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Copper Flat Mine Discharge Permit 1840 Application

TODD STEIN, P.G.
Senior Hydrogeologist, Golder Associates, Inc.
Albuquerque, NM

August 17, 2018

Copper Flat Mine Reclamation and Closure Plan

August 17, 2018

Background and Experience

- **Role on Copper Flat Project**
  - Development of Reclamation and Closure Plan
- **Educational Background**
  - B.S. Geology, New Mexico Tech, 1987
  - M.S. Hydrology, New Mexico Tech, 1990
- **Relevant Experience**
  - Worked as an environmental consultant for the past 28 Years. Work has involved private sector, state and federal agency clients
  - Employed with Golder Associates, Inc. since 2004
  - Involved in the development of Closure/Closeout Plans in New Mexico since 2007
  - Evaluation and development of reclamation cover designs and performance testing since 1997

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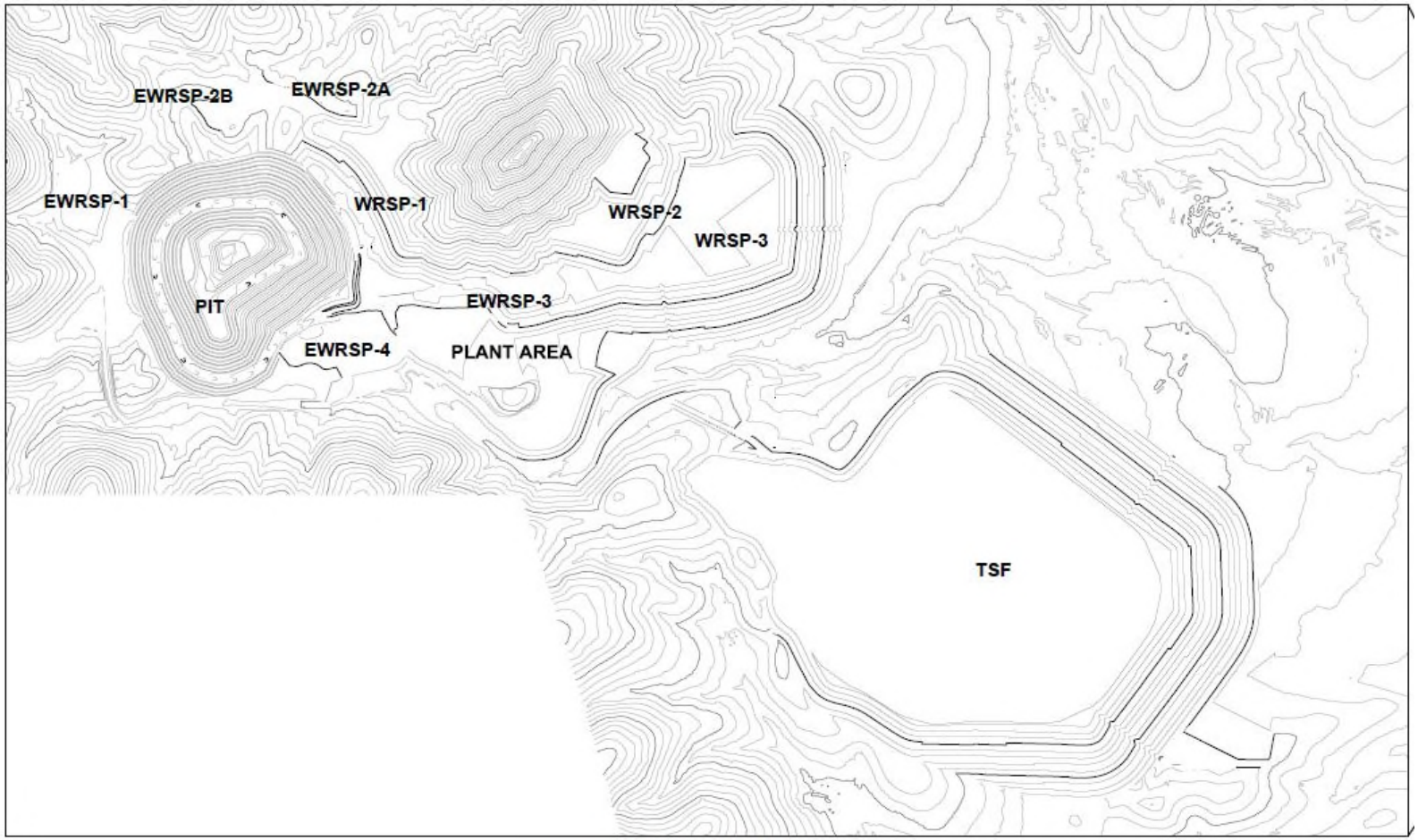
Copper Flat Reclamation and Closure Components

- Existing Waste Rock Stockpiles (EWRSP-1, 2, 3, and 4)
- Grayback Arroyo
- New Waste Rock Stockpiles (WRSP-1, 2, and 3)
- Tailings Storage Facility (TSF)
- Open Pit
- Plant Area
- Surface Impoundments
- Ancillary Facilities and Structures
- Soil Salvaging - Growth Media Stockpiles (GMSP-1, 2, 3)



LOCATION MAP

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i. Existing Waste Rock Stockpile Reclamation and Closure Plans

- All four legacy EWRSP's will be reclaimed in accordance with requirements of Sections 20.6.7.33 (Closure Requirements for Copper Mine Facilities) and 20.6.7.34 (Implementation of Closure) NMAC.
- EWRSP-1, the majority of EWRSP-2, and portions of EWRSP-4 will be reclaimed during the pre-production phase of mine operations.
- EWRSP-3 will be reclaimed at the end of mine life as part of the plant area reclamation.
- Portion of EWRSP-2 that is outside the design limit of WRSP-1 will be reclaimed during the pre-production phase of mine operations. Remaining portion of EWRSP-2 will be covered over by WRSP-1 during production phase of mining operations.
- Exterior (southern) outslope of EWRSP-4 will be reclaimed during the pre-production phase of mine operations. The top surface of EWRSP-4 will be regraded to drain toward the open pit and used as an equipment/supply laydown yard during operations and will be reclaimed at the end of mine life.

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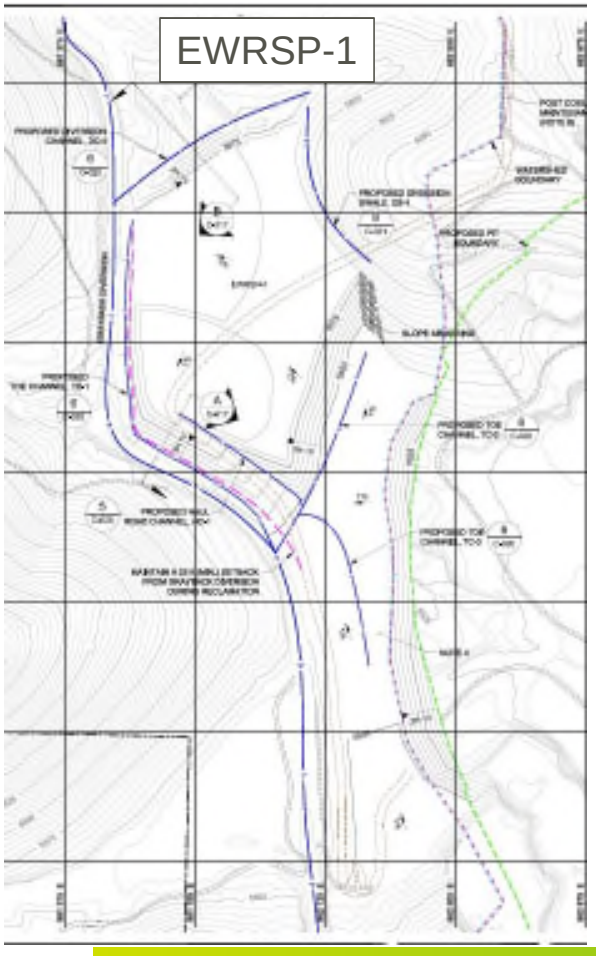
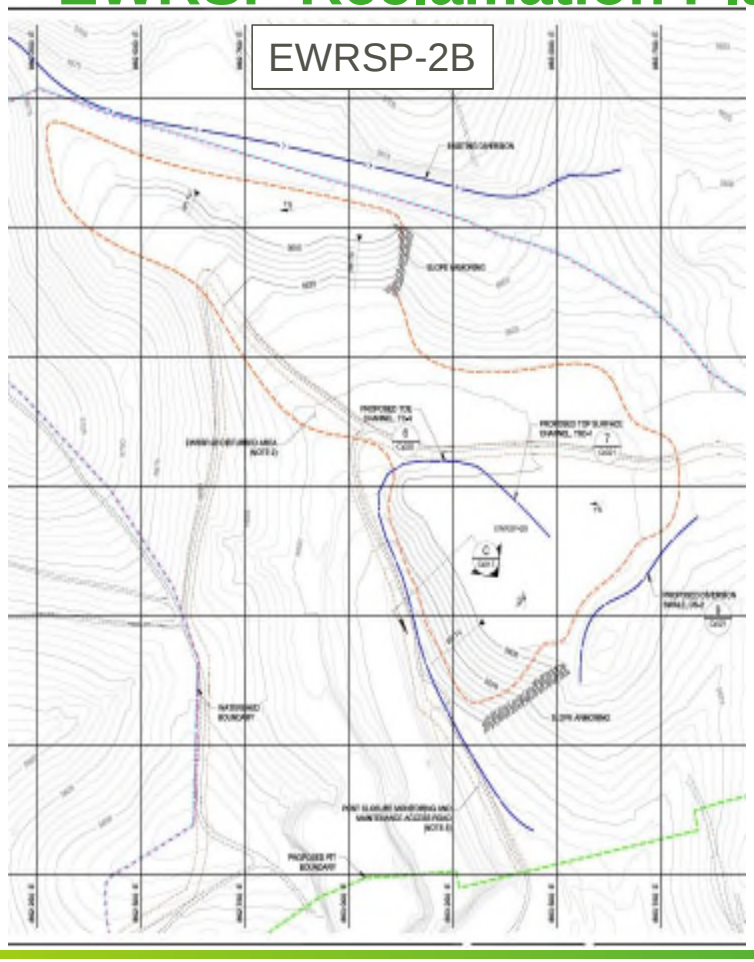
i. Existing Waste Rock Stockpile Reclamation and Closure Plans

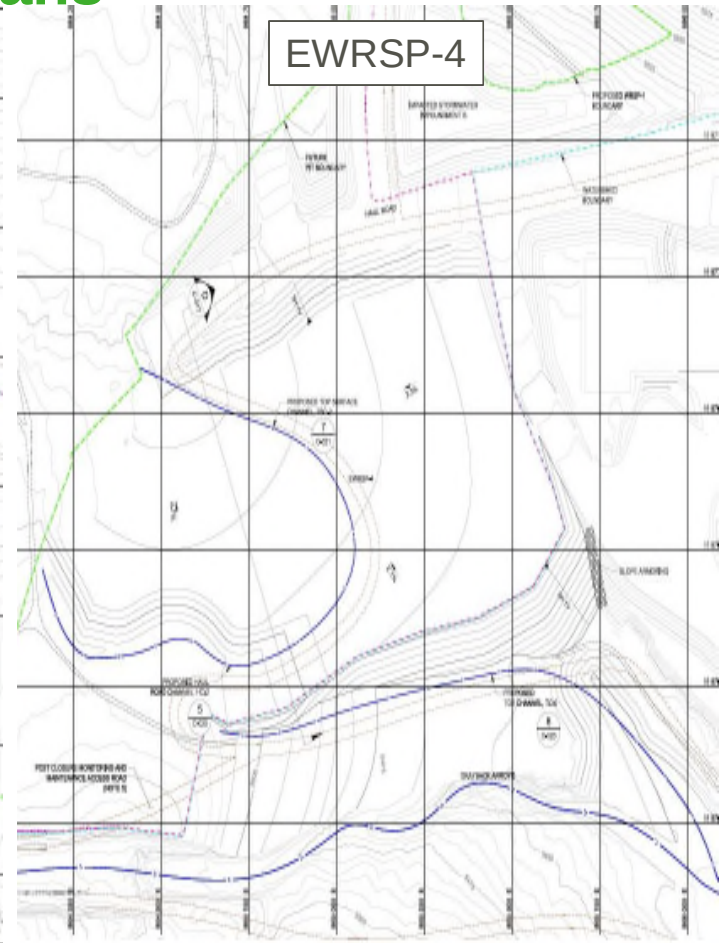
- **Primary Closure Components:**
  - Regrading to interbench slopes of 3H:1V in accordance to 20.6.7.33.C(3) NMAC.
  - Maximum uninterrupted slope lengths of 200 feet in accordance with 20.6.7.33.C(4) NMAC.
  - Top surface graded to drain with slopes of between 1.0% and 5.0% in accordance with 20.6.7.33C(2) NMAC
  - 3-ft thick store and release earthen cover in accordance to 20.6.7.33.F NMAC.
  - Grading and ripping of the disturbed areas associated with the EWRSPs to provide positive drainage. Where adequate growth media does not exist, areas will be ripped and covered with 6-inches of growth media.
  - Stormwater channels designed to convey peak flows generated by the 100 year return interval storm event in accordance to 20.6.7.33.A NMAC.
  - Revegetation designed to create a stable, self-sustaining plant community that conforms to the planned grazing and wildlife habitat PMLU in accordance with 19.10.5.507 NMAC.
  - Installation, operation, and maintenance of groundwater monitoring wells that may be required for post-closure monitoring in accordance with 20.6.7.35.B NMAC.
  - Reclamation Cover Material Test Plots will be constructed and monitored on one of the reclaimed EWRSP's.


Existing Waste Rock Stockpiles
EWRSP-2B
EWRSP-2A
EWRSP-1
EWRSP-3
EWRSP-4
GRAYBACK DIVERSION
Google earth
© SPOT IMAGE
N
2000 ft

EWRSP Reclamation Plans





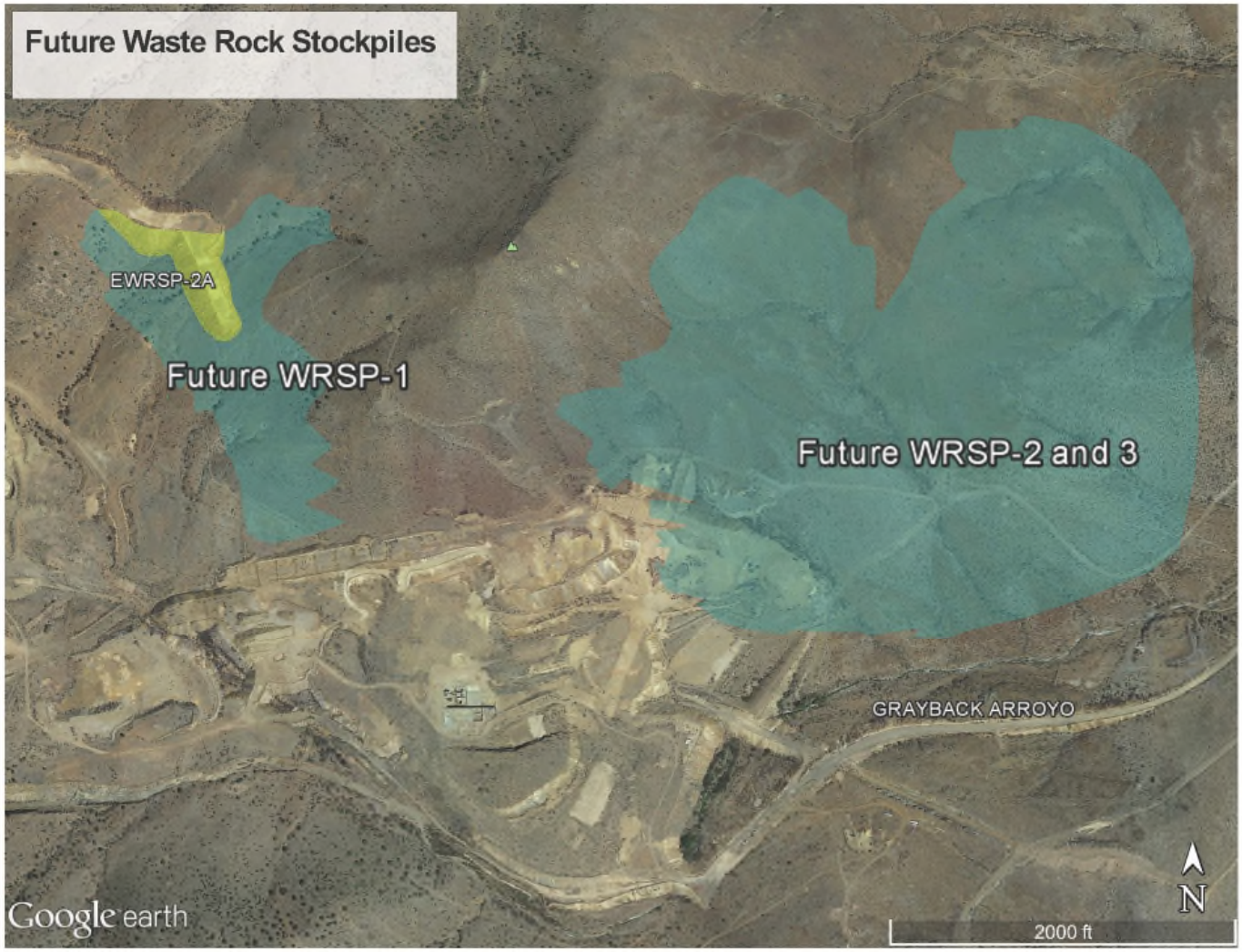


ii. Grayback Arroyo Reclamation Plan

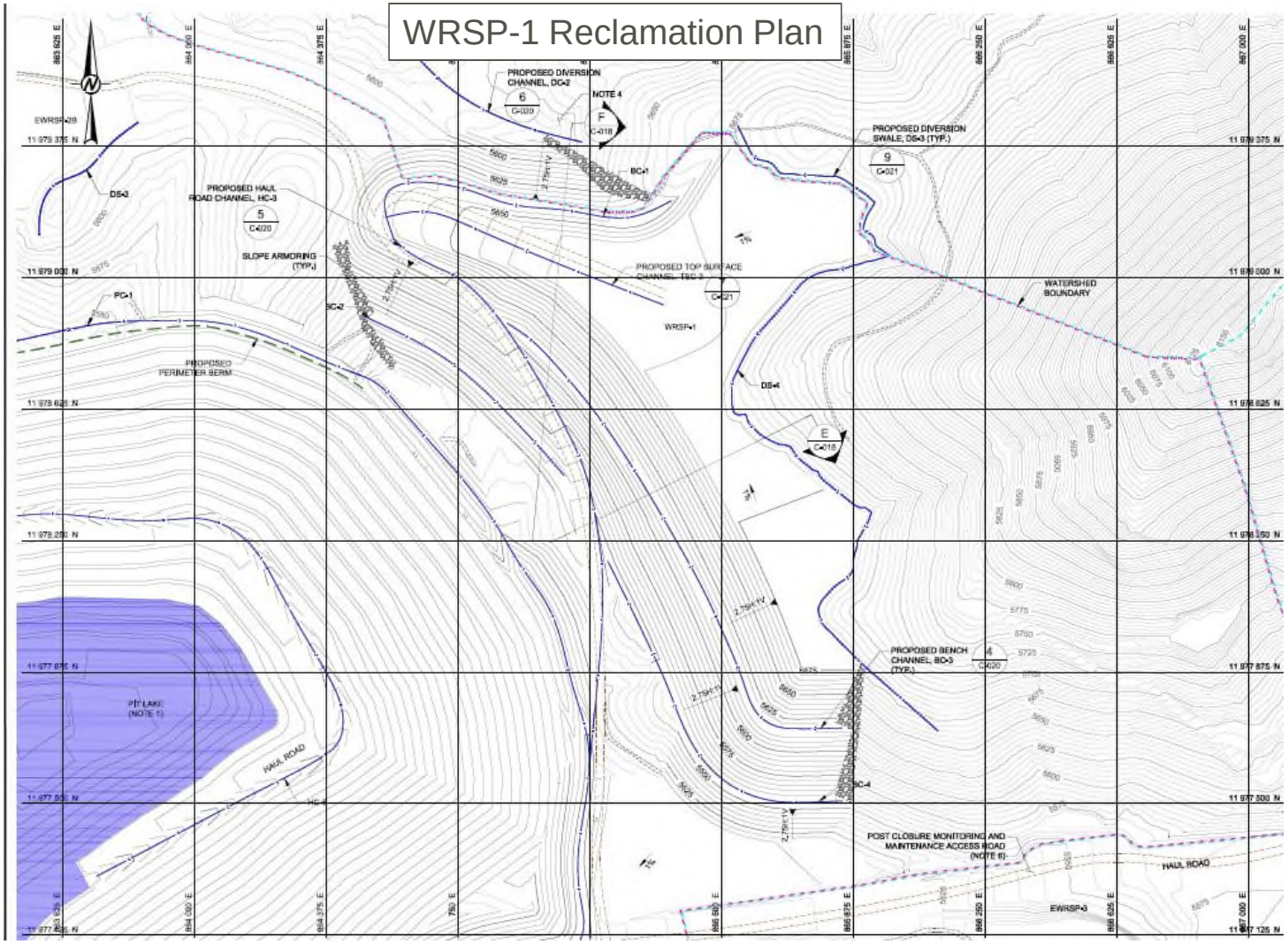
- Legacy disturbances along Grayback Arroyo will be reclaimed in accordance with requirements of Sections 20.6.7.33 (Closure Requirements for Copper Mine Facilities) and 20.6.7.34 (Implementation of Closure) NMAC.
- Exterior outslopes of EWRSP-1 and EWRSP-4 will be reclaimed during the pre-production phase of mine operations to mitigate against potential surface water impacts to Grayback Arroyo.
- Reclamation of all of the slopes along the perimeter of the plant area. Grading plan includes both pull back sections and pushdown sections along the perimeter of the plant area.
- Exterior and perimeter slopes will be graded to a slope of 3.0H:1V and covered with 36 inches of growth media.
- Grading and ripping of the disturbed areas adjacent to Grayback Arroyo to provide positive drainage. Where adequate growth media does not exist, areas will be ripped and covered with 6-inches of growth media.
- The land bridge used as the entrance access road to the plant area and the land bridge at the downstream Grayback culvert will be removed. The remaining angle of repose slopes following removal of the land bridges will be graded to a slope of 3.0H:1V and covered with 36 inches of growth media.
- Existing Grayback Arroyo diversion structure will be maintained during operations and throughout the post-closure period.
- Revegetation designed to create a stable, self-sustaining plant community that conforms to the planned grazing and wildlife habitat PMLU in accordance with 19.10.5.507 NMAC.

iii. New Waste Rock Stockpile Reclamation and Closure Plans

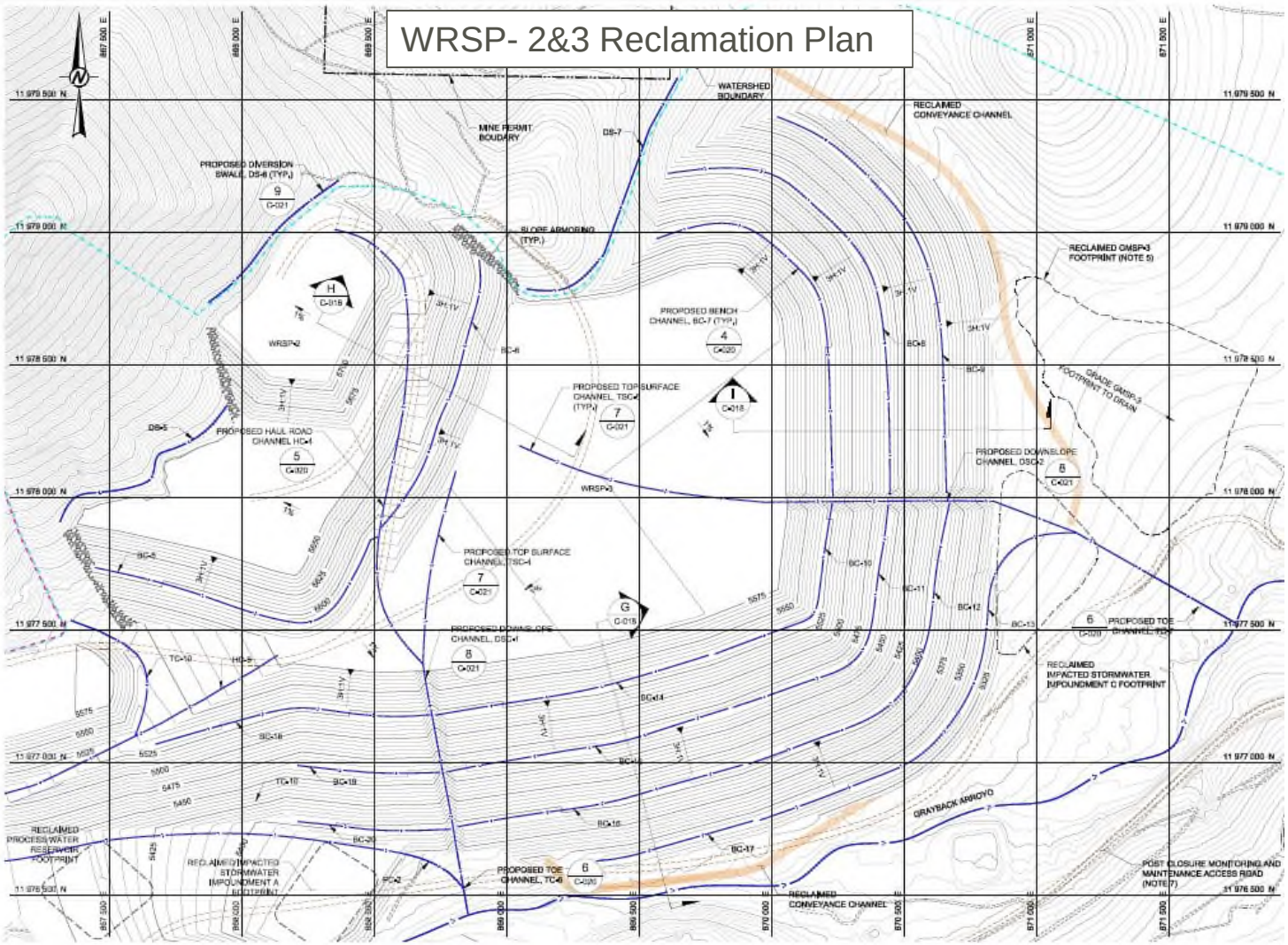
- All three new waste rock stockpiles will be reclaimed in accordance with requirements of Sections 20.6.7.33 (Closure Requirements for Copper Mine Facilities) and 20.6.7.34 (Implementation of Closure) NMAC.
- **Primary Closure Components:**
  - Regrading to interbench slopes to between 2.75H:1V (WRSP-1 slopes within Open Pit Surface Drainage Area) and 3H:1V (WRSP's 2 & 3) in accordance to 20.6.7.33.C(3) NMAC.
  - Maximum uninterrupted slope lengths of 200 feet in accordance with 20.6.7.33.C(4) NMAC.
  - Top surface graded to drain with slopes of between 1.0% and 5.0% in accordance with 20.6.7.33C(2) NMAC
  - 25-ft wide benches
  - 3-ft thick store and release earthen cover in accordance to 20.6.7.33.F NMAC.
  - Stormwater channels designed to convey peak flows generated by the 100 year return interval storm event in accordance to 20.6.7.33. A NMAC.
  - Revegetation designed to create a stable, self-sustaining plant community that conforms to the planned grazing and wildlife habitat PMLU in accordance with 19.10.5.508 NMAC .
  - Installation, operation, and maintenance of groundwater monitoring wells that may be required for post-closure monitoring in accordance with 20.6.7.35.B NMAC.


Future Waste Rock Stockpiles
EWRSP-2A
Future WRSP-1
Future WRSP-2 and 3
GRAYBACK ARROYO
Google earth
N
2000 ft

WRSP-1 Reclamation Plan

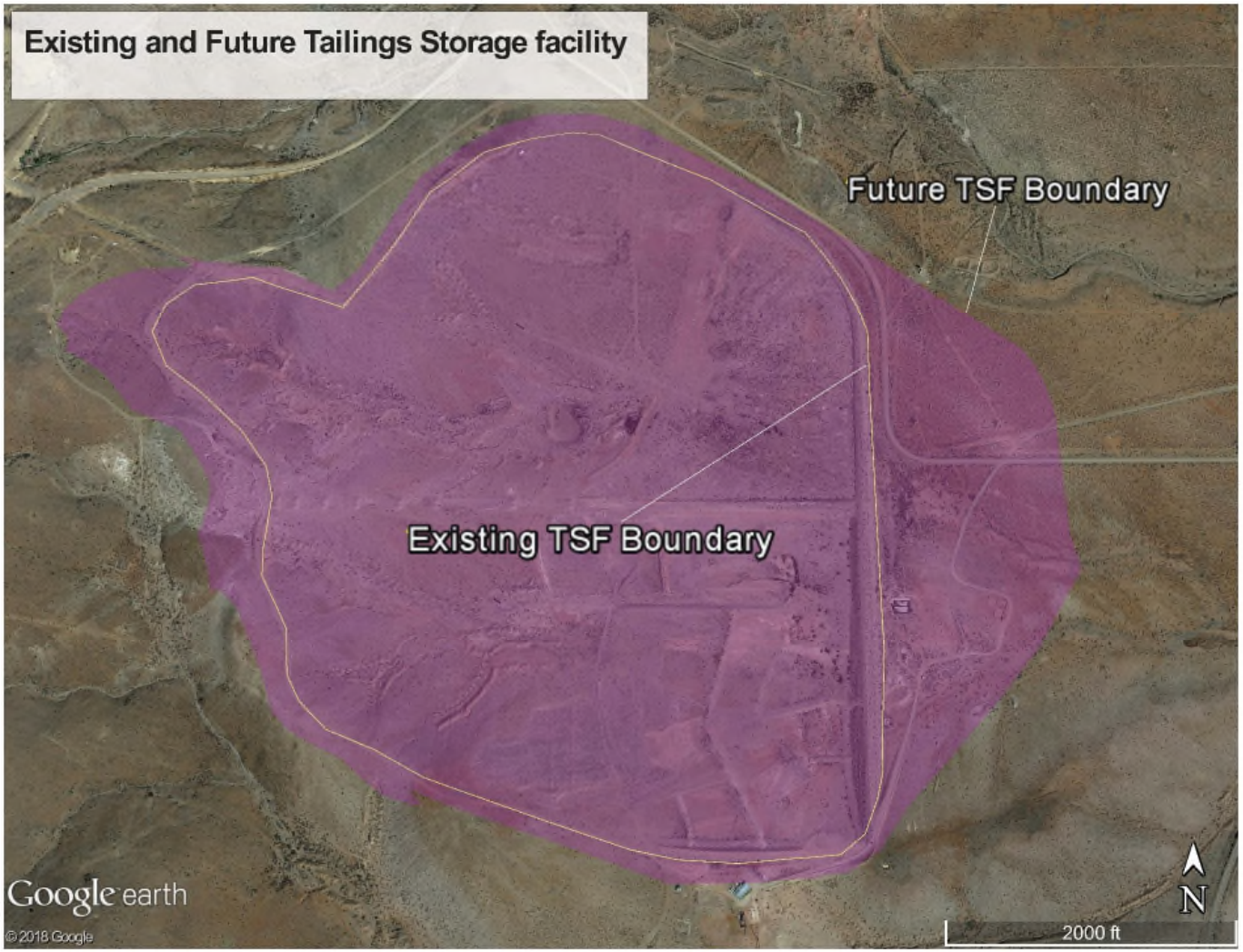


WRSP- 2&3 Reclamation Plan



iv. Tailings Storage Facility Reclamation and Closure Plan

- TSF will be reclaimed in accordance with requirements of Sections 20.6.7.33 (Closure Requirements for Copper Mine Facilities) and 20.6.7.34 (Implementation of Closure) NMAC.
- **Primary Closure Components:**
  - All structures, tanks, storage facilities, buildings and equipment will be removed from the cyclone plant and TSF areas and disposed of in an approved manner according to applicable federal and state laws.
  - Grading and ripping of the disturbed areas associated with the cyclone plant area to provide positive drainage. Where adequate growth media does not exist, areas will be covered with 6-inches of growth media.
  - Regrading the TSF interbench slopes to between 3H:1V and 3.5H:1V in accordance to 20.6.7.33.C(3) NMAC.
  - Maximum uninterrupted slope lengths of between 200 feet (3H:1V) and 250 feet (3.5:1V) in accordance with 20.6.7.33.C(4) NMAC.
  - Top surface graded to drain with slopes of between 1.0% and 5.0% in accordance with 20.6.7.33C(1) NMAC
  - 25-ft wide benches
  - 3-ft thick store and release earthen cover in accordance to 20.6.7.33.F NMAC.
  - Stormwater channels designed to convey peak flows generated by the 100 year return interval storm event in accordance to 20.6.7.33. A NMAC.
  - Revegetation designed to create a stable, self-sustaining plant community that conforms to the planned grazing and wildlife habitat PMLU in accordance with 19.10.5.508 NMAC.
  - Installation, operation, and maintenance of groundwater monitoring wells that may be required for post-closure monitoring in accordance with 20.6.7.35.B NMAC.


Existing and Future Tailings Storage facility
Future TSF Boundary
Existing TSF Boundary
Google earth
© 2018 Google
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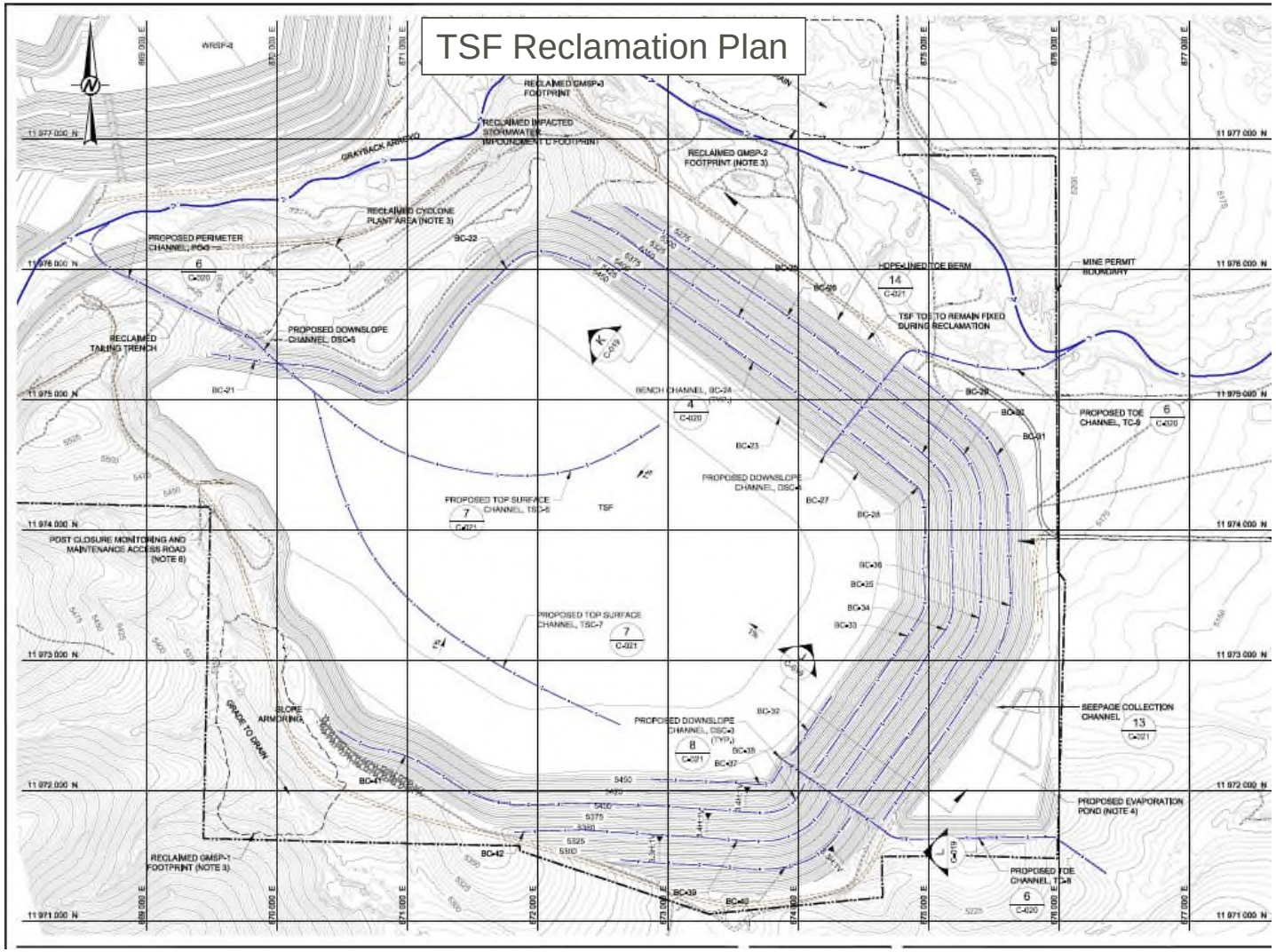
2000 ft

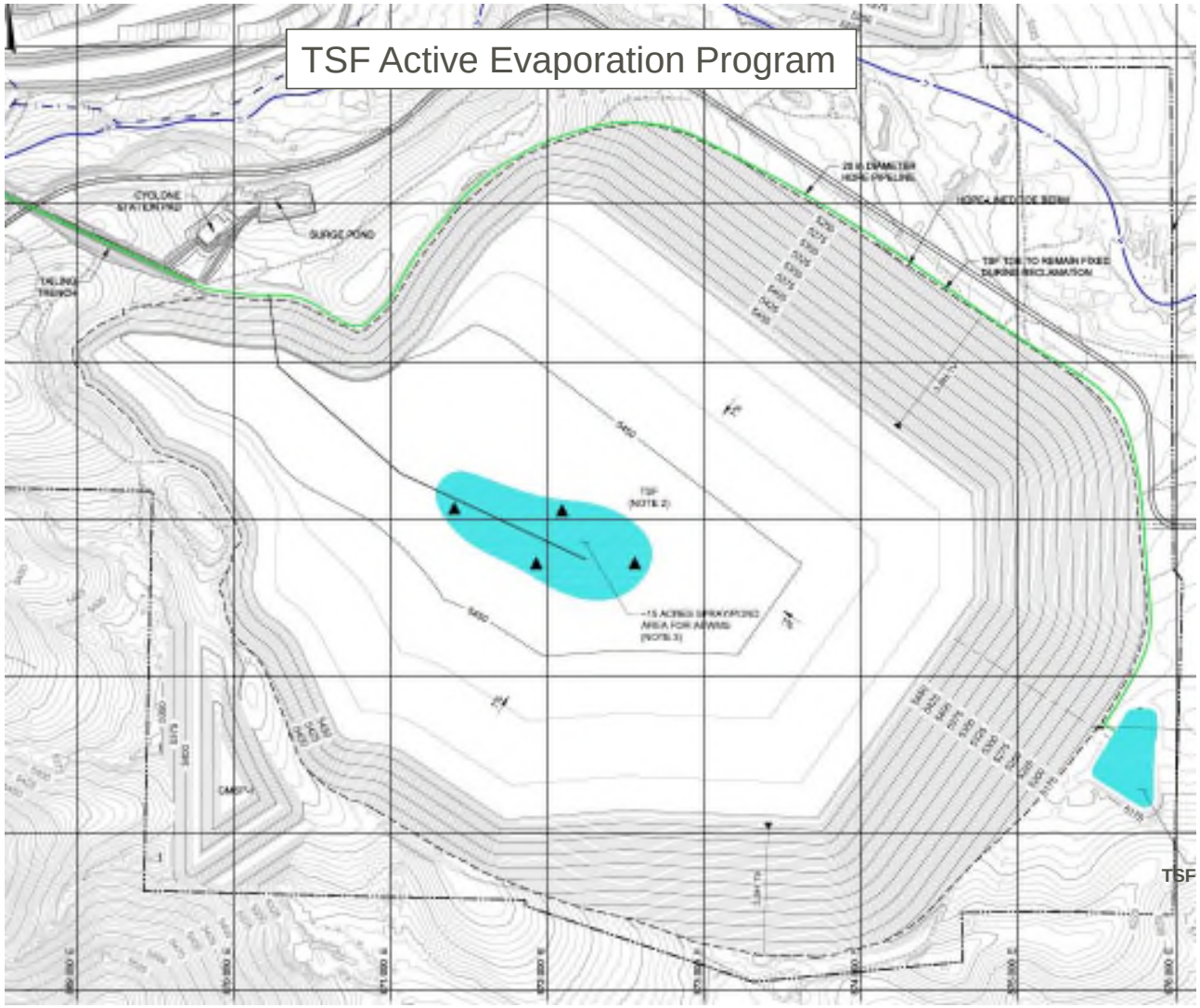
TSF Reclamation Plan



Tailings Storage Facility Water Management Plan

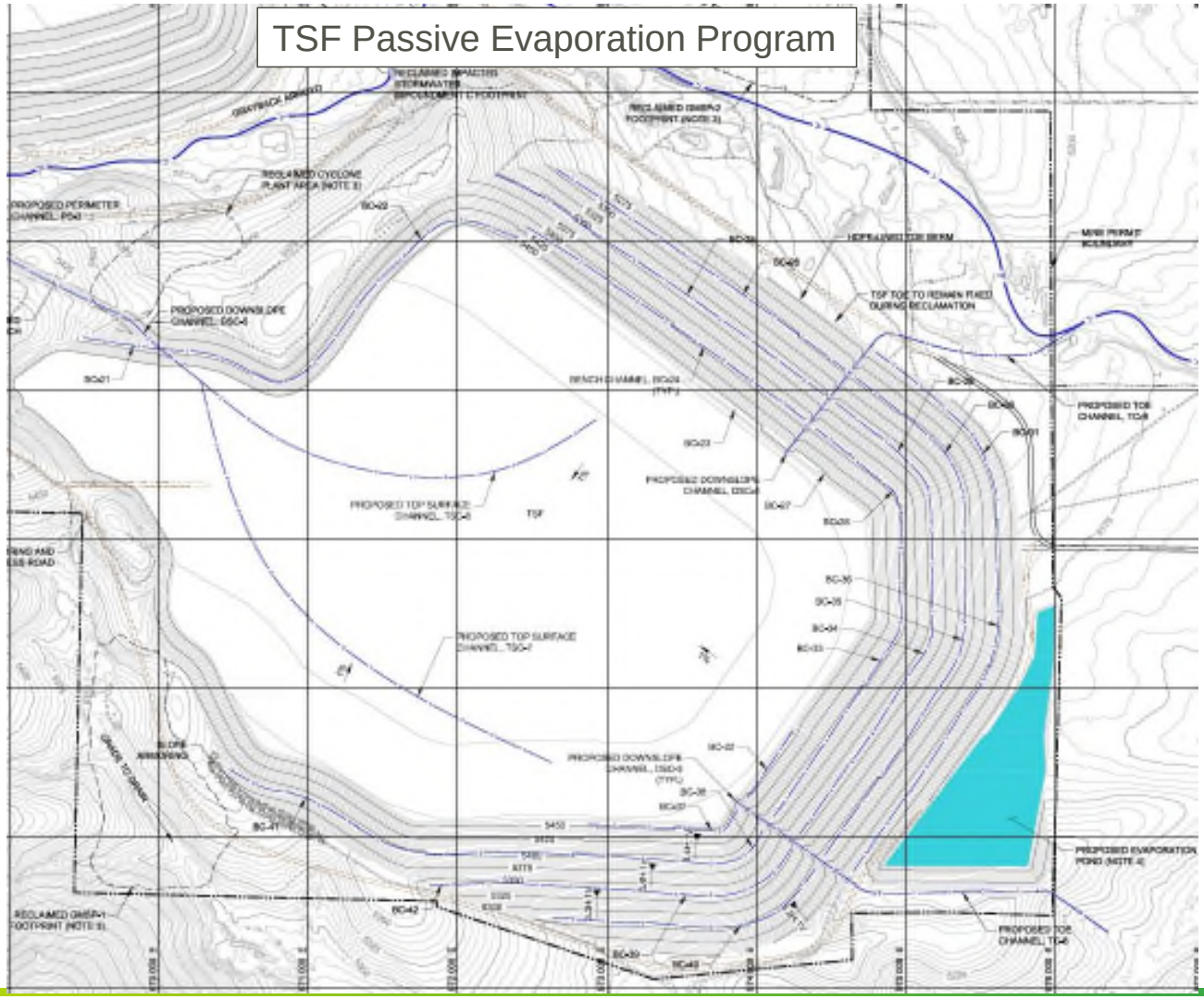
- **Active Evaporation Program (mechanical spray systems and wetted surface evaporation):**
  - Forced evaporation and wetted surface evaporation of water collected from the TSF underdrain collection system and surface water runoff from the TSF embankment.
  - 15 acre ponding/spray area on top of the TSF.
  - 4 unit mechanical spray evaporator system with a capacity to handle up to 1,520 gpm with an average evaporation rate of approximately 789 gpm.
  - Will operate for a period of 5 years or until TSF drain down reduces to a point to where the flows can be handled through passive evaporation.
- **Passive Evaporation Program (wetted surface evaporation):**
  - Construction of 22 acre HDPE–lined evaporation pond for management of long-term drain down water from the TSF at end of active evaporation phase.
  - Excess evaporation (free water evaporation minus incident precipitation) is estimated at approximately 113 acre-feet/year (average 70 gpm annually).
  - Maximum estimated TSF drain down flow during the passive evaporation program is estimated at 67 gpm and reduces to rates below 5 gpm after 16 years.
  - Passive evaporation plan assumes 20 years of operation or when the volume of drain down from the TSF is reduced to a point to where the evaporation pond is no longer required. This point in time will be determined in collaboration with the Agencies.

TSF Active Evaporation Program



TSF Underdrain Collection Pond

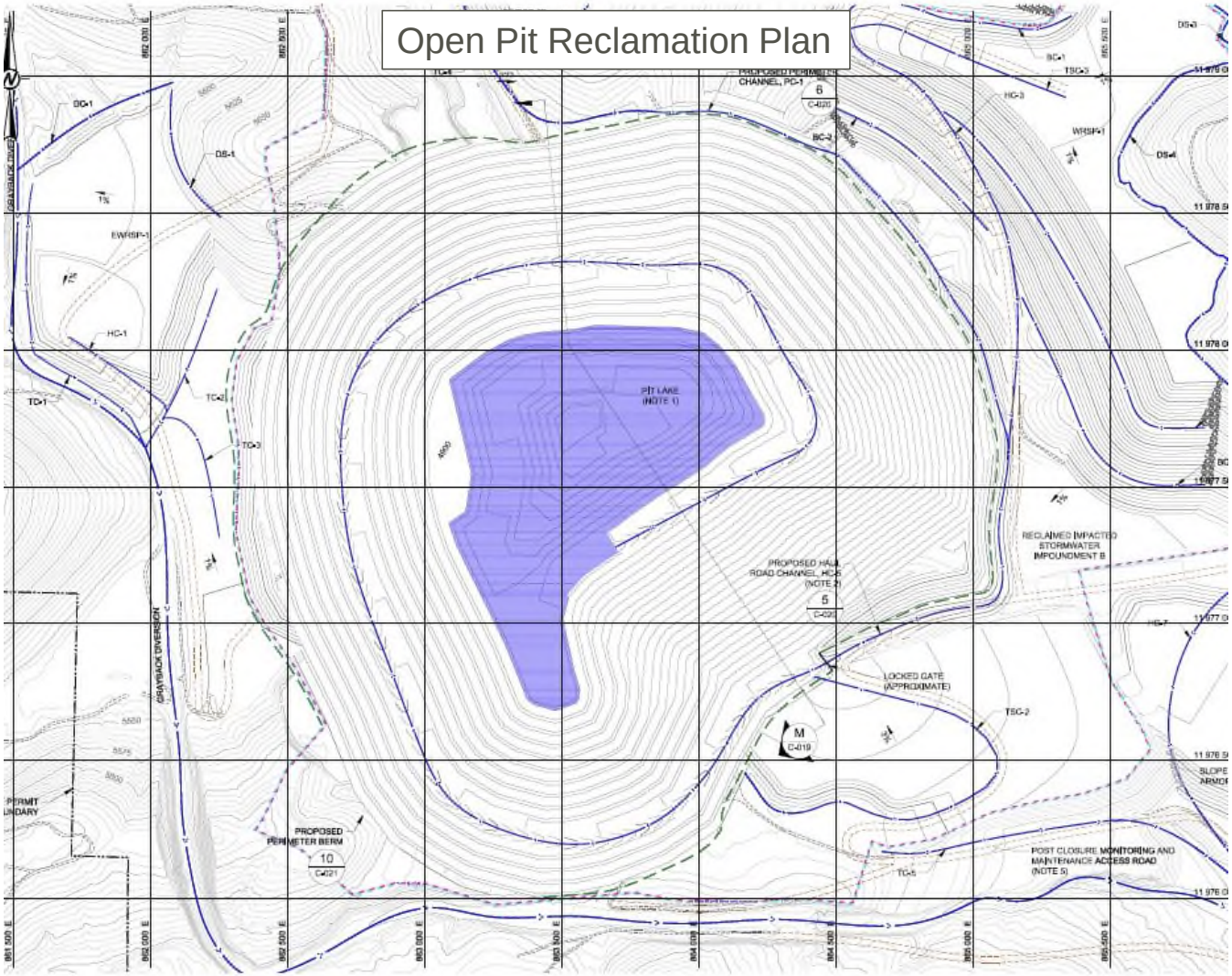
TSF Passive Evaporation Program



v. Open Pit Reclamation and Closure Plan

- **Primary Closure Components:**
  - Removal of infrastructure (pumps, piping, electrical) not required for post-closure water management.
  - Rapid filling of the pit with approximately 2,200 acre-feet of water over a period of approximately 6 months.
  - Construction of an earthen safety berm and barbed wire fencing around the perimeter of the open pit.
  - Construction of surface water channels around the perimeter of the pit and within the pit along the existing haul road that are designed to convey peak flows generated by the 100 year return interval storm event in accordance to 20.6.7.33. A NMAC.
  - Grading of the disturbed areas associated with the pit perimeter, perimeter channels, and safety berm construction.
  - Installation of a security gate at the haul road entrance into the pit.
  - Reclamation of the main haul road and accessible flat areas within the open pit shell in response to MMD's request. Reclaimed area will include approximately 55 acres (including 20 acres of pit lake) or approximately 43% of total pit shell area.
  - Revegetation of disturbed areas around the pit perimeter and 35 acres within the pit designed to create a stable, self-sustaining plant community in accordance with 19.10.5.507 NMAC.
  - Installation, operation, and maintenance of groundwater monitoring wells that may be required for post-closure monitoring in accordance with 20.6.7.35.B NMAC.

Open Pit Reclamation Plan



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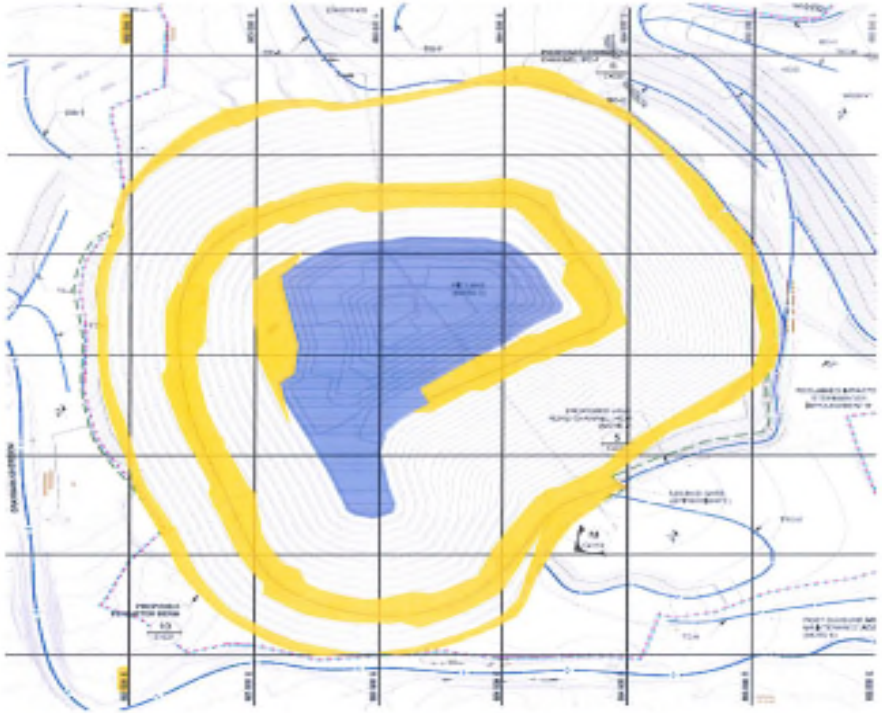
Open Pit Reclamation Plan



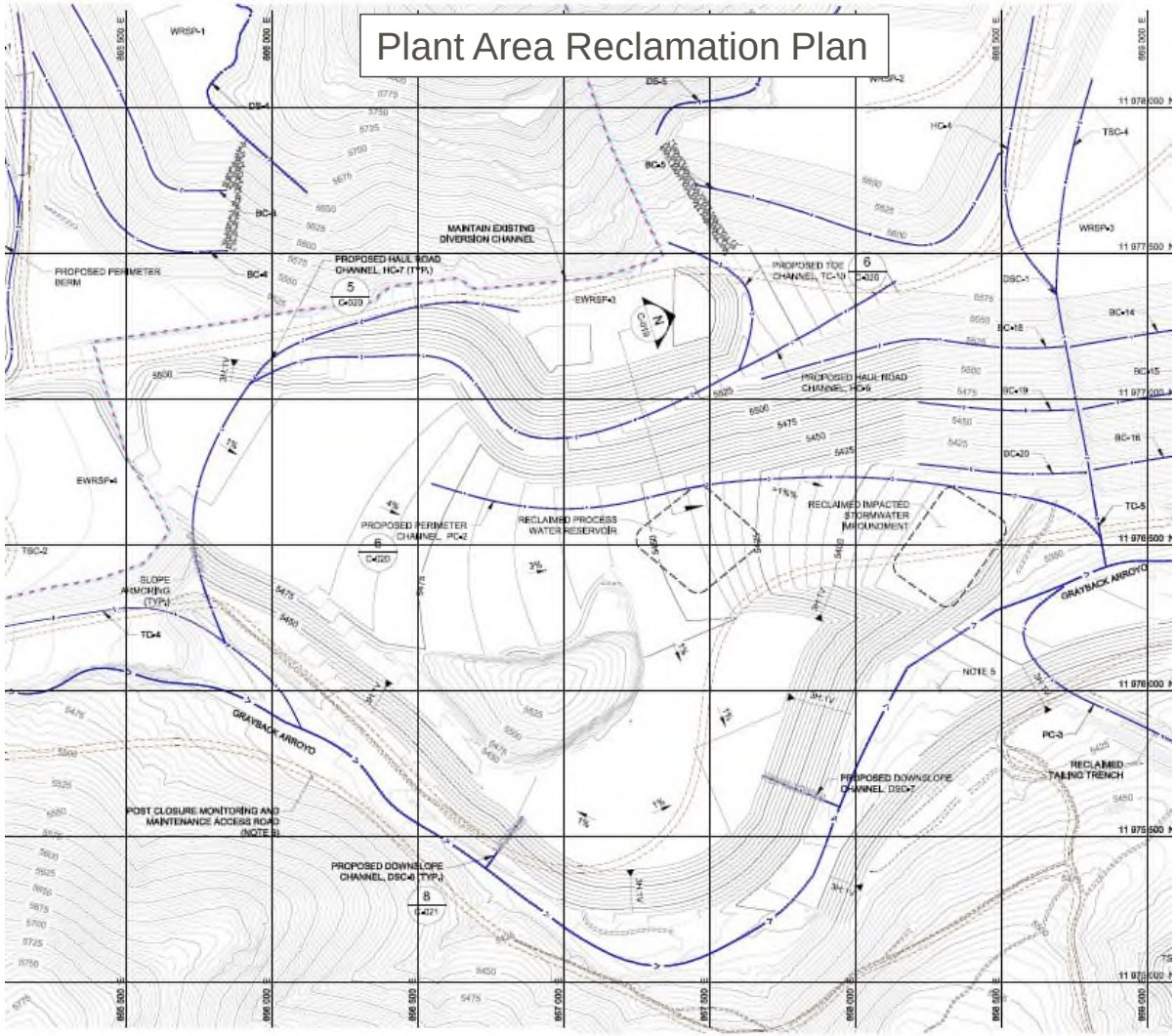
Proposed pit sheill reclamation/vegetation area

Proposed rapid-fill water body

vi. Plant Area Reclamation and Closure Plan

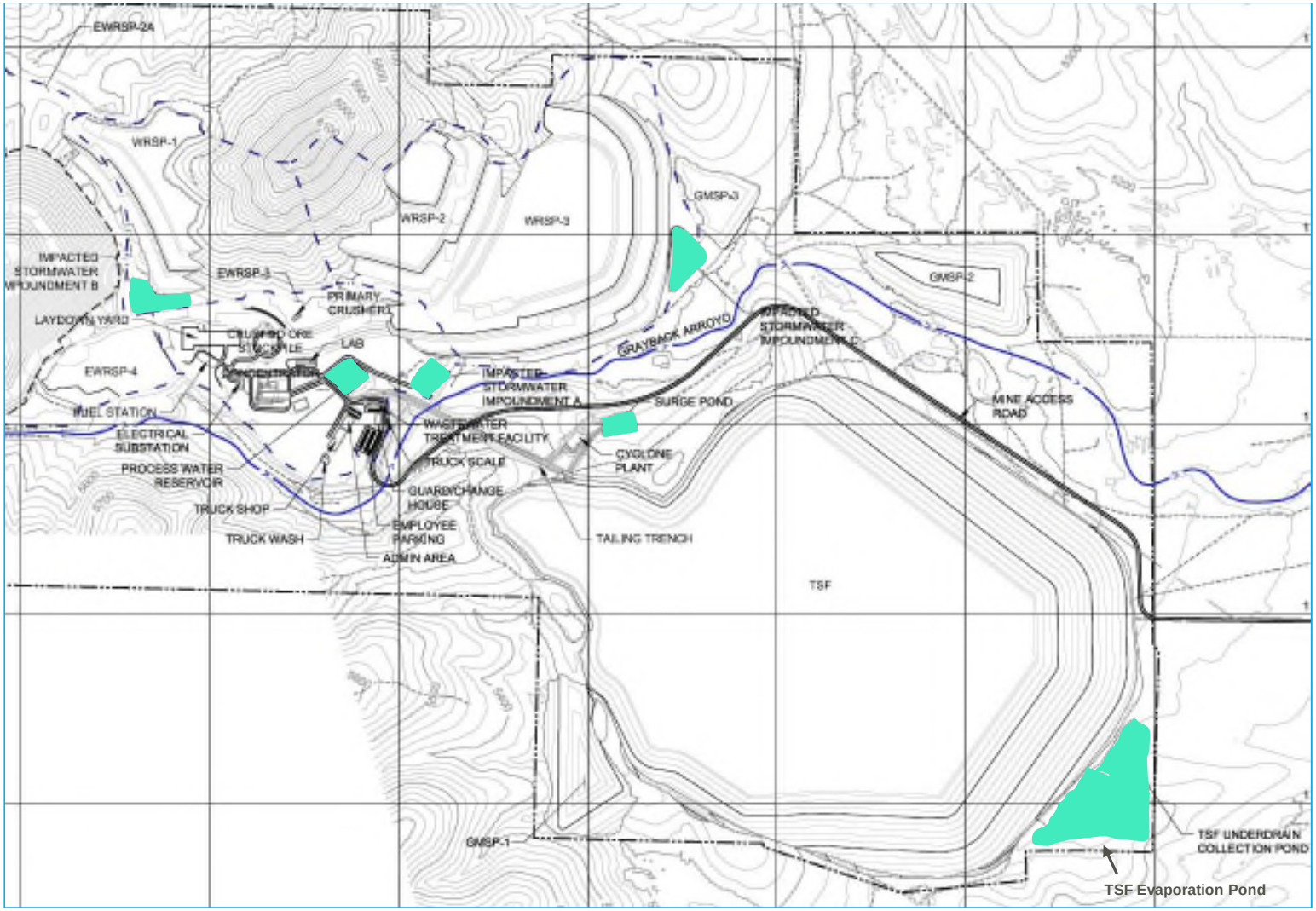
- **Primary Closure Components:**
  - All fuel tanks, reagent storage facilities, buildings and equipment will be removed from the site and disposed of in an approved manner according to applicable federal and state laws.
  - Concrete foundations will be broken, walls toppled, backfilled, and covered with 36 inches of growth media; or removed and disposed of at a nearby approved construction and debris landfill.
  - Closure of the process water reservoir and impacted storm water impoundment A as described in Surface Impoundment slides.
  - Closure of EWRSP-3 as described in Existing Waste Rock Stockpiles slides.
  - Residual materials to be removed from all pipelines; above-ground pipelines will be removed and disposed of at a nearby approved construction and debris landfill or the TSF; buried pipelines to be capped.
  - Electrical substation and associated transmission lines will be removed once they are no longer needed.
  - Ripping and grading of the top surfaces of the plant area to a slope of 1% or greater and covering of ripped and graded disturbed areas with 6-inches of growth media.
  - Stormwater channels designed to convey peak flows generated by the 100 year return interval storm event in accordance to 20.6.7.33. A NMAC.
  - Revegetation designed to create a stable, self-sustaining plant community that conforms to the planned grazing and wildlife habitat PMLU in accordance with 19.10.5.507 NMAC.
  - Installation, operation, and maintenance of groundwater monitoring wells that may be required for post-closure monitoring in accordance with 20.6.7.35.B NMAC.

Plant Area Reclamation Plan



vii. Surface Impoundments Reclamation and Closure Plan

- Surface impoundments to be closed include: impacted stormwater impoundments A through C; process water reservoir; surge pond; TSF underdrain collection pond; and TSF evaporation pond.
- **Primary Closure Components:**
  - Removal of all above ground impoundment electrical systems, pumps, and infrastructure, including outdoor lighting and transmission lines.
  - Pumping of remaining water in the impoundments onto the top of the TSF to evaporate.
  - Flushing of all process water pipelines to remove residual solutions and disposing of the solutions in the TSF to evaporate.
  - Removing and disposing of the above-ground process pipelines in the TSF or at a nearby approved construction and debris landfill. Capping all buried process water, tailings delivery, and water delivery pipelines.
  - Ripping surface impoundment HDPE liners and folding over prior to backfilling.
  - Grading impoundment berms over ripped HDPE liners and backfilling the impoundments with clean fill.
  - Grading the backfilled areas to drain and re-contour surfaces to blend into the natural topography.
  - Covering of impoundments with 6-inches of suitable cover material where unsuitable growth media exists after grading.
  - Revegetation of covered and disturbed areas designed to create a stable, self-sustaining plant community that conforms to the planned grazing and wildlife habitat PMLU in accordance with 19.10.5.508 NMAC.
  - Installation, operation, and maintenance of groundwater monitoring wells that may be required for post-closure monitoring in accordance with 20.6.7.35.B NMAC.


EWRSP-2A
WRSP-1
WRSP-2
WRSP-3
GMSP-3
GMSP-2
IMPACTED STORMWATER IMPOUNDMENT B
EWRSP-3
PRIMARY CRUSHER
LAYDOWN YARD
CRUSHED ORE STACKPILE
LAB
EWRSP-4
IMPACTED STORMWATER IMPOUNDMENT C
GRAYBACK ARROYO
IMPACTED STORMWATER IMPOUNDMENT A
SURGE POND
MINE ACCESS ROAD
FUEL STATION
ELECTRICAL SUBSTATION
WASTEWATER TREATMENT FACILITY
CYCLONE PLANT
PROCESS WATER RESERVOIR
TRUCK SCALE
GUARD/CHANGE HOUSE
TRUCK SHOP
EMPLOYEE PARKING
TRUCK WASH
ADMIN AREA
TAILING TRENCH
TSF
GMSP-1
TSF UNDERDRAIN COLLECTION POND
TSF Evaporation Pond

viii. Ancillary Facilities Reclamation and Closure Plan

- **Primary Closure Components:**
  - Haul roads and access roads not needed for closure and post-closure access will be reclaimed by ripping to a depth of between 12 and 18 inches and covering with 6-inches of growth media where suitable growth media does not exist. Removal of culverts not needed for post-closure storm water management and disposal of them in an approved manner.
  - Existing roads utilized for closure and post-closure access that are wider than that required for single vehicle access will be narrowed during reclamation by ripping, grading and covering the excess width with 6-inches of suitable cover material where unsuitable growth media exists.
  - Removal of pumping stations and on-site electrical substation once they are no longer needed for post-closure water management. Removal of overhead lines and power poles and disconnect from the 115kV line owned by Tri-State Generation and Transmission.
  - Removal of residual sediments and fluids from pipelines and disposal of materials on top of the TSF prior to reclamation of this facility, or at an approved location. Removal and disposal of the above-ground pipelines in the TSF prior to reclamation of this facility, or at a nearby approved construction and debris landfill. Capping all buried pipelines.
  - Ripping HDPE liners within corridors. Backfilling of pipeline corridor trenches with clean fill. Grading the backfilled areas to drain and recontouring surfaces to blend into the natural topography. Covering of pipeline corridors with 6-inches of suitable cover material where unsuitable growth media exists after grading.
  - Ripping of non-impacted disturbed areas to a depth of 12 to 18 inches.
  - Revegetation of covered and disturbed areas designed to create a stable, self-sustaining plant community that conforms to the planned grazing and wildlife habitat PMLU in accordance with 19.10.5.507 and 19.10.5.508 NMAC.

ix. Soil Salvage Stockpiles Reclamation and Closure Plan

- Combined soil salvage stockpiles GMSP-1, GMSP-2, and GMSP-3 will store an estimated 4.5 million cy of growth media/cover material for reclamation.
- **Primary Closure Components:**
  - Grading remaining growth media material and associated disturbed areas to drain and re-contour surfaces to blend into the natural topography.
  - Leave a minimum of six inches of growth media material in place, as needed, within the stockpile footprints.
  - Ripping of the remaining growth media and disturbed areas.
  - Revegetation of former GMSP footprint areas and associated disturbed areas to create a stable, self-sustaining plant community that conforms to the planned grazing and wildlife habitat PMLU in accordance with 19.10.5.508 NMAC.


Future Growth Media Stockpiles
FUTURE GMSP-3
FUTURE GMSP-2
GRAYBACK ARROYO
FUTURE GMSP-1
Google earth
© SPOT IMAGE
© 2018 Google
4000 ft
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Reclamation Schedule

Reclamation Facility Area	Reclamation Schedule, Year Following Mine Permit Approval[1]	
	Start	Finish
Existing Waste Rock Stockpiles		
EWRSP-1, EWRSP-2A, and EWRSP-2B (Placement of EWRSP-2A Stockpile Material Outside OPSDA onto the top of EWRSP-2B, Regrading and Cover Placement, Conveyance Channel Construction, Revegetation)	Year 1	Year 2
EWRSP-4 (Regrading, Cover Placement on Outslopes, Revegetation Outslopes)	Year 1	Year 2
EWRSP-4 (Cover Placement on Top Surface, Conveyance Channel Construction, Revegetation of Top Surface)	Year 14	Year 15
EWRSP-3 (Regrading and Cover Placement, Conveyance Channel Construction, Revegetation. Reclaimed as part of plant area reclamation)	Year 15	Year 16
Proposed Waste Rock Stockpiles		
WRSP-1 (Regrading and Cover Placement, Conveyance Channel Construction, Revegetation)	Year 14	Year 15
WRSP-2 (Regrading and Cover Placement, Conveyance Channel Construction, Revegetation)	Year 13	Year 15
WRSP-3 (Regrading and Cover Placement, Conveyance Channel Construction, Revegetation)	Year 10	Year 15
Proposed Tailing Storage Facility		
Tailings Storage Facility (Regrading and Cover Placement, Backfilling and Reclamation of Tailings Pipeline Corridor, Conveyance Channel Construction, Revegetation)	Year 16	Year 21
Active Evaporation of Drain Down Waters	Year 13	Year 18
Construction of Evaporation Pond	Year 17	Year 18
Passive Evaporation of Drain Down Waters	Year 18	Year 38
Evaporation Pond Closure (Ripping Liner and Backfilling Pond, Regrading and Cover Placement, Revegetation)	Year 38	Year 39
Proposed Plant Area Facility[2]		
Plant Area (Building/Structure Demolition & Removal, Removal of Land Bridges, Regrading and Cover Placement, Conveyance Channel Construction, Revegetation)	Year 15	Year 16
Proposed Open Pit		
Rapid Fill of Pit Lake	Year 12	Year 13
Pit Perimeter (Construction of Pit Perimeter Conveyance Channels Perimeter Berm/Fencing and Cover Placement, Construction of Haul Road Conveyance Channel, Revegetation)	Year 14	Year 15
Ancillary Facilities		
Building/Structure/Pipeline Demolition, Removal, and Burial, Regrading and Cover Placement, Facility Revegetation	Year 16	Year 20

Notes:
Contemporaneous reclamation is considered reclamation activities conducted prior to cessation of active mining operations
[1] - The reclamation schedule is based on the number of years from the time NMCC obtains all of the required Mine permits and approvals to begin operations. Active mining operations are projected to be completed approximately 12 years and 3 months following the issuance of the mine permit. Processing of ore is projected to be completed approximately 13 years and 6 months following the issuance of the mine permit.

SUMMARY

- **Copper Flat Closure and Reclamation Plan meets or exceeds requirements in the Copper Rule and is designed to re-establish a self sustaining ecosystem that conforms to the planned grazing and wildlife habitat PMLU.**
- **NMCC has committed to concurrent reclamation of legacy stockpiles as discussed in this presentation and proposed WRSP-3 during operations.**
- **NMCC has committed to concurrent reclamation of legacy disturbances along Grayback Arroyo during operations.**
- **Reclamation Cover Material Test Plots will be constructed and monitored on one of the reclaimed EWRSP's to demonstrate suitability of the RCM at Copper Flat.**