Reclamation Permit Application #70-011988
Mining Operations and Reclamation Narrative
Littlerock Sand and Gravel Mine

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1.0 INTRODUCTION

Black Lake Quarry, LLC (applicant) has prepared this surface mine application (SM8A and associated documents) for continued and expanded mining at the Littlerock Mine at 10200 Littlerock Road SW, near Tumwater, WA. This reclamation permit application is for:

1. Combining of the Littlerock I mine (formerly the Fairview Pit, DNR #70-11988) and the Littlerock II mine (formerly the Hard Rock Pit, DNR #70-12633) under a single reclamation permit with WADNR.
2. Expanding the extraction area to 160 acres, as approved by Thurston County.
3. Increasing the WDNR Reclamation Permit area to 242 acres to accommodate the reclamation of un-mined, but previously disturbed areas.
4. Extending sand and gravel extraction below the water table over an approximately 24 acre area.
5. Implementing a phased extraction and reclamation plan.
6. Reclaiming areas of Littlerock I that were previously disturbed under DNR #70-11988.

This reclamation application, including this narrative, WADNR forms, maps, and figures are being submitted to reflect the April 30, 2018 decision by the Thurston County Hearings Examiner to approve the mine expansion plan under the Thurston County Mineral Code. Maps and WADNR forms are in Attachments 1 and 2, respectively. The Thurston County Hearing Examiner's decision is provided as Attachment 3 to this narrative. The corresponding SEPA determination is provided at Attachment 4.

2.0 SITE DESCRIPTION

2.1 Site Location

The Littlerock mine will expand into Section 18 T17N R2W and Sections 13 and 24 of T17NR3W, approximately 1 mile west of Littlerock Road SW. The address is 10201 Littlerock Road SW. A map of the mine location is included in the permit drawings.

- AECOM "Groundwater Monitoring Report for February 2015 Littlerock Resource Recovery Site - Special Use Permit No. 2009100282" dated June 19, 2015.
- AECOM "Groundwater Monitoring Report for September 2015 Littlerock Resource Recovery Site - Special Use Permit No. 2009100282" dated December 17, 2015.
- Gardner Bay Consulting, LLC "Groundwater Monitoring Report for April 2016 Littlerock Resource Recovery Site - Special Use Permit No. 2009100282" dated November 15, 2016.
- Gardner Bay Consulting, LLC "Groundwater Monitoring Report for September 2016 Littlerock Resource Recovery Site - Special Use Permit No. 2009100282" dated December 30, 2016.
- Gardner Bay Consulting, LLC "Groundwater Monitoring Report for March 2017 Littlerock Resource Recovery Site - Special Use Permit No. 2009100282" dated June 23, 2017.

These documents provide an assessment of water well information near the Mine, recent and past water quality findings, and hydrogeologic cross sections. Copies of the report are provided electronically on the USB storage contained in the cover sleeve (USB Exhibits SS1, SS2, and SS3). These studies concluded that the unconfined aquifer beneath the mines flows from east to west and discharges to the Black River wetland system. Numerical groundwater modeling predicted that impacts to groundwater flow and discharge resulting from the below water mining were not significant or adverse and could be mitigated through on-site water management strategies and by controlling the thickness of lake bed sediment. Sampling and analysis of groundwater at and near the Mine show that past mining has not impacted groundwater quality or quantity in the unconfined aquifer.

With the County's approval of the expansion permit includes conditions that the sampling and monitoring program be expanded and new groundwater monitoring points and protocols be established for on-going hydrogeologic monitoring. The expanded points and protocols are presented in the attached Groundwater Monitoring Program Plan.

4.0 MINING AND RECLAMATION

4.1 Mine Operations and Reclamation

The expanded mine area will be developed in seven (7) individual phases as described below and as shown on Sheet 4 of 8 of the attached drawing set. Each phase will be reclaimed to final grade and planted coincident with the start of the subsequent phase. All mining will occur above seasonal high groundwater with pit floor elevations ranging from 160 to 135 feet above sea level, except during Phase 7, when mining will extend to the base of the unconfined aquifer, which is expected at to occur at 100 feet above mean sea level. The areas of each phase and the volume of material remaining to be removed is summarized in Table 1.

Mined sand and aggregate will be transported via truck or conveyor to the portable wash plant located in un-reclaimed operating areas. Reclamation described below will be performed using existing on-site soils, supplemented with clean material imported from off-site locations. A clean fill plan is provided as Attachment 5. Native trees will be planted on slopes and a

mixture of trees and grasses will be planted in flatter areas along the pit floor. Existing areas disturbed during the mining of LRI that are no longer required for mine access or operations will be reclaimed with trees and grasses this reclamation permit.

PHASE 1 - Phase 1 will commence in the southeast quadrant of Parcel 12718310000. Phase 1 will begin with the removal of top soil that will be stockpiled on Phase 2 areas. Mining will proceed from

TABLE 1 - SUMMARY OF EXTRACTION BY PHASE

Phase	Area	Acres	CY (in place)
1	1,457,518	33.46	1,824,010
2	1,027,145	23.58	1,675,775
3	875,992	20.11	792,245
4	568,022	13.04	837,930
5	1,423,976	32.69	713,405
6	417,740	9.59	539,720
Lake	1,041,084	23.90	1,156,760
TOTAL	6,811,477	156	7,539,845

north to south with all mining occurring above the water table. The final pit floor elevation will be between 160 and 150 feet.

Coincident with Phase 1, some of the area disturbed during the operation and mining of LRI will be reclaimed. This includes removing the former wash plant, all stockpiles, and equipment located outside the Thurston County approved extraction area. An approximately 12-acre area north of the scale house and west of Ashley Creek will be reclaimed with stockpiled top soil and new plantings. The original LRI mine foot print will remain un-reclaimed until completion of Phase 7. This area will continue to serve as an operations area with scales and stockpiled materials. A small area of previously disturbed slope at the southwestern most corner of the parcel (south end of Phase 6 area) will also be reclaimed during Phase 1.

At completion of extraction in the Phase I area, the area will be reclaimed by establishing and plowing final grades, spreading top soil, and installing plants as shown on the plans. The western boundary will not be planted so it can be used for stockpiling Phase 2 top soil. This area will be planted once the top soil is harvested for reclamation of other areas.

PHASE 2 - Phase 2 will extend westward from the Phase 1 area. Top soil removed from the Phase 2 area will be stockpiled along the Phase 1 boundary. Phase 2 mining will occur entirely above the water table, with the final pit floor elevation between 150 and 145 foot.

The Phase 2 area will remain active until after completion of Phase 7 as most of the area will be reclaimed by the lake and the remnant area is needed for lake dredging.

PHASE 3 - Phase 3 will extend westward from the Phase 2 area and to the south into the former LRII mine. Phase 3 is parallel to the BPA easement and will remove sand and gravel to an elevation between 145 and 140 feet. Most of the top soil has been removed from Phase 3 and stockpiled as a berm along the western boundary of Phase 5. This berm will remain in place as to not impact wetlands adjacent to the west side of the berm. Remaining Phase 3 top soil will be stockpiled in the Phase 5 area. All Phase 3 mining will occur above the water table.

The northern portion of Phase 3 will remain active until the completion of Phase 7 when it will be reclaimed as part of the pit lake. The southern portion of Phase 3 will be reclaimed coincident with the start of Phase 4 by establishing 2h:1v side slopes along the eastern boundary and a gentle slope (1%-2% slope) across the western portion. Final grades will be plowed, top soil applied and plantings installed.

PHASE 4 - Phase 4 will extend to the south through Parcel 13724140000. Phase 4 will begin with the removal of top soil that will be used to reclaim the southern portion of Phase 3. Excess top soil will be combined with Phase 3 soils in the Phase 5 area and used to create a perimeter berm on the south and east sides of Phase 4. All Phase 4 mining will occur above the water table with final pit floor elevations between 140 and 145 feet.

Phase 4 will be reclaimed after reaching permitted mine elevations. Reclamation will involve creating 2h:1v side slopes on the east and south boundary and matching elevations on the north and west. Top soil will be retrieved from existing stockpiled sources to provide for planting.

PHASE 5 - Phase 5 will extend from south to north across the western portion of the former LRII mine (parcels 13713440000 and -13724110000). This phase will involve some mining of residual sources above the water table, which is expected to occur between 135 and 140 feet. This area was previously cleared of top soil, which is stock piled adjacent to the wetland boundary on the western perimeter of this area.

Phase 5 will be reclaimed as the mining moves from south to north. Reclamation will involve the placement of top soil and native plantings. The existing perimeter berm along the west side of the Phase 5 mining area will remain in place so top soil will be derived from other on-site sources (the parts of Phases 2 and 3 that are reclaimed as pit lake) and supplemented as needed with on-site amendments (silt, clay, mulch) and/or imported top soil. Final reclamation will establish 2h:1v slopes between the berm crest and the mine floor. Phase 5 will be finished to allow surface run-off from the reclaimed area to infiltrate along the western perimeter of the reclaimed mine.

PHASE 6 - Phase 6 will extend westward from the operating area to western boundary of Parcel 12712831000. Top soil will be used to complete Phase 5 reclamation. All mining will occur above the water table with the pit floor reaching an elevation of 135 feet.

Phase 6 will be reclaimed by establishing 2h:1v slopes along the mine perimeter, sloping into the mine. The pit floor will then be raised between 5 and 10 feet to accommodate changes to the groundwater table that are expected as a result of constructing Phase 7. At final grade, top soil will be retrieved from the stored top soil pile on the eastern edge of Phase 1.

PHASE 7 Phase 7 will extend between the mine floor and elevation 100 feet. Phase 7 is expected to encounter the groundwater table at approximately 140 feet along its western extents. Mining is proposed to start in the southwest corner of the proposed pit lake. A drag line would be established on the southern shore and by dragging from east to west, establish the lake bottom and 1.5h:1v inward slopes along the southern and western lake boundaries. The drag line would then move to the north part of Phase 7 and begin dragging from west to east until reaching the eastern lake boundary. Final Phase 7 mining will be performed on the northern lake to extend the lake into the operating area and establish final slopes on the north shore. During mining, surface water runoff will be directed to the pit lake.

Phase 7 will be reclaimed as a pond consistent with the Washington Division of Geology and Earth Resources Open File Report 96-2 or the equivalent guidance document in place at the time of the final reclamation permit. Shoreline vegetation and habitat functions will be installed and monitored until established. Top soil will be retrieved from remaining stockpiles developed during the mining of LRI.

Coincident with Phase 7 reclamation, the remaining un-reclaimed areas of Phase 1, Phase 2, Phase 3, and the former LRI area will be reclaimed by establishing final grades, spreading top soil and planting.

In addition to the recovery of sand and gravel, the mine will operate several accessory uses, that have been approved in permits for current mining. These include:

- Concrete crushing and recycling
- Asphalt recycling
- Gravel crushing and washing
- Minor equipment maintenance

4.2 Top Soil Management

Top soil and sub soil that were removed during mining activities on LRI are currently stockpiled in berms on the LRI area. This material should be sufficient to re-cover the LRI disturbed areas and the Phase 6 area. With the completion of the pit lake, which will not require top soil, the stock piled top soil from LRI and retained topsoil from Phases 1 and 2 will be sufficient to supplement topsoil needs to reclaim Phases 3 and 5. Should supplemental top soil be required to complete reclamation of any area, it will be imported from a local source per the clean fill plan or manufactured on site using fine-grained soils and mulch.

5.0 Erosion Control

The mining plan is for all on-site water to infiltrate to the ground within the mine perimeter. Run-off will be directed either to the pit lake, or during operations, to the west side of Phase 5 where it currently is routed and infiltrates. Final grading will include swales and small topography controls that will direct run off to the infiltration areas. Slopes will be softened with planting mounds and clustered plantings to reduce on-site erosion. The closed depression created on the western side of Phase 5 allows water to infiltrate on site and recharge the wetlands to the west. The future pit lake will also serve as a run-off collection area for Phases 1, 2, parts of 3, and 6. The two collection areas will provide sufficient storage to contain rainfall events.

6.0 Revegetation

All disturbed areas, including areas disturbed during the mining of LRI will be replanted with 2 planting zones. Zone A consists of trees and tall shrubs. Zone B includes smaller shrubs and grasses. Sheet 8 of 8 shows the approximate location of zones. The planting schedule is shown in Table 2. A schematic of zone planting around the pit lake is shown in Figure 1.

Table 2 **Restoration Planting Plan**

Common Name	Scientific Name	Location, Size & Spacings	Totals
TREES AND TALL SHRUBS (300 plants per acre)			
Big-leaf maple	*Acer macrophyllum*	1-Gallon container minimum/ 18" height/ 10' on center spacing	150
Douglas fir	*Pseudotsuga menziesii*		200
Western red cedar	*Thuja plicata*		100
Western hemlock	*Tusga hetrophylla*		100
Vine maple	*Acer circinatum*		125
Sitka willow	*Salix stichensis*		100
Pacific willow	*Salix lucida* ssp. *lasiandra*		50
Red elderberry	*Sambucus racemose*		75
MEDIUM SIZED SHRUBS (400 shrubs per acre)			
Red-osier dogwood	*Cornus stolonifera*	1-Gallon container minimum/ 18" height/ 8' on center spacing	100
Salal	*Gaultheria shallon*		250
Black twinberry	*Linicare involucrate*		50
Oregon grape	*Mahonia aquilfollium*		100
Nootka or wild cluster rose	*Rosa nutkana, R. pisocarpos*		100
Thimbleberry	*Rubus parviflorus*		50
Western salmonberry	*Rubus spectabilis*		100
Sword fern	*Polystichum munitum*		200
Common snowberry	*Symphoricarpos albus*		250
GRASSES (Orchard Grass, red fescue, bluegrass) 20#/acre. Fertilizer 200#/acre.			

Planting inside the perimeter berm will not occur until all mining activities are complete and final perimeter grades are achieved. This will allow top soil stored in the perimeter berm to be placed on reclaimed surfaces and used to support revegetation plans. All

transferable plants growing on the berm will be transplanted during final reclamation. Trees and shrubs may be clustered to create variation in the revegetation of the lake shore, and industrial vs. residential land uses. Below is a schematic depicting the variable slope and planting scheme.

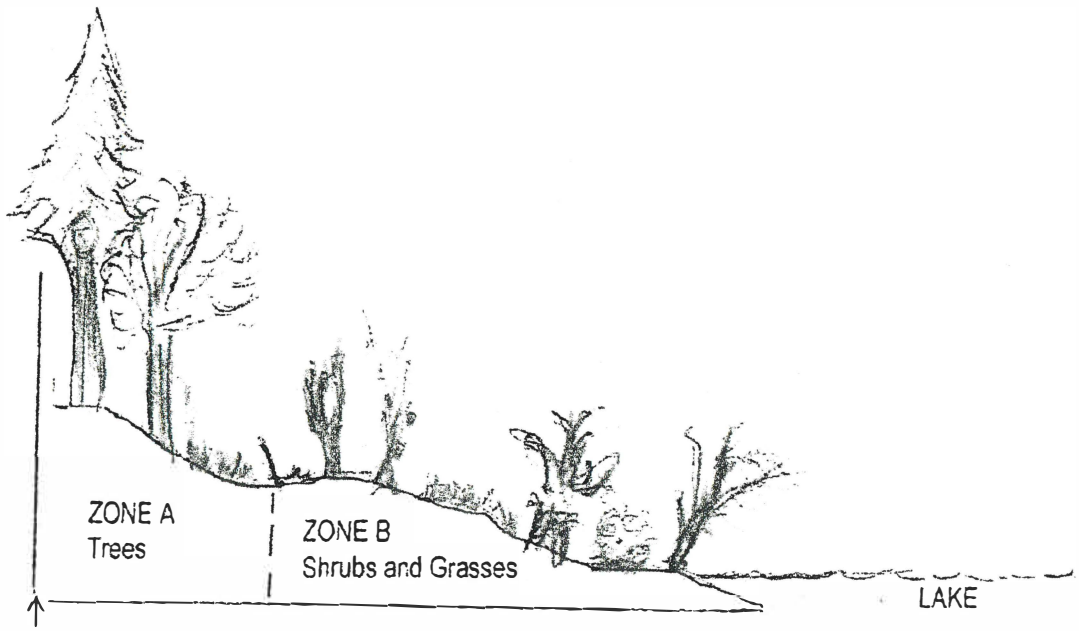

FIGURE 1 SCHEMATIC OF RECLAMATION PLANTING PLAN