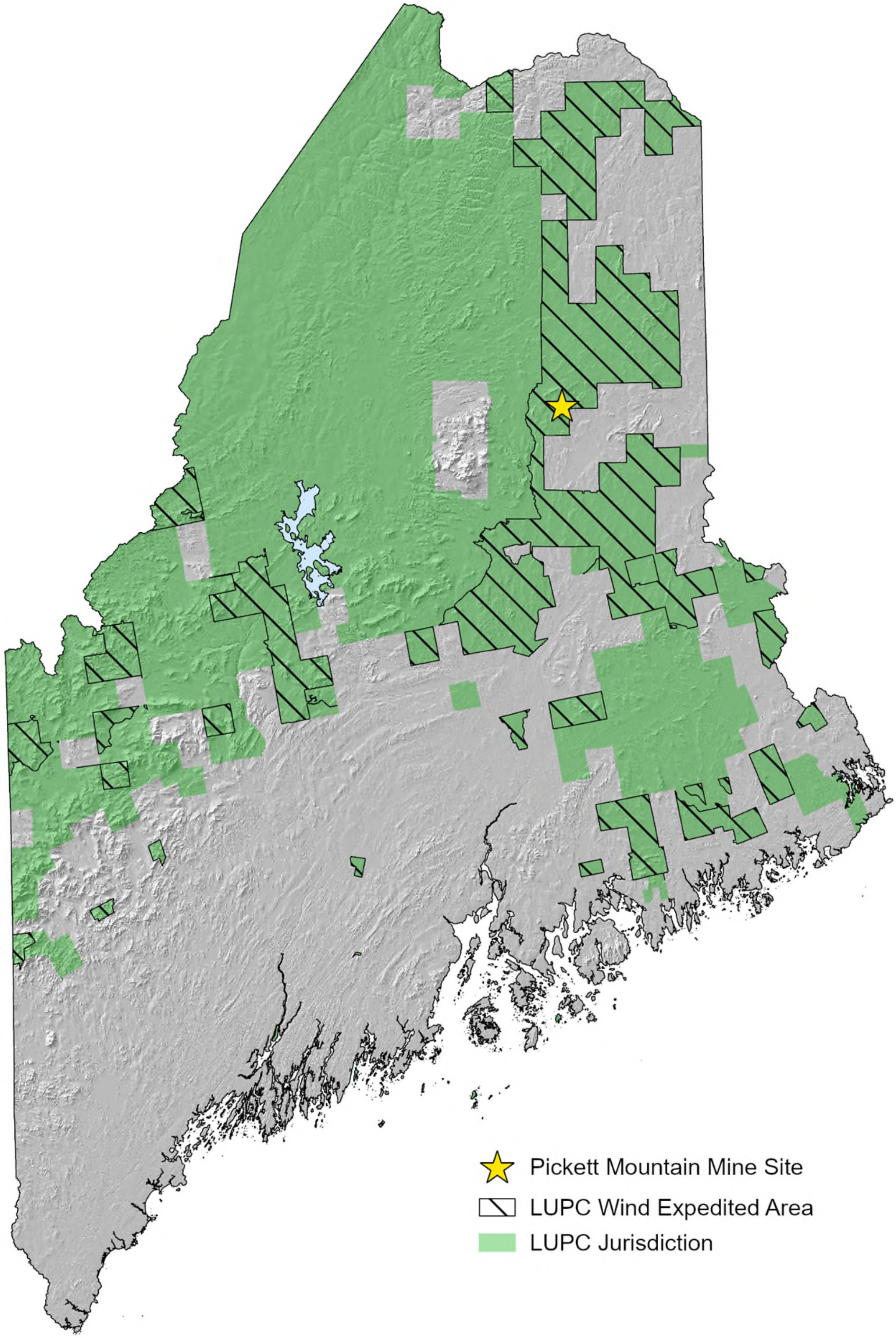
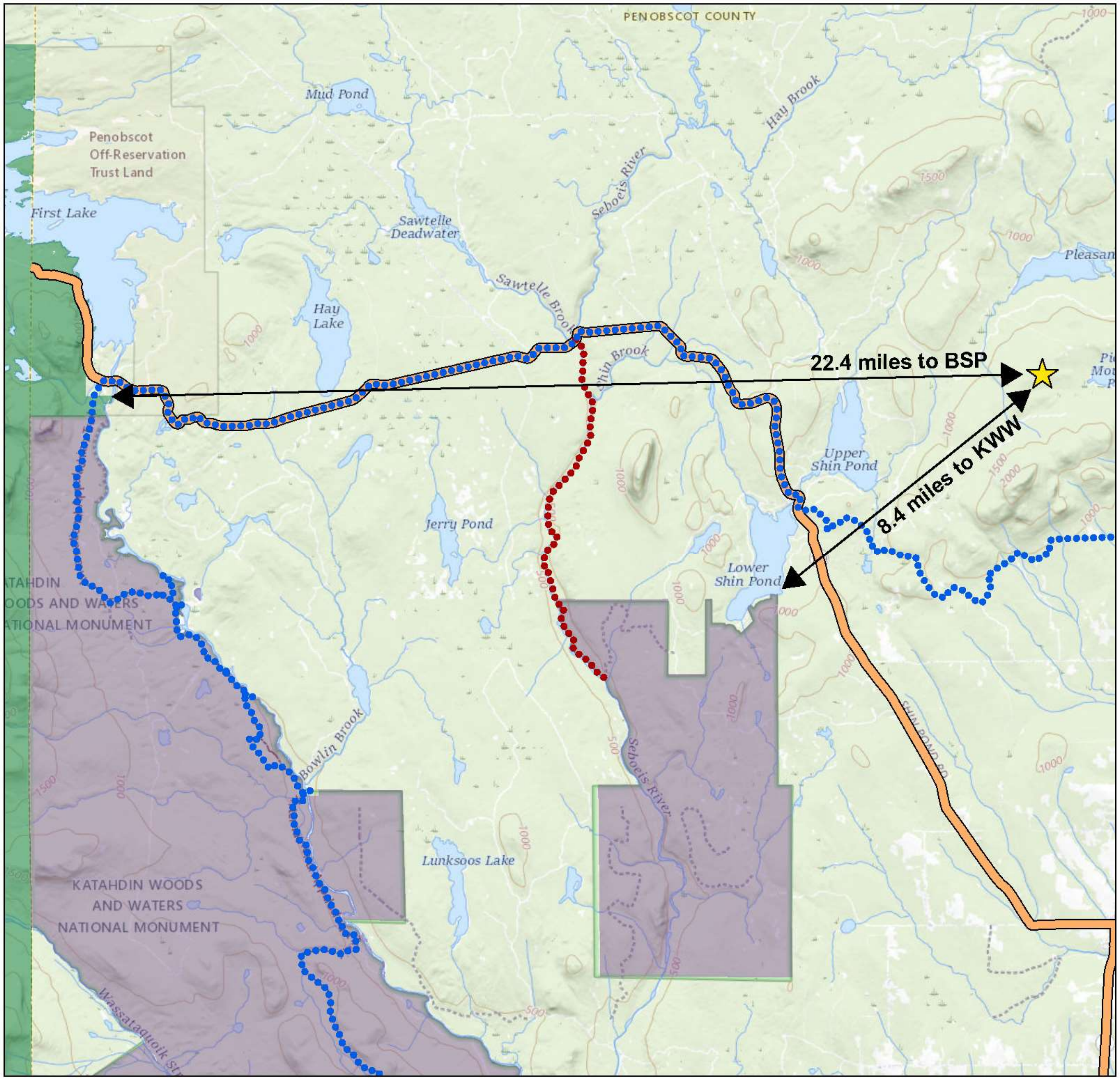


Pickett Mountain Mine Site
LUPC Wind Expedited Area
LUPC Jurisdiction



Stantec

Legend

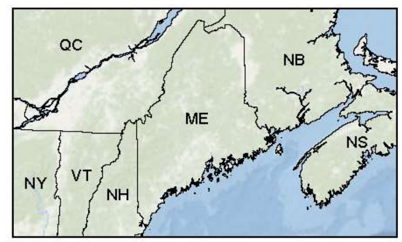
- Pickett Mountain Mine Site
- International Application Trail
- Sebois River Trail
- Katahdin Woods & Waters Scenic Byway
- Katahdin Woods and Waters National Monument
- Baxter State Park

N

0 2.5 Miles
(At original document size of 8.5x11)
1:162,000

Notes

1. Coordinate System: NAD 1983 UTM Zone 19N
2. Data Sources: USGS, MeDOT, Penobscot River Trails, Inc.
3. Background: The USGS National Map



Project Location
T6 R6 WELS, Maine

Prepared by GC on 2023-10-12
Reviewed by DS on 2023-10-12

Client/Project 195602317
Wolfden Resources Corporation
Pickett Mountain Metallic Mine Project

Figure No.
1

Title
Visuals

U:\195611956023170\03_data\gis_cad\gis\MXDs\Testimony\Archeological Testimony Maps Sept2023\Archeological Testimony Maps Sept2023.aprx Revised: 2023-10-12 By: gcarpentier

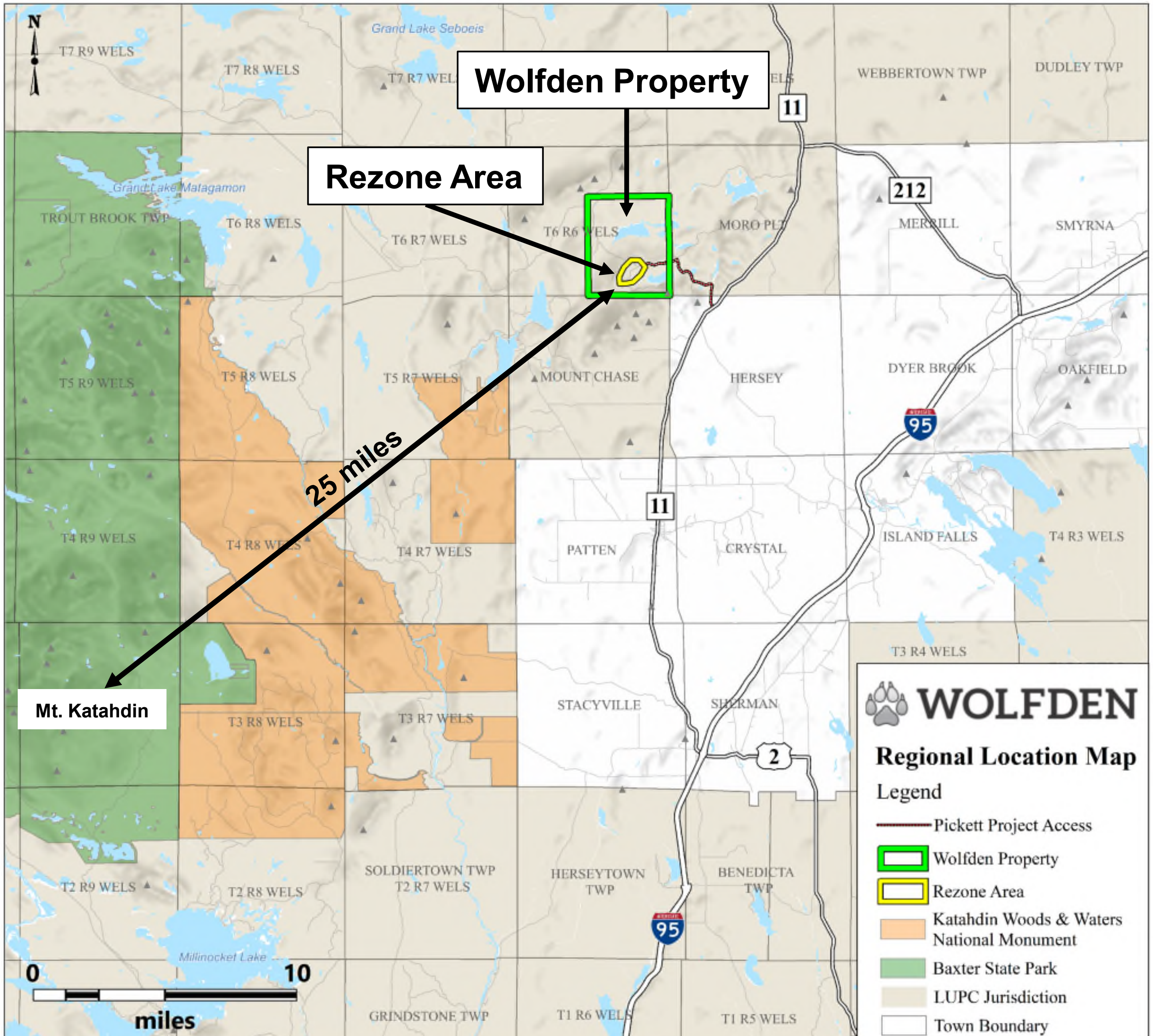
WOLFDEN

Pickett PROJECT

Project Overview – Jeremy Ouellette P. Eng

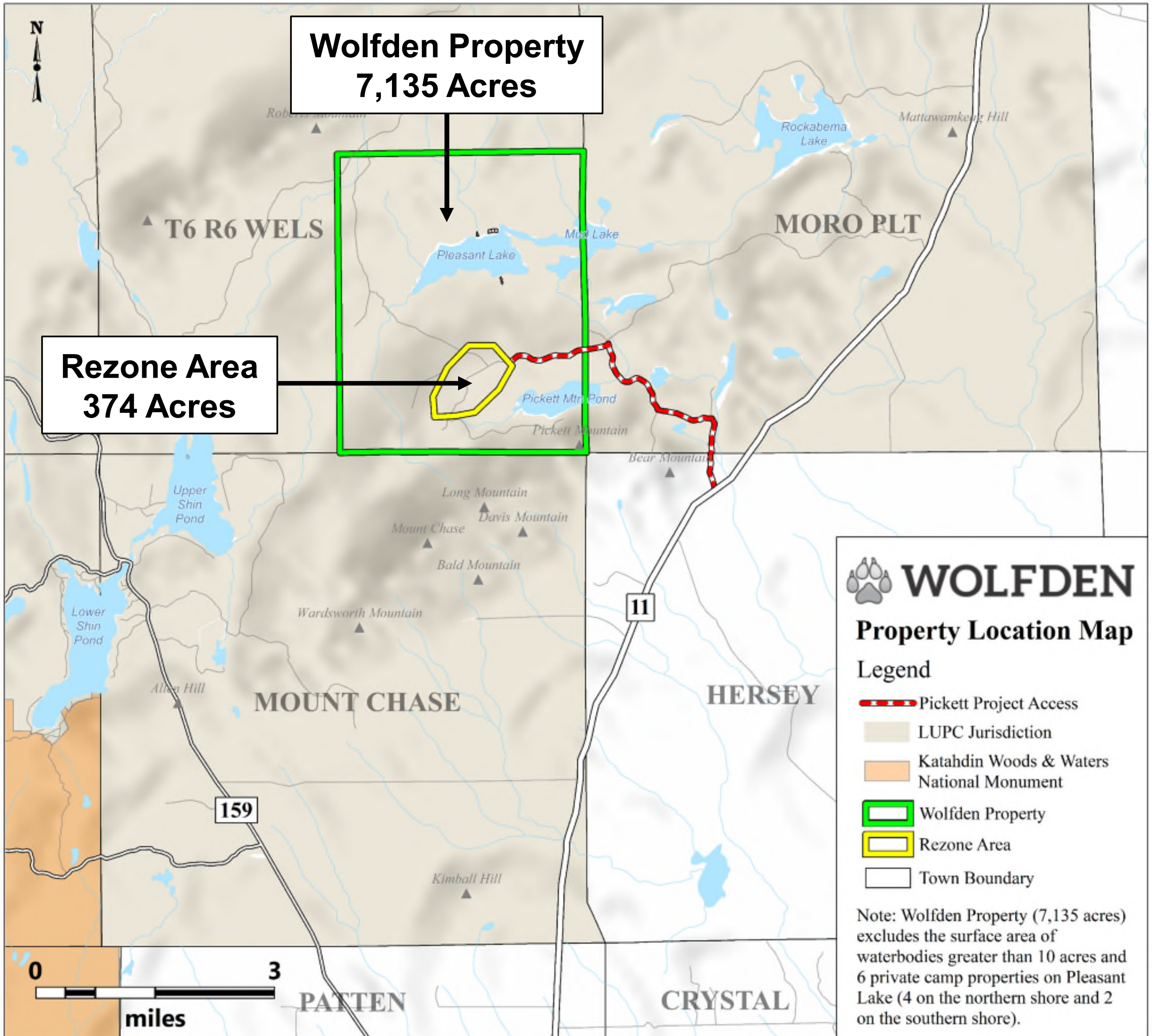
Regional Project Location

WOLFDEN

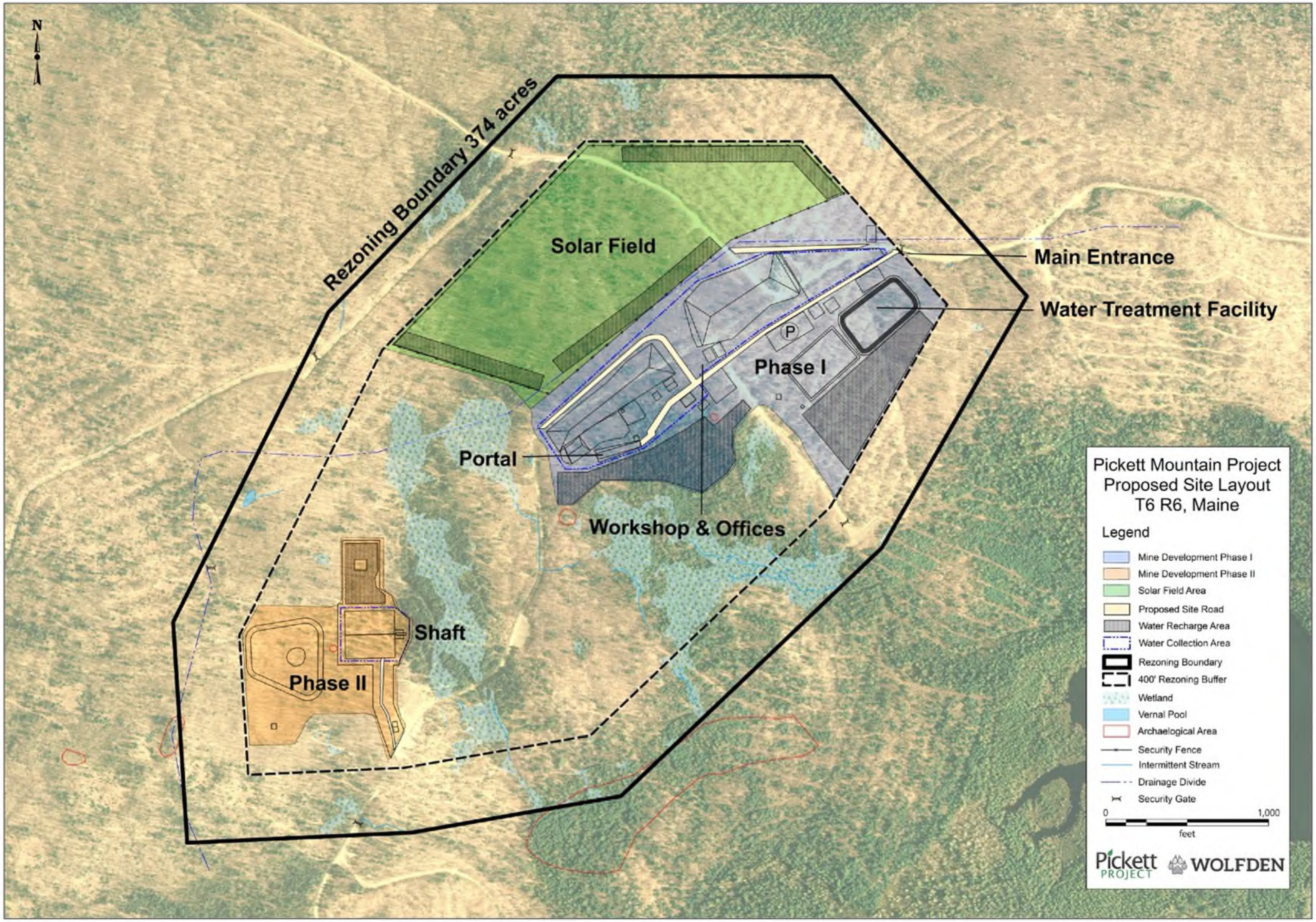


Project Site Location

WOLFDEN



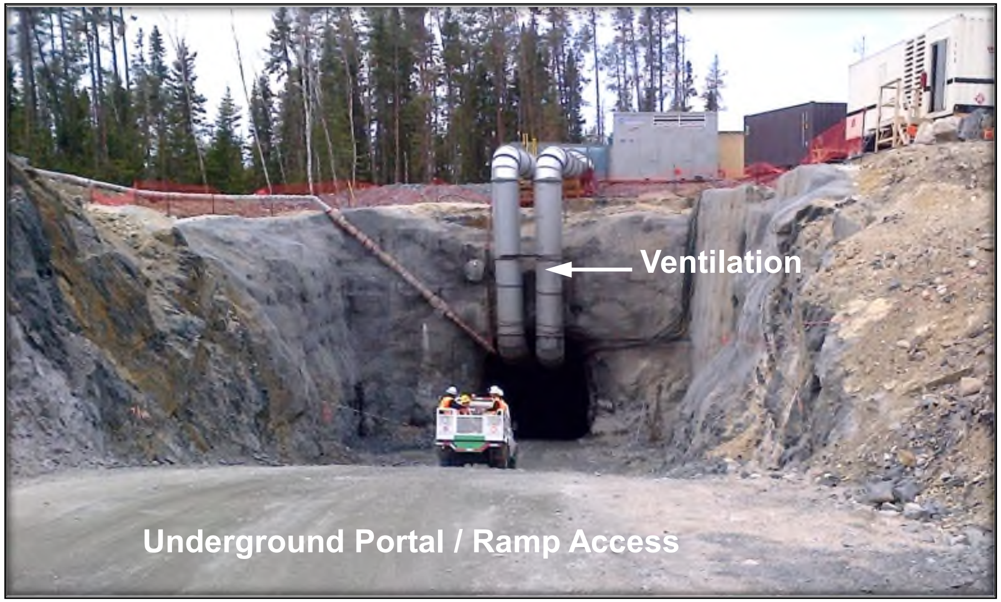
Proposed Mine Site Layout

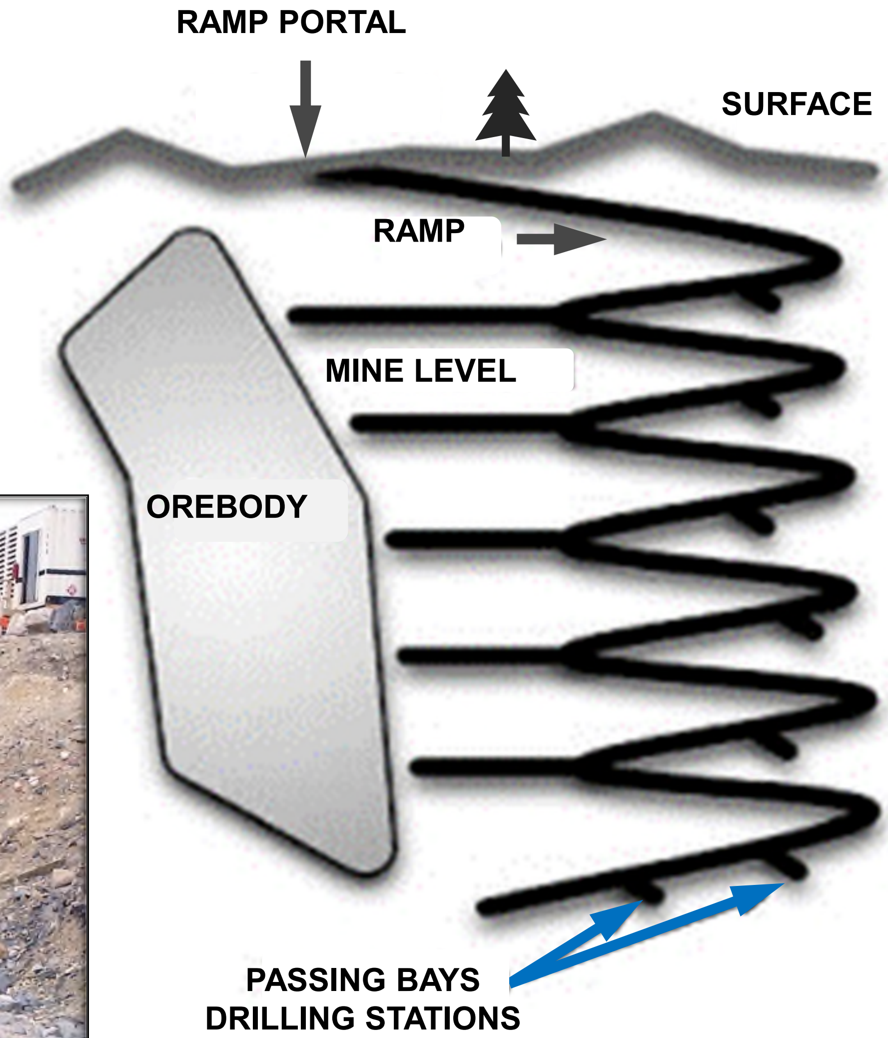


Mining Method

WOLFDEN

- Small Surface Impact (64’ x 100’)
- Ramp access to underground workings (16’x16’ tunnels)
- Underground trucks transport rock to surface through the ramp
- Waste rock from tunnels used to fill orebody excavations

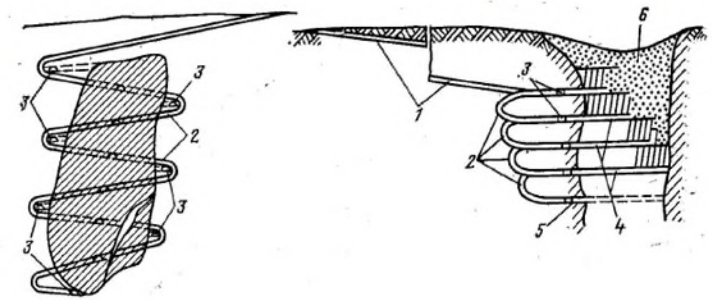


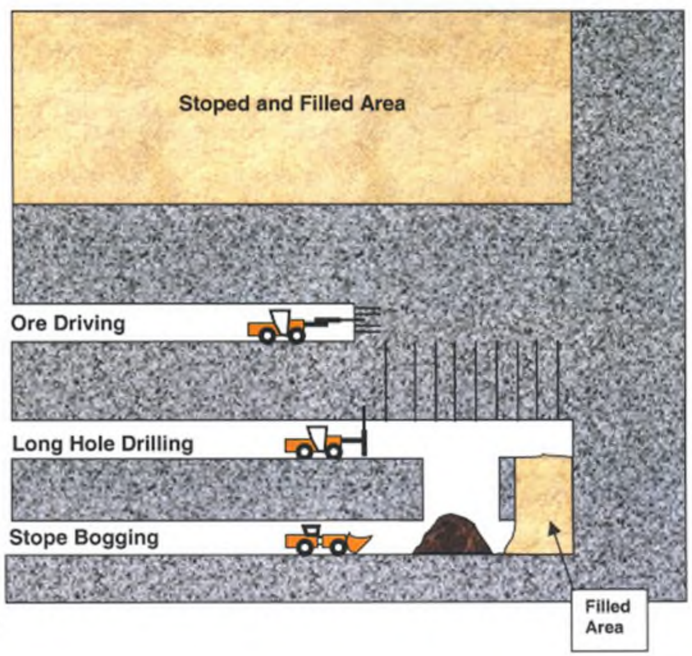


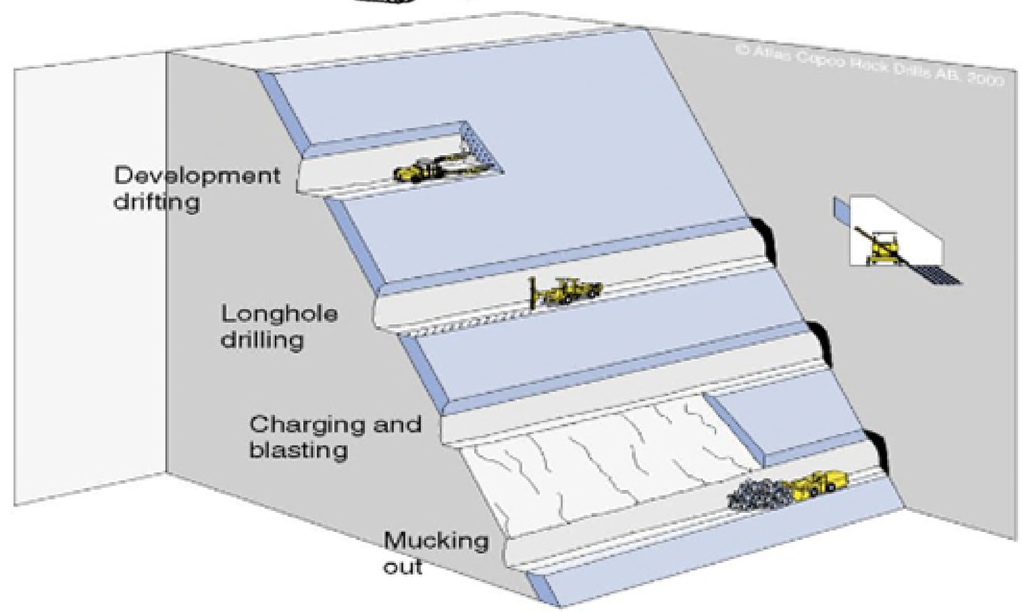
Mining Method

- Mining Method - Long Hole Stoping
- Underground trucks haul rock to surface
- Waste rock used to backfill open stopes

ore extraction by ramp







Reclamation Example – Flambeau Mine 1993-1999

WOLFDEN

Reclamation Example – Flambeau Mine 1993-1999

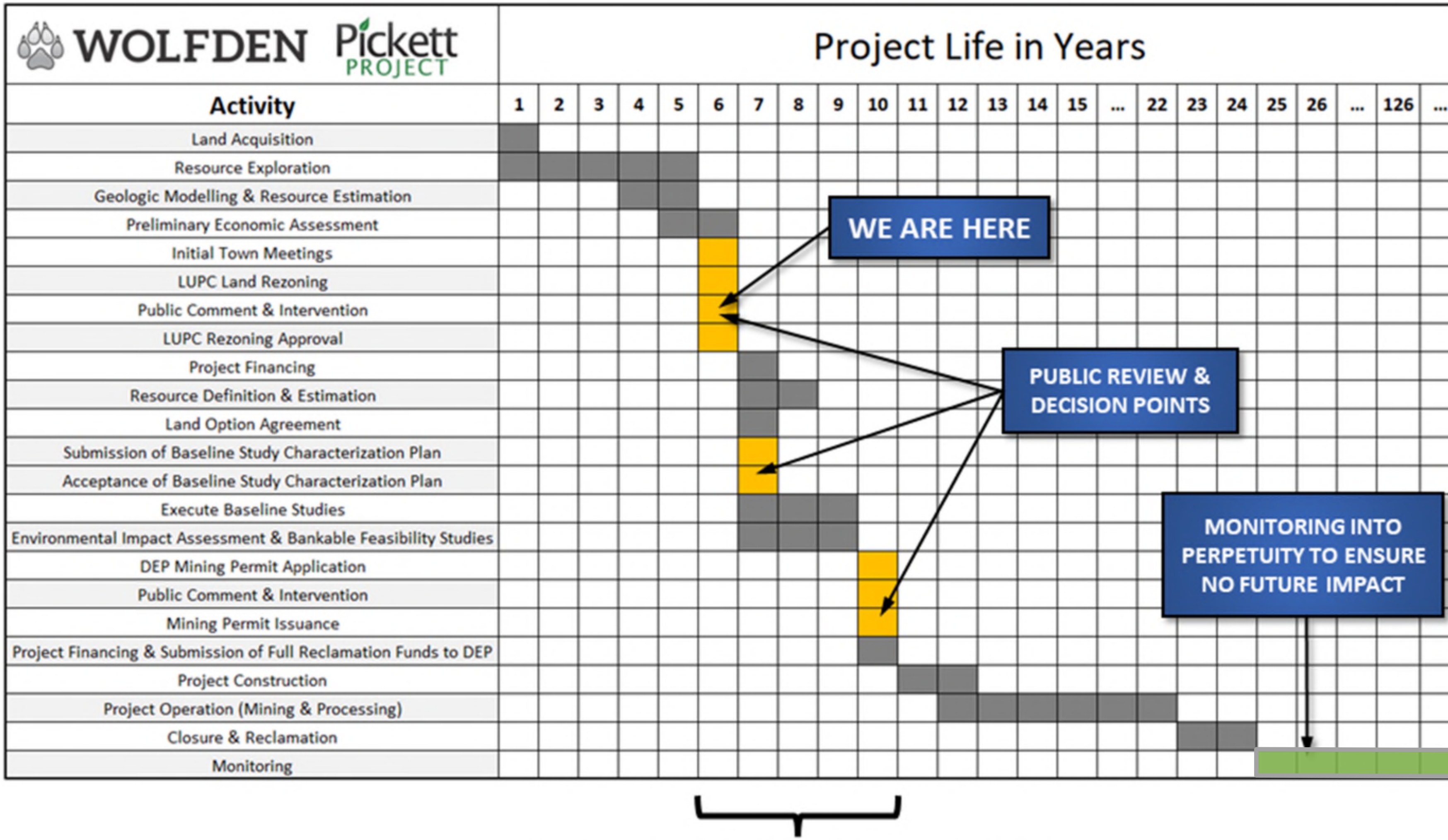
Reclamation Example – Flambeau Mine 1993-1999

Reclamation Example – Lamefoot Mine Operations

WOLFDEN

Reclamation Example – Lamefoot Mine Reclaimed

Project Development Timeline



4 – 5 years of studies and process before construction of any mining project can take place

Callahan Mine Site

WOLFDEN

Blue Hill Mine

Acid Rock Drainage at Historic Mines

WOLFDEN

- Spain - Río Tinto ("red river")
- Mined for copper, silver, gold since 3,000 BC without concern for environment
- River now has a pH of 2
- Red hue is due to high iron dissolved in the water
- Other metals also dissolved in water due to low pH

WHY THIS WON'T HAPPEN AT PICKETT

- All potential acid generating rocks will be placed on a double lined pad
- All accepted waste rock is placed back underground into void openings as backfill
- Upon closure the mine is flooded and no acid will be generated
- Any small amount of acid generated during mine life will be treated by water treatment plant

Historic Site Design Flaws

WOLFDEN

- Proper planning and implementation are key
- Brunswick No. 12 in New Brunswick
  - After-the-fact remediation
  - Inadequate buffering
  - No impervious top liner cover
  - Resulting acid seepage requires continued water treatment

WHY THIS WON'T HAPPEN AT PICKETT

- Design includes bottom and top liner and proper drainage run-off collection
- Pickett is small and confined proposed site with state of the art water collection/management systems.
- No perpetual liability left on surface and no active perpetual management required.

Pickett Community Advisory Committee (CAC)

Chapter 200 – Highlights and Assurances

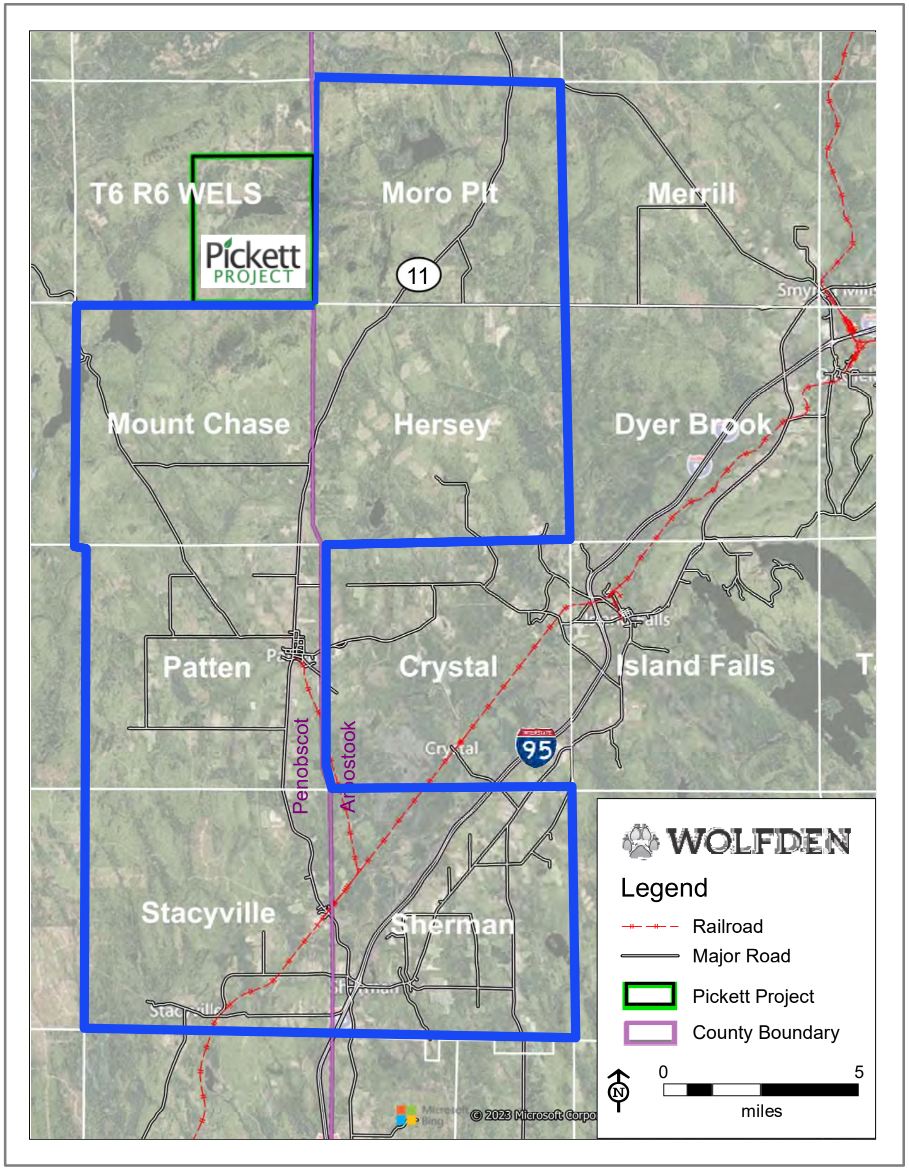
WOLFDEN

- ✓ Heavily Focused on Water Management
- ✓ Water Treatment to meet background water quality
- ✓ Underground Mining Only
- ✓ Reclamation and Closure Funding in Trust – Eliminate Financial Risk

- ✓ Chapter 200 heralded by environmental organizations who were active in crafting Chapter 200
- ✓ NRCM stated publicly they would support Pickett Project if it meets the standards of Chapter 200
- ✓ Work to date indicates the ability to meet Chapter 200 requirements
- ✓ Chapter 200 process involves comprehensive data gathering and analysis, including detailed geochemistry and hydrogeological work, to demonstrate compliance with highly protective standards

Surrounding Community Support – Public Votes

WOLFDEN

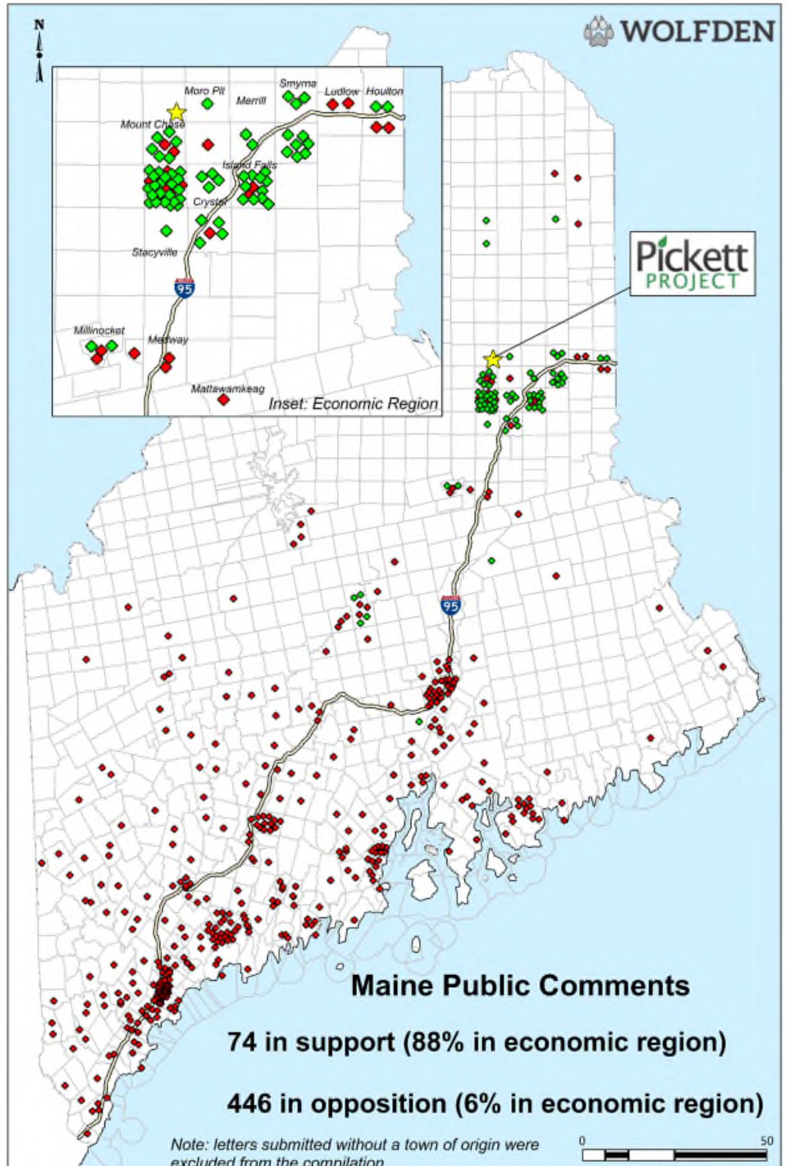


Wolfden Pickett Project Owned Land ~ 7,135 acres

Towns and Townships that held Public Votes on Pickett in 2022/23

- ✓ **Strong Local Support**
- ✓ **5/6 Public Votes in Favor of Project**
- ✓ **1/6 Public Votes 50/50**
- ✓ **Other Towns & Townships not voted**

Pickett Public Comments Compilation Map



Total Benefits of the Pickett Project

WOLFDEN

Training and Employment

- +270 total direct jobs with 233 jobs at Mine site
- High wages
- Training Programs

+$230 million[1]
in Employment Earnings

Community Engagement

- Investment into local and regional communities. What do town residents see as town needs and wants?
- Growth of Local Businesses
- Local Infrastructure improvements

+$310 million[1]
in Regional Expenses

Economic Benefits

- Increased Tax Revenue to Town
- Increase in Sales Tax Revenue
- Community Benefits Agreement
- Funding for local Projects

+$670 million[1]
in Economic Output

[1]*Economic Assessment of the Proposed Pickett Mine Project*, Stepwise Data Research (November 14, 2022)

Proposed Operating Mine Employment

WOLFDEN

Pickett Mine Employment Estimate	
Position	**# of Total Hires**
Mine Manager	1
Mine Superintendent	1
Technical Services Superintendent	1
Senior Engineer	1
Accountant	1
Engineer/Geologist Technicians	2
Warehouse Manager	1
Environment Coordinator	1
Medical Contract	1
Security Guard	4
Site Services	1
Underground Equipment Operator	32
Underground Mechanic	44
Underground Laborer	46
Underground Miner (Standard)	32
Underground Miner (Alimak)	20
Supervisor	8
Total Wolfden Mine Employees	**197**
Steady State Contract Employees	36
Total Employees at Site	**233**

for Areas within the Jurisdiction of the
Maine Land Use Regulation Commission

Maine Land Use Regulation Commission
Department of Conservation

"The Commission's procedures establish a two-stage permitting process for metallic mineral mining operations. First, a developer must petition to rezone the area proposed for mining and related facilities to the D-PD Subdistrict. If the Commission deems the area appropriate for this type of use and rezones it, the site review process follow, focusing on design, engineering and environmental protection. Chapter 12 of the Commission's rules provides more specific guidance regarding how the Commission evaluates proposals to rezone areas to the D-PD Subdistrict for purposes of metallic mineral mining.

The rezoning phase focuses on the socio-economic and environmental effects associated with metallic mining facilities. The site review process is designed to ensure a high-quality operation that is protective of existing uses and natural resources, and establishes specific data gathering requirements and standards regarding facility design, operation and closure."

WOLFDEN

INTERDEPARTMENTAL MEMORANDUM

MAINE GEOLOGICAL SURVEY, DEPARTMENT OF AGRICULTURE, CONSERVATION AND FORESTRY

93 STATE HOUSE STATION, AUGUSTA, ME 04333-0093, (207) 287-2801

Appropriateness of New District Designation

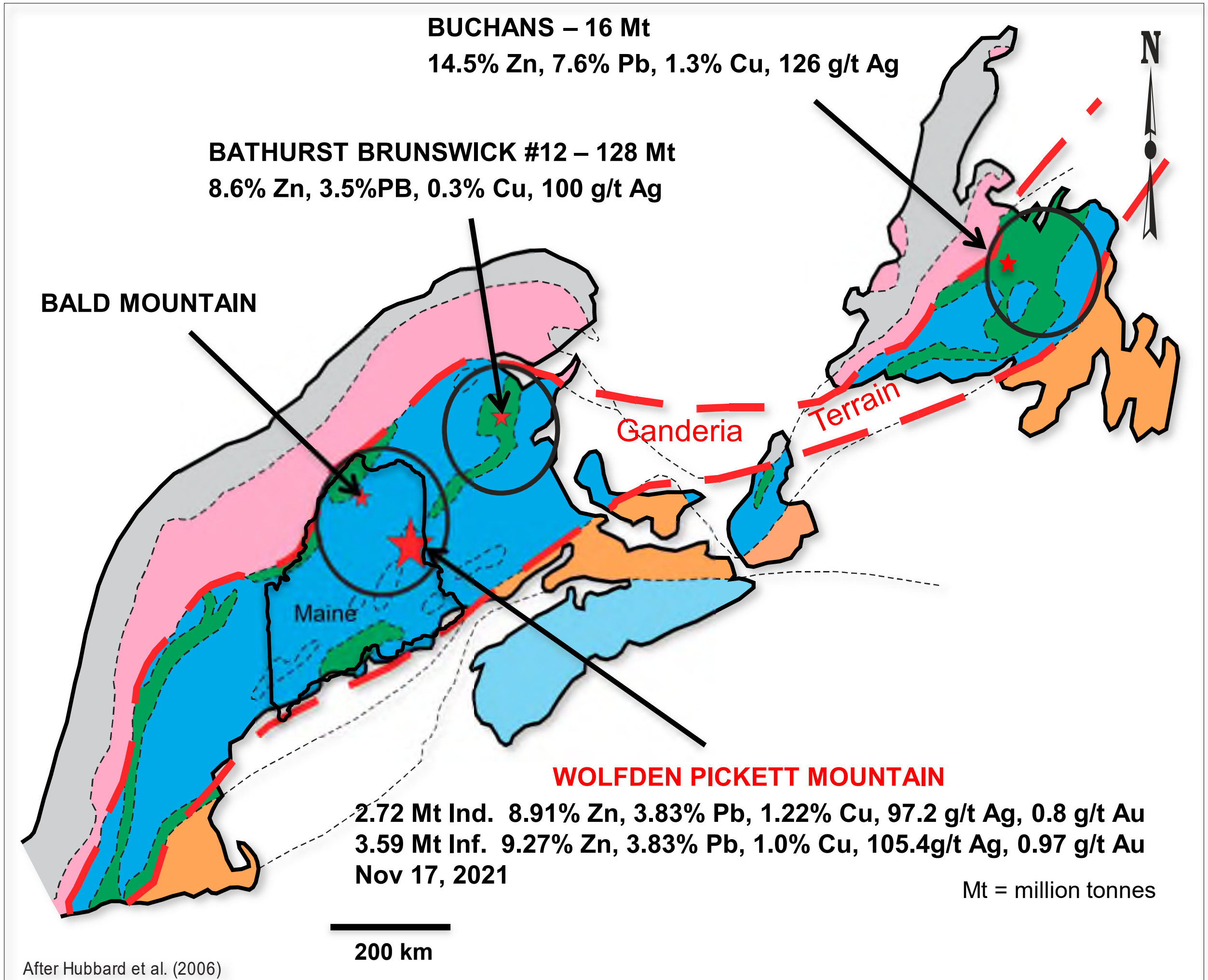
"Environmentally responsible mining of metallic mineral resources is a goal of the CLUP, as the Application mentions. We would add that there are currently very few mineral deposits in Maine known to be of a significant size and grade. . . . Of those few, the Pickett Mountain polymetallic deposit stands out as most compatible with the objectives of the Maine Metallic Minerals Mining Act (MMMMA) which favors small, high-grade deposits that can be mined underground, having less potential environmental impact than large, low grade, surface mines. . . . **Therefore, in our view, it would be more appropriate management of the metallic mineral deposit to allow it to proceed to the permitting process as envisioned by the CLUP and regulated by the MMMMA, than to have it remain in the M-G[N] zone**."


WOLFDEN
- Pickett Project -
Geology Overview – Don Dudek

Regional Geological Setting

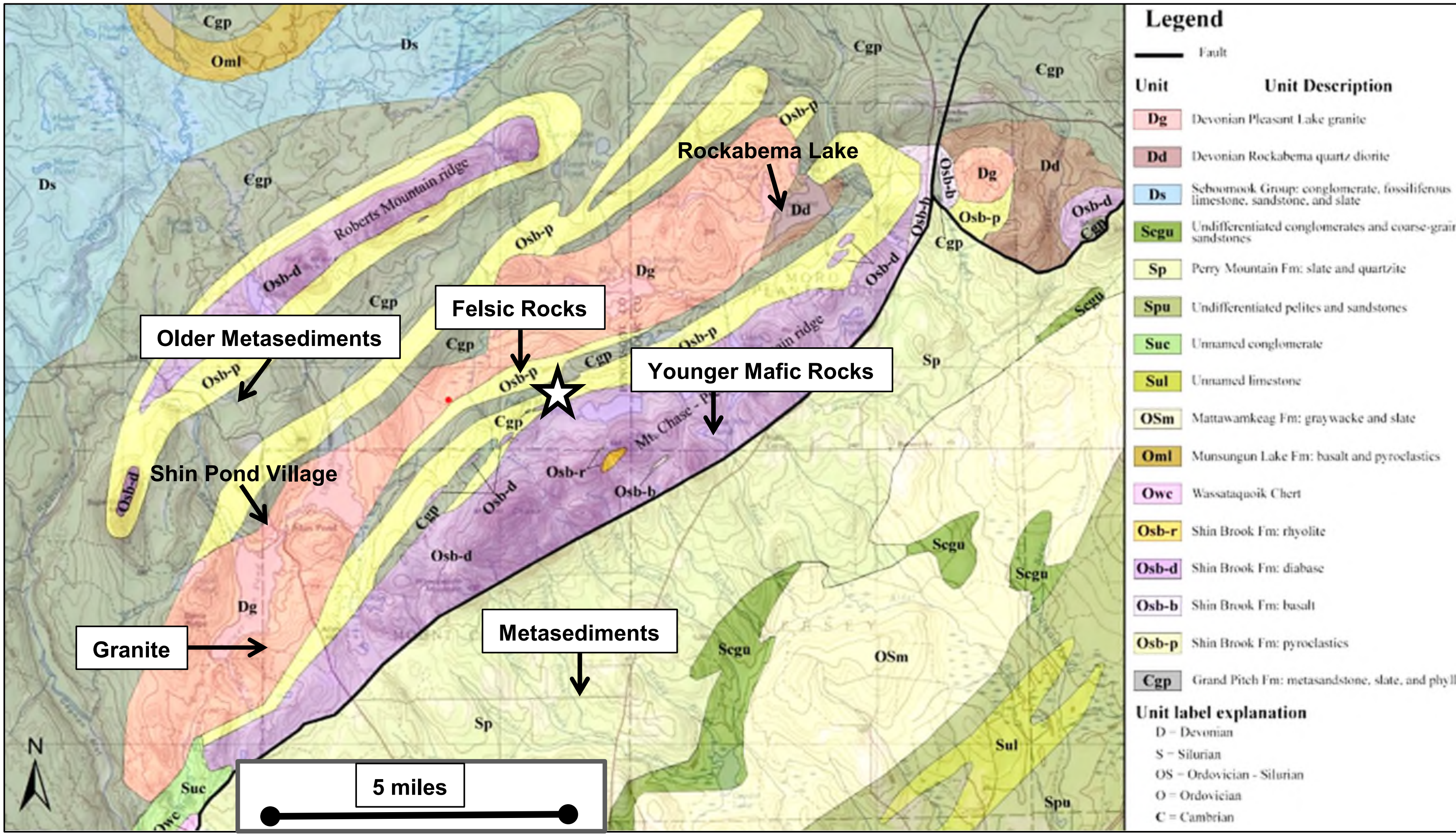
WOLFDEN

Tectonic Map of the Appalachians



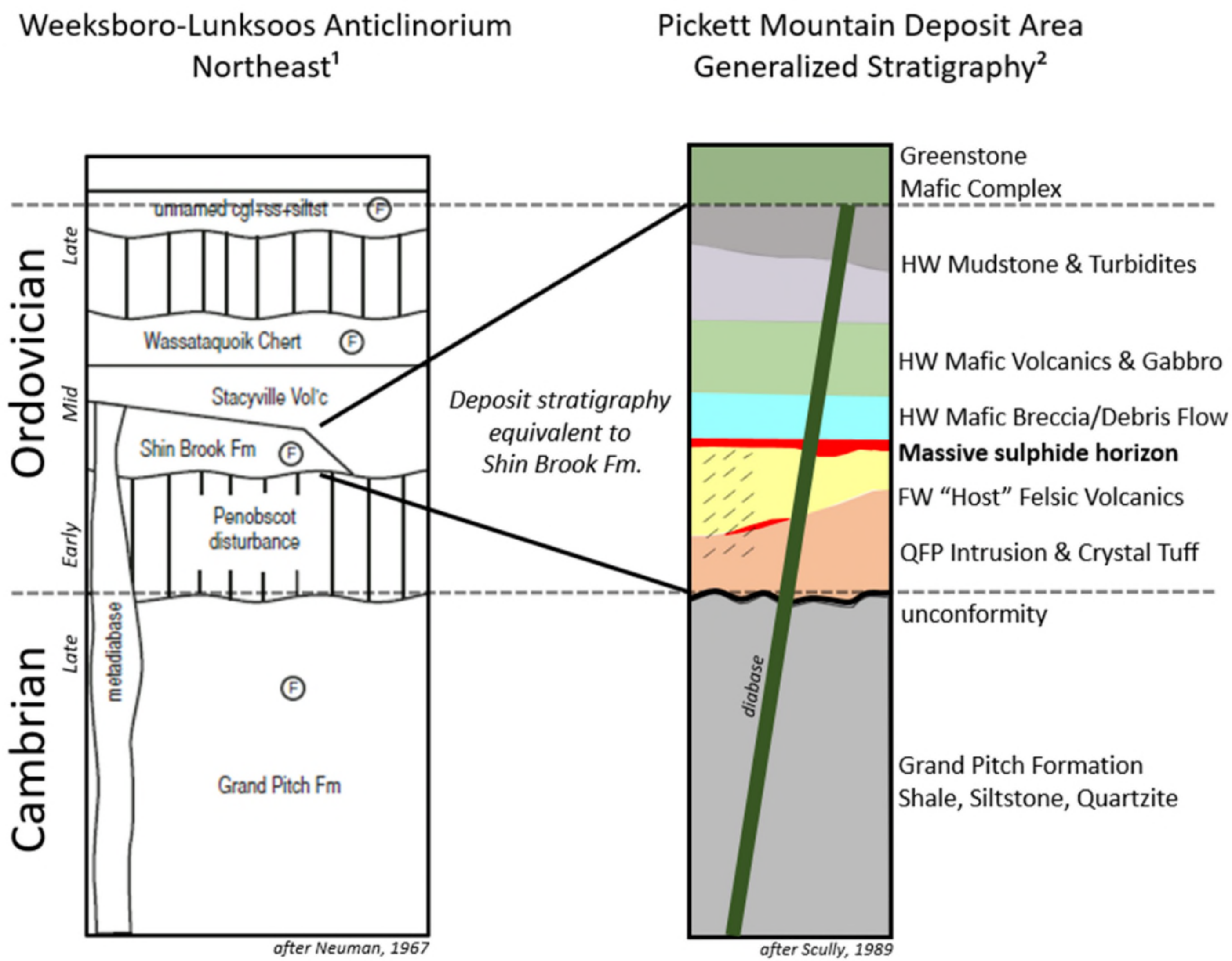
- Ganderia Terrain geologic belt hosts world-scale endowment of high-grade Zn-Pb-Cu-Ag massive sulphide deposits
- **BATHURST CAMP 349 Mt** World's largest VMS district w/ Production of 134 Mt
- **BUCHANS CAMP 112 Mt** Production 16 Mt
- **WOLFDEN PICKETT MTN.** Continuation of Ganderia Terrain belt into Maine - **underexplored and undeveloped**

Regional Geology – Weeksboro Lunksoos Belt



Revised regional bedrock geologic map of the Weeksboro-Lunksoos Lake Belt, northern Maine (after Neuman, 1967 and McCormick, 2021).

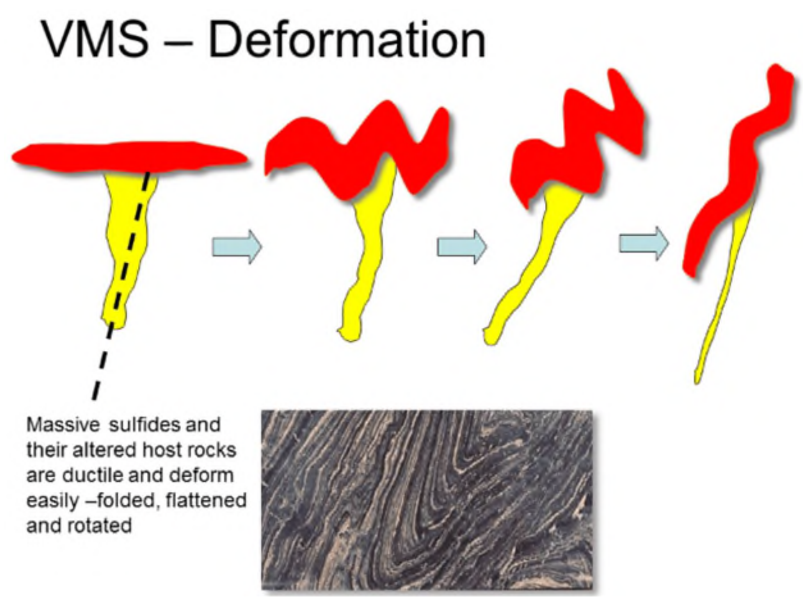
Stratigraphic Section – Pickett Deposit Area



Stratigraphic Section of Weeksboro-Lunksoos Lake Anticlinorium and Pickett Mountain Deposit (Wolfden, 2023 after Neuman, 1967 (1) and Scully, 1989 (2))

VMS Formation

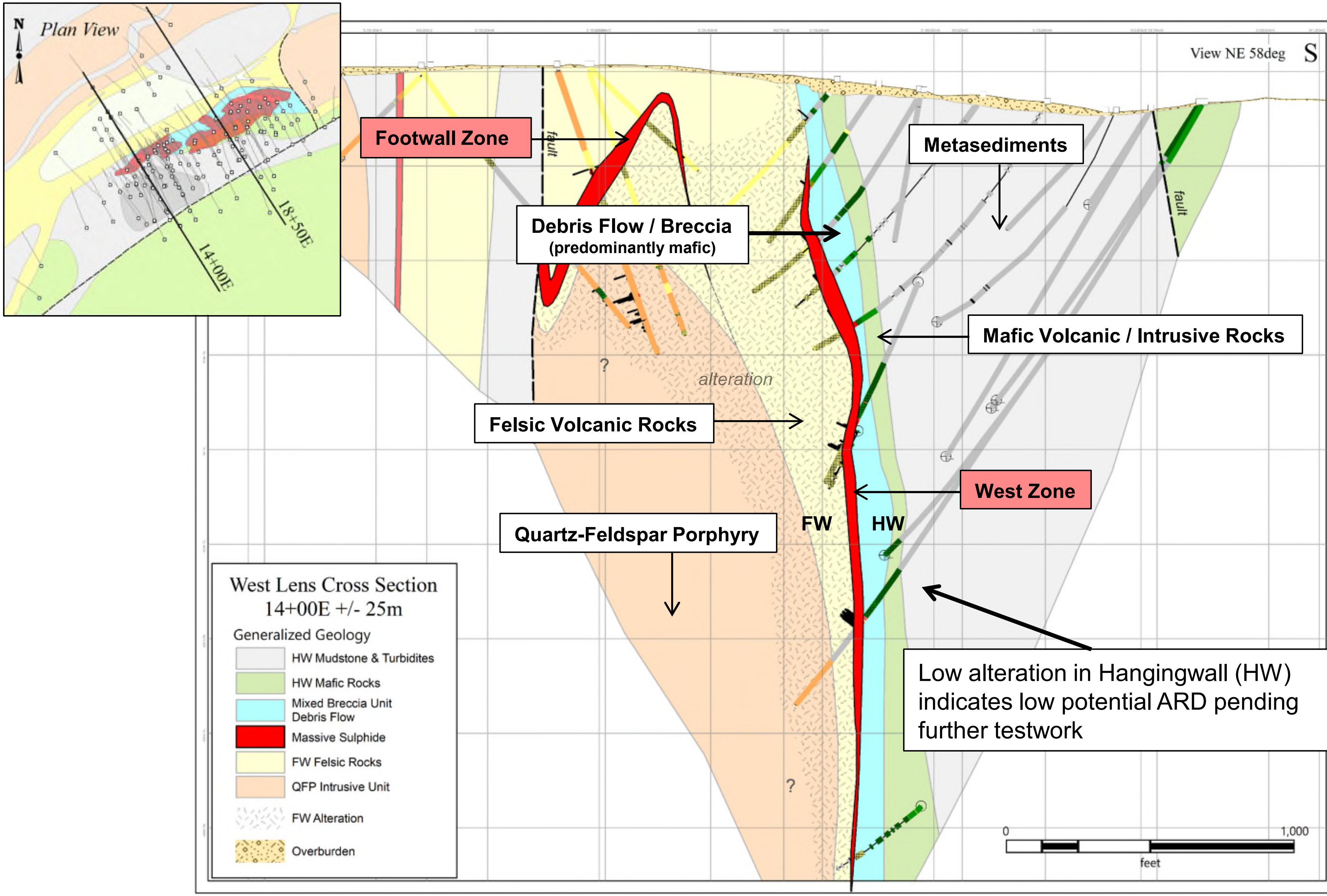
- Volcanogenic Massive Sulfide deposits form on or near the seafloor during active volcanism (oceanic spreading centers near volcanic arcs)
- Superheated seawater is one of the driving forces in VMS formation
- Pickett Mt. deposit formed ~450 million years ago due to nearby oceanic plate subduction beneath the North American continent



Graphics source: 911 Metallurgist

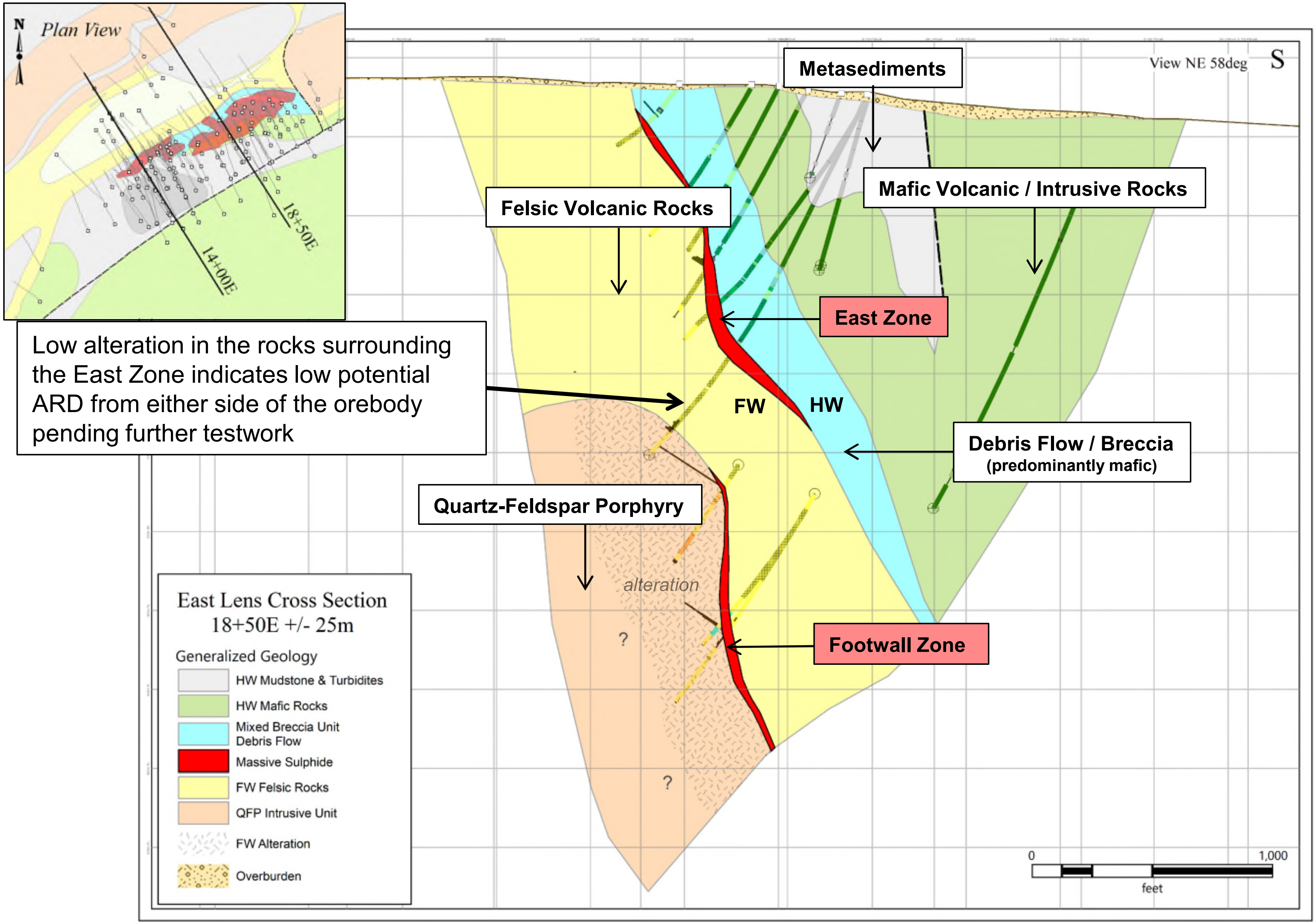
West Zone Cross Section – Pickett Deposit

WOLFDEN

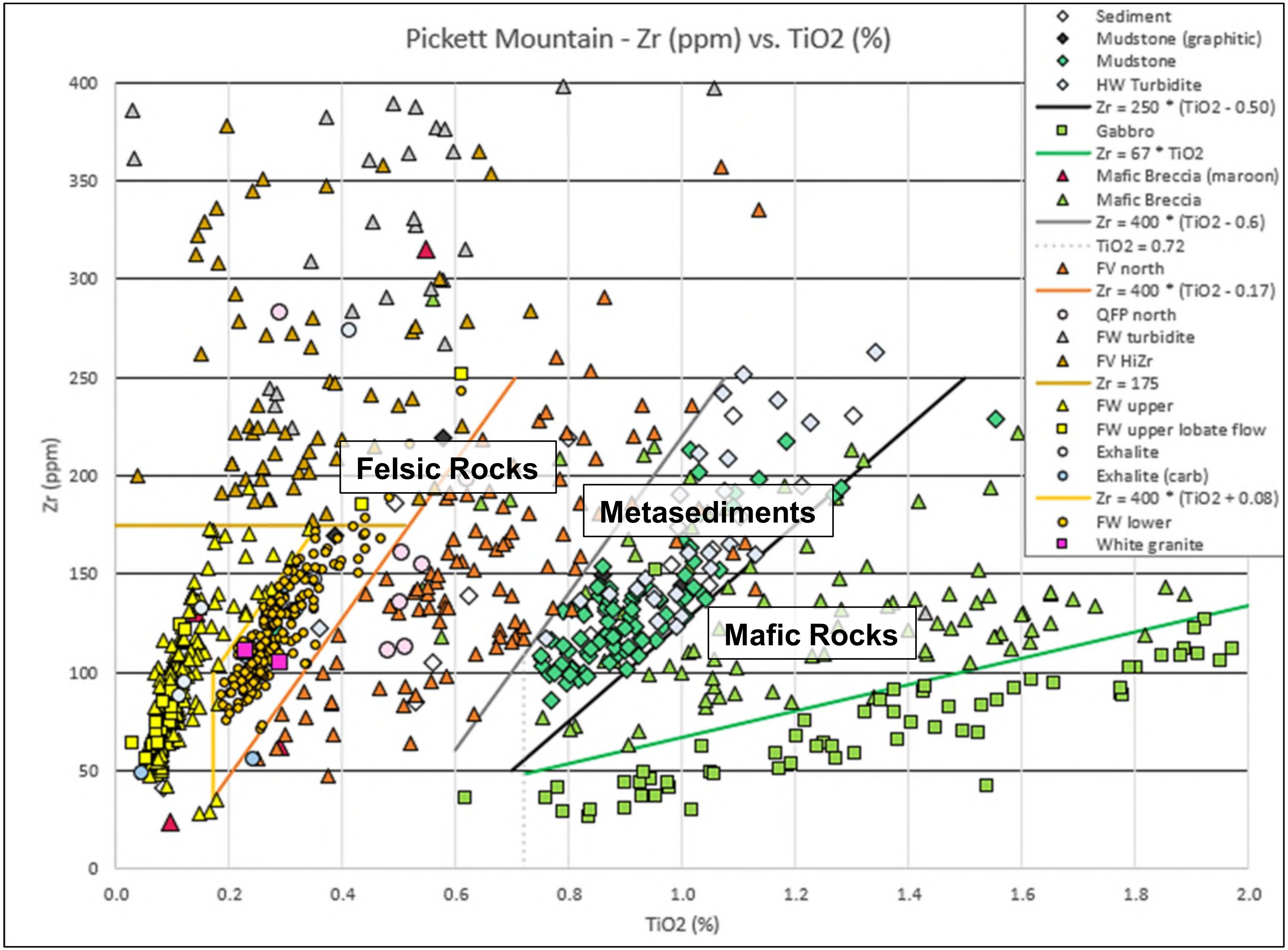


East Zone Cross Section - Pickett Deposit

WOLFDEN

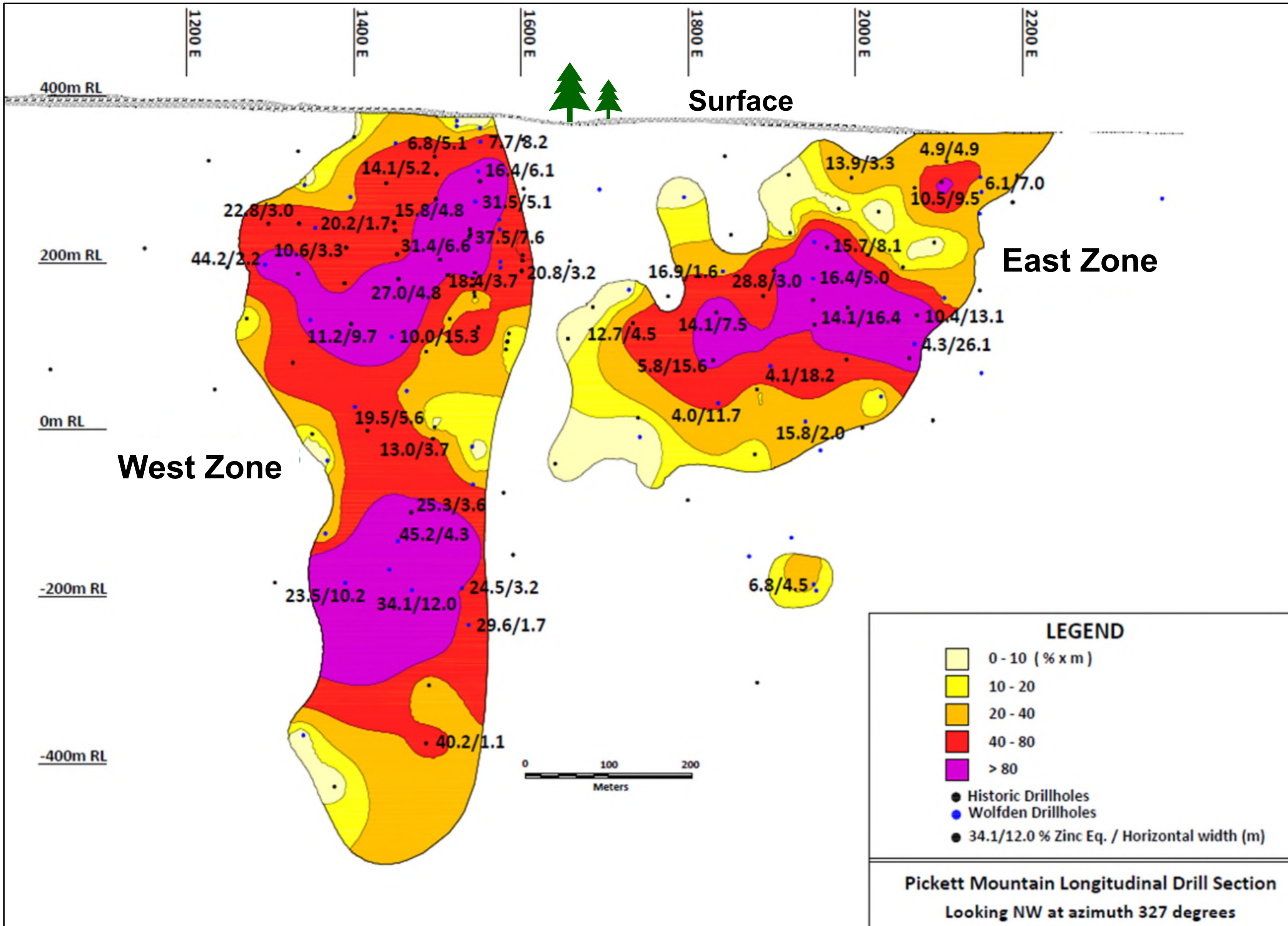


Rock Chemistry Analysis to Date



Longitudinal Section looking North

WOLFDEN

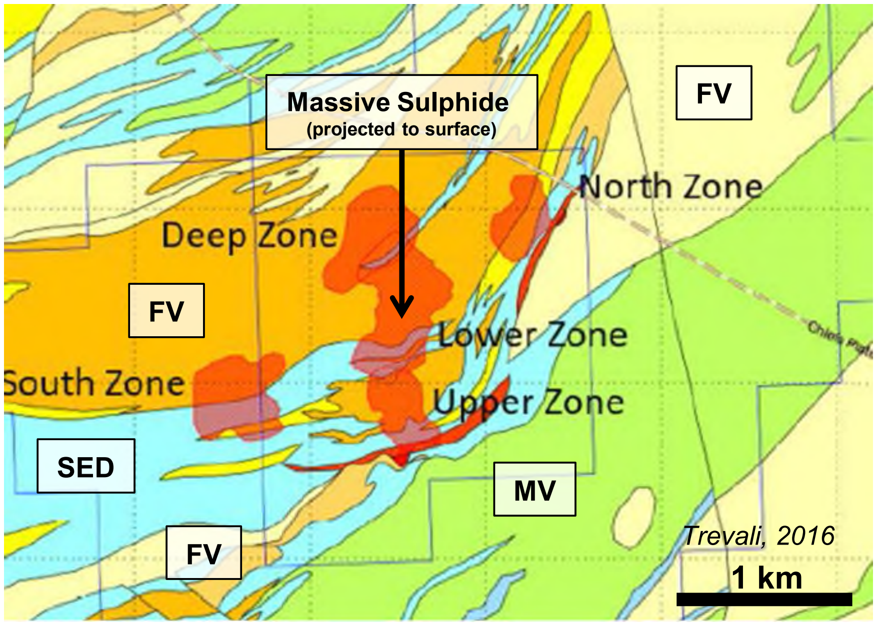


PM20-16 FW Zinc Stringer Mineralization in QFP

Pickett Deposit vs Halfmile Mine (New Brunswick)

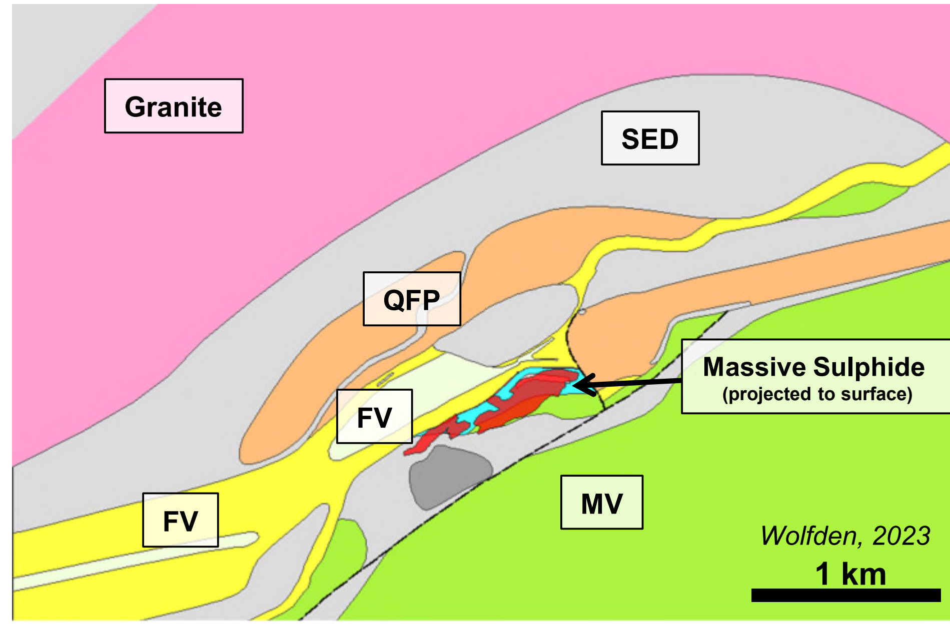
WOLFDEN

Halfmile Mine Bedrock Geology



- Deposit hosted primarily in felsic volcanic rocks and lesser amounts of sedimentary rocks.
- Stratigraphy – footwall is felsic volcanics and hanging wall is sediments and felsic lapilli tuff

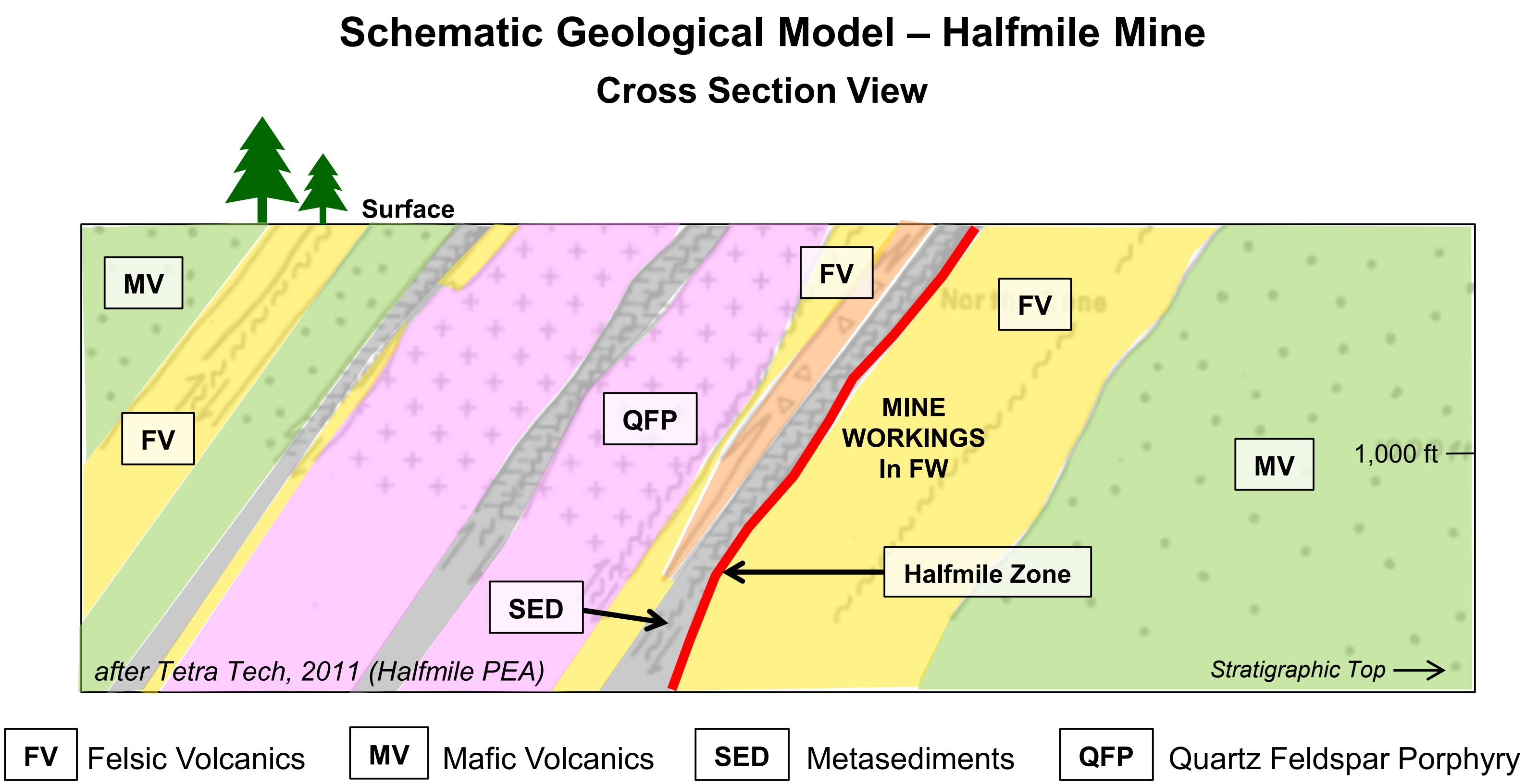
Pickett Deposit Bedrock Geology



- The bulk of the deposit is situated at the contact between felsic volcanics and a package of mixed sediments, intrusions and mafic volcanic rocks

FV	Felsic Volcanics
MV	Mafic Volcanics
SED	Metasediments
QFP	Quartz Feldspar Porphyry

Schematic Geological Model – Halfmile Mine



Mine workings are located in the less altered Felsic Footwall rocks, reducing ARD potential

Mine Development Options to Avoid ARD

WOLFDEN

West Lens

- The rocks on the lower north side of the West Zone contain some disseminated and stringer sulphide mineralization
- The rocks on the south side of West Zone are not expected to have any acid-generating potential

East Zone

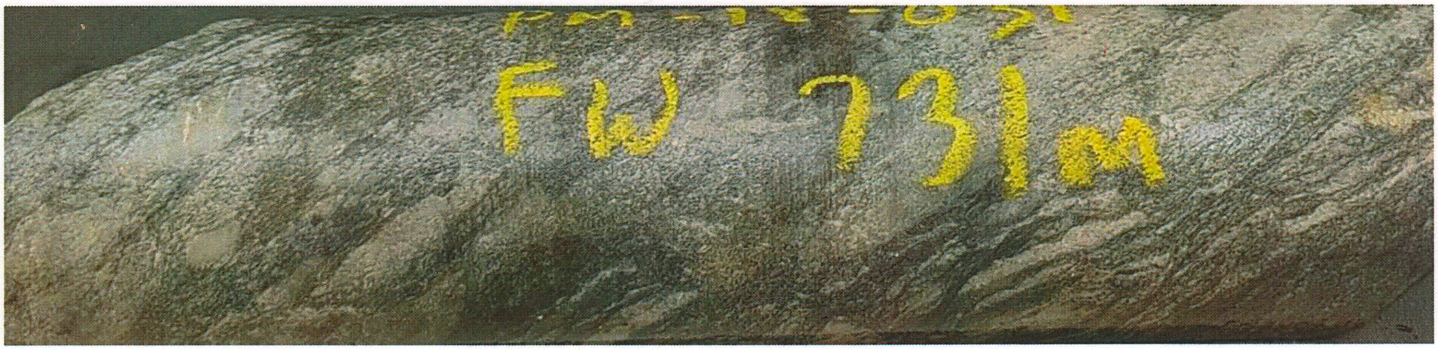
- There are no material amounts of sulphides on either side of the East Zone and therefore, limited to no potential for acid generation.

Summary

- The site specific geology of the Pickett Mountain deposit provides several options for mine development in rocks that are not expected to have potential for acid generation

West Zone massive sulphide grading 55% ZnEq.

West Zone FW. Strongly altered felsic volcanic rock with 2-4% pyrite.



East Zone FW. Weakly altered felsic volcanic rock.

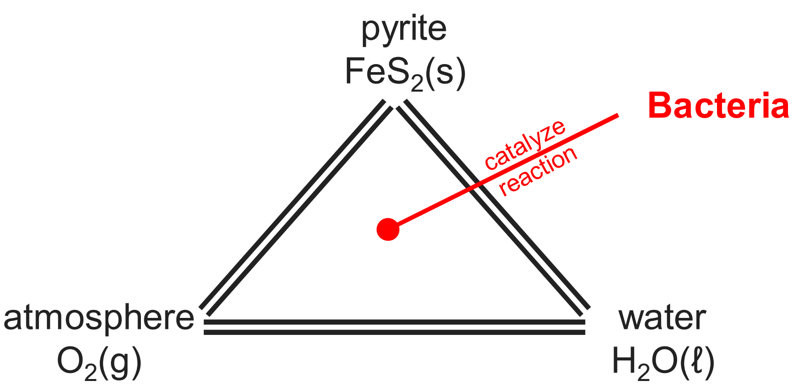
HW debris flow. Mafic volcanic.

Testimony of Jim B. Finley, Ph. D., P.G.

Pickett Mountain Project Geochemistry

Acid Rock Drainage (ARD)

- What is it?
- Cause
- Rock containing sulfide minerals is exposed to air and water
- Sulfide minerals transform by chemical reaction producing acidity



Acid Rock Drainage (ARD)

- **ARD**: water that has been affected by contact with sulfide-bearing rock characterized by low pH and concentrations of metals; if from a mine called acid mine drainage (AMD)
- **Potentially Acid Generating (PAG)**: rock that has potential to generate acid drainage
- **Non-Potentially Acid Generating (non-PAG)**: rock that has no potential to generate acid drainage

Rock: with no economic value generated during mining to access ore; managed at the mine site

Ore: rock with economic value; managed off site

Mine Wall Rock: for underground, the walls of the access tunnels and ore excavations

Temporary Storage Pile: the location where waste rock is stored before placement back underground as backfill

Acid Rock Drainage (ARD)

Need to distinguish between PAG and Non-PAG rock

- Collect samples of all rock types and conduct laboratory testing
- Number of samples of each rock type is tied to amount of each rock type to yield representative results
- Implement tests that allow classifying ARD/ML of mine rock, but that also indicate how fast changes occur

Classifying mine rocks

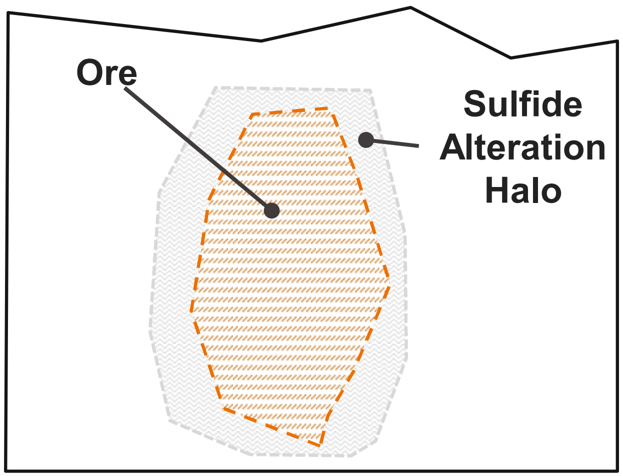
- Acid-Base Accounting (ABA): comparison of acid generation potential and neutralization potential
- Net Acid Generation (NAG-pH): measure total potential acidity of a rock

Measuring Timing of Change

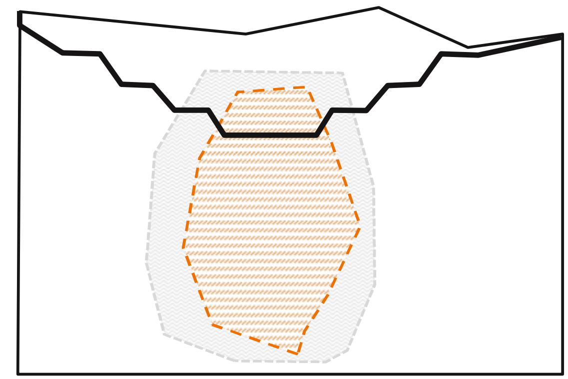
- Humidity Cell Testing (HCT): expose rock sample to conditions that enhance potential for changes related to sulfide minerals
- Field bins: large HCTs in barrels on site

Acid Rock Drainage (ARD)

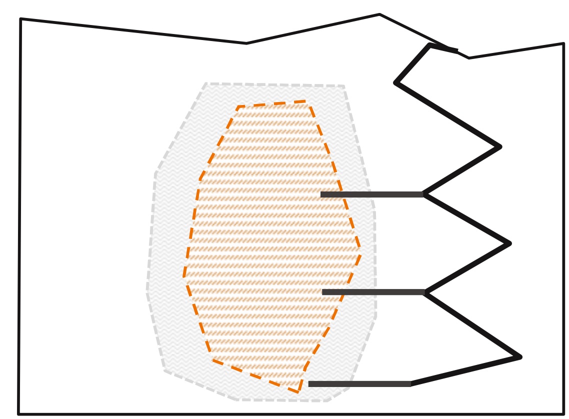
Ore deposit with Sulfide Alteration Halo



Open Pit



Underground



- Open pit has more waste rock than ore
- Underground has less waste rock than ore
- Less waste rock can result in less sulfide-bearing rock
- A sulfide alteration halo or sulfides in waste rock influences an ARD management plan for waste rock and mine wall faces

Acid Rock Drainage (ARD)

Available Data

Sample ID	Paste pH	Total Sulfur	Sulfate[†] (as S)	Sulfide	Carbon Total Inorganic	Carbon Total	Acid Production Potential	Neutralizing Potential pH 8.3	Net NP pH 8.3	NP/AP
		%	%	%	%	%	Kg $CaCO_3$/tonne			
ABA-001	9.5	0.124	0.009	0.114	0.15	0.21	3.8	17.4	13.6	4.6
ABA-002	9.4	0.021	0.005	0.016	< 0.01	< 0.01	0.5	5.5	5.0	11.0
ABA-003	8.3	2.70	0.008	2.69	< 0.01	< 0.01	84.1	1.7	-82.4	0.0
ABA-004	9.7	0.262	0.002	0.260	< 0.01	0.02	8.1	3.7	-4.4	0.5
ABA-005	9.7	0.085	0.002	0.083	0.05	0.07	2.6	8.5	5.9	3.3
ABA-006	8.9	0.926	0.003	0.923	0.05	0.08	28.8	7.7	-21.2	0.3
ABA-007	9.3	0.005	0.003	0.002	0.01	0.04	0.1	8.2	8.1	82[1]

† Acid soluble, non-volatile sulfur species (sulfate (as S)).

Sulfide was determined as the difference between Total Sulfur and Sulfate (as S).

1. Ratio corrected from erroneous value of 131 in original table

Geochemical Characterization Guides

Common ARD/ML Guides

Report/Document	Year	Title
Maest et al.	2005	Predicting Water Quality at Hardrock Mines: Methods and Model, Uncertainties, and State-of-the-Art
MEND 1.20.1	2009	Prediction Manual for Drainage Chemistry from Sulphidic Geologic Materials
GARD Guide	2009	Global Acid Rock Drainage Guide
BMRR Guidance, State of Nevada	2018	Guidance for Geochemical Modeling at Mine Sites

Reference to mines operated and closed prior to dates listed above do not reflect the modern era of geochemical characterization

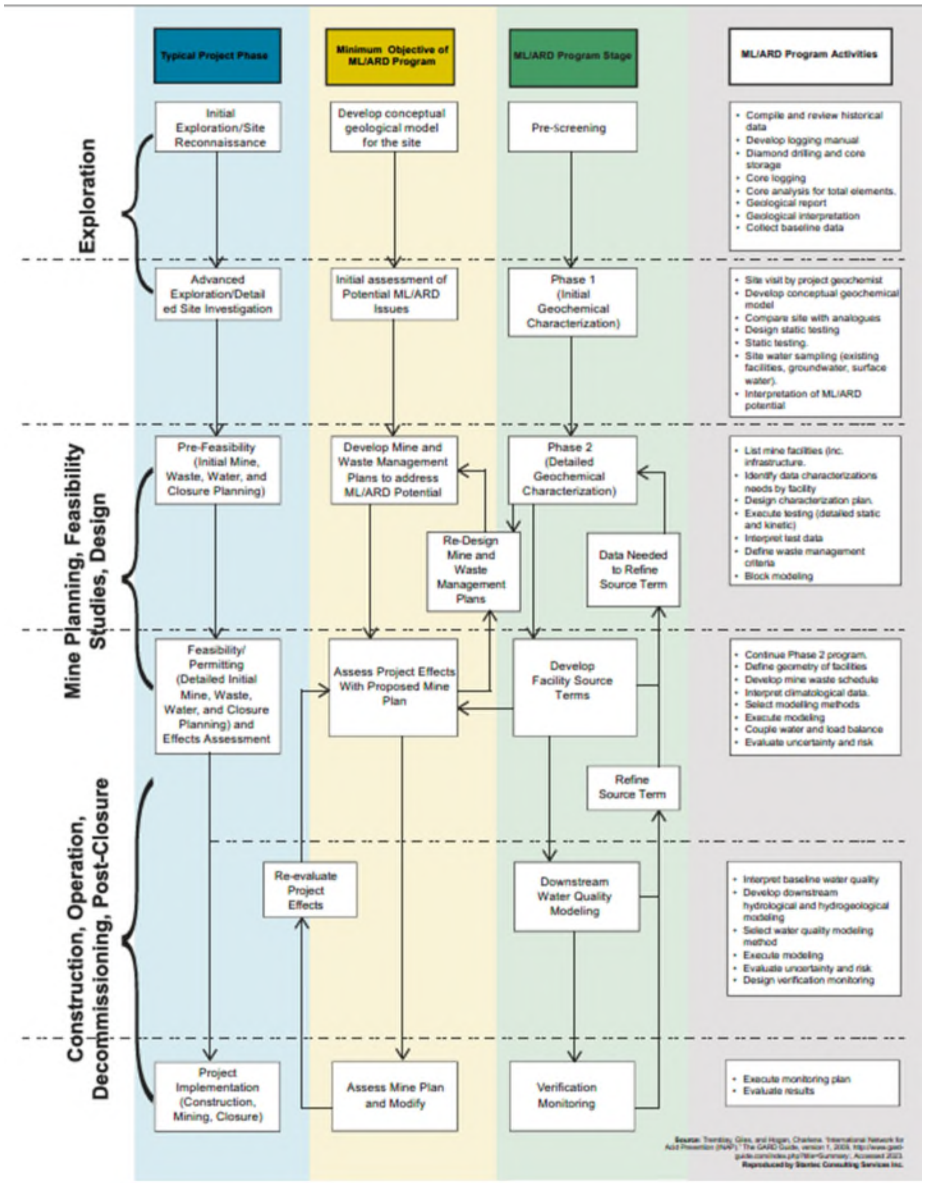
Geochemical Characterization

Chapter 200 Investigation (Prior to Permit Issuance):

- Baseline Characterization
- Mine Waste Characterization
- Mining Operations Plan
- Environmental Impact Assessment
- Monitoring Plan Design

Chapter 200 Monitoring (During Operation):

- Groundwater
- Surface Water
- Sediments
- Hydrology
- Biological Resources
- Mining Operations



INAP: International Network for Acid Prevention
GARD Guide: Global Acid Rock Drainage Guide
www.guardguide.com

ARD/ML, Mines & Pickett Mountain Project

- **Examples of mines with no geochemistry, management, or mitigation**
- Iron Mountain
- Holden Mine
- Berkeley Pit
- Bronze Age Mine, Spain
- 500 yr old mine Bolivia

Examples from Kuipers et al. (2006)

- 18 of 25 mines listed are open pit operations
- 25 of 25 were started before the modern era of geochemical/hydrologic characterization and water quality modeling
- None are comparable to Pickett due to mining method, size, and/or era

Examples from Earthworks study (updated 2019)

- Chino, NM
- Bagdad, AZ
- Bingham Canyon, UT

ARD/ML, Mines & Pickett Mountain Project

Water Quality Predictions Failure Modes, Root Causes and Examples from Case Studies

Failure Mode	Root Cause	Examples
Hydrologic Characterization	Lack of hydrologic characterization	Royal Mountain King, CA; Black Pine, MT
	Dilution overestimated	Greens Creek, AK; Jerritt Canyon, NV
	Amount of discharge underestimated	Mineral Hill, MT
	Size of storms underestimated	Zortman and Landusky, MT
Geochemical Characterization	Lack of adequate geochemical characterization	Jamestown, CA; Royal Mountain King, CA; Grouse Creek, ID; Black Pine, MT
	Sample size and/or representation	Greens Creek, AK; McLaughlin, CA; Thompson Creek, ID; Golden Sunlight, MT; Mineral Hill, MT; Zortman and Landusky, MT; Jerritt Canyon, NV
Mitigation	Mitigation not identified, inadequate, or not installed	Bagdad, AZ; Royal Mountain King, CA; Grouse Creek, ID
	Waste rock mixing and segregation not effective	Greens Creek, AK; McLaughlin, CA; Thompson Creek, ID; Jerritt Canyon, NV
	Liner leak, embankment failure or tailings spill	Jamestown, CA; Golden Sunlight, MT; Mineral Hill, MT; Stillwater, MT; Florida Canyon, NV; Jerritt Canyon, NV; Lone Tree, NV; Rochester, NV; Twin Creeks, NV
	Land application discharge not effective	Beal Mountain, MT

from Kuipers et. al., 2006

ARD/ML, Mines & Pickett Mountain Project

Summary

- Current understanding is that access to ore body can be achieved to avoid and limit the amount of PAG waste rock
- During mining groundwater flows into the mine not out of the mine
- Limited time on surface for waste rock before being placed back underground as backfill
- When a mine is backfilled there will be limited to no air in backfilled areas, limiting sulfide reaction and AMD (mitigation)
- Rock fill will be non-acid generating (mitigation)
- There will be a period of time before mine water re-connects with groundwater (upon mine closure) providing opportunity to address water quality if needed (mitigation)

ARD/ML, Mines & Pickett Mountain Project

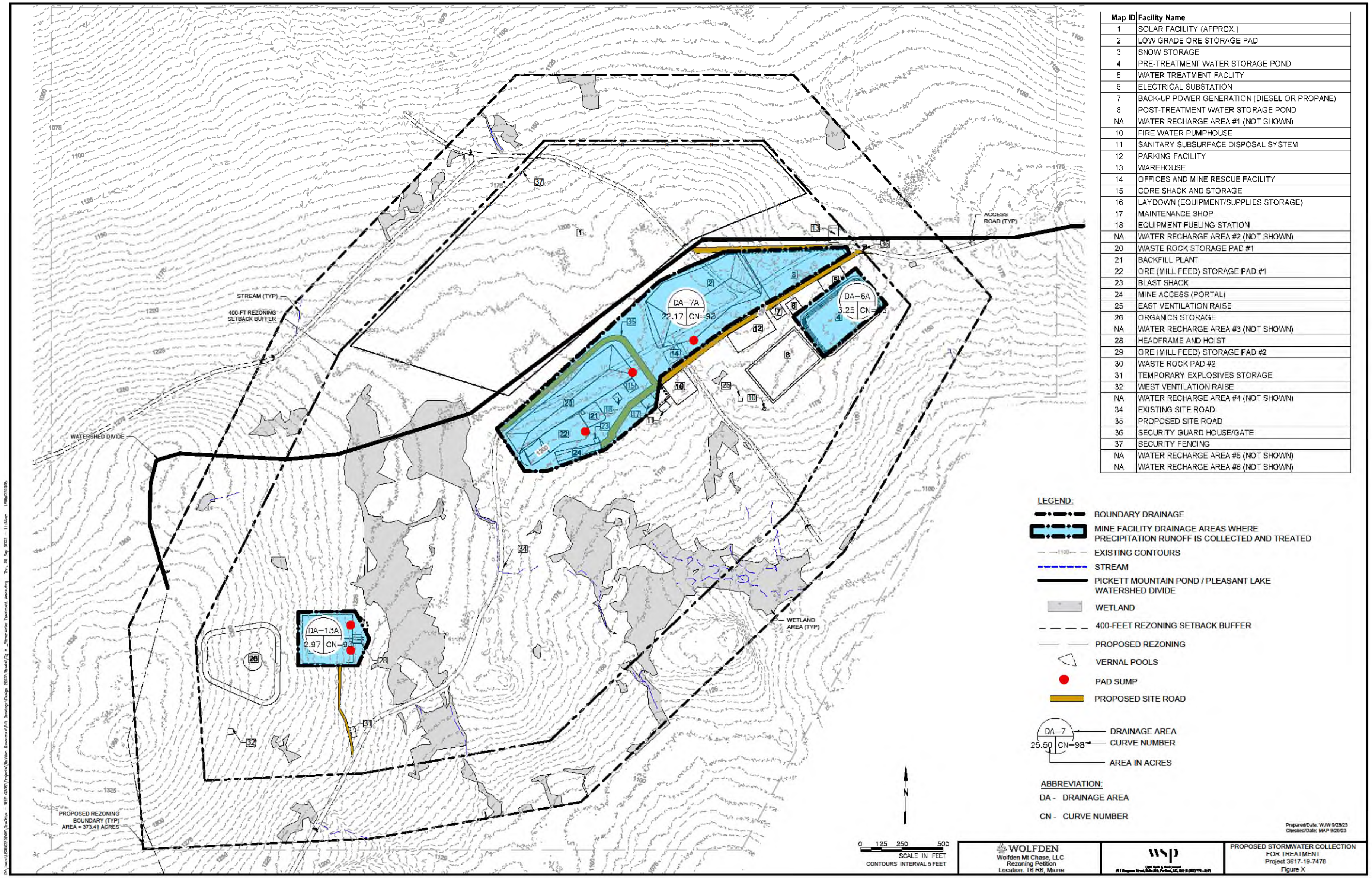
Summary

- A comprehensive geochemical characterization will be conducted as part of the Chapter 200 process to include:
  - Analysis of potential effects of the mine operation
  - Description and analysis of mitigation measures to limit generation of ARD/ML
  - Development of an ARD/ML management plan that covers all phases of the mining operation (mine development, mine operations, reclamation, and closure)

Proposed Pickett Mountain Mine Project

Preliminary Design of Surface Water Collection and Pre-Treatment Storage Pond Sizing for Mine Facilities Water Collection Areas

Proposed Pickett Mountain Mine Project
Conceptual Mine Layout – Water Collection Areas



Proposed Pickett Mountain Mine Project
Pre-Treatment Water Storage Pond

Summary of Precipitation Runoff Collection Areas for Storage and Treatment

Map ID	Facility Name	Facility Area (Ac) (1)
2	Low Grade Ore Storage Pad	5.276
3	Snow Storage	2.579
4	Pre-Treatment Water Storage Pond	2.818
14	Offices and Mine rescue Facility	0.214
15	Core Shack and Storage	0.099
17	Maintenance Shop	0.110
18	Equipment Fueling Station	0.042
20	Waste Rock Storage Pad #1	3.591
21	Backfill Plant	0.334
22	Ore (Mill Feed) Storage Pad #1	1.259
23	Blast Shack	0.023
24	Mine Access (Portal)	0.385
28	Headframe and Hoist	0.071
29	Ore (Mill Feed) Storage Pad #2	1.016
30	Waste Rock Pad #2	1.016
35	Site Mine Roads	2.368
--	Area Surrounding Mine Facilities (2)	7.188
	Total	28.389

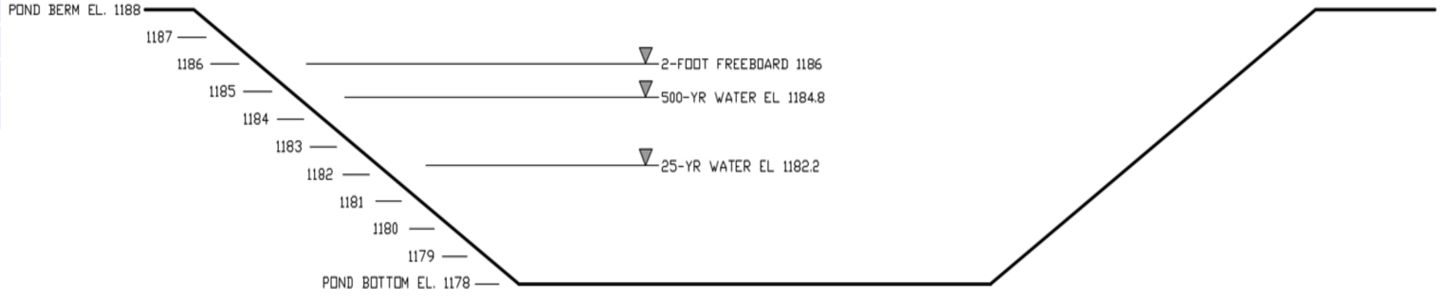
(1) Areas taken from the Conceptual Mine Layout provided on next slide.
(2) Includes the areas immediately adjacent to mine facilities listed in the table that will be within the runoff collection area including the pond surrounding berm.

Stormwater Analysis

- Stormwater runoff calculations conducted using USDA Technical Release 20 (TR-20) Methodology using HydroCAD® software
- TR-20 is a fully accepted standard engineering method for calculating stormwater runoff
- Collection area for treatment – Mine facilities with potential mine impact to stormwater as shown in the table = 28.39 acres
- Required storage volume assumes no discharge for treatment and ignores storage in containment pads, sumps, collection trenches
- Precipitation - 500-year storm event per Chapter 200
- Precipitation data taken from NOAA Atlas 14, Volume 10, Version 3, the 500-year, 24-hour is 7.82 inches of precipitation for the mine site
- Chapter 400 Maine Solid Waste Management Rules (landfills) requires stormwater design based on a 25-year storm event
- Chapter 500 Maine Stormwater Management standards for other development projects requires stormwater design based on a 25-year storm event

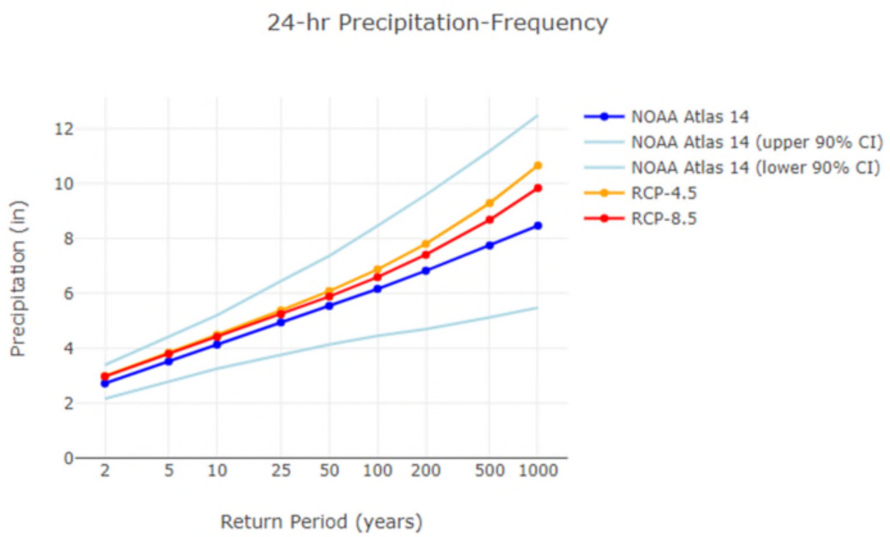
Proposed Pickett Mountain Mine Project
Preliminary Pre-Treatment Water Storage Pond

PRE-TREATMENT WATER STOAGE POND STAGE STORAGE TABLE				
Elevation (feet)	Surface Area (sq-ft)	Storage (cubic-feet)	Storage (mgal)	Comment
1,178.0	90,440	0	0	Pond Bottom
1,178.6	92,283	54,817	0.41	
1,179.0	93,513	91,976	0.69	
1,179.6	95,356	148,637	1.11	
1,180.0	96,585	187,025	1.40	
1,180.6	98,476	245,543	1.84	
1,181.0	99,738	285,186	2.13	
1,181.6	101,629	345,596	2.59	
1,182.0	102,890	386,500	2.89	
1,182.2	103,537	407,143	3.05	25-year water elevation
1,183.0	106,123	491,007	3.67	
1,183.6	108,063	555,262	4.15	
1,184.0	109,356	598,746	4.48	
1,184.6	111,345	664,956	4.97	
1,184.8	112,008	687,291	5.14	500-year water elevation
1,185.0	112,671	709,759	5.31	
1,185.6	114,659	777,958	5.82	
1,186.0	115,985	824,087	6.16	2-foot Freeboard
1,186.6	118,010	894,285	6.69	
1,187.0	119,360	941,759	7.04	
1,187.6	121,384	1,013,982	7.58	
1,188.0	122,734	1,062,806	7.95	Pond Top of Berm



POND SECTION

Future Climate Precipitation-Frequency - Using ClimateEVA tool (WSP)



	Atlas-14 24-hr Precipitation-Frequency			Future:Baseline		Future Climate	
T (yrs)	Depth (in)	Upper 90% CI (in)	Lower 90% CI (in)	RCP-4.5	RCP-8.5	RCP-4.5 (in)	RCP-8.5 (in)
2	2.74	3.41	2.18	1.098	1.092	3.008	2.991
5	3.54	4.43	2.81	1.090	1.077	3.859	3.813
10	4.15	5.22	3.28	1.086	1.067	4.507	4.430
25	4.96	6.46	3.78	1.088	1.060	5.396	5.259
50	5.56	7.38	4.15	1.097	1.061	6.101	5.901
100	6.18	8.47	4.47	1.115	1.069	6.890	6.606
200	6.84	9.6	4.71	1.143	1.085	7.817	7.421
500	7.76	11.2	5.14	1.199	1.121	9.301	8.698

Representative Concentration Pathway (**RCP**) is a greenhouse gas concentration trajectory adopted by the Intergovernmental Panel on Climate Change (IPCC).

RCP 4.5 is described by the IPCC as an intermediate scenario. Emissions in RCP 4.5 peak around 2040, then decline. According to resource specialists IPCC emission scenarios are biased towards exaggerated availability of fossil fuel reserves; RCP 4.5 is the most probable baseline scenario (no climate policies) taking into account the exhaustible character of non-renewable fuels.

RCP 8.5 emissions continue to rise throughout the 21st century. This scenario has been thought to be very unlikely, but still possible as feedbacks are not well understood. RCP 8.5 is generally taken as the basis for worst-case climate change scenario based on what proved to be overestimation of projected coal outputs. For the short 15-year time frame, the ClimateEVA tool for 8.5 RCP is underestimated.

PreTreatment Pond Sizing-Contingincy *Type III 24-hr 500-Climate Change Rainfall=9.30"*
Prepared by WSP USA Printed 9/28/2023
HydroCAD® 10.20-3f s/n 00854 © 2023 HydroCAD Software Solutions LLC

Summary for Pond P-1: PreTreatment Pond

Base Flow 300 GPM mine dewatering flow

Inflow Area = 28.389 ac, 13.25% Impervious, Inflow Depth > 9.05" for 500-Climate Change event
Inflow = 226.32 cfs @ 12.12 hrs, Volume= 21.409 af, Incl. 0.67 cfs Base Flow = 300 GPM
Outflow = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af, Atten= 100%, Lag= 0.0 min

Routing by Dyn-Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs / 2
Peak Elev= 1,186.92' @ 24.00 hrs Surf.Area= 119,092 sf Storage= 932,315 cf
Flood Elev= 1,188.00' Surf.Area= 122,734 sf Storage= 1,062,806 cf

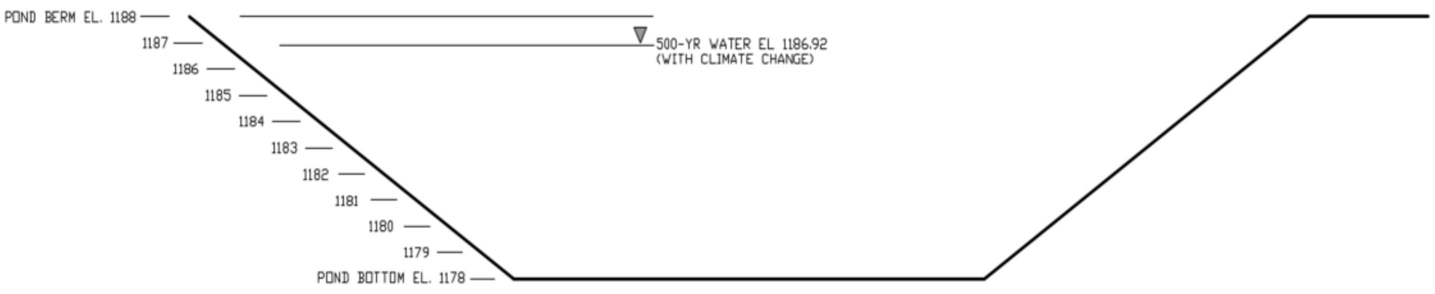
Plug-Flow detention time= (not calculated: initial storage exceeds outflow)
Center-of-Mass det. time= (not calculated: no outflow)

Volume	Invert	Avail.Storage	Storage Description
#1	1,178.00'	1,062,806 cf	**Pre-Treatment Water Storage Pond (Prismatic)** Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
1,178.00	90,440	0	0
1,180.00	96,585	187,025	187,025
1,182.00	102,890	199,475	386,500
1,184.00	109,356	212,246	598,746
1,186.00	115,985	225,341	824,087
1,188.00	122,734	238,719	1,062,806

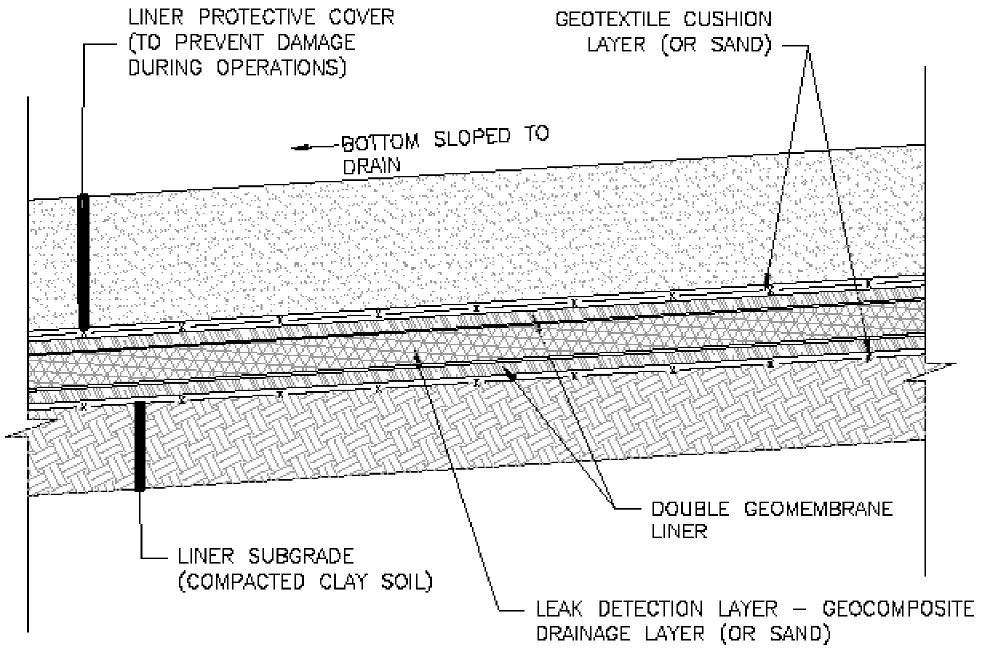
Proposed Pickett Mountain Mine Project
Preliminary Pre-Treatment Storage Pond – Storage Contingency

Elevation (feet)	Surface Area (sq-ft)	Storage (cubic-feet)	Storage (mgal)	Comment
1,178.0	90,440	0	0	Pond Bottom
1,178.5	91,976	45,604	0.34	
1,179.0	93,513	91,976	0.69	
1,179.5	95,049	139,117	1.04	
1,180.0	96,585	187,025	1.40	
1,180.5	98,161	235,712	1.76	
1,181.0	99,738	285,186	2.13	
1,181.5	101,314	335,449	2.51	
1,182.0	102,890	386,500	2.89	
1,182.5	104,507	438,349	3.28	
1,183.0	106,123	491,007	3.67	
1,183.5	107,740	544,472	4.07	
1,184.0	109,356	598,746	4.48	
1,184.5	111,013	653,838	4.89	
1,185.0	112,671	709,759	5.31	
1,185.5	114,328	766,509	5.73	
1,186.0	115,985	824,087	6.16	
1,186.5	117,672	882,501	6.60	
1,186.9	119,022	932,315	6.97	Potential 500-Yr Climate Change water elevation
1,187.0	119,360	941,759	7.04	
1,187.5	121,047	1,001,861	7.49	
1,188.0	122,734	1,062,806	7.95	Pond Top of Berm



POND SECTION

Proposed Pickett Mountain Mine Project
Conceptual Liner System



DOUBLE LINER SYSTEM WITH LEAK DETECTION

NOT TO SCALE

- Select a liner material appropriate for the type of exposure – i.e. AMD.
- Provide appropriate protective cover to prevent damage during operations.
- Conduct Electrical Leak detection surveys- can be performed at any time during or after installation and is able to detect even the smallest holes.
- Provide redundancy in the liner system - Double liner with a leak detection layer
- Leak detection layer drains to monitoring sump
- Provide regular inspection and maintenance throughout project life – monitor sumps; electrical leak detection surveys
- Finite project life – (10-15 years)

Water Treatment Plant Design and Performance for Pickett Project

Brian Danyliw and Paul Thoen

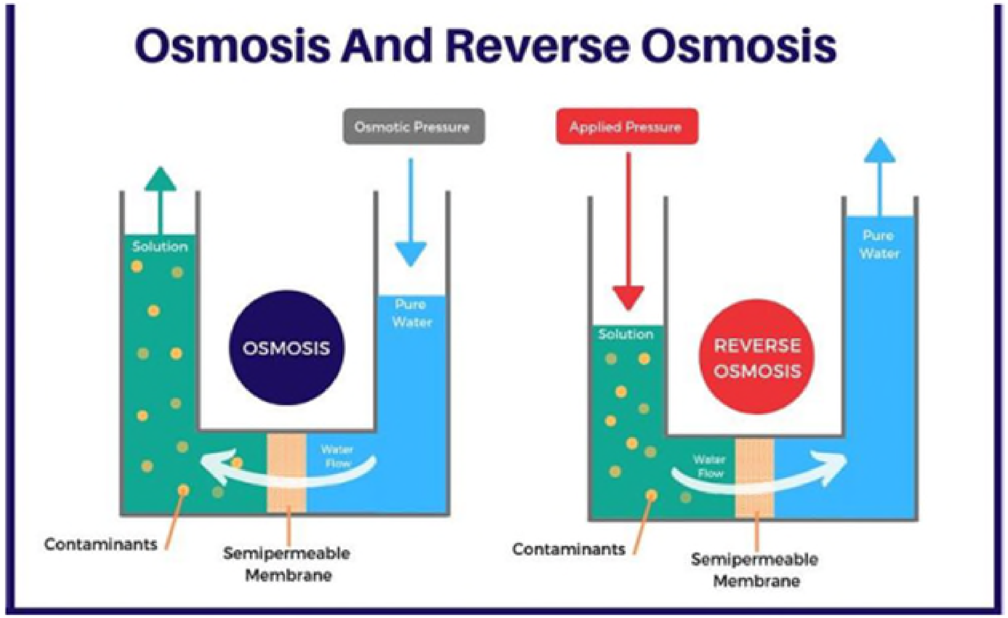
Treatment Overview

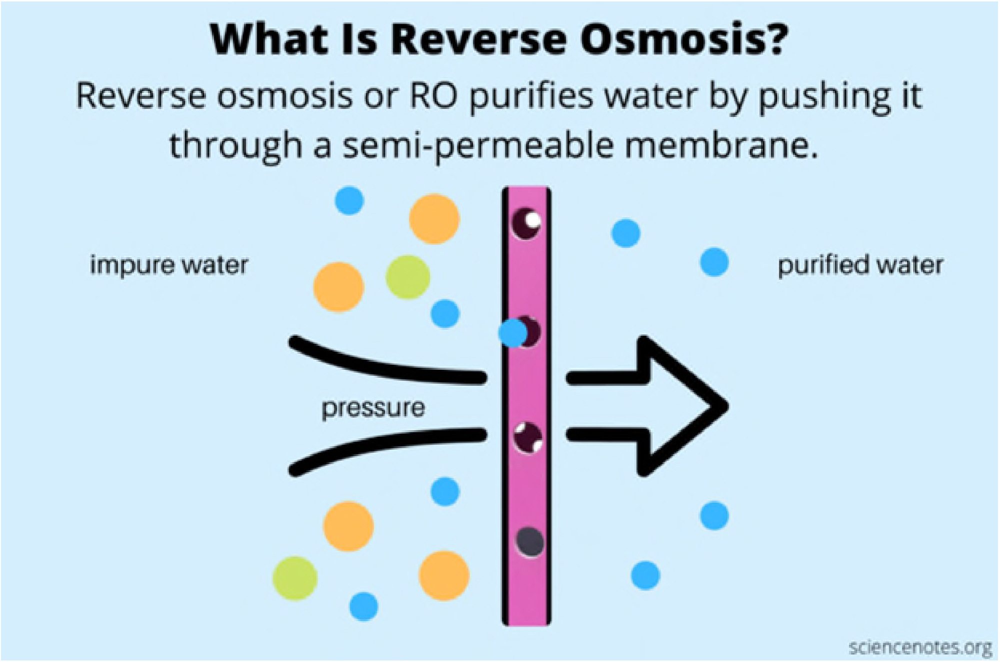
- Ultrafiltration followed by reverse osmosis

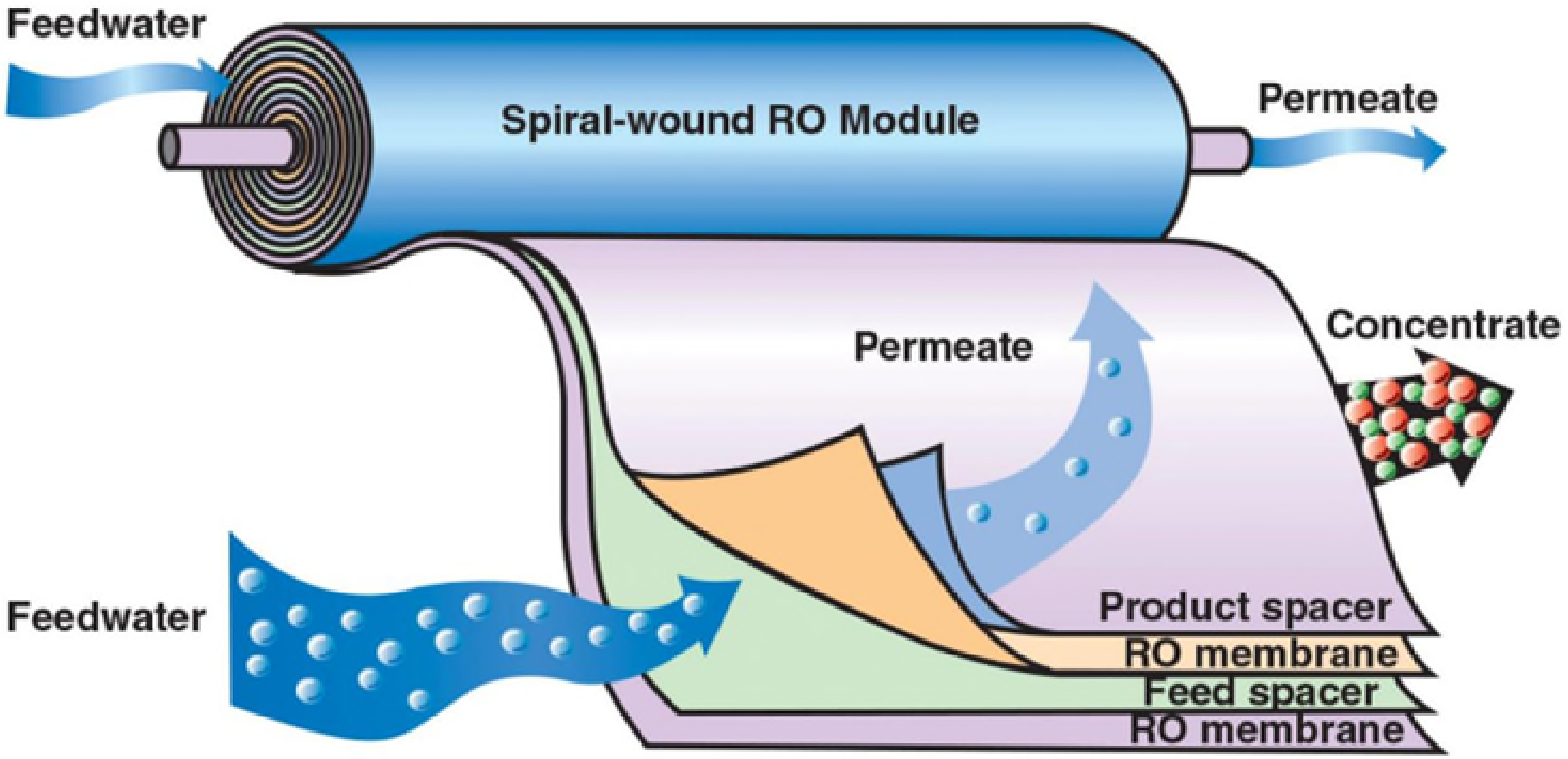
Ultrafiltration

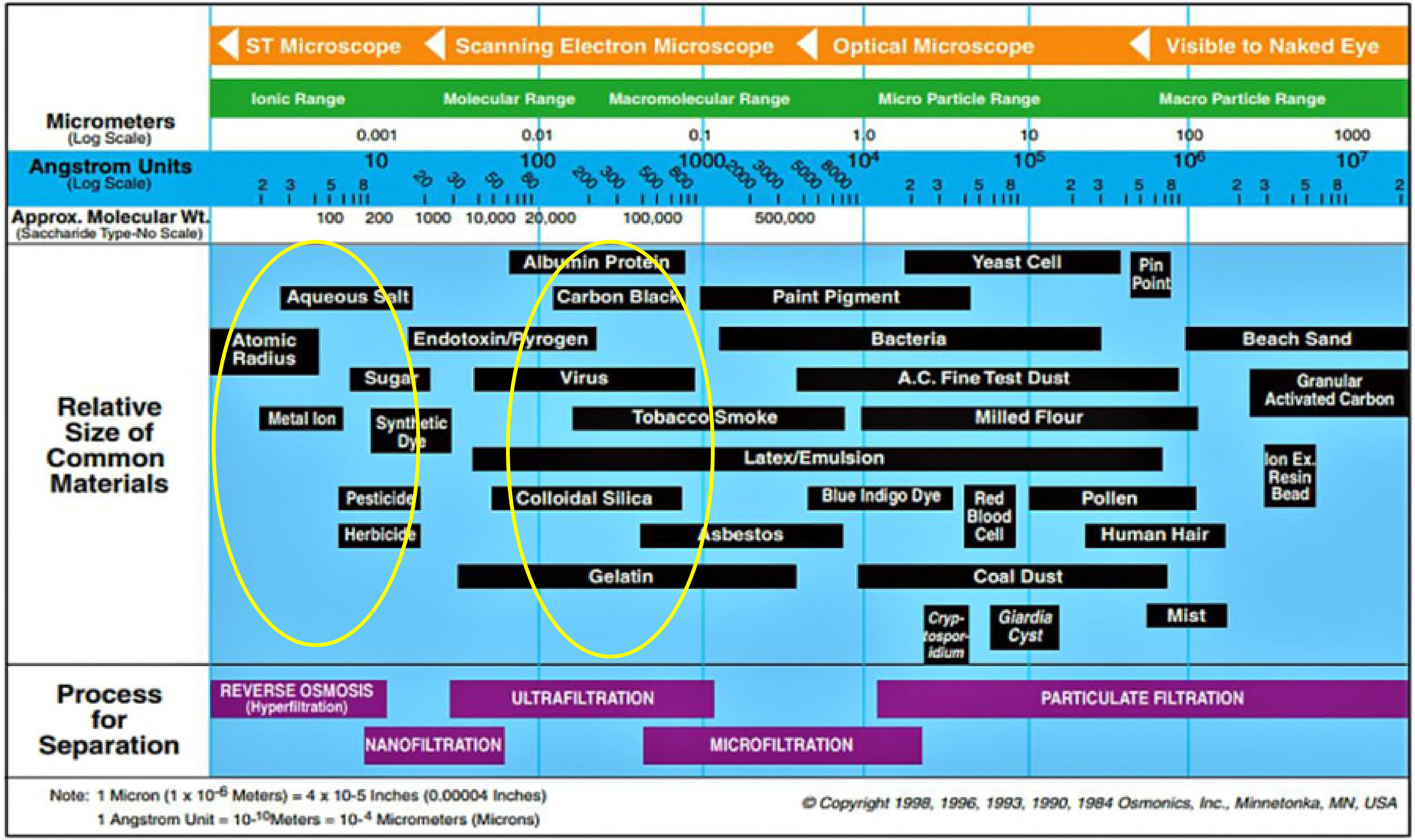
- Proposed water treatment technologies for this Project are multistage and scalable.
- First, membrane filtration utilizing ultrafiltration (UF), which removes particles down to 0.1 micron in size and is a pretreatment stage to remove suspended solids before the water is sent to the reverse osmosis (RO) membranes.

Reverse Osmosis






Feedwater
Spiral-wound RO Module
Permeate
Permeate
Concentrate
Feedwater
Product spacer
RO membrane
Feed spacer
RO membrane



Mine Water Service

Modeling and Projected Water Quality

Design

- A two-pass RO system will meet water quality requirements
- System is modular to allow additional passes to improve quality with incremental cost
- Volume can be easily increased with incremental cost

Assurances

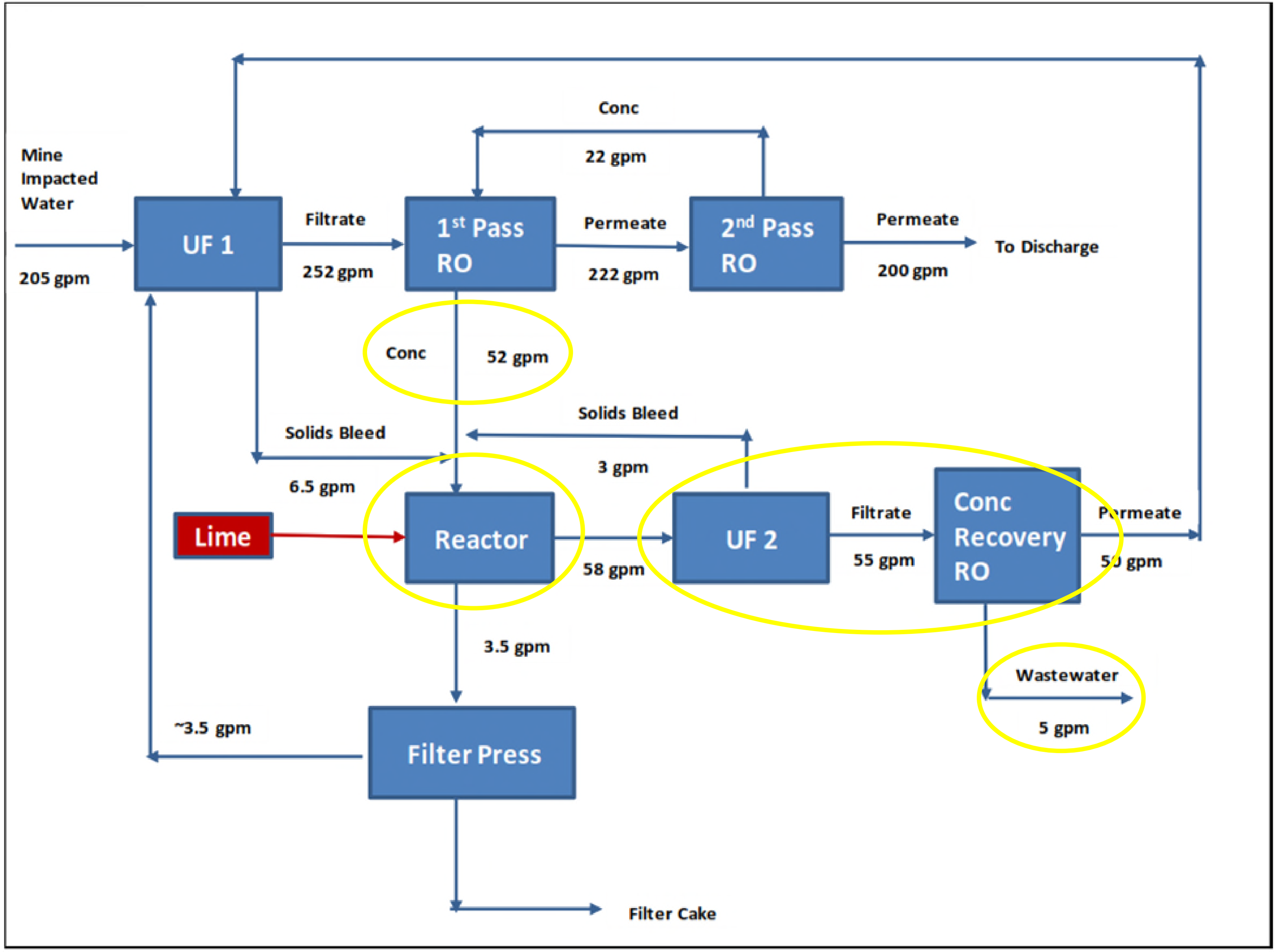
- Operating plants have instrumentation and controls to ensure constant compliance
- All treated water is tested prior to discharge
- RO modelling provides valuable data

Results

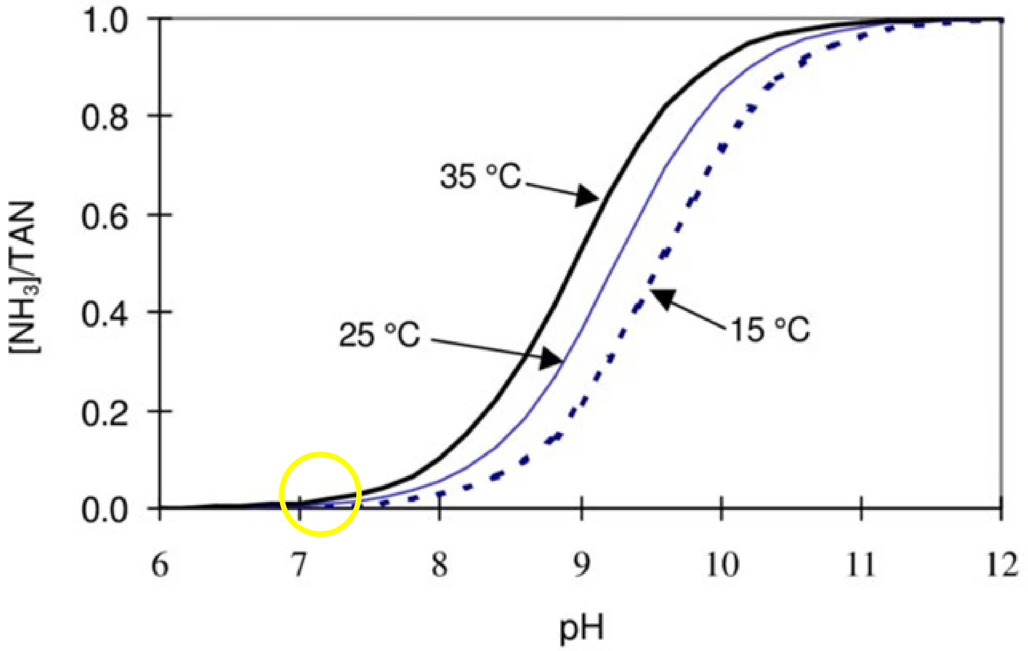
- Many parameters are below detection limits
- All parameters not below detection limits are at or below levels in background water quality
- RO system can meet any required target water quality including those of Maine and Pickett Mt

Proposed Plant Process Flow Diagram

Mine Water Service



Unionized Ammonia as a Percentage of Total Ammonia



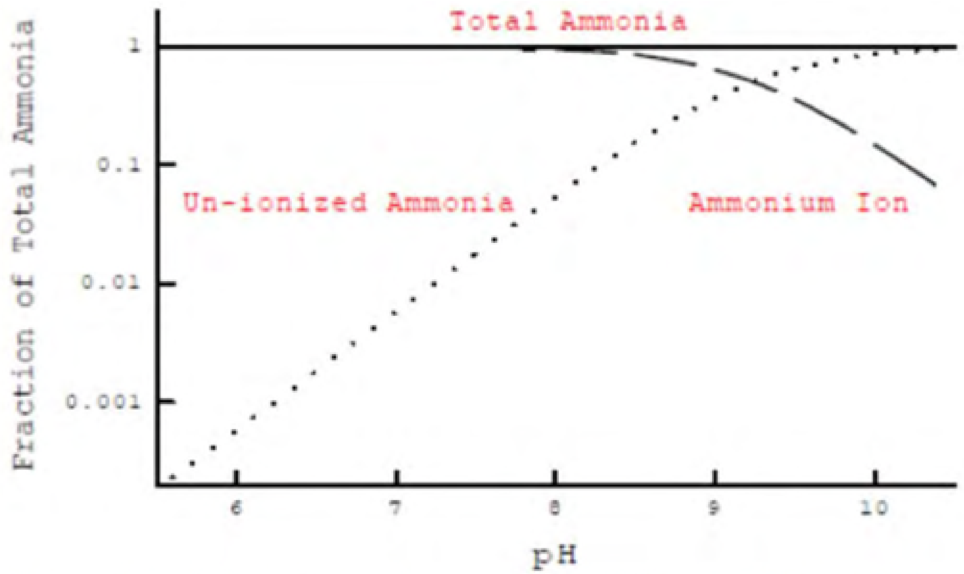


Figure 2. Chemical speciation of ammonia over a range of pH values (EPA, 1999).

Typical High-Rate Membrane System

- 4 X 200 gpm Systems

Sevee & Maher Engineers' Task –

Determine the best method to return treated water to the site.

SME
SEVEE & MAHER
ENGINEERS

Estimated Collected Water Flows

	GPM	MGY
Mine Dewatering (Wolfden)	30	16
Collected Precipitation (WSP)	57	30
Total	87	46

From: Credere Associates, September 2022

Assumptions

- **Mine Water Assumptions:**
  - Provided by Wolfden based on previous mine experience
  - SME evaluated separately based on overall recharge available to groundwater in the area and typical permeability of bedrock in Maine
- **Collected Precipitation Assumptions:**
  - Provided by WSP based on HydroCAD, an industry standard based on NRCS TR-20 method, first issued in 1982

SME
SEVEE & MAHER
ENGINEERS

Site and Permitting Constraints

Site Considerations	Depth to water table
	Soil permeability
	Available permitted land area
	Depth to bedrock or other restrictive layers
	Minimal disturbance of site soils and vegetation
	Slopes
Wetlands	Maintain recharge to wetlands
Climate	Frost depth is 6’
	Summer and winter disposal options for water management

SME
SEVEE & MAHER
ENGINEERS

Selected Methods –

Spray Irrigation and Snowmaking

Spray Irrigation

Spray Irrigation
Allows for evaporation and transpiration
Easily installed
Equipment is readily available and replaceable
Provides flexibility for seasonal water distribution
Mimics natural rainfall relative to adding dissolved oxygen to the sprayed water

Snowmaking

SME
SEVEE & MAHER
ENGINEERS

Snowmaking
Easily installed
Equipment is readily available and replaceable
Will minimize winter storage requirements
Dovetails well with spray irrigation
Provides flexibility for seasonal water distribution
Mimics the natural precipitation at the site

SME
SEVEE & MAHER ENGINEERS

Review of existing sites that use these technologies

Spray Irrigation and Snowmaking	Soil Type	Irrigation (MGY)			Application Rate (in./week)		Area (Acres)		
		Spray	Snow	**Total**	Spray	Snow	Spray	Snow	**Total**
Moosehead	**Till**	145	61	**206**	2.5	4.1	63	26	**89**
Carrabassett Valley	**Loamy Till**	129	54	**183**	3.7	2.9	43	32	**75**
Rangeley (Chick Hill)	**Loamy Till**	74	29	**103**	2.5	1.6	36	28	**64**
Wolfeboro, NH	**Unknown**	97	-	**97**	3.0	-	46	-	**46**
Pineland Farms Potato	**Gravelly Loamy Till**	233	104	**337**	2.0	<1.0	113	113	**113**
Pickett Mountain (2-in)	**Silty Till**	32	14	**46**	2	2	17	12	**29**
(3-in)	**Silty Till**	32	14	**46**	3	3	12	8	**20**
(4-in)	**Silty Till**	32	14	**46**	4	4	9	6	**15**

Review of Pickett Mountain Site Relative to Wetland Recharge

Wetlands are recharged by:

- Surface water runoff and/or upward groundwater gradients
- Depends on the setting of each wetland
- By reviewing the overall recharge, we include both of the recharge pathways

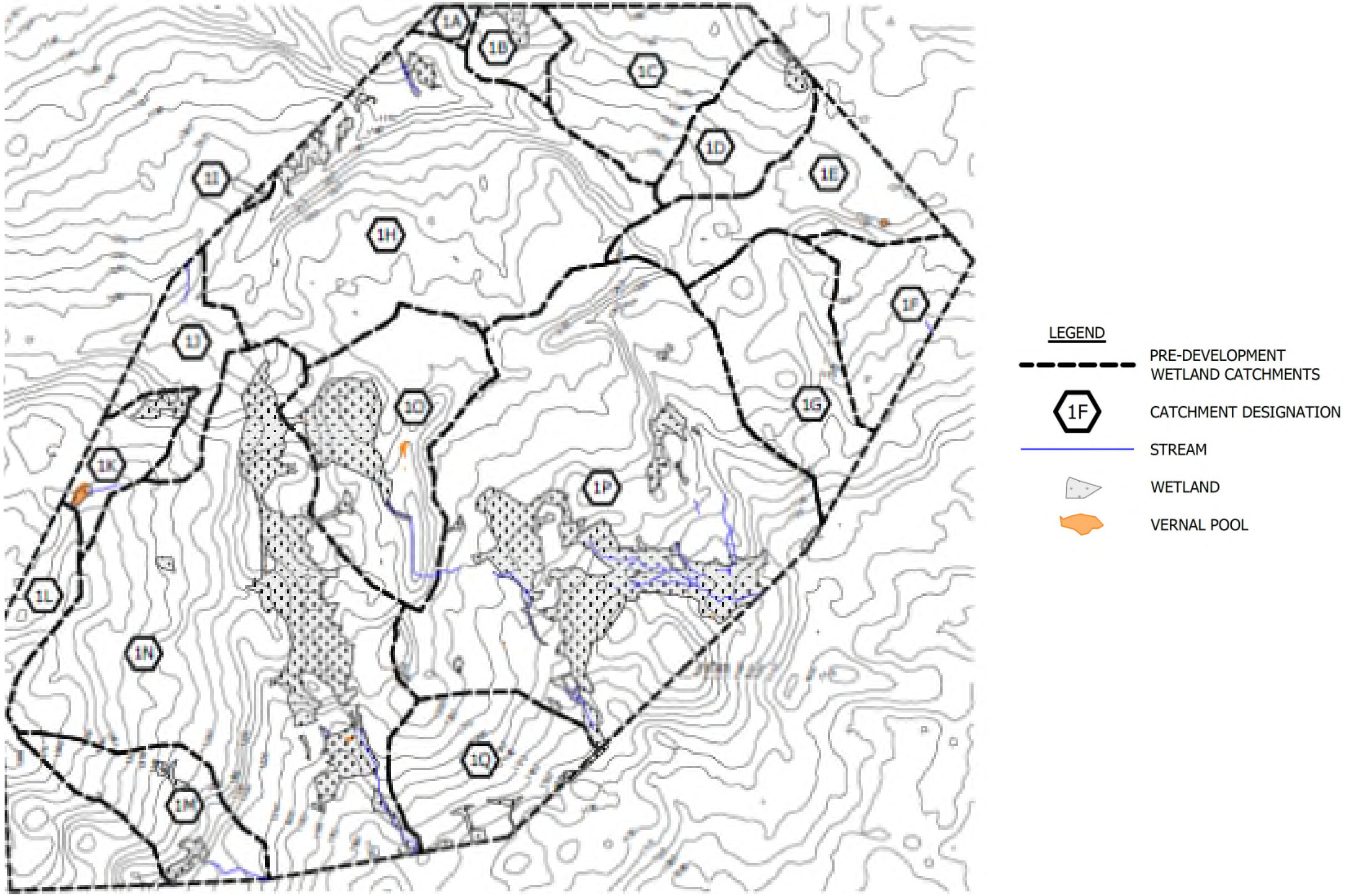
Determine recharge area for each watershed:

- Current condition
- During active mining

SME
SEVEE & MAHER
ENGINEERS

Pickett Mountain Wetland Watersheds

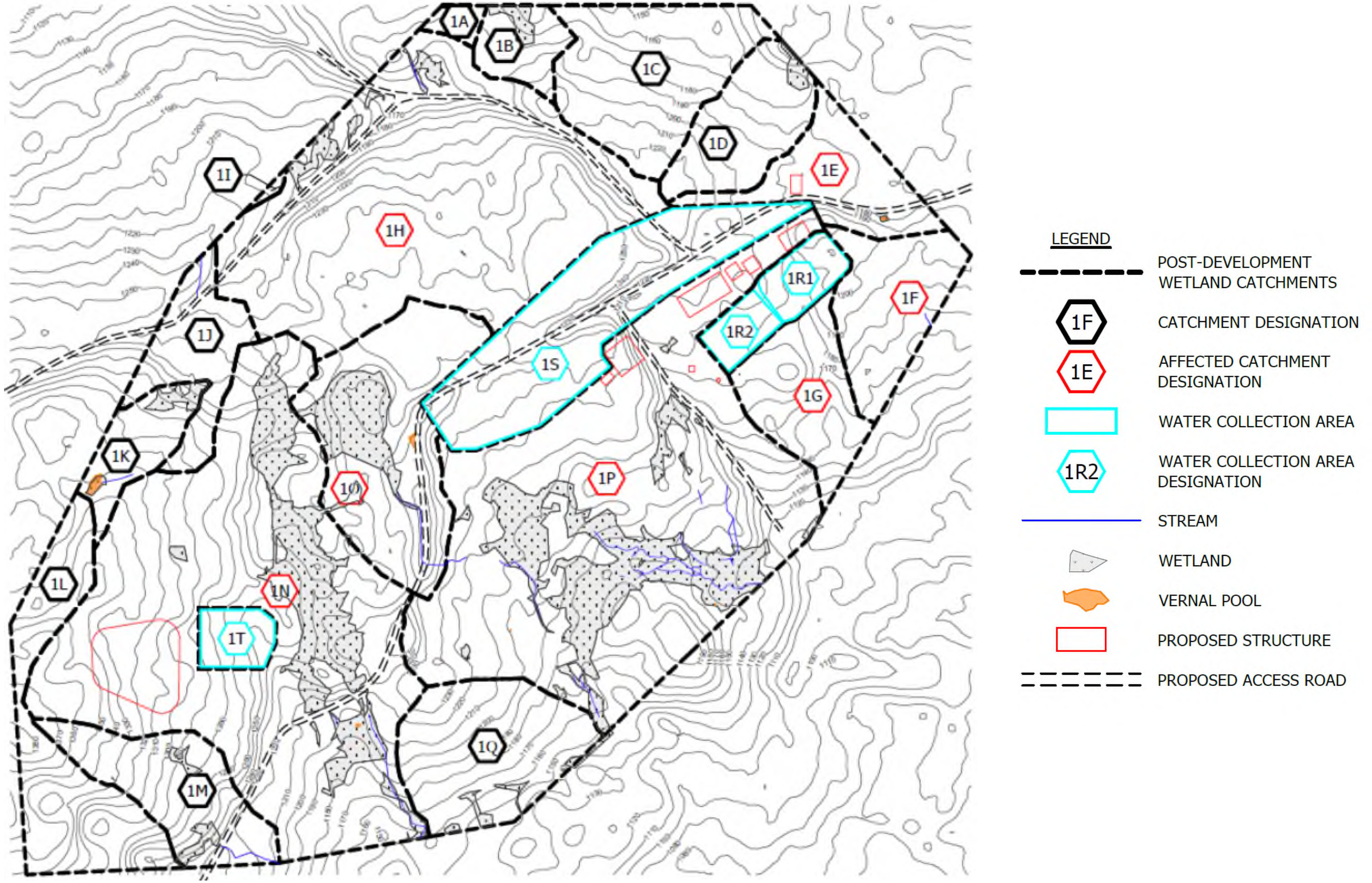
Current Condition



SME
SEVEE & MAHER ENGINEERS

Pickett Mountain Wetland Watersheds

During Active Mining



SME SEVEE & MAHER ENGINEERS

Conceptual Design (pg. 1)

- **Calculate recharge to each wetland watershed, before and after**
  - Precipitation that falls on the site will become either:
    - **Evaporation** – percentages based on pan evaporation studies
    - **Transpiration** – amount lost to plant growth, roughly the same amount as lost to evaporation
    - **Infiltration** – based on the site's soils – long established, typical values used in both hydrology and hydrogeology
    - **Runoff** – what's left over

SME
SEVEE & MAHER ENGINEERS

Conceptual Design (pg. 2)

- **Also calculate losses to evaporation from spray irrigation**
  - Used standard calculation methods developed for agricultural applications
  - Based on climatic conditions for the summer in Caribou, including average rainfall, temperature, wind speed, and humidity
  - Evaporation will vary depending on spray rates, numbers of nozzles used, and nozzle size, which gives flexibility to the system to manage varying flow rates

Catchments Affected by Development

Catchment ID	Contains Wetlands	Pre- Development Area (SF)	Area During Active Mining (SF)	Precipitation Deficit (gal/yr)	Total Recharge to be Added (gal/yr)
1E	Adjacent	687,000	430,000	7,208,000	7,333,000
1F	Adjacent	492,000	472,000	561,000	698,000
1G	No	786,000	449,000	9,453,000	9,584,000
1H	Yes	2,439,000	2,413,000	729,000	1,432,000
1N	Yes	3,284,000	3,152,000	3,702,000	4,620,000
1O	Yes	1,041,000	948,000	2,609,000	2,885,000
1P	Yes	3,656,000	3,171,000	13,604,000	14,528,000
Total		12,385,000	11,035,000	37,866,000	41,080,000
Percent of Pre-Development Precipitation				**10.9%**	**11.8%**

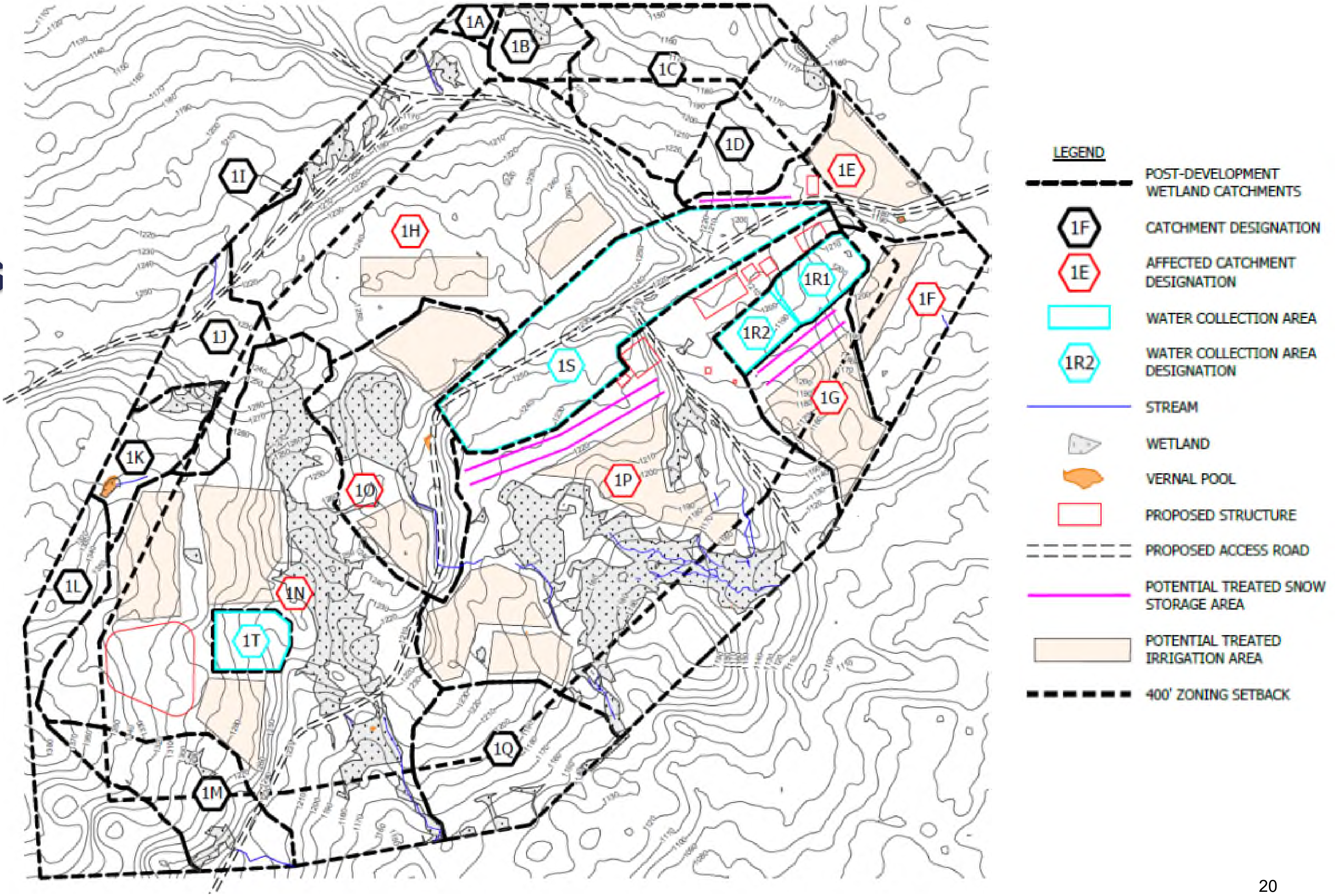
SME
SEVEE & MAHER
ENGINEERS

Conceptual Layout for Spray Irrigation and Snowmaking Areas

SME
SEVEE & MAHER
ENGINEERS

Pickett Mountain Wetland Watersheds

Conceptual Layout of Spray Irrigation and Snowmaking Areas



SME SEVEE & MAHER ENGINEERS

Proposed Inches of Recharge Added per Wetland Catchment

Catchment ID	Contains Wetlands	Total Recharge to be Added (gal/yr)	Total added as Snow (gal/yr of water)	Total added as Spray Irrigation (gal/yr)	Total Spray Irrigation Recharge Area (square feet)	Spray Irrigation per Week (inches)
1E	Adjacent	7,333,000	1,790,000	5,543,000	191,800	2.3
1F	Adjacent	698,000	0	698,000	99,900	0.6
1G	No	9,584,000	3,903,000	5,681,000	267,700	1.7
1H	Yes	1,432,000	0	1,432,000	406,000	0.3
1N	Yes	4,620,000	0	4,620,000	590,900	0.6
1O	Yes	2,885,000	0	2,885,000	103,900	2.2
1P	Yes	14,528,000	8,307,000	6,221,000	836,100	0.8
Total		41,080,000				

SME SEVEE & MAHER ENGINEERS

Planning for variability in flows

SME
SEVEE & MAHER
ENGINEERS

Evaluating Variability in Flows

- **Historic variability of precipitation**
  - 80 years of precipitation data for Caribou (1939 to 2018)
  - Lowest 10-year average precipitation (1959 to 1968) 34.8 inches/year
  - Highest 10-year average precipitation (2009 to 2018) 43.7 inches/year
    - 25% variability
  - Lowest individual year (1987) 28.1 inches/year
  - Highest individual year (2011) 55.4 inches/year
    - 2011 was nearly double 1987

SME
SEVEE & MAHER
ENGINEERS

Variability in Flows - Conclusions

- The wetlands exist in a highly variable environment
- Precipitation will continue to vary, with or without the mine
- Planned to maintain a similar amount of recharge to each wetland
- Number and size of nozzles allow flexibility
- Spray and snowmaking capabilities will be sized to accommodate variations in precipitation
- **There is a low amount of spray irrigation proposed, as compared to other existing spray sites in Maine**

SME SEVEE & MAHER ENGINEERS

Questions -

Peter Maher, P.E.
Lisa Turner, P.E., L.S.S.
Sevee & Maher Engineers, Inc.
207.829.5016
PMM@SMEMaine.com
Lisa.Turner@SMEMaine.com

SME SEVEE & MAHER ENGINEERS

4 Blanchard Road, P.O. Box 85 A
Cumberland, Maine 04021
Phone 207.829.5016
sme-engineers.com

ENVIRONMENTAL • CIVIL • GEOTECHNICAL • WATER • COMPLIANCE