

Environmental Assessment Worksheet

This most recent Environmental Assessment Worksheet (EAW) form and guidance documents are available at the Environmental Quality Board’s website at: <https://www.eqb.state.mn.us/>. The EAW form provides information about a Project that may have the potential for significant environmental effects. Guidance documents provide additional detail and links to resources for completing the EAW form.

Cumulative potential effects can either be addressed under each applicable EAW Item or can be addressed collectively under EAW Item 21.

Note to reviewers: Comments must be submitted to the responsible governmental unit (RGU) during the 30-day comment period following notice of the EAW in the *EQB Monitor*. Comments should address the accuracy and completeness of information, potential impacts that warrant further investigation and the need for an Environmental Impact Statement (EIS).

- 1. Project Title:** U. S. Steel Keetac Tailings Storage Facility Project
- 2. Proposer: United States Steel Corporation, Minnesota Ore Operations – Keetac Mine**

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- 3. RGU: Minnesota Department of Natural Resources (DNR)**

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- 4. Reason for EAW Preparation:** (check one)

Required:

Discretionary:

EIS Scoping

Citizen Petition

X Mandatory EAW

RGU discretion

X Proposer initiated

If EAW or EIS is mandatory give EQB rule category subpart number(s) and name(s):

The Project requires a mandatory EAW under Minnesota Rules part 4410.4300, subpart 11, (Metallic mineral mining and processing) Item B (expansion of a stockpile, tailings basin, or mine by 320 or more acres).

A list of tables, figures, and appendices is provided below.

Tables

Table 5.1	Project Location
Table 6.1	Project Impact Acreages
Table 6.2	Project Components
Table 6.3	TSF Stages and Dike and Dam Heights
Table 6.4	Project Footprint
Table 7.1	Proposed Climate Adaptation
Table 8.1	Existing and Proposed Cover Types for the TSF
Table 8.2	Existing and Proposed Green Infrastructure
Table 8.3	Existing and Proposed Canopy Cover
Table 9.1	Applicable Regulatory Authorities and Required Permits
Table 10.1	Farmland Classification Within the Project Area
Table 10.2	Water-Related Land Use Management District Impacts
Table 10.3	Tailing Basin Reclamation Mitigation
Table 11.1	Soils Characteristics Within the Project Area
Table 12.1	Lakes/Reservoirs Within the Project Area
Table 12.2	Streams Within the Project Area
Table 12.3	Water Quality and Trophic Status for Lakes and Reservoirs in the Project Area Based on a 10-Year Average of All Summer Samples
Table 12.4	Water Quality and Index of Biotic Integrity Scores for Streams in the Project Area, 2015 Survey
Table 12.5	Impaired Waterbodies Within 5 Miles Downstream of Project Area
Table 12.6	Field Delineated Potentially Direct WCA-Regulated Wetlands Impacts Within Project Area
Table 12.7	Field Delineated Potentially Indirect WCA-Regulated Wetland Impacts Within Project Area
Table 13.1	MPCA Permitted Facilities, Contamination and Leak Sites Within 0.5 Mile of the Project Area
Table 13.2	Potential Solid and Hazardous Wastes Within the Project Boundary

Table 14.1	Non-Protected Wildlife Species With Potential to Occur Within the Project Area
Table 14.2	Lake Distances from the Project Area
Table 14.3	Stream Distances from the Project Area
Table 14.4	State-listed Plant Species With Potential Habitat in and Documented near the Project Area
Table 14.5	Federal and State-Listed Species with Potential to Occur in the Project Area
Table 16.1	2010 FEIS Visual Impacts Analysis
Table 16.2	Current, Authorized, and Proposed Elevations of Stage 2 Interior and Exterior
Table 18.1	Estimated Construction Emissions
Table 18.2	Operational Emissions
Table 19.1	Existing NSAs
Table 19.2	Minnesota Noise Standards
Table 19.3	Noise Levels of Typical Mine Equipment
Table 19.4	Construction Noise Levels at NSAS Closest to the Project Area (dBA)
Table 19.5	Construction Noise Levels at NSAS Farthest from the Project Area (dBA)
Table 21.1	Summary of Cumulative Potential Effects on Environmental Features

Figures

Figure 6.1	Keetac Operations
Figure 6.2 (parts 1–4)	U. S. Steel-Owned Parcels
Figure 6.3	Keetac TSF Areas
Figure 6.4	Project Footprint and Permit to Mine Mining Area
Figure 6.5	Permanent Impacts Footprint
Figure 6.6	Separation Facility Infrastructure
Figure 7.1	Historic Annual Average Temperature in Itasca and St. Louis Counties (1895–2024)
Figure 7.2	Historical Annual Maximum Temperature in Itasca and St. Louis Counties (1895–2024)
Figure 7.3	Historical Annual Minimum Temperature in Itasca and St. Louis Counties (1895–2024)
Figure 7.4	Historical Annual Average Precipitation in Itasca and St. Louis Counties (1895–2024)
Figure 7.5	Historical Palmer Drought Severity Index (PDSI) Values in July for Itasca and St. Louis Counties (1895–2024)
Figure 7.6	Projected Average Temperatures for Itasca and St. Louis Counties
Figure 7.7	Potential Changes in Extreme Heat
Figure 7.8	Projected Precipitation for Itasca and St. Louis Counties
Figure 7.9	Potential Changes in Rainfall Intensity

Figure 7.10	SSURGO - Flooding Frequency
Figure 8.1	NLCD Landcover
Figure 10.1	Landownership and Recreation
Figure 10.2	Project Location – 1855 Treaty Area
Figure 10.3	Zoning
Figure 11.1	Mine Pits within 10 miles of the Keetac Process Facility
Figure 11.2	SSURGO Soils Map
Figure 12.1	Watersheds
Figure 12.2	USGS NHD Mapped Waterbodies
Figure 12.3(parts 1-4)	DNR Determination Field Delineated Wetlands and Waters
Figure 12.4	DNR Wetland Determination
Figure 12.5	Groundwater Resources
Figure 12.6	Conceptual Cross Section and Stormwater Runoff - Eastern side of TSF
Figure 12.7	Post-Construction Watersheds
Figure 12.8	Keetac Water Flows
Figure 13.1	MPCA Contamination Sites
Figure 14.1	Wild Rice Producing Waterbodies
Figure 16.1	2010 FEIS Visual Impacts Analysis

Appendices

Appendix A	Project Location Figure
Appendix B	USS Keetac Topography Map
Appendix C	Natural Heritage Review Letter
Appendices D through O,	available upon request
Appendix D	FEMA Floodplains Map
Appendix E	Wetland Assessment and Delineation (Barr July 2021)
Appendix F	Wetland Delineation & Functional Assess Report (Barr November 2021)
Appendix G	Fugitive Dust Emissions Control Plan
Appendix H	Spill Prevention Control and Countermeasure Plan (SPCC)
Appendix I	Revised Wetland Delineation and Functional Assessment Report (Barr 2023)
Appendix J	Final 2023 SWPPP
Appendix K	IPaC
Appendix L	Cultural Resource Literature Review
Appendix M	Mining Area Boundary Revisions

Appendix N	Greenhouse Gas Calculation Spreadsheet
Appendix O	DNR Permit to Mine Notice of Decision (Wetland Boundary or Type) (DNR 2023)

5. Project Location:

U. S. Steel owns and operates the Keetac Mine in Keewatin, Minnesota. The tailings storage facility (TSF) is located approximately two miles south of the Keetac Processing Facility (Figure 6.1).

The specific location details of the Project are as follows:

Watershed (81 major watershed scale): St. Louis River Watershed (3) and Mississippi River- Grand Rapids Watershed (9) (Figure 12.1)

County: St. Louis and Itasca Counties

City/Township: Cities of Hibbing and Nashwauk/Township of Lone Pine

GPS Coordinates: 47.337136, -93.064939

PLS Location (¼, ¼, Section, Township, Range): See Table 5.1.

Table 5.1 summarizes the Public Land Survey (PLS) location, project components, and tax parcel numbers for the Project which make up the Project Location.

Table 5.1: Project Location

Project Component	PLS Location	Tax Parcel Number
Permanent Impacts	T56 R21W Section 17, T56 R21W Section 18, T56 R21W Section 4, T56 R21W Section 8, T56 R21W Section 9, T56 R22W Section 1, T56 R22W Section 11, T56 R22W Section 12, T56 R22W Section 13, T56 R22W Section 2, T57 R21W Section 32, T57 R21W Section 33	25-001-1100,25-001-1200,25-001-1300,25-001-2100,25-001-2400,25-001-3100,25-001-3200,25-001-3300,25-001-3400,25-002-4303,25-002-4304,25-002-4400,25-011-1100,25-011-1203,25-011-1204,25-011-1301,25-011-1302,25-011-4201,25-011-4202,25-011-4300,25-011-4400,25-012-3300,25-013-1100,25-013-1200,25-013-1300,25-013-1400,25-013-2100,25-013-2200,25-013-2400,25-014-1100,141-0040-00870,141-0040-01560,141-0040-00890,141-0040-01550,141-0040-00820,141-0040-00830,141-0040-00860,141-0040-01730,141-0040-01740,141-0040-00850,141-0040-01720,141-0040-03110,141-0040-00880,141-0040-03280,141-0040-00800,141-0040-00840,141-0040-03080,141-0050-06490,141-0050-06210,141-0040-03230,141-0040-03270,141-0050-06390
Temporary Impacts	T56 R21W Section 17, T56 R21W Section 18, T56 R21W Section 4, T56 R21W Section 8, T56 R21W Section 9, T56 R22W Section 1, T56 R22W Section 11, T56 R22W Section 13, T56 R22W Section 2, T57 R21W Section 32, T57 R21W Section 33	25-001-1100,25-001-1200,25-001-2100,25-001-2400,25-002-4303,25-002-4304,25-011-1204,25-011-3101,25-011-3102,25-011-4201,25-011-4202,25-011-4300,25-013-1300,25-013-1400,25-013-2100,25-013-2200,25-013-2300,25-013-2400,141-0040-01560,141-0040-00890,141-0040-01550,141-0040-00860,141-0040-01730,141-0040-01740,141-0040-00850,141-0040-01720,141-0040-03110,141-0040-03280, 141-0040-03080,141-0050-06490,141-0050-06520,141-0050-06210,141-0040-03230,141-0050-06390
Pipeline (for Separation and/or Dewatering Infrastructure)	T56 R22W Section 1, T56 R22W Section 2, T57 R22W Section 36	25-002-1103,25-002-1401,25-002-1402,25-002-4100,25-002-4200,25-002-4303,25-002-4400,95-036-1301,95-036-1401,95-036-3400,95-036-4200,95-036-4300,25-001-2203,25-001-2100
Separation and/or Dewatering Infrastructure	T56 R22W Section 1	25-001-2100, 25-001-2203

Project Component	PLS Location	Tax Parcel Number
Stage 2 Exterior	T56 R21W Section 17, T56 R21W Section 18, T56 R21W Section 4, T56 R21W Section 5, T56 R21W Section 7, T56 R21W Section 8, T56 R21W Section 9, T56 R22W Section 1, T56 R22W Section 11, T56 R22W Section 12, T56 R22W Section 13, T56 R22W Section 2	25-001-1200,25-001-1300,25-001-2400,25-001-3100,25-001-3300,25-001-3400,25-001-4201,25-001-4202,25-001-4301,25-001-4302,25-002-4400,25-011-1100,25-011-1203,25-011-1301,25-011-1302,25-011-4201,25-011-4202,25-011-4300,25-011-4400,25-012-1100,25-012-1201,25-012-1202,25-012-1301,25-012-1302,25-012-1400,25-012-2100,25-012-2300,25-012-2401,25-012-2402,25-012-3101,25-012-3102,25-012-3200,25-012-3300,25-012-3400,25-012-4100,25-012-4200,25-012-4300,25-012-4400,25-013-1100,25-013-1200,25-013-2100,25-013-2200,141-0040-00870,141-0040-01000,141-0040-01080,141-0040-01520,141-0040-01560,141-0040-01450,141-0040-01460,141-0040-01550,141-0040-00830,141-0040-00970,141-0040-01730,141-0040-01740,141-0040-00990,141-0040-01360,141-0040-03110,141-0040-00880,141-0040-03280,141-0040-00800,141-0040-00840,141-0040-03230,141-0040-03270

Overall Project Location: See Table 5.1 above and Figure 6.1.

Watershed (81 major watershed scale): 07010103 (HUC8) and 04010201 (HUC8)

GPS Coordinates: 47.346003, -93.061772

Tax Parcel Number: See Table 5.1 above and Figure 6.2

At a minimum attach each of the following to the EAW:

- **County map showing the general location of the Project.** Attached as Appendix A.
- **U.S. Geological Survey 7.5 minute, 1:24,000 scale map indicating Project boundaries (photocopyacceptable).** Attached as Appendix B.
- **Site plans showing all significant Project and natural features. Pre-construction site plan and post-construction site plan.** Pre- and post-construction depictions are provided as figures. Figure 6.3 depicts existing conditions (pre-construction). Figure 6.4 depicts the Project components and mining area (post-construction).
 - **List of data sources, models, and other resources (from the Item-by-Item Guidance: *Climate Adaptation and Resilience* or other) used for information about current Minnesota climate trends and how climate change is anticipated to affect the general location of the Project during the life of the Project (as detailed below in Item 7. *Climate Adaptation and Resilience*).** A list of sources, models, and resources used for this analysis is provided in Part 7 of the bibliography.

6. Project Description:

- a. **Provide the brief Project summary to be published in the *EQB Monitor*, (approximately 50words).**

U.S. Steel is proposing to modify its existing Tailings Storage Facility for its Keetac taconite mining operation in St. Louis and Itasca Counties. Activities would involve vertically raising the existing dams and dikes using downstream and modified centerline construction methods, that would extend the dam and dikes beyond the current tailings storage facility’s footprint. The Project would also involve constructing a new access road, as well as new industrial building and infrastructure for tailings separation and tailings dewatering. The infrastructure would produce coarse tailings for use in dam and dike construction and thickened fine tailings for discharge to the tailings storage facility. The project proposes revisions to the existing tailings basin, but there are no proposed revisions to mining activities or taconite processing facilities.

- b. Give a complete description of the proposed Project and related new construction, including infrastructure needs. If the Project is an expansion include a description of the existing facility. Emphasize: 1) construction, operation methods and features that will cause physical manipulation of the environment or will produce wastes, 2) modifications to existing equipment or industrial processes, 3) significant demolition, removal or remodeling of existing structures, and 4) timing and duration of construction activities.**

The Keetac Mine extracts taconite (low-grade magnetic iron ore) from open pit mines in the sub-crop of the Biwabik Iron Formation of the Mesabi Iron Range. Taconite generally contains iron oxides, quartz, iron silicates, and iron carbonate minerals. Taconite is processed on-site to concentrate iron content and form taconite pellets that can be sold and shipped to steel mills to be melted down into steel.

Tailings are a byproduct from processing. Tailings produced at Keetac are piped to an existing TSF (Figure 6.1). Tailings were first discharged to the TSF in 1967. The TSF has subsequently been developed in 3 stages, each one leveraging natural topography, supplemented by constructed perimeter dikes. Stage 1 comprised approximately 1,560 acres and was the sole tailings deposition location from 1967 until the Stage 2 Exterior was constructed in the 1980s. The Stage 2 Exterior expanded the TSF to the south by constructing clay core perimeter dams and created a new approximately 4,300-acre deposition area. Stage 2 Exterior was utilized for tailings storage for 10+ years until it was idled in 1993. During that time, the Stage 2 Interior was constructed, which raised portions of the Stage 1 area and the Stage 2 area to create an internal basin (i.e., the Stage 2 Interior). The Stage 2 Interior is 2,500 acres and has been the active TSF since that time. Most of the Stage 2 Interior dike was constructed upon tailings that had been deposited into the Stage 2 Exterior. An additional area was originally planned for Stage 3 that has not been used. Stage 3 is reflected in the mining area, and all stages described above are shown on Figure 6.3.

The TSF operates under Minnesota Department of Natural Resources (DNR) Dam Safety Permit No. 2022-0721. The permit authorizes construction and operation of the TSF to its safe design parameters. Stage 1 is near the design storage capacity and cannot accept additional tailings. Currently, tailings are mostly discharged to the Stage 2 Interior with some strategic placement in the Stage 2 Exterior.

The current operation delivers total tailings at a rate of approximately 16,000 gallons per minute (GPM) via a 22-inch diameter pipeline that can deliver total tailings around the entire perimeter of Stage 2 Interior. Only one discharge location is active at any one time. During direct reduction (DR)-grade pellet production an additional 10 percent of tailings are generated and are discharged to the northern portion of the facility via a dedicated DR tailings line. The tailings slurry is discharged via spigot and settles within the TSF according to particle size. Coarse material deposits near the discharge point while the fines travel downstream toward the center of the TSF. Keetac uses this natural segregation process to provide coarse borrow material which is used for upstream construction of the dikes.

At current mining rates, the Stage 2 Interior is anticipated to soon reach its designed and permitted height. U. S. Steel was approved via the 2022 Permit to Mine amendment to raise the Stage 2 Exterior dikes and construct an internal diversion berm within the Stage 2 Exterior footprint (referred to as Phase 1 in the Permit to Mine amendment application). These features, constructed in 2022, created freeboard and allowed for short-term, controlled deposition of tailings into the Stage 2 Exterior, with the intent to improve the stability of the Stage 2 Interior basin embankments. U. S. Steel began discharging tailings into the Stage 2 Exterior as Phase I in July 2023.

The current design of the Stage 2 Interior and permitted Stage 2 Exterior is expected to be at full capacity by 2028. A second phase of vertical development of the Stage 2 Exterior is proposed to provide longer term storage to align with the Keetac life of mine (Phase 2).

The Project assessed in this document represents Phase 2 (Figure 6.4). Phase 2 is designed to vertically raise the Stage 2 Exterior dams and dikes to allow for long-term controlled deposition of tailings into the existing Stage 2

Exterior. Vertically raising the existing dams and dikes would be achieved using downstream and modified centerline construction methods, that would extend the dam and dikes beyond the current TSF footprint. Downstream dams and modified centerline dikes are described by their construction methods. In this context, dams are considered to be hydraulic retaining features designed to store water while dikes are features designed to store tailings. Downstream dams are built in stages, starting with a foundation and then adding layers of material downstream. This method ensures that the entire dam is on a stable foundation and is robust enough to store large amounts of water. Modified centerline dikes are also built in stages starting with the foundation but are raised vertically from the centerline of the original dam. This method ensures the entire dam footprint is supported by a firm foundation while minimizing downstream impacts.

The Phase 2 water retention dam would be constructed using downstream methods to vertically raise the existing embankment. The water retention dam would be constructed primarily of coarse tailings material. The design of the water retention dam includes a seepage reduction feature along the upstream face of the dam to lower the phreatic surface and limit seepage through the dam. The seepage reduction feature would consist of either a linear low-density polyethylene (LLDPE) geomembrane or an inclined mechanically placed soil-cement blanket consisting of a mixture of coarse tailings and cement. The Phase 2 dike would be constructed using modified centerline methods and be constructed of coarse tailings. The Phase 2 dikes and dams are shown on Figure 6.5.

Site preparation activities would need to be completed prior to vertically raising the dams and dikes. Typical site preparation activities would include grubbing any vegetation, stripping (removal of debris, loose rock, organic material, and unsuitable material), topsoil excavation (stockpile for progressive reclamation), and clearing. Site preparation would be completed using mechanical equipment common for such activities. This could include dozers, excavators, haul trucks, logging equipment, and loaders.

Once the foundational site is prepared both the water retention dam and the dike would be mechanically raised in lifts using typical construction equipment that could include haul trucks, dozers, graders, sheepsfoot rollers, and excavators.

During construction Keetac would establish and maintain erosion control features until the Project is completed. General practices below would be used, where applicable:

1. Minimize disturbed areas and sequence work to minimize exposure time.
2. Use temporary vegetation, mulch, or other cover to protect areas during construction.
3. Utilize stone check dams, haybale dikes, or sit fence to trap sediment.
4. Reduce volume and velocity of water crossing disturbed areas by using diversion dams, berms, or other facilities.

Additionally, site stabilization measures would be ongoing as applicable. For example, once final grade is reached for any one construction stage, topsoil would be placed to a minimum depth of six inches on the slope then fertilized, seeded, and mulched. In some cases, hydroseeding may be used for greater effectiveness.

The intent of Keetac Phase 2 Project is to not only to align the TSF with Keetac's mine life but also to reduce risk and improve the safety of the TSF while minimizing impacts to the environment - with the ultimate goal of reducing the risk of dam failure. While the DNR does not specify factor of safety criteria for analysis, U. S. Steel along with GEI (Engineer of Record) have selected a minimum factor of safety criteria for evaluation of Phase 2 that meets or exceeds industry standards and is defensible to independent review. Results from stability analysis throughout the life of Phase 2 have factors of safety higher than the minimum criterion and provide further evidence of the robustness of design. Keetac currently has over 190 piezometers, 40 inclinometers, and 3 shape accelerator arrays (SAA) to help measure the performance of the facility. During the life of Phase 2, continual improvement of geotechnical monitoring would take place. Additional geotechnical investigations, piezometers

(to measure pore pressure), inclinometers and SAA (to measure horizontal deformations), observation wells (to measure water levels and water quality), settlement monitoring devices (to measure vertical displacements), and adoption of new technologies would be installed to monitor the health and performance of the facility as per USS Tailings Management System.

The Project would occur in stages to align with the Keetac life of mine predicted from permitted reserves through 2048 which includes time for reclamation and closure. At current mining rates, total tailings delivered to the TSF are anticipated to be approximately 340 million long tons. However, the ultimate dam configuration was designed conservatively to accommodate greater storage volume generated from potential lower head grades (would lead to more tailings tonnage), nearby mineral resources which are in the current permitted footprint but require in-fill drill spacing and/or mineral leases to be converted to reserve, or possible variations in in-situ tailings characteristics (this proposal does not involve any change in mining or processing from what has been permitted). At full design capacity the project could safely contain 590 million long tons of tailings, the Stage 2 Exterior dikes and dams would be 1,580 feet elevation (5 feet lower than the height of the Stage 2 Interior dike) and accommodate 225,000 acre-feet of fine tailings storage. This Project does not propose to increase the permitted life of the mine.

The Project would also involve building new infrastructure for tailings separation and tailings dewatering (Figure 6.6). The infrastructure would produce coarse tailings for use in dam and dike construction and thickened fine tailings for discharge to the TSF. The infrastructure would include an industrial building housing hydroseparators, screw classifiers, and dewatering screens necessary to separate and dewater the tailings by size. Inside the industrial building, it is also proposed to include a workers dry and meeting space. A fine tailings thickener, conveyors, load-out bin, and minimal haul truck service area would be located near the building. The building and associated infrastructure is proposed to be constructed north of Reservoir No. 6 to minimize new environmental impacts.

Site preparation for the industrial building and associated infrastructure would include grubbing any vegetation, stripping, topsoil excavation, and clearing. Site preparation will be completed using mechanical equipment common for such activities. This could include dozers, excavators, haul trucks, logging equipment, and loaders.

Using the dewatered coarse fraction of the tailings for construction would have a smaller environmental footprint than developing off-site natural borrow sources to obtain dam and dike construction materials, reduce the amount of tailings storage required within the TSF footprint, and enhance water management for the Keetac facility. The addition of the fine tailings thickener allows for increased water recycling (by reducing water loss to pore space during deposition) and provides better management for fugitive dust (by increasing trafficability of fine tailings and reducing surface area per discharge point).

A new permanent road would be built around the Stage 2 Exterior for access and maintenance. The road would be mechanically built using coarse tailings using the same equipment for site preparation and dam/dike construction (see Figures 6.4 and 6.5). Tailings would be piped to the TSF from the point of separation in pipelines laid on wooden blocks one to two feet above ground and along existing infrastructure corridors. Fixed frame haul trucks would convey the coarse tailings from the separation and dewatering infrastructure to the TSF 24 hours a day, seven days a week. The exact size of the haul trucks is to be determined. Preliminary haulage assessments indicate five Cat 785 mining trucks would adequately handle the coarse tailings material and dam construction while reducing the environmental impacts when compared to fewer but larger haul trucks.

The Project would permanently impact 608.6 acres and would temporarily impact 89.7 acres of land (Figure 6.4). However, most impacts would occur within the existing mining area. Of the 608.6 acres of permanent impacts, only 108.1 acres are located outside of the existing mining area. Of the 89.7 acres of temporary impacts, only 30.6 acres are located outside of the existing mining area.

The Project impact acreages and components are shown in Table 6.1 and Table 6.2. TSF stages and dike and dam heights are shown in Table 6.3.

Table 6.1: Project Impact Acreages

Area of Impact*	Permanent Impact Areas			Total Permanent Impact Area	Total Temporary Impact Area	Total Impact Area
	Permanent Impacts (Dike and Dam footprints)	Pipeline and Separation and tailings Dewatering Infrastructure	Permanent Access Road			
Portion inside of the Permit to Mine (acres)	434.6	28.2	37.7	500.5	59.1	559.6
Portion outside of the Permit to Mine (acres)	81.8	13.3	12.9	108.1	30.6	138.7
Total Acres	516.4	41.5	50.7	608.6	89.7	698.3

*Acreage of disturbance outside of current TSF or other Keetac Operational footprint.

Construction is proposed to begin in the winter of 2026-2027 and would take 2 years. Vegetation clearing would occur during the winter months to minimize potential impact on bats and migratory birds. The TSF would be built in stages throughout operations. Similarly, temporary workspaces would be utilized in stages of six months or less. Outside of site preparation, it is anticipated construction would occur throughout the entire calendar year.

The Project does not require any demolition and no new waste streams would be generated. Water would be managed consistent with current TSF operations.

Table 6.2: Project Components

Project Component	Notes
New Permanent Footprint Impacts*	Up to 608.6 acres would be permanently impacted to create the additional dams and the separation and/or dewatering infrastructure of the 608.6 acres, only 108.1 acres are located outside of the mining area.
Vertically Raising Existing Retention Dikes	Dikes would be constructed using a modified centerline construction method completed in staged lifts.
Vertically Raising Existing Water Dams	Dams would be built using downstream construction methods including a seepage reduction feature completed in staged lifts.
New Tailings Separation and/or Dewatering Infrastructure	Located near the TSF in mostly upland area. The infrastructure would separate coarse tailings for dike and dam construction. The enclosed infrastructure would include machinery to separate the tailings (as needed), dewater the coarse tailings, and load coarse tailings into haul trucks. The building would have parking, potable water, and sewage (septic holding tank meeting the requirements of the MN Statute 7080) facilities. Maintenance facilities for trucks and machinery and fuel storage.
Power	Powerline upgrades may need to be constructed to connect the separation and/or dewatering infrastructure to the grid. Minnesota Power would perform this. Two 10-15 HP mobile generator units would be used 12 hours per day for lighting around the TSF as needed. They would be powered by Ultra Low Sulphur Diesel #2, except in the winter a blend of #1 and #2 will be used to avoid cloud and pour point issues.
Pipelines	New pipelines would be required to convey fine tailings from the separation and/or dewatering infrastructure to the TSF. These would be above ground lines, raised on blocks, and routed along existing roads and corridors.

Project Component	Notes
Roads	A new road along the exterior of proposed dams and dikes would be constructed for access and maintenance.
Temporary Footprint Impact*	Up to 89.7 acres, of which only 30.6 acres are located outside of the existing mining area.
Temporary Construction Areas	Needed to support construction of the dikes, dams, and separation and/or dewatering infrastructure. Located in upland areas as much as possible and reclaimed following use.
Other Activities and Controls (no new direct footprint impacts)	
Tailings disposal	Tailings stored within the existing active Stage 2 Exterior (brownfield), retained by the vertically raised dikes and dams through the life of mine. The ultimate height of the Stage 2 Exterior would be 1,580 feet. (similar to Stage 2 Interior).
Water management and treatment	Tailings water would drain to the Stage 2 Exterior Pond and eventually be gravity fed into Reservoir No. 6 to be pumped for use as process water. Stormwater would be managed under the Stormwater Pollution Prevention Plan, which would include best management practices.
Waste management	Waste would be hauled to approved facilities per Keetac operational management.
Transport and mobile machinery	Haul trucks used to transport coarse tailings from the separation and/or dewatering infrastructure to the TSF, mobile construction equipment, and staff vehicles.
Lighting	Lighting would be required at the separation and/or dewatering infrastructure and the TSF for safe 24-hour operation.
Dust control	Dust would be mitigated in accordance with the Dust Control Plan.
Employment	The Project would require approximately 10 new employees through construction and operation.

*Acreage of disturbance outside of current TSF or other Keetac Operational footprint.

Table 6.3: TSF Stages and Dike and Dam Heights

Stage	Current Permitted Height (feet)	Current Actual Height (feet)	Proposed Maximum Height (feet)	Estimated Date Maximum Height Would Be Reached
Stage 1	1,500	1,500	1,500	at capacity
Stage 2 Interior	1,585	1,553-1,580	1,585	2028
Stage 2 Exterior	1,470 South 1,510 East	1,465 South 1,495 East	1,580	2063*

*The Project's proposed design would accommodate tailings through the current 2022 Permit to Mine period (2048) and allow for additional capacity for potential increased tailings generation.

Reclamation

Reclamation techniques such as grading, disking, seeding or planting, fertilizing, and mulching would be used in the establishment of vegetation. Vegetation would be established on exposed soils along roads, TSF, dikes, and dams. Waste rock and coarse tailings stockpiles' exterior slope lifts would be designed not to exceed 30 feet in height, or 40 feet in height if covered with overburden and vegetation.

Progressive reclamation activities in the TSF would be conducted on the interior of the TSF and on the exterior portion of the dikes and dams (meaning these areas would be reclaimed as soon after initiation of the operations as practical and as continuously as practical throughout the life of the operation). The TSF would be designed and constructed according to Minnesota Rules, part 6130.3000 and in accordance with the Dam Safety Permit. The

dust generation on the TSF would be minimized by maximizing the water pond area, vegetating exposed surfaces (either permanently or temporarily), through non-vegetative methods described in Minnesota Rules, part 6130.3700, and by modifying TSF operations. This operational modification would allow for more water retention and would move the beach area from the middle of the TSF, where it was inaccessible, to the outside edges of the TSF, where it would be accessible for the establishment of vegetation. These changes would reduce fugitive dust emissions from the TSF.

Fertilizing, seeding and mulching would occur to expedite revegetation and to minimize erosion. Herbaceous plants would be seeded using a hydro-seeder or other methods. Seed mixes would be designed to achieve early stabilization and long-term cover. When necessary to control dust, temporary seeding may be used. In areas where erosion is a concern, mulch may be used to hasten stabilization. Removal of equipment, facilities, and structures would be accomplished, and provisions would be made for subsequent use and continued maintenance where necessary. Areas exposed during such removal (i.e., the building sites) would be vegetated. After three growing seasons (five growing seasons if it is a south or west facing slope) the surface would be repaired or replaced if 90 percent ground cover, consisting of living vegetation and its litter, has not been established. The repair or replacement would take place during the next normal planting period after it is determined that 90 percent ground cover has not been established.

Within ten growing seasons, established vegetation consistent with subsequent land use is required before a release from the Permit to Mine can be granted (Minnesota Rules, part 6130.3600, subpart 4, Item B). The reclamation process would include creation of wetlands where feasible, replacing some of the wetland functions and values lost through mining activities. Post-mining land uses would be presented to the commissioner of the DNR for approval at least two years prior to the deactivation of the mining area. The proposed land uses would be selected pursuant to Minnesota Rules, part 6130.4100, subp. 2. The deactivation activities for final closure of the mine would be fulfilled as prescribed in Minnesota Rules, part 6130.4100.

c. Project magnitude:

The specific footprint acreages of the Project components are shown in Table 6.4.

Table 6.4: Project Footprint

Project Component	Size
Stage 2 Exterior*	2,236.1 acres
Dam and Dike Footprint	516.4 acres
Pipeline and Separation and/or Dewatering Infrastructure	41.5 acres
Permanent Access Road	50.6 acres
Number and Type of Residential Units	None
Residential Building Area	None
Commercial Building Area	None
Industrial Building Area*	19,600 square feet
Institutional Building Area	None
Other Uses—specify	None
Structure Height(s)	70 feet: separation and/or dewatering infrastructure 1,580 feet: TSF

**This is a disturbed brownfield area with historic and current tailings deposition. This portion of the TSF is included in the Project description because it will be raised higher than what was previously permitted.*

d. Explain the Project purpose; if the Project will be carried out by a governmental unit, explain the need for the Project and identify its beneficiaries.

The Keetac Mine has taconite reserves to support mining through 2048 (at current mining rates) as approved under the Permit to Mine. There are also additional taconite resources beyond the Permit to Mine reserves that, in the future, may also be economical to mine. Taconite mined at Keetac is processed and tailings are stored in an existing TSF. At current mining rates, the existing TSF is estimated to meet its design safe storage capacity by approximately 2028.

The Permit to Mine was issued following the completion of the Keetac Mine Expansion Environmental Impact Statement (EIS) in 2010. At that time, it was planned that Keetac would raise Stage 2 Interior vertically using an upstream construction method with hydraulically placed tailings. Since that time however, U. S. Steel has undertaken measures to assess the risk associated with the Tailings Facilities it operates; it was identified that continuing to vertically raise Stage 2 Interior at Keetac in an upstream method was not sustainable. Option evaluations to reduce risk prompted Keetac Phase I and the proposed Keetac Phase II.

Keetac Phase 1 began by U. S. Steel communicating to the DNR that it would like to reduce the risk of the Stage 2 Interior first by buttressing and followed by a new robust design change (Keetac Phase II) that would allow additional capacity and strengthen the existing Stage 2 Interior. During those communications U. S. Steel and its Engineer of Record recommended that the Stage 2 Interior does not raise higher than 1585 feet on the south dike without substantial work (requiring additional permitting activity beyond the Permit to Mine and Dam Safety Permit). This language was then adopted in permits as a constraining height limit, which is estimated not to support tailings disposal past 2028.

Thus, U. S. Steel needs a longer-term solution to safely manage tailings generated by the Keetac Mine under the existing Permit to Mine, and with capacity for the ultimate life of mine.

e. Are future stages of this development including development on any other property planned or likely to happen? Yes No

If yes, briefly describe future stages, relationship to present Project, timeline and plans for environmental review.

The Project is intended to fulfill tailings storage requirements for the Keetac life of the mine. No future phases are anticipated.

While the Project would result in a TSF capacity that could accommodate tailings beyond the current Permit to Mine (2048), this Project does not propose any expansion of mining or processing. U. S. Steel has not proposed future expansion of mining or processing. Mineral resources have not been properly evaluated, and there is no mine plan beyond what is currently approved.

f. Is this Project a subsequent stage of an earlier Project? Yes No

If yes, briefly describe the past development, timeline and any past environmental review.

Below is a brief history of milestones regarding the Keetac TSF and the associated references:

1967	Tailings deposition into Stage 1 began. Taconite mining and taconite pellet production initiated. Keetac began production using rotary hearth technology, which was later abandoned for grate kiln technology.
1969	The original Phase I grate kiln pellet line began operation.
1977	The Phase II expansion added a second grate kiln pellet line.
1980	The Phase I facility was idled; Stage 2 constructed in the 1980's

1986	Permit to Mine issued to the National Steel Pellet Company #1 for areas including the Proposed TSF
1993	Permit to Mine Amendment issued to National Steel Pellet company authorizing a new "tailings stacking method" i.e., upstream construction of Stage 2 Interior. Stage 2 Exterior idled.
2003	The former National Steel Pellet Company facility was purchased by U. S. Steel and renamed Keetac.
October 2003	The DNR issued permit 65-1138 authorizing appropriation of water from a well located in the SW1/4 NW1/4, Section 19, Township 57 North, Range 21 West for potable and sanitary use and emergency pellet process cooling at the Keewatin Taconite Plant. This permit was issued to Hannah Mining Company October 11, 1965. The permit was amended in 2003.
2008	Scoping Environmental Assessment Worksheet and a Draft Scoping Decision Document was submitted to provide information about the Keetac Expansion Project. This served as the blueprint for the Environmental Impact Statement submission (see 2010 for Final Environment Impact Statement).
October 2010	Minnesota Pollution Control Agency (MPCA) approved the Water Management Study Plan for the Keetac facility which evaluates water discharge and water consumption alternatives.
October 2010	MPCA approved the Sulfate Reduction Strategy Study Plan for water quantity and quality data review, and evaluation of source control strategies and sulfate treatment technologies.
November 2010	Final Environmental Impact Statement was submitted with the intent to restart an idled production line and expand sections of the open pit iron ore mine at the Keetac Mine and processing facility. The intent of the Project would increase the taconite pellet production capacity by expanding the mine pit, adding stockpile areas, upgrading the concentrating and agglomerating process, and restarting the Phase I line.
November 2011	MPCA issued NPDES/SDS Permit No MN0055948 allowing for the construction, installation, and operation of a disposal system at the Keetac facility and to discharge from the facility to Reservoir 2, Welcome Creek.
January 2012	DNR approved Keetac's Wetland Permit Application for impacts due to the Keetac Mine Expansion Project with revised Palisade Mitigation Plans. 75.9 credits were debited from the Thompson Site, and remaining credits from Palisade Wetland Mitigation Site.
October 2012	U.S. Army Corps of Engineers (USACE or the Corps) approved the modification of permit 2008-02481-JCP, which included the discharge of dredged or fill material into 553.31 acres of wetlands at the Keetac Mine site, permanent dewatering of 24.96 acres of deep water habitat at the mine site for the expansion of the east mine pit, south mine pit, east stockpile, and south stockpile and the discharge of dredged and fill material into 36.76 acres of wetlands for the construction of upland berms at the Palisade I mitigation site.
October 2012	A Programmatic Agreement was developed between the Corps, State Historic Preservation Office (SHPO), the Ojibwe Bands, and U. S. Steel, agreeing that if a permit is issued for the Keetac Expansion, stipulations would be implemented which consider historic properties.

November 2012	USACE issued approval for the discharge of dredged and fill material into 75.89 acres of wetlands for the construction of an eastern stockpile and for the structural reinforcement of an existing TSF at the Keetac Mine. Known as “Keetac Phase 1 Permit”.
September 2014	MPCA issued Air Emission Permit Major Amendment No 13700063-005 for an administrative amendment. The request served two purposes, first to revise the form of the mine fleet mobile source limit and associated monitoring and recordkeeping to mitigate impacts in Class I areas from operation of the expansion line, and second, to incorporate an 18-month extension of the construction deadline (authorized until October 2014).
September 2015	MPCA issued NPDES/SDS Permit No MN 0031879 for the operation of a disposal system at the Keetac facility and to discharge at Welcome Lake.
April 2022	DNR issued a Permit to Mine amendment for the purpose of raising the exterior dikes at the Keetac Stage 2 exterior TSF to a maximum elevation of 1,500 feet, and the construction of an interior diversion dike.
September 2022	DNR approved the Keetac Wetland Replacement Plan for impacts at the Keetac TSF for tailings basin modifications and deposition (Phase I). The wetland delineation and incidental determination were approved by the DNR on January 24, 2022. A total of 127.31 acres of wetlands regulated under WCA were debited from Palisade Project Specific Wetland Mitigation Site surplus credits.
October 2022	USACE made an approved jurisdictional determination for impacts at the Keetac TSF. The area contained 119.96 acres of approved compensatory wetland mitigation areas used to satisfy previous compensatory mitigation requirements as part of the Keetac mine expansion (MVP-2008-02481). 120.0003 credits were debited from Palisade III Mitigation Bank.
May 2023	DNR approved Permit to Mine Amendment which granted U. S. Steel approval to construct a plant expansion for the purpose of producing Direct Reduced Pellets. The expansion increased the plant by approximately one acre and added approximately 13,400 feet of additional tailings pipeline.
July 2023	U. S. Steel began construction of a buttress against Stage 2 interior that extends into the Stage 2 Exterior as Phase I.
January 2024	USACE provided a jurisdictional determination of the 2021 Study Area and 2023 Study area.
January 2025	MPCA reissued Keetac’s Title V air emission permit 13700063-102, which included an updated Fugitive Dust Control Plan
February 2025	DNR clarified the mining area in the Permit to Mine TSF mining area based upon more accurate mapping tools and historical documents to include Reservoir 6, among other areas (Appendix N)
July 2025	NPDES/SDS permits were placed on public notice by the MPCA; permits include compliance schedule for sulfate.

7. Climate Adaptation and Resilience:

- a. **Describe the climate trends in the general location of the Project (see guidance: *Climate Adaptation and Resilience*) and how climate change is anticipated to affect that location during the life of the Project.**

Climate Trends Summary

The area of Minnesota where the Project is located has been increasing in annual average temperature, along with rising minimum and maximum temperatures overall (Minnesota Climate Trends; MPCA 2023). Throughout the next century, the Intergovernmental Panel on Climate Change (IPCC) projects an increase in mean-average temperature under three of the IPCC Coupled Model Intercomparison Project Phase 6 climate scenarios: SSP2-RCP4.5, SSP3-RCP7.0, and SSP5-RCP8.5. These scenarios were developed by the IPCC and correspond with climate change trends projected by over 30 global climate models which incorporate Shared Socioeconomic Pathways (SSPs).

- SSP2-RCP4.5 is a lower emissions scenario where warming stays below 3°C.
- SSP3-RCP7.0 is a high emissions scenario where average warming will likely be higher than 3°C.
- SSP5-RCP8.5 is a very high emissions scenario resulting in warming above 4°C.

Projection data in the following sections utilizes the climate output corresponding to the above scenarios for both St. Louis and Itasca Counties.

The climate in the Project Area is projected to have increasing temperatures over the next 30 years (MNDNR 2023). Northern Minnesota has experienced an increase of 7.5°F in nightly winter temperatures over the last century (IPCC 2021). Snowfall is expected to decrease, though Minnesota is expected to experience more frequent and severe rainfall events (get wetter) (MPCA 2023). Heavy rains and severe rain events have increased in frequency. Long-term monitoring has revealed significant increases in rainfall events greater than 1 to 3 inches (MPCA 2023). Rains that previously would have been in the 98th percentile annually have seen a significant uptick since 2000 in Minnesota. Historically, the total precipitation in 24 hours during a 10-year storm event is 3.08 inches, a 50-year event is 4.53, and a 100-year event is 5.28 (Hibbing Power Substation, NOAA station ID USC00213727). This area is unlikely to be impacted by extreme winds (First Street Foundation 2023). According to the 2018 Planning for Climate & Health Impacts in Northeast Minnesota, there is increased fire risk in this area due to projected higher frequency of late growing season drought, reduced snowpack, and elevated temperatures (Minnesota Climate & Health Program 2018).

Historical Climate

Historical climate data for Itasca and St. Louis counties were selected using the DNR “Minnesota Climate Explorer” tool from 1895-2024 and are presented below.

Temperature

The average temperature in St. Louis and Itasca Counties is increasing at a rate of 0.29°F per decade (Figure 7.1).

The maximum average annual temperature for St. Louis and Itasca Counties has been increasing at a rate of 0.21°F per decade (Figure 7.2).

The minimum average temperature has been increasing at a greater rate than maximum annual average temperature at 0.37°F per decade (Figure 7.3).

The average annual precipitation has been increasing by 0.19 inches per decade (Figure 7.4).

The Palmer Drought Severity Index is based on soil water balance and estimates relative soil moisture conditions. Values below -3 indicate a severe drought and positive values indicate greater soil moisture (Dai 2012). The average Palmer Drought Severity Index in July for Itasca and St. Louis counties is increasing at 0.18 per decade

indicating wetter soils over time (Figure 7.5) July was chosen as a representative of the wettest months in Minnesota, which are typically May through September (MNDNR 2024).

Projections

Temperature

Projected climate trends indicate that temperatures within both counties will continue to increase. Figure 7.6 illustrates projected average temperatures for the counties. Several climate models are shown in the projected temperature analysis. The model mean, shown in blue, illustrates the average of all models included in the analysis. Figure 7.6 shows the modelled present conditions, mid-century (2040-2059) at Representative Concentration Pathway (RCP) 4.5, late-century (2080-2099) at RCP 4.5, and late-century (2080-2099) at RCP 8.5. RCP is a greenhouse gas concentration scenario used by the IPCC in the fifth assessment report. RCP 4.5 is an intermediate scenario in which emissions decline after peaking around 2040 and RCP 8.5 represents a worst-case scenario in which emissions continue rising through the 21st century. Under the RCP 4.5 scenario, the annual temperature is anticipated to increase within the counties from a modeled present mean of 45.4°F (1980-1999) to a mid-century (2040-2059) model mean of 49.0°F and a late-century (2080-2099) model mean of 51.4°F. Under the RCP 8.5 worst-case scenario, the counties would experience a late-century (2080-2099) model mean temperature of 55.1°F. Under RCP4.5 and RCP8.5 the number of days over 100°F will from 0 days in 2010 to 2 days and 6-8 days respectively by 2081 as shown on Figure 7.7.

Precipitation

Projected climate trends indicate that precipitation within both counties will continue to increase. Figure 7.8 illustrates projected average precipitation for the counties. Like the temperatures, the precipitation climate models are shown in the projected temperature analysis. The model mean, shown in blue, illustrates the average of all models included in the analysis. Figure 7.9 shows the modeled present conditions, mid-century (2040-2059) at RCP 4.5, late-century (2080-2099) at RCP 4.5, and late-century (2080-2099) at RCP 8.5. RCP is a greenhouse gas concentration scenario used by the IPCC in the fifth assessment report. RCP 4.5 is an intermediate scenario in which emissions decline after peaking around 2040 and RCP 8.5 represents a worst-case scenario in which emissions continue rising through the 21st century. Under the RCP 4.5 scenario, the annual precipitation is anticipated to increase within the counties from a modeled present mean of 0.87 inches (1980-1999) to a mid-century (2040-2059) model mean of 0.94 inches, and a late-century (2080-2099) model mean of 1.04 inches. Under the RCP 8.5 worst-case scenario, the counties would experience a late-century (2080-2099) model mean precipitation of 1.16 inches.

Flooding

According to the Federal Emergency Management Agency Flood Plain Map Service Center, there are no mapped floodplains within or in the vicinity of the Project Area (FEMA 2021). Flooding frequency in the vicinity of the Project Area is derived from the Natural Resource Conservation Service SSURGO database (Figure 7.10). If unmapped floodplains are present in the Project Area, they could be impacted by soil compaction. Impacts associated with compaction and mitigation measures that would be implemented to minimize such impacts are identified in Section 4.9-Soils.

7b: Project Interaction with Climate Trends The climate risk for construction, operation, and closure of the Keetac TSF is considered below. U. S. Steel has an emergency action plan that would be implemented in the event of dam or dike break or overtopping.

Construction Climate Interactions

The initial construction phase of the Project is anticipated to take two years and begin 2026. It is not expected that climate would be significantly different during this period than today's conditions, and construction should

be able to work around weather events. The dams and dikes would be built in stages throughout operations, which is discussed below.

The separation and/or dewatering infrastructure is located in predominantly upland area. Construction of the separation and/or dewatering infrastructure would permanently impact 0.06 acres of WCA-regulated deep marsh wetlands, 1.08 acres of WCA-regulated fresh (wet) meadow wetlands, and 0.15 acres of shallow marsh (1.29 acres total). However, since the separation and/or dewatering infrastructure would be constructed at a higher elevation (i.e., why there are few delineated wetlands in this location), it would be less prone to flooding. Access to the separation and/or dewatering infrastructure does not cross any waterways susceptible to flooding.

Construction would result in loss of wetlands and associated flood storage within the proposed Project footprint. Loss of vegetated areas has the potential to increase stormwater runoff. The Project would adhere to the Stormwater Pollution Prevention Plan (SWPPP) that U. S. Steel is currently operating under for the existing TSF. Potential wetland mitigation measures could include the purchase of wetland bank credits, Palisade Wetland Mitigation Site or restoration of wetlands elsewhere on-site.

Operation Climate Interactions

The relevant potential climatic hazards for operations include increased precipitation and extreme weather events which may result in flooding and water stress/drought. Extreme rainfall and flooding are potential major hazards that could last for long periods of time and have an impact on the Project.

Twenty-five percent of global tailings dam failures between 1917 and 2006 were caused by heavy precipitation events (Rico et.al 2008). The purpose of the Project is to increase stability of the TSF. It has been designed to have more stable embankments and accommodate extreme weather events. Analysis was completed for 100-year rainfall event based on past precipitation and a probable maximum precipitation event. The 100-year storm modeled was for 6.35 inches of rainfall in a 24-hour period. Probable maximum precipitation (PMP) was also modeled for the dam design and was estimated at 28.5 inches of rainfall in a 24-hour period.

The analysis exercise also considered the impact that climate change would have on the hydrologic response of the basin. When determining the PMP depth, the potential effects of climate change was considered. An atmosphere that is subject to warmer weather may be more susceptible to an increase in atmospheric moisture; however, the relationship between a warming climate and the dynamics of a storm is not known. An increase in temperature may affect the frequency or intensity of a storm, but the evidence that has been gathered does not show a significant trend in data regarding PMP depth. Climate change should not be considered when estimating the rainfall depths for PMP events (WMO 2009, Section 1.1.1). Similar climate change conclusions were recently discussed in the report "Site-Specific Probable Maximum Precipitation Study for Tittabawassee River Basin, Michigan Final Report" by Applied Weather Associates (AWA). This analysis exercise selected the runoff from the 24-hour PMP event as the basis for design of Keetac Phase 2. That is, Phase 2 is designed to store all runoff generated from a 24-hour PMP event (including wave run-up) until water can be safely discharged.

Water within the TSF would be discharged in a controlled manner to Reservoir No. 6, which has designed outfalls to accommodate emergency events and maintain the integrity of the TSF. The stability of the TSF is monitored and reported to the DNR in accordance with the Dam Safety Permit. The TSF design is progressively updated to accommodate anticipated operational needs, and to accommodate the updated knowledge base including anticipated climatic conditions.

Extreme rainfall can also impact the soil and ground surface integrity, shifting or altering existing construction materials. Along with flooding, landslides can also pose a high construction risk. In addition to being a hazard to workers, they can block roads and cause construction delays. Soils may become loosened by rains and can co-occur with more intense rainfall events.

Alternatively, water stress may have some impacts on the Project due to the decreased snowfall in the winter leading to more dust. The Project can adapt to increase and extend dust control measures as identified in the Fugitive Dust Emission and Control Plan. Roadside fires could increase under dry conditions during operations if vehicles are close to dry vegetation. Additionally, a fire in the area could cause a hazardous working environment due to unhealthy air quality conditions. Extreme heat can similarly cause hazardous working conditions and fatigue. These hazards may influence operating costs due to increased maintenance, safety measures, and other expenditures.

Closure and Post Closure Interactions

The TSF is not planned for closure until the end of life of the mine (mining at Keetac is currently permitted through 2036 but has stated reserves well beyond). Some portions of the TSF could be progressively reclaimed prior to that, and land areas would be seeded and vegetated with native species as appropriate for the TSF conditions to minimize erosion, and for safe maintenance. Closure of the TSF would be managed according to the reclamation and closure procedures outlined in the Dam Safety Permit, Permit to Mine, and Minnesota Rules 6130.4100. Additionally, best practices, stakeholder input, any requirements in the NPDES permit for cessation, and current conditions at the time of closure would be incorporated. The current dam safety permit requires perpetual maintenance on all components to ensure integrity of all structures. Prior to the ultimate termination of the dam, a review by the DNR would be conducted to establish any perpetual activities necessary and financial responsibility is adequate by the owner.

Post-mining land uses and a detailed closure plan would be presented to the DNR for approval two years prior to deactivation. The permitted post-closure plan framework states within three years after deactivation or within a longer period that may be reasonable, the surface water will be drained via a channel cut through the Stage 2 Interior Dike draining water safely to the Stage 2 Exterior. The Stage 2 Interior would be vegetated for dust control, wildlife habitat or other purposes permitted by the DNR. Where necessary, the TSF would be shaped and contoured to ensure proper drainage in a manner that would not adversely affect structural stability of the drainage channel or result in erosion. All closure and reclamation procedures would adhere to Minnesota Rules and take necessary input from industry best practices, stakeholder engagement, and current conditions at time of closure.

Long-term climatic conditions, watershed restoration, and vegetation responses would be considered in reclamation planning. Site conditions and needs would be monitored in post closure.

b. For each Resource Category in the table below: Describe how the Project's proposed activities and how the Project's design will interact with those climate trends. Describe proposed adaptations to address the Project effects identified.

The Project has been designed with consideration for potential climate change impacts and trends. Table 7.1 outlines the key resource categories that may be affected by climate change and how the Project's design and proposed activities would interact with and adapt to these climate trends.

Table 7.1: Proposed Climate Adaptation

Resource Category	Climate Considerations (as identified in 7a)	Project Information (what features of resource category addresses vulnerabilities of/due to climate and climate trend)	Adaptations (effect on the feature)
Project Design	<p>Increase in annual precipitation</p> <p>Reduction in snow cover</p>	<p>Dams and dikes height relative to potential increased rainfall / extreme events.</p> <p>Possible increase in tailings exposure throughout the winter.</p>	<p>Dams and dikes have enhanced designs to improve overall structural integrity.</p> <p>Dams, dikes, and seepage control / water management infrastructure is designed with future precipitation trends in mind.</p> <p>Increase/extend the dust control measures outlined in the Fugitive Dust Emission and Control Plan. Separate coarse and fine tailings would allow for more strategic deposition with respect to fugitive emissions.</p>
Land Use	Increased temperatures and precipitation	Conversion of open space to tailings storage would result in loss of wetlands and associated flood storage within proposed Project footprint. Loss of vegetated areas may increase stormwater runoff.	Wetland mitigation measures would include use of surplus credits from the Palisade Wetland Mitigation Site. Stormwater management practices would be implemented as identified in the Stormwater Pollution and Prevention Plan.
Water Resources	Addressed in Section 12	Addressed in Section 12	Addressed in Section 12
Contamination/ Hazardous Materials/Wastes	Not applicable	Not applicable	Not applicable
Fish, wildlife, plant communities, and sensitive ecological resources (rare features)	Addressed in Section 14	Addressed in Section 14	Addressed in Section 14

8. Cover types: Estimate the acreage of the site with each of the following cover types before and after development:

Table 8.1 provides detail of the cover types for the Stage 2 Exterior, separation and/or dewatering infrastructure and pipeline, temporary impact areas, and permanent impact areas, using cover type data sourced from the National Land Cover Database (NLCD). The Stage 2 Exterior is currently being filled with tails and converted to barren land. An additional 1,200.6 acres within the Stage 2 Exterior, which is composed of anthropogenically disturbed land, would be categorized as barren lands as tails continue to be pumped into the area. The separation and/or dewatering infrastructure and pipeline would convert 37 acres to impervious surfaces. The footprint for the dams, dikes, and supporting roads would convert 536.6 acres to barren land. Temporary construction areas outside of wetlands would be restored to pre-construction conditions. Tree clearing and grubbing would occur in temporary workspaces prior to construction. Forested and shrub/scrub land cover types in temporary construction areas would be reseeded, resulting in 62.9 acres of herbaceous land cover. Figure 8.1 illustrates the existing NLCD land cover types.

Table 8.1: Existing and Proposed Cover Types for the TSF

Cover Types	National Land Cover Data Classifications	Before (acres)	After (acres)
Wetlands and shallow lakes (<2 meters deep)*	Emergent Herbaceous Wetlands	133.7	2.2
	Woody Wetlands	461.8	14.7
Deep lakes (>2 meters deep)	Open Water	420.3	0.5
Wooded/forest	Deciduous Forest	433.2	0
	Evergreen Forest	4.6	0
	Mixed Forest	115.8	0
Rivers/streams	N/A	0	0
Brush/grasslands	Shrub/Scrub	225.2	0
	Herbaceous	58.0	62.9
Cropland	N/A	0	0
Livestock rangeland/pastureland	N/A	0	0
Lawn/landscaping	N/A	0	0
Green infrastructure TOTAL	N/A	0	0
Impervious surface	N/A	0	37.0
Developed or barren land	Developed, Low Intensity	1.9	0.8
	Developed, Medium Intensity	0.2	0.2
	Developed, Open Space	2.6	1.6
	Barren Land	1,077.3	2,814.5
Other (none)	N/A	0	0
TOTAL		2,934.4	2,934.4

* The NLCD data is remotely sensed at a 30-meter spatial resolution wetland acreages may vary from field delineated acreages, as shown in Table 12.6. Table 8.1 includes acreages for the conversion of wetlands in the Stage 2 Exterior that is currently being filled with tails, as well as the Project Area.

Table 8.2 details proposed green infrastructure that would be incorporated. For the proposed Project, green infrastructure would not be applicable.

Table 8.2: Existing and Proposed Green Infrastructure

Green Infrastructure	Before (acreage)	After (acreage)
Constructed infiltration systems (infiltration basins/ infiltration trenches/ rainwater gardens/ bioretention areas without underdrains/ swales with impermeable check dams)	0	0
Constructed tree trenches and tree boxes	0	0
Constructed wetlands	0	0
Constructed green roofs	0	0
Constructed permeable pavements	0	0
Other (describe)	0	0
TOTAL	0	0

Table 8.3 details proposed canopy cover changes. Approximately 1,015.3 acres of the Project Area are estimated to be covered by canopy according to the NLCD. In the construction phase, all trees within the Project Area will be removed. No additional tree planting is anticipated.

Table 8.3: Existing and Proposed Canopy Cover

Trees	Percent	Number
Percent tree canopy removed, or number of mature trees removed during development	100%	1,015.3
Number of new trees planted	0	0

9. Permits and approvals required: List all known local, state and federal permits, approvals, certifications and financial assistance for the Project. Include modifications of any existing permits, governmental review of plans and all direct and indirect forms of public financial assistance including bond guarantees, Tax Increment Financing and infrastructure. All these final decisions are prohibited until all appropriate environmental review has been completed. See Minnesota Rules, Chapter 4410.3100.

Table 9.1 lists the local, state, and federal permits, approvals, and certifications for the Project.

Table 9.1: Applicable Regulatory Authorities and Required Permits

Unit of Government	Type of Application	Status
U.S. Army Corps of Engineers (USACE)	Clean Water Act Section 404 Individual Permit	To be applied for
	Section 7 Endangered Species Act Consultation with the U.S. Fish & Wildlife Service	Consultation led by the USACE
	National Historic Preservation Act Section 106 Determination for Historic Properties	Consultation led by the USACE
U.S. Fish and Wildlife Service	Federal Endangered Species Permits	Coordination led by USACE
Minnesota Department of Natural Resources (DNR)	Permit to Mine Amendment	Expires in 2048 An amended Permit to Mine will be required prior to starting Project work.
	Dam Safety Permit	Permit No. 2022-0721 To be amended
	Public Waters Work Permit	To be applied for, if needed
	Wetland Replacement Plan for Wetland Conservation Act	To be applied for

Unit of Government	Type of Application	Status
	Burning Permit (land clearing)	To be applied for, if needed
	Takings Permit (for Endangered or Threatened Species)	Coordination with DNR
Minnesota Pollution Control Agency	Air Emissions Permit (Prevention of Significant Deterioration/Title V Air Permit)	Permit No. 13700063-102 To be amended, if needed
	Clean Water Act Section 401 Water Quality Certification	To be applied for
	National Pollutant Discharge Elimination System (NPDES)/State Disposal System (SDS) Permit for Industrial Wastewater Discharge and Storm Water Discharge for Industrial Activity—Tailings Basin	Permit No. MN0055948 Pending reissuance
	Storage Tank Permits (fuel tanks)	Not required, Keetac is under MN Rules Chapter 7151
	Hazardous Waste Generator License	Keetac is a small quantity generator and complies with U.S. Environmental Protection Agency’s (USEPA’s) and Minnesota Pollution Control Agency’s (MPCA’s) waste management rules
City of Hibbing	Building Permit	To be applied for, if needed
	Shoreland Alteration Permit for construction in a shoreland management district	To be applied for, if needed
	Rezoning, Zoning Variance or Conditional Use Permit (CUP)	To be applied for in sections zoned as open space in the TSF
City of Nashwauk	Zoning Permit	To be applied for, if needed (Section 17.2 local ordinance)
Itasca County	Septic Permit	To be applied for, meeting the requirements of MN Statute 7080
	Extractive Use Permit/CUP	To be applied for, if needed (Section 3.13.1-3.13.11 local ordinance) Per Section 3.13 CUP is required if there is a residence within 1,000 feet of an extractive use operation
	Shoreland Alteration Permit for the movement of more than 10 cubic yards of material on steep slopes or within shore/bluff impact zones or 50 cubic yards or greater outside abovementioned zones.	To be applied for, if needed

10. Land Use:

a. Describe:

- i. Existing land use of the site as well as areas adjacent to and near the site, including parks and open space, cemeteries, trails, prime or unique farmlands.**

Existing Conditions

The Project is located on the border of St. Louis and Itasca Counties, south of Highway 169 East in Minnesota. The cities of Hibbing and Nashwauk are partially located within the Project Area boundary, and the city of Keewatin is located approximately two miles north of the Project Area. The mine and associated process facility is located within the city of Keewatin; however, the Project Area is located outside the city’s jurisdiction.

Land within and surrounding the Project Area is privately owned by U. S. Steel, as shown on Figure 6.2 (Itasca County Parcel Information System 2023; St. Louis County Land Explorer 2018).

The Project Area does not contain any known cemeteries, trails, or publicly designated open space.

Recreational areas in the vicinity of the Project Area include the O'Brien Reservoir Recreation Area, the Mesabi Trail, and various snowmobile trails (including the Lawron Trail), as shown on Figure 10.1.

The Project area is entirely within the 1855 Ceded Territory, which was created by the 1855 Treaty of Washington. In this treaty the Mississippi, Pillager, and Lake Winibigoshish Bands of Ojibwe ceded the lands contained within the Ceded Territory to the United States Government. Among others the Treaty created the Mille Lacs Reservation and Leech Lake Reservation, the latter being approximately 80 miles west of the Project site. The location of the Project Area within the 1855 boundary is shown in Figure 10.2.

The O'Brien Reservoir Recreation Area encompasses approximately 192 acres and is owned by the City of Keewatin. The O'Brien Reservoir Recreation Area is located approximately 3 miles northwest of the Project Area, and includes a DNR boat ramp, a fishing dock, and a public beach.

The Mesabi Trail is a paved recreational trail, currently under construction, that would stretch nearly 165 miles along the length of the Mesabi Range from Grand Rapids to Ely, Minnesota when completed. Currently, over 135 miles of trail have been constructed. A section of the Mesabi Trail is located approximately two miles from the Project Area, beginning in Nashwauk, and extending eastward past O'Brien Lake to the City of Keewatin. From Keewatin, the trail extends along Trunk Highway 169 (TH 169) for three miles, north to Kelly Lake, and east to the City of Hibbing.

Minnesota snowmobile trails border the Project Area to the south, east, and west. The Lawron Trail is located approximately one mile to the west of the Project Area and extends south from Highway 169 for five miles to the Itasca #1 Greenway Trail. The Itasca #1 Greenway is situated approximately two miles to the south of the Project Area. It extends southeast from the Lawron Trail for two miles and connects with the Chisholm/Side Lake/Hibbing Spur. The Chisholm/Side Lake/Hibbing Spur runs north-to-south and is located approximately 0.5 mile from the Project Area. It extends seven miles along the eastern side of the Project Area and continues to Highway 169, where it continues east of Keewatin.

Minnesota's iron ore deposits are concentrated in the northeastern "Iron Range," encompassing the Vermilion, Mesabi, and Cuyuna Ranges. The Project Area is located within the Mesabi Range, which extends from near Grand Rapids, Minnesota to Birch Lake, Minnesota. The Keetac Mine is a conglomeration of taconite mine pits established in the early 1900s and is now the third largest mine in the Iron Range. The existing TSF has been in operation and development since the 1960s and has undergone numerous modifications as tailings are deposited and its perimeter walls are raised, as stated in the Project Description.

The Project Area encompasses several key components: the existing Stage 2 Exterior of the TSF, planned dam and dike construction areas to the southwest and adjacent to the Stage 2 Exterior, an area near an unnamed road on the northwest side of the TSF, approximately 13 acres of forested land adjacent to the road, the separation and/or dewatering infrastructure, and supporting infrastructure footprints. In addition to deposited tails, the Stage 2 Exterior contains previously disturbed areas that facilitated the creation of incidental wetlands. Initial disturbance of Stage 2 Exterior began in the 1980s with construction of perimeter dams and deposition of tailings up to 20 feet deep, continuing until the year 2000. Beginning in 2022, some additional enhancement work and tailings deposition was restarted in Stage 2 Exterior as part of Phase 1 enhancements (Section 1.3).

The areas immediately southwest and adjacent to the Stage 2 Exterior are composed of forest, wetlands, and water bodies. The area south of the Stage 2 Exterior was previously disturbed for construction of the perimeter of the TSF, which has resulted in the creation of incidental wetlands. Several waterbodies surround the TSF, including Reservoir No. 2, Reservoir 2 North, Reservoir No. 6, Hay Lake, Swan Lake, Hay Creek, and Swan River.

The area within the TSF has been the site of historic logging and mining activities since the early 20th century. Disturbance from these activities have facilitated the creation of primarily shallow marsh, deep marsh, wet/sedge meadow, and alder thicket wetland types. The National Land Cover Database classifies most of the

land use within the Stage 2 Exterior area of the Project Area. Dominant land cover types included barren land (54 percent), with some woody wetlands (17 percent) and scrub shrub (8 percent) and deciduous forest (8 percent). A wetland delineation was conducted in November 2021. The report provides photographic documentation of these wetlands and the land cover at that time. Land use classification within the Stage 2 Exterior portion of the Project Area is shown in Section 8 – Cover Types, Table 8.1 (USGS 2016).

Farmland classifications are shown in Table 10.1. Approximately 85.4 percent of the Project Area is Not Prime Farmland (596.5 acres). Approximately 9.6 percent (66.7 acres) of the Project Area is classified as Farmland of Statewide Importance (does not meet Prime Farmland characteristics but is important for agricultural production), 3.1 percent (21.8 acres) is classified as Prime Farmland if Drained (meets Prime Farmland characteristics except depth to seasonal high water table and are suitable for drainage). The remaining 1.9 percent (13.3 acres) are Prime Farmland (prime characteristics for agricultural production).

Table 10.1: Farmland Classification Within the Project Area

Farmland Classification	Permanent Impacts			Temporary Construction Impacts	Total Acres
	Dam/Dike Construction	Permanent Access Road	Pipeline and Separation and/or Dewatering Infrastructure		
Not Prime Farmland	451.1	38.8	39.9	66.7	596.5
Farmland of Statewide Importance	38.2	7.9	0.0	20.6	66.7
Prime Farmland If Drained	17.3	2.2	0.0	2.4	21.9
All Areas Are Prime Farmland	9.8	1.9	1.7	0.0	13.3
Total acres*	516.4	50.6	41.5	89.8	698.3

**Total acreages may not reflect sum of farmland classification types due to rounding.*

- ii. **Plans. Describe planned land use as identified in comprehensive plan (if available) and any other applicable plan for land use, water, or resources management by a local, regional, state, or federal agency.**

The Project Area straddles the City of Hibbing (Saint Louis County), Nashwauk City, and Lone Pine Township (Itasca County) (Figure 10.3).

The City of Hibbing adopted its current comprehensive plan December 19, 2018. The Hibbing comprehensive plan identifies community goals, visions, and land use and zoning maps with designated associated zones. The city lists mining as one of the top two industries employing Hibbing workers. The existing land use regulations (Section 11.05) of the Ordinance identifies both mineral exploration and gravel pits as permitted uses within the I-2 zoning district. While most of the Project Area is zoned I-2, a permitted use, there are small portions that traverse the mine that have a designation of O (Open Space), O-1 (Open Space), A-R (Agricultural-Rural Residential), and R-R (Rural Residential). Rezoning, and/or a comprehensive plan Amendment may be necessary to align the zoning with the future land use maps found within the comprehensive plan.

The City of Nashwauk adopted its current comprehensive plan October 2014. The plan itself describes its current land use, and desired future conditions. The proposed land use map is comprised of three land use areas: mining, industrial park (heavy, moderate, light industrial, business park, commercial, and timber), and multi-use (residential, multi-family, cluster, retail, schools, parks and light commercial). The intent of the designations is to guide community development decisions and ensure land use and development occur in harmony. As stated in the plan, Nashwauk is looking to preserve tradition and embrace progress. The zoning map itself designates the Project Area as M-3, or Heavy Industrial Mining. This aligns with the intent of the comprehensive plan and zoning map.

The Itasca County Comprehensive Land Use Plan was adopted May 23, 2000, with updates on April 9, 2013. The intent of the comprehensive plan is to guide the county's land use activities over a 20-year period. The comprehensive plan, includes a mining objective, which states: "Support the continuation and expansion of the mining industry." Methods identified to provide this support include establishing a mining industrial zone, with multiple overlay districts that prioritize mining. In addition, the plan states to "designate adjacent lands necessary for processing minerals and storing overburden, lean ore, tailings and other mining activities." The plan focuses on cooperative partnerships, cooperative planning, and facilitating the process to ensure successful outcomes. Identified within the zoning map, this Project is zoned for an Industrial designation. Within the Industrial Zoning District, Mining and associated activities are considered a permitted use.

The St. Louis County's comprehensive future land use plan does not include the Project Area.

Overall, the Project Area is included within two One Watershed One Plan boundaries: the Upper Mississippi-Grand Rapids and the St. Louis River. While the Upper Mississippi-Grand Rapids is currently in the planning stage (initiating the effort in 2022), St. Louis does have an approved Comprehensive Watershed Management Plan. The approved plan is broken up and prioritized based off planning areas. The Project Area is identified within the St. Louis River North planning area (Swan River Watershed). This planning area includes the headwaters of the St. Louis and Sand Rivers, East and West Swan Rivers, East and West Two Rivers and the Embarrass River. The planning area is classified by both active and historic mining operations. Identified priority issues within this area include surface water quality degradation (related to impairments of aquatic life); drinking water quality and quantity threats; impacts to watershed health from urbanization, development and road expansion; altered hydrology leading to channel instability, excess sedimentation and loss of water storage; forest fragmentation and loss impacting habitat and water resources. The 10-year goals for the St. Louis River North planning area focus on reducing bacteria, chlorides, and other pollutants in surface waters; protecting drinking water; implementing stormwater management and low impact development; improving stream connectivity and habitat; restoring wetlands and shorelines; and protecting privately owned forests.

Future land use of the Project Area will be important given the proximity of the Project Area to the city of Keewatin. Any evaluation of potential future land use would consider the goals and objectives of the cities of Keewatin, Nashwauk, and Hibbing, the township of Lone Pine, and Itasca and St. Louis counties.

iii. Zoning, including special districts or overlays such as shoreland, floodplain, wild and scenic rivers, critical area, agricultural preserves, etc.

The state's Shoreland Management Rules, specifically Minnesota Rules, part 6120.3300, subp. 12, indicate that taconite mining within shoreland is a permitted use provided the provisions of the Mineland Reclamation Act are satisfied. The state Mineland Reclamation Rules, which implement that Act, states that shorelands are avoidance areas for mining and that mining will only be allowed within shorelands when there is no feasible and prudent alternative (Minnesota Rules, part 6130.1300, subp. B (2008)). In addition, Minnesota Rules 6130.1000 requires that all mining sites must incorporate setbacks or separations needed to comply with local land use regulations and requirements of other appropriate authorities. Finally, state Water Law (Minnesota Statute 103F.221, subd. 5 (1990)) allows municipalities, including counties, to adopt shoreland controls that are stricter than state standards.

Several local units of government have regulatory authority within the proposed Project vicinity, including the City of Nashwauk, the City of Hibbing, Itasca County, and St. Louis County. The City of Nashwauk does not have a shoreland zoning ordinance. Language stated in Section 15b.1 of the local zoning ordinance states that the Heavy Industrial and Mining District "shall not be used in any shoreland district, except water filled mining pits." When applying for zoning permits with the City of Nashwauk, the shoreland district rules would be discussed.

Within St. Louis County, the entirety of the Project lies within the regulated boundary of the City of Hibbing. These shoreland management districts are based on zoning ordinance information from the respective

governments. The City of Hibbing’s Shoreland Ordinance designates shoreland zones within 1,000 feet and 300 feet of the ordinary high water level (OHW) of lakes and streams, respectively. A shoreland alteration permit is required from the City of Hibbing for any grading/filling or excavation within the Shoreland Overlay District established under the city zoning ordinance.

Itasca County classifies certain public waterbodies by use. Within, and immediately downstream of the Project Area, several waterbodies have been assigned Natural Environment (NE) or Tributary classifications, as shown in Table 10.2. NE waterbodies are often shallow lakes with limited capacities for assimilating the impacts of development and recreational use. They often have adjacent lands with substantial constraints for development such as high water tables, exposed bedrock, and soils unsuitable for septic systems. These waterbodies do not typically have much existing development or recreational use.

Itasca County designates shoreland overlay districts in its zoning ordinance for county public waters to implement the current shoreland standards described in Minnesota Rules, Chapter 6120 for lakes and streams identified in the DNR Public Waters Inventory (PWI). These shoreland zones are designated within 1,000 feet and 300 feet of the OHW of lakes and streams, respectively. Within shorelands, the county zoning ordinance requires a 200-foot setback for mining-related activities. A zoning variance request may be required for portions of the Project Area that are unable to meet the 200-foot setback requirement. Itasca County Zoning Ordinance Article 5 – Shoreland Overlay Districts defines specific lake classifications and zoning provisions enacted by the county (see Table 10.2).

Table 10.2: Water-Related Land Use Management District Impacts

Name	LGU Jurisdiction	LGU Classification	DNR PWI Status	Proposed Zoning Impacts
Hay Creek	Itasca County	Tributary	Public Water Stream	A portion of the Project Area is within a shoreland impact zone.
West Swan River	City of Hibbing	R-R, A-1, O-1, A-R	Public Water Stream	No shoreland zoning impacts anticipated.
O’Brien Diversion Channel	Itasca County	Tributary	Public Water Stream	No shoreland zoning impacts anticipated.
Welcome Creek	City of Keewatin	No shoreland zoning	Public Water Stream	No shoreland zoning impacts anticipated.
Reservoir No. 2	Itasca County	Not Listed	31103900	A portion of the Project Area is within a shoreland impact zone.
Reservoir No. 6	Itasca County	Not Listed	31122900	A portion of the Project Area is within a shoreland impact zone.
Reservoir 2 North	Itasca County	Not Listed	31122800	A portion of the Project Area is within a shoreland impact zone.

- iv. If any critical facilities (i.e. facilities necessary for public health and safety, those storing hazardous materials, or those with housing occupants who may be insufficiently mobile) are proposed in floodplain areas and other areas identified as at risk for localized flooding, describe the risk potential considering changing precipitation and event intensity.**

No critical facilities are proposed to be constructed within floodplain areas or areas identified as at risk for localized flooding.

- b. Discuss the Project’s compatibility with nearby land uses, zoning, and plans listed in Item 10a above concentrating on implications for environmental effects.**

The proposed Project appears to align with the identified goals found within each community’s comprehensive plan, as they relate to mining. Rezoning requests may be needed to align the existing zoning designation and shoreland management areas identified in the zoning ordinances of each applicable local government unit.

c. Identify measures incorporated into the proposed Project to mitigate any potential incompatibility as discussed in Item 10b above and any risk potential.

Impacts to waterbodies within shoreland management areas would be mitigated or prevented through use of erosion control measures and BMPs, and minimization of the duration of impacts, as required by applicable permits.

The following mitigation measures, described in Table 10.3, would be implemented to reclaim land impacted throughout the Project.

Table 10.3: Tailings Basin Reclamation Mitigation

Mining Impact	Description	Reclamation Mitigation Practice
Erosion/sedimentation	Bare soil and sloped ground at TSF or haul roads increase erosion and sedimentation potential.	<ul style="list-style-type: none"> ▪ Temporary vegetation of inactive areas ▪ Regrading ▪ Revegetation ▪ Mulching ▪ Dust control
Wetland impacts	Direct wetland losses resulting from the Project.	<ul style="list-style-type: none"> ▪ Minimize watershed modifications ▪ Creation of wetlands within revegetated TSF ▪ Mitigation of unavoidable impacts
Changes in vegetation cover types	Removal of existing vegetation during construction.	<ul style="list-style-type: none"> ▪ Revegetation ▪ Vegetation/land use approval
Wildlife	Loss of wildlife habitat resulting from changes in cover types. Potential barriers to travel in steep-sloped areas created by mining.	<ul style="list-style-type: none"> ▪ Revegetation ▪ Regrading
Changes in surface water quality and quantity	Increase in runoff (and potential increase in pollutant transport in runoff) due to exposed, compacted soils and steep slopes.	<ul style="list-style-type: none"> ▪ SWPPP ▪ Revegetation ▪ Regrading ▪ Mulching
Changes in ground water quality and quantity	The Project is not expected to have an increase in overall potential for seepage of process water into groundwater. The total volume of ponded water would remain the same as current conditions. Furthermore, the dams in contact with ponded water would include a seepage reduction feature intended to limit seepage through the dam. Additionally, the project proposes adding additional thickeners to recycle more water in the tailings prior to discharge.	<ul style="list-style-type: none"> ▪ Use of an engineered seepage reduction feature is projected to minimize seepage rate and total seepage volume. ▪ Monitoring plan in development
Air quality (dust)	Bare soil increases wind transport of soil particles.	<ul style="list-style-type: none"> ▪ Watering or dust suppressant treatment of exposed soil to minimize dust ▪ Temporary vegetation in inactive areas

Mining Impact	Description	Reclamation Mitigation Practice
		<ul style="list-style-type: none"> ▪ Revegetation of exposed soils

As stated in Minnesota Rules, part 6130.2200, altered watersheds would be returned to pre-mining conditions when possible. Vegetation establishment would be initiated within the first growing season after an area, according to the Permit to Mine, is no longer scheduled to be disturbed or used in a manner that would interfere with the establishment and maintenance of vegetation.

The Project’s existing SWPPP and the Spill Control and Countermeasure Plan (SPCC) plans incorporate several measures and best management practices (BMPs) that align with the goals outlined in the St. Louis River Watershed Management Plan including:

- Use of settling ponds and basins to treat stormwater runoff and reduce sediment loads before discharge, which aligns with the goal of reducing pollutants like sediment to address surface water quality degradation.
- Secondary containment for all outdoor aboveground storage tanks to prevent spills of fuel oil, lube oil, etc. from contaminating stormwater runoff. This aligns with the goals of protecting surface and drinking water quality.
- Covering and containing hazardous and non-hazardous waste storage areas to prevent exposure to stormwater, which supports goals of protecting surface and drinking water quality.
- Diverting stormwater and railcar deluge water away from surface waters and into settling basins for treatment, supporting the goal of reducing pollutant loads to surface waters.
- Managing mine stockpiles to minimize erosion through measures like establishing vegetation, maintaining perimeter berms, sloping benches inward, and limiting lift heights/slope angles. This aligns with goals of reducing sedimentation and erosion to protect surface water quality.
- Conducting regular facility inspections, preventative maintenance, good housekeeping practices, spill prevention and response procedures, and employee training to proactively identify and address potential stormwater contamination issues. These measures broadly support the plan's water quality protection and pollution prevention goals.
- Keetac’s NPDES permits incorporate requirements related to the downstream wild rice sulfate impairments, further tying the facility’s water management to the St Louis River Watershed plan’s goals.

In addition to the SWPPP and SPCC plans, the Project includes wetland mitigation measures that further contribute to meeting the watershed management goals. These measures include minimizing watershed modifications and creating new wetlands within the revegetated TSF, thus supporting and maintaining water storage capacity, reducing sedimentation, and improving water quality. The new wetlands would also provide valuable habitat for wildlife, offsetting some of the impacts of forest fragmentation and loss in the planning area.

Through the implementation of the SWPPP, SPCC plans, and wetland mitigation measures, the Project would actively work towards meeting the 10-year goals set forth in the St. Louis River Watershed Management Plan. These efforts would contribute towards ultimately supporting the overall health and sustainability of the watershed.

11. Geology, soils and topography/landforms:

- a. **Geology - Describe the geology underlying the Project Area and identify and map any susceptible geologic features such as sinkholes, shallow limestone formations, unconfined/shallow aquifers, or karst conditions. Discuss any limitations of these features for**

the Project and any effects the Project could have on these features. Identify any Project designs or mitigation measures to address effects to geologic features.

The Project Area is located within the late Cenomanian Age Coleraine Formation, which is characterized by conglomerate, lignite, sandstone, and shale. Regional maps of depth-to-bedrock show that most of the Project Area contains soils for which depth to bedrock is approximately 275 feet (Minnesota Natural Resources Atlas 2023).

The perimeter dike embankment is underlain by a dense, Quaternary Period (less than 2.6 million years old), matrix-dominated, red clayey till, deposited by the St. Louis sub lobe, which is generally less than 10 feet thick (Jennings and Reynolds 2005). These young Quaternary sediments were deposited on top of the Mesozoic Coleraine Formation (600 million years old), consisting of conglomerate, lignite, sandstone, and shale, and Precambrian Period (1.6 to 1.7 billion years old) granite, quartzite, iron formation, argillite, and gabbro (Jirsa et al. 2011; Winter 1973).

There are no unique geological features that have received state or federal protection within the Project Area.

Based on review of the U.S. Geological Survey (USGS) Quaternary Faults and Folds database, no faults were active in the Quaternary Period near the Project Area, and no earthquakes have been recorded in the region (USGS 2022a; Chandler 1994). Based on the tectonic history of the region and the absence of active faults and significant earthquakes, seismic activity in the Project Area is unlikely.

Mineral Resources

The Project Area does not overlap with any active mineral operations (USGS 2011; Esri 2021; USGS 2022b). U. S. Steel has surface and mineral rights in the Project Area. As shown on Figure 11.1, the closest active mining area, aside from the Keetac Mine, is the Cleveland-Cliffs Hibbing Taconite Pit, which is located approximately seven miles northeast of the Project Area.

Paleontology

The Cenomanian (Upper Cretaceous) Coleraine Formation contains numerous fossils from the Western Interior Seaway and its shores, including fossilized teleost fish scales, shark teeth, clams, snails, and crocodile parts (Minnesota Geological Survey undated). As such, the Project may encounter paleontological resources.

Construction Impacts and Mitigation

No unique geological features that have received state or federal protection would be disturbed by the Project. Project construction would result in permanent impacts to topography through the buildup of the dams and dikes. Direct permanent impacts would result from raising the Stage 2 Exterior basin. Topsoil would be removed for construction and for temporary construction areas, but the underlying geology would not be impacted by the Project. Construction of a permanent access road, and grading or leveling of land in temporary construction areas are required to create safe and level equipment staging, site access, and preparation areas. These impacts would occur over the course of approximately two years. No mitigation activities are proposed for the geological resources since no unique geological features would be impacted by the Project. Additionally, no impacts to mineral resources are expected.

Operations Impacts and Mitigation

Operational impacts to topography, bedrock, or surface geology would include the continued deposition of tailings into the Stage 2 Exterior. Deposition would cover the existing geological features with tailings over time. Ultimately reaching a height of approximately 1,580 feet at the end of mine life, creating a plateau-like feature in the landscape. No other impacts to topography, bedrock, or surface geology would occur during operations.

There is minimal risk of earthquake-related impacts on the dam, dikes, separation and/or dewatering infrastructure, and access roads or other infrastructure during operations due to the limited potential for large,

seismically induced ground movements. Any potential risks to bedrock or surface geology would be mitigated by accepted dam construction industry specifications and adherence to DNR dam safety permit design requirements, as well as routine safety monitoring and analysis. Further, the Dam Safety Permit requires annual monitoring reports and submittal of an operation and maintenance plan.

- b. Soils and topography - Describe the soils on the site, giving NRCS (SCS) classifications and descriptions, including limitations of soils. Describe topography, any special site conditions relating to erosion potential, soil stability or other soils limitations, such as steep slopes, highly permeable soils. Provide estimated volume and acreage of soil excavation and/or grading. Discuss impacts from Project activities (distinguish between construction and operational activities) related to soils and topography. Identify measures during and after Project construction to address soil limitations including stabilization, soil corrections or other measures. Erosion/sedimentation control related to stormwater runoff should be addressed in response to Item 12.b.ii.**

The sections below detail soils and topography associated with the Project Area. Table 11.1 below provides soil characteristics within the Project Area.

Table 11.1: Soil Characteristics Within the Project Area

Soil Map Unit Symbol	Soil Map Unit Name	Hydric Rating	Drainage Class	Hydrologic Soil Group	Soil Erodibility Factor (K)	Acres
TSF Perimeter						
B28B	Buhl loam, 1 to 5 percent slopes	No	Somewhat poorly drained	C/D	0.27	38.2
A1B	Eagleview and Menahga soils, 1 to 8 percent slopes	No	Somewhat excessively drained	A	0.02	88.1
A1C	Eagleview and Menahga soils, 3 to 15 percent slopes	No	Somewhat excessively drained	A	0.02	0.8
549	Greenwood-Greenwood, ponded, complex, 0 to 1 percent slopes	Yes	Very poorly drained	A/D	0	7.5
619	Keewatin silt loam	No	Somewhat poorly drained	D	0.39	17.3
B27A	McQuade-Buhl complex, 0 to 3 percent slopes	Yes	Poorly drained	C/D	0.27	25.4
B33A	McQuade-Fayal, depressional, complex, 0 to 2 percent slopes	Yes	Poorly drained	C/D	0.27	18.1
797	Mooselake and Lupton soils, 0 to 1 percent slopes	Yes	Very poorly drained	A/D	0	6.7
622B	Nashwauk fine sandy loam, 1 to 10 percent slopes	No	Moderately well drained	D	0.40	9.8
B67A	Rifle soils, Hibbing catena, 0 to 1 percent slopes	Yes	Very poorly drained	A/D	0	0.8
995	Seelyeville-Seelyeville, ponded, complex, 0 to 1 percent slopes	Yes	Very poorly drained	A/D	0	1.4
1050	Tailings basin	Unranked	Unknown	Unknown	0	72.4

Soil Map Unit Symbol	Soil Map Unit Name	Hydric Rating	Drainage Class	Hydrologic Soil Group	Soil Erodibility Factor (K)	Acres
1003B	Udorthents, loamy (cut and fill land)	No	Well drained	Unknown	0	59.1
1043C	Udorthents, nearly level to rolling	No	Well drained	A	0.43	82.9
Pipeline and Separation and/or Dewatering Infrastructure						
A1B	Eagleview and Menahga soils, 1 to 8 percent slopes	No	Somewhat excessively drained	A	0.02	9.6
622B	Nashwauk fine sandy loam, 1 to 10 percent slopes	No	Moderately well drained	D	0.40	1.6
1043C	Udorthents, nearly level to rolling	No	Well drained	A	0.43	29.9
Permanent Access Road						
B28B	Buhl loam, 1 to 5 percent slopes	No	Somewhat poorly drained	C/D	0.27	7.9
A1B	Eagleview and Menahga soils, 1 to 8 percent slopes	No	Somewhat excessively drained	A	0.02	7.8
549	Greenwood-Greenwood, ponded, complex, 0 to 1 percent slopes	Yes	Very poorly drained	A/D	0	1.4
619	Keewatin silt loam	No	Somewhat poorly drained	D	0.39	2.2
B27A	McQuade-Buhl complex, 0 to 3 percent slopes	Yes	Poorly drained	C/D	0.27	4.6
B33A	McQuade-Fayal, depressional, complex, 0 to 2 percent slopes	Yes	Poorly drained	C/D	0.27	3.2
797	Mooselake and Lupton soils, 0 to 1 percent slopes	Yes	Very poorly drained	A/D	0	1.2
622B	Nashwauk fine sandy loam, 1 to 10 percent slopes	No	Moderately well drained	D	0.40	1.9
B67A	Rifle soils, Hibbing catena, 0 to 1 percent slopes	Yes	Very poorly drained	A/D	0	0.8
995	Seelyeville-Seelyeville, ponded, complex, 0 to 1 percent slopes	Yes	Very poorly drained	A/D	0	0.2
1050	Tailings basin	Un-ranked	Unknown	Unknown	0	2.0
1003B	Udorthents, loamy (cut and fill land)	No	Well drained	Unknown	0	8.3
1043C	Udorthents, nearly level to rolling	No	Well drained	A	0.43	1.8
Temporary Construction Impacts						
B28B	Buhl loam, 1 to 5 percent slopes	No	Somewhat poorly drained	C/D	0.27	20.6

Soil Map Unit Symbol	Soil Map Unit Name	Hydric Rating	Drainage Class	Hydrologic Soil Group	Soil Erodibility Factor (K)	Acres
A1B	Eagleview and Menahga soils, 1 to 8 percent slopes	No	Somewhat excessively drained	A	0.02	10.6
619	Keewatin silt loam	No	Somewhat poorly drained	D	0.39	2.4
B27A	McQuade-Buhl complex, 0 to 3 percent slopes	Yes	Poorly drained	C/D	0.27	24.3
1050	Tailings basin	Un-ranked	Unknown	Unknown	0	1.5
1043C	Udorthents, nearly level to rolling	No	Well drained	A	0.43	5.5

General Soil Composition

The Project Area occurs in the Land Resource Region K: Northern Lake States Forest and Forage Region. Within this region, the Project Area is entirely within Major Land Resource Area (MLRA) 57: Northern Minnesota Gray Drift. This MLRA is characterized by a complex pattern of end moraines; ground moraines; outwash plains; drumlins; small, isolated lake plains; and drainages associated with Wisconsin-age gray calcareous drift of the Des Moines and Wadena Lobes. The dominant soil orders are Alfisols, Entisols, and Histosols with a frigid temperature regime, an aquic or udic moisture regime, and mixed or smectic mineralogy. These soils are generally very deep and generally sandy to loamy textures (USDA NRCS 2022).

Soil mapping units and characteristics within the Project Area were identified using the USGS Soil Survey Geographic (SSURGO) database, as shown in Table 11.1 and on Figure 11.2 (USDA NRCS 2023).

The soil erodibility factor quantifies susceptibility of soil particle detachment by water (K value). Soils high in clay content are resistant to detachment and have lower K values (about 0.05 to 0.15), with coarse textured soils having a higher K value (about 0.05 to 0.20), and silty loam soils in between producing moderate runoff (MSU 2002). The western portion of the Project Area ranges in soil erodibility from low (0.0) to moderately high (0.43). The eastern portion of the Project Area has a lower erodibility of approximately 0.27.

The hydric rating classifies whether a soil is hydric based on conditions of saturation, flooding, or ponding during the growing season. The drainage class identifies natural drainage conditions based on frequency and duration of wet periods. Hydrologic Soil Groups A, B, C, and D (as well as dual classes A/D, B/D, and C/D) are used to classify soils by runoff potential and correspond to soils with low, moderately low, moderately high, and high runoff potential (Ross et al. 2018). Hydrologic Soil Groups are assigned based on similar physical and runoff characteristics. Most of the western portion of the Project Area (generally portions of the Project Area within the Hay Creek watershed) is classified as Group A, soils of deep, well drained, or gravelly sands with high infiltration and low runoff rates, with a small amount of Group D, soils with very slow infiltration rates and high runoff potential on the southern side of the Stage 2 Exterior. The eastern half of the Project Area (generally within the Upper West Swan River Watershed) is classified as Group C/D, soils with a very slow infiltration rate due to a high water table, with a slow infiltration rate when drained.

Topography in the Project Area is relatively flat due to the grinding actions of the St. Louis glacial sublobe, which occurred approximately 14,000 years ago during the Pleistocene epoch. Elevations in the Project Area range from approximately 1,440 to 1,460 feet above mean sea level (AMSL) (USGS 2022c).

Construction Impacts and Mitigation

Soils in the Project Area could be compacted, eroded, or contaminated during the construction of the Project. During construction, approximately 225,000 cubic yards or less of soil would be excavated/graded.

Temporary construction areas would be cleared of trees and graded to establish level workspaces for construction equipment and materials. Soil impacts in these areas would include compaction due to heavy machinery use and construction-related traffic, erosion due to exposure to stormwater from vegetation removal, and potential contamination from equipment leaks or spills of petroleum-based products, coolants, or antifreeze.

Earth disturbance of one acre or more requires a construction stormwater permit issued by the MPCA and the development of a SWPPP. A SWPPP would be prepared that would identify potential pollutant discharges associated with construction activities and describe prevention techniques to minimize the risk of non-point source pollution, erosion, and sedimentation, as well as spill response plans. Dikes and dams would be constructed from coarse tailings and would be periodically seeded to establish vegetative cover. Stormwater runoff would be managed in compliance with the SWPPP and applicable BMPs. Implementation of the practices outlined in the SPCC (as well as stormwater BMPs, would avoid or minimize risks and impacts of soil contamination). Additionally, the Dam Safety Permit (2022-0721) requires that erosion control measures be installed in accordance with the *Minnesota Stormwater Manual* by the MPCA prior to Project commencement and maintained throughout the Project. The Dam Safety Permit also requires that all exposed soils must be stabilized as soon as possible and no later than 72 hours after completion of the Project.

Soil compaction would be reduced by keeping construction staging areas to the minimum amount required for safe and efficient construction work and having specified machinery paths. Timber matting or other stabilization materials would be placed in wetlands and wet areas during construction.

Following their use, temporary construction areas would be tilled and supplemented with organic material that was stripped prior to construction as appropriate to mitigate compaction. Exposed soils would be stabilized, seeded, and monitored until they reach 70 percent vegetative cover, as required by the MPCA construction stormwater permits, to prevent soil erosion and sediment runoff from construction work areas. Ultimately, the areas would be required to meet standards within the Permit to Mine (i.e., 90 percent vegetative cover). The Dam Safety Permit requires that topsoil be used to re-dress disturbed soil areas and native plant species be used for revegetation of disturbed areas when possible.

Operations Impacts and Mitigation

Within the Stage 2 Exterior, any soils that were not previously affected by tailings deposition would be permanently impacted through the continued deposition of tailings. Soils would be permanently inundated with water and tailings.

Impacts to soils outside of the Stage 2 Exterior during operations would be limited to sporadic and temporary disturbance during maintenance activities in discrete locations. If excavation is required during maintenance activities, soils would be restored upon completion. Compaction would be minimized by limiting traffic and machinery access to previously established roadways. There is a potential for soil contamination from equipment leaks or spills of petroleum-based products, coolants or antifreeze. Implementation of the practices outlined in the SPCC, as well as applicable stormwater BMPs, would avoid or minimize risks and impacts of spills and any other operational impacts on soils. Slopes of the dikes and dams would be maintained consistent with the current practice in the Stage 2 Interior – inspected regularly for erosion, repaired (and maintained as needed), and vegetated periodically to reduce erosion due to stormwater runoff. Stormwater runoff would be managed in accordance with the SWPPP. Soil erosion from slope runoff would be mitigated through the deposition of coarse tails or planting of vegetative cover.

12. Water Resources:

a. Describe surface water and groundwater features on or near the site in a.i. and a.ii. below.

- i. **Surface water - lakes, streams, wetlands, intermittent channels, and county/judicial ditches. Include any special designations such as public waters, shoreland classification and floodway/floodplain, trout stream/lake, wildlife lakes, migratory waterfowl feeding/resting lake, and outstanding resource value water. Include the presence of aquatic invasive species and the water quality impairments or special designations listed on the current MPCA 303d Impaired Waters List that are within 1 mile of the Project. Include DNR PWI number(s), if any.**

The Project Area is divided between the Upper Mississippi Region and the Great Lakes Region watersheds. Most of the Project Area is in the Upper Mississippi Region, HUC 02 (07). It drains to the southwest, ultimately to the Mississippi River (via Reservoir No. 2, O'Brien, Little O'Brien, and Swan Lake to Swan River). The eastern edge of the Project Area drains to the Great Lake Region, HUC 02 (04), to the southeast, ultimately to Lake Superior (via West Swan River to the St. Louis River) (USGS 2023).

The Project Area watersheds are further broken down into the following subregions:

- HUC 02 (07) – The Upper Mississippi Region is approximately 190,000 square miles and stretches from Minnesota in the North to Kentucky in the South, and from Indiana to South Dakota.
 - HUC 04 (0701) – Mississippi Headwaters subregion is approximately 20,200 square miles and includes the Mississippi River Basin above its confluence with the St. Croix River, excluding the Minnesota River Basin.
 - HUC 06 (070101) – Mississippi Headwaters Basin encompasses approximately 11,700 square miles and includes the Mississippi River Basin above Blanchard Dam (in Royalton, MN).
- HUC 02 (04) Great Lakes Region is approximately 238,000 square miles and incorporates all the great lakes reaching from Minnesota to Maine.
 - HUC 04 (0401) – The Western Lake Superior subregion encompasses approximately 2,260 square miles and includes the drainage into Lake Superior from the Ontario-Minnesota international boundary to and including the Montreal River Basin.
 - HUC 06 (040102) – St. Louis Basin is approximately 796 square miles and includes the Mississippi River Basin above its confluence with the St. Croix River, excluding the Minnesota River Basin.

The DNR has delineated Minnesota into a set of 81 Major Watersheds (8-digit HUCs). The Project Area is located within the Lake Superior St. Louis River (Major Watershed 3, HUC 04010201) and Mississippi River Grand Rapids (Major Watershed 9, HUC 07010103) (MNDNR undated). While they provide a guide to the extent of the watershed, they do not accurately reflect the current boundary conditions.

Based on field observations and review of topology, there is a mapping error in the DNR HUC watershed boundary separating the Lake Superior St. Louis River and Mississippi River Grand Rapids on the eastern side of the TSF. The current watershed boundary follows the outer limit of all historical TSF features, whereas the DNR HUC watershed boundary excludes a portion of the existing Stage 2 Exterior. This portion of the TSF had been used for tailings disposal approximately in the 1980s, and the landscape has not been significantly altered since that time, so watershed flow regimes are likely to have stayed the same since then. Figure 12.1 depicts a more accurate alignment of the current watershed boundary as compared to the HUC boundary.

Waterbodies

Lakes/Reservoirs

There are five lakes/reservoirs located in, or immediately downstream of, the Project Area, including: Reservoir 2 North, Reservoir No. 6, Reservoir No. 2, Hay Lake, and Swan Lake (Table 12.1). Lakes/reservoirs within the Project vicinity downstream of the Project area are shown on Figure 12.2. O'Brien Lake and Little O'Brien Lake are in the vicinity, however, they are not downstream of the TSF.

Table 12.1: Lakes/Reservoirs Downstream of the Project Area

Lake	DNR Lake/Stream ID	Watershed Size (acre)	Lake Area (acre)	Major Inflow	Outlet
Reservoir 2 North	31122800	333.39	60.47	Welcome Creek	Drainage Ditch to Reservoir No. 2
Reservoir No. 6	31122900	749.04	171.57	Outer Tailings Basin Second Stage Pond	Plant Make-up and Drainage Ditch between Reservoir 2 North and Reservoir No. 2
Reservoir No. 2	31103900	1,234.51	418.75	Drainage Ditch from Reservoir 2 North	O'Brien Diversion Channel
Hay Lake	31003700	309.70	38.83	Hay Creek	Hay Creek
Swan Lake	31006702	7,365.09	2,143.72	Hay Creek	Upper Swan River

Source: MNDNR 2023

Reservoir 2 North

Reservoir 2 North is a roughly 60-acre basin located south of TH 169 and immediately adjacent to the northwest corner of the TSF. It receives inflows from the City of Keewatin stormwater flows and Welcome Creek, which flows south of Welcome Lake near the main Keetac plant in the City of Keewatin (MNDNR 2010). Reservoir 2 North outlets to a non-regulated drainage ditch that connects to Reservoir No. 6 and Reservoir No. 2. Reservoir 2 North is included in the mining area, as defined under the current mining area.

Reservoir No. 6

Reservoir No. 6 is an approximately 172-acre basin located downstream of Reservoir 2 North and upstream of Reservoir No. 2. Reservoir No. 6 receives surface water from the TSF. It serves as the main source of water for the Keetac Processing Plant (MNDNR 2010). Reservoir No. 6 connects to a drainage ditch located between Reservoir No. 2 and Reservoir 2 North (SD 005 of Permit No. MN0055948). Water flows between Reservoir No. 6 and Reservoir No. 2 via the drainage ditch are dependent on the water levels in Reservoir No. 6 (MNDNR 2010).

If water levels become too low in Reservoir No. 6, water can be pumped from Reservoir No. 2 into Reservoir No. 6 to provide make-up water for the plant. Additionally, if water levels become too high in Reservoir No. 6 there is an emergency overflow from Reservoir No. 6 to Reservoir No. 2. Reservoir No. 6 is part of the Keetac operational process and is a public water regulated by the DNR.

Reservoir No. 2

Reservoir No. 2 is an approximately 419-acre basin that receives inflows from Reservoir 2 North and Reservoir No. 6 via a non-regulated drainage ditch. Reservoir No. 2 also receives wastewater flows from the combined Wastewater Treatment Plant (WWTP) of the Cities of Nashwauk and Keewatin, while also serving as the routine discharge and emergency overflow route for Reservoir No. 6 (MNDNR 2010). Reservoir No. 2 outlets to the O'Brien Diversion Channel.

Hay Lake

Hay Lake is an approximately 39-acre basin located along Hay Creek, downstream of the confluence of Hay Creek and the O'Brien Diversion Channel, and 3.5 miles upstream of Swan Lake. Inflows and outflows are via Hay Creek. Per the MPCA and 2010 FEIS (MNDNR 2010), Hay Lake is a wild rice-producing waterbody (Barr 2009).

Swan Lake

Swan Lake is an approximately 2,144-acre basin that receives inflow from 6 sources: Oxhide Creek, Pickerel Creek, O'Brien Creek downstream of TH 169, Hay Creek, Hart Creek, and Lebron Creek. The portion of O'Brien Creek upstream of O'Brien Lake (north of TH 169) is diverted into the O'Brien Diversion Channel and routed into Hay Creek, which then flows into Swan Lake. Per the MPCA and 2010 FEIS, Swan Lake is also a wild rice-producing waterbody (Barr 2009).

Stream

There are five streams located downstream of the TSF with potential to be impacted by the Project, including: Hay Creek, Swan River, West Swan River, the O'Brien Diversion Channel, and Welcome Creek. Table 12.2 describes the five streams nearest to the Project Area, as shown on Figure 12.2.

Table 12.2: Streams Downstream of the Project Area

Stream	Public Waters Inventory ID	Flow Regime	Stream Length (mi)	Inflow
Hay Creek	Public Water Stream	Perennial	8.5	O'Brien Diversion Channel (Receives inflows from Reservoir 4 and Reservoir No. 2)
Swan River	Public Water Stream	Perennial	87.07	Hay Creek
West Swan River	Public Water Stream	Perennial	41.74	Potential groundwater seepage from TSF
O'Brien Diversion Channel	Public Water Stream	Perennial	11.11	O'Brien Creek (Reservoir 4) and Reservoir No. 2
Welcome Creek	Public Water Stream	Perennial	1.5	Welcome Creek Weir

Source: 2010 and MNDNR 2024

Hay Creek

Hay Creek runs south from the existing TSF. Though National Hydrography Dataset (NHD) and PWI data depict that Hay Creek begins within the existing TSF, the landscape is historically affected from the existing Stage 2 Exterior embankments, as well as old borrow pits adjacent to the embankment. Wetlands and waterbodies within the Project's dam/dike footprint were delineated in August of 2021. In the field delineation, the stream features in the Project Area mapped in the NHD and PWI as Hay Creek were characterized as shallow marsh wetlands that formed in depressions resultant from previous anthropogenic disturbance (construction of the TSF) rather than a stream channel or identifiable waterway. The delineation results were field-verified during a site visit with the DNR and USACE and were confirmed by the DNR via a wetland determination (a Minnesota Wetland Conservation Act Notice of Decision) in August 2023, and by the USACE in a January 2024 Approved Jurisdictional Determination.

Hay Creek flows southwest from the headwaters for approximately 3.5 miles where the O'Brien Diversion Channel flows into Hay Creek. The creek then continues south for 1.5 miles where it enters Hay Lake. The creek exits Hay Lake and then flows southwest for an additional 3.5 miles into the southeast corner of Swan Lake (FEIS 2010). Some datasets, including the DNR PWI, label Hay Creek as Swan River beginning at its headwaters. This review classifies Hay Creek as the watercourse that extends from south of the TSF (and south of the Project Area) to the southeast corner of Swan Lake.

Swan River

Swan River begins at Swan Lake and exits the southwest corner of the lake before flowing south, eventually discharging into the Mississippi River (MNDNR 2010). Per the MPCA and 2010 MNDNR, Swan River is a wild rice-producing waterbody (Barr 2009).

West Swan River

West Swan River's headwaters begin at Kelly Lake, northeast of the Project Area near the Keetac Processing Plant. It flows along the east side of the TSF perimeter before eventually ending at its confluence with the East Swan River, approximately 12 miles southeast of the TSF.

O'Brien Diversion Channel

The Hanna Mining Company created the O'Brien Diversion Channel in approximately 1978. It receives dewatering flows from the west mine pits, O'Brien Creek, Reservoir 4, and the plant process water that is discharged ultimately through Reservoir No. 2. The O'Brien Diversion Channel flows into Hay Creek, which eventually flows into Swan Lake (MNDNR 2010).

Welcome Creek

The headwaters of Welcome Creek begin at the Welcome Creek weir (SD002 of Permit No. MN 0031879). Welcome Creek starts approximately one mile south of the Keetac Processing Plant and flows south to its outlet into Reservoir 2 North. Between its headwaters and discharge into Reservoir 2 North, additional flows from the City of Keewatin storm sewer system occur. Over time, Welcome Creek has been straightened and has experienced changes in watershed boundaries due to previous mining activities (MNDNR 2010).

Water Quality

Where available, water quality data were retrieved from the MPCA Lakes and Stream water quality dashboard (v. 1.0.4) for the water bodies located in or immediately downstream of the Project Area and with potential to be impacted by the Project.

Table 12.3 below presents water quality and trophic status data for lakes and reservoirs in the Project Area, based on a 10-year average of summer samples from 2005 to 2021. The Trophic State Index (TSI) is used to assess the nutrient richness of these water bodies, ranging from oligotrophic (clear, low in nutrients) to hypereutrophic (green, very high nutrient levels).

Among the five lakes/reservoirs in the Project Area, limited water quality data were available only for Hay Lake, and Swan Lake (Table 12.3). Based on data averaged over 10 years, from 2005 to 2014, the lakes showed varying trophic statuses, ranging from mesotrophic (i.e., moderately clear) to eutrophic (i.e., green). Hay Lake is classified as eutrophic, indicating high nutrient levels. Swan Lake is classified as mesotrophic, suggesting moderate nutrient levels and intermediate water quality conditions. While Hay Lake had relatively high total phosphorus concentrations (830 ppb), consistent with its eutrophic status, Swan Lake, by comparison, had appreciably lower phosphorus levels (17 ppb), consistent with its mesotrophic status and indicative of overall acceptable water quality conditions. Water transparency was found to be comparatively higher in Swan Lake at 4 meters, compared to Hay Lake (1 meter) indicating better water quality conditions in the two mesotrophic lakes.

Hay Lake has the highest TSI value of 81, falling above the expected range of 38 to 53 for lakes in the same ecoregion. This high TSI confirms its eutrophic status and suggests that Hay Lake is nutrient-rich compared to other lakes in the region. Swan Lake has TSI values of 44, which fall within the expected range for the ecoregion.

Although Swan Lake has good clarity and recreational use it is reported to be impaired based on mercury concentrations in fish tissue.

Table 12.3: Water Quality and Trophic Status for Lakes and Reservoirs in the Project Area Based on a 10-Year Average of All Summer Samples

Lakes	Identification No.	Water Transparency (m)	Chlorophyll a (ppb)	Total Phosphorus (ppb)	Trophic Status	Overall Trophic Status Index	Expected TSI Range in the Same Ecoregion
Reservoir 2 North*	07010103-576	n/a	n/a	n/a	n/a	n/a	n/a
Reservoir No. 2*	07010103-580	n/a	n/a	n/a	n/a	n/a	n/a
Reservoir No. 6	07010103-578	n/a	n/a	n/a	n/a	n/a	n/a
Hay Lake	31-0037-00	1	n/a	830	Eutrophic	81	38–53
Swan Lake	31-0067-02	4	5	18	Mesotrophic	44	38–53

*Water chemistry values are based on data collected from 2005-2014 and TSI values are calculated based on data collected from 2008–2017.

Two streams downstream of the Project Area were surveyed in 2015 for various water quality parameters, including nitrogen, total phosphorus, total suspended solids (TSS), ammonia, dissolved oxygen, and pH (Table 12.4). Additionally, fish and invertebrate communities were sampled to obtain Index of Biotic Integrity (IBI) scores that would be indicative of overall ecological integrity in the streams. No data were available for West Swan River and Welcome Creek.

Total phosphorus and nitrogen concentrations at all streams were relatively low, indicating low nutrient pollution from sources such as wastewater discharges or development and therefore a reduced risk of eutrophication. Dissolved oxygen levels were relatively high in Hay Creek (8.51 mg/L) indicating well-oxygenated conditions. Based on the IBI scores, Hay Creek is classified as ‘good’ and ‘fair’ for fish and invertebrate community structure, respectively, suggesting that this stream has a relatively healthy aquatic ecosystem that could be affected by temporary, indirect impacts from construction activities, such as increased turbidity and localized sedimentation due to vegetation clearing and other construction activities. These impacts, however, are planned to be mitigated through the implementation of erosion control measures and BMPs and therefore, are not expected to cause any substantial impacts to the water quality. Like Hay Creek, Swan River has a ‘good’ and ‘fair’ rating based on fish and invertebrate IBIs, respectively. This stream, however, is classified as impaired based on mercury concentrations in sampled fish tissue and sulfate impairment affecting wild rice production.

Table 12.4: Water Quality and Index of Biotic Integrity Scores for Streams in the Project Area, 2015 survey*

Stream	Identification No.	Biological Stream Station ID	Nitrogen (mg/L)	Total Phosphorus (mg/L)	TSS (mg/L)	Ammonia (mg/L)	Dissolved Oxygen (mg/L)	pH	Fish IBI Score	Invertebrate IBI Score
Hay Creek	07010103-545	99UM061	n/a	0.039	4.8	< 0.1	8.51	8.02	60—good	60—Fair
Swan River	07010103-753	10EM194	< 0.05	0.03	< 4	< 0.1	n/a	n/a	68—good	65—Fair
O'Brien Creek	07010103-583	15UM069	< 0.05	0.022	8.8	< 0.1	9.85	7.3	59—good	63—Fair
Welcome Creek	07010103-581		n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a

*No data were available for the West Swan River.

Impaired and Infested Waters

States are required to inventory water quality standards and submit a list of impaired and threatened waters every two years to the USEPA, per Clean Water Act Section 303(d). There are no infested waterbodies within five miles of the Project Area (MNDNR 2022a). Impaired waterbodies within five miles downstream of the Project Area are shown in Table 12.5 (MPCA 2024).

Table 12.5: Impaired Waterbodies Within 5 Miles Downstream of Project Area

Waterbody	Public Waters Inventory ID	Impairment	TMDL
Swan River	07010103-753	Mercury Sulfate	E. coli, Aquatic consumption— mercury in fish tissue N/A
Swan Lake (Main Basin)	31-0067-02	Mercury	Aquatic consumption— mercury in fish tissue
Swan Lake (West Bay)	31-0067-01	Mercury	N/A
Swan Lake (Southwest Bay)	31-0067-03	Sulfate, Mercury	N/A
Hay Lake	31-0037-00	Sulfate	N/A

Ecologically Significant Waterbodies

There are no trout streams or lakes, designated wildlife lakes, migratory waterfowl feeding/resting lakes, or outstanding resource value waters located in, or immediately downstream of, the Project Area.

Floodplains

According to the Federal Emergency Management Agency Flood Plain Map Service Center, there are no mapped floodplains within or in the vicinity of the Project Area (FEMA 2021). Flooding frequency in the vicinity of the Project Area is derived from the Natural Resource Conservation Service SSURGO database, which provides an estimate of the likelihood of flooding each year, based on a soil's likelihood to be inundated by surface water from overflowing streams or from adjacent slopes (Figure 7.10). The flooding frequency classifications range from non (no reasonable possibility of flooding) to very frequent (more than 50 percent chance of flooding in all months in any year). West Swan River and Hay Creek (outside of the Project Area) experience "frequent" flooding indicating that there is more than a 50 percent chance of flooding in any year, but less than a 50 percent chance of flooding in all months in any year (USDA NRCS 2023).

If unmapped floodplains are present in the Project Area, they could be impacted by soil compaction. Impacts associated with compaction and mitigation measures that would be implemented to minimize such impacts are identified in Section 11b-Soils.

Shoreland classifications are discussed in Table 10.2 – Shoreland Zoning Classifications within Section 10 – Land Use.

Wetlands

Formal field-focused wetland and waterbody delineations were conducted to identify the extent and characteristics of aquatic resources situated in the Project Area. Based on the delineations, the following wetland/water types were identified in the Project Area: deep water, shallow marsh, deep marsh, fresh (wet) meadow, coniferous bogs, shrub-carr, alder thicket, and hardwood swamp. Wetlands were identified and mapped in accordance with the Routine On-Site Determination Method as specified in the 1987 USACE Wetlands Delineation Manual and the Regional Supplement to the Corps of Engineers Wetland Delineation Manual: Northcentral and Northeast Region (Version 2.0) (USACE 1987, 2012). Delineated jurisdictional wetlands and waters within the permanent and temporary impact footprints are shown on Figure 12.3 (parts 1-4).

Wetlands and waterbodies within the Stage 2 Exterior were delineated in May of 2021. The resulting Wetland Assessment and Delineation was submitted to the DNR in July 2021 to demonstrate that most of the wetlands in the TSF should be considered “incidental wetlands” and not regulated under the Minnesota Wetland Conservation Act (WCA). According to Minnesota Rules 8420.0930, Subp. 1,

Impacts to wetlands that the landowner can demonstrate, to the satisfaction of the local government unit, were created by pits, stockpiles, or tailing basins, and by actions the purpose of which was not to create the wetland according to part 8420.0105, subpart 2, Item D, are not regulated under this chapter.

Later in July 2021, a WCA Notice of Decision (NOD) was issued by the DNR that approved the incidental status of 237.09 acres within the Stage 2 Exterior of the TSF, confirming that these wetlands were not regulated under WCA. Additional evidence to support the incidental status of 322.10 acres of wetlands within the TSF was submitted following the July 2021 NOD. These 322.10 acres were deemed incidental in a January 2022 NOD, leaving 127.31 acres of regulated wetlands within the Stage 2 Exterior. In a September 2022 NOD, the DNR approved the use of 127.31 surplus credits from the previously approved Palisade Project (Bank Service Area 5). As all wetlands within the Stage 2 Exterior have been deemed incidental or mitigated for, they are not included in this discussion of existing wetlands or in subsequent wetland impact discussions.

Wetlands and waterbodies within the Project’s dam/dike footprint were delineated in August of 2021. Wetlands and waterbodies within the temporary construction areas, the pipeline footprint, and the separation and/or dewatering infrastructure footprint were delineated in August of 2023. On August 11, 2023, the DNR issued a formal wetland determination (a Minnesota Wetland Conservation Act Notice of Decision) for the dam/dike footprint that was delineated in August of 2021. A revised wetland delineation report was submitted to the DNR for jurisdictional review in October of 2023. The revised delineation report included the original 2021 dam/dike footprint (2021 Study Area), as well as the pipeline footprint, the separation facility footprint, temporary workspace footprints, and minor augmentations to the dam/dike footprint (2023 Study Area). At the time of EAW submission to the DNR, the DNR has not made a determination regarding the jurisdictional status of additional wetland and waterbody features included in the revised delineation report. Figure 12-4 depicts the spatial extent of the portion of the Project Area for which the jurisdictional determination has been completed (364.8 acres) and the portion of the Project Area for which the jurisdictional extent of wetland and waterbody features remains under review (333.5 acres).

Table 12.6 below provides acreages of all WCA-jurisdictional wetlands in the Project Area (including areas for which a determination has been made and areas that are currently under review by the DNR). These acreages exclude incidental wetlands (which totaled 71.12 acres).

Minnesota’s WCA does not regulate impacts to “incidental” wetlands. Incidental wetlands are defined as “...wetlands that the landowner can demonstrate, to the satisfaction of the local government unit, were created by pits, stockpiles, or tailings basins, and by actions the purpose of which was not to create the wetland...” (M.R. 8420.0930, Subp. 1). In addition, incidental wetlands are further defined in M.R. 8420.0105, Subp. 2.D. as follows:

This chapter does not regulate impacts to incidental wetlands. "Incidental wetlands" are wetland areas that the landowner can demonstrate, to the satisfaction of the local government unit, were created in nonwetland areas solely by actions, the purpose of which was not to create the wetland. Incidental wetlands include drainage ditches, impoundments, or excavations constructed in nonwetlands solely for the purpose of effluent treatment, containment of waste material, storm water retention or detention, drainage, soil and water conservation practices, and water quality improvements and not as part of a wetland replacement process that may, over time, take on wetland characteristics.

Some delineated wetlands, detailed in the delineation reports, were created by grading, excavating, or the tailings basin, or for drainage purposes and therefore, may be considered “incidental.” These wetlands are excluded from Figure 12.3 (parts 1-4) and Table 12.6 and were not included in the impact analysis for the Project.

Table 12.6: Field Delineated Potentially Direct WCA-Regulated Wetlands Impacts Within Project Area**

Wetland Type	Proposed Stage 2 Exterior Dam and Dike Footprints (Permanent Impact; acres)	Permanent Access Road (acres)	Separation and/or Dewatering Infrastructure and Pipeline (Permanent Impact; acres)	Temporary Construction Areas (acres)	Total (acres)
Alder Thicket	11.01	3.44	0.00	0.00	14.45
Coniferous Bog	8.25	1.84	0.00	0.00	10.09
Deep Marsh	6.69	0.32	0.06	2.17	9.25
Deep Water	21.88	4.75	0.00	0.00	26.63
Fresh (wet) Meadow	0.78	0.16	1.08	0.11	2.14
Hardwood Swamp	0.74	0.96	0.00	1.07	2.77
Shallow Marsh	26.26	2.73	0.15	2.80	31.95
Shrub-carr	4.95	1.41	0.00	3.60	9.95
Total	80.55	15.62	1.30	9.75	107.22

***If wetland type sums don't match totals exactly, it is due to rounding in GIS.*

**Wetland acreages in Table 12.6 reflect only the field delineated acreages in the proposed Stage 2 Exterior dams and dikes, access road, separation infrastructure, and temporary construction acres.*

Indirect wetland analyses were performed by Barr and 0.58 acre of wetlands are expected to be impacted by Project activities. Additionally, 0.39 acre of wetlands will be indirectly impacted temporarily and 0.19 acre of indirect impacts will come from access road construction. Temporary impacts to wetlands would take place in under 6 months. The wetland types that would be indirectly impacted are fresh (wet) meadow and hardwood swamp, as shown in Table 12.7.

Table 12.7: Field Delineated Potentially Indirect WCA-Regulated Wetland Impacts Within Project Area^**

Wetland Type	Proposed Stage 2 Exterior Dam and Dike Footprints (Indirect Impact; acres)	Permanent Access Road (Indirect impact; acres)	Separation and/or Dewatering Infrastructure and Pipeline (Indirect Impact; acres)	Temporary Construction Areas (Indirect Impact; acres)	Total (acres)
Alder Thicket	0.00	0.0	0.00	0.00	0.00
Coniferous Bog	0.00	0.0	0.00	0.00	0.00
Deep Marsh	0.00	0.0	0.00	0.00	0.00
Deep Water	0.00	0.0	0.00	0.00	0.00
Fresh (wet) Meadow	0.00	0.08	0.00	0.00	0.08
Hardwood Swamp	0.00	0.11	0.00	0.39	0.50
Shallow Marsh	0.00	0.0	0.00	0.00	0.00
Shrub-carr	0.00	0.0	0.00	0.00	0.00
Total	0.00	0.19	0.00	0.39	0.58

**If wetland type sums don't match totals exactly, it is due to rounding in GIS.*

Based on information with the wetland delineation reports, wetlands within the Project Area have overall wetland functional assessment ratings ranging from high to low based on an abbreviated version of the *Minnesota Routine Assessment Method for Evaluating Wetland Functions, Version 3.4*. These include evaluation of vegetative diversity, outlet configuration, upland condition, wildlife habitat, and public value.

- ii. **Groundwater – aquifers, springs, seeps. Include: 1) depth to groundwater; 2) if Project is within a MDH wellhead protection area; 3) identification of any on-site and/or nearby wells, including unique numbers and well logs if available. If there are no wells known on-site or nearby, explain the methodology used to determine this.**

The Project Area overlies several groundwater aquifers including the Cretaceous Bedrock Aquifer, the Biwabik Iron Formation Aquifer, the Quaternary water-table aquifer, and the Quaternary buried artesian aquifer.

The Quaternary water-table aquifer is an unconfined surficial aquifer consisting of unconsolidated sediments while the Quaternary buried artesian aquifer is a confined aquifer underlying a layer of low-permeability material, known as an aquitard (MNDNR 2021).

The Cretaceous bedrock aquifer consists of sandstone layers interbedded with thick layers of shale. The Cretaceous Aquifer is located near the ground surface, with finished wells in the area ranging generally from 7 to 1,437 feet in depth. Aquifer recharge mainly occurs through infiltration and precipitation through overlying drift.

Wells in vicinity to the Project Area have been completed within the Quaternary water-table aquifer and Quaternary buried artesian aquifer with observed static water levels generally ranging from 3 to 20 feet below ground surface (bgs) for the Quaternary water-table aquifer and 20 to 35 feet bgs in the Quaternary buried-artesian aquifer (Minnesota Department of Health 2025). The Biwabik Iron Formation Aquifer is a sedimentary bedrock aquifer composed of iron-rich chert (Adolphson et al., 1981). Drinking water for the City of Keewatin is sourced from the Biwabik Iron Formation Aquifer via two municipal wells located to the north and upgradient of the TSF (Well Nos. 1 and 3).

There are no springs or seeps within the Project Area.

- 1) Depth to groundwater: Shallow groundwater at the Project Area is estimated to be approximately 3 to 30 feet below ground surface, according to a review of available Minnesota Department of Health well logs in the area.
- 2) Project location in relation to MDH wellhead protection area: The Project Area is not located within any wellhead protection areas and the nearest Wellhead Protection Areas (Keewatin and Keetac) are situated northwest and up gradient of the Project Area.
- 3) Identification of on-site and/or nearby wells:
 - o On-Site Wells:
 - There are no active water monitoring wells within or adjacent to the Project Area.
 - Some historical wells (referred to as MW-1, MW-11 and MW-12) were located at the south-west boundary of the Stage 2 Exterior. A Groundwater Sensitivity analysis performed in support of the Project Phase I Wetland Conservation Act Wetland Replacement Plan (WRP) found that groundwater quality adjacent to the TSF was within acceptable ranges when compared to the applicable standards (Barr 2022). The DNR decision document agreed with this conclusion. U. S. Steel is developing a groundwater monitoring plan to address a condition of the DNR WCA Decision document.

- U. S. Steel maintains internal geotechnical monitoring (instrument) wells within the existing TSF to monitor conditions related to the structural integrity of the TSF. Additional instrument wells would be installed to continue monitoring the stability of the TSF.
- Nearby Wells: A review of the Minnesota Well Index and the USGS National Water Information System Mapper indicates that two domestic wells exist within 0.5 mile of the Project Area, shown on Figure 12.5. The closest domestic well to the Project Area is 0.3 miles to the east. Several historical ‘other wells’ are located near the Project Area. These other wells are abandoned and used for non-potable purposes.

The methodology used to determine the presence of on-site and nearby wells included a review of the Minnesota Well Index and the USGS National Water Information System Mapper.

b. Describe effects from Project activities on water resources and measures to minimize or mitigate the effects in Item b.i. through Item b.iv. below.

i. Wastewater - For each of the following, describe the sources, quantities and composition of all sanitary, municipal/domestic and industrial wastewater produced or treated at the site.

The monitoring parameters in the facility’s industrial wastewater, which is discharged through NPDES Permit No. MN0055948 outfall SD-005, include sulfate, pH, flow, specific conductance, selenium, mercury, dissolved iron and, suspended solids. Levels of mercury and other heavy metals are relatively low based on historical monitoring. The average discharge volume recorded during 2024 was 4.7 million gallons per day (MGD). The design of the water retention dam includes a seepage reduction feature along the upstream face of the dam to lower the phreatic surface and limit seepage through the dam. The seepage reduction feature would consist of either a linear low-density polyethylene (LLDPE) geomembrane or an inclined mechanically placed soil-cement blanket consisting of a mixture of coarse tailings and cement. In addition to the design features of the dam, the project proposes to add additional thickeners as part of the classification system allowing for the recycling of more water to the plant prior to tailings disposal.

- 1) If the wastewater discharge is to a publicly owned treatment facility, identify any pretreatment measures and the ability of the facility to handle the added water and waste loadings, including any effects on, or required expansion of, municipal wastewater infrastructure.**

The facility does not discharge any wastewater to a publicly owned treatment facility.

- 2) If the wastewater discharge is to a subsurface sewage treatment system (SSTS), describe the system used, the design flow, and suitability of site conditions for such a system. If septic systems are part of the Project, describe the availability of seepage disposal options within the region to handle the ongoing amounts generated as a result of the Project. Consider the effects of current Minnesota climate trends and anticipated changes in rainfall frequency, intensity and amount with this discussion.**

There are no SSTSs on-site.

- 3) If the wastewater discharge is to surface water, identify the wastewater treatment methods and identify discharge points and proposed effluent limitations to mitigate impacts. Discuss any effects to surface or groundwater from wastewater discharges, taking into consideration how current Minnesota climate trends and anticipated climate change in the general location of the Project may influence the effects.**

Water from the TSF flows into Reservoir No. 6 where it could be pumped for use in process, or flow into Reservoir 2 North that has the permitting outfall: SD005 (Figure 12.8). From SD005, water flows to Reservoir No. 2, the O'Brien Diversion Channel, Hay Creek, Hay Lake and Swan Lake. Discharges are subject to NPDES permit limits that are based on water quality standards. The NPDES Permit No. MN0055948 is in the process of reissuance. The draft NPDES/SDS permit is currently on public notice (July 8 – September 8, 2025) and contains a compliance schedule for U.S Steel to attain compliance with the final sulfate effluent limits. This permit reissuance actions include updating sulfate compliance schedules.

To minimize impacts, the process facility employs several mitigation measures:

- Use of recirculating wet scrubber and lime treatment to remove sulfate (prior to discharge into the TSF)
- Oil/water separators to remove oil (prior to discharge into the TSF)
- Settling ponds to remove suspended solids prior to discharge
- Compliance with NPDES permit limits

The State of Minnesota has been experiencing a warming trend, with warmer winter lows and summer highs, and more frequent extreme precipitation events (MNDNR 2024). These trends are expected to continue in the coming decades because of climate change (MPCA 2017, 2023). Climate change in Northern Minnesota, characterized by increased precipitation, heavy rainfall events, warmer temperatures, and altered evaporation rates, could substantially influence the Keetac facility's wastewater management. These changes may lead to higher wastewater volumes, increased erosion and contaminant loads, altered water balance in the TSF, and challenges in meeting NPDES discharge limits. Additionally, the timing and quantity of runoff and stream flows could affect the receiving waters' capacity to assimilate wastewater, while warmer temperatures and changes in hydrology and water chemistry could potentially exacerbate mercury methylation and sulfide formation downstream. To mitigate these impacts, the facility may need to adjust its treatment systems, holding reservoir capacities, settling pond maintenance, and the timing and volume of discharges to match the changing conditions.

- ii. Stormwater - Describe changes in surface hydrology resulting from change of land cover. Describe the routes and receiving water bodies for runoff from the Project site (major downstream water bodies as well as the immediate receiving waters). Discuss environmental effects from stormwater discharges on receiving waters post-construction including how the Project will affect runoff volume, discharge rate and change in pollutants. Consider the effects of current Minnesota climate trends and anticipated changes in rainfall frequency, intensity and amount with this discussion. For projects requiring NPDES/SDS construction stormwater permit coverage, state the total number of acres that will be disturbed by the Project and describe the SWPPP, including specific BMPs to address soil erosion and sedimentation during and after Project construction. Discuss permanent stormwater management plans, including methods of achieving volume reduction to restore or maintain the natural hydrology of the site using green infrastructure practices or other stormwater management practices. Identify any receiving waters that have construction-related water impairments or are classified as special as defined in the Construction Stormwater permit. Describe additional requirements for special and/or impaired waters.**

Changes in surface hydrology resulting from change of land cover:

The construction of the Project would require vegetation clearing and earthworks, which would have a localized impact on the natural surface hydrology and drainage patterns within its footprint. For example, site preparation for the separation facility would have engineered stormwater design, and construction of dams and dikes would introduce additional slope to areas that are currently low relief. Precipitation falling within the Stage 2 Exterior would continue to be retained within the basin, as part of the ponded water. The exterior slopes of the dikes/dams themselves could generate some runoff; however, much of the rainfall that falls on the embankments is expected to infiltrate. Any surface runoff would be managed through the SWPPP to prevent erosion and downstream impacts.

Routes and receiving water bodies for runoff from the Project site:

The Upper West Swan River and Hay Creek watershed boundary runs along the eastern crest of the existing Stage 2 Exterior berm (Figure 12.1). The Project has been designed to maintain the same preexisting crest alignment as the dikes are elevated, so stormwater runoff would continue to flow to the same watersheds as it did pre-construction (Figure 12.6). Therefore, even though construction of the dikes will encroach into the Upper West Swan watershed, the Project's dikes will not change the watershed boundary.

Currently, process water (not slurry) is discharged into the historic Stage 1 impoundment when an East tailings pipeline needs to be drained. This water drains to the south-east corner of the impoundment and then flows south into the Stage 2 Exterior via culvert under a road and the existing berm. As described below, the Stage 2 Exterior basin outflows into Reservoir No. 6 (a process water waterbody) which has a permitted outfall that is part of the Mississippi River watershed.

The Project would raise the dikes around Stage 2 Exterior and the culvert currently allowing water from the historic Stage 1 impoundment area would need to be removed. U. S. Steel would cease discharging all process water into the historic Stage 1 impoundment, so any new water would be rainfed. Rainwater from the Stage 1 impoundment would then naturally flow to the east and into the Upper West Swan River watershed similar to pre-mining conditions. The changes to the watershed boundary as a result of the Project are shown in Figure 12.7.

Construction of the Project and this change in rainwater runoff flow into the Upper West Swan would result in a net increase in catchment for the Great Lakes watershed of 669.9 acres. The catchment for the Hay Creek watershed (part of the Mississippi River watershed) would be reduced by an equivalent amount. However, the loss of water to the Mississippi would be negligible given the proportion of the watershed that this represents; it would be partially offset by process water remaining within the TSF, including the additional water added through ongoing tailings deposition, and because the removed area was flowing into Reservoir No. 6 which is used for mine process water as discussed below.

The Stage 2 Exterior basin is designed to be a closed system with no direct discharges to surface waters. Runoff from within the basin would be directed to the interior pond and ultimately to Reservoir No. 6 via a decant structure. This allows for settling of suspended tailings particles before the water is released.

The only potential routes for basin water to reach downstream water bodies are through the existing permitted outfall from Reservoir No. 6 via Reservoir No. 2 North - SD005 (culvert outfall) and into Reservoir No. 2, as shown on Figure 12.8. The outfall is monitored and has specific discharge limits and requirements set in the facility's NPDES/SDS permit.

From Reservoir No. 2, the flow path to downstream waters includes the O'Brien Diversion Ditch, Hay Creek, Hay Lake and Swan Lake. Swan Lake is the culminating receiving water body for the Project site, located several miles downstream, and ultimately discharges into the Mississippi River.

Environmental effects from stormwater discharges on receiving waters post-construction:

The Project's alteration of natural runoff patterns has the potential to have a minor change to flows to downstream water bodies compared to pre-construction conditions. There would be some change to the Upper West Swan and Hay Creek watershed boundaries as noted in the *Routes and receiving water bodies for runoff from the Project site* section above. This may result in a small increase in flow to the Upper West Swan.

To manage the increased runoff rates and volumes from the exterior slopes of the new dikes/dams, the SWPPP would implement several BMPs outlined in the existing plan. These include installation of silt fence, routine inspections of site conditions and stormwater runoff to identify any issues or maintenance needs. Erosion would be prevented on dike/dam slopes through the deposition of coarse tails or planting of vegetative cover, with slopes maintained and inspected regularly.

The Project may have minor impacts on flow variability of the waterbodies in the system because of the loss of wetlands within the Project footprint, but within the greater context of the watershed, ecological function and ecosystem services are unlikely to be altered.

To address the potential impacts of climate change on stormwater management, the SWPPP would be updated to include provisions for more frequent site inspections, especially during snowmelt and precipitation runoff events. As outlined in the SWPPP, the plan would be reviewed at least annually and modified as necessary to reflect any changes in site conditions, monitoring results, or regulatory requirements.

NPDES/SDS construction stormwater permit requirements:

The need for an NPDES/SDS construction stormwater permit is triggered by the proposed land disturbance exceeding the one-acre threshold. For this Project, approximately 608.6 acres would be permanently impacted and 89.8 acres would be temporarily impacted. A total of approximately 225,000 cubic yards of soil is expected to be excavated or graded, representing a substantial disturbance footprint. The construction stormwater permit for this Project was obtained in April 2024.

An important component of the construction stormwater permit is the development and implementation of a construction phase SWPPP. Its purpose is to identify all potential sources of stormwater pollution from the construction activities and prescribe appropriate BMPs to minimize erosion, sedimentation and other impacts.

Specific elements that would be addressed in the construction SWPPP include:

- Detailed erosion and sediment control plans showing the locations and types of BMPs to be installed, such as silt fences, check dams, sediment basins, inlet protection, etc. The Dam Safety Permit also has explicit requirements for erosion control measures to be installed and maintained in accordance with the *Minnesota Stormwater Manual*.
- Procedures for stabilizing exposed soils during and after construction, including temporary and permanent seeding, mulching, erosion control blankets, etc. The Dam Safety Permit requires all exposed soils to be stabilized within 72 hours of completion.
- Pollution prevention measures for activities such as vehicle fueling and maintenance, concrete washout, storage of hazardous materials, etc. This includes having adequate spill kits on-site and training personnel on their use.
- Inspection and maintenance schedules for all BMPs to ensure they remain effective over time. This will involve more frequent inspections than the routine industrial SWPPP due to the active nature of construction.
- Corrective action procedures to address any failures or deficiencies identified during inspections.

- Documentation and recordkeeping requirements, including site maps, BMP specifications, inspection reports, corrective actions, etc.

Overall, the construction SWPPP represents a comprehensive plan that is tailored to the specific conditions and risks associated with the Stage 2 Exterior basin construction. Its effective implementation would prevent substantial adverse impacts to downstream receiving waters during the active disturbance phase.

NPDES/SDS industrial stormwater requirements:

Facilities in certain industries that store materials, waste, or equipment outdoors are subject to industrial stormwater regulations administered by the MPCA. Approximately 6,000 acres of the TSF contain industrial activities or significant materials that may come in contact with stormwater. The primary Standard Industrial Classification (SIC) code which applies to operations at Keetac is 1011- Iron Ores, but the ancillary activities primarily taking place at the TSF include outdoor storage of significant materials, dust or particulate-generating processes, and wastewater treatment and solid waste management. Keetac currently operates under two NPDES permits that contain stormwater conditions/requirements— NPDES/SDS Permit MN0031879 governs water discharged from the plant and mining activities, while NPDES/SDS Permit MN0055948 governs water discharged from the TSF. After construction of the Stage 2 Exterior basin is completed, stormwater management would transition to the post-construction or operational phase. At this point the construction SWPPP would no longer be applicable, and stormwater would be managed under Keetac’s updated industrial SWPPP as part of the NPDES/SDS Permit. Permit reissuance for MN0055948 is in progress and will include industrial stormwater requirements.

Permanent stormwater management plans:

The existing SWPPP already outlines a range of stormwater control measures and BMPs that will continue to be implemented. These include good housekeeping practices, preventative maintenance, employee training, and spill prevention and response procedures. The SWPPP also includes regular inspections of the site to identify any issues or maintenance needs.

In the long-term, temporary construction areas and the slopes of the completed portions of the dam and dikes would return to vegetated cover, which would help to stabilize soils and reduce erosion potential. The detention effect of the interior basin pond would serve as a primary BMP for capturing and slowly releasing runoff from the Stage 2 Exterior. This detention would allow for settling of suspended tailings particles and help to regulate discharge rates to Reservoir No. 6 and downstream waters. Regular maintenance, including removal of accumulated sediments back to the TSF deposition areas would help sustain its stormwater treatment function over time.

Operations of the TSF will not be changed by the Project construction. Therefore, changes to water quality post-construction are not anticipated. No change to the overall watershed health scores is anticipated because of the operation of the TSF.

As with the construction phase SWPPP, the post-construction stormwater management plan would be periodically reviewed and updated to reflect any changes in site conditions, regulatory requirements, or climate patterns.

Receiving waters with construction-related impairments or special classification:

Hay Lake and the southwest bay of Swan Lake are identified as impaired waters for wild rice sulfate but do not have any construction-related impairments or special classifications. Active construction stormwater management activities are unlikely to impact the impairment of the receiving waters. It is anticipated there would be no material change in water quality from the no action alternative.

In addition to the wild rice sulfate impairment, Swan Lake is also listed as impaired for mercury in fish tissue. This impairment is not directly related to construction activities but is still relevant for the facility's overall stormwater management and NPDES/SDS permit compliance. Discharges from the Keetac site will continue to be monitored in accordance with permit requirements.

Additional requirements for special and/or impaired waters:

Keetac's NPDES/SDS permits are subject to the requirements of the Statewide Mercury TMDL due to the mercury impairment in Swan Lake. The TMDL allows for a wasteload allocation of 4 kg/year of mercury for the Northeast Region of Minnesota, which includes the Keetac site. However, the TMDL does not include any specific stormwater control requirements related to industrial discharges.

For the wild rice sulfate impairment in Hay Lake and the southwest bay of Swan Lake, a permit reissuance is in progress and will include updated compliance schedules for sulfate. Average sulfate concentration in the discharge from the tailings basin (SD 005) which flows to Hay Lake is 120 mg/L in 2024. The standard is 10 mg/L.

While the existing SWPPP does not outline any specific stormwater control measures or BMPs related to mercury or sulfate discharges, it does include general measures for minimizing pollutant loading in stormwater runoff, as follows:

- Regular inspections of the site to identify any issues or maintenance needs.
- Implementation of spill prevention and response procedures.
- Employee training on stormwater pollution prevention.
- Ongoing maintenance of stormwater control structures and equipment.

The above measures will help reduce the potential for mercury and sulfate loading from the site. The SWPPP will be reviewed and updated annually to reflect any changes in regulatory requirements or site conditions. If additional mercury or sulfate control measures are deemed necessary based on monitoring results or regulatory changes, they will be incorporated into an updated SWPPP at that time.

- iii. Water appropriation - Describe if the Project proposes to appropriate surface or groundwater (including dewatering). Describe the source, quantity, duration, use and purpose of the water use and if a DNR water appropriation permit is required. Describe any well abandonment. If connecting to an existing municipal water supply, identify the wells to be used as a water source and any effects on, or required expansion of, municipal water infrastructure. Discuss environmental effects from water appropriation, including an assessment of the water resources available for appropriation. Discuss how the proposed water use is resilient in the event of changes in total precipitation, large precipitation events, drought, increased temperatures, variable surface water flows and elevations, and longer growing seasons. Identify any measures to avoid, minimize, or mitigate environmental effects from the water appropriation. Describe contingency plans should the appropriation volume increase beyond infrastructure capacity or water supply for the Project diminish in quantity or quality, such as reuse of water, connections with another water source, or emergency connections.**

The proposed Project will not require water appropriation.

iv. Surface Waters

- a) Wetlands - Describe any anticipated physical effects or alterations to wetland features such as draining, filling, permanent inundation, dredging and vegetative removal. Discuss direct and indirect environmental effects from physical modification of wetlands,**

including the anticipated effects that any proposed wetland alterations may have to the host watershed, taking into consideration how current Minnesota climate trends and anticipated climate change in the general location of the Project may influence the effects. Identify measures to avoid (e.g., available alternatives that were considered), minimize, or mitigate environmental effects to wetlands. Discuss whether any required compensatory wetland mitigation for unavoidable wetland impacts will occur in the same minor or major watershed and identify those probable locations.

Construction Impacts and Mitigation

Construction of the Project would result in both permanent and temporary impacts to potentially WCA-regulated wetlands. Temporary impacts would take place in under six months. Wetland acreages in Tables 12.6 and 12.7 represent Project-related impacts except those listed for pipeline construction, as pipeline construction would occur aboveground and would not impact existing WCA-regulated wetlands. As mentioned previously, the DNR had not made a determination regarding the jurisdictional status of wetlands and waterbodies mapped during the August 2023 delineations (i.e., those included in the Project Area). Thus, the pending determination may require updates, which would affect both impact and mitigation acreages. The Project would permanently impact 80.55 acres of WCA-regulated wetlands because of dam and dike work, and 15.62 acres of WCA-regulated wetlands for the construction of the permanent access road. The access road is also expected to indirectly impact 0.19 acre of WCA-regulated wetlands. Construction of the separation and/or dewatering infrastructure would permanently impact 1.30 acres of WCA-regulated wetlands. In total, 97.47 acres of WCA-regulated wetlands would be permanently and directly impacted with an additional 0.19 acre of indirect impacts. The Project would temporarily impact 9.75 acres of WCA-regulated wetlands because of equipment staging and temporary site access. Temporary construction areas are also anticipated to indirectly impact 0.39 acre of wetlands.

Construction of the pipeline would occur above 0.25 acre of wetlands but would result in no permanent or temporary impacts. The pipeline would be placed on wooden blocks several feet above the ground. The blocks would be placed outside of wetlands. Construction of the pipeline would occur along the footprint of the existing access road and the newly constructed permanent access road. Wetlands within the dam and dike footprint (and associated permanent access road) would be permanently filled using clay and coarse tails during construction. Impacts resulting from the construction of the separation and/or dewatering infrastructure, dam, dike, and permanent access road would be mitigated for through the credits available at U. S. Steel's Palisade Mitigation Wetland Site and purchase of mitigation credits, discussed further below.

Wetlands that are not proposed to be permanently or temporarily impacted by the Project would be protected using sediment and erosion control methods and best practices to prevent sediment or other contaminants from entering the wetlands. To minimize impacts to WCA-regulated wetlands, the Project has been designed to avoid wetlands where possible. Where the removal of trees or shrubby vegetation occurs within wetlands, U. S. Steel would use the least intrusive method possible to clear the corridor. Hand-cutting of vegetation would be conducted, where possible, to avoid and minimize impacts on streams and/or wetlands. There would be no change in contours or redirection of water flow, and the amount of spoil from foundation installation and structure placement would be minimal. Mats would be used for construction equipment to travel over wetlands, as appropriate. Staging activities would avoid wetlands to the greatest extent feasible. PFO/PSS wetlands would be cleared of trees and shrubs during the winter season and would be permanently converted to PEM/PSS wetlands over time.

Where tree clearing within wetlands in temporary workspaces is necessary, forested wetlands would be permanently converted to scrub shrub or emergent wetlands after construction. Wetlands, particularly forested wetlands, provide ecological functions, such as peak flood flow reduction, nutrient and sediment capture, filtration of pollutants to adjacent waterbodies, and diversity of habitat. The conversion of forested wetlands would reduce or eliminate some of these functions. Required tree removal adjacent to waterbodies would reduce riparian buffer functions, such as stream bank stabilization and erosion control, nutrient and sediment

filtration, floodwater storage and peak flow reduction, and water temperature modification from shading. Vegetation within temporary workspaces would be allowed to return after construction is complete, which would provide some filtration stabilization to help protect waterbodies from pollutants.

To compensate for the loss of WCA-regulated wetlands, U. S. Steel would use available surplus wetland mitigation credits at a 1-to-1 mitigation ratio from the Palisade Wetland Mitigation Site, which is located within the same watershed as the Project Area (Major Watershed 9, HUC 07010103). Since wetland mitigation would take place within the same HUC 08 watershed as the Project, no substantial effects to the host watershed are anticipated. As of April 2024, this Project specific wetland mitigation site contained approximately 79 acres of fresh wet sedge credits available for use as surplus wetland credits and approximately 10 shrub-carr credits available for use as surplus wetland credits. A credit release request was submitted to the USACE and the DNR in April of 2024. After the 2024 and 2025 growing season, another credit release request would likely be created for the inclusion of more in-kind credits.

Operations Impacts and Mitigation

Operational impacts to wetlands in the Project Area were evaluated through wetland delineation and functional assessment studies conducted in 2021 and 2023 following guidance for evaluation of wetland functions from the *Minnesota Routine Assessment Method for Evaluating Wetland Functions, Version 3.4*. Field functional assessments allow for an evaluation of potential direct and indirect impacts from Project development based on a series of metrics that include but are not limited to topographic settings, vegetative diversity, wildlife habitat and human disturbance factors (e.g., roads stockpiles, mine pits, soil removal). Ratings for each metric result in an overall classification of the wetland as 'high quality' (characterized by a high diversity of native plant species and little to no disturbance), 'medium quality' (dominated by native or non-native species with variable species diversity and variable disturbance) and 'low quality' (characterized by low species diversity, high non-native cover and high levels of disturbance).

Results of an abbreviated function assessment on each of the 55 wetlands delineated in 2021 showed that 13 wetlands were rated as high quality, 31 as medium quality and 11 as low quality. A similar assessment conducted on 50 additional wetlands that were delineated in 2023 showed that 5 of the 50 delineated wetlands were rated as high quality, 24 as medium quality, and 21 as low quality. The difference in the number of high and medium quality wetlands between the two years was attributed to the relatively higher level of disturbance observed in the 2023 survey area compared to the 2021 survey area. Based on these results and attribution of low-quality wetlands to mining operations, it can be concluded that approximately 30 percent of wetlands are directly or indirectly impacted because of operations in the Project Area. A revised delineation to include the 2023 delineation was submitted in October 2023 to the USACE and DNR. USACE completed their jurisdictional review of delineated wetlands in January 2024. A jurisdictional decision from the DNR is pending.

During operations, the TSF is managed under its SWPPP. There are no newly proposed sources of discharge and the TSF would operate in the same way that it operated prior to the construction of the Project. Therefore, no additional impacts are anticipated to wetlands during operations.

Hydrology monitoring data, collected as part of the wetland monitoring plan, would be evaluated to determine if adverse impacts are occurring resulting from the Project. Criteria for identifying impacts include changes in wetland hydrology criteria, reduction in wetland size, shifts in wetland community type, and decreased vegetation quality. Other factors, including wetland delineations, precipitation, and local climate trends would also be considered. If adverse impacts are found, they will be documented in annual reports submitted to USACE and DNR.

b) Other surface waters- Describe any anticipated physical effects or alterations to surface water features (lakes, streams, ponds, intermittent channels, county/judicial ditches) such as draining, filling, permanent inundation, dredging, diking, stream diversion, impoundment, aquatic plant removal and riparian alteration. Discuss direct and indirect

environmental effects from physical modification of water features, taking into consideration how current Minnesota climate trends and anticipated climate change in the general location of the Project may influence the effects. Identify measures to avoid, minimize, or mitigate environmental effects to surface water features, including in-water BMPs that are proposed to avoid or minimize turbidity/sedimentation while physically altering the water features. Discuss how the Project will change the number or type of watercraft on any water body, including current and projected watercraft usage.

Construction Impacts and Mitigation

Lakes/Reservoirs

Reservoir 2 North

A tailings pipeline that transports tailings from the processing plant to the separation and/or dewatering infrastructure is proposed to be placed on the west side of Reservoir 2 North, an impoundment of Welcome Creek. Approximately 0.8 mile of pipeline would be constructed upgradient of Reservoir 2 North. The pipeline would run along existing infrastructure corridor and would be above ground on raised blocks. Therefore, there would not be notable ground disturbing activities associated with the installation of the pipeline. At its nearest point, the pipeline would be over 100 feet from the shoreline, with dense vegetation separating the construction impact area from the reservoir. Erosion control measures and BMPs would be implemented downgradient of land disturbing activities to mitigate these impacts in accordance with the SWPPP. As a result, construction-related impacts to Reservoir 2 North would not be substantial.

Reservoir No. 6

The proposed separation and/or dewatering infrastructure would be constructed on the north of Reservoir No. 6 and tailings pipelines running along the north side to the separation and/or dewatering infrastructure, and west side to the TSF would be laid above ground on blocks along existing infrastructure corridors. Reservoir No. 6 could potentially be impacted by erosion and sedimentation from laying the pipeline, but erosion control measures and BMPs would be implemented downgradient of land disturbing activities to mitigate these impacts in accordance with the SWPPP. Construction of the separation and/or dewatering infrastructure would take place on the west side of a private access road separating it from the reservoir; substantial construction-related impacts would not be expected.

A water retention dam with a seepage reduction feature would be constructed between the Stage 2 Exterior Pond and Reservoir No. 6. A gravity reinforced concrete drop decant structure would be designed to include bulkheads and a sluice/roller gate to control the basin pond elevation, and gravity would convey water into the downstream polishing pond prior to returning to the plant (Figure 6.6). The proposed dam would permanently impact 38.7 acres of Reservoir No. 6 and approximately 5,242 linear feet of shoreline. These impacts would be mitigated or prevented through use of erosion control measures and BMPs, such as a floating silt curtain, and minimization of the duration of impacts. Temporary, indirect impacts on water quality, such as increased turbidity and localized sedimentation, could occur during construction because of vegetation clearing and other construction activities around and within the waterbody. The construction of the water retention dam would result in some minor impacts to Reservoir No. 6 due to placement of fill.

Flows into Reservoir No. 6 are likely to be different as a result of the project given the design features, removal of flows from Stage 1, and ongoing tailings deposition into the Stage 2 Exterior.

Reservoir No. 6 is used for mine process makeup and is an impoundment of Welcome Creek.

Reservoir No. 2

Reservoir No. 2, an impoundment of Welcome Creek, through impacts to Reservoir No. 6, may be impacted during construction of the proposed dam between Reservoir No. 6 and the Stage 2 Exterior Pond. Temporary, indirect impacts on water quality, such as increased turbidity and localized sedimentation, could occur during

construction because of vegetation clearing and other construction activities around and within the waterbody. These impacts would be mitigated or prevented through use of erosion control measures and BMPs, and minimization of the duration of impacts. No substantial impacts to Reservoir No. 2 are anticipated during construction.

Hay Lake

Hay Lake, through impacts to Hay Creek watershed (discussed below), may be impacted during construction. Temporary, indirect impacts on water quality, such as increased turbidity and localized sedimentation, could occur during construction because of vegetation clearing other construction activities upstream of the waterbody. These impacts would be mitigated or prevented through use of erosion control measures and BMPs, and minimization of the duration of impacts. No substantial impacts to Hay Lake are anticipated during construction.

Swan Lake

Swan Lake would not experience any direct discharges from the Project and as a result, is not anticipated to be substantially impact the construction of the Project.

Streams

Hay Creek

The Project Area is within the Hay Creek Watershed; however, there is no defined stream in the Project Area. Refer to section 12.a.i *Streams, Hay Creek* above for more detail. Construction of the Stage 2 Exterior dike would extend into the Hay Creek watershed, but the stream channel would not be directly affected. Approximately 466.06 acres of the 37,255-acre Hay Creek watershed would be permanently constructed on and impacted (1.3 percent of the total watershed) and approximately 43.3 acres of the Hay Creek watershed would be temporarily impacted (0.1 percent of the total watershed).

Construction of the dike would mostly retain the current watershed boundaries, so while the gradient within the Project Area would be altered (e.g. steeper slopes on the dike), the watershed acreage for Hay Creek above the confluence with O'Brien Diversion Channel (Ditch) would remain the same.

Water downstream of the confluence of the O'Brien Diversion Channel (Ditch) may experience a negligible change in flow as a result in the loss watershed area. As shown on Figure 12.7 and discussed in section 12.b.ii *Routes and receiving water bodies for runoff from the Project site*, construction of the Project would result in stormwater from the historic Stage 1 area flowing into the Upper West Swan River watershed. Currently, water in Stage 1 (including pumped process water) flows into the Stage 2 Exterior, then into Reservoir No. 6 where it is used for process water or eventually flows into O'Brien Diversion Channel (Ditch) and into Hay Creek. Impacts on flow are expected to be negligible because water coming from Stage 1 currently includes process water that is occasionally flushed (as needed in winter operations) into Stage 1 area, and flushing would no longer be needed once the Project is implemented, so that process water would remain within the TSF watershed. Only stormwater runoff in the Stage 1 Area would change from the Hay Creek watershed to the Upper West Swan River watershed. The loss of this stormwater would be expected to be offset through the additional water added to the Stage 2 Exterior through thickening of tailings. Thickening of tailings prior to discharge reduces the water loss to void space.

Temporary, indirect impacts on water quality, such as increased turbidity and localized sedimentation, could occur during construction because of vegetation clearing and other construction activities in the headwaters. These impacts would be mitigated or prevented through use of erosion control measures and BMPs, and minimization of the duration of impacts, as required by applicable permits.

Swan River

Swan River receives inflows from Hay Creek, impacts to which are discussed above. The construction footprint within the Hay Creek watershed reflects less than 1.2 percent of the watershed for Swan River at the confluence with Hay Creek.

Temporary, indirect impacts on water quality, such as increased turbidity and localized sedimentation, could occur during construction because of vegetation clearing and other construction activities around and within the Hay Creek watershed. These impacts would be mitigated or prevented through use of erosion control measures and BMPs, and minimization of the duration of impacts.

West Swan River

The West Swan River is located to the east of the TSF and would not be directly impacted by construction of the Project.

Construction of the dike would retain the majority of the current watershed boundaries, so while the gradient within the Project Area would be altered (e.g. steeper slopes on the dike), the watershed for the Upper West Swan would largely remain unchanged where the dikes are. However, as shown on Figure 12.7 and discussed in section 12.b.ii *Routes and receiving water bodies for runoff from the Project site*, construction of the Project would result in stormwater from the historic Stage 1 area flowing into the Upper West Swan River watershed instead of the Stage 2 Exterior. Construction of the Project and this change in rainwater runoff flow into the Upper West Swan would result in a net increase in catchment of 669.9 acres.

Temporary, indirect impacts on water quality, such as increased turbidity and localized sedimentation, could occur during construction because of vegetation clearing and other construction activities in the headwaters. These impacts would be mitigated or prevented through use of erosion control measures and BMPs, and minimization of the duration of impacts, as required by applicable permits.

While it is possible that there would be some groundwater interaction between the West Swan River and the TSF, surface level construction activities are not expected to have a substantial impact on the flow of the river.

O'Brien Diversion Channel

The O'Brien Diversion Channel receives inflows from Reservoir No. 2, which may be impacted by construction activities occurring in and around Reservoir No. 6. As discussed in the Hay Creek section above, flows into O'Brien Diversion Channel may experience a negligible change as a result of stormwater from the historical Stage 1 area changing to flow into the Upper West Swan River watershed.

Flows to the O'Brien Diversion Channel are not anticipated to be substantially affected by upstream construction, and any temporary sedimentation impact in Reservoir No. 6 would not be expected to reach the O'Brien Diversion Channel. Impacts to O'Brien Diversion Channel are not anticipated during construction.

Welcome Creek

Welcome Creek outlets into Reservoir 2 North (upstream of the TSF). Some project infrastructure (pipeline) would be constructed along an existing road corridor that already crosses Welcome Creek.

Temporary, indirect impacts on water quality, such as increased turbidity and localized sedimentation, could occur during construction along the existing road; however, these impacts would be mitigated or prevented through use of erosion control measures and BMPs, and minimization of the duration of impacts.

Welcome Creek would not receive direct discharge from areas affected by the Project, and as a result, no substantial construction impacts are anticipated.

Operations Impacts and Mitigation

Following impacts during construction, general operations of the Project would be consistent with existing operations at the TSF. There are no proposed water appropriations, or new discharges, and the overall water balance and/or water quality at the TSF is not expected to change from pre-existing conditions. Therefore, no substantial impacts are anticipated on any lake or stream during operation of the Project. A water quality and quantity monitoring plan would be developed for DNR approval in accordance with the requirement of the previous WCA Decision document for phase 1 of the Project.

13. Contamination/Hazardous Materials/Wastes:

- a. **Pre-Project site conditions - Describe existing contamination or potential environmental hazardson or near the Project site such as soil or ground water contamination, abandoned dumps, closed landfills, existing or abandoned storage tanks, and hazardous liquid or gas pipelines. Discuss any potential environmental effects from pre-Project site conditions that would be caused or exacerbated by Project construction and operation. Identify measures to avoid, minimize or mitigate adverse effects from existing contamination or potential environmental hazards. Include development of a Contingency Plan or Response Action Plan.**

The MPCA’s What’s in My Neighborhood contamination database identifies potentially contaminated or historical contamination sites, and environmentally permitted sites within 0.5 mile of the Project Area, as shown in Table 13.1 and on Figure 13.1 (MPCA 2023). The status indicates if the site is active or inactive. Inactive sites are those in which the activity that the MPCA was interested in no longer exists. This could mean a closed leak site, or a permit is no longer in force. Within 0.5 mile of the Project, there are 3 active projects. The active projects are sites that the MPCA has interest in, meaning there is an ongoing investigation into a potential leak or there is an active permit. The active projects within 0.5 miles of the Project are all permitted projects (Figure 13.1). The water quality and stormwater sites within the Project Area are Keetac’s construction stormwater and NPDES/SDS permits. There are no pre-Project site conditions that would be caused or exacerbated by Project construction and operation. Therefore, measures to avoid, minimize, or mitigate effects from existing contamination or potential environmental hazards are not proposed.

Table 13.1: MPCA Permitted Facilities, Contamination, and Leak Sites Within 0.5 Mile of the Project Area

MPCA Program(s)	Site Name	MPCA ID(s)	Status	Industry Classification
Hazardous Waste	Deane Morrow Trucking Inc	84898	Inactive	Specialized Freight (except Used Goods) Trucking, Local
Aboveground Tanks; Air Quality; Construction Stormwater; Hazardous Waste; Wastewater, Industrial SDS Permit	ERP Iron Ore LLC - Plant 1	126163	Active	Iron Ore Mining
Construction Stormwater; Industrial Stormwater; Solid Waste, Permitted Solid Waste Facility; Wastewater	General Waste and Recycling LLC	99174	Active	Recyclable Material Merchant Wholesalers
Aboveground Tanks; Hazardous Waste, Minimal quantity generator; Industrial Stormwater	Olsons Body Shop	5091	Active	Used Car Dealers; All Other Automotive Repair and Maintenance
Underground Tanks	Ron Peterson	109686	Inactive	N/A
Investigation and Cleanup	Keewatin Dump Site	185474	Inactive	N/A
Leak Site	Keewatin Taconite former Natl Steel Pellet	LS0016602	Closed	N/A

- b. Project-related generation/storage of solid wastes - Describe solid wastes generated/stored during construction and/or operation of the project. Indicate method of disposal. Discuss potential environmental effects from solid waste handling, storage and disposal. Identify measures to avoid, minimize or mitigate adverse effects from the generation/storage of solidwaste including source reduction and recycling.**

Solid and hazardous waste that could be produced during Project construction and the proposed disposal methods are listed in Table 13.2. The Project would not generate wastes during operation. Therefore, measures to avoid, minimize, or mitigate effects from the generation/storage of solid wastes during operations are not proposed.

Table 13.2: Potential Solid and Hazardous Wastes Within the Project Boundary

Source	Disposal Method
Construction	Trucked to landfill
Scrap metal	Removed for recycling
Demolition/Industrial Waste	Trucked to landfill
Waste tires	Removed for recycling
Vehicle batteries	Removed for recycling
Used oil/oil filters	Removed for recycling
Antifreeze	Removed for recycling
Electronics	Removed for recycling
Fluorescent and HID lamps	Removed for recycling
Lithium and nickel cadmium batteries	Removed for recycling
Mercury switches and bulk mercury-containing equipment	Sent to waste facility
Aerosol cans	Sent to waste facility
Solvents	Sent to waste facility

- c. Project-related use/storage of hazardous materials - Describe chemicals/hazardous materials used/stored during construction and/or operation of the project including method of storage. Indicate the number, location and size of any new above or below ground tanks to store petroleum or other materials. Indicate the number, location, size and age of existing tanks on the property that the project will use. Discuss potential environmental effects from accidental spill or release of hazardous materials. Identify measures to avoid, minimize or mitigate adverse effects from the use/storage of chemicals/hazardous materials including source reduction and recycling. Include development of a spill prevention plan.**

Hazardous materials used and stored on-site for Project construction would include diesel fuel storage within the separation and/or dewatering infrastructure (for fueling haul trucks), other hazardous materials would be limited to fuels (diesel/gasoline), lubricant (engine oil), or coolant for equipment/vehicle maintenance. Potential environmental impacts resulting from an accidental spill or release of these hazardous materials may contaminate soil or surface water, and may have deleterious impacts on plants, insects, and animals. Spills would be avoided and mitigated with the implementation of BMPs, such as secondary containment and sediment protections around wetlands and waterbodies. Specific BMPs are detailed in the SPCC.

Within the Project Area, potential contaminants associated with future operations would include fuels (diesel/gasoline), lubricants (engine oil), and coolant and antifreeze for use in equipment and vehicle fueling and maintenance. Potential contaminants or hazardous materials at the TSF are managed as required by the SPCC,

which provides plans and requirements for the storage of petroleum products and the containment and cleanup of spills. The SPCC is updated every 3 years and is certified by a licensed professional engineer.

The Project would have a maintenance facility for trucks, as well as a fuel storage facility, associated with the separation and and/or dewatering infrastructure (Figure 6.6). The maintenance facility would likely be a two-bay small facility used only for preventative maintenance and small repairs. The second bay would be used for fueling purposes.

- d. Project-related generation/storage of hazardous wastes - Describe hazardous wastes generated/stored during construction and/or operation of the project. Indicate method of disposal. Discuss potential environmental effects from hazardous waste handling, storage, and disposal. Identify measures to avoid, minimize or mitigate adverse effects from the generation/storage of hazardous waste including source reduction and recycling.**

The Project would not generate or require storage of hazardous wastes during construction or operation.

14. Fish, wildlife, plant communities, and sensitive ecological resources (rare features):

- a. Describe fish and wildlife resources as well as habitats and vegetation on or in near the site.**

Existing Wildlife

Wildlife, including mammals, birds, fish, reptiles/amphibians, and invertebrates, may be present within the Project Area. Table 14.1 includes non-protected species with potential to occur.

Table 14.1: Non-Protected Wildlife Species with Potential to Occur Within the Project Area

	Common Name	Scientific Name
Mammals	Beaver	<i>Castor canadensis</i>
	Black Bear	<i>Ursus americanus</i>
	Bobcat	<i>Lynx rufus</i>
	Coyote	<i>Canis latrans</i>
	Fisher	<i>Pekania pennanti</i>
	Mink	<i>Neovison vison</i>
	Pine Marten	<i>Martes martes</i>
	Red Fox	<i>Vulpes vulpes</i>
	Red Squirrel	<i>Tamiasciurus hudsonicus</i>
	Snowshoe Hare	<i>Lepus americanus</i>
	White-Tailed Deer	<i>Odocoileus virginianus</i>
Birds	Belted Kingfisher	<i>Megaceryle alcyon</i>
	Common Snipe	<i>Gallinago gallinago</i>
	Great Blue Heron	<i>Ardea herodias</i>
	Killdeer	<i>Charadrius vociferus</i>
	Peregrine Falcon	<i>Falco peregrinus</i>
	Ruffed Grouse	<i>Bonasa umbellus</i>
	Sharp-tailed Grouse	<i>Tympanuchus phasianellus</i>
	Swamp Sparrow	<i>Melospiza georgiana</i>

	Common Name	Scientific Name
Fish	Bluegill	<i>Lepomis macrochirus</i>
	Black Crappie	<i>Pomoxis nigromaculatus</i>
	Largemouth Bass	<i>Micropterus salmoides</i>
	Northern Pike	<i>Esox lucius</i>
	Rock Bass	<i>Ambloplites rupestris</i>
	Walleye	<i>Sander vitreus</i>
Reptiles/Amphibians	Bullfrog	<i>Lithobates catesbeianus</i>
	Common Garter Snake	<i>Thamnophis spp.</i>
	Gray Treefrog	<i>Dryophytes versicolor</i>
	Northern Leopard Frog	<i>Lithobates pipiens</i>
	Painted Turtle	<i>Chrysemys picta</i>
	Redbelly Snake	<i>Storeria occipitomaculata</i>
	Snapping Turtle	<i>Chelydra serpentina</i>
Invertebrates	Dark Fishing Spider	<i>Dolomedess pp.</i>
	Tricolored Bumblebee	<i>Bombus ternarius</i>

Source: MNDNR 2010

Existing Vegetation Conditions

North America is divided into ecoregions of similar environmental characteristics that contribute to the natural vegetation in the area, such as geology, vegetation, climate, soils, land use, wildlife, and hydrology (USEPA 2023). The Project Area occurs in the Northern Lakes and Forests Level III Ecoregion of the United States (USEPA 2013). The Northern Lakes and Forests ecoregion is characterized by its humid continental climate (warm summers and severe winters) with no marked dry season. Vegetation is dominated by coniferous and northern hardwood forests (maple, birch, spruce, fir, and pine) with black spruce, tamarack, and northern white cedar in wetter and cooler areas. This region also has widespread wetlands.

Within Minnesota, four provinces have been defined based on the major climate zones, native vegetation, and biomes. Within the provinces, sections and subsections are defined by glacial deposit origins, regional elevation, plant distribution, and regional climate. Under Minnesota’s Ecological Classification System, the ecoregion corresponds to the Northern Superior Uplands section of the Laurentian Mixed Forest Province (MNDNR undated).

The Project Area is located within the Nashwauk Uplands Subsection (212Lc), with medium-to-coarse textured soils, forest communities of white pine, red pine, balsam fir, white spruce, and aspen-birch. Historically, this region was comprised of red and white pine forests, with aspen, paper birch, spruce, and balsam fir. Logging in the late 1800s and early 1900s left forests dominated by quaking aspen and paper birch, with jack pine present in droughty and exposed bedrock and sandy outwash areas (MNDNR undated). Peatlands and wet forests are present within broader upland forest areas. Additionally, the Stage 2 Exterior was anthropogenically disturbed prior to TSF development.

Existing Aquatics

There are five lakes and five streams in or immediately downstream of the Project Area, as shown in Tables 14.2 and 14.3. These waterbodies are home to a variety of fish species (MNDNR 2010). The DNR prepares Lake Management Plans for lakes that are actively managed for fishing and recreational activity. Each plan provides a summary of the fish population assessments conducted on the lake, fisheries management information such as

stocking reports, historical background, and future management plans. Of the lakes evaluated in this assessment, lake management plans were available for Swan Lake. In the absence of a lake management plan, information about the fisheries resources, aquatic habitat, and recreational uses for the other lakes are limited. As a result, the discussion of potential impacts to these lakes is general. However, based on similarities between some of the lakes and on other sources of information available, reasonable inferences can be made on fish resources and aquatic habitat.

Five lakes occur downstream of the Project Area: Swan Lake, Hay Lake, Reservoir No. 2, Reservoir 2 North, and Reservoir No. 6. Their distances from the Project Area are shown in Table 14.2. Descriptions of these waterbodies can be found in Item 12. The lakes are home to littoral, benthic, and pelagic species, such as walleye, northern pike, black crappie, pumpkinseed, rock bass, yellow perch, white sucker, brown bullhead, bluegill, and largemouth bass (MNDNR 2010).

Table 14.2: Lake Distances from the Project Area

Lake	Distance from Project Area (miles)
Hay Lake	3.4
Reservoir No. 6	0
Reservoir No. 2	0
Reservoir 2 North	0
Swan Lake	4.1

Five streams occur downstream of the Project Area: Hay Creek, Swan River, West Swan River, the O’Brien Diversion Channel, and Welcome Creek. Their distances from the Project Area are shown in Table 14.3. Descriptions of these streams can be found in Item 12. These streams contain fish, such as largemouth bass, northern pike, black crappie, pumpkin seed, yellow perch, and rock bass (MNDNR 2010).

Table 14.3: Stream Distances from the Project Area

Stream	Distance from Project Area (miles)
Hay Creek	0
O’Brien Diversion Channel	0.4
Swan River	6.6
Welcome Creek	0
West Swan River	0

- b. Describe rare features such as state-listed (endangered, threatened or special concern) species, native plant communities, Minnesota Biological Survey Sites of Biodiversity Significance, and other sensitive ecological resources on or within proximity to the site. Provide the license agreement number (LA-1051) and/or correspondence number (MCE2023-00649) from which the data were obtained and attach the Natural Heritage Review letter from the DNR. Indicate if any additional habitat or species survey work has been conducted within the site and describe the results.**

The Minnesota DNR completed a NHIS review under MCE 2023-00649 (Appendix C). According to the DNR, state-listed plant species with the potential habitat in and documented near the Project Area are shown in Table 14.4.

Table 14.4: State-listed Plant Species with Potential Habitat in and Documented near the Project Area

Common Name	Scientific Name	State Status ^a	Federal Status
Tuberclad Rein Orchid	<i>Platanthera flava var. herbiola</i>	T	No Status
St. Lawrence Grapefern	<i>Botrychium rugulosum</i>	SC	No Status

Source: MN NHIS 2024

^a State Status Codes: T = threatened; SC = Special Concern

In July of 2022, a rare plant survey was conducted in the proposed dam/dike footprint. No state-listed threatened or endangered species were identified during the survey, however a species of special concern, *Botrychium (Sceptridium) rugulosum* was found (Barr 2022). In November of 2023, the DNR provided concurrence based on their review of the 2022 rare plant survey and determined that no state-listed threatened or endangered species were likely to be in the dam/dike footprint, and that a take permit would not be warranted. In April of 2024, U. S. Steel requested concurrence from the DNR to confirm that no additional rare plant surveys are warranted in all other portions of the Project Area. DNR determined that an additional field survey is needed. The additional survey would be conducted from late June to early July in 2026.

The USFWS protects special species on the federal level under the Endangered Species Act. To assess the potential for federally listed species to occur in the Project Area, an Information for Planning and Consultation review was conducted. Table 14.5 lists federal and state-listed species with potential to occur in the Project Area.

Table 14.5: Federal and State-Listed Species with Potential to Occur in the Project Area

Common Name	Scientific Name	State Status ^a	Federal Status ^b	Suitable Habitat in the Project Area	Habitat Description in Minnesota
Canada Lynx	<i>Lynx canadensis</i>	none	LT	Yes	Canada Lynx are primarily found in the Arrowhead region of Minnesota. They travel and hunt between patches of boreal and mixed conifer-hardwood forest. They particularly favor boreal forests that have a high-density of snowshoe hare. Den sites that offer thermal cover such as large areas with downed logs and woody debris are preferred.
Gray Wolf	<i>Canus lupus</i>	D	LT	Yes	Although this species prefers large areas of contiguous forest, they are habitat generalists, therefore they are dependent on prey availability (e.g. deer and hare) rather than land cover. Their den sites are typically located near the core of their territories and are surrounded by upland trees and close to lowland shrubs. Dens may vary from a dug-out burrow, a hollow log, to an overturned tree.
Monarch Butterfly	<i>Danaus plexippus</i>	none	PT	Yes	Preferred habitats include fields, meadows, parks, and other open areas where milkweed, native plants, and breeding season nectar sources are located.
Northern Long-eared Bat	<i>Myotis septentrionalis</i>	SC	LE	Yes	This species overwinters in natural caves or mines and spends the rest of the year in forested habitats. Preferred sites consist of minimal airflow, high humidity levels, and constant temperatures. In the summer, NLEB occupy any dead or live tree with cavities or crevices greater than 3 inches diameter. They tend to roost and forage in wooded habitats with a variety of densities and canopy closures and seem to travel in intact forest with sparse to medium vegetation density. However, they may travel and forage in areas with adjacent wetlands and agricultural areas.
Suckley's Cuckoo Bumble Bee	<i>Bombus suckleyi</i>	none	PE	Yes	This species has been found in various habitat types including prairies, grasslands, meadows, woodlands, boreal forests, urban areas, and agricultural areas. The Suckley's Cuckoo Bumble Bee relies on other <i>Bombus</i> species to rear their young and they are dependent on other species' colonies for survival.
Tricolored Bat	<i>Permyotis subflavus</i>	SC	PE	Yes	In general, this species prefers mesic hardwood forest, fire dependent forest, and subterranean habitats. In the winter, these bats occupy mines, tunnels, and caves where airflow is minimal, the temperature and humidity are constant. In the summer, the bats roost in trees, and some even in their winter hibernaculum. They forage over water and avoid open fields and deep woods.

^a State Status Codes: D = delisted; SC = special concern

^b Federal Status Codes: LE = listed endangered; LT = listed threatened; PE = proposed endangered; PT = proposed threatened

Source: MN NHIS 2024; MNDNR 2018a, b; MNDNR 2024a, b, c, d

There are no native plant communities within the Project Area. The nearest native plant community is 4.9 miles south of the Project Area.

The Project Area is not included in the Minnesota Biological Survey area. In general, northeastern Minnesota has areas of outstanding, high, and moderate biodiversity significance (MNDNR 2014).

Wild rice (*Zizania palustris*) an important aquatic plant found throughout Minnesota, providing food for waterfowl, as well as cultural and economic benefits to many Minnesotans is present in three waterbodies downstream of the Project Area – Swan Lake, Swan River, and Hay Lake. These are shown in Figure 14.1.

A wild rice and stream survey conducted by MNDNR in 2009 found approximately three acres of wild rice in medium to abundant density in Hay Lake; the crop appeared severely damaged and likely not harvestable. In Hay Creek, wild rice was found to be abundant at the outlet of Hay Lake becoming increasingly sparse and unhealthy further downstream except for a moderately dense 200-foot section between 0.6 and 0.8 mile downstream of the lake. Based on survey results wild rice health in this area is likely affected by increased water levels and elevated sulfate concentrations in the lake.

- c. **Discuss how the identified fish, wildlife, plant communities, rare features and ecosystems may be affected by the project including how current Minnesota climate trends and anticipated climate change in the general location of the project may influence the effects. Include a discussion on introduction and spread of invasive species from the project construction and operation. Separately discuss effects to be known threatened and endangered species.**

Wildlife

Project construction would cause both temporary and permanent loss of habitat. This loss of habitat, along with the noise of construction, could potentially drive species from the area. The disturbance of soil may increase erosion, which could further deteriorate habitat. For common wildlife species, impacts to populations would be expected to be minor. Tree clearing would result in a loss of forested habitat, causing a loss of nesting habitat for some migratory birds, which could result in impacts to populations at a local level.

Additionally, construction vehicles could introduce invasive species through either introduced materials or attachment to vehicles and workers. Mortality or injury could also occur to individual animals impacted by unintended vehicle strikes.

Potential Impacts to Federal listed Species

Canada lynx. If Canada lynx were to occur in the Project Area, potential effects could include temporary noise and/or physical disturbance of habitat from construction activities. As a result, disturbance may prompt lynx to vacate the area for a short period. However, because the lynx is a highly mobile species that may disperse long distances (movements can be greater than 60 miles) (Mowat et al. 1999), lynx may move away from the local area of disturbance for a short period and may begin using the area again shortly after cessation of activities. Apart from the construction of the separation and/or dewatering infrastructure, the Project largely represents augmentation and continued operation of an existing operating TSF. Therefore, construction is unlikely to impede lynx movement and displace individuals.

Studies demonstrate that lynx may tolerate daily human use and presence in an area (Mowat et al. 1999). As the Project Area is near an already existing mine and contains a TSF which are disturbed, it is unlikely that Project operations would result in a major impact on lynx. Along with the patchy nature of suitable lynx habitat in the Project Area, the prevalence of similar habitat in adjacent areas, the mobility of lynx, and their large home ranges, impacts to lynx or lynx populations are not expected.

Gray wolf. Noise or physical disturbance because of Project construction may prompt wolves to vacate the area for a short period. However, because the wolf is a mobile species, it is anticipated that any wolf would move away from the local area of disturbance and may begin using the space again shortly after cessation of activities. Apart from the construction of the separation and/or dewatering infrastructure, the Project largely represents augmentation and continued operation of an existing operating TSF. Therefore, construction is unlikely to impede wolf movement and displace individuals. If it does, the impact would be minimal and temporary.

Humans and human activities are the primary cause of wolf mortality, vehicle collision being a primary source. Although driving alert during operation would be advised when transporting throughout the area (e.g., maintenance activities), it is unlikely that a wolf would be harmed by a vehicular traffic due to their infrequent occurrence in the Project Area, the continued disturbance of the Project Area, and lack of collisions in the past. Project operations could have a minor effect on wolves through increased disturbance that would result in wolves avoiding the Project Area; however, this effect is expected to be minor because the Project Area has been and continues to be disturbed.

Monarch butterfly. The Project may temporarily impact habitat, including nectar-bearing wildflowers, on which adult monarch butterflies might feed. Project construction activities also create an opportunity for introducing and spreading noxious weeds and invasive plant species within the Project Area. Noxious weeds and invasive plants can outcompete native forbs that provide food and/or sources for egg laying for the monarch butterfly. Weed control measures and treatment methods may be incorporated into the Project to reduce the threat of introducing or spreading noxious weeds and invasive plant species within the Project Area. With the proposed mitigation measures, construction would not jeopardize the continued existence of the species.

Visual or physical disturbances from the physical presence of people, maintenance activities, and moving vehicles may impact the monarch butterfly. The disturbance could cause individuals to move from resting/nectaring locations or alter the flight paths of adults. However, given the amount of available habitat adjacent to the Project Area, operations would not jeopardize the continued existence of the monarch butterfly.

Northern long-eared bat. Project impacts could occur if construction activities were to displace roosting or foraging bats from nearby habitats due to increased noise and human activity in the area. Bats would likely move to surrounding undeveloped treed areas surrounding the Project Area. There are large, forested habitats in the vicinity of the Project Area, along with small patches of trees along riparian corridors, which could provide suitable roosting trees. To minimize impacts to the NLEB, all tree clearing would occur outside of roosting season (which extends from April 14 to November 1).

During operations, human activity, noise, and vibration from operations may occasionally disturb NLEB habitat and nearby roosting sites. However, this effect is expected to be minor as the Project Area is already disturbed.

Tricolored bat. Impacts could occur if construction activities were to displace roosting or foraging bats from nearby habitat due to increased noise and human activity in the area. Bats would likely move to surrounding undeveloped treed areas surrounding the Project Area. There are large, forested habitats in the vicinity of the Project Area, along with small patches of trees along riparian corridors which could provide potentially suitable roosting trees. To minimize impacts to the tricolored bats, all tree clearing would occur outside of roosting season (which extends from April 14 to November 1).

During operations, human activity, noise, and vibration from operation activities may occasionally disturb tricolored bats habitat and nearby roosting sites. However, this impact is expected to be minor as the Project Area is disturbed. Therefore, operation would not jeopardize the continued existence of the tricolored bat.

Suckley's Cuckoo Bumble Bee. Impacts to the Suckley's Cuckoo Bumble Bee would be similar to those of the Monarch Butterfly as construction activities would temporarily remove flowering plants that the bees rely on for nectar and pollen. Project Construction could introduce invasive species and noxious weeds that could outcompete native species and reduce forage. Ground disturbances during construction may remove the nests of

other *Bombus* species that the Suckley's Cuckoo Bumble Bee rely on. Weed control measures and treatments may be incorporated into the Project to reduce the spread of invasive species and reduce impacts. There is suitable habitat within the vicinity of the Project Area and nests may relocate outside of the Project Area. Construction would not jeopardize the continued existence of the species Suckley's Cuckoo Bumble Bee.

During operations, the physical presence of people, maintenance activities, and moving vehicles may impact the Suckley's Cuckoo Bumble Bee. The bee may alter flight paths and change foraging patterns in response to the disturbance. Suitable habitat is found within the vicinity of the Project Area and the Project operations would not jeopardize the continued existence of the Suckley's Cuckoo Bumble Bee.

State-listed Species

The 2022 survey did not result in observations of state-listed plant species within the surveyed area (the dam/dike footprint), thus impacts to state-listed are not expected within this area. Surveys are proposed to occur in 2026 in areas that have not been previously surveyed.

Aquatic Species

Construction of the proposed dam would directly impact Reservoir No. 6, both temporarily and permanently. Construction activities have the potential to adversely impact fish populations through loss of habitat and the spawning area along the eastern side of the reservoir, where dam construction would occur. The construction in the waterbody could cause an increase in turbidity through the disturbance and introduction of sediment, which can reduce gill function, degrade spawning beds, and decrease lake productivity (MPCA 2008). The connected lakes and streams could be indirectly affected during construction of the proposed dam because of temporary increase in turbidity downstream of Reservoir No. 6.

The Hay Creek watershed would also be directly impacted as construction would likely cause the loss of habitat at the headwaters of the creek. Relative to the total watershed, the impacted area would be small. This could also cause a temporary increase in turbidity that could negatively affect fish downstream.

General operations of the Project would be consistent with existing operations at the TSF. There are no proposed water appropriations, or new discharges, and the overall water balance or water quality at the TSF is not expected to change from pre-existing conditions.

Vegetation

Project construction would require vegetation clearing in both temporary and permanent impact areas, which would result in an overall loss of vegetated areas. Any potential impacts to vegetation during operations would be limited to potential localized dust cover, or vegetation maintenance to keep rights-of-way and work areas clear and safe.

Invasive Species

It is possible that construction vehicles could introduce invasive species through either introduced materials or attachment to vehicles and workers.

Minnesota Climate Trend

The Project would have a direct and unavoidable impact on vegetation and less mobile species within the Project Area. Increased activity at the Project Area may further deter some wildlife species from the site.

The climate within the Project Area is projected to become warmer and wetter. This could help minimize dust at the site, could offset the impact of the relatively small loss in watershed to downstream flows.

Closer planning will consider climate trends in determining appropriate seed mixes and revegetation planning.

Overall, the effects of the Project are unlikely to be exacerbated by climate change.

d. Identify measures that will be taken to avoid, minimize, or mitigate the adverse effects to fish, wildlife, plant communities, ecosystems, and sensitive ecological resources.

Wildlife

All vegetation clearing (including tree clearing) would occur in the winter to avoid the nesting bird and roosting bat seasons.

Impacts to habitats would be mitigated for by the replanting of vegetation in temporary construction areas. To mitigate for potential increases in erosion, soil control devices would be installed, and topsoil conservation methods would be implemented. In addition, accidental spills of oil or mechanical fluid could negatively impact species in the Project Area. Any spilled fluids would be cleaned up and a containment/prevention plan would be implemented. To minimize impacts to bats, all tree clearing would occur outside of roosting season (which extends from April 14 to November 1).

Vehicle collisions with wildlife can be mitigated with alert driving.

Aquatic Species

Changes in turbidity due to construction activities would likely be temporary and would decrease again once construction ceases. Additionally, a silt curtain would be installed to protect the western portion of the reservoir. The eastern portion of the reservoir, where permanent impacts would occur, would be stacked with rock prior to the placement of tailings to minimize potential impacts to aquatic habitats and water quality.

By implementing erosion control measures, impacts would not substantially impact water quality downstream of Reservoir No. 6.

Vegetation and Invasive Species

Upon construction completion, temporary construction areas would be returned to pre-construction contours to the extent practicable. Temporary erosion control measures would be implemented during construction and disturbed areas would be seeded with a native seed mix and/or would return to a permanent vegetated state naturally.

The spread of invasive species could be prevented or minimized by inspecting vehicles, clothing, and equipment before moving to new sites. In addition, sourcing vehicles and equipment locally could minimize the likelihood of introduction. Vehicles used for Project construction would be existing Keetac facility equipment. Additionally, the added material used in the construction would be sourced locally to prevent the introduction of invasive species.

Per the conditions of the Project's Dam Safety Permit (No. 2022-0721), all equipment used must be free of prohibited invasive species and aquatic plants prior to being transported into or within the state and placed into state waters. All applicable conditions pertaining to equipment would be adhered to. Minnesota Rules Chapter 6130 requires the reclamation of mined lands following completion of mining activities. Reclamation requirements include re-establishment of vegetation in areas disturbed by mining activities.

Wild rice

Any potential impact on wild rice would be associated with changes to water conditions. The Project is not anticipated to affect the overall water balance or water quality at the TSF. Downstream waterbodies are not expected to experience substantial change from pre-existing conditions.

15. Historic properties:

Describe any historic structures, archaeological sites, and/or traditional cultural properties on or near the site. Include: 1) historic designations, 2) known artifact areas, and 3) architectural features. Attach letter received from the State Historic Preservation Office (SHPO). Discuss any

anticipated effects to historic properties during project construction and operation. Identify measures that will be taken to avoid, minimize, or mitigate adverse effects to historic properties.

U. S. Steel sponsored a Cultural Resource Literature Review (In Situ, 2021) to inform this phase in 2021. In June 2025, U. S. Steel reviewed the Minnesota Statewide Historic Inventory Portal (MnSHIP) and Office of the State Archaeologist Portal (OSA) public maps to note any additions to these databases since 2021, with focus on areas proposed for direct impacts. No cultural resources surveys have been conducted for the Project.

No archaeological sites, historic structures, or historic districts are located within the project area. One archaeological site has been identified east of the Project boundary, and has not been evaluated for inclusion on the National Register of Historic Places (NRHP). The TSF has not been identified as historical property that has been evaluated for eligibility for under the NRHP.

Operations would not impact the archaeological site or any other known archaeological or historic structure sites since all operational activities would occur within the interior portion of the dams and dikes.

Since no archaeological sites, historic structures, or historic districts are within the project area, no impacts to such resources are anticipated during Project construction or operations. Accordingly, no avoidance, minimization, or mitigation of effects are expected. Although unanticipated finds are unlikely given land use history within the phase construction footprint, the inadvertent discovery of heretofore unknown cultural resources or human remains is possible. In the event of inadvertent discovery of a cultural resource, U. S. Steel would adhere to state and federal requirements to identify cultural resources, assess Project impacts, and develop treatment plans to avoid, minimize, or mitigate adverse impacts to such resources. Should human remains be identified, U. S. Steel would advise the applicable county sheriff and the Office of the State the OSA, in accordance with the Private Cemeteries Act (MS 307.08). This coordination is consistent with the (expired) 2012 Programmatic Agreement.

16. Visual: Describe any scenic views or vistas on or near the project site. Describe any project-related visual effects such as vapor plumes or glare from intense lights. Discuss the potential visual effects from the project. Identify any measures to avoid, minimize, or mitigate visual effects.

The visual assessment uses above mean sea level (AMSL) to be consistent with the digital elevation model (DEM) analysis documented in the 2010 Final EIS. The Project Area is located approximately 0.75 mile south of Trunk Highway 169. The Stage 2 Interior dike crest ranges between 1,553 and 1,580 feet AMSL. The Stage 2 Exterior dike crest is currently approximately 1,470 feet AMSL in the south and west, and approximately 1,500 feet AMSL in the east. The perimeter dikes do not extend to the north of the TSF because the natural topography is higher in this area and provides a natural barrier for tailings.

Topography within the TSF generally slopes downhill in the southern, western, and eastern portions of the site, and slightly upward in the north. The entire Project Area is surrounded with forested vegetation. Currently, the TSF is visible from Highway 169, the City of Keewatin, and several surrounding residences. From these vantage points, the TSF appears as a large man-made hill with vegetated (grassy) slopes. The TSF has been present at this location and slowly growing since the 1960s. The area has an extensive mining history and several other mine related areas (pits, waste rock stockpiles, TSFs) exist throughout the iron range.

Construction Impacts and Mitigation

Due to the vegetative buffer around the Project Area and the presence of the existing TSF, visual impacts during the construction period are not anticipated. The construction of the separation and/or dewatering infrastructure is not anticipated to impact the general aesthetic of the area. As such, mitigation is not proposed.

Operations Impacts and Mitigation

A DEM analysis was completed as part of the 2010 Final EIS to evaluate visual impacts to the surrounding landscape. In 2010, the Stage 2 Interior dike stood at approximately 1,530 feet in height with an annual elevation increase of approximately 2.7 feet per year and an anticipated final height of 1,612 feet by 2036. The 2010 visual impacts analysis modeled visual impacts to locations surrounding the TSF at the final height of the 2010 project (1,612 feet). Locations evaluated for visual impacts in the 2010 Final EIS included: the northwest and west shore of Swan Lake; north and south points in the City of Nashwauk; the northwest, northeast, southwest, and southeast corners of the City of Keewatin; the intersection of Old Highway 169 and Highway 169; and points around Kelly Lake along West Swan River (Figure 16.1). The DEM evaluated whether the TSF would be visible from these locations using 1,554 and 1,612 feet as reference heights for the TSF and using a worst-case scenario methodology that disregarded vegetative and other visual buffers, which accounted solely for elevation in assessing the visual impact (MNDNR 2010).

The Project would raise the elevation of the Stage 2 Exterior dike by approximately 70 to 110 feet, which would be 5 feet less than the final Stage 2 Interior height, at approximately 1,580 feet. Since Stage 2 Exterior is immediately adjacent to the Stage 2 Interior, and the 2010 visual effects analysis included visual impacts from elevations higher than what are proposed for this Project, the results from that study provide a conservative estimate of the visual effects of the Project and are listed below in Table 16.1 (MNDNR 2010).

Table 16.1: 2010 FEIS Visual Impacts Analysis

Location	TSF Elevation (feet AMSL)	Approximate Distance from TSF (miles)	Visible (Yes/No)
NW Keewatin	1,554	2.9	Yes
	1,612		Yes
South Kelly Lake Development	1,554	3.4	Yes
	1,612		Yes
Southeast Keewatin	1,554	2.1	No
	1,612		Yes
Central Kelly Lake Development	1,554	3.6	No
	1,612		No
Intersection of Old Highway 169 and Highway 169	1,554	2.1	No
	1,612		No
Hull Rust Mine View	1,554	7.2	No
	1,612		No
Northeast Keewatin	1,554	2.5	No
	1,612		No
North Kelly Lake Development	1,554	4.3	No
	1,612		No
North Nashwauk	1,554	5.8	No
	1,612		No
Swan Lake (northwest shore)	1,554	7.6	No
	1,612		No
South Nashwauk	1,554	5.6	No
	1,612		No

Location	TSF Elevation (feet AMSL)	Approximate Distance from TSF (miles)	Visible (Yes/No)
SW Keewatin	1,554	2.7	No
	1,612		No
Swan Lake (west central shore)	1,554	8.0	No
	1,612		No

Based on the visual impacts analysis, the TSF is visible at its current elevations from the northwestern portion of the City of Keewatin and the South Kelly Lake Development. The TSF would also be visible in southeastern portions of the City of Keewatin at the assessed height of 1,612 feet (the Project would not reach this height).

The Project would progressively increase the elevation of the Stage 2 Exterior by 70 to 110 feet over the course of 40 years to the ultimate height of 1,580 feet. A comparison of the planned Stage 2 Exterior height to the existing Stage 2 Interior is shown in Table 16.2.

Table 16.2: Current, Authorized, and Proposed Elevations of Stage 2 Interior and Exterior

Perimeter	Current Height (feet)	Increase (feet)	Authorized Final Height (feet)	Proposed Project Height (feet)	Increase (feet)
Stage 2 Interior	1,553 and 1,580	5 - 77	1,585	1,585	0
Stage 2 Exterior	1,470 feet in the south and west to 1,500 feet in the east	10	1,470 – 1,510	1,580	70 - 110

During operations, tailings would continue to be deposited into the Stage 2 Exterior, which would only be visible from locations where the TSF is already visible. It may become visible in southeast Keewatin as it reaches the proposed height of 1,580 feet; however, the proposed height is lower than the height assessed in the 2010 Final EIS which concluded no significant impact. As a result, no major operational impacts to visual resources are anticipated. Upon closure, the TSF would be reclaimed, which would involve further revegetation and consideration for safety, land use and aesthetics.

17. Air

- a. **Stationary source emissions - Describe the type, sources, quantities and compositions of any emissions from stationary sources such as boilers or exhaust stacks. Include any hazardous air pollutants, criteria pollutants. Discuss effects to air quality including any sensitive receptors, human health or applicable regulatory criteria. Include a discussion of any methods used to assess the project's effect on air quality and the results of that assessment. Identify pollution control equipment and other measures that will be taken to avoid, minimize, or mitigate adverse effects from stationary source emissions.**

The Project would use mobile generators for lighting nighttime work. The Project would not have any other stationary source emissions; no mitigation is proposed to offset emissions from the use of the mobile generators. It is anticipated there would be a reduction in exposed beach areas due to changes in deposition of tails, and wind velocities across exposed areas would be reduced during operations resulting in fewer fugitive dust emissions.

- b. **Vehicle emissions - Describe the effect of the project's traffic generation on air emissions. Discuss the project's vehicle-related emissions effect on air quality. Identify measures (e.g., traffic operational improvements, diesel idling minimization plan) that will be taken to minimize or mitigate vehicle-related emissions.**

Air quality impacts from vehicle emissions are expected for this Project from vehicular traffic, construction equipment, logging equipment, coarse tailings haul trucks and water trucks. Approximately 10 employees are anticipated to be hired for the construction of the Project. This would nominally increase the number of vehicle-related emissions in the area. Project emissions from construction equipment would be minimal. Construction equipment would be operated on an as-needed basis, and efforts would be made to maintain the equipment in accordance with the manufacturer's recommendations to minimize equipment emissions. Excavation equipment, vehicles, and other mobile sources may be powered by ultralow sulfur diesel or gasoline engines that are sources of combustion-related emissions, including the criteria pollutants (NO_x, CO, VOCs, SO₂, PM₁₀, and PM_{2.5}) and a minimal number of Hazardous Air Pollutants (HAPs).

Project emissions from operations would be generated by the 24-hour operation of four haul trucks, a water truck, and mobile generators used to provide portable lighting.

U. S. Steel would encourage carpooling and efficient construction time to limit emissions. Haul trucks and other construction equipment would be maintained to avoid additional emissions.

- c. Dust and odors - Describe sources, characteristics, duration, quantities, and intensity of dust and odors generated during project construction and operation. (Fugitive dust may be discussed under item 17a). Discuss the effect of dust and odors in the vicinity of the project including nearby sensitive receptors and quality of life. Identify measures that will be taken to minimize or mitigate the effects of dust and odors.**

Fugitive dust emissions from wind erosion and material movement caused by land clearing and excavation activities would also likely result from construction activities. The amount of fugitive dust generated would depend on multiple factors, including the duration and type of construction activity, moisture content and nature of material that would be disturbed, wind speed and frequency of precipitation, and the area of disturbance. Fugitive dust emissions during construction and operation would be controlled by water application, dust suppressant application, access road maintenance, and by limiting vehicular and equipment speeds on access roads and in the right-of-way. Fugitive dust control measures are discussed in U. S. Steel's Fugitive Dust Plan which would be updated to reflect actions to minimize fugitive dust from dam construction, including but not limited to the addition of water on haul roads utilized by the haul trucks and reclamation of inactive areas. The deposition of the coarse tails via haul truck is not likely to be a source of fugitive emissions as the coarse tailings are high in moisture content.

18. Greenhouse Gas (GHG) Emissions/Carbon Footprint

- a. GHG Quantification: For all proposed projects, provide quantification and discussion of project GHG emissions. Include additional rows in the tables as necessary to provide project-specific emission sources. Describe the methods used to quantify emissions. If calculation methods are not readily available to quantify GHG emissions for a source, describe the process used to come to that conclusion and any GHG emission sources not included in the total calculation.**

Greenhouse gas emissions associated with the Project consist of direct emissions from mobile equipment used during construction, land use changes, and from the haul trucks used to deposit coarse tails during operation. The separation and tailings dewatering infrastructure would generate indirect scope 2 emissions from electricity use.

Emissions were calculated for on-road and off-road equipment proposed to be used in both the construction and operations. Off-road vehicles used for construction would be excavators, loaders, graders, haul trucks, and a water truck. This equipment utilizes AQMD's *Off-road Mobile Source Emission Factors* to determine emission rates for criteria pollutants and GHGs. Expected engine loads were applied to more accurately represent the emissions associated with the Project. On-road vehicles used during construction and operations would be trucks

used for transportation of workers. Four trucks were used to calculate the emissions for construction with an assumed driving distance of 100 miles per day and averaging 20 miles per gallon.

Equipment needed for the construction phase would be logging equipment used in vegetation clearing, and mobile generators used to provide nighttime lighting (assumed 12 hours per day). The logging equipment was assumed to be 8 gasoline powered chainsaws using 3 gallons per day, and 3 large feller bunchers using 90 gallons of fuel per day. This equipment utilizes fuel usage and 40 CFR Part 98 Subpart C's tables C-1 and C-2 to determine GHG emissions (40 CFR § 98).

During operation, five 150-ton haul trucks would carry coarse tailings from the separation and/or dewatering infrastructure and deposit them along the TSF, with a sixth not running and on standby. A water truck would be used during operation to suppress dust in summer months (assumed six months of operation).

Scope 2 emissions would be generated from the operation of the separation and tailings dewatering infrastructure. A list of equipment associated with Project operations was used to estimate power demand. U.S. eGrid emission factors were used to convert that electric demand to emissions (USEPA 2024).

The construction of the separation and tailings dewatering infrastructure, dams and dikes, and other permanent infrastructure would permanently alter existing land cover including forests, wetlands, and shrub/scrub areas (Table 8.1 and Figure 8.1). The alteration of these land types would remove a carbon sink. Land cover is based on the NLCD (refer to section 8). Emission factors for the GHG emissions from land use conversion are based on the values found in the 2019 Refinement to the 2006 IPCC Guidelines for National Greenhouse Gas Inventories (IPCC 2024).

Emissions of CO₂ from developed areas are calculated based on IPCC 19R V4 Ch02 Generic Methods Table 2.2. CO₂ is generated from burning litter and dead wood when clearing the land for development. Emission factors are given in total carbon, which has to be converted to CO₂ by multiplying the molecular weight of CO₂ (44) and dividing by the molecular weight of elemental carbon (12). The amount of litter and dead wood depends on land type, so each type of land developed by the Project was attributed to one of the available Emission Factors and multiplied by acreage to find total carbon cleared. IPCC recommends annualizing construction emissions evenly over a 20-year period.

It is assumed that methane emissions would result from anaerobic digestion of carbon stored in the existing Stage 2 Exterior tailings area as this area becomes more flooded and covered with tailings. The emission factor selected is from IPCC 19R V4 Ch07 Wetlands Table 7.15 for Cool Temperate areas and are given in units of kg CH₄ per hectare per year. The emission factor was multiplied by the area of flooded land (covered by tailings) to determine total annual emission value, which is multiplied by 20 (years) to determine the emissions of methane over the same 20-year period as the CO₂ emissions from clearing the land (per IPCC). Note that this is a conservative approach to methane emissions given the Stage 2 Exterior is already impacted by tailings and deposition of additional tailings may suppress the anaerobic digestion of any residual carbon in the footprint compared to "flooding" that the emissions factor assumes (the majority of the Stage 2 Exterior is mapped as barren land per Figure 8.1).

The following tables provide estimations GHG generated by the construction and operations of the Project (Tables 18.1 and 18.2). The values in Table 18.2 are reported as short tons of CO₂e emissions per year of operation and include the annualized emissions from table 18.1 because those annualized emissions would be occurring during both construction and operational periods. All emissions reported in both tables follow the general methods from Minnesota's 2024 EAW *Climate Guidance*, such as including IPCC 4th Assessment report GWPs, sources required to be included, and all applicable GHGs. Other specific resources were utilized in calculating these emissions and are noted in the tables.

Table 18.1: Estimated Construction Emissions

Scope	Type of Emission	Emission Sub-Type	Project-Related CO ₂ e Emissions (tons/year)	Calculation Method(s)
Scope 1	Combustion	Diesel non-road Equipment	3,559	AQMD <i>Off-road Mobile Source Emission Factors</i>
Scope 1	Combustion	Logging Equipment	1,198	Fuel usage and 40 CFR Part 98 Subpart C Emission Factors.
Scope 1	Combustion	Passenger Vehicles	71	Fuel usage and 40 CFR Part 98 Subpart C Emission Factors.
Scope 1	Land Use Change	Conversion	4,413	Represents one year of annualized emissions over 20 years from IPCC Guidelines for National Greenhouse Gas Inventories (2019)
TOTAL			9,241	

Table 18.2: Operational Emissions

Scope	Type of Emission	Emission Sub-type	Existing facility CO ₂ e Emissions (tons/year)	Project-related CO ₂ e Emissions (tons/year)	Total CO ₂ e Emissions (tons/year)	Calculation method(s)
Scope 1	Combustion	Mobile Equipment		71		Fuel usage and 40 CFR Part 98 Subpart C Emission Factors.
Scope 1	Combustion	Non-Road Diesel Equipment		9,790		AQMD <i>Off-road Mobile Source Emission Factors</i>
Scope 2	Off-Site Electricity	Grid-based		45,931		eGRID EFs from MROW area.
Scope 1	Ongoing Land Use	Conversion		4,413		Represents one year of annualized emissions over 20 years from IPCC Guidelines for National Greenhouse Gas Inventories (2019))
Scope 1	Annualized Construction Emissions	Combustion Emissions		178		Annualized emissions over 20 years.
TOTAL				60,383		

b. GHG Assessment**i. Describe any mitigation considered to reduce the project's GHG emissions.**

The project design reduced unnecessary vegetation clearing. Vehicles would be maintained for efficiency and equipment would be running only as needed. No other mitigation measures related to GHG emissions is proposed. U. S. Steel.

ii. Describe and quantify reductions from selected mitigation, if proposed to reduce the project's GHG emissions. Explain why the selected mitigation was preferred.

No additional mitigation measures are proposed.

- iii. **Quantify the proposed projects predicted net lifetime GHG emissions (total tons/#of years) and how those predicted emissions may affect achievement of the Minnesota Next Generation Energy Act (MNGEA) goals and/or other more stringent state or local GHG reduction goals.**

MNGEA requires a statewide 80 percent reduction of greenhouse gas emissions by 2050. The closest interim goal is a 30 percent reduction by 2025. The 2023 biennial greenhouse gas emissions report inventoried state emissions from 2005 to 2020. This report found that GHG emissions declined 23 percent from 2005-2020, and the state is on track to reduce GHG emissions by 2050.

A total of 4,828 tons of GHG emissions from construction equipment would be produced. Additionally, 4,413 tons of GHG would be produced from the land use conversion in the first year. The overall anticipated GHG emissions from construction would be 9,241 tons.

Following construction, the Project is expected to generate 60,383 tons/ year of GHG from operational activities. The 2020 estimate of CO₂e for the state of Minnesota was 137,238,222 tons (MPCA 2023). The 9,241 tons generated by construction and land conversion are 0.01 percent of CO₂e emissions that were emitted in Minnesota in 2020. The 60,883 tons/year generated by operations are 0.045 percent of Minnesota’s total state emissions in 2020. While the Project does introduce some additional sources of GHG, these would be partially offset by the reduction in activity at the Stage 2 Interior.

19. Noise

Describe sources, characteristics, duration, quantities, and intensity of noise generated during project construction and operation. Discuss the effect of noise in the vicinity of the project including 1) existing noise levels/sources in the area, 2) nearby sensitive receptors, 3) conformance to state noise standards, and 4) quality of life. Identify measures that will be taken to minimize or mitigate the effects of noise.

Existing Conditions

Mining activities have been occurring at the project location for over 50 years. Long time residents maybe accustomed to the sounds caused by normal mining activities within the general area.

Existing Noise Sensitive Areas (NSAs) are located mainly to the east of the Project Area along Highway 73 and North Leighton Road. The NSAs comprise single family residences. The nearest NSA to the Project Area is a single residence located on Karkas Road, approximately 0.18 miles east of the Project Area. An additional NSA is located on Townline Road, approximately 0.25 miles east/northeast of the Project Area. The majority of NSAs are located farther away from the Project Area along Highway 73 and North Leighton Road. Table 19.1 provides a summary of the existing NSAs and the approximate distance to and direction from the Project Area.

Table 19.1: Existing NSAs

NSA	Distance (miles/feet)—Direction from Closest Portion of the Project Area	Distance(miles/feet)—Direction from Farthest Portion of the Project Area
Karkas Road	0.18/950—East	4.17/22,000—Southwest
Townline Road	0.25/1,320—East/Northeast	4.36/23,000—Southwest
Highway 73	0.72/3,800—Southeast	3.79 20,000—Northwest
North Leighton Road	0.76/4,000—East	4.55/24,000—West/Southwest

U. S. Steel would comply with the noise requirements outlined in its air emissions permit. The State of Minnesota recognizes the MPCA as the authority to regulate noise disturbance through the implementation of local noise ordinances (MPCA 2015). The current Minnesota noise standards are in Minnesota Administrative Rules, Part

7030.0040, Subpart 2. Maximum allowable sound levels for various land use categories are provided in Table 19.2.

Table 19.2: Minnesota Noise Standards

Noise Area Classification	Daytime		Nighttime	
	L10 (dBA)	L50 (dBA)	L10 (dBA)	L50 (dBA)
1 (Residential)	65	60	55	50
2 (Retail, commercial, recreational)	70	65	70	65
3 (Industrial and agricultural)	80	75	80	75

Source: Minnesota Rules 7030.0040, Subpart 2 (2003)

The state standard evaluates noise via L₁₀ and L₅₀ sound levels. These parameters represent the sound levels that are exceeded 10 percent and 50 percent of the time, respectively. The L₅₀ is often considered comparable to the L_{eq} (equivalent sound level), which is a more widely recognized parameter. Additionally, construction noise is typically measured with the L_{eq} parameter.

Construction Impacts and Mitigation

Table 19.3 provides anticipated noise levels that would be associated with the Project’s construction activities.

Table 19.3: Noise Levels of Typical Mine Equipment

Equipment	Maximum Noise Level at 50 feet (dBA)
Chainsaw	85
Skidder (Grapple)	85
Excavator	85
Backhoe	78
Dozer	82
Trucks	77

Source: FHWA 2006

Notably, construction of the dams and dikes would occur over a large area, and construction-related noise levels impacting any NSA would be a function of distance. As such, no existing residence would be exposed to the same sound levels over an extended period, as construction would occur progressively in stages around the TSF. Table 19.4 details construction equipment sound levels operating at maximum throttle at the reference distance of 50 feet, as well as the calculated sound levels at various distances from the nearest Project boundary to the identified NSA areas. The calculated sound levels were determined by utilizing the procedures found in the International Organization for Standardization standard ISO-9613-2. This standard provides the method to extrapolate sound levels from a known reference distance (in this case 50 feet) to a more distant location by considering the additional distance to the receiver (i.e., the 6 dBA reduction with every doubling of distance) plus the additional reduction due to the absorption of sound by the atmosphere, which over large distances is significant.

Exhaust noise from diesel engines that power the equipment is usually the predominant source of construction equipment noise. The Project would ensure that functional mufflers are installed on all diesel-powered equipment. Table 19.5 presents the calculated sound levels for all notable noise generating equipment, when equipment is operating at the farthest Project Area boundary line from the same NSAs.

Table 19.4: Construction Noise Levels at NSAs Closest to the Project Area (dBA)

Equipment	Construction Noise Levels (dBA)				
	50 feet	Karkas Road 950 feet	Townline Road 1,320 feet	Highway 73 3,800 feet	North Leighton Road 4,000 feet
Chainsaw	85	59	55	44	44
Skidder (Grapple)	85	59	55	44	44
Excavator	85	59	55	44	44
Backhoe	78	52	48	37	37
Dozer	82	56	52	41	41
Trucks	77	51	47	36	36

Table 19.5: Construction Noise Levels at NSAs Farthest from the Project Area (dBA)

Equipment	Construction Noise Levels (dBA)				
	50 feet	Karkas Road 22,000 feet	Townline Road 23,000 feet	Highway 73 20,000 feet	North Leighton Road 24,000 feet
Chainsaw	85	17	16	19	15
Skidder (Grapple)	85	17	16	19	15
Excavator	85	17	16	19	15
Backhoe	78	10	9	12	8
Dozer	82	14	13	16	12
Trucks	77	9	8	11	7

Construction sound levels at the closest NSA would be expected to be below the Minnesota Noise Standard during daytime hours, even when equipment is in operation in portions of the Project Area that are situated closest to the NSA. The noise limits may be exceeded during nighttime hours at the 2 nearest NSAs when multiple machines are operating, and when that equipment is operated in portions of the Project Area that are situated closest to the NSA. Construction noise levels at the remaining NSAs, and especially the NSA areas along Highway 73 and North Leighton Road, would be below the noise standard during both daytime and nighttime hours.

Operations Impacts and Mitigation

Noise levels following completion of Project construction are anticipated to be less than noise levels during the active construction phase, however, there would be ongoing use of haul trucks and mobile equipment twenty-four hours a day, seven days a week, (24/7) to support the staged construction of the dikes and dams. The current operations intermittently extend 24/7, so this could be seen as a change in noise to NSAs. No additional operational noise impacts are anticipated from Project operations, no mitigation is proposed.

The separation and/or dewatering infrastructure would be located on the western side of the Project Area. Noise generated by pumps and equipment associated with the infrastructure would be inside and the distance from receptors would minimize impacts.

20. Transportation

- a. **Describe traffic-related aspects of project construction and operation. Include: 1) existing and proposed additional parking spaces, 2) estimated total average daily traffic generated, 3) estimated maximum peak hour traffic generated and time of occurrence, 4) indicate source of**

trip generation rates used in the estimates, and 5) availability of transit and/or other alternative transportation modes.

Roads

The Project Area would be accessed via existing roadways to Keetac (public and private roads), and specifically around the Stage 2 Exterior dikes and dams via the permanent access road that would be constructed as part of the Project. There is an existing private road adjacent to where the separation and/or dewatering infrastructure would be built which would be used for construction access to that site.

Construction activities associated with the Project may result in short-term impacts to transportation infrastructure and traffic. The traffic volume along roads close to the TSF entrances could briefly increase due to the movement of construction equipment and materials. Temporary road closures during construction are not anticipated and any impacts on local traffic during construction would be temporary and minor.

Railroads

No increased use of railroads is anticipated for the construction or continued operation of the Project; therefore, no impacts are anticipated.

Airports

No increased use of the airport is anticipated for the construction or continued operation of the Project; therefore, no impacts are anticipated.

- b. Discuss the effect on traffic congestion on affected roads and describe any traffic improvements necessary. The analysis must discuss the project's impact on the regional transportation system. If the peak hour traffic generated exceeds 250 vehicles or the total daily trips exceeds 2,500, a traffic impact study must be prepared as part of the EAW. Use the format and procedures described in the Minnesota Department of Transportation's Access Management Manual, Chapter 5 (available at: <http://www.dot.state.mn.us/accessmanagement/resources.html>) or a similar local guidance,**

The Project does not anticipate measurable effect on traffic congestion on roads accessing Keetac mine or TSF, therefore no traffic improvements are necessary.

- c. Identify measures that will be taken to minimize or mitigate project-related transportation effects.**

Roads

Road functions would be restored after construction including, but not specifically limited to, repair of any unlikely but possible damage to the road surface caused by construction, and removal and restoration of access points installed to facilitate ingress/egress to the construction workspace. Construction impacts to roads and public road users are not anticipated to be substantial.

No long-term impacts are expected on roads used to access the Project Area. U. S. Steel would also mitigate and restore any temporary road impacts that may result from the Project maintenance or other ongoing operational activities that occur through regular operation of the TSF.

Railroads

No increased use of railroads is anticipated for the construction or continued operation of the TSF; therefore, no impacts are expected, and mitigation isn't warranted.

Airports

No increased use of the airport is anticipated for the construction or continued operation of the TSF; therefore, no impacts are expected, and mitigation isn't warranted.

21. Cumulative potential effects: (Preparers can leave this item blank if cumulative potential effects are addressed under the applicable EAW Items)

a. Describe the geographic scales and timeframes of the project-related environmental effects that could combine with other environmental effects resulting in cumulative potential effects.

The overall geographic scale for assessing cumulative potential effects of the Project includes the Mississippi River - Grand Rapids / Hay Creek watershed, which encompasses the tailing separation and/or dewatering infrastructure and 88 percent of the Stage 2 Exterior dikes and dams; and the Lake Superior - St. Louis / Upper West Swan River HUC 12 watershed, which contains the rest of the TSF, dikes and dams on the east edge of the Project Area.

Potential effects include a temporary timeframe effect during construction from 2025-2028, staged cessation of tailings deposition into Stage 2 Interior Basin part of the tailings basin with subsequent reclamation activities, and an operation impact timeframe while tailing processing and deposition continue over the approved mine lifespan (2048), potentially spanning to 2063, as described in Section 6a.

Environmental effects from the proposed project are listed below and discussed in detail within the relevant topic areas of the EAW, avoidance, minimization, and mitigation measures are also discussed within each topic.

b. Describe any reasonably foreseeable future projects (for which a basis of expectation has been laid) that may interact with environmental effects of the proposed project within the geographic scales and timeframes identified above.

Staff from local government units including the cities of Hibbing, Nashwauk, Itasca County, the North St. Louis Watershed District, and the Itasca Soil and Water Conservation District were contacted to inquire about current planned projects within the same geographic area and timeframe as the proposed project. No reasonably foreseeable future projects for which a basis of expectation has been laid were identified at the time of publication.

c. Discuss the nature of the cumulative potential effects and summarize any other available information relevant to determining whether there is potential for significant environmental effects due to these cumulative effects.

There are no reasonably foreseeable future projects for which an expectation has been laid that could combine with the environmental effects from the proposed project within the same geographic scales and timeframe of the proposed project to create potential effects greater than those from the proposed project.

Land Use and Human Settlement

The primary long-term impacts of the Project stem from the permanent land type modification of 608.6 acres, resulting in habitat loss. Temporary impacts would occur on an additional 89.8 acres for staging and site access during construction. These impacts, represent an incremental augmentation of the existing disturbed area rather than introduction of new impacts to an undisturbed landscape. Mitigation measures, such as progressive reclamation of temporary impact areas, compliance with construction permit requirements, and the use of timber matting or other stabilization methods to minimize impacts on wetlands, would help to reduce the Project's overall environmental footprint.

The TSF would extend slightly beyond the mining area by approximately 700 feet to the east and 500 feet to the west. This represents a relatively small incremental augmentation in the context of the existing mine operations,

with over 95 percent of the surrounding landcover remaining unaffected. The Project is not expected to impact nearby residential, commercial, or recreational areas, as it is located within an industrial mining site.

The project would contribute incremental losses of forests and wetlands at a localized scale. The Project would not introduce substantially new stressors or impact types, and the conversion of additional landcover represents a continuation of established land use impacts considering the existing level of disturbance associated with the long-term, ongoing mining operations, which is partially offset by initiation of reclamation activities in the Stage 2 Interior Basin part of the tailings facility. Given the industrial nature of the existing land use, the limited extent of new permanent and temporary impacts, and the proposed mitigation measures, the Project is not anticipated to substantially alter land use patterns or human settlement in the region.

Visual

Visual analysis indicates that while the 70-to-110-foot increase in TSF height from this Project may make it visible from some new vantage points in southeast Keewatin, this represents an incremental change rather than introduction of a new visual impact. The surrounding area has an established mining/industrial landscape with existing tailings piles and waste rock piles visible. The proposed increase falls within the maximum height evaluated in prior studies which previously found no significant impacts. Given the context of it expanding an existing visual condition in this mining district, Other than reclamation and re-vegetation plans upon closure would further minimize long-term aesthetic impacts.

Air Quality

Air quality impacts would be temporary and localized during the construction phase from sources like fugitive dust, vehicle emissions, and construction equipment. Impacts on receptors within .25 miles are expected to be minimal and typical of an industrial construction site with proper dust suppression and engine maintenance practices. During operations, the expanded TSF footprint may generate some incremental fugitive dust compared to existing conditions as activities in the Stage Interior Basin are phased out, this represents an incremental change consistent with the area's longstanding mining and tailings management activities. Minimal degradation of air quality and no exceedances of NAAQS are anticipated from the Project's emissions sources. Mitigation through the implementation of BMPs such as those outlined in U. S. Steel's Fugitive Dust Plan, should minimize the air quality impacts given the Project's context within an established mining/industrial area.

Noise

Impact of noise levels associated with construction activities is expected to be temporary and offset by existing noise levels generated from ongoing operations, including the phase-out of the Stage 2 Interior Basin. Operations stemming from the Project are not expected to increase existing noise levels to any substantial degree.

Transportation

Transportation impacts would be limited to a temporary increase in road traffic volumes around the Project Area during the construction phase from worker commutes and equipment/material deliveries. These impacts are expected to be minor and short-lived, with no road closures anticipated. No impacts to rail or air transportation are expected, as the Project will not require increased use of these modes during construction or operations. The Project's transportation effects represent a localized short-term impact consistent with typical construction activities. With mitigation practices like road maintenance and traffic management, impacts to the local or regional transportation network are anticipated to be minimal from this Project, which is accessed via existing private roads serving the established mining activities in the area.

Contamination and Hazardous Waste

The Project's construction phase would generate some solid wastes like scrap metal, demolition debris, and oil/antifreeze from equipment maintenance, etc., that would be stored properly in containers and transported to

appropriate disposal or recycling facilities off-site per regulations. Any hazardous wastes like solvents or lead acid batteries would also be packaged for proper off-site disposal. During operations, the potential for contamination exists from fuel/oil use and storage on-site; these substances would be managed in accordance with the site's SPCC plan to prevent releases and mitigate any incidental spills. Given the Project's relatively small scale, adherence to hazardous materials handling protocols, and the absence of any major contaminated sites in the area, impacts related to contamination or hazardous waste releases are not anticipated. The risks are typical of a construction/industrial operation and would be managed through BMPs that include secondary containment, worker training, and emergency response procedures as outlined in the SPCC plan.

Geology

While the vertical augmentation of the TSF by up to 110 feet would represent a permanent topographic modification over the existing condition, this impact occurs within the context of an area that has experienced extensive topographic disturbance from decades of large-scale mining activity. The underlying geology and soils have been previously impacted, with no state or federally protected geological features present in the Project Area. The primary permanent impact is modification of the existing man-made topography created by previous tailings deposition in the TSF. Some temporary grading impacts may occur during construction for access roads and staging areas; these are minor alterations to an already disturbed industrial landscape. Given the absence of sensitive geological resources and the Project's context as an incremental augmentation of existing large-scale industrial disturbance, impacts to geological resources are anticipated to be minimal. Standard mitigation practices for dam construction, safety monitoring, and stormwater management are proposed that would ensure topographic changes are properly controlled.

Soils

Within the expanded TSF area, soils would be permanently impacted as they are inundated and covered by the deposition of tailings over the life of the Project. However, this represents an incremental augmentation of existing impacts, as soils in the current TSF area have already experienced similar disturbance. During construction, temporary soil impacts like compaction from heavy equipment, erosion from vegetation clearing, and potential contamination from leaks/spills are possible in staging and work areas. These temporary impacts would be mitigated through BMPs outlined in the SWPPP, SPCC, and other permit requirements. This includes practices like silt fencing, stabilization with matting, dust control, vegetation reseeding, and proper material storage/handling. Given the currently disturbed nature of the site and with proposed mitigation measures, impacts to soil resources are anticipated to be minimal beyond the permanent conversion within the expanded tailings footprint itself. Operational soil impacts outside the TSF are expected to be minor and infrequent, related to maintenance activities.

Groundwater

The Project would increase the overall potential for seepage of process water into the groundwater system. This impact is expected to be minimal due to the offsetting effect of using a finer tailings mixture that would act as a less porous barrier compared to the coarser tailings currently in place. While some continued seepage into groundwater is anticipated as an ongoing condition, the use of less porous tailings is projected to result in negligible increases in seepage rates or total volumes despite the larger basin size and higher water content of the tailings. The installation of new monitoring wells would allow for an evaluation of any unforeseen changes to seepage conditions and groundwater quality that may arise during operations versus the current established baseline. With proper management practices already in place, minor impacts to groundwater resources are expected from the incremental augmentation of tailings disposal activities. The draft NPDES/SDS permit on public notice addresses seepage to groundwater by requiring a "Functional Equivalent Evaluation". The purpose of this evaluation is to better understand the potential effects of seepage from the tailings basin. Additional water quality monitoring is required in nearby surface waters as well as in the tailings basin for the evaluation

Floodplains

There are no mapped floodplains within or in the vicinity of the Project Area. If unmapped floodplains are present in the Project Area, they could be impacted by soil compaction; however, given that the site is currently disturbed because of ongoing operations, effects are expected to be minimal to floodplains because of the Project.

Watersheds

Construction of the expanded TSF and associated infrastructure would permanently convert approximately 554 acres of forested and wetland areas to barren land/impervious surfaces across the two watersheds. This loss of vegetative cover, hydrologic storage capacity from wetlands, and increased impervious areas could incrementally impact factors like hydrology, habitat, and water quality at the watershed scale. The projected changes constitute less than two percent of the total land cover in the Mississippi River watershed and less than seven percent in the Lake Superior watershed. When viewed in the context of the watersheds' overall extents, these localized impacts are expected to result in negligible changes to the aggregated metrics that determine overall watershed health scores. The Project's impacts, though notable at the immediate site level, represent an incremental augmentation of existing large-scale industrial disturbance rather than introduction of new stressors to an undisturbed landscape. With proper mitigation practices like stormwater management and wetland restoration/offsets, watershed impacts are anticipated to be minimal from this Project.

Wetlands

The construction of the proposed Project would lead to both permanent and temporary impacts on WCA-regulated wetlands. Direct permanent WCA-regulated impacts, totaling 97.47 acres, would result from dam and dike work, as well as the construction of a permanent access road and separation and/or dewatering infrastructure. Indirect permanent wetland impacts would total 0.19 acre. Temporary impacts, affecting 9.75 acres directly and 0.39 acre indirectly, would be caused by equipment staging and temporary site access. Where tree clearing within wetlands is necessary, forested wetlands would be permanently converted to scrub shrub or emergent wetlands, leading to a reduction or elimination of some ecological functions, such as peak flood flow reduction, nutrient and sediment capture, and habitat diversity. To mitigate these impacts, the Project has been designed to avoid wetlands where possible, and BMPs would be employed to minimize disturbance. Additionally, U. S. Steel would use available surplus mitigation credits at a 1-to-1 ratio from the Palisade Wetland Mitigation Site to compensate for the loss of regulated wetlands. During the operational phase, the TSF would be managed under its existing SWPPP, and no additional impacts on wetlands are anticipated. Considering the proposed mitigation measures, including wetland avoidance, minimization of impacts, and the use of surplus wetland credits, the impacts of the Project on wetlands are not expected to be substantial.

Waterbodies

The construction of the proposed water retention dam would result in direct, permanent impacts to Reservoir No. 6, including the loss of 38.7 acres of surface area and 5,242 linear feet of shoreline. The loss of a substantial portion of this reservoir is notable. Several other waterbodies in the Project Area, such as Reservoir 2 North, Reservoir No. 2, Hay Lake, Hay Creek, and Swan River, could potentially experience temporary, indirect impacts on water quality, such as increased turbidity and localized sedimentation, during construction activities. These impacts would be mitigated through the implementation of erosion control measures, BMPs, and minimization of the duration of disturbance. Additionally, adhering to the requirements of the modified NPDES/SDS permits (which regulate water treatment and disposal systems and require monitoring of various water quality parameters, including sulfate), would mitigate impacts. During the operational phase, the Project is not expected to substantially alter the overall water balance or water quality at the TSF compared to pre-existing conditions especially considering the proposed mitigation measures and the regulatory requirements for

water quality monitoring, the impacts of the Project on waterbodies is not expected to be substantially different than existing conditions.

Vegetation

The construction of the proposed Project would involve the clearing of vegetation within both temporary and permanent impact areas, resulting in a loss of forested, herbaceous, and wetland habitats. However, the Project is not anticipated to impact any federal or state-listed plant species. Upon completion of construction, temporary impact areas would be restored to pre-construction contours, and erosion control measures would be implemented. These areas would be seeded with native seed mixes or allowed to naturally revegetate. Additionally, the Project would adhere to the conditions of the Dam Safety Permit, ensuring that all equipment is free of prohibited invasive species and aquatic plants before being transported into the Project Area. During the operational phase, potential impacts to vegetation would be limited to localized dust accumulation and routine maintenance of rights-of-way and work areas. Furthermore, Minnesota Rules Chapter 6130 requires the reclamation of mined lands, which includes the re-establishment of vegetation in disturbed areas. Considering the proposed mitigation measures and the regulatory requirements for reclamation, the impacts of the Project on vegetation are not expected to be substantial.

Wildlife

The construction and operation of the proposed Project are expected to result in minimal impacts on most of the wildlife species analyzed, including the Canada lynx, gray wolf, monarch butterfly, northern long-eared bat, and tricolored bat. The Canada lynx and gray wolf are unlikely to be substantially affected due to their mobility and the availability of adjacent habitats, while the monarch butterfly is expected to find suitable habitats nearby. The implementation of tree clearing restrictions during the roosting season would help minimize impacts on the northern long-eared bat and tricolored bat. However, migratory birds may face impacts, particularly due to the permanent loss of some forested nesting habitat, which could have long-term effects on their local populations. Although preconstruction surveys and nest buffers would be implemented to reduce these impacts, the loss of nesting habitat remains a concern. To further mitigate the potential impacts on migratory birds, U. S. Steel would prioritize the implementation of the proposed mitigation measures and consider additional measures, such as habitat restoration or compensation, to ensure the long-term conservation of these species within the Project Area and its surroundings. Additionally, all vegetation clearing (including tree clearing) would occur in the winter.

Aquatic Species

The construction of the proposed dam would directly impact Reservoir No. 6, both temporarily and permanently, potentially affecting fish populations and aquatic habitats. The loss of habitat and spawning areas along the eastern side of the reservoir, as well as increased turbidity due to sediment disturbance, could adversely impact aquatic species. However, these impacts would be mitigated by replanting aquatic plants and creating suitable environments for the re-establishment of native species on the western side of the reservoir. Additionally, a silt curtain would be installed to protect the western portion of the reservoir, and the eastern portion, where permanent impacts would occur, would be stacked with rock to minimize potential impacts on aquatic habitats and water quality. The Hay Creek watershed would also be directly impacted, with the loss of habitat at the headwaters of the creek, but the impacted area would be relatively small compared to the total watershed. Construction vehicles could potentially introduce terrestrial invasive species to the banks of affected waterbodies; this risk would be mitigated by inspecting vehicles, clothing, and equipment before any interaction with the water and sourcing construction materials locally. During the operational phase, no substantial impacts on aquatic species are anticipated, as there are no proposed water appropriations or new discharges, and the overall water balance and water quality at the TSF are not expected to change from pre-existing conditions. Considering the proposed mitigation measures and the limited scope of impacts relative to the overall watershed, the impacts of the Project on aquatic species are not expected to be substantial.

Cultural Resources

The construction of the proposed Project could potentially impact one known cultural resource site, which is located within the Project's Direct APE. The site, which has an undetermined eligibility for listing on the NRHP, is situated in a temporary impact area where staging activities could occur. To mitigate potential impacts, the Project plans to avoid the site by implementing a 200-foot avoidance buffer. If avoidance is not possible, U. S. Steel would be required to consult with the parties listed in the Programmatic Agreement, and additional investigations may be necessary to determine the site's eligibility for NRHP listing. If the site is found to be eligible and adversely affected, a Phase III data recovery investigation would be conducted to resolve the adverse effects. Additionally, archaeological monitoring during construction in areas near the cultural site and the implementation of a terrestrial post-review discoveries plan would help reduce potential impacts on any previously undiscovered archaeological resources encountered during construction. While it is possible that an undiscovered archaeological site could be impacted during construction, state and federal requirements for identifying, assessing, and mitigating impacts on cultural resources would limit the extent, scale, and magnitude of any such impacts. Considering the proposed mitigation measures and regulatory requirements, the impacts of the Project on cultural resources are not expected to be substantial

22. Other potential environmental effects:

If the Project may cause any additional environmental effects not addressed by Items 1 to 19, describe the effects here, discuss the how the environment will be affected, and identify measures that will be taken to minimize and mitigate these effects.

The Project is not anticipated to cause any additional environmental effects beyond those discussed in items 1 to 19.

RGU CERTIFICATION. *(The Environmental Quality Board will only accept **SIGNED** Environmental Assessment Worksheets for public notice in the EQB Monitor.)*

I hereby certify that:

- The information contained in this document is accurate and complete to the best of my knowledge.
- The EAW describes the complete Project; there are no other projects, stages or components other than those described in this document, which are related to the Project as connected actions or phased actions, as defined at Minnesota Rules, parts 4410.0200, subparts 9c and 60, respectively.
- Copies of this EAW are being sent to the entire EQB distribution list.

Signature s/s Becky Horton

Date August 25, 2025

Title Project Manger

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