



JANET T. MILLS
GOVERNOR

STATE OF MAINE
DEPARTMENT OF AGRICULTURE, CONSERVATION & FORESTRY
LAND USE PLANNING COMMISSION
22 STATE HOUSE STATION
AUGUSTA, MAINE 04333-022

AMANDA E. BEAL
COMMISSIONER

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EXECUTIVE DIRECTOR

May 27, 2020

Via E-mail

Jeremey Ouellette
Wolfden Mt. Chase, LLC.
1100 Russell St., Unit 5
Thunder Bay, Ontario P7B 5N2
Canada

Dear Mr. Ouellette;

The Land Use Planning Commission has reviewed the additional information submitted by Wolfden Mt. Chase, LLC. on May 1, 2020 for Zoning Petition 779, Pickett Mountain Mine. Because the additional information responds, in part, to both the request for additional information in the Commission's April 15, 2020 letter and items requested in the Commission's March 6, 2020 letter, we are providing an updated, comprehensive list of information that the Commission needs to begin a thorough analysis of the petition. Based on this latest review, there are still several items requiring revision or clarification before the petition can be deemed complete for processing. In addition, there are other outstanding information requests, and a few new questions based on the revised submittals to date, that the Commission needs answered to complete its review.

When Wolfden Mt. Chase submits a response to this letter, please 1) submit the entire section in which the revised information is contained, 2) *date and number the pages* in each revised section, and 3) provide a table that indicates where each of the items requested below can be found, by question, exhibit, or attachment number and page number. The Commission requests that the next submission of additional information provide a response to all the information listed below. If the next submission does not provide sufficient information to deem the petition complete for processing, the Commission may consider stopping the review process and returning the petition. If you have questions about the implications of returning the petition, we would be happy to discuss it with you. Please respond to this letter by June 30, 2020.

Information Required to Deem the Petition Complete:

1. *Estimate of the total cleared area.* Although the estimate of the cleared area was revised, the May 1 submittal did not clarify whether the total cleared area provided in Question 4, Project Description includes all necessary clearing for road improvements. Please provide that clarification.
2. *Percent of the total parcel covered by impervious area.*
 - a. The current calculation of 19% for the proposed lot coverage appears to reflect impervious area due to structures and lined facilities but not impervious area due to roadways, parking areas, laydown areas, and equipment storage. Note that the percentage of impervious area should be calculated based on the area of the entire parcel rather than the area proposed for rezoning. Please update the calculation in Question 4, Project Description.

- b. The revised discussion of lot coverage in Question 4, page 1 indicates that lined dry stack tailings facilities represent an area of 96.4 acres. Should that read “lined facilities represent an area of 96.4 acres (including 91.7 acres for lined tailings”?
3. *Minimum width of roads.* The last submittal provided information on the width of the transmission line corridor, and a proposed maximum width of access roads. To review whether the roads will provide safe access to and from the facility, in Question 4, Project Description or Attachment J, Transportation, provide the *minimum width* of improved roads (travel surfaces and shoulders).
4. *Waste management, tailings disposal.* There is still at least one residual reference to backfilling tailings in the mine shaft which is found in Question 15, CLUP Consistency; see attached with highlights. Please review and update all questions, exhibits, and attachments, as needed.
5. *Section B(3)(d).* Section B(3)(d) still has several references that are now out of date, including references to the height and size of the Tailings Management Facility and the total developed area; see attached with yellow highlights.

Additional information requests:

1. D-PD Subdistrict Boundary
 - a. Provide updated sections with revised maps that show the new boundary of the proposed D-PD subdistrict. Based on LUPC staff review, at least the following sections will need to be updated: Questions 5 and 6; Exhibits A, D-1, and D-2; and Attachments B, E, G, H, I, and K.
 - b. Also provide a new shape file with the new boundary of the proposed D-PD subdistrict.
2. Existing Zones (Question 3; Appendix A, Section A)
 - a. If any streams are identified during field surveys in the proposed D-PD area, include on a site plan the P-SL2 zones for these streams and discuss the development impacts on these zones.
3. Public and Community Services (Question 11)
 - a. Revise the table provided in response to Question 11 with updated information on the provider for cable services and the distance to the nearest public road.
4. Consistency with the Comprehensive Land Use Plan (Question 15)
 - a. Noise. Noise sources that will occur simultaneously should not be considered individually. Provide a model prepared by a qualified professional that estimates the cumulative noise levels at property lines, the nearest seasonal residence, and recreational resources including lakes and ponds, campsites, and hiking trails. This model may be based on sound levels produced during normal operations as provided by manufacturers. Alternatively, sound levels could be measured by a qualified professional at a similar facility under routine operations and used to estimate noise levels at property lines, the nearest seasonal residence, and the recreational resources.
 - b. Visual Impact.
 - i. Include more detailed information describing the method used to complete the viewshed analysis, including what software was used and any assumptions that were made in the analysis. Explain why a height of 10 meters was used for the analysis. Given the height of the proposed concentrator building of 60 feet, it appears that 18 meters is the more appropriate figure to use.

- ii. Provide a revised map for the desktop viewshed analysis that labels scenic resources from which there may be views of the proposed development including campsites, hiking trails, boat launches, waterbodies, etc.
 - iii. LUPC staff recommends that a qualified professional with experience in visual impact analysis provide an interpretation of the results of the desktop viewshed analysis.
- 5. Natural and Historic Features (Question 18, Exhibit M)
 - a. Provide a Phase 0 archaeology study for the area proposed for rezoning to D-PD.
- 6. Recreational Resources (Question 19; Appendix A, Section L)
 - a. Provide additional detail on *the level of use* and potential impacts to recreational resources, including daytime visual impacts, visual impacts from lighting at night and *noise impacts*, on the following resources:
 - i. Lakes within 3 miles of the project site, especially those with public boat ramps or launches, including Pleasant Lake;
 - ii. Campsites within 3 miles of the project, including the campsites on Pleasant Lake; and
 - iii. Permanent trails within 3 miles of the project, for example the hiking trail on Mt. Chase.

The best source of available information on the location of public boat ramps, launches, and campsites is the DeLorme Maine Atlas and Gazetteer (available for purchase online) or individuals with local knowledge. Note, the DeLorme Atlas shows campsites and a boat launch on Pleasant Lake. Noise levels should be estimated by a qualified professional, and level of use can be obtained through individuals with local knowledge.

- b. Provide a clearer map of the recreational resources within a 3-mile radius of the project site. Show and label boat ramps, launches, waterbodies, campsites, and permanent hiking trails, etc.
- 7. Preliminary Site Plan (Exhibit D-2)
 - a. Update the Preliminary Site Plan narrative and table to include updated figures on the cleared area and developed area (including square feet for the dry stack tailings facility) and add the parking areas for employees and equipment to the table and site plan.
- 8. Financial Capacity (Exhibit H)

The Commission cannot approve a rezoning to a D-PD subdistrict for metallic mineral mining unless there is substantial evidence that, among other criteria, the proposed change in districting is consistent with the purpose and intent of 12 M.R.S. ch. 206-A, which includes sound planning and zoning, and with the standards and purpose of the D-PD Subdistrict (See 01-672 C.M.R. ch. 12, § 4(B)(1)(a), 4(C)(1)(p). “The purpose of the D-PD subdistrict is to allow for large scale, well-planned development,” proposals for which the Commission will consider “provided they can be shown to be of high quality and not detrimental to other values” of the Commission’s jurisdictional area. 01-672 C.M.R. ch. 10, § 10(H)(1). Whether a project is technically feasible and financially practicable is a particularly important consideration for a custom zone, such as a D-PD subdistrict, that will be specifically established for a single large-scale development project. A project that is not technically feasible and financially practicable is not a well-planned or high-quality development and therefore would not satisfy the requirements of 01-672 C.M.R. ch. 12, § 4(B)(1)(a) or 4(C)(1)(p).

- a. To allow evaluation of the financial practicability and technical feasibility of the proposed project, provide the following:
 - i. a more detailed financing plan for development of the metallic mineral mine that is a commercially reasonable method for financing a metallic mineral mining operation from start-up through to closure and reclamation;
 - ii. information on the role of junior mining companies and major mining companies, and how each typically finance their roles in staking a claim, exploration, and development of a metallic mineral mine;
 - iii. confirmation that Wolfden Mt. Chase LLC is a junior mining company; and
 - iv. evidence that development of the Pickett Mountain Mine will be technically feasible and financially practicable with supporting documentation such as a Preliminary Economic Assessment.

9. Soil Suitability (Exhibit J)

- a. Submit a report from a certified soil scientist, based on a field survey, that indicates the soils onsite are suitable for the proposed use, or that any onsite soil limitations can be overcome with standard engineering practices.

[Published soil maps available to LUPC Staff indicate soil suitability for proposed uses is limited, and therefore cannot be relied upon for a soil suitability determination.]

10. Public Services (Exhibit L or Appendix A, Section O)

- a. Provide letters from the Penobscot County Sheriff's Department, and Hughes Net (or another phone/cable provider) indicating that they can provide services to the facility.

11. Potential Impacts to Uses and Resources (Section B(3)(d))

- a. Update the Estimated Hydrologic Budget table with the current size of the developed area and revise results based on the larger developed area. The table does not appear to include the new size of the Tailings Management Facility, within which precipitation will be captured and then used in the beneficiation process.
- b. Provide confirmation from the reverse osmosis (RO) manufacturer that the RO units are capable of removing all the analytes showing an increase in concentration in the Halfmile Mine August 2019 samples.
- c. Provide additional information on where the samples were collected from, and who collected and analyzed the samples to produce the data in the Halfmile Mine Analysis of Metals in Water table.
- d. What is the function of the clean in place tank and how does it fit into the treatment flow for the wastewater treatment process? The diagram for the wastewater treatment process does not show any flow to this unit.

12. Existing Conditions (Appendix A, Section F)

- a. Submit a revised existing conditions plan (See Exhibit D-2) at a scale of at least 1"=100' and that shows streams, wetlands, and vernal pools mapped by a qualified professional at least at a reconnaissance level of mapping. Include a supporting report by the qualified professional describing the methodology used to prepare the map and discussing whether any other significant

wildlife habitats or S1/S2 plant communities were found on the site during the field reconnaissance.

13. Transportation (Appendix A, Section J)

- a. Provide evidence that landowners are willing to enter into a cooperative agreement for *road upgrades and maintenance*. The letter provided from H.C. Haynes indicates a right to use the off-site private roads for access but does not provide evidence of a right to improve and maintain the private roads.

14. Development Plan (Appendix A, Section R)

- a. The proposed development plan must be consistent with the LUPC's Land Use Districts and Standards (Chapter 10 of the LUPC's Rules and Standards) in terms, definitions, and standards; or the Development Plan will need to include new definitions and proposed standards. Improve the Development Plan by:
 - i. Providing definitions for terms not defined in Chapter 10.
 - ii. Providing standards for activities allowed by standard if none exist in Chapter 10.
 - iii. Considering that determinations on whether an allowed use requires a permit (such as solar facilities and worker housing) must be consistent with DEP permit requirements.

[Additional consultation with LUPC Staff on improvements to the Development Plan is recommended]

Please note that additional questions may arise during the Commission's continued review of the zoning petition. If you have any questions about the agency's additional information request or about the petition process, please feel free to contact me. I can be reached during normal business hours at telephone number 207-557-2535 or by e-mail at stacie.r.beyer@maine.gov.

Sincerely,



Stacie R. Beyer
Planning Manager
Land Use Planning Commission

Enclosure

**Excerpts from ZP 779, Pickett Mountain Mine Petition
With LUPC Highlights**

Yellow highlights indicate statements or figures that may require updates based on the current proposal

5. ACREAGE. Specify the acreage proposed for rezoning under “Acres to be Developed.” If your petition to rezone is intended for subsequent subdivision, specify the acreage proposed to be retained by the petitioner under “Retained Acres.” Specify the total amount of contiguous land area that is owned or leased by the petitioner within the township, town or plantation of the project area under “Total Contiguous Acres.” “Total Contiguous Acres” should equal the sum of “Acres to be Developed” and “Retained Acres.”

Acres to be Rezoned / Developed: 197.5	Acres to retain current zoning: 6,947.5	Total Contiguous Acres: 7,145 (by Deed)
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6. SITE CONDITIONS. Describe in detail the present condition of your property and areas to be rezoned, including the nature of any water frontage (rocky, sandy, wooded, cleared, etc.); the general slope and topography of the ground (flat, steep, percent slope, etc.); existing vegetation; the history of vegetation clearing and timber harvesting activities; hydrologic features, including whether portions of the site are subject to flooding or ponding; special natural features, such as rare or unique plants or plant communities; and other natural and cultural conditions.

Water Frontage: The area proposed for rezoning does not have water frontage. The area proposed to be rezoned is approximately **2.76 %** of the total property. The balance of the Wolfden property (outside the area proposed for rezoning) includes Pleasant Lake and the western portions of Mud Lake and Pickett Mountain Pond. The water frontage of Pickett Mountain Pond is approximately 17,300 feet and wooded including adjacent areas outside of the Wolfden property. Combined Pleasant and Mud Lakes have a frontage of approximately 48,860 feet and are wooded including eastern Mud Lake which is outside the Wolfden parcel.

Slope and Topography: Topography within the area proposed for rezoning is gently sloping where development is proposed. Minimum slopes of 0.02 ft/ft to maximum slopes of 0.04 ft/ft (2%-4%). Area proposed is along a broad and relatively flat upland ridge. The remainder of the Wolfden property has a wide range of topographic conditions from flat lying forested and wetland areas around the previously mentioned lakes and streams, to a series of moderate mountain peaks, including Pickett Mountain to the south (el. 1,753 ft), a prominent ridge line in middle of the property (maximum el. 1,330 ft), to a series of unnamed ridges north of Pleasant Lake ranging from 1,146 ft to 1,100 ft. The steepest hill slopes are around Pickett Mountain which rises approximately 710 feet above Picket Mountain Pond at an average slope of 0.3 ft/ft.

Existing Vegetation: The area proposed for rezoning is primarily upland forested habitat, co-dominated by deciduous trees (i.e., beech, birch, and red maple trees) and coniferous trees (i.e., spruce, fir, cedar and hemlock). The area has been logged in the past and is currently in vegetative re-growth, while part of the area may be harvested during the development of the operation. It is presumed the forest habitat of the balance of the Wolfden property is dominated by similar deciduous and coniferous tree species.

Hydrologic Features: The area proposed for rezoning contains at least two intermittent streams associated with forested wetlands that have yet to be fully mapped and characterized. The Wolfden property includes lakes, ponds, and streams, including Pleasant Lake, Pickett Mountain Pond, Mud Pond, and West Branch of the Mattawamkeag River. Depth to groundwater is shallow, where observed and intermittent stream features are present as discussed further below. Groundwater hydrology has not been formally characterized. A moderate yield sand and gravel aquifer has been mapped on the northern side of Pleasant Lake.

Wetlands: During site reconnaissance within the area proposed for rezoning, wetlands, potential vernal pools, and intermittent streams were observed. A detailed wetland and vernal pool survey during the growing season and amphibian breeding season is planned for the Spring of 2020. The final design permitted by DEP will attempt to avoid or minimize to the extent practical impacts to these resources and mitigate unavoidable impacts. Within the balance of the Wolfden property, NWI mapped forested wetland and scrub-shrub wetlands are present surrounding drainages and streams associated with the lakes and ponds. Wetlands of special significance are also associated with areas between Pleasant Lake and Mud Lake and surrounding Mud Lake.

Special Natural Areas: Special natural areas have not been observed during site reconnaissance and the Maine Natural Area Program (MNAP) has prepared an environmental site review and identified no rare botanical features in the project area based on available data. Wolfden will work with the MNAP to document botanical features in the lakeside graminoid/shrub fen between Pleasant and Mud Lakes.

Natural and Cultural Conditions: A Phase 0 archeological survey will be conducted in the Spring of 2020. The scope of the survey has been developed in consultation with the MHPC to identify the potential presence of historic or prehistoric cultural features. A Phase 1 survey will follow if necessary.

7. CURRENT USE OF PROPERTY.

How has your property been used over the past ten years?

<input type="checkbox"/> Residential	<input type="checkbox"/> Residential with home occupation	<input type="checkbox"/> Commercial or industrial
<input checked="" type="checkbox"/> Undeveloped / Forestry	<input type="checkbox"/> Public or institutional	<input type="checkbox"/> Other: _____

13. SURROUNDING USES.

A. Within one mile of the site, the area is forested and is currently in use for wood harvesting. In general, the area beyond one mile is surrounded by commercial forests. The site has been logged within the last 7 to 10 years and is in vegetative regrowth. Pickett Mountain Pond is within one mile of the site and Pleasant Lake (and nearby Mud Lake) are slightly beyond a mile. Maine Department of Inland Fisheries and Game surveys (1958 and 1953 respectively) indicate both are shallow mud bottom ponds with warm temperatures at all depths in summer months. The ponds did not have conditions supportive of cold-water fish species at the time of these surveys, but inlet and outlet streams (West Branch of the Mattawamkeag River, Pickett Mountain Stream and Spring Brook) provided spawning and nursing areas for trout. The use of these ponds and streams for recreational use is not restricted. There are a small number of seasonal residences around Pleasant Lake. Two residences are located within 675 feet of the southern shore, and four residences are located along the northern shore within 1,600 feet of the outlet to Mud Lake. **These residences are from 1 mile to 1.6 miles from the closest border of the area proposed for rezoning.** These are depicted in **Appendix A-Attachment B.**

B. Beyond the six seasonal residences / house lots depicted in Attachment B, there are no other residential or commercial enterprises or other established land uses proximal to the site. The Wolfden property is occasionally used for motorized recreation (ATVs and snow mobiles) and these uses foreseeably may continue outside the area of the future operations and any main access roads (although Wolfden reserves the right to assert its property interests against trespassers and assumes no liability for trespass on its property). Roads accessing private parcels within the Wolfden tract are established right of ways to these properties and their use will also continue.

15. CONSISTENCY WITH COMPREHENSIVE PLAN.

Consistency with the LUPC's Comprehensive Land Use Plan

The Comprehensive Land Use Plan (CLUP) provides for sound planning practices in the public interest to encourage and manage multiple uses of land and resources within the LUPC's jurisdiction. The following subsections describe how the proposed rezoning fits within the CLUP, and how the planned Pickett Mountain Mine project would meet the CLUP's goals and policies.

BROAD GOALS

The Pickett Mountain deposit is a unique mineral resource that is ideally situated to allow mineral extraction in an environmentally responsible manner through underground mining while ensuring the following:

- Enhancing the living and working conditions of the people of Maine including property owners and residents by creating an economic benefit in terms of capital investment, training, jobs and enhanced tax base within host and adjacent communities and counties.
- The proposed rezoning will meet the goal of separating incompatible uses. The area that is proposed for rezoning is currently a general management subdistrict (M-GN) that has been used for timber, and outside the proposed activity the logging operations can continue. The proposed rezoning will not impact any great ponds.
- The proposed project is designed to have a small foot-print (approximately 528.2 acres) with a comprehensive water management plan that will ensure protection of adjacent natural resources including groundwater and surface water quality, forest resources, wildlife and other natural resource values such as plant and animal habitat. The current information available indicates no known occurrences of endangered, threatened or special concern species within the project area. The IF&W also has not mapped any significant wildlife habitats within the project area. Based on current information from the MNAP, rare and exemplary botanical features are not present or not expected to be present in the area proposed for rezoning. The MNAP did identify a priority area for a botanical survey on the Wolfden property located between Pleasant and Mud Lakes. This area is a graminoid/shrub fen and a survey is planned to determine the whether or not rare plants or natural community types are present.
- The proposed project will allow continued use of forest resources related to logging for wood and fiber production on Wolfden's property.

DEVELOPMENT GOALS AND POLICIES

Location of Development

The Pickett Mountain Mine project location is dictated by the unique geologic conditions that resulted in the formation of a mineral deposit of economic value. As such there are no alternatives to the project location and the project is exempt from the policy of adjacency. The location and physical relationship of the mineralized zones to surrounding topography and water bodies allows the deposit to be developed by underground mining methods which when combined with carefully managed mine water collection and treatment systems will allow mine development, operation and closure without impacting water quality of these adjacent resources. The manner in which the project will be designed shall be subject to avoidance and mitigation, to the extent possible, of protected natural resources including but not limited to wetlands, vernal pools, rare and endangered species including plants and wildlife. Therefore, aside from adjacency, the project as proposed, meets the LUPC's development goals and polices with respect to project location.

The project is also unique in having a finite duration currently anticipated to be from 10 - 15 years. Therefore, unavoidable impacts to resources such as wetlands are ephemeral or short lived, and resource values and functions can and will be restored upon project completion. The reclamation of the proposed site will sequentially remove all buildings and structures including the water treatment systems when they are no longer required or needed. Once the access to underground workings are permanently sealed and the site is regraded and revegetated it will attain the natural character and values that existed prior to mining. An above ground sub-aerial TMF will remain at closure. The TMF will be designed with a liner in accordance with DEP Chapter 200 requirements. This area will contain tailings that have been stabilized and compacted and which could present some risk to the environment if not managed properly. These risks will however be managed by collection and treatment of water that comes in contact with these materials during operations and capping at closure. The higher sulfide bearing tailings will be stabilized and used as a structural backfill in the underground mine working and will not present any risk. The above ground TMF will be constructed and graded to follow the original upland land surface at an elevation approximately ten feet higher over approximately 42 acres. This approach will preserve the current appearance of the ridgeline post reclamation. This area will also be revegetated and designed to allow regrowth of natural ground cover as discussed in later sections of this Petition.

Thus while meeting many of the goals related to location of development, the project is also consistent with and meets CLUP polices including:

Policy 1 Development that is directed to a suitable area and retains the principal values including a working forest, and integrity of natural resources.

- Policy 2 The project location is near existing towns (the nearest community being Hersey (4.5 miles) and Patton (9.5 miles) with proximity and connectivity by public roads to other organized town and economic centers, with adequate available public infrastructure and services.
- Policy 7 Project allows for (a) planned development dependent on a particular natural feature which is the presence of a metallic mineral resource.

Economic Development

One of the CLUP's goals is to encourage economic development that is connected to local economies, is efficient in its use of existing services and infrastructure and is compatible with existing natural resources and surrounding land uses.

The project will provide direct and substantial economic benefit to the local communities (see **Appendix A-Attachment N**). This benefit is in the form of job skills training, primary wages to local employees, wages that are spent in the local economy, an increase in property tax revenue, and indirect wages at secondary jobs that help support the mining operations (mechanical equipment repair, vehicle maintenance, road maintenance, solid waste management, and other specialized services).

The site is in vegetative regrowth from past logging efforts that are estimated to have occurred from 7 to 10 years ago. Wolfden actively leases its timber rights to a local logging company, preserving productive use of its working forests. The proposed development will be largely self-sufficient and not impose an undue burden on local community services or resources (see **Appendix A-Attachment O**). The project will require importation of approximately 6 megawatts of electrical supply which is larger than is currently available locally. This will require construction of approximately 14.6 miles of new transmission line along Route 11 and the existing private gravel access road.

The project occupies a largely upland area removed from adjacent lakes and ponds and would not impact water quality of such water bodies or affect related fish and wildlife resources during the active period of the project. Plants and natural communities that are located outside of the proposed area of land disturbance would not be impacted. If rare and exemplary botanical features are identified on-site in subsequent surveys impacts will be avoided to the extent possible, and such plant communities would be relocated or protected pending concurrence with the MNAP. The planned grading of the TMF will limit ridgeline impacts which will help mitigate scenic impacts. The presence of cultural resources, including historic logging camps and related structures are not known to be present on the site. A Phase 0 archeological survey will be conducted in the spring of 2020 to assess the presence of cultural features. The Phase 0 survey will also evaluate the potential for prehistoric archeological resources. A known prehistoric archeological site is in close proximity to the east end of Pickett

Pond. Since the extent of the site is limited in size, other mountain areas and other geologic resources would not be impacted.

The site is not in a remote area of the jurisdiction, being located approximately five miles from state highway SR-11 and is accessed by well developed, existing gravel roads on private property. The planned development of the site will occur along a portion of a ridgeline and at project completion the final profile of the ridgeline would be elevated approximately 10 feet from existing ground surface and parallel to the original profile. This slight alteration should not diminish overall character of the area and regrowth of vegetation common to the area is expected as part of the reclamation.

In addition to these goals the project also meets many elements of the CLUP's policies including the following items:

- Policy 1 Encourage other resource-based industries and enterprises which further the jurisdiction's tradition of multiple use without diminishing its principal values.
- Policy 4 Allow new technologies (sub-aerial tailings) which will provide the LUPC the opportunity to evaluate the technology and its effectiveness.

Site Review

A goal of the CLUP is to assure that development fits harmoniously into the existing communities, neighborhoods and the natural environment.

The nature of the proposed project, its location and the proposed reclamation, as discussed in following sections, would ensure a harmonious relationship to the natural environment and local communities.

In addition, the project will meet established noise and lighting requirements of the CLUP as specified under section 10.25F.

Noise. The maximum permissible continuous sound pressure level allowable in a D-PD district is determined by the LUPC. Specified maximum sound levels range from 70 dB(A) in daytime (7 AM to 7 PM) to 65 dB(A) at night (7 PM to 7 AM) for certain subdistricts (commercial-industrial for example) to 55 dB(A) and 45 dB(A) for all unspecified subdistricts. Construction activities conducted between 7 AM and 7 PM are exempt from 10.25F. Other exempt activities include but are not limited to safety and warning signals, traffic on roadways, etc.

During the mine construction phase, noise will be created from construction equipment operating above ground, including drilling and minor blasting. Once the underground development has progressed, blasting will be occurring below ground and will no longer be a source of noise above ground.

During mine operations, the noise source with the largest pressure levels will be the fans used to ventilate the underground workings. Rock crushing is also a source of noise but less so than the ventilation fans. Once crushed, the final milling of the mineralized rock is conducted within a building and is not a large source of noise. The ventilation fans will typically produce 110 decibels (dB) and can be dampened up to 20% to operate at approximately 88 dB.

Reduction in pressure levels with increasing distance from a source is described by an inverse square law. The most conservative assumption would be a free field where sound is traveling over an unobstructed plane with no barriers between the source and receptor. Barriers that would exist at the site include buildings and tree lines. Sound is also dampened (absorbed) by the ground and vegetation.

Assuming a free field condition (unobstructed path) reduction in sound would be described as:

$$\begin{aligned}dL &= Lp2 - Lp1 \\ &= 10 \log (R2 / R1)^2 \\ &= 20 \log (R2 / R1)\end{aligned}$$

where

dL = difference in sound pressure level (dB)

Lp1 = sound pressure level at location 1 (dB)

Lp2 = sound pressure level at location 2 (dB)

R1 = distance from source to location 1 (ft, m)

R2 = distance from source to location 2 (ft, m)

A "free field" is defined as a flat surface without obstructions.

Assume L1 is 1 foot from the source at measured decibels

The nearest property boundary from the preliminary location of the ventilation fans is approximately 3,000 feet to the south, near Fire Road C. The nearest residence is approximately 8,850 feet to the northeast, on the south side of Pleasant Lake. Applying this equation yields the following reduction with distance from the source.

							Nearest Property Boundary			Nearest Residence
Source dB	110	110	110	110	110	110	110	110	110	110
L1 (ft)	1	1	1	1	1	1	1	1	1	1
L2 (ft)	1	10	100	500	1000	2000	3000	4000	5000	8550
dl=	0.0	20.0	40.0	54.0	60.0	66.0	69.5	72.0	74.0	78.6
Receptor dB	110.0	90.0	70.0	56.0	50.0	44.0	40.5	38.0	36.0	31.4
With 20% Dampening	20%									
Receptor dB	88.0	68.0	48.0	34.0	28.0	22.0	18.5	16.0	14.0	9.4

As noise sources can be sometimes unpredictable, confirmatory work for noise in the surrounding area are scheduled to be completed for the next stage of study and permitting. This study will be performed through several avenues and will justify the table above. This study will include a review of similar projects sites related to noise generation and carry as well as a desktop model of noise generation and projection using dampening impacts from trees and hills, etc. The proposed noise prediction model will be developed using the Cadna/A software published by DataKustik GmbH or equivalent software configured to implement ISO 9613-2 environmental noise propagation algorithms.

Calculated Sound Pressure Levels from Source (unobstructed path)

1. Ventilation Fans - Without dampening the underground ventilation fans, the expected sound levels at the property boundary and nearest residence are below sound levels for "all unspecified subdistricts". Wolfden intends to use enclosures and other means to dampen the source noise levels. Given the presence of other dampening factors (buildings, vegetation and tree lines), a conservative estimate of noise levels at the property line and the nearest seasonal residence (1.1 miles) indicates that expected noise levels will be very low at approximately 31.4 dB. It will be considerably lower at 3 miles, perhaps even undiscernible unless there is a wind from that direction. A value of 10 dB is commonly cited as the noise level of normal breathing.
2. Blasting - Involves the drilling holes into rock then charging or loading the holes with a specified amount of explosives that are numbered according to a firing sequence. When detonated, the firing sequence controls which holes "fire" or detonate in order to distribute the energy throughout the rock in a balanced controlled manner. The overall blasting process during the construction and development phase at Pickett Mountain is as follows:
 - Excavation of overburden and loose rocks from the footprint of the portal.

- Drill a blasting pattern (Typically 3' x 3' square pattern) with 4.5" drill holes for desired blast. Typically, larger excavations such as portal can take 2 – 3 blasts to complete in a very controlled manner.
- Clean all of the holes and measure for accuracy.
- Load explosives and detonators into the holes at design levels and quantities.
- Clear property with sign outs and guards.
- Sound appropriate warnings and alarms
- Detonate the blast.
- Check over the blast to ensure proper detonation and fracturing
- Excavate fractured rock to waste rock storage pad.

It is worth noting that open-air blasting to commence the access (portal) for the underground workings is only expected to last two or three weeks. Once underground, (after two to three more weeks) sound from the underground blasting will no longer be heard at the property boundary.

Lighting. Within the plant operations area, all above ground exterior lights greater than 60 watts or incandescent lights greater than 160 watts will be housed in downward facing full cut-off fixtures as specified in CLUP Standards under 10.25F. Other sources of light will include vehicle headlights and building interior lighting.

In addition, the project would meet other CLUP policies including the following items:

Policy 1(a) A buffer would be established around the proposed area of rezoning and would be far removed from other land use activities. At closure of the project the ridgeline where the TMF is located would be elevated approximately 10 feet above its current topographic profile. Once reclaimed and vegetated this will be a minimal change to the natural appearance of the landforms at the site.

Policy 1(b) The project will provide for parking at the mine operations site and the transportation routes, described in **Appendix J** would not adversely affect traffic circulation.

Policy 1(c) The only signage visible to the public associated with the project would be for transportation safety at the location where vehicles egress and exit from SR-11 to private roads.

Policy 2 The project final design will be permitted through the DEP and efforts will be made to minimize impacts to the principal values of the jurisdiction including avoidance and mitigation of impacts to protected natural resources.

Infrastructure

The project meets the CLUP's goal of ensuring that infrastructure improvements are well planned and do not have an adverse impact on the jurisdiction's principal values. These improvements will include upgrading existing gravel access roads located on private lands and the intersection of the private road with State Highway 11 for public safety purposes. The project will also, separate from this Petition, establish a new power transmission service line to supply additional needed electrical power for the project.

The power transmission route has been discussed with Emera Maine and would run from their substation located on Route 11, located approximately 0.6 miles south of downtown Patten, Maine. The transmission line would run north and northeast along Route 11 for approximately 9.5 miles then follow the same gravel access road proposed for the mine for approximately 5.1 miles. The access road upgrades to be considered in the design for the permit application submittal will be developed concurrently with the transmission line design.

The project also meets other CLUP policies including the following items:

Policy 1 To consider the capacity of existing infrastructure and services to accommodate proposed development. It is Wolfden's objective that primary workforce be employed locally from residents. This will require training for that work force since many unique skills are required of miners working underground. The mine will employ approximately 60 workers, composed of 30 workers per shift with two shifts per day. With a local workforce, the imposition on existing infrastructure and services (housing, schools, roads, medical facilities, fire, police, solid waste, and municipal) is minimized since this population is already using these services. An analysis of the capacity of these services in the local communities is provided in **Appendix A- Attachment O**.

Policy 2 The project will not require construction or establishment of any new public roads that would degrade the natural character of remote areas.

Policy 3 The new utility lines, principally electric power transmission, will be located or co-located within or adjacent to existing utility or public road rights of way to the extent practicable. Where new utilities cannot be established along existing utility corridors, they will be designed to minimize visual and physical impacts that would degrade natural values of the area. The areas contemplated would not be considered remote and would be near or adjacent to existing private roads.

Policy 5 Although not highly visible, infrastructure at the Site (buildings, water collection and treatment ponds, soil stockpile areas or pens) would be decommissioned, dismantled and removed at the end of the project as part site reclamation. The land surface once occupied by these buildings would be regraded and returned as close to original grades as possible.

Development Rate, Density and Type

The project will be constructed in accordance with plans approved by the DEP with input from LUPC. Since the project will be constructed in one phase the density and type of structures will be known and with input from the LUPC, will be consistent with the jurisdiction's principal values and policies concerning development.

Affordable Housing

The project does not involve construction of housing but as described in **Appendix A – Attachment O** the local employment anticipated by the project will provide employee wages sufficient for those employees to afford available housing in the local market.

Land Conservation

The project will support the long-term conservation of select areas of working forests in the project area as well as protecting high-value natural resources such as surface water bodies, streams, wetlands, vernal pools, flora and fauna. The manner in which these natural resources shall be protected is discussed in **Section B (3)(d)**. Wolfden will continue to work with local logging companies to manage and allow harvesting of forest resources on its property.

The project would meet the CLUP's land conservation policy:

Policy 1 Wolfden has developed cooperative working relationships with local landowners and local timber companies, to ensure continued use of its working forest resources and help maintain public access on private roads to access lakes within its property.

Natural and Cultural Resources and Policies

Air and Climate Resources

The project will not adversely affect air quality since dust will be controlled and processes that utilize chemicals that would be considered air pollutants are not used. On-site emission

sources will be limited to motorized heavy machinery and vehicles for above ground and underground mining related activities.

Rock crushing operations are a potential source of dust, but adequate provisions will be provided for dust management and control. Dust suppression is an important operational safety concern below ground in the mine. Blasted rock is mucked out wet to eliminate dust underground. Rock placed into the crusher is therefore wet and that moisture greatly reduces dust during crushing operations. If dust becomes an issue, dust collection equipment can and would be installed above the crusher and removed via a bag house filter.

Cultural, Architectural and Historical Resources

The Maine Historic Preservation Commission (MHPC) has been consulted and due to the presence of archaeological site 147.001 (MHPC Archeological Survey report 2719- E.C. Jordan 1984) at the headwaters of Pickett Mountain Pond a Phase 0 Archeological survey will be conducted in Spring 2020 as discussed in **Exhibit M**. The scope for the Phase 0 survey has been developed in consultation with the MHPC and is presented the Exhibit M. By working cooperatively with MHPC, the project will meet the CLUP's goal of protecting archaeological and historical resources of cultural significance.

These activities will meet the following CLUP policies:

- Policy 1 Identify and protect unique, rare and representative cultural resources to preserve their educational, scientific and social values.
- Policy 2. Collaborate with other agencies in efforts aimed at the protection of cultural resources.
- Policy 3. Complete an archaeological survey as part of this development proposal.

Energy

The project will further the CLUP's energy goals through designs that favor and incorporate energy efficiency and utilization of technologies such as heat pumps to assist heating and cooling at above ground facilities, when possible. The project will require a new transmission line to provide the needed energy requirements. The project will of course require emergency back-up power in the form of generators, but these would be used only when needed. Any new energy generation will be used exclusively for the project.

Forest Resources

As discussed in **Section B (3)(d)** and **Appendix A-Attachment Q** the project footprint will require only 57 acres of actual development. Only the area occupied by the dry TMF (approximately 42 acres) will be excluded as a future forest resource for lumber and fiber production. Upon final reclamation, all other areas (approximately 15 acres excluding roads) will be returned to current conditions. The balance of Wolfden's property will be accessible for timber harvest, thus meeting the CLUP's goal to conserve, protect and enhance the forest.

The specific policies items that are supported by the proposed project include:

- Policy 1 Encourage active forest management.
- Policy 2 Support uses that are compatible with continued timber and wood fiber production, as well as biodiversity.
- Policy 3 Protect areas identified as environmentally sensitive.
- Policy 5 Support efforts by landowners to manage vehicular access to private roads when necessary to reduce land use conflicts.
- Policy 9. Encourage the use of Maine's best management practices for forestry on its land.

Geologic Resources

The LUPC has established goals of conserving soil and geologic resources by controlling erosion and protecting areas of significance. The CLUP's goal with respect to mineral resources is to allow environmentally responsible exploration and mining of metallic and non-metallic mineral resources where there are not overriding, conflicting public values which require protection.

The Pickett Mountain Site is under extensive exploration for mineral resources and there are no identified important natural geological formations, or geologic hazards such as seismically active faults, high elevations or steep slopes subject to instability or erosion. Based on visual inspection the area proposed for the project features nearly level to gentle slopes with high percentage of vegetative cover and organic matter, and moderate to deeply rooted vegetation in glacially derived soils with a shallow water table. Fragile soils, most subject to erosion, are not known to be present.

As discussed in **Attachment J**, site access is by existing gravel roads that are currently used for logging operations and which are in good condition. Any modification or improvement of these roads will be completed in accordance with a sedimentation and erosion control plan that will be developed during the mine design and permitting phase under DEP rules. Based on current information, soil types are suitable for proposed development, though detailed high intensity soil mapping and geotechnical investigations will be required prior to final design of buildings and the sub-aerial TMF. Any modification of roads or the one existing stream

crossing (outlet from Pickett Mountain Pond) would be completed in conformance with Land Use Standards enumerated in Chapter 10.27D.

The proposed metallic mineral mining would occur only within the area rezoned for planned development and would not adversely impact competing uses and public values. The proposed facility would minimize water, air, land, noise and visual pollution through operations described in **Section B (3)(d)** and **Appendix A-Attachment Q**. These operations will not affect public safety and health, and will avoid undue adverse impacts on fisheries, wildlife, botanical, natural, historic, archaeological, socioeconomic and other values. The proposed mining operation provides distinct economic and social benefits and would not pose undue burden on existing services as described in **Attachments M, N and O**.

The project will be subject to a long-term post closure monitoring and maintenance program subject to the requirements of DEP Chapter 200 rules and including reclamation of the mine site to restore natural values and protect public health and safety and allow beneficial reuse of the majority of the property.

Specifically, the project would support the following policy items pertaining mineral resources:

- Policy 6 Exploration for mineral resources with minimal disturbance to natural and cultural resources.
- Policy 9. Permit a major metallic mining development in an area zoned for planned development, which broadly considers impacts and benefits, competing uses and public values.
- Policy 10. Regulate the mining operation to minimize water, air, land, noise and visual pollution, to ensure public safety and health, and to avoid undue adverse impacts on fisheries, wildlife, botanical, natural, historic, archaeological, socioeconomic and other values.
- Policy 11. Complete effective monitoring and reclamation of the mining site to protect public health and safety and to promote beneficial reuse where feasible.

Plant and Animal Habitat Resources

The proposed mining activity is not within areas known to contain unique, threatened or endangered plant or wildlife resources and will be able to meet the CLUP goals and policies to preserve and protect aesthetic, ecological, cultural and economic values of plant and wildlife resources. The area proposed for development is primarily upland forested habitat, co-dominated by deciduous trees (i.e., beech, birch, and red maple trees) and coniferous trees (i.e., spruce, fir, cedar and hemlock). The area has been logged in the past and is currently in vegetative re-growth. The proposed mining activities are within an area that is actively logged and would have a lesser short- and long-term effect on habitats than current logging practices.

Since the area is relatively small compared to the surrounding woodland habitat it should not have a negative effect on connectivity of habitats in the area. Wolfden has received preliminary correspondence from the Maine Department of Inland Fisheries and Wildlife concerning potential habitats supporting Rare, Threatened or Endangered (RTE) species. Based on work completed to date habitat supporting rare, threatened, or endangered species are not known to be present in the area. Also, unique habitats such as deer wintering areas, great blue heron nesting sites or habitat for bats, were not observed. Wolfden plans on conducting delineation of wetlands and vernal pools in spring 2020 will at that time conduct a final assessment for potential RTE species.

Wolfden has also met with staff of the MNAP. There is one area, a fen, between Pleasant and Mud Lakes that MNAP has identified as a priority site for a botanical survey. This area is far removed from the proposed site and would not be adversely affected by proposed activities and is outside the area proposed to be re-zoned. The MANP environmental review for the project is presented in Exhibit N. Based on current information RTE plants are unlikely to be present in the upland areas proposed for rezoning. Wolfden plans on conducting additional evaluation in spring 2020 in consultation with the MNAP and if plant resources requiring protection are identified, Wolfden will make appropriate accommodations to avoid impacts where possible.

Specifically, the policy items that would be met by the project include:

- Policy 1. Coordinating with and supporting agencies in the identification and protection of a variety of high-value wildlife habitats, including but not limited to: habitat for rare, threatened or endangered species; rare or exemplary natural community and ecosystem types; native salmonid fish species; riparian areas; deer wintering areas; seabird nesting islands; waterfowl and wading bird habitats; and significant vernal pools.
- Policy 2. Conduct land use activities that are protective of sensitive habitats, including but not limited to habitats for fish spawning, nursery, feeding and other life requirements for fish species.
- Policy 3. Develop the site in a manner that retains connectivity of habitats and minimize road mortality of wildlife by promoting road building practices that facilitate wildlife movement and by directing development to appropriate areas.
- Policy 5. Protect wildlife habitat in a fashion that is balanced and reasonably considers the management needs and economic constraints of project owner (landowner).
- Policy 7. Encouraging sustainable land use (forestry management) over much of the Wolfden parcel which will contribute to maintaining a large tract of undeveloped land, with ecological significance that is important locally to healthy plant and animal populations.

Recreational Resources

See Section 19 of this Petition for a discussion of recreational resources.

The specific recreational resource policies of the CLUP that would be met or supported by the proposed project include:

Policy 6. Cooperative efforts that assure continued public access across any rights of way on Wolfden's property (excepting reasonable restrictions on certain roads that lead to the mine site, if needed for public safety).

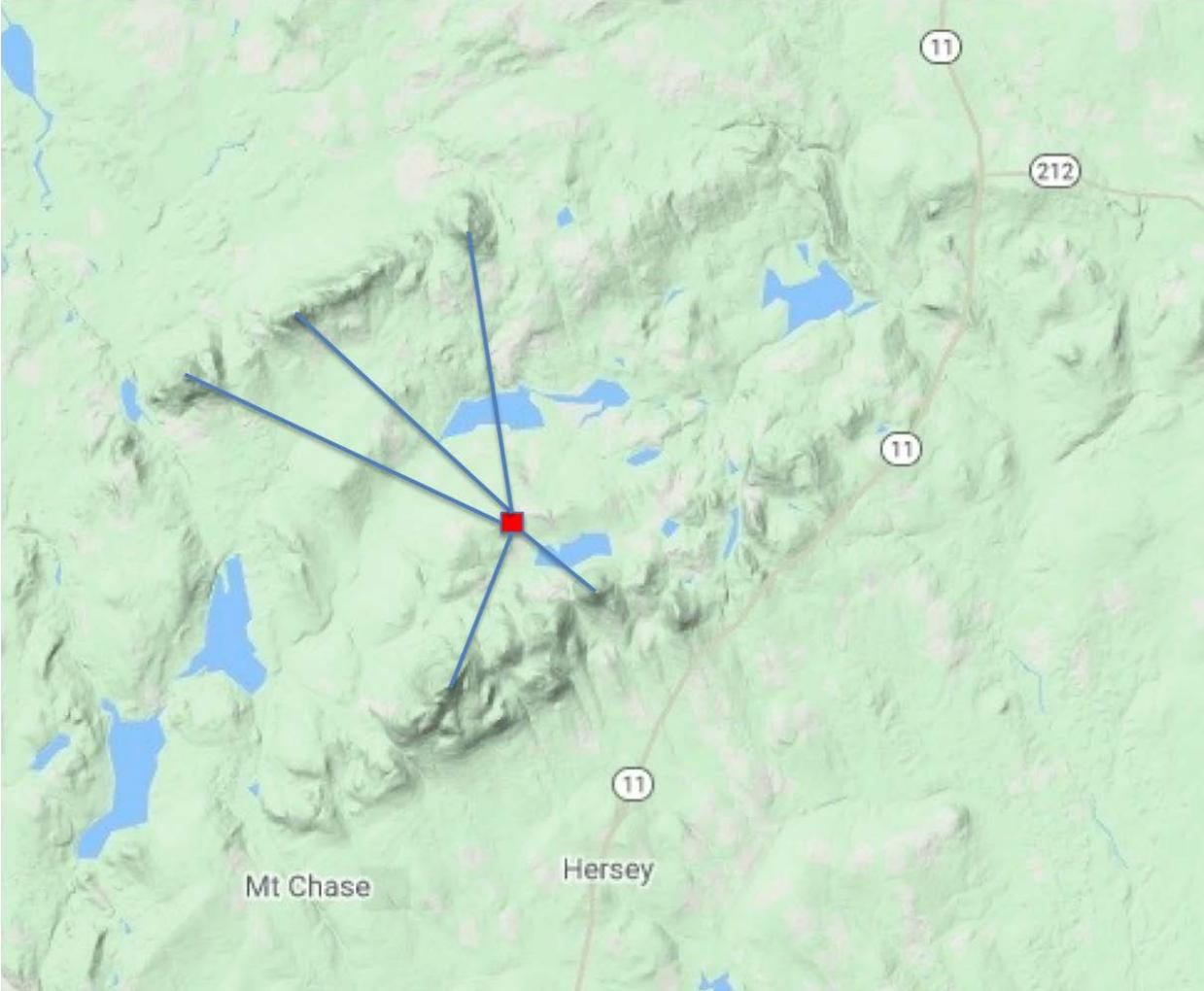
Policy 7. Efforts on the part of Wolfden that ensure continued public access to public waters .

Policy 8. Responsible use of Wolfden's property.

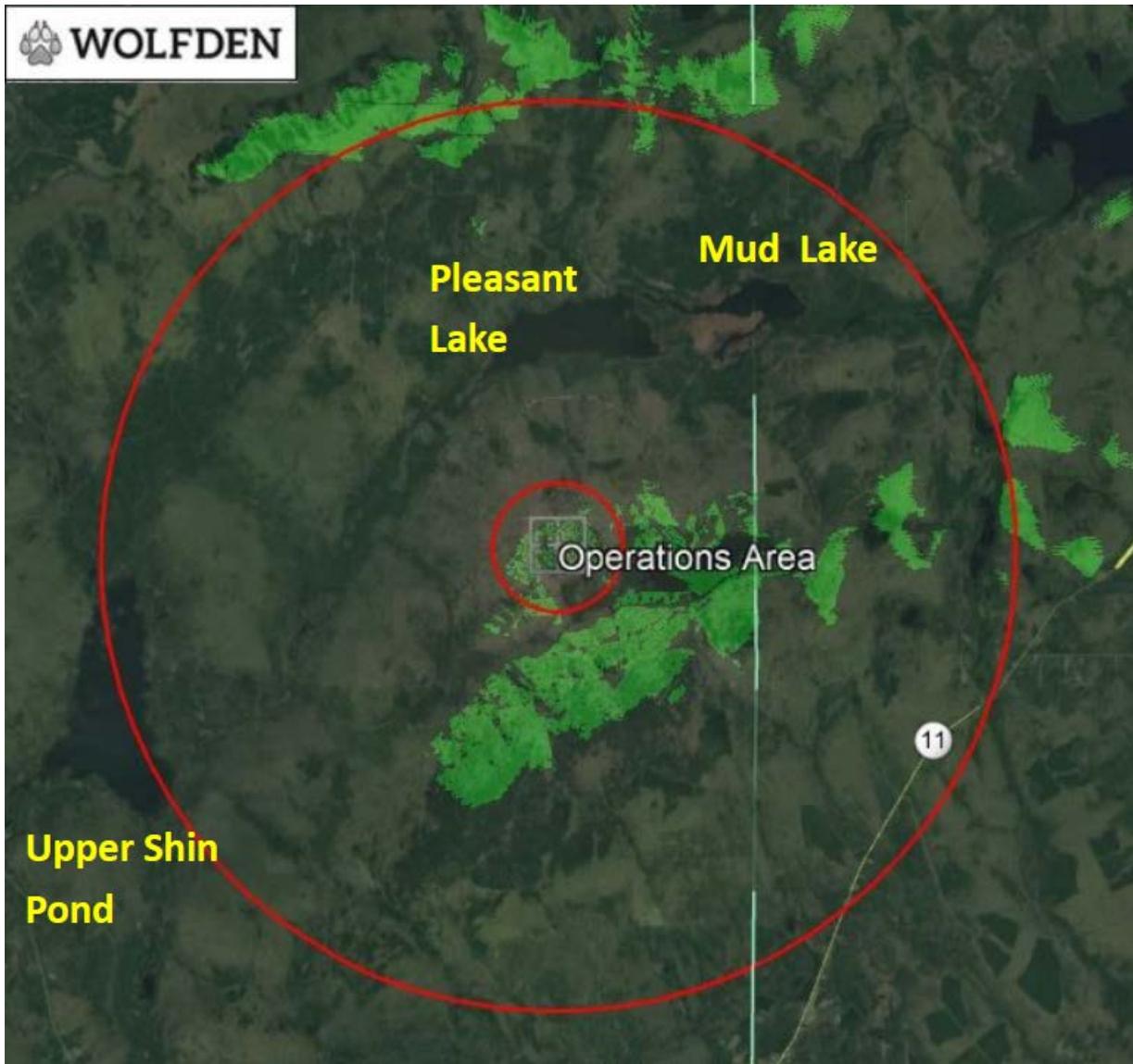
Scenic Resources

The topography surrounding the site provides the area proposed for rezoning a high degree of visual screening from public roads (Route 11 and Route 159) and the established high use recreation areas located to the west of the site. The area proposed for rezoning has a prominent ridgetop immediately west of the areas where proposed buildings would be constructed screening those buildings from view from that direction. A ring of higher elevation peaks is present south of Picket Mountain Pond and north and west of Pleasant Lake. While an unobstructed line of site exists from Pickett Mountain Pond, Pleasant Lake, Mud Lake and Grass Pond, the visibility of the site would likely be obscured by tree lines that would be left in place around the developed areas. The most visible portion of the site would be the northern and northeastern corners of the dry stacked tailings area.

The landforms surrounding the site are complex rolling hills and moderate elevation mountain peaks with mixed forests, that would be more tolerant to visual impacts from the site. Based on the topography, landforms and forested nature of the area, the proposed site is a reasonably harmonious fit with the surrounding environment and generally meets the CLUP's goal of protecting the high-value scenic resources of the surrounding area.



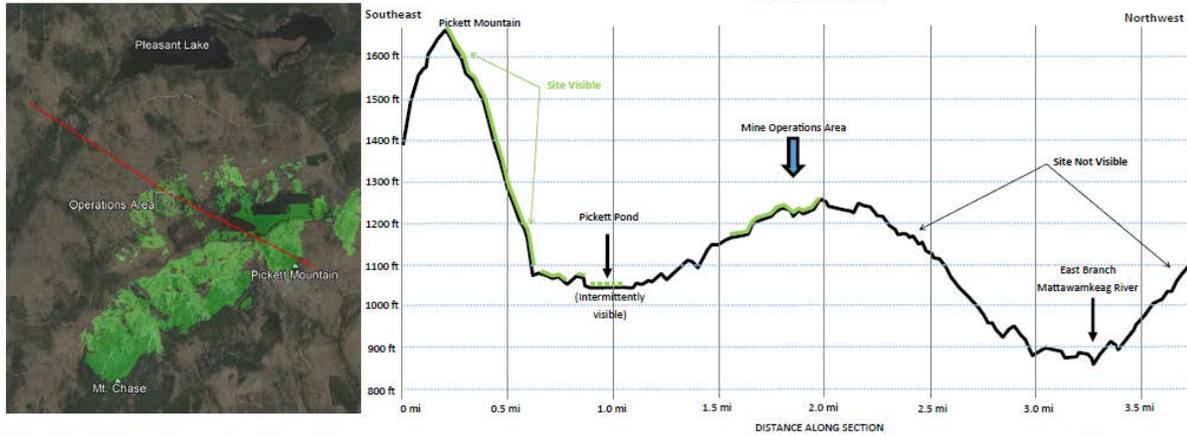
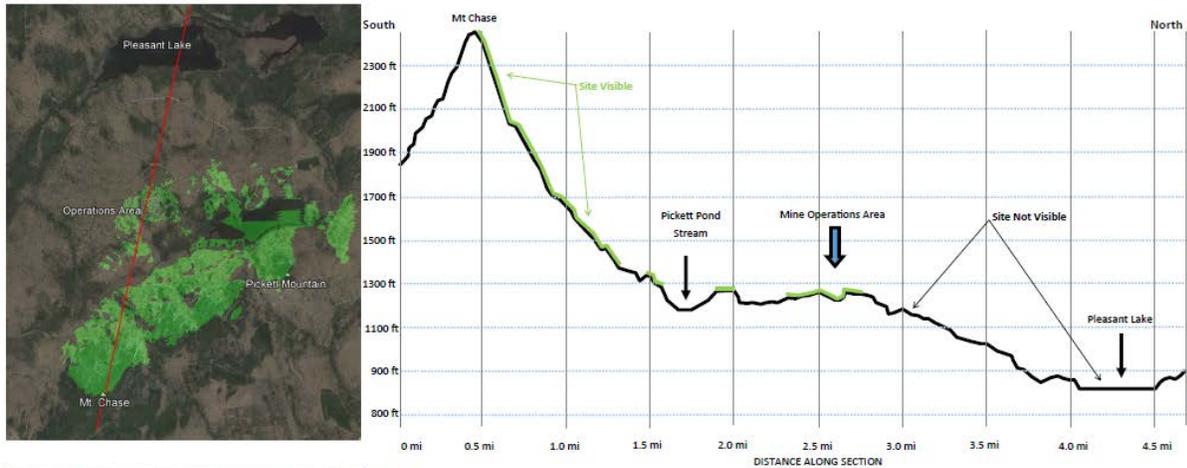
Peaks Surrounding Pickett Mountain Project Site



Three Mile Radius Analysis

The inner circle of the image above represents a 0.5 mile radius which encompasses the proposed site boundary. The outer circle is a 3.5 mile radius to show a net 3 mile radius from the boundary of the property. The view height is 10 meters above ground level (average tree height) therefore the highlighted areas (and those highlighted on surrounding peaks map) are potential areas with a line of site to the property. It should be noted, that to obtain a line of site to the property from the surrounding areas, one has to be above the tree line to have an unobstructed view. The property will not be visible from anywhere along Route 11 nor from any State park or State managed trail. There are no official trails within the proposed area, however, within a 3.0 mile radius of the site boundary, there are several ATV, snowmobile and hiking trails as shown in attachment L. Hiking trails are along the south face of the mountain belt and a snowmobile/ATV trail travels along the north face of the mountain belt. Based on the sections

below, trails that are travelled along the north face of Mount Chase are likely to have visual line of site to the property if standing on a cleared area. The tallest building on the property is estimated at 60 feet tall and would rise above the tree line and therefore would be the visible point.



Viewshed of Operations Area (Green)

Topographic Profiles Across Site

Viewshed Sections

Water Resources

Appendix A Section B(3)(d) provides a discussion of Potential Impacts to Existing Uses and Natural Resources and provides an overview of mine water management, involving the collection and treatment of precipitation that contacts mined rock materials and tailings. The project description in Section 4 of this Petition describes the operations and reclamation phases of the project. Collectively these environmentally responsible mine-management practices would prevent degradation or impacts to groundwater and surface water and protect water quality in adjacent aquatic habitats including wetlands, vernal pools, streams, lakes and ponds.

These actions would meet the CLUP's goal of protecting the quality and quantity of surface waters and groundwater.

The project will have no direct impact on shorelands since the project location is removed from such features.

The specific CLUP policies that will be advanced through the planned development and regulatory framework include the following:

- Policy 1 Regulate uses of land and water in order to prevent degradation of the jurisdiction's excellent water quality and undue harm to aquatic habitat.
- Policy 2 Protect the recreational and aesthetic values associated with water resources.
- Policy 4 Conserve and protect lakes, ponds, rivers, streams and their shorelands, which provide significant public recreational opportunities.
- Policy 8 Control land uses on identified aquifers and their recharge areas in order to prevent adverse effects on water quality or quantity
- Policy 10 Protect ground water quality throughout the jurisdiction through proper controls on potentially polluting activities.
- Policy 12 Conserve the quality and quantity of public and certain private water supplies by managing land use in source protection areas.

Wetland Resources

See Appendix A Section B(3)(d) of this Petition for a discussion of wetland resources.

The specific wetlands resource policies of the CLUP that would be met or supported by the proposed project include:

- Policy 1 Support the nationwide goal of no net loss of wetland functions and values by avoidance or minimization of impacts.
- Policy 2 Provide compensation to offset loss or degradation of wetland functions, while recognizing that such losses may not be avoidable in every instance.
- Policy 3 Plan development to avoid alteration of wetland areas. If avoidance is not feasible, ensure that development minimizes alteration. If loss of wetland functions is unavoidable, require actions to restore, reduce or gradually eliminate lost or degraded wetland functions. If necessary, require compensation for lost or degraded wetland functions through protection of wetlands of equal or greater value.

B(3)(d) Potential Impacts to Existing Uses and Natural Resources

Introduction

The following subsections present an assessment of potential for impacts to natural resources including forest resources; historic sites; wildlife and plant habitats; scenic resources; water resources; and recreation resources.

A significant component of this discussion is dedicated to surface waters (ponds and streams) and groundwater since these are the resources most vulnerable during the development, operation and closure of the Pickett Mountain mineral deposit. This evaluation discusses the nature of the water resources including the relationships between topography, location of groundwater divides, areas of groundwater recharge and groundwater discharge. An initial estimate of an overall hydrologic water balance for the site is also provided.

The mine development, operation and closure strategy is predicated on protecting these water related resources. Therefore, a discussion of this overarching strategy is presented after discussion of the resources and addresses how these resources will be protected.

This information is followed by a general discussion of the Pickett Mountain mine development, operation and closure strategy and the management of mine-related waters. Those approaches, as well as the physical setting of the mineral deposit provide the means for mitigation of potential impacts to water resources.

Surface Water Resources and Groundwater

The following sections describe the physical setting, surface water, groundwater hydrogeology and groundwater resources.

Physical Setting and Surface Water Resources

The Pickett Mountain Deposit is situated beneath a portion of an approximate 2.7 mile long ridge with moderate elevations ranging from 1,360 to 1,140 feet (west to east). The ridge is bordered to the south by Pickett Mountain Pond, to the east by Tote Road Pond and Grass Pond, and to the north by Pleasant Lake and Mud Lake. Pickett Mountain Pond flows through an unnamed stream to Grass Pond and hence north to Mud Lake and the West Branch of the Mattawamkeag River. Pleasant Pond flows easterly to Mud Lake. Tote Road Pond outlets to a stream that flows easterly to Hale Pond and hence northerly through Green Pond to an unnamed stream that also joins the West Branch of the Mattawamkeag River.

The various lakes and ponds have the approximate following acreages:

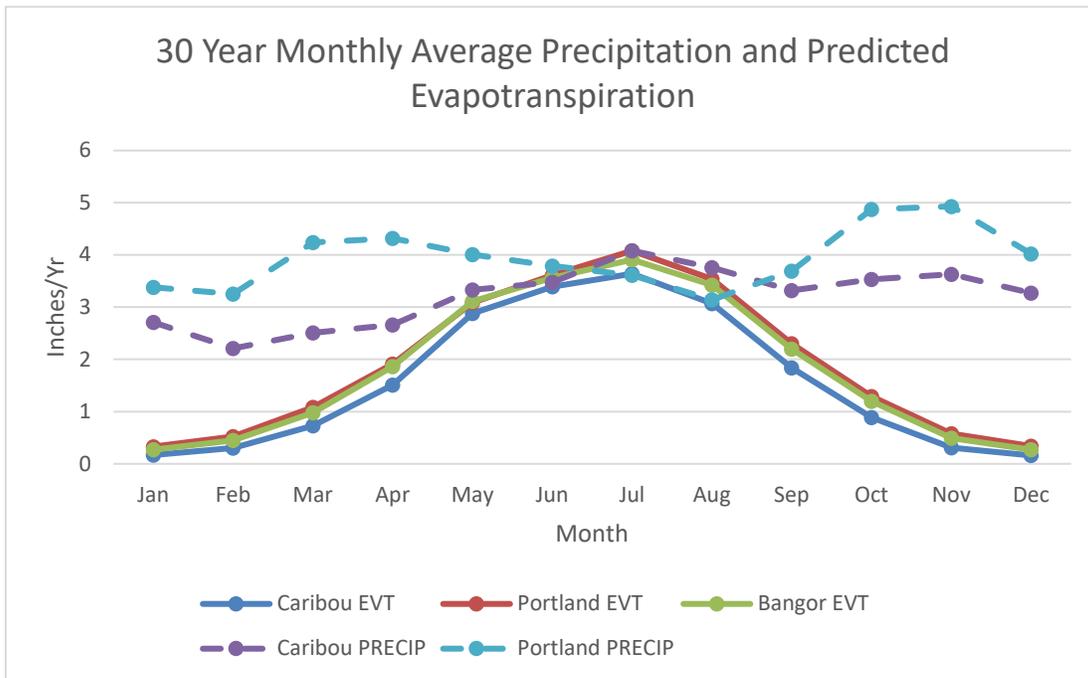
Pickett Pond	173 acres
Grass Pond	42 acres
Pleasant Lake	310 acres

Mud Lake 188 acres
Tote Road Pond 28 acres

The ridge occupying the Pickett Mountain Deposit is bordered by higher elevations to the south including Mount Chase, Long Mountain and Pickett Mountain and to the north by Hay Brook Mountain, Roberts Mountain and Green Mountain. Another intervening ridge of similar elevation is present north of the West Branch of the Mattawamkeag River, where it enters the west side of Pleasant Lake. Surface water drainage and shallow groundwater discharge from the southern slope of this intervening ridge and Green Mountain contribute groundwater and surface water flows along the north side of both Pleasant and Mud Lakes. Prior field observations including surface water temperature measurements indicate the presence of groundwater seeps that flow into Pickett Mountain Pond and the stream flowing from it. Long and Pickett Mountain to the south, also contribute to groundwater and surface water inflows to Pickett Mountain Pond.

Groundwater Hydrogeology

Based on subsurface drilling conducted during mineral exploration activities, the site is characterized by relatively thin glacial deposits which mantle bedrock with moderate to steep slopes. Within margins of intervening valleys stratified glacial deposits are potentially present. Groundwater and surface water divides are expected to be controlled by topography and groundwater flow direction should mimic topography. **Attachment I** provides a depiction of the anticipated groundwater and surface water divides, and indicates anticipated groundwater flow directions. Based on studies of similar geologic and geographic settings (Gerber and Hebson, 1996) and historically averaged precipitation data (<http://www.nrcc.cornell.edu/wxstation/pet/pet.html>), the site is anticipated to receive approximately 45 inches of total annual precipitation (see figure below). Recharge to groundwater (Net precipitation minus evapotranspiration) will result in overburden groundwater and shallow bedrock groundwater recharge and groundwater flow toward surface water bodies including lakes, ponds and streams.



Average Precipitation and Evapotranspiration Rates Across Maine

The majority of shallow groundwater recharge is in spring and fall when temperatures are above freezing and evapotranspiration rates are lowest, and precipitation highest as depicted in Exhibit 1. The majority of recharge will be too shallow (possibly perched) and deeper overburden groundwater with a smaller amount of recharge to bedrock groundwater, typically in the range of 2-10% (Gerber and Hebson, 1996). The amount of recharge typically increases toward the top of the topographic highs due to increased vertical gradients, with lower recharge rates down slope toward groundwater discharge areas. This shallow groundwater will form the base flow of groundwater recharge to surface water.

The hydraulic conductivity of silty glacial tills is typically low (< 1ft/day). Therefore, the movement of overburden groundwater at the site is expected to be slow (< 0.2 ft/day) given anticipated hydraulic gradients, which should approximate the slope of the hill slope from the site to Pickett Mountain Pond (0.05 ft/ft). The slow groundwater migration rates and large distances to surface water bodies from the site (3,500 feet to Pickett Pond and 6,500 feet to Pleasant Lake afford a high degree of protection to surface water resources.

Significant Sand and Gravel Deposits

A surficial deposit with good to moderate potential yields is mapped along the northern side of portions of Pleasant and Mud Lakes (**Attachment I**). Based on topography and subsurface drainage basin boundaries indicated on the Significant Sand and Gravel Aquifers Map of the Green Mountain Quadrangle (MGS Open File No. 01-75 2001) surface water divides are generally coincident with groundwater divides. This significant sand and gravel deposits therefore do not receive recharge or run-off from site (i.e., the north facing portion of the ridge that contains the Pickett Mountain Deposit) and would not be affected by the proposed project.

Hydrologic Water Budget - Overburden and Bedrock Groundwater Resources

A surface water and groundwater divide occur along the ridge separating surface water and groundwater flow to Picket Mountain Pond and Pleasant Lake (Attachment I). The drainage sub-basin occupied by this portion of the ridge occupies approximately 3,330 acres (830 acres south of the divide and 2500 acres north of the divide). On average it is expected that 42% of precipitation is lost to evapotranspiration and run-off, with the remaining water budget resulting in recharge to overburden and bedrock groundwater (Gerber and Hebson, 1996). Approximately 5% of precipitation is assumed be to bedrock. This results in the following estimated water balance for the sub-basin provided in the following table. Most of the overburden groundwater would be expected to discharge locally within the local drainage basin (>95%), with the exclusion of recharge to bedrock. Some shallow bedrock groundwater would also be expected to discharge locally to streams in upland mountain areas and deeper sections of ponds, where present.

Estimated Hydrologic Budget

Area	Size (acres)	Net Precipitation (acre/feet/yr)	Evapotranspiration (acre/feet/yr)	Overburden Recharge (acre/feet/yr)	Bedrock Recharge (acre/feet/yr)	Overburden Recharge gallons/year	Bedrock Recharge gallons/year
Total Sub-Basin	3330	11933	5012	6575	346	2,142,548,037	112,765,686
North of Divide	2500	8958	3763	4936	260	1,608,519,547	84,658,924
South of Divide	830	2974	1249	1639	86	534,028,490	28,106,763
Developed Mine Area	49	176	0	-88	-8	(28,608,878)	(2,574,799)
Percent Excluded During Mine Operation	1%	0%	0%	1%	2%	1%	2%

Total Annual Precipitation Interception

45
2

Net Annual Precipitation

43 inches

Bedrock Net Recharge

5 %

EVT Rate & Run-off

0.42 %

Developed Mine Area = area where precipitation/ runoff is collected.

The total area of land disturbance for mine development (excluding roads) is approximately 105 acres and includes the foot-print of buildings, mine portal, a surface water management facility and a dry TMF (approximately 92 acres). Precipitation over much of this area (approximately 49 acres) will be managed to control run-off of non-contact waters, and water that potentially contact waste materials (waste rock and tailings). Collected waters will be treated as discussed later in this section.

The area of mine development during operations is intentionally limited in size. When the water budget within this area is compared to the drainage basin, it becomes clear that impacts to recharge of groundwater (overburden and bedrock) and run-off of surface water to surface water bodies is negligible, and as a percentage (1-2 %) is within the range of annual variations in precipitation. Even if average annual precipitation varied by as much as 10 % (+/- 5 inches), the percent reduction in recharge remains essentially the same. The immediate reduction in recharge is replaced by re-infiltration of clear treated effluent from the water management system.

Forest Resources

Wolfden currently owns 7,148 acres located in the southeastern corner of Township 6, Range 6 (T6R6). The property is entirely undeveloped and forested, except for six privately owned camps (seasonal residences) and logging/woods roads. The property generates approximately \$300k in revenue annually from timber revenue. The timber industry is the primary industry in the area and is the driver of the local economy. The area proposed for rezoning is approximately 528.2 acres which includes approximately 105 acres of land that would be constructed upon or disturbed by construction. The mine is planned to operate for 10 years after which the impacted area would be restored. The mine operations area would be restored as forest and would eventually again be logged/harvested. The dry stacked tailings would be contoured, capped and restored/revegetated. The cap concepts will be developed during the final feasibility designs. The cap is required to achieve the same permeability as the liner system. Several concepts will be evaluated from a dry cap that promotes run-off in a course armored infiltration layer that would discourage large tree growth and protect the underlying low permeability barrier from root damage and wind throw, to a wet cap that mimics local hydrology and is able to sustain a wetland like condition where large tree growth is naturally discouraged. Other alternatives include long term management of vegetative growth on the cap, similar to a conventional landfill cap. There would be no restrictions on current and future timber operations on the remaining 6,947.5 acres of the property while the mine is in operation and being restored. The development associated with the proposed mine would affect less than 3% of the property currently in forest production. Therefore, impacts to the forest resources and timber industry would be negligible.

Wetland Resources

The U.S. Fish and Wildlife Service has mapped wetlands in T6R6 as a part of the National Wetland Inventory (NWI). The NWI mapped wetlands have been promulgated into LUPC Land Use Guidance Maps. There are NWI mapped wetlands on the property. The mapped wetlands are primarily palustrine forested and palustrine scrub/shrub wetlands, associated with Pleasant Lake and Pickett Mountain Pond. In addition, the West Branch of the Mattawamkeag River flows across the south part of the property. There are no NWI mapped wetlands in the area of the proposed mine development, however due to the scale of NWI mapping, it can't be concluded that there are no wetlands on the site.

A reconnaissance of the area proposed for development was conducted in October 2019. The purpose of this reconnaissance was to preliminarily identify wetland resources including wetlands and potential vernal pools, and the possible presence of small or intermittent streams. During the reconnaissance wetlands, potential vernal pools, and intermittent streams were observed. The results of the reconnaissance suggest that a detailed wetland and vernal pool survey of the proposed development area during the growing season is warranted. In addition, in order to verify the significance of the potential vernal pools, the survey would need to be conducted during the spring amphibian breeding season; for northern Maine, that period typically falls between May 5th and June 5th. Wetlands, streams and potential vernal pools located within the area proposed for development will be avoided to the extent practicable. Wolfden plans to conduct the survey, in consultation with the IF&W, during the Spring of 2020. Any impacts to these areas would be mitigated to the extent practical during the design and permitting phase of the project. With the exception of the planned dry TMF, current depicted locations of proposed facilities have been placed outside of the area anticipated to contain wetlands. An approximate  5 acre area is present within the area of the planned dry TMF that may contain some wetlands, however this area is heavily rutted from prior logging (skidder ruts) and the surface expression of groundwater here is likely due largely to these former ground disturbances rather than natural wetland hydrology. The areas of potential wetlands in addition to potential intermittent streams are depicted in Attachment F1.

Wolfden's goal is to conserve and protect the wetlands and their ecological functions by avoiding impacts to the extent practical, minimizing impacts where they cannot be avoided, and compensating impacts that are not avoidable.

At the completion of the mining project, the site will be reclaimed removing all buildings and structures except the dry TMF. The final grading plan for this final phase of the project can be designed in a manner to enhance and create forested wetlands and associated vernal pool habitats in areas with appropriate hydrology within the footprint of the mine operational area.

Based on our current understanding of wetlands present at the site, the project will meet the goal of protecting the ecological functions of wetland resources, including vernal pools.

Correspondence with the Maine Department of Inland Fisheries and Wildlife is presented in Exhibit N.

Other Water Resources (surface water, streams, shallow groundwater)

The property includes lakes, ponds, and streams, including Pleasant Lake, Pickett Mountain Pond, Mud Pond, west branch of the Mattawamkeag River. The area proposed for development however does not include any mapped streams or surface water bodies based on the USGS topographic map (i.e., Green Mountain, Maine). Although there are no USGS mapped streams within the area proposed for development, the area may include intermittent streams, too small to be picked up at the scale of the USGS maps. As noted in the Wetlands section, intermittent streams and shallow groundwater were observed during the October 2019 reconnaissance of the property and therefore a detailed delineation of intermittent streams is warranted and would be required as a part of the rezoning process. Impacts to water resources would be avoided to the extent practicable and any impacts would be mitigated through restoration activities. In general impacts to water resources would be negligible based on the proposed treatment and discharge of water generated during mine operations, as discussed in the preceding sections. The water generated by mine operations will be treated and released back into the environment following all rules and best management practices.

Wildlife Resources and Habitats

The property contains a mix of terrestrial and aquatic habitats, including forested uplands, forested and scrub shrub wetlands, rivers, streams, ponds and lakes. The majority of the property is forested composed of a mix of deciduous and evergreen trees. Wildlife common to the Northwoods include deer, moose, bobcats, fishers, as well as a number of small mammal species. Avian species including passerine birds, accipiters and buteos, and piscivorous birds such as kingfishers and herons are also common, as are waterfowl including ducks, geese, and loons. The area proposed for development is primarily upland forested habitat, co-dominated by deciduous trees (i.e., beech, birch, and red maple trees) and coniferous trees (i.e., spruce, fir, cedar and hemlock). The area has been logged in the past and is currently in re-growth. Evidence of past logging operations in the form of skidder trails and logging roads are common throughout the area proposed for rezoning and development. The forest understory is relatively open and lacks dense growth commonly found in recently cut forest. Wildlife are accustomed to logging activities in the Northwoods and based on the current mine plan the mine operation would have less impacts to wildlife than common logging operations.

Correspondence has been sent to the Inland Fish and Wildlife Service (November 6, 2019) to obtain a list of Rare, Threatened, or Endangered species that could potentially be found in the area. The IF&W provided a preliminary response to this request on November 25, 2019 which indicated there were no known occurrences of endangered, threatened or special concern

species within the project area (Exhibit N). The IF&W also has not mapped any significant wildlife habitats within the project area. The IF&W did identify Great Blue Heron colonies as species of concern and noted the special protection afforded to eight species of bats and concern for habitat protection. The preliminary screening survey conducted to date did not identify habitat that would support Great Blue Heron colonies or bats, the latter due principally to very limited and small exposures of bedrock outcrop and lack of any talus slopes. When the detailed mapping of wetlands, intermittent streams and vernal pools is conducted in the spring it will include a final species assessment encompassing a survey of the area proposed for development individual species and or suitable habitat for the species identified. Impacts to rare, threatened or endangered wildlife are not known or expected and if identified will be avoided and minimized.

Plant Habitats

The area proposed for development includes upland forested habitat and as noted has been logged in the past. The forest habitat includes a relatively open understory dominated by saplings of the dominant tree species. Shrubs are also present in the forested. The herbaceous growth in the forest habitat includes moss, ferns, grasses, and sedges.

Correspondence with the MNAP was submitted to request a list of known or suspect rare, threatened or endangered plants occurring in the area. Exhibit N contains the MNAP response which indicates that there are no rare botanical features documented specifically within the project area. Impacts to rare, threatened or endangered plants are therefore unlikely but if such botanical features are identified they will be avoided and minimized. Unavoidable impacts will be mitigated through moving/transplanting rare, threatened or endangered species when impacts are unavoidable. Based on discussions on MNAP correspondence lakeside graminoid/shrub fen is located between Pleasant and Mud Lakes. These would not be affected by proposed activities and are outside the area to be re-zoned. The MNAP did indicate this as a priority area on the Wolfden property for a botanical survey.

Historical Sites

The Maine State Historic Preservation Office has been consulted to identify any known or suspected historical sites on the property. A stone tool archeological habitation site is known near the headwater of Pickett Pond. A Phase 0 archeological survey will be conducted within the area proposed for rezoning and development to verify that there are no historical resources present. The scope of the survey has been developed in consultation with Maine State Historic Preservation Office and discussed previously in Exhibit M. The survey will be conducted by a State certified archeologist following an approved work plan. If historical sites are identified within the proposed development the area will be investigated, cataloged and mapped. Any pre-historic or other artifacts discovered will be recovered in consultation with Maine State Historic Preservation Office.

Scenic Resources

The project has been designed to limit impacts to scenic resources. The "below ground" mine operation limits the footprint of mine requiring a relatively small area for mine operations (approximately 16 acres) and dry stack tailings pile (approximately 42 acres), thus impacting approximately 58 acres). In addition, the dry stacked tailings will match base line contours, to not protrude from the surrounding topography. The overall elevation increase in the footprint of the tailings is expected to be approximately 10 feet higher than the original ground surface. Once the mine operations end the impacted area will be restored and will be allowed to reestablish as forest.

Recreational Resources

The area proposed for development does not include any snowmobile trails, hiking trails, or camping areas nor does it include any aquatic resources suitable for fishing. The area proposed for rezoning makes up only 2.8% of the total property. It is unlikely that the proposed mine would impact recreation resources. Once the mine is closed there would be no impacts to recreational resources.

Mine Development, Operation and Closure Strategy

The following section provides a general overview of how mine and process waters will be managed. The strategy for mine development, processing of mineralized rock, and management of tailings is discussed. Each of these processes have a water management component. Additional Information is provided in **Appendix M**.

Overview - Management of Mine Waters, Process Waters and Septic Waters

Proper planning, management and treatment of site impacted waters can avert impacts to natural water resources including groundwater, run-off, and surface water. Elements of water management designed to alleviate the potential for adverse impacts are described in the following subsections.

Development of the Pickett Mountain mineral deposit will require collection of groundwater seepage for subsurface dewatering during underground mining operations and collection of surface water run-off from within the footprint of the developed property. These waters will be used in the beneficiation of the economically valuable minerals which includes milling and flotation to separate valuable from non-valuable minerals and create a concentrate that will be shipped off-site for further refinement (smelting) as well as tailings that will be stored on a lined tailings facility located onsite. Waters impacted by these processes will be treated and re-used to the maximum extent possible. It will be the intention of the concentrator/tailings design to have a net negative water balance that will require makeup water.

Water from the mine (seepage and process water) will be collected and treated to within water discharge guidelines and rules that include at or better than background quality. A portion of the treated water will be reused at mining process water and concentrator process water make up. Sewage from the mine will be contained to Portable Toilets (Porta Potties). These will be on contract basis and managed through replacement of filled facilities with clean facilities by the supplier. Sewage from all surface structures will drain to a septic system located on the site down gradient of the building infrastructure and potable water supply. Any excess treated water will be returned to the environment as recharge via system of underground diffusers, similar to a septic system leach field. Water from the TMF will be managed separately. As a result of the water management strategy and the water balance required to sustainably operate the mine, impacts to water resources are expected to be negligible.

The estimated water balance from the milling/tailings facility is as follows resulting in a process water make up requirement of 68.4 cubic meters per day or 12.3 USgpm.

Overall Water Balance				
Water Product	Solids		Water t/d or m ³ /d	Comments
	%	t/d		
Plant Feed (flotation feed)	30	1000	2333.3	Need per day
Cu Conc.	80	15.5	3.87	Lost in concentrate
Pb Conc.	80	10.6	2.65	Lost in concentrate
Zn Conc.	80	49.5	12.4	Lost in concentrate
Tailing	80	807.4	49.5	Lost in concentrate
Process Water Recycle	-	-	2264.88	Amount recovered
Need Process water	-	-	68.42	

Mine Development Strategy

The strategy for mine development is to conduct underground mining using a long hole stoping method with a decline, to allow underground haulage trucks to carry mineralize rock (mill feed) to a surface staging pad, where waste rock will be segregated from Mineralize Rock. Waste rock would be staged until it can be returned underground for backfill. Waste rock that is placed underground as backfill is not treated or neutralized, rather is simply placed as broken rock. Typically, waste rock outside of the Pickett Mountain deposit is non-acid generating and in fact carries significant neutralizing potential. In addition, after waste rock is deposited underground, it is in a low oxygen environment and therefore will not react with ground water if portions of the rock do contain acid generating potential. Seepage of bedrock water as well as injection of mine process water into the underground workings, necessitates a program of mine dewatering. Although engineering/hydrologic studies have not been conducted to quantify flow rates required to keep the working areas of the mine in a dewatered state, it is currently estimated based on similar site experience and the likelihood of low transmissivity bedrock at depth, that these "seepage" flows are likely to be on the order of 30 gallons per minute (gpm) long term.

Initial dewatering is usually conducted through use of bedrock extraction wells (dewatering wells) to reduce the bedrock potentiometric surface prior to and during development of the decline. This water will be used for storage and recycled for underground diamond drilling for blastholes. As underground workings are advanced, and seepage into these openings will occur, and that seepage will be pumped out eventually replacing the dewatering wells and establishing a network of water conveyance pipes within the developing mine infrastructure. During mine operation, seepage waters will continue to be collected underground through a series of temporary sumps and pumps and treated at the water management facility prior to being re-used for underground process water with excess discharged to the environment. Waters used underground for drilling and wetting down rock surfaces to eliminate dust when mucking rock outwill be pumped through a connected network of pipes that can be modified and extended as the underground workings are developed.

When sulfide mineralized rock is mined and processed, the surface area of exposed sulfides increases along with the potential for acid generation. Exposure of these sulfide minerals to oxygen and water results in weathering and oxidation producing acidity (hydrogen ions), dissolved sulfate, dissolved metals and soluble acid-sulfate minerals. Undisturbed sulfide mineral deposits have limited exposed surfaces, and therefore pose little threat to groundwater under natural, oxygen-limited conditions. Since this weathering process requires presence of both oxygen and water, as well as time, effective strategies to prevent acid generation are incorporated into the design and operation of the mine. In the short term, these strategies rely on limiting exposure of these materials to water in the presence of oxygen as well as water collection and treatment. In the long term, strategies rely on isolating materials from water (infiltration), intrusion of atmospheric oxygen.

The waste rock will be mined separately and segregated from the mill feed, temporarily staged and then returned underground as backfill on an on-going basis. This manages and mitigates potential leaching and environmental release of metals from this waste rock material.

Mineralized Rock Milling and Flotation Strategy

Mineralized Rock (mill feed) will be crushed on-site and finely ground to a powder utilizing a comminution (Grinding) circuit. The finely ground rock is the feed stock for the flotation circuits, where the valuable sulfide minerals (Zn, Cu, Pb, and associated precious metals Au and Ag) are sequentially segregated from gangue minerals of no economic value and into a series of Copper, Lead and Zinc concentrates. This flotation process is done with a series of chemicals and reagents that are used to treat the minerals to optimize recoveries. Chemicals that are used within the process typically remain in the process water and are broken down over time. However, since majority of the water is reclaimed into the process, this material is reused. Any potential waste chemicals or spillage, are collected and pumped to the TMF. These are then broken down over time or gathered through precipitation and ultimately gathered back into the process. Any stored chemicals that are expired or unusable for other reasons are repackaged and shipped back to the supplier or to a qualified management facility for appropriate disposal during operations and mine closure. The non-valuable or gangue minerals which will constitute approximately 80% of the mill feed result in the production of tailings requiring management. A conceptual flow diagram of the milling process is shown below.

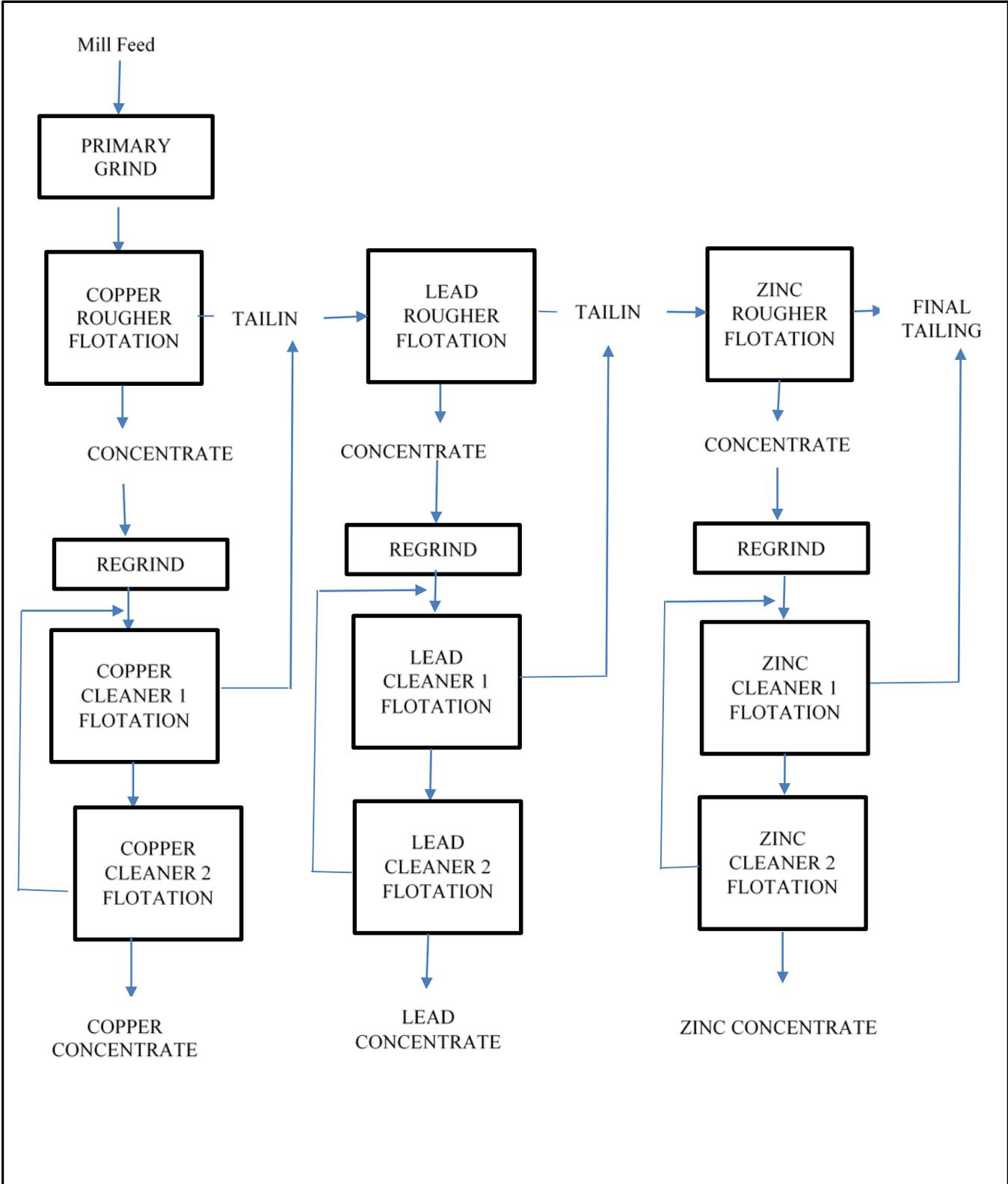


FIGURE: CONCEPTUAL PROCESS FLOWSHEET

Tailings Treatment and Management Strategy

The tailings, will contain some iron sulfides as well as other metallic sulfide minerals and are managed accordingly to mitigate acid generation and leaching. When tailings are first produced, they are oversaturated with respect to water content and are pumped in a slurry.

All tailings will be deposited on a dry stack tailings management facility (TMF). The cleaned and filtered tailings will be dewatered and transported by truck or conveyor belt to the TMF where they are spread, stacked and compacted by a dozer. All water generated by the dewatering process is recycled and pumped back to the concentrator for reuse in the process circuit. The dewatered tailings have a low moisture content and is expected that no supernatant pond will form as they are compacted in the TMF. Rainfall on the TMF is expected and run-off collection is required. All water will be collected from the TMF in a lined collection pond at the south edge of the TMF. Water from the lined TMF collection pond will be pumped back to the concentrator for reuse in the processing circuit. The dewatered tailings will exit the concentrator plant via conveyor onto a storage pad with 24 hours of capacity. The tailings will be loaded and hauled via 35 or 40 tonne articulated trucks to the TMF. With an expected 800 tonnes per day of tailings, this will result in 1.5 or 1.0 trucks per hour depending on the size of the truck. Once or twice per shift, the truck operator will spent up to one hour with a dozer and roller compactor to grade and compact the tailings. The expected cycle time to the farthest area of the TMF is under 7 hours while the closest will be 4 hours. This allows more than sufficient time for haulage, grading and compacting in a 10-hour work shift.

Sub-aerial (dry stacked) tailings are the only above ground tailings management method allowed under the DEP Chapter 200 rules for Group A and Group B mine waste. The sub-aerial TMF will be designed in accordance with requirements (including a composite liner and leachate collection) of Chapter 200 Subchapter 5 Section 21 Mine Waste Unit Design Standards. Leachate ponds that collect water that encounters tailings are also governed by these standards. TMF ground slopes of 20% to 30% may be used for dry stack tailings. The maximum height of the TMF cells when completed at Pickett Mt. are not expected to exceed 20 feet and may average less than 15 feet.

Once compacted, these tailings will not be subject to infiltration of water and intrusion of atmospheric oxygen which will mitigate the oxidation of sulfide minerals. Management of dry stacked tailings placed within a lined containment facility, that is progressively closed during mine operation will control leaching of metals and provide long-term protection to water resources (groundwater and surface water). The TMF would be designed with run-on controls to prevent contact with surface water run-off. During the operating period of the dry stacked tailings facility, contact water (precipitation) is actively managed.

An example of similar tailings deposition is Cerro Lindo (Peru) show in the following collection of images. Although the climate in Peru is drier than in Maine, the concept is the same. Sub-aerial tailings are currently used in other cold regions including Alaska, Minnesota and Canada.

In most cases in cold weather climates, the tailings are progressively covered to optimize water treatment and reduce the remaining area requiring closure during final reclamation. The DEP regulations require a cover system of permeability equal to the liner system which has specific maximum permeability requirements.



Cerro Lindo Moist Cake Disposal (1:2 Slope)



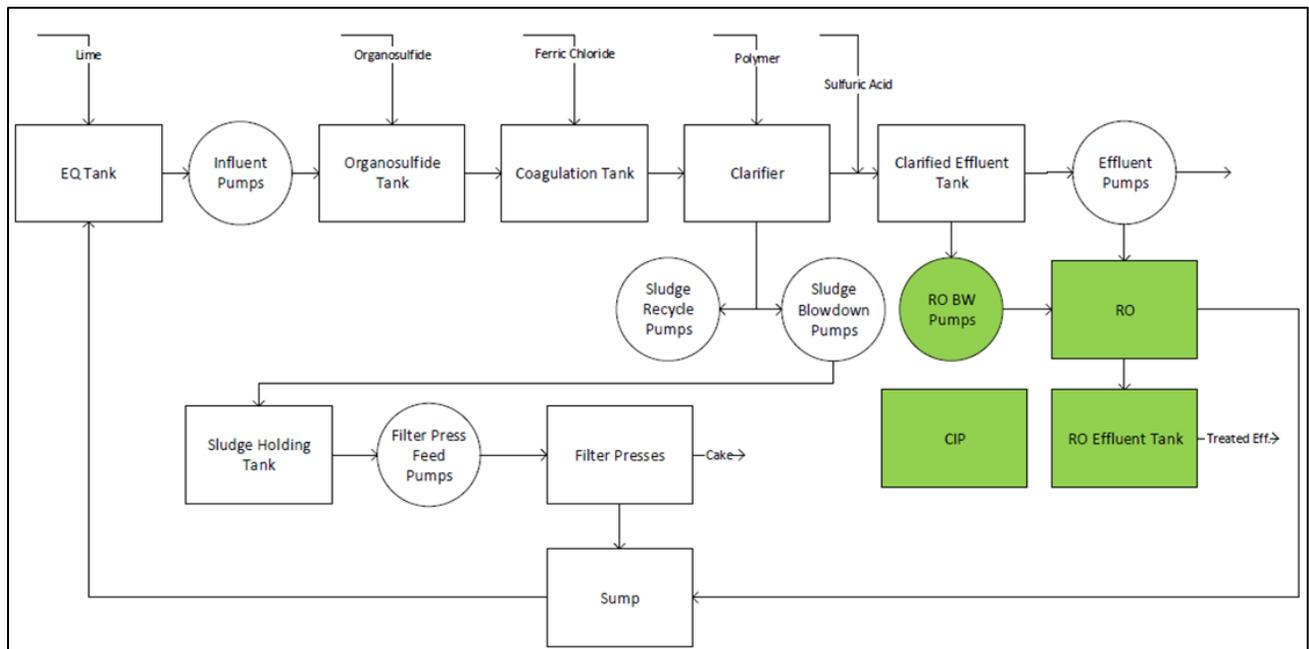
Conceptual Tailings Facility at Pickett Mountain

The figure above illustrates a dry stack tailings facility. The tailings stack features an outer side slope of 20% raised to a maximum height of about 22ft (7 m). The volume of tailings in this model is approximately (1,400,000 m³), equivalent to about 2.6 Mt when fully consolidated or compacted to 88 wt% solids.

Mine Water Management and Treatment

All process and seepage water into the mine as well as precipitation landing outside of the tailings facility footprint are collected via run off ditching and routed to the south eastern (down gradient) corner of the project site into a lined raw water pond in order to contain all water collected on the project site. Seepage water from tailings as well as precipitation water onto the TMF are collected separately and pumped into the mill as recycled water. A series of berms will be designed to re-route precipitation water outside of project footprint in order to reduce contact with site and minimize potential impact. Once the water is collected in the raw water pond, it is pumped to the water treatment facility. The technological state of mine water treatment is very advanced as a form of waste water treatment with processes designed to

adjust pH, remove sulfates and metals producing a high quality effluent and a high density solids waste stream (sludge) the latter of which is thickened by a conventional filter press to produce a sulfate filter cake. The solid filter cake will be placed underground in the mine. Excess water from the filter press is returned to the influent equalization tank for treatment. The conceptual treatment train is show in the following figure. The treated effluent may then be recharged to groundwater with no chemical impacts via underground infiltration structures. Recharge of treated water to groundwater is also protective of surface water that eventually receives groundwater.



Mine Water Treatment Process Flow Diagram

Notes:

EQ= Equalization (Tank); RO= Reverse Osmosis, BW= Backwash, CIP=Clean in Place (Tank)

The treatment plant will be operated in accordance with an operations and maintenance plan that will specify storage and management of chemical reagents and actions to be taken to prevent spills and accidental releases and to address spill clean-up and reporting should an accidental spill occur.

The groundwater quality will be monitored quarterly during the life of the mine and for a period of time post-closure that is specified in the mining permit issued by the DEP. Monitoring will occur at locations where mining activities have a reasonable potential for impact to groundwater and surface water. In general, these parameters will be based on baseline background water quality data and consideration of parameters related to mining operations (metals, pH, specific conductance and inorganic parameters such as sulfate). Surface water and sediment quality will also be monitored under an approved program during mine

operations and for a post-closure period specified in the mining permit. The department may require additional sampling of aquatic biological resources and monitoring of specific parameters at certain structures including water storage ponds, leachate collection systems and underdrains.

The following tables summarize of ground water variances for a full list of elements and characteristics in ground water surrounding the Halfmile Mine owned by Trevali Mining Corporation located West of Miramichi, NB. It can be noted that certain non-targeted and non-harmful minerals are higher than background. This is the driving factor behind the addition of a reverse osmosis system down stream of the chemical treatment facility proposed for Pickett Mountain. The mechanical type of filtration is able to draw these final minerals from the water and ensure the final treated quality is back to or better than background quality.

Halfmile Mine Analysis of Metals in Water		Ground Water Well											
Sample Identification		327776-1	327776-2	327776-3	327776-4	125083-1	125083-3	125083-4	125083-2	Variance	Variance	Variance	Variance
Well Identification		MB-1	MB-3	HB-1	MB-2	MB1	MB3	HB1	MB2	MB1	MB3	HB1	MB2
Date Sampled:		28-Aug-19	28-Aug-19	28-Aug-19	28-Aug-19	7-Sep-11	7-Sep-11	7-Sep-11	7-Sep-11	NA	NA	NA	NA
Analytes	Units												
Aluminum	µg/L	3	17	24	27	8	43	56	44	-5	-26	-32	-17
Antimony	µg/L	0	0	0	0	0	0	0	0	0	0	0	0
Arsenic	µg/L	0	0	0	0	0	0	0	0	0	0	0	0
Barium	µg/L	2	3	3	3	2	2	3	2	0	1	0	1
Beryllium	µg/L	0	0	0	0	0	0	0	0	0	0	0	0
Bismuth	µg/L	0	0	0	0	0	0	0	0	0	0	0	0
Boron	µg/L	2	0	0	1	1	1	2	1	1	-1	-2	0
Cadmium	µg/L	0.02	0	0	0	0	0	0	0	0.02	0	0	0
Calcium	µg/L	6250	8620	8230	8490	4910	6900	6770	6780	1340	1720	1460	1710
Chromium	µg/L	0	0	0	0	0	0	0	0	0	0	0	0
Cobalt	µg/L	0	0	0	0	0	0	0	0	0	0	0	0
Copper	µg/L	0	0	0	0	0	0	0	0	0	0	0	0
Iron	µg/L	0	20	30	30	0	60	90	60	0	-40	-60	-30
Lead	µg/L	0	0	0	0	0	0.1	0.1	0	0	-0.1	-0.1	0
Lithium	µg/L	0.1	0	0	0	0	0	0	0	0.1	0	0	0
Magnesium	µg/L	840	900	1040	900	630	790	910	780	210	110	130	120
Manganese	µg/L	0	4	10	9	0	5	9	6	0	-1	1	3
Mercury	µg/L	0	0	0	0	0	0	0	0	0	0	0	0
Molybdenum	µg/L	0	0.2	0.1	0.1	0.1	0	0	0.1	-0.1	0.2	0.1	0
Nickel	µg/L	0	0	0	0	0	0	0	0	0	0	0	0
Potassium	µg/L	430	380	430	380	370	320	350	320	60	60	80	60
Rubidium	µg/L	0.2	0.5	0.4	0.5	0.2	0.3	0.3	0.3	0	0.2	0.1	0.2
Selenium	µg/L	0	0	0	0	0	0	0	0	0	0	0	0
Silver	µg/L	0	0	0	0	0	0	0	0	0	0	0	0
Sodium	µg/L	2190	1610	1750	1680	1730	1400	1380	1400	460	210	370	280
Strontium	µg/L	22	25	24	25	15	18	18	18	7	7	6	7
Tellurium	µg/L	0	0	0	0	0	0	0	0	0	0	0	0
Thallium	µg/L	0	0	0	0	0	0	0	0	0	0	0	0
Tin	µg/L	0	0	0	0	0	0	0	0	0	0	0	0
Uranium	µg/L	0	0	0	0	0	0	0	0	0	0	0	0
Vanadium	µg/L	0	0	0	0	0	0	0	0	0	0	0	0
Zinc	µg/L	3	1	2	1	0	2	0	2	3	-1	2	-1

Halfmile Mine Groundwater Metals Variance September 2011 – August 2019

Halfmile Mine Water Chemistry Analysis		Ground Water Well											
Sample Identification		327776-1	327776-2	327776-3	327776-4	125083-1	125083-3	125083-4	125083-2	na	na	na	na
Well Identification		MB-1	MB-3	HB-1	MB-2	MB1	MB3	HB1	MB2	MB-1	MB-3	HB-1	MB-2
Date Sampled:		28-Aug-19	28-Aug-19	28-Aug-19	28-Aug-19	7-Sep-11	7-Sep-11	7-Sep-11	7-Sep-11	NA	NA	NA	NA
Analytes	Units												
Ammonia (as N)	mg/L	0	0	0	0	0	0	0	0	0	0	0	0
pH	units	7.5	7.5	7.5	7.5	7	7.1	7.1	7.1	0.5	0.4	0.4	0.4
Acidity (as CaCO ₃)	mg/L	0	0	0	0	0	0	0	0	0	0	0	0
Sulfate	mg/L	4	0	0	0	0	0	0	0	4	0	0	0
Solids - Total Suspended	mg/L	0	0	0	0	0	0	0	0	0	0	0	0
Conductivity	µS/cm	54	62	60	60					54	62	60	60
Hardness (as CaCO ₃)	mg/L	19.1	25.2	24.8	24.9	14.9	20.5	20.6	20.2	4.2	4.7	4.2	4.7

Halfmile Mine Groundwater Chemistry Variance September 2011 – August 2019

The mine water balance will be carefully managed to take advantage of recycling of mine waste contact waters including precipitation run-off and seepage water. These anticipated water streams volumes are evaluated to determine the design capacity of the water treatment system. These water sources will be used in the beneficiation of the mineralize rock (milling and flotation) are compared to those design flows to determine the extent of water recycling and excess treated water requiring recharge back to groundwater.

A preliminary mine water balance has been developed. This preliminary estimate assumes all infiltration /run-off within the footprint of the developed facility will be collected and treated in addition to approximately 30 gpm of seepage water. The annual average precipitation over the facility footprint is equivalent to an average flow of 175 gpm. This results in an average flow of approximately 205 gpm for use by the treatment facility.

The concentrator water balance indicates, after recycle, approximately 68.4 metric tons of make water (or approximately 13 gpm) such that the daily water balance of available water is greater than the water required. Therefore, net recharge of treated effluent back to ground, will be close to the natural recharge that is excluded within the developed facility footprint. Operation of the envisioned facility will therefore not require additional sources of water supply (groundwater or surface water) and the operation of the facility is sustainable with respect to water needs, water use and management.

Attachment A

Narrative Description of the Nature and Basis for the Requested Subdistrict Change

Consistency with D-PD Development Subdistrict Standards

This narrative addresses the nature and basis for the requested subdistrict change and describes how the project will be consistent with the D-PD development standards applicable to the project. This narrative summarizes why the project is realistic, the applicant's technical capacity to complete the project, the anticipated project schedule, the relationship of the proposed D-PD subdistrict to other existing subdistricts and uses, and how the project will avoid and minimize impacts to water quality and other natural resources.

The area proposed for the project is currently zoned as a general management subdistrict. The proposed project is a major planned development that must be conducted within a D-PD Development subdistrict as required by the LUPC for metallic mineral mine projects consistent with standards for said subdistricts and within the intent and provisions of 12 M.R.S.A. Chapter 206A. Under Chapter 685-B, Development Review and Approval, a permit is not required for metallic minerals mining projects that are reviewed under the Maine Metallic Mineral Mining Act. This project will require review and permitting by the DEP under its Chapter 200 rules for Metallic Mineral Exploration, Advanced Exploration and Mining since all metallic mineral mining activity within a D-PD district is permitted through the DEP. The LUPC must certify to the DEP that the proposed development is an allowed use and that the proposed development meets applicable land use standards established by the LUPC and not otherwise considered as part of the DEP's review.

The mineralized rock at the Pickett Mountain Deposit contains high grade zinc, and lesser copper, lead, gold and silver at tonnages indicating the project is economically realistic, and can be financed and completed. Financial capacity and project financing are discussed in **Exhibit H**. Wolfden, through its own engineering staff, its current specialized consultants in metallurgy and tailings management, supported by the mining engineering capabilities of Wood, has the technical capacity and expertise to design, construct and operate the project through final reclamation.

The project schedule is dependent on the LUPC's approval of this Petition. Wolfden anticipates this process could take up to a year. Wolfden will conduct any additional required natural resource studies in the Spring and Summer of 2020 (wetland, flora, wildlife habitat, and archeological resources). Wolfden also will work with the DEP to establish a baseline environmental characterization program that will require two years of data collection to complete. Once completed, the mine permit application will be submitted for DEP review. It is anticipated that review and public comment could take up to one year. This could conceivably

allow the construction phase of the project to commence in 2023-2024. The duration of mining would be 10 years from that point.

Based on correspondence with the MDIF&W and MNAP and current information from preliminary site surveys, potential impacts to protected wildlife, habitat and flora within and adjacent to areas proposed for development should be limited to areas containing forested wetland and associated intermittent streams within upland areas. Wolfden is committed to working with the regulatory agencies to avoid impacts to the extent possible, to minimize impacts and compensate where unavoidable. In this manner, the functions and values of upland wetlands and streams within the local Pickett Pond / Pleasant Lake watershed that are important to wildlife habitat and surface water quality can be maintained during the active life of the project. Upon reclamation, impacts that were initially unavoidable will be mitigated.

The project location is approximately 6 radial miles from Patten, the closest town. The project location is entirely dependent on the presence and location of a potentially economic mineral deposit. The project location is exempt by definition from adjacency. The proposed rezoning includes 197.5 contiguous acres which meets the minimum requirements under Chapter 10 (10.21,H (D-PD)) of 50 acres for metallic mineral extraction projects. Of this, approximately 57 acres will result in surface disturbance to construct necessary mining facilities. Wolfden has evaluated project mining requirements to minimize the footprint of the proposed project and to place above ground facilities adjacent to each other to construct a compact and efficient operations area. The remaining area to be rezoned encompasses the subsurface areas of mineralized rock and subsurface treated water infiltration galleries, and buffers around surface facilities. The rezoning will occur entirely within a General Management subdistrict and is not adjacent to and will not impact Protection subdistricts in affect at this time. Within a three-mile radius of the site, the protection subdistricts present include forested and scrub-shrub wetlands adjacent to great ponds (Pickett Pond, Pleasant Lake and Mud Lake) and associated stream drainages, and wetlands of special significance between Mud Lake and Pleasant Lake. Fish and wildlife subdistricts are located to the northwest. A recreation subdistrict is designated surrounding Green Mountain Pond and Lane Brook Pond, located greater than 3 miles from the site. The location map showing the existing conditions, proposed structures and existing and proposed subdistrict boundaries is provided in **Exhibit D-1**.

As discussed in **Section B (3)(d)** and **Appendix A-Attachment Q** the project operations will include comprehensive engineered facilities to collect and treat waters that come in contact with rock and earthen materials that are mined in the subsurface and brought to the land surface for beneficiation or long term management. These water collection, treatment and treated water recharge facilities will substantially protect groundwater and surface water quality during and after active mining. The plan for mine reclamation outlined in **Attachment Q** describes how the affected areas will be restored and returned to pre-existing or comparable conditions including forested habitat at the end of the project.

As described in this Petition, the project is located at distances greater than 400 feet from any property line, is reasonably self-sufficient and self-contained, provides for its own water and domestic sewage services, maintenance of roads, solid waste disposal and to the extent possible, fire protection and security.

This Petition contains discussion of other required criteria under Chapter 12 of the LUPC's rules for Mining and Level C Mineral Exploration Activities (**Appendix A Appendices and Narratives**). Based on these considerations, the proposed rezoning is consistent with the D-PD subdistrict standards.

Attachment P
**Explanation of How This Proposal is Consistent with the Standards and Purpose of
the D-PD Development Subdistrict**

Consistency with D-PD Development Subdistrict Standards

The proposed project will be conducted within a D-PD Development subdistrict consistent with standards for said subdistrict and within the intent and provisions of 12 M.R.S.A. Chapter 206A. Under Chapter 685-B, Development Review and Approval, a permit is not required for mining of metallic minerals that is reviewed under the Maine Metallic Mineral Mining Act. This project will require review and permitting under the DEP Chapter 200 Metallic Mineral Exploration, Advanced Exploration and Mining since all metallic mineral mining activity within a D-PD district is permitted through the DEP. The LUPC must certify to the DEP that the proposed development is an allowed use and that the proposed development meets applicable land use standards established by the LUPC, not otherwise considered by the DEP review.

The mineralized rock at the Pickett Mountain Deposit contains high grade zinc, and lesser copper, lead, gold and silver at tonnages indicating the project is economically feasible, and can be financed and completed. Financial capacity and project financing are discussed in Exhibit H. Wolfden, through its own engineering staff, its current specialized consultants in metallurgy and tailings management, supported by the mining engineering capabilities of Wood, has the technical capacity and expertise to design, construct and operate the project through final reclamation.

The project schedule is dependent on the issuance the LUPC's approval of this Petition. Wolfden anticipates this process could take up to a year from the date of the Petition. Wolfden will conduct any additional required natural resource studies in spring and summer of 2020 (wetland, flora, wildlife habitat, and archeological resources). Wolfden also intends to work with the Maine DEP to establish a baseline environmental characterization program that will require two years of data collection to complete. Once completed the mine permit application will be submitted for DEP review. It is anticipated that review and public comment could take up to one year. This could potentially allow the construction phase of the project to commence in 2023-2024. The duration of mining would be 10 years from that point.

Based on preliminary correspondence with the MDIF&W and DEC Natural Areas Division and current information from preliminary site surveys, potential impacts to protected wildlife, habitat and flora within and adjacent to areas proposed for development should be limited to areas containing forested wetland and associated intermittent streams within upland area. Wolfden is committed to working with the agencies to avoid impacts to the extent possible, to minimize impacts and compensate where unavoidable. In this manner, the functions and values of upland wetlands and streams within the local Pickett Pond / Pleasant Lake watershed that are important to wildlife habitat and surface water quality can be maintained during the

active life of the project. Upon reclamation, impacts that were initially unavoidable can be restored / replaced in-kind where originally located.

The project location is approximately 6 radial miles from Patten, the closest town. The project location is entirely dependent on the presence and location of a potentially economic mineral deposit. The project location is exempt by definition from adjacency. The proposed rezoning includes 197.5 contiguous acres which meets the minimum requirements under Chapter 10 (10.21,H (D-PD)) of 50 acres for metallic mineral extraction projects. Of this, approximately 57 acres will result in surface disturbance to construct necessary mining facilities. Other areas within the contiguous 197.5 acre area potentially contain wetlands and will be avoided to the extent practical. Wolfden has evaluated project mining requirements to minimize the footprint of the proposed project and to place above ground facilities adjacent to each other to construct a compact and efficient operations area. The remaining area to be rezoned encompasses the subsurface areas of mineralized rock and subsurface treated water infiltration galleries, and buffers around surface facilities. The rezoning will occur entirely within a General Management subdistrict and is not adjacent to and will not impact Protection subdistricts in affect at this time. Within a three-mile radius of the site, the protection subdistricts present include forested and scrub-shrub wetlands adjacent to great ponds (Pickett Pond, Pleasant Lake and Mud Lake) and associated stream drainages, and wetlands of special significance between Mud Lake and Pleasant Lake. Fish and wildlife subdistricts are located to the northwest. A recreation subdistrict is designated surrounding Green Mountain Pond and Lane Brook Pond, located greater than 3 miles from the site. The location maps showing the existing conditions, proposed structures and existing and proposed subdistrict boundaries are provided in Exhibit D-1 and D-2.

Collectively, Exhibit D-2 and the project description under Section 4 constitute the preliminary development plan for the project. The Final development plan will be reflected in designs provided in the Maine DEP Chapter 200 permit application. The proposed land use activities and structures that would be allowed in the Pickett Mountain (D-PD) planned development subdistrict follow at the end of this section.

As discussed in Section B (3)(d) and Appendix A-Attachment Q, the project operations will include comprehensive engineered facilities to collect and treat waters that come in contact with rock and earthen materials that are mined in the subsurface and brought to the land surface for beneficiation or long-term management. These water collection, treatment and treated water recharge facilities will substantially protect groundwater and surface water quality during and after active mining. The plan for mine reclamation outlined in Attachment Q describes how the affected areas will be restored and returned to pre-existing or comparable conditions including forested habitat at the end of the project.

As described in this Petition, the project is located at distances greater than 400 feet from any property line, is reasonably self-sufficient and self-contained, provides for its own water and

domestic sewage services, maintenance of roads, solid waste disposal and to the extent possible, fire protection and security.

This Petition contains discussion of all the criteria under Chapter 12 of the LUPC's rules for Mining and Level C Mineral Exploration Activities (Appendix A).