Freeport-McMoRan Chino Mines Company
P.O. Box 10
Bayard, NM 88023

November 4, 2025

Certified Mail # 70221670000184288332

David Ennis, Program Manager
Mining and Minerals Division- EMNRD
Mining Act Reclamation Program
1220 South St. Francis Drive
Santa Fe, NM 87505

Dear Mr. Ennis:

Re: Freeport-McMoRan Chino Mines Company Permit GR009RE
Closure Closeout Plan Amendment for Kessel Stockpile

Freeport-McMoRan Chino Mines Company (Chino) is providing this letter as an amendment to the Closure Closeout Plan (CCP) Update submitted by Chino on October 30, 2024. In that submission, Chino introduced a new stockpile referred to as the Kessel Stockpile and, according to MMD procedures, Chino included a closure-closeout plan for the stockpile as it is planned in the next 5 years. Upon approval of that scope, Chino will proceed to update the Reclamation Cost Estimate (RCE).

The Mining and Minerals Division (MMD) requested the CCP design for the Kessel Stockpile that reflects the full buildout of the stockpile. This amendment package includes the requested design to facilitate MMD's review and permitting of the new stockpile.

Please note that the 2024 CCP originally included three stormwater ponds for the Kessel Stockpile. However, the plan has since been revised and only two ponds are now proposed. This updated design is reflected in the attached figures.

Chino appreciates the time and effort spent by the agency in reviewing this amendment. If you have any questions or would like to schedule time to review these application documents, please contact me at (575) 694-0013 or Mariana Lafon at (575) 519-9572.

Sincerely,

Tyler R. Johnson

Tyler R. Johnson, Chief Engineer
Environmental Services

TRJ:ml
Enclosures
20251023-002

ec: Kevin Barnes (MMD)

TELESTO
SOLUTIONS • INCORPORATED

October 8, 2025
Via Electronic Mail

Mr. Tyler Johnson
Freeport-McMoRan Chino Mines Company (Chino)
99 Chino Mines Road
Vanadium, New Mexico, 88023

Subject: **Kessel Stockpile Full-Buildout Closure Plan and Reclamation Cost Estimate**

Dear Tyler:

To better understand long-term costs, Chino requested that Telesto estimate the potential reclamation costs associated with the full buildout of the Kessel Stockpile. The full buildout here refers to the ultimate permitted elevations of 7100 ft and a 3.5:1 (horizontal: vertical) grade. Telesto prepared the closure designs for the full buildout and Reclamation Cost Estimate (RCE) for the Kessel Stockpile. The attached report details the closure plan, design, and RCE.

Telesto's approach to cost estimation for the RCE is consistent with previous approaches for RCEs done for Chino. The closure cost includes grading benches, constructing channels, cover material placement, revegetating, post-closure O&M, and road maintenance. Site-specific needs are also included with the construction of down drains and down drain dissipators.

The total reclamation cost for the closure plan for the full buildout of the Kessel Stockpile is $22,924,160 as summarized in Table 1.

Additionally, calculations in Appendix C determine the optimal operational bench height and width based on closure criteria as 63.5 feet and 119 feet, respectively. The bench optimization calculation set (Appendix C) compares these optimal values against alternate scenarios with varying operational bench heights.

If you have any comments, questions, or concerns regarding this letter and closure plan, please do not hesitate to contact Walt or me at your earliest convenience.

Sincerely,
Telesto Solutions, Inc.

Colorado Office (Corporate)
750 14th Street SW
Loveland, Colorado 80537
970-484-7704 / 970-484-7789 (FAX)

New Mexico Office
1303 Pope Street
Silver City, New Mexico 88061
575-538-5620 / 575-538-5625 (FAX)

Shea Zeman

Shea Zeman
Project Engineer

SKZ:ts
Enclosure
cc:

Table 1 Full Buildout Kessel Stockpile RCE

Facility	Direct Cost	Indirect Cost (30% of Direct)	Total Estimated Cost
Kessel Stockpile	$8,526,690	$2,558,007	$11,084,696
Rubio Peak Cover Area	$5,841,574	$1,752,472	$7,594,046
Closure Costs Total	***$14,368,263***	***$4,310,479***	***$18,678,743***
O&M		**17.5% of Direct**	
Full Site O&M Costs Total	**$3,613,121**	**$632,296**	**$4,245,417**
Total Cost (Closure + O&M)	**$17,981,972**	**$4,942,775**	**$22,924,160**

Kessel Stockpile Reclamation Plan – Projected Ultimate Configuration

Prepared for:

Freeport-McMoRan Chino Mines Company
99 Chino Mine Road
Vanadium, New Mexico 88023

Prepared by:

Telesto Solutions Inc.
750 14th Street SW
Loveland, Colorado 80537

October 2025

TELESTO
SOLUTIONS • INCORPORATED

Signature Page

Kessel Stockpile Reclamation Plan– Projected Ultimate Configuration

October 2025

Telesto Solutions, Inc.

Shea Zeman – Primary Author

Tom Shelley – Report Review

Contributors:

Dena Mawlawi
Scott Norsen

Table of Contents

List of Tables

List of Appendices

List of Sheets (Appendix A)

1.0 BACKGROUND

In October 2024, Freeport-McMoRan Chino Mines Company (Chino) submitted an update to the Chino Mine Closure/Closeout Plan (CCP) to the New Mexico Mining and Minerals Division (MMD) and the New Mexico Environment Department (NMED); collectively (the Agencies). The CCP included a reclamation plan for Kessel Stockpile based on the end-of-year 2030 mine plan. While the Agencies require an updated CCP every 5 years focused on the estimated configuration of the mine over the next five years, the federal Bureau of Land Management (BLM) requires consideration of the expected ultimate (or full-buildout configuration) for the federal Mine Plan of Operations process. Thus, the purpose of this report is to evaluate the reclamation of the ultimate Kessel Stockpile configuration to meet the requirements of the New Mexico Mining Act Rules and Bureau of Land Management rules and conform with the 2024 Chino CCP.

1.1 Closure Performance Objectives

Overall, the objectives for the Kessel Stockpile reclamation include:

- Public and worker safety
- Protection of groundwater and surface water
- Reclamation to achieve a self-sustaining ecosystem (SSE) or other approved post-mining land use (PMLU)

For Kessel Stockpile, a wildlife PMLU is proposed.

Primary closure performance objectives for the stockpiles and associated mining disturbed areas include:

- Reestablishment of an SSE for a wildlife PMLU
- Establish stable slopes and prevent excessive erosion of reclaimed areas

These objectives are consistent with BLM's applicable standards as stated in 3809.420, which include:

- Reclamation cover material management (RCM, including topsoil, if present) for final application after reshaping disturbed areas
- Measure to control erosion, landslides, and water runoff
- Measure to isolate potentially acid-generating materials

- Reshaping the area disturbed, application of the RCM, and revegetation of disturbed area

1.2 Reclamation Plan Design Criteria

Design criteria set the basis for the associated engineering conceptual designs required for reclamation planning. Design criteria ensure this reclamation plan meets the closure performance objectives and conforms with the 2024 Chino CCP.

Reducing erosion and ensuring stockpiles are geotechnically stable are two of the overarching objectives in the closure plan. Meeting these objectives also helps establish an SSE. General design criteria to meet these and other objectives are as follows:

- Erosion Reduction:
  - For 3:1 (horizontal:vertical) to 4H:1V inter-bench slopes, maximum slope length of 200 feet
  - For 2.5H:1V inter-bench slopes, maximum slope length of 175 feet
  - Provide for adequate gravel and rock percentage in cover materials and vegetation establishment
  - Average bench channel velocities < 5 fps (Chow, 1959)
- Mass Stabilization (prevention of landslides):
  - Maximum of 2.7H:1V overall stockpile slope (Note: the proposed operational configuration of the Kessel Stockpile will meet this basic stability target, and reclamation activities will only improve stockpile stability)
- Reduce stockpile seepage:
  - Three feet of approved cover material

Tables 1 and 2 provide additional design criteria and facility characteristics specifically for the Kessel Stockpile.

2.0 RECLAMATION PLAN

This reclamation plan reflects the full buildout of the Kessel Stockpile, including the ultimate permitted elevation of 7100 ft, as shown in the planned full buildout on Sheet 2 (Appendix A). Appendix B details reclamation activities and quantities (e.g., materials moved, capital required, energy expended, cover borrow sources, costs). This reclamation

plan utilizes existing components and related engineering controls during reclamation activities.

Reclamation steps common to stockpiles are:

- Grading of steeper operational slopes to slopes meeting the design criteria, with a balance of cut and fill within each stockpile
- Placement of benches and bench channels to:
  - Limit slope lengths to match the design criteria
  - Safely collect and convey stormwater from the reclaimed surface
- Installation of down drains to safely move stormwater from the bench channels back into the watershed
- Placement of three feet of approved cover material and subsequent vegetating activities (e.g., scarify, seed, mulch)

2.1 Kessel Stockpile Reclamation Plan

Appendix A, Sheet 2, shows the full buildout design configuration for Kessel Stockpile. Sheets 3 through 6 (Appendix A) illustrate the detailed earthwork and reclamation plans, including grading and drainage, cover, and revegetation.

Kessel Stockpile has a 3.5H:1V out-slope at its ultimate configuration. Thus, the grading of the out-slope is limited to a relatively short downslope distance between benches. The tops require only fine grading before cover placement. The top surface and side slopes are covered with three feet of reclamation cover material and the resultant surface is revegetated. Sheets 3 through 6 summarize the grading and drainage conveyance for the full buildout of Kessel Stockpile. The closure plan includes removing Kessel Stormwater 1 and 2 operational stormwater management features, opening the underdrains, and armoring the outlets. The sedimentation basin in Kessel Stormwater 1 will be retained as an energy dissipator for closure.

3.0 CAPITAL AND OPERATION AND MAINTENANCE COST ESTIMATE

Appendix B details the basis for the earthwork cost estimate associated with the facilities' proposed reclamation. Chino will submit the component and total estimated cost details

for reclamation of the ultimate Kessel Stockpile once the Agencies approve the scope of work and cost basis. The RCE divides capital costs and operation and maintenance (O&M) costs. The following section summarizes the basis used in establishing the RCE.

3.1 Basis for Earthworks Capital Cost Estimate

Earthmoving and reconfiguration from operational slopes to stable reclamation slopes drives the bulk of the capital earthwork cost estimate. Additional factors include the costs to cover and vegetate the facilities. The reclamation plan shown in Appendix A is the basis for the material quantities needed to achieve reclamation slopes and apply final cover. Estimated earthmoving energy consumption derives from the physics of moving material up and down slopes, as well as documented equipment fuel consumption and efficiencies. Unit rates are from sources to which the Agencies and Freeport-McMoRan Chino Mines Company agreed (Chino, 2019; NMED & MMD, 2019). Appendix B (details the basis of the earthwork capital cost estimate.

3.2 Basis for Earthworks Operational and Maintenance Cost Estimate

O&M costs include erosion control, road maintenance, and revegetation maintenance. O&M efforts will diminish with time:

- Erosion Control
  - Reclamation years 0-12: 12 days/year
  - Reclamation years 13-39: 4 days/year
  - Reclamation years 40-99: 1 day/year
- Road Maintenance
  - Reclamation years 0-19: 4 months/year at 24 hours/month
  - Reclamation years 20-39: 2 months/year at 24 hours/month
  - Reclamation years 40-99: 1 month/year at 24 hours/month
- Water Quality Monitoring and Reporting
  - Reclamation years 0-19: 4 days/year
  - Reclamation years 20-39: 2 days/year
  - Reclamation years 40-99: 1 day/year
- Revegetation Maintenance

- Reclamation years 0-11: Based on observations of previously reclaimed areas, the annual vegetation failure is conservatively estimated to be 2% failure every year for a total of 12 years, starting the year reclamation is completed

4.0 CONCLUSION AND DISCUSSION

The differences in the closure plan and reclamation designs for the 2030 mine plan versus the full buildout result primarily from the increase in facility footprint. Reclaimed acres increase from 243 in the 2030 mine plan to 806 for the full buildout, resulting in an increased reclamation scope and cost.

Hydraulic calculations in Appendix C determined the requirements for reclamation drainage features. The primary down drain follows the Kessel haul road (see Sheet 3, Appendix A). An additional down drain diverts flow from the primary down drain into Tributary 1, and a third down drain collects flows from bench channels on the northeast side of stockpile.

Through this report and the specifics found in Appendices A, B, and C, we conclude that the reclamation of the ultimate Kessel Stockpile configuration meets the requirements of the New Mexico Mining Act Rules and Bureau of Land Management rules as cited in Section 1.0 of the CCP.

5.0 REFERENCES

Chino, 2019. *Freeport-McMoRan Chino Mines Company - Continential mine Financial Assurance, Permit, GR002RE Discharge Permit 1403. Letter to Messrs. Shepherd (MMD) and Vollbrecht (NMED) from Sherry Burt-Kested, Mgr (Chino),* Bayard, New Mexico: Freeport-McMoRan Chino Mines Company. January 11, 2019.

Chow, V., 1959. *Open-Channel Hydraulics,* New York, New York: McGraw-Hill.

NMED & MMD, 2019. *Approval of Cost Estimate Resolutions (Agreement) and Request for Schedule. Letter from Messrs. Shepherd (MMD) and Vollbrect (NMED) to Sherry Burt-Kested, Mgr. (Chino),* Santa Fe, New Mexico: New Mexico Department of Mining and Minerals.

Telesto, 2024. *Chino Mine Closure/Closeout Plan Update 2024,* Loveland, Colorado: Telesto Solutions, Inc. October 2024.

Tables

Table 1 Reclamation Design Criteria by Facility

Facility/Area	Reclamation Activities	Criteria			
		Grading	Channels and Stormwater Conveyance	Cover/Ripping/Vegetation	Notes
North Mine Area					
Kessel Stockpile	∞ Rough grade inter-bench slopes to reclamation slopes ∞ Haul and grade cover material ∞ Grade in out-slope channels ∞ Complete surface water channels to route stormwater ∞ Rip and revegetate covered areas	∞ 200-foot maximum inter-bench slope length ∞ Maximum 3H:1V inter-bench slopes ∞ 1% minimum top surface slope	∞ Top surface sheet flow ∞ Out-slope channels: 30-foot wide, 5.0% maximum cross-bench slope, 2.0% longitudinal bench slope (max 5%) ∞ Down-drains: up to 1,000 cfs flow, spaced to maintain freeboard in out-slope channels	∞ 36-inch top and out-slope cover thickness ∞ Placed cover loosened by ripping to promote vegetation growth ∞ Approved Native seed mix	∞ Stockpile constructed at rough reclamation grades ∞ Benches pre-constructed

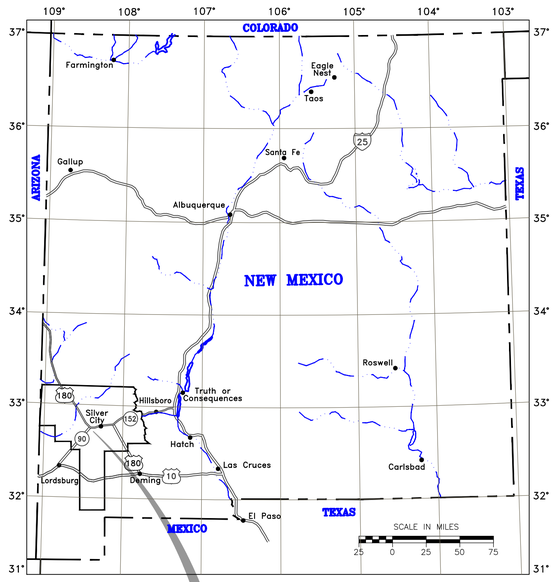
Table 2 Chino Closure/Closeout Facility Characteristics Form – Kessel Stockpile

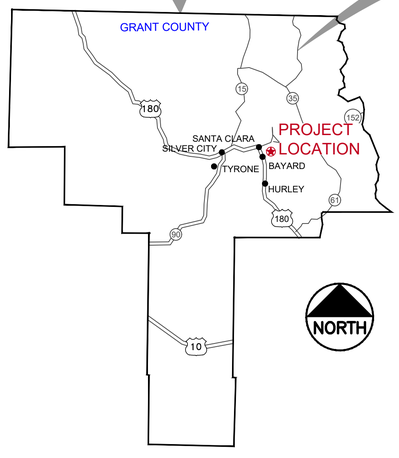
Function	Waste Rock Stockpile
Location Stormwater Flow Direction Regional Depth to Groundwater Winds General Notes	South of SW Lampbright, east of Rubio Peak Easterly >50' Medium upwind fetch, limited downwind fetch Outside the AOPHC, Permtting underway
Construction Method	End dumped
Physical Characteristics	Particle size: fine (silt and clay) to very large boulders High saturated hydraulic conductivity
Leach Status	Non-leach
Existing Engineering Measures	Stormwater control plans in place

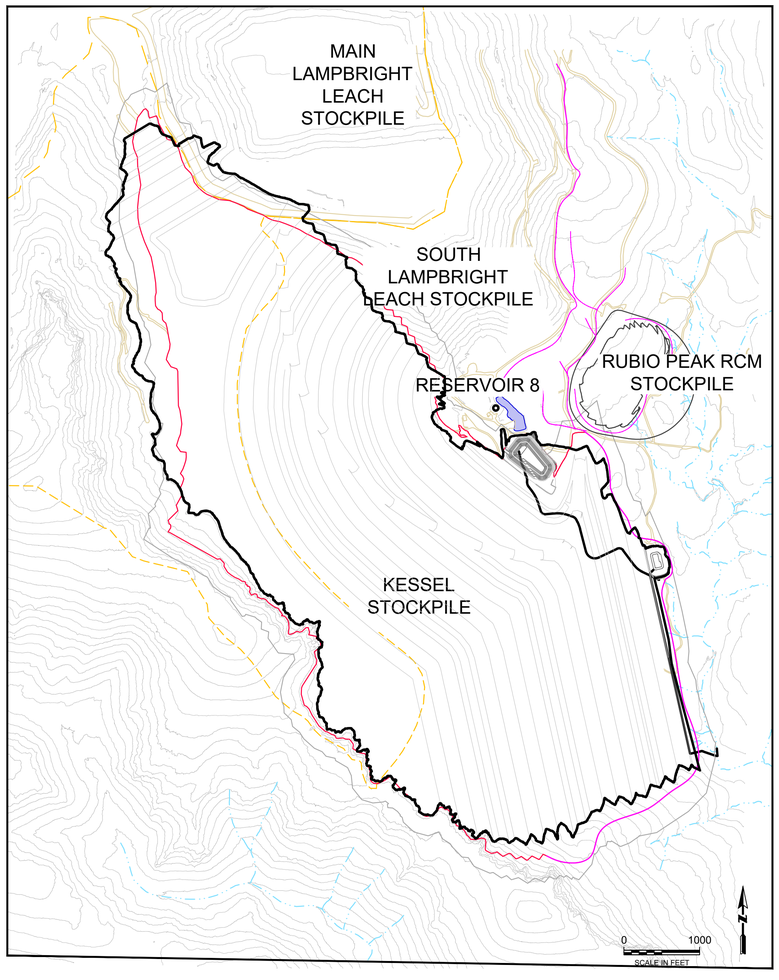
Appendix A
Reclamation Drawings

KESSEL STOCKPILE FULL-BUILDOUT CLOSURE PLAN

8/26/2025







SHEET INDEX

DETAIL REFERENCE

1 / 3 — DETAIL IDENTIFICATION NUMBER OR LETTER; NUMBER OF SHEET ON WHICH DETAIL IS SHOWN

SECTION REFERENCE

A / 5 — SECTION/PROFILE IDENTIFICATION LETTER; NUMBER OF SHEET ON WHICH SECTION IS SHOWN

SECTION/DETAIL TITLE

1 / 3 — DETAIL/SECTION NUMBER OR LETTER; [DETAIL TITLE]; DETAIL; SHEET NUMBER OF DETAIL/SECTION CALL OUT

COORDINATE SYSTEM
CHINO LOCAL MINE

REVISIONS

#	DESCRIPTION	DATE	BY	APPROVED
0	FOR CLIENT REVIEW	8/26/25	WN	SZ

DATE	08/26/2025
PROJECT	20240406
TASK NUMBER	01
DRAWN BY	SN
PROJECT ENGINEER	WN
CHECKED BY	WN

KESSEL ULTIMATE CCP

COVER SHEET

SHEET NUMBER: 1

REVISION NUMBER: 0

PREPARED BY: TELESTO SOLUTIONS INCORPORATED

PREPARED FOR: FREEPORT-MCMORAN

MAIN LAMPBRIGHT LEACH STOCKPILE

SOUTH LAMPBRIGHT LEACH STOCKPILE

SOUTHWEST LAMPBRIGHT WASTE ROCK STOCKPILE

RUBIO PEAK RCM MMD PERMIT BOUNDARY

RUBIO PEAK RCM STOCKPILE

RESERVOIR 8

KESSEL STORMWATER 1

KESSEL STORMWATER 2

TRIBUTARY 1

TRIBUTARY 2

GROUNDWATER INTERCEPTOR FRENCH DRAIN

E 6000 N -3000
E 6000 N -5000
E 6000 N -7000
E 6000 N -9000
E 6000 N -11000
E 13000 N -5000
E 15000 N -7000
E 15000 N -9000
E 15000 N -11000

LEGEND & NOTES

- PRE-RECLAMATION CONTOURS
- PRE-EXISTING GRAVEL ROAD
- EXISTING DRAINAGE
- BUILDING
- RUBIO PEAK PERMIT BOUNDARY
- STORMWATER DIVERSION

0 1"=400'
SCALE IN FEET

COORDINATE SYSTEM
CHINO LOCAL MINE

REVISIONS

#	DESCRIPTION	DATE	BY	APPROVED
0	FOR CLIENT REVIEW	8/26/25	WN	SZ

DATE	*08-26-25*
PROJECT	*200450-006*
TASK NUMBER	*01*
DRAWN BY	*SN*
PROJECT ENGINEER	*WN*
CHECKED BY	*SZ*

KESSEL ULTIMATE CCP

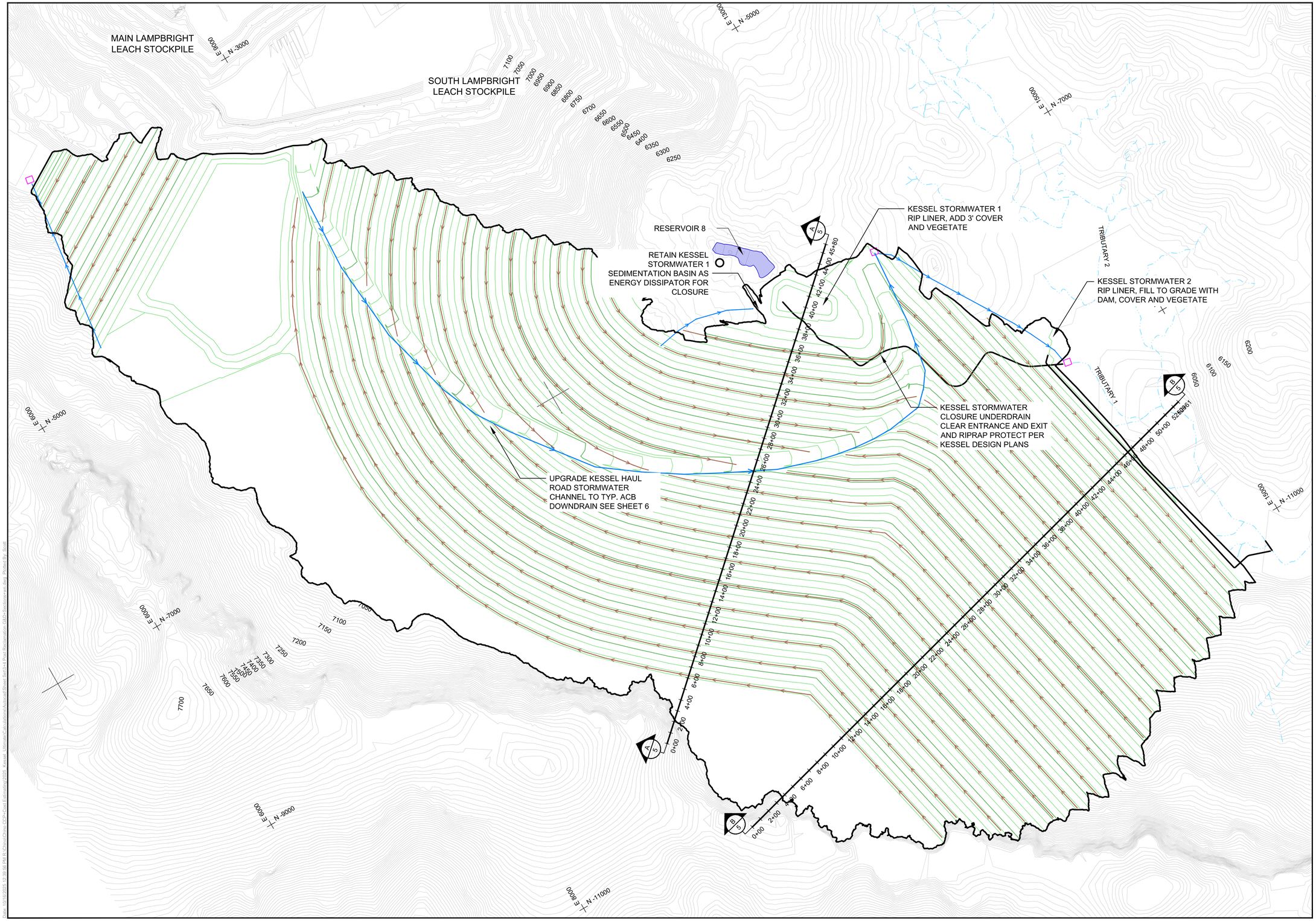
PRE-RECLAMATION CONFIGURATION

SHEET NUMBER:	REVISION NUMBER:
2	0

PREPARED BY: TELESTO SOLUTIONS INCORPORATED

PREPARED FOR: FREEPORT-MCMORAN

Date: 8/27/2025 10:42:04 AM R:\Chino\Chino CCP+Cost Estimating\2025 Kessel Ultimate\Calculations\Autocad\Sheet Set\2 Pre Reclamation Topography\main.dwg Plotted By: Walt Nicoll



LEGEND & NOTES

- PRE-RECLAMATION CONTOURS
- GRAVEL ROAD
- EXISTING DRAINAGE

PROPOSED CONTOURS

- MAJOR (50 FT)
- MINOR (10 FT)
- BENCH CHANNEL
- DOWN DRAIN
- ENERGY DISSIPATOR

0 1"=400'
SCALE IN FEET

COORDINATE SYSTEM
CHINO LOCAL MINE

REVISIONS

#	DESCRIPTION	DATE	BY	APPROVED
1	FOR CLIENT REVIEW	8/26/25	WN	SZ

DATE	*08-26-25*
PROJECT	*200450-006*
TASK NUMBER	*01*
DRAWN BY	*SN*
PROJECT ENGINEER	*WN*
CHECKED BY	*SZ*

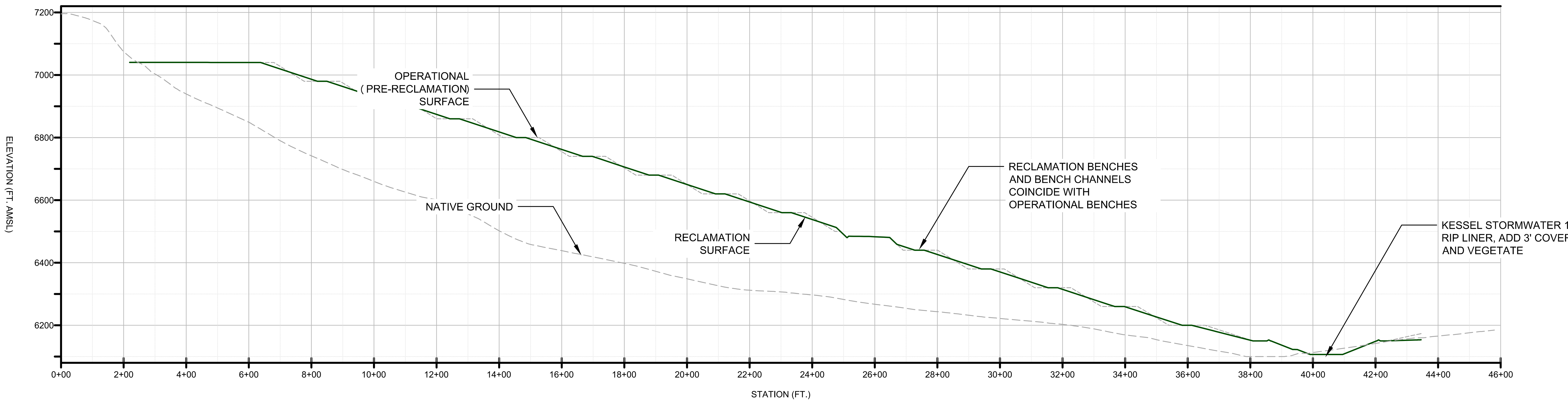
KESSEL ULTIMATE CCP

RECLAMATION GRADING AND DRAINAGE PLAN

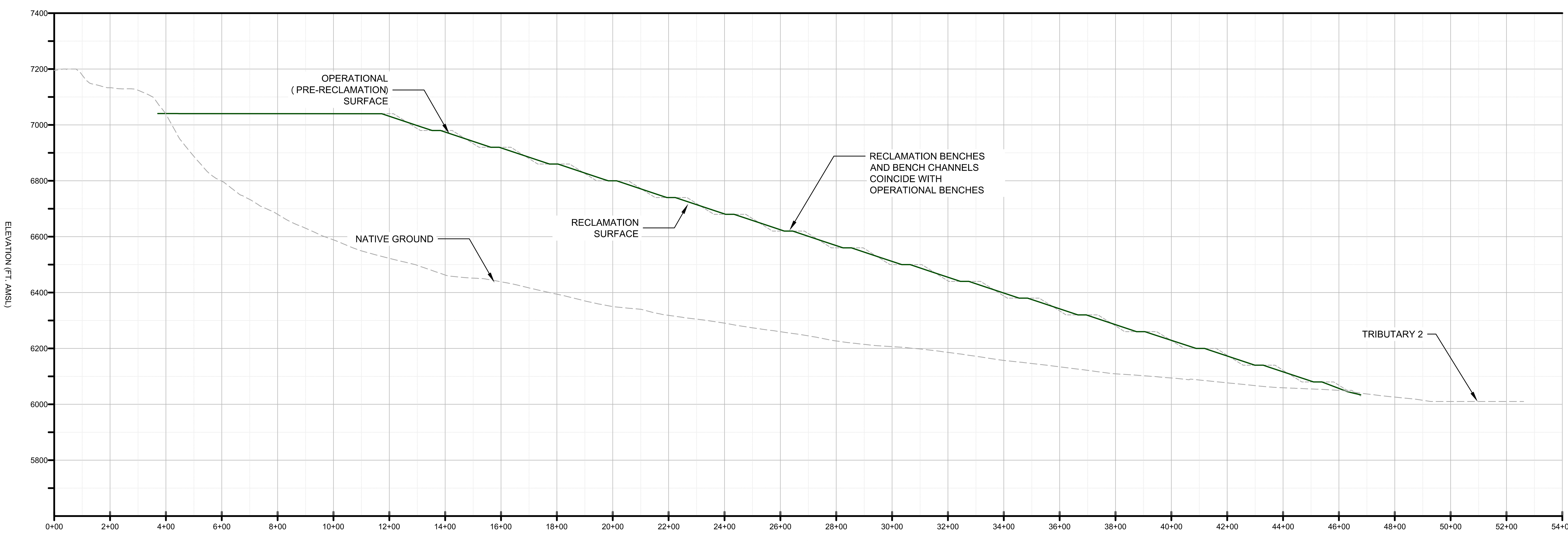
SHEET NUMBER:	REVISION NUMBER:
3	0

PREPARED BY: TELESTO SOLUTIONS INCORPORATED

PREPARED FOR: FREEPORT-McMoRan



A/3 TOP OF KESSEL THROUGH KESSEL STORMWATER 2 CROSS SECTION



B/3 TOP OF KESSEL THROUGH KESSEL TRIBUTARY 2 CROSS SECTION

0 1"=200'
SCALE IN FEET

COORDINATE SYSTEM
CHINO LOCAL MINE

REVISIONS

#	DESCRIPTION	DATE	BY	APPROVAL
0	FOR CLIENT REVIEW	8/26/25	WN	SZ

DATE	08-26-25
PROJECT	200450-006
TASK NUMBER	01
DRAWN BY	SN
PROJECT ENGINEER	WN
CHECKED BY	SZ

KESSEL ULTIMATE CCP

PRE- AND POST-RECLAMATION CROSS SECTIONS

SHEET NUMBER: 4
REVISION NUMBER: 0

PREPARED BY: TELESTO SOLUTIONS INCORPORATED

PREPARED FOR: FREEPORT-MCMORAN

Date: 10/16/2025 12:39:56 PM R:\Chino\Chino CCP+Cost Estimating\2025_Kessel_Ultimate\Calculations\Autocad\Sheet Set\3+4 Post Reclamation G&D+Sections+wn.dwg Plotted By: Scott

MAIN LAMPBRIGHT LEACH STOCKPILE

SOUTH LAMPBRIGHT LEACH STOCKPILE

RECLAIMED
RUBIO PEAK
RCM STOCKPILE

KESSEL STORMWATER 1

RECLAIMED
KESSEL STOCKPILE

E 6000 N -3000
E 6000 N -5000
E 6000 N -7000
E 6000 N -9000
E 6000 N -11000
E 13000 N -5000
E 15000 N -7000
E 15000 N -9000
E 15000 N -11000

LEGEND & NOTES

- FINAL GROUND CONTOURS
- GRAVEL ROAD
- EXISTING DRAINAGE

PROPOSED CONTOURS
- MAJOR (50 FT)
- MINOR (10 FT)

- COVER+REVEGETATE
- BORROW+REVEGETATE

0 1"=400'
SCALE IN FEET

COORDINATE SYSTEM
CHINO LOCAL MINE

REVISIONS

#	DESCRIPTION	DATE	BY	APPROVAL
0	FOR CLIENT REVIEW	8/26/25	WN	SZ

DATE	*08-26-25*
PROJECT	*200450-006*
TASK NUMBER	*01*
DRAWN BY	*SN*
PROJECT ENGINEER	*WN*
CHECKED BY	*SZ*

KESSEL ULTIMATE CCP

COVER BORROW AND VEGETATION PLAN

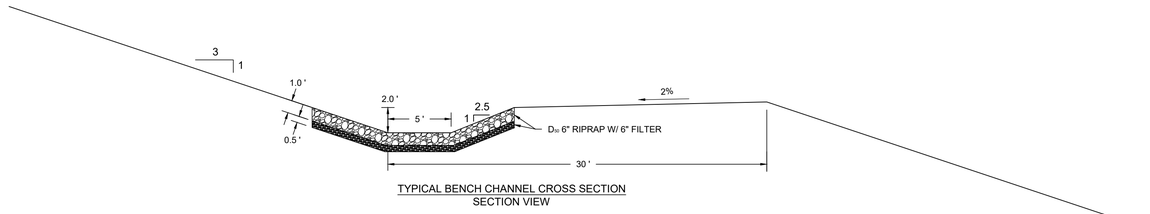
SHEET NUMBER: 5

REVISION NUMBER: 0

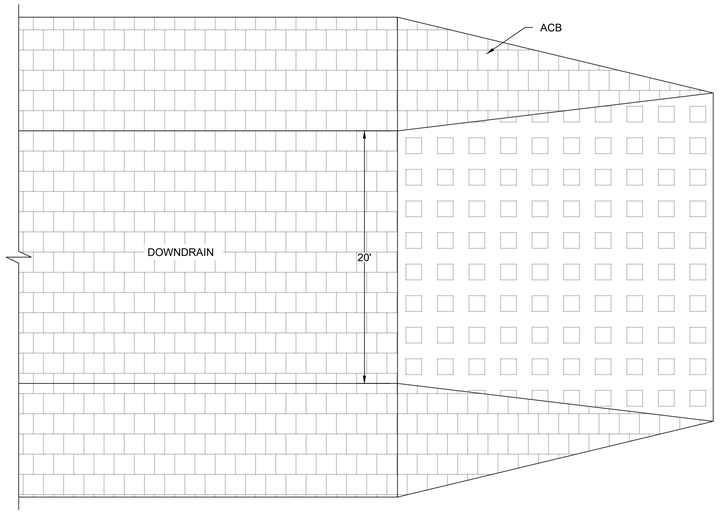
PREPARED BY: TELESTO SOLUTIONS INC

PREPARED FOR: FREEPORT-MCMORAN

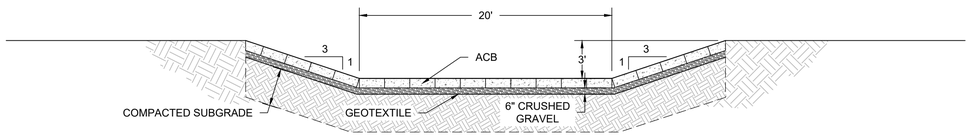
Date: 8/27/2025, 10:54:05 AM R:\Chino\Chino CCP+Cost Estimating\2025_Kessel_Ultimate\Civil\Drawings\Autocad\Sheet Set\5 KESSEL_STOCKPILE COVER & BORROW\VEG PLAN-WN.dwg Plotted By: Wan Nicoli



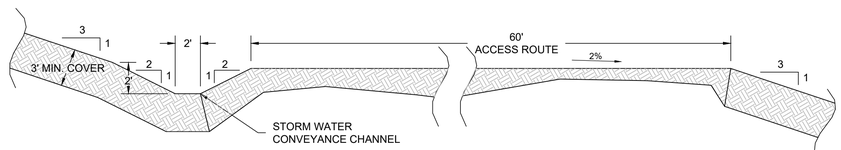
TYPICAL BENCH CHANNEL CROSS SECTION
SECTION VIEW



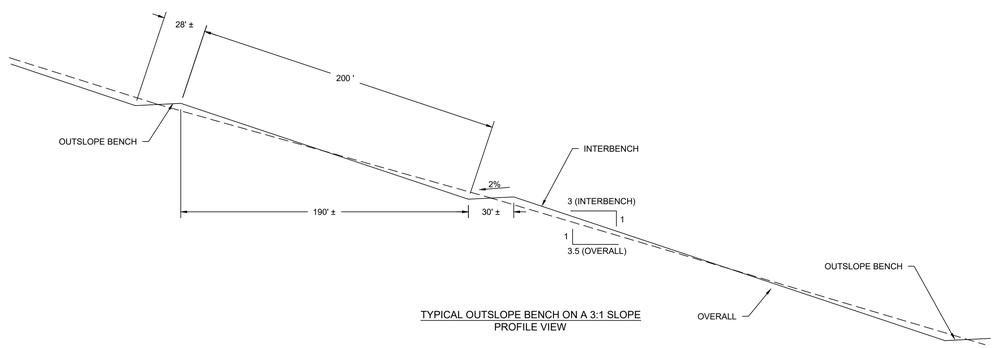
TYPICAL ENERGY DISSIPATOR
PLAN VIEW



TYPICAL DOWNDRAIN
SECTION VIEW



ACCESS CORRIDOR
- TYPICAL SECTION -



TYPICAL OUTSLOPE BENCH ON A 3:1 SLOPE
PROFILE VIEW

0 6
SCALE IN FEET

COORDINATE SYSTEM
CHINO LOCAL MINE

REVISIONS

#	DESCRIPTION	DATE	BY	APPROVED
0	FOR CLIENT REVIEW	8/26/25	WN	SZ

DATE	*08-26-25*
PROJECT	*200450-006*
TASK NUMBER	*01*
DRAWN BY	*SN*
PROJECT ENGINEER	*WN*
CHECKED BY	*SZ*

KESSEL ULTIMATE CCP

TYPICAL SECTIONS

SHEET NUMBER:	REVISION NUMBER:
6	0

PREPARED BY:
TELESTO SOLUTIONS INCORPORATED

PREPARED FOR:
FREEPORT-McMoRan

Appendix B
Reclamation Cost Estimate Calculations

Earthwork Reclamation Cost Estimate
Process Summary Report

Kessel Ultimate Stockpile

Prepared for

Freeport-McMoRan
Chino Mines Company
P.O. Box 10
Bayard, New Mexico 88023

Prepared by

Telesto Solutions, Inc.
750 14th Street SW
Loveland, CO 80537

October 2025

TELESTO
SOLUTIONS • INCORPORATED

Signature Page

Earthwork Reclamation Cost Estimate Process Summary Report

Kessel Ultimate Stockpile

October 2025

Report Authors and Contributors

Telesto Solutions, Inc.

Dena Mawlawi – Primary Author

Shea Zeman – Report Review

TABLE OF CONTENTS

LIST OF TABLES

LIST OF FIGURES

LIST OF APPENDICES

1.0 INTRODUCTION

Telesto Solutions Inc. (Telesto) presents this Reclamation Cost Estimate (RCE) report for the final build-out of the Kessel Stockpile at Chino Mines Company (Chino). This earthwork RCE report outlines the scope of earthwork related to closure and closeout activities, including attachments that describe the main assumptions and methods used to determine the financial assurance. The supporting reclamation drawings for the cost estimate are in Appendix A. Agreements made in 2019 between the agencies and Chino form the basis for the earthwork RCE costs.

1.1 Reclamation Overview

The earthwork RCE is based on the planned ultimate build-out of the Kessel stockpile. The plan assumes that the reclamation design for Kessel will be implemented during the ninth closure year, with reclamation beginning that same year. The O&M cost estimate assumes revegetation maintenance will continue for 12 years after reclamation is completed, while erosion control, road maintenance, and groundwater monitoring will continue for 100 years after closure.

While this report solely focuses on the Kessel Ultimate Stockpile, it aligns with the current Chino Mine's Closure/Closeout Plan. Therefore, additional information and supporting documents can be found in the 2024 Chino CCP, Appendix F: Earthwork Reclamation Cost Estimate Process Summary Report. Refer to Table 1 for further details.

1.2 Report Organization

This earthwork RCE process summary report includes the following sections:

- **Section 1.0** offers an introduction and overview of the RCE prepared for Kessel

- **Section 2.0** outlines the data and assumptions used for estimating earthwork, equipment, operation and maintenance (O&M) costs, quotes, and unit costs
- **Section 3.0** summarizes the information used in calculating the earthwork RCE
- **Section 4.0** presents the results, covering both direct and indirect capital costs
- **Section 5.0** lists the references cited in this report

The following attachments provide supporting information and calculations:

- **Attachment 1** presents the engineering take-offs used in the calculations
- **Attachment 2** presents supporting data for the cost estimation, including labor rates, equipment data, direct quotes, and information on fuel costs
- **Attachment 3** presents the RCE spreadsheet

2.0 DATA AND ASSUMPTIONS

Appendix A of the Kessel CCP report contains the reclamation design that serves as the foundation for the earthwork RCE. The calculation sheet in Attachment 3 of this earthwork RCE report provides the reclamation cost estimate.

Data and key assumptions used in the cost estimate calculations for earthwork processes and equipment, indirect and O&M costs, and direct quotes are outlined in this section. Attachment 2 of this earthwork RCE report provides more detailed information.

2.1 Earthwork Processes and Equipment

The RCE uses the following data and assumptions to determine the cost of earthwork processes and equipment:

- **Dozer Push Distances:** Dozer push distances indicate the distance from the centroid of the cut block to the centroid of the fill block
- **Cover Placement:** Trucks, loaders, shovels, and graders manage loading and distribution with optimal truck-to-equipment ratios for each haul route
- **Haul Distances:** Haul distances are calculated based on a preferred route and up to three segments; they start and end at the approximate source and reclamation area centroids

- **Borrow Area:** All coverage for the Kessel Stockpile is supplied by the Rubio Peak Cover Stockpile
- **Truck and Shovel Operations:** This RCE refers to the Caterpillar 770G haul truck for operation calculations; no shovels are included
- **Scrappers:** No scrappers are used in this reclamation plan
- **Dust Suppression and Road Maintenance:** A water truck and motor grader are part of the reclamation fleet, with the same task time as a loader or hydraulic shovel
- **Labor Rates:** All labor rates are based on the NMDOL Type H (Heavy Engineering) rates. These rates include the base pay, fringe benefits, and apprenticeship contribution rates
- **Equipment Rates:** Operational costs per equipment unit are sourced from the EquipmentWatch Custom Cost Evaluator
- **Hourly Adjustment:** The cost information provided in EquipmentWatch is based on 50 minutes of work per hour. Since the RCE calculation also uses this time frame, an hourly adjustment is made when applying this data to a 60-minute work hour
- **Revegetation and Scarification:** The revegetation unit cost is based on R.S. Means, EquipmentWatch, and direct quotes. Scarifying the final surface occurs alongside revegetation
- **Equipment Production Factors**: Table 3 Summarizes equipment production factors from the Caterpillar Handbook (CPH) and EquipmentWatch. Productivity curves are also developed from the Caterpillar references and equipment-specific brochures.
- **Fuel Costs:** The fuel cost is based on discussions with the FA Work Group in the fall of 2018, as agreed in January 2019; historical local quotes are correlated with public data to estimate the fuel cost (see Attachment 2)
- **Miscellaneous Unit Costs**: Other miscellaneous unit costs, shown in Table 5, were taken from several sources. Supporting documentation is included in Attachment 2.

2.2 Indirect and Operation and Maintenance Costs

The following sections explain how the RCE manages indirect and O&M costs.

2.2.1 Capital Indirect Costs and Operation Maintenance

Total indirect costs of 30% are applied to the direct capital costs, and 17.5% indirect costs are applied to the direct O&M costs (Chino, 2019; MMD and NMED, 2019). Indirect costs include, but are not limited to, mobilization and demobilization, contingencies, engineering

redesign fees, contractor profit and overhead, project management fees, and state procurement costs.

2.2.2 Reclamation Timeframe

The earthwork RCE assumes reclamation progresses at a steady rate of about 200 acres per year (see Chino's 2024 CCP, Table 16). Reclamation of the Kessel Stockpile begins in the ninth year after closure and is finished by the tenth year, with O&M starting the following year. Revegetation monitoring is expected to end 12 years after initial revegetation.

2.3 Direct Quotes

Direct quotes help determine unit costs in the RCE. Direct quotes include the following:

- **Articulated Concrete Blocks (ACBs):** ACB material and installation unit costs
- **Revegetation Materials**: Costs for seed and hay mulch used for reclamation

3.0 CALCULATIONS

This section describes the elements involved in estimating the earthwork reclamation costs for the Kessel Stockpile, based on the data and assumptions discussed in Section 2.0. Attachment 1 details the quantity take-offs used in the RCE spreadsheet, which are based on the Ultimate Kessel closure plans. Chino's 2024 CCP, Appendix F, Attachment 2, offers additional details on the key equations and calculations used for the cost estimate. Cost calculations are presented in the spreadsheet in Attachment 3, along with design parameters, assumptions, and other relevant information to support the cost estimate.

The steps taken to complete the earthwork RCE include:

1. List relevant reclamation activities, and estimate the effort needed for each, including material quantities, distances, slopes, equipment choices, and

work types. (Table 2)

2. Estimate the unit cost of each reclamation activity based on construction industry data, including labor and fuel costs (see Tables 3 through 5)
3. Multiply the quantities by the unit costs to calculate the total subcost for each reclamation activity, then add them together for the total direct costs
4. Multiply the indirect percentage rate by the total, then add the direct and indirect costs to determine the final cost estimate

Overall, the cost-estimating process follows the typical, standard approach used in the engineering and construction industries. The earthwork cost estimate is an iterative process based on the required loading and hauling operations, as well as the haul distance. Telesto uses the unit costs associated with equipment in the fleet to calculate the total reclamation cost using spreadsheets. Figure 1 outlines the costing steps for one piece of equipment in developing the fleet.

3.1 Stockpile Reclamation

The following discusses the main reclamation activities for the Ultimate Kessel Earthwork RCE as summarized in Table 2.

3.1.1 Regrading and Grading

Slopes are graded to an overall outslope gradient of 3.5:1 (horizontal: vertical), with inter-bench slope lengths of 200 ft and 3:1 inter-bench slopes, where possible. Grading is performed to ensure positive drainage. The top surface is graded to a minimum final grade of 1% toward water management structures.

3.1.2 Top Surface Channels and Channel Construction

Due to the shallow reclamation grade on top of the Kessel Stockpile, top surface channels are unnecessary. Bench channels running nearly parallel to the out-slopes are designed to carry a 100-year, 24-hour storm with a six inch freeboard. Slopes vary from 1% to 5%. Bench channels are stable against erosion as constructed with reclamation cover material

unless velocities exceed five feet per second (fps). If velocities go above five fps, channels are lined with rip-rap.

3.1.3 Down Drain, Cover, Scraper Operations, Truck and Shovel

To prevent erosion, down drains use ACBs and energy dissipators as needed. The cost estimate includes transporting and placing 36 inches of fine-grained cover. Backfilling and repositioning are performed by trucks and loaders with dozer support. Trucks, loaders, or hydraulic shovels with dozer assistance manage all cover loading and distribution. Each haul route will use the most cost-effective number of trucks per loader or hydraulic shovel.

3.1.4 Revegetation, Scarification, and Haul Road Reclamation

The revegetation unit cost is based on R.S. Means, EquipmentWatch, and direct quotes. Scarifying the final surface is performed simultaneously with the revegetation and is included in the revegetation cost. Haul road areas will be reclaimed through ripping and revegetation; however, since the cost for haul road reclamation is included in the 2024 Chino Mines CCP, it is not repeated in this cost estimate.

3.2 Reservoirs

Before starting earthwork reclamation on the Kessel Stockpile, water management measures must be completed. The first step is to open both ends of the Haul Road Underdrain. Next, the Kessel Stormwater 2 dam will be breached. Finally, both Kessel Stormwater 1 and 2 will be reclaimed by ripping and burying the liners in place, and the sedimentation basins will be demolished. Since this work involves general Kessel Stockpile reclamation rather than final build-out activities, the related costs are included in Chino Mine's 2024 CCP and are not repeated here.

3.3 Seepage Collection

Seepage collection areas that are not designated for PMLU or used in water treatment are reclaimed and buried as part of the stockpile reclamation process. Costs for ongoing seepage collection are included in the water treatment section of the 2024 Chino Mine's CCP and are not repeated here.

3.4 Roads

All haul roads, except those within the OPSDA, designated for PMLU, or used during O&M, are included in the 2024 Chino Mine's reclamation cost estimate and are not repeated here.

3.5 Other Reclamation Costs

Other reclamation activities covered in the earthwork RCE include building demolition, well abandonment, utility demolition, pipeline demolition, pipeline corridor closure, and unplanned future disturbance area closures. These costs are all included in the 2024 Chino Mine's CCP and are not repeated here. However, operation and maintenance (O&M) costs discussed below are included in this report.

3.5.1 Operations and Maintenance

Operations and maintenance (O&M) costs in this estimate include periodic erosion control, water quality monitoring, road maintenance, and vegetation maintenance, as detailed in the spreadsheet calculations (Attachment 3). These costs are assumed to decrease over time.

Erosion Control and Monitoring: Chino Mine's annual erosion control and monitoring costs assume an erosion control crew engaged for:

- Reclamation Years 0–12: 12 days/year
- Reclamation Years 13–39: 4 days/year

- Reclamation Years 40–99: 1 day/year

Water Quality Monitoring and Reporting: Groundwater quality monitoring will consist of sampling and analysis at designated site locations:

- Reclamation Years 0–19: 4 days/year
- Reclamation Years 20–39: 2 days/year
- Reclamation Years 40–99: 1 day/year

Road Maintenance: Roads will be maintained monthly during the four-month monsoon season using a motor grader for 24 hours per month:

- Reclamation Years 0–19: 4 months/year at 24 hours/month
- Reclamation Years 20–39: 2 months/year at 24 hours/month
- Reclamation Years 40–99: 1 month/year at 24 hours/month

Vegetation Maintenance: Vegetation maintenance of reclaimed areas assumes a 2% failure rate per year for 12 years at each facility, starting from the completion of reclamation.

4.0 RESULTS

The total current dollar cost for earthwork reclamation of the Kessel Ultimate Stockpile is estimated to be $18,678,743, plus $4,245,417 in O&M, for a total of **$22,924,160**. A summary of the cost estimate is provided in Table 6. The costs presented in this RCE are current (2025) dollar costs.

5.0 REFERENCES

Caterpillar, Inc. (2018). *Caterpillar Performance Handbook, Edition 48.* Peoria, Illinois: Caterpillar, Inc.

Caterpillar, Inc. (2019). *Caterpillar Performance Handbook, Edition 49.* Peroria, Illinois.

Caterpillar, Inc. (2022). *Caterpillar Performance Handbook, Edition 50.* Peoria, Illinois.

Chino. (2018, February 18). Freeport-McMoRan Chino Mines Company-Updated Closure Closeout Plan. *Submittal Letter from Thomas L. Shelley (Chino) to Bruce Yurdin (NMED) and Fernando Martinez (MMD)*. Bayard, New Mexico: Freeport-McMoRan Chino Mines Company.

Chino. (2019). *Freeport-McMoRan Chino Mines Company - Continental mine Financial Assurance, Permit GR002RE Discharge Permit 1403. Letter to Messrs. Shepherd (MMD) and Vollbrecht (NMED) from Sherry Burt-Kested, Mgr (Chino).* Bayard, New Mexico: Freeport-McMoRan Chino Mines Company. January 11, 2019.

EquipmentWatch. (2024, July 22). *EquipmentWatch*. Retrieved from https://equipmentwatch.com/

Freeport-McMoRan Copper & Gold. (2012). *Letter to NMED and MMD - Reclamation Cost Estimate Update (September 5).* Tyrone, NM.

Golder Associates. (2017). *9 Waste Rock Stockpile Closure/Closeout Plan.* Vanadium, New Mexico: Prepared for New Mexico Environment Department and Mining and Minerals Division. Submitted by Freeport-McMoRan Chino Mining Company.

Golder Associates. (2018). *Chino Mine Closure/Closeout Plan.* Vanadium, New Mexico: Prepared for New Mexico Environment Department and Mining and Minerals Division. Submitted by Freeport-McMoRan Chino Mining Company.

Golder Associates. (2021). *Emma Project Closure/Closeout Plan.* Tyrone, New Mexico: Prepared for Freeport-McMoRan Tyrone, Inc. October.

Gordian. (2024, July 29). *Heavy Construction*. Retrieved from RSMeans Online: https://www.rsmeansonline.com/

Heavy Construction Cost Data Version 8.7. (2024, July 29). Retrieved from R.S. Means: https://www.rsmeansonline.com

MMD and NMED. (2019). *Approval of Cost Estimate Resolutions (Agreement) and Request for Schedule. Letter from Messrs. Shepherd (MMD) and Vollbrect (NMED) to Sherry Burt-Kested, Mgr. (Chino).* Santa Fe, New Mexico: New Mexico Department of Mining and Minerals. January 16, 2019.

NMDOL. (2021). *Prevailing Wage Poster H 2021*. Retrieved May 6, 2020, from New Mexico Department of Labor: https://www.dws.state.nm.us/Portals/0/DM/LaborRelations/Prevailing_Wage_Poster_H_2021.pdf

NMDOL. (2024, July 22). *New Mexico Department of Labor*. Retrieved from Type "H" - Heavy Engineering: https://www.dws.state.nm.us/Portals/0/DM/LaborRelations/Prevailing_Wage_Poster_H_2024.pdf

Penton Media. (2024, July). *EquipmentWatch Construction Estimator*. Retrieved May 8, 2020, from EquipmentWatch: https://equipmentwatch.com

R.S. Means. (2023, May). *Heavy Construction Cost Data, Version 8.7*. Retrieved from R.S. Means Data Online: https://www.rsmeansonline.com

Telesto Solutions, Inc. (2017). *Chino Mine Closure/Closeout Plan, Earthworks and Ancillary Facilities Financial Assurance Cost Estimate Process Summary.* Vanadium, New Mexico: Prepared for Freeport-McMoRan Chino Mining Company.

TABLES

Table 1 Relevant Resources from Chino's 2024 CCP RCE

2024 CCP Appendix F: Earthwork Reclamation Cost Estimate Process Summary Report		
Relevant Tables	**Table Title**	**Notes**
Table 1	Facility Overview	Gives a description of the stockpile and an overview of reclamation activities
Table 2	NMA Stockpiles - Cost Estimating Reclamation Activities	Checklist of reclamation activities used in the cost estimate
Table 5	Earthwork Equipment Production Factors	Complete list of equipment from the RCE spreadsheet; ***Table 3 below includes only equipment used at Kessel with updated 2025 costs***
Relevant Attachments	**Attachment Title**	**Notes**
Attachment 2	Key Equations and Calculations	• Earthwork RCE Calculation Summary • Truck and Scraper Optimization • O&M Costs • Bench Grading Unit Costs • Bench Channel Unit Costs • Downdrain/Dissipater Unit Costs • Revegetation Unit Costs • Fuel Cost (in 2024 dollars)
Attachment 3	Indirect Costs	Letter and table documenting the FA Work Group agreement for indirect costs used in the RCE
Attachment 4	Supporting Data for Cost Estimation	• 4.1: tabulates the 2024 labor rates from the New Mexico Department of Labor • 4.2: contains copies of the EquipmentWatch sheets from which equipment unit rates were obtained • 4.3: provides the curve fits used in the production sheets for dozers and haul trucks • 4.4: provides copies of the pertinent information from R.S. Means and pages from several editions of the Caterpillar Performance Handbook • 4.5: provides direct quotes used in the cost estimates • 4.6: provides data and calculations used to prepare the fuel cost ****Kessel-specific equipment and labor rates are updated for 2025 in this RCE's Attachment 2****

Table 2 Kessel Ultimate Stockpile - RCE Activities

	Kessel Stockpile
Rip the top surface	X
Rough Grading	X
Dozer Assist Loaders/ Scrapers	X
Load and Haul Stockpile Material	-
Load, Haul, Place, Grade Cover	X
Rip Cover Stockpiles	-
Excavate, Grade Benches	X
Install Downdrains and Dissipaters	X
Scarify & Seed / Revegetate	X
O&M	X

Table 3 Earthwork Equipment Production Factors

Parameter	Value	Comment/Reference
Swell Factor Stockpiles and Tailings[1]	0% for native rock 8% for cover load & haul sites	Virgin materials are being excavated to generate cover. A swell factor is applied to the excavated native volume. Cover material volumes are calculated based on the reclaimed area and the cover depth. A swell factor is included in the cost estimate while calculating the bank cover volume.
Coarse Regrading Tops and Outslopes (D11T CD)		
Operator Factor [1]	1	Due to large job size assume operator with excellent skills (CPH 48: 19-55, excellent)
Material Factor	1.2 1	(CPH 48: 19-55) 1.2 for fine grading cover, other surfaces, and channel, 1.0 for coarse regrading stockpiles and tailing
Work Hour (min/hr)	50	(CPH 48: 19-55) Job efficiency
Grade Factor – Tops	1	(CPH 48: 19-55) 1 to 5% Slope
Grade Factor - Outslopes[1]	1.6	(CPH 48: 19-55) 3H:1V Slopes
Material Weight (lb/cy)	3,300 2,900	Stockpiles Tailing, cover materials
Production Method/Blade Factor	1.2	(CPH 48: 19-55) Slot dozing
Visibility Factor	1	(CPH 48: 19-55) Clear, dust controlled by water trucks
Elevation Factor	1	(CPH 48: 30-7) Horsepower reduction table
Direct Drive Transmission	1	-
Fine Grading Cover, Other Surfaces, and Channels (D11T CD, D9T, D6T, 16M, 14M)		
Material Factor	1.2	(CPH 48: 19-55) fine grading cover
Grade Factor – Tops	1	(CPH 48: 19-55) 1-5% slopes

Grade Factor – Outslopes[1]	1.6	(CPH 48: 19-55) 3H:1V Slopes
Material Weight (lb/cy)	2,900	Fine grading cover material and tailing
Production Method/Blade	1.2 1	(CPH 48: 19-55, slot dozing) No correction applied channels, downdrains, and benches
Effective Blade Width (feet [ft])	22.0 ft D11T CD Universal Blade 14.08 ft D9T Semi Universal Blade 16 ft 16M, 14 ft 14M 10.67' D6T SU	(CPH 48: 19-17, 19-49) (CPH 48: 19-47) (CPH 48: 11-17) (CPH 48: 19-10, 19-43)
Speed (miles/hr)	2.5 mph D11T CD, 16M, and 14M 1.0 mph D9T and D6T	(CPH 48: 11-19, 19-24, 19-25) maximum equipment speeds based on information provided in the Cat Handbook and Safe mining practices
Operator Factor[1]	0.75	(CPH 48: 19-55) Average operator skill
Work Hour (min/hr)	50	(CPH 48: 19-55) Job efficiency
Visibility Factor	1	(CPH 48: 19-55) Clear, dust controlled by water trucks
Elevation	1	(CPH 48: 30-7)
Direct Drive Transmission	1	-
Ripper (D11T CD Multi-shank [w/MSR-359H])		
Ripping Length (ft)	1,000 large surface areas 100 liners	-
Penetration (in)	18	Scope of Work (Telesto Solutions, Inc., 2017)
Pocket Spacing (in)	59	(CPH 48: 19-72)
Number of Pockets	3	(CPH 48: 19-72)
Turn Time (min/pass)	0.25	(CPH 48: 19-72 to 19-75)

Speed (mph)	1	(CPH 48: 19-72 to 19-75)
Work Hour (min/hr)	50	(CPH 48: 19-55) Job efficiency
Distance between passes (in)	59	Maintain pocket spacing value between passes (Scope of Work (Telesto Solutions, Inc., 2017))
Loader (Cat 986K)		
Struck Capacity (cy)	6.7	(CPH 49: 23-216)
Loader Cycle Time (load, dump, and maneuver; min)	0.575	(CPH 49: 23-287)
Bucket Fill Factor	0.875	(CPH 49: 23-287) $\geq$ 1" Loose Material
Speed (mph)	8 14	(CPH 49: 23-17) 8 mph loaded, forward 2nd gear; 14 mph empty, forward 3rd gear
Work Hour (min/hr)	50	(CPH 48: 19-55)
Trucks (CAT 770G)		
Struck Capacity (cy)	22.52	(CPH 49: 10-4)
Heaped Capacity (cy)	32.8	(CPH 49: 10-4)
Rolling Resistance	2.50%	(CPH 48: 30-2) Radial tires, dirt road maintained fairly regularly, watered, flexing slightly
Truck Exchange Time (min)	0.7	(CPH 49: 10-20) Avg. 0.6-0.8
Dump/Maneuver Time (min)	1.1	(CPH 49: 10-20) Avg. 1.0-1.2
Speed (mph)	45.7	(CPH 49: 10-4) top speed (loaded)
Work Hour (min/hr)	50	(CPH 48: 19-55) Job efficiency

CPH = Caterpillar Performance Handbook Editions 48 and 49 (Caterpillar, Inc., 2018; Caterpillar, Inc., 2019)

(1) The swell and operator factors used are consistent with factors presented to MMD and NMED in meetings with Tyrone on June 11, 2012, November 2, 2012, and a letter to MMD and NMED from Tyrone dated September 5, 2012 (Freeport-McMoRan Copper & Gold, 2012)

Table 4 Labor and Equipment Unit Costs

Equipment Description	Fuel Cost ($/hr)	Total Rental Cost (w/o fuel) ($/hr)	NMDOL Operator Group	NMDOL Labor Rates	Total Cost (Equipment, Fuel, Labor) ($/hr)
Cat D11T CD	$78.29	$342.53	Equipment Operator IV	$34.82	$455.64
Cat D6, SU Blade	$20.41	$93.69	Equipment Operator IV	$34.82	$148.92
Cat 986K	$21.42	$116.47	Equipment Operator VI	$35.20	$173.09
Cat 14M3	$22.48	$77.51	Equipment Operator IV	$34.82	$134.81
Cat D11T CD Multi-shank (w/ MSR-189H)	$78.29	$349.74	Equipment Operator IV	$34.82	$462.85
Cat 770G	$20.15	$55.89	Truck Driver III	$30.55	$106.59
Off-Hwy Water Tanker Truck,6,000-gal.	$33.19	$95.01	Truck Driver III	$30.55	$158.75
1 Deck Screening Plant (5X16, 48X60)	$27.23	$72.31	Laborer I	$27.85	$127.39
3 Deck Screening Plant (5X16, 42X60)	$17.32	$98.02	Laborer I	$27.85	$143.19

Costs updated to reflect 2025 values.

Table 5 Miscellaneous Unit Costs

Activity	Base Per Unit Cost	Fuel Per Unit Cost	Units	Source	Reference
Fuel	$2.95	-	gal	-	Diesel fuel cost is estimated by correlating historical local quotes with public data, as agreed upon in November 2018 discussions with the agencies. Fuel cost includes direct and indirect costs as agreed upon in a letter to MMD dated January 18, 2022. Updated July 2025
Revegetation	$1,685.34	$4.38	ac	Revegetation Unit Cost Sheet	See unit rates calculations - Cost is based on a calculated unit rate that includes tractor rental and maintenance, fuel, scarifying, discing, drill seeding, mulching, crimping, seed, and mulch
Bench Grading Stockpile	$2.10	$0.43	ft	Bench Grading Unit Cost Sheet	See unit rate calculations
Downdrain Construction	$471.97	1	ft	Downdrain Unit Cost Sheet	See unit rate calculations
Downdrain Dissipater	$18,628.69	1	ea	Downdrain Unit Cost Sheet	See unit rate calculations
Erosion Control	$7,319.81	$1,751.36	day	Modified Crew B-13A; Full Site O&M Sheet	Erosion control for O&M - includes 1 foreman, 2 laborers, 1 equipment operator, 2 truck drivers, 1 loader (4 cy), 2 dump trucks (8 cy)
Road Maintenance	$5,709.43	$1,568.88	month	Full Site O&M Sheet	Road maintenance for O&M - includes one 14M motor grader and one 6,000-gal water truck
Groundwater Monitoring	$2,707.00	-	event	Full Site O&M Sheet	Solid pickup; average of minimum and maximum

Unit Rates updated to reflect 2025 values.

Table 6 Earthwork Cost Estimate Summary

Facility	Direct Cost	Indirect Cost (30% of Direct)	Total Estimated Cost
Kessel Stockpile	$14,368,263	$4,310,479	$18,678,743
Closure Costs Total	***$14,368,263***	***$4,310,479***	***$18,678,743***
O&M		**17.5% of Direct**	
Full Site O&M Costs Total	**$3,613,121**	**$632,296**	**$4,245,417**
Total Cost (Closure + O&M)	**$17,981,385**	**$4,942,775**	**$22,924,160**

FIGURES

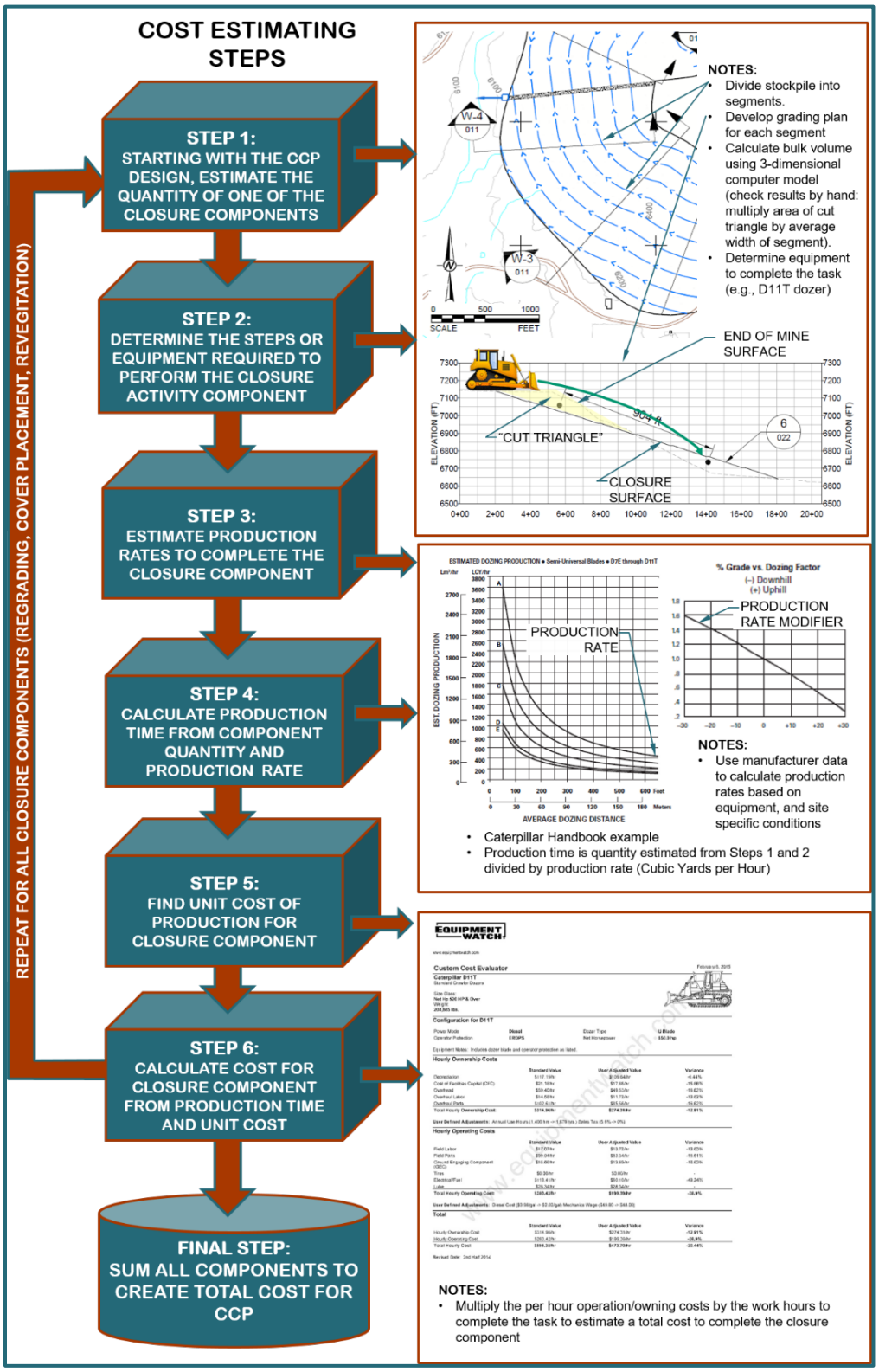


Figure 1 Earthwork Cost Estimating Process

ATTACHMENTS

Attachment 1
Engineering Take-Offs and Quantities Calculations

											Segment 1		Segment 2		Segment 3	
1	2	3	4	5	6	7	8	11	12	14	15	16	17	18	19	20
Item	**Facility**	**Sub Area or Destination for Cover Material**	**Description**	**Area (sf)**	**Volume (cy)**	**Push Distance (ft)**	**Coarse Regrading and Fine Grading (%)**	**Down Drains (ft)**	**Downdrain Dissipater (ea)**	**Bench Grading (ft)**	**Distance (ft)**	**Average Grade (%)**	**Distance (ft)**	**Average Grade (%)**	**Distance (ft)**	**Average Grade (%)**
1200	Kessel Stockpile	Kessel Stockpile	Kessel Stockpile	35,204,756				11,495	3	129,093	3,298	-2.47%	10,725	-3.71%	3,165	-2.37%
1201	Kessel	K-1	Outslope	5,422,784	334,983.34	100	-28.6%									
1202	Kessel	K-2	Outslope	17,254,116	1,600,857.46	100	-28.6%									
1203	Kessel	K-3	Outslope	12,527,856	1,230,959.20	100	-28.6%									
9003	Rubio Peak Stockpile	1200	Kessel Stockpile	35,204,756							3,298	-2.5%	10,725	-3.7%	3,165	-2.4%

Based on Civil 3D (an AutoCAD program)

Attachment 2

Supporting Data for Cost Estimation

The following pages show the updated (2025) costs used in this RCE.
For additional estimates, quotes, and equipment information, refer to
Attachments 3 and 4 of Appendix F of the 2024 Chino Closure Closeout Plan.

Fuel Price Data

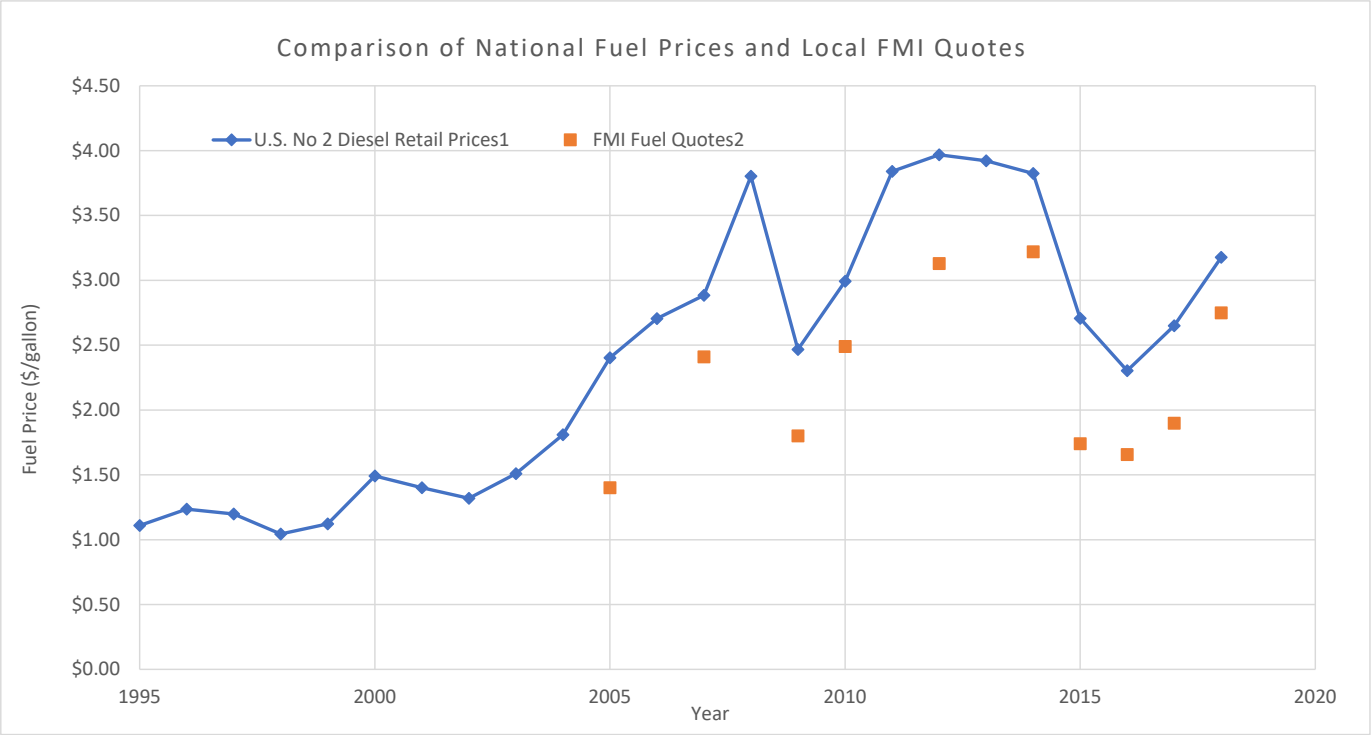
Data 1: U.S. No 2 Diesel Retail Prices (Dollars per Gallon)	
Date	U.S. No 2 Diesel Retail Prices[1]
1995	1.109
1996	1.235
1997	1.198
1998	1.044
1999	1.121
2000	1.491
2001	1.401
2002	1.319
2003	1.509
2004	1.81
2005	2.402
2006	2.705
2007	2.885
2008	3.803
2009	2.467
2010	2.992
2011	3.84
2012	3.968
2013	3.922
2014	3.825
2015	2.707
2016	2.304
2017	2.65
2018	3.178
2019	3.056
2020	2.551
2021	3.125
Date	U.S. No 2 Diesel Retail Prices[1]
July 2024	3.722
June 2025	3.599

FMI Fuel Quotes[2]			
Site	Date	Dyed, low-sulfur diesel	Notes
Continental	1/21/2005	$1.40	Tom Shelley - quote from fuel broker
Chino & Tyrone	5/9/2007	$2.41	Porter Oil Quote (7500 gal capacity)
Continental	1/23/2009	$1.80	Porter Oil Quote (7500 gal capacity)
Tyrone (Little Rock)	1/14/2010	$2.49	Porter Oil Quote (7500 gal capacity)
Tyrone	7/7/2012	$3.13	Western Refining Oil
Continental	6/18/2014	$3.22	Western Refining Oil
Chino (North Lampbright)	11/5/2015	$1.74	Western Refining Oil
Chino	5/20/2016	$1.66	Western Refining Oil
Tyrone (Little Rock)	4/24/2017	$1.90	Western Refining Oil
Continental	3/12/2018	$2.75	Griffin Propane
Chino	10/10/2018	$2.75	Griffin Propane

1. U.S. Energy Information Administration
https://www.eia.gov/dnav/pet/hist/LeafHandler.ashx?n=PET&s=EMD_EPD2D_PTE_NUS_DPG&f=M
2. Quotes obtained from Freeport-McMoRan (FMI)

Correlation Between U.S. No.2 Diesel Retail Prices and FMI Fuel Quotes Since 1995

Year	U.S. No 2 Diesel Retail Prices[1]	FMI Fuel Quotes[2]
1995	1.109	
1996	1.235	
1997	1.198	
1998	1.044	
1999	1.121	
2000	1.491	
2001	1.401	
2002	1.319	
2003	1.509	
2004	1.81	
2005	2.402	$1.40
2006	2.705	
2007	2.885	$2.41
2008	3.803	
2009	2.467	$1.80
2010	2.992	$2.49
2011	3.84	
2012	3.968	$3.13
2013	3.922	
2014	3.825	$3.22
2015	2.707	$1.74
2016	2.304	$1.66
2017	2.65	$1.90
2018	3.178	$2.75
2019	3.056	
2020	2.551	
2021	3.125	

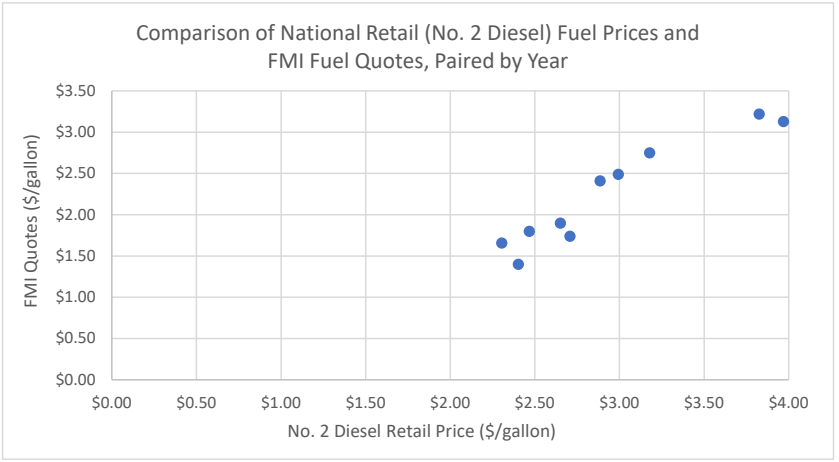


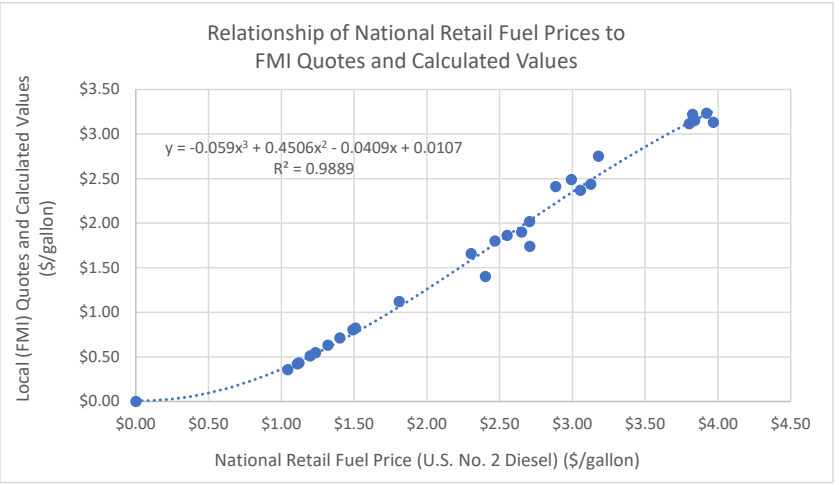
Correlation 0.952

1. U.S. Energy Information Administration
https://www.eia.gov/dnav/pet/hist/LeafHandler.ashx?n=PET&s=EMD_EPD2D_PTE_NUS_DPG&f=M
2. Quotes obtained from Freeport-McMoRan (FMI)

Calculations and Results for Fuel Price Prediction

U.S. No. 2 Diesel Retail Prices[1]	FMI Fuel Quotes[2]	Difference Between Retail Prices and FMI Quotes	Calculated FMI Values Based on Average Difference	Calculated FMI Values and Quotes	y = -0.05904x3 + 0.450612x2 - 0.04089x + 0.010713
$0.00				*$0.00*	$0.01
$1.11			$0.42	*$0.42*	$0.44
$1.24			$0.55	*$0.55*	$0.54
$1.20			$0.51	*$0.51*	$0.51
$1.04			$0.36	*$0.36*	$0.39
$1.12			$0.43	*$0.43*	$0.45
$1.49			$0.80	*$0.80*	$0.76
$1.40			$0.71	*$0.71*	$0.68
$1.32			$0.63	*$0.63*	$0.61
$1.51			$0.82	*$0.82*	$0.77
$1.81			$1.12	*$1.12*	$1.06
$2.40	$1.40	$1.00		$1.40	$1.69
$2.71			$2.02	*$2.02*	$2.03
$2.89	$2.41	$0.47		$2.41	$2.23
$3.80			$3.11	*$3.11*	$3.13
$2.47	$1.80	$0.67		$1.80	$1.77
$2.99	$2.49	$0.50		$2.49	$2.34
$3.84			$3.15	*$3.15*	$3.16
$3.97	$3.13	$0.84		$3.13	$3.25
$3.92			$3.23	*$3.23*	$3.22
$3.83	$3.22	$0.61		$3.22	$3.14
$2.71	$1.74	$0.97		$1.74	$2.03
$2.30	$1.66	$0.65		$1.66	$1.59
$2.65	$1.90	$0.75		$1.90	$1.97
$3.18	$2.75	$0.43		$2.75	$2.54
$3.06			$2.37	*$2.37*	$2.41
$2.55			$1.86	*$1.86*	$1.86
$3.13			$2.44	*$2.44*	$2.48
	Average	$0.69			





Correlations

Between No. 2 Retail Price and FMI Quotes	0.95
Between No. 2 Retail Price and 3rd order polynomial FMI Quotes	0.99
Between New FMI quotes and 3rd order polynomial FMI Quotes	0.96
Between FMI quotes and 3rd order polynomial FMI Quotes	0.99

New Fuel Rate	U.S. No 2 Diesel Retail Prices[1]		Proposed Fuel Quote
	Jul-25	$3.60	$2.95

1. U.S. Energy Information Administration
https://www.eia.gov/dnav/pet/hist/LeafHandler.ashx?n=PET&s=EMD_EPD2D_PTE_NUS_DPG&f=M
2. Quotes obtained from Freeport-McMoRan (FMI)

Labor Rates

NMDOL Type H Operator Group	Base rate	Fringe rate	Apprenticeship		Total 2025 Rate ($/hr)
Equipment Operator IV	27.27	6.95	0.6	$	34.82
Equipment Operator V	27.39	6.95	0.6	$	34.94
Equipment Operator VI	27.65	6.95	0.6	$	35.20
Equipment Operator VII	27.67	6.95	0.6	$	35.22
Equipment Operator VIII	30.56	6.95	0.6	$	38.11
Laborer I	19.74	7.51	0.6	$	27.85
Laborer II	21.19	7.51	0.6	$	29.30
Truck Driver III	20.55	9.40	0.60	$	30.55
Truck Driver V	20.55	9.40	0.60	$	30.55
Truck Driver VIII	20.55	9.40	0.60	$	30.55

Labor rates based on NM Department of Labor Type H (Heavy Engineering) 2025 labor rates. Rates include base hourly wage, https://www.dws.state.nm.us/Portals/0/DM/LaborRelations/Prevailing_Wage_Poster_H_2025_4.10.2025.pdf

Occupational Employment and Wages Statistics Dashboard

Table | Visualizations | Area Comparison | Definitions

Occupational Employment & Wages Table

Select Geography
- (●) New Mexico
- ( ) Central Region
- ( ) Eastern Region
- ( ) Northern Region
- ( ) Southwestern Region
- ( ) Albuquerque

Annual or Hourly?
- ( ) Annual
- (●) Hourly

Select Occupational Level
All

Major Occupational Group
All

Detailed Occupation
Mobile Heavy Equipment Mechanics, Ex..

2024 Hourly Wages for New Mexico

SOC	Occupation Title	Employment	Entry	Average	Experienced	10th Pctl	25t
493042	Mobile Heavy Equipment Mechanics, Except Engines	1,290	$21.61	$29.78	$33.81	$21.00	

Entry and experienced wage data are not available for the U.S.

EquipmentWatch

www.equipmentwatch.com

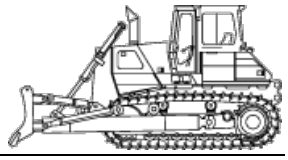
All prices shown in US dollars ($)

Adjustments for WalterNiccoli88 in Chino RCE Equipment List

July 24, 2025

Caterpillar D11T CD (disc. 2018)
Standard Crawler Dozers

Size Class:
520 hp & Over
Weight:
N/A



Configuration for D11T CD (disc. 2018)

Dozer Type	**U Blade**	Horsepower	**850.0 hp**
Operator Protection	**EROPS**	Power Mode	**Diesel**

Hourly Ownership Costs

	Standard Value	User Adjusted Value	Variance
Depreciation	USD $83.80/hr	USD $85.04/hr	+1.5%
Cost of Facilities Capital (CFC)	USD $30.40/hr	USD $25.03/hr	-17.7%
Overhead	USD $53.30/hr	USD $43.25/hr	-18.9%
Overhaul Labor	USD $20.01/hr	USD $8.26/hr	-58.8%
Overhaul Parts	USD $87.07/hr	USD $70.64/hr	-18.9%
Total Hourly Ownership Cost:	**USD $274.58/hr**	**USD $232.21/hr**	**-15.4%**

User Defined Adjustments: Discount (6% -> 0%) Sales Tax (5.1% -> 0%) Annual Use Hours (1,200hrs -> 1,479hrs)

Hourly Operating Costs

	Standard Value	User Adjusted Value	Variance
Field Labor	USD $19.33/hr	USD $7.97/hr	-58.8%
Field Parts	USD $84.80/hr	USD $22.93/hr	-73%
Ground Engaging Component (GEC)	USD $14.13/hr	USD $0.00/hr	-100%
Tire	USD $0.00/hr	-	-
Electrical/Fuel	USD $93.86/hr	USD $26.54/hr	-71.7%
Lube	USD $18.66/hr	USD $0.00/hr	-100%
Total Operating Ownership Cost:	**USD $230.79/hr**	**USD $57.45/hr**	**-75.1%**

User Defined Adjustments: Fuel (USD $3.54 -> USD $1.00) Annual Ground Engaging Component (USD $16,959.92 -> USD $0.00) Mechanics Wage (USD $58.58 -> USD $29.78) Hourly Lube Costs (USD $18.66 -> USD $0.00) Annual Misc Supply Parts (USD $16,959.92 -> USD $0.00) Annual Field Repair Parts Cost (USD $84,799.58 -> USD $33,919.84)

Total

	Standard Value	User Adjusted Value	Variance
Hourly Ownership Costs	USD $274.58/hr	USD $232.21/hr	-15.4%
Hourly Operating Costs	USD $230.79/hr	USD $57.45/hr	-75.1%
Total Hourly Cost	**USD $505.37**	**USD $289.66/hr**	**-42.7%**

Non-active use rates

	Standard Value	User Adjusted Value	Variance
Standby	USD $167.50/hr	USD $153.31/hr	-8.5%
Idle	USD $368.44/hr	USD $258.76/hr	-29.8%

Revised Date: 3rd quarter 2025

The equipment represented in this report has been exclusively prepared for (wniccoli@telesto-inc.com)

EquipmentWatch

www.equipmentwatch.com

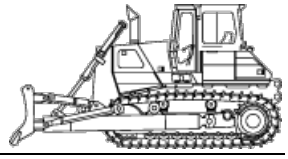
All prices shown in US dollars ($)

Adjustments for WalterNiccoli88 in Chino RCE Equipment List

July 24, 2025

Caterpillar D11T CD (disc. 2018)
Standard Crawler Dozers

Size Class:
520 hp & Over
Weight:
N/A



Configuration for D11T CD (disc. 2018)

Dozer Type	**U Blade**	Horsepower	**850.0 hp**
Operator Protection	**EROPS**	Power Mode	**Diesel**

AED Rental Rates

These rental rates reflect an average for equipment of this type and size. Rates shown for specific brands or models are provided for convenience only. Rates charged by rental companies for specific brands or models will vary depending on many factors

	Monthly	Weekly	Daily
Published Rates	USD $46,054.00	USD $17,639.00	USD $6,625.00
Adjustments			
Region (New Mexico: 111.96%)	USD $5,508.87	USD $2,109.94	USD $792.47
User Defined			
Rental Rates (100%)	-	-	-
Total:	**USD $51,562.88**	**USD $19,748.94**	**USD $7,417.47**

Date Last Updated: Jun 01, 2025

The equipment represented in this report has been exclusively prepared for (wniccoli@telesto-inc.com)

EquipmentWatch

www.equipmentwatch.com

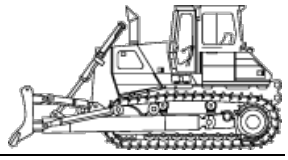
All prices shown in US dollars ($)

Adjustments for WalterNiccoli89 in Chino RCE Equipment List

July 24, 2025

Caterpillar D6
Standard Crawler Dozers

Size Class:
190 - 259 hp
Weight:
N/A



Configuration for D6

Horsepower **215.0 hp**

Hourly Ownership Costs

	Standard Value	User Adjusted Value	Variance
Depreciation	USD $27.17/hr	USD $28.40/hr	+4.5%
Cost of Facilities Capital (CFC)	USD $11.40/hr	USD $9.18/hr	-19.5%
Overhead	USD $19.14/hr	USD $15.19/hr	-20.6%
Overhaul Labor	USD $10.50/hr	USD $4.23/hr	-59.7%
Overhaul Parts	USD $19.72/hr	USD $15.65/hr	-20.6%
Total Hourly Ownership Cost:	**USD $87.93/hr**	**USD $72.66/hr**	**-17.4%**

User Defined Adjustments: Discount (8% -> 0%) Sales Tax (5.1% -> 0%) Annual Use Hours (1,200hrs -> 1,512hrs)

Hourly Operating Costs

	Standard Value	User Adjusted Value	Variance
Field Labor	USD $12.94/hr	USD $5.22/hr	-59.7%
Field Parts	USD $19.11/hr	USD $5.06/hr	-73.5%
Ground Engaging Component (GEC)	USD $3.19/hr	USD $0.00/hr	-100%
Tire	USD $0.00/hr	-	-
Electrical/Fuel	USD $24.48/hr	USD $6.92/hr	-71.7%
Lube	USD $5.26/hr	USD $0.00/hr	-100%
Total Operating Ownership Cost:	**USD $64.98/hr**	**USD $17.20/hr**	**-73.5%**

User Defined Adjustments: Fuel (USD $3.54 -> USD $1.00) Annual Ground Engaging Component (USD $3,822.90 -> USD $0.00) Mechanics Wage (USD $58.58 -> USD $29.78) Hourly Lube Costs (USD $5.26 -> USD $0.00) Annual Misc Supply Parts (USD $3,822.90 -> USD $0.00) Annual Field Repair Parts Cost (USD $19,114.52 -> USD $7,645.80)

Total

	Standard Value	User Adjusted Value	Variance
Hourly Ownership Costs	USD $87.93/hr	USD $72.66/hr	-17.4%
Hourly Operating Costs	USD $64.98/hr	USD $17.20/hr	-73.5%
Total Hourly Cost	**USD $152.91**	**USD $89.86/hr**	**-41.2%**

Non-active use rates

	Standard Value	User Adjusted Value	Variance
Standby	USD $57.71/hr	USD $52.77/hr	-8.6%
Idle	USD $112.41/hr	USD $79.58/hr	-29.2%

Revised Date: 3rd quarter 2025

The equipment represented in this report has been exclusively prepared for (wniccoli@telesto-inc.com)

EquipmentWatch

www.equipmentwatch.com

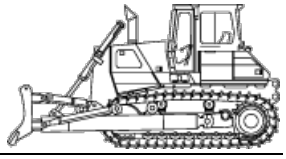
All prices shown in US dollars ($)

Adjustments for WalterNiccoli89 in Chino RCE Equipment List

July 24, 2025

Caterpillar D6
Standard Crawler Dozers

Size Class:
190 - 259 hp
Weight:
N/A



Configuration for D6

Horsepower	**215.0 hp**

AED Rental Rates

These rental rates reflect an average for equipment of this type and size. Rates shown for specific brands or models are provided for convenience only. Rates charged by rental companies for specific brands or models will vary depending on many factors

	Monthly	Weekly	Daily
Published Rates	USD $12,285.00	USD $4,433.00	USD $1,586.00
Adjustments			
Region (New Mexico: 111.96%)	USD $1,469.50	USD $530.27	USD $189.71
User Defined			
Rental Rates (100%)	-	-	-
Total:	**USD $13,754.50**	**USD $4,963.27**	**USD $1,775.71**

Date Last Updated: Jun 01, 2025

The equipment represented in this report has been exclusively prepared for (wniccoli@telesto-inc.com)

EquipmentWatch

www.equipmentwatch.com

All prices shown in US dollars ($)

Custom Cost Evaluator

July 24, 2025

Caterpillar 986K
4-Wd Articulated Wheel Loaders

Size Class:
350 - 499 hp
Weight:
N/A

Configuration for 986K

Horsepower **378.0 hp**

Hourly Ownership Costs

	Standard Value	User Adjusted Value	Variance
Depreciation	USD $29.30/hr	USD $34.71/hr	+18.5%
Cost of Facilities Capital (CFC)	USD $14.05/hr	USD $11.38/hr	-19%
Overhead	USD $24.60/hr	USD $19.65/hr	-20.1%
Overhaul Labor	USD $12.05/hr	USD $4.89/hr	-59.4%
Overhaul Parts	USD $9.83/hr	USD $7.85/hr	-20.1%
Total Hourly Ownership Cost:	**USD $89.83/hr**	**USD $78.49/hr**	**-12.6%**

User Defined Adjustments: Discount (16% -> 0%) Sales Tax (5.1% -> 0%) Annual Use Hours (1,215hrs -> 1,521hrs)

Hourly Operating Costs

	Standard Value	User Adjusted Value	Variance
Field Labor	USD $14.71/hr	USD $5.97/hr	-59.4%
Field Parts	USD $10.85/hr	USD $2.47/hr	-77.2%
Ground Engaging Component (GEC)	USD $1.48/hr	USD $0.00/hr	-100%
Tire	USD $8.04/hr	-	-
Electrical/Fuel	USD $25.68/hr	USD $7.26/hr	-71.7%
Lube	USD $6.10/hr	USD $0.00/hr	-100%
Total Operating Ownership Cost:	**USD $66.84/hr**	**USD $23.74/hr**	**-64.5%**

User Defined Adjustments: Fuel (USD $3.54 -> USD $1.00) Annual Ground Engaging Component (USD $1,794.40 -> USD $0.00) Mechanics Wage (USD $58.58 -> USD $29.78) Hourly Lube Costs (USD $6.10 -> USD $0.00) Annual Misc Supply Parts (USD $1,962.62 -> USD $0.00) Annual Field Repair Parts Cost (USD $11,214.98 -> USD $3,757.02)

Total

	Standard Value	User Adjusted Value	Variance
Hourly Ownership Costs	USD $89.83/hr	USD $78.49/hr	-12.6%
Hourly Operating Costs	USD $66.84/hr	USD $23.74/hr	-64.5%
Total Hourly Cost	**USD $156.68**	**USD $102.23/hr**	**-34.7%**

Non-active use rates

	Standard Value	User Adjusted Value	Variance
Standby	USD $67.95/hr	USD $65.74/hr	-3.2%
Idle	USD $115.51/hr	USD $85.75/hr	-25.8%

Revised Date: 3rd quarter 2025

The equipment represented in this report has been exclusively prepared for (wniccoli@telesto-inc.com)

EquipmentWatch

www.equipmentwatch.com

All prices shown in US dollars ($)

AED Green Book®

July 24, 2025

Caterpillar 986K
4-Wd Articulated Wheel Loaders

Size Class:
350 - 499 hp
Weight:
N/A

Configuration for 986K

Horsepower	**378.0 hp**

AED Rental Rates

These rental rates reflect an average for equipment of this type and size. Rates shown for specific brands or models are provided for convenience only. Rates charged by rental companies for specific brands or models will vary depending on many factors

	Monthly	Weekly	Daily
Published Rates	USD $16,713.00	USD $6,161.00	USD $2,321.00
Adjustments			
Region (New Mexico: 98.87%)	(USD $188.06)	(USD $69.33)	(USD $26.12)
User Defined			
Rental Rates (100%)	-	-	-
Total:	**USD $16,524.94**	**USD $6,091.67**	**USD $2,294.88**

Date Last Updated: Jun 01, 2025

The equipment represented in this report has been exclusively prepared for (wniccoli@telesto-inc.com)

EquipmentWatch

www.equipmentwatch.com

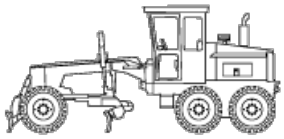
All prices shown in US dollars ($)

Adjustments for WalterNiccoli96 in Chino RCE Equipment List

July 24, 2025

Caterpillar 14M3 (disc. 2019)
Articulated Frame Graders

Size Class:
200 - 249 hp
Weight:
N/A



Configuration for 14M3 (disc. 2019)

Moldboard Size	**14 ft**	Horsepower	**238 hp**
Operator Protection	**ROPS/FOPS**	Power Mode	**Diesel**

Hourly Ownership Costs

	Standard Value	User Adjusted Value	Variance
Depreciation	USD $24.37/hr	USD $24.43/hr	+0.2%
Cost of Facilities Capital (CFC)	USD $11.02/hr	USD $8.72/hr	-20.8%
Overhead	USD $15.42/hr	USD $12.03/hr	-22%
Overhaul Labor	USD $2.44/hr	USD $0.97/hr	-60.4%
Overhaul Parts	USD $18.56/hr	USD $14.47/hr	-22%
Total Hourly Ownership Cost:	**USD $71.82/hr**	**USD $60.62/hr**	**-15.6%**

User Defined Adjustments: Discount (5% -> 0%) Sales Tax (5.1% -> 0%) Annual Use Hours (1,200hrs -> 1,539hrs)

Hourly Operating Costs

	Standard Value	User Adjusted Value	Variance
Field Labor	USD $1.46/hr	USD $0.58/hr	-60.4%
Field Parts	USD $18.00/hr	USD $3.51/hr	-80.5%
Ground Engaging Component (GEC)	USD $1.50/hr	USD $0.00/hr	-100%
Tire	USD $8.93/hr	-	-
Electrical/Fuel	USD $26.93/hr	USD $7.62/hr	-71.7%
Lube	USD $5.48/hr	USD $0.00/hr	-100%
Total Operating Ownership Cost:	**USD $62.31/hr**	**USD $20.63/hr**	**-66.9%**

User Defined Adjustments: Fuel (USD $3.54 -> USD $1.00) Annual Ground Engaging Component (USD $1,800.22 -> USD $0.00) Mechanics Wage (USD $58.58 -> USD $29.78) Hourly Lube Costs (USD $5.48 -> USD $0.00) Annual Misc Supply Parts (USD $3,600.45 -> USD $0.00) Annual Field Repair Parts Cost (USD $18,002.23 -> USD $5,400.67)

Total

	Standard Value	User Adjusted Value	Variance
Hourly Ownership Costs	USD $71.82/hr	USD $60.62/hr	-15.6%
Hourly Operating Costs	USD $62.31/hr	USD $20.63/hr	-66.9%
Total Hourly Cost	**USD $134.12**	**USD $81.25/hr**	**-39.4%**

Non-active use rates

	Standard Value	User Adjusted Value	Variance
Standby	USD $50.82/hr	USD $45.18/hr	-11.1%
Idle	USD $98.75/hr	USD $68.23/hr	-30.9%

Revised Date: 3rd quarter 2025

The equipment represented in this report has been exclusively prepared for (wniccoli@telesto-inc.com)

EquipmentWatch

www.equipmentwatch.com

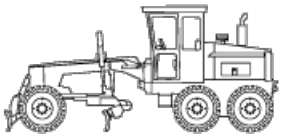
All prices shown in US dollars ($)

Adjustments for WalterNiccoli96 in Chino RCE Equipment List

July 24, 2025

Caterpillar 14M3 (disc. 2019)
Articulated Frame Graders

Size Class:
200 - 249 hp
Weight:
N/A



Configuration for 14M3 (disc. 2019)

Moldboard Size	**14 ft**	Horsepower	**238 hp**
Operator Protection	**ROPS/FOPS**	Power Mode	**Diesel**

AED Rental Rates

These rental rates reflect an average for equipment of this type and size. Rates shown for specific brands or models are provided for convenience only. Rates charged by rental companies for specific brands or models will vary depending on many factors

	Monthly	Weekly	Daily
Published Rates	USD $11,594.00	USD $4,575.00	USD $1,612.00
Adjustments			
Region (New Mexico: 89.59%)	(USD $1,207.40)	(USD $476.44)	(USD $167.87)
User Defined			
Rental Rates (100%)	-	-	-
Total:	**USD $10,386.60**	**USD $4,098.56**	**USD $1,444.13**

Date Last Updated: Jun 01, 2025

The equipment represented in this report has been exclusively prepared for (wniccoli@telesto-inc.com)

EquipmentWatch

www.equipmentwatch.com

All prices shown in US dollars ($)

Adjustments for WalterNiccoli97 in Chino RCE Equipment List

July 24, 2025

Miscellaneous MSR-189H
Crawler Tractor Multi-Shank Rippers

Size Class:
To 260 hp
Weight:
3557 lbs

Configuration for MSR-189H

Horsepower	**130.0 hp**	Number Of Shanks	**3.0**
Ripper Type	**Parallelogram**	Power Mode	**Hydraulic**

Hourly Ownership Costs

	Standard Value	User Adjusted Value	Variance
Depreciation	USD $2.64/hr	USD $2.72/hr	+3%
Cost of Facilities Capital (CFC)	USD $0.51/hr	USD $0.41/hr	-18.5%
Overhead	USD $0.66/hr	USD $0.52/hr	-21.1%
Overhaul Labor	USD $1.09/hr	USD $0.44/hr	-59.9%
Overhaul Parts	USD $0.95/hr	USD $0.75/hr	-21.1%
Total Hourly Ownership Cost:	**USD $5.85/hr**	**USD $4.84/hr**	**-17.3%**

User Defined Adjustments: Discount (7.5% -> 0%) Sales Tax (5.1% -> 0%) Annual Use Hours (1,285hrs -> 1,629hrs)

Hourly Operating Costs

	Standard Value	User Adjusted Value	Variance
Field Labor	USD $1.82/hr	USD $0.73/hr	-59.9%
Field Parts	USD $1.18/hr	USD $0.93/hr	-21.1%
Ground Engaging Component (GEC)	USD $0.99/hr	USD $0.00/hr	-100%
Tire	USD $0.00/hr	-	-
Electrical/Fuel	USD $0.00/hr	-	-
Lube	USD $0.15/hr	USD $0.00/hr	-100%
Total Operating Ownership Cost:	**USD $4.14/hr**	**USD $1.67/hr**	**-59.8%**

User Defined Adjustments: Annual Ground Engaging Component (USD $1,268.16 -> USD $0.00)Mechanics Wage (USD $58.58 -> USD $29.78)Hourly Lube Costs (USD $0.15 -> USD $0.00) Annual Misc Supply Parts (USD $253.63 -> USD $0.00)Annual Field Repair Parts Cost (USD $1,268.16 -> USD $1,521.79)

Total

	Standard Value	User Adjusted Value	Variance
Hourly Ownership Costs	USD $5.85/hr	USD $4.84/hr	-17.3%
Hourly Operating Costs	USD $4.14/hr	USD $1.67/hr	-59.8%
Total Hourly Cost	**USD $9.99**	**USD $6.50/hr**	**-34.9%**

Non-active use rates

	Standard Value	User Adjusted Value	Variance
Standby	USD $3.81/hr	USD $3.65/hr	-4.1%
Idle	USD $5.85/hr	USD $4.84/hr	-17.3%

Revised Date: 3rd quarter 2025

The equipment represented in this report has been exclusively prepared for (wniccoli@telesto-inc.com)

EquipmentWatch

www.equipmentwatch.com

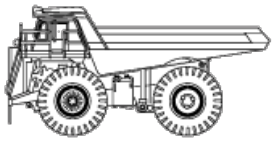
All prices shown in US dollars ($)

Custom Cost Evaluator

July 24, 2025

Caterpillar 770G
Mechanical Drive Rear Dumps

Size Class:
39.5 - 54.4 mt
Weight:
N/A



Configuration for 770G

Horsepower **477 hp**

Hourly Ownership Costs

	Standard Value	User Adjusted Value	Variance
Depreciation	USD $25.57/hr	USD $29.23/hr	+14.3%
Cost of Facilities Capital (CFC)	USD $9.63/hr	USD $8.02/hr	-16.7%
Overhead	USD $16.50/hr	USD $13.53/hr	-18%
Overhaul Labor	USD $2.48/hr	USD $1.03/hr	-58.3%
Overhaul Parts	USD $10.82/hr	USD $8.87/hr	-18%
Total Hourly Ownership Cost:	**USD $65.00/hr**	**USD $60.69/hr**	**-6.6%**

User Defined Adjustments: Discount (15% -> 0%) Sales Tax (5.1% -> 0%) Annual Use Hours (1,534hrs -> 1,871hrs)

Hourly Operating Costs

	Standard Value	User Adjusted Value	Variance
Field Labor	USD $3.06/hr	USD $1.27/hr	-58.3%
Field Parts	USD $6.68/hr	USD $0.91/hr	-86.3%
Ground Engaging Component (GEC)	USD $0.00/hr	-	-
Tire	USD $7.40/hr	-	-
Electrical/Fuel	USD $24.15/hr	USD $6.83/hr	-71.7%
Lube	USD $6.63/hr	USD $0.00/hr	-100%
Total Operating Ownership Cost:	**USD $47.91/hr**	**USD $16.41/hr**	**-65.7%**

User Defined Adjustments: Fuel (USD $3.54 -> USD $1.00) Mechanics Wage (USD $58.58 -> USD $29.78) Hourly Lube Costs (USD $6.63 -> USD $0.00) Annual Misc Supply Parts (USD $1,707.26 -> USD $0.00) Annual Field Repair Parts Cost (USD $8,536.28 -> USD $1,707.26)

Total

	Standard Value	User Adjusted Value	Variance
Hourly Ownership Costs	USD $65.00/hr	USD $60.69/hr	-6.6%
Hourly Operating Costs	USD $47.91/hr	USD $16.41/hr	-65.7%
Total Hourly Cost	**USD $112.91**	**USD $77.10/hr**	**-31.7%**

Non-active use rates

	Standard Value	User Adjusted Value	Variance
Standby	USD $51.70/hr	USD $50.78/hr	-1.8%
Idle	USD $89.15/hr	USD $67.52/hr	-24.3%

Revised Date: 3rd quarter 2025

The equipment represented in this report has been exclusively prepared for (wniccoli@telesto-inc.com)

EquipmentWatch

www.equipmentwatch.com

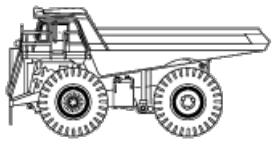
All prices shown in US dollars ($)

AED Green Book®

July 24, 2025

Caterpillar 770G
Mechanical Drive Rear Dumps

Size Class:
39.5 - 54.4 mt
Weight:
N/A



Configuration for 770G

Horsepower	**477 hp**

AED Rental Rates

These rental rates reflect an average for equipment of this type and size. Rates shown for specific brands or models are provided for convenience only. Rates charged by rental companies for specific brands or models will vary depending on many factors

	Monthly	Weekly	Daily
Published Rates	USD $6,400.00	USD $2,516.00	USD $878.00
Adjustments			
Region (New Mexico: 109.11%)	USD $583.04	USD $229.21	USD $79.99
User Defined			
Rental Rates (100%)	-	-	-
Total:	**USD $6,983.04**	**USD $2,745.21**	**USD $957.99**

Date Last Updated: Sep 01, 2023

The equipment represented in this report has been exclusively prepared for (wniccoli@telesto-inc.com)

EquipmentWatch

www.equipmentwatch.com

All prices shown in US dollars ($)

Adjustments for WalterNiccoli104 in Chino RCE Equipment List

July 24, 2025

Miscellaneous 6000 330
Off-Highway Water Tanker Trucks

Size Class:
300 - 399 hp
Weight:
54400 lbs

Configuration for 6000 330

Horsepower	**330.0 hp**	Power Mode	**Diesel**
Tank Capacity	**6000.0 gal**		

Hourly Ownership Costs

	Standard Value	User Adjusted Value	Variance
Depreciation	USD $22.90/hr	USD $26.54/hr	+15.9%
Cost of Facilities Capital (CFC)	USD $15.68/hr	USD $10.83/hr	-31%
Overhead	USD $15.43/hr	USD $10.45/hr	-32.3%
Overhaul Labor	USD $4.12/hr	USD $1.42/hr	-65.6%
Overhaul Parts	USD $11.96/hr	USD $8.10/hr	-32.3%
Total Hourly Ownership Cost:	**USD $70.09/hr**	**USD $57.32/hr**	**-18.2%**

User Defined Adjustments: Discount (15% -> 0%) Sales Tax (5.1% -> 0%) Annual Use Hours (711hrs -> 1,050hrs)

Hourly Operating Costs

	Standard Value	User Adjusted Value	Variance
Field Labor	USD $2.06/hr	USD $0.71/hr	-65.6%
Field Parts	USD $22.55/hr	USD $2.54/hr	-88.7%
Ground Engaging Component (GEC)	USD $0.00/hr	-	-
Tire	USD $6.42/hr	-	-
Electrical/Fuel	USD $39.79/hr	USD $11.25/hr	-71.7%
Lube	USD $6.45/hr	USD $0.00/hr	-100%
Total Operating Ownership Cost:	**USD $77.27/hr**	**USD $20.93/hr**	**-72.9%**

User Defined Adjustments: Fuel (USD $3.54 -> USD $1.00) Mechanics Wage (USD $58.58 -> USD $29.78) Hourly Lube Costs (USD $6.45 -> USD $0.00) Annual Misc Supply Parts (USD $2,671.74 -> USD $0.00) Annual Field Repair Parts Cost (USD $13,358.67 -> USD $2,671.74)

Total

	Standard Value	User Adjusted Value	Variance
Hourly Ownership Costs	USD $70.09/hr	USD $57.32/hr	-18.2%
Hourly Operating Costs	USD $77.27/hr	USD $20.93/hr	-72.9%
Total Hourly Cost	**USD $147.36**	**USD $78.26/hr**	**-46.9%**

Non-active use rates

	Standard Value	User Adjusted Value	Variance
Standby	USD $54.01/hr	USD $47.81/hr	-11.5%
Idle	USD $109.88/hr	USD $68.58/hr	-37.6%

Revised Date: 3rd quarter 2025

The equipment represented in this report has been exclusively prepared for (wniccoli@telesto-inc.com)

EquipmentWatch

www.equipmentwatch.com

All prices shown in US dollars ($)

Adjustments for WalterNiccoli104 in Chino RCE Equipment List

July 24, 2025

Miscellaneous 6000 330
Off-Highway Water Tanker Trucks

Size Class:
300 - 399 hp
Weight:
54400 lbs

Configuration for 6000 330

Horsepower	**330.0 hp**	Power Mode	**Diesel**
Tank Capacity	**6000.0 gal**		

AED Rental Rates

These rental rates reflect an average for equipment of this type and size. Rates shown for specific brands or models are provided for convenience only. Rates charged by rental companies for specific brands or models will vary depending on many factors

	Monthly	Weekly	Daily
Published Rates	USD $13,888.00	USD $4,893.00	USD $2,414.00
Adjustments			
Region (New Mexico: 99.97%)	(USD $3.72)	(USD $1.31)	(USD $0.65)
User Defined			
Rental Rates (100%)	-	-	-
Total:	**USD $13,884.28**	**USD $4,891.69**	**USD $2,413.35**

Date Last Updated: Jun 01, 2025

The equipment represented in this report has been exclusively prepared for (wniccoli@telesto-inc.com)

EquipmentWatch

www.equipmentwatch.com

All prices shown in US dollars ($)

Custom Cost Evaluator

July 24, 2025

Miscellaneous 48 X 60' - 516
Single Deck Portable Screening Plants

Size Class:
37 in & Over
Weight:
24800 lbs

Configuration for 48 X 60' - 516

Conveyor Size	**48' X 60'**	Horsepower	**132.0**
Power Mode	**Gasoline**	Screen Size	**5' X 16'**

Hourly Ownership Costs

	Standard Value	User Adjusted Value	Variance
Depreciation	USD $10.08/hr	USD $10.87/hr	+7.8%
Cost of Facilities Capital (CFC)	USD $3.25/hr	USD $2.53/hr	-22.3%
Overhead	USD $4.13/hr	USD $3.13/hr	-24.2%
Overhaul Labor	USD $5.84/hr	USD $2.25/hr	-61.5%
Overhaul Parts	USD $9.45/hr	USD $7.16/hr	-24.2%
Total Hourly Ownership Cost:	**USD $32.75/hr**	**USD $25.94/hr**	**-20.8%**

User Defined Adjustments: Discount (11% -> 0%) Sales Tax (5.1% -> 0%) Annual Use Hours (1,033hrs -> 1,363hrs)

Hourly Operating Costs

	Standard Value	User Adjusted Value	Variance
Field Labor	USD $2.89/hr	USD $1.11/hr	-61.5%
Field Parts	USD $8.88/hr	USD $1.35/hr	-84.8%
Ground Engaging Component (GEC)	USD $0.00/hr	-	-
Tire	USD $0.41/hr	-	-
Electrical/Fuel	USD $29.28/hr	USD $9.23/hr	-68.5%
Lube	USD $3.70/hr	USD $0.00/hr	-100%
Total Operating Ownership Cost:	**USD $45.15/hr**	**USD $12.09/hr**	**-73.2%**

User Defined Adjustments: Fuel (USD $3.17 -> USD $1.00) Mechanics Wage (USD $58.58 -> USD $29.78) Hourly Lube Costs (USD $3.70 -> USD $0.00) Annual Misc Supply Parts (USD $1,833.84 -> USD $0.00) Annual Field Repair Parts Cost (USD $7,335.37 -> USD $1,833.84)

Total

	Standard Value	User Adjusted Value	Variance
Hourly Ownership Costs	USD $32.75/hr	USD $25.94/hr	-20.8%
Hourly Operating Costs	USD $45.15/hr	USD $12.09/hr	-73.2%
Total Hourly Cost	**USD $77.90**	**USD $38.03/hr**	**-51.2%**

Non-active use rates

	Standard Value	User Adjusted Value	Variance
Standby	USD $17.46/hr	USD $16.53/hr	-5.4%
Idle	USD $62.03/hr	USD $35.16/hr	-43.3%

Revised Date: 3rd quarter 2025

The equipment represented in this report has been exclusively prepared for (wniccoli@telesto-inc.com)

EquipmentWatch

www.equipmentwatch.com

All prices shown in US dollars ($)

AED Green Book®

July 24, 2025

Miscellaneous 48 X 60' - 516
Single Deck Portable Screening Plants

Size Class:
37 in & Over
Weight:
24800 lbs

Configuration for 48 X 60' - 516

Conveyor Size	**48' X 60'**	Horsepower	**132.0**
Power Mode	**Gasoline**	Screen Size	**5' X 16'**

AED Rental Rates

These rental rates reflect an average for equipment of this type and size. Rates shown for specific brands or models are provided for convenience only. Rates charged by rental companies for specific brands or models will vary depending on many factors

	Monthly	Weekly	Daily
Published Rates	USD $11,333.00	USD $3,778.00	USD $1,194.00
Adjustments			
Region (New Mexico: 102.1%)	USD $238.09	USD $79.37	USD $25.08
User Defined			
Rental Rates (100%)	-	-	-
Total:	**USD $11,571.09**	**USD $3,857.37**	**USD $1,219.08**

Date Last Updated: Jun 01, 2025

The equipment represented in this report has been exclusively prepared for (wniccoli@telesto-inc.com)

EquipmentWatch

www.equipmentwatch.com

All prices shown in US dollars ($)

Custom Cost Evaluator

July 24, 2025

Miscellaneous 42 X 60' - 516
Triple Deck Portable Screening Plants

Size Class:
37 in & Over
Weight:
27600 lbs

Configuration for 42 X 60' - 516

Conveyor Size	**42' X 60'**	Horsepower	**84.0**
Power Mode	**Gasoline**	Screen Size	**5' X 16'**

Hourly Ownership Costs

	Standard Value	User Adjusted Value	Variance
Depreciation	USD $9.90/hr	USD $10.68/hr	+7.8%
Cost of Facilities Capital (CFC)	USD $2.74/hr	USD $2.22/hr	-18.9%
Overhead	USD $3.42/hr	USD $2.71/hr	-20.7%
Overhaul Labor	USD $5.86/hr	USD $2.36/hr	-59.7%
Overhaul Parts	USD $7.83/hr	USD $6.21/hr	-20.7%
Total Hourly Ownership Cost:	**USD $29.75/hr**	**USD $24.18/hr**	**-18.7%**

User Defined Adjustments: Discount (11% -> 0%) Sales Tax (5.1% -> 0%) Annual Use Hours (1,250hrs -> 1,577hrs)

Hourly Operating Costs

	Standard Value	User Adjusted Value	Variance
Field Labor	USD $2.95/hr	USD $1.19/hr	-59.7%
Field Parts	USD $7.36/hr	USD $1.17/hr	-84.1%
Ground Engaging Component (GEC)	USD $0.00/hr	-	-
Tire	USD $0.36/hr	-	-
Electrical/Fuel	USD $18.63/hr	USD $5.87/hr	-68.5%
Lube	USD $2.63/hr	USD $0.00/hr	-100%
Total Operating Ownership Cost:	**USD $31.93/hr**	**USD $8.58/hr**	**-73.1%**

User Defined Adjustments: Fuel (USD $3.17 -> USD $1.00) Mechanics Wage (USD $58.58 -> USD $29.78) Hourly Lube Costs (USD $2.63 -> USD $0.00) Annual Misc Supply Parts (USD $1,839.73 -> USD $0.00) Annual Field Repair Parts Cost (USD $7,358.91 -> USD $1,839.73)

Total

	Standard Value	User Adjusted Value	Variance
Hourly Ownership Costs	USD $29.75/hr	USD $24.18/hr	-18.7%
Hourly Operating Costs	USD $31.93/hr	USD $8.58/hr	-73.1%
Total Hourly Cost	**USD $61.69**	**USD $32.76/hr**	**-46.9%**

Non-active use rates

	Standard Value	User Adjusted Value	Variance
Standby	USD $16.06/hr	USD $15.61/hr	-2.8%
Idle	USD $48.38/hr	USD $30.05/hr	-37.9%

Revised Date: 3rd quarter 2025

The equipment represented in this report has been exclusively prepared for (wniccoli@telesto-inc.com)

EquipmentWatch

www.equipmentwatch.com

All prices shown in US dollars ($)

AED Green Book®

July 24, 2025

Miscellaneous 42 X 60' - 516
Triple Deck Portable Screening Plants

Size Class:
37 in & Over
Weight:
27600 lbs

Configuration for 42 X 60' - 516

Conveyor Size	**42' X 60'**	Horsepower	**84.0**
Power Mode	**Gasoline**	Screen Size	**5' X 16'**

AED Rental Rates

These rental rates reflect an average for equipment of this type and size. Rates shown for specific brands or models are provided for convenience only. Rates charged by rental companies for specific brands or models will vary depending on many factors

	Monthly	Weekly	Daily
Published Rates	USD $16,005.00	USD $5,336.00	USD $1,756.00
Adjustments			
Region (New Mexico: 101.91%)	USD $305.01	USD $101.69	USD $33.46
User Defined			
Rental Rates (100%)	-	-	-
Total:	**USD $16,310.01**	**USD $5,437.69**	**USD $1,789.46**

Date Last Updated: Jun 01, 2025

The equipment represented in this report has been exclusively prepared for (wniccoli@telesto-inc.com)

Attachment 3
Cost Spreadsheet

Kessel Ultimate Earthwork Closure
Stockpile Spreadsheet Worksheet #1
8/27/2025

General Information

Applicant	Chino Mines Company Hurley, New Mexico 88043	
Disturbed Surface Area (acres)		808
Type of Operation	Existing/Surface/Copper	
Current value of earthwork and O&M before escalation and discounting	**$22,924,160**	
EOY 2026 Mine Plan		**Stockpiles, Tailing, Reservoirs, Haul Roads and Disturbed Areas**

Demolition

Building Demolition costs are calculated in "1 BuildingDemo", "2 BuildingCover", "3 BuildingVeg", and "4BuildingWaste" and summarized on the last line of this table.

Item	Material	Quantity	Unit	Unit Cost ($/unit)	Direct Item Cost ($)	Reference	Means Line Item	Description
Building Demolition	See Building Demo Sheets	N/A	N/A	N/A	$0	See Building Demo Sheets	N/A	No demolitions are planned with Kessel Ultimate Stockpile

Total Direct Cost: $0

Material Handling Plan Summary Sheet

All activities are listed on this sheet and carried through the succeeding worksheets of the RCE. The column labeled ID contains the codes for the facility location, activity, material and equipment used for that particular row of work. The description lists the activity, top or outslope (if applicable), and the material. The source location lists the stockpile name (or sub-area) for the location of the activity. If borrow material is involved, it is transported from a borrow stockpile to a destination stockpile. Blank cells indicate that that column is not relevant to a particular activity.

Notes and Assumptions:

1 - Haul/Push Distance based on CCP drawings
2 - Haul Grades based on CCP drawings
3 - Grade Factors from CCP drawings

Truck = Tk1
Shovel = Sh1

Item	Activity	Material	Eq	ID	Description	Source Location 1	Destination Location 2	Total Haul/Push Distance (ft)[1]	Grade (%)[2,3]	Equipment
1201	E	a	Rp1	1201-E-a-Rp1	Rip-Outslope-Existing Ground	Kessel	-	100	-28.6%	Cat D11T CD Multi-shank (w/ MSR-359H)
1201	A	a	Dz4	1201-A-a-Dz4	Grade-Outslope-Existing Ground	Kessel	-	100	-28.6%	Cat D6, SU Blade
1201	E	c	Rp1	1201-E-c-Rp1	Rip-Outslope-Rough Graded Material	Kessel	-	100	-28.6%	Cat D11T CD Multi-shank (w/ MSR-359H)
1202	E	a	Rp1	1202-E-a-Rp1	Rip-Outslope-Existing Ground	Kessel	-	100	-28.6%	Cat D11T CD Multi-shank (w/ MSR-359H)
1202	A	a	Dz4	1202-A-a-Dz4	Grade-Outslope-Existing Ground	Kessel	-	100	-28.6%	Cat D6, SU Blade
1202	E	c	Rp1	1202-E-c-Rp1	Rip-Outslope-Rough Graded Material	Kessel	-	100	-28.6%	Cat D11T CD Multi-shank (w/ MSR-359H)
1203	E	a	Rp1	1203-E-a-Rp1	Rip-Outslope-Existing Ground	Kessel	-	100	-28.6%	Cat D11T CD Multi-shank (w/ MSR-359H)
1203	A	a	Dz4	1203-A-a-Dz4	Grade-Outslope-Existing Ground	Kessel	-	100	-28.6%	Cat D6, SU Blade
1203	E	c	Rp1	1203-E-c-Rp1	Rip-Outslope-Rough Graded Material	Kessel	-	100	-28.6%	Cat D11T CD Multi-shank (w/ MSR-359H)
9003	B	b	Dz4	9003-B-b-Dz4	Dozer Assist-Cover	Rubio Peak Stockpile	Kessel Stockpile	-	0.0%	Cat D6, SU Blade
9003	C	b	Ld2	9003-C-b-Ld2	Load-Cover	Rubio Peak Stockpile	Kessel Stockpile	-	0.0%	Cat 986K
9003	D	b	Tk1	9003-D-b-Tk1	Haul-Cover	Rubio Peak Stockpile	Kessel Stockpile	17,189	-3.2%	Cat 770G
1200	A	d	Mg2	1200-A-d-Mg2	Grade-Kessel Stockpile-Placed Cover	Kessel Stockpile	-	-	0.0%	Cat 14M3
1200	F	e	U3	1200-F-e-U3	Grade Benches-Kessel Stockpile-Final Grade	Kessel Stockpile	-	-	0.0%	-
1200	G	e	U6	1200-G-e-U6	Construct Downdrains-Kessel Stockpile-Final Grade	Kessel Stockpile	-	-	0.0%	-
1200	Gb	e	U7	1200-Gb-e-U7	Construct Downdrain Dissipators-Kessel Stockpile-Final Grade	Kessel Stockpile	-	-	0.0%	-
1200	J	e	U2a	1200-J-e-U2a	Revegetate-Kessel Stockpile-Final Grade	Kessel Stockpile	-	-	0.0%	-
1200	M	e	U9	1200-M-e-U9	Post-Closure O&M-Kessel Stockpile-Final Grade	Kessel Stockpile	-	-	0.0%	-

Earthwork Quantity Worksheet

Notes and Assumptions:

1 - Acres and volumes based on 3CCP drawings
2 - Cover Material Swell: The 'Loose Volume' is calculated based on the acreage to be covered, cover depth, and accounts for appropriate swell factor.
3 - Has been agreed upon with State agencies that swell occurs when cover material is moved from source to haul truck but not from the truck to placement on stockpile

ID	Description	Source Location 1	Destination Location 2	Area (ac)[1]	Cover Depth (in)	Bank/Stockpile Volume (bcy)[1]	Swell Factor (%)[3]	Loose/Stockpile Volume (lcy)[2]
1201-E-a-Rp1	Rip-Outslope-Existing Ground	Kessel	-	124.5	-	-	0%	-
1201-A-a-Dz4	Grade-Outslope-Existing Ground	Kessel	-	124.5	-	334,983	0%	334,983
1201-E-c-Rp1	Rip-Outslope-Rough Graded Material	Kessel	-	124.5	-	-	0%	-
1202-E-a-Rp1	Rip-Outslope-Existing Ground	Kessel	-	396.1	-	-	0%	-
1202-A-a-Dz4	Grade-Outslope-Existing Ground	Kessel	-	396.1	-	1,600,857	0%	1,600,857
1202-E-c-Rp1	Rip-Outslope-Rough Graded Material	Kessel	-	396.1	-	-	0%	-
1203-E-a-Rp1	Rip-Outslope-Existing Ground	Kessel	-	287.6	-	-	0%	-
1203-A-a-Dz4	Grade-Outslope-Existing Ground	Kessel	-	287.6	-	1,230,959	0%	1,230,959
1203-E-c-Rp1	Rip-Outslope-Rough Graded Material	Kessel	-	287.6	-	-	0%	-
9003-B-b-Dz4	Dozer Assist-Cover	Rubio Peak Stockpile	Kessel Stockpile	808.2	36.0	3,621,889	8%	3,911,640
9003-C-b-Ld2	Load-Cover	Rubio Peak Stockpile	Kessel Stockpile	808.2	36.0	3,621,889	8%	3,911,640
9003-D-b-Tk1	Haul-Cover	Rubio Peak Stockpile	Kessel Stockpile	808.2	36.0	3,621,889	8%	3,911,640
1200-A-d-Mg2	Grade-Kessel Stockpile-Placed Cover	Kessel Stockpile	-	808.2	36.0	3,911,640	0%	3,911,640
1200-F-e-U3	Grade Benches-Kessel Stockpile-Final Grade	Kessel Stockpile	-	808.2	-	-	0%	-
1200-G-e-U6	Construct Downdrains-Kessel Stockpile-Final Grade	Kessel Stockpile	-	808.2	-	-	0%	-
1200-Gb-e-U7	Construct Downdrain Dissipators-Kessel Stockpile-Final Grade	Kessel Stockpile	-	808.2	-	-	0%	-
1200-J-e-U2a	Revegetate-Kessel Stockpile-Final Grade	Kessel Stockpile	-	808.2	-	-	0%	-
1200-M-e-U9	Post-Closure O&M-Kessel Stockpile-Final Grade	Kessel Stockpile	-	808.2	-	-	0%	-

Productivity and Hours Required for Dozer Use---Earthmoving

Notes and Assumptions:
Uses volumes of outslope sections and dam breaches to calculate productivity
Uses push distances of outslope sections for grading productivity
Uses scraper push cycle time for dozer assist with scraper
Uses loader cycle time for dozer assist with loader at cover stockpiles
Grade Factor = -0.02(Grade %) + 1
May filter on equipement (D14) to show pertinent rows

Number of Dozers per 1

PERFORMANCE FACTORS

ID	Task Description	Source Location 1	Destination Location 2	Equipment	Type of Equipment to Assist (ID)	Type of Equipment to Assist (Name)	Number of Dozers per Assist	Loose /Stockpile Volume (cy)	Area (ac)	Productivity (cy/hr)	Productivity (ac/hr)	Total Task Time (hrs)	Material Factor	Grade Factor	Material Weight (lb/cy)	Production Method/ Blade	Centroid to Centroid Push Distance (ft)	Normal Production (cy/hr)	Effective Blade Width (ft)	Speed (mph)	Operator Factor	Work Hour (min/hr)	Visibility Factor	Elevation Factor	Direct Drive Trans.	Cut to Fill Haul Grade (%)
1201-E-a-Rp1	Rip-Outslope-Existing Ground	Kessel	-	Cat D11T CD Multi-shank	--	--	--	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0%
1201-A-a-Dz4	Grade-Outslope-Existing Ground	Kessel	-	Cat D6, SU Blade	--	--	--	334,983	124	442	-	758.5	1.2	1.6	3,300	1.2	100	336	11	2	1.00	50	1.0	1.0	1.0	-29%
1201-E-c-Rp1	Rip-Outslope-Rough Graded Materi	Kessel	-	Cat D11T CD Multi-shank	--	--	--	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0%
1202-E-a-Rp1	Rip-Outslope-Existing Ground	Kessel	-	Cat D11T CD Multi-shank	--	--	--	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0%
1202-A-a-Dz4	Grade-Outslope-Existing Ground	Kessel	-	Cat D6, SU Blade	--	--	--	1,600,857	396	442	-	3,624.6	1.2	1.6	3,300	1.2	100	336	11	2	1.00	50	1.0	1.0	1.0	-29%
1202-E-c-Rp1	Rip-Outslope-Rough Graded Materi	Kessel	-	Cat D11T CD Multi-shank	--	--	--	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0%
1203-E-a-Rp1	Rip-Outslope-Existing Ground	Kessel	-	Cat D11T CD Multi-shank	--	--	--	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0%
1203-A-a-Dz4	Grade-Outslope-Existing Ground	Kessel	-	Cat D6, SU Blade	--	--	--	1,230,959	288	442	-	2,787.1	1.2	1.6	3,300	1.2	100	336	11	2	1.00	50	1.0	1.0	1.0	-29%
1203-E-c-Rp1	Rip-Outslope-Rough Graded Materi	Kessel	-	Cat D11T CD Multi-shank	--	--	--	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0%
9003-B-b-Dz4	Dozer Assist-Cover	Rubio Peak Stocl	Kessel Stockpile	Cat D6, SU Blade	Ld2	Cat 988H Loader	1	3,911,640	808	-	-	6,075.3	-	-	-	-	-	-	-	-	-	50	-	-	-	0%
9003-C-b-Ld2	Load-Cover	Rubio Peak Stocl	Kessel Stockpile	Cat 986K	--	--	--	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0%
9003-D-b-Tk1	Haul-Cover	Rubio Peak Stocl	Kessel Stockpile	Cat 770G	--	--	--	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0%
1200-A-d-Mg2	Grade-Kessel Stockpile-Placed Cov	Kessel Stockpile	-	Cat 14M3	--	--	--	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0%
1200-F-e-U3	Grade Benches-Kessel Stockpile-Fi	Kessel Stockpile	-	-	--	--	--	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0%
1200-G-e-U6	Construct Downdrains-Kessel Stock	Kessel Stockpile	-	-	--	--	--	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0%
1200-Gb-e-U7	Construct Downdrain Dissipators-Ke	Kessel Stockpile	-	-	--	--	--	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0%
1200-J-e-U2a	Revegetate-Kessel Stockpile-Final C	Kessel Stockpile	-	-	--	--	--	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0%
1200-M-e-U9	Post-Closure O&M-Kessel Stockpile	Kessel Stockpile	-	-	--	--	--	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0%

Productivity and Hours Required for Water Truck Use

Notes and Assumptions:
6,000 gal water truck for compaction (water truck hours tied to 1/3 of grading time for fill material)
May filter on equipement (D14) to show pertinent rows
Compaction volume assumed to 1/3 of fill material

Sheet to which to tie hrs 12 Scrapers
Equipment for hrs Sc2

ID	Task Description	Source Location 1	Destination Location 2	Equipment	Operational Maintenance Time (hrs)
1201-E-a-Rp1	Rip-Outslope-Existing Ground	Kessel	-	Cat D11T CD Multi-shank (w/ MSR-359H)	-
1201-A-a-Dz4	Grade-Outslope-Existing Ground	Kessel	-	Cat D6, SU Blade	-
1201-E-c-Rp1	Rip-Outslope-Rough Graded Material	Kessel	-	Cat D11T CD Multi-shank (w/ MSR-359H)	-
1202-E-a-Rp1	Rip-Outslope-Existing Ground	Kessel	-	Cat D11T CD Multi-shank (w/ MSR-359H)	-
1202-A-a-Dz4	Grade-Outslope-Existing Ground	Kessel	-	Cat D6, SU Blade	-
1202-E-c-Rp1	Rip-Outslope-Rough Graded Material	Kessel	-	Cat D11T CD Multi-shank (w/ MSR-359H)	-
1203-E-a-Rp1	Rip-Outslope-Existing Ground	Kessel	-	Cat D11T CD Multi-shank (w/ MSR-359H)	-
1203-A-a-Dz4	Grade-Outslope-Existing Ground	Kessel	-	Cat D6, SU Blade	-
1203-E-c-Rp1	Rip-Outslope-Rough Graded Material	Kessel	-	Cat D11T CD Multi-shank (w/ MSR-359H)	-
9003-B-b-Dz4	Dozer Assist-Cover	Rubio Peak Stockpile	Kessel Stockpile	Cat D6, SU Blade	-
9003-C-b-Ld2	Load-Cover	Rubio Peak Stockpile	Kessel Stockpile	Cat 986K	-
9003-D-b-Tk1	Haul-Cover	Rubio Peak Stockpile	Kessel Stockpile	Cat 770G	-
1200-A-d-Mg2	Grade-Kessel Stockpile-Placed Cover	Kessel Stockpile	-	Cat 14M3	-
1200-F-e-U3	Grade Benches-Kessel Stockpile-Final Grade	Kessel Stockpile	-	-	-
1200-G-e-U6	Construct Downdrains-Kessel Stockpile-Final Grade	Kessel Stockpile	-	-	-
1200-Gb-e-U7	Construct Downdrain Dissipators-Kessel Stockpile-Final Grade	Kessel Stockpile	-	-	-
1200-J-e-U2a	Revegetate-Kessel Stockpile-Final Grade	Kessel Stockpile	-	-	-
1200-M-e-U9	Post-Closure O&M-Kessel Stockpile-Final Grade	Kessel Stockpile	-	-	-

Productivity and Hours Required for Dust Suppression and Road Maintenance

Notes and Assumptions:
6,000 gal water truck and 14M motor grader for dust suppression and site maintenance (water truck hours and 14M hours tied to loading time for cover material)
May filter on equipement (D14) to show pertinent rows

Sheet to which to tie hrs 11 Loader Shovel
Equipment for hrs Ld3
Equipment for hrs Ld1

ID	Task Description	Source Location 1	Destination Location 2	Equipment	Operational Maintenance Time (hrs)
1201-E-a-Rp1	Rip-Outslope-Existing Ground	Kessel	-	Cat D11T CD Multi-shank (w/ MSR-359H)	-
1201-A-a-Dz4	Grade-Outslope-Existing Ground	Kessel	-	Cat D6, SU Blade	-
1201-E-c-Rp1	Rip-Outslope-Rough Graded Material	Kessel	-	Cat D11T CD Multi-shank (w/ MSR-359H)	-
1202-E-a-Rp1	Rip-Outslope-Existing Ground	Kessel	-	Cat D11T CD Multi-shank (w/ MSR-359H)	-
1202-A-a-Dz4	Grade-Outslope-Existing Ground	Kessel	-	Cat D6, SU Blade	-
1202-E-c-Rp1	Rip-Outslope-Rough Graded Material	Kessel	-	Cat D11T CD Multi-shank (w/ MSR-359H)	-
1203-E-a-Rp1	Rip-Outslope-Existing Ground	Kessel	-	Cat D11T CD Multi-shank (w/ MSR-359H)	-
1203-A-a-Dz4	Grade-Outslope-Existing Ground	Kessel	-	Cat D6, SU Blade	-
1203-E-c-Rp1	Rip-Outslope-Rough Graded Material	Kessel	-	Cat D11T CD Multi-shank (w/ MSR-359H)	-
9003-B-b-Dz4	Dozer Assist-Cover	Rubio Peak Stockpile	Kessel Stockpile	Cat D6, SU Blade	-
9003-C-b-Ld2	Load-Cover	Rubio Peak Stockpile	Kessel Stockpile	Cat 986K	-
9003-D-b-Tk1	Haul-Cover	Rubio Peak Stockpile	Kessel Stockpile	Cat 770G	-
1200-A-d-Mg2	Grade-Kessel Stockpile-Placed Cover	Kessel Stockpile	-	Cat 14M3	-
1200-F-e-U3	Grade Benches-Kessel Stockpile-Final Grade	Kessel Stockpile	-	-	-
1200-G-e-U6	Construct Downdrains-Kessel Stockpile-Final Grade	Kessel Stockpile	-	-	-
1200-Gb-e-U7	Construct Downdrain Dissipators-Kessel Stockpile-Final Grade	Kessel Stockpile	-	-	-
1200-J-e-U2a	Revegetate-Kessel Stockpile-Final Grade	Kessel Stockpile	-	-	-
1200-M-e-U9	Post-Closure O&M-Kessel Stockpile-Final Grade	Kessel Stockpile	-	-	-

Productivity and Hours Required for Ripper---Equipped Dozer Use

Notes and Assumptions:
Uses area to calculate task time
88 ft/min = 1 mph
May filter on equipement (D14) to show pertinent rows

PERFORMANCE FACTORS

ID	Task Description	Source Location 1	Destination Location 2	Equipment	Area (ac)	Productivity (ac/hr)	Task Time (hrs)	Ripping Length (ft)	Ripper Penetration (in)	Pocket Spacing (in)	Distance b/n Passes (in)	Number of Shank Pockets	Turn Time (min/ pass)	Work Hour (min/hr)	Speed (mph)	1000 Ft Passes /Acre	Ripped Width Plus Distance b/n Passes (ft)
1201-E-a-Rp1	Rip-Outslope-Existing Ground	Kessel	-	Cat D11T CD Multi-shank (w	124.49	2.9	42.7	1,000	18	59	59	3	0.25	50	1.0	1.5	30
1201-A-a-Dz4	Grade-Outslope-Existing Ground	Kessel	-	Cat D6, SU Blade	-	-	-	-	-	-	-	-	-	-	-	-	-
1201-E-c-Rp1	Rip-Outslope-Rough Graded Material	Kessel	-	Cat D11T CD Multi-shank (w	124.49	2.9	42.7	1,000	18	59	59	3	0.25	50	1.0	1.5	30
1202-E-a-Rp1	Rip-Outslope-Existing Ground	Kessel	-	Cat D11T CD Multi-shank (w	396.10	2.9	135.9	1,000	18	59	59	3	0.25	50	1.0	1.5	30
1202-A-a-Dz4	Grade-Outslope-Existing Ground	Kessel	-	Cat D6, SU Blade	-	-	-	-	-	-	-	-	-	-	-	-	-
1202-E-c-Rp1	Rip-Outslope-Rough Graded Material	Kessel	-	Cat D11T CD Multi-shank (w	396.10	2.9	135.9	1,000	18	59	59	3	0.25	50	1.0	1.5	30
1203-E-a-Rp1	Rip-Outslope-Existing Ground	Kessel	-	Cat D11T CD Multi-shank (w	287.60	2.9	98.6	1,000	18	59	59	3	0.25	50	1.0	1.5	30
1203-A-a-Dz4	Grade-Outslope-Existing Ground	Kessel	-	Cat D6, SU Blade	-	-	-	-	-	-	-	-	-	-	-	-	-
1203-E-c-Rp1	Rip-Outslope-Rough Graded Material	Kessel	-	Cat D11T CD Multi-shank (w	287.60	2.9	98.6	1,000	18	59	59	3	0.25	50	1.0	1.5	30
9003-B-b-Dz4	Dozer Assist-Cover	Rubio Peak Stock	Kessel Stockpile	Cat D6, SU Blade	-	-	-	-	-	-	-	-	-	-	-	-	-
9003-C-b-Ld2	Load-Cover	Rubio Peak Stock	Kessel Stockpile	Cat 986K	-	-	-	-	-	-	-	-	-	-	-	-	-
9003-D-b-Tk1	Haul-Cover	Rubio Peak Stock	Kessel Stockpile	Cat 770G	-	-	-	-	-	-	-	-	-	-	-	-	-
1200-A-d-Mg2	Grade-Kessel Stockpile-Placed Cover	Kessel Stockpile	-	Cat 14M3	-	-	-	-	-	-	-	-	-	-	-	-	-
1200-F-e-U3	Grade Benches-Kessel Stockpile-Fina	Kessel Stockpile	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
1200-G-e-U6	Construct Downdrains-Kessel Stockpil	Kessel Stockpile	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
1200-Gb-e-U7	Construct Downdrain Dissipators-Kes	Kessel Stockpile	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
1200-J-e-U2a	Revegetate-Kessel Stockpile-Final Gr	Kessel Stockpile	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
1200-M-e-U9	Post-Closure O&M-Kessel Stockpile-F	Kessel Stockpile	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

Productivity and Hours Required for Hydraulic Excavator

Notes and Assumptions:

Uses area to calculate time for perforating liners

3' sheepsfoot roller

Can be used for excavating and loading, or sheepsfoot compaction using a roller
May filter on equipment (D14) to show pertinent rows

5	6	7	8	9	10	11		12	13		14
ID	**Task Description**	**Source Location 1**	**Destination Location 2**	**Equipment**	**Area (ac) or Volume (lcy)**	**Unit (ac or lcy)**	**Sheepsfoot Roller Width (ft) or Bucket Capacity (cy)**	**Unit (ft or cy)**	**Maximum Reach at Ground Level (ft)**	**Cycle Time (min)**	**Work Hour (min/hr)**	**Task Time (hr)**
1201-E-a-Rp1	Rip-Outslope-Existing Ground	Kessel	-	Cat D11T CD Multi-shank (w/ MSR-359H)	-	-	-	-	-	-	-	-
1201-A-a-Dz4	Grade-Outslope-Existing Ground	Kessel	-	Cat D6, SU Blade	-	-	-	-	-	-	-	-
1201-E-c-Rp1	Rip-Outslope-Rough Graded Material	Kessel	-	Cat D11T CD Multi-shank (w/ MSR-359H)	-	-	-	-	-	-	-	-
1202-E-a-Rp1	Rip-Outslope-Existing Ground	Kessel	-	Cat D11T CD Multi-shank (w/ MSR-359H)	-	-	-	-	-	-	-	-
1202-A-a-Dz4	Grade-Outslope-Existing Ground	Kessel	-	Cat D6, SU Blade	-	-	-	-	-	-	-	-
1202-E-c-Rp1	Rip-Outslope-Rough Graded Material	Kessel	-	Cat D11T CD Multi-shank (w/ MSR-359H)	-	-	-	-	-	-	-	-
1203-E-a-Rp1	Rip-Outslope-Existing Ground	Kessel	-	Cat D11T CD Multi-shank (w/ MSR-359H)	-	-	-	-	-	-	-	-
1203-A-a-Dz4	Grade-Outslope-Existing Ground	Kessel	-	Cat D6, SU Blade	-	-	-	-	-	-	-	-
1203-E-c-Rp1	Rip-Outslope-Rough Graded Material	Kessel	-	Cat D11T CD Multi-shank (w/ MSR-359H)	-	-	-	-	-	-	-	-
9003-B-b-Dz4	Dozer Assist-Cover	Rubio Peak Stockpile	Kessel Stockpile	Cat D6, SU Blade	-	-	-	-	-	-	-	-
9003-C-b-Ld2	Load-Cover	Rubio Peak Stockpile	Kessel Stockpile	Cat 986K	-	-	-	-	-	-	-	-
9003-D-b-Tk1	Haul-Cover	Rubio Peak Stockpile	Kessel Stockpile	Cat 770G	-	-	-	-	-	-	-	-
1200-A-d-Mg2	Grade-Kessel Stockpile-Placed Cover	Kessel Stockpile	-	Cat 14M3	-	-	-	-	-	-	-	-
1200-F-e-U3	Grade Benches-Kessel Stockpile-Final G	Kessel Stockpile	-	-	-	-	-	-	-	-	-	-
1200-G-e-U6	Construct Downdrains-Kessel Stockpile-F	Kessel Stockpile	-	-	-	-	-	-	-	-	-	-
1200-Gb-e-U7	Construct Downdrain Dissipators-Kessel	Kessel Stockpile	-	-	-	-	-	-	-	-	-	-
1200-J-e-U2a	Revegetate-Kessel Stockpile-Final Grade	Kessel Stockpile	-	-	-	-	-	-	-	-	-	-
1200-M-e-U9	Post-Closure O&M-Kessel Stockpile-Fina	Kessel Stockpile	-	-	-	-	-	-	-	-	-	-

Productivity and Hours Required for Truck Use

Notes and Assumptions:
Uses haul distance to calculate haul and return time (total task time includes loading, manuevering, dumping, hauling and return time) - moves from cover stockpile to destination stockpile
Volume of cover material based on area of destination
Cycles per truck = the greater of Heaped capacity or Struck capacity divided by Loader's per bucket capacity
1 mph = 88 ft/min
1 m/min = 0.03728227153424 mph
See Truck Optimization optimum number of trucks per loader
Haul Grade (%) assumes positive is uphill while the Effective Haul Grade (%) and Effective Return Grade (%) are postive for downhill and uphill
May filter on equipement (D14) to show pertinent rows

PERFORMANCE FACTORS

5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38	39	40	41	42	43	44	45	46	47	48	49
ID	Task Description	Source Location 1	Destination Location 2	Equipment	Loading Equipment ID	Loose/ Stockpile Volume (cy)	Truck Cycle Time (min)	Optimum Number of Trucks	Loader/ Shovel/ Excavator Net Bucket Capacity (cy)	Productivity (cy/hr)	Loader/ Shovel/ Excavator Task Time(hrs)	Truck Task Time (hrs)	Struck Capacity (cy)	Heaped Capacity (cy)	Loader/ Shovel Cycles per Truck	Total Haul Distance (ft)	Haul Distance Segment 1 (ft)	Haul Distance Segment 2 (ft)	Haul Distance Segment 3 (ft)	Haul Grade Segment 1 (%)	Haul Grade Segment 2 (%)	Haul Grade Segment 3 (%)	Rolling Resistance (%)	Haul Distance Segment 1 (meters)	Haul Distance Segment 2 (meters)	Haul Distance Segment 3 (meters)	Effective Haul Grade Segment 1 (%)	Effective Haul Grade Segment 2 (%)	Effective Haul Grade Segment 3 (%)	Effective Return Grade Segment 1 (%)	Effective Return Grade Segment 2 (%)	Effective Return Grade Segment 3 (%)	Haul Time (min)	Return Time (min)	Loading Time (min)	Truck Exchange Time (min)	Dump/ Maneuver Time (min)	Work Hour (min/hr)	Travel Time Loaded Segment 1 (min/m)	Travel Time Loaded Segment 2 (min/m)	Travel Time Loaded Segment 3 (min/m)	Travel Time Empty Segment 1 (min/m)	Travel Time Empty Segment 2 (min/m)	Travel Time Empty Segment 3 (min/m)
1201-E-a-Rp1	Rip-Outslope-Existing Ground	Kessel	-	Cat D11T CD Multi-shank (v	--	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0.0%	0.0%	0.0%	0.0%	-	-	-	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	-	-	-	-	-	-	-	-	-	-	-	-
1201-A-a-Dz4	Grade-Outslope-Existing Ground	Kessel	-	Cat D6, SU Blade	--	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0.0%	0.0%	0.0%	0.0%	-	-	-	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	-	-	-	-	-	-	-	-	-	-	-	-
1201-E-c-Rp1	Rip-Outslope-Rough Graded Materia	Kessel	-	Cat D11T CD Multi-shank (v	--	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0.0%	0.0%	0.0%	0.0%	-	-	-	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	-	-	-	-	-	-	-	-	-	-	-	-
1202-E-a-Rp1	Rip-Outslope-Existing Ground	Kessel	-	Cat D11T CD Multi-shank (v	--	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0.0%	0.0%	0.0%	0.0%	-	-	-	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	-	-	-	-	-	-	-	-	-	-	-	-
1202-A-a-Dz4	Grade-Outslope-Existing Ground	Kessel	-	Cat D6, SU Blade	--	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0.0%	0.0%	0.0%	0.0%	-	-	-	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	-	-	-	-	-	-	-	-	-	-	-	-
1202-E-c-Rp1	Rip-Outslope-Rough Graded Materia	Kessel	-	Cat D11T CD Multi-shank (v	--	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0.0%	0.0%	0.0%	0.0%	-	-	-	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	-	-	-	-	-	-	-	-	-	-	-	-
1203-E-a-Rp1	Rip-Outslope-Existing Ground	Kessel	-	Cat D11T CD Multi-shank (v	--	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0.0%	0.0%	0.0%	0.0%	-	-	-	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	-	-	-	-	-	-	-	-	-	-	-	-
1203-A-a-Dz4	Grade-Outslope-Existing Ground	Kessel	-	Cat D6, SU Blade	--	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0.0%	0.0%	0.0%	0.0%	-	-	-	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	-	-	-	-	-	-	-	-	-	-	-	-
1203-E-c-Rp1	Rip-Outslope-Rough Graded Materia	Kessel	-	Cat D11T CD Multi-shank (v	--	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0.0%	0.0%	0.0%	0.0%	-	-	-	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	-	-	-	-	-	-	-	-	-	-	-	-
9003-B-b-Dz4	Dozer Assist-Cover	Rubio Peak Stoc	Kessel Stockpile	Cat D6, SU Blade	--	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0.0%	0.0%	0.0%	0.0%	-	-	-	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	-	-	-	-	-	-	-	-	-	-	-	-
9003-C-b-Ld2	Load-Cover	Rubio Peak Stoc	Kessel Stockpile	Cat 986K	--	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0.0%	0.0%	0.0%	0.0%	-	-	-	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	-	-	-	-	-	-	-	-	-	-	-	-
9003-D-b-Tk1	Haul-Cover	Rubio Peak Stoc	Kessel Stockpile	Cat 770G	Ld2	3,911,640	14.9	6	8.0	643.9	5,623.0	6,075.3	22.5	32.8	4.0	17,189	3,298	10,725	3,165	-2.5%	-3.7%	-2.4%	2.5%	1,005	3,269	965	0.0%	1.2%	0.1%	5.0%	6.2%	4.9%	4.2	6.6	2.30	0.7	1.1	50	0.00080	0.00080	0.00080	0.00118	0.00132	0.00117
1200-A-c-Mg2	Grade-Kessel Stockpile-Placed Cove	Kessel Stockpile	-	Cat 14M3	--	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0.0%	0.0%	0.0%	0.0%	-	-	-	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	-	-	-	-	-	-	-	-	-	-	-	-
1200-F-e-U3	Grade Benches-Kessel Stockpile-Fir	Kessel Stockpile	-	-	--	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0.0%	0.0%	0.0%	0.0%	-	-	-	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	-	-	-	-	-	-	-	-	-	-	-	-
1200-G-e-U6	Construct Downdrains-Kessel Stock	Kessel Stockpile	-	-	--	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0.0%	0.0%	0.0%	0.0%	-	-	-	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	-	-	-	-	-	-	-	-	-	-	-	-
1200-Gb-e-U7	Construct Downdrain Dissipators-Ke	Kessel Stockpile	-	-	--	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0.0%	0.0%	0.0%	0.0%	-	-	-	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	-	-	-	-	-	-	-	-	-	-	-	-
1200-J-e-U2a	Revegetate-Kessel Stockpile-Final G	Kessel Stockpile	-	-	--	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0.0%	0.0%	0.0%	0.0%	-	-	-	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	-	-	-	-	-	-	-	-	-	-	-	-
1200-M-e-U9	Post-Closure O&M-Kessel Stockpile-	Kessel Stockpile	-	-	--	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0.0%	0.0%	0.0%	0.0%	-	-	-	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	-	-	-	-	-	-	-	-	-	-	-	-

Productivity and Hours Required for Front End Loader Use or Hydraulic Shovel Use

Assumptions:
Uses cover volume to calculate loading time of cover material
May filter on equipement (D14) to show pertinent rows

								PERFORMANCE FACTORS				
5	6	7	8	9	10	11	12	13	14	15	16	17
ID	**Task Description**	**Source Location 1**	**Destination Location 2**	**Equipment**	**Hauling Equipment ID**	**Loose/ Stockpile Volume (cy)**	**Loader/ Shovel Cycle Time (min)**	**Per Loader/ Shovel Productivity (cy/hr)**	**Loader/ Shovel Task Time (hrs)**	**Max of Loader/ Shovel or Truck Task Time (hrs)**	**Net Bucket Capacity (cy)**	**Work Hour (min/hr)**
1201-E-a-Rp1	Rip-Outslope-Existing Ground	Kessel	-	Cat D11T CD Multi-shank (w/ MSR-359H)	--	-	-	-	-	-	-	-
1201-A-a-Dz4	Grade-Outslope-Existing Ground	Kessel	-	Cat D6, SU Blade	--	-	-	-	-	-	-	-
1201-E-c-Rp1	Rip-Outslope-Rough Graded Material	Kessel	-	Cat D11T CD Multi-shank (w/ MSR-359H)	--	-	-	-	-	-	-	-
1202-E-a-Rp1	Rip-Outslope-Existing Ground	Kessel	-	Cat D11T CD Multi-shank (w/ MSR-359H)	--	-	-	-	-	-	-	-
1202-A-a-Dz4	Grade-Outslope-Existing Ground	Kessel	-	Cat D6, SU Blade	--	-	-	-	-	-	-	-
1202-E-c-Rp1	Rip-Outslope-Rough Graded Material	Kessel	-	Cat D11T CD Multi-shank (w/ MSR-359H)	--	-	-	-	-	-	-	-
1203-E-a-Rp1	Rip-Outslope-Existing Ground	Kessel	-	Cat D11T CD Multi-shank (w/ MSR-359H)	--	-	-	-	-	-	-	-
1203-A-a-Dz4	Grade-Outslope-Existing Ground	Kessel	-	Cat D6, SU Blade	--	-	-	-	-	-	-	-
1203-E-c-Rp1	Rip-Outslope-Rough Graded Material	Kessel	-	Cat D11T CD Multi-shank (w/ MSR-359H)	--	-	-	-	-	-	-	-
9003-B-b-Dz4	Dozer Assist-Cover	Rubio Peak Stockpile	Kessel Stockpile	Cat D6, SU Blade	--	-	-	-	-	-	-	-
9003-C-b-Ld2	Load-Cover	Rubio Peak Stockpile	Kessel Stockpile	Cat 986K	Tk1	3,911,640	0.58	695.7	5,623.0	6,075.3	8.0	50
9003-D-b-Tk1	Haul-Cover	Rubio Peak Stockpile	Kessel Stockpile	Cat 770G	--	-	-	-	-	-	-	-
1200-A-d-Mg2	Grade-Kessel Stockpile-Placed Cover	Kessel Stockpile	-	Cat 14M3	--	-	-	-	-	-	-	-
1200-F-e-U3	Grade Benches-Kessel Stockpile-Final Gı	Kessel Stockpile	-	-	--	-	-	-	-	-	-	-
1200-G-e-U6	Construct Downdrains-Kessel Stockpile-F	Kessel Stockpile	-	-	--	-	-	-	-	-	-	-
1200-Gb-e-U7	Construct Downdrain Dissipators-Kessel S	Kessel Stockpile	-	-	--	-	-	-	-	-	-	-
1200-J-e-U2a	Revegetate-Kessel Stockpile-Final Grade	Kessel Stockpile	-	-	--	-	-	-	-	-	-	-
1200-M-e-U9	Post-Closure O&M-Kessel Stockpile-Final	Kessel Stockpile	-	-	--	-	-	-	-	-	-	-

Productivity for Scrapers

Notes and Assumptions:
Uses volumes of stockpile or cover for hauling and grading times
Haul & Scrape Grade (%) assumes positive is downhill
May filter on equipement (D14) to show pertinent rows

Number of scrapers used for grading cover = 1
1609.344 meters/mile

5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30
ID	**Task Description**	**Source Location 1**	**Destination Location 2**	**Equipment**	**Loose/ Stockpile Volume (cy)**	**Total Haul Distance One Way (feet)**	**Haul & Scrape Grade (%)**	**Rolling Resistance (%)**	**Effective Grade Uphill (%)**	**Effective Grade Downhill (%)**	**Load Time (min)**	**Maneuver & Spread Time (min)**	**Full Scraper Haul Speed (mph)**	**Empty Scraper Return Speed (mph)**	**Scraper R/T Cycle Task Time (min)**	**Pusher Cycle Time (min/cycle)**	**Rated Load (lb)**	**Soil Weight (lbs/cy)**	**Heaped Capacity (cy)**	**Work Hour (min/hr)**	**Cycles per Scraper per Hr**	**Productivity per Heaped Scraper (cy/hr)**	**Total Task Time (hrs)**	**Number of Scrapers**	**Task Time w All Scrapers (hrs)**
1201-E-a-Rp1	Rip-Outslope-Existing Ground	Kessel	-	Cat D11T CD Multi-shank (w/ MSR-359H)	-	-	0.00%	0.0%	0.0%	0.0%	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
1201-A-a-Dz4	Grade-Outslope-Existing Ground	Kessel	-	Cat D6, SU Blade	-	-	0.00%	0.0%	0.0%	0.0%	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
1201-E-c-Rp1	Rip-Outslope-Rough Graded Material	Kessel	-	Cat D11T CD Multi-shank (w/ MSR-359H)	-	-	0.00%	0.0%	0.0%	0.0%	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
1202-E-a-Rp1	Rip-Outslope-Existing Ground	Kessel	-	Cat D11T CD Multi-shank (w/ MSR-359H)	-	-	0.00%	0.0%	0.0%	0.0%	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
1202-A-a-Dz4	Grade-Outslope-Existing Ground	Kessel	-	Cat D6, SU Blade	-	-	0.00%	0.0%	0.0%	0.0%	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
1202-E-c-Rp1	Rip-Outslope-Rough Graded Material	Kessel	-	Cat D11T CD Multi-shank (w/ MSR-359H)	-	-	0.00%	0.0%	0.0%	0.0%	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
1203-E-a-Rp1	Rip-Outslope-Existing Ground	Kessel	-	Cat D11T CD Multi-shank (w/ MSR-359H)	-	-	0.00%	0.0%	0.0%	0.0%	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
1203-A-a-Dz4	Grade-Outslope-Existing Ground	Kessel	-	Cat D6, SU Blade	-	-	0.00%	0.0%	0.0%	0.0%	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
1203-E-c-Rp1	Rip-Outslope-Rough Graded Material	Kessel	-	Cat D11T CD Multi-shank (w/ MSR-359H)	-	-	0.00%	0.0%	0.0%	0.0%	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
9003-B-b-Dz4	Dozer Assist-Cover	Rubio Peak Stockpile	Kessel Stockpile	Cat D6, SU Blade	-	-	0.00%	0.0%	0.0%	0.0%	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
9003-C-b-Ld2	Load-Cover	Rubio Peak Stockpile	Kessel Stockpile	Cat 986K	-	-	0.00%	0.0%	0.0%	0.0%	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
9003-D-b-Tk1	Haul-Cover	Rubio Peak Stockpile	Kessel Stockpile	Cat 770G	-	-	0.00%	0.0%	0.0%	0.0%	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
1200-A-d-Mg2	Grade-Kessel Stockpile-Placed Cover	Kessel Stockpile	-	Cat 14M3	-	-	0.00%	0.0%	0.0%	0.0%	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
1200-F-e-U3	Grade Benches-Kessel Stockpile-Final Gr	Kessel Stockpile	-	-	-	-	0.00%	0.0%	0.0%	0.0%	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
1200-G-e-U6	Construct Downdrains-Kessel Stockpile-F	Kessel Stockpile	-	-	-	-	0.00%	0.0%	0.0%	0.0%	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
1200-Gb-e-U7	Construct Downdrain Dissipators-Kessel S	Kessel Stockpile	-	-	-	-	0.00%	0.0%	0.0%	0.0%	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
1200-J-e-U2a	Revegetate-Kessel Stockpile-Final Grade	Kessel Stockpile	-	-	-	-	0.00%	0.0%	0.0%	0.0%	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
1200-M-e-U9	Post-Closure O&M-Kessel Stockpile-Fina	Kessel Stockpile	-	-	-	-	0.00%	0.0%	0.0%	0.0%	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

Productivity and Hours Required for Motorgrader Use---Grading

Notes and Assumptions:
Productivity (based on area of overall stockpile) = Sq.ft per hour = Speed x (Eff. Blade L -Blade Overlap) x Efficiency (*Cat. Handbook Edition 47* pg 11-27)
Max. safe slope for motor graders is 2:1 (50%), proposed final grade for Tyrone cover grading on stockpiles is 33%, therefore use of graders an option (Cat. Handbook Edition 46 pg 11-30)
Grade Factor = -0.02(Grade %) + 1
May filter on equipement (D14) to show pertinent rows

ID	Task Description	Source Location 1	Destination Location 2	Grading Equipment	Area (ac)	Grading Shaping Productivity (ac/hr)	Task Time (hrs)	Grade Factor	Material Factor	Material Weight (lb/cy)	Production Method/ Blade	Effective Blade Width (ft)	Pass Overlap (ft)	Speed (mph)	Work Hour (min/hr)	Operator Factor
1201-E-a-Rp1	Rip-Outslope-Existing Ground	Kessel	-	Cat D11T CD Multi-shank (w/ MSR-359H)	-	-	-	-	-	-	-	-	-	-	-	-
1201-A-a-Dz4	Grade-Outslope-Existing Ground	Kessel	-	Cat D6, SU Blade	-	-	-	-	-	-	-	-	-	-	-	-
1201-E-c-Rp1	Rip-Outslope-Rough Graded Material	Kessel	-	Cat D11T CD Multi-shank (w/ MSR-359H)	-	-	-	-	-	-	-	-	-	-	-	-
1202-E-a-Rp1	Rip-Outslope-Existing Ground	Kessel	-	Cat D11T CD Multi-shank (w/ MSR-359H)	-	-	-	-	-	-	-	-	-	-	-	-
1202-A-a-Dz4	Grade-Outslope-Existing Ground	Kessel	-	Cat D6, SU Blade	-	-	-	-	-	-	-	-	-	-	-	-
1202-E-c-Rp1	Rip-Outslope-Rough Graded Material	Kessel	-	Cat D11T CD Multi-shank (w/ MSR-359H)	-	-	-	-	-	-	-	-	-	-	-	-
1203-E-a-Rp1	Rip-Outslope-Existing Ground	Kessel	-	Cat D11T CD Multi-shank (w/ MSR-359H)	-	-	-	-	-	-	-	-	-	-	-	-
1203-A-a-Dz4	Grade-Outslope-Existing Ground	Kessel	-	Cat D6, SU Blade	-	-	-	-	-	-	-	-	-	-	-	-
1203-E-c-Rp1	Rip-Outslope-Rough Graded Material	Kessel	-	Cat D11T CD Multi-shank (w/ MSR-359H)	-	-	-	-	-	-	-	-	-	-	-	-
9003-B-b-Dz4	Dozer Assist-Cover	Rubio Peak Stockpile	Kessel Stockpile	Cat D6, SU Blade	-	-	-	-	-	-	-	-	-	-	-	-
9003-C-b-Ld2	Load-Cover	Rubio Peak Stockpile	Kessel Stockpile	Cat 986K	-	-	-	-	-	-	-	-	-	-	-	-
9003-D-b-Tk1	Haul-Cover	Rubio Peak Stockpile	Kessel Stockpile	Cat 770G	-	-	-	-	-	-	-	-	-	-	-	-
1200-A-d-Mg2	Grade-Kessel Stockpile-Placed Cover	Kessel Stockpile	-	Cat 14M3	808	4	210.4	1.0	1.2	2,900	1.20	14.00	2.00	3.70	50	0.75
1200-F-e-U3	Grade Benches-Kessel Stockpile-Final Gr	Kessel Stockpile	-	-	-	-	-	-	-	-	-	-	-	-	-	-
1200-G-e-U6	Construct Downdrains-Kessel Stockpile-F	Kessel Stockpile	-	-	-	-	-	-	-	-	-	-	-	-	-	-
1200-Gb-e-U7	Construct Downdrain Dissipators-Kessel S	Kessel Stockpile	-	-	-	-	-	-	-	-	-	-	-	-	-	-
1200-J-e-U2a	Revegetate-Kessel Stockpile-Final Grade	Kessel Stockpile	-	-	-	-	-	-	-	-	-	-	-	-	-	-
1200-M-e-U9	Post-Closure O&M-Kessel Stockpile-Final	Kessel Stockpile	-	-	-	-	-	-	-	-	-	-	-	-	-	-

Summary Calculation of Earthmoving Costs

Summarizes costs for line items involving earthworks

Notes and Assumptions:
Productivity (based on area of overall stockpile) = Sq.ft per hour = Speed x (Eff. Blade L -Blade Overlap) x Efficiency (*Cat. Handbook Edition 47* pg 11-27)
Max. safe slope for motor graders is 2:1 (50%), proposed final grade for cover grading on stockpiles is 33%, therefore use of graders an option (Cat. Handbook Edition 46 pg 11-30)
Grade Factor = -0.02(Grade %) + 1
May filter on equipement (D14) to show pertinent rows

ID	Description	Source Location 1	Destination Location 2	Equipment	Fuel Cost ($/hr)	Lube, Tires, GEC, & Field Parts Adjusted Rental Cost (w/o fuel) ($/hr)	Labor Cost ($/hr)	Number of Units (Equipment)	Time Req'd Per Unit (hrs)	Direct Fuel Cost ($)	Direct Lube, Tires, GEC, & Field Parts Adjusted Rental Cost (w/o fuel) ($)	Direct Labor Cost ($)	Total Equipment Cost ($)	Total Production Volume (CY)	Total Production Area (AC)
1201-E-a-Rp1	Rip-Outslope-Existing Ground	Kessel	-	Cat D11T CD Multi-shank (w/ MSR-359H)	$78.29	$349.74	$34.82	1	42.7	$3,343	$14,933	$1,487	$19,762	-	124.5
1201-A-a-Dz4	Grade-Outslope-Existing Ground	Kessel	-	Cat D6, SU Blade	$20.41	$93.69	$34.82	1	758.5	$15,483	$71,060	$26,410	$112,953	334,983	-
1201-E-c-Rp1	Rip-Outslope-Rough Graded Material	Kessel	-	Cat D11T CD Multi-shank (w/ MSR-359H)	$78.29	$349.74	$34.82	1	42.7	$3,343	$14,933	$1,487	$19,762	-	124.5
1202-E-a-Rp1	Rip-Outslope-Existing Ground	Kessel	-	Cat D11T CD Multi-shank (w/ MSR-359H)	$78.29	$349.74	$34.82	1	135.9	$10,636	$47,513	$4,730	$62,880	-	396.1
1202-A-a-Dz4	Grade-Outslope-Existing Ground	Kessel	-	Cat D6, SU Blade	$20.41	$93.69	$34.82	1	3,624.6	$73,993	$339,592	$126,209	$539,794	1,600,857	-
1202-E-c-Rp1	Rip-Outslope-Rough Graded Material	Kessel	-	Cat D11T CD Multi-shank (w/ MSR-359H)	$78.29	$349.74	$34.82	1	135.9	$10,636	$47,513	$4,730	$62,880	-	396.1
1203-E-a-Rp1	Rip-Outslope-Existing Ground	Kessel	-	Cat D11T CD Multi-shank (w/ MSR-359H)	$78.29	$349.74	$34.82	1	98.6	$7,723	$34,498	$3,435	$45,656	-	287.6
1203-A-a-Dz4	Grade-Outslope-Existing Ground	Kessel	-	Cat D6, SU Blade	$20.41	$93.69	$34.82	1	2,787.1	$56,896	$261,125	$97,047	$415,068	1,230,959	-
1203-E-c-Rp1	Rip-Outslope-Rough Graded Material	Kessel	-	Cat D11T CD Multi-shank (w/ MSR-359H)	$78.29	$349.74	$34.82	1	98.6	$7,723	$34,498	$3,435	$45,656	-	287.6
9003-B-b-Dz4	Dozer Assist-Cover	Rubio Peak Stockpile	Kessel Stockpile	Cat D6, SU Blade	$20.41	$93.69	$34.82	1	6,075.3	$124,022	$569,202	$211,543	$904,767	3,911,640	-
9003-C-b-Ld2	Load-Cover	Rubio Peak Stockpile	Kessel Stockpile	Cat 986K	$21.42	$116.47	$35.20	1	6,075.3	$130,116	$707,605	$213,852	$1,051,572	3,911,640	-
9003-D-b-Tk1	Haul-Cover	Rubio Peak Stockpile	Kessel Stockpile	Cat 770G	$20.15	$55.89	$30.55	6	6,075.3	$734,454	$2,037,171	$1,113,609	$3,885,234	3,911,640	-
1200-A-d-Mg2	Grade-Kessel Stockpile-Placed Cover	Kessel Stockpile	-	Cat 14M3	$22.48	$77.51	$34.82	1	210.4	$4,729	$16,308	$7,326	$28,363	-	808.2
1200-F-e-U3	Grade Benches-Kessel Stockpile-Final Gr	Kessel Stockpile	-	-	$0.00	$0.00	$0.00	1	-	$0	$0	$0	$0	-	-
1200-G-e-U6	Construct Downdrains-Kessel Stockpile-F	Kessel Stockpile	-	-	$0.00	$0.00	$0.00	1	-	$0	$0	$0	$0	-	-
1200-Gb-e-U7	Construct Downdrain Dissipators-Kessel S	Kessel Stockpile	-	-	$0.00	$0.00	$0.00	1	-	$0	$0	$0	$0	-	-
1200-J-e-U2a	Revegetate-Kessel Stockpile-Final Grade	Kessel Stockpile	-	-	$0.00	$0.00	$0.00	1	-	$0	$0	$0	$0	-	-
1200-M-e-U9	Post-Closure O&M-Kessel Stockpile-Final	Kessel Stockpile	-	-	$0.00	$0.00	$0.00	1	-	$0	$0	$0	$0	-	-
									TOTAL	$1,183,096	$4,195,952	$1,815,299	$7,194,348	$14,901,719	$2,425

Revegetation Costs

Description:
Includes scarifying (ripping), discing, rangeland drill seeding, mulching, crimping, and daily per diem
May filter on equipement (D14) to show pertinent rows

Item	Activity	Material	Eq	ID	Description	Source Location 1	Destination Location 2	Area (ac)	Fuel Unit Cost ($/ac)	Reveg w/o Fuel Unit Cost ($/ac)	Fuel Direct Cost ($)	Reveg w/o Fuel Direct Cost ($)
1201	E	a	Rp1	1201-E-a-Rp1	Rip-Outslope-Existing Ground	Kessel	-	0.0	$ -	$ -	$ -	$ -
1201	A	a	Dz4	1201-A-a-Dz4	Grade-Outslope-Existing Ground	Kessel	-	0.0	$ -	$ -	$ -	$ -
1201	E	c	Rp1	1201-E-c-Rp1	Rip-Outslope-Rough Graded Material	Kessel	-	0.0	$ -	$ -	$ -	$ -
1202	E	a	Rp1	1202-E-a-Rp1	Rip-Outslope-Existing Ground	Kessel	-	0.0	$ -	$ -	$ -	$ -
1202	A	a	Dz4	1202-A-a-Dz4	Grade-Outslope-Existing Ground	Kessel	-	0.0	$ -	$ -	$ -	$ -
1202	E	c	Rp1	1202-E-c-Rp1	Rip-Outslope-Rough Graded Material	Kessel	-	0.0	$ -	$ -	$ -	$ -
1203	E	a	Rp1	1203-E-a-Rp1	Rip-Outslope-Existing Ground	Kessel	-	0.0	$ -	$ -	$ -	$ -
1203	A	a	Dz4	1203-A-a-Dz4	Grade-Outslope-Existing Ground	Kessel	-	0.0	$ -	$ -	$ -	$ -
1203	E	c	Rp1	1203-E-c-Rp1	Rip-Outslope-Rough Graded Material	Kessel	-	0.0	$ -	$ -	$ -	$ -
9003	B	b	Dz4	9003-B-b-Dz4	Dozer Assist-Cover	Rubio Peak Stockpile	Kessel Stockpile	0.0	$ -	$ -	$ -	$ -
9003	C	b	Ld2	9003-C-b-Ld2	Load-Cover	Rubio Peak Stockpile	Kessel Stockpile	0.0	$ -	$ -	$ -	$ -
9003	D	b	Tk1	9003-D-b-Tk1	Haul-Cover	Rubio Peak Stockpile	Kessel Stockpile	0.0	$ -	$ -	$ -	$ -
1200	A	d	Mg2	1200-A-d-Mg2	Grade-Kessel Stockpile-Placed Cover	Kessel Stockpile	-	0.0	$ -	$ -	$ -	$ -
1200	F	e	U3	1200-F-e-U3	Grade Benches-Kessel Stockpile-Final Gr	Kessel Stockpile	-	0.0	$ -	$ -	$ -	$ -
1200	G	e	U6	1200-G-e-U6	Construct Downdrains-Kessel Stockpile-F	Kessel Stockpile	-	0.0	$ -	$ -	$ -	$ -
1200	Gb	e	U7	1200-Gb-e-U7	Construct Downdrain Dissipators-Kessel S	Kessel Stockpile	-	0.0	$ -	$ -	$ -	$ -
1200	J	e	U2a	1200-J-e-U2a	Revegetate-Kessel Stockpile-Final Grade	Kessel Stockpile	-	808.2	$ 4.38	$ 1,685.34	$ 3,540	$ 1,362,078
1200	M	e	U9	1200-M-e-U9	Post-Closure O&M-Kessel Stockpile-Final	Kessel Stockpile	-	0.0	$ -	$ -	$ -	$ -
							TOTAL	808			$ 3,540	$ 1,362,078

Other Reclamation Activity Costs

Assumptions:
1 - Cost to construct drain or channel on re-graded stockpile
2 - The downdrain, ACB, well plug & abandon, and well replacement costs include fuel
May filter on equipement (D14) to show pertinent rows

Item	Activity	Material	Eq	ID	Description	Source Location 1	Destination Location 2	Quantity	Unit	Fuel Unit Cost ($/unit)	Unit Cost w/o Fuel ($/unit)[1,2]	Fuel Direct Cost ($)	Direct w/o Fuel Cost ($)
1201	E	a	Rp1	1201-E-a-Rp1	Rip-Outslope-Existing Ground	Kessel	-	-	-	$ -	$ -	$ -	$ -
1201	A	a	Dz4	1201-A-a-Dz4	Grade-Outslope-Existing Ground	Kessel	-	-	-	$ -	$ -	$ -	$ -
1201	E	c	Rp1	1201-E-c-Rp1	Rip-Outslope-Rough Graded Material	Kessel	-	-	-	$ -	$ -	$ -	$ -
1202	E	a	Rp1	1202-E-a-Rp1	Rip-Outslope-Existing Ground	Kessel	-	-	-	$ -	$ -	$ -	$ -
1202	A	a	Dz4	1202-A-a-Dz4	Grade-Outslope-Existing Ground	Kessel	-	-	-	$ -	$ -	$ -	$ -
1202	E	c	Rp1	1202-E-c-Rp1	Rip-Outslope-Rough Graded Material	Kessel	-	-	-	$ -	$ -	$ -	$ -
1203	E	a	Rp1	1203-E-a-Rp1	Rip-Outslope-Existing Ground	Kessel	-	-	-	$ -	$ -	$ -	$ -
1203	A	a	Dz4	1203-A-a-Dz4	Grade-Outslope-Existing Ground	Kessel	-	-	-	$ -	$ -	$ -	$ -
1203	E	c	Rp1	1203-E-c-Rp1	Rip-Outslope-Rough Graded Material	Kessel	-	-	-	$ -	$ -	$ -	$ -
9003	B	b	Dz4	9003-B-b-Dz4	Dozer Assist-Cover	Rubio Peak Stockpile	Kessel Stockpile	-	-	$ -	$ -	$ -	$ -
9003	C	b	Ld2	9003-C-b-Ld2	Load-Cover	Rubio Peak Stockpile	Kessel Stockpile	-	-	$ -	$ -	$ -	$ -
9003	D	b	Tk1	9003-D-b-Tk1	Haul-Cover	Rubio Peak Stockpile	Kessel Stockpile	-	-	$ -	$ -	$ -	$ -
1200	A	d	Mg2	1200-A-d-Mg2	Grade-Kessel Stockpile-Placed Cover	Kessel Stockpile	-	-	-	$ -	$ -	$ -	$ -
1200	F	e	U3	1200-F-e-U3	Grade Benches-Kessel Stockpile-Final Gr	Kessel Stockpile	-	129,093	ft	$ 0.43	$ 2.10	$ 55,876.62	$ 271,275
1200	G	e	U6	1200-G-e-U6	Construct Downdrains-Kessel Stockpile-F	Kessel Stockpile	-	11,495	ft	$ -	$ 471.97	$ -	$ 5,425,260
1200	Gb	e	U7	1200-Gb-e-U7	Construct Downdrain Dissipators-Kessel S	Kessel Stockpile	-	3	ea	$ -	$ 18,628.69	$ -	$ 55,886
1200	J	e	U2a	1200-J-e-U2a	Revegetate-Kessel Stockpile-Final Grade	Kessel Stockpile	-	-	-	$ 4.38	$ 1,685.34	$ -	$ -
1200	M	e	U9	1200-M-e-U9	Post-Closure O&M-Kessel Stockpile-Final	Kessel Stockpile	-	-	-	$ 1,751.36	$ 7,319.65	$ -	$ -
											TOTAL	$ 55,877	$ 5,752,421

Kessel Stockpile

Reclamation Summary Stockpiles, Haul Roads, Reservoirs, and Disturbed Areas

			Current Value
DIRECT COSTS	Facility and Structure Removal		$0
	Earthmoving		$7,194,348
	Revegetation		$1,365,618
	Other		$5,808,298
	Subtotal, Direct Costs		**$14,368,263**
INDIRECT COSTS	**Subtotal, Indirect Costs**	**30.0%**	**$4,310,479**
TOTAL COST			**$18,678,743**

Notes:

Indirect costs are based on 2019 agreement between FMI and agencies

Indirect costs include but are not limited to mobilization and demobilization, engineering redesign fee, contingencies, contractor profit and overhead, project management fee, and state procurement cost

Reclamation Summary

Notes and Assumptions
Used to summarize costs for Sheet 17b Facilty Characteristics

ID	Description	Source Location 1	Destination Location 2	Area (ac)	Cover Material Excav, Haul, Grade ($)	Cover Material Excav, Haul, Grade Fuel ($)	Cover Material Excav, Haul, Grade Indirects ($)	Pullback and Backfill ($)	Pullback and Backfill Fuel ($)	Pullback and Backfill Indirects ($)	Top/ Outslope Adjustment Grading w/o Fuel ($)	Top/ Outslope Adjustment Grading Fuel ($)	Top/ Outslope Adjustment Grading Indirects ($)	Scarify, Seed & Mulch, Reveg w/o Fuel ($)	Scarify, Seed & Mulch, Reveg Fuel ($)	Scarify, Seed & Mulch, Reveg Indirects ($)	Channels & Benches ($)	Channels & Benches Fuel ($)	Channels & Benches Indirects ($)	Other ($)	Other Fuel ($)	Other Indirects ($)	Capital Cost Totals ($)	Capital Cost/Acre ($)
1201-E-a-Rp1	Rip-Outslope-Existing Ground	Kessel	-	124.5	$ -	$ -	$ -	$ -	$ -	$ -	$ 16,420	$ 3,343	$ 5,929	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ 19,762	$ 159
1201-A-a-Dz4	Grade-Outslope-Existing Ground	Kessel	-	124.5	$ -	$ -	$ -	$ -	$ -	$ -	$ 97,470	$ 15,483	$ 33,886	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ 112,953	$ 907
1201-E-c-Rp1	Rip-Outslope-Rough Graded Material	Kessel	-	124.5	$ -	$ -	$ -	$ -	$ -	$ -	$ 16,420	$ 3,343	$ 5,929	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ 19,762	$ 159
1202-E-a-Rp1	Rip-Outslope-Existing Ground	Kessel	-	396.1	$ -	$ -	$ -	$ -	$ -	$ -	$ 52,243	$ 10,636	$ 18,864	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ 62,880	$ 159
1202-A-a-Dz4	Grade-Outslope-Existing Ground	Kessel	-	396.1	$ -	$ -	$ -	$ -	$ -	$ -	$ 465,801	$ 73,993	$ 161,938	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ 539,794	$ 1,363
1202-E-c-Rp1	Rip-Outslope-Rough Graded Material	Kessel	-	396.1	$ -	$ -	$ -	$ -	$ -	$ -	$ 52,243	$ 10,636	$ 18,864	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ 62,880	$ 159
1203-E-a-Rp1	Rip-Outslope-Existing Ground	Kessel	-	287.6	$ -	$ -	$ -	$ -	$ -	$ -	$ 37,933	$ 7,723	$ 13,697	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ 45,656	$ 159
1203-A-a-Dz4	Grade-Outslope-Existing Ground	Kessel	-	287.6	$ -	$ -	$ -	$ -	$ -	$ -	$ 358,172	$ 56,896	$ 124,520	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ 415,068	$ 1,443
1203-E-c-Rp1	Rip-Outslope-Rough Graded Material	Kessel	-	287.6	$ -	$ -	$ -	$ -	$ -	$ -	$ 37,933	$ 7,723	$ 13,697	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ 45,656	$ 159
9003-B-b-Dz4	Dozer Assist-Cover	Rubio Peak Stockpile	Kessel Stockpile	808.2	$ 780,745	$ 124,022	$ 271,430	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ 904,767	$ 1,119
9003-C-b-Ld2	Load-Cover	Rubio Peak Stockpile	Kessel Stockpile	808.2	$ 921,457	$ 130,116	$ 315,472	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ 1,051,572	$ 1,301
9003-D-b-Tk1	Haul-Cover	Rubio Peak Stockpile	Kessel Stockpile	808.2	$ 3,150,781	$ 734,454	$ 1,165,570	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ 3,885,234	$ 4,807
1200-A-d-Mg2	Grade-Kessel Stockpile-Placed Cover	Kessel Stockpile	-	808.2	$ 23,633	$ 4,729	$ 8,509	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ 28,363	$ 35
1200-F-e-U3	Grade Benches-Kessel Stockpile-Final G	Kessel Stockpile	-	808.2	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ 271,275	$ 55,877	$ 98,146	$ -	$ -	$ -	$ 327,152	$ 405
1200-G-e-U6	Construct Downdrains-Kessel Stockpile-F	Kessel Stockpile	-	808.2	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ 5,425,260	$ -	$ 1,627,578	$ -	$ -	$ -	$ 5,425,260	$ 6,713
1200-Gb-e-U7	Construct Downdrain Dissipators-Kessel	Kessel Stockpile	-	808.2	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ 55,886	$ -	$ 16,766	$ -	$ -	$ -	$ 55,886	$ 69
1200-J-e-U2a	Revegetate-Kessel Stockpile-Final Grade	Kessel Stockpile	-	808.2	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ 1,362,078	$ 3,540	$ 409,685	$ -	$ -	$ -	$ -	$ -	$ -	$ 1,365,618	$ 1,690
1200-M-e-U9	Post-Closure O&M-Kessel Stockpile-Fina	Kessel Stockpile	-	808.2	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -
			Total:		$ 4,876,616	$ 993,320	$ 1,760,981	$ -	$ -	$ -	$ 1,134,635	$ 189,776	$ 397,323	$ 1,362,078	$ 3,540	$ 409,685	$ 5,752,421	$ 55,877	$ 1,742,489	$ -	$ -	$ -	$ 14,368,263	$ 20,805

Facility Characteristics

Facilities are categorized in this listing to meet the MMD reporting requirement

	1200	9003	
Facility	**Kessel Stockpile**	**Kessel Stockpile**	**Total**
Reclaimed Acres[6]	808.19		**808.19**
Item	**Capital Cost**	**Capital Cost**	
Cover Material Excav, Haul, Grade[1]	$5,869,937	$0	$5,869,937
Pullback or Backfill	$0	$0	$0
Top/Outslope Adjustment Grading[2]	$1,324,411	$0	$1,324,411
Scarify, Seed & Mulch, Reveg[3]	$1,365,618	$0	$1,365,618
Channels & Benches[4]	$5,808,298	$0	$5,808,298
Demolition	-	-	$0
Other[5]	$0	$0	$0
Capital Cost Totals	**$14,368,263**	**$0**	**$14,368,263**
Capital Cost/Acre	**$17,778**	**-**	**$17,778**
Cover Material Excav, Haul, Grade1	$1,760,981	$0	$1,760,981
Pullback or Backfill	$0	$0	$0
Top/Outslope Adjustment Grading[2]	$397,323	$0	$397,323
Scarify, Seed & Mulch, Reveg[3]	$409,685	$0	$409,685
Channels & Benches[4]	$1,742,489	$0	$1,742,489
Demolition	-	-	$0
Other[5]	$0	$0	$0
Indirect Cost Totals	**$4,310,479**	**$0**	**$4,310,479**
Indirect Cost/Acre	**$5,333**	**-**	**$5,333**
Total Cost	**$18,678,743**	**$0**	**$18,678,743**
Total Cost Cover	$7,630,918	$0	$7,630,918
Pullback or Backfill	$0	$0	$0
Total Cost Top/Outslope Adjustment	$1,721,734	$0	$1,721,734
Total Cost Earthwork	$9,352,652	$0	$9,352,652
Capital Cost Re-Veg	$1,775,304	$0	$1,775,304
Capital Cost Other[5]	$0	$0	$0
Total Cost/Acre	**$23,112**	**-**	**$23,112**
Total Cost/Acre Cover	**$9,442**	**-**	**$9,442**
Pullback or Backfill	**$0**	**-**	**$0**
Total Cost/Acre Top/Outslope Adjustment	**$2,130**	**-**	**$2,130**
Total Cost/Acre Earthwork	**$11,572**	**-**	**$11,572**
Capital Cost/Acre Re-Veg	**$2,197**	**-**	**$2,197**
Capital Cost/Acre Other[5]	**$0**	**-**	**$0**

1 Cover Material includes dozer assist, load, haul, grade cover, and water truck and motor grader for road maintenance and du

2 Top/Outslope Adjustment Grading includes rough grading and ripping before placing cover

3 Revegetation includes scarifying, discing, drill speeding, mulching, crimping, per diem, mobilization, seeding, and mulching

4 Channels & Benches includes channels, downdrains, benches

5 Other includes well installation/closure, well replacement, berm construction, fencing and signage, and seepage collection/int

6 Capital costs before O&M

Appendix C
Misc Calculations

TELESTO SOLUTIONS • INCORPORATED

Job No: 200450-006-01 Client: Chino Page 1 of 7

Task: Closure Downdrains Ultimate Kessel Stockpile Computed By: S. Zeman Date: 07/23/25

Checked By: J. Cullor Date: 07/30/25

Calculation Documentation

Problem Statement:

Freeport-McMoRan Chino Mines Company (Chino) updates reclamation plans (CCP) every 5 years based on the upcoming 5-year mining plan to satisfy requirements by the NM MMD and NMED (Agencies) to place financial assurance for closure. The typical Agencies objective is that stormwater developed on reclaimed slopes be managed such that it does not harm reclamation surfaces. The Agencies' standard criteria are:

- 3H:1V reclamation slopes (inter-bench)
- Maximum slope length of 300 ft
- Conveyance for the 100-yr interval storm event with 6-inches of freeboard (20.6.7.17 D(2)(f) NMAC)

Chino submitted the most recent CCP and developed an internal reclamation cost estimate (RCE) based on the mine plan for End of Year 5. This included a CCP and RCE Kessel Stockpile. The ultimate buildout of Kessel Stockpile is scheduled after that, and the closure plan and RCE for the ultimate buildout are underway. The number of side-channels are indirectly dictated by the Agencies criteria, but the size and number of outlets from the bench channels (i.e., down drains) are unknown.

Calculation Objectives:

1. Find the number of down drains required to remove stormwater from the design storm safely from the reclaimed side-slopes
2. Find the channel size required to remove stormwater from the design storm safely from the reclaimed facility tops

Approach:

1. Use the SCS TR55 to calculate peak runoff from a unit width watershed representing the standard reclamation slope(s)
2. Estimate the flow capacity of the bench channels based on previous closure designs
3. Calculate the flow capacity requirement for top discharge channels
4. Calculate the average down drain spacing to convey water from the side channels off the slopes

Calculation Documentation

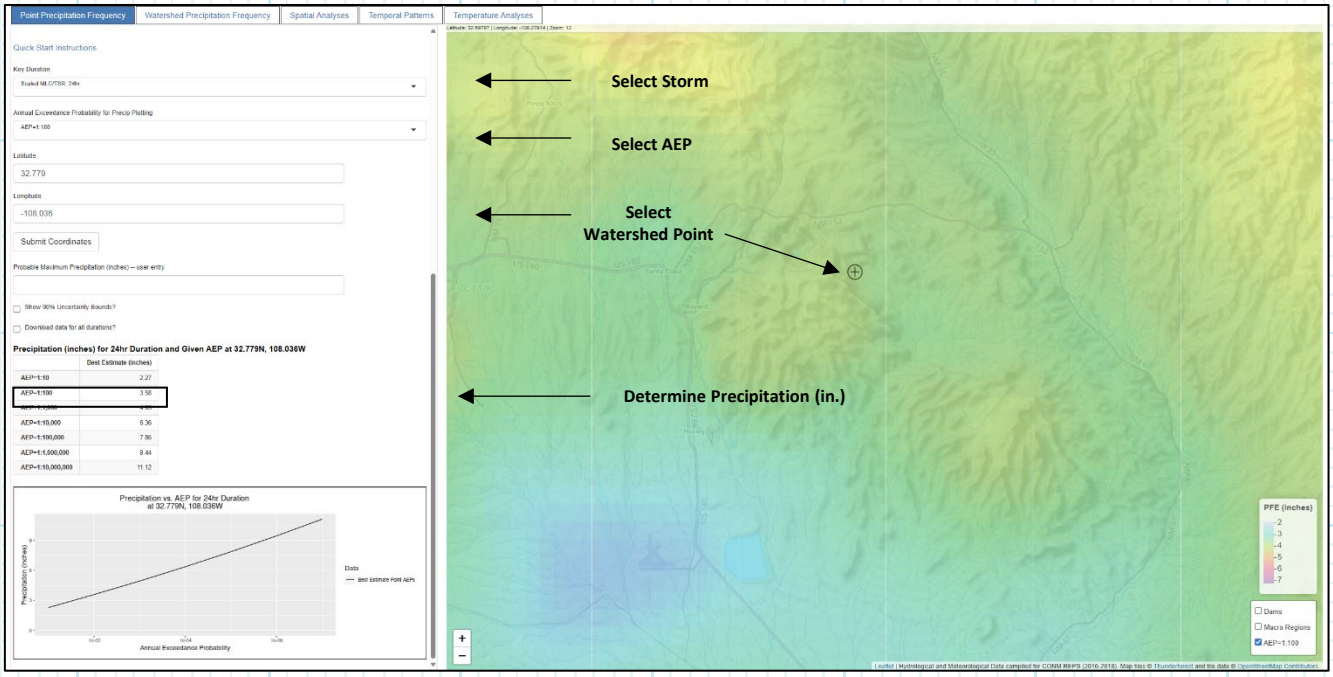
Data and Assumptions:

1. Curve number (CN) of 72 for reclaimed surfaces (average for all reclamation covers)

Representative of Established Reclamation Cover

Cover description: Cover type	Hydrologic condition[2/]	Curve numbers for hydrologic soil group: A[3/]	B	C	D
Herbaceous—mixture of grass, weeds, and low-growing brush, with brush the minor element.	Poor		80	87	93
	Fair		71	81	89
	Good		62	74	85
Oak-aspen—mountain brush mixture of oak brush, aspen, mountain mahogany, bitter brush, maple, and other brush.	Poor		66	74	79
	Fair		48	57	63
	Good		30	41	48
Pinyon-juniper—pinyon, juniper, or both; grass understory.	Poor		75	85	89
	Fair		58	73	80
	Good		41	61	71
Sagebrush with grass understory.	Poor		67	80	85
	Fair		51	63	70
	Good		35	47	55
Desert shrub—major plants include saltbush, greasewood, creosotebush, blackbrush, bursage, palo verde, mesquite, and cactus.	Poor	63	77	85	88
	Fair	55	72	81	86
	Good	49	68	79	84

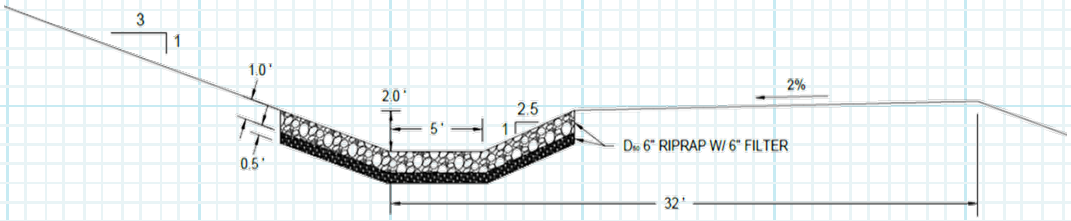
2. Maximum distance of sheet flow – 300 ft (TR55)
3. 100-yr, 24-hr storm depth = 3.58 inches (CO-NM REPS, 2025)



Calculation Documentation

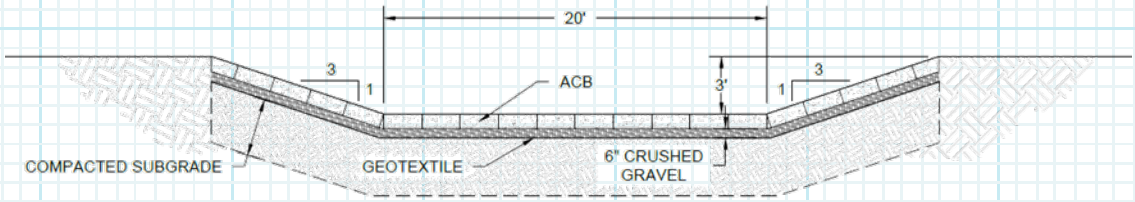
Data and Assumptions (con'd):

4. Manning's for:
   a. Riprap = 0.033
   b. Reclaimed surfaces = 0.13
   c. Articulated block = 0.025 (Contech)
5. Typical bench channel section (@ 2% slope):



TYPICAL BENCH CHANNEL CROSS SECTION
SECTION VIEW

6. Typical down drain cross section:



TYPICAL DOWNDRAIN
SECTION VIEW

Calculation Documentation

Calculations:

1. SCS Runoff from TR-55 (sheet flow portion), spreadsheet: 20250730_CCP_ChannelSizing.xlsx

SCS runoff curve number method

The SCS Runoff Curve Number (CN) method is described in detail in NEH-4 (SCS 1985). The SCS runoff equation is

$$Q = \frac{(P - I_a)^2}{(P - I_a) + S} \quad \text{[eq. 2-1]}$$

where

Q = runoff (in)
P = rainfall (in)
S = potential maximum retention after runoff begins (in) and
I_a = initial abstraction (in)

Initial abstraction (I_a) is all losses before runoff begins. It includes water retained in surface depressions, water intercepted by vegetation, evaporation, and infiltration. I_a is highly variable but generally is correlated with soil and cover parameters. Through studies of many small agricultural watersheds, I_a was found to be approximated by the following empirical equation:

$$I_a = 0.2S \quad \text{[eq. 2-2]}$$

By removing I_a as an independent parameter, this approximation allows use of a combination of S and P to produce a unique runoff amount. Substituting equation 2-2 into equation 2-1 gives:

$$Q = \frac{(P - 0.2S)^2}{(P + 0.8S)} \quad \text{[eq. 2-3]}$$

S is related to the soil and cover conditions of the watershed through the CN. CN has a range of 0 to 100, and S is related to CN by:

$$S = \frac{1000}{CN} - 10 \quad \text{[eq. 2-4]}$$

Figure 2-1 and table 2-1 solve equations 2-3 and 2-4 for a range of CN's and rainfall.

For sheet flow of less than 300 feet, use Manning's kinematic solution (Overtop and Meadows 1976) to compute T_t:

$$T_t = \frac{0.007(nL)^{0.8}}{(P_2)^{0.5} s^{0.4}} \quad \text{[eq. 3-3]}$$

where:

T_t = travel time (hr),
n = Manning's roughness coefficient (table 3-1)
L = flow length (ft)
P_2 = 2-year, 24-hour rainfall (in)
s = slope of hydraulic grade line (land slope, ft/ft)

	A	B	C	D	E	F	G
1	Southern New Mexico Reclamation Slopes						
2	3:1						
3	TOTAL WATERSHED LENGTH						
4	L^1 =	200.00	ft				
5	TOTAL WATERSHED AREA						
6	A^2 =	0.0046	ac				
7		7.17E-06	mi^2				
8	TIME OF TRAVEL (MANNING'S FORMULA) FOR SHEET FLOW, TR55						
9	n =	0.13					
10	L(<300) =	200.00	ft				
11	P2 =	1.17	in				
12	S =	0.333333					
13							
14	Tt =	8.15	min				
15							
16	TIME OF TRAVEL FOR SHALLOW CONCENTRATED FLOW, TR55						
17	L =	0	ft				
18	v =	9.15	ft/s				
19							
20	Tt =	0.00	min				
21							
22	Tc =	8.15	min				
23		0.135885	hr				
24	SCS CURVE NUMBER METHOD						
25	P^3 =	3.58	in				
26	Ia =	0.78	in				
27	CN =	72					
28							
29	S =	3.89	in				
30	Q =	1.17	in				
31		0.000449	ac-ft				

LENGTH OF FLOW FROM CRITERIA

AREA OF UNIT WIDTH =B4/43560

=B6/640

MANNING'S n FOR RECLAIMED SURFACES

=B30

RECLAMATION SLOPE

=0.007*((B9*B10))^0.8/(B11^0.5*B12^0.4)*60

DESIGNED TO AVOID OCCURANCE

DESIGN STORM DEPTH

=0.2*B29

CURVE NUMBER

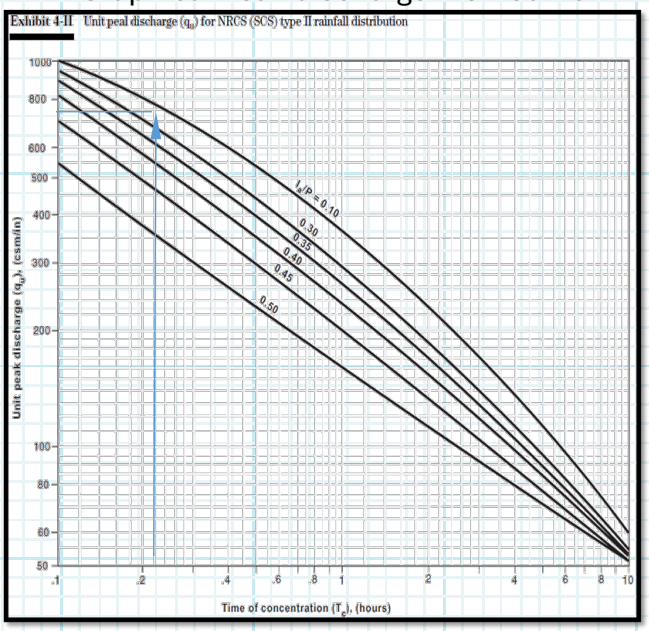
=1000/B27-10

=(B25-B26)^2/(B25-B26+B29)

Calculation Documentation

Calculations (con'd):

2. Graphical Peak discharge method from TR-55, spreadsheet: 20250730_CCP_ChannelSizing.xlsx



$q_p = q_u A_m Q F_p$ [eq

where:

q_p = peak discharge (cfs)
q_u = unit peak discharge (csm/in)
A_m = drainage area (mi²)
Q = runoff, (in)
F_p = pond and swamp adjustment factor

Table 4-2 Adjustment factor (F_p) for pond and swamp areas that are spread throughout the watershed

Percentage of pond and swamp areas	F_p
0	1.00
0.2	0.97
1.0	0.87
3.0	0.75
5.0	0.72

	A	B	C	D	E	F
1	Southern New Mexico Reclamation Slopes (per width of slope)					
2	3:1					
32	GRAPHICAL PEAK DISCHARGE METHOD					
33						
34	Ia/P =	0.22				
35						
36	qu^4 =	867	csm/in			
37	Am =	7.17E-06	mi²			
38	Q =	1.17	in			
39	Fp =	0.70				
40						
41	Qp =	5.11E-03	cfs			

=B26/B25

=IF(B34<=0.1,10^(2.55323+-0.61512*LOG(B23)+-0.16403*(LOG(B23))^2),IF(B34>=0.5,10^(2.20282+-0.51599*LOG(B23)+-0.01259*(LOG(B23))^2),10^((VLOOKUP(B34,'qu-fit'!$K$8:$N$48,2))+(VLOOKUP(B34,'qu-fit'!$K$8:$N$48,3))*LOG(B23)+(VLOOKUP(B34,'qu-fit'!$K$8:$N$48,4))*(LOG(B23))^2)))

=B6/640

=B30

BASED ON ROUGH SURFACE

=B39*B38*B37*B36

RUNOFF PER UNIT WIDTH OF RECLAIMED SLOPE

Calculation Documentation

Calculations (con'd):

3. Estimate bench channel capacity @ 6" freeboard using Manning's formula:

$$Q_{channel} := \frac{1.49 \frac{ft^{\frac{1}{3}}}{sec}}{n} \cdot A_{channel} \cdot \left(R_{h\_channel}\right)^{\frac{2}{3}} \cdot S_{channel}^{\frac{1}{2}}$$

	A	B	C	D	E	F	G	H	I	J	K	L
1												
2			TRAPEZOIDAL DITCH									
3	NAME	SLOPE	LS SLOPE L:H	RS SLOPE L:H	DEPTH FT	BOTTOM WIDTH FT	MANNINGS COEFF	AREA FT^2	WETTED PER FT	HYD RAD FT	MANNING FLOW CFS	VELOCITY F/S
6						Riprap Bench Channel						
18	A	0.02	3	2.5	1.50	5	0.033	13.69	13.78	0.99	88.20	6.44

CHANNEL SLOPE
LEFT SIDE SLOPE
RIGHTSIDE SLOPE
DEPTH OF FLOW W/6" FREEBOARD
CHANNEL BOTTOM WIDTH
RIPRAP MANNING'S n
=(F56+F56+E56*C56+E56*D56)*E56/2
=F56+SQRT(E56^2+(E56*C56)^2)+SQRT(E56^2+(E56*D56)^2)
=H56/I56
=1.49/G56*H56*(J56)^(2/3)*B56^0.5
=K56/H56

4. Down drain capacity (3:1 slope – Kessel Stockpile)

	A	B	C	D	E	F	G	H	I	J	K	L
1												
2			TRAPEZOIDAL DITCH									
3	NAME	SLOPE	LS SLOPE L:H	RS SLOPE L:H	DEPTH FT	BOTTOM WIDTH FT	MANNING COEFF	AREA FT^2	WETTED PER FT	HYD RAD FT	MANNING FLOW CFS	VELOCITY F/S
6						Articulated Concrete Block						
21	A	0.33	2	2	2.50	20	0.018	62.50	31.18	2.00	4724.80	75.60

Calculation Documentation

Calculations (con'd):

5. Maximum bench channel length (Agencies' criteria)

$$Q_p := 5.11 \cdot 10^{-3} \frac{cfs}{ft}$$

$$Q_{max\_bench} := 88.2\ cfs$$

$$D_{ddrains} := \frac{Q_{max\_bench}}{Q_p} = 17300\ ft$$

6. Maximum total length of bench channels reporting to a single down drain (Agencies' Criteria)

$$Q_p = 0.00511 \frac{cfs}{ft}$$

$$Q_{design\_dd} := 4724.8\ cfs$$

$$D_{bench\_to\_dd} := \frac{Q_{design\_dd}}{Q_p} = 9.25 \cdot 10^{5}\ ft$$

Results and Discussion:

- For the Agencies' criteria, maximum bench channel length is 17,300 feet, and each down drain may collect from over 925,000 feet of cumulative bench channels. This indicates that the standard channel and down-drain design used as a site-wide average for Chino are overly conservative for Kessel Stockpile
- One down drain is needed to meet the runoff requirement for the Agencies' criteria.

Conclusions:

This calculation set met its objectives as follows:

1. It found the number of down drains required to remove stormwater from the design storm safely from the reclaimed side-slopes
2. It found the channel size required to remove stormwater from the design storm safely from the reclaimed facility tops

References:

CO-NM REPS, 2025. *Colorado-New Mexico Regional Extreme Precipitation Study MetPortal* website: https://rti-metportal.shinyapps.io/conm_region/

NRCS. (1986). Urban Hydrology for Small Watersheds: TR-55. Washington, DC: United States Department of Agriculture: Natural Resource Conservation Service. June 1986.

Calculation Documentation

Problem Statement:

Telesto Solutions, Inc. (Telesto) prepared a closure/closeout plan (CCP) for the final build-out of the Kessel Stockpile at Chino Mines. A key step in developing the CCP is determining the optimal operational bench widths based on bench height. This relationship ensures that the stockpile fits within the permitted footprint while meeting closure slope requirements. The following calculations evaluate various bench height and width combinations to identify operational setups that comply with closure design criteria.

Objectives:

Identify optimal operational bench widths based on bench height.

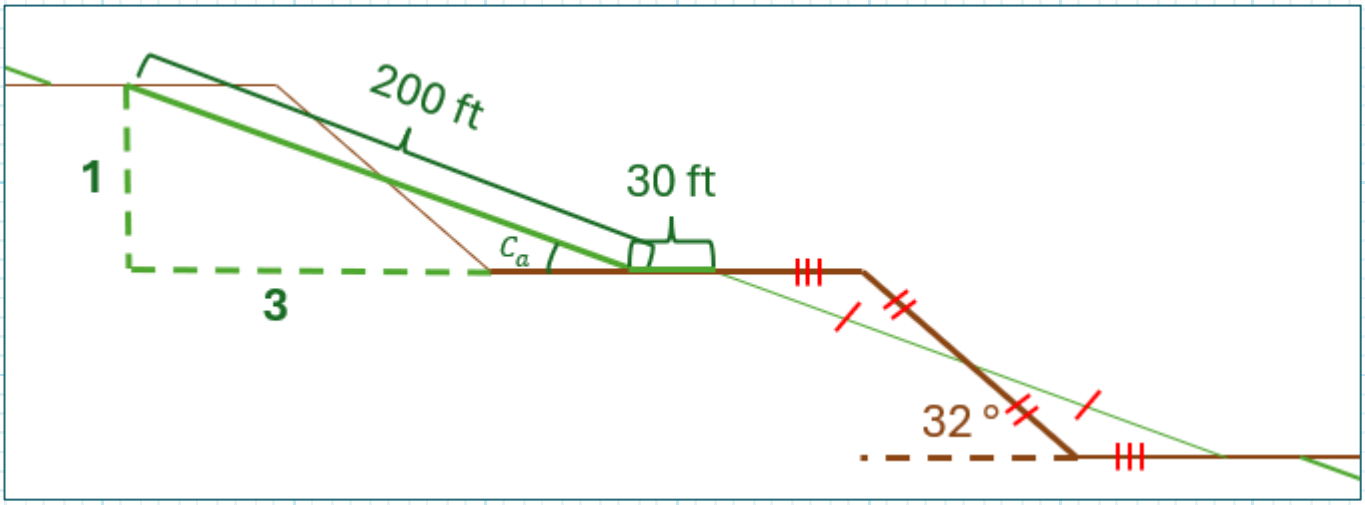
Approach:

1. Calculate the closure face angle (C_a) based on the slope closure requirements.
2. Determine the optimal bench height according to the closure face angle and slope closure requirements.
3. Identify which typical bench heights satisfy the slope closure requirements.
    a. Use the bench height and the closure face angle to calculate the slope length.
    b. Compare the slope length at each height to the maximum slope length for closure.
4. For each bench height that satisfies the closure requirements, calculate the necessary operational bench width.
5. For each bench height that fails the closure requirements, calculate the operational bench width needed for compliance.

Calculation Documentation

Data and Assumptions:

1. Angle of repose (operational face angle) = 32 °
2. Closure Requirements:
   a. Interbench closure slope = 3H:1V
   b. Maximum closure slope length = 200 feet (inclined length of face)
3. Closure bench widths = 30 feet
4. Typical bench heights = 40 ft, 50 ft, 75 ft, and 100 ft
5. Cut and fill volumes are approximately equal, meaning the closure slopes bisect the operational slopes in cross-sections



Brown shows the operational benches.

Green shows the closure benches.

Calculation Documentation

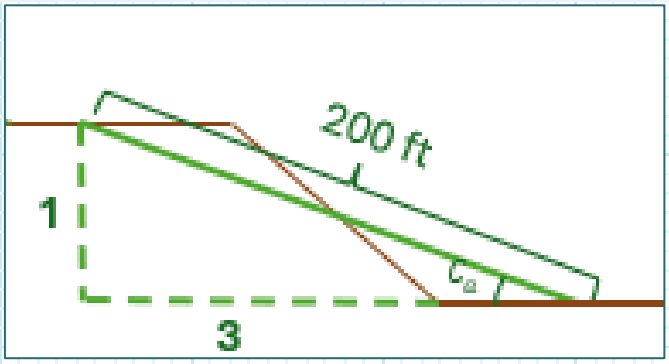
Calculations and Results:

1. The closure face angle **(C_a) = 18.4349** °

   If reclamation slopes are 3h:1v, then:

   $\tan(C_a) = \frac{1}{3}$ which means

   $\text{atan}\left(\frac{1}{3}\right) = 18.4349\ \text{deg}$



2. Ideal Bench Height **(H) = 63.25 feet**

   If the closure slope length is 200 feet and the closure face angle is 18.4349 °, then:

$$\sin(18.4349°) = \frac{H}{200}$$

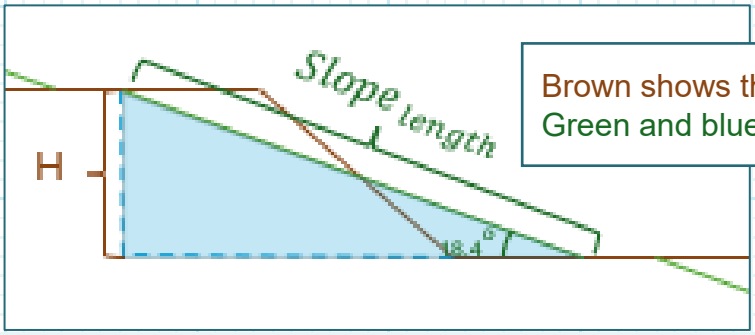
$$H = 200 \cdot \sin(18.4349°)$$

$200\ \text{ft} \cdot \sin(18.4349\ \text{deg}) = 63.2454\ \text{ft}$

Brown shows the operational benches
Green and blue show the closure benches

Calculation Documentation

Calculations and Results:



Brown shows the operational benches
Green and blue show the closure benches

3. Typical Bench Heights that meet Slope Closure Requirements are **40 and 50 feet**

If the height of a bench is *H* and the closure face angle of the bench is 18.4349°, the slope length (inclined length of the face) can be calculated using:

$$\sin(18.4349°) = \frac{H}{Slope_{length}}$$

Which means: $Slope_{length} = \frac{H}{\sin(18.4349°)}$

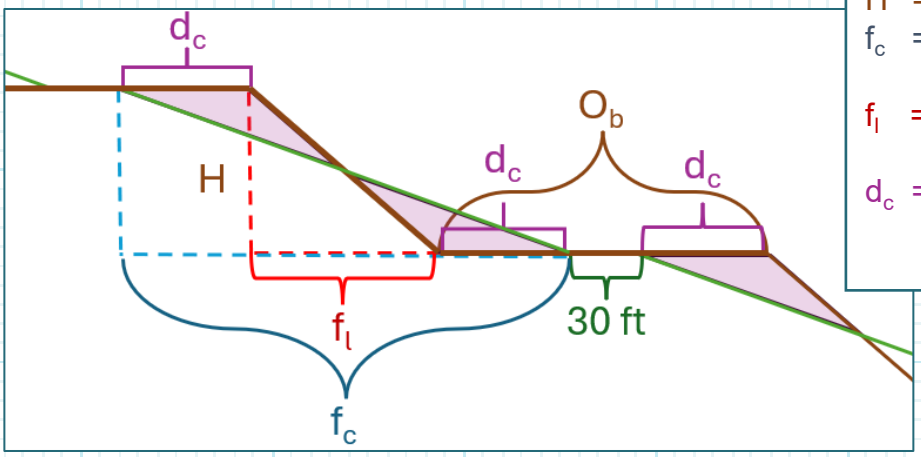
Typical Bench Heights (ft)	Calculations	Slope Length (ft)
40	$\frac{40\ ft}{\sin(18.4349\ deg)} = 126.4914\ ft$	127
50	$\frac{50\ ft}{\sin(18.4349\ deg)} = 158.1143\ ft$	159
63.25	$\frac{63\ ft}{\sin(18.4349\ deg)} = 199.224\ ft$	200
75	$\frac{75\ ft}{\sin(18.4349\ deg)} = 237.1714\ ft$	238
100	$\frac{100\ ft}{\sin(18.4349\ deg)} = 316.2286\ ft$	317

Since the maximum slope length at closure is 200 feet, **the ideal bench height is 63.25 feet, and any height below 63.25 feet is acceptable**. Bench heights exceeding 63.25 feet are not ideal and will need additional considerations if used.

Calculation Documentation

Calculations and Results:

O_b = Operational Bench Width
H = Height of Bench
f_c = Closure face length (horizontal)
f_l = Operational face length (horizontal)
d_c = Distance between the operational and closure bench crests



4. Operational Bench Width for satisfactory bench heights:

40 ft high is 86 ft, 50 ft high is 100 ft, and 63.25 ft high is 119 ft

Operational bench width (O_b) is the sum of the 30-foot closure bench and double the distance between the operational and closure crests (d_c).

$$O_b = 2(d_c) + 30\ ft$$ where $$2(d_c) = f_c - f_l$$

To find the face lengths (f_c and f_l): $$\tan(Face_{angle}) = \frac{H}{Face_{length}}$$

Therefore, $$f_c = \frac{H}{\tan(18.4349°)}$$ $$f_l = \frac{H}{\tan(32°)}$$

Which means, $$2(d_c) = H\left(\frac{1}{\tan(18.4349°)} - \frac{1}{\tan(32°)}\right)$$

Satisfactory Bench Heights (ft)	Calculations to find 2b	2b (ft)	Calculations to find O_b	O_b (ft)
40	$40\ ft \cdot \left(\frac{1}{\tan(18.4349\ deg)} - \frac{1}{\tan(32\ deg)}\right) = 55.987\ ft$	56	56 + 30	86
50	$50\ ft \cdot \left(\frac{1}{\tan(18.4349\ deg)} - \frac{1}{\tan(32\ deg)}\right) = 69.9837\ ft$	70	70 + 30	100
63.25	$63.25\ ft \cdot \left(\frac{1}{\tan(18.4349\ deg)} - \frac{1}{\tan(32\ deg)}\right) = 88.5294\ ft$	89	89 + 30	119

Calculation Documentation

Calculations and Results:

5. Operational Bench Widths for non-satisfactory bench heights:

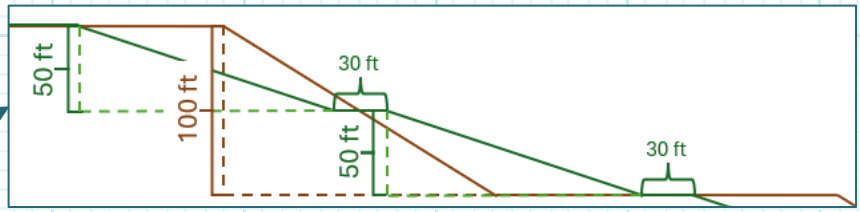
75 ft high is 150 ft, and 100 ft high is 200 ft

A 75-foot bench height results in a closure slope length of 238 feet, while a 100-foot bench height has a closure slope length of 317 feet. To meet the agency's requirement of a maximum slope length of 200 feet, additional benches need to be graded in at closure if bench heights are built to 75 or 100 feet.

a. Since a 100-foot bench easily divides into two 50-foot benches, the simplest option is to create two 50-foot closure benches for every 100-foot operational bench. Therefore, the operational width of a 100-foot-high bench can be calculated as follows:

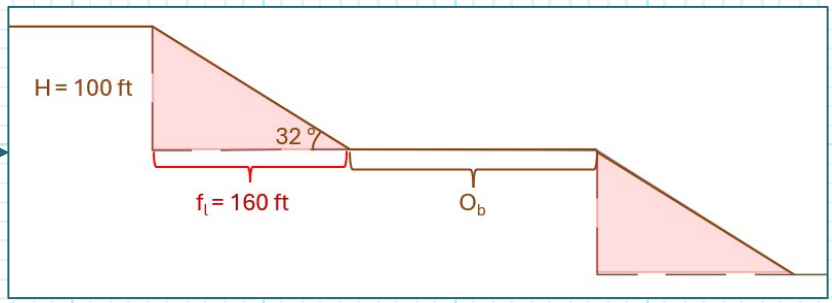
Brown and red show the operational benches

Green shows the closure benches



i. Determine the face length (horizontal distance) of the 100-foot bench:

$$\tan(32°) = \frac{100}{f_l} \text{ which means } f_l = \frac{100}{\tan(32°)} = \frac{100\ \text{ft}}{\tan(32\ \text{deg})} = 160.0335\ \text{ft}$$



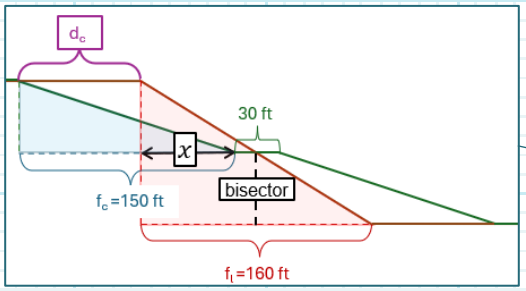
Calculation Documentation

Calculations and Results:

ii. Assume the 30-foot closure bench bisects the 100-foot bench's cross-sectional slope length and use this to calculate the distance between the crests of the operational and closure benches (d_c).

1) The distance between the crests is equal to the portion of the closure face length (f_c) that does not overlap the operational face length (f_l).

2) This means $d_c = f_c - \boldsymbol{x}$. Where $\boldsymbol{x} = \frac{1}{2}(f_l) - \frac{1}{2}(30)$.



Brown and red show the operational benches

Green and blue show the closure benches

3) Since $f_l = 160\ ft$, $\boldsymbol{x = 65\ ft}$.

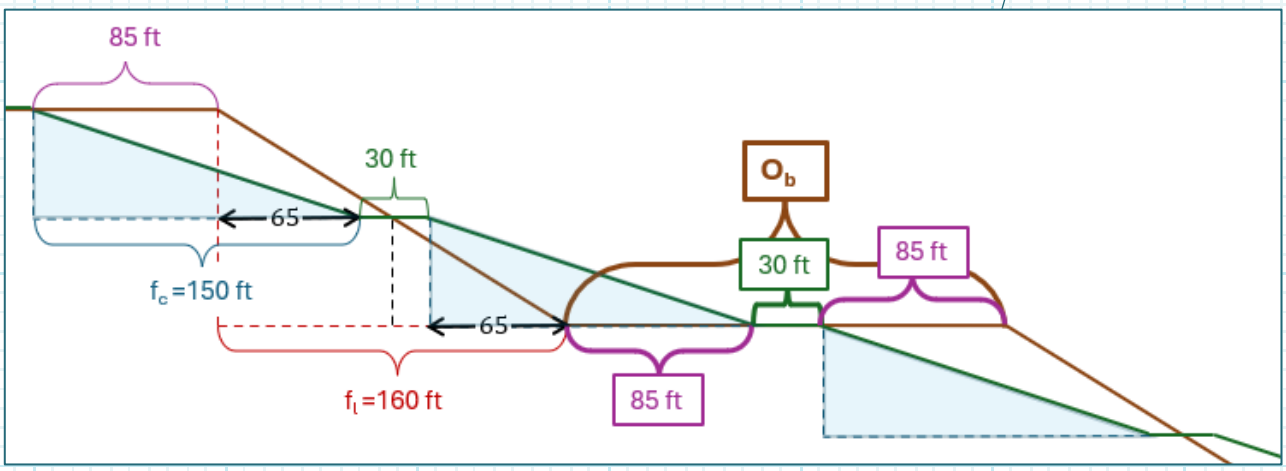
$$\frac{1}{2} \cdot 160\ \text{ft} - \frac{1}{2} \cdot 30\ \text{ft} = 65\ \text{ft}$$

4) Since $f_c = 150\ ft$, $d_c = 85\ ft$.

$$150\ \text{ft} - 65\ \text{ft} = 85\ \text{ft}$$

iii. Calculate the operational bench width by adding the 30 ft closure bench to double the distance between the bench crests.

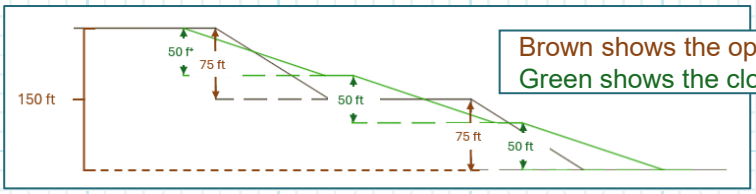
$O_b = 30 + 2(d_c)$ therefore $O_b = 200\ ft$



Calculation Documentation

Calculations and Results:

b. Since half of 75 feet (37.5 feet) is not a standard bench height, the closure design must treat **two** operational benches as a single unit. The total height then reaches 150 feet, allowing for three 50-foot benches at closure.



The operational bench width for this case can be calculated as follows:

a. Determine the face length (horizontal distance) of the operational bench.

$$\tan(32°) = \frac{75}{f_l} \text{ which means } f_l = \frac{75}{\tan(32°)} = \frac{75\ \text{ft}}{\tan(32\ \text{deg})} = 120.0251\ \text{ft}$$

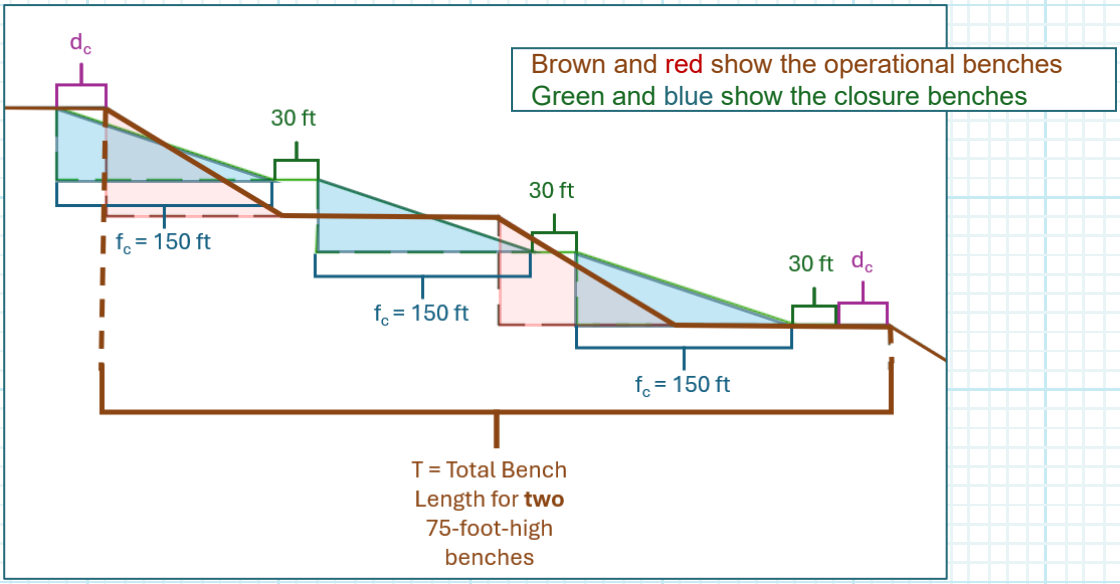
b. Using all known information about the 50-foot-high closure benches, calculate the total width (T) of **two** 75-foot benches.

$$T = (150 - d_c) + 30 + 150 + 30 + 150 + 30 + d_c$$

$$T = 3(150) + 3(30) - d_c + d_c$$

$$T = 450 + 90 + 0 = 540$$

T = 540 feet



Calculation Documentation

Calculations and Results:

c. Knowing that the total width (*T*) of two 75-foot-high benches is 540 feet and using all available information about the 75-foot-high operational benches, calculate the width of **one** operational bench (O_b).

$$T = 120 + O_b + 120 + O_b$$

$$T = 2(120) + 2(O_b)$$

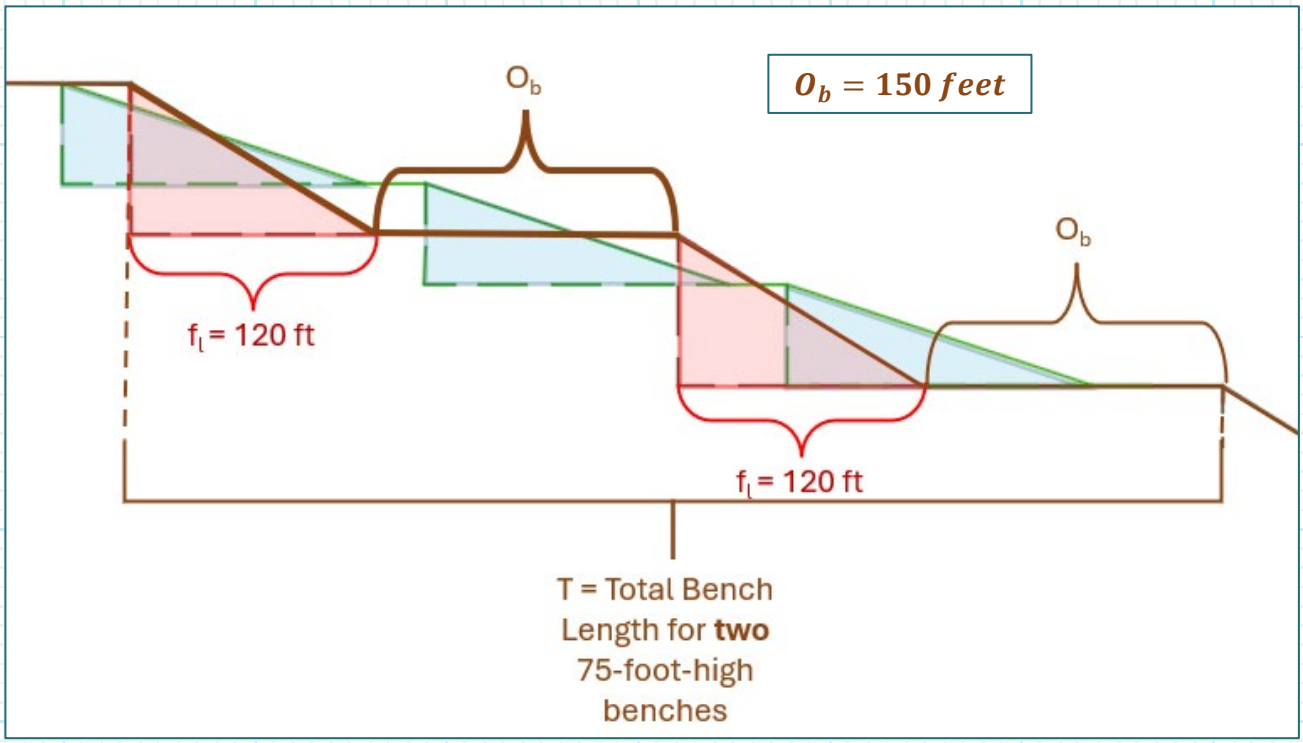
$T = 540$ so:

$$540 = 2(120) + 2(O_b)$$

$$540 = 240 + 2(O_b)$$

$$300 = 2(O_b)$$

$$150 = O_b$$



Brown and red show the operational benches
Green and blue show the closure benches

Calculation Documentation

Conclusions and Recommendations:

Bench height directly influences the amount of regrading required to meet final closure slope criteria. This evaluation determines that the optimal operational bench height is 63.25 feet. This value represents the maximum bench height that complies with closure requirements without additional grading. Operational benches constructed at heights less than or equal to 63.25 feet (e.g., 40 or 50 feet) inherently meet closure standards. In contrast, operational benches exceeding 63.25 feet (e.g., 75 or 100 feet) require the construction and grading of additional closure benches to achieve the required geometry, thereby increasing closure costs.

Typical Bench Heights (ft)	Slope Length at Closure (ft)	Meets Closure Requirements	Additional Benches Required at Closure	Operational Bench Length Needed (ft)
40	127	yes	no	86
50	159	yes	no	100
63.25	**200**	**yes**	**no: ideal bench height**	**119**
75	238	no	yes: three 50 ft benches for every two 75 ft benches	135
100	317	no	yes: two 50 ft benches for every 100 ft bench	170