

6.4.4 EXHIBIT D – Extraction Plan

The mining plan shall supply the following information, correlated with the affected lands, map(s) and timetables:

- (a) description of the method(s) of mining to be employed in each stage of the operation as related to any surface disturbance on affected lands;
- (b) earthmoving;
- (c) all water diversions and impoundments; and
- (d) the size of area(s) to be worked at any one time.
- (e) An approximate timetable to describe the mining operation. The timetable is for the purpose of establishing the relationship between mining and reclamation during the different phases of a mining operation. An Operator/Applicant shall not be required to meet specific dates for initiation, or completion of mining in a phase as may be identified in the timetable. This does not exempt an Operator/Applicant from complying with the performance standards of Rule 3.1. If the operation is intended to be an intermittent operation as defined in Section 34-32.5-103(11)(b), C.R.S., the Applicant should include in this exhibit a statement that conforms to the provisions of Section 34-32.5-103(11)(b), C.R.S. Such timetable should include:
 - (i) an estimate of the periods of time which will be required for the various stages or phases of the operation;
 - (ii) a description of the size and location of each area to be worked during each phase; and
 - (iii) outlining the sequence in which each stage or phase of the operation will be carried out. (Timetables need not be separate and distinct from the mining plan, but may be incorporated therein.)
- (f) A map (in Exhibit C - Pre-Mining and Mining Plan Maps(s) of Affected Lands, Rule 6.4.3) may be used along with a narrative to present the following information:
 - (i) nature, depth and thickness of the deposit to be mined and the thickness and type of overburden to be removed (may be marked "CONFIDENTIAL," pursuant to Rule 1.3(3)); and
 - (ii) nature of the stratum immediately beneath the material to be mined in sedimentary deposits.
- (g) Identify the primary and secondary commodities to be mined/extracted and describe the intended use; and
- (h) name and describe the intended use of all expected incidental products to be mined/extracted by the proposed operation.
- (i) Specify if explosives will be used in conjunction with the mining (or reclamation). In consultation with the Office, the Applicant must demonstrate pursuant to Rule 6.5(4), Geotechnical Stability Exhibit, that off-site areas will not be adversely affected by blasting.
- (j) Specify the dimensions of any existing or proposed roads that will be used for the mining operation. Describe any improvements necessary on existing roads and the specifications to be used in the construction of new roads. New or improved roads must be included as part of the affected lands and permitted acreage. Affected land shall not include off-site roads which existed prior to the date on

6.4.4 EXHIBIT D – Extraction Plan

which notice was given or permit application was made to the office and which were constructed for purposes unrelated to the proposed mining operation and which will not be substantially upgraded to support the mining operation.

Describe any associated drainage and runoff conveyance structures to include sufficient information to evaluate structure sizing.

Prologue: Extraction of natural resources for rock products is essential to the well-being of a community. The urban infrastructure served by development of construction materials is a local and transitional benefit. The more remote these resources are from the need, the greater the cost to the private and public community. Unlike fixed urban impacts to the landform and area ecosystems, reclamation and restoration of extracted lands allow for preservation of natural buffers, and complementary alteration of both natural and human systems.

Commencing on the family farm in 1948, the Varra family combines nearly 73± years of operational experience that serves as testimony to a history of sound and thoughtfully executed operations of this kind. For the Two Rivers Sand Gravel and Reservoir Project, lands not otherwise occupied for Developed Water Resources will be improved to the highest possible end-use. Post Extraction Uses beyond the Primary Use of Developed Water Resources will likely comprise continuing and diverse general agricultural uses; as well as possible light residential, commercial, or industrial uses; as determined by right, or as otherwise authorized by the governing authority.

The restoration of above ground lands to native grasses and attending large water bodies are a baseline asset to area wildlife terrestrials and avifauna. Beyond good will, there are continuing landowner philosophical and economic enticements to further benefit area wildlife populations and diversity to further the value and enjoyment of the modified and surrounding lands. These efforts laid down over time involve the considerable experience of the landowner, staff, and other resources, including periodic consultation with the Colorado Division of Wildlife, the U.S. Natural Resources and Conservation Service, Colorado State University Natural Resource Departments and Extension Service, and a multitude of other natural resource professionals; including those highly qualified organizations and professionals who have already contributed to the Exhibits included under this application.

Setting: The project area lies along and within the flood plain of the South Platte and Big Thompson Rivers. The predominant location of extraction is proximal to the geological delta found near the existing confluence of the two rivers (hence, the Two Rivers Sand Gravel and Reservoir Project (Two Rivers

6.4.4 EXHIBIT D – Extraction Plan

Project; or TRP); and overlies bedrock that varies in depths as shallow as 20± feet in some locations, and more commonly 30-45± feet in depth from the surface.

The permit area is flanked on its immediate western boundary by agricultural operations. To the north, residential uses expand, as remnant agriculture clings to the rising ground. Unfettered agricultural and rangeland uses still thrive as they extend beyond the permit boundary east, west, and south of the permit boundary along the alluvial influences of the two rivers. To the immediate east of the TRP, riverine lands are under active transformation into a created wetland bank. It should be understood that agricultural practices will remain active over the project area until converted by resource recovery and reclamation.

America's first Transcontinental Railroad was being discussed in the 1840's, and surveyed in the 1850's. The railroads began the transformation of the American West on 10 May 1869 at Promontory Point, Utah. Railroad routes were being planned for this location and surrounding lands likely soon after the end of America's Civil War. The lines planned over the Two Rivers parcels were never built. Other lines were built nearby, like the Union Pacific's Dent line, that runs parallel to this day along the south bank of the South Platte River; and below the TRP.

With area railroads came increased settlement, and with population the nature of the landscape became modified to complement growing market economies of agriculture and commerce since the early 1870's. We estimate the lands hugging the two rivers were farmed and the topography gradually manipulated for agriculture following the early establishment of Greeley and LaSalle, Colorado; in 1869-70.

Area crops are commonly in corn, but this has not always been the case. We postulate that near the onset of the Twentieth Century sugar beet farming began to feed the demand of area sugar beet mills, further evidenced by speculative railroad routes over and near the parcel, itself. So, the appearance of the land that we see today, is commonly different than what it appeared at the time of settlement.

In order to improve the area and extent of tillable lands, even early agricultural practices included landform modification to aid the plow. Prior floodplain modification is evidenced today by the historical placement of utilitarian levees flanking the existing agricultural fields along the outer cottonwood tree lined escarpments of each river. The levees are maintained to this day, and form perimeter access to the rivers and tillable fields.

6.4.4 EXHIBIT D – Extraction Plan

The later creation of farm to market County Road 396 eased access to the areas' agricultural fields, yet consequentially separates the fields at the TRP with its graveled surface, and subsequent rights-of-way and easements.

The levees, public roads, cottonwood corridors and area tributaries are visible in the different map exhibit aerial images, and will not be impacted by planned extraction. All planned operations have conforming setbacks, and levee access will remain limited to wheeled vehicles during operations.

Today, the upper terrace where extraction operations are planned, supports agricultural crops above the lower stream terrace formed further below and beyond the perimeter levees and cottonwood corridors that frame the adjacent active stream channels. The Fields designated for resource recovery (Central Field and North-West Field; as shown on Exhibit C - 2: Extraction Plan Map) lie over a nearly level upper terrace of the two rivers. The South Platte River borders the southern and eastern extent of planned extraction, and the Big Thompson River intersects the permit area north of the Fields.

The stream terrace itself is a riparian area that supports on its flanking escarpment an uneven aged stand of Cottonwood trees. The uneven aged trees suggest this segment of the river has experienced some scouring in the past from periodic, yet commonly limited, flooding; which encourages natural regeneration of Cottonwoods.

To determine the influence of past activities on groundwater, twelve (12) Piezometer Wells were located along and within the entire TRP boundary. Groundwater level information here, is based on 8.5 years of continuous monthly measurements at twelve (12) piezometer locations identified on the included Exhibit G: Water Information Map. Recorded groundwater depths vary in elevation below the surface, with a general (weighted) mean depth of $8.40\pm$ feet.

Groundwater elevations are influenced by crop irrigation practices that run generally from April through September, and may occasionally lag into the middle of October. During this time groundwater depths may be skewed higher in elevation to the extreme North-eastern extents of Central Field, yet with few exceptions, groundwater elevations over the entire site remain significantly deeper than $5.11\pm$ feet from the surface, year over year, over the entire TRP area.

Using the approximate surface elevation at the extreme eastern boundaries of North-West Field and Central Field, and noting that groundwater fluctuations will commonly meet at $8.40\pm$ feet below the surface, yet rarely rise more than $5.11\pm$ feet from the surface, we determined the Static Water Level using the

6.4.4 EXHIBIT D – Extraction Plan

upper limit of 5.0± feet. The Cyan colored contour shown on Exhibit G: Water Information Map represents the Static Groundwater Elevation at 4675' at North-West Field, and 4673' at Central Field. Since completed reservoirs will be lined to meet State of Colorado Water Resources specifications and requirements, and since lined basins will ultimately equalize with the surrounding groundwater elevations, the Static Water Levels shown should reasonably reflect those of the both the lined or unlined state; and represent a proper reflection of the optimal surface area of the water over the finished basins. Raptor Materials, LLC has sufficient water to meet the circumstances and obligations of both the lined and unlined states; and as reflected under Exhibit G: Water Resources Information; until and unless the reservoirs have an approved liner, the Operator will dedicate sufficient waters to secure the reclamation of the resulting basins in the unlined state.

Planned Field Activities: The 409.23± acre parcel boundary forms the permit boundary, as reflected on exhibit maps. All lands under its direct control within the 409.23± acre permit area, are affected lands under C.R.S. 34-32.5-103(1), respective of this permit application. As a result, any changes required in the nature of planned extraction or reclamation will be made only through the Colorado Office of Mined Land Reclamation (OMLR), by Technical Revision only. If lands are needed beyond the designated permit boundary, those lands will be secured for the active OMLR permit by Amendment.

Within the permit boundary, there are two* (2) identifiable areas designated for primary extraction, the description of which will help to explain the nature of planned extraction and reclamation. The Primary Areas of Extraction are as follows:

162.57± Acres = Primary Extraction (***) **Central Field:** 15-25± years (2023- '48) **
 41.04± Acres = Primary Extraction **North-West Field:** 4-8± years (2045- '53) **
 203.61± Acres = Total Primary Extraction *
 205.62± Acres = Affected Lands beyond planned extraction limits
 409.23± **TOTAL**

(*) NOTE: The third area of secondary extraction is limited to approx. 5.860± Acres for a Plant Processing/Stockpile Area Pond, as further indicated, below; and is not included in this total.

(**) NOTE: Final reclamation will add up to five (5.0±) years to the anticipated Life of the Mine, subsequent to completion of extraction and removal of all marketable materials. Life of Extraction is an approximation, and could lengthen or shorten the overall life of the mine depending upon market conditions.

(***) NOTE: Of the 162.57± Acres of Primary Extraction, 4.09± Acres comprise an existing Farm Yard & Structures with residence. These facilities may be leased or

6.4.4 EXHIBIT D – Extraction Plan

otherwise utilized as an Office and Support/Storage facilities for Operations, potable water and sanitation. Lands identified within a designated Extraction Limit may not be extracted, including the Farm Yard area, as circumstances warrant according to the discretion of the Operator.

Of the outlying 205.62± Acres, 5.80± Acres is planned as secondary extraction for the Plant Processing/Stockpile Area Wash Pond.

The remaining 199.82± acres of lands within the permitted limits may comprise planned or existing permanent access roads, levees, previously affected areas, and areas of minor to no disturbance (including public transportation corridors, right-of-way's, easements, permanent structures, river and stream terrace and cottonwood corridor buffer areas), or other farm land features or structures; or as otherwise determined from included maps and aeriels. These lands may also include essential support operations, including: parked vehicles, equipment, plant site equipment and processing stockpiles, etc., not otherwise explicitly indicated or shown, but reasonably associated with operations of like kind, and may be varied in location and extent over time; or otherwise, field fit within the permit boundary as warranted.

Wetland conditions appear confined within portions of the stream terrace and bank-full stage of the rivers, and along segments internal to the Evans Canal. Extraction will form a depression (basin) within the floodplain as shown in Exhibit C-2: Extraction Plan Map. Temporary above ground fill may occur within the floodplain, and as part of this permitted activity, provided the above ground volume does not exceed the below ground volume created by extraction. All product stockpiles and processing will occur within the city limits of Evans under this application, and North and outside of the floodplain boundary of the 100-year floodplain of the Big Thompson River. The floodplain extent will be visually marked in the field to better assure the integrity of the floodplain.

Material transport of raw materials from extraction locations to the plant site will be by mining equipment hauling within the extraction limits.

Known structures and landowners, including above and below ground utility owners, located on and within 200± ft. of the permit boundary, are shown on Exhibit C-1: Existing Conditions Map. Exhibit S: Stability Analysis – provides certification from a registered professional engineer that these structures will not be harmed by planned extraction profiles and extents.

¹For lands within the Extraction Limits, only those structures, easements, and rights-of-way shown in Exhibit C-2: Extraction Plan Map, are anticipated to

¹ Adequacy Item 18

6.4.4 EXHIBIT D – Extraction Plan

remain from those shown in Exhibit C-1: Existing Conditions Map. If changes to existing or possible revised structures, easements, or right-of-way are in any manner retained, or where they might occur subsequent to OMLR approval of this application, then a Technical Revision will be submitted to update Exhibit C-2: Extraction Plan Map. All established setback distances from planned activities to any remaining features will be maintained regardless.

Operations or related Processing Areas and Wash Pond are not intended to affect existing structures, Easements, or Right-of-Ways within the Planned Extraction Limits identified as remaining and are designed to avoid and retain any remaining structure, Easement or Right-of-Way on the surface, and subsurface. Future agreements may be reached allowing mining in areas currently identified as being restricted to mining containing certain structures, Easements or Right-of-Ways.

Exhibit C-1 shows and identifies all these features understood by us, and the respective Surveyed information, and correlated Observation and Title Work upon which they are based and represented on the attending Maps. The Maps are not Surveys. They are Maps and as such, they comprise a reasonable representation of all site features, but must not be relied upon by themselves exclusively for location purposes. Maps and features are not a substitute for field identification of underground structures and will rely upon location services of the 811 service. Setbacks where required will be based on the actual field locations of site features.

Exhibit C-2 shows the remaining Oil Wells and Lines within Planned Operations at the time of the Submittal. Any revisions, additions, or modifications of residual Oil Wells or Lines will be avoided as represented on updated Maps and Revisions to the Permit, and consistent with Setback Distances identified in this submittal. Removal of any Existing Structures such as the Oil and Gas structures and or lines, will be updated on required Annual Reports, or by Technical Revision, as warranted, or as otherwise directed consistent with Colorado Statute.

Access to the Theater of Operations: Entry into the permitted areas is dependent upon the needs and necessary management of continued agricultural activities during operations, as well as essential management and mobility within the active areas of extraction, processing; and correlated need for transportation of human resources, equipment, and product. Human resources for operations, heavy equipment, and haul traffic will occur based upon the desired and dynamic activities necessitated by time and circumstance within the designated Fields. Access points for continued agricultural, extraction, and plant site operations are shown * on Exhibit C-2:

6.4.4 EXHIBIT D – Extraction Plan

Extraction Plan Map, as follows (NOTE: Access purpose and usage may change in time from that indicated here-in. Also, General Existing Dimensions and length of existing access roads are represented in the aerial images on the Exhibit Maps relative to the Access locations detailed, below. Modifications may occur as needed and will be reported in OMLR Annual Reports.):



* Entrance 1: Farmstead entrance. Limited Access. Note: Visitors will first access operations by checking in at an established plant scale-house, not here.

Entrance 2: Primary Access to the lower boundary of Central Field.

Entrance 3: Primary Western Access to the North-West Field.

Entrance 4: Primary Eastern Access to the Wash Pond and designated Plant Site.

Entrance 5: Adjacent Parcel Existing Access.

Entrance 6: Oil & Gas Access into the Western Section of Central Field.

Entrance 7: Primary Eastern Access to the North-West Field.

Entrance 8: Primary Northern Access to Central Field.

Entrance 9: Primary Northern Access into the designated Plant Site location.

Entrance 10: Internal Access from Adjacent Lands.

Entrance X – Agricultural/Mechanical

Entrance WV – Agricultural/Mechanical – Westervelt R-O-W Access to adjacent Wetland Bank

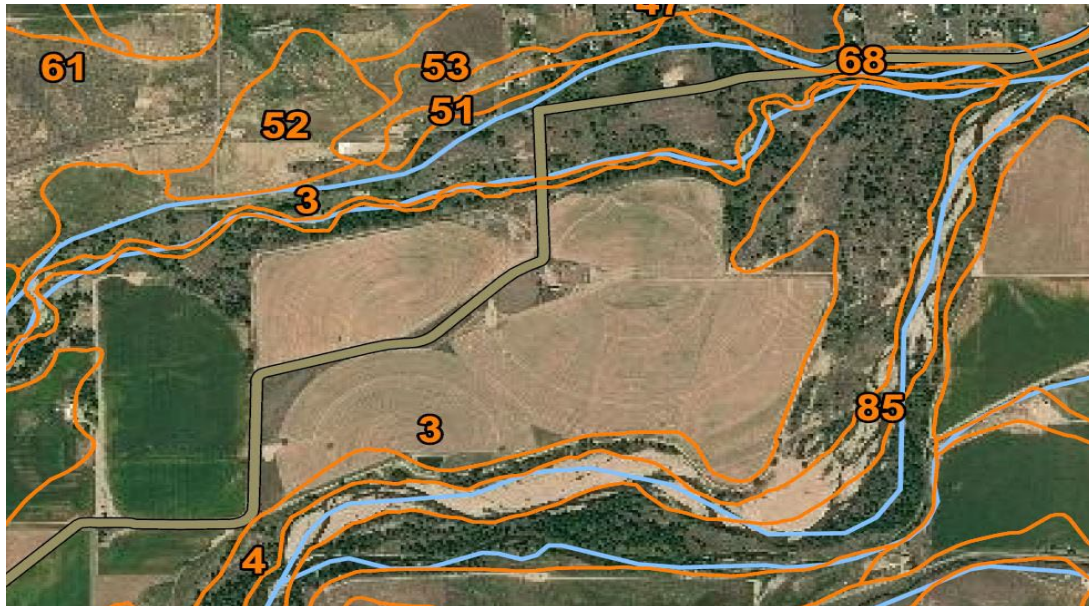
Existing roads outside of the permit boundary are shown on Exhibit C-1: Existing Conditions Map. Existing on-site internal access roads are also visible to scale in the aerial information provided under Exhibit C-2: Extraction Plan Map and other map exhibits included with this submittal. In general, Operations will predominantly utilize unmodified existing agricultural field access roads (unless otherwise indicated), which will themselves be subsequently extracted in time where they fall within the extraction limits shown on Exhibit C-2: Extraction Plan Map. No other defined roads within the Extraction Limits will occur except for the temporary paths created by extraction equipment, or otherwise determined by subsequent Revision to the permit.

All existing agricultural roads outside of the designated extraction limits will be retained according to the desires of the landowner. The same shall form part of the final end use of the reclaimed lands, unless otherwise indicated in this submittal or by subsequent permit revision. For purposes of this submittal, all lands within the indicated permit boundary will be considered affected lands,

6.4.4 EXHIBIT D – Extraction Plan

but only those locations between the existing access roads, and which otherwise remain above the anticipated static water level of the resulting basins, will be soiled (where soil is absent) and seeded to establish vegetation consistent with the approved reclamation plan.

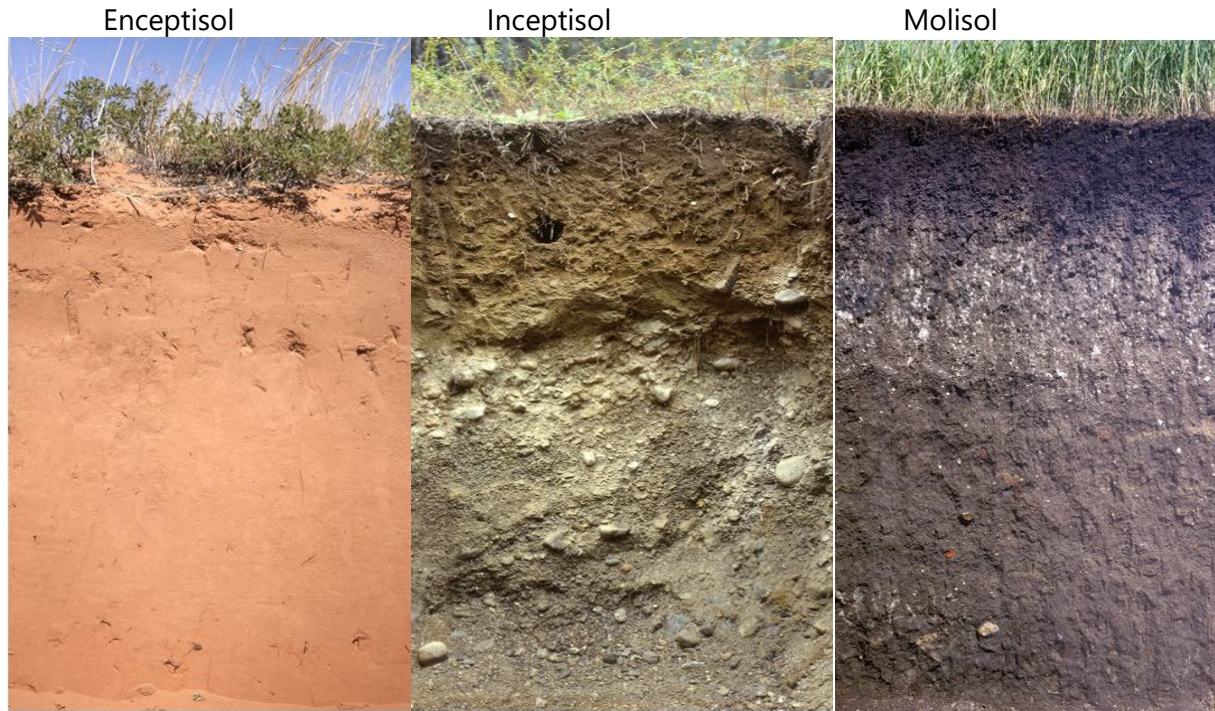
Area and Site Soils: Soil formation surrounding and within the project area varies according to diverse geologic, natural, and man-caused influences. The United States Soil Conservation Service, Soil Surveys, are the foundation source for understanding area soils as identified on Soil Survey Maps by their Soil Unit Number. Unit 3 Soil formations for Weld County are not easily typified or quantified as other soil units, for a reason; natural and man-made alteration and use of the land over time.



Planned extraction limits will affect predominantly Unit 3 Soils. Extract from Exhibit I/J.

Unit 3 soils commonly form within floodplains. As a result, differing states of soil formation may exist within the soil unit designation; such as soils with little horizon development like Entisols and Inceptisols. Mollisols with deep well-developed horizons may exist in the minority and the near fringe of planned extraction. Refer to graphic above, and below.

6.4.4 EXHIBIT D – Extraction Plan



Soil Morphology

With over a century of agricultural manipulation of area agricultural fields, prior mixing or importation of soils for land leveling, or flood plain management in the creation of levees, may have dramatically altered the original native soil profiles and properties. The native A profile of the upland terrace found within the agricultural Fields at the TRP, is predominantly modified as a plow (Ap) layer of $6.0\pm$ to $8.0\pm$ inches. The historic practice of incorporating manure into the plow layer should have served to maintain the organic base and quality of the cropped soils and accelerated soil horizon formation and development where it was lagging. Since the cropped soils have been irrigated, care should be taken not to salvage soils greater than $12.0\pm$ inches in depth to avoid mixing of potential accumulated salts.

Generally, total soil depth (including all soil horizons) over the property may vary from approximately zero inches to four [$4.0\pm$] feet, yet predominantly having a shallow Ap plow layer of six to eight [$6-8\pm$] inches, lacking a B profile and having the potential for a mixture of silt, clay, or gravel outcrops over random areas. Gravel depth may occur from the surface to the underlying Fox Hills Sandstone varying at approximately $30.0\pm$ to $45.0\pm$ feet over the entire property. Suitable soil in excess of that needed for reclamation will be made commercially available to meet area infrastructure and residential demand.

Soils found within the entire project area are described more thoroughly under Exhibit I – Soils Exhibit, and the attending Exhibit I/J – Soils and

6.4.4 EXHIBIT D – Extraction Plan

Vegetation Map, shown not to scale, above. Additional geologic considerations are also included under Exhibit S – Stability Analysis.

Area and Site Geology: The area geology is typified by mixed alluvial and aeolian development, that is commonly alluvial in nature at lower elevations. As viewed in the Geologic Timeline and shown in Figure 1, below, the aggregate deposit is found between the Laramie and Fox Hills Sandstone formations, both formed during the Upper Cretaceous Period nearly 65 million years ago. The alluvium of the river valleys and aeolian sands that cap the hills formed of the Laramie formation north of the permit area are more geologically recent, developing during the Quaternary Period.

				MILLIONS OF YEARS AGO	
ERA	PERIOD		EPOCH	NOW	
Cenozoic	Quaternary		Holocene		0.1
			Pleistocene	Late	0.8
	Tertiary	Neogene		Early	1.8
			Pliocene	Late	3.6
				Early	5.3
			Miocene	Late	11.2
		Middle		16.4	
		Early		23.7	
		Paleogene	Oligocene	Late	28.5
				Early	33.7
			Eocene	Late	41.3
				Middle	49.0
	Early			54.8	
	Paleocene		Late	61.0	
		Early	65.0		
Mesozoic	Cretaceous		Late		99.0
			Early		144
	Jurassic		Late		159
			Middle		180
			Early		206
	Triassic		Late		227
			Middle		242
			Early		248

Geologic Time - Livescience.com

6.4.4 EXHIBIT D – Extraction Plan

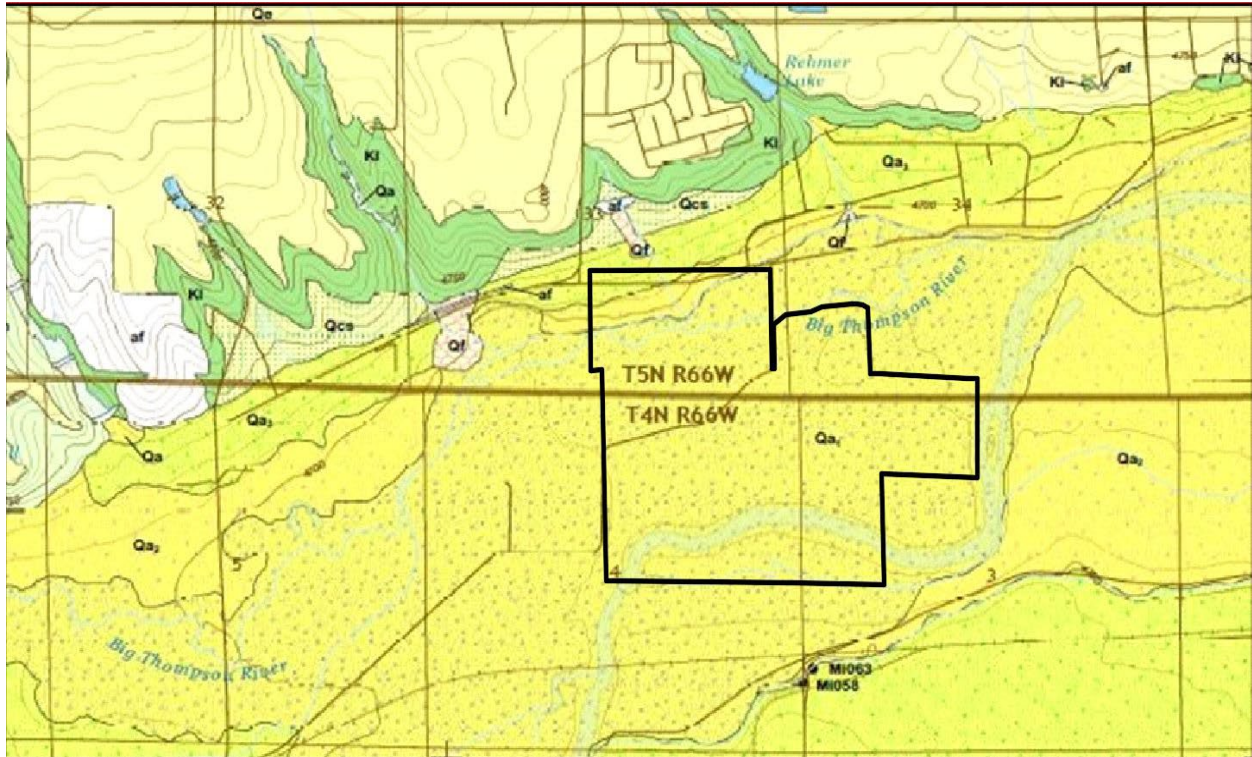


Figure 1: Area Geology Map

The areas of extraction are in the alluvium whose general morphology, area and extent are better understood in Figure 1 above, and 2 and 3, below (Colorado Geological Survey).

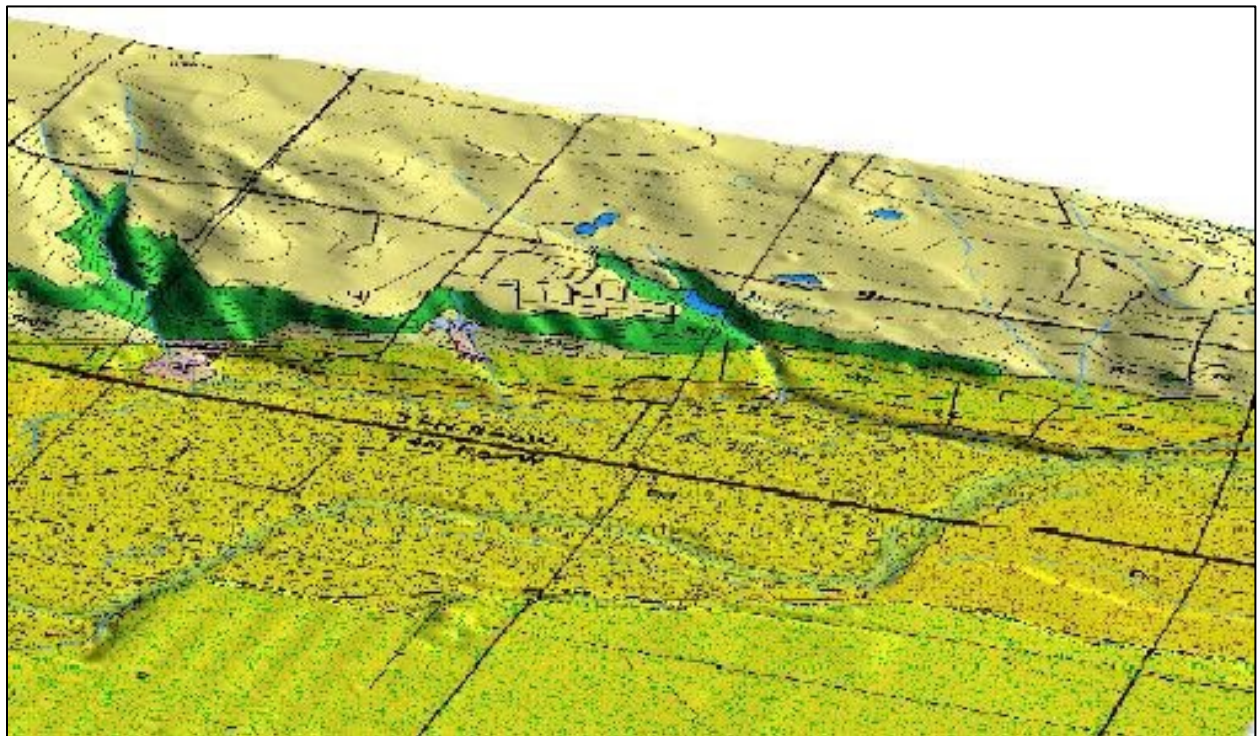


Figure 2: Area Geology 3D Oblique View

6.4.4 EXHIBIT D – Extraction Plan

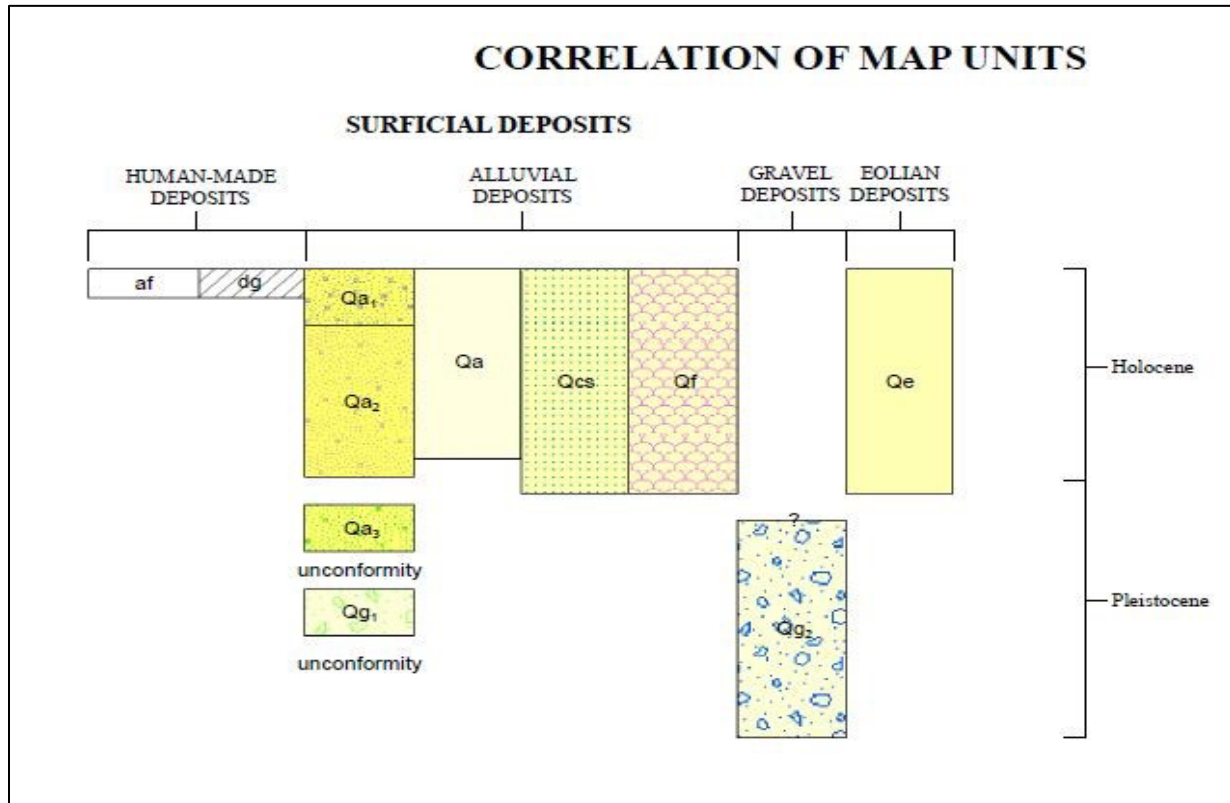


Figure 3: Surficial Deposits relative to areas shown in Figure 2, above.

The aggregate deposits of Qa1 and Qa2 (Figure 3, above) form the bulk of the deposit planned for extraction. Depths vary by field from approx. 30 to 45 feet. Depths are shallower as the adjacent hillside rises to the north; while the deposit dips deeper toward the South-East of each designated Field.

Soil Salvage: Resource recovery will commence by first removing the upper [A profile/plow layer] six to twelve inches of soil [six (6.0±) inches typical], combined with existing grass or crop stubble. Removal will utilize scrapers or excavators, aided by dozers where necessary, and hauled to the Northeast Section of Central Field. All extraction and surface related activities detailed in this application will occur under an approved Fugitive Dust Permit issued by the Colorado Department of Public Health and Environment (CDPHE).

Until resoiling activity occurs, where harvested soils have been stockpiled and remain undisturbed for reclamation or sale, they will be seeded with the mixture specified under Exhibit L - Table L-1: Primary/Preferred Revegetation Seed Mixture. A stabilizing cover of native vegetation may take up to three years to fully establish the desired cover. In the event the native seed mixture fails, an optional mixture of predominantly introduced species will be used as a fall back to better assure a stabilizing cover of vegetation. Still, using the

6.4.4 EXHIBIT D – Extraction Plan

preferred native seed mixture offers opportunity to gauge the potential performance of the selected species prior to utilizing it over larger areas requiring reclamation later in the life of the resource recovery operation.

Once vegetation is established over the initial reclamation soil stockpiles, they will likely remain untouched for the life of the operation until final reclamation of remaining affected lands takes place. Where concurrent reclamation is possible, operations will utilize soil in an over the shoulder method when practical. In this manner, reclamation is expedited without increasing soil stockpile volumes while reducing expenditures related to labor, handling, and time.

²Soil salvaged as stated above will range six to twelve inches in thickness. Resulting volumes of salvaged soil will range from 131,100± - 262,300± cubic yards for Central field, and from 33,100± - 66,300± cubic yards for the North West field. Salvaged soil will generally be stockpiled on top of the Westervelt soil storage area in the North-East section of Central field. Smaller short-term stockpiles may be created along the pit edges where regrading is imminent or in progress and resoiling will follow.

Resoiling volumes required above the waterline of the lined water storage will require much less soil. The resoiling areas are estimated at 11.19 ± acres for Central field and 4.76 ± acres for the North West field with volumes at a nominal six inches of soil cover at 9,027 ± and 3,840± cubic yards respectively. Excess soil not needed on site may be sold.

Dewatering: As extraction activity progresses into the aggregate profile, groundwater must generally be removed in advance through the use of pumps and subsequent discharge into area tributaries. A complete dewatering evaluation was performed by AWES in their report of 27 July 2020, as provided at the back of Exhibit G: Water Information. The report concludes that ‘the results of analytical and numerical solutions indicate that the proposed mine dewatering activities will not adversely affect the regional groundwater hydrology.’ The reader is further assured that all discharge of waters will be conducted under an approved CDPHE discharge permit.

Initial dewatering of the property in preparation for extraction and resource recovery will occur by establishment of a dewatering pump and/or well in the Southern boundary near an existing agricultural pond. The point of discharge is on Exhibit G: Water Information Map. Other discharge locations may occur in time as needed and otherwise approved under the applicable

² Adequacy Item 23/32

6.4.4 EXHIBIT D – Extraction Plan

CDPHE discharge permit requirements. Subsequent CDPHE approved discharge locations will be field fit and the location updated in the following OMLR Annual Report.

Active Resource Recovery: Following soil salvage, the balance of the extractable deposit will be removed to the depth of the unconsolidated or weathered bedrock, transported by mining equipment to the plant site pit run, and subsequently manipulated as desired by screening, crushing, washing, and other methods to size and properly dimension the earth product into diverse merchantable materials for sale. Resource recovery will commence from the northwest corner of the initial area of extraction, establishing a keyway moving south, and then moving eastward via an advancing face. The planned first discharge point is shown near the Southern boundary of Central Field.

There are no fixed sequences or phases scheduled as part of the extraction plan. Instead, Fields are used instead of Phases to describe the activities, since each Field can be accessed concurrently instead of sequentially with the other; as reflected or otherwise updated as part of required OMLR Annual Reports. Under this method, extraction is 'pulsed.' As such, the rate of extraction and subsequent reclamation will slow or quicken according to influences of the markets, weather, and internal logistics. Flexibility in Operations encourages better outcomes when adapting to changing circumstance or unexpected field conditions, and may involve actively working different fields or different parts of the same field as necessary.

³For Two Rivers, there are four Fields, intended as sequential areas of extraction unless market demands warrant concurrent development:

- 121.86± Acres - Central Field – Center Section
- 15.58± Acres - Central Field – North-East Section
- 25.09± Acres - Central Field - West Section
- 41.04± Acres - North-West Field

Generally, flexibility aids integrity of operations and encourages optimizing operational activity and subsequent reclamation of affected lands. Therefore, any method that accelerates the extraction timeline will be utilized, and should be encouraged to better engage the unpredictable elements and variables that reasonably affect the capacities of the Operator.

Exhibit C-2: Extraction Plan Map, shows the location and planned extraction limits, general direction of extraction, and related features described above;

³ Adequacy Item 17: Aspects of detail required. Other aspects addressed elsewhere.

6.4.4 EXHIBIT D – Extraction Plan

along with features made obvious in the included aerial image of the permit location and surrounding lands.

⁴Exhibits C-2: Extraction Plan Map and L: Financial Warranty Map, shows Initial Extraction proposed to begin in the yellow hatch area shown on the Exhibit L Map. The direction of extraction will advance to the east. As extraction advances, the perimeter keyway (dewatering trench⁵) will be established for the 121.86± acre Center Section of Central Field. The initial area of extraction is the anticipated mining advance in the first 5 years of extraction comprising approximately 51.1± acres and will leave approximately 70.76± acres, that may be extracted in later years. The Initial Extraction area is practical as it has no encumbrances and is adjacent to the existing pond⁶.

The initial extraction area is bordered to the South along a near 800± foot section of oil and gas line that is pending removal; along with the two oil and gas wells, also pending removal (refer to Exhibit C for ownership details). If or while this infrastructure is still in place, extraction will not occur within 10 feet of these lines, or 25 feet from the wells, as indicated in the setbacks detailed below. Below this gas line is an existing pond and well that will be used as a Settling Basin Area, containing at present a solitary settling basin and pump as a point of discharge of groundwater. This pond may be expanded or added to below this line and may then be extracted itself once discharge is discontinued for Central Field Operations.

Perimeter Keyway Extraction will maintain a perimeter slope no steeper than 1.25H:1V, except for the perimeter shown in red along its extraction limit, and respective toe where cut slopes will not exceed 2.00H:1V; as indicated (refer to Exhibit S: Stability Analysis for additional information). At the toe of the cut perimeter slope is the keyway that runs below the extracted deposit of the basin, into the bedrock, which allows the subsurface waters to flow to the settling basin and discharge pumps necessary to keep the cut basin dry during a time of extraction and reclamation of the affected perimeter slopes.

The keyway dimensions may vary more or less from 4± to 8± feet in depth and 4± to 16± feet in width. Extraction must be broad enough to allow equipment to safely approach the toe and excise the bed dimensions where the resulting channel is sufficient to convey the groundwaters to the settling basin for discharge.

⁴ Technical Revision 01 Item: Modified from first adequacy response to better define the mining and reclamation plan and reference a schedule in Exhibit E. [Let's discuss]

⁵ Adequacy Item 15: Keyway clarification

⁶ Minor edits in this paragraph in response to third adequacy review, noting updates to Exhibit C-2 and readability.

6.4.4 EXHIBIT D – Extraction Plan

Please Note: The graphic representation of the Initial Mining Area and general mining progression is idealized, and may vary in shape, size, and location presented. Annual Reports will report on the nature and extent of affected lands and more properly reflect actual conditions on the ground in a given year of operations.

At anticipated production levels and production only from the Center Section of Central Field, extraction of the remaining area could take 8-10± years, overlapping with initial development of the next field. With sequential development, extraction of the North-East Section of Central Field could take 3-5± years, the West Section of Central Field 4-6± years, and the North-West Field, 6-8± years. Please Note: The time periods will depend on the actual rate of production required to meet market demand, and the average annual advance may also vary with thickness of the sand and gravel and ground conditions. Some flexibility may also be exercised to optimize operations around or through existing infrastructure if scheduled for removal.

Table E-1 provides a projection of mine development and regrading/reclamation. The plan as described in this Exhibit D and also in Exhibit E, is a forecast and may vary according to market conditions with mining and subsequent regrading occurring faster or slower, sometimes significantly so. The geology may also dictate changes in the rate of extraction. If efficiency demands in a higher production demand scenario, up to four separate areas could be developed in the manner described simultaneously. Such changes may happen quickly and would be addressed in the Annual Report. ⁷In discussing this flexing of production and scaling operations up or down with OMLR staff, a concern was raised as to impacts on mule deer habitat if there were separate production areas with a larger area under active production. This has been addressed as having minimal impact in a letter from Ron Beane, Senior Wildlife Biologist with wildlife consultant ERO Resources Corp attached as an addendum to this Exhibit D.

As discussed above and considered in the letter from ERO Resources Corp, Raptor envisions up to four active mining areas (area of active extraction operations) of up to 16 acres could be in production simultaneously for an anticipated maximum active mining area of 64 acres. As noted in the ERO Resources letter, this area is only a small percentage of the riparian corridor within and adjacent to the extraction area and while Raptor would not anticipate exceeding 64 acres of active mining area, small and temporary variances may occur in response to market demands, coordinating operations around existing infrastructure, water management, or to ensure safe operations. The maximum disturbed area will continue to grow over the life of the operation as the post mining land use is lined water storage and as noted by the DRMS, until the basin is fully extracted and lined, and a leak test is

⁷ Adequacy Item 17: Wildlife concern

6.4.4 EXHIBIT D – Extraction Plan

performed and approved by the State Engineer. Progressive regrading and lining however will be performed and is discussed in Exhibit L.

⁸The fifth adequacy review requested Raptor address minimization of impacts to mule deer population in the riparian corridor along the Big Thompson River during construction of the project and during winter. Raptor commits to construction activities will only be conducted during daylight hours and to not leaving open trenches or pits during construction that could result in harm to animals. Raptor also commits to limiting the use of lights on the conveyor in the riparian areas.

Additional information is provided under Exhibit C-1: Existing Conditions Map; which shows all known current and active significant man-made structures located on or within 200 feet of the permit boundary detailed under including creeks, roads, buildings, oil and gas facilities [such as tanks, batteries, wells and lines], and power and communication lines and support structures, easements and rights-of-way; located over the permitted lands or within 200 feet of the same. A listing of the adjoining surface owner's names and addresses located within these areas are listed under Exhibit C Text, correlated with those shown in the afore-mentioned Exhibit C-1: Existing Conditions Map.

The extraction limits assure through the use of setbacks that other interests are not affected by planned extraction. Extraction is set back uniformly at a minimum 10.0± feet from the edge of property lines; easements and rights-of-way; underground gas lines or other underground facilities, irrigation ditches and seep ditch, wells and other structures. ⁹Minor variations may occur in the field over time from those represented on Exhibit Maps. The plans detailed in this application are based upon future events for which minor or temporary departures at any point in time may be evident. To the extent any significant departure in the field occurs in a time and manner not otherwise anticipated in these exhibits, the operator may cure by self-inspection, by observation from OMLR inspection in a timely manner, or by operator-initiated Revision to the Permit or otherwise via clarification in attending required OMLR Annual Reports.

Extraction will not occur closer than 125± feet¹⁰ from the face of a residential structure; unless there is a written accommodation with the owner of the residential structure that allows extraction to occur within a closer stated limit. Extraction will occur no closer than 25± feet from well heads and related above ground facilities. Extraction around well heads will be concurrently backfilled to maintain a 100± foot buffer from the balance of extracted lands. At all

⁸ Fifth Adequacy Response

⁹ Adequacy Item 21

¹⁰ Adequacy Item 22

6.4.4 EXHIBIT D – Extraction Plan

times, safety will take precedent and over-ride all other conditions in time with a matter of safety or emergency respective to any and all aspects of the approved permit.

To minimize the potential of river capture, planned setbacks from the two rivers was evaluated by Flow Technologies (refer to report at the back of Exhibit G: Water Information – titled: ‘Two Rivers Riverside Berm Failure Analysis and Flood Control Mitigation Plan’ of 22 January 2020). The report finds:

‘... that head cutting/erosion will not progress through the full length of a 100-ft riverside berms. It is important to note that should a flood occur that results in head cutting/erosion of a riverside berm, Varra Companies, Inc. will act diligently to restore the damaged areas to pre-flood conditions.

As mentioned, this analysis is conservative and riverside head cutting/erosion is based on the 100-yr flood. There is a small probability that such a flood event could occur during extraction and when the pit is dewatered.

The DRMS in a supplemental adequacy response dated November 17, 2022 challenged the validity of the engineered design approach taken by Flow Technologies despite having accepted it as valid in the past. Raptor Materials believes the approach is valid and is in the process of performing an analysis by alternate methods incorporated in HEC-RAS. This, however, will take time. Raptor has per DRMS suggestion decided to adopt the 400-foot setback from the top of the riverbanks to the top of the pit-side slope based on guidance developed using generic and non-site-specific empirical methods as adopted by the Mile High Flood District whose jurisdiction does not include the proposed operation. Raptor Materials intends after permit approval to present the results of the ongoing engineering evaluation as a Technical Revision to obtain relief from what we are confident are extreme setbacks.

During extraction, a predominantly vertical advancing pit wall (the extraction front) is not anticipated due to the use of excavators in the removal of the material deposits. Excavators provide a great deal of control over the extraction process. The maximum length of the extraction front will likely never exceed the maximum cross-sectional length of the center section of the Central Field as the advancing front moves eastward, or 2,640± feet, or less; in any given direction. The advancing front will result in a moving face with a slope typically equal to or flatter than 1.25H:1V, and commonly not greater than 1.25H:1V along the perimeter of the extraction limits to depth.

The exception to cut perimeter slopes is shown with a distinct Red Boundary on Exhibit C-2: Extraction Plan Map, where cut slopes will not exceed 2H:1V in

6.4.4 EXHIBIT D – Extraction Plan

order to maintain integrity and stability along that designated perimeter area (refer to the AWES Slope Stability Analyses of 23 December 2019, located at the back of this exhibit). Internal transport of extracted materials to conveyor systems or other internal transport; or otherwise by approved public roadways, will be used in the transportation of extracted materials to the designated plant/stockpile location, described in greater detail, below.

Acreage to be affected during the first year of extraction activities include the establishment of the initial Wash Pond and attending Settling Pond(s), Plant Site, and Initial Areas of Extraction and attending means of transportation by ground haulage. While the acreage required for the Plant Site and Wash Pond are not expected to change, the Initial Area of Extraction will expand until concurrent reclamation follows as each location is exhausted of resource.

Although initial extraction may otherwise result in temporary slopes up to 1.25h:1v, all cut slopes will be backfilled with unconsolidated bedrock, overburden (on-site unmerchantable excess materials, or imported inert materials) and soil to advance the reclamation and completion of the desired basins. Final reclaimed slopes and grades will be concurrently established where practical to 3h:1v, or flatter, and at a minimum from 5± feet above to 10± below the expected water level of each location of extraction, and to the basin floor.

Concurrent backfilling and grading of cut perimeter slopes, while desirable, may be obstructed in time and extent by the need to maintain keyways and basin discharge during extraction. Backfilling of slopes can only occur once enough of the floor is exposed to facilitate backfilling and finished grade of extracted basin slopes without interfering with basin discharge operations. This makes concurrent backfill difficult to accurately forecast. Regardless, any completed slope remediation will be indicated in any subsequent OMLR Annual Report.

Cut slopes will cause direct precipitation to drain internally into the resulting basins and are not anticipated to result in any off-site impacts due to erosion or stormwater runoff. The gentle to near flat topography of the area landscape tends to aid in overall stability above the planned areas of extraction. While some erosion of resulting basin perimeter slopes will be evident subsequent to extraction, the advance of reclamation activity over affected lands will provide cover for both near and long-term stability of those lands remaining above water level of the finished basins. All completed slopes above the anticipated static groundwater elevation will be soiled, seeded and stabilized as provided for under Exhibit E - Reclamation Plan.

6.4.4 EXHIBIT D – Extraction Plan

Of the total 203.61± acres of potential extraction, the resulting basins will function as multiple-use reservoirs with a slightly fluctuating combined water surface area covering 187.66± acres. The remaining balance of 37.3± acres of land above the anticipated high-water mark of the reservoirs, and not otherwise committed to existing or planned structures or infrastructure over the parcel, will be stabilized with vegetation; including the anticipated 15.95± acres of basin slopes reflected in the total.

NOTE: Shoreline irregularities and fill to establish and enhance the aesthetic and end-use functions of the resulting basins shown on Exhibit F: Reclamation Plan Map, are illustrative only, as this effect as to location and extent will be field-fit where practical, and may substantively different from that portrayed under the application. The actual location and extent will be identified in subsequent OMLR Annual Reports, and absent there, at the time of any applicable release of a location in part or whole from the permit. Since representations cannot be accurately portrayed in advance, Exhibit F simply identifies the near maximum extent [typical] of the resulting basins or ponds and the potential for shallows during lining and finished grading.

The estimated timetable for extraction, commencing approximately spring to winter 2023; is estimated to take 23-28± years combined, or longer, followed by an additional five years to complete reclamation; or a total estimated life of the mine of 28-33± years; ending approximately winter 2051 to 2056. This is a life of the mine operation and all timetables are estimates and may prove shorter or longer than stated. The final determination will occur five years after the deposit is exhausted and all marketable product has been removed and necessary infill completed at the location to the point of final reclamation as approved or modified under the terms of the permit is completed.

This submittal is unable to fully forecast the maximum extent of affected land expected at any given point in time, beyond an annual basis. As operational extraction and reclamation efforts will vary annually, the timing of extraction, reclamation, and life of operation as forecasts must be based on an initial estimate [refer to Exhibit L - Reclamation Costs], then subsequently verified and adjusted as reasonably determined at the time of the required OMLR Annual Report. If justified by field conditions, a rider to the warranty would follow in due course to reflect current or forecast conditions where such conditions cannot be reasonably attenuated in a timely manner prior to the due date of the next year's Annual Report. This will serve to assure flexibility and confidence in continued operations until completion of the desired end use.

Additional information on the reclamation and restoration of affected lands is identified under Exhibit E: Reclamation Plan. All reclamation will follow

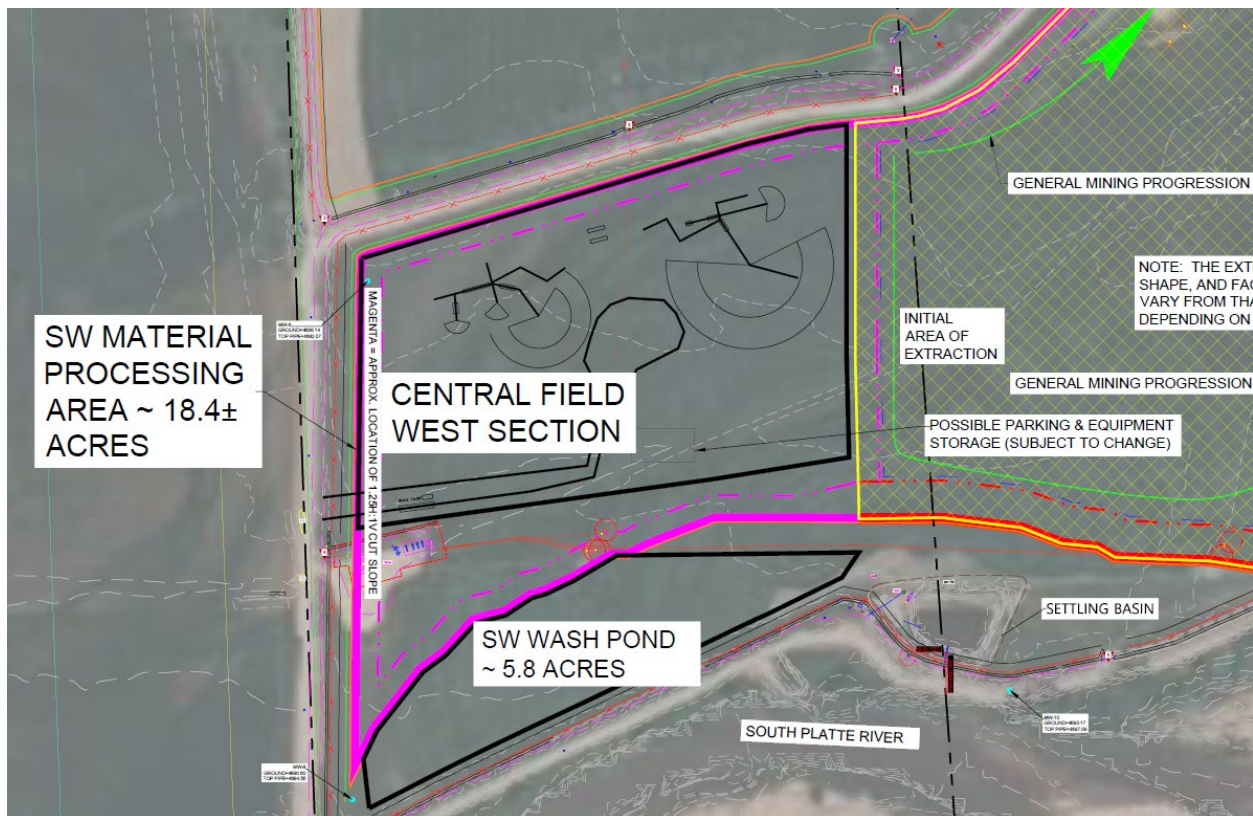
6.4.4 EXHIBIT D – Extraction Plan

guidelines established under Exhibit E - Reclamation Plan and Exhibit I/J: Soils and Vegetation Information, until and unless otherwise revised. To the extent possible, pond bottoms will be left rough, with the possible introduction of logs or other non-putrescent inert material to aid in aquatic habitat and cover [Refer to Exhibit H - Wildlife Information].

Plant Site Development & Operations: Plant operations are generally comprised of portable equipment. A small wash pond will be established near the onset of extraction operations as shown in Exhibit C-2: Extraction Plan Map. Deposit materials are predominantly transported or conveyed from the extraction areas to the plants or surrounding yard, where subsequently processed and scaled for sale. Pit-run (unprocessed materials) may also be loaded and transported directly from the extraction areas to area markets as needed and where appropriate. Plant Site operations may also receive and process materials, and utilize fresh water supply, sourced from locations outside of the permit area or planned areas of extraction. Provisions for a material processing plant may at some point be joined by complementary processing that may include periodic use of on-site recycling facilities.

While recycling activities may occur within the approved plant site/stockpile location; concrete and/or asphalt batch plant facilities and locations are not presently determined or sought at the time of this submittal. Due to the extended life of the mine the Operator desires an essential flexibility to complement future area needs according to permit requirements and approvals applicable at the time should such facilities be sought. Any facility development of this kind will be determined at that time as identified in a later Technical Revision to the OMLR under the approved permit. These potential activities are mentioned here solely for purposes of transparency in establishing these activities as acceptable, normal, and necessary activities to meet and facilitate the delivery of essential construction material needs of the area which may occur over time during the life of the approved OMLR Construction Materials Permit Operations.

6.4.4 EXHIBIT D – Extraction Plan



Initial Plant Site Theater as seen in Exhibit C-2: Extraction Plan Map

All plant site processing activities will occur within the Central Field – West Section; extraction will begin in the Central Field – Central Section, then progress to the North-East section, West Section, and finally the North West field. All sections of the Central Field are located within the 100-year floodplain, located south of Weld County Road 396 and north of the South Platte River. Location of the processing plant and wash pond within the 100-year floodplain were approved as part of the Floodplain Development Permit for the Two Rivers Sand Gravel and Reservoir Project

Plant activities will require a wash plant and attending wash pond to recycle wash water and receive discharge silts and other reject fines from the washed product. Plant and Wash Pond areas are identified on Exhibit C-2: Extraction Plan Map. The wash pond will function as recycling wash water and receiving basin for reject fines for the intended Plant/Processing activities. Since the basin functions in a closed system, it will not require dewatering.

Once the wash pond is established, wet plant operations can be created and join any dry plant activities in progress. Dry Plant operations can be readily established since water is not integral to their operations. Once established,

6.4.4 EXHIBIT D – Extraction Plan

wash pond water will function as a closed system. Settled materials from wash ponds will be utilized as product or for reclamation as desired.

Plant equipment will include, but is not limited to, a crusher, screens, and conveyors, scale house and scale, and attending equipment. Resulting stockpiles of pit run and processed products may be temporarily stockpiled here with processed stockpiles, or combined as needed, until transported to market.

Ultimately, once the wash plant activities near the completion of extracted deposit material, the closed system wash pond will fill with silt and be revegetated in a manner consistent with Exhibit E - Reclamation Plan. Interim clean out of the wash pond will occur until that point, returning the inert materials to the bottom of exhausted pits, or utilizing it in part or in whole as product, or for purposes as substitute soil, soil additive, or as subsoil for reclamation.

Plant and material processing activity will divide materials into diverse and dynamic product stockpiles that will come and go with unpredictable variations in sale and production. To the extent possible, product material will surround plant activities to further lessen visual and noise impacts to surrounding properties.

Plant placement will assure that plant noise is well below that of the nearby traffic. Relative to noise, traffic travelling on area roads at 55 mph or above is approximately $70.0\pm$ decibels within 100 feet from the centerline of the Highway. Noise at ground zero at a cone crusher, as measured by a hand-held meter, is at $80.0\pm$ decibels, dropping to $70.0\pm$ decibels at $100.0\pm$ feet from the center. The level drops an additional $5.0\pm$ decibels for every $100.0\pm$ feet from the center of the crusher and surrounding plant noise, achieving residential background levels at a total setback of $400\pm$ feet.

Backup sirens and heavy equipment averaged $60.0\pm$ to $75\pm$ decibels, with similar decreases in decibel readings from the source measured in a manner similar to that indicated for the crusher and plant equipment sources. Plant stockpiles will aid muting of plant sourced noise just as noise levels at areas of extraction are buffered with increasing depth of extraction.

The location of the portable scale and scale house and correlated internal traffic at the plant site location will vary depending upon production levels and areas needed for product stockpiling. Regardless, the scale house will be located along internal paths for haul trucks, where finished material will be weighed and disembarked to help build the urban matrix of roads, highways, foundations, and desirable neighborhoods communities most desire.

6.4.4 EXHIBIT D – Extraction Plan

For a diverse list of products to be extracted and/or processed, and sold, they may include but are not limited to the more common products identified under [Table DI - Earth Products](#), or other inert or commonly useful products used for diverse construction purposes, including, but not limited to: structural fill, concrete products, road construction products; and other products to aid the residential, commercial, industrial customer; and for any other infrastructure use. Explosives – will not be utilized.