# **Mining Plan**

## Mining Limits

Ogilvy River Farm, LLC proposes to mine in the land located in the Southeast ½ of the Southeast ¼ of Section 5, Township 5 North, Range 64 West of the 6<sup>th</sup> Principal Meridian and the Northeast ¼ of the Northeast ¼ of Section 8, Township 5 North, Range 64 West of the 6<sup>th</sup> Principal Meridian, in Weld County, Colorado.

The proposed mining site is located approximately 1,500 feet south of WCR 60<sup>1</sup>/<sub>2</sub>, is adjacent to WCR 53 on the side, and is adjacent to the South Platte River on the south side of the site. WCR 53 is immediately adjacent to the east side of the permit boundary and the South Platte River is immediately adjacent to the south side of the permit boundary. Access to the site will be located at the east side of the permit boundary off of WCR 53. The dominant land use surrounding the property is agricultural and industrial.

The permit boundary will encompass approximately 71.91 acres which will all be affected acreage, and approximately 45.06 acres being mined. The remaining area will consist of access roads, and disturbed/undisturbed land. The following table depicts the different affected acreage:

Affected Acreage	Mining Plan
	Area (acres)
Mined Area	<mark>44.04</mark>
Access Roads	<mark>2.41</mark>
<b>Disturbed Land Adjacent to Mining Slopes</b>	<mark>9.11</mark>
Undisturbed Land	<mark>16.35</mark>
TOTAL	71.91

Various setbacks from adjacent roads, adjacent structures, and oil and gas infrastructure will be maintained as mining occurs. All setbacks specified in the surface use agreements with the oil/gas companies will be followed. The final executed agreements are expected to be obtained in the near future and will be forwarded to the Division when they are available. A minimum 200-foot setback from any existing oil/gas facility will be maintained until that time. See Exhibit C, Mining Plan Map, and the Slope Stability Report for the mining limit configuration and information on setbacks and their locations. The abandoned wells would be cutoff after mining has reached the bedrock surface or the reclaimed slope surface where a new cap and any additional concrete for the existing plug would be needed. Petroleum Development Corporation (PDC) is the leaseholder and operator of the existing abandoned wells. Discussions with PDC have indicated they would cut down the existing casings as mining occurs. We have also worked with McCarty Engineering, LLC to provide this service at other mining permit locations for other operators. If PDC does not want to perform this work then McCarty Engineering, LLC



would be contacted to do it. They are licensed and bonded to obtain approvals from the COGCC to do these types of re-plug services on abandoned oil and gas wells.

## Products

Sand and gravel will be the primary product produced from the Ogilvy River Farm Pit. The principal intended use for the sand and gravel is for road base and construction aggregates.

Subsurface drilling and testing have verified that the Ogilvy River Farm Pit property contains a significant commercial deposit of sand and gravel. The depth of interbedded sandy clays at the surface range from 1 to 11 feet. The thickness of the aggregate material ranges from 46 to 81.5 feet where bedrock contact occurs.

#### Mining Methods

The deposit will be dry mined after a slurry wall is constructed around the perimeter of the mining area. Mining will not expose groundwater prior to the slurry wall being constructed. Design specifications for the slurry wall and quality control procedures used during construction will ensure that the reclaimed reservoir meets State Engineer's Office (SEO) performance standards. Dewatering trenches will be excavated around the perimeter of the mining area prior to mining operations commencing. The depth of the ditches will vary as the mining progresses deeper into the alluvium in order to maintain the groundwater level below the bottom of the active mining surface, and therefore minimize the exposed groundwater surface area. The dewatering ditches will flow to a collection pond, from which the water will be pumped and discharged where it will reach the South Platte River.

The equipment and facilities may include, but are not limited to the following:

#### Scaling Equipment

A scale house and scale will be used to weigh trucks and product leaving the pit. The dimensions of the scale house are 40' x 12' and the scale will be 70' by 10'. The scale house will be founded on typical trailer type jacks and tiedowns on top of concrete pads with minimal rebar to provide reinforcement. The scale will also be founded on concrete pads with reinforcement where load cells are located for the scale. These foundations would be removed once the pit is fully mined.

#### Processing Equipment

Screens, wash plant, crusher, conveyors, stackers, and other miscellaneous processing equipment. All processing equipment will be mobile and temporary without fixed foundations. Washing will occur at the wash plant and excess water from the washing will be recycled to the wash water ponds within the processing area, there will be a sedimentation pond that will receive the excess water first and then and overflow from the sedimentation pond to the clear water pond for re-using the water and pumping back to the wash plant.

#### Earth Moving Equipment

Dozers, loaders, scrapers, excavators, and compactors will be used for mining and earth moving operations.

## Haul Roads and Access Roads

Haul roads will be graded and constructed using the existing pit run where needed outside the processing area in order to move material from the mine using haul trucks, loaders, or scrapers. These roads will be mined and removed as the mining is completed.



Access roads to the processing plant will be constructed with aggregates made at the site where the entrance to the permit boundary is located to the scale house and through the scaling area until the access reaches the stockpile locations. The roads around the stockpiles will be constructed from the existing pit run similar to the haul roads.

#### Miscellaneous Equipment

Dewatering pumps, electrical trailer, generator trailer, small portable generators and watering trucks will be used as needed.

As mining progresses, topsoil and overburden will be stripped to expose the aggregate product below. Topsoil will be stripped and salvaged from areas where overburden material will be stockpiled. All soil and overburden material will be used on-site for reclamation; so long-term stockpiling of these materials is not anticipated. Overburden stockpiles will be located within the proposed mining area. See the attached mining plan in Exhibit C for the stockpile locations.

Mining of the aggregate will progress down to the underlying bedrock. Since reclamation will occur concurrently with mining, it is not anticipated that overburden material will be stockpiled long-term prior to use in production of road base. During mining, the mining the face will have a 2H:1V slope to bedrock or the bottom of the future reclaimed reservoir. The processed aggregate material will be temporarily stockpiled near the portable processing plant.

Recommendations for monitoring of slope stability, including, conducting a visual inspection of the excavated slopes on a weekly basis for the duration of mining, conducting a visual inspection after a major precipitation event that has saturated the ground using the same procedures, contacting qualified personnel to evaluate and recommend remediation work to stabilize the area in the event a visual inspection detects signs of potential slope failure, and if no visible signs of slope failure are detected during mining, reducing visual inspections to once every six months after mining completion, or after every major precipitation event.

All local, State, and Federal rules and regulations will be followed for the storage and handling of any fuel for the facilities.

## Topsoil Handling Plan

As stated previously the topsoil will be stripped to expose the aggregate product underlying the topsoil. The topsoil will be stripped using scrapers and stockpiled in the topsoil stockpile as depicted in Exhibit C. Topsoil will be stripped and salvaged from areas where overburden material will be stockpiled. The volume of topsoil is approximately 90,000 cubic yards. The depth of the topsoil is approximately twelve inches over the majority of the mining area. The topsoil will be stripped and stockpiled prior to mining operations. The height of the topsoil stockpile y15 feet.

## Mine Phasing

Ogilvy River Farm, LLC anticipates mining and reclaiming 55.56 acres of the 71.91 permit boundary for the Ogilvy River Farm Pit progressing as shown on the Mining Plan Map, there are 16.35 acres that will remain undisturbed within the permit boundary. The overall time required to complete the mining and reclamation is estimated to be 5 years 6 months based on an average rate of 650,000 tons per year. The initial production is expected to be 300,000 tons per year with the maximum production expected to be 1,000,000 tons per year.



due to demand fluctuations, mining could progress slower than anticipated and additional time may be required for mining and reclamation of the site.

The mining will progress beginning at the outer edge where material will be moved toward the interior such that the mining slope can be established. The mining slope will be established for the entire perimeter in 3 to 6 feet intervals.

## **Dewatering**

Dewatering trenches will be placed along the perimeter of each mining area. The dewatering trench around the perimeter of the phase being mined will be placed at the toe of the mining slope. As the phase is mined deeper the dewatering trench will be lowered and moved laterally along the mining slope toward the center of that phase. Slurry walls are anticipated to be installed around the perimeter of prior to exposing groundwater and mining will continue to commence in those phases and it is expected minimal dewatering will be required after the slurry walls are installed due to the slurry walls cutting off groundwater infiltration into the pit. Ogilvy River Farm, LLC will have an approved substitute water supply plan and well permit prior to exposing groundwater. The substitute supply plan will be updated annually to account for water that is consumed due to exposing groundwater by the mining operation.

## **Explosives**

Explosives will not be used during mining.



# **Reclamation Plan**

Lined water storage reservoirs will be the final reclaimed use for the Ogilvy River Farm Pit. Portions of mining area will be reclaimed as "native" areas, which will be re-seeded with native vegetation. The mining area will be reclaimed as a water storage reservoir. The remaining area within the proposed permit boundary will consist of reservoir shoreline, unimproved access roads around the reservoirs, and reclaimed vegetated land.

Final Land Use	Reclamation Plan Area (acres)
Reservoir Water Surface	<mark>36.65</mark>
Access Roads	<mark>2.41</mark>
Reclaimed Vegetated Land (Disturbed Land and Slopes above Reservoir Water Surface)	<mark>16.50</mark>
Undisturbed Land	<mark>16.35</mark>
TOTAL	71.91

# Water Storage Reservoir

In general, the mining limits will be mined down to the shale/claystone/sandstone bedrock. The relatively impermeable bedrock will make the bottom of the reservoir. The reservoir will be separated from the surrounding alluvial aquifer by the slurry wall liner system as detailed in the cross-section shown on the Reclamation Plan Map. The slurry wall liner will be keyed into the bedrock material and extend upward through the height of the alluvium to three feet above the reclaimed normal water surface elevation. Design specifications and quality control procedures used during the construction of the slurry wall liner and clay liner will ensure that the reservoir meets the State Engineer's Office (SEO) performance standards for permeability.

All reservoir slopes will be reclaimed to at least 4.5H:1V final grade. Since reclamation will be concurrent with mining, most soil, overburden, and bedrock material excavated during mining will be used almost immediately. Scrapers and dozers and compactors will be used to shape the reclaimed slope material along the reservoir perimeters to achieve the final grade. Upon placing the backfill material, 95 percent compaction will be achieved to ensure adequate integrity of the liner, backfilled areas for haul/access roads and recharge pond areas that are not within the future water storage/reservoir footprint. Final reclamation by capping with topsoil and revegetating above the expected reservoir water level will follow grading operations as well as backfilled areas that will not be haul/access roads to minimize the amount of disturbance at any one time.

Recommendations for monitoring of slope stability, including, conducting a visual inspection of the excavated slopes on a weekly basis for the duration of mining, conducting a visual inspection after a major precipitation event that has saturated the ground using the same procedures, contacting qualified personnel to evaluate and recommend remediation work to stabilize the area in the event a visual inspection detects signs of potential slope failure, and if no visible signs of slope failure are detected during mining, reducing visual inspections to once every six months after mining completion, or after every major precipitation event.



During reclamation activities, inlet and outlet facilities for the reservoir will be designed and installed once the operational criteria of the proposed reservoir have been identified by an end user.

## Reclamation Measures/Materials Handling

Backfilling will be done to provide stabilized shorelines around the reservoir and to minimize erosion. The backfill material will consist of gravel, overburden, clay, and topsoil from on-site materials. There will not be known toxic or hazardous materials in the backfill material. Additionally, it is not likely that acid forming or toxic materials will be encountered during mining. The mining will not leave high walls on the property. In addition, there will be no auger holes, excavations, or shafts left on the property. The auger holes for the gravel investigation were backfilled with native gravel and soil cuttings from the drilling. The auger holes that were not backfilled were the four monitor wells that were constructed and permitted as permanent monitoring wells to monitor groundwater at the north, east, west, and south sides of the permit boundary. Monitor wells will remain on the property so the end user may continue to monitor levels of the groundwater elevations.

Topsoil will be placed to finalize the grading such that seeding can occur. The topsoil will be placed at all disturbed areas and on the mining slope to an elevation matching the expected reservoir water level.

## <u>Topsoiling</u>

Approximately the top **twelve** inches of soil on the property is classified as topsoil. This layer includes the root zone of grasses and crops, which will be stripped and stockpiled separately. Topsoil will be re-handled as little as possible and a Technical Revision will be submitted prior to re-locating topsoil stockpiles. By using concurrent reclamation techniques, the topsoil is not expected to remain in stockpiles for more than one to five years. If the stockpile remains more than one growing season, it will be seeded with a fast-growing vegetative cover to prevent erosion. All topsoil will be retained on-site to reclaim the reservoir shoreline, and other areas disturbed by mining activities. Where required, topsoil will be replaced to a depth of twelve inches. Prior to placing topsoil uneven areas and low spots will be graded to subgrade elevation, in addition debris, roots, branches, stones, in excess of 2 inch in size will be removed. Scarify surface to depth of 8 inches where topsoil is to be placed for a roughened condition to assist in eliminating erosion. Scarify/cultivate in areas where equipment used for hauling and spreading topsoil has compacted subsoil. Place topsoil during dry weather and on dry unfrozen subgrade. Remove vegetable matter and foreign non-organic material from topsoil while spreading. Grade topsoil to eliminate rough, low or soft areas.

#### Revegetation

As mining operations are completed, areas for reclamation will be graded and shaped for revegetation. Runoff or excess water from adjacent areas will not be allowed to flow over slopes being graded and seeded. If needed, berms or channels will be constructed to divert excess water and convey it in a safe and non-erosive manner.

For disturbed areas, the reclamation plan includes re-vegetating with appropriate seed mixes to minimize erosion and re-establish natural terrain. A proper seedbed is firm and free of competing vegetation. Correct firmness is when an adult footprint is only slightly visible on the prepared bed prior to the seeding operation. The seedbed can be firmed, if needed, by pulling a commercial or homemade packer or roller. A firm seedbed is essential for proper seeding depth



prior to using the mechanical seeder or broadcasting seed. Apply seed evenly in two intersecting directions. Rake in lightly. Apply seed at the vendor's recommended bulk seed rate/acre according to the quantity of PLS contained in their bulk seed to achieve the specified PLS/acre rate utilizing a mechanical seeder. Where access is limited and seed is applied by hand broadcasting, apply the seed mix at twice the PLS rate per acre and rake in once broadcasting in completed. Do not seed areas in excess of that which can be mulched on same day. Do not sow immediately following rain, when ground is too dry, or when winds are over 10 mph. Immediately following seeding, apply mulch to thickness of 1/4 inch.

The seed mixture below was selected as recommended by the DRMS for this climate zone (Dryland Quick Establishment, elevation less than 8,000 feet). Reservoir side slopes below the anticipated reservoir water level will not be seeded. The proposed seed mix is shown in the following table.

Seed Mix	Species	Scientific Name	Application Rate <sup>*</sup> (#PLS/acre)
Grasses	Intermediate Wheatgrass	Thinopyrum intermedium	2.50
	Slender Wheatgrass	Elymus trachycaulus,	2.00
	Pubescent Wheatgrass	Thinopyrum intermedium	3.00
	Russian Wildrye	Psathyrostachys juncea	3.00
	Western Wheatgrass	Pascoprum smithii	2.00
	Sand Dropseed	Sporobolus cryptandrus	0.25
*Application rate is for drilling the seed. If seed is to be broadcast, the application rate will be doubled.			

# **Reclamation and Temporary Stockpile Seed Mix**

The seed mix for final reclamation as described above does not require fertilizer per the information provided by the DRMS. The seeded areas will be covered with dead crop litter from sorghum or milo crop forage, or with straw mulch at a rate of 2,000 pounds per acre. Ideal seeding dates for Colorado are November 1 to May 1, when the soil is not frozen. Grasses should be seeded when soil moisture and temperature are optimum for germination. Grasses are designated either "cool" or "warm" season based on their growth cycle. Cool-season grasses can be planted when temperatures are cooler and day lengths are short. Warm-season grasses need warmer temperatures and longer day lengths to grow. Refer to Weld County's seeding recommendations as a resource for time frames outside of the ideal seeding times at www.weld.gov/Government/Departments/Public-Works/Weed-Management/Controlling-Weeds/Reseeding.

If a significant invasion of noxious weeds occurs after seeding, the weeds will be mowed before they can go to seed. The areas will be mowed periodically for additional control as needed. Mechanical control will be used as a first priority. Chemical methods will only be used if no other alternative produces acceptable results. See Exhibit J for specifics of the weed control plan.

For temporary earthen stockpiles, the reclamation plan includes re-vegetating with appropriate seed mixes to minimize erosion and establish more rapidly to stabilize the stockpiles. If a



temporary earthen stockpile remains more than one growing season, it will be seeded with the seed mix above to prevent erosion.

# <u>Water – General Requirement</u>

To minimize the effect on the prevailing hydrologic balance, Ogilvy River Farm, LLC will:

- a. Comply with all applicable Colorado water laws.
- b. Comply with all applicable Federal and State water quality laws and regulations.
- c. Comply with all Federal and State requirements for dredge and fill.
- d. Re-grade and backfill all sediment and siltation structures after mining is completed.
- e. Monitor groundwater levels adjacent to the site and mitigate any damage to adjacent wells that dewatering activities may have. (See Exhibit G)

# Groundwater – Specific Requirements

The operation will not affect groundwater quality on or off the site. The operation will comply with State groundwater quality standards.

The mining and reclamation may affect the groundwater table surrounding the mine site. The proposed mitigation efforts to minimize these impacts are ditches in necessary areas to maintain groundwater levels during the mining, and a perimeter drain if needed to convey groundwater around the lined reservoir after the pit side liner is installed. A ground water model by McGrane Water Engineering, LLC has also been provided and the results indicate that water levels will be affected by +/-1 to 3 ft and the wells within the predicted water level change are in the mounded area so the overall impact of the slurry wall and clay liner will be insignificant and not noticeable because the depth to groundwater is greater than 30 feet at those well locations. Ogilvy River Farm, LLC proposes that they monitor groundwater levels through both interior (within phases of the mining) and exterior (outside the slurry wall lining) monitoring wells that they have installed, or have access to before, during, and after the mining and reclamation is complete so that impacts to the groundwater table, from this mining operation, can be identified and addressed. It is the intent of Ogilvy River Farm, LLC to operate responsibly and to mitigate any damage to wells that is directly attributable to the mining and reclamation of this site.

# Reclamation – Approximate Time Table

The initial proposed rate of production for the mine is 300,000 tons per year and the maximum proposed rate of production for the mine is 1,000,000 tons per year. The total time frame to mine all phases assuming an average production rate of 650,000 tons per year is approximately 5 years and 6 months. The following table shows the approximate time frame to finish each phase of mining assuming an average production rate of 650,000 tons per year:

Acreage	Time Frame to Complete and Reclaim Phase 1
71.91 acres	5 years and 6 months

The assumed annual production rate is 300,000 tons initially to 1,000,000 tons maximum for processed material leaving the mine each year. The size and area of reclamation varies but generally consists of the outside mining slope being reclaimed at a 4.5H:1V slope with the addition of clay, overburden, topsoil, and revegetation. For more information on sequencing and size of the reclamation activities refer to Exhibit L financial warranty calculations.









