RFI 150
Pebble Project EIS

Request for Information

Title/Subject:	**Siting Criteria for Main Water Management Pond**
Requestor:	AECOM
Date Transmitted:	10/21/2019
Recipient:	Pebble Limited Partnership
Response Requested by:	11/01/2019
Rationale:	Additional information is needed on the siting of the main Water Management Pond to evaluate if the proposed location is the only reasonable and practicable location, or if there are other reasonable and practicable locations that would avoid and minimize environmental impacts, including impacts to aquatic resources.
Describe the Information Requested and Level of Detail:	Please provide: 1. Information on the siting criteria considered for the main WMP; 2. Identify and describe any other locations or designs considered for the main WMP; 3. Explain why the proposed main WMP location is the preferred alternative, 4. Demonstrate that the main WMP location has fewer environmental impacts than other locations or designs that were considered; and 5. Describe how the main WMP was optimized to avoid and minimize impacts to aquatic resources.

Recipient Response Form

Date Received from USACE:	Click here to enter text.
Response from Recipient (Describe Information Requested to the Level of Detail Requested; Provide Attachments as Needed):	Click here to enter text.
List Number and Type of Response Attachments:	RFI 150_Siting Criteria Main WMP Response.pdf
Date Returned to USACE:	Click here to enter text.

AECOM Intake Form

Date Response was Received:	10/25/2019
Received by:	AECOM
Describe any Follow-up Related to this RFI:	Click here to enter text.

From: James Fueg, Pebble Limited Partnership

To: Shane McCoy, US Army Corps of Engineers

Date: October 24th, 2019

The questions presented in RFI 150 on the Main WMP are addressed below:

1. *Information on the siting criteria considered for the main WMP;*

The primary design criterion for the Main WMP is the ability to store up to 56,000 acre-feet of excess site water plus the capacity for the design storm event and required freeboard for the specific site evaluated. The total capacity for each site varies depending on the drainage area of the site. For example, the 56,000 acre-feet reported as the operating capacity for the proposed Main WMP does not include the design storm event storage and freeboard for that location. If those are included, the absolute volume of the proposed Main WMP is about 69,000 acre-feet.

Additional factors evaluated for each alternative included:

- Total footprint and catchment area to minimize the amount of water requiring management and downstream flow impacts.
- Overall site layout, prioritizing site compactness and the NFK or SFK drainages. The site could not displace other facilities (TSFs) that would increase the overall site footprint or impact.
- Distance and head requirements with respect to the primary facilities (mill, bulk TSF, pyritic TSF) to minimize energy required for pumping water.
- Minimizing impacts to wetlands and streams.
- Minimizing impacts to anadromous waters.
- Geotechnical design considerations and cost.

2. *Identify and describe any other locations or designs considered for the main WMP;*

PLP evaluated eight alternatives, including the proposed Main WMP location. Each alternative met the water storage requirement, is located within the general project area, and is located within either the NFK or SFK drainages. The same general design features (earth fill embankment, lined facility) were used for each alternative. The locations considered are shown in Figure 1 – Water Management Pond Alternatives.

3. *Explain why the proposed main WMP location is the preferred alternative,*

The optimal location for the Main WMP from an engineering and operability perspective is one that is:

- Central to the primary site facilities that involve significant volumes of water, namely the processing plant, the bulk TSF, the bulk TSF seepage collection pond, the pyritic TSF, and the highest volume discharge location (NFK). This minimizes the construction requirements for large tailings and water pipelines, their associated footprint impacts, and spill potential associated

with longer pipelines. It also minimizes the energy required to pump water and tailings, which is significant for facilities of the size proposed.

- Similar in elevation to the processing plant, associated water treatment plant, and highest volume discharge location (NFK) to further minimize the energy required to pump water.
- Below, or similar in elevation to, the bulk TSF, bulk TSF seepage collection pond, and pyritic TSF to allow for low head pumping (and potentially the use of the syphons for the TSFs) to move water from the TSFs into the Main WMP, further reducing energy requirements. This is also an important consideration for managing water levels in the TSF in the event of an extended loss of primary power generation.
- Downstream of site facilities to allow for gravity-driven capture and management of the maximum amount of site runoff water, further reducing the need for additional pumping.

The proposed location best meets all the criteria outlined above due to its location and elevation. However, further evaluation of the feasibility of the other alternatives was completed.

- Complete removal of the pyritic TSF and return of the pyritic tailings and PAG waste rock to the open pit is considered a key part of the project proposal that brings overarching environmental benefits to the plan. This requires a pyritic TSF location of sufficient size adjacent to the pit, with the proposed pyritic TSF location being the only feasible one identified. Therefore, the use of that location for the pyritic TSF takes priority and main water management pond alternatives 1 and 2 were determined to be unfeasible due to their overlap with the pyritic TSF footprint.
- Alternatives 3, 4, 5, 6, and 7 did not meet any of the engineering criteria outlined above. These locations would result in significant additional construction and operational impacts associated with the management and movement of water between facilities. They would also increase the spill risk due to the requirement for much longer tailings and process water pipelines.
- Alternatives 5 and 6 would share a portion of the embankment with the proposed pyritic TSF. The potential for fluctuating loading and the lack of physical access to the southern face of the southern embankment of the pyritic TSF during operations was identified as a significant risk factor and as a result these alternatives were determined to be unfeasible. This overlap would also have impacted the effective construction and full use of the pyritic TSF.
- Alternatives 4, 5, and 6 would all require high main embankments (315-425 ft) and are in a steep-sided valley, which presents significant challenges with the construction and maintenance of an effective liner given a fluctuating water pond level. As a result these alternatives were determined to be unfeasible.
- Alternative 7 was determined to be unfeasible due to the distal location, the significant topographic crest between the site and other facilities outlined above, and the large drainage area impacted which would have resulted in significant additional water management requirements.
- Alternative 3 was determined to be unfeasible due to the size of the required pond, the proximity to the open pit, and the large drainage area impacted.

Based on the above analysis, the proposed Main WMP was the only feasible location identified.

4. *Demonstrate that the main WMP location has fewer environmental impacts than other locations or designs that were considered;*

Table 1 shows a comparison of the primary environmental factors evaluated for each alternative. These factors include:

- Total footprint area
- Wetlands acres impacted (the calculation was completed using the mosaiced wetlands layer with mosaics assumed to be 100% wetlands consistent with the approach in the DEIS)
- Stream miles impacted using the National Hydrography Dataset
- Anadromous stream miles impacted using the Anadromous Waters Catalog
- Total catchment area, which is a comparative analog for additional flow impacts and water treatment requirements

Maximum embankment height, which is an engineering factor, is listed to support the discussion in question 3 above.

The cells marked in red indicate where the impacts for a factor exceed the proposed Main WMP.

Alternative	Footprint (acres)	Wetland Acres (Mosaics at 100%)	Stream Miles Filled (NHD)	Anadromous Stream Miles Filled (AWC)	Catchment Area (acres)	Maximum Embankment Height (ft)
Alternative 1	1009	596	5.2	0.0	1837	190
Alternative 2	781	471	2.9	0.0	1263	225
Alternative 3	1520	1234	8.8	3.4	6795	30
Alternative 4	538	112	3.5	2.3	3145	315
Alternative 5	640	148	3.5	1.2	2755	410
Alternative 6	582	235	2.2	0.0	918	425
Alternative 7	698	122	4.5	0.8	3857	310
Main WMP	1002	164	3.3	0.5	1607	190

Table 1 – Environmental Factors

The following can be noted from the table in comparison to the proposed Main WMP location:

- Alternatives 1, 2, 3, and 6 have significantly higher impacts to wetlands.
- Wetlands, flow impacts, and anadromous stream impacts for Alternative 3 are much higher.
- Flow impacts and anadromous stream impacts for Alternatives 4 and 5 are much higher.
- Stream and anadromous stream impacts are higher and flow impacts are much higher for Alternative 7.
- Incorporation of the wetland impacts associated with the seepage collection facilities, support roads, and water pipelines that would be required for alternatives 4, 5, 6, and 7 would significantly increase the associated wetlands impacts. Additionally, access to the base of the

dam during construction and operations would most likely require construction of a road down the SFK valley with a significant number of stream crossings.

5. *Describe how the main WMP was optimized to avoid and minimize impacts to aquatic resources.*

As outlined in questions 3 and 4, the proposed Main WMP location offers by far the best location from an engineering, construction, and operability perspective. Furthermore, the location minimizes requirements for pipeline construction and pumping with the associated environmental benefits. Analysis of the listed environmental factors also shows that the proposed location has the lowest overall level of impact to the environment.

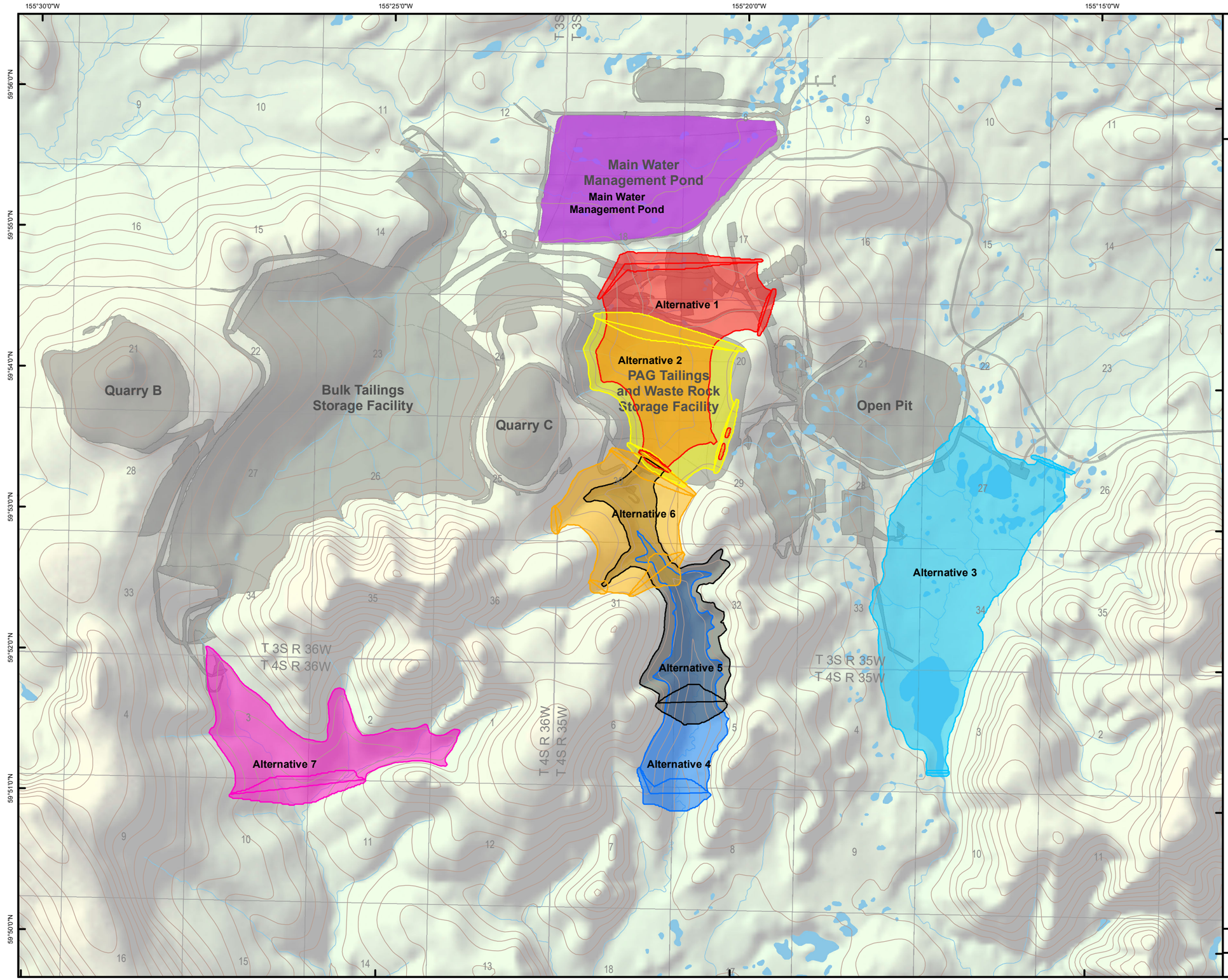
Once the location of the proposed Main WMP was selected, additional work was undertaken to minimize both direct impacts to aquatic resources and to further reduce the potential for impacts to aquatic resources resulting from unplanned releases of contact water from the facility.

Measures to reduce direct impacts include:

- Relocating the Main WMP overburden stockpile to reduce wetlands impacts.
- Moving the NFK water discharge location approximately one mile upstream to reduce flow impacts in the NFK resulting from the construction of the Main WMP.

Measures to reduce the potential for impacts resulting from unplanned releases of contact water include:

- Revising the proposed design to require excavation of the embankment foundation to bedrock to increase the seismic stability of the facility.



THE pebble PARTNERSHIP

FIGURE 1

Water Management Pond Alternatives

Water Managment Pond Alternatives

- Alternative 1
- Alternative 2
- Alternative 3
- Alternative 4
- Alternative 5
- Alternative 6
- Alternative 7
- Main Water Management Pond
- Mine Site Footprints
- Mine Site Access Road
- 50' Contour (Existing)
- Township Boundary
- Section Boundary

0 0.5 1 1.5 Miles

N

Scale 1:50,000

Alaska State Plane Zone 5 (units feet)
1983 North American Datum

File: PLP_Fig1_WaterManagmentPondAlts.mxd	Date: 10/22/2019
Version: x	Author: HDR

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