



Wolfden Mt. Chase LLC

Petition to Rezone Portion of Township 6, Range 6 Penobscot  
County, Maine for Development of an Underground Metallic  
Mineral Deposit

Submitted to:

Maine Land Use Planning Commission

Date: January 26, 2020



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## LIST OF EXHIBITS

Exhibit A	Location Map and Digital Location Data
Exhibit B	Deed, Lease or Easement
Exhibit C	Site Photographs
Exhibit D-1	Existing Site Plan
Exhibit D-2	Preliminary Site Plan or Subdivision Plan
Exhibit E	Flood Area Zoning <b>Not Applicable</b>
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## APPENDICES

Appendix A	Chapter 12 Requirements for Mining and Level C Mineral Exploration Activities
Appendix A	Attachments:
Attachment A	A narrative description of the nature and basis for the subdistrict change being requested.



- Attachment B A legal description and delineation of the property boundaries proposed for redistricting, including names, addresses and affiliations of current owners and any other entities having a legal interest in the property.
- Attachment C Names and addresses of property owners located within 1,000 feet of the subject property.
- Attachment D A preliminary plan for general location and timing of the elements of the Pickett Mountain Mine project.
- Attachment E A location map drawn to scale on the most recent version of the USGS topographic map and a LUPC Land Use Guidance Map that indicates the area for which a D-PD Development Subdistrict designation is sought and the estimated boundaries of the ore body proposed to be explored or mined.
- Attachment F A map drawn to scale of at least 1 inch to 100 feet showing existing site conditions, including contours at 10 foot intervals or less, water courses, unique or unusual natural conditions, forest cover, wetlands, known or likely deer wintering areas, lakes, ponds, existing structures, road and transportation routes, property boundaries and names of adjoining property owners, scenic locations and other prominent topographical and natural resource features.
- Attachment G A soils map of low intensity that encompasses those portions of the property proposed for D- PD Development Subdistrict designation, including identification of soils used in the USDA Soil Series.
- Attachment H Surficial and bedrock geology maps at a scale of 1:24,000, or largest scale available, of the property proposed for D-PD Development Subdistrict designation.
- Attachment I A map and or description of the location of public, private and industrial water supplies as well as mapped aquifers located within a three-mile radius of the mining area or exploration site;
- Attachment J A map and description of the location and extent of existing infrastructure to include roadways and transportation routes to be utilized, potential impacts on this existing infrastructure, as well as infrastructure to be constructed or improved.
- Attachment K A map identifying significant natural resources and sensitive natural areas located within a three-mile radius of the mining area or exploration site including protected water bodies, significant wildlife and plant areas,



fragile mountain areas, historic sites, scenic resources, public lands, registered critical areas, and LUPC subdistricts.

- Attachment L A map and description of existing uses, such as recreational, within a three-mile radius of the mining area or exploration site.
- Attachment M A description of general measures that may be undertaken to assure that mining in the specified location will not have undue adverse impacts on existing uses, resources and measures that a permittee may take to avoid, minimize or mitigate any adverse impacts;
- Attachment N A description of socioeconomic impacts, both positive and negative, of the proposed metallic mineral mining or level C mineral exploration activities upon the immediate area and communities within and adjacent to the LUPC's jurisdiction likely to be affected by the proposed activities, as well as to the county and state.
- Attachment O An evaluation of the sufficiency of existing services and utilities, a description of any general measures necessary to increase those service capacities and an examination of the burdens on communities or government to provide those services.
- Attachment P An explanation of how this proposal is consistent with the standards and purpose of the D-PD Development Subdistrict.
- Attachment Q A description of the anticipated site conditions following closure and the potential for future reclamation and beneficial use of the affected area.
- Attachment R Proposed Land Use Activities and Structure Allowed in the Picket Mountain (D-PD) Planned Development Subdistrict



## LIST OF ACRONYMS

Ag	Silver
Au	Gold
AAPT	Average Annual Daily Transportation
AM	Ante Meridiem – (before noon)
ATV	All-Terrain Vehicle
CLUP	Comprehensive Land Use Plan
Cu	Copper
DEP	Maine Department of Environmental Protection
DOT	Department of Transportation
dB	Decibels
EL	Elevation
ft	Feet
IF&W	Inland Fisheries and Wildlife
LMA	Local Market Area
LUPC	Land Use Planning Commission
M	Million
MDIF&W	Maine Department Inland Fisheries and Wildlife
MEDOT	Maine Department of Transportation
MHPC	Maine Historic Preservation Commission
Mi	Miles
MNAP	Maine Natural Areas Program (Department of Conservation)
M-GN	General Management
MRSA	Maine Revised Statues
M <sup>3</sup> /d	Cubic meters/day
NWI	National Wetlands Inventory



Pb	Lead
P-DP	Planned Development
PM	Post Meridiem (after noon)
%	Percent
RSU	Regional School Unit
RTE	Rare Threatened or Endangered
SR	State Route
TMF	Tailings Management Facility
T	Tonnes
tpd or t/d	Tonnes per day
UNK	Unknown
Zn	Zinc





## References

Gerber and Hebson, 1996 In Geologic Society of Maine, Bulletin 4 Selected Papers on the Hydrology of Maine. Pages 23-52.

	<b>ZP</b>				
Tracking No.		Permit No.		\$	Fee Received

# Zoning Petition

for Petitions to Rezone to Most Subdistricts

**⚠ If you propose to rezone any portion of your land area to a Resource Plan Protection (P-RP) Subdistrict, STOP HERE!**  
 You cannot use this form. Contact the LUPC office that serves your area if you have questions.

## 1A. PETITIONER INFORMATION

Petitioner Name(s) Wolfden Mt. Chase LLC; a wholly owned subsidiary of Wolfden Resources Corporation		Petitioner Title (if representative of a corporation, etc.) Ron Little, President and CEO of Wolfden Resources Corporation; Sole Owner of Wolfden Mt. Chase LLC	
Daytime Phone (613) 862 3699		FAX (if applicable)	
Mailing Address 1100 Russell Street Unit 5		Email (if applicable) rlittle@wolfdenresources.com	
State Ontario		Zip Code P7B 5N2	

## 1B. AGENT INFORMATION (If applicable)

Agent Name(s)	Daytime Phone	FAX (if applicable)
Business Name		
Mailing Address	Email (if applicable)	
Town	State	Zip Code

## 2. PETITIONER AND/OR AGENT SIGNATURES


**Petitioner:** All persons, or authorized representatives of corporations, listed on the deed(s), lease(s) or sales contract as owners or lessees of the property must read the following statement and sign below.

- If an Agent is listed above, I hereby authorize that individual or business to act as my legal agent in all matters relating to this petition.
- If an Agent is not listed above, I have personally examined and am familiar with the information submitted in this petition, including the accompanying exhibits and supplements, and to the best of my knowledge and belief, this petition is complete with all necessary exhibits. The information in this petition is a true and adequate depiction of what currently exists on, and what is proposed at, the property. I understand that I am ultimately responsible for complying with all regulations, conditions and limitations of any petitions and permits issued to me by the Commission.

Please check **one** of the boxes below: (see "Accessing the Project Site for Site Evaluation and Inspection" just prior to the application form)

- I authorize staff of the Land Use Planning Commission to access the project site as necessary at any reasonable hour for the purpose of evaluating the site to verify the application materials I have submitted, and for the purpose of inspecting for compliance with statutory and regulatory requirements, and the terms and conditions of my permit.
- I request that staff of the Land Use Planning Commission make reasonable efforts to contact me in advance to obtain my permission to fully access the project site for purposes of any necessary site evaluation and compliance inspection.

The person(s) signing below must demonstrate that they have a legal right to apply for this petition, either as the petitioner or Maine DEP a legal agreement or other written contract with the petitioner. (See Exhibit B).

**Petitioner Signature**  \_\_\_\_\_ **Date** 1/26/20

**Agent:** All agents listed above must read the following statement and sign below.

I understand that I am hereby authorized by the above-listed petitioner to act as their legal agent in all matters relating to this zoning petition. I have personally examined and am familiar with the information submitted in this petition, including the accompanying exhibits and supplements, and to the best of my knowledge and belief, this petition is complete with all necessary exhibits. I understand that if the petition is incomplete or without any required exhibits that it will result in delays in processing the petition. The information in this petition is a true and adequate depiction of what currently exists on, and what is proposed at, the property. I certify that I will provide any final action by the Commission on this petition and associated conditions to the petitioner. I will ensure that the petitioner understand that they are ultimately responsible for complying with all regulations, conditions and limitations of any petitions and permits issued by the Commission as they regard this property.

If the petitioner has not signed above, the petition must include legal documentation designating the agent listed above as a representative of the petitioner in matters such as these. (See Exhibit B).

**Agent Signature** \_\_\_\_\_ **Date** \_\_\_\_\_

**3. PROPERTY LOCATION.** Provide the following details about your property location. Tax plan and lot numbers are listed on your property tax bill. Book and page numbers are listed on your deed. If you lease your property, check your lease to find out whether any unique lease lot numbers have been assigned to the property.

Township, Town or Plantation T6R6 WELS, Maine			County Penobscot		
<p><b>ⓘ</b> If your property is located in one of the following Prospectively Zoned Plantations or Townships, please contact the LUPC office that serves your area prior to completing this form: Adamstown Twp., Dallas Plt., Lincoln Plt., Magalloway Plt., Rangeley Plt., Richardsontown Twp., Sandy River Plt., Township C, Township D, or Township E.</p>					
Tax Information <i>(check tax bill)</i>			Deed or Lease Information <i>(check deed or lease)</i>		
Map:1 _____	Plan: _____	Lot: 2 _____	Book:14672 _____	Page:27 _____	
Map: _____	Plan: _____	Lot: _____	Lease #: Book: _____	Page: _____	
Map: _____	Plan: _____	Lot: _____	Lease #: _____		
<b>Lot size 7,145 Acres</b> <i>(in acres, or in square feet if less than 1 acre)</i>			<b>Lot Coverage</b> <i>(in square feet)</i>		
<b>All Current Zoning on Property</b> <i>(check the appropriate <a href="#">LUPC map</a>)</i> <b>M-GN, P-GP, P-WL1, P-WL-2, P-WL3, P-SG, P-SL2</b>			<b>Current Zoning at Development Site: M-GN</b>		
<b>Road Frontage.</b> List the name(s) and frontage(s) (in feet) for any public or private roads, or other rights-of-way adjacent to your lot:			<b>Water Frontage.</b> List the name(s) and frontage(s) (in feet) for any lakes, ponds, rivers, streams, or other waters <b>on</b> or <b>(&amp;) adjacent</b> to your lot:		
Road #1 NA _____	Frontage _____		Waterbody #1 Pickett Mountain Pond _____	Frontage 17,300 ft.	
ft. Road #2 _____	Frontage _____		Waterbody #2 Pleasant and Mud Lakes _____	Frontage 48,860 ft.	
<p><b>ⓘ</b> Provide, as <b>EXHIBIT A</b>, a location map. See page iv of the instructions for more detail regarding this exhibit.</p> <p><b>ⓘ</b> Provide, as <b>EXHIBIT B</b>, your deed, lease or easement. See page iv of the instructions for more detail regarding this exhibit.</p>					

**4. PROJECT DESCRIPTION.** Provide a brief summary of your proposal, including a general description of the project, including proposed development, number of lots (if applicable), roads, and land use activities.

The proposed development includes construction of facilities necessary for initial development, operation and closure of an underground metallic mineral mine. Access to the mine operations area will be by existing gravel roads that will be subject to ongoing maintenance and improvements for safety. The area to be rezoned from a General Management (M-GN) to a Planned Development (P-DP) subdistrict encompasses approximately 197.5 acres. The surface facilities to be constructed encompass approximately 57 acres and include a Portal to access underground workings, Sub-Aerial (Dry Stacked) Tailings Facility, Mill Feed Staging Area, Interim Waste Rock Storage Facility, and Surface Water Management Facilities.

The project will be completed in four phases:

Phase 1 Permitting

Phase 2 Construction

Phase 3 Operations

Phase 4 Restoration, Reclamation and Monitoring

These Phases are described in greater detail in the **Project Description** presented on the following pages.

**Proposed Zoning.** List all proposed zoning designations (contact the [LUPC office that serves your area](#) if you have questions).

**ⓘ** If your proposal includes rezoning lands to or from one of the following subdistricts, be sure to provide as **EXHIBIT G**, the necessary documentation, data, and/or maps that support the proposed change:

Aquifer Protection (P-AR) Subdistrict; Fish and Wildlife Protection (P-FW) Subdistrict;  
 Soil and Geology Protection (P-SG) Subdistrict; or Wetland Protection (P-WL) Subdistrict  
 See page v of the instructions for more detail regarding this exhibit.

Proposed Project Name *(if applicable)* **Pickett Mountain Mine**

## Project Description

Wolfden Mt. Chase LLC (Wolfden) is requesting a subdistrict change to a 197.5 acre area of land that is currently within a General Management subdistrict in order to allow for construction, mining, milling, closure and reclamation activities to occur over an estimated duration of 10-15 years. The mine life could subsequently be extended through discovery of additional minable ore, or importation of material from a similar deposit. This specific area is required for subdistrict change due to the nature of mining operations. The geological resource has been identified in this location and in order to safely, environmentally responsibly and economically responsibly extract the resource, the project site is required to be nearest possible to the resource. In addition, the layout of the project site takes advantage of topographic relief in a manner that supports future closure of the property with little impact to the original landscape.

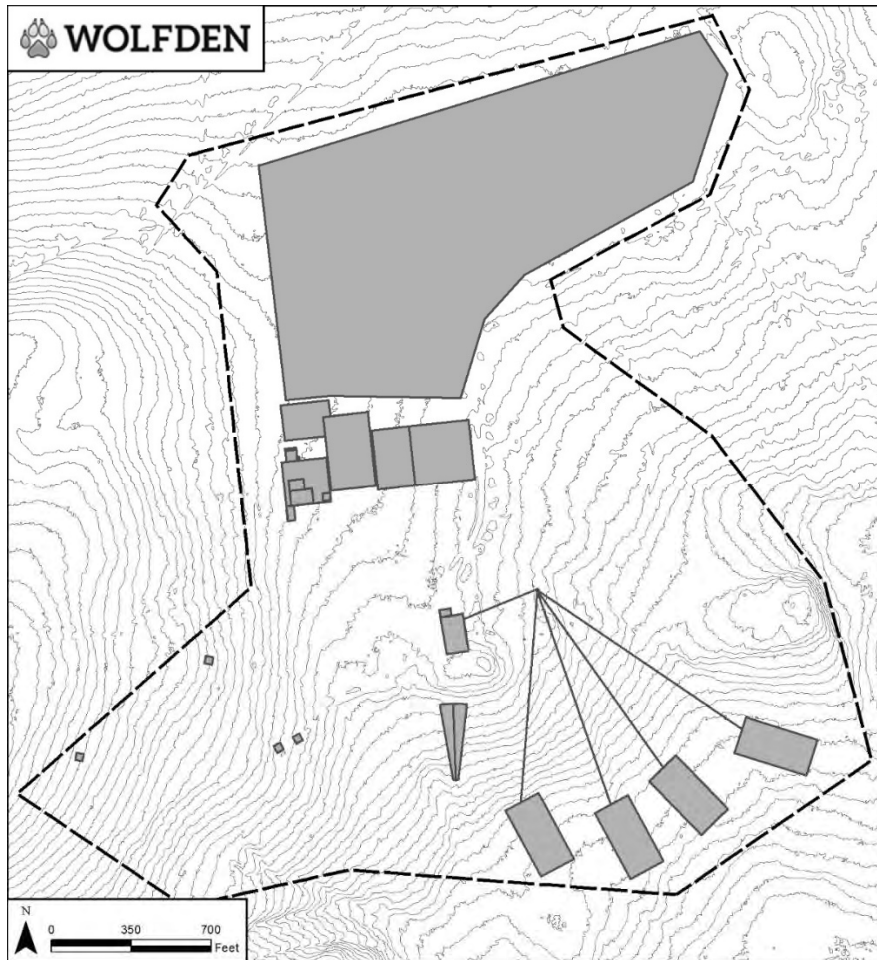
The project in question has been named Pickett Mountain and is located north of Patten bordering both Penobscot and Aroostook Counties as shown in the following location map.



**Location Map of Proposed Project**

Pickett Mountain, is a high-grade base metal deposit primarily composed of Zinc, Lead, Copper, Silver and Gold as economic minerals of interest. The intended process is to excavate valuable rocks from underground via drilling and blasting the in-situ material in order to fragment it to a manageable size, then to load it into underground haul trucks to carry it to a temporary surface stockpile. Once on the stockpile, the material will be crushed, milled and fed into an onsite concentrator at a nominal rate of 1000 tonnes per day (tpd). The concentrator will pulverize the material into a fine dust and then use flotation technology to separate the valuable minerals (concentrate) from the non-valuable minerals (tailings). Three concentrates will be produced—copper, lead and zinc—with each being generated sequentially and stored separately for transportation to a selected smelter outside the State of Maine. Transportation will be facilitated using truck and trailer combinations with optimized capacity for the amount of concentrate produced. The tailings will be targeted for underground tailings deposition as a type of backfill to replace voids that are excavated during mining operations. These tailings will help stabilize the underground openings as well as be deposited in such a way that they will be stable long after the mine has been closed. The remaining tailings will be targeted for surface thickened tailings deposition (sub-aerial deposition). These tailings will be thickened into a “toothpaste like” consistency and delivered via trucks and dozers to an approved Tailings Management Facility (TMF). The TMF will be lined in such a way as to ensure decant water, precipitation, or other water introductions to be collected and not allowed to contact the water table below. All water collected from the TMF will be and transitioned back into the milling circuit described above along with some make up water. The milling process as a whole will have a net negative water balance, meaning that it will require injection of minimal amounts of water to keep the process working.

A series of ancillary activities will be required to support the project. These include electrical generation/distribution, maintenance/mechanical support, security, water management and treatment, warehousing and procurement, accounting, human resources management, health and safety management, environmental management and community relations. All ancillary activities will occur on the project site. The conceptual location of each of these activities is shown in the following figure. The building designations, including their functions and approximate sizes and types are identified in Exhibit D-2.



**Conceptual Location of Buildings and Facilities**

The life of the project can be broken down into four phases. Permitting, Construction, Production and, Reclamation/Remediation. Each of these phases will occur sequentially however the latter three phases will also overlap to ensure smooth transitions, including concurrent reclamation, as described below.

**Phase 1 – Permitting:**

The permitting steps for this project under chapters 10, 12 and 13 of the LUPC’s rules and DEP’s Chapter 200 rules are as follows:

- Rezoning for appropriate land use.

The land that the Picket Mountain deposit is located on is currently zoned as General Management subdistrict (M-GN). For construction, operating and rehabilitation work to take place, it must be rezoned to a Planned Development subdistrict (P-DP) which allows for development work outside of standard development. The process of rezoning is to:

- Establish a conceptual project plan.
- Submit a rezoning petition outlining the details and potential impacts of the plan.
- Confer with the LUPC and public identifying all opportunities and risks and mitigation plans to address risks.
- Receive the LUPC's approval of the rezoning petition.

Once the land has been rezoned for project development, a mining permit application may be submitted to the DEP. The following steps would be taken before submitting a mining permit application for approval:

- Design of the baseline study work for environmental, biological, and archeological status of the property.
- Review and approval of the baseline work with the DEP.
- Complete baseline study work for environmental, biological, and archeological status of the property.
- Submit the baseline study results as well as detailed construction, operation, and reclamation plans for the life of the project including the project outcomes such as economics and anticipated impacts on the environment, population, economy, infrastructure, etc.
- Receive DEP's conditional approval of the mining permit application.

## **Phase 2 - Construction:**

Upon completion and approval of the mining permit application, the project may move forward to construction. Construction of the Pickett Mountain Mine project will include the following activities (not necessarily in this order):

- Removal of trees and grub the land to be used will happen throughout the construction on an as needed basis to ensure no over stripping of land.
- Construction of roadways to various locations at site.
- Construction of mineralized and waste rock pads.
- Installation of temporary explosives magazines (Rental from supplier).
- Installation of ground and surface water monitoring locations.
- Installation of air monitoring systems.
- Construction of the water management ponds and discharge structures.
- Construction of the water treatment facility.
- Construction of temporary shop facility.
- Excavation of the mine portal and installation of temporary mining services (compressed air, power generation, ventilation, process water).
- Commence mining development.
- Excavation of ventilation raise to surface.
- Installation of potable water system.
- Installation of security infrastructure.
- Installation of mine offices and dry facility (Change house).
- Installation of warehouse and laydown area.

- Installation of electrical substation
- Tie in electrical infrastructure to newly installed grid (Completed by others)
- Construction of TMF stage 1.
- Construction of concentrator and supporting facilities.
- Construction of permanent shop facility.

Grubbed material will be managed on-site. Most of the timber and stumps are small, and to the extent timber removed has limited or no economic value, it will be chipped on-site for use as erosion control materials, including stumpage. Stumps too large for chipping will be stored with the organic topsoils in pens and allowed to decompose until used at the end of the project during reclamation. Identified solid waste facilities (Casella) have verbally confirmed that they do not have capacity to take the stumpage. The final design will reevaluate alternatives for stumpage.

Construction will typically utilize as much local or state skill sets as possible and the majority of material used during construction will be sourced locally or within the State of Maine. Specialty skillsets, services, and materials will be sourced externally as required and are expected to include such items as the flotation and ball mill equipment and services within the concentrator, as well as initial or contract mining services. As programs advance through construction, skillsets will be built and trained locally to continuously convert external services to in-state services.

### **Phase 3 – Operation:**

As the site is constructed and the concentrator facilities are finalized, development of underground workings will continue to take place. Waste rock excavated from the mine will be deposited and stored on the surface pad and mineralized material will be stored on the mill feed pad. The mineralized ore will be stockpiled on the pad and used during the commissioning of the concentrator. Upon completion of commissioning of the concentrator, regular operations of mining, crushing, concentration and shipping will commence. During this phase of steady-state operations, significant and continuous training to upskill a local workforce is anticipated related to the mining, processing and support services which are currently estimated to last 8-9 years. Programs in training and education will occur to facilitate a working pool of employees to ensure stability of the operation support of the local workforce.

All activities will occur continuously during the operation phase in order to explore, develop, extract, concentrate and sell minerals from the project. As the project nears final completion, activities will stop sequentially.

Exploration will continue during the operation phase of the project with the intent to define additional reserves for mining and processing through the operation. Activities included in exploration are as follows:



- Diamond Drilling
- Exploration Geology, Geophysics, Mapping, Soil Sampling, Trenching
- Drilling, Core Logging
- Geotechnical Drilling and Logging
- Geological Modelling and Reserve Estimation

Development activities will occur to provide access and service drifts (tunnels) from surface to the deposit. If deeper extensions of the ore deposit are discovered during the mining process, a shaft from surface may be necessary to access and haul ore from these deeper areas. Various types of underground workings include:

- A portal (opening at surface) for the commencement of a ramp (decline) will be used from surface to access the underground workings and act as a haulage route for manpower, materials, rock and ventilation.
- Lateral drifts on each working level connect the ramp to the deposit underground.
- Ventilation raises are near vertical tunnels that are used to provide clean air or exhaust to and from all of the drifts and ramps in order to provide workers with a clean air environment.
- Auxiliary raises/drifts are tunnels used to carry services such as compressed air, process water, dewatering, electrical, secondary and escape routes for the mine.
- Underground infrastructure with short termination (dead-end drifts) include, refuge stations, water collection sumps and pumping stations, electrical distribution substations, material storage areas, remucks (Rock storage areas), explosives storages, and washroom facilities.

Activities used for development will include:

- Horizontal development drilling is typically completed using an hydraulic jumbo drill (carrier mounted drills) and an operator in the larger drifts. Small drifts may be mined by jackleg.
- Vertical or inclined openings may be mined by a jackleg, stoper or wagaon drill.
- Blasting is performed using hand-held pneumatic loaders or by hand loading emulsions sticks into the drilled holes. Blasting occurs, typically two to three times per day once everyone is confirmed out of the mine.
- Mucking is a term to describe the removal of the rock (ore or waste) from a development heading typically with a scoop tram (Low profile front end loader). The rock is placed into a low profile truck for haulage to surface or remuck location for further handling.
- Haulage is completed using underground low profile haul-trucks that are loaded by the scoop trams. The trucks are used for hauling rock (ore and waste) out of the mine as well as hauling waste rock and cement back into the mine during the backfilling phase.

- Ground support such bolts, screen/mesh and rebar are typically used as required to ensure rock stability of the walls and roof of the underground workings in order to ensure safety for all workers throughout the project life. This is completed according to an engineering procedure and planning and varies based on type of rock, locations, duration of opening, etc. The tasks included in ground support are drilling holes, installing a steel mesh screen over the rock face and securing it in place using various tendons or "rock bolts".
- In addition to ground support, other underground construction may include cement work, timber work, steel work, plumbing, electrical work, in order to provide necessary services and improve safety.

Extraction/production activities will be continuous and repetitive compared to other activities that take place in the mine. Once various production areas in the mine are prepared, production miners will take over and accomplish the following activities in order to provide ~1000 tonnes per day of ore mill feed material to surface:

- Production drilling at Pickett Mountain will comprise near vertical holes on rings within a production area or panel (stope). These rings are drilled in a distributed grid to effectively distribute explosives throughout the panel for optimized fragmentation of the rocks.
- Blasting practices are similar in process to development but on a larger scale and in vertical holes vs horizontal holes. These activities are typically performed by hand including the loading of explosives into the drilled blast holes.
- Mucking is similar to the development activity. However, mucking for production is sometimes done via remote control in order to reduce the risk of injury to the operator.
- Haulage of ore is similar to the haulage of development rock activity.
- Backfilling is complete after a production area has been completed and there is a significant void left behind to be filled. Backfilling can occur using a scoop tram dumping waste material back into the void. This material is typically waste rock that has been hauled to surface during the development phase. Another backfilling method is by utilizing tailings from the concentrator and blending it with the waste rock and sometimes with some cement as binder.

Concentration of ore mill feed takes place on surface via the concentrator facilities and is described in detail in another section of this Petition. The activities that will occur within the concentrator to separate the valuable minerals from the non-valuable minerals will include the following:

- Comminution is the act of crushing and grinding the ore mill feed material to a fine powder. The grain size of the powder is specifically targeted to liberate or expose the valuable minerals within the rock with the least amount of grinding and energy.

- Flotation is a process that involves mixing several reagents with the ground rock in a series of baths then injecting air bubbles. The chemicals cause the valuable minerals to selectively attach to the bubbles. The bubbles then float to the top of the bath and overflow producing concentrate. The materials that are not selectively floated (sank in the bath) are collected, cleaned and sent to the TMF.
- Reagent mix is completed to ensure that various chemicals within the process are prepared and delivered when and where designed.
- Each of the products generated from the flotation process are thickened to a thick paste then dried to a predetermined specification. This is typically performed by a type of pressure filter.
- Tailings (waste byproduct) is the remaining ground rock that did not float into a valuable concentrate. This material is cleaned and thickened so that it can be stored on surface within an engineered facility in order to mitigate any potential impacts to the environment that could be caused by this material. The full management of tailings is discussed in detail in another chapter of this Petition.

The concentrator will generate three separate concentrates of copper, lead and zinc that will be transported and sold to a smelter for further refinement into metals that can be used by industry. Transportation from Pickett Mountain will be via truck and trailer designed to haul concentrates and hauled on the existing highways infrastructure. A description of this process is described in greater detail further below.

#### **Phase 4 – Reclamation/Remediation**

The overall design and operational strategy at Pickett Mountain is to limit and maintain a small environmental impact throughout all phases of the project (construction and operation). For example, as the project generates tailings from production, they will be stored in separate cells, such that a completed cell will be closed and reclaimed while the next cell is in use. This will spread the closure and reclamation over the life of the project, rather than at the end. Ongoing closure can be monitored and adjusted to maximize efficiencies and effectiveness.

Upon completion of the mine and processing of all ore, final reclamation activities will take place. These activities will be based on a previously engineered and approved reclamation plan required by the mining application. A description of this process is described in greater detail in a subsequent section of this Petition.

The majority of the required reclamation work will be completed by a skilled workforce from the state and include

- Decommissioning, sale and salvage of steel and site buildings.
- Ground surface cleanup and contouring.
- Spreading overburden, soils and buffer capping material on the impacted sites and tailings.

- Construction of underground opening blockages (plugs.)
- Removal of pond and storage pad infrastructure.
- Continued operation of water treatment facility and monitoring of water quality.

A high-level schedule of the 4 project phases is shown in the following chart.

Year	Years From Mining Permit Approval														
	-1	-2	0	1	2	3	4	5	6	7	8	9	10	11	12
<b>Permitting Phase</b>															
Conceptual Plan															
Rezoning Petition Submission															
Dialogue with Commission															
Approval of Rezoning															
Mining Application Initiated															
Baseline Study Work Proposal															
Baseline Study Work Approval															
Baseline Study Work Execution															
Mining Application Final Submission															
Mining Permit Approval															
<b>Construction Phase</b>															
Removal of trees and grub the land.															
Construction of roadways and working areas															
Construction of mineralized and waste rock pads.															
Installation of Temporary Power Generation.															
Installation of temporary explosives magazines (Rental from supplier).															
Installation of ground and surface water monitoring locations.															
Installation of air monitoring systems.															
Construction of the water management ponds and discharge structures.															
Construction of the water treatment facility.															
Construction of temporary shop facility.															
Excavation of the mine portal and services															
Begin mining development.															
Excavation of ventilation raise to surface.															
Installation of potable water system.															
Installation of security infrastructure.															
Installation of mine offices and dry facility.															
Installation of warehouse and laydown area.															
Installation of electrical substation															
Tie in electrical infrastructure grid															
Construction of TMF stage 1.															
Construction of Concentrator and supporting facilities.															
Construction of permanent shop facility.															
<b>Operations Phase</b>															
Mine Development															
Mine Production Ramp Up															
Commercial Production															
Production Ramp Down															
Mine Closure															
<b>Reclamation Phase</b>															
Decommissioning of site buildings															
Site final cleanup and contouring															
Capping and closure of tailings facility															
Spread stored overburden and capping material on impacted sites															
Construction of underground blockages (Plugs)															
Removal of Pond and storage pad infrastructure															
Operation of water treatment facility															
Removal of water treatment facility															
Ground and surface water monitoring program															

### High Level Schedule of Mine Permitting, Construction, Operation and Reclamation

**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: <b>197.5</b>	Acres to retain current zoning: <b>6,947.5</b>	Total Contiguous Acres: <b>7,145 (by Deed)</b>
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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 Pickett 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?

Residential                       Residential with home occupation                       Commercial or industrial  
 Undeveloped / Forestry                       Public or institutional                       Other: \_\_\_\_\_

**8. EXISTING STRUCTURES AND DEVELOPMENT.** Please list any structures or development on your property, such as roads, residences, accessory structures, driveways, trails and/or other uses.

Type of use or structure (dwelling, garage, driveway, commercial, recreation, etc.)	Year built	Exterior dimensions (in feet) (LxWxH)	Type of foundation (full basement, slab, post, etc.)	Distance (in feet) of structure from nearest:					
				Road	Property line	Lake or pond	River or stream	Wetland	Ocean
Gravel Logging Roads	UNK	Various							
No other existing structures									





## 11. PUBLIC AND COMMUNITY SERVICES.

Service / feature	Name of provider / facility	Distance (in miles) from site:
Ambulance	Island Falls Ambulance Service	23
Education	RSU 89, (Stacyville, ME)	30 / 18.5
Fire	Island Falls Volunteer Fire Department	23
Police	Penobscot County Sherriff Dept. (Bangor) / Aroostook County Sheriff	90 / 45
Solid waste disposal (during construction: construction debris, stumps, brush, asphalt and pavement products)	Casella Waste Management (Houlton ME)	44
Solid waste disposal (after construction, if different)	Same	
Public water supply (if applicable)	NA	
Public wastewater (if applicable)	NA	
Public road	State Highway Route 11	4.5
Service center	Patten	
Electric utilities	Emera Maine (New power transmission line from Patten)	14.6
Phone utilities	Cable- Spectrum	5.1

Provide as **EXHIBIT L**, either: i) a letter from each service provider confirming the facility's availability and capacity to provide the necessary services to the proposed development; OR ii) only in cases where the rezoning is for legally existing development, provide notice of the rezoning proposal to each service provider and provide, as EXHIBIT L, proof of such notice. All zoning petitions intended for residential development must submit such exhibits for education services, regardless whether the dwelling units are anticipated to be seasonal or year-round dwellings. See page vi of the instructions for more detail regarding this exhibit.

Public services, such as those identified above, are commonly provided by a municipality, or in the case of much of the unorganized territories, these services are provided or contracted for, by the county. In some cases, service centers may provide some of these public services. Service centers are identified by the Department of Agriculture, Conservation and Forestry's Municipal Planning Assistance Program. A partial listing of those near the Commission's jurisdiction includes: Ashland, Augusta, Bethel, Bingham, Brewer, Bridgeton, Calais, Caribou, Dexter, Dover-Foxcroft, Eastport, Ellsworth, Farmington, Fort Kent, Greenville, Guilford, Houlton, Jackman, Limestone, Lincoln, Machias, Madawaska, Mars Hill, Mexico, Milbridge, Millinocket, Newport, Norway, Orono, Pittsfield, Presque Isle, Rangeley, Rumford, Van Buren. For a more complete listing, check with the Municipal Planning Assistance Program at [www.maine.gov/dacf/municipalplanning/index.shtml](http://www.maine.gov/dacf/municipalplanning/index.shtml).

## 12. ACCESS TO SITE.

- a. Starting with the closest public road, then each successive road, provide the following information about each existing road that will be used to access the area proposed for rezoning.

Road name	Public or private? (if private, complete the rest of this row)	Owner name	Length and travel width of road	Right-of-way width	Type of wearing surface
See Appendix A Attachment J	Private	Wolden Mt. Chase LLC	5.1 mi /15 ft	NA	Gravel

If access to your site is limited as part of your deed, lease, easement or other covenants, be sure to include a copy of such restrictions or provisions as part of **EXHIBIT B**. See page iv of the instructions for more detail regarding this exhibit.

- b. Water Only Access- Not Applicable

### 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.

#### **14. ANTICIPATED IMPACTS.**

This Petition contains information on how the proposed Pickett Mountain Mine project meets the criteria for approval to change the current General Management (M-GN) subdistrict to a D-PD Development subdistrict for Metallic Mineral Mining. This includes positive impacts within and adjacent to the LUPCs jurisdiction, positive impacts associated with transportation routes, and potential reclamation and beneficial reuse of the land after mining. These discussions are provided in **Appendix A Sections B(2)(a),(b) and (c)**.

Possible negative impacts of the rezoning are discussed in **Appendix A Sections B(2)(a),(b) and (c)**, and **Appendix A Sections B(3)(a),(b), (c) and (d)**.

These discussions are not repeated here to avoid unnecessary duplication in this Petition.

## **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 197.5 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 10.25.F

**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 65dB(A) at night (7 PM to 7 AM) for certain subdistricts (commercial-industrial for example) to 55dB(A) and 45dB(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	110
L1 (ft)	1	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
<b>With 20% Dampening</b>	20%										
Receptor dB	88.0	68.0	48.0	34.0	28.0	22.0	18.5	16.0	14.0		9.4

### Calculated Sound Pressure Levels from Source (unobstructed path)

Without dampening, 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 residence indicates that expected noise levels will be very low. A value of 10 dB is commonly cited as the noise level of normal breathing.

**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 Wolden'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 10.27,D.

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. Although a formal visibility analysis (using viewshed in ArcGIS or similar tools) has not yet been conducted, other more simplistic tools (such as publicly available elevation profile tools in Google Earth Pro) have been used to investigate site visibility from public roads and nearby recreation areas. 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 sight 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. There may be windows of visibility to this portion of the site along SR 11 north of the intersection with Route 212, approximately 8 miles distant.

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.

### **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:

- Policy1 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.

## **16. SHORELAND DEVELOPMENT.**

The proposed development is not adjacent to the shoreland of a lake. Lakes within a one-mile radius include Pickett Mountain Pond and within a 3-mile radius include Pleasant Lake and Mud Lake and several smaller ponds including Bear Mountain Pond, Tote Road Pond, Grass Pond, Duck Pond and Huntley Pond.

Pickett Mountain Pond, Pleasant Lake, Mud Lake Tote Road Pond and Grass Pond have been surveyed and were in general found to be shallow and muddy with uniform temperatures at all depths in summer months lacking desirable conditions for cold water species such as brook trout or salmon. The inlet and outlet streams however do provide habitat as spawning and nursery areas for trout.

As discussed in Appendix A Section B(3)(d) water management and treatment will preclude water quality impacts to these lakes and ponds and associated streams. The proposed mining activities will in no way impact recreational use of these lakes or use of the surrounding area.

**17. SUBDIVISION OR DEVELOPMENT ZONING PROPOSAL.**

**Not Applicable**

## 18. NATURAL AND HISTORICAL FEATURES.

- 📌 Provide as **EXHIBIT M**, either a Phase 1 archaeological survey or a letter from the Maine Historic Preservation Commission that a Phase 1 archaeological survey is not necessary. See page vi of the instructions for more detail regarding this exhibit.
- 📌 Provide as **EXHIBIT N**, letters from the Maine Natural Areas Program AND Maine Inland Fisheries and Wildlife confirming the presence or absence of rare or special plant communities or significant wildlife habitat in the area of the rezoning. See page vi of the Instructions for additional detail regarding this exhibit.

Please see Exhibits M and N for requested information.

- A. A scope of work for a Phase 0 archeological investigation has been developed in consultation with the MHPC. The Phase 0 investigation will be conducted in the Spring of 2020 by a Level II prequalified Prehistoric Archeologist. If the Phase 0 work identifies archeological resources that require further evaluation, then a Phase 1 survey will follow. The scope of a Phase 1 survey would be established based on the results of the Phase 0 Report and in consultation with the MHPC.

The scope of work for the Phase 0 investigation is as follows:

Historic and prehistoric archaeological sites would be assessed, both within the mine project area and also at selected locations along the access roads that may be subject to improvement as needed. The assessment will be based primarily on a pedestrian (“walkover”) survey, supplemented as indicated by subsurface testing with 0.5 m square test pits. Note: a Phase 0 archaeological survey is designed to assess the overall probability of presence of archaeological sites, not to complete a survey of sufficient intensity to indicate site absence or to find all sites present.

Based on information from the MHPC, there is a low probability of historic archaeological sites being present, mostly being lumbering camps. The walkover survey may be supplemented with a metal detector if there is surface indication of prospective sites. As is standard with Phase 0 investigations, preliminary documentary research would be necessary in the event of finding a site.

There is a moderate probability of finding prehistoric archaeological sites within the proposed survey area, based on:

1. the project location within the area of possible Ordovician or Silurian chert toolstone outcrops, and
2. the discovery of site 147.001 during initial survey for the Chase Mountain mine tailing pond project in 1984, on the edge of the Pickett Mountain Pond valley.

Site 147.001 is located outside the area of the proposed Pickett Mountain Mine project. However, the area of the Pickett Mountain Mine project will be assessed for possible toolstone outcrops and associated workshop/toolstone reduction sites. Rock outcrop of any kind in the site area is limited.

The Phase 0 investigation will include:

- consultation with a qualified geologist,

- walkover survey to locate bedrock outcrops and assess their suitability as toolstone and record same, and
- excavation of up to 50 test pits, in transects with 5 or 10 m intervals, within the areas assessed to be “most likely” to contain prehistoric quarry reduction debris and/or habitation sites.

Following completion of this work, a draft report will be prepared and provided to the MHPC for review. Any comments or questions will be addressed in the final Phase 0 Report.

Relevant correspondence with the MHPC is provided in Exhibit M.

- B. The MNAP has provided an environmental review for rare and exemplary botanical features in proximity to the Pickett Mountain Project. Based on current information and reconnaissance, rare and exemplary botanical features have not been observed or are not known or expected to exist in the area proposed for rezoning. During the Spring of 2020, surveys will be made by a qualified biologist to ensure that no undocumented rare or exemplary botanical features are present that would be inadvertently harmed.

The MIL&W has also provided an environmental review with similar findings, that significant wildlife habit is not known or expected at the project site.

Relevant correspondence is provided in Exhibit N.

## 19. RECREATIONAL RESOURCES.

The area in the immediate vicinity of the proposed rezoning has limited high value recreational resources (cold water fisheries, scenic views, primitive and remote locations) and is privately owned. Public recreation use of the area is primarily motorized, accessing existing gravel logging roads including ATVs and snow mobiles. Wolfden would affirmatively impose restrictions on certain roads that lead to the mine site, if needed for public safety. The roads providing access to the site are already well developed and used extensively by logging operations.

Nearby designated recreational resources, including Lane Brook Pond, Green Mountain Pond as well as fish and wildlife protection subdistricts along portions of the headwaters to Upper Shin Pond, would not be affected directly by the project or indirectly through increased traffic. The tributaries to Upper Shin Pond are valued as stream spawning and nursery areas for brook trout and the thoroughfare to Lower Shin Pond for salmon. These areas are not within the watershed drainage of the proposed site. Upper and Lower Shin Pond are accessed by Route 159 which is not connected to any existing private or public roads used to access the site. The proposed site would not increase traffic to these areas. These recreational resources are used by anglers in spring and summer months and by hikers and motorized recreational vehicles year-round. These recreational resources would also not be affected by the project; and the project, based on current information, would not be visible from those areas.

One of the parcels of the Katahdin Woods and Waters National Monument is located approximately 6.3 miles to the southwest just south of Lower Shin Pond and extends over to the Seboeis River approximately 9 miles from the site. This area is accessed by several unimproved roads off Route 159 that include scenic overlooks, picnic areas and an unimproved boat launch on the river. The proposed site would not increase use of these recreational resources. Neither would the site be visible from scenic viewpoints within the Monument.

The East Branch of the Penobscot River is located fifteen miles southwest of the site and is the eastern boundary of the largest parcel of the Katahdin Woods and Waters National Monument. Within the monument there are numerous recreational opportunities including hiking, fishing, camping, boating and biking; hunting and snowmobiling are permitted east of the East Branch of the Penobscot River. Mountain elevations in the Monument range from approximately 1,900 to 1,400 feet. The upland ridgeline where development is proposed at the site is approximately 1,200 feet in elevation and is surrounded by higher elevations to the northwest (Green Mountain - 1,600 feet and Lane Brook Hills-1,500 feet) and to the south (Picket Mountain- 1,700 feet), and to the southwest (Mount Chase -2,400 feet). Due to the surrounding elevations the site would not be readily visible from Upper or Lower Shin Pond, and vantage points from within the Katahdin Woods and Waters National Monument. The site would be within the line of sight from the summit of Sugarloaf Mountain, but at an extreme distance of 7.3 miles. Sugarloaf Mountain is located approximate 2 miles northwest of Lower Shin Pond and is not

the same as the ski area located in Carrabassett Valley. The proposed mine site would not have visual or other adverse impacts on the scenic values of these recreational resources.

Development of the site would not increase traffic to these areas since they are accessed by roads not connected to the site.



**20. PROSPECTIVELY ZONED AREAS.**

**Not Applicable**

**21. PLANNED DEVELOPMENT OR PLANNED RECREATION FACILITY  
DEVELOPMENT SUBDISTRICTS.**

The proposed development will require permitting under Chapter 200 by the DEP. Rezoning approval is required by LUPC. This Petition addresses the additional requirements of the LUPC's Chapter 12 rules. The applicant has prepared this Petition in consultation with the LUPC and other relevant agencies. Please see **Appendix A – Attachment A** for a narrative description of the nature and basis for the requested subdistrict change.

## **22. ADDITIONAL INFORMATION.**

Appendix A of this Petition contains additional information intended to provide a more detailed understanding of the proposed mining activities and their responsiveness to the requirements of the LUPC's Chapter 12 rules.

**23. REQUIRED FEES, EXHIBITS AND SUPPLEMENTS.**

Submit all necessary fees, exhibits and supplemental information with this petition, as described in the instructions.

**CHECKLIST OF REQUIRED FEES, EXHIBITS, AND SUPPLEMENTS**

Please check off the following for the fee, exhibits, and supplements. To determine which exhibits are required for your petition, use the highlighted notes (👉) contained in certain items and the instructions in Required Fees, Exhibits and Supplements. Please check if the exhibit is required and if it has been provided, and note that the supplements may also require additional exhibits. Please check with the LUPC staff if you have any questions.

Required*		Provided		Exhibit	*Required
YES	NO	YES	NO		
√	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	Pre-application meeting .....	Required unless otherwise indicated by the LUPC staff.
√	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	Application Fee .....	Required unless a waiver is granted by the LUPC Director in very specific and limited circumstances.
√	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	Exhibit A – Location Map and Digital Location Data.....	Location map required; digital location data is ideal.
√	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	Exhibit B – Deed, Lease or Easement.....	Required unless already on file with the Commission and no changes have been made from what is on file.
√	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	Exhibit C – Site Photographs .....	Required unless already on file with the Commission and photos are representative of current conditions.
√	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	Exhibit D-1 – Existing Site Plan .....	Required. Show all existing and proposed structures and features, and existing and proposed subdistrict boundaries.
√	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	Exhibit D-2 – Preliminary Site Plan or Subdivision Plan.....	Required if the proposed rezoning is intended to accommodate a subsequent subdivision; Optional if subsequent subdivision is not intended and if all proposed changes cannot be clearly shown on Exhibit D-1.
<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Exhibit E – Flood Area Zoning	Required for any rezoning of a FEMA Flood Plain or a P-FP Subdistrict, if your answer to any part of item 10 b, c, or d is YES.
√	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	Exhibit F – Notice of Filing .....	Required.
<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Exhibit G – Protection Subdistricts .....	Required for rezoning to or from a P-AR, P-FW, P-SG, or P-WL.

**The following exhibits may only be required for petitions that propose a development subdistrict:**

<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	Exhibit H – Financial Capacity .....	Required.
<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	Exhibit I – Corporate Good Standing.....	Required if applicant is a corporation.
<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	Exhibit J – Soil Suitability and Mapping.....	Required.
<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	Exhibit K – Wastewater Disposal.....	Required.
<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	Exhibit L – Impacts on Public Services.....	Required.
<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	Exhibit M – Archaeological Resources.....	Required.
<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	Exhibit N – Rare or Special Plant Communities and Wildlife Habitat.....	Required.

## NOTICE OF FILING OF ZONING PETITION WITH THE MAINE LAND USE PLANNING COMMISSION

At the time a zoning petition is filed with the Maine Land Use Planning Commission, the petitioner must send by certified mail a completed copy of this notice to: all persons owning or leasing property abutting or within 1,000 feet of the property to be rezoned (as shown on the records of the Maine Revenue Service or plantation or town tax assessors); plantation assessors or town select board; and county commissioners. Note: if the number of persons owning or leasing land within 1,000 feet of the affected land is more than 50, notice may instead be by publication in a newspaper(s) of general circulation in the area affected by the petition as determined by the LUPC staff.

**TO BE PROVIDED UNDER SEPARATE COVER**

This is to notify you that \_\_\_\_\_  
(name and address of petitioner)  
 has filed a zoning petition with the Maine Land Use Planning Commission, pursuant to provisions of 12 M.R.S.A. Section 685-A(8-A), to rezone \_\_\_\_\_ acres of land located in \_\_\_\_\_  
(name of town, township or plantation, and county)  
 from its present \_\_\_\_\_ designation  
(name(s) of the existing zoning subdistricts)  
 to \_\_\_\_\_  
(name(s) of the proposed zoning subdistricts)  
 for purposes of \_\_\_\_\_  
 \_\_\_\_\_  
 \_\_\_\_\_  
 \_\_\_\_\_

The petition will be filed for public inspection at the Maine Land Use Planning Commission offices below

on \_\_\_\_\_.  
(specify the date that this petition will be filed with the LUPC).

AUGUSTA OFFICE		EAST MILLINOCKET OFFICE	
18 Elkins Lane - Harlow Bldg. 22 State House Station Augusta, ME 04333-0022	Tel. (207)287-2631 TTY (888)577-6690 FAX (207)287-7439	191 Main Street East Millinocket, ME 04430	Tel. (207)485-8354 Tel. (207)399-2176 FAX (207)746-2243

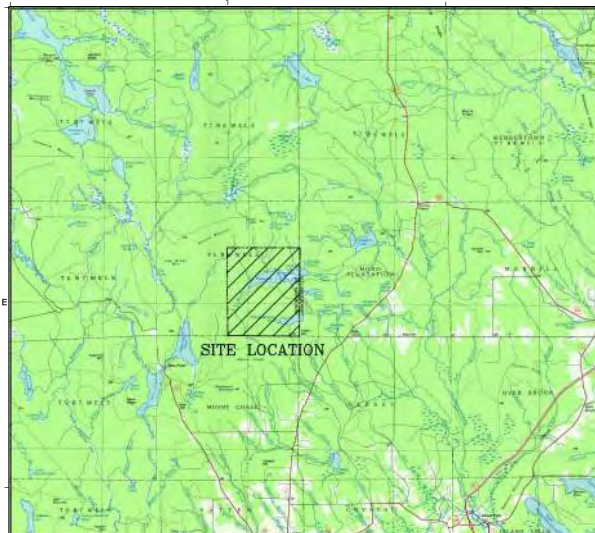
In accordance with the Commission's Chapter 12 rule, **a public hearing must be held** for this zoning petition. Details on the public hearing, including how to participate in the hearing, request intervenor status, receive future notifications, and the date the record closes, will be posted in a separate Notice of Public Hearing as soon as that information is available.

Public comments are welcome up until the close of the record after the hearing. The LUPC encourages interested persons to submit written comments on this petition electronically to the e-mail address [Wolfdenrezoning.LUPC@maine.gov](mailto:Wolfdenrezoning.LUPC@maine.gov). Written comments submitted in hard copy should be sent to the Maine Land Use Planning Commission's Augusta Office address, attention: Stacie Beyer, and **must be received by the Commission in a timely manner**.

For additional information, contact Stacie Beyer at the Augusta Office, or through the project e-mail address listed above.

## **Exhibit A**

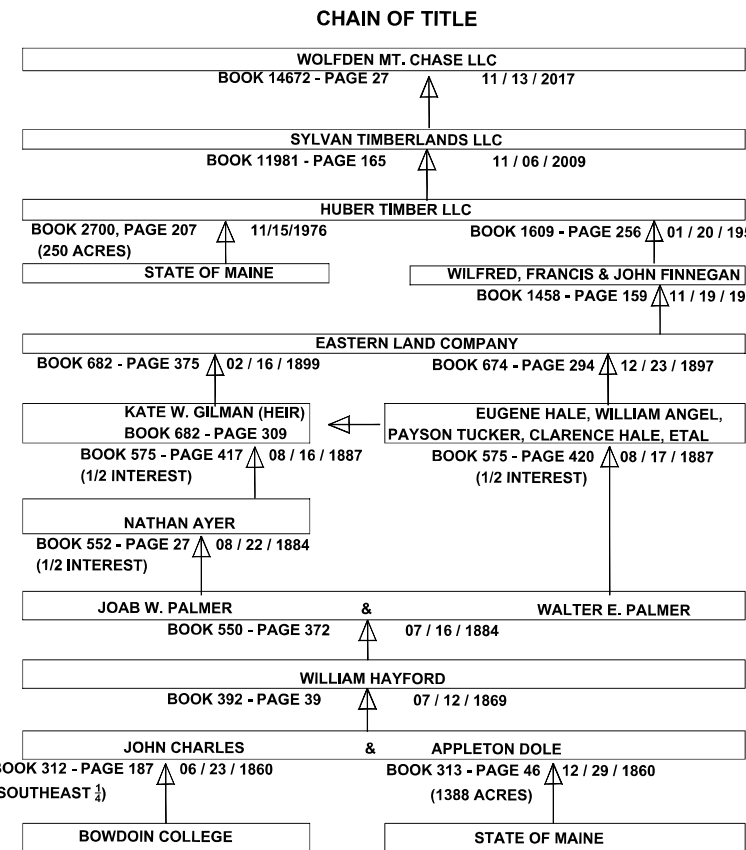
### **Location Map and Digital Location Data**



LOCATION MAP  
(NOT TO SCALE)

N/F AROOSTOOK TIMBERLANDS, LLC  
TAX MAP 1, LOT 1  
P.C. BOOK 6980, PAGE 329

APPROXIMATE BOUNDARY LINE  
(TYPICAL)



N/F AROOSTOOK TIMBERLANDS, LLC  
TAX MAP 1, LOT 1  
P.C. BOOK 6980, PAGE 329

N/F RAYE M. PORTER  
KATHY L. GRANT  
CHRIS R. GALLAGHER  
TAX MAP 1, LOT 2.1  
TAX MAP 1, LOT 5.1  
P.C. BOOK 11374, PAGE 213  
P.C. BOOK 9535, PAGE 291

1388 ACRE PARCEL

N/F DAVID PORTER  
TAX MAP 1, LOT 5  
P.C. BOOK 10085, PAGE 166

N/F KYLE WESCOTT  
& JON DAVID WESCOTT  
TAX MAP 1, LOT 4  
P.C. BOOK 9467, PAGE 231

N/F RYAN R. ALLEN  
TAX MAP 1, LOT 6  
P.C. BOOK 15346, PAGE 308

N/F BERT S. LORD  
TAX MAP 1, NO LOT #  
P.C. BOOK 3728, PAGE 106

LOCUS  
TAX MAP 1, LOT 2  
P.C. BOOK 14672, PAGE 27

FORMERLY  
STATE OF MAINE  
BOOK 2700, PAGE 207  
(250 ACRE PARCEL)

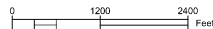
T6, R6 WELS  
MOUNT CHASE

GENERAL NOTES:  
ALL LOTS & PROPERTY LINES SHOWN HEREON ARE APPROXIMATE AND ARE SHOWN FOR REFERENCE PURPOSES ONLY.

TITLE TO THE 1388 ACRE PARCEL IS BELIEVED TO HAVE BEEN SUCCESSFULLY TRANSFERRED BY INSTRUMENTS RECORDED IN THE PENOBSCOT COUNTY REGISTRY OF DEEDS BOOK 11981, PAGE 165 AND BOOK 14672, PAGE 27. HOWEVER BOTH DEEDS HAVE LANGUAGE THAT COULD BE INTERPRETED TO EXCLUDE LAND OUTSIDE THE SOUTHEAST QUARTER OF T6, R6 WELS. THE 1388 ACRE TRACT LAYS OUTSIDE THE SAID SOUTHEAST QUARTER.

N/F CASSIDY TIMBERLANDS, LLC  
MOUNT CHASE TAX MAP 1, LOT 7  
P.C. BOOK 9975, PAGE 337

N/F GARDNER LAND COMPANY, INC.  
MOUNT CHASE TAX MAP 1, LOT 8  
P.C. BOOK 13713, PAGE 223



PENOBSCOT COUNTY  
AROOSTOOK COUNTY

T6, R6 WELS  
MORO PLANTATION

MOUNT CHASE  
HERSHEY

GRID NORTH MAINE EAST (NAD83)

HUNTLEY POND

MUD LAKE

DUCK POND

N/F LAKEVILLE SHORES, INC  
MORO TAX MAP 1, LOT 3  
A.C. BOOK 4868, PAGE 93

GRASS POND

TOTE ROAD POND

HALE POND

PICKETT MOUNTAIN POND

N/F HERBERT C. HAYNES, INC  
& LAKEVILLE SHORES, INC  
MORO TAX MAP 1, LOT 1  
A.C. BOOK 4230, PAGE 111

BEAR MOUNTAIN POND

MORO PLANTATION  
HERSEY

N/F HERBERT C. HAYNES, INC  
& LAKEVILLE SHORES, INC  
HERSEY TAX MAP 3, LOT 1  
A.C. BOOK 4937, PAGE 184

ABUTTING LAND OWNER ADDRESSES:

RYAN R. ALLEN  
8 KNOTTA WAY  
NAPLES, MAINE 04055

AROOSTOOK TIMBERLANDS, LLC.  
P.O. BOX 5777  
SAINT JOHN, NEW BRUNSWICK  
E2L 4M3, CANADA

CASSIDY TIMBERLANDS, LLC  
C/O BENJAMIN D. CARLISLE  
P.O. BOX 637  
BANGOR, MAINE 04402 0637

RAYMOND & JEANETTE GALLAGHER  
P.O. BOX 478  
PATTEN, MAINE 04765

GARDNER LAND COMPANY, INC  
NICKOLAS IRELAND  
P.O. BOX 189  
LINCOLN, MAINE 04457

HERBERT C. HAYNES, INC.  
C/O GINGER MAXWELL  
P.O. BOX 96  
WINN, MAINE 04495

LAKEVILLE SHORES, INC.  
C/O GINGER MAXWELL  
P.O. BOX 96  
WINN, MAINE 04495

BERT S. LORD  
(POSSIBLY)  
131 WILEY ROAD  
LITTLETON, MAINE 04730-6508

DAVID PORTER  
131E NEWPORT ROAD  
STETSON, MAINE 04488

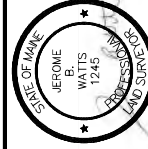
RAYE & KATHY PORTER  
131 EAST NEWPORT ROAD  
STETSON, MAINE 04488

KYLE & JON WESCOTT  
191 LOCATION ROAD  
BELGRADE, MAINE 04917



Environment & Infrastructure Solutions, Inc.  
511 Congress St., Suite 200, Portland ME 04101  
P. (207) 775-5401 F. (207) 772-4762 www.woodpl.com

PROJECT  
WOLFEN RESOURCES  
CORPORATION  
1100 RUSSELL STREET  
THUNDER BAY, ONTARIO  
CANADA, P7B 5N2



DECEMBER 6, 2019

DEED SKETCH OF BOUNDARY  
FOR WOLFEN MT CHASE LLC  
T6, R6, WELS, MAINE

NO.	REVISION/ISSUE DESCRIPTION	DATE
# 1	ADDITIONAL DATA	12-23-20
# 2		

JOB NO. 361719478  
PROJECT MANAGER JBW  
DRAWN BY LHG

SHEET 1  
OF  
1

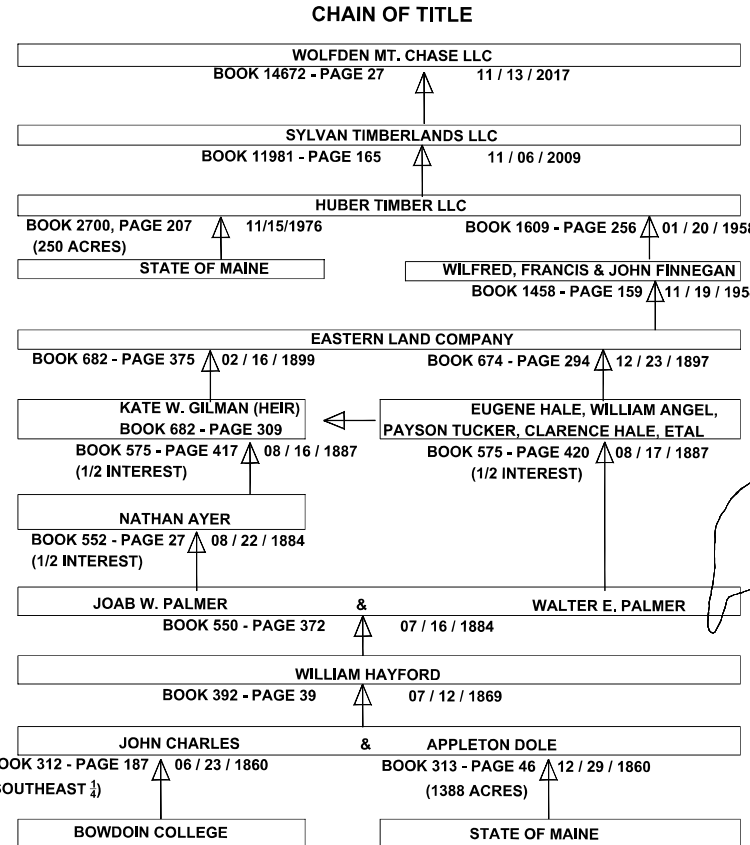


NOT FOR CONSTRUCTION



LOCATION MAP  
(NOT TO SCALE)

N/F AROOSTOOK TIMBERLANDS, LLC  
TAX MAP 1, LOT 1  
P.C. BOOK 6980, PAGE 329

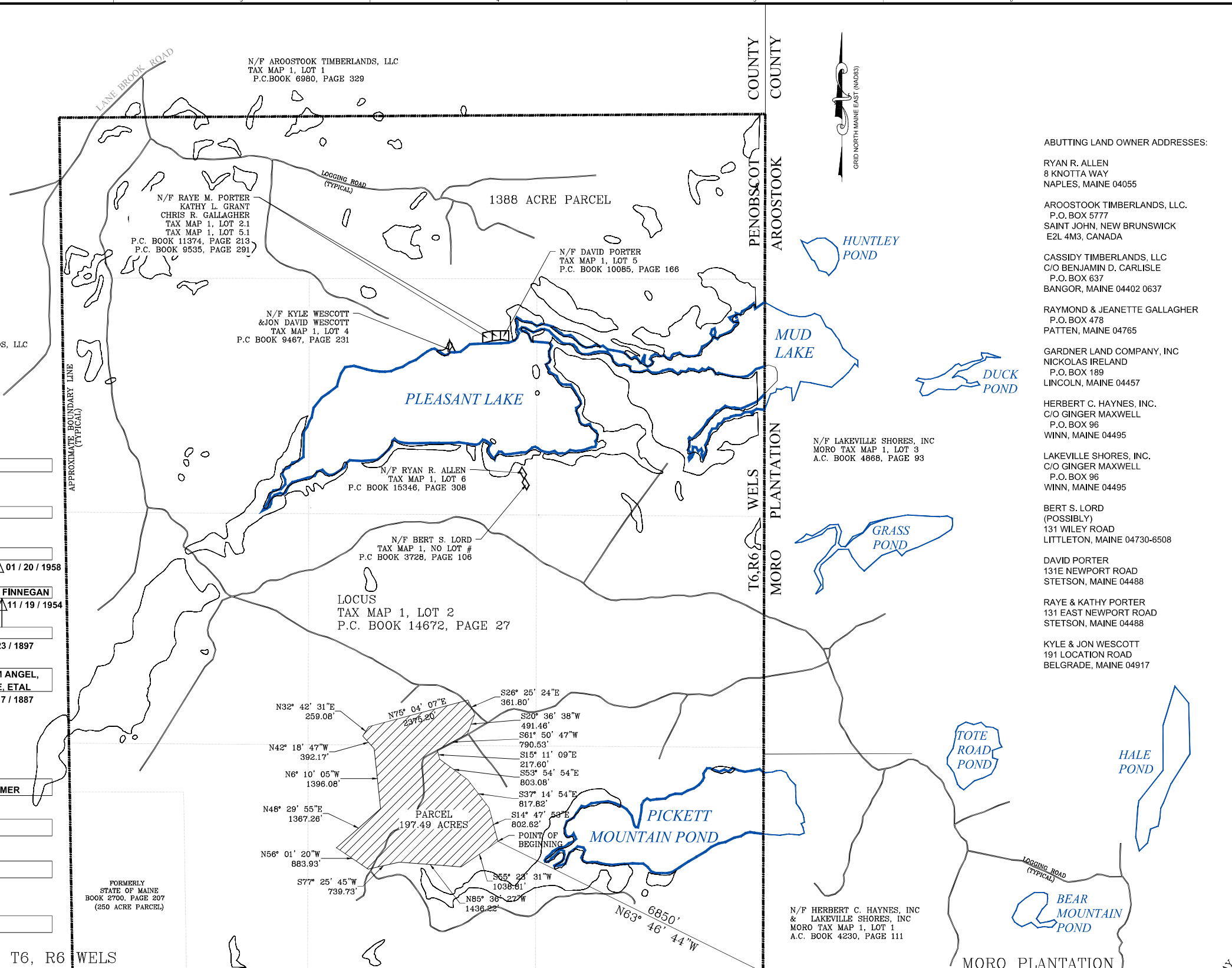


T6, R6 WELS  
MOUNT CHASE

N/F CASSIDY TIMBERLANDS, LLC  
MOUNT CHASE TAX MAP 1, LOT 7  
P.C. BOOK 9975, PAGE 337

GENERAL NOTES:  
ALL LOTS & PROPERTY LINES SHOWN HEREON ARE APPROXIMATE AND ARE SHOWN FOR REFERENCE PURPOSES ONLY.

TITLE TO THE 1388 ACRE PARCEL IS BELIEVED TO HAVE BEEN SUCCESSFULLY TRANSFERRED BY INSTRUMENTS RECORDED IN THE PENOBSCOT COUNTY REGISTRY OF DEEDS BOOK 11981, PAGE 165 AND BOOK 14672, PAGE 27. HOWEVER BOTH DEEDS HAVE LANGUAGE THAT COULD BE INTERPRETED TO EXCLUDE LAND OUTSIDE THE SOUTHEAST QUARTER OF T6, R6 WELS. THE 1388 ACRE TRACT LAYS OUTSIDE THE SAID SOUTHEAST QUARTER.



PENOBSCOT COUNTY  
AROOSTOOK COUNTY  
WELS  
MORO PLANTATION  
MOUNT CHASE  
HERSEY

ABUTTING LAND OWNER ADDRESSES:

- RYAN R. ALLEN  
8 KNOTTA WAY  
NAPLES, MAINE 04055
- AROOSTOOK TIMBERLANDS, LLC.  
P.O. BOX 5777  
SAINT JOHN, NEW BRUNSWICK  
E2L 4M3, CANADA
- CASSIDY TIMBERLANDS, LLC  
C/O BENJAMIN D. CARLISLE  
P.O. BOX 637  
BANGOR, MAINE 04402 0637
- RAYMOND & JEANETTE GALLAGHER  
P.O. BOX 478  
PATTEN, MAINE 04765
- GARDNER LAND COMPANY, INC  
NICKOLAS IRELAND  
P.O. BOX 189  
LINCOLN, MAINE 04457
- HERBERT C. HAYNES, INC.  
C/O GINGER MAXWELL  
P.O. BOX 96  
WINN, MAINE 04495
- LAKEVILLE SHORES, INC.  
C/O GINGER MAXWELL  
P.O. BOX 96  
WINN, MAINE 04495
- BERT S. LORD  
(POSSIBLY)  
131 WILEY ROAD  
LITTLETON, MAINE 04730-6508
- DAVID PORTER  
131E NEWPORT ROAD  
STETSON, MAINE 04488
- RAYE & KATHY PORTER  
131 EAST NEWPORT ROAD  
STETSON, MAINE 04488
- KYLE & JON WESCOTT  
191 LOCATION ROAD  
BELGRADE, MAINE 04917



PROJECT  
WOLFEN RESOURCES  
CORPORATION  
1100 RUSSELL STREET  
THUNDER BAY, ONTARIO  
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JOB NO. 3617197478  
PROJECT MANAGER JBW  
DRAWN BY LHG

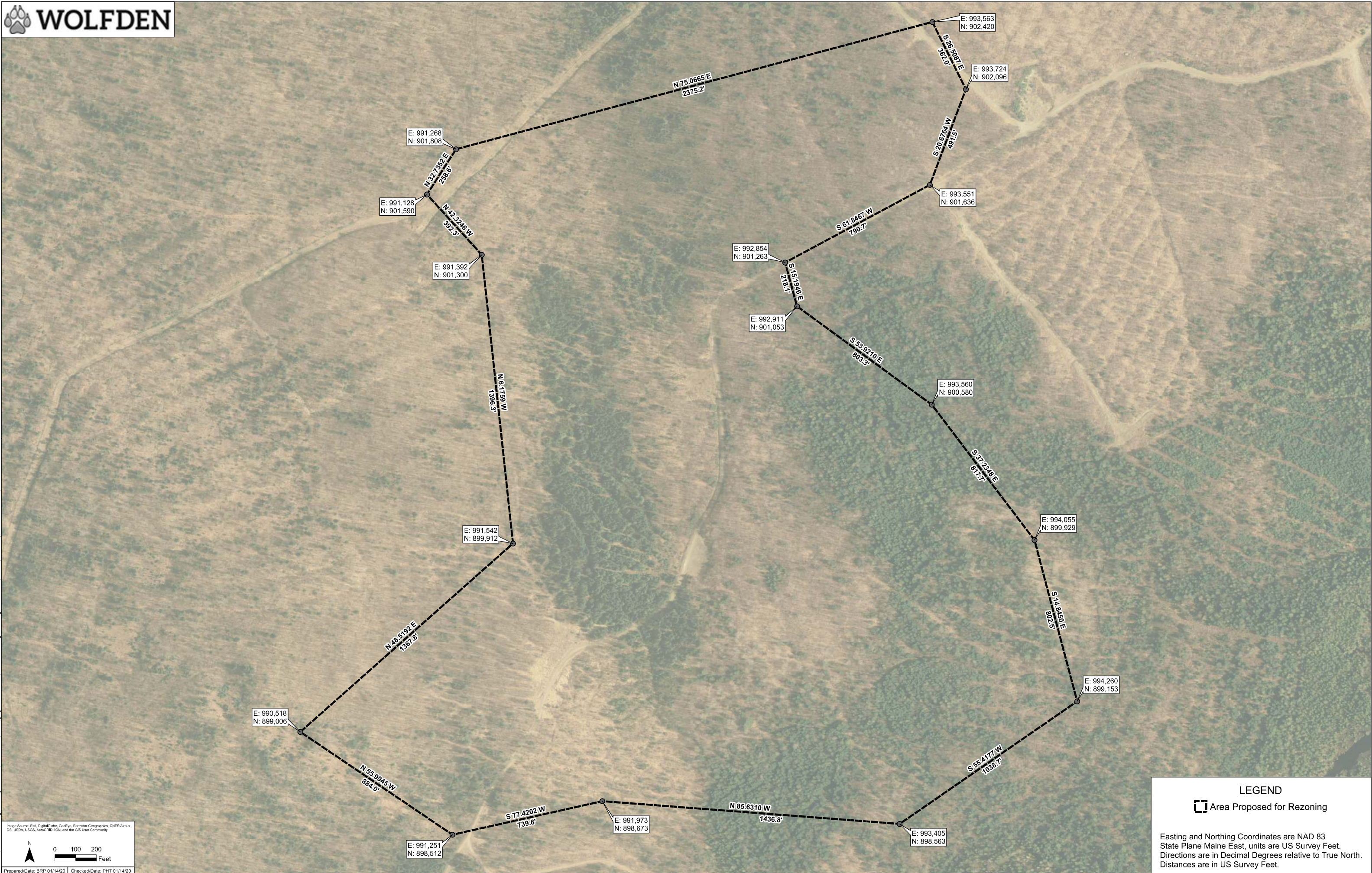
SHEET 1  
OF  
1



NOT FOR CONSTRUCTION

Environment & Infrastructure Solutions, Inc.  
511 Congress St., Suite 200, Portland ME 04101  
P. (207) 775-5401 F. (207) 772-4762 www.woolpic.com  
SIGNED AND DATED PAPER COPY PROVIDED BY THIS OFFICE MAY BE UTILIZED FOR BIDDING OR CONSTRUCTION PURPOSES. PLEASE NOTE THIS DOCUMENT MAY NOT ACCURATELY REPRESENT THE FINAL DOCUMENT. ONLY AN ENGINEER, ARCHITECT OR SURVEYOR





**LEGEND**

Area Proposed for Rezoning

Easting and Northing Coordinates are NAD 83 State Plane Maine East, units are US Survey Feet. Directions are in Decimal Degrees relative to True North. Distances are in US Survey Feet.

## **Exhibit B**

### **Deed**

**QUITCLAIM DEED WITH COVENANT**  
(Maine Statutory Short Form)


KNOW ALL BY THESE PRESENTS, that SYLVAN TIMBERLANDS, LLC, a Delaware limited liability company having a place of business in Exeter, County of Rockingham, and State of New Hampshire ("Grantor"), for consideration paid, GRANTS to WOLF DEN MT. CHASE LLC, a Delaware limited liability company having a mailing address of 1100 Russell Street, Thunder Bay, Ontario P7B 5N2 ("Grantee"), with QUITCLAIM COVENANT, certain real estate located in T6 R6 WELS, Penobscot County, Maine, which is more particularly described in Exhibit A attached hereto and made a part hereof (the "Property").

TOGETHER WITH all appurtenances, structures, improvements, and rights associated therewith, as well as all minerals, mining, subsurface and surface rights to the extent owned by Grantor.

This conveyance also is made SUBJECT TO those matters set forth on Exhibit B attached hereto and made a part hereof.

IN WITNESS WHEREOF, SYLVAN TIMBERLANDS, LLC has caused this instrument to be executed on its behalf by its duly authorized undersigned representative as an instrument under seal, this 10<sup>th</sup> day of November, 2017.

  
\_\_\_\_\_  
Witness


SYLVAN TIMBERLANDS, LLC  
By:   
\_\_\_\_\_  
Scott Mooney, Authorized Person

STATE OF SOUTH CAROLINA  
County of Greenville SS.

November 13, 2017

Then personally appeared the above-named Scott Mooney, Authorized Person of SYLVAN TIMBERLANDS, LLC and acknowledged the foregoing instrument to be his free act and deed in his said capacity, and the free act and deed of said SYLVAN TIMBERLANDS, LLC.

Before me,

  
\_\_\_\_\_  
Notary Public/Maine Attorney-at-Law  
Printed Name: Sandra D. Edwards



**Exhibit A**

Those certain parcels of land located in the southeast quarter of Township 6, Range 6 WELS, Penobscot County, Maine known as "Tract 3200" and described in a deed from Huber Timber LLC to Sylvan Timberlands, LLC dated November 6, 2009 and recorded in the Penobscot County Registry of Deeds in Book 11981, Page 165; being more particularly described as follows:

Being the southeast quarter of Township six (6) Range six (6) W.E.L.S., the same being three (3) miles square, according to the survey and plan of Lore Alford, and the 1388 acre lot, so-called, which adjoins said southeast quarter, as shown on said plan, a copy of said plan being recorded in Penobscot Registry of Deeds Land Office Plan Book 2, Page 33, hereby referred to for a further and more particular description.

EXCEPTING from this conveyance the 2 acre parcel conveyed to Ansel L. Lumbert by deed dated October 12, 1914 and recorded in said registry in Book 859, Page 434.

Also EXCEPTING the following described parcel:

A certain lot or parcel of land with the buildings thereon, situated on the north side of Pleasant Lake, so called, lying adjacent to and easterly of Spring Brook, so-called, bounded and described as follows, viz:

Beginning at a point in the thread of Spring Brook, said point being about four (4) chains northerly of its junction with the north side of Pleasant Lake; thence south thirty-four (34) degrees and thirty (30) minutes east, twenty-three (23) links to a cedar post surrounded by stones and marked on north "Huber"; on south "Finnegan" thence on same course three and eighty-one hundredths (3.81) chains from point of beginning to second cedar post surrounded by stones on the north bank of Pleasant Lake, said post being marked on north "Huber" and on south "Finnegan"; thence on same course nineteen (19) links to high-water mark on said shore of Lake; thence on same course to low-water mark on shore of said Lake; thence by and along said low-water mark in a southerly and westerly direction to the junction of Spring Brook with said Lake; thence northerly following the thread of said Spring Brook about four (4) chains to point of beginning and containing 1.25 acres, more or less.

Also EXCEPTING a parcel on the north shore of Pleasant Lake as described in a deed from Huber Timber LLC to Raye M. Porter et al dated April 24, 2008 and recorded in Book 11374, Page 213.

Also EXCEPTING a parcel approximately 500 feet south of Pleasant Lake as described in a deed from Elizabeth J. Grass to Ryan R. Allen and Maria A. Allen dated November 9, 2007 and recorded in Book 11201, Page 277.

**Exhibit B**  
**Permitted Encumbrances**

1. Ad valorem real estate taxes not yet due and payable.
2. Matters which would be shown on a survey of the Property which would not have a material and adverse effect on Purchaser's use of the Property as recreational property, commercial timberlands or a mineral exploration property but expressly excluding matters relating to encroachments over boundary lines by abutters.
3. Rights or claims to any bottomlands, streams, creeks or rivers by the state where the Property is located or any other governmental agencies and any and all other riparian rights.
4. Applicable rules and regulations of any planning and/or zoning board or commission or any other rules or regulations of or by any other governmental authority.
5. Any existing public streets and all railroad and public utility lines located within the Property.

**Maine Real Estate  
Transfer Tax Paid**

**Susan F. Bulay, Register  
Penobscot County, Maine**

## **Exhibit C**

### **Site Photographs**

**Site Photographs**

*Client:* Wolfden Resources      *Project Number:* 3617197478

*Site Name:* Pickett Mountain      *Site Location:* T6 R6, Maine

*Photo Source*  
Wolfden Resources

*Date:*  
2018

*Photograph:* 1

*Direction (if Known)*  
Northwest

*Description:*  
Looking South toward site over Pleasant Lake.



*Photo Source*  
Wolfden Resources

*Date:*  
2018

*Photograph:* 2

*Direction (if Known)*  
North

*Description:*  
Looking North from site toward Pleasant Lake



### Site Photographs

**Client:** Wolfden Resources                      **Project Number:** 3617197478  
**Site Name:** Pickett Mountain                      **Site Location:** T6 R6, Maine

**Photo Source**  
Wood

**Date:**  
October 2019

**Photograph:** 3

**Direction (if Known)**  
Northeast

**Description:**  
Route 11 at junction of  
gravel access road.



**Photo Source**  
Wood

**Date:**  
October 2019

**Photograph:** 4

**Direction (if Known)**  
Southwest

**Description:**  
Route 11 at junction of  
gravel access road.





**Site Photographs**

*Client:* Wolfden Resources *Project Number:* 3617197478

*Site Name:* Pickett Mountain *Site Location:* T6 R6, Maine

*Photo Source*  
Wood

*Date:*  
October 2019

*Photograph:* 5

*Direction (if Known)*  
Southeast

*Description:*  
Junction with Route 11.



*Photo Source*  
Wood

*Date:*  
October 2019

*Photograph:* 6

*Direction (if Known)*  
North

*Description:*  
Gravel access road leading into site from Route 11.



**Site Photographs**

**Client:** Wolfden Resources

**Project Number:** 3617197478

**Site Name:** Pickett Mountain

**Site Location:** T6 R6, Maine

**Photo Source**

Wood

**Date:**

October 2019

**Photograph:** 7

**Direction (if Known)**

**Description:**

View of existing road.  
Access (typ).



**Photo Source**

Wood

**Date:**

October 2019

**Photograph:** 8

**Direction (if Known)**

**Description:**

View of existing road.  
Access (typ).



**Site Photographs**

**Client:** Wolfden Resources

**Project Number:** 3617197478

**Site Name:** Pickett Mountain

**Site Location:** T6 R6, Maine

**Photo Source**

Wood

**Date:**

October 2019

**Photograph:** 9

**Direction (if Known)**

Southeast

**Description:**

View of bridge over outlet stream to Pickett Pond



**Photo Source**

Wood

**Date:**

October 2019

**Photograph:** 10

**Direction (if Known)**

Southeast

**Description:**

View of bridge deck and concrete pier spanning outlet stream to Pickett Pond



**Site Photographs**

**Client:** Wolfden Resources **Project Number:** 3617197478

**Site Name:** Pickett Mountain **Site Location:** T6 R6, Maine

**Photo Source**

Wood

**Date:**

October 2019

**Photograph:** 11

**Direction (if Known)**

**Description:**

View of existing roads (typ).



**Photo Source**

Wood

**Date:**

October 2019

**Photograph:** 12

**Direction (if Known)**

**Description:**

View of existing roads (typ).



### Site Photographs

**Client:** Wolfden Resources **Project Number:** 3617197478

**Site Name:** Pickett Mountain **Site Location:** T6 R6, Maine

**Photo Source**

Wood

**Date:**

October 2019

**Photograph:** 13

**Direction (if Known)**

Northeast

**Description:**

View of typical uplands within proposed tailings management area.



**Photo Source**

Wood

**Date:**

October 2019

**Photograph:** 14

**Direction (if Known)**

North

**Description:**

View of road cut to access to boring site. Upland area in center of proposed tailings management area.



**Site Photographs**

**Client:** Wolfden Resources      **Project Number:** 3617197478

**Site Name:** Pickett Mountain      **Site Location:** T6 R6, Maine

**Photo Source**

Wood

**Date:**

October 2019

**Photograph:** 15

**Direction (if Known)**

Northwest

**Description:**

Exposed “weathered bedrock” upland area, typical Thorndike soils.



**Photo Source**

Wood

**Date:**

October 2019

**Photograph:** 16

**Direction (if Known)**

North

**Description:**

View of road cut to access to boring site.



### Site Photographs

**Client:** Wolfden Resources      **Project Number:** 3617197478

**Site Name:** Pickett Mountain Mine      **Site Location:** T6 R6, Maine

**Photo Source**

Wood

**Date:**

October 2019

**Photograph:** 17

**Direction (if Known)**

Northwest

**Description:**

View of road cut to access to boring site. Note where soils surface and shallow groundwater table has been intersected.



**Photo Source**

Wood

**Date:**

October 2019

**Photograph:** 18

**Direction (if Known)**

Southwest

**Description:**

View of existing roads, northeastern corner of proposed development (tailings pile).



**Site Photographs**

**Client:** Wolfden Resources      **Project Number:** 3617197478

**Site Name:** Pickett Mountain      **Site Location:** T6 R6, Maine

**Photo Source**

Wolfden Resources

**Date:**

April 12, 2018

**Photograph:** 19

**Direction (if Known)**

**Description:**

Typical diamond drilling exploration location.



**Photo Source**

Wolfden Resources

**Date:**

April 14, 2018

**Photograph:** 20

**Direction (if Known)**

**Description:**

Typical drilling exploration location after initial restoration and temporary erosion control.





**Site Photographs**

**Client:** Wolfden Resources      **Project Number:** 3617197478

**Site Name:** Pickett Mountain      **Site Location:** T6 R6, Maine

**Photo Source**

Wood

**Date:**

October 2019

**Photograph:** 21

**Direction (if Known)**

**Description:**

View of typical upland area.



**Photo Source**

Wood

**Date:**

October 2019

**Photograph:** 22

**Direction (if Known)**  
South

**Description:**

View of typical wetland area/potential vernal pool south of proposed mine operations area.



<b>Site Photographs</b>	
<b>Client:</b> Wolfden Resources	<b>Project Number:</b> 3617197478
<b>Site Name:</b> Pickett Mountain	<b>Site Location:</b> T6 R6, Maine
<b>Photo Source</b> Wood	
<b>Date:</b> October 2019	
<b>Photograph:</b> 23	
<b>Direction (if Known)</b> Southeast	
<b>Description:</b> View of old skidder trail with "wet" ruts.	
<b>Photo Source</b> Wood	
<b>Date:</b> October 2019	
<b>Photograph:</b> 24	
<b>Direction (if Known)</b> South	
<b>Description:</b> View of wetlands / potential vernal pool south of the proposed mine operations area.	

**Site Photographs**

**Client:** Wolfden Resources      **Project Number:** 3617197478

**Site Name:** Pickett Mountain      **Site Location:** T6 R6, Maine

**Photo Source**

Wood

**Date:**

October 2019

**Photograph:** 25

**Direction (if Known)**

Northwest

**Description:**

View of wetland in southern portion of area.



**Photo Source**

Wood

**Date:**

October 2019

**Photograph:** 26

**Direction (if Known)**

South

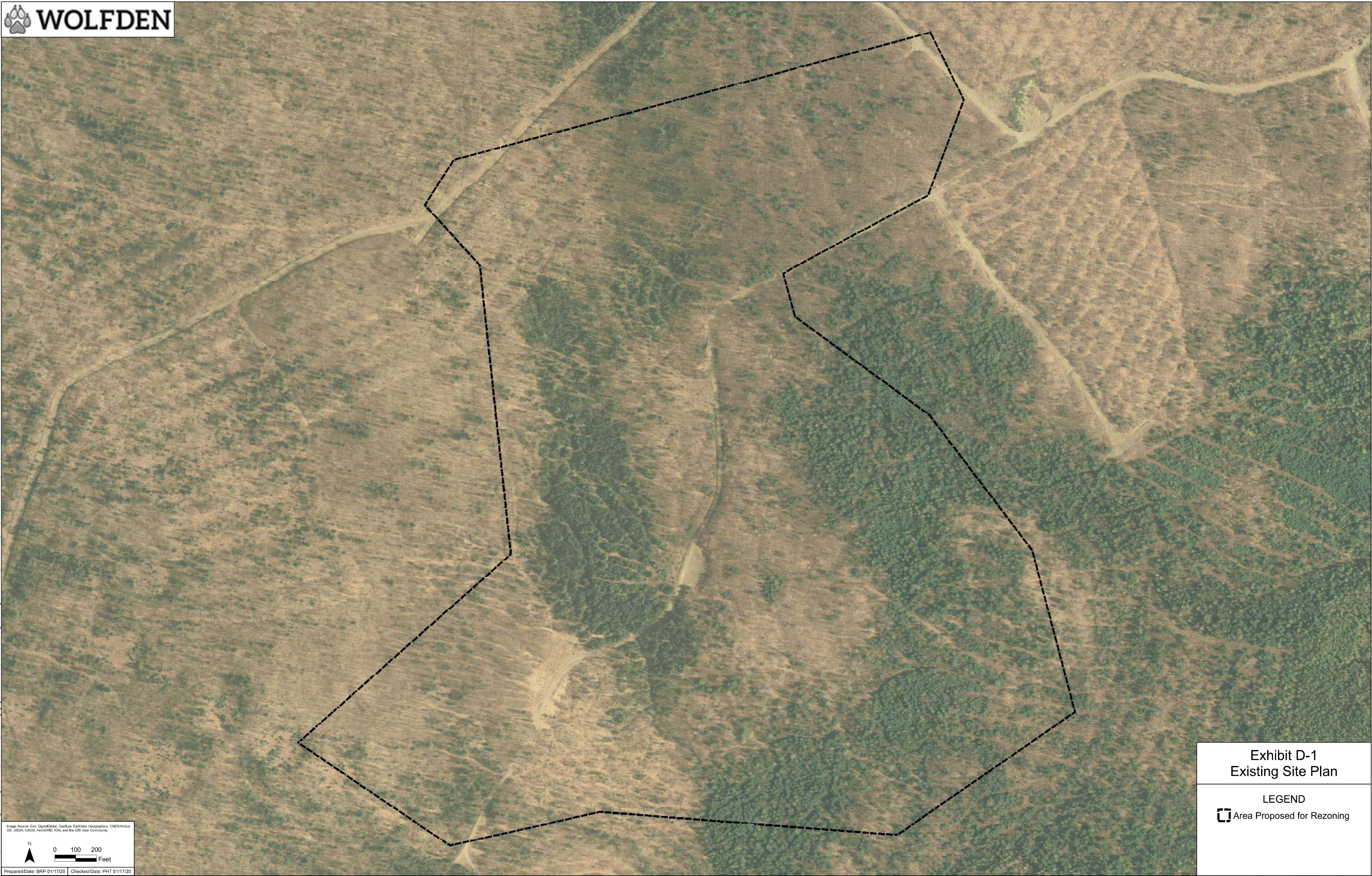
**Description:**

View of wetland in southern portion of area.




**Exhibit D-1**

**Existing Site Plan**



**Exhibit D-1  
Existing Site Plan**

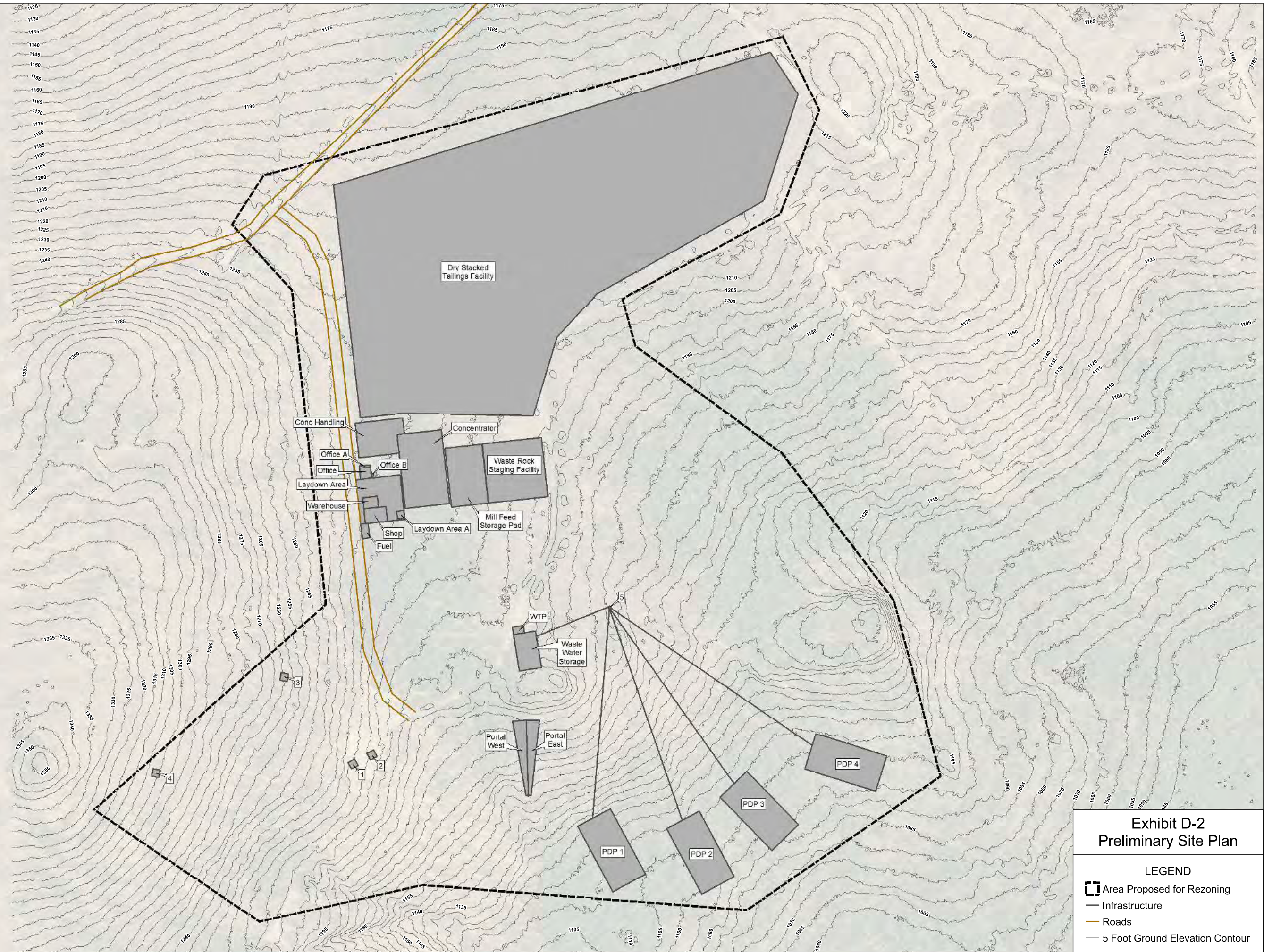
**LEGEND**  
 Area Proposed for Rezoning

## Exhibit D-2

### Preliminary Site Plan

The following plan provides a conceptual layout of the facilities and buildings associated with the project. The building designation, structure type and size are summarized below. In addition to buildings and other structures, it is anticipated that a 0.5 acre parking area will be required for employees with an additional 2.5 acres dedicated to parking for trucks and other equipment. Therefore, the total area to be cleared is 56.8 acres (approximately 57 acres). The water collection and treatment systems will not collect precipitation around buried structures or office buildings but will collect run-off around other buildings, the tailings storage area, storage pads etc. These areas with roads from the portal to the storage pad encompass approximately 49 acres.

Building Designation	SQ FT	Structure Type	Acreage	Notes
1	1,077	Building	0.02	Temporary Explosives Magazine
2	1,077	Building	0.02	Temporary Explosives Magazine
3	1,077	Vent Raise	0.02	Ventilation Exhaust Raise
4	1,077	Vent Raise	0.02	Ventilation Exhaust Raise
5	97	Buried Structure	0.00	Concrete Water Diffuser
Conc Handling	29,874	Building	0.69	
Concentrator	64,619	Building	1.48	
Dry Stacked Tailings Facility	1,832,434	Storage Pad	42.07	
Fuel	2,126	Tank	0.05	
Laydown Area	27,983	Storage Pad	0.64	
Laydown Area A	1,077	Storage Pad	0.02	
Mill Feed Storage Pad	43,080	Storage Pad	0.99	
Office	2,423	Building	0.06	
Office A	485	Building	0.01	
Office B	97	Building	0.00	
PDP 1	53,849	Buried Structure	1.24	Septic Type System
PDP 2	53,849	Buried Structure	1.24	Septic Type System
PDP 3	53,849	Buried Structure	1.24	Septic Type System
PDP 4	53,849	Buried Structure	1.24	Septic Type System
Portal	23,642	Excavation	0.54	
Shop	6,462	Building	0.15	
Warehouse	3,231	Building	0.07	
Waste Rock Storage Facility	69,143	Storage Pad	1.59	
Waste Water Storage	16,155	Pond Structure	0.37	
WTP	1,615	Building	0.04	
<b>Total</b>	<b>2,344,247</b>	<b>SQ FT</b>	<b>53.82</b>	<b>Acres</b>
	<b>110,960</b>	<b>Buildings Only</b>	<b>2.55</b>	<b>Buildings Only</b>



**Exhibit D-2  
Preliminary Site Plan**

- LEGEND**
- Area Proposed for Rezoning
  - Infrastructure
  - Roads
  - 5 Foot Ground Elevation Contour

Image Source: Esri, DigitalGlobe, GeoEye, Earthstar Geographics, CNES/Airbus DS, USDA, USGS, AeroGRID, IGN, and the GIS User Community

Prepared Date: BRP 01/17/20 | Checked Date: PHT 01/17/20

Scale: 0 100 200 Feet

**Exhibit E**

**Flood Area Zoning  
Not Applicable**



**Exhibit F**  
**Notice of Filing**

**TO BE PROVIDED UNDER SEPARATE COVER**

**Exhibit G**

**Protection Subdistricts  
Not Applicable**

## **Exhibit H**

### **Financial Capacity**

## **Financial Capacity**

Funding for the Pickett Mountain Mine project to date has been a combination of small equity raises and timber sales from the property. Wolfden's share price will be an important factor for its ability to fully finance the construction of the project. Wolfden continues to trade at a discount to many of its peers because investors have their doubts about Maine's willingness to issue mining permits. We anticipate that this trend will continue for the project until milestones like the rezoning have been achieved and the project is proceeding well through its baseline studies.

Typically, mining projects are funded through a combination of debt and equity. Wolfden anticipates that its share value will be considerably higher at such a point when it attempts to secure a full project financing. The financing alternatives would include: (1) partnerships with larger producing companies which can put up much of the capital; and (2) takeover by a larger producing company once Wolfden's permitting efforts have "de-risked" the project.

Wolfden is committed to demonstrating to the mining community, its investors and all relevant stakeholders that Maine is open for business when it comes to employing proven safe and modern mining techniques. Permitting and implementation of the project also would demonstrate that the LUPC and DEP rules governing metallic mineral mines are not preclusive of mining in the State of Maine.

In the meantime, Wolfden benefits from its established strategic relationships with larger companies, Kinross and Altius, which are company shareholders and have the experience and capability to build a modern base metal mine in Maine. Wolfden's management also has a track record of success in building modern mines, including the financing of a mine in Burkina Faso that is the largest producing mine (Essakane Mine) in that country ten years later and the single largest contributor to that country's GDP.

## **Exhibit I**

### **Corporate Good Standing**

# State of Maine



## Department of the Secretary of State

I, the Secretary of State of Maine, certify that according to the provisions of the Constitution and Laws of the State of Maine, the Department of the Secretary of State is the legal custodian of the Great Seal of the State of Maine which is hereunto affixed and that the paper to which this is attached is a true copy from the records of this Department.

*In testimony whereof*, I have caused the Great Seal of the State of Maine to be hereunto affixed. Given under my hand at Augusta, Maine, this sixteenth day of January 2020.



A handwritten signature in black ink, appearing to read 'Matthew Dunlap', written over a horizontal line.

Matthew Dunlap  
Secretary of State

### Additional Addresses

Legal Name	Title	Name	Charter #	Status
WOLFDEN MT. CHASE LLC	Registered Agent	JOSEPH C. SIVISKI, ESQ.	20180806FC	GOOD STANDING
Home Office Address (of foreign entity )		Other Mailing Address		
101 GARDNER STREET PATTEN, ME 04765		ONE CANAL PLAZA, 9TH FLOOR PORTLAND, ME 04101		

## **Exhibit J**

### **Soil Suitability and Mapping**

Attachment G provides available low intensity soil maps. The soils present are derived from glacial till deposited over bedrock. On-site mapping of soils has not been conducted but based on available information soils are generally suitable for the proposed project. Geotechnical investigations will be required for determination of geotechnical characteristics of soils for design of building foundations, the TMF, and completing stability analyses required by DEP's Chapter 200 rules. Hydrogeologic characterization will also be required to design monitoring systems, determine an appropriate location for a domestic wastewater septic field, and to design and size the infiltration galleries for re-injection of treated water back to groundwater. These studies will be detailed in nature and implemented as part of the baseline and background studies to support detailed design of the above ground mine facilities.

## **Exhibit K**

### **Wastewater Disposal**

The location for a wastewater disposal system using a septic field will be determined based on field investigations in the Spring of 2020. The disposal system will be designed during the DEP permitting phase of the project.



**Exhibit L**  
**Impacts on Public Services**

See discussions provided in Appendix A – Attachment O.

**Exhibit M**  
**Archaeological Resources**

## Thompson, Peter H.

---

**From:** Spiess, Arthur <Arthur.Spiess@maine.gov>  
**Sent:** Monday, December 9, 2019 3:06 PM  
**To:** Thompson, Peter H.  
**Subject:** RE: Draft Scope Phase I Survey - Pickett Mountain  
**Attachments:** draft RFP language.wpd; draft RFP language.doc

Hello Peter:

Some draft language that might help with your RFP for archaeological survey is attached (2 formats, same text in each one). Hopefully you can open/access one or both.

Regards, Art Spiess

*Dr. Arthur Spiess*  
Senior Archaeologist, Maine Historic Preservation  
State House Station 65  
Augusta, ME 04333  
desk phone: 207-287-2789

---

**From:** Thompson, Peter H. <peter.thompson@woodplc.com>  
**Sent:** Wednesday, December 04, 2019 2:41 PM  
**To:** Spiess, Arthur <Arthur.Spiess@maine.gov>  
**Cc:** Jeremy Ouellette <JOuellette@wolfdenresources.com>  
**Subject:** Draft Scope Phase I Survey - Pickett Mountain

**EXTERNAL: This email originated from outside of the State of Maine Mail System. Do not click links or open attachments unless you recognize the sender and know the content is safe.**

Arthur- Thank you for your time on the phone today. Your offer to comment on a draft scope of work for an archaeological survey for the subject site is greatly appreciated. I have attached a brief document for your review and comment as well as a figure. It would be our intention to include the EC Jordan document you provided to us as an attachment. I am presuming this scope can be brief since it will be submitted to pre-approved archeologists familiar with your technical requirements. Thank you for your assistance.

Best regards

Peter

**Peter Thompson**  
Principal Project Manager  
Environment & Infrastructure Solutions  
511 Congress Street, Suite 200  
Portland, Maine 04101  
Direct: 207 828 3490  
Mobile: 207 522 7171  
[www.woodplc.com](http://www.woodplc.com)

Arthur Spiess December 9, 2019

Draft language to use in Pickett Mountain Archaeological Phase 0 RFP

The work should include "Phase 0" assessment for historic and prehistoric archaeological sites, both within the mine project APE and also at selected locations along the access roads that may be subject to improvement as needed. Phase 0 assessment will be based primarily on "walkover" or surface assessment, supplemented as indicated by subsurface testing with 0.5 m square testpits. Note: Phase 0 archaeological survey is designed to assess the overall probability of presence of archaeological sites, not to complete a survey of sufficient intensity to indicate site absence or to find all sites present.

There is a low probability of historic archaeological sites being present, mostly being lumbering camps. Walkover survey may be supplemented with a metal detector if there is surface indication. As is standard with historic archaeological survey Phase 0 assessment, preliminary documentary research is necessary in the event of finding a site.

There is a moderate probability of finding prehistoric archaeological sites, based on 1) the project location within the area of possible Ordovician or Silurian chert toolstone outcrops, and 2) the discovery of site 147.001 during initial survey for the Chase Mountain mine tailing pond project in 1984, on the edge of the Pickett Mountain Pond valley. Site 147.001 is located outside the proposed current Pickett Mountain mine project area. However, the Pickett Mountain mine project area must be assessed for possible toolstone outcrops, and associated workshop/toolstone reduction sites. The Phase 0 assessment should include consultation with an appropriate geologist, walkover survey to locate bedrock outcrops and assessment of their suitability as toolstone and record same, and excavation of 50 testpits in transects with 5 or 10 m intervals within the areas assessed to be "most likely" to contain prehistoric quarry reduction debris and/or habitation sites.

**Maine Historic Preservation Commission  
Archaeological Survey Report 2714**

MAINE HISTORIC PRESERVATION

ARCHAEOLOGICAL SURVEY REPORT

FILE #

2719

~~REPORT~~

ARCHAEOLOGICAL RECONNAISSANCE AND TESTING  
OF THE  
CHASE MOUNTAIN TAILING POND SITE

SUBMITTED TO  
E. C. JORDAN COMPANY

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## ABSTRACT

The University of Maine at Orono contracted with the E. C. Jordan Company to undertake assessment of the archaeological potential of a proposed tailing pond for the Mount Chase mine site. The results of the foot survey, a shovel testing, and an archaeological testing program outlined in the scope of work are reported here.

The most significant finding of these investigations is the discovery of an archaeological site, known as the Pickett Pond site (147-1). The prehistoric site occurs at the proposed dam site, and will require mitigation if a decision is made to proceed with construction. Analyses of flakes, artifacts, and the physical setting of the 200 sq m site suggest an early Archaic or late Paleoindian Period occupation. A geoarchaeological approach is recommended for the mitigation phase of the project. A geoarchaeological consultant will be required to reconstruct the geophysical system that existed at the time of occupation; additionally, this individual will assist with the interpretation of site stratigraphy. An archaeological team composed of a dig foreman, six experienced excavators, and a field cataloger are suggested for the excavation of approximately one-third of the site. Laboratory investigations will focus on the analyses of lithic remains. A multi-level analysis of material, shape, use-wear, and technology of flakes and artifacts by a laboratory



vi-Bonnichsen  
technician over a three-month period is recommended.  
Archaeological data and results will be written in a report of  
publishable quality.

1-Bonnichsen

#### SCOPE OF WORK

The University of Maine at Orono contracted with the E. C. Jordan Company to conduct an Environmental Impact Statement evaluating the archaeological resource potential of an 80-acre parcel of land scheduled to become a tailing pond for the Mount Chase mine. The project area is located about 1.5 km west-southwest of Pickett Pond (Figure 1). The scope of work for this project called for: 1) an initial foot survey of the property, 2) a shovel test pitting program to search for sub-surface archaeological remains, 3) an archaeological testing program to examine any archaeological site(s) discovered, 4) a report on archaeological remains recovered, and 5) development of a mitigation plan.

A significant archaeological site was discovered in the first shovel test placed in the project area adjacent to the proposed dam. The Pickett Pond site (147-1) is worthy of mitigation if a decision is made to construct the proposed dam. Each item outlined in the scope of work is covered in the following pages.

## DESCRIPTION OF THE PROJECT AREA

Location

The tailing pond site is located on the northeast side of Mount Chase in the SE 1/4 of Township 6, Range 6 West, Penobscot County. It also extends slightly into the NE 1/4 of the Mount Chase township. From the study area, the town of Patten is located approximately 12.8 km to the south-southeast, and Pleasant Lake is located approximately 2.8 km to the north-northwest. The topography of the area is rugged and covered by heavy forest (Figure 2). Numerous northeast-southwest trending ridges and hills occur within the region, and have elevational ranges from 299 m above mean sea level (amsl) at Pickett Mountain Pond to 552 m amsl at Long Mountain.

Within the region, rocks of Ordovician age are predominant with some Silurian and Cambrian rocks present. The major structural feature, the Weeksboro-Lunksoos anticline, is located approximately 2.8 km to the north of the study area. The anticline trends northeast-southwest, as do the majority of the bedrock formations within the area. Almost all of the bedrock formations (with the exception of some granitic intrusions east of the study area) have well developed cleavage planes and have been severely deformed (with dips of less than 70 degrees being rare). Deformation probably occurred during the Acadian Orogeny

(Ekren and Frischknecht 1967). Apparently the development of the cleavage planes occurred after the main episode of folding, possibly as a result of a slight shift in the direction of applied force. The area has apparently been exposed as a land mass since the Devonian (Ekren and Frischknecht 1967).

Geologic maps (Ekren and Frischknecht 1967) indicate that Mount Chase volcanics underlie the study area. Rockabema quartz diorite outcrops immediately to the north of Pickett Mountain Pond, while a quartz diabase outcrops in the northern portion of the study area. While quartzites and fine-grained volcanics may have been utilized by prehistoric humans to manufacture stone tools, cryptocrystalline silicates, such as cherts, are generally preferable for knapping. The nearest chert outcrop is located approximately 8 km to the east of the study area (Ekren and Frischknecht 1967). Also, an exposure of Wassataquoik chert is located approximately 10 km to the southwest of the study area (Neuman 1967). Red, gray, and black cherts are locally available as small cobbles within the stream bed and in glacial till deposits. It is not clear whether prehistoric peoples used these materials for artifact production.

The project is located in a small southwest-northeast trending basin. A small stream flows through the basin to Pickett Pond. The area was extensively modified during the Wisconsinian glaciation. Till thickness varies from less than 1 m to more than 40 m in the Pleasant Pond vicinity. The surficial geology

4-Bonnichsen

of the basin is typified by a series of what are tentatively identified as kame terraces along the lateral margins of the basin. The basin bottom is characterized by a till bench and what is probably Holocene terrace deposits. Refer to Figure 3.

5-Bonnichsen

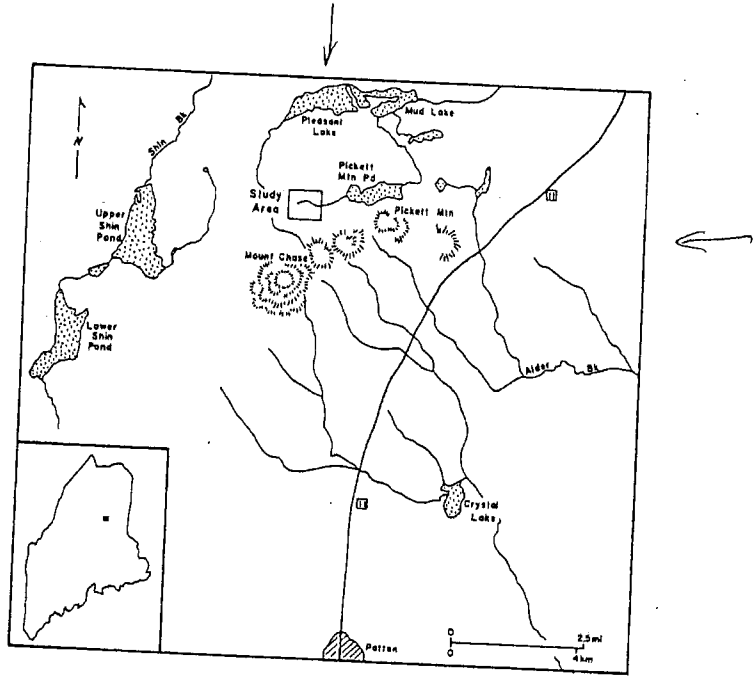
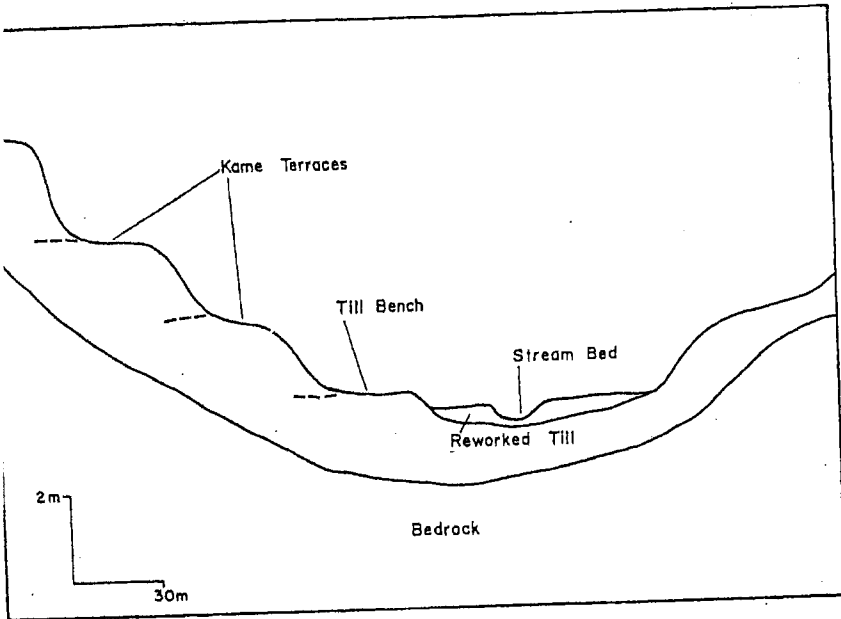


Figure 1. Regional map of project vicinity.

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7-Bonnichsen

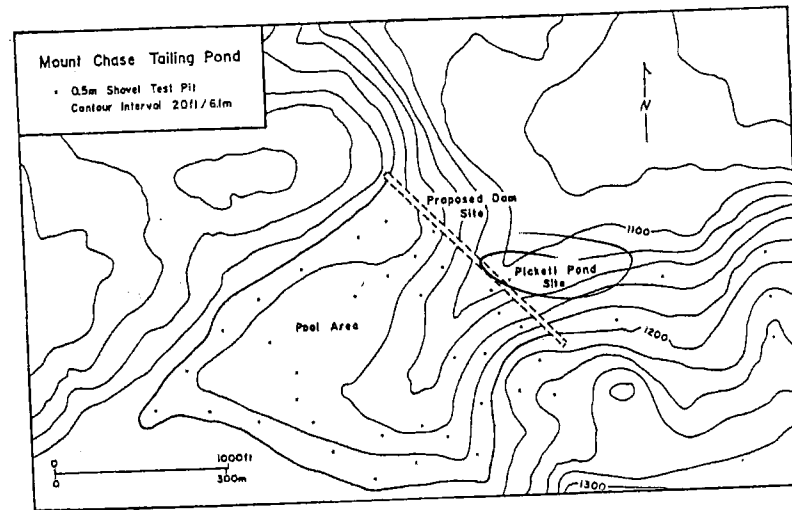


Figure 2. Map of tailing pond area illustrating shovel test pit location.

Figure 3. Profile sketch map of basin surficial geology.

## THE TESTING PROGRAM

Foot Survey

The initial phase of fieldwork began October 20, 1984 with a pedestrian survey of the proposed impact area. Heavily wooded benches and terraces almost completely mask the ground surface of the project area. A series of benches and terraces, observed along the margins of the small valley, were interpreted as areas suitable for the location of prehistoric campsites. However, no archaeological evidence was found during this particular survey.

Shovel Test Pitting

Following the pedestrian survey, a shovel test pitting program was initiated to investigate sub-surface deposits of the benches and terraces in the basin for archaeological remains. Shovel test pits were placed in relatively flat surfaces suited for camps at lookout points where one could view the valley below. The shovel test pits tended to measure approximately 50 cm to the side; they were excavated to till or outwash gravel deposits. All sediments from the shovel test pits were screened through 0.5 cm hardware cloth.

On the initial day of testing, October 20, 1984, the first shovel test pit placed into the first bench surface above the stream yielded approximately 20 stone flakes produced by humans. With an understanding that a site did exist and a lack of

manpower and time to implement a full-fledged site testing program, a decision was made to continue shovel test pitting in other sectors of the project area.

On November 2 and 3, a three-person crew returned to the project area for additional work. In total, 40 shovel test probes 0.5 sq m were placed in and along the basin margins. The locations of these pits are plotted on Figure 2. Only the one archaeological site was discovered through shovel test pitting. 3

Shovel Test Pitting 147-1

The Pickett Pond site (147-1) is located on the south side of the stream that traverses the basin bottom and immediately south of the proposed tailing pond dam site (Refer to Figure 3). The site is located on a bench approximately 2 m above the base level of the adjacent stream bed and occurs immediately below what appears to be a kame terrace. The sketch diagram presented in Figure 3 depicts our tentative interpretations of the geomorphic setting of the site area.

Today a small perennial stream flows 10 m to the northwest of the site, approximately 2 m below the site surface. The till bench on which the site occurs is covered by redeposited till colluvium derived from the hill slope on the south side of the site. Tree throw activity is extensive, both on and off the site.

The exploratory testing program at Pickett Pond was divided into two phases: a shovel test pitting program for determining site size, and a testing program for ascertaining the archaeological content of the site. A grid system was established perpendicular to the dam site and parallel to the longitudinal axis of the terrace. The 9+00 survey stake at the dam site served as an anchor point for establishing a 00 point in the NW corner of a coordinate system over the site area. The axis of the grid systems is N 60 degrees east. With an objective of determining site size, shovel probes were placed at the 5 m intersections of the grid system. The excavation methodology used for determining the site parameters was identical to that used for shovel test pitting the various landforms in the project area. A total of 29 shovel probes were made into the surface of the bench on which the site is located. Test pits which produced flakes are circled in Figure 4. Flakes recovered from the shovel probes were collected in ziplock plastic bags. Information on the spatial location of all flakes excavated in the shovel pit probes were recorded on provenience slips. These documentation procedures allow us to precisely record the location of all archaeological materials excavated. Judging from the distribution of flakes found in the shovel probes, the site covers an area approximately 10 m wide and 20 m long. From these figures, we can conclude that the site covers a 200 sq m area.

Testing 147-1

Within the flake concentration area, two 1 sq m test pits were excavated within the framework provided by the coordinate system. These pits are designated as Units 3N/10E and 4N/10E in reference to their placement in the overall grid system. Arbitrary 10 cm levels were excavated below the surface elevation of the northwest corner of the pits. The excavation technique entailed root cutting, shovel shaving, troweling, and passing all sediments through a 0.5 cm screen. All flakes and artifacts recovered were placed in ziplock bags and labeled by square and arbitrary level.

Flakes were the predominate material recovered, although several flake tools were discovered during the testing operation. Humanly produced flakes occur in the upper 40 cm of deposits. The test pits were extended to 50 cm in depth where sterile till deposits were encountered. The upper 50 cm of deposit is primarily a till rich colluvium, apparently derived from the slope on the south side of the site. It is quite probable that human occupation occurred on the surface of the colluvial deposits and that a history of tree throws has resulted in the burial of flakes to about 40 cm in depth.

The colluvial deposits which overlie the basal till have been modified by soil development and appear to be typical for a forest spodosol. Sediments and soils from the test pits can be described in the following manner.

1. A 5 cm thick organic humus and leaf mat occurs on the surface.
2. A 10YR 2/1 black silty clay loam with small amounts of alluvial sand and gravel occurs from 5-10 cm below the surface. This sediment has a high amount of organic material and a high degree of root intrusion.
3. A thin AE or A2 10YR 5/1 gray horizon is less than 1 cm in thickness and is discontinuous when viewed in pit profiles. It consists of leached silts and sands and is primarily silicate.
4. A 5YR 3/3 dark reddish brown B horizon is a sandy clay loam with angular to slightly rounded stream gravels and cobbles occurs next in the profile. There continues to be moderately heavy root intrusion.
5. The above soil horizon grades into a 10YR 3/4 C horizon which is a dark yellowish brown sandy clay loam. This layer is interpreted as reworked glacial till. It consists of fine- to coarse-grained sands and gravels with some clays. There are numerous angular to slightly rounded gravel and cobble sized clasts extant within this layer. Several of these clasts exhibit randomly oriented striations on their surfaces.

Although the age of this surface is difficult to accurately assess without additional fieldwork, occurrence of the site on a till bench is important. Because the same terrace lies above the bench on which the site occurs, it is reasonable to infer that the till deposits originated from relic stagnant ice in the basin bottom. What appears to be a terrace of fluvial origin occurs approximately 0.5 m above the stream bed and 1.5 m below the site. Thus the surface on which the site is located would have been accessible for occupation in late glacial times. In short, the geomorphic context of the Pickett Pond site suggests the site could be quite old.

The relationship between Pickett Pond and the site area has yet

to be systematically explored. The basin in which Pickett Pond is located was probably formed by a large stagnant relic ice block located in a topographically low area. It is probable that Pickett Pond was more substantial in late glacial times than today. Erosion and down cutting have lowered the base level of the pond, which has reduced the size of the pond. Additional geological fieldwork outside of the immediate site area will be required to determine if these proposed geomorphic relationships are correct. Nevertheless, on the basis of the present observations there is a reasonable possibility that the occupants of the site camped at the head of a bay where a fresh water stream entered Pickett Pond, rather than adjacent to a perennial stream as is the case today.

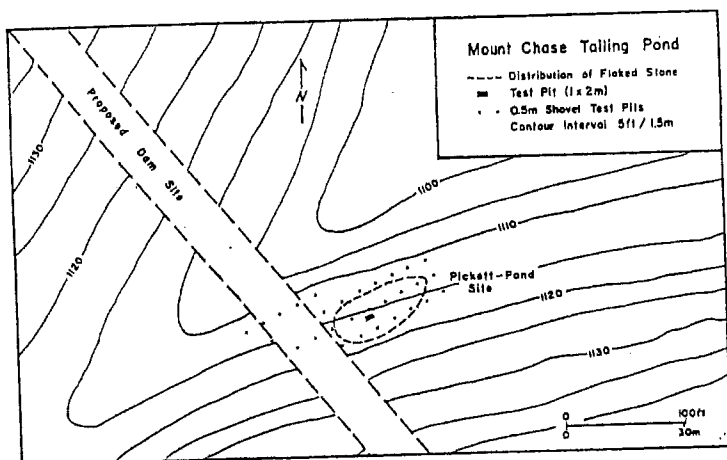


Figure 4. Map of site area.

## ANALYSIS OF FLAKES AND ARTIFACTS

Approach

In previous studies, Young and Bonnichsen (1984) and Pollock (1984) developed what is known as a cognitive approach for the study of stone tools. The goal of this approach is to link artifact morphology with the behavioral and cognitive systems that prehistoric craftsmen used in manufacturing stone tools. The approach relies heavily on the use of modern analogues. By studying, in controlled experimental settings, how modern-day craftsmen produce stone artifacts, a good deal has been learned concerning how these craftsmen produce bifaces--the central concept that underlies many aboriginal tool production systems. For the purposes of this study, concepts developed by Young and Bonnichsen (1984) and Pollock (1984) will be modified for the analysis of flakes and flake tools.

Although many archaeologists frequently ignore flakes in their analyses, flakes can yield considerable information concerning the production grammar used to produce artifacts. Flakes are reasonably complex and document, in their proximal, ventral, and distal surface morphologies, different events used in the production of artifacts. Since the system of manufacture behind the artifact is probably more important than the artifact



itself, the goal of this analysis is to reconstruct the behavioral grammar used to make artifacts at the Pickett Pond site.

The archaeological assemblage recovered from shovel test pits and the two 1 m sq test pits at the Pickett Pond site is composed of 70 specimens. Sixty-nine are flakes and one is a biface fragment. A number of the flakes have been modified into flake tools. These specimens were subjected to material and technological analyses. A shape analysis based on metric attributes was not attempted because a significant percentage of the flakes were broken and could not be measured. Prior to analysis each specimen was washed and cataloged. Catalog numbers consist of a site, square, and specimen number. These data, along with other provenience information, were entered into a permanent catalog. See Appendix I.

#### Material Identification

The flaked stone from the site is a volcanic tuff. Bedrock deposits of tuff may occur locally in the vicinity of the Pickett Pond site (B. Hall, personal communication to R. Birnie). However, the source of the bedrock was not located during our survey. In procuring raw materials for artifact production, it is unlikely that the tool making artisans scavenged tuff cobbles from the nearby stream. Cobbles in the stream bed are either water-rounded or striated from glacial transport. All specimens recovered are made from materials

which do not exhibit evidence of water or glacial transport. Many of the flakes from the site are patinated, and some are badly degraded, apparently from acidic ground water conditions at the site. These chemically altered flakes are tan to white in color.

The consistency in choice of raw materials, gross similarities in technological procedures used to manufacture tools, and small site size in a limited geographical area lead us to consider the working hypothesis that only a single people occupied the site area. A detailed technological analysis of material recovered was undertaken with the objective of determining if more than one lithic industry is represented at the site.

#### Technology

The reconstruction of production grammars on the basis of flakes entails the use of robust methodology involving a number of discrete steps. These include: 1) refitting broken pieces, 2) creating definitions, 3) establishing a key for sorting flakes into discrete patterns, 4) linking morphological patterns to behavioral sequences, 5) describing artifacts, and 6) constructing a general production grammar for the site. Methods followed during each step of the analysis and the results will now be discussed.

#### Refitting

The first step involved refitting broken proximal and distal

ends of specimens. The flakes were divided into two groupings--flakes with proximal ends and flakes without proximal ends. For analysis purposes the flakes were laid on a table with their dorsal faces up. Then each proximal end was fitted against all broken distal ends in search of matches. The second step in refitting entailed turning the two rows of flakes so that their dorsal surface faced up. Then working with one flake at a time, an attempt was made to match the ventral surface of the control flake with the dorsal face of all other flakes. Only proximal and distal matches were found in the Pickett Pond collection. Although both broken halves were given catalog numbers, only the lowest of the two cataloged numbers was used to represent the flake in subsequent analyses.

Creating Definitions and Nomenclature. At the heart of analyses lies the issue of how definitions are created. Definitions employed in this study are based on experimental studies in which a modern-day craftsman (R. Bonnichsen) produced bifacially-flaked artifacts. These control studies have allowed behavior and morphology to be linked. Diagnostic morphological characteristics, produced by different behavioral techniques of flake removal in experimental settings, can serve as keys for reconstructing procedures used for the removal of flakes from prehistoric specimens.

The methodology followed here for determining relevant definitions was based on a thorough review of all material

recovered from the site. Categories presented were formulated in view of 30 years of experience and many years of analysis of prehistoric specimens. In observing the assemblage, a visual search was made of the entire assemblage for contrasts in how prehistoric craftsmen prepared platforms, treated the dorsal faces of flakes, and removed different kinds of flakes.

Pollock (1984), after studying data created by modern-day craftsmen, R. Bonnichsen, and Errett Callahan, formalized attribute definitions which are modified for our purposes here. Additionally, specialized terminology is illustrated through graphics.

Classifying Flake Scars. Each flake documents, in its morphology, several events: partial scars may occur on the dorsal face documenting previous behavioral events, the platform may exhibit one or more modification patterns to facilitate the preparation of a solid striking platform for flake removal, and the ventral face is a complete flake scar documenting the removal event of the specific flake under consideration. Since the platform and ventral face preserve intact morphological units produced by the craftsman, it is these units that are of greatest importance for classifying flake scar morphology and the reconstruction of production behavior. Scar patterns on the dorsal face are not so easy to analyze. The proximal ends of these scars may be truncated from platform preparation, and only portions of overlapping scars may be represented. In view of

these considerations, a two step procedure was developed for analyzing the Pickett Pond flakes. A key was developed to sort flakes into patterns on the basis of their platform morphology and ventral surface morphology (Table 1), and dorsal face characteristics are plotted against the resulting flake scar patterns in Table 2.

Central to the interpretation of the flake scar patterns is establishing the linkage between flake scar patterns and behavior. Individual experiments should be run for each distinct kind of raw material to learn how morphological characteristics will be expressed in materials with different properties. Since we have yet to isolate the source of raw material used at the Pickett Pond site, it has not been possible to run control experiments to ensure the accuracy of the following behavioral interpretations.

Specialized definitions used in the analysis linking morphology to behavior which may not be self-evident to specialists are defined below.

Flake morphology was analysed in respect to the dorsal face, platform, and ventral face. Terms important for interpreting dorsal faces include:

1) face paring flake scars document where material has been removed from the face of an artifact being produced; flakes are greater than 15 mm in length. In the Pickett Pond population of flakes, paring flakes and margin contouring flakes have

non-overlapping metric distributions; margin contouring flakes are less than 15 mm in length;

2) margin contouring flakes are used to remove material from the margins of artifacts in order to achieve a curved surface near the edge to facilitate the loading of the edge for the removal of substantial thinning flakes (flakes detached in the process of thinning bifaces). Margin contouring flakes are less than 15 mm in length and have a high platform thickness-length ratio relative to other kinds of flakes.

Three contrasting morphological patterns were identified on the dorsal faces of flakes: faces with face paring and margin contouring scars, flakes with only margin contouring scars, and flakes with only face paring scars.

Platforms at the Pickett Pond site saw four different types of treatment:

1) single scar refers to the occurrence of a single scar on the platform; presumably these were produced to create a striking surface with an appropriate angle that could be used in the removal of several flakes from the same platform--e.g., as in core reduction;

2) microflaking refers to a series of short, small, step-like flakes, presumably these flakes were removed to develop an appropriate bevelled angle for detaching thinning flakes;

3) ground and rounded preforms refers to the rounding and dulling of edges by rubbing an abrasive parallel to the edge for the purpose of creating a strong striking platform; rounded platforms mitigate against sliding when a blow is delivered to an edge;

4) platform crushing was not produced on purpose and appears to represent an accident where the edge angle was inappropriate for flake removal.

A search was made for a single attribute on the ventral face--a bulb of force. Bulbs of force on the proximal ventral surface

flakes were either present or they were absent. Our interpretation is that flakes without bulbs of force were made by indirect percussion thinning, and thinning flakes with bulbs of force were detached by a soft hammer technique such as a billet. There are other qualitative characteristics that are associated with the discrete bulb patterns. What are believed to be thinning flakes exhibit large lips and have almost no curvature. See Figure 5.

#### Results of Flake Classification

Sixty-nine specimens were processed through the flake key. Ten flake patterns were isolated and these patterns appear in the branch diagram presented in Table 1. Two of the patterns, 6 and 9, are relatively meaningless. Pattern 6 may represent a large raillure flake that was embedded in another flake scar. Pattern 9 is composed of 37 broken specimens (53.62%), and these specimens are almost certainly broken paring flakes.

In a sense, each individual flake provides a behavioral statement concerning the production repertoire in use at a site. Upon reviewing the behavioral statements made in the right hand column of Table 3, it is apparent repetitive cycles were used to manufacture Pickett Pond flakes.

When behavioral interpretations are linked with the morphological patterns (see Table 3), a logical and coherent pattern begins to emerge. Pattern 7 is a large face paring

flake probably struck from a massive core. The flake is wider than it is long, and is typical of thousands of flakes observed at quarry sites at Round Mountain Pond, located approximately 55 km north-northwest of Pickett Pond. Flakes such as these were likely to have been the preforms for biface production.

Face paring is the beginning operation in patterns 1-7 and is followed by margin contouring (patterns 1-7). Variation occurs in how platforms were prepared. Two patterns (1 & 10) exhibit beveling scars--not only may beveling be used to create an appropriate platform angle, this unit may also be used to straighten crooked edges. Another kind of platform preparation is indicated by ground edges. Ground edges are made by a rub abrading process (patterns 1-5) and occur on flakes made by both indirect percussion (2,3,5,8) and billet thinning flakes (1,4). The occurrence of both indirect percussion and billet thinning is not surprising. Indirect percussion is well suited for the manufacture of large thin bifaces; whereas billets are quite appropriate for more refined finishing and shaping activities.

On the basis of the behavioral sequences presented in Table 3, it is possible to construct a general grammar of flake production. By examining all behavioral sequences simultaneously in a single table, an integrated set of production themes characterizing the assemblage becomes apparent. For example, face paring and margin contouring precede all varieties of platform preparation.

Platform clearing, bevelling, and rub abrading are used at different stages of production. Platform clearing is used during the core stage, bevelling is used to create appropriate striking angles and to shape the specimens, and rub abrade edge alteration is used to strengthen platforms so they will not collapse when struck. It is interesting to observe that on some occasions only bevelling precedes the use of indirect percussion thinning. In contrast, bevelling and rub abrade always precede billet thinning. It is likely that the Pickett Pond craftsmen hit bifaces with their billets directly on edges, and this is why bulbs of force occur. By contrast, indirect percussion tools were placed behind edges and grinding was not always necessary to facilitate flake removal. Margin contouring flakes exhibit a small negative scar on their platforms, implying bevelling or shaping preceded contouring. Furthermore, the occurrence of margin contouring scars on the dorsal faces of margin contouring flakes suggests margin contouring was repetitive and several sequences of flakes were detached.

In addition to the behavioral units listed in Tables 3 and 4, the units of serrating and scalloping discussed under artifacts could be added to the general repertoire.

#### Artifacts.

Artifacts from the Pickett Pond site have been classified into five classes.

Biface Fragment. Specimen 40,10,40 is either a biface fragment that resulted from a manufacturing error or an exhausted piece of escaille core. Longitudinal negative scars extend down two edges which occur at right angles to the flaked surfaces suggesting the removal of edge spalls.

Side of Bifacially Flaked Artifact. A very large thinning flake (specimen 0,5,02) exhibits remnants of five thinning flake scars on its dorsal surface indicating that most of the face of a biface undergoing manufacture was removed by a single behavioral event. Even though the resolution of the fracture scar has been diminished by chemical degradation, it is apparent that the platform area of the flake was crushed in an effort to thin the parent biface--a problem that sometimes occurs when an inappropriate platform angle is used in attempting to use indirect percussion thinning techniques for biface reduction (Figure 7).

Thinning Flakes with Scalloped Edges. Six specimens (4,10,12; 4,10,18; 5,10,07; 5,20,04; 5,20,07; 5,20,09) have edges with a scalloped appearance when viewed in plan view. Small crescentic shaped sections of the flake edges have been removed, leaving concave right angle fracture surfaces relative to the faces of

the thinning flakes. Often several crescentic-shaped scalloped pieces were removed from flake edges leaving a broken series of projecting points; the distance between points along flake edges with multiple breaks range from 0.5-2.0 cm. Neither the techniques used to remove these crescentic sections nor their function is fully understood. Light edge damage--microflaking--was observed on one specimen adjacent to a crescentic scallop suggesting that the right angle edges may have served as planning or scraping tools. Flakes with snapped edges have previously been reported from the Vail site, a Paleoindian site located in western Maine (Gramley 1982) and have also been found by R. Bonnichsen in association with Paleoindian sites at Munsungun Lake, north central Maine (Figure 9).

Large Thinning Flake with Serrated Edge. A large thinning flake (5,10,18) retouched with a fine pressure tool, exhibits a series of small notches and projections, 2-4 mm from point to point, along the lateral edges. Macroscopic use-wear is not evident along the altered edges; the overall shape of the specimens suggests that it may have been produced to serve as a saw (Figure 9).

Thinning Flake with Retouched Edge. A single specimen (5, 10, 11) was found with a retouched edge. The retouch is characterized by parallel tiny flake scars which lack negative bulbs; this pattern is indicative of tensile loading. The

flaking was probably produced as a function of use. Whittling is a good task specific possibility. On the opposing convex lateral edge, small scalloped breaks occur near the distal end of the specimen.

#### SUMMARY AND CONCLUSION

There are several converging lines of evidence which suggest the Pickett Pond site is an important archaeological site. Its occurrence on a till bench just below a kame terrace implies the site may have considerable antiquity. The small isolated nature of the site, the localized distribution of remains, and the use of a single raw material for the manufacture of artifacts suggest that a single occupation occurred at the site. The production grammar reconstruction of flakes produced and analysis of artifacts at the site has been quite revealing. A sophisticated production system was used to manufacture bifaces at the site. Flake tools with scalloped edges similar to the specimens from Pickett Pond have been found at the Vail Paleoindian site. Although no diagnostic bifaces were found at the site, enough was learned from the grammatical reconstruction to propose that the only known site in the region with a similar production grammar occurs at Round Mountain Pond. This site (164-31) has not been dated; interestingly, it occurs on the first till bench below a kame terrace. Other younger sites occur on lower terraces. The Round Mountain Pond leaf-shaped bifaces share in common with the Pickett Pond production grammar



Table 2. Flake Pattern Frequencies.

Pattern Number	Patterns		MC		MC+PS		C		M	
	#	%	#	%	#	%	#	%	#	%
1	4	5.80	-	-	4	5.80	-	-	-	-
2	9	13.04	-	-	9	13.04	-	-	-	-
3	5	7.25	-	-	5	7.25	-	-	-	-
4	3	4.35	-	-	3	4.35	-	-	-	-
5	6	8.70	-	-	6	8.70	-	-	-	-
6	1	1.45	-	-	-	-	1	1.45	-	-
7	1	1.45	-	-	1	1.45	-	-	-	-
8	1	1.45	-	-	-	-	1	1.45	-	-
9	37	53.62	-	-	-	-	-	-	37	53.62
10	2	2.90	-	-	-	-	-	-	-	-
Totals	69	100.00	2	2.90	28	40.58	2	2.90	37	53.62

Code:  
 MC = Margin contouring scars on dorsal face  
 MC+PS = Margin contouring and paring scars on dorsal face  
 C = Can not determine appropriate code  
 M = Missing information--e.g. flake is broken

Table 3. Interpreting Flake Scar Patterns

Pattern Number	Morphology	Behavioral Interpretation
1	P: microflaking & ground edge. DF: Margin contouring & face paring VF: no bulb	face paring → margin contouring → bevelling → rub-abrade → billet thinning
2	P: microflaking & ground edge VF: no bulb DF: margin contouring & paring flakes	Face paring → margin contouring → rub abrade → indirect percussion thinning
3	P: ground edge & single scar VF: no bulb DF: margin contouring & face paring	Face paring → margin contouring → rub abrade → indirect percussion thinning
4	P: ground edge VF: bulb present DF: margin contouring & face paring	Face paring → margin contouring → ground edge → billet thinning
5	P: ground edge VF: no bulb	Face paring → margin contouring → ground edge →



DF: margin contouring & face paring	indirect percussion thinning
6 P: microflaking	Can not interpret
VF: no bulb	
DF: may be erailure scar	
7 P: single scar platform	Face paring → platform clearing → hard hammer
VF: large bulb	
DF: margin contouring and dorsal face	paring
8 P: platform crushed	Indirect percussion thinning → platform crushing → indirect percussion thinning
VF: no bulbs	
DF: large paring scars	
9 broken flake mid-sections and proximal ends	Thinning flakes broken in manufacture
10 P: single scar	Margin contouring → beveling → margin contouring
VF: no bulb	
DF: margin contouring scars	

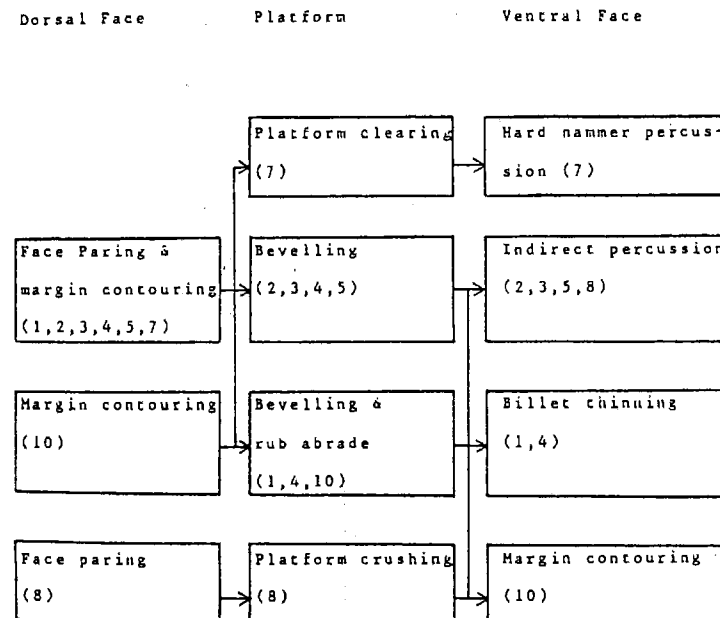
Code:

P = Proximal end of flake

VF = Ventral face of flake

DF = Dorsal face of flake

Table 4. General Model of Flake Production Grammar.



Code:

Numbers in parentneses = pattern numbers

→ = sequential relationship between two behaviors

Table 5. Structure of Flake and Artifact Assemblage.

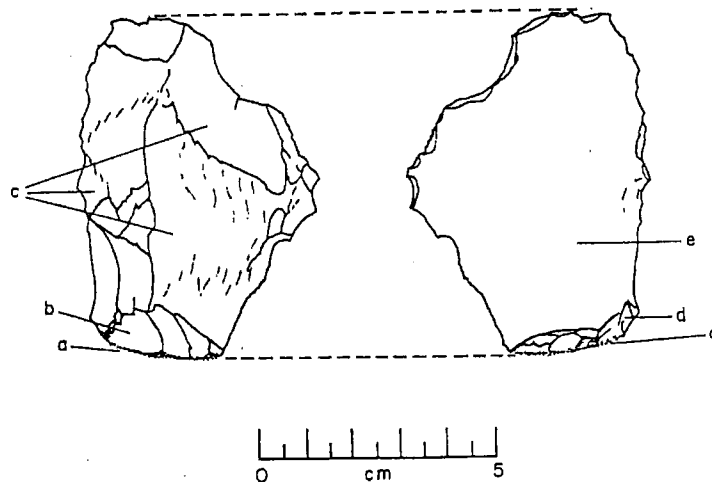
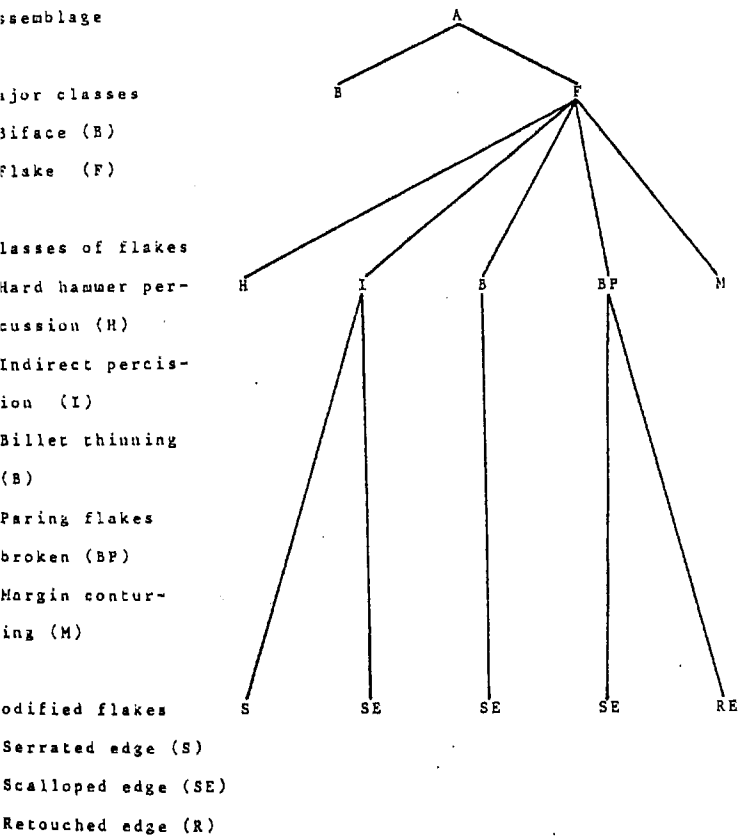


Figure 5. Indirect percussion thinning flake in orientation position with diagnostic characteristics: a) ground edge; b) margin contouring scars; c) face paring scar; d) lip and edge of biface; and e) ventral surface of flakes.

36-Bonnichsen

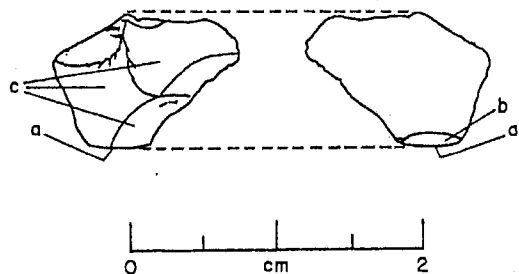


Figure 6. Margin contouring flake: a) bevelled platform; b) lip on platform to ventral face; and c) margin contouring scars.

37-Bonnichsen

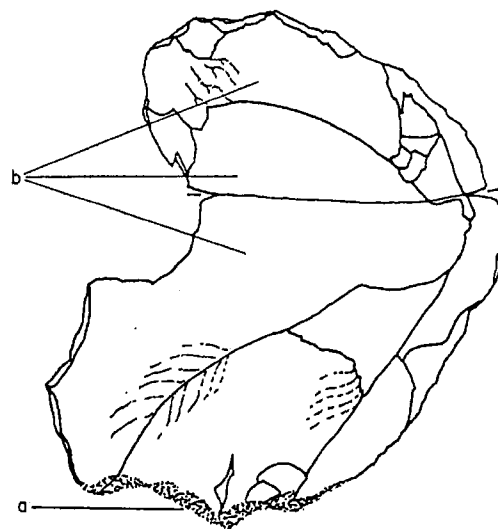


Figure 7. Face of artifact removed by indirect percussion thinning: a) crushed platform area; and b) indirect percussion thinning scars on dorsal face.

38-Bonnichsen

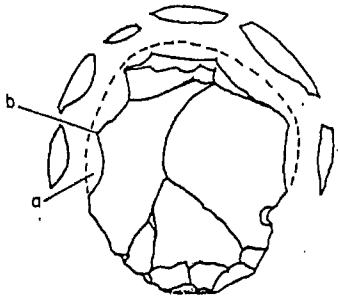


Figure 8. Indirect percussion thinning flake with scalloped edges.

39-Bonnichsen

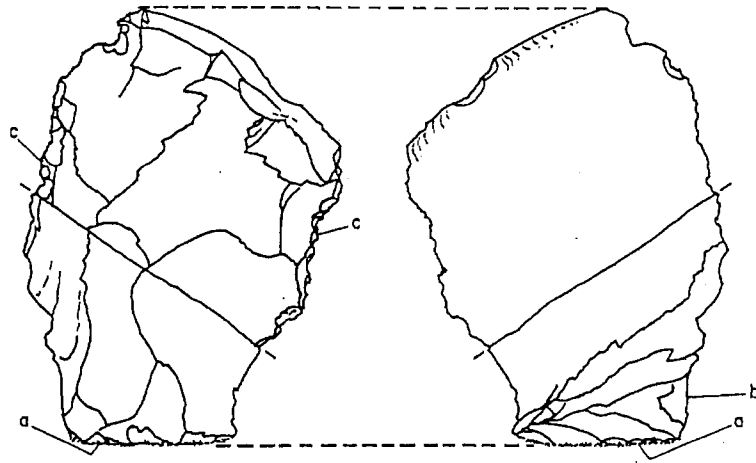


Figure 9. Indirect percussion thinning flake with serrated edges: a) ground platform; b) lip; and c) serrated edges.

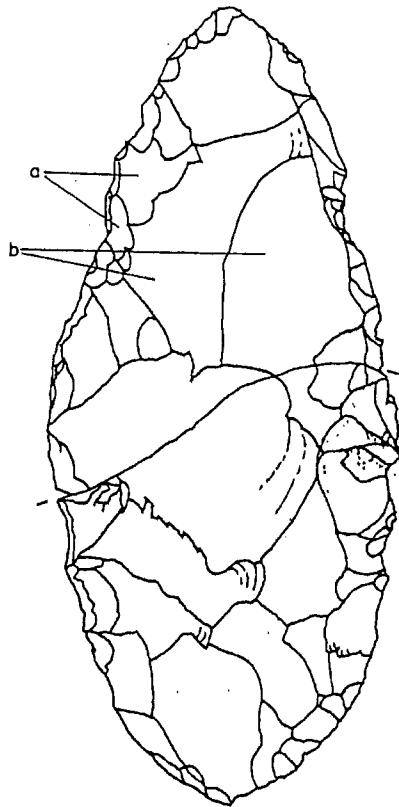


Figure 10. Biface from Round Mountain made by production grammar similar to grammar used to make Pickett Pond flakes.

## MITIGATION PLAN

On the basis of the remains recovered during the testing program, we anticipate that the mitigation of the Pickett Pond site will yield important new information on a little known Paleoindian or early Archaic Period site.

Field research at the Pickett Pond site suggests that lithic remains cover approximately a 200 sq m area and have a maximum depth of 40 cm below ground surface. Our assumption is that the flake and stone artifacts have a direct correlation with the most intensively occupied portion of the site area. Furthermore, because of the isolated and relatively small size of the site, homogeneity of raw materials, and consistency in reduction strategies, we anticipate that the site represents a single occupation. The site has been seriously disturbed by tree throw activity and cryoturbation (frost heaving). Thus, it is doubtful if intact structural features such as rock alignments will be in their original positions. Nevertheless, the occurrence of the site in an inadequately known archaeological area, in conjunction with the unique nature of the site, indicates that it is a significant archaeological site worthy of mitigation. New knowledge will be created regarding how human populations adapted to post glacial environments in the Pickett Pond area.

the construction of the earthfill dam for the Mount Chase  
 the tailing pond will involve the use of heavy equipment  
 that would result in the destruction of the Pickett Pond  
 site.

#### Organization of the Research Team

One of the most effective archaeological strategies for  
 investigation work is the use of small well-organized teams. It  
 is the responsibility of the principal investigator to plan,  
 oversee, and report all findings on the project. For the  
 purposes of this project, a geoarchaeological approach is  
 recommended for placing the Pickett Pond site in its  
 topographical setting. Air photo interpretive techniques and  
 geological foot reconnaissance techniques will be used to map  
 landforms and will provide the basis for reconstructing the  
 history of drainage in the project area. The  
 geoarchaeologist will assist the archaeologist in  
 reconstructing site formation processes important for  
 understanding the distribution of specimens at the site.  
 Additionally, the geoarchaeologist will collaborate with the  
 archaeologist in locating the source of local tuff used for  
 tool manufacture.

Archaeological research will focus on the excavation and  
 analyses of remains recovered from the site. An  
 archaeological team composed of a dig foreman, six

experienced field workers, a field cataloger, and a cook is  
 recommended. The team could excavate approximately one-third  
 of the site in a month or 20 man days of fieldwork.

#### Logistics

A tent field camp could be placed on one of the benches near  
 the site or alternatively along the shore of Pickett Pond.  
 Potable water occurs in the area. The placement of a field  
 camp in the site area will significantly reduce  
 transportation time to and from the site and would  
 substantially reduce the overall costs of the project. If  
 sufficient planning time is allowed, reservations can be made  
 through the UMO motor vehicle pool for the use of a van to  
 transport personnel and a trailer to carry equipment to and  
 from the project area. If this can not be done, then a  
 vehicle will have to be leased from a commercial dealer at a  
 significantly higher cost than the one reflected in the  
 proposed budget. All field equipment is now on hand at UMO  
 that will be needed for the excavation and field camp. Fire  
 permits and permission of the land owner would be required  
 before establishing the base camp.

#### Excavation Procedures

Standard archaeological excavation procedures are recommended  
 for mitigating the site. The area to be excavated will be  
 clear cut of trees prior to excavation. Next, a permanent  
 bench mark will be established, and the axis of the

coordinate system will parallel the coordinate system developed for the testing program. The coordinate system will provide the framework to guide the excavation and mapping of site topography, profiles and distribution of artifacts and features.

Once the site has been staked out, adjacent 2 sq m will be excavated. The rationale behind this approach is that human activity areas are often larger than area covered by 2 m sqs. For example, in the manufacture of artifacts, broken parts are often scattered but still lie within two or three meters of one another.

Past excavation experience in the northern Maine woods suggests that a two person team can dig approximately 10 cm per day within a two meter square. Thus, approximately 8 man days will be required to excavate each square. A very meticulous methodology involving the use of trowel, dust pan, measurement of each artifact in place, and sieving through 0.5 cm hardware cloth insures complete recovery of all materials encountered.

Two factors work against the use of rapid excavation procedures. The top 20 cm of the site area contains a heavy root mat which makes digging rather difficult. Furthermore, lithic artifacts are relatively fragile and easily broken when shovels are used to chop through root mats. Our

conclusion is that although the methods proposed here are slower than those used by others, quality control is maintained over the data recovered.

#### Cataloging

Central to the maintenance of quality control is the cataloging of specimens while still in the field. The role of the cataloger is to cross-check all proveniences recorded on field labels and make certain that all data is accurately recorded in a master catalog. The system we use at the UMO archaeology laboratory readily facilitates computer-assisted data analyses.

#### Analysis

Unless excavations reveal archaeological remains significantly different than those recovered during the testing operation, the kinds of analysis that can be conducted will be limited to material, technology, shape, and use-wear studies of the stone artifacts and the spatial distribution of artifacts across the site using techniques developed by Young and Bonnichsen (1984) and Pollock (1984). Computer techniques will facilitate quantitative descriptions of the assemblage of specimens recovered. Standard soil and sediment descriptive procedures will facilitate the description of site stratigraphy. The preparation of maps, illustrations, and photographs will follow standard professional procedures.

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On the basis of the testing program, we anticipate that the site will produce a rich record of lithic flakes and artifacts. The services of a technician will be required over a four month period to fully analyze data recovered during the excavation.

The budget presented in the following pages is based on 1984 costs. Indirect costs and Fringe Benefits are negotiated annually at the University of Maine at Orono and are subject to change.

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BUDGET

I. Personnel	Amount
A. Principle investigator at \$204/day for 20 days	4,080.00
B. Field foreman (Grad Stud.) \$64/day for 20 days	1,280.00
C. Six field workers (Grad. Stud.) \$40/day for 20 days	
D. Field cataloger \$40/day for 20 days	800.00
E. Laboratory technician 4 mos./\$1300	5,200.00
F. Cook 1 mo./\$800 mo.	800.00
F. Secretary \$4.85/hr. for 80 hrs	388.00
G. Geoarchaeologist (Consultant) \$100 day/4 days	400.00
H. Graphic illustrator (Consultant) Preparation of art work	200.00
Sub-total	13,148.00
Fringe benefits 23% (A+E+F)	2,318.00
Sub-total plus fringe benefi	15,466.00

II. Transportation

A. Rental of UMO van



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\$5/day for 30 day 150.00

B. Mileage

\$0.22 per mile for 2000 miles 440.00

C. Trailer rental

U-Haul trailer 8X10 for one mo. 250.00

Food and Accomodations

A. Food for crew of 10 for 20 days/

\$7 day 1,400.00

Field Supplies

A. Miscellaneous items--e.g.

specimen bags, graph paper, pens  
pencils, notebooks, etc. 250.00

B. Photographic supplies

Color and B&W film, developing,  
chemicals, paper, negative sleeves  
etc. 200.00

Other

A. Radiocarbon dates

4 dates at \$175/date 700.00

B. Office supplies 150.00

C. Telephone 100.00

D. Photostat preparation 25.00

E. Computer analysis 100.00

## **Exhibit N**

### **Rare or Special Plant Communities and Wildlife Habitat**



**STATE OF MAINE**  
**DEPARTMENT OF AGRICULTURE, CONSERVATION & FORESTRY**

177 STATE HOUSE STATION  
AUGUSTA, MAINE 04333

**JANET T. MILLS**  
GOVERNOR

**AMANDA E. BEAL**  
COMMISSIONER

January 22, 2020

Peter Thompson  
wood., Wood Environment & Infrastructure Solutions  
11 Congress Street, Suite 200  
Portland, ME 04101

Via email: [peter.thompson@woodplc.com](mailto:peter.thompson@woodplc.com)

Re: Rare and exemplary botanical features in proximity to: Wolfden Pickett Mountain Site, T6 R6 WELS, Maine

Dear Mr. Thompson:

I have searched the Maine Natural Areas Program's (MNAP's) Biological and Conservation Data System files in response to your request received December 4, 2019 for information on the presence of rare or unique botanical features documented from the vicinity of the project in T6R6 WELS, Maine. Rare and unique botanical features include the habitat of rare, threatened, or endangered plant species and unique or exemplary natural communities. Our review involves examining maps, manual and computerized records, other sources of information such as scientific articles or published references, and the personal knowledge of staff or cooperating experts.

Our official response covers only botanical features. For authoritative information and official response for zoological features you must make a similar request to the Maine Department of Inland Fisheries and Wildlife, 284 State Street, Augusta, Maine 04333.

According to the information currently in our Biological and Conservation Data System files, there are no rare botanical features documented specifically within the project area. This lack of data may indicate minimal survey efforts rather than confirm the absence of rare botanical features. You may want to have the site inventoried by a qualified field biologist to ensure that no undocumented rare features are inadvertently harmed.

Please refer to the attached supplemental information regarding rare and exemplary botanical features documented to occur within four miles of the project site. The list includes information on one feature, Orono Sedge, known to occur historically in the area. MNAP does not expect that this rare sedge species would be found at the Pickett Mountain site. Also attached is a map showing the features that occur within three miles of the project site. MNAP has received landowner permission to release this map which shows exemplary Montane Spruce – Fir Forest and exemplary Spruce – Pine Woodland at Mount Chase south of the project site. Please also refer to the attached factsheets for more information about these natural community types.

MNAP has also identified a priority area for botanical survey on the property owned by Wolfden Mt. Chase LLC. This area is a lakeside graminoid/shrub fen between Pleasant and Mud Lakes. As this fen is downhill and downstream from the proposed project site near Pickett Mountain, MNAP strongly recommends survey by a qualified ecologist to determine presence/absence of rare plants and natural community type(s) that may be

**MOLLY DOCHERTY, DIRECTOR**  
MAINE NATURAL AREAS PROGRAM  
BLOSSOM LANE, DEERING BUILDING



PHONE: (207) 287-804490  
WWW.MAINE.GOV/DACF/MNAP

present at that location per the Maine natural community classification (*Natural Landscapes of Maine: A Guide to Natural Communities and Ecosystems* by Gawler and Cutko, 2018 revised edition). The MNAP is available to conduct this survey, for a fee, if you cannot identify a qualified ecologist. Please contact me at 207-287-8043, [kristen.puryear@maine.gov](mailto:kristen.puryear@maine.gov), if you are interested in MNAP conducting this survey.

This finding is available and appropriate for preparation and review of environmental assessments, but it is not a substitute for on-site surveys. Comprehensive field surveys do not exist for all natural areas in Maine, and in the absence of a specific field investigation, the Maine Natural Areas Program cannot provide a definitive statement on the presence or absence of unusual natural features at this site.

The Maine Natural Areas Program (MNAP) is continuously working to achieve a more comprehensive database of exemplary natural features in Maine. We would appreciate the contribution of any information obtained should you decide to do field work. MNAP welcomes coordination with individuals or organizations proposing environmental alteration, or conducting environmental assessments. If, however, data provided by MNAP are to be published in any form, the Program should be informed at the outset and credited as the source.

The Maine Natural Areas Program has instituted a fee structure of \$75.00 an hour to recover the actual cost of processing your request for information. You will receive an invoice for \$375.00 for five hours of our services.


Thank you for using MNAP in the environmental review process. Please do not hesitate to contact me if you have further questions about the Natural Areas Program or about rare or unique botanical features on this site.

Sincerely,



Kristen Puryear | Ecologist | Maine Natural Areas Program  
207-287-8043 | [kristen.puryear@maine.gov](mailto:kristen.puryear@maine.gov)

**Wolfden Pickett Mountain Site  
T6 R6 WELS, Maine**

 Approximate Project Location

 Montane Spruce - Fir Forest

 Spruce - Pine Woodland

 Town



0 0.25 0.5 Miles

Maine Natural Areas Program, December 2019

**T6 R6 WELS**



**Mount Chase**

**Spruce - Pine Woodland**

**Montane Spruce - Fir Forest**

---

## Rare and Exemplary Botanical Features within 4 miles of Project: Wolfden Pickett Mountain Site, T6 R6 WELS, Maine

---

Common Name	State Status	State Rank	Global Rank	Date Last Observed	Occurrence Number	Habitat
<b>Montane Spruce - Fir Forest</b>						
<null>		S5	G3G5	2005-07-18	9	Conifer forest (forest, upland)
<b>Orono Sedge</b>						
T		S3	G3	1989-06-27	31	Old field/roadside (non-forested, wetland or upland)
<b>Spruce - Fir - Northern Hardwoods Ecosystem</b>						
<null>		S5	GNR	2003-06-05	16	Conifer forest (forest, upland),Hardwood to mixed forest (forest, upland)
<b>Spruce - Pine Woodland</b>						
<null>		S4	G3G5	2005-07-18	8	Dry barrens (partly forested, upland),Rocky summits and outcrops (non-forested, upland)

# Spruce - Pine Woodland

## State Rank S4

### Community Description

This type is a mixed canopy woodland (25-70% closure) in which red spruce and/or white pine is always present and associated species vary. Red spruce or white pine is strongly dominant at some sites; at others, the canopy is mixed, with no one tree species strongly dominant. White spruce may rarely replace red spruce at coastal sites. The shrub layer is typically very sparse (and variable in composition), and the herb layer has mostly 15-50% cover. Heath shrubs are the dominant feature of the herb layer; herb species rarely exceed 8% cover. The bryoid layer is sparse at some sites (<25%) and well developed at others (35-70%). Fruticose lichens typically make up half or more of the bryoid cover.

### Soil and Site Characteristics

Sites occur on mid to upper slopes (usually 10-20% slope) and low summits at elevations up to 2000'. Soils are thin (<25 cm), consisting of coarse mineral soil or poorly decomposed duff, and form patches over the bedrock substrate. The very well drained soils are acidic

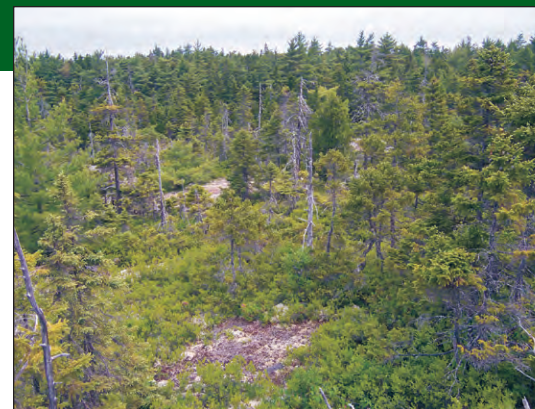
(pH 4.6-5.2) and nutrient poor. Some sites show evidence of past fire, but many do not.

### Diagnostics

Sites are woodlands on bedrock, with conifer cover exceeding deciduous cover. Red spruce is typically dominant, or occasionally co-dominant with white pine or red spruce.

### Similar Types

Other upland coniferous woodlands may include red spruce but will have other tree species (northern white cedar, pitch pine, red pine, jack pine, or black spruce) in greater abundance. Oak - Pine Woodlands may have considerable red



Spruce - Pine Woodland

spruce (an oak - spruce mix), but have more deciduous than coniferous tree cover. Moving downslope, or into areas of greater soil development, these woodlands can grade into spruce or pine forests, but those have more continuous canopy and less shrub and herb cover.

### Conservation, Wildlife, and Management Considerations

Most sites have little pressure from development or timbering; the primary impacts are from recreational use. Communications towers or wind turbines could have an impact on some of these woodlands on mid-elevation summits. Several sites are in public or private conservation ownership.

Birds that may nest in this habitat include the sharp-shinned hawk, gray jay, yellow-bellied flycatcher, boreal chickadee, Blackburnian warbler, red crossbill, and northern parula.

### Distribution

New England - Adirondack Province and Laurentian Mixed Forest Province, extending eastward, westward, and northward from Maine.

Landscape Pattern: Small Patch

### Characteristic Plants

These plants are frequently found in this community type. Those with an asterisk are often diagnostic of this community.

#### Canopy

- Balsam fir\*
- Black spruce\*
- Northern white cedar\*
- Paper birch\*
- Red spruce\*
- White pine\*
- White spruce\*

#### Sapling/shrub

- Bayberry\*
- Shadbush
- Wild-raisin\*

#### Dwarf Shrub

- Black huckleberry\*
- Lowbush blueberry\*
- Sheep laurel\*

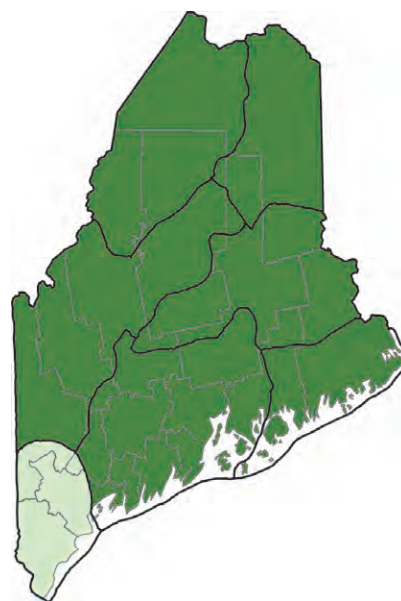
#### Herb

- Bracken fern

#### Bryoid

- Dicranum moss
- Red-stemmed moss
- Reindeer lichen\*

### Location Map



- Community is known from this Ecoregion
- Community may occur in this Ecoregion
- Bailey's Ecoregion
- County



Wild Raisin

# Montane Spruce - Fir Forest

*State Rank S5*

## Community Description

These closed canopy or sometimes patchy canopy forests are dominated by red spruce (50-95% cover); fir is a common associate (up to 35% cover) in younger stands and in canopy gaps, and yellow birch is the most common hardwood. Other conifers (northern white cedar, hemlock, or white pine) occasionally reduce the spruce dominance to as low as 40% cover. Striped maple is typical in the shrub layer, along with tree saplings. The herb layer is well developed (>15% cover, and often >30%), with tree regeneration and an assortment of herbs. Dwarf shrubs are conspicuously absent, except for a bit of velvet-leaf blueberry. Most of the ground surface is a lush mosaic of feather-mosses and leafy liverworts.

## Soil and Site Characteristics

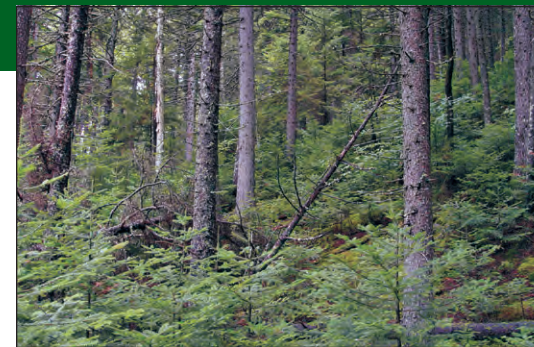
These forests occur on cool and moist microsites at moderate elevations (600'-2500', perhaps slightly higher), and north of 45 degrees latitude. Slopes are moderate to steep (5-50%), and usually north, west, or east facing. Soils are mostly well drained (some imperfectly drained), sandy to loamy, of moderate depth (25-50 cm), with pH 5.0-5.5.

## Diagnostics

Red spruce is dominant, and yellow birch is the most abundant hardwood. Herbaceous species exceed 15% cover, with montane/boreal herbs such as bluebead lily, northern wood-sorrel, creeping snowberry, mountain wood fern, and/or rose twisted stalk locally common. Bryoids exceed 40% cover, with a large proportion of feather-mosses.

## Similar Types

Fir - Heart-leaved Birch Subalpine Forests can share many species and often grade into this type as elevation decreases, but will have fir more abundant than spruce in the canopy, shorter trees, and canopy gaps more frequent. Spruce - Fir - Broom-moss Forests have similar canopies but much more depauperate herb and bryoid layers. They usually occur on somewhat drier sites and lack the assortment of montane/boreal herbs and the most common mosses will be broom-mosses rather than feather-mosses. Some Maritime Spruce - Fir Forests have a similar herb layer, but if so they have more canopy fir and occur along the immediate coast.



Montane Spruce - Fir Forest

## Conservation, Wildlife, and Management Considerations

This is the characteristic spruce - fir type of mountain slopes just below the subalpine zone, and it is extensively harvested and managed. Spruce budworm has impacted many sites as well, creating patchy forest structure. Some areas of high ecological quality, in the hundreds of acres, are known but not necessarily designated as areas reserved from harvesting. Almost all are within a landscape of managed forest rather than surrounded by land that has been permanently cleared and converted to other uses.

This community type may be utilized as nesting habitat by a number of coniferous forest specialist bird species, such as the sharp-shinned hawk, yellow-bellied flycatcher, bay-breasted warbler, Cape May warbler, blackpoll warbler, northern parula, blackburnian warbler, boreal chickadee, Swainson's thrush, red crossbill, white-winged crossbill, gray jay, and spruce grouse.

## Distribution

Western Maine westward (New England - Adirondack Province).

Landscape Pattern: Large Patch, mostly as hundreds of acres.

## Characteristic Plants

These plants are frequently found in this community type. Those with an asterisk are often diagnostic of this community.

### Canopy

- Balsam fir\*
- Red spruce\*
- Yellow birch\*

### Sapling/shrub

- Balsam fir\*
- Red maple
- Striped maple

### Dwarf Shrub

- Velvet-leaf blueberry

### Herb

- Bluebead lily\*
- Bunchberry
- Canada mayflower
- Creeping snowberry\*
- Goldthread
- Northern wood-sorrel\*
- Painted trillium
- Starflower

### Bryoid

- Common broom-moss\*
- Mountain fern moss
- Red-stemmed moss
- Three-lobed bazzania

## Associated Rare Plants

- Boreal bedstraw
- Lesser wintergreen

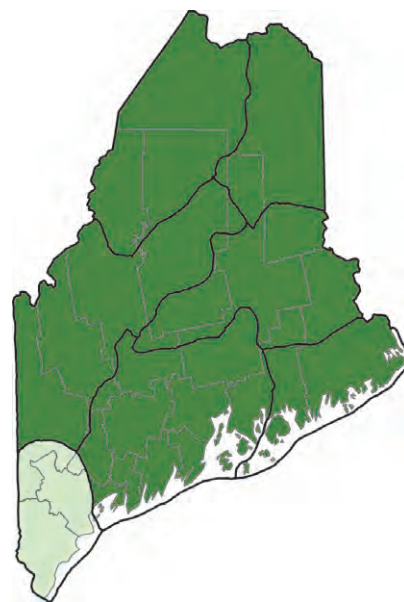
## Associated Rare Animals

- Bicknell's thrush

## Examples on Conservation Lands You Can Visit

- Deboullie Ponds Public Lands - Aroostook Co.
- Elephant Mountain, Appalachian Trail - Franklin Co.
- Lower Horns Pond Trail, Bigelow Preserve - Franklin Co.
- Traveler Mountain, Baxter State Park - Piscataquis Co.
- Whitecap Mountain, Appalachian Trail - Piscataquis Co.

## Location Map



- Community is known from this Ecoregion
- Community may occur in this Ecoregion
- Bailey's Ecoregion
- County





## STATE RARITY RANKS

- S1** Critically imperiled in Maine because of extreme rarity (five or fewer occurrences or very few remaining individuals or acres) or because some aspect of its biology makes it especially vulnerable to extirpation from the State of Maine.
- S2** Imperiled in Maine because of rarity (6-20 occurrences or few remaining individuals or acres) or because of other factors making it vulnerable to further decline.
- S3** Rare in Maine (20-100 occurrences).
- S4** Apparently secure in Maine.
- S5** Demonstrably secure in Maine.
- SU** Under consideration for assigning rarity status; more information needed on threats or distribution.
- SNR** Not yet ranked.
- SNA** Rank not applicable.
- S#?** Current occurrence data suggests assigned rank, but lack of survey effort along with amount of potential habitat create uncertainty (e.g. S3?).

**Note:** **State Rarity Ranks** are determined by the Maine Natural Areas Program for rare plants and rare and exemplary natural communities and ecosystems. The Maine Department of Inland Fisheries and Wildlife determines State Rarity Ranks for animals.

## GLOBAL RARITY RANKS

- G1** Critically imperiled globally because of extreme rarity (five or fewer occurrences or very few remaining individuals or acres) or because some aspect of its biology makes it especially vulnerable to extinction.
- G2** Globally imperiled because of rarity (6-20 occurrences or few remaining individuals or acres) or because of other factors making it vulnerable to further decline.
- G3** Globally rare (20-100 occurrences).
- G4** Apparently secure globally.
- G5** Demonstrably secure globally.
- GNR** Not yet ranked.

**Note:** **Global Ranks** are determined by NatureServe.

## STATE LEGAL STATUS

**Note:** State legal status is according to 5 M.R.S.A. § 13076-13079, which mandates the Department of Conservation to produce and biennially update the official list of Maine's **Endangered and Threatened** plants. The list is derived by a technical advisory committee of botanists who use data in the Natural Areas Program's database to recommend status changes to the Department of Conservation.

- E** ENDANGERED; Rare and in danger of being lost from the state in the foreseeable future; or federally listed as Endangered.
- T** THREATENED; Rare and, with further decline, could become endangered; or federally listed as Threatened.

## NON-LEGAL STATUS

- SC** SPECIAL CONCERN; Rare in Maine, based on available information, but not sufficiently rare to be considered Threatened or Endangered.
- PE** Potentially Extirpated; Species has not been documented in Maine in past 20 years or loss of last known occurrence has been documented.

## ELEMENT OCCURRENCE RANKS - EO RANKS

Element Occurrence ranks are used to describe the quality of a rare plant population or natural community based on three factors:

- **Size**: Size of community or population relative to other known examples in Maine. Community or population's viability, capability to maintain itself.
- **Condition**: For communities, condition includes presence of representative species, maturity of species, and evidence of human-caused disturbance. For plants, factors include species vigor and evidence of human-caused disturbance.
- **Landscape context**: Land uses and/or condition of natural communities surrounding the observed area. Ability of the observed community or population to be protected from effects of adjacent land uses.

These three factors are combined into an overall ranking of the feature of **A**, **B**, **C**, or **D**, where **A** indicates an **excellent** example of the community or population and **D** indicates a **poor** example of the community or population. A rank of **E** indicates that the community or population is **extant** but there is not enough data to assign a quality rank. The Maine Natural Areas Program tracks all occurrences of rare (S1-S3) plants and natural communities as well as A and B ranked common (S4-S5) natural communities.

**Note:** **Element Occurrence Ranks** are determined by the Maine Natural Areas Program for rare plants and rare and exemplary natural communities and ecosystems. The Maine Department of Inland Fisheries and Wildlife determines Element Occurrence ranks for animals.

Visit our website for more information on rare, threatened, and endangered species!  
<http://www.maine.gov/dacf/mnap>



Wood Environment & Infrastructure Solutions, Inc.  
511 Congress Street  
Ste. 200  
Portland, ME 04101  
USA  
T: 207-775-5401  
[www.woodplc.com](http://www.woodplc.com)

December 4, 2019

Ms Kristen Puryear

Maine Department of Conservation  
Natural Areas Program  
93 State House Station  
Augusta, Maine 04333-0093

**Subject: Environmental Site Review, Wolfden - Pickett Mountain Site, T6R6, Maine**

Dear Ms Puryear:

It was a pleasure meeting with you and others on November 6, 2019 to discuss aspects of Wolfden's in-progress rezoning petition with LUPC on a parcel located in T6R6. During the meeting you indicated there were potential records of rare and exemplary botanical features within a 3 mile buffer of the proposed site and you kindly offered to follow up with additional information, if possible, from private land owners pending permission.

I am providing this letter with a figure to facilitate your Environmental Site Review of the subject project for rare and exemplary botanical features. Attached please find a figure showing the Preliminary Site Survey Area completed on October 29<sup>th</sup> and 30<sup>th</sup> which is consistent with the area currently proposed for development. The property, owned by Wolfden Mt. Chase LLC, is forested with a mix of deciduous and evergreen trees. Developed areas on site are limited to woods/logging roads. The area where development is proposed has been logged within the past 5 to 7 years and is in re-growth.

As discussed in the meeting, we will be conducting a survey in the spring for formal delineation of wetlands, intermittent streams and an assessment of vernal pools. At that time we will also review the subject site for rare, threatened and endangered plants. Your input is appreciated. If you need additional information, please feel free to contact me directly at 207-828-3490.

Sincerely

**Wood Environment & Infrastructure Solutions, Inc.**

Peter Thompson  
Principal Project Manager


Cc; Jeremy Ouellette





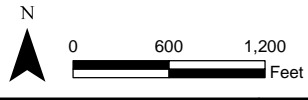
Service Layer Credits: Source: Esri, DigitalGlobe, GeoEye, Earthstar Geographics, CNES/Airbus DS, USDA, USGS, AeroGRID, IGN, and the GIS User Community  
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**Legend**  
 Approximate Limit of Preliminary Site Survey

Preliminary Site Survey Area

Coordinates of approximate center of Preliminary Site Survey Area:  
 X: 992,556 Y: 900,791  
 (NAD 83 State Plane Maine East, US Survey Feet)



Wolfden Resources  
 Pickett Mountain Mine

Document: P:\Projects\Wolfden Resources\4.0\_Deliverables\4.5\_Databases\GIS\MapDocuments\Overview\_F&W\_11x17P.mxd PDF: P:\Projects\Wolfden Resources\4.0\_Deliverables\4.5\_Databases\GIS\Figures\Prelim Site Survey Area.pdf 11/07/2019 9:46 AM brian.peters



STATE OF MAINE  
DEPARTMENT OF  
INLAND FISHERIES & WILDLIFE  
284 STATE STREET  
41 STATE HOUSE STATION  
AUGUSTA ME 04333-0041



November 25, 2019

Peter Thompson  
Wood PLC  
511 Congress Street, Suite 200  
Portland, Maine 04101

**RE: Information Request - Wolfden Resources Metallic Mineral Mining Rezoning, T6 R6 WELS**

Dear Peter,

Per your request received November 7, 2019, we have reviewed current Maine Department of Inland Fisheries and Wildlife (MDIFW) information for known locations of important fisheries, wildlife, and critical habitat resources within the vicinity of the proposed Wolfden Resources project noted above. Please note that our comments should be considered preliminary based on the limited information provided at this stage.

As described during our meeting on November 5, 2019, MDIFW concerns relate to Rare, Threatened, and Endangered (RTE) species occurrences and habitats; Significant Wildlife Habitats (SWHs); and Protected Natural Resources (PNRs). MDIFW's preliminary record searches identify known resources, but site surveys are necessary to identify other important resources that have not yet been investigated but may be present in an area. Some species are limited by specific region or habitat type, which quickly eliminates them from being present in some areas or, alternatively, indicates a potential presence in other areas that needs to be followed up by survey. Locating a project in or in proximity to certain habitats can result in adverse impacts to those habitats and the species that utilize them and, in those situations, MDIFW will likely recommend increased siting and design considerations, operational measures, monitoring practices, and/or other efforts in attempt to avoid, minimize, and possibly mitigate for such impacts. It should be noted that there is no comprehensive statewide inventory that includes all RTE species occurrences and habitats or SWHs and that the completeness of maps varies by habitat, location, and previous survey efforts. Resource surveys, project siting, facility design/layout, and operational practices are all very important steps in this process.

**Rare, Threatened, and Endangered Species and Habitats**

The Maine Endangered Species Act (MESA; 12 M.R.S. §12801 et. seq.) identifies all inland fish and wildlife species that are listed as Endangered or Threatened in Maine and provides the Commissioner of MDIFW with the authority to implement MESA. Pursuant to MESA, listed species are afforded special protection against activities that may cause "take" (kill or cause death), "harassment" (create injury or significantly disrupt normal behavior patterns), and other adverse actions. Further, the No Adverse Environmental Effect Standard of the Site Location Law (06-096, CMR 375) provides for the preservation of "unusually important wildlife habitats, particularly those of rare or endangered species", as well as protection of "wildlife and fisheries by maintaining suitable and sufficient habitat" and avoiding adverse effects on "wildlife and fisheries lifecycles". Rare or "Special Concern" species are defined by MDIFW as

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species that do not meet the criteria as Endangered or Threatened, but are particularly vulnerable and could easily become Endangered, Threatened, or Extirpated due to restricted distribution, low or declining numbers, specialized habitat needs or limits, or other factors.

### **Significant Wildlife Habitats**

Significant Wildlife Habitats are defined and protected pursuant to the Natural Resources Protection Act (38 M.R.S., §480-B.10) and SWH Rules (06-096 CMR 335; 09-137 CMR 10). Subject to the requirements of the Rules, SWHs include habitats for state and federal endangered and threatened animal species; high and moderate value deer wintering areas and travel corridors; seabird nesting islands; critical Atlantic salmon spawning and nursery areas; significant vernal pool habitat; high and moderate value waterfowl and wading bird habitat; and shorebird nesting, feeding, and staging areas.

### **Protected Natural Resources**

Protected Natural Resources are defined and protected by the Natural Resources Protection Act (38 M.R.S., §480-B.8). PNRs include coastal sand dune systems, coastal wetlands, significant wildlife habitats, fragile mountain areas, freshwater wetlands, great ponds, rivers, streams, and brooks. Some of these resources are specifically managed by MDIFW based on the presence of, and unique habitat value for, certain species of fish or wildlife.

MDIFW's preliminary review of information on record indicated no known occurrences of Endangered, Threatened, or Special Concern species within the project area. Additionally, our Department has not mapped any Significant Wildlife Habitats that would be directly affected by your project, based on the information provided to date. As we discussed, the following resources require further investigation.

#### Freshwater wetlands

It was indicated in our meeting that a wandering survey has been performed for preliminary locations of natural resources but, formal wetland delineations have not yet been conducted. Therefore, accurate information is not yet available on the extent of wetlands on site. Freshwater wetlands are valuable natural resources that serve important functions to help preserve, protect, and enhance adjacent aquatic and terrestrial habitats as well as provide important habitats themselves for a myriad of species. MDIFW recommends that freshwater wetlands be definitively located and delineated on site to enable an informed assessment of resources and appropriate agency recommendations.

#### Intermittent and perennial streams

As noted during our meeting, one of our principal concerns will be to identify the presence of intermittent and perennial streams and stream-related species of concern. Rivers, streams, and brooks within remote project sites are often in or near headwaters, providing high water quality and habitat values for fish and other aquatic and wetland species. MDIFW recommends maintaining 100-foot undisturbed, vegetated buffers from the upland edge of all intermittent and perennial streams and any contiguous wetlands. Maintaining and enhancing buffers along these resources is critical to the protection of water temperatures, water quality, natural inputs of coarse woody debris, and various forms of aquatic life necessary to support conditions required by coldwater fish and other aquatic species. As discussed, there are numerous coldwater fisheries resources and watersheds throughout the area that are of importance. Riparian buffers also provide critical habitat and important travel corridors for a variety of wildlife species.

Stream crossings should be avoided but, if a stream crossing is necessary or an existing crossing needs to be modified, it should be designed to provide full fish passage. Small streams, including intermittent

streams, can provide crucial rearing habitat, cold water for thermal refugia, and abundant food for juvenile salmonids on a seasonal basis. Undersized crossings may inhibit these functions. Generally, MDIFW recommends that all new, modified, and replacement stream crossings be sized to span at least 1.2 times the bank-full width of the stream. In addition, we generally recommend that stream crossings be open bottomed (i.e. natural bottom), although embedded structures which are backfilled with representative streambed material have been shown to be effective in not only providing habitat connectivity for fish but also for other aquatic organisms. MDIFW encourages consideration of these factors during initial design of the project, selection of its position in the landscape, site preparation, and installation of infrastructure, to ensure continuation of these important habitat functions.

#### Significant Vernal Pools

At our meeting, it was noted that site surveys have not yet been conducted for Significant Vernal Pools. Vernal pools are shallow depressions that usually contain water for only part of the year and typically dry out by mid to late summer. Although vernal pools may only contain water for a relatively short period of time, they serve as unique breeding habitat for certain species of wildlife, including salamanders and frogs. The “significance” of vernal pools and their associated buffers (Critical Terrestrial Habitats) is dependent upon several factors, including the presence or use by state RTE species, or the presence and reproductive success of certain pool-breeding amphibians. It should be noted, a comprehensive statewide inventory for SVPs has not been conducted. And, since vernal pools dry out on a seasonal basis, they can easily be missed during dry conditions. Therefore, we recommend that surveys for vernal pools be conducted within the project site boundary by qualified wetland scientists prior to final project design to determine whether there are SVPs present in the area. These surveys should extend out to 250 feet beyond the anticipated project footprint to determine potential impacts to the critical terrestrial habitats of off-site SVPs, assuming such pools are located on land owned or controlled by the applicant. A MDEP Maine State Vernal Pool Assessment Form should be completed for each pool and submitted to MDIFW for pool status determination as soon as possible and **well before the project application is submitted**. The optimal time for assessing the presence of amphibian indicator species coincides with a 2-3-week spring breeding period that varies slightly with geography, elevation, and weather. Vernal Pools are designated as “Potentially Significant” until such time that a seasonally valid survey is conducted, and the true value determined. Because of the limited survey period, some developers may choose to initially consider their pools as Significant and reassess them in the future under viable conditions. Alternatively, a developer may choose to consider them as Significant Vernal Pools, not formally survey them, and design the proposed project accordingly to avoid (recommended), minimize, and mitigate for any impacts to these resources.

#### Great blue heron colonies

The great blue heron (*Ardea herodias*) is designated as a Species of Special Concern in Maine due to an 82% decline in the coastal breeding population observed from 1983 to 2018. Since 2009, MDIFW has been monitoring the statewide population to determine if the decline seen along the coast is also occurring statewide. Great blue herons build large stick nests in live, dead, or dying trees 8-100 feet or more above the ground, and may nest in uplands, wetlands, or on islands. Great blue herons nest in groups and generally occupy colonies from April 1<sup>st</sup> thru August 15<sup>th</sup> (known as the Sensitive Nesting Period). During this time, the birds can be extremely sensitive to disturbances caused by human intrusion, noise, and predators, and may even abandon a colony as a result.

Not all great blue heron colonies have been mapped in Maine. For this reason, MDIFW recommends that, while conducting further site investigations and resource surveys for project design and review, the applicant survey live trees in upland areas within the proposed project boundaries for great blue heron

nest colonies and level of use. Heron surveys should be conducted between May 1 and June 15 for projects in northern and Downeast Maine. If heron nest colonies are known or discovered, MDIFW recommends that these areas be avoided and that any construction activities (land clearing, road construction, and building of permanent structures) within 600 feet occur outside of the Sensitive Nesting Period. Also, any standing dead wood in the vicinity of heron nests that is not commercial and doesn't pose a safety hazard should be left to provide potential nesting habitat for waterfowl, wading birds, or cavity nesting birds/mammals.

#### Bat habitat

During our meeting, we discussed the dire statuses of bat populations in Maine. Of the eight species of bats that occur in Maine, three *Myotis* species are afforded special protection under Maine's Endangered Species Act: the little brown bat (*M. lucifugus*, State Endangered); northern long-eared bat (*M. septentrionalis*, State Endangered); and eastern small-footed bat (*M. leibii*, State Threatened). The five remaining bat species are designated as Species of Special Concern: red bat (*Lasiurus borealis*), hoary bat (*L. cinereus*), silver-haired bat (*Lasionycteris noctivagans*), tri-colored bat (*Perimyotis subflavus*), and big brown bat (*Eptesicus fuscus*). Different bat species utilize specific types of habitat during critical periods of their life cycles. MDIFW and other parties are conducting surveys throughout the state. As discussed, please document if the project site contains any areas with ½-acre or more of talus fields or rocky outcrops, or cliffs visible from remote imagery.

This consultation review has been conducted specifically for known MDIFW jurisdictional features and should not be interpreted as a comprehensive review for the presence of other regulated features that may occur in this area. Prior to the start of any future site disturbance, we recommend additional consultation with other state agencies including the Maine Natural Areas Program, the Maine Land Use Planning Commission, and the Maine Department of Environmental Protection, in order to avoid unintended disturbances of protected resources. Further, as noted above, our comments should be considered preliminary based on the limited information provided at this stage. MDIFW requests the opportunity for further review of complete natural resource reports, application materials, and plans related to Wolfden Resources' proposed activities related to metallic mineral mining, solar energy, transmission line corridors, etc. and how design and operational measures are intended to protect groundwater, surface waters, and natural resources of concern.

MDIFW hopes that this information is of assistance to you in your project design. If you have any questions or concerns, please feel free to contact me at [robert.d.stratton@maine.gov](mailto:robert.d.stratton@maine.gov) or (207) 287-5659.

Sincerely,

Handwritten signature of Robert D. Stratton in cursive, with a small "IFW" monogram at the end.

Robert D. Stratton  
Environmental Program Manager  
Maine Department of Inland Fisheries & Wildlife

cc: Ron Little, Jeremy Ouellette (Wolfden Resources)  
Stacie Beyer, Billie MacLean, Tim Carr (LUPC)  
Kevin Dunham, Mark Caron (MDIFW)



## Thompson, Peter H.

---

**From:** Stratton, Robert D <Robert.D.Stratton@maine.gov>  
**Sent:** Monday, December 30, 2019 11:53 AM  
**To:** Thompson, Peter H.  
**Cc:** 'rlittle@wolfdenresources.com'; 'Jeremy Ouellette'; Beyer, Stacie R; MacLean, Billie J; Carr, Tim; Dunham, Kevin; Caron, Mark  
**Subject:** RE: Information Request - Pickett Mountain  
**Attachments:** TopoMap\_TalusLayer.pdf; Wolfden prelim resource surveys 25Nov2019.pdf

Good day Peter,

I am writing to update some of the information provided in the attached letter of 11/25/19 and in our meeting of 11/05/19 for Wolfden Resources' proposed rezoning and potential mineral mining project in T6R6. Much of the information that we have disseminated in recent years concerning bats has been related to wind energy proposals. Though concerns with population trends and the desire to avoid or minimize detrimental impacts applies universally, we recognize that there are also differences between various types of development. Accordingly, we have been working on developing more general development guidelines. As we discussed, in addition to traditional hibernacula like caves and old mines, recent findings indicate that *Myotis* and Big Brown bats may also overwinter in exposed rocky features. Some species of bat, like the eastern small-footed bat, use rocky features year-round. For wind energy proposals, and as was recommended for Wolfden Resources, MDIFW recommends surveys for areas of "*½-acre or more of talus fields, rocky outcrops, or cliffs visible from remote imagery*" on site. For wind energy proposals, surveys are recommended to extend for a distance of three miles from the project site. MDIFW's draft guidance for solar energy and other significant proposals recommends surveys for rocky features of approximately 1,000 square feet in size or more, including smaller areas of rock piles and tailings (i.e., quarry spoils), on and within 250-feet of a project site. This recommendation is more applicable for a Wolfden Resources' application than the one that was previously provided.

Occupied talus slopes in Maine have consisted of variable rock sizes, ranging in size from softball to car-sized boulders. Rock piles, rock ledges, and small vertical cracks in rocks (>1/2 inch wide) create crevices that allow bats to access deeper cavities that provide protection for predators and suitable temperature and humidity conditions. Detailed photographs and coordinates should be submitted to MDIFW for review, and acoustic monitoring may be recommended to document occupancy. Alternatively, these features should be appropriately buffered commensurate with the size and layout of the project. If these features are not present in the project area, MDIFW does not anticipate significant impacts to any of the bat species as a result of this project based on currently best available science.

MDIFW has incorporated a new "*Maine Cliff and Talus Areas*" feature in its habitat map layers. This new layer is not a comprehensive record of such features and does not replace onsite surveys. However, it does provide an initial starting point for interested parties. MDIFW has added this feature to the attached preliminary resource map for Wolfden Resources. You will see that rocky/talus features, depicted as dotted polygons, are shown south of Pickett Mountain and some distance away from the project search area, based on current known information.

I hope this information is of assistance to you. Please let me know of any concerns or questions. Thank you and happy new year, Bob.

**Bob Stratton**  
**MDIFW**

---

**From:** Stratton, Robert D  
**Sent:** Monday, November 25, 2019 11:51 AM

**To:** Thompson, Peter H. <peter.thompson@woodplc.com>  
**Cc:** rlittle@wolfdenresources.com; Jeremy Ouellette <JOuellette@wolfdenresources.com>; Beyer, Stacie R <Stacie.R.Beyer@maine.gov>; MacLean, Billie J <Billie.J.MacLean@maine.gov>; Carr, Tim <Tim.Carr@maine.gov>; Dunham, Kevin <Kevin.Dunham@maine.gov>; Caron, Mark <Mark.Caron@maine.gov>  
**Subject:** RE: Information Request - Pickett Mountain

Peter,

Please find attached, MDIFW's preliminary review of known natural resources and recommended surveys associated with Wolfden's request for rezoning in T6R6 WELS. If you have any concerns or questions, please feel free to contact me. Thank you, Bob.

**Bob Stratton**  
**Wildlife Biologist**  
**Environmental Program Manager**

Maine Department of Inland Fisheries & Wildlife  
284 State Street; 41 State House Station  
Augusta, Maine 04333-0041  
Tel: (207) 287-5659  
[mefishwildlife.com](http://mefishwildlife.com)

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**From:** Thompson, Peter H. <peter.thompson@woodplc.com>  
**Sent:** Thursday, November 07, 2019 2:12 PM  
**To:** Stratton, Robert D <Robert.D.Stratton@maine.gov>; IFWEnvironmentalreview <IFWEnvironmentalreview@maine.gov>  
**Cc:** Jeremy Ouellette <JOuellette@wolfdenresources.com>  
**Subject:** RE: Information Request - Pickett Mountain

**EXTERNAL: This email originated from outside of the State of Maine Mail System. Do not click links or open attachments unless you recognize the sender and know the content is safe.**

Thanks Bob

Much appreciated

Peter

---

**From:** Stratton, Robert D [<mailto:Robert.D.Stratton@maine.gov>]  
**Sent:** Thursday, November 07, 2019 1:54 PM  
**To:** Thompson, Peter H. <peter.thompson@woodplc.com>; IFWEnvironmentalreview <IFWEnvironmentalreview@maine.gov>  
**Cc:** Jeremy Ouellette <JOuellette@wolfdenresources.com>  
**Subject:** RE: Information Request - Pickett Mountain

Peter,

It was good to meet with the Wolfden team and learn about the proposal. It was also a flashback to run into you after so many years! Thank you for forwarding this information. As I mentioned, I will be away from the office next week, but we have begun assembling information and I will work on this request further when I return. Thanks, Bob.

**Bob Stratton**

**Wildlife Biologist**

**Environmental Program Manager**

Maine Department of Inland Fisheries & Wildlife

284 State Street; 41 State House Station

Augusta, Maine 04333-0041

Tel: (207) 287-5659

[mefishwildlife.com](http://mefishwildlife.com)

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**From:** Thompson, Peter H. <[peter.thompson@woodplc.com](mailto:peter.thompson@woodplc.com)>

**Sent:** Thursday, November 07, 2019 11:33 AM

**To:** IFWEnvironmentalreview <[IFWEnvironmentalreview@maine.gov](mailto:IFWEnvironmentalreview@maine.gov)>

**Cc:** Stratton, Robert D <[Robert.D.Stratton@maine.gov](mailto:Robert.D.Stratton@maine.gov)>; Jeremy Ouellette <[JOuellette@wolfdenresources.com](mailto:JOuellette@wolfdenresources.com)>

**Subject:** Information Request - Pickett Mountain

**EXTERNAL: This email originated from outside of the State of Maine Mail System. Do not click links or open attachments unless you recognize the sender and know the content is safe.**

Greetings Bob

It was a pleasure meeting with you this last Tuesday. At your suggestion, and on behalf of Wolfden Resources, I am transmitting by this e-mail a request to Inland Fish and Wildlife to provide information concerning potential significant habitats, endangered and threatened species, species of special concern and other information the Department will require to be evaluated and reviewed for the Pickett Mountain Project located in T6R6.

To facilitate your review and in locating the Site I am attaching a copy of the Site figure presented by Jeremy Ouellette at the meeting. In addition I am providing a figure with a topographic background that shows the area covered by our recent preliminary "meander" survey. The coordinates of the approximate center of the Site are provided in a note below the legend (NAD 83 State Plane East).

If you have any question please feel free to reach out to Jeremy or myself.

Best Regards

Peter

**Peter Thompson**

Principal Project Manager

Environment & Infrastructure Solutions

511 Congress Street, Suite 200

Portland, Maine 04101

Direct: 207 828 3490

Mobile: 207 522 7171

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# Safety Shield

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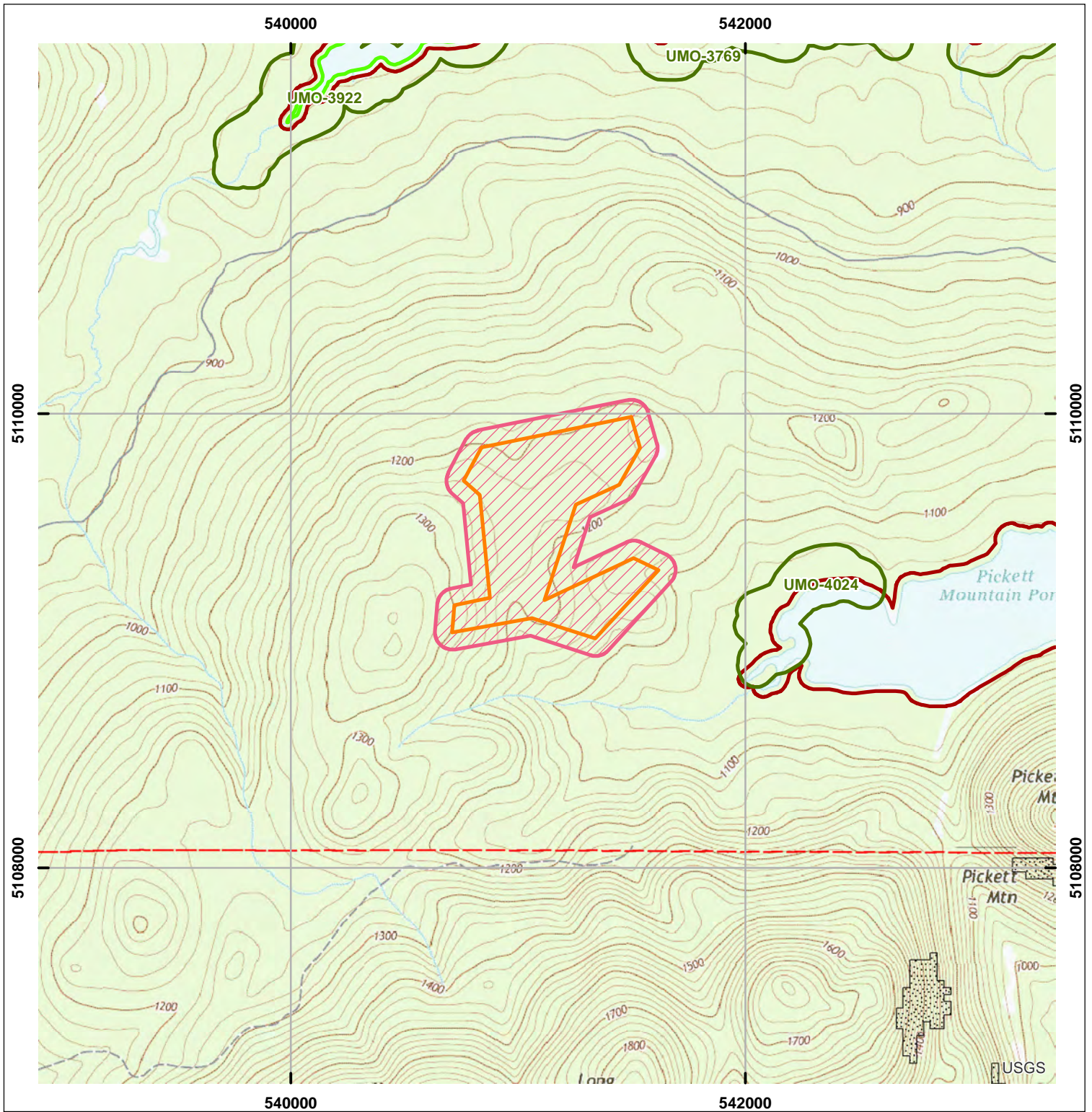
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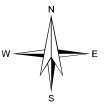
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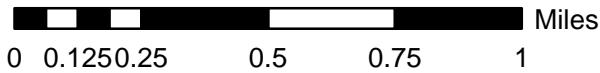


## Environmental Review of Fish and Wildlife Observations and Priority Habitats

Project Name: T6R6, Wolfden metallic mineral mining rezoning

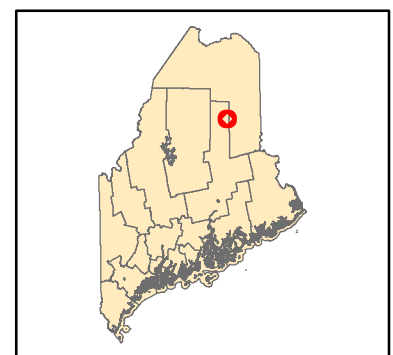
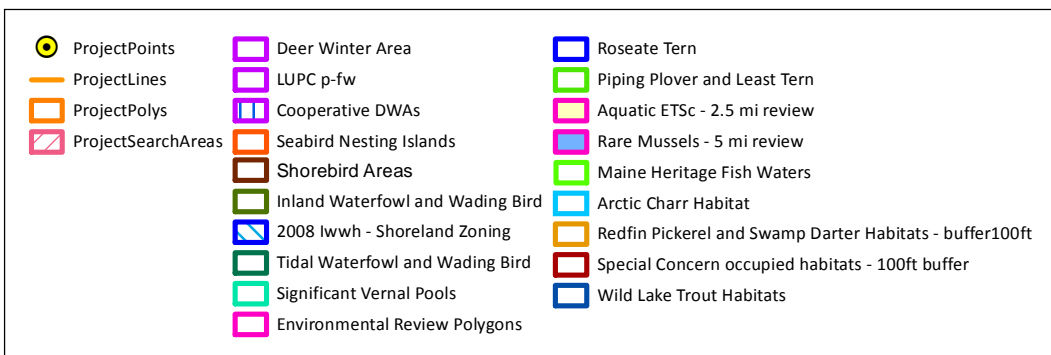


Maine Department of  
Inland Fisheries and Wildlife



Projection: UTM, NAD83, Zone 19N

Date: 12/30/2019



## **Appendix A**

### **Chapter 12 Requirements**

#### **Mining and Level C Mineral Exploration Activities**

## **B. Criteria for Approval of a Petition to Change a Subdistrict to a D-PD Development Subdistrict for Metallic Mineral Mining and Level C Mineral Exploration Activities.**

This Section of the Petition is responsive specifically to Chapter 12 § 4.B.(3) of the LUPC rules.

The factors listed in Chapter 12 § 4.B.(2) are addressed in corresponding Attachments to this Petition.

### **B(3)(a) Potential Short- and Long-Term Socioeconomic Impacts**

#### **Description of Cost Modelling:**

In order to estimate the economic impact that could result from a project such as Pickett Mountain, Wolfden first constructed an overall cost estimate and economic forecast of the entire project (Cashflow Model). This model was constructed using a series of first principles calculations, to develop the underlying basis for cost and revenue streams as well as comparative studies in order to estimate unit costs for each aspect of the project. Costs are broken down into several silos. These silos include:

- Capital Infrastructure/Construction
- Mining Costs
- Milling Costs
- Environmental Costs
- General & Administration Costs
- Energy Costs
- Maintenance Costs

Capital Infrastructure/Construction are a series of estimated project costs scheduled into the model. This is inclusive of building costs, earthworks, civil works, any infrastructure required as well as upfront permitting expenses, exploration projects, and design engineering prior to starting construction of the project.

Mining costs are built mainly from first principles then compared to other project costs to evaluate accuracy. These costs include the cost of development, production, vertical development and diamond drilling work. In addition, these costs cover engineering support and mine management.

Milling costs include all reagents, manpower, tailings management, assay lab and related activities, and crushing costs (Contracted or with owned equipment).

Environmental costs include equipment, related to environmental activities, lab consumables, manpower, the water treatment facility, any spill clean-up costs, environmental consulting fees, ongoing permitting fees and any licensing fees related to environmental projects.

General and Administrative (G&A) costs include Administration manpower, training, education and professional development costs, software licenses, insurances, general office supplies, communications costs, general site maintenance (Snow removal, road work, etc..) and freight costs.

Energy costs include diesel consumptions, gasoline used on site, propane and electrical power consumption.

Maintenance costs include maintenance on mobile equipment used in the mine, mill and on surface and fixed building maintenance for all infrastructure onsite, as well as components within them. Maintenance is sometimes contracted based on specialty requirements.

After each of the cost silos were constructed, the costs were then compiled to each of their specific project phases (Permitting, construction, operations and reclamation) and distributed by the following when applicable:

- Employment
- Consumables
- Services
- Energy

By organizing costs in this fashion, Wolfden can anticipate the distribution of costs, by project phase and schedule, that would be spent within the local communities, the impacted counties, the state and the country. The result are summarized in the following tables.



Year	Year -2	Year -1	Year 0	Year 1	Year 2	Year 3	Year 4	Year 5	Year 6	Year 7	Year 8	Year 9	Year 10	Year 11	Year 12	Year 13	Year 14	Year 15	Total	
<b>Community Manpower</b>																				
Permitting Phase	\$0	\$0	\$0																\$0	
Construction Phase				\$9,988,575															\$9,988,575	
Operations Phase				\$3,021,333	\$3,961,580	\$3,961,580	\$3,961,580	\$3,961,580	\$3,961,580	\$3,961,580	\$3,961,580	\$3,961,580	\$3,961,580	\$2,965,137	\$2,965,137	\$2,965,137	\$2,965,137	\$2,965,137	\$53,501,242	
Reclamation Phase														\$1,238,333	\$1,238,333				\$2,476,667	
<b>County Manpower</b>																				
Permitting Phase	\$133,913	\$133,913	\$133,913																\$401,740	
Construction Phase				\$9,988,575															\$9,988,575	
Operations Phase				\$4,059,103	\$5,234,412	\$5,234,412	\$5,234,412	\$5,234,412	\$5,234,412	\$5,234,412	\$5,234,412	\$5,234,412	\$5,234,412	\$3,758,903	\$3,758,903	\$3,758,903	\$3,758,903	\$3,758,903	\$69,963,321	
Reclamation Phase														\$1,857,500	\$1,857,500				\$3,715,000	
<b>State Manpower</b>																				
Permitting Phase	\$334,783	\$334,783	\$334,783																\$1,004,349	
Construction Phase				\$29,965,724															\$29,965,724	
Operations Phase				\$5,490,476	\$6,900,847	\$6,900,847	\$6,900,847	\$6,900,847	\$6,900,847	\$6,900,847	\$6,900,847	\$6,900,847	\$6,900,847	\$6,228,626	\$6,228,626	\$6,228,626	\$6,228,626	\$6,228,626	\$98,741,232	
Reclamation Phase														\$4,953,333	\$4,953,333				\$9,906,667	
<b>Country Manpower</b>																				
Permitting Phase	\$334,783	\$334,783	\$334,783																\$1,004,349	
Construction Phase				\$29,965,724															\$29,965,724	
Operations Phase				\$6,474,383	\$7,884,753	\$7,884,753	\$7,884,753	\$7,884,753	\$7,884,753	\$7,884,753	\$7,884,753	\$7,884,753	\$7,884,753	\$6,930,859	\$6,930,859	\$6,930,859	\$6,930,859	\$6,930,859	\$112,091,460	
Reclamation Phase														\$6,191,667	\$6,191,667				\$12,383,333	
<b>Community Supplies</b>																				
Permitting Phase	\$66,780	\$66,780	\$66,780																\$200,340	
Construction Phase				\$19,977,149															\$19,977,149	
Operations Phase				\$3,536,954	\$3,956,402	\$3,956,402	\$3,956,402	\$3,956,402	\$3,956,402	\$3,956,402	\$3,956,402	\$3,956,402	\$3,956,402						\$39,144,577	
Reclamation Phase														\$1,238,333	\$1,238,333				\$2,476,667	
<b>County Supplies</b>																				
Permitting Phase	\$133,913	\$133,913	\$133,913																\$401,740	
Construction Phase				\$21,641,912															\$21,641,912	
Operations Phase				\$4,740,468	\$5,159,916	\$5,159,916	\$5,159,916	\$5,159,916	\$5,159,916	\$5,159,916	\$5,159,916	\$5,159,916	\$5,159,916						\$51,179,712	
Reclamation Phase														\$1,238,333	\$1,238,333				\$2,476,667	
<b>State Supplies</b>																				
Permitting Phase	\$334,783	\$334,783	\$334,783																\$1,004,349	
Construction Phase				\$49,942,873															\$49,942,873	
Operations Phase				\$9,001,465	\$9,420,913	\$9,420,913	\$9,420,913	\$9,420,913	\$9,420,913	\$9,420,913	\$9,420,913	\$9,420,913	\$9,420,913						\$93,789,679	
Reclamation Phase														\$2,476,667	\$2,476,667				\$4,953,333	
<b>Country Supplies</b>																				
Permitting Phase	\$334,783	\$334,783	\$334,783																\$1,004,349	
Construction Phase				\$74,914,310															\$74,914,310	
Operations Phase				\$10,554,103	\$10,973,551	\$10,973,551	\$10,973,551	\$10,973,551	\$10,973,551	\$10,973,551	\$10,973,551	\$10,973,551	\$10,973,551						\$109,316,066	
Reclamation Phase														\$2,476,667	\$2,476,667				\$4,953,333	
<b>Community Energy</b>																				
Permitting Phase	\$0	\$0	\$0																\$0	
Construction Phase				\$1,664,762															\$1,664,762	
Operations Phase				\$2,623,029	\$2,623,029	\$2,623,029	\$2,623,029	\$2,623,029	\$2,623,029	\$2,623,029	\$2,623,029	\$2,623,029	\$2,623,029						\$26,230,288	
Reclamation Phase														\$1,238,333	\$1,238,333				\$2,476,667	
<b>County Energy</b>																				
Permitting Phase	\$0	\$0	\$0																\$0	
Construction Phase				\$1,664,762															\$1,664,762	
Operations Phase				\$5,987,189	\$5,987,189	\$5,987,189	\$5,987,189	\$5,987,189	\$5,987,189	\$5,987,189	\$5,987,189	\$5,987,189	\$5,987,189						\$59,871,885	
Reclamation Phase														\$1,238,333	\$1,238,333				\$2,476,667	
<b>State Energy</b>																				
Permitting Phase	\$0	\$0	\$0																\$0	
Construction Phase				\$4,161,906															\$4,161,906	
Operations Phase				\$8,510,308	\$8,510,308	\$8,510,308	\$8,510,308	\$8,510,308	\$8,510,308	\$8,510,308	\$8,510,308	\$8,510,308	\$8,510,308						\$85,103,083	
Reclamation Phase														\$1,238,333	\$1,238,333				\$2,476,667	
<b>Country Energy</b>																				
Permitting Phase	\$0	\$0	\$0																\$0	
Construction Phase				\$6,659,050															\$6,659,050	
Operations Phase				\$8,510,308	\$8,510,308	\$8,510,308	\$8,510,308	\$8,510,308	\$8,510,308	\$8,510,308	\$8,510,308	\$8,510,308	\$8,510,308						\$85,103,083	
Reclamation Phase														\$1,238,333	\$1,238,333				\$2,476,667	
<b>Community Services</b>																				
Permitting Phase	\$37,000	\$37,000	\$37,000																\$111,000	
Construction Phase				\$1,664,762															\$1,664,762	
Operations Phase				\$360,562	\$360,562	\$360,562	\$360,562	\$360,562	\$360,562	\$360,562	\$360,562	\$360,562	\$360,562						\$3,605,621	
Reclamation Phase														\$495,333	\$495,333				\$990,667	
<b>County Services</b>																				
Permitting Phase	\$37,000	\$37,000	\$37,000																\$111,000	
Construction Phase				\$1,664,762															\$1,664,762	
Operations Phase				\$360,562	\$360,562	\$360,562	\$360,562	\$360,562	\$360,562	\$360,562	\$360,562	\$360,562	\$360,562						\$3,605,621	
Reclamation Phase														\$743,000	\$743,000				\$1,486,000	
<b>State Services</b>																				
Permitting Phase	\$185,000	\$185,000	\$185,000																\$555,000	
Construction Phase				\$4,161,906															\$4,161,906	
Operations Phase				\$2,271,006	\$2,271,006	\$2,271,006	\$2,271,006	\$2,271,006	\$2,271,006	\$2,271,006	\$2,271,006	\$2,271,006	\$2,271,006						\$22,710,057	
Reclamation Phase														\$2,476,667	\$2,476,667				\$4,953,333	
<b>Country Services</b>																				
Permitting Phase	\$185,000	\$185,000	\$185,000																\$555,000	
Construction Phase				\$6,659,050															\$6,659,050	
Operations Phase				\$2,583,653	\$2,583,653	\$2,583,653	\$2,583,653	\$2,583,653	\$2,583,653	\$2,583,653	\$2,583,653	\$2,583,653	\$2,583,653						\$25,836,533	
Reclamation Phase														\$2,476,667	\$2,476,667				\$4,953,333	
<b>Total</b>	<b>\$2,117,739</b>	<b>\$2,117,739</b>	<b>\$2,117,739</b>	<b>\$352,770,705</b>	<b>\$84,698,992</b>	<b>\$84,698,992</b>	<b>\$84,698,992</b>	<b>\$84,698,992</b>	<b>\$84,698,992</b>	<b>\$84,698,992</b>	<b>\$84,698,992</b>	<b>\$84,698,992</b>	<b>\$84,698,992</b>	<b>\$84,698,992</b>	<b>\$52,699,359</b>	<b>\$52,699,359</b>	<b>\$19,883,526</b>	<b>\$19,883,526</b>	<b>\$19,883,526</b>	<b>\$1,286,464,146</b>

In total, the anticipated investment within each of these impact jurisdictions (community, county, state and country) over each of the four project phases (permitting, construction, operations and reclamation), is as follows:

- Total estimated investment into the local communities over Life of Project (LoP) duration is \$164.5 M USD.
- Total estimated investment into the impacted counties over the LoP is \$230.6 M USD.
- Total estimated investment into the state of Maine over the LoP is \$413.4 M USD.
- Total estimated investment into the United States of America over the LoP is \$477.8 M USD.

Not included in the economic benefits calculated above, is the potential continued future income from trained employees who elect to travel abroad for work post operation of Pickett Mountain. In the mining industry, traveling employment (Fly In, Fly Out) or camp style jobs have become standard. Travel and work schedules range and vary significantly depending on the project, however, these types of jobs are structured to support skilled and trained workers who enjoy working in the mining industry but do not want to relocate away from their home: in this case, Maine. Mining companies commonly support employees through this type of creative and flexible employment model due to the nature of mining in distant and remote areas where mineral deposits are located far from population centers.

Assuming 50% of the total ~60 employees trained and hired at Pickett Mountain remain within the industry for the remainder of their careers (~14 years), this could potentially result in additional income of \$44.4 M USD. This does not consider future generations that take an interest in this industry. This type of operation can be seen all over the world and some North American examples are as follows:

Mine	Company	Location	Schedule	Shift Duration	Total Employees
Meliadine Mine	Agnico Eagle	Nunavut, Canada	2 weeks in 2 weeks out	12 hours on and 12 hours off	~800
Schefferville	Tata Steel Minerals	Labrador, Canada	2 weeks in 2 weeks out	12 hours on and 12 hours off	~250
Mussel White	Newmont	Thunderbay, Canada	2 weeks in 2 weeks out	12 hours on and 12 hours off	~600
Red Dog	Teck Resources Limited	Alaska, USA	4 weeks in 2 weeks out	12 hours on and 12 hours off	~460

## **Employment:**

### **Exploration/Permitting Phase**

The levels of employment, aggregate wages and other direct expenses during the exploration and permitting phase is typically small compared to the overall project and are filled via contract/short term hires. The scope of professional services during this phase is designed to communicate with public and state stakeholders, produce communications and application submittals as well as address any comments or questions that arise throughout the permitting process. Within this phase of the project, it is typical that a series of test work is completed which include:

- Environmental baseline characterization work
- Engineering studies (health and safety, environmental management, geotechnical metallurgical, mining, financial)
- Infrastructure evaluations
- Workforce evaluations
- Detailed sequencing and scheduling

Concurrent with permitting activities, it is customary to continue conducting exploration activities to improve the knowledge of the current deposit as well as to expand known or inferred mineral resources.

Environmental baseline characterization work will be performed through the support of consultants sourced within Maine since the skillsets required for this work exist within the state. The work will be a combination of field work, desk top studies, data analysis and reporting. Typical unburdened wages for these employees are between 40-45\$/hr USD as an average of experience and skillsets. Exploration positions such as geologists, drillers and drill helpers that take place at the site are typically done with similar employee rates (40-45\$/hr USD) as an average across skillsets and experience. These employees oversee drilling core and other geological samples as well as logging and mapping the rocks as well as identifying resources which are then converted to potential mining areas.

As the project becomes permitted and transitions into construction phase, Wolfden would target a transition to permanent hires for some of these technical positions. Skillsets that are based in Maine (environmental, civil & infrastructure, construction planning) would be sourced locally. Specialty skillsets such as mining and specific metallurgy will likely be outsourced to support project success. Within this phase of the project, communications with local post-secondary schools to guide interest in establishing a program to target specialty skillsets in order to replace non-local workforce with local workforce in subsequent phases of the project. These types of programs will consist of both field and classroom learning and will target the next generation demographics. These types of programs have been very successful in other jurisdictions with high level of employment post-graduation, not only in the target project but projects abroad as this industry has a high rate of travelling workers and professionals. This type of program has worked well in various mining camps including neighboring New Brunswick, Canada which initially focused on First Nations employees. A synopsis of the short education campaign performed in New Brunswick is as follows:

- Ran three First Nation mining courses through the New Brunswick Community College (NBCC) in Miramichi and Bathurst NB
- 26 People were trained for underground miners course
- 12 people were trained for mill operators course
- 14 People are still employed underground at the Caribou Mine in New Brunswick

- 2 Mill operators are still employed at the concentrator and are proceeding through the ranks
- Several trained miners have transitioned to working at different mines via relocation or fly in fly out
- Courses were difficult to fill as they were restricted to First Nation members. Majority of the First Nation communities are greater than an hour drive from the mine site.

Based on the conceptual project economics, the anticipated spend / investment on manpower for exploration and permitting phase of the project is ~\$1.4 M USD.

### **Construction Phase**

The construction phase of the project is anticipated to last one year in duration. During the construction phase, significant civil projects are required to take place as described above. As designs will likely be completed within the permitting phase of the project, most of the workforce during this period will be engineering, procurement and construction management (EPCM), project management, and labor workforce. Typically, labor includes heavy equipment operators, concrete and civil works, logging, steel and timber construction work, millwrighting, surveying, logistics coordination etc. The amount of workforce expected during this phase is extremely variable and will be sourced significantly through contractors as majority of the skillsets required are short term. Throughout the construction phase, the manpower working onsite can range anywhere between 10 to 50 people working at any given time depending on the construction projects currently on going and at what stage they are. Majority of the workforce for this phase of the project will be contracted due to short duration, and majority of the contractors hired can potentially be sourced locally depending on skillsets available as the tasks involved are not specialized for a significant portion of the construction phase. Specialty work that is required during the mining initiation as well as construction of the concentrator will likely be sourced externally.

Based on the conceptual project economics, the anticipated spend / investment on manpower for the construction phase of the project is ~\$49.9M USD.

### **Operating Phase**

The operating phase of the project is anticipated to last for roughly 10 years which has potential to extend longer provided positive results from diamond drilling exploration throughout the mine life.

With steady state operations, comes significant opportunity to train and employee significant local workforce. As described above, it is Wolfden's strategy to establish a training program through a local college in order to facilitate organized education of the next generation of

miners and mill operators within the region. While being able to offer on the job training opportunities exist that lead to full time employment pending posting availability and employee performance. This is extremely valuable to Wolfden, as it provides the availability of a labour "pool". Having this source of local employees helps ensure steady operation of the mine and mill complex. Shifts in both the concentrator and in the mine will be 12hours long with two shifts per day to cover the 24/7 operation. Schedules will typically be 1 week of work on and 1 week of work off. This allows employees significant rest opportunity as well as maintains similar annual cumulative hours to a standard 40-hour work week.

The roles within the Operating phase of the project include but are not limited to the following:

#### Mine

- Equipment operators (scoops and trucks)
- Jumbo drillers
- Long hole drillers
- Blasters
- Nippers (materials and supply delivery and retrieval)
- Grader operators
- Ground support miners

#### Concentrator

- Crusher operators
- Grinding operators
- Flotation operators
- Reagent mix operators
- Dewatering operators
- Tailings operators
- Concentrator loadout

#### Ancillary

- Mechanics
- Electricians
- General Construction/Maintenance
- Civil works
- Road grading and snow removal
- Purchasing and procurement
- Accounting
- Human resources
- Security
- Supervision/Management
- Water treatment facility operators

## Technical

- Mine Engineering
- Geology
- Ventilation
- Geotechnical
- Survey
- Environmental Engineering
- Planning
- IT

Based on the conceptual project economics, the anticipated spend / investment on manpower for the construction phase of the project is ~\$99.5M USD.

### **Reclamation**

The majority of the reclamation work would occur during the operation phase, as well as early in the reclamation phase. It is Wolfden's priority to ensure that the project is significantly de-risked at all stages of the operation. The tailings management facility (TMF) will be constructed using a staged approach.

A detailed description of the reclamation phase is discussed later in this Petition. With regard to workforce, the skillsets required for this phase of the project life will once again be short term and somewhat specialized. For that reason, it is anticipated that much of this decommissioning work will be contracted to Maine based specialists. In addition, operators to finalize closure of the TMF will be kept on as well as water treatment facility operators to continue treating and discharging water. The environmental team will be the last to remain on the site, ensuring that all discharge guidelines are being met as well as evaluate the site contact water to ensure that it is returning back to background per design.

Based on the conceptual project economics, the anticipated spend / investment on manpower for the construction phase of the project is ~\$12.4M USD.

### **Consumables:**

Materials, supplies and consumables at each stage of the project vary significantly by type and volume. Majority of the consumables will be purchased within the construction and operation phase of the project and locally sources when applicable, however, a significant portion (~50%) of this spend will be sourced external to Maine due to the nature of the supply. The estimated spend / investment on materials, supplies and consumables is as follows by project phase:

Construction - \$99.9 M USD

Operation - \$95.3 M USD

Reclamation - \$5.0 M USD

## **Services**

Services required by the project phases are support provided by contractors and consultants etc. These are typically used for short term or specialized projects throughout the life of the project. These costs are also inclusive of payments to the government agencies of Maine in order to facilitate review and management of any permits required for this project. It is not anticipated that majority of these skillsets will be sourced locally. However, within Maine and other states, significant support for these services are anticipated to be found.

The estimated spend / investment on services by project phase is as follows:

Permitting/Exploration – \$1.1 M USD

Construction - \$8.3 M USD

Operation - \$66.4 M USD

Reclamation - \$4.9 M USD

## **Energy**

Energy costs related to Pickett Mountain are mainly supplied from within Maine. Energy includes costs such as electricity, diesel fuel, propane and gasoline to run through each phase of the project life. The estimated spend / investment on energy by project phase is as follows:

Permitting/Exploration – \$0.0 M USD

Construction - \$8.3 M USD

Operation - \$82.6 M USD

Reclamation - \$2.5 M USD

## **B(3)(b) Potential Impacts on Services**

Attachment O contains an evaluation of the potential impacts on services (including fire and police protection, education and solid waste disposal) and utilities. The evaluation identifies the proximity or availability of those services and utilities, and potential burdens for communities or State, county or local governments to provide those services if burdened. Attachment O is titled *Evaluation of Sufficiency of Existing Services and Utilities, and General Measures to Increase Service Capacities (if required) including Burdens on Communities or Government to Provide*

*Those Services.* The evaluation describes the demographics of the labor market (principally the Houlton Labor Market Area), the housing market, education infrastructure and public safety services and discusses the expected geographic relationship between these services and where Wolfden anticipates the needed 60 person work force might come from locally (i.e., which towns and communities) as these new jobs are created for mine construction, operation and closure.

This evaluation suggests the proposed mine and job creation will have a positive local effect of housing, and the job market in general but is unlikely to pose an undue burden on other services provided at the community and state levels. The largest burden is likely to be the introduction of some new students into the regional school system, but whether this represents a burden or not depends on the capacity of the individual public school to support additional students, if their parents move into a school district in response to employment at the mine. Attachment O contains a letter from the Stacyville school district (Regional School Unit 89) indicating that expected enrollment of additional students within that RSU would not be a burden.

### **B(3)(c) Potential Impacts on Existing Infrastructure**

The two primary infrastructure systems that could be affected by the project include power and roads. The project will not require public water or public waste water disposal.

**Attachment J** provides a map and description of existing transportation infrastructure routes, and an analysis of potential impacts and improvements. Access to the site is through well developed and well-maintained private gravel roads, currently used for logging. These private roads connect to a series of State highway routes and eventually the interstate system. These routes will be used for travel of employees to work and for transportation of mineral concentrates to market for smelting in Canada. The additional traffic volume and capacity of this road system does not burden the infrastructure.

A new power transmission line will be installed by Emera Maine from their substation located south of Patten Maine on Route 11. The new power line will follow Route 11 for 9.5 miles then the existing gravel access road for another 5.1 miles. Wolfden will contract with Emera directly for this service.



## **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:

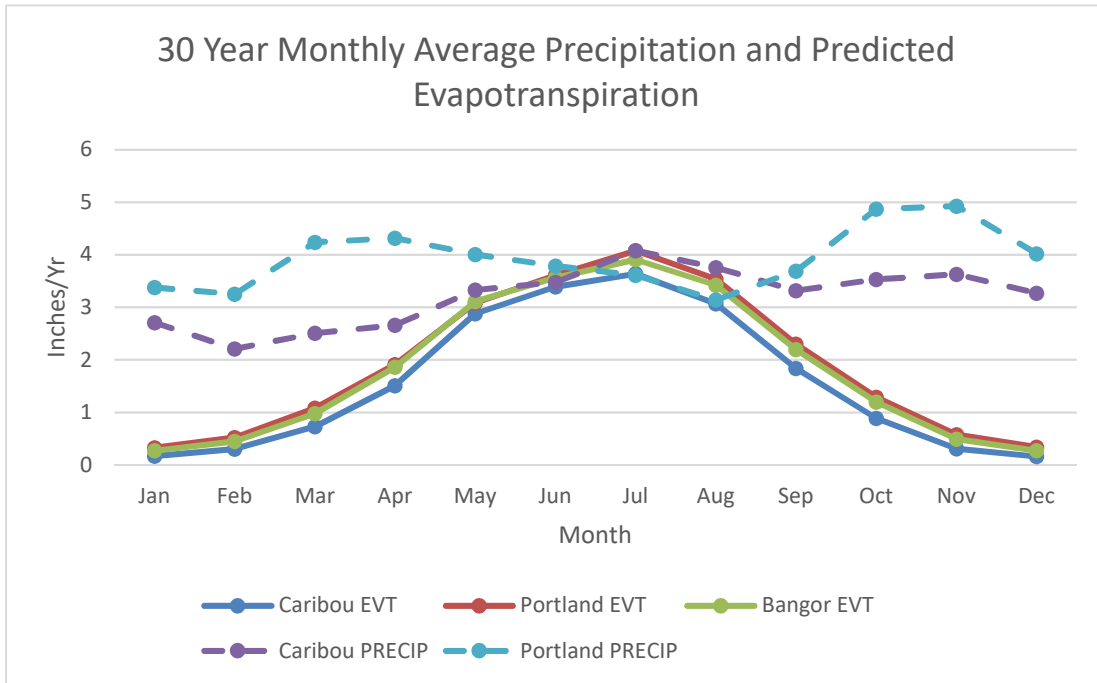
Pickett Pond	173 acres
Grass Pond	42 acres
Pleasant Lake	310 acres

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 deposit therefore does 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 occurs 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 to 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 45  
 Interception 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 57 acres and includes the foot print of buildings, mine portal, a surface water management facility and a dry TMF (approximately 42 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 197.5 acres which includes approximately 57 acres of land that would be constructed upon or disturbed by construction (12 acres in the proposed mine operations area, 3 acres of car and truck/equipment parking and 42 acres for dry stacked TMF. 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 pile would be capped and restored/revegetated. The cap concepts will be developed during the final design. 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 5<sup>th</sup> and June 5<sup>th</sup>. 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 TMF, current depicted locations of proposed facilities have been placed outside of the area anticipated to contain wetlands. An approximate 4.25 acre area is present within the area of the planned 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.

It is Wolfden's aim 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 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 water fowl 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 and Process 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. 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 tailings facility 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 <sup>3</sup> /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 stopping 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. 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.

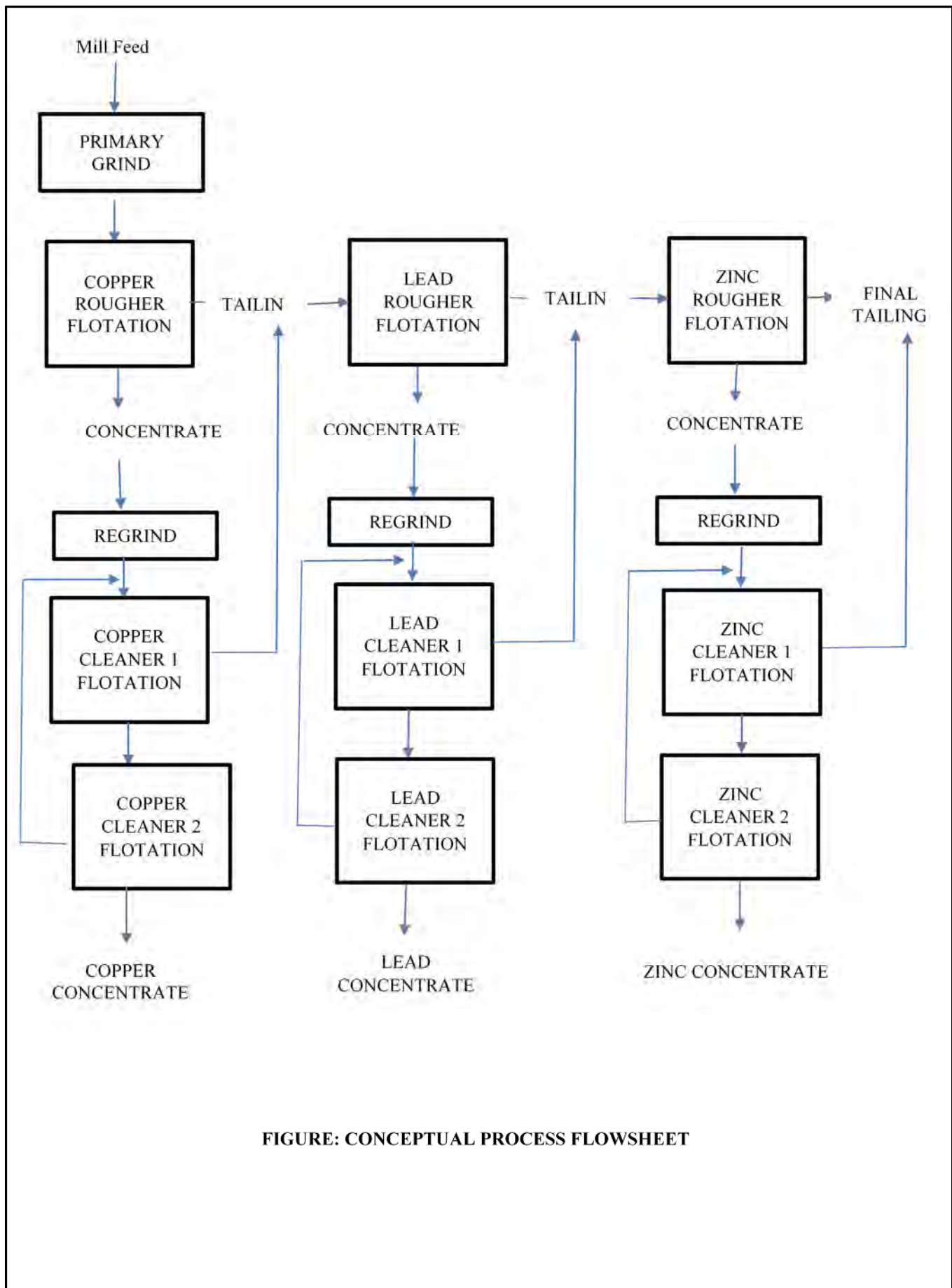
When sulfide mineralized rock is mined and processed, the surface area of exposed sulfides increases along with the potential for acid generation. Exposure of these sulfide minerals to oxygen and water results in weathering and oxidation producing acidity (hydrogen ions),

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. Sulfides in water under reducing (low oxygen) conditions are stable and will not oxidize or leach and therefore not produce any acidity.

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. These non-valuable 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**

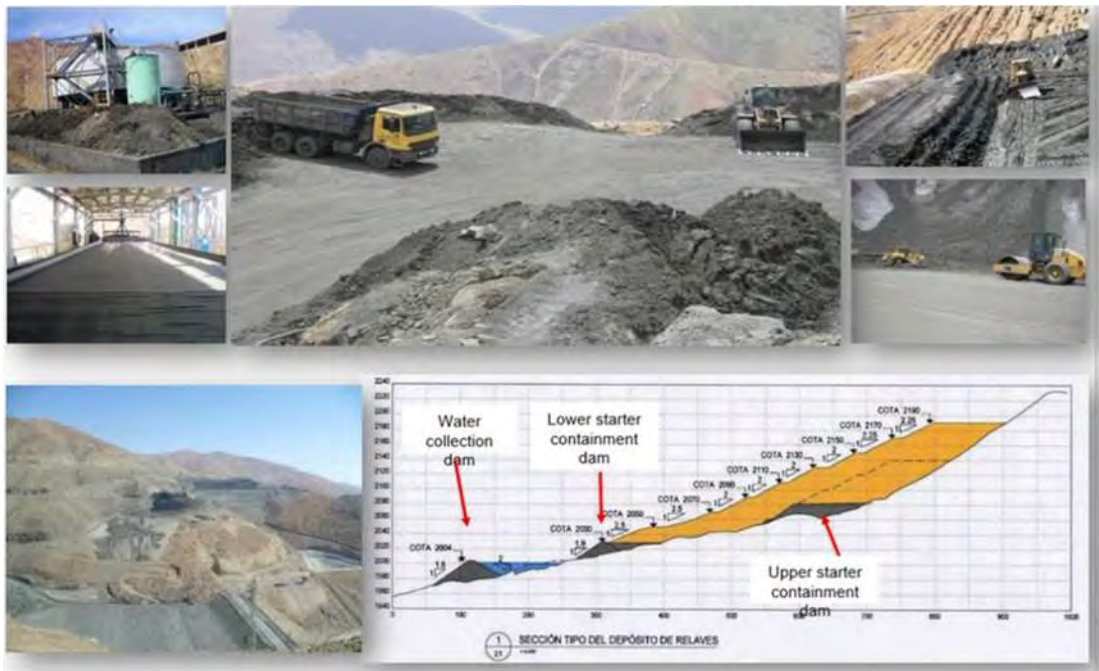
Tailings, also contain iron sulfides as well as other metallic sulfide minerals and are managed accordingly to mitigate acid generation and leaching. When tailings are first produced they are oversaturated with respect to water content and are pumped in a slurry. As mine backfilling takes place, the slurry is thickened and blended with waste rock fill then hauled and placed into underground excavations. Since these tailings are deposited within the mine workings, impacted water from the tailings are then collected and pumped to surface for water treatment and recycling or discharge. Post closure of the project site, the tailings remain below the ground water table and are not exposed to air. Since no oxidation of sulphides can occur, there is no potential to produce acid or leach metals from these deposited tailings into perpetuity. In addition, deep bedrock groundwater migration rates are likely to be very slow owing to low transmissivity would not be expected to migrate toward local groundwater discharge areas that are stratigraphically shallow.

The remaining tailings will be deposited on a sub-aerial tailings facility. Filtered tailings will be dewatered and transported by truck or conveyor belt to an area where they are stacked and can be compacted to be more physically stable. These tailings may be hauled by truck and spread by dozer. Very little water is used to transport the tailings meaning that no supernatant pond will form. Runoff collection is required however. Slopes of up to 20% to 30% may be achieved using dry stack tailings. At 800 t/d, this requires 1.5 loads/hour using 35 t off-road articulated haul truck, or 1 per hour @ 40 t off-road articulated haul truck. Transport of filter cake is likely to consist of a bunker loaded by small stacking conveyor with 24-hr of tailings storage, with a single operator able to operate the front-end-loader and articulated haul truck and dump into the TMF; once or twice per shift, the operator may require an hour on a dozer to grade the tailings, followed by roller compacting. It is expected that the cycle time to the farthest of the TMF will require under 7 hrs while shortest is 4 hrs; dozing and compacting can complete a 10-hr day with time to spare.

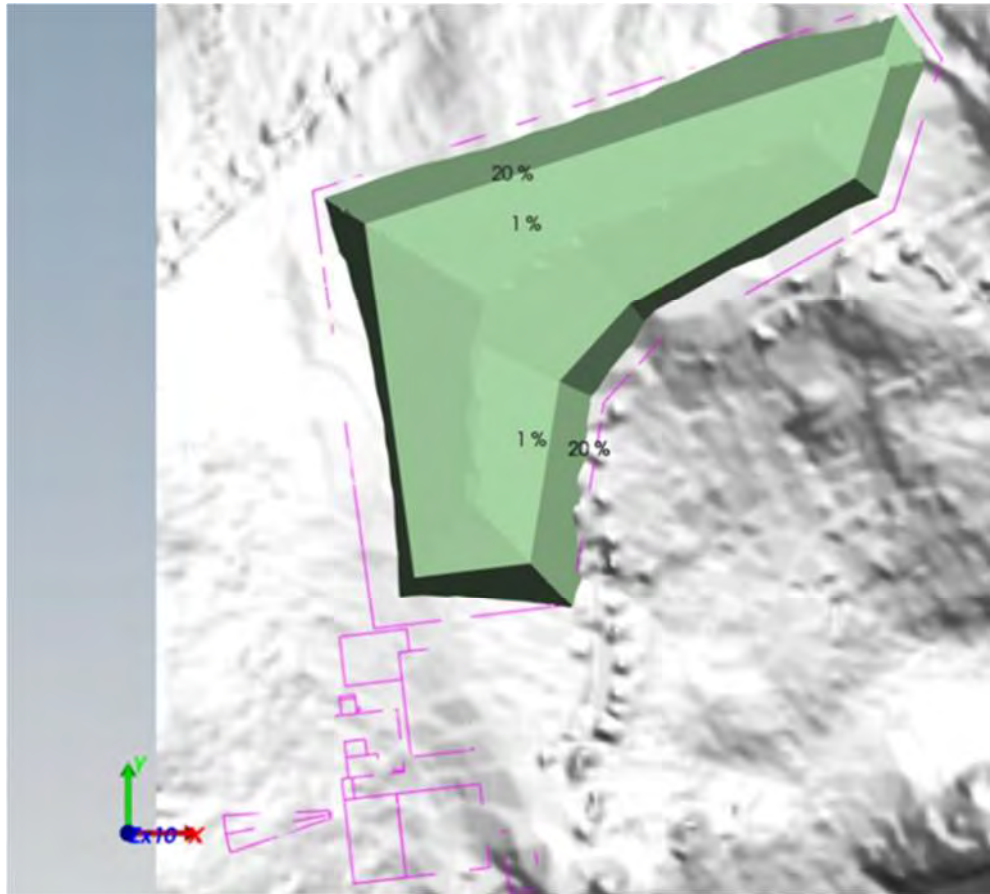
Sub-aerial (dry stacked) tailings are the only above ground tailing management method allowed under the DEP Chapter 200 rules for Group A and Group B mine waste. The sub-aerial TMF will be designed in accordance with requirements (including a composite liner and leachate collection) of Chapter 200 Subchapter 5 Section 21 Mine Waste Unit Design Standards. Leachate ponds that collect water that encounters tailings are also governed by these standards.

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**

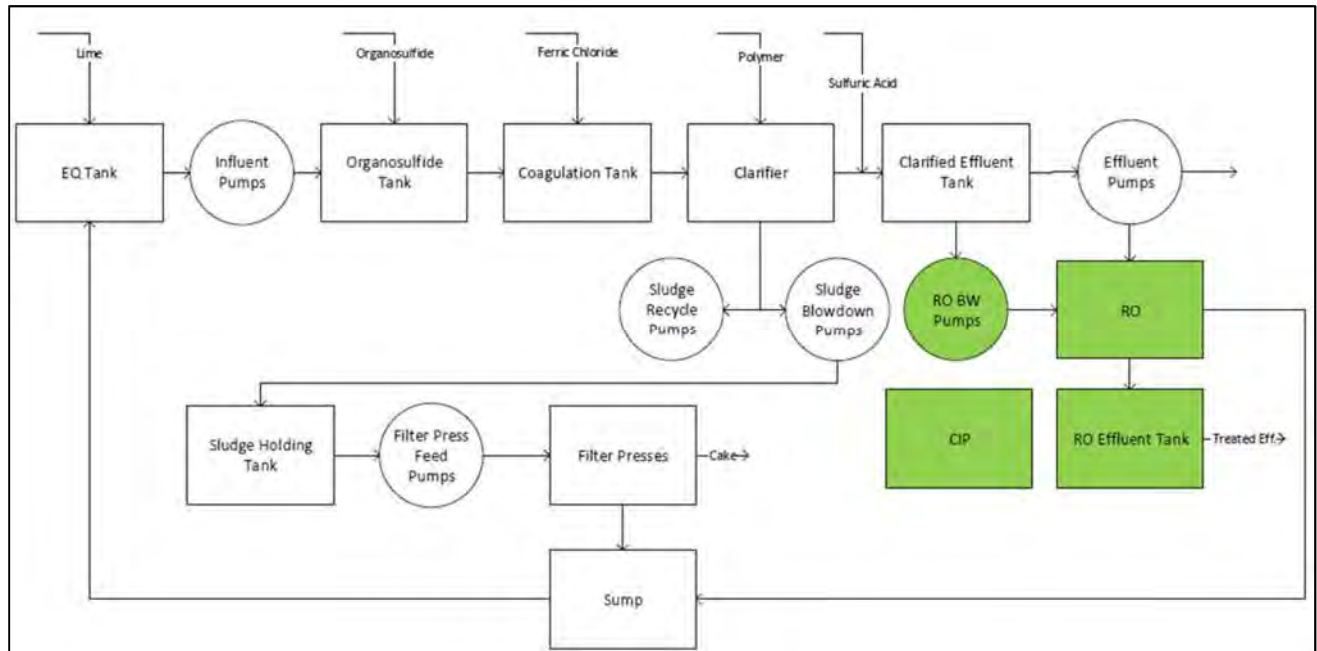
The figure above illustrates a dry stack tailings facility. The tailings stack features an outer side slope of 20% raised to a maximum height of about 22ft (7 m). The volume of tailings in this model is approximately 940,000 cubic yards (720,000 m<sup>3</sup>), equivalent to about 1.8 Mt when fully consolidated 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 raw water pond. Seepage water from tailings as well as precipitation water onto the tailings facility 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 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.

## C. Submittal Contents.

The following Attachments (A through Q) are provided to assist the LUPC's verification that the proposed rezoning would meet the criteria discussed in subsection B, above, and the balance of this Petition:

- Attachment A** A narrative description of the nature and basis for the subdistrict change being requested;
- Attachment B** A legal description and delineation of the property boundaries proposed for redistricting, including names, addresses and affiliations of current owners and any other entities having a legal interest in the property;
- Attachment C** Names and addresses of property owners located within 1,000 feet of the subject property;
- Attachment D** A preliminary plan for general location and timing of project elements;
- Attachment E** A location map drawn to scale on the most recent version of the USGS topographic map and a LUPC Land Use Guidance Map that indicates the area for which a D-PD Development Subdistrict designation is sought and the estimated boundaries of the ore body proposed to be explored or mined;
- Attachment F** A map drawn to scale of at least 1 inch to 100 feet showing existing site conditions, including contours at 10 foot intervals or less, water courses, unique or unusual natural conditions, forest cover, wetlands, known or likely deer wintering areas, lakes, ponds, existing structures, road and transportation routes, property boundaries and names of adjoining property owners, scenic locations and other prominent topographical and natural resource features;
- Attachment G** A soils map of low intensity that encompasses those portions of the property proposed for D- PD Development Subdistrict designation, including identification of soils used in the USDA Soil Series;
- Attachment H** Surficial and bedrock geology maps at a scale of 1:24,000, or largest scale available, of the property proposed for D-PD Development Subdistrict designation;
- Attachment I** A map and or description of the location of public, private and industrial water supplies as well as mapped aquifers located within a three-mile radius of the mining area or exploration site;
- Attachment J** A map and description of the location and extent of existing infrastructure to include roadways and transportation routes to be utilized, potential impacts on this existing infrastructure, as well as infrastructure to be constructed or improved;
- Attachment K** A map identifying significant natural resources and sensitive natural areas located within a three-mile radius of the mining area or exploration site including protected water

bodies, significant wildlife and plant areas, fragile mountain areas, historic sites, scenic resources, public lands, registered critical areas, and LUPC subdistricts;

**Attachment L** A map and description of existing uses, such as recreational uses, within a three-mile radius of the mining area or exploration site;

**Attachment M** A description of general measures that may be undertaken to assure that mining in the specified location will not have undue adverse impacts on existing uses and resources and measures that a permittee may take to avoid, minimize or mitigate any adverse impacts;

**Attachment N** A description of socioeconomic impacts, both positive and negative, of the proposed metallic mineral mining or level C mineral exploration activities upon the immediate area and communities within and adjacent to the LUPC's jurisdiction likely to be affected by the proposed activities, as well as to the county and state;

**Attachment O** An evaluation of the sufficiency of existing services and utilities, a description of any general measures necessary to increase those service capacities and an examination of the burdens on communities or government to provide those services;

**Attachment P** An explanation of how this proposal is consistent with the standards and purpose of the D-PD Development Subdistrict; and

**Attachment Q** A description of the anticipated site conditions following closure and the potential for future reclamation and beneficial use of the affected area.

## 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 B**

### **Legal Description and Delineation of the Property Boundaries Proposed for Redistricting**

#### **Legal Description (please see attached Property Map)**

A CERTAIN PIECE OR PARCEL OF LAND LOCATED WITHIN TOWNSHIP 6, RANGE 6 WELS (T6, R6 WELS), AND BEING MORE PARTICULARLY DESCRIBED AS FOLLOWS:

BEGINNING AT A POINT LOCATED IN THE MAINE STATE PLANE COORDINATE SYSTEM – NAD 83 (EAST ZONE – 1801), AS MEASURED IN UNITED STATES SURVEY FEET AT North: 899153.00', East: 994260.00', SAID POINT ALSO LYING ON A COURSE OF NORTH SIXTY-THREE DEGREES FORTY-SIX MINUTES FORTY-FOUR SECONDS WEST (N 63°46'44" W) AND SIX THOUSAND EIGHT HUNDRED AND FIFTY (6850) FEET FROM THE GENERALLY SOUTH EAST CORNER OF SAID T6, R6 WELS;

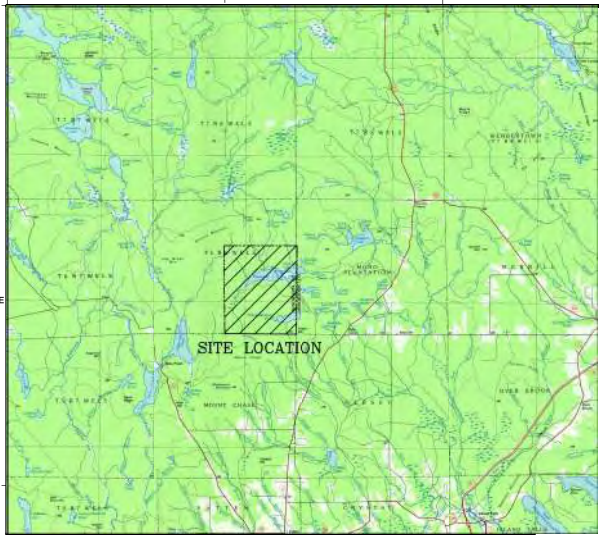
THENCE RUNNING THROUGH THE LAND OF THE GRANTOR THE FOLLOWING SIXTEEN (16) COURSES  
THENCE, S 55° 23' 31" W, 1038.81 FEET TO A POINT LOCATED AT NORTH 898563.00', EAST 993405.00';  
THENCE, N 85° 36' 27" W, 1436.22 FEET TO A POINT LOCATED AT NORTH 898673.00', EAST 991973.00'  
THENCE, S 77° 25' 45" W, 739.73 FEET TO A POINT LOCATED AT NORTH 898512.00', EAST 991251.00'  
THENCE, N 56° 01' 20" W, 883.93 FEET TO A POINT LOCATED AT NORTH 899006.00', EAST 990518.00'  
THENCE N 48° 29' 55" E, 1367.26 FEET TO A POINT LOCATED AT NORTH 899912.00', EAST 991542.00'  
THENCE, N 6° 10' 05" W, 1396.08 FEET TO A POINT LOCATED AT NORTH 901300.00', EAST 991392.00'  
THENCE, N 42° 18' 47" W, 392.17 FEET TO A POINT LOCATED AT NORTH 901590.00', EAST 991128.00'  
THENCE, N 32° 42' 31", 259.08 FEET TO A POINT LOCATED AT NORTH 901808.00', EAST 991268.00'  
THENCE, N 75° 04' 07" E, 2375.20 FEET TO A POINT LOCATED AT NORTH 902420.00' EAST 993563.00'  
THENCE, S 26° 25' 24" E, 361.80 FEET TO A POINT LOCATED AT NORTH 902096.00', EAST 993724.00'  
THENCE, S 20° 36' 38" W, 491.46 FEET TO A POINT LOCATED AT NORTH 901636.00' EAST 993551.00'  
THENCE, S 61° 50' 47" W, 790.53 FEET TO A POINT LOCATED AT NORTH 901263.00' EAST 992854.00'  
THENCE, S 15° 11' 09" E, 217.60 FEET TO A POINT LOCATED AT NORTH 901053.00' EAST 992911.00'  
THENCE, S 53° 54' 54" E, 803.08 FEET TO A POINT LOCATED AT NORTH 900580.00' EAST 993560.00'  
THENCE, S 37° 14' 54" E, 817.82 FEET TO A POINT LOCATED AT NORTH 899929.00' EAST 994055.00'  
THENCE, S 14° 47' 53" E, 802.62 FEET TO THE POINT OF BEGINNING.

BEARINGS ARE BASED ON NAD 83.

SAID PARCEL CONTAINS 197.489 ACRES MORE OR LESS.

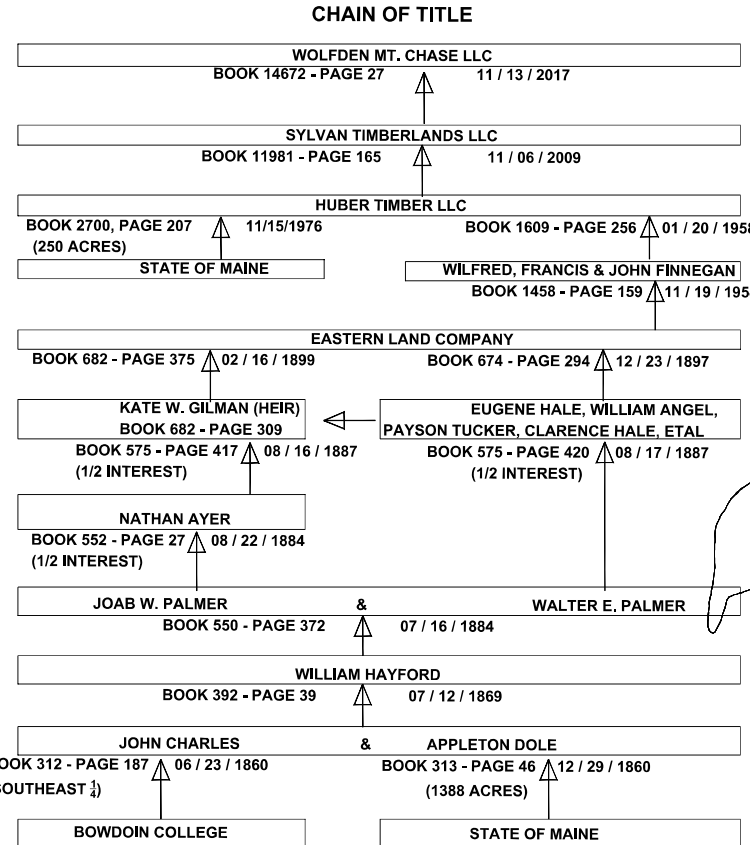
THE ABOVE DESCRIBED PARCEL IS A PORTION OF LAND OWNED BY THE GRANTOR AS DESCRIBED IN BOOK 14672, PAGE 27 OF THE PENOBSCOT REGISTRY OF DEEDS LOCATED IN BANGOR, MAINE





LOCATION MAP  
(NOT TO SCALE)

N/F AROOSTOOK TIMBERLANDS, LLC  
TAX MAP 1, LOT 1  
P.C. BOOK 6980, PAGE 329

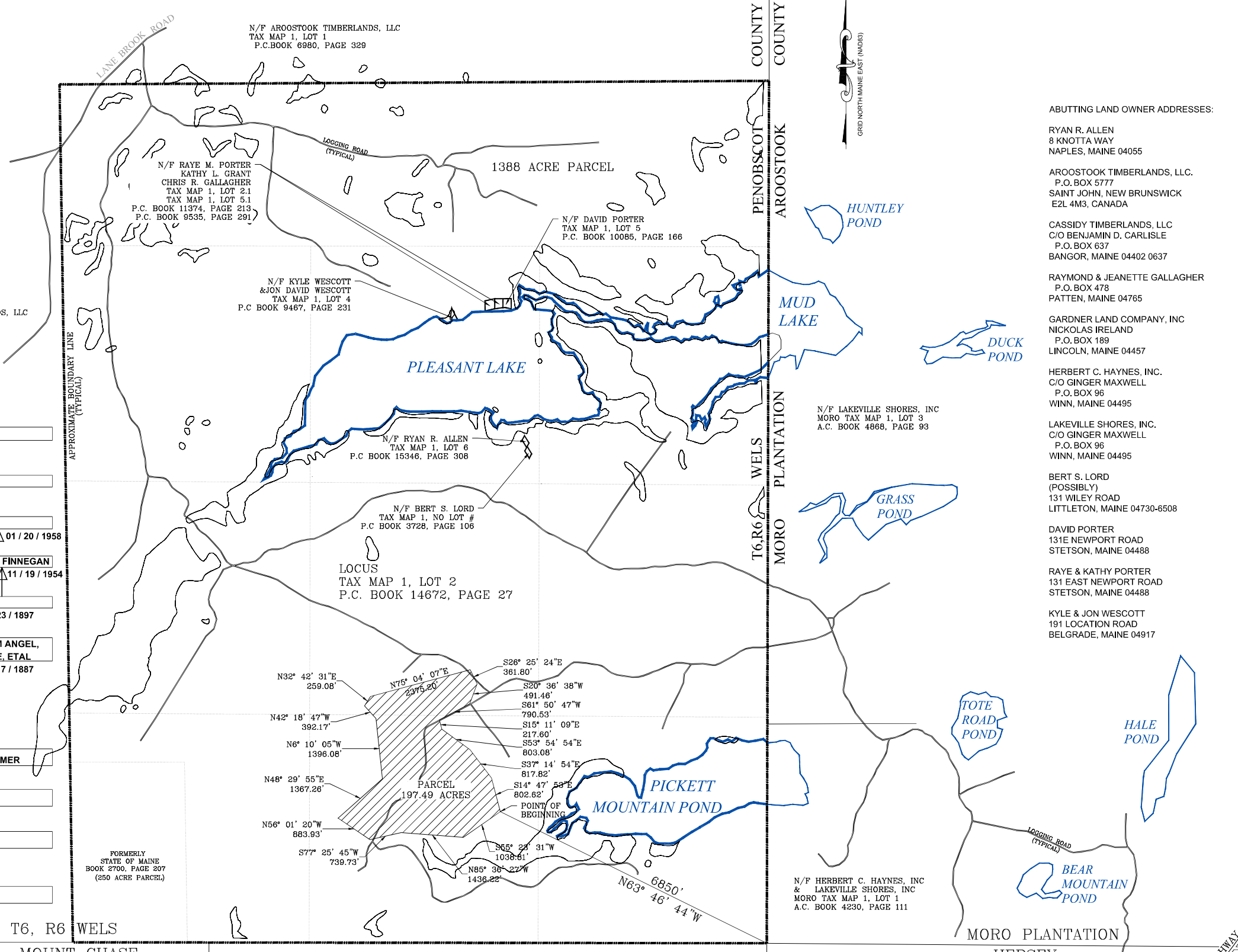


T6, R6 WELS  
MOUNT CHASE

N/F CASSIDY TIMBERLANDS, LLC  
MOUNT CHASE TAX MAP 1, LOT 7  
P.C. BOOK 9975, PAGE 337

GENERAL NOTES:  
ALL LOTS & PROPERTY LINES SHOWN HEREON ARE APPROXIMATE AND ARE SHOWN FOR REFERENCE PURPOSES ONLY.

TITLE TO THE 1388 ACRE PARCEL IS BELIEVED TO HAVE BEEN SUCCESSFULLY TRANSFERRED BY INSTRUMENTS RECORDED IN THE PENOBSCOT COUNTY REGISTRY OF DEEDS BOOK 11981, PAGE 165 AND BOOK 14672, PAGE 27. HOWEVER BOTH DEEDS HAVE LANGUAGE THAT COULD BE INTERPRETED TO EXCLUDE LAND OUTSIDE THE SOUTHEAST QUARTER OF T6, R6 WELS. THE 1388 ACRE TRACT LAYS OUTSIDE THE SAID SOUTHEAST QUARTER.



PENOBSCOT COUNTY  
AROOSTOOK COUNTY  
WELS  
MORO PLANTATION  
MOUNT CHASE  
HERSHEY

ABUTTING LAND OWNER ADDRESSES:

- RYAN R. ALLEN  
8 KNOTTA WAY  
NAPLES, MAINE 04055
- AROOSTOOK TIMBERLANDS, LLC.  
P.O. BOX 5777  
SAINT JOHN, NEW BRUNSWICK  
E2L 4M3, CANADA
- CASSIDY TIMBERLANDS, LLC  
C/O BENJAMIN D. CARLISLE  
P.O. BOX 637  
BANGOR, MAINE 04402 0637
- RAYMOND & JEANETTE GALLAGHER  
P.O. BOX 478  
PATTEN, MAINE 04765
- GARDNER LAND COMPANY, INC  
NICKOLAS IRELAND  
P.O. BOX 189  
LINCOLN, MAINE 04457
- HERBERT C. HAYNES, INC.  
C/O GINGER MAXWELL  
P.O. BOX 96  
WINN, MAINE 04495
- LAKEVILLE SHORES, INC.  
C/O GINGER MAXWELL  
P.O. BOX 96  
WINN, MAINE 04495
- BERT S. LORD  
(POSSIBLY)  
131 WILEY ROAD  
LITTLETON, MAINE 04730-6508
- DAVID PORTER  
131E NEWPORT ROAD  
STETSON, MAINE 04488
- RAYE & KATHY PORTER  
131 EAST NEWPORT ROAD  
STETSON, MAINE 04488
- KYLE & JON WESCOTT  
191 LOCATION ROAD  
BELGRADE, MAINE 04917



PROJECT  
WOLFEN RESOURCES  
CORPORATION  
1100 RUSSELL STREET  
THUNDER BAY, ONTARIO  
CANADA, P7B 5N2



DECEMBER 6, 2019  
DEED SKETCH OF BOUNDARY  
FOR WOLFEN MT CHASE LLC  
T6, R6, WELS, MAINE

REV	REVISION/ISSUE DESCRIPTION	DATE
# 1	ADDITIONAL DATA	12-23-20
# 2		

JOB NO. 3617197478  
PROJECT MANAGER JBW  
DRAWN BY LHG

SHEET 1  
OF  
1



NOT FOR CONSTRUCTION

Environment & Infrastructure Solutions, Inc.  
511 Congress St., Suite 200, Portland ME 04101  
P. (207) 775-5401 F. (207) 772-4762 www.woolpic.com  
SIGNED, SEALED AND DATED PAPER COPY PROVIDED BY THIS OFFICE MAY BE UTILIZED FOR BIDDING OR CONSTRUCTION PURPOSES. PLEASE NOTE: THIS DOCUMENT MAY NOT ACCURATELY REPRESENT THE FINAL DOCUMENT. ONLY AN ENGINEER, ARCHITECT OR SURVEYOR

## Attachment C

### Names and Addresses of Property Owners Located Within 1,000 feet of the Property

Please see Attachment B for property locations

ABUTTING LAND OWNER ADDRESSES:

RYAN R. ALLEN  
8 KNOTTA WAY  
NAPLES, MAINE 04055

AROOSTOOK TIMBERLANDS, LLC.  
P.O. BOX 5777  
SAINT JOHN, NEW BRUNSWICK  
E2L 4M3, CANADA

CASSIDY TIMBERLANDS, LLC  
C/O BENJAMIN D. CARLISLE  
P.O. BOX 637  
BANGOR, MAINE 04402 0637

RAYMOND & JEANETTE GALLAGHER  
P.O. BOX 478  
PATTEN, MAINE 04765

GARDNER LAND COMPANY, INC  
NICKOLAS IRELAND  
P.O. BOX 189  
LINCOLN, MAINE 04457

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C/O GINGER MAXWELL  
P.O. BOX 96

WINN, MAINE 04495  
LAKEVILLE SHORES, INC.  
C/O GINGER MAXWELL  
P.O. BOX 96

WINN, MAINE 04495  
BERT S. LORD  
(POSSIBLY)  
131 WILEY ROAD  
LITTLETON, MAINE 04730-6508

DAVID PORTER  
131E NEWPORT ROAD  
STETSON, MAINE 04488

RAYE & KATHY PORTER  
131 EAST NEWPORT ROAD  
STETSON, MAINE 04488

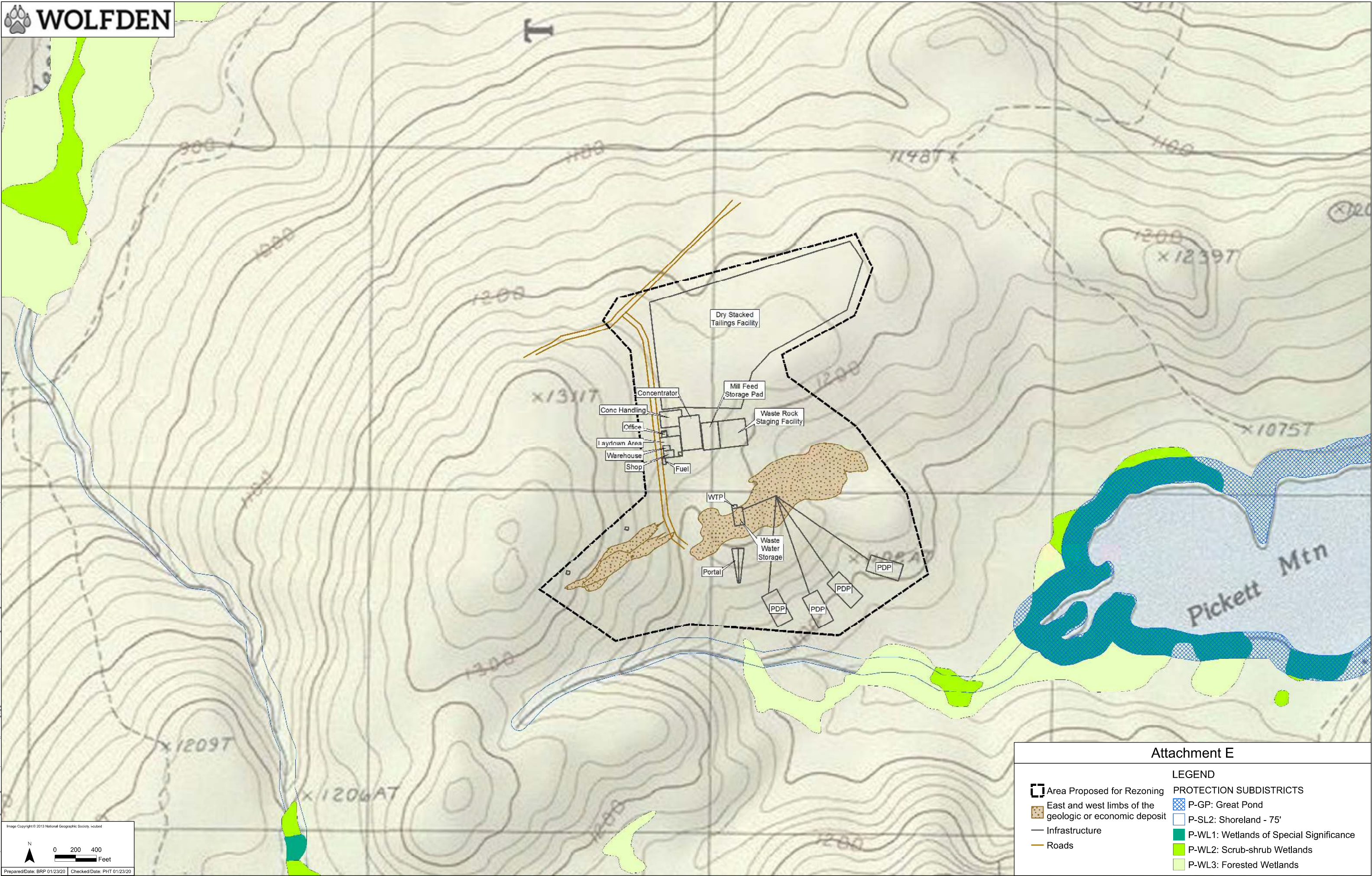
KYLE & JON WESCOTT  
191 LOCATION ROAD  
BELGRADE, MAINE 04917

**Attachment D**  
**Preliminary Plan for General Location and Timing of Project Elements**

Please see Preliminary Site Plan Exhibit D-2 for general location of buildings and facilities and the Schedule under Section 4 Project Description for timing of project elements. The phases of the project development are discussed in the Project Description.

## **Attachment E**

**Location Maps Indicating the Area of Proposed D-PD Development Subdistrict Designation Showing Estimated Boundaries of the Ore Body**



**Attachment E**

LEGEND	
	Area Proposed for Rezoning
	East and west limbs of the geologic or economic deposit
	Infrastructure
	Roads
	P-GP: Great Pond
	P-SL2: Shoreland - 75'
	P-WL1: Wetlands of Special Significance
	P-WL2: Scrub-shrub Wetlands
	P-WL3: Forested Wetlands

## **Attachment F**

### **Existing Site Conditions Map (1 inch to 100 feet)**

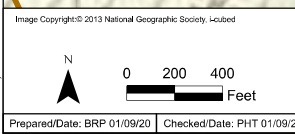
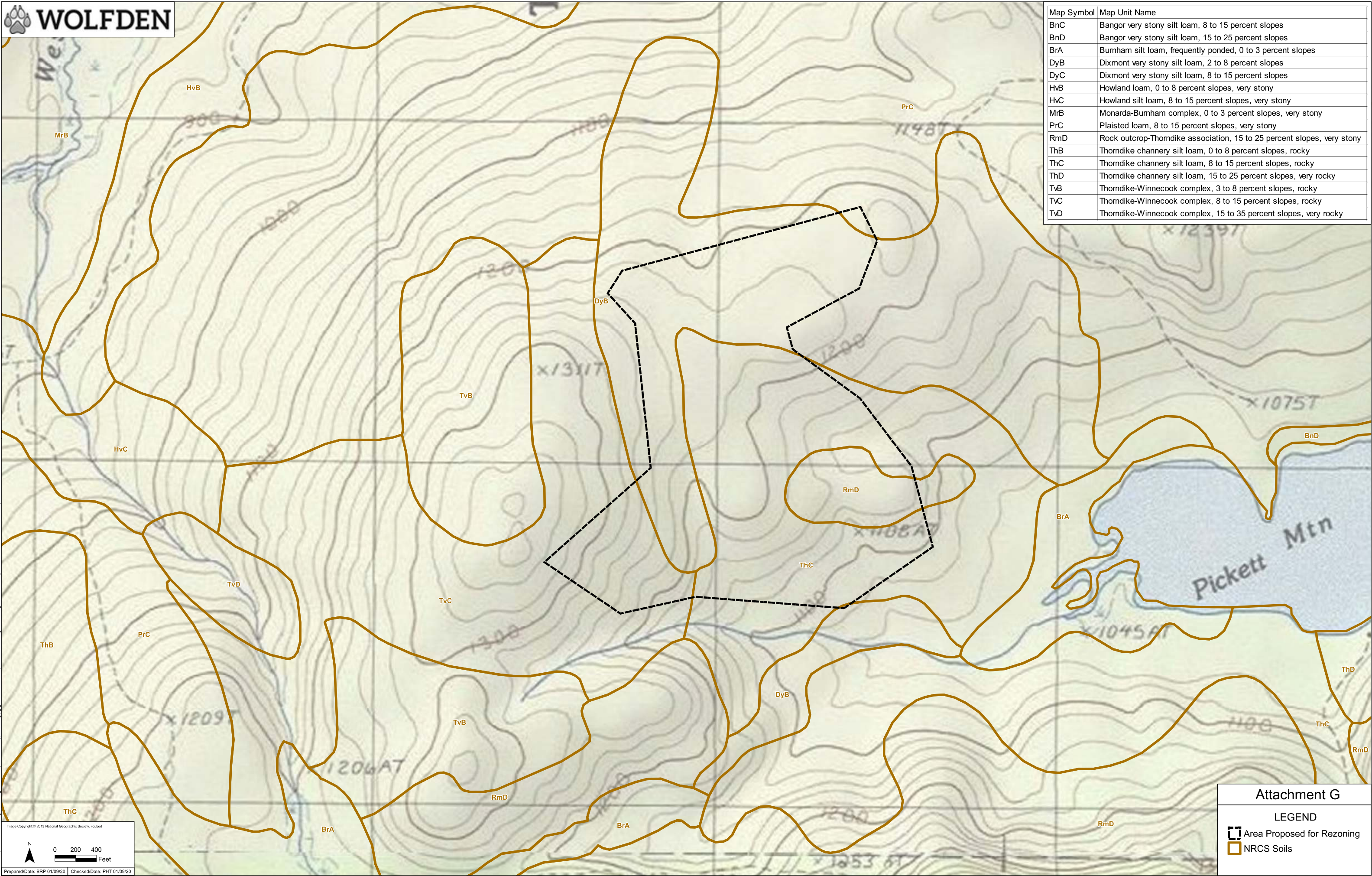
Please see Exhibit A-1 for adjoining property owner information

**Attachment G**

**Low Intensity Soils Map of the Property Proposed for D- PD Development  
Subdistrict Designation**





Map Symbol	Map Unit Name
BnC	Bangor very stony silt loam, 8 to 15 percent slopes
BnD	Bangor very stony silt loam, 15 to 25 percent slopes
BrA	Bumham silt loam, frequently ponded, 0 to 3 percent slopes
DyB	Dixmont very stony silt loam, 2 to 8 percent slopes
DyC	Dixmont very stony silt loam, 8 to 15 percent slopes
HvB	Howland loam, 0 to 8 percent slopes, very stony
HvC	Howland silt loam, 8 to 15 percent slopes, very stony
MrB	Monarda-Bumham complex, 0 to 3 percent slopes, very stony
PrC	Plaisted loam, 8 to 15 percent slopes, very stony
RmD	Rock outcrop-Thorndike association, 15 to 25 percent slopes, very stony
ThB	Thorndike channery silt loam, 0 to 8 percent slopes, rocky
ThC	Thorndike channery silt loam, 8 to 15 percent slopes, rocky
ThD	Thorndike channery silt loam, 15 to 25 percent slopes, very rocky
TvB	Thorndike-Winnecook complex, 3 to 8 percent slopes, rocky
TvC	Thorndike-Winnecook complex, 8 to 15 percent slopes, rocky
TvD	Thorndike-Winnecook complex, 15 to 35 percent slopes, very rocky



**Attachment G**

**LEGEND**

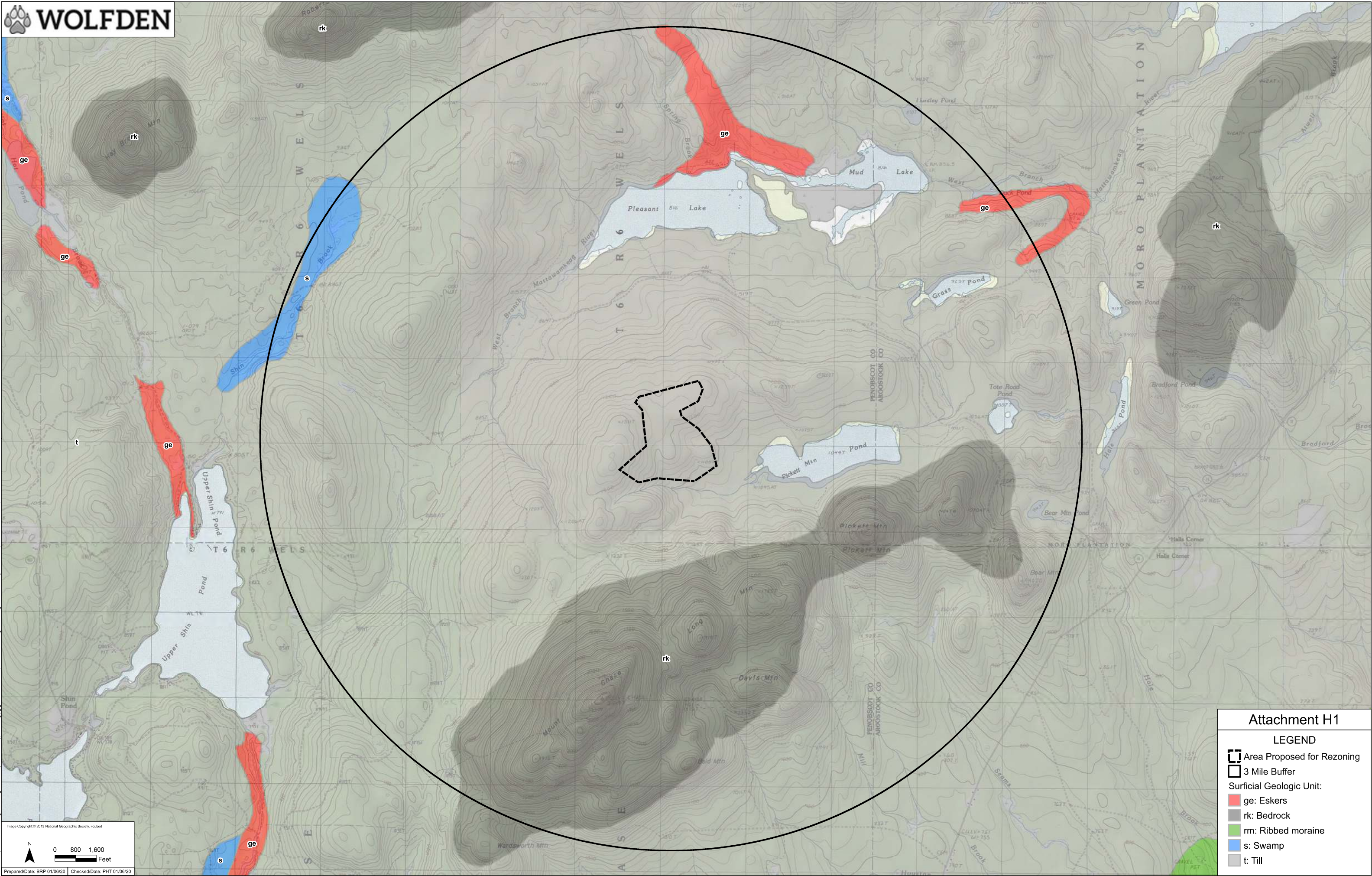
-  Area Proposed for Rezoning
-  NRCS Soils

## **Attachment H**

### **Surficial and Bedrock Geology Maps of the Property Proposed for D-PD Development Subdistrict Designation**

**Attachment H-1 Surficial Geologic Map**

**Attachment H-2 Bedrock Geologic Map**



**Attachment H1**

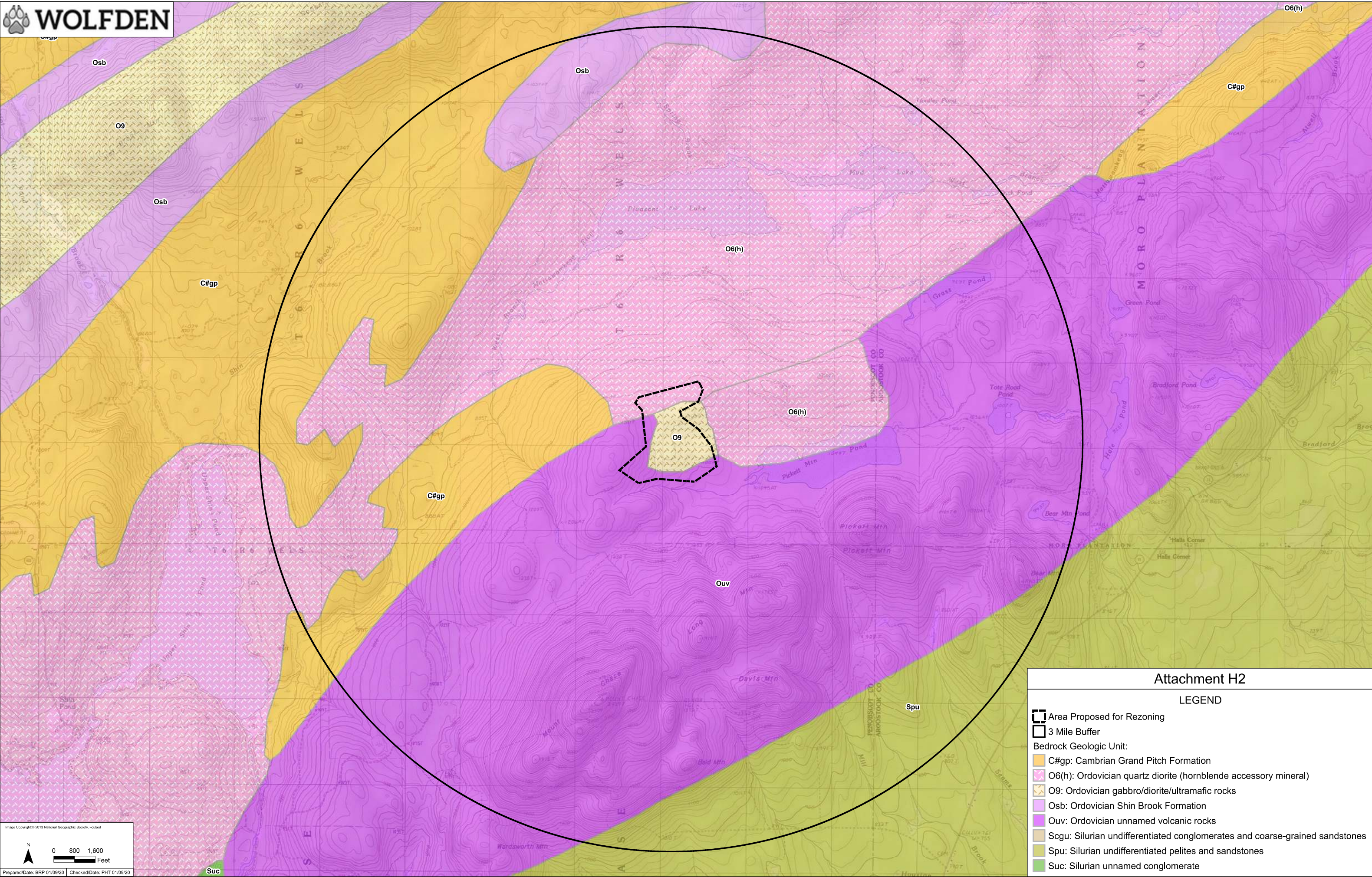
**LEGEND**

- Area Proposed for Rezoning
- 3 Mile Buffer
- Surficial Geologic Unit:
- ge: Eskers
- rk: Bedrock
- rm: Ribbed moraine
- s: Swamp
- t: Till

Image Copyright © 2013 National Geographic Society. All rights reserved.

N  
0 800 1,600  
Feet

Prepared/Date: BRP 01/06/20 Checked/Date: PHT 01/06/20



Attachment H2

LEGEND

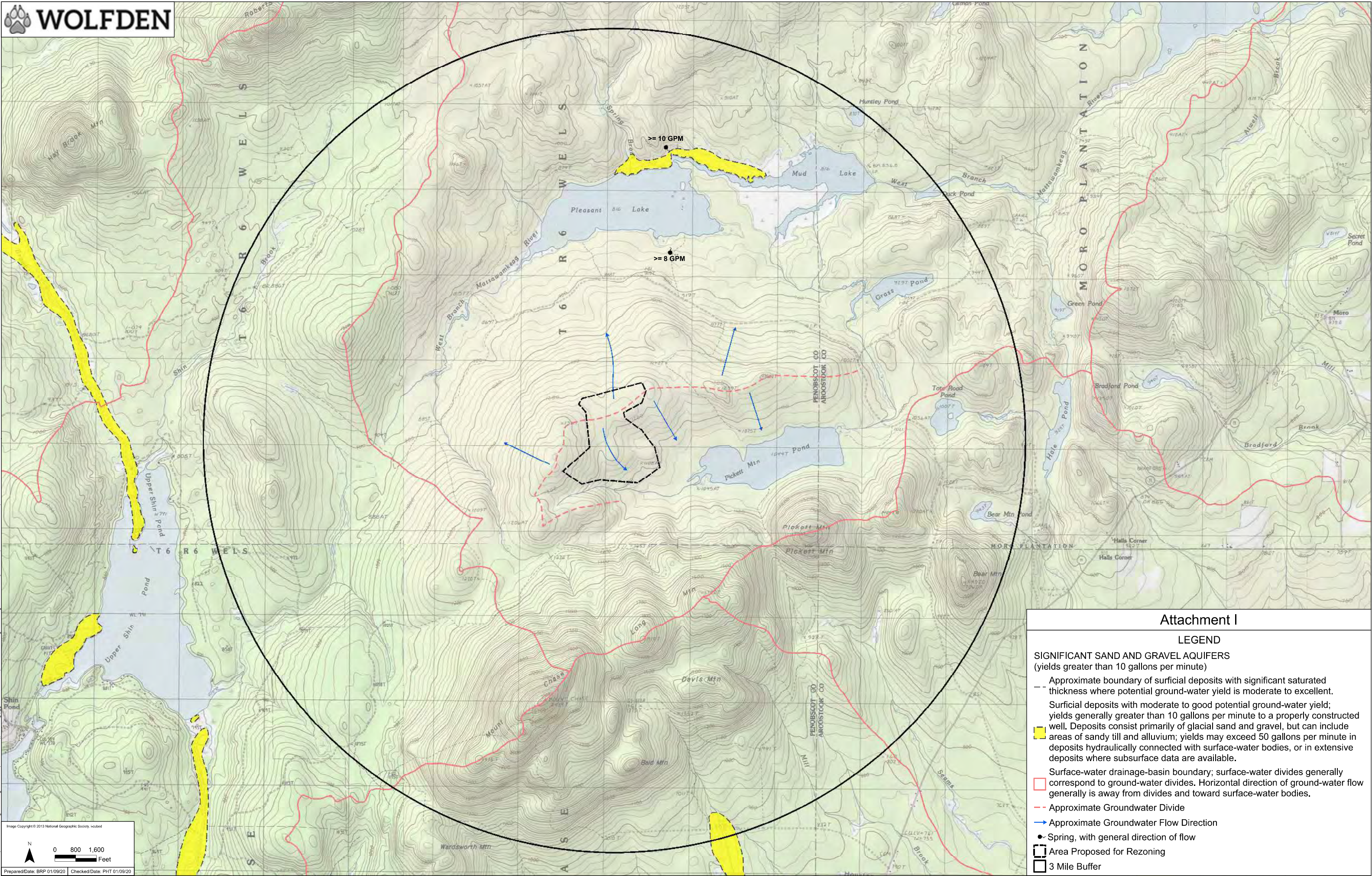
- Area Proposed for Rezoning
- 3 Mile Buffer
- Bedrock Geologic Unit:
  - C#gp: Cambrian Grand Pitch Formation
  - O6(h): Ordovician quartz diorite (hornblende accessory mineral)
  - O9: Ordovician gabbro/diorite/ultramafic rocks
  - Osb: Ordovician Shin Brook Formation
  - Ouv: Ordovician unnamed volcanic rocks
  - Scgu: Silurian undifferentiated conglomerates and coarse-grained sandstones
  - Spu: Silurian undifferentiated pelites and sandstones
  - Suc: Silurian unnamed conglomerate

## **Attachment I**

### **Map and Description of Water Supplies and Mapped Sand and Gravel Aquifers Located within a Three Mile Radius of the Proposed Mine Area**

## **Water Supplies and Mapped Aquifer Description**

A medium yield sand and gravel aquifer has been mapped along the north shore of Pleasant Lake. Indicated yields are  $\geq 10$  gallons per minute. The yield of the residential well on the south side of Pleasant Lake is reported as  $\geq 8$  gallons per minute. It is presumed that all five residential lots have private water supplies, though this has not been confirmed by a well survey. There are no other known private or public water supplies within a three-mile radius of the site. The attached figure depicts these features in addition to inferred surface water divides and groundwater flow direction in the vicinity of the site.



### Attachment I

#### LEGEND

- SIGNIFICANT SAND AND GRAVEL AQUIFERS**  
(yields greater than 10 gallons per minute)
- Approximate boundary of surficial deposits with significant saturated thickness where potential ground-water yield is moderate to excellent.
  - Surficial deposits with moderate to good potential ground-water yield; yields generally greater than 10 gallons per minute to a properly constructed well. Deposits consist primarily of glacial sand and gravel, but can include areas of sandy till and alluvium; yields may exceed 50 gallons per minute in deposits hydraulically connected with surface-water bodies, or in extensive deposits where subsurface data are available.
  - Surface-water drainage-basin boundary; surface-water divides generally correspond to ground-water divides. Horizontal direction of ground-water flow generally is away from divides and toward surface-water bodies.
  - - - Approximate Groundwater Divide
  - Approximate Groundwater Flow Direction
  - Spring, with general direction of flow
  - ▭ Area Proposed for Rezoning
  - 3 Mile Buffer

## **Attachment J**

### **Map and Description of Existing Transportation Infrastructure Routes, Impacts and Improvements**

#### **Description of Proposed Transportation Infrastructure Routes, Impacts and Improvements**

The following transportation evaluation describes the proposed route to be used by trucks carrying mineral concentrate from the proposed Pickett Mountain site to the US – Canadian border, the level of additional traffic, potential impacts and potential improvements to promote safety. The proposed route is dependent on the final locations where mineral concentrate will be shipped for further processing (smelting) in Canada. The processing locations have not been finalized and therefore the proposed route could be subject to change.

#### **Transportation Need**

The proposed mining activity has an anticipated mill feed rate of 1,000 tonnes/day with anticipated metal recoveries, total concentrate yields will be approximately 160 tonnes/day of concentrate for shipment (352,740 lbs). Typical tractor trailer tare weights (empty weight including driver and fuel) vary and range from 26,000 to 37,000 lbs. Using an average of 32,000 lbs tare weight allows 48,000 lbs for cargo; requiring approximately 7 shipments/day.

Roads within the area will also be used for employee travel to and from the mine and discussed later in this section.

#### **Route Description**

The proposed truck route consists of gravel roads on private property from the Pickett Mountain site to public roads that include three rural state highways, and one US Interstate Highway (See **Figure Attachment J** for locations and sections). From the site, trucks will travel on private gravel roads to Maine (ME) State Route 11 (ME SR-11), hence northeast to the intersection of ME SR-212. Trucks will travel southeast along ME SR-212 to Oakfield, (where it turns into Smyrna – Oakfield Road) and enter Interstate 95 (I-95) traveling east to Houlton and the Canadian-US border and proceed to the Canadian National Highway in Woodstock New Brunswick. These roads are more specifically described below:

- 5.1 miles of gravel roads (consisting of an unnamed road, Pleasant Lane Road, and Bear Mountain Road). Elevations from the Pickett Mountain site to Maine (ME) state route (SR)-11 drop from approximately 1200 to 850 feet mean sea level (MSL) from west to east.
  - Existing gravel roads are currently in good condition, and well maintained for logging operations conducted on and around the property.
  - The gravel roads are single lane varying in width from 10 to 15 feet with drainage ditches where elevated. One bridge crossing is present.



- The permanent bridge crossing at Pickett Pond outlet, consists of concrete abutments with two layers of wood decking and steel beams for support. The bridge deck is approximately 15 feet wide with a 20 foot span. The bridge appears to be in good structural condition.
  - Intersection of the gravel road with ME SR-11 has a good turning radius. The gravel road width at the shoulder of SR-11 is approximately 55 feet.
  - There is no available traffic data for the gravel roads mostly used for logging traffic in addition to access to a seasonal camp on the south side of Pleasant Pond.
  - The gravel roads are also used for recreational purposes by the public including all-terrain vehicles (ATVs) and snowmobiles.
- 19 miles of 2-lane rural state highway from the intersection of Bear Mountain Road with ME SR-11 to the intersection of Smyrna – Oakfield Road with I-95 (including 7.3 miles along ME SR-11 and 10.3 miles along ME SR-212, and 1.4 miles along the Smyrna – Oakfield Road). ME SR-11 and ME SR-212 are characterized by rolling hills ranging in elevation from approximately 550 to 1150 feet MSL. Posted speed limits are 50 MPH on ME SR-11 and 45 MPH on ME SR-212, and 35 MPH on the Smyrna-Oakfield Road. Each road has an approximate 11 foot wide travel lane with 3-foot shoulder in both directions.
    - Roads are in good to fair condition and include bridge crossings over West Branch of Mattawamkeag River on ME SR-11 and over East Hastings Brook on MR SR-212.
    - Average Annual Daily Traffic (AADT) presented on Maine Department of Transportation (Maine DOT) website ranged from 470-1270 along ME SR-11 and ME SR-212 in 2015. Ten crashes were reported from 2017-2019 at intersection of Clark Road and SR-212 in town of Merrill according to Maine DOT Crash Portal. The Level of Service is A (light & free flowing) on all state roads within the route.
    - Intersections along state routes have good turning radiuses.
  - 9.1 miles of US Interstate Highway (I-95) from SR-212 to US-Canada border, with a posted speed of 75 MPH, 10-foot right shoulder both directions.
    - Road is in good condition.
    - AADT data from Maine DOT website ranged from 1480-2470 in 2015, 78 crashes along I-95 section from 2017-2019 according to Maine DOT Crash Portal with most assumed as animal collisions, with a Level of Service of C (stable).
    - On-ramps to be used along proposed route have good turning radiuses.

### **Traffic Increases**

- Proposed traffic to the Pickett Mountain site includes a peak 30 workers per shift with two shifts per day offset by one hour. This results in a maximum of 60 peak hour trip/

hour during shift changes on ME SR-11. It is expected that the majority of workers employed at the mine will be from local work force, many of whom may currently use portions of this route for current employment.

- Maine DOT requires a traffic permit to be obtained if traffic to be added to a route is greater than or equal to 100/hour. Proposed traffic increase will not require a traffic permit.
- The daily traffic to and from the site (assuming 30 workers and two shifts/day plus 7 shipments of concentrate) results in 134 additional trips/day on ME SR-11 (an average of 5.6 vehicles/hour. The road has an hourly capacity of 1800 vehicles and its use is currently well under that capacity.
- Shipping of concentrate via trucks will only occur during daytime hours.

## **Impacts**

The proposed route for hauling concentrate consists of state and federal highways. The weight limit will be restricted by the Federal Interstate which allows a maximum of 80,000 pounds (lbs) for both five and six axel tractor trailer configurations. State roads allow up to 88,000 lbs for 5 axel configurations for certain commodities including unconsolidated rock material. Planned weight load will be 80,000 lbs. The private gravel roads are constructed for logging trucks with the similar weight constraints.

As identified previously, on average seven truck shipments of concentrate will occur daily. This small level of increased traffic will not burden or impact proposed traffic route.

As discussed in previous sections, the additional volume of traffic will not require a traffic permit nor represent a burden or impact on the existing traffic capacity of the proposed route.

## **Anticipated Improvements**

### **Unimproved Gravel Roads**

Improvements on existing gravel roads will be conducted to improve year round use, safe passage of vehicles on a single lane road and public safety.

- Maintenance of spring thaw impacts along the gravel roads will be undertaken by Wolfden. Wolfden will evaluate the scope of maintenance and improvements during the design analysis for the mine under the mining application (mine design and permitting phase).
- During the mine design analysis widening of the gravel roads will be evaluated for safe passage of logging trucks, concentrate trucks, and workers. A maximum width between 22 and 25 feet to the road shoulder should be sufficient for safe passage of large vehicles and recreational traffic (ATVs and snowmobiles in winter).

- During that analysis, consideration will also be given to providing a separate lane for safe passage of recreational vehicular traffic (ATVs and snowmobiles).
- Maintenance of bridge decking at Pickett Pond outlet crossing, may include improvement or replacement of the wood decking as dictated by normal wear and tear of truck traffic. During the mine design analysis, widening of the bridge will also be evaluated for safety considerations. If widening of the bridge is proposed during mine design and permitting phase the replacement will be a similar structure with concrete abutment and footings allowing the natural streambed to be maintained. A replacement structure would be designed to accommodate a 25-year frequency storm event with arches located landward 1.2 times the channel width at normal high water. Work in the stream would be minimized allowing the streams natural structure and integrity to remain intact.
- A cooperative road maintenance agreement, in general, will be established between Wolfden and commercial loggers whom access their own private property as well the Wolfden property.

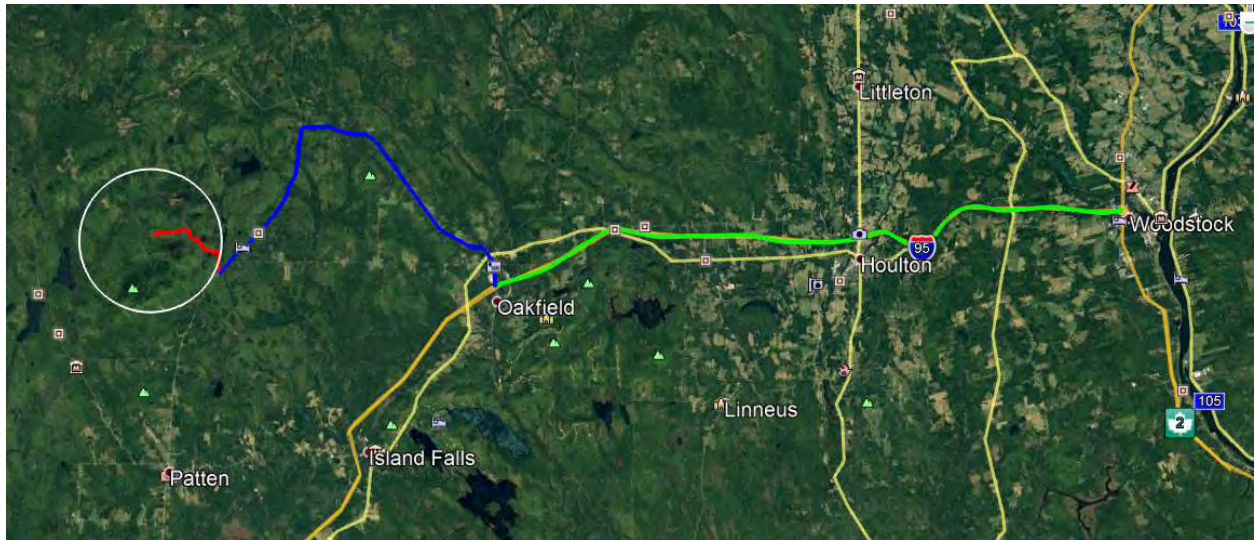
### Rural State Highways

Potential Improvements to state highways will be for traffic safety. Wolfden will hire an MEDOT approved transportation engineer familiar with the area to consider, evaluate and design improvements, as needed, during the mine design and permitting phase. These improvements may include:

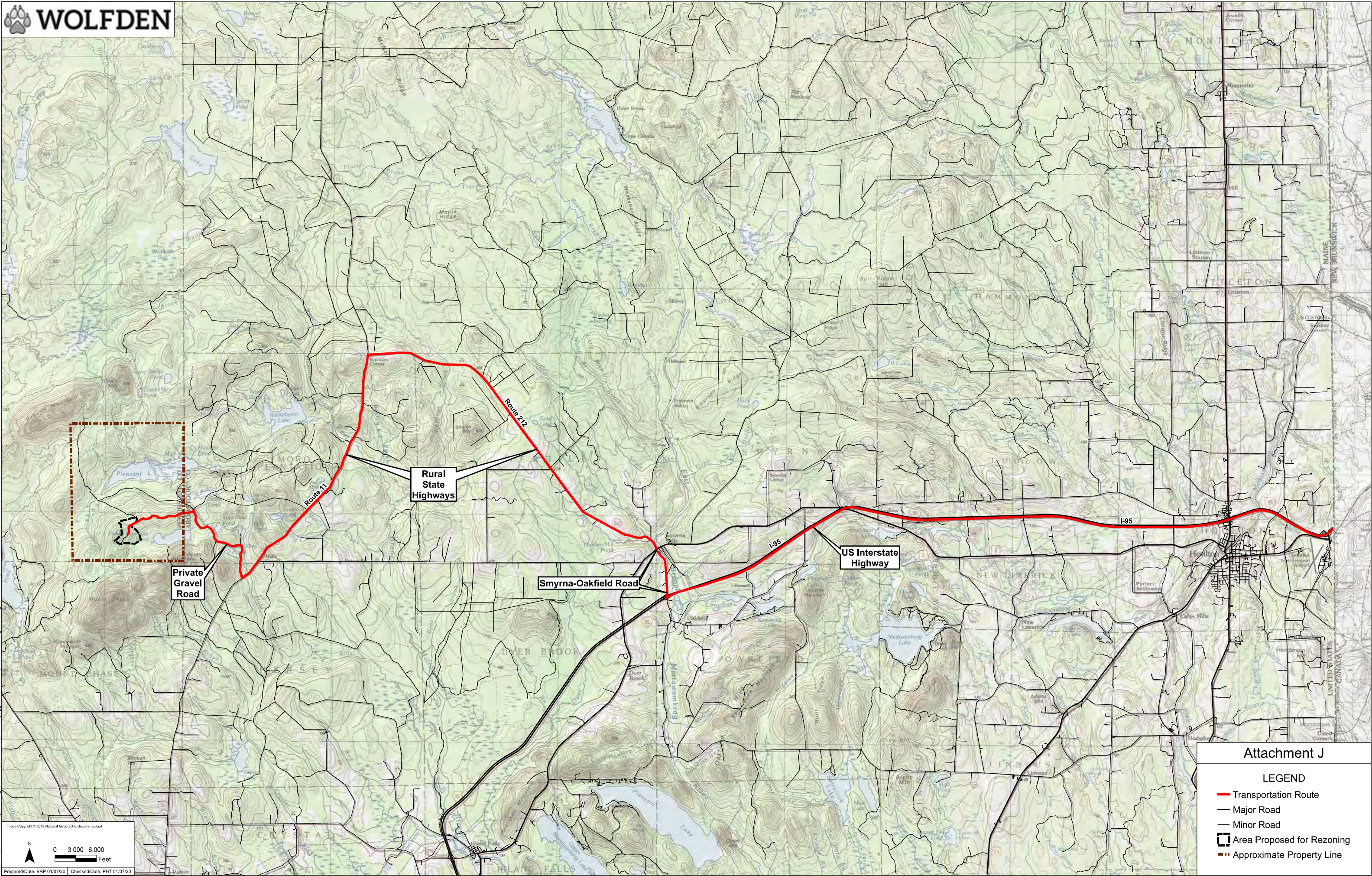
- Signage and lighting at intersection of Bear Mountain Road and ME SR-11 indicating truck entering and leaving Bear Mountain Road (i.e. "Trucks Entering").
- Addition of deceleration and acceleration lanes at the intersection of Bear Mountain Road and ME SR-11 for trucks to avoid obstruction of traffic during acceleration and deceleration periods.
- Widening right shoulder at intersection of ME SR-11 and ME SR-212 in Moro Plantation to facilitate right turning truck traffic.

### Summary

The proposed traffic route (Appendix J and below) and additional traffic levels do not constitute an impact on the existing road infrastructure. Wolfden will work with stakeholders (LUPC, the public, commercial loggers, and MEDOT) to accommodate modifications to ensure public safety and recreational access along the proposed private and state highway routes.








Proposed Truck Route from Pickett Mountain Site with unimproved gravel roads in red, 2-lane rural state highways in blue, and US Interstate Highway in Green. An approximate three-mile radius is drawn around the site (white)



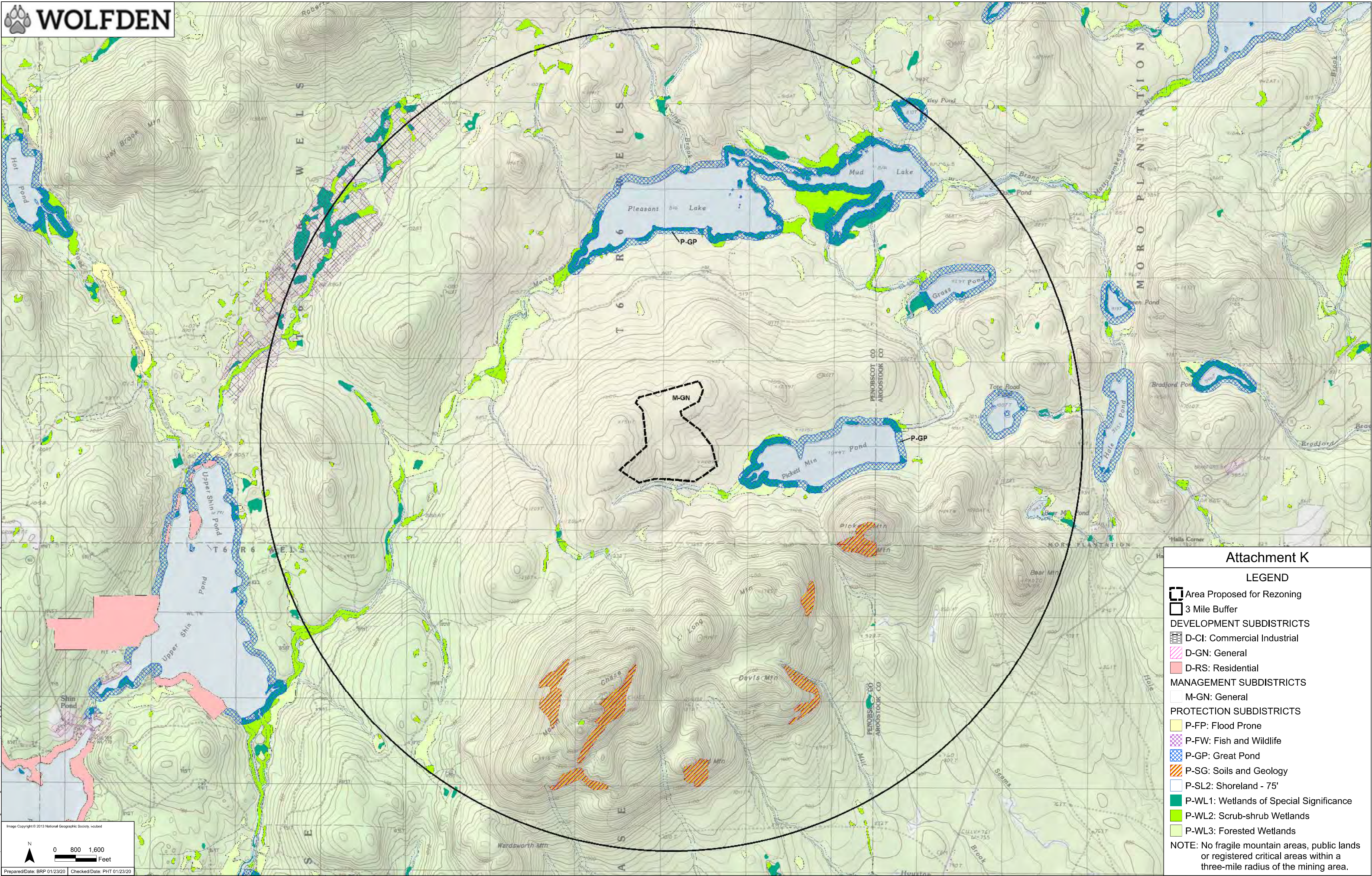
**Attachment J**

**LEGEND**

-  Transportation Route
-  Major Road
-  Minor Road
-  Area Proposed for Rezoning
-  Approximate Property Line

**Attachment K**  
**Map Identifying Significant Natural Resources and Sensitive Natural Areas Located**  
**Within a Three-mile Radius of the Mining Area**

Note the attached map reflects only currently published data from National Wetland Inventory maps, LUPC management subdistricts and protection subdistricts. A Phase 0 Archeological survey will be conducted in Spring 2020 as well as wetland delineations and vernal pool assessments. The P-SG designation for Soils and Geology may reflect fragile mountain areas or rock outcrop and talus slopes which could provide habitat for bats. Other features if field confirmed in spring 2020 would be added to this map.



**Attachment K**

**LEGEND**

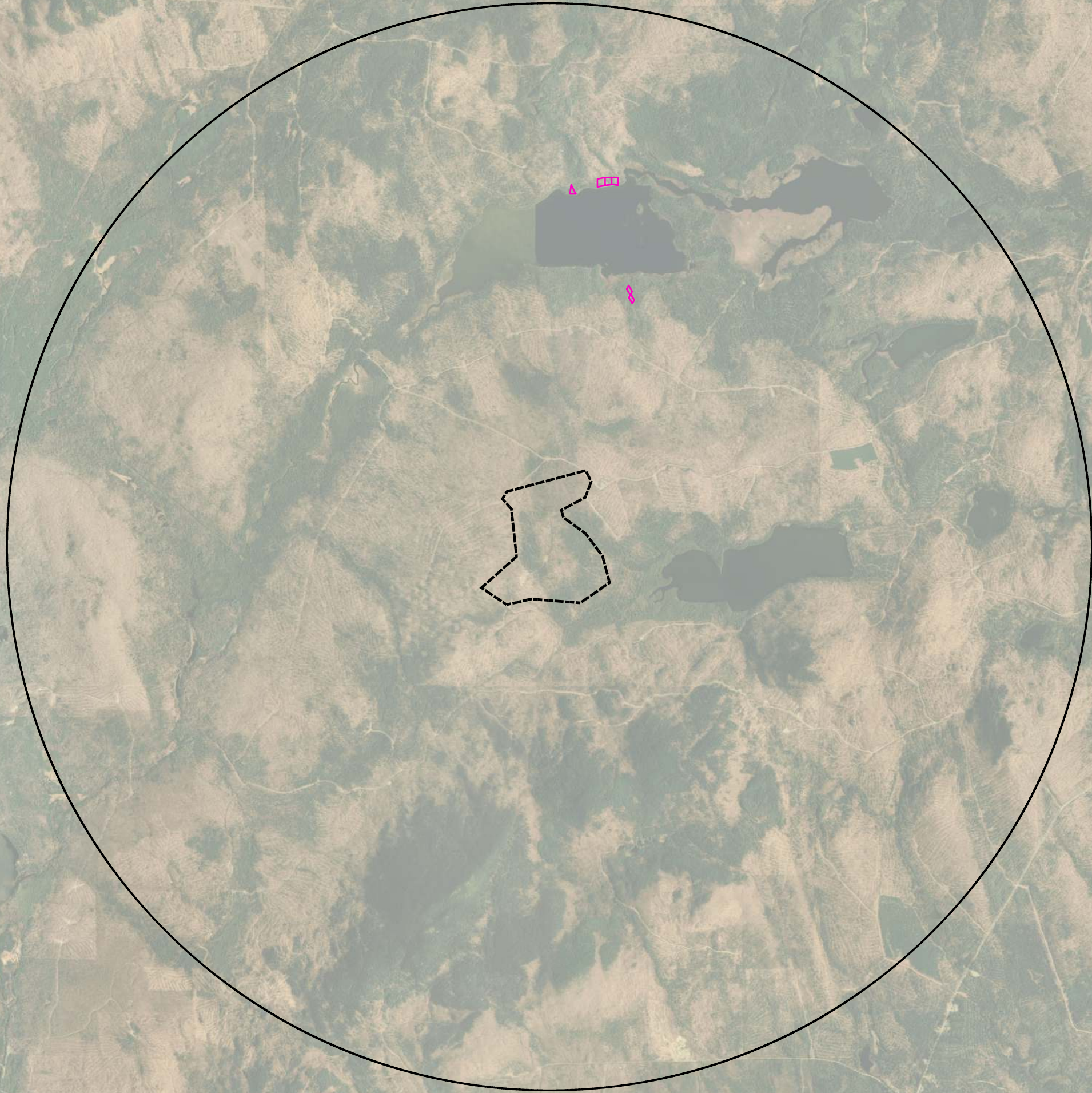
- Area Proposed for Rezoning
- 3 Mile Buffer
- DEVELOPMENT SUBDISTRICTS**
- D-CI: Commercial Industrial
- D-GN: General
- D-RS: Residential
- MANAGEMENT SUBDISTRICTS**
- M-GN: General
- PROTECTION SUBDISTRICTS**
- P-FP: Flood Prone
- P-FW: Fish and Wildlife
- P-GP: Great Pond
- P-SG: Soils and Geology
- P-SL2: Shoreland - 75'
- P-WL1: Wetlands of Special Significance
- P-WL2: Scrub-shrub Wetlands
- P-WL3: Forested Wetlands

NOTE: No fragile mountain areas, public lands or registered critical areas within a three-mile radius of the mining area.

**Attachment L**  
**Map and Description of Existing Uses Within a Three-mile Radius of the Proposed Mining Area**




As discussed in prior sections, the area surrounding the Pickett Mountain Project site is wooded and the primary use is forest industry related. Six residential properties with seasonal dwellings are present on the southern and northern shore of Pleasant Lake which are used for recreation there along with other great ponds. The area is also used for motorized recreation, including ATVs and snowmobiles. The attached map provides a 3-mile radius around the site indicating the location of these features.





Attachment L

LEGEND

-  Area Proposed for Rezoning
-  3 Mile Buffer
-  Residential Property

**Attachment M**  
**General Measures Undertaken to Assure Mining Will Not Have Undue Adverse Impacts on Existing Uses and Resources Including Measures to Avoid, Minimize or Mitigate Any Adverse Impacts**

Please see Section 3 Project Description and Appendix A Section B(3)(d) Impacts on Existing Uses and Natural Resources. These sections discuss the environmentally responsible approaches used in modern mining to avoid and minimize any adverse impacts. During operation and post closure, an environmental monitoring plan for groundwater, surface water and sediment, with reporting requirement to the DEP will be in place. If such monitoring identifies an adverse impact, mitigation plans would be developed and implemented in consultation with the DEP. At this point in time, such impacts are not anticipated or expected.

**Attachment N**  
**Description of Socioeconomic Impacts of Proposed Mining Upon Immediate Area,**  
**Adjacent Communities County and State**

Please see Appendix A Section B(3)(b) Potential Short and Long Term Socioeconomic Impacts.

**Attachment O**  
**Evaluation of Sufficiency of Existing Services and Utilities, and General Measures to Increase Service Capacities (if required) including Burdens on Communities or Government to Provide Those Services**

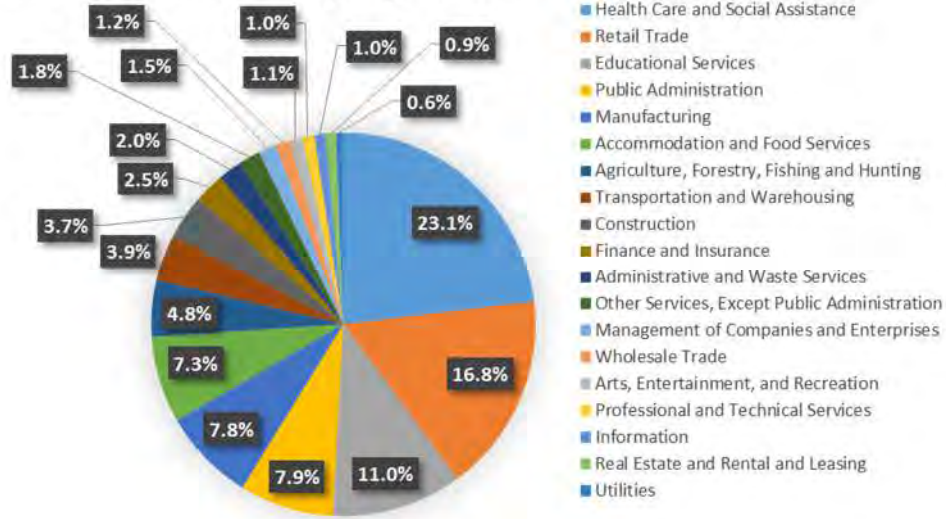
**Description of Local Economy and Existing Local Services**

The following sections describe the geographic distribution of employment within an approximate 30-mile distance from the proposed mine site. It is expected that a majority of employees for the mine will come from this population. Local services that will be used by this employed workforce within this geographic region are then described to assess burdens on communities and local government to provide needed services.

**Local Economy and Workforce**

The regional economy has been dominated historically by timber harvesting and wood products industries including manufacturing in addition to tourism related service and retail businesses. Houlton, approximately 30 miles from the site, is the closest municipal service center and is also a designated Labor Market Area (LMA). The average employed population within the Houlton LMA in 2018 was listed as 6,016 by the Maine Department of Labor. The majority of employment was within service producing industry sectors (83.6%) with the remainder goods producing (16.4%). Currently, employment in this local economy is dominated by health care, retail trade, education and public administration as depicted below from the same data source. The employment categories are ordered from highest to lowest, by percentage of total employment, and are consistent with the percentages provided on the pie chart.

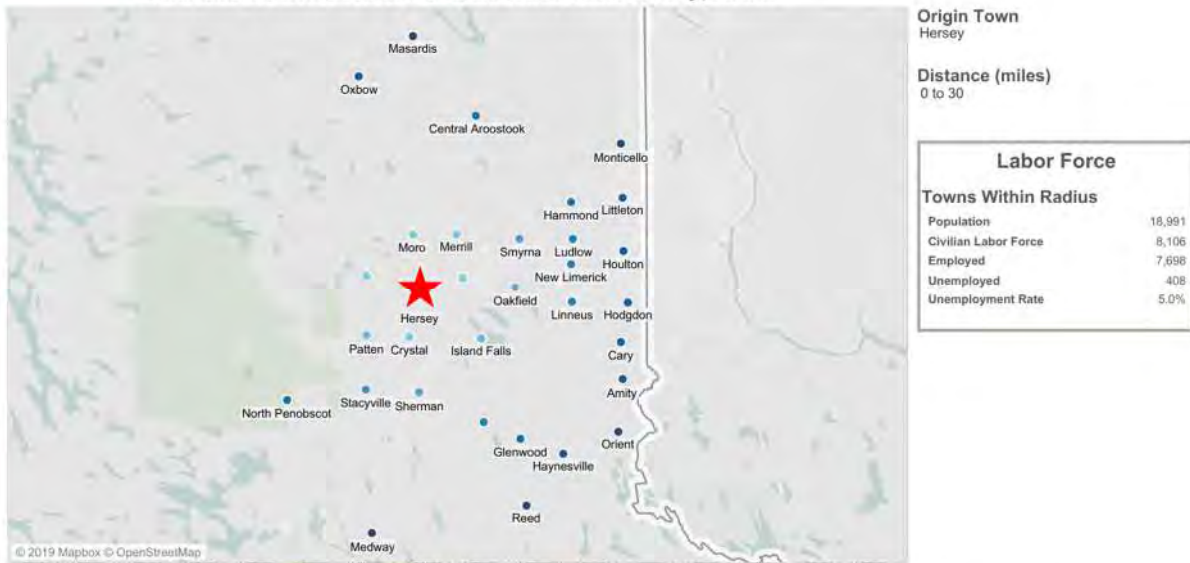
## Distribution of Employment in the Houlton LMA



The employed population in the Houlton LMA has varied by only 1 to 2 percent over the last four years (2014-2018) and there has been little change in employment sectors; however average wages have risen approximately 10% over that same period according to Maine Department of Labor statistics.

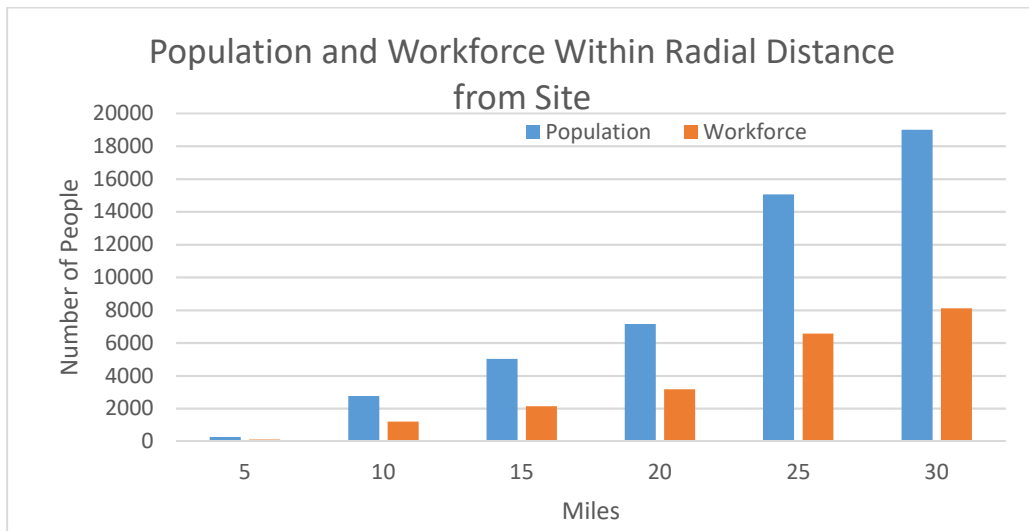
Hersey Maine is the closest town to the site and is within the Houlton LMA. Within a 30 mile radius of Hersey, the employed labor force is comparable to, though slightly larger than, the Houlton LMA (8,106 versus 6,016)

### Cities and Towns Between 0 to 30 Miles from Hersey, Maine



Labor Force: 2018 annual average, Maine Department of Labor, Center for Workforce Research and Information. Population: 2018 United States Census Bureau.

The principal towns in proximity to the site (within a twenty-mile radius) are located to the south and east and include Stacyville, Sherman, Patten, Island Falls and Oakfield. Other communities include Hersey, Crystal, Moro, Merrill, Smyrna and Dyer Brook. Beyond twenty miles to Houlton, the population and available work force increases more than two fold as shown graphically below.



Operation of the mine, once constructed, will require full time employment of 60 individuals. The majority of these will be skilled labor positions requiring training. A training program will be established by Wolfden in advance of commencing mine operations so that a majority of these positions can be filled from within the local labor market.

It is the aim and objective of Wolfden to provide the maximum employment benefit locally. Based on demographics of the current population, it is reasonable to expect that approximately 40% of the workforce (24) could come from communities with 20 miles of the site and the remaining 60% of the workforce (36) from within 20-30 miles of the site and other more distant communities. This would equate to approximately 0.7% of the total employed work force within 30 miles from the site. Unemployment in the area averages approximately 5% (400 workers).

<b>Communities in Proximity to the Site</b>	
Within 20 Miles	Within 20-30 Miles
Crystal	Central Aroostook
Dyer Brook	Glenwood
Island Falls	Hammond
Moro, Merrill	Haynesville
Mount Chase	Hodgdon
Oakfield	Houlton
Patten	Linneas
Sherman	Littleton
Smyrna	Ludlow
South Aroostook	Masardis
Staceyville	Medway
	Monticello
	New Limerick
	North Penobscott
	Orient
	Oxbow
	Reed

The primary municipal services required by mine operations include solid waste disposal and potentially emergency response including fire and ambulance services. The primary municipal and community services that would be accessed by employees include education, housing, medical and healthcare services, and municipal solid waste disposal. Since it is anticipated that a majority of the employees will come from within the with the Houlton LMA there should be little net demand increase on services from towns or communities since the future employees are already using these services. It is assumed that 10% to 15% of the initial employees (6-9) will be imported into the work force area to provide a local management team with advanced skills and experience in mine operations. Once the local work force that is hired gains experience, it is likely some of these imported employee positions would be replaced by those local resident employees.

## Description of Local Services

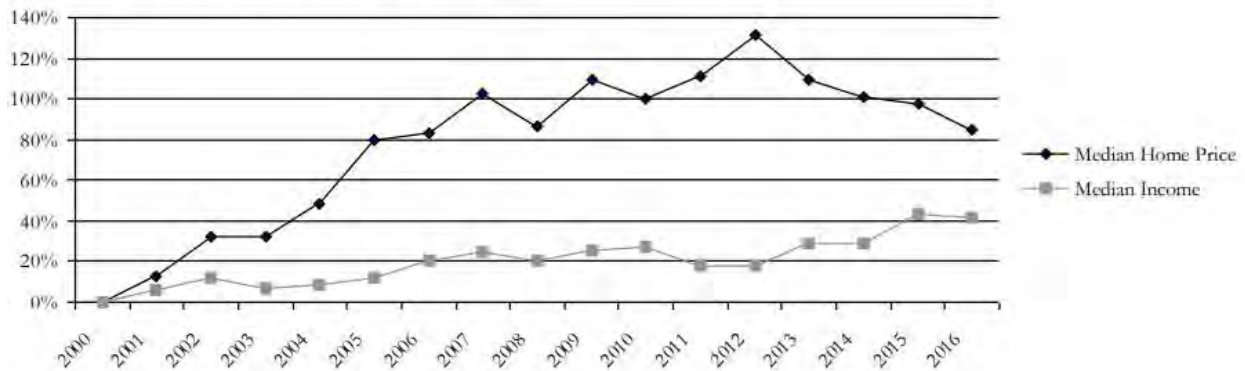
The following local services are described below: Housing, Education, Public Safety (Fire, Emergency Response, and Police), Healthcare and Municipal solid waste management.

## Housing

Data on housing affordability in the Houlton LMA is available through [Mainehousing.org](https://www.mainehousing.org/docs/default-source/policy-research/housing-facts/2016/houltonlma2016.pdf?sfvrsn=5). <https://www.mainehousing.org/docs/default-source/policy-research/housing-facts/2016/houltonlma2016.pdf?sfvrsn=5>.

This data covers recent years from 2012 to 2016. During that time frame the median housing price has fallen, while median income has risen, thus increasing the number of households with the median income needed to afford the median home price. The average number of households unable to afford the medium home price in Maine is approximately 52%. This number drops to 25% in the Houlton LMA and down to 18% and 14% in Patten and Island Falls respectively. The trends in housing prices and income in the Houlton LMA are depicted in the following graph (source: [Mainehousing.org](https://www.mainehousing.org/docs/default-source/policy-research/housing-facts/2016/houltonlma2016.pdf?sfvrsn=5) cited above).

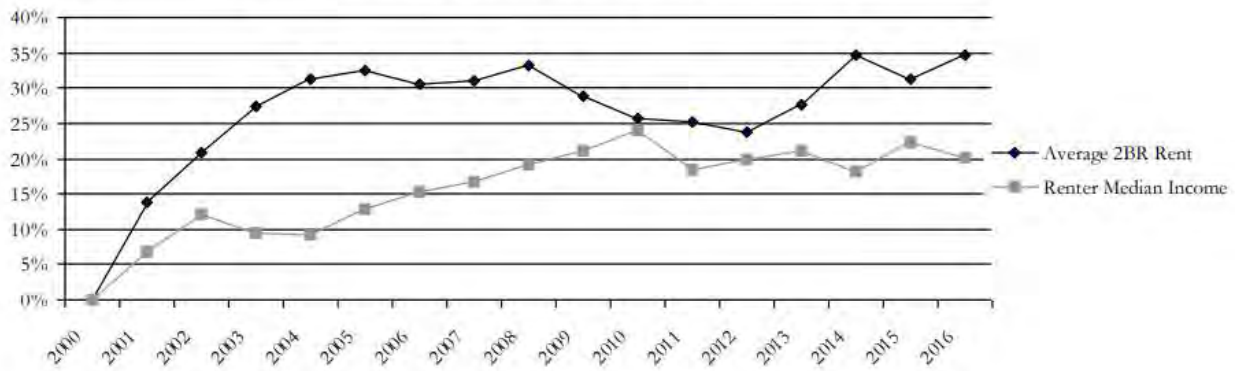
**Relative Increases in Income and Home Price <sup>3</sup>**



The housing data for rental properties (2 bedroom rental units-2BR) from the same source indicates opposite trends in the local rental market. In Maine the average hourly 2016 wage needed to afford the average 2BR rental was \$16.77/hour and \$10.28 in the Houlton LMA. Given the average 2018 wage in the Houlton LMA was 16.85/hour, there is a shortage in affordable rental housing (44% unable to afford the average 2BR rent). Trends in in rent and renter income are depicted graphically below using 2000 as the baseline year for computing relative changes (source: [Mainehousing.org](https://www.mainehousing.org/docs/default-source/policy-research/housing-facts/2016/houltonlma2016.pdf?sfvrsn=5) cited above).



**Relative Increases in Renter Income and Average 2BR Rent<sup>3</sup>**



### **Burden on Housing Market**

The proposed project will provide good wages above the Houlton LMA average wage and the prospect of steady employment for individuals who pursue this career. The effect on housing should be positive in that it will allow residents employed by Wolfden the prospect of affordable home ownership or the ability to successfully enter the rental housing market. There would be no burden on communities or municipalities with respect to housing. As the housing market has declined in recent years, the introduction of 60 new jobs in the local economy should have a positive effect on the local housing market where additional property transactions result.

### **Education Services**

Within the labor market area as described previously, the public educational needs of families is served through four regional school districts including RSU 29, RSU 50, RSU 70 and RSU 89 as shown below. The current total student body from elementary school through high school is approximately 2,563 based on information from the Maine Department of Education. RSU 89 was recently formed from communities previously within RSU 50.

## Regional Public Schools Serving Local Towns and Communities

School Year	SAU Name	School Name	Number of Students
2019	RSU 29/MSAD 29	Houlton Elementary School	423
2019	RSU 29/MSAD 29	Houlton High School	364
2019	RSU 29/MSAD 29	Houlton Junior High School	298
2019	RSU 29/MSAD 29	Houlton Southside School	319
2019	RSU 50	So Aroostook School	358
2019	RSU 70/MSAD 70	Hodgdon Middle/High School	191
2019	RSU 70/MSAD 70	Mill Pond School	284
2019	RSU 89	Katahdin Elementary School	145
2019	RSU 89	Katahdin Middle/High School	181
Total			2,563

RSU No.	Communities Served
RSU 29	Houlton, Hammond, Littleton, and Monticello
RSU 50	Crystal, Dyer Brook, Hersey, Island Falls, Merrill, Oakfield, and Smyrna
RSU 70	Amity, Cary Plantation, Haynesville, Hodgdon, Ludlow and New Limerick
RSU 89	Mount Chase, Patten, Sherman and Stacyville

### Burden on Education Services

As discussed previously it is anticipated the majority of the mine work force will be employed from Maine residents within the Houlton LMA. Initially, some of the work force may be imported into the area. These imported workers would contribute to the local economy through spending and taxes. Therefore, there may be a small increase in student enrollment in some school districts. This increase however should be small and would not represent a disproportionate burden. Otherwise it is expected that current or future educational needs of existing residents who become employed by Wolfden are already being met or anticipated and would not represent a burden on services. RSU 89, located closest to the site in Stacyville confirmed that the expected level of additional educational services is not a burden (see attached concurrence letter).

### Public Safety Services

Services related to public safety include fire, 9-1-1 emergency response / ambulance and police services. Some of these services are provided by local towns while others are provided at the County Level.

The project site, when including private access roads, falls within both Penobscot and Aroostook counties. Each county has its own Regional Communication Center which acts as a dispatch Public Safety Answering Point (PSAP) operating on a 24 hour basis to answer and relay

9-1-1 calls, or directly dispatch emergency services. The Penobscot RCC, located in Bangor, supports residents in both Penobscot and Aroostook counties. The Aroostook RCC is located in Houlton and responds to all 9-1-1 calls originating in the county. The facility is housed collectively with Maine State Police Troop F, Maine Warden Service, Maine Forest Service and the Maine Fire Marshalls office. The Aroostook RCC handles dispatches for all state public safety agencies including the Aroostook County Sheriff's Department, the County office of Emergency Management and local fire departments including Oakfield.

Locally, several of the towns closest to the site have volunteer fire departments including Patton, Island Falls, Sherman and Oakfield. Island Falls also has an enhanced 9-1-1 Ambulance service. Island Falls has indicated its ambulance and fire response capabilities is sufficient to conceptually support Wolfden's plan and potential need for services (see attached concurrence letter)

Police services, primarily law enforcement, are provided through the Aroostook County Sheriff's Department in Houlton and the Penobscot County Sheriff's Department in Bangor. Law enforcement is also supported by the Maine State Police Troop F which is responsible for police coverage for all of Aroostook County and the northern parts of Penobscot, Piscataquis and Somerset Counties.

### **Burden on Public Safety Services**

The proposed mine will be developed incorporating fire protection standards for building design and related structures. The mine will be operated under a very strict and well-defined safety program and in conformance with OSHA General Industry standards which also include requirements for medical, first aid and fire protection. Wolfden will provide for any fire response underground as this requires specialized training and equipment. With exception of volunteer fire, public safety services are implemented and funded at the county level. Wolfden's mining operations will provide a tax base that will contribute to the state and county services.

It is not expected that mine operations will place a significant burden on public safety services.

It is noted that in recognition of the decline in number of volunteer fire fighters in Maine, in 2017 the Maine Legislature passed a pension system for volunteers based on time of service (Maine Length of Service Award Program). The state of Maine does have a Volunteer Fire Assistance (VFA) Program for rural fire departments to provide federal financial and technical support in the form of matching fund grants that meet specific established criteria. Wolfden is sensitive to the volunteer nature of fire-fighting services within the communities near the proposed project.

## **Healthcare and Medical Service**

The Houlton Regional Hospital is a major regional hospital that provides a full range of medical services. Other medical services are also available from private physicians practicing in the area.

The Katahdin Valley Health Center has two facilities in Patten. One covers primary and dental care and includes a pharmacy. The second center is primarily engaged in occupational physical therapy and chiropractic care.

## **Burden on Healthcare and Medical Services**

There are abundant sources for medical services in the area. Health care and social services is the largest employment sector in the Houlton LMA. The proposed mine will not burden healthcare and medical services in the area.

## **Municipal Solid Waste Disposal**

Solid waste management in the area is serviced by Casella Waste Management, including the Pine Tree Waste transfer station in Houlton and the Northern Katahdin Valley Waste Disposal District in Dyer Brook. This district serves the communities of Amity, Crystal, Dyer Brook, Hammond, Hersey, Island Falls, Merrill, Moro Plantation, Mount Chase, Patton and New Limerick. The facilities offer commercial and municipal waste disposal transfer. There would be no burden on these services as they are paid for services.

## **Power and Utilities**

Power and other utilities are addressed elsewhere in this Petition. The project will have to import power and will provide its own source of water, for drinking purposes. Sanitary disposal of gray and black water will be managed through a septic field. There are no burdens to towns or municipalities for these services.

## **Concurrence Letters**

# Katahdin Schools

**RSU 89**

*Where education is exciting!*

800 Station Road Stacyville, Maine 04777

Phone: 207-365-4218

Fax: 207-365-6011

www.rsu89.org

@katahdinschools

Marie Robinson, Superintendent/Principal

Jo-Anna Merry, Assistant Principal/ Special Services Director

---

January 16, 2020

Jeremy Ouellette, P.Eng  
Vice President Project Development  
Wolfden Resources Corporation

Dear Mr. Ouellette,

This letter is in response to our conversation related to available services from the Regional School Unit No. 89.

As discussed, Wolfden would like to develop a project north of Patten in order to extract minerals from a geological deposit through mining and concentration. These processes are industrial in nature and will require an estimated workforce of 60 people. Of these 60 employees, majority will be drawn from local sources. However, a small percentage (10%-20%) of these employees could be sourced from outside of the surrounding communities, some of which bringing families.

RSU 89 typically manages variances of student population on the order of 10-15 incoming or leaving children annually. Therefore, we do not anticipate any net impact to the RSU due to this project as conceptually planned.

Sincerely,



Marie Robinson  
Superintendent of Schools  
Katahdin Schools - RSU 89



January 10, 2020

Mr. Jeremy Ouellette  
Wolfden Resources  
101 Gardner Street  
Patten, ME 04765

Dear Jeremy:

Thank you for meeting with us to discuss Wolfden Resources' plan for a mining site on Pickett Mountain located in the Patten area.

Our engineering department has been able to run preliminary load flows for the future mining load fed from the Patten tap by extending it eleven miles north to your site.

Initially, the model indicated that there would be voltage drop issues with 336.4 ACSR at 44 kV. This is the size conductor we would recommend for a starting point. Once some VAR support was added, the site maintained good voltage under steady state conditions. The VAR requirement is large for Emera Maine-Maine Public District with up to nine MVAR required with a peak ten MW, three MVAR load assumption. This arrangement also worked with the L1176 contingency.

What this means for you, Mr. Ouellette, is that conceptually, the plan as outlined above should be able to supply your site with the necessary power. However, please understand that a full study would need to be completed first.

If you should have any further questions, please don't hesitate to reach out to me at 207-760-2401 or at [chris.lyng@emeramaine.com](mailto:chris.lyng@emeramaine.com).

We look forward to hearing from you.

Sincerely,

A handwritten signature in black ink that reads "Christopher Lyng". The signature is written in a cursive style with a large initial "C" and "L".

Christopher Lyng  
Supervisor, Customer Contact Center

cc: Internal Distribution



# TOWN OF ISLAND FALLS

68 Houlton Road, P.O. Box 100  
Island Falls, Maine 04747

## Board of Selectmen

Frank Porter  
Anthony Bowers  
Glenn McNelly  
Royden Hunt  
Anthony Binotto

## Town Manager

Jutta Beyer

## Town Clerk

Kelly Ripley

## Phone

207.463.2246

## Water Dept. Phone

207.463.2124

## Fax

207.463.2550

## Website

[www.islandfallsme.us](http://www.islandfallsme.us)

To Jeremy Ouellette, P.Eng  
Vice President Project Development  
Wolfden Resources Corporation

01/16/2020

Dear Mr. Ouellette

This letter is in response to our conversation related to available services from the town of **Island Falls**

As discussed, Wolfden would like to develop a project north of Patten in order to extract minerals from a geological deposit through mining and concentration. These processes are industrial in nature and will require a estimated workforce of 60 people. Support services including Policing, Ambulance, Fire, and Waste Management will be needed by Wolfden during the various planned project phases. Majority of emergency response at the property will be managed internally by an established Wolfden Emergency Response/Mine Rescue team. These teams will be trained in the response of incidents that could potentially occur onsite. Support from the surrounding communities would be in addition to the existing services and will be minimal in nature.

Island Falls is unable to supply police response services to the proposed Pickett Mountain project site. However, based on Wolfden's minimal anticipated need for ambulance and fire services along with its ability to respond internally to incidents, I can confirm that Island Falls' Ambulance and Fire Response is sufficient and able to conceptually support Wolfden's Plan.

Sincerely,

Jutta Beyer

Town Manager Island Falls

cc/ Board of Selectmen



## **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).

## **Attachment Q**

### **Description of the Anticipated Site Conditions Following Closure and the Potential for Future Reclamation and Beneficial Use of the Affected Area.**

As described in earlier sections of this Petition, the mine (Dry Tailings Facility, Mill Feed Staging Area, Interim Waste Rock Storage Facility, Surface Water Management Facility) will be constructed in a manner to capture contaminated water run off for collection, treatment and management.

At Pickett Mountain, there will be 3 classes of structures. Class 1 is a permanently fixed structure that will remain post-closure of the property. Specifically, this will be the dry TMF. Class 2 is a non-permanent structure that is deemed acceptable to decommission and remove only after the site has been deemed ready for rezoning back to a General Management (M-GN) Subdistrict. Specifically, this will be the water management and water treatment facilities including all drainage and water collection structures. Class 3 is a non-permanent structure that is decommissioned and removed as soon as production operations cease. Specifically, this includes all buildings on-site that are not related to water collection and treatment, mill feed and waste rock storage pads, and none essential roadways.

Upon completion of mining and processing of material from the Pickett Mountain mineral deposit, all class 3 structures will immediately be decommissioned and sold, or, to the extent practical, demolished and deconstructed to allow inert materials to be placed in remaining open underground workings (raises and drifts as discussed in Section 4 Project Description). The land surface will then be contoured and smoothed to reasonably match the original landscaping. This closure work will be conducted under an approved erosion and sedimentation control plan. Material from the overburden storage areas (original soils stripped prior to mine construction) will be placed on top of the regraded surface as final soil cover to support natural growth of vegetation. Openings to surface from underground that are non-essential will be plugged and capped with engineered concrete or steel plugs to ensure future access cannot happen either purposefully or not. All precipitation that contacts these locations will continue to be collected and monitored for water quality and treated before being discharged. After removal of all class 3 structures, it is anticipated that water quality of run-off being collected and treated will already begin to improve.

Class 1 structures will remain in place into perpetuity. Concurrently with the placement of tailings on the TMF, the TMF will be reclaimed through progressive capping and revegetating. Therefore, the final reclamation will be to cover the TMF with an engineered clay or silt cap constructed from local borrow sources. After it is capped and contoured to support precipitation drainage, the TMF will be covered with a final soil layer using the remaining material from the overburden storage areas. This will support regrowth of natural vegetation and long term, permanent erosion control. Precipitation that falls on the TMF will drain off

around the perimeter of the facility. The restoration design will include appropriately sized and constructed drainage features to handle storm events, consistent with DEP's stormwater management requirements. With all the class 1 and class 3 structures being closed or removed, the remaining site features will not adversely impact the water quality of run-off that is being collected and treated prior to discharge. After roughly 1 year post-complete closure, it is anticipated that the drainage water from site will be back to historical quality and no longer require treatment. After this has been confirmed, Wolfden will decommission, remove and sell the water management facility. The water management facility will be excavated and inert material (demolition debris) placed underground and the area recontoured. A final engineered plug will be placed in the portal area to completely and permanently block access to any underground workings.

Once final reclamation work is completed, continued post-closure monitoring of surface water and groundwater will take place for a duration that is specified in the DEP mining permit. Within the first year, samples will be taken frequently, following the sampling requirements established for operating the property. Within the second year, sampling intervals will decrease as confidence in the quality of closure increases. This will continue for 5 years until the sampling frequency is minimized to one time per year. The frequency of monitoring will be established statistically based on water quality trends and data.

The property will then be rezoned. Land use restrictions and deed covenants will be instituted over land occupied by the tailings facility to ensure that no industrial or commercial activity occurs over that portion of the site post closure.

Beneficial re-use of the property will include timber harvesting as it occurs presently outside the tailings facility footprint. Also, the portal will be closed in a manner that will allow entry underground to bats, providing valuable habitat.

**Attachment R**  
**Proposed Land Use Activities and Structure Allowed in the Pickett Mountain (D-PD) Planned Development Subdistrict**

This Petition contains preliminary locations and dimensions of new buildings and structures required for the project. During detailed engineering analysis and planning in support of the mine permit application to the DEP, these preliminary locations and dimensions may change. Changes may reflect improvements in the efficiency of the project, environmental management of the site, and comments by the DEP.

The following land use activities and structures are anticipated for the Pickett Mountain (D-PD) Planned Development Subdistrict, including:

- A. Uses and activities allowed without a permit;
- B. Uses allowed without a permit subject to standards
- C. Uses and activities allowed with a permit or by special exemption.

**A. Land use activities and structures allowed in the Pickett Mountain (D-PD) Planned Development Subdistrict without a permit**

- 1. Motorized vehicular traffic on roads and trails.
- 2. Snowmobile traffic on-and off roads.
- 3. Electrical Services Construction, installation, servicing, maintenance, including electrical Service drops. and High/Medium/Low Voltage service
- 4. Mineral exploration activities, including geophysical investigations.
- 5. Surveying and other natural resource analysis.
- 6. Signs listed as exempt in Section 10.27,J,1of the LUPC's Land Use Districts and Standards.
- 7. Temporary lighting equipment.
- 8. Emergency operations conducted for the public health, safety or general welfare, such as emergency medical response, law enforcement, resource protection and other rescue operations.
- 9. The general management, operations and maintenance of roads, structures, above ground and subsurface utilities
- 10. Shipping and receipt of materials
- 11. On-site and Off-site management of solid waste generated on-site.

12. Forest management activities
13. The operation of vehicles, vehicular equipment on existing roads, service roadways and associated areas.
14. The repair, and maintenance of vehicles, vehicular equipment, and other equipment in on-site maintenance buildings and areas and emergency repairs in on-site maintenance building and other facilities including roads, service roadway, and associated areas.
15. Hunting and trapping of wild animals, provided such hunting and trapping is conducted at least 500 feet away from existing development including structures.
16. Decommissioning of all installed infrastructure
17. Environmental work
18. Security Services

**B. Land use activities and structures allowed in the Pickett Mountain (D-PD) Planned Development Subdistrict without a permit subject to standards**

1. Expansion of a building approved as part of the mining permit issued by DEP, so long as it does not add or change uses to the building.
2. Construction, operation and maintenance of all subsurface facilities and assets related to mineral extraction, backfilling and closure of such facilities, including but not limited to additional surface facilities not envisioned at this time but could be needed in the future to support subsurface operations including ventilation shafts, raises, surface shafts and attendant headworks to facilitate deeper ore removal.
3. Importation of electrical power via a new utility line constructed by others
4. Road maintenance activities, including grading, replacement of gravel travel surface, widening, maintaining shoulders, drainage and trimming vegetation.
5. Increase in the amount of cleared area within the subdistrict.
6. Minor modifications of the location or design of buildings and other structures approved pursuant to a permit, which are made necessary or preferable to unforeseen conditions.  
Minor changes to be allowed under this section may include:
  - a. Relocation of exterior lighting within 50 feet of the location(s) shown on the approved plans;
  - b. Relocation or realignment of roadways or alignment(s) shown on the approved plans, provided that required erosion control systems are adjusted accordingly;
  - d. Relocation of culvert(s) within 50 feet of the location(s) shown on the approved plans;

- e. Relocation of water treatment and management facilities, including subsurface piping, including those for domestic wastewater
  - c.. Fuel storage tanks for operation of heating and backup power generation;
7. Constructed ponds: Creation, alteration or maintenance of constructed ponds of less than 4,300 square feet in size which are not fed or drained by flowing waters, provided they are constructed and maintained in conformance with the vegetative buffer strip requirements of Section 10.27,C,2,a.
  8. Filling and grading.
  9. Clearing and grubbing and maintenance of topsoil pens for later use in site restoration/ reclamation.
  10. Mineral exploration activities: Level A and B mineral exploration activities, excluding associated access ways.
  11. Road projects: Level A road projects.
  12. Maintenance of employee parking areas within the mine operations area
  13. Service drops.
  14. Signs.
  15. Exterior lighting
  16. Storing and utilizing explosives assigned for underground.

**C. Land uses and activities allowed in the Pickett Mountain (D-PD) Planned Development Subdistrict requiring a permit.**

1. Mineral (natural) resource extraction, crushing and processing including all related metallic mineral mining activities and Tier one advanced exploration and all related support activities required for the safe and environmentally secure execution of the mining, crushing and processing activities.
2. Construction, operation and maintenance of buildings, pads, office facilities and attendant structures for the sorting, milling, processing of the mineral resource and shipping off-site of mineral concentrates
3. Construction, operation and maintenance of water treatment facilities and attendant structures for the collection, conveyance of waters, and re-infiltration of treated waters.
4. Construction, operation and maintenance of lined facilities for eventual and permanent management of dry stacked tailings.
5. Constructed ponds: Creation, alteration or maintenance of constructed ponds 4,300 square feet or greater in size which are not fed or drained by flowing waters, or of such ponds less



than 4,300 square feet in size which are not in conformance with the vegetative buffer strip requirements of Section 10.27,C,2,a.

6. Draining or altering the water table or water level for other than mineral extraction.
7. Filling and grading, which is not in conformance with the standards of Section 10.27,F.
8. Road projects: Level B and C road projects, except for water crossings as provided for in Section 10.21,A,3,b.
9. Signs which are not in conformance with the standards of Section 10.27,J.
10. Utility facilities, above ground and underground electric utility lines excluding service drops, and wire and pipe line extensions which do not meet the definition of service drops;
11. Water impoundments and ponds for water storage, treatment or detention.
12. All potential electrical work including High/Medium/Low Voltage service installation, operation and maintenance, including installation of cables, and associated infrastructure
13. Other structures, uses, or services which the LUPC determines are consistent with the purposes of this subdistrict and of the Comprehensive Land Use Plan and are not detrimental to the resources and uses they protect, and are of similar type, scale and intensity as other uses under this permit.