TRUE NORTH GOLD MINE

RECLAMATION AND CLOSURE PLAN

Prepared by:

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May 2012

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Submitted to:

Alaska Department of Natural Resources
Division of Mining, Land and Water
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Fairbanks, Alaska 99709

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and

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May 2012

CONTENTS

			Page
1	**INTRODUCTION**		**2**
	1.1	Purpose	2
	1.2	Applicant Information	3
	1.3	Location and Land Status	4
	1.4	History of True North Mine	4
2	**PROJECT DESCRIPTION**		**7**
	2.1	Environmental Description	7
	2.1.1	Topography and Climate	7
	2.1.2	Geology	7
	2.1.3	Surface Water	9
	2.1.4	Groundwater	9
	2.1.5	Background Water Chemistry	10
	2.1.6	Vegetation	12
	2.1.7	Permafrost	12
	2.1.8	Wetlands	12
	2.1.9	Wildlife	13
3	**WETLANDS**		**16**
	3.1	Jurisdictional Wetlands Survey	16
	3.1.1	1995 Delineation	16
	3.1.2	1996 Delineation	16
	3.1.3	1997 Delineation	16
	3.1.4	2010 Delineation	16
	3.2	Department of the Army Section 404 Permit	17
4	**SURFACE DISTURBANCE AND LAND USE**		**20**
	4.1	Surface Disturbance	20
	4.1.1	Waste Rock Dumps	21
	4.1.2	Pits	22
	4.1.3	Growth Media Stockpiles	22
	4.1.4	Roads, Trails and RS2477 Routes	22
	4.1.5	Buildings and Infrastructure	23
5	**RECLAMATION PRACTICES**		**24**
	5.1	Reclamation Objectives	24
	5.2	Schedule of Reclamation Activities	24
	5.3	General Reclamation Procedures	25
	5.3.1	Earthwork	25
	5.3.2	Control of Sedimentation	25
	5.3.3	Growth Media	25
	5.3.4	Seedbed Preparation	26
	5.3.5	Fertilizer and Fertilization	26
	5.3.6	Seed and Seeding	26
	5.3.7	Revegetation Timing	26
	5.3.8	Revegetation Cover Criteria	27

5.4 Post-mining and Post-reclamation 27
5.4.1 Drainage 27
5.4.2 Acid Rock Drainage Potential 27
5.5 Public Access 28
5.6 Financial Assurance Release 28

6 FACILITY SPECIFIC RECLAMATION AND CLOSURE 30
6.1 Pits 30
6.2 Waste Rock Dumps 30
6.3 Roads, Trails and RS 2477 Routes 31
6.4 Maintenance 33
6.5 Building and Infrastructure 33
6.6 Well Closure 34
6.7 Spruce Creek 34

7 APPLICANT STATEMENT OF RESPONSIBILITY 37

8 ESTIMATE OF RECLAMATION AND CLOSURE COSTS 38
8.1 Reclamation Cost Estimates and Financial Assurance Adjustment 38
8.2 Cost Estimate Assumptions 39

9 ACKNOWLEDGEMENTS 40

10 REFERENCES 41

TABLES

Table 2-1: Surface Water Sampling Sites by Drainage 11
Table 4-1: Mine Production by Year 20
Table 4-2 Existing Facility Disturbance 21
Table 4-3: Remaining Growth Media Stockpile Volumes 22
Table 5-1: Seed Mix 26
Table 6-1: Reclamation by Facility Type 30
Table 8-1 - Reclamation and Closure Cost Estimate 38

FIGURES

Figure 1.1: True North Project Location Map 5
Figure 1.2: Millsite Lease Boundary 6
Figure 2.1: Area Topography 14
Figure 2.2: Newmont Groundwater and Surface Water Baseline Locations 15
Figure 3.1: True North Wetland Surveys 18
Figure 3.2: Disturbed Wetlands 19
Figure 5.1: Map of Existing Facilities 29
Figure 6.1: Schedule of Reclamation Activities 35
Figure 6.2 Monitoring Locations 36

APPENDICES

A National Park Service, U.S. Department of the Interior, Fire Monitoring Handbook Point-Intercept Method
B Cost Support Calculations
C Detailed 2012 Reclamation Activities
D RS2477 Roads

LIST OF ABBREVIATIONS

ACOE	Army Corp of Engineers
ADEC	Alaska Department of Environmental Conservation
ADF&G	Alaska Division of Fish and Game
ADNR	Alaska Department of Natural Resources
ARD	acid rock drainage
BMP	Best Management Practice
CEO	Chief Executive Officer
CFO	Chief Financial Officer
COO	Chief Operating Officer
cm/sec	centimeters per second
FGMI	Fairbanks Gold Mining, Inc.
GVEA	Golden Valley Electric Association
HDR	HDR Alaska
KGC	Kinross Gold Corporation
mg/L	milligrams per liter
MSHA	Mining Safety & Health Administration
NEPA	National Environmental Policy Act
PMC	Plant Materials Center, ADNR
ppm	parts per million
QA/QC	Quality Assurance/Quality Control
RVP	Regional Vice President
TDS	total dissolved solids

1 INTRODUCTION

1.1 Purpose

Fairbanks Gold Mining, Inc. (FGMI), a wholly owned subsidiary of Kinross Gold Corporation (KGC), has prepared this reclamation and closure plan to address reclamation, monitoring and post-mining land use for the True North Mine. This plan is submitted to:

- Alaska Department of Natural Resources, Division of Mining (ADNR) in accordance with AS 27.19.010 et. seq. and 11 AAC 97.100 et. seq.
- U.S. Army Corps of Engineers (ACOE) as required by the Clean Water Act Section 404 Permit No. M-940742, N-940742, O-940742, P-940742 and Q-940742 Murray Creek 2.

The True North Mine Reclamation and Closure Plan is designed to return land disturbed by mining operations to a stabilized, near-natural condition that will ensure the long-term protection of land and water resources. Additional goals include: minimizing or eliminating long-term management requirements, and meeting state and federal regulatory requirements. This plan describes the existing site condition, schedule for reclamation, general reclamation procedures, and methods for achieving the final closure requirements and objectives. In addition, the plan serves as a basis for calculating reclamation costs and the adjustment of financial assurance.

Due to the constantly changing regulatory framework and the introduction of new reclamation methods, the reclamation plan may be amended as deemed necessary (11AAC 97.330 Amendment of Reclamation Plan).

Access by Federal and State regulatory personnel to the True North Project mine facilities for the purpose of inspecting for reclamation or other appropriate compliance areas are statutory/regulatory mandates and will be honored by FGMI, with the request that agents contact mine management to gain access. The health and safety of FGMI employees and that of regulatory personnel is the rational for this request.

1.2 Applicant Information

Fairbanks Gold Mining, Inc.
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Fairbanks, AK 99707-3726
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Executive Vice President & COO:	Brant Hinze
Senior Vice President Environment and Permitting:	Rick Baker
Executive Vic President & CFO:	Paul Barry
Vice President Administration & Corp Secretary:	Shelley M. Riley

Fairbanks Gold Mining, Inc. is a wholly owned subsidiary of Kinross Gold Corporation

Alaska Registered Agent

Name: Fairbanks Gold Mining, Inc.
Address: c/o C.T. Corporation System (Agent)
240 Main Street, Suite 800
Juneau, Alaska 99801

1.3 Location and Land Status

The True North Mine is within the Chatanika River watershed located on the northwest flank of Pedro Dome approximately 25 miles northeast of Fairbanks (Figure 1-1). Millsite Lease boundary is located in portions of Sections 21, 27, 28, 29, 32, & 33, Township 3N, Range 1E, Fairbanks meridian (Figure 1-2) and is located entirely on State and University of Alaska land. The True North ore body and ancillary facilities have been placed within the Millsite Lease. There is no federal land involved within the project boundaries and the closest residence is approximately one mile from the project boundary.

1.4 History of True North Mine

Placer and lode-type mining has been occurring in the True North area since the early 1900s. In 1902, Felix Pedro and Tom Gilmore made a large placer discovery on Pedro Creek, which resulted in the development of Fairbanks as a major mining center. Placer mining began in the True North area in 1924 and was limited to the Cleary Creek, Little Eldorado Creek, and Dome Creek drainages, and primarily consisted of dredging operations. Dredging was discontinued by 1964, although several small placer operations still operate in Little Eldorado and Dome Creeks.

The largest lode production in the True North area came from the Soo property that was patented in 1913. The Hindenburg Mine, located within the True North Mine, produced stibnite during World War I. By 1942 a stamp mill had been constructed at the site, and exploration and production have occurred intermittently since then.

In 1998, Kinross Gold Corporation merged with Amax Gold Inc., and FGMI is now a wholly owned subsidiary of Kinross. In 1999, Kinross acquired 100% ownership of the True North Mine from the True North Joint Venture Project, a joint venture between Newmont Alaska Limited (Newmont) and La Teko Resources. Newmont had been directing exploration activities, and drilled over 500 exploration holes between 1992 and 1997. Preliminary baseline hydrologic data was also collected by Newmont. During 1999, FGMI continued with geologic exploration and baseline hydrologic data collection activities at the True North site.

Prior to construction of the proposed True North mine facilities; placer, exploration, and other mining activities had disturbed approximately 68 acres within the True North Mine area. This acreage does not include areas encompassed by trails, historic ditches, cabin sites, and small-localized disturbances. Some of these previously disturbed areas are located where the Hindenburg pit, East pit, and waste rock dumps are situated.

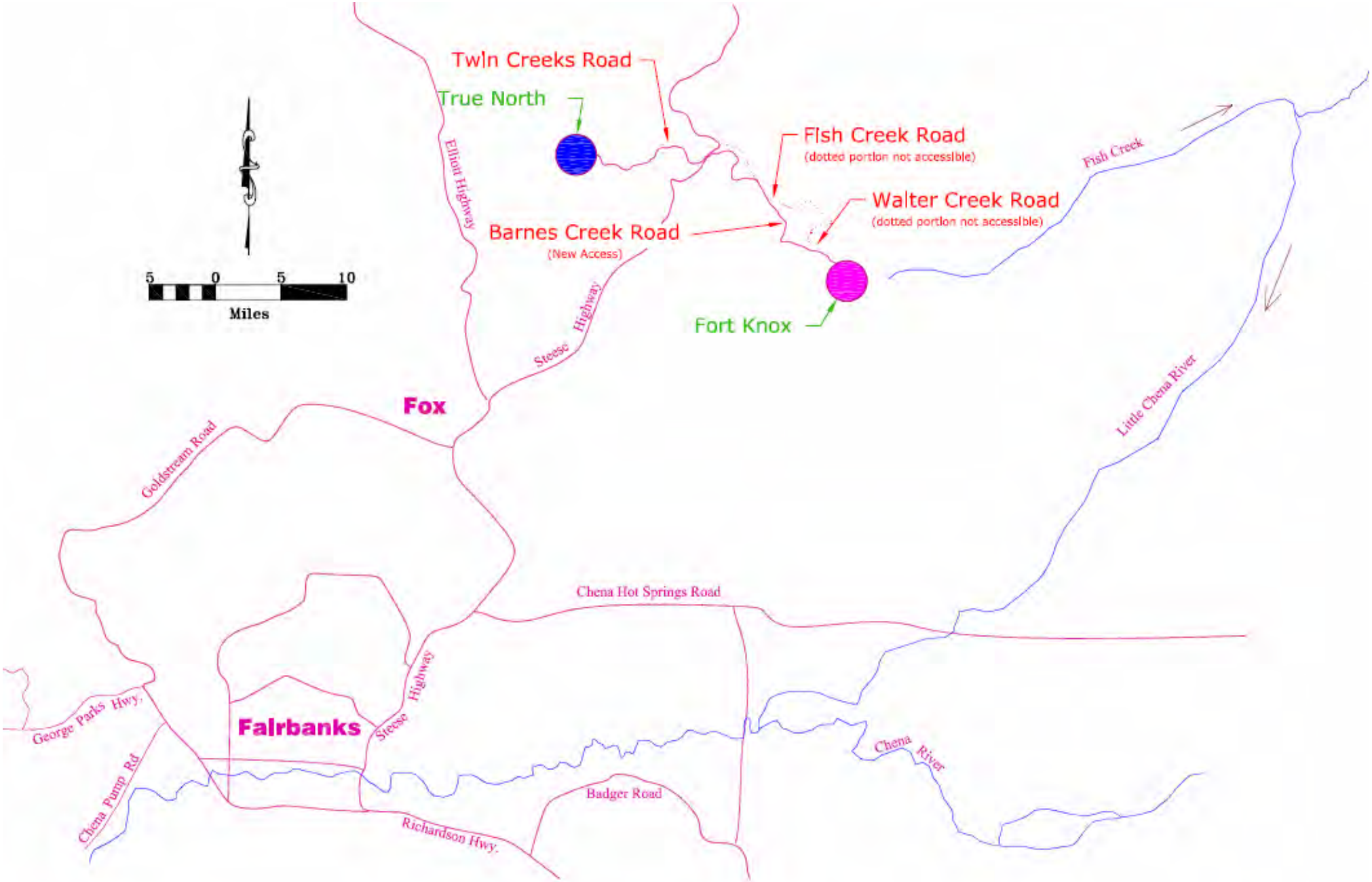


Figure 1.1: True North Project Location Map

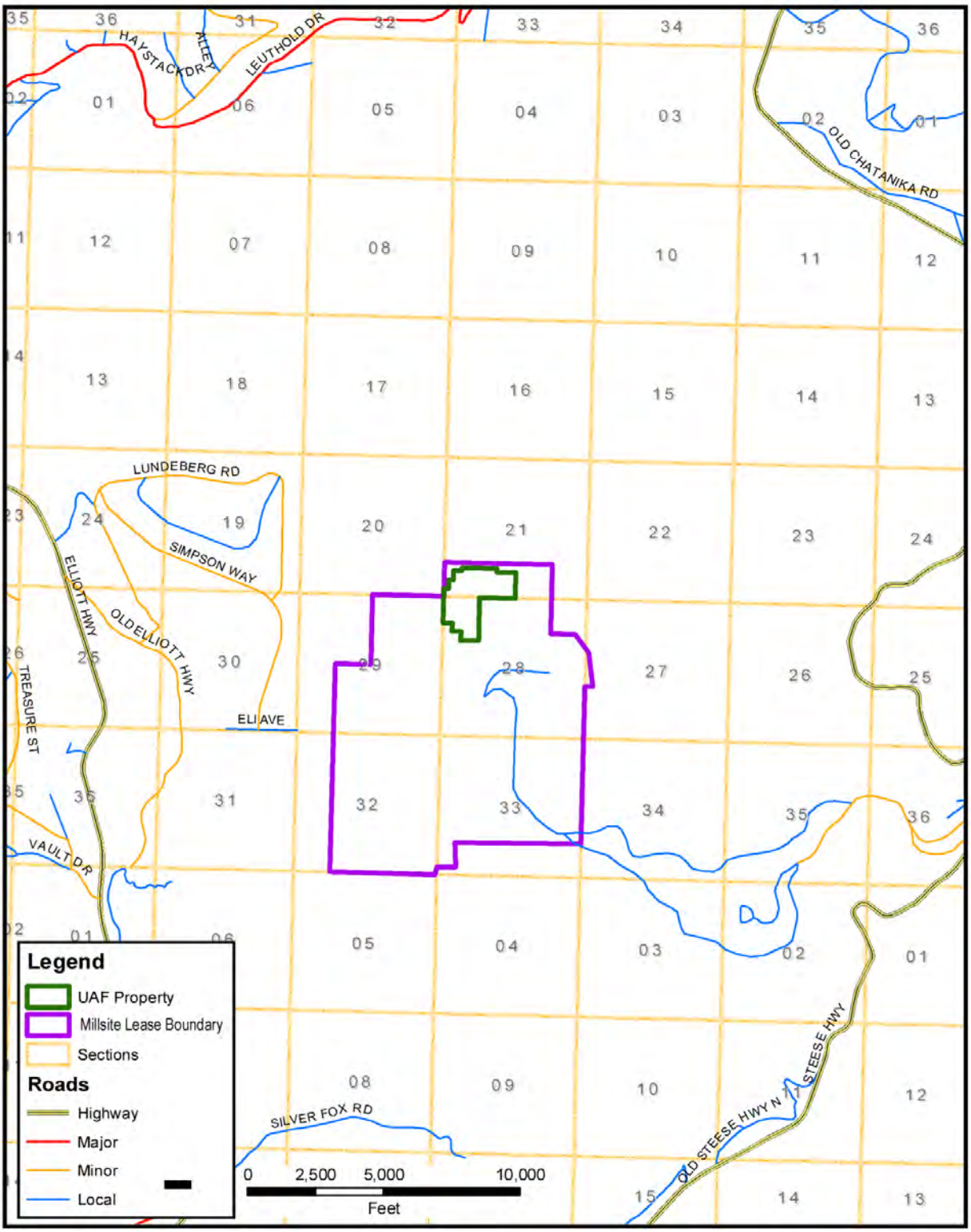


Figure 1.2: Millsite Lease Boundary

2 PROJECT DESCRIPTION

FGMI previously operated the True North Mine located northeast of Fairbanks, Alaska. The mine ceased production at the end of 2004, and began initial stages of reclamation in 2005. In 2009, FGMI made the decision to not continue with any further mining of the property, and final reclamation and closure was initiated. Reclamation work was performed in 2009 and 2010. Reclamation was then discontinued until a reclamation plan could be approved.

2.1 Environmental Description

2.1.1 Topography and Climate

The True North Mine area is in the Yukon-Tanana Uplands, and is characterized by rounded, even topped ridges with gentle slopes. The deposit is located on the northwest flank of Pedro Dome at elevations ranging between 1,760 to 1,200 feet.

The drainages include; Murray Creek, a tributary of Dome Creek to the south; and Louis Creek, Whiskey Gulch, and Spruce Creek, tributaries of Little Eldorado Creek to the north (Figure 2-1).

The center of the ore body is located on the northwest flank of Pedro Dome on the ridge between Dome Creek and Eldorado Creeks. Calcareous and carbonate-altered schist hosts the True North deposit. The ore body is elongated northeast gently dipping to the southwest.

The climatic conditions of the Fairbanks area are characterized by typical interior Alaskan conditions, with short warm summers and long cold winters. Diurnal temperature fluctuations can be very large and are driven by the vast change of sunlight occurring throughout the year. The regions to the north and east of Fairbanks are colder during the summer and warmer during the winter. The annual precipitation at the site is estimated to range between 13 to 22 inches with a mean of approximately 18 inches. Historically the wettest months include June to September and the driest months are February through April.

2.1.2 Geology

The True North deposit is located within the Yukon-Tanana terrane, which is bounded on the northeast by the Tintina fault and on the southwest by the Denali fault. The Yukon-Tanana terrane consists of accreted metamorphic rock of primarily sedimentary origin that was subjected to greenschist, amphibolite, and eclogite-facies grade metamorphism. Intermediate to felsic plutons and stocks intruded the metamorphic rocks during the Cretaceous Period (85-95 million years ago).

The True North property is bisected by the high angle northeast striking Eldorado Fault that emplaced the Fairbanks Schist, in a high angle contact with the allochthonous Chatanika terrane. The True North deposit occurs in a structurally complex mineralized zone within the Chatanika terrane, parallel to the Eldorado Fault. Ore zones are typically gently dipping, variably brecciated zones that may be related to regional thrust faulting. The thickness and shape of the breccia zones are widely variable and appear to have been modified by higher angle faults.

Calcareous and carbonate-altered schist of the Chatanika terrane hosts the True North deposit. These rocks have been subdivided into three main lithologic subunits: (1) a slate unit consisting

of slate and fine-grained carbonaceous quartzite; (2) a mafic schist unit consisting of chlorite-biotite-amphibole schist, eclogite, amphibolite, and marble; and (3) a felsic unit consisting of

muscovite schist, quartz-muscovite-biotite schist, and quartzite. The felsic and mafic schist units are the main hosts for gold at True North.

Fine grained gold is closely associated with pyrite, arsenopyrite, and (less directly) stibnite in the unoxidized portion of the True North deposit. Gold occurs in drusy quartz veins and altered and brecciated schist adjacent to the quartz veins. The most intensely mineralized zones are graphitic breccias with numerous quartz-carbonate-sulfide veins. Less intensely mineralized zones contain fewer quartz veins in variably brecciated, iron carbonate and calcium carbonate altered schist. Weakly mineralized to unmineralized zones are calcite-altered and are locally brecciated.

2.1.3 Surface Water

The True North Mine area lies within the Chatanika River Basin. The northern area of the site drains to Little Eldorado Creek that is fed by the tributaries of Last Chance Creek, Louis Creek, Discontented Pup, Whiskey Gulch, and Spruce Creek. Little Eldorado Creek feeds into the Chatanika River approximately 5 miles north and west of the project area. The southern portion of the site drains into Dome Creek, primarily fed via the tributary of Murray Creek. Dome Creek feeds into the Chatanika River about 6 miles north and west of the project area. The Chatanika River generally flows east to west in the vicinity of the True North area and ultimately discharges into the Tolovana River approximately 50 miles west of the project area.

2.1.4 Groundwater

Regional groundwater flow is heavily influenced by the presence of permafrost. Due to its low permeability, permafrost has a large impact on groundwater flow in terms of potentially restricting lateral flow, and focusing recharge and discharge zones in areas where permafrost is absent.

Key components of regional groundwater flow in a discontinuous permafrost environment include:

- Groundwater flow above the permafrost (suprapermafrost groundwater) is likely highly localized and discontinuous.
- Groundwater flow below the permafrost (subpermafrost groundwater) represents the primary regional flow system and may occur under both unconfined and confined conditions.
- Recharge to deep groundwater occurs through zones where permafrost is absent over extensive areas (such as south facing slopes or hilltops) or taliks (unfrozen zones in permafrost areas).
- Recharge to the regional groundwater flow system is primarily sourced by snowmelt during the late spring. Recharge potential during the summer is generally low due to relatively high soil moisture storage potential during the primary evaporation season, and the fact that summer rainfall in the Fairbanks area is generally of low intensity and short duration.
- Discharge of deep groundwater likely occurs primarily along stream courses or in lakes that penetrate the permafrost. Discharge can also occur as springs or seeps within drainages and along hill slopes where permafrost is discontinuous.

2.1.5 Background Water Chemistry

Surface Water Chemistry

Baseline surface water sample collection has been carried out since 1994 from 18 surface locations in six different drainages. Table 2-1 lists the specific drainages, along with the main tributaries within each drainage, which have been historically sampled. The location of these surface samples can be seen in Figure 2-2. A total of 82 surface water samples were collected from sites in and around the True North Mine site prior to mining operations.

Surface water in the immediate project area (Whiskey Gulch, South Fork Spruce Creek, North Fork Spruce Creek, Spruce Creek, Lower Spruce Creek, and South Fork of Little Eldorado Creek) is calcium sulfate dominant water, while samples from outside the immediate project area are calcium carbonate dominant waters.

The North Fork of Little Eldorado Creek drains the project site along with Whiskey Gulch and Louis Creek. Last Chance Creek and Marshall Gulch drain areas either upgradient of the site or adjacent uplands. Samples collected from the Little Eldorado Creek and North Fork of Little Eldorado Creek sites include the combined flow from all of the upgradient water sources. The data indicate that the water within Louis Creek is calcium carbonate type water with low TDS. Water from Whiskey Gulch calcium sulfate type water) has mildly elevated concentrations of major ions calcium, iron (total), magnesium, potassium, silicon (total), and sulfate, as well as elevated conductance and concentrations of TDS, TSS, total solids, and turbidity. Water samples collected from Marshall Gulch, although a calcium carbonate type water, have slightly elevated concentrations of iron (total), silicon (total), total solids, TSS, and turbidity. The concentrations of measured parameters in water samples from the North Fork of Little Eldorado Creek sampling site decline to levels similar to those found in discharge from Louis Creek.

Water samples from the South Fork of Little Eldorado Creek drainage, including Spruce Creek, are exclusively calcium sulfate type waters. Water samples from the North Fork of Spruce Creek and South Fork of Spruce Creek have slightly elevated concentrations of calcium and sulfate and elevated conductance, TDS, TSS, total solids, and turbidity. Concentrations of these constituents are generally higher when compared to calcium carbonate type waters such as the low TDS water of Louis Creek. The source of the higher metals load in water samples from the South Fork of Little Eldorado Creek drainage may be the head waters at the project site. The short reach of Spruce Creek, provides little opportunity for dilution prior to the confluence with the South Fork of Little Eldorado Creek.

Table 2-1: Surface Water Sampling Sites by Drainage

Sampling Scale	River / Stream	Sample Site
Regional main river baseline water chemistry	Chatanika River	Chatanika River above Little Eldorado Creek(1)(2)
		Chatanika River below Dome Creek(1)(2)
		Chatanika River above Dome Creek(1)
Tributary baseline water chemistry	North Fork Little Eldorado Creek drainage	Upper Louis Creek(1)
		Lower Louis Creek (1)(2)
		Whiskey Gulch(1)(2)
		Marshall Gulch(1)
		Marshall Creek(2)
		Little Eldorado Creek(2)
		North Fork Little Eldorado Creek(1)
	South Fork Little Eldorado Creek drainage	South Fork Spruce Creek(1)
		North Fork Spruce Creek(1)
		Lower Spruce Creek(1)
		Spruce Creek(2)
		South Fork Little Eldorado Creek(1)
	Dome Creek drainage	Murray Creek(1)(2)
		Moose Creek(1)(2)
		Lower Dome Creek(1)
		Dome Creek(2)
	Ruby Creek Drainage	Ruby Creek
	Pedro Creek drainage	North Fork Steamboat Creek(1)
		Steamboat Creek(1)
		Granite Creek(1)

(1) Sites sampled by Newmont
(2) Sites sampled by FGMI

Groundwater Chemistry

A total of 16 groundwater samples were collected by Newmont and FGMI prior to active mining at True North. The 3 Newmont monitoring locations can be found in Figure 2-2, while the 13 FGMI monitoring locations can be found in Figure 7-1. As with the surface water chemistry, two types of groundwater are present in the True North Mine site; calcium carbonate type water and calcium sulfate type water. Calcium sulfate type groundwater samples were obtained from monitoring wells located along the trend of the mineralization. These samples measured elevated concentrations of calcium, magnesium, manganese, potassium, sodium, sulfate, TDS, and TSS compared with calcium carbonate type groundwater samples. One or more of the 16 samples exceeded the minimum water quality standard for antimony, arsenic, iron, manganese, sulfate, and TDS.

Acid Rock Drainage Potential

An assessment was completed of the potential of site subsurface material to generate acid rock drainage. A total of 274 samples were collected over consecutive ten foot depth intervals from 12 exploration drill holes and analyzed for total sulfur and acid neutralizing potential (ANP). From this data, the acid generating potential, or AGP, and net neutralizing potential, or NNP were determined.

Total sulfur analyses showed that the bedrock profile across the project site is stratified with low total sulfur concentrations in the upper 200 ft, with increasing sulfur concentrations with depth. The average total sulfur concentration for the upper 200 feet is less than 0.1 weight percent.

The average total sulfur concentration for the deeper intervals 200 to 300 ft, 300 to 400 ft and 400 to 495 ft are 0.2, 0.7, and 2.5 weight percent, respectively.

The acid neutralizing potential also shows a change in character below roughly 200 ft depth. Below 300 ft depth, the ANP ranges from 170 to 240 tons $CaCO_3$/Kton rock. Between 200 and 300 ft, the range in ANP varies between 40 to 240 tons $CaCO_3$/Kton rock and averages 175 tons $CaCO_3$/Kton rock. Above 200 ft depth, the ANP has a much larger range; from roughly 2 to over 500 tons $CaCO_3$/Kton rock, and averages approximately 150 tons $CaCO_3$/Kton rock.

Owing to the relatively low total sulfur content of the samples, the distribution of NNP values mimics the pattern of ANP with depth. Roughly 70% of the samples in the top 200 ft of the drill holes were non-acid generating. Samples below 200 ft were all non-acid generating. The acid generating potential for the remaining samples fell within the uncertain range.

Based on the assessment, the rock material generated from the pit area is not considered acid generating.

2.1.6 Vegetation

The poorly drained soils with a high permafrost table generally support communities of black spruce, willow, and alder (*Alnus* spp.). A thick moss mat, principally *Sphagnum* spp., covers the ground. Lichens such as *Cladonia* spp. and *Peltigera* spp. are common in the moss mat also. This mat supports a dense cover of shrubs; primarily bog birch (*Betula glandulosa*), spirea (*Spirea beauverdiana*), Labrador tea (*Ledum decumbens*), cranberry (*Vaccinium vitis-idaea*), and blueberry (*Vaccinium uliginosum*). Tussocks of cotton grass (*Eriophorum* spp.) are also common, especially along the toe slopes. Poorly drained soils with a high permafrost table may be found on the northern exposures of the mountain slopes, especially those areas that are concave or broken. Spindly black spruce and a thick moss mat are typical on these sites. Permafrost is discontinuous throughout the project area, and does not exist on some north-facing mountain slopes where it normally would be expected. South-facing slopes receive much more radiation from the sun, and generally support white spruce, paper birch, and quaking aspen.

2.1.7 Permafrost

Golder Associates, Inc. assessed permafrost conditions at the project site during site investigation work. Their studies concluded that permafrost occupies the upper part of the site and is associated with the black spruce forest. Areas free of permafrost, or with a lowered permafrost table, are associated with the birch forest that occupies the lower slope area. No massive ice was encountered while drilling the site.

2.1.8 Wetlands

ABR, Inc. performed three wetland delineations for True North. No high value wetlands, such as open water or emergent wetlands are located within the Millsite Lease area. The impacted wetlands are associated with permafrost and have vegetative cover of black spruce and a moss mat. Similar type wetlands are abundant in the True North Mine area and surrounding region (ABR, Inc., 1997, 2000). Approximately 242.5 acres of wetlands were disturbed due to roads and pit development, as seen in Figure 3-2. The office, shop, explosive storage area, development rock dumps, growth media stockpile and ore stockpile are located on uplands which accounted for an additional disturbance of approximately 450 acres.

2.1.9 Wildlife

The True North Mine area does not currently support any threatened or endangered species, but may support populations of three species of concern: Northern Goshawk, Olive-sided Flycatcher, and Lynx. Populations of these species appear to be present in numbers similar to other locations in interior Alaska. Suitable habitats for these species are abundant in the True North Mine area and surrounding region (ABR, Inc., 1998).

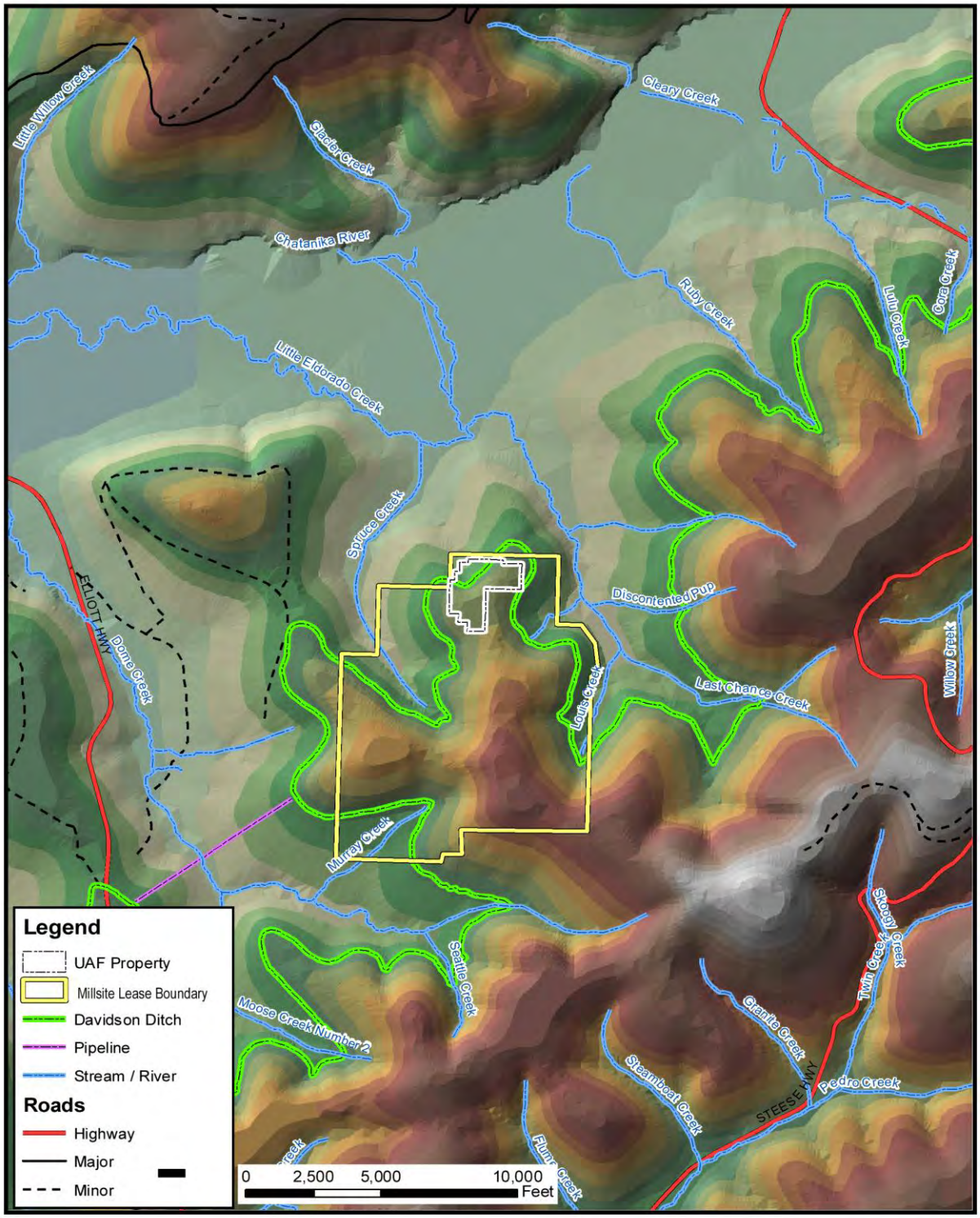


Figure 2.1: Area Topography

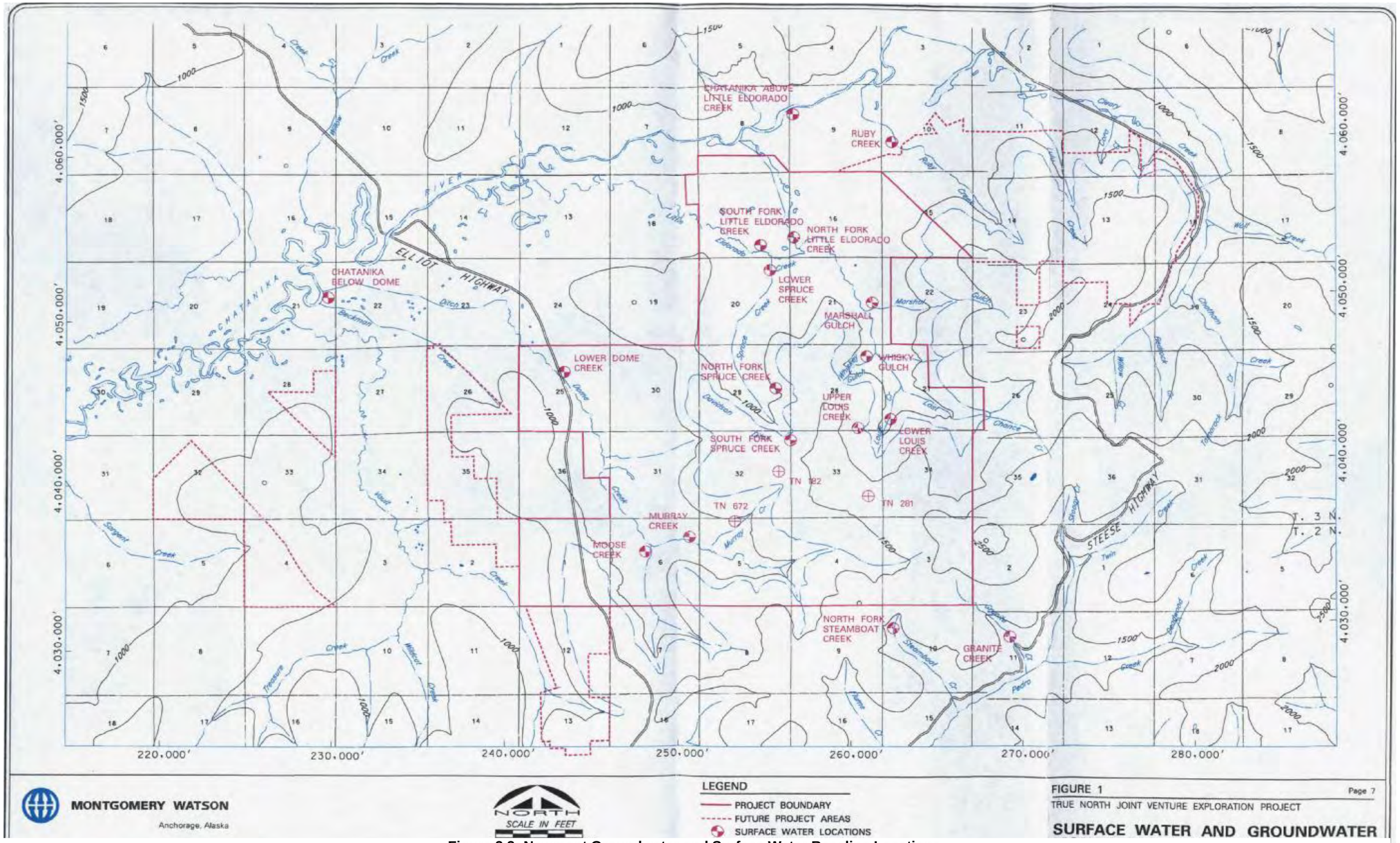


Figure 2.2: Newmont Groundwater and Surface Water Baseline Locations

3 WETLANDS

3.1 Jurisdictional Wetlands Survey

ABR, Inc. performed three wetland delineations for True North. No high value wetlands, such as open water or emergent wetlands are located within the Millsite Lease area. The impacted wetlands are associated with permafrost and have vegetative cover of black spruce and a moss mat. Similar type wetlands are abundant in the True North Mine area and surrounding region (ABR, Inc., 1997, 2000). The areas for each of the wetland delineation studies are outlined in Figure 3-1.

Approximately 242.5 acres of wetlands have been disturbed to date due to roads, dumps and pit development. The disturbed areas can be seen in Figure 3-2.

3.1.1 1995 Delineation

An inventory and delineation of wetlands that exist in the True North project areas was initially conducted by ABR, Inc., in the fall of 1995. The results indicated that 55.6% of the project area was covered by wetland vegetation types, with the remaining 44.6% being covered by well-drained upland types.

The wetlands delineation survey (ABR Inc., 1995) identified 13 wetland types within the project area. Scrub-shrub and forested wetlands accounted for the majority of the wetlands (20.9% and 28%, respectively), while ponds and riparian communities were infrequent (6.6% cover). The remaining vegetated wetland types in the survey area are confined to the edges of perennial and ephemeral streams.

At the time of the 1995 delineation, 23 acres of surface disturbance had occurred, including 9.1 acres of wetlands. Approximately 14 acres of surface disturbance had been reclaimed, including approximately 5 acres of wetlands. The existing disturbances were associated with historical exploration activities that had taken place over the previous five years.

3.1.2 1996 Delineation

A wetlands delineation survey (ABR, Inc., 1996) was completed in October of 1996 to an additional 2766 acres located south of the previously permitted area. The survey identified 13 wetland types within the modification area. The results of this survey indicated that 18.8% (518.7 acres) of the modification area was covered by wetland vegetation types

3.1.3 1997 Delineation

In 1997, wetlands were surveyed from June 9th to 20th and again on the 8th, 10th and 23rd to 24th of July. Forty-one wetland types were identified and encompassed approximately 65.2% (3757.2 acres) of the 5762.5 acres of land that was studied in 1997.

3.1.4 2010 Delineation

In October 2010, a wetlands delineation was completed by HDR Alaska, Inc. 17.0 acres were delineated with 4.68 acres identified as wetlands.

3.2 Department of the Army Section 404 Permit

In October 1996, the Department of the Army Permit No. 4-940742, Murray Creek 2, was issued by the U.S. Army Engineer District, Alaska to FGMI. It permitted the discharge of approximately 122,500 cubic yards of fill material and mechanized land clearing of 37.3 acres of jurisdictional wetlands.

In March 1997, Permit No. M-940742, Murray Creek 2, was issued. This permit allowed for the placement of an additional 109,500 cubic yards of fill and the mechanized land clearing of 38 acres of wetlands, in the construction of roads and drill pads associated with exploration.

In April 1998, Permit No. N-940742, Murray Creek 2, was issued. This permit allowed for the placement of an additional 71,000 cubic yards of fill and the mechanized land clearing of 36 acres of wetlands, in the construction of roads and drill pads associated with exploration.

In February 1999, Permit No. O-940742, Murray Creek 2, was issued. This permit allowed for the placement of an additional 127,214 cubic yards of fill and the mechanized land clearing of 24.4 acres of wetlands, in the construction of roads and drill pads associated with exploration.

In March 1999, Permit No. P-940742, Murray Creek 2, was issued. This permit renewed the original permit issued in October 1996 acres of wetlands, in the construction of roads and drill pads associated with exploration.

In January 2001, Permit No. Q-940742, Murray Creek 2, was issued. This permit allowed for the construction of the new access road to the True North Mine. The disturbance of this road included 11 acres of wetlands. In addition to the new access road, the permit allowed the construction of secondary access roads within the mine and an open pit. 33 acres and 34 acres of wetlands were to be disturbed, respectively.

In July 2002, Permit No. R-940742, Murray Creek 2, was issued. This permit allowed the expansion of the existing and approved mining operation into adjacent wetlands for roads and mine pits. 145 acres of wetlands were planned to be disturbed by road construction, while an additional 93 acres were planned for open pit development.

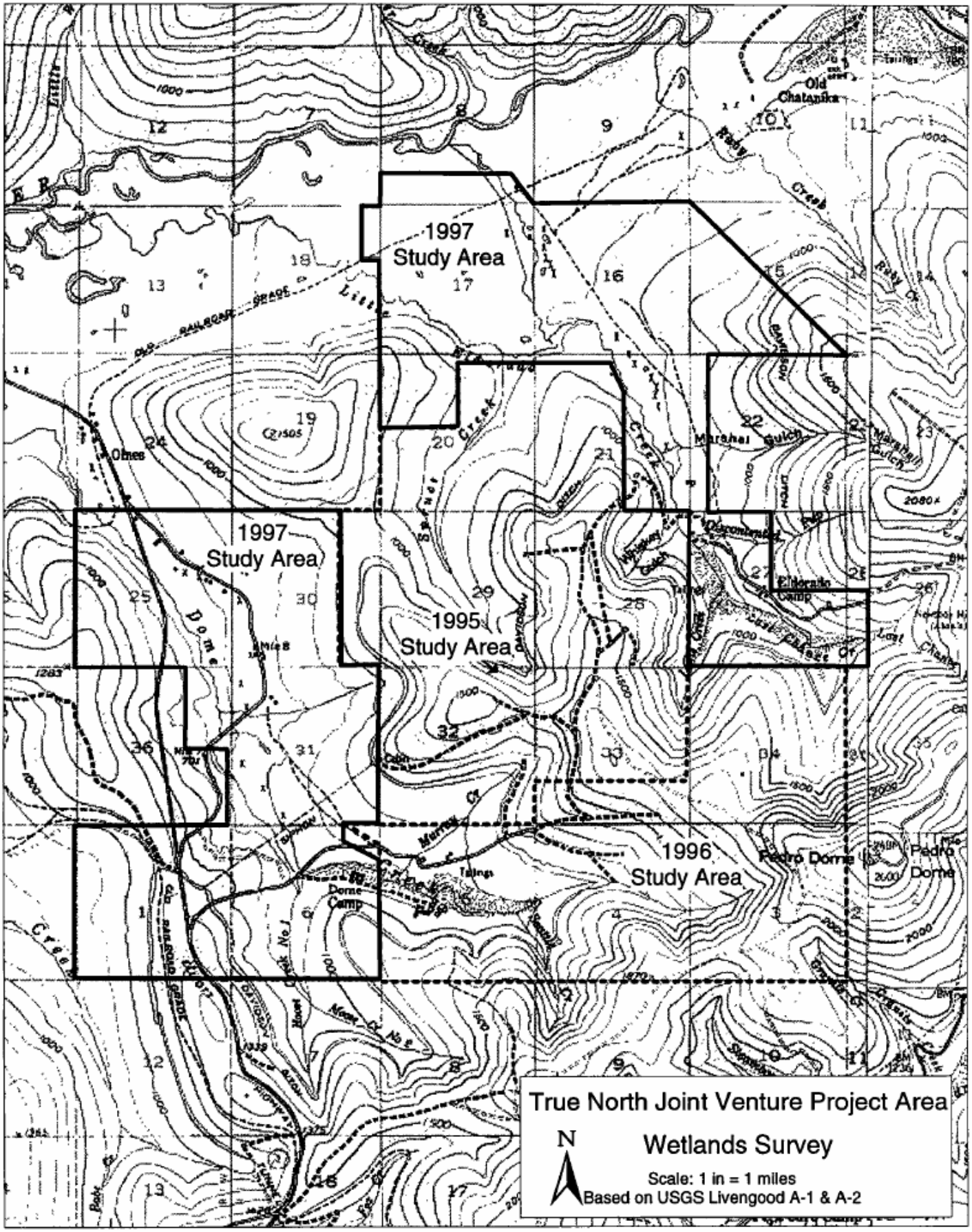


Figure 3.1: True North Wetland Surveys

Figure 3.2: Disturbed Wetlands

4 SURFACE DISTURBANCE AND LAND USE

4.1 Surface Disturbance

The True North Mine commenced operation at the end of January 2001 with the first blast occurring on February 9, 2001. Routine hauling of ore to the Fort Knox Primary Crusher began on April 13, 2001. A total of 36.4 million tons of material were mined between January 2001 and December 2004 including 11.7 million tons of ore (Table 4-1). Mining operations were suspended in December 2004. See Table 4-1 for surface disturbance acres.

Table 4-1: Mine Production by Year

Year	Ore (Million Tons)	Low Grade Ore (Million Tons)	Waste (Million Tons)	Total (Million Tons)
2001	2.38	0.81	5.26	8.45
2002	3.37	1.08	7.01	11.45
2003	2.85	0.00	9.86	12.71
2004	1.26	0.00	2.51	3.76
2005	0.00	0.00	0.00	0.00
Total	**9.85**	**1.89**	**24.64**	**36.38**

Table 4-2 Existing Facility Disturbance

Facility Type	Facility Name	Area (acres)
Growth Media Stockpile	East Pit GM	3.3
	Hindenburg GM	2.6
	Shop Pad GM	2.6
Pit	Hindenburg Pit	53.1
	North Central Pit	33.6
	Shepard Pit	38.5
Road / Trail	Explosives Road	18.3
	Hindenburg Road	6.9
	Louis Road	5.7
	Shepard Road	33.1
	Shop Pad Road	15.2
	Trails	9.5
Stock pad	Shop Pad	14.1
	Upper A Stock pad	6.4
	Upper B Stock pad	15.5
Waste Rock Dump	East Pit Dump	50.5
	East Shepard Dump	8.3
	Hindenburg Dump	8.5
	Lower A B Dump	11.2
	Mid Shepard Dump	14.5
	North Central Dump	5.9
	North Louis Dump	17.7
	North Shepard Dump (Reclaimed)	32.4
	South Louis Dump	19.2
	South Shepard Dump	68.6
	Upper Hindenburg Dump (Reclaimed)	10.7
	Upper Louis Dump	16.4
	Zeppelin & Hindenburg Dumps (Reclaimed)	86.3
Other	Diversion Ditch Area	7.2
	Grand Total	**615.8**

4.1.1 Waste Rock Dumps

Thirteen separate waste rock dumps account for approximately 350 acres of current disturbance. Reclamation earthwork was performed during 2005 at the North Shepard Dump, Upper Hindenburg Dump, and Zeppelin/Hindenburg Dump. The earthwork consisted of recontouring, scarifying, fertilizing, and seeding approximately 129 acres. In 2009 FGMI made the decision to permanently close and reclaim the True North mine site. During that year, reclamation was performed on approximately 202 acres of dumps.

Subsequent to this reclamation work, a portion of the North Shepard Dump slumped and required additional earthwork and reseeding/fertilizing. The slump area encompassed approximately 7 acres. FGMI corrected this problem in early 2010 by picking up the slide material and back filling the North Central Pit along the south and west edge of the pit. The back

fill material was then pushed to the south and east at a 3:1 slope for final grading. The slump area was excavated to a 2.5:1 or shallower slope or until natural ground was encountered.

In addition to the North Shepard Slump Remediation work done in 2010; the East Pit Dump, South Shepard Dump and Mid-Shepard Dump were fully reclaimed as well.

4.1.2 Pits

The remaining pits at True North are the Hindenburg Pit, North Central Pit, and Shepard Pit. Other pits developed during mining have been backfilled. The three remaining pits account for 125 acres of disturbance. The North Central Pit was partially backfilled in 2007 to reduce surface water pooling. The Hindenburg Pit floor was graded and scarified to reduce potential runoff to the North Central Pit. Both of these pits received seed and fertilizer in 2007 to promote revegetation to reduce surface water flow. A diversion ditch along the southeast rim of the North Central Pit and Hindenburg Pit was constructed in 2007 to divert storm water drainage away from the pits.

Due to continued work within the pits and continued water flow, the North Central Pit and Hindenburg Pit were regraded and scarified once again in August 2010. To prevent water flow, the diversion ditch above the pit was cleaned out and reconstructed to divert water towards the Shepard Road. Both of these pits received seed and fertilizer in September 2010 to promote revegetation to reduce potential surface water flow.

The Shepard Pit was reclaimed in July 2010. Once earthwork and haul had ceased on the North Shepard Remediation project; the pit floor was scarified, seeded and fertilized to promote revegetation to reduce surface water flow.

4.1.3 Growth Media Stockpiles

Two growth media stockpiles and growth media from the North Shepard Slump Remediation project has a combined volume of approximately 91,000 cubic yardswhich will beused as needed during reclamation (Table 4-3). In addition to the stockpiles, growth media is stored in constructed berms along the various mine site roadways.

Table 4-3: Remaining Growth Media Stockpile Volumes

Year	Volume (Cubic Yards)
Hindenburg GM Stockpile	10,000
Shop Pad GM Stockpile	43,000
Shepard Pit	38,000
Total	**91,000**

To date the East Pit GM and Hindenburg GM stockpiles have been used for reclamation. The East Pit GM Stockpile has been depleted, primarily for coverage of the East Pit Dump and North Louis Dump. The Hindenburg GM Stockpile has been used for the Hindenburg Pit, Hindenburg Dump, Upper Hindenburg Dump and for the rework of the surface cracking.

4.1.4 Roads, Trails and RS2477 Routes

A network of roads and trails link the various facilities at True North accounting for approximately 89 acres of disturbance within the project boundary. Minimal reclamation has been done to the roadways.

Working with the ADNR Northern Region Lands Section it was determined RS2477 rights-of-way at True North can be addressed under 11 AAC 51.065(k), administrative realignment, pending submittal of a proposed realignment plan

4.1.5 Buildings and Infrastructure

There are no longer any building facilities remaining at True North. The final building to be removed was the True North shop, which covered approximately 13,500 square feet. The shop was fully removed in December 2010 and the concrete pad was covered with growth media seeded and fertilized.

In addition to the shop removal, the septic system was cleaned out, filled in and buried, following closure regulations. Contaminated soil from the shop sump was removed transported off site to be incinerated. Transportation of the contaminated material followed ADEC regulations (18 AAC 60.015). The power lines and power poles owned by FGMI have been removed from the site; the remaining poles are property of GVEA.

5 RECLAMATION PRACTICES

5.1 Reclamation Objectives

FGMI's long-term goals of reclamation during and after mining operations are to contour, stabilize, and revegetate disturbed areas in order to return the land to a safe, stable and productive condition in accordance with “Reclamation Performance Standards” 11 AAC 97.200. The planned use of the True North area upon completion of closure activities is for wildlife habitat and recreation.

FGMI is contouring and stabilizing disturbed areas to create ground conditions that promote vegetation development and provide conditions for colonization by native species. Native grass species available commercially are used for rapid soil stabilization. The ADNR Plant Material Center (PMC) recommended fertilizer formulas are being used.

The objectives of this reclamation and closure plan are:

- Stabilization and protection of soil materials from wind and water erosion;
- Stabilization of steep slopes through contouring and levelling to provide rounded landforms and suitable seedbeds with erosion control;
- Establishment of long-term, self-sustaining vegetation communities through reseeding and/or promotion of natural invasion and succession.
- Ensure that only clean water that meets state standards is discharged from the site.

FGMI will continue working with ADNR, Division of Agriculture Plant Materials Center to achieve the successful implementation and subsequent evaluation of both concurrent and long-term reclamation activities. FGMI considers reclamation to be a progressive process that includes the design, construction, operation, and closure of the mining operation. Reclamation will or has occurred in the following phases, with some overlap:

- Interim reclamation to stabilize and maintain viability of topsoil and growth media stockpiles will be completed during and directly after construction;
- Previously disturbed areas including historic exploration trenches, abandoned roads, and exploration drill pads that will not be affected by current mining operations will be concurrently reclaimed;
- Final contouring will occur upon final cessation of mining operations. This will be initiated within one year upon final cessation of mining operations.
- Vegetation, slope stability, and water quality monitoring will continue until closure and all reclamation performance standards are achieved.

The general reclamation procedures are discussed in Section 5.3. The details and procedures for area specific reclamation such as the pits, waste rock dumps, etc. are discussed in Section 6.0.

5.2 Schedule of Reclamation Activities

It is planned for reclamation to be completed in 2012, as seen in Figure 6-1. A number of waste dumps, pits, etc. have been reclaimed to date. In general, waste rock dumps and pits will be reclaimed first, followed by building demolition, then roads as they become unnecessary for reclamation access and well closure once post-closure monitoring is completed and those otherwise agreed. Table 6-1 outlines the required tasks for each type of facility.

5.3 General Reclamation Procedures

The primary reclamation components of the True North Reclamation Plan include grading & recontouring, storm water conveyance channel construction, growth media placement, seedbed preparation, fertilizing, seeding, and monitoring. FGMI will manage these components keeping in mind that the ultimate goal is to achieve a stable revegetated post-mining land surface that will promote natural invasion by native plants. FGMI will continue to work in coordination with Alaska Department of Fish and Game - Division of Habitat to develop and enhance the wildlife potential throughout the project area.

5.3.1 Earthwork

Waste rock dumps will require major grading, contouring, and possible growth media application. Other disturbed areas will be revegetated; some may require regrading. Growth media will be applied on all waste rock dumps and areas that require it to successfully achieve a 70% cover. Generally, slopes will be graded to 2½H:1V or shallower. Waste rock dumps will be configured to establish drainage and avoid swales and depressions.

Earthwork will utilize heavy equipment typical to the industry. It is anticipated that the equipment list will include (or equivalents thereof): D10 CAT, D9 CAT, D8 CAT, water truck and motor graders. Other equipment such as (but not limited to) front-end loaders, track and tire mounted backhoes, and haul trucks may be substituted for or included with this general equipment list. Equipment needs and use must and will remain dynamic, as specific conditions require during implementation of the plan.

5.3.2 Control of Sedimentation

Storm water drainage channels will be constructed when deemed necessary during recontouring to minimize potential soil erosion while vegetation is re-establishing. Implementation of Best Management Practices (BMP) to control erosion during active mining will be designed to minimize re-disturbance during reclamation. The BMPs will be consistent with those measures and practices identified in Alaska Department of Transportation and Public Facilities. Temporary control devices will be removed when the site-specific potential for erosion has been minimized through earthwork or revegetation. There may be sound reasons to continue maintenance of some control structures depending on final recreational use and other types of use.

5.3.3 Growth Media

Growth media is defined herein as all native soil (in-place) material with the physical and chemical properties capable of germinating and sustaining vegetation growth with or without amendments. At the True North mine site, the term growth media is interchangeable with the terms "topsoil" and "overburden". Overburden material, suitable for use as growth media, is the unconsolidated material that lies between the topsoil horizon (where present) and bedrock and exhibits no chemical characteristics that will inhibit vegetation development.

Growth media is stockpiled at True North in anticipation of future reclamation needs (Table 3-2). Approximately 6 inches of growth media may be applied generally to those sites requiring additional growth media to be revegetated or to promote natural re-invasion by native plant species. However, application depth will vary depending upon the facility. Roads, trails, stock pads, and building sites may require little, if any, growth media, but each site will be individually evaluated on a site-specific base. Growth media will be applied by scraper or dump truck and spread by a D8CAT or equivalent.

5.3.4 Seedbed Preparation

Following the application of growth media if necessary, the specific site will be prepared for seeding by ripping on the contour to roughen the surface. A broken, roughened surface will serve to trap moisture, reduce wind shear, minimize surface erosion by increasing infiltration, and create micro-habitats conducive to seed germination and development. The goal of preparing the seedbed in this fashion will promote revegetation and enhance evapotranspiration At True North, the general method of seedbed preparation will be ripping or scarifying on the contour using a D8N CAT (or equivalent) equipped with a 2 or 3-shank ripper. Highly compacted areas such as equipment lots and roads will be ripped in a linear fashion.

5.3.5 Fertilizer and Fertilization

Prepared seedbeds will be fertilized prior to, after, or during the seeding operation. Specific fertilization requirements will depend on the quality of growth media being used. Currently, the general fertilizer application rate recommended by Alaska Plant Materials Center is 450 pounds per acre of 20N-20P-10K for both spring and fall seeding. Final fertilizer and application rates will consider information acquired from current reclamation efforts

5.3.6 Seed and Seeding

The grass seed mix presently used at True North is listed in Table 5-1. The primary purpose of this seed mix is to achieve quick vegetative cover that will help minimize soil erosion and promote succession back to climax vegetation. The seed mix may change over time in response to such factors as internal and external research results, changes in technology, changes in land management philosophy, and commercial availability. Native species will be the preferred mix. However, other species may be used some years due to availability or if deemed to better meet the post-mining land use criteria and approved by ADNR.

Table 5-1: Seed Mix

Seed Type	Mix %
Arctared Fescue	50%
Gruening Alpine Bluegrass	20%
Tundra Glaucous Bluegrass	20%
Nortran Tufted Hairgrass	10%

Seeding will be accomplished using aerial broadcasting or the traditional ground broadcasting. The application rate for broadcast seeding using the presently proposed grass seed mix will be 11-18 pounds of pure live seed per acre. In some instances, mulch has been found to be useful in conserving moisture, moderating soil temperatures, and improving erosion control. The cool moist summers of Alaska's interior generally bring adequate rainfall to achieve a high seed germination rate. The practice of scarifying the seedbed on the contour prior to seeding minimizes the potential for erosion. Mulch will be evaluated if seed germination becomes a limiting factor in the reestablishment of vegetation.

5.3.7 Revegetation Timing

Seeding will be conducted as soon as possible following seedbed preparation. Ground conditions suitable for large scale earthwork occur primarily during the spring and summer months. Research and experience with concurrent reclamation will be used to evaluate the potential of dormant seeding. Generally, seeding is implemented after spring break-up until mid-July. Such seeding allows the seed to take advantage of the summer moisture period.

However, actual experience has shown that all seedbed preparation on large-scale mine reclamation projects cannot and does not occur at one point in time. Thus, while every effort will be made to conduct the majority of seeding after spring breakup and before mid-July, seeding actually may occur during spring, summer or fall. If a seeding is unsuccessful for any reason, the area will be reseeded the following year.

5.3.8 Revegetation Cover Criteria

A vegetative cover criterion of 70% will be achieved prior to requesting release of financial assurance for each reclaimed area. The 70% cover criteria may be waived upon the approval of ADNR or the land owner for specific areas that are deemed stable, have minimal potential to adversely impact surface water quality, and are consistent with the post mining land use.

Percent live foliar cover will be determined using a method such as the Point-Intercept Method described in National Park Service's fire monitoring handbook. Other more suitable methods to determine percent cover may become available and will be used upon approval from ADNR.

For a seeding determined to be unsuccessful, FGMI will implement appropriate action, which could include reseeding the area, fertilization, and/or placement of growth media on the site.

5.4 Post-mining and Post-reclamation

5.4.1 Drainage

The ridgelines drain into Murray Creek, a tributary of Dome Creek to the south; and Louis Creek, Whiskey Gulch, and Spruce Creek, tributaries of Little Eldorado Creek drain to the north.

Post-mining drainage patterns will be similar in overall gradient and direction to downstream drainages. Diversion ditches around the Hindenburg Pit, North Central Pit, and northern portion of the Shepard Pit will channel spring breakup and storm runoff into Spruce Creek. Diversion structures above the southern portion of the Shepard pit will divert surface flows to the Murray Creek drainage. The East Pit Dump will have runoff directed toward Louis Creek.

5.4.2 Acid Rock Drainage Potential

FGMI has evaluated overburden, ore and development rock as to their potential to generate acid rock drainage (ARD). The Acid/Base Accounting (ABA) analysis for the Hindenburg, East, Central, Shepard, and Zeppelin pits during baseline studies indicated minimal potential for acid generation. Approximately 20% of the exploration holes drilled in 1999, 2000, and 2001, plus reviews of geologic logs from past exploration drilling programs since 1992 were used to make this determination. The ABA testing was used to characterize the potential of both ore and waste material to adversely impact either surface or ground water.

If FGMI becomes aware of acid formation occurring or the potential thereof, this issue will be managed according to Best Management Practices (BMP) specific to ARD. If routine characterization of material indicates a potential for acid rock drainage, then a specific management plan for material handling will be immediately developed by FGMI. This plan will be submitted to ADNR and ADEC for approval, and the reclamation plan modified according to 11 AAC 97.240. The plan will detail the method or methods for segregating sulfides for encapsulation or mixing oxide and sulfides to neutralize acid generating potential. The plan will list specific BMP's to manage storm water run-on and runoff during and after final reclamation.

Monitoring will be conducted by FGMI according to the True North Monitoring Plan (2012).

5.5 Public Access

Public access to the True North site will be restricted until reclamation and closure are completed. Once FGMI relinquishes the Millsite Lease property, public access to the True North site will be managed by the State of Alaska. The existing access road will remain to provide access to the Shepard and Hindenburg pits. Roads to be left in place following completion of reclamation will be determined by ADNR.

Public safety is a principal concern in closure and reclamation of mining operations. The True North pit safety berms will remain in place to restrict access to the pit area. Generally, berms four to six feet in height will be utilized to restrict access to the steeper highwall sections of the pit and other potentially hazardous areas. FGMI will evaluate if a signage plan is appropriate.

5.6 Financial Assurance Release

FGMI will submit a request for an annual adjustment of financial assurance based on the results of an annually updated SRCE model.

Figure 5.1: Map of Existing Facilities

6 FACILITY SPECIFIC RECLAMATION AND CLOSURE

For reclamation purposes the site facilities are divided into the following categories; waste rock dumps, pits, roads / trails, growth media stockpiles, stock pads, undisturbed, buildings / infrastructure, and other. Each facility type is likely to require differing degrees of reclamation activity prior to applying seed and fertilizer (Table 6-1). A detailed description is found in Appendix C.

Table 6-1: Reclamation by Facility Type

Facility Type	Grading and Recontour	Place Growth Media	Seedbed Preparation	Fertilizing/ Seeding	Drainage Channels
Waste Rock Dumps	Extensive	Site specific	Yes	Yes	Yes
Pits	Where feasible	Where feasible	Where feasible	Yes	Where feasible along pit rims
Roads / Trails	As needed in fill areas	Minor, as needed	Extensive ripping in highly compacted areas	Yes	Storm water diversion as needed
Growth Media Stockpiles	Minor recontour	No	Minor scarifying	Yes	As needed
Stockpads	Minor, as needed	6” as needed	Extensive ripping in highly compacted areas	Yes	Minor, as needed
Building / Infrastructure		Yes			

6.1 Pits

The pit slopes will be left in a stable condition and growth media may be placed on the pit floors followed by seeding and fertilizing, however pit floors are not held to a standard.

6.2 Waste Rock Dumps

Lower AB waste rock dump reclamation will entail grading and recontouring the dump to establish a slope of approximately 2.5H: 1V or flatter. The top of the dump will be rounded to minimize impoundment of storm water and snowmelt. Large boulders that are uncovered during grading may be left on the surface to provide topographical diversity, microhabitats for wildlife and vegetation, and to break the linear appearance of the final slope.

East Shepard Dump earthwork footprint is minimized to reduce the destruction of natural vegetation. Murray Creek is situated below the dump, so minimal earthwork will greatly reduce the risk of disturbance to the creek. Earthwork tasks will include pulling the crest back to a stable distance using an excavator and then grading the top of the dump to an approximate slope of 3H:1V providing slope stability and minimal disturbance to surrounding area. HDR completed a wetland delineation finding 0.12 acres of wetlands; these wetlands will not be disturbed by reclamation activities. Approximately 4.5 acres will be cleared to accommodate placement of waste rock material uphill. The trees will be placed on the uphill side of the final footprint as a windrow. Growth media from the clearing will be placed on the recontoured waste rock dump.

Previous reclamation plans included the ANFO area as a part of Explosives Road; it will now be treated as a waste rock dump. Approximately 7 acres will be cleared around the dump for pushing waste rock material to a 3H: 1V slope. Growth media from the clearing will be placed on the recontoured ANFO area.

The waste rock dumps at True North contain variable amounts of finer grained material that may be suitable as a growth media. Areas within each waste rock dump will be evaluated for suitability as growth media. If it is determined by FGMI that the waste rock does not provide a growth media that will support the successful establishment of vegetation, a minimum of 6 inches of growth media will be placed.

When final sloping, contouring, and growth media placement (if required) have been completed, both waste rock dumps will be ripped along the contour were possible. Contour ripping will reduce the erosion potential by reducing smooth slope length with the series of furrows created that will also increase infiltration. Ripping on the contour will provide micro-habitats for increased moisture retention and seed germination. The berms will remain until a vegetative cover is established and the potential for erosion is minimized.

Lower AB and East Shepard waste rock dumps will be revegetated following completion of earthwork. Due to the rocky, irregular nature of the final slopes, broadcast-seeding methods will be utilized. Seed and fertilizer will be applied as discussed in Section 5.3.6.

6.3 Roads, Trails and RS 2477 Routes

There is currently over 5 miles of roads and trails within the project site accounting for 115.5 acres of disturbance (including stock pads). All roads except those required for equipment access or monitoring will be reclaimed. The roads required for monitoring and equipment access will be reduced to one lane.

Reclamation procedures will be similar for all types of roads and trails that are to be reclaimed, with the exception of the Explosives Road. Culverts (if installed) will be removed; natural drainage areas restored or stabilized and roadbeds will be graded where necessary to provide adequate drainage. Following grading, roadbeds will be scarified/ripped depending upon the degree of compaction and seeded. Water bars to divert run-off and control erosion and berms to restrict public access will be incorporated where necessary and as approved by ADNR. The Shepard Road, Hindenburg Road and selective trails will be reclaimed down to a single 20 foot service lane to provide access for monitoring and maintenance.

Explosives Road area had a wetland delineation prepared by HDR. Soil samples below and above the roadway were evaluated. It was determined that there are areas of wetlands along the toe of the roadway. Reclamation will not disturb these areas. Using dozers and an excavator, the volume of rock will be worked by pulling up and relocating the rock to a stable condition. The 20 foot wide roadway approximately 1,900 feet from the Air Force Gate access spur will provide a RS2477 realignment option. A turnaround area will be established at the end of the road.

A drawing of RS2477 Little Eldorado Creek Road and Spurs pre-mining routes is shown in Appendix D. These roads and trails were not platted or surveyed; therefore per 11 AAC 51.065(k) they can be realigned without going through the easement vacation process. A proposal of realignments will be submitted to ADNR Northern Region Lands Section for evaluation and approval by means of an administrative decision. The realignment will

specifically identify a realignment that connects the original routes entry and exit points while providing access through the property comparable to the original route. The proposed realignment utilizes some parts of the existing roads. These portions will most likely be reduced to one lane and some small connector sections will have to be constructed see Appendix D

6.4 Maintenance

During the duration of reclamation, there will be maintenance required for the previous year's construction and vegetation efforts. Earthwork maintenance is forecasted Zeppelin/Hindenburg Dump.

A partial section of the North Shepard Dump beside the 2010 remediation area began to slump in June 2010. The movement has since subsided, but may require earthwork to blend in with the surroundings. It is expected that if earthwork is ultimately required, the process will be similar to that of the 2010 North Shepard Dump remediation. The slide material will be removed and placed in an area where growth media is required. The slump area would then be excavated to a 2.5:1 or shallower slope or until natural ground was encountered. The area would be seeded, fertilized and visually monitored for additional movement.

The Zeppelin/Hindenburg Dump area requires earthwork to repair the area that has cracked, the area will be regraded seeded and fertilized See Appendix C

The areas that require maintenance due to settlement, cracks and sloughs, will be brought to a stable condition by the most efficient and economical means, reference True North Monitoring Plan (May 2012) Section 2.4 Stability Monitoring for more information

6.5 Building and Infrastructure

Buildings and site-wide infrastructure will be reclaimed as follows:

- Buildings, materials, and equipment will be removed from the True North Mine as each site facility is decommissioned.
- Non-hazardous and nontoxic solid waste such as lumber and non-salvageable metal scrap will be burned on-site and/or disposed in satellite dumpsters.
- Hazardous and toxic materials such as petroleum products, acids, and solvents will be moved off-site by licensed transporters and either returned to the vendor or disposed at licensed facilities.
- Equipment and piping not needed for the reclamation and monitoring process will be utilized at another mining site, sold, salvaged, or disposed in a manner approved by ADNR and other appropriate agencies.
- When electrical power requirements are no longer necessary, substations and associated facilities will be removed from the site, unless approved otherwise by the ADNR.

Building sites will be graded for proper drainage, ripped and scarified, seeded, and if necessary mulched. Although it is not likely that growth media will be needed, each site will be evaluated following final grading. If growth media is needed it will be applied at a depth of approximately 6-inches.

6.6 Well Closure

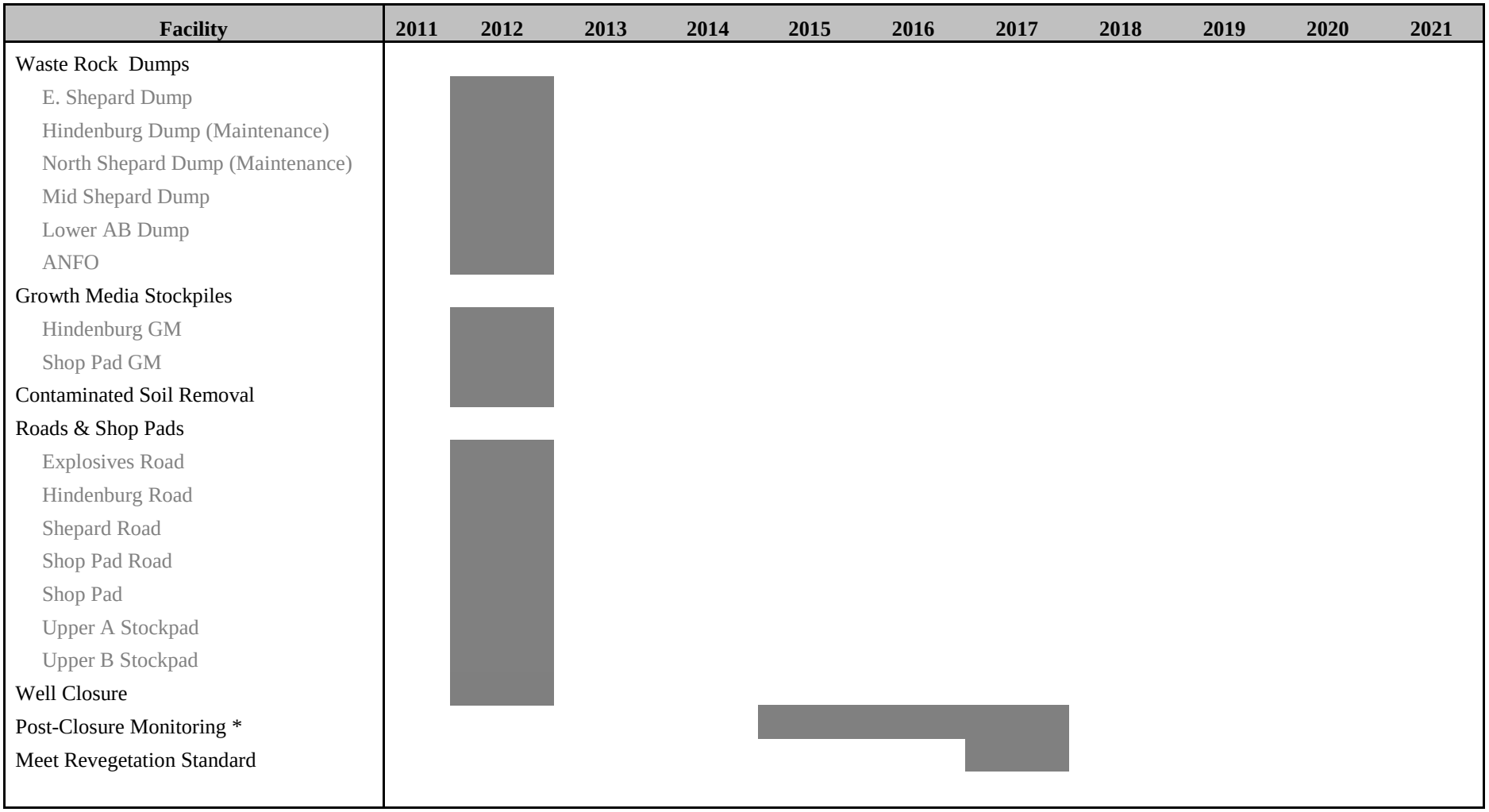
All 13 monitoring wells (Figure 6-2) will be decommissioned with exception to MW #9. Monitoring well 9 is no longer accessible by FGMI.

In October 2010, ADNR approved the closure of Monitoring wells 1, 5, 9 and 13, along with any thermistor wells found on site. Closure of all wells is planned to occur after the ground freezes in late 2012 and early 2013.

Well abandonment will be conducted according to ADEC regulations (18 AAC 80.015). FGMI will follow the abandonment procedures including removal and disposal of pumps and piping, removal of the casing where possible or perforation, plugging of the well with an approved sealing material at total depth, removal of the surface casing, minor grading around the well site, and seeding.

6.7 Spruce Creek

A portion of Spruce creek was covered during the reclamation of Hindenburg Waste Rock Dump. It is the intent of FGMI to establish surficial hydrological connectivity with the goal of stable hydrologic equilibrium. Connectivity will be established by excavating material starting at the upper reach of Spruce Creek extending 400 feet down gradient following the pre-mine topography.



*A point when analytes are either decreasing or unchanging

Figure 6.1: Schedule of Reclamation Activities

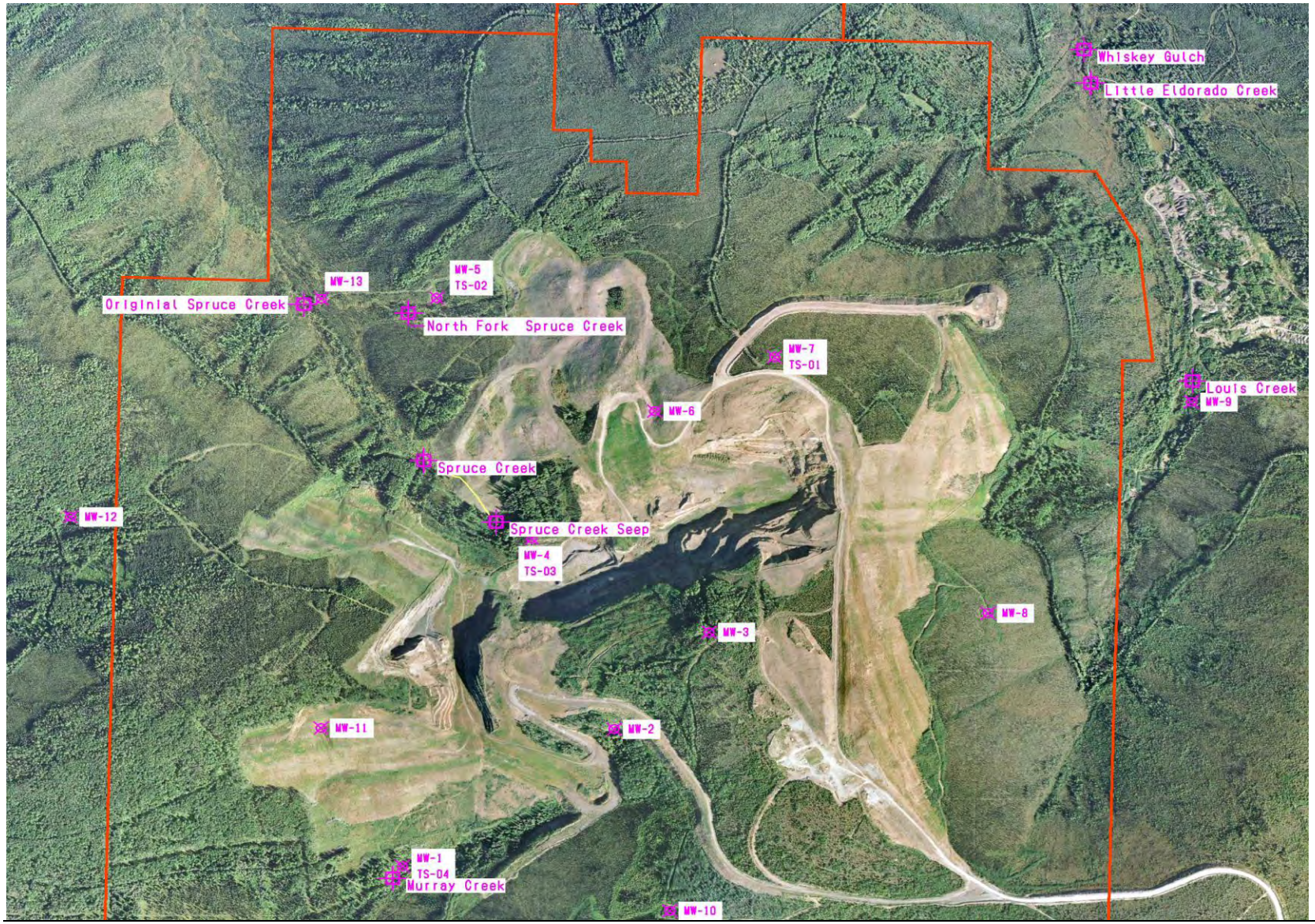


Figure 6.2 Monitoring Locations

7 APPLICANT STATEMENT OF RESPONSIBILITY

FGMI recognizes its responsibility in the use of public (State) lands and accepts that responsibility in agreeing to reclaim the True North Mine site. FGMI will meet the requirements of its reclamation plan and return the site to a safe and stable condition, consistent with the approved post-mining land use. FGMI will meet required local, State, and Federal regulations regarding reclamation of any surface area affected by the mining operation. Reclamation activities and post-reclamation maintenance of remaining structures are FGMI's responsibility. In the event a new operator/land owner assumes control of the True North Mine, the new operator or land owner will agree to assume responsibility for the reclamation and maintenance of any affected land and structures that are the subject of this plan or existing permits. The new operator/land owner will request transfer of all applicable State and Federal permits. The new operator/land owner will provide surety acceptable to the U.S. Army Corps of Engineers and with ADNR as allowed by **11 AAC 97.420 (c)** that will cover reclamation of disturbed land.

8 ESTIMATE OF RECLAMATION AND CLOSURE COSTS

8.1 Reclamation Cost Estimates and Financial Assurance Adjustment

Table 8-1 provides a breakdown by activity of the costs comprising the Financial Assurance estimate.

Table 8-1 - Reclamation and Closure Cost Estimate

TOTAL COST	**$3,066,526**
DIRECT COSTS	
Earthwork/Recontouring (Mob/Demob Included)	$1,447,585
Revegetation/Stabilization	$82,263
Monitoring and Maintenance	$352,477
Closure Planning	$30,000
TOTAL DIRECT COSTS	**$1,912,325**
INDIRECT COSTS	
Engineering Design (4%)	$76,372
Contingency (10%)	$190,929
Insurance (1.5%)	$6,787
Performance Bond (3%)	$57,279
Contractor Profit (35%)	$668,251
Contract Administration (8%)	$152,743
TOTAL INDIRECT COSTS	**$1,154,201**

Direct costs were calculated using quotes from local contractors, RS Means tables, and. These estimates include contractor profit and overhead, mobilization and demobilization fees, and contingencies. We will account for inflation by increasing our financial assurance by the CPI-U for Anchorage of the previous year.

FGMI will reclaim affected land as contemporaneously as practicable. The plan and cost estimate provides the ADNR, ADEC and FGMI an opportunity to review and, if necessary, modify the reclamation plan as required under provision of the Millsite Lease.

Under the provisions of 11 AAC 97.0320.(a), FGMI will file an Annual Activity Report that includes the total acreage reclaimed in that year, and a statement as to whether the reclamation plan is on schedule.

Reclamation plans typically are updated to account for the additional disturbance planned to occur during the next five years. Since the various facilities such as the pit and development rock dumps, have different reclamation requirements, successful reclamation will be achieved much more rapidly for some facilities than others. Therefore, FGMI will seek incremental surety release on each facility or affected acreage as successful reclamation is completed as required in 11 AAC 97.435.

8.2 Cost Estimate Assumptions

General assumptions used in constructing the cost estimates are as follows:

- Wage rates are based on Laborers' &Mechanics Minimum Rates of Pay, dated November 1, 2011, an overtime factor based on a seven day / twelve hour work week and a burden rate of 21%.
- Equipment and productivity rates are based upon 41th Edition of the Caterpillar Performance Handbook.
- Estimates for material costs (seed, fertilizer, mulch, and cement) are based on vendor quotes, contractor estimates, and actual experience with concurrent reclamation at True North and other operations within interior Alaska.
- Well abandonment costs are premised on actual cost of bentonite and all-inclusive cost for labor and equipment based on well drilling contractor estimates.
- Cost estimates for surety determination assume work is being completed by a qualified Alaska contractor.

9 ACKNOWLEDGEMENTS

A. It is understood that should the nature of the operation change a modified or supplemental plan of operations and reclamation may be required.

B. It is understood that approval of this reclamation plan does not constitute:

   1. Certification of ownership to any person named herein; and
   2. Recognition of the validity of any mining claim herein.

C. It is understood that a financial assurance equivalent to the estimated cost of performing the agreed upon reclamation measures will be required before this plan can be approved. Financial assurance and any financial assurance reduction amounts will be set on a site-specific basis by ADNR in coordination with the cooperating agencies.

D. It is understood that any information provided with this plan or provided in the future, that is marked Confidential will be treated as such by the agency in accordance with that agency's laws, rules and regulations.

E. FGMI will fund the required Environmental Audit to determine if any environmental liabilities exist as a direct or indirect result of the True North Mine.

Fairbanks Gold Mining, Inc. has reviewed and agrees to comply with all conditions in the plan of reclamation. Fairbanks Gold Mining, Inc. understands that the bond will not be released until ADNR gives written approval of the reclamation work.

FAIRBANKS GOLD MINING, INC.

By: Delbert Parr

Title: Environmental Manager

Signature: Delbert E Parr

Date: May 21, 2012

10 REFERENCES

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Appendix A

POINT-INTERCEPT METHOD
Sighting Devices, Pin Frames, and Point Frames

1. General Description The Point-Intercept method consists of employing a sighting device or pin/point frame along a set of transects to arrive at an estimate of cover. It measures cover for individual species, total cover, and species composition by cover. Point-Intercept is the method used in the NPS Fire Monitoring Handbook to estimate cover.

It is important to establish a photo plot and take both close-up and general view photographs. This allows the portrayal of resource values and conditions and furnishes visual evidence of vegetation and soil changes over time.

2. Areas of Use This method is suited to all vegetation types less than about 1.5 meters in height. This is because sighting devices and pin/point frames require the observer to look down on the vegetation from above in a vertical line with the ground. If the sighting device allows upward viewing, the method can also be used to estimate the canopy cover of large shrubs and trees.

3 . Advantages and Limitations Point interception measurements are highly repeatable and lead to more precise measurements than cover estimates using quadrats. The method is more efficient than line intercept techniques, at least for herbaceous vegetation, and it is the best method of determining ground cover and the cover of the more dominant species. Given the choice between sighting devices and pin/point frames, the optical sighting device is preferable.

A limitation of point-intercept sampling is the difficulty in picking up the minor species in the community without using a very large number of points. In addition, wind will increase the time required to complete a study because of the need to view a stationary plant.

One limitation that is specific to the use of point frames is that a given number of points grouped in frames gives less precise estimates of cover than the same number of points distributed individually. In fact, single-pin measurements require only one-third as many points as when point frames are used . Another problem with frames is that they overestimate the cover of large or dumped plants because the same plant is intercepted by different points on the same frame. This problem is overcome with the method described here by treating the frames as the sampling units (rather than using the individual points as sampling units). However, this approach doesn't change the fact that more points must be read than when the points are independent.

Use of a pin frame device (as opposed to a grid frame made of crossing strings) will result in overestimation of cover because the pins have finite diameter. The use of a sharpened pin will greatly reduce overestimation when only the point of the pin is used to record a hit or a miss.

4. Equipment The following equipment is needed.

A. Study Location and Documentation Data form
B. Cover Data form
C. Sighting device (A sighting device is available commercially from ESCO, P.O. Box 18775, Boulder, Colorado 80308)

D. Tripod for mounting sighting device
E. Panhead for tripod (makes possible rapid positioning of sighting device)
F. Pin or point frame. This can be a pin frame usually with 10 pins or a point frame , consisting of two superimposed string grids mounted one above the other on three adjustable legs.
G. Hammer
H. Permanent yellow or orange spray paint
I. Tally counter (optional)
J. Two stakes: 3/4 - or I -inch angle iron not less than 16 inches long
K. Compass
L. Steel post and driver
M. Tape: 50-, 100-, or 200-foot delineated in tenths and hundreds or a metric tape of the desired length.

5. Training A minimum of training is needed to make sure the examiners understand how to lay out baselines and transects and position and read the specific sighting device or pin/point frame being employed. The examiners must learn what constitutes a "hit". The technique should take about 1/2 hr training instruction and 1 day of practice to develop consistency. The examiners must also be able to identify the plant species.

6. Establishing Studies Careful establishment of studies is a critical element in obtaining meaningful data.

A. **Site Selection** The most important factor in obtaining usable data is selecting representative areas (critical or key areas) in which to run the study. Study sites should be located within a single plant community within a single ecological site. Transects and sampling points need to be randomly located within the critical or key areas (see Section III).

B. **Pilot Studies** Collect data on several pilot studies to determine the number of samples (transects or observation points) and the number and size of quadrats needed to collect a statistically valid sample.

C. **Number of Studies** Establish a minimum of one study on each study site; establish more if needed (see Section II.D and III.B).

D. **Study Layout** Data can be collected using the baseline, macroplot, or linear study designs. The baseline technique is the recommended procedure.

E. **Reference Post or Point** Permanently mark the location of each study with a reference post and a study location stake.

F. **Study Identification** Number studies for proper identification to ensure that the data collected can be positively associated with specific sites on the ground.

G. **Study Documentation** Document pertinent information concerning the study on the Study Location and Documentation Data form.

7. Taking Photographs Establish photo plots.

8. Sampling Process In addition to collecting the specific studies data, general observations

should be made of the study sites.

A. **Transects** Run a series of transects perpendicular to the baseline in both directions. The beginning points for each transect are randomly selected points along the baseline and the direction of each transect is also randomly determined.

To ensure that both transects and points/point frames are independent, spacing between transects and between points/point frames on each transect should be greater than the average diameter of the largest plants likely to be sampled. (If only basal cover is to be sampled, this diameter is the basal diameter; otherwise, it is canopy diameter.)

B. **Sampling along Transects** The first point/point frame read on each transect should be randomly determined. After the first point/point frame is read, all others are spaced the predetermined interval from the first point. If a tape is used for the transects, always read on the same side of the tape. (One of the devices manufactured by ESCO employs a mounting arm that is exactly 0.5 m long from tripod pivot to the axis of point projection. With this device, two points along each transect can be read with each placement of the tripod (assuming that I m is the selected interval between points). If this device is used, the tripod is placed at 2 m intervals along the tape (or at a number of paces approximating 2 m if no tape is used), the arm is rotated toward the baseline, the intercepted object is recorded, the arm rotated 180 degrees, the next intercepted object is recorded, and so on.)

(1) **Sighting Device** Determine hits by sighting through the device and recording the cover category in the cross hairs.

(2) **Pin/point frames** Determine hits by recording the cover category intercepted by each of the points. For pin frames, this is the cover category hit by each pin; for grid frames, this is the cover category determined by sighting through the "cross hairs" formed by each of the intersections of strings.

Hits are recorded on the Cover Data form in the following categories: vegetation (by plant species), litter, gravel, stone, and bare ground. Prior to recording data, the examiner needs to determine if canopy/foliar cover or basal cover (or both) will be recorded and if hits will be recorded in more than one canopy layer. For sighting devices and some pin/point frames, recording hits in more than one canopy layer requires that upper layers be temporarily moved out of the way to provide a direct line of sight to the lower canopy layers.

C. **Paired Samples** If the data are to be analyzed as paired samples, each transect should be permanently marked the first year at both ends. In each subsequent year of measurement, a tape should be run from one end to the other and the points/point frames read at the selected intervals along the transect. This process should then be repeated for each transect.

D. **Independent Samples** If the data are to be analyzed as independent samples, the transects do not have to be permanently marked. In this case, it is sufficient to pace each transect, taking measurements at each specified pace interval. The observer must ensure, however, that no bias is introduced by subconsciously "choosing" the point to be read. Such bias can be avoided by looking at the horizon when placing the tripod down.

9. Calculations Make the calculations and record the results on the Cover Data form.

A. **Cover of Individual Plants, Litter, Gravel, Stone, and Bare Ground**

(1) **Paired samples** Calculate the percent cover of each species along each transect by totaling all of the "hits" for that species along the transect, dividing the hits by the total number of points along the transect, and multiplying by 100. Calculate the total percent cover for the species in the sampled area by adding together all the transect cover values for the species and dividing by the number of transects. Do the same for litter, gravel, stone, and bare ground.

When point frames are used, the point frames themselves can be analyzed as sampling units. In this case, percent cover of each species is calculated for each point frame. Percent cover is calculated by totaling all of the "hits" for that species in one frame, dividing the hits by the total number of points in that frame, and multiplying by I 00. In this situation, cover data for each frame must be recorded separately on one form or on separate forms.

(2) **Independent samples: Sighting device and Pin frames** Calculate the percent cover of each species in the study area as a whole by totaling all the "hits" for that species along all of the transects, dividing by the total number of points in the study, and multiplying by 100. Do the same for litter, gravel, stone, and bare ground.

(3) **Independent samples: Point frames** For independent samples, the frames themselves can be considered the sampling units. Calculate the percent cover of each species in each point frame by totaling all the "hits" for that species in the frame, dividing the hits by the total number of points in the frame, and multiplying by 100. Calculate the total percent cover for the species in the sampled area by adding together all of the point frame cover values for the species and dividing by the number of point frames. Do the same for litter, gravel, stone, and bare ground.

(4) **Total vegetation cover** Calculate total vegetation cover by adding the study area cover percentages for all plant species. This total could exceed 100 percent if multiple hits (overlapping canopies) were recorded at each point along the transect.

B. **Species Composition** Species composition is based on the percent cover of the various species. Calculate percent composition by dividing the percent cover for each plant species by the total cover for all plant species.

10. Data Analysis The method of data analysis depends upon whether or not the transects are permanent.

A. **Permanent Transects** If the transects are permanent, the transects or point frames are the sampling units. Either a paired t test or the nonparametric Wilcoxon signed rank test is used to test for significant change in average cover between two sampling periods. Repeated measures analysis of variance is used to test for significant change in average cover between three or more sampling periods.

B. **Transects Not Permanent** If the transects are not permanent, that is, if they are randomly located in each sampling period, then the samples are independent and the points can be treated as the sampling units.

Sighting Devices: Analysis consists of a Chi Square contingency table analysis to test for significant change between years in numbers of "hits" on the key species, other plant species,

or cover classes.

Point Frames: Analysis consists of testing for significant changes in average cover between sampling periods using the independent sample t test or the nonparametric Mann Whiitney U test. Independent sample analysis of variance or the nonparametric Kruskal-Wallis test is used to test for significant changes in average cover between three or more years.

11. Cost Ten minutes per 10 pins (for a 10 pin frame).

Appendix B

Closure Cost Estimate
Cost Summary

Project Name: True North
Project Date: 4/20/2012
Model Version: Version 1.4.1
File Name: SRCE_Version_1_4_1_014.xlsm

A. Earthwork/Recontouring	Labor (1)	Equipment (2)	Materials	Total
Exploration	$0	$0	$0	$0
Exploration Roads & Drill Pads	$0	$0	$0	$0
Roads	$39,100	$66,832	$0	$105,932
Well Abandonment	$2,210	$1,904	$39	$4,153
Pits	$0	$0	N/A	$0
Quarries & Borrow Areas	$0	$0	$0	$0
Underground Openings	$0	$0	$0	$0
Process Ponds	$0	$0	$0	$0
Heaps	$0	$0	$0	$0
Waste Rock Dumps	$151,882	$118,510	$0	$270,392
Landfills	$0	$0	$0	$0
Tailings	$0	$0	$0	$0
Foundation & Buildings Areas	$0	$0	$0	$0
Yards, Etc.	$61,250	$101,611	$0	$162,861
Drainage & Sediment Control	$1,316	$1,713	$0	$3,029
Generic Material Hauling	$61,982	$47,626	$0	$109,608
Other User Costs (from Other User sheet)	$82,925	$631,821	$0	$714,746
Other**				$0
Subtotal	**$400,665**	**$970,017**	**$39**	**$1,370,721**
Mob/Demob if included in Other User sheet	$33,915	$42,949	$0	$76,864
Mob/Demob				$0
Subtotal "A"	**$434,581**	**$1,012,966**	**$39**	**$1,447,585**

B. Revegetation/Stabilization	Labor (1)	Equipment (2)	Materials	Total
Exploration	$0	$0	$0	$0
Exploration Roads & Drill Pads	$0	$0	$0	$0
Roads	$0	$9,863	$4,324	$14,187
Well Abandonment				N/A
Pits	$0	$0	$0	$0
Quarries & Borrow Areas	$0	$0	$0	$0
Underground Openings				N/A
Process Ponds	$0	$0	$0	$0
Heaps	$0	$0	$0	$0
Waste Rock Dumps	$0	$24,928	$10,923	$35,851
Landfills	$0	$0	$0	$0
Tailings	$0	$0	$0	$0
Foundation & Buildings Areas	$0	$0	$0	$0
Yards, Etc.	$0	$3,730	$1,635	$5,365
Drainage & Sediment Control	$0	$237	$72	$309
Generic Material Hauling	$0	$0	$0	$0
Other User Costs (from Other User sheet)	$0	$18,728	$7,823	$26,551
Other**				$0
Subtotal "B"	**$0**	**$57,486**	**$24,777**	**$82,263**

C. Detoxification/Water Treatment/Disposal of Wastes**	Labor (1)	Equipment (2)	Materials	Total
Process Ponds/Sludge				$0
Heaps				$0
Dumps (Waste & Landfill)				$0
Tailings				$0
Surplus Water Disposal				$0
Monitoring				$0
Miscellaneous				$0
Solid Waste - On Site	$0	$0	N/A	$0
Solid Waste - Off Site				$0
Hazardous Materials				$0
Hydrocarbon Contaminated Soils	$0	$0	$0	$0
Pumping (from Solution Mgmt sheet)	$0	$0	N/A	$0
Evaporation (from Solution Mgmt sheet)	$0	$0	$0	$0
Treatment (from Solution Mgmt sheet)	$0	$0	$0	$0
Decontamination (from Solution Mgmt sheet)	$0	$0	$0	$0
Other User Costs (from Other User sheet)	$0	$0	$0	$0
Other**				$0
Subtotal "C"	**$0**	**$0**	**$0**	**$0**

D. Structure, Equipment and Facility Removal, and Misc.	Labor (1)	Equipment (2)	Materials	Total
Foundation & Buildings Areas	$0	$0	$0	$0
Other Demolition	$0	$0	$0	$0
Equipment Removal	$0	$0	$0	$0
Fence Removal	$0	$0		$0
Fence Installation	$0	$0	$0	$0
Culvert Removal	$0	$0	N/A	$0
Pipe Removal	$0	$0	N/A	$0
Powerline Removal	$0			$0
Transformer Removal	$0			$0
Rip-rap, rock lining, gabions	$0	$0	$0	$0
Other Misc. Costs	$0	$0	$0	$0
Other User Costs (from Other User sheet)	$0	$0	$0	$0
Other**				$0
Subtotal "D"	**$0**	**$0**	**$0**	**$0**

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Closure Cost Estimate
Cost Summary

Project Name: True North
Project Date: 4/20/2012
Model Version: Version 1.4.1
File Name: SRCE_Version_1_4_1_014.xlsm

E. Monitoring	Labor (1)	Equipment (2)	Materials	Total
Reclamation Monitoring and Maintenance	$0	$197,871	$121,227	$319,098
Ground and Surface Water Monitoring	$2,921	$165	$3,703	$6,788
Other User Costs (from Other User sheet)	$16,169	$10,422	$0	$26,591
Subtotal "E"	**$19,090**	**$208,457**	**$124,930**	**$352,477**

F. Construction Management & Support	Labor	Equipment (2)	Materials	Total
Construction Management	$0	$0	N/A	$0
Construction Support	$0	$0	$0	$0
Road Maintenance	$0	$0	$0	$0
Other User Costs (from Other User sheet)	$0	$0	$0	$0
Other**				$0
Subtotal "F"	**$0**	**$0**	**$0**	**$0**

G. Closure Planning, G&A, Human Resources			Include?	Total
Closure Planning				$30,000
General & Administration				
Human Resources				
Other User Costs (from Other User sheet)	$0	$0	$0	$0
Other**				$0
Subtotal "G"	**$0**	**$0**	**$0**	**$30,000**

Subtotal Operational & Maintenance Costs	Labor (1)	Equipment (2)	Materials (3)	Total
Subtotal A through G	**$453,671**	**$1,278,909**	**$149,746**	**$1,912,325**

** Other Operator supplied costs - additional documentation required.

Indirect Costs			Include?	Total
1. Engineering, Design and Construction (ED&C) Plan (7)				$76,493
2. Contingency (8)				$191,233
3. Insurance (9)	$6,805			$6,805
4. Performance Bond (10)				$57,370
5. Contractor Profit (11)				$669,314
6. Contract Administration (12)				$152,986
7. Government Indirect Cost (13)				$0
Subtotal Add-On Costs				**$1,154,201**
Total Indirect Costs as % of Direct Cost				60%
GRAND TOTAL				**$3,066,526**

Administrative Cost Rates (%)

	Cost Ranges for Indirect Cost Percentages				
	<=	<=	<=	>	
1. Engineering, Design and Construction (ED&C) Plan (7)	$500,000	$2,500,000	$25,000,000	$25,000,000	Small Plan
Variable Rate	4%	4%	0.04	4%	0%
	<=	<=	<=	>	
2. Contingency (8)	$500,000	$5,000,000	$50,000,000	$50,000,000	Small Plan
Variable Rate	10%	10%	10%	10%	0%
3. Insurance (9)	1.5%	of labor costs			
4. Bond (10)	3.0%	of the O&M costs if O&M costs are >$100,000			
5. Contractor Profit (11)	35%	of the O&M costs			
	<=	<=	<=	>	
6. Contract Administration (12)	$1,000,000	$15,000,000	$25,000,000	$25,000,000	
Variable Rate	8%	8%	0.08	8%	
0	0%	$0			

RECLAMATION COST ESTIMATION SUMMARY SHEET FOOTNOTES
NOTE :

Contractor Profit -Due to True North being a smaller scale project
a higer percentage rate is used.
Growth Media Placement - Recent contractor quotes are for hauling and placement within a mile radius.
Brining cost in line with recent contractor quotes.

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Project Name: True North - Reclamation Plan
Date of Submittal: 4/20/2012
File Name: SRCE_Version_1_4_1_014.xlsm
Model Version: Version 1.4.1
Cost Data: User Data
Cost Data File: Cost data for SRCE model.xlsm
Cost Estimate Type: Surety Cost Basis: Alaska

Cost Schedule and Financial Analysis

Budget Year:	2012	
First Year of Operation	2000	
Operating Period	5	years
Closure Year 1:	2012	
Closure Period:	1	years
Post Closure Period	30	years

Inflation Rate (r) (%):	0.0%
Market Risk (MR)(%):	0.0%
Discount Rate (i)(%):	0.0%

Closure Period:	
Post Closure Period:	

Engineering, Design and Construction Plan (%)	4%
Contingency (%)	10.0%
Contractor OH and Profit (CP)(%):	35%
Contract Administration (%)	8%

Show how many years in schedule (10 to 100): 20 Set Years <<< Set years and click "Set Years" button

	Term (t)(years): Schedule Variance	Total From Cost Summary	0 2012	1 2013	2 2014	3 2015	4 2016	5 2017	6 2018	7 2019	8 2020	9 2021	10 2022	11 2023	12 2024	13 2025	14 2026	15 2027	16 2028	17 2029	18 2030	19 2031	20 2032	TOTAL	Comments
A. Earthwork/Recontouring																									
Exploration	$ -	$ -																						$ -	
Exploration Roads & Drill Pads	$ -	$ -																						$ -	
Roads	$ (105,932)	$ 105,932																						$ -	
Well Abandonment	$ (4,153)	$ 4,153																						$ -	
Pits	$ -	$ -																						$ -	
Quarries & Borrow Areas	$ -	$ -																						$ -	
Underground Openings	$ -	$ -																						$ -	
Process Ponds	$ -	$ -																						$ -	
Heaps	$ -	$ -																						$ -	
Waste Rock Dumps	$ (270,392)	$ 270,392																						$ -	
Landfills	$ -	$ -																						$ -	
Tailings	$ -	$ -																						$ -	
Foundation & Buildings Areas	$ -	$ -																						$ -	
Yards, Etc.	$ (162,861)	$ 162,861																						$ -	
Drainage & Sediment Control	$ (3,029)	$ 3,029																						$ -	
Generic Material Hauling	$ (109,608)	$ 109,608																						$ -	
Other User Costs (from Other User sheet)	$ (714,746)	$ 714,746																						$ -	
Other**	$ -	$ -																						$ -	
Mob/Demob if included in Other User sheet	$ (76,864)	$ 76,864																						$ -	
Mob/Demob	$ -	$ -																						$ -	
Subtotal "A"	$ (1,447,585)	$ 1,447,585	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	
B. Revegetation/Stabilization																									
Exploration	$ -	$ -																						$ -	
Exploration Roads & Drill Pads	$ -	$ -																						$ -	
Roads	$ (14,187)	$ 14,187																						$ -	
Well Abandonment		N/A																						$ -	
Pits	$ -	$ -																						$ -	
Quarries & Borrow Areas	$ -	$ -																						$ -	
Underground Openings		N/A																						$ -	
Process Ponds	$ -	$ -																						$ -	
Heaps	$ -	$ -																						$ -	
Waste Rock Dumps	$ (35,851)	$ 35,851																						$ -	
Landfills	$ -	$ -																						$ -	
Tailings	$ -	$ -																						$ -	
Foundation & Buildings Areas	$ -	$ -																						$ -	
Yards, Etc.	$ (5,365)	$ 5,365																						$ -	
Drainage & Sediment Control	$ (309)	$ 309																						$ -	
Generic Material Hauling	$ -	$ -																						$ -	
Other User Costs (from Other User sheet)	$ (26,551)	$ 26,551																						$ -	
Other**	$ -	$ -																						$ -	
Subtotal "B"	$ (82,263)	$ 82,263	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	
C. Detoxification/Water Treatment/Disposal of Wastes**																									
Process Ponds/Sludge	$ -	$ -																						$ -	
Heaps	$ -	$ -																						$ -	
Dumps (Waste & Landfill)	$ -	$ -																						$ -	
Tailings	$ -	$ -																						$ -	
Surplus Water Disposal	$ -	$ -																						$ -	
Monitoring	$ -	$ -																						$ -	
Miscellaneous	$ -	$ -																						$ -	
Solid Waste - On Site	$ -	$ -																						$ -	
Solid Waste - Off Site	$ -	$ -																						$ -	
Hazardous Materials	$ -	$ -																						$ -	
Hydrocarbon Contaminated Soils	$ -	$ -																						$ -	
Pumping (from Solution Mgmt sheet)	$ -	$ -																						$ -	
Evaporation (from Solution Mgmt sheet)	$ -	$ -																						$ -	
Treatment (from Solution Mgmt sheet)	$ -	$ -																						$ -	
Decontamination (from Solution Mgmt sheet)	$ -	$ -																						$ -	
Other User Costs (from Other User sheet)	$ -	$ -																						$ -	
Other**	$ -	$ -																						$ -	
Subtotal "C"		$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	
D. Structure, Equipment and Facility Removal, and Misc.																									
Foundation & Buildings Areas	$ -	$ -																						$ -	
Other Demolition	$ -	$ -																						$ -	
Equipment Removal	$ -	$ -																						$ -	
Fence Removal	$ -	$ -																						$ -	
Fence Installation	$ -	$ -																						$ -	
Culvert Removal	$ -	$ -																						$ -	
Pipe Removal	$ -	$ -																						$ -	
Powerline Removal	$ -	$ -																						$ -	
Transformer Removal	$ -	$ -																						$ -	
Rip-rap, rock lining, gabions	$ -	$ -																						$ -	
Other Misc. Costs	$ -	$ -																						$ -	
Other User Costs (from Other User sheet)	$ -	$ -																						$ -	
Other**	$ -	$ -																						$ -	
Subtotal "D"		$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	
E. Monitoring																									
Reclamation Monitoring and Maintenance	$ (319,098)	$ 319,098																						$ -	
Ground and Surface Water Monitoring (calculated from user input in Monitoring Sheet)	$ -	$ 6,788		$ 970	$ 970	$ -	$ -	$ 970	$ -	$ -	$ -	$ -	$ 970	$ -	$ -	$ -	$ -	$ 970	$ -	$ -	$ -	$ -	$ 970	$ 6,788	
Other User Costs (from Other User sheet)	$ (26,591)	$ 26,591																						$ -	
Subtotal "E"	$ (345,689)	$ 352,477	$ -	$ 970	$ 970	$ -	$ -	$ 970	$ -	$ -	$ -	$ -	$ 970	$ -	$ -	$ -	$ -	$ 970	$ -	$ -	$ -	$ -	$ 970	$ 6,788	
F. Construction Management & Support																									
Construction Management	$ -	$ -																						$ -	
Construction Support	$ -	$ -																						$ -	
Road Maintenance	$ -	$ -																						$ -	
Other User Costs (from Other User sheet)	$ -	$ -																						$ -	
Other**	$ -	$ -																						$ -	
Subtotal "F"		$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	

	Term (t)(years):	Total From Cost Summary	0	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	TOTAL	Comments
	Schedule Variance		2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030	2031	2032		
G. Closure Planning, G&A, Human Resources																									
Closure Planning	$ (30,000)	$ 30,000																						$ -	
General & Administration	#VALUE!	#VALUE!																						$ -	
Human Resources	#VALUE!	#VALUE!																						$ -	
Other User Costs (from Other User sheet)	$ -	$ -																						$ -	
Other**	$ -	$ -																						$ -	
Subtotal "G"	$ (30,000)	$ 30,000	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	
Subtotal Operational & Maintenance Costs																									
Subtotal A through G	$ (1,905,537)	$ 1,912,325	$ -	$ 970	$ 970	$ -	$ -	$ 970	$ -	$ -	$ -	$ -	$ 970	$ -	$ -	$ -	$ -	$ 970	$ -	$ -	$ -	$ -	$ 970	$ 6,788	
Indirect Costs																									
1. Engineering, Design and Construction (ED&C) Plan (7)	$ (76,493)	$ 76,493																						$ -	
2. Contingency (8)		$ 191,233	$ -	$ 97	$ 97	$ -	$ -	$ 97	$ -	$ -	$ -	$ -	$ 97	$ -	$ -	$ -	$ -	$ 97	$ -	$ -	$ -	$ -	$ 97	$ 679	
3. Insurance (9)	$ (6,805)	$ 6,805																						$ -	
4. Performance Bond (10)	$ (57,370)	$ 57,370																						$ -	
5. Contractor Profit (11)		$ 669,314	$ -	$ 339	$ 339	$ -	$ -	$ 339	$ -	$ -	$ -	$ -	$ 339	$ -	$ -	$ -	$ -	$ 339	$ -	$ -	$ -	$ -	$ 339	$ 2,376	
6. Contract Administration (12)		$ 152,986	$ -	$ 78	$ 78	$ -	$ -	$ 78	$ -	$ -	$ -	$ -	$ 78	$ -	$ -	$ -	$ -	$ 78	$ -	$ -	$ -	$ -	$ 78	$ 543	
7. Government Indirect Cost (13)	$ -	$ -																						$ -	
Subtotal Add-On Costs	$ (1,150,603)	$ 1,154,201	$ -	$ 514	$ 514	$ -	$ -	$ 514	$ -	$ -	$ -	$ -	$ 514	$ -	$ -	$ -	$ -	$ 514	$ -	$ -	$ -	$ -	$ 514	$ 3,598	
Grand Total (Undiscounted)	$ (3,056,140)	$ 3,066,526	$ -	$ 1,484	$ 1,484	$ -	$ -	$ 1,484	$ -	$ -	$ -	$ -	$ 1,484	$ -	$ -	$ -	$ -	$ 1,484	$ -	$ -	$ -	$ -	$ 1,484	$ 10,386	
Inflation Adjustment (Future Value = FV)	$FV = Se^{(rt)}$		$ -	$ 1,484	$ 1,484	$ -	$ -	$ 1,484	$ -	$ -	$ -	$ -	$ 1,484	$ -	$ -	$ -	$ -	$ 1,484	$ -	$ -	$ -	$ -	$ 1,484	$ 10,386	
Market Risk Adjustment	**(MR x FV)**		$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	
Future Value (Fv_{adj})	**Fv_{adj} = (FV + MR)**		$ -	$ 1,484	$ 1,484	$ -	$ -	$ 1,484	$ -	$ -	$ -	$ -	$ 1,484	$ -	$ -	$ -	$ -	$ 1,484	$ -	$ -	$ -	$ -	$ 1,484	$ 10,386	
Net Present Value (PV)	**$PV = Fv_{adj}/(1+i)^t$**	$ 10,386	$ -	$ 1,484	$ 1,484	$ -	$ -	$ 1,484	$ -	$ -	$ -	$ -	$ 1,484	$ -	$ -	$ -	$ -	$ 1,484	$ -	$ -	$ -	$ -	$ 1,484	$ 10,386	

Grand Total (Undiscounted)		$ 10,386
Grand Total (Inflation Adjusted) (FV)		$ 10,386
Grand Total Market Risk Adjusted (Fv_{adj})		$ 10,386
Grand Total Net Present Value (NPV)		$ 10,386

Source: This worksheet was prepared and contributed by Patric Lassiter, SRK Consulting

Closure Cost Estimate
Other User

Project Name: True North - Reclamation Plan
Date of Submittal: 4/20/2012
File Name: SRCE_Version_1_4_1_014.xlsm
Model Version: Version 1.4.1
Cost Data: User Data
Cost Data File: Cost data for SRCE model.xlsm
Cost Estimate Type: Surety Cost Basis: Alaska

Other Cost Items Calculated Elsewhere

	Description (required)	ID Code	Facility Type	Quantity	Units	Total Capital Cost $	Material Unit Cost $	Labor Unit Cost $	Equipment/ Operating Unit Cost $	Cost Type (select)	Total Cost $	Comments
1	Waste Rock Stability Monitoring		Waste Rock Dump	10	Events	$0	$0.00	$1,136.95	$249.07	E. Monitoring	$13,860	See User 1 Tab
2	2012 Compliance monitoring		Monitoring/Regulatory R	15	Events	$0	$0.00	$320.00	$528.75	E. Monitoring	$12,731	See User 2 Tab
3	Zep/Hindenberg and N Shepard Dump Regrade		Waste Rock Dump	1	Events	$0	$0.00	$8,343.10	$80,658.37	A. Earthwork	$89,001	See User 3 Tab
4	East Shepard Area B		Waste Rock Dump	1	Events	$0	$0.00	$73,851.24	$137,396.24	A. Earthwork	$211,247	See User 4 Tab
5	Monitoring Well Closure		Monitoring/Regulatory R	11	Wells	$0	$0.00		$37,500.00	A. Earthwork	$412,500	See User 5 Tab
6	Mob/Demob Fees		Equipment Removal	2	Events	$0	$0.00	$16,957.67	$21,474.55	Mob/Demob	$76,864	See User 6 Tab
7	Seed and Fertilizer Difference		Other Facilities	1	Events	$0	$7,822.98	$0.00	$18,727.74	B. Revegetation	$26,551	See User 7 Tab
8	RS 2477 Connector Trail Install (Mob/Demob included in line 6)		Other Facilities	1	Events	$0	$0.00	$730.90	$1,266.23	A. Earthwork	$1,997	See User 8 Tab
						$0	$7,823	$133,010	$703,920		$844,753	

Notes: Capital cost is lump sum (i.e. not multiplied by the quantity).
Material, Labor and Equipment/Operating costs are unit costs (i.e. multiplied by the quantity).

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Closure Cost Estimate
Closure Planning

Project Name: True North - Reclamation Plan
Date of Submittal: 4/20/2012
File Name: SRCE_Version_1_4_1_014.xlsm
Model Version: Version 1.4.1
Cost Data: User Data
Cost Data File: Cost data for SRCE model.xlsm
Cost Estimate Type: Surety Cost Basis: Alaska

Closure Plan Management	
	Totals
Technical Studies	$30,000
Engineering	$0
Permitting	$0
TOTALS	**$30,000**

Color Code Key	
User Input - Direct Input	**Direct Input**
User Input - Pull Down List	**Pull Down Selection**
Program Constant (can override)	**Alternate Input**
Program Calculated Value	**Locked Cell - Formula or Reference**

Closure Plan Studies and Reporting

	Description (required)	ID Code	Type (select type)	Total Cost $	Comments
1	**Waste Rock Stability Analysis**		**geotechnical**	**$15,000**	**Anticipated Reports**
2	**Water Quality Analyis and Report**		**water quality**	**$15,000**	**Anticipated Reports**
				$30,000	

Notes:

Closure Plan Engineering

	Description (required)	ID Code	Type (select type)	Total Cost $	Comments
1					
				$0	

Notes:

Closure Plan Permitting

	Description (required)	ID Code	Type (select type)	Total Cost $	Comments
1					
				$0	

Notes:

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Closure Cost Estimate
Reclamation Quantities

Project Name: True North - Reclamation Plan
Date of Submittal: 4/20/2012
File Name: SRCE_Version_1_4_1_014.xlsm
Model Version: Version 1.4.1
Data Cost File: Cost data for SRCE model.xlsm
Cost Data: User Data
Cost Data File: Cost data for SRCE model.xlsm
Cost Estimate Type: Surety Cost Basis: Alaska

Reclamation Quantity Summary

												Unit Costs					
	Description	Total Regrade or Haul Volume cy	Total Regrade or Haul Cost $	Total Cover Volume cy	Cover Placement Cost $	Total Growth Media Volume cy	Growth Media Placement Cost $	Total Surface Area acres	Total Scarify Cost $	Total Revetation Cost $	TOTALS $	Regrade Unit Cost $/CY	Material Haul or Backfill Unit Cost $/CY	Cover Unit Cost $/CY	Growth Media Unit Cost $/CY	Scarify Unit Cost $/CY	Area Unit Cost $/acre
1	Waste Rock Dumps	192,178	$ 99,936		$ -	84,846	$ 152,893	106.3	$ 17,563	$ 35,851	$ 306,243	$0.52	N/A		$1.80	$165.22	$2,880.93
2	Tailings Impoundments		$ -		$ -		$ -		$ -	$ -	$ -		N/A				
3	Heap Leach Pads		$ -		$ -		$ -		$ -	$ -	$ -		N/A				
5	Open Pits		$ -							$ -	$ -		N/A				
4	Quarries & Borrow Pits		$ -		$ -		$ -		$ -	$ -	$ -		N/A				
6	Roads	102,632	$ 92,915			4,167	$ 6,378	41.62	$ 6,571	$ 14,187	$ 120,051	$0.91	N/A		$1.53	$157.88	$2,884.45
7	Landfills		$ -		$ -		$ -		$ -	$ -	$ -		N/A				
8	Buildings				$ -		$ -		$ -	$ -	$ -		N/A				
9	Yards	80,850	$ 143,214		$ -	10,810	$ 16,929	17.56	$ 2,718	$ 5,365	$ 168,226	$1.77	N/A		$1.57	$154.78	$9,580.07
10	Ponds		$ -				$ -			$ -	$ -	N/A					
11	Exploration Roads		$ -				$ -		$ -	$ -	$ -		N/A				
12	Exploration Trenches		$ -							$ -	$ -		N/A				
13	Diversion Ditches		$ 3,029					0.7		$ 309	$ 3,338		N/A				$4,768.57
14	Sediment Ponds		$ -				$ -		$ -	$ -	$ -						
15	Generic Haulage/Backfill	75,910	$ 109,598		$ -		$ -	0.8	$ -	$ -	$ 109,598	N/A	$1.44			$0.00	#########
16	Adit/Decline Backfilling1		$ -								$ -	N/A					
17	Shaft Backfilling		$ -								$ -	N/A					
	TOTALS	451,570	$ 448,692	-	$ -	99,823	$ 176,200	166.98	$ 26,852	$ 55,712	$ 707,456						
	Average Costs	per CY	$0.99	per CY		per CY	$1.77	per acre	$160.81	$2.07	$4,237	per acre					

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Closure Cost Estimate
Waste Rock Dumps

Project Name: True North - Reclamation Plan
Date of Submittal: 4/20/2012
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Model Version: Version 1.4.1
Cost Data: User Data
Cost Data File: Cost data for SRCE model.xlsm
Cost Estimate Type: Surety Cost Basis: Alaska

Waste Rock Dumps - Cost Summary

	Labor	Equipment	Materials	Totals
Grading Costs	$34,937	$64,999	N/A	$99,936
Cover Placement Cost	$0	$0	N/A	$0
Topsoil Placement Cost	$110,805	$42,088	N/A	$152,893
Ripping/Scarifying Cost	$6,140	$11,423	N/A	$17,563
Subtotal Earthworks	**$151,882**	**$118,510**	**$0**	**$270,392**
Revegetation Cost	$0	$24,928	$10,923	$35,851
TOTALS	**$151,882**	**$143,438**	**$10,923**	**$306,243**

Color Code Key

User Input - Direct Input	**Direct Input**
User Input - Pull Down List	**Pull Down Selection**
Program Constant (can override)	**Alternate Input**
Program Calculated Value	**Locked Cell - Formula or Reference**

Waste Rock Dumps - User Input

You must fill in ALL green cells in this section for each dump, lift or dump category

	Facility Description			Physical - MANDATORY									Cover				Growth Media			
	Description (required)	ID Code	Type	Underlying Ground Slope % Grade	Ungraded Slope _H:1V	Final Slope _H:1V	Final Top Slope % Grade	Lift (dump) Height ft	Mid-Bench Length ft	Average Flat Area Long Dimension (ripping distance) ft	Final (Regraded) Dump Footprint acres	Regrade Volume (1) (if calculated elsewhere) cy	Cover Thickness Slopes in	Cover Thickness Flat Areas in	Distance from Cover Borrow ft	Slope from Dump to Cover Borrow % grade	Slope Growth Media Thickness in	Flat Area Growth Media Thickness in	Distance from Growth Media Stockpile ft	Slope from Dump to Stockpile % grade
1	East Shepard Dump Section A (small section is located in Mid Shepard Dump)		Waste Rock Du	6.0	2.0	3.0	1.0	60	316	217	1.13						6.0	6.0	5,280	-10.0
2	Lower AB Dump		Waste Rock Du	10.0	1.3	9.5	10.5	3	2,000	1,192	11.20						6.0	6.0	5,280	-10.2
3	Upper B Stock Pad		Stockpile	11.0	1.3	3.0	0.0	96	1,063	541	2.57						6.0	6.0	5,280	1.0
4	ANFO Area		Waste Rock Du	15.5	1.7	3.0	7.0	75	1,538	700	9.70						6.0	6.0	5,280	-10.0
5	Spruce Creek Hydro Connection		Waste Rock Du	17.0	1.3	3.0	11.0	3	375	375	1.32	13,500								

Notes:
1. All Physical parameters must be input even if manual overrides for volume or area are used.
2. If Slope from facility to borrow source is >20, downhill travel time may be underestimated due to limitation of uphill travel time curves and downhill speed tables from CAT Handbook (see Productivty Sheet)

Waste Rock Dumps - User Input (cont.)

You must fill in ALL green cells and relevant blue cells in this section for each dump, lift or dump category

		Grading				Cover		Growth Media		Revegetation								
	Description (required)	Dozing Material Condition (select)	Dump Material Type (select)	Grading Equipment Fleet (select)	Slot/Side-by-Side (select)	Cover Material Type (select)	Cover Placement Equipment Fleet (select)	Growth Media Material Type (select)	Growth Media Equipment Fleet (select)	Seed Mix Slopes (select)	Seed Mix Flat Areas (select)	Mulch Slopes (select)	Mulch Flat Areas (select)	Fertilizer Slopes (select)	Fertilizer Flat Areas (select)	Slope Scarify/ Rip? (select)	Flat Area Scarify/ Rip? (select)	Scarify/ Ripping Fleet (select)
1	East Shepard Dump Section A (small section is located in	1	Shale	Med	No			Topsoil	Med Truck	User Mix 5 (fr	User Mix 5 (fron	None	None	Chemical	Chemical	Yes	Yes	Med Dozer
2	Lower AB Dump	1	Shale	Med	No			Topsoil	Med Truck	User Mix 5 (fr	User Mix 5 (fron	None	None	Chemical	Chemical	Yes	Yes	Med Dozer
3	Upper B Stock Pad	1	Shale	Med	No			Topsoil	Med Truck	User Mix 5 (fr	User Mix 5 (fron	None	None	Chemical	Chemical	Yes	Yes	Med Dozer
4	ANFO Area	1	Shale	Med	No			Topsoil	Med Truck	User Mix 5 (fr	User Mix 5 (fron	None	None	Chemical	Chemical	Yes	Yes	Med Dozer
5	Spruce Creek Hydro Connection	1	Shale	Med	No											Yes	Yes	Med Dozer

Notes:
1. Material Types are used for density correction based on material densities in Caterpillar Performance Handbook material density table

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Waste Rock Dumps - Calculations

Regrading Volume Calculation

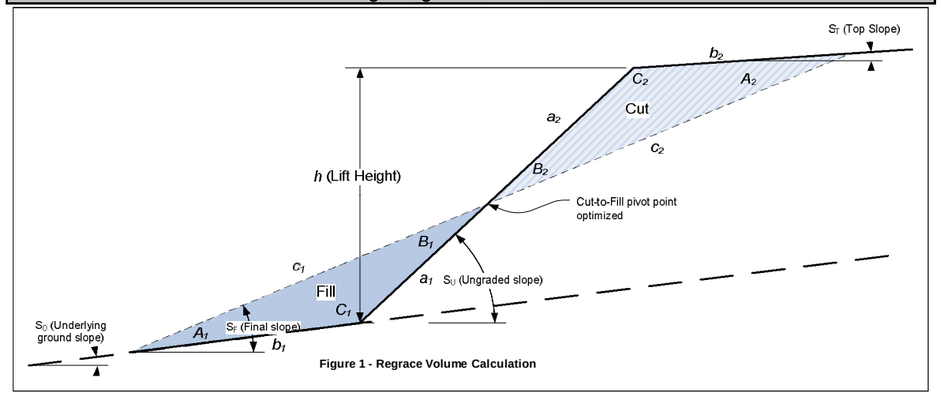

Figure 1 - Regrace Volume Calculation

Final Slope Area and Footprint Area Calculations

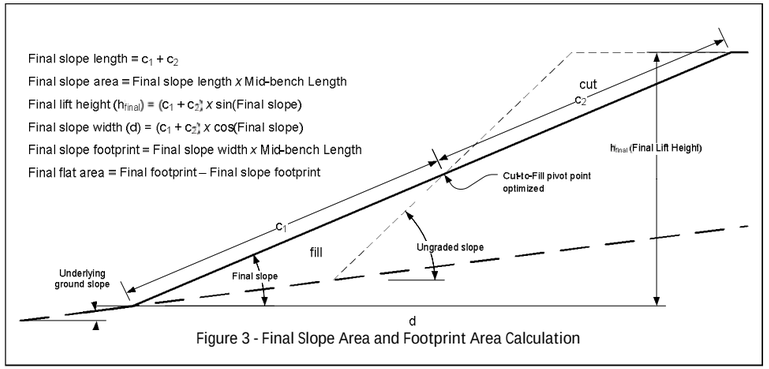

Figure 3 - Final Slope Area and Footprint Area Calculation

Regrading Push Distance Calculation

dozing distance: based on 2/3 final cut slope + 2/3 final fill slope (minimum = 50 ft)

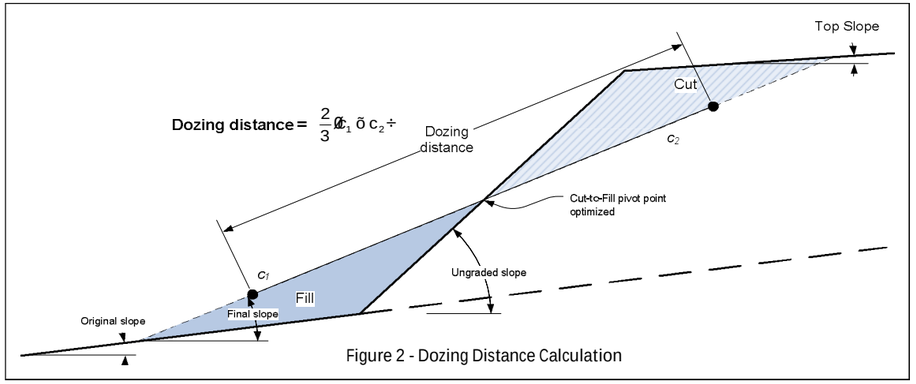

Figure 2 - Dozing Distance Calculation

Ripping/Scarifying Calculations

Minimum 1 hr ripping/scarifying time per dump

Slopes:
Number of passes = Final slope length ÷ Grader width
Travel distance = Number of passes x Mid-bench length
Total hours = (Travel distance ÷ Grader productivity) + (Number of passes x Grader maneuver time)
Minimum 1 hr

Flat Areas:
Flat area width = Final flat area ÷ Average long dimensions
Number of passes = Flat area width ÷ Grader width
Travel distance = Number of passes x Average long dimensions
Total hours = (Travel distance ÷ Grader productivity) + (Number of passes x Grader maneuver time)

Revegetation: Minimum 1 acre revegetation crew time per area

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Closure Cost Estimate
Waste Rock Dumps

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Waste Rock Dumps - Regrading Costs

Productivity = Dozer Productivity x Grade Correction x Density Correction x Operator (0.75) x Material x Visibility x Job Efficiency (0.83) x (Slot/Side-by-Side) x (Altitude Deration)

	Description (required)	Regrading Volume cy	Dozing Distance (see above) ft	Regrading Fleet	Uncorrected Dozer Productivity cy/hr	Grade Correction	Dozing Material	Density Correction	Side-by-Side or Slot Dozing	Total Hourly Productivity cy/hr	Total Dozer Hours hr	Total Labor Cost $	Total Equipment Cost $	Total Regrading Cost $
1	East Shepard Dump Section A (small section is located in	5,477	110	D8R	715	1.6	1.0	1.10	1.0	783	7	$512	$952	$1,464
2	Lower AB Dump	22,000	618	D8R	111	1.6	1.0	1.10	1.0	122	180	$13,156	$24,476	$37,632
3	Upper B Stock Pad	86,890	165	D8R	461	1.6	1.0	1.10	1.0	505	172	$12,571	$23,389	$35,960
4	ANFO Area	64,311	147	D8R	523	1.6	1.0	1.10	1.0	573	112	$8,186	$15,230	$23,416
5	Spruce Creek Hydro Connection	13,500	50	D8R	1,677	1.6	1.0	1.10	1.0	1,837	7	$512	$952	$1,464
		192,178									478	**$34,937**	**$64,999**	**$99,936**

Waste Rock Dumps - Cover and Growth Media Costs

		Cover (lower layer)								Growth Media Placement							
	Description (required)	Cover Volume cy	Cover Replacement Fleet	Fleet Productivity LCY/hr	Number of Trucks/ Scrapers	Total Fleet Hours	Cover Labor Cost $	Cover Equipment Cost $	Total Cover Cost $	Growth Media Volume cy	Growth Media Replacement Fleet	Fleet Productivity BCY/hr	Number of Trucks/ Scrapers	Total Fleet Hours	Total Labor Cost $	Total Equipment Cost $	Total Topsoiling Cost $
1	East Shepard Dump Section A (small section is located in						$0	$0	$0	1,162	730/972G	488	7	2	$1,316	$478	$1,794
2	Lower AB Dump						$0	$0	$0	68,559	730/972G	488	7	140	$92,093	$33,480	$125,573
3	Upper B Stock Pad						$0	$0	$0	6,752	730/972G	396	3	17	$6,213	$4,065	$10,278
4	ANFO Area						$0	$0	$0	8,373	730/972G	488	7	17	$11,183	$4,065	$15,248
5	Spruce Creek Hydro Connection						$0	$0	$0						$0	$0	$0
							$0	**$0**	**$0**	84,846				176	**$110,805**	**$42,088**	**$152,893**

Waste Rock Dumps - Scarifying/Revegetation Costs

	Description (required)	Slope Area acres	Flat Area acres	Total Surface Area acres	Final Slope Length ft	Flat Area Long Dimension ft	Ripping/ Scarifying Fleet	Slope Scarifying/ Ripping Hours hrs	Flat Area Scarifying/ Ripping Hours hrs	Scarifying/ Ripping Labor Costs $	Scarifying/ Ripping Equipment Cost $	Total Scarifying/ Ripping Costs $	Revegetation Labor Cost $	Revegetation Equipment Cost $	Revgetation Material Cost $	Total Revegetation Cost $
1	East Shepard Dump Section A (small section is located in	1.44		1.44	198	217	D8R	1		$73	$136	$209	$0	$341	$150	$491
2	Lower AB Dump	84.99		84.99	1,851	1,192	D8R	67		$4,897	$9,111	$14,008	$0	$20,143	$8,825	$28,968
3	Upper B Stock Pad	8.37		8.37	343	541	D8R	7		$512	$952	$1,464	$0	$1,984	$870	$2,854
4	ANFO Area	10.38		10.38	294	700	D8R	8		$585	$1,088	$1,673	$0	$2,460	$1,078	$3,538
5	Spruce Creek Hydro Connection	0.12	1.00	1.12	14	375	D8R	0	1	$73	$136	$209	$0	$0	$0	$0
		105.30	1.00	106.30				83	1	**$6,140**	**$11,423**	**$17,563**	**$0**	**$24,928**	**$10,923**	**$35,851**

Notes: 1) Minimum total ripping hours = 1 (i.e. If total ripping hrs (slope + flat) < 1, then one hour of fleet time is assumed, regardless of acres shown in in scarifying table.)

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Closure Cost Estimate
Roads

Project Name: True North - Reclamation Plan
Date of Submittal: 4/20/2012
File Name: SRCE_Version_1_4_1_014.xlsm
Model Version: Version 1.4.1
Cost Data: User Data
Cost Data File: Cost data for SRCE model.xlsm
Cost Estimate Type: Surety Cost Basis: Alaska

Roads - Cost Summary	Labor	Equipment	Materials	Totals
Grading Costs	$33,182	$59,733	N/A	$92,915
Cover Placement Cost	$3,508	$2,870	N/A	$6,378
Ripping/Scarifying Cost	$2,342	$4,229	N/A	$6,571
Subtotal Earthworks	**$39,032**	**$66,832**		**$105,864**
Revegetation Cost	$0	$9,863	$4,324	$14,187
TOTALS	**$39,032**	**$76,695**	**$4,324**	**$120,051**

Color Code Key	
User Input - Direct Input	**Direct Input**
User Input - Pull Down List	**Pull Down Selection**
Program Constant (can override)	**Alternate Input**
Program Calculated Value	**Locked Cell - Formula or Reference**

Maximum slope grade allowed for dozer: **30** % (max 40%)

Roads - User Input

You must fill in ALL green cells and relevant blue cells in this section for each road

	Facility Description			Physical (1) - MANDATORY						User Overrides		Growth Media		
	Description (required)	ID Code	Type	Underlying Ground Slope % grade	Ungraded Slope _H:1V	Cut Slope degrees	Road Width ft	Road Length ft	Slope Replacement Percent %	Regrade Volume (if calculated elsewhere) cy	Disturbed Area (if calculated elsewhere) acres	Growth Media Thickness in	Haul Distance from Growth Media Stockpile ft	Slope from Road to Stockpile % grade
1	**Explosives Road Sections A-D**		**Project Road**	**15.0**	**1.7**	**80.0**	**85.0**	**2,216**	**80%**			**6.0**	**2,216**	**6%**
2	**Shop Pad Road Sect 1**		**Project Road**	**5.5**	**1.7**	**80.0**	**60.0**	**2,395**	**100%**					
3	**Shop Pad Road Sect 2**		**Project Road**	**16.7**	**1.7**	**80.0**	**60.0**	**3,461**	**80%**					
4	**Shop Pad Road Sect 3**		**Project Road**	**21.0**	**1.7**	**80.0**	**60.0**	**1,110**	**80%**					
5	**Shepard Road Sect 1**		**Project Road**	**25.6**	**1.7**	**80.0**	**60.0**	**2,084**	**80%**					
6	**Shepard Road Sect 2**		**Project Road**	**30.0**	**1.7**	**80.0**	**60.0**	**4,881**	**80%**					
7	**Shepard Road Sect 3**		**Project Road**	**20.0**	**1.7**	**80.0**	**60.0**	**822**	**100%**					
8	**North Shepard Dump Road**		**Project Road**	**47.0**	**1.7**	**80.0**	**60.0**	**1,000**	**100%**					
9	**Hindenburg Road**		**Project Road**	**14.0**	**1.7**	**80.0**	**60.0**	**3,362**	**100%**					

Notes:
1. All Physical parameters must be input even if manual overrides for volume or area are used.
2. If Slope from facility to borrow source is >20, downhill travel time may be underestimated due to limitation of uphill travel time curves and downhill speed tables from CAT Handbook (see Productivty Sheet)
3. Because the work required for building roads with a dozer is similar to that required to regrade a road with a dozer, this sheet could be used to provide a rough estimate of road construction costs if a dozer is selected as the grading fleet.

North Shepard Dump Road - Ungraded and cut slope is a best guess.
Shepard Road regrade volume incudes berm material
Explosives Road is the road only. ANFO bin area is now treated as a WRD.

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Closure Cost Estimate
Roads

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Model Version: Version 1.4.1
Cost Data: User Data
Cost Data File: Cost data for SRCE model.xlsm
Cost Estimate Type: Surety Cost Basis: Alaska

Roads - User Input (cont.)

		Haul Road Safety Berms				
	Description (required)	Berm Length ft	Berm Height ft	Berm Base Width ft	Berm Sideslope Angle _H:1V	Number of Berms (2) (1 or 2 sides)
1	Explosives Road Sections A-D	2,216.0	2.5	7.0	1.3	1
2	Shop Pad Road Sect 1					
3	Shop Pad Road Sect 2					
4	Shop Pad Road Sect 3					
5	Shepard Road Sect 1					
6	Shepard Road Sect 2					
7	Shepard Road Sect 3					
8	North Shepard Dump Road	1,000.0	2.5	7.0	1.3	1
9	Hindenburg Road					

(2) Enter 1 if berm on only one side of road, 2 if both sides of road are bermed.

Roads - User Input (cont.)

You must fill in ALL green cells and relevant blue cells in this section for each road

		Grading				Growth Media			Revegetation				
	Description (required)	Dozing Material Condition (select)	Cut Material Type (select)	Recontouring Equipment Fleet(2) (select)	No. of Excavators if grade >30% (select)	Growth Media Material Type (select)	Cover Placement Equipment Fleet (select)	Maximum Fleet Size (user override)	Seed Mix (select)	Mulch (select)	Fertilizer (select)	Scarifying/ Ripping? (select)	Ripping Fleet (select)
1	Explosives Road Sections A-D	1	Shale	Med Dozer		Topsoil	Med Truck		User Mix 5 (from	None	Chemical	Yes	Med Dozer
2	Shop Pad Road Sect 1	1	Shale	Med Dozer					User Mix 5 (from	None	Chemical	Yes	Med Dozer
3	Shop Pad Road Sect 2	1	Shale	Med Dozer					User Mix 5 (from	None	Chemical	Yes	Med Dozer
4	Shop Pad Road Sect 3	1	Shale	Med Dozer					User Mix 5 (from	None	Chemical	Yes	Med Dozer
5	Shepard Road Sect 1	1	Shale	Med Dozer					User Mix 5 (from	None	Chemical	Yes	Med Dozer
6	Shepard Road Sect 2	1	Shale	Med Dozer					User Mix 5 (from	None	Chemical	Yes	Med Dozer
7	Shepard Road Sect 3	1	Shale	Med Dozer					User Mix 5 (from	None	Chemical	Yes	Med Dozer
8	North Shepard Dump Road	1	Shale	Med Excavator	1				User Mix 5 (from	None	Chemical	Yes	Small Dozer
9	Hindenburg Road	1	Shale	Med Dozer					User Mix 5 (from	None	Chemical	Yes	Small Dozer

Notes:
1. Material Types are used for density correction based on material densities in Caterpillar Performance Handbook material density table
2. If original slope >30% only excavators are allowed.

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Closure Cost Estimate
Roads

Project Name: True North - Reclamation Plan
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Model Version: Version 1.4.1
Cost Data: User Data
Cost Data File: Cost data for SRCE model.xlsm
Cost Estimate Type: Surety Cost Basis: Alaska

Roads - Calculations

Regrading Volume and Footprint Volume

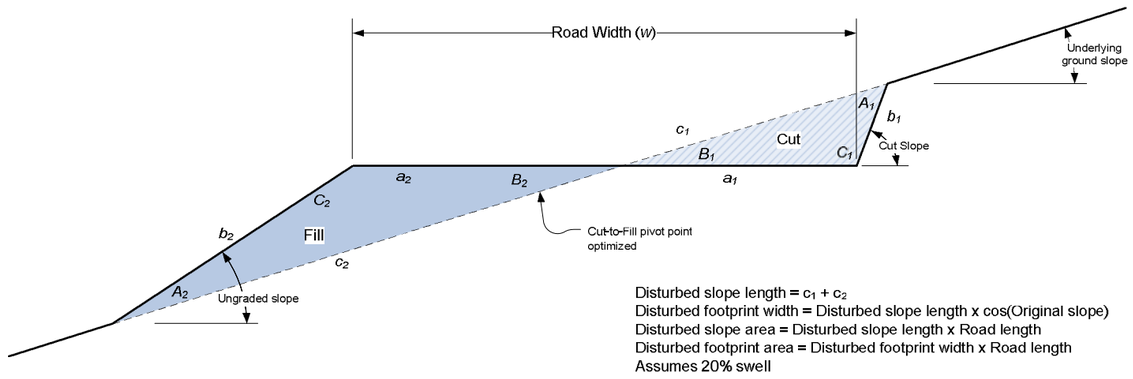


Figure 1 - Regrading Volume Calculation

Will not allow dozer for slopes greater than 30%
For dozer regrading push distance = road width
Assumes dozer push is uphill
Assumes minimum push distance of 100 ft

Ripping/Scarifying Calculations

Minimum 1 hr ripping/scarifying time per area
Number of passes = Final slope length ÷ Grader width
Travel distance = Number of passes x Road length
Total hours = (Travel distance ÷ Grader productivity) + (Number of passes x Grader maneuver time)
For dozer regrading assumes push distance = 3 x road width

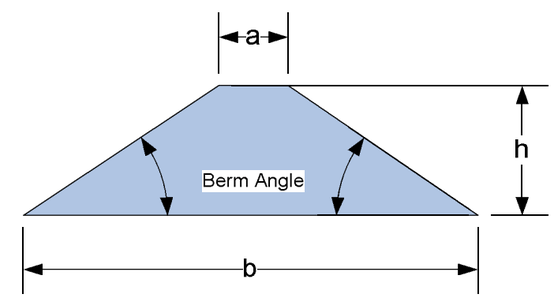
Revegetation Calculations

Minimum of 1 acre crew time per area

Safety Berm Volume Calculation

Cross Sectional Area = $\frac{(a + b)}{2} \times h$

Berm Volume = Berm Length x Cross Sectional Area x No. Sides



Total berm volume doubled if both sides of road are bermed.
If length of berm on each side of road is different, input total length of both berms and input 1 for number of sides

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Closure Cost Estimate
Roads

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Cost Data: User Data
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Roads - Regrading Costs

	Description (required)	Regrading Volume cy	Recontouring Fleet	Fleet Productivity cy/hr	Total Fleet Hours hr	Total Labor Cost $	Total Equipment Cost $	Total Regrading Cost $
1	**Explosives Road Sections A-D**	12,205	D8R	363	34	$2,485	$4,623	$7,108
2	**Shop Pad Road Sect 1**	2,532	D8R	480	5	$365	$680	$1,045
3	**Shop Pad Road Sect 2**	10,095	D8R	342	30	$2,193	$4,079	$6,272
4	**Shop Pad Road Sect 3**	4,313	D8R	287	15	$1,096	$2,040	$3,136
5	**Shepard Road Sect 1**	10,556	D8R	226	47	$3,435	$6,391	$9,826
6	**Shepard Road Sect 2**	30,954	D8R	167	185	$13,522	$25,156	$38,678
7	**Shepard Road Sect 3**	3,752	D8R	299	13	$950	$1,768	$2,718
8	**North Shepard Dump Road**	18,260	330C	369	49	$7,163	$11,325	$18,488
9	**Hindenburg Road**	9,965	D8R	376	27	$1,973	$3,671	$5,644
		102,632			405	**$33,182**	**$59,733**	**$92,915**

Roads - Growth Media Costs

	Description (required)	Growth Media Volume cy	Growth Media Replacement Fleet	Fleet Productivity LCY/hr	Number of Trucks/ Scrapers	Total Fleet Hours	Total Labor Cost $	Total Equipment Cost $	Total Topsoiling Cost $
1	**Explosives Road Sections A-D**	4,167	730/972G	357	2	12	$3,508	$2,870	$6,378
2	**Shop Pad Road Sect 1**						$0	$0	$0
3	**Shop Pad Road Sect 2**						$0	$0	$0
4	**Shop Pad Road Sect 3**						$0	$0	$0
5	**Shepard Road Sect 1**						$0	$0	$0
6	**Shepard Road Sect 2**						$0	$0	$0
7	**Shepard Road Sect 3**						$0	$0	$0
8	**North Shepard Dump Road**						$0	$0	$0
9	**Hindenburg Road**						$0	$0	$0
		4,167				12	**$3,508**	**$2,870**	**$6,378**

Roads - Scarifying/Revegetation Costs

	Description (required)	Total Surface Area acres	Final Slope Length ft	Ripping Hours hrs	Ripping Labor Costs $	Ripping Equipment Cost $	Total Ripping Costs $	Revegetation Labor Cost $	Revegetation Equipment Cost $	Revgetation Material Cost $	Total Revegetation Cost $
1	**Explosives Road Sections A-D**	5.17	102.0	4	$292	$544	$836	$0	$1,225	$537	$1,762
2	**Shop Pad Road Sect 1**	3.49	64.0	3	$219	$408	$627	$0	$827	$363	$1,190
3	**Shop Pad Road Sect 2**	5.84	73.0	5	$365	$680	$1,045	$0	$1,384	$606	$1,990
4	**Shop Pad Road Sect 3**	2.00	79.0	2	$146	$272	$418	$0	$474	$208	$682
5	**Shepard Road Sect 1**	4.09	85.0	3	$219	$408	$627	$0	$969	$425	$1,394
6	**Shepard Road Sect 2**	10.46	93.0	8	$585	$1,088	$1,673	$0	$2,479	$1,087	$3,566
7	**Shepard Road Sect 3**	1.46	77.0	1	$73	$136	$209	$0	$346	$152	$498
8	**North Shepard Dump Road**	3.66	160.0	3	$190	$297	$487	$0	$867	$380	$1,247
9	**Hindenburg Road**	5.45	71.0	4	$253	$396	$649	$0	$1,292	$566	$1,858
		41.62		33	**$2,342**	**$4,229**	**$6,571**	**$0**	**$9,863**	**$4,324**	**$14,187**

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Closure Cost Estimate
Haul Material

Project Name: True North - Reclamation Plan
Date of Submittal: 4/20/2012
File Name: SRCE_Version_1_4_1_014.xlsm
Model Version: Version 1.4.1
Cost Data: User Data
Cost Data File: Cost data for SRCE model.xlsm
Cost Estimate Type: Surety Cost Basis: Alaska

Generic Material Hauling - Cost Summary

	Labor	Equipment	Materials	Totals
Hauling/Crush/Screen/Compact	$61,972	$47,626	N/A	$109,598
Cover Placement Cost	$0	$0	N/A	$0
Topsoil Placement Cost	$0	$0	N/A	$0
Ripping/Scarifying Cost	$0	$0	N/A	$0
Subtotal Earthworks	**$61,972**	**$47,626**	**$0**	**$109,598**
Revegetation Cost	$0	$0	$0	$0
TOTALS	**$61,972**	**$47,626**	**$0**	**$109,598**

Color Code Key

User Input - Direct Input	**Direct Input**
User Input - Pull Down List	**Pull Down Selection**
Program Constant (can override)	**Alternate Input**
Program Calculated Value	**Locked Cell - Formula or Reference**

Generic Material Hauling - User Input

	Facility Description			Physical		Hauled Material			Crushing & Screening					Cover			Growth Media		
	Description (required)	ID Code	Type	Final Surface Area acres	Average Ripping Distance ft	Material Volume Required cy	Distance from Borrow Source (1) ft	Slope to Borrow Source % grade	Crush Material	Screen Material	Loss to Crushing/ Screening %	Distance to Placement Location (2) ft	Slope to Placement % grade	Cover Thickness in	Distance to Cover Borrow ft	Slope to Borrow % grade	Growth Media Thickness in	Distance to Growth Material Stockpile ft	Slope to Stockpile % grade
1	**East Shepard Dump Haul Material**		**Waste Rock Dump**			**20,000**	**1,500**	**6.9**	**No**	**No**									
2	**East Shepard Dump Clearing and Grubbing haul**		**Waste Rock Dump**			**7,250**	**300**	**-20.0**	**No**	**No**									
3	**Explosives Road Sec A**		**Waste Rock Dump**			**4,600**	**2,730**	**6.3**	**No**	**No**									
4	**Explosives Road Sec B**		**Waste Rock Dump**			**9,500**	**2,216**	**6.3**	**No**	**No**									
5	**Explosives Road Sec C**		**Waste Rock Dump**			**10,150**	**1,957**	**6.3**	**No**	**No**									
6	**Explosives Road Sec D**		**Waste Rock Dump**			**13,100**	**1,357**	**6.3**	**No**	**No**									
7	**Explosives Road Clearing and Grubbing Haul**		**Waste Rock Dump**			**11,300**	**1,200**	**-15.0**	**No**	**No**									
8	**Haul Material to Monitoring Well 1 to fill in undercut**		**Waste Rock Dump**			**10**	**3,853**	**20.0**	**No**	**No**									

Notes:
1. Input distance to crusher if material to be crushed
2. Input distance from crusher to placement if material to be crushed
3. If Slope from facility to borrow source is >20, downhill travel time may be underestimated due to limitation of uphill travel time curves and downhill speed tables from CAT Handbook (see Productivty Sheet)

Growth media placement is accounted for in WRD sheet and User Sheet 4

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Closure Cost Estimate
Haul Material

Project Name: True North - Reclamation Plan
Date of Submittal: 4/20/2012
File Name: SRCE_Version_1_4_1_014.xlsm
Model Version: Version 1.4.1
Cost Data: User Data
Cost Data File: Cost data for SRCE model.xlsm
Cost Estimate Type: Surety Cost Basis: Alaska

Generic Material Hauling - User Input (cont.)

		Hauling Material				Cover			Growth Media			Revegetation				
	Description (required)	Haul Material Type (select)	Material Hauling Fleet (select)	Each Fleet Size (from/to crusher) (user override)	Compact After Placement?	Cover Material Type (select)	Cover Placement Equipment Fleet (select)	Maximum Fleet Size (user override)	Growth Media Material Type (select)	Growth Media Equipment Fleet (select)	Maximum Fleet Size (user override)	Seed Mix (select)	Mulch Type (select)	Fertilizer Type (select)	Scarify/ Rip? (select)	Scarifying/ Ripping Fleet (select)
1	**East Shepard Dump Haul Material**	**Shale**	**Med Truck**		**No**											
2	**East Shepard Dump Clearing and Grubbing haul**	**Topsoil**	**Med Truck**		**No**											
3	**Explosives Road Sec A**	**Shale**	**Med Truck**		**No**											
4	**Explosives Road Sec B**	**Shale**	**Med Truck**		**No**											
5	**Explosives Road Sec C**	**Shale**	**Med Truck**		**No**											
6	**Explosives Road Sec D**	**Shale**	**Med Truck**		**No**											
7	**Explosives Road Clearing and Grubbing Haul**	**Topsoil**	**Med Truck**		**No**											
8	**Haul Material to Monitoring Well 1 to fill in undercut**	**Shale**	**Small Truck**		**No**											

Notes:
1. Material Types are used for density correction based on material densities in Caterpillar Performance Handbook material density table

Generic Material Hauling - Load, Haul, Place and Grade

		Material Haulage								Crush and/or Compact			
	Description (required)	Material Volume to Crusher cy	Final Material Volume cy	Material Haulage Fleet	Fleet Productivity LCY/hr	Number of Trucks/ Scrapers	Total Fleet Hours	Hauling Labor Cost $	Hauling Equipment Cost $	Total Crush/ Screen Cost $	Compact Labor Cost $	Compact Equipment Cost $	Total Load/Haul/ Place Cost $
1	**East Shepard Dump Haul Material**	20,000	20,000	730/972G	364	2	55	$16,080	$13,153	$0	$0	$0	$29,233
2	**East Shepard Dump Clearing and Grubbing haul**	7,250	7,250	730/972G	428	2	17	$4,970	$4,065	$0	$0	$0	$9,035
3	**Explosives Road Sec A**	4,600	4,600	730/972G	448	3	10	$3,655	$2,391	$0	$0	$0	$6,046
4	**Explosives Road Sec B**	9,500	9,500	730/972G	483	3	20	$7,309	$4,783	$0	$0	$0	$12,092
5	**Explosives Road Sec C**	10,150	10,150	730/972G	335	2	30	$8,771	$7,174	$0	$0	$0	$15,945
6	**Explosives Road Sec D**	13,100	13,100	730/972G	374	2	35	$10,233	$8,370	$0	$0	$0	$18,603
7	**Explosives Road Clearing and Grubbing Haul**	11,300	11,300	730/972G	408	3	28	$10,233	$6,696	$0	$0	$0	$16,929
8	**Haul Material to Monitoring Well 1 to fill in undercut**	10	10	725/966G	551	8	1	$721	$994	$0	$0	$0	$1,715
		75,910	75,910				196	**$61,972**	**$47,626**	**$0**	**$0**	**$0**	**$109,598**

Notes: Final Material Volume includes allowance for additional material hauled to crushing/screening plant based on Loss to Crushing/Screening input above.

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Closure Cost Estimate
Haul Material

Project Name: True North - Reclamation Plan
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File Name: SRCE_Version_1_4_1_014.xlsm
Model Version: Version 1.4.1
Cost Data: User Data
Cost Data File: Cost data for SRCE model.xlsm
Cost Estimate Type: Surety Cost Basis: Alaska

Generic Material Hauling - Cover and Growth Media Costs

		Cover Placement								Growth Media Placement							
	Description (required)	Cover Volume cy	Cover Placement Fleet	Cover Fleet Productivity LCY/hr	Number of Trucks/ Scrapers	Total Fleet Hours	Total Labor Cost $	Total Equipment Cost $	Total Cover Placement Cost $	Growth Media Volume cy	Growth Media Placement Fleet	Growth Media Fleet Productivity LCY/hr	Number of Trucks/ Scrapers	Total Fleet Hours	Total Labor Cost $	Total Equipment Cost $	Total Topsoil Placement Cost $
1	East Shepard Dump Haul Material						$0	$0	$0	0					$0	$0	$0
2	East Shepard Dump Clearing and Grubbing haul						$0	$0	$0	0					$0	$0	$0
3	Explosives Road Sec A						$0	$0	$0	0					$0	$0	$0
4	Explosives Road Sec B						$0	$0	$0	0					$0	$0	$0
5	Explosives Road Sec C						$0	$0	$0	0					$0	$0	$0
6	Explosives Road Sec D						$0	$0	$0	0					$0	$0	$0
7	Explosives Road Clearing and Grubbing Haul						$0	$0	$0	0					$0	$0	$0
8	Haul Material to Monitoring Well 1 to fill in undercut						$0	$0	$0	0					$0	$0	$0
							$0	**$0**	**$0**						**$0**	**$0**	**$0**

Generic Material Hauling - Scarifying/Revegetation Costs

	Description (required)	Total Surface Area acres	Scarifying/ Ripping Hours hrs	Scarifying/ Ripping Labor Cost $	Scarifying/ Ripping Equipment Cost $	Total Scarifying/ Ripping Cost $	Revegetation Labor Cost $	Revegetation Equipment Cost $	Revgetation Material Cost $	Total Revegetation Cost $
1	East Shepard Dump Haul Material	0.10		$0	$0	$0	$0	$0	$0	$0
2	East Shepard Dump Clearing and Grubbing haul	0.10		$0	$0	$0	$0	$0	$0	$0
3	Explosives Road Sec A	0.10		$0	$0	$0	$0	$0	$0	$0
4	Explosives Road Sec B	0.10		$0	$0	$0	$0	$0	$0	$0
5	Explosives Road Sec C	0.10		$0	$0	$0	$0	$0	$0	$0
6	Explosives Road Sec D	0.10		$0	$0	$0	$0	$0	$0	$0
7	Explosives Road Clearing and Grubbing Haul	0.10		$0	$0	$0	$0	$0	$0	$0
8	Haul Material to Monitoring Well 1 to fill in undercut	0.10		$0	$0	$0	$0	$0	$0	$0
		0.80		**$0**	**$0**	**$0**	**$0**	**$0**	**$0**	**$0**

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Closure Cost Estimate
Sediment & Drainage Control

Project Name: True North - Reclamation Plan
Date of Submittal: 4/20/2012
File Name: SRCE_Version_1_4_1_014.xlsm
Model Version: Version 1.4.1
Cost Data: User Data
Cost Data File: Cost data for SRCE model.xlsm
Cost Estimate Type: Surety Cost Basis: Alaska

Drainage Control - Cost Summary

	Labor	Equipment	Materials	Totals
Diversion Ditch Construction	$1,316	$1,713	N/A	$3,029
Diversion Ditch Liner	$0	$0	$0	$0
Diversion Ditch Rip-Rap	$0	$0	$0	$0
Sed Pond Construct/Regrade	$0	$0	N/A	$0
Liner Installation	$0	$0	$0	$0
Sed Pond Cover	$0	$0	N/A	$0
Ripping/Scarifying Cost	$0	$0	N/A	$0
Subtotal Earthworks	**$1,316**	**$1,713**	**$0**	**$3,029**
Diversion Ditch Revegetation	$0	$237	$72	$309
Sediment Pond Revegetation	$0	$0	$0	$0
Subtotal Revegetation	**$0**	**$237**	**$72**	**$309**
TOTALS	**$1,316**	**$1,950**	**$72**	**$3,338**

Color Code Key

User Input - Direct Input	**Direct Input**
User Input - Pull Down List	**Pull Down Selection**
Program Constant (can override)	**Alternate Input**
Program Calculated Value	**Locked Cell - Formula or Reference**

Diversion Ditches - User Input

			Diversions Ditches							Revegetation			Liner and Rip-Rap Installation			
	Description (required)	ID Code	Diversion Length ft	Diversion Depth ft	Ditch Bottom Width ft	Ditch Sideslope Angle _H:1V	Excavate Volume (if calculated elsewhere) cy	Excavating Material Condition (select)	Excavating Equipment Fleet (select)	Seed Mix (select)	Mulch (select)	Fertilizer (select)	Liner Area S.Y.	Liner Type (select)	Rip-Rap Area S.Y.	Rip-Rap Type (select type)
1	**Spruce Creek**		**500**	**9.0**	**6.0**	**3.0**		**1**	**Medium**	**User Mix 5 (fron**	**None**	**Chemical**				

Notes:
Diversion ditch material will be placed above then graded out, costs associated with grading and contouring this material is accounted for in WRD worksheet
493

Sediment/Evaporation Pond Construction/Removal - User Input

			Sediment Ponds								Growth Media		
	Description (required)	ID Code	Pond Width ft	Pond/Berm Length ft	Berm Height ft	Crest Width ft	Sideslope Angle _H:1V	Final Area (if calculated elsewhere) acres	Regrade Volume (if calculated elsewhere) cy	Cover Volume (if calculated elsewhere) cy	Growth Media Thickness in	Distance from Growth Media Stockpile ft	Slope from Pond to Borrow % grade

Notes:
1. All Physical parameters must be input even if manual overrides for volume or area are used.
2. If Slope from facility to borrow source is >20, downhill travel time may be underestimated due to limitation of uphill travel time curves and downhill speed tables from CAT Handbook (see Productivty Sheet)
3. Material Types are used for density correction based on material densities in Caterpillar Performance Handbook material density table

Sediment/Evaporation Pond Construction/Removal - User Input (cont.)

		Sediment Ponds				Growth Media			Revegetation			Ripping/Scarifying	
	Description (required)	Excavating Material Condition (select)	Material Type (select)	Excavating Equipment Fleet (select)	Liner Type (select)	Growth Media Material Type (select)	Growth Media Placement Equipment Fleet (select)	Maximum Fleet Size (user override)	Seed Mix (select)	Mulch (select)	Fertilizer (select)	Scarify/ Rip? (select)	Scarify/ Ripping Fleet (select)

Notes:
1. Material Types are used for density correction based on material densities in Caterpillar Performance Handbook material density table

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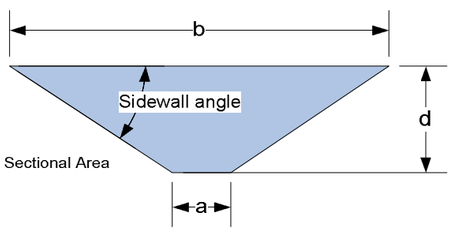
Closure Cost Estimate
Sediment & Drainage Control

Project Name: True North - Reclamation Plan
Date of Submittal: 4/20/2012
File Name: SRCE_Version_1_4_1_014.xlsm
Model Version: Version 1.4.1
Cost Data: User Data
Cost Data File: Cost data for SRCE model.xlsm
Cost Estimate Type: Surety Cost Basis: Alaska

Drainage Control - Calculations

Diversion Ditch Volume Calculation



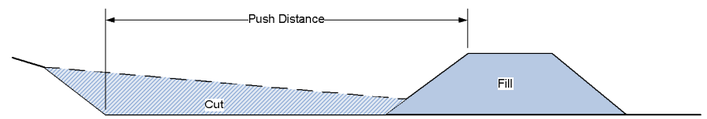
Cross Sectional Area = $\frac{(a + b)}{2} \times d$

Ditch Volume = Ditch Length x Cross Sectional Area

Figure 1 - Ditch Volume Calculation

1) Assume 20% swell for excavations
2) Assumes heavy duty trenching bucket is used

Sediment/Evaporation Pond Construction Calculation



Cut = Fill
Push distance = pond width up to 2/3 max push distance (400 ft)

Figure 2 - Sediment Ponds

1) Assume balanced cut-to-fill for berm construction
2) Include cost for liner, if required.
3) Include line items for removal, if necessary.
4) Assume 20% swell for excavations
5) Minimum 1 hr ripping/scarifying per area
6) Minimum 1 acre revegetation crew time per area

Diversion Ditches - Excavation Costs

									Liner Installation				Rip-Rap Installation			
	Description (required)	Diversion Ditch Volume LCY	Diversion Ditch Equipment	Corrected Excavator Productivity LCY/hr	Total Hours	Diversion Ditch Labor Cost $	Diversion Ditch Equipment Cost $	Total Diversion Ditch Cost $	Total Labor Cost $	Total Equipment Cost $	Total Material Cost $	Total Liner Cost $	Labor Cost $	Equipment Cost $	Material Cost $	Total Cost $
1	Spruce Creek	6,600	330C	369	18	$1,316	$1,713	$3,029	$0	$0	$0	$0	$0	$0	$0	$0
		6,600			18	**$1,316**	**$1,713**	**$3,029**	**$0**	**$0**	**$0**	**$0**	**$0**	**$0**	**$0**	**$0**

Notes: LCM assumes 20% swell from ditch volume

Diversion Ditches - Revegetation Costs

	Description (required)	Surface Area acres	Revegetation Labor Cost $	Revegetation Equipment Cost $	Revgetation Material Cost $	Total Revegetation Cost $
1	Spruce Creek	0.70	$0	$237	$72	$309
		0.70	**$0**	**$237**	**$72**	**$309**

Sediment/Evaporation Ponds - Construction/Regrading Costs

Productivity = Dozer Productivity x Grade Correction x Density Correction x Operator (0.75) x Material x Visibility x Job Efficiency (0.83)

											Earthwork			Liner			
	Description (required)	Regrading Volume cy	Sed/Evap Pond Equipment	Dozing Distance (see above) ft	Uncorrected Dozer Productivity LCY/hr	Grade Correction	Density Correction	Excavating Material	Corrected Productivity LCY/hr	Total Dozer Hours hr	Total Labor Cost $	Total Equipment Cost $	Total Constr/ Regrading Cost $	Total Labor Cost $	Total Equipment Cost $	Total Material Cost $	Total Liner Cost $
											$0	**$0**	**$0**	**$0**	**$0**	**$0**	**$0**

Sediment/Evaporation Ponds - Growth Media Costs

		Growth Media							
	Description (required)	Growth Media Volume cy	Growth Media Fleet	Fleet Productivity LCY/hr	Number of Trucks/ Scrapers	Total Fleet Hours	Total Labor Cost $	Total Equipment Cost $	Total Cover Placement Cost $
							$0	**$0**	**$0**

Sediment/Evaporation Ponds - Revegetation Costs

	Description (required)	Surface Area acres	Long Ripping Distance ft	Area Width ft	Scarifying/ Ripping Hours hrs	Scarifying/ Ripping Labor Costs $	Scarifying/ Ripping Equipment Cost $	Total Scarifying/ Ripping Costs $	Revegetation Labor Cost $	Revegetation Equipment Cost $	Revgetation Material Cost $	Total Revegetation Cost $
					0	**$0**	**$0**	**$0**	**$0**	**$0**	**$0**	**$0**

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Closure Cost Estimate
Yards, Etc.

Project Name: True North - Reclamation Plan
Date of Submittal: 4/20/2012
File Name: SRCE_Version_1_4_1_014.xlsm
Model Version: Version 1.4.1
Cost Data: User Data
Cost Data File: Cost data for SRCE model.xlsm
Cost Estimate Type: Surety Cost Basis: Alaska

Yards, Etc. - Cost Summary

	Labor	Equipment	Materials	Totals
Regrading Cost	$50,067	$93,147	N/A	$143,214
Cover Placement Cost	$0	$0	N/A	$0
Growth Media Placement Cost	$10,233	$6,696	N/A	$16,929
Ripping/Scarifying Cost	$950	$1,768	N/A	$2,718
Subtotal Earthworks	**$61,250**	**$101,611**		**$162,861**
Revegetation Cost	$0	$3,730	$1,635	$5,365
TOTALS	**$61,250**	**$105,341**	**$1,635**	**$168,226**

Color Code Key

User Input - Direct Input	**Direct Input**
User Input - Pull Down List	**Pull Down Selection**
Program Constant (can override)	**Alternate Input**
Program Calculated Value	**Locked Cell - Formula or Reference**

Yards, Etc. - User Input

You must fill in ALL green cells and relevant blue cells in this section for each building or facility

	Facility Description			Physical			Cover			Growth Media		
	Description (required)	ID Code	Type	Area acres	Average Flat Area Long Dimension (ripping distance) ft	Regrade Volume (calculated elsewhere) cy	Cover Thickness in	Distance from Cover Borrow Area ft	Slope from Facility to Borrow Area % grade	Growth Media Thickness in	Distance from Growth Media Stockpile ft	Slope from Facility to Stockpile % grade
1	**Shop Pad / Upper A Stockpad**		**Yard**	**7.33**	**1,422**	**37,000**				**6**	**5,280**	**2.0**
2	**Upper B Stock Pad - west side**		**Yard**	**6.13**	**574**	**19,000**				**6**	**5,280**	**2.0**
3	**Shop Pad Growth Media Stockpile**		**Yard**	**2.28**	**423**	**16,000**						
4	**Central Pit - Drill Blast Pattern**		**Yard**	**1.82**	**488**	**8,850**						

Notes:
1. All Physical parameters must be input even if manual overrides for volume or area are used.
2. If Slope from facility to borrow source is >20, downhill travel time may be underestimated due to limitation of uphill travel time curves and downhill speed tables from CAT Handbook (see Productivty Sheet)

Regrade Volume
Upper B Stock Pad - grading west of side of shop pad voulme from 2011 survey

Yards, Etc. - User Input (cont.)

You must fill in ALL green cells and relevant blue cells in this section for each building or facility

		Grading			Cover			Growth Media			Revegetation				
	Description (required)	Dozing Material Condition (select)	Dozing Material Type (select)	Grading Equipment Fleet (select)	Cover Material Type (select)	Cover Placement Equipment Fleet (select)	Maximum Fleet Size (user override)	Growth Media Material Type (select)	Growth Media Equipment Fleet (select)	Maximum Fleet Size (user override)	Seed Mix (select)	Mulch (select)	Fertilizer (select)	Scarify/ Rip? (select)	Ripping Fleet (select)
1	**Shop Pad / Upper A Stockpad**	**1**	**Shale**	**Med**				**Topsoil**	**Med Truck**		**User Mix 5 (fro**	**None**	**Chemical**	**Yes**	**Med Dozer**
2	**Upper B Stock Pad - west side**	**1**	**Shale**	**Med**				**Topsoil**	**Med Truck**		**User Mix 5 (fro**	**None**	**Chemical**	**Yes**	**Med Dozer**
3	**Shop Pad Growth Media Stockpile**	**1**	**Topsoil**	**Med**							**User Mix 5 (fro**	**None**	**Chemical**	**Yes**	**Med Dozer**
4	**Central Pit - Drill Blast Pattern**	**0.6**	**Shale**	**Med**											

Notes:
1. Material Types are used for density correction based on material densities in Caterpillar Performance Handbook material density table

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Project Name: True North - Reclamation Plan
Date of Submittal: 4/20/2012
File Name: SRCE_Version_1_4_1_014.xlsm
Model Version: Version 1.4.1
Cost Data: User Data
Cost Data File: Cost data for SRCE model.xlsm
Cost Estimate Type: Surety Cost Basis: Alaska

Yards, Etc. - Calculations

Grading Calculations

Average push distance assumed to be 2/3 of the 600 feet maximum from Catepillar Handbook or 400 feet
Material assumed to be loose stockile (1.2 productivity factor)
Slope assumed to be 0 to 5% (1.0 productivity factor)

Cover Volume Calculation

Yard area x cover thickness

Ripping/Scarifying Calculations

Flat area width = Final flat area ÷ Average long dimensions
Number of passes = Flat area width ÷ Grader width
Travel distance = Number of passes x Average long dimensions
Total hours = (Travel distance ÷ Grader productivity) + (Number of passes x Grader maneuver time)
Minimum 1 hr ripping/scarifying per area

Revegetation

Minimum 1 acre revegetation crew time per area

Yards, Etc. - Regrading Costs

Productivity = Dozer Productivity x Grade Correction x Density Correction x Operator (0.75) x Material x Visibility x Job Efficiency (0.83) x (Slot/Side-by-Side)

	Description (required)	Regrading Volume cy	Dozing Distance (see above) ft	Uncorrected Dozer Productivity cy/hr	Grade Correction	Dozing Material	Density Correction	Total Hourly Productivity cy/hr	Total Dozer Hours hr	Total Labor Cost $	Total Equipment Cost $	Total Regrading Cost $
1	**Shop Pad / Upper A Stockpad**	37,000	400	177	1.0	1.0	1.10	121	306	$22,366	$41,610	$63,976
2	**Upper B Stock Pad - west side**	19,000	400	177	1.0	1.0	1.10	121	157	$11,475	$21,349	$32,824
3	**Shop Pad Growth Media Stockpile**	16,000	400	177	1.0	1.0	1.44	159	101	$7,382	$13,734	$21,116
4	**Central Pit - Drill Blast Pattern**	8,850	400	177	1.0	0.6	1.10	73	121	$8,844	$16,454	$25,298
		80,850							685	**$50,067**	**$93,147**	**$143,214**

Yards, Etc. - Cover and Growth Media Costs

		Cover								Growth Media							
	Description (required)	Cover Volume cy	Topsoil Repacement Fleet	Fleet Productivity LCY/hr	Number of Trucks/ Scrapers	Total Fleet Hours	Total Labor Cost $	Total Equipment Cost $	Total Cover Cost $	Growth Media Volume cy	Growth Media Fleet	Fleet Productivity LCY/hr	Number of Trucks/ Scrapers	Total Fleet Hours	Total Labor Cost $	Total Equipment Cost $	Total Topsoiling Cost $
1	**Shop Pad / Upper A Stockpad**						$0	$0	$0	5,889	730/972G	383	3	15	$5,482	$3,587	$9,069
2	**Upper B Stock Pad - west side**						$0	$0	$0	4,921	730/972G	383	3	13	$4,751	$3,109	$7,860
3	**Shop Pad Growth Media Stockpile**						$0	$0	$0						$0	$0	$0
4	**Central Pit - Drill Blast Pattern**						$0	$0	$0						$0	$0	$0
							$0	**$0**	**$0**	10,810				28	**$10,233**	**$6,696**	**$16,929**

Yards, Etc. - Scarifying/Revegetation Costs

	Description (required)	Surface Area acres	Area Long Dimension ft	Scarifying/ Ripping Hours hrs	Scarifying/ Ripping Labor Costs $	Scarifying/ Ripping Equipment Cost $	Total Scarifying/ Ripping Costs $	Revegetation Labor Cost $	Revegetation Equipment Cost $	Revgetation Material Cost $	Total Revegetation Cost $
1	**Shop Pad / Upper A Stockpad**	7.33	1,422	6	$439	$816	$1,255	$0	$1,737	$761	$2,498
2	**Upper B Stock Pad - west side**	6.13	574	5	$365	$680	$1,045	$0	$1,453	$637	$2,090
3	**Shop Pad Growth Media Stockpile**	2.28	423	2	$146	$272	$418	$0	$540	$237	$777
4	**Central Pit - Drill Blast Pattern**	1.82	488		$0	$0	$0	$0	$0	$0	$0
		17.56		13	**$950**	**$1,768**	**$2,718**	**$0**	**$3,730**	**$1,635**	**$5,365**

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Closure Cost Estimate
Well Abandonment

Project Name: True North - Reclamation Plan
Date of Submittal: 4/20/2012
File Name: SRCE_Version_1_4_1_014.xlsm
Model Version: Version 1.4.1
Cost Data: User Data
Cost Data File: Cost data for SRCE model.xlsm
Cost Estimate Type: Surety Cost Basis: Alaska

Well Abandonment	Labor	Equipment	Materials	Totals
Production, Dewatering, Infiltration Wells	$0	$0	$0	$0
Monitoring Wells	$2,210	$1,904	$39	$4,153
TOTALS	**$2,210**	**$1,904**	**$39**	**$4,153**

Color Code Key	
User Input - Direct Input	**Direct Input**
User Input - Pull Down List	**Pull Down Selection**
Program Constant (can override)	**Alternate Input**
Program Calculated Value	**Locked Cell - Formula or Reference**

Well seal thickness: **20** ft
Minimum seal above groundwater table: **50** ft

Production, Dewatering and Infiltration Well Closure

	Description (required)	ID Code	Number of Holes	Casing Diam in	Average Depth(1) ft bgs	Depth to First Water ft bgs	Original Static Water Level ft bgs	Top of Slotted Casing(2) ft bgs	Blank Casing Below Top of Screen(2) ft	Type of Pump (if any) (select)	Depth to Pump ft bgs	Hole Plug Method (select)	Casing Volume per ft cf	Perforation Length (3,4) ft	Grout Volume per Hole(4,5) cy	Cement Volume per Hole(6) cy	Inert Media Volume per Hole(7) cy	Pump Removal Labor Cost $	Pump Removal Equip Cost $	Perf Labor Cost $	Perf Equip Cost (8) $	Grout + Cement Labor Cost(9) $	Grout + Cement Equip Cost(9) $	Grout + Cement Material Cost $	Inert Media Labor Cost(10) $	Inert Media Equip Cost(9) $	Total Cost $
																		$0	**$0**	**$0**	**$0**	**$0**	**$0**	**$0**	**$0**	**$0**	**$0**

(1) For previously abandoned holes enter "0" for depth
(2) Wells abandoned per Nevada Administrative Code (NAC 534.420). Hole grouted and perforated from bottom to 50 feet (15.24m) above the top of the screen, or first water encountered or original static water level, depending on vertical hydraulic gradient and well construction parameters. Inert media (cuttings or alluvium) used from top of grout to top seal.
(3) Perforation length = amount of blank casing below first water (for confined aquifers) or predicted recovered water table (unconfined aquifers) + 50 feet (15.24m) of blank casing above water table
(4) Assumes 50' (15.24m) sanitary seal at top of hole. Therefore, perforation and grouting only required to bottom of sanitary seal.
(5) Assumes 100% loss to formation for grout (abandonite) for screened and perforated sections.
(6) Assumes 10' (3m) top seal of cement in casing only. See note 4.
(7) Inert material is cuttings or alluvium sourced locally.
(8) Includes perforation tool wear cost/ft of perforation (see Productivty Sheet).
(9) See Productivity Sheet for hourly production. Minimum 1 hr per hole + fixed hours per hole for move and setup. If no perforation required, use standard drill rig.
(10) See Productivity Sheet for hourly production. Minimum 1 hr per hole.

Notes:

Monitoring Well Closure

	Description (required)	ID Code	Number of Holes	Casing Diam in	Average Depth ft bgs	Top of Screen(1) ft bgs	Hole Plug Method (select)	Casing Volume per ft ft3	Grout Volume/ Well(2,3) cy	Cement Volume per Hole(4) cy	Inert Backfill Volume per Hole(5) cy	Total Grouting Hours/ Hole hr	Total Inert Media Hours/ Hole hr	Grout + Cement Labor Cost(6) $	Grout + Cement Equip Cost(6) $	Grout + Cement Material Cost $	Inert Material Labor Cost(7) $	Inert Material Equip Cost(7) $	Total Cost $
1	**Thermistor 1**		**1**	**1.5**	**250**	**0**	**Grout Onl**	0.010	0.11	0.01		3.5		$744	$641	$14	$0	$0	$1,399
2	**Thermistor 2**		**1**	**1.5**	**220**	**0**	**Grout Onl**	0.010	0.09	0.01		3.4		$722	$622	$11	$0	$0	$1,355
3	**Thermistor 4**		**1**	**1.5**	**252**	**0**	**Grout Onl**	0.010	0.11	0.01		3.5		$744	$641	$14	$0	$0	$1,399
4														$0	$0	$0	$0	$0	$0
														$2,210	**$1,904**	**$39**	**$0**	**$0**	**$4,153**

Wells abandoned per NAC 534.420 with bentonite grout placed to 50 feet above the top of the screen (see note 1).
(1) Assumes top of screen is at or above the static water level (in unconfined aquifers) or the depth of first water encountered (in confined aquifers).
(2) Assumes 25% loss to formation for grouting
(3) Grouting only required to 50' (15.24m) above the top of screen because monitor wells are constructed with a seal in the annular space.
(4) Assumes top 10' (3m) plugged with cement.
(5) Assumes hole plugged with inert material (cuttings or alluvium) above grout up to cement surface plug.
(6) See Productivity Sheet for hourly production. Minimum 1 hr per hole + fixed hours per hole for move and setup (see Productivty Sheet).
(7) See Productivity Sheet for hourly production. Minimum 1 hr per hole.

Notes:

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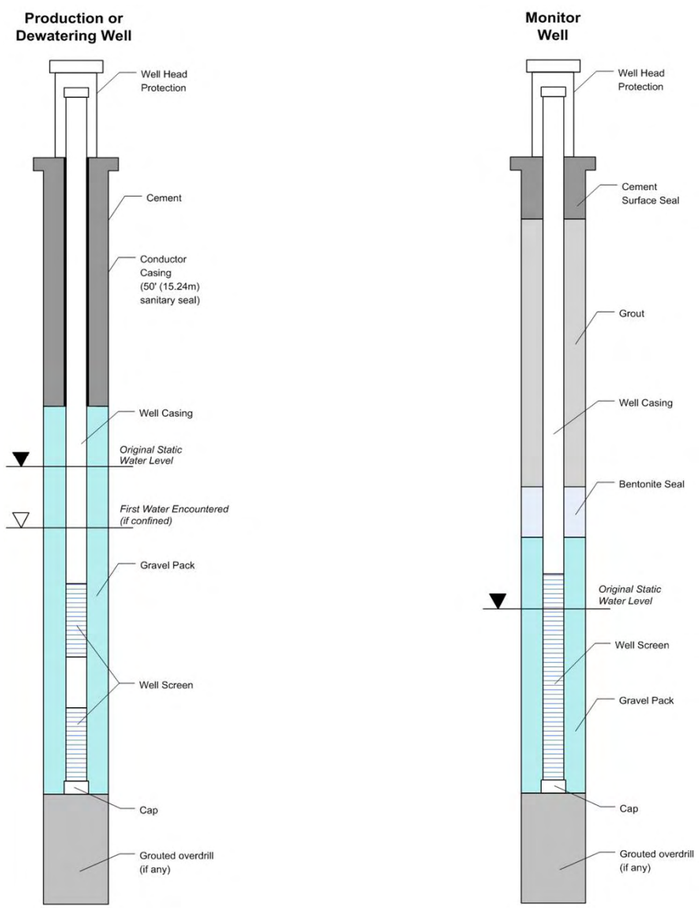
Project Name: True North - Reclamation Plan
Date of Submittal: 4/20/2012
File Name: SRCE_Version_1_4_1_014.xlsm
Model Version: Version 1.4.1
Cost Data: User Data
Cost Data File: Cost data for SRCE model.xlsm
Cost Estimate Type: Surety Cost Basis: Alaska

Well Construction



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Project Name: True North - Reclamation Plan
Date of Submittal: 4/20/2012
File Name: SRCE_Version_1_4_1_014.xlsm
Model Version: Version 1.4.1
Cost Data: User Data
Cost Data File: Cost data for SRCE model.xlsm
Cost Estimate Type: Surety Cost Basis: Alaska

Reclamation Monitoring & Maintenance - Cost Summary

	Labor	Equipment	Lab & Materials	Totals
Revegetation Maintenance	$0	$197,871	$121,227	$319,098
Erosion Maintenance	$0	$0	N/A	$0
Reclamation Monitoring	$0	$0	N/A	$0
Subtotal Reclamation Monitoring	**$0**	**$197,871**	**$121,227**	**$319,098**
Water Quality Monitoring	$2,921	$165	$3,703	$6,788
TOTAL MONITORING	**$2,921**	**$198,036**	**$124,930**	**$325,886**

Reclamation Maintenance

Description	Total Revegetation Surface Area (1,2) acres	% Area Requiring Reseeding	Seed Mix (select)	Area Requiring Reseeding acres	Seed $/acres	Labor $/acres	Equipment $/acres	Totals $
Revegetation Maintenance	167	**500%**	**Mix 1**	834.9	$145.20	$0.00	$237.00	
Labor								$0
Equipment								$197,871
Materials								$121,227
Cost/Acre								$382
							Subtotal	**$319,098**

Notes: 1) Surface area is NOT the same as footprint disturbance area typically used for permitting purposes.
2) If BRCE model, revegetation surface area determined by area included in PER, LOM or Surety estimate
See Mix 1 is aerial application of fertilizer only.
% requiring reseeding, total surface area generated by SRCE does not account for areas we have already reclaimed
the percentage is based on a ratio of the 577 acres we know we have to fertilize to the SCRE generated surface area

	Total Volume Growth Media cy	% Volume Requiring Maintenance	Average Growth Media Placement Cost $/CY	Volume Requiring Replacement cy		Labor (assume: 25%) $/acres	Equipment (assume: 75%) $/acres	Total $
Erosion Maintenance	99,823	**0%**	$1.77	0		$0.00	$0.00	$0

Notes:

Reclamation Monitoring

Description	Hrs/Day	Days/Year	Number of Years	Rate $/hr		
Field Work						
Field Geologist/Engineer				$152.25		$0
Range Scientist						$0
Reporting						
Field Geologist/Engineer				$152.25		$0
Range Scientist						$0
					Subtotal	**$0**
Travel						
	Hrs/Trip hr	**Trips/Year**	**Years**	**Truck Cost** $/hr		
Travel				$23.82		$0
					Subtotal	**$0**
					Total Reclamation Monitoring	**$0**

Notes:

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Closure Cost Estimate
Monitoring

Project Name: True North - Reclamation Plan
Date of Submittal: 4/20/2012
File Name: SRCE_Version_1_4_1_014.xlsm
Model Version: Version 1.4.1
Cost Data: User Data
Cost Data File: Cost data for SRCE model.xlsm
Cost Estimate Type: Surety Cost Basis: Alaska

Water and Rock Sample Analysis

Description	Samples #	Events/Year	No. Years	First Sample Year closure year (1-100)	No. of Samplers	Days/Event	Hrs/Day	Analysis Cost $/sample	Supplies $/sample	Lab Cost $	Material Cost $	Equipment Cost $	Labor Cost $	Cost $	Comments
Lower Spruce Creek	1	1	1	1	1	1	1	$528.75	$0.00	$529	$0	$24	$417	$970	
Lower Spruce Creek	1	1	1	2	1	1	1	$528.75	$0.00	$529	$0	$24	$417	$970	
Lower Spruce Creek	1	1	1	5	1	1	1	$528.75	$0.00	$529	$0	$24	$417	$970	
Lower Spruce Creek	1	1	1	10	1	1	1	$528.75	$0.00	$529	$0	$24	$417	$970	
Lower Spruce Creek	1	1	1	15	1	1	1	$528.75	$0.00	$529	$0	$24	$417	$970	
Lower Spruce Creek	1	1	1	20	1	1	1	$528.75	$0.00	$529	$0	$24	$417	$970	
Lower Spruce Creek	1	1	1	30	1	1	1	$528.75	$0.00	$529	$0	$24	$417	$970	
														$0	
														$0	
														$0	
														$0	
														$0	
														$0	
														$0	
														$0	
														$0	
										$3,703.00	$0.00	$164.50	$2,920.68		
													Subtotal Sampling Costs	**$6,788**	

Notes: Sampling labor cost = No. Samplers x Years x Events/year x Days/event x Hour/Day x Labor Rate
Sampling equipment costs include 1 pickup truck for every two samplers

Ground & Surface Water Monitoring

Pump Costs

Description	No. of units		Years		Cost $
Pump (purchased)		Replacement period (yrs):			$0
				Subtotal Field Work	**$0**

Notes: Replacement period = frequency of pump replacement

Reporting

Description	Hrs/Event	Rate $/hr	Cost $
Field Geologist/Engineer			
		Subtotal Reporting	

Notes:

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Closure Cost Estimate
Labor Rates

Project Name: True North - Reclamation Plan
Date of Submittal: 4/20/2012
File Name: SRCE_Version_1_4_1_014.xlsm
Model Version: Version 1.4.1
Cost Data: User Data
Cost Data File: Cost data for SRCE model.xlsm
Cost Estimate Type: Surety Cost Basis: Alaska

Color Code Key	
User Input - Direct Input	**Direct Input**
User Input - Pull Down List	**Pull Down Selection**
Program Constant (can override)	**Alternate Input**
Program Calculated Value	**Locked Cell - Formula or Reference**

ZONE ADJUSTMENTS			
Cost Basis/Project Region	**Alaska**	Interior Alaska	
Power Equipment Operators	**Overtime Factor**	$9.91	
Truck Drivers	**Overtime Factor**	$9.91	
Laborers	**Overtime Factor**	$9.91	
INDIRECT COSTS			
Unemployment (%)			
Retirement/SS/Medicare (%)			
Workman's Compensation (%)			
Other Indirects			
State Payroll Tax (13),(15),(17),(18			
Total Other Indirects	**0.00%**		

HOURLY LABOR RATE TABLE

EQUIPMENT TYPE (1) OR JOB DESCRIPTION	Labor Group	Base Rate ($/hr)	Zone Adjustment ($/hr)	Hourly Wage ($/hr)	Fringe ($/hr)	Retirement/ Medicare ($/hr)	Unemployment Insurance ($/hr)	Workman's Compensation ($/hr)	Other Indirect Costs ($/hr)	Additional User Markups to Base Rate† ($/hr)	%	($/hr)	Total ($/hr)
Equipment Operators ($/hr) (2)													
Bulldozers													
D6R	A1601 Group 1	$36.83	$9.91	$46.74	$16.53	$0.00	$0.00	$0.00	$0.00			$0	$63.27
D6R w/ Winch	A1601 Group 1	$36.83	$9.91	$46.74	$16.53	$0.00	$0.00	$0.00	$0.00			$0	$63.27
D7R	A1601 Group 1	$36.83	$9.91	$46.74	$16.53	$0.00	$0.00	$0.00	$0.00			$0	$63.27
D8R	A1601 Group 1	$36.83	$9.91	$46.74	$16.53	$0.00	$0.00	$0.00	$0.00		**21.00%**	$10	$73.09
D9R	A1601 Group 1	$36.83	$9.91	$46.74	$16.53	$0.00	$0.00	$0.00	$0.00		**21.00%**	$10	$73.09
D10R	A1601 Group 1	$36.83	$9.91	$46.74	$16.53	$0.00	$0.00	$0.00	$0.00		**21.00%**	$10	$73.09
D11R	A1601 Group 1	$36.83	$9.91	$46.74	$16.53	$0.00	$0.00	$0.00	$0.00		**21.00%**	$10	$73.09
Wheeled Dozers													
824G	A1601 Group 1	$36.83	$9.91	$46.74	$16.53	$0.00	$0.00	$0.00	$0.00		**21.00%**	$10	$73.09
834G	A1601 Group 1	$36.83	$9.91	$46.74	$16.53	$0.00	$0.00	$0.00	$0.00		**21.00%**	$10	$73.09
844	A1601 Group 1	$36.83	$9.91	$46.74	$16.53	$0.00	$0.00	$0.00	$0.00		**21.00%**	$10	$73.09
854G	A1601 Group 1	$36.83	$9.91	$46.74	$16.53	$0.00	$0.00	$0.00	$0.00		**21.00%**	$10	$73.09

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Closure Cost Estimate
Labor Rates

HOURLY LABOR RATE TABLE

EQUIPMENT TYPE (1) OR JOB DESCRIPTION	Labor Group	Base Rate ($/hr)	Zone Adjustment ($/hr)	Hourly Wage ($/hr)	Fringe ($/hr)	Retirement/ Medicare ($/hr)	Unemployment Insurance ($/hr)	Workman's Compensation ($/hr)	Other Indirect Costs ($/hr)	Additional User Markups to Base Rate† ($/hr)	%	($/hr)	Total ($/hr)
Motor Graders													
120H	A1601 Group 1	$36.83	$9.91	$46.74	$16.53	$0.00	$0.00	$0.00	$0.00		**21.00%**	$10	$73.09
14G/H	A1601 Group 1	$36.83	$9.91	$46.74	$16.53	$0.00	$0.00	$0.00	$0.00		**21.00%**	$10	$73.09
16G/H	A1601 Group 1	$36.83	$9.91	$46.74	$16.53	$0.00	$0.00	$0.00	$0.00		**21.00%**	$10	$73.09
24M	A1601 Group 1	$36.83	$9.91	$46.74	$16.53	$0.00	$0.00	$0.00	$0.00		**21.00%**	$10	$73.09
Track Excavators													
312C	A1601 Group 1	$36.83	$9.91	$46.74	$16.53	$0.00	$0.00	$0.00	$0.00		**21.00%**	$10	$73.09
320C	A1601 Group 1	$36.83	$9.91	$46.74	$16.53	$0.00	$0.00	$0.00	$0.00		**21.00%**	$10	$73.09
325C	A1601 Group 1	$36.83	$9.91	$46.74	$16.53	$0.00	$0.00	$0.00	$0.00		**21.00%**	$10	$73.09
330C	A1601 Group 1	$36.83	$9.91	$46.74	$16.53	$0.00	$0.00	$0.00	$0.00		**21.00%**	$10	$73.09
345B	A1601 Group 1	$36.83	$9.91	$46.74	$16.53	$0.00	$0.00	$0.00	$0.00		**21.00%**	$10	$73.09
365BL	A1601 Group 1	$36.83	$9.91	$46.74	$16.53	$0.00	$0.00	$0.00	$0.00		**21.00%**	$10	$73.09
385BL	A1601 Group 1	$36.83	$9.91	$46.74	$16.53	$0.00	$0.00	$0.00	$0.00		**21.00%**	$10	$73.09
Scrapers													
631G	A1601 Group 1	$36.83	$9.91	$46.74	$16.53	$0.00	$0.00	$0.00	$0.00		**21.00%**	$10	$73.09
637G	A1601 Group 1	$36.83	$9.91	$46.74	$16.53	$0.00	$0.00	$0.00	$0.00		**21.00%**	$10	$73.09
Wheeled Loaders													
924G	A1601 Group 1	$36.83	$9.91	$46.74	$16.53	$0.00	$0.00	$0.00	$0.00		**21.00%**	$10	$73.09
928G	A1601 Group 1	$36.83	$9.91	$46.74	$16.53	$0.00	$0.00	$0.00	$0.00		**21.00%**	$10	$73.09
950G	A1601 Group 1	$36.83	$9.91	$46.74	$16.53	$0.00	$0.00	$0.00	$0.00		**21.00%**	$10	$73.09
966G	A1601 Group 1	$36.83	$9.91	$46.74	$16.53	$0.00	$0.00	$0.00	$0.00		**21.00%**	$10	$73.09
972G	A1601 Group 1	$36.83	$9.91	$46.74	$16.53	$0.00	$0.00	$0.00	$0.00		**21.00%**	$10	$73.09
980G	A1601 Group 1	$36.83	$9.91	$46.74	$16.53	$0.00	$0.00	$0.00	$0.00		**21.00%**	$10	$73.09
988G	A1601 Group 1	$36.83	$9.91	$46.74	$16.53	$0.00	$0.00	$0.00	$0.00		**21.00%**	$10	$73.09
990	A1601 Group 1	$36.83	$9.91	$46.74	$16.53	$0.00	$0.00	$0.00	$0.00		**21.00%**	$10	$73.09
992G	A1601 Group 1	$36.83	$9.91	$46.74	$16.53	$0.00	$0.00	$0.00	$0.00		**21.00%**	$10	$73.09
994D	A1601 Group 1	$36.83	$9.91	$46.74	$16.53	$0.00	$0.00	$0.00	$0.00		**21.00%**	$10	$73.09
L2350	A1601 Group 1	$36.83	$9.91	$46.74	$16.53	$0.00	$0.00	$0.00	$0.00		**21.00%**	$10	$73.09
Shovels													
PC2000	A1601 Group 1	$36.83	$9.91	$46.74	$16.53	$0.00	$0.00	$0.00	$0.00		**21.00%**	$10	$73.09
PC3000	A1601 Group 1	$36.83	$9.91	$46.74	$16.53	$0.00	$0.00	$0.00	$0.00		**21.00%**	$10	$73.09
PC4000	A1601 Group 1	$36.83	$9.91	$46.74	$16.53	$0.00	$0.00	$0.00	$0.00		**21.00%**	$10	$73.09
PC5500	A1601 Group 1	$36.83	$9.91	$46.74	$16.53	$0.00	$0.00	$0.00	$0.00		**21.00%**	$10	$73.09
PC8000	A1601 Group 1	$36.83	$9.91	$46.74	$16.53	$0.00	$0.00	$0.00	$0.00		**21.00%**	$10	$73.09

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HOURLY LABOR RATE TABLE

EQUIPMENT TYPE (1) OR JOB DESCRIPTION	Labor Group	Base Rate ($/hr)	Zone Adjustment ($/hr)	Hourly Wage ($/hr)	Fringe ($/hr)	Retirement/ Medicare ($/hr)	Unemployment Insurance ($/hr)	Workman's Compensation ($/hr)	Other Indirect Costs ($/hr)	Additional User Markups to Base Rate† ($/hr)	%	($/hr)	Total ($/hr)
Hydraulic Hammers													
H-120 (fits 325)													
H-160 (fits 345)													
H-180 (fits 365/385)													
Demolition Shears													
S340 (fits 322/325/330)													
S365 (fits 330/345)													
S390 (fits 365/385)													
Demolition Grapples													
G315 (fits 322/325)													
G320 (fits 325/330)													
G330 (fits 345/365)													
Other Equipment													
420D 4WD Backhoe	A1602 Group 1 A	$36.83	$9.91	$46.74	$16.53	$0.00	$0.00	$0.00	$0.00		**21.00%**	$10	$73.09
428D 4WD Backhoe	A1601 Group 1	$36.83	$9.91	$46.74	$16.53	$0.00	$0.00	$0.00	$0.00		**21.00%**	$10	$73.09
CS533E Vibratory Roller	A1601 Group 1	$36.83	$9.91	$46.74	$16.53	$0.00	$0.00	$0.00	$0.00		**21.00%**	$10	$73.09
CS633E Vibratory Roller	A1601 Group 1	$36.83	$9.91	$46.74	$16.53	$0.00	$0.00	$0.00	$0.00		**21.00%**	$10	$73.09
CP533E Sheepsfoot Compactor	A1601 Group 1	$36.83	$9.91	$46.74	$16.53	$0.00	$0.00	$0.00	$0.00		**21.00%**	$10	$73.09
CP633E Sheepsfoot Compactor	A1601 Group 1	$36.83	$9.91	$46.74	$16.53	$0.00	$0.00	$0.00	$0.00		**21.00%**	$10	$63.27
Light Truck - 1.5 Ton	A2106 Group V	$34.35	$9.91	$44.26	$16.53	$0.00	$0.00	$0.00	$0.00		**21.00%**	$9	$70.08
Supervisor's Truck	A2106 Group V	$34.35	$9.91	$44.26	$16.53	$0.00	$0.00	$0.00	$0.00		**21.00%**	$9	$70.08
Flatbed Truck	A2105 Group IV	$35.11	$9.91	$45.02	$16.53	$0.00	$0.00	$0.00	$0.00		**21.00%**	$9	$61.55
Air Compressor + tools	A1601 Group 1	$36.83	$9.91	$46.74	$16.53	$0.00	$0.00	$0.00	$0.00		**21.00%**	$10	$63.27
Welding Equipment	A1601 Group 1	$36.83	$9.91	$46.74	$16.53	$0.00	$0.00	$0.00	$0.00		**21.00%**	$10	$63.27
Heavy Duty Drill Rig	A1601 Group 1	$36.83	$9.91	$46.74	$16.53	$0.00	$0.00	$0.00	$0.00		**21.00%**	$10	$63.27
Pump (plugging) Drill Rig	A1601 Group 1	$36.83	$9.91	$46.74	$16.53	$0.00	$0.00	$0.00	$0.00		**21.00%**	$10	$63.27
Concrete Pump					$16.53						**21.00%**	$0	
Gas Engine Vibrator	A1601 Group 1	$36.83	$9.91	$46.74	$16.53	$0.00	$0.00	$0.00	$0.00			$0	$63.27
Generator 5KW					$16.53							$0	
HDEP Welder (pipe or liner)					$16.53							$0	
5 Ton Crane	A1601 Group 1	$36.83	$9.91	$46.74	$16.53	$0.00	$0.00	$0.00	$0.00			$0	$63.27
20 Ton Crane	A1601 Group 1	$36.83	$9.91	$46.74	$16.53	$0.00	$0.00	$0.00	$0.00			$0	$63.27
50 Ton Crane	A1601 Group 1	$36.83	$9.91	$46.74	$16.53	$0.00	$0.00	$0.00	$0.00			$0	$63.27
120 Ton Crane	A1601 Group 1	$36.83	$9.91	$46.74	$16.53	$0.00	$0.00	$0.00	$0.00			$0	$63.27

NOTES:

(1) Equipment Type:	Catepillar model or equivalent, LeTourneau
(2) Equipment Operator Source:	
(3) Zone Basis:	

Truck Drivers ($/hr) (4)

725	A1601 Group 1	$36.83	$9.91	$46.74	$16.53	$0.00	$0.00	$0.00	$0.00		**21.00%**	$10	$73.09
730	A1601 Group 1	$36.83	$9.91	$46.74	$16.53	$0.00	$0.00	$0.00	$0.00		**21.00%**	$10	$73.09
735	A1601 Group 1	$36.83	$9.91	$46.74	$16.53	$0.00	$0.00	$0.00	$0.00		**21.00%**	$10	$73.09
740	A1601 Group 1	$36.83	$9.91	$46.74	$16.53	$0.00	$0.00	$0.00	$0.00		**21.00%**	$10	$73.09
769D	A1601 Group 1	$36.83	$9.91	$46.74	$16.53	$0.00	$0.00	$0.00	$0.00		**21.00%**	$10	$73.09
773E	A1601 Group 1	$36.83	$9.91	$46.74	$16.53	$0.00	$0.00	$0.00	$0.00		**21.00%**	$10	$73.09
777D	A1601 Group 1	$36.83	$9.91	$46.74	$16.53	$0.00	$0.00	$0.00	$0.00		**21.00%**	$10	$73.09
785C	A1601 Group 1	$36.83	$9.91	$46.74	$16.53	$0.00	$0.00	$0.00	$0.00		**21.00%**	$10	$73.09
793C	A1601 Group 1	$36.83	$9.91	$46.74	$16.53	$0.00	$0.00	$0.00	$0.00		**21.00%**	$10	$73.09
797B	A1601 Group 1	$36.83	$9.91	$46.74	$16.53	$0.00	$0.00	$0.00	$0.00		**21.00%**	$10	$73.09
613E (5,000 gal) Water Wagon	A1601 Group 1	$36.83	$9.91	$46.74	$16.53	$0.00	$0.00	$0.00	$0.00		**21.00%**	$10	$73.09
621E (8,000 gal) Water Wagon	A1601 Group 1	$36.83	$9.91	$46.74	$16.53	$0.00	$0.00	$0.00	$0.00		**21.00%**	$10	$73.09
777D Water Truck	A1601 Group 1	$36.83	$9.91	$46.74	$16.53	$0.00	$0.00	$0.00	$0.00		**21.00%**	$10	$73.09
785C Water Truck	A1601 Group 1	$36.83	$9.91	$46.74	$16.53	$0.00	$0.00	$0.00	$0.00		**21.00%**	$10	$73.09
Dump Truck (10-12 yd3)	A2104 Group III	$35.69	$9.91	$45.60	$16.53	$0.00	$0.00	$0.00	$0.00		**21.00%**	$10	$71.71

NOTES:

(4) Truck Driver Source:	Alaska Laborers & Mechanics Minimum Rates of Pay
(5) Zone Basis:	

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Closure Cost Estimate
Labor Rates

HOURLY LABOR RATE TABLE

EQUIPMENT TYPE (1) OR JOB DESCRIPTION	Labor Group	Base Rate ($/hr)	Zone Adjustment ($/hr)	Hourly Wage ($/hr)	Fringe ($/hr)	Retirement/ Medicare ($/hr)	Unemployment Insurance ($/hr)	Workman's Compensation ($/hr)	Other Indirect Costs ($/hr)	Additional User Markups to Base Rate† ($/hr)	%	($/hr)	Total ($/hr)
Laborers ($/hr) (6,7)													
General Laborer	A1601 Group 1	$36.83	$9.91	$46.74	$18.05	$0.00	$0.00	$0.00	$0.00		**21.00%**	$10	$74.61
Skilled Laborer	A1601 Group 1	$36.83	$9.91	$46.74	$18.05	$0.00	$0.00	$0.00	$0.00		**21.00%**	$10	$74.61
Driller's Helper	A1601 Group 1	$36.83	$9.91	$46.74	$18.05	$0.00	$0.00	$0.00	$0.00		**21.00%**	$10	$74.61
Rodmen (reinforcing concrete)	A1601 Group 1	$36.83	$9.91	$46.74	$18.05	$0.00	$0.00	$0.00	$0.00		**21.00%**	$10	$74.61
Cement finisher	A1601 Group 1	$36.83	$9.91	$46.74	$18.05	$0.00	$0.00	$0.00	$0.00			$0	$64.79
Carpenter	A1601 Group 1	$36.83	$9.91	$46.74	$18.05	$0.00	$0.00	$0.00	$0.00			$0	$64.79

NOTES:

(6) Laborer Source:	
(7) Carpenter Source:	
(8) Zone Basis:	

Project Management and Technical Labor ($/hr) (9)													
Project Manager		$200.00	$9.91	$209.91	$18.05	$0.00	$0.00	$0.00	$0.00		**21.00%**	$44	$272.04
Foreman		$81.72	$9.91	$91.63	$18.05	$0.00	$0.00	$0.00	$0.00		**21.00%**	$19	$128.92
Field Geologist/Engineer		$101.00	$9.91	$110.91	$18.05	$0.00	$0.00	$0.00	$0.00		**21.00%**	$23	$152.25
Field Tech/Sampler		$320.00	$9.91	$329.91	$18.05	$0.00	$0.00	$0.00	$0.00		**21.00%**	$69	$417.24
Range Scientist					$18.05						**21.00%**		
Senior Planning Engineer		$120.00	$9.91	$129.91	$18.05	$0.00	$0.00	$0.00	$0.00		**21.00%**	$25	$173.16
Project Engineer		$120.00	$9.91	$129.91	$18.05	$0.00	$0.00	$0.00	$0.00		**21.00%**	$25	$173.16
Mechanic/Fitter					$18.05								
Contract Sampling (non bulk rate)		$320.00	$9.91	$329.91	$18.05	$0.00	$0.00	$0.00	$0.00			$0	$347.96
					$18.05								
					$18.05								
					$18.05								

NOTES:

(9) Project Manager:	Merit
(9) Foreman Source:	
(9) Techical Labor Source:	
Other Labor Source:	
Other Labor Source:	
†Additional User Markups	
(These are added by the user to the	
base rate to account for site-specific	
conditions or corporate requirements)	

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Closure Cost Estimate
Equipment Costs

Project Name: True North - Reclamation Plan
Date of Submittal: 4/20/2012
File Name: SRCE_Version_1_4_1_014.xlsm
Model Version: Version 1.4.1
Cost Data: User Data
Cost Data File: Cost data for SRCE model.xlsm
Cost Estimate Type: Surety Cost Basis: Alaska

Color Code Key	
User Input - Direct Input	**Direct Input**
User Input - Pull Down List	**Pull Down Selection**
Program Constant (can override)	**Alternate Input**
Program Calculated Value	**Locked Cell - Formula or Reference**

Monthly Rental Basis: 200 hrs month

EQUIPMENT RENTAL RATE TABLE

EQUIPMENT TYPE (1)	Monthly Owner/Rental Rate	Equipment Hourly Rate	Fuel/Lube/ Wear	Total Rate
Bulldozers				
D6R	$14,260.28	$71.30	$27.66	$98.96
D6R w/ Winch	$14,960.00	$74.80	$27.66	$102.46
D7R	$19,086.84	$95.43	$32.78	$128.21
D8R	$18,000.00	$90.00	$45.98	$135.98
D9R	$27,000.00	$135.00	$64.38	$199.38
D10R	$36,000.00	$180.00	$80.72	$260.72
D11R			$108.39	$108.39
Wheeled Dozers				
824G			$46.07	$46.07
834G			$53.63	$53.63
844			$63.45	$63.45
854G			$77.71	$77.71
Motor Graders				
120H	$9,680.00	$48.40	$18.46	$66.86
14G/H	$15,782.00	$78.91	$30.66	$109.57
16G/H	$23,105.86	$115.53	$35.78	$151.30
24M			$63.40	$63.40
Track Excavators				
312C	$8,280.36	$41.40	$9.79	$51.19
320C	$9,802.49	$49.01	$22.14	$71.15
325C	$13,530.00	$67.65	$29.09	$96.74
330C	$11,900.00	$59.50	$35.64	$95.14
345B	$15,500.00	$77.50	$48.45	$125.95
365BL	$24,285.45	$121.43	$59.09	$180.52
385BL	$28,189.30	$140.95	$71.58	$212.52
Scrapers				
631G	$27,913.74	$139.57	$61.35	$200.92
637G	$32,208.17	$161.04	$97.14	$258.18
Wheeled Loaders				
924G	$8,118.00	$40.59	$13.35	$53.94
928G	$9,709.13	$48.55	$16.42	$64.96
950G	$11,726.00	$58.63	$18.46	$77.09
966G			$25.62	$25.62
972G	$14,500.00	$72.50	$30.66	$103.16
980G	$15,995.00	$79.98	$35.78	$115.75
988G	$21,000.00	$105.00	$52.49	$157.49
990			$69.53	$69.53
992G	$45,000.00	$225.00	$102.93	$327.93
994D			$147.24	$147.24
L2350			$269.94	$269.94
Shovels				

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Closure Cost Estimate
Equipment Costs

Project Name: True North - Reclamation Plan
Date of Submittal: 4/20/2012
File Name: SRCE_Version_1_4_1_014.xlsm
Model Version: Version 1.4.1
Cost Data: User Data
Cost Data File: Cost data for SRCE model.xlsm
Cost Estimate Type: Surety **Cost Basis: Alaska**

PC2000			$151.33	$151.33
PC3000			$204.50	$204.50
PC4000			$286.30	$286.30
PC5500			$486.71	$486.71
PC8000			$609.41	$609.41
Hydraulic Hammers				
H-120 (fits 325)				$0.00
H-160 (fits 345)			$9.21	$9.21
H-180 (fits 365/385)				$0.00
Demolition Shears				
S340 (fits 322/325/330)				$0.00
S365 (fits 330/345)				$0.00
S390 (fits 365/385)				$0.00
Demolition Grapples				
G315 (fits 322/325)				$0.00
G320 (fits 325/330)				$0.00
G330 (fits 345/365)				$0.00
Other Equipment				
420D 4WD Backhoe			$14.37	$14.37
428D 4WD Backhoe			$14.37	$14.37
CS533E Vibratory Roller			$17.44	$17.44
CS633E Vibratory Roller			$21.53	$21.53
CP533E Sheepsfoot Compactor			$17.44	$17.44
CP633E Sheepsfoot Compactor			$21.53	$21.53
Light Truck - 1.5 Ton	$3,116.00	$15.58	$8.24	$23.82
Supervisor's Truck	$3,462.00	$17.31	$6.19	$23.50

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Closure Cost Estimate
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Flatbed Truck	$8,000.00	$40.00	$21.32	$61.32
Air Compressor + tools	$8,250.00	$41.25	$6.19	$47.44
Welding Equipment			$10.28	$10.28
Heavy Duty Drill Rig	$28,000.00	$140.00	$51.18	$191.18
Pump (plugging) Drill Rig	$28,000.00	$140.00	$43.00	$183.00
Concrete Pump	$16,000.00	$80.00	$40.90	$120.90
Gas Engine Vibrator			$4.09	$4.09
Generator 5KW	$2,769.00	$13.85	$6.14	$19.98
HDEP Welder (pipe or liner)			$8.18	$8.18
5 Ton Crane			$12.27	$12.27
20 Ton Crane			$16.36	$16.36
50 Ton Crane			$19.22	$19.22
120 Ton Crane			$21.27	$21.27
Trucks				
725	$16,750.00	$83.75	$21.32	$105.07
730	$16,750.00	$83.75	$26.37	$110.12
735	$16,750.00	$83.75	$35.16	$118.91
740	$16,750.00	$83.75	$35.16	$118.91
769D			$39.93	$39.93
773E	$40,000.00	$200.00	$53.16	$253.16
777D			$70.61	$70.61
785C			$101.28	$101.28
793C			$172.86	$172.86
797B			$242.39	$242.39
613E (5,000 gal) Water Wagon			$26.64	$26.64
621E (8,000 gal) Water Wagon			$46.07	$46.07
777D Water Truck	$10,584.00	$52.92	$72.61	$125.53
785C Water Truck	$10,584.00	$52.92	$101.28	$154.20
Dump Truck (10-12 yd^3)			$21.27	$21.27

NOTES:

(1) Power Equipment Source:	
(2) Power Equipment Type:	Catepillar model or equivalent, LeTourneau loader, Komatsu shovels
(3) Drilliing Equipment Source:	Back Drilling
(4) Other Equipment Source:	
(5) Drill rig includes support (pipe) truck	

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FUEL, LUBE AND WEAR CALCULATIONS

EQUIPMENT TYPE	PM Cost Per Hour (1)	Under carriage or Tires (2)	G.E.T Consumption (3)	Fuel Use Rate gal/hr (4)	Cost@ 4.09	Total Hourly Equipment Cost
Bulldozers						
D6R	$2.10			6.25	$25.56	$27.66
D6R w/ Winch	$2.10			6.25	$25.56	$27.66
D7R	$2.10			7.50	$30.68	$32.78
D8R	$2.10		$4.00	9.75	$39.88	$45.98
D9R	$2.10		$4.00	14.25	$58.28	$64.38
D10R	$2.10		$5.00	18.00	$73.62	$80.72
D11R				26.50	$108.39	$108.39
Wheeled Dozers						
824G	$2.10	$0.00		10.75	$43.97	$46.07
834G	$2.10	$0.00		12.60	$51.53	$53.63
844	$2.10	$0.00		15.00	$61.35	$63.45
854G		$0.00		19.00	$77.71	$77.71
Motor Graders						
120H	$2.10			4.00	$16.36	$18.46
14G/H	$2.10		$3.00	6.25	$25.56	$30.66
16G/H	$2.10		$3.00	7.50	$30.68	$35.78
24M				15.50	$63.40	$63.40
Track Excavators						
312C	$2.10			1.88	$7.69	$9.79
320C	$2.10			4.90	$20.04	$22.14
325C	$2.10			6.60	$26.99	$29.09
330C	$2.10			8.20	$33.54	$35.64
345B	$2.10		$3.00	10.60	$43.35	$48.45
365BL	$2.10		$3.00	13.20	$53.99	$59.09
385BL				17.50	$71.58	$71.58
Scrapers						
631G				15.00	$61.35	$61.35
637G				23.75	$97.14	$97.14
Wheeled Loaders						
924G	$2.10			2.75	$11.25	$13.35
928G	$2.10			3.50	$14.32	$16.42
950G	$2.10			4.00	$16.36	$18.46
966G	$2.10			5.75	$23.52	$25.62
972G	$2.10		$3.00	6.25	$25.56	$30.66
980G	$2.10		$3.00	7.50	$30.68	$35.78
988G			$3.00	12.10	$49.49	$52.49
990				17.00	$69.53	$69.53
992G			$8.86	23.00	$94.07	$102.93
994D				36.00	$147.24	$147.24
L2350				66.00	$269.94	$269.94
Shovels						
PC2000				37.00	$151.33	$151.33
PC3000				50.00	$204.50	$204.50
PC4000				70.00	$286.30	$286.30
PC5500				119.00	$486.71	$486.71
PC8000				149.00	$609.41	$609.41
Hydraulic Hammers						
H-120 (fits 325)	N/A					$0.00
H-160 (fits 345)	N/A		$9.21			$9.21
H-180 (fits 365/385)	N/A					$0.00

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Equipment Costs

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Demolition Shears						
S340 (fits 322/325/330)	N/A					$0.00
S365 (fits 330/345)	N/A					$0.00
S390 (fits 365/385)	N/A					$0.00
Demolition Grapples						
G315 (fits 322/325)	N/A					$0.00
G320 (fits 325/330)	N/A					$0.00
G330 (fits 345/365)	N/A					$0.00
Other Equipment						
420D 4WD Backhoe	$2.10			3.00	$12.27	$14.37
428D 4WD Backhoe	$2.10			3.00	$12.27	$14.37
CS533E Vibratory Roller	$2.10			3.75	$15.34	$17.44
CS633E Vibratory Roller	$2.10			4.75	$19.43	$21.53
CP533E Sheepsfoot Compactor	$2.10			3.75	$15.34	$17.44
CP633E Sheepsfoot Compactor	$2.10			4.75	$19.43	$21.53
Light Truck - 1.5 Ton	$2.10			1.50	$6.14	$8.24
Supervisor's Truck	$2.10			1.00	$4.09	$6.19
Flatbed Truck	$2.10			4.70	$19.22	$21.32
Air Compressor + tools	$2.10		N/A	1.00	$4.09	$6.19
Welding Equipment	$2.10		N/A	2.00	$8.18	$10.28
Heavy Duty Drill Rig	$2.10			12.00	$49.08	$51.18
Pump (plugging) Drill Rig	$2.10			10.00	$40.90	$43.00
Concrete Pump			N/A	10.00	$40.90	$40.90
Gas Engine Vibrator			N/A	1.00	$4.09	$4.09
Generator 5KW			N/A	1.50	$6.14	$6.14
HDEP Welder (pipe or liner)			N/A	2.00	$8.18	$8.18
5 Ton Crane				3.00	$12.27	$12.27
20 Ton Crane				4.00	$16.36	$16.36
50 Ton Crane				4.70	$19.22	$19.22
120 Ton Crane				5.20	$21.27	$21.27

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Trucks						
725	$2.10			4.70	$19.22	$21.32
730	$2.10		$3.00	5.20	$21.27	$26.37
735	$2.10		$3.00	7.35	$30.06	$35.16
740	$2.10		$3.00	7.35	$30.06	$35.16
769D	$2.10			9.25	$37.83	$39.93
773E	$2.10		$3.00	11.75	$48.06	$53.16
777D	$2.10			16.75	$68.51	$70.61
785C	$2.10			24.25	$99.18	$101.28
793C	$2.10			41.75	$170.76	$172.86
797B	$2.10			58.75	$240.29	$242.39
613E (5,000 gal) Water Wagon	$2.10			6.00	$24.54	$26.64
621E (8,000 gal) Water Wagon	$2.10			10.75	$43.97	$46.07
777D Water Truck	$2.10		$2.00	16.75	$68.51	$72.61
785C Water Truck	$2.10			24.25	$99.18	$101.28
Dump Truck (10-12 yd3) (5)	N/A		N/A	5.20	$21.27	$21.27

Notes:

(1) PM Source:	
(2) Undercarriage Source:	
(3) G.E.T. Source:	CAT Historical Data
(4) Fuel Use Source:	Caterpillar Handbook, Edition 35, Ch. 20; or estimated average for smaller vehicles
(5) Dump Truck Oper. Cost Source:	Means Heavy Construction (2008)

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Closure Cost Estimate
Equipment Costs

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TIRE COST TABLES

Equipment	Tire Size	# of Tires Per Piece of Equipment	Cost Per Tire	Tire Cost (1)(2)	Life Expectency Hours (Low/Zone A) (3)	Tire Cost per Hour
Bulldozers						
D6R			N/A			
D6R w/ Winch			N/A			
D7R			N/A			
D8R			N/A			
D9R			N/A			
D10R			N/A			
D11R			N/A			
Wheeled Dozers						
824G	29.5R25	4		$0.00	3,500	$0.00
834G	35/65-R33	4		$0.00	3,500	$0.00
844	45/65-R39	4		$0.00	3,500	$0.00
854G	45/65-R45	4		$0.00	3,500	$0.00
Motor Graders						
120H	13PR24	6		$0.00	3,500	
14G/H	20.5R25	6		$0.00	3,500	
16G/H	23.5R25	6		$0.00	3,500	
24M	23.5R25	6		$0.00	3,500	
Track Excavators						
312C			N/A			
320C			N/A			
325C			N/A			
330C			N/A			
345B			N/A			
365BL			N/A			
385BL			N/A			
Scrapers						
631G	37.25R35	4		$0.00	4,000	
637G	37.25R35	4		$0.00	4,000	
Wheeled Loaders						
924G	17.5R25	4		$0.00	4,500	
928G	17.5R25	4		$0.00	4,500	
950G	26.5R25	4		$0.00	4,500	
966G	26.5R25	4		$0.00	4,500	
972G	26.5R25	4		$0.00	4,500	
980G	29.5R25	4		$0.00	4,500	
988G	35/65-33	4		$0.00	4,500	
990	41.25/70-39	4		$0.00	4,500	
992G	45/65R45	4		$0.00	4,500	
994D	55/85R57	4		$0.00	4,500	
L2350	55/85R57	4		$0.00	4,500	
Shovels						
PC2000			N/A			
PC3000			N/A			
PC4000			N/A			
PC5500			N/A			
PC8000			N/A			

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Hydraulic Hammers						
H-120 (fits 325)			N/A			
H-160 (fits 345)			N/A			
H-180 (fits 365/385)			N/A			
Demolition Shears						
S340 (fits 322/325/330)			N/A			
S365 (fits 330/345)			N/A			
S390 (fits 365/385)			N/A			
Demolition Grapples						
G315 (fits 322/325)			N/A			
G320 (fits 325/330)			N/A			
G330 (fits 345/365)			N/A			
Other Equipment						
420D 4WD Backhoe	340/80R18-19.5LR24	2		$0.00	3,000	
428D 4WD Backhoe	340/80R18-16.9R28	2		$0.00	3,000	
CS533E Vibratory Roller			N/A			
CS633E Vibratory Roller			N/A			
CP533E Sheepsfoot Compactor			N/A			
CP633E Sheepsfoot Compactor			N/A			
Light Truck - 1.5 Ton		4		$0.00	3,000	
Supervisor's Truck		4		$0.00	3,000	
Flatbed Truck		22		$0.00	3,000	
Air Compressor + tools			N/A			
Welding Equipment			N/A			
Heavy Duty Drill Rig		4		$0.00	3,000	
Pump (plugging) Drill Rig		4		$0.00	3,000	
Concrete Pump			N/A			
Gas Engine Vibrator			N/A			
Generator 5KW			N/A			
HDEP Welder (pipe or liner)			N/A			
5 Ton Crane		4		$0.00	3,000	
20 Ton Crane		4		$0.00	3,000	
50 Ton Crane		6		$0.00	3,000	
120 Ton Crane		6		$0.00	3,000	
Trucks						
725	23.5R25	6		$0.00	2,000	
730	23.5R25	6		$0.00	2,000	
735	26.5R25	6		$0.00	2,000	
740	29.5R25	6		$0.00	2,000	
769D	18.00R33	6		$0.00	6,000	
773E	24.00R35	6		$0.00	5,000	
777D	27.00R49	6		$0.00	5,000	
785C	33.00R51	6		$0.00	4,000	
793C	40.00R57	6		$0.00	4,000	
797B	40.00R57	6		$0.00	4,000	
613E (5,000 gal) Water Wagon	23.5R25	6		$0.00	6,000	
621E (8,000 gal) Water Wagon	33.25R29	6		$0.00	8,000	
777D Water Truck	27.00R49	6		$0.00	5,000	
785C Water Truck	33.00R51	6		$0.00	4,000	
Dump Truck (10-12 yd3)		10		$0.00	6,000	

Notes:

(1) Unit Cost Basis:	Cost per tyre each
(2) Cost Basis:	
(3) Tire Cost Source:	
(4) Tire Wear Source:	Caterpillar Handbook, Edition 37

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Closure Cost Estimate
Material Costs

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Color Code Key	
User Input - Direct Input	**Direct Input**
User Input - Pull Down List	**Pull Down Selection**
Program Constant (can override)	**Alternate Input**
Program Calculated Value	**Locked Cell - Formula or Reference**

Revegetation Materials

Seed Mixes

Seed Mix	Description		Cost/Acre
None			
Mix 1	Basins		$145.20
Mix 2	Low Hills		
Mix 3	Uplands		
Mix 4	Riparian or Custom		
User Mix 1			
User Mix 2			
User Mix 3			
User Mix 4			
	Cost/lb	**lbs/Acre**	**Cost/Acre**
User Mix 5 (from Seed Mix sheet)	$2.25	$44.00	$99.00
Notes:			

Mulch

Item	Cost/lb	lbs/Acre	Cost/Acre
None			
Straw Mulch		**10**	
Hydro Mulch		**10**	
Timber Mulch		**10**	
		10	
Notes:			

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Closure Cost Estimate
Material Costs

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Cost Estimate Type: Surety Cost Basis: Alaska

Amendments			
Item	**Cost/lb**	**lbs/Acre**	**Cost/Acre**
None			
Organic Matter		**10**	
Treated Sludge		**10**	
Chemical	$0.48	**10**	$4.84
		10	
Notes:			

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Well Abandonment Materials

Description	Cost/50lb bag	Units	Cost/unit*
Cement	$30.39	cy	$144.71
Grout (Low Grade Bentonite)	$23.31	cy	$111.00
Inert Material/Cuttings	$0.00	cy	$0.00
		cy	
		cy	

Cement and grout quotes from 2012 Baroid pricing
Wells will be closed with grout. Inert Material is assumed to be grout

* Assumes 1 bag mixes with water to make 0.21 y3 or 0.16 m3 of grout/cement slurry.

Monitoring Costs

Description	Units	Cost/unit
Monitor Well Pump	ea.	$595.00
Sampling Supplies	ea.	$0.00
	ea.	
Lower Spruce Creek	ea.	$528.75
	ea.	
	ea.	
	ea.	
	ea.	
	ea.	
	ea.	
	ea.	
	ea.	
	ea.	
	ea.	
	ea.	
	ea.	

Sampling costs are non-diccounted/bulk rate from ACZ

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Cost Estimate Type: Surety **Cost Basis: Alaska**

Fuel, Etc.

Description	Units	Cost/unit	User Overrides
Off-road Diesel - delivered (1)	$/gal	$4.090	
Pickup Truck Mileage	$/mi		
Electical Power	$/kWh		

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Closure Cost Estimate
Material Costs

Revegetation Method				
Slopes				
Disturbance Type	**Seed Application Method**	**Labor** Cost/Acre	**Equipment** Cost/Acre	**Total** Cost/Acre
Waste Rock Dumps	**Mechanical Broadcast**		$237.00	$237.00
Heap Leach	**Mechanical Broadcast**		$237.00	$237.00
Tailings	**Mechanical Broadcast**		$237.00	$237.00
Quarries & Borrow Pits	**Mechanical Broadcast**		$237.00	$237.00
Flat Areas and Undifferentiated				
Disturbance Type	**Seed Application Method**	**Labor** Cost/Acre	**Equipment** Cost/Acre	**Total** Cost/Acre
Exploration Trenches	**Mechanical Broadcast**		$237.00	$237.00
Exploration Roads	**Mechanical Broadcast**		$237.00	$237.00
Waste Rock Dumps	**Mechanical Broadcast**		$237.00	$237.00
Heap Leach	**Mechanical Broadcast**		$237.00	$237.00
Tailings	**Mechanical Broadcast**		$237.00	$237.00
Quarries & Borrow Pits	**Mechanical Broadcast**		$237.00	$237.00
Roads	**Mechanical Broadcast**		$237.00	$237.00
Pits	**Mechanical Broadcast**		$237.00	$237.00
Haul Material	**Mechanical Broadcast**		$237.00	$237.00
Foundations & Buildings	**Mechanical Broadcast**		$237.00	$237.00
Sediment & Drainge Control	**Mechanical Broadcast**		$237.00	$237.00
Process Ponds	**Mechanical Broadcast**		$237.00	$237.00
Landfills	**Mechanical Broadcast**		$237.00	$237.00
Yards, Etc.	**Mechanical Broadcast**		$237.00	$237.00
Revegetation Maintenance	**Mechanical Broadcast**		$237.00	$237.00

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Closure Cost Estimate
Misc. Unit Costs

Project Name: True North - Reclamation Plan
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Model Version: Version 1.4.1
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Revegetation

	Means Number	Unit	Crew	Daily Output	Daily Output User	Materials	Labor	Equipment	Total	Notes
Seeding - Broadcast Hand (1)		acres							$0.00	
Seeding - Broadcast Mechanical (1)		acres						$237.00	$237.00	Seed Broadcasting is Aerial and includes labor
Seeding - Drill (1)		acres		365			$1.64	$0.00	$1.64	
Seeding - Hydroseeding (1)				365			$1.64	$0.00	$1.64	
Shrub Planting - bare root 6-10 in (150- 250mm) (2)	02910-400-0561	ea.	1 Clab	365			$1.64	$0.00	$1.64	
Tree Planting - bare root 11-16 in (270- 400mm) (3)	02910-400-0562	ea.	1 Clab	260			$2.30	$0.00	$2.30	
Cactus Planting (4)		ea.	1 Clab						$0.00	
NOTES:										
(1) Seeding Source:										
(2) Shrub Source:										
(3) Tree Source:										
(4) Cactus Source:										

Building and Wall Demolition

Hourly productivity rates and crew composition from Means Heavy Construction 2005 Edition by permission of R.S.Means/Reed Construction Data .
All equipment, labor and material unit costs are from Labor Costs, Equipment Costs and Material Costs spreadsheets

	Means Number	Unit	Crew	Daily Output	Daily Output User	Labor	Equipment	Premium	Total	Notes
Building Demolition										
Lg. steel	02220-110-0012	C.F.	B-8	21500		$0.21	$0.05		$0.26	
Lg. concrete	02220-110-0050	C.F.	B-8	15300		$0.29	$0.06		$0.35	
Lg. masonry	02220-110-0080	C.F.	B-8	20100		$0.22	$0.05		$0.27	
Lg. mixed	02220-110-0100	C.F.	B-8	20100		$0.22	$0.05		$0.27	
Sm. steel	02220-110-0500	C.F.	B-3	14800		$0.27	$0.06		$0.33	
Sm. concrete	02220-110-0600	C.F.	B-3	11300		$0.35	$0.08		$0.43	
Sm. masonry	02220-110-0650	C.F.	B-3	14800		$0.27	$0.06		$0.33	
Sm. wood	02220-110-0700	C.F.	B-3	14800		$0.27	$0.06		$0.33	
Wall Demolition										
Block 4 in (100 mm) thick	02220-130-2000	S.F.	1 Clab	180		$3.32	$0.00	20%	$3.98	assumes vertical reinforcing rods included (20% premium)
Block 6 in (150 mm) thick	02220-130-2040	S.F.	1 Clab	170		$3.51	$0.00	20%	$4.21	assumes vertical reinforcing rods included (20% premium)
Block 8 in (200 mm) thick	02220-130-2080	S.F.	1 Clab	150		$3.98	$0.00	20%	$4.78	assumes vertical reinforcing rods included (20% premium)
Block 12 in (300 mm) thick	02220-130-2100	S.F.	1 Clab	150		$3.98	$0.00	20%	$4.78	assumes vertical reinforcing rods included (20% premium)
Conc 6 in (150 mm) thick	02220-130-2400	S.F.	B-9	160		$24.53	$2.37	10%	$29.59	assumes average reinforcing (10% premium)
Conc 8 in (200 mm) thick	02220-130-2420	S.F.	B-9	140		$28.04	$2.71	10%	$33.83	assumes average reinforcing (10% premium)
Conc 10 in (250 mm) thick	02220-130-2440	S.F.	B-9	120		$32.71	$3.16	10%	$39.46	assumes average reinforcing (10% premium)
Conc 12 in (300 mm) thick	02220-130-2500	S.F.	B-9	100		$39.25	$3.80	10%	$47.36	assumes average reinforcing (10% premium)

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Closure Cost Estimate
Misc. Unit Costs

Project Name: True North - Reclamation Plan
Date of Submittal: 4/20/2012
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Cost Estimate Type: Surety Cost Basis: Alaska

Waste Disposal

Unit rates from Means Heavy Construction 2006 Edition by permission of R.S.Means/Reed Construction Data .

	Means Number	Unit	Crew	Daily Output	Materials	Labor	Equipment		Total	Notes
Rubbish Handling										
Dumpster delivery (average for all sizes)	02220-350-0910	ea.							$0.00	
Haul (average for all sizes)	02220-350-0920	ea.							$0.00	
Rent per month (average for all sizes)	02220-350-0940	ea.							$0.00	
Disposal fee per ton (tonne) (average for all sizes)	02220-350-0950	ton							$0.00	
NOTES:										
Dumpster Cost Source										
Dumpster Disposal Fee Source:										
Hazardous Material Handling - Solids (+ Liquids in drums)										
Pickup fees 55 gal (200 L). drums	02110-300-1100	ea.							$0.00	
Bulk material (average)	02110-300-1220/1230	ton							$0.00	
Transport - truck load (80 drums, 25 cy (m3), 18 tons)	02110-300-1260/1270	mile							$0.00	
Dump site solid disposal fee	02110-300-6000/6020	ton							$0.00	
NOTES:										
Solid Handling Cost Source										
Solid Disposal Fee Source:										
Hazardous Material Handling - Liquids										
Vacuum Truck Pickup (2200 gal/8300 L)	02110-300-3110	hr.							$0.00	
Vacuum Truck Pickup (5000 gal/19000 L)	02110-300-3120	hr.							$0.00	
Dump site liquid disposal fee	02110-300-6000/6020	ton							$0.00	
NOTES:										
Liquid Handling Cost Source										
Liquid Disposal Fee Source:										
Hydrocarbon Contaminated Soils (HCS)										
Insitu Biotreatment	02115-200-2020/2021	C.Y.							$0.00	
HCS disposal fee	02115-200-2050/2055	C.Y.							$0.00	
NOTES:										
Insitu Treatement Cost Source										
HCS Disposal Fee Source:										

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Closure Cost Estimate
Misc. Unit Costs

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Concrete Structure Installation

Weekly dumpster rental rates from Means Heavy Construction 2005 Edition with permission by R.S.Means/Reed Construction Data .
Weekly dumpster rental rates include haul to off-site disposal site and disposal fees

	Means Number	Unit	Crew	Daily Output	Materials	Labor	Equipment	Premium	Total	Notes
Reinforced Concrete Bulkheads and Shaft Covers										
Grade walls - 15 in (400mm) thick, 8 ft (2.5m) high	03310-240-4300	C.Y.	C-14D	80.02		$179.13	$14.85		$193.98	includes reinforcing
Grade walls - 15 in (400mm) thick, 12 ft (3.7m) high	03310-240-4350	C.Y.	C-14D	26.2		$547.09	$45.34		$592.43	includes reinforcing
Elevated conc, 1-way beam & slab - 15ft (4.6m) span	03310-240-2700	C.Y.	C-14B	20.59		$728.96	$57.69		$786.65	includes reinforcing
Elevated conc, 1-way beam & slab - 25ft (7.5m) span	03310-240-2750	C.Y.	C-14B	28.36		$529.24	$41.89		$571.13	includes reinforcing
Bat Gate/Foam Plug Installation										
Bat Gate (5)		ea.								materials $/ea. Installed
Culvert Gate (5)		ea.								materials $/ea. Installed
Adit Foam Plug (6)		ea./C.Y.								materials $/cy placed
Production Opening Foam Plug (6)		ea./C.Y.								materials $/cy placed

NOTES:
(5) Bat Gate Source:
(6) Foam Plug Source:

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Closure Cost Estimate
Misc. Unit Costs

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Misc. Linear Projects

Hourly productivity rates and crew composition from Means Heavy Construction 2005 Edition by permission of R.S.Means/Reed Construction Data .
All equipment, labor and material unit costs are from Labor Costs, Equipment Costs and Material Costs spreadsheets

	Means Number	Unit	Crew	Daily Output	Materials	Labor	Equipment	Premium	Total	Notes
Fencing Installation										
Barbed 3-strand	02820-170-1650	L.F.	B-80A	760		$3.09	$0.25		$3.34	
Barbed 4-strand	extrapolated	L.F.	B-80A	570		$4.13	$0.33		$4.46	
Barbed 5-strand	02820-130-0920	L.F.	B-80A	456		$5.16	$0.42		$5.58	
Chain link 8-10ft (2.5-3m) Install	02820-130-0920	L.F.	B-80C	180		$13.06	$1.06		$14.12	
Wood stockade fence 6 ft (2 m) high - Install	02820-510-1240	L.F.	B-80C	150		$15.68	$1.27		$16.95	
	user	L.F.							$0.00	
	user	L.F.							$0.00	
	user	L.F.							$0.00	
	user	L.F.							$0.00	
Fencing Removal										
Barbed 3-strand Removal	02220-220-1600	L.F.	2 Clab	430		$4.08	$0.44		$4.52	
Barbed 4-strand Removal	extrapolated	L.F.	2 Clab	355		$4.94	$0.54		$5.48	
Barbed 5-strand Removal	02220-220-1650	L.F.	2 Clab	280		$6.27	$0.68		$6.95	
Chain link 8-10 ft (2.5-3 m) Removal	02220-220-1700	L.F.	B-6	445		$4.00	$1.17		$5.17	
Wood, all types 4-6 ft ("1.5-2 m) high - Removal	02220-220-1775	L.F.	2 Clab	430		$4.08	$0.44		$4.52	
	user	L.F.								
	user	L.F.							$0.00	
	user	L.F.							$0.00	
	user	L.F.							$0.00	
Culvert Removal										
12 in (300 mm) Diameter	02220-220-2900	L.F.	B-6	175		$10.16	$2.97		$13.13	
18 in (450 mm) Diameter	02220-220-2930	L.F.	B-6	150		$11.86	$3.46		$15.32	
24 in (600 mm) Diameter	02220-220-2960	L.F.	B-6	120		$14.82	$4.33		$19.15	
36 in (1m) Diameter	02220-220-3000	L.F.	B-6	90		$19.76	$5.77		$25.53	
Pipeline Removal										
0.75 in (20mm) - 4 in (100 mm) diameter	02220-381-1600	L.F.	B-20	700		$3.98	$0.27		$4.25	
6 in (150 mm) - 8 in (200 mm)	02220-381-1700	L.F.	B-20	500		$5.57	$0.38		$5.95	
10 in (250 mm) - 18 in (450 mm)	02220-381-1800	L.F.	B-20	300		$9.29	$0.64		$9.93	
20 in (500 mm) - 36 in (1 m)	02220-381-1900	L.F.	B-20	200		$13.93	$0.95		$14.88	
Pipe and Drainpipe Installation										
Water 4in (100mm) 40ft (12m) length, welded HDPE	02510-760-0100	L.F.	B-22A	400		$8.61	$3.89		$12.50	
Water 6in (150mm) 40ft (12m) length, welded HDPE	02510-760-0200	L.F.	B-22A	380		$9.06	$4.10		$13.16	
Water 12in (300mm) 40ft (12m) length, welded HDPE	02510-760-0500	L.F.	B-22A	260		$13.24	$5.99		$19.23	
Drain 4in (100mm) perforated PVC	02620-630-2100	L.F.	B-14	315		$14.49	$0.97		$15.46	
Drain 6in (150mm) perforated PVC	02620-630-2110	L.F.	B-14	300		$15.21	$1.02		$16.23	
Drain 4in (100mm) corrugated, perf or plain	02620-660-0040	L.F.	2 Clab	1200		$1.46	$0.16		$1.62	
Drain 6in (150mm) corrugated., perf or plain	02620-660-0060	L.F.	2 Clab	900		$1.95	$0.21		$2.16	

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Closure Cost Estimate
Misc. Unit Costs

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Drain Rock Preparation										
Crushing		C.Y.								
Screening		C.Y.								
TOTAL									$0.00	
Misc.										
Backhoe work	02210-700-0120	C.Y.	B-11M	28		$20.88	$4.11		$24.99	
Powerline and Transformer Removal										
Single Pole		mile								
Double Pole		mile								
Transformer (9)		ea.							$27,500.00	
NOTES:										
(7) Single Pole Source:										
(8) Double Pole Source:										
(9) Transformer Source:										
Erosion and Sedimentation Control										
Hourly productivity rates and crew composition from Means Heavy Construction 2005 Edition by permission of R.S.Means/Reed Construction Data .										
All equipment, labor and material unit costs are from Labor Costs, Equipment Costs and Material Costs spreadsheets										
	Means Number	**Unit**	**Crew**	**Daily Output**	**Materials**	**Labor**	**Equipment**	**Premium**	**Total**	**Notes**
Rip-Rap & Rock Lining										
Rip-Rap 3/8 to 1/4 CY (m3) pieces, grouted	02370-450-0110	S.Y.	B-13	80		$49.06	$1.92		$50.98	assumes on-site source of rip-rap
Rip-Rap 18 in (450 mm) min thick, no grout	02370-450-0200	S.Y.	B-13	53		$74.06	$2.90		$76.96	assumes on-site source of rip-rap
Gabions, 6 in (150 mm) deep	02370-450-0400	S.Y.	B-13	200		$19.63	$0.77		$20.40	assumes on-site source rock fill for gabions
Gabions, 9 in (250 mm) deep	02370-450-0500	S.Y.	B-13	163		$24.08	$0.94		$25.02	assumes on-site source rock fill for gabions
Gabions, 12 in (300 mm) deep	02370-450-0200	S.Y.	B-13	153		$25.65	$1.00		$26.65	assumes on-site source rock fill for gabions
Gabions, 18 in (450 mm) deep	02370-450-0200	S.Y.	B-13	102		$38.48	$1.51		$39.99	assumes on-site source rock fill for gabions
Gabions, 36 in (1m) deep	02370-450-0200	S.Y.	B-13	60		$65.42	$2.56		$67.98	assumes on-site source rock fill for gabions
HDEP Liner Installation										
Finish grading large area	2310-100-0100	S.F.	B-11L	54000		$0.02	$0.02		$0.04	
Compaction-riding, vibrating roller - 12in (300mm) lifts	2315-310-5100	C.Y.	B-10Y	2600		$0.45	$0.05		$0.50	
60 mil HDPE	2660-610-0010	S.F.	3 Skwk	1600		$1.48	$0.11	10%	$1.75	
80 mil HDPE	user	S.F.	3 Skwk	149	$9.00	$15.94	$1.21		$26.15	
40 mil VLDPE	user	S.F.	3 Skwk	150	$7.00	$15.84	$1.20		$24.04	
	user	S.F.	3 Skwk	149		$15.94	$1.21		$17.15	
	user	S.F.	3 Skwk	149		$15.94	$1.21		$17.15	

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Construction Management Support										
Office Trailer, Furnished, no hook-ups		0150-500-0250	mo.						$0.00	
Toilet Portable, chemical		1590-400-6410	mo.						$0.00	
TOTAL						$0.00			$0.00	
Pump and Casing Removal										
	Pump Type	**Measurement**	**Unit**				**Labor**	**Equipment**	**Total**	**Notes**
Pump Removal										
Submersible		ft to pump	L.F.						$0.00	
Line Shaft		ft to pump	L.F.						$0.00	
NOTES:										
(10) Pump Removal Source:										

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EQUIPMENT FLEETS

ACTIVITY AND FLEET		Standard Labor Crew	User Defined Labor Crew	EQUIPMENT UNIT COST (Hourly)	TOTAL LABOR UNIT COST (Hourly)	TOTAL COST (Hourly)
RIPPING						
Rip road						
Waste rock dumps, heaps, tails - rip flat surfaces						
Surface preparation						
Scarify						
Small Dozer w/ multi-shank						
D6R				$98.96	$63.27	$162.23
Totals				$98.96	$63.27	$162.23
Medium Dozer w/ multi-shank						
D8R				$135.98	$73.09	$209.07
Totals				$135.98	$73.09	$209.07
Large Dozer w/ multi-shank						
D10R				$260.72	$73.09	$333.81
Totals				$260.72	$73.09	$333.81
Grader w/ multi-shank						
16G/H				$151.30	$73.09	$224.39
Totals				$151.30	$73.09	$224.39
GRADING						
Grading storage and structure areas						
Grading waste rock dumps and heaps						
Grading landfills						
Constructing pit safety berms						
Small Dozer Fleet						
D7R				$128.21	$63.27	$191.48
Totals				$128.21	$63.27	$191.48
Medium Dozer Fleet						
D8R				$135.98	$73.09	$209.07
Totals				$135.98	$73.09	$209.07
Large Dozer Fleet						
D10R				$260.72	$73.09	$333.81
Totals				$260.72	$73.09	$333.81
EXPLORATION GRADING						
Backfilling and grading exploration trenches						
Grading flat exploration roads						
Small Dozer Fleet						
D7R				$128.21	$63.27	$191.48
Totals				$128.21	$63.27	$191.48
Medium Dozer Fleet						
D8R				$135.98	$73.09	$209.07
Totals				$135.98	$73.09	$209.07
Large Dozer Fleet						
D8R				$135.98	$73.09	$209.07
Totals				$135.98	$73.09	$209.07

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EQUIPMENT FLEETS

ACTIVITY AND FLEET		Standard Labor Crew	User Defined Labor Crew	EQUIPMENT UNIT COST (Hourly)	TOTAL LABOR UNIT COST (Hourly)	TOTAL COST (Hourly)
EXCAVATING						
Earthen Berms						
Diversion ditch excavation and backfill						
Underground openings backfill - excavate and place						
Pit berm construction (excavator option)						
Small Excavator						
325C				$96.74	$73.09	$169.83
Totals				$96.74	$73.09	$169.83
Medium Excavator						
330C				$95.14	$73.09	$168.23
Totals				$95.14	$73.09	$168.23
Large Excavator						
385BL				$212.52	$73.09	$285.61
Totals				$212.52	$73.09	$285.61
EXCAVATE AND RECONTOUR						
Recontour large roads (haul roads, access roads, etc.)						
Ponds - Excavate and pull liner and bury						
Small Excavator + Dozer						
325C				$96.74	$73.09	$169.83
D7R				$128.21	$63.27	$191.48
Total Equipment				$224.95	$136.36	$361.31
Medium Excavator + Dozer						
330C				$95.14	$73.09	$168.23
D8R				$135.98	$73.09	$209.07
Totals				$231.12	$146.18	$377.30
Large Excavator + Dozer						
385BL				$212.52	$73.09	$285.61
D10R				$260.72	$73.09	$333.81
Totals				$473.24	$146.18	$619.42
EXPLORATION ROAD/PAD RECONTOUR						
Recontour small roads (exploration roads, service roads, etc.)						
Cut and Fill reclamation on slopes						
Drill pad recountour						
Drill sump backfill						
Small Dozer						
D6R				$98.96	$63.27	$162.23
Totals				$98.96	$63.27	$162.23
Large Dozer						
D8R				$135.98	$73.09	$209.07
Totals				$135.98	$73.09	$209.07
Grader						
16G/H				$151.30	$73.09	$224.39
Totals				$151.30	$73.09	$224.39
Small Excavator						
320C				$71.15	$73.09	$144.24
Totals				$71.15	$73.09	$144.24
Medium Excavator						
345B				$125.95	$73.09	$199.04
Totals				$125.95	$73.09	$199.04

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Model Version: Version 1.4.1
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EQUIPMENT FLEETS

ACTIVITY AND FLEET		Standard Labor Crew	User Defined Labor Crew	EQUIPMENT UNIT COST (Hourly)	TOTAL LABOR UNIT COST (Hourly)	TOTAL COST (Hourly)
LOAD, HAUL AND PLACE MATERIAL						
Rock placement						
Haul overburden for backfill						
Haul borrow for backfill						
Haul cover or growth media						
Small Truck/Loader Fleet						
725				$105.07	$73.09	$178.16
966G	**Loader**			$25.62	$73.09	$98.71
D7R		1		$128.21	$63.27	$191.48
Totals				$258.90	$209.45	$468.35
Medium Truck/Loader Fleet						
730				$0.00	$73.09	$73.09
972G	**Loader**			$103.16	$73.09	$176.25
D8R		1		$135.98	$73.09	$209.07
Totals				$239.14	$219.27	$458.41
Large Truck/Loader Fleet						
777D				$70.61	$73.09	$143.70
992G	**Loader**			$327.93	$73.09	$401.02
D10R		1		$260.72	$73.09	$333.81
Totals				$659.26	$219.27	$878.53
Extra Large Truck/Loader Fleet						
785C				$101.28	$73.09	$174.37
992G	**Loader**			$327.93	$73.09	$401.02
D11R		1		$108.39	$73.09	$181.48
Totals				$537.60	$219.27	$756.87
Scraper/Dozer Fleet						
631G				$200.92	$73.09	$274.01
D10R				$260.72	$73.09	$333.81
D7R		1		$128.21	$63.27	$191.48
Totals				$589.85	$209.45	$799.30
Tandem Scraper Fleet						
637G				$258.18	$73.09	$331.27
D7R		1		$128.21	$63.27	$191.48
Totals				$386.39	$136.36	$522.75
MISC. LOAD AND HAUL AND EARTHWORKS						
Sludge removal						
Drainage controls						
Misc. - Cat 325B Excavator / 10-12 yd3 Truck						
325C				$96.74	$73.09	$169.83
Dump Truck (10-12 yd3)				$21.27	$71.71	$92.98
Totals				$118.01	$144.80	$262.81
Misc. - Cat D9R Dozer/ Loader (5 yd3) / 10-12 yd3 Truck						
D9R				$199.38	$73.09	$272.47
966G				$25.62	$73.09	$98.71
Dump Truck (10-12 yd3)				$21.27	$71.71	$92.98
Totals				$246.27	$217.89	$464.16
Misc. - Cat D6 Dozer / Cat 966 Loader / 10-12 yd3 Truck						
D6R				$98.96	$63.27	$162.23
966G				$25.62	$73.09	$98.71
Dump Truck (10-12 yd3)				$21.27	$71.71	$92.98
Totals				$145.85	$208.07	$353.92

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EQUIPMENT FLEETS

ACTIVITY AND FLEET		Standard Labor Crew	User Defined Labor Crew	EQUIPMENT UNIT COST (Hourly)	TOTAL LABOR UNIT COST (Hourly)	TOTAL COST (Hourly)
CONCRETE BREAKING						
Slab demolition						
Footing demolition						
Wall demolition						
Small - Cat 325B Excavator w/ H140D s Hammer						
325C				$96.74	$73.09	$169.83
H-120 (fits 325)				$0.00	$0.00	$0.00
D9R				$199.38	$73.09	$272.47
Totals				$296.12	$146.18	$442.30
Medium - Cat 345B Excavator w/ H180D s Hammer						
345B				$125.95	$73.09	$199.04
H-160 (fits 345)				$9.21	$0.00	$9.21
D9R				$199.38	$73.09	$272.47
Totals				$334.54	$146.18	$480.72
Large - Cat 385B Excavator w/ H180D s Hammer						
385BL				$212.52	$73.09	$285.61
H-180 (fits 365/385)				$0.00	$0.00	$0.00
D9R				$199.38	$73.09	$272.47
Totals				$411.90	$146.18	$558.08
DRILL HOLE ABANDONMENT						
Drill Hole - Grout or Cement						
Pump (plugging) Drill Rig				$183.00	$63.27	$246.27
Driller's Helper		2		$0.00	$149.22	$149.22
Totals				$183.00	$212.49	$395.49
Drill Hole - Inert Media (Means Crew B-11M+ 1 Laborer)						
420D 4WD Backhoe				$14.37	$73.09	$87.46
General Laborer		1		$0.00	$74.61	$74.61
Totals				$14.37	$147.70	$162.07
Drill Hole - Casing Perforation or Removal						
Heavy Duty Drill Rig				$191.18	$63.27	$254.45
Driller's Helper		2		$0.00	$149.22	$149.22
Totals				$191.18	$212.49	$403.67
MAINTENANCE FLEET						
Road Grading, Dust Suppression, Clean Up						
Maintenance - Small Water Truck and Cat 14G Grader						
613E (5,000 gal) Water Wagon				$26.64	$73.09	$99.73
120H				$66.86	$73.09	$139.95
Totals				$93.50	$146.18	$239.68
Maintenance - Medium Water Truck and Cat 16G Grader						
613E (5,000 gal) Water Wagon				$26.64	$73.09	$99.73
14G/H				$109.57	$73.09	$182.66
Totals				$136.21	$146.18	$282.39
Maintenance - Large Water Truck and Cat 16G Grader						
777D Water Truck				$125.53	$73.09	$198.62
16G/H				$151.30	$73.09	$224.39
Totals				$276.83	$146.18	$423.01
PROJECT SUPERVISION						
Foreman		1		$0.00	$128.92	$128.92
Supervisor's Truck		1		$23.50	$70.08	$93.58
Totals				$23.50	$199.00	$222.50

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EQUIPMENT FLEETS

ACTIVITY AND FLEET		Standard Labor Crew	User Defined Labor Crew	EQUIPMENT UNIT COST (Hourly)	TOTAL LABOR UNIT COST (Hourly)	TOTAL COST (Hourly)
MEANS CREW DEFINITIONS						
Crew composition from Means Heavy Construction 2005 Edition by permission of R.S.Means/Reed Construction Data . For use with misc. unit costs where Means is the source for productivity						
1 Clab - Seedling Planting/Block Wall Demolition						
General Laborer		1		$0.00	$74.61	$74.61
Totals				$0.00	$74.61	$74.61
2 Clab - Barbed Wire/Wood Fence Removal, Drainpipe Installation, Pumping, Evaporation						
General Laborer		2		$0.00	$149.22	$149.22
Light Truck - 1.5 Ton		1		$23.82	$70.08	$93.90
Totals				$23.82	$219.30	$243.12
2 Clab + Excavator - Pond Liner Cut and Fold						
General Laborer		2		$0.00	$149.22	$149.22
325C				$96.74	$73.09	$169.83
Totals				$96.74	$222.31	$319.05
2 Clab + Welder - Bat Gates						
General Laborer		2		$0.00	$149.22	$149.22
Welding Equipment				$10.28	$63.27	$73.55
Light Truck - 1.5 Ton		1		$23.82	$70.08	$93.90
Totals				$34.10	$282.57	$316.67
3 Clab - Foam Adit Plugs						
General Laborer		2		$0.00	$149.22	$149.22
420D 4WD Backhoe				$14.37	$73.09	$87.46
Light Truck - 1.5 Ton		1		$23.82	$70.08	$93.90
Totals				$38.19	$292.39	$330.58
3 Clab + Welder - Culvert Bat Gate						
General Laborer		2		$0.00	$149.22	$149.22
Welding Equipment				$10.28	$63.27	$73.55
420D 4WD Backhoe				$14.37	$73.09	$87.46
Light Truck - 1.5 Ton		1		$23.82	$70.08	$93.90
Totals				$48.47	$355.66	$404.13
3 Clab D - 3 Laborers + Foreman - Decontamination						
General Laborer		3		$0.00	$223.83	$223.83
Foreman		1		$0.00	$128.92	$128.92
Supervisor's Truck		1		$23.50	$70.08	$93.58
Light Truck - 1.5 Ton		1		$23.82	$70.08	$93.90
Totals				$47.32	$492.91	$540.23
3 SKWK - Liner Installation						
Skilled Laborer		3		$0.00	$223.83	$223.83
HDEP Welder (pipe or liner)		1		$8.18	$0.00	$8.18
420D 4WD Backhoe		1		$14.37	$73.09	$87.46
				$0.00		$0.00
				$0.00		$0.00
				$0.00		$0.00
Totals				$22.55	$296.92	$319.47

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Model Version: Version 1.4.1
Cost Data: User Data
Cost Data File: Cost data for SRCE model.xlsm
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EQUIPMENT FLEETS

ACTIVITY AND FLEET		Standard Labor Crew	User Defined Labor Crew	EQUIPMENT UNIT COST (Hourly)	TOTAL LABOR UNIT COST (Hourly)	TOTAL COST (Hourly)
B-3 - Small Building Demoltion						
LABOR						
General Laborer		2		$0.00	$149.22	$149.22
Foreman		1		$0.00	$128.92	$128.92
				$0.00		$0.00
				$0.00		$0.00
				$0.00		$0.00
EQUIPMENT						
928G		1		$64.96	$73.09	$138.05
Dump Truck (10-12 yd3)		2		$42.54	$143.42	$185.96
				$0.00		$0.00
				$0.00		$0.00
				$0.00		$0.00
				$0.00		$0.00
				$0.00		$0.00
				$0.00		$0.00
				$0.00		$0.00
Totals				$107.50	$494.65	$602.15
B-6 - Chain Link Fence/Culvert Removal						
General Laborer		2		$0.00	$149.22	$149.22
928G		1		$64.96	$73.09	$138.05
Totals				$64.96	$222.31	$287.27
B-8 - Large Building Demolition						
LABOR						
General Laborer		2		$0.00	$149.22	$149.22
Foreman		1		$0.00	$128.92	$128.92
				$0.00		$0.00
				$0.00		$0.00
				$0.00		$0.00
EQUIPMENT						
928G		1		$64.96	$73.09	$138.05
20 Ton Crane		1		$16.36	$63.27	$79.63
Dump Truck (10-12 yd3)		2		$42.54	$143.42	$185.96
				$0.00		$0.00
				$0.00		$0.00
				$0.00		$0.00
				$0.00		$0.00
				$0.00		$0.00
				$0.00		$0.00
				$0.00		$0.00
				$0.00		$0.00
				$0.00		$0.00
				$0.00		$0.00
				$0.00		$0.00
Totals				$123.86	$557.92	$681.78
B-9 - Concrete Wall Demolition						
General Laborer		4		$0.00	$298.44	$298.44
Foreman		1		$0.00	$128.92	$128.92
Air Compressor + tools				$47.44	$63.27	$110.71
Totals				$47.44	$490.63	$538.07

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Model Version: Version 1.4.1
Cost Data: User Data
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EQUIPMENT FLEETS

ACTIVITY AND FLEET		Standard Labor Crew	User Defined Labor Crew	EQUIPMENT UNIT COST (Hourly)	TOTAL LABOR UNIT COST (Hourly)	TOTAL COST (Hourly)
B-10Y - General Compaction						
General Laborer		1		$0.00	$74.61	$74.61
CS533E Vibratory Roller		1		$17.44	$73.09	$90.53
Totals				$17.44	$147.70	$165.14
B-11L - Fine Grading for Evaporation Pond Liner Base						
General Laborer		1		$0.00	$74.61	$74.61
14G/H		1		$109.57	$73.09	$182.66
Totals				$109.57	$147.70	$257.27
B-11M - Backhoe Work						
420D 4WD Backhoe		1		$14.37	$73.09	$87.46
Totals				$14.37	$73.09	$87.46
B-12G - Rip-Rap Machine Placed (Modified)						
966G		1		$25.62	$73.09	$98.71
325C		1		$96.74	$73.09	$169.83
Light Truck - 1.5 Ton		1		$23.82	$70.08	$93.90
Totals				$146.18	$216.26	$362.44
B-13 - Grouted Rip-Rap & Gabion Baskets						
General Laborer		4		$0.00	$298.44	$298.44
Foreman		1		$0.00	$128.92	$128.92
50 Ton Crane		1		$19.22	$63.27	$82.49
Totals				$19.22	$490.63	$509.85
B-14 PVC Drain Pipe Installation						
Foreman		1		$0.00	$128.92	$128.92
General Laborer		4		$0.00	$298.44	$298.44
420D 4WD Backhoe		1		$14.37	$73.09	$87.46
Light Truck - 1.5 Ton		1		$23.82	$70.08	$93.90
Totals				$38.19	$570.53	$608.72
B-20 - Remove Pipelines						
Foreman		1		$0.00	$128.92	$128.92
Skilled Laborer		1		$0.00	$74.61	$74.61
General Laborer		1		$0.00	$74.61	$74.61
Light Truck - 1.5 Ton		1		$23.82	$70.08	$93.90
Totals				$23.82	$348.22	$372.04
B-22A - HDEP Installation - Pipe or Liner						
Skilled Laborer		1		$0.00	$74.61	$74.61
General Laborer		2		$0.00	$149.22	$149.22
D7R		1		$128.21	$63.27	$191.48
Light Truck - 1.5 Ton		1		$23.82	$70.08	$93.90
420D 4WD Backhoe		1		$14.37	$73.09	$87.46
Generator 5KW		1		$19.98	$0.00	$19.98
HDEP Welder (pipe or liner)		1		$8.18	$0.00	$8.18
Totals				$194.56	$430.27	$624.83
B-80A - Install Barbed Wire Fence						
General Laborer		3		$0.00	$223.83	$223.83
Light Truck - 1.5 Ton		1		$23.82	$70.08	$93.90
Totals				$23.82	$293.91	$317.73

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ACTIVITY AND FLEET		Standard Labor Crew	User Defined Labor Crew	EQUIPMENT UNIT COST (Hourly)	TOTAL LABOR UNIT COST (Hourly)	TOTAL COST (Hourly)
B-80C - Install Chain Link Fence (Flatbed truck has small crane)						
General Laborer		3		$0.00	$223.83	$223.83
Light Truck - 1.5 Ton		1		$23.82	$70.08	$93.90
Totals				$23.82	$293.91	$317.73
C-14B - Elevated Concrete Slabs (Reinforced Concrete Shaft Covers)						
Foreman		1		$0.00	$128.92	$128.92
Supervisor's Truck		1		$23.50	$70.08	$93.58
Carpenter		16		$0.00	$1,036.64	$1,036.64
General Laborer		2		$0.00	$149.22	$149.22
Rodmen (reinforcing concrete)		4		$0.00	$298.44	$298.44
Cement finisher		2		$0.00	$129.58	$129.58
Gas Engine Vibrator		1		$4.09	$63.27	$67.36
Concrete Pump		1		$120.90	$0.00	$120.90
Totals				$148.49	$1,876.15	$2,024.64
C-14D - Concrete Walls Formed in Place (Reinforced Concrete Adit Bulkheads)						
Foreman		1		$0.00	$128.92	$128.92
Supervisor's Truck		1		$23.50	$70.08	$93.58
Carpenter		18		$0.00	$1,166.22	$1,166.22
General Laborer		2		$0.00	$149.22	$149.22
Rodmen (reinforcing concrete)		2		$0.00	$149.22	$149.22
Cement finisher		1		$0.00	$64.79	$64.79
Gas Engine Vibrator		1		$4.09	$63.27	$67.36
Concrete Pump		1		$120.90	$0.00	$120.90
Totals				$148.49	$1,791.72	$1,940.21

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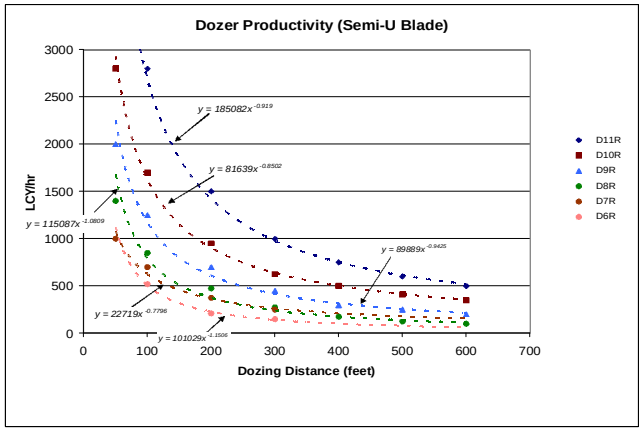
Productivity - Bulldozers

Dozer Specifications						
Description	**D11R**	**D10R**	**D9R**	**D8R**	**D7R**	**D6R**
Blade Width (SU) (ft)	18.33	15.92	14.17	12.92	12.08	10.67
Shank Guage (3 shanks) (ft)	9.83	8.67	7.67	7.08	6.5	6.5
Pocket Spacing (ft)	4.75	4.33	3.87	3.58	3.25	3.25
Ripping Width (Ripper + 1 Pocket) (ft)	14.58	13	11.54	10.66	9.75	9.75
Ripping Speed (mph)	1	1	1	1	1	1
Ripping Maneuver (turn) Time (min)	0.25	0.25	0.25	0.25	0.25	0.25
Altitude Deration Factor	1	1	1	1	1	1
Ripping Hourly Production (excluding maneuvering time) (ft)	5,280	5,280	5,280	5,280	5,280	5,280

Source: Caterpillar Performance Handbook Edition 35

Dozer Productivity vs. Grading Distance						
	Production (LCY/hr)					
Average Dozing Distance (feet)	**D11R**	**D10R**	**D9R**	**D8R**	**D7R**	**D6R**
50	4,800	2,800	2,000	1,400	1,000	
100	2,800	1,700	1,250	850	700	520
200	1,500	950	700	475	375	210
300	1,000	625	450	275	250	150
400	750	500	300	175		
500	600	410	250	125		
600	500	350	200	100		
dozer productivity = k x Dozing Distance^p (see graph)						
k =	185082	81639	89889	115087	22719	101029
p =	-0.919	-0.8502	-0.9425	-1.0809	-0.7796	-1.1506

Source: Caterpillar Performance Handbook Edition 35



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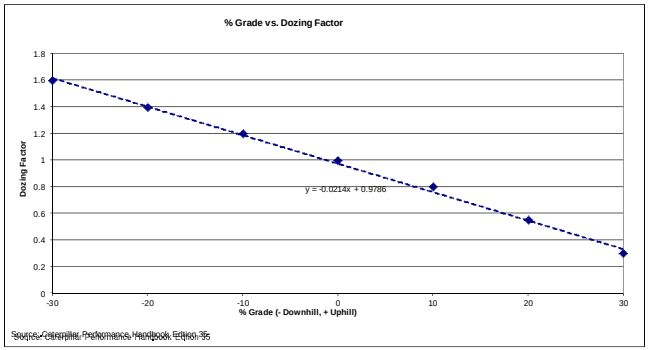
Productivity - Bulldozers (cont.)

% Grade vs. Dozing Factor	
% Grade	**Dozing Factor**
-30	1.6
-20	1.4
-10	1.2
0	1
10	0.8
20	0.55
30	0.3
Source: Caterpillar Performance Handbook Edition 35	
% Grade Dozing Factor = -0.0214x + 0.9786 (see graph)	



Job Condition Correction Factors - Bulldozers	
OPERATOR	
Average	0.75
MATERIAL (1)	
Loose stockpile	1.2
Normal	1
Hard to cut; frozen — with tilt cylinder	0.8
Hard to drift; "dead" (dry,non-cohesive material) or very sticky material	0.8
Rock, ripped or blasted	0.6
SLOT DOZING OR SIDE BY SIDE (1)	1.2
VISIBILITY	
Good conditions	1
JOB EFFICIENCY	
50 min/hr	0.83
(1) Selected in facility worksheets. Other factors included as standard factors. Source: Caterpillar Performance Handbook Edition 35	

Material Densities(1)		
Material	**lb/cy**	**kg/m^3**
Alluvium	2,900	1,720
Basalt	3,300	1,960
Clay - Dry	2,500	1,480
Granite - broken	2,800	1,660
Gravel	2,550	1,510
LS - broken	2,600	1,540
LS - crushed	2,600	1,540
Sandstone	2,550	1,510
Shale	2,100	1,250
Stone - crushed	2,700	1,600
Tailings - Coarse (dry, loose sand)	2,400	1,420
Tailings - Slimes (loose sand & clay)	2,700	1,600
Topsoil	1,600	950
(1) Source: Caterpillar Performance Handbook Edition 35		

Note: uses Sand & Gravel - Dry from Caterpillar Handbook

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Productivity - Scrapers

Scraper Specifications		
Description	**631G**	**637G**
Empty Weight	100,600	112,760
Payload Capacity (cy)		
Struck	24	24
Heaped	34	34
Average	29	29
Loaded by	One D10R	Self*
Load Time (min)	1	1
Maneuver and Spread (min)	1	1
Job Efficiency	1	1
Rolling Resistance**	3	3
Altitude Deration Factor	1	1

* Requires pair

**A firm, smooth, rolling roadway with dirt or light surfacing, flexing slightly under load or undulating, maintained fairly regularly, watered

Source: Caterpillar Performance Handbook Edition 35

Weight of Materials			Downhill Scraper Speed - Grade Retarding vs. Effective Grade (Grade - Rolling Resistance)											
			631G						637G PP					
Material	**lb/cy**	**Scraper Load lb**	**Loaded Weight (lbs)**	**22**	**16**	**10**	**5**	**1**	**Loaded Weight (lbs)**	**25**	**15**	**10**	**5**	**1**
Alluvium	2,900	84,100	184,700	7.5	10	13	33	33	196,860	7	10	18.5	34	34
Basalt	3,300	95,700	196,300	7.5	10	13	24.5	33	208,460	7	10	18.5	25	34
Clay - Dry	2,500	72,500	173,100	7.5	10	13	33	33	185,260	7	10	18.5	34	34
Granite - broken	2,800	81,200	181,800	7.5	10	13	33	33	193,960	7	10	18.5	34	34
Gravel	2,550	73,950	174,550	7.5	10	13	33	33	186,710	7	10	18.5	34	34
LS - broken	2,600	75,400	176,000	7.5	10	13	33	33	188,160	7	10	18.5	34	34
LS - crushed	2,600	75,400	176,000	7.5	10	13	33	33	188,160	7	10	18.5	34	34
Sandstone	2,550	73,950	174,550	7.5	10	13	33	33	186,710	7	10	18.5	34	34
Shale	2,100	60,900	161,500	7.5	10	18	33	33	173,660	10	13.5	18.5	34	34
Stone - crushed	2,700	78,300	178,900	7.5	10	13	33	33	191,060	7	10	18.5	34	34
Tailings - Coarse (dry, loose sand)	2,400	69,600	170,200	7.5	10	13	33	33	182,360	7	10	18.5	34	34
Tailings - Slimes (loose sand & clay)	2,700	78,300	178,900	7.5	10	13	33	33	191,060	7	10	18.5	34	34
Topsoil	1,600	46,400	147,000	7.5	10	18	33	33	159,160	10	13.5	18.5	34	34
			Empty	10	18	24.5	33	33	Empty	10	13.5	18.5	34	34

Source: Caterpillar Performance Handbook Edition 34

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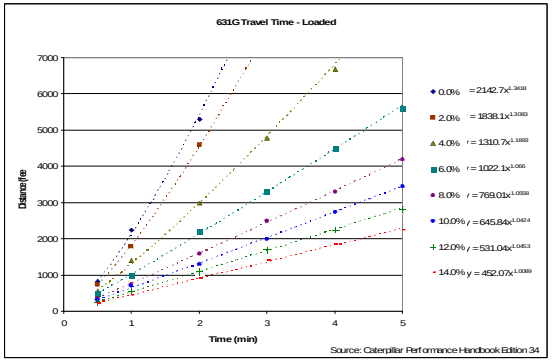
Productivity - Scrapers (cont.)

631G Scraper Travel Time - Uphill Loaded

Total Resistance (%) (rolling + grade)	Time (min) 0.5	1	2	3	4	5	k	p
0	825	2,250	5,300				2142.7	1.3418
2	750	1,800	4,600				1838.1	1.3083
4	550	1,400	3,000	4,800	6,700		1310.7	1.1893
6	490	1,000	2,200	3,300	4,500	5,600	1022.1	1.066
8	375	750	1,600	2,500	3,300	4,200	769.01	1.0558
10	300	700	1,300	2,000	2,750	3,450	645.84	1.0424
12	250	550	1,100	1,700	2,250	2,800	531.04	1.0453
14	225	450	900	1,400	1,850	2,250	452.07	1.0089

$$\text{Travel Time (min)} = \sqrt[p]{\frac{\text{distance}}{k}}$$

Source: Caterpillar Performance Handbook Edition 35

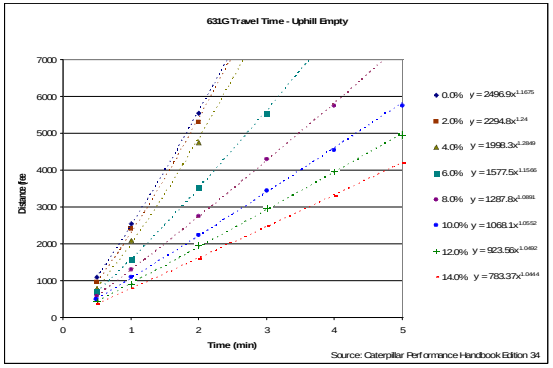


631G Scraper Travel Time - Uphill Empty

Total Resistance (%) (rolling + grade)	Time (min) 0.5	1	2	3	4	5	k	p
0	1,100	2,550	5,550				2496.9	1.1675
2	950	2,400	5,300				2294.8	1.24
4	800	2,100	4,750				1998.3	1.2849
6	700	1,600	3,550	5,550			1557.5	1.1566
8	600	1,300	2,750	4,300	5,750		1287.8	1.0891
10	500	1,100	2,250	3,450	4,550	5,750	1068.1	1.0552
12	450	900	1,950	2,950	3,950	4,950	923.56	1.0492
14	375	800	1,600	2,500	3,300	4,200	783.37	1.0444

$$\text{Travel Time (min)} = \sqrt[p]{\frac{\text{distance}}{k}}$$

Source: Caterpillar Performance Handbook Edition 35



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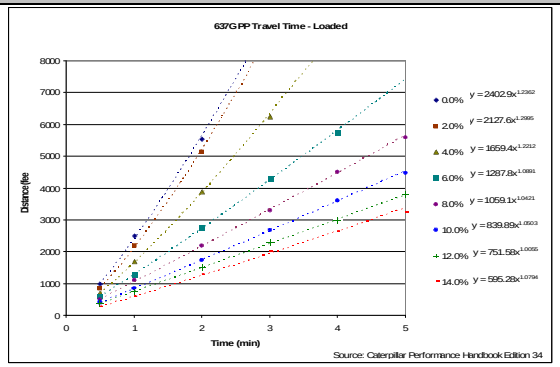
Productivity - Scrapers (cont.)

637G Push-Pull Scraper Travel Time - Uphill Loaded

Total Resistance (%) (rolling + grade)	Time (min) 0.5	1	2	3	4	5	k	p
0	1,000	2,500	5,550				2402.9	1.2362
2	850	2,200	5,150				2127.6	1.2995
4	700	1,700	3,900	6,250			1659.4	1.2212
6	600	1,300	2,750	4,300	5,750		1287.8	1.0891
8	500	1,100	2,200	3,300	4,500	5,600	1059.1	1.0421
10	400	850	1,750	2,700	3,600	4,475	839.89	1.0503
12	375	750	1,500	2,300	3,000	3,800	751.58	1.0055
14	275	600	1,300	2,000	2,650	3,250	595.28	1.0794

Travel Time (min) = $\sqrt[p]{\frac{distance}{k}}$

Source: Caterpillar Performance Handbook Edition 35



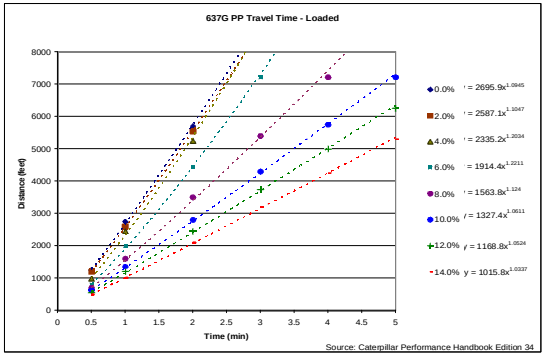
Source: Caterpillar Performance Handbook Edition 34

637G Push-Pull Scraper Travel Time - Uphill Empty

Total Resistance (%) (rolling + grade)	Time (min) 0.5	1	2	3	4	5	k	p
0	1,250	2,750	5,700				2695.9	1.0945
2	1,200	2,600	5,550				2587.1	1.1047
4	990	2,450	5,250				2335.2	1.0234
6	800	2,000	4,450	7,216			1914.4	1.2211
8	700	1,600	3,500	5,400	7,216		1563.8	1.124
10	625	1,350	2,800	4,300	5,750	7,216	1327.4	1.0611
12	550	1,200	2,450	3,750	5,000	6,250	1168.8	1.0524
14	495	1,010	2,100	3,200	4,250	5,300	1015.8	1.0337

Travel Time (min) = $\sqrt[p]{\frac{distance}{k}}$

Source: Caterpillar Performance Handbook Edition 35



Source: Caterpillar Performance Handbook Edition 34

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Productivity - Haul Trucks

Haul Truck Specifications

Description	769D	773E	777D	785C	793C	797B
Chassis Weight (lb)	53,506	70,330	113,160	170,000	259,500	473,600
Body Weight (lb)	17,350	20,300	34,785	36,788	70,785	104,200
Standard Liner Weight (lb)	7,000	8,600	12,040	16,846	24,418	8,800
Total Truck Weight (lb)	77,856	99,230	159,985	223,634	354,703	586,600
Payload Capacity (cy)						
Struck	21.6	34.8	55	78.5	126	228
Heaped	31.7	46	78.6	102	169	290
Average	26.65	40.4	66.8	90.25	147.5	259
Maneuver to Load Time (min)	0.7	0.7	0.7	0.7	0.7	0.7
Maneuver and Dump Time (min)	1.1	1.1	1.1	1.1	1.1	1.1
Job Efficiency	0.83	0.83	0.83	0.83	0.83	0.83
Rolling Resistance**	2.5	2.5	2.5	2.5	2.5	2.5
Altitude Deration Factor	1	1	1	1	1	1

**A firm, smooth, rolling roadway with dirt or light surfacing, flexing slightly under load or undulating, maintained fairly regularly, watered

Source: Caterpillar Performance Handbook Edition 35

Weight of Materials / Downhill Haul Truck Speed - Grade Retarding vs. Effective Grade (Grade - Rolling Resistance)

Material	lb/cy	Truck (769D) Load lb	Truck (773E) Load lb	Truck (777D) Load lb	769D Loaded Weight (lbs)	20	15	10	5	773E Loaded Weight (lbs)	20	15	10	5	777D Loaded Weight (lbs)	20	15	10	5
Alluvium	2,900	77,285	117,160	193,720	155,141	11	11	15	26	216,390	7	7	13	23	353,705	7	9	12	29
Basalt	3,300	87,945	133,320	220,440	165,801	11	11	11	20	232,550	7	7	13	23	380,425	7	7	12	21
Clay - Dry	2,500	66,625	101,000	167,000	144,481	11	11	15	26	200,230	7	9	13	23	326,985	7	9	16	29
Granite - broken	2,800	74,620	113,120	187,040	152,476	11	11	15	26	212,350	7	7	13	23	347,025	7	9	12	29
Gravel	2,550	67,958	103,020	170,340	145,814	11	11	15	26	202,250	7	9	13	23	330,325	7	9	16	29
LS - broken	2,600	69,290	105,040	173,680	147,146	11	11	15	26	204,270	7	9	13	23	333,665	7	9	12	29
LS - crushed	2,600	69,290	105,040	173,680	147,146	11	11	15	26	204,270	7	9	13	23	333,665	7	9	12	29
Sandstone	2,550	67,958	103,020	170,340	145,814	11	11	15	26	202,250	7	9	13	23	330,325	7	9	16	29
Shale	2,100	55,965	84,840	140,280	133,821	11	11	15	26	184,070	7	9	13	31	300,265	7	9	16	29
Stone - crushed	2,700	71,955	109,080	180,360	149,811	11	11	15	26	208,310	7	7	13	23	340,345	7	9	12	29
Tailings - Coarse (dry, loose sand)	2,400	63,960	96,960	160,320	141,816	11	11	15	26	196,190	7	9	13	23	320,305	7	9	16	29
Tailings - Slimes (loose sand & clay)	2,700	71,955	109,080	180,360	149,811	11	11	15	26	208,310	7	7	13	23	340,345	7	9	12	29
Topsoil	1,600	42,640	64,640	106,880	120,496	11	11	15	26	163,870	7	9	17	31	266,865	9	12	16	29
					Empty	15	15	26	36	Empty	13	17	23	42	Empty	16	16	29	39

Source: Caterpillar Performance Handbook Edition 35

Weight of Materials / Downhill Haul Truck Speed - Grade Retarding vs. Effective Grade (Grade - Rolling Resistance)

Material	lb/cy	Truck (785C) Load lb	Truck (793C) Load lb	Truck (797B) Load lb	785C Loaded Weight (lbs)	20	15	10	5	793C Loaded Weight (lbs)	20	15	10	5	797B Loaded Weight (lbs)	20	15	10	5
Alluvium	2,900	261,725	427,750	751,100	485,359	8	8	14	27	782,453	7	7	10	17	1,337,700	7	7	9	17
Basalt	3,300	297,825	486,750	854,700	521,459	8	8	14	27	841,453	7	7	10	17	1,441,300	7	7	9	17
Clay - Dry	2,500	225,625	368,750	647,500	449,259	8	11	14	36	723,453	7	7	10	25	1,234,100	7	7	9	23
Granite - broken	2,800	252,700	413,000	725,200	476,334	8	8	14	27	767,703	7	7	10	17	1,311,800	7	7	9	17
Gravel	2,550	230,138	376,125	660,450	453,772	8	8	14	36	730,828	7	7	10	25	1,247,050	7	7	9	23
LS - broken	2,600	234,650	383,500	673,400	458,284	8	8	14	27	738,203	7	7	10	25	1,260,000	7	7	9	23
LS - crushed	2,600	234,650	383,500	673,400	458,284	8	8	14	27	738,203	7	7	10	25	1,260,000	7	7	9	23
Sandstone	2,550	230,138	376,125	660,450	453,772	8	8	14	36	730,828	7	7	10	25	1,247,050	7	7	9	23
Shale	2,100	189,525	309,750	543,900	413,159	8	11	14	36	664,453	7	7	10	25	1,130,500	7	7	13	23
Stone - crushed	2,700	243,675	398,250	699,300	467,309	8	8	14	27	752,953	7	7	10	17	1,285,900	7	7	9	23
Tailings - Coarse (dry, loose sand)	2,400	216,600	354,000	621,600	440,234	8	11	14	36	708,703	7	7	10	25	1,208,200	7	7	9	23
Tailings - Slimes (loose sand & clay)	2,700	243,675	398,250	699,300	467,309	8	8	14	27	752,953	7	7	10	17	1,285,900	7	7	9	23
Topsoil	1,600	144,400	236,000	414,400	368,034	8	11	19	36	590,703	7	10	13	25	1,001,000	7	9	13	23
					Empty	14	19	36	36	Empty	10	13	17	33	Empty	13	17	23	42

Source: Caterpillar Performance Handbook Edition 35

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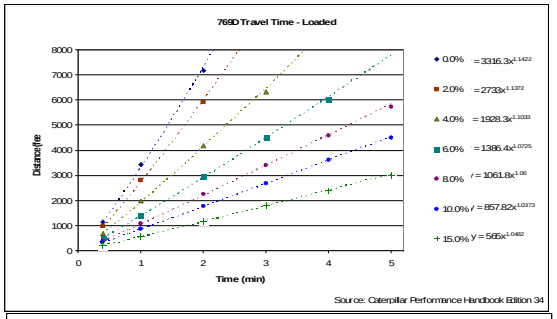
Productivity - Haul Trucks (cont.)

769D Haul Truck Travel Time - Uphill Loaded

Total Resistance (%) (rolling + grade)	Time (min) 0.4	1	2	3	4	5	k	p
0	1,148	3,428	7,183				3316.3	1.1422
4	689	1,984	4,198	6,330			1928.3	1.1033
6	508	1,427	2,952	4,510	6,002		1386.4	1.0725
8	394	1,082	2,263	3,411	4,592	5,740	1061.8	1.06
10	328	869	1,771	2,690	3,608	4,510	857.82	1.0373
15	213	574	1,181	1,804	2,394	3,018	565	1.0482

$$\text{Travel Time (min)} = \sqrt[p]{\frac{\text{distance}}{k}}$$

Source: Caterpillar Performance Handbook Edition 35



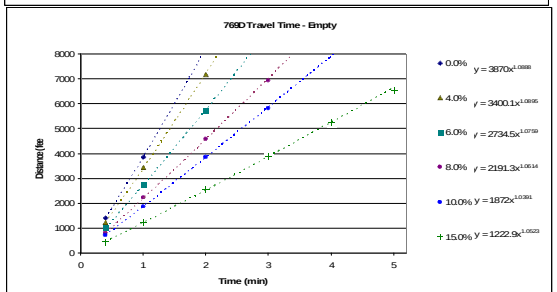
Source: Caterpillar Performance Handbook Edition 34

769D Haul Truck Travel Time - Uphill Empty

Total Resistance (%) (rolling + grade)	Time (min) 0.4	1	2	3	4	5	k	p
0	1,427	3,870					3870	1.0888
4	1,246	3,444	7,183				3400.1	1.0895
6	1,017	2,755	5,740				2734.5	1.0759
8	820	2,230	4,592	6,954			2191.3	1.0614
10	722	1,870	3,870	5,838			1872	1.0391
15	459	1,246	2,558	3,903	5,248	6,560	1222.9	1.0523

$$\text{Travel Time (min)} = \sqrt[p]{\frac{\text{distance}}{k}}$$

Source: Caterpillar Performance Handbook Edition 35



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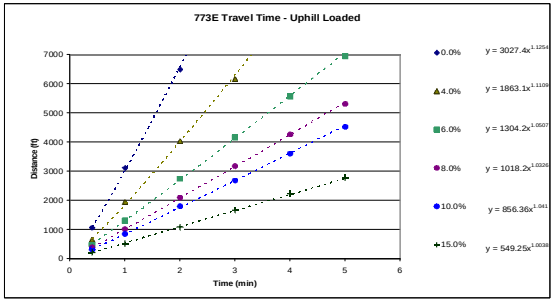
Productivity - Haul Trucks (cont.)

773E Haul Truck Travel Time - Uphill Loaded

Total Resistance (%) (rolling + grade)	Time (min) 0.4	1	2	3	4	5	k	p
0	1,066	3,117	6,496				3027.4	1.1254
4	656	1,952	4,035	6,168			1863.1	1.1109
6	492	1,312	2,756	4,167	5,577	6,955	1304.2	1.0507
8	394	1,017	2,100	3,182	4,265	5,315	1018.2	1.0326
10	328	853	1,804	2,690	3,609	4,528	856.36	1.041
15	226	525	1,083	1,673	2,231	2,789	549.25	1.0038

$$\text{Travel Time (min)} = \sqrt[p]{\frac{\text{distance}}{k}}$$

Source: Caterpillar Performance Handbook Edition 35

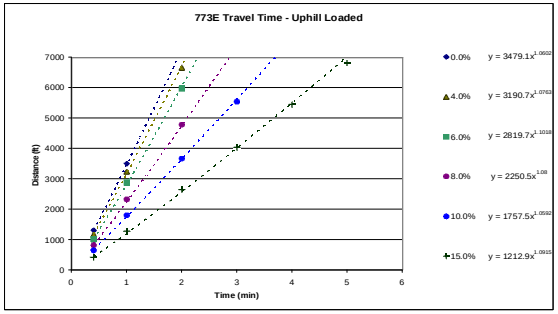


773E Haul Truck Travel Time - Uphill Empty

Total Resistance (%) (rolling + grade)	Time (min) 0.4	1	2	3	4	5	k	p
0	1,312	3,510	7,218				3479.1	1.0602
4	1,181	3,248	6,660				3190.7	1.0763
6	1,017	2,887	5,971				2819.7	1.1018
8	820	2,329	4,790	7,218			2250.5	1.08
10	656	1,804	3,675	5,545			1757.5	1.0592
15	427	1,280	2,657	4,035	5,446	6,824	1212.9	1.0915

$$\text{Travel Time (min)} = \sqrt[p]{\frac{\text{distance}}{k}}$$

Source: Caterpillar Performance Handbook Edition 35



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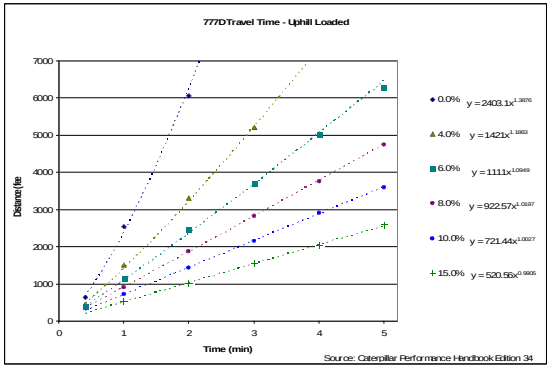
Productivity - Haul Trucks (cont.)

777D Haul Truck Travel Time - Uphill Loaded

Total Resistance (%) (rolling + grade)	Time (min) 0.4	1	2	3	4	5	k	p
0	656	2,558	6,068				2403.1	1.3876
4	459	1,509	3,313	5,215	7,085		1412	1.1863
6	394	1,148	2,460	3,706	5,018	6,298	1111	1.0949
8		918	1,886	2,837	3,772	4,756	922.57	1.0197
10		722	1,443	2,165	2,919	3,608	721.44	1.0027
15		525	1,017	1,558	2,034	2,591	520.56	0.9905

$$\text{Travel Time (min)} = \sqrt[p]{\frac{\text{distance}}{k}}$$

Source: Caterpillar Performance Handbook Edition 35

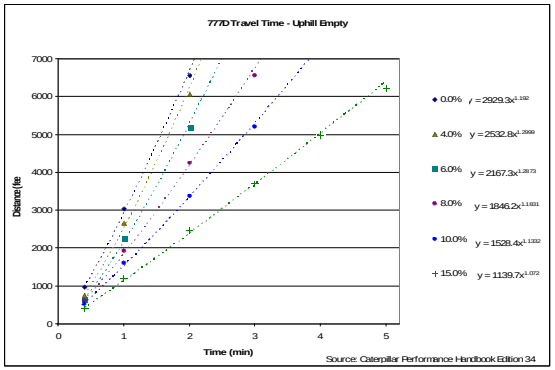


777D Haul Truck Travel Time - Uphill Empty

Total Resistance (%) (rolling + grade)	Time (min) 0.4	1	2	3	4	5	k	p
0	968	3,034	6,560				2929.3	1.192
4	754	2,657	6,068				2532.8	1.2999
6	656	2,247	5,182				2167.3	1.2873
8	607	1,935	4,248	6,560			1846.2	1.1831
10	525	1,607	3,378	5,215	7,282		1528.4	1.1332
15	410	1,197	2,460	3,706	4,986	6,232	1139.7	1.072

$$\text{Travel Time (min)} = \sqrt[p]{\frac{\text{distance}}{k}}$$

Source: Caterpillar Performance Handbook Edition 35



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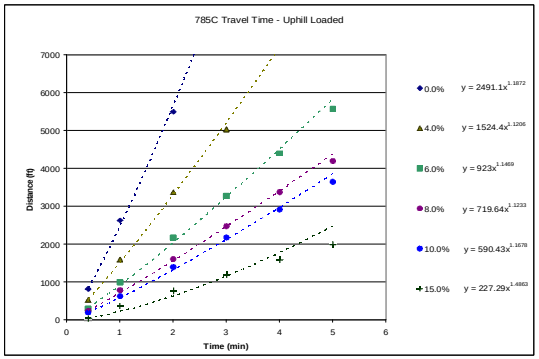
Productivity - Haul Trucks (cont.)

785C Haul Truck Travel Time - Uphill Loaded

Total Resistance (%) (rolling + grade)	Time (min) 0.4	1	2	3	4	5	k	p
0	820	2,630	5,500				2491.1	1.1872
4	530	1,600	3,370	5,040			1524.4	1.1206
6	300	1,000	2,180	3,270	4,400	5,570	923	1.1469
8	240	790	1,610	2,480	3,380	4,200	719.64	1.1233
10	190	630	1,400	2,180	2,920	3,650	590.43	1.1678
15	40	370	770	1,200	1,590	2,000	227.29	1.4863

$$\text{Travel Time (min)} = \sqrt[p]{\frac{\text{distance}}{k}}$$

Source: Caterpillar Performance Handbook Edition 35

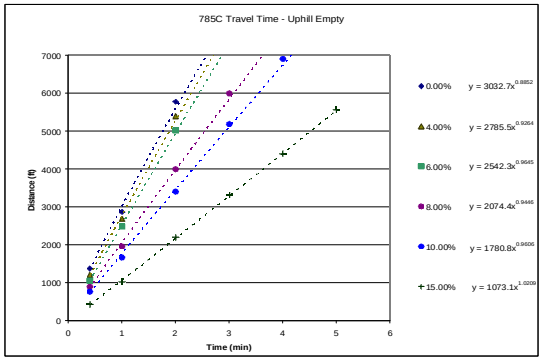


785C Haul Truck Travel Time - Uphill Empty

Total Resistance (%) (rolling + grade)	Time (min) 0.4	1	2	3	4	5	k	p
0	1,380	2,870	5,780				3032.7	0.8852
4	1,210	2,690	5,400				2785.5	0.9264
6	1,060	2,490	5,020				2542.3	0.9645
8	900	1,960	4,000	6,000			2074.4	0.9446
10	770	1,670	3,410	5,190	6,910		1780.8	0.9606
15	430	1,030	2,200	3,320	4,410	5,570	1073.1	1.0209

$$\text{Travel Time (min)} = \sqrt[p]{\frac{\text{distance}}{k}}$$

Source: Caterpillar Performance Handbook Edition 35



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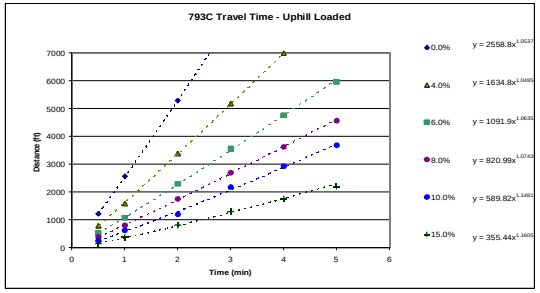
Productivity - Haul Trucks (cont.)

793C Haul Truck Travel Time - Uphill Loaded

Total Resistance (%) (rolling + grade)	Time (min) 0.5	1	2	3	4	5	k	p
0	1,230	2,570	5,300				2558.8	1.0537
4	800	1,600	3,400	5,190	7,000		1634.8	1.0485
6	520	1,090	2,300	3,560	4,760	5,970	1091.9	1.0635
8	390	810	1,760	2,700	3,630	4,570	820.99	1.0743
10	260	630	1,200	2,180	2,930	3,690	589.82	1.1481
15	150	380	810	1,300	1,760	2,210	355.44	1.1605

$$\text{Travel Time (min)} = \sqrt[p]{\frac{\text{distance}}{k}}$$

Source: Caterpillar Performance Handbook Edition 35

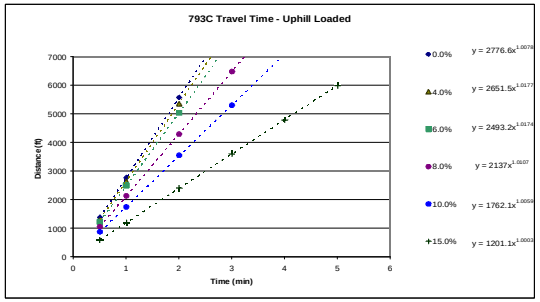


793C Haul Truck Travel Time - Uphill Empty

Total Resistance (%) (rolling + grade)	Time (min) 0.5	1	2	3	4	5	k	p
0	1,380	2,780	5,580				2776.6	1.0078
4	1,310	2,650	5,370				2651.5	1.0177
6	1,230	2,500	5,040				2493.2	1.0174
8	1,060	2,140	4,300	6,490			2137	1.0107
10	880	1,750	3,560	5,310			1762.1	1.0059
15	600	1,200	2,410	3,610	4,800	6,000	1201.1	1.0003

$$\text{Travel Time (min)} = \sqrt[p]{\frac{\text{distance}}{k}}$$

Source: Caterpillar Performance Handbook Edition 35



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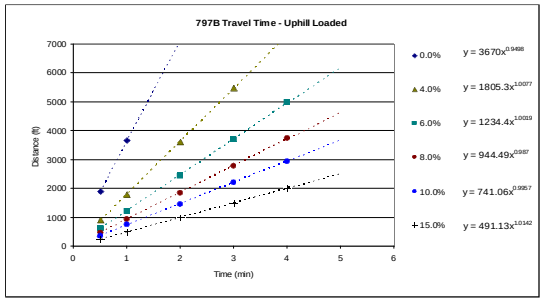
Productivity - Haul Trucks (cont.)

797B Haul Truck Travel Time - Uphill Loaded

Total Resistance (%) (rolling + grade)	Time (min) 0.5	1	2	3	4	5	k	p
0	1,900	3,670					3670	0.9498
4	900	1,800	3,620	5,480			1805.3	1.0077
6	620	1,230	2,450	3,700	5,000		1234.4	1.0019
8	480	940	1,850	2,790	3,750		944.49	0.987
10	370	750	1,460	2,220	2,950		741.06	0.9957
15	240	500	1,000	1,480	2,000		491.13	1.0142

$$\text{Travel Time (min)} = \sqrt[p]{\frac{\text{distance}}{k}}$$

Source: Caterpillar Performance Handbook Edition 35

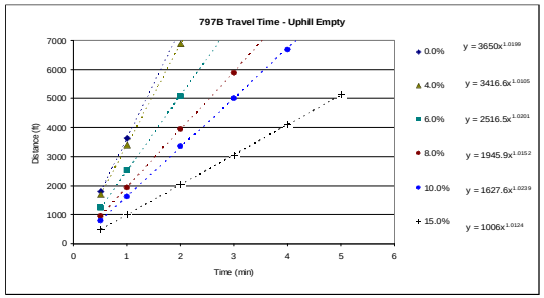


797B Haul Truck Travel Time - Uphill Empty

Total Resistance (%) (rolling + grade)	Time (min) 0.5	1	2	3	4	5	k	p
0	1,800	3,650					3650	1.0199
4	1,700	3,400	6,900				3416.6	1.0105
6	1,240	2,520	5,100				2516.5	1.0201
8	960	1,950	3,960	5,900			1945.9	1.0152
10	800	1,620	3,350	5,000	6,700		1627.6	1.0239
15	500	1,000	2,040	3,050	4,100	5,130	1006	1.0124

$$\text{Travel Time (min)} = \sqrt[p]{\frac{\text{distance}}{k}}$$

Source: Caterpillar Performance Handbook Edition 35



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Productivity - Articulated Trucks

Articulated Truck Specifications				
Description	**725**	**730**	**735**	**740**
Chassis Weight (lb)				
Body Weight (lb)				
Standard Liner Weight (lb)				
Operating Weight (Empty) (lb)	50,120	51,220	65,830	72,070
Payload Capacity (cy)				
Struck	14.5	17.1	19.3	23.3
Heaped	18.8	22.1	31.8	30.2
Average	16.65	19.6	25.55	26.75
Maneuver to Load Time (min)	0.7	0.7	0.7	0.7
Maneuver and Dump Time (min)	1.1	1.1	1.1	1.1
Job Efficiency	0.83	0.83	0.83	0.83
Rolling Resistance**	2.5	2.5	2.5	2.5
Altitude Deration Factor	1	1	1	1

**A firm, smooth, rolling roadway with dirt or light surfacing, flexing slightly under load or undulating, maintained fairly regularly, watered

Source: Caterpillar Performance Handbook Edition 35

Weight of Materials				Downhill Haul Truck Speed - Grade Retarding vs. Effective Grade (Grade - Rolling Resistance)									
				725					730				
Material	**lb/cy**	**Truck (725) Load lb**	**Truck (730) Load lb**	**Loaded Weight (lbs)**	**20**	**15**	**10**	**5**	**Loaded Weight (lbs)**	**20**	**15**	**10**	**5**
Alluvium	2,900	48,285	56,840	98,405	9	9	13	30	108,060	5	8	13	29
Basalt	3,300	54,945	64,680	105,065	5	9	13	22	115,900	5	8	13	29
Clay - Dry	2,500	41,625	49,000	91,745	9	13	13	30	100,220	8	8	13	29
Granite - broken	2,800	46,620	54,880	96,740	9	13	13	30	106,100	5	8	13	29
Gravel	2,550	42,458	49,980	92,578	9	13	13	30	101,200	8	8	13	29
LS - broken	2,600	43,290	50,960	93,410	9	13	13	30	102,180	8	8	13	29
LS - crushed	2,600	43,290	50,960	93,410	9	13	13	30	102,180	8	8	13	29
Sandstone	2,550	42,458	49,980	92,578	9	13	13	30	101,200	8	8	13	29
Shale	2,100	34,965	41,160	85,085	9	13	22	30	92,380	8	13	13	29
Stone - crushed	2,700	44,955	52,920	95,075	9	13	13	30	104,140	8	8	13	29
Tailings - Coarse (dry, loose sand)	2,400	39,960	47,040	90,080	9	13	13	30	98,260	8	8	13	29
Tailings - Slimes (loose sand & clay)	2,700	44,955	52,920	95,075	9	13	13	30	104,140	8	8	13	29
Topsoil	1,600	26,640	31,360	76,760	9	13	22	30	82,580	8	13	22	35
				Empty	13	13	22	30	Empty	13	13	22	35

Source: Caterpillar Performance Handbook Edition 35

Weight of Materials				Downhill Haul Truck Speed - Grade Retarding vs. Effective Grade (Grade - Rolling Resistance)									
				735					740				
Material	**lb/cy**	**Truck (735) Load lb**	**Truck (740) Load lb**	**Loaded Weight (lbs)**	**20**	**15**	**10**	**5**	**Loaded Weight (lbs)**	**20**	**15**	**10**	**5**
Alluvium	2,900	74,095	77,575	139,925	7	9	13	27	149,645	7	9	17	23
Basalt	3,300	84,315	88,275	150,145	7	9	13	27	160,345	7	9	13	23
Clay - Dry	2,500	63,875	66,875	129,705	7	9	13	27	138,945	9	13	17	31
Granite - broken	2,800	71,540	74,900	137,370	7	9	13	27	146,970	7	9	17	23
Gravel	2,550	65,153	68,213	130,983	7	9	13	27	140,283	7	9	17	31
LS - broken	2,600	66,430	69,550	132,260	7	9	13	27	141,620	7	9	17	31
LS - crushed	2,600	66,430	69,550	132,260	7	9	13	27	141,620	7	9	17	31
Sandstone	2,550	65,153	68,213	130,983	7	9	13	27	140,283	7	9	17	31
Shale	2,100	53,655	56,175	119,485	9	9	18	27	128,245	7	13	17	31
Stone - crushed	2,700	68,985	72,225	134,815	7	9	13	27	144,295	7	9	17	23
Tailings - Coarse (dry, loose sand)	2,400	61,320	64,200	127,150	7	9	13	27	136,270	9	13	17	31
Tailings - Slimes (loose sand & clay)	2,700	68,985	72,225	134,815	7	9	13	27	144,295	7	9	17	23
Topsoil	1,600	40,880	42,800	106,710	9	13	18	36	114,870	9	13	17	31
				Empty	13	18	27	42	Empty	17	17	23	31

Source: Caterpillar Performance Handbook Edition 35

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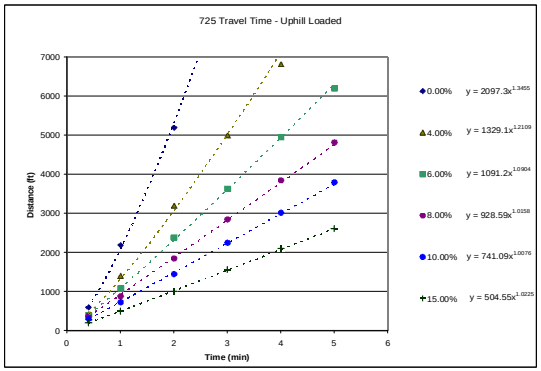
Productivity - Articulated Trucks (cont.)

725 Articulated Truck Travel Time - Uphill Loaded

Total Resistance (%) (rolling + grade)	Time (min) 0.5	1	2	3	4	5	k	p
0	600	2,190	5,200				2097.3	1.3455
4	420	1,400	3,200	5,000	6,820		1329.1	1.2109
6	400	1,080	2,390	3,630	4,950	6,200	1091.2	1.0904
8	380	880	1,850	2,850	3,850	4,820	928.59	1.0158
10	300	729	1,450	2,250	3,020	3,800	741.09	1.0076
15	200	500	1,000	1,570	2,100	2,620	504.55	1.0225

$$\text{Travel Time (min)} = \sqrt[p]{\frac{\text{distance}}{k}}$$

Source: Caterpillar Performance Handbook Edition 35

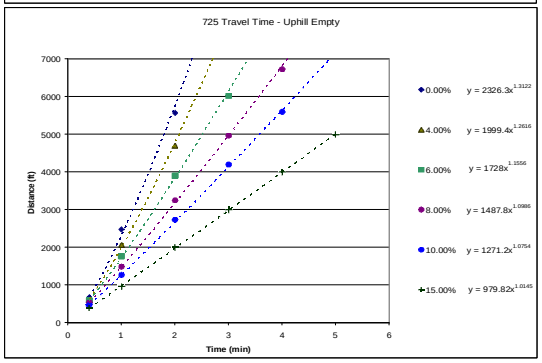


725 Haul Truck Travel Time - Uphill Empty

Total Resistance (%) (rolling + grade)	Time (min) 0.5	1	2	3	4	5	k	p
0	680	2,480	5,570				2326.3	1.3122
4	620	2,070	4,700				1999.4	1.2616
6	590	1,770	3,900	6,020			1728	1.1556
8	540	1,490	3,250	4,970	6,730		1487.8	1.0986
10	470	1,270	2,740	4,200	5,600	7,050	1271.2	1.0754
15	390	960	2,000	3,000	4,000	5,000	979.82	1.0145

$$\text{Travel Time (min)} = \sqrt[p]{\frac{\text{distance}}{k}}$$

Source: Caterpillar Performance Handbook Edition 35



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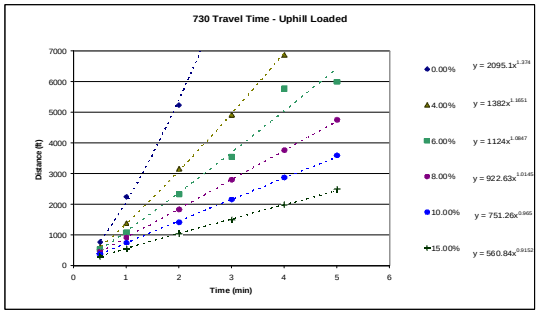
Productivity - Articulated Trucks (cont.)

730 Articulated Truck Travel Time - Uphill Loaded

Total Resistance (%) (rolling + grade)	Time (min) 0.5	1	2	3	4	5	k	p
0	780	2,250	5,240				2095	1.374
4	610	1,390	3,170	4,930	6,880		1382	1.1651
6	540	1,100	2,340	3,550	5,780	6,000	112	1.0847
8	460	920	1,840	2,810	3,770	4,760	922.63	1.0145
10	390	750	1,420	2,170	2,880	3,600	751.26	0.965
15	300	560	1,050	1,500	1,995	2,500	560.84	0.9152

$$\text{Travel Time (min)} = \sqrt[p]{\frac{\text{distance}}{k}}$$

Source: Caterpillar Performance Handbook Edition 35

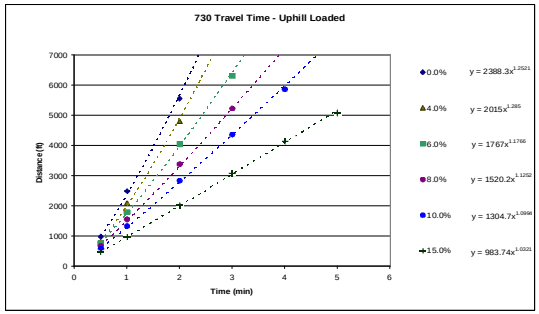


730 Haul Truck Travel Time - Uphill Empty

Total Resistance (%) (rolling + grade)	Time (min) 0.5	1	2	3	4	5	k	p
0	980	2,500	5,560				2388	1.25621
4	810	2,100	4,810				2015	1.285
6	770	1,800	4,060	6,310			1767	1.1766
8	680	1,560	3,390	5,230	7,070		1520.2	1.1252
10	595	1,340	2,840	4,370	5,870		1304.7	1.0994
15	480	980	2,020	3,090	4,150	5,090	983.74	1.0321

$$\text{Travel Time (min)} = \sqrt[p]{\frac{\text{distance}}{k}}$$

Source: Caterpillar Performance Handbook Edition 35



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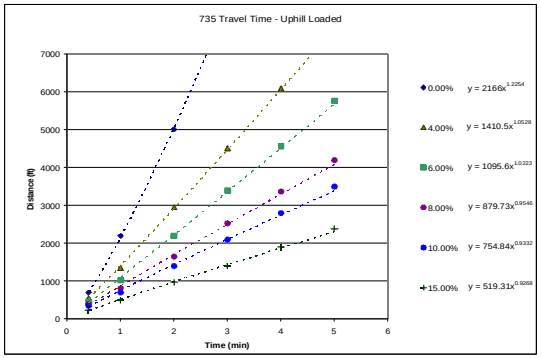
Productivity - Articulated Trucks (cont.)

735 Articulated Truck Travel Time - Uphill Loaded

Total Resistance (%) (rolling + grade)	Time (min) 0.5	1	2	3	4	5	k	p
0	700	2,200	5,020				2166	1.2254
4	550	1,350	2,950	4,520	6,100		1410.5	1.0528
6	450	1,020	2,200	3,400	4,570	5,770	1095.6	1.0223
8	390	810	1,650	2,530	3,370	4,200	879.73	0.9546
10	340	700	1,400	2,100	2,800	3,500	754.84	0.9332
15	230	500	970	1,400	1,900	2,390	519.31	0.9268

$$\text{Travel Time (min)} = \sqrt[p]{\frac{\text{distance}}{k}}$$

Source: Caterpillar Performance Handbook Edition 35

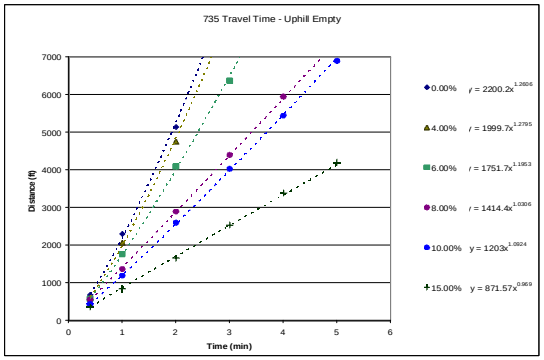


735 Haul Truck Travel Time - Uphill Empty

Total Resistance (%) (rolling + grade)	Time (min) 0.5	1	2	3	4	5	k	p
0	680	2,300	5,140				2200.2	1.2606
4	610	2,070	4,760				1999.7	1.2795
6	580	1,770	4,100	6,370			1751.7	1.1953
8	560	1,370	2,900	4,400	5,950		1414.4	1.0306
10	440	1,200	2,600	4,030	5,450	6,900	1203	1.0924
15	370	840	1,660	2,540	3,390	4,200	871.57	0.969

$$\text{Travel Time (min)} = \sqrt[p]{\frac{\text{distance}}{k}}$$

Source: Caterpillar Performance Handbook Edition 35



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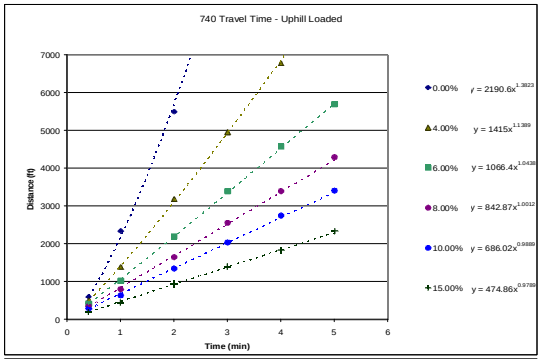
Productivity - Articulated Trucks (cont.)

740 Articulated Truck Travel Time - Uphill Loaded

Total Resistance (%) (rolling + grade)	Time (min) 0.5	1	2	3	4	5	k	p
0	600	2,340	5,500				2190.6	1.3823
4	500	1,390	3,190	4,960	6,780		1415	1.1389
6	420	1,020	2,200	3,400	4,580	5,700	1066.4	1.0438
8	350	800	1,650	2,560	3,400	4,300	842.87	1.0012
10	290	640	1,350	2,040	2,750	3,410	686.02	0.9889
15	200	450	940	1,400	1,830	2,340	474.86	0.9789

$$\text{Travel Time (min)} = \sqrt[p]{\frac{\text{distance}}{k}}$$

Source: Caterpillar Performance Handbook Edition 35

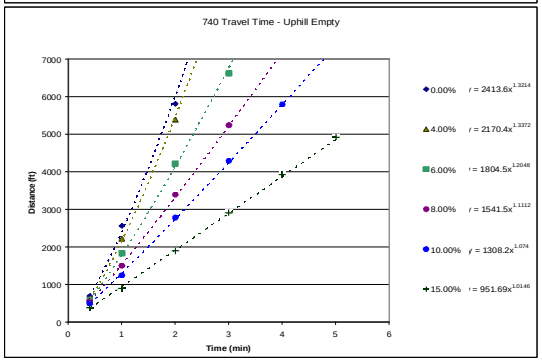


740 Haul Truck Travel Time - Uphill Empty

Total Resistance (%) (rolling + grade)	Time (min) 0.5	1	2	3	4	5	k	p
0	700	2,570	5,820				2413.6	1.3214
4	630	2,230	5,400				2170.4	1.3372
6	590	1,840	4,230	6,630			1804.5	1.2048
8	560	1,510	3,400	5,250	7,120		1541.5	1.1112
10	500	1,250	2,790	4,300	5,800		1308.2	1.074
15	390	900	1,900	2,920	3,930	4,930	951.69	1.0146

$$\text{Travel Time (min)} = \sqrt[p]{\frac{\text{distance}}{k}}$$

Source: Caterpillar Performance Handbook Edition 35



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Productivity - Wheel Loaders

Wheel Loader Specifications

Description	924G	928G	950G	966G	972G	972G (2)	980G	988G	988G(2)	990	992G	992G(2)	994D	L2350
Payload Capacity (cy)														
Struck	2.2	2.5	3.46	4.46	4.71	4.71	6.34	6.9	6.9	9.5	13.2	13.2	18	
Heaped	2.7	3.25	4	5.25	5.5	5.5	7.25	8.33	8.33	11.25	16	16	22.5	
Average	2.45	2.875	3.73	4.855	5.105	5.105	6.795	7.615	7.615	10.375	14.6	14.6	20.25	53
Matched Truck	N/A	N/A	N/A	725	730	735	N/A	740	769D	773D	777D	785C	793C	797B
Average Cycle Time (min)	0.45	0.45	0.5	0.5	0.5	0.5	0.55	0.55	0.55	0.55	0.6	0.6	0.6	0.75
Passes to Fill Truck	N/A	N/A	N/A	3	4	5	N/A	4	3	4	5	6	7	5
Altitude Deration Factor	1	1	1	1	1	1	1	1	1	1	1	1	1	1
Operator Efficiency	1	1	1	1	1	1	1	1	1	1	1	1	1	1
Job Efficiency	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83
Time to Fill Truck	N/A	N/A	N/A	1.5	2	2.5	N/A	2.2	1.65	2.2	3	3.6	4.2	3.75
Rolling Resistance**	2.5	2.5	2.5	2.5	2.5	2.5	2.5	2.5	2.5	2.5	2.5	2.5	2.5	2.5

Loader matched to small truck fleet
Loader matched to medium truck fleet
Loader matched to large truck fleet
Loader matched to extra large truck fleet

**A firm, smooth, rolling roadway with dirt or light surfacing, flexing slightly under load or undulating, maintained fairly regularly, watered
992G (2) - can be used to load 785 with 6 passes

Source: Caterpillar Performance Handbook Edition 35; LeTourneau/actual Chilean mine operating data for L2350.

Wheeled Loaders	General Purpose	Spade Nose-Rock
928G	3.25 cubic yard	not available
966G	5.0 cubic yard	not available
972G	5.5 cubic yard	not available
988G	not available	8.3 cubic yard
992G	not available	16.0 cubic yard

note: capacities are 2:1 heaped, SAE standards
NOTES: Buckets for both Track Excavators and Wheel Loaders are offered by CECo & available for the rental rates quoted. Bucket sizes and capacities obtained from CATERPILLAR PERFORMANCE HANDBOOK, ED 34; Section 12, Wheel Loader and Section 4, Excavators

Bucket capacity and width dictated by material weight and configuration, ie., shot, loose, tight bank, stockpile, rock, etc. Typical Nevada applications were used to determine above bucket capacities as related to materials & densities. Job site specifics may alter specific bucket requirements. (Cashman Equipment, Elko, Nevada - February 21, 2005)

Productivity - Shovels

Shovel Specifications (Komatsu equivalent)

Description	PC2000	PC3000	PC4000	PC5500	PC8000
Payload Capacity (cy)					
Struck	10.46	18.84	26.16	33.48	47.09
Heaped	14.39	25.9	35.97	46.04	64.75
Average	12.43	22.37	31.07	39.76	55.92
Matched Truck	740	777D	785C	793C	797B
Average Cycle Time (min)	0.49	0.49	0.59	0.59	0.69
Passes to Fill Truck	2.05	2.84	3.38	4.69	5.11
Altitude Deration Factor	1	1	0.9	1	1
Operator Efficiency	1	1	1	1	1
Job Efficiency	0.83	0.83	0.83	0.83	0.83
Time to Fill Truck	1.68	2.33	3.32	4.61	5.86
Rolling Resistance**	2.5	2.5	2.5	2.5	2.5

Shovel matched to small truck fleet
Shovel matched to medium truck fleet
Shovel matched to large truck fleet
Shovel matched to extra large truck fleet

**A firm, smooth, rolling roadway with dirt or light surfacing, flexing slightly under load or undulating, maintained fairly regularly, watered
992G (2) - can be used to load 785 with 6 passes

Source: Caterpillar Performance Handbook Edition 35; Komatsu actual Peruvian mine (Lagunas Norte) operating data for PC4000.

Productivity - Motor Graders

Motor Grader Specifications

Description	120H	14G/H	16G/H	24M
Grader Width (ft)	8	9.25	10.08	14.04
Blade Width (ft)	12	14	16	16
Ripper Width (7 shanks) (ft)	7.6	8.5	9.75	12.83
Road Maintence Speed (mph)				
Minimum	3	3	3	3
Maximum	9.5	9.5	9.5	9.5
Average	6.25	6.25	6.25	6.25
Hourly Production	33,000	33,000	33,000	33,000
Ripping Speed (mph)	1	1	1	1
Minimum	0	0	0	0
Maximum	3	3	3	3
Average	1.5	1.5	1.5	1.5
Altitude Deration Factor	1	1	1	1
Hourly Production (with job efficiency correction & altitude deration factors) (excluding manuever time)	6,574	6,574	6,574	6,574
Maneuver time per pass (min)	0.5	0.5	0.5	0.5
Operator Efficiency	1	1	1	1
Job Efficiency	0.83	0.83	0.83	0.83

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Source: Caterpillar Performance Handbook Edition 35

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Productivity - Excavators

Track Excavator Specifications

Description	312C	320C	325C	330C	345B	365BL	385BL
Bucket Capacity (cy)	0.68	1.57	2.22	2.22	3	4.6	7.3
Fill Factor	0.9	0.9	0.9	0.9	0.9	0.9	0.9
Average Bucket Load (cy)	0.612	1.413	1.998	1.998	2.7	4.14	6.57
Soil Type	packed earth	hard clay	hard clay	hard clay	hard clay	hard clay	hard clay
Job Condition	med-hard	med-hard	med-hard	med-hard	med-hard	med-hard	med-hard
Cycle Times (minutes) - based on hard clay							
Load Bucket	0.07	0.09	0.09	0.09	0.13	0.1	0.19
Swing Loaded	0.06	0.06	0.06	0.07	0.07	0.09	0.06
Dump Bucket	0.03	0.03	0.04	0.04	0.02	0.04	0.03
Swing Empty	0.05	0.05	0.06	0.07	0.06	0.07	0.07
Total Cycle Time	0.21	0.23	0.25	0.27	0.28	0.3	0.35
Job Efficiency	0.83	0.83	0.83	0.83	0.83	0.83	0.83
Operator Efficiency	1	1	1	1	1	1	1
Altitude Deration Factor	1	1	1	1	1	1	1
Corrected Productivity (LCY/hr)	145	306	398	369	480	687	935
Exploration Road Cycle Time (1) (min)	N/A	0.38	0.4	N/A	0.42	N/A	N/A
Exploration Road Corr Prod (LCY/hr)	N/A	185	249	N/A	320	N/A	N/A
Track Width (ft)	8.17	9.17	9.83	10.5	11.42	11.5	11.5
Ditch/Trench Excavation							
Bucket Capacity (cy)	0.42	0.58	0.88	0.89	2.09	3.27	2.75
Fill Factor	0.5	0.5	0.5	0.5	0.5	0.5	0.5
Corrected Productivity (LCY/hr)	50	63	88	82	186	271	196

Source: Caterpillar Performance Handbook Edition 35

Track Excavators	Hvy Duty Rock	Extreme Service Exc (e.g. haulroad recontour)	Hvy Duty Trench
312C	30", 0.68 cubic yd	47", 0.94 cubic yd	22", .42 cubic yd
320C	30", 0.90 cubic yd	55.1", 1.57 cubic yd	23.6", .58 cubic yd
325C	36", 1.25 cubic yd	60", 2.22 cubic yd	30", .88 cubic yd
330C	36", 1.25 cubic yd	60", 2.22 cubic yd	30", .89 cubic yd
345B	43.2", 1.69 cubic yd	65", 3.0 cubic yd	48", 2.09 cubic yd
365BL	60", 3.25 cubic yd	82", 4.6 cubic yd	59", 3.27 cubic yd
385BL	85", 6.30 cubic yd.	96.0, 7.30 cubic yd	57", 2.75 cubic yd

Note: capacities are 2:1 heaped, SAE standards
NOTES: Buckets for both Track Excavators and Wheel Loaders are offered by CECo &

available for the rental rates quoted. Bucket sizes and capacities obtained from CATERPILLAR
PERFORMANCE HANDBOOK, ED 34; Section 12, Wheel Loader and Section 4, Excavators
Bucket capacity and width dictated by material weight and configuration, ie., shot, loose,
tight bank, stockpile, rock, etc. Typical Nevada applications were used to determine above
bucket capacities as related to materials & densities. Job site specifics may alter specific
bucket requirements (Cashman Equipment, Elko, Nevada - February 21, 2005)

(1) Exploration cycle time assumes feathering/smoothing performed by excavator

Concrete Breaking Production

Track Excavator w/Hammer Specifications

Description	325C	345B	385BL
Hydraulic Hammer	H120D s	H160D s	H180D s
Material	reinforced concrete		
Min Shift Production (yd3/8hr)	160	300	350
Max Shift Production (yd3/8hr)	300	850	1,550
Avg Shift Production (8hr)	230	575	950
Job Efficiency	0.83	0.83	0.83
Altitude Deration Factor	1	1	1

Source: Caterpillar Performance Handbook Edition 35

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Drill Hole Plugging Productivity

Drill Hole Plugging Productivity		
Description	**Drill Rig**	**Pump Rig**
Move-to-hole, set-up, tear-down [1]	2	2
Trip in tremmie pipe [1]	500	
Pulling casing (threaded, not cemented) [1]	200	
Single-pass perforating (water wells)	Productivity(all pa	Passes
4	60	4
6	60	4
8	50	4
12	45	6
18	40	9
24	28	12
Perforation setup,trip in/out,tear-down time	2	
Perforation tool cost (wear cost)[3]	2.5	
Inert Material Placement (backfill)		
Grouting/Cement [4] (cy/hr)		5.33
Cuttings (see below) (cy/hr)		3.5

Sources:
1. Drillers daily logs from Newmont, Barrick, New West Gold, Agnico Eagle, Idaho General Mines Inc.
2. Drillers daily logs from Newmont, Barrick, Target Minerals
3. Drillers daily logs from Newmont
4. WDC Exploration, Dec 2005

Sourrce: WDC Exploration, Dec 2005

Cuttings Placement Productivity

Shift productivity (Means 02210-700-0120; Crew B11M)	28	cy / shift
Shift length	8	hours
Estimated Hourly Productivity	3.5	cy / hour

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Altitude Deration Table

	Elevation											
	0-760 m (0-2500')		760-1500 m (2500-5000')		1500-2300 m (5000-7000')		2300-3000 m (7500-10,000')		3000-3800 m (10,000-12,000')		3800-4600 m (12,500-15,000')	
MODEL	**CAT**	**User**	**CAT**	**User**	**CAT**	**User**	**CAT**	**User**	**CAT**	**User**	**CAT**	**User**
Bulldozers												
D6R	100		100		100		100		92		84	
D6R w/ Winch	100		100		100		100		92		84	
D7R	100		100		100		100		100		96	
D8R	100		100		100		93		85		77	
D9R	100		100		100		93		85		77	
D10R	100		100		100		100		97		89	
D11R	100		100		100		93		85		77	
Wheeled Dozers												
824G	100		100		100		100		92		84	
834G	100		100		100		100		92		84	
844	100		100		100		100		100		96	
854G	100		100		100		93		85		77	
Graders												
120H	100		100		100		100		96		93	
14G/H	100		100		100		100		98		96	
16G/H	100		100		100		100		98		96	
24M	100		100		100		100		98		96	
Excavators												
312C	100		100		100		83		78		73	
320C	100		100		90		87		83		76	
325C	100		100		100		100		100		100	
330C	100		100		100		100		100		100	
345B	100		100		100		100		93		93	
365BL	100		100		100		86		86		86	
385BL	100		100		100		93		85		78	
Scrapers												
631G	100		100		100		100		97		90	
637G	100		100		100		95		87		80	
Loaders												
924G	100		100		100		100		97		89	
928G	100		100		100		100		92		85	
950G	100		100		100		100		100		100	
966G	100		100		100		100		96		88	
972G	100		100		92		84		77		70	
980G	100		100		100		100		96		88	
988G	100		100		100		95		85		75	
990	100		100		100		100		92		85	
992G	100		100		100		100		93		87	
994D	100		100		100		100		96		88	
L2350	100		100		100		100		96		90	
Shovels												
PC2000	100		100		100		100		96		90	
PC3000	100		100		100		100		96		90	
PC4000	100		100		100		100		96		90	
PC5500	100		100		100		100		96		90	
PC8000	100		100		100		100		96		90	
Other Equipment												
420D 4WD Backhoe	99		97		95		91		91		91	
428D 4WD Backhoe	99		97		95		91		91		91	
CS533E Vibratory Roller	100		100		98		95		91		86	
CS633E Vibratory Roller	100		100		100		100		91		86	
CP533E Sheepsfoot Compactor	100		100		98		95		91		100	
CP633E Sheepsfoot Compactor	100		100		100		100		91		86	
Light Truck - 1.5 Ton												
Supervisor's Truck												
Flatbed Truck												
Air Compressor + tools												
Welding Equipment												
Heavy Duty Drill Rig												
Pump (plugging) Drill Rig												
Concrete Pump												
Gas Engine Vibrator												
Generator 5KW												
HDEP Welder (pipe or liner)												
5 Ton Crane												
20 Ton Crane												
50 Ton Crane												
120 Ton Crane												
Trucks												
725	100		100		100		100		100		95	
730	100		100		100		100		100		95	
735	100		100		100		100		99		91	
740	100		100		100		100		99		91	
769D	100		100		100		93		88		82	
773E	100		100		100		100		93		85	
777D	100		100		100		100		93		87	
785C	100		100		100		93		86		80	
793C	100		100		100		100		100		93	
797B	100		100		100		100		100		93	
613E (5,000 gal) Water Wagon	100		100		100		100		95		87	
621E (8,000 gal) Water Wagon	100		100		100		100		97		90	
777D Water Truck	100		100		100		100		93		87	
785C Water Truck	100		100		100		93		86		80	
Dump Truck (10-12 yd^3) (5)												

Notes:
User entered deration value will override values from CAT Performance Handbook, except L2350 Loader: data from actual mine performance in Chile.
Komatsu altitude deration assumed from LeTourneau L2350

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Closure Cost Estimate
Seed Mixture

Project Name: True North - Reclamation Plan
Date of Submittal: 4/20/2012
File Name: SRCE_Version_1_4_1_014.xlsm
Model Version: Version 1.4.1
Cost Data: User Data
Cost Data File: Cost data for SRCE model.xlsm
Cost Estimate Type: Surety Cost Basis: Alaska

Seed Mixture						
Common Name	Scientific Name	Species Number of Seeds / lb	Species % in Mix	PLS/acre	Cost/Lb	Cost/Acre
Grasses						
Arctared Fescue			50.00	11.00	4.50	$49.50
Gruenin Alpine Bluegrass			20.00	11.00	1.80	$19.80
Tundra Glaucous Bluegrass			20.00	11.00	1.80	$19.80
Nortran tufted hairgrass			10.00	11.00	0.90	$9.90
Forbs						
Shrubs						
Total				$44.00		$99.00

Source:

Notes:

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Closure Cost Estimate
User 3

Project Name: True North - Reclamation Plan

Date of Submittal: 4/20/2012

North Shepard Dump Regrading

File Name: SRCE_Version_1_4_1_014.xlsm
Model Version: Version 1.4.1
Cost Data: User Data
Cost Data File: Cost data for SRCE model.xlsm
Cost Estimate Type: Surety **Cost Basis: Alaska**

Waste Rock Dumps

	TOTAL	Zep.Hind.Dump	N.Shepard.Dump
	Lookup	**WRD.Zep.Hind**	**WRD.N.Shepard**
Excavation Total: $0	$0	$0	$0
Grading & Recontouring Total: $77,728	$77,728	$30,625	$47,103
Place Growth Media Total: $0	$0	$0	$0
Scarify Total: $962	$962	$682	$281
Revegetate Total: $1,968	$1,968	$1,394	$574
TOTAL: $80,658	**$80,658**	**$32,701**	**$47,958**

LABOR

Labor Cost	**$7,027**	**$7,027**	**$10,549**
Supervisor Cost	**$1,316**	**$1,316**	**$1,945**
Total Labor Cost	**$8,343**	**$8,343**	**$12,495**

Closure Cost Estimate
User 3

	Area.Grading?	**TRUE**	**TRUE**
GRADING & RECONTOURING			
Material	**Range Name**		
Material Type	Area.Grade.Material	Waste.Rock	Waste.Rock
Material Density (lb/cy)	Material.Density	3,500	3,500
Side Slope (cy)	Side.Slope.CY	40,879	66,212
Top Slope (cy)	Top.Slope.CY	0	0
Total (cy)		**40,879**	**66,212**
Equipment			
Dozer Model	Grading.Dozer.Model	Cat.D10R	Cat.D10R
Blade Type	Grading.Dozer.Blade	U	U
Dozer Productivity Model ID	Cat.D10R.U	Cat.D10R.U	Cat.D10R.U
General Adjustment Factors			
Material Dozing Factor	Material.Dozing.Factor	0.70	0.70
Material Weight Factor		0.66	0.66
Operator Ability Factor	Operator.Factor	0.75	0.75
Visibility Factor	Visibility.Factor	1.00	1.00
Job Efficiency Factor	Job.Efficiency.Factor	0.83	0.83
Dozing Factor	Grading.Dozing.Factor	1.20	1.20
Other Dozing Adjustment	Grading.Dozing.Adjustment	1.00	1.00
Subtotal		**0.34**	**0.34**
Side Slope Productivity			
Push Distance (ft)	Side.Slope.Push.Dist	150	150
Dozer Push Distance Lookup	Push.150	Push.150	Push.150
Push Grade (%)	Side.Slope.Push.Grade	0%	-3%
Grade Factor		1.00	1.05
Unadjusted Dozer Productivity (LCY/hr)		1,300	1,300
Adjustment Factor		0.34	0.36
Side Slope Dozer Productivity (LCY/hr)		**447**	**470**
Side Slope Dozer Duration (hr)		**91**	**141**
Top Slope Productivity			
Push Distance (ft)	Top.Slope.Push.Dist	50	50
Dozer Push Distance Lookup	Push.150	Push.50	Push.50
Push Grade (%)	Top.Slope.Push.Grade	0%	0%
Grade Factor		1.00	1.00
Unadjusted Dozer Productivity (LCY/hr)		2,900	2,900
Adjustment Factor		0.34	0.34
Top Slope Dozer Productivity (LCY/hr)		**996**	**996**
Top Slope Dozer Duration (hr)		**0**	**0**
Grading Recontouring & Summary Calculations			
Task Duration (hr)		91	141
Dozer Cost ($)	Equip.Hourly.Cost	22,582	34,732
Labor Cost ($)	Labor.Cost	6,797	10,455
Supervisor Cost ($)	Supervisor.Cost	1,246	1,917
Unit Cost ($/cy)		0.75	0.71
Total Grading and Recontouring Cost		**$30,625**	**$47,103**

Closure Cost Estimate
User 3

SCARIFY			
	Area.Scarify?	**TRUE**	**TRUE**
Scarify Equipment Model	Scarify.Equip.Model	Cat.D8R	Cat.D8R
Scarify Area (ac)	Area.Acres	3.4	1.4
Dozer Ripping Productivity			
Unadjusted Scarify Productivity (ac/hr)	Scarify.Productivity	1.1	1.1
Scarify Adjustment Factor (%)		1.00	1.00
Adjusted Scarify Productivity (ac/hr)		1.1	1.1
Scarify Summary Calculations			
Task Duration (hr)		3.1	1.3
Total Equipment Cost ($)	Equip.Hourly.Cost	$410	$169
Total Labor Cost ($)	Labor.Cost	$230	$95
Supervisor Cost ($)	Supervisor.Cost	$42	$17
Unit Cost ($/ac)		$200.49	$200.49
Total Scarify Cost		**$682**	**$281**

REVEGETATE			
	Area.Reveg?	**TRUE**	**TRUE**
Upland Area (ac)	Upland.Area	3.4	1.4
Total Area (ac)		**3.4**	**1.4**
Materials			
Upland Seed (lb)	Upland.Seed.Rate	37	15
Upland Fertilizer (ton)	Fertilizer.Rate	0.5	0.2
Revegetate Summary Calculations			
Upland Seed Cost ($)	Upland.Seed.Cost	$337	$139
Upland Fertilizer Cost ($)	Fertilizer.Cost	$400	$165
Application Cost ($)	Aerial.Application.Cost	$629	$259
Task Duration (hr)	Reveg.Application.Rate	0.3	0.1
Supervisor Cost ($)	Supervisor.Cost	$28	$11
Unit Cost ($/ac)		$409.92	$409.92
Total Revegetate Cost		**$1,394**	**$574**

Closure Cost Estimate
User 1

Project Name: True North - Reclamation Plan
Date of Submittal: 12/28/2011
File Name: SRCE_Version_1_4_1_014.xlsm
Model Version: Version 1.4.1
Cost Data: User Data
Cost Data File: Cost data for SRCE model.xlsm
Cost Estimate Type: Surety **Cost Basis: Alaska**

Waste Rock Stability Monitoring

Notes:
Wages Source - State of Alaska average wage rates
17-3031 - Surveyors and Mapping Technicians
Burden rate includes payroll taxes, insurance, associated with employment, benefits (holiday, sick leave, and vacation)
Equipment rental rate from RS Means 2010

Hindenburg

Field Work/ Travel	Task	Duration (hr.)	Job Classification	Staff Level	Base Labor Rate	Burden (72%)	
Field	1. Place a visible scale (a level rod or other large scale) across cracks or depressions so that the dimensions of the feature would be obvious in the photographs	0.5	Surveyors and Mapping Technicians	2	$ 24.51	$ 42.16	$ 42.16
Office	2. Document on an aerial photo based site plan, the location of the camera and the direction in which it is pointing; including GPS coordinates. The features that continue to develop in the same area take the pictures from the same position each time	2	Surveyors and Mapping Technicians	1	$ 24.51	$ 42.16	$ 84.31
	Note the date and time each picture is taken	0.5	Surveyors and Mapping Technicians	2	$ 24.51	$ 42.16	$ 42.16
	Take the pictures at the following times: When the depth of the feature becomes more than 6 inches, the length is more than 5 feet, or the opening is more than 3 inches	3	Surveyors and Mapping Technicians	2	$ 24.51	$ 42.16	$ 252.94
	Travel From Fairbanks (Round Robin)	2	Surveyors and Mapping Technicians	2	$ 24.51	$ 42.16	$ 168.63
Labor	Total per event	8					$ 590.20
Operating and Equipment Costs	Transportation (Lt Duty Truck)	6			15.58		93.48

North Shepard and Zep/Hin Prism Monitoring

Field Work/ Office / Travel	Area	Duration (hr.)	Job Classification	Staff Level	Base Rate	Burden (72%)	
	Hindenburg	1.5	Surveyors and Mapping Technicians	2	$ 24.51	$ 42.16	$ 126.47
	North Shepard Dump	1.5	Surveyors and Mapping Technicians	2	$ 24.51	$ 42.16	$ 126.47
Office	Data Entry	1.5	Surveyors and Mapping Technicians	1	$ 25.51	$ 43.88	$ 65.82
	Travel (Round Robin)	2.5	Surveyors and Mapping Technicians	2	$ 26.51	$ 45.60	$ 227.99
		5.5					$ 546.75
Labor	Office -Total per event	7					
Equipment	Laser Transit/Level (daily rate)	5.5			$ 69.90		$ 69.90
	Transportation (Lt Duty Truck)	5.5			$ 15.58		$ 85.69
	Equipment total per event						$ 155.59

Totals

Labor	$	1,136.95
Equipment	$	249.07

Closure Cost Estimate
User 2

Project Name: True North - Reclamation Plan
Date of Submittal: 4/20/2012
File Name: SRCE_Version_1_4_1_014.xlsm
Model Version: Version 1.4.1
Cost Data: User Data
Cost Data File: Cost data for SRCE model.xlsm
Cost Estimate Type: Surety Cost Basis: Alaska

True North Monitoring 2012

Sample Type	Analysis Type	Samples/Year	Cost Each Lab				
		Schedule	Analytical		Labor		
Little Eldorado Creek	Profile.1.Cost	1	528.75	$	320	$	849
Murray Creek	Profile.1.Cost	1	528.75	$	320	$	849
Spruce Creek	Profile.1.Cost	1	528.75	$	320	$	849
Louis Creek	Profile.1.Cost	1	528.75	$	320	$	849
Whiskey Gulch	Profile.1.Cost	1	528.75	$	320	$	849
Duplicate	Profile.1.Cost	1	528.75	$	320	$	849
Rinse Blank	Profile.1.Cost	1	528.75	$	320	$	849
TMW-2	Profile.2.Cost	1	528.75	$	320	$	849
TMW-3	Profile.2.Cost	1	528.75	$	320	$	849
TMW-6	Profile.2.Cost	1	528.75	$	320	$	849
TMW-7	Profile.2.Cost	1	528.75	$	320	$	849
TMW-8	Profile.2.Cost	1	528.75	$	320	$	849
TMW-10	Profile.2.Cost	1	528.75	$	320	$	849
TMW-11	Profile.2.Cost	1	528.75	$	320	$	849
TMW-12	Profile.2.Cost	1	528.75	$	320	$	849
True North Analytical and Labor Costs 2012		15				**$**	**12,731**

* Note Quarter one sampling is complete, therefore three sampling events remain for each location.
ACZ Analytical non-discounted rate is 528.75

Closure Cost Estimate
User 4

Project Name: True North - Reclamation Plan East Shepard Dump Section B
Date of Submittal: 4/20/2012
File Name: SRCE_Version_1_4_1_014.xlsm
Model Version: Version 1.4.1
Cost Data: User Data
Cost Data File: Cost data for SRCE model.xlsm
Cost Estimate Type: Surety **Cost Basis: Alaska**

30,000	CY	Waste rock to be pulled
13	Acre	Area after regrading
10487	CY	Growth Media required
6	inch	Depth of growth media

Equipment Type / Labor	Hourly Rate ($/hr) Labor	Equipment	Time (hrs)	Labor Cost	Equipment Cost	Total Cost ($)
Grading				-	-	
D8	73.09	135.98	979	71,588.02	133,185.64	204,773.66
Growth Media						
D8	73.09	135.98	19	1,399.43	2,603.56	4,002.99
Scarify						
D8	73.09	135.98	11.8	863.79	1,607.04	2,470.83
Totals				73,851.24	137,396.24	211,247.48

GRADING & RECONTOURING & GROWTH MEDIA PLACEMENT

Material		
Material Type	Shale	Topsoil
Material Density (lb/cy)	2,100	1600
Total (cy)	30,000	10487
Equipment		
Dozer Model	D8	D8
Blade Type		
General Adjustment Factors		
Material Dozing Factor	0.70	1.70
Material Weight Factor	1.10	1.44
Operator Ability Factor	0.75	0.75
Visibility Factor	1.00	1.00
Job Efficiency Factor	0.83	0.83
Dozing Factor	1.20	1.20
Other Dozing Adjustment	0.25	0.25
Subtotal	0.14	0.46
Side Slope Productivity		
Push Distance (ft)	150	150
Push Grade (%)	33%	-33%
Grade Factor	0.2377	1.7623
Unadjusted Dozer Productivity (LCY/hr)	900	681
Adjustment Factor	0.03	0.80
Side Slope Dozer Productivity (LCY/hr)	31	548
Side Slope Dozer Duration (hr)	979	19

*Growth media will come from clearing 4.5 acres located above the foot print of the WRD. A dozer is all that will be needed.

SCARIFY	
Scarify Equipment Model	D8
Scarify Area (ac)	13
Dozer Ripping Productivity	
Unadjusted Scarify Productivity (ac/hr)	1.1
Scarify Adjustment Factor (%)	1
Adjusted Scarify Productivity (ac/hr)	1.1
Scarify Summary Calculations	
Task Duration (hr)	11.82

Closure Cost Estimate
User 5

Project Name: True North - Reclamation Plan
Date of Submittal: 4/20/2012
File Name: SRCE_Version_1_4_1_014.xlsm
Model Version: Version 1.4.1
Cost Data: User Data
Cost Data File: Cost data for SRCE model.xlsm
Cost Estimate Type: Surety Cost Basis: Alaska

Monitoring Well Closure
* Items 1-6 is a local contractors estimate for closing 6 wells.
* Wells are scattered over a large area and diffucult acces

Well Closure

No	Description	Volume	Unit	Cost	Extended
1	Remove all pumps and pipes	1	lump sum	100,000	$ 100,000.00
2	Remove casings 3 feet below the su	1	lump sum	50000	$ 50,000.00
3	Backfill wells with Bentonite	1	lump sum	70000	$ 70,000.00
4	Grading around wells	1	lump sum	5000	$ 5,000.00
				Total	$ 225,000.00
				Each Well =	$ 37,500.00

Closure Cost Estimate
User 6

Project Name: True North - Reclamation Plan
Date of Submittal: 4/20/2012
File Name: SRCE_Version_1_4_1_014.xlsm
Model Version: Version 1.4.1
Cost Data: User Data
Cost Data File: Cost data for SRCE model.xlsm
Cost Estimate Type: Surety Cost Basis: Alaska

2011 MOB/DEMOB using R.S. MEANS and SRCE equipment and Alaska Labor Rates

Miles to project, one way	350
Speed (MPH)	55
Hours travel time	6.36

Equipment	Mobilization $/hour Equipment	Dead head Equipment	Mobilization $/hour Labor	Dead Head Labor	# of units	One Way Mob Cost Equipment	One Way Mob Cost Labor	Total Mob and Demob Cost
Bulldozers								
D8R	$ 240	$ 115	$ 202	$ 62	2	$ 4,524	$ 3,351	$ 15,748.22
Motor Graders								
16 G/H	$ 240	$ 115	$ 202	$ 62	2	$ 4,524	$ 3,351	$ 15,748.22
Track Excavators								
320C	$ 191	$ 107	$ 202	$ 62	1	$ 1,898	$ 1,675	$ 7,145.63
Wheeled Loaders								
972G	$ 214	$ 107	$ 202	$ 62	2	$ 4,094	$ 3,351	$ 14,889.13
Haul Truck								
730	$ 226	$ 107	$ 202	$ 62	2	$ 4,237	$ 3,351	$ 15,175.49
Other Equipment								
420D 4WD Backhoe	$ -		$ -			$ -		$ -
CS563E Vibratory Roller	$ -		$ -			$ -		$ -
Light Truck - 1.5 Ton	$ -		$ -			$ -		$ -
Supervisor's Truck	$ -		$ -			$ -		$ -
Air Compressor + tools	$ -		$ -			$ -		$ -
Welding Equipment	$ -		$ -			$ -		$ -
Heavy Duty Drill Rig	$ -		$ -			$ -		$ -
Pump (plugging) Drill Rig	$ -		$ -			$ -		$ -
Concrete Pump	$ -		$ -			$ -		$ -
Gas Engine Vibrator	$ -		$ -			$ -		$ -
Generator 5KW	$ -		$ -			$ -		$ -
HDEP Welder (pipe or liner)	$ -		$ -			$ -		$ -
5 Ton Crane Truck	$ -		$ -			$ -		$ -
25 Ton Crane	$ -		$ -			$ -		$ -
Trucks								
777D Water Truck	$ 195	$ 107	$ 202	$ 62	1	$ 1,922	$ 1,675	$ 7,195.36
Dump Truck (10-12 yd^3)	$ -		$ -			$ -		$ -
TOTAL						$ 21,198	$ 16,753	$ 75,902

Closure Cost Estimate
User 7

Project Name: True North - Reclamation Plan
Date of Submittal: 4/20/2012
File Name: SRCE_Version_1_4_1_014.xlsm
Model Version: Version 1.4.1
Cost Data: User Data
Cost Data File: Cost data for SRCE model.xlsm
Cost Estimate Type: Surety **Cost Basis: Alaska**

Reclamation Seed and Fertilizing				
		Equipment	**Materials**	**Totals**
Revegetation	Subtotal Revegetation Difference	$18,728	$7,823	$26,551

Reclamation Seed and Fertilizing					
Description	**Area not accounted for in SRCE but determinded by AutoCad** acres	**Seed Mix** (select)	**Seed and Ferilizer** $/acres	**Equipment (includes labor and fuel)** $/acres	**Totals** $
Revegetation Maintenance	79	**User Mix 5 (fror**	$99.00	$237.00	
Equipment					$18,728
Materials					$7,823
Cost/Acre					$336
				Subtotal	**$26,551**

Notes: 1) Surface area is NOT the same as footprint disturbance area typically used for permitting purposes.
2) If BRCE model, revegetation surface area determined by area included in PER, LOM or Surety estimate

Closure Cost Estimate
User 8

Project Name: True North - Reclamation Plan
Date of Submittal: 4/20/2012
File Name: SRCE_Version_1_4_1_014.xlsm
Model Version: Version 1.4.1 RS 2477 Trail Install (Connector Install)
Cost Data: User Data
Cost Data File: Cost data for SRCE model.xlsm
Cost Estimate Type: Surety Cost Basis: Alaska

2011 MOB/DEMOB using R.S. MEANS and SRCE equipment and Alaska Labor Rates

Miles to project, one way	35
Speed (MPH)	45
Hours travel time	0.78

Equipment	Mobilization $/hour	Dead head Equipmen	Mobilization $/hour	Dead Head Labor	# of units	One Way Mob Cost Equipment	One Way Mob Cost Labor	One Way Total Mob and Demob Cost
Bulldozers								
D6R	$ 240	$ 115.40	$ 202	$ 62	1	$ 276	$ 205	$ 962.39

Trail Install

Length	Duration (Hr)
2500 LF	10

	Equipment	Labor	Total
D6	1266.23	730.9	1997.13

Appendix C

The proposed work planned for 2012 to be performed as follows:

EXPLOSIVES ROAD

1) Reduce current road to a 20 foot wide road with a small vehicle turnaround area at the end. Explosives road will be reduced to a single lane by ripping along the eastern edge.

2) Current diversion ditch to remain

3) Haul and dump cut material at the ANFO area.

4) Place a maximum of 6 inches of growth media along the entire hill side. Primary source of growth media will come from the ANFO stockpile. When necessary the remaining growth media from the Shop Pad stockpile may be utilized.

5) Rip 12 to 18 inches on contour

6) Reference drawings TN-2012-04-001 throughTN-2012-04-003

ANFO AREA

1) Clear approximately 7 acres, 12 inches deep around the ANFO. Stockpile growth media.

2) Grade ANFO to a 3:1.

3) Place 6 inches of growth media. Primary source will com form ANFO stock pile remaining will come from Hindenburg stockpile.

4) Rip 12 t o18 inches on contour

5) Remove and dispose of abandoned piping.

6) Pulverize concrete slab in place

7) Reference drawings TN-2012-04-001 though TN-2012-04-003

ZEPPLIN & HINDENBURG DUMPS

1) Erosion due to drainage disturbed approximately 0.5 acres of already reclaimed land. Place straw waddles to reduce water flow. Straw waddles are on site.

LOWER AB DUMP

1) Regrade approximately 11.2 acres.

2) Place a maximum of 6 inches of growth media on the entire dump. This growth media will be obtained from the Hindenburg Growth Media Stockpile and the Shop Pad stockpile.

3) Rip 12 to 18 inches on contour.

GROWTH MEDIA STOCKPILES

1) Estimated Hindenburg available growth media is 10,000 CY
2) Estimated Shop Pad available growth media is 43,000 CY
3) Reserve GM in Central Pit
4) Reserve GM in Shepard Pit
5) Grade and scarify the Hindenburg and Shop Pad growth media stockpiles footprint (2.2 acres).
6) Grade and scarify reserve GM Central Pit and Shepard Pit

HINDENBURG ROAD

1) Berms will be removed from the road edge by spreading them across the existing roadway.

UPPER B STOCKPAD

1) Pull back and grade the northeastern corner of the stock pad to a 3:1 slope or shallower. Prevent disturbance to the trees below.
2) Place a maximum of 6 inches of growth media.
3) Rip 12 to 18 inches on contour.
4) Cleanup grading of the west side of the stockpad , where there is a buildup of material.
5) Maintenance may be required to the diversion ditch system that runs from the northern tip of the stockpad.

SHOP PAD

1) Grade and bled the material built up on west side
2) Use some of the west side material to fill in decommissioned barrel storage area.
3) Remove and dispose of old pipe and other debris.
4) Place 6 inches of growth med
5) Rip 12 to 18 inches

UPPER A STOCKPAD

1) The slope leading from the tree line on the west side needs to be pushed out slightly to reduce the steepness
2) Place a maximum of 6 inches of growth media.
3) Rip 12 to 18 inches

SHOP PAD ROAD

1) A light grading of the roadway is required to knock down some of the built up material along the road.
2) Reduce to 20 feet wide
3) The roadway requires placement of 6 inches of growth media. The growth media will be obtained from the Shop Pad growth media stockpile.

EAST SHEPARD DUMP

1) Clear approximately 4.5 acres placing trees as a windrow uphill and parallel to dump, remove 12 inches of organics stock pile for placement over dump.
2) Pulled back and grade according to TN-2012-04-004 - TN-2012-04-006
3) Rip 12 to 18 inches on contour.
4) Place maximum of 6 inches of growth media along the reclaimed dump. Use the stock piled growth media from tree clearing.
5) Reference Drawing TN-2012-04-004 - TN-2012-04-006

MID SHEPARD DUMP

1) Fill depression with approximately 20,000 CY of East Shepard Dump cut material.
2) Grade according to TN-2012-04-004 - TN-2012-04-006.
3) Place 6 inches of growth media.
4) Rip 12 to 18 inches on contour.

NORTH SHEPARD DUMP

1) Remove existing roadway (only lower roadway), material from above the roadway will be pulled down to fill in the excavated roadway.
2) The area will then need to be lightly graded to blend in with the existing slope. It is essential that minimal vegetation is affected in this area.

S**HEPARD ROAD**

1) Reduce road to a single lane measuring 20 feet wide.
2) Where possible create a 3:1 slope by either pushing out or pulling including berm material.
3) The roadway and daylight edge slope to be ripped on contour.

RS 2477 TRAILS

1) Establish connector trails approximately 2,500 LF no greater than 20 foot wide.

ZEP/HIND WASTE ROCK DUMP

1) Regrade cracks and blend into surrounding area foot print is 3.4 acres

SPRUCE CREEK

1) Excavate 3,000 cy of material forming a drainage ditch.
2) Material to be placed and graded adjacent to ditch. Location to be coordinate in field.
3) Reference drawings reference drawing TN-2012-04-008 Rev 1

ALTERNATE 1

1) Monitoring well access -1 reference drawing TN-2012-04-009
2) Install 1000 foot trail
3) Haul 10 cy of material to monitoring well locations to fill in undercut

ALTERNATE 2

1) Monitoring well access – 2 reference drawing TN-2012-04-010
2) Cut back windrow to form a 20 foot clearance
3) Smooth out hump at windrow opening

COMMENTS:

ESTABLISH 20' ROAD WITH TURN AROUND
CUT = 100,000 CY – FILL 95,000 CY
TREE REMOVAL = 7 ACRES AT EASTEND ONLY
APPROX. 11,000 CY TOPSOIL

KINROSS Fort Knox

Merit

APPROVAL DRAFT DATE

USKH

TRUE NORTH
2012 RECLAIMATION
EXPLOSIVES ROAD

SCALE 1" = 200'	SIZE TABLOID/ANSI B
DRAWN BY S.DENNY	DATE APRIL 17 2012
	MAY 17 2012
DRAWING NUMBER TN-2012-04-001	REV 01

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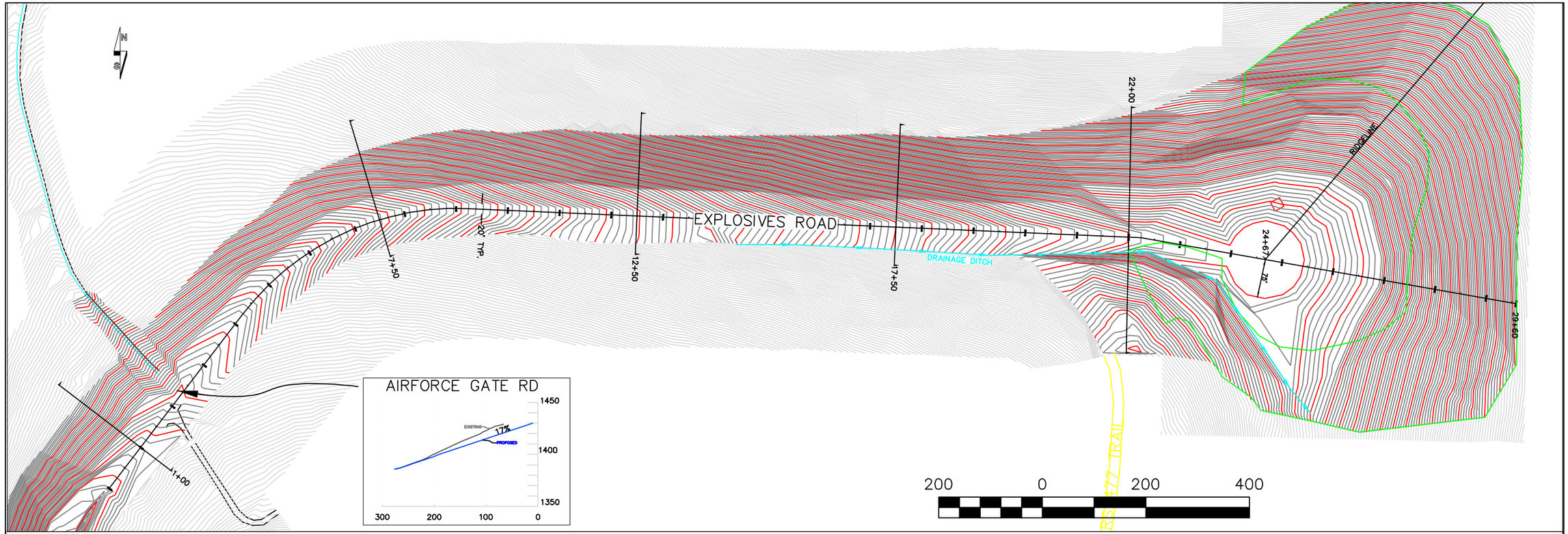

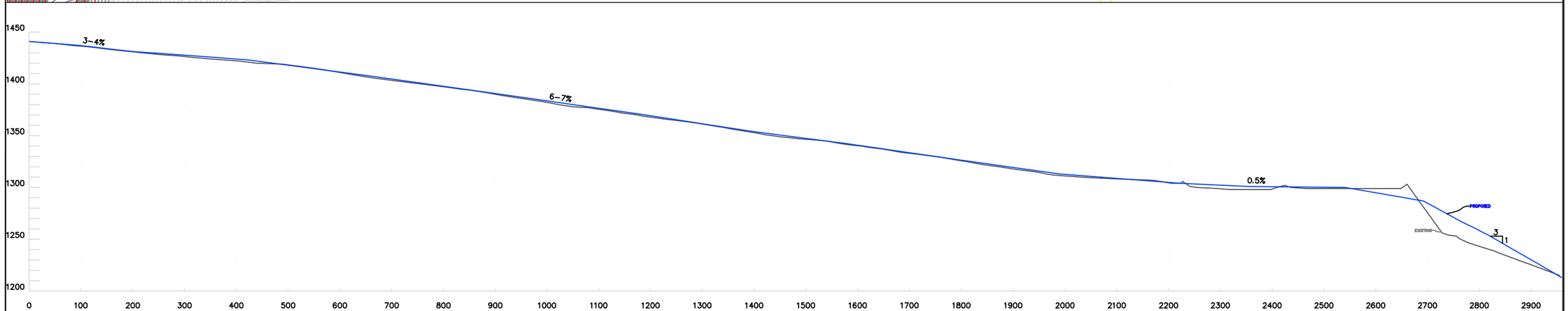

COMMENTS:

KINROSS Fort Knox

Merit

APPROVAL DRAFT DATE

USKH

TRUE NORTH
2012 RECLAIMATION
EXPLOSIVES ROAD
PROFILE

SCALE 1" = 200'	SIZE TABLOID/ANSI B
DRAWN BY S.DENNY	DATE APRIL 14 2012
	MAY 17 2012
DRAWING NUMBER TN-2012-04-002	REV 01

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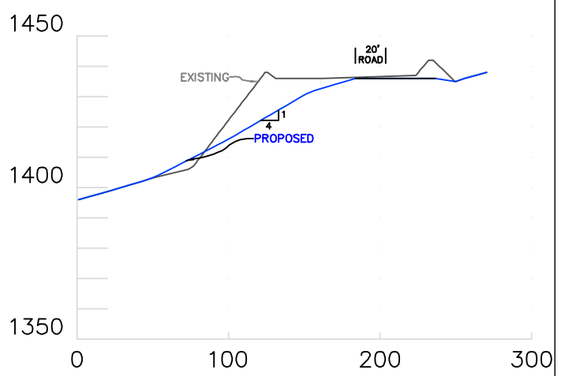

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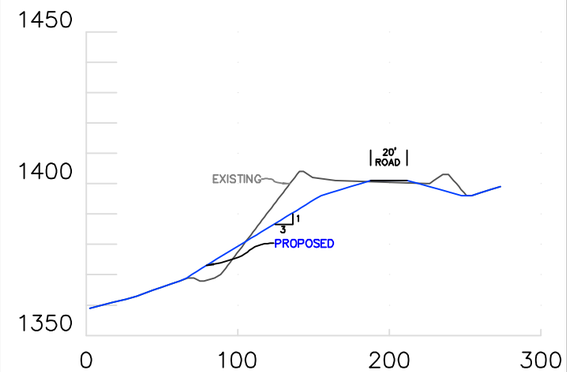

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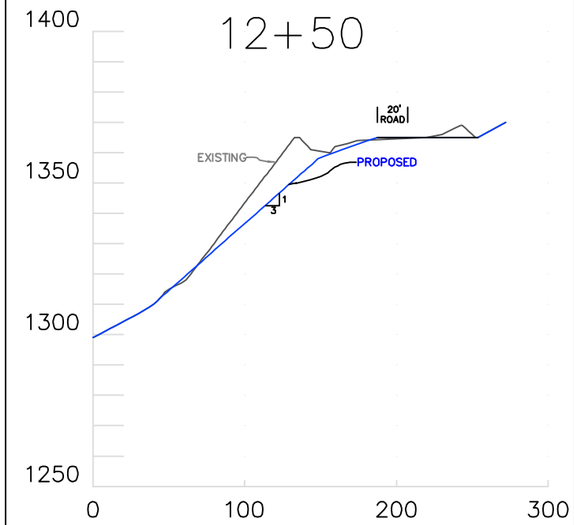

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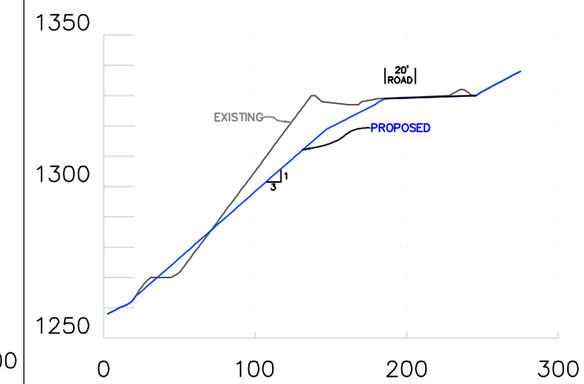

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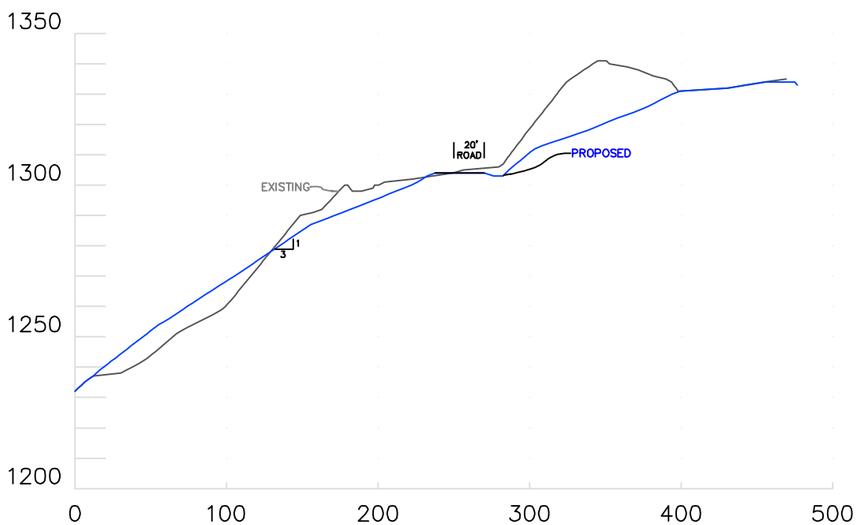
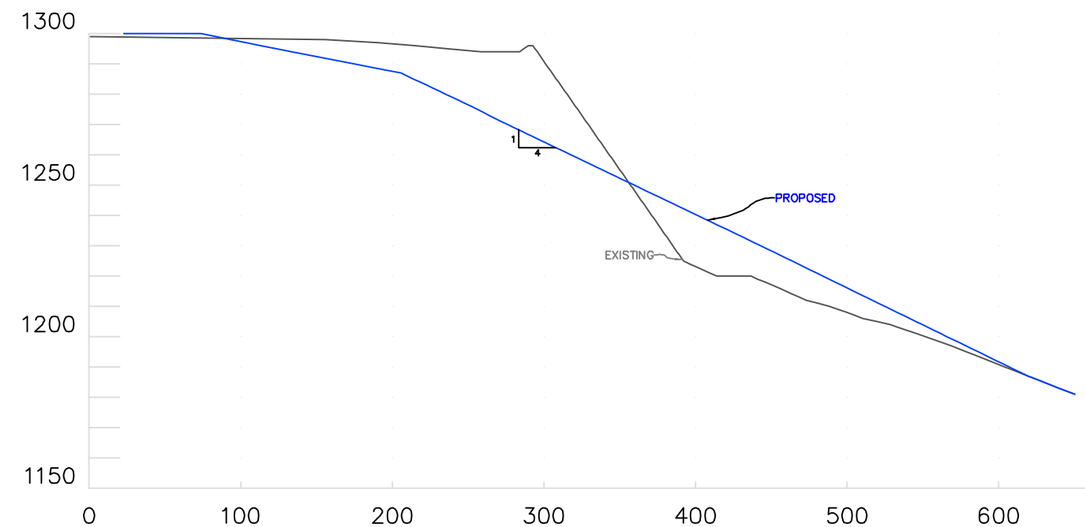


RIDGELINE



COMMENTS:

KINROSS Fort Knox

Merit

APPROVAL DRAFT DATE

USKH

TRUE NORTH

2012 RECLAIMATION EXPLOSIVES ROAD CROSS SECTIONS

SCALE 1" = 50'	SIZE TABLOID/ANSI B
DRAWN BY S.DENNY	DATE APRIL 16 2012
	MAY 17 2012
DRAWING NUMBER TN-2012-04-003	REV 01

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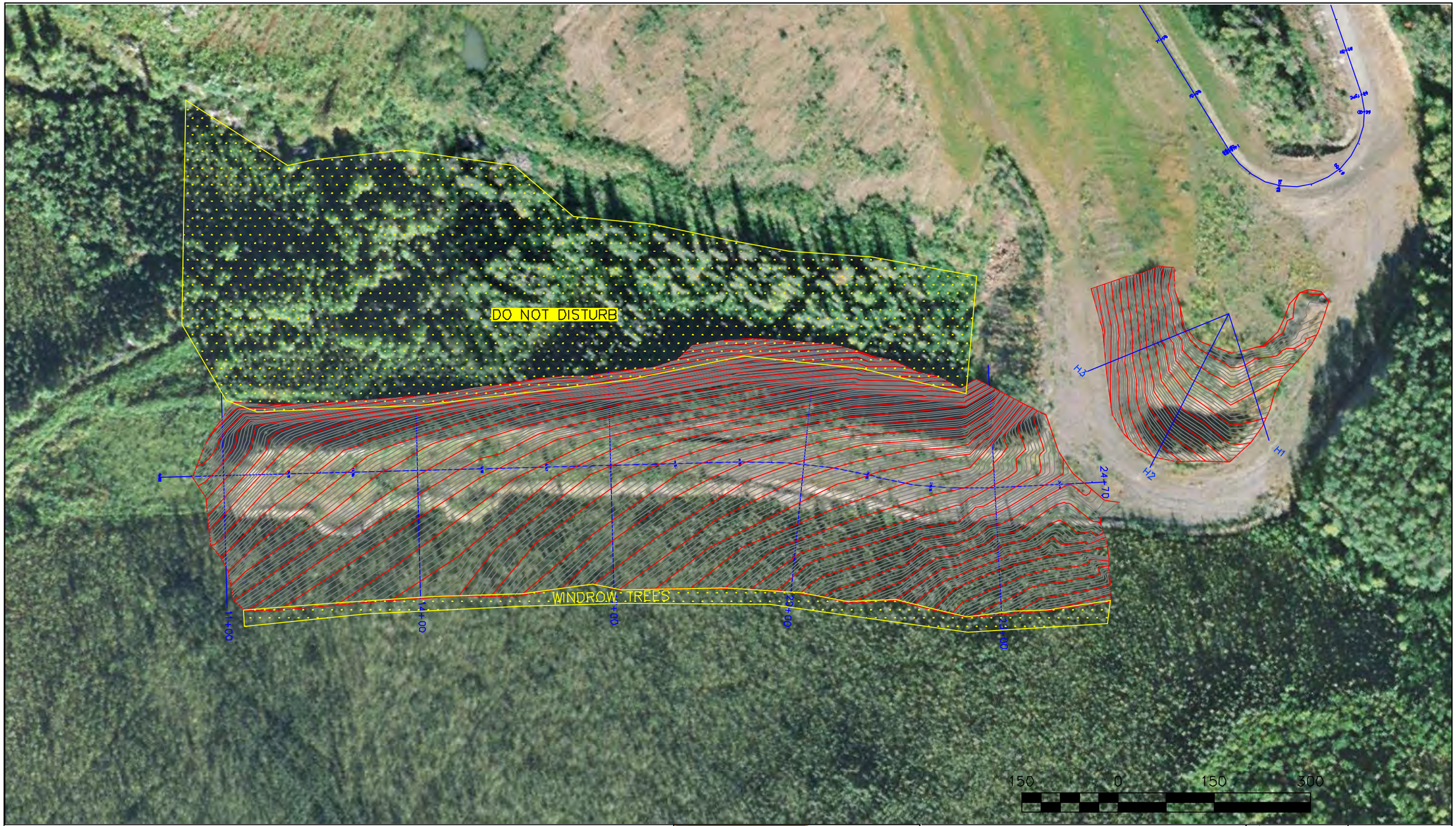

COMMENTS;

REMOVE ALL EVIDENCE OF ROAD & CONTOUR TO HILLSIDE

CUT = 51,000 CY – FILL 58,000 CY

TREE REMOVAL AND WINDROW = 4.5 ACRES

APPROX. TOPSOIL @ 1' = 7,200 CY

KINROSS Fort Knox

Merit

APPROVAL DRAFT DATE

USKH

TRUE NORTH

2012 RECLAIMATION

EAST SHEPARD DUMP

SCALE 1" = 150'	SIZE TABLOID/ANSI B
DRAWN BY S.DENNY	DATE APRIL 19 2012
	MAY 17 2012
DRAWING NUMBER TN-2012-04-004	REV 01

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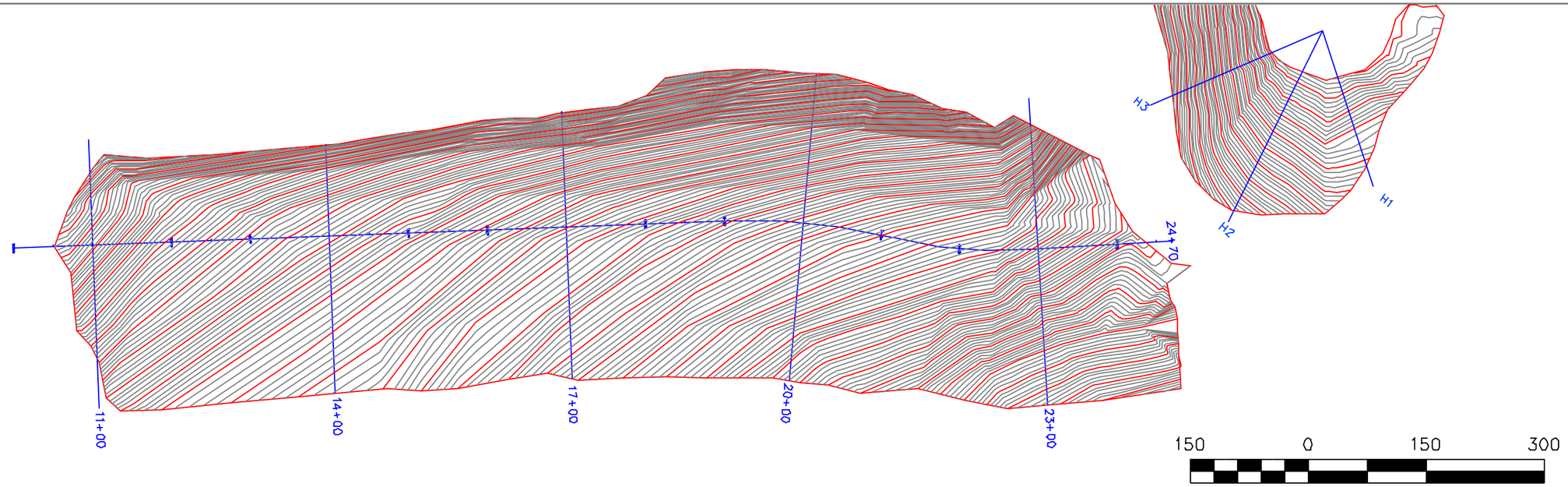

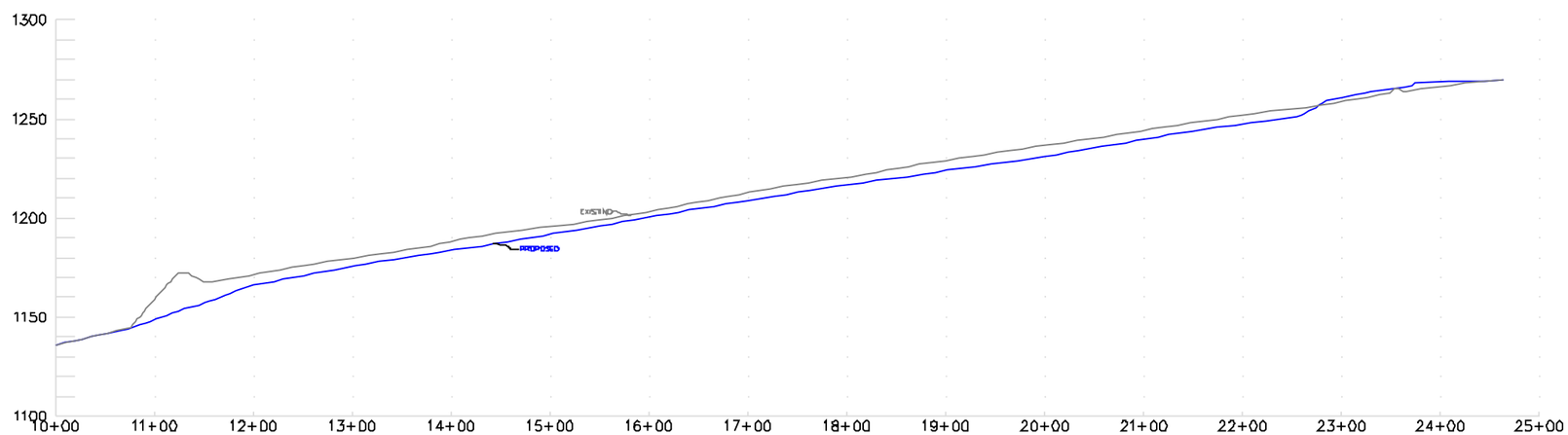

COMMENTS:

KINROSS Fort Knox

Merit

APPROVAL DRAFT DATE

USKH

TRUE NORTH

2012 RECLAIMATION
EAST SHEPARD DUMP
PROFILE

SCALE 1" = 150'

SIZE TABLOID/ANSI B

DRAWN BY S.DENNY

DATE APRIL 19 2012

DRAWING NUMBER TN-2012-04-005

REV 00

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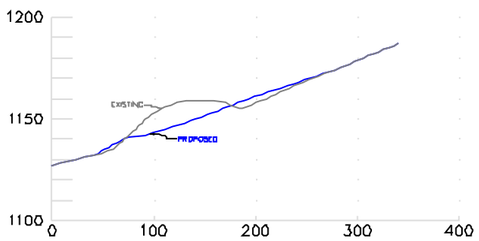

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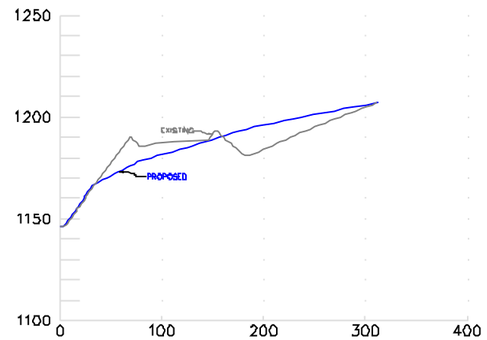

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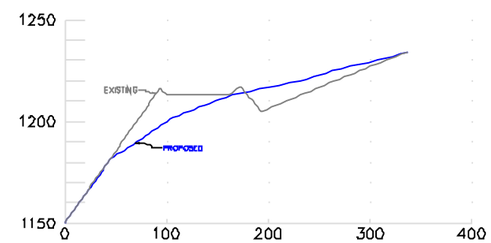

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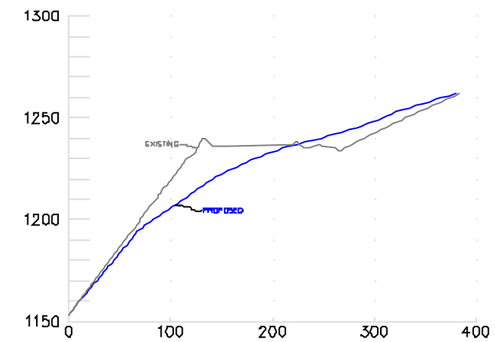

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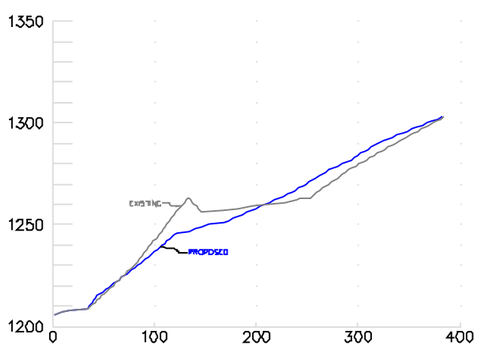

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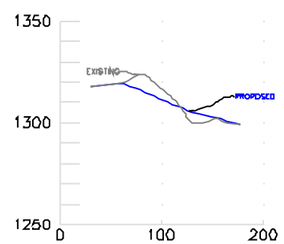

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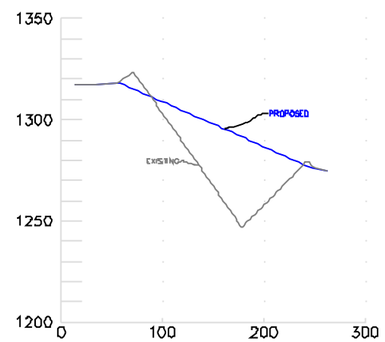

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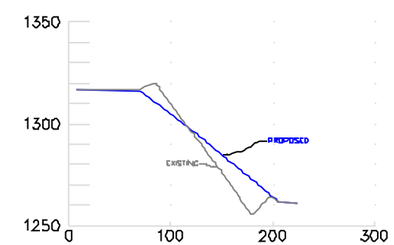

COMMENTS;

KINROSS Fort Knox

Merit

APPROVAL DRAFT DATE

USKH

TRUE NORTH
2012 RECLAIMATION
EAST SHEPARD DUMP
CROSS SECTIONS

SCALE 1" = 150'	SIZE TABLOID/ANSI B
DRAWN BY S.DENNY	DATE APRIL 19 2012
DRAWING NUMBER TN-2012-04-006	REV 00

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COMMENTS:

GRADE AND FILL BOREHOLES
APPROX. 2 ACRES

KINROSS Fort Knox

Merit

APPROVAL DRAFT DATE

USKH

TRUE NORTH
2012 RECLAIMATION
CENTRAL PIT

SCALE 1" = 150'	SIZE TABLOID/ANSI B
DRAWN BY S.DENNY	DATE APRIL 19 2012
DRAWING NUMBER TN-2012-04-007	REV 00

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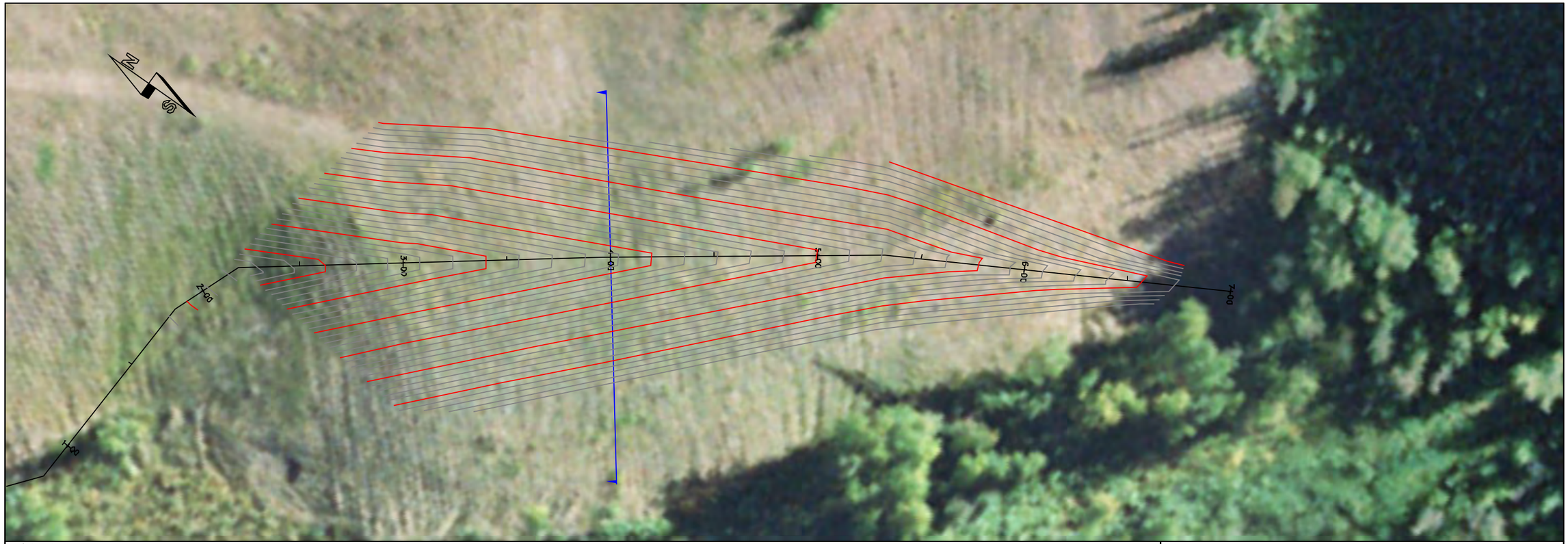

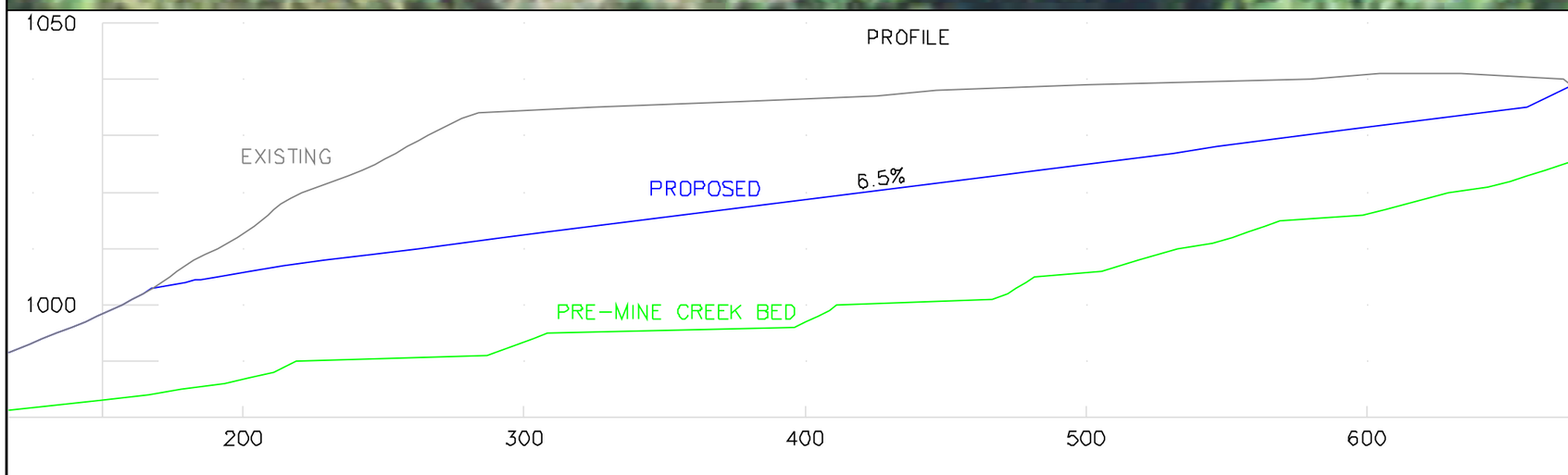

COMMENTS:

ESTABLISH DRAINAGE ALONG PRE-MINE CREEK ROUTE
CUT = 13,300 CY - FILL 13,300 CY
SALVAGE 6" TO 15" ROCK FOR RIP RAP TO BE PLACED ON WEST SLOPE
SPREAD FILL TO THE NORTHEAST

KINROSS Fort Knox

Merit

APPROVAL DRAFT DATE

USKH

TRUE NORTH
2012 RECLAIMATION
SPRUCE CREEK

SCALE 1" = 50'	SIZE TABLOID/ANSI B
DRAWN BY S.DENNY	DATE APRIL 23 2012
	APRIL 25 2012
CHANGED DITCH BOTTOM ELEVATION	
DRAWING NUMBER TN-2012-04-008	REV 01

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COMMENTS:

REPAIR APPROX. 750' OF EXISTING TRAIL
FOR TRUCK ACCESS TO DECOMISSION WELLS

KINROSS Fort Knox

Merit

APPROVAL DRAFT DATE

USKH

TRUE NORTH
2012 RECLAIMATION
MONITOR WELL ACCESS-1

SCALE 1" = 200'	SIZE TABLOID/ANSI B
DRAWN BY S.DENNY	DATE APRIL 23 2012
	MAY 17 2012
DRAWING NUMBER TN-2012-04-009	REV 01

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COMMENTS;

KINROSS Fort Knox

Merit

APPROVAL DRAFT DATE

USKH

TRUE NORTH
2012 RECLAIMATION
MONITOR WELL ACCESS-2

SCALE 1" = 300'	SIZE TABLOID/ANSI B
DRAWN BY S.DENNY	DATE APRIL 23 2012
DRAWING NUMBER TN-2012-04-010	REV 00

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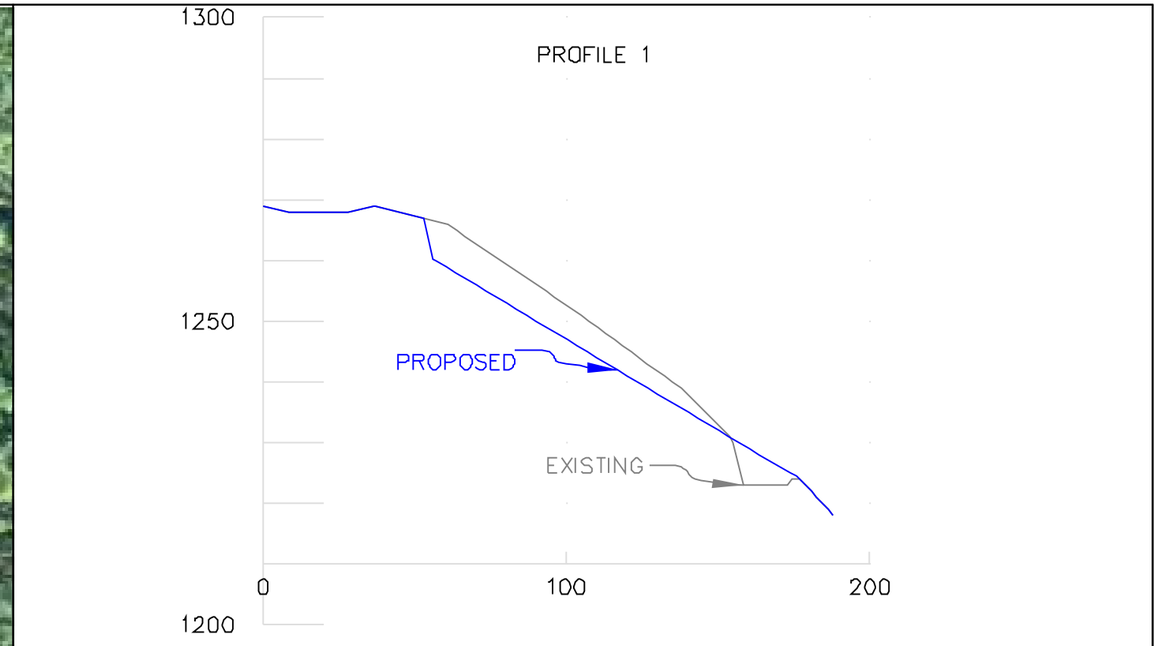
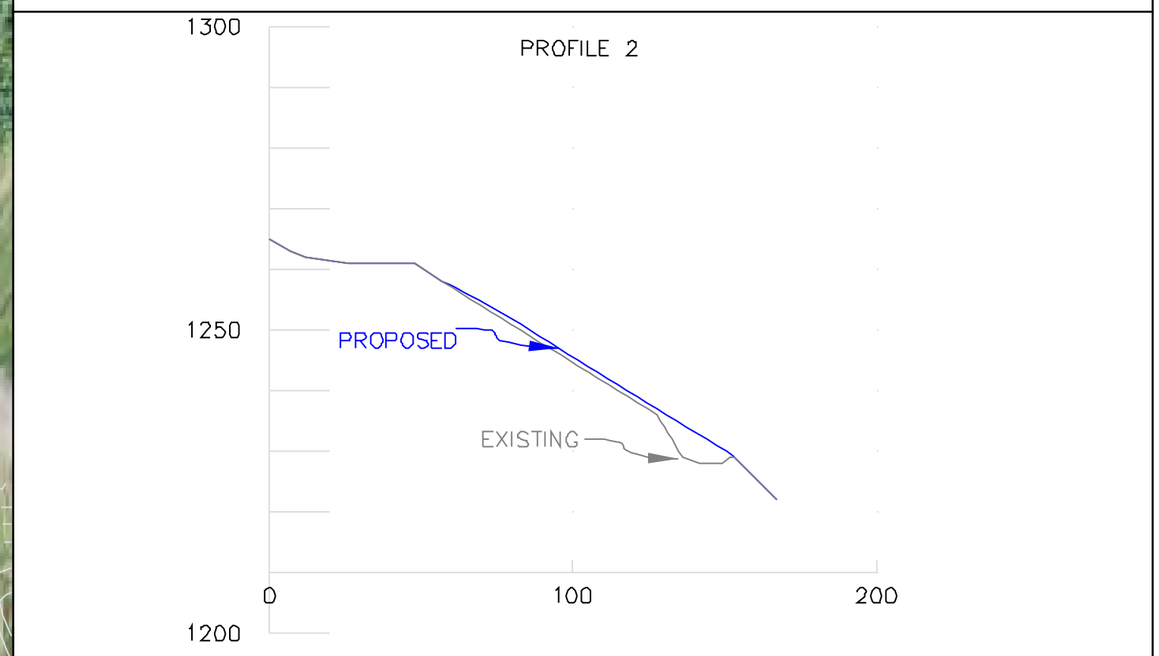




COMMENTS;

REMOVE LOWER ROAD BY SPREADING MATERIAL FROM ABOVE, BLEND TO MATCH CONTOURS

APPROX. 700-750'

APPROX. 2,000 CY

KINROSS Fort Knox

Merit

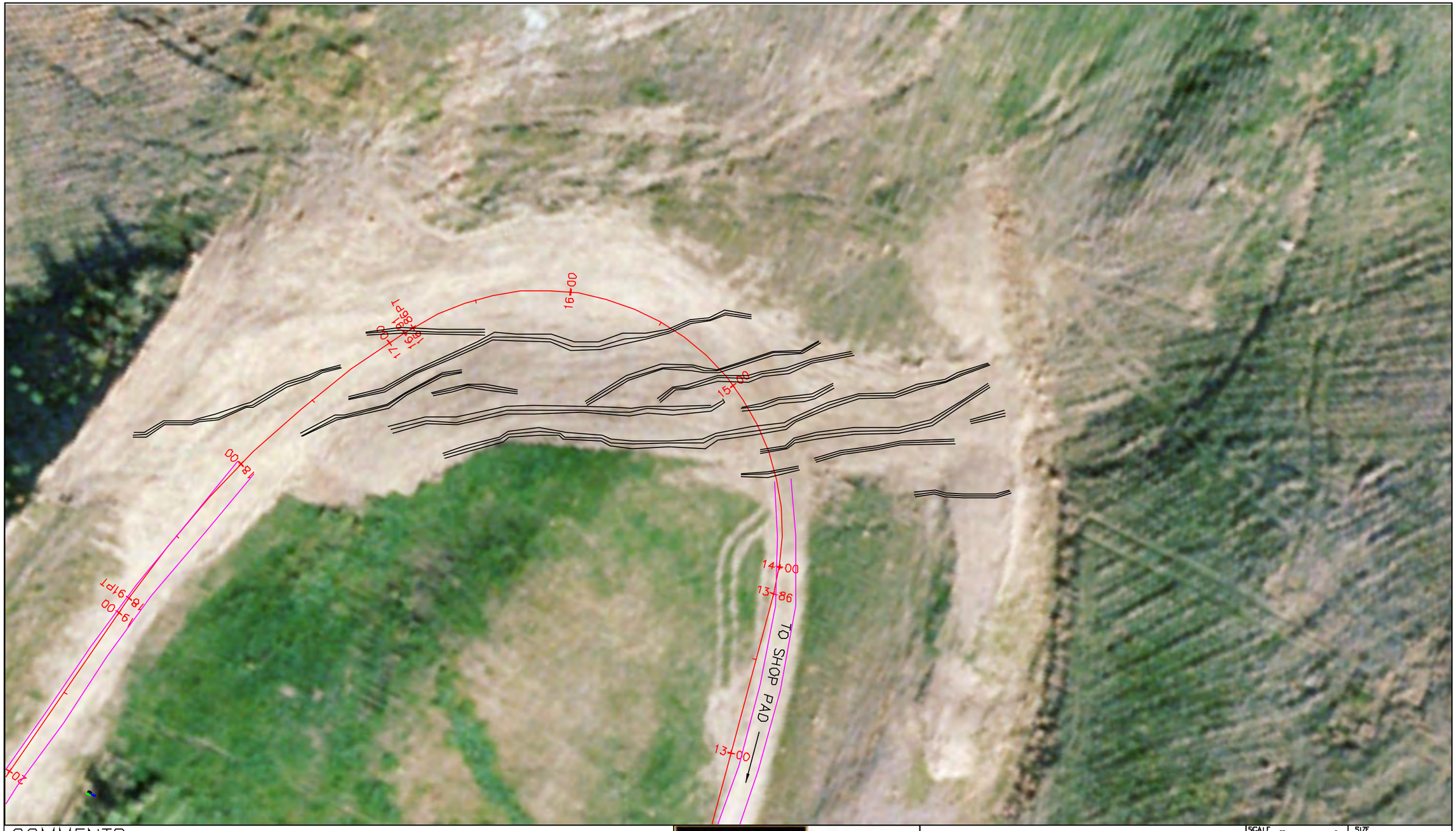
APPROVAL DRAFT DATE

USKH

TRUE NORTH
2012 RECLAIMATION
NORTH SHEPARD DUMP

SCALE 1" = 300'	SIZE TABLOID/ANSI B
DRAWN BY S.DENNY	DATE MAY 18 2012
DRAWING NUMBER TN-2012-05-001	REV 00

C:\JOBS\Fort Knox\dwgs\Working dwgs\2012\TRUE NORTH\2012 TRUE NORTH MASTER.dwg, 5/18/2012 9:59:41 AM, LandscapeTabloidANSIB



COMMENTS:

RIP AND REGRADE CRACKS, BLEND TO EXISTING CONTOURS
APPROX. 3500 SY

KINROSS Fort Knox

Merit

APPROVAL DRAFT DATE

USKH

TRUE NORTH
2012 RECLAIMATION
ZEPPLIN/HINDENBURG
WASTE ROCK DUMP

SCALE 1" = 50'	SIZE TABLOID/ANSI B
DRAWN BY S.DENNY	DATE APRIL 23 2012
DRAWING NUMBER TN-2012-05-002	REV 00

C:\JOBS\Fort Knox\Kwgs\Working dwgs\2012\2.TRUE NORTH\2012.2.TRUE NORTH MASTER.dwg, 5/18/2012 2:01:42 PM, Landscape Tabloid ANSI B

Appendix D

True North RS 2477
RST 1932 - Little Eldorado Road
Date: 05/03/2012

Notes:

Original Portions of Trails to be Rerouted

Final Trail System

Connector Trail to be Constructed

N

0 1000' 1500' 2000'

"= 1000'