A Guide to Developing Reclamation Plans for Nonmetallic Mining Sites in Chippewa County, WI

Chippewa County Department of Land Conservation & Forest Management

January 27, 2022

DISCLAIMER

This document is intended solely as guidance and does not contain any mandatory requirements except where requirements found in statue or administrative rule are referenced. This guidance does not establish or affect legal rights or obligations and is not finally determinative of any of the issues addressed.

This guidance does not create any rights enforceable by any party in litigation with Chippewa County acting as the responsible regulatory authority, under WI Admin. Code NR 135.32. Any regulatory decisions made by Chippewa County, in any matter addressed by this guidance, will be made by applying the governing statues and administrative rules to the relevant facts.

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I. OVERVIEW OF STAUTORY REQUIREMENTS FOR MINING RECLAMATION

In response to concerns about abandoned nonmetallic mining sites, Wisconsin Act 464 was enacted in April of 1994. Through this law, the Legislature directed the WDNR to write a reclamation rule that could be used to implement uniform statewide mine reclamation standards. After several revisions and public comment, Chapter NR 135 Wis. Adm. Code was published in September of 2000 and became effective in December 2000.

The purpose of NR 135 is to establish county and municipal reclamation programs through the enactment of an applicable ordinance as a means of ensuring that uniform reclamation standards are applied consistently throughout the state. In this way, NR 135 provides assurance that a stable and productive post-mining condition will be achieved at all active nonmetallic mines in the State of Wisconsin. This new rule made it mandatory for counties to enact ordinances by June 1, 2001, for the purpose of establishing and administering programs to address the reclamation of nonmetallic mining sites. Although mandatory for counties, the rule allows the option of enacting an ordinance establishing a reclamation program for cities, villages and towns.

It is important to note that reclamation is a separate program and is in addition to all existing and applicable federal, state, county and local requirements. In writing the reclamation law, the legislature conveyed its intent that land use decisions continue to be addressed within the existing county or local zoning process. **The requirements contained in NR 135 serve only to create a uniform standard of reclaiming nonmetallic mining sites.** Thus, NR 135 confines itself to the implementation of the reclamation standards while the regulation of mine operations and the actual siting of nonmetallic mines continues to be a local decision.

(As excerpted from A Guide to Developing Reclamation Plans for Nonmetallic Mining Sites in Wisconsin, Publication – WA-834 2002, WI Dept. of Natural Resources, Bureau of Waste Management)

II. PURPOSE OF GUIDANCE AND REFERENCE DOCUMENTS

This technical guidance is intended to assist nonmetallic mine operators to develop reclamation plans for nonmetallic mining sites in Chippewa County, so that these plans are prepared to meet the requirements of Ch. NR 135 of the Wisconsin Administrative Code, and Chapter 30 of the Chippewa County Code of Ordinances.

This guidance has been developed by the Chippewa County Department of Land Conservation & Forest Management (LCFM). This local guidance will be; routinely updated, maintained through time, and posted by the LCFM on the Department's website to be used as a current reference.

This local guidance has been issued to be consistent with provisions of NR 135; and to augment any state-wide technical guidance for nonmetallic mining reclamation that has been published by the WI Dept. of Natural Resources (DNR), or that may be forthcoming from the DNR in the future.

This local guidance includes a series of titled appendices that are attached to this document, and a number of published literature references and web-based links that provide direct access to other sources of information that may be of value in the reclamation planning process.

It is important to recognize that this guidance is advisory and does not extend the scope of the County's authority to regulate nonmetallic mine reclamation, beyond that which has been delegated to the County, as the regulatory authority under NR 135.32.

In preparing this local guidance, the following publications and documents were considered and have been referenced:

A. A Guide to Developing Reclamation Plans for Nonmetallic Mining Sites in Wisconsin, (DNR PUBL-WA-834 2002) and Appendix A Reclamation Plan Checklist and Code Citations.

B. A Guide to Preparing and Reviewing Financial Assurance for Reclamation of Nonmetallic Mining Sites, (DNR PUBL-WA-835 2002).

C. Proposed draft Nonmetallic Mine Reclamation Plan Guidance, (WDNR – SS-1206-2021; 4/1/21).

D. An unpublished summary of working notes from County stakeholder Ad Hoc Success Criteria Workgroup (DNR Working "Draft" Ver. 5.1.15; 4/22/15).

E. An unpublished summary of reclamation performance standards and performance periods, contained in published policy guidance, adopted by eastern and western U.S. States, as applied in the permitting and reclamation of coal mining operations.

F. Published literature and bibliography references; Reclamation of Disturbed Lands (T.J. Toy and W. L. Daniels).

For more information regarding the Chippewa County application and permitting processes, and the requirements of the Chippewa County Nonmetallic Mining Reclamation Ordinance requirements, please refer to the Chippewa County Dept. of Land Conservation & Forest Management web page at www.co.chippewa.wi.us/lcfm.

For more information regarding WI Admin. Code NR 135 and statewide guidance for nonmetallic mining reclamation, please refer to Wisconsin Department of Natural Resources' Bureau of Waste Management Nonmetallic Mining webpage at https://dnr.wisconsin.gov/topic/Mines/Nonmetallic.html .

III. OVERVIEW OF THE COUNTY APPLICATION PROCESS

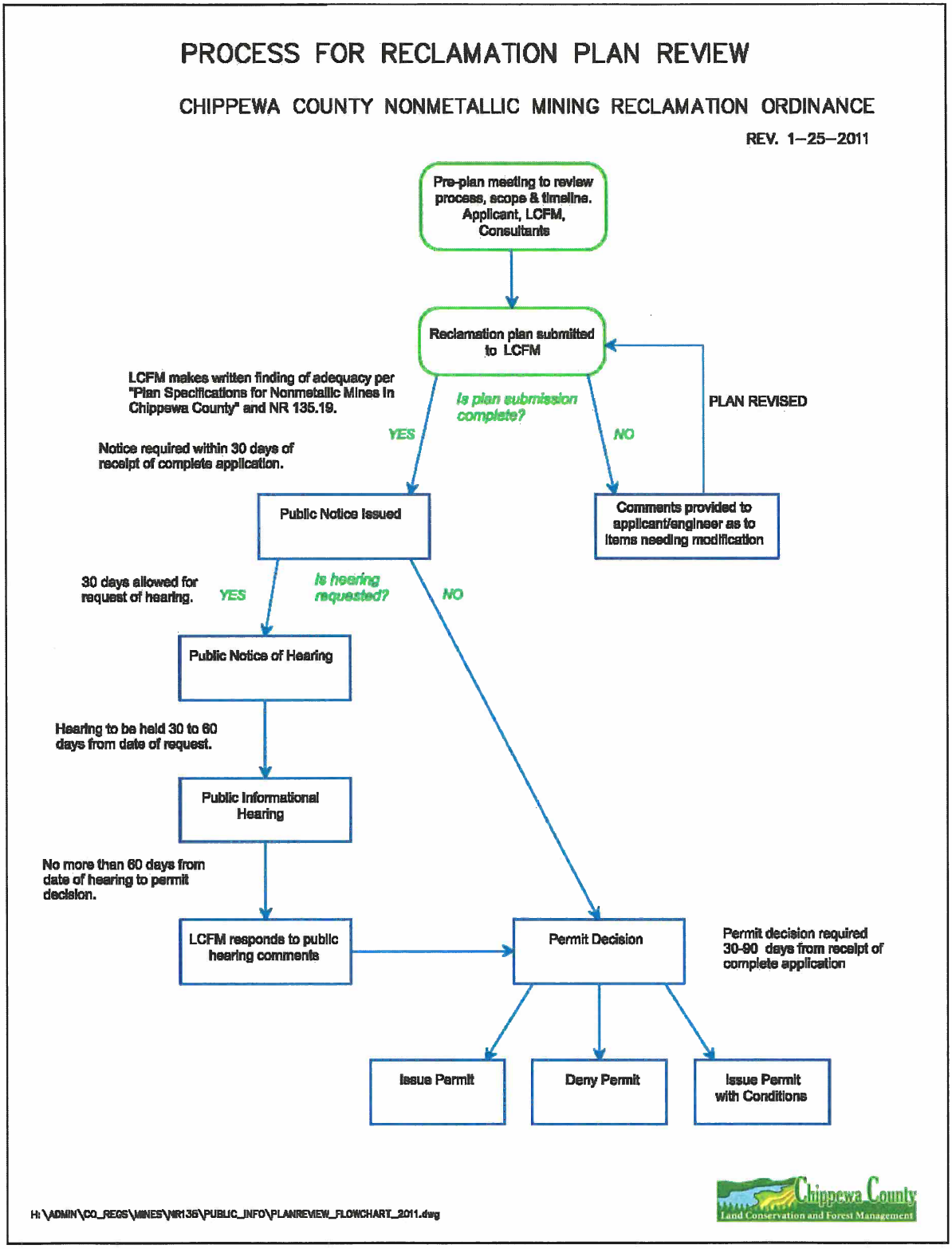
The requirements and procedures for nonmetallic mine reclamation permitting are established in Subchapter III of WI Admin. Code NR 135, and Division 4 of the Chippewa County Nonmetallic Mining Reclamation Ordinance.

In Chippewa County, the Department of Land Conservation & Forest Management has been assigned the responsibility of the regulatory authority for nonmetallic mine reclamation under NR 135.32, and administers the permitting processes.

In so doing, the Department coordinates its efforts with those of the County Planning & Zoning Department in circumstances where a site or operation is subject to a conditional use permit under Chapter 54 and 70 of the County Code of Ordinances, or other ordinances administrated by the County Zoning authority.

Figure 1 shows the administrative process that is used to receive and to administer permit applications in accordance with Subchapter III of NR 135, and to coordinate this process with permit application in areas subject to County zoning.

Figure 1


PROCESS FOR RECLAMATION PLAN REVIEW
CHIPPEWA COUNTY NONMETALLIC MINING RECLAMATION ORDINANCE
REV. 1–25–2011
Pre-plan meeting to review process, scope & timeline. Applicant, LCFM, Consultants
Reclamation plan submitted to LCFM
LCFM makes written finding of adequacy per "Plan Specifications for Nonmetallic Mines in Chippewa County" and NR 135.19.
Is plan submission complete?
YES
NO
PLAN REVISED
Notice required within 30 days of receipt of complete application.
Public Notice Issued
Comments provided to applicant/engineer as to items needing modification
30 days allowed for request of hearing.
YES
Is hearing requested?
NO
Public Notice of Hearing
Hearing to be held 30 to 60 days from date of request.
Public Informational Hearing
No more than 60 days from date of hearing to permit decision.
LCFM responds to public hearing comments
Permit Decision
Permit decision required 30-90 days from receipt of complete application
Issue Permit
Deny Permit
Issue Permit with Conditions
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Chippewa County
Land Conservation and Forest Management

IV. LOCAL GUIDANCE FOR PREPARING NOMETALLIC MINING RECLAMATION PLANS AND EVALUATING SUCCESSFUL RECLAMATION

A. Plan Content and Specifications

WI Admin Code NR 135.19, Reclamation Plan, Subsection (1-7) establishes statewide requirements and specifications for reclamation plan content.

Appendix A to this guidance document provides a Reclamation Plan Checklist with applicable NR 135 code references for each section.

Appendix B, Appendix C, and Appendix D to this guidance document provide further detail and recommendations for reclamation plan content for non-metallic mines being developed in Chippewa County, recognizing the physical geology of Chippewa County, and the type and location of nonmetallic mineral deposits in the landscape.

Examples of nonmetallic reclamation plans that have been approved and that are now being actively applied by mine operators to pursue contemporaneous reclamation and final reclamation, are available upon request and are posted on the LCFM web page at www.co.chippewa.wi.us/lcfm .

B. Post-Mining Land Uses and Cover Types

WI Admin Code NR 135.19(3)(a) Post-Mining Land Use requires that a reclamation plan specify a proposed post-mining land use, and that the proposed land use be consistent with local land use plans, local zoning, and applicable state, local, and federal laws.

The accompanying note, as referenced in NR 135.19(3)(a), states: "A proposed post-mining land use is necessary to determine the type and degree of reclamation needed to correspond with that land use. The post mining land use will be key in determining the reclamation plan. Final slopes, drainage patterns, site hydrology, seed mixes and the degree of removal of mining-related structures, drainage structures, and sediment control structures will be dedicated by the approved post-mining land use".

State guidance documents (WDNR Publication WA-835 2002) have generally recognized that the purpose of the reclamation plan is to achieve a level of acceptable final site reclamation to a desired land use that will be in compliance with the uniform reclamation standards, as established in NR 135, Subchapter II.

Given this fact, a clearly defined proposed post-mining land use is essential to determine the type and degree of reclamation needed to attain that land use, and to attain the reclamation performance standards established in NR 135.

Local experience in reclamation programming has shown that a clearly defined post-mining land use, with specific detail on post-mining vegetative cover types, as defined in the reclamation plan, is critically important in determining the evaluation and performance measurement criteria to be used to evaluate when reclamation has been achieved.

In Chippewa County, six (6) of the twenty-three (23) towns participate in County Zoning, with one (1) town that administers town-based zoning, as approved by the County.

The defined categories of land use, as established under the adopted zoning districts, are as follows:

-Conservation District
-Public Institutional District
-Public Conservancy District
-Recreational District
-Residential 1 District
-Residential 2 District
-Residential 2 – Twin Home District
-Residential 3 District
-Agriculture District
-Local Commercial District
-Highway Commercial District
-Industrial District
-Highway Corridor District
-Planned Unit Development District

It is important to note that these zoning districts have been created to define the type and intensity of land use that are permitted in a given district, but do not provide a level of detail necessary to determine when the physical site conditions, as required to achieve that land use and the prescribed reclamation standards established in NR 135 have been attained.

To overcome this deficiency, Appendix E to this guidance document has been developed to provide a standardized listing of potential post-mining land uses and associated cover types for use in nonmetallic mining reclamation in Chippewa County.

This listing has been prepared to augment the post-mining land uses as applied in zoned towns in Chippewa County, and to provide a basis for uniform reclamation planning in both zoned and unzoned areas.

It is recommended that post-mining land uses and cover types shall be established by the applicant in the reclamation plan, using the general categories of commonly applied land uses and associated cover types established in Appendix E – Table 1.

Variations may be proposed by the permit applicant, and will be considered by the County on a case-by-case basis in unique circumstances where the proposed post-mining land use cannot be readily defined through standardized categories.

It is further recommended that the mine site should be systematically mined and reclaimed using a process of contemporaneous reclamation to meet the reclamation standards established in NR 135, Subchapter II, and to achieve the selected post-mining land use(s) and cover types specified in the reclamation plan.

It is the general intent of the County to work routinely with the mine operators to monitor, measure, and evaluate the extent of "reclamation success" on an ongoing basis during the process of contemporaneous reclamation and final site reclamation.

It is anticipated that sites being reclaimed to "nonproductive ecologically-based conservation land uses" and associated cover types that require low inputs and pose low environmental risk, will be evaluated over a shorter time period ranging from three (3) to five (5), after the year of planting.

It is further anticipated that sites being reclaimed to "productive economically-based working lands" and associated cover types that require higher inputs to sustain economic yields, and that pose higher environmental risk, will be evaluated over a longer time period ranging from five (5) to seven (7) years, after the year of planting.

In practice, the final term of the evaluation period will be established by the County based upon the intended post-mining land use(s), the proven success of establishing the intended cover type(s), and the physical characteristics of the mine site, as measured using the established evaluation criteria.

In determining the end of the evaluation period, the County shall take into account the amount of seasonal variability in weather that has been experienced during the evaluation period to assess if the weather and site conditions experienced are representative, and provide a reasonable assurance that the land use and cover type are sustainable.

C. Recommended Criteria and Performance Measures to Evaluate Successful Reclamation

NR 135.13(1) Assessing Completion of Successful Reclamation requires that:

"The criteria for assessing when reclamation is complete and, therefore, when the financial assurance may be released shall be specified in the reclamation plan. Criteria to evaluate reclamation success shall be quantifiable."

WI Admin Code NR 135.19(4) Reclamation Measures requires that "the reclamation plan shall include a description of the proposed reclamation, including methods and procedures to be used and a proposed schedule and sequence for the completion of reclamation activities for various stages of reclamation of the mining site".

NR 135.19(4)(g) requires that the plan include "Quantifiable standards for revegetation adequate to show that a sustainable stand of vegetation has been established which will support the approved post-mining land use. Standards for revegetation may be based on the percent vegetative cover, productivity, plant density, diversity or other applicable measures.

WI Admin Code NR 135.19(5) Criteria for Successful Reclamation requires that "The reclamation plan shall contain criteria for assuring successful reclamation, in accordance with s. NR 135.13".

State guidance documents (WDNR Publication WA-835 2002) have general recognized that criteria for measuring successful reclamation be detailed enough to objectively evaluate the progress being made to achieve the planned post-mining land use during an evaluation period, when site monitoring and maintenance may be required, to gather physical data before a site can be certified as reclaimed.

Appendix F to this guidance is a table that provides standardized criteria and performance measures that can be readily applied to post-mining land uses and associated cover types in Chippewa County to evaluate site conditions and ultimately determine when reclamation has been achieved, prior to the release of financial assurances.

It is important to note that other alternative criteria and quantifiable performance measures, other than those listed, that are proposed in a reclamation plan, will also be considered by the County.

D. Evaluating Reclamation Success

NR 135.13(2) Assessing Completion of Successful Reclamation requires that:

"Compliance with the revegetation success standards in the approved reclamation plan shall be determined by:

(a) On-site inspections by the regulatory authority or its agent;

(b) Reports presenting results obtained during reclamation evaluations including summarized data on revegetation, photo documentation or other evidence that the criteria approved in the reclamation plan to ascertain success have been met; or

(c) A combination of inspections and reports."

WI Admin. Code NR 135.15 Maintenance requires that "...prior to release of financial assurance, the operator shall perform any maintenance necessary to prevent erosion, sedimentation or environmental pollution, comply with the standards of this subchapter, or to meet the goals specified in the reclamation plan."

To assess the completion of successful reclamation, in accordance with NR 135.13, the Department of Land Conservation & Forest Management (LCFM) shall attempt to conduct scheduled site inspections to collect physical data over multiple growing seasons to document the extent of site reclamation.

When making a determination of reclamation success under NR 135.13, the LCFM may consider:

1. The type and intensity of the planned post mining land use and vegetative cover type, established under NR 135.19(3).

2. The physical and chemical properties of the disturbed soil where the topsoil has been altered, removed or replaced.

3. The physical properties of the regraded mine site and disturbed soil, and the capacity of the disturbed soil to attenuate sources of nonpoint pollution to surface water and groundwater.

4. The extent of soil amendments, chemical inputs, and vegetative management required to recondition the soil; and to establish and sustain the post-mining land use and vegetative cover types in compliance with environmental regulations, including those referenced in NR 135.06(5).

To assist in reclamation planning and to provide a basis for discussion with mine operators, the LCFM has developed target thresholds or performance benchmarks, by which to pursue and measure reclamation success, using recommended evaluation criteria.

These recommended thresholds or benchmarks have been developed for several of the more commonly applied post-mining land uses and associated cover types.

Examples are provided in a series of tables, as provided in Appendix G.

It is important to note that it is the intent of the County to recognize these as reasonable targets that will be evaluated and adjusted over time, as hard data is collected at multiple mine sites to determine reclamation success.

Explanatory Note:

It is anticipated that nonmetallic mine sites that are being reclaimed as "working lands" to production-based agricultural or forestry related cover types or cropping systems may require a higher level of soil fertility, vegetative management, and pest control to recondition the disturbed soil; and to pursue established yield goals. As a result, it is anticipated these production-based land uses will require a longer period of time to systematically monitor and evaluate site conditions under NR 135.13, using established evaluation criteria to evaluate reclamation success.

For purposes of planning, it is anticipated that for sites that are being reclaimed to a production-based agricultural or forested land use, it will be necessary to collect a minimum of five (5) years of physical data commencing after the year of planting, to assess whether the post-mining land use and vegetative cover type or cropping system is sustainable; whether the cover type or cropping system meets agricultural nonpoint pollution control standards established in WI Admin. Code NR 151; and whether reclamation can be certified as complete under NR 135.40.

IV. APPENDIXES

Appendix A	Reclamation Plan Checklist and Code Citations
Appendix B	Plan Specifications for Nonmetallic Mines in Chippewa County
Appendix C	Reclamation Guidance for Nonmetallic Mines in Chippewa County
Appendix D	Plan Content, Specifications and Engineering Recommendations for Nonmetallic Mine Construction in Bedrock
Appendix E	General Categories of Commonly Applied Post Mining Land Uses and Associated Cover Types for Use in Non-metallic Mine Reclamation
Appendix F	Standardized Criteria & Performance Measures to be Applied to Post Mining Land Uses and Associated Land Cover Types to Determine Successful Reclamation
Appendix G	Examples of Performance Measures and Possible Benchmarks for Evaluating Reclamation Success, as Applied to Commonly Applied Land Uses and Associated Cover Types

APPENDIX A

RECLAMATION PLAN CHECKLIST AND CODE CITATIONS

Source: A Guide to Developing Reclamation Plans for Nonmetallic Mining Sites in Wisconsin, (DNR PUBL-WA-834 2002) and Appendix A Reclamation Plan Checklist and Code Citations.

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IMPORTANT: *The checklist below is based on a restatement of the reclamation plan requirements of s. NR 135.19. However, it is only a summary, and users should refer to the code text itself when interpretations are needed or in order to resolve any ambiguities. The checklist is included both to assist in the process of preparing and submitting a "complete" reclamation plan for review and for use by plan reviewers. There is no intent to imply that all items on this checklist are necessary in all reclamation plans. Should you have questions on the need for your plan to include a given item, please contact your regulatory authority.*

NR 135.19(1) PLAN REQUIRED. An operator who conducts or plans to conduct nonmetallic mining on or after August 1, 2001 shall submit to the regulatory authority a reclamation plan that meets the requirements of this section and complies with the standards of Subch. II. To avoid duplication, the reclamation plans may, by reference, incorporate existing plans and materials that meet the requirements of Chapter NR 135.

☐ Site Information:

NR 135.19(2) SITE INFORMATION. The reclamation plan shall include information sufficient to describe the existing natural and physical conditions of the site, including, but not limited to:

☐ Maps:

NR 135.19(2)(a) Maps of the nonmetallic mining site including the general location, property boundaries, the areal extent, geologic composition and depth of the nonmetallic mineral deposit, the distribution, thickness and type of topsoil, the approximate elevation of ground water, the location of surface waters and the existing drainage patterns.

Note: Some of or all of the information required above may be shown on the same submittal, i.e. the site map required by par. (a) may also show topography required by par. (c).

- ☐ **General Location:**
- ☐ **Property Boundaries:**
- ☐ **Areal Extent:**
- ☐ **Geologic Composition and Depth of the Mineral**
- ☐ **Deposit: Distribution, Thickness and Type of**
- ☐ **Topsoil: Approximate Elevation of Ground Water:**
- ☐ **Location of Surface Waters:**
- ☐ **Existing Drainage Patterns:**
- ☐ **Existing Topography:**

NR 135.19(2)(c) Existing topography as shown on contour maps of the site at intervals specified by the regulatory authority.

Note: Some of or all of the information required here may be combined to avoid duplication, e.g. a single map may show anticipated post-mining topography required by par. (c) as well as structures and roads as required by par. (d).

- ☐ **Location of Manmade Features:**

NR 135.19(2)(d) Location of manmade features on or near the site.

- ☐ Previously Mined Areas: (IF APPLICABLE)

NR 135.19(2)(e) For existing mines, a plan view drawing showing the location and extent of land previously affected by nonmetallic mining, including the location of stockpiles, wash ponds and sediment basins.

☐ Biological Information:

NR 135.19(2)(b) Information available to the mine operator on biological resources, plant communities, and wildlife use at and adjacent to the proposed or operating mine site.

☐ Post-mining Land Use:

NR 135.19(3) POST-MINING LAND USE. *(a)* The reclamation plan shall specify a proposed post-mining land use for the nonmetallic mine site. The proposed post-mining land use shall be consistent with local land use plans and local zoning at the time the plan is submitted, unless a change to the land use plan or zoning is proposed. The proposed post- mining land use shall also be consistent with any applicable state, local or federal laws in effect at the time the plan is submitted.

Note: A proposed post-mining land use is necessary to determine the type and degree of reclamation needed to correspond with that land use. The post-mining land use will be key in determining the reclamation plan. Final slopes, drainage patterns, site hydrology, seed mixes and the degree of removal of mining-related structures, drainage structures and sediment control structures will be dictated by the approved post-mining land use.

NR 135.19(3)(b) Land used for nonmetallic mineral extraction in areas zoned under an exclusive agricultural use ordinance pursuant to s. 91.75, Stats., shall be restored to agricultural use.

Note: Section 91.75(9), Stats., contains this requirement. Section 91.01(1), Stats., defines the term "agricultural use".

☐ **Reclamation Measures**

NR 135.19(4) RECLAMATION MEASURES. The reclamation plan shall include a description of the proposed reclamation, including methods and procedures to be used and a proposed schedule and sequence for the completion of reclamation activities for various stages of reclamation of the nonmetallic mining site. The following shall be included:

☐ Earthwork and Grading:

NR 135.19(4)(a) A description of the proposed earthwork and reclamation, including final slope angles, high wall reduction, benching, terracing and other structural slope stabilization measures.

☐ Topsoil:

NR 135.19(4)(b) The methods of topsoil or topsoil substitute material removal, storage, stabilization and conservation that will be used during reclamation.

☐ Topography:

NR 135.19(4)(c) A plan or map which shows anticipated topography of the reclaimed site and any water impoundments or artificial lakes needed to support the anticipated future land use of the site.

☐ Structures:

NR 135.19(4)(d) A plan or map which shows surface structures, roads and related facilities after the cessation of mining.

☐ Cost:

NR 135.19(4)(e) The estimated cost of reclamation for each stage of the project or the entire site if reclamation staging is not planned.

☐ Revegetation Plan:

NR 135.19(4)(f) A revegetation plan which shall include 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.

☐ Revegetation Standards:

NR 135.19(4)(g) Quantifiable standards for revegetation adequate to show that a sustainable stand of vegetation has been established which will support the approved post-mining land use. Standards for revegetation may be based on the percent vegetative cover, productivity, plant density, diversity or other applicable measures.

☐ Erosion Control:

NR 135.19(4)(h) A plan and, if necessary, a narrative showing erosion control measures to be employed during reclamation activities. These shall address how reclamation activities will be conducted to minimize erosion and pollution of surface and groundwater.

☐ Interim Reclamation: (OPTIONAL)

NR 135.19(4)(i) A description of any areas which will be reclaimed on an interim basis sufficient to qualify for the waiver of fees pursuant to s. NR 135.41 and which will be subsequently disturbed prior to final reclamation. Descriptions shall include an identification of the proposed areas involved, methods of reclamation to comply with the standards in Subch. II and timing of interim and final reclamation.

☐ Criteria for Successful Reclamation

NR 135.19(5) The reclamation plan shall contain criteria for assuring successful reclamation in accordance with s. NR 135.13.

☐ Certification of the Reclamation Plan

NR 135.19(6) CERTIFICATION OF RECLAMATION PLAN. ***(a)*** The operator shall provide a signed certification that reclamation will be carried out in accordance with the reclamation plan. The landowner and lessee, if different from the operator, shall also provide signed certification that they concur with the reclamation plan and will allow its implementation, except as provided in par. (b).

NR 135.19(6)(b) For the following situations, the landowner and lessee, if different from the mine operator, are not required to submit a written certification in accordance with par. (a). For these situations, the operator shall provide written evidence that the landowner and lessee, if different than the operator, have been provided with a written copy of the reclamation plan.

1. The mine operator has submitted a reclamation plan for an existing mine in accordance with s. NR 135.18(1).

2. The operator has submitted a reclamation plan for a new or reopened mine in accordance s. NR 135.18(2) which is located on land for which a lease agreement or memorandum of lease between the landowner and applicant was recorded prior to 8 months following December 1, 2000 *(i.e. August 1, 2001)*.

Note: Please see the certification statement examples in Appendix XX for more information.

☐ **Financial Assurance**

NR 135.40(1-13)

Note: Please see Appendix XX, Part 11 and Appendix XX for more information on financial assurance.

☐ **Submitting the Plan**

NR 135.19(7) APPROVAL. The regulatory authority shall approve, approve conditionally or deny the reclamation plan in writing in accordance with s. NR 135.21(1)(f) for existing mines and s. NR 135.21(2) for new or reopened mines. Conditional approvals shall be issued according to s. NR 135.21(3), and denials of permit applications shall be made according to s. NR 135.22.

APPENDIX B

PLAN SPECIFICATIONS FOR NONMETALLIC MINES IN CHIPPEWA COUNTY

Excerpted and Amended from Nonmetallic Mining Reclamation Ordinance
Revised July 2007; Amended 11/3/21

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These specifications for plan development are provided to aid applicants for nonmetallic mining permits in the development of plans for mine permits and to aid Chippewa County in review of applications for nonmetallic mining permits.

Three components of the Site Plan are an Initial Site Description, a Site Operations Plan, and a Final Site Description.

Maps should show locations and activities referenced in the supporting text. Maps are to be drawn at a scale adequate to convey all required information. Detailed maps are not to be of scale less than 1 inch = 200 feet. Contours intervals for topographic maps is to be 10 feet or less.

1. Initial Site Plan

The Initial Site Plan should include an initial site map and supporting text.

a. Initial Site Maps, should include:

   i. Location map to indicate general location of the project in the county or ownership;

   ii. topographic map of affected lands;

   iii. property boundaries showing the land under consideration and neighboring parcels located within 660 feet of the project site;

   iv. roads located on or within 660 feet of the project site, with road names indicated;

v. road right-of-way lines;

vi. locations of all structures within 660 feet of the site and the use of each structure;

vii. locations and names of all intermittent and perennial streams and lakes as indicated on USGS 7.5 min topographic maps;

viii. areas which convey concentrated flows to or from the site;

ix. locations of all wetlands within 660 feet of the site;

x. boundaries of previous excavations on the site;

xi. wells within 660 feet of the site;

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

xiii. locations of all utilities at the site.

b. Supporting Information for Initial Site Description:

i. Owner and Applicant Information
The name and address of the landowner and name and address of the applicant (if other than the landowner).

ii. Lease(s)
A copy of the signed lease(s) which authorizes an operator to enter upon the lessor's land for the purpose of mining. The expiration date of the lease shall be clearly indicated thereon. A substitute form may be used to verify that a lease is in effect without requiring the entire lease.

iii. Legal Description
A legal description and tax parcel numbers of property subject to application.

iv. Parties of interest
List of names and addresses of parties of interest within 660 feet of the project site.

v. Soil Information
Thicknesses of the A & B soil horizons and the method of determination.

2. Site Operations Plan

The Site Operations Plan shall include a site operations map and supporting text.

a. Site Operations Maps, to include:

i. Location and description of mining site boundary;

ii. locations of separation boundaries and separation dimensions (from structures, public roads, rights-of-way, zoning districts, etc.) as referenced in Mine Siting Standards;

iii. planned cell boundaries;

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

v. processing facilities;

vi. location and discharge point of site dewatering systems;

vii. arrows indicating the directions of flow of surface runoff internal and external to the site;

viii. vegetative (i.e. trees) and structural (i.e. berms) measures to be taken to screen the operation from view of surrounding land uses, where required;

ix. roads, culverts, and all points of public road access; and

x. 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.

b. Description of Site Operations:

i. Description or list of the type of materials to be extracted;

ii. description or list of the type of extraction and processing activities to be conducted at the site;

iii. 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;

iv. methods for site dewatering and effluent discharge. Discharges may require a Wisconsin Pollution Discharge Elimination System permit;

v. storm water permits required by other agencies;

vi. erosion control permits required by other agencies;

Note: County permits may be granted contingent on receipt of all other required permits for effluent discharge, storm water management, erosion control, and highway road access.

vii. description of reclamation activities to be conducted during mining operations. 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;

viii. the sequence of progression through and between planned cells; and

ix. a timetable for the commencement and cessation of nonmetallic mining operations. The timetable shall document the sequence of excavation and reclamation during operation of each cell, during the permit period, and during the projected life of the site.

3. Final Site Plan

The Final Site Plan shall include a final site map and text describing measures to be used to restore the site. Site reclamation shall comply with county Reclamation Standards.

a. Final Site Maps, to include:

i. final depths, final slope angles, and slope stabilization measures;

ii. areas which convey concentrated flow to, across, or from the site;

iii. locations of facilities or structures to remain in place;

iv. locations of planned development features on the site following closure; and

v. cross sections through the site – sufficient sections to show current ground surface, final slopes, groundwater elevation, and significant ground elevations.

b. Description of Final Reclamation:

i. Description of plans for disposition of surface structures, roads, and related facilities after cessation of mining;

ii. description of topsoil reapplication;

iii. a description of how the reclamation plan addresses the long-term safety of the reclaimed mining site. The description shall include a discussion of site-specific safety measures to be implemented at the site and include measures that address public safety with regard to adjacent land uses;

Note: Safety measures include: visual warnings, physical barriers, slope modifications such as reclamation blasting, scaling of the rock face, creation of benches. Other measures may be employed if found to be equivalent by a registered professional engineer.

iv. seeding plan which shall include a seeding schedule, seeding type and rates, mulching, netting, tree plantings, and other techniques needed to accomplish soil and slope stabilization; and

v. Description of anticipated future use of the site.

4. Other Information

The county may request other information as may be necessary to determine the nature of the extraction operation and proposed reclamation.

APPENDIX C

RECLAMATION GUIDANCE FOR NONMETALLIC MINES IN CHIPPEWA COUNTY

Excerpted and Amended from Nonmetallic Mining Reclamation Ordinance
Revised July 2007; Amended 11/3/21

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This reclamation guidance has been developed as a consistent basis for nonmetallic mine reclamation. They have been developed to meet minimum state of Wisconsin requirements (under NR135) and to aid Chippewa County in administration and review of nonmetallic mining permits.

The following are general recommendations that apply to all permitted nonmetallic mine sites.

A. SLOPES

Final slopes should not exceed three (3) feet horizontal to one (1) foot vertical incline. This slope angle should extend vertically six (6) feet below the lowest seasonal groundwater level if groundwater is present. In cases of bedrock quarries final slopes may be steeper than 3:1 if it can be shown that the final quarry face should be stable and safe at the proposed slope; a slope no steeper than 3:1 should be created at a designated location or locations, depending on the size of the water body to allow for a safe exit.

All areas affected by mining should be addressed in the approved reclamation plan, pursuant to s. 30-102 to provide that a stable and safe condition consistent with the post-mining land use is achieved. The reclamation plan may designate highwalls or other unmined and undisturbed natural solid bedrock as stable and safe and not in need of reclamation or designate other areas affected by mining including slopes comprised of unconsolidated materials that exceed a 3:1 slope, whether or not graded, as stable and safe. For slopes designated as stable under this subsection, the regulatory authority may require that either: a site-specific engineering analysis be performed by a registered professional engineer to demonstrate that an acceptable slope stability factor is attainable at a steeper slope, or the operator perform a field test plot demonstration to demonstrate that a stable and safe condition should be achieved and that the post-mining land use specified in the reclamation plan should not be adversely affected.

Final reclaimed slopes covered by topsoil or topsoil substitute material may not be steeper than a 3:1 horizontal to vertical incline, unless found acceptable through one or more of the following: alternative requirements are approved under s. 30-107; steeper slopes are shown to be stable through a field plot demonstration approved as part of an approved reclamation plan; or stable slopes can be demonstrated based on site-specific engineering analysis performed by a registered professional engineer. All areas in the nonmetallic mine site where topsoil or topsoil substitute material is to be reapplied should be graded or otherwise prepared prior to topsoil or topsoil substitute material redistribution to provide the optimum adherence between the topsoil or topsoil substitute material and the underlying material.

B. TOPSOIL STORAGE AND REAPPLICATION

1. Topsoil should be systematically stripped and stockpiled for future application. The A and B horizons should be stripped and separately stockpiled, unless the applicant can prove that the full volume of the B horizon is not needed to support a proposed vegetative cover. In all cases a minimum of 8 inches of topsoil should be stripped and stockpiled. If the site is documented to lack these minimum depths of topsoil a waiver may be allowed under which that topsoil which is present should be required to be stripped and retained.

2. Soil stockpiles should be seeded down to retain soil.

3. Soil stockpiles should be graded to 3:1 slope or flatter.

4. The location of stockpiled soil or topsoil substitute material should be chosen to protect the material from erosion, further disturbance or contamination. Runoff water should be diverted around all locations in which soil material is stockpiled.

5. In reclamation, topsoil should be reapplied to the site as uniformly as possible. Sites which lack adequate topsoil should have the topsoil applied preferentially to the sloped areas.

6. The reapplication of soil horizons (A and B) should be such that each horizon is placed back in its original location in the profile.

7. Topsoil Waivers
   The County may consider waivers of topsoil requirements under the following conditions:
   a. The site, before extraction activities begins, lacks the minimum required depth.
   b. The actual depth of available topsoil is documented before excavation begins and every attempt is made to strip and stockpile that amount of topsoil; and
   c. Other provisions approved by the county have been made to assure that the soil condition is stable for subsequent stabilization treatment. No waiver from topsoil standards should be considered if the landowner or operator, through intention or negligence allows existing topsoil to be removed from the site.

C. STABILIZATION TREATMENTS

1. Seeding should be required on all exposed areas immediately following completion of topsoil reapplication. Seeding should be completed in accordance with Appendix A, Section (1).

2. Planting of woody vegetation may be accepted in combination with other stabilization techniques. Species used should be compatible with site characteristics.

3. Sodding, rip-rap or other appropriate measures may be required for areas of drainageways which convey concentrated flow to, across or from the site, and for critical erosion areas as needed to correct a problem on the site. Sod should be installed according to Appendix A, Section (2).

4. Mulch should be applied to all seeded areas greater than 10:1 (10 percent) slope. Mulch is to be applied pursuant to Appendix A, Section (3).

5. Riprap; when required for drainageways, ditch outlets, culvert ends or bridge openings, as shown on the Site Plan, or as required by the Department to deter or correct a problem on the site; should be installed according to Appendix A, Section (4).

6. Any future amendments, revisions or modifications of any cited standards or appendixes incorporated herein are made a part of these standards.

7. In all cases, measures should be taken to assure that soil, sediment and debris from the mine site do not leave the boundaries of the mine site.

D. WASTEWATER AND STORMWATER DISCHARGE

Water from site dewatering and washing operations should meet the conditions of the required Wisconsin Pollution Discharge Elimination System (WPDES) permit from DNR.

Storm water runoff leaving the site should be controlled to limit sediment delivery to surface waters. Appropriate storm water discharge or construction site erosion permits must be obtained.

E. WASTE STORAGE AT SITE

It is the duty of the landowner to remove all waste substances as may be deposited by himself or others. During the period of the permit and thereafter, no gravel pit or borrow site should be used to receive, store, or serve as a depository for demolition materials, or solid waste except yard waste as defined in Wis. Stat. 159.01(17) and except authorized solid waste management and recycling programs consistent with local, state or federal guidelines and administered by the Chippewa County Solid Waste Management Authority.

F. PROGRESSIVE RECLAMATION

Reclamation activities are to be conducted on an ongoing and progressive basis. The county should review progress toward reclamation on an ongoing basis.

APPENDIX D

PLAN CONTENT, SPECIFICATIONS AND ENGINEERING RECOMMENDATIONS FOR NONMETALLIC MINE CONSTRUCTION IN BEDROCK

Excerpted and Amended from LCC/LCFM Committee Guidance
Adopted 4/15/2009 & 9/17/2009; Amended 11/3/21

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Purpose

Nonmetallic mines constructed in bedrock pose unique challenges that are not encountered when mining sand and gravel from unconsolidated glacial deposits.

Failure to adequately plan, design, operate, and reclaim mines in bedrock can:

1. Result in offsite environmental impacts that can damage property and pose a threat to the public health, safety, and welfare.

2. Increase the operational costs of mining and phased reclamation.

3. Add significantly to the public costs of reclamation plan review and permit oversight.

This administrative guidance has been developed to clarify the content and design requirements of reclamation plans submitted for nonmetallic mines proposed in bedrock that are subject to the Chippewa County Nonmetallic Mining Ordinance.

Note 1: This guidance does not apply to small quarries or borrow sites that are currently allowed and exempt from ordinance requirements under NR 135.02(3).

Note 2: For the purposes of this guidance the county has adopted the definition of bedrock as contained in NR 213.04 as follows: "Bedrock" means the rocks that underline soil material or are at the earth's surface which are encountered when the weathered in–place consolidated material, larger than 2 millimeters in size, is greater than 50% by volume.

Engineering Assurance

Upon considering the physical characteristics of the site and scope of mine operations, professional engineering and design computations may be required to assure that the reclamation standards of the ordinance can be met.

The type and extent of engineering shall be limited to that necessary to meet physical site limitations, and to assure that the reclamation standards established in NR 135 Subchapter II can be achieved.

Engineering shall be encouraged for mines constructed in bedrock when any of the following threshold criteria are met:

1. The mine site and mine architecture involves the presence of high walls or steep slopes that:

   A. Will have a mine face that will be greater than 20 feet in height, or,
   B. Warrant concerns for slope stability during mining operations while pursuing standards for final grading and slope stability under NR 135.10, using the process of contemporaneous reclamation.

2. The mine site is externally drained, or where storm water runoff or other discharge is expected from the site.

3. The total projected, or potential built-out area of mine site is greater than 5 acres, over the life of the mine.

Monitoring and Reporting Requirements

The applicant, working independently, or through a consultant or professional engineer, shall develop the following documents:

1. A Reclamation Plan. The plan shall meet the requirements of NR 135.19 and shall document the sequence of phased mining and reclamation activities, applying the concept of "contemporaneous reclamation".

2. An Annual Reclamation Report and Activities Plan. The report shall meet the requirements of NR 135.36 and shall document the reclamation activities completed throughout the past year and the activities planned for the upcoming year.

Reclamation Plan Contents and Specifications

The scope and detail of the reclamation plan shall be adequate to allow for critical public and third party engineering review.

To meet this objective, reclamation plans for nonmetallic mines developed in bedrock shall meet the following plan specifications and include the following information:

1. All requirements of NR 135.19.

2. All requirements, as established in a guidance document titled: *Plan Specifications for Nonmetallic Mines in Chippewa County; Standardized Categories of Post Mining Land Uses and Associated Cover Types for Use in Nonmetallic Mine Reclamation;* and *Standardized Criteria & Performance Measures to be Applied to Post Mining Land Uses and Associated Land Cover Types to Determine Successful Reclamation*, and on file and maintained by the Chippewa Co. Dept. of Land Conservation & Forest Management.

3. Physical data as measured, and supporting documentation from published resource inventories and studies that will be used to characterize site conditions, and to facilitate groundwater management in accordance with standards and requirements of NR 135.08 and NR 135.19.

This information shall, at a minimum, include:

A. The elevations and spacial extent of mapped bedrock formations and glacial deposits, as shown on regional and more localized geologic maps.
B. Estimated groundwater contour elevations and general groundwater flow directions, as shown on the 1:100,000 Chippewa County Groundwater Inventory Maps.
C. Estimated depth to regional water table, and the anticipated range of seasonable and historical groundwater fluctuations, as previously recorded in the County.
D. The estimated rate of infiltration of in situ soils and geologic deposits, and the anticipated groundwater flow rates through bedrock formations.
E. The location of any anticipated high capacity wells on or adjacent the mine site.
F. The location of any anticipated groundwater monitoring wells or well networks, as planned to measure, monitor, and verify groundwater protection standards of NR 135.08(1) and (2), can be achieved.

4. Physical data as measured, and supporting documentation from published literature and resource inventories to characterize site conditions and to facilitate surface water and storm water management, in accordance with standards and requirements of NR135.07 & 135.19.

This information shall be provided for each major stage of mine development and reclamation and, at a minimum, include:

A. A copy of proof of permit coverage for the site, as regulated and any associated under NR216.21, and state WPDES storm water discharge permits.
B. A projection of anticipated discharges of storm water, contaminated storm water and process water, and a statement of intent indicating whether the site will be managed as an internally or externally drained site.
C. An overview of physical controls to prevent or limit the discharge of storm water contaminants, including an explanation of how the mine will apply source area pollution prevention controls and storm water best management practices to prevent or treat contaminated storm water.
D. A map showing how storm water will be routed during mining, contemporaneous mine reclamation, and mine closure; and the location of anticipated structural best management practices that are planned to manage storm water runoff from the 25 year, 24 hour storm event.
E. An operation, maintenance, and inspection plan for the storm water management system.
F. Copy of a preliminary Storm Water Pollution Prevention Plan (SWPP), as proposed to meet state WPDES storm water permit requirements.
G. Anticipated chemistry of storm water, contaminated storm water and waste water generated at the mine.

5. Physical data as measured, and supporting documentation from published literature and resource inventories to characterize site conditions and to facilitate soil and overburden management in accordance with NR 135.09 & NR 135.19.

This information shall be provided for each major stage of mine development and reclamation and, at a minimum, include:

A. The type and estimated thickness of the geologic overburden to be stripped and stored.
B. The measured thickness and estimated volumes of the soil A horizons, and soil B horizons.
C. An overview of the process and timeline to be used in stripping, stockpiling, stabilizing, and managing the geologic overburden.
D. An overview of the process and timeline to be used in stripping, stockpiling, stabilizing, rehabilitating, and managing soil and soil stockpiles.

6. Physical data and supporting documentation from published literature and resource inventories to characterize site conditions and to facilitate slope reconstruction and stabilization in accordance with NR135.10 & NR135.19.

This information shall be provided for each major stage of mine development and reclamation and, at a minimum, include:

A. The physical processes and general sequence of construction activities that will be used in slope reconstruction and stabilization.
B. The material source(s) to be used, including the anticipated use of overburden, rejected mine materials generated on site, and mine processing and fill materials imported to the site.

C. The type and estimate of volumes of source materials to be used in slope reconstruction.
D. An explanation of materials testing that will be used to characterize materials to be used for slope reconstruction and reclamation.
E. An operation, maintenance, and inspection plan to be used in slope reconstruction and stabilization.
F. The anticipated use of engineering modeling, calculations, or test plots to document slope stability.

7. Physical data and supporting documentation from published literature and resource inventories to characterize site conditions and to facilitate topsoil reestablishment in accordance with NR135.11 & NR135.19.

This information shall be provided for each major stage of mine development and reclamation and, at a minimum, include:

A. The physical process and general sequence of construction activities to be used in the soil application process, and reestablishment of A horizon and soil B horizon that will be used.
B. Best management practices and measures to limit soil compaction.
C. Best management practices and measures that will be used to control erosion, in accordance with NR 135.11, and to the maximum extent practicable, in accordance with state WPDES requirements.
D. An operation, maintenance, and inspection plan to be used in slope reconstruction and stabilization.

8. Physical data and supporting documentation from published literature and resource inventories to characterize site conditions and to facilitate site revegetation in accordance with NR135.12 & NR135.19.

This information shall be provided for each major stage of mine development and reclamation and shall, at a minimum, include:

A. The physical process and general sequence of activities to be used in the site revegetation.
B. The specific plant species, seeding mixes, and planting rates, as planned to establish planned vegetative cover types, and plant communities for designated areas of the mine.
C. The agronomic best management practices to be used to soil test and to manage soil nutrients and amendments to establish target and soil fertility, as prescribed for the planned plant species and vegetative cover types.
D. The agronomic best management practices to be used to prepare a seedbed and to physically plant designated areas of the mine to establish the planned cover types.
E. The agronomic best management practices to be used to monitor and control weeds, pests, noxious weeds, and invasive species.
F. An operation, maintenance, and inspection plan to be used in vegetative management.

APPENDIX E

GENERAL CATEGORIES OF COMMONLY APPLIED PST MINING LAND USES AND ASSOCIATED COVER TYPES FOR USE IN NON-METALLIC MINE RECLAMATION

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GENERAL CATEGORIES OF COMMONLY APPLIED POST MINING LAND USES AND ASSOCIATED COVER TYPES FOR USE IN NON-METALLIC MINE RECLAMATION

POST MINING LAND USE	SUB-CATEGORY	LAND COVER TYPE/PLANT COMMUNITY	MGNT APPROACH/INTENSITY
Conservation Lands ①			
Conservation/Ecological Use	Public Inst. Private Inst.	Forest/Woodland Grassland/Prairie Grassland/Prairie/Forest Savannah Wet/Sedge Meadow Surface water; Shallow Ponded/Deep Ponded Other	Defined in soil rehabilitation & vegetation management plan
Working Lands ②			
Forest Production		Even aged species Mixed aged species Other	Defined in soil rehabilitation & vegetation management plan
Agricultural Production		Pasture Perennial Forage - Conservation Cover Perennial Forage - Hay Cultivated Cropland; Forage Rotation Cultivated Cropland; Row Crop Other	Defined in soil rehabilitation & vegetation management plan
Developed Lands			
Residential	Low Density Med. Density High Density		Defined in Site Development Plan
Commercial	Low Intensity Med. Intensity High Intensity		Defined in Site Development Plan
Industrial	Low Intensity Med. Intensity High Intensity		Defined in Site Development Plan
Institutional	Public Inst. Private Inst.		Defined in Site Development Plan
Any other proposed land use category, as defined in an approved comprehensive plan or zoning ordinance, as agreed to by the permitted mine operator and County.		Any other proposed land cover type/plant community, as agreed to by the permitted mine operator and County.	

① To determine successful reclamation, the recommended evaluation period for post mining land uses reclaimed as conservation lands and associated cover types, is anticipated to extend from 3-5 years, commencing the first year after planting.

② To determine successful reclamation, the recommended evaluation period for post mining land uses reclaimed as working lands and associated cover types, is anticipated to extend from 5-7 years, commencing the first year after planting.

APPENDIX F

STANDARDIZED CRITERIA & PERFORMANCE MEASURES TO BE APPLIED TO POST MINING LAND USES AND ASSOCIATED LAND COVER TYPES TO DETERMINE SUCCESSFUL RECLAMATION

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STANDARDIZED CRITERIA & PERFORMANCE MEASURES TO DETERMINE SUCCESSFUL RECLAMATION
POST MINE LAND USE; WORKING LANDS; AGRICULTURAL PRODUCTION - PASTURE COVER TYPE①

STANDARDIZED CRITERIA FOR DETERMINING SUCCESSFUL RECLAMATION	QUANTIFABLE PERFORMANCE MEASURES	PERFORMANCE THRESHOLD TO DETERMINE SUCCESSFUL RECLAMATION 1a
Site stability		
Sheet & rill erosion	% area of field surface w/rills & deposition	0% ranging to the highest degree of control practically attainable, based upon demonstrated mngt effort
Channel & gully erosion	% area of concentrated flows w/channel erosion	0% ranging to the highest degree of control practically attainable, based upon demonstrated mngt effort
Mass wasting	% area of field surface & highwall unstable	0% ranging to the highest degree of control practically attainable, based upon demonstrated mngt effort
Plant density and species diversity		
Species density	1. % ground covered by planted & volunteer species	>80% ground cover
	2. Volume by weight of planted & volunteer species	% of yield capability in comparison to soil survey mapping unit; Table 6, Soil Survey
Plant diversity	% presence of planted & volunteer species	>50% species planted
Noxious weeds & invasive species	% presence of each type; noxious weed & invasive plant species	0% ranging to the highest degree of control practically attainable, based upon demonstrated mngt effort
Soil test chemistry		
Soil acidity	pH	>6
Macro nutrient fertility	Concentration of N-P-K (ppm)	12 ppm NO_3; 20 ppm P; 80 ppm K
Soil organic matter	% O.M.	1.0%
Soil depth, soil infiltration, and plant rooting depth		
Topsoil depth	% of original A & B soil horizon depth, measured in comparison to soil survey mapping unit	70% original surface layer thickness
Soil permeability	Soil permeability measured using 6" infiltration ring (inches/hr)	70% of permeability in comparison to soil survey mapping unit (inches/hr); Table 16, Soil Survey
Plant rooting depth	Minimum soil depth to support unrestricted root growth for selected cover type, as defined in soil rehabilitation & vegetation management plan	>12 inches
Other alternative criteria, as agreed to by the permitted mine operator and County		
1. Prescribed Grazing; USDA NRCS Code 528		
2. Pastures for Profit; UWEX A3529		
3. Soil Fertility Guidelines for Pastures in WI; UWEX A4034		
4. NR151		

① To determine successful reclamation, the recommended evaluation period for post mining land uses reclaimed as conservation lands and associated cover types, is anticipated to extend from 3-5 years, commencing the first year after planting.

1a Performance thresholds are offered as goals to be measured toward attainment and are not established as numerical standards.

STANDARDIZED CRITERIA & PERFORMANCE MEASURES TO DETERMINE SUCCESSFUL RECLAMATION
POST MINE LAND USE; WORKING LANDS; FOREST PRODUCTION - EVEN AGED SPECIES (1)

STANDARDIZED CRITERIA FOR DETERMINING SUCCESSFUL RECLAMATION	QUANTIFABLE PERFORMANCE MEASURES	PERFORMANCE THRESHOLD TO DETERMINE SUCCESSFUL RECLAMATION (1a)
Site stability		
Sheet & rill erosion	% area of surface slopes w/rills & deposition	0% ranging to the highest degree of control practically attainable, based upon demonstrated mngt effort
Channel & gully erosion	% area of concentrated flow w/channel erosion	0% ranging to the highest degree of control practically attainable, based upon demonstrated mngt effort
Mass wasting	% of slopes/highwall unstable	0% ranging to the highest degree of control practically attainable, based upon demonstrated mngt effort
Plant density and species diversity		
Plant density	1. % ground covered by cover crop and planted, volunteer & noninvasive species	>80% ground cover
	2. % survival as a function of planned planting rate for each planted species	>70% of survival of planted species
	3. Mass & growth rate measured as a function of basal diameter of planted species and ultimately stand	Continuous recorded growth of surviving planted species
Species diversity	% presence of planted & volunteer species	>70% survival of planted species
Noxious weeds & invasive plant species	% presence of invasive plant species & noxious weeds	Invasive = <10%/Noxious weeds = <5%
Soil chemistry		
Soil acidity	pH	> 5.6
Macro nutrient fertility	Concentration of N-P-K (ppm)	12 ppm NO3, 10 ppm P; 45 ppm K
Soil organic matter	% O.M.	> 0.5
Soil physical characteristics		
Soil depth	% of original A & B soil horizon depth, measured in comparison to soil survey mapping unit	70% original surface layer thickness
Soil permeability	Soil permeability measured using 6" infiltration ring (inches/hr)	70% of permeability in comparison to soil survey mapping units/permeability (Inches/hr); Table 16, Soil Survey
Plant rooting depth	Minimum soil depth to support unrestricted root growth for selected cover type, as defined in soil rehabilitation & vegetation management plan	> 12 inches
Other alternative criteria, as agreed to by the permitted mine operator and County		

(1) To determine successful reclamation, the recommended evaluation period for post mining land uses reclaimed as conservation lands and associated cover types, is anticipated to extend from 3-5 years, commencing the first year after planting.

(1a) Performance thresholds are offered as goals to be measured toward attainment and are not established as numerical standards.

APPENDIX F

STANDARDIZED CRITERIA & PERFORMANCE MEASURES TO BE APPLIED TO POST MINING LAND USES AND ASSOCIATED LAND COVER TYPES TO DETERMINE SUCCESSFUL RECLAMATION

STANDARDIZED CRITERIA & PERFORMANCE MEASURES TO BE APPLIED TO POST MINING LAND USES AND ASSOCIATED LAND COVER TYPES TO DETERMINE SUCCESSFUL RECLAMATION

STANDARDIZED CRITERIA FOR DETERMINING SUCCESSFUL RECLAMATION	QUANTIFABLE PERFORMANCE MEASURES
Site stability	
Sheet & rill erosion	% area of field surface w/rills & deposition
Channel & gully erosion	% area of concentrated flows w/channel erosion
Mass wasting	% area of field surface & highwall unstable
Plant density and species diversity	
Plant density	1. % ground covered by planted & volunteer species
	2. Volume by weight or mass of planted & volunteer species, if applicable
Species diversity	% presence of planted & volunteer species
Noxious weeds & invasive plant species	% presence of each type; noxious weed & invasive plant species
Soil chemistry	
Soil acidity	pH
Macro nutrient fertility	Concentration of N-P-K (ppm)
Soil organic matter	% O.M.
Soil physical characteristics	
Soil depth	% of original A & B soil horizon depth, measured in comparison to soil survey mapping unit
Soil permeability	Soil permeability measured using 6" infiltration ring (inches/hr)
Plant rooting depth	Minimum soil depth to support unrestricted root growth for selected cover type, as defined in soil rehabilitation & vegetation management plan
Other alternative criteria, as agreed to by the permitted mine operator and County	Other quantifiable performance measures, as agreed to by the permitted mine operator and County

Appendix G

Examples of Performance Measures and Possible Benchmarks for Evaluating Reclamation Success, as Applied to Commonly Applied Land Uses and Associated Cover Types

-Standardized Criteria & Performance Measures to Determine Successful Reclamation Post Mine Land Use; Conservation Lands; Conservation/Ecological Use – Forest/Woodland

-Standardized Criteria & Performance Measures to Determine Successful Reclamation Post Mine Land Use; Conservation/Ecological Use – Grassland/Prairie/Forest Savannah Cover Type

--Standardized Criteria & Performance Measures to Determine Successful Reclamation Post Mine Land Use; Conservation/Ecological Use – Grassland/Prairie Cover Type

-Standardized Criteria & Performance Measures to Determine Successful Reclamation Post Mine Land Use; Conservation Lands; Conservation/Ecological Use – Surface Water; Shallow Ponded/Deep Ponded

-Standardized Criteria & Performance Measures to Determine Successful Reclamation Post Mine Land Use; Working Lands; Forest Production – Even Aged Species

-Standardized Criteria & Performance Measures to Determine Successful Reclamation Post Mine Land Use; Working Lands; Agricultural Production – Past Cover Type

-Standardized Criteria & Performance Measures to Determine Successful Reclamation Post Mine Land Use; Working Lands; Agricultural Production – Perennial Forage - Hay

APPENDIX G

EXAMPLES OF PERFORMANCE MEASURES AND POSSIBLE BENCHMARKS FOR EVALUATING RECLAMATION SUCCESS, AS APPLIED TO COMMONLY APPLIED LAND USES AND ASSOCIATED COVER TYPES

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STANDARDIZED CRITERIA & PERFORMANCE MEASURES TO DETERMINE SUCCESSFUL RECLAMATION
POST MINE LAND USE; CONSERVATION/ LANDS; CONSERVATION/ECOLOGICAL USE -
SURFACE WATER; SHALLOW PONDED / DEEP PONDED

STANDARDIZED CRITERIA FOR DETERMINING SUCCESSFUL RECLAMATION	QUANTIFABLE PERFORMANCE MEASURES	PERFORMANCE THRESHOLD TO DETERMINE SUCCESSFUL RECLAMATION
Shoreline stability ③		
Sheet & rill erosion	% area of shoreline w/rills & deposition	0%
Channel & gully erosion	% area of shoreline with channel and gully erosion	0%
Mass wasting	% of shoreline unstable	0%
Physical characteristics ④⑤⑥		
Pond design	Configuration constructed as planned with stable inlet and outlet	Functioning as intended from soil rehabilitation & vegetation management plan
Pond hydrology	Observed seasonal water depth and duration	Functioning as intended from soil rehabilitation & vegetation management plan
Water chemistry ⑦		
Water quality testing criteria, as defined in applicable WI NR administrative rules or WPDES permits	Concentrations of chemical constituents including nutrients, metals, organics, and other as established in NR 216, NR 102, and NR 140	Proven and ongoing compliance with DNR permits
Other alternative criteria, as agreed to by the permitted mine operator and County		

③ Standardized criteria for determining successful shoreline stability are the same as those used to determine site stability.

④ When planning pond design for shallow and deep ponded surface waters, consider the following guidance: 1) NRCS conservation practice standard no. 378 for Pond; 2) NRCS conservation practice standard no. 646 for Shallow Water Development & Management; 3) University of WI Extension no. G3693 for Managing Wisconsin Fish Ponds.

⑤The soil rehabilitation & vegetation management plan should be used to define the contributing watershed area and water budget to show the planned seasonal water depths and durations.

⑥When a surface water pond is designed for a mine with external drainage, and the pond is created using an embankment resulting in water levels greater than 3 ft. above the outlet of the pond, the pond embankment and outlet will be engineered to meet the requirements of NRCS 378 or, when required by law, NR 333.

⑦ Surface water testing will only be required when there is an environmental concern that is documented under NR 135, or when the surface water discharges are subject to permit or enforcement under NR 216, NR 102, or NR 140.

STANDARDIZED CRITERIA & PERFORMANCE MEASURES TO DETERMINE SUCCESSFUL RECLAMATION
POST MINE LAND USE; CONSERVATION LANDS; CONSERVATION / ECOLOGICAL USE - FOREST / WOODLAND ①

STANDARDIZED CRITERIA FOR DETERMINING SUCCESSFUL RECLAMATION	QUANTIFABLE PERFORMANCE MEASURES	PERFORMANCE THRESHOLD TO DETERMINE SUCCESSFUL RECLAMATION ①a
Site stability		
Sheet & rill erosion	% area of surface slopes w/rills & deposition	0% ranging to the highest degree of control practically attainable, based upon demonstrated mngt effort
Channel & gully erosion	% area of concentrated flow w/channel erosion	0% ranging to the highest degree of control practically attainable, based upon demonstrated mngt effort
Mass wasting	% of slopes/highwall unstable	0% ranging to the highest degree of control practically attainable, based upon demonstrated mngt effort
Plant density and species diversity		
Plant density	1. % ground covered by cover crop & planted, volunteer & noninvasive species	>80% ground cover
	2. % survival as a function of planned planting rate for each planted species	>50% of survival of planted species
	3. Mass & growth rate measured as a function of basal diameter of planted species and ultimately stand density	Continuous recorded growth of surviving planted species
Species diversity	% presence of planted & volunteer species	>50% survival of planted species
Noxious weeds & invasive plant species	% presence of invasive plant species & noxious weeds	Invasive = <10%/Noxious weeds = <5%
Soil chemistry		
Soil acidity	pH	> 5.6
Macro nutrient fertility	Concentration of N-P-K (ppm)	12 ppm NO3, 10 ppm P; 45 ppm K
Soil organic matter	% O.M.	> 0.5
Soil physical characteristics		
Soil depth	% of original A & B soil horizon depth, measured in comparison to soil survey mapping unit	70% original surface layer thickness
Soil permeability	Soil permeability measured using 6" infiltration ring (inches/hr)	70% of permeability in comparison to soil survey mapping units/permeability (Inches/hr); Table 16, Soil Survey
Plant rooting depth	Minimum soil depth to support unrestricted root growth for selected cover type, as defined in soil rehabilitation & vegetation management plan	> 12 inches
Other alternative criteria, as agreed to by the permitted mine operator and County		

① To determine successful reclamation, the recommended evaluation period for post mining land uses reclaimed as conservation lands and associated cover types, is anticipated to extend from 3-5 years, commencing the first year after planting.

①a Performance thresholds are offered as goals to be measured toward attainment and are not established as numerical standards.

STANDARDIZED CRITERIA & PERFORMANCE MEASURES TO DETERMINE SUCCESSFUL RECLAMATION
POST MINE LAND USE; CONSERVATION/ECOLOGICAL USE - GRASSLAND/PRAIRIE/FOREST SAVANNAH COVER TYPE①

STANDARDIZED CRITERIA FOR DETERMINING SUCCESSFUL RECLAMATION	QUANTIFABLE PERFORMANCE MEASURES	PERFORMANCE THRESHOLD TO DETERMINE SUCCESSFUL RECLAMATIO ①a
Site stability		
Sheet & rill erosion	% area of surface slopes w/rills & deposition	0% ranging to the highest degree of control practically attainable, based upon demonstrated mngt effort
Channel & gully erosion	% area of concentrated flow w/channel erosion	0% ranging to the highest degree of control practically attainable, based upon demonstrated mngt effort
Mass wasting	% of field surface & highwall unstable	0% ranging to the highest degree of control practically attainable, based upon demonstrated mngt effort
Plant density and species diversity		
Plant density	1. % ground covered by planted & volunteer species	>80% ground cover
	2. Volume by weight of planted & volunteer species	% of yield capability in comparison to soil survey mapping unit; Table 6, Soil Survey
Species diversity	% presence of planted & volunteer species	>50% species planted
Noxious weeds & invasive plant species	% presence of each type; noxious weed & invasive plant species	0% ranging to the highest degree of control practically attainable, based upon demonstrated mngt effort
Soil chemistry		
Soil acidity	pH	>5.6
Macro nutrient fertility	Concentration of N-P-K (ppm)	12 ppm NO_3; 10 ppm P; 60 ppm K
Soil organic matter	% O.M.	>0.5
Soil physical characteristics		
Soil depth	% of original A & B soil horizon depth, measured in comparison to soil survey mapping unit	70% original surface layer thickness
Soil permeability	Soil permeability measured using 6" infiltration ring (inches/hr)	70% of permeability in comparison to soil survey mapping unit (inches/hr); Table 16, Soil Survey
Plant rooting depth	Minimum soil depth to support unrestricted root growth for selected cover type, as defined in soil rehabilitation & vegetation management plan	> 12 inches
Other alternative criteria, as agreed to by the permitted mine operator and County		

① To determine successful reclamation, the recommended evaluation period for post mining land uses reclaimed as conservation lands and associated cover types, is anticipated to extend from 3-5 years, commencing the first year after planting.

①a Performance thresholds are offered as goals to be measured toward attainment and are not established as numerical standards.

STANDARDIZED CRITERIA & PERFORMANCE MEASURES TO DETERMINE SUCCESSFUL RECLAMATION
POST MINE LAND USE; CONSERVATION/ECOLOGICAL USE - GRASSLAND/PRAIRIE COVER TYPE(1)

STANDARDIZED CRITERIA FOR DETERMINING SUCCESSFUL RECLAMATION	QUANTIFABLE PERFORMANCE MEASURES	PERFORMANCE THRESHOLD TO DETERMINE SUCCESSFUL RECLAMATION (1a)
Site stability		
Sheet & rill erosion	% area of surface slopes w/rills & deposition	0% ranging to the highest degree of control practically attainable, based upon demonstrated mngt effort
Channel & gully erosion	% area of concentrated flow w/channel erosion	0% ranging to the highest degree of control practically attainable, based upon demonstrated mngt effort
Mass wasting	% of field surface & highwall unstable	0% ranging to the highest degree of control practically attainable, based upon demonstrated mngt effort
Plant density and species diversity		
Plant density	1. % ground covered by planted & volunteer species	>80% ground cover
	2. Volume by weight of planted & volunteer species	% of yield capability in comparison to soil survey mapping unit; Table 6, Soil Survey
Species diversity	% presence of planted & volunteer species	>50% species planted
Noxious weeds & invasive plant species	% presence of each type; noxious weed & invasive plant species	0% ranging to the highest degree of control practically attainable, based upon demonstrated mngt effort
Soil chemistry		
Soil acidity	pH	>5.6
Macro nutrient fertility	Concentration of N-P-K (ppm)	12 ppm NO_3; 10 ppm P; 60 ppm K
Soil organic matter	% O.M.	>0.5
Soil physical characteristics		
Soil depth	% of original A & B soil horizon depth, measured in comparison to soil survey mapping unit	70% original surface layer thickness
Soil permeability	Soil permeability measured using 6" infiltration ring (inches/hr)	70% of permeability in comparison to soil survey mapping unit (inches/hr); Table 16, Soil Survey
Plant rooting depth	Minimum soil depth to support unrestricted root growth for selected cover type, as defined in soil rehabilitation & vegetation management plan	> 12 inches
Other alternative criteria, as agreed to by the permitted mine operator and County		

(1) To determine successful reclamation, the recommended evaluation period for post mining land uses reclaimed as conservation lands and associated cover types, is anticipated to extend from 3-5 years, commencing the first year after planting.

(1a) Performance thresholds are offered as goals to be measured toward attainment and are not established as numerical standards.

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STANDARDIZED CRITERIA & PERFORMANCE MEASURES TO DETERMINE SUCCESSFUL RECLAMATION POST MINE LAND USE; CONSERVATION/ LANDS; CONSERVATION/ECOLOGICAL USE - SURFACE WATER; SHALLOW PONDED / DEEP PONDED

STANDARDIZED CRITERIA FOR DETERMINING SUCCESSFUL RECLAMATION ②	QUANTIFABLE PERFORMANCE MEASURES	PERFORMANCE THRESHOLD TO DETERMINE SUCCESSFUL RECLAMATION (1a)
Site stability		
Sheet & rill erosion	% area of surface slopes w / rills & deposition	0% ranging to the highest degree of control practically attainable, based upon demonstrated mngt effort
Channel & gully erosion	% area of concentrated flow w / channel erosion	0% ranging to the highest degree of control practically attainable, based upon demonstrated mngt effort
Mass wasting	% of slopes / highwall unstable	0% ranging to the highest degree of control practically attainable, based upon demonstrated mngt effort
Plant density and species diversity		
Plant density	1. % ground covered by planted & non invasive volunteer species	>80% ground cover
	2. Volume by weight of planted & non invasive volunteer species	% of yield capability in comparison to soil survey mapping unit/species yield Table 6, Soil Survey
Species diversity	% presence of planted & volunteer species	>50% species planted
Noxious weeds & invasive plant species	% presence of each type; noxious weed & invasive plant species	0% noxious/<10% invasive
Soil chemistry		
Soil acidity	pH	See defined threshold for adjacent upland cover type
Macro nutrient fertility	Concentration of N-P-K (ppm)	See defined threshold for adjacent upland cover type
Soil organic matter	% O.M.	See defined threshold for adjacent upland cover type
Soil physical characteristics		
Soil depth	% of original A & B soil horizon depth, measured in comparison to soil survey mapping unit	70% original surface layer thickness
Soil permeability	Soil permeability measured using 6" infiltration ring (inches/hr)	70% of permeability in comparison to soil survey mapping units/permeability (Inches/hr); Table 16, Soil Survey
Plant rooting depth	Minimum measured unrestricted rooting depth to support selected cover type, as defined in soil rehabilitation & vegetation management plan	> 12 inches, unless physically restricted
Other alternative criteria, as agreed to by the permitted mine operator and County		

① To determine successful reclamation, the recommended evaluation period for post mining land uses reclaimed as conservation lands and associated cover types, is anticipated to extend from 3-5 years, commencing the first year after planting.

(1a) Performance thresholds are offered as goals to be measured toward attainment and are not established as numerical standards.

② Performance thresholds for site stability, plant density and species diversity, soil chemistry, and soil physics are defined based upon the upland cover type selected and planted adjacent the pond. See defined thresholds in tables for selected upland cover type.

STANDARDIZED CRITERIA & PERFORMANCE MEASURES TO DETERMINE SUCCESSFUL RECLAMATION
POST MINE LAND USE; WORKING LANDS; AGRICULTURAL PRODUCTION - PERRENIAL FORAGE - HAY①

STANDARDIZED CRITERIA FOR DETERMINING SUCCESSFUL RECLAMATION	QUANTIFABLE PERFORMANCE MEASURES	PERFORMANCE THRESHOLD TO DETERMINE SUCCESSFUL RECLAMATION ①a
Site stability		
Sheet & rill erosion	% area of field surface w/rills & deposition	0% ranging to the highest degree of control practically attainable, based upon demonstrated mngt effort
Channel & gully erosion	% area of concentrated flows w/channel erosion	0% ranging to the highest degree of control practically attainable, based upon demonstrated mngt effort
Mass wasting	% area of field surface & highwall unstable	0% ranging to the highest degree of control practically attainable, based upon demonstrated mngt effort
Plant density and species diversity		
Plant density	1. % ground covered by planted & volunteer species	>80% ground cover
	2. Volume by weight of planted & volunteer species	% of yield capability in comparison to soil survey mapping unit; Table 6, Soil Survey
Species diversity	% presence of planted & volunteer species	>50% species planted
Noxious weeds & invasive plant species	% presence of each type; noxious weed & invasive plant species	0% ranging to the highest degree of control practically attainable, based upon demonstrated mngt effort
Soil chemistry		
Soil acidity	pH	>6.5
Macro nutrient fertility	Concentration of N-P-K (ppm)	12 ppm NO_3; 20 ppm P; 80 ppm K
Soil organic matter	% O.M.	1.0%
Soil physical characteristics		
Soil depth	% of original A & B soil horizon depth, measured in comparison to soil survey mapping unit	70% original surface layer thickness
Soil permeability	Soil permeability measured using 6" infiltration ring (inches/hr)	70% of permeability in comparison to soil survey mapping unit (inches/hr); Table 16, Soil Survey
Plant rooting depth	Minimum soil depth to support unrestricted root growth for selected cover type, as defined in soil rehabilitation & vegetation management plan	> 12 inches
Other alternative criteria, as agreed to by the permitted mine operator and County		
1. NR 151		
2. USDA NRCS Nutrient Management standard 590		

① To determine successful reclamation, the recommended evaluation period for post mining land uses reclaimed as conservation lands and associated cover types, is anticipated to extend from 3-5 years, commencing the first year after planting.

①a Performance thresholds are offered as goals to be measured toward attainment and are not established as numerical standards.