WOLFDEN

April 13, 2023

Mr. Tim Carr
Land Use Planning Commission
22 State House Station
Augusta, ME 04333-0022

RE: Response to LUPC Comments of February 24, 2023

Dear Mr. Carr,

I'm pleased to reply to you and the LUPC with respect to your written request dated February 24, 2023.

Please accept the following as our responses and clarifications to your questions.

1. **Acreages of Current Zones**

   Surveys of the area to be rezoned have found intermittent streams. By rule these streams are bordered by Shoreland Protection subdistricts (P-SL2) of 75 ft. landward from the normal high-water mark on either side. Please provide a revised total acreage of General Management subdistrict (M-GN) and the total acreage of P-SL2 subdistrict that will be rezoned to the D-PD subdistrict. It is our understanding that the total area proposed for rezoning is 374 acres.

   The P-SL2 areas within the footprint represent 24 acres of the 374 rezone area as shown on Figure 1 below. This results in a General Management Subdistrict of 350 acres.

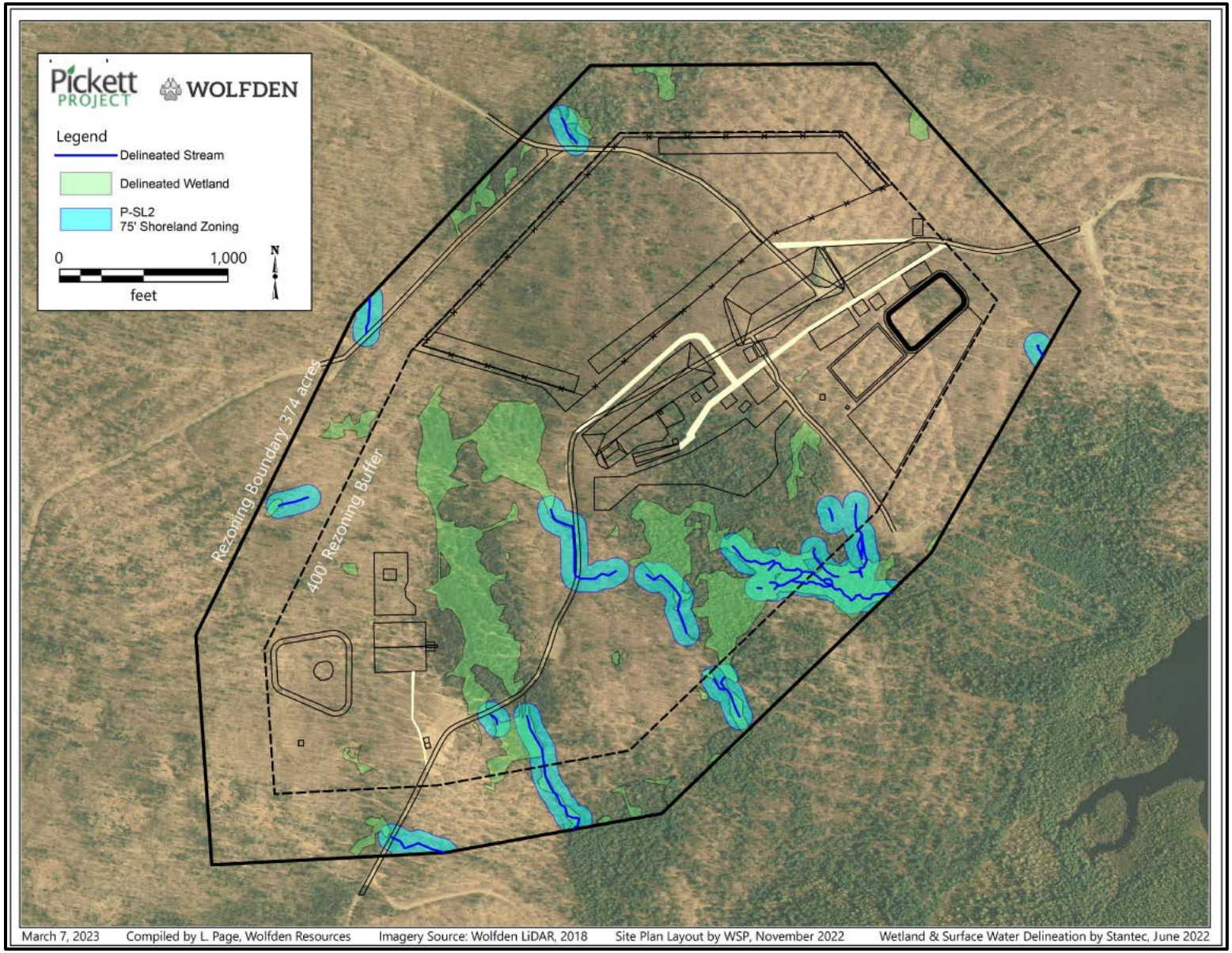

Figure 1: P-SL2 Areas Map

2. Total Number of Employees

Clarify the number of employees and contractors expected to work at the mine site as well as the total number of employees and contractors for the mine plus the offsite concentrator and tailings management facilities. The application provides varying numbers, some of which are described below.

- Executive Summary, ES.1: 272 "project related jobs"

272 includes contractor and full-time employees described in Tables 17/18 of Exhibit 10 – Attachment 10-A for the mine and the mill site combined. For additional clarity, please see Table 1 below for a summary of anticipated employees at the Pickett Project. Project related jobs includes direct employees as well as contract employees working at the project site.

Table 1: Pickett Employees Summary

Pickett Employee #'s Summary		
	Job Site	**Inputs**
Operations Timeframe	Mine/Concentrator	24hrs per day 365 days per year
Shift Work Schedule	Mine/Concentrator	7 days on 7 days off
Total General Administrative Employees	Mine	15
Total Shift Employees per 24 Hours (46 Dayshift/45 Nightshift)	Mine	91
Total Shift Employees Hired	Mine	182
Total Employees Hired	Mine	197
Total Local Contractors	Mine	36
Total Employeed at Mine Site	**Mine**	**233**
Total General Administrative Employees (7 for Each Cross Shift Rotation and 1 Mill Superintendent)	Concentrator	15
Total Shift Employees per 24 Hours	Concentrator	12
Total Shift Employees Hired	Concentrator	24
Total Employees Hired	Concentrator	39
Total Local Contractors	Concentrator	0
Total Employeed at Concentrator	**Concentrator**	**39**
Total Mine and Concentrator Employees	Mine/Concentrator	**236**
Total Employeed at both sites (Including Contractors)	Mine/Concentrator	**272**

- Consistency with the Comprehensive Land Use Plan (Exhibit 9), page 9.6: "233 workers:"

The reference to 233 workers is correct and includes the number of employees and contractors working at the mine site in T6R6; it does not include the 39 employees working at the concentrator site.

- Surrounding Uses and Anticipated Impacts (Exhibit 10), page 10.16: 272 "project associated jobs:"

The reference to 272 includes contractor and full-time employees described in Tables 17/18 of Exhibit 10 – Attachment 10-A; it includes both the mine site and the concentrator site.

- Surrounding Uses and Anticipated Impacts (Exhibit 10), page 10.16: describes 250 jobs

The reference to "14 hired staff that work-day shift only" refers to the total number of staff in that position (and included in the number of Total General Administrative Employees for the Concentrator in Table 1 above), which includes two shifts of 7 staff that will work a schedule of 7 days on and 7 days off, for a total of 14 staff positions. The total jobs are 236 jobs, which is reflected in Table 1 above.

- Surrounding Uses and Anticipated Impacts (Exhibit 10), Attachment 10-A, Economic Assessment, Tables 17 and 18: 236 jobs

As summarized in the table above, this includes 236 Wolfden employees that work at the mine and the concentrator sites but does not include the 36 local contractor positions who will work at the mine site as noted on the fifth line of the mine jobs in Table 1 above.

- Public Roads (Exhibit 21), WSP Traffic and Transportation Routes Memorandum, Attachment 21-A, Table 1, p. 6: accounting for two weekly shifts results in 212 employee vehicles total (248 vehicles total including contractors)

212 is inclusive of one-way trips (not vehicles) from 15 administrative and support staff (in and out once per day), 46 dayshift mine employees and 45 nightshift employees each travelling twice per day (in and out once). This totals 106 employees travelling per day. This is reflected in Table 1 above and consistent in Exhibit 21.

3. Underground Facilities

Clarify the underground facilities that are planned. The Preliminary Economic Assessment (Financial Practicability, Exhibit 14, Attachment 14-A) describes underground facilities that are not included in the Project Description (Exhibit 2): a breakdown maintenance shop, an equipment wash bay, water transfer stations and holding tanks for mine process water, and communication and control systems. Provide detailed schematics for any of these additional underground facilities that are planned.

Please see Attachment A for details related to these additional underground facilities.

4. Spray Irrigation and Snowmaking

Provide conceptual schematics for proposed spray irrigation and snowmaking equipment for the Water Recharge Areas (WRAs).

Please see Attachment B for a complete report by SME Engineers, which includes details related to spray irrigation and snowmaking equipment for the Water Recharge Areas, as well as impacted snow storage.

5. Setbacks

Table 6-1 of Structures, Features, Uses (Exhibit 6) includes several structures (for example: solar panels, warehouse, office, and core shack) and a parking area with proposed 0-foot setbacks from roads. The minimum road setback requirement applicable to the project will

be 20 feet unless alternative road setback requirements are included in the proposed Development Plan (Exhibit 27) and approved by the Commission. The application should address one of these options.

Because the interior roads are not used by the public, the minimum 20-foot setback from roads does not apply and, further, we understand that there is no minimum setback that applies.

In some cases, the setbacks in Table 6-1 do not match those shown on Figure 7-2 in the Site Plans (Exhibit 7). Examples include Water Recharge Area #3 (Map ID 27), Ore (Mill Feed) Storage Pad #2 (Map ID 29), and Water Recharge Area #5 (Map ID 38).

Please see Attachment C for an updated summary of setbacks and a reconciled Figure 7-2.

6. Snow Storage

Provide evidence that sufficient area is set aside for storing snow from the collection area.

Please see Attachment B for a complete report by SME Engineers, which includes details related to spray irrigation and snowmaking equipment for the Water Recharge Areas, as well as impacted snow storage.

7. Rock Crushing/Milling

Clarify if all rock crushing/milling will take place underground. The Project Description (Exhibit 2), Attachment 2-A, Underground Infrastructure Drawings, shows a subsurface crushing station, and the aboveground noise assessment in Harmonious Fit and Natural Character (Exhibit 16) does not include crushing equipment. However, the Project Description (Exhibit 2) and the Site Plans (Exhibit 7) include aboveground pads described as ore (mill feed) pads, suggesting that some rock crushing/milling could occur at the surface.

All mined ore rock crushing is planned to take place underground. The pads described in Exhibits 2 and 7 are storage pads. Material stored on these pads will be blast/broken rock from underground and, in the case of ore, material that is crushed underground before being hauled to the surface and stored on the pad.

8. Blasting During Construction of Surface Development

Clarify if blasting may be necessary for construction. Soil Suitability (Exhibit 23) states that "[t]he Project site layout does not require blasting for construction of infrastructure, water collection ponds, or pads" (p. 23.1). This statement conflicts with other areas in the application, described below.

- Soil Suitability (Exhibit 23), Attachment 23-A, Soil Suitability Report: "Due to the topography differential, a single level pad is not likely feasible. Therefore, appropriate engineering and construction practices could include terraced or benched pad construction approach. Blasting may be needed…" (p. 4-4).

- Financial Practicability (Exhibit 14), Attachment 14-A, Preliminary Economic Assessment (PEA) Report, Section 18.3.1: "There is a $65,000 mobilization fee plus $3.45 per cubic yard to drill and blast the material necessary to level out the area" (p. 143) relating to preparation for the main pad.

- Project Description (Exhibit 2): Figures 2-4 through 2-6 show cross-sections with significant cuts that appear to exceed the depth to bedrock provided in the Soil Suitability Report (Exhibit 23, Attachment 23-A).

Blasting for construction is not likely to be required but, if necessary, blasting will take place in accordance with all state and federal regulations.

9. Traffic

Clarify the number of trips expected per day and their breakdown into categories. Public Roads (Exhibit 21), Attachment 21-A, WSP Traffic and Transportation Routes Memorandum, shows 254 trips for employees, contractors, and visitors plus 110 trips for hauling ore rock (p. 5 and Table 1, p. 6). Attachment 21-B, WSP Pickett Mountain Mine Site – Gravel Road and Bridge Field Reconnaissance Summary, shows 236 trips for employees, contractors, and visitors, plus a maximum of 10 deliveries per day, plus 110 trips for hauling ore rock (p. 2).

Please see Attachment D – Traffic Clarifications, which includes a letter from WSP clarifying Attachment 21-A and Attachment 21-B in the Application.

10. Development Plan (Exhibit 27)

The Development Plan must be a stand-alone document that follows the structure of the subdistrict sections in the LUPC's Chapter 10, Sub-Chapter II, Land Use Subdistricts, including the subdistrict purpose, description, and allowed land uses. Please see recommended edits and comments on the draft Development Plan (based on the submission for Exhibit 27) attached to this letter.

A revised draft Development Plan is provided as Attachment E as a stand-alone document and may also be considered a replacement for Exhibit 27 of the Application.

11. Stormwater and Mine Water Management

The application does not include a sufficient demonstration that the discharge of collected storm and mine waters would have no undue adverse impact on down gradient wetland and stream hydrology, especially considering the timing and quantity of water flows. If any wetland or flowing water will receive more or less water than pre-development, provide evidence to demonstrate that there will not be undue adverse impacts on those habitats or the species depending on those habitats. Consider if water would be diverted from one subcatchment area to another and that water from mine shaft dewatering may not have reached the streams pre-development and therefore will be a source of additional volume.

Please see Attachment B for a complete report by SME Engineers, which clarifies how discharge of the collected storm and mine water will have no undue adverse impact on

down gradient wetland and stream hydrology and includes detail on the quantity of such water flows. That report includes an analysis of where water recharge areas associated with spray irrigation might be located to ensure there will be no adverse impact on site hydrology. The actual water recharge areas will be determined as part of the final design for disposition of treated water, and the areas reflected in Attachment B and Figure 3 to Attachment B should be viewed as illustrative only. To reflect the fact that the spray irrigation areas may be located outside the development area envelopes, and consistent with the requirement to ensure they are sited most appropriately to maintain site hydrology, Figures 2-1 and 27-1, as well as Table 6-1, have been updated to remove specific locations of the WRAs. Additionally Exhibit 27 has been updated (i) to allow spray irrigation and snowmaking to occur anywhere within the rezone area pursuant to a permit, except that no infrastructure or clearing will be allowed within the 400-foot buffer, (ii) to require any infiltration galleries, to the extent they may be required, to be located within one of the three development areas shown on Figure 27-1.

Please note that references in the application to illustrate WRAs have not been updated throughout the application text. Instead, the key figures, Figures 2-1 and 27-1, and Table 6-1 have been updated to remove references to specific locations of WRAs. In addition, the limitation on impacts within the 400-foot buffer and siting of infiltration galleries within development areas is captured in Exhibit 27.

Thank you for consideration of this additional information.

Sincerely,

Jeremy Ouellette
_____

Jeremy Ouellette, Vice President Project Development
WOLFDEN MT. CHASE LLC
20 Main Street
Patten, ME 04765

Attachment A – Additional Mine Figures (#3)

Figure 2 is an example of an underground maintenance/breakdown shop with an attached wash bay. This is typical of underground workings and allows space for maintenance team offices, vehicle washing prior to/during breakdown and maintenance activities, as well as parts and supplies storage.

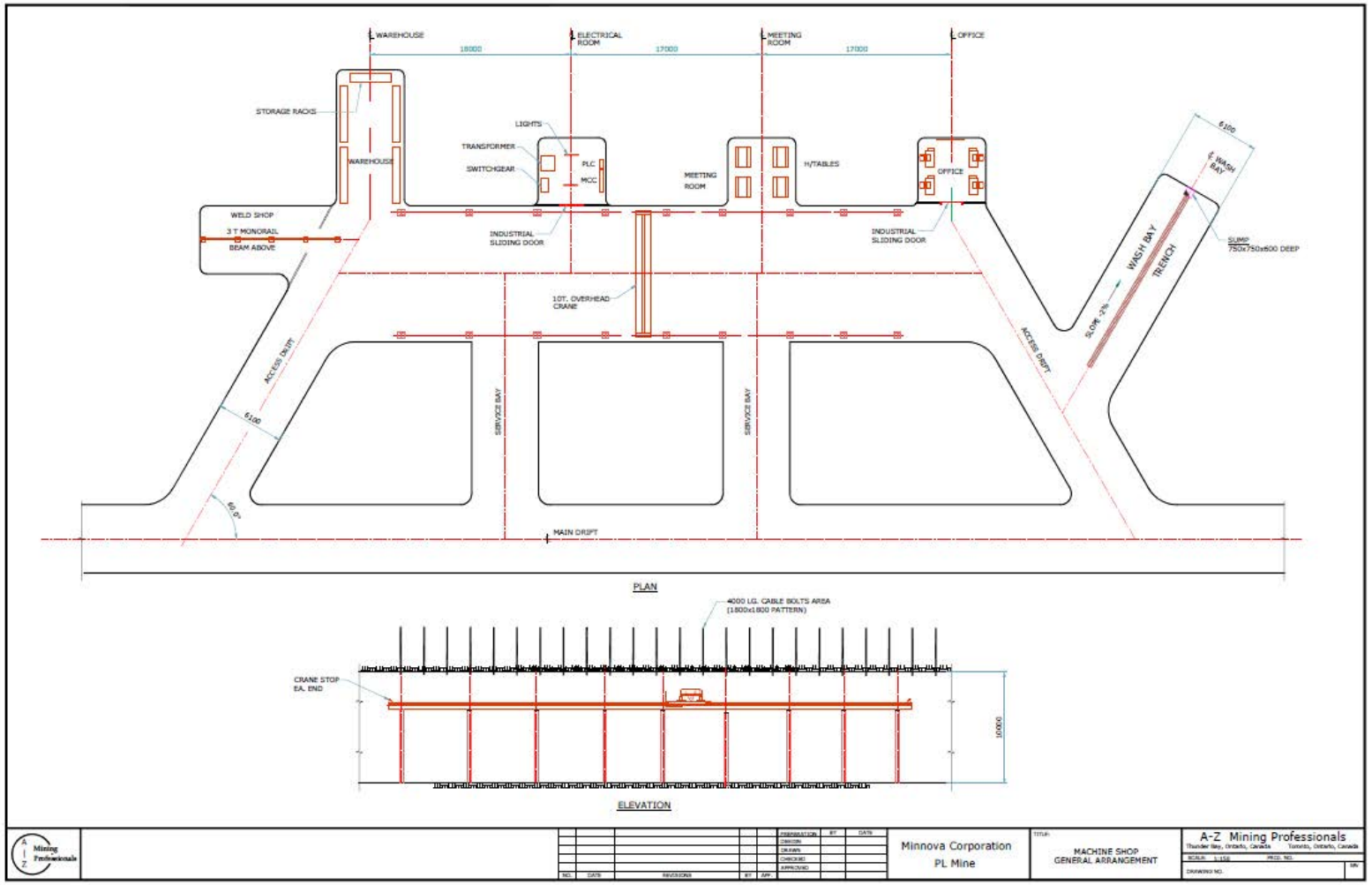

Figure 2: Typical Underground Shop/Service Bay/ Wash Bay

Figure 3 is a diagram of how underground process water is delivered to the underground workings in a controlled manner while maintaining consistent and manageable pressure throughout the system. A pressure break tank is used to reset to atmospheric pressure as water is delivered deeper into the mine workings. Water into the tank is controlled via a float switch and valve.

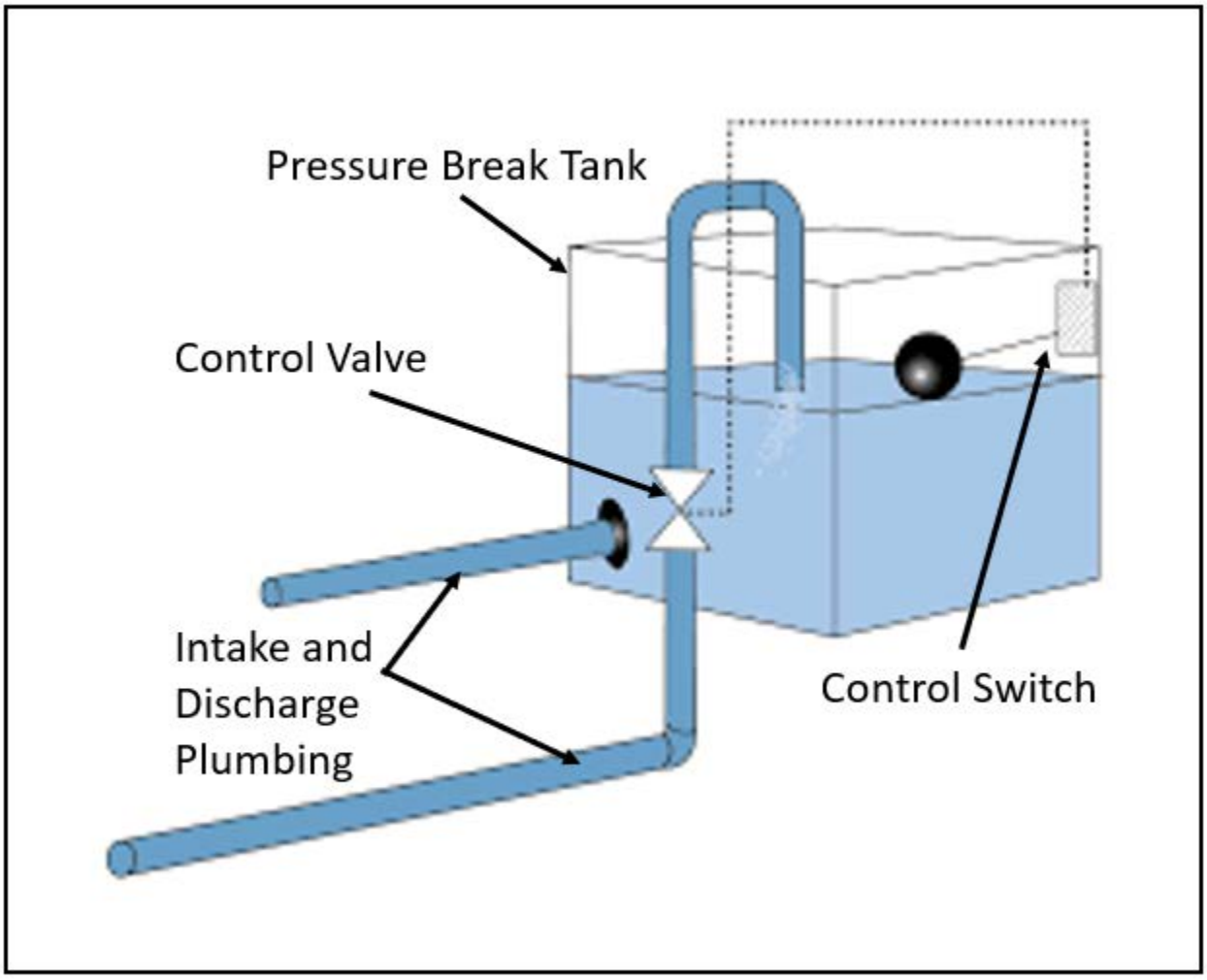

Figure 3: Typical Pressure Break Tank and Control System for Process Water Underground

Figure 4 is a diagram of how underground communications can be configured. There are several types of underground communications infrastructure and platforms which generally include a head end or source equipment that communicates data from the remaining infrastructure to a surface network. Data is then distributed throughout the mine workings (tunnels) via a series of cables. The data is then distributed to and received from radios, equipment, and various fixed points through transmitters along the cable or in some cases, via the cable itself.

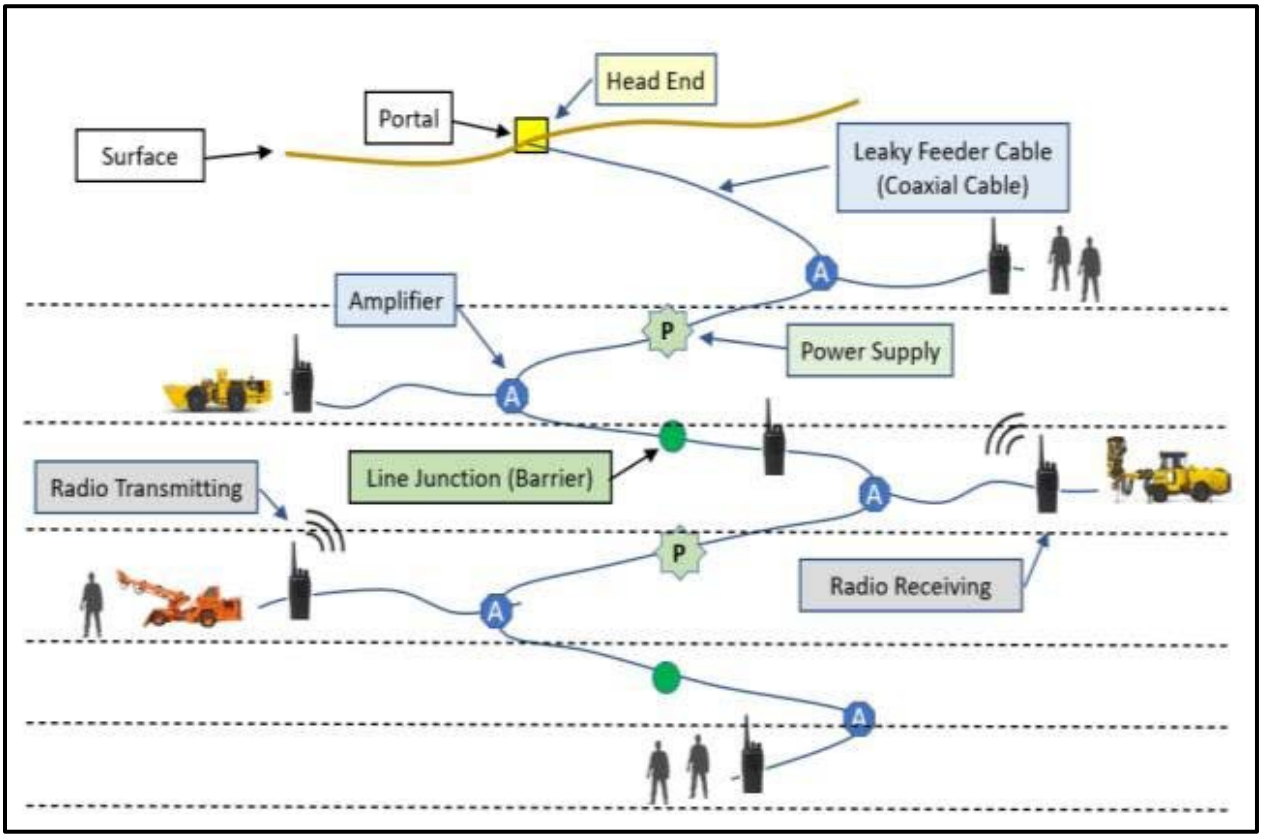

Figure 4: Typical Underground Communications System

Attachment B – Spray Irrigation/Snowmaking/Snow Storage

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TECHNICAL MEMORANDUM

TO: Jeremy Ouellette, Wolfden Resources Corporation

FROM: Peter Maher, P.E.
Erik Clapp, L.G.
Lisa Turner, P.E., L.S.S.

DATE: April 12, 2023

SUBJECT: **WATER RESOURCE PRESERVATION AT THE PICKETT MOUNTAIN MINE SITE**

LUPC COMMENT 11 - STORMWATER AND MINE WATER MANAGEMENT

The application does not include a sufficient demonstration that the discharge of collected storm and mine waters would have no undue adverse impact on downgradient wetland and stream hydrology, especially considering the timing and quantity of water flows. If any wetland or flowing water will receive more or less water than pre-development, provide evidence to demonstrate that there will not be undue adverse impacts on those habitats or the species depending on those habitats. Consider if water would be diverted from one subcatchment area to another and that water from mine shaft dewatering may not have reached the streams pre-development and therefore will be a source of additional volume.

SME's Response:

Hydrogeologic Overview of the Site's Water Resources

The Pickett Mountain site is located on the crest of a hill; therefore, it is assumed that there is no discharge of deep groundwater to the site's surface water. The only recharge to the ground and surface water system at the site is from precipitation. A portion of the precipitation will be lost to evapotranspiration, a portion will infiltrate through the overburden to the bedrock groundwater system, and the remainder will either infiltrate into the shallow overburden groundwater or run off to downgradient areas.

Given the sloping topography of the site and the generally low permeability of bedrock in the area, it is anticipated that as the shallow groundwater reaches the wetlands at the toe of the slope, it will discharge and, along with the site's runoff, recharge the wetlands. These wetlands subsequently discharge to the intermittent and perennial streams on-site and surrounding the site. In order to retain the character of the wetlands and streams, it will be necessary to maintain a similar amount of recharge to each wetland after mine development. Based on the analysis presented below, pre-development and post-development inflow to the site wetlands will vary by less than one percent.

Precipitation Recharge to the Undeveloped Site

Sevee & Maher Engineers, Inc. (SME) used an average precipitation value of 45 inches per year (Wood, Technical Memorandum to Wolfden, revised August 25, 2022) to calculate a total average precipitation inflow of approximately 456 million gallons per year (MGY) for the 374-acre site. LIDAR topography was reviewed relative to the wetland areas on and immediately adjacent to the site, and seventeen separate wetland catchments were identified for the pre-development condition. These wetland catchments are depicted on Figure 1.

Precipitation Recharge to the Developed Site

Three separate areas totaling approximately 31 acres will require collection of precipitation once the site is developed. These are shown as water collection areas on Figure 2 and include the following:

- 1R1 and 1R2 - the pre-treatment and post-treatment ponds,
- 1S - the main developed area in the center of the site, and
- 1T - Ore Storage Pad #2 and Waste Rock Pad #2.

The proposed development will occur in seven of the initial 17 wetland catchments (1E, 1F, 1G, 1H, 1N, 1O, and 1P) and will alter natural precipitation recharge in those areas. To estimate the recharge to each wetland catchment during the developed condition, the affected wetland catchments delineated in Figure 1 were reduced to reflect the removal of the water collection areas from the wetland catchments (see Figure 2).

A new, reduced value for total water inflow from precipitation was calculated for each of the seven affected catchments. In the pre-development condition, these catchments collectively receive approximately 347 MGY of inflow from precipitation. In the post-development condition, they will receive only 309 MGY of inflow from precipitation, a total reduction of inflow of 38 MGY or 11 percent of the initial inflow to the affected catchments.

Quantity of Treated Water to be Introduced to the Developed Site

Based on the HydroCAD evaluation prepared by Wood (August 2022), of the estimated 38 MGY of precipitation falling on the water collection areas, only 28 MGY will be collected as surface water runoff. The remainder is an evaporative loss of 10 MGY, as calculated by the HydroCAD model, which is consistent with the average evapotranspiration values for the northeast (Hanson, R.L., 1991, Evapotranspiration and Droughts, **in** Paulson, R.W., Chase, E.B., Roberts, R.S., and Moody, D.W., Compilers, National Water Summary 1988-89--Hydrologic Events and Floods and Droughts: U.S. Geological Survey Water-Supply Paper 2375, p. 99-104). An additional 15.8 MGY of mine water (Wood, August 2022) will be treated and require disposition, for a total of 43.8 MGY to be reintroduced to the site's water recharge system.

Of this 43.8 MGY, approximately 11.8 MGY is planned to be distributed on the site as snow through the utilization of snow making equipment, with the remaining 32 MGY being distributed through spray irrigation. A sprinkler evaluation nomograph (Frost and Schwalen, 1955) and typical

atmospheric conditions at the site (based on climatic data for Patten, Maine on weather-us.com/en/maine-usa/patten-climate) during the spray season (April through September) were used to determine that approximately 8.5 percent, or 2.7 MGY of the spray irrigation water will evaporate during spraying. This leaves 29.3 MGY of spray irrigation water along with the 11.8 MGY of snow that will be added back to the water recharge system, a total of 41.1 MGY.

Introduction of Treated Water to the Developed Site

38 MGY of the total 41.1 MGY of water to be introduced can be apportioned back to replace the water lost from the seven wetland catchments that were reduced in size by the development. This leaves a remaining 3.1 MGY of water that will need to be apportioned to the site. Because this is such a small percentage of the total inflow to the affected catchments (0.9 percent of the initial precipitation recharge of 347 MGY) and falls well within the natural variation at the site (see discussion below), it is not necessary to apportion the excess water over the entire site. The excess water can be distributed to the seven affected catchments within the natural variation of precipitation for the site and is not anticipated to have an adverse impact on the associated wetland and stream resources. A summary of the water inflows to each catchment for the pre-development and developed conditions is included in Table 1.

Potential areas were designated for the spray irrigation and snow stockpiles for treated water, as depicted on Figure 3. Final locations will be determined as part of the final design for the disposition of treated water.

SME
SEVEE & MAHER
ENGINEERS

TABLE 1

WETLAND CATCHMENT AREAS AND INFLOWS
PRE- AND POST-DEVELOPMENT

Catchment ID	Contains Wetlands	Pre-Development Area (SF)	Developed Area (SF)	Decreased Inflow Post-Development (SF)	Pre-Development Precipitation (gal/yr)	Post-Development Precipitation (gal/yr)	Precipitation Deficit (gal/yr)	Total Post-Development Inflow Including Precipitation (gal/yr)	Additional Post - Development Flow to Catchment (gal/yr)
CATCHMENTS REDUCED BY DEVELOPMENT									
1E	Adjacent	687,000	430,000	-257,000	19,270,000	12,062,000	7,208,000	125,000	7,333,000
1F	Adjacent	492,000	472,000	-20,000	13,801,000	13,240,000	561,000	137,000	698,000
1G	No	786,000	449,000	-337,000	22,047,000	12,594,000	9,453,000	131,000	9,584,000
1H	Yes	2,439,000	2,413,000	-26,000	68,414,000	67,685,000	729,000	703,000	1,432,000
1N	Yes	3,284,000	3,152,000	-132,000	92,116,000	88,414,000	3,702,000	918,000	4,620,000
1O	Yes	1,041,000	948,000	-93,000	29,200,000	26,591,000	2,609,000	276,000	2,885,000
1P	Yes	3,656,000	3,171,000	-485,000	102,551,000	88,947,000	13,604,000	924,000	14,528,000
Total		12,385,000	11,035,000		347,399,000	309,533,000	37,866,000	3,214,000	41,080,000
Percent of Pre-Development Precipitation							10.9%	0.9%	11.8%
CATCHMENTS UNAFFECTED BY DEVELOPMENT									
1A	No	50,000	50,000	0	1,403,000	1,403,000	0	0	0
1B	Yes	192,000	192,000	0	5,386,000	5,386,000	0	0	0
1C	No	737,000	737,000	0	20,673,000	20,673,000	0	0	0
1D	Yes	422,000	422,000	0	11,809,000	11,809,000	0	0	0
1I	No	12,000	12,000	0	337,000	337,000	0	0	0
1J	Yes	370,000	370,000	0	10,379,000	10,379,000	0	0	0
1K	Yes	251,000	251,000	0	7,013,000	7,013,000	0	0	0
1L	No	670,000	670,000	0	18,794,000	18,794,000	0	0	0
1M	Yes	507,000	507,000	0	14,221,000	14,221,000	0	0	0
1Q	Yes	674,000	674,000	0	18,934,000	18,934,000	0	0	0
		3,884,000	3,884,000						
DEVELOPED AREAS (ALL PRECIPITATION COLLECTED)									
1R	Two Ponds		253,000						
1S	Development		966,000						
1T	Development		131,000						

The total number of inches per week of precipitation added to each snow stockpile from snowmaking was calculated and is included as Table 2. On average, assuming a 20-week-long snowmaking season, an equivalent of approximately 3.0 inches of precipitation per week will be added to wetland catchments 1E, 1G, and 1P, as shown in Table 2. This is below the up to four inches of weekly recharge typically seen at other wastewater snowmaking sites in Maine.

TABLE 2

PROPOSED INCHES OF RECHARGE ADDED THROUGH SNOWMAKING

Catchment ID	Total Proposed Length of Snow Pile (feet)	Total Precipitation Deposited per Catchment as Snowmaking (gal/yr of water)	Inches of Water Added per Week (inches)
1E	500	1,790,000	3.0
1G	1,090	3,903,000	3.0
1P	2,320	8,307,000	3.0
TOTAL	3,910	14,000,000	

The volume of precipitation added to each wetland catchment as snow was subtracted from the total amount of precipitation to be added to provide recharge to the catchment. The remaining quantity of additional water to be added to each affected wetland catchment through spray irrigation was divided by the square footage of the proposed spray irrigation areas and an assumed 20-week spray irrigation period. The weekly recharge rate ranges from a low of 0.3 inches per week in wetland catchment 1H to a high of 2.3 inches per week in wetland catchment 1E. This demonstrates that there is more than enough area in each affected wetland catchment to allow water to be added at rates below the up to four inches of recharge typically seen at other wastewater spray irrigation sites in Maine (see application Attachment 10-E) and provide sufficient water to recharge the wetlands. These recharge values are summarized in Table 3.

TABLE 3

PROPOSED INCHES OF RECHARGE ADDED THROUGH SPRAY IRRIGATION

Catchment ID	Additional Post - Development Flow to Catchment (gal/yr)	Total Snow Recharge Deposited per Catchment (gal/yr of water)	Remaining Flow to be Added to Catchment as Spray Irrigation (gal/yr)	Total Proposed Spray Recharge Area (square feet)	Inches of Water Added as Spray Irrigation per Week (inches)
1E	7,333,000	1,790,000	5,543,000	**191,800**	2.3
1F	698,000	0	698,000	**99,900**	0.6
1G	9,584,000	3,903,000	5,681,000	**267,700**	1.7
1H	1,432,000	0	1,432,000	**406,000**	0.3
1N	4,620,000	0	4,620,000	**590,900**	0.6
1O	2,885,000	0	2,885,000	**103,900**	2.2
1P	14,528,000	8,307,000	6,221,000	**836,100**	0.8
	41,080,000				

As can be seen on Figure 3, a portion of the spray irrigation areas in wetland catchments 1E, 1F, 1G, and 1P will be within the 400-foot setback from the edge of the rezoning area. No structures or clearing will be located in the setback, the usage is simply adding spray water recharge to maintain the wetland areas.

Variation in Naturally Occurring Precipitation

To assess the impact of an additional 0.9 percent of inflow to the wetlands, SME reviewed the historical precipitation data for Caribou, Maine, from 1939 to 2018 (National Oceanic and Atmospheric Administration), which is the nearest station to Patten with long-term data available. The data was averaged in ten-year increments, beginning in 1939. The lowest ten-year average was 34.8 inches from 1959 through 1968, the highest was 43.7 inches from 2009 to 2018, a 25 percent difference. The lowest individual precipitation year was 28.1 inches in 1987, the highest year was 55.4 inches in 2011, a 97 percent difference. Given the large variability in natural precipitation in the area, it is assumed that an additional 0.9 percent inflow to the wetlands will not cause an undue adverse impact on the water resources at the site. A graph of the eighty years of precipitation data showing the annual variability is included as Figure 4.

LUPC COMMENT 4 - SPRAY IRRIGATION AND SNOWMAKING

Provide conceptual schematics for proposed spray irrigation and snowmaking equipment for the Water Recharge Areas (WRAs).

SME's Response: Attachment 1 contains photos and schematics of typical spray irrigation equipment commonly used at wastewater treatment plants. Attachment 2 contains photos and schematics of typical snow making equipment commonly used at wastewater treatment plants, as well as some examples of snow stockpiles. Attachment 3 includes a case study of wastewater disposal through spray irrigation and snowmaking in Carrabassett, Maine.

Potential areas were designated for the spray irrigation and snow stockpiles of treated effluent, as depicted on Figure 3. Due to the inherent challenges in managing water during the winter at below freezing temperatures, the proposed snow stockpiles were selected to be near the storage ponds and to be at the highest points in the wetland catchments so that melting snow will drain to the wetland areas. Final locations will be determined as part of the final design for the disposition of treated water.

LUPC COMMENT 6 – SNOW STORAGE IN AFFECTED AREA

Provide evidence that sufficient area is set aside for storing snow from the collection area.

SME's Response: The following table provides an estimate of the annual snow storage requirement for the developed area. It is anticipated that only one third of the site will require snow removal, with the remainder of the developed portion of the site consisting of the treatment ponds, rock storage areas, etc. The required storage volume assumes a snow compaction rate of 70 percent, which is expected to occur during placement and settling. The 2.6-acre snow storage area shown on Figure 5 would require only a 16-foot-high snow pile, as calculated in Table 4. The average annual snowfall was taken from climate data for Caribou Municipal Airport, Maine as reported by the

National Oceanic and Atmospheric Administration (NOAA), National Snowfall Analysis. (National Gridded Snowfall Analysis - NOHRSC - The ultimate source for snow information (noaa.gov))

TABLE 4

DEVELOPED AREA SNOW STORAGE

Annual Snow Fall	118	inches
Collection Footprint	1,350,000	SF
Percent of Footprint requiring snow removal	33%	
Volume of Snow to be Stockpiled	4,388,000	CF
Snow Compaction from Placement and Settling	70%	
Compacted Snow Volume Collected	1,316,000	CF
Proposed Snow Storage Footprint	2.6	acres
Required snow storage height	16	ft

Abbreviations:
ft = feet
SF = square feet
CF = cubic feet

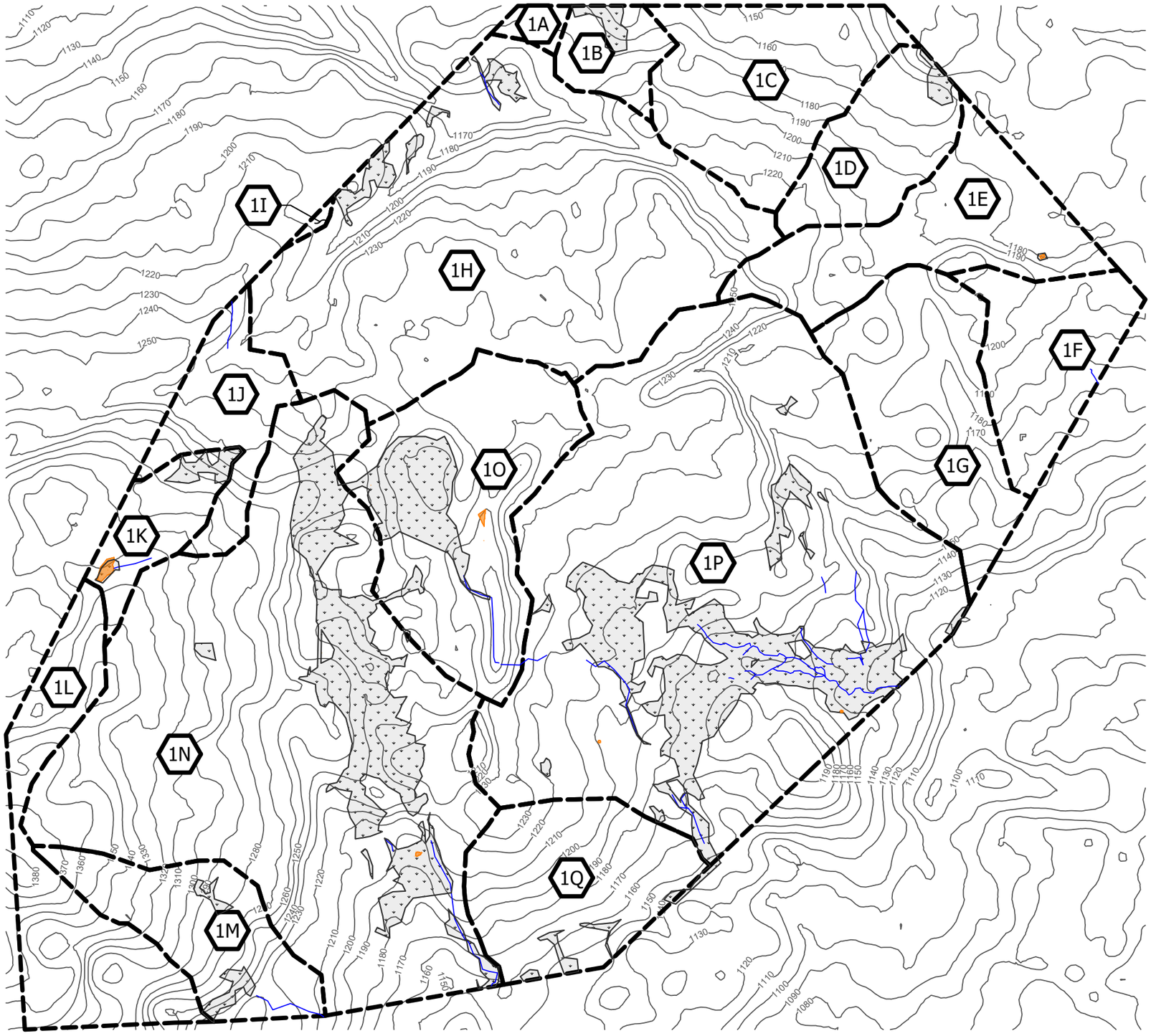
Attachments:

Figures 1 through 5

Attachment 1 Spray Irrigation Systems and Equipment

Attachment 2 Snowmaking Systems and Equipment

Attachment 3 Case Study: Carrabassett, Maine Wastewater Disposal through Spray Irrigation and Snowmaking



LEGEND

PRE-DEVELOPMENT WETLAND CATCHMENTS

1F CATCHMENT DESIGNATION

STREAM

WETLAND

VERNAL POOL

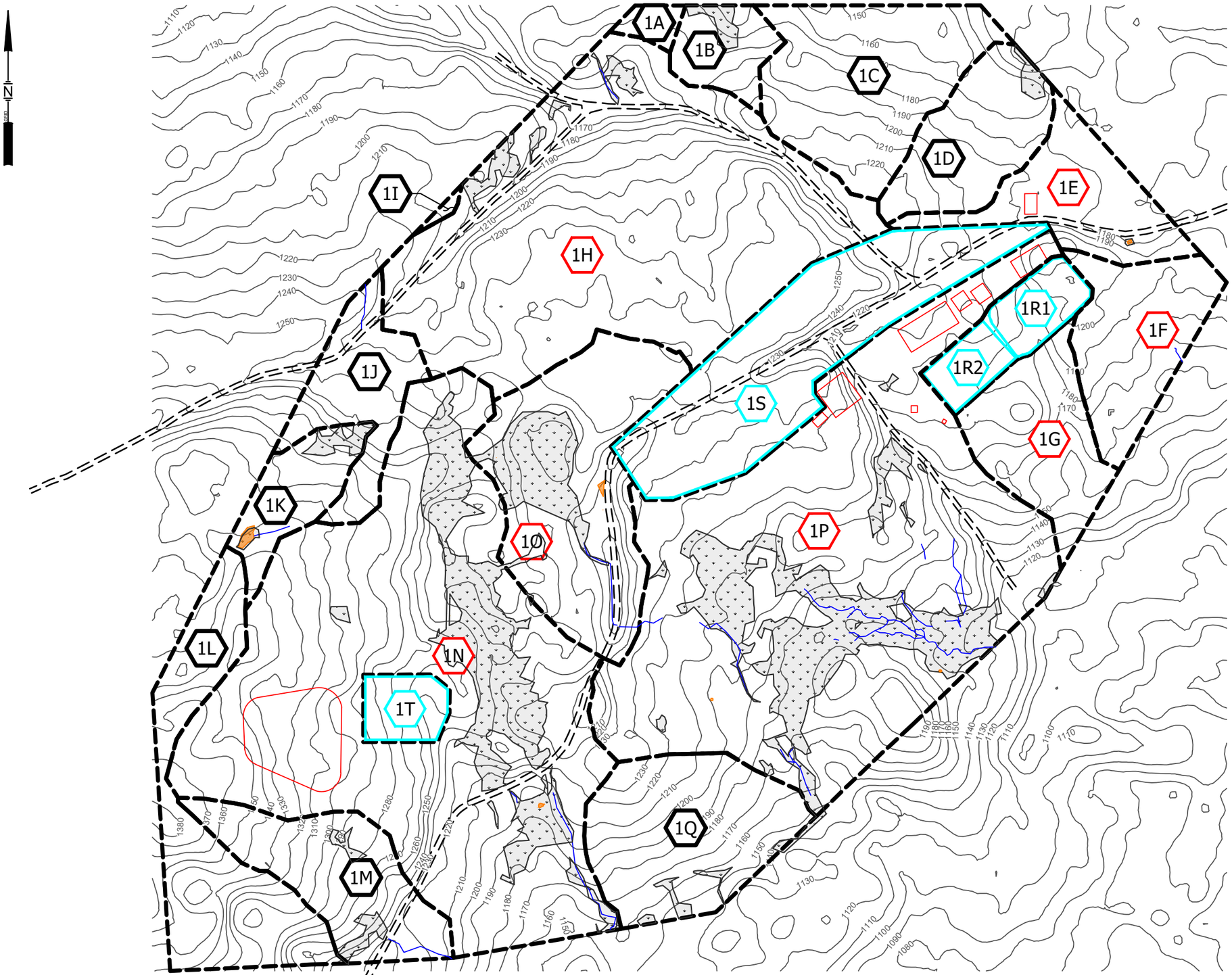
250 0 500 FEET

FIGURE 1
PRE-DEVELOPMENT
WETLAND CATCHMENTS
WOLFDEN RESOURCE CORPORATION
PICKETT MOUNTAIN MINE SITE
T6 R6, MAINE

SME
SEVEE & MAHER
ENGINEERS

DWG: V-SP05 PM LMN: SMP-PRE CTB: SME-STD REV: 3/21/2023

\\NSERVER\cfs\WolfdenACAD\Plans\BASE.dwg, FIG 1 - SMP-PRE-DEV, 3/21/2023 8:01:07 AM, jrl



LEGEND

- POST-DEVELOPMENT WETLAND CATCHMENTS
- 1F — CATCHMENT DESIGNATION
- 1E — AFFECTED CATCHMENT DESIGNATION
- WATER COLLECTION AREA
- 1R2 — WATER COLLECTION AREA DESIGNATION
- STREAM
- WETLAND
- VERNAL POOL
- PROPOSED STRUCTURE
- PROPOSED ACCESS ROAD

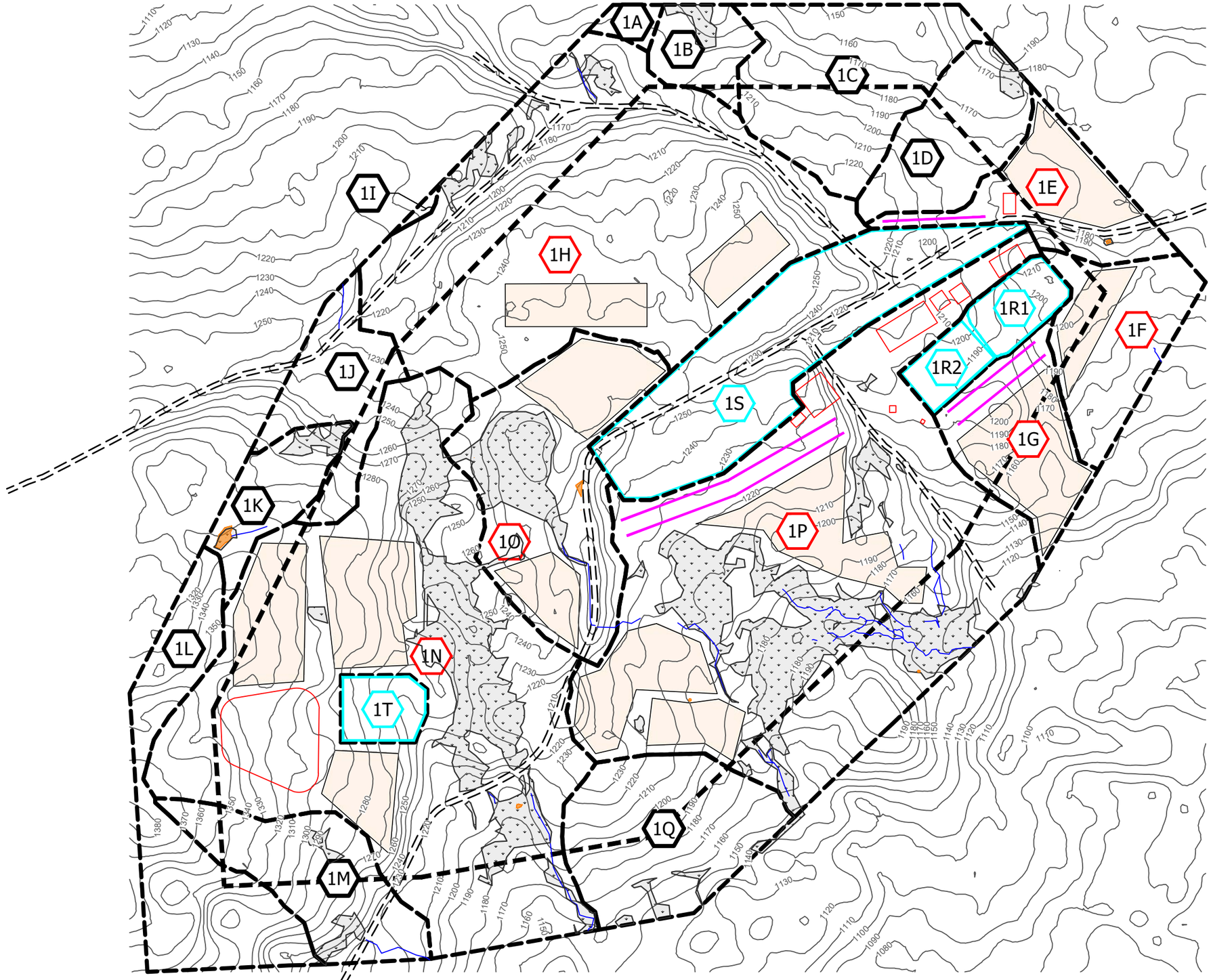
250 0 500 FEET

FIGURE 2
POST-DEVELOPMENT
WETLAND CATCHMENTS
WOLFDEN RESOURCE CORPORATION
PICKETT MOUNTAIN MINE SITE
T6 R6, MAINE

SME
SEVEE & MAHER
ENGINEERS

DWG: V-SP05 PM LMN: SMP-POST CTB: SME-STD REV: 3/21/2023

\\NSERVER\cfs\Wolfden\ACAD\Plans\BASE.dwg, FIG 2 - SMP-POST-DEV, 3/21/2023 7:58:22 AM, jrl



LEGEND

- POST-DEVELOPMENT WETLAND CATCHMENTS
- 1F — CATCHMENT DESIGNATION
- 1E — AFFECTED CATCHMENT DESIGNATION
- WATER COLLECTION AREA
- 1R2 — WATER COLLECTION AREA DESIGNATION
- STREAM
- WETLAND
- VERNAL POOL
- PROPOSED STRUCTURE
- PROPOSED ACCESS ROAD
- POTENTIAL TREATED SNOW STORAGE AREA
- POTENTIAL TREATED IRRIGATION AREA
- 400' ZONING SETBACK

250 0 500 FEET

FIGURE 3
POTENTIAL SNOW STORAGE
AND IRRIGATION AREAS
WOLFDEN RESOURCE CORPORATION
PICKETT MOUNTAIN MINE SITE
T6 R6, MAINE

SME
SEVEE & MAHER
ENGINEERS

DWG: V-SP05 PM LMN: SNOW-IRRG CTB: SME-STD REV: 4/12/2023

\\NSERVER\cls\Wolfden\ACAD\Plans\BASE.dwg, FIG 3 - SNOW-IRRG, 4/12/2023 8:37:48 AM, jrl

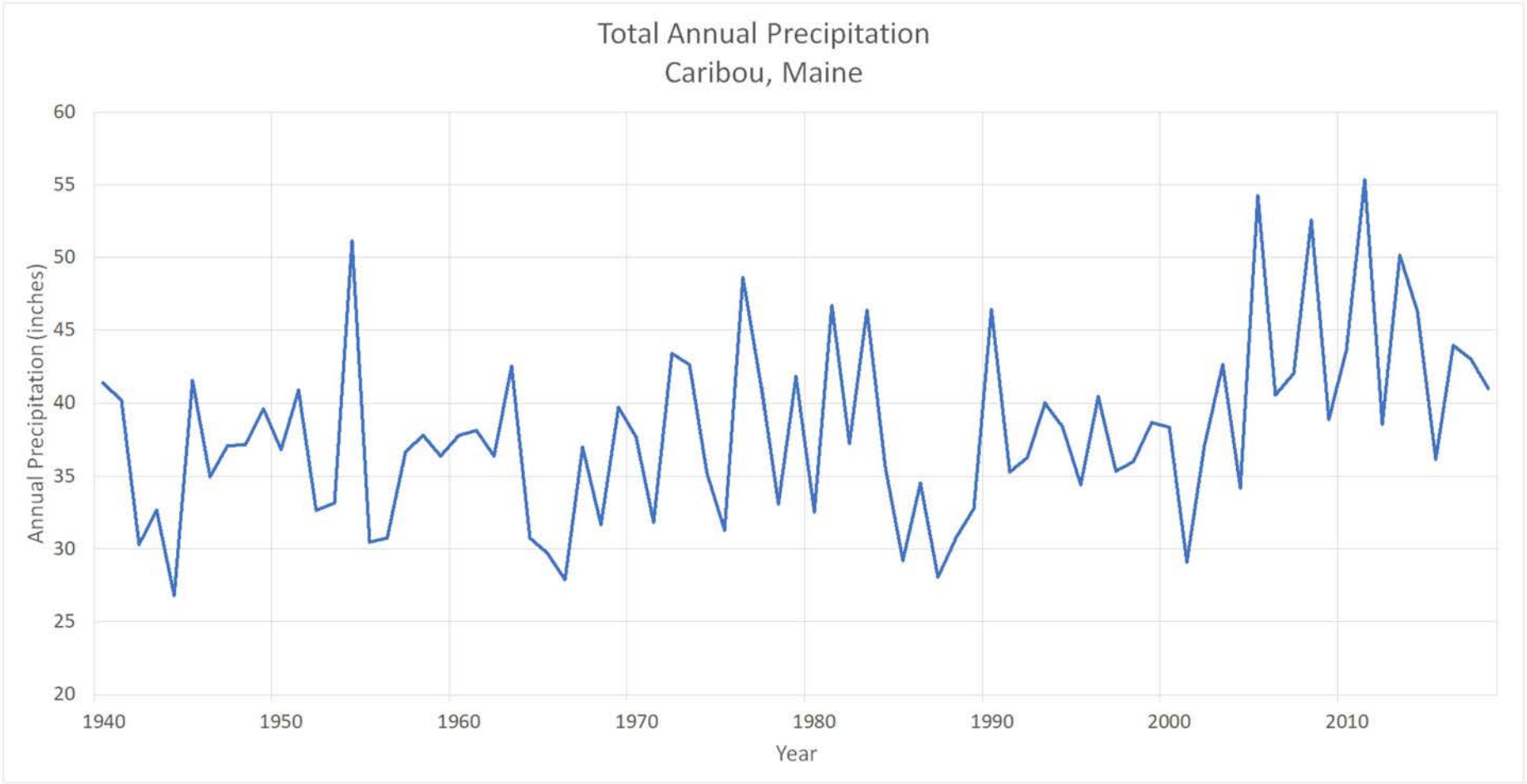


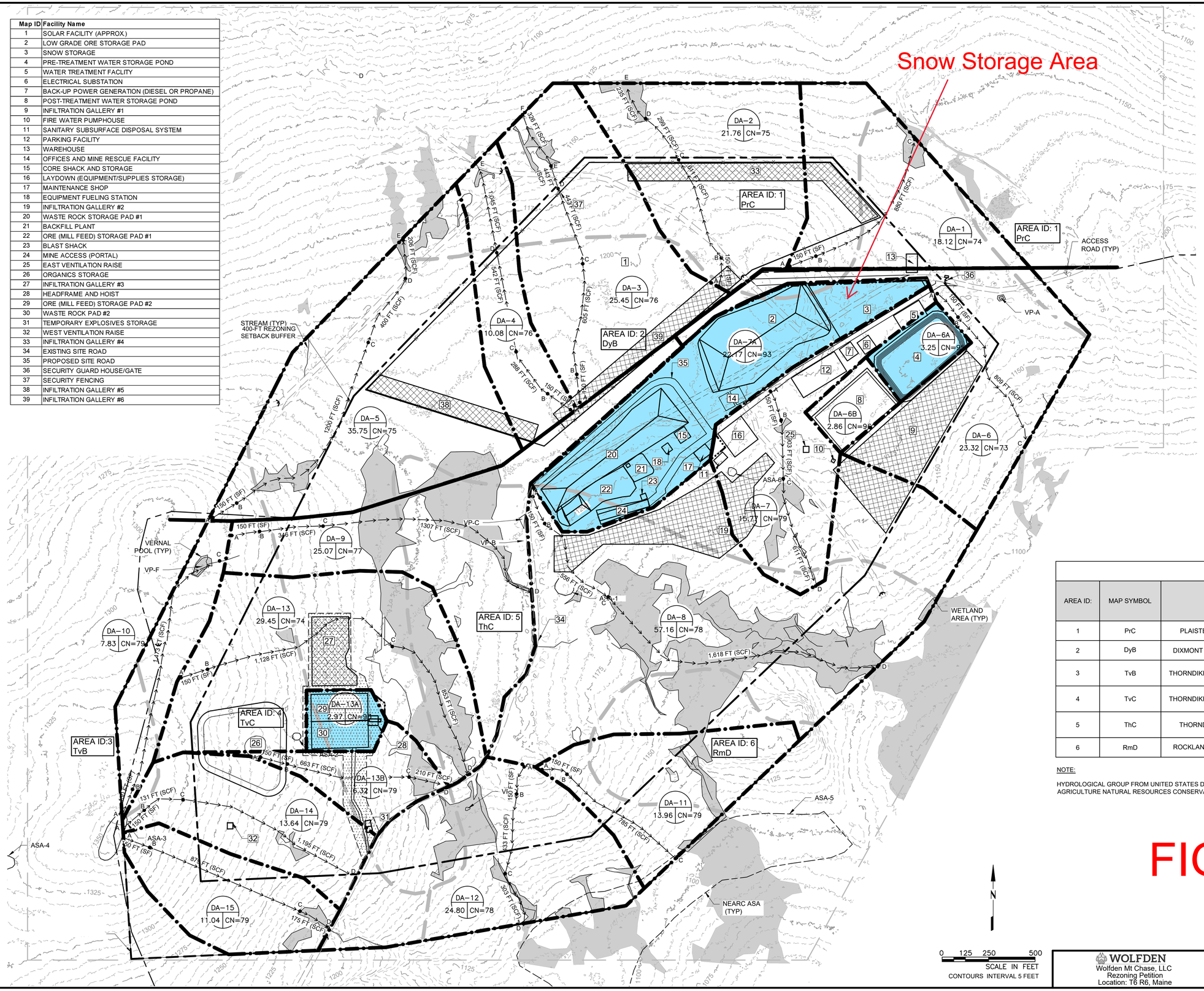
FIGURE 4
TOTAL ANNUAL PRECIPITATION
WOLFDEN RESOURCES CORPORATION
PICKETT MOUNTAIN MINE SITE
T6 R6, MAINE

SME
SEVEE & MAHER
ENGINEERS

DWG: BASE LMN: LMN CTB: SME-STD REV: 3/31/2023

\\NSERVER\cfs\Wolfden\ACAD\Plans\BASE.dwg, FIG 4 - AN-PRECIP, 3/31/2023 10:10:55 AM, jrl

Map ID	Facility Name
1	SOLAR FACILITY (APPROX.)
2	LOW GRADE ORE STORAGE PAD
3	SNOW STORAGE
4	PRE-TREATMENT WATER STORAGE POND
5	WATER TREATMENT FACLITY
6	ELECTRICAL SUBSTATION
7	BACK-UP POWER GENERATION (DIESEL OR PROPANE)
8	POST-TREATMENT WATER STORAGE POND
9	INFILTRATION GALLERY #1
10	FIRE WATER PUMPHOUSE
11	SANITARY SUBSURFACE DISPOSAL SYSTEM
12	PARKING FACILITY
13	WAREHOUSE
14	OFFICES AND MINE RESCUE FACILITY
15	CORE SHACK AND STORAGE
16	LAYDOWN (EQUIPMENT/SUPPLIES STORAGE)
17	MAINTENANCE SHOP
18	EQUIPMENT FUELING STATION
19	INFILTRATION GALLERY #2
20	WASTE ROCK STORAGE PAD #1
21	BACKFILL PLANT
22	ORE (MILL FEED) STORAGE PAD #1
23	BLAST SHACK
24	MINE ACCESS (PORTAL)
25	EAST VENTILATION RAISE
26	ORGANICS STORAGE
27	INFILTRATION GALLERY #3
28	HEADFRAME AND HOIST
29	ORE (MILL FEED) STORAGE PAD #2
30	WASTE ROCK PAD #2
31	TEMPORARY EXPLOSIVES STORAGE
32	WEST VENTILATION RAISE
33	INFILTRATION GALLERY #4
34	EXISTING SITE ROAD
35	PROPOSED SITE ROAD
36	SECURITY GUARD HOUSE/GATE
37	SECURITY FENCING
38	INFILTRATION GALLERY #5
39	INFILTRATION GALLERY #6



LEGEND:

- BOUNDARY DRAINAGE
- TC FLOW PATH
- MINE FACILITY DRAINAGE AREAS WHERE PRECIPITATION RUNOFF IS COLLECTED AND TREATED
- EXISTING CONTOURS
- SOIL SERIES BOUNDARY
- STREAM
- PICKETT MOUNTAIN POND / PLEASANT LAKE WATERSHED DIVIDE
- WETLAND
- 400-FEET REZONING SETBACK BUFFER
- PROPOSED REZONING
- VERNAL POOLS

ABBREVIATION:

DA - DRAINAGE AREA

TC - TIME OF CONCENTRATION

CN - CURVE NUMBER

POA - POINT OF ANALYSIS

SF - SHEET FLOW

SCF - SHALLOW CONCENTRATION FLOW

DA=7, 25.50, CN=98 — DRAINAGE AREA, CURVE NUMBER, AREA IN ACRES

SOIL KEY					
AREA ID:	MAP SYMBOL	SOIL SERIES	DRAINAGE CONDITION	SLOPE (%)	HYDROGRAPHICAL GROUP
1	PrC	PLAISTED VERY STONY LOAM	WELL DRAINED	8-15	C
2	DyB	DIXMONT VERY STONY SILT LOAM	SOMEWHAT POORLY DRAINED	2-8	C/D
3	TvB	THORNDIKE VERY STONY SILT LOAM	SOMEWHAT EXCESSIVELY DRAINED	2-8	D
4	TvC	THORNDIKE VERY STONY SILT LOAM	SOMEWHAT EXCESSIVELY DRAINED	8-15	D
5	ThC	THORNDIKE SHALY SILT LOAM	SOMEWHAT EXCESSIVELY DRAINED	8-15	D
6	RmD	ROCKLAND, THORNDIKE MATERIA	EXCESSIVE DRAINAGE	15-25	-

NOTE:

HYDROLOGICAL GROUP FROM UNITED STATES DEPARTMENT OF AGRICULTURE NATURAL RESOURCES CONSERVATION SERVICE

FIGURE 5

N

0 125 250 500

SCALE IN FEET

CONTOURS INTERVAL 5 FEET

Prepared/Date: WJW 08/24/22
Checked/Date: MAP 08/24/22

WOLFDEN
Wolfden Mt Chase, LLC
Rezoning Petition
Location: T6 R6, Maine

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

PROPOSED WATERSHED CONDITIONS
Project 3617-19-7478
Figure 2

ATTACHMENT 1

SPRAY IRRIGATION SYSTEMS AND EQUIPMENT

FOR MORE INFORMATION:
https://www.kometirrigation.com/products/big-sprinkler/long-distance-sprinkler

SME
SEVEE & MAHER
ENGINEERS

WASTEWATER SPRAY IRRIGATION SYSTEMS

Nelson SR150 End Gun, Part Circle

SKU: SR150

|Brand:Nelson
$2177.32
Qty:

Description

Nelson SR150 End Gun, Part Circle is Valley, Lindsay/Zimmatic, Reinke, Pierce, Olson and Lockwood compatible.

Nelson SR150End Gun, Part Circle
150 Series Big Gun
The 150 Series is a perfect fit for solid set irrigation, traveler irrigation and dust suppression. Anodized, Powder Coated or Stainless Steel units are available, which makes this a great option for mining or wastewater applications.
The Nelson 150 Series Big Gun Part Circle (21 , 24 , 27 , 43 , or 15 -45 adjustable trajectory) sprinkler. Taper, Taper Ring, or Taper Bore Nozzles are available.

YUZUAK JET 35T 2" CLEAN/DIRTY WATER GEAR DRIVE RAIN GUN

Item Information

Condition:
Bulk savings:
2 or more for $399.97/eaBuy 2 or more for 399.97 each one

komet | INNOVATIVE IRRIGATION

komet | *Sprinklers*

Universal Sprinklers
for Solid-set Systems

Universale Regner
für ortsfeste Anlagen

THE KOMET ADVANTAGE:
INNOVATION WITH IMPACT

komet | *Sprinklers*

While conceiving new products, we must make sure that they meet the values in which we strongly believe: quality, reliability and a solid advantage to the customer. The quality of a product is a reflection of what the people who create, manufacture and market it, stand for. This approach to our work is very important to us.
Reliability is achieved by using the most suitable and functional materials for the intended purpose as well as implementing the strictest quality controls in every step throughout the manufacturing process of our products. The advantage to the customer is found in our efforts to offer products of highest quality and reliability combined with innovative features that we implement in all of them.
The Komet Universal Sprinklers represent our capacity to integrate innovative technology, performance and reliability.

Ein neues Produkt spiegelt immer auch die Menschen, die an seiner Entwicklung und Herstellung beteiligt waren. Und die Überzeugungen, für welche diese Menschen stehen. Für uns sind das Werte wie Qualität, absolute Zuverlässigkeit und ein immanenter Vorteil für den Anwender. Für diesen Anspruch stehen wir ein. Wir glauben an das, was wir tun und vor allem daran, wie wir es tun.
Unser Qualitätsanspruch beginnt mit der Verwendung des besten Materials. Innovatives Ingenieurswissen fließt in die Konzeption und Erprobung neuer Produkte ein. Der Fertigungsprozess schließlich ist von engmaschigen Qualitätskontrollen begleitet und sichert so die Solidität und Langlebigkeit unserer Produkte.
Die Komet Universal Regner sind das Ergebnis dieses perfekten Zusammenspiels von innovativer Technologie, Leistung und Zuverlässigkeit.

komet

Komet Philosophy

We are a family business. We inherited the values that are the foundation of our relationships from the company's founder Roland Drechsel, our father. For us, the order of the day is honesty, respect and trust. We believe that in today's world, rather than inventing new promises, it is far more important to respect, uphold and build on the customer promises that our company was founded on. In addition to providing the highest quality irrigation equipment, we want to make sure our customers have water application products that operate at the highest levels of efficiency and effectiveness, which in turn will help to limit the waste of our natural resources. We believe in building long lasting relationships with our customers. This gives us the opportunity to understand their needs, analyze how our products are meeting those needs, and to continue to improve. We believe in what we do, and are passionate about how we do it.

Komet Philosophie

Wir sind ein Familienunternehmen. Und als solches fühlen wir uns den Werten und der Tradition, für die schon unser Vater Roland Drechsel als Unternehmensgründer eingestanden ist, weiterhin verpflichtet. Ehrlichkeit, Respekt und Vertrauen stehen für uns an erster Stelle. Für uns sind sie – auch und gerade in Zeiten des globalisierten Business – die Basis erfolgreicher Geschäftsbeziehungen. Dass ein gegebenes Versprechen eingehalten wird, dass Vereinbarungen für uns verbindlich sind – das erscheint uns heute wichtiger denn je.
Als kompetenter und verlässlicher Partner helfen wir unseren Kunden, die optimale Beregnung zu gewährleisten – bei höchster Effizienz und maximaler Schonung der Ressourcen. Wir bemühen uns um langfristige und tragfähige Beziehungen zu unseren Kunden. Der intensive Austausch mit den Kunden und eine genaue Analyse der jeweiligen Rahmenbedingungen und Erfahrungen ermöglichen es uns, individuelle Lösungen anzubieten und bestehende Konzepte gegebenenfalls zu optimieren. Eine Vielzahl langjähriger Geschäftsbeziehungen spricht dafür, dass dieser Weg der richtige ist.

Operating Cost

VS

Purchase Cost

A trend has been developing in the past few years in which the purchase cost of a product has become the most important factor when purchasing equipment. This trend has changed the scope of many companies, moving to a short term market approach that focuses on the purchase cost instead of its real operating cost. We at Komet are firmly convinced that our customers generate greater benefit by optimizing the operating cost of the products they use.
Our priorities when developing products are to make sure that they are the most reliable, always operate at the optimum efficiency, are easy to use and minimize the waste of precious natural resources. It is surely less demanding and more economically feasible to concentrate a company's product lines with the short term market approach, but we believe that the credibility of our brand is based on the long term quality and performance of our products, and more importantly the return on investment our customers can realize.

Betriebs-kosten

VS

An-schaffungs-kosten

Zu den Marktgesetzen der jüngeren Vergangenheit zählt es, dass die Anschaffungskosten eines Produktes im Vordergrund stehen. Das ist verständlich, steht einer nachhaltigen Kosten-Nutzen-Analyse aber oft im Weg. Gerade bei langlebigen Produkten wie unseren, die viele Jahre im Einsatz sind, entscheiden in erster Linie die Betriebskosten und die Wartungs- und Reparaturfrequenzen über die tatsächliche Rentabilität. Wir von Komet sind davon überzeugt, dass durch die Optimierung der Betriebskosten der eigentliche Mehrwert für den Kunden entsteht. Deshalb konzentrieren wir uns bei der Entwicklung unserer Produkte auf hohe Zuverlässigkeit, einfache Bedienbarkeit und eine optimale, Ressourcen schonende Effizienz.
Etwas kostengünstigere Lösungen mögen auf den ersten Blick ökonomischer sein. Auf lange Sicht aber bewähren sich eben diese den individuellen Bedürfnissen angepassten Produkte, die sich durch hohe Qualität und Langlebigkeit und vergleichsweise geringe Betriebskosten auszeichnen. Auch dafür geben wir unser Wort.

komet

The Advantages /
Die Vorteile

1.

WATER DISTRIBUTION
WASSERVERTEILUNG

–

Water distribution is a very important aspect in irrigation and therefore it is important to develop devices with improved performance levels. The Komet Sprinkler product line offers great performance with an excellent water distribution uniformity even in lower pressure conditions.
Die Wasserverteilung ist ein sehr wichtiger Aspekt in der Beregnung und deshalb ist es wichtig, Geräte mit immer besseren Leistungen zu entwickeln. Die Komet Sprinkler Produktlinie bietet höchste Leistung mit ausgezeichneter Wasserverteilung und dies auch bei geringeren Betriebsdrücken.

2.

THROW
WURFWEITE

–

A longer throw results in a larger irrigated area and this factor is fundamental to the cost effectiveness of the irrigation. Due to the hydraulic design of the sprinklers the water reaches the nozzle with the least possible turbulences and pressure losses allowing for best throw values.
Die Wurfweite bestimmt die beregnete Fläche: je größer die Wurfweite desto größer die beregnete Fläche, was wiederum die Wirtschaftlichkeit steigert. Durch den optimal gestalteten Wasserdurchfluss der Komet Regner gelangt das Wasser mit den geringst möglichen Turbulenzen und Druckverlusten zur Düse und ermöglicht so große Wurfweiten.

3.

EFFICIENCY
EFFIZIENZ

–

All irrigation operations need to achieve a correct cost balance. The quality materials used manufacturing the Komet Sprinklers allow for a long service life making them highly efficient and cost effective in a long term vision.
Die Beregnung muss in einem vernünftigen Kostenrahmen stattfinden. Die in der Fertigung verwendete Qualität der Materialen lassen eine lange Lebensdauer der Komet Produkte erwarten was sich auf lange Sicht wirtschaftlich sehr positiv auswirkt.

4.

RELIABILITY
ZUVERLÄSSIGKEIT

–

For every grower the dependability of the products he is working with is most important when he is irrigating. To make sure to achieve this goal Komet has set high standards in selecting the materials and has adopted strict quality controls throughout the manufacturing process because in the field quality matters.
Für jeden Anwender ist die Zuverlässigkeit der benutzten Arbeitsmittel das Allerwichtigste. Aus diesem Grund hat Komet schon immer die besten Materialien und Produktionstechniken eingesetzt, da am Feld die Zuverlässigkeit der Arbeitsgeräte von entscheidener Bedeutung ist.

5.

ADAPTABILITY
ANPASSUNGSFÄHIGKEIT

–

To be an effective working tool it must be adaptable to the requirements of the different usages. Komet has developed a complete product line to best adapt to the requirements of the growers and the different irrigation system requirements while delivering always best possible performance.
Um effizient zu sein, muss sich jedes Arbeitsgerät den verschiedenen Anforderungen anpassen können. Komet hat eine komplette Serie von Produkten entwickelt, welche sich bestens den Anforderungen der Anwender und der unterschiedlichen Beregnungssysteme anpassen lässt und dabei immer bestmögliche Leistung erbringt.

komet

The Result /
Das Resultat

komet

komet | *Sprinkler 163*

Part and full circle model
Sektor- und Kreisregner

Thread 1 ½" FBSP
IG-Anschluss 1 ½" BSP

5 Nozzles / 5 Düsen
∅ 8 - 16 mm

Dimensions /
Abmessungen

458 mm

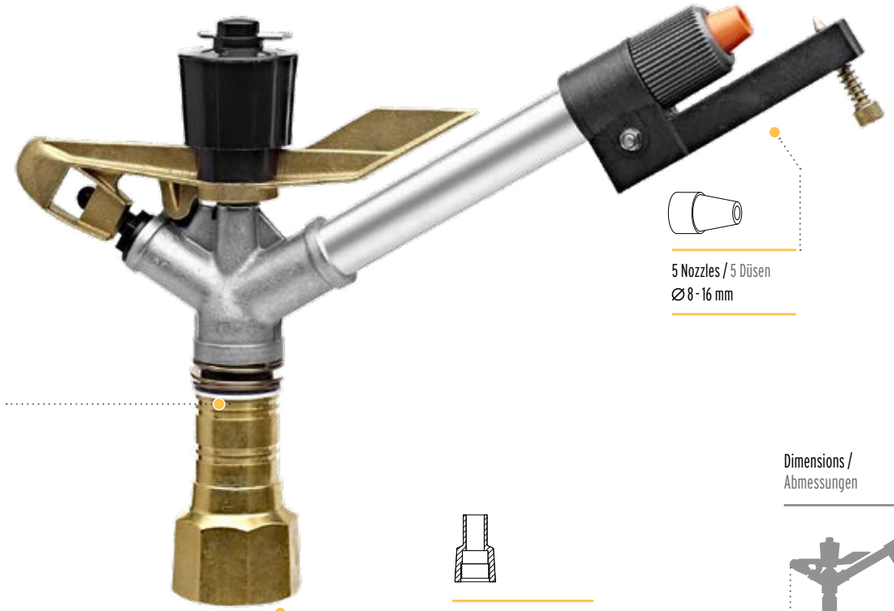
This medium volume sprinkler is suitable for versatile use in general field irrigation on solid-set and mechanized irrigation systems such as travellers. Changing from part circle to full circle operation is easy by adjusting the part circle stops. The Komet 163 shows good performance in windy conditions, and complements the full circle model Komet 162 where irrigation of adjacent fields is not allowed. Long wear life, high performance, proven design and maintenance free operation are among other its outstanding features.

Universal Sektor- und Kreisregner für die Mittelstarkberegnung. Die Anwendung erschließt den gesamten Bereich der extensiven landwirtschaftlichen Kulturen. Der Komet 163 findet auch Einsatz auf Beregnungsmaschinen. Er ist leistungsstark, wartungsfrei, von robuster Bauart und kann schnell von Sektor- auf Kreisbetrieb umgestellt werden.

Nozzle Düse	Pressure Druck	Throw Wurfweite	Flow Durchfluss		Surface Fläche	Precipitation rate Regenhöhe	▲ Set-up / Verband			■ Set-up / Verband		
							Spacing Regnerabstand	Surface Fläche	Precipitation rate Regenhöhe	Spacing Regnerabstand	Surface Fläche	Precipitation rate Regenhöhe
mm	bar	m	m³/h	l/sec	m²	mm/h	max. m	m²	mm/h	max. m	m²	mm/h
8	2	19,5	5,377	1,494	1158	4,64	28/33	942	5,71	27	729	7,38
	3	22,0	6,585	1,829	1466	4,49	32/37	1184	5,56	30	900	7,32
	4	24,0	7,604	2,112	1779	4,27	32/41	1454	5,23	34	1156	6,58
	5	25,5	8,501	2,361	2059	4,13	38/44	1675	5,08	36	1296	6,56
10	2	21,5	6,855	1,904	1385	4,95	31/36	1122	6,11	30	900	7,62
	3	24,0	8,396	2,332	1750	4,80	35/41	1554	5,40	33	1089	7,71
	4	26,5	9,695	2,693	2124	4,56	39/45	1752	5,53	37	1369	7,08
	5	28,5	10,839	3,011	2463	4,40	42/48	1994	5,44	39	1521	7,13
12	2	23,0	8,771	2,436	1576	5,57	34/39	1315	6,67	32	1024	8,57
	3	26,0	10,742	2,984	2027	5,30	38/44	1675	6,41	36	1296	8,29
	4	28,5	12,404	3,445	2463	5,04	42/48	1994	6,22	39	1521	8,15
	5	30,5	13,868	3,852	2865	4,84	45/52	2340	5,93	43	1849	7,50
	6	32,5	15,191	4,220	3217	4,72	48/55	2617	5,80	45	2025	7,50
14	2	24,0	11,045	3,068	1720	6,42	35/40	1358	8,13	33	1089	10,14
	3	27,5	13,527	3,757	2290	5,91	41/47	1911	7,08	38	1444	9,37
	4	30,0	15,619	4,339	2715	5,75	44/51	2250	6,94	41	1681	9,29
	5	32,0	17,463	4,851	3097	5,64	47/54	2524	6,92	44	1936	9,02
	6	33,5	19,130	5,314	3421	5,59	49/57	2811	6,81	47	2209	8,66
16	2	24,5	13,083	3,634	1809	7,23	35/41	1554	8,42	34	1156	11,32
	3	28,5	16,024	4,451	2463	6,51	42/48	1994	8,04	39	1521	10,53
	4	31,5	18,503	5,140	3019	6,13	47/54	2524	7,33	44	1936	9,56
	5	33,5	20,686	5,746	3380	6,12	49/57	2811	7,36	46	2116	9,78
	6	34,5	22,661	6,295	3674	6,17	51/59	3012	7,52	48	2304	9,84

N.B.: The performance data were obtained under ideal testing conditions and may be adversely affected by wind and other factors. Pressure refers to pressure at nozzle. Consider wind speed and wind direction when designing an irrigation system. Reduce the spacing for the selected sprinkler set-up accordingly. Die in der Tabelle angegebenen Daten beziehen sich auf Windstille und können durch Windeinfluss oder andere Faktoren negativ beeinflusst werden. Der angegebene Betriebsdruck bezieht sich auf den Druck an der Düse. Bei Auslegung von Beregnungsanlagen sind Windrichtung und Windgeschwindigkeit zu berücksichtigen. Die Regnerabstände sind im Verband entsprechend zu verringern.

komet | *Sprinkler 162*

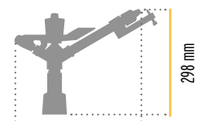


Full circle model
Kreisregner

Thread 1 ½" FBSP
IG-Anschluss 1 ½" BSP

5 Nozzles / 5 Düsen
∅ 8 - 16 mm

Dimensions /
Abmessungen



405 mm

The Komet 162 is a medium volume sprinkler with full circle operation and the same performance and features as the Komet 163. Designed for use in general field irrigation mainly in extensive solid-set and moveable irrigation systems. Long wear life, high performance, proven design and maintenance free operation are among other its outstanding features.

Der Komet 162 ist ein Universal Kreisregner für die Mittelstarkberegnung. Die Anwendung erschließt das ganze Gebiet der extensiven landwirtschaftlichen Kulturen, insbesondere findet der Komet 162 weitgehend Einsatz in ausgedehnten ortsfesten Anlagen. Der Komet 162 ist leistungsstark, wartungsfrei und von robuster Bauart.

Nozzle Düse	Pressure Druck	Throw Wurfweite	Flow Durchfluss		Surface Fläche	Precipitation rate Regenhöhe	▲ Set-up / Verband			■ Set-up / Verband		
							Spacing Regnerabstand	Surface Fläche	Precipitation rate Regenhöhe	Spacing Regnerabstand	Surface Fläche	Precipitation rate Regenhöhe
mm	bar	m	m³/h	l/sec	m²	mm/h	max. m	m²	mm/h	max. m	m²	mm/h
8	2	19,5	6,293	1,748	1158	5,43	28/33	942	6,68	27	729	8,63
	3	22,0	7,708	2,141	1466	5,26	32/37	1184	6,51	30	900	8,56
	4	24,0	8,900	2,472	1779	5,00	32/41	1454	6,12	34	1156	7,70
	5	25,5	9,950	2,764	2059	4,83	38/44	1675	5,94	36	1296	7,68
10	2	21,5	8,079	2,244	1385	5,83	31/36	1122	7,20	30	900	8,98
	3	24,0	9,895	2,749	1750	5,65	35/41	1454	6,81	33	1089	9,09
	4	26,5	11,425	3,174	2124	5,38	39/45	1752	6,52	37	1369	8,35
	5	28,5	12,774	3,548	2463	5,19	42/48	1994	6,41	39	1521	8,40
12	2	23,0	9,981	2,773	1576	6,33	34/39	1315	7,59	32	1024	9,75
	3	26,0	12,225	3,396	2027	6,03	38/44	1675	7,30	36	1296	9,43
	4	28,5	14,116	3,921	2463	5,73	42/48	1994	7,08	39	1521	9,28
	5	30,5	15,782	4,384	2865	5,51	45/52	2340	6,74	43	1849	8,54
	6	32,5	17,288	4,802	3217	5,37	48/55	2617	6,61	45	2025	8,54
14	2	24,0	12,354	3,432	1720	7,18	35/40	1385	8,92	33	1089	11,34
	3	27,5	15,130	4,203	2290	6,61	41/47	1911	7,92	38	1444	10,48
	4	30,0	17,471	4,853	2715	6,44	44/51	2250	7,76	41	1681	10,39
	5	32,0	19,533	5,426	3097	6,31	47/54	2524	7,74	44	1936	10,09
	6	33,5	21,398	5,944	3421	6,25	49/57	2811	7,61	47	2209	9,69
16	2	24,5	14,483	4,023	1809	8,01	35/41	1454	9,96	34	1156	12,53
	3	28,5	17,738	4,927	2463	7,20	42/48	1954	9,08	39	1521	11,66
	4	31,5	20,482	5,689	3019	6,78	47/54	2524	8,11	44	1936	10,58
	5	33,5	22,899	6,361	3380	6,77	49/57	2811	8,15	46	2116	10,82
	6	34,5	25,085	6,968	3674	6,83	51/59	3012	8,33	48	2304	10,89

N.B.: The performance data were obtained under ideal testing conditions and may be adversely affected by wind and other factors. Pressure refers to pressure at nozzle. Consider wind speed and wind direction when designing an irrigation system. Reduce the spacing for the selected sprinkler set-up accordingly. Die in der Tabelle angegebenen Daten beziehen sich auf Windstille und können durch Windeinfluss oder andere Faktoren negativ beeinflusst werden. Der angegebene Betriebsdruck bezieht sich auf den Druck an der Düse. Bei Auslegung von Beregnungsanlagen sind Windrichtung und Windgeschwindigkeit zu berücksichtigen. Die Regnerabstände sind im Verband entsprechend zu verringern.

komet | *Sprinkler R20*

The Komet R20 is a medium / low volume sprinkler and is suitable for versatile use in general field irrigation on solid-set and mechanized irrigation systems such as travellers. The Komet R20 shows good performance also in medium to low pressures conditions. Long wear life, high performance, proven design and maintenance free operation are among other its outstanding features.

Der Komet R20 ist ein Universal Sektor- und Kreisregner für die Mittelstark- und Schwachberegnung. Die Anwendung erschließt den gesamten Bereich der extensiven landwirtschaftlichen Kulturen. Er wird auch auf Beregnungsmaschinen eingesetzt. Er ist leistungsstark, wartungsfrei, von robuster Bauart und kann schnell von Sektor- auf Kreisbetrieb umgestellt werden.

Nozzle Düse	Pressure Druck	Throw Wurf-weite	Flow Durchfluss		Surface Fläche	Precipitation rate Regenhöhe	▲ Set-up / Verband			■ Set-up / Verband		
							Spacing Regner-abstand	Surface Fläche	Precipitation rate Regenhöhe	Spacing Regner-abstand	Surface Fläche	Precipitation rate Regenhöhe
mm	bar	m	m3/h	l/sec	m²	mm/h	max. m	m²	mm/h	max. m	m²	mm/h
6	2,5	16,5	2,09	0,582	855	2,44	24/28	678	3,08	23	529	3,95
	3,5	19,0	2,48	0,689	1133	2,19	28/33	942	2,63	26	676	3,67
	4,5	21,0	2,81	0,781	1385	2,03	31/36	1121	2,51	29	841	3,34
7	2,0	16,5	2,55	0,709	855	2,98	24/28	678	3,76	23	529	4,82
	3,0	19,0	3,12	0,868	1133	2,75	28/33	942	3,31	26	676	4,61
	4,0	21,0	3,61	1,002	1385	2,60	31/36	1121	3,22	29	841	4,29
8	2,0	18,0	3,33	0,926	1017	3,27	26/31	931	4,01	25	625	5,33
	3,0	21,0	4,08	1,134	1385	2,94	31/36	1121	3,64	29	841	4,85
	4,0	22,5	4,72	1,310	1590	2,97	33/39	1315	3,59	31	941	4,91
10	2,0	19,5	5,21	1,447	1194	4,36	28/33	942	5,53	27	729	7,15
	3,0	22,0	6,38	1,772	1520	4,20	33/38	1249	5,11	31	961	6,64
	4,0	24,0	7,36	2,046	1808	4,07	35/41	1454	5,06	34	1156	6,36
12	2,5	22,0	8,38	2,329	1520	5,51	33/38	1249	6,71	31	961	8,72
	3,5	24,0	9,92	2,756	1808	5,48	35/41	1454	6,42	34	1156	8,58
	4,5	26,0	11,25	3,125	2122	5,30	39/45	1751	6,42	36	1296	8,68

N.B.: The performance data were obtained under ideal testing conditions and may be adversely affected by wind and other factors. Pressure refers to pressure at nozzle. Consider wind speed and wind direction when designing an irrigation system. Reduce the spacing for the selected sprinkler set-up accordingly. Die in der Tabelle angegebenen Daten beziehen sich auf Windstille und können durch Windeinfluss oder andere Faktoren negativ beeinflusst werden. Der angegebene Betriebsdruck bezieht sich auf den Druck an der Düse. Bei Auslegung von Beregnungsanlagen sind Windrichtung und Windgeschwindigkeit zu berücksichtigen. Die Regnerabstände sind im Verband entsprechend zu verringern.

komet | *Sprinkler R8*

The Komet R8 is a medium / low volume sprinkler and is suitable for versatile use in general field irrigation on solid-set systems. The Komet R8 shows good performance also in medium to low pressures conditions. Long wear life, high performance, proven design and maintenance free operation are among other its outstanding features.

Der Komet R8 ist ein Universal Kreisregner für die Mittelstark- und Schwachberegnung. Die Anwendung erschließt das ganze Gebiet der extensiven landwirtschaftlichen Kulturen, insbesondere findet der Komet R8 weitgehend Einsatz in ausgedehnten ortsfesten Anlagen. Der Komet R8 ist leistungsstark, wartungsfrei und von robuster Bauart.

Nozzle Düse	Pressure Druck	Throw Wurf-weite	Flow Durchfluss		Surface Fläche	Precipitation rate Regenhöhe	▲ Set-up / Verband			■ Set-up / Verband		
							Spacing Regner-abstand	Surface Fläche	Precipitation rate Regenhöhe	Spacing Regner-abstand	Surface Fläche	Precipitation rate Regenhöhe
mm	bar	m	m3/h	l/sec	m²	mm/h	max. m	m²	mm/h	max. m	m²	mm/h
6	1,5	14,0	1,62	0,451	615	2,63	20/24	498	3,25	19	361	4,49
	2,5	16,5	2,09	0,582	855	2,44	24/28	678	3,08	23	529	3,95
	3,5	19,0	2,48	0,689	1133	2,19	28/33	942	2,63	26	676	3,67
	4,5	21,0	2,81	0,781	1385	2,03	31/36	1121	2,51	29	841	3,34
7	2,0	16,5	2,55	0,709	855	2,98	24/28	678	3,76	23	529	4,82
	3,0	19,0	3,12	0,868	1133	2,75	28/33	942	3,31	26	676	4,61
	4,0	21,0	3,61	1,002	1385	2,60	31/36	1121	3,22	29	841	4,29
8	2,0	18,0	3,33	0,926	1017	3,27	26/31	931	4,01	25	625	5,33
	3,0	21,0	4,08	1,134	1385	2,94	31/36	1121	3,64	29	841	4,85
	4,0	22,5	4,72	1,310	1590	2,97	33/39	1315	3,59	31	941	4,91
10	2,0	19,5	5,21	1,447	1194	4,36	28/33	942	5,53	27	729	7,15
	3,0	22,0	6,38	1,772	1520	4,20	33/38	1249	5,11	31	961	6,64
	4,0	24,0	7,36	2,046	1808	4,07	35/41	1454	5,06	34	1156	6,36
12	2,5	22,0	8,38	2,329	1520	5,51	33/38	1249	6,71	31	961	8,72
	3,5	24,0	9,92	2,756	1808	5,48	35/41	1454	6,42	34	1156	8,58
	4,5	26,0	11,25	3,125	2122	5,30	39/45	1751	6,42	36	1296	8,68

N.B.: The performance data were obtained under ideal testing conditions and may be adversely affected by wind and other factors. Pressure refers to pressure at nozzle. Consider wind speed and wind direction when designing an irrigation system. Reduce the spacing for the selected sprinkler set-up accordingly. Die in der Tabelle angegebenen Daten beziehen sich auf Windstille und können durch Windeinfluss oder andere Faktoren negativ beeinflusst werden. Der angegebene Betriebsdruck bezieht sich auf den Druck an der Düse. Bei Auslegung von Beregnungsanlagen sind Windrichtung und Windgeschwindigkeit zu berücksichtigen. Die Regnerabstände sind im Verband entsprechend zu verringern.

komet | *Sprinkler F41 - F41/2 - F43*

komet | *Sprinkler F41*

The Komet F41, single jet and full circle sprinkler, is suitable for versatile use on solid-set irrigation systems. The Komet F41 shows good performance also in medium to low pressures conditions and an outstanding uniformity in the water distribution. Long wear life, high performance, proven design and maintenance free operation are among other its outstanding features.

Der Komet F41, Einstrahl-Kreisregner für die Schwachberegnung findet weitgehend Einsatz in ortsfesten Anlagen. Ausgezeichnete Funktion und Wasserverteilung auch bei Niederdruck. Der Komet F41 ist leistungsstark, wartungsfrei und von robuster Bauart.

komet | *Sprinkler F41/2*

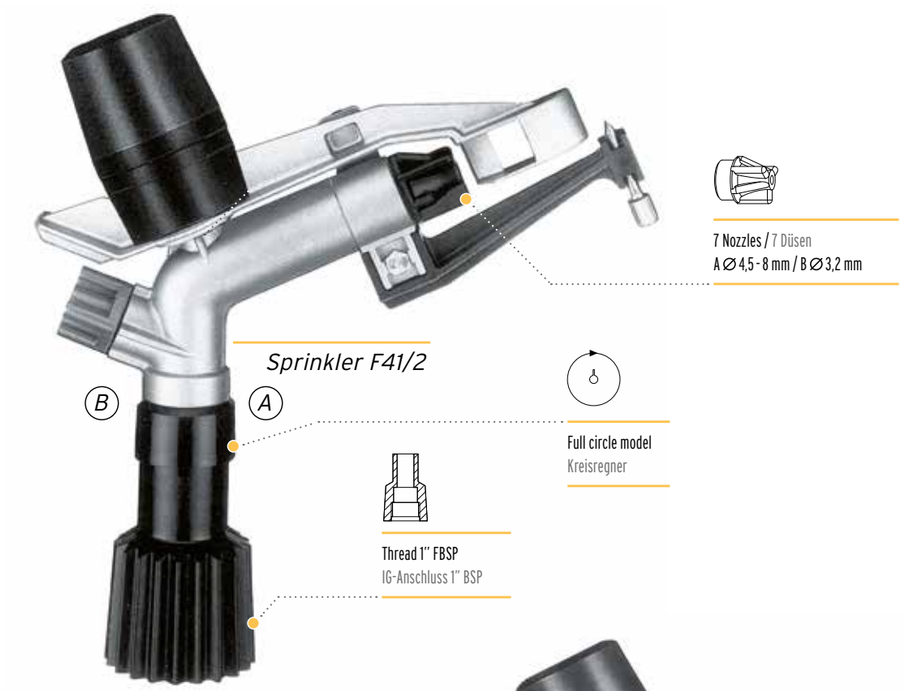
The Komet F41/2, double jet and full circle sprinkler, is suitable for versatile use on solid-set irrigation systems. The Komet F41/2 shows good performance also in medium to low pressures conditions and an outstanding uniformity in the water distribution. Long wear life, high performance, proven design and maintenance free operation are among other its outstanding features.

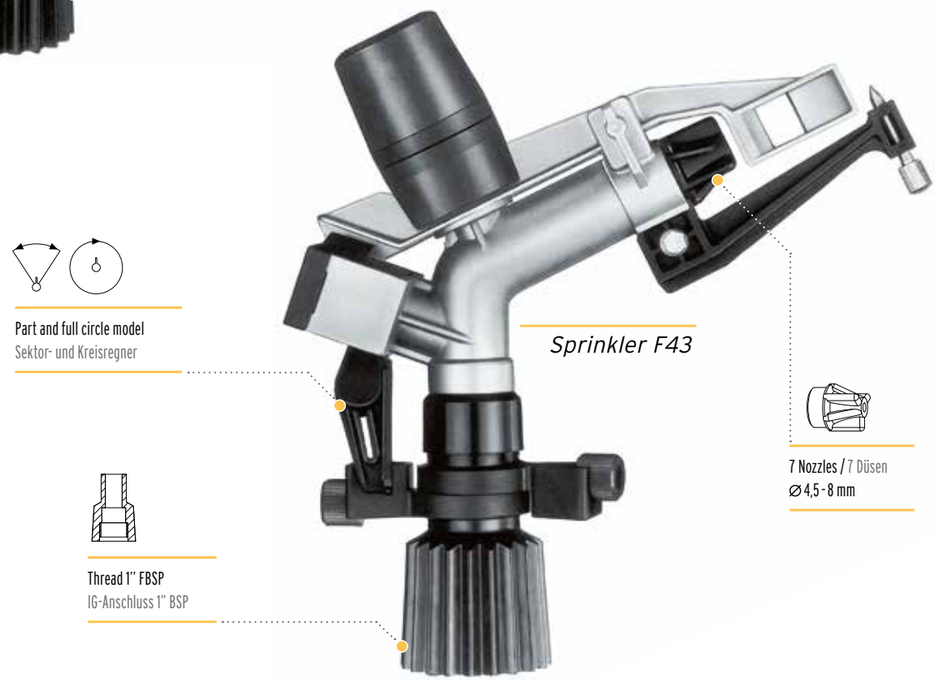
Der Komet F41/2, Zweistrahl-Kreisregner für die Schwachberegnung findet weitgehend Einsatz in ortsfesten Anlagen. Ausgezeichnete Funktion und Wasserverteilung auch bei Niederdruck. Der Komet F41/2 ist leistungsstark, wartungsfrei und von robuster Bauart.

komet | *Sprinkler F43*

The Komet F43, part and full circle sprinkler is suitable for versatile use on solid-set irrigation systems. The Komet F43 shows good performance also in medium to low pressures conditions Changing from part circle to full circle operation is easy by adjusting the part circle stops. Long wear life, high performance, proven design and maintenance free operation are among other its outstanding features.

Der Komet F43, Kreis- und Sektorregner für die Schwachberegnung findet weitgehend Einsatz in ortsfesten Anlagen. Ausgezeichnete Funktion und Wasserverteilung auch bei Niederdruck. Der Komet F43 ist leistungsstark, wartungsfrei und von robuster Bauart und kann schnell von Sektor- auf Kreisbetrieb umgestellt werden.





komet | *Sprinkler F41 -F43*

Dimensions / Abmessungen

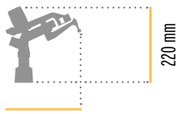
Dimensions / Abmessungen

Nozzle Düse mm	Pressure Druck bar	Throw Wurf- weite m	Flow / Durchfluss m3/h	 l/sec	Surface Fläche m²	Precipitation rate Regenhöhe mm/h	▲ Set-up / Verband Spacing Regnerabstand max. m	 Surface Fläche m²	 Precipitation rate Regenhöhe mm/h	■ Set-up / Verband Spacing Regnerabstand max. m	 Surface Fläche m²	 Precipitation rate Regenhöhe mm/h
	2,0	13,8	1,05	0,29	598	1,76	20,7/23,9	494	2,12	19,5	380	2,76
	2,5	14,8	1,18	0,33	688	1,71	22,2/25,6	569	2,07	20,9	438	2,69
4,5	3,0	15,7	1,29	0,36	774	1,67	23,5/27,2	640	2,01	22,2	493	2,62
	3,5	16,5	1,40	0,39	855	1,64	24,7/28,6	707	1,98	23,3	544	2,57
	4,5	17,8	1,58	0,44	995	1,59	26,7/30,8	823	1,92	25,1	633	2,49
	2,0	14,2	1,30	0,36	633	2,05	21,3/24,6	524	2,48	20,1	403	3,22
	2,5	15,3	1,46	0,40	735	1,99	22,9/26,5	608	2,40	21,6	468	3,12
5,0	3,0	16,2	1,59	0,44	824	1,93	24,3/28,0	681	2,33	22,9	524	3,03
	3,5	17,0	1,72	0,48	908	1,89	25,5/29,4	750	2,29	24,0	578	2,97
	4,5	18,4	1,95	0,54	1063	1,83	27,6/31,8	879	2,22	26,0	677	2,88
	2,0	14,7	1,58	0,44	678	2,33	22,0/25,4	561	2,81	20,8	432	3,66
	2,5	15,7	1,76	0,49	774	2,27	23,5/27,2	640	2,75	22,2	492	3,57
5,5	3,0	16,7	1,93	0,54	876	2,20	25,0/28,9	724	2,66	23,6	557	3,46
	3,5	17,5	2,08	0,58	962	2,16	26,2/30,3	795	2,61	24,7	612	3,40
	4,5	19,0	2,36	0,66	1134	2,08	28,5/32,9	938	2,52	26,8	722	3,27
	2,0	15,0	1,88	0,52	706	2,66	22,5/26,0	584	3,22	21,2	449	4,18
	2,5	16,2	2,10	0,58	824	2,55	24,3/28,0	682	3,08	22,9	524	4,00
6,0	3,0	17,1	2,30	0,64	918	2,50	25,6/29,6	759	3,03	24,1	584	3,93
	3,5	18,0	2,48	0,69	1017	2,44	27,0/31,1	841	2,95	25,4	647	3,83
	4,5	19,5	2,81	0,78	1194	2,35	29,2/33,7	988	2,84	27,6	760	3,70
	2,0	15,4	2,20	0,61	745	2,95	23,1/26,6	616	3,57	21,8	474	4,64
	2,5	16,5	2,46	0,68	855	2,88	24,7/28,5	707	3,48	23,3	544	4,52
6,5	3,0	17,5	2,70	0,75	962	2,81	26,2/30,3	795	3,39	24,7	612	4,41
	3,5	18,4	2,91	0,81	1063	2,74	27,6/31,8	879	3,31	26,0	677	4,30
	4,5	20,0	3,30	0,92	1256	2,63	30,0/34,6	1039	3,18	28,2	799	4,13
	2,0	15,7	2,55	0,71	774	3,29	23,5/27,2	640	3,98	22,2	493	5,17
	2,5	16,9	2,85	0,79	897	3,18	25,3/29,2	742	3,84	23,9	571	4,99
7,0	3,0	17,9	3,13	0,87	1006	3,11	26,8/31,0	832	3,76	25,3	640	4,88
	3,5	18,8	3,38	0,94	1110	3,04	28,2/32,5	918	3,68	26,6	707	4,78
	4,5	20,4	3,83	1,06	1307	2,93	30,6/35,3	1081	3,54	28,8	832	4,60
	2,0	16,3	3,33	0,93	834	3,99	24,4/28,2	690	4,82	23,0	531	6,27
	2,5	17,5	3,73	1,04	962	3,88	26,2/30,3	795	4,69	24,7	612	6,09
8,0	3,0	18,6	4,08	1,13	1087	3,75	27,9/32,2	899	4,54	26,3	692	5,90
	3,5	19,5	4,41	1,23	1194	3,69	29,2/33,7	987	4,46	27,5	760	5,80
	4,5	21,2	5,00	1,39	1411	3,54	31,8/36,7	1167	4,28	30,0	900	5,56

N.B.: The performance data were obtained under ideal testing conditions and may be adversely affected by wind and other factors. Pressure refers to pressure at nozzle. Consider wind speed and wind direction when designing an irrigation system. Reduce the spacing for the selected sprinkler set-up accordingly. Die in der Tabelle angegebenen Daten beziehen sich auf Windstille und können durch Windeinfluss oder andere Faktoren negativ beeinflusst werden. Der angegebene Betriebsdruck bezieht sich auf den Druck an der Düse. Bei Auslegung von Beregnungsanlagen sind Windrichtung und Windgeschwindigkeit zu berücksichtigen. Die Regnerabstände sind im Verband entsprechend zu verringern.

komet | *Sprinkler F41/2*

Dimensions / Abmessungen



Nozzle Düse A / B mm	Pressure Druck bar	Throw Wurf- weite m	Flow / Durchfluss m3/h	 l/sec	Surface Fläche m²	Precipitation rate Regenhöhe mm/h	▲ Set-up / Verband Spacing Regnerabstand max. m	 Surface Fläche m²	 Precipitation rate Regenhöhe mm/h	■ Set-up / Verband Spacing Regnerabstand max. m	 Surface Fläche m²	 Precipitation rate Regenhöhe mm/h
	2,0	13,8	1,62	0,45	598	2,71	20,7/23,9	495	3,27	19,5	381	4,25
	2,5	14,8	1,81	0,50	688	2,63	22,2/25,6	569	3,18	20,9	438	4,13
4,5 x 3,2	3,0	15,7	1,99	0,55	774	2,57	23,5/27,2	640	3,11	22,2	493	4,04
	3,5	16,5	2,14	0,60	855	2,50	24,7/28,6	707	3,03	23,3	544	3,93
	4,5	17,8	2,43	0,68	995	2,44	26,7/30,8	823	2,95	25,1	633	3,83
	2,0	14,2	1,84	0,51	633	2,90	21,3/24,6	524	3,51	20,1	404	4,56
	2,5	15,3	2,05	0,57	735	2,79	22,9/26,5	608	3,37	21,6	468	4,38
5,0 x 3,2	3,0	16,2	2,25	0,62	824	2,73	24,3/28,0	682	3,30	22,9	525	4,29
	3,5	17,0	2,43	0,67	908	2,68	25,5/29,4	750	3,24	24,0	578	4,20
	4,5	18,4	2,75	0,76	1063	2,59	27,6/31,8	879	3,13	26,0	677	4,06
	2,0	14,7	2,11	0,59	678	3,11	22,0/25,4	561	3,76	20,8	433	4,88
	2,5	15,7	2,36	0,65	774	3,05	23,5/27,2	640	3,69	22,2	493	4,79
5,5 x 3,2	3,0	16,7	2,58	0,72	876	2,94	25,0/28,9	724	3,56	23,6	558	4,63
	3,5	17,5	2,79	0,77	962	2,90	26,2/30,3	795	3,51	24,7	612	4,56
	4,5	19,0	3,16	0,88	1134	2,79	28,5/32,9	938	3,37	25,8	722	4,38
	2,0	15,0	2,41	0,67	706	3,41	22,5/26,0	584	4,12	21,2	450	5,36
	2,5	16,2	2,69	0,75	824	3,26	24,3/28,0	682	3,95	22,9	525	5,13
6,0 x 3,2	3,0	17,1	2,95	0,82	918	3,21	25,6/29,6	759	3,88	24,1	584	5,04
	3,5	18,0	3,19	0,89	1017	3,13	27,0/31,1	841	3,79	25,4	648	4,92
	4,5	19,5	3,61	1,00	1194	3,02	29,2/33,7	988	3,65	27,6	760	4,75
	2,0	15,4	2,73	0,76	745	3,66	23,1/26,6	616	4,43	21,8	474	5,76
	2,5	16,5	3,06	0,85	855	3,58	24,7/28,5	707	4,33	23,3	544	5,62
6,5 x 3,2	3,0	17,5	3,35	0,93	962	3,48	26,2/30,3	795	4,21	24,7	612	5,47
	3,5	18,4	3,62	1,00	1063	3,40	27,6/31,8	879	4,12	26,0	677	5,35
	4,5	20,0	4,10	1,14	1256	3,26	30,0/34,6	1039	3,95	28,3	800	5,13
	2,0	15,7	3,09	0,86	774	3,99	23,5/27,2	640	4,83	22,2	492	6,27
	2,5	16,9	3,45	0,96	897	3,84	25,3/29,2	742	4,65	23,9	571	6,04
7,0 x 3,2	3,0	17,9	3,78	1,05	1006	3,76	26,8/31,0	832	4,54	25,3	641	5,90
	3,5	18,8	4,08	1,13	1110	3,67	28,2/32,5	918	4,44	26,6	707	5,77
	4,5	20,4	4,63	1,29	1307	3,54	30,6/35,3	1081	4,28	28,8	832	5,56
	2,0	16,3	3,87	1,07	834	4,64	24,4/28,2	690	5,61	23,0	530	7,28
	2,5	17,5	4,32	1,20	962	4,49	26,2/30,3	795	5,43	24,7	612	7,05
8,0 x 3,2	3,0	18,6	4,74	1,32	1087	4,36	27,9/32,2	899	5,27	26,3	692	6,85
	3,5	19,5	5,12	1,42	1194	4,29	29,2/33,7	987	5,18	27,5	760	6,73
	4,5	21,2	5,80	1,61	1411	4,11	31,8/36,7	1167	4,97	29,9	899	6,45

N.B.: The performance data were obtained under ideal testing conditions and may be adversely affected by wind and other factors. Pressure refers to pressure at nozzle. Consider wind speed and wind direction when designing an irrigation system. Reduce the spacing for the selected sprinkler set-up accordingly. Die in der Tabelle angegebenen Daten beziehen sich auf Windstille und können durch Windeinfluss oder andere Faktoren negativ beeinflusst werden. Der angegebene Betriebsdruck bezieht sich auf den Druck an der Düse. Bei Auslegung von Beregnungsanlagen sind Windrichtung und Windgeschwindigkeit zu berücksichtigen. Die Regnerabstände sind im Verband entsprechend zu verringern.

Charts and hints

1) Average daily watering requirements

- cold and humid climate	2,5 mm = l/sec per hectare 0,29
- cold and dry climate	3,8 mm = l/sec per hectare 0,44
- moderate and humid climate	3,8 mm = l/sec per hectare 0,44
- moderate and dry climate	5,1 mm = l/sec per hectare 0,59
- hot and humid climate	5,1 mm = l/sec per hectare 0,59
- hot and dry climate	7,6 mm = l/sec per hectare 0,88

2) Intake rates of various soils per hour (level ground)

- sand	19-25 mm/hour
- loamy sand	12-19 mm/hour
- sandy loam	up to 12 mm/hour
- loam	up to 10 mm/hour
- silt	up to 8 mm/hour

3) Slope precipitation table

Grade of slope	*Precipitation rate reduction*
0 - 5%	0%
6 - 8%	20%
9 - 12%	40%
13 - 20%	60%
over 20% 75%	

4) Wind and sprinkler spacing

Wind is a very crucial factor in irrigation and wind speed and direction have to be taken into account when determining the spacing of sprinklers. Throws in the charts are based on conditions assuming the absence of wind, which is the exception in real life. Maximum spacings between sprinklers and between laterals have to be reduced according to wind speed.

It is suggested for example:

Average wind speed		Reduction factor (throw)	SETUP ■		SETUP ▲	
km/h	m/sec		spacing between sprinklers	spacing between laterals	spacing between sprinklers	spacing between laterals
0 - 3	0,85	0,90	1.25 R*	1.30 R	1.60 R	1.35 R
3 - 7	0,85 - 2	0,85	1.20 R	1.20 R	1.50 R	1.30 R
7 - 10	2 -3	0,80	1.10 R	1.20 R	1.40 R	1.20 R
over 10	over 3	0,70	1.00 R	1.10 R	1.20 R	1.10 R

* R (Radius) = distance of throw

5) Determination of the required water supply

$q = qs \times F \frac{24}{h}$

where:
q = Water requirements in l/sec
qs = specific water requirements in l/sec/ha (as under pt. 1)
F = Area to be irrigated in ha
h = hours of irrigation per day

6) Selection of set-up and sprinkler spacing

a) Square or rectangular set-up is preferred for movable systems.
In the absence of wind the maximum theoretical sprinkler spacing can be calculated as follows:
$L = \sqrt{2}\,R$
where:
L = Length of square in m = sprinkler spacing
R = Radius = distance of throw in m can be obtained from the charts.
IMPORTANT: reduce spacing according to average prevailing wind speed (as under pt. 4)

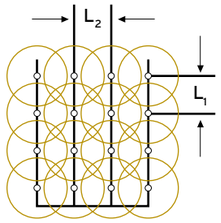
b) Triangular setup is preferred in solid set systems and for frost protection systems.
In the absence of wind maximum spacing can be calculated as follows:
Between sprinklers $L_1 = \sqrt{3}\,R$
Between laterals $L_2 = 1{,}5\,R$
The irrigated area F covered by any chosen setup is calculated as follows:
$F = L_1 \times L_2$

IMPORTANT: reduce spacing according to average prevailing wind speed (as under pt. 4)

7) Precipitation

Precipitation is the amount of water applied evenly to a certain area within 1 hour measured in mm/hour and is calculated as follows:

$i = \frac{q \times 1000}{L_1 \times L_2}$



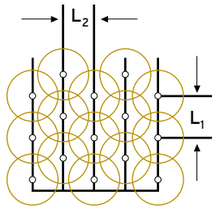
where:
q = discharge of sprinkler in m^3/h
i = precipitation in mm/h
This formula applies to any setup ▲ and ■

IMPORTANT: i should not be higher than the intake rate of the prevailing soil corrected for any existing slope (see point 2 and 3).

8) Running time of irrigation equipment

Running time necessary to apply the desired precipitation rate is calculated as follows:

$T = \frac{H}{i}$



where:
T = running time in hours
H = desired precipitation rate in mm
i = precipitation rate in mm/h

An easy evaluation of the irrigated area and the precipitation rate as a result of reduced spacings due to wind can be done using the factors in this table. The performance data of the sprinklers refer to no wind condition.

wind speed km/h	% reduction of ▲ and ■ spacing	% reduction of covered area	% increase precipitation rate
0 - 3	- 8%	- 16%	+ 16%
3 - 7	- 14%	- 28%	+ 28%
7 - 10	- 20%	- 40%	+ 40%
over 10	- 30%	- 60%	+ 60%

NOTE: Information given on this page is based on average conditions and given for the purpose of orientation and to show examples of the most common variations of conditions and their qualitative influence on irrigation. Any data given are deemed reliable but not guaranteed.

Technische Hinweise

1) Täglicher Wasserbedarf, Durchnittswerte

- kaltes und feuchtes Klima	2,5 mm = l/s pro ha 0,29
- kaltes und trockenes Klima	3,8 mm = l/s pro ha 0,44
- gemäßigtes und feuchtes Klima	3,8 mm = l/s pro ha 0,44
- gemäßigtes und trockenes Klima	5,1 mm = l/s pro ha 0,59
- warmes und feuchtes Klima	5,1 mm = l/s pro ha 0,59
- warmes und trockenes Klima	7,6 mm = l/s pro ha 0,88

2) Wasseraufnahmevermögen des Bodens

- Sand	19-25 mm/h
- lehmiger Sand	12-19 mm/h
- sandiger Lehm	bis 12 mm/h
- Lehm	bis 10 mm/h
- Ton	bis 8 mm/h

3) Einfluss der Hangneigung

Hangneigung	*Verminderung der Wasseraufnahmefähigkeit des Bodens*
0 - 5%	0%
6 - 8%	20%
9 - 12%	40%
13 - 20%	60%
über 20% 75%	

4) Windeinfluss

Wind ist bekanntlich der größte Störfaktor in der Beregnung, er ist durch zweckmäßige Reduzierung der Regnerabstände im Verband unbedingt zu berücksichtigen. Absolute Windstille wie sie den Tabellen zu Grunde liegt,
ist ein Ausnahmefall, es ist deshalb bei der Auslegung jeder Anlage der Einfluss des Windes mit seiner Richtung und Geschwindigkeit unbedingt entsprechend zu berücksichtigen. Man verwendet hierzu einen proportional der Windgeschwindigkeit entsprechenden Verringerungskoeffizienten.

Man empfiehlt z.B.:

Windgeschwindigkeit		Verringerungs koeffizient	■ VERBAND		▲ VERBAND	
km/h	m/sec		Abstand auf Leitung	Ab. zwischen Leitungen	Abstand auf Leitung	Ab. zwischen Leitungen
0 - 3	0,85	0,90	1.25 R*	1.30 R	1.60 R	1.35 R
3 - 7	0,85 - 2	0,85	1.20 R	1.20 R	1.50 R	1.30 R
7 - 10	2 -3	0,80	1.10 R	1.20 R	1.40 R	1.20 R
über 10	über 3	0,70	1.00 R	1.10 R	1.20 R	1.10 R

* R = Wurfweite

5) Ermittlung des Wasserbedarfs

$q = qs \times F \frac{24}{h}$

wobei:
q = Wasserverbrauch in l/sec
qs = spezifischer Wasserverbrauch in l/sec/ha (siehe Pkt. 1)
F = zu beregnende Fläche in ha
h = Stunden pro Tag

6) Auswahl eines Verbandes und Ermittlung der Regnerabstände

a) Viereck- oder Rechteckverband wird bei beweglichen Anlagen bevorzugt.
Bei Windstille ist der maximale, theoretische Regnerabstand:
$L = \sqrt{2}\,R$
wobei:
L = Seitenlänge des Vierecks in m
R = Wurfweite des Regners in m

Die Werte für R werden den Tabellen entnommen.
WICHTIG: nicht vergessen, die Windverhältnisse zu berücksichtigen (siehe Pkt. 4)

b) Dreieck-Verband wird bei stationären und bei Frostschutzanlagen bevorzugt.

Bei Windstille sind die maximalen, theoretischen Regnerabstände:
auf der Leitung: $L_1 = \sqrt{3}\,R$
zwischen den Leitungen: $L_2 = 1{,}5\,R$
Die beregnete Fläche F jeder X-beliebigen Regneraufstellung errechnet sich aus dem Produkt des Regnerabstandes auf der Leitung und des Regnerabstandes zwischen den Leitungen:
$F = L_1 \times L_2$

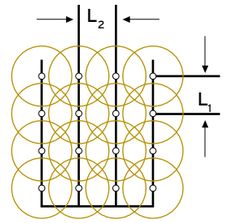
WICHTIG: nicht vergessen, die Windverhältnisse zu berücksichtigen.

7) Niederschlagshöhe

Die Niederschlagshöhe ist die auf eine Fläche in einer Stunde entfallende Regenhöhe in mm/h.
Sie errechnet sich:

$i = \frac{q \times 1000}{L_1 \times L_2}$

wobei:



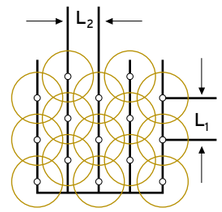
q = Wasserverbrauch eines Regners in m^3/h
i = Niederschlagshöhe in mm/h
Diese Formel gilt für jede Art von Aufstellung, sei es ▲ - oder ■ - Verband

WICHTIG: Der Wert der Niederschlagshöhe soll die Werte der Wasseraufnahmefähigkeit des Bodens, auch Hanglagen berücksichtigen, nicht über-schreiten. (siehe Pkt. 2 und 3)

8) Einschaltdauer der Anlage

$T = \frac{H}{i}$

wobei:



T = Einschaltdauer in h
H = gewünschte Niederschlagshöhe in mm
i = Niederschlagshöhe in mm/h

Die einfache und schnelle Ermittlung der beregneten Fläche und der Niederschlagshöhe in Abhängigkeit der Windgeschwindigkeit, kann man aus der untenstehenden Tabelle ersehen. Grundlage hierfür sind die, in den einzelnen Tabellen angegebenen Werte, welche den Einfluss des Windes nicht berücksichtigen. Um eine Flächendeckung auch bei Wind zu haben, ist deshalb dessen Einfluss unbedingt zu berücksichtigen.

Wind km/h	Regnerabstand im ▲ u. ■ reduzieren um m in %	Beregnete Fläche im ▲ u. ■ vermindert sich um:	Niederschlagshöhe erhöht sich im ▲ u. ■ um:
0 - 3	- 8%	- 16%	+ 16%
3 - 7	- 14%	- 28%	+ 28%
7 - 10	- 20%	- 40%	+ 40%
über 10	- 30%	- 60%	+ 60%

N.B.: Die technischen Daten auf diesem Blatt sind allgemeine Erfahrungswerte, welche durch besondere Gegebenheiten, Veränderungen unterworfen sind.
Alle Angaben haben informativen Charakter, deshalb ohne Gewähr.

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ATTACHMENT 2

SNOWMAKING SYSTEMS AND EQUIPMENT

FOR MORE INFORMATION:
https://www.technoalpin.com/en/

SME
SEVEE & MAHER
ENGINEERS

WASTEWATER SNOWMAKING

SNOWMAKING EQUIPMENT

SMI **GRIZZLY** STICK

The Grizzly is SMI's newest low energy stick and an excellent performer in all temperature conditions.

Utilizing SMI's custom 5 jet nucleation technology and angled head design, the Grizzly creates extra hangtime and powerful throw, creating better snow quality for your conditions.

The Grizzly's 4 step water adjustment is simple and easy to use with SMI's Revolver Valve on manual equipment or an intelligent automatic valve at the tail of the stick.

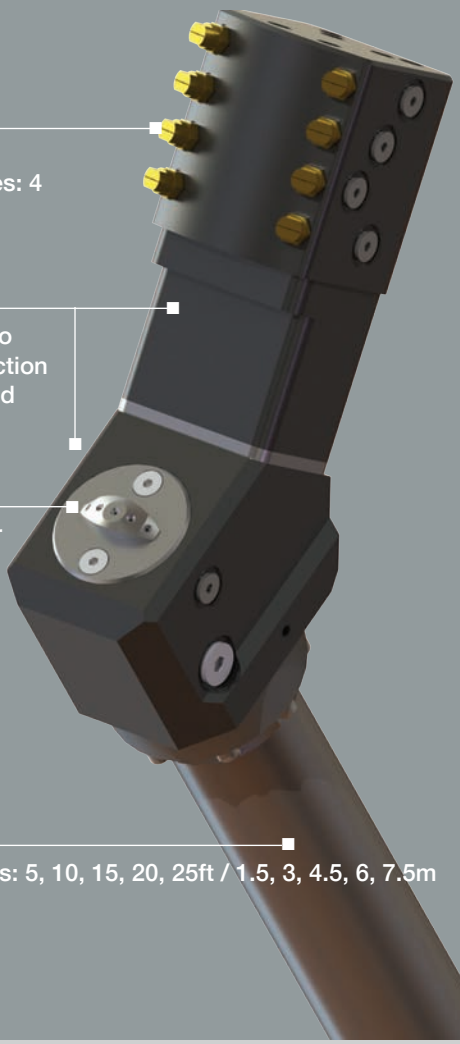
The Grizzly also comes with an easy to access water filter and pressure gauge. Air and water flows are customized for your resort and configured based on your local weather and snowmaking goals.

The Grizzly is simple to operate, maintain and an excellent performer. A great addition to your LowE fleet. Contact your local SMI Representative for more information.

SMI Snow Makers

GRIZZLY STICK HIGHLIGHTS

1. HEAD



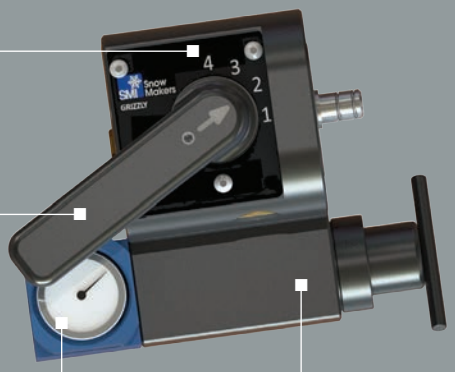
Water nozzles: 8
Water flow stages: 4

Head designed to maximize production and fight the wind

SMI inline power 5 jet nucleator

Standard heights: 5, 10, 15, 20, 25ft / 1.5, 3, 4.5, 6, 7.5m

2. MANUAL REVOLVER VALVE



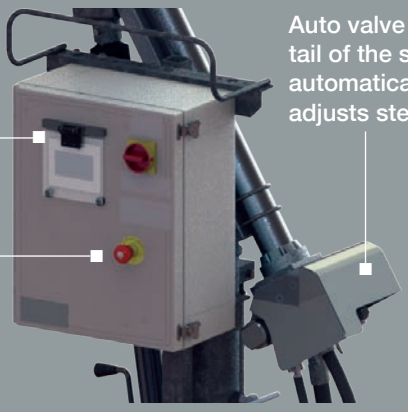
4 Flow steps

Easy turn handle to adjust flow steps

Accessible filter

Water pressure gauge

3. AUTO VALVE OPTIONS



Auto valve on tail of the stick automatically adjusts steps

Touchscreen HMI to control equipment

Emergency stop on control panel

CONFIGURATION OPTIONS

- Mounts: Base tube, vault, sled, 2-wheel cart
- Air: Hill Air (CFM Range from 8 to 120 CFM/ 226 to 3,400 LPM) or On-Board Compressor
- Controls: Manual or Automated

AUTO HYDRANT ACTUATOR OPTIONS

- Hydrant Actuator for above ground hydrant. SMI automated pit valve for vault.
- Communication options: standalone, hardwire or radio
- Optional onboard weather
- Optional SmartSnow integration

Snow Machines, Inc. 1512 North Rockwell Dr. Midland, MI 48642 Tel: +1-989-631-6091 Toll Free: +1-800-248-6600 snowmakers.com

TECHNICAL SPECIFICATIONS

- 10.5’ (3.2 m) and 15.5’ (4.5m) towers or 3-wheel galvanized carriage, and 25’ (8 m) swing arm
- Electrical: 3-phase
- Super Puma Fan: 25 HP (19 Kw)
  Standard Puma Fan: 15 to 20 HP (11-15 Kw)
  Propeller: SMI custom aluminum
  Screen: stainless steel
- Compressor: 5 or 10 HP (4 or 7.5 Kw) Rotary Vane
- Heating: 500 to 2,500 Watts
- Water Flow: 10-130 gpm (40-500 lpm)
- Water Pressure: 150-1000 psi (10-63 Bar)
- Water Connection: Customer choice
- Valves: Five self draining heated 3-way valves
- Nucleators: Periphery with 27 nozzles
- Filtration System: Stainless steel filter with washable 30 mesh screen
- Electrical Cord: Tower 30’ (10 m) Carriage 100’ (30 m)
- Rotation: 360° horizontal rotation, -10° to 60° elevation adjustment
- Oscillator: Included as standard for 359° rotation with programable arcs

Snow Makers
WEATHERPROOF™

Snow Machines, Inc.
512 North Rockwell Dr.
Midland, MI 48642
USA Toll free: +1.800.248.6600
International: +1.989.631.6091
snowmakers.com

king of the mountain

THE PUMA SERIES

The Puma and Super Puma Snowmakers have been developed with input from customers, service technicians and sales reps, worldwide, with a goal of maximizing production over a wide range of conditions, especially in marginal temperatures. The Puma was designed to interface with automation and control software for optimum performance in any snowmaking weather. It is equipped with an on-board aspirated weather station, air and water pressure monitoring, and automated flow control. The small flow steps deliver a smooth snowmaking curve, fine-tuning the water volume, air pressure and nucleation to best suit constantly changing weather conditions.

Each unit employs a convenient touch-screen panel at eye level for manual control when desired, and the Puma can be configured to communicate with a central computer via hardwire (copper, CAT 5 Ethernet or fiber optic), or by radio. The machine is well-suited to central intelligence (a single computer or control room for all snowguns) or distributed intelligence (some type of computer to manage each snowgun, pod or ski trail).

Thanks to the Puma's level of automation, operators can raise and lower the barrel or adjust the oscillation arc up to 359° on any number of machines from a central command station, helping to deliver pinpoint control with minimal labor. The result is better snow distribution and reduced man hours needed for grooming.

With its low, compact center of gravity and ergonomic design, the Puma is easy to use and transport. Components are positioned to make transport via snow cat blade easy and safe, minimizing overhanging load and reducing stress on the blade. Adjustable lifting brackets accommodate all snow cat blade designs.

Like all of SMI's products, the Puma follows a philosophy of easy operation, transport and maintenance. The units are designed to be user serviceable, with readily available replacement parts.

SMI's ultimate goal is to provide equipment that allows ski resorts to open earlier in the season, with higher trail counts. The rising levels of automation in designs like the Puma help achieve that goal, and to recover more quickly from bad weather events, so you can stay open longer and offer the best snow surfaces possible.

SMI
snowmakers.com







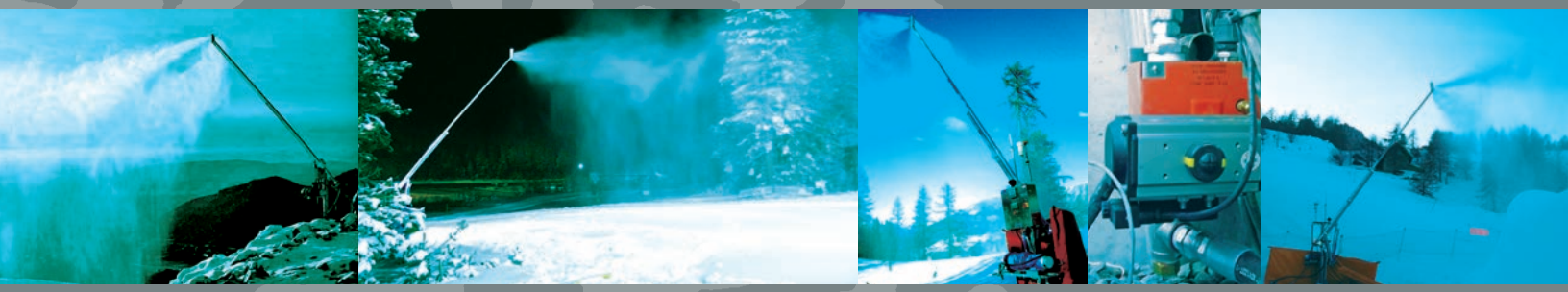
SMI **V2** SNOWTOWER™

The low energy V2 is designed for versatility and flexible performance across a full range of temperature and wind conditions. The V2 is a four step (2 valves) stick with 12 nozzles and 2 nucleators.

Features of the V2 include: mounts in post for hill or vault, and in portable sled; on board compressor and central air feed options; light weight components that feature tool less fasteners for easy portability; easy lift off compressor and control panel; 15 to 25 foot (4.5 to 7.5 meter) mast lengths; manual, semi automatic and fully automated options; automated on board or central weather options; and nucleator air flow ranges from 20 to 140 cfm (0.6 to 4.0 cmm).

The V2 is well packaged and simple to install and operate. The custom nucleation and filter system are easy to maintain. The jack for raising and lowering the V2 is safe and easy to operate. The optional automatic valving system is a custom design that allows the extra water to simply adjust to the changing temperatures.

Call SMI or your local representative today for more information or visit us at snowmakers.com.



TECHNICAL SPECIFICATIONS

V2 FLEXIBILITY AND PERFORMANCE

The V2 SnowTower™ has many flexible automation options including remote control and full automatic modes of operation for individual standalone machines or when connected to a complete network.

SMI's SmartSnow™ Automation & Control software is flexible and customizable and offers proven communication options, accurate weather measurement, supporting equipment and instrumentation, integrated auxiliary equipment, and service that is second to none.

This low energy air / water stick relies on the shared accessories available in the Viking product family such as:

i) Common vault – for direct mounting of stick (Optional covered and heated concrete vault provides base tube mounting, electrical, water, air (optional), and communication (optional) connection ports)
ii) Common base assembly
iii) Easy lift off components
iv) Removable jack

- Approximate overall height: 20' (6 m) or 30' (9 m)
- Water nozzles: 12 nozzles
- Nucleation nozzles: 2 nozzles
- Air supply: minimum 20 cfm (0.57 m3/min) for hill air
- Jack: removable hydraulic with safety latch
- Boom and head assembly: aluminum
- Tower and base: galvanized steel
- Operating water pressure range: 250-870 psi (17 - 60 bar)
- Feed-through tower assembly for clean appearance
- Mount: post, vault or sled

SMI Snow Makers
Snow Machines, Inc.
1512 North Rockwell Dr.
Midland, MI 48642
Tel: +1-989-631-6091
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ATTACHMENT 3

CASE STUDY: CARRABASSETT, MAINE WASTEWATER DISPOSAL THROUGH SPRAY IRRIGATION AND SNOWMAKING

SME
SEVEE & MAHER
ENGINEERS

Lagoon Systems In Maine

An Informational Resource for Operators of Lagoon Systems

Carrabassett Valley Sanitary District

Carrabassett Valley, Maine

Design & Operation
Lagoon Aeration
Tech Papers
Operation Articles
Lagoons In Maine
The Laboratory
Maine Lagoon News
Lagoon Biology
Resources
Biosolids

new 2003 Maine Wastewater Salary Survey as conducted by the Maine Wastewater Control Association

new 2003 Maine Wastewater Rate Survey conducted by the Maine Rural Water Association

Carrabassett Valley, Maine, well known for some of the best skiing in the Northeast, has placed itself on the map for another reason. Its wastewater authority has successfully put in place the first permanent system of its kind in the world to treat and **dispose of wastewater by spraying effluent into snow**.

CVSD Snowfields

The **Carrabassett Valley Sanitary District** serves approximately 900 living units plus the commercial facilities, the equivalent of about 6,000 people. The 7 lagoons are earthen-berm construction with clay lining. The aerated lagoon and each of the initial three storage lagoons are designed to hold 5.2 million gallons of sewage. Each backup lagoon is designed to hold 5.8 million gallons, giving a total volume of thirty-eight million gallons of which 33 million gallons is storage. The treated effluent is then pumped to a land-based disposal system comprised of a slow rate sprinkler irrigation system and freeze nucleation (snowmaking).

The spray irrigation system is designed to empty the contents of the lagoons plus the associated summer wastewater flow and precipitation.

Maine DEP Monthly O & M Newsletter

Maine and WEF's Operation Forum

Penobscot Watershed and Development of a TMDL

EPA Binational Toxics Strategy

Maine Rural Water Association

Maine Wastewater Operator Certification Guide

Maine Is Technology Newsletter

Maine Wastewater Control Association

Maine Wastewater Engineering Firms

Two 125 horsepower vertical turbine pumps (300 gpm each) deliver effluent to the snow making towers

Effluent is pumped to a forested disposal site, separate from the snowmaking site, at fifty thousand gallons per acre per week.

Located in the western mountains of Maine, Carrabassett Valley has historically relied on spray irrigation for wastewater disposal of treated effluent during the summer. As soon as the Carrabassett Valley Sanitary District (District) was organized in 1993 to provide wastewater disposal services for the Sugarloaf Mountain Ski Resort and surrounding area, the Board of Trustees faced a shortage of lagoon storage space. Although their community is small, it increases to more than 10,000 during ski season, and the lagoons were full to nearly overflowing by the time the spray season began. Before the concept of spraying effluent into snow was ever discussed, plans called for construction of as many as 54 lagoons at a cost of $250,000 each and 26 spray irrigation areas, at a cost of $150,000 to $200,000 each, over 200 acres of wooded spray irrigation areas.

This construction would take place on the treatment site property, located several miles from the access road to the Sugarloaf Mountain Ski Resort to accommodate projected build-out of the sewered area.

There are 2 two hundred horsepower air compressors capable of delivering 800 cfm @ 140 psi.

Never entirely satisfied that the lagoon construction plan was the best approach, sanitary district trustees went looking for an alternate strategy. A less costly and more practical approach to wastewater treatment and disposal by constructing snowmaking towers on the treatment site property instead of scores of lagoons was the new direction taken. A decade of environmental hurdles was about to begin in Carrabassett Valley.

The primary stumbling block to be cleared was overcoming regulators' concerns about the fate of contaminants, surface runoff, and over saturation of the soil. Furthermore, without the Maine Department of Environmental Protection’s blessing, financing sources were wary. Woodard

& Curran, selected as the newly organized Carrabassett Valley Sanitary District's engineer, analyzed the technology. This analysis turned out to be the critical step in allowing the project to move forward by explaining and resolving the issue of contaminant fate and transport. An explanation to Maine DEP why it worked by identifying the fundamental physical/chemical principles involved took place. This convinced them that making snow was, in fact, a viable treatment technology and cleared the way for license approval. The project has moved ahead smoothly ever since.

Snowmobile tracks cover the landscape. The machines are used by the operators to keep a watchful eye on the snowmaking process.

Snow is made out of lagoon effluent throughout the winter and is spread out over a cleared, prepared site. Melting and disposal into the ground take place over the spring and early summer. This approach significantly reduces the storage volume required by applying effluent to the fields over the winter, when the influx of people to the ski resort results in the District's highest flows. The process is intended as a disposal method primarily, although the lagoon effluent receives additional treatment by means of the freeze/thaw process.

Another key to the process is making snow as soon as freezing weather starts. This way the snow pack develops before the ground freezes. Then, in the spring, when warm weather starts the melting process, the treated effluent (melted water) infiltrates into the unfrozen ground with minimal runoff. It is not uncommon to see mounds of snow still melting in July.

After the systems first year of operation (28,000,000 gals. of effluent turned into snow), the District Trustees voted to increase the operational effectiveness by adding three additional snowmaking towers and a 750 kW diesel generator. This reduced the power costs from $20,000 a month to $18,000 annually (based upon costs of $0.50 /gal. of diesel fuel).

The 1,000 horsepower generator powers 2 two hundred horsepower air compressors capable of delivering 800 cfm @ 140 psi. Two 125 horsepower vertical turbine pumps (300 gpm each) deliver effluent via buried 6-inch welded steel pipe to the eleven 40-foot high snowmaking towers. Normal snowmaking operations of 1,000 hours per year (42 days) are required to turn the stored lagoon effluent into man-made snow. Facility

Superintendent David Keith describes optimum snowmaking conditions as “cold and windy”.


District Superintendent Dave Keith checks the nozzles atop the snow gun tower

This two hundred and fifty thousand dollar ($250K) upgrade improved the ability to more evenly distribute snow across the cleared application area and reduced operating costs by approximately fifty thousand dollars ($50K) annually with savings from in-house power generation and reduced site maintenance. Design, equipment purchases, and planning were performed in-house at a considerable savings.


A view from the bottom

In 1997, CVSD recognized weaknesses in the snowmaking process control system. The Trustees approved a further expenditure from the remaining balance of construction funds to upgrade the snowmaking system from a PC based control system to a PC/PLC based I/O system. The revised system is SCADA technology that allows centrally based control, monitoring and reporting (operator interface software) at the main control building. This allowed communications locally to PLCs (processors and I/O with system programs) within the control building and with the facility’s in-house power generation system, at the snowmaking distribution vault and the District’ s sewage pumping station. To further enhance the system, both the District Superintendent and Plant Operator have remote access and control of the operating system via home-based personal computers.

The addition of snowmaking technology has the potential to more than double the capacity of Carrabassett Valley's existing facilities without needing any additional storage lagoons and within the existing 60 acres of land application area. This

effluent disposal project has relieved the District's concerns for a long time to come.

Carrabassett Valley Sanitary District - Operational Snap Shot
In-House Three Phase Power Generation

	Gallons Processed	Hours Operated	Gallons Hour	Fuel Usage Gallons	Fuel $/Gal	KWH Generated	$$ KWH	$/Gallon Snowmaking
Dec-99	3,234,562	100	32,546.6	3,994	0.50	53,230	0.0375	0.0006
Jan-00	6,939,425	202	34,353.6	8,298	0.50	108,033	0.0384	0.0006
Feb-00	2,666,652	79	33,755.1	3,292	0.50	42,116	0.0391	0.0006
Mar-00	581,246	15	38,749.7	579	0.50	8387	0.0345	0.0005
Dec-00	2,287,716	74	30,915.1	3,063	0.50	38,904	0.0394	0.0007
Jan-01	5,036,128	146	34,494.0	5,986	1.17	75,392	0.0929	0.0014
Feb-01	3,026,193	87	34,783.8	3,489	1.25	45,469	0.0959	0.0014
Totals		**703**		**28,701**				
		Average	**34,199.57**			**0.0540**		**$0.00083**

Lagoon Specifications

Lagoons	No.1	No.2	No.3	No.4	Storage 1	Storage 1	Storage 1
Volume	5.2 MG	5.2 MG	5.2 MG	5.2 MG	5.8 MG	5.8 MG	5.8 MG
Aeration	Coarse Bubble	None	None	None	None	None	None

Comments: Lagoons operate at 9.0 feet of depth.
Total lagoon area - 18 acres or 780,00 sq. ft.

System Information

Design Flow	Licensed to Discharge 40 MG/Year to Spray Irrigation and 56 MG/Year
Actual Flow	0.10 to 0.40 MGD (highest in winter)
Discharge To	Land Application

Year Built	1985
Design Engineers	James Sewall Co. Upgrade - Woodard and Curran
Septage Received	No
Collector System	12 miles gravity sewer, 1 pump station , 280 manholes
Staff Size	2 Full Time
Number of Users	Year round 100 users. Winter peaks to 4,000 people
Billing Software	Uses GIS for collection system maintenance

Back to Lagoons in Maine

Attachment C – Setback Table 6-1 and reconciled Figure 7-2

The following table represents an update of measured structure setbacks from existing roads, property lines, lake/ponds, river/streams and wetlands. All measurements are represented in feet.

Update to Application Table 6-1: Existing and Proposed Structures or Development Area within the Project Area, April 2023

Map ID	Type of Structure and Use (specify if temporary)	Duration in Place if Temporary (specify days or months)	*Current* Exterior Dimensions (LxWxH) in feet	*Proposed* Exterior Dimensions (LxWxH) in feet			Approximate Distance (in feet) of structure from nearest:					
				Length	Width	Height	Road	Property line	Lake or pond	River or stream	Wetland	Ocean/Coastal Wetland
Existing Structures												
	No existing stuctures	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Proposed Structures												
1	Solar Facility	15 years plus	NA	2290	885	5 to 8	0	430	3150	150	80	NA
2	Low Grade Ore Storage Pad	10-15 years	NA	676	355	65	0	962	2840	1070	254	NA
3	Snow Storage	10-15 years	NA	535	210	30	0	492	2726	850	392	NA
4	Pre-Treatment Water Storage Pond	10-15 years	NA	485	292	10	170	504	2339	470	260	NA
5	Water Treatment Facility	10-15 years	NA	160	92	30	118	560	2608	750	380	NA
6	Electric Substation	15 years plus	NA	50	40	30	156	897	2633	930	540	NA
7	Back-up Power Generation (Diesel or Propane)	10-15 years	NA	30	20	10	140	993	2704	1020	440	NA
8	Post-Treatment Water Storage Pond	10-15 years	NA	400	260	10	276	695	2354	633	109	NA
NA	Water Recharge Area #1 (Not shown)	10-15 years	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
10	Fire Water Pumphouse	10-15 years	NA	24	16	10	180	842	2338	570	230	NA
11	Sanitary Subsurface Wastewater Disposal System	10-15 years	NA	66	42	-2 to 4	198	1363	2790	760	300	NA
12	Parking Facility	10-15 years	NA	298	128	0	130	1030	2620	930	144	NA
13	Warehouse	10-15 years	NA	100	60	30	10	403	2788	940	465	NA
14	Office and Mine Rescue Facility	10-15 years	NA	84	100	20	0	1428	2985	990	210	NA
15	Core Shack and Storage	10-15 years	NA	60	60	20	90	1580	3020	920	450	NA
16	Laydown (Equipment/Supplies Storage)	10-15 years	NA	157	155	0	10	1260	2755	753	100	NA
17	Maintenance Shop	10-15 years	NA	80	60	30	230	1438	2870	810	370	NA
18	Equipment Fueling Station	10-15 years	NA	50	40	12	132	1622	3060	880	550	NA
NA	Water Recharge Area #2 (Not shown)	10-15 years	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
20	Waste Rock Storage Pad #1	10-15 years	NA	850	192	50	0	1463	3080	410	220	NA
21	Backfill Plant	10-15 years	NA	50	50	20	122	1707	3080	840	500	NA
22	Ore (Mill Feed) Storage Pad #1	10-15 years	NA	436	125	35	140	1568	3140	390	270	NA
23	Blast Shack	10-15 years	NA	30	30	12	322	1524	3070	690	360	NA
24	Mine Access (Portal)	10-15 years	NA	280	60	-32	265	1465	3030	520	190	NA
25	East Ventilation Raise	10-15 years	NA	10	10	10	110	992	2490	640	130	NA
26	Organics Storage	10-15 years	NA	456	425	15	566	430	4600	782	190	NA
NA	Water Recharge Area #3 (Not shown)	10-15 years	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
28	Headframe and Hoist	10-15 years	NA	62	52	120	438	1178	4088	500	152	NA
29	Ore (Mill Feed) Storage Pad #2	10-15 years	NA	305	145	40	490	916	3930	560	110	NA
30	Waste Rock Storage Pad #2	10-15 years	NA	305	145	40	360	982	3900	460	110	NA
31	Temporary Explosives Storage	10-15 years	NA	60	30	8	30	620	3820	390	270	NA
32	West Ventilation Raise	10-15 years	NA	10	10	10	695	558	4600	750	230	NA
NA	Water Recharge Area #4 (Not shown)	10-15 years	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
36	Security Guard House/Gate	10-15 years	NA	20	10	10	0	356	2710	800	290	NA
37	Security fencing	10-15 years	NA	NA	NA	6	0	417	3195	180	113	NA
NA	Water Recharge Area #5 (Not shown)	10-15 years	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
NA	Water Recharge Area #6 (Not shown)	10-15 years	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
NA	Underground Mining Facilities (Not shown)	10-15 years	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA

Map ID	Facility Name
1	SOLAR FACILITY (APPROX.)
2	LOW GRADE ORE STORAGE PAD
3	SNOW STORAGE
4	PRE-TREATMENT WATER STORAGE POND
5	WATER TREATMENT FACLITY
6	ELECTRICAL SUBSTATION
7	BACK-UP POWER GENERATION (DIESEL OR PROPANE)
8	POST-TREATMENT WATER STORAGE POND
NA	WATER RECHARGE AREA #1 (NOT SHOWN)
10	FIRE WATER PUMPHOUSE
11	SANITARY SUBSURFACE DISPOSAL SYSTEM
12	PARKING FACILITY
13	WAREHOUSE
14	OFFICES AND MINE RESCUE FACILITY
15	CORE SHACK AND STORAGE
16	LAYDOWN (EQUIPMENT/SUPPLIES STORAGE)
17	MAINTENANCE SHOP
18	EQUIPMENT FUELING STATION
NA	WATER RECHARGE AREA #2 (NOT SHOWN)
20	WASTE ROCK STORAGE PAD #1
21	BACKFILL PLANT
22	ORE (MILL FEED) STORAGE PAD #1
23	BLAST SHACK
24	MINE ACCESS (PORTAL)
25	EAST VENTILATION RAISE
26	ORGANICS STORAGE
NA	WATER RECHARGE AREA #3 (NOT SHOWN)
28	HEADFRAME AND HOIST
29	ORE (MILL FEED) STORAGE PAD #2
30	WASTE ROCK PAD #2
31	TEMPORARY EXPLOSIVES STORAGE
32	WEST VENTILATION RAISE
NA	WATER RECHARGE AREA #4 (NOT SHOWN)
34	EXISTING SITE ROAD
35	PROPOSED SITE ROAD
36	SECURITY GUARD HOUSE/GATE
37	SECURITY FENCING
NA	WATER RECHARGE AREA #5 (NOT SHOWN)
NA	WATER RECHARGE AREA #6 (NOT SHOWN)
NA	UNDERGROUND MINING FACILITIES (NOT SHOWN)

LEGEND:

- 1125 MAJOR CONTOURS
- 1124 MINOR CONTOURS
- STREAM
- EXISTING SITE ROAD
- VERNAL POOLS
- ASA - ARCHEOLOGICAL SENSITIVE AREAS
- 400-FEET REZONING SETBACK BUFFER
- PROPOSED REZONING
- OLD REZONING
- WETLAND
- 14 FACILITIES DESIGN
- WATER COLLECTION AREA
- PHASE II (POST YEAR)
- PROPOSED SITE ROAD
- DRAINAGE DIVIDE
- SECURITY FENCE
- SECURITY GATE
- CLEARING LIMIT
- 400' SETBACK DISTANCE (FT)

NOTES:

1. CONTOUR INTERVAL = 5FT.
2. TOPO CONTOURS ARE FROM LIDAR DATA (NOAA.GOV), MARCH 2021.
3. INITIAL WETLAND, VERNAL POOL AND STREAM DATA WERE COLLECTED BY WOOD AND OTHERS IN MAY-JUNE OF 2020. ADDITIONAL WETLAND, VERNAL POOL, AND STREAM DATA WERE COLLECTED BY STANTEC-JUNE OF 2022. WETLANDS WERE DELINEATED IN ACCORDANCE WITH THE US ARMY CORPS OF ENGINEERS WETLAND DELINEATION MANUAL WETLANDS TECHNICAL REPORT (Y-87-1) AND THE NORTH CENTRAL AND THE NORTHEAST REGIONAL SUPPLEMENT (ERDC/EL TR-12-1).
4. WETLAND BOUNDARIES WERE DELINEATED WITHIN THE REZONE BOUNDARY AND MAY CONTINUE BEYOND THE SHADING SHOWN.
5. THE STREAMS ON SITE WERE DELINEATED FOLLOWING THE NATURAL RESOURCE PROTECTION ACT (NRPA) IDENTIFICATION GUIDE FOR RIVERS, STREAMS, AND BROOKS (DANIELSON, 2018).
6. VERNAL POOLS (VPS) WERE IDENTIFIED ON MAY 17, MAY 18, AND MAY 28, 2020, BASED ON PHYSICAL CHARACTERISTICS OF THE FEATURES INCLUDING ISOLATED WATER BODIES, WATER STAINED LEAVES, WATER LINES, SPHAGNUM MOSS AND THE PRESENCE OF HYDROPHYTIC VEGETATION AS WELL AS EGG MASS COUNTS OF SPOTTED SALAMANDERS AND WOOD FROGS WERE COLLECTED.

VERSION 3

0 125 250 500
SCALE IN FEET

Prepared/Date: WJW 4/13/23
Checked/Date: MAP 4/13/23

WOLFDEN
Wolfden Mt Chase, LLC
Rezoning Petition
Location: T6 R6, Maine

wsp
USA Earth & Environment
511 Congress Street, Suite 200, Portland, ME, 04112 (207) 775 - 5401

SETBACKS
FOR PROPOSED FEATURES
Project 3617-22-7547
Figure 7-2

C:\Users\wilson.whitten\OneDrive - WSP\ 0365\Projects\Wolfden Resources\8.0 Drawings\Design 2022\Sheets\Figure 7-2_Setback Plan.dwg Thu, 13 Apr 2023 - 9:54am wilson.whitten

Attachment D – Traffic Clarifications

511 Congress St.
Suite 200
Portland, ME, 04101
+1 (207) 775-5401

wsp.com

March 22, 2023

Jeremy Ouellette
Wolfden Resources, LLC

Re: Rezoning Petition
Pickett Mountain Mine Site
Traffic and Transportation Routes
LUPC Question related to Exhibit 21

Dear Jeremy:

The following question by the LUPC on the Exhibit 21-A and 21-B and your response was forwarded to WSP on March 20, 2023:

1. *Traffic*

   Clarify the number of trips expected per day and their breakdown into categories. Public Roads (Exhibit 21), Attachment 21-A, WSP Traffic and Transportation Routes Memorandum, shows 254 trips for employees, contractors, and visitors plus 110 trips for hauling ore rock (p. 5 and Table 1, p. 6). Attachment 21-B, WSP Pickett Mountain Mine Site – Gravel Road and Bridge Field Reconnaissance Summary, shows 236 trips for employees, contractors, and visitors, plus a maximum of 10 deliveries per day, plus 110 trips for hauling ore rock (p. 2).

WSP Response

The following table summarizes the correct number of trips anticipated per 24-hour period to and from the Pickett Mine Site. Attachment 21-A should also have included the traffic associated with deliveries and Attachment 21-B had identified 9 contractors per day, but the correct total is 18 contractors per 24-hour period.

Table 1: Peak Traffic Summary per 24 Hour Period

Pickett Mountain (Mine Only) Traffic Summary Peak Per Day						
	Employees	Contractors	Visitors	Deliveries	Ore Haulage Loads	**Total**
Units	106	18	3	10	55	**192**
# of Trips (One Way)	212	36	6	20	110	**384**

Closing:

WSP concludes that the change from 364 total trips to 384 total trips to include the 20 additional delivery trips does not change the analysis provided in the Traffic and Transportation Routes memorandum provided in Attachment 21-A. WSP also concludes that the change from 366 total trips to 384 total trips to include the 18 additional contractors trips does not change the analysis provided in the Gravel Road and Bridge Filed Reconnaissance Summary in Attachment 21-B.

Sincerely,

Mark Peters
Associate Engineer -
Design Lead
207-828-3397
mark.peters@wsp.com

Attachment E – Draft Development Plan

Response to LUPC Comments of February 24, 2023

Picket Mountain Planned Development Subdistrict (Pickett Mtn. D-PD) Development Plan

Date: April 13, 2023

1. Purpose and Scope

a. Purpose. The Land Use Planning Commission's (Commission) Chapter 10 rules, Land Use Districts and Standards (Chapter 10), establish that the purpose of the Planned Development subdistrict (D-PD) is to allow for large scale, well-planned development, including developments separated from existing development, provided: 1) they are shown to be of high quality and not detrimental to other values established in the Comprehensive Land Use Plan; and 2) they depend on a particular natural feature or location that is available at the proposed site. In accordance with Chapter 12 of the Commission's Land Use District Requirements for Metallic Mineral Mining and Level C Mineral Exploration Activities, metallic mineral mining activities are allowed only within the D-PD subdistrict.

Planned development within a D-PD subdistrict must be consistent with a Development Plan approved as part of the rezoning process. A Development Plan identifies land uses allowed within the subdistrict, specifies which uses require a development permit, and outlines the nature, location, and design of the Planned Development for which the subdistrict was created.

The purpose of the Pickett Mtn. D-PD subdistrict and Development Plan is to allow for well-planned, metallic mineral mining activities and other associated development near Pickett Mountain, in T6 R6 WELS, Penobscot County.

b. Scope. The nature, location, and design of the planned development for this subdistrict is detailed in the zoning application filed by Wolfden Mt. Chase, LLC., ZP 779a, including Figure 2-1, Conceptual Site Plan, dated April 13, 2023 (Conceptual Site Plan) and Table 6-1, Existing and Proposed Structures or Development Area within the Project Area, April 2023 (Setback Table). During detailed engineering analysis and planning in support of the mine permit application to the Maine Department of Environmental Protection (MDEP), the 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 MDEP.

Changes to the Conceptual Site Plan and Setback Table may be authorized by permit and requests for certification, where applicable, but may not cause individually or cumulatively any of the following:

1) The addition of a land use not previously approved in the Development Plan;

2) A material change in the size, scope, or nature of the project;

3) Material increases in traffic volume;

4) Any reduction in vegetated buffers required for the Pickett Mtn. D-PD subdistrict and the Pickett Mountain Mine;

5) A material reduction in open space or parking; or

6) A material change giving rise to adverse environmental impact.

All other changes to the Pickett Mountain Development Plan must be made as part of a zoning application.

2. Description

The Pickett Mtn. D-PD subdistrict includes:

a. An area of land, owned by Wolfden Mt. Chase, LLC, necessary to reasonably conduct authorized mining and mineral exploration activities, and to adequately buffer those activities from surrounding resources or uses; and

b. Approximately 374 contiguous acres, as described in the "Legal Description and Delineation of the Property Boundaries Proposed for Rezoning," attached in Appendix A of this Development Plan.

c. The Conceptual Site Plan and Setback Table, attached as Appendix B and C of this Development Plan, respectively.

Wolfden Mt. Chase, LLC, does not intend to create a subdivision nor divide and transfer any of the land within the subdistrict during the lifetime of the subdistrict.

3. Land Uses

Land uses anticipated for the Pickett Mtn. D-PD subdistrict include:

- Uses and activities allowed without a permit;
- Uses allowed without a permit subject to standards; and
- Uses and activities allowed with a permit.

The Pickett Mtn. D-PD subdistrict is an undivided, custom subdistrict. The following uses are allowed within the subdistrict.

a. Uses Allowed Without a Permit

The following uses are allowed without a permit within the Picket Mtn. D-PD subdistrict.

1) Baseline and ongoing environmental monitoring and data collection necessary to finalize design and establish and maintain compliance with applicable State regulatory requirements, including the requirements of the MDEP's Chapter 200 rules, 06-096 CMR 200

2) Emergency operations conducted for the public health, safety or general welfare, such as emergency medical response, firefighting, law enforcement, resource protection, and search and rescue operations

3) Forest management activities, except for timber harvesting

4) Hunting and trapping of wild animals provided such hunting and trapping is conducted at least 500 feet away from existing development including legally existing structures

5) Motorized vehicular traffic on roads and trails, parking areas, storage pads, and similar legally existing impervious surfaces, including snowmobile and all-terrain vehicle traffic on-and off roads

6) Normal maintenance and repair

   (a) The repair and maintenance of vehicles, vehicular equipment, and other mobile equipment provided that repair and maintenance activities occur in on-site maintenance buildings to the fullest extent practicable; and

   (b) The normal maintenance and repair of legally existing structures (including underground or subsurface structures), parking areas, lined pads; and other impervious surfaces, provided that adequate measures are taken to control runoff and minimize soil erosion.

7) Primitive recreational uses, including fishing, hiking, wildlife study and photography, wild crop harvesting, horseback riding, tent and shelter camping, canoe portaging, cross country skiing, and snowshoeing

8) Security operations conducted for public health, safety, or general welfare, and the protection of onsite personnel, equipment, and assets including but not limited to installation or relocation of security fencing within the Major Mine Development Phase 1 or Mine Development Phase II areas reflected on Figure 27-1 Custom Zone Development Areas, dated April 13, 2023 (Appendix D)

9) Shipping and receiving of materials

10) Surveying and other resource analysis

11) Wildlife and fishery management practices

b. Uses Allowed Without a Permit Subject to Standards

The following uses are allowed without a permit within the Pickett Mtn. D-PD subdistrict subject to applicable standards. Note that the minimum roadway setbacks set forth in Chapter 10, Section 10.26(D) of the Commission's rules do not apply to the roads within the D-PD subdistrict.

1) Accessory structures: New structures accessory to any structures and uses reflected on the Conceptual Site Plan provided that:

   (a) The total square footage of the footprint of all new accessory structures built within a two- year period is not more than 2,000 square feet; and

   (b) All other requirements and standards of the Commission's Chapter 10, Section 10.27(P) are met.

2) Filling and grading within development area envelopes as shown on Figure 27-1

3) Mineral exploration activities: Level A and B mineral exploration activities, including associated temporary access ways, in conformance with the requirements for such activities in Chapter 13 of the Commission's rules

4) Road projects: Level A road projects in conformance with the requirements for such activities in Chapter 10, Section 10.27(D) of the Commission's rules

5) Service drops to legally existing structures

6) Signs in conformance with the requirements for such activities in Chapter 10, Section 10.27(J) of the Commission's rules

7) Water crossings of minor flowing waters in conformance with Chapter 10, Section 10.27(D) of the Commission's rules

c. Uses Requiring a Permit

The following uses, and related accessory structures, may be allowed within the Pickett Mtn. D-PD subdistrict upon issuance of a permit by LUPC, DEP, or the Department of Health and Human Resources, as applicable.

1) Constructed ponds: Pre- and post-treatment water storage ponds, provided that:

   (a) The ponds are in conformance with the Conceptual Site Plan and Setback Table and located within the applicable development area envelope shown on Figure 27-1; or

   (b) For any footprint expansions, the cumulative surface area expansion of ponds within an applicable development area envelope does not increase by more than 20%.

2) Driveways and vehicle parking areas

3) Fences located outside of Major Mine Development Phase I or Mine Development Phase II areas shown on Figure 27-1

4) Land management roads

5) Metallic mineral mining activities: Metallic mineral mining activities and processes, as defined in Chapter 10, Section 10.02, and in conformance with the Conceptual Site Plan and Setback Table

6) Mineral exploration activities: Access ways for Level A and B mineral exploration activities, and Level A and B mineral exploration activities which are not in conformance with the standards of Chapter 13 of the Commission's rules

7) On-site storage and disposal of land clearing and construction debris in compliance with applicable MDEP rules

8) Relocations: Relocations of metallic mineral mining activities and structures that are shown on the Conceptual Site Plan provided that the relocated activity or structure:

(a) Will be located within the applicable development area envelope as shown on Figure 27-1; and

(b) Does not involve the addition of a land use not previously approved in this Development Plan.

9) Road projects: Level A road projects not in conformance with the requirements for such activities in Chapter 10, Section 10.27(D) of the Commission's rules; and Level B and C road projects

10) Signs that are not in conformance with the standards of Chapter 10, Section 10.27(J) of the Commission's rules

11) Solar energy systems, including large-scale solar energy generation facilities and associated structures, located within the applicable development area envelope

12) Storage pads for ore and waste rock, laydown areas, and storage areas for snow and organic materials provided that:

(a) The pads, laydown areas, and storage areas are in conformance with the Conceptual Site Plan and Setback Table; and located within the applicable development area envelope (Figure 27-1); or

(b) For any footprint expansions, the cumulative surface area expansion of pads, laydown areas, and storage areas within an applicable development area envelope does not increase by more than 20%.

13) Stormwater management structures including but not limited to piping conveying water to water storage ponds, ditching and pumping structures

14) Structures:

(a) All structures in conformance with the Conceptual Site Plan and Setback Table and located within the applicable development area envelope (Figure 27-1); or

(b) New structures not shown on the Conceptual Site Plan or expansion of structures shown on the Conceptual Site Plan provided that the new or expanded structures:

i. Will be located within one of the three development areas as shown on the Conceptual Site Plan;

ii. Will not exceed a total maximum structure footprint increase of 20,000 square feet for the lifetime of the subdistrict based on the total structure footprint (for clarity, structures do not include constructed ponds, laydown areas, or roads or parking areas) shown on the Conceptual Site Plan and in the Setback Table;

iii. Will not exceed 120 feet in height as measured from the lowest adjacent grade; and

iv. Will not involve the addition of a land use not previously approved in the Development Plan.

15) Subsurface Sanitary Wastewater Disposal Systems

16) Timber harvesting

17) Utility facilities, excluding service drops

18) Ventilation shafts, raises, surface shafts and attendant headworks that are needed to facilitate deeper ore removal and provide for safe working conditions in the mine

19) Water crossings of minor flowing waters not in conformance with Chapter 10, Section 10.27(D) of the Commission's rules

20) Water recharge areas (WRAs) (e.g., drip or spray irrigation, snowmaking, infiltration galleries) subject to the following additional limitations

(a) No clearing or infrastructure associated with drip or spray irrigation or snowmaking may be located within the 400-foot buffer, and,

(b) Infiltration galleries must be located within the development areas shown on Figure 27-1

21) All uses and structures identified on the Conceptual Site Plan to the extent not otherwise expressly authorized as allowed with or without a permit

4. Prohibited Uses

All uses not expressly allowed, with or without a permit, are prohibited in the Pickett Mtn. D-PD subdistrict.

5. Appendices

Appendix A. Legal Description and Delineation of the Property Boundaries Proposed for Rezoning

Appendix B. Figure 2-1, Conceptual Site Plan, Dated April 13, 2023

Appendix C. Table 6-1, Existing and Proposed Structures or Development Area within the Project Area, April 2023

Appendix D. Figure 27-1, Custom Zone Development Areas, Dated April 13, 2023

Appendix A. Legal Description and Delineation of the Property Boundaries Proposed for Rezoning

A certain piece or parcel of land located within township 6, range 6 wells (t6, r6 wells), county of Penobscot, state of Maine and being more particularly bounded and 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: 901910.4220, east: 995529.5778; thence running through the land of the grantor on a course of south twenty-nine degrees fifty-six minutes forty-three seconds west (S 29° 56' 43" W) a distance of one thousand seven hundred eighty-four and thirty-three hundredths (1784.33) feet to a point located at north 900364.2935, east 994638.8868;

Thence running through the land of the grantor on a course of south forty-six degrees twenty-two minutes forty-four seconds west (S 46° 22' 44" W) a distance of two thousand two hundred thirteen and fifty-six hundredths (2213.56) feet to a point located at north 898837.1935, east 993036.4493;

Thence running through the land of the grantor on a course of south eighty degrees seven minutes thirteen seconds west (S 80° 07' 13" W) a distance of one thousand three hundred three and seventynine hundredths (1303.79) feet to a point located at north 898613.4902, east 991751.9960;

Thence running through the land of the grantor on a course of south eighty-seven degrees twenty-threeminutes four seconds west (S 87° 23' 04" W) a distance of one thousand three hundred seventy-nine and thirty-three hundredths (1379.33) feet to a point located at north 898550.5425, east 990374.1055;

Thence running through the land of the grantor on a course of north three degrees thirty-nine minutes six seconds west (N 03° 39' 06" W) a distance of one thousand three hundred fifty-nine and sixty-eight hundredths (1359.68) feet to a point located at north 899907.4634, east 990287.5060;

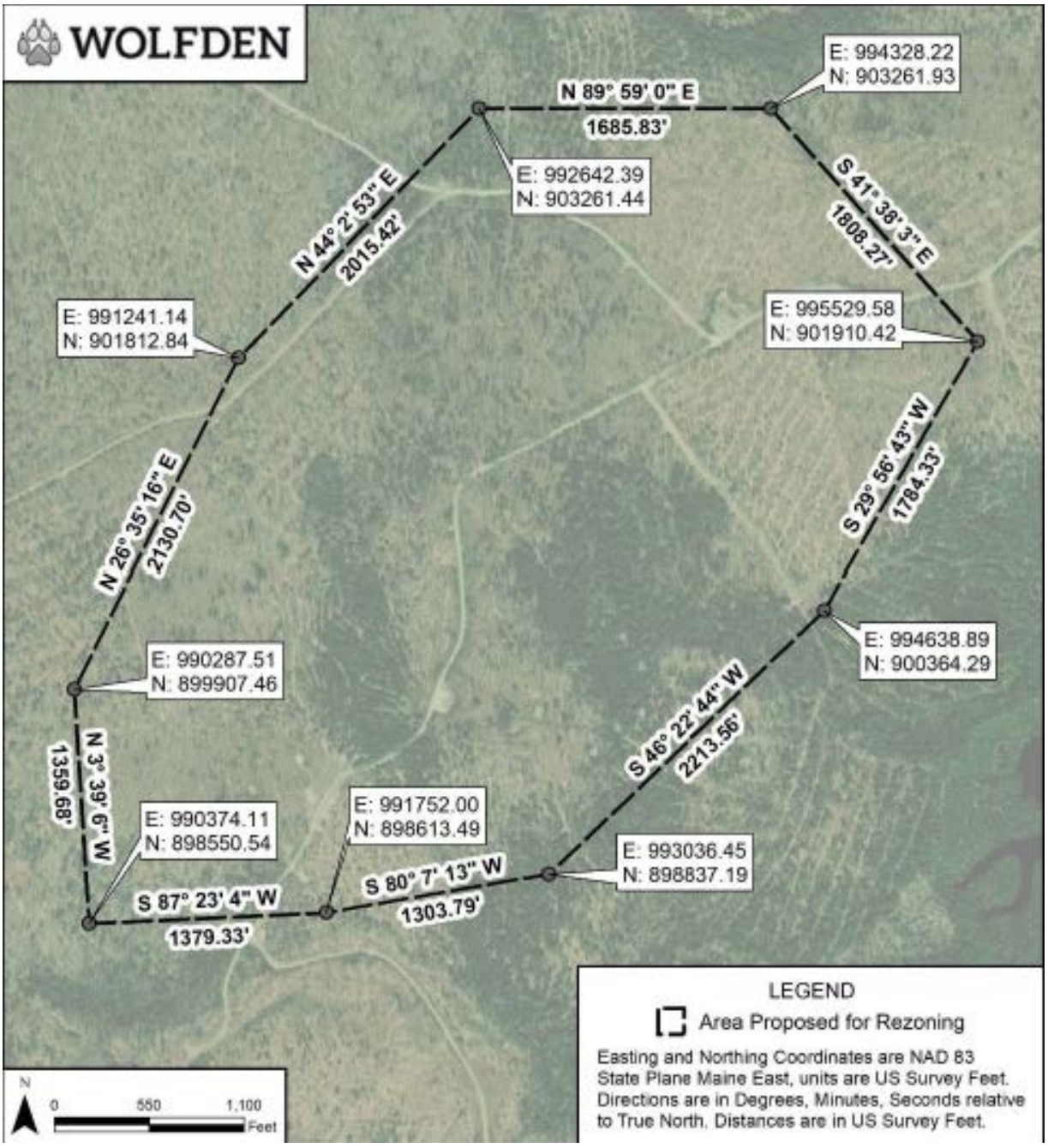
Thence running through the land of the grantor on a course of north twenty-six degrees thirty-six minutes sixteen seconds east (N 26° 36’ 16" E) a distance of two thousand one hundred thirty and seven tenths (2130.70) feet to a point located at north 901812.8389, east 991241.1408;

Thence running through the land of the grantor on a course of north forty-four degrees two minutes fiftythree seconds east (N 44° 02' 53" E) a distance of two thousand fifteen and forty-two hundredths (2015.42) feet to a point located at north 903261.4363, east 992642.3903;

Thence running through the land of the grantor on a course of north eighty-nine degrees fifty-nine minutes zero seconds east (N 89° 59' 00" E) a distance of one thousand six hundred eighty-five and eighty-three hundredths (1685.83) feet to a point located at north 903261.9253, east 994328.2162;

Thence running through the land of the grantor on a course of south forty-one degrees thirty-eight minutes three seconds east (S 41° 38' 03" E) a distance of one thousand eight hundred eight and twentyseven hundreds (1808.27) feet to the aforementioned point of beginning.

Said parcel contains three hundred seventy-three and forty-one hundredths (373.41) 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.


WOLFDEN
E: 994328.22
N: 903261.93
N 89° 59' 0" E
1685.83'
E: 992642.39
N: 903261.44
S 41° 38' 3" E
1808.27'
N 44° 2' 53" E
2015.42'
E: 991241.14
N: 901812.84
E: 995529.58
N: 901910.42
S 29° 56' 43" W
1784.33'
N 26° 35' 16" E
2130.70'
E: 994638.89
N: 900364.29
E: 990287.51
N: 899907.46
S 46° 22' 44" W
2213.56'
N 3° 39' 6" W
1359.68'
E: 990374.11
N: 898550.54
E: 991752.00
N: 898613.49
E: 993036.45
N: 898837.19
S 80° 7' 13" W
1303.79'
S 87° 23' 4" W
1379.33'
LEGEND
Area Proposed for Rezoning
Easting and Northing Coordinates are NAD 83 State Plane Maine East, units are US Survey Feet. Directions are in Degrees, Minutes, Seconds relative to True North. Distances are in US Survey Feet.
N
0
550
1,100
Feet

Appendix B. Figure 2-1, Conceptual Site Plan, Dated April 13, 2023

Map ID	Facility Name
1	SOLAR FACILITY (APPROX.)
2	LOW GRADE ORE STORAGE PAD
3	SNOW STORAGE
4	PRE-TREATMENT WATER STORAGE POND
5	WATER TREATMENT FACLITY
6	ELECTRICAL SUBSTATION
7	BACK-UP POWER GENERATION (DIESEL OR PROPANE)
8	POST-TREATMENT WATER STORAGE POND
NA	WATER RECHARGE AREA #1 (NOT SHOWN)
10	FIRE WATER PUMPHOUSE
11	SANITARY SUBSURFACE DISPOSAL SYSTEM
12	PARKING FACILITY
13	WAREHOUSE
14	OFFICES AND MINE RESCUE FACILITY
15	CORE SHACK AND STORAGE
16	LAYDOWN (EQUIPMENT/SUPPLIES STORAGE)
17	MAINTENANCE SHOP
18	EQUIPMENT FUELING STATION
NA	WATER RECHARGE AREA #2 (NOT SHOWN)
20	WASTE ROCK STORAGE PAD #1
21	BACKFILL PLANT
22	ORE (MILL FEED) STORAGE PAD #1
23	BLAST SHACK
24	MINE ACCESS (PORTAL)
25	EAST VENTILATION RAISE
26	ORGANICS STORAGE
NA	WATER RECHARGE AREA #3 (NOT SHOWN)
28	HEADFRAME AND HOIST
29	ORE (MILL FEED) STORAGE PAD #2
30	WASTE ROCK PAD #2
31	TEMPORARY EXPLOSIVES STORAGE
32	WEST VENTILATION RAISE
NA	WATER RECHARGE AREA #4 (NOT SHOWN)
34	EXISTING SITE ROAD
35	PROPOSED SITE ROAD
36	SECURITY GUARD HOUSE/GATE
37	SECURITY FENCING
NA	WATER RECHARGE AREA #5 (NOT SHOWN)
NA	WATER RECHARGE AREA #6 (NOT SHOWN)
NA	UNDERGROUND MINING FACILITIES (NOT SHOWN)

LEGEND:

- MAJOR CONTOURS (1125)
- MINOR CONTOURS (1124)
- STREAM
- EXISTING SITE ROAD
- VERNAL POOLS
- ASA - ARCHEOLOGICAL SENSITIVE AREAS
- 400-FEET REZONING SETBACK BUFFER
- PROPOSED REZONING
- OLD REZONING
- WETLAND
- FACILITIES DESIGN (14)
- WATER COLLECTION AREA
- PHASE II (POST YEAR)
- PROPOSED SITE ROAD
- DRAINAGE DIVIDE
- SECURITY FENCE
- SECURITY GATE
- CLEARING LIMIT

NOTES:

1. CONTOUR INTERVAL = 5FT.
2. TOPO CONTOURS ARE FROM LIDAR DATA (NOAA.GOV), MARCH 2021.
3. INITIAL WETLAND, VERNAL POOL AND STREAM DATA WERE COLLECTED BY WOOD AND OTHERS IN MAY-JUNE OF 2020. ADDITIONAL WETLAND, VERNAL POOL, AND STREAM DATA WERE COLLECTED BY STANTEC-JUNE OF 2022. WETLANDS WERE DELINEATED IN ACCORDANCE WITH THE US ARMY CORPS OF ENGINEERS WETLAND DELINEATION MANUAL WETLANDS TECHNICAL REPORT (Y-87-1) AND THE NORTH CENTRAL AND THE NORTHEAST REGIONAL SUPPLEMENT (ERDC/EL TR-12-1).
4. WETLAND BOUNDARIES WERE DELINEATED WITHIN THE REZONE BOUNDARY AND MAY CONTINUE BEYOND THE SHADING SHOWN.
5. THE STREAMS ON SITE WERE DELINEATED FOLLOWING THE NATURAL RESOURCE PROTECTION ACT (NRPA) IDENTIFICATION GUIDE FOR RIVERS, STREAMS, AND BROOKS (DANIELSON, 2018).
6. VERNAL POOLS (VPS) WERE IDENTIFIED ON MAY 17, MAY 18, AND MAY 28, 2020, BASED ON PHYSICAL CHARACTERISTICS OF THE FEATURES INCLUDING ISOLATED WATER BODIES, WATER STAINED LEAVES, WATER LINES, SPHAGNUM MOSS AND THE PRESENCE OF HYDROPHYTIC VEGETATION AS WELL AS EGG MASS COUNTS OF SPOTTED SALAMANDERS AND WOOD FROGS WERE COLLECTED.
7. WATER COLLECTION AREAS INCLUDE AREAS WHERE STORMWATER RUNOFF IS COLLECTED BY BERMS, SWALES, OR OTHER CONVEYANCE METHODS AND TREATED AT THE WATER TREATMENT FACILITY DUE TO POTENTIAL IMPACT FROM MINE OPERATIONS.

VERSION 12

0 125 250 500
SCALE IN FEET

Prepared/Date: WJW 4/13/23
Checked/Date: MAP 4/13/23

WOLFDEN
Wolfden Mt Chase, LLC
Rezoning Petition
Location: T6 R6, Maine

wsp
USA Earth & Environment
511 Congress Street, Suite 200, Portland, ME. 04112 (207) 775 - 5401

CONCEPTUAL
SITE PLAN
Project 3617-22-7547
Figure 2-1

Appendix C: Table 6-1, Existing and Proposed Structures or Development Area within the Project Area, April 2023

Update to Table 6-1: Existing and Proposed Structures or Development Area within the Project Area, April 2023

Map ID	Type of Structure and Use (specify if temporary)	Duration in Place if Temporary (specify days or months)	*Current* Exterior Dimensions (LxWxH) in feet	*Proposed* Exterior Dimensions (LxWxH) in feet			Approximate Distance (in feet) of structure from nearest:					
				Length	Width	Height	Road	Property line	Lake or pond	River or stream	Wetland	Ocean/Coastal Wetland
Existing Structures												
	No existing stuctures	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Proposed Structures												
1	Solar Facility	15 years plus	NA	2290	885	5 to 8	0	430	3150	150	80	NA
2	Low Grade Ore Storage Pad	10-15 years	NA	676	355	65	0	962	2840	1070	254	NA
3	Snow Storage	10-15 years	NA	535	210	30	0	492	2726	850	392	NA
4	Pre-Treatment Water Storage Pond	10-15 years	NA	485	292	10	170	504	2339	470	260	NA
5	Water Treatment Facility	10-15 years	NA	160	92	30	118	560	2608	750	380	NA
6	Electric Substation	15 years plus	NA	50	40	30	156	897	2633	930	540	NA
7	Back-up Power Generation (Diesel or Propane)	10-15 years	NA	30	20	10	140	993	2704	1020	440	NA
8	Post-Treatment Water Storage Pond	10-15 years	NA	400	260	10	276	695	2354	633	109	NA
NA	Water Recharge Area #1 (Not shown)	10-15 years	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
10	Fire Water Pumphouse	10-15 years	NA	24	16	10	180	842	2338	570	230	NA
11	Sanitary Subsurface Wastewater Disposal System	10-15 years	NA	66	42	-2 to 4	198	1363	2790	760	300	NA
12	Parking Facility	10-15 years	NA	298	128	0	130	1030	2620	930	144	NA
13	Warehouse	10-15 years	NA	100	60	30	10	403	2788	940	465	NA
14	Office and Mine Rescue Facility	10-15 years	NA	84	100	20	0	1428	2985	990	210	NA
15	Core Shack and Storage	10-15 years	NA	60	60	20	90	1580	3020	920	450	NA
16	Laydown (Equipment/Supplies Storage)	10-15 years	NA	157	155	0	10	1260	2755	753	100	NA
17	Maintenance Shop	10-15 years	NA	80	60	30	230	1438	2870	810	370	NA
18	Equipment Fueling Station	10-15 years	NA	50	40	12	132	1622	3060	880	550	NA
NA	Water Recharge Area #2 (Not shown)	10-15 years	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
20	Waste Rock Storage Pad #1	10-15 years	NA	850	192	50	0	1463	3080	410	220	NA
21	Backfill Plant	10-15 years	NA	50	50	20	122	1707	3080	840	500	NA
22	Ore (Mill Feed) Storage Pad #1	10-15 years	NA	436	125	35	140	1568	3140	390	270	NA
23	Blast Shack	10-15 years	NA	30	30	12	322	1524	3070	690	360	NA
24	Mine Access (Portal)	10-15 years	NA	280	60	-32	265	1465	3030	520	190	NA
25	East Ventilation Raise	10-15 years	NA	10	10	10	110	992	2490	640	130	NA
26	Organics Storage	10-15 years	NA	456	425	15	566	430	4600	782	190	NA
NA	Water Recharge Area #3 (Not shown)	10-15 years	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
28	Headframe and Hoist	10-15 years	NA	62	52	120	438	1178	4088	500	152	NA
29	Ore (Mill Feed) Storage Pad #2	10-15 years	NA	305	145	40	490	916	3930	560	110	NA
30	Waste Rock Storage Pad #2	10-15 years	NA	305	145	40	360	982	3900	460	110	NA
31	Temporary Explosives Storage	10-15 years	NA	60	30	8	30	620	3820	390	270	NA
32	West Ventilation Raise	10-15 years	NA	10	10	10	695	558	4600	750	230	NA
NA	Water Recharge Area #4 (Not shown)	10-15 years	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
36	Security Guard House/Gate	10-15 years	NA	20	10	10	0	356	2710	800	290	NA
37	Security fencing	10-15 years	NA	NA	NA	6	0	417	3195	180	113	NA
NA	Water Recharge Area #5 (Not shown)	10-15 years	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
NA	Water Recharge Area #6 (Not shown)	10-15 years	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
NA	Underground Mining Facilities (Not shown)	10-15 years	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA

Appendix D: Figure 27-1, Custom Zone Development Areas, Dated April 13, 2023

Map ID	Facility Name
1	SOLAR FACILITY (APPROX.)
2	LOW GRADE ORE STORAGE PAD
3	SNOW STORAGE
4	PRE-TREATMENT WATER STORAGE POND
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NA	WATER RECHARGE AREA #6 (NOT SHOWN)
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LEGEND:

- 1125 MAJOR CONTOURS
- 1124 MINOR CONTOURS
- STREAM
- EXISTING SITE ROAD
- VERNAL POOLS
- ASA - ARCHEOLOGICAL SENSITIVE AREAS
- 400-FEET REZONING SETBACK BUFFER
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- FACILITIES DESIGN
- WATER COLLECTION AREA
- PHASE II (POST YEAR)
- PROPOSED SITE ROAD
- DRAINAGE DIVIDE
- SECURITY FENCE
- SECURITY GATE
- CUSTOM ZONE DEVELOPMENT AREAS
- SOLAR FIELD AREA
- MAJOR MINE DEVELOPMENT PHASE I
- MINE DEVELOPMENT PHASE II

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VERSION 5

0 125 250 500
SCALE IN FEET

Prepared/Date: WJW 4/13/23
Checked/Date: MAP 4/13/23

WOLFDEN
Wolfden Mt Chase, LLC
Rezoning Petition
Location: T6 R6, Maine

wsp
USA Earth & Environment
511 Congress Street, Suite 200, Portland, ME. 04112 (207) 775 - 5401

CUSTOM ZONE DEVELOPMENT AREAS
Project 3617-22-7547
Figure 27-1