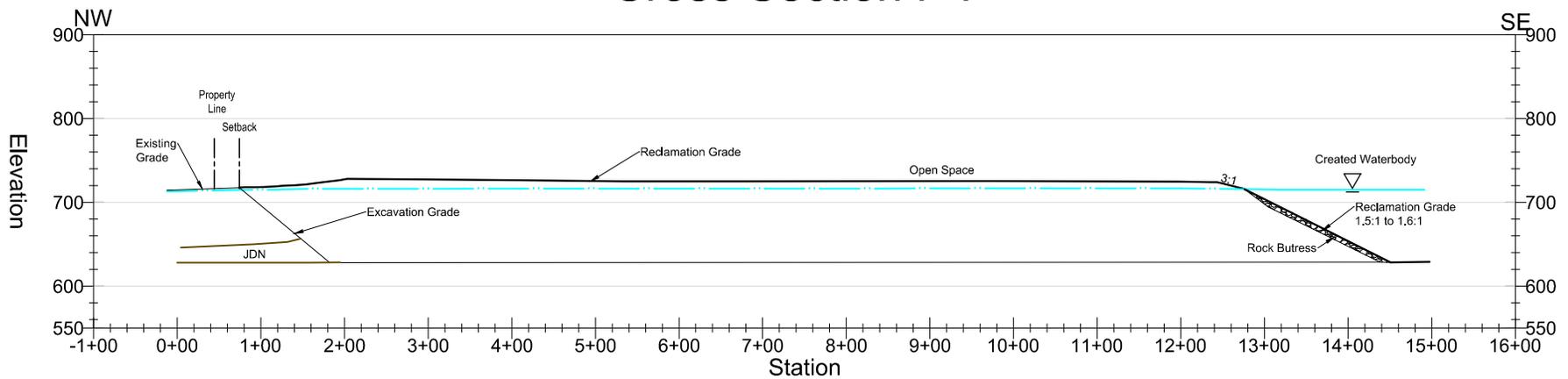


Section demonstrates preliminary design of reclamation slope. Final reclamation slope to be determined based on field verification of competency of PDC, future observation during mining, and proposed development loads by qualified geotechnical engineer.

Figure 9
Cross Section E-E'
 Merriam Junction Sands
 Reclamation Plan



Cross Section F-F'



Key:

PDC = Prarie du Chien

JDN = Jordan Sandstone

Section demonstrates preliminary design of reclamation slope. Final reclamation slope to be determined based on field verification of competency of PDC, future observation during mining, and proposed development loads by qualified geotechnical engineer.

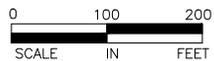
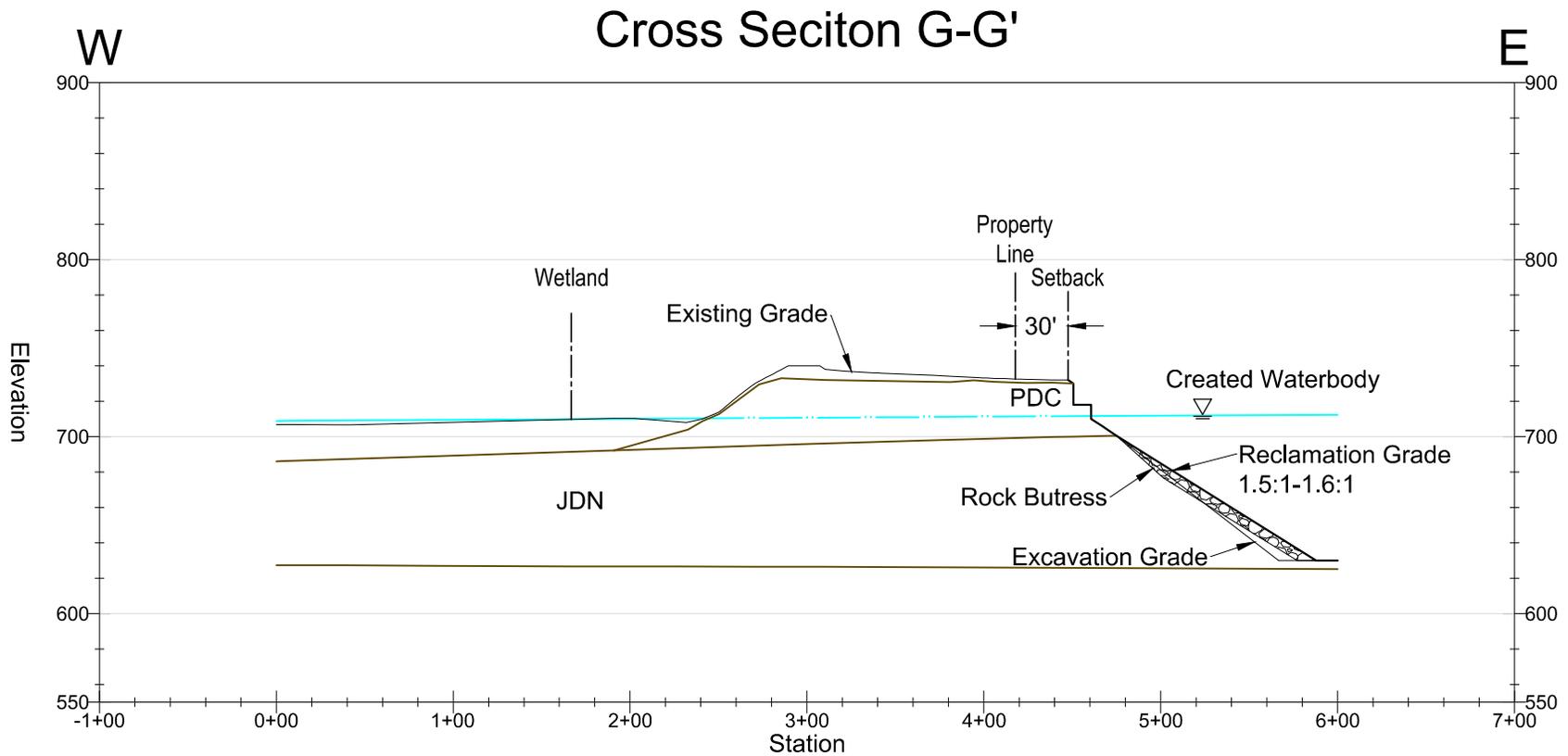


Figure 10
Cross Section F-F'
Merriam Junction Sands
Reclamation Plan





Key:

PDC = Prarie du Chien

JDN = Jordan Sandstone

Section demonstrates preliminary design of reclamation slope. Final reclamation slope to be determined based on field verification of competency of PDC, future observation during mining, and proposed development loads by qualified geotechnical engineer.

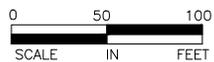
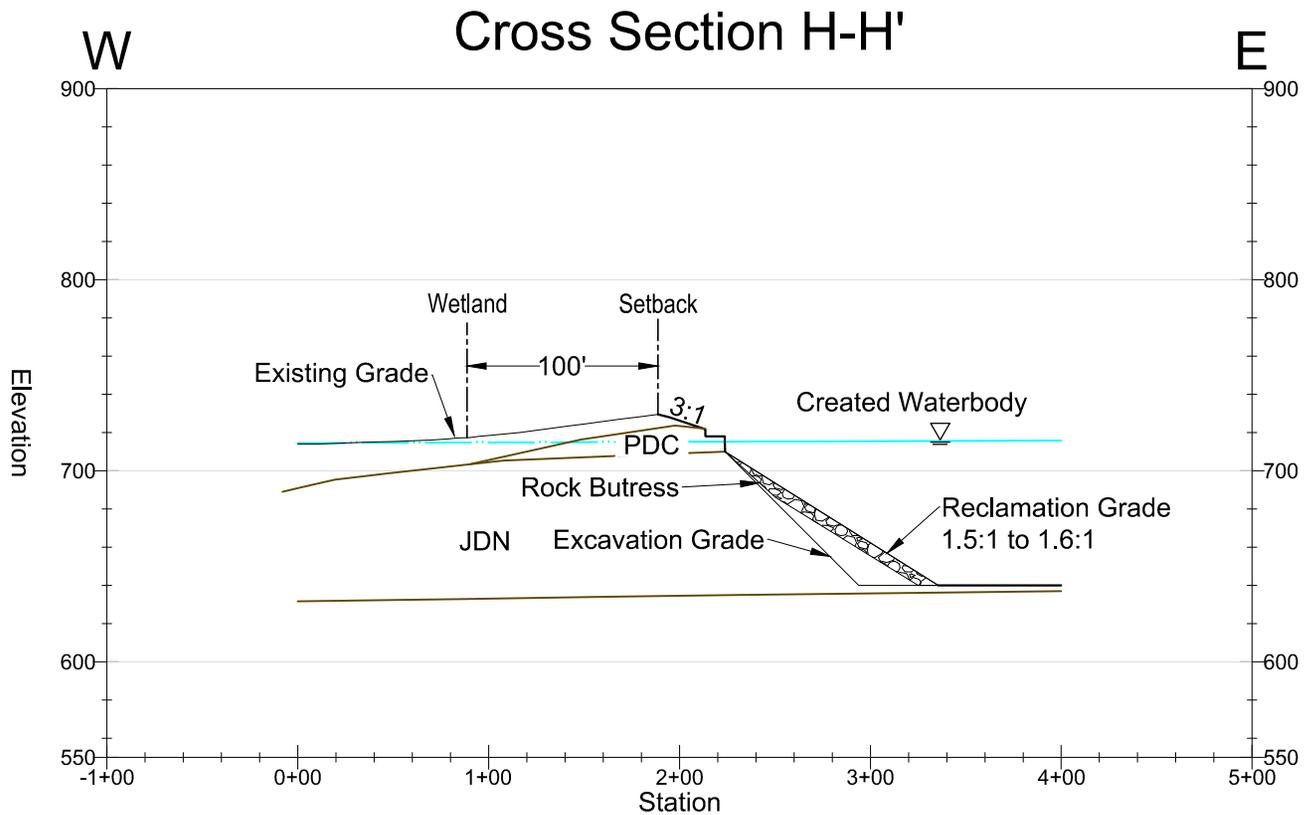


Figure 11
Cross Section G-G'
Merriam Junction Sands
Reclamation Plan





Key:

PDC = Prarie du Chien

JDN = Jordan Sandstone

Section demonstrates preliminary design of reclamation slope. Final reclamation slope to be determined based on field verification of competency of PDC, future observation during mining, and proposed development loads by qualified geotechnical engineer.

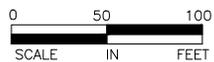
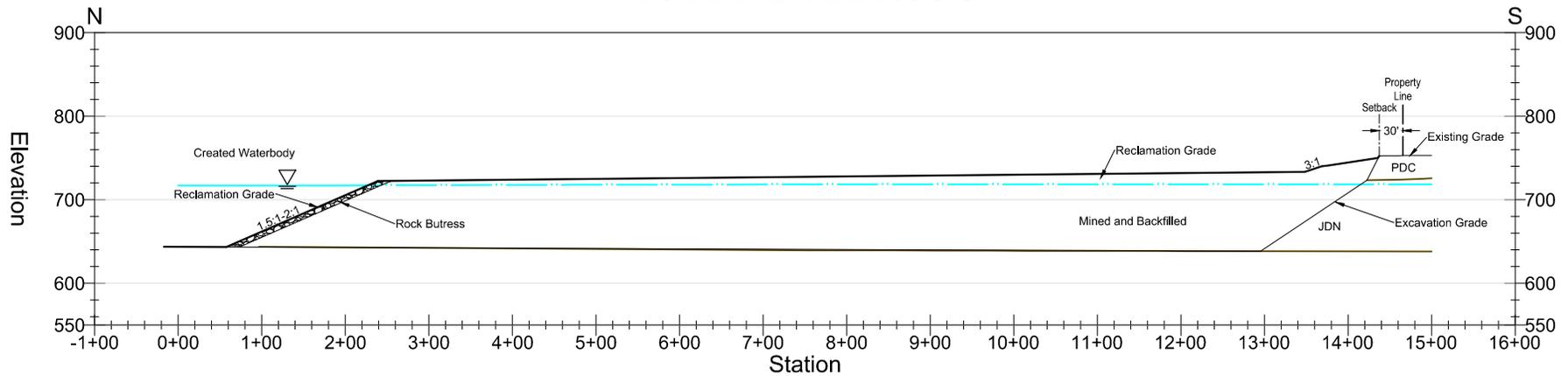


Figure 12
Cross Section H-H'
Merriam Junction Sands
Reclamation Plan



Cross Section I-I'



Key:

PDC = Prarie du Chien

JDN = Jordan Sandstone

Section demonstrates preliminary design of reclamation slope. Final reclamation slope to be determined based on field verification of competency of PDC, future observation during mining, and proposed development loads by qualified geotechnical engineer.

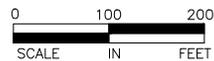
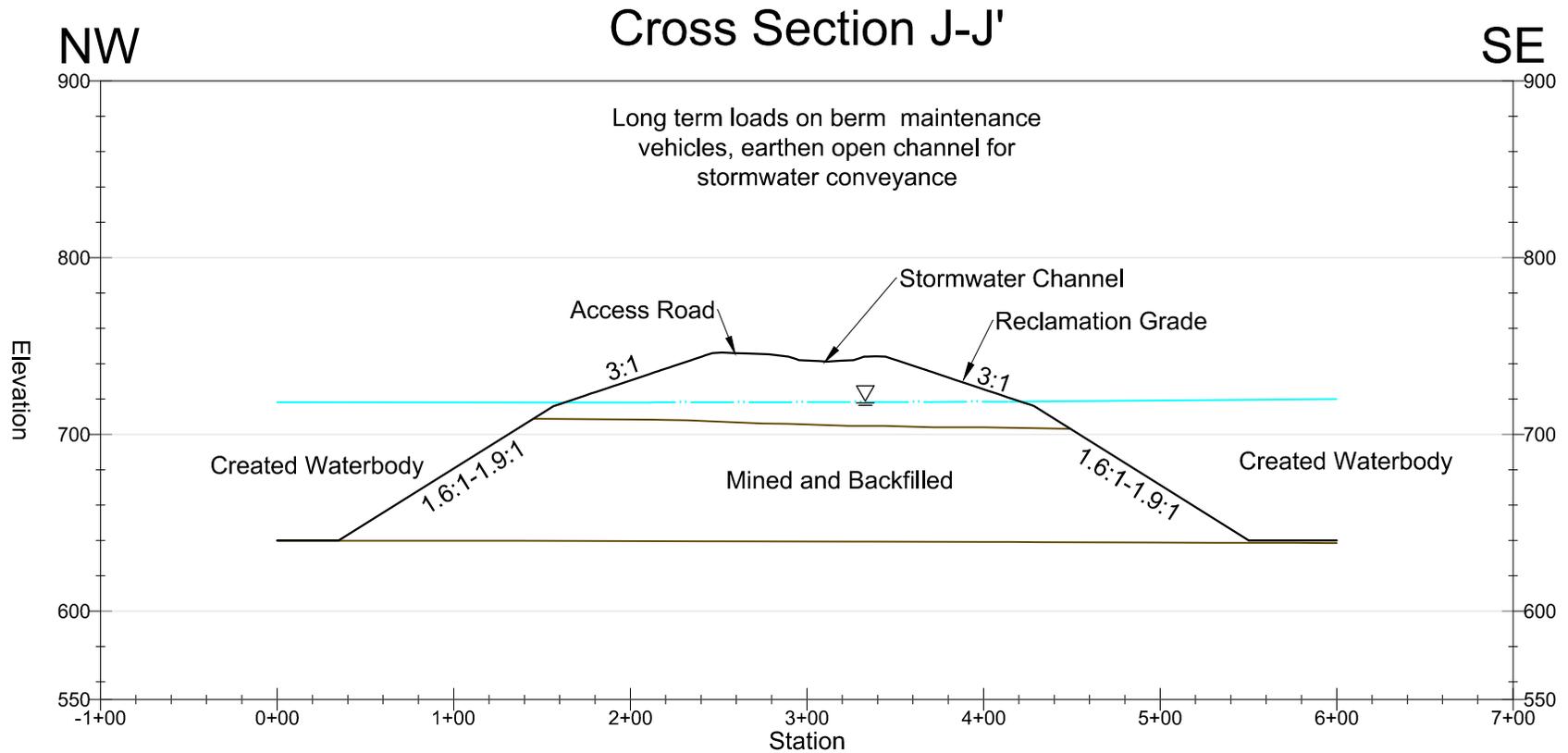


Figure 13
Cross Section I-I'
Merriam Junction Sands
Reclamation Plan





Key:

PDC = Prairie du Chien

JDN = Jordan Sandstone

Section demonstrates preliminary design of reclamation slope. Final reclamation slope to be determined based on field verification of competency of PDC, future observation during mining, and proposed development loads by qualified geotechnical engineer.

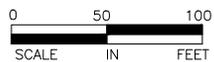


Figure 14
Cross Section J-J'
Merriam Junction Sands
Reclamation Plan

