Example Alternatives for Closure of Anvil Range Mining Complex

ATTACHMENTS

Prepared for

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on behalf of the

Faro Mine Closure Planning Office

Prepared by

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List of Attachments

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(In progress)
Attachment B: Preliminary Soil Cover Designs
Attachment C: Results of Risk Rating Workshops
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Attachment A

Annotated Bibliography of Project Reports

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Attachment B
Preliminary Soil Cover Designs

1 Preliminary Designs of Soil Covers

1.1 Introduction

Most of the example alternatives for closure of the Anvil Range Complex include some form of soil cover over waste rock piles, sulphide cells, low grade ore, oxide fines or tailings. The purpose of this report is to describe the reasoning used to select the cover designs and make estimates of cover performance for the assessment of example alternatives.

The designs and performance estimates presented herein are preliminary only. Investigations related to soil covers for the Anvil Range waste rock and tailings are expected to continue for several seasons before definitive cover designs are put forward. The ongoing investigations are presented in more detail in SRK (2006a), SRK (2006b) and SRK (2005).

The appendices to this report also present background information from earlier studies that have not been reported elsewhere:

- Appendix 1 reviews the cover studies that were completed at the site prior to the Interim Receivership;
- Appendix 2 presents results of laboratory and field tests, completed in 2003, to characterize the locally available soil materials that might be used for cover construction; and
- Appendix 3 presents results of preliminary modeling, completed in 2004, to estimate the range of infiltration rates that could be achieved by covers constructed from the locally available materials.

2 Overview of Cover Types and Functions

2.1 Cover Types

Table 1 lists and briefly describes the major types of soil covers. SRK (2004) and Rykaart et al. (2006) present a survey of soil covers constructed at minesites around the world, and show that there will be exceptions to any simple categorization. The reason is that soil cover design and construction is highly dependent on both the local climate and the locally available materials. The categorization in Table 1 captures the range of cover possibilities for the Anvil Range site.

The "no cover" option is included as a base case, and because it was under consideration for the most inert waste rock. "Rudimentary covers" are assumed to be the minimum thickness of soil needed for reclamation. They would also serve to minimize dust release and prevent direct contact of animals with the waste. The "low infiltration" and "very low infiltration" covers are designed to limit the amount of water that enters the underlying tailings or rock, and thereby reduce the amount of contaminated water that ultimately needs to be captured and treated. There are several types within each category. The distinction between "low infiltration" and "very low infiltration" is arbitrary, but is included to allow for the possibility that higher strength contaminant sources might warrant covers that allow much less infiltration.

The distinction between "barrier" covers and "store and release" covers is important. Barrier covers are what most people think of when they picture a low infiltration or very low infiltration cover. They incorporate a low permeability "barrier" layer that simply blocks the flow of water. In dry areas such as the Yukon, the permeability of the barrier layer must be very low, as can be illustrated by a simple calculation. If the mean annual precipitation of about 380 mm/year is assumed to fall uniformly throughout the year, the rate of precipitation would be about 1x10-6 cm/s. To be an effective barrier to infiltration under those conditions, a soil layer would need to have a permeability much lower than 1x10-6 cm/s. Such low permeabilities are achievable with the till soils available in the Anvil Range area, but require heavy compaction at carefully controlled moisture contents.

Store and release covers represent a very different system. They limit infiltration by acting as sponges that hold the water until it can be removed by evaporation and/or uptake by plant roots. The evaporated water is lost directly to the atmosphere. The water taken up by plant roots is either consumed in the plant or makes its way back to the atmosphere by a process known as evapotranspiration. In all cases, the water is no longer available to infiltrate to the underlying tailings or rock. Store and release covers are in common use in dry climates, and the science to test the store and release capacity of soil materials is well developed (largely from studies of agricultural irrigation). Testing of the till soils available in the Anvil Range area shows that they can retain up to 180 mm of water in each metre of soil. That means that roughly 2 m of such soil would be capable of storing an entire year's worth of precipitation. However, in practice, store and release covers are designed only to store seasonal peak flows, meaning that thinner layers would be feasible.

The table does not attempt to list many requirements that are common to all types of soil covers. These include:

1. Identification and development of borrow sources;
2. Development of haul roads;
3. Re-grading of steeply sloping areas to allow machine access and effective compaction, and re-grading of flat or "bubble dump" surfaces to promote positive drainage;
4. Excavating, loading, hauling, dumping, spreading and compacting the soil materials, with intensive field quality assurance and control;
5. Reclamation of borrow sources and haul roads;
6. Re-vegetation of the cover surface by seeding or planting and fertilization, with maintenance applications of additional seed and fertilizer until a natural succession is established;
7. Construction of ditches and/or swales to promote the shedding of surface water, with heavy maintenance and suspended sediment controls in the first several years and likely some level of annual maintenance over the long term;
8. Repair of erosion-damaged areas annually for the first few years after construction, and after extreme climate or seismic events in the long term; and
9. Annual inspections until stable conditions are established.

A further requirement specific to the low infiltration and very low infiltration covers is the completion of field investigations. As discussed in the references cited in Section 1, field tests of covers have been initiated. However, several additional seasons of monitoring, followed by detailed analysis of the data, will be required before final designs are possible.

Table 1: Types of Soil Cover

Category	Description
No Cover	Un-covered rock or tailings surface allowed to weather and, if possible, re-vegetate naturally.
Rudimentary Covers	Cover rock or tailings with the minimum thickness of soil needed to allow plant growth.
Low Infiltration Covers	Cover rock or tailings with layers of soil to significantly reduce the amount of water entering the surface of the waste. Two major types: • "Barrier" covers incorporating a compacted, low permeability layer that acts to stop water flow. • "Store and release" covers incorporating a thick layer of soil that can hold water until it can be evaporated and/or taken up by plants.
Very Low Infiltration Covers	Cover rock or tailings with layers of soil and/or synthetic materials to minimize the amount of water entering the surface of the waste. The major types are: • Soil covers, including barrier covers as above but with a lower permeability layer, store and release covers as above but with thicker layers, and combination covers that have store and release layers above barrier layers. • Covers incorporating a plastic, clay-impregnated fabric, or bitumen-impregnated fabric liner as the very low permeability element, generally with layers of soil below and above.

2.2 Cover Functions

Table 2 presents a list of the functions that might be required of soil covers at the Anvil Range site, and assessments of the extent to which each cover type can achieve each function. The list of functions was compiled from previous discussions with the project team and reviewers. The assessments were based on a combination of experience elsewhere and consideration of the site climate and soil properties. Most of the assessments are straightforward, but some require explanation:

- Revegetation of surface. All of the covers would allow some form of re-vegetation, (and in fact require it per item 6 in Section 2), but the thicker covers would allow a greater diversity of vegetation types. Concerns about root penetration can also limit the types of vegetation that are allowed to colonize a cover. For example, thinner barrier type covers and covers incorporating geosynthetics have a requirement for annual or bi-annual removal of deeply rooting tree species.
- Contamination of surface runoff. All of the covers include swales and ditches (see item 7 above) to assist water to run over the surface without becoming contaminated by the underlying waste. The extent to which the runoff can be kept clean is mostly dependent on those surface swales and ditches, and the associated maintenance (see item 8). However, the thinner rudimentary covers are the most likely to be eroded and the most likely to experience an upward flux of contaminants, and are therefore the least likely to provide clean runoff.
- Infiltration and contaminated seepage. Even rudimentary covers will promote runoff and uptake of water by vegetation, and thereby will reduce the infiltration of water into the underlying waste. However, the low infiltration and very low infiltration covers are designed specifically to reduce infiltration and will therefore be much more effective in that regard.
- Oxygen. Rudimentary covers can partially limit the flow of air through waste rock, and thereby restrict the oxidation reactions that lead to the release of contaminants. Thicker store and release or barrier covers will be more effective in that regard. Barrier covers that include a water saturated layer also have the potential to slow the diffusion of oxygen into the underlying waste, further limiting oxidation and acid generation.
- Material variability. The thicker covers that rely on either store and release or synthetic low permeability elements are likely to retain their functionality even when the soil materials are variable. Rudimentary covers are likely to be very sensitive to material variability, because the thin construction will spread any poor quality material over large areas. Covers that incorporate low permeability soil layers are also very sensitive to material variability, because both variations in grain size and moisture content can strongly affect a soil layer's "as built" permeability.
- Construction quality. Concerns about construction quality go hand in hand with concerns about material variability. However, some cover types can be sensitive to changes in construction quality, even when the material is perfect. Store and release covers generally have limited compaction requirements, and are therefore more likely to function even when construction quality is poor (within reason). Rudimentary covers, on the other hand, are likely to be very

sensitive to failures to control layer thickness and/or compaction. Both construction of low permeability soil layers and installation of geosynthetic liners require a high level of quality control, so covers incorporating such layers are sensitive to poor construction quality.

- Erosion. The primary defenses against erosion are vegetation and surface water management, which would be required for all of the cover types (see items 6, 7 and 8 above). However, the thinner rudimentary covers have less soil to lose, and are therefore more likely to be compromised by erosion. Covers with thicker layers have the added benefit that they can eventually self-armour, meaning that wind and water will wash away the finest surficial materials and leave behind a sand and gravel mixture that makes the remaining surface more resistant to erosion.
- Frost action. The term "frost action" covers many different phenomena arising from seasonal freezing of the soil. Soil freezing is most strong near the surface, and therefore the thinner rudimentary covers will be the most likely to be damaged by any of these processes. Freezing and thawing of compacted soils is known to significantly decrease compaction and increase permeability, meaning that covers incorporating low permeability soil layers could also be compromised by frost action. Covers incorporating geosynthetic layers are likely to be retain their low permeability even after frost action, but could be subject to frost-induced heaving and solifluction. The thicker store and release covers, which do not rely on heavy compaction and do not incorporate sharply different materials, are the most likely to retain their functionality under freeze-thaw conditions.
- Root penetration. Root penetration has two effects on covers. First the root holes provide a conduit for water to get through the cover. Second, when wind or rot causes some types of trees to fall, large root balls can be pulled out and leave wide holes in the cover. The thinner rudimentary covers are the most sensitive to both effects. Covers with low permeability soil layers are most susceptible to the former effect, but covers with low permeability geosynthetic layers are also susceptible to root penetration. Covers with store and release layers generally benefit from the presence of roots, which act to draw the stored water out of the cover, but they are also susceptible to damage from uprooting.

Table 2: Cover Functions

Cover Type		Prevents release of contaminated dust	Prevents direct contact by animals	Allows re-vegetation of surface	Reduces contamination of surface runoff	Reduces infiltration & contaminated seepage	Limits oxygen entry & slows acid generation	Retains functionality in event of:				
								Material variability	Poor construction quality	Erosion	Frost action	Root penetration
No Cover		No	No	No	No	No	No	n/a	n/a	No	n/a	n/a
Rudimentary Covers		Yes	Yes	Yes (+)	Yes (-)	Yes (-)	Yes (-)	No	No	No	No	No
Low Infiltration Covers	Barrier	Yes	Yes	Yes (+)	Yes (++)	Yes (++)	Yes (++)	No	No	Yes	No	No
	Store & Release	Yes	Yes	Yes (+++)	Yes (++)	Yes (++)	Yes (+)	Yes	Yes	Yes	Yes (++)	Yes (+)
Very Low Infiltration Covers	Soil only barrier	Yes	Yes	Yes (+++)	Yes (++)	Yes (+++)	Yes (++)	No	No	Yes	No	No
	Soil only store & release	Yes	Yes	Yes (+++)	Yes (++)	Yes (+++)	Yes (+)	Yes	Yes	Yes	Yes (++)	Yes (+)
	Soil only combination	Yes	Yes	Yes (+++)	Yes (++)	Yes (+++)	Yes (++)	No	No	Yes	Yes (+/-)	Yes (+/-)
	Soil and geosynthetic	Yes	Yes	Yes (+)	Yes (++)	Yes (+++)	Yes (++)	Yes	No	Yes	Yes (+/-)	Yes(+/-)

3 Selection of Cover Types for Example Alternatives

3.1 Covers for Mine Areas

The example alternatives for closure of the Faro Mine area and the Vangorda/Grum Mine area were intended to cover a wide range of possibilities. Not surprisingly therefore, rudimentary covers, low infiltration covers and very low infiltration covers are all included. Tables 3 and 4 show the selections for each example alternative.

Where low infiltration covers are required, store and release covers were chosen over barrier covers. The reasons are largely apparent in Table 2, which shows that the store and release covers will be more robust against material variability, poor construction quality, frost action and root penetration. The borrow material studies to date also indicate an abundance of material suitable for use in store and release covers, but less material suitable for low permeability barriers.

Where very low infiltration covers are required, the choice was for either combination soil covers or soil and geosynthetic covers. It was agreed that both forms of very low permeability cover could be constructed, but that both methods have associated questions. For combination soil covers, it is not clear how thick the upper layer would need to be to protect the low permeability layer from frost action. For soil and geosynthetic covers, it is uncertain whether the use of the synthetic material with a finite life span would be acceptable to stakeholders. The decision was made to include both types in the example alternatives, so that these questions could receive further discussion by a larger group.

Table 3: Cover Types for Faro Mine Example Alternatives

Component	Alternative 1 Flow-Through Pit	Alternative 2 Upgrade Faro Creek Diversion	Alternative 3 Minimize Construction	Alternative 4 Minimize Water Treatment
Oxide Fines/ Low-Grade Ore	Very low infiltration cover, soil + geosynthetic	Very low infiltration cover, soil + geosynthetic	Rudimentary cover	Relocated to pit
Sulphide Cells	Low infiltration cover, store & release	Low infiltration cover, store & release	Rudimentary cover	Very low infiltration cover, combination soil
Faro Valley Dump	Rudimentary cover	Rudimentary cover	Rudimentary cover	Relocated to sulphide cells
Other Waste Rock	Rudimentary cover	Rudimentary cover	Rudimentary cover	Low infiltration cover, store & release

Table 4: Cover types for Vangorda/Grum Example Alternatives

Component	Alternative 1 Backfill Vangorda Pit	Alternative 2 Stabilize in Place	Alternative 3 Minimize Construction	Alternative 4 Minimize Water Treatment
Vangorda Waste Rock	Relocated to pit, low infiltration cover, store & release	Low infiltration cover, store & release	Rudimentary cover	Relocated to pit, low infiltration cover, store & release
Grum Waste	Rudimentary cover	Rudimentary cover	Rudimentary cover	Low infiltration cover, store & release
Grum Sulphide Cell	Low infiltration cover, store & release	Low infiltration cover, store & release	Rudimentary cover	Very low infiltration cover, combination soil
Ore Transfer Pad	Rudimentary cover	Rudimentary cover	Rudimentary cover	Rudimentary cover

3.2 Tailings Covers

The primary distinction among the Tailings Area example alternatives is whether the tailings are relocated. As shown in Table 5, tailings that remain in place under Example Alternatives 2 and 3 would be covered with a low infiltration cover. Under Example Alternative 4, the tailings surface would be treated to reduce dust emissions but would otherwise be left uncovered.

Table 5: Cover Types for Tailings Example Alternatives

Component	Alternative 1 Complete Relocation	Alternative 2 Stabilize in Place	Alternative 3 Partial Relocation	Alternative 4 Minimize Construction
Intermediate Tailings	Relocated to Pit	Low infiltration cover, store & release	Relocated to Pit	No cover
Original and Secondary Tailings			Low infiltration cover, store & release	

4 Design and Performance Assumptions

Long term field studies are currently underway, and will provide the basis for definitive cover designs and performance estimates. In the interim, it is necessary to make judicious assumptions about the design and performance of each type of cover, specifically:

- The material to be used;
- The thickness of material needed; and
- The resulting effect on infiltration (which affects both water quality and water treatment costs).

The following paragraphs present the design and performance assumptions recommended for use in the comparison of example alternatives. All of the assumptions are based on the best current information, but they will be subject to review as results of the long-term studies become available.

The cover types share many common requirements, as listed in Section 2. Because they are common to all of the cover types, those requirements are not discussed further herein. However, they were taken into account in estimating the construction and maintenance costs associated with each example alternative.

4.1 Mine Areas

4.1.1 Rudimentary Covers

Material

The logical source of material for construction of rudimentary covers are the abundant till deposits on the Vangorda/Grum side of the property. Laboratory tests of the till grain size distribution, compaction, permeability and soil water characteristic curves, as well as field assessments of the (previously constructed) till cover on the Vangorda waste rock dump, are reported in Appendix 2:

- The till is somewhat variable and can be classified as either sandy-clay (CL) or clayey-sand (SC) with a plasticity index between 2 and 10. Some tested till samples have no plasticity and classify as a silty-sand (SM).
- The till is generally well-graded with the gravel content less than 20%. Occasional well-rounded cobbles and boulders are found within the till matrix.
- Laboratory compaction testing shows a saturated hydraulic conductivity of between 2.5 x 10-6 cm/sec and 1.1 x 10-7 cm/sec at 95% of Standard Proctor Density.
- Field permeability tests on the Vangorda cover indicate saturated hydraulic conductivities between 2.5 x 10-4 and 1.9 x 10-5 cm/sec, at densities between 80 and 82% of Standard Proctor Density. The measured densities are significantly lower than they were immediately after construction, indicating the strong effect of seasonal freeze-thaw and wet-dry cycles.

- The capacity of the till to store and release water, estimated as the difference between the volumetric moisture contents at 33 kPa suction (i.e. field capacity) and at 1500 kPa (the wilting point of common plants), ranges from 0.15 to 0.18. In other words, the till can store from 150 to 180 mm of water in each meter of thickness.

The borrow source investigations discussed in SRK (2005) indicate that it would be necessary to haul the till a relatively long distance for use in the Faro Mine area, but no better local sources have been identified.

Design Thickness

To meet the objective of a rudimentary cover, the thickness of the till layer only needs to be sufficient to allow plant growth. Layers as thin as 0.2 m have been used for that purpose elsewhere. However, such thin layers are difficult to place uniformly over coarse surfaces. A thickness of 0.5 m was therefore assumed for the rudimentary cover in the example alternatives. The till would need to be lightly compacted to keep it in place during construction and to minimize erosion until vegetation is established.

Estimated Infiltration Rate

The rudimentary covers would be expected to reduce infiltration of water into the underlying waste in two ways. First, the cover material would act as a sponge to store water until it could be taken up and evapotranspired by plants (i.e. a store and release effect). The 0.5 m of lightly compacted till would be able to store about 75 mm of water, or about 20% of Mean Annual Precipitation (MAP). Second, the surface grading and water management ditches would promote runoff. Currently, there is very little runoff from the waste rock surfaces, so any increase would represent an improvement.

Studies of the surface water balance of the Faro, Grum and Vangorda waste rock piles during the 2004-05 water year concluded that approximately 55% of precipitation ended up infiltrating into the uncovered dumps. However, long-term meteorological records from the Faro airport indicate that the 2004-05 water year was exceptionally wet. Total precipitation at the airport was 420 mm, which is the highest in the 28-year record and is 32% above MAP. In a more normal year, one would expect lower infiltration rates. The long term water balance and contaminant loading predictions for the site therefore assume that a typical rate of infiltration into uncovered waste rock piles will be about 45% of MAP. (Janowicz et al 2006, SRK 2006c).

Starting with the estimated infiltration of 45% of MAP into uncovered dumps, and allowing for increased evapotranspiration and runoff, a reasonable estimate of infiltration through the rudimentary covers is from about 15% to about 25% of MAP. That range was adopted for sensitivity analysis of the example alternatives. The middle of the range, 20% of MAP, was adopted as the base case assumption.

4.1.2 Low Infiltration Covers

Material

The Vangorda/Grum till deposits are the logical source of material for the construction of low infiltration covers. The properties of the till are discussed in Appendix 2 and summarized in the preceding section.

Design Thickness

Section 2 above defines a low infiltration cover as one that "significantly reduces" infiltration. Section 3 concludes that store-and-release covers are best suited to achieve that objective in the Anvil Range area.

As noted above, the till is capable of storing and releasing from 150 to 180 mm of water in each metre of thickness. Total cover thicknesses in the range of 1-2 m would therefore be capable of storing and releasing roughly from 50% to 90% of MAP, which is the typical range of effective store and release covers.

A thickness of 2.0 m was assumed for the preliminary design. In addition to being in the range needed for effective store and release of water, the 2.0 m design would allow for:

- Construction in at least four layers, which in turn allows for good quality control and reduces any impact of material variability;
- Compaction of the lowest 0.5 m layer to provide a "barrier" function; and
- Some protection of the compacted layer from freeze-thaw effects.

Regarding the last point, it is recognized that the 2.0 m depth is not sufficient to offer complete protection from freeze-thaw effects. However, it should allow the barrier layer to remain reasonably compact during the first several years after construction. By the time significant degradation of the barrier occurs, vegetation will be well established and the store and release processes will be fully operative.

Estimated Infiltration Rate

As noted above, the estimated rate of infiltration into uncovered dumps is 45% of MAP. The 2.0 m thick till covers would increase surface runoff and provide strong store and release effects. Infiltration rates through the covers would be expected to be less than 10% of MAP.

The complexities of store and release processes mean that more precise estimates of cover performance need to be based on numerical modeling. The currently ongoing field tests are expected to provide the data necessary to calibrate such models, but only after several more seasons of monitoring.

Scoping level numerical modeling, based on the material properties measured in laboratory and field tests carried out in 2003, is reported in Appendix 3. The results indicate that till covers with a thickness of 2.0 m would allow infiltration rates of about 5% of MAP. Given the limitations of models that have not been calibrated with extensive field tests that estimate needs to be treated cautiously. However, a number of conservative assumptions were made in the scoping level modeling, for example the effects of vegetation and frozen layers of soil were not included.

It therefore seems reasonable to use the 5% MAP estimate as a base case assumption, but to include a wider range in sensitivity analyses. The range selected for sensitivity analyses was 3% to 8% of MAP.

4.1.3 Very Low Infiltration Covers

Material

The simplest method to construct a very low infiltration cover is to employ a geosynthetic material such as a high density polyethylene (HDPE) liner. It is well proven that such materials, if placed and seamed with adequate quality control, can be essentially impervious.

However, there are many significant concerns about the use of geosynthetics, including:

- High cost;
- Quality control difficulties associated with placing large areas of geosynthetic liner under the conditions typical of the Anvil Range site;
- Instability on sloped surfaces;
- Finite longevity; and
- A preference expressed by local first nations on other mine closure projects to avoid heavy reliance on "plastic" materials.

Therefore, an alternative type of very low infiltration cover, consisting only of till, was also considered.

Design Thickness

The combination soil and geosynthetic cover was assumed to require geotextile protection layers above and below the HDPE, a thin 0.3 m layer of compacted till subgrade below the geosynthetics, and a 1.0 m layer of till above the geosynthetics to support vegetation. These dimensions are in the range of practice elsewhere.

The soil only very low infiltration cover was assumed to consist of a 1.0 m thick layer of compacted till, overlain by 1.5 m of lightly compacted till. These dimensions were chosen arbitrarily, with the intent being only that this cover would be significantly thicker than the low infiltration cover. The 1.0 m compacted layer is intended to be a more effective barrier than the corresponding 0.5 m layer in the low infiltration cover.

Estimated Infiltration Rates

Section 2 above defines a very low infiltration cover as one that "minimizes" infiltration. The combination of soil and geosynthetic can reasonably be expected to do that. An infiltration rate of 0.5% of MAP was assumed for the combination soil and geosynthetic covers. Studies elsewhere suggest that that estimate will be conservative, even for the case of geosynthetic liners placed with poor quality control.

An infiltration rate of 2% of MAP was assumed for the very low infiltration soil cover. That estimate was arbitrarily selected to be significantly lower than the 5% MAP assumption adopted for the low infiltration covers, but still higher than the 0.5% MAP estimate for the soil and geosynthetic covers.

4.2 Tailings Area

4.2.1 No Cover

The rate of infiltration into the uncovered tailings were estimated by two methods:

- Examination of the tailings porewater chemistry, and specifically the depth to which oxidation products had penetrated, led to estimated infiltration rates of 9% of MAP in fine tailings and 19% of MAP in coarse tailings.
- The scoping level numerical modeling discussed in Section 4.1.2 also included modeling of uncovered tailings, and provided estimated infiltration rates of 7% and 24% in fine and coarse tailings, respectively.

The good correlation between these two sets of estimates, developed in very different ways, is encouraging. The former estimates, which are based on field evidence, were adopted.

4.2.2 Waste Rock and Till

The scoping level numerical modeling of tailings cover variants indicated that very low infiltration rates could theoretically be obtained by some combinations of till and waste rock covers. However, those results required high proportions of the water to run off the cover surface. In the real world, construction difficulties and long-term settlement will make it difficult to ensure surface water will run off the tailing covers. It is therefore more reasonable to consider both the infiltration and the infiltration plus runoff estimates from the scoping level modeling, which ranged from a low of 5% of MAP to a high of roughly 20% of MAP.

That range also coincidentally brackets the range of infiltration estimates for the uncovered tailings. It is reasonable to assume that one requirement for the final design of the tailings covers will be that they not significantly increase infiltration. In other words, the covers will not be allowed to significantly increase either the contamination of the underlying aquifer or the cost of groundwater collection and treatment.

The range 5% to 20% MAP was therefore adopted for the sensitivity analyses of the tailings covers, and 10% of MAP was adopted as the base case estimate.

5 Summary

Table 6 summarizes the design and performance assumptions recommended for use in the assessment of example alternatives. As noted in Section 1, these recommendations are preliminary only, and subject to revision as further results become available from the ongoing field testing.

Table 6: Summary of Preliminary Design and Performance Assumptions

Cover Type	Design Assumptions	Assumed Infiltration Rate (%MAP)	
		Base Case Assumption	Range for Sensitivity Analyses
Rudimentary Covers	0.5 m lightly compacted till	20%	15% - 25%
Low Infiltration Covers	0.5 m compacted till overlain by 1.5 lightly compacted till	5%	3% - 8%
Very Low Infiltration Covers - Soil Only	1.0 m compacted till overlain by 1.5 m lightly compacted till	2%	n/a
Very Low Infiltration Covers - Soil and Geosynthetic	0.3 m till bedding layer, overlain by geotextile, HDPE geomembrane, geotextile and 1.0 m till cover layer	0.5%	n/a
Tailings Covers	0.5 m waste rock overlain by 1.5 m lightly compacted till	10%	5% - 20%

6 References

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1 ARMC Tailings Test Covers

Curragh Resources Inc. initiated a program of seven test plots on the Original Rose Creek tailings impoundment in the summer of 1987 and monitored them for five years (SRK, 1986). The purpose of these test plots was to test the effects of various cover types on Faro tailings, specifically their ability to inhibit acid generation in the tailings.

The test facility, illustrated in Photo 1, consisted of six test plots (see Figure 2) and one designated site within the old tailings adjacent to the test plots. Five different cover types were investigated including; (1) shallow water cover, (2) till cover, (3) unsaturated composite cover, (4) saturated composite cover, and an (5) organic cover. The sixth test plot was a control plot of uncovered tailings, and the seventh site was uncovered old (in-situ) tailings. Details of the construction of the test facility, baseline chemical composition of the tailings and annual monitoring results are documented in a number of reports.

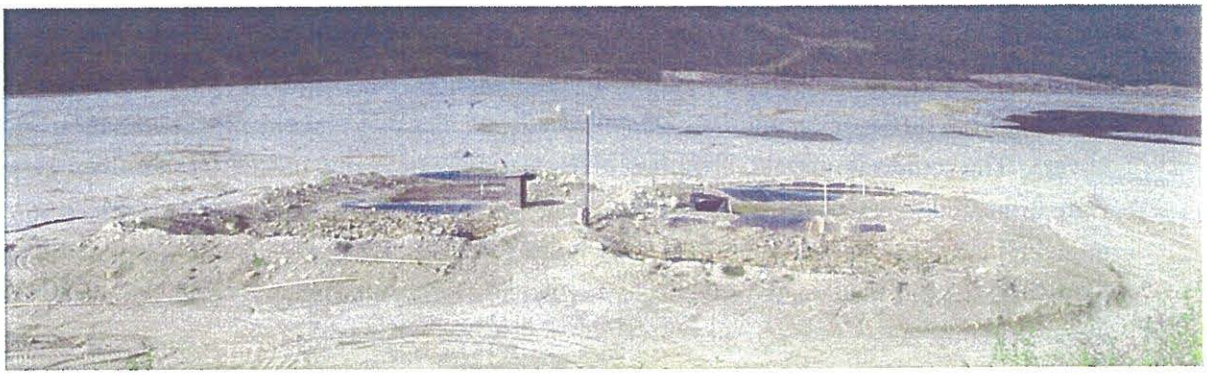


Photo 1: Tailings cover test facility on the Original impoundment of the Rose Creek tailings

The effectiveness of the test covers was measured by the covers effect on temperature and oxygen availability within the tailings mass. This in turn was used to estimate the effect of the cover on the rate of sulphide oxidation and acid generation within the tailings mass.

The experiment results confirmed that the different covers did affect the oxidation processes of the tailings mass. The tailings in each test plot were shown to be generating acid, however pore water chemistry confirmed that the test plots were oxidizing at different rates.

The cover test program was not entirely successful due to a number of instrumentation failures, and the fact that the test design caused a different thermal regime than in the actual tailings impoundment. Furthermore meteoric water infiltrating through the covers was not measured and this made interpretation of the pore water chemistry difficult. However, it could be deduced that the composite covers were useful in reducing acid generation and/or migration. A review of the oxidation products indicated that the composite covers showed the greatest limitation of oxidation.

The second most effective cover appeared to be the organic cover; however this was only in based on temperature control. Based on pore water chemistry the till cover appeared to be more effective than the organic cover. The till cover however had little effect on the temperature regime, therefore its affect on oxidation retardation is prescribed to oxygen control only.

Theoretically both low temperatures and low oxygen can limit oxidation. The composite covers were shown to significantly lower the underlying tailings temperature. The same was observed for the organic cover, although much more subdued than for the composite covers. The extent to which oxidation retardation was caused by temperature control as opposed to oxygen diffusion is not known.

Although it could be deduced that the composite covers were effective in reducing the oxidation rate in the underlying tailings, the long term effects could not be determined. After the five year test period, it was recommended that the cover monitoring be extended; however, this was never carried out.

Nicholson et al. (1996) documents the results of a numerical model which was used to estimate the release of zinc and other sulphide oxidation products from the Rose Creek tailings. The purpose of this modeling was to compare the relative differences in the water quality of the Rose Creek resulting from different decommissioning alternatives. However one result is pertinent to the test covers. The composite covers, identified in the test program as the most effective cover system, were estimated to have a diffusion coefficient of 1 x 10^{-8} m^2/s over the long term. Nicholson's modeling indicates that would provide only limited protection from rapid sulphide oxidation. The modeling suggests that a more effective cover would require a diffusion coefficient a factor of five lower than this.

2 Partial Vangorda Waste Rock Pile Cover

When the Vangorda waste rock pile was designed, it was anticipated that it would be closed, by re-sloping to 3H:1V and placing a 3 m thick low permeability till cover, which would act as an infiltration and oxygen barrier. In 1993 SRK was contracted to design an interim cover for the Vangorda waste rock pile. A requirement of the design was that the waste rock pile could be reactivated in the event that mining would continue, and as such the design was not considered the final closure design. The soil cover requirement of 3 m till was considered excessive and SRK ultimately designed a 2-layer, 2 m thick till cover. The bottom 1 m till was placed with a high degree of compaction, and the upper 1 m was only loosely compacted. Furthermore, the re-sloping was done to 2.5H:1V, more as a result of survey errors by the contractor, than the intended design.

SRK recommended a small test section first to evaluate constructability of the cover. This test section would then be used to determine quality control measures for the rest of the project. This test section involved a 100 m wide section of re-sloped waste rock, and 50 m wide of till cover placed

over the entire side slope length. Unfortunately, cover construction was halted at that time, and no further work continued.

The original cover design called for the final surface to be vegetated as an erosion protection measure, however due to the construction being halted, this was never done. Furthermore, since construction was halted prematurely, the final surface was not cross-graded perpendicular to the slope, and therefore runoff could flow unimpeded down the entire slope length.

This full scale test cover section has been in place for almost 10 years now. Dr. Maritz Rykaart, P.Eng., conducted a visual inspection of the site in July 2003. There were numerous erosion gulleys on the cover; however the largest gulleys were less than 200 mm deep, with the majority being between 50 and 100 mm deep (with the exception of the lower section were a sharp slope break occurs). Photos 2 and 3 illustrate some of the gulleying on this cover. The till cover is a low plasticity material, which is prone to erosion, and the amount of washed out material in the toe collection drain is evidence of the amount of the erosion that has occurred to date (See Photo 4). The amount of rilling and erosion could possibly have been limited if vegetation had established, and if the final surface was cross-rilled perpendicular to the slope to break the length of the flow path.

Photo 2: Erosion gullies on the 10 year old till cover on the Vangorda waste rock pile, as seen from the crest of the pile

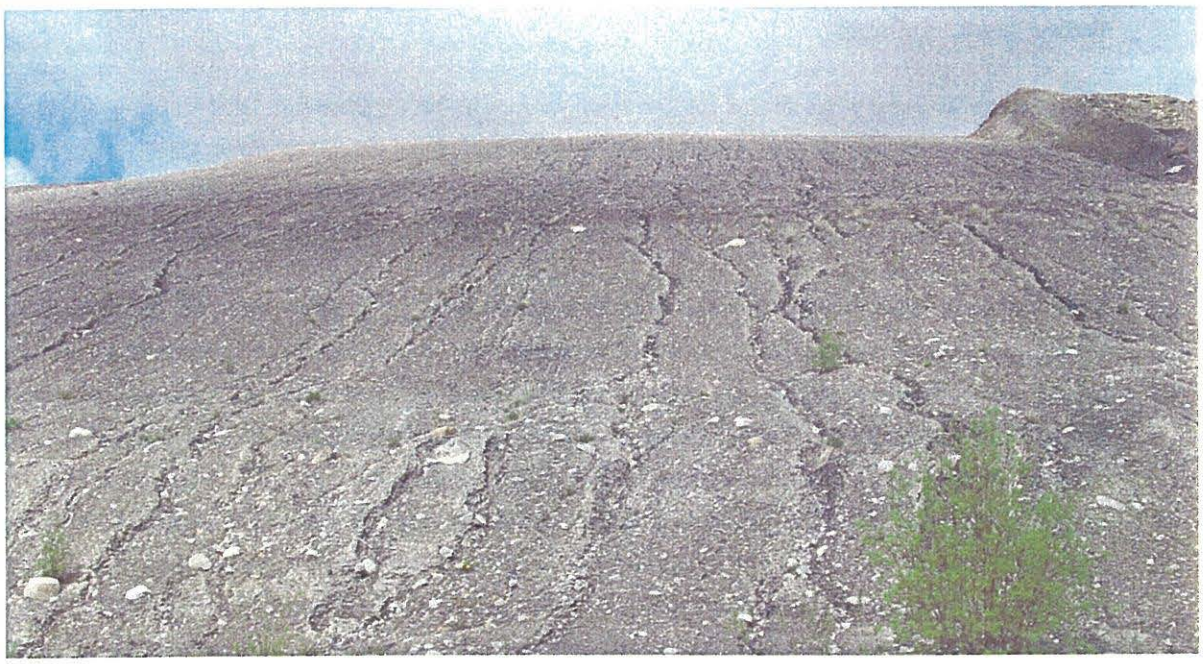


Photo 3: View of the 10 year old till cover on the Vangorda waste rock pile as seen from the base of the pile

Photo 4: View of the collection drain at the toe of the till cover. Note the accumulated fines that have been washed off the slope

There was no evidence of cracking of the cover, either due to freeze/thaw action or natural wetting and drying. Some minor vegetation spots have started to develop on the cover, mostly within the erosion gulleys (Photo 5).

The original cover design called for the lower compacted till layer to be 98% Standard Proctor density, and the upper loose layer to be 95% Standard Proctor density. Actual construction quality control records show that both layers were in fact placed at densities between 95 and 100% Standard Proctor density. In-situ density tests by SRK in 2003 confirmed that the cover was in a state resembling 90% Standard Proctor density, which does suggest that natural weathering has taken place. This density state is however consistent with that observed on the Overburden dump, and is therefore likely the natural density state to which this material will revert irrespective of its initial compaction.

In-situ infiltration testing on the cover in September 2003, indicated permeabilities of 2.5×10^{-4} to 6.5×10^{-5} cm/s, both at surface and 1 m deep. Simple oxygen lances were installed through the cover by SRK in 2002, and the measured oxygen concentration results suggest that the cover is not acting as an effective oxygen barrier, however, that is most likely due to the cover not being saturated at the same time of testing, a fact confirmed by shallow test pitting in the cover in September 2003.

Photo 5: Sparse natural vegetation starting to establish in the erosion gulleys on the 10 year old Vangorda waste rock pile till cover.

Paste pH and conductivity testing in the cover was carried out in 2003. The results did not suggest any uptake contamination from the underlying waste rock, which could imply that there is no upward flux through the cover.

3 Vangorda Waste Rock Pile Starter Berm

The Vangorda waste rock pile has a compacted till started dyke, with 2H:1V exposed side slopes. These till dykes have been constructed with similar till as that used for the Vangorda cover test section, and the remainder of till available on site for future cover construction. The performance of the starter dyke with respect to resistance to long-term weathering and erosion has been similar to that of the Vangorda cover trial. Much of the area has been re-graded, so long-term erosion is no longer evident. The re-graded area had a very hard surface, due to either compaction or drying. The hard surface is not conducive to vegetation, indicating that it will be necessary to carefully control surface compaction, seeding and fertilization to prevent the development of an infertile surface.

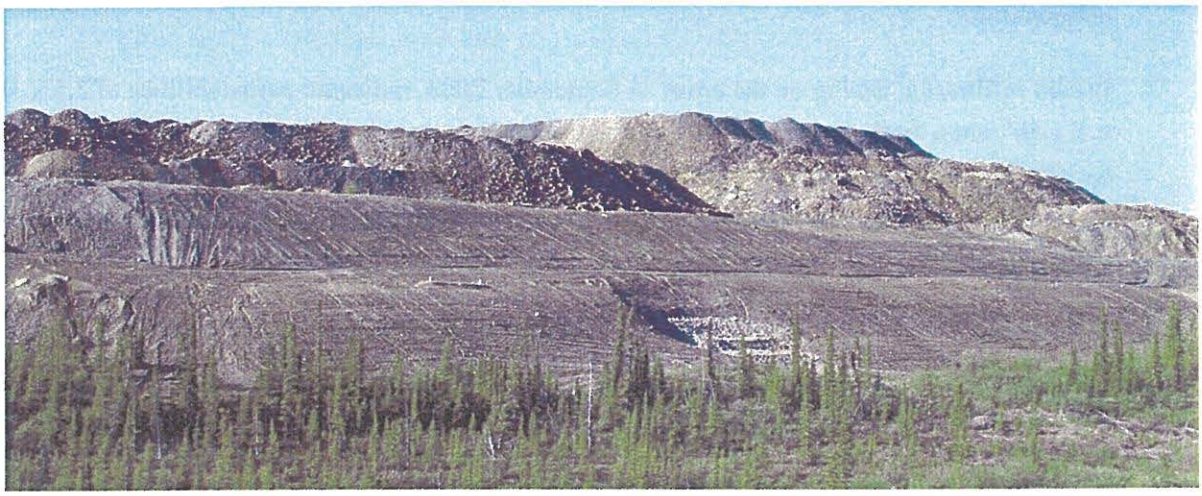


Photo 6: View of the Vangorda waste rock pile starter berm, which has been constructed from the same till that is available as a potential cover material

4 Overburden Dump

The Overburden dump consist primarily of till salvaged from the Grum pit development. This dump, which is at angle of repose, does not show excessive erosion problems, and there are signs of natural vegetation establishing, which suggest that with some assistance the material may carry vegetation. These slopes are illustrated on Photo 6.

Curragh Resources did some experimenting with re-vegetation of the Overburden dump till. They re-sloped a 200 m wide section of the dump to approximately 3H:1V and seeded the slope. No formal records exist of how and when this was done. However, vegetation continues to grow in the area, which is shown in Photo 7.

There are substantial erosion rills present on the slope, again reflecting the high erosion potential of the till material. However, the final grading on the slope was not perpendicular to the slope, thus creating preferential flow paths. Clearly the sequence and timing of revegetation is also an issue. Generally, one objective of revegation is to quickly establish enough vegetation cover and root

development to inhibit erosion. That does not appear to have been achieved in the Curragh Resources trials.

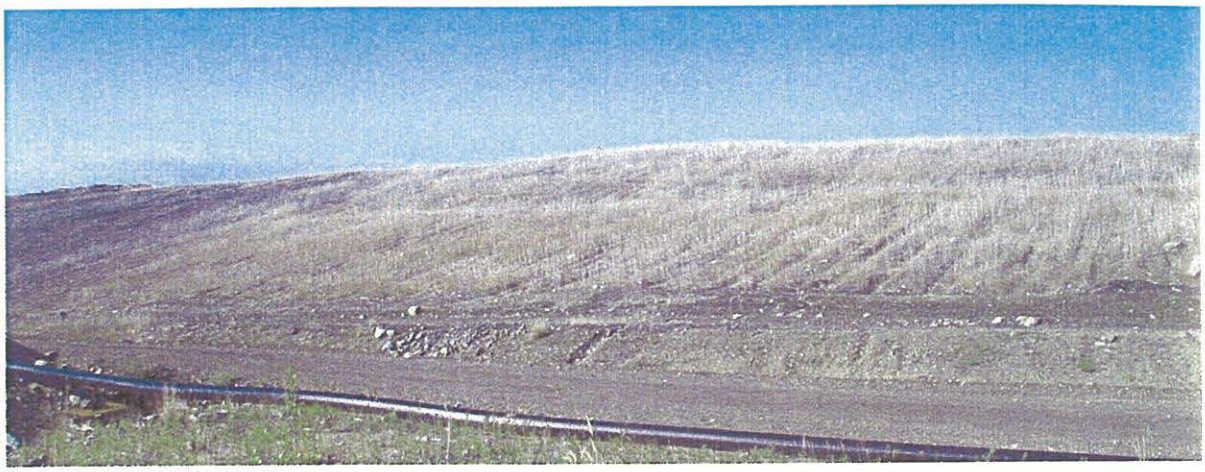
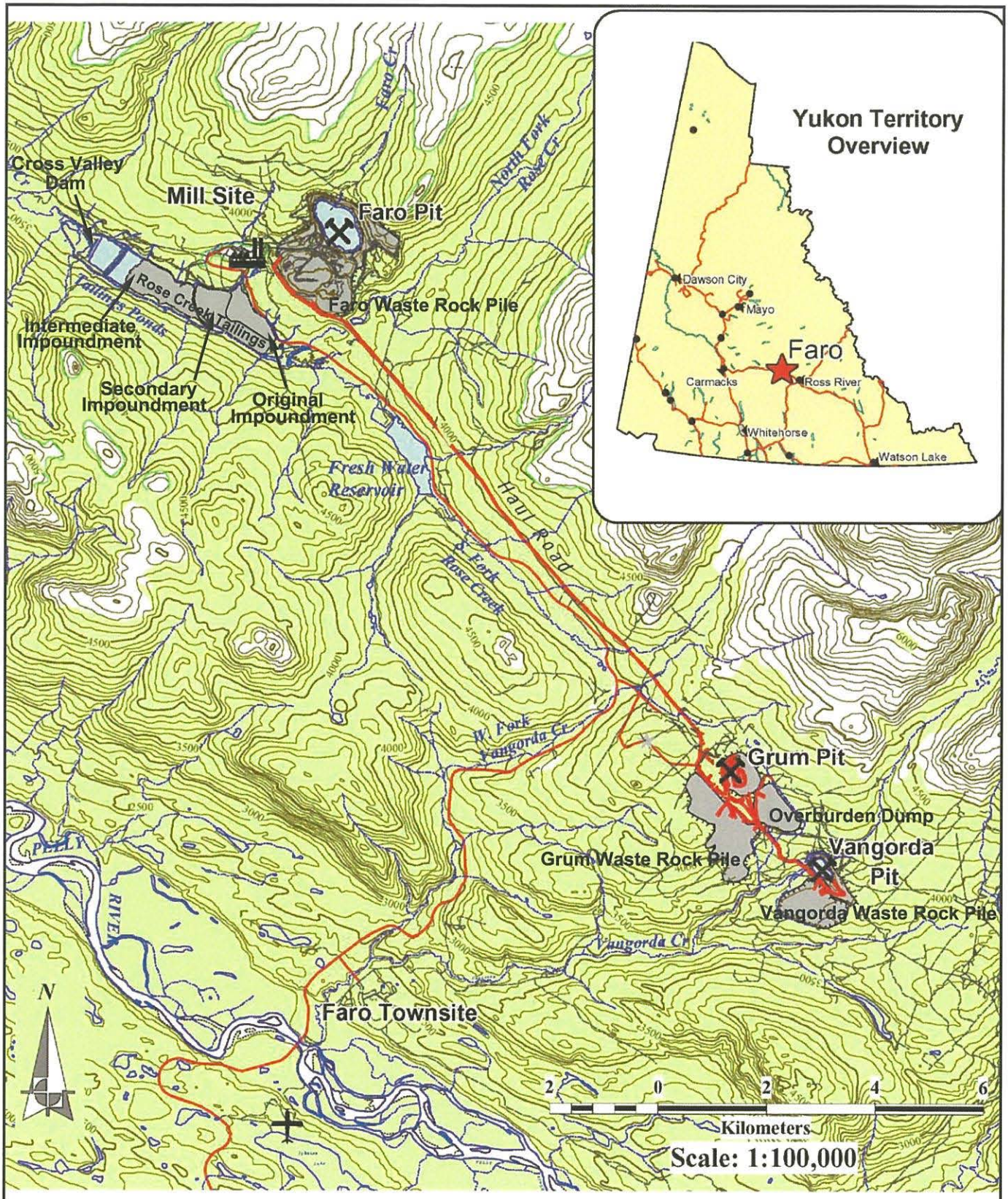


Photo 7: View of re-sloped and re-vegetated slope on the Overburden dump. Note the abrupt edge of the vegetation, confirming that without active seeding, natural re-vegetation potential is low.

Figures



Dwg Ref: Regional Loc Map.dwg

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Anvil Range Mining Complex

Location Map

PROJECT NO.	DATE	APPROVED	FIGURE
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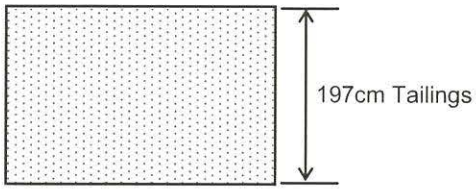
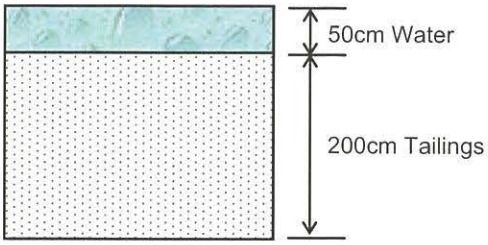
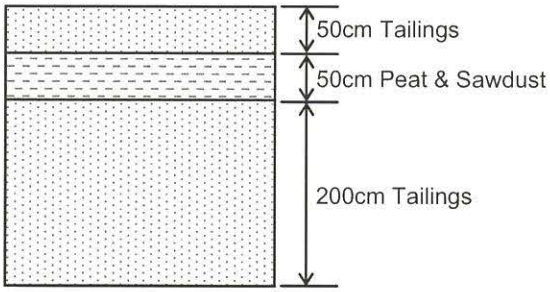


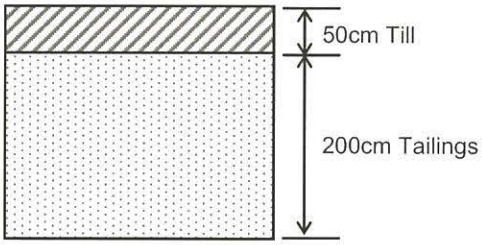
Test Pit #3
(Control)



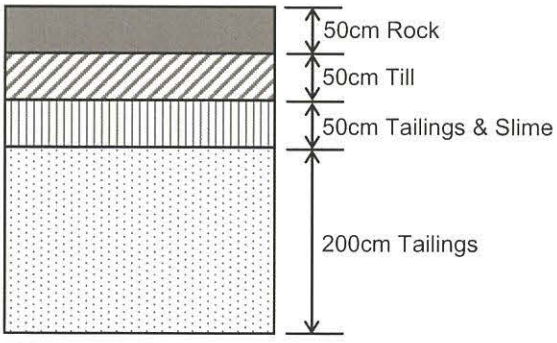
Test Pit #6
(Water Cover)



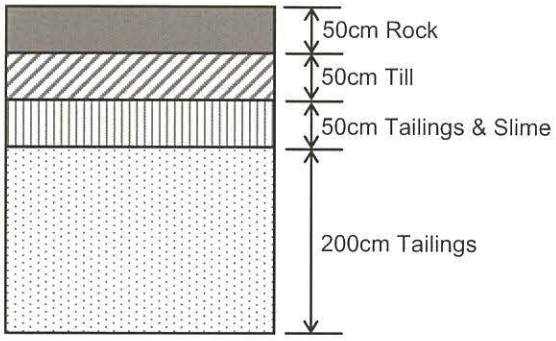
Test Pit #2
(Organic Cover)



Test Pit #5
(Till Cover)



Test Pit #1
(Composite Cover)
saturated



Test Pit #4
(Composite cover)
unsaturated

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Rose Creek Tailings Impoundment Test Covers

PROJECT:	DATE:	APPROVED:	FIGURE:
1CD003.26	February 2004	EMR	2

Appendix 2: Results of Laboratory and Field Testing of Soil Cover Material Properties

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1 Laboratory Testing

1.1 Borrow Sources (Haul Distances)

SRK conducted a borrow source investigation in 2003 (SRK, 2003) to explore various potential borrow areas in the vicinity of the ARMC for use as cover materials and erosion protection. The investigation included a compilation of existing geological information for the site which was used to select locations for excavating 60 shallow test pits, which were profiled and selectively sampled for basic geotechnical testing (grain size and plasticity).

The borrow source investigation identified four primary sources of material; silts and medium plasticity clays (present in the form of till deposits), silty sands to sandy gravels (present in the glaciofluvial deposits), coarse-grained rock (for use as rip-rap), and organics. These borrow sites are scattered throughout the mine site, as illustrated on Figures 1 and 2, and the economical use of these borrow sources as potential cover materials would be dependant on the haul distances to the waste facilities.

For the purpose of this study, haul distances between the waste facilities and the borrow sources were calculated using the latest site mapping (2003 aerial photography). These haul distances are summarized in Table 1 and are based on the maximum distance between the most likely development area of each borrow site and the center of the waste facility as measured along the existing network of roads on the site.

Table 1: Summary of potential cover material volumes & haul distances

Material Type	Source (Location)	Estimated Volume (Million m^3)	Calculated Maximum Haul Distance (km)			
			Rose Creek Tailings	Faro Waste Rock Pile	Grum Waste Rock Pile	Vangorda Waste Rock Pile
Till	Grum overburden dump	8.00	18.9	18.1	3.8	4.9
	Vangorda overburden dump	0.40	19.6	18.8	4.5	2.9
	Haul road	0.72	5.6	4.7	12.3	14.8
	Rose Creek haul road	0.80	5.7	10.5	19.4	21.9
	Faro tailings	1.70	4.7	9.5	18.4	20.9
Galcio-fluvial	Haul road	0.15	5.6	4.7	12.3	14.8
	Moose pond	0.45	18.7	17.9	3.6	2.9
	Grum creek	0.20	18.7	17.9	3.6	2.8
	Vangorda/Grum back road	0.10	19.8	19.0	4.7	4.2
	Upper Vangorda creek	0.50	20.4	19.6	5.3	4.3
	Rose creek	1.40	6.7	11.4	20.4	22.8
Organics	East of Vangorda dump	0.075–0.15	20.4	19.6	5.3	4.3
	Faro west	0.05–0.075	6.0	10.8	19.7	22.2

The borrow source investigation estimated the volume of potential cover materials primarily based on the aerial extent of the deposits. The depth of the deposits was estimated based on local anecdotal knowledge of the area as opposed to actual deep drilling results. Based on these estimates, there is approximately 11.62 million cubic meters of till material, 2.8 million cubic meters of glaciofluvial material and between 0.125 to 0.225 million cubic meters of organics.

1.2 Laboratory Testing Program

1.2.1 Introduction

The evaluation of the effectiveness of a soil cover rests on a detailed assessment of the unsaturated geotechnical properties of the waste and potential cover material. Representative samples of the waste and potential cover materials were collected by SRK in June 2003, specifically for testing of these properties. This section presents the detailed results of this testing program.

1.2.2 Sample Collection, Shipping & Testing Requirements

Field samples were collected for laboratory testing by Dr. Maritz Rykaart, P.Eng. a Senior Geotechnical Engineer from SRK Vancouver, on June 10 and 11, 2003. Eight samples were collected with one sample each of the tailings (beach tailings from the Original impoundment) and waste rock (re-handled waste rock from the re-contoured slopes on the Vangorda waste rock pile), two samples containing glaciofluvial deposits, and the remaining four were till samples. The sample locations were identified in the field using a hand-held GPS, and Table 2 lists the complete information regarding each sample. The sample locations are marked on Figures 3 and 4, and Photos 1 through 8 illustrate what the sample location looked like.

Table 2: Details of waste and potential cover samples collected in June 2003

Sample No.	GPS Coordinate[1]		Sample Type (classified for general identification)
	Easting (m)	Northing (m)	
SRK-03-C01	593,781	6,902,291	Till
SRK-03-C02	593,017	6,904,626	Till
SRK-03-C03	584,776	6,912,652	Glaciofluvial
SRK-03-C04	581,020	6,914,323	Till
SRK-03-C05	579,171	6,915,071	Glaciofluvial
SRK-03-C06	580,257	6,914,564	Till
SRK-03-C07	583,228	6,912,905	Tailings
SRK-03-C08	593,749	6,902,441	Waste Rock

Coordinates based on hand-held GPS readings using UTM NAD 27 in zone 8V.

Photo 1: SRK-03-C01, till sample from the Vangorda waste rock pile cover. The sample excluded material that exceeded 50 mm (2") in size

Photo 2: SRK-03-C02, till sample from the top of the Overburden dump. The sample excluded material that exceeded 50 mm (2") in size

Photo 3: SRK-03-C03, glaciofluvial sample from north fork haul road borrow area. The sample excluded material that exceeded 50 mm (2") in size.

Photo 4: SRK-03-C04, till sample from Rose Creek haul road borrow area. The sample excluded material that exceeded 50 mm (2") in size.

Photo 5: SRK-03-05, glaciofluvial sample from Rose Creek west pit borrow area. The sample excluded material that exceeded 50 mm (2") in size.

Photo 6: SRK-03-C06, till sample from road cut opposite main Rose Creek tailings dam. The sample excluded material that exceeded 50 mm (2") in size.

Photo 7: SRK-03-C07, surface beach tailings from the Original impoundment at Rose Creek tailings.

Photo 8: SRK-03-C08, re-handled waste rock from Vangorda waste rock pile. The sample excluded material that exceeded 50 mm (2") in size.

Samples SRK-03-C01 through SRK-03-C06 was collected in four Ziploc bags (each weighing approximately 5 kg), and samples SRK-03-C07 and SRK-03-C08 was collected in two standard soil sample bags (each weighing approximately 10 kg). Each set of sample bags was then placed in individual plastic 5-gallon pails for shipping to the laboratory. All samples were from shallow hand-dug test pits, using a shovel, as shown in Photos 1 through 8.

The samples were transported by road from the ARMC to Whitehorse on June 11, 2003. From here they were road shipped by a commercial freight company to MDH Engineered Solutions Corp. (MDH) in Saskatoon. MDH confirmed arrival of the samples at their laboratory on June 18, 2003. At the time of testing, this was the only laboratory in Canada that could carry out the specialized unsaturated soils testing that was required.

SRK specified a list of tests that MDH was to carry out on the collected samples. This list is presented in Table 3 below. The complete laboratory results were presented to SRK on October 31, 2003 in the form of a Laboratory Testing Report (MDH, 2003) attached hereto as Data Sheet A. The results of the materials property testing is summarized in the following sections.

Table 3: List of laboratory testing carried out by MDH

Sample No.	Atterberg Limits	Specific Gravity[1]	Grain size	Standard Proctor	SWCC[2]	Consolidation	Hydraulic Conductivity
SRK-03-C01	Yes	<#4 #4 – 3/8" 3/8" – 2"	Sieve & Hydrometer	4-inch mould	300 mm & 64 mm	No test	Falling head
SRK-03-C02	Yes	<#4 #4 – 3/8" 3/8" – 2"	Sieve & Hydrometer	4-inch mould	64 mm	No test	Falling head
SRK-03-C03	Yes	<#4 #4 – 3/8"	Sieve & Hydrometer	6-inch mould	300 mm & 64 mm	No test	Constant head
SRK-03-C04	Yes	<#4 #4 – 3/8"	Sieve & Hydrometer	4-inch mould	64 mm	No test	Falling head
SRK-03-C05	Yes	<#4 #4 – 3/8"	Sieve & Hydrometer	4-inch mould	64 mm	No test	Falling head & Constant head
SRK-03-C06	Yes	<#4 #4 – 3/8"	Sieve & Hydrometer	4-inch mould	64 mm	No test	Falling head
SRK-03-C07	Yes	<#4 #4 – 3/8"	Sieve & Hydrometer	No test	64 mm	Yes	Falling head
SRK-03-C08	Yes	<#4 #4 – 3/8"	Sieve & Hydrometer	No test	300 mm	No test	Constant head

1. Specific gravity testing was carried out using the different size fractions noted here.
2. Soil Water Characteristic Curves (SWCC).

1.2.3 Atterberg Limits

Atterberg limits tests were attempted on all eight samples. According to the Unified Soil Classification System (UCS), based on plasticity alone, three of the till samples were classified as inorganic clays of low to medium plasticity (CL). The remaining five samples, including one till sample, two glaciofluvial and one each tailings and waste rock samples was all classified as being non-plastic. The complete Atterberg limits results are presented in Table 4.

Table 4: Summary of Atterberg limits results

Sample No.	Material Type	Liquid Limit (%)	Plastic Limit (%)	Plasticity Index (%)
SRK-03-C01	Till	23.0	14.5	8.5
SRK-03-C02	Till	23.8	13.9	9.9
SRK-03-C04	Till	19.4	16.8	2.6
SRK-03-C06	Till	Non-plastic		
SRK-03-C03	Glaciofluvial	Non-plastic		
SRK-03-C05	Glaciofluvial	Non-plastic		
SRK-03-C07	Tailings	Non-plastic		
SRK-03-C08	Waste Rock	Non-plastic		

1.2.4 Specific Gravity

Specific gravity tests were conducted on each sample using three size fractions. The till and glaciofluvial samples measured consistent values of between 2.68 and 2.73, with no significant variance between different size fractions. This value is typical of normal silica material. The waste rock measured a specific gravity of between 2.85 and 2.88, and again the difference between the size fractions was not significant. The slightly higher specific gravity is representative of the sulphides present in the waste rock. The finer fraction of the tailings had a measured value of 3.46, which is consistent with sulphide tailings. The complete results are summarized in Table 5.

Table 5: Summary of specific gravity results

Sample No.	Material Type	<#4 Sieve (4.75 mm)	#4 Sieve – 3/8"	3/8" – 2"
SRK-03-C01	Till	2.70	2.73	2.72
SRK-03-C02	Till	2.69	2.68	2.72
SRK-03-C04	Till	2.69	2.71	No test
SRK-03-C06	Till	2.68	2.70	No test
SRK-03-C03	Glaciofluvial	2.68	2.70	No test
SRK-03-C05	Glaciofluvial	2.68	2.70	No test
SRK-03-C07	Tailings	3.46	No test	No test
SRK-03-C08	Waste Rock	2.88	2.85	No test

1.2.5 Particle-Size Analysis

Particle-size analysis was carried out on all eight samples, and included both sieve and hydrometer testing, to measure the full envelope of the fines. Table 6 list the major size fractions of each sample, and the final UCS designation assigned to each sample (inclusive of the limits results). Figure 5 presents a summary of all these curves.

It should be noted that the sampling of till, glaciofluvial and waste rock was specifically biased to select materials smaller than 50 mm (2"). This bias when sampling the till material should not significantly affect the representativeness of the data, since the overriding majority of this material is

less than 4.75 mm in size. The glaciofluvial results may be less representative, since there are clearly significant amounts of cobbles and boulders in these deposits. These cobbles and boulders can however be easily screened, and it is likely that the materials represented by the testing would be a material that could practically be manufactured. Photos 9, 10 and 11 illustrates the heterogeneity of the till and glaciofluvial material.

Photo 9: A typical exposed till slope. Note the well-rounded cobles and boulders contained in the soil matrix, which is not included in the laboratory sampling and testing.

Photo 10: The first of two typical exposed glaciofluvial deposits. In these deposits, there are horizontal boulder layers present, which can be easily screened out.

Photo 11: The second of two typical exposed glaciofluvial deposits. In these deposits, there are much less cobbles and boulders, and when present they are mixed throughout the matrix.

A visual inspection of the waste rock piles would lead one to conclude that the waste rock sample tested during this study would not be representative (Photo 12). Whilst this may be true, we specifically selected a sample on the re-sloped Vangorda waste rock pile for testing. If soil covers are to be used, it is a reasonable assumption that waste rock surfaces must be re-sloped. Re-sloping of these highly weathered waste rock piles, would result in the finer material being brought to surface. Furthermore, the amount of cobbles and boulders that are present after such grading and weathering, will remain in the matrix, but is less likely to dominate flow.

Photo 12: The waste rock can be anything from clay size particles to boulders.

Table 6: Summary of grain-size distribution results

Sample No.	Material Type	Gravel Content (>4.75 mm) (%)	Sand Content (0.075 mm - 4.75 mm) (%)	Fines Content (<0.075 mm) (%)	UCS
SRK-03-C01	Till	16	34	50	CL (sandy-clay)
SRK-03-C02	Till	16	37	47	SC (clayey-sand)
SRK-03-C04	Till	19	43	38	SC (clayey-sand)
SRK-03-C06	Till	0	71	29	SM (silty-sand)
SRK-03-C03	Glaciofluvial	40	60	0	GP (poorly graded gravel-sand mixture)
SRK-03-C05	Glaciofluvial	16	78	6	GP (poorly graded gravel-sand mixture)
SRK-03-C07	Tailings	0	70	30	SM (silty-sand)
SRK-03-C08	Waste Rock	49	39	12	GW (well graded gravel-sand mixture)

1.2.6 Standard Proctor Compaction Test

The potential cover materials were subjected to Standard Proctor compaction testing. The results of these tests are summarized in Table 7 below.

Table 7: Summary of Standard Proctor compaction test results

Sample No.	Material Type	Maximum Dry Density (kg/m^3)	Optimum Water Content (%)
SRK-03-C01	Till	2,072	9.9
SRK-03-C02	Till	2,045	10.0
SRK-03-C04	Till	2,120	7.4
SRK-03-C06	Till	2,087	8.4
SRK-03-C03	Glaciofluvial	2,195	6.9
SRK-03-C05	Glaciofluvial	2,065	8.5

1.2.7 Consolidation Test

A consolidation test was performed on the tailings sample (SRK-03-C07). The results of this test are summarized in Table 8. The sample was slurried into the consolidation ring and the initial moisture content was 19.2% for an initial dry density of 2,391 kg/m^3, at a void ratio of 0.44.

Table 8: Summary of consolidation test results

Pressure (kPa)	Void Ratio	Coefficient of Consolidation, c_v (cm^2/s)
13.9	0.44	3.39×10^{-5}
29.3	0.44	1.34×10^{-4}
64.2	0.44	2.25×10^{-5}
131.9	0.43	3.21×10^{-5}
267.6	0.42	5.69×10^{-5}
607.8	0.40	1.11×10^{-4}
1204.7	0.38	7.07×10^{-5}
2426.5	0.36	8.59×10^{-5}
4866.6	0.32	4.35×10^{-5}

1.2.8 Saturated Hydraulic Conductivity Test

Falling head and constant head hydraulic conductivity tests was conducted on select samples. Sample SRK-03-05 was subjected to both a falling head and constant head test for quality assurance purposes. The complete hydraulic conductivity results are summarized in Table 9. All samples were prepared to 95% Standard Proctor density.

Table 9: Summary of laboratory hydraulic conductivity tests

Sample No.	Material Type	Test Type	Water content (%)	Dry Density (kg/m^3)	Hydraulic Conductivity (cm/s)
SRK-03-C01	Till	Falling Head	15.9	1,966	1.28×10^{-7}
SRK-03-C02	Till	Falling Head	14.8	1,932	1.09×10^{-7}
SRK-03-C04	Till	Falling Head	14.2	2,025	3.25×10^{-6}
SRK-03-C06	Till	Falling Head	14.8	1,967	2.48×10^{-6}
SRK-03-C03	Glaciofluvial	Constant Head	8.0	2,095	1.13×10^{-3}
SRK-03-C05	Glaciofluvial	Falling Head	-	2,011	3.81×10^{-5}
SRK-03-C05	Glaciofluvial	Constant Head	10.0	2,019	4.98×10^{-5}
SRK-03-C07	Tailings	Falling Head	15.4	2,676	1.16×10^{-5}
SRK-03-C08	Waste Rock	Constant Head	8.0	1,852	5.11×10^{-3}

1.2.9 Soil-Water Characteristic Curve Test

Soil water characteristic curve (SWCC) tests were carried out on all the samples using the pressure plate technique for the suction range below 1,500 kPa and the vapour extraction technique for suctions higher than this. Two samples; one till and one glaciofluvial sample were subjected to both the standard test method (63 mm sample diameter) which consists of screening out the size fraction less than 4.75 mm, and full size fraction using 300 mm diameter Tempe cells. The complete laboratory results are presented in Figure 6.

The numerical code RETC was used to fit curves to the laboratory data, using the van Genuchten formulation. The most representative curves for all samples are presented on Figures 7, 8 and 9, and the representative van Genuchten parameters for these curves are listed in Table 10.

Table 10: Summary of van Genuchten parameters for SWCC's

Sample No.	Material Type	θ_r (%)[1]	θ_s (%)[2]	K_s (cm/sec)[3]	a[4]	n[4]	p[4]
SRK-03-C01	Till	20.8	27.8	1.46×10^{-7}	0.007	1.314	0.5
SRK-03-C01 – large test	Till	17.8	28.7	1.46×10^{-7}	11.782	1.137	0.5
SRK-03-C02	Till	10.8	27.0	1.52×10^{-7}	0.003	1.154	0.5
SRK-03-C04	Till	0.0	26.0	3.61×10^{-6}	0.071	1.073	0.5
SRK-03-C06	Till	0.0	26.2	2.67×10^{-6}	0.002	1.411	0.5
SRK-03-C03	Glaciofluvial	0.0	22.8	1.15×10^{-3}	0.011	1.350	0.5
SRK-03-C03 – large test	Glaciofluvial	0.0	23.1	1.15×10^{-3}	0.293	1.222	0.5
SRK-03-C05	Glaciofluvial	0.0	24.6	4.49×10^{-5}	0.008	1.406	0.5
SRK-03-C07	Tailings	8.0	38.0	1.31×10^{-5}	0.012	2.103	0.5
SRK-03-C08	Waste Rock	0.0	36.1	5.54×10^{-3}	0.327	1.225	0.5

1. Residual volumetric moisture content.
2. Saturated volumetric moisture content.
3. Saturated hydraulic conductivity.
4. Curve fit parameters.

RETC applies a best-fit SWCC curve to the laboratory data, however in some cases these curve fits were not representative of the sample characteristics. Figures 10 to 13 present the results of four SWCC tests where we manually adjusted the curve fit. In all these cases the base case RETC curve resulted in a steep SWCC with a higher Air Entry Value (AEV) than suggested by the data, and lower saturated volumetric moisture content. If we forced the curve fit to pass through the laboratory measured saturated volumetric moisture content, the AEV became less than suggested by the data points, and to steep in the medium suction range. In these cases we therefore opted to ignore the high suction range data points and used a best-fit through the low to medium range data points. This was deemed representative, since the availability of moisture and the primary infiltration characteristics of these materials will be governed by matric suction and hydraulic conductivity in the low suction ranges, as opposed to the high suction ranges.

Two samples were subjected to both the standard test method, and a large-scale SWCC test. The large scale test was designed to yield more representative results for samples with substantial amounts of particles larger than 4.75 mm. The large scale till sample (Figure 14) showed a very low AEV (less than 0.1 kPa); however the curve suggests that the sample has a dual porosity with another AEV at approximately 200 kPa. The small scale-sample showed a more distinct AEV at approximately 10 kPa, however, the high suction data points again suggested dual porosity with another AEV at approximately 1,000 kPa.

The difference between the large and small-scale test on the glaciofluvial sample (Figure 15) was similar with the large cell indicating a lower AEV than the small cell. These results can be explained in terms of the greater drainage characteristics of the larger particles present in the large cells.

The determination of the saturated volumetric water content (θ_s), for each SWCC was a direct outcome of the test, whilst the determination of the AEV, the residual matric suction (ψ_r) and the residual moisture content (θ_r) for each test was carried out using the construction technique proposed by Fredlund and Xing (1994), using the van Genuchten curves presented in Figures 7, 8 and 9. Table 11 list these properties for each of the tested samples.

Table 11: Summary of soil water characteristic curve results

Sample No.	Material Type	θ_s (%)	AEV (kPa)	θ_r (%)	ψ_r (kPa)
SRK-03-C01	Till	27.8	10.0	3,000	6.0
SRK-03-C01 – large test	Till	28.7	0.1	3,000	4.0
SRK-03-C02	Till	27.0	20.0	3,000	6.0
SRK-03-C04	Till	26.0	1.0	3,000	4.0
SRK-03-C06	Till	26.2	20.0	3,000	3.0
SRK-03-C03	Glaciofluvial	22.8	3.0	3,000	2.0
SRK-03-C03 – large test	Glaciofluvial	23.1	0.1	3,000	4.0
SRK-03-C05	Glaciofluvial	24.6	3.0	3,000	2.0
SRK-03-C07	Tailings	38.0	3.0	3,000	4.0
SRK-03-C08	Waste Rock	36.1	0.1	3,000	3.0

1.2.10 Unsaturated Hydraulic Conductivity

The unsaturated hydraulic conductivity curves for each of the samples were developed from the SWCC data using a number of empirical formulations. The saturated hydraulic conductivity value for each sample was taken initially from the laboratory data as presented in the previous section. Later adjustments were made to these curves based on in-situ saturated hydraulic conductivity measurements (see next section of this report). The corresponding unsaturated hydraulic conductivity curves are presented in Figures 16 to 19 for each of the material types tested.

1.3 Summary of Cover Materials

The borrow source investigation estimated the volume of potential cover materials primarily based on the aerial extent of the deposits. The depth of the deposits was estimated based on local anecdotal knowledge of the area as opposed to actual deep drilling results. Based on these estimates, there is approximately 11.62 million cubic meters of till material, 2.8 million cubic meters of glaciofluvial material and between 0.125 to 0.225 million cubic meters of organics.

The most abundant potential cover material is the till deposits. The till is predominantly silicatious, having a specific gravity of 2.7, and is predominantly well graded sandy-clay (CL) to clayey-sand

(SC) with a plasticity index between 2 and 10. This material generally has 20% gravel content with the sand fraction between 34 and 43%, and a fines content of 38 to 50%. One of the tested till samples were a non-plastic silty-sand (SM), consisting of zero gravel content, 71% sand and 29% fines.

Standard Proctor compaction suggests a maximum dry density of between 2,072 and 2,120 kg/m^3 is achievable at moisture contents ranging between 7.4 and 10%. Falling head permeability results on samples compacted to 95% Proctor density showed results that ranged between 2.5 x 10^{-6} and 1.3 x 10^{-7} cm/sec.

The well-graded nature of the till, together with the fines content suggests that the material would be a good "barrier-type" cover material. The SWCC's of the tested samples suggest AEV's between 1 and 20 kPa, however, the data suggest that there may be a dual porosity in the material, with a secondary AEV value of approximately 1,000 kPa. This means that although the till does allow some rapid de-saturation, the fines have a large potential to retain moisture, and therefore act as a barrier to oxygen diffusion where sufficient moisture is available.

The glaciofluvial deposits are also silica based, sharing the same specific gravity value of 2.7 as the till. The material can however be classified as poorly graded gravel-sand mixtures with an abundance of sand and gravel and virtually no fines. Compaction results showed similar maximum dry densities and moisture contents as observed for the till material, however the 95% Proctor saturated permeabilities illustrates the effects of the fine sands, varying between 1.1 x 10^{-3} and 5 x 10^{-5} cm/sec.

The water retention properties of the glaciofluvial material is less complex than the till, showing a fairly steep curve, with AEV's around 10 kPa for standard Tempe cells tests. The large Tempe cell test suggests that the AEV of the sample as a whole is closer to 1 kPa. Based on these results it is likely to expect that the glaciofluvial material would be less suitable to use as a barrier cover than the till material.

2 In-Situ Testing

2.1 Introduction

Laboratory testing is an important component in characterizing potential cover materials; however, natural soils exhibit a large degree of heterogeneity and therefore in-situ material property testing becomes invaluable when trying to predict cover performance.

In order to develop some understanding regarding the in-situ permeability and density of the materials under consideration at the ARMC, SRK excavated a number of shallow test pits in September 2003. These test pits and the area immediately surrounding the test pits were subjected to in-situ infiltration tests (using a single ring infiltrometer and/or Guelph permeameter), and density tests (sand-cone replacement tests).

In addition to these tests pits a number of shallow thermistors were installed into the various potential cover materials to allow us to measure the depth of the active zone.

2.2 Field Program

The field program was carried out by Dr. Maritz Rykaart, P.Eng., a Senior Geotechnical Engineer and Mr. Joe Pun, E.I.T, a Junior Engineer, both from SRK in Vancouver. The field program was carried out between September 8 and 19, 2003.

A total of 16 thermistors was installed and seven test pits was excavated, around which a total of 28 single ring infiltrometer tests was conducted, seven Guelph permeameter tests and 19 sand-cone replacement tests. The test locations are marked on Figures 3 and 4, and the details of each test pit location is also listed in Table 12.

Test pits were excavated using a CAT-235B excavator supplied by the ARMC, complete with skilled operators.

Table 12: Details of the test pit locations for conducting in-situ property testing

Location	Test Pit ID	GPS Coordinates[1]	
		Easting (m)	*Northing (m)*
Vangorda Overburden Dump	VA-OD-TP01	593,152	6,904,689
Vangorda Embankment Till	VA-ET-TP01	593,663	6,902,864
Vangorda Re-sloped Till Cover	VA-CT-TP01	593,774	6,902,416
Vangorda Re-sloped Waste Rock Piles	VA-WR-TP01	593,719	6,902,451
Vangorda Glaciofluvial Deposits[1]	VA-GF-TP01	584,816	6,912,522
Faro Slime Tailings	FA-TS-TP01	582,167	6,913,155
Faro Beach Tailings	FA-TB-TP01	583,409	6,912,613

1. Co-ordinates based on hand-held GPS readings using UTM NAD 27 in zone 8V.
2. This sample was incorrectly labelled as being on the Vangorda property – it is actually at Faro.

2.3 Thermistor String Installation

Shallow thermistor strings were installed into the ground, through potential cover materials and into the tailings, to start to gather a data base of information with respect to the depth of the active zone.

Thermistor strings were proposed to be installed at all test pit locations (three, 5-meter thermistor strings at each of the Vangorda test pits and four 6-meter strings at Faro tailings) excluding the re-sloped Vangorda till cover and waste rock pile area. The installation technique however prevented some installations from being completed, and field adjustments were made. Table 13 lists the final locations of all the thermistors.

All thermistors, except for those on Rose Creek tailings were installed by pushing down a 50 mm diameter steel pipe, 1 m shorter than the thermistor string, into the profile with the bucket of an excavator. A specially manufactured metal drive-point tip was first placed at the base of the pipe to ensure that the pipe does not fill with soil, and assist in penetration of the pipe. Once the pipe was completely pushed in, the thermistor string was placed into the pipe, before slowly pulling the pipe out again using the excavator. The drive-point tip and the thermistor string remained in the hole. The hole was then backfilled around the thermistor to ensure that it stayed in place. The Rose Creek tailings thermistors was installed using a 50 mm diameter hand auger

The thermistor strings were ordered from RST Instruments Ltd. with 12 strings in 5 meter lengths and four strings in 6 meter lengths. All thermistor strings were designed to have beads positioned at 1.5, 2.0, 2.5, 3.0, 4.0, and 5.0 meters below the nominal ground surface (with 1 m stick-up), while the 6 meter lengths thermistor strings have one extra bead positioned at 6.0 meter beneath normal ground surface. They were each constructed with open-ended wires at the above-ground end to allow hand-held devices for data collection in relation to each bead. Photo 13 illustrates completed thermistor installations in the till and on the Rose Creek tailings.

A hand-held digital thermometer (model 866C from Omega Technologies) was used to collect temperature data from the installed thermistor strings. Up to two sets of data were collected after the

thermistor strings were installed. Details of the collected data are presented in Data Sheet B-6, together with the complete thermistor calibration data sheets. The second set of readings confirmed that the strings are reaching equilibrium, and more data will be completed during the later winter and spring of 2004.

Table 13: Details of Installed thermistors strings

Location	Therm. No. (Serial #)	Date Installed	GPS Coordinate[1]		Depth of Beads from Ground Surface (m)
			Easting (m)	*Northing (m)*	
Overburden Dump	TS-04 (23262-4)	10-Sep-03	593,174	6,904,639	0.05, 040, 0.90, 1.40, 2.40, 3.40
	TS-06 (23262-6)	10-Sep-03	593,158	6,904,668	0.05, 0.50, 1.00, 1.50, 2.50, 3.50
Vangorda Embankment Till	TS-08[2] (23262-8)	10-Sep-03	593,668	6,902,65	0.05, 0.55, 1.05, 1.55, 2.55, 3.55
	TS-09 (23262-9)	11-Sep-03	593,652	6,9028,54	0.10, 0.60, 1.10, 1.60, 2.60, 3.60
	TS-10 (23262-10)	10-Sep-03	593,688	6,9028,70	0.05, 0.20, 0.30, 0.80, 1.80, 2.80
	TS-11 (23262-11)	11-Sep-03	593,638	6,9028,44	0.05, 0.55, 1.05, 1.55, 2.55, 3.55
Vangorda Glaciofluvial Deposits	TS-01 (23262-1)	15-Sep-03	584,823	6,9124,38	0.05, 0.36, 0.86, 1.36, 2.36, 3.36
	TS-02 (23262-2)	15-Sep-03	584,908	6,9125,54	0.05, 0.10, 0.15, 0.20, 0.50, 1.50
	TS-03 (23262-3)	15-Sep-03	584,835	6,9124,57	0.05, 0.23, 0.73, 1.23, 2.23, 3.23
	TS-05 (23262-5)	15-Sep-03	584,774	6,9125,13	0.05, 0.10, 0.53, 1.03, 2.03, 3.03
Faro Tailings	TS-07 (23262-7)	12-Sep-03	583,173	6,9125,10	0.05, 0.45, 0.95,1.45, 2.45, 3.45
	TS-12 (23262-12)	12-Sep-03	582,194	6,9131,97	0.50, 1.00, 1.50, 2.00, 3.00, 4.00
	TS-13 (23262-13)	12-Sep-03	583,105	6,9128,51	0.05, 0.15, 0.25, 0.75, 1.75, 2.75, 3.75
	TS-14 (23262-14)	12-Sep-03	583,206	6,9129,36	0.50, 1.00, 1.50, 2.00, 3.00, 4.00, 5.00
	TS-15 (23262-15)	12-Sep-03	582,235	6,9131,27	0.05, 0.15, 0.25, 0.55, 1.55, 2.55, 3.55
	TS-16 (23262-16)	12-Sep-03	582,894	6,9126,96	0.05, 0.25, 0.75, 1.25, 2.25, 3.25, 4.25

1. Co-ordinates based on hand-held GPS readings using UTM NAD 27 in zone 8V.
2. GPS Location not exact - estimated from neighboring installed thermistor locations.

Photo 13: Examples of the thermistor installations on (1) Rose Creek tailings and (2) Vangorda waste rock pile starter dyke till.

2.4 Single Ring Infiltrometer Tests

Single ring infiltrometer tests were used to obtain an in-situ measurement of the saturated hydraulic conductivity of the potential cover soils and the waste.

The infiltrometers measured approximately 60 cm in diameter and 30 cm in height, and was constructed from 44-gallon steel drums. The test is performed by placing the infiltrometer on a relatively level surface, then pushing/driving the ring into the ground for at least 5 to 10 cm. The ring is then filled with water to a predetermined height, and the rate of water loss is recoded over time to second lower predetermined level. The water level is topped-up, and the process is repeated until a constant rate of water loss is observed. If leakage was observed around the outer edge of the infiltrometer during the test, some fine soils was used as backfill against the edge, and if this could not contain the leakage, the test was abandoned. Photo 14 illustrates tests being conducted.

Many of the tests required at the ARMC were on the side slopes, which does not allow for testing using the ring infiltrometer. In these locations an area measuring approximately 100 cm x 100 cm was excavated by hand using geological picks and shovels to allow a flat platform to perform the test on. Similarly, where infiltrometer tests were conducted in the bottom of test pits, a flat platform was prepared for placing the test

The infiltration measured from the ring infiltrometers were analyzed to convert it to an equivalent saturated hydraulic conductivity, using the procedure developed by Bouwer et al. (1999). Summarized results of the ring-infiltrometer tests are presented in Table 14 and the complete field data sheets are presented in Data Sheet B-1.

Table 14: Summarized results of the single ring infiltration tests

Test Site	Test Pit ID	Date Tested	Location	Test No.	In-Situ Saturated Hydraulic Conductivity, K_{fs} (cm/sec)
Vangorda Overburden Dump	VA-OD-TP1	9-Sep-03	Bottom of Test Pit	SR-01	2.31×10^{-4}
			Surface	SR-02	1.49×10^{-4}
Vangorda Re-sloped Embankment Till	VA-ET-TP1	10-Sep-03	Bottom of Test Pit	SR-01	2.25×10^{-4}
			Surface	SR-02	3.14×10^{-5}
				SR-03	3.16×10^{-5}
				SR-04	5.63×10^{-5}
Vangorda Re-sloped Till Cover	VA-CT-TP1	11-Sep-03	Bottom of Test Pit	SR-01	2.48×10^{-4}
			Surface	SR-02	1.94×10^{-5}
				SR-03	6.42×10^{-5}
				SR-04	5.73×10^{-5}
Vangorda Re-Sloped Waste Rock Dump	VA-WR-TP1	12-Sep-03	Bottom of Test Pit	SR-01	1.68×10^{-3}
			Surface	SR-02	1.23×10^{-5}
				SR-03	9.23×10^{-5}
				SR-04	4.85×10^{-4}
				SR-05	4.38×10^{-4}
Vangorda Glaciofluvial Deposits	VA-GF-TP1	13-Sep-03	Surface (loosened)	SR-01	2.84×10^{-3}
				SR-04	4.64×10^{-3}
			Surface (compacted)	SR-02	1.39×10^{-5}
				SR-03	9.92×10^{-5}
Faro Slime Tailings	FA-TS-TP1	14-Sep-03	Surface	SR-01	8.61×10^{-8}
				SR-02	4.08×10^{-6}
				SR-03	3.01×10^{-5}
				SR-04	9.15×10^{-8}
				SR-05	1.92×10^{-6}
Faro Beach Tailings	FA-TB-TP1	17-Sep-03	Surface	SR-01	1.58×10^{-3}
				SR-02	1.51×10^{-3}
				SR-03	1.58×10^{-3}
				SR-04	1.88×10^{-3}

Photo 14: Sloped test site showing 3 ring infiltrometers being used for testing.

2.5 Guelph Permeameter Tests

Additional in-situ infiltration tests were conducted using a Guelph permeameter. The Guelph permeameter differs from the ring infiltrometer in that it is essentially a constant head as opposed to a falling head permeability test, and its area of influence is substantially smaller than the ring infiltrometer. The Guelph permeameter is therefore more suited to finer grained, fairly homogeneous material, such as the tailings.

Although the till is a good candidate for using the Guelph permeameter in terms of its fines content, the large gravel fraction therein makes for quite random results, which may not necessarily be representative. For this reason, only a limited amount of Guelph permeameter testing was completed.

The complete field data sheets are included in Data Sheet B-2, and Table 15 summarizes the results of the Guelph permeameter tests. Photo 15 illustrates a Guelph permeameter test being conducted adjacent to a ring infiltrometer test.

Table 15: Summary of Guelph permeameter test results

Test Site	Date Tested	Test No.	Location	Depth of Well Hole	Effective Saturated Hydraulic Conductivity, K_{fs} (cm/sec)
Vangorda Overburden Dump	9-Sep-03	GP-01	Up-slope of SR-02	20cm	2.62×10^{-4}
Vangorda Embankment Till	10-Sep-03	GP-01	Nearby SR-02	20cm	4.85×10^{-4}
		GP-02	Nearby SR-01	20cm	4.35×10^{-3}
Faro Beach Tailings	18-Sep-03	GP-01-1	Nearby SR-03	20cm	3.86×10^{-3}
	19-Sep-03	GP-01-2		50cm	1.77×10^{-3}
		GP-02-1	Nearby SR-04	20cm	4.40×10^{-3}
		GP-02-2		50cm	1.93×10^{-3}

Photo 15: Test site showing a ring infiltrometer and Guelph permeameter.

2.6 In-Situ Density Tests

The sand cone test method (ASTM D1556 with 6-inch cone and Ottawa sand) was used to determine the in-situ density of the potential cover soils and waste at various locations.

The experiments were performed by first preparing a level surface (approximately 30 cm x 30 cm) at each designated location, for placing the base plate. The sand-cone replacement test was then conducted, and the in-situ sand weights were determined on site using the scale in the water laboratory at the Faro main gate.

The wet samples was preserved and shipped to EBA Engineering in Whitehorse for moisture content determination. Table 16 presents a summary of the test results, and the complete data sheets are presented in Data Sheet B-3.

Table 16: Summary of the in-situ density test results

Test Site	Date Tested	Test No.	Location	In-Situ Dry Density (g/cm^3)
Vangorda Re-sloped Till Cover	11-Sep-03	SC-01	Surface - sloped	1.91
		SC-02	Surface - sloped	2.05
	15-Sep-03	SC-03	Surface - sloped	1.75
		SC-04	Surface - sloped	1.63
Vangorda Embankment Till	16-Sep-03	SC-01	Surface - sloped	1.61
		SC-02	Surface - sloped	1.46
		SC-03	Surface - sloped	1.32
Vangorda Overburden Dump		SC-01	Surface - sloped	1.75
		SC-02	Surface - sloped	1.85
		SC-03	Surface - sloped	1.70
Vangorda Glaciofluvial Deposits		SC-01	Surface - flat	1.89
		SC-02	Surface - flat	2.06
		SC-03	Surface - flat	2.09
Faro Slime Tailings	14-Sep-03	SC-01	Surface - flat	1.66
		SC-02	Surface - flat	1.78
		SC-03	Surface - flat	1.91
Faro Beach Tailings	17-Sep-03	SC-01	Surface - flat	1.43
		SC-02	Surface - flat	1.34
		SC-03	Surface - flat	1.43

2.7 Conductivity and pH Sampling

Samples were collected at all test pits at various depths for conductivity and pH testing. The samples were mixed with distilled water in a 1:1 volume ratio to form a paste composition for testing using calibrated hand-held instruments. For low range conductivity samples (0 – 1,999µS), hand held instruments (model TDSTestr 40 from Oakton Instruments) and (model pHTestr 3 from Oakton Instruments) were used for conductivity and pH testing respectively. Conversely, for the higher range conductivity samples (>1,999µS), a different instrument (model pH/Cond 340i from WTW Wissenschaftlich-Technische Werkstätten GmbH & Co. KG) was used for both conductivity and pH testing.

Different sampling procedures were conducted at different test pit locations. For samples collected at the Rose Creek tailings impoundment, a hand auger was used to obtain samples at 50 cm intervals from the surface down to a maximum depth of 500 cm. Alternatively for all the actual test pits, samples were collected, at 1 m intervals, from the surface. Detailed results from the laboratory testing are presented in Data Sheet B-5.

2.8 In-Situ Moisture Content

Samples were collected at various depths of all test pits to determine the in-situ moisture content of the materials before and after the single ring infiltrometer tests. A hand auger was used to obtain a dry soil profile of samples (15 cm intervals from the surface down to a maximum depth of 60 cm) before the infiltration tests. Subsequently after each test, a wet surface sample was collected. A minimum of one set of dry and wet samples were obtained at each test pit where single ring infiltrometer tests were conducted. The samples were kept in air-tight containers and were sent to EBA Engineering in Whitehorse for moisture content determination. The results are provided in the laboratory report from EBA Engineering in Data Sheet B-4. A summary of the collected sample locations, date, quantities and depths is outlined in Table 17 below.

Table 17: Details of in-situ moisture content samples collected

Test Pit Site	Date Collected	Location (Single Ring Infiltration Test No.)	Quantity & Depths (cm below ground surface)
Vangorda Overburden Dump	9-Sep-03	SR-01	dry profile (0, 15, 30, 45, 60)
			wet profile (0, 15, 30, 45, 60)
		SR-02	dry profile (0, 15, 30, 45, 60)
			wet profile (0, 15, 30, 45, 60)
Vangorda Embankment Till	10-Sep-03	SR-01	dry profile (0, 15, 30, 45, 60)
			wet profile (0, 15, 30)
		SR-02	dry profile (0, 15, 30, 45, 60)
Vangorda Till Cover	11-Sep-03	SR-02	dry profile (0, 15)
			wet surface sample
Vangorda Waste Rock Dump	12-Sep-03	SR-01	wet surface sample
		SR-03	dry profile (0, 15)
			wet surface sample
		SR-04	wet surface sample
Vangorda Glaciofluvial	13-Sep-03	SR-01	dry profile (0, 15, 30, 45, 60)
			wet surface sample
Faro Slime Tailings	14-Sep-03	SR-01	dry profile (0, 15, 30, 45, 60)
			wet surface sample
Faro Beach Tailings	17-Sep-03	SR-03	dry profile (0, 15, 30, 45, 60)
			wet surface sample

2.9 Summary of In-Situ Testing Results

The in-situ permeability results confirmed that the field hydraulic conductivity of the till is between 1.5×10^{-4} and 6.4×10^{-5} cm/sec (473 to 202 mm/year), which is between 1 and 2 orders of magnitude more permeable than the laboratory results. Similarly, the in-situ permeability of the glaciofluvial material is approximately 9.9×10^{-5} cm/sec (312 mm/year) for the compacted traffic surfaces and

2.8×10^{-3} cm/sec (8,830 mm/year) for the looser unconsolidated sections. These results are quite consistent with the laboratory results.

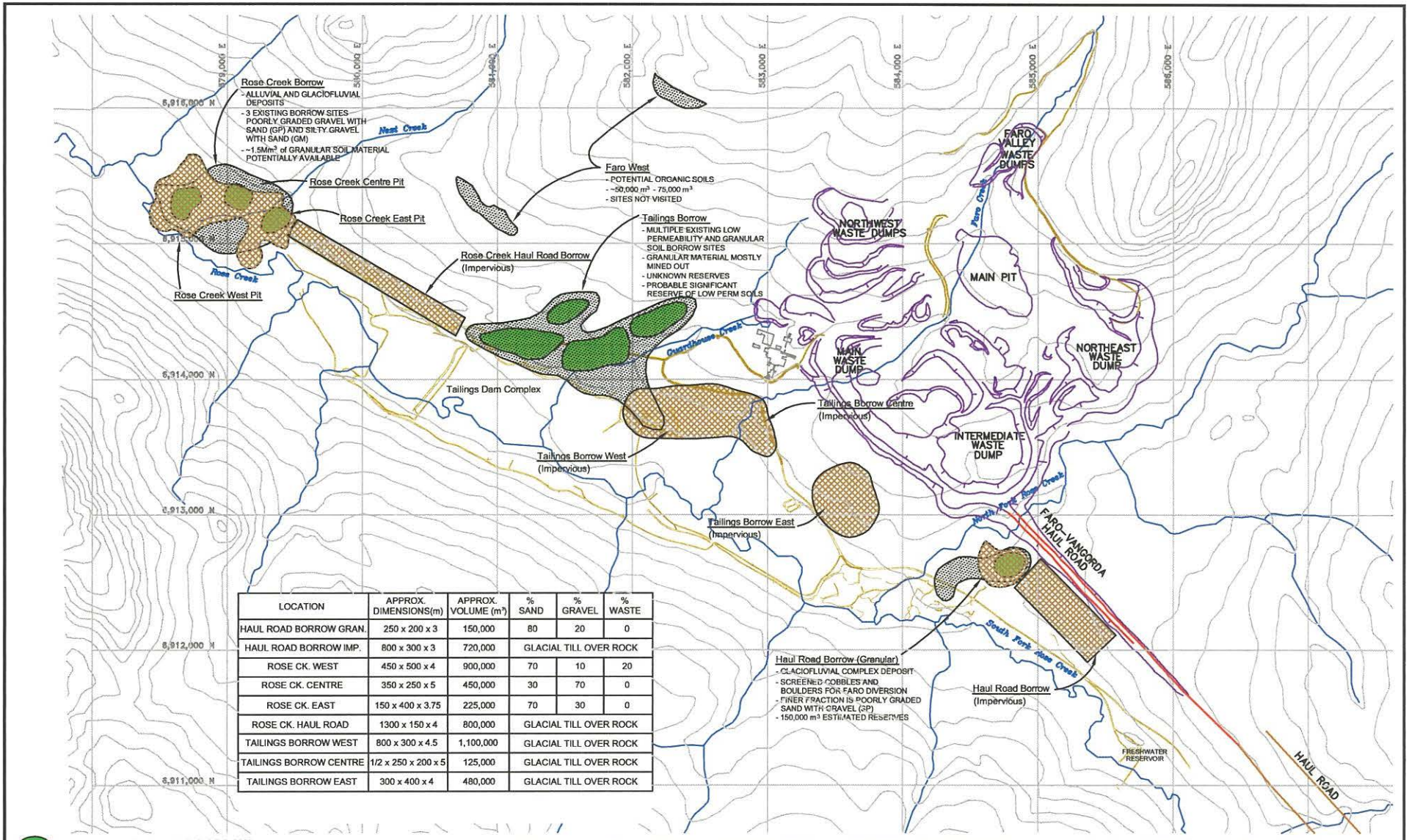
The in-situ density results for the till, suggest substantially lower densities than the 95% Proctor density tested in the laboratory, which may be part of the reason for the higher permeabilities measured in the field.

The tailings and waste rock samples measured conductivities in the milli-Siemens range, whilst all the potential cover materials measured conductivities in the micro-Siemens range. He most important conclusion with regard to these results are the fact that the Vangorda waste rock pile till cover, does not appear to be impacted by contaminants that are present in the underlying waste rock. There is no definitive gradient of increased conductivities close to the waste rock contact, suggesting that upward fluxes are negligible, if present at all. This is further confirmed by the past pH results which show the waste rock to have a consistent paste pH of 5.1 to 5.9, whilst the till cover has a consistent paste pH between 7.4 and 7.7.

The embankment till did show the highest conductivities in natural materials, and these higher conductivities were associated with lower paste pH values ranging between 5.7 and 6.9. This result cannot be immediately explained.

The tailings conductivities were consistently high, and the paste pH varied between 1.6 and 5.2, with a near consistent pattern of increasing pH with depth.

Figures



LOCATION	APPROX. DIMENSIONS(m)	APPROX. VOLUME (m³)	% SAND	% GRAVEL	% WASTE
HAUL ROAD BORROW GRAN.	250 x 200 x 3	150,000	80	20	0
HAUL ROAD BORROW IMP.	800 x 300 x 3	720,000	GLACIAL TILL OVER ROCK		
ROSE CK. WEST	450 x 500 x 4	900,000	70	10	20
ROSE CK. CENTRE	350 x 250 x 5	450,000	30	70	0
ROSE CK. EAST	150 x 400 x 3.75	225,000	70	30	0
ROSE CK. HAUL ROAD	1300 x 150 x 4	800,000	GLACIAL TILL OVER ROCK		
TAILINGS BORROW WEST	800 x 300 x 4.5	1,100,000	GLACIAL TILL OVER ROCK		
TAILINGS BORROW CENTRE	1/2 x 250 x 200 x 5	125,000	GLACIAL TILL OVER ROCK		
TAILINGS BORROW EAST	300 x 400 x 4	480,000	GLACIAL TILL OVER ROCK		

EXISTING QUARRY OR BORROW
POTENTIAL QUARRY OR BORROW
AREA IDENTIFIED BY BOND
MINE INFRASTRUCTURE
EXISTING ACCESS ROAD

0 500 1000 Metres

REFERENCE
BOND, J.D. (OPEN FILE 1999-10)
SURFICIAL GEOLOGY MAP AND TILL GEOCHEMISTRY OF MOUNT MYE (105K/3&6 W), CENTRAL YUKON TERRITORY

FILE REF: FIG-3.dwg

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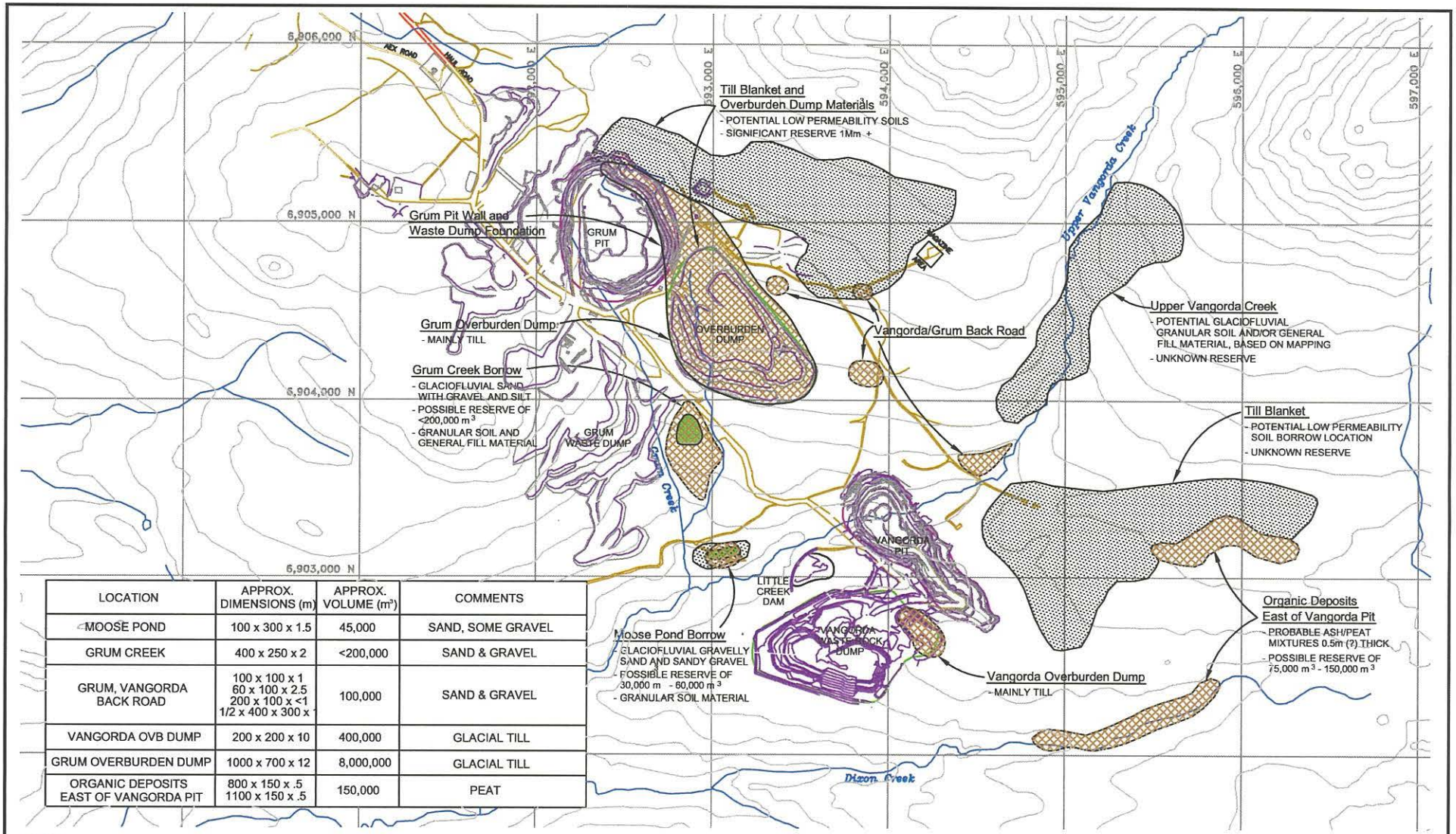
Anvil Range Mining Complex

Borrow Source Locations – Faro Mine

PROJECT NO.	DATE	APPROVED	FIGURE
1CD003.26	Feb. 2004	J.H.P.	1



LOCATION	APPROX. DIMENSIONS (m)	APPROX. VOLUME (m³)	COMMENTS
MOOSE POND	100 x 300 x 1.5	45,000	SAND, SOME GRAVEL
GRUM CREEK	400 x 250 x 2	<200,000	SAND & GRAVEL
GRUM, VANGORDA BACK ROAD	100 x 100 x 1 60 x 100 x 2.5 200 x 100 x <1 1/2 x 400 x 300 x 1	100,000	SAND & GRAVEL
VANGORDA OVB DUMP	200 x 200 x 10	400,000	GLACIAL TILL
GRUM OVERBURDEN DUMP	1000 x 700 x 12	8,000,000	GLACIAL TILL
ORGANIC DEPOSITS EAST OF VANGORDA PIT	800 x 150 x .5 1100 x 150 x .5	150,000	PEAT

EXISTING QUARRY OR BORROW
POTENTIAL QUARRY OR BORROW
AREA IDENTIFIED BY BOND
MINE INFRASTRUCTURE
EXISTING ACCESS ROAD

0 500 1000 Metres

REFERENCE
BOND, J.D. (OPEN FILE 1999-10)
SURFICIAL GEOLOGY MAP AND TILL GEOCHEMISTRY OF MOUNT MYE (105K/3&6 W), CENTRAL YUKON TERRITORY

FILE REF: FIG-3.dwg

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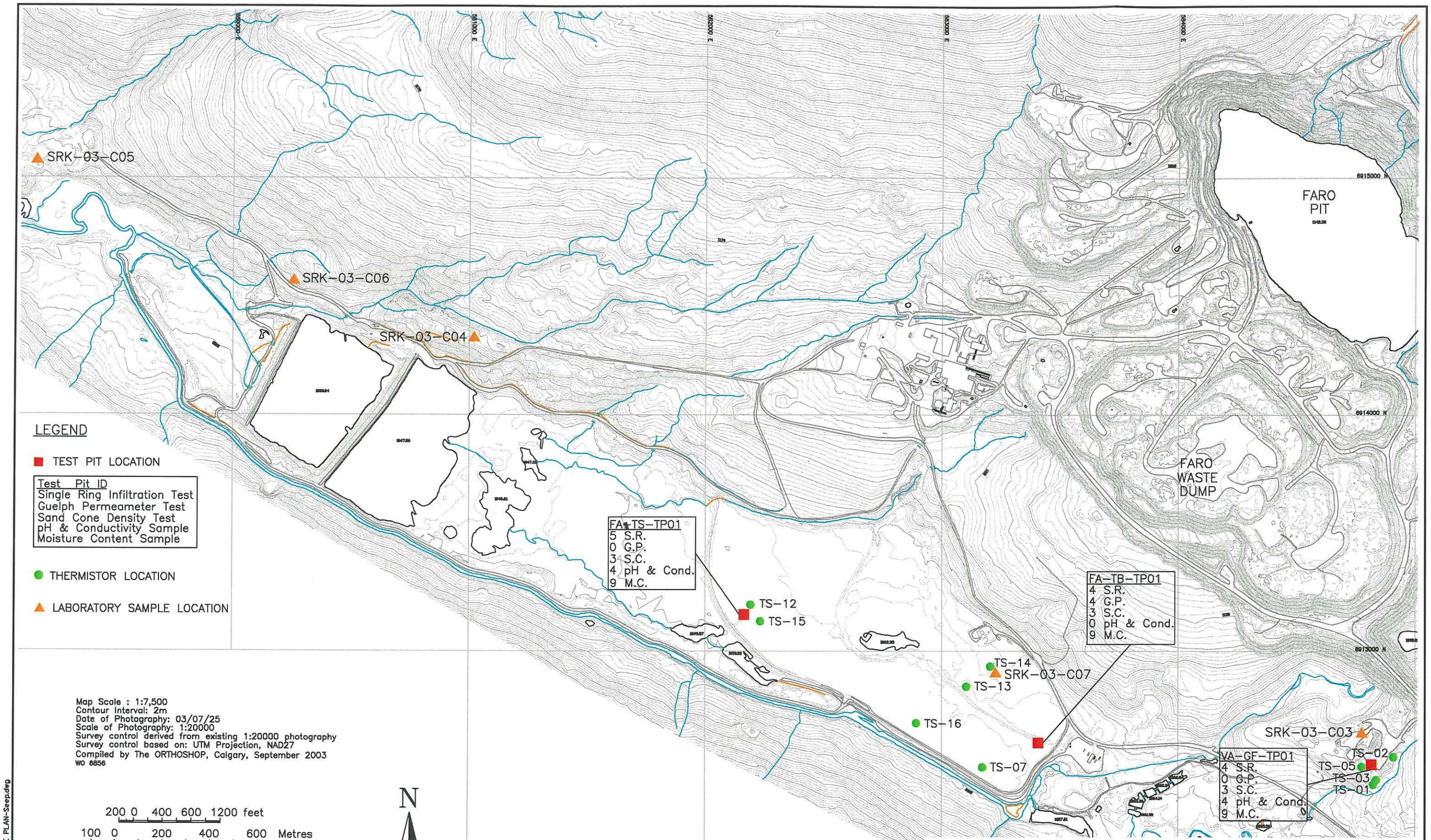
Borrow Source Locations – Vangorda Plateau

PROJECT NO.	DATE	APPROVED	FIGURE
1CD003.26	Feb. 2004	J.H.P.	2



LEGEND

- TEST PIT LOCATION

Test Pit ID
Single Ring Infiltration Test
Guelph Permeameter Test
Sand Cone Density Test
pH & Conductivity Sample
Moisture Content Sample

- THERMISTOR LOCATION
- LABORATORY SAMPLE LOCATION

Map Scale : 1:7,500
Contour Interval: 2m
Date of Photography: 03/07/25
Scale of Photography: 1:20000
Survey control derived from existing 1:20000 photography
Survey control based on: UTM Projection, NAD27
Compiled by The ORTHOSHOP, Calgary, September 2003
WO 8856

200 0 400 600 1200 feet
100 0 200 400 600 Metres
Scale 1:15,000

N

File Ref: FARO SITE PLAN-Seep.dwg

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Test Pit & Sample Locations – Faro Mine

PROJECT NO.	DATE	APPROVED	FIGURE
1CD003.26	Feb. 2004	J.H.P.	3

593,000 E
6,905,000 N
594,000 E
6,904,000 N
595,000 E
1311.40
1305.94
1305.51
1305.84
SLUDGE POND
1301.53
VA-OD-TP01
2 S.R.
1 G.P.
3 S.C.
8 pH & Cond.
23 M.C.
TS-06
TS-04
SRK-03-C02
OVERBURDEN DUMP
GRUM PIT
1185.40
1227.78
1261.82
1184.79
1186.63
VANGORDA PIT
1089.88
ORE TRANSFER PAD
1125.42
LITTLE CREEK POND
1108.13
TS-10
TS-08
TS-09
TS-11
VA-ET-TP01
4 S.R.
2 G.P.
3 S.C.
8 pH & Cond.
16 M.C.
VA-CT-TP01
4 S.R.
0 G.P.
4 S.C.
8 pH & Cond.
7 M.C.
TRIBUTARY B
MAIN STEM OF GRUM CREEK
GRUM WASTE DUMP
REGRADED SLOPE (1995)
TILL COVER (1995)
SRK-03-C08
SRK-03-C01
VANGORDA WASTE DUMP
VA-WR-TP01
5 S.R.
0 G.P.
0 S.C.
8 pH & Cond.
5 M.C.
TRIBUTARY A
VANGORDA CREEK
SEEPAGE COLLECTION DITCH
SWEET CK.
Dixon Creek
592,000 E
6,903,000 N
593,000 E
6,902,000 N

LEGEND

- TEST PIT LOCATION

Test Pit ID
Single Ring Infiltration Test
Guelph Permeameter Test
Sand Cone Density Test
pH & Conductivity Sample
Moisture Content Sample

- THERMISTOR LOCATION
- LABORATORY SAMPLE LOCATION

Map Scale: 1:2500
Contour Interval: 2m
Date of Photography: 03/07/25
Scale of Photography: 1:20000
Survey control derived from existing 1:20000 photography
Survey control based on: UTM Projection, NAD27
Compiled by The ORTHOSHOP, Calgary, September 2003
WO 8856

0 100 200 300 400 500 600 700 800 900 1000m
Scale 1:10,000

File Ref: site_plan_Thermistor-(11x17therm-Fig1).dwg

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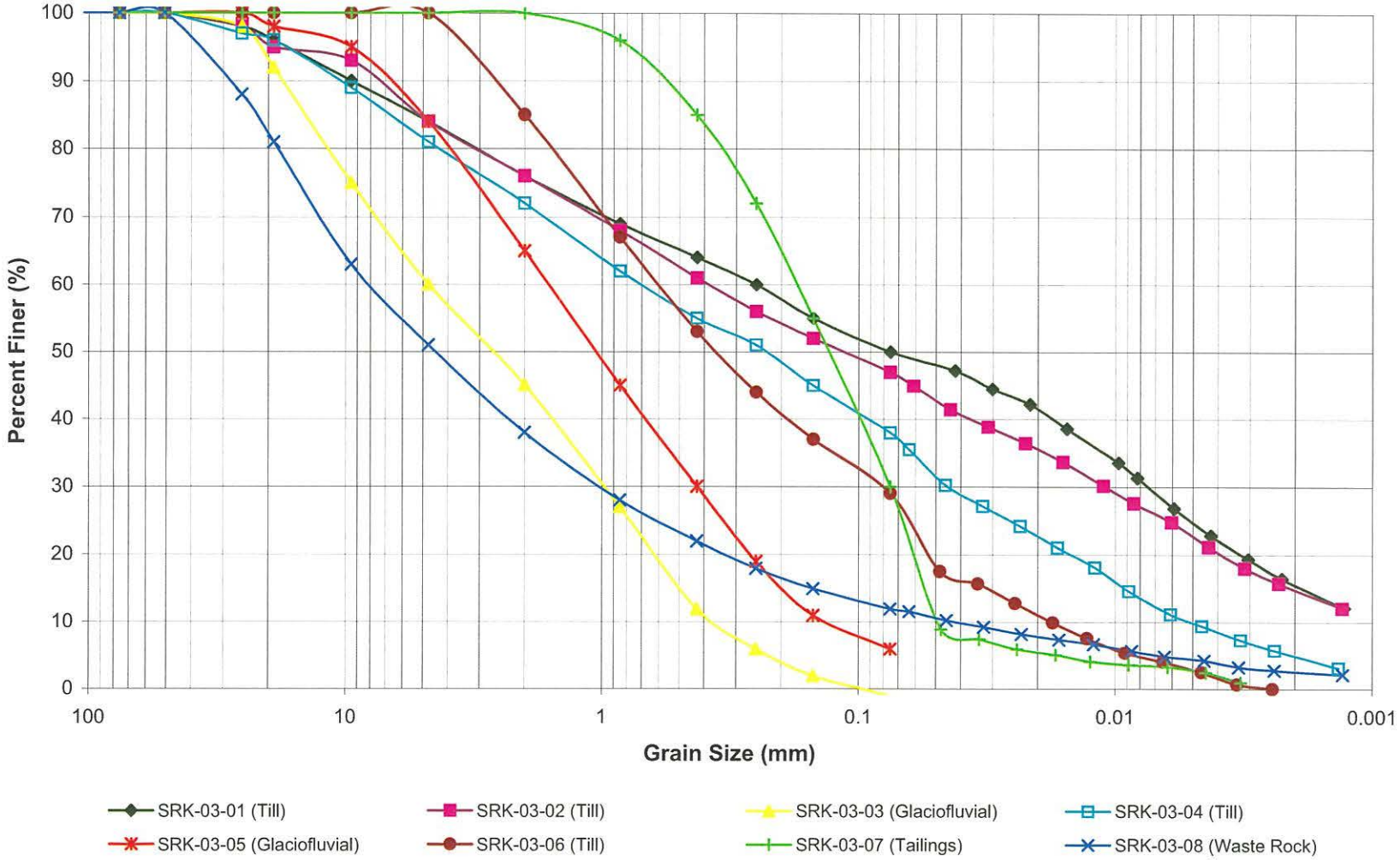
Test Pit & Sample Locations – Vangorda Plateau

PROJECT NO.	DATE	APPROVED	FIGURE
1CD003.26	Feb. 2004	J.H.P.	4



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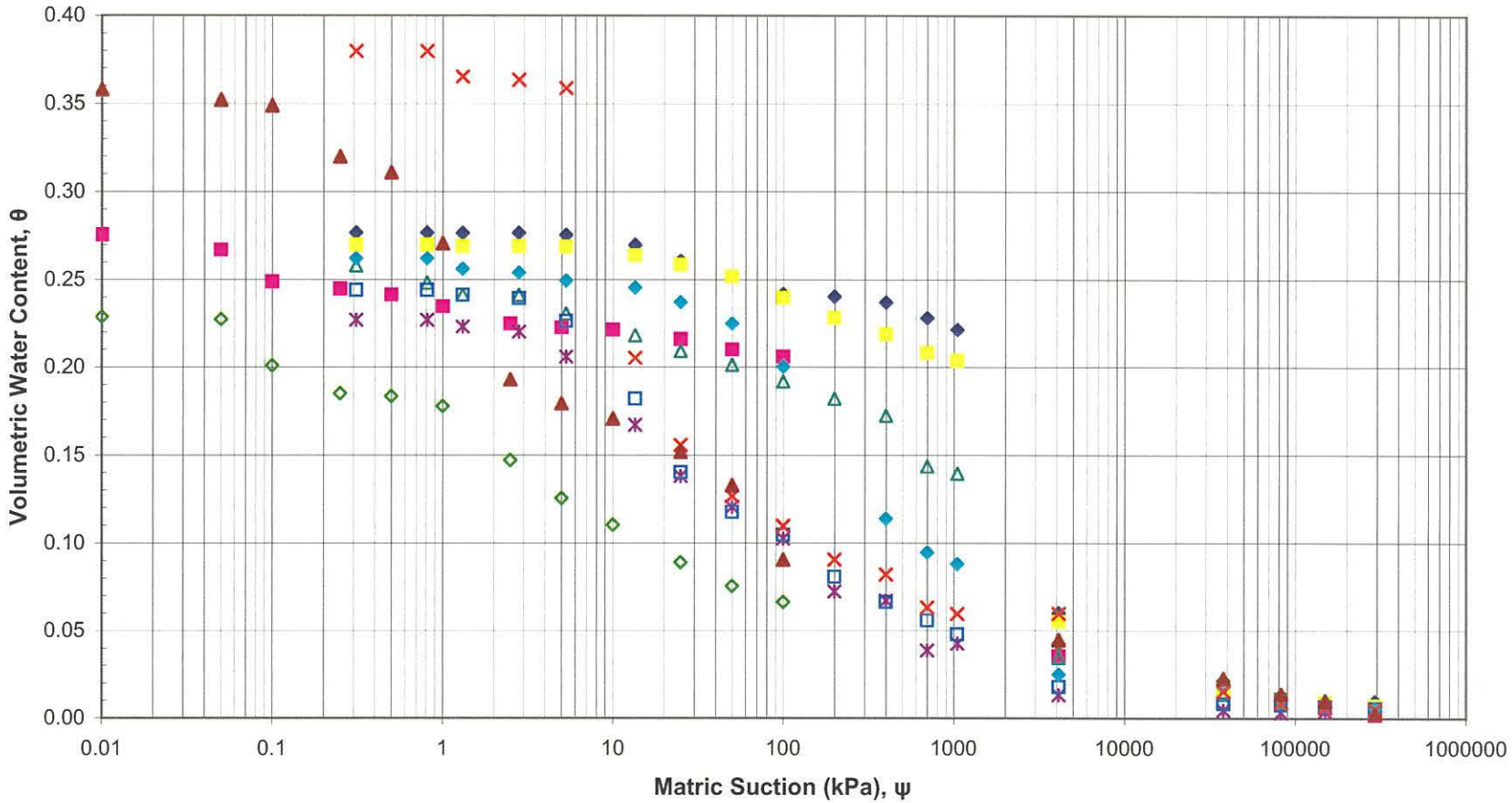
Particle Size Distribution Curves

PROJECT	DATE	APPROVED	FIGURE
1CD003.26	Feb. 2004	E.M.R.	5

Report Figures.xls, PSD



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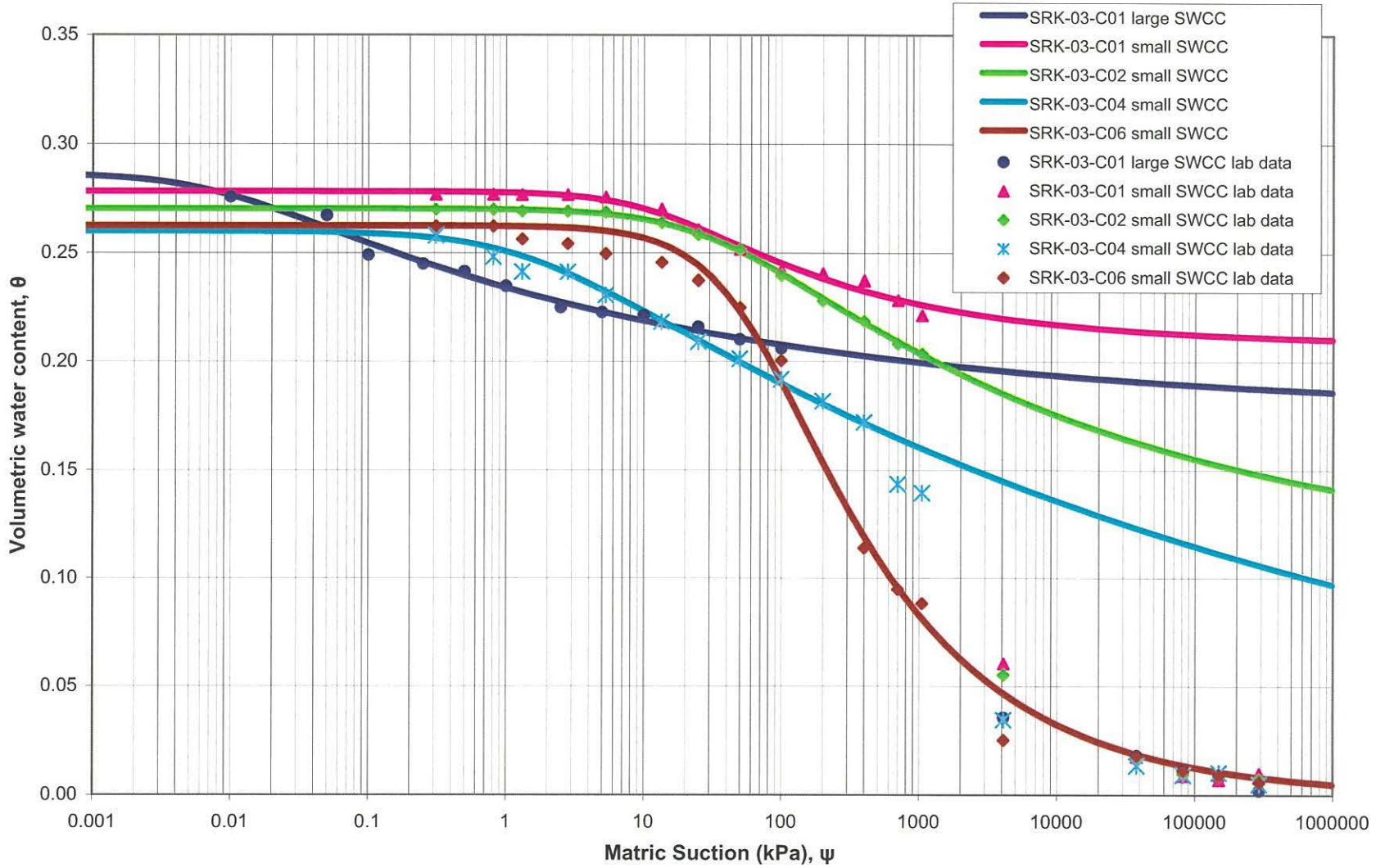
Soil Water Characteristic Curve Data

PROJECT	DATE	APPROVED	FIGURE
1CD003.26	Feb. 2004	E.M.R.	6



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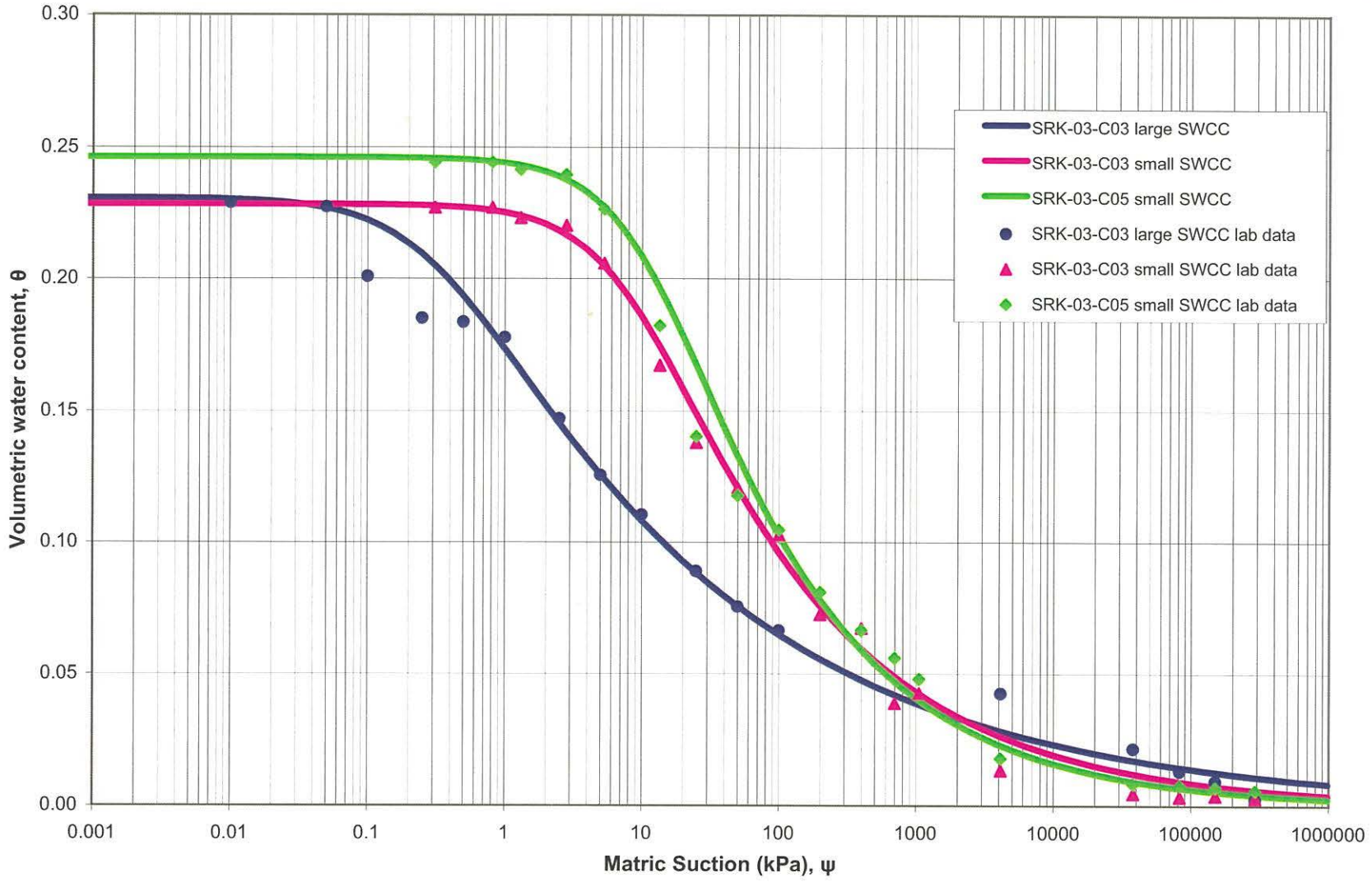
Soil Water Characteristic Curves (Till Material)

PROJECT	DATE	APPROVED	FIGURE
1CD003.26	Feb. 2004	E.M.R.	7

Report Figures.xls, SWCC (Till)



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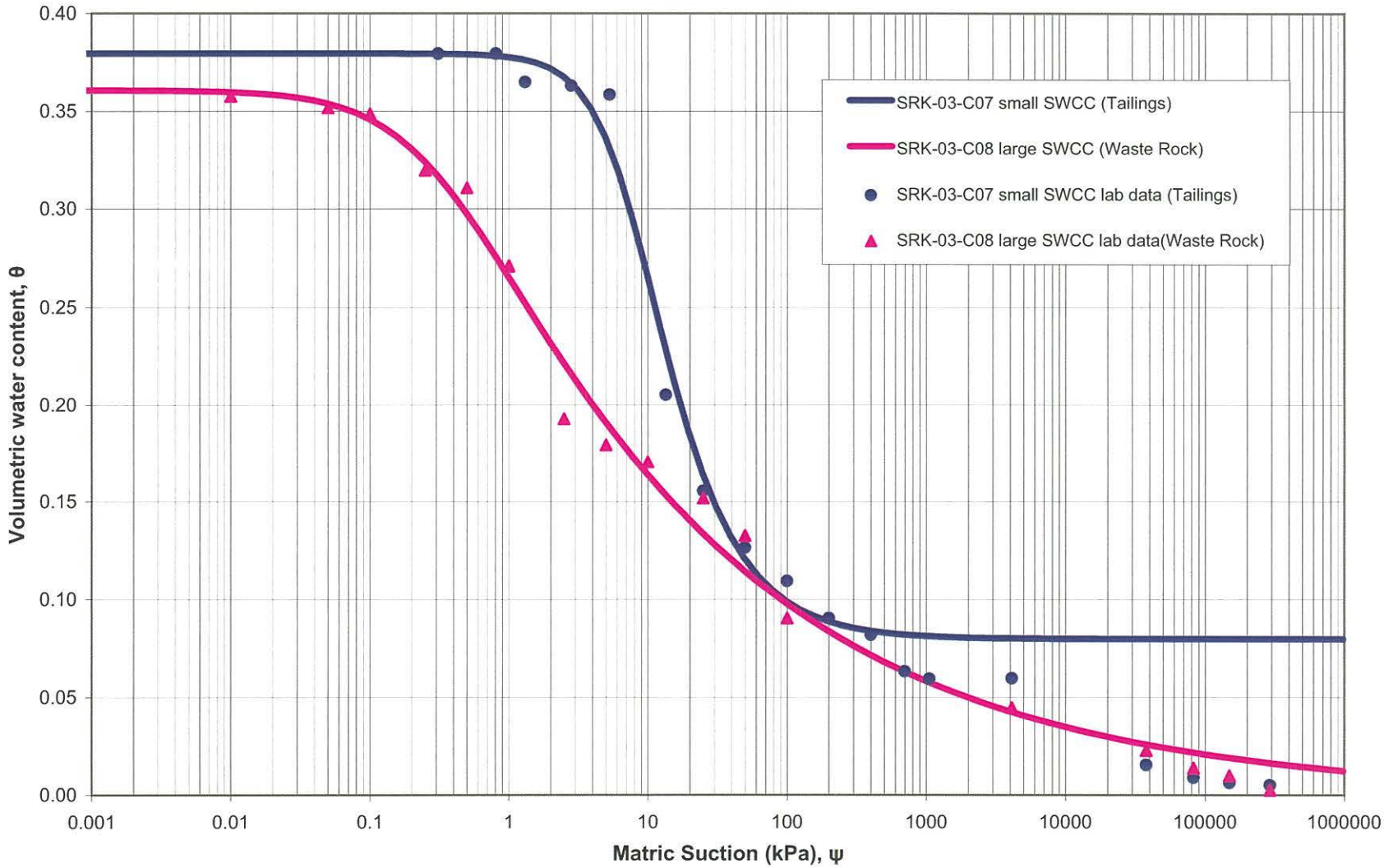
Soil Water Characteristic Curves (Glaciofluvial Material)

PROJECT	DATE	APPROVED	FIGURE
1CD003.26	Feb. 2004	E.M.R.	8

Report Figures.xls, SWCC (GF)



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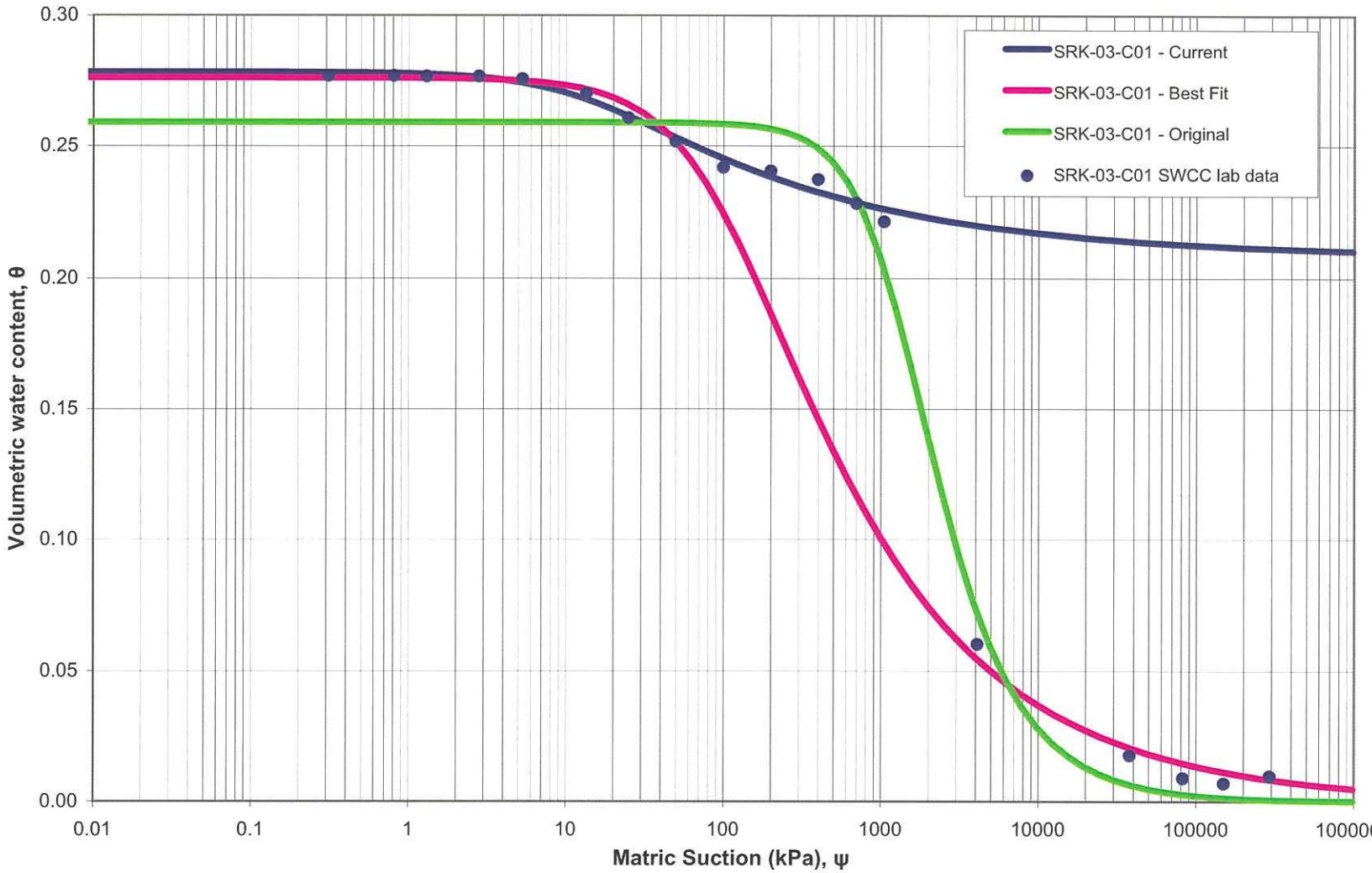
Soil Water Characteristic Curves (Waste Rock & Tailings)

PROJECT	DATE	APPROVED	FIGURE
1CD003.26	Feb. 2004	E.M.R.	9



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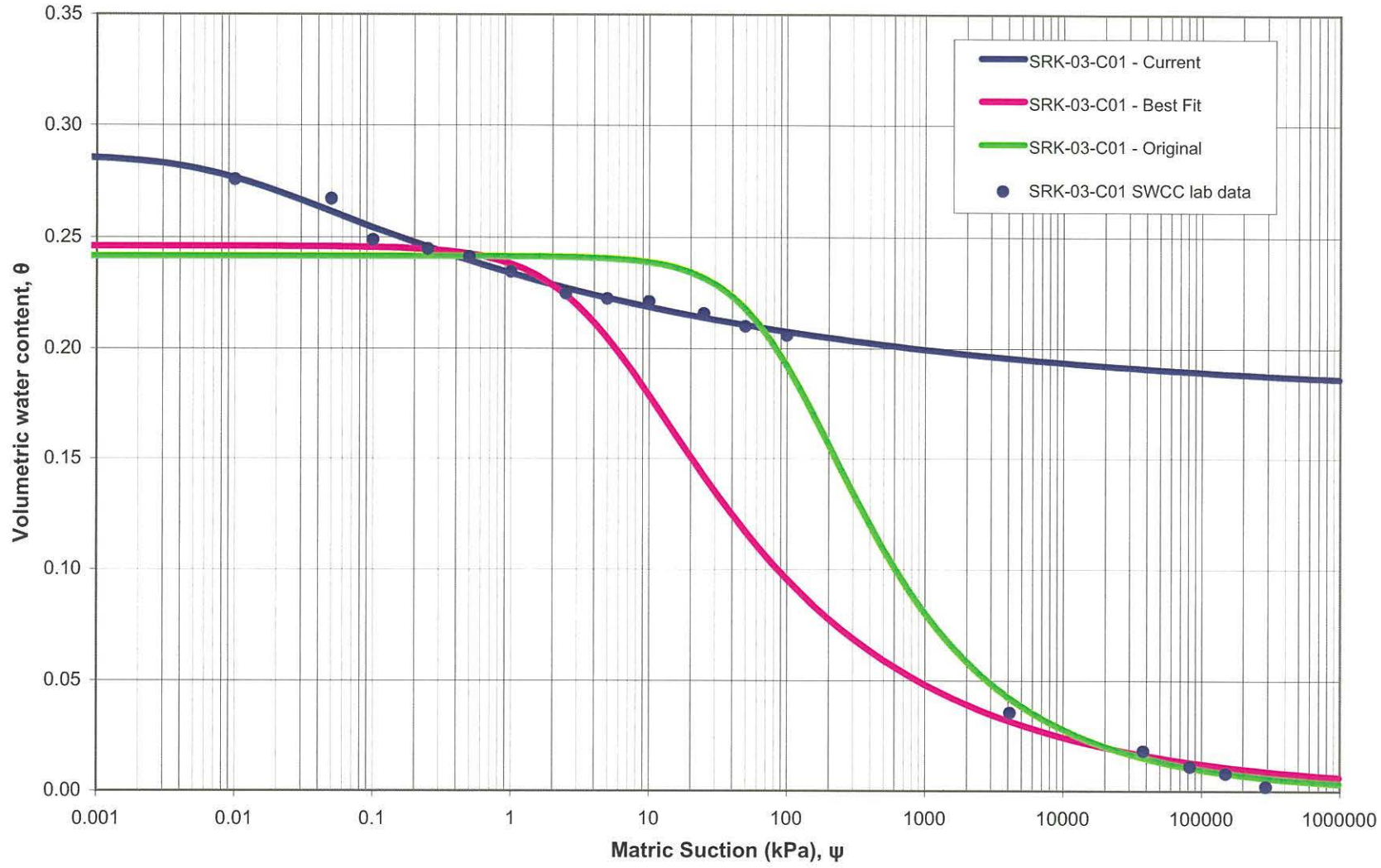
Soil Water Characteristic Curves (Till, SRK-03-C01, Standard Tempe Cell)

PROJECT	DATE	APPROVED	FIGURE
1CD003.26	Feb. 2004	E.M.R.	10

Report Figures.xls, Tail-end fit (C01 small)



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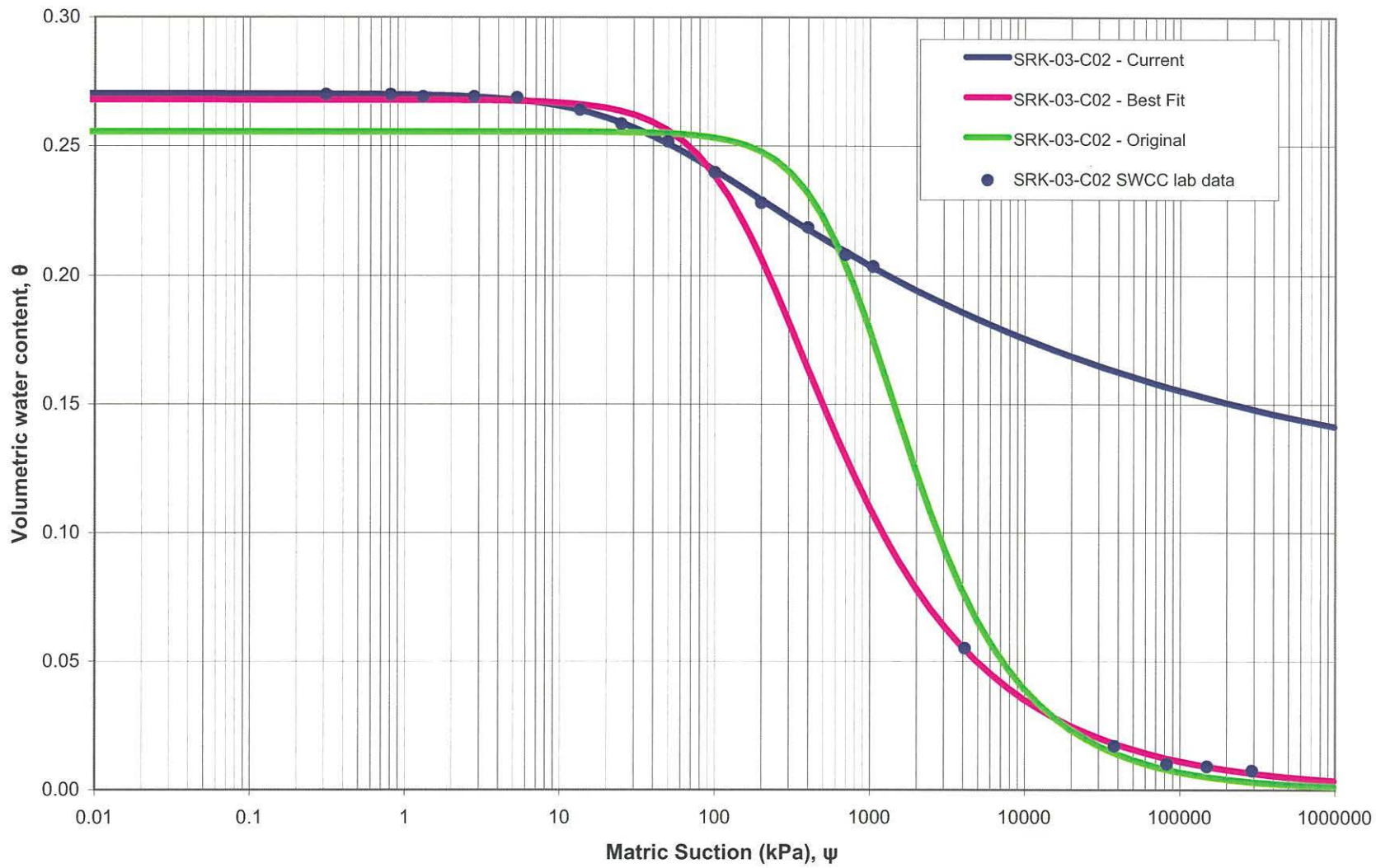
Soil Water Characteristic Curves (Till, SRK-03-C01, Large Tempe Cell)

PROJECT	DATE	APPROVED	FIGURE
1CD003.26	Feb. 2004	E.M.R.	11

Report Figures.xls, Tail-end fit (C01 large)



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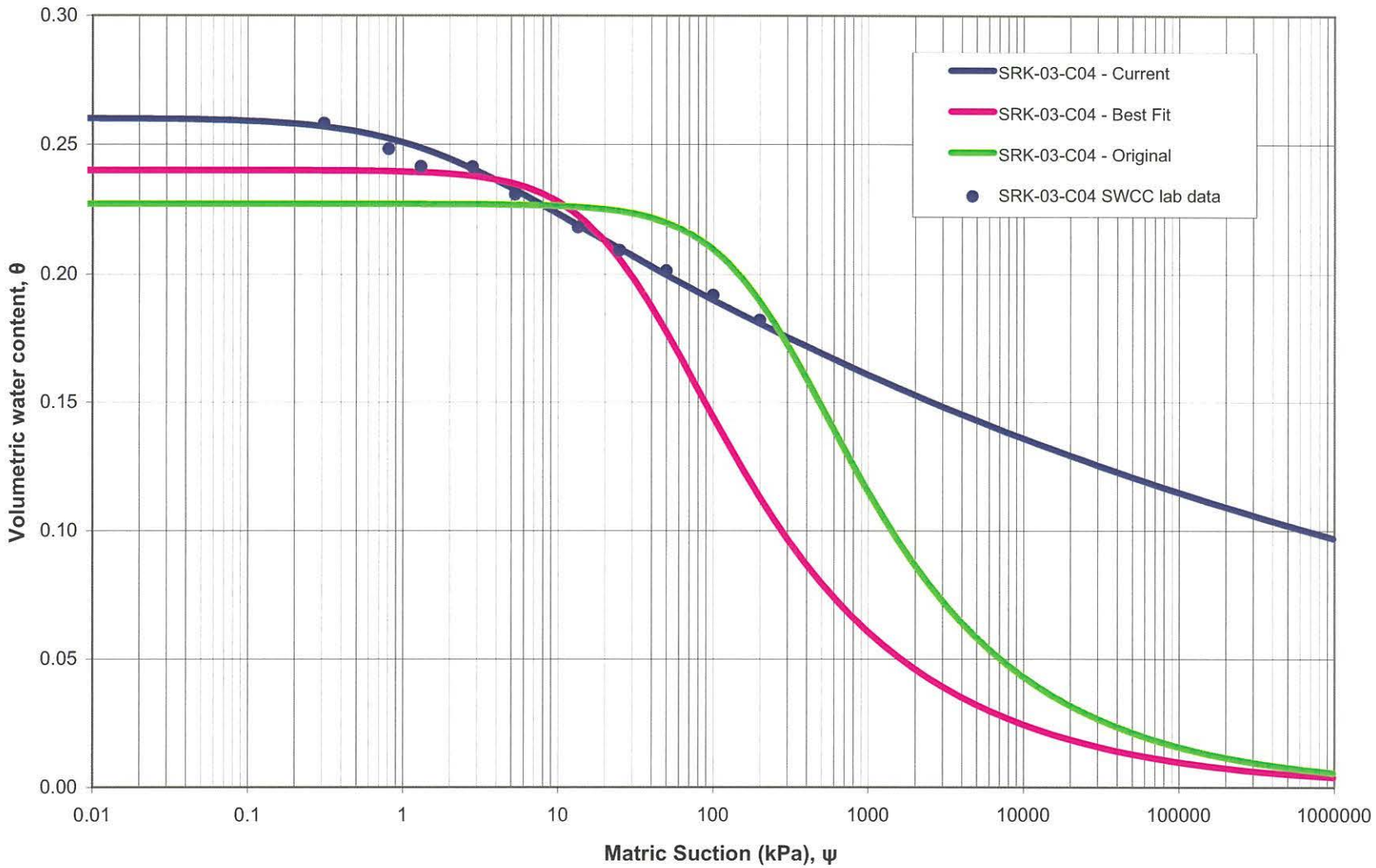
Soil Water Characteristic Curves (Till, SRK-03-C02, Standard Tempe Cell)

PROJECT	DATE	APPROVED	FIGURE
1CD003.26	Feb. 2004	E.M.R.	12

Report Figures.xls, Tail-end fit (C02 small)



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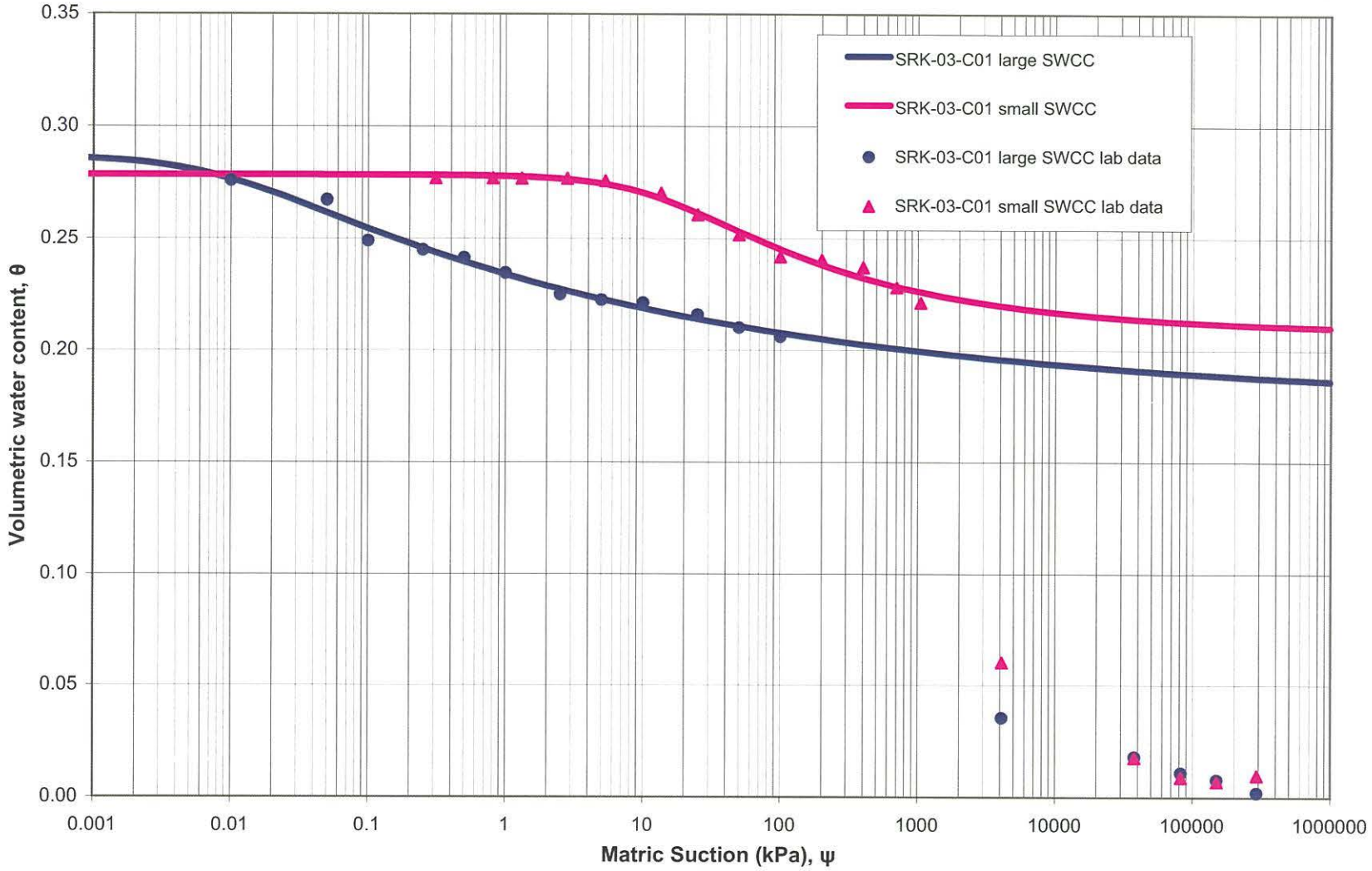
Soil Water Characteristic Curves (Till, SRK-03-C04, Standard Tempe Cell)

PROJECT	DATE	APPROVED	FIGURE
1CD003.26	Feb. 2004	E.M.R.	13

Report Figures.xls, Tail-end fit (C04 small)



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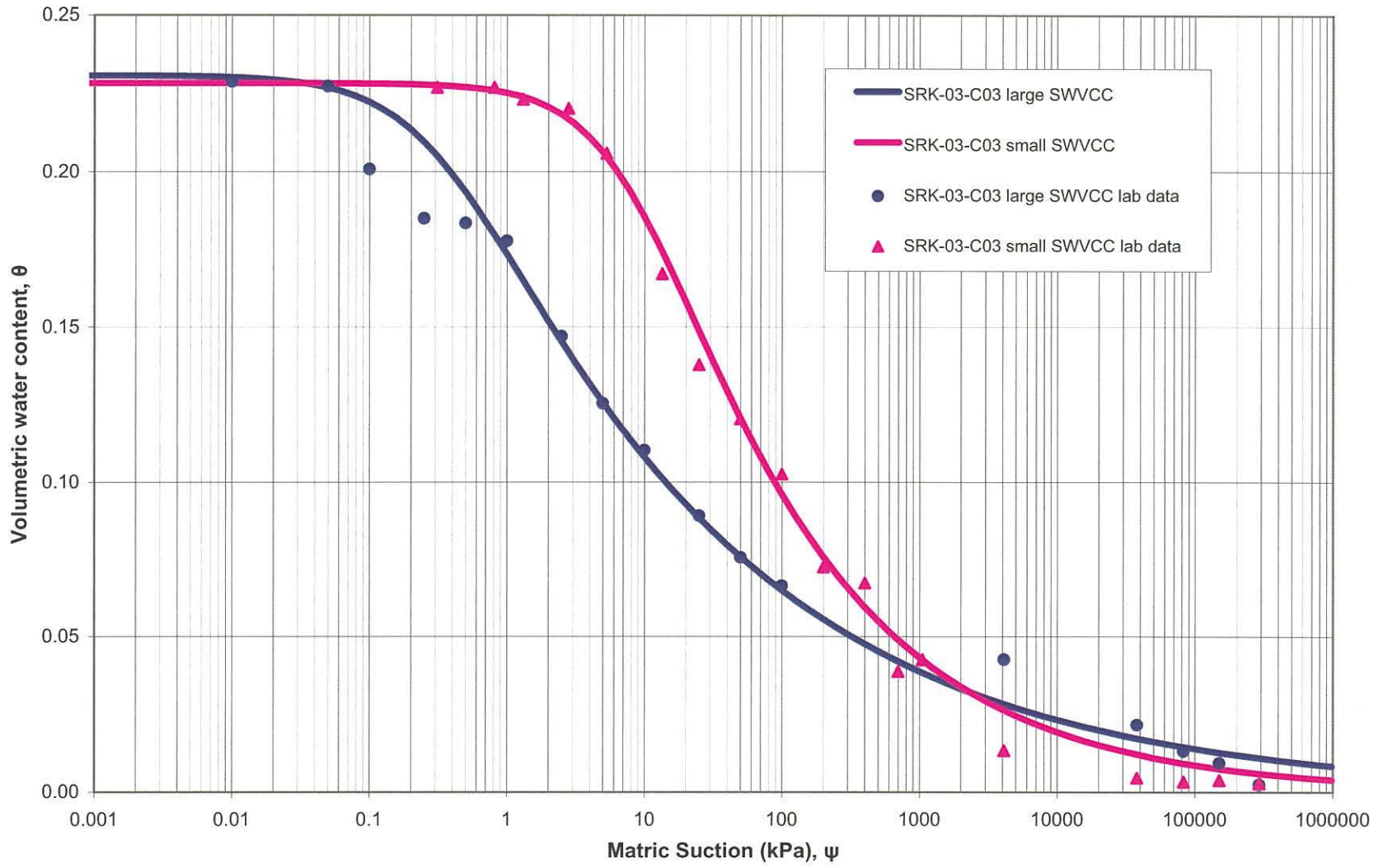
Soil Water Characteristic Curves (Till, SRK-03-C01)

PROJECT	DATE	APPROVED	FIGURE
1CD003.26	Feb. 2004	E.M.R.	14



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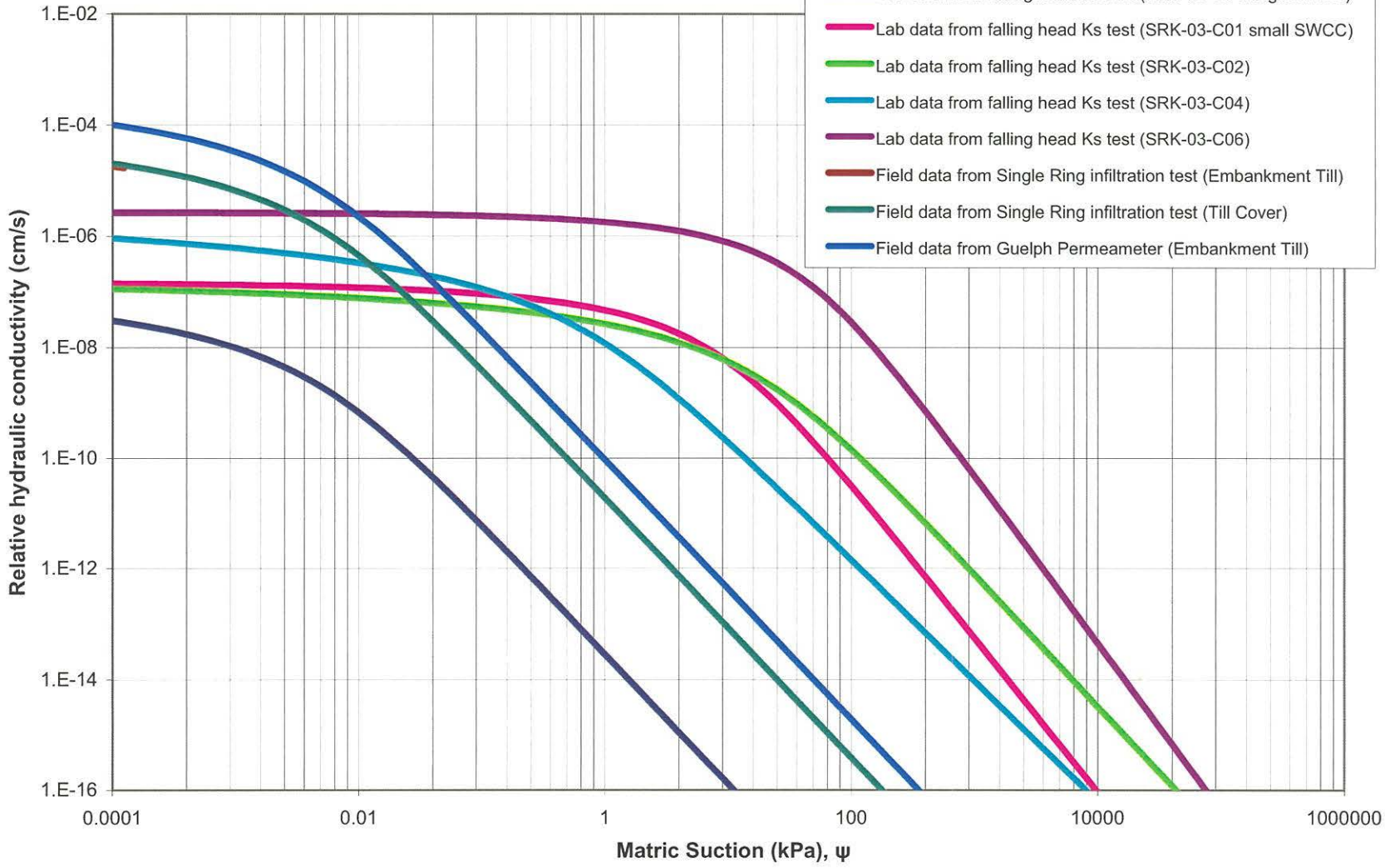
Soil Water Characteristic Curves (Glaciofluvial, SRK-03-C03)

PROJECT	DATE	APPROVED	FIGURE
1CD003.26	Feb. 2004	E.M.R.	15

Report Figures.xls, SWCC (C03)



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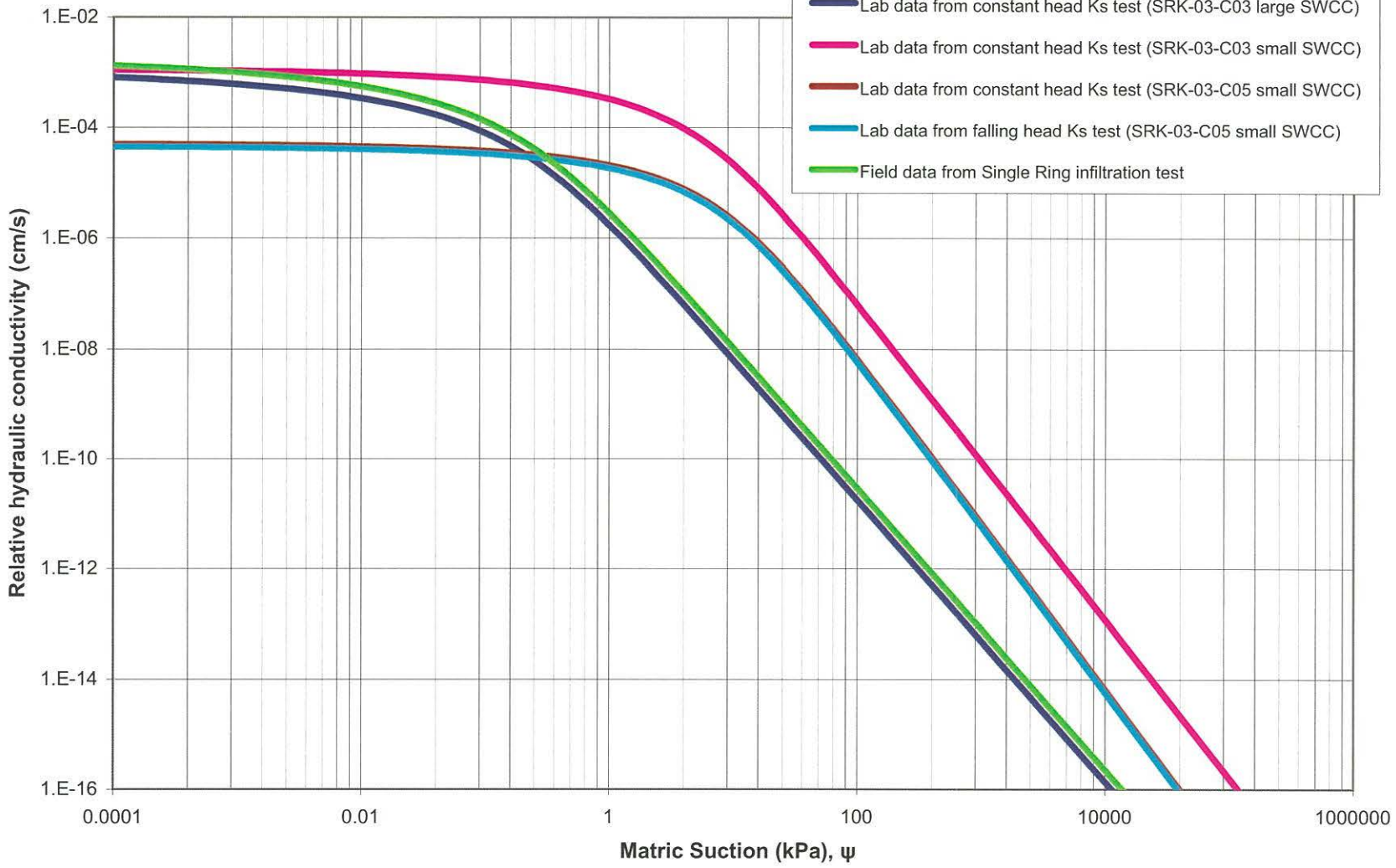
Unsaturated Hydraulic Conductivity Curves (Till Material)

PROJECT	DATE	APPROVED	FIGURE
1CD003.26	Feb. 2004	E.M.R.	16

Report Figures.xls, K-sat (Till)



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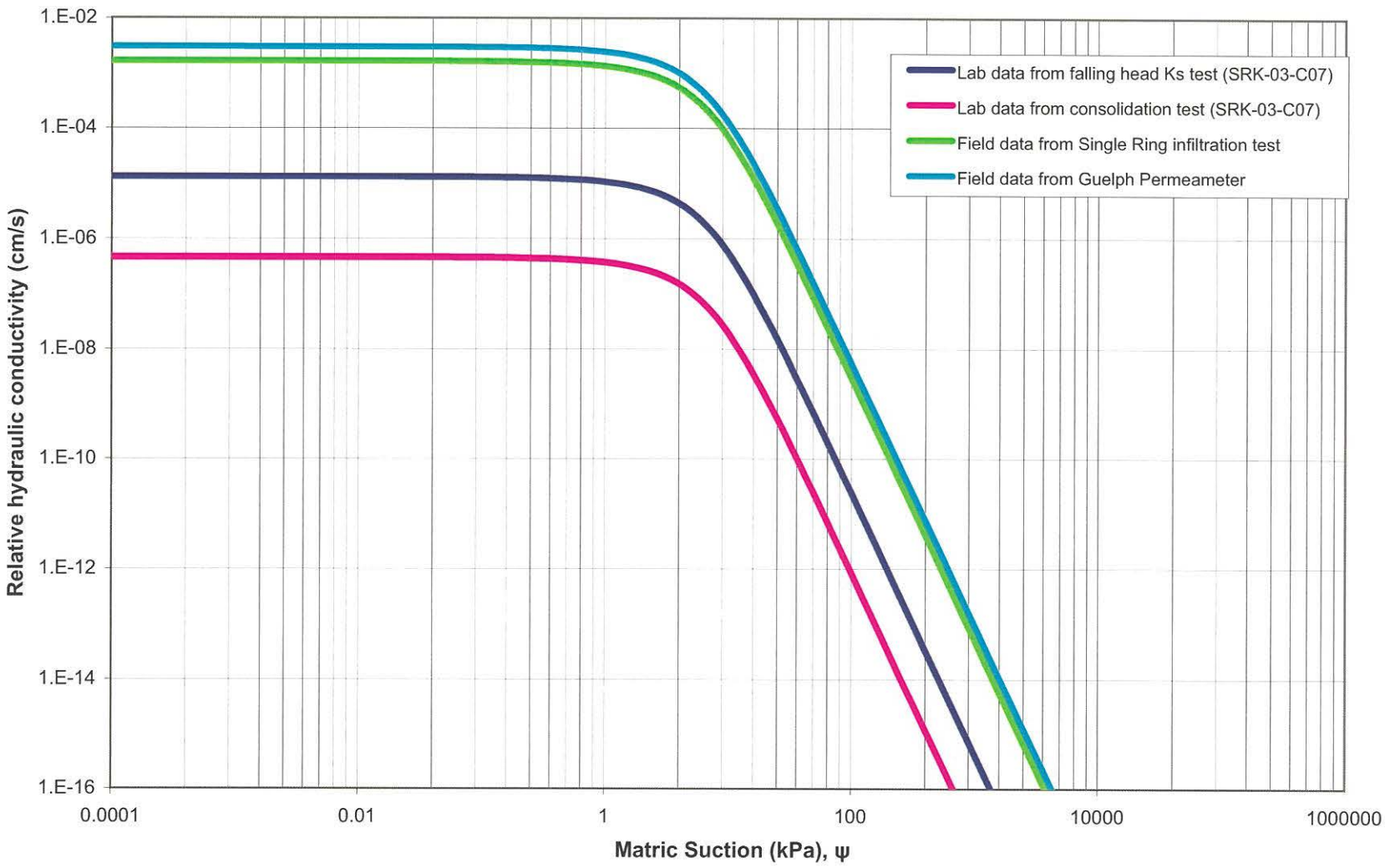
Anvil Range Mining Complex

Unsaturated Hydraulic Conductivity Curves (Glaciofluvial Material)

PROJECT	DATE	APPROVED	FIGURE
1CD003.26	Feb. 2004	E.M.R.	17

Report Figures.xls, K-sat (GF)



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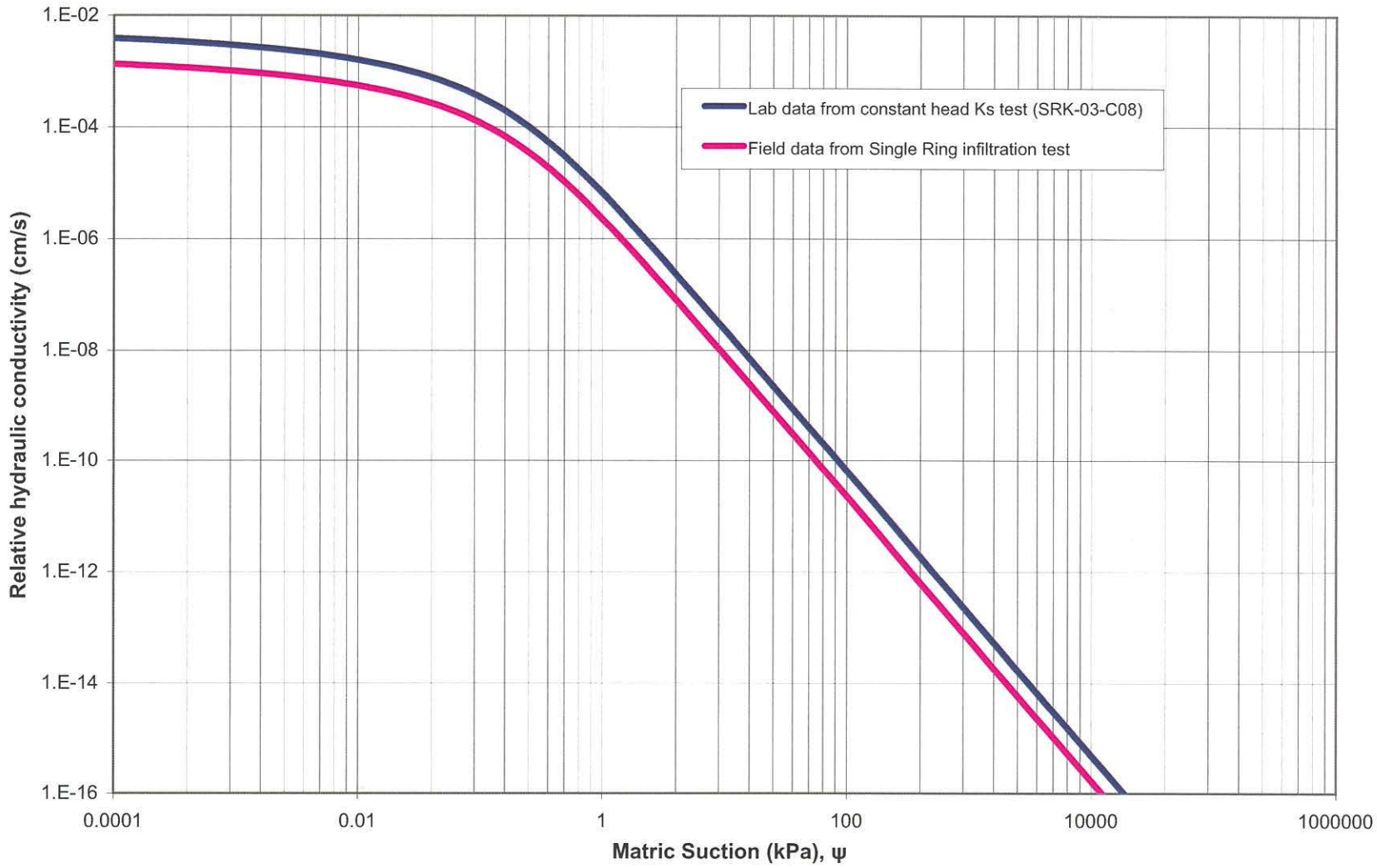
Unsaturated Hydraulic Conductivity Curves (Tailings)

PROJECT	DATE	APPROVED	FIGURE
1CD003.26	Feb. 2004	E.M.R.	18

Report Figures.xls, K-sat (TA)



SRK Consulting
Engineers and Scientists

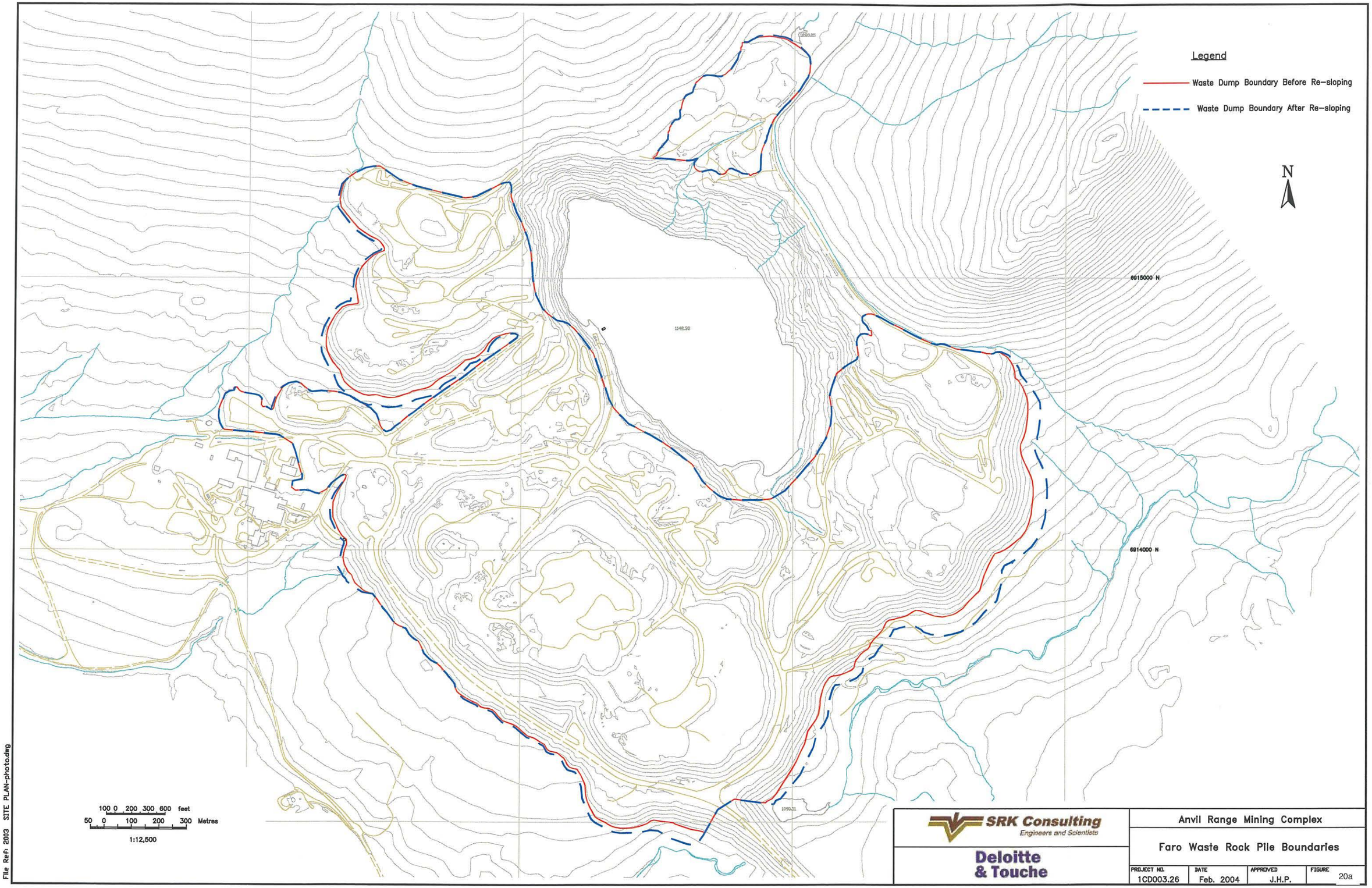
Deloitte & Touche

Anvil Range Mining Complex

Unsaturated Hydraulic Conductivity Curves (Waste Rock)

PROJECT	DATE	APPROVED	FIGURE
1CD003.26	Feb. 2004	E.M.R.	19

Report Figures.xls, K-sat (WR)



File Ref: 2003 SITE PLAN-photo.dwg

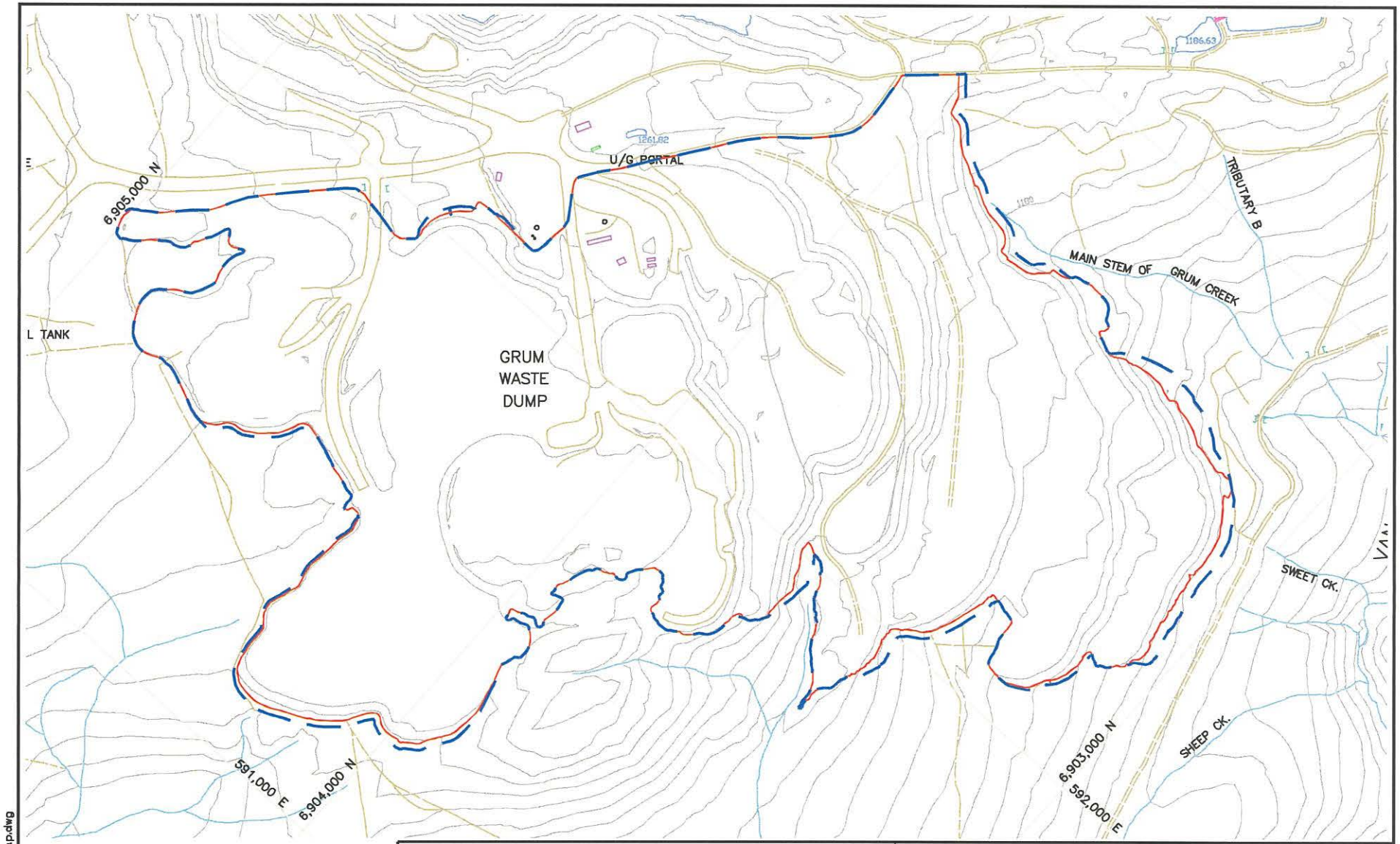
SRK Consulting
Engineers and Scientists

Deloitte & Touche

Anvil Range Mining Complex

Faro Waste Rock Pile Boundaries

PROJECT NO.	DATE	APPROVED	FIGURE
1CD003.26	Feb. 2004	J.H.P.	20a



SRK Consulting
Engineers and Scientists

Deloitte & Touche

Anvil Range Mining Complex

Grum Waste Rock Pile Boundaries

PROJECT NO.	DATE	APPROVED	FIGURE
1CD003.26	Feb. 2004	J.H.P.	20b

Dwg Ref: Regional Loc Map.dwg

Data Sheets

Data Sheet A
MDH Engineering Laboratory Report

MDH
ENGINEERED SOLUTIONS
HEAD OFFICE: 232-111 Research Drive, Saskatoon, SK, S7N 3R2 Telephone: (306) 934-7527 Fax: (306) 934-7528
LABORATORY: #1-320 Jessop Avenue, Saskatoon, SK, S7N 1Y6 Telephone: (306) 955-2735 Fax: (306) 651-3676

October 31, 2003

Dr. Maritz Rykaart, P.Eng.
Senior Geoenvironmental Engineer
SRK Consulting
Suite 800, 1066 West Hastings Street
Vancouver, BC
Canada V6E 3X2

Dear Dr. Rykaart:

Re: Geotechnical Laboratory Testing for Faro Mine Project, White Horse

This letter presents the results of a laboratory testing program conducted on materials from the Faro Mine in White Horse. MDH Geotechnical Laboratories conducted this testing program for SRK Consulting in Vancouver.

On June 18, 2003, eight 5-gallon pails of materials were received at MDH Geotechnical laboratories. The pails were labeled:

1. SRK-03-C01 (consists of 4 Ziploc bags of sandy till)
2. SRK-03-C02 (consists of 4 Ziploc bags of sandy till with some gravels)
3. SRK-03-C03 (consists of 4 Ziploc bags of glaciofluvial sand)
4. SRK-03-C04 (consists of 4 Ziploc bags of till)
5. SRK-03-C05 (consists of 4 Ziploc bags of glaciofluvial sand)
6. SRK-03-C06 (consists of 4 Ziploc bags of till)
7. SRK-03-C07 (consists of 2 bags of tailings)
8. SRK-03-C08 (consists of 2 bags of weathered waste rocks).

Instructions were received from SRK consulting to combine the individual bags in each pail to form eight samples for the laboratory testing program.

Laboratory Testing Program

The testing program is presented in Table 1 below.

Materials	Atterberg Limits	Specific gravity	Grain size	Standard Proctor	SWCC	Consolidation	Hydraulic Conductivity
SRK-03-C01	Yes	<#4 #4– 3/8" 3/8"-2"	Mech & hydrometer	4-inch mold	300-mm 64-mm		Falling head
SRK-03-C02	Yes	<#4 #4– 3/8" 3/8"-2"	Mech & hydrometer	4-inch mold	64-mm		Falling head
SRK-03-C03	Yes	<#4 #4– 3/8"	Mech & hydrometer	6-inch mold	300-mm 64-mm		Constant head
SRK-03-C04	Yes	<#4 #4– 3/8"	Mech & hydrometer	4-inch mold	64-mm		Falling head
SRK-03-C05	Yes	<#4 #4– 3/8"	Mech & hydrometer	4-inch mold	64-mm		Falling head & Constant head
SRK-03-C06	Yes	<#4 #4– 3/8"	Mech & hydrometer	4-inch mold	64-mm		Falling head
SRK-03-C07	Yes	<#4 #4– 3/8"	Mech & hydrometer		64-mm	Max Press. 4866 kPa	Falling head
SRK-03-C08	Yes	<#4 #4– 3/8"	Mech & hydrometer		300-mm		Constant head

Atterberg Limits

The Atterberg limits tests were conducted as per ASTM D 4318.

The Atterberg limits tests determine the water contents at which the materials were in the plastic and liquid ststes. The plastic limit is determined by the water content at which the soil begins to exhibit plastic behaviour and the liquid limit is determined by the water content at which the soil is at the boundary between the semi-liquid and plastic states. The plasticity index is the water

content over which the soil behaves in a plastic manner. Numerically, plastic index is the difference between the liquid limit and the plastic limit.

Atterberg limits are conducted on fine-grained materials only. The Atterberg limits are used to characterize the fine-grained fraction of soils and are used to correlate with engineering behavior such as compressibility, permeability, compactibility, shrink-swell, water retention and shear strength.

Atterberg limits tests were attempted on all eight materials. Five out of the eight materials turned out to be non-plastic. These non-plastic materials are SRK-03-C03, SRK-03-C05, SRK-03-C06, SRK-03-C07 and SRK-03-C08. Results of the Atterberg limits tests are presented in Appendix I.

Specific Gravity

Specific gravity tests were conducted for fine-grained materials as well as for coarse aggregates. Specific gravity tests for the fine-grained materials were conducted on materials passing the #4 sieve (4.75-mm) as per ASTM D 854. Specific gravity tests for the coarse aggregates were conducted on materials larger than the #4 sieve as per ASTM C 127. For the specific gravity tests on the coarse aggregates, the materials were divided into two size groups, namely; #4 to 3/8" and 3/8" to 2'.

The specific gravity is required for calculating phase relationships.

Results of the specific gravity tests are presented in Appendix II.

Grain-size Distribution

Grain-size analyses were conducted as per ASTM D 422.

Wash sieve analyses were conducted on material larger than the #10 sieve (2.00-mm) and hydrometer analyses were conducted on material smaller than the #10 sieve. Results from the wash sieve analyses and hydrometer analyses were combined to provide the grain-size distribution curves. Results from the wash sieve analyses and hydrometer analyses are presented in Appendix III.

Standard Proctor Tests

Standard Proctor tests were conducted as per ASTM D 698.

The standard Proctor tests establish the relationship between water content and dry density of soils compacted in a 4 or 6-inch (101.6 or 152.4-mm) diameter mold using a 5.5-lbf (24.4-N) hammer dropped from a height of 12 inches (305 mm), producing a compactive effort of 12,400 ft-lb/ft3 (600 kN-m/m3).

Standard Proctor tests were conducted on six of the eight materials. These six materials were SRK-03-C01, SRK-03-C02, SRK-03-C03, SRK-03-C04 SRK-03-C05 and SRK-03-C06. Only one Standard Proctor test on material SRK 03-CO3 was conducted using a 6-inch mold due to the amount of oversize materials. The remainder of the materials were tested using a 4-inch mold.

Results of the standard proctor tests are presented in Appendix IV.

Soil-Water Characteristic Curve Tests

The pressure plate technique and the vapor extraction technique were used in the soil-water characteristic curve tests. The pressure plate technique was used for suction values up to the wilting point (i.e., 15-bar pressure). The vapor extraction technique was used for suction values greater than the wilting point.

Pressure Plate Apparatus

MDH Geotechnical Laboratories have three models of pressure plate apparatuses. These are 1.) 300mm diameter pressure plate cells suitable for testing waste rock materials with maximum particle size of 60mm (Figure 1), 2.) small pressure cells suitable for fine-grained and sand-size materials passing the #4 sieve (4.75mm) (Figure 2), and 3.) a large conventional pressure plate extractor from Soil Moisture commonly used by agricultural soil scientists. The large conventional pressure plate extractor from Soil Moisture is suitable only for testing fine-grained material and cannot be used for testing coarse-grained materials like waste rocks.

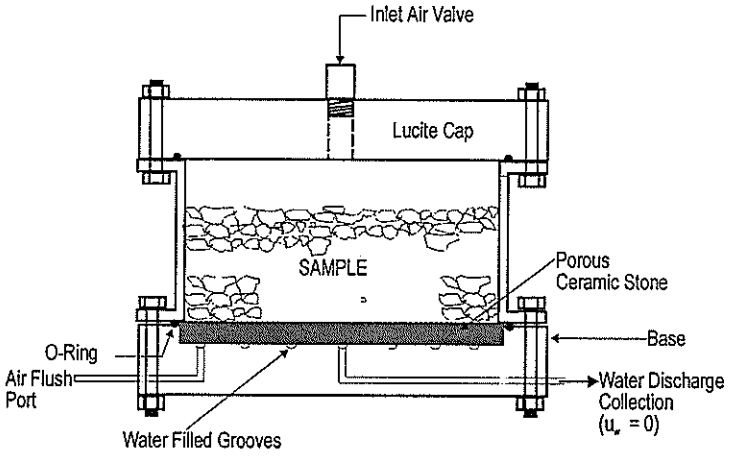


Figure 1 – Large pressure plate cell suitable for testing waste rocks with maximum particle size of 60mm.

Testing in this program were conducted using the small pressure plate cells for suction values up to 100 kPa and the conventional large pressure plate extraction for suction values from 200 kPa to 1500 kPa.

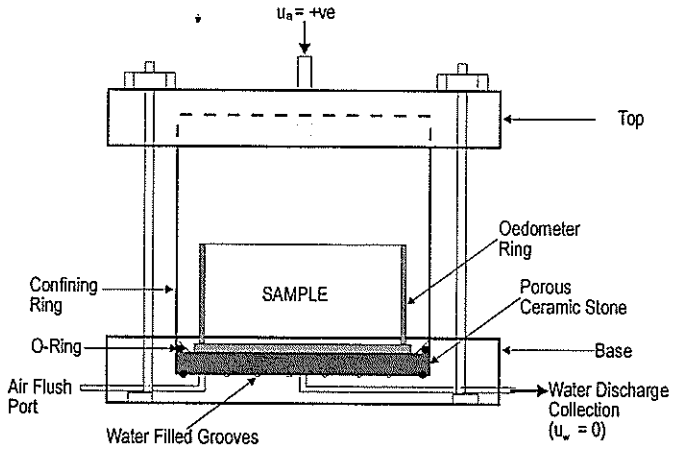


Figure 2 – Schematic diagram of small pressure plate cell.

Specimen Preparation

64-mm diameter specimens were used for the soil-water characteristic curve tests using the small pressure plate cells and the conventional large pressure plate extractor. The specimens were prepared using steel consolidometer rings with a diameter of 64mm and a height of 30mm.

The test specimens were prepared by tamping materials at its as-received water content condition into the steel consolidometer rings to 95% standard Proctor density.

Slurry test specimens were prepared in the following manner. Each slurry sample was first thoroughly mixed using an electric mixer for about 5 minutes. The thoroughly mixed slurry was allowed to settle overnight. Excess water was decanted and a test specimen was obtained by pressing the steel oedometer ring into the settled slurry.

The ringed-test specimens were then mounted into the small pressure plate cells (Figure 2) for soil-water characteristic curve tests. The high air-entry ceramic disks of the pressure plate cells were saturated prior to use.

Test Procedure

The soil-water characteristic curve tests conducted in this program were strictly desorption tests. Adsorption tests were not conducted. The tests specimens were saturated prior to starting the desorption process.

Specimens prepared from consolidated slurries were assumed saturated. Compacted specimens were saturated in the pressure plate cells by applying a water head to the bottom of the specimen. This was accomplished using a water column attached to the base of the pressure plate cell. Wetting from the bottom allowed air to escape easily through the surface of the specimen. During the saturation process, the pressure plate cell was vented to the atmosphere.

Suction was initially applied to the soil specimens by means of a water column. A 1-m long flexible tubing was attached to the outlet port of the pressure plate cell. The flexible tubing was completely filled with water to ensure a continuous water phase to the soil specimen. A negative water head was applied to the water in the soil specimen by maintaining the water level in the flexible tubing at the required distance below the surface of the soil specimen. The flexible tubing was capped with a septum and vented using a hypodermic needle. Suction equilibrium was attained in the soil specimen when water ceased to drain from the soil. At each suction equilibrium stage, the entire pressure plate cell system was weighed. In this manner, water that was extracted from the soil specimen can be accurately tracked. The water column was used for extracting water from the specimen up to a suction value of 5 kPa (negative 50 cm head). The water head was measured with reference to the surface of the specimen. The height of the specimen was about 30mm and there would be a suction difference of about 0.3 kPa between the top and bottom of the specimen.

The tests were continued beyond 5kPa using an air pressure supply for controlling suction in the soil specimen. On achieving suction equilibrium at 100 kPa, the test specimens were transferred into the conventional large pressure plate extractor for continuation of testing up to 1500 kPa.

The pressure plate tests used the axis-translation technique. In the axis-translation technique, the air and water pressures within the soil specimens were both translated to ensure that the water within the soil measurement systems remained at a positive value. In this test program, the water pressures were maintained near atmospheric condition for the tests that were conducted using an air supply system. Using the axis-translation technique, it is then possible to apply suction greater than 100 kPa without the problem of cavitation of the water phase within the measurement system. The applied suction being equal to the difference between the air and water pressure.

At the completion of the pressure plate test, the volume-mass properties of each test specimen were determined. From the volume-mass data obtained at the end of the test, the volumetric and gravimetric water contents of the soil specimens corresponding to each suction equilibrium condition were computed by accounting for the amount of water that was lost from the soil at each stage.

Vapor Extraction Using Desiccators

For obtaining the soil-water characteristic curves at suctions greater than the wilting point, the vapor extraction technique was used. The vapor extraction tests were conducted using desiccators containing saturated salt solutions. The salt solutions and their corresponding suction values are presented in Table 2.

Table 2 – Saturated salt solutions and equivalent total suctions.

DESICCATOR	SALT	TEMPERATURE (°C)	RELATIVE HUMIDITY (%)	EQUIVALENT TOTAL SUCTION (kPa)
A	Lithium Chloride ($LiCl_2.H_2O$ + $LiCl_2.2H_2O$)	20	11.5	2.93×10^5
B	Magnesium Chloride ($MgCl_2.6H_2O$)	20	33.0	1.50×10^5
C	Magnesium Nitrate ($Mg(NO_3)_2.6H_2O$)	20	54.3	8.26×10^4
D	Sodium Chloride (NaCl)	20	75.5	3.80×10^4
E	Potassium Sulphate	20	97.0	4.12×10^3

Small samples from each of the ten material types were placed in each of the above five desiccators at the start of the testing program. The samples were kept in the desiccators until the pressure plate tests were nearing completion, a period of over six weeks in this case. Typically, a period of two to three weeks was required for the specimens in the desiccators to attain equilibrium. The equilibrium conditions were checked by weighing the specimens. Constant weight over two weighing period would confirm equilibrium condition. The water contents of each sample on attaining vapor equilibrium were then determined.

Results of the large diameter (300-mm) and small diameter (64-mm) soil-water characteristic curve tests are presented in Appendix V-a and V-b, respectively.

Consolidation Test

Consolidation test was conducted on tailings material SRK-03-C07 as per ASTM D 2435. The test was conducted to a maximum pressure of 4866 kPa. Results of the consolidation tests performed on SRK-03-C07 are presented in Appendix VI.

Hydraulic Conductivity Tests

Falling head hydraulic conductivity tests were conducted on materials SRK-03-C01, SRK-03-C02 SRK-03-C04, SRK-03-C05, SRK-03-C06 and SRK-03-C07.

Constant head tests were conducted on materials SRK-03-C03 and SRK-03-C08. Constant head test was also repeated for material SRK-03-C05, and the results checked out well with the falling head test results.

Details on the constant head and falling head tests can be found in "Liu & Evett, 1984, SOIL PROPERTIES: Testing, Measurement, and Evaluation, Prentice-Hall, New Jersey ".

Results of the falling head and constant head tests are presented in Appendix VII-a and VII-b, respectively.

Closure

The tests conducted in this program were requested by Dr. Maritz Rykaart of SRK Consulting, Vancouver. This report was prepared exclusively for SRK Consulting, Vancouver.

We trust this report meets your present needs. Please contact the undersigned if you have any questions, or if we can be of further assistance.

Respectfully submitted

MDH Geotechnical Laboratories

Julian Gan, M.Sc., P.Eng.
Laboratories Manager

APPENDIX I

Atterberg Limits Tests Results

MDH ENGINEERED SOLUTIONS

ATTERBERG LIMITS

Project: Faro Mine
Location: Whitehorse, Yukon
SRK Consulting
Technician: SO Date: 22-Jul-03

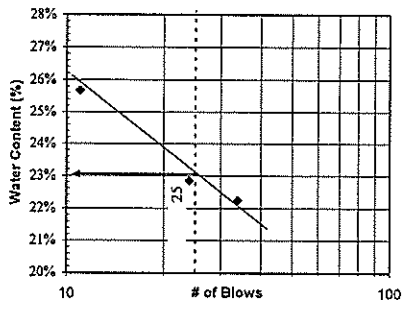
Sample: SRK-03-C01

Plastic Limit

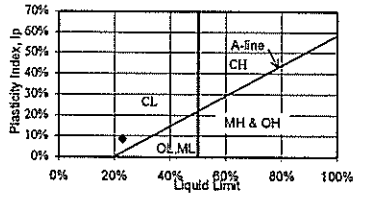
Tare #	A11	A2					
Tare Wt, g	13.41	13.16					
Wet + Tare, g	21.11	19.25					
Dry + Tare, g	20.13	18.48					
M%	14.6%	14.5%		Average:	14.5%		

Liquid Limit

# of Blows	11	24	34				
Tare #	A15	A6	A14				
Tare Wt, g	13.65	13.33	13.52				
Wet + tare, g	28.49	28.12	30.39				
Dry + tare, g	25.46	25.37	27.32				
M%	25.7%	22.8%	22.2%				



Plastic Limit: 14.5%
Liquid Limit: 23.0%
Plasticity Index: 8.5%
Classification: CL



Comments:

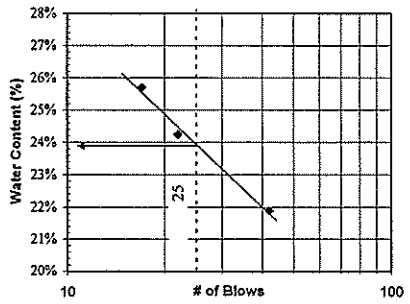
MDH ENGINEERED SOLUTIONS

ATTERBERG LIMITS

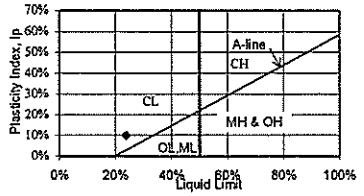
Project: Faro Mine
Location: Whitehorse, Yukon
SRK Consulting
Technician: SO Date: 22-Jul-03

Sample: SRK-03-C02

Plastic Limit							
Tare #	A5	A4					
Tare Wt, g	13.45	13.50					
Wet + Tare, g	19.6	20.43					
Dry + Tare, g	18.85	19.58					
M%	13.9%	14.0%		Average:	13.9%		
Liquid Limit							
# of Blows	42	22	17				
Tare #	A8	A3	A11				
Tare Wt, g	13.50	13.74	13.35				
Wet + tare, g	30.71	27.78	26.95				
Dry + tare, g	27.62	25.04	24.17				
M%	21.9%	24.2%	25.7%				



Plastic Limit: 13.9%
Liquid Limit: 23.8%
Plasticity Index: 9.9%
Classification: CL



Comments:

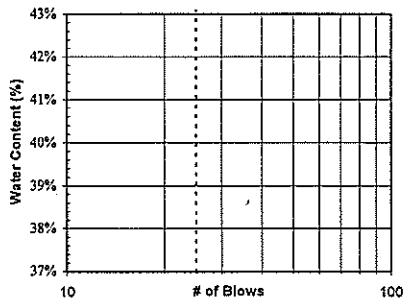
MDH ENGINEERED SOLUTIONS

ATTERBERG LIMITS

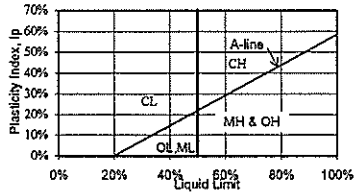
Project: Faro Mine
Location: Whitehorse, Yukon
SRK Consulting
Technician: SO Date: 22-Jul-03

Sample: SRK-03-C03

Plastic Limit							
Tare #							
Tare Wt, g							
Wet + Tare, g							
Dry + Tare, g							
M%	#DIV/0!	#DIV/0!		Average:	#DIV/0!		
Liquid Limit							
# of Blows							
Tare #							
Tare Wt, g							
Wet + tare, g							
Dry + tare, g							
M%	#DIV/0!	#DIV/0!	#DIV/0!				



Plastic Limit: #DIV/0!
Liquid Limit:
Plasticity Index: #DIV/0!
Classification:



Comments: Material would not roll - all sand. Material classified as NONPLASTIC

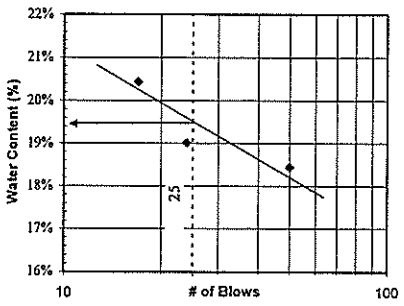
MDH ENGINEERED SOLUTIONS

ATTERBERG LIMITS

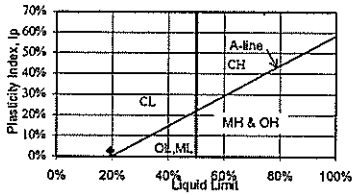
Project: Faro Mine
Location: Whitehorse, Yukon
SRK Consulting
Technician: SO Date: 22-Jul-03

Sample: SRK-03-C04

Plastic Limit							
Tare #	A13	A9					
Tare Wt, g	13.37	13.42					
Wet + Tare, g	19.91	22.27					
Dry + Tare, g	18.97	20.99					
M%	16.8%	16.9%		Average:	16.8%		
Liquid Limit							
# of Blows	17	24	50				
Tare #	A12	A7	A24				
Tare Wt, g	13.59	13.50	13.12				
Wet + tare, g	31.68	35.91	29.37				
Dry + tare, g	28.61	32.33	26.84				
M%	20.4%	19.0%	18.4%				



Plastic Limit: 16.8%
Liquid Limit: 19.4%
Plasticity Index: 2.6%
Classification: CL



Comments:

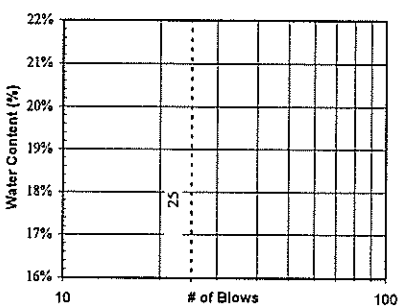
MDH ENGINEERED SOLUTIONS

ATTERBERG LIMITS

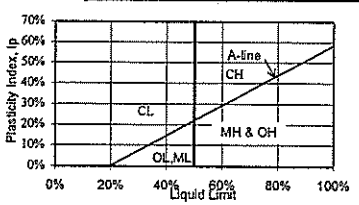
Project: Faro Mine
Location: Whitehorse, Yukon
SRK Consulting
Technician: SO Date: 22-Jul-03

Sample: SRK-03-C05

Plastic Limit							
Tare #							
Tare Wt, g							
Wet + Tare, g							
Dry + Tare, g							
M%	#DIV/0!	#DIV/0!		Average:	#DIV/0!		
Liquid Limit							
# of Blows							
Tare #							
Tare Wt, g							
Wet + tare, g							
Dry + tare, g							
M%	#DIV/0!	#DIV/0!	#DIV/0!				



Plastic Limit: #DIV/0!
Liquid Limit:
Plasticity Index: #DIV/0!
Classification:



Comments: Material would not roll - too sandy - soil classified as NONPLASTIC

MDH ENGINEERED SOLUTIONS

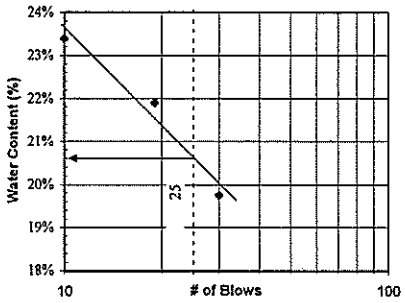
ATTERBERG LIMITS

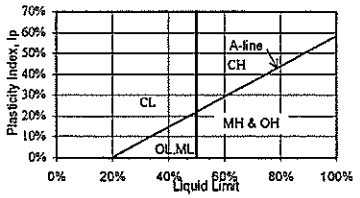
Project: Faro Mine
Location: Whitehorse, Yukon
SRK Consulting
Technician: SO Date: 22-Jul-03

Sample: SRK-03-C06

Plastic Limit							
Tare #	A31	A19					
Tare Wt, g	13.57	13.54					
Wet + Tare, g	20.08	19.36					
Dry + Tare, g	18.89	18.33					
M%	22.4%	21.5%		Average:	21.9%		
Liquid Limit							
# of Blows	10	19	30				
Tare #	A30	A29	A25				
Tare Wt, g	13.17	13.38	13.60				
Wet + tare, g	31.00	31.08	32.52				
Dry + tare, g	27.62	27.90	29.40				
M%	23.4%	21.9%	19.7%				

Plastic Limit: 21.9%
Liquid Limit: 20.6%
Plasticity Index: -1.3%
Classification:





Comments: Material barely rolled - too sandy - soil classified as NONPLASTIC

MDH ENGINEERED SOLUTIONS

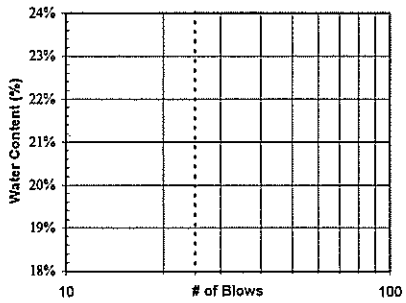
ATTERBERG LIMITS

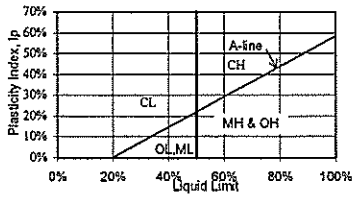
Project: Faro Mine
Location: Whitehorse, Yukon
SRK Consulting
Technician: SO Date: 22-Jul-03

Sample: SRK-03-C07

Plastic Limit							
Tare #							
Tare Wt, g							
Wet + Tare, g							
Dry + Tare, g							
M%	#DIV/0!	#DIV/0!		Average:	#DIV/0!		
Liquid Limit							
# of Blows							
Tare #							
Tare Wt, g							
Wet + tare, g							
Dry + tare, g							
M%	#DIV/0!	#DIV/0!	#DIV/0!				

Plastic Limit: #DIV/0!
Liquid Limit:
Plasticity Index: #DIV/0!
Classification:





Comments: Material would not roll - too sandy - soil classified as NONPLASTIC

MDH ENGINEERED SOLUTIONS

ATTERBERG LIMITS

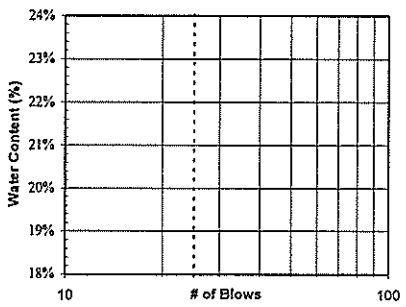
Project: Faro Mine
Location: Whitehorse, Yukon
SRK Consulting
Technician: SO Date: 22-Jul-03

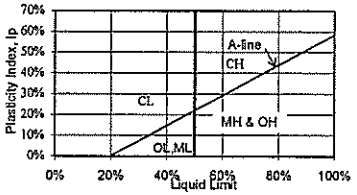
Sample: SRK-03-C08

Plastic Limit							
Tare #							
Tare Wt, g							
Wet + Tare, g							
Dry + Tare, g							
M%	#DIV/0!	#DIV/0!		Average:	#DIV/0!		

Liquid Limit							
# of Blows							
Tare #							
Tare Wt, g							
Wet + tare, g							
Dry + tare, g							
M%	#DIV/0!	#DIV/0!	#DIV/0!				

Plastic Limit: #DIV/0!
Liquid Limit:
Plasticity Index: #DIV/0!
Classification:





Comments: Material would not roll - too sandy - soil classified as NONPLASTIC

APPENDIX II

Specific Gravity Results

MDH ENGINEERED SOLUTIONS

SPECIFIC GRAVITY DETERMINATION FOR COARSE AGGREGATE - ASTM C 127

Project: SRK Consulting
Location: Faro Mine, WhiteHorse
Date: 14-Jul-03

Computation for Bulk Specific Gravity	Sample: SRK-03-C01			
Soil	> 2"	3/8" - 2"	#4 - 3/8"	<#4
Weight of Oven-Dry Sample in Air, *A* (g)		263.86	92.22	
Weight of Saturated-Surface-Dry Sample in Air, *B* (g)		265.85	93.39	
Weight of Saturated Sample in Water, *C* (g)		166.85	58.42	
Bulk Specific Gravity, G_s =*B/(B-C)*		2.69	2.67	
Apparent Specific Gravity, G_{ss} = *A/(A-C)*		2.72	2.73	2.70

Computation for Bulk Specific Gravity	Sample: SRK-03-CO2			
Soil	> 2"	3/8" - 2"	#4 - 3/8"	<#4
Weight of Oven-Dry Sample in Air, *A* (g)		263.86	107.12	
Weight of Saturated-Surface-Dry Sample in Air, *B* (g)		265.85	108.24	
Weight of Saturated Sample in Water, *C* (g)		166.85	67.08	
Bulk Specific Gravity, G_s =*B/(B-C)*		2.69	2.63	
Apparent Specific Gravity, G_{ss} = *A/(A-C)*		2.72	2.68	2.69

Computation for Bulk Specific Gravity	Sample: SRK-03-CO3			
Soil	> 2"	3/8" - 2"	#4 - 3/8"	<#4
Weight of Oven-Dry Sample in Air, *A* (g)			215.25	
Weight of Saturated-Surface-Dry Sample in Air, *B* (g)			217.60	
Weight of Saturated Sample in Water, *C* (g)			135.61	
Bulk Specific Gravity, G_s =*B/(B-C)*			2.65	
Apparent Specific Gravity, G_{ss} = *A/(A-C)*			2.70	2.68

Comments:

MDH ENGINEERED SOLUTIONS

SPECIFIC GRAVITY DETERMINATION FOR COARSE AGGREGATE - ASTM C 127

Project: SRK Consulting
Location: Faro Mine, WhiteHorse
Date: 14-Jul-03

Computation for Bulk Specific Gravity	Sample: SRK-03-C04			
Soil	> 2"	3/8" - 2"	#4 - 3/8"	<#4
Weight of Oven-Dry Sample in Air, *A* (g)			108.16	
Weight of Saturated-Surface-Dry Sample in Air, *B* (g)			109.72	
Weight of Saturated Sample in Water, *C* (g)			68.18	
Bulk Specific Gravity, G_s =*B/(B-C)*			2.64	
Apparent Specific Gravity, G_{ss} = *A/(A-C)*			2.71	2.69

Computation for Bulk Specific Gravity	Sample: SRK-03-CO5			
Soil	> 2"	3/8" - 2"	#4 - 3/8"	<#4
Weight of Oven-Dry Sample in Air, *A* (g)			148.02	
Weight of Saturated-Surface-Dry Sample in Air, *B* (g)			150.87	
Weight of Saturated Sample in Water, *C* (g)			93.15	
Bulk Specific Gravity, G_s =*B/(B-C)*			2.61	
Apparent Specific Gravity, G_{ss} = *A/(A-C)*			2.70	2.68

Computation for Bulk Specific Gravity	Sample: SRK-03-CO6			
Soil	> 2"	3/8" - 2"	#4 - 3/8"	<#4
Weight of Oven-Dry Sample in Air, *A* (g)			155.73	
Weight of Saturated-Surface-Dry Sample in Air, *B* (g)			158.70	
Weight of Saturated Sample in Water, *C* (g)			98.07	
Bulk Specific Gravity, G_s =*B/(B-C)*			2.62	
Apparent Specific Gravity, G_{ss} = *A/(A-C)*			2.70	2.68

Comments:

MDH ENGINEERED SOLUTIONS

SPECIFIC GRAVITY DETERMINATION FOR COARSE AGGREGATE - ASTM C 127

Project: SRK Consulting
Location: Faro Mine, WhiteHorse
Date: 14-Jul-03

Computation for Bulk Specific Gravity	Sample: SRK-03-C07			
Soil	> 2"	3/8" - 2"	#4 - 3/8"	<#4
Weight of Oven-Dry Sample in Air, *A* (g)			108.16	
Weight of Saturated-Surface-Dry Sample in Air, *B* (g)			109.72	
Weight of Saturated Sample in Water, *C* (g)			68.18	
Bulk Specific Gravity, G_s =*B/(B-C)*			2.64	
Apparent Specific Gravity, G_{as} = *A/(A-C)*			2.71	3.46

Computation for Bulk Specific Gravity	Sample: SRK-03-C08			
Soil	> 2"	3/8" - 2"	#4 - 3/8"	<#4
Weight of Oven-Dry Sample in Air, *A* (g)			167.43	
Weight of Saturated-Surface-Dry Sample in Air, *B* (g)			170.19	
Weight of Saturated Sample in Water, *C* (g)			108.71	
Bulk Specific Gravity, G_s =*B/(B-C)*			2.77	
Apparent Specific Gravity, G_{as} = *A/(A-C)*			2.85	2.88

Computation for Bulk Specific Gravity				
Soil	> 2"	3/8" - 2"	#4 - 3/8"	<#4
Weight of Oven-Dry Sample in Air, *A* (g)				
Weight of Saturated-Surface-Dry Sample in Air, *B* (g)				
Weight of Saturated Sample in Water, *C* (g)				
Bulk Specific Gravity, G_s =*B/(B-C)*				
Apparent Specific Gravity, G_{as} = *A/(A-C)*				

Comments:

APPENDIX III

Grain Size Distribution Results

GRAIN SIZE DISTRIBUTION

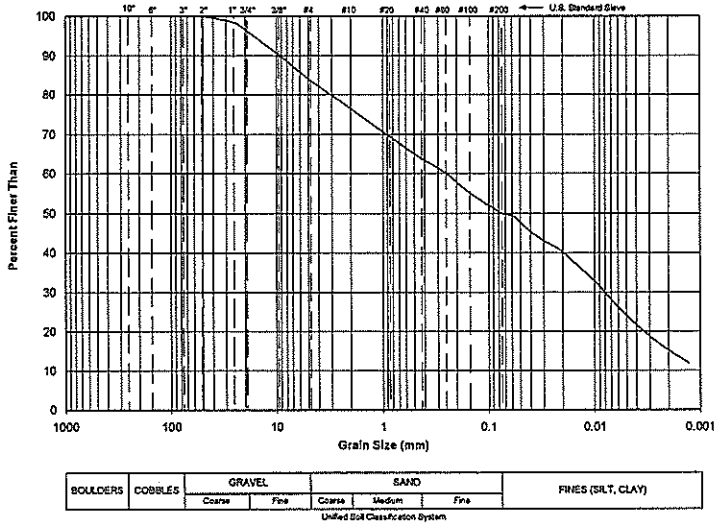
	Sieve	Diameter (mm)	% Finer
Mechanical:	10"	254.0	100
	9"	228.6	100
	8"	203.2	100
	7"	177.8	100
	6"	152.4	100
	5"	127.0	100
	4"	101.6	100
	3"	76.2	100
	2"	50.8	100
	1"	25.4	98
	3/4"	19.1	96
	3/8"	9.5	90
	# 4	4.75	84
	# 10	2.00	76
	# 20	0.850	69
	# 40	0.425	64
	# 60	0.250	60
	# 100	0.150	55
	# 200	0.075	50
		0.0584	50.8
		0.0420	47.2
		0.0301	44.4
		0.0215	42.2
		0.0154	38.6
		0.0097	33.6
		0.0082	31.3
		0.0059	26.8
		0.0042	22.8
		0.0030	19.4
		0.0022	16.5
		0.0013	12.1

MDH ENGINEERED SOLUTIONS

PROJECT: Faro Mine
LOCATION: Whitehorse, Yukon
SITE: SRK Consulting
SAMPLE: SRK-03-C01
DATE: 25-Jul-03
COMMENTS:

PARTICLE SIZE DISTRIBUTION SUMMARY

% BOULDERS	
% COBBLES	
% GRAVEL	16
% SAND	34
% FINES (SILT, CLAY)	50



GRAIN SIZE DISTRIBUTION

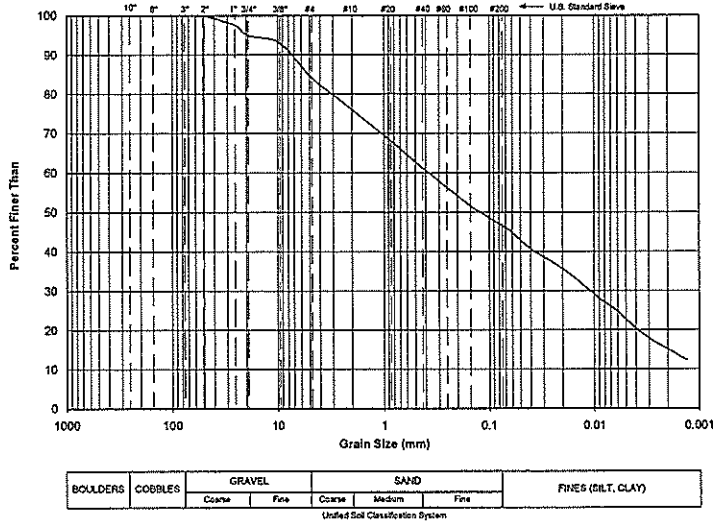
	Sieve	Diameter (mm)	% Finer
Mechanical:	10"	254.0	100
	9"	228.6	100
	8"	203.2	100
	7"	177.8	100
	6"	152.4	100
	5"	127.0	100
	4"	101.6	100
	3"	76.2	100
	2"	50.8	100
	1"	25.4	98
	3/4"	19.1	95
	3/8"	9.5	93
	# 4	4.75	84
	# 10	2.00	76
	# 20	0.850	68
	# 40	0.425	61
	# 60	0.250	56
	# 100	0.150	52
	# 200	0.075	47
		0.0610	44.9
		0.0437	41.5
		0.0313	38.9
		0.0223	36.4
		0.0160	33.7
		0.0111	30.2
		0.0085	27.6
		0.0060	24.8
		0.0043	21.2
		0.0031	18.1
		0.0023	15.8
		0.0013	12.2

MDH ENGINEERED SOLUTIONS

PROJECT: Faro Mine
LOCATION: Whitehorse, Yukon
SITE: SRK Consulting
SAMPLE: SRK-03-C02
DATE: 25-Jul-03
COMMENTS:

PARTICLE SIZE DISTRIBUTION SUMMARY

% BOULDERS	
% COBBLES	
% GRAVEL	16
% SAND	37
% FINES (SILT, CLAY)	47



GRAIN SIZE DISTRIBUTION

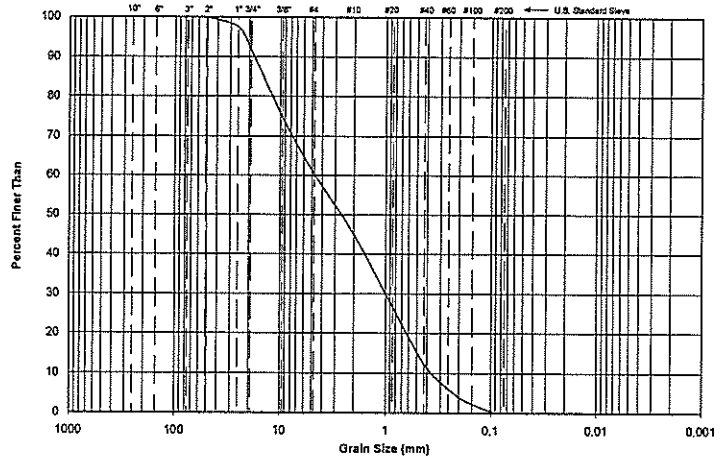
	Sieve	Diameter (mm)	% Finer
Mechanical:	10"	254.0	100
	9"	228.6	100
	8"	203.2	100
	7"	177.8	100
	6"	152.4	100
	5"	127.0	100
	4"	101.6	100
	3"	76.2	100
	2"	50.8	100
	1"	25.4	98
	3/4"	19.1	92
	3/8"	9.5	75
	# 4	4.75	60
	# 10	2.00	45
	# 20	0.850	27
	# 40	0.425	12
	# 60	0.250	6
	# 100	0.150	2
	# 200	0.075	-1

MDH ENGINEERED SOLUTIONS

PROJECT: Faro Mine
LOCATION: Whitehorse, Yukon
SITE: SRK Consulting
SAMPLE: SRK-03-C03
DATE: Jul 3-03
COMMENTS:

PARTICLE SIZE DISTRIBUTION SUMMARY

% BOULDERS	
% COBBLES	
% GRAVEL	40
% SAND	60
% FINES (SILT, CLAY)	



GRAIN SIZE DISTRIBUTION

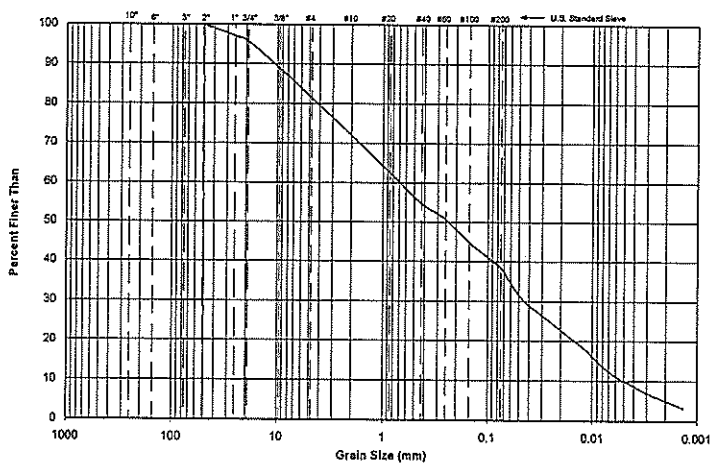
	Sieve	Diameter (mm)	% Finer
Mechanical:	10"	254.0	100
	9"	228.6	100
	8"	203.2	100
	7"	177.8	100
	6"	152.4	100
	5"	127.0	100
	4"	101.6	100
	3"	76.2	100
	2"	50.8	100
	1"	25.4	97
	3/4"	19.1	96
	3/8"	9.5	89
	# 4	4.75	81
	# 10	2.00	72
	# 20	0.850	62
	# 40	0.425	55
	# 60	0.250	51
	# 100	0.150	45
	# 200	0.075	39
		0.0634	35.5
		0.0457	30.3
		0.0327	27.1
		0.0234	24.2
		0.0167	21.1
		0.0120	18.1
		0.0088	14.7
		0.0061	11.2
		0.0046	9.5
		0.0032	7.3
		0.0024	5.8
		0.0013	3.2

MDH ENGINEERED SOLUTIONS

PROJECT: Faro Mine
LOCATION: Whitehorse
SITE: SRK Consulting
SAMPLE: SRK-03-C04
DATE: 25-Jul-03
COMMENTS:

PARTICLE SIZE DISTRIBUTION SUMMARY

% BOULDERS	
% COBBLES	
% GRAVEL	19
% SAND	43
% FINES (SILT, CLAY)	38



GRAIN SIZE DISTRIBUTION

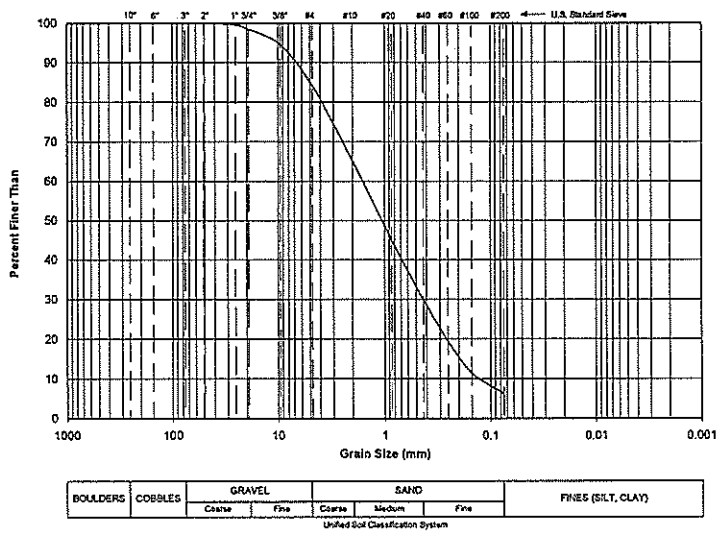
	Sieve	Diameter (mm)	% Finer
Mechanical:	10"	254.0	100
	9"	228.6	100
	8"	203.2	100
	7"	177.8	100
	6"	152.4	100
	5"	127.0	100
	4"	101.6	100
	3"	76.2	100
	2"	50.8	100
	1"	25.4	100
	3/4"	19.1	98
	3/8"	9.5	95
	# 4	4.75	84
	# 10	2.00	65
	# 20	0.850	45
	# 40	0.425	30
	# 60	0.250	19
	# 100	0.150	11
	# 200	0.075	6

MDH ENGINEERED SOLUTIONS

PROJECT: SRK Consultants
LOCATION:
SITE: Faro Mine, Whitehorse
SAMPLE: SRK-030-C05
DATE: Jul-3-03
COMMENTS:

PARTICLE SIZE DISTRIBUTION SUMMARY

% BOULDERS	
% COBBLES	
% GRAVEL	16
% SAND	78
% FINES (SILT, CLAY)	6



GRAIN SIZE DISTRIBUTION

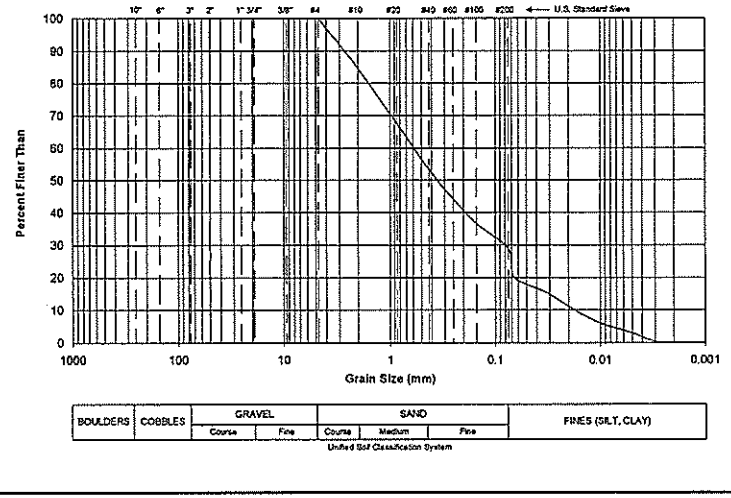
	Sieve	Diameter (mm)	% Finer
Mechanical:	15"	381.0	100
	14"	355.6	100
	13"	330.2	100
	12"	304.8	100
	11"	279.4	100
	10"	254.0	100
	9"	228.6	100
	8"	203.2	100
	7"	177.8	100
	6"	152.4	100
	5"	127.0	100
	4"	101.6	100
	3"	76.2	100
	2"	50.8	100
	1"	25.4	100
	3/4"	19.1	100
	3/8"	9.5	100
	# 4	4.75	100
	# 10	2.00	85
	# 20	0.850	67
	# 40	0.425	53
	# 60	0.250	44
	# 100	0.150	37
	# 200	0.075	28
Hydrometer:		0.0573	20.4
		0.0481	17.6
		0.0342	15.7
		0.0245	12.8
		0.0175	10.0
		0.0129	7.6
		0.0091	5.4
		0.0065	4.1
		0.0046	2.6
		0.0034	0.7
		0.0024	0.0
		0.0014	

MDH ENGINEERED SOLUTIONS

PROJECT: Faro Mine
Whitehorse, Yukon
SRK Consulting
SAMPLE: SRK-03-C06
DATE: 22-Jul-03
COMMENTS:

PARTICLE SIZE DISTRIBUTION SUMMARY

% BOULDERS	
% COBBLES	
% GRAVEL	
% SAND	71
% FINES (SILT, CLAY)	29



GRAIN SIZE DISTRIBUTION

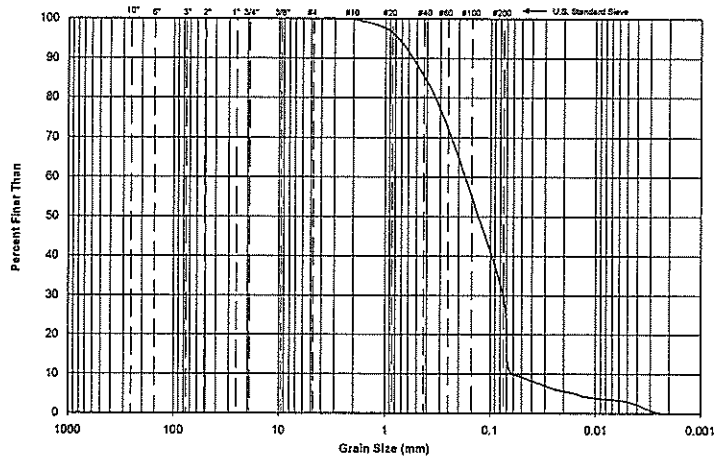
MDH ENGINEERED SOLUTIONS

	Sieve	Diameter (mm)	% Finer
Mechanical:	10"	254.0	100
	9"	228.6	100
	8"	203.2	100
	7"	177.8	100
	6"	152.4	100
	5"	127.0	100
	4"	101.6	100
	3"	76.2	100
	2"	50.8	100
	1"	25.4	100
	3/4"	19.1	100
	3/8"	9.5	100
	# 4	4.75	100
	# 10	2.00	100
	# 20	0.850	96
	# 40	0.425	85
	# 60	0.250	72
	# 100	0.150	55
	# 200	0.075	30
		0.0666	11.4
		0.0475	8.9
		0.0338	7.5
		0.0240	6.0
		0.0170	5.1
		0.0125	4.1
		0.0088	3.7
		0.0062	3.3
		0.0044	2.5
		0.0033	1.0
		0.0024	
		0.0013	

PROJECT: Faro Mine
LOCATION: Whitehorse
SITE:
SAMPLE: SRK-03-C07
DATE: 25-Jul-03
COMMENTS:

PARTICLE SIZE DISTRIBUTION SUMMARY

% BOULDERS	
% COBBLES	
% GRAVEL	
% SAND	70
% FINES (SILT, CLAY)	30



GRAIN SIZE DISTRIBUTION

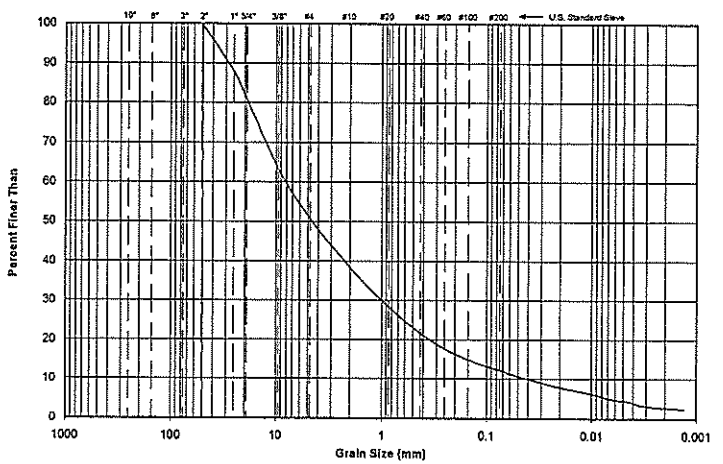
MDH ENGINEERED SOLUTIONS

	Sieve	Diameter (mm)	% Finer
Mechanical:	10"	254.0	100
	9"	228.6	100
	8"	203.2	100
	7"	177.8	100
	6"	152.4	100
	5"	127.0	100
	4"	101.6	100
	3"	76.2	100
	2"	50.8	100
	1"	25.4	88
	3/4"	19.1	81
	3/8"	9.5	63
	# 4	4.75	51
	# 10	2.00	38
	# 20	0.850	28
	# 40	0.425	22
	# 60	0.250	18
	# 100	0.150	15
	# 200	0.075	12
		0.0633	11.6
		0.0453	10.3
		0.0324	9.3
		0.0231	8.2
		0.0165	7.4
		0.0121	6.7
		0.0086	5.7
		0.0064	4.9
		0.0045	4.3
		0.0033	3.3
		0.0024	2.8
		0.0013	2.2

PROJECT: Faro Mine
LOCATION: Whitehorse
SITE:
SAMPLE: SRK-03-C08
DATE: 10-Jul-03
COMMENTS:

PARTICLE SIZE DISTRIBUTION SUMMARY

% BOULDERS	
% COBBLES	
% GRAVEL	49
% SAND	39
% FINES (SILT, CLAY)	12



APPENDIX IV

Standard Proctor Tests Results

MDH ENGINEERED SOLUTIONS

COMPACTION TEST

PROJECT: M453
Faro Mine
Whitehorse, Yukon
SAMPLE: SRK 03-C01
DATE: 10-Jul-03

Test Results:

Water Content: (%)	Dry Density (kg/m^3)
6.8	1997
8.7	2057
10.3	2070
11.4	2011
13.0	1958

Maximum dry density: 2072 kg/m^3
Optimum water content: 9.9 %

Results corrected for oversized material?
yes

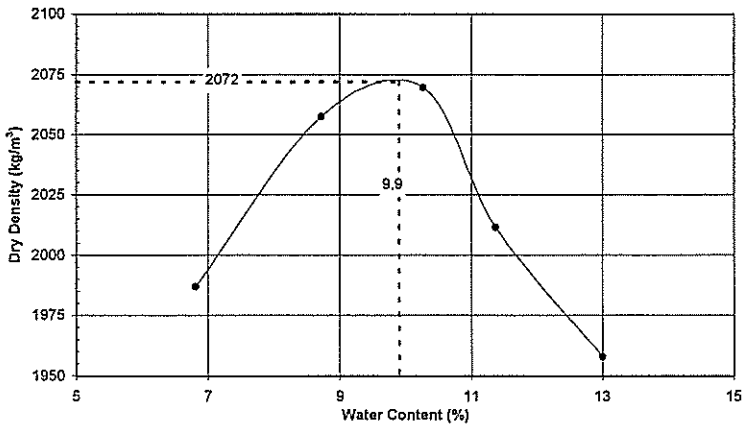
Test Details:

Effort:	Standard	
Procedure used:	A	
Diameter of mold:	101	mm
Compacted material less than:	4.75	mm in diameter
Method of preparation:	dry	

Oversize Correction Data (if applicable):

Percentage oversize fraction:	21.0	%
Specific gravity:	2.50	(assumed)

Comments:



MDH ENGINEERED SOLUTIONS

COMPACTION TEST

PROJECT: Faro Mine
Whitehorse

SAMPLE: SRC 03 C02
DATE: 3-Jul-03

Test Results:

Water Content: (%)	Dry Density (kg/m^3)
6.6	1870
8.2	1978
9.8	2048
11.4	1999
13.1	1934

Maximum dry density: 2045 kg/m^3
Optimum water content: 10.0 %

Results corrected for oversized material?
yes

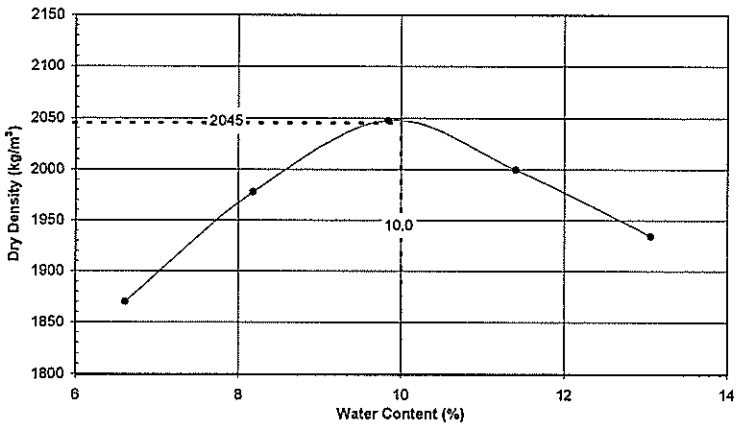
Test Details:

Effort:	Standard	
Procedure used:	A	
Diameter of mold:	101	mm
Compacted material less than:	4.75	mm in diameter
Method of preparation:	dry	

Oversize Correction Data (if applicable):

Percentage oversize fraction:	17.3	%
Specific gravity:	2.50	(assumed)

Comments:



MDH ENGINEERED SOLUTIONS

COMPACTION TEST

PROJECT: M453
Faro Mine
Whitehorse, Yukon

SAMPLE: SRK 03-C03
DATE: 11-Jul-03

Test Results:

Water Content: (%)	Dry Density (kg/m^3)
1.9	2129
3.5	2157
5.5	2183
7.2	2193
8.4	2144

Maximum dry density: 2195 kg/m^3
Optimum water content: 6.9 %

Results corrected for oversized material?
yes

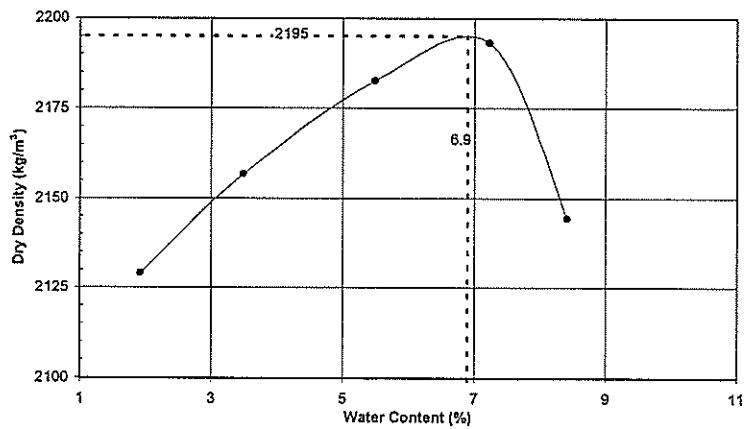
Test Details:

Effort:	Standard	
Procedure used:	C	
Diameter of mold:	152	mm
Compacted material less than:	19.1	mm in diameter
Method of preparation:	dry	

Oversize Correction Data (if applicable):

Percentage oversize fraction:	6.0	%
Specific gravity:	2.50	(assumed)

Comments:



MDH ENGINEERED SOLUTIONS

COMPACTION TEST

PROJECT: Faro Mine
Whitehorse

SAMPLE: SRK-03-C04
DATE: 10-Jul-03

Test Results:

Water Content: (%)	Dry Density (kg/m^3)
4.8	2033
6.3	2102
7.6	2117
9.4	2057
11.0	1992

Maximum dry density: 2120 kg/m^3
Optimum water content: 7.4 %

Results corrected for oversized material?
N/A

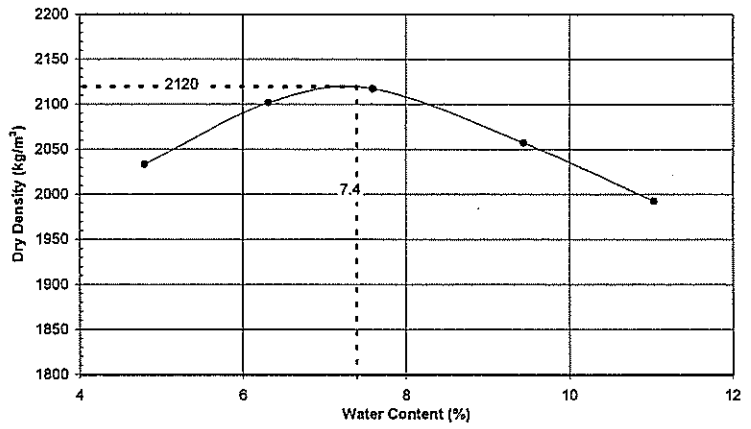
Test Details:

Effort:	Standard	
Procedure used:	A	
Diameter of mold:	101	mm
Compacted material less than:	4.75	mm in diameter
Method of preparation:	dry	

Oversize Correction Data (if applicable):

Percentage oversize fraction:	20.0	%
Specific gravity:	2.50	(assumed)

Comments:



MDH ENGINEERED SOLUTIONS

COMPACTION TEST

PROJECT: M453
Faro Mine
Whitehorse, Yukon

SAMPLE: SRK 03-C05
DATE: 8-Jul-03

Test Results:

Water Content: (%)	Dry Density (kg/m^3)
5.3	2024
6.9	2040
8.3	2065
10.0	2040
12.3	1931

Maximum dry density: 2065 kg/m^3
Optimum water content: 8.5 %

Results corrected for oversized material?
yes

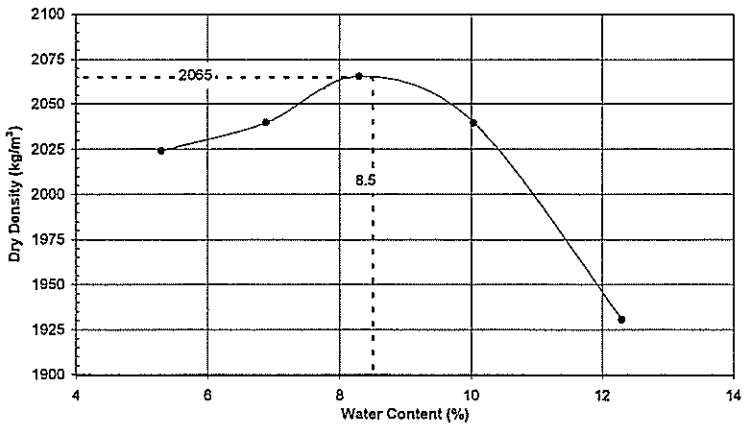
Test Details:

Effort:	Standard	
Procedure used:	A	
Diameter of mold:	101	mm
Compacted material less than:	4.75	mm in diameter
Method of preparation:	dry	

Oversize Correction Data (if applicable):

Percentage oversize fraction:	13.0	%
Specific gravity:	2.50	(assumed)

Comments:



MDH ENGINEERED SOLUTIONS

COMPACTION TEST

PROJECT: M453
Faro Mine
Whitehorse, Yukon
SAMPLE: SRK 03-C06
DATE: 10-Jul-03

Test Results:

Water Content: (%)	Dry Density (kg/m^3)
5.1	2051
6.6	2069
8.4	2087
9.6	2061
11.2	2011

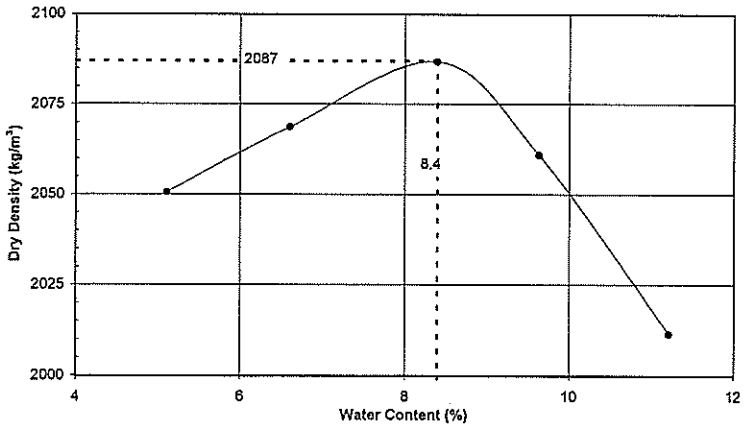
Maximum dry density: 2087 kg/m^3
Optimum water content: 8.4 %

Results corrected for oversized material?
yes

Test Details:

Effort:	Standard	
Procedure used:	A	
Diameter of mold:	101	mm
Compacted material less than:	4.75	mm in diameter
Method of preparation:	dry	
Oversize Correction Data (if applicable):		
Percentage oversize fraction:	21.0	%
Specific gravity:	2.50	(assumed)

Comments:



APPENDIX V-a

Large Diameter (300-mm) SWCC Tests Results

M.D. Haug & Associates Ltd.

SOIL-WATER CHARACTERISTIC CURVE

Project: SRK Consultants, Vancouver
Location: Faro Mine, Whitehorse
Date: 23-Jul-03

Sample: SRK-03-C01 @1.968 Mg/m^3 @ 10.5%

	Elevation of water column below top of sample (cm)	Applied air pressure (kPa)	Suction at surface of sample (kPa)	Weight of system (g)	Weight of saturated stone/fluckte plate/etc (g)	Cumulative weight of water loss (g)	Weight of water in soil (g)	Gravimetric water content	Vol. water content		Notes
Large Pressure Plate cell	0	0	0.01	67801		0	1894.0	0.138	0.276		
	0.5	0	0.05	67742		59	1835.0	0.133	0.267		
	1	0	0.1	67617		184	1710.0	0.124	0.249		
	2.5	0	0.25	67589		212	1682.0	0.122	0.245		
	5	0	0.5	67565		236	1658.0	0.120	0.241		
	10	0	1	67519		282	1612.0	0.117	0.235		
	25	0	2.5	67452		349	1545.0	0.112	0.225		
	50	0	5	67436		365	1529.0	0.111	0.223		
	0	10	10	67427		374	1520.0	0.110	0.221		
	0	25	25	67390		411	1483.0	0.108	0.216		
	0	50	50	67350		451	1443.0	0.105	0.210		
	0	100	100	67322		479	1415.0	0.103	0.206		

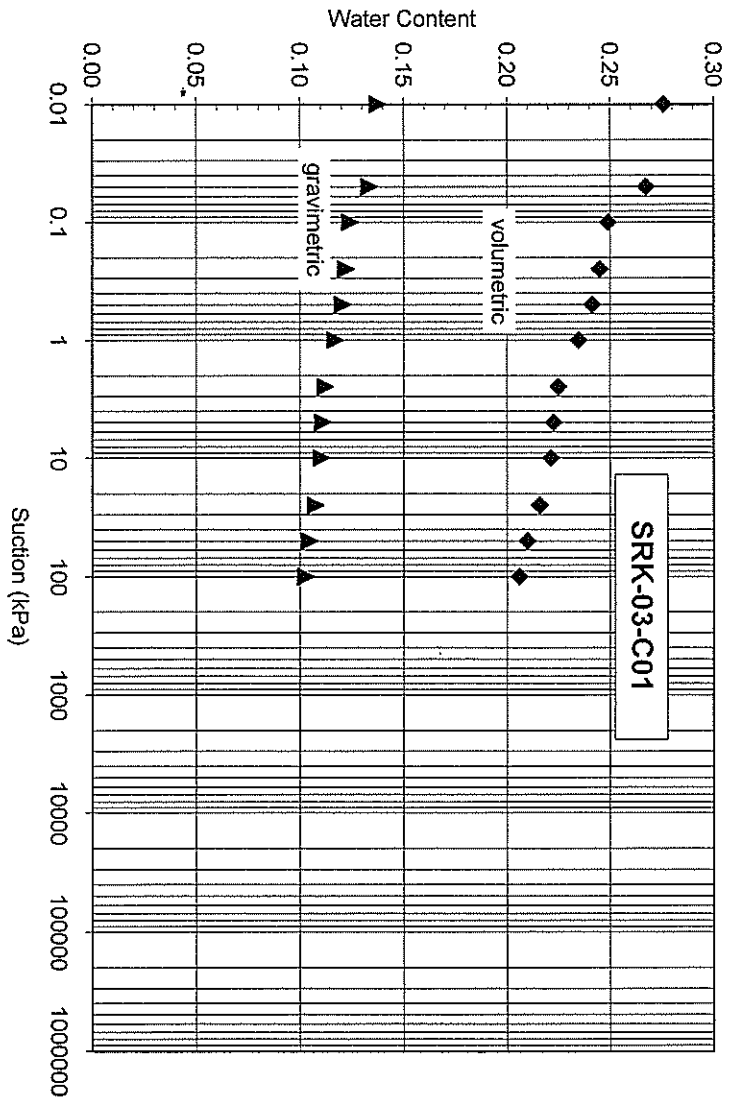
Dessicator Tests

Soil wet + tare (g)	Soil dry + tare (g)	Weight of tare (g)	Suction (kPa)					Gravimetric water content	Volumetric water content			
4.282	4.189	0.627	4120					0.026	0.03552			
4.086	4.042	0.722	38000					0.013	0.01803			
3.123	3.103	0.622	82600					0.008	0.01097			
4.066	4.048	0.918	150000					0.006	0.00782			
4.288	4.283	0.917	293000					0.001	0.00202			

Final water content determination

	Tare #1	Tare #2	Total
Weight of tare (g)	985	644	1609
Tare + soil wet (g)	11040	5756	16796
Tare + soil dry (g)	10076	5305	15381
Weight of dry soil (g)	9111	4661	13772
Weight of water in soil (g)	964	451	1415
Water content			10.3%

Dimensions of specimen	Initial
Diameter of specimen (mm)	305.00
Height of specimen (mm)	94.00
Volume of specimen (cc)	6868.7
Dry density of specimen (kg/m^3)	2005.04



M.D. Haug & Associates Ltd.

SOIL-WATER CHARACTERISTIC CURVE

Project: SRK Consultants, Vancouver
Location: Faro Mine, Whitehorse
Date: 23-Jul-03

Sample: SRK-03-C03 @2.085 Mg/m^3 @ 7.5%

	Elevation of water column below top of sample (cm)	Applied air pressure (kPa)	Suction at surface of sample (kPa)	Weight of system (g)	Weight of saturated stone/fucite plate/etc (g)	Cumulative weight of water loss (g)	Weight of water in soil (g)	Gravimetric water content	Vol. water content		Notes
Large Pressure Plate cell	0	0	0.01	67598		0	1663.0	0.110	0.229		
	0.5	0	0.05	67587		11	1652.0	0.109	0.227		
	1	0	0.1	67395		203	1460.0	0.097	0.201		
	2.5	0	0.25	67280		318	1345.0	0.089	0.185		
	5	0	0.5	67269		329	1334.0	0.088	0.183		
	10	0	1	67227		371	1292.0	0.085	0.178		
	25	0	2.5	67004		594	1069.0	0.071	0.147		
	50	0	5	66847		751	912.0	0.060	0.125		
	0	10	10	66737		861	802.0	0.053	0.110		
	0	25	25	66582		1016	647.0	0.043	0.089		
	0	50	50	66484		1114	549.0	0.036	0.076		
	0	100	100	66418		1180	483.0	0.032	0.066		

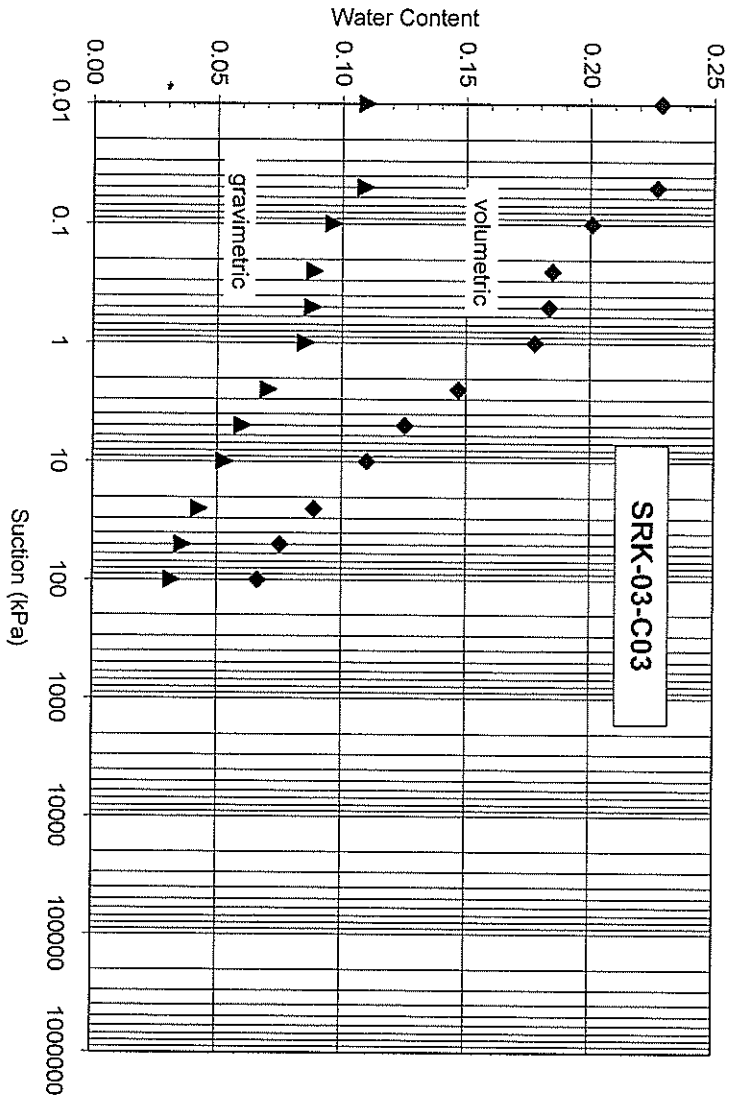
Dessicator Tests

Soil wet + tare (g)	Soil dry + tare (g)	Weight of tare (g)	Suction (kPa)					Gravimetric water content	Volumetric water content			
4.282	4.189	0.627	4120					0.026	0.04269			
4.086	4.042	0.722	38000					0.013	0.02167			
3.123	3.103	0.622	82600					0.008	0.01318			
4.066	4.048	0.918	150000					0.006	0.0094			
4.288	4.283	0.917	293000					0.001	0.00243			

Final water content determination

	Tare #3	Tare #4	Total
Weight of tare (g)	960	624	1584
Tare + soil wet (g)	10886	6296	17182
Tare + soil dry (g)	10581	6118	16699
Weight of dry soil (g)	9621	5494	15115
Weight of water in soil (g)	305	178	483
Water content			3%

Dimensions of specimen	Initial
Diameter of specimen (mm)	305.00
Height of specimen (mm)	99.50
Volume of specimen (cc)	7270.6
Dry density of specimen (kg/m^3)	2076.93



M.D. Haug & Associates Ltd.

SOIL-WATER CHARACTERISTIC CURVE

Project: SRK Consultants, Vancouver
Location: Faro Mine, Whitehorse
Date: 23-Jul-03

Sample: SRK-03-C08

	Elevation of water column below top of sample (cm)	Applied air pressure (kPa)	Suction at surface of sample (kPa)	Weight of system (g)	Weight of saturated stone/fluclte plate/etc (g)	Cumulative weight of water loss (g)	Weight of water in soil (g)	Gravimetric water content	Vol. water content		Notes
Large Pressure Plate cell	0	0	0.01	54434		0	2639.0	0.197	0.358		
	0.5	0	0.05	54391		43	2596.0	0.193	0.352		
	1	0	0.1	54367		67	2572.0	0.192	0.349		
	2.5	0	0.25	54155		279	2360.0	0.176	0.320		
	5	0	0.5	54089		345	2294.0	0.171	0.311		
	10	0	1	53794		640	1999.0	0.149	0.271		
	25	0	2.5	53218		1216	1423.0	0.106	0.193		
	50	0	5	53118		1316	1323.0	0.099	0.179		
	0	10	10	53054		1380	1259.0	0.094	0.171		
	0	25	25	52915		1519	1120.0	0.083	0.152		
	0	50	50	52774		1660	979.0	0.073	0.133		
	0	100	100	52463		1971	668.0	0.050	0.091		

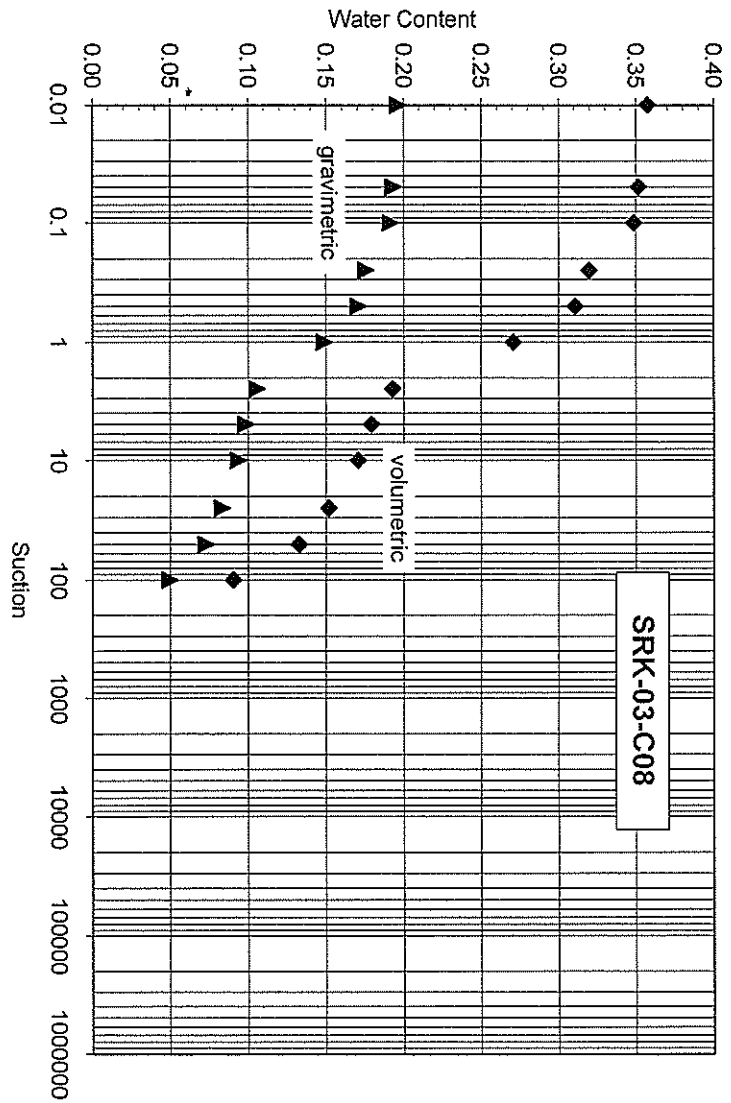
Dessicator Tests

Soil wet + tare (g)	Soil dry + tare (g)	Weight of tare (g)	Suction (kPa)					Gravimetric water content	Volumetric water content			
4.282	4.189	0.627	4120					0.026	0.04476			
4.086	4.042	0.722	38000					0.013	0.02272			
3.123	3.103	0.622	82600					0.008	0.01382			
4.066	4.048	0.918	150000					0.006	0.00986			
4.268	4.283	0.917	293000					0.001	0.00255			

Final water content determination

	Tare #5	Tare #6	Total
Weight of tare (g)	623	622	1245
Tare + soil wet (g)	7345	7997	15342
Tare + soil dry (g)	7030	7644	14674
Weight of dry soil (g)	6407	7022	13429
Weight of water in soil (g)	315	353	668
Water content			5%

Dimensions of specimen	Initial
Diameter of specimen (mm)	305.00
Height of specimen (mm)	101.00
Volume of specimen (cc)	7380.2
Dry density of specimen (kg/m³)	1819.6



APPENDIX V-b

Small Diameter (64-mm) SWCC Tests Results

MDH ENGINEERED SOLUTIONS

SOIL-WATER CHARACTERISTIC CURVE

Project: SRK Consultants
Location: Faro Mine, Whitehorse
Date: 10-Aug-03
Sample: SRK-03-CO1

	Elevation of water column below base of sample (cm)	Applied air pressure (kPa)	Suction at surface of sample (kPa)	Weight of system (g)	Weight of saturated stone/fluckte plate/etc (g)	Cumulative weight of water loss (g)	Weight of water in soil (g)	Gravimetric water content	Vol. water content (assuming volume constant during test)	Degree of saturation (computed based on Gs)		
1-Bar Stone	0	0	0.31	393.364	85.637	0.000	27.608	0.141	0.277	1.022		
	5	0	0.81	393.364	85.637	0.000	27.608	0.141	0.277	1.022		
	10	0	1.31	393.350	85.637	0.014	27.594	0.141	0.277	1.022		
	25	0	2.81	393.350	85.637	0.014	27.594	0.141	0.277	1.022		
	50	0	5.31	393.244	85.637	0.120	27.488	0.140	0.276	1.018		
	0	13.5	13.5	392.696	85.637	0.668	26.940	0.137	0.270	0.997		
	0	25	25	391.760	85.637	1.604	26.004	0.132	0.261	0.963		
	0	50	50	390.864	85.637	2.500	25.108	0.128	0.252	0.930		
	0	100	100	389.879	85.637	3.485	24.123	0.123	0.242	0.893		
	0	100	100	389.879	85.637	3.485	24.123	0.123	0.242	0.893		
	0	100	100	389.879	85.637	3.485	24.123	0.123	0.242	0.893		
	0	100	100	389.879	85.637	3.485	24.123	0.123	0.242	0.893		
5-Bar Stone	0	100	100	440.146	136.110	3.485	24.123	0.123	0.242	0.893		
	0	200	200	440.011	136.110	3.620	23.988	0.122	0.241	0.888		
	0	400	400	439.687	136.110	3.944	23.664	0.121	0.237	0.876		
15-Bar Stone	0	400	400	303.473	0.000	3.944	23.664	0.121	0.237	0.876		
	0	700	700	302.578	0.000	4.839	22.769	0.116	0.228	0.843		
	0	1050	1050	301.891	0.000	5.526	22.082	0.112	0.221	0.818		

Desiccator tests	Suction (kPa)	Soil wet + tare (g)	Soil dry + tare (g)	Weight of tare (g)		Gravimetric water content	Volumetric water content			
	4120	3.909	3.811	0.631		0.031	0.06031			
	38000	4.714	4.680	0.910		0.009	0.01765			
	82600	3.626	3.613	0.746		0.005	0.00887			
	150000	3.302	3.293	0.762		0.004	0.0070			
	293000	3.914	3.899	0.893		0.005	0.00977			

Final water content determination	
Weight of ring (g)	83.42
Weight of tare (g)	115.246
Tare + ring + soil wet (g)	417.118
Tare + ring + soil dry (g)	395.036
Weight of dry soil (g)	196.370
Weight of water in soil (g)	22.082
Specific gravity, G_s	2.70

Dimensions of specimen	Initial
Diameter of specimen (mm)	64.00
Height of specimen (mm)	31.00
Volume of specimen (cc)	99.74
Dry density of specimen (kg/m^3)	1968.8
Volume of solids (cc)	72.73
Porosity	0.271

MDH ENGINEERED SOLUTIONS

SOIL-WATER CHARACTERISTIC CURVE

Project: SRK Consultants
Location: Faro Mine, Whitehorse
Date: 10-Aug-03

Sample: SRK-03-CO2

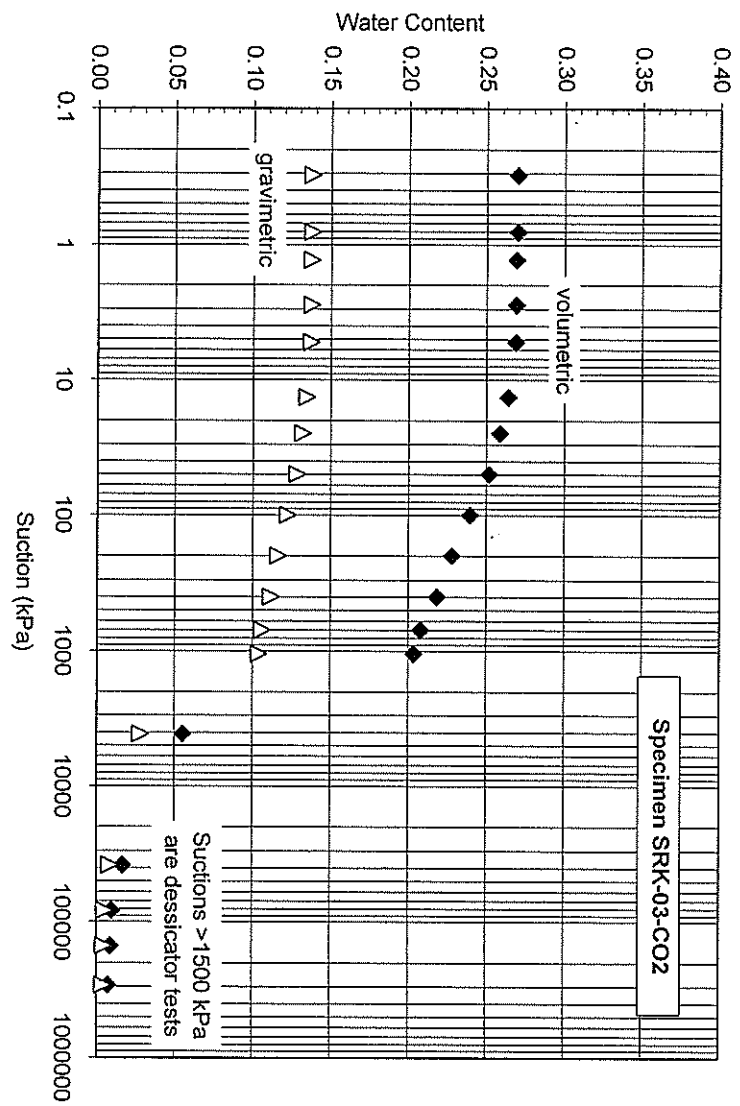
	Elevation of water column below base of sample (cm)	Applied air pressure (kPa)	Suction at surface of sample (kPa)	Weight of system (g)	Weight of saturated stone/fucite plate/etc (g)	Cumulative weight of water loss (g)	Weight of water in soil (g)	Gravimetric water content	Vol. water content (assuming volume constant during test)	Degree of saturation (computed based on G_s)		
1-Bar Stone	0	0	0.31	440.546	135.253	0.000	26.902	0.138	0.270	0.991		
	5	0	0.81	440.546	135.253	0.000	26.902	0.138	0.270	0.991		
	10	0	1.31	440.468	135.253	0.078	26.824	0.137	0.269	0.988		
	25	0	2.81	440.466	135.253	0.080	26.822	0.137	0.269	0.988		
	50	0	5.31	440.431	135.253	0.115	26.787	0.137	0.269	0.986		
	0	13.5	13.5	439.950	135.253	0.596	26.306	0.135	0.264	0.969		
	0	25	25	439.411	135.253	1.135	25.767	0.132	0.258	0.949		
	0	50	50	438.726	135.253	1.818	25.084	0.129	0.252	0.924		
	0	100	100	437.534	135.253	3.012	23.890	0.122	0.240	0.880		
	0	100	100	437.534	135.253	3.012	23.890	0.122	0.240	0.880		
	0	100	100	437.534	135.253	3.012	23.890	0.122	0.240	0.880		
	0	100	100	437.534	135.253	3.012	23.890	0.122	0.240	0.880		
5-Bar Stone	0	100	100	442.500	140.295	3.012	23.890	0.122	0.240	0.880		
	0	200	200	441.333	140.295	4.179	22.723	0.116	0.228	0.837		
	0	400	400	440.396	140.295	5.116	21.786	0.112	0.219	0.802		
15-Bar Stone	0	400	400	300.059	0.000	5.116	21.786	0.112	0.219	0.802		
	0	700	700	299.006	0.000	6.169	20.733	0.106	0.208	0.763		
	0	1050	1050	298.559	0.000	6.616	20.286	0.104	0.203	0.747		

Desiccator tests	Suction (kPa)	Soil wet + tare (g)	Soil dry + tare (g)	Weight of tare (g)		Gravimetric water content	Volumetric water content		
	4120	4.985	4.871	0.823		0.028	0.05526		
	38000	4.207	4.179	0.909		0.009	0.0168		
	82600	3.803	3.787	0.621		0.005	0.00992		
	150000	5.197	5.177	0.752		0.005	0.00887		
	293000	4.694	4.680	0.920		0.004	0.00731		

Final water content determination

Weight of ring (g)	83.154
Weight of tare (g)	115.409
Tare + ring + soil wet (g)	413.961
Tare + ring + soil dry (g)	393.675
Weight of dry soil (g)	195.112
Weight of water in soil (g)	20.286
Specific gravity, G_s	2.69

Dimensions of specimen	Initial
Diameter of specimen (mm)	63.85
Height of specimen (mm)	31.13
Volume of specimen (cc)	99.69
Dry density of specimen (kg/m^3)	1957.2
Volume of solids (cc)	72.53
Porosity	0.272



MDH ENGINEERED SOLUTIONS

SOIL-WATER CHARACTERISTIC CURVE

Project: SRK Consultants
Location: Faro Mine, Whitehorse
Date: 10-Aug-03

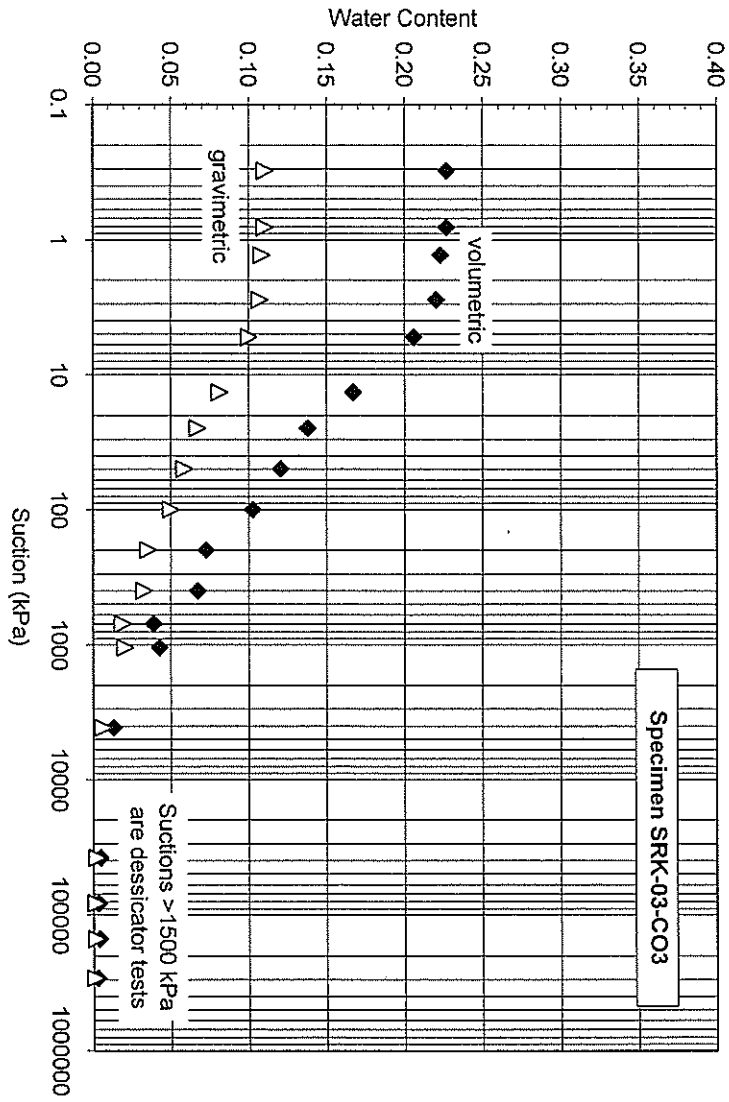
Sample: SRK-03-CO3

	Elevation of water column below base of sample (cm)	Applied air pressure (kPa)	Suction at surface of sample (kPa)	Weight of system (g)	Weight of saturated stone/fluctio plate/etc (g)	Cumulative weight of water loss (g)	Weight of water in soil (g)	Gravimetric water content	Vol. water content (assuming volume constant during test)	Degree of saturation (computed based on Gs)		
1-Bar Stone	0	0	0.31	389.072	85.066	0.000	22.280	0.110	0.227	0.973		
	5	0	0.81	389.072	85.066	0.000	22.280	0.110	0.227	0.973		
	10	0	1.31	388.691	85.066	0.381	21.899	0.109	0.223	0.957		
	25	0	2.81	388.408	85.066	0.664	21.616	0.107	0.220	0.944		
	50	0	5.31	387.003	85.066	2.069	20.211	0.100	0.206	0.883		
	0	13.5	13.5	383.199	85.066	5.873	16.407	0.081	0.167	0.717		
	0	25	25	380.333	85.066	8.739	13.541	0.067	0.138	0.591		
	0	50	50	378.619	85.066	10.453	11.827	0.059	0.120	0.517		
	0	100	100	376.855	85.066	12.217	10.063	0.050	0.102	0.440		
	0	100	100	376.855	85.066	12.217	10.063	0.050	0.102	0.440		
	0	100	100	376.855	85.066	12.217	10.063	0.050	0.102	0.440		
	0	100	100	376.855	85.066	12.217	10.063	0.050	0.102	0.440		
5-Bar Stone	0	100	100	430.337	138.926	12.217	10.063	0.050	0.102	0.440		
	0	200	200	427.394	138.926	15.160	7.120	0.035	0.073	0.311		
	0	400	400	426.881	138.926	15.673	6.607	0.033	0.067	0.289		
15-Bar Stone	0	400	400	287.888	0.000	15.673	6.607	0.033	0.067	0.289		
	0	700	700	285.101	0.000	18.460	3.820	0.019	0.039	0.167		
	0	1050	1050	285.471	0.000	18.090	4.190	0.021	0.043	0.183		

Desiccator tests	Suction (kPa)	Soil wet + tare (g)	Soil dry + tare (g)	Weight of tare (g)		Gravimetric water content	Volumetric water content			
	4120	4.359	4.337	0.932		0.006	0.01336			
	38000	3.898	3.891	0.748		0.002	0.00461			
	82600	4.542	4.536	0.785		0.002	0.00331			
	150000	3.939	3.933	0.718		0.002	0.00356			
	293000	3.676	3.672	0.771		0.001	0.00265			

Final water content determination	
Weight of ring (g)	79.493
Weight of tare (g)	268.843
Tare + ring + soil wet (g)	554.310
Tare + ring + soil dry (g)	550.120
Weight of dry soil (g)	201.784
Weight of water in soil (g)	4.19
Specific gravity, G_s	2.68

Dimensions of specimen	Initial
Diameter of specimen (mm)	63.50
Height of specimen (mm)	31.00
Volume of specimen (cc)	98.19
Dry density of specimen (kg/m^3)	2055.1
Volume of solids (cc)	75.29
Porosity	0.233



MDH ENGINEERED SOLUTIONS

SOIL-WATER CHARACTERISTIC CURVE

Project: SRK Consultants
Location: Faro Mine, Whitehorse
Date: 10-Aug-03

Sample: SRK-03-CO4

	Elevation of water column below base of sample (cm)	Applied air pressure (kPa)	Suction at surface of sample (kPa)	Weight of system (g)	Weight of saturated stone/fuclte plate/etc (g)	Cumulative weight of water loss (g)	Weight of water in soil (g)	Gravimetric water content	Vol. water content (assuming volume constant during test)	Degree of saturation (computed based on Gs)		
1-Bar Stone	0	0	0.31	449.907	139.899	0.000	25.977	0.129	0.258	1.004		
	5	0	0.81	448.923	139.899	0.984	24.993	0.124	0.248	0.966		
	10	0	1.31	448.231	139.899	1.676	24.301	0.121	0.241	0.939		
	25	0	2.81	448.220	139.899	1.687	24.290	0.121	0.241	0.939		
	50	0	5.31	447.161	139.899	2.746	23.231	0.115	0.231	0.898		
	0	13.5	13.5	445.905	139.899	4.002	21.975	0.109	0.218	0.849		
	0	25	25	444.984	139.899	4.923	21.054	0.105	0.209	0.814		
	0	50	50	444.196	139.899	5.711	20.266	0.101	0.201	0.783		
	0	100	100	443.251	139.899	6.656	19.321	0.096	0.192	0.747		
	0	100	100	443.251	139.899	6.656	19.321	0.096	0.192	0.747		
	0	100	100	443.251	139.899	6.656	19.321	0.096	0.192	0.747		
	0	100	100	443.251	139.899	6.656	19.321	0.096	0.192	0.747		
5-Bar Stone	0	100	100	434.891	131.595	6.656	19.321	0.096	0.192	0.747		
	0	200	200	433.802	131.595	7.645	18.332	0.091	0.182	0.709		
	0	400	400	432.922	131.595	8.625	17.352	0.086	0.172	0.671		
15-Bar Stone	0	400	400	301.274	0.000	8.625	17.352	0.086	0.172	0.671		
	0	700	700	298.381	0.000	11.518	14.459	0.072	0.144	0.559		
	0	1050	1050	297.979	0.000	11.920	14.057	0.070	0.140	0.543		

Desiccator tests	Suction (kPa)	Soil wet + tare (g)	Soil dry + tare (g)	Weight of tare (g)		Gravimetric water content	Volumetric water content			
	4120	4.496	4.435	0.913		0.017	0.03458			
	38000	3.987	3.966	0.880		0.007	0.01359			
	82600	4.406	4.389	0.747		0.005	0.00932			
	150000	4.974	4.953	0.926		0.005	0.01041			
	283000	5.624	5.612	0.869		0.003	0.00505			

Final water content determination	
Weight of ring (g)	82.668
Weight of tare (g)	31.076
Tare + ring + soil wet (g)	329.055
Tare + ring + soil dry (g)	314.998
Weight of dry soil (g)	201.254
Weight of water in soil (g)	14.057
Specific gravity, G_s	2.69

Dimensions of specimen	Initial
Diameter of specimen (mm)	63.80
Height of specimen (mm)	31.49
Volume of specimen (cc)	100.68
Dry density of specimen (kg/m^3)	1998.9
Volume of solids (cc)	74.82
Porosity	0.257

MDH ENGINEERED SOLUTIONS

SOIL-WATER CHARACTERISTIC CURVE

Project: SRK Consultants
Location: Faro Mine, Whitehorse
Date: 10-Aug-03

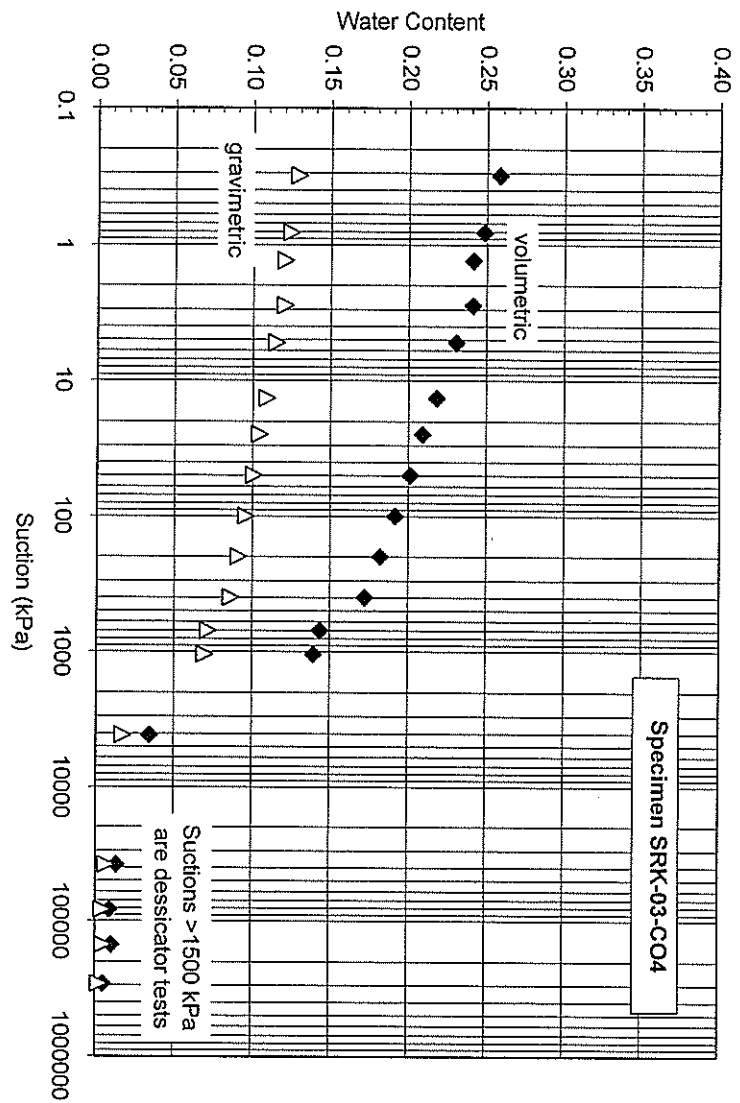
Sample: SRK-03-CO5

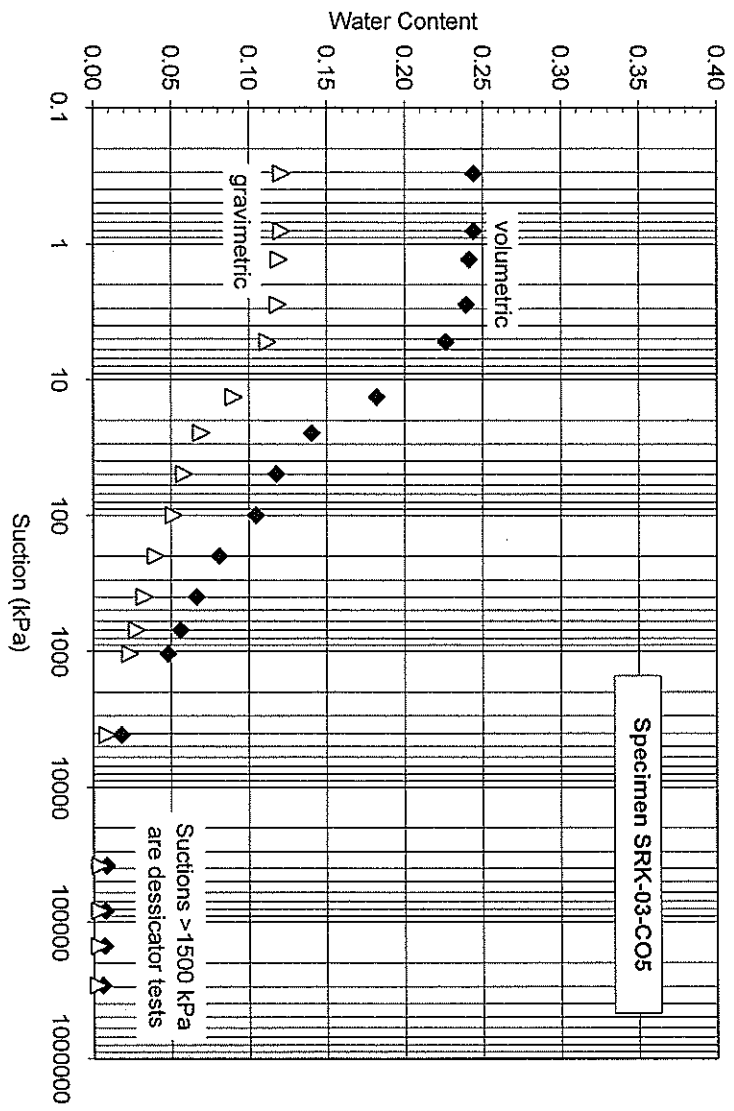
	Elevation of water column below base of sample (cm)	Applied air pressure (kPa)	Suction at surface of sample (kPa)	Weight of system (g)	Weight of saturated stone/ceramic plate/ele (g)	Cumulative weight o water loss (g)	Weight of water in soil (g)	Gravimetric water content	Vol. water content (assuming volume constant during test)	Degree of saturation (computed based on Gs)		
1-Bar Stone	0	0	0.31	432.112	137.616	0.000	23.884	0.121	0.244	0.992		
	5	0	0.81	432.112	137.616	0.000	23.884	0.121	0.244	0.992		
	10	0	1.31	431.839	137.616	0.273	23.611	0.119	0.241	0.980		
	25	0	2.81	431.656	137.616	0.456	23.428	0.119	0.240	0.973		
	50	0	5.31	430.376	137.616	1.736	22.148	0.112	0.226	0.919		
	0	13.5	13.5	426.046	137.616	6.066	17.818	0.090	0.182	0.740		
	0	25	25	421.950	137.616	10.162	13.722	0.069	0.140	0.570		
	0	50	50	419.741	137.616	12.371	11.513	0.058	0.118	0.478		
	0	100	100	418.457	137.616	13.655	10.229	0.052	0.105	0.425		
	0	100	100	418.457	137.616	13.655	10.229	0.052	0.105	0.425		
	0	100	100	418.457	137.616	13.655	10.229	0.052	0.105	0.425		
	0	100	100	418.457	137.616	13.655	10.229	0.052	0.105	0.425		
5-Bar Stone	0	100	100	412.050	131.218	13.655	10.229	0.052	0.105	0.425		
	0	200	200	409.742	131.218	15.963	7.921	0.040	0.081	0.329		
	0	400	400	408.333	131.218	17.372	6.512	0.033	0.067	0.270		
15-Bar Stone	0	400	400	277.059	0.000	17.372	6.512	0.033	0.067	0.270		
	0	700	700	276.034	0.000	18.397	5.487	0.028	0.056	0.228		
	0	1050	1050	275.258	0.000	19.173	4.711	0.024	0.048	0.196		

Desiccator tests	Suction (kPa)	Soil wet + tare (g)	Soil dry + tare (g)	Weight of tare (g)		Gravimetric water content	Volumetric water content			
	4120	6.288	6.239	0.742		0.009	0.01804			
	38000	3.749	3.737	0.881		0.004	0.00845			
	82600	4.282	4.269	0.880		0.004	0.00776			
	150000	4.096	4.085	0.927		0.003	0.00705			
	293000	5.396	5.383	0.909		0.003	0.00588			

Final water content determination	
Weight of ring (g)	72.865
Weight of tare (g)	30.905
Tare + ring + soil wet (g)	306.072
Tare + ring + soil dry (g)	301.361
Weight of dry soil (g)	197.591
Weight of water in soil (g)	4.711
Specific gravity, G_s	2.68

Dimensions of specimen	Initial
Diameter of specimen (mm)	63.73
Height of specimen (mm)	30.66
Volume of specimen (cc)	97.82
Dry density of specimen (kg/m³)	2020.0
Volume of solids (cc)	73.73
Porosity	0.246





MDH ENGINEERED SOLUTIONS

SOIL-WATER CHARACTERISTIC CURVE

Project: SRK Consultants

Location: Faro Mine, Whitehorse

Date: 10-Aug-03

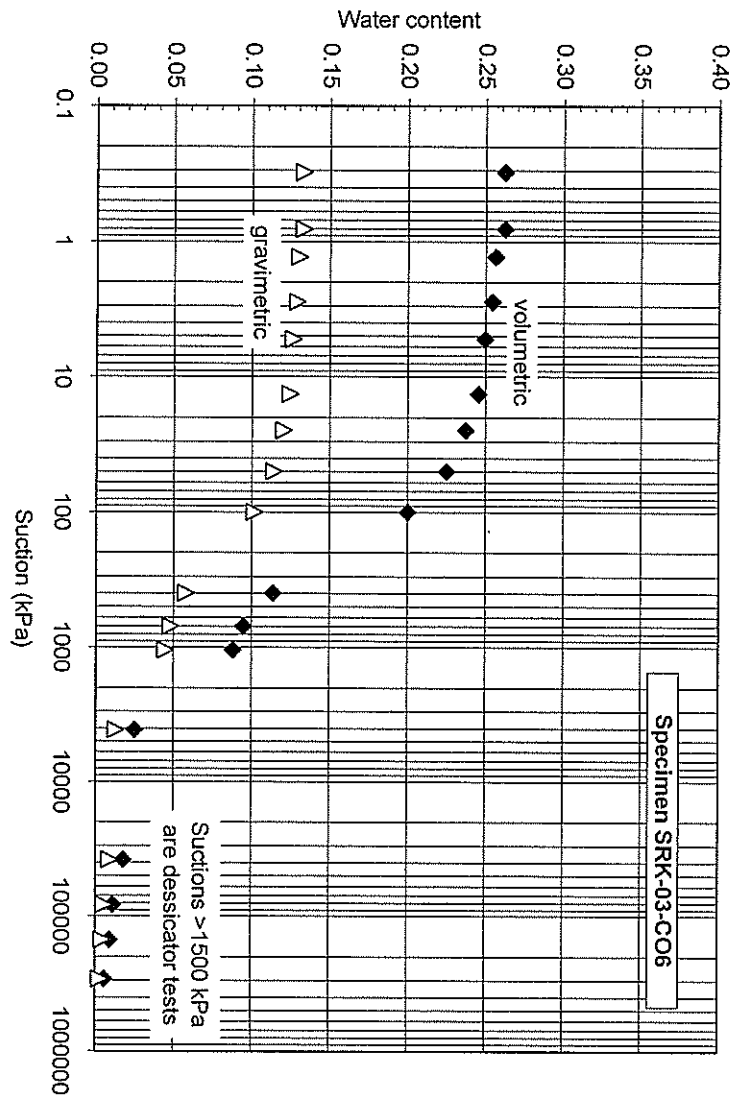
Sample: SRK-03-CO6

	Elevation of water column below base of sample (cm)	Applied air pressure (kPa)	Suction at surface of sample (kPa)	Weight of system (g)	Weight of saturated stonefuckite plate/etc (g)	Cumulative weight of water loss (g)	Weight of water in soil (g)	Gravimetric water content	Vol. water content (assuming volume constant during test)	Degree of saturation (computed based on Gs)		
1-Bar Stone	0	0	0.31	438.787	139.022	0.000	25.972	0.133	0.262	0.990		
	5	0	0.81	438.787	139.022	0.000	25.972	0.133	0.262	0.990		
	10	0	1.31	438.200	139.022	0.587	25.385	0.130	0.256	0.968		
	25	0	2.81	437.992	139.022	0.795	25.177	0.129	0.254	0.960		
	50	0	5.31	437.542	139.022	1.245	24.727	0.127	0.250	0.943		
	0	13.5	13.5	437.146	139.022	1.641	24.331	0.125	0.246	0.928		
	0	25	25	436.320	139.022	2.467	23.505	0.120	0.237	0.896		
	0	50	50	435.096	139.022	3.691	22.281	0.114	0.225	0.849		
	0	100	100	432.659	139.022	6.128	19.844	0.102	0.200	0.756		
	0	100	100	432.659	139.022	6.128	19.844	0.102	0.200	0.756		
	0	100	100	432.659	139.022	6.128	19.844	0.102	0.200	0.756		
	0	100	100	432.659	139.022	6.128	19.844	0.102	0.200	0.756		
5-Bar Stone	0	100	100	371.970	78.493	6.128	19.844	0.102	0.200	0.756		
	0	400	400	363.401	78.493	14.697	11.275	0.058	0.114	0.430		
	0	400	400	363.401	78.493	14.697	11.275	0.058	0.114	0.430		
15-Bar Stone	0	400	400	284.798	0.000	14.697	11.275	0.058	0.114	0.430		
	0	700	700	282.907	0.000	16.586	9.386	0.048	0.095	0.358		
	0	1050	1050	282.254	0.000	17.239	8.733	0.045	0.088	0.333		

Desiccator tests	Suction (kPa)	Soil wet + tare (g)	Soil dry + tare (g)	Weight of tare (g)		Gravimetric water content	Volumetric water content			
	4120	3.120	3.090	0.731		0.013	0.02512			
	38000	5.005	4.968	0.900		0.009	0.01797			
	82600	3.319	3.305	0.824		0.006	0.01115			
	150000	3.541	3.529	0.920		0.005	0.00909			
	293000	3.311	3.304	0.909		0.003	0.00577			

Final water content determination	
Weight of ring (g)	78.271
Weight of tare (g)	32.052
Tare + ring + soil wet (g)	314.215
Tare + ring + soil dry (g)	305.482
Weight of dry soil (g)	195.159
Weight of water in soil (g)	8.733
Specific gravity, G_s	2.68

Dimensions of specimen	Initial
Diameter of specimen (mm)	63.80
Height of specimen (mm)	30.98
Volume of specimen (cc)	99.05
Dry density of specimen (kg/m³)	1970.2
Volume of solids (cc)	72.82
Porosity	0.265



MDH ENGINEERED SOLUTIONS

SOIL-WATER CHARACTERISTIC CURVE

Project: SRK Consultants
Location: Faro Mine, Whitehorse
Date: 10-Aug-03
Sample: SRK-03-CO7

	Elevation of water column below base of sample (cm)	Applied air pressure (kPa)	Suction at surface of sample (kPa)	Weight of system (g)	Weight of saturated stone/fluxite plate/etc (g)	Cumulative weight of water loss (g)	Weight of water in soil (g)	Gravimetric water content	Vol. water content (assuming volume constant during test)	Degree of saturation (computed based on Gs)		
1-Bar Stone	0	0	0.31	412.549	89.164	0.000	37.293	0.180	0.380	0.970		
	5	0	0.81	412.549	89.164	0.000	37.293	0.180	0.380	0.970		
	10	0	1.31	411.106	89.164	1.443	35.850	0.173	0.365	0.932		
	25	0	2.81	410.934	89.164	1.615	35.678	0.172	0.363	0.928		
	50	0	5.31	410.475	89.164	2.074	35.219	0.170	0.358	0.916		
	0	13.5	13.5	395.419	89.164	17.130	20.163	0.097	0.205	0.524		
	0	25	25	390.536	89.164	22.013	15.280	0.074	0.156	0.397		
	0	50	50	387.676	89.164	24.873	12.420	0.060	0.126	0.323		
	0	100	100	386.013	89.164	26.536	10.757	0.052	0.109	0.280		
	0	100	100	386.013	89.164	26.536	10.757	0.052	0.109	0.280		
	0	100	100	386.013	89.164	26.536	10.757	0.052	0.109	0.280		
	0	100	100	386.013	89.164	26.536	10.757	0.052	0.109	0.280		
5-Bar Stone	0	100	100	374.315	78.176	26.536	10.757	0.052	0.109	0.280		
	0	200	200	372.455	78.176	28.396	8.897	0.043	0.091	0.231		
	0	400	400	371.624	78.176	29.227	8.066	0.039	0.082	0.210		
15-Bar Stone	0	400	400	293.370	0.000	29.227	8.066	0.039	0.082	0.210		
	0	700	700	291.533	0.000	31.064	6.229	0.030	0.063	0.162		
	0	1050	1050	291.165	0.000	31.432	5.861	0.028	0.060	0.152		

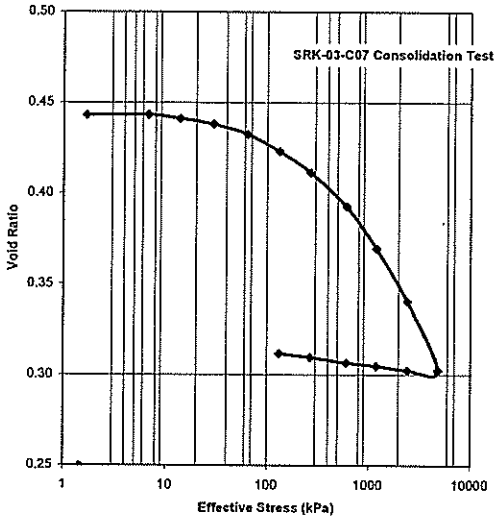
Desiccator tests	Suction (kPa)	Soil wet + tare (g)	Soil dry + tare (g)	Weight of tare (g)		Gravimetric water content	Volumetric water content			
	4120	4.089	4.001	0.866		0.028	0.05982			
	38000	3.132	3.114	0.623		0.007	0.0154			
	82600	4.131	4.118	0.988		0.004	0.0088			
	150000	2.268	2.264	0.889		0.003	0.0062			
	293000	3.924	3.917	0.958		0.002	0.00504			

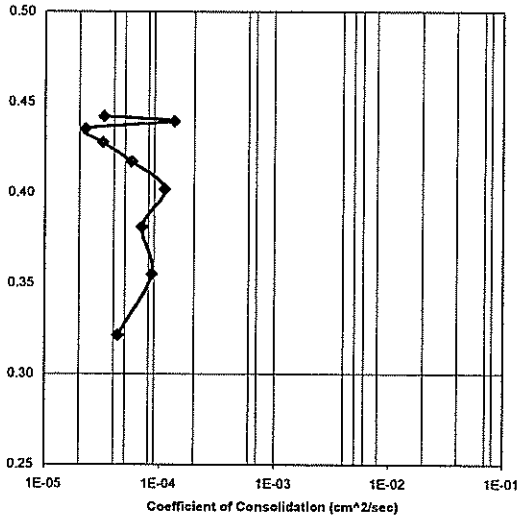
Final water content determination	
Weight of ring (g)	78.343
Weight of tare (g)	122.835
Tare + ring + soil wet (g)	414.004
Tare + ring + soil dry (g)	408.143
Weight of dry soil (g)	206.965
Weight of water in soil (g)	5.861
Specific gravity, G_s	3.46

Dimensions of specimen	Initial
Diameter of specimen (mm)	63.73
Height of specimen (mm)	30.80
Volume of specimen (cc)	98.26
Dry density of specimen (kg/m³)	2106.3
Volume of solids (cc)	59.82
Porosity	0.391

APPENDIX VI

Consolidation Tests Results





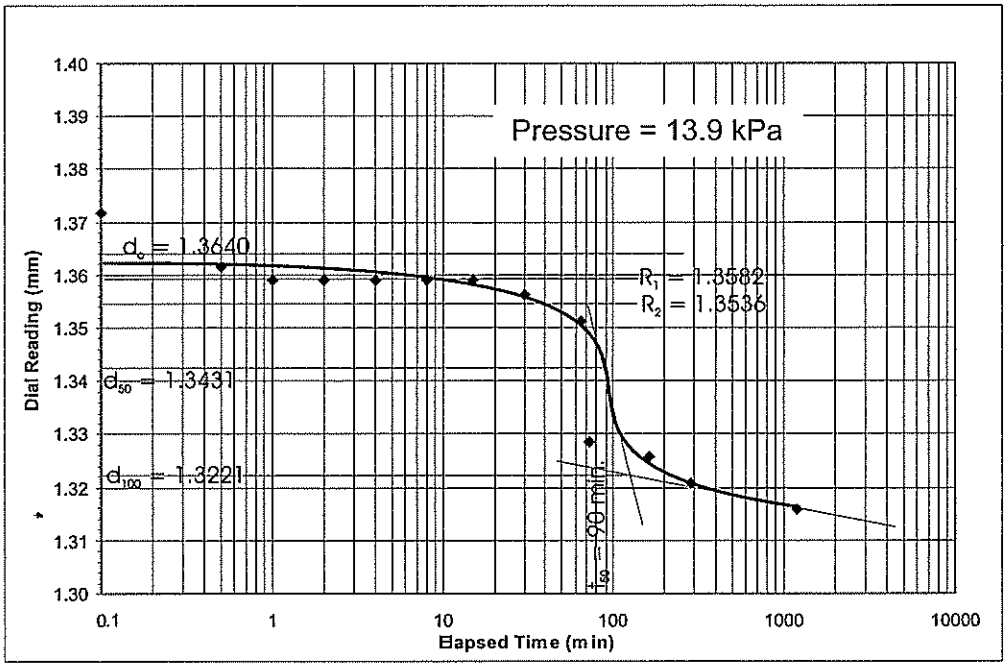
Input:

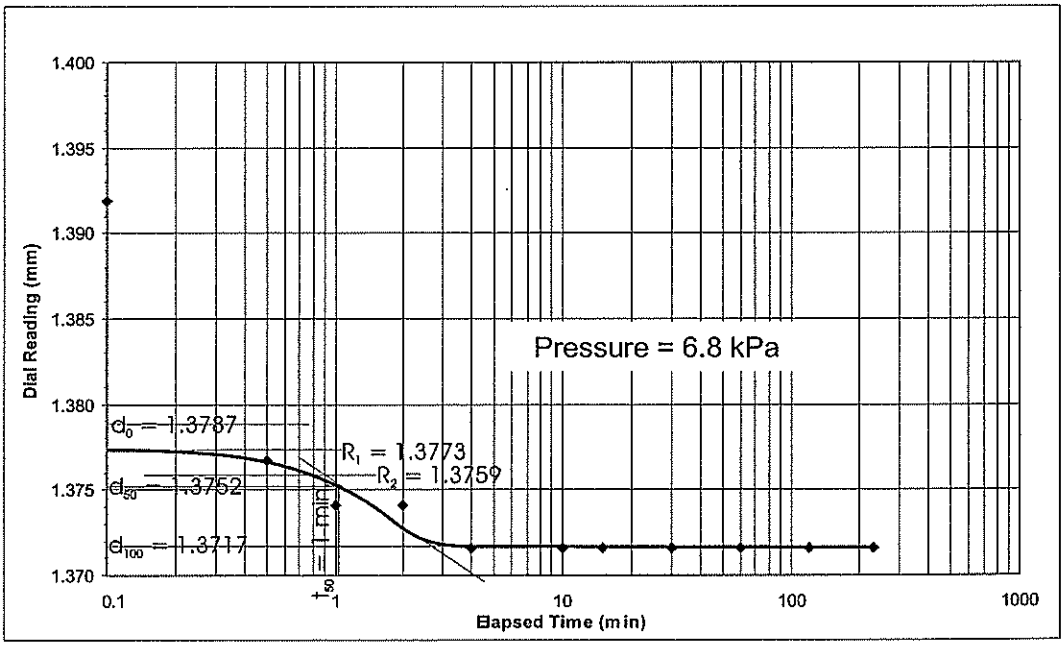
Diameter of ring:	63.84	mm
Initial height of sample:	18.99	mm
Specific gravity:	3.45	
Initial wet sample mass:	173.22	g
Initial water content:	19.2	%
Initial dial reading:	0.0548	inches
Final dry mass of sample:	145.32	g
Mechanical Advantage:	11.04	

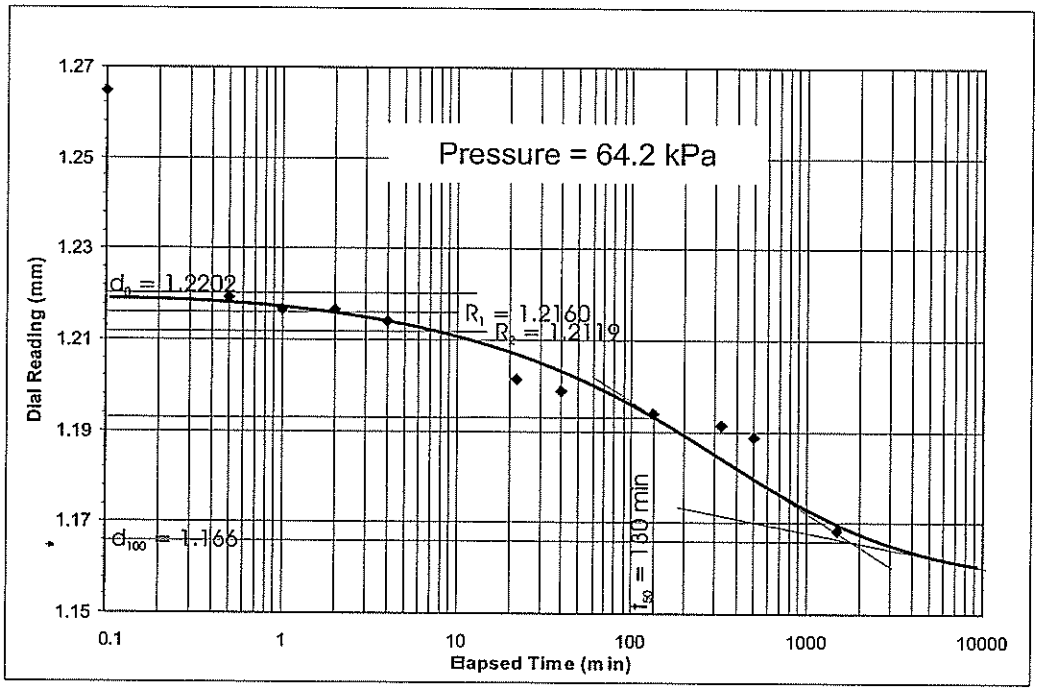
Calculations:

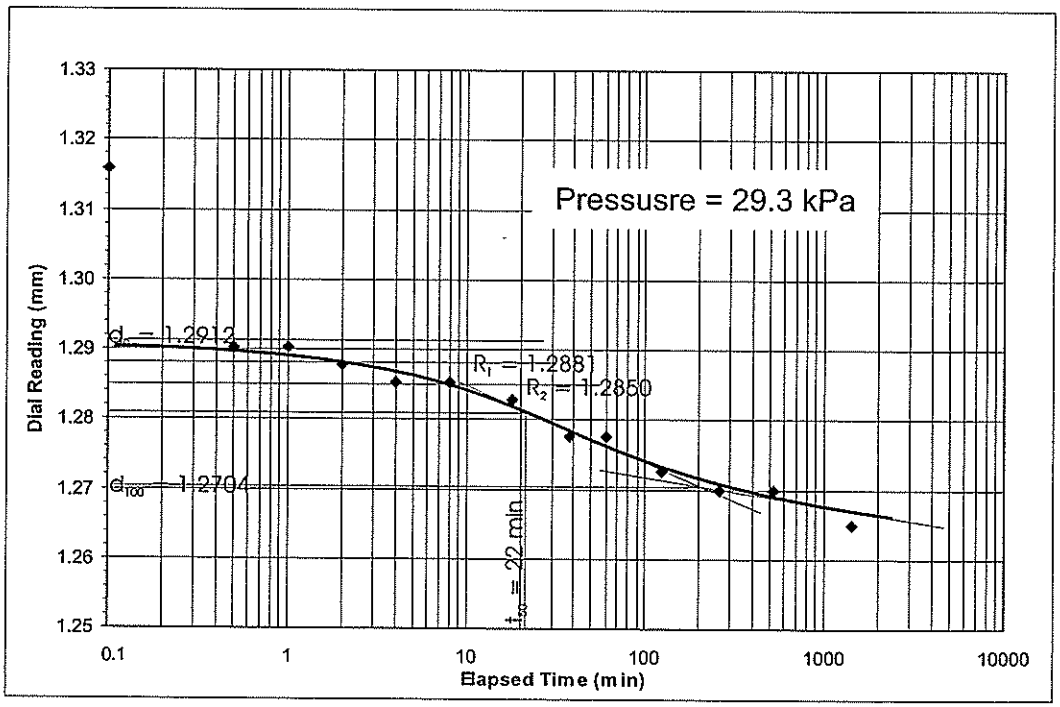
Cross-sectional area:	32.01	cc 3.2E-03 m^3
Volume of solids:	42.12	cc 4.2E-05 m^3
Total volume:	60.79	cc (prior to loading)
Volume of voids:	18.66	cc (prior to loading)
Initial void ratio:	0.44	(prior to loading)
Dry mass of solids:	145.32	g
Initial wet density:	2850	kg/m^3 (prior to loading)
Initial dry density:	2391	kg/m^3 (prior to loading)
Initial dial reading:	1.39	mm

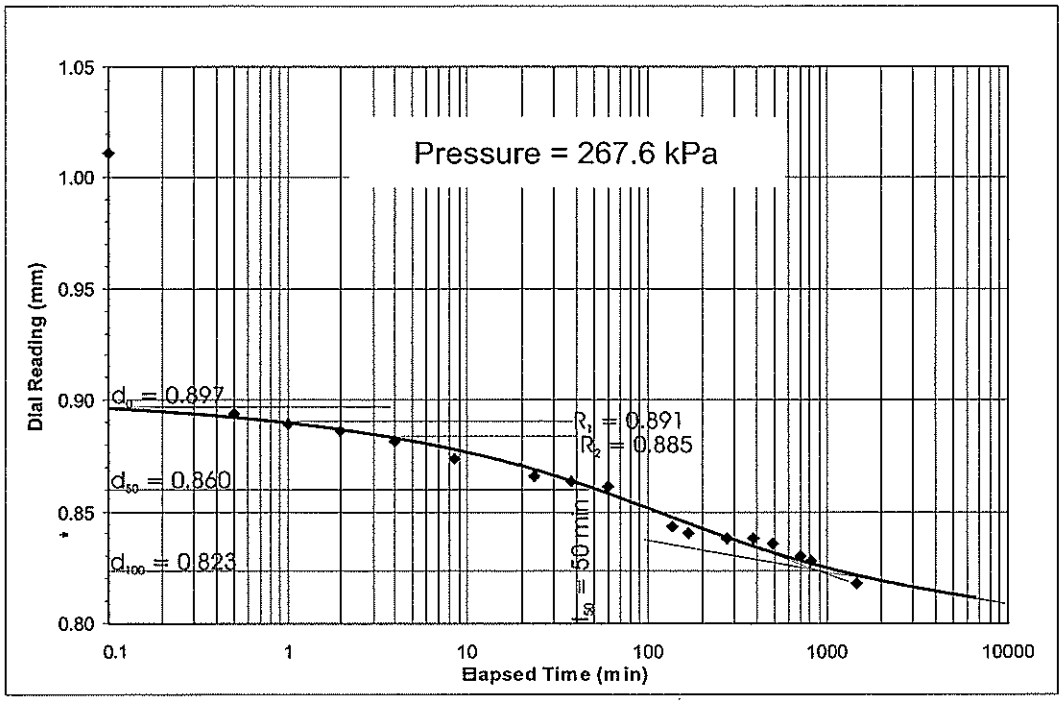
		At End of Primary Consolidation							Coefficient of Consolidation					
Loading Increment	Pressure (kPa)	R_{100} (mm)	Uncorrected Sample Height (mm)	Equipment Compressibility (mm)	Corrected Sample Height (mm)	Volume of Sample (cc)	Volume of Voids (cc)	Void Ratio	Average Void Ratio	R_{50} (mm)	Corrected Sample Height at R_{50} (mm)	H_{t50} (mm)	time50 (sec)	Coefficient of Consolidation c_v (cm^2/s)
swelling	1.7							0.44						
1	6.8	1.37	18.97	0.023	18.99	60.79	18.67	0.44						
2	13.9	1.32	18.92	0.043	18.96	60.70	18.58	0.44	0.44	1.34	18.98	9.49	5400	3.29E-05
3	29.3	1.27	18.87	0.056	18.92	60.58	18.45	0.44	0.44	1.28	18.93	9.47	1320	1.34E-04
4	64.2	1.17	18.76	0.086	18.85	60.34	18.22	0.43	0.44	1.19	18.88	9.44	7800	2.25E-05
5	131.9	1.01	18.61	0.119	18.73	59.94	17.82	0.42	0.43	1.05	18.76	9.38	5400	3.21E-05
6	267.6	0.82	18.42	0.152	18.57	59.45	17.33	0.41	0.42	0.86	18.61	9.31	3000	5.69E-05
7	607.8	0.52	18.11	0.213	18.33	58.66	16.54	0.39	0.40	0.56	18.37	9.19	1500	1.11E-04
8	1204.7	0.15	17.75	0.274	18.02	57.69	15.57	0.37	0.38	0.22	18.09	9.04	2280	7.07E-05
9	2426.5	-0.32	17.28	0.358	17.64	56.47	14.35	0.34	0.36	-0.24	17.72	8.86	1800	8.59E-05
10	4866.6	-0.93	16.66	0.475	17.14	54.86	12.74	0.30	0.32	-0.24	17.83	8.92	3600	4.35E-05
11	2426.5	-0.86	16.73	0.406	17.14	54.86	12.74	0.30	0.30					
12	1204.7	-0.79	16.81	0.366	17.17	54.97	12.84	0.30	0.30					
13	607.8	-0.74	16.86	0.333	17.20	55.04	12.92	0.31	0.31					
14	267.6	-0.67	16.93	0.305	17.23	55.17	13.04	0.31	0.31					
15	131.9	-0.62	16.98	0.279	17.26	55.25	13.13	0.31	0.31					

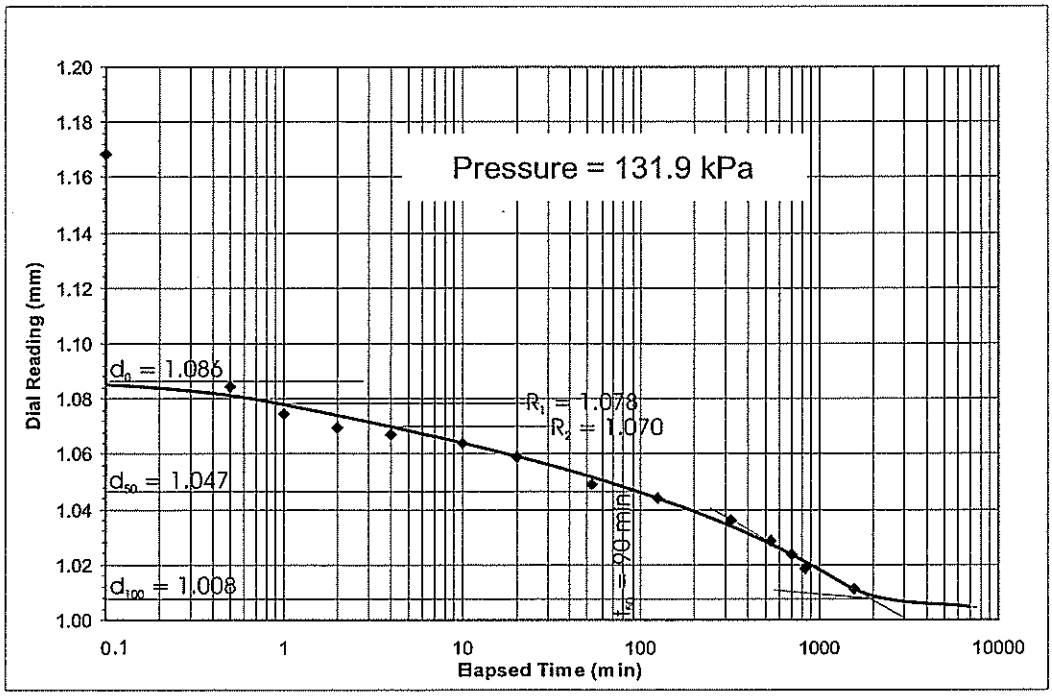

Pressure = 13.9 kPa
d_o = 1.3640
R_1 = 1.3582
R_2 = 1.3536
d_{50} = 1.3431
d_{100} = 1.3221
t_{50} = 90 min.
Dial Reading (mm)
Elapsed Time (min)
1.40
1.39
1.38
1.37
1.36
1.35
1.34
1.33
1.32
1.31
1.30
0.1
1
10
100
1000
10000

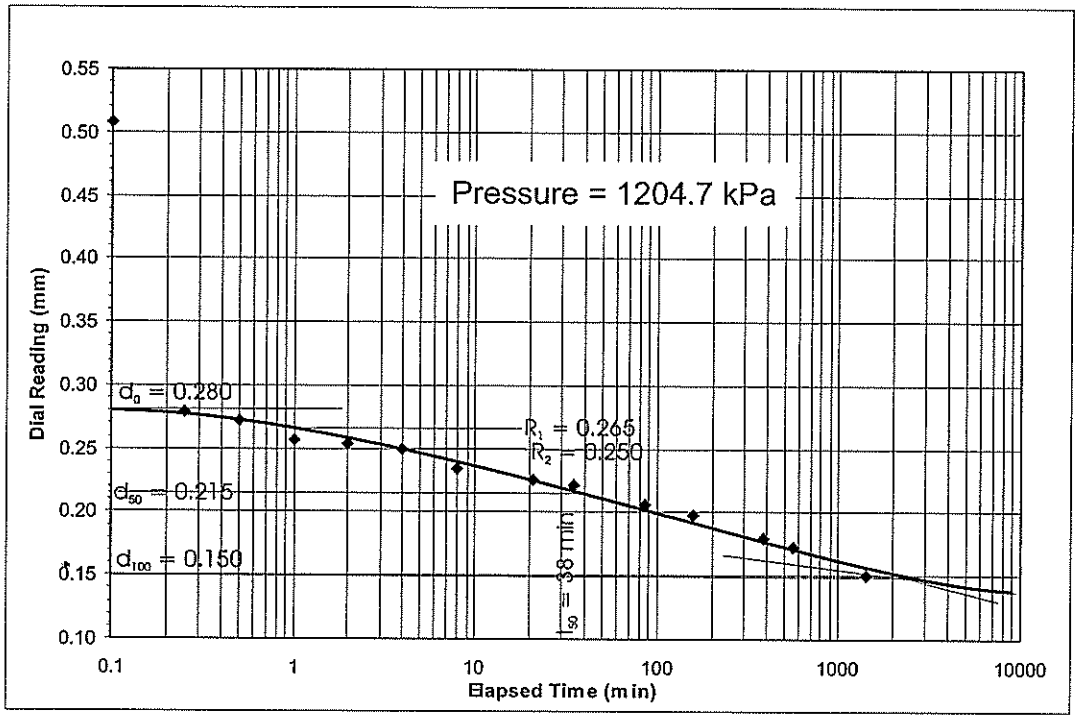

Pressure = 6.8 kPa
d_o = 1.3787
R_1 = 1.3773
R_2 = 1.3759
d_{50} = 1.3752
d_{100} = 1.3717
t_{50} = 1 min.
Dial Reading (mm)
Elapsed Time (min)
1.400
1.395
1.390
1.385
1.380
1.375
1.370
0.1
1
10
100
1000

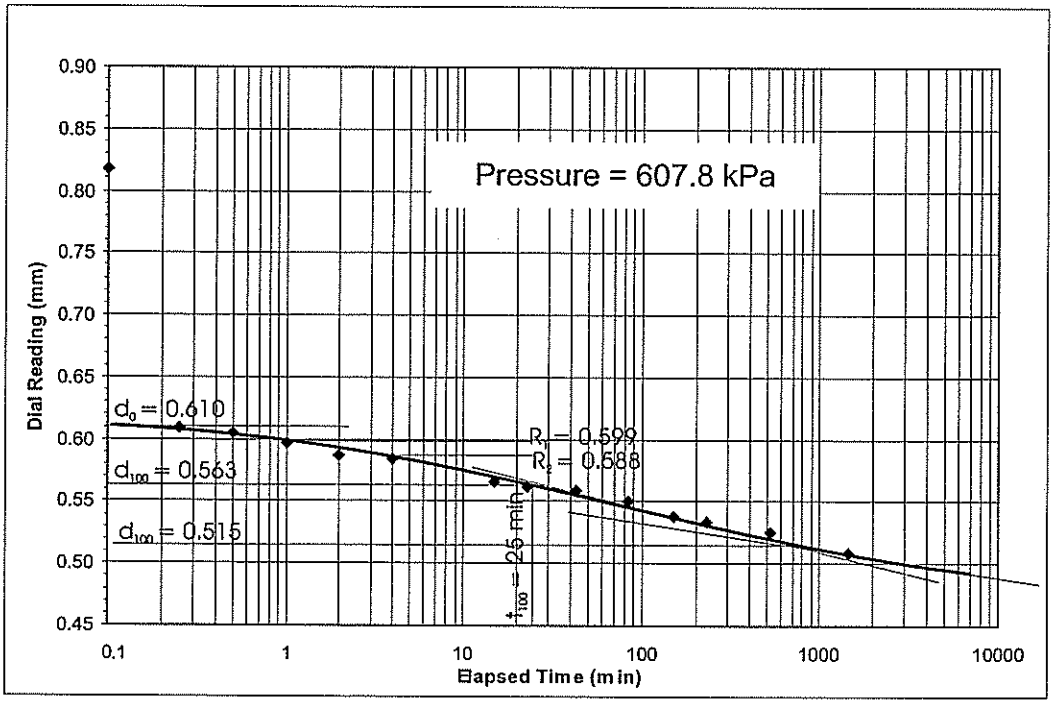

Pressure = 64.2 kPa
Dial Reading (mm)
Elapsed Time (min)
1.27
1.25
1.23
1.21
1.19
1.17
1.15
0.1
1
10
100
1000
10000
d_0 = 1.2202
R_1 = 1.2160
R_2 = 1.2119
d_{100} = 1.166
t_{50} = 180 min

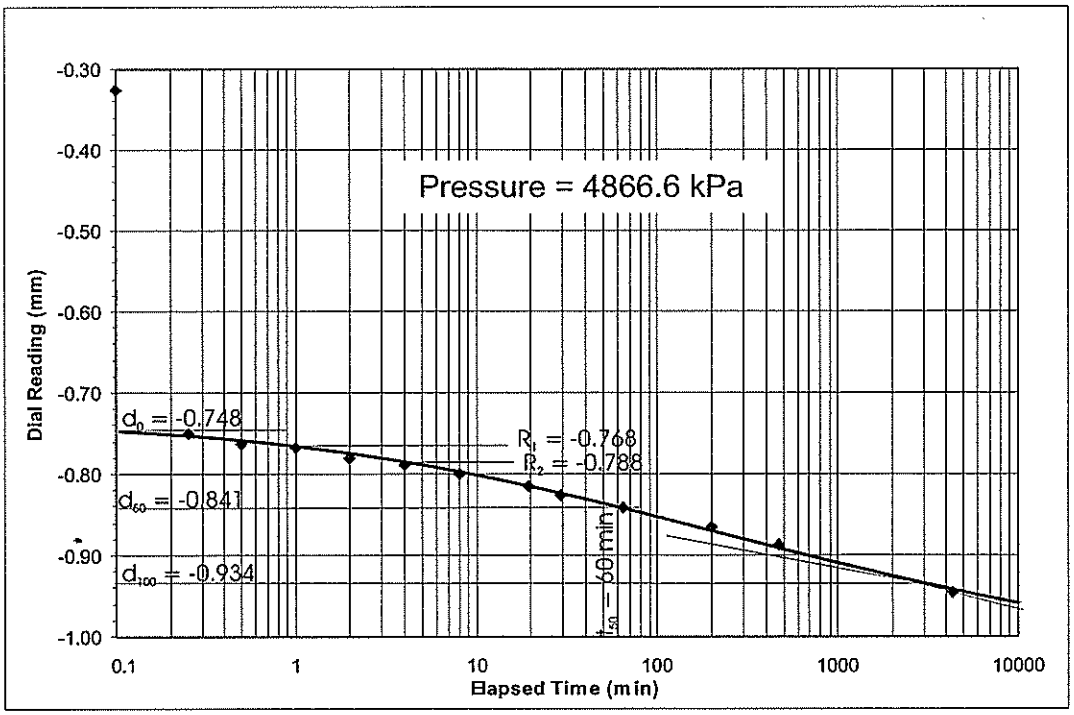

Pressusre = 29.3 kPa
Dial Reading (mm)
Elapsed Time (min)
1.33
1.32
1.31
1.30
1.29
1.28
1.27
1.26
1.25
0.1
1
10
100
1000
10000
d_0 = 1.2912
R_1 = 1.2881
R_2 = 1.2850
d_{100} = 1.2704
t_{50} = 22 min

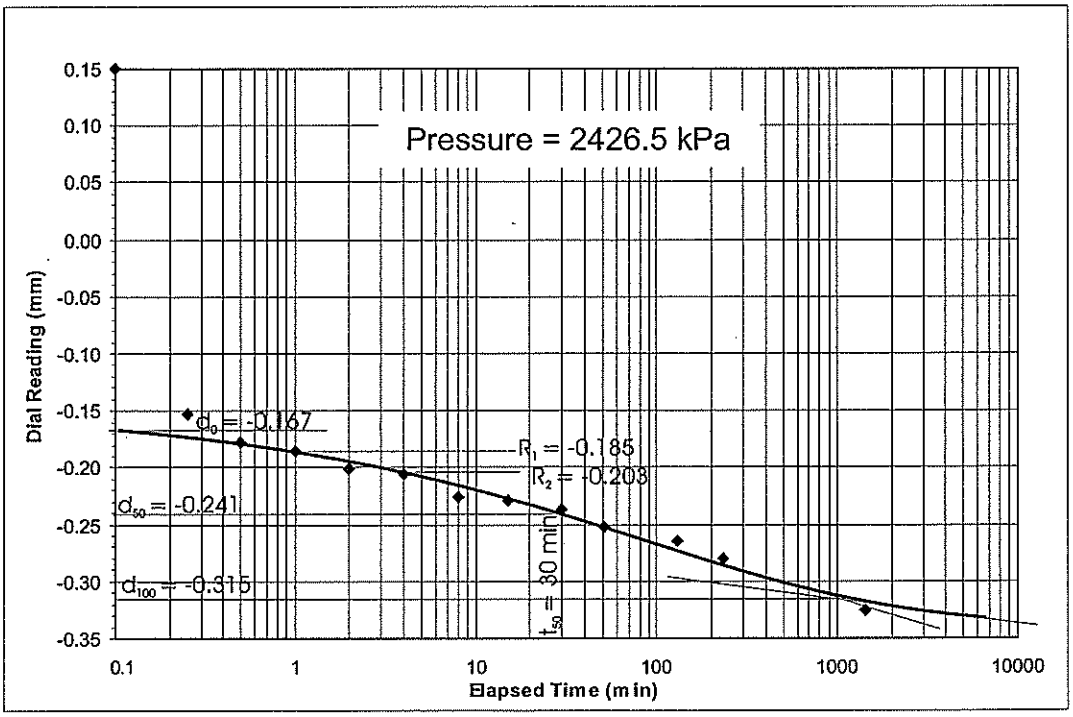

Pressure = 267.6 kPa
Dial Reading (mm)
Elapsed Time (min)
1.05
1.00
0.95
0.90
0.85
0.80
0.1
1
10
100
1000
10000
d_0 = 0.897
d_{50} = 0.860
d_{100} = 0.823
R_1 = 0.891
R_2 = 0.885
t_{50} = 50 min

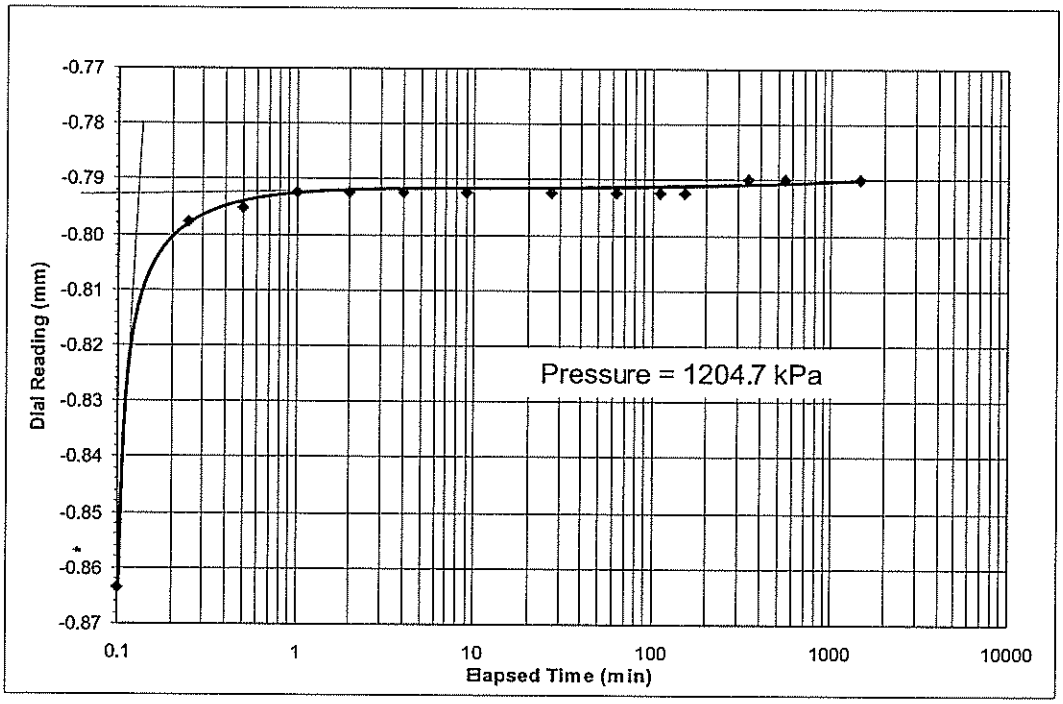

Pressure = 131.9 kPa
Dial Reading (mm)
Elapsed Time (min)
1.20
1.18
1.16
1.14
1.12
1.10
1.08
1.06
1.04
1.02
1.00
0.1
1
10
100
1000
10000
d_0 = 1.086
d_{50} = 1.047
d_{100} = 1.008
R_1 = 1.078
R_2 = 1.070
t_{50} = 90 min

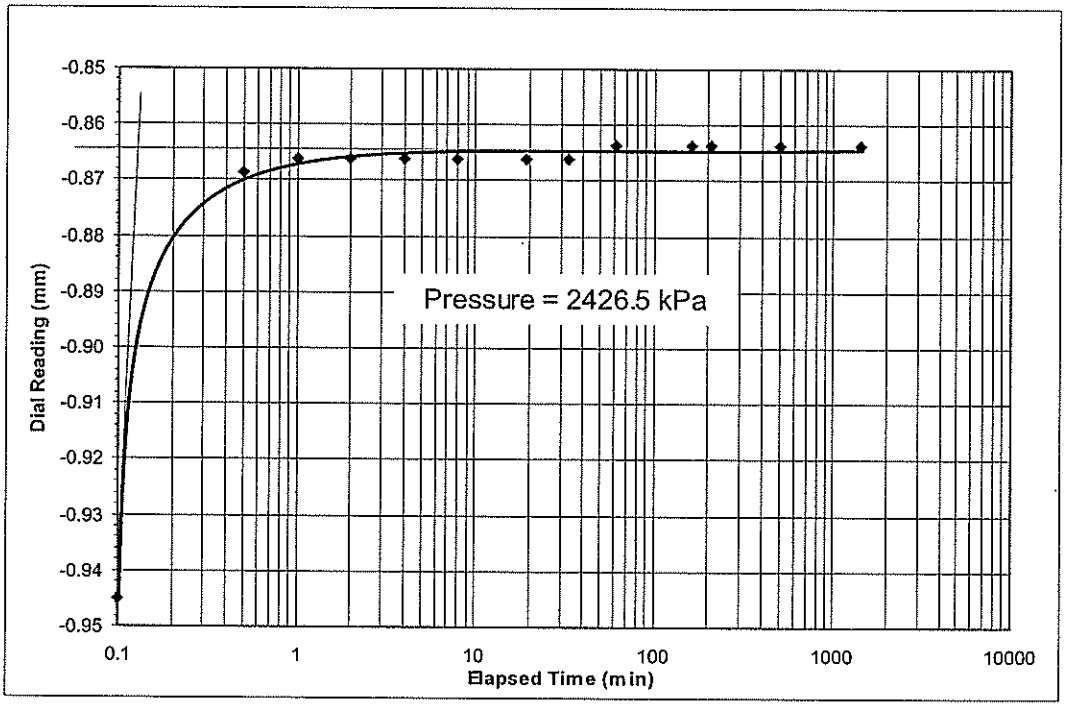

Pressure = 1204.7 kPa
Dial Reading (mm)
Elapsed Time (min)
0.55
0.50
0.45
0.40
0.35
0.30
0.25
0.20
0.15
0.10
0.1
1
10
100
1000
10000
d_0 = 0.280
d_{50} = 0.215
d_{100} = 0.150
R_1 = 0.265
R_2 = 0.250
t_{50} = 38 min

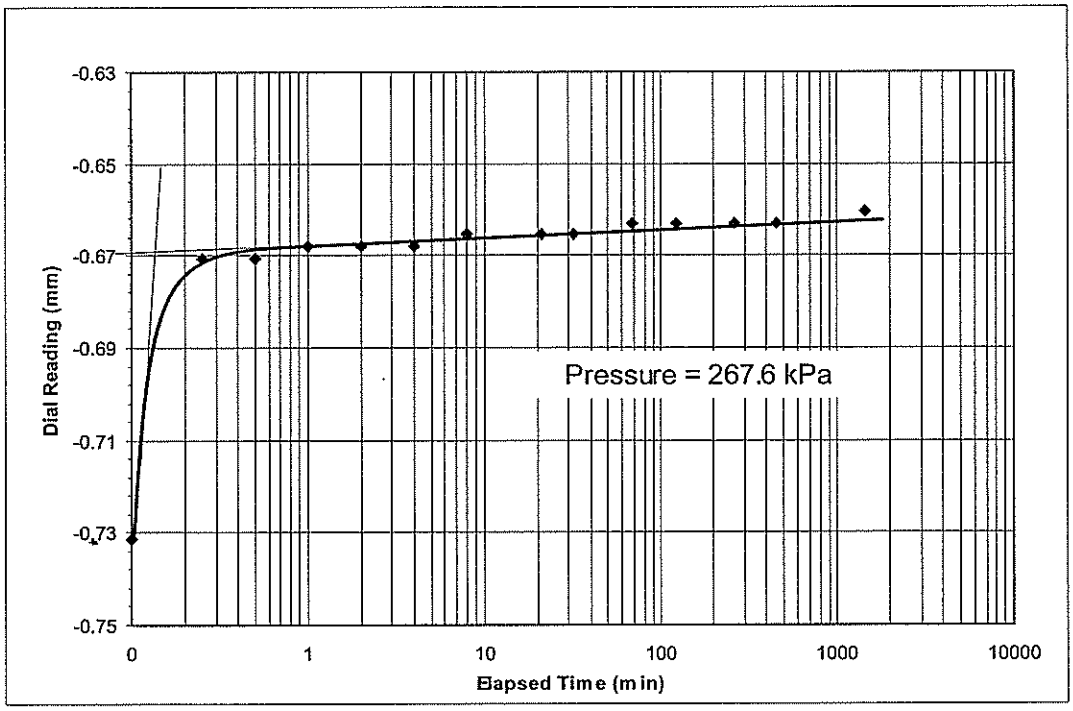

Pressure = 607.8 kPa
Dial Reading (mm)
Elapsed Time (min)
0.90
0.85
0.80
0.75
0.70
0.65
0.60
0.55
0.50
0.45
0.1
1
10
100
1000
10000
d_0 = 0.610
d_{100} = 0.563
d_{100} = 0.515
R_1 = 0.599
R_2 = 0.588
t_{100} = 25 min

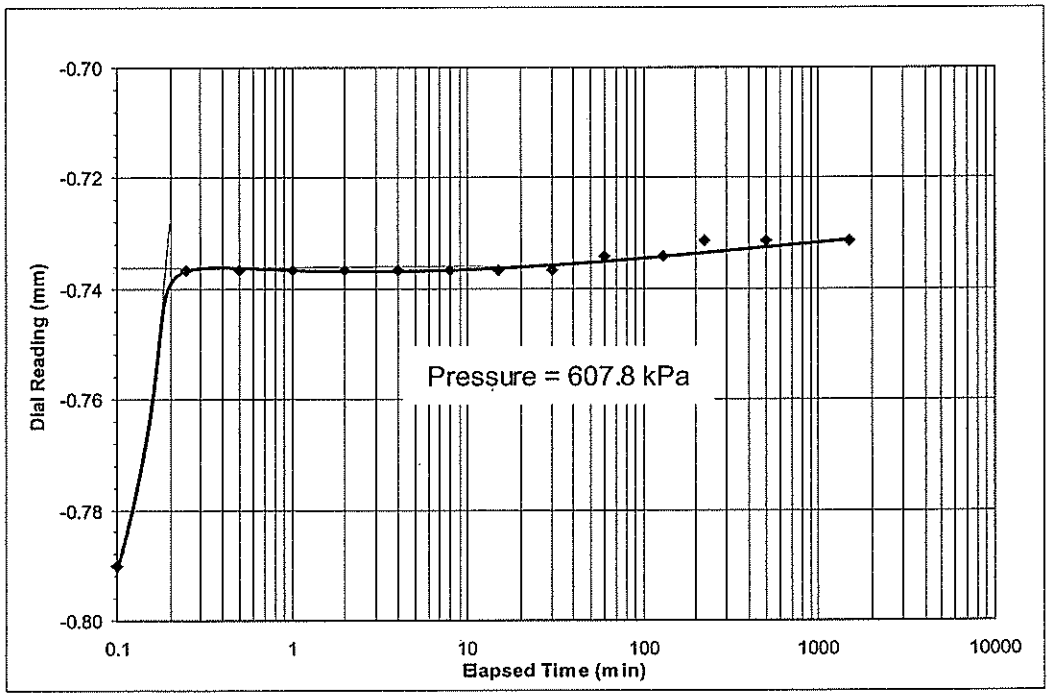

Pressure = 4866.6 kPa
Dial Reading (mm)
-0.30
-0.40
-0.50
-0.60
-0.70
-0.80
-0.90
-1.00
d_0 = -0.748
R_1 = -0.768
R_2 = -0.788
d_{50} = -0.841
d_{100} = -0.934
t_{50} = 60 min
0.1
1
10
100
1000
10000
Elapsed Time (min)

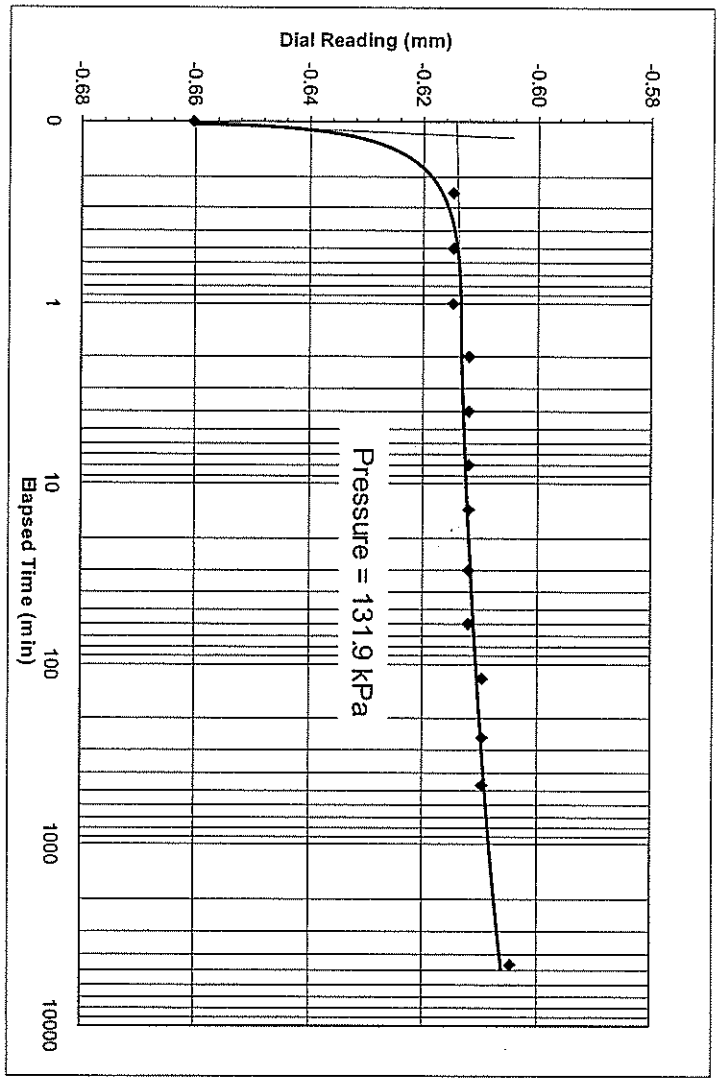

Pressure = 2426.5 kPa
Dial Reading (mm)
0.15
0.10
0.05
0.00
-0.05
-0.10
-0.15
-0.20
-0.25
-0.30
-0.35
d_0 = -0.167
R_1 = -0.185
R_2 = -0.203
d_{50} = -0.241
d_{100} = -0.315
t_{50} = 30 min
0.1
1
10
100
1000
10000
Elapsed Time (min)


-0.77
-0.78
-0.79
-0.80
-0.81
-0.82
-0.83
-0.84
-0.85
-0.86
-0.87
Dial Reading (mm)
Pressure = 1204.7 kPa
0.1
1
10
100
1000
10000
Elapsed Time (min)


-0.85
-0.86
-0.87
-0.88
-0.89
-0.90
-0.91
-0.92
-0.93
-0.94
-0.95
Dial Reading (mm)
Pressure = 2426.5 kPa
0.1
1
10
100
1000
10000
Elapsed Time (min)

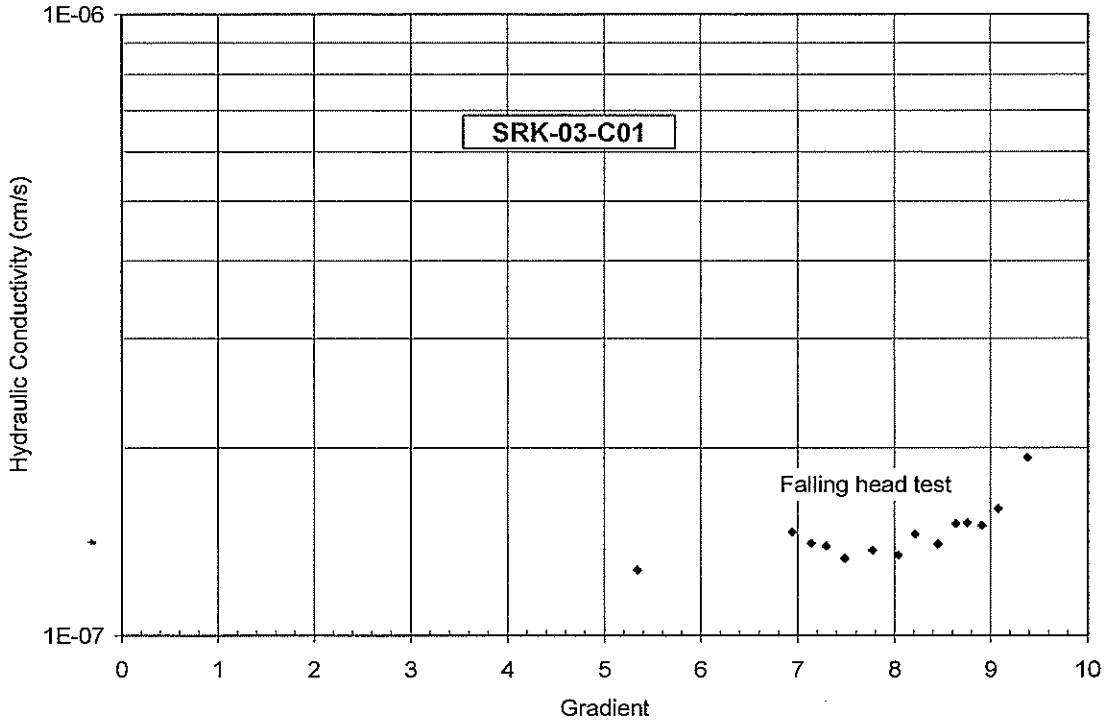

-0.63
-0.65
-0.67
-0.69
-0.71
-0.73
-0.75
Dial Reading (mm)
Pressure = 267.6 kPa
0
1
10
100
1000
10000
Elapsed Time (min)


-0.70
-0.72
-0.74
-0.76
-0.78
-0.80
Dial Reading (mm)
Pressure = 607.8 kPa
0.1
1
10
100
1000
10000
Elapsed Time (min)



APPENDIX VII-a

Falling Head Hydraulic Conductivity Tests
Results



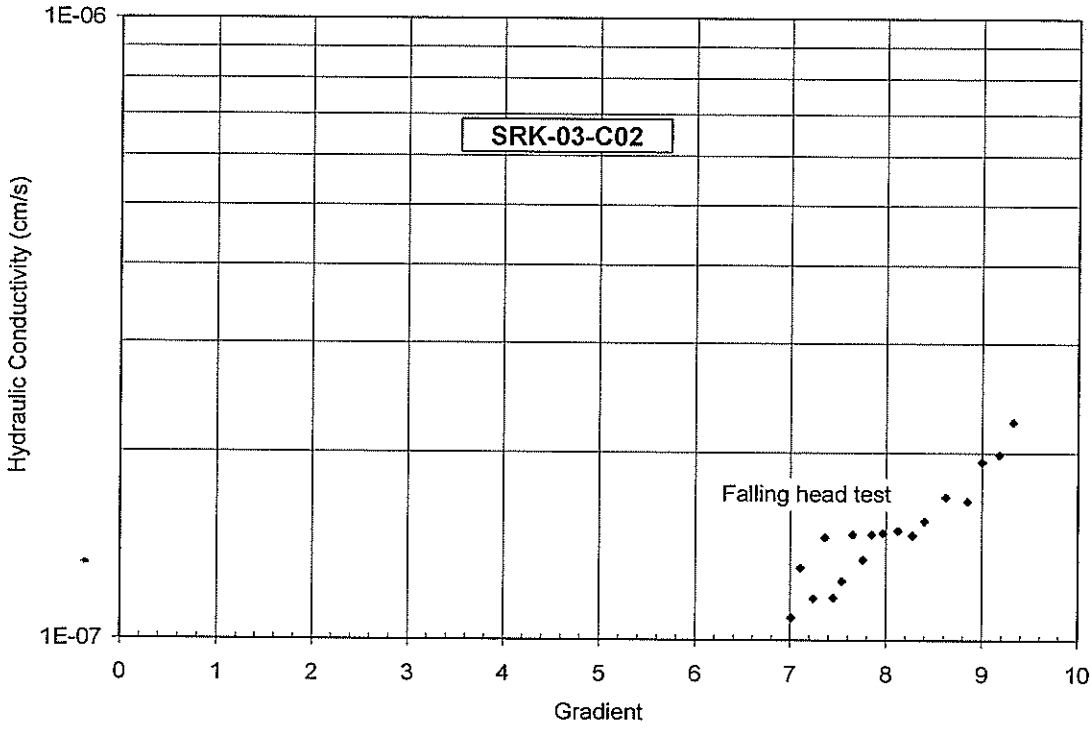
FALLING-HEAD K-TEST

Sample: SRK-03-C01

Time T1	Time T2	delta t min	Buret reading at T1	H1 cm	Buret reading at T2	H2 cm	k cm/s	Average gradient
9:26:00	10:16:00	50	98.30	113.300	93.10	108.100	1.93E-07	9.39
10:16:00	10:40:00	24	93.10	108.100	91.10	106.100	1.60E-07	9.08
10:40:00	11:06:00	26	91.10	106.100	89.10	104.100	1.50E-07	8.91
11:06:00	11:27:00	21	89.10	104.100	87.50	102.500	1.52E-07	8.76
11:27:00	11:43:00	16	87.50	102.500	86.30	101.300	1.51E-07	8.64
11:43:00	12:30:00	47	86.30	101.300	83.10	98.100	1.40E-07	8.45
12:30:00	13:05:00	35	83.10	98.100	80.70	95.700	1.45E-07	8.22
13:05:00	13:34:00	29	80.70	95.700	78.90	93.900	1.35E-07	8.04
13:34:00	14:46:00	72	78.90	93.900	74.50	89.500	1.37E-07	7.78
14:46:00	15:28:00	42	74.50	89.500	72.10	87.100	1.33E-07	7.49
15:28:00	16:04:00	36	72.10	87.100	70.00	85.000	1.39E-07	7.30
16:04:00	16:30:00	26	70.00	85.000	68.50	83.500	1.41E-07	7.14
16:30:00	17:23:00	53	68.50	83.500	65.40	80.400	1.47E-07	6.95
17:23:00	8:37:00	914	65.40	80.400	30.60	45.600	1.28E-07	5.34

Test using material <#4 sieve
Maximum dry density = 1980 Mg/m3
Optimum water content = 12.5%

Buret, a =	0.183 cm2
Specimen dimensions	
Height, L =	5.4 cm
Diameter, D=	10.1 cm
X-sectional area, A =	80.13 cm2
Post-test information	
Water content	
Tare mass =	18.47 g
Wet sample + tare =	1004.32 g
Dry sample + tare	869.05 g
Water content =	15.9%
Dry density =	1.966 Mg/m3



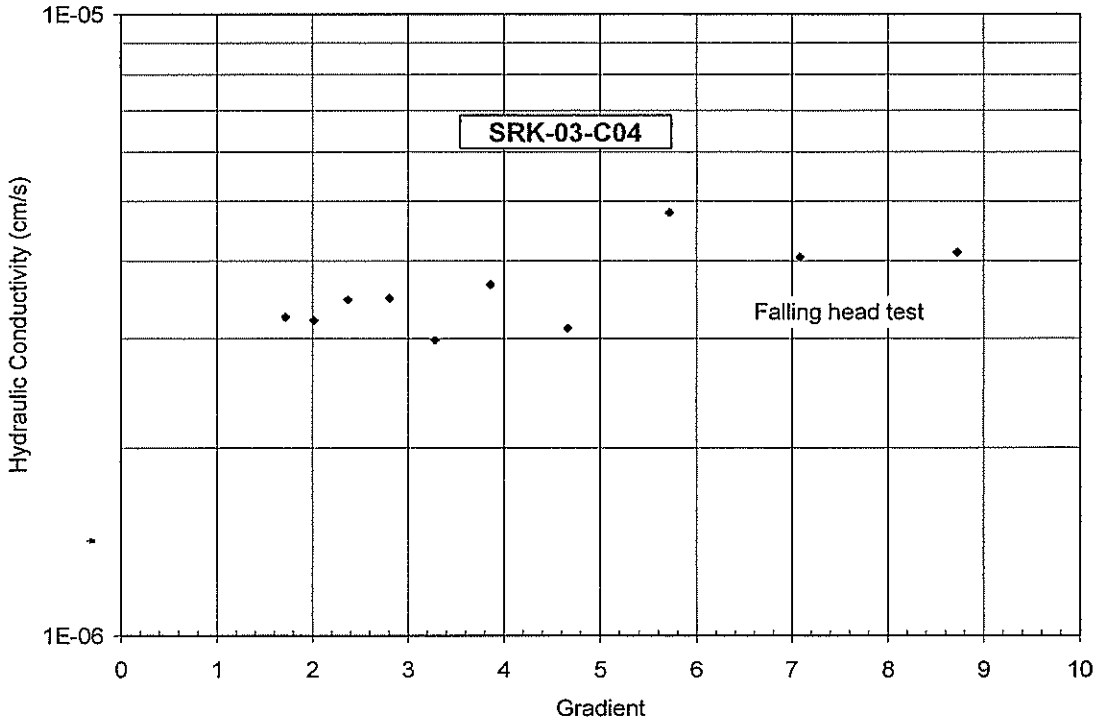
FALLING-HEAD K-TEST

Sample: SRK-03-C02

Time T1	Time T2	delta t min	Buret reading at T1	H1 cm	Buret reading at T2	H2 cm	k cm/s	Average gradient
9:17:00	9:27:00	10	95.50	110.500	94.30	109.300	2.24E-07	9.32
9:27:00	9:48:00	21	94.30	109.300	92.10	107.100	1.99E-07	9.17
9:48:00	10:07:00	19	92.10	107.100	90.20	105.200	1.94E-07	9.00
10:07:00	10:27:00	20	90.20	105.200	88.50	103.500	1.67E-07	8.85
10:27:00	11:11:00	44	88.50	103.500	84.80	99.800	1.70E-07	8.62
11:11:00	11:31:00	20	84.80	99.800	83.30	98.300	1.56E-07	8.40
11:31:00	11:51:00	20	83.30	98.300	81.90	96.900	1.47E-07	8.28
11:51:00	12:21:00	30	81.90	96.900	79.80	94.800	1.50E-07	8.13
12:21:00	12:46:00	25	79.80	94.800	78.10	93.100	1.49E-07	7.97
12:46:00	13:01:00	15	78.10	93.100	77.10	92.100	1.48E-07	7.85
13:01:00	13:21:00	20	77.10	92.100	75.90	90.900	1.35E-07	7.76
13:21:00	13:41:00	20	75.90	90.900	74.60	89.600	1.48E-07	7.65
13:41:00	14:07:00	26	74.60	89.600	73.20	88.200	1.24E-07	7.54
14:07:00	14:21:00	14	73.20	88.200	72.50	87.500	1.17E-07	7.45
14:21:00	14:42:00	21	72.50	87.500	71.20	86.200	1.47E-07	7.36
14:42:00	15:15:00	33	71.20	86.200	69.60	84.600	1.17E-07	7.24
15:15:00	15:45:00	30	69.60	84.600	68.00	83.000	1.31E-07	7.11
15:45:00	16:01:00	16	68.00	83.000	67.30	82.300	1.09E-07	7.01

Test using material <#4 sieve
Maximum dry density = 1975 Mg/m3
Optimum water content = 12.0 %

Buret, a =	0.183 cm2
Specimen dimensions	
Height, L =	5.4 cm
Diameter, D=	10.1 cm
X-sectional area, A =	80.13 cm2
Post-test information	
Water content	
Tare mass =	312 g
Wet sample + tare =	1272 g
Dry sample + tare	1148.16 g
Water content =	14.8%
Dry density =	1.932 Mg/m3



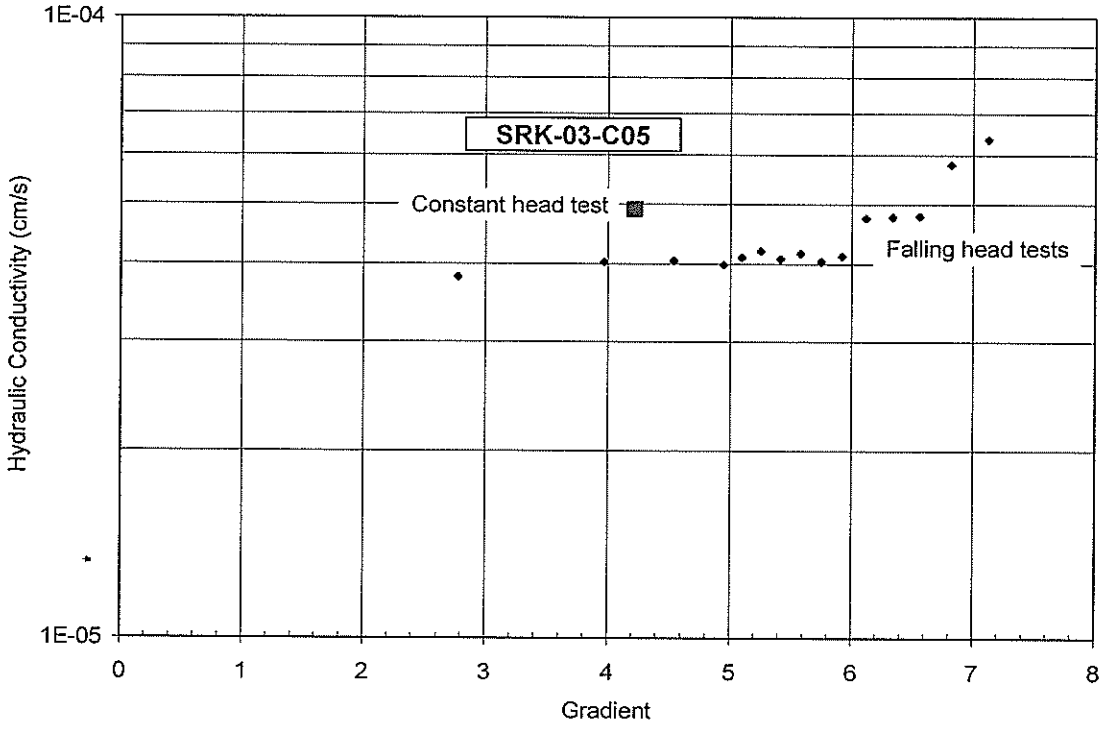
FALLING-HEAD K-TEST

Sample: SRK-03-C04

Time T1	Time T2	delta t min	Buret reading at T1	H1 cm	Buret reading at T2	H2 cm	k cm/s	Average gradient
10:58:00	11:08:00	10	98.20	113.200	77.60	92.600	4.13E-06	8.73
11:08:00	11:19:00	11	77.60	92.600	59.50	74.500	4.05E-06	7.08
11:19:00	11:28:00	9	59.50	74.500	45.40	60.400	4.79E-06	5.72
11:28:00	11:41:00	13	45.40	60.400	34.60	49.600	3.11E-06	4.66
11:41:00	11:51:00	10	34.60	49.600	26.50	41.500	3.66E-06	3.86
11:51:00	12:01:00	10	26.50	41.500	20.90	35.900	2.98E-06	3.28
12:01:00	12:11:00	10	20.90	35.900	15.30	30.300	3.49E-06	2.81
12:11:00	12:21:00	10	15.30	30.300	10.60	25.600	3.46E-06	2.37
12:21:00	12:31:00	10	10.60	25.600	6.90	21.900	3.21E-06	2.01
12:31:00	12:41:00	10	6.90	21.900	3.70	18.700	3.25E-06	1.72

Test using material <#4 sieve
Maximum dry density = 2045 Mg/m3
Optimum water content = 9.0 %

Buret, a =	0.183 cm2
Specimen dimensions	
Height, L =	5.4 cm
Diameter, D=	10.1 cm
X-sectional area, A =	80.13 cm2
Post-test information	
Water content	
Tare mass =	308.42 g
Wet sample + tare =	1309.66 g
Dry sample + tare	1184.82 g
Water content =	14.2%
Dry density =	2.025 Mg/m3



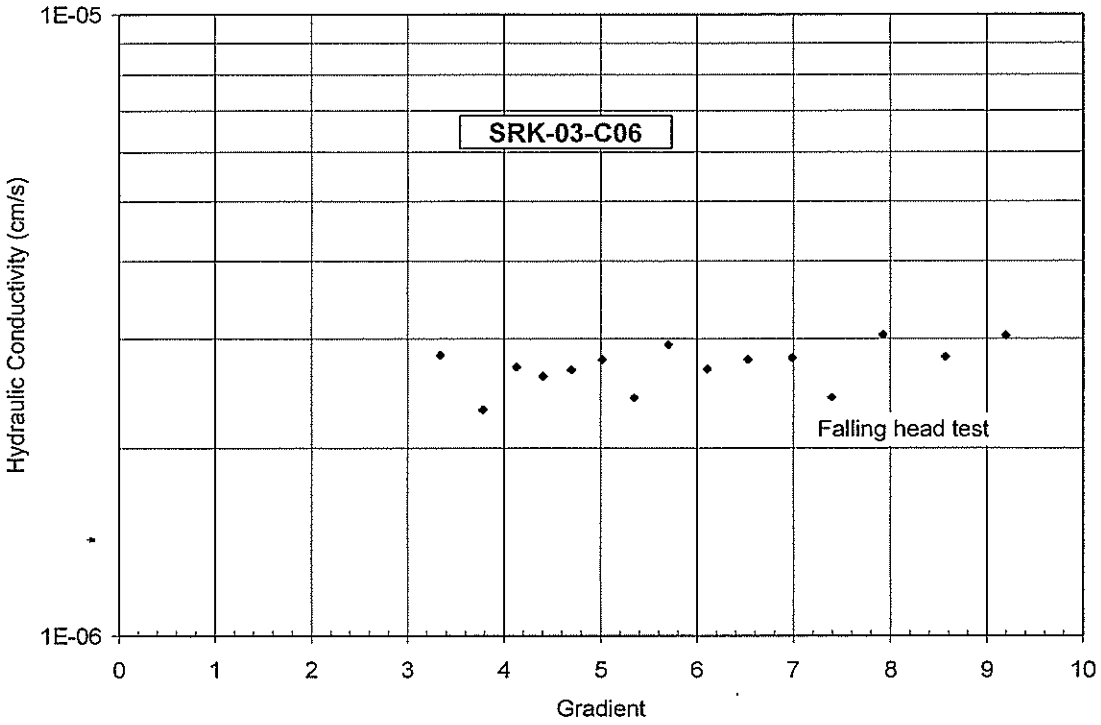
FALLING-HEAD K-TEST

Sample: **SRK-03-C05**

Time T1	Time T2	delta t min	Buret reading at T1	H1 cm	Buret reading at T2	H2 cm	k cm/s	Average gradient
16:46:30	16:47:00	0.5	84.30	86.000	80.40	82.100	6.36E-05	7.13
16:47:00	16:47:30	0.5	80.40	82.100	77.00	78.700	5.80E-05	6.82
16:47:30	16:48:00	0.5	77.00	78.700	74.30	76.000	4.78E-05	6.56
16:48:00	16:48:30	0.5	74.30	76.000	71.70	73.400	4.77E-05	6.33
16:48:30	16:49:00	0.5	71.70	73.400	69.20	70.900	4.75E-05	6.12
16:49:00	16:49:30	0.5	69.20	70.900	67.10	68.800	4.12E-05	5.92
16:49:30	16:50:00	0.5	67.10	68.800	65.10	66.800	4.04E-05	5.75
16:50:00	16:50:30	0.5	65.10	66.800	63.10	64.800	4.17E-05	5.58
16:50:30	16:51:00	0.5	63.10	64.800	61.20	62.900	4.08E-05	5.41
16:51:00	16:51:30	0.5	61.20	62.900	59.30	61.000	4.20E-05	5.25
16:51:30	16:52:00	0.5	59.30	61.000	57.50	59.200	4.10E-05	5.10
16:52:00	16:52:30	0.5	57.50	59.200	55.80	57.500	3.99E-05	4.95
16:52:30	16:55:00	2.5	55.80	57.500	47.90	49.600	4.05E-05	4.54
16:55:00	16:57:00	2	47.90	49.600	42.40	44.100	4.03E-05	3.97
16:57:00	17:10:00	13	42.40	44.100	19.70	21.400	3.81E-05	2.78
					Constant head test		4.90E-05	4.22

Test using material <#4 sieve
Maximum dry density = 2020 Mg/m3
Optimum water content = 10.5 %

Buret, a =	0.183 cm2
Specimen dimensions	
Height, L =	18.0 cm
Diameter, D=	10.1 cm
X-sectional area, A =	80.13 cm2
Initial dry density =	2.011 Mg/m3



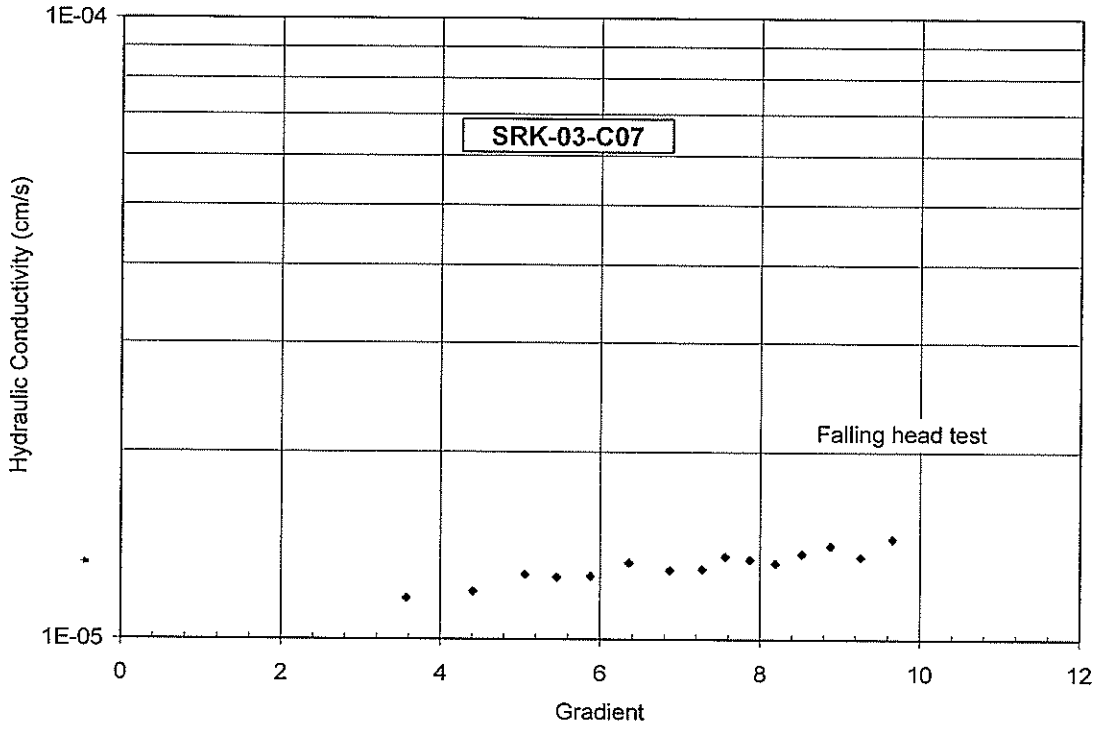
FALLING-HEAD K-TEST

Sample: **SRK-03-C06**

Time T1	Time T2	delta t min	Buret reading at T1	H1 cm	Buret reading at T2	H2 cm	k cm/s	Average gradient
13:37:00	13:42:00	5	97.50	112.500	89.50	104.500	3.03E-06	9.20
13:42:00	13:47:00	5	89.50	104.500	82.60	97.600	2.81E-06	8.57
13:47:00	13:53:00	6	82.60	97.600	74.30	89.300	3.04E-06	7.92
13:53:00	13:57:00	4	74.30	89.300	70.20	85.200	2.42E-06	7.40
13:57:00	14:02:00	5	70.20	85.200	64.60	79.600	2.79E-06	6.99
14:02:00	14:07:00	5	64.60	79.600	59.40	74.400	2.78E-06	6.53
14:07:00	14:12:00	5	59.40	74.400	54.70	69.700	2.68E-06	6.11
14:12:00	14:17:00	5	54.70	69.700	49.90	64.900	2.93E-06	5.71
14:17:00	14:22:00	5	49.90	64.900	46.20	61.200	2.41E-06	5.35
14:22:00	14:27:00	5	46.20	61.200	42.20	57.200	2.78E-06	5.02
14:27:00	14:32:00	5	42.20	57.200	38.60	53.600	2.67E-06	4.70
14:32:00	14:37:00	5	38.60	53.600	35.30	50.300	2.61E-06	4.41
14:37:00	14:42:00	5	35.30	50.300	32.10	47.100	2.70E-06	4.13
14:42:00	14:52:00	10	32.10	47.100	27.10	42.100	2.31E-06	3.78
14:52:00	15:02:00	10	27.10	42.100	21.70	36.700	2.82E-06	3.34
15:02:00	15:12:00	10	21.70	36.700	17.30	32.300	2.62E-06	2.93
15:12:00	15:22:00	10	17.30	32.300	13.40	28.400	2.64E-06	2.57
15:22:00	15:32:00	10	13.40	28.400	10.40	25.400	2.29E-06	2.28
15:32:00	15:47:00	15	10.40	25.400	6.20	21.200	2.48E-06	1.98

Test using material <#4 sieve
Maximum dry density = 2000 Mg/m3
Optimum water content = 10.5 %

Buret, a =	0.183 cm2
Specimen dimensions	
Height, L =	5.4 cm
Diameter, D=	10.1 cm
X-sectional area, A =	80.13 cm2
Post-test information	
Water content	
Tare mass =	13.26 g
Wet sample + tare =	990.2 g
Dry sample + tare	864.57 g
Water content =	14.8%
Dry density =	1.967 Mg/m3



FALLING-HEAD K-TEST

Sample: SRK-03-C07

Time T1	Time T2	delta t min	Buret reading at T1	H1 cm	Buret reading at T2	H2 cm	k cm/s	Average gradient
14:27:00	14:27:30	0.5	95.60	116.300	90.70	111.400	1.45E-05	9.65
14:27:30	14:28:00	0.5	90.70	111.400	86.30	107.000	1.36E-05	9.26
14:28:00	14:28:30	0.5	86.30	107.000	81.90	102.600	1.42E-05	8.89
14:28:30	14:29:00	0.5	81.90	102.600	77.80	98.500	1.38E-05	8.53
14:29:00	14:29:30	0.5	77.80	98.500	74.00	94.700	1.33E-05	8.19
14:29:30	14:30:00	0.5	74.00	94.700	70.30	91.000	1.34E-05	7.87
14:30:00	14:30:30	0.5	70.30	91.000	66.70	87.400	1.36E-05	7.56
14:30:30	14:31:00	0.5	66.70	87.400	63.40	84.100	1.30E-05	7.27
14:31:00	14:32:00	1	63.40	84.100	57.20	77.900	1.29E-05	6.87
14:32:00	14:33:00	1	57.20	77.900	51.30	72.000	1.33E-05	6.36
14:33:00	14:34:00	1	51.30	72.000	46.10	66.800	1.26E-05	5.88
14:34:00	14:35:00	1	46.10	66.800	41.30	62.000	1.26E-05	5.46
14:35:00	14:36:00	1	41.30	62.000	36.80	57.500	1.27E-05	5.07
14:36:00	14:39:00	3	36.80	57.500	25.80	46.500	1.19E-05	4.41
14:39:00	14:42:00	3	25.80	46.500	17.10	37.800	1.16E-05	3.57

Test using material <#4 sieve

Buret, a =	0.183 cm2
Specimen dimensions	
Height, L =	5.7 cm
Diameter, D=	11.457 cm
X-sectional area, A =	103.11 cm2
Post-test information	
Water content	
Tare mass =	308.23 g
Wet sample + tare =	2123.2 g
Dry sample + tare	1880.96 g
Water content =	15.4%
Dry density =	2.676 Mg/m3

APPENDIX VII-b

Constant Head Hydraulic Conductivity Tests
Results

M.D. Haug & Associates Ltd.

Project: SRK Consultants, Vancouver
Location: Faro Mine, Whitehorse
Date: 11-Aug-03

Sample:SRK-03-C05

Diameter of specimen, D, cm =	10.1
Height of specimen, L, cm =	18
Cross-sectional Area, A, cm^2 =	80.12886

Initial condition of test specimen

Weight of wet soil, g =	3204
Water content of wet soil, % =	10%
Weight of dry soil, g =	2912.7
Volume of test specimen, cm^3 =	1442.3194
Dry density of test specimen, kg/m^3 =	2019

Time		Water level		Head, h	Q cm3	t sec	Q/At	I = h/L	k cm/s
Start	End	H_1	H_2	cm					
15:48	16:09	76	0	76.0	21.21	1260	2.10E-04	4.222	4.98E-05

M.D. Haug & Associates Ltd.

Project: SRK Consultants, Vancouver
Location: Faro Mine, Whitehorse
Date: 18-Aug-03

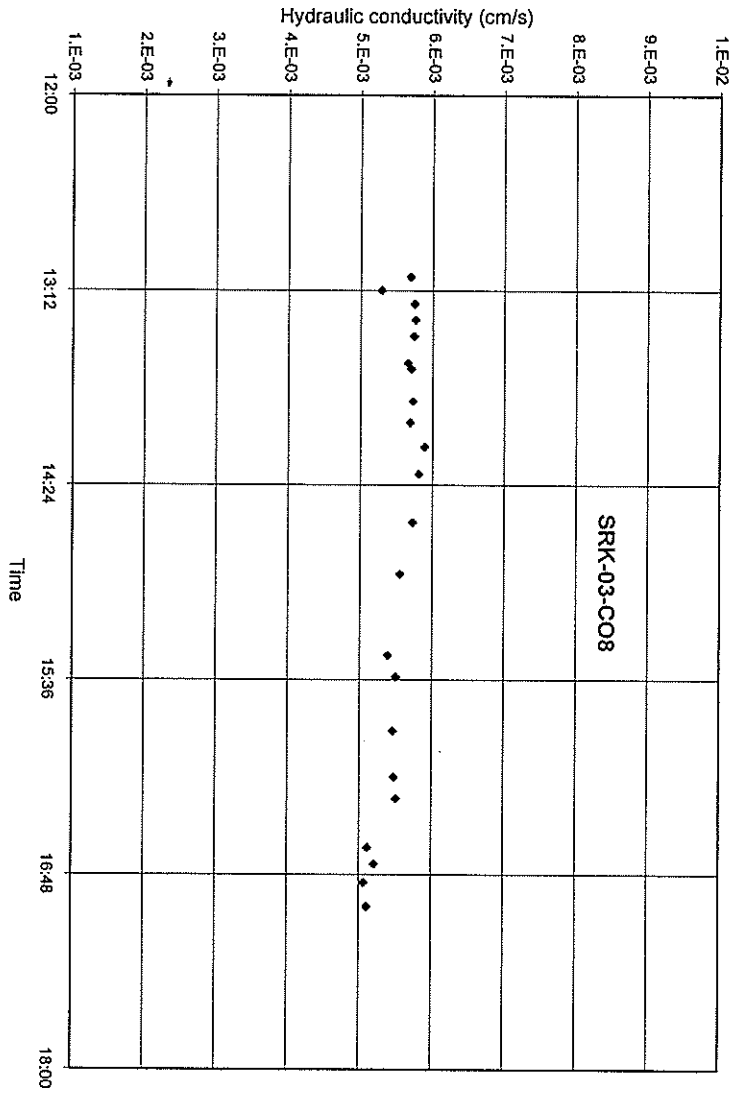
Sample:SRK-03-C08

Diameter of specimen, D, cm =	19.95
Height of specimen, L, cm =	15.84
Cross-sectional Area, A, cm^2 =	312.631

Initial condition of test specimen

Weight of wet soil, g =	9914
Water content of wet soil, % =	8%
Weight of dry soil, g =	9171
Volume of test specimen, cm^3 =	4952
Dry density of test specimen, kg/m^3 =	1852

Time		Water level		Head, h	Q cm3	t sec	Q/At	i = h/L	k cm/s
Start	End	H_1	H_2	cm					
13:07	13:08	26.5	13.4	13.1	88.3	60	4.71E-03	0.827	5.69E-03
13:12	13:13	26.5	13.4	13.1	82.1	60	4.38E-03	0.827	5.29E-03
13:17	13:18	26.5	13.4	13.1	89.2	60	4.76E-03	0.827	5.75E-03
13:23	13:24	26.5	13.4	13.1	89.4	60	4.77E-03	0.827	5.76E-03
13:29	13:30	26.5	13.4	13.1	89.1	60	4.75E-03	0.827	5.74E-03
13:39	13:40	26.5	13.4	13.1	87.8	60	4.68E-03	0.827	5.66E-03
13:41	13:42	26.5	13.4	13.1	88.5	60	4.72E-03	0.827	5.70E-03
13:53	13:54	26.5	13.4	13.1	88.9	60	4.74E-03	0.827	5.73E-03
14:01	14:02	26.5	13.4	13.1	88.3	60	4.71E-03	0.827	5.69E-03
14:10	14:11	26.5	13.4	13.1	91.4	60	4.87E-03	0.827	5.89E-03
14:20	14:21	26.5	13.4	13.1	90.2	60	4.81E-03	0.827	5.81E-03
14:38	14:39	26.5	13.4	13.1	88.9	60	4.74E-03	0.827	5.73E-03
14:57	14:58	26.5	13.4	13.1	86.2	60	4.60E-03	0.827	5.56E-03
15:27	15:28	26.5	13.4	13.1	83.7	60	4.46E-03	0.827	5.40E-03
15:35	15:36	26.5	13.4	13.1	85.4	60	4.55E-03	0.827	5.51E-03
15:55	15:56	26.5	13.4	13.1	84.8	60	4.52E-03	0.827	5.47E-03
16:12	16:13	26.5	13.4	13.1	85.1	60	4.54E-03	0.827	5.49E-03
16:20	16:21	26.5	13.4	13.1	85.5	60	4.56E-03	0.827	5.51E-03
16:38	16:39	26.5	13.4	13.1	79.4	60	4.23E-03	0.827	5.12E-03
16:44	16:45	26.5	13.4	13.1	80.9	60	4.31E-03	0.827	5.21E-03
16:51	16:52	26.5	13.4	13.1	78.6	60	4.19E-03	0.827	5.07E-03
17:00	17:01	26.5	13.4	13.1	79.3	60	4.23E-03	0.827	5.11E-03



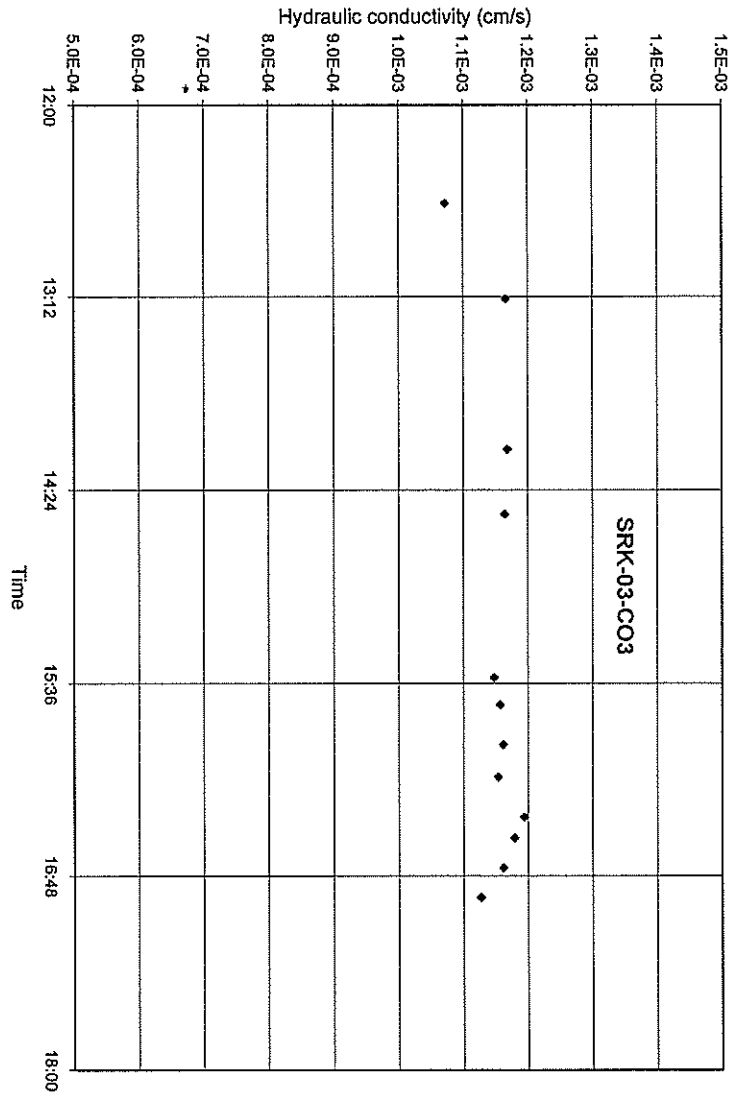
M.D. Haug & Associates Ltd.

Project: SRK Consultants, Vancouver
Location: Faro Mine, Whitehorse
Date: 18-Aug-03

Sample:SRK-03-C03

Diameter of specimen, D, cm =	19.95	**Initial condition of test specimen**	
Height of specimen, L, cm =	16.06	Weight of wet soil, g =	11353
Cross-sectional Area, A, cm^2 =	312.631	Water content of wet soil, % =	8%
		Weight of dry soil, g =	10520
		Volume of test specimen, cm^3 =	5021
		Dry density of test specimen, kg/m^3 =	2095

Time		Water level		Head, h	Q cm3	t sec	Q/At	I = h/L	k cm/s
Start	End	H_1	H_2	cm					
9:36	9:41	26.5	13.4	13.1	88.3	300	9.41E-04	0.816	1.15E-03
12:37	12:42	26.5	13.4	13.1	82.1	300	8.75E-04	0.816	1.07E-03
13:13	13:18	26.5	13.4	13.1	89.2	300	9.51E-04	0.816	1.17E-03
14:09	14:14	26.5	13.4	13.1	89.4	300	9.53E-04	0.816	1.17E-03
14:33	14:38	26.5	13.4	13.1	89.1	300	9.50E-04	0.816	1.16E-03
15:34	15:39	26.5	13.4	13.1	87.8	300	9.36E-04	0.816	1.15E-03
15:44	15:49	26.5	13.4	13.1	88.5	300	9.44E-04	0.816	1.16E-03
15:59	16:04	26.5	13.4	13.1	88.9	300	9.48E-04	0.816	1.16E-03
16:11	16:16	26.5	13.4	13.1	88.3	300	9.41E-04	0.816	1.15E-03
16:26	16:31	26.5	13.4	13.1	91.4	300	9.75E-04	0.816	1.19E-03
16:34	16:39	26.5	13.4	13.1	90.2	300	9.62E-04	0.816	1.18E-03
16:45	16:50	26.5	13.4	13.1	88.9	300	9.48E-04	0.816	1.16E-03
16:56	17:01	26.5	13.4	13.1	86.2	300	9.19E-04	0.816	1.13E-03



Data Sheet B
Field Investigation In-Situ Test Data

Data Sheet B-1
Single Ring Infiltrometer Test Data

Single Ring Infiltrometer Calculation Sheet

Location: Vangorda Till Cover
Date: 11-Sep-03
Test Pit No.: VA-CT-TP01
Ring No.: SR-01
Tested By: Joe Pun

Inner Diameter of Ring: 57.0 cm
Inner Area of Ring: 2551.8 cm^2
Lateral Divergence: 5 cm
Depth of Wetting Front: 6.5 cm
Water Entry Value: -24 cm

No.	Start Time (hh:mm)	End Time (hh:mm)	Time Elapsed (min)	Initial Water Level (cm)	Ending Water Level (cm)	Change in Water Level (cm)	Incremental Ring Volume (cm^3)	Infiltration Rate (cm/hr)
1	9:35	9:38	3.0	5.0	4.0	1.0	2551.8	20.0
2	9:38	9:42	4.0	5.0	4.0	1.0	2551.8	15.0
3	9:42	15:29	347.0	5.5	5.0	0.5	1275.9	0.1
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Average Depth of Water in the Ring: 5.2 cm
Average Infiltraiton Rate: 11.7 cm/hr

Infiltration Rate (account for lateral divergence): 8.46 cm/hr
Effective Saturated Hydraulic Conductivity K_{fs}: 4.29E-04 cm/sec

Appendix B-1

Single Ring Infiltrometer Calculation Sheet

Location: Vangorda Till Cover
Date: 11-Sep-03
Test Pit No.: VA-CT-TP01
Ring No.: SR-02
Tested By: Joe Pun

Inner Diameter of Ring: 57.0 cm
Inner Area of Ring: 2551.8 cm^2
Lateral Divergence: 5 cm
Depth of Wetting Front: 9 cm
Water Entry Value: -24 cm

No.	Start Time (hh:mm)	End Time (hh:mm)	Time Elapsed (min)	Initial Water Level (cm)	Ending Water Level (cm)	Change in Water Level (cm)	Incremental Ring Volume (cm^3)	Infiltration Rate (cm/hr)
1	9:16	10:02	46.0	5.0	4.0	1.0	2551.8	1.3
2	10:02	12:26	144.0	5.0	4.0	1.0	2551.8	0.4
3	12:26	15:07	161.0	5.0	4.1	0.9	2296.6	0.3
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Average Depth of Water in the Ring: 5.0 cm
Average Infiltraiton Rate: 0.7 cm/hr

Infiltration Rate (account for lateral divergence): 0.50 cm/hr
Effective Saturated Hydraulic Conductivity K_{fs}: 3.26E-05 cm/sec

Single Ring Infiltrometer Calculation Sheet

Location: Vangorda Till Cover
Date: 11-Sep-03
Test Pit No.: VA-CT-TP01
Ring No.: SR-03
Tested By: Joe Pun

Inner Diameter of Ring: 57.0 cm
Inner Area of Ring: 2551.8 cm^2
Lateral Divergence: 5 cm
Depth of Wetting Front: 30 cm
Water Entry Value: -24 cm

No.	Start Time (hh:mm)	End Time (hh:mm)	Time Elapsed (min)	Initial Water Level (cm)	Ending Water Level (cm)	Change in Water Level (cm)	Incremental Ring Volume (cm^3)	Infiltration Rate (cm/hr)
1	10:00	10:22	22.0	5.0	4.0	1.0	2551.8	2.7
2	10:22	10:58	36.0	5.0	4.0	1.0	2551.8	1.7
3	10:58	11:35	37.0	5.0	4.0	1.0	2551.8	1.6
4	11:35	12:20	45.0	5.0	4.0	1.0	2551.8	1.3
5	12:20	13:05	45.0	5.0	4.0	1.0	2551.8	1.3
6	13:05	13:50	45.0	5.0	4.0	1.0	2551.8	1.3
7	13:50	14:40	50.0	5.0	4.0	1.0	2551.8	1.2
8	14:40	16:28	108.0	5.0	4.0	1.0	2551.8	0.6
9	16:28	17:18	50.0	5.0	4.2	0.8	2041.4	1.0
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Average Depth of Water in the Ring: 5.0 cm
Average Infiltraiton Rate: 0.9 cm/hr

Infiltration Rate (account for lateral divergence): 0.66 cm/hr
Effective Saturated Hydraulic Conductivity K_{fs}: 9.25E-05 cm/sec

Appendix B-1

Single Ring Infiltrometer Calculation Sheet

Location: Vangorda Till Cover
Date: 11-Sep-03
Test Pit No.: VA-CT-TP01
Ring No.: SR-04
Tested By: Joe Pun

Inner Diameter of Ring: 57.0 cm
Inner Area of Ring: 2551.8 cm^2
Lateral Divergence: 5 cm
Depth of Wetting Front: 20 cm
Water Entry Value: -24 cm

No.	Start Time (hh:mm)	End Time (hh:mm)	Time Elapsed (min)	Initial Water Level (cm)	Ending Water Level (cm)	Change in Water Level (cm)	Incremental Ring Volume (cm^3)	Infiltration Rate (cm/hr)
1	10:13	11:14	61.0	5.0	3.7	1.3	3317.3	1.3
2	11:14	12:25	71.0	5.0	4.0	1.0	2551.8	0.8
3	12:25	14:18	113.0	5.0	4.0	1.0	2551.8	0.5
4	14:18	15:40	82.0	5.0	4.0	1.0	2551.8	0.7
5	15:40	16:59	79.0	5.0	4.0	1.0	2551.8	0.8
6	16:59	17:20	21.0	5.0	4.4	0.6	1531.1	1.7
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Average Depth of Water in the Ring: 5.0 cm
Average Infiltraiton Rate: 1.1 cm/hr

Infiltration Rate (account for lateral divergence): 0.77 cm/hr
Effective Saturated Hydraulic Conductivity K_{fs}: 8.77E-05 cm/sec

Single Ring Infiltrometer Calculation Sheet

Location: Vangorda Overburden Dump
Date: 9-Sep-03
Test Pit No.: VA-OD-TP01
Ring No.: SR-01
Tested By: Maritz Rykaart

Inner Diameter of Ring: 57.0 cm
Inner Area of Ring: 2551.8 cm^2
Lateral Divergence: 5 cm
Depth of Wetting Front: 20 cm
Water Entry Value: -24 cm

No.	Start Time (hh:mm)	End Time (hh:mm)	Time Elapsed (min)	Initial Water Level (cm)	Ending Water Level (cm)	Change in Water Level (cm)	Incremental Ring Volume (cm^3)	Infiltration Rate (cm/hr)
1	14:07	14:11	4.0	5.0	4.0	1.0	2551.8	15.0
2	14:11	14:37	26.0	5.0	3.5	1.5	3827.6	3.5
3	14:38	15:13	35.0	5.0	4.0	1.0	2551.8	1.7
4	15:13	15:45	32.0	5.5	4.0	1.5	3827.6	2.8
5	15:46	16:20	34.0	5.0	4.0	1.0	2551.8	1.8
6	16:20	16:45	25.0	5.0	4.0	1.0	2551.8	2.4
7	16:45	17:01	16.0	5.0	4.5	0.5	1275.9	1.9
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Average Depth of Water in the Ring: 5.0 cm
Average Infiltraiton Rate: 2.0 cm/hr

Infiltration Rate (account for lateral divergence): 1.46 cm/hr
Effective Saturated Hydraulic Conductivity K_{fs}: 1.65E-04 cm/sec

Appendix B-1

Single Ring Infiltrometer Calculation Sheet

Location: Vangorda Overburden Dump
Date: 9-Sep-03
Test Pit No.: VA-OD-TP01
Ring No.: SR-02
Tested By: Maritz Rykaart

Inner Diameter of Ring: 57.0 cm
Inner Area of Ring: 2551.8 cm^2
Lateral Divergence: 5 cm
Depth of Wetting Front: 20 cm
Water Entry Value: -24 cm

No.	Start Time (hh:mm)	End Time (hh:mm)	Time Elapsed (min)	Initial Water Level (cm)	Ending Water Level (cm)	Change in Water Level (cm)	Incremental Ring Volume (cm^3)	Infiltration Rate (cm/hr)
1	14:21	14:48	27.0	5.0	4.0	1.0	2551.8	2.2
2	14:49	15:56	67.0	5.0	4.0	1.0	2551.8	0.9
3	15:56	17:07	71.0	5.0	4.1	0.9	2296.6	0.8
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Average Depth of Water in the Ring: 5.0 cm
Average Infiltraiton Rate: 1.3 cm/hr

Infiltration Rate (account for lateral divergence): 0.94 cm/hr
Effective Saturated Hydraulic Conductivity K_{fs}: 1.06E-04 cm/sec

Single Ring Infiltrometer Calculation Sheet

Location: Vangorda Glaciofluvial
Date: 13-Sep-03
Test Pit No.: VA-GF-TP01
Ring No.: SR-01
Tested By: Joe Pun

Inner Diameter of Ring: 57.0 cm
Inner Area of Ring: 2551.8 cm^2
Lateral Divergence: 5 cm
Depth of Wetting Front: 50 cm
Water Entry Value: -8.5 cm

No.	Start Time (hh:mm)	End Time (hh:mm)	Time Elapsed (min)	Initial Water Level (cm)	Ending Water Level (cm)	Change in Water Level (cm)	Incremental Ring Volume (cm^3)	Infiltration Rate (cm/hr)
1	9:12	9:14	2.0	5.0	4.0	1.0	2551.8	30.0
2	9:14	9:17	3.0	5.0	4.0	1.0	2551.8	20.0
3	9:17	9:20	3.0	5.0	4.0	1.0	2551.8	20.0
4	9:20	9:23	3.0	5.0	4.0	1.0	2551.8	20.0
5	9:23	9:26	3.0	5.0	4.0	1.0	2551.8	20.0
6	9:26	9:30	4.0	5.0	4.0	1.0	2551.8	15.0
7	9:30	9:33	3.0	5.0	4.0	1.0	2551.8	20.0
8	9:33	9:36	3.0	5.0	4.0	1.0	2551.8	20.0
9	9:36	9:39	3.0	5.0	4.0	1.0	2551.8	20.0
10	9:39	9:42	3.0	5.0	4.0	1.0	2551.8	20.0
11	9:42	9:45	3.0	5.0	4.0	1.0	2551.8	20.0
12	9:45	9:49	4.0	5.0	4.0	1.0	2551.8	15.0
13	9:49	9:52	3.0	5.0	4.0	1.0	2551.8	20.0
14	9:52	9:55	3.0	5.0	4.0	1.0	2551.8	20.0
15	9:55	9:58	3.0	5.0	4.0	1.0	2551.8	20.0
16	9:58	10:01	3.0	5.0	4.0	1.0	2551.8	20.0
17	10:01	10:04	3.0	5.0	4.0	1.0	2551.8	20.0
18	10:04	10:07	3.0	5.0	4.0	1.0	2551.8	20.0
19	10:07	10:10	3.0	5.0	4.0	1.0	2551.8	20.0
20	10:10	10:14	4.0	5.0	4.0	1.0	2551.8	15.0
21	10:14	10:17	3.0	5.0	4.0	1.0	2551.8	20.0
22	10:17	10:20	3.0	5.0	4.0	1.0	2551.8	20.0
23	10:20	10:23	3.0	5.0	4.0	1.0	2551.8	20.0
24	10:23	10:27	4.0	5.0	4.0	1.0	2551.8	15.0
25	10:27	10:30	3.0	5.0	4.0	1.0	2551.8	20.0
26								
27								
28								
29								
30								

Average Depth of Water in the Ring: 5.0 cm
Average Infiltraiton Rate: 18.3 cm/hr

Infiltration Rate (account for lateral divergence): 13.27 cm/hr
Effective Saturated Hydraulic Conductivity K_{fs}: 2.90E-03 cm/sec

Appendix B-1

Single Ring Infiltrometer Calculation Sheet

Location: Vangorda Glaciofluvial
Date: 13-Sep-03
Test Pit No.: VA-GF-TP01
Ring No.: SR-02
Tested By: Joe Pun

Inner Diameter of Ring: 57.0 cm
Inner Area of Ring: 2551.8 cm^2
Lateral Divergence: 5 cm
Depth of Wetting Front: 10 cm
Water Entry Value: -8.5 cm

No.	Start Time (hh:mm)	End Time (hh:mm)	Time Elapsed (min)	Initial Water Level (cm)	Ending Water Level (cm)	Change in Water Level (cm)	Incremental Ring Volume (cm^3)	Infiltration Rate (cm/hr)
1	12:32	17:10	278.0	5.0	4.2	0.8	2041.4	0.2
2								
3								
4								
5								
6								
7								
8								
9								
10								
11								
12								
13								
14								
15								
16								
17								
18								
19								
20								
21								
22								
23								
24								
25								
26								
27								
28								
29								
30								

Average Depth of Water in the Ring: 5.0 cm
Average Infiltraiton Rate: 0.2 cm/hr

Infiltration Rate (account for lateral divergence): 0.12 cm/hr
Effective Saturated Hydraulic Conductivity K_{fs}: 1.48E-05 cm/sec

Single Ring Infiltrometer Calculation Sheet

Location: Vangorda Glaciofluvial
Date: 13-Sep-03
Test Pit No.: VA-GF-TP01
Ring No.: SR-03
Tested By: Joe Pun

Inner Diameter of Ring: 57.0 cm
Inner Area of Ring: 2551.8 cm^2
Lateral Divergence: 5 cm
Depth of Wetting Front: 20 cm
Water Entry Value: -8.5 cm

No.	Start Time (hh:mm)	End Time (hh:mm)	Time Elapsed (min)	Initial Water Level (cm)	Ending Water Level (cm)	Change in Water Level (cm)	Incremental Ring Volume (cm^3)	Infiltration Rate (cm/hr)
1	13:08	13:30	22.0	5.0	4.0	1.0	2551.8	2.7
2	13:30	14:13	43.0	5.0	4.0	1.0	2551.8	1.4
3	14:13	15:12	59.0	5.0	4.0	1.0	2551.8	1.0
4	15:12	16:19	67.0	5.0	4.0	1.0	2551.8	0.9
5	16:19	17:12	53.0	5.0	4.4	0.6	1531.1	0.7
6								
7								
8								
9								
10								
11								
12								
13								
14								
15								
16								
17								
18								
19								
20								
21								
22								
23								
24								
25								
26								
27								
28								
29								
30								

Average Depth of Water in the Ring: 5.0 cm

Average Infiltraiton Rate: 0.9 cm/hr

Infiltration Rate (account for lateral divergence): 0.63 cm/hr
Effective Saturated Hydraulic Conductivity K_{fs}: 1.04E-04 cm/sec

Single Ring Infiltrometer Calculation Sheet

Location: Vangorda Glaciofluvial
Date: 13-Sep-03
Test Pit No.: VA-GF-TP01
Ring No.: SR-04
Tested By: Joe Pun

Inner Diameter of Ring: 57.0 cm
Inner Area of Ring: 2551.8 cm^2
Lateral Divergence: 5 cm
Depth of Wetting Front: 50 cm
Water Entry Value: -8.5 cm

No.	Start Time (hh:mm)	End Time (hh:mm)	Time Elapsed (min)	Initial Water Level (cm)	Ending Water Level (cm)	Change in Water Level (cm)	Incremental Ring Volume (cm^3)	Infiltration Rate (cm/hr)
1	15:39	15:40	1.0	5.0	4.0	1.0	2551.8	60.0
2	15:40	15:42	2.0	5.0	4.0	1.0	2551.8	30.0
3	15:42	15:44	2.0	5.0	4.0	1.0	2551.8	30.0
4	15:44	15:46	2.0	5.0	4.0	1.0	2551.8	30.0
5	15:46	15:48	2.0	5.0	4.0	1.0	2551.8	30.0
6	15:48	15:50	2.0	5.0	4.0	1.0	2551.8	30.0
7	15:50	15:52	2.0	5.0	4.0	1.0	2551.8	30.0
8	15:52	15:54	2.0	5.0	4.0	1.0	2551.8	30.0
9	15:54	15:56	2.0	5.0	4.0	1.0	2551.8	30.0
10	15:56	15:58	2.0	5.0	4.0	1.0	2551.8	30.0
11	15:58	16:00	2.0	5.0	4.0	1.0	2551.8	30.0
12	16:00	16:02	2.0	5.0	4.0	1.0	2551.8	30.0
13	16:02	16:04	2.0	5.0	4.0	1.0	2551.8	30.0
14	16:04	16:06	2.0	5.0	4.0	1.0	2551.8	30.0
15	16:06	16:08	2.0	5.0	4.0	1.0	2551.8	30.0
16	16:08	16:10	2.0	5.0	4.0	1.0	2551.8	30.0
17	16:10	16:12	2.0	5.0	4.0	1.0	2551.8	30.0
18	16:12	16:14	2.0	5.0	4.0	1.0	2551.8	30.0
19	16:14	16:16	2.0	5.0	4.0	1.0	2551.8	30.0
20	16:16	16:18	2.0	5.0	4.0	1.0	2551.8	30.0
21	16:18	16:20	2.0	5.0	4.0	1.0	2551.8	30.0
22	16:20	16:22	2.0	5.0	4.0	1.0	2551.8	30.0
23	16:22	16:24	2.0	5.0	4.0	1.0	2551.8	30.0
24	16:24	16:26	2.0	5.0	4.0	1.0	2551.8	30.0
25	16:26	16:28	2.0	5.0	4.0	1.0	2551.8	30.0
26	16:28	16:30	2.0	5.0	4.0	1.0	2551.8	30.0
27	16:30	16:32	2.0	5.0	4.0	1.0	2551.8	30.0
28	16:32	16:35	3.0	5.0	4.0	1.0	2551.8	20.0
29	16:35	16:37	2.0	5.0	4.0	1.0	2551.8	30.0
30	16:37	16:39	2.0	5.0	4.0	1.0	2551.8	30.0
31	16:39	16:41	2.0	5.0	4.0	1.0	2551.8	30.0
32	16:41	16:44	3.0	5.0	4.0	1.0	2551.8	20.0
33	16:44	16:46	2.5	5.0	4.0	1.0	2551.8	24.0
34	16:46:30	16:49	2.5	5.0	4.0	1.0	2551.8	24.0
35	16:49	16:51	2.5	5.0	4.0	1.0	2551.8	24.0
36	16:51:30	16:54	2.5	5.0	4.0	1.0	2551.8	24.0
37	16:54	16:56	2.0	5.0	4.0	1.0	2551.8	30.0
38	16:56	16:58	2.0	5.0	4.0	1.0	2551.8	30.0
39	16:58	17:00	2.0	5.0	4.0	1.0	2551.8	30.0
40								

Average Depth of Water in the Ring: 5.0 cm

Average Infiltraiton Rate: 30.0 cm/hr

Infiltration Rate (account for lateral divergence): 21.71 cm/hr
Effective Saturated Hydraulic Conductivity K_{fs}: 4.75E-03 cm/sec

Single Ring Infiltrometer Calculation Sheet

Location: Vangorda Embankment Till
Date: 10-Sep-03
Test Pit No.: VA-ET-TP01
Ring No.: SR-01
Tested By: Joe Pun

Inner Diameter of Ring: 57.0 cm
Inner Area of Ring: 2551.8 cm^2
Lateral Divergence: 5 cm
Depth of Wetting Front: 70 cm
Water Entry Value: -24 cm

No.	Start Time (hh:mm)	End Time (hh:mm)	Time Elapsed (min)	Initial Water Level (cm)	Ending Water Level (cm)	Change in Water Level (cm)	Incremental Ring Volume (cm^3)	Infiltration Rate (cm/hr)
1	9:12	9:14	2.0	5.0	4.0	1.0	2551.8	30.0
2	9:14	9:19	5.0	5.0	4.0	1.0	2551.8	12.0
3	9:19	9:30	11.0	5.0	4.0	1.0	2551.8	5.5
4	9:30	9:50	20.0	5.5	4.0	1.5	3827.6	4.5
5	9:50	10:12	22.0	5.0	4.0	1.0	2551.8	2.7
6	10:12	10:31	19.0	5.0	4.0	1.0	2551.8	3.2
7	10:31	10:48	17.0	5.0	4.0	1.0	2551.8	3.5
8	10:48	10:59	11.0	5.0	4.0	1.0	2551.8	5.5
9	10:59	11:13	14.0	5.0	4.0	1.0	2551.8	4.3
10	11:13	11:35	22.0	5.0	4.0	1.0	2551.8	2.7
11	11:35	12:02	27.0	5.0	4.0	1.0	2551.8	2.2
12	12:02	12:32	30.0	5.0	4.0	1.0	2551.8	2.0
13	12:32	13:02	30.0	5.0	4.0	1.0	2551.8	2.0
14	13:02	13:32	30.0	5.0	4.0	1.0	2551.8	2.0
15								
16								
17								
18								
19								
20								
21								
22								
23								
24								
25								
26								
27								
28								
29								
30								

Average Depth of Water in the Ring: 5.0 cm
Average Infiltraiton Rate: 2.0 cm/hr

Infiltration Rate (account for lateral divergence): 1.45 cm/hr
Effective Saturated Hydraulic Conductivity K_{fs}: 2.84E-04 cm/sec

Appendix B-1

Single Ring Infiltrometer Calculation Sheet

Location: Vangorda Embankment Till
Date: 10-Sep-03
Test Pit No.: VA-ET-TP01
Ring No.: SR-02
Tested By: Joe Pun

Inner Diameter of Ring: 57.0 cm
Inner Area of Ring: 2551.8 cm^2
Lateral Divergence: 5 cm
Depth of Wetting Front: 20 cm
Water Entry Value: -24 cm

No.	Start Time (hh:mm)	End Time (hh:mm)	Time Elapsed (min)	Initial Water Level (cm)	Ending Water Level (cm)	Change in Water Level (cm)	Incremental Ring Volume (cm^3)	Infiltration Rate (cm/hr)
1	9:25	10:23	58.0	5.0	4.0	1.0	2551.8	1.0
2	10:23	11:35	72.0	5.0	4.2	0.8	2041.4	0.7
3	11:35	14:02	147.0	5.1	4.3	0.8	2041.4	0.3
4	14:02	15:20	78.0	5.5	4.5	1.0	2551.8	0.8
5								
6								
7								
8								
9								
10								
11								
12								
13								
14								
15								
16								
17								
18								
19								
20								
21								
22								
23								
24								
25								
26								
27								
28								
29								
30								

Average Depth of Water in the Ring: 5.2 cm
Average Infiltraiton Rate: 0.6 cm/hr

Infiltration Rate (account for lateral divergence): 0.43 cm/hr
Effective Saturated Hydraulic Conductivity K_{fs}: 4.80E-05 cm/sec

Single Ring Infiltrometer Calculation Sheet

Location: Vangorda Embankment Till
Date: 10-Sep-03
Test Pit No.: VA-ET-TP01
Ring No.: SR-03
Tested By: Joe Pun

Inner Diameter of Ring: 57.0 cm
Inner Area of Ring: 2551.8 cm^2
Lateral Divergence: 5 cm
Depth of Wetting Front: 16 cm
Water Entry Value: -24 cm

No.	Start Time (hh:mm)	End Time (hh:mm)	Time Elapsed (min)	Initial Water Level (cm)	Ending Water Level (cm)	Change in Water Level (cm)	Incremental Ring Volume (cm^3)	Infiltration Rate (cm/hr)
1	13:34	14:28	54.0	5.0	4.0	1.0	2551.8	1.1
2	14:28	17:16	168.0	5.0	4.2	0.8	2041.4	0.3
3								
4								
5								
6								
7								
8								
9								
10								
11								
12								
13								
14								
15								
16								
17								
18								
19								
20								
21								
22								
23								
24								
25								
26								
27								
28								
29								
30								

Average Depth of Water in the Ring: 5.0 cm
Average Infiltraiton Rate: 0.7 cm/hr

Infiltration Rate (account for lateral divergence): 0.51 cm/hr
Effective Saturated Hydraulic Conductivity K_{fs}: 4.99E-05 cm/sec

Appendix B-1

Single Ring Infiltrometer Calculation Sheet

Location: Vangorda Embankment Till
Date: 10-Sep-03
Test Pit No.: VA-ET-TP01
Ring No.: SR-04
Tested By: Joe Pun

Inner Diameter of Ring: 57.0 cm
Inner Area of Ring: 2551.8 cm^2
Lateral Divergence: 5 cm
Depth of Wetting Front: 30 cm
Water Entry Value: -24 cm

No.	Start Time (hh:mm)	End Time (hh:mm)	Time Elapsed (min)	Initial Water Level (cm)	Ending Water Level (cm)	Change in Water Level (cm)	Incremental Ring Volume (cm^3)	Infiltration Rate (cm/hr)
1	12:55	13:28	33.0	5.0	4.0	1.0	2551.8	1.8
2	13:28	14:18	50.0	5.0	4.0	1.0	2551.8	1.2
3	14:18	16:00	102.0	5.0	4.0	1.0	2551.8	0.6
4	16:00	17:01	61.0	5.0	4.4	0.6	1531.1	0.6
5								
6								
7								
8								
9								
10								
11								
12								
13								
14								
15								
16								
17								
18								
19								
20								
21								
22								
23								
24								
25								
26								
27								
28								
29								
30								

Average Depth of Water in the Ring: 5.0 cm
Average Infiltraiton Rate: 0.8 cm/hr

Infiltration Rate (account for lateral divergence): 0.57 cm/hr
Effective Saturated Hydraulic Conductivity K_{fs}: 8.10E-05 cm/sec

Single Ring Infiltrometer Calculation Sheet

Location: Faro Slime Tailings
Date: 14-Sep-03
Test Pit No.: FA-TS-TP01
Ring No.: SR-01
Tested By: Joe Pun

Inner Diameter of Ring: 57.0 cm
Inner Area of Ring: 2551.8 cm^2
Lateral Divergence: 3 cm
Depth of Wetting Front: 1.5 cm
Water Entry Value: -60 cm

No.	Start Time (hh:mm)	End Time (hh:mm)	Time Elapsed (min)	Initial Water Level (cm)	Ending Water Level (cm)	Change in Water Level (cm)	Incremental Ring Volume (cm^3)	Infiltration Rate (cm/hr)
1	10:54	17:06	372.0	5.0	4.9	0.1	255.2	0.02
2								
3								
4								
5								
6								
7								
8								
9								
10								
11								
12								
13								
14								
15								
16								
17								
18								
19								
20								
21								
22								
23								
24								
25								
26								
27								
28								
29								
30								

Average Depth of Water in the Ring: 5.0 cm
Average Infiltraiton Rate: 0.02 cm/hr

Infiltration Rate (account for lateral divergence): 0.01 cm/hr
Effective Saturated Hydraulic Conductivity K_{fs}: 8.27E-08 cm/sec

Appendix B-1

Single Ring Infiltrometer Calculation Sheet

Location: Faro Slime Tailings
Date: 14-Sep-03
Test Pit No.: FA-TS-TP01
Ring No.: SR-02
Tested By: Joe Pun

Inner Diameter of Ring: 57.0 cm
Inner Area of Ring: 2551.8 cm^2
Lateral Divergence: 3 cm
Depth of Wetting Front: 5 cm
Water Entry Value: -60 cm

No.	Start Time (hh:mm)	End Time (hh:mm)	Time Elapsed (min)	Initial Water Level (cm)	Ending Water Level (cm)	Change in Water Level (cm)	Incremental Ring Volume (cm^3)	Infiltration Rate (cm/hr)
1	11:09	14:14	185.0	5.0	4.0	1.0	2551.8	0.3
2	14:14	17:18	184.0	5.0	4.5	0.5	1275.9	0.2
3								
4								
5								
6								
7								
8								
9								
10								
11								
12								
13								
14								
15								
16								
17								
18								
19								
20								
21								
22								
23								
24								
25								
26								
27								
28								
29								
30								

Average Depth of Water in the Ring: 5.0 cm
Average Infiltraiton Rate: 0.2 cm/hr

Infiltration Rate (account for lateral divergence): 0.20 cm/hr
Effective Saturated Hydraulic Conductivity K_{fs}: 3.96E-06 cm/sec

Single Ring Infiltrometer Calculation Sheet

Location: Faro Slime Tailings
Date: 14-Sep-03
Test Pit No.: FA-TS-TP01
Ring No.: SR-03
Tested By: Joe Pun

Inner Diameter of Ring: 57.0 cm
Inner Area of Ring: 2551.8 cm^2
Lateral Divergence: 3 cm
Depth of Wetting Front: 16 cm
Water Entry Value: -60 cm

No.	Start Time (hh:mm)	End Time (hh:mm)	Time Elapsed (min)	Initial Water Level (cm)	Ending Water Level (cm)	Change in Water Level (cm)	Incremental Ring Volume (cm^3)	Infiltration Rate (cm/hr)
1	11:24	11:43	19.0	5.0	4.0	1.0	2551.8	3.2
2	11:43	12:35	52.0	5.0	4.0	1.0	2551.8	1.2
3	12:35	13:44	69.0	5.0	4.0	1.0	2551.8	0.9
4	13:44	15:23	99.0	5.0	4.0	1.0	2551.8	0.6
5	15:23	17:19	116.0	5.0	4.0	1.0	2551.8	0.5
6								
7								
8								
9								
10								
11								
12								
13								
14								
15								
16								
17								
18								
19								
20								
21								
22								
23								
24								
25								
26								
27								
28								
29								
30								

Average Depth of Water in the Ring: 5.0 cm
Average Infiltraiton Rate: 0.7 cm/hr

Infiltration Rate (account for lateral divergence): 0.54 cm/hr
Effective Saturated Hydraulic Conductivity K_{fs}: 2.98E-05 cm/sec

Appendix B-1

Single Ring Infiltrometer Calculation Sheet

Location: Faro Slime Tailings
Date: 14-Sep-03
Test Pit No.: FA-TS-TP01
Ring No.: SR-04
Tested By: Joe Pun

Inner Diameter of Ring: 57.0 cm
Inner Area of Ring: 2551.8 cm^2
Lateral Divergence: 3 cm
Depth of Wetting Front: 1.5 cm
Water Entry Value: -60 cm

No.	Start Time (hh:mm)	End Time (hh:mm)	Time Elapsed (min)	Initial Water Level (cm)	Ending Water Level (cm)	Change in Water Level (cm)	Incremental Ring Volume (cm^3)	Infiltration Rate (cm/hr)
1	11:49	17:39	350.0	5.0	4.9	0.1	255.2	0.02
2								
3								
4								
5								
6								
7								
8								
9								
10								
11								
12								
13								
14								
15								
16								
17								
18								
19								
20								
21								
22								
23								
24								
25								
26								
27								
28								
29								
30								

Average Depth of Water in the Ring: 5.0 cm
Average Infiltraiton Rate: 0.02 cm/hr

Infiltration Rate (account for lateral divergence): 0.01 cm/hr
Effective Saturated Hydraulic Conductivity K_{fs}: 8.79E-08 cm/sec

Single Ring Infiltrometer Calculation Sheet

Location: Faro Slime Tailings
Date: 14-Sep-03
Test Pit No.: FA-TS-TP01
Ring No.: SR-05
Tested By: Joe Pun

Inner Diameter of Ring: 57.0 cm
Inner Area of Ring: 2551.8 cm^2
Lateral Divergence: 3 cm
Depth of Wetting Front: 4.5 cm
Water Entry Value: -60 cm

No.	Start Time (hh:mm)	End Time (hh:mm)	Time Elapsed (min)	Initial Water Level (cm)	Ending Water Level (cm)	Change in Water Level (cm)	Incremental Ring Volume (cm^3)	Infiltration Rate (cm/hr)
1	12:09	17:42	333.0	5.0	4.3	0.7	1786.2	0.13
2								
3								
4								
5								
6								
7								
8								
9								
10								
11								
12								
13								
14								
15								
16								
17								
18								
19								
20								
21								
22								
23								
24								
25								
26								
27								
28								
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Average Depth of Water in the Ring: 5.0 cm
Average Infiltraiton Rate: 0.13 cm/hr

Infiltration Rate (account for lateral divergence): 0.10 cm/hr
Effective Saturated Hydraulic Conductivity K_{fs}: 1.86E-06 cm/sec

Appendix B-1

Single Ring Infiltrometer Calculation Sheet

Location: Faro Beach Tailings
Date: 17-Sep-03
Test Pit No.: FA-TB-TP01
Ring No.: SR-01
Tested By: Joe Pun

Inner Diameter of Ring: 57.0 cm
Inner Area of Ring: 2551.8 cm^2
Lateral Divergence: 5 cm
Depth of Wetting Front: 70 cm
Water Entry Value: -42 cm

No.	Start Time (hh:mm)	End Time (hh:mm)	Time Elapsed (min)	Initial Water Level (cm)	Ending Water Level (cm)	Change in Water Level (cm)	Incremental Ring Volume (cm^3)	Infiltration Rate (cm/hr)
1	9:36	9:40	4.0	5.0	4.0	1.0	2551.8	15.0
2	9:40	9:45	5.0	5.0	4.0	1.0	2551.8	12.0
3	9:45	9:50	5.0	5.0	4.0	1.0	2551.8	12.0
4	9:50	9:55	5.0	5.0	4.0	1.0	2551.8	12.0
5	9:55	10:00	5.0	5.0	4.0	1.0	2551.8	12.0
6	10:00	10:05	5.0	5.0	4.0	1.0	2551.8	12.0
7	10:05	10:10	5.0	5.0	4.0	1.0	2551.8	12.0
8	10:10	10:15	5.0	5.0	4.0	1.0	2551.8	12.0
9	10:15	10:20	5.0	5.0	4.0	1.0	2551.8	12.0
10	10:20	10:25	5.0	5.0	4.0	1.0	2551.8	12.0
11	10:25	10:30	5.0	5.0	4.0	1.0	2551.8	12.0
12	10:30	10:35	5.0	5.0	4.0	1.0	2551.8	12.0
13	10:35	10:40	5.0	5.0	4.0	1.0	2551.8	12.0
14	10:40	10:45	5.0	5.0	4.0	1.0	2551.8	12.0
15	10:45	10:50	5.0	5.0	4.0	1.0	2551.8	12.0
16	10:50	10:55	5.0	5.0	4.0	1.0	2551.8	12.0
17	10:55	11:00	5.0	5.0	4.0	1.0	2551.8	12.0
18	11:00	11:04	4.0	5.0	4.0	1.0	2551.8	15.0
19	11:04	11:09	5.0	5.0	4.0	1.0	2551.8	12.0
20	11:09	11:13	4.0	5.0	4.0	1.0	2551.8	15.0
21	11:13	11:19	6.0	5.0	3.5	1.5	3827.6	15.0
22	11:19	11:24	5.0	5.0	4.0	1.0	2551.8	12.0
23	11:24	11:28	4.0	5.0	4.0	1.0	2551.8	15.0
24	11:28	11:33	5.0	5.0	4.0	1.0	2551.8	12.0
25	11:33	11:37	4.0	5.0	4.0	1.0	2551.8	15.0
26	11:37	11:41	4.0	5.0	4.0	1.0	2551.8	15.0
27								
28								
29								
30								

Average Depth of Water in the Ring: 5.0 cm
Average Infiltraiton Rate: 14.0 cm/hr

Infiltration Rate (account for lateral divergence): 10.13 cm/hr
Effective Saturated Hydraulic Conductivity K_{fs}: 1.68E-03 cm/sec

Single Ring Infiltrometer Calculation Sheet

Location: Faro Beach Tailings
Date: 17-Sep-03
Test Pit No.: FA-TB-TP01
Ring No.: SR-02
Tested By: Joe Pun

Inner Diameter of Ring: 57.0 cm
Inner Area of Ring: 2551.8 cm^2
Lateral Divergence: 5 cm
Depth of Wetting Front: 55 cm
Water Entry Value: -42 cm

No.	Start Time (hh:mm)	End Time (hh:mm)	Time Elapsed (min)	Initial Water Level (cm)	Ending Water Level (cm)	Change in Water Level (cm)	Incremental Ring Volume (cm^3)	Infiltration Rate (cm/hr)
1	10:17	10:21	4.0	5.0	4.0	1.0	2551.8	15.0
2	10:21	10:28	7.0	5.0	4.0	1.0	2551.8	8.6
3	10:28	10:34	6.0	5.0	4.0	1.0	2551.8	10.0
4	10:34	10:40	6.0	5.0	4.0	1.0	2551.8	10.0
5	10:40	10:47	7.0	5.0	4.0	1.0	2551.8	8.6
6	10:47	10:54	7.0	5.0	4.0	1.0	2551.8	8.6
7	10:54	11:00	6.0	5.0	4.0	1.0	2551.8	10.0
8	11:00	11:05	5.0	5.0	4.0	1.0	2551.8	12.0
9	11:05	11:10	5.0	5.0	4.0	1.0	2551.8	12.0
10	11:10	11:14	4.0	5.0	4.0	1.0	2551.8	15.0
11	11:14	11:19	5.0	5.0	4.0	1.0	2551.8	12.0
12	11:19	11:23	4.0	5.0	4.0	1.0	2551.8	15.0
13	11:23	11:27	4.0	5.0	4.0	1.0	2551.8	15.0
14	11:27	11:32	5.0	5.0	4.0	1.0	2551.8	12.0
15	11:32	11:36	4.0	5.0	4.0	1.0	2551.8	15.0
16	11:36	11:40	4.0	5.0	4.0	1.0	2551.8	15.0
17	11:40	11:44	4.0	5.0	4.0	1.0	2551.8	15.0
18								
19								
20								
21								
22								
23								
24								
25								
26								
27								
28								
29								
30								

Average Depth of Water in the Ring: 5.0 cm
Average Infiltraiton Rate: 15.0 cm/hr

Infiltration Rate (account for lateral divergence): 10.86 cm/hr
Effective Saturated Hydraulic Conductivity K_{fs}: 1.63E-03 cm/sec

Appendix B-1

Single Ring Infiltrometer Calculation Sheet

Location: Faro Beach Tailings
Date: 17-Sep-03
Test Pit No.: FA-TB-TP01
Ring No.: SR-03
Tested By: Joe Pun

Inner Diameter of Ring: 57.0 cm
Inner Area of Ring: 2551.8 cm^2
Lateral Divergence: 5 cm
Depth of Wetting Front: 70 cm
Water Entry Value: -42 cm

No.	Start Time (hh:mm)	End Time (hh:mm)	Time Elapsed (min)	Initial Water Level (cm)	Ending Water Level (cm)	Change in Water Level (cm)	Incremental Ring Volume (cm^3)	Infiltration Rate (cm/hr)
1	14:05	14:07	2.0	5.0	4.0	1.0	2551.8	30.0
2	14:07	14:10	3.0	5.0	4.0	1.0	2551.8	20.0
3	14:10	14:14	4.0	5.0	4.0	1.0	2551.8	15.0
4	14:14	14:18	4.0	5.0	4.0	1.0	2551.8	15.0
5	14:18	14:22	4.0	5.0	4.0	1.0	2551.8	15.0
6	14:22	14:27	5.0	5.0	4.0	1.0	2551.8	12.0
7	14:27	14:31	4.0	5.0	4.0	1.0	2551.8	15.0
8	14:31	14:35	4.0	5.0	4.0	1.0	2551.8	15.0
9	14:35	14:40	5.0	5.0	4.0	1.0	2551.8	12.0
10	14:40	14:44	4.0	5.0	4.0	1.0	2551.8	15.0
11	14:44	14:48	4.0	5.0	4.0	1.0	2551.8	15.0
12	14:48	14:52	4.0	5.0	4.0	1.0	2551.8	15.0
13	14:52	14:57	5.0	5.0	4.0	1.0	2551.8	12.0
14	14:57	15:01	4.0	5.0	4.0	1.0	2551.8	15.0
15	15:01	15:05	4.0	5.0	4.0	1.0	2551.8	15.0
16	15:05	15:09	4.0	5.0	4.0	1.0	2551.8	15.0
17	15:09	15:13	4.0	5.0	4.0	1.0	2551.8	15.0
18	15:13	15:17	4.0	5.0	4.0	1.0	2551.8	15.0
19	15:17	15:22	5.0	5.0	4.0	1.0	2551.8	12.0
20	15:22	15:26	4.0	5.0	4.0	1.0	2551.8	15.0
21	15:26	15:31	5.0	5.0	4.0	1.0	2551.8	12.0
22	15:31	15:35	4.0	5.0	4.0	1.0	2551.8	15.0
23	15:35	15:39	4.0	5.0	4.0	1.0	2551.8	15.0
24								
25								
26								
27								
28								
29								
30								

Average Depth of Water in the Ring: 5.0 cm
Average Infiltraiton Rate: 14.0 cm/hr

Infiltration Rate (account for lateral divergence): 10.13 cm/hr
Effective Saturated Hydraulic Conductivity K_{fs}: 1.68E-03 cm/sec

Single Ring Infiltrometer Calculation Sheet

Location: Faro Beach Tailings
Date: 17-Sep-03
Test Pit No.: FA-TB-TP01
Ring No.: SR-04
Tested By: Joe Pun

Inner Diameter of Ring: 57.0 cm
Inner Area of Ring: 2551.8 cm^2
Lateral Divergence: 5 cm
Depth of Wetting Front: 70 cm
Water Entry Value: -42 cm

No.	Start Time (hh:mm)	End Time (hh:mm)	Time Elapsed (min)	Initial Water Level (cm)	Ending Water Level (cm)	Change in Water Level (cm)	Incremental Ring Volume (cm^3)	Infiltration Rate (cm/hr)
1	14:32	14:35	3.0	5.0	4.0	1.0	2551.8	20.0
2	14:35	14:38	3.0	5.0	4.0	1.0	2551.8	20.0
3	14:38	14:41	3.0	5.0	4.0	1.0	2551.8	20.0
4	14:41	14:44	3.0	5.0	4.0	1.0	2551.8	20.0
5	14:44	14:48	4.0	5.0	4.0	1.0	2551.8	15.0
6	14:48	14:51	3.0	5.0	4.0	1.0	2551.8	20.0
7	14:51	14:54	3.0	5.0	4.0	1.0	2551.8	20.0
8	14:54	14:57	3.0	5.0	4.0	1.0	2551.8	20.0
9	14:57	15:01	4.0	5.0	4.0	1.0	2551.8	15.0
10	15:01	15:04	3.0	5.0	4.0	1.0	2551.8	20.0
11	15:04	15:08	4.0	5.0	4.0	1.0	2551.8	15.0
12	15:08	15:11	3.0	5.0	4.0	1.0	2551.8	20.0
13	15:11	15:14	3.0	5.0	4.0	1.0	2551.8	20.0
14	15:14	15:17	3.0	5.0	4.0	1.0	2551.8	20.0
15	15:17	15:21	4.0	5.0	4.0	1.0	2551.8	15.0
16	15:21	15:24	3.0	5.0	4.0	1.0	2551.8	20.0
17	15:24	15:27	3.0	5.0	4.0	1.0	2551.8	20.0
18	15:27	15:30	3.0	5.0	4.0	1.0	2551.8	20.0
19	15:30	15:33	3.0	5.0	4.0	1.0	2551.8	20.0
20	15:33	15:36	3.0	5.0	4.0	1.0	2551.8	20.0
21	15:36	15:39	3.0	5.0	4.0	1.0	2551.8	20.0
22	15:39	15:43	4.0	5.0	4.0	1.0	2551.8	15.0
23	15:43	15:47	4.0	5.0	4.0	1.0	2551.8	15.0
24	15:47	15:52	5.0	5.0	4.0	1.0	2551.8	12.0
25	15:52	15:55	3.0	5.0	4.0	1.0	2551.8	20.0
26	15:55	15:59	4.0	5.0	4.0	1.0	2551.8	15.0
27	15:59	16:02	3.0	5.0	4.0	1.0	2551.8	20.0
28	16:02	16:06	4.0	5.0	4.0	1.0	2551.8	15.0
29	16:06	16:10	4.0	5.0	4.0	1.0	2551.8	15.0
30								

Average Depth of Water in the Ring: 5.0 cm
Average Infiltraiton Rate: 16.7 cm/hr

Infiltration Rate (account for lateral divergence): 12.06 cm/hr
Effective Saturated Hydraulic Conductivity K_{fs}: 2.00E-03 cm/sec

Appendix B-1

Single Ring Infiltrometer Calculation Sheet

Location: Vangorda Wasterock Dump
Date: 12-Sep-03
Test Pit No.: VA-WR-TP01
Ring No.: SR-01
Tested By: Joe Pun

Inner Diameter of Ring: 57.0 cm
Inner Area of Ring: 2551.8 cm^2
Lateral Divergence: 5 cm
Depth of Wetting Front: 55 cm
Water Entry Value: -1.5 cm

No.	Start Time (hh:mm)	End Time (hh:mm)	Time Elapsed (min)	Initial Water Level (cm)	Ending Water Level (cm)	Change in Water Level (cm)	Incremental Ring Volume (cm^3)	Infiltration Rate (cm/hr)
1	9:18	9:19	1.0	5.0	4.0	1.0	2551.8	60.0
2	9:19	9:20	1.0	5.0	4.0	1.0	2551.8	60.0
3	9:20	9:22	2.0	5.0	4.0	1.0	2551.8	30.0
4	9:22	9:24	2.0	5.0	4.0	1.0	2551.8	30.0
5	9:24	9:27	3.0	5.0	4.0	1.0	2551.8	20.0
6	9:27	9:30	3.0	5.0	4.0	1.0	2551.8	20.0
7	9:30	9:33	3.0	5.0	4.0	1.0	2551.8	20.0
8	9:33	9:36	3.0	5.0	4.0	1.0	2551.8	20.0
9	9:36	9:39	3.0	5.0	4.0	1.0	2551.8	20.0
10	9:39	9:42	3.0	5.0	4.0	1.0	2551.8	20.0
11	9:42	9:45	3.0	5.0	4.0	1.0	2551.8	20.0
12	9:45	9:50	5.0	5.0	4.0	1.0	2551.8	12.0
13	9:50	9:54	4.0	5.0	4.0	1.0	2551.8	15.0
14	9:54	9:57	3.0	5.0	4.0	1.0	2551.8	20.0
15	9:57	10:01	4.0	5.0	4.0	1.0	2551.8	15.0
16	10:01	10:05	4.0	5.0	4.0	1.0	2551.8	15.0
17	10:05	10:09	4.0	5.0	4.0	1.0	2551.8	15.0
18	10:09	10:13	4.0	5.0	4.0	1.0	2551.8	15.0
19	10:13	10:16	3.0	5.0	4.0	1.0	2551.8	20.0
20	10:16	10:20	4.0	5.0	4.0	1.0	2551.8	15.0
21	10:20	10:24	4.0	5.0	4.0	1.0	2551.8	15.0
22	10:24	10:28	4.0	5.0	4.0	1.0	2551.8	15.0
23	10:28	10:32	4.0	5.0	4.0	1.0	2551.8	15.0
24	10:32	10:36	4.0	5.0	4.0	1.0	2551.8	15.0
25	10:36	10:40	4.0	5.0	4.0	1.0	2551.8	15.0
26	10:40	10:44	4.0	5.0	4.0	1.0	2551.8	15.0
27	10:44	10:48	4.0	5.0	4.0	1.0	2551.8	15.0
28	10:48	10:51	3.0	5.0	4.0	1.0	2551.8	20.0
29								
30								

Average Depth of Water in the Ring: 5.0 cm
Average Infiltraiton Rate: 16.7 cm/hr

Infiltration Rate (account for lateral divergence): 12.06 cm/hr
Effective Saturated Hydraulic Conductivity K_{fs}: 3.00E-03 cm/sec

Single Ring Infiltrometer Calculation Sheet

Location: Vangorda Wasterock Dump
Date: 12-Sep-03
Test Pit No.: VA-WR-TP01
Ring No.: SR-02
Tested By: Joe Pun

Inner Diameter of Ring: 57.0 cm
Inner Area of Ring: 2551.8 cm^2
Lateral Divergence: 5 cm
Depth of Wetting Front: 8 cm
Water Entry Value: -1.5 cm

No.	Start Time (hh:mm)	End Time (hh:mm)	Time Elapsed (min)	Initial Water Level (cm)	Ending Water Level (cm)	Change in Water Level (cm)	Incremental Ring Volume (cm^3)	Infiltration Rate (cm/hr)
1	9:09	10:30	81.0	5.0	4.0	1.0	2551.8	0.7
2	10:30	12:20	110.0	5.0	4.0	1.0	2551.8	0.5
3	12:20	14:18	118.0	5.0	4.0	1.0	2551.8	0.5
4	14:18	17:05	167.0	5.2	4.1	1.1	2806.9	0.4
5								
6								
7								
8								
9								
10								
11								
12								
13								
14								
15								
16								
17								
18								
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25								
26								
27								
28								
29								
30								

Average Depth of Water in the Ring: 5.1 cm
Average Infiltraiton Rate: 0.5 cm/hr

Infiltration Rate (account for lateral divergence): 0.35 cm/hr
Effective Saturated Hydraulic Conductivity K_{fs}: 5.33E-05 cm/sec

Single Ring Infiltrometer Calculation Sheet

Location: Vangorda Wasterock Dump
Date: 12-Sep-03
Test Pit No.: VA-WR-TP01
Ring No.: SR-03
Tested By: Joe Pun

Inner Diameter of Ring: 57.0 cm
Inner Area of Ring: 2551.8 cm^2
Lateral Divergence: 5 cm
Depth of Wetting Front: 13 cm
Water Entry Value: -1.5 cm

No.	Start Time (hh:mm)	End Time (hh:mm)	Time Elapsed (min)	Initial Water Level (cm)	Ending Water Level (cm)	Change in Water Level (cm)	Incremental Ring Volume (cm^3)	Infiltration Rate (cm/hr)
1	9:57	10:07	10.0	5.0	4.0	1.0	2551.8	6.0
2	10:07	10:29	22.0	5.0	3.7	1.3	3317.3	3.5
3	10:29	10:52	23.0	5.0	4.0	1.0	2551.8	2.6
4	10:52	11:13	21.0	5.0	4.0	1.0	2551.8	2.9
5	11:13	11:41	28.0	5.0	4.0	1.0	2551.8	2.1
6	11:41	12:05	24.0	5.0	4.0	1.0	2551.8	2.5
7	12:05	12:27	22.0	5.0	4.0	1.0	2551.8	2.7
8	12:27	12:51	24.0	5.0	4.0	1.0	2551.8	2.5
9	12:51	13:17	26.0	5.0	4.0	1.0	2551.8	2.3
10	13:17	13:42	25.0	5.0	4.0	1.0	2551.8	2.4
11	13:42	14:09	27.0	5.0	4.8	0.2	510.4	0.4
12								
13								
14								
15								
16								
17								
18								
19								
20								
21								
22								
23								
24								
25								
26								
27								
28								
29								
30								

Average Depth of Water in the Ring: 5.0 cm
Average Infiltraiton Rate: 2.4 cm/hr

Infiltration Rate (account for lateral divergence): 1.74 cm/hr
Effective Saturated Hydraulic Conductivity K_{fs}: 3.22E-04 cm/sec

Single Ring Infiltrometer Calculation Sheet

Location: Vangorda Wasterock Dump
Date: 12-Sep-03
Test Pit No.: VA-WR-TP01
Ring No.: SR-04
Tested By: Joe Pun

Inner Diameter of Ring: 57.0 cm
Inner Area of Ring: 2551.8 cm^2
Lateral Divergence: 5 cm
Depth of Wetting Front: 20 cm
Water Entry Value: -1.5 cm

No.	Start Time (hh:mm)	End Time (hh:mm)	Time Elapsed (min)	Initial Water Level (cm)	Ending Water Level (cm)	Change in Water Level (cm)	Incremental Ring Volume (cm^3)	Infiltration Rate (cm/hr)
1	10:02	10:04	2.0	5.0	4.0	1.0	2551.8	30.0
2				Paused (drained out)				
3				Continued				
4	11:33	11:40	7.0	5.0	4.0	1.0	2551.8	8.6
5	11:40	11:49	9.0	5.0	4.0	1.0	2551.8	6.7
6	11:49	11:58	9.0	5.0	3.7	1.3	3317.3	8.7
7	11:58	12:08	10.0	5.2	4.0	1.2	3062.1	7.2
8	12:08	12:16	8.0	5.0	4.0	1.0	2551.8	7.5
9	12:16	12:22	6.0	5.0	4.0	1.0	2551.8	10.0
10	12:22	12:28	6.0	5.0	4.0	1.0	2551.8	10.0
11	12:28	12:35	7.0	5.0	4.0	1.0	2551.8	8.6
12	12:35	12:42	7.0	5.0	4.0	1.0	2551.8	8.6
13	12:42	12:49	7.0	5.0	4.0	1.0	2551.8	8.6
14	12:49	12:56	7.0	5.0	4.0	1.0	2551.8	8.6
15	12:56	13:03	7.0	5.0	4.0	1.0	2551.8	8.6
16	13:03	13:10	7.0	5.0	4.0	1.0	2551.8	8.6
17	13:10	13:16	6.0	5.0	4.0	1.0	2551.8	10.0
18	13:16	13:24	8.0	5.0	4.0	1.0	2551.8	7.5
19	13:24	13:31	7.0	5.0	4.0	1.0	2551.8	8.6
20	13:31	13:38	7.0	5.0	4.0	1.0	2551.8	8.6
21	13:38	13:44	6.0	5.0	4.0	1.0	2551.8	10.0
22								
23								
24								
25								
26								
27								
28								
29								
30								

Average Depth of Water in the Ring: 5.0 cm
Average Infiltraiton Rate: 9.0 cm/hr

Infiltration Rate (account for lateral divergence): 6.55 cm/hr
Effective Saturated Hydraulic Conductivity K_{fs}: 1.37E-03 cm/sec

Single Ring Infiltrometer Calculation Sheet

Location: Vangorda Wasterock Dump
Date: 12-Sep-03
Test Pit No.: VA-WR-TP05
Ring No.: SR-03
Tested By: Joe Pun

Inner Diameter of Ring: 57.0 cm
Inner Area of Ring: 2551.8 cm^2
Lateral Divergence: 5 cm
Depth of Wetting Front: 40 cm
Water Entry Value: -1.5 cm

No.	Start Time (hh:mm)	End Time (hh:mm)	Time Elapsed (min)	Initial Water Level (cm)	Ending Water Level (cm)	Change in Water Level (cm)	Incremental Ring Volume (cm^3)	Infiltration Rate (cm/hr)
1	14:51	14:57	6.0	5.0	4.0	1.0	2551.8	10.0
2	14:57	15:05	8.0	5.0	4.0	1.0	2551.8	7.5
3	15:05	15:14	9.0	5.0	4.0	1.0	2551.8	6.7
4	15:14	15:24	10.0	5.0	4.0	1.0	2551.8	6.0
5	15:24	15:35	11.0	5.0	4.0	1.0	2551.8	5.5
6	15:35	15:46	11.0	5.0	4.0	1.0	2551.8	5.5
7	15:46	15:57	11.0	5.0	4.0	1.0	2551.8	5.5
8	15:57	16:09	12.0	5.0	4.0	1.0	2551.8	5.0
9	16:09	16:22	13.0	5.0	4.0	1.0	2551.8	4.6
10	16:22	16:33	11.0	5.0	4.0	1.0	2551.8	5.5
11	16:33	16:44	11.0	5.0	4.0	1.0	2551.8	5.5
12								
13								
14								
15								
16								
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24								
25								
26								
27								
28								
29								
30								

Average Depth of Water in the Ring: 5.0 cm
Average Infiltraiton Rate: 5.2 cm/hr

Infiltration Rate (account for lateral divergence): 3.75 cm/hr
Effective Saturated Hydraulic Conductivity K_{fs}: 8.95E-04 cm/sec

Data Sheet B-2
Guelph Permeameter Infiltration Test Data

GUELPH INFILTROMETER CALCULATION SHEET

Date: September 9, 2003
Investigator: Maritz Rykaart
Location: Vangorda Overburden Dump
Site: VA-OD-TP01-GP01
Dominant Soil Type: Clay/Gravel & Boulders
Depth of Well Hole: 20 cm

Volumetric Moisture Content
Initial Moisture Content, θ_i: 0.110
Final Moisture Content, θ_{fs}: 0.139
Moisture Content Difference, $\Delta\theta$: 0.029

Resavoir X Constant: 35.22 cm^2
Resavoir Y Constant: 2.15 cm^2

Both Resavoirs Used: Yes
Only Inner Resavoir Used:

Reading Set #1 - H1 = 5 cm:

No.	Time [hh:mm]	Time Int. [min]	Water Level [cm]	Level Change [cm]	Rate of Change, R1 [cm/sec]
1	15:53	0.00	0.0	0.0	0.000
2	15:53:30	0.50	1.6	1.6	0.053
3	15:55	1.50	2.0	0.4	0.004
4	16:02	7.00	3.2	1.2	0.003
5	16:05	3.00	3.9	0.7	0.004
6	16:10	5.00	4.8	0.9	0.003
7	16:15	5.00	6.5	1.7	0.006
8	16:20	5.00	8.1	1.6	0.005
9	16:25	5.00	10.0	1.9	0.006
10	16:30	5.00	11.4	1.4	0.005
11	16:35	5.00	12.8	1.4	0.005
12	16:40	5.00	14.2	1.4	0.005
13					
14					
15					
16					
17					
18					
19					
20					

Reading Set #1 - H1 = 10 cm:

No.	Time [hh:mm]	Time Int. [min]	Water Level [cm]	Level Change [cm]	Rate of Change, R1 [cm/sec]
1	16:41	0.00	14.5	0.0	0.000
2	16:42	1.00	14.7	0.2	0.003
3	16:45	3.00	15.7	1.0	0.006
4	16:50	5.00	17.1	1.4	0.005
5	16:55	5.00	18.5	1.4	0.005
6	17:00	5.00	19.8	1.3	0.004
7	17:05	5.00	21.1	1.3	0.004
8	17:10	5.00	22.4	1.3	0.004
9	17:15	5.00	23.7	1.3	0.004
10					
11					
12					
13					
14					
15					
16					
17					
18					
19					
20					

$R1_{avg}$: 0.005 cm/sec
$R2_{avg}$: 0.004 cm/sec

When Using Both Resavoirs

Field Saturated Hyd. Cond., K_{fs}:	-2.62E-04	cm/sec
Matric Flux Potential, ϕ_m:	5.78E-03	cm^2/sec
Sorptivity, S:	0.0183	$cm/sec^{-1/2}$
Alpha Parameter, α:	-0.0453	1/cm

When Using Only Inner Resavoir

Field Saturated Hyd. Cond., K_{fs}:	-1.60E-05	cm/sec
Matric Flux Potential, ϕ_m:	3.53E-04	cm^2/sec
Sorptivity, S:	0.0045	$cm/sec^{-1/2}$
Alpha Parameter, α:	-0.0453	1/cm

Field Measured Moisture Contents

	Before	After
Tare (g)		
Tare + Wet Sample (g)		
Tare + Dry Sample (g)		
Weight Water (g)	0	0
Weight Dry Sample (g)	0	0
Gravimetric Moisture Content	-	-
Water Density (g/cm^3)	1.000	
Tailings Dry Density (g/cm^3)	1.400	
Water Volume (cm^3)	0.00	0.00
Total Volume (cm^3)	0.00	0.00
Volumetric Moisture Content	11.0%	13.9%

Special Note: A negative result indicates soil heterogeneities - further testing required

Appendix B-2

GUELPH INFILTROMETER CALCULATION SHEET

Date: September 10, 2003
Investigator: Maritz Rykaart/Joe Pun
Location: Vangorda Embankment Till
Site: VA-ET-TP01-GP01
Dominant Soil Type: Sand/Silt
Depth of Well Hole: 20 cm

Volumetric Moisture Content
Initial Moisture Content, θ_i: 0.115
Final Moisture Content, θ_{fs}: 0.185
Moisture Content Difference, $\Delta\theta$: 0.070

Resavoir X Constant: 35.22 cm^2
Resavoir Y Constant: 2.15 cm^2

Both Resavoirs Used: Yes
Only Inner Resavoir Used:

Reading Set #1 - H1 = 5 cm:

No.	Time [hh:mm]	Time Int. [min]	Water Level [cm]	Level Change [cm]	Rate of Change, R1 [cm/sec]
1	10:00	0.00	0.0	0.0	0.000
2	10:01	1.00	2.4	2.4	0.040
3	10:05	4.00	3.1	0.7	0.003
4	10:15	10.00	4.2	1.1	0.002
5	10:25	10.00	5.4	1.2	0.002
6	10:35	10.00	6.3	0.9	0.001
7	10:45	10.00	7.2	0.9	0.002
8	10:55	10.00	8.1	0.9	0.002
9	11:05	10.00	9.0	0.9	0.001
10					
11					
12					
13					
14					
15					
16					
17					
18					
19					
20					

Reading Set #1 - H1 = 10 cm:

No.	Time [hh:mm]	Time Int. [min]	Water Level [cm]	Level Change [cm]	Rate of Change, R1 [cm/sec]
1	11:17	0.00	13.5	0.0	0.000
2	11:18	1.00	13.7	0.2	0.003
3	11:20	2.00	14.0	0.3	0.003
4	11:25	5.00	15.0	1.0	0.003
5	11:30	5.00	15.8	0.8	0.003
6	11:40	10.00	17.5	1.7	0.003
7	11:50	10.00	19.1	1.6	0.003
8	12:00	10.00	21.0	1.9	0.003
9	12:10	10.00	23.0	2.0	0.003
10	12:20	10.00	24.6	1.6	0.003
11	12:30	10.00	26.8	2.2	0.004
12	12:40	10.00	28.0	1.2	0.002
13	12:50	10.00	31.4	3.4	0.006
14	13:00	10.00	35.7	4.3	0.007
15	13:10	10.00	36.2	0.5	0.001
16	13:20	10.00	39.2	3.0	0.005
17	13:30	10.00	42.2	3.0	0.005
18	13:40	10.00	45.5	3.3	0.006
19	13:50	10.00	48.8	3.3	0.005
20					

$R1_{avg}$: 0.002 cm/sec
$R2_{avg}$: 0.005 cm/sec

When Using Both Resavoirs

Field Saturated Hyd. Cond., K_{fs}:	4.85E-04	cm/sec
Matric Flux Potential, ϕ_m:	-1.43E-03	cm^2/sec
Sorptivity, S:	#NUM!	$cm/sec^{-1/2}$
Alpha Parameter, α:	-0.3391	1/cm

When Using Only Inner Resavoir

Field Saturated Hyd. Cond., K_{fs}:	2.96E-05	cm/sec
Matric Flux Potential, ϕ_m:	-8.73E-05	cm^2/sec
Sorptivity, S:	#NUM!	$cm/sec^{-1/2}$
Alpha Parameter, α:	-0.3391	1/cm

Field Measured Moisture Contents

	Before	After
Tare (g)		
Tare + Wet Sample (g)		
Tare + Dry Sample (g)		
Weight Water (g)	0	0
Weight Dry Sample (g)	0	0
Gravimetric Moisture Content	-	-
Water Density (g/cm^3)	1.000	
Tailings Dry Density (g/cm^3)	1.400	
Water Volume (cm^3)	0.00	0.00
Total Volume (cm^3)	0.00	0.00
Volumetric Moisture Content	11.5%	18.5%

Special Note: A negative result indicates soil heterogeneities - further testing required

GUELPH INFILTROMETER CALCULATION SHEET

Date: September 10, 2003
Investigator: Joe Pun
Location: Vangorda Embankment Till
Site: VA-ET-TP01-GP02
Dominant Soil Type: Sand/Silt
Depth of Well Hole: 20 cm

Volumetric Moisture Content
Initial Moisture Content, θ_i: 0.114
Final Moisture Content, θ_{fs}: 0.185
Moisture Content Difference, $\Delta\theta$: 0.071

Resavoir X Constant: 35.22 cm^2
Resavoir Y Constant: 2.15 cm^2

Both Resavoirs Used: Yes
Only Inner Resavoir Used:

Reading Set #1 - H1 = 5 cm:

No.	Time [hh:mm]	Time Int. [min]	Water Level [cm]	Level Change [cm]	Rate of Change, R1 [cm/sec]
1	14:43	0.00	0.0	0.0	0.000
2	14:44	1.00	1.8	1.8	0.030
3	14:45	1.00	4.0	2.2	0.037
4	14:46	1.00	6.3	2.3	0.038
5	14:47	1.00	8.4	2.1	0.035
6	14:48	1.00	10.4	2.0	0.033
7	14:49	1.00	12.4	2.0	0.033
8	14:50	1.00	14.0	1.6	0.027
9	14:51	1.00	16.1	2.1	0.035
10	14:52	1.00	18.0	1.9	0.032
11	14:53	1.00	19.8	1.8	0.030
12	14:54	1.00	21.8	2.0	0.033
13	14:55	1.00	23.6	1.8	0.030
14	14:56	1.00	25.5	1.9	0.032
15	14:57	1.00	27.3	1.8	0.030
16	14:58	1.00	29.1	1.8	0.030
17	14:59	1.00	30.8	1.7	0.028
18	15:00	1.00	32.4	1.6	0.027
19	15:01	1.00	34.0	1.6	0.027
20	15:02	1.00	35.6	1.6	0.027

Reading Set #1 - H1 = 10 cm:

No.	Time [hh:mm]	Time Int. [min]	Water Level [cm]	Level Change [cm]	Rate of Change, R1 [cm/sec]
1	15:13	0.00	0.0	0.0	0.000
2	15:41	28.00	2.4	2.4	0.001
3	15:51	10.00	4.4	2.0	0.003
4	15:56	5.00	5.9	1.5	0.005
5	16:02	6.00	7.2	1.3	0.004
6	16:07	5.00	9.4	2.2	0.007
7	16:12	5.00	11.6	2.2	0.007
8	16:17	5.00	13.9	2.3	0.008
9	16:22	5.00	15.7	1.8	0.006
10	16:29	7.00	18.1	2.4	0.006
11	16:34	5.00	20.3	2.2	0.007
12	16:39	5.00	22.5	2.2	0.007
13	16:44	5.00	24.0	1.5	0.005
14	16:49	5.00	25.6	1.6	0.005
15	16:54	5.00	27.2	1.6	0.005
16	16:59	5.00	28.7	1.5	0.005
17	17:04	5.00	30.2	1.5	0.005
18	17:09	5.00	31.7	1.5	0.005
19					
20					

$R1_{avg}$: 0.027 cm/sec
$R2_{avg}$: 0.005 cm/sec

When Using Both Resavoirs

Field Saturated Hyd. Cond., K_{fs}:	-4.35E-03	cm/sec
Matric Flux Potential, ϕ_m:	4.95E-02	cm^2/sec
Sorptivity, S:	0.0839	$cm/sec^{1/2}$
Alpha Parpmeter, a:	-0.0878	1/cm

When Using Only Inner Resavoir

Field Saturated Hyd. Cond., K_{fs}:	-2.66E-04	cm/sec
Matric Flux Potential, ϕ_m:	3.02E-03	cm^2/sec
Sorptivity, S:	0.0207	$cm/sec^{1/2}$
Alpha Parpmeter, a:	-0.0878	1/cm

Field Measured Moisture Contents

	Before	After
Tare (g)		
Tare + Wet Spmple (g)		
Tare + Dry Spmple (g)		
Weight Water (g)	0	0
Weight Dry Spmple (g)	0	0
Gravimetric Moisture Content	-	-
Water Density (g/cm^3)	1.000	
Tailings Dry Density (g/cm^3)	1.400	
Water Volume (cm^3)	0.00	0.00
Total Volume (cm^3)	0.00	0.00
Volumetric Moisture Content	11.4%	18.5%

Special Note: A negative result indicates soil heterogeneities - further testing required

Appendix B-2

GUELPH INFILTROMETER CALCULATION SHEET

Date: September 18, 2003
Investigator: Joe Pun
Location: Faro Beach Tailings
Site: FA-TB-TP01-GP01
Dominant Soil Type: Beach Tailings
Depth of Well Hole: 20 cm

Volumetric Moisture Content
Initial Moisture Content, θ_i: 0.067
Final Moisture Content, θ_{fs}: 0.235
Moisture Content Difference, $\Delta\theta$: 0.168

Resavoir X Constant: 35.22 cm^2
Resavoir Y Constant: 2.15 cm^2

Both Resavoirs Used: Yes
Only Inner Resavoir Used:

Reading Set #1 - H1 = 5 cm:

No.	Time [hh:mm]	Time Int. [min]	Water Level [cm]	Level Change [cm]	Rate of Change, R1 [cm/sec]
1	16:11	0.00	0.0	0.0	0.000
2	16:12	1.00	4.7	4.7	0.078
3	16:13	1.00	6.5	1.8	0.030
4	16:14	1.00	8.9	2.4	0.040
5	16:15	1.00	10.0	1.1	0.018
6	16:16	1.00	11.6	1.6	0.027
7	16:17	1.00	13.4	1.8	0.030
8	16:18	1.00	15.1	1.7	0.028
9	16:19	1.00	16.8	1.7	0.028
10	16:20	1.00	18.4	1.6	0.027
11	16:21	1.00	20.1	1.7	0.028
12					
13					
14					
15					
16					
17					
18					
19					
20					

Reading Set #1 - H1 = 10 cm:

No.	Time [hh:mm]	Time Int. [min]	Water Level [cm]	Level Change [cm]	Rate of Change, R1 [cm/sec]
1	16:22	0.00	26.9	0.0	0.000
2	16:23	1.00	31.1	4.2	0.070
3	16:24	1.00	35.0	3.9	0.065
4	16:25	1.00	38.7	3.7	0.062
5	16:26	1.00	42.4	3.7	0.062
6	16:27	1.00	46.2	3.8	0.063
7	16:28	1.00	49.7	3.5	0.058
8	16:29	1.00	53.3	3.6	0.060
9	16:30	1.00	57.2	3.9	0.065
10	16:31	1.00	61.5	4.3	0.072
11	16:32	1.00	65.3	3.8	0.063
12	16:33	1.00	69.1	3.8	0.063
13	16:34	1.00	72.9	3.8	0.063
14					
15					
16					
17					
18					
19					
20					

$R1_{avg}$: 0.028 cm/sec
$R2_{avg}$: 0.063 cm/sec

When Using Both Resavoirs

Field Saturated Hyd. Cond., K_{fs}:	3.86E-03	cm/sec
Matric Flux Potential, ϕ_m:	3.10E-03	cm^2/sec
Sorptivity, S:	0.0323	$cm/sec^{1/2}$
Alpha Parpmeter, a:	1.2478	1/cm

When Using Only Inner Resavoir

Field Saturated Hyd. Cond., K_{fs}:	2.36E-04	cm/sec
Matric Flux Potential, ϕ_m:	1.89E-04	cm^2/sec
Sorptivity, S:	0.0080	$cm/sec^{1/2}$
Alpha Parpmeter, a:	1.2478	1/cm

Field Measured Moisture Contents

	Before	After
Tare (g)		
Tare + Wet Spmple (g)		
Tare + Dry Spmple (g)		
Weight Water (g)	0	0
Weight Dry Spmple (g)	0	0
Gravimetric Moisture Content	-	-
Water Density (g/cm^3)	1.000	
Tailings Dry Density (g/cm^3)	1.400	
Water Volume (cm^3)	0.00	0.00
Total Volume (cm^3)	0.00	0.00
Volumetric Moisture Content	6.7%	23.5%

Special Note: A negative result indicates soil heterogeneities - further testing required

GUELPH INFILTROMETER CALCULATION SHEET

Date: September 19, 2003
Investigator: Joe Pun
Location: Faro Beach Tailings
Site: FA-TB-TP01-GP01
Dominant Soil Type: Beach Tailings
Depth of Well Hole: 50 cm

Volumetric Moisture Content
Initial Moisture Content, θ_i: 0.067
Final Moisture Content, θ_{fs}: 0.235
Moisture Content Difference, $\Delta\theta$: 0.168

Resavoir X Constant: 35.22 cm^2
Resavoir Y Constant: 2.15 cm^2

Both Resavoirs Used: Yes
Only Inner Resavoir Used:

Reading Set #1 - H1 = 5 cm:

No.	Time [hh:mm]	Time Int. [min]	Water Level [cm]	Level Change [cm]	Rate of Change, R1 [cm/sec]
1	10:39	0.00	0	0.0	0.000
2	10:40	1.00	4.9	4.9	0.082
3	10:41	1.00	8.2	3.3	0.055
4	10:42	1.00	11.2	3.0	0.050
5	10:43	1.00	14.0	2.8	0.047
6	10:44	1.00	16.9	2.9	0.048
7	10:45	1.00	19.6	2.7	0.045
8	10:46	1.00	22.2	2.6	0.043
9	10:47	1.00	25.0	2.8	0.047
10	10:48	1.00	27.8	2.8	0.047
11	10:49	1.00	30.6	2.8	0.047
12	10:50	1.00	33.5	2.9	0.048
13					
14					
15					
16					
17					
18					
19					
20					

Reading Set #1 - H1 = 10 cm:

No.	Time [hh:mm]	Time Int. [min]	Water Level [cm]	Level Change [cm]	Rate of Change, R1 [cm/sec]
1	10:51	0.00	36.2	0.0	0.000
2	10:52	1.00	45.1	8.9	0.148
3	10:53	1.00	50.0	4.9	0.082
4	10:54	1.00	54.5	4.5	0.075
5	10:55	1.00	59.3	4.8	0.080
6	10:56	1.00	63.7	4.4	0.073
7	10:57	1.00	68.2	4.5	0.075
8	10:58	1.00	72.7	4.5	0.075
9					
10					
11					
12					
13					
14					
15					
16					
17					
18					
19					
20					

$R1_{avg}$: 0.047 cm/sec
$R2_{avg}$: 0.074 cm/sec

When Using Both Resavoirs

Field Saturated Hyd. Cond., K_{fs}:	1.77E-03	cm/sec
Matric Flux Potential, ϕ_m:	3.30E-02	cm^2/sec
Sorptivity, S:	0.1053	$cm/sec^{-1/2}$
Alpha Parpmeter, a:	0.0536	1/cm

When Using Only Inner Resavoir

Field Saturated Hyd. Cond., K_{fs}:	1.08E-04	cm/sec
Matric Flux Potential, ϕ_m:	2.01E-03	cm^2/sec
Sorptivity, S:	0.0260	$cm/sec^{-1/2}$
Alpha Parpmeter, a:	0.0536	1/cm

Field Measured Moisture Contents

	Before	After
Tare (g)		
Tare + Wet Spmple (g)		
Tare + Dry Spmple (g)		
Weight Water (g)	0	0
Weight Dry Spmple (g)	0	0
Gravimetric Moisture Content	-	-
Water Density (g/cm^3)	1.000	
Tailings Dry Density (g/cm^3)	1.400	
Water Volume (cm^3)	0.00	0.00
Total Volume (cm^3)	0.00	0.00
Volumetric Moisture Content	6.7%	23.5%

Special Note: A negative result indicates soil heterogeneities - further testing required

Appendix B-2

GUELPH INFILTROMETER CALCULATION SHEET

Date: September 19, 2003
Investigator: Joe Pun
Location: Faro Beach Tailings
Site: FA-TB-TP01-GP02
Dominant Soil Type: Beach Tailings
Depth of Well Hole: 20 cm

Volumetric Moisture Content
Initial Moisture Content, θ_i: 0.067
Final Moisture Content, θ_{fs}: 0.235
Moisture Content Difference, $\Delta\theta$: 0.168

Resavoir X Constant: 35.22 cm^2
Resavoir Y Constant: 2.15 cm^2

Both Resavoirs Used: Yes
Only Inner Resavoir Used:

Reading Set #1 - H1 = 5 cm:

No.	Time [hh:mm]	Time Int. [min]	Water Level [cm]	Level Change [cm]	Rate of Change, R1 [cm/sec]
1	11:44	0.00	0	0.0	0.000
2	11:45	1.00	4.4	4.4	0.073
3	11:46	1.00	6.5	2.1	0.035
4	11:47	1.00	8.3	1.8	0.030
5	11:48	1.00	10.2	1.9	0.032
6	11:49	1.00	12.0	1.8	0.030
7	11:50	1.00	13.7	1.7	0.028
8	11:51	1.00	15.5	1.8	0.030
9	11:52	1.00	17.3	1.8	0.030
10	11:53	1.00	19.1	1.8	0.030
11					
12					
13					
14					
15					
16					
17					
18					
19					
20					

Reading Set #1 - H1 = 10 cm:

No.	Time [hh:mm]	Time Int. [min]	Water Level [cm]	Level Change [cm]	Rate of Change, R1 [cm/sec]
1	11:54	0.00	20.9	0.0	0.000
2	11:55	1.00	29.3	8.4	0.140
3	11:56	1.00	34.3	5.0	0.083
4	11:57	1.00	38.8	4.5	0.075
5	11:58	1.00	43.4	4.6	0.077
6	11:59	1.00	48.0	4.6	0.077
7	12:00	1.00	52.0	4.0	0.067
8	12:01	1.00	56.5	4.5	0.075
9	12:02	1.00	61.1	4.6	0.077
10	12:03	1.00	65.3	4.2	0.070
11	12:04	1.00	69.5	4.2	0.070
12	12:05	1.00	73.7	4.2	0.070
13					
14					
15					
16					
17					
18					
19					
20					

$R1_{avg}$: 0.030 cm/sec
$R2_{avg}$: 0.070 cm/sec

When Using Both Resavoirs

Field Saturated Hyd. Cond., K_{fs}:	4.40E-03	cm/sec
Matric Flux Potential, ϕ_m:	2.01E-03	cm^2/sec
Sorptivity, S:	0.0260	$cm/sec^{-1/2}$
Alpha Parpmeter, a:	2.1930	1/cm

When Using Only Inner Resavoir

Field Saturated Hyd. Cond., K_{fs}:	2.69E-04	cm/sec
Matric Flux Potential, ϕ_m:	1.23E-04	cm^2/sec
Sorptivity, S:	0.0064	$cm/sec^{-1/2}$
Alpha Parpmeter, a:	2.1930	1/cm

Field Measured Moisture Contents

	Before	After
Tare (g)		
Tare + Wet Spmple (g)		
Tare + Dry Spmple (g)		
Weight Water (g)	0	0
Weight Dry Spmple (g)	0	0
Gravimetric Moisture Content	-	-
Water Density (g/cm^3)	1.000	
Tailings Dry Density (g/cm^3)	1.400	
Water Volume (cm^3)	0.00	0.00
Total Volume (cm^3)	0.00	0.00
Volumetric Moisture Content	6.7%	23.5%

Special Note: A negative result indicates soil heterogeneities - further testing required

GUELPH INFILTROMETER CALCULATION SHEET

Date: September 19, 2003
Investigator: Joe Pun
Location: Faro Beach Tailings
Site: FA-TB-TP01-GP02
Dominant Soil Type: Beach Tailings
Depth of Well Hole: 50 cm

Volumetric Moisture Content
Initial Moisture Content, θ_i: 0.067
Final Moisture Content, θ_{fs}: 0.235
Moisture Content Difference, $\Delta\theta$: 0.168

Resavoir X Constant: 35.22 cm^2
Resavoir Y Constant: 2.15 cm^2

Both Resavoirs Used: Yes
Only Inner Resavoir Used:

Reading Set #1 - H1 = 5 cm:

No.	Time	Time Int.	Water Level	Level Change	Rate of Change, R1
	[hh:mm]	[min]	[cm]	[cm]	[cm/sec]
1	12:26	0.00	0	0.0	0.000
2	12:27	1.00	5.0	5.0	0.083
3	12:28	1.00	8.1	3.1	0.052
4	12:29	1.00	10.8	2.7	0.045
5	12:30	1.00	13.5	2.7	0.045
6	12:31	1.00	16.2	2.7	0.045
7	12:32	1.00	19.0	2.8	0.047
8	12:33	1.00	21.7	2.7	0.045
9					
10					
11					
12					
13					
14					
15					
16					
17					
18					
19					
20					

$R1_{avg}$: 0.046 cm/sec

Reading Set #1 - H1 = 10 cm:

No.	Time	Time Int.	Water Level	Level Change	Rate of Change, R1
	[hh:mm]	[min]	[cm]	[cm]	[cm/sec]
1	12:37	0.00	0	0.0	0.000
2	12:38	1.00	7.0	7.0	0.117
3	12:39	1.00	12.8	5.8	0.097
4	12:40	1.00	15.7	2.9	0.048
5	12:41	1.00	20.0	4.3	0.072
6	12:42	1.00	24.2	4.2	0.070
7	12:43	1.00	28.2	4.0	0.067
8	12:44	1.00	32.7	4.5	0.075
9	12:45	1.00	36.8	4.1	0.068
10	12:46	1.00	41.2	4.4	0.073
11	12:47	1.00	45.6	4.4	0.073
12	12:48	1.00	50.0	4.4	0.073
13	12:49	1.00	54.4	4.4	0.073
14					
15					
16					
17					
18					
19					
20					

$R2_{avg}$: 0.073 cm/sec

When Using Both Resavoirs

Field Saturated Hyd. Cond., K_{fs}:	1.93E-03	cm/sec
Matric Flux Potential, ϕ_m:	3.06E-02	cm^2/sec
Sorptivity, S:	0.1013	$cm/sec^{-1/2}$
Alpha Parpmeter, a:	0.0630	1/cm

When Using Only Inner Resavoir

Field Saturated Hyd. Cond., K_{fs}:	1.18E-04	cm/sec
Matric Flux Potential, ϕ_m:	1.87E-03	cm^2/sec
Sorptivity, S:	0.0250	$cm/sec^{-1/2}$
Alpha Parpmeter, a:	0.0630	1/cm

Field Measured Moisture Contents

	Before	After
Tare (g)		
Tare + Wet Spmple (g)		
Tare + Dry Spmple (g)		
Weight Water (g)	0	0
Weight Dry Spmple (g)	0	0
Gravimetric Moisture Content	-	-
Water Density (g/cm^3)	1.000	
Tailings Dry Density (g/cm^3)	1.400	
Water Volume (cm^3)	0.00	0.00
Total Volume (cm^3)	0.00	0.00
Volumetric Moisture Content	6.7%	23.5%

Special Note: A negative result indicates soil heterogeneities - further testing required

Data Sheet B-3
Sand Cone In-Site Density Test Data

IN-SITU DENSITY (Sand-Cone Method)

Site Location: Vangorda Embankment Till

Soil Description : Well-grained silt, clay	Test Pit # : VA-ET-TP01
Sand Type: Ottawa Sand	Test Date: 16-Sep-03
Specific Gravity of Sand: 2.65	Test No: SC-01
Sand Bulk Density (g/cm^3): 1.42	Tested By: Joe Pun

Maximum Particle Size	Minimum Test Hole Volume
1/2" (12.7 mm)	1415 cm^3 (0.05 ft^3)
1" (25.4 mm)	2125 cm^3 (0.075 ft^3)
1.5" (38 mm)	2830 cm^3 (0.1 ft^3)

Approximate Hole Size	6" Φ, 9cm depth
Mass of Empty Moisture Tight Container (g)	40.4
Mass of Moisture Tight Container with Wet Sample (g)	1650.1
Mass of Wet Sample Removed From Hole (g)	1609.7
Water Content (%)	10.6
Mass of Apparatus Filled With Sand Prior to Test (g)	6550.0
Mass of Empty Apparatus (g)	194.6
Mass of Remaining Sand In Sample Container (g)	3261.4
Mass of Sand Used to Fill Test Hole, Funnel & Base Plate (g)	3134.4
Mass of Sand Used to Fill Funnel & Base Plate (g)	1845.0
Calculated Volume of Test Hole (cm^3)	905.0
Mass of Dry Soil Removed From Test Hole (g)	1455.4
In-Situ Wet Density (g/cm^3)	1.8
In-Situ Dry Density (g/cm^3)	1.6

Appendix B-3

IN-SITU DENSITY (Sand-Cone Method)

Site Location: Vangorda Embankment Till

Soil Description : Well-grained silt, clay	Test Pit # : VA-ET-TP01
Sand Type: Ottawa Sand	Test Date: 16-Sep-03
Specific Gravity of Sand: 2.65	Test No: SC-02
Sand Bulk Density (g/cm^3): 1.42	Tested By: Joe Pun

Maximum Particle Size	Minimum Test Hole Volume
1/2" (12.7 mm)	1415 cm^3 (0.05 ft^3)
1" (25.4 mm)	2125 cm^3 (0.075 ft^3)
1.5" (38 mm)	2830 cm^3 (0.1 ft^3)

Approximate Hole Size	6" Φ, 9cm depth
Mass of Empty Moisture Tight Container (g)	40.4
Mass of Moisture Tight Container with Wet Sample (g)	1427.4
Mass of Wet Sample Removed From Hole (g)	1387.0
Water Content (%)	10.1
Mass of Apparatus Filled With Sand Prior to Test (g)	6550.0
Mass of Empty Apparatus (g)	194.6
Mass of Remaining Sand in Sample Container (g)	3323.6
Mass of Sand Used to Fill Test Hole, Funnel & Base Plate (g)	3072.2
Mass of Sand Used to Fill Funnel & Base Plate (g)	1845.0
Calculated Volume of Test Hole (cm^3)	861.4
Mass of Dry Soil Removed From Test Hole (g)	1259.8
In-Situ Wet Density (g/cm^3)	1.6
In-Situ Dry Density (g/cm^3)	1.5

IN-SITU DENSITY (Sand-Cone Method)

Site Location: Vangorda Embankment Till	
Soil Description : Well-grained silt, clay	Test Pit # : VA-ET-TP01
Sand Type: Ottawa Sand	Test Date: 16-Sep-03
Specific Gravity of Sand: 2.65	Test No: SC-03
Sand Bulk Density (g/cm^3): 1.42	Tested By: Joe Pun

Maximum Particle Size	Minimum Test Hole Volume
1/2" (12.7 mm)	1415 cm^3 (0.05 ft^3)
1" (25.4 mm)	2125 cm^3 (0.075 ft^3)
1.5" (38 mm)	2830 cm^3 (0.1 ft^3)

Approximate Hole Size	6" Φ, 9cm depth
Mass of Empty Moisture Tight Container (g)	40.4
Mass of Moisture Tight Container with Wet Sample (g)	1981.6
Mass of Wet Sample Removed From Hole (g)	1941.2
Water Content (%)	10.5
Mass of Apparatus Filled With Sand Prior to Test (g)	6550.0
Mass of Empty Apparatus (g)	194.6
Mass of Remaining Sand in Sample Container (g)	2650.4
Mass of Sand Used to Fill Test Hole, Funnel & Base Plate (g)	3745.4
Mass of Sand Used to Fill Funnel & Base Plate (g)	1845.0
Calculated Volume of Test Hole (cm^3)	1333.9
Mass of Dry Soil Removed From Test Hole (g)	1756.7
In-Situ Wet Density (g/cm^3)	1.5
In-Situ Dry Density (g/cm^3)	1.3

Appendix B-3

IN-SITU DENSITY (Sand-Cone Method)

Site Location: Vangorda Till Cover	
Soil Description : Sand, silt, cobbles	Test Pit # : VA-CT-TP01
Sand Type: Ottawa Sand	Test Date: 11-Sep-03
Specific Gravity of Sand: 2.65	Test No: SC-01
Sand Bulk Density (g/cm^3): 1.42	Tested By: Maritz Rykaart

Maximum Particle Size	Minimum Test Hole Volume
1/2" (12.7 mm)	1415 cm^3 (0.05 ft^3)
1" (25.4 mm)	2125 cm^3 (0.075 ft^3)
1.5" (38 mm)	2830 cm^3 (0.1 ft^3)

Approximate Hole Size	6" Φ, 9cm depth
Mass of Empty Moisture Tight Container (g)	40.4
Mass of Moisture Tight Container with Wet Sample (g)	2149.2
Mass of Wet Sample Removed From Hole (g)	2108.8
Water Content (%)	7.9
Mass of Apparatus Filled With Sand Prior to Test (g)	6550.0
Mass of Empty Apparatus (g)	194.6
Mass of Remaining Sand in Sample Container (g)	3089.2
Mass of Sand Used to Fill Test Hole, Funnel & Base Plate (g)	3306.6
Mass of Sand Used to Fill Funnel & Base Plate (g)	1845.0
Calculated Volume of Test Hole (cm^3)	1025.9
Mass of Dry Soil Removed From Test Hole (g)	1954.4
In-Situ Wet Density (g/cm^3)	2.1
In-Situ Dry Density (g/cm^3)	1.9

IN-SITU DENSITY (Sand-Cone Method)

Site Location: Vangorda Till Cover	
Soil Description : Sand, silt, cobbles	Test Pit # : VA-CT-TP01
Sand Type: Ottawa Sand	Test Date: 11-Sep-03
Specific Gravity of Sand: 2.65	Test No: SC-02
Sand Bulk Density (g/cm^3): 1.42	Tested By: Maritz Rykaart

Maximum Particle Size	Minimum Test Hole Volume
1/2" (12.7 mm)	1415 cm^3 (0.05 ft^3)
1" (25.4 mm)	2125 cm^3 (0.075 ft^3)
1.5" (38 mm)	2830 cm^3 (0.1 ft^3)

Approximate Hole Size	6" Φ, 9cm depth
Mass of Empty Moisture Tight Container (g)	40.4
Mass of Moisture Tight Container with Wet Sample (g)	1841.5
Mass of Wet Sample Removed From Hole (g)	1801.1
Water Content (%)	8.0
Mass of Apparatus Filled With Sand Prior to Test (g)	6550.0
Mass of Empty Apparatus (g)	194.6
Mass of Remaining Sand in Sample Container (g)	3390.5
Mass of Sand Used to Fill Test Hole, Funnel & Base Plate (g)	3005.3
Mass of Sand Used to Fill Funnel & Base Plate (g)	1845.0
Calculated Volume of Test Hole (cm^3)	814.4
Mass of Dry Soil Removed From Test Hole (g)	1667.7
In-Situ Wet Density (g/cm^3)	2.2
In-Situ Dry Density (g/cm^3)	2.0

Appendix B-3

IN-SITU DENSITY (Sand-Cone Method)

Site Location: Vangorda Till Cover	
Soil Description : Sand, silt, cobbles	Test Pit # : VA-CT-TP01
Sand Type: Ottawa Sand	Test Date: 15-Sep-03
Specific Gravity of Sand: 2.65	Test No: SC-03
Sand Bulk Density (g/cm^3): 1.42	Tested By: Joe Pun

Maximum Particle Size	Minimum Test Hole Volume
1/2" (12.7 mm)	1415 cm^3 (0.05 ft^3)
1" (25.4 mm)	2125 cm^3 (0.075 ft^3)
1.5" (38 mm)	2830 cm^3 (0.1 ft^3)

Approximate Hole Size	6" Φ, 9cm depth
Mass of Empty Moisture Tight Container (g)	40.4
Mass of Moisture Tight Container with Wet Sample (g)	1743.9
Mass of Wet Sample Removed From Hole (g)	1703.5
Water Content (%)	11.3
Mass of Apparatus Filled With Sand Prior to Test (g)	6550.0
Mass of Empty Apparatus (g)	194.6
Mass of Remaining Sand in Sample Container (g)	3307.2
Mass of Sand Used to Fill Test Hole, Funnel & Base Plate (g)	3088.6
Mass of Sand Used to Fill Funnel & Base Plate (g)	1845.0
Calculated Volume of Test Hole (cm^3)	872.9
Mass of Dry Soil Removed From Test Hole (g)	1530.5
In-Situ Wet Density (g/cm^3)	2.0
In-Situ Dry Density (g/cm^3)	1.8

IN-SITU DENSITY (Sand-Cone Method)

Site Location: Vangorda Till Cover	
Soil Description : Sand, silt, cobbles	Test Pit # : VA-CT-TP01
Sand Type: Ottawa Sand	Test Date: 15-Sep-03
Specific Gravity of Sand: 2.65	Test No: SC-04
Sand Bulk Density (g/cm^3): 1.42	Tested By: Joe Pun

Maximum Particle Size	Minimum Test Hole Volume
1/2" (12.7 mm)	1415 cm^3 (0.05 ft^3)
1" (25.4 mm)	2125 cm^3 (0.075 ft^3)
1.5" (38 mm)	2830 cm^3 (0.1 ft^3)

Approximate Hole Size	6" Φ, 9cm depth
Mass of Empty Moisture Tight Container (g)	40.4
Mass of Moisture Tight Container with Wet Sample (g)	1540.1
Mass of Wet Sample Removed From Hole (g)	1499.7
Water Content (%)	10.1
Mass of Apparatus Filled With Sand Prior to Test (g)	6550.0
Mass of Empty Apparatus (g)	194.6
Mass of Remaining Sand in Sample Container (g)	3358.9
Mass of Sand Used to Fill Test Hole, Funnel & Base Plate (g)	3036.9
Mass of Sand Used to Fill Funnel & Base Plate (g)	1845.0
Calculated Volume of Test Hole (cm^3)	836.6
Mass of Dry Soil Removed From Test Hole (g)	1362.1
In-Situ Wet Density (g/cm^3)	1.8
In-Situ Dry Density (g/cm^3)	1.6

Appendix B-3

IN-SITU DENSITY (Sand-Cone Method)

Site Location: Vangorda Overburden Dump	
Soil Description : Clay, sand, cobbles	Test Pit # : VA-OD-TP01
Sand Type: Ottawa Sand	Test Date: 16-Sep-03
Specific Gravity of Sand: 2.65	Test No: SC-01
Sand Bulk Density (g/cm^3): 1.42	Tested By: Joe Pun

Maximum Particle Size	Minimum Test Hole Volume
1/2" (12.7 mm)	1415 cm^3 (0.05 ft^3)
1" (25.4 mm)	2125 cm^3 (0.075 ft^3)
1.5" (38 mm)	2830 cm^3 (0.1 ft^3)

Approximate Hole Size	6" Φ, 9cm depth
Mass of Empty Moisture Tight Container (g)	40.4
Mass of Moisture Tight Container with Wet Sample (g)	1517.1
Mass of Wet Sample Removed From Hole (g)	1476.7
Water Content (%)	11.6
Mass of Apparatus Filled With Sand Prior to Test (g)	6550.0
Mass of Empty Apparatus (g)	194.6
Mass of Remaining Sand in Sample Container (g)	3474.7
Mass of Sand Used to Fill Test Hole, Funnel & Base Plate (g)	2921.1
Mass of Sand Used to Fill Funnel & Base Plate (g)	1845.0
Calculated Volume of Test Hole (cm^3)	755.3
Mass of Dry Soil Removed From Test Hole (g)	1323.2
In-Situ Wet Density (g/cm^3)	2.0
In-Situ Dry Density (g/cm^3)	1.8

IN-SITU DENSITY (Sand-Cone Method)

Site Location: Vangorda Overburden Dump	
Soil Description : Clay, sand, cobbles	Test Pit # : VA-OD-TP01
Sand Type: Ottawa Sand	Test Date: 16-Sep-03
Specific Gravity of Sand: 2.65	Test No: SC-02
Sand Bulk Density (g/cm^3): 1.42	Tested By: Joe Pun

Maximum Particle Size	Minimum Test Hole Volume
1/2" (12.7 mm)	1415 cm^3 (0.05 ft^3)
1" (25.4 mm)	2125 cm^3 (0.075 ft^3)
1.5" (38 mm)	2830 cm^3 (0.1 ft^3)

Approximate Hole Size	6" Φ, 9cm depth
Mass of Empty Moisture Tight Container (g)	40.4
Mass of Moisture Tight Container with Wet Sample (g)	1634.4
Mass of Wet Sample Removed From Hole (g)	1594.0
Water Content (%)	12.6
Mass of Apparatus Filled With Sand Prior to Test (g)	6550.0
Mass of Empty Apparatus (g)	194.6
Mass of Remaining Sand in Sample Container (g)	3463.0
Mass of Sand Used to Fill Test Hole, Funnel & Base Plate (g)	2932.8
Mass of Sand Used to Fill Funnel & Base Plate (g)	1845.0
Calculated Volume of Test Hole (cm^3)	763.5
Mass of Dry Soil Removed From Test Hole (g)	1415.6
In-Situ Wet Density (g/cm^3)	2.1
In-Situ Dry Density (g/cm^3)	1.9

Appendix B-3

IN-SITU DENSITY (Sand-Cone Method)

Site Location: Vangorda Overburden Dump	
Soil Description : Clay, sand, cobbles	Test Pit # : VA-OD-TP01
Sand Type: Ottawa Sand	Test Date: 16-Sep-03
Specific Gravity of Sand: 2.65	Test No: SC-03
Sand Bulk Density (g/cm^3): 1.42	Tested By: Joe Pun

Maximum Particle Size	Minimum Test Hole Volume
1/2" (12.7 mm)	1415 cm^3 (0.05 ft^3)
1" (25.4 mm)	2125 cm^3 (0.075 ft^3)
1.5" (38 mm)	2830 cm^3 (0.1 ft^3)

Approximate Hole Size	6" Φ, 9cm depth
Mass of Empty Moisture Tight Container (g)	40.4
Mass of Moisture Tight Container with Wet Sample (g)	1821.2
Mass of Wet Sample Removed From Hole (g)	1780.8
Water Content (%)	8.7
Mass of Apparatus Filled With Sand Prior to Test (g)	6550.0
Mass of Empty Apparatus (g)	194.6
Mass of Remaining Sand in Sample Container (g)	3180.5
Mass of Sand Used to Fill Test Hole, Funnel & Base Plate (g)	3215.3
Mass of Sand Used to Fill Funnel & Base Plate (g)	1845.0
Calculated Volume of Test Hole (cm^3)	961.8
Mass of Dry Soil Removed From Test Hole (g)	1638.3
In-Situ Wet Density (g/cm^3)	1.9
In-Situ Dry Density (g/cm^3)	1.7

IN-SITU DENSITY (Sand-Cone Method)

Site Location: Vangorda Glaciofluvial Deposit

Soil Description : Sand & Silt	Test Pit # : VA-GF-TP01
Sand Type: Ottawa Sand	Test Date: 16-Sep-03
Specific Gravity of Sand: 2.65	Test No: SC-01
Sand Bulk Density (g/cm^3): 1.42	Tested By: Joe Pun

Maximum Particle Size	Minimum Test Hole Volume
1/2" (12.7 mm)	1415 cm^3 (0.05 ft^3)
1" (25.4 mm)	2125 cm^3 (0.075 ft^3)
1.5" (38 mm)	2830 cm^3 (0.1 ft^3)

Approximate Hole Size	6" Φ, 9cm depth
Mass of Empty Moisture Tight Container (g)	40.4
Mass of Moisture Tight Container with Wet Sample (g)	1816.0
Mass of Wet Sample Removed From Hole (g)	1775.6
Water Content (%)	4.1
Mass of Apparatus Filled With Sand Prior to Test (g)	6550.0
Mass of Empty Apparatus (g)	194.6
Mass of Remaining Sand in Sample Container (g)	3264.7
Mass of Sand Used to Fill Test Hole, Funnel & Base Plate (g)	3131.1
Mass of Sand Used to Fill Funnel & Base Plate (g)	1845.0
Calculated Volume of Test Hole (cm^3)	902.7
Mass of Dry Soil Removed From Test Hole (g)	1705.7
In-Situ Wet Density (g/cm^3)	2.0
In-Situ Dry Density (g/cm^3)	1.9

Appendix B-3

IN-SITU DENSITY (Sand-Cone Method)

Site Location: Vangorda Glaciofluvial Deposit

Soil Description : Sand & Silt	Test Pit # : VA-GF-TP01
Sand Type: Ottawa Sand	Test Date: 16-Sep-03
Specific Gravity of Sand: 2.65	Test No: SC-02
Sand Bulk Density (g/cm^3): 1.42	Tested By: Joe Pun

Maximum Particle Size	Minimum Test Hole Volume
1/2" (12.7 mm)	1415 cm^3 (0.05 ft^3)
1" (25.4 mm)	2125 cm^3 (0.075 ft^3)
1.5" (38 mm)	2830 cm^3 (0.1 ft^3)

Approximate Hole Size	6" Φ, 9cm depth
Mass of Empty Moisture Tight Container (g)	40.4
Mass of Moisture Tight Container with Wet Sample (g)	2071.4
Mass of Wet Sample Removed From Hole (g)	2031.0
Water Content (%)	4.2
Mass of Apparatus Filled With Sand Prior to Test (g)	6550.0
Mass of Empty Apparatus (g)	194.6
Mass of Remaining Sand in Sample Container (g)	3203.2
Mass of Sand Used to Fill Test Hole, Funnel & Base Plate (g)	3192.6
Mass of Sand Used to Fill Funnel & Base Plate (g)	1845.0
Calculated Volume of Test Hole (cm^3)	945.9
Mass of Dry Soil Removed From Test Hole (g)	1949.1
In-Situ Wet Density (g/cm^3)	2.1
In-Situ Dry Density (g/cm^3)	2.1

IN-SITU DENSITY (Sand-Cone Method)

Site Location: Vangorda Glaciofluvial Deposit	
Soil Description : Sand & Silt	Test Pit # : VA-GF-TP01
Sand Type: Ottawa Sand	Test Date: 16-Sep-03
Specific Gravity of Sand: 2.65	Test No: SC-03
Sand Bulk Density (g/cm^3): 1.42	Tested By: Joe Pun

Maximum Particle Size	Minimum Test Hole Volume
1/2" (12.7 mm)	1415 cm^3 (0.05 ft^3)
1" (25.4 mm)	2125 cm^3 (0.075 ft^3)
1.5" (38 mm)	2830 cm^3 (0.1 ft^3)

Approximate Hole Size	6" Φ, 9cm depth
Mass of Empty Moisture Tight Container (g)	40.4
Mass of Moisture Tight Container with Wet Sample (g)	1925.5
Mass of Wet Sample Removed From Hole (g)	1885.1
Water Content (%)	4.6
Mass of Apparatus Filled With Sand Prior to Test (g)	6550.0
Mass of Empty Apparatus (g)	194.6
Mass of Remaining Sand in Sample Container (g)	3319.7
Mass of Sand Used to Fill Test Hole, Funnel & Base Plate (g)	3076.1
Mass of Sand Used to Fill Funnel & Base Plate (g)	1845.0
Calculated Volume of Test Hole (cm^3)	864.1
Mass of Dry Soil Removed From Test Hole (g)	1802.2
In-Situ Wet Density (g/cm^3)	2.2
In-Situ Dry Density (g/cm^3)	2.1

Appendix B-3

IN-SITU DENSITY (Sand-Cone Method)

Site Location: Faro Slime Tailings	
Soil Description : Slime Tailings	Test Pit # : FA-TS-TP01
Sand Type: Ottawa Sand	Test Date: 14-Sep-03
Specific Gravity of Sand: 2.65	Test No: SC-01
Sand Bulk Density (g/cm^3): 1.42	Tested By: Joe Pun

Maximum Particle Size	Minimum Test Hole Volume
1/2" (12.7 mm)	1415 cm^3 (0.05 ft^3)
1" (25.4 mm)	2125 cm^3 (0.075 ft^3)
1.5" (38 mm)	2830 cm^3 (0.1 ft^3)

Approximate Hole Size	6" Φ, 9cm depth
Mass of Empty Moisture Tight Container (g)	40.4
Mass of Moisture Tight Container with Wet Sample (g)	2428.0
Mass of Wet Sample Removed From Hole (g)	2387.6
Water Content (%)	20.6
Mass of Apparatus Filled With Sand Prior to Test (g)	6550.0
Mass of Empty Apparatus (g)	194.6
Mass of Remaining Sand in Sample Container (g)	2848.4
Mass of Sand Used to Fill Test Hole, Funnel & Base Plate (g)	3547.4
Mass of Sand Used to Fill Funnel & Base Plate (g)	1845.0
Calculated Volume of Test Hole (cm^3)	1194.9
Mass of Dry Soil Removed From Test Hole (g)	1979.8
In-Situ Wet Density (g/cm^3)	2.0
In-Situ Dry Density (g/cm^3)	1.7

IN-SITU DENSITY (Sand-Cone Method)

Site Location: Faro Slime Tailings	
Soil Description : Slime Tailings	Test Pit # : FA-TS-TP01
Sand Type: Ottawa Sand	Test Date: 14-Sep-03
Specific Gravity of Sand: 2.65	Test No: SC-02
Sand Bulk Density (g/cm^3): 1.42	Tested By: Joe Pun

Maximum Particle Size	Minimum Test Hole Volume
1/2" (12.7 mm)	1415 cm^3 (0.05 ft^3)
1" (25.4 mm)	2125 cm^3 (0.075 ft^3)
1.5" (38 mm)	2830 cm^3 (0.1 ft^3)

Approximate Hole Size	6" Φ, 9cm depth
Mass of Empty Moisture Tight Container (g)	40.4
Mass of Moisture Tight Container with Wet Sample (g)	2364.1
Mass of Wet Sample Removed From Hole (g)	2323.7
Water Content (%)	22.6
Mass of Apparatus Filled With Sand Prior to Test (g)	6550.0
Mass of Empty Apparatus (g)	194.6
Mass of Remaining Sand in Sample Container (g)	3034.8
Mass of Sand Used to Fill Test Hole, Funnel & Base Plate (g)	3361.0
Mass of Sand Used to Fill Funnel & Base Plate (g)	1845.0
Calculated Volume of Test Hole (cm^3)	1064.1
Mass of Dry Soil Removed From Test Hole (g)	1895.4
In-Situ Wet Density (g/cm^3)	2.2
In-Situ Dry Density (g/cm^3)	1.8

Appendix B-3

IN-SITU DENSITY (Sand-Cone Method)

Site Location: Faro Slime Tailings	
Soil Description : Slime Tailings	Test Pit # : FA-TS-TP01
Sand Type: Ottawa Sand	Test Date: 14-Sep-03
Specific Gravity of Sand: 2.65	Test No: SC-03
Sand Bulk Density (g/cm^3): 1.42	Tested By: Joe Pun

Maximum Particle Size	Minimum Test Hole Volume
1/2" (12.7 mm)	1415 cm^3 (0.05 ft^3)
1" (25.4 mm)	2125 cm^3 (0.075 ft^3)
1.5" (38 mm)	2830 cm^3 (0.1 ft^3)

Approximate Hole Size	6" Φ, 9cm depth
Mass of Empty Moisture Tight Container (g)	40.4
Mass of Moisture Tight Container with Wet Sample (g)	2270.5
Mass of Wet Sample Removed From Hole (g)	2230.1
Water Content (%)	23.2
Mass of Apparatus Filled With Sand Prior to Test (g)	6550.0
Mass of Empty Apparatus (g)	194.6
Mass of Remaining Sand in Sample Container (g)	3202.7
Mass of Sand Used to Fill Test Hole, Funnel & Base Plate (g)	3193.1
Mass of Sand Used to Fill Funnel & Base Plate (g)	1845.0
Calculated Volume of Test Hole (cm^3)	946.2
Mass of Dry Soil Removed From Test Hole (g)	1810.1
In-Situ Wet Density (g/cm^3)	2.4
In-Situ Dry Density (g/cm^3)	1.9

IN-SITU DENSITY (Sand-Cone Method)

Site Location: Faro Beach Tailings	
Soil Description : Beach Tailings	Test Pit # : FA-TB-TP01
Sand Type: Ottawa Sand	Test Date: 17-Sep-03
Specific Gravity of Sand: 2.65	Test No: SC-01
Sand Bulk Density (g/cm^3): 1.42	Tested By: Joe Pun

Maximum Particle Size	Minimum Test Hole Volume
1/2" (12.7 mm)	1415 cm^3 (0.05 ft^3)
1" (25.4 mm)	2125 cm^3 (0.075 ft^3)
1.5" (38 mm)	2830 cm^3 (0.1 ft^3)

Approximate Hole Size	6" Φ, 9cm depth
Mass of Empty Moisture Tight Container (g)	40.4
Mass of Moisture Tight Container with Wet Sample (g)	1983.9
Mass of Wet Sample Removed From Hole (g)	1943.5
Water Content (%)	11.0
Mass of Apparatus Filled With Sand Prior to Test (g)	6550.0
Mass of Empty Apparatus (g)	194.6
Mass of Remaining Sand in Sample Container (g)	2806.0
Mass of Sand Used to Fill Test Hole, Funnel & Base Plate (g)	3589.8
Mass of Sand Used to Fill Funnel & Base Plate (g)	1845.0
Calculated Volume of Test Hole (cm^3)	1224.7
Mass of Dry Soil Removed From Test Hole (g)	1750.9
In-Situ Wet Density (g/cm^3)	1.6
In-Situ Dry Density (g/cm^3)	1.4

Appendix B-3

IN-SITU DENSITY (Sand-Cone Method)

Site Location: Faro Beach Tailings	
Soil Description : Beach Tailings	Test Pit # : FA-TB-TP01
Sand Type: Ottawa Sand	Test Date: 17-Sep-03
Specific Gravity of Sand: 2.65	Test No: SC-02
Sand Bulk Density (g/cm^3): 1.42	Tested By: Joe Pun

Maximum Particle Size	Minimum Test Hole Volume
1/2" (12.7 mm)	1415 cm^3 (0.05 ft^3)
1" (25.4 mm)	2125 cm^3 (0.075 ft^3)
1.5" (38 mm)	2830 cm^3 (0.1 ft^3)

Approximate Hole Size	6" Φ, 9cm depth
Mass of Empty Moisture Tight Container (g)	40.4
Mass of Moisture Tight Container with Wet Sample (g)	2087.9
Mass of Wet Sample Removed From Hole (g)	2047.5
Water Content (%)	11.7
Mass of Apparatus Filled With Sand Prior to Test (g)	6550.0
Mass of Empty Apparatus (g)	194.6
Mass of Remaining Sand in Sample Container (g)	2600.4
Mass of Sand Used to Fill Test Hole, Funnel & Base Plate (g)	3795.4
Mass of Sand Used to Fill Funnel & Base Plate (g)	1845.0
Calculated Volume of Test Hole (cm^3)	1369.0
Mass of Dry Soil Removed From Test Hole (g)	1833.0
In-Situ Wet Density (g/cm^3)	1.5
In-Situ Dry Density (g/cm^3)	1.3

IN-SITU DENSITY (Sand-Cone Method)

Site Location: Faro Beach Tailings

Soil Description : Beach Tailings	Test Pit # : FA-TB-TP01
Sand Type: Ottawa Sand	Test Date: 17-Sep-03
Specific Gravity of Sand: 2.65	Test No: SC-03
Sand Bulk Density (g/cm^3): 1.42	Tested By: Joe Pun

Maximum Particle Size	Minimum Test Hole Volume
1/2" (12.7 mm)	1415 cm^3 (0.05 ft^3)
1" (25.4 mm)	2125 cm^3 (0.075 ft^3)
1.5" (38 mm)	2830 cm^3 (0.1 ft^3)

Approximate Hole Size	6" Φ, 9cm depth
Mass of Empty Moisture Tight Container (g)	40.4
Mass of Moisture Tight Container with Wet Sample (g)	2895.5
Mass of Wet Sample Removed From Hole (g)	2855.1
Water Content (%)	6.6
Mass of Apparatus Filled With Sand Prior to Test (g)	6550.0
Mass of Empty Apparatus (g)	194.6
Mass of Remaining Sand in Sample Container (g)	1884.3
Mass of Sand Used to Fill Test Hole, Funnel & Base Plate (g)	4511.5
Mass of Sand Used to Fill Funnel & Base Plate (g)	1845.0
Calculated Volume of Test Hole (cm^3)	1871.6
Mass of Dry Soil Removed From Test Hole (g)	2678.3
In-Situ Wet Density (g/cm^3)	1.5
In-Situ Dry Density (g/cm^3)	1.4

Data Sheet B-4
EBA Engineering Laboratory Report

EBA Engineering Consultants Ltd.
Creating and Delivering Better Solutions

October 14, 2003

SRK Consulting
Suite 800, 1066 West Hastings
Vancouver, B.C.
V6E 3X2

EBA File: 1200034.026

Attention: Mr. Joe Pun
Project Engineer

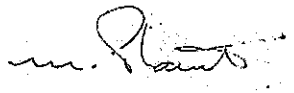
Subject: **Summary Letter – Moisture Content Testing**
Faro, Yukon

As requested, this letter summarizes the moisture content testing program completed on the samples which were collected by SRK forces in Faro, Yukon and delivered to EBA's Whitehorse laboratory for natural moisture content testing. Testing was completed on "whole samples" (delivered in bags and jars) in accordance to test method designation ASTM D2216. Results are presented below:

Test Pit Location	Sample No.	Moisture Content	Test Pit Location	Sample No.	Moisture Content	Test Pit Location	Sample No.	Moisture Content
VA-OD-TP1	SR01-B0	11.9	VA-ET-TP1	SR01-B0	11.4	VA-GF-TP1	SR01-B0	2.7
	SR01-B15	12.0		SR01-B15	11.2		SR01-B15	2.8
	SR01-B30	8.9		SR01-B30	12.9		SR01-B30	2.9
	SR01-B45	10.7		SR01-B45	11.9		SR01-B45	3.1
	SR01-B60	10.9		SR01-B60	12.3		SR01-B60	3.4
	SR01-Af0	16.6		SR01-Af0	18.5		SR01-Af0	11.6
	SR01-Af15	19.7		SR01-Af15	18.5		SC-01	4.1
	SR01-Af30	15.7		SR01-Af30	18.9		SC-02	4.2
	SR01-Af45	16.9		SR02-B0	11.5		SC-03	4.6
	SR01-Af60	12.9		SR02-B15	11.9			
	SR02-B0	11.0		SR02-B30	10.2	FA-TS-TP1	SR01-B0	24.2
	SR02-B15	12.5		SR02-B45	9.4		SR01-B15	32.4
	SR02-B30	12.8		SR02-B60	9.6		SR01-B30	29.7
	SR02-B45	13.6		SC-01	10.6		SR01-B45	25.3
	SR02-B60	12.0		SC-02	10.1		SR01-B60	22.9
	SR02-Af0	13.9		SC-03	10.5		SR01-Af0	22.3
	SR02-Af15	11.3					SC-01	20.6
	SR02-Af30	12.8	VA-CT-TP1	SR02-B0	5.4		SC-02	22.6
	SR02-Af45	13.7		SR02-B15	5.7		SC-03	23.2
	SR02-Af60	12.2		SR02-Af0	17.9			
	SC-01	11.6		SC-01	7.9	FA-TB-TP1	SR03-B0	6.7
	SC-02	12.6		SC-02	8.0		SR03-B15	6.2
	SC-03	8.7		SC-03	11.3		SR03-B30	6.1
				SC-04	10.1		SR03-B45	6.8
							SR03-B60	6.1
			VA-WR-TP1	SR03-B0	3.8		SR03-Af0	23.5
				SR03-B15	3.8		SC-01	11.0
				SR01-Af0	13.6		SC-02	11.7
				SR03-Af0	14.2		SC-03	6.6
				SR04-Af0	13.2			

We trust this summary meets your present requirements; however, if you have any questions or concerns please contact the undersigned.

Yours truly,
EBA Engineering Consultants Ltd.



Myles C. Plaunt, C.E.T.
Senior Technologist
(Direct Line: (867) 668-2071, ext. 27)
(email: mplaunt@eba.ca)

Data Sheet B-5
Conductivity and pH Test Data

Faro Field SampleS Log

Test Pit	Date Collected	Sample No. *L: left side of test pit R: right side of test pit*	Location: Inclined Depth from Ground Surface (m)	Location: Vertical Depth from Ground Surface (m)	pH	Conductivity (Initial)	Corrections	Conductivity (Final)
Vangorda Overburden Dump	9-Sep-03	L1-0	0	0.00	7.60	280 µS	-	280 µS
		L1-1	1	0.71	7.00	546 µS	-	546 µS
		L1-2	2	1.41	6.88	787 µS	-	787 µS
		L1-3	3	2.12	6.82	626 µS	-	626 µS
		R1-0	0	0.00	7.20	162.2 µS	-	162.2 µS
		R1-1	1	0.71	6.85	611 µS	-	611 µS
		R1-2	2	1.41	6.78	816 µS	-	816 µS
		R1-3	3	2.12	6.77	638 µS	-	638 µS
Vangorda Embankment Till	10-Sep-03	L1-0	0	0.00	6.98	1188 µS	-	1188 µS
		L1-1	1	0.71	6.90	976 µS	-	976 µS
		L1-2	2	1.41	5.79	1223 µS	-	1223 µS
		L1-3	3	2.12	5.76	1220 µS	-	1220 µS
		R1-0	0	0.00	5.75	1149 µS	-	1149 µS
		R1-1	1	0.71	5.71	947 µS	-	947 µS
		R1-2	2	1.41	5.71	1038 µS	-	1038 µS
		R1-3	3	2.12	5.62	1210 µS	-	1210 µS
Vangorda Till Cover	11-Sep-03	L1-0	0	0.00	7.67	636 µS	-	636 µS
		L1-1	1	0.71	7.64	456 µS	-	456 µS
		L1-2	2	1.41	7.46	803 µS	-	803 µS
		L1-3	3	2.12	7.44	298 µS	-	298 µS
		R1-0	0	0.00	7.56	560 µS	-	560 µS
		R1-1	1	0.71	7.58	381 µS	-	381 µS
		R1-2	2	1.41	7.74	447 µS	-	447 µS
		R1-3	3	2.12	7.52	742 µS	-	742 µS
Vangorda Waste Rock	12-Sep-03	L1-0	0	0.00	5.12	6.35 mS	-40 µS	6.31 mS
		L1-1	1	0.71	5.74	3.5 mS	-40 µS	3.46 mS
		L1-2	2	1.41	5.68	5.56 mS	-40 µS	5.52 mS
		L1-3	3	2.12	5.48	4.41 mS	-40 µS	4.37 mS
		R1-0	0	0.00	5.90	4.33 mS	-40 µS	4.29 mS
		R1-1	1	0.71	5.75	2.48 mS	-40 µS	2.44 mS
		R1-2	2	1.41	5.66	5.23 mS	-40 µS	5.19 mS
		R1-3	3	2.12	5.90	3.7 mS	-40 µS	3.66 mS

Appendix B-5

Test Pit	Date Collected	Sample No. *L: left side of test pit R: right side of test pit*	Location: Inclined Depth from Ground Surface (m)	Location: Vertical Depth from Ground Surface (m)	pH	Conductivity (Initial)	Corrections	Conductivity (Final)
Vangorda Glaciofluvial Deposits	13-Sep-03	Sample 1	N/A	N/A	7.32	50 µS	-	50 µS
		Sample 2	N/A	N/A	7.47	49 µS	-	49 µS
		Sample 3	N/A	N/A	7.63	64 µS	-	64 µS
		Sample 4	N/A	N/A	6.45	54 µS	-	54 µS
Faro Tailings	11-Sep-03	T1-0	N/A	0	2.06	8.65 mS	-27 µS	8.62 mS
		T1-50	N/A	50	2.28	7.99 mS	-27 µS	7.96 mS
		T1-100	N/A	100	2.26	10.41 mS	-27 µS	10.38 mS
		T1-150	N/A	150	2.82	7.21 mS	-27 µS	7.18 mS
		T1-200	N/A	200	4.41	3.13 mS	-27 µS	3.10 mS
		T1-250	N/A	250	5.05	4.9 mS	-27 µS	4.87 mS
		T1-300	N/A	300	4.20	8.27 mS	-27 µS	8.24 mS
		T1-350	N/A	350	4.69	19.75 mS	-27 µS	19.72 mS
		T1-400	N/A	400	4.48	9.39 mS	-27 µS	9.36 mS
		T1-450	N/A	450	4.09	4.59 mS	-27 µS	4.56 mS
		T1-500	N/A	500	4.26	5.99 mS	-27 µS	5.96 mS
		T2-0	N/A	0	1.65	15.57 mS	-22 µS	15.55 mS
		T2-50	N/A	50	2.26	11.55 mS	-22 µS	11.53 mS
		T2-100	N/A	100	3.81	6.9 mS	-22 µS	6.88 mS
		T2-150	N/A	150	4.31	10.35 mS	-22 µS	10.33 mS
		T2-200	N/A	200	4.16	6.24 mS	-22 µS	6.22 mS
		T2-250	N/A	250	4.14	10.32 mS	-22 µS	10.30 mS
		T2-300	N/A	300	4.48	19.18 mS	-22 µS	19.16 mS
		T2-350	N/A	350	3.24	14.04 mS	-22 µS	14.02 mS
		T2-400	N/A	400	3.36	14.11 mS	-22 µS	14.09 mS
		T3-0	N/A	0	1.87	8.67 mS	-34 µS	8.64 mS
		T3-50	N/A	50	2.46	34.1 mS	-34 µS	34.07 mS
		T3-100	N/A	100	2.93	5.09 mS	-34 µS	5.06 mS
		T3-150	N/A	150	4.25	2.99 mS	-34 µS	2.96 mS
		T3-200	N/A	200	3.97	7.78 mS	-34 µS	7.75 mS
		T3-250	N/A	250	3.77	5.48 mS	-34 µS	5.45 mS
		T3-300	N/A	300	4.07	10.37 mS	-34 µS	10.34 mS
		T3-350	N/A	350	4.71	13.74 mS	-34 µS	13.71 mS
		T3-400	N/A	400	4.42	9.96 mS	-34 µS	9.93 mS
		T3-450	N/A	450	5.16	13.45 mS	-34 µS	13.42 mS
		T3-500	N/A	500	5.11	15.8 mS	-34 µS	15.77 mS
		T4-0	N/A	0	1.57	19.13 mS	-31 µS	19.10 mS
		T4-50	N/A	50	2.61	20.5 mS	-31 µS	20.47 mS
		T4-100	N/A	100	4.08	10.92 mS	-31 µS	10.89 mS
		T4-150	N/A	150	4.69	10.13 mS	-31 µS	10.10 mS
		T4-200	N/A	200	4.84	5.51 mS	-31 µS	5.48 mS
		T4-250	N/A	250	4.67	2.53 mS	-31 µS	2.50 mS
		T4-300	N/A	300	4.63	4.95 mS	-31 µS	4.92 mS
		T4-350	N/A	350	4.03	6.09 mS	-31 µS	6.06 mS
		T4-400	N/A	400	4.93	10.41 mS	-31 µS	10.38 mS
		T4-450	N/A	450	5.12	9.85 mS	-31 µS	9.82 mS

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2/10/2004

Data Sheet B-6
Thermistor Data and Calibration Sheets

THERMISTOR DATA			
TS-01	Read By		Joe Pun
	Date		09/18/2003
Bead No.	Bead Location from Top (m)	Bead Depth (m)	Temperature (Celsius)
Bead 1	1.5	0.05	5.2
Bead 2	2.0	0.36	7.0
Bead 3	2.5	0.86	7.8
Bead 4	3.0	1.36	6.7
Bead 5	4.0	2.36	3.6
Bead 6	5.0	3.36	0.4
String Serial No. = 23262-1 Total string length = 5.0 m			

Appendix B-6

THERMISTOR DATA			
TS-02	Read By		Joe Pun
	Date		09/18/2003
Bead No.	Bead Location from Top (m)	Bead Depth (m)	Temperature (Celsius)
Bead 1	1.5	0.05	6.1
Bead 2	2.0	0.10	3.0
Bead 3	2.5	0.15	0.0
Bead 4	3.0	0.20	-0.1
Bead 5	4.0	0.50	-0.1
Bead 6	5.0	1.50	-0.1
String Serial No. = 23262-2 Total string length = 5.0 m			

THERMISTOR DATA			
TS-03	Read By		Joe Pun
	Date		09/18/2003
Bead No.	Bead Location from Top (m)	Bead Depth (m)	Temperature (Celsius)
Bead 1	1.5	0.05	5.7
Bead 2	2.0	0.23	7.2
Bead 3	2.5	0.73	7.1
Bead 4	3.0	1.23	5.4
Bead 5	4.0	2.23	1.8
Bead 6	5.0	3.23	0.4
String Serial No. = 23262-3 Total string length = 5.0 m			

Appendix B-6

THERMISTOR DATA				
TS-04	Read By		Maritz Rykaart	Joe Pun
	Date		09/13/2003	09/18/2003
Bead No.	Bead Location from Top (m)	Bead Depth (m)	Temperature (Celsius)	
Bead 1	1.5	0.05	6.6	6.2
Bead 2	2.0	0.40	7.2	7.0
Bead 3	2.5	0.90	7.8	6.6
Bead 4	3.0	1.40	7.9	5.2
Bead 5	4.0	2.40	7.6	2.4
Bead 6	5.0	3.40	4.5	-0.6
String Serial No. = 23262-4 Total string length = 5.0 m				

THERMISTOR DATA			
TS-05	Read By		Joe Pun
	Date		09/18/2003
Bead No.	Bead Location from Top (m)	Bead Depth (m)	Temperature (Celsius)
Bead 1	1.5	0.05	6.6
Bead 2	2.0	0.10	7.6
Bead 3	2.5	0.53	6.5
Bead 4	3.0	1.03	3.8
Bead 5	4.0	2.03	0.0
Bead 6	5.0	3.03	0.0
String Serial No. = 23262-5			
Total string length = 5.0 m			

Appendix B-6

THERMISTOR DATA				
TS-06	Read By		Maritz Rykaart	Joe Pun
	Date		09/13/2003	09/18/2003
Bead No.	Bead Location from Top (m)	Bead Depth (m)	Temperature (Celsius)	
Bead 1	1.5	0.05	6.8	6.4
Bead 2	2.0	0.50	7.1	7.3
Bead 3	2.5	1.00	8.2	7.4
Bead 4	3.0	1.50	8.2	6.3
Bead 5	4.0	2.50	8.3	3.8
Bead 6	5.0	3.50	5.0	-0.2
String Serial No. = 23262-6				
Total string length = 5.0 m				

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2/10/2004

THERMISTOR DATA				
TS-07	Read By		Maritz Rykaart	Joe Pun
	Date		09/13/2003	09/18/2003
Bead No.	Bead Location from Top (m)	Bead Depth (m)	Temperature (Celsius)	
Bead 1	1.5	0.05	5.3	5.3
Bead 2	2.0	0.45	6.6	6.5
Bead 3	2.5	0.95	8.2	7.5
Bead 4	3.0	1.45	8.6	7.1
Bead 5	4.0	2.45	8.7	4.5
Bead 6	5.0	3.45	5.9	2.4
String Serial No. = 23262-7 Total string length = 5.0 m				

Appendix B-6

THERMISTOR DATA				
TS-08	Read By		Maritz Rykaart	Joe Pun
	Date		09/13/2003	09/18/2003
Bead No.	Bead Location from Top (m)	Bead Depth (m)	Temperature (Celsius)	
Bead 1	1.5	0.05	6.7	6.6
Bead 2	2.0	0.55	7.2	6.9
Bead 3	2.5	1.05	7.4	6.5
Bead 4	3.0	1.55	7.1	5.3
Bead 5	4.0	2.55	7.8	2.8
Bead 6	5.0	3.55	5.3	-1.4
String Serial No. = 23262-8 Total string length = 5.0 m				

THERMISTOR DATA				
TS-09	Read By		Maritz Rykaart	Joe Pun
	Date		09/13/2003	09/18/2003
Bead No.	Bead Location from Top (m)	Bead Depth (m)	Temperature (Celsius)	
Bead 1	1.5	0.10	8.8	6.6
Bead 2	2.0	0.60	8.9	7.0
Bead 3	2.5	1.10	8.3	6.9
Bead 4	3.0	1.60	6.8	5.9
Bead 5	4.0	2.60	8.2	3.6
Bead 6	5.0	3.60	9.2	-0.1
String Serial No. = 23262-9 Total string length = 5.0 m				

Appendix B-6

THERMISTOR DATA				
TS-10	Read By		Maritz Rykaart	Joe Pun
	Date		09/13/2003	09/18/2003
Bead No.	Bead Location from Top (m)	Bead Depth (m)	Temperature (Celsius)	
Bead 1	1.5	0.05	9.1	6.8
Bead 2	2.0	0.20	6.7	6.9
Bead 3	2.5	0.30	8.0	4.5
Bead 4	3.0	0.80	7.0	1.5
Bead 5	4.0	1.80	5.7	0.4
Bead 6	5.0	2.80	4.9	-1.0
String Serial No. = 23262-10 Total string length = 5.0 m				

THERMISTOR DATA				
TS-11	Read By		Maritz Rykaart	Joe Pun
	Date		09/13/2003	09/18/2003
Bead No.	Bead Location from Top (m)	Bead Depth (m)	Temperature (Celsius)	
Bead 1	1.5	0.05	7.6	6.0
Bead 2	2.0	0.55	16.6	6.5
Bead 3	2.5	1.05	9.8	6.4
Bead 4	3.0	1.55	10.1	5.6
Bead 5	4.0	2.55	10.1	3.3
Bead 6	5.0	3.55	6.9	-0.7
String Serial No. = 23262-11 Total string length = 5.0 m				

THERMISTOR DATA				
TS-12	Read By		Maritz Rykaart	Joe Pun
	Date		09/13/2003	09/18/2003
Bead No.	Bead Location from Top (m)	Bead Depth (m)	Temperature (Celsius)	
Bead 1	1.5	0.50	5.8	5.9
Bead 2	2.0	1.00	7.7	7.6
Bead 3	2.5	1.50	8.9	8.9
Bead 4	3.0	2.00	9.8	9.2
Bead 5	4.0	3.00	10.1	8.8
Bead 6	5.0	4.00	10.4	6.6
String Serial No. = 23262-12 Total string length = 5.0 m				

THERMISTOR DATA				
TS-13	Read By		Maritz Rykaart	Joe Pun
	Date		09/13/2003	09/18/2003
Bead No.	Bead Location from Top (m)	Bead Depth (m)	Temperature (Celsius)	
Bead 1	1.5	0.05	5.4	5.5
Bead 2	2.0	0.15	7.0	6.9
Bead 3	2.5	0.25	8.6	8.2
Bead 4	3.0	0.75	9.9	7.7
Bead 5	4.0	1.75	8.9	2.7
Bead 6	5.0	2.75	7.9	2.2
Bead 7	6.0	3.75	6.9	3.6
String Serial No. = 23262-13 Total string length = 6.0 m				

Appendix B-6

THERMISTOR DATA				
TS-14	Read By		Maritz Rykaart	Joe Pun
	Date		09/13/2003	09/18/2003
Bead No.	Bead Location from Top (m)	Bead Depth (m)	Temperature (Celsius)	
Bead 1	1.5	0.50	5.6	5.4
Bead 2	2.0	1.00	6.7	6.7
Bead 3	2.5	1.50	8.7	8.4
Bead 4	3.0	2.00	10.2	9.7
Bead 5	4.0	3.00	11.4	10.1
Bead 6	5.0	4.00	11.2	9.5
Bead 7	6.0	5.00	13.1	6.3
String Serial No. = 23262-14 Total string length = 6.0 m				

THERMISTOR DATA				
TS-15	Read By		Maritz Rykaart	Joe Pun
	Date		09/13/2003	09/18/2003
Bead No.	Bead Location from Top (m)	Bead Depth (m)	Temperature (Celsius)	
Bead 1	1.5	0.05	8.9	6.4
Bead 2	2.0	0.15	8.0	7.8
Bead 3	2.5	0.25	9.3	8.8
Bead 4	3.0	0.55	10.2	6.6
Bead 5	4.0	1.55	9.1	2.6
Bead 6	5.0	2.55	7.9	1.7
Bead 7	6.0	3.55	6.7	2.3
String Serial No. = 23262-15 Total string length = 6.0 m				

Appendix B-6

THERMISTOR DATA				
TS-16	Read By		Maritz Rykaart	Joe Pun
	Date		09/13/2003	09/18/2003
Bead No.	Bead Location from Top (m)	Bead Depth (m)	Temperature (Celsius)	
Bead 1	1.5	0.05	4.7	4.8
Bead 2	2.0	0.25	6.2	6.1
Bead 3	2.5	0.75	8.3	8.0
Bead 4	3.0	1.25	9.8	8.7
Bead 5	4.0	2.25	9.9	7.8
Bead 6	5.0	3.25	8.2	1.8
Bead 7	6.0	4.25	6.0	2.6
String Serial No. = 23262-16 Total string length = 6.0 m				

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2252 ohm
THERMISTOR STRING CALIBRATION

Customer: SRK
Date: 4-Sep-03
Calibration Reference HP 34401A Digital Multimeter S/N US36053118
Last referenced to National Standards 11-April-03
Reference Thermistor Number RST0036
Referenced Annually to National Standards

THERMISTOR #	Cable Length	Position	Low Temperature		High Temperature	
			Measured Resistance ohms	Calculated Temperature °C	Measured Resistance ohms	Calculated Temperature °C
Reference			5738	4.9	2879	19.5
23262-1	5m	Pt. 1	5739	4.9	2879	19.5
		Pt. 2	5749	4.9	2885	19.5
		Pt. 3	5741	4.9	2887	19.5
		Pt. 4	5741	4.9	2876	19.5
		Pt. 5	5755	4.9	2891	19.4
		Pt. 6	5737	5.0	2876	19.5

Temperature calculated using:

Steinhart-Hart Linearization

$$T_c = \frac{1}{C_0 + C_1(\ln R) + C_3(\ln R)^3} - 273.15$$

2252 Ohm @ 25C NTC Thermistor
C_0= 0.0014733
C_1= 0.0002372
C_3= 0.0000001074
lnR= Natural Log of Resistance
T_c= Temperature in °C

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2252 ohm
THERMISTOR STRING CALIBRATION

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Reference Thermistor Number RST0036
Referenced Annually to National Standards

THERMISTOR #	Cable Length	Position	Low Temperature		High Temperature	
			Measured Resistance ohms	Calculated Temperature °C	Measured Resistance ohms	Calculated Temperature °C
Reference			5738	4.9	2879	19.5
23262-2	5m	Pt. 1	5748	4.9	2879	19.5
		Pt. 2	5727	5.0	2863	19.6
		Pt. 3	5709	5.0	2856	19.7
		Pt. 4	5758	4.9	2881	19.5
		Pt. 5	5743	4.9	2874	19.5
		Pt. 6	5740	4.9	2866	19.6

Temperature calculated using:

Steinhart-Hart Linearization

$$T_c = \frac{1}{C_0 + C_1(\ln R) + C_3(\ln R)^3} - 273.15$$

2252 Ohm @ 25C NTC Thermistor
C_0= 0.0014733
C_1= 0.0002372
C_3= 0.0000001074
lnR= Natural Log of Resistance
T_c= Temperature in °C

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Referenced Annually to National Standards

THERMISTOR #	Cable Length	Position	Low Temperature		High Temperature	
			Measured Resistance ohms	Calculated Temperature °C	Measured Resistance ohms	Calculated Temperature °C
Reference			5738	4.9	2879	19.5
23262-3	5m	Pt. 1	5761	4.8	2895	19.4
		Pt. 2	5761	4.9	2887	19.5
		Pt. 3	5759	4.9	2881	19.5
		Pt. 4	5767	4.8	2889	19.4
		Pt. 5	5764	4.8	2879	19.5
		Pt. 6	5753	4.9	2885	19.5

Temperature calculated using:

Steinhart-Hart Linearization

$$T_C = \frac{1}{C_0 + C_1(\ln R) + C_3(\ln R)^3} - 273.15$$

2252 Ohm @ 25C NTC Thermistor
C_0= 0.0014733
C_1= 0.0002372
C_3= 0.0000001074
lnR= Natural Log of Resistance
T_c= Temperature in °C

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THERMISTOR STRING CALIBRATION

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THERMISTOR #	Cable Length	Position	Low Temperature		High Temperature	
			Measured Resistance ohms	Calculated Temperature °C	Measured Resistance ohms	Calculated Temperature °C
Reference			5738	4.9	2879	19.5
23262-4	5m	Pt. 1	5759	4.9	2886	19.4
		Pt. 2	5773	4.8	2884	19.5
		Pt. 3	5755	4.9	2873	19.6
		Pt. 4	5795	4.7	2898	19.4
		Pt. 5	5759	4.9	2874	19.5
		Pt. 6	5787	4.8	2894	19.4

Temperature calculated using:

Steinhart-Hart Linearization

$$T_C = \frac{1}{C_0 + C_1(\ln R) + C_3(\ln R)^3} - 273.15$$

2252 Ohm @ 25C NTC Thermistor
C_0= 0.0014733
C_1= 0.0002372
C_3= 0.0000001074
lnR= Natural Log of Resistance
T_c= Temperature in °C

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Last referenced to National Standards 11-April-03
Reference Thermistor Number RST0036
Referenced Annually to National Standards

THERMISTOR #	Cable Length	Position	Low Temperature		High Temperature	
			Measured Resistance ohms	Calculated Temperature °C	Measured Resistance ohms	Calculated Temperature °C
Reference			5738	4.9	2879	19.5
23262-5	5m	Pt. 1	5709	5.0	2860	19.7
		Pt. 2	5731	5.0	2876	19.5
		Pt. 3	5742	4.9	2881	19.5
		Pt. 4	5706	5.1	2860	19.7
		Pt. 5	5742	4.9	2880	19.5
		Pt. 6	5705	5.1	2869	19.6

Temperature calculated using:

Steinhart-Hart Linearization

$$T_C = \frac{1}{C_0 + C_1(\ln R) + C_3(\ln R)^3} - 273.15$$

2252 Ohm @ 25C NTC Thermistor
C_0= 0.0014733
C_1= 0.0002372
C_3= 0.0000001074
lnR= Natural Log of Resistance
T_c= Temperature In °C

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Date: 4-Sep-03
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Referenced Annually to National Standards

THERMISTOR #	Cable Length	Position	Low Temperature		High Temperature	
			Measured Resistance ohms	Calculated Temperature °C	Measured Resistance ohms	Calculated Temperature °C
Reference			5738	4.9	2879	19.5
23262-6	5m	Pt. 1	5701	5.1	2858	19.7
		Pt. 2	5742	4.9	2877	19.5
		Pt. 3	5738	4.9	2868	19.6
		Pt. 4	5739	4.9	2876	19.5
		Pt. 5	5717	5.0	2860	19.7
		Pt. 6	5732	5.0	2875	19.5

Temperature calculated using:

Steinhart-Hart Linearization

$$T_C = \frac{1}{C_0 + C_1(\ln R) + C_3(\ln R)^3} - 273.15$$

2252 Ohm @ 25C NTC Thermistor
C_0= 0.0014733
C_1= 0.0002372
C_3= 0.0000001074
lnR= Natural Log of Resistance
T_c= Temperature In °C

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THERMISTOR STRING CALIBRATION

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Reference Thermistor Number RST0036
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THERMISTOR #	Cable Length	Position	Low Temperature		High Temperature	
			Measured Resistance ohms	Calculated Temperature °C	Measured Resistance ohms	Calculated Temperature °C
Reference			5738	4.9	2879	19.5
23262-7	5m	Pt. 1	5736	5.0	2867	19.6
		Pt. 2	5751	4.9	2874	19.5
		Pt. 3	5742	4.9	2871	19.6
		Pt. 4	5744	4.9	2885	19.5
		Pt. 5	5746	4.9	2874	19.5
		Pt. 6	5753	4.9	2890	19.4

Temperature calculated using:

Steinhart-Hart Linearization

$$T_C = \frac{1}{C_0 + C_1(\ln R) + C_3(\ln R)^3} - 273.15$$

2252 Ohm @ 25C NTC Thermistor
C_0= 0.0014733
C_1= 0.0002372
C_3= 0.0000001074
lnR= Natural Log of Resistance
T_c= Temperature in °C

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2252 ohm
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Last referenced to National Standards 11-April-03
Reference Thermistor Number RST0036
Referenced Annually to National Standards

THERMISTOR #	Cable Length	Position	Low Temperature		High Temperature	
			Measured Resistance ohms	Calculated Temperature °C	Measured Resistance ohms	Calculated Temperature °C
Reference			5738	4.9	2879	19.5
23262-8	5m	Pt. 1	5688	5.1	2849	19.7
		Pt. 2	5730	5.0	2864	19.6
		Pt. 3	5754	4.9	2878	19.5
		Pt. 4	5732	5.0	2876	19.5
		Pt. 5	5759	4.9	2885	19.5
		Pt. 6	5726	5.0	2868	19.6

Temperature calculated using:

Steinhart-Hart Linearization

$$T_C = \frac{1}{C_0 + C_1(\ln R) + C_3(\ln R)^3} - 273.15$$

2252 Ohm @ 25C NTC Thermistor
C_0= 0.0014733
C_1= 0.0002372
C_3= 0.0000001074
lnR= Natural Log of Resistance
T_c= Temperature in °C

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2252 ohm
THERMISTOR STRING CALIBRATION

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Calibration Reference HP 34401A Digital Multimeter S/N US36053118
Last referenced to National Standards 11-April-03
Reference Thermistor Number RST0036
Referenced Annually to National Standards

THERMISTOR #	Cable Length	Position	Low Temperature		High Temperature	
			Measured Resistance ohms	Calculated Temperature °C	Measured Resistance ohms	Calculated Temperature °C
Reference			5738	4.9	2879	19.5
23262-9	5m	Pt. 1	5752	4.9	2880	19.5
		Pt. 2	5748	4.9	2878	19.5
		Pt. 3	5757	4.9	2888	19.4
		Pt. 4	5751	4.9	2873	19.6
		Pt. 5	5780	4.8	2897	19.4
		Pt. 6	5743	4.9	2869	19.6

Temperature calculated using:

Steinhart-Hart Linearization

$$T_C = \frac{1}{C_0 + C_1(\ln R) + C_3(\ln R)^3} - 273.15$$

2252 Ohm @ 25C NTC Thermistor
C_0= 0.0014733
C_1= 0.0002372
C_3= 0.0000001074
lnR= Natural Log of Resistance
T_c= Temperature in °C

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2252 ohm
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Customer: SRK
Date: 4-Sep-03
Calibration Reference HP 34401A Digital Multimeter S/N US36053118
Last referenced to National Standards 11-April-03
Reference Thermistor Number RST0036
Referenced Annually to National Standards

THERMISTOR #	Cable Length	Position	Low Temperature		High Temperature	
			Measured Resistance ohms	Calculated Temperature °C	Measured Resistance ohms	Calculated Temperature °C
Reference			5738	4.9	2879	19.5
23252-10	5m	Pt. 1	5744	4.9	2888	19.4
		Pt. 2	5758	4.9	2884	19.5
		Pt. 3	5753	4.9	2875	19.5
		Pt. 4	5759	4.9	2882	19.5
		Pt. 5	5726	5.0	2861	19.6
		Pt. 6	5741	4.9	2878	19.5

Temperature calculated using:

Steinhart-Hart Linearization

$$T_C = \frac{1}{C_0 + C_1(\ln R) + C_3(\ln R)^3} - 273.15$$

2252 Ohm @ 25C NTC Thermistor
C_0= 0.0014733
C_1= 0.0002372
C_3= 0.0000001074
lnR= Natural Log of Resistance
T_c= Temperature in °C

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2252 ohm
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Customer: SRK
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Last referenced to National Standards 11-April-03
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THERMISTOR #	Cable Length	Position	Low Temperature		High Temperature	
			Measured Resistance ohms	Calculated Temperature °C	Measured Resistance ohms	Calculated Temperature °C
Reference			5738	4.9	2879	19.5
23262-11	5m	Pt. 1	5767	4.8	2890	19.4
		Pt. 2	5750	4.9	2877	19.5
		Pt. 3	5732	5.0	2874	19.5
		Pt. 4	5737	5.0	2868	19.6
		Pt. 5	5724	5.0	2882	19.5
		Pt. 6	5731	5.0	2870	19.6

Temperature calculated using:

Steinhart-Hart Linearization

$$T_c = \frac{1}{C_0 + C_1(\ln R) + C_3(\ln R)^3} - 273.15$$

2252 Ohm @ 25C NTC Thermistor

C_0= 0.0014733
C_1= 0.0002372
C_3= 0.0000001074
lnR= Natural Log of Resistance
T_c= Temperature in °C

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2252 ohm
THERMISTOR STRING CALIBRATION

Customer: SRK
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THERMISTOR #	Cable Length	Position	Low Temperature		High Temperature	
			Measured Resistance ohms	Calculated Temperature °C	Measured Resistance ohms	Calculated Temperature °C
Reference			5738	4.9	2879	19.5
23262-12	5m	Pt. 1	5681	5.1	2854	19.7
		Pt. 2	5726	5.0	2869	19.6
		Pt. 3	5731	5.0	2868	19.6
		Pt. 4	5761	4.9	2888	19.4
		Pt. 5	5739	4.9	2873	19.6
		Pt. 6	5761	4.9	2880	19.5

Temperature calculated using:

Steinhart-Hart Linearization

$$T_c = \frac{1}{C_0 + C_1(\ln R) + C_3(\ln R)^3} - 273.15$$

2252 Ohm @ 25C NTC Thermistor

C_0= 0.0014733
C_1= 0.0002372
C_3= 0.0000001074
lnR= Natural Log of Resistance
T_c= Temperature in °C

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2252 ohm
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Reference Thermistor Number RST0036
Referenced Annually to National Standards

THERMISTOR #	Cable Length	Position	Low Temperature		High Temperature	
			Measured Resistance ohms	Calculated Temperature °C	Measured Resistance ohms	Calculated Temperature °C
Reference			5738	4.9	2879	19.5
23262-13	6m	Pt. 1	5750	4.9	2888	19.4
		Pt. 2	5765	4.9	2890	19.4
		Pt. 3	5779	4.8	2890	19.4
		Pt. 4	5759	4.9	2878	19.5
		Pt. 5	5749	4.9	2885	19.5
		Pt. 6	5756	4.9	2878	19.5
		Pt. 7	5780	4.8	2891	19.4

Temperature calculated using:

Steinhart-Hart Linearization

$$T_C = \frac{1}{C_0 + C_1(\ln R) + C_3(\ln R)^3} - 273.15$$

2252 Ohm @ 25C NTC Thermistor
C_0= 0.0014733
C_1= 0.0002372
C_3= 0.0000001074
lnR= Natural Log of Resistance
T_c= Temperature in °C

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2252 ohm
THERMISTOR STRING CALIBRATION

Customer: SRK
Date: 4-Sep-03
Calibration Reference HP 34401A Digital Multimeter S/N US36053118
Last referenced to National Standards 11-April-03
Reference Thermistor Number RST0036
Referenced Annually to National Standards

THERMISTOR #	Cable Length	Position	Low Temperature		High Temperature	
			Measured Resistance ohms	Calculated Temperature °C	Measured Resistance ohms	Calculated Temperature °C
Reference			5738	4.9	2879	19.5
23262-14	6m	Pt. 1	5746	4.9	2893	19.4
		Pt. 2	5755	4.9	2888	19.4
		Pt. 3	5777	4.8	2893	19.4
		Pt. 4	5741	4.9	2878	19.5
		Pt. 5	5748	4.9	2886	19.5
		Pt. 6	5729	5.0	2873	19.6
		Pt. 7	5768	4.8	2897	19.4

Temperature calculated using:

Steinhart-Hart Linearization

$$T_C = \frac{1}{C_0 + C_1(\ln R) + C_3(\ln R)^3} - 273.15$$

2252 Ohm @ 25C NTC Thermistor
C_0= 0.0014733
C_1= 0.0002372
C_3= 0.0000001074
lnR= Natural Log of Resistance
T_c= Temperature in °C

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THERMISTOR STRING CALIBRATION

Customer: SRK
Date: 4-Sep-03
Calibration Reference HP 34401A Digital Multimeter S/N US36053118
Last referenced to National Standards 11-April-03
Reference Thermistor Number RST0036
Referenced Annually to National Standards

THERMISTOR #	Cable Length	Position	Low Temperature		High Temperature	
			Measured Resistance ohms	Calculated Temperature °C	Measured Resistance ohms	Calculated Temperature °C
Reference			5738	4.9	2879	19.5
23262-15	6m	Pt. 1	5701	5.1	2857	19.7
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		Pt. 3	5745	4.9	2873	19.6
		Pt. 4	5751	4.9	2880	19.5
		Pt. 5	5718	5.0	2858	19.7
		Pt. 6	5742	4.9	2874	19.5
		Pt. 7	5751	4.9	2878	19.5

Temperature calculated using:

Steinhart-Hart Linearization

$$T_C = \frac{1}{C_0 + C_1(\ln R) + C_3(\ln R)^3} - 273.15$$

2252 Ohm @ 25C NTC Thermistor

C_0= 0.0014733
C_1= 0.0002372
C_3= 0.0000001074
lnR= Natural Log of Resistance
T_c= Temperature in °C

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2252 ohm
THERMISTOR STRING CALIBRATION

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Date: 4-Sep-03
Calibration Reference HP 34401A Digital Multimeter S/N US36053118
Last referenced to National Standards 11-April-03
Reference Thermistor Number RST0036
Referenced Annually to National Standards

THERMISTOR #	Cable Length	Position	Low Temperature		High Temperature	
			Measured Resistance ohms	Calculated Temperature °C	Measured Resistance ohms	Calculated Temperature °C
Reference			5738	4.9	2879	19.5
23262-16	6m	Pt. 1	5772	4.8	2887	19.5
		Pt. 2	5773	4.8	2882	19.5
		Pt. 3	5748	4.9	2870	19.6
		Pt. 4	5761	4.9	2879	19.5
		Pt. 5	5751	4.9	2874	19.5
		Pt. 6	5769	4.8	2891	19.4
		Pt. 7	5748	4.9	2873	19.6

Temperature calculated using:

Steinhart-Hart Linearization

$$T_C = \frac{1}{C_0 + C_1(\ln R) + C_3(\ln R)^3} - 273.15$$

2252 Ohm @ 25C NTC Thermistor

C_0= 0.0014733
C_1= 0.0002372
C_3= 0.0000001074
lnR= Natural Log of Resistance
T_c= Temperature in °C

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Resistance versus Temperature Relationship 2252 NTC Thermistors

R ohms	T deg C	R ohms	T deg C	R ohms	T deg C	R ohms	T deg C
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74000	-39.64	20500	-18.89	7100	0.69	2700	20.92
73000	-39.43	20000	-18.46	7000	0.97	2650	21.33
72000	-39.23	19500	-18.02	6900	1.26	2600	21.76
71000	-39.01	19000	-17.56	6800	1.54	2550	22.19
70000	-38.80	18500	-17.10	6700	1.84	2500	22.64
69000	-38.58	18000	-16.61	6600	2.14	2450	23.09
68000	-38.36	17500	-16.12	6500	2.44	2400	23.56
67000	-38.13	17000	-15.61	6400	2.75	2350	24.04
66000	-37.90	16500	-15.08	6300	3.06	2300	24.52
65000	-37.67	16000	-14.53	6200	3.38	2250	25.02
64000	-37.43	15800	-14.30	6100	3.71	2200	25.54
63000	-37.19	15600	-14.07	6000	4.04	2150	26.06
62000	-36.95	15400	-13.84	5900	4.38	2100	26.60
61000	-36.70	15200	-13.61	5800	4.72	2050	27.16
60000	-36.44	15000	-13.37	5700	5.07	2000	27.73
59000	-36.18	14800	-13.13	5600	5.43	1950	28.32
58000	-35.92	14600	-12.88	5500	5.79	1900	28.92
57000	-35.65	14400	-12.64	5400	6.17	1880	29.17
56000	-35.37	13900	-12.00	5300	6.55	1860	29.42
55000	-35.09	13400	-11.33	5200	6.94	1840	29.67
54000	-34.81	12900	-10.64	5100	7.33	1820	29.93
53000	-34.52	12400	-9.91	5000	7.74	1800	30.19
52000	-34.22	12200	-9.61	4900	8.16	1780	30.45
51000	-33.92	12000	-9.31	4800	8.58	1760	30.72
50000	-33.60	11800	-9.00	4700	9.02	1740	30.99
49000	-33.29	11600	-8.68	4600	9.46	1720	31.26
48000	-32.96	11400	-8.36	4500	9.92	1700	31.54
47000	-32.63	11200	-8.03	4400	10.39	1680	31.82
46000	-32.29	11000	-7.69	4300	10.87	1660	32.10
45000	-31.94	10800	-7.35	4200	11.36	1640	32.39
44000	-31.58	10600	-7.00	4100	11.87	1620	32.69
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34000	-27.42	8700	-3.25	3500	15.24	1420	35.86
33000	-26.93	8600	-3.03	3450	15.55	1400	36.20
32000	-26.42	8500	-2.81	3400	15.86	1380	36.55
31000	-25.89	8400	-2.58	3350	16.18	1360	36.91
30000	-25.35	8300	-2.35	3300	16.51	1340	37.27
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27000	-23.59	8000	-1.64	3150	17.52	1280	38.40
26000	-22.95	7900	-1.39	3100	17.87	1260	38.79
25000	-22.29	7800	-1.15	3050	18.23	1240	39.18
24000	-21.60	7700	-0.90	3000	18.59	1220	39.58
23000	-20.87	7600	-0.64	2950	18.96	1200	40.00
22500	-20.49	7500	-0.38	2900	19.33	1180	40.41
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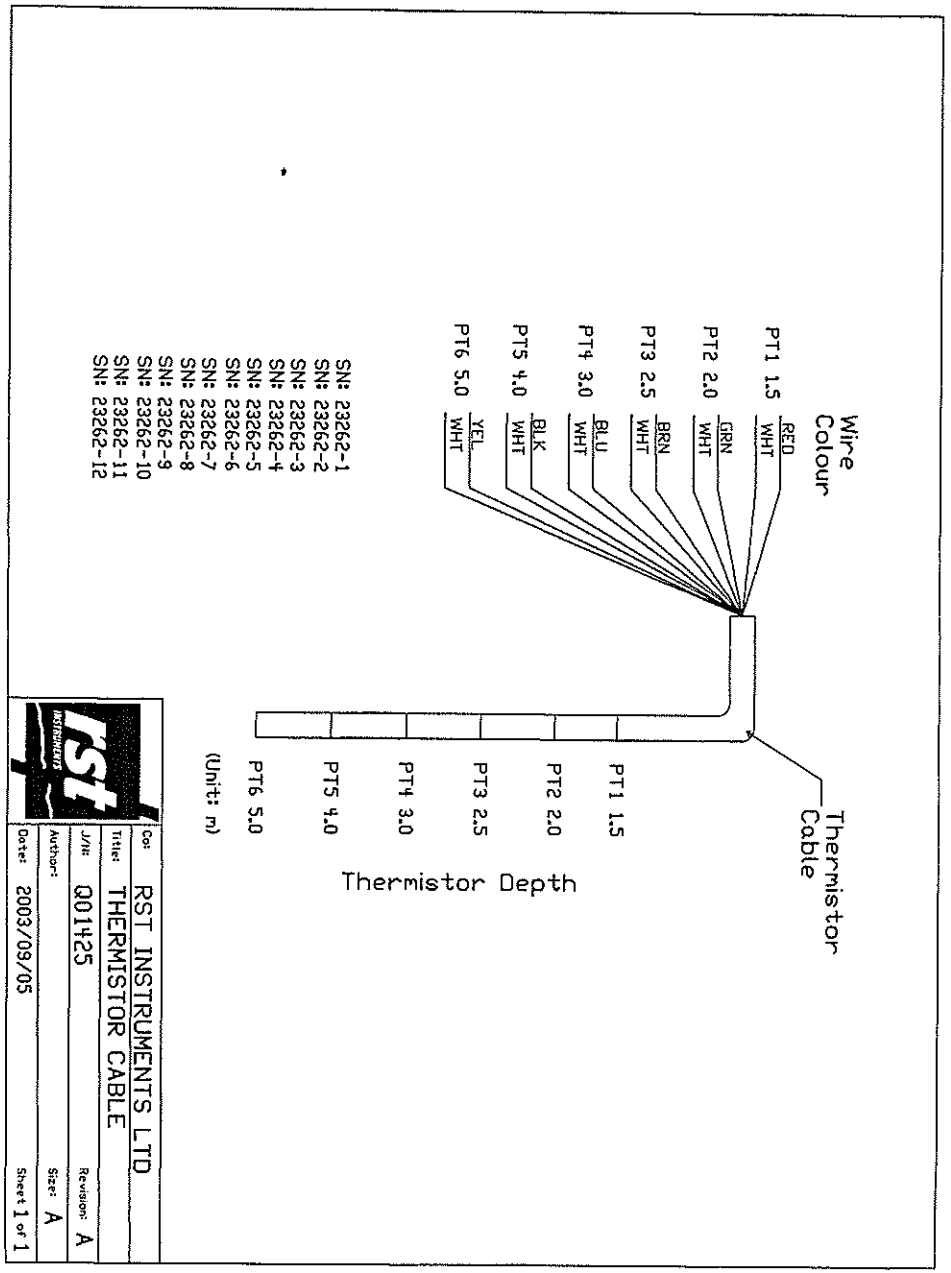

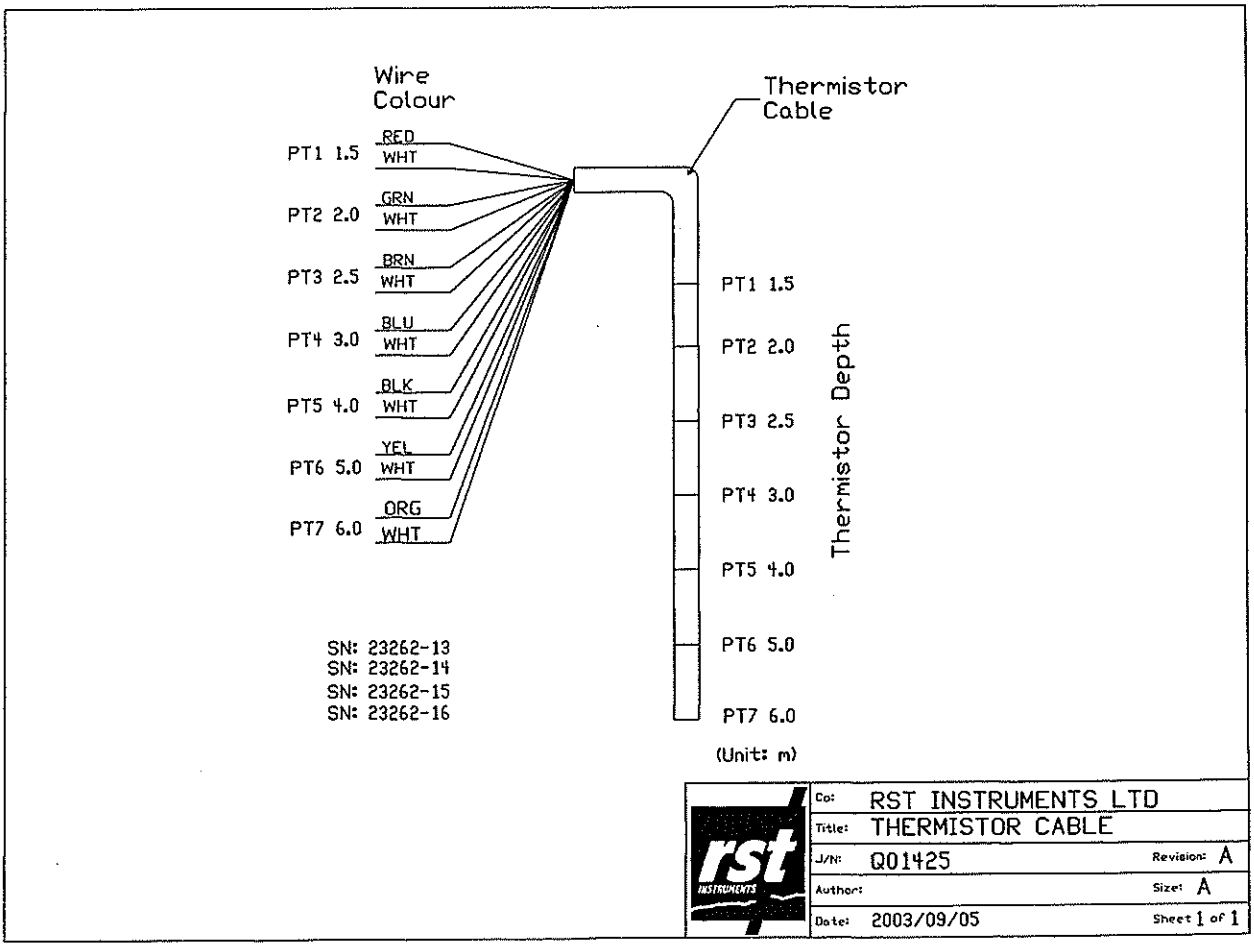
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GRN
WHT
PT3 2.5
BRN
WHT
PT4 3.0
BLU
WHT
PT5 4.0
BLK
WHT
PT6 5.0
YEL
WHT
PT7 6.0
ORG
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PT5 4.0
PT6 5.0
PT7 6.0
Thermistor Depth
(Unit: m)
Co: RST INSTRUMENTS LTD
Title: THERMISTOR CABLE
J/N: Q01425
Revision: A
Author:
Size: A
Date: 2003/09/05
Sheet 1 of 1

Appendix 3: Scoping Level Numerical Modeling of Anvil Range Soil Covers

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1 Introduction

Scoping level numerical modeling was carried out to give a preliminary indication of the range of infiltration that can be achieved by placing soil covers over the Rose Creek tailings impoundment and the ARMC waste rock piles. The scoping level numerical modeling was based solely on laboratory and field measurements of soil properties. Long-term field tests are widely seen as a much better basis for definitive modeling. Therefore the results herein should be considered as preliminary only.

The SoilCover model was used. SoilCover is a mechanistic one-dimensional, transient, finite element coupled heat and water transfer (liquid and vapour) model that implements the physically based method described by Wilson et al. (1994) for predicting the exchange of moisture between the atmosphere and a soil surface. The coupling of the soil profile to the atmosphere is accomplished using a modified Penman formulation developed by Wilson (1990) and Wilson et al. (1994) that allows for the calculation of evaporation from a saturated or an unsaturated surface. These formulations represent the state of the art in numerical modeling. However, they do not account for many effects that are known to influence cover performance in the field, which is another reason why definitive predictions must await the completion of long-term field tests.

2 Model Setup

2.1 Mesh Generation

Two different mesh sizes were created for simulations for the waste rock and tailings covers. Waste rock cover profiles had a depth of 10 meters, while the tailings cover profiles had a depth of 7 m. These profiles were based on sensitivity analysis runs, and were selected to minimize boundary effects.

The base temperature was kept constant at 4°C in all simulations, while the initial surface temperature was set equal to 0°C. The top temperature was chosen to coincide with the beginning of the spring thaw, while the base temperature was chosen to be 6°C warmer than the mean annual temperature. The algorithms in SoilCover were used to calculate the daily ground temperatures. Initial moisture conditions for each profile were set by means of matric suction for the tailings simulations and by water content for waste rock simulations.

2.2 Material Properties

The material properties used in SoilCover is presented in this section, and has been based on actual laboratory and field test results. General properties for each material used in the simulations are summarized in the Table 1, and the remainder of the properties are discussed in subsequent sections. Appendix 2 provides the full range of laboratory and field measurements.

Table 1: Summary of material properties used in SoilCover modeling

Material	Porosity	Specific Gravity	Saturated Permeability (cm/s)
Waste Rock	0.361	2.86	1.7×10^{-3}
Till	0.262	2.70	2.7×10^{-6}
Glaciofluvial	0.246	2.70	1.0×10^{-4}
Coarse Tailings	0.380	2.93[a]	2.0×10^{-3}
Fine Tailings	0.419	2.93[a]	1.0×10^{-6}
Slimes	0.419	2.93[a]	1.0×10^{-8}

a. This value should be 3.14; it does not impact the results significantly.

Soil Water Characteristic Curves

Points from the fitted van Genuchten SWCC's presented in Section 3 of this report were entered into the SoilCover model for each material. SoilCover uses the Fredlund and Xing (1996) method to develop a SWCC for use in calculations. The corresponding SWCC's that were used in the modeling is presented in Figure 1.

Unsaturated Hydraulic Conductivity Functions

Suction and relative permeability data is generated using the method developed by Fredlund et al. (1994). Modelled data is presented in Figure 2.

Thermal Conductivity & Specific Heat Functions

SoilCover generates a thermal conductivity function by specifying an overall weighted quartz percentage in the soil using the Johansen (1975) method. The function describes the amount of heat which flows through a unit area of soil, in a unit time, under a unit gradient (SoilCover, 1997). The values were entered using the typical values listed in the SoilCover manual and are listed in Table 2.

SoilCover also generates a volumetric specific heat function, by specifying a mass specific heat for each soil, using the de Vries method (1953). The function describes the amount of stored heat required to change the temperature of a unit volume ($1m^3$) by one degree Celsius (SoilCover, 1997). The values were entered using the typical values listed in the SoilCover manual and are listed in Table 2.

Table 2: Summary of thermal conductivity and volumetric specific heat constants

Material	% Quartz (dec.)	Solids Specific Heat (J/Kg-°C)
Waste Rock	0.9	850
Till	0.8	800
Glaciofluvial	0.8	800
Coarse Tailings	0.9	850
Fine Tailings	0.9	850
Slimes	0.9	850

2.3 General Boundary Conditions

Site data criteria used in SoilCover were kept constant for all simulations. Temperature and humidity lags were set to zero. The site latitude is 62.25°N. Simulations were carried out without making use of the soil freezing and vegetation modules of the model.

Initial conditions for the waste rock and tailings simulations were different. For the waste rock, profiles were created that varied linearly, with saturated water content at the surface to a volumetric water content of 16% at the bottom of the ten meter profile. For tailings, profiles were created that varied linearly from a suction of 50 kPa at the surface, to a suction of 0 kPa (saturation) at the bottom of the 7 m profile. Sensitivity analysis confirmed that for these simulations the depth to the water table had little effect on the modelled results.

The water content and suction profiles at the end of year 1 simulations were subsequently used as the initial condition for the start of year 2 simulations, which was used to evaluate final results.

2.4 Climate Data

Available climate data included daily air temperatures, rainfall, snowfall and precipitation data from the Faro airport weather station for the years from 1978 to 2000. The start and end date for the simulations were chosen as March 18th and October 25th of any particular year, which corresponds to the dates where the average maximum daily temperatures were above zero. For the remaining portion of the year, the ground is assumed to be frozen and no infiltration would occur.

Precipitation

A representative year for precipitation data was chosen to be 1995 as both the yearly rainfall (220 mm) and total precipitation (301 mm) was close to the annual rainfall average (215 mm) and total precipitation average (314 mm). For wet year precipitation data, the average of the three wettest years on record for the Faro airport from 1978 to 2000 were used (1991, 1993 and 2000). Figure 3 presents the daily rainfall used in the simulations for an average year.

Precipitation data was modified to account for the elevation difference between the airport and the mine site. Correlating the data between the Faro airport (717 m) and the ARMC weather station (1160 m) found that the precipitation increased by 18 mm per 100 m gained in elevation. Using an average top of dump elevation of 1200 m, gave an average precipitation total of 387 mm per year.

In order to simulate the spring snow melt, eighty percent of the total precipitation from Oct. 26th to March 17th was assumed to be present as snow on day one of the simulations. 3 mm of this total was then assumed to melt each day over the daylight hours of 10:00 to 16:00 until gone, which for an average year corresponded to 22 days. The remaining daily precipitation would occur over a 24 hr period on any given day.

Air Temperature

Daily maximum and minimum temperatures entered in all average year SoilCover simulations were from average daily data at the Faro Airport from 1978 to 2000. For wet year temperature data, the average temperatures of the wettest three years were used. Daily air temperatures used are shown in Figure 4.

Relative Humidity

Relative humidity data for the Faro area was scarce. The humidity data used was based on June and December average relative humidity data for Mayo, Yukon, found on the Government of Yukon website (http://www.gov.yk.ca/depts/eco/stats/annual/enviro.pdf). Monthly averages were derived by varying the data linearly from a maximum and minimum of 84% and 82% in December to the maximum and minimum of 75% and 44% in June. The monthly relative humidity values used are presented on Figure 5.

Evaporation

Lake Evaporation at Faro was determined to be 490 mm by Gartner Lee in the 2004 to 2008 Water License Renewal Report. A monthly breakdown of the Lake Evaporation was found in the SRK Report 60635 "Down Valley Tailings Impoundment Decommissioning Plan", April 1991. The monthly Lake Evaporation data used was for Whitehorse, Yukon, and the actual numbers used in the SoilCover modeling is presented in Figure 6.

3 Modeling Results

3.1 Tailings Covers

The base case against which the numerical modeling results were evaluated, were the existing uncovered tailings. Tailings properties vary greatly in the tailings impoundment, from coarse beach tailings to fine tailings (slimes). Furthermore the phreatic level within the tailings impoundment varies greatly, from being right at the surface at the ponds, to being as far down as 10 m in some areas. Rykaart (2002) illustrated that site specific spatial surface flux boundary functions can be developed for tailings profiles such as these, which would allow for rigorous calculation of surface fluxes anywhere on the tailings surface. This was not attempted for this project; however, the same modeling principal was adopted, which calls for modeling generalized tailings profiles; in the case of Rose Creek tailings, a coarse and a fine tailings profile, and using varying depths to the water table. The model simulations confirmed that the most representative base case results for the uncovered tailings could be presented with two simulations of coarse (beach) and fine tailings using a phreatic level of 7 m below surface.

Appropriate cover configurations were selected based on available materials and the minimum cover layer thickness was arbitrarily set at 50 cm. Both single and multilayer covers were considered (see Figures 7a through d). Table 3 presents a list of the final modelling results.

Tailings settlement and trafficability is considered to be a significant risk associated with the successful application of any infiltration reducing cover at this site. It may thus be necessary to construct a traffic layer first, and after settlement has taken place, to construct a low-permeability cover. Since there is a shortage of suitable cover materials on site, we have assumed that waste rock could be used as a cover material, specifically to fill this bulk requirement. It is important to note that the modeled waste rock properties are well graded material containing significant fines. This material will not be representative of large run-of-mine material, and therefore the results should be considered in the appropriate context.

Table 3: Summary of tailings cover simulations

Cover Profile	Full Simulation Period (Precipitation = 387 mm)				
	Runoff (mm)	Evap-oration (mm)	Infil-tration (mm)	Flux at Top of Tailings [1] (mm)	Flux at Top of Tailings [1] (%)
Uncovered Tailings					
Uncovered Fine tailings	60	277	28	---	7%
Uncovered Coarse tailings	0	280	92	---	24%
Single Layer Covers					
1m Till on Fine Tailings	40	293	38	-33	-9%
1m Till on Coarse Tailings	26	280	64	-64	-17%
Two-Layer Covers					
0.5m Till, 1m Waste Rock on Fine Tailings	57	293	21	0	0%
0.5m Till, 1m Waste Rock on Coarse Tailings	56	294	21	0	0%
1m Till, 1m Waste Rock, 5m Fine Tailings	49	297	25	0	0%
1m Till, 1m Waste Rock, 5m Coarse Tailings	48	299	24	0	0%

1. For uncovered tailings a positive flux, implies a flux into the tailings, but for covered tailings, a negative flux implies flux through the cover into the underlying waste.

The uncovered fine tailings allows approximately 7% overall infiltration with 34% of the snowmelt reporting as infiltration. Surface runoff constitutes 16% of the water balance. In contrast the coarse uncovered tailings allows 24% overall infiltration, with 75% of the snowmelt infiltration, whilst there is no reported runoff. Currently, although local runoff can occur on the Rose Creek tailings, all this runoff is collected and contained on the impoundment, however, to allow more representative modeling we need to consider what occur on a more micro-scale.

One meter thick single layer till covers till are estimated to result in only a marginal reduction in infiltration. The close similarity of the water retention characteristics of the tailings and till is the likely explanation for these results.

The multilayer covers are estimated to perform better, with the model predicting no overall infiltration through the cover. This is evidence of a "capillary break" effect. However, it should be noted that capillary break effects are typically very pronounced in model simulations, but less strong in the field, where material variability blurs the contrast in propertises that creates the effect.

3.2 Waste Rock Piles

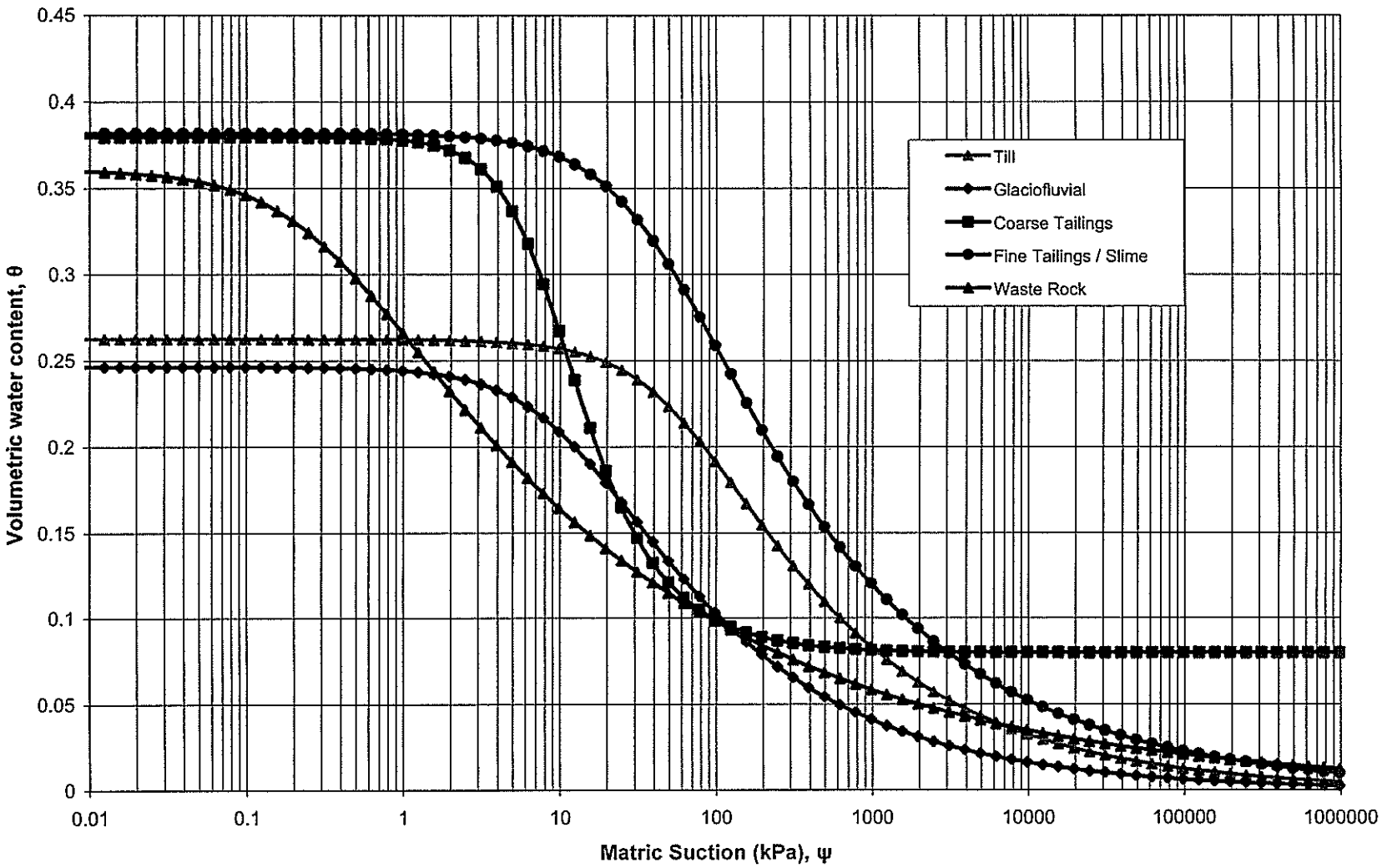
The base case against which modeling results were evaluated for covers over the waste rock piles, were the uncovered waste rock. It was however assumed that the waste rock piles would have to be re-contoured extensively to allow placement of the cover, as had occurred at the cover test section on the Vangorda waste rock pile. For this reason, the uncovered waste rock profile model simulations were based on those material properties. It should be noted that the ARMC waste rock appears to be highly susceptible to environmental weathering, and re-handling of this weathered waste results in a well graded mixture of gravel-sand-silt mixture, as opposed to the poorly graded segregated boulders that is commonly observed on the side slopes. Modeling results of the final runs are presented in Table 4 and on Figure 8.

Table 4: Summary of waste rock pile cover simulations

Cover Profile	Full Simulation Period (Precipitation = 387 mm)				
	Runoff (mm)	Evap-oration (mm)	Infil-tration (mm)	Flux at Top of Waste Rock[1] (mm)	Flux at Top of Waste Rock[1] (%)
Uncovered Waste Rock					
10m Waste Rock	80	199	92	----	24%
10m Waste Rock (K_{sat} 10^1 less permeable)	165	163	44	----	11%
10m Waste Rock (K_{sat} 10^1 more permeable)	6	234	131	----	34%
Covered Waste Rock					
0.5m Till, 9.5m Waste Rock	62	296	14	-17	-4%
0.5m Till (K_{sat} 10^1 more Permeable); 9.5m Waste Rock	0	347	2.5	3.3	1%
0.5m Till (K_{sat} 10^1 Less Permeable); 9.5m Waste Rock	131	222	17	2	1%
1.0m Till, 9m Waste Rock	48	299	24	-20	-5%
1.5m Till , 8.5m Waste Rock	47	298	26	-24	-6%
2.0m Till, 8.0m Waste Rock	45	296	30	-28	-7%

1. For uncovered waste rock a positive flux, implies a flux into the waste rock, but for covered waste rock, a negative flux implies flux through the cover into the underlying waste.

Figures



SRK Consulting
Engineers and Scientists

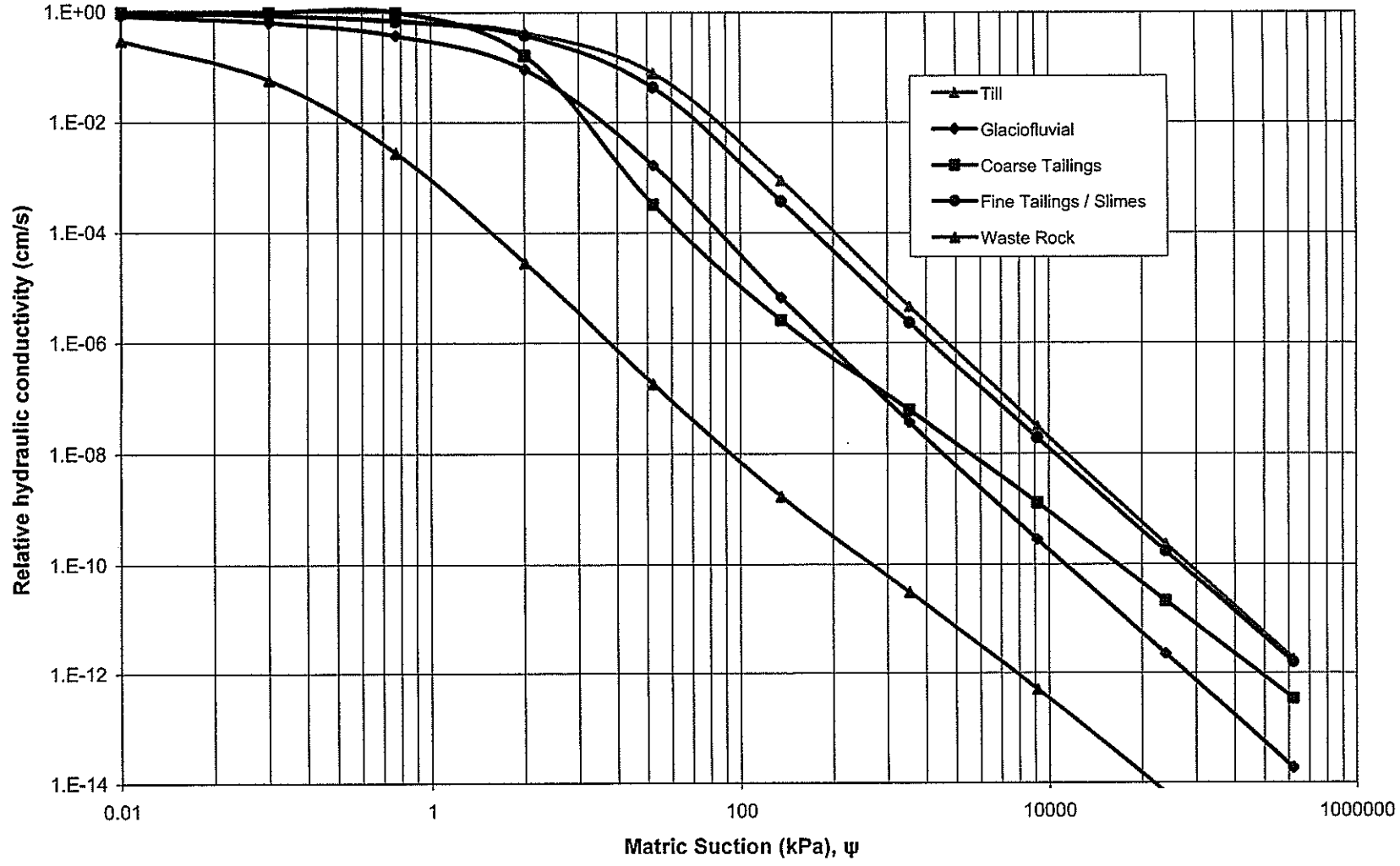
Deloitte & Touche

Anvil Range Mining Complex

Soil Water Characteristic Curves Used in SoilCover Modeling

PROJECT	DATE	APPROVED	FIGURE
1CD003.26	Feb. 2004	E.M.R.	1

Report Figures.xls, SWCC-model



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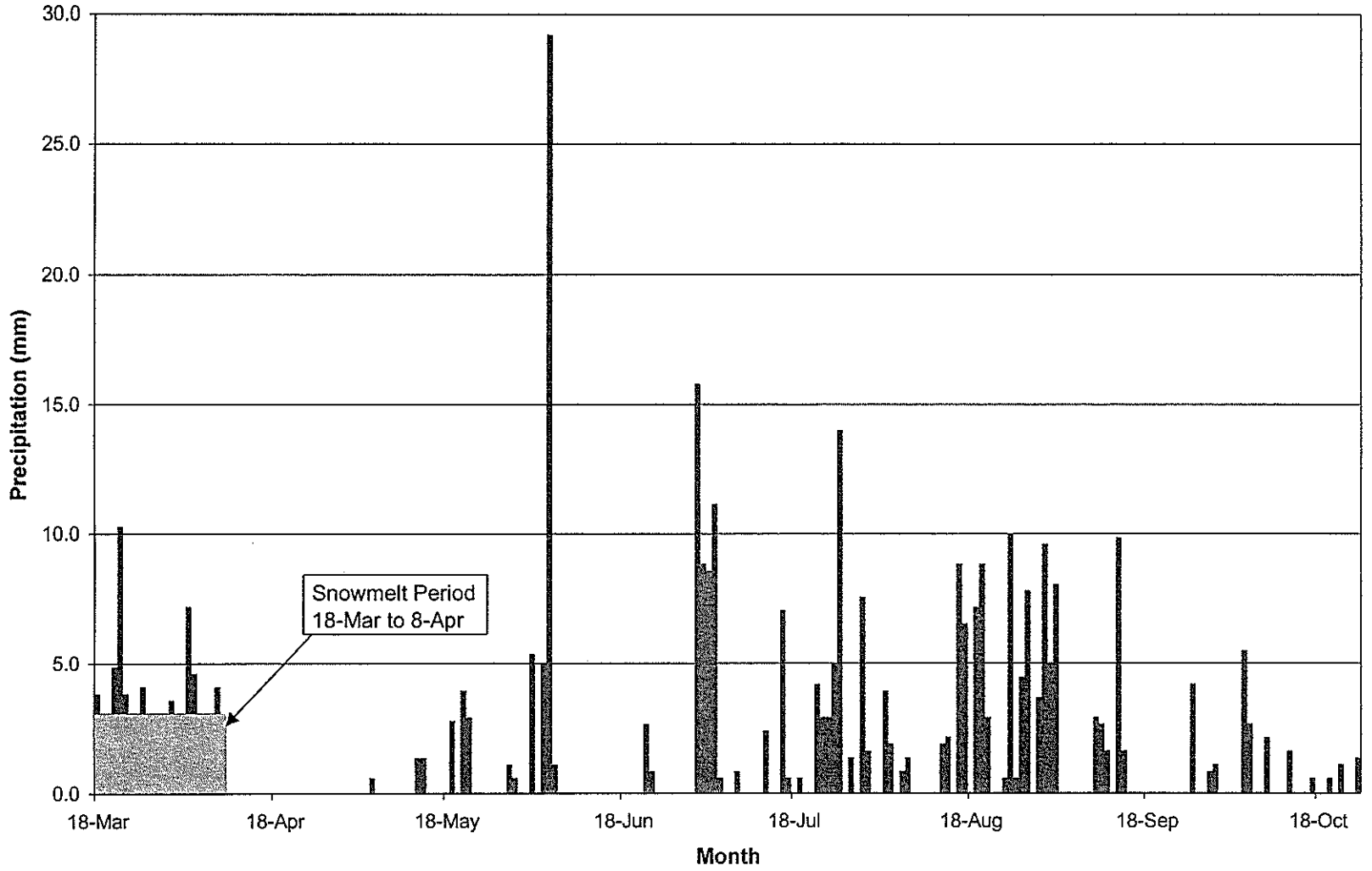
Relative Unsaturated Hydraulic Conductivity Curves Used in SoilCover Modeling

PROJECT	DATE	APPROVED	FIGURE
1CD003.26	Feb. 2004	E.M.R.	2

Report Figures.xls, Ksat



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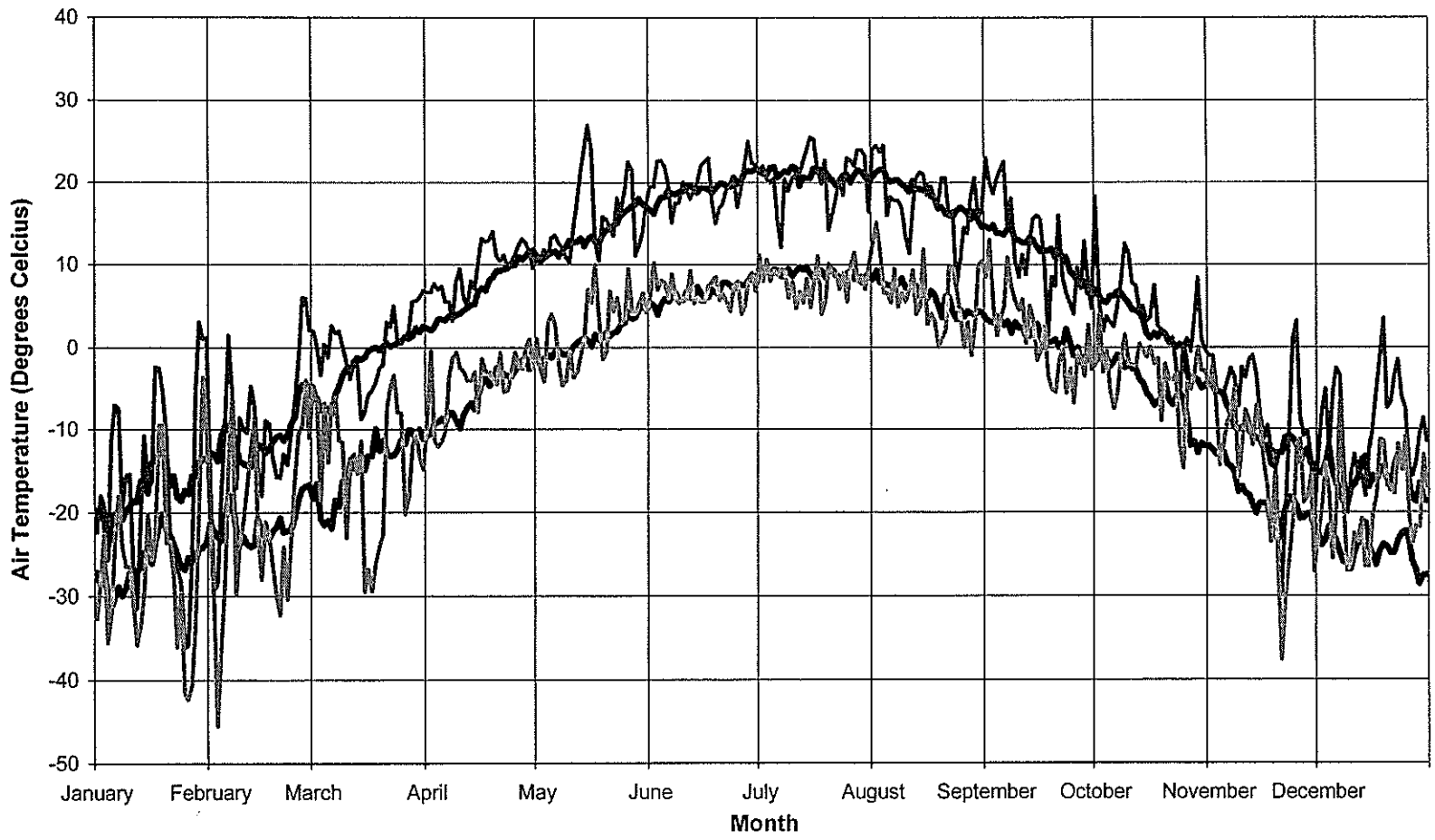
Average Yearly Precipitation Used in SoilCover Modeling

PROJECT	DATE	APPROVED	FIGURE
1CD003.26	Feb. 2004	E.M.R.	3

Report Figures.xls, Precip



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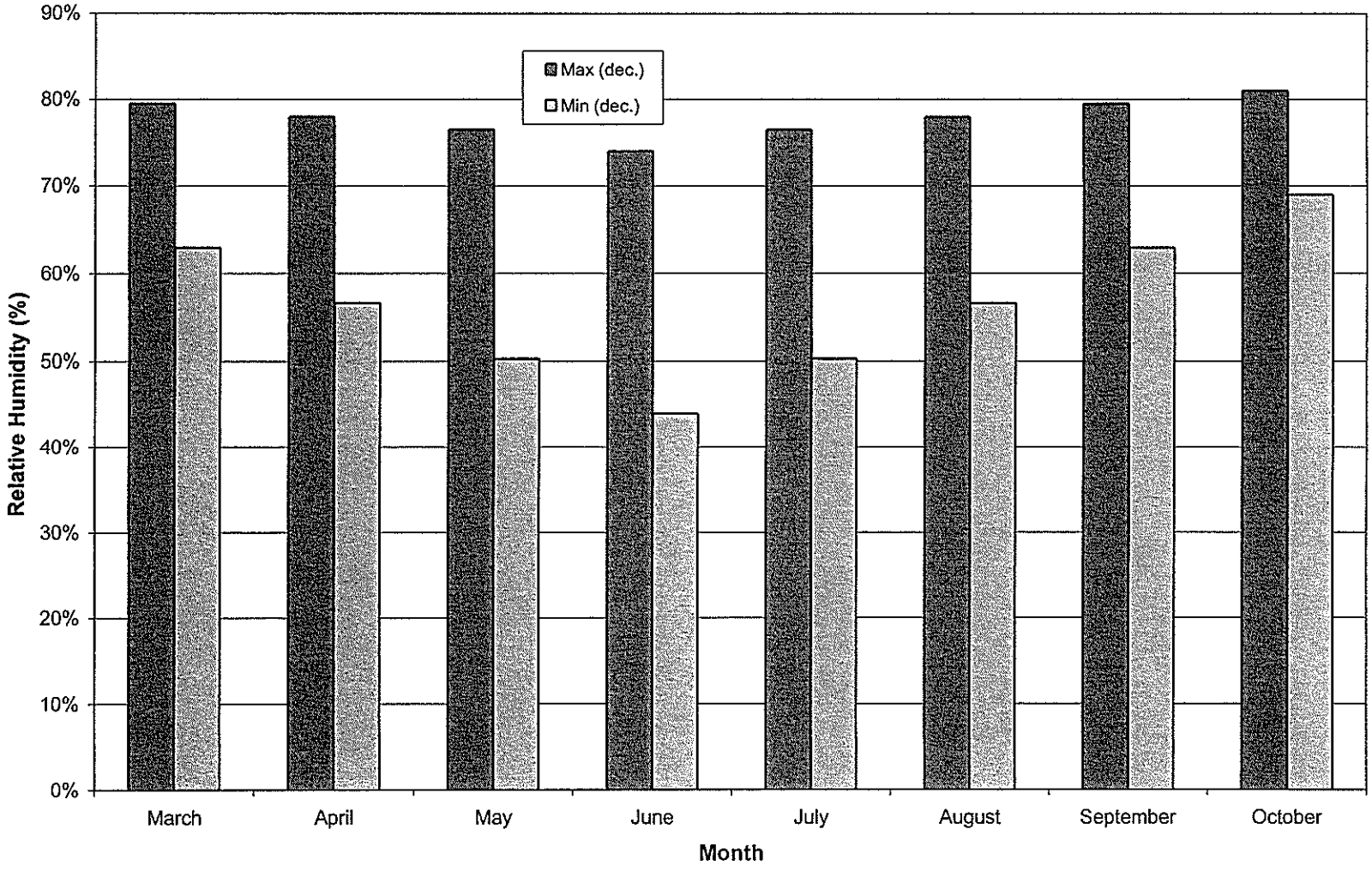
Annual Air Temperatures Used in SoilCover Modeling

PROJECT	DATE	APPROVED	FIGURE
1CD003.26	Feb. 2004	E.M.R.	4

Report Figures.xls, Temp



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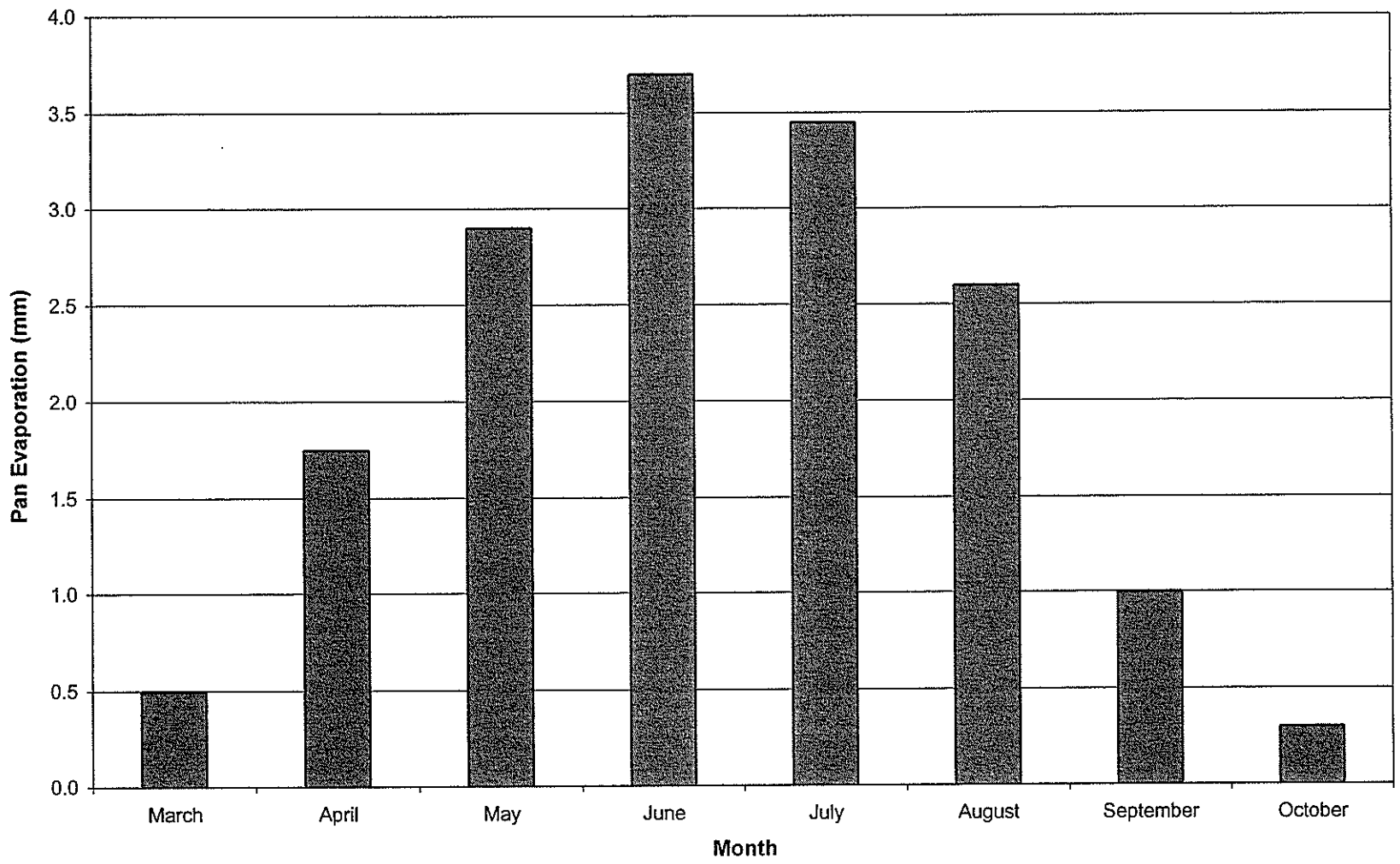
Average Relative Humidity Used in SoilCover Modeling

PROJECT	DATE	APPROVED	FIGURE
1CD003.26	Feb. 2004	E.M.R.	5

Report Figures.xls, Humidity



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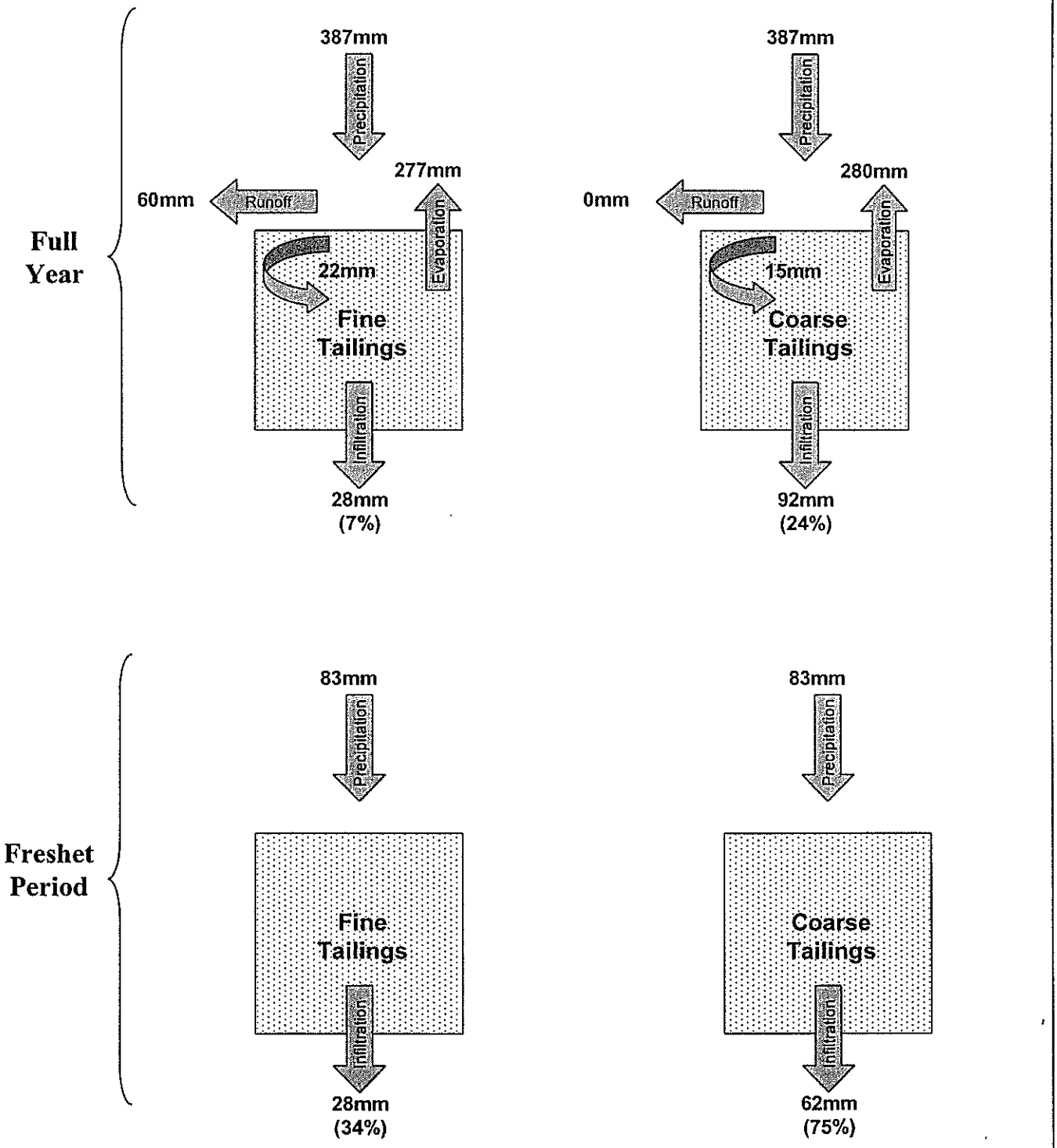
Average Evaporation Used in SoilCover Modeling

PROJECT	DATE	APPROVED	FIGURE
1CD003.26	Feb. 2004	E.M.R.	6

Report Figures.xls, Evaporation



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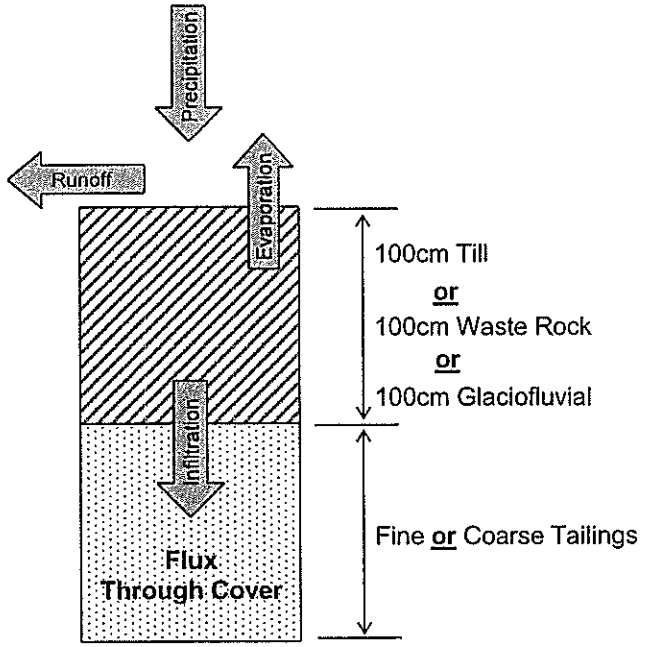
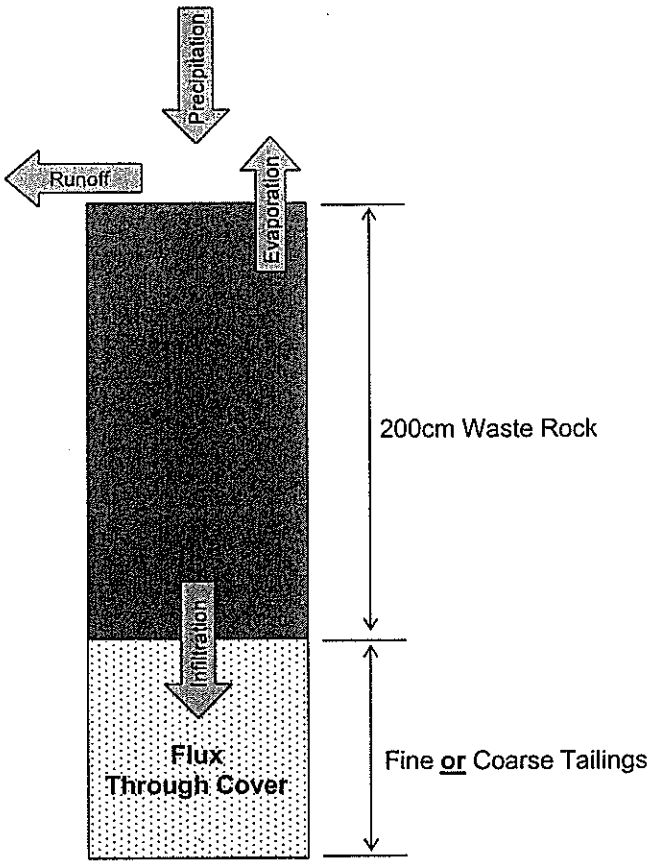
Tailings Profiles
Uncovered Tailings

PROJECT:	DATE:	APPROVED:	FIGURE:
1CD003.26	February 2004	EMR	7a





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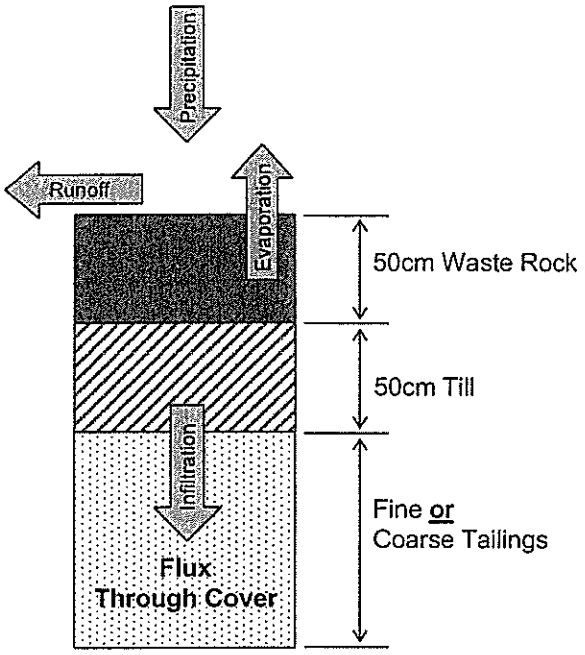
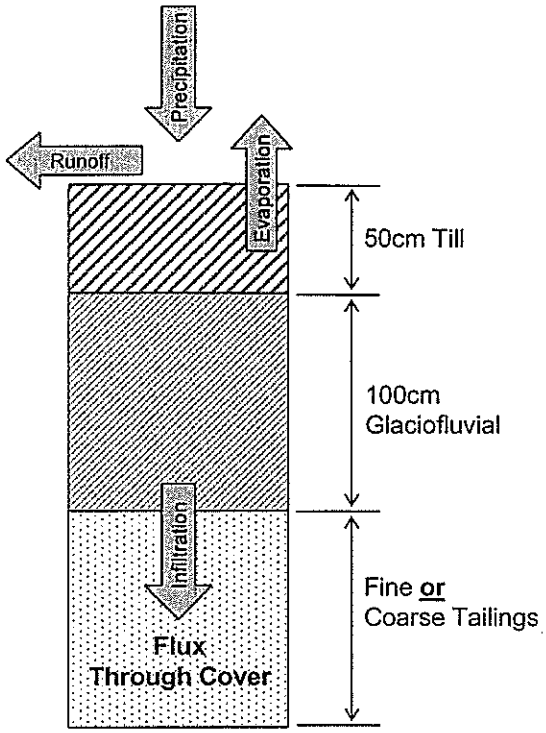
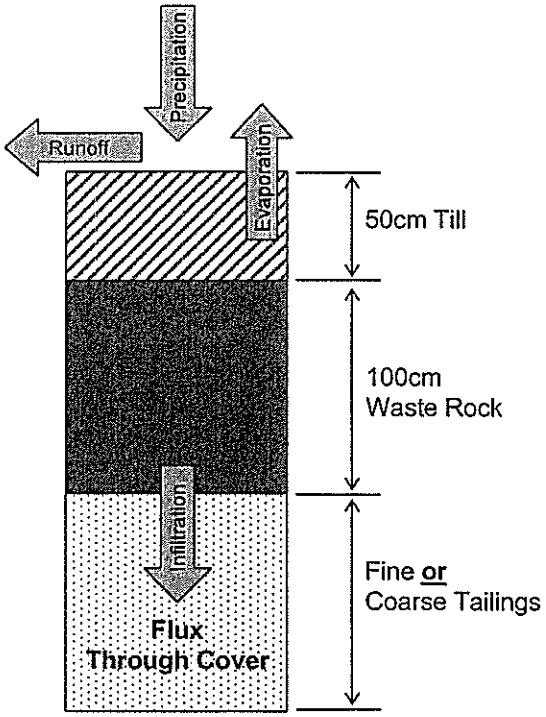
Anvil Range Mining Complex

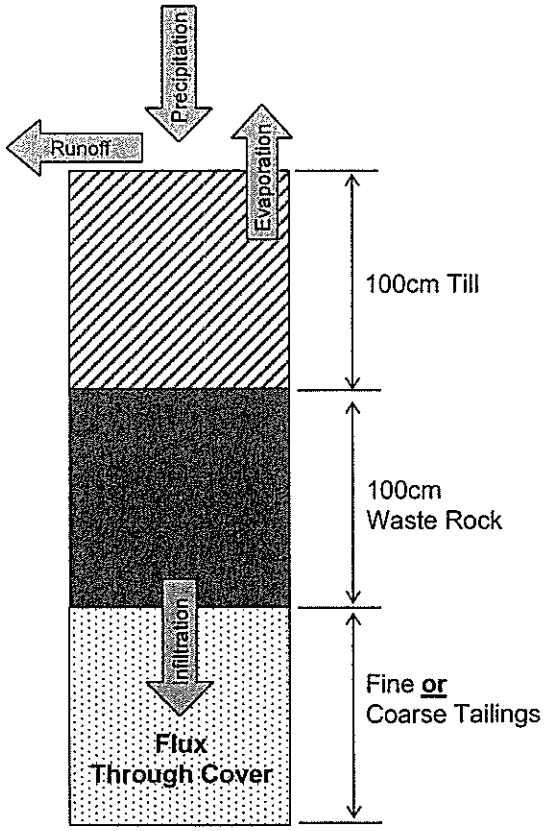
Tailings Profiles
Single-layer Tailings Covers

PROJECT:	DATE:	APPROVED:	FIGURE:
1CD003.26	February 2004	EMR	7b









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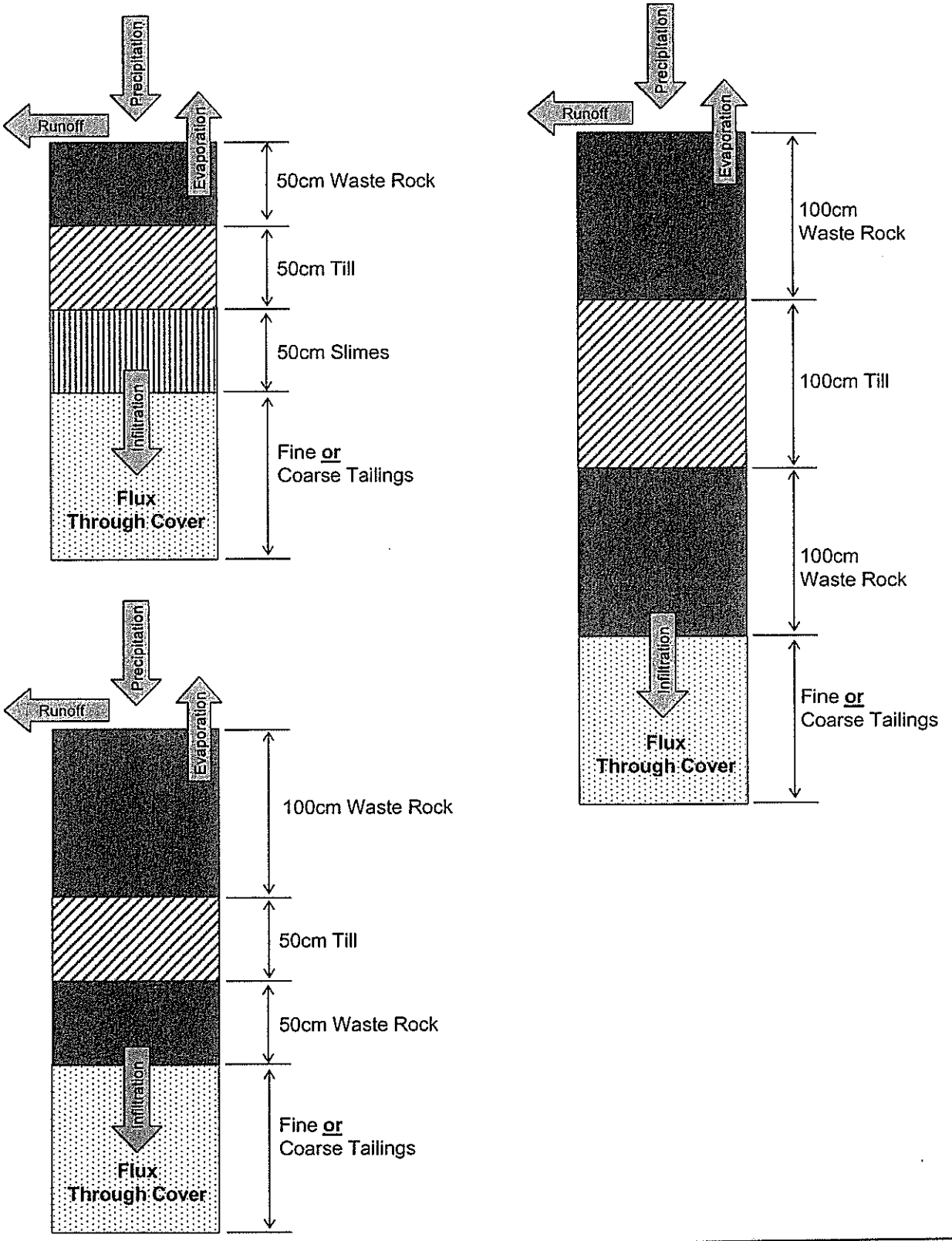
Tailings Profiles
Two-layer Tailings Covers

PROJECT:	DATE:	APPROVED:	FIGURE:
1CD003.26	February 2004	EMR	7c



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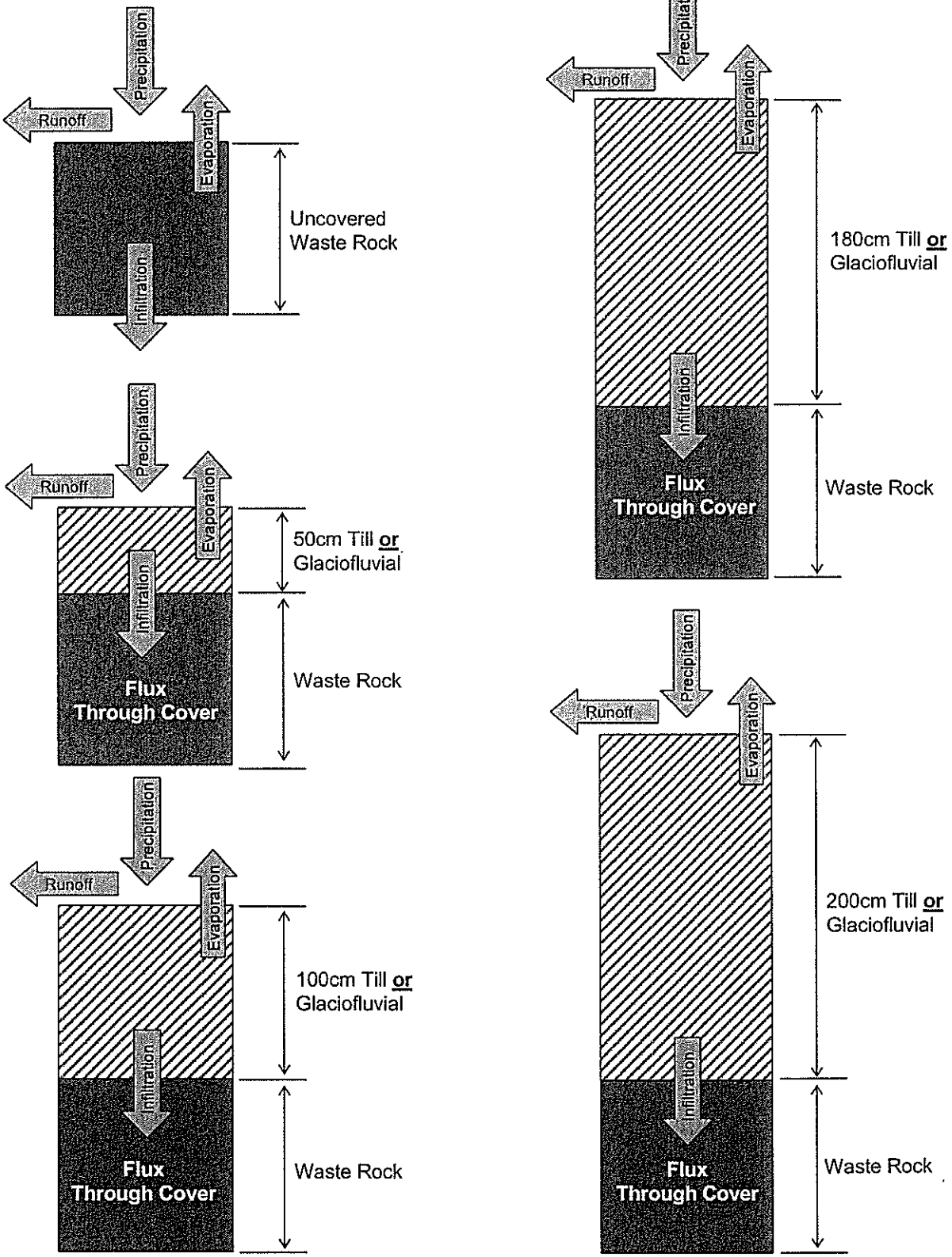
Tailings Profiles
Three-layer Tailings Covers

PROJECT:	DATE:	APPROVED:	FIGURE:
1CD003.26	February 2004	EMR	7d



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Waste Rock Cover Profiles

PROJECT:	DATE:	APPROVED:	FIGURE:
1CD003.26	February 2004	EMR	8

Attachment C

Attachment C

Results of Risk Rating Workshops

1 Introduction

This attachment presents the results of three facilitated workshops held to assess the risks associated with the example alternatives.

The workshop participants included representatives of the Faro Mine Closure Planning Office, SRK, the Type II Mines Office, affected First Nations, and Environment Canada. All participants were provided with draft copies of the example alternatives report prior to the workshop. A preparatory day was held immediately prior to the first workshop to review the draft report and introduce the risk rating method.

2 Method

The workshops used a modified form of the "Risk Rating" method developed by the INAC Contaminated Sites Program.

The risk rating method employs the three charts on the following pages.

The "Consequence-Severity Matrix" lists various types of negative outcomes, and classifies their severity from "Low" to "Critical". The matrix shown here is taken directly from the INAC-CSP guidance. The examples show how consequence severities have been classified at other mine sites.

The "Likelihood" chart defines a series of terms used to define the likelihood that a consequence (from the previous chart) will be realized. The columns of the table give examples to guide the selection of the appropriate term.

The "Risk Matrix" assigns each combination of severity and likelihood to a "risk" level. The significance of the risk levels is only apparent when one considers the resulting actions. For the assessment of example alternatives, the following set of "required actions" was adopted.

- For "Very High", "High" and most "Moderately High" risks, available mitigation measures were added to the alternative and included in the cost estimate.
- For "Moderate", "Low" and "Moderately High" risks with low probabilities, contingencies were added to the cost estimates.
- All risks that, after mitigation measures and contingencies are added, still classified as "Very High", "High" or "Moderately High" were identified as "residual risks" in subsequent presentations of the example alternatives.

The workshops were held at SRK's Vancouver offices in January and February 2006. Within the workshops, the risk rating tools were applied as follows for each example alternative:

- The example alternative was introduced and its components described by the SRK and FMCPO engineers. Workshop participants asked questions where needed to clarify their understanding of the alternative.

- For each component of that alternative, the workshop participants were then asked to identify scenarios or conditions leading to risks. Each scenario or condition was followed through to one of the consequences shown on the C-S matrix. For example, if a "dam failure" scenario was suggested, the group was asked to work though the subsequent chain of events, such as "tailings release leading to severe long-term contamination of Rose Creek".

- The group then agreed where the consequence lies on the C-S scale. In the above example, it would likely be a "Major" or "Critical" consequence in the "Environmental" category.

- The group then assessed likelihood of the final consequence. Again using the above example, the likelihood of a dam failure is one quantity, but the quantity needed in the risk rating system is the likelihood of a dam failure leading to tailings release leading to a "Major" or "Critical" environmental consequence.

- Other consequences were briefly examined in the same manner. The above example would certainly have "Consequence Costs". It would also have "Legal" and "Community/Media/Reputation" consequences. However, the workshop was directed towards technical risks, so the "Environmental" and "Consequence Cost" categories were the focus.

- Once all components were assessed, the group returned to risks where mitigation measures are available, discussed the mitigation measure and its likely costs.

- The "mitigated alternative" was then re-assessed and the risk ratings revised.

Figure 1. Consequence Severity Matrix (*with examples from other Type II sites*)

Consequence Categories	Very Low	Minor	Moderate	Major	Critical
1. Environmental Impact	No impact.	Minor localized or short-term impacts.	Significant impact on valued ecosystem component.	Significant impact on valued ecosystem component and medium-term impairment of ecosystem function.	Serious long-term impairment of ecosystem function.
		UKHM: Ice plug release at Onek 400 adit	*UKHM: Tailings dam breach*	*Mt. Nansen: Failure of Main Dam leads to release of contaminated water & tailings into Victoria Creek*	
2. Special Considerations	Some disturbance but no impact to traditional land use.	Minor or perceived impact to traditional land use.	Some mitigable impact to traditional land use.	Significant temporary impact to traditional land use.	Significant permanent impact on traditional land use.
		Clinton Creek: Ongoing erosion of tailings into creek			*Mt. Nansen: Tailings dam breach*
3. Legal Obligations	No non-compliance but lack of conformance with departmental policy requirement. Informal advice from a regulatory. agency. No land claim or other agreement.	Technical/Administrative non-compliance with permit, approval or regulatory requirement. Warning letter issued. Land claim or other agreement requires the Crown to satisfy administrative obligations (e.g. notification).	Breach of regulations, permits, or approvals (e.g. 1 day violation of discharge limits). Order or direction issued. Land claim or other agreement requires the Crown to respond, but no time frame is specified.	Substantive breach of regulations, permits or approvals (e.g. multi-day violation of discharge limits). Prosecution. Land claim or other agreement requires the Crown to exercise its obligations within a specified time frame (i.e. 2-5 years)	Major breach of regulation – wilful violation. Court order issued. Land claim or other agreement requires the Crown to exercise its obligations within a specified short time frame (i.e. 1-2 years)
			Mt. Nansen: Hydrocarbon from historical spills seeps into receiving water	*UKHM: Tailings dam breach*	
4. Consequence Costs	< $100,000	$100,000 - $500,000	$ 500,000 - $2.5 Million	$2.5-$10 Million	>$10 Million
		Mt. Nansen: Erosion leads to loss of spillway		*Mt. Nansen: fire in mill leads to loss of power and treatment*	*UKHM: Tailings dam breach leading to tailings release*
5. Community/ Media/Reputation	Local concerns, but no local complaints or adverse press coverage.	Public concern restricted to local complaints or local adverse press coverage.	Heightened concern by local community, criticism by NGOs or adverse local /regional media attention.	Significant adverse national public, NGO or media attention.	Serious public outcry/demonstrations or adverse International NGO attention or media coverage.
				UKHM: Tailings dam breach	
6. Human Health and Safety	Low-level short-term subjective symptoms. No measurable physical effect. No medical treatment.	Objective but reversible disability/impairment and /or medical treatment injuries requiring hospitalization.	Moderate irreversible disability or impairment to one or more people.	Single fatality and /or severe irreversible disability or impairment to one or more people.	Multiple fatalities.
			UKHM: Public access to boneyards leads to injury	*UKHM: Snow machine accident on waste rock leads to fatality*	*UKHM: Vehicle accident on poorly maintained road leads to multiple fatalities*

Figure 2. Likelihood Terminology

Likelihood	Descriptor 2	Frequency Descriptor	Probability of occurrence over twenty years	Probability of occurrence in any one year
Almost Certain	Happens often	High frequency (more than once every 5 years)	98%	17.8%
Likely	Could easily happen	Event does occur, has a history, once every 15 years	75%	6.7%
Possible	Could happen and has happened elsewhere	Occurs once very 40 years	40%	2.5%
Unlikely	Hasn't happened yet but could	Occurs once every 200 years	10%	0.5%
Very Unlikely	Conceivable, but only in extreme circumstances	Occurs once every 1000 years	2%	0.1%

Figure 3. Risk Matrix

Likelihood	Consequence Severity				
	Low	Minor	Moderate	Major	Critical
Almost Certain	Moderate	Moderately High	High	Very High	Very High
Likely	Moderate	Moderate	Moderately High	High	Very High
Possible	Low	Moderate	Moderately High	High	High
Unlikely	Low	Low	Moderate	Moderately High	Moderately High
Very Unlikely	Low	Low	Low	Moderate	Moderately High

3 Results

All steps in the risk rating process for each alternative were recorded on a spreadsheet. Print-outs of the spreadsheet were distributed to participants each evening, and reviewed the next day.

The final spreadsheets were then re-sorted by SRK to highlight the "Very High", "High" and "Moderately High" residual risks. The re-sorted results are provided on the following twelve pages.

Although the results have been sorted, they remain the raw output of the workshops. Some of the descriptions and ratings are likely to be understandable only to people who participated in the workshops.

The description of risks in Section 6 of the Example Alternatives report provides the more complete discussion that will be of interest to most readers.

Faro Mine Alternative 1 - Flow-through Pit - After Mitigation

Likelihood	Consequence Severity				
	Very Low	Minor	Moderate	Major	Critical
Almost Certain					
Likely			14C		
Possible		13C	16E, 21C, 26E	1E, 1C	10C
Unlikely			11C, 17E, 18E, 19E, 20C, 22C, 24C	2E, 3E, 5C, 8C, 9C, 12C, 23E, 23C, 24E, 25E	6E, 7E
Very Unlikely				4E, 15E	

	Risks of groundwater collection and cover performance estimates not being achieved
1E	Failure to meet 95% collection efficiency at S-Well area leads to chronic exceedence of site-specific criteria
23E	Failure to meet groundwater collection design efficiency in Zone II Pit outwash area leading to chronic exceedence exceedence..
24E	Failure to meet groundwater collection design efficiency at ETA leading to chronic exceedence exceedence..
16E	Failure of elevated North Fork channel leads to picking up of contaminated groundwater further contaminating downstream flow
2E	Cover infiltration to the sulphide cell increases from 5% to 10% leading to chronic exceedence of site-specific criteria
3E	Reduction in cover performance due to lack of maintenance leading to chronic exceedence…
7E	Some combination of water chemistry, capture efficeincy and cover failure leads to significant chronic exceedeences of site spec criteria

	Risks of failure of groundwater collection & treatment system
25E	Water collection and treatment system fails to operate for one year leading to contaminant release
26E	2 weeks shutdown or systematic failure of groundwater collection system leads to exceedence of site specific criteria

	Risks that pit lake biological treatment will not perform adequately
10C	Increased loadings to pit exceed biological treatment capacity and requiring perpetual active treatment
6E	Uncertainty in WQ modelling leads to greater loading than anticpiated
9C	In-situ treatment not effective, requiring active treatment for limited period of time

	Risks of implementation costs being higher than estimated
5C	Failure to identify all of the high source material leading to increased cost
14C	Exavation difficulties along outflow ditch lead to increased costs

	Risks of operating, maintenance and repair costs being higher than estimated
1C	Failure to meet 95% collection efficiency at S-Well area leads to chronic exceedence of site-specific criteria
8C	Monitoring shows the need for additional groundwater capture and upgrade of water treatment system
21C	Movement of pit wall below low grade ore stockpile leading to increased cover maintenance costs
12C	Plug dam leaks more than anticipated leading to increased flow thru Zone II Pit and increased loadings and costs

	Moderate risks
4E	Failure to cover or relocate the high source material leading to chronic exceedence..
11C	Contamination from NW Dump leads to increased loadings at X14
13C	Increased grouting requirements at plug dam
15E	Plugging of outflow ditch leading to overtopping and breach of plug dam leading to overflow of Zone II Pit into Rose Creek
17E	Extreme wet year leading to release of contaminated pit water
18E	Pit wall failure leads to disruption of treatment system and requirement to discharge untreated water
19E	Excess phosphate in pit water discharge leads to eutrophication in downstream waters
20C	Technical uncertainties of passive treatment lead to significant increased pit water monitoring/study costs
22C	Cover maintenance costs higher than anticipated

Faro Mine Alternative 2 - Continued Faro Creek Diversion - After Mitigation

Likelihood	Consequence Severity				
	Very Low	Minor	Moderate	Major	Critical
Almost Certain					
Likely					
Possible			17E, 18C, 21E	4E, 4C	
Unlikely		1C	2C, 10C, 16E, 19C	3E, 3C, 5E, 6E, 8E, 9E, 10E, 11C, 13E 15C, 20E	14E
Very Unlikely				2E, 7E, 11E, 15E	12E

	Risks of groundwater collection and cover performance estimates not being achieved
4E	Fail to meet seepage collection design efficiency (95%) at S-Well area leading to chronic exceedance of site specific criterion
3E	Fail to meet seepage collection design efficiency (95%) at Zone II outwash area leading to chronic exceedance of site specific criterion
5E	Fail to meet seepage collection design efficiency (90%) at S-Well area leading to chronic exceedance of site specific criterion
10E	Risk that ETA collection system does not meet design capture efficiency (99%) leading to chronic exceedance of site specific criterion at X14
6E	Cover infiltration to sulphide cells increases from 5 % to 10 % leading to chronic exceedance of site specific criterion
8E	Infiltration through rudimentary cover increses from 20 to 30 % of MAP leading to chronic exceedance of site specific criterion
9E	Reduction in cover performance due to lack of maintenance leading to chronic exceedance of site spefic criterion
12E	Uncertainty in water quality modelings leads to loadings greater than predicted (i.e. Future 3) and leading to chronic exceedance of site specific criterion
13E	Uncertainty in water quality modelings leads to laodiings greater than predicted (i.e. twice the Future 2 estimate) and leading to chronic exceedance of site specific c
14E	Some combination of water chemistry, capture effeiciency and cover failure leads to significant chronic exceedances of site speficic criterion
	Risks of failure of groundwater collection & treatment system
20E	Water collection and treatment system fails to operate for one year leading to contaminant release
21E	2 weeks shutdown or systematic failure of groundwater collection system leads to exceedence of site specific criteria
17E	Failure of elevated North Fork channel leads to flushing of contaminated groundwater
	Risks of implementation costs being higher than estimated
11C	Failure to identify all of the low grade oxide fines and ores leading to underestimation of total cost for remediation
15C	Monitoring shows the need for additional groundwater capture systems and upgrade of water treatment systems leading to increased costs
	Risks of operating, maintenance and repair costs being higher than estimated
4C	Fail to meet seepage collection design efficiency (95%) at S-Well area leading to chronic exceedance of site specific criterion
3C	Fail to meet seepage collection design efficiency (95%) at Zone II outwash area leading to chronic exceedance of site specific criterion
18C	Movement of pit wall below low grade ore leads to cracking of cover
	Moderate and low risks
2C, 2E	Failure of the diversion leading to loss of storage capacity and increased water treatment requirements
7E	Cover infiltration to Low and Medium Grade and Oxide fInes increases from 0.5 % to 2%in ETA catchment leading to chronic exceedance of site soecific criterion
10C	Risk that ETA collection system does not meet design capture efficiency (99%) leading to chronic exceedance of site specific criterion at X14
11E	Failure to relocate and/or cover the high source materails (Ox fines + LG and MG ores) leading to continued loading and chronic exceedance of site speficic criteria
15E	Monitoring shows the need for additional groundwater capture systems and upgrade of water treatment systems leading to increased costs
16E	Contamination from Northwest Dump leads to increased loading to X14 and exceedance of site specific criterion
19C	Cover maintenance cost higher than anticipated
1C	Diversion of Faro Creek leads to increased seepage to Faro Valley Dumps leading to increased loading to Faro Pit leading to increased treatment

Faro Mine Alternative 3 - Lowest Capital Cost or "Minimize Construction" - After Mitigation

Likelihood	Consequence Severity				
	Very Low	Minor	Moderate	Major	Critical
Almost Certain					
Likely			3C	4E, 4C, 5E, 12E, 13E, 14E, 15C	
Possible			18E	2E, 2C, 3E, 6E, 7E, 8E, 10E, 10C, 11E, 15E, 17E	
Unlikely		1C	16E, 19C	9E	
Very Unlikely					

Risks of groundwater collection and cover performance estimates not being achieved

3E	Fail to meet seepage collection design efficiency at Zone II outwash area leading to chronic exceedance of site specific criteria
4E	Fail to meet seepage collection design efficiency (99%) at S-Well area leading to chronic exceedance of site specific criterion
6E	Infiltration to sulphide cells increases above 20 % leading to chronic exceedance of site specific criterion
7E	Infiltration to Low and Medium Grade Ore and Oxide fines increases above 20 % in ETA catchment leading to chronic exceedance of site specific criterion
8E	Infiltration through rudimentary cover increases from 20 to 30 % of MAP leading to chronic exceedance of site specific criterion
9E	Reduction in cover performance due to lack of maintenance leading to chronic exceedance of site specific criterion
10E	Risk that Cross Valley Dam collection system does not meet design capture efficiency (99%) leading to chronic exceedance of site specific criterion at X14
12E	Uncertainty in water quality modeling leads to loadings greater than predicted (i.e. Future 3) and chronic exceedance of site specific criterion
13E	Uncertainty in water quality modeling leads to loadings greater than predicted (i.e. twice the Future 2 estimate) and chronic exceedance of site specific criterion
14E	Some combination of water chemistry, capture efficiency and cover failure leads to significant chronic exceedances of site specific criteria

Risks of failure of groundwater collection & treatment system

5E	Delay in montioring or implementing groundwater collection improvements in S-Well Area leads to limited duration impact
11E	Delay in montioring or implementing groundwater collection improvements in CVD Area leads to limited duration impact
17E	Water collection and treament system fails to operate for 1 year leading to contaminant release
18E	2 week shutdown or systmatic failure of groundwater collection system leading to contaminants release

Risks of implementation costs being higher than estimated

2E, 2C	Failure of the diversion leading to loss of storage capacity and overflowing leading to environmental impacts and increased costs

Risks of operating, maintenance and repair costs being higher than estimated

3C	Fail to meet seepage collection design efficiency at Zone II outwash area leading to chronic exceedance of site specific criteria
4C	Fail to meet seepage collection design efficiency (99%) at S-Well area leading to chronic exceedance of site specific criterion
10C	Risk that Cross Valley Dam collection system does not meet design capture efficiency (99%) leading to chronic exceedance of site specific criterion at X14
15E, 15C	Monitoring shows the need for additional groundwater capture systems and upgrade of water treatment systems leading to exceedences and increased costs

Moderate and low risks

16E	Contamination from Northwest Dump leads to increased loadings to X14 and exceedance of site specific criterion
19C	Cover maintenance costs higher than anticipated
1C	Deterioriation of diversion of Faro Creek leads to increased seepage to Faro Valley Dumps leading to increased loading to Faro Pit and increased treatment costs

Faro Mine Alternative 4 - Additional Relocation & Covering with Flow Through or "Minimize Water Treatment"

Likelihood	Consequence Severity				
	Very Low	Minor	Moderate	Major	Critical
Almost Certain					
Likely			18C		
Possible		5C, 20C	9C, 12E, 14E		
Unlikely			22E, 23E, 24E, 25E, 26E	2E, 3E, 4E, 8E, 10C, 13E, 17C, 19C	7E, 15C, 16E
Very Unlikely			11E	1E, 5E, 6E, 9E, 21E	

Risks of groundwater collection and cover performance estimates not being achieved

2E	Fail to meet seepage collection design efficiency at S-Well area leading to chronic exceedance of site specific criterion
3E	Fail to meet seepage collection design efficiency (95%) at ETA leading to chronic exceedance of site specific criterion
16E	Uncertainty in water quality modelling leads to greater loading to the pit than anticpiated
4E	Cover infiltration to sulphide cells increases to above 5% of MAP leading to chronic exceedance of site specific criterion
8E	Reduction in cover performance due to lack of maintenance leading to chronic exceedance of site specific criterion
7E	Some combination of water chemistry, caputure efficiency and cover failure leads to contaminant release and chronic exceedence of site specific criterion

Risks of failure of groundwater collection & treatment system

12E	Failure of elevated North Fork Channel leads to picking up of contaminated groundwater further contaminating downstream flow
13E	Water collection and treament system fails to operate for 1 year leading to contaminant release
14E	2 week shutdown or systmatic failure of groundwater collection system leading to contaminant release

Risks of implementation costs being higher than estimated

9C	Failure to identify all of the low grade oxide fines and ores leading to underestimation of total cost for remediation
18C	Excavation difficulties along the outflow channel leads to increased costs
19C	Plug dam leaks more than anticipated leading to greater flow thru Zone II Pit and increased loadings and costs

Risks of operating, maintenance and repair costs being higher than estimated

10C	Monitoring shows the need for additional groundwater capture systems and upgrade of water treatment systems leading to increased costs
15C	Increased loadings to pit exceed biological treatment capacity requiring perpetual active treatment
17C	In-situ treatment not effective requiring active treatment for limited time

Moderate and low risks

1E	Fail to meet seepage collection design efficiency (80%) at Zone II outwash area leading to chronic exceedance of site specific criterion
5E, 5C	Neutralization of low to medium grade ore and oxide fines in pit lake not as effective as expected
6E	Infiltration through low infiltration cover increases from 5 to 10 % of MAP leading to chronic exceedance of site specific criterion
9E	Failure to identify and relocate all of the high source materails (Ox fines + LG and MG ores) leading to continued loading and chronic exceedance of site specific cri
20C	Increased grouting requirement at plug dam
21E	Plugging of outflow ditch leading to overtopping and breach of plug dam with overflow to Zone II Pit into Rose Creek
22E	Extreme wet year leading to relase of contaminated pit water
23E	Pit wall failure leads to disruption of treatment system and requirement to discharge untreated water
24E	Excess phosphate in pit water discharge leads to eutrophication in downstream waters
25E	Technical uncertainties of passive treatment lead to significant increased pit water monitoring/study costs
26E	Cover maintenance costs higher than anticipated
11E	Contamination from Northwest Dump leads to increased loadings to X14 and exceedance of site specific criterion

Tailings Alternative 1 - Stabilize in Place - After Mitigation

Likelihood	Consequence Severity				
	Very Low	Minor	Moderate	Major	Critical
Almost Certain					
Likely			21C, 25E		
Possible			10C, 18C, 12E, 13E, 9E, 3C, 20E	15C	
Unlikely			14E, 16C	1C, 5E, 5C, 7E, 8E, 11E, 19E, 22E, 23E, 24E	
Very Unlikely			2E		4E, 4C, 6E, 17E, 17C

	Risks of groundwater collection and cover performance estimates not being achieved
8E	Escape of 3 % (or greater) of the groundwater (from Tailings) leads to chronic exceedance of site specific criterion (for current design)
11E	Cover does meet design performance for infiltration leading to increased load in seepage collection bypass causing an exceedance in site specific criterion
22E	Uncertainty in water quality modelings leads to loadings greater than predicted (i.e. Future 3) and leading to chronic exceedance of site specific criterion
12E	Runoff from the north side of the valley leads to increased loading in seepage collection bypass causing an exceedance in site specific criterion
	Risks of failure of groundwater collection & treatment system
7E	Water collection and treatment system fails due to technical constraint to operate for 1 year leading to contaminant release
9E	Shutdown or systematic failure of groundwater collection system for more than 2 weeks leads to periodic exceedance of site specific criterion
24E	Institutional upset leads to a year of groundwater seepage discharge without collection and treatment
	Risks of tailings dam breach and tailings release
4E	Flood exceeding the design flood, overtops the diversion and causes failure leading to failure of intermediate dam leading to tailings release
5E	Rainfall induced upstream slope movement and rainfall event leads to partial blockage and reduced capacity of channel and overtopping leading to breach of the Inte
6E	Institutional faiilure leads to lack of adequate maintenance leading to breach of the Intermediate Dam
17E	Dam stabilization ineffective leading to a breach of the Intermediate or Secondary Dam during an earthquake
	Risks of non-catastrophic maintenance failures
13E	Run-on (from Rose Creek Div) leakage causes inundation of Int. Pond Cover and causes zinc contamination of cover surface
20E	Failure of Guardhouse Creek diversion fails and leads to inundation of Int. Pond Cover and causes zinc contamination o fthe cover surface
19E	Aufeis (Glaciation) leads to partial blockage leads causing diversion overtopping of diversion causing erosion and release of tailings
23E	Vegetation growth and sedimentation cause decrease in capacity and overtopping of diversion
25E	Poor maintenance decisions lead to operational failures
	Risks of implementation costs being higher than estimated
1C	Construction of spillway more costly than expected
21C	Soil and/or permafrost conditions cause additional cost in construction of Rose Creek Diversion
18C	Addiitonal measures required to stabilize the downstream face of the intermediate dam
	Risks of operating, maintenance and repair costs being higher than estimated
15C	Liquefaction of tailings during an earthquake causes substantial damage to cover leading to significant reconstruction costs
3C	Spillway maintenance costs will be high
4C	Flood exceeding the design flood, overtops the diversion and causes failure leading to failure of intermediate dam leading to tailings release
5C	Rainfall induced upstream slope movement and rainfall event leads to partial blockage and reduced capacity of channel and overtopping leading to breach of the Inte
10C	Collection volume for treatment is substantially higher than allowed for in current design
17C	Dam stabilization ineffective leading to a breach of the Intermediate or Secondary Dam during an earthquake
	Moderate and low risks
14E	Upwelling of tailings through the waste rock and wicking causes formation of evaporites to form on the surface of the cover
16C	Differential settlement and erosion of the cover leads to increased maintenance costs
2E	The spillway does not allow fish passage leading to long term impacts

Tailings Alternative 2 - Complete Relocation - After Mitigation

Likelihood	Consequence Severity				
	Very Low	Minor	Moderate	Major	Critical
Almost Certain					
Likely					
Possible			8C	2C	
Unlikely		7E, 12C, 19C, 20C	3C, 6C, 7C, 13C, 15C, 17E	9C, 10C, 23C	22C
Very Unlikely		21C	6E, 16C	4E, 4C, 5H, 11C, 14E, 18H	

Risks of implementation costs being higher than estimated

2C	Slurry density less than CURRENT estimate 35 % leading to increased operating time and to 20 % increase in operating cost
8C	Local escalation in labour costs leading to higher closure cost
9C	Under-estimation of lime demand leading to increased lime costs
10C	Increase in lime costs (function of fuel costs) leading to increased overall costs
23C	Greater than 2 m thickness of tailings currently allowed for left after minitoring complete leading to increased cost
22C	Changes in government leading to short term stop in funding and resulting in project delays; ongoing care and maintenance

Moderate and low risks

1	Failure of slurry pipeline leads to tailings cleanup and pipeline repair
3C	Slurry density less than DESIGN estimate 35 % leading to increased operating time and to 20 % increase in operating cost
4E, C	Hydrualic mining leads to a significant tailings and/or contaminated water release
5H	Unanticipated movement of faces leading to burying of operator
6C	Water loading to tailings leading to increased contaminant leaching to the aquifer leading to increased treatment costs
7C	Difficulties with final clean-up leads to extended loading to aquifer
11C	Increased power costs leading to increased overall costs
13C	Removal of contaminated material creates need for local reconstruction of Rose Creek between breached sections
14E	Failure of Rose Creek leading to the flooding of the tailings area during relocation and leads to loss of operations for 1 year
15C	Failure of Rose Creek diversion during adaptive management, after tailings relocated, leading to flooding of the valley
17E	Groundwater collection system performance does not meet design efficiency leading to seepage bypass causing an exceedance in the site specific site criterion
18H	Operator error leading to fatality
6E	Water loading to tailings leading to increased contaminant leaching to the aquifer
7E	Difficulties with final clean-up leads to extended loading to aquifer
12C	Use of geosynthetics in channels (dam breach) lead to increased maintenance and replacement costs
16C	Failure of Rose Creek diversion during adaptive management, after tailings relocated, leading to loss of flow in D/S Rose Creek
19C	Power supply to the mine site is interupted leading to loss in production
20C	Failure of the Faro Creek Diversion fails leads to flooding of the pit preventing tailings deposition
21C	Dam construction materials contains contamination that needs to be removed leading to increased closure costs

Tailings Alternative 3 - Partial Relocation - After Mitigation

Likelihood	Consequence Severity				
	Very Low	Minor	Moderate	Major	Critical
Almost Certain					
Likely		2C			
Possible			7E, 15C, 24C	20C	
Unlikely			1C, 9C, 12E, 13E, 14E, 16C, 21C, 28C	6E, 10C, 11E, 19E, 25C	30C
Very Unlikely			18C	3C, 3E, 4C, 4E, 5C, 5E, 8E, 22C, 22E, 23H, 26C, 27C, 29H	17E, 17C

Risks of groundwater collection and cover performance estimates not being achieved

11E	Cover design does not meet infiltration performance causing exceedence of site-specific criteria
19E	Uncertainty in WQ modelling leads to loadings greater than predicted and leading to chronic exceedence of site-specific criteria

Risks of failure of groundwater collection & treatment system

6E	Water collection and treatment system fails to operate for one year leading to contaminant release
7E	2 weeks shutdown or systematic failure of groundwater collection system leads to exceedence of site specific criteria

Risks of tailings dam breach and tailings release

17E	Dam stabilization ineffective leading to breach of Secondary Dam during earthquake

Risks of implementation costs being higher than estimated

20C	Slurry density less than current estimate leads to increased operating time and cost
24C	Local escalation in labour costs leads to increase in tailings relocation costs
24C	Underestimation of lime demand leads to increase in liming costs
30C	Changes in government leading to short-term stop in funding and resulting project delays, ongoing C & M
10C	Adaptive management of groundwater is more lengthy and complex than anticipated

Risks of operating, maintenance and repair costs being higher than estimated

17C	Dam stabilization ineffective leading to breach of Secondary Dam during earthquake

Moderate and low risks

1C	Soil conditions result in increased costs for Rose Creek diversion channel upgrade
2C	Spillway maintenance costs will be high
3C, 3E	Failure of mtce in RCDC Failure of erosion control along leads to slumping of tailings into creek
4C, 4E	Rainfall induced slope movement liked to flood leads to erosion of Sec Dam and slumping of tailings into creek
5C, 5E	Institutional failure leads to RCDC failure, ersoion of Sec Dam and slumping of tailings into creek
8E	Escape of groundwater from tailings greater than expectations leads to chronic exceedence of site-specific criteria
9C	Long-term groundwater collection volume greater than assumed in design
12E	Runoff from north side of valley leads to increased loading in seepage collection bypass causing exceedence of site-specific criteria
13E	Runoff from north side and cover leads to erosion of dam and release of tailings
14E	Upwelling of tailings through waste rock and wicking causes formation of evaporites to form on the surface of the cover
21C	Slurry density less than design estimate leads to increased operating time and cost
22C	Hydraulic mining leads to significant release of tailings
23H	Unanticipated movement of faces leads to burying of operator
26C	Increased lime cost leads to increased liming costs
27C	Increased power costs leads to increased overall cost
28C	Removal of contaminated material creates need for local reconstruction of rose creek betweeen the breached sections
29H	Operator error leading to fatality
18C	Upon further investigation, additional measures are required to stabilize downstream face of secondary dam

Tailings Alternative 4 - Lowest Capital Cost or "Minimize Construction" - After Mitigation

Likelihood	Consequence Severity				
	Very Low	Minor	Moderate	Major	Critical
Almost Certain					
Likely			20C, 24E		
Possible			3C, 9E, 10C, 12E, 14E, 17C, 19E	8E, 11E, 15C, 21E, 23E, 25E, 25C	22E
Unlikely			13E	1C, 5E, 5C, 7E, 18E	
Very Unlikely			2E		4E, 4C, 6E, 16E, 16C

Risks of groundwater collection and cover performance estimates not being achieved

8E	Escape of sig greater than 1% of the groundwater (from Tailings) leads to chronic exceedance of site specific criterion (for current design)
11E	Infiltration thru uncovered tailings does meet expectation for infiltration leading to increased load in seepage collection bypass causing an exceedance in site specifi
12E	Runoff from the north side of the valley leads to increased loading in seepage collection bypass
21E	Uncertainty in water quality modelings leads to laodings greater than predicted (i.e. Future 3) and leading to chronic exceedance of site specific criterion

Risks of failure of groundwater collection & treatment system

22E	Vegetation growth and sedimentation cause decrease in capacity and overtopping of diversion
23E	Institutional upset leads to a year of groundwater seepage discharge without collection and treatment
25E, 25C	Delay in detection, implementation or improvement of collection leading to exceedence or additional cleanup cost
7E	Water collection and treatment system fails to operate for 1 year leading to contaminant release
9E	Shutdown or systematic failure of groundwater collection system for more than 2 weeks leads to periodic exceedance of site specific criterion
24E	Poor maintenance decisions lead to operational failures

Risks of tailings dam breach and tailings release

4E, 4C	Rose Creek diversion does not pass design flood leading to failure of intermediate dam leading to tailings release
5E, 5C	Rainfall induced upstream slope movement and rainfall event leads to partial blockage and reduced capacity of channel and overtopping leading to breach of the Inte
6E	Institutional faiilure leads to lack of adequate maintenance leading to breach of the Intermediate Dam
16E, 16C	Dam stabilization ineffective leading to a breach of the Intermediate (or Secondary) during an earthquake

Risks of non-catastrophic maintenance failures

18E	Aufeis (Glaciation) leads to partial blockage and overtopping of diversion causing erosion and release of tailings
19E	Failure of Guard House Creek diversion fails and leads to inundation of Int. Pond tailings and causes increased zinc contamination of the aquifer
14E	Dusting from the tailings leads to contamination of surrounding soils and vegetation
26E	Fence causes animal mortality

Risks of implementation costs being higher than estimated

1C	Soil conditions result in spillway costs significantly greater than present cost estimate
17C	Addiitonal measures required to stabilize the downstream face of the intermediate dam
20C	Soil and/or permafrost conditions cause additional cost in construction of Rose Creek Diversion

Risks of operating, maintenance and repair costs being higher than estimated

15C	Differential settlement in tailings lead to ponding and increased infiltration through the tailings leading to increased treatment costs
3C	Spillway maintenance costs will be high
10C	Collection volume for treatment is substantially higher than allowed for in current design

Moderate and low risks

13E	Run-on (from diversion leakage) causes inundation of Intermediate Pond tailings and causes zinc contamination of surface
2E	The spillway does not allow fish passage leading to long term impacts

Vangorda/Grum Alternative 1 - Backfill Vangorda Pit - After Mitigation

Likelihood	Consequence Severity				
	Very Low	Minor	Moderate	Major	Critical
Almost Certain					
Likely				20C	
Possible		22E	12E		
Unlikely			2E, 4E, 8H, 9E, 10E, 11C, 17E, 18C, 19C	1E, 1C, 3E, 7E, 15C, 16C, 21E	
Very Unlikely			13E	5H, 14H	7C

	Risks of groundwater collection and cover performance estimates not being achieved
1E	Failure to meet groundwater collection targets below Grum Dump
3E	Low infiltration covers do not meet design performance leading to higher infiltration
7E	Grum Dump goes more acidic than expected
	Risks of failure of or damage to Vangorda Creek diversion
12E	Failure of channel leading to increased leakage into pit
21E	Failure of Vangorda diversion during backfilling leads to solids release
	Risks of implementation costs being higher than estimated
15C	Under-estimation of lime demand leads to increased costs
	Risks of operating, maintenance and repair costs being higher than estimated
20C	Grum pit unable to passively treat groundwater collected below Grum Dump
1C	Failure to meet groundwater collection targets below Grum Dump
7C	Grum Dump goes more acidic than expected
16C	Increase in lime costs due to fuel costs
	Moderate and low risks
2E	Shutdowm or systematic failure of the Grum Dump collection system leads to 2 weeks of release
4E	Rudimentary cover at Grum Dump does not meet design performance for infiltration leading to increased seepage (>20% infiltr)
5H	Person or passerby falls into pit leading to fatality
8H	Exposure to contaminated sediment and soli leads to uptake in particular of As leading to an increased risk of cancer on human health
9H	Contaminant release from ore transfer pad leads to contamination of Vangorda Creek
10E	Backfill cover performance is less than expected leading to increased seepage from backfill pit
11C	Failure of channel leads to erosion damage of cover leading to increased cost of repair
14H	Rockfall in pit leads to fatality during relocation
17C	Predicted porewater quality not achived due to not adding sufficient lime leading to impacts on Vangorda Creek
18C	Residual contaminantion in Vangorda Dump foundation soils leading to increased relocation costs
19C	Temporary groundwater cleanup required under the Vangorda footprint area
22E	Release of algae from the pit lake leads to downstream eutrophication
3C	Failure to meet groundwater collection target in the Vangorda Dump Seepage collection system leading to contaminant release to Vangorda Creek
10C	Vangorda Creek Diversion fails during a flood year leading to an increase of water to be treated (est. 3 million m3)

Vangorda/Grum Alternative 2 - Stabilize Current Situation - After Mitigation

Likelihood	Consequence Severity				
	Very Low	Minor	Moderate	Major	Critical
Almost Certain					
Likely					
Possible			11C, 19C	9C	
Unlikely			2E, 4E, 5E, 7E, 12E, 17H, 18E, 19E	1E, 6E, 9E, 16E	
Very Unlikely			3C, 10C	3E, 8E, 13E, 14H, 20E, 20C	16C

Risks of groundwater collection and cover performance estimates not being achieved

1E	Failure to meet groundwater collection targets below Grum Dump
6E	Low infiltration covers do not meet design performance leading to higher infiltration
16E	Grum Dump goes more acidic than expected

Risks of failure of or damage to Vangorda Creek diversion

9C	Geotechnical failure of pit wall below Vangorda Creekdiversion leading to release of pit water
9E	Geotechnical failure of pit wall below Vangorda Creekdiversion leading to release of pit water

Risks of operating and maintenance costs being higher than estimated

19C	Groundwater leakage from Vangorda Pit requires investigation, capture and treatment
11C	Steeper sections near bottom of Vangorda Creek diversion fail in flood and require costly repairs
16C	Grum Dump goes more acidic than expected

Moderate and low risks

2E	Shutdowm or systematic failure of the Grum Dump collection system leads to 2 weeks of release
3E	Failure to meet groundwater collection target in the Vangorda Dump Seepage collection system leading to contaminant release to Vangorda Creek
4E	Shutdowm or systematic failure of the Vangorda Dump collection system leads to 2 weeks of release
5E	Toe drain failure leeds to short term (2 weks) surface water release at Vangorda Dump leading to impacts on in Vangorda Creek
7E	Rudimentary cover at Grum Dump does not meet design performance for infiltration leading to increased seepage (>20% infiltr)
8E	Vangorda Creek Diversion fails during a 100 year flood leading to discharge to Vangorda Pit leading to overtopping after 16 days and release of contaminated water
12E	Grum Pit water quality worse than predicted leading to release of contaminated water
13E	Water collection and treatment system fails to operate for one year leading to release of contaminated water due to lack of funding
14H	Person or passerby falls into pit leading to fatality
17H	Exposure to contaminated sediment and soli leads to uptake in particular of As leading to an increased risk of cancer on human health
18E	Contaminant release from ore transfer pad leads to contamination of Vangorda Creek
19E	Groundwater Leakage from Vangorda pit daylighting and contaminating Vangorda Creek
20E, 20C	Vangorda dump goes more acidic than expected leading to increased impact on Vangorda Creek
3C	Failure to meet groundwater collection target in the Vangorda Dump Seepage collection system leading to contaminant release to Vangorda Creek
10C	Vangorda Creek Diversion fails during a flood year leading to an increase of water to be treated (est. 3 million m3)

Vangorda/Grum Alternative 3 - Lowest Capital Cost or "Minimize Construction"- After Mitigation

Likelihood	Consequence Severity				
	Very Low	Minor	Moderate	Major	Critical
Almost Certain			11C		
Likely			10C		
Possible			19C	1E, 1C, 6E, 9E, 9C, 16E, 20E, 21E	
Unlikely			2E, 3C, 4E, 5E, 7E, 8C, 12E, 17H, 18E, 19E	3E, 8E, 20C	
Very Unlikely				13E, 14H	16C

Risks of groundwater collection and cover performance estimates not being achieved

1E	Failure to meet groundwater collection target in the Grum Dump Seepage collection System
3E	Failure to meet groundwater collection target in the Vangorda Dump Seepage collection System
6E	Rudimentary covers on Vangorda and Grum sulphide cells do not meet design performance for infiltration leading to increased seepage (>20% infiltr)
16E	Grum dump goes more acidic than expected leading to increased contaminant release
20E	Vangorda dump goes more acidic than expected leading to increased impact on Vangorda Creek

Risks of failure of or damage to Vangorda Creek diversion

21E	Delay in detection and implementation and improvement in collection leading to exceedences of site specific criterion for limited period

Risks of failure or damage to Vangorda Creek Diversion

8E	Vangorda Creek Diversion fails during a 100 year flood leading to discharge to Vangorda Pit leading to overtopping after 16 days and release of contaminated water
9E	Geotechnical failure of the pit wall below the channel leading to a breach of the Vangorda Creek Diversion leading to the overtopping of the pit and release of conta
10C	Vangorda Creek Diversion fails during a flood year leading to an increase of water to be treated (est. 3 million m3)
11C	Vangorda Creek Diversion fails during a flood year flood leading to a cost of mitigation (repair of diversion)

Risks of operating and maintenance costs being higher than estimated

1C	Failure to meet groundwater collection target in the Grum Dump Seepage collection System
9C	Geotechnical failure of the pit wall below the channel leading to a breach of the Vangorda Creek Diversion leading to the overtopping of the pit and release of conta
16C	Grum dump goes more acidic than expected leading to increased collection and treatment costs
19C	Groundwater leakage from Vangorda pit daylighting and contaminating Vangorda Creek
20C	Vangorda dump goes more acidic than expected leading to increased collection and treatment costs

Moderate and low risks

2E	Shutdowm or systematic failure of the Grum Dump collection system leads to 2 weeks of release
3C	Failure to meet groundwater collection target in the Vangorda Dump Seepage collection System leading to increased costs
4E	Shutdowm or systematic failure of the Vangorda Dump collection system leads to 2 weeks of release
5E	Toedrain failure leads to short term (2 weeks) surface water release at Vangorda Dump
7E	Rudimentary cover on Vangorda and Grum Dump other waste does not meet design performance for infiltration leading to increased seepage (>20% infiltr)
8C	Vangorda Creek Diversion fails during a 100 year flood leading to discharge to Vangorda Pit leading to overtopping after 16 days and release of contaminated water
12E	Grum Pit water quality worse than predicted leading to release of contaminated water
13E	Water collection and treatment system fails to operate for one year leading to release of contaminated water due to lack of funding
14H	Person or passerby falls into pit leading to fatality
17H	Exposure to contaminated sediment and soil leads to uptake in particular of arsenic leading to an increased risk of cancer on human health
18E	Contaminant release from ore transfer pad lead to contamination of Vangorda Creek
19E	Groundwater leakage from Vangorda pit daylighting and contaminating Vangorda Creek

Vangorda/Grum Alternative 4 - Additional Covering or "Minimize Water Treatment"

Likelihood	Consequence Severity				
	Very Low	Minor	Moderate	Major	Critical
Almost Certain					
Likely					
Possible		22E	12E	20C	
Unlikely			2E, 4E, 8H, 9E, 10E, 11C, 15C, 16C, 17E, 18C, 19C	1E, 1C, 3E, 7E, 21E	
Very Unlikely			13E	5H, 14H	7C

Risks of groundwater collection and cover performance estimates not being achieved

1E	Failure to meet groundwater collection target in the Grum Dump Seepage collection system
3E	Very Low infiltration soil cover on Grum Sulphide cell does not meet design performance for infiltration leading to increased seepage (>5% infiltr)
7E	Grum dump goes more acidic than expected leading to increased contaminant release

Risks of failure of or damage to Vangorda Creek diversion

12E	Failure of channel leads loss of water to the pit leading increased contaminant loadings to Vangorda Creek
21E	Failure of Vangorda Creek diversion during backfilling leading to overtopping and release of contaminated water from the pit

Risks of operating and maintenance costs being higher than estimated

1C	Failure to meet groundwater collection target in the Grum Dump Seepage collection system
7C	Grum dump goes more acidic than expected leading to increased collection and treatment costs
20C	Grum pit water quality does not reach predicted concentrations due to Grum Pit Lake treatment not being able to treat seepage collection from Grum Dump

Moderate and low risks

2E	Shutdown or systematic failure of the Grum Dump collection system leads to 2 weeks of release
4E	Low infiltration cover at Grum Dump does not meet design performance for infiltration leading to increased seepage (>20% infiltr)
5H	Person or passerby falls into pit leading to fatality
8H	Exposure to contaminated sediment and soil leads to uptake in particular of arsenic leading to an increased risk of cancer on human health
9E	Contaminant release from ore transfer pad leads to contamination of Vangorda Creek
10E	Backfill cover performance is less than expected leading to increased seepage from backfill pit
11C	Failure of channel leads to erosion damage of cover leading to increased cost of repair
14H	Rockfall in pit leads to fatality during relocation
15C	Underestimation of lime demand leads to increased closure costs
16C	Increase in lime costs caused by increased fuel costs leads to increased overall costs
17E	Predicted porewater quality not achived due to not adding sufficient lime leading to impacts on Vangorda Creek
18C	Residual contaminantion in Vangorda Dump foundation soils leading to increased relocation costs
19C	Temporary groundwater cleanup required under the Vangorda footprint area
22E	Release of algae from the pit lake leads to downstream eutrophication
13E	Dust release during relocation leads to contaminant release to surrounding vegetation

Attachment D

Water and Load Balance Calculations

Anvil Range Mining Complex: Site Water and Load Balance

2005/06 Task 19c

- DRAFT -

Prepared for

Deloitte & Touche Inc.

On behalf of the

Faro Mine Closure Planning Office

Prepared by

SRK Consulting
Engineers and Scientists

September 2006

Anvil Range Mining Complex: Site Water and Load Balance

2005/06 Task 19c

- DRAFT -

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1 Introduction

Assessment of the example alternatives for closure of the Anvil Range Complex required that impacts on water quality be evaluated and where necessary water treatment requirements be established. A site wide water and load balance was therefore developed to estimate current and potential future impacts based on the specific closure methods proposed for each example alternative. The purpose of this report is to describe the modelling approach that was adopted and summarise the assumptions and inputs that were used in the modelling undertaken for the assessment of example alternatives.

This report is arranged as follows. Chapter 2 provides an overview of the overall site water and load balance calculations, including a breakdown of the hydrological assumptions and inputs. Chapter 3 summarizes the source concentration inputs to the load balances. Chapter 4 summarizes the inputs and results for each of the example alternatives and sensitivity analyses that were modeled.

2 Water Balance and Load Balance

2.1 Faro Site

2.1.1 Model Configuration

The models developed in this report are mass balances that simulate the generation, movement and storage of water and associated chemical loading within the Anvil Creek, Vangorda Creek and Pelly River catchments. The general structure of the models was simplified as much as possible to ease interpretation of the model results and to emphasize the main sources and sinks of contamination within the catchments. The models were developed in Excel spreadsheets and run on a monthly time step. The models were programmed in such a manner that they can be quickly adapted to represent different combinations of closure measures by adjusting the values of input parameters, rather than having to alter equations in the spreadsheet cells.

Figure 2-1 is a schematic of the model developed for that portion of the Anvil Range Mine Complex contained within the Anvil Creek catchment. The model was set up to estimate the average discharge and associated water chemistry at four key receiving points within the catchment, namely: North Fork at X2, Rose Creek at X14, Rose Creek at its mouth and Anvil Creek at its mouth. These locations are represented in Figure 2-1 as filled circles.

The basic "building block" for the models was the sub-catchment area. To create a model without excessive detail, the Anvil Creek catchment was subdivided into a total of 10 sub-catchments. The boundaries of the sub-catchments were dictated by the locations of: i) the four key receiving points listed above; ii) existing and proposed diversion channels; and iii) the main mine elements (open pits, waste dumps and tailings impoundment). In delineating the sub-catchment boundaries, it was also necessary to consider the effects of candidate closure measures on the potential routing of flow and chemical loading throughout the mine development. For example, one of the sub-catchments used in the model is the area controlled by the Faro Creek Diversion Channel (FCDC). This sub-catchment had to be specified as a separate entity because, depending on what closure measures are finally adopted, its runoff and associated chemical loading could flow to the North Fork, as it presently does, or be discharged directly to the Faro Pit, or be diverted to the North Wall Interceptor Ditch. The boundaries of the 10 catchments are outlined on Figure 2-2. These catchments are represented on the flowsheets as rectangular boxes (see Figure 2-1). The sub-catchments are labeled with capital letters (A to J) to aid in the cross referencing of figures and tables in this report.

While sub-catchment areas represent the main building block of the model, it was also necessary to include an element representing a water treatment plant (WTP). A WTP at site (if constructed) would represent a sink for contamination and would influence the routing of water about the mine development.

To complete the model, it was necessary to account for the linkages of flows amongst the sub-catchments, the WTP and the various receiving points. Flowlines on Figure 2-1 illustrate how water and chemical loading are simulated to move in the model. All potential routings available in the model are shown, although some will not be applicable for certain combinations of closure measures. For example, three lines emanate from the box representing the catchment presently controlled by the FCDC (Catchment A). These lines represent all the different pathways water could potentially exit the sub-catchment in the future, including ditch leakage to the Faro Pit and flow along a candidate diversion channel around the west side of the pit. Only one or two of these lines would be applicable for any given model simulation.

A number is shown on each flowline to denote the average annual discharge rate or average annual chemical loading, depending on whether the flowsheet is being used to represent a water balance or a load balance. Flow is given in units of m^3/s, while loading is presented in units of tonnes or kg. The runoff (or chemical loading) generated by each sub-catchment is also denoted on the flowsheet as a number inside the rectangular boxes. Flowsheets for specific combinations of closure measures are provided in Section 4.

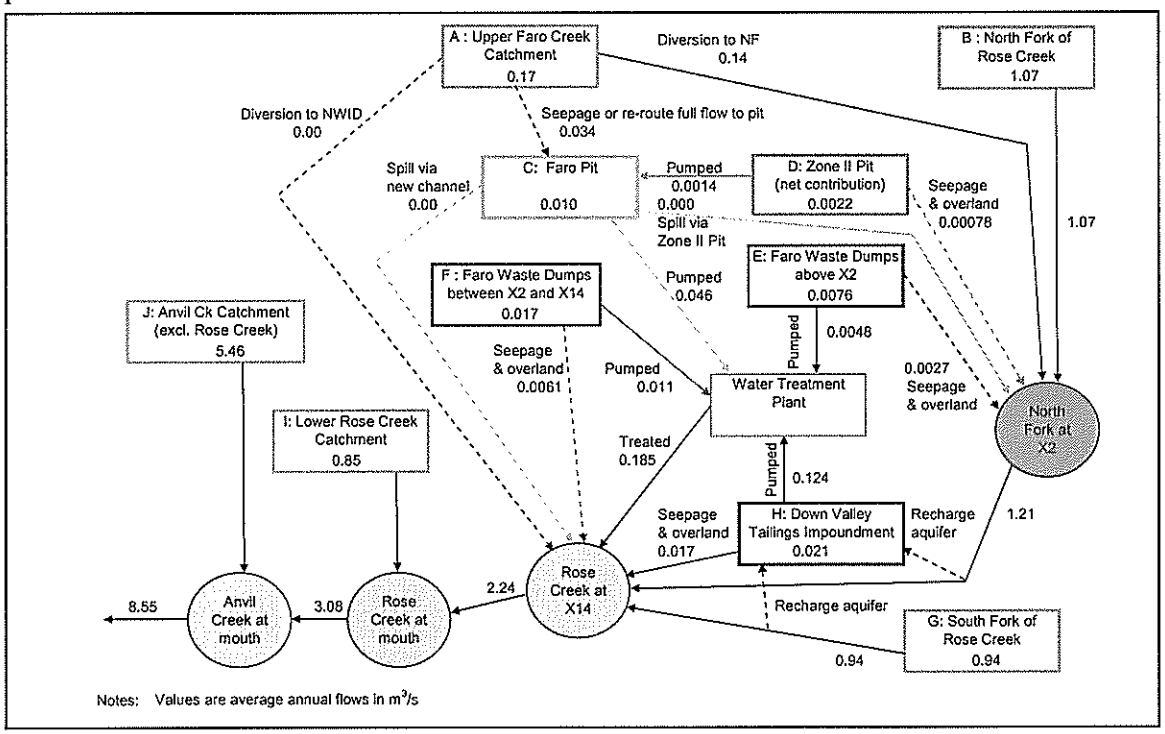

Figure 2-1 Faro Site Water and Load Balance Model Configuration

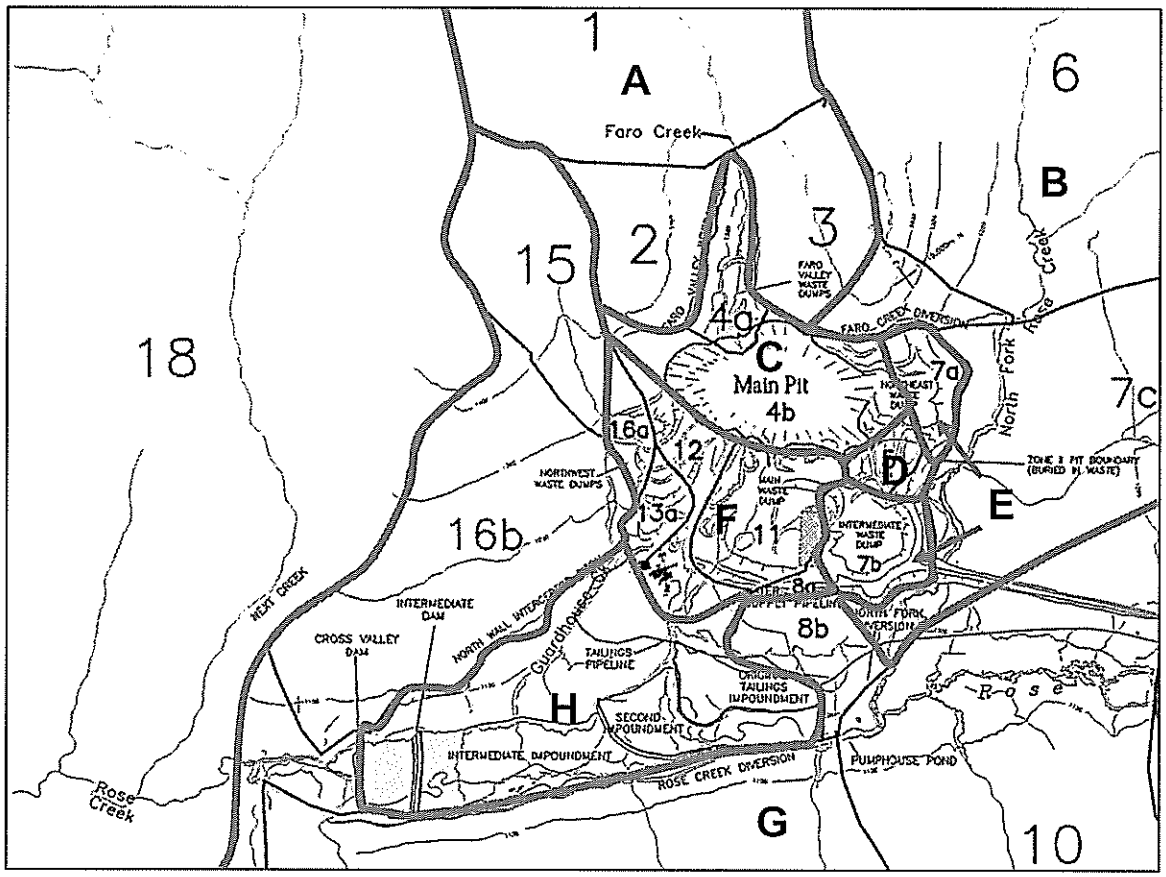

Figure 2-2 Catchments for North Fork at X2, Rose Creek at X14, Rose Creek at Anvil Creek and Anvil Creek

2.1.2 Mean Annual Runoff

The model was set up to represent average climatic conditions. The runoff generated by each sub-catchment was estimated using a technique known as Regional Analysis. This technique employs data from regional streamflow gauging stations to develop empirical relationships that can be used to estimate the runoff conditions at ungauged sites. The empirical relationships relate a streamflow statistic, such as mean annual runoff, to one or more catchment physiographic characteristics, such as elevation or forest cover.

The Regional Analysis used in this study was prepared in 1996, as part of the analyses undertaken to develop an earlier closure plan for the Anvil Range Mining Complex (ICAP, 1996). Figure 2-3 shows the empirical relationship developed to estimate mean annual runoff (MAR) at the minesite. It exploits the well-known observation that MAR tends to increase with increasing elevation in a mountainous region. The y-axis on the figure shows MAR expressed as an equivalent depth in the same units as used for precipitation (i.e., millimeters). The x-axis shows the variable adopted to represent the elevation characteristics of the catchments of the regional streamflow gauging stations, i.e., catchment median elevation. This is the contour that divides a catchment exactly into halves.

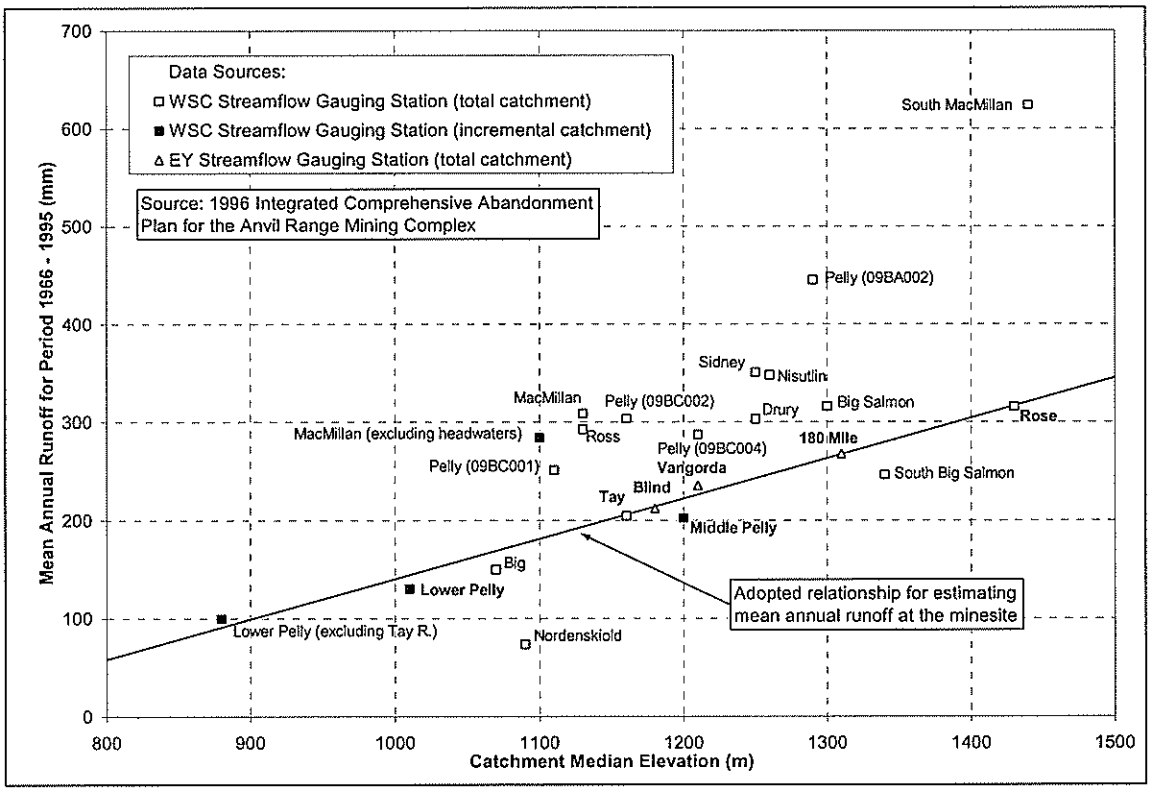

Figure 2-3 Empirical Relationship Developed to Estimate MAR at Faro Minesite

Table 2.1 shows the results of applying the empirical relationship to the 10 sub-catchments used to construct the Faro site model. The adopted MAR values represent the total yield generated by the sub-catchments (i.e., total of overland, interflow and groundwater components of runoff).

Table 2.1 Run-off Estimates for Faro Catchments

Catchment Name/Designation		Subcatchment ID No.	Drainage Area (km^2)	Mean Annual Runoff (mm)
Upper Faro Creek	A	1, 2 & 3a	15.3	352
North Fork (excl. mine development)	B	3b, 6 & 7c	103.9	325
Faro Pit (incremental)	C	4	2.15	247
Zone II Pit	D	5	0.33	206
Waste Dumps above X2	E	7a & 7b	1.18	202
Waste Dumps between X2 and X14	F	8a, 11, 12, 13a & 16a	2.51	213
South Fork (+ inflows to NWID & RCDC)	G	8b, 9, 10, 14, 15, 16b & 17	102.1	290
Tailings Impoundment (incremental)	H	13b	4.1	161
Rose Creek between X14 and mouth	I	18	105	255
Anvil Creek (excl. Rose Creek catchment)	J	19 & 20	643	268
Sum			**979.57**	**276**

To estimate seasonal flows for the sub-catchments, the mean annual runoff was distributed amongst the twelve months of the year using the normalized average monthly runoff distribution for a regional streamflow gauging station. The station selected for this purpose was operated by the Water

Survey of Canada near the mouth of Tay River. The catchment for this stream is located north of the mine development and shares part of its drainage divide with the catchment of Anvil Creek. The elevational characteristics of the Tay River and the Anvil Creek catchments are similar and, accordingly, the runoff patterns on the two streams, particularly during freshet, should coincide reasonably well. The estimated annual distribution for the Tay River is provided in Table 2.2. The table also shows the annual distributions at X23, X13 and the Faro Creek Diversion leakage to the Faro Pit. The flow distribution at X23 was adopted for estimating waste rock seepage flows, and X13 for the distribution of flows from the tailings, as discussed later.

Table 2.2 Hydrographs Adopted for the Faro Mine Site Catchments

Month	Tay (1160 m) Average Monthly Flow	Lake Evaporation	X23 Average Monthly Flow	X13 Average Monthly Flow	Seepage/ Leakage to Faro Pit
	(% MAR)	(mm)	(% MAR)	(% MAR)	(% MAR)
Jan	1.6%	0	5.9%	6.6%	4.4%
Feb	1.2%	0	5.3%	6.7%	4.0%
Mar	1.2%	8	6.7%	8.6%	4.4%
Apr	2.3%	53	9.0%	9.3%	4.7%
May	20.6%	90	10.7%	10.6%	8.2%
Jun	21.2%	112	13.7%	10.3%	16.1%
Jul	14.8%	108	11.6%	8.9%	14.2%
Aug	10.3%	81	8.5%	9.4%	11.8%
Sep	13.9%	31	8.8%	9.0%	10.6%
Oct	7.2%	10	6.7%	8.5%	10.1%
Nov	3.3%	0	6.5%	6.3%	7.1%
Dec	2.4%	0	6.6%	5.8%	4.4%

2.1.3 Faro Pit

A wide variety of closure measures have been proposed for the Faro Pit. To make the model flexible enough to accommodate all of these measures, the water and load balances for the pit allow for up to five inflow streams, six outflow streams and one storage component. The five inflow streams are:

- runoff from area above the pit lake but below the present diversions (viz., Faro Valley Interceptor Ditch and FCDC);
- direct precipitation on pit lake;
- ditch leakage and groundwater bypass (if FCDC is retained or another diversion channel constructed in its place);
- total runoff from area presently controlled by FCDC (if this channel is breached and allowed to enter the pit); and,
- dewatering of the Zone II Pit (if required).

The outflow streams (both existing and potential) comprise:

- abstraction for WTP;

- seepage towards the tailings impoundment (requiring a high pit lake level to achieve high seepage rates);
- spill to a prospective spillway that links the open pit to Rose Creek;
- seepage to the Zone II Pit and the North Fork of Rose Creek (NFRC);
- spill to a prospective spillway that links the open pit to the NFRC; and,
- direct evaporation from the pit lake.

The storage component of the water balance represents seasonal fluctuations in the pit lake volume. This component is only used to simulate options in which the pit water is delivered to a WTP. In this case, the large storage in the pit would be used to regulate the flow so that the feed to the WTP could be near constant for the portion of the year that the WTP was operating. The assumption is made that there is no net accumulation of water in the pit lake over the simulated year (i.e., water is not carried over for subsequent treatment in the following year).

To minimize clutter on the flowsheets, some of the flowlines are combined on the figures presented in this report. For example, the outflows for spillage and seepage towards the NFRK are represented on the flowsheets as a single, combined flowline.

The mean annual precipitation (MAP) for the pit lake was estimated by performing a climatic water balance (i.e., MAP = MAR + mean annual evapo-transpiration). The resulting value for MAP is 433 mm. The average evaporation from ponds and lakes at the mine development was estimated to be 493 mm (ICAP, 1996).

Ditch leakage from the FCDC is a significant inflow component to the Faro Pit. The term "ditch leakage" refers here to water that seeps into the base and sides of the diversion channel, as well as groundwater flows that completely bypass the diversion. Based on detailed water balance analyses carried out during the mine operation, the ditch leakage was estimated to represent about 24% of the total yield generated by the catchment controlled by the FCDC (Catchment A). To account for recent improvements to the FCDC, the ditch leakage rate was reduced somewhat to 20% in the simulations presented in this report. This new value should be validated using recent water balance data for the Faro Pit. (Such an analysis was beyond the scope of this initial study).

2.1.4 Waste Rock

To allow flows and concentrations to be calculated at the key receiving points, the waste dumps at the Faro site were aggregated into two groups, one representing dumps that drain to the North Fork above Station X2 and the other representing dumps that drain to Rose Creek between X14 and X2.

The total yield for the dumps (surface + subsurface) was estimated using the regional relationship between MAR and elevation described in Section 2.1.2. The tacit assumption in using this relationship is that runoff from the dumps is comparable to the runoff generated by the natural ground over which the waste dumps are placed. The possibility exists that the yield from the dumps could be different from the natural ground due to a number of factors, such as: i) snow blowing off

the tops of the dumps during the winter; ii) enhanced evaporation due to airflow through the dumps; and iii) enhanced evaporation due to heat generated by the oxidation process. The estimated yields for the dumps should be validated using data from continuous flow monitoring stations recently established at the toes of the dumps in the old Faro Creek channel. (Such an analysis was outside the scope of this study).

The model allows for three potential fates for the yield generated by the waste dumps. It can: i) be intercepted by a collection system and pumped to a WTP; ii) discharged to a local stream after first percolating through the waste dump; or iii) discharged to a local stream after first running off the waste dump as either surface runoff or shallow groundwater. This last flow stream is of particular importance for closure measures that involve placing a cover on the waste dumps.

For the first two fates, the seasonal pattern of runoff was assumed to be the same as observed at Station X23 (see Table 2.2), a monitoring station located at the toe of the Main Dump. Spot measurements of flow from 1987 to 2004 were used to approximate the average monthly distribution at X23.

For the final fate, the seasonal pattern of runoff was estimated using the same technique adopted for characterizing conditions on natural catchments (i.e., use of the average monthly streamflow distribution for the Tay River, Table 2.2).

2.1.5 Tailings Area

The water and load balance for the tailings area excludes potential contributions from upstream locations in the mine development, such as the Faro Pit, Zone II Pit, the waste dumps and the WTP. This was done to simplify the model structure, but in no way does it introduce errors in the computed flows and concentrations at the four key receiving points. For example, the flowsheet shows a flowline running directly from the Faro Waste Dumps (Subcatchment F) to the node representing Rose Creek at X14. To provide a strict representation of the movement of water through the mine development, this flowline instead would have been shown to pass via the tailings impoundment before reaching X14. This, however, was purposefully avoided because it would have added clutter to the flowsheets and unnecessary complexity to the spreadsheet programming. Based on the assumptions associated with this mass balance model, no differences in the computed flows and concentrations at X14 would have resulted by first routing the water through the tailings area.

As represented in the model, the user should interpret the water and load balance for the tailings area as being the net contribution from sub-catchment H (i.e., the conditions that would exist if indeed the contributions from the upstream mine development were routed around the tailings impoundment and discharged directly into Rose Creek upstream of X14).

The water and load balance for the tailings area comprises three inflow streams and three outflow streams. The inflows are:

- runoff generated by the local catchment of the tailings area (i.e., area above the Cross Valley Dam and below the Rose Creek Diversion Channel, the North Wall Interceptor Ditch and the waste dumps draining to the old Faro Creek channel);
- ditch leakage and groundwater bypass from the Rose Creek Diversion Channel and the North Wall Interceptor Ditch; and,
- groundwater entering the tailings area via the alluvial aquifer filling the Rose Creek valley.

The existing and potential outflows are:

- groundwater intercepted by wells and delivered to the WTP;
- groundwater downstream of the tailings area, which can include: i) groundwater discharge between the toe of the Cross Valley Dam and X14; and ii) flow passing in the alluvial aquifer below X14; and,
- surface spill from the Cross Valley Dam (or if this dam is removed, surface runoff from sub-catchment H at the former location of the dam).

The seasonal pattern for the middle outflow stream was assumed to approximate the pattern observed at Station X13 (see Table 2.2), a weir at the toe of the Cross Valley Dam. The seasonal pattern for the last outflow stream was assumed to be the same as observed on Tay River.

2.2 Vangorda/Grum Site

2.2.1 Model Configuration

Figure 2-4 schematically illustrates the structure of the model used to simulate conditions within the Vangorda Creek catchment. This model was programmed in a similar manner as described above for the Faro site model. The focus of the model was to estimate flows and concentrations at two key points within the catchment: Vangorda Creek at V27 and Vangorda Creek at V8.

As with the other model, the basic building block was the sub-catchment area. The Vangorda Creek was subdivided into seven sub-catchments, as dictated by the locations of diversions, open pits, waste dumps, and the two key points noted above. Figure 2-5 shows the outlines of the seven sub-catchments while Table 2.3 provides their details, including estimated MAR and drainage area. In addition to the sub-catchments, an element was included in the model to represent the operation of a WTP.

The flowlines on Figure 2-4 illustrate all the different ways water can be simulated to move within the model. As with the Faro site model, some of the flowlines are not applicable to all combinations of closure measures. For example, depending on the adopted set of closure measures, seepage from the Grum Waste Dump could be pumped to the Grum Pit, the Vangorda Pit, or directly to the WTP. Allowance was also made for seepage bypass and overland flow from the waste dump to Vangorda Creek. Inclusion of an overland flow component was required to represent conditions if a cover was placed over the waste dump.

For flowsheets used to represent the site water balance, numbers on the flowlines denote average annual flow rates in units of m^3/s. Numbers within the rectangular boxes specify the estimated average annual yield generated by the sub-catchment (surface + subsurface components), also in units of m^3/s. For flowsheets representing load balances, the numbers correspond to average annual total chemical loadings in units of tonnes or kg.

All yields for the sub-catchments were estimated using the MAR-elevation relationship presented in Section 2.1.2. Seasonal runoff patterns were assumed to be the same as observed on Tay River (See Table 2.2).

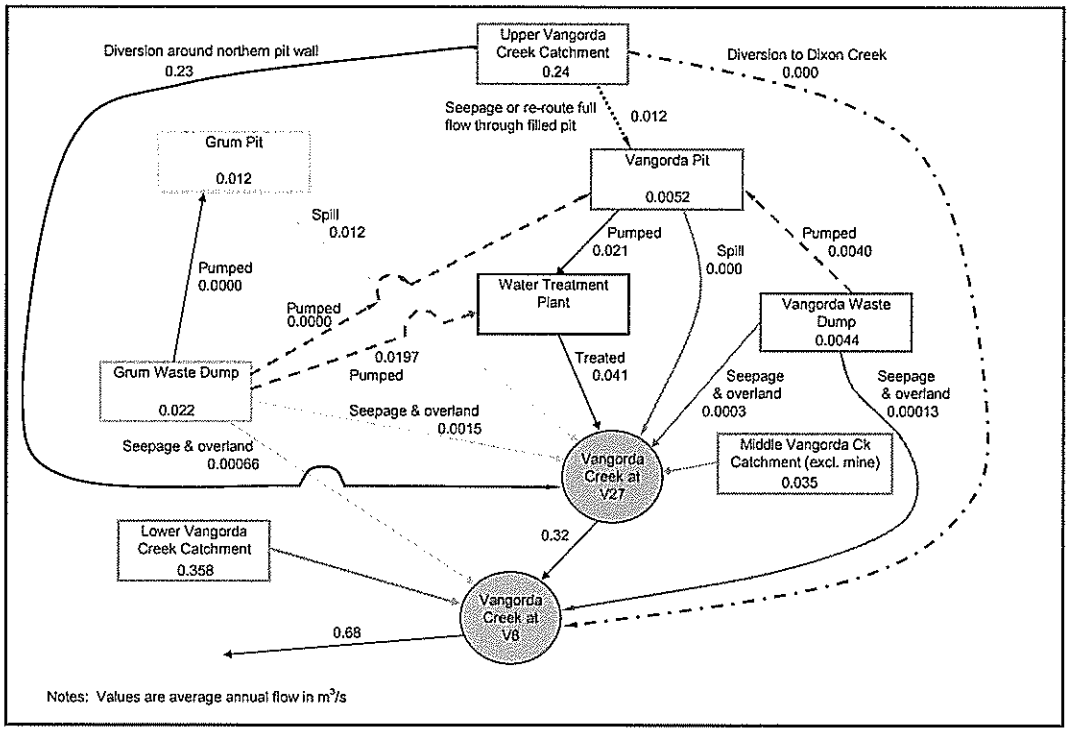

Figure 2-4 Vangorda-Grum Site Water and Load Balance Model Configuration

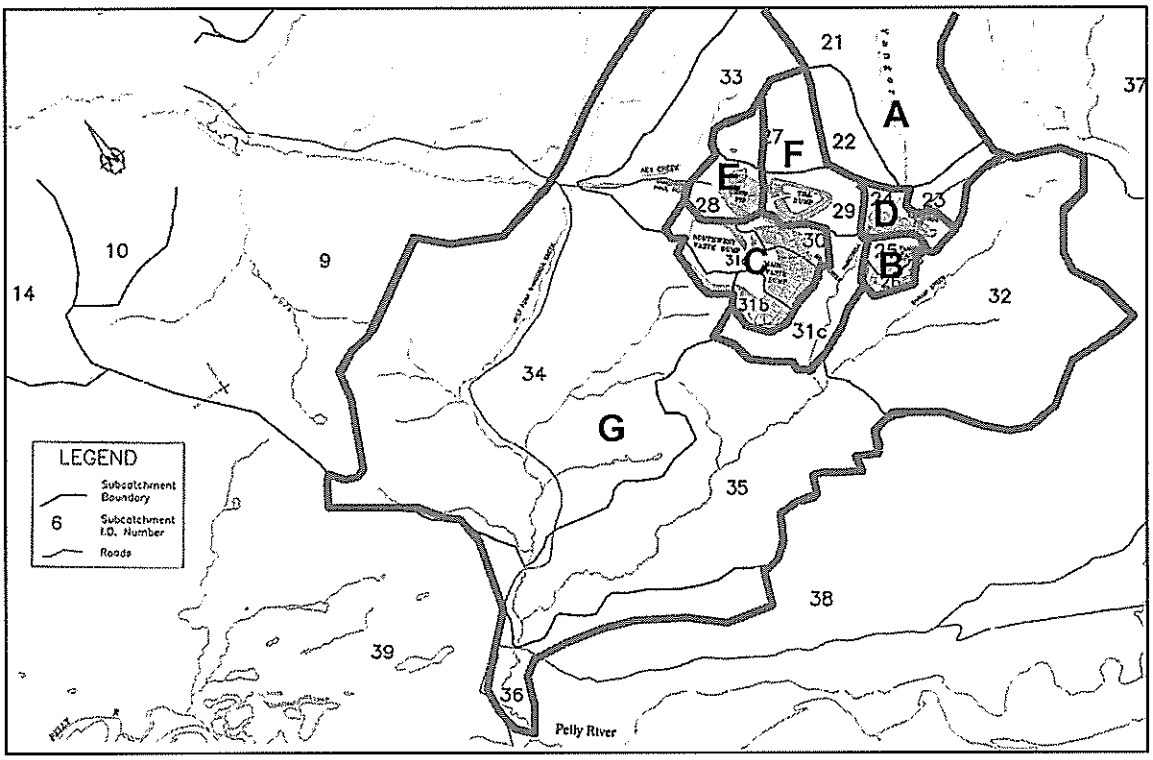

Figure 2-5 Vangorda-Grum Site Catchments at V27 and V8

Table 2.3 Runoff Estimates for the Vangorda-Grum Site Catchments

Catchment Name		Subcatchment ID No.	Drainage Area (km^2)	Mean Annual Runoff (mm)
Upper Vangorda Creek (incl. catchment of NE Interceptor)	A	21, 22 & 23	21.0	368
Vangorda Waste Dump (portion in V27 drainage)	B	25 & 26b	0.50	193
Vangorda Waste Dump (portion in Shrimp Ck drainage)	C	26a	0.22	193
Grum Waste Dump (portion in V27 drainage)	D	30, 31a & 31b	2.81	238
Grum Waste Dump (portion in WF Vangorda Ck drainage)	E	34a	0.085	263
Vangorda Pit	F	24	0.80	206
Grum Pit	G	27a & 28	1.46	270
Vangorda Ck between V1 and V27 (excl. mine development)	H	27b, 29 & 31c	4.84	226
Vangorda Ck between V27 and V8 (excl. mine development)	I	32, 33, 34b, 35 & 36	58.8	192

2.2.2 Vangorda Pit Lake

The water balance for the Vangorda Pit comprises 5 inflow streams, 2 outflow streams and a storage component. The inflow streams are:

- runoff generated by the local catchment, i.e., net precipitation on lake surface plus runoff from area above lake but below the current Vangorda Creek Diversion channel (VGDC);
- ditch leakage and groundwater bypass (if the VCDC is retained and upgraded);
- total runoff from area currently controlled by the VCDC (if this diversion is breached and the total flow of Vangorda Creek is directed to the pit);
- runoff from Vangorda Waste Dump that is intercepted and pumped to Vangorda Pit; and,

- runoff from Grum Waste Dump that is intercepted and pumped to Vangorda Pit.

The outflow streams are:

- abstraction for WTP; and
- water spilled from open pit to Vangorda Creek (applicable for flow-through options).

Storage within the Vangorda Pit would be used to temporarily store a portion of the inflows during high flow periods for subsequent delivery to the WTP during low flow periods. The model was programmed to simulate this regulation of flows to the WTP. As average climatic conditions are simulated by the model, it was assumed that there is no net change in storage by the end the simulated year (i.e., the excess water in the pit is assumed to be treated by the WTP in the same year it accumulates).

Ditch leakage from the VCDC is significantly less than experienced at the Faro Pit. Based on a reconstruction of the Vangorda Pit water balance for the period 1992 to 1995, the ditch leakage (including groundwater bypass) amounted to about 5% of the total yield of the catchment controlled by the VCDC. The seasonal distribution for the ditch leakage was assumed to match the same pattern adopted for the Faro Pit (which was estimated by reconstructing the Faro Pit water balance during various periods when the mine was operating, including the period when the pit was used as a repository for tailings).

2.2.3 Grum Pit Lake

The water balance for this open pit comprised two inputs and one output. The inputs are:

- runoff into the open pit, including net precipitation on surface of lake; and,
- runoff from the Grum Waste Dump that is intercepted and pumped to the open pit.

The single output is spillage from the open pit to Vangorda Creek at a point above Station V27.

The current diversion ditch located to the northeast of the pit (viz., Grum Northeast Interceptor Ditch) was assumed to be breached for all closure measures examined in this study.

2.2.4 Vangorda Waste Rock

The average annual yield generated by the Vangorda Waste Dump was estimated using the regional relationship between MAR and elevation. Because this relationship is based on measurements on streams with minimal impact from human activity, the resulting MAR estimates can be thought of as representing the yield of natural catchment areas. As described in the discussion on the Faro Waste Dumps, the possibility exists that waste dumps may generate less yield than natural catchment areas. Recent flow measurements at the toe of the Vangorda and Grum Waste Dumps should be used to check the accuracy of the yield estimates made by the MAR-elevation relationship. Such an analysis was beyond the scope of the current study. In performing the check, it should be noted that the waste dumps may not have reached their field capacities (i.e., there may still be a net increase in the stored moisture each year within the voids of the waste dumps).

The estimated yields used in the model represent total runoff or, in other words, the sum of the overland, interflow and deep groundwater components of runoff. The sub-catchment for the Vangorda Waste Dump used in the model includes the area controlled by the Little Creek Dam, as well as the footprint of the dump.

The runoff from the Vangorda Waste Dump has the following five potential fates:

- pumped to the Vangorda Pit for subsequent treatment by the WTP;
- seepage bypass to Vangorda Creek above V27;
- overland flow to Vangorda Creek above V27 (particularly for case in which a cover is placed on the dump);
- seepage bypass to Vangorda Creek below V27 (a portion of the waste dump lies within the catchment of Shrimp Creek, which discharges to Vangorda Creek below V27); and,
- overland flow to Vangorda Creek below V27.

The adopted seasonal distribution for the seepage components listed above, including water pumped to the Vangorda Pit, was assumed to be the same as observed at the weir below the Main Dump on the Faro side (i.e., Station X23). Overland components were assumed to mimic the average seasonal distribution of Tay River.

2.2.5 Grum Waste Rock

The water balance for the Grum Waste Dump was handled in the same general manner as described above for the Vangorda Waste Dump. The only differences were in the number and types of fates that the runoff from the dump could be subject to. The model allowed for a total of seven potential fates, as follows:

- pumped to Vangorda Pit for subsequent treatment by WTP;
- pumped to Grum Pit;
- pumped directly to the WTP;
- seepage bypass to Vangorda Creek above V27;
- overland flow to Vangorda Creek above V27;
- seepage bypass to Vangorda Creek below V27 (a small portion of the waste dump lies within the catchment of the West Fork of Vangorda Creek, which discharges to Vangorda Creek well downstream of V27); and,
- overland flow to Vangorda Creek below V27.

2.3 Receiving Water Quality

A third model was developed to examine the impact of the Anvil Range Mine Complex on the water quality of the Pelly River. Figure 2-6 is a schematic of the model. Circles indicate nodes where water quality was estimated while boxes represent sub-catchment areas. The model was set up to estimate concentrations at three key points within the Pelly River: i) at a point just downstream of Vangorda Creek; ii) at a point just downstream of Anvil Creek; and iii) at Pelly Crossing, some 50 km upstream of the confluence of the Pelly and Yukon Rivers.

The model was based on observed flow records at the first and third nodes listed above. The Water Survey of Canada operates streamflow gauging stations at both sites. The station at Pelly Crossing (09BC001) was established in 1951 and commands a catchment area of 49,000 km^2. The station below Vangorda Creek (09BC004) has operated since 1972 and has a catchment area of 22,100 km^2. The average monthly flows at these stations for their full periods of records were used to quantify the flows at the corresponding nodes in the model.

For the purpose of developing the model, the Pelly River was subdivided into the following five sub - catchments:

- Pelly River catchment above Vangorda Creek;
- Vangorda Creek at V8;
- Pelly River incremental catchment between Vangorda and Anvil Creeks;
- Anvil Creek at the mouth; and,
- Pelly River incremental catchment between Anvil Creek and Pelly Crossing.

The flows and associated chemical loadings for the Vangorda and Anvil Creek catchments were extracted from the models described above in Sections 2.1 and 2.2. The runoff for the sub-catchment representing the upper Pelly River drainage was estimated by subtracting the estimated flows of Vangorda Creek from the measured flows at Station 09BC004. The flows for the incremental Pelly River catchment between the confluences of Vangorda and Anvil Creeks was estimated using the regional relationship between MAR and elevation. Finally, the runoff from the lower catchment of Pelly River was obtained by subtracting the estimated flows in the Pelly River below Anvil Creek from the measured flows at Station 09BC001.

The average annual flows from Vangorda Creek and Anvil Creek represent 0.2% and 2.2%, respectively, of the total yield of the Pelly River at Pelly Crossing.

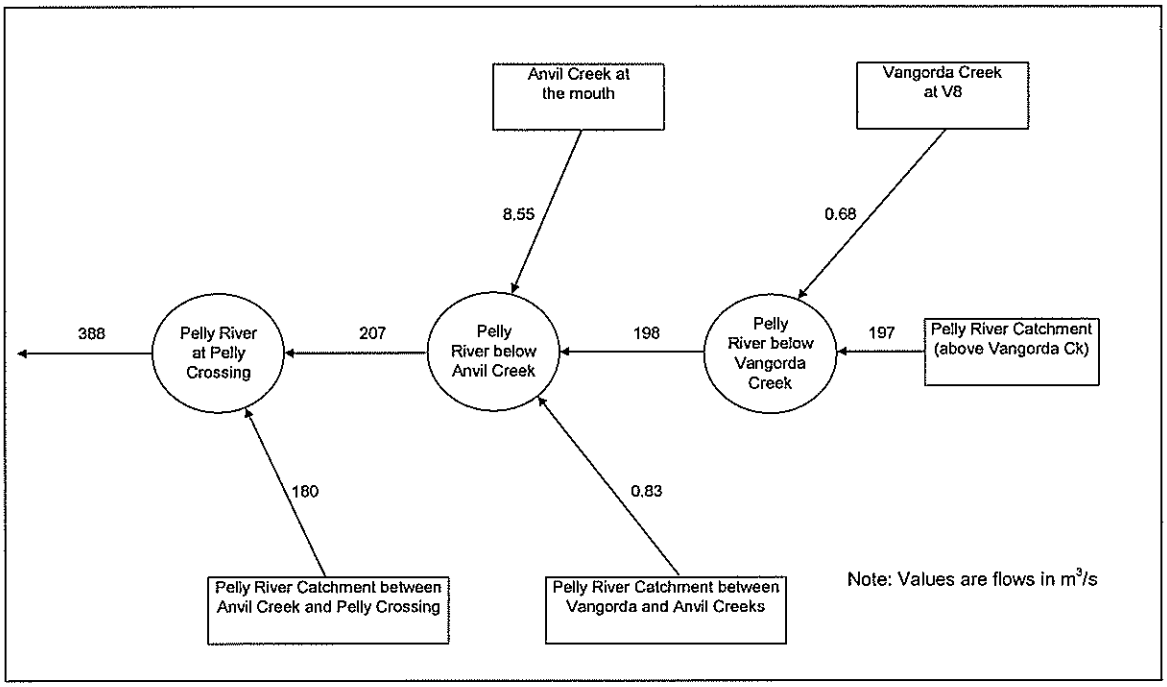

Figure 2-6 Schematic of Receiving Water Quality Model

3 Sources and Loadings

3.1 Background Water Quality

3.1.1 Faro Site

Estimates of background water quality data were prepared by SENES Consultants, primarily based on water quality monitoring results for R7 and R6. Because of the limited database, average concentrations were calculated and no attempt was made to derive monthly or seasonal averages. A summary of the background concentrations adopted for each of the Faro Site Creeks is provided in Table 3.1

Table 3.1 Background Water Quality Adopted for the Faro Mine Site Catchments

Parameter	Units	Faro Creek	North Fork	Rose Ck S/Fork	Anvil Ck / Lower Rose Ck
Ag	mg/L	0.0001	0.0001	0.0001	0.0001
Al	mg/L	0.0659	0.0659	0.0659	0.0659
Alkalinity*	mg/L	94.9	94.9	94.9	94.9
As	mg/L	0.0010	0.0010	0.0010	0.0010
Ca	mg/L	29.6	29.6	29.6	29.6
Cd	mg/L	0.0002	0.0002	0.0002	0.0002
Cl	mg/L	0.0002	0.0002	0.0002	0.0002
Co	mg/L	0.0006	0.0006	0.0006	0.0006
Cu	mg/L	0.0045	0.0045	0.0045	0.0045
Fe	mg/L	0.264	0.264	0.264	0.264
K	mg/L	0.921	0.921	0.921	0.921
Mg	mg/L	6.54	6.54	6.54	6.54
Mn	mg/L	0.0283	0.0283	0.0283	0.0283
Na	mg/L	2.26	2.26	2.26	2.26
Ni	mg/L	0.0011	0.0011	0.0011	0.0011
Pb	mg/L	0.0017	0.0017	0.0017	0.0017
SO4	mg/L	0.0038	0.0038	0.0038	0.0038
Zn	mg/L	0.0256	0.0256	0.0256	0.0256

Note: * alkalinity in units of mg $CaCO_3$ eq/L

3.1.2 Vangorda / Grum Site

Estimates of background water quality prepared by SENES Consultants for the Grum Vangorda site are provided in Table 3.2. As for the Faro Site, these estimates represent average concentrations for Stations V1 and V4.

3.1.3 Pelly River

A summary of the background water quality data adopted for the Pelly River is provided in Table 3.3.

Table 3.2 Background Water Quality Adopted for the Vangorda-Grum Site Catchments

Parameter	Units	Back Ground Concentrations
Ag	mg/L	0.0005
Al	mg/L	0.0829
Alkalinity*	mg/L	21.0
As	mg/L	0.0037
Ca	mg/L	35.1
Cd	mg/L	0.0003
Cl	mg/L	0.0003
Co	mg/L	0.0011
Cu	mg/L	0.0178
Fe	mg/L	0.183
K	mg/L	0.735
Mg	mg/L	10.8
Mn	mg/L	0.0159
Na	mg/L	2.22
Ni	mg/L	0.0039
Pb	mg/L	0.0037
SO4	mg/L	10
Zn	mg/L	0.0137

Note: * alkalinity in units of mg $CaCO_3$ eq/L

Table 3.3 Background Water Quality Adopted for the Vangorda-Grum Site Catchments

Parameter	Units	Pelly Below VG Creek	Pelly at Pelly Xing	Pelly at Ross River
Ag	mg/L	n/d	n/d	n/d
Al	mg/L	n/d	n/d	n/d
Alkalinity	mg/L	96.0	98.7	103.1
As	mg/L	0.0006	0.0006	
Ca	mg/L	35.04	36.4	37.6
Cd	mg/L	0.0005	0.0005	0.0010
Cl	mg/L	0.469	0.549	0.331
Co	mg/L	0.0010	0.0010	0.0010
Cu	mg/L	0.0050	0.0062	0.0053
Fe	mg/L	1.34	1.38	0.0214
K	mg/L	0.0043	0.0072	0.0082
Mg	mg/L	10.4	10.5	n/d
Mn	mg/L	0.0466	0.0586	0.014
Na	mg/L	1.51	2.30	1.56
Ni	mg/L	0.0010	0.0010	0.0010
Pb	mg/L	0.0043	0.0072	0.0082
SO4	mg/L	32.6	34.3	33.9
Zn	mg/L	0.0222	0.0278	0.00836

Note: * alkalinity in units of mg $CaCO_3$ eq/L

3.2 Site Component Sources

Input loadings for each of the sources that are accounted for in the water and load balance calculations, respectively for the Faro and the Vangorda/Grum areas, are taken directly from the estimates that have been derived elsewhere as follows:

- Waste rock, oxide fines and sulphides cell source loadings are taken directly from the water quality predictions for these sources as described in "Water Quality Estimates for Anvil Range Waste Rock" SRK Report 1CD003.34, June 2004.
- Pit wall rocks and pit lake loadings were obtained directly from the water quality and loading estimates presented in "Anvil Range Pit Lakes Evaluation of In-Situ Treatment", SRK Report 1CD003.072, July 2006.
- The source term loadings for the tailings were obtained from the calculations that are presented in a memorandum prepared by SRK, attached as Appendix B in Robertson GeoConsultants Report No. 118001/1, September 2005.

The derivation of the source terms for each source is described in the referenced reports respectively and is not repeated herein. To illustrate the range considered, Table 3.4 gives examples of assumed contaminant concentrations in Faro Mine Area seepage.

Table 3.4 Source Term Water Quality – Faro Waste Rock

Case	Seepage Type	pH	Acidity	Alkalinity	Al	Cd	Co	Cu	Fe	Mn	Ni	Pb	SO4	Zn
Future 1	F1	7.3	14	185	0.2	0.01	0.01	0.01	0.03	0.11	0.06	0.06	722	2.5
Future 1	F2 Waste	6.7	51	137	0.3	0.03	0.052	0.04	1.9	4.9	0.17	0.06	1701	26
Future 1	F3 Waste	3.9	968	16	15	0.16	0.30	2	76	10	0.56	0.36	1614	109
Future 1	F3 Ore	3.4	14470	6	207	6.5	5.0	92	2773	388	3.9	1.5	17107	4260
Future 1	G1a	7.5	10	325	0.2	0.01	0.01	0.01	0.03	0.16	0.05	0.05	255	0.0
Future 1	G1b	7.3	23	526	0.2	0.01	0.011	0.01	0.0	0.1	0.38	0.05	1093	3
Future 1	V2	6.4	352	134	0.3	0.11	1.37	0.01	40	67	2.57	0.08	2878	184
Future 1	V3	4.1	6279	26	40	3.53	9.52	29	706	996	8.03	1.03	15482	2948
Future 2	F1	7.3	14	185	0.2	0.01	0.01	0.01	0.03	0.11	0.06	0.06	722	2.5
Future 2	F2 Waste	6.7	51	137	0.3	0.03	0.052	0.04	1.9	4.9	0.17	0.06	1701	26
Future 2	F3 Waste	3.9	968	16	15	0.16	0.30	2	76	10	0.56	0.36	1614	109
Future 2	F3 Ore	3.4	14470	6	207	6.5	5.0	92	2773	388	3.9	1.5	17107	4260
Future 2	G1a	7.5	10	325	0.2	0.01	0.01	0.01	0.03	0.16	0.05	0.05	255	0.0
Future 2	G1b	7.3	23	526	0.2	0.01	0.011	0.01	0.0	0.1	0.38	0.05	1093	3
Future 2	V2	6.4	352	134	0.3	0.11	1.37	0.01	40	67	2.57	0.08	2878	184
Future 2	V3	4.1	6279	26	40	3.53	9.52	29	706	996	8.03	1.03	15482	2948
Future 3	F1	8.1	29	242	0.2	0.01	0.01	0.01	0.03	0.422	0.09	0.15	2470	5.3
Future 3	F2 Waste	5.8	115	407	1.6	0.09	0.15	0.5	20.2	19	0.6	0.23	3860	51
Future 3	F3 Waste	2.2	8750	92	73	0.85	1.5	8.06	416	64.3	3.2	1.6	4780	751
Future 3	F3 Ore	2.2	49500	31	986	15.5	20	559	15100	2360	15	3.0	59000	10900
Future 3	G1a	6.87	40	405	0.20	0.01	0.01	0.01	0.03	1.9	0.07	0.05	575	0.028
Future 3	G1b	6.67	69	700	0.20	0.01	0.03	0.01	0.03	0.43	0.59	0.05	1350	5.1
Future 3	V2	6.03	755	289	0.40	0.28	3.0	0.02	127	139	5.3	0.10	4440	412
Future 3	V3	2.55	16500	160	339	8.5	22	180	3040	2600	17	2.5	33400	6990

3.3 Site Component Source Distributions

Since some of the waste rock piles, as identified in the waste rock seepage quality assessment, straddle some of the sub-catchments it was necessary to estimate the relative contaminant contributions from each of the major site components to the each of the sub-catchments. The estimated distributions for the Faro Site are shown in Table 3.5. Note that the source codes correspond to the abbreviated waste rock dumps names used in the waste rock dump seepage water quality assessment.

The source distributions for the Vangorda-Grum Site are more clearly associated with the sub-catchments selected and do not require a similar estimation of source contribution distributions.

Table 3.5 Estimated Percentage of Each Source Contributing to Each Catchment

	Sub-catchment Name				
	Faro Pit (incr.)	Zone II Pit	Waste Dumps above X2	Waste Dumps between X2 and X14	Tailings Area (incremental)
	C	D	E	F	H
Sources	4	5	7a & 7b	8a, 11, 12, 13a & 16a	13b
Pitwalls	100				
Tailings					100
FVN, FVS	100				
NEU	40		60		
NEL	30	10	60		
NEO	100				
RZD	20	80			
RD	20	10		70	
SWPW	70			30	
ID		10	90		
ZII-W		100			
ZII-E		90	10		
ME			20	80	
OHRW			40	60	
OHRE			100		
NFRD			100		
MW				100	
LGSPA, LGSPC, FTW, FTE				100	
OX_SPB				100	
NWU, NWM, NWL				100	
MME, MMW				100	
LPL, UPLMMW				100100	
UPLLPL				100100	

3.4 Treated Effluent Water Quality

Some alternatives require that seepage and other streams be collected and treated. For the purpose of assessing the loadings that will result from conventional high density sludge (HDS) treatment, the average water quality that resulted from the amenability testing that was undertaken as part of the water treatment assessment (SRK, 2005) was used for the treated effluent concentrations. These concentrations also are in agreement with values measured in full-scale systems elsewhere. The estimated concentrations are summarised in Table 3.5. Note that calcium and sulphate are calculated based on ion balances since treatment of water with elevated sulphate concentrations will result in the precipitation of gypsum. Equilibrium concentrations for these two parameters were therefore estimated by calculation. Input options were included in the water and load balance that allowed for the selection of either a six or a twelve month treatment period.

In cases where biological treatment was included as part of the treatment option for pit lakes, rates of contaminant removal (in $kg/m^2/day$) were obtained from the biological treatment pit lake treatment assessment. These rates of removal were then applied for the summer months only, over the entire surface area of the pit lake. The effluent water quality was then calculated based on the seasonal mass balance for the pit lake, i.e. the concentrations at the end of the season were obtained by calculating the residual mass in the pit lake, which equalled the mass dissolved contaminant in the lake at the start of the season plus contained plus the mass loading during the season less the overall mass removed during the season, and dividing that by the volume of water in the pit lake or mixing zone, as applicable.

Table 3.6 Estimated Source Concentrations for Treated Effluent

Parameter	Units	Concentration
Acidity*	mg/L	0.0
Ag	mg/L	0.0001
Al	mg/L	0.01
Alkalinity*	mg/L	17.5
As	mg/L	0.005
Ca	mg/L	calculated
Cd	mg/L	0.005
Co	mg/L	0.005
Cu	mg/L	0.005
Fe	mg/L	0.015
K	mg/L	8.23
Mg	mg/L	19.7
Mn	mg/L	0.0362
Na	mg/L	18.4
Ni	mg/L	0.025
Pb	mg/L	0.025
SO4	mg/L	calculated
Zn	mg/L	0.0548

4 Water Quality Modelling

4.1 Introduction

Various example closure alternatives were developed for the minesite areas by selecting different combinations of closure methods for each of the major site components. These example alternatives are described elsewhere (SRK, 2006b). While combinations of example alternatives can be modelled in their entirety, it is more expedient to determine downstream concentrations from each alternative. It is then relatively easy to combine that outcome with the concentrations arising from example alternatives for other areas. This modelling approach was therefore adopted.

In the following section, a series of base case evaluations are first completed, as discussed in Section 4.2. Sensitivity analyse were then completed on selected base case evaluations as discussed in Section 4.3. Finally, combinations of example alternatives were run as discussed in Section 4.4.

4.2 Base Case Examples

4.2.1 Faro Mine Site

Two base case assessments were completed for the Faro Minesite. The input assumptions are summarised in Table 4.1. In the first case (FM01) flow-through conditions were assessed for the pit Faro Pit. In this case the pit would be allowed to fill and it was assumed that the overflow would discharge via a constructed channel to X14 in Rose Creek. The second case (FM02), it was assumed that the Faro Pit would remain isolated and that the Faro Creek diversion would be upgraded. It was further assumed that the pit would act as a central sump to which collected seepage would be pumped, and from which water would be abstracted for treatment and discharge to maintain the site water balance.

For each case three source concentration assumptions were used for the waste rock dumps, consistent with the seepage water quality estimates. These were termed "Future 1" "Future 2" and "Future 3" respectively. The steady state contaminant loadings to the open pit after the maximum flood elevation was reached were used in all estimates. The results are provided in Appendix A.

4.2.2 Rose Creek Tailings Area

Three base case assessments were completed for the Rose Creek Tailings area. The input assumptions are summarised in Table 4.2. In the first case (RCT01) it is assumed that the current situation will be stabilized by placing a till cover and upgrading the Rose Creek Diversion. As for the waste rock, three source loading estimates (Future 1 to 3) were assessed.

Table 4.1 Assumptions Adopted for Faro Minesite Base Case Assessments

Case / Component	Variants	Method	Regrade Footprint Increase (%)	Regraded Final Footprint Area (ha)	MAP (mm)	MAR (mm)	Infiltr. (mm or % of MAP)	G/Water Collection Efficiency	Volume Collected Drainage (m3)	Volume of Released Drainage (m3)
FM01 - Flow-through pit										
Faro Creek		Direct into pit		1549		341				5,282,090
Faro Valley Dumps	Cover in Situ	Rudimentary Cover, seepage to pit	8%	19.5	400	341	20%	100%	15,575	-
Low Grade Ore / Oxide Fines	Consolidate and cover	Very Low Infil Cover; seepage to pit	8%	7.4	400	341	0.5%	100%	148	-
Sulphide Cells		Low Infil Cover; seepage collection	0%	20.4	400	341	5%	90%	3,681	409
Waste Rock Dumps		Rudimentary Cover, seepage to pit	8%	303.8	400	341	20%	90%	218,749	24,305
Zone II Pit	Pump to Faro Pit	Rudimentary Cover, seepage to pit	0%	23.0	400	341	20%	90%	16,594	1,844
Emergency Tailings Area		Relocate to pit Lime amended						95%		
Faro Pit	Biological treatment	Flow-through		1720	400	341		100%	5,865,200	-
Treatment Plant	Zone II Variant	Lime treatment - contingency								
FM02 - Improved Faro Creek Diversion										
Faro Creek		Reroute to the west		1549	400	341				5,282,090
Faro Valley Dumps	Cover in Situ	Rudimentary Cover, seepage to pit	8%	19.5	400	341	20%	100%	15,575	-
Low Grade Ore / Oxide Fines	Consolidate and cover	Very Low Infil. Cover; seepage collection	8%	7.4	400	341	0.5%	90%	133	15
Sulphide Cells		Low Infil. Cover; seepage collection	1%	20.7	400	341	5%	90%	3,717	413
Waste Rock Dumps		Rudimentary Cover, seepage to pit	8%	303.8	400	341	20%	90%	218,749	24,305
Zone II Pit	Pump to Faro Pit	Rudimentary Cover, seepage to pit	1%	23.3	400	341	20%	90%	16,760	1,862
Emergency Tailings Area		Relocate to pit Lime amended						95%		
Faro Pit	Seepage Storage	Isolated pit		171		341		100%	583,110	-
Treatment Plant	U/S of Tailings Deposit	Lime treatment of Seepage							838,045	

Table 4.2 Summary of Assumed Input Conditions for the base Case Rose Creek Tailings Assessments

Case / Component	Variants	Method	Footprint Area (ha)	MAP (mm)	MAR (mm)	Infiltration (mm or % of MAP)	Collection Efficiency
RCT01 Stabilize Current Situation							
Original Tailings		Waste Rock and Til Cover - 40 mm infiltration	38.6	400	341	10%	98%
Secondary Tailings		Waste Rock and Til Cover - 40 mm infiltration	57	400	341	10%	98%
Intermediate Tailings		Waste Rock and Til Cover - 40 mm infiltration	76.8	400	341	10%	98%
Lime Treatment	U/S of RC Tailings Deposit						
RCT02 Complete Tailings Relocation							
Original Tailings		Lime amend & relocate	Contaminated groundwater only			-	-
Secondary Tailings		Lime amend & relocate	Contaminated groundwater only			-	-
Intermediate Tailings		Lime amend & relocate	Contaminated groundwater only			-	-
Lime Treatment	U/S of RC Tailings Deposit						
RCT03 Partial Tailings Relocation							
Original Tailings		Waste Rock and Til Cover - 40 mm infiltration	38.6	400	341	10%	98%
Secondary Tailings		Waste Rock and Til Cover - 40 mm infiltration	57	400	341	10%	98%
Intermediate Tailings Lime Treatment	U/S of RC Tailings Deposit	Lime amend & relocate - separate treatment system					

In the second case (RCT02) all of the tailings were assumed to be relocated to the Faro Pit. In this case it was assumed that once the tailings have been relocated some groundwater would remain that would be 'flushed' away in time. In this case the Future 1 source loadings reflect the initial levels of groundwater contamination. The subsequent source loadings are assumed to diminish to negligible levels so that no Future 2 or Future 3 evaluations were necessary.

In the third case (RCT03) it was assumed that the tailings would be partially relocated. For this scenario, the tailings in the Intermediate Impoundment would be relocated to the pit whereas the tailings in the Secondary and Original impoundments would remain in place and be covered with a till cover. Three source concentration estimates were evaluated for the tailings remaining in place.

The modelling results are presented in Appendix B.

4.2.3 Vangorda-Grum Site

Two base case evaluations were completed for the Vangorda-Grum site. The input assumptions are summarised in Table 4.3. In the first case (VG01) it was assumed that the Vangorda dump and oxide fines will be backfilled to the Vangorda Pit. The backfill will then be covered with a low infiltration cover system, and Vangorda Creek would be routed across the backfill. For the second case, the Vangorda Pit would remain open as an isolated pit, the Vangorda dump would be stabilized in place. Contaminated seepage would be collected and treated in a high density sludge (HDS) treatment system.

As for the Faro site, three source concentration assumptions were used for the waste rock dumps, consistent with the seepage water quality estimates. The steady state contaminant loadings to the Vangorda (as applicable) and Grum open pits, after the maximum flood elevation was reached, were used in all estimates. The results are presented in Appendix C.

4.3 Sensitivity Analyses

A series of sensitivity analyses were completed to assess changes in water quality affected by changes in the effectiveness of various rehabilitation methods. The sensitivity runs were completed on selected base cases, as shown in Table 4.4. Changes in the base case assumptions are highlighted in the table. As shown in the table, the sensitivity analysis assessed primarily i) ground water collection efficiency, ii) cover efficiency (infiltration), and iii) changes in the loading effected by, for example, cover placement. The results are contained in Appendix D.

Table 4.3 Summary of Vangorda-Grum Base Case Assumptions

Case / Component	Method	Regraded Footprint Area (ha)	MAP (mm)	MAR (mm)	Infiltration (% MAP)	Collection Efficiency	Volume of Collected Drainage (m3)
VG01 Vangorda Pit Backfill							
Grum Pit	Biological treatment	150		270		100%	405,000
Ore Transfer Pad	Rudimentary Cover, seepage to Grum pit	13.8	450	270	20%	90%	11,206
Grum Waste Dump	Rudimentary Cover, seepage to Grum pit	132.1	450	270	20%	90%	107,041
Sulphide Cell	Low Infil Cover; seepage to Grum	21.5	450	270	5%	90%	4,344
Vangorda Creek	Flow across pit						
Vangorda Pit	Backfilled; low infiltration cover; seepage to Grum	60	380	362	5%	98%	11,172
Vangorda Waste Dump	Backfilled						
Oxide fines	Backfilled						
VG02 Stabilize Current Situation							
Grum Pit	Biological treatment	150		341		100%	511,500
Ore Transfer Pad	Rudimentary Cover; seepage to Grum pit	13.8	400	341	20%	90%	9,961
Grum Waste Dump	Rudimentary Cover; seepage to Grum pit	132.1	400	341	20%	90%	95,147
Sulphide Cell	Low Infil Cover; seepage collected	21.5	400	341	5%	90%	3,861
Vangorda Creek	Diverted around pit						
Vangorda Pit	Pump and treat	60	380	362	5%	100%	11,400
Vangorda Waste Dump	Low Infil Cover; seepage collection	54.4	400	341	5%	90%	9,790
Oxide fines	Low Infil Cover; seepage collection	4.2	400	341	5%	90%	760
Water Treatment	HDS at Vangorda Pit						

Maybe insert a note about why the Vangorda Pit MAP is lower than the rest of the site.

Table 4.4 Summary of Sensitivity Run Assumptions

Location	Run	Case	Capture Efficiency (%)			Cover % Infiltration		Load Increase %		Source
			WR	ETA	TAILS	Rudimentary	Low Infil	Rudimentary	Low Infiltr	
Mining Area	SF01	FM02	**70**	98	n/a	20	5	0	0	F2
	SF02	FM02	**95**	98	n/a	20	5	0	0	F2
	SF03	FM02	90	**90**	n/a	20	5	0	0	F2
	SF04	FM02	90	**99**	n/a	20	5	0	0	F2
	SF05	FM02	90	98	n/a	**15**	**3**	0	0	F2
	SF06	FM02	90	98	n/a	**25**	**8**	0	0	F2
	SF07	FM02	90	98	n/a	**15**	5	0	0	F2
	SF08	FM02	90	98	n/a	**25**	5	0	0	F2
	SF09	FM02	90	98	n/a	20	**3**	0	0	F2
	SF10	FM02	90	98	n/a	20	**8**	0	0	F2
	SF11	FM02	90	98	n/a	20	5	**50**	**100**	F2
	SF12	FM02	90	98	n/a	20	5	**50**	0	F2
	SF13	FM02	90	98	n/a	20	5	0	**100**	F2
Tailings Area	SF15	RCT01	n/a	n/a	**97**	10	n/a	n/a	n/a	F2
	SF16	RCT01	n/a	n/a	**99**	10	n/a	n/a	n/a	F2
	SF17	RCT01	n/a	n/a	98	**20**	n/a	n/a	n/a	F2
	SF18	RCT01	n/a	n/a	98	**5**	n/a	n/a	n/a	F2

Note: Shaded/bold indicate changes from base case assessment

4.4 Supplemental Sensitivity Runs

Supplemental sensitivity runs were completed to provide additional water quality estimates that may be used to assess alternatives not covered by the initial series of sensitivity runs. These include options for "minimize construction" and "minimize water treatment". The input assumptions for these additional sensitivity runs are summarised in Table 4.5. The results are provided in Appendix E.

4.5 Discussion and Usage of Results

The results were evaluated in two ways. First, direct comparison of the base case and sensitivity runs provided an indication of the effect on water quality that may result from improved performance of a method (e.g. cover performance or a water collection efficiency). Second, by combining the results for the major site components for any combination of method efficiency, the performance of a complete alternative can be derived. The latter however requires a correction to prevent 'double accounting' of background water quality.

It is impractical to discuss in detail all of the results that have been generated. In the following sections examples outputs are provide to guide the reader in the interpretation of the results.

4.5.1 Base Case / Sensitivity Results

The water quality model predicts the water quality in the receiving environment as a monthly average concentration for each month of the year. As noted before, the background water quality is assumed to be constant throughout the year, which means the shape of the curve provides a direct indication of the change brought about by the particular source being assessed. For example, the predicted zinc concentration at X14 for the second Faro Mine Site base case (FM02) is shown in Figure 4.1 for Future 2 source loadings. As an example the figure also illustrates the effect of different cover performance assumptions for rudimentary covers in isolation (Runs SF07 and SF08) on zinc concentration as indicated by the sensitivity runs.

Furthermore, direct comparisons for any particular parameter can also be made. For example, Table 4.6 provides a direct comparison of the maximum zinc concentration that will result for each of the sensitivity runs completed for the Future 2 source loadings at the Faro Mine Site.

Based on the results contained in the appendices, similar comparisons can be made for different cover combinations, water collection efficiencies or load increases in isolation or in any combination.

Table 4.5 Supplemental Base Case and Sensitivity Runs

Location	Description	Basis Model	Cover Efficiency	Groundwater collection	Run #
Minimize Construction					
Tailings	Base case	Tailings stabilize in place	Uncovered. Infiltration varies with grain size.	Cross Valley Dam 98%	RCT04
	Sensitivity	Tailings stabilize in place	Uncovered. Infiltration varies with grain size.	Cross Valley Dam 99%	FSN01
Faro	Base case	Faro upgrade diversion	Rudimentary covers on everything, 20% MAP	ETA 98%, S-Wells & Zone II 90%	FM03
	Sensitivity 1	Faro upgrade diversion	Rudimentary covers on everything, 20% MAP	ETA 99%, S-Wells & Zone II 95%	FSN02
	Sensitivity 2	Faro upgrade diversion	Rudimentary covers on everything, 20% MAP	ETA 99%, S-Wells & Zone II 98%	FSN03
Vangorda/Grum	Base Case	Vg/G stabilize in place	Rudimentary covers on everything, 20% MAP	All groundwater 90%	VG03
	Sensitivity 1	Vg/G stabilize in place	Rudimentary covers on everything, 20% MAP	All groundwater 95%	FSN04
	Sensitivity 2	Vg/G stabilize in place	Rudimentary covers on everything, 20% MAP	All groundwater 98%	FSN05
Minimize Water Treatment					
Faro	Base case	Faro flow through pit	Oxide fines and LGO relocated Faro Valley Dumps relocated Other waste rock - low infiltration covers, 5% MAP Sulphide cells - very low infiltration soil covers, 2% MAP	ETA 98%, S-wells & Zone II 90%	FM04
	Sensitivity 1	Faro flow through pit	Oxide fines and LGO relocated Faro Valley Dumps relocated Other waste rock - low infiltration covers, 5% MAP Sulphide cells - very low infiltration soil covers, 2% MAP	ETA 95%, S-wells & Zone II 80%	FSN06
	Sensitivity 2	Faro upgrade diversion	Oxide fines and LGO relocated Faro Valley Dumps relocated Other waste rock - low infiltration covers, 5% MAP Sulphide cells - very low infiltration soil covers, 2% MAP	ETA 95%, S-wells & Zone II 80%	FSN07
Vangorda	Base case	Backfill Vangorda pit	Sulphide cells - very low infiltration soil covers, 2% MAP Other waste rock - low infiltration covers, 5% MAP	Assume no collection & treatment	VG04
Vangorda	Sensitivity 1	Backfill Vangorda pit	Sulphide cells - very low infiltration soil covers, 2% MAP Other waste rock - low infiltration covers, 5% MAP	All groundwater 90%	FSN08

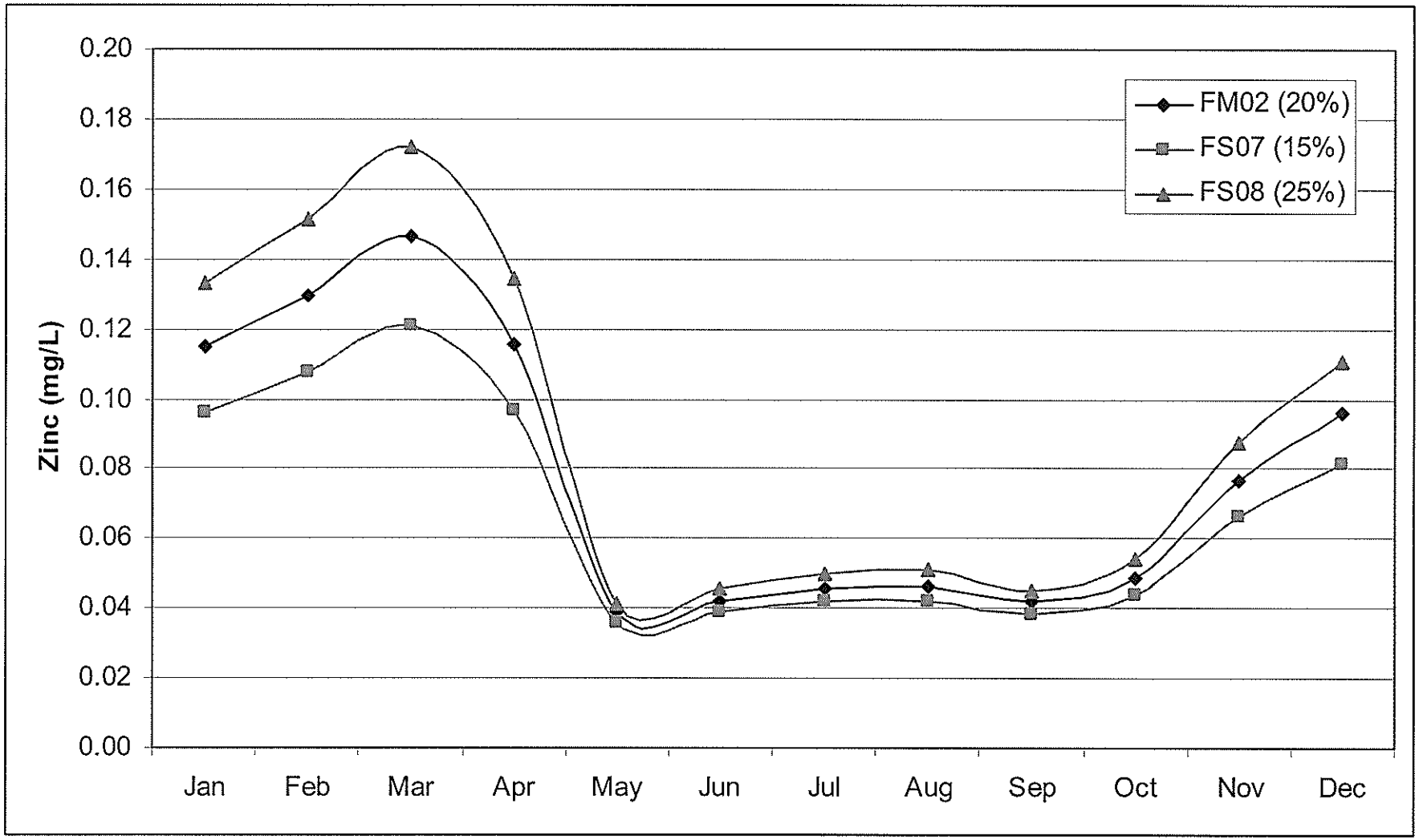

Figure 4-1 Example Predicted Zinc Concentration Profile at X14 for Base Case FM02 and Different Rudimentary Cover Efficiencies and Future 2 Source Loadings

Table 4.6 Comparison of Predicted Maximum Zinc Concentration at X14 for Various Base Case and Sensitivity Runs

Area	Run	Base Case	Capture Eff %			Cover % Infil		Load Incr %		Source Loadings	Max. Zincat X14 (mg/L)
			WR	ETA	TAILS	Rudimentary	Low Infil	Rudiment	Low Infiltr		
Mining Area	Base	FM02	90	98	n/a	20	5	0	0	F2	0.15
	SF01	FM02	70	98	n/a	20	5	0	0	F2	0.26
	SF02	FM02	95	98	n/a	20	5	0	0	F2	0.12
	SF03	FM02	90	90	n/a	20	5	0	0	F2	0.38
	SF04	FM02	90	99	n/a	20	5	0	0	F2	0.12
	SF05	FM02	90	98	n/a	15	3	0	0	F2	0.11
	SF06	FM02	90	98	n/a	25	8	0	0	F2	0.18
	SF07	FM02	90	98	n/a	15	5	0	0	F2	0.12
	SF08	FM02	90	98	n/a	25	5	0	0	F2	0.17
	SF09	FM02	90	98	n/a	20	3	0	0	F2	0.14
	SF10	FM02	90	98	n/a	20	8	0	0	F2	0.16
	SF11	FM02	90	98	n/a	20	5	50	100	F2	0.22
	SF12	FM02	90	98	n/a	20	5	50	0	F2	0.20
	SF13	FM02	90	98	n/a	20	5	0	100	F2	0.17
Tailings Area	Base	RCT01	n/a	n/a	98	10	n/a	n/a	n/a	F2	0.33
	SF15	RCT01	n/a	n/a	97	10	n/a	n/a	n/a	F2	0.49
	SF16	RCT01	n/a	n/a	99	10	n/a	n/a	n/a	F2	0.19
	SF17	RCT01	n/a	n/a	98	20	n/a	n/a	n/a	F2	0.64
	SF18	RCT01	n/a	n/a	98	5	n/a	n/a	n/a	F2	0.19
Additional	SF19	FM02	99	99	n/a	20	5	0	0	F2	0.04
	SF20	FM02	95	99	n/a	20	5	0	0	F2	0.08

4.5.2 Combinations of Example Alternatives

Each of the base case and sensitivity runs provide a set of water quality predictions in the receiving streams downstream of the Faro Mine Area, Tailings Area, and the Vangorda-Grum Mine Area, respectively. By combining the results for each area, and correcting the results to eliminate 'double accounting' of background water quality inputs, water quality estimates for combined alternatives can be prepared. Table 4.7 provides a summary of combinations of example alternatives for the Faro Mine Area and Faro Tailings Area, The water quality at X14 is obtained simply by summing the results from the site method with those of the tailings method, and subtracting the background concentration.

It should be apparent from this table that any number of combinations or permutations of method and method efficiencies can be assessed from the various base and sensitivity runs to develop water quality estimates for a number of complete alternatives.

Table 4.7 Summary of Water Quality Estimates at X14 for Combinations of Methods to Develop Combined Example Alternatives

Mine Area Method		Tailings Method		Parameter (mg/L)										
				Al	As	Cd	Co	Cu	Fe	Mn	Ni	Pb	SO_4	Zn
"Future 1" Chemistry														
1	Flow-Through Pit	1	Stabilize In Place	0.046	0.0028	0.0024	0.0024	0.015	0.68	0.033	0.010	0.010	50	0.55
1	Flow-Through Pit	2	Complete Relocation	0.050	0.0022	0.0016	0.0016	0.013	0.58	0.032	0.006	0.006	50	0.37
1	Flow-Through Pit	3	Partial Relocation	0.049	0.0023	0.0017	0.0018	0.014	0.61	0.031	0.007	0.007	42	0.54
2	Upgrade Faro Creek Diversion	1	Stabilize In Place	0.038	0.0030	0.0028	0.0030	0.012	0.61	0.028	0.014	0.014	89	0.27
2	Upgrade Faro Creek Diversion	2	Complete Relocation	0.042	0.0023	0.0020	0.0022	0.010	0.51	0.026	0.010	0.010	89	0.09
2	Upgrade Faro Creek Diversion	3	Partial Relocation	0.041	0.0024	0.0021	0.0023	0.011	0.55	0.026	0.010	0.010	81	0.26
"Future 2" Chemistry														
1	Flow-Through Pit	1	Stabilize In Place	0.077	0.0033	0.0026	0.0029	0.023	1.1	0.066	0.011	0.011	70	0.85
1	Flow-Through Pit	2	Complete Relocation	0.068	0.0026	0.0018	0.0020	0.017	0.73	0.062	0.007	0.007	53	0.56
1	Flow-Through Pit	3	Partial Relocation	0.076	0.0028	0.0020	0.0022	0.020	0.95	0.063	0.008	0.007	58	0.81
2	Upgrade Faro Creek Diversion	1	Stabilize In Place	0.058	0.0031	0.0029	0.0032	0.017	0.90	0.041	0.014	0.014	143	0.46
2	Upgrade Faro Creek Diversion	2	Complete Relocation	0.049	0.0024	0.0021	0.0023	0.011	0.56	0.037	0.010	0.010	126	0.16
2	Upgrade Faro Creek Diversion	3	Partial Relocation	0.057	0.0025	0.0022	0.0025	0.015	0.78	0.038	0.011	0.011	131	0.41
"Future 3" Chemistry														
1	Flow-Through Pit	1	Stabilize In Place	4.33	0.25	0.080	0.092	1.6	57	7.8	0.084	0.033	497	57.3
1	Flow-Through Pit	2	Complete Relocation	4.24	0.25	0.079	0.090	1.6	56	7.8	0.080	0.028	356	56.6
1	Flow-Through Pit	3	Partial Relocation	4.31	0.25	0.080	0.091	1.6	57	7.8	0.081	0.029	451	57.2
2	Upgrade Faro Creek Diversion	1	Stabilize In Place	0.34	0.016	0.0069	0.0080	0.11	5.1	0.43	0.018	0.015	511	3.6
2	Upgrade Faro Creek Diversion	2	Complete Relocation	0.25	0.015	0.0059	0.0066	0.086	3.3	0.41	0.013	0.011	371	2.9
2	Upgrade Faro Creek Diversion	3	Partial Relocation	0.32	0.015	0.0061	0.0072	0.11	4.6	0.42	0.014	0.012	466	3.5

5 Conclusions

A site water and load balance has been developed to predict water quality in the various receiving water streams downstream of the Faro and Vangorda-Grum minesites respectively.

The water and load balance incorporates source terms for waste rock, pit wall rocks and tailings as applicable. The model provides estimates of monthly average concentrations for each month of the year, at various key locations within the local stream and can be used to estimate water quality in the Pelly River some distance downstream of the Anvil Ranges Minesites. The output from the model can also be used to predict the volume and quality of seepage and other flows that would be collected for treatment. The estimated water quality can then be used to determine water treatment requirements.

The model was used to complete a number of base case assessments which then served as the basis for a series of sensitivity runs. Based on these runs, a large database of water quality predictions was assembled that can easily be used to assess a large number of complete alternatives, at various method performance levels.

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6 References

SRK Consulting, 2006a **Anvil Range Pit Lakes Evaluation of In-Situ Treatment**, SRK Report 1CD003.072, July 2006.

SRK Consulting, 2006b. **Example Alternatives for Closure of Anvil Range Mining Complex,** SRK Project Number 1CD003.065, September 2006

SRK Consulting 2004. **Water Quality Estimates for Anvil Range Waste Rock,** SRK Report 1CD003.34, June 2004.

Robertson GeoConsultants 2005. SRK memorandum attached as Appendix B in Robertson GeoConsultants Report No. 118001/1, September 2005.

Appendix A
Faro Mine Site Base Case Results

Faro Minesite FM02 - Stabilize In Place
Summary Tables

Conditions FUTURE 3

Location X2

	Flows	Ag	Al	As	Ca	Cd	Cl	Co	Cu	Fe	K	Mg	Mn	Na	Ni	Pb	SO4	Zn
	(x 1000 m3)	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L
Jan	553	0.00021	0.333	0.0164	30.0	0.00521	0.1770	0.0063	0.0996	3.716	1.0	7.7	0.5133	2.3	0.0059	0.0032	31.7	3.659
Feb	403	0.00023	0.395	0.0199	30.1	0.00638	0.2181	0.0076	0.1217	4.519	1.0	7.9	0.6263	2.4	0.0070	0.0035	36.3	4.505
Mar	407	0.00027	0.478	0.0247	30.3	0.00794	0.2732	0.0094	0.1511	5.593	1.0	8.3	0.7773	2.4	0.0085	0.0040	42.5	5.636
Apr	784	0.00022	0.353	0.0175	30.1	0.00560	0.1905	0.0067	0.1069	3.979	1.0	7.7	0.5504	2.4	0.0062	0.0033	33.2	3.937
May	6991	0.00012	0.104	0.0032	29.7	0.00092	0.0256	0.0014	0.0186	0.759	0.9	6.7	0.0979	2.3	0.0018	0.0019	14.6	0.547
Jun	7191	0.00012	0.114	0.0037	29.7	0.00110	0.0318	0.0016	0.0219	0.880	0.9	6.7	0.1149	2.3	0.0020	0.0020	15.3	0.675
Jul	5013	0.00012	0.124	0.0043	29.7	0.00129	0.0385	0.0018	0.0255	1.013	0.9	6.8	0.1335	2.3	0.0021	0.0020	16.0	0.814
Aug	3506	0.00012	0.127	0.0045	29.7	0.00134	0.0404	0.0019	0.0265	1.048	0.9	6.8	0.1385	2.3	0.0022	0.0020	16.3	0.851
Sep	4720	0.00012	0.113	0.0037	29.7	0.00108	0.0311	0.0016	0.0215	0.867	0.9	6.7	0.1131	2.3	0.0019	0.0020	15.2	0.661
Oct	2460	0.00013	0.134	0.0049	29.7	0.00148	0.0453	0.0021	0.0292	1.145	0.9	6.8	0.1522	2.3	0.0023	0.0021	16.8	0.953
Nov	1115	0.00016	0.212	0.0094	29.8	0.00294	0.0968	0.0037	0.0567	2.151	0.9	7.1	0.2935	2.3	0.0037	0.0025	22.6	2.012
Dec	821	0.00018	0.267	0.0126	29.9	0.00398	0.1334	0.0049	0.0763	2.864	1.0	7.4	0.3938	2.3	0.0047	0.0028	26.8	2.764
Total	33964																	

Location X14

	Flows	Ag	Al	As	Ca	Cd	Cl	Co	Cu	Fe	K	Mg	Mn	Na	Ni	Pb	SO4	Zn
	(x 1000 m3)	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L
Jan	1192	0.00014	0.198	0.0103	29.9	0.00363	0.1040	0.0043	0.0594	2.178	1.6	25.4	0.3056	3.7	0.0085	0.0050	272.8	2.120
Feb	912	0.00014	0.218	0.0118	28.9	0.00423	0.1221	0.0049	0.0686	2.500	1.7	28.8	0.3529	3.9	0.0075	0.0055	322.1	2.484
Mar	981	0.00015	0.246	0.0136	27.3	0.00483	0.1434	0.0056	0.0798	2.897	1.7	29.0	0.4094	3.9	0.0080	0.0057	329.8	2.914
Apr	1784	0.00014	0.204	0.0103	27.8	0.00348	0.1060	0.0042	0.0605	2.231	1.3	18.5	0.3111	3.1	0.0056	0.0040	184.0	2.159
May	14480	0.00011	0.086	0.0024	29.3	0.00067	0.0157	0.0011	0.0131	0.553	1.0	8.1	0.0698	2.4	0.0017	0.0020	33.8	0.338
Jun	14796	0.00011	0.092	0.0027	29.3	0.00078	0.0196	0.0012	0.0152	0.629	1.0	8.0	0.0805	2.4	0.0018	0.0020	33.2	0.417
Jul	10302	0.00011	0.098	0.0031	29.4	0.00092	0.0238	0.0014	0.0175	0.707	1.0	8.7	0.0918	2.4	0.0020	0.0022	43.1	0.502
Aug	7268	0.00011	0.098	0.0032	29.2	0.00097	0.0247	0.0014	0.0179	0.719	1.0	9.6	0.0938	2.5	0.0022	0.0023	55.2	0.520
Sep	9748	0.00011	0.091	0.0027	29.3	0.00079	0.0191	0.0012	0.0149	0.616	1.0	8.7	0.0789	2.4	0.0019	0.0021	43.2	0.408
Oct	5108	0.00011	0.101	0.0034	29.2	0.00109	0.0277	0.0016	0.0194	0.770	1.1	10.9	0.1015	2.6	0.0024	0.0025	72.8	0.580
Nov	2303	0.00012	0.143	0.0063	29.8	0.00212	0.0594	0.0027	0.0361	1.363	1.3	16.1	0.1670	3.0	0.0040	0.0034	143.4	1.221
Dec	1705	0.00013	0.173	0.0082	30.4	0.00285	0.0814	0.0035	0.0477	1.775	1.4	20.0	0.2464	3.3	0.0051	0.0041	195.5	1.665
Total	70579																	

Location Mouth of Rose Creek

	Flows	Ag	Al	As	Ca	Cd	Cl	Co	Cu	Fe	K	Mg	Mn	Na	Ni	Pb	SO4	Zn
	(x 1000 m3)	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L
Jan	1628	0.00013	0.163	0.0078	29.8	0.00271	0.0762	0.0033	0.0448	1.666	1.4	20.4	0.2314	3.3	0.0051	0.0041	202.9	1.559
Feb	1230	0.00013	0.179	0.0090	29.1	0.00319	0.0906	0.0038	0.0522	1.923	1.5	23.1	0.2691	3.5	0.0058	0.0046	242.0	1.849
Mar	1301	0.00014	0.202	0.0105	27.9	0.00369	0.1082	0.0043	0.0614	2.249	1.5	23.5	0.3157	3.5	0.0063	0.0047	251.6	2.203
Apr	2402	0.00013	0.169	0.0079	28.2	0.00264	0.0788	0.0032	0.0462	1.725	1.2	15.5	0.2384	2.9	0.0044	0.0034	139.7	1.611
May	19992	0.00010	0.081	0.0020	29.4	0.00054	0.0114	0.0010	0.0109	0.473	1.0	7.6	0.0583	2.3	0.0015	0.0019	27.7	0.252
Jun	20466	0.00011	0.085	0.0022	29.4	0.00062	0.0142	0.0011	0.0124	0.528	1.0	7.6	0.0660	2.3	0.0016	0.0019	27.2	0.309
Jul	14254	0.00011	0.089	0.0025	29.4	0.00072	0.0173	0.0012	0.0140	0.585	1.0	8.1	0.0742	2.4	0.0018	0.0020	34.4	0.370
Aug	10032	0.00011	0.089	0.0026	29.3	0.00076	0.0180	0.0012	0.0143	0.593	1.0	8.7	0.0757	2.4	0.0019	0.0021	43.2	0.384
Sep	13469	0.00011	0.084	0.0022	29.4	0.00063	0.0139	0.0011	0.0122	0.519	1.0	8.1	0.0650	2.4	0.0017	0.0020	34.5	0.302
Oct	7047	0.00011	0.091	0.0028	29.3	0.00084	0.0201	0.0013	0.0154	0.631	1.0	9.7	0.0814	2.5	0.0021	0.0023	56.0	0.428
Nov	3181	0.00012	0.122	0.0048	29.7	0.00159	0.0431	0.0021	0.0275	1.059	1.2	13.4	0.1432	2.8	0.0032	0.0029	107.0	0.891
Dec	2352	0.00012	0.143	0.0062	30.2	0.00212	0.0591	0.0027	0.0360	1.359	1.3	16.3	0.1864	3.0	0.0040	0.0034	145.0	1.214
Total	97354																	

Location Mouth of Anvil Creek

	Flows	Ag	Al	As	Ca	Cd	Cl	Co	Cu	Fe	K	Mg	Mn	Na	Ni	Pb	SO4	Zn
	(x 1000 m3)	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L
Jan	4432	0.00011	0.101	0.0035	29.7	0.00112	0.0281	0.0016	0.0196	0.779	1.1	11.6	0.1029	2.7	0.0026	0.0026	82.0	0.589
Feb	3272	0.00011	0.108	0.0040	29.4	0.00132	0.0342	0.0018	0.0227	0.888	1.1	12.7	0.1188	2.7	0.0029	0.0028	98.3	0.711
Mar	3362	0.00011	0.118	0.0047	28.9	0.00155	0.0420	0.0020	0.0268	1.032	1.1	13.1	0.1395	2.7	0.0031	0.0029	104.6	0.868
Apr	6375	0.00011	0.105	0.0036	29.1	0.00112	0.0298	0.0016	0.0205	0.815	1.0	9.9	0.1075	2.5	0.0023	0.0024	59.9	0.623
May	55469	0.00010	0.071	0.0014	29.5	0.00032	0.0042	0.0007	0.0071	0.340	0.9	6.9	0.0391	2.3	0.0013	0.0018	17.5	0.107
Jun	56957	0.00010	0.073	0.0014	29.5	0.00035	0.0052	0.0008	0.0077	0.359	0.9	6.9	0.0419	2.3	0.0013	0.0018	17.3	0.127
Jul	39693	0.00010	0.074	0.0015	29.5	0.00039	0.0063	0.0008	0.0082	0.379	0.9	7.1	0.0448	2.3	0.0013	0.0018	19.9	0.149
Aug	27824	0.00010	0.074	0.0016	29.5	0.00040	0.0066	0.0008	0.0084	0.383	0.9	7.3	0.0454	2.3	0.0014	0.0018	23.1	0.155
Sep	37419	0.00010	0.072	0.0014	29.5	0.00035	0.0051	0.0008	0.0076	0.356	0.9	7.1	0.0415	2.3	0.0013	0.0018	19.9	0.125
Oct	19528	0.00010	0.075	0.0016	29.5	0.00043	0.0074	0.0008	0.0088	0.396	1.0	7.7	0.0475	2.3	0.0014	0.0019	27.7	0.171
Nov	8835	0.00011	0.086	0.0024	29.7	0.00070	0.0156	0.0011	0.0131	0.550	1.0	9.0	0.0697	2.5	0.0019	0.0021	46.0	0.337
Dec	6515	0.00011	0.094	0.0029	29.8	0.00089	0.0214	0.0013	0.0162	0.659	1.1	10.0	0.0854	2.5	0.0022	0.0023	59.8	0.455
Total	269678																	

Faro Minesite FM02 - Stabilize in Place
Summary Tables
Conditions FUTURE 2

Location X2

	Flows	Ag	Al	As	Ca	Cd	Cl	Co	Cu	Fe	K	Mg	Mn	Na	Ni	Pb	SO4	Zn
	(x 1000 m3)	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L
Jan	553	0.00011	0.075	0.0012	29.9	0.00033	0.0058	0.0008	0.0061	0.318	0.9	6.9	0.0419	2.4	0.0017	0.0020	14.5	0.130
Feb	403	0.00011	0.077	0.0012	30.0	0.00036	0.0071	0.0009	0.0063	0.330	0.9	7.0	0.0451	2.4	0.0018	0.0021	15.2	0.154
Mar	407	0.00011	0.080	0.0012	30.1	0.00040	0.0088	0.0010	0.0067	0.347	0.9	7.2	0.0493	2.4	0.0020	0.0022	16.1	0.187
Apr	784	0.00011	0.075	0.0012	30.0	0.00034	0.0062	0.0008	0.0062	0.322	0.9	7.0	0.0429	2.4	0.0017	0.0020	14.7	0.138
May	6991	0.00010	0.067	0.0010	29.6	0.00022	0.0010	0.0006	0.0052	0.272	0.9	6.6	0.0303	2.3	0.0012	0.0017	12.1	0.041
Jun	7191	0.00010	0.067	0.0010	29.7	0.00022	0.0012	0.0006	0.0052	0.274	0.9	6.6	0.0307	2.3	0.0012	0.0018	12.2	0.044
Jul	5013	0.00010	0.068	0.0010	29.7	0.00023	0.0014	0.0006	0.0052	0.276	0.9	6.6	0.0312	2.3	0.0012	0.0018	12.3	0.048
Aug	3506	0.00010	0.068	0.0010	29.7	0.00023	0.0015	0.0007	0.0052	0.276	0.9	6.6	0.0314	2.3	0.0012	0.0018	12.4	0.049
Sep	4720	0.00010	0.067	0.0010	29.7	0.00022	0.0012	0.0006	0.0052	0.273	0.9	6.6	0.0307	2.3	0.0012	0.0018	12.2	0.044
Oct	2460	0.00010	0.068	0.0010	29.7	0.00023	0.0016	0.0007	0.0053	0.278	0.9	6.6	0.0318	2.3	0.0013	0.0018	12.4	0.052
Nov	1115	0.00010	0.071	0.0011	29.8	0.00027	0.0033	0.0007	0.0056	0.293	0.9	6.8	0.0357	2.3	0.0014	0.0019	13.3	0.083
Dec	821	0.00011	0.073	0.0011	29.9	0.00030	0.0044	0.0008	0.0058	0.304	0.9	6.8	0.0385	2.3	0.0016	0.0019	13.8	0.104
Total	33964																	

Location X14

	Flows	Ag	Al	As	Ca	Cd	Cl	Co	Cu	Fe	K	Mg	Mn	Na	Ni	Pb	SO4	Zn
	(x 1000 m3)	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L
Jan	1192	0.00008	0.050	0.0015	28.5	0.00086	0.0041	0.0012	0.0052	0.217	1.6	13.6	0.0329	3.7	0.0041	0.0043	72.4	0.115
Feb	912	0.00007	0.044	0.0015	27.3	0.00098	0.0048	0.0012	0.0050	0.198	1.7	14.7	0.0326	3.9	0.0047	0.0048	83.6	0.129
Mar	981	0.00007	0.041	0.0015	25.7	0.00101	0.0056	0.0012	0.0050	0.191	1.7	14.5	0.0331	3.9	0.0048	0.0048	84.8	0.147
Apr	1784	0.00008	0.053	0.0013	26.9	0.00068	0.0042	0.0010	0.0053	0.232	1.3	10.7	0.0332	3.1	0.0031	0.0034	50.8	0.115
May	14480	0.00010	0.064	0.0010	29.2	0.00026	0.0008	0.0006	0.0050	0.260	1.0	7.1	0.0290	2.4	0.0014	0.0019	16.7	0.039
Jun	14796	0.00010	0.065	0.0010	29.2	0.00026	0.0009	0.0007	0.0051	0.262	1.0	7.0	0.0295	2.4	0.0014	0.0019	16.5	0.042
Jul	10302	0.00010	0.064	0.0011	29.2	0.00029	0.0011	0.0007	0.0051	0.261	1.0	7.3	0.0297	2.4	0.0015	0.0020	18.8	0.046
Aug	7268	0.00010	0.063	0.0011	28.9	0.00031	0.0011	0.0007	0.0050	0.255	1.0	7.6	0.0293	2.5	0.0016	0.0021	21.6	0.046
Sep	9748	0.00010	0.064	0.0011	29.1	0.00028	0.0009	0.0007	0.0051	0.258	1.0	7.3	0.0292	2.4	0.0015	0.0020	18.9	0.042
Oct	5108	0.00009	0.061	0.0011	28.9	0.00035	0.0012	0.0007	0.0050	0.250	1.1	8.1	0.0293	2.6	0.0018	0.0023	25.8	0.049
Nov	2303	0.00009	0.058	0.0012	29.1	0.00054	0.0025	0.0009	0.0052	0.244	1.3	10.1	0.0314	3.0	0.0027	0.0030	42.3	0.077
Dec	1705	0.00009	0.056	0.0014	29.5	0.00068	0.0033	0.0010	0.0054	0.240	1.4	11.6	0.0330	3.4	0.0033	0.0036	54.6	0.096
Total	70579																	

Location Mouth of Rose Creek

	Flows	Ag	Al	As	Ca	Cd	Cl	Co	Cu	Fe	K	Mg	Mn	Na	Ni	Pb	SO4	Zn
	(x 1000 m3)	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L
Jan	1628	0.00009	0.054	0.0013	28.8	0.00068	0.0031	0.0010	0.0051	0.229	1.4	11.7	0.0317	3.3	0.0033	0.0036	56.2	0.091
Feb	1230	0.00008	0.050	0.0014	27.9	0.00078	0.0036	0.0011	0.0050	0.215	1.5	12.6	0.0315	3.5	0.0038	0.0040	65.1	0.102
Mar	1301	0.00008	0.047	0.0014	26.7	0.00081	0.0043	0.0011	0.0050	0.209	1.5	12.6	0.0319	3.5	0.0039	0.0040	66.8	0.117
Apr	2402	0.00009	0.056	0.0012	27.6	0.00054	0.0032	0.0009	0.0052	0.240	1.2	9.6	0.0319	2.9	0.0026	0.0029	40.8	0.092
May	19992	0.00010	0.065	0.0010	29.3	0.00024	0.0006	0.0006	0.0050	0.261	1.0	6.9	0.0288	2.3	0.0013	0.0019	15.3	0.035
Jun	20466	0.00010	0.065	0.0010	29.3	0.00025	0.0007	0.0006	0.0051	0.263	1.0	6.9	0.0291	2.3	0.0013	0.0018	15.2	0.038
Jul	14254	0.00010	0.065	0.0010	29.3	0.00026	0.0009	0.0007	0.0051	0.262	1.0	7.1	0.0293	2.4	0.0014	0.0019	16.9	0.040
Aug	10032	0.00010	0.063	0.0011	29.1	0.00028	0.0009	0.0007	0.0050	0.258	1.0	7.3	0.0290	2.4	0.0015	0.0020	18.9	0.041
Sep	13469	0.00010	0.064	0.0010	29.3	0.00026	0.0007	0.0007	0.0050	0.260	1.0	7.1	0.0289	2.4	0.0014	0.0019	16.9	0.037
Oct	7047	0.00010	0.063	0.0011	29.1	0.00031	0.0010	0.0007	0.0050	0.254	1.0	7.7	0.0290	2.5	0.0016	0.0021	21.9	0.042
Nov	3181	0.00009	0.060	0.0012	29.3	0.00045	0.0018	0.0008	0.0051	0.250	1.2	9.1	0.0305	2.8	0.0022	0.0027	33.9	0.063
Dec	2352	0.00009	0.059	0.0013	29.5	0.00055	0.0024	0.0009	0.0053	0.247	1.3	10.2	0.0317	3.1	0.0027	0.0031	42.8	0.077
Total	97354																	

Location Mouth of Anvil Creek

	Flows	Ag	Al	As	Ca	Cd	Cl	Co	Cu	Fe	K	Mg	Mn	Na	Ni	Pb	SO4	Zn
	(x 1000 m3)	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L
Jan	4432	0.00009	0.062	0.0011	29.3	0.00038	0.0013	0.0007	0.0051	0.251	1.1	8.4	0.0295	2.7	0.0019	0.0024	28.1	0.050
Feb	3272	0.00009	0.060	0.0011	29.0	0.00042	0.0015	0.0008	0.0050	0.246	1.1	8.8	0.0295	2.7	0.0021	0.0026	31.8	0.054
Mar	3362	0.00009	0.059	0.0011	28.5	0.00044	0.0018	0.0008	0.0050	0.243	1.1	8.9	0.0297	2.7	0.0022	0.0026	33.0	0.061
Apr	6375	0.00010	0.062	0.0011	28.8	0.00033	0.0013	0.0007	0.0051	0.255	1.0	7.7	0.0297	2.5	0.0017	0.0022	22.7	0.051
May	55468	0.00010	0.065	0.0010	29.5	0.00022	0.0004	0.0006	0.0050	0.263	0.9	6.7	0.0285	2.3	0.0012	0.0018	13.0	0.029
Jun	56957	0.00010	0.066	0.0010	29.5	0.00022	0.0004	0.0006	0.0050	0.264	0.9	6.7	0.0286	2.3	0.0012	0.0018	13.0	0.030
Jul	39693	0.00010	0.065	0.0010	29.5	0.00022	0.0004	0.0006	0.0050	0.263	0.9	6.7	0.0287	2.3	0.0012	0.0018	13.6	0.031
Aug	27824	0.00010	0.065	0.0010	29.4	0.00023	0.0004	0.0006	0.0050	0.262	0.9	6.8	0.0286	2.3	0.0012	0.0018	14.3	0.031
Sep	37419	0.00010	0.065	0.0010	29.5	0.00022	0.0004	0.0006	0.0050	0.263	0.9	6.7	0.0285	2.3	0.0012	0.0018	13.6	0.030
Oct	19528	0.00010	0.065	0.0010	29.4	0.00024	0.0005	0.0006	0.0050	0.260	1.0	6.9	0.0285	2.3	0.0013	0.0019	15.4	0.032
Nov	8835	0.00010	0.064	0.0011	29.5	0.00029	0.0008	0.0007	0.0051	0.259	1.0	7.5	0.0291	2.5	0.0015	0.0020	19.7	0.039
Dec	6515	0.00010	0.063	0.0011	29.6	0.00032	0.0010	0.0007	0.0051	0.258	1.1	7.9	0.0295	2.5	0.0017	0.0022	22.9	0.044
Total	269678																	

Faro Minesite FM02 - Stabilize in Place
Summary Tables
Conditions FUTURE 1

Location X2

	Flows	Ag	Al	As	Ca	Cd	Cl	Co	Cu	Fe	K	Mg	Mn	Na	Ni	Pb	SO4	Zn
	(x 1000 m3)	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L
Jan	553	0.00011	0.068	0.0011	29.8	0.00023	0.0021	0.0007	0.0052	0.273	0.9	6.7	0.0310	2.3	0.0012	0.0018	12.9	0.048
Feb	403	0.00011	0.068	0.0011	29.8	0.00024	0.0026	0.0007	0.0053	0.275	0.9	6.7	0.0317	2.3	0.0013	0.0018	13.2	0.053
Mar	407	0.00011	0.069	0.0012	29.9	0.00025	0.0032	0.0007	0.0054	0.278	0.9	6.8	0.0325	2.3	0.0013	0.0018	13.5	0.060
Apr	784	0.00011	0.068	0.0011	29.8	0.00024	0.0023	0.0007	0.0053	0.274	0.9	6.7	0.0312	2.3	0.0013	0.0018	13.0	0.050
May	6991	0.00010	0.066	0.0010	29.6	0.00020	0.0005	0.0006	0.0050	0.265	0.9	6.6	0.0287	2.3	0.0011	0.0017	11.9	0.029
Jun	7191	0.00010	0.066	0.0010	29.6	0.00021	0.0005	0.0006	0.0050	0.266	0.9	6.6	0.0288	2.3	0.0011	0.0017	11.9	0.030
Jul	5013	0.00010	0.066	0.0010	29.6	0.00021	0.0006	0.0006	0.0051	0.266	0.9	6.6	0.0289	2.3	0.0011	0.0017	12.0	0.030
Aug	3506	0.00010	0.066	0.0010	29.6	0.00021	0.0006	0.0006	0.0051	0.266	0.9	6.6	0.0289	2.3	0.0011	0.0017	12.0	0.031
Sep	4720	0.00010	0.066	0.0010	29.6	0.00021	0.0005	0.0006	0.0050	0.266	0.9	6.6	0.0288	2.3	0.0011	0.0017	11.9	0.029
Oct	2460	0.00010	0.066	0.0010	29.6	0.00021	0.0007	0.0006	0.0051	0.266	0.9	6.6	0.0290	2.3	0.0011	0.0017	12.0	0.031
Nov	1115	0.00010	0.067	0.0011	29.7	0.00022	0.0012	0.0006	0.0051	0.269	0.9	6.6	0.0298	2.3	0.0012	0.0018	12.4	0.038
Dec	821	0.00010	0.067	0.0011	29.7	0.00023	0.0016	0.0006	0.0052	0.271	0.9	6.7	0.0304	2.3	0.0012	0.0018	12.6	0.042
Total	33964																	

Location X14

	Flows	Ag	Al	As	Ca	Cd	Cl	Co	Cu	Fe	K	Mg	Mn	Na	Ni	Pb	SO4	Zn
	(x 1000 m3)	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L
Jan	1192	0.00008	0.045	0.0014	25.3	0.00080	0.0013	0.0010	0.0044	0.182	1.6	9.0	0.0250	3.7	0.0039	0.0042	42.5	0.060
Feb	912	0.00007	0.038	0.0014	23.4	0.00090	0.0015	0.0011	0.0041	0.157	1.7	9.2	0.0234	3.9	0.0043	0.0046	48.0	0.066
Mar	981	0.00007	0.035	0.0014	21.7	0.00092	0.0017	0.0011	0.0039	0.142	1.7	8.9	0.0222	3.8	0.0044	0.0046	48.2	0.072
Apr	1784	0.00008	0.048	0.0012	24.7	0.00059	0.0014	0.0009	0.0045	0.196	1.3	7.7	0.0251	3.0	0.0028	0.0032	31.1	0.060
May	14480	0.00010	0.063	0.0010	28.9	0.00025	0.0004	0.0006	0.0049	0.255	1.0	6.7	0.0279	2.4	0.0013	0.0019	14.2	0.031
Jun	14796	0.00010	0.064	0.0010	28.9	0.00025	0.0004	0.0006	0.0050	0.256	1.0	6.7	0.0280	2.4	0.0013	0.0019	14.1	0.032
Jul	10302	0.00010	0.063	0.0010	28.8	0.00027	0.0005	0.0007	0.0049	0.253	1.0	6.8	0.0279	2.4	0.0014	0.0020	15.3	0.034
Aug	7268	0.00010	0.061	0.0011	28.4	0.00030	0.0005	0.0007	0.0049	0.247	1.0	6.8	0.0275	2.5	0.0015	0.0021	16.6	0.034
Sep	9748	0.00010	0.063	0.0010	28.7	0.00027	0.0004	0.0006	0.0049	0.252	1.0	6.8	0.0277	2.4	0.0014	0.0020	15.3	0.032
Oct	5108	0.00009	0.060	0.0011	28.1	0.00034	0.0005	0.0007	0.0048	0.241	1.1	7.0	0.0272	2.6	0.0017	0.0023	18.7	0.035
Nov	2303	0.00009	0.056	0.0012	27.5	0.00050	0.0008	0.0008	0.0047	0.224	1.3	7.8	0.0269	3.0	0.0025	0.0030	27.2	0.046
Dec	1705	0.00009	0.053	0.0013	27.2	0.00063	0.0011	0.0009	0.0047	0.213	1.4	8.4	0.0268	3.3	0.0031	0.0035	33.6	0.054
Total	70579																	

Location Mouth of Rose Creek

	Flows	Ag	Al	As	Ca	Cd	Cl	Co	Cu	Fe	K	Mg	Mn	Na	Ni	Pb	SO4	Zn
	(x 1000 m3)	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L
Jan	1628	0.00009	0.050	0.0013	26.4	0.00064	0.0010	0.0009	0.0046	0.204	1.4	8.3	0.0259	3.3	0.0031	0.0035	34.3	0.051
Feb	1230	0.00008	0.046	0.0013	25.0	0.00072	0.0012	0.0010	0.0043	0.184	1.5	8.5	0.0246	3.5	0.0035	0.0039	38.6	0.055
Mar	1301	0.00007	0.042	0.0013	23.6	0.00074	0.0014	0.0010	0.0042	0.172	1.5	8.3	0.0237	3.4	0.0036	0.0039	39.3	0.060
Apr	2402	0.00009	0.053	0.0012	26.0	0.00049	0.0011	0.0008	0.0046	0.214	1.2	7.4	0.0259	2.8	0.0024	0.0028	26.1	0.051
May	19992	0.00010	0.064	0.0010	29.1	0.00024	0.0003	0.0006	0.0049	0.257	1.0	6.6	0.0280	2.3	0.0013	0.0018	13.5	0.029
Jun	20466	0.00010	0.064	0.0010	29.1	0.00024	0.0004	0.0006	0.0050	0.258	1.0	6.6	0.0281	2.3	0.0013	0.0018	13.4	0.030
Jul	14254	0.00010	0.064	0.0010	29.0	0.00025	0.0004	0.0006	0.0050	0.256	1.0	6.7	0.0280	2.4	0.0013	0.0019	14.3	0.031
Aug	10032	0.00010	0.063	0.0010	28.7	0.00027	0.0004	0.0006	0.0049	0.252	1.0	6.7	0.0277	2.4	0.0014	0.0020	15.3	0.031
Sep	13469	0.00010	0.064	0.0010	29.0	0.00025	0.0003	0.0006	0.0049	0.255	1.0	6.7	0.0279	2.4	0.0013	0.0019	14.3	0.030
Oct	7047	0.00010	0.062	0.0011	28.5	0.00030	0.0004	0.0007	0.0049	0.247	1.0	6.9	0.0275	2.5	0.0016	0.0021	16.8	0.032
Nov	3181	0.00009	0.058	0.0011	28.1	0.00042	0.0007	0.0008	0.0048	0.235	1.2	7.4	0.0273	2.8	0.0021	0.0026	23.0	0.040
Dec	2352	0.00009	0.056	0.0012	27.8	0.00051	0.0008	0.0008	0.0048	0.227	1.3	7.9	0.0272	3.0	0.0025	0.0030	27.6	0.046
Total	97354																	

Location Mouth of Anvil Creek

	Flows	Ag	Al	As	Ca	Cd	Cl	Co	Cu	Fe	K	Mg	Mn	Na	Ni	Pb	SO4	Zn
	(x 1000 m3)	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L
Jan	4432	0.00009	0.060	0.0011	28.4	0.00036	0.0005	0.0007	0.0048	0.242	1.1	7.2	0.0274	2.7	0.0018	0.0024	20.0	0.035
Feb	3272	0.00009	0.058	0.0011	27.9	0.00040	0.0006	0.0007	0.0047	0.234	1.1	7.3	0.0269	2.7	0.0020	0.0025	21.8	0.037
Mar	3362	0.00009	0.057	0.0011	27.3	0.00041	0.0007	0.0007	0.0047	0.229	1.1	7.2	0.0265	2.7	0.0021	0.0025	22.4	0.039
Apr	6375	0.00009	0.061	0.0011	28.2	0.00031	0.0005	0.0007	0.0049	0.245	1.0	6.9	0.0274	2.5	0.0016	0.0021	17.1	0.035
May	55468	0.00010	0.065	0.0010	29.4	0.00021	0.0002	0.0006	0.0050	0.262	0.9	6.6	0.0282	2.3	0.0012	0.0017	12.4	0.027
Jun	56957	0.00010	0.065	0.0010	29.4	0.00021	0.0003	0.0006	0.0050	0.262	0.9	6.6	0.0282	2.3	0.0012	0.0017	12.3	0.027
Jul	39693	0.00010	0.065	0.0010	29.4	0.00022	0.0003	0.0006	0.0050	0.261	0.9	6.6	0.0282	2.3	0.0012	0.0018	12.6	0.028
Aug	27824	0.00010	0.065	0.0010	29.3	0.00023	0.0003	0.0006	0.0050	0.260	0.9	6.6	0.0281	2.3	0.0012	0.0018	13.0	0.028
Sep	37419	0.00010	0.065	0.0010	29.4	0.00022	0.0003	0.0006	0.0050	0.261	0.9	6.6	0.0282	2.3	0.0012	0.0018	12.6	0.027
Oct	19528	0.00010	0.064	0.0010	29.2	0.00024	0.0003	0.0006	0.0049	0.258	1.0	6.7	0.0280	2.3	0.0013	0.0018	13.6	0.028
Nov	8835	0.00010	0.063	0.0011	29.0	0.00028	0.0004	0.0007	0.0049	0.254	1.0	6.9	0.0279	2.5	0.0015	0.0020	15.8	0.031
Dec	6515	0.00010	0.062	0.0011	29.0	0.00031	0.0004	0.0007	0.0049	0.251	1.0	7.0	0.0279	2.5	0.0016	0.0022	17.4	0.033
Total	269678																	

Faro Mine Area - FM01 - Flow-Through Pit
Summary Tables

Conditions Future 3

Location X2

	Flows (x 1000 m3)	Ag mg/L	Al mg/L	As mg/L	Ca mg/L	Cd mg/L	Cl mg/L	Co mg/L	Cu mg/L	Fe mg/L	K mg/L	Mg mg/L	Mn mg/L	Na mg/L	Ni mg/L	Pb mg/L	SO4 mg/L	Zn mg/L
Jan	559	0.0011	2.4256	0.1390	32.7	0.0448	1.5736	0.0507	0.8519	31.0749	1.2846	15.73	4.3427	2.85	0.0418	0.0140	184.9	32.258
Feb	409	0.0013	2.9678	0.1707	33.4	0.0550	1.9352	0.0623	1.0465	38.1542	1.3682	17.85	5.3340	2.98	0.0511	0.0168	224.7	39.664
Mar	414	0.0016	3.6877	0.2128	34.4	0.0686	2.4152	0.0776	1.3049	47.5547	1.4791	20.66	6.6503	3.16	0.0635	0.0205	277.6	49.499
Apr	793	0.0011	2.6041	0.1494	33.0	0.0481	1.6927	0.0545	0.9160	33.4056	1.3121	16.43	4.6690	2.89	0.0448	0.0149	198.0	34.697
May	7002	0.0002	0.4078	0.0210	30.0	0.0067	0.2282	0.0079	0.1277	4.7286	0.9738	7.87	0.6535	2.35	0.0070	0.0035	36.8	4.696
Jun	7206	0.0003	0.4913	0.0259	30.2	0.0082	0.2839	0.0096	0.1577	5.8190	0.9866	8.19	0.8061	2.37	0.0084	0.0039	42.9	5.837
Jul	5026	0.0003	0.5824	0.0312	30.3	0.0100	0.3446	0.0116	0.1904	7.0076	1.0007	8.55	0.9726	2.39	0.0100	0.0044	49.6	7.080
Aug	3515	0.0003	0.6069	0.0326	30.3	0.0104	0.3610	0.0121	0.1992	7.3285	1.0045	8.64	1.0175	2.40	0.0104	0.0045	51.4	7.416
Sep	4729	0.0003	0.4823	0.0254	30.1	0.0081	0.2778	0.0094	0.1544	5.7007	0.9852	8.16	0.7886	2.37	0.0083	0.0039	42.3	5.713
Oct	2467	0.0003	0.6736	0.0365	30.4	0.0117	0.4054	0.0135	0.2231	8.1993	1.0147	8.90	1.1394	2.42	0.0116	0.0049	56.3	8.327
Nov	1122	0.0006	1.3627	0.0768	31.3	0.0247	0.8649	0.0282	0.4704	17.1964	1.1209	11.59	2.3993	2.58	0.0234	0.0084	106.9	17.739
Dec	828	0.0008	1.8491	0.1053	32.0	0.0339	1.1892	0.0385	0.6450	23.5479	1.1958	13.49	3.2687	2.70	0.0318	0.0110	142.6	24.384
Total	34070																	

Location X14

	Flows (x 1000 m3)	Ag mg/L	Al mg/L	As mg/L	Ca mg/L	Cd mg/L	Cl mg/L	Co mg/L	Cu mg/L	Fe mg/L	K mg/L	Mg mg/L	Mn mg/L	Na mg/L	Ni mg/L	Pb mg/L	SO4 mg/L	Zn mg/L
Jan	1025	0.0013	3.0758	0.1818	25.8	0.0565	2.0892	0.0647	1.1225	39.9037	1.1306	17.00	5.6497	2.46	0.0541	0.0174	231.1	40.881
Feb	775	0.0015	3.6370	0.2156	23.7	0.0670	2.4808	0.0767	1.3318	47.3222	1.1273	18.66	6.7021	2.39	0.0640	0.0202	271.7	48.518
Mar	839	0.0017	4.2352	0.2516	22.6	0.0782	2.8965	0.0894	1.5542	55.2084	1.1575	20.66	7.8206	2.40	0.0745	0.0233	315.2	56.609
Apr	1598	0.0013	3.0123	0.1779	26.5	0.0553	2.0442	0.0633	1.0986	39.0557	1.1444	16.90	5.5292	2.50	0.0530	0.0171	226.6	39.940
May	13347	0.0003	0.4853	0.0262	29.2	0.0080	0.2911	0.0095	0.1606	5.7854	0.9542	8.02	0.8113	2.30	0.0085	0.0039	42.3	5.796
Jun	14936	0.0004	0.7507	0.0404	28.2	0.0131	0.4688	0.0153	0.2546	9.1599	0.9550	9.07	1.2892	2.39	0.0137	0.0057	65.0	9.564
Jul	10370	0.0004	0.8519	0.0465	28.1	0.0150	0.5391	0.0174	0.2922	10.4937	0.9654	9.45	1.4783	2.40	0.0155	0.0062	72.9	10.736
Aug	7291	0.0004	0.8731	0.0478	27.7	0.0154	0.5546	0.0179	0.3004	10.7843	0.9530	9.44	1.5197	2.37	0.0159	0.0063	75.0	11.036
Sep	9821	0.0004	0.7461	0.0401	27.8	0.0131	0.4659	0.0152	0.2529	9.1028	0.9446	9.00	1.2812	2.37	0.0137	0.0057	65.3	9.321
Oct	5133	0.0004	0.9608	0.0530	27.1	0.0171	0.6154	0.0198	0.3328	11.9363	0.9464	9.63	1.6831	2.35	0.0175	0.0068	79.0	12.301
Nov	2280	0.0008	1.7785	0.1020	26.9	0.0324	1.1815	0.0372	0.6357	22.6841	1.0270	12.64	3.2070	2.46	0.0319	0.0111	138.9	23.366
Dec	1643	0.0010	2.3948	0.1389	26.8	0.0439	1.6080	0.0503	0.8640	30.7844	1.0907	14.93	4.3555	2.56	0.0428	0.0144	184.0	31.703
Total	69058																	

Location Mouth of Rose Creek

	Flows (x 1000 m3)	Ag mg/L	Al mg/L	As mg/L	Ca mg/L	Cd mg/L	Cl mg/L	Co mg/L	Cu mg/L	Fe mg/L	K mg/L	Mg mg/L	Mn mg/L	Na mg/L	Ni mg/L	Pb mg/L	SO4 mg/L	Zn mg/L
Jan	1461	0.0009	2.1779	0.1279	26.9	0.0397	1.4660	0.0456	0.7892	28.0791	1.0681	13.88	3.9728	2.40	0.0383	0.0127	165.7	28.694
Feb	1093	0.0011	2.5998	0.1533	25.4	0.0476	1.7603	0.0546	0.9465	33.6553	1.0674	15.14	4.7639	2.35	0.0457	0.0149	196.2	34.434
Mar	1160	0.0013	3.0840	0.1824	24.5	0.0567	2.0968	0.0649	1.1264	40.0380	1.0922	16.76	5.6691	2.36	0.0542	0.0174	231.4	40.986
Apr	2215	0.0009	2.1912	0.1286	27.3	0.0399	1.4746	0.0458	0.7938	28.2453	1.0821	14.02	3.9962	2.43	0.0385	0.0128	166.7	28.817
May	18859	0.0002	0.3627	0.0188	29.3	0.0057	0.2081	0.0069	0.1152	4.1716	0.9445	7.59	0.5824	2.29	0.0063	0.0033	33.4	4.110
Jun	20606	0.0003	0.5623	0.0295	28.5	0.0096	0.3399	0.0112	0.1859	6.7123	0.9457	8.37	0.9423	2.35	0.0103	0.0046	50.3	6.939
Jul	14322	0.0003	0.6350	0.0339	28.5	0.0109	0.3904	0.0128	0.2129	7.6706	0.9532	8.65	1.0782	2.36	0.0115	0.0050	56.0	7.780
Aug	10055	0.0003	0.6512	0.0350	28.2	0.0113	0.4022	0.0131	0.2192	7.8922	0.9442	8.64	1.1097	2.34	0.0118	0.0051	57.6	8.009
Sep	13542	0.0003	0.5592	0.0293	28.3	0.0095	0.3380	0.0112	0.1848	6.6740	0.9381	8.33	0.9369	2.34	0.0102	0.0046	50.5	6.767
Oct	7072	0.0003	0.7154	0.0387	27.8	0.0125	0.4467	0.0145	0.2429	8.7359	0.9394	8.78	1.2294	2.33	0.0130	0.0054	60.6	8.935
Nov	3158	0.0006	1.3022	0.0739	27.6	0.0234	0.8529	0.0270	0.4603	16.4487	0.9976	10.94	2.3229	2.41	0.0233	0.0085	103.5	16.875
Dec	2290	0.0008	1.7368	0.0999	27.6	0.0315	1.1538	0.0362	0.6213	22.1614	1.0428	12.56	3.1329	2.47	0.0310	0.0108	135.3	22.753
Total	95833																	

Location Mouth of Anvil Creek

	Flows (x 1000 m3)	Ag mg/L	Al mg/L	As mg/L	Ca mg/L	Cd mg/L	Cl mg/L	Co mg/L	Cu mg/L	Fe mg/L	K mg/L	Mg mg/L	Mn mg/L	Na mg/L	Ni mg/L	Pb mg/L	SO4 mg/L	Zn mg/L
Jan	4265	0.0004	0.7892	0.0444	28.7	0.0137	0.5022	0.0160	0.2736	9.7902	0.9714	9.05	1.3792	2.31	0.0138	0.0055	64.4	9.844
Feb	3135	0.0004	0.9491	0.0541	28.1	0.0167	0.6137	0.0194	0.3331	11.9020	0.9721	9.53	1.6788	2.30	0.0167	0.0063	76.0	12.018
Mar	3220	0.0005	1.1527	0.0563	27.8	0.0205	0.7552	0.0238	0.4088	14.5866	0.9827	10.22	2.0595	2.30	0.0202	0.0073	90.8	14.776
Apr	6188	0.0004	0.8267	0.0467	28.8	0.0144	0.5280	0.0168	0.2874	10.2804	0.9787	9.21	1.4487	2.33	0.0145	0.0057	67.2	10.332
May	54335	0.0001	0.1689	0.0072	29.5	0.0021	0.0717	0.0028	0.0432	1.6204	0.9292	6.90	0.2206	2.27	0.0029	0.0022	19.2	1.443
Jun	57096	0.0002	0.2450	0.0113	29.2	0.0036	0.1228	0.0044	0.0703	2.5912	0.9300	7.20	0.3581	2.30	0.0044	0.0028	25.6	2.521
Jul	39761	0.0002	0.2709	0.0129	29.2	0.0041	0.1407	0.0050	0.0799	2.9320	0.9327	7.30	0.4065	2.30	0.0049	0.0029	27.7	2.819
Aug	27847	0.0002	0.2772	0.0133	29.1	0.0042	0.1454	0.0051	0.0824	3.0186	0.9295	7.30	0.4188	2.29	0.0050	0.0029	28.3	2.909
Sep	37492	0.0002	0.2441	0.0112	29.1	0.0036	0.1222	0.0044	0.0699	2.5794	0.9272	7.18	0.3565	2.29	0.0044	0.0027	25.7	2.461
Oct	19553	0.0002	0.3008	0.0146	28.9	0.0046	0.1617	0.0056	0.0911	3.3284	0.9277	7.35	0.4627	2.29	0.0054	0.0030	29.4	3.248
Nov	8812	0.0003	0.5090	0.0271	28.9	0.0085	0.3058	0.0101	0.1682	6.0651	0.9485	8.12	0.8508	2.32	0.0091	0.0041	44.6	6.065
Dec	6453	0.0003	0.6588	0.0361	28.9	0.0113	0.4095	0.0132	0.2237	8.0336	0.9643	8.67	1.1299	2.34	0.0117	0.0049	55.6	8.090
Total	268157																	

Faro Mine Area - FM01 - Flow-Through Pit
Summary Tables
Conditions Future 2

Location X2

	Flows	Ag	Al	As	Ca	Cd	Cl	Co	Cu	Fe	K	Mg	Mn	Na	Ni	Pb	SO4	Zn
	(x 1000 m3)	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L
Jan	553	0.0001	0.0740	0.0011	29.8	0.0003	0.0049	0.0008	0.0060	0.3121	0.9320	6.83	0.0394	2.33	0.0016	0.0020	13.8	0.118
Feb	403	0.0001	0.0758	0.0012	29.9	0.0003	0.0060	0.0008	0.0062	0.3232	0.9345	6.90	0.0420	2.34	0.0017	0.0020	14.3	0.139
Mar	407	0.0001	0.0783	0.0012	30.0	0.0004	0.0074	0.0009	0.0065	0.3382	0.9379	6.99	0.0455	2.36	0.0019	0.0021	15.0	0.168
Apr	784	0.0001	0.0746	0.0011	29.9	0.0003	0.0052	0.0008	0.0060	0.3157	0.9328	6.86	0.0403	2.33	0.0016	0.0020	14.0	0.125
May	6991	0.0001	0.0671	0.0010	29.6	0.0002	0.0009	0.0006	0.0051	0.2710	0.9227	6.58	0.0299	2.27	0.0012	0.0017	12.0	0.039
Jun	7191	0.0001	0.0673	0.0010	29.6	0.0002	0.0010	0.0006	0.0052	0.2727	0.9230	6.59	0.0303	2.28	0.0012	0.0017	12.1	0.042
Jul	5013	0.0001	0.0676	0.0010	29.6	0.0002	0.0012	0.0006	0.0052	0.2745	0.9235	6.60	0.0307	2.28	0.0012	0.0018	12.2	0.046
Aug	3506	0.0001	0.0677	0.0010	29.7	0.0002	0.0013	0.0006	0.0052	0.2750	0.9236	6.60	0.0308	2.28	0.0012	0.0018	12.2	0.047
Sep	4720	0.0001	0.0673	0.0010	29.6	0.0002	0.0010	0.0006	0.0052	0.2725	0.9230	6.59	0.0302	2.28	0.0012	0.0017	12.1	0.042
Oct	2460	0.0001	0.0680	0.0010	29.7	0.0002	0.0014	0.0007	0.0052	0.2763	0.9239	6.61	0.0311	2.28	0.0012	0.0018	12.3	0.049
Nov	1115	0.0001	0.0703	0.0011	29.7	0.0003	0.0028	0.0007	0.0055	0.2903	0.9270	6.70	0.0344	2.30	0.0014	0.0018	12.9	0.076
Dec	821	0.0001	0.0720	0.0011	29.8	0.0003	0.0037	0.0007	0.0057	0.3002	0.9293	6.76	0.0367	2.31	0.0015	0.0019	13.3	0.095
Total	33964																	

Location X14

	Flows	Ag	Al	As	Ca	Cd	Cl	Co	Cu	Fe	K	Mg	Mn	Na	Ni	Pb	SO4	Zn
	(x 1000 m3)	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L
Jan	1008	0.0001	0.0646	0.0016	21.6	0.0006	0.0111	0.0009	0.0094	0.3434	0.6775	5.19	0.0508	1.72	0.0017	0.0017	12.4	0.439
Feb	760	0.0001	0.0612	0.0016	18.7	0.0006	0.0132	0.0009	0.0100	0.3461	0.5875	4.63	0.0538	1.51	0.0018	0.0016	12.0	0.496
Mar	820	0.0001	0.0601	0.0017	16.7	0.0007	0.0154	0.0010	0.0108	0.3589	0.5258	4.27	0.0581	1.37	0.0019	0.0015	12.0	0.539
Apr	1571	0.0001	0.0659	0.0016	22.4	0.0006	0.0109	0.0009	0.0094	0.3470	0.7014	5.35	0.0509	1.78	0.0017	0.0017	12.6	0.368
May	13316	0.0001	0.0660	0.0011	28.6	0.0003	0.0017	0.0006	0.0056	0.2761	0.8916	6.38	0.0315	2.20	0.0012	0.0017	11.9	0.164
Jun	14970	0.0001	0.1100	0.0012	28.4	0.0011	0.0243	0.0017	0.0146	0.6105	0.8917	7.46	0.0825	2.30	0.0032	0.0028	24.1	0.854
Jul	10412	0.0001	0.1091	0.0013	28.7	0.0011	0.0242	0.0017	0.0146	0.6068	0.9026	7.86	0.0824	2.32	0.0033	0.0028	27.6	0.660
Aug	7342	0.0001	0.1074	0.0013	28.8	0.0011	0.0241	0.0017	0.0144	0.5989	0.9070	8.29	0.0816	2.33	0.0033	0.0029	31.9	0.655
Sep	9861	0.0001	0.1103	0.0012	28.6	0.0011	0.0249	0.0017	0.0147	0.6157	0.8992	7.86	0.0835	2.32	0.0033	0.0029	27.9	0.675
Oct	5114	0.0001	0.1105	0.0012	26.0	0.0011	0.0260	0.0017	0.0151	0.6250	0.8193	6.35	0.0855	2.14	0.0032	0.0027	16.9	0.768
Nov	2261	0.0001	0.1138	0.0014	24.6	0.0012	0.0299	0.0019	0.0168	0.6676	0.7777	6.17	0.0944	2.06	0.0035	0.0028	17.6	0.892
Dec	1624	0.0001	0.1163	0.0016	23.7	0.0013	0.0327	0.0020	0.0181	0.6992	0.7490	6.06	0.1011	2.00	0.0037	0.0028	18.1	0.982
Total	69058																	

Location Mouth of Rose Creek

	Flows	Ag	Al	As	Ca	Cd	Cl	Co	Cu	Fe	K	Mg	Mn	Na	Ni	Pb	SO4	Zn
	(x 1000 m3)	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L
Jan	1443	0.0001	0.0650	0.0014	24.0	0.0005	0.0078	0.0008	0.0080	0.3195	0.7510	5.60	0.0440	1.89	0.0015	0.0017	12.2	0.314
Feb	1077	0.0001	0.0626	0.0014	21.9	0.0005	0.0094	0.0008	0.0085	0.3220	0.6858	5.19	0.0463	1.74	0.0016	0.0016	11.9	0.357
Mar	1140	0.0001	0.0617	0.0015	20.3	0.0006	0.0112	0.0009	0.0092	0.3323	0.6368	4.91	0.0497	1.62	0.0017	0.0016	11.9	0.395
Apr	2189	0.0001	0.0659	0.0014	24.4	0.0005	0.0079	0.0008	0.0081	0.3236	0.7634	5.69	0.0445	1.92	0.0015	0.0017	12.4	0.271
May	18828	0.0001	0.0660	0.0011	28.9	0.0002	0.0013	0.0006	0.0054	0.2726	0.9002	6.43	0.0306	2.22	0.0012	0.0017	11.8	0.123
Jun	20640	0.0001	0.0979	0.0012	28.7	0.0008	0.0177	0.0014	0.0119	0.5153	0.8998	7.21	0.0676	2.29	0.0026	0.0025	20.7	0.627
Jul	14364	0.0001	0.0972	0.0012	28.9	0.0008	0.0176	0.0014	0.0119	0.5125	0.9077	7.49	0.0675	2.31	0.0027	0.0025	23.2	0.485
Aug	10107	0.0001	0.0961	0.0012	29.0	0.0008	0.0175	0.0014	0.0118	0.5073	0.9108	7.81	0.0670	2.31	0.0027	0.0026	26.4	0.483
Sep	13583	0.0001	0.0982	0.0012	28.9	0.0009	0.0181	0.0014	0.0121	0.5194	0.9052	7.50	0.0684	2.30	0.0027	0.0026	23.5	0.497
Oct	7053	0.0001	0.0982	0.0012	27.0	0.0009	0.0189	0.0014	0.0123	0.5258	0.8473	6.40	0.0698	2.17	0.0026	0.0024	15.5	0.564
Nov	3139	0.0001	0.1004	0.0013	26.0	0.0010	0.0216	0.0015	0.0135	0.5547	0.8179	6.28	0.0759	2.12	0.0028	0.0025	15.9	0.650
Dec	2270	0.0001	0.1019	0.0014	25.4	0.0010	0.0234	0.0016	0.0143	0.5753	0.7981	6.20	0.0804	2.08	0.0030	0.0025	16.3	0.709
Total	95833																	

Location Mouth of Anvil Creek

	Flows	Ag	Al	As	Ca	Cd	Cl	Co	Cu	Fe	K	Mg	Mn	Na	Ni	Pb	SO4	Zn
	(x 1000 m3)	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L
Jan	4247	0.0001	0.0656	0.0011	27.7	0.0003	0.0028	0.0007	0.0060	0.2829	0.8633	6.22	0.0336	2.14	0.0012	0.0017	11.9	0.124
Feb	3120	0.0001	0.0648	0.0012	26.9	0.0003	0.0034	0.0007	0.0062	0.2841	0.8398	6.07	0.0345	2.08	0.0013	0.0017	11.8	0.140
Mar	3201	0.0001	0.0644	0.0012	26.3	0.0003	0.0041	0.0007	0.0065	0.2884	0.8198	5.96	0.0359	2.04	0.0013	0.0017	11.8	0.157
Apr	6162	0.0001	0.0659	0.0011	27.8	0.0003	0.0029	0.0007	0.0061	0.2852	0.8651	6.23	0.0341	2.14	0.0013	0.0017	11.9	0.113
May	54304	0.0001	0.0659	0.0010	29.4	0.0002	0.0006	0.0006	0.0052	0.2670	0.9139	6.50	0.0291	2.25	0.0011	0.0017	11.8	0.059
Jun	57130	0.0001	0.0774	0.0011	29.3	0.0004	0.0065	0.0009	0.0075	0.3549	0.9134	6.78	0.0425	2.27	0.0017	0.0020	15.0	0.243
Jul	39803	0.0001	0.0772	0.0011	29.4	0.0004	0.0065	0.0009	0.0075	0.3537	0.9163	6.88	0.0424	2.28	0.0017	0.0020	15.9	0.191
Aug	27898	0.0001	0.0768	0.0011	29.4	0.0004	0.0065	0.0009	0.0075	0.3522	0.9174	7.00	0.0423	2.28	0.0017	0.0020	17.0	0.191
Sep	37533	0.0001	0.0776	0.0011	29.3	0.0004	0.0067	0.0009	0.0076	0.3565	0.9153	6.88	0.0428	2.28	0.0017	0.0020	16.0	0.196
Oct	19533	0.0001	0.0776	0.0011	28.7	0.0004	0.0069	0.0009	0.0077	0.3586	0.8945	6.49	0.0433	2.23	0.0017	0.0020	13.1	0.220
Nov	8793	0.0001	0.0782	0.0011	28.3	0.0005	0.0078	0.0009	0.0080	0.3679	0.8842	6.44	0.0453	2.21	0.0017	0.0020	13.2	0.248
Dec	6434	0.0001	0.0786	0.0011	28.1	0.0005	0.0084	0.0009	0.0083	0.3739	0.8777	6.42	0.0467	2.20	0.0018	0.0020	13.3	0.267
Total	268157																	

Faro Mine Area - FM01 - Flow-Through Pit
Summary Tables

Conditions: Future 1

Location: X2

	Flows (x 1000 m3)	Ag mg/L	Al mg/L	As mg/L	Ca mg/L	Cd mg/L	Cl mg/L	Co mg/L	Cu mg/L	Fe mg/L	K mg/L	Mg mg/L	Mn mg/L	Na mg/L	Ni mg/L	Pb mg/L	SO4 mg/L	Zn mg/L
Jan	553	0.0001	0.0675	0.0011	29.7	0.0002	0.0018	0.0006	0.0052	0.2722	0.9251	6.65	0.0305	2.28	0.0012	0.0018	12.6	0.044
Feb	403	0.0001	0.0679	0.0011	29.7	0.0002	0.0021	0.0007	0.0053	0.2741	0.9260	6.68	0.0310	2.28	0.0012	0.0018	12.8	0.048
Mar	407	0.0001	0.0684	0.0011	29.8	0.0002	0.0026	0.0007	0.0053	0.2767	0.9272	6.71	0.0316	2.28	0.0013	0.0018	13.0	0.054
Apr	784	0.0001	0.0677	0.0011	29.7	0.0002	0.0019	0.0007	0.0052	0.2729	0.9254	6.66	0.0306	2.28	0.0012	0.0018	12.6	0.045
May	6991	0.0001	0.0661	0.0010	29.6	0.0002	0.0004	0.0006	0.0050	0.2653	0.9217	6.55	0.0286	2.27	0.0011	0.0017	11.8	0.028
Jun	7191	0.0001	0.0662	0.0010	29.6	0.0002	0.0005	0.0006	0.0050	0.2656	0.9218	6.56	0.0287	2.27	0.0011	0.0017	11.9	0.029
Jul	5013	0.0001	0.0663	0.0010	29.6	0.0002	0.0005	0.0006	0.0050	0.2659	0.9220	6.56	0.0288	2.27	0.0011	0.0017	11.9	0.030
Aug	3506	0.0001	0.0663	0.0010	29.6	0.0002	0.0006	0.0006	0.0051	0.2659	0.9220	6.56	0.0288	2.27	0.0011	0.0017	11.9	0.030
Sep	4720	0.0001	0.0662	0.0010	29.6	0.0002	0.0005	0.0006	0.0050	0.2655	0.9218	6.56	0.0287	2.27	0.0011	0.0017	11.9	0.029
Oct	2460	0.0001	0.0663	0.0010	29.6	0.0002	0.0006	0.0006	0.0051	0.2662	0.9221	6.56	0.0288	2.27	0.0011	0.0017	11.9	0.030
Nov	1115	0.0001	0.0668	0.0010	29.7	0.0002	0.0011	0.0006	0.0051	0.2685	0.9233	6.60	0.0295	2.27	0.0012	0.0017	12.2	0.036
Dec	821	0.0001	0.0671	0.0011	29.7	0.0002	0.0014	0.0006	0.0052	0.2702	0.9241	6.62	0.0299	2.27	0.0012	0.0018	12.4	0.039
Total	33964																	

Location: X14

	Flows (x 1000 m3)	Ag mg/L	Al mg/L	As mg/L	Ca mg/L	Cd mg/L	Cl mg/L	Co mg/L	Cu mg/L	Fe mg/L	K mg/L	Mg mg/L	Mn mg/L	Na mg/L	Ni mg/L	Pb mg/L	SO4 mg/L	Zn mg/L
Jan	1008	0.0001	0.0521	0.0012	21.4	0.0004	0.0028	0.0006	0.0065	0.2371	0.6664	4.88	0.0290	1.64	0.0011	0.0014	10.2	0.303
Feb	760	0.0001	0.0463	0.0012	18.4	0.0004	0.0033	0.0006	0.0065	0.2194	0.5743	4.26	0.0278	1.41	0.0010	0.0012	9.4	0.334
Mar	820	0.0001	0.0426	0.0013	16.4	0.0005	0.0038	0.0006	0.0068	0.2105	0.5104	3.84	0.0276	1.26	0.0010	0.0011	8.9	0.350
Apr	1571	0.0001	0.0537	0.0012	22.2	0.0004	0.0027	0.0006	0.0066	0.2430	0.6906	5.05	0.0295	1.70	0.0011	0.0014	10.5	0.235
May	13316	0.0001	0.0643	0.0010	28.6	0.0002	0.0006	0.0006	0.0052	0.2615	0.8901	6.34	0.0285	2.19	0.0011	0.0017	11.6	0.145
Jun	15168	0.0001	0.0593	0.0014	27.2	0.0007	0.0006	0.0010	0.0053	0.2394	1.6058	6.71	0.0296	3.77	0.0034	0.0039	17.6	0.245
Jul	11042	0.0001	0.0567	0.0016	26.4	0.0009	0.0006	0.0012	0.0053	0.2290	1.8991	6.82	0.0300	4.42	0.0044	0.0049	20.1	0.059
Aug	8222	0.0001	0.0531	0.0018	25.2	0.0011	0.0006	0.0014	0.0053	0.2132	2.2319	6.89	0.0299	5.15	0.0055	0.0060	22.9	0.060
Sep	10451	0.0001	0.0562	0.0016	26.3	0.0009	0.0005	0.0012	0.0052	0.2259	1.9196	6.81	0.0296	4.47	0.0045	0.0049	20.2	0.053
Oct	4683	0.0001	0.0619	0.0010	27.3	0.0002	0.0008	0.0006	0.0053	0.2550	0.8503	6.07	0.0282	2.09	0.0011	0.0016	11.2	0.134
Nov	2063	0.0001	0.0598	0.0011	25.8	0.0003	0.0016	0.0006	0.0059	0.2550	0.8030	5.78	0.0293	1.98	0.0011	0.0016	11.1	0.203
Dec	1477	0.0001	0.0584	0.0012	24.7	0.0004	0.0022	0.0006	0.0064	0.2558	0.7699	5.58	0.0301	1.89	0.0011	0.0015	11.1	0.253
Total	70579																	

Location: Mouth of Rose Creek

	Flows (x 1000 m3)	Ag mg/L	Al mg/L	As mg/L	Ca mg/L	Cd mg/L	Cl mg/L	Co mg/L	Cu mg/L	Fe mg/L	K mg/L	Mg mg/L	Mn mg/L	Na mg/L	Ni mg/L	Pb mg/L	SO4 mg/L	Zn mg/L
Jan	1443	0.0001	0.0562	0.0012	23.9	0.0003	0.0020	0.0006	0.0060	0.2452	0.7433	5.38	0.0288	1.83	0.0011	0.0015	10.7	0.219
Feb	1077	0.0001	0.0521	0.0012	21.7	0.0004	0.0024	0.0006	0.0061	0.2326	0.6765	4.93	0.0279	1.66	0.0010	0.0014	10.0	0.243
Mar	1140	0.0001	0.0492	0.0012	20.1	0.0004	0.0028	0.0006	0.0063	0.2256	0.6257	4.60	0.0278	1.54	0.0010	0.0013	9.7	0.259
Apr	2189	0.0001	0.0571	0.0012	24.3	0.0003	0.0020	0.0006	0.0061	0.2489	0.7556	5.47	0.0292	1.86	0.0011	0.0015	10.8	0.176
May	18828	0.0001	0.0648	0.0010	28.9	0.0002	0.0005	0.0006	0.0052	0.2623	0.8992	6.40	0.0285	2.21	0.0011	0.0017	11.6	0.110
Jun	20838	0.0001	0.0611	0.0013	27.8	0.0006	0.0005	0.0009	0.0052	0.2461	1.4195	6.66	0.0292	3.36	0.0028	0.0033	16.0	0.185
Jul	14994	0.0001	0.0591	0.0014	27.2	0.0007	0.0005	0.0011	0.0053	0.2382	1.6413	6.75	0.0295	3.85	0.0035	0.0040	17.9	0.050
Aug	10986	0.0001	0.0563	0.0016	26.3	0.0009	0.0005	0.0012	0.0052	0.2260	1.9021	6.80	0.0295	4.43	0.0044	0.0049	20.1	0.051
Sep	14172	0.0001	0.0588	0.0014	27.1	0.0007	0.0005	0.0011	0.0052	0.2360	1.6574	6.74	0.0293	3.89	0.0036	0.0041	18.0	0.046
Oct	6822	0.0001	0.0631	0.0010	28.0	0.0002	0.0006	0.0006	0.0052	0.2577	0.8711	6.21	0.0282	2.14	0.0011	0.0016	11.4	0.102
Nov	2941	0.0001	0.0616	0.0011	26.9	0.0003	0.0012	0.0006	0.0056	0.2577	0.8383	6.01	0.0290	2.06	0.0011	0.0016	11.3	0.150
Dec	2124	0.0001	0.0607	0.0012	26.2	0.0003	0.0016	0.0006	0.0060	0.2583	0.8159	5.87	0.0296	2.01	0.0011	0.0016	11.3	0.184
Total	97354																	

Location: Mouth of Anvil Creek

	Flows (x 1000 m3)	Ag mg/L	Al mg/L	As mg/L	Ca mg/L	Cd mg/L	Cl mg/L	Co mg/L	Cu mg/L	Fe mg/L	K mg/L	Mg mg/L	Mn mg/L	Na mg/L	Ni mg/L	Pb mg/L	SO4 mg/L	Zn mg/L
Jan	4247	0.0001	0.0626	0.0011	27.7	0.0002	0.0008	0.0006	0.0054	0.2577	0.8607	6.14	0.0285	2.12	0.0011	0.0016	11.4	0.091
Feb	3120	0.0001	0.0611	0.0011	26.9	0.0003	0.0010	0.0006	0.0054	0.2532	0.8366	5.98	0.0282	2.06	0.0011	0.0016	11.1	0.101
Mar	3201	0.0001	0.0599	0.0011	26.2	0.0003	0.0011	0.0006	0.0055	0.2504	0.8159	5.84	0.0281	2.01	0.0011	0.0016	11.0	0.109
Apr	6162	0.0001	0.0628	0.0011	27.7	0.0003	0.0008	0.0006	0.0054	0.2587	0.8623	6.16	0.0286	2.12	0.0011	0.0016	11.4	0.079
May	54304	0.0001	0.0655	0.0010	29.4	0.0002	0.0003	0.0006	0.0051	0.2635	0.9135	6.49	0.0284	2.25	0.0011	0.0017	11.7	0.055
Jun	57328	0.0001	0.0641	0.0011	29.0	0.0003	0.0003	0.0007	0.0051	0.2576	1.1023	6.58	0.0286	2.66	0.0017	0.0023	13.3	0.084
Jul	40433	0.0001	0.0634	0.0012	28.7	0.0004	0.0003	0.0008	0.0051	0.2545	1.1882	6.61	0.0288	2.85	0.0020	0.0026	14.0	0.035
Aug	28777	0.0001	0.0622	0.0012	28.3	0.0005	0.0003	0.0008	0.0051	0.2496	1.2956	6.64	0.0288	3.09	0.0024	0.0029	14.9	0.035
Sep	38122	0.0001	0.0633	0.0012	28.7	0.0004	0.0003	0.0008	0.0051	0.2536	1.1948	6.61	0.0287	2.87	0.0020	0.0026	14.1	0.033
Oct	19102	0.0001	0.0649	0.0010	29.0	0.0002	0.0004	0.0006	0.0051	0.2619	0.9038	6.42	0.0283	2.22	0.0011	0.0017	11.6	0.052
Nov	8594	0.0001	0.0644	0.0010	28.7	0.0002	0.0005	0.0006	0.0052	0.2619	0.8928	6.35	0.0285	2.20	0.0011	0.0017	11.6	0.068
Dec	6288	0.0001	0.0641	0.0011	28.5	0.0002	0.0007	0.0006	0.0053	0.2622	0.8856	6.31	0.0287	2.18	0.0011	0.0017	11.6	0.079
Total	269678																	

Appendix B

Rose Creek Tailings Base Case Results

RCT01 Rose Creek Tailings - Stabilize in Place
Summary Tables

Conditions: Future 1

Location: X2

	Flows (x 1000 m3)	Ag mg/L	Al mg/L	As mg/L	Ca mg/L	Cd mg/L	Cl mg/L	Co mg/L	Cu mg/L	Fe mg/L	K mg/L	Mg mg/L	Mn mg/L	Na mg/L	Ni mg/L	Pb mg/L	SO4 mg/L	Zn mg/L
Jan	661	0.00009	0.060	0.0009	27.1	0.00018	0.0002	0.0005	0.0046	0.242	0.8	6.0	0.0259	2.1	0.0010	0.0016	10.7	0.023
Feb	483	0.00009	0.059	0.0009	26.6	0.00018	0.0002	0.0005	0.0045	0.237	0.8	5.9	0.0254	2.0	0.0010	0.0015	10.5	0.023
Mar	485	0.00009	0.059	0.0009	26.5	0.00018	0.0002	0.0005	0.0045	0.236	0.8	5.8	0.0253	2.0	0.0010	0.0015	10.5	0.023
Apr	901	0.00010	0.063	0.0010	28.3	0.00019	0.0002	0.0006	0.0048	0.252	0.9	6.2	0.0270	2.2	0.0011	0.0016	11.2	0.024
May	8165	0.00010	0.065	0.0010	29.1	0.00020	0.0002	0.0006	0.0049	0.259	0.9	6.4	0.0278	2.2	0.0011	0.0017	11.5	0.025
Jun	8391	0.00010	0.064	0.0010	28.9	0.00020	0.0002	0.0006	0.0049	0.258	0.9	6.4	0.0276	2.2	0.0011	0.0017	11.4	0.025
Jul	5833	0.00010	0.064	0.0010	28.8	0.00019	0.0002	0.0006	0.0049	0.257	0.9	6.4	0.0275	2.2	0.0011	0.0017	11.4	0.025
Aug	4128	0.00010	0.063	0.0010	28.4	0.00019	0.0002	0.0006	0.0048	0.254	0.9	6.3	0.0272	2.2	0.0011	0.0016	11.3	0.025
Sep	5537	0.00010	0.064	0.0010	28.8	0.00019	0.0002	0.0006	0.0049	0.257	0.9	6.4	0.0275	2.2	0.0011	0.0017	11.4	0.025
Oct	2894	0.00010	0.063	0.0010	28.3	0.00019	0.0002	0.0006	0.0048	0.253	0.9	6.3	0.0271	2.2	0.0011	0.0016	11.2	0.024
Nov	1321	0.00009	0.062	0.0009	27.6	0.00019	0.0002	0.0006	0.0047	0.247	0.9	6.1	0.0264	2.1	0.0010	0.0016	10.9	0.024
Dec	977	0.00009	0.062	0.0009	27.7	0.00019	0.0002	0.0006	0.0047	0.248	0.9	6.1	0.0265	2.1	0.0010	0.0016	11.0	0.024
Total	39776																	

Location: X14

	Flows (x 1000 m3)	Ag mg/L	Al mg/L	As mg/L	Ca mg/L	Cd mg/L	Cl mg/L	Co mg/L	Cu mg/L	Fe mg/L	K mg/L	Mg mg/L	Mn mg/L	Na mg/L	Ni mg/L	Pb mg/L	SO4 mg/L	Zn mg/L
Jan	1224	0.00010	0.063	0.0022	19.9	0.00165	0.0001	0.0020	0.0097	0.512	3.0	4.4	0.0317	6.9	0.0083	0.0086	42.7	0.140
Feb	908	0.00010	0.065	0.0025	17.8	0.00198	0.0001	0.0023	0.0116	0.621	3.5	4.0	0.0330	8.0	0.0099	0.0102	49.8	0.182
Mar	925	0.00011	0.069	0.0026	16.8	0.00212	0.0001	0.0025	0.0133	0.732	3.7	3.8	0.0340	8.5	0.0106	0.0108	52.9	0.221
Apr	1681	0.00010	0.070	0.0018	22.7	0.00123	0.0001	0.0016	0.0100	0.550	2.4	5.0	0.0316	5.6	0.0062	0.0066	33.7	0.141
May	14404	0.00010	0.066	0.0011	28.5	0.00032	0.0002	0.0007	0.0056	0.301	1.1	6.3	0.0285	2.6	0.0017	0.0023	14.3	0.041
Jun	14817	0.00010	0.066	0.0011	28.4	0.00031	0.0002	0.0007	0.0056	0.298	1.1	6.3	0.0284	2.6	0.0017	0.0022	14.1	0.040
Jul	10338	0.00010	0.066	0.0011	28.1	0.00037	0.0002	0.0008	0.0057	0.305	1.2	6.2	0.0285	2.8	0.0019	0.0025	15.3	0.043
Aug	7298	0.00010	0.066	0.0012	27.5	0.00044	0.0002	0.0008	0.0061	0.326	1.3	6.1	0.0286	3.0	0.0023	0.0028	16.8	0.052
Sep	9770	0.00010	0.066	0.0011	28.1	0.00037	0.0002	0.0008	0.0058	0.308	1.2	6.2	0.0285	2.8	0.0020	0.0025	15.4	0.044
Oct	5136	0.00010	0.065	0.0013	26.9	0.00054	0.0002	0.0009	0.0064	0.343	1.4	5.9	0.0289	3.3	0.0028	0.0033	19.0	0.060
Nov	2378	0.00010	0.063	0.0016	24.3	0.00092	0.0002	0.0013	0.0072	0.381	2.0	5.4	0.0295	4.6	0.0046	0.0051	26.9	0.081
Dec	1778	0.00010	0.062	0.0018	22.8	0.00119	0.0001	0.0015	0.0078	0.405	2.4	5.1	0.0303	5.5	0.0060	0.0064	32.9	0.095
Total	70657																	

Location: Mouth of Rose Creek

	Flows (x 1000 m3)	Ag mg/L	Al mg/L	As mg/L	Ca mg/L	Cd mg/L	Cl mg/L	Co mg/L	Cu mg/L	Fe mg/L	K mg/L	Mg mg/L	Mn mg/L	Na mg/L	Ni mg/L	Pb mg/L	SO4 mg/L	Zn mg/L
Jan	1660	0.00010	0.064	0.0019	22.5	0.00127	0.0001	0.0016	0.0085	0.447	2.5	5.0	0.0308	5.7	0.0064	0.0068	34.5	0.110
Feb	1226	0.00010	0.065	0.0021	20.8	0.00152	0.0001	0.0019	0.0099	0.529	2.9	4.6	0.0318	6.5	0.0076	0.0080	40.0	0.142
Mar	1245	0.00010	0.069	0.0022	20.1	0.00163	0.0001	0.0020	0.0112	0.611	3.0	4.5	0.0326	6.9	0.0082	0.0085	42.3	0.171
Apr	2298	0.00010	0.069	0.0016	24.6	0.00095	0.0002	0.0013	0.0086	0.473	2.0	5.4	0.0307	4.7	0.0048	0.0053	27.8	0.110
May	19916	0.00010	0.066	0.0011	28.8	0.00029	0.0002	0.0007	0.0055	0.291	1.0	6.4	0.0285	2.5	0.0015	0.0021	13.6	0.037
Jun	20486	0.00010	0.066	0.0011	28.8	0.00028	0.0002	0.0007	0.0054	0.288	1.0	6.4	0.0283	2.5	0.0015	0.0021	13.4	0.036
Jul	14291	0.00010	0.066	0.0011	28.5	0.00032	0.0002	0.0007	0.0055	0.294	1.1	6.3	0.0284	2.6	0.0017	0.0023	14.3	0.038
Aug	10062	0.00010	0.066	0.0011	28.1	0.00037	0.0002	0.0008	0.0058	0.309	1.2	6.2	0.0285	2.8	0.0020	0.0025	15.4	0.045
Sep	13492	0.00010	0.066	0.0011	28.5	0.00033	0.0002	0.0007	0.0056	0.296	1.1	6.3	0.0285	2.7	0.0017	0.0023	14.4	0.039
Oct	7075	0.00010	0.066	0.0012	27.6	0.00045	0.0002	0.0008	0.0060	0.321	1.3	6.1	0.0287	3.1	0.0023	0.0029	17.0	0.050
Nov	3257	0.00010	0.064	0.0014	25.7	0.00072	0.0002	0.0011	0.0066	0.350	1.7	5.7	0.0292	3.9	0.0037	0.0042	22.8	0.066
Dec	2425	0.00010	0.063	0.0016	24.6	0.00093	0.0002	0.0013	0.0071	0.367	2.0	5.5	0.0297	4.6	0.0047	0.0052	27.3	0.077
Total	97432																	

Location: Mouth of Anvil Creek

	Flows (x 1000 m3)	Ag mg/L	Al mg/L	As mg/L	Ca mg/L	Cd mg/L	Cl mg/L	Co mg/L	Cu mg/L	Fe mg/L	K mg/L	Mg mg/L	Mn mg/L	Na mg/L	Ni mg/L	Pb mg/L	SO4 mg/L	Zn mg/L
Jan	4464	0.00010	0.065	0.0013	26.9	0.00060	0.0002	0.0010	0.0063	0.332	1.5	6.0	0.0292	3.5	0.0031	0.0036	20.2	0.057
Feb	3268	0.00010	0.066	0.0014	26.3	0.00069	0.0002	0.0011	0.0068	0.363	1.6	5.8	0.0296	3.9	0.0035	0.0041	22.3	0.069
Mar	3306	0.00010	0.067	0.0014	26.0	0.00074	0.0002	0.0011	0.0073	0.395	1.7	5.8	0.0299	4.0	0.0038	0.0043	23.3	0.080
Apr	6271	0.00010	0.067	0.0012	27.8	0.00048	0.0002	0.0009	0.0063	0.341	1.3	6.1	0.0292	3.1	0.0025	0.0030	17.6	0.057
May	55392	0.00010	0.066	0.0010	29.3	0.00023	0.0002	0.0006	0.0052	0.274	1.0	6.5	0.0284	2.4	0.0013	0.0018	12.4	0.030
Jun	56977	0.00010	0.066	0.0010	29.3	0.00023	0.0002	0.0006	0.0051	0.273	1.0	6.5	0.0283	2.4	0.0012	0.0018	12.3	0.029
Jul	39730	0.00010	0.066	0.0010	29.2	0.00024	0.0002	0.0006	0.0052	0.275	1.0	6.5	0.0283	2.4	0.0013	0.0019	12.6	0.030
Aug	27853	0.00010	0.066	0.0010	29.0	0.00026	0.0002	0.0007	0.0053	0.280	1.0	6.4	0.0284	2.5	0.0014	0.0020	13.0	0.033
Sep	37442	0.00010	0.066	0.0010	29.2	0.00025	0.0002	0.0006	0.0052	0.276	1.0	6.4	0.0284	2.4	0.0013	0.0019	12.7	0.031
Oct	19555	0.00010	0.066	0.0011	28.9	0.00029	0.0002	0.0007	0.0054	0.285	1.1	6.4	0.0285	2.5	0.0015	0.0021	13.6	0.035
Nov	8910	0.00010	0.065	0.0012	28.2	0.00039	0.0002	0.0008	0.0056	0.295	1.2	6.2	0.0286	2.9	0.0020	0.0026	15.8	0.040
Dec	6588	0.00010	0.065	0.0012	27.8	0.00047	0.0002	0.0009	0.0058	0.302	1.3	6.1	0.0288	3.1	0.0024	0.0030	17.4	0.044
Total	269756																	

RCT01 Rose Creek Tailings - Stabilize in Place
Summary Tables
Conditions Future 2

Location X2

	Flows (x 1000 m3)	Ag mg/L	Al mg/L	As mg/L	Ca mg/L	Cd mg/L	Cl mg/L	Co mg/L	Cu mg/L	Fe mg/L	K mg/L	Mg mg/L	Mn mg/L	Na mg/L	Ni mg/L	Pb mg/L	SO4 mg/L	Zn mg/L
Jan	661	0.00009	0.060	0.0009	27.1	0.00018	0.0002	0.0005	0.0046	0.242	0.8	6.0	0.0259	2.1	0.0010	0.0016	10.7	0.023
Feb	483	0.00009	0.059	0.0009	26.6	0.00018	0.0002	0.0005	0.0045	0.237	0.8	5.9	0.0254	2.0	0.0010	0.0015	10.5	0.023
Mar	485	0.00009	0.059	0.0009	26.5	0.00018	0.0002	0.0005	0.0045	0.236	0.8	5.8	0.0253	2.0	0.0010	0.0015	10.5	0.023
Apr	901	0.00010	0.063	0.0010	28.3	0.00019	0.0002	0.0006	0.0048	0.252	0.9	6.2	0.0270	2.2	0.0011	0.0016	11.2	0.024
May	8165	0.00010	0.065	0.0010	29.1	0.00020	0.0002	0.0006	0.0049	0.259	0.9	6.4	0.0278	2.2	0.0011	0.0017	11.5	0.025
Jun	8391	0.00010	0.064	0.0010	28.9	0.00020	0.0002	0.0006	0.0049	0.258	0.9	6.4	0.0276	2.2	0.0011	0.0017	11.4	0.025
Jul	5833	0.00010	0.064	0.0010	28.8	0.00019	0.0002	0.0006	0.0049	0.257	0.9	6.4	0.0275	2.2	0.0011	0.0017	11.4	0.025
Aug	4128	0.00010	0.063	0.0010	28.4	0.00019	0.0002	0.0006	0.0048	0.254	0.9	6.3	0.0272	2.2	0.0011	0.0016	11.3	0.025
Sep	5537	0.00010	0.064	0.0010	28.8	0.00019	0.0002	0.0006	0.0049	0.257	0.9	6.4	0.0275	2.2	0.0011	0.0017	11.4	0.025
Oct	2894	0.00010	0.063	0.0010	28.3	0.00019	0.0002	0.0006	0.0048	0.253	0.9	6.3	0.0271	2.2	0.0011	0.0016	11.2	0.024
Nov	1321	0.00009	0.062	0.0009	27.6	0.00019	0.0002	0.0006	0.0047	0.247	0.9	6.1	0.0264	2.1	0.0010	0.0016	10.9	0.024
Dec	977	0.00009	0.062	0.0009	27.7	0.00019	0.0002	0.0006	0.0047	0.248	0.9	6.1	0.0265	2.1	0.0010	0.0016	11.0	0.024
Total	39776																	

Location X14

	Flows (x 1000 m3)	Ag mg/L	Al mg/L	As mg/L	Ca mg/L	Cd mg/L	Cl mg/L	Co mg/L	Cu mg/L	Fe mg/L	K mg/L	Mg mg/L	Mn mg/L	Na mg/L	Ni mg/L	Pb mg/L	SO4 mg/L	Zn mg/L
Jan	1224	0.00011	0.071	0.0022	20.5	0.00166	0.0001	0.0020	0.0118	0.654	3.0	4.6	0.0330	6.9	0.0083	0.0086	55.1	0.208
Feb	908	0.00011	0.076	0.0025	18.5	0.00199	0.0001	0.0024	0.0145	0.817	3.5	4.1	0.0347	8.0	0.0099	0.0102	65.2	0.276
Mar	925	0.00011	0.083	0.0026	17.5	0.00214	0.0001	0.0025	0.0170	0.977	3.7	3.9	0.0362	8.5	0.0106	0.0108	69.5	0.338
Apr	1681	0.00011	0.078	0.0019	23.1	0.00124	0.0001	0.0016	0.0122	0.696	2.4	5.1	0.0330	5.6	0.0062	0.0066	42.6	0.211
May	14404	0.00010	0.067	0.0011	28.6	0.00032	0.0002	0.0007	0.0059	0.321	1.1	6.3	0.0287	2.6	0.0017	0.0023	15.4	0.050
Jun	14817	0.00010	0.067	0.0011	28.5	0.00032	0.0002	0.0007	0.0058	0.316	1.1	6.3	0.0285	2.6	0.0017	0.0022	15.1	0.049
Jul	10338	0.00010	0.067	0.0011	28.2	0.00037	0.0002	0.0008	0.0061	0.328	1.2	6.2	0.0287	2.8	0.0019	0.0025	16.8	0.054
Aug	7298	0.00010	0.068	0.0012	27.6	0.00044	0.0002	0.0008	0.0066	0.360	1.3	6.1	0.0289	3.0	0.0023	0.0028	18.9	0.068
Sep	9770	0.00010	0.067	0.0011	28.1	0.00038	0.0002	0.0008	0.0061	0.332	1.2	6.2	0.0287	2.8	0.0020	0.0025	16.9	0.056
Oct	5136	0.00010	0.068	0.0013	27.0	0.00055	0.0002	0.0009	0.0070	0.386	1.4	6.0	0.0293	3.3	0.0028	0.0033	22.0	0.081
Nov	2378	0.00010	0.067	0.0016	24.6	0.00092	0.0002	0.0013	0.0083	0.451	2.0	5.5	0.0302	4.6	0.0047	0.0051	33.1	0.115
Dec	1778	0.00010	0.067	0.0018	23.2	0.00120	0.0001	0.0016	0.0091	0.491	2.4	5.2	0.0310	5.5	0.0060	0.0064	41.5	0.136
Total	70657																	

Location Mouth of Rose Creek

	Flows (x 1000 m3)	Ag mg/L	Al mg/L	As mg/L	Ca mg/L	Cd mg/L	Cl mg/L	Co mg/L	Cu mg/L	Fe mg/L	K mg/L	Mg mg/L	Mn mg/L	Na mg/L	Ni mg/L	Pb mg/L	SO4 mg/L	Zn mg/L
Jan	1660	0.00010	0.069	0.0019	22.9	0.00127	0.0001	0.0016	0.0100	0.552	2.5	5.1	0.0318	5.7	0.0064	0.0068	43.7	0.160
Feb	1226	0.00011	0.073	0.0021	21.4	0.00153	0.0001	0.0019	0.0120	0.674	2.9	4.8	0.0331	6.5	0.0076	0.0080	51.3	0.211
Mar	1245	0.00011	0.078	0.0022	20.6	0.00164	0.0001	0.0020	0.0139	0.794	3.0	4.6	0.0342	6.9	0.0082	0.0085	54.7	0.258
Apr	2298	0.00011	0.074	0.0016	24.9	0.00096	0.0002	0.0014	0.0102	0.580	2.0	5.5	0.0317	4.7	0.0048	0.0053	34.3	0.161
May	19916	0.00010	0.067	0.0011	28.9	0.00029	0.0002	0.0007	0.0057	0.305	1.0	6.4	0.0286	2.5	0.0015	0.0021	14.4	0.043
Jun	20486	0.00010	0.067	0.0011	28.8	0.00028	0.0002	0.0007	0.0056	0.302	1.0	6.4	0.0285	2.5	0.0015	0.0021	14.2	0.042
Jul	14291	0.00010	0.067	0.0011	28.6	0.00032	0.0002	0.0007	0.0058	0.310	1.1	6.3	0.0286	2.6	0.0017	0.0023	15.4	0.046
Aug	10062	0.00010	0.067	0.0011	28.1	0.00038	0.0002	0.0008	0.0061	0.334	1.2	6.2	0.0288	2.8	0.0020	0.0025	16.9	0.057
Sep	13492	0.00010	0.067	0.0011	28.5	0.00033	0.0002	0.0007	0.0058	0.313	1.1	6.3	0.0286	2.7	0.0017	0.0023	15.5	0.048
Oct	7075	0.00010	0.067	0.0012	27.7	0.00045	0.0002	0.0008	0.0065	0.353	1.3	6.1	0.0290	3.1	0.0023	0.0029	19.1	0.066
Nov	3257	0.00010	0.067	0.0014	26.0	0.00073	0.0002	0.0011	0.0074	0.400	1.7	5.7	0.0297	3.9	0.0037	0.0042	27.4	0.091
Dec	2425	0.00010	0.066	0.0016	24.9	0.00093	0.0002	0.0013	0.0080	0.430	2.0	5.5	0.0303	4.6	0.0047	0.0052	33.5	0.107
Total	97432																	

Location Mouth of Anvil Creek

	Flows (x 1000 m3)	Ag mg/L	Al mg/L	As mg/L	Ca mg/L	Cd mg/L	Cl mg/L	Co mg/L	Cu mg/L	Fe mg/L	K mg/L	Mg mg/L	Mn mg/L	Na mg/L	Ni mg/L	Pb mg/L	SO4 mg/L	Zn mg/L
Jan	4464	0.00010	0.067	0.0013	27.1	0.00060	0.0002	0.0010	0.0069	0.371	1.5	6.0	0.0296	3.5	0.0031	0.0036	23.6	0.076
Feb	3268	0.00010	0.069	0.0014	26.5	0.00070	0.0002	0.0011	0.0076	0.418	1.6	5.9	0.0301	3.9	0.0036	0.0041	26.6	0.095
Mar	3306	0.00010	0.071	0.0015	26.2	0.00074	0.0002	0.0011	0.0084	0.464	1.7	5.8	0.0305	4.0	0.0038	0.0043	27.9	0.113
Apr	6271	0.00010	0.069	0.0012	27.9	0.00048	0.0002	0.0009	0.0069	0.380	1.3	6.2	0.0295	3.1	0.0025	0.0030	20.0	0.075
May	55392	0.00010	0.066	0.0010	29.3	0.00023	0.0002	0.0006	0.0052	0.279	1.0	6.5	0.0284	2.4	0.0013	0.0018	12.7	0.032
Jun	56977	0.00010	0.066	0.0010	29.3	0.00023	0.0002	0.0006	0.0052	0.278	1.0	6.5	0.0284	2.4	0.0012	0.0018	12.6	0.032
Jul	39730	0.00010	0.066	0.0010	29.2	0.00024	0.0002	0.0006	0.0053	0.281	1.0	6.5	0.0284	2.4	0.0013	0.0019	13.0	0.033
Aug	27853	0.00010	0.066	0.0011	29.1	0.00026	0.0002	0.0007	0.0054	0.289	1.0	6.4	0.0285	2.5	0.0014	0.0020	13.6	0.037
Sep	37442	0.00010	0.066	0.0010	29.2	0.00025	0.0002	0.0006	0.0053	0.282	1.0	6.5	0.0284	2.4	0.0013	0.0019	13.1	0.034
Oct	19555	0.00010	0.066	0.0011	28.9	0.00029	0.0002	0.0007	0.0055	0.296	1.1	6.4	0.0286	2.5	0.0015	0.0021	14.4	0.040
Nov	8910	0.00010	0.066	0.0012	28.3	0.00039	0.0002	0.0008	0.0059	0.314	1.2	6.2	0.0288	2.9	0.0021	0.0026	17.4	0.049
Dec	6588	0.00010	0.066	0.0012	27.9	0.00047	0.0002	0.0009	0.0061	0.325	1.3	6.2	0.0290	3.1	0.0024	0.0030	19.7	0.055
Total	269756																	

RCT01 Rose Creek Tailings - Stabilize In Place
Summary Tables

Conditions: Future 3

Location: X2

	Flows	Ag	Al	As	Ca	Cd	Cl	Co	Cu	Fe	K	Mg	Mn	Na	Ni	Pb	SO4	Zn
	(x 1000 m3)	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L
Jan	661	0.00009	0.060	0.0009	27.1	0.00018	0.0002	0.0005	0.0046	0.242	0.8	6.0	0.0259	2.1	0.0010	0.0016	10.7	0.023
Feb	483	0.00009	0.059	0.0009	26.6	0.00018	0.0002	0.0005	0.0045	0.237	0.8	5.9	0.0254	2.0	0.0010	0.0015	10.5	0.023
Mar	485	0.00009	0.059	0.0009	26.5	0.00018	0.0002	0.0005	0.0045	0.236	0.8	5.8	0.0253	2.0	0.0010	0.0015	10.5	0.023
Apr	901	0.00010	0.063	0.0010	28.3	0.00019	0.0002	0.0006	0.0048	0.252	0.9	6.2	0.0270	2.2	0.0011	0.0016	11.2	0.024
May	8165	0.00010	0.065	0.0010	29.1	0.00020	0.0002	0.0006	0.0049	0.259	0.9	6.4	0.0278	2.2	0.0011	0.0017	11.5	0.025
Jun	8391	0.00010	0.064	0.0010	28.9	0.00020	0.0002	0.0006	0.0049	0.258	0.9	6.4	0.0276	2.2	0.0011	0.0017	11.4	0.025
Jul	5833	0.00010	0.064	0.0010	28.8	0.00019	0.0002	0.0006	0.0049	0.257	0.9	6.4	0.0275	2.2	0.0011	0.0017	11.4	0.025
Aug	4128	0.00010	0.063	0.0010	28.4	0.00019	0.0002	0.0006	0.0048	0.254	0.9	6.3	0.0272	2.2	0.0011	0.0016	11.3	0.025
Sep	5537	0.00010	0.064	0.0010	28.8	0.00019	0.0002	0.0006	0.0049	0.257	0.9	6.4	0.0275	2.2	0.0011	0.0017	11.4	0.025
Oct	2894	0.00010	0.063	0.0010	28.3	0.00019	0.0002	0.0006	0.0048	0.253	0.9	6.3	0.0271	2.2	0.0011	0.0016	11.2	0.024
Nov	1321	0.00009	0.062	0.0009	27.6	0.00019	0.0002	0.0006	0.0047	0.247	0.9	6.1	0.0264	2.1	0.0010	0.0016	10.9	0.024
Dec	977	0.00009	0.062	0.0009	27.7	0.00019	0.0002	0.0006	0.0047	0.248	0.9	6.1	0.0265	2.1	0.0010	0.0016	11.0	0.024
Total	39776																	

Location: X14

	Flows	Ag	Al	As	Ca	Cd	Cl	Co	Cu	Fe	K	Mg	Mn	Na	Ni	Pb	SO4	Zn
	(x 1000 m3)	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L
Jan	1224	0.00013	0.118	0.0023	24.0	0.00171	0.0001	0.0023	0.0248	1.528	3.0	5.4	0.0408	6.9	0.0084	0.0087	148.1	0.452
Feb	908	0.00014	0.141	0.0027	22.7	0.00207	0.0001	0.0027	0.0324	2.022	3.5	5.2	0.0456	8.0	0.0102	0.0103	179.7	0.612
Mar	925	0.00015	0.165	0.0029	22.2	0.00223	0.0001	0.0030	0.0395	2.489	3.7	5.1	0.0498	8.5	0.0109	0.0109	193.4	0.760
Apr	1681	0.00013	0.126	0.0020	25.6	0.00129	0.0001	0.0019	0.0255	1.596	2.4	5.7	0.0410	5.6	0.0064	0.0066	108.8	0.462
May	14404	0.00010	0.074	0.0011	28.9	0.00033	0.0002	0.0008	0.0077	0.440	1.1	6.4	0.0298	2.6	0.0017	0.0023	23.4	0.084
Jun	14817	0.00010	0.073	0.0011	28.8	0.00032	0.0002	0.0007	0.0075	0.430	1.1	6.4	0.0295	2.6	0.0017	0.0022	22.6	0.080
Jul	10338	0.00010	0.074	0.0012	28.6	0.00038	0.0002	0.0008	0.0081	0.468	1.2	6.3	0.0300	2.8	0.0020	0.0025	27.8	0.094
Aug	7298	0.00011	0.079	0.0012	28.2	0.00046	0.0002	0.0009	0.0097	0.570	1.3	6.2	0.0308	3.0	0.0023	0.0028	34.6	0.127
Sep	9770	0.00010	0.075	0.0012	28.6	0.00039	0.0002	0.0008	0.0083	0.482	1.2	6.3	0.0301	2.8	0.0020	0.0025	28.3	0.098
Oct	5136	0.00011	0.082	0.0013	27.8	0.00056	0.0002	0.0010	0.0110	0.654	1.4	6.2	0.0317	3.3	0.0029	0.0033	44.3	0.155
Nov	2378	0.00011	0.090	0.0017	26.3	0.00095	0.0002	0.0014	0.0146	0.879	2.0	5.9	0.0340	4.6	0.0047	0.0051	79.5	0.234
Dec	1778	0.00012	0.095	0.0019	25.6	0.00123	0.0001	0.0017	0.0169	1.018	2.4	5.7	0.0358	5.5	0.0061	0.0065	105.4	0.283
Total	70657																	

Location: Mouth of Rose Creek

	Flows	Ag	Al	As	Ca	Cd	Cl	Co	Cu	Fe	K	Mg	Mn	Na	Ni	Pb	SO4	Zn
	(x 1000 m3)	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L
Jan	1660	0.00012	0.104	0.0020	25.4	0.00131	0.0001	0.0018	0.0196	1.196	2.5	5.7	0.0375	5.7	0.0065	0.0068	112.3	0.340
Feb	1226	0.00013	0.122	0.0023	24.5	0.00159	0.0001	0.0022	0.0253	1.567	2.9	5.5	0.0411	6.5	0.0078	0.0080	136.2	0.460
Mar	1245	0.00014	0.139	0.0024	24.1	0.00171	0.0001	0.0024	0.0306	1.917	3.0	5.4	0.0443	6.9	0.0084	0.0086	146.7	0.571
Apr	2298	0.00012	0.110	0.0017	26.7	0.00100	0.0002	0.0016	0.0200	1.238	2.0	6.0	0.0376	4.7	0.0049	0.0053	82.7	0.345
May	19916	0.00010	0.072	0.0011	29.1	0.00029	0.0002	0.0007	0.0070	0.392	1.0	6.4	0.0294	2.5	0.0016	0.0021	20.1	0.067
Jun	20486	0.00010	0.071	0.0011	29.0	0.00029	0.0002	0.0007	0.0068	0.384	1.0	6.4	0.0292	2.5	0.0015	0.0021	19.6	0.065
Jul	14291	0.00010	0.072	0.0011	28.9	0.00033	0.0002	0.0008	0.0073	0.412	1.1	6.4	0.0295	2.6	0.0017	0.0023	23.4	0.075
Aug	10062	0.00010	0.075	0.0012	28.6	0.00039	0.0002	0.0008	0.0084	0.486	1.2	6.3	0.0301	2.8	0.0020	0.0025	28.3	0.099
Sep	13492	0.00010	0.073	0.0011	28.8	0.00033	0.0002	0.0008	0.0074	0.422	1.1	6.4	0.0296	2.7	0.0017	0.0023	23.7	0.078
Oct	7075	0.00011	0.076	0.0012	28.3	0.00046	0.0002	0.0009	0.0094	0.547	1.3	6.3	0.0308	3.1	0.0024	0.0029	35.3	0.120
Nov	3257	0.00011	0.084	0.0015	27.2	0.00075	0.0002	0.0012	0.0120	0.713	1.7	6.1	0.0325	3.9	0.0038	0.0042	61.2	0.178
Dec	2425	0.00011	0.087	0.0017	26.7	0.00096	0.0002	0.0014	0.0137	0.817	2.0	6.0	0.0338	4.6	0.0048	0.0052	80.4	0.215
Total	97432																	

Location: Mouth of Anvil Creek

	Flows	Ag	Al	As	Ca	Cd	Cl	Co	Cu	Fe	K	Mg	Mn	Na	Ni	Pb	SO4	Zn
	(x 1000 m3)	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L
Jan	4464	0.00011	0.080	0.0014	28.1	0.00061	0.0002	0.0011	0.0104	0.611	1.5	6.2	0.0317	3.5	0.0031	0.0036	49.1	0.142
Feb	3268	0.00011	0.087	0.0015	27.7	0.00072	0.0002	0.0012	0.0126	0.753	1.6	6.2	0.0331	3.9	0.0036	0.0041	58.4	0.189
Mar	3306	0.00011	0.094	0.0015	27.5	0.00077	0.0002	0.0013	0.0146	0.887	1.7	6.1	0.0343	4.0	0.0038	0.0043	62.6	0.231
Apr	6271	0.00011	0.082	0.0013	28.5	0.00049	0.0002	0.0010	0.0105	0.621	1.3	6.3	0.0317	3.1	0.0025	0.0030	37.7	0.143
May	55392	0.00010	0.068	0.0010	29.4	0.00023	0.0002	0.0006	0.0057	0.310	1.0	6.5	0.0287	2.4	0.0013	0.0019	14.7	0.041
Jun	56977	0.00010	0.068	0.0010	29.4	0.00023	0.0002	0.0006	0.0057	0.307	1.0	6.5	0.0286	2.4	0.0013	0.0018	14.6	0.040
Jul	39730	0.00010	0.068	0.0010	29.3	0.00025	0.0002	0.0007	0.0058	0.317	1.0	6.5	0.0287	2.4	0.0013	0.0019	15.9	0.043
Aug	27853	0.00010	0.069	0.0011	29.2	0.00027	0.0002	0.0007	0.0062	0.344	1.0	6.5	0.0290	2.5	0.0014	0.0020	17.7	0.052
Sep	37442	0.00010	0.068	0.0010	29.3	0.00025	0.0002	0.0007	0.0059	0.321	1.0	6.5	0.0288	2.4	0.0013	0.0019	16.0	0.044
Oct	19555	0.00010	0.070	0.0011	29.1	0.00030	0.0002	0.0007	0.0066	0.367	1.1	6.4	0.0292	2.5	0.0016	0.0021	20.3	0.060
Nov	8910	0.00010	0.072	0.0012	28.7	0.00040	0.0002	0.0008	0.0076	0.428	1.2	6.4	0.0298	2.9	0.0021	0.0026	29.8	0.081
Dec	6588	0.00010	0.074	0.0012	28.5	0.00048	0.0002	0.0009	0.0082	0.468	1.3	6.3	0.0303	3.1	0.0025	0.0030	37.0	0.095
Total	269756.2																	

RCT02 - Rose Creek Tailings - Complete Relocation
Summary Tables

Conditions Base Case Current Loadings

Location X2

	Flows	Ag	Al	As	Ca	Cd	Cl	Co	Cu	Fe	K	Mg	Mn	Na	Ni	Pb	SO4	Zn
	(x 1000 m3)	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L
Jan	566	0.00010	0.064	0.0010	28.8	0.00019	0.0002	0.0006	0.0049	0.257	0.9	6.4	0.0275	2.2	0.0011	0.0017	11.4	0.025
Feb	415	0.00010	0.064	0.0010	28.6	0.00019	0.0002	0.0006	0.0048	0.255	0.9	6.3	0.0274	2.2	0.0011	0.0016	11.3	0.025
Mar	422	0.00010	0.063	0.0010	28.4	0.00019	0.0002	0.0006	0.0048	0.253	0.9	6.3	0.0271	2.2	0.0011	0.0016	11.2	0.025
Apr	803	0.00010	0.064	0.0010	28.7	0.00019	0.0002	0.0006	0.0049	0.256	0.9	6.3	0.0275	2.2	0.0011	0.0017	11.4	0.025
May	7139	0.00010	0.065	0.0010	29.0	0.00020	0.0002	0.0006	0.0049	0.259	0.9	6.4	0.0278	2.2	0.0011	0.0017	11.5	0.025
Jun	7431	0.00010	0.064	0.0010	28.8	0.00019	0.0002	0.0006	0.0049	0.257	0.9	6.4	0.0275	2.2	0.0011	0.0017	11.4	0.025
Jul	5197	0.00010	0.064	0.0010	28.7	0.00019	0.0002	0.0006	0.0049	0.256	0.9	6.3	0.0275	2.2	0.0011	0.0017	11.4	0.025
Aug	3652	0.00010	0.064	0.0010	28.6	0.00019	0.0002	0.0006	0.0048	0.255	0.9	6.3	0.0274	2.2	0.0011	0.0016	11.3	0.025
Sep	4907	0.00010	0.064	0.0010	28.7	0.00019	0.0002	0.0006	0.0048	0.256	0.9	6.3	0.0274	2.2	0.0011	0.0016	11.4	0.025
Oct	2616	0.00010	0.063	0.0010	28.2	0.00019	0.0002	0.0006	0.0048	0.252	0.9	6.2	0.0270	2.2	0.0010	0.0016	11.2	0.024
Nov	1224	0.00009	0.061	0.0009	27.5	0.00019	0.0002	0.0006	0.0047	0.246	0.9	6.1	0.0263	2.1	0.0010	0.0016	10.9	0.024
Dec	897	0.00009	0.061	0.0009	27.6	0.00019	0.0002	0.0006	0.0047	0.246	0.9	6.1	0.0264	2.1	0.0010	0.0016	10.9	0.024
Total	35269																	

Location X14

	Flows	Ag	Al	As	Ca	Cd	Cl	Co	Cu	Fe	K	Mg	Mn	Na	Ni	Pb	SO4	Zn
	(x 1000 m3)	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L
Jan	1164	0.00010	0.068	0.0017	24.5	0.00101	0.0002	0.0014	0.0086	0.464	2.1	5.4	0.0308	4.9	0.0051	0.0055	42.2	0.036
Feb	855	0.00010	0.070	0.0018	23.3	0.00120	0.0001	0.0016	0.0100	0.551	2.4	5.2	0.0317	5.5	0.0061	0.0065	49.6	0.040
Mar	873	0.00011	0.073	0.0019	22.6	0.00128	0.0001	0.0017	0.0112	0.632	2.5	5.0	0.0323	5.7	0.0064	0.0068	52.5	0.043
Apr	1651	0.00010	0.070	0.0015	25.7	0.00075	0.0002	0.0012	0.0085	0.476	1.7	5.7	0.0303	4.0	0.0038	0.0043	32.5	0.035
May	14389	0.00010	0.066	0.0010	28.9	0.00026	0.0002	0.0007	0.0054	0.290	1.0	6.4	0.0283	2.5	0.0014	0.0020	14.1	0.027
Jun	14815	0.00010	0.066	0.0010	28.8	0.00026	0.0002	0.0007	0.0054	0.287	1.0	6.4	0.0282	2.4	0.0014	0.0020	13.9	0.026
Jul	10337	0.00010	0.066	0.0011	28.6	0.00029	0.0002	0.0007	0.0055	0.293	1.0	6.3	0.0282	2.5	0.0015	0.0021	15.0	0.027
Aug	7243	0.00010	0.066	0.0011	28.3	0.00033	0.0002	0.0007	0.0057	0.309	1.1	6.3	0.0284	2.6	0.0017	0.0023	16.5	0.027
Sep	9768	0.00010	0.066	0.0011	28.5	0.00029	0.0002	0.0007	0.0055	0.295	1.0	6.3	0.0283	2.5	0.0015	0.0021	15.1	0.027
Oct	5133	0.00010	0.066	0.0011	27.8	0.00038	0.0002	0.0008	0.0059	0.320	1.2	6.1	0.0284	2.8	0.0020	0.0025	18.4	0.028
Nov	2377	0.00010	0.065	0.0013	26.3	0.00058	0.0002	0.0010	0.0065	0.349	1.5	5.8	0.0286	3.4	0.0030	0.0035	25.8	0.030
Dec	1776	0.00010	0.064	0.0014	25.4	0.00072	0.0002	0.0011	0.0069	0.368	1.7	5.6	0.0290	3.9	0.0037	0.0042	31.3	0.031
Total	70381																	

Location Mouth of Rose Creek

	Flows	Ag	Al	As	Ca	Cd	Cl	Co	Cu	Fe	K	Mg	Mn	Na	Ni	Pb	SO4	Zn
	(x 1000 m3)	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L
Jan	1600	0.00010	0.067	0.0015	25.9	0.00079	0.0002	0.0012	0.0076	0.410	1.8	5.7	0.0301	4.2	0.0040	0.0045	33.9	0.033
Feb	1173	0.00010	0.069	0.0016	25.0	0.00093	0.0002	0.0013	0.0086	0.473	2.0	5.5	0.0308	4.6	0.0047	0.0052	39.3	0.036
Mar	1193	0.00010	0.071	0.0017	24.5	0.00099	0.0002	0.0014	0.0096	0.533	2.1	5.4	0.0312	4.8	0.0050	0.0054	41.5	0.038
Apr	2268	0.00010	0.069	0.0013	26.7	0.00060	0.0002	0.0010	0.0076	0.418	1.5	5.9	0.0297	3.5	0.0031	0.0036	26.8	0.032
May	19901	0.00010	0.066	0.0010	29.1	0.00025	0.0002	0.0006	0.0053	0.283	1.0	6.4	0.0283	2.4	0.0013	0.0019	13.4	0.026
Jun	20485	0.00010	0.066	0.0010	29.0	0.00024	0.0002	0.0006	0.0053	0.281	1.0	6.4	0.0282	2.4	0.0013	0.0019	13.3	0.026
Jul	14289	0.00010	0.066	0.0010	28.8	0.00026	0.0002	0.0007	0.0053	0.285	1.0	6.4	0.0282	2.5	0.0014	0.0020	14.1	0.026
Aug	10007	0.00010	0.066	0.0011	28.7	0.00029	0.0002	0.0007	0.0055	0.297	1.0	6.3	0.0284	2.5	0.0016	0.0021	15.2	0.027
Sep	13489	0.00010	0.066	0.0010	28.8	0.00027	0.0002	0.0007	0.0054	0.286	1.0	6.4	0.0283	2.5	0.0014	0.0020	14.1	0.026
Oct	7072	0.00010	0.066	0.0011	28.3	0.00033	0.0002	0.0007	0.0057	0.305	1.1	6.3	0.0284	2.7	0.0017	0.0023	16.6	0.027
Nov	3255	0.00010	0.065	0.0012	27.2	0.00048	0.0002	0.0009	0.0061	0.326	1.3	6.0	0.0285	3.1	0.0025	0.0030	22.0	0.029
Dec	2423	0.00010	0.065	0.0013	26.6	0.00058	0.0002	0.0010	0.0064	0.340	1.5	5.9	0.0288	3.5	0.0030	0.0035	26.1	0.030
Total	97156																	

Location Mouth of Anvil Creek

	Flows	Ag	Al	As	Ca	Cd	Cl	Co	Cu	Fe	K	Mg	Mn	Na	Ni	Pb	SO4	Zn
	(x 1000 m3)	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L
Jan	4404	0.00010	0.066	0.0012	28.3	0.00041	0.0002	0.0008	0.0059	0.317	1.2	6.2	0.0290	3.0	0.0022	0.0027	19.8	0.028
Feb	3215	0.00010	0.067	0.0012	27.9	0.00047	0.0002	0.0009	0.0063	0.340	1.3	6.2	0.0292	3.1	0.0024	0.0030	21.8	0.029
Mar	3254	0.00010	0.068	0.0012	27.7	0.00049	0.0002	0.0009	0.0067	0.363	1.3	6.1	0.0294	3.2	0.0025	0.0031	22.7	0.030
Apr	6241	0.00010	0.067	0.0011	28.6	0.00035	0.0002	0.0007	0.0059	0.320	1.1	6.3	0.0288	2.7	0.0018	0.0024	17.2	0.028
May	55378	0.00010	0.066	0.0010	29.4	0.00022	0.0002	0.0006	0.0051	0.271	0.9	6.5	0.0283	2.3	0.0012	0.0018	12.3	0.026
Jun	56975	0.00010	0.066	0.0010	29.4	0.00022	0.0002	0.0006	0.0051	0.270	0.9	6.5	0.0283	2.3	0.0012	0.0018	12.3	0.026
Jul	39728	0.00010	0.066	0.0010	29.3	0.00022	0.0002	0.0006	0.0051	0.272	1.0	6.5	0.0283	2.3	0.0012	0.0018	12.6	0.026
Aug	27798	0.00010	0.066	0.0010	29.3	0.00023	0.0002	0.0006	0.0052	0.276	1.0	6.5	0.0283	2.4	0.0013	0.0019	13.0	0.026
Sep	37439	0.00010	0.066	0.0010	29.3	0.00022	0.0002	0.0006	0.0051	0.272	1.0	6.5	0.0283	2.3	0.0012	0.0018	12.6	0.026
Oct	19552	0.00010	0.066	0.0010	29.1	0.00025	0.0002	0.0006	0.0052	0.279	1.0	6.4	0.0283	2.4	0.0013	0.0019	13.5	0.026
Nov	8908	0.00010	0.066	0.0011	28.7	0.00030	0.0002	0.0007	0.0054	0.287	1.1	6.3	0.0284	2.6	0.0016	0.0022	15.5	0.027
Dec	6587	0.00010	0.065	0.0011	28.5	0.00034	0.0002	0.0007	0.0055	0.292	1.1	6.3	0.0285	2.7	0.0018	0.0024	17.0	0.027
Total	269480																	

RCT03 - Rose Creek Tailings - Partial Relocation
Summary Tables

Conditions: Future 1

Location: X2

	Flows (x 1000 m3)	Ag mg/L	Al mg/L	As mg/L	Ca mg/L	Cd mg/L	Cl mg/L	Co mg/L	Cu mg/L	Fe mg/L	K mg/L	Mg mg/L	Mn mg/L	Na mg/L	Ni mg/L	Pb mg/L	SO4 mg/L	Zn mg/L
Jan	624	0.00009	0.060	0.0009	26.8	0.00018	0.0002	0.0005	0.0045	0.239	0.8	5.9	0.0256	2.1	0.0010	0.0015	10.6	0.023
Feb	465	0.00009	0.059	0.0009	26.3	0.00018	0.0002	0.0005	0.0044	0.235	0.8	5.8	0.0252	2.0	0.0010	0.0015	10.4	0.023
Mar	471	0.00009	0.058	0.0009	26.2	0.00018	0.0002	0.0005	0.0044	0.234	0.8	5.8	0.0250	2.0	0.0010	0.0015	10.4	0.023
Apr	831	0.00009	0.062	0.0009	28.0	0.00019	0.0002	0.0006	0.0047	0.250	0.9	6.2	0.0268	2.1	0.0010	0.0016	11.1	0.024
May	7150	0.00010	0.065	0.0010	29.0	0.00020	0.0002	0.0006	0.0049	0.259	0.9	6.4	0.0277	2.2	0.0011	0.0017	11.5	0.025
Jun	7431	0.00010	0.064	0.0010	28.8	0.00019	0.0002	0.0006	0.0049	0.257	0.9	6.4	0.0275	2.2	0.0011	0.0017	11.4	0.025
Jul	5197	0.00010	0.064	0.0010	28.7	0.00019	0.0002	0.0006	0.0048	0.256	0.9	6.3	0.0274	2.2	0.0011	0.0016	11.4	0.025
Aug	3652	0.00010	0.064	0.0010	28.6	0.00019	0.0002	0.0006	0.0048	0.255	0.9	6.3	0.0273	2.2	0.0011	0.0016	11.3	0.025
Sep	4907	0.00010	0.064	0.0010	28.6	0.00019	0.0002	0.0006	0.0048	0.255	0.9	6.3	0.0274	2.2	0.0011	0.0016	11.3	0.025
Oct	2616	0.00010	0.063	0.0010	28.1	0.00019	0.0002	0.0006	0.0048	0.251	0.9	6.2	0.0269	2.2	0.0010	0.0016	11.1	0.024
Nov	1224	0.00009	0.061	0.0009	27.4	0.00019	0.0002	0.0006	0.0046	0.245	0.9	6.1	0.0262	2.1	0.0010	0.0016	10.9	0.024
Dec	897	0.00009	0.061	0.0009	27.5	0.00019	0.0002	0.0006	0.0046	0.245	0.9	6.1	0.0263	2.1	0.0010	0.0016	10.9	0.024
Total	35467																	

Location: X14

	Flows (x 1000 m3)	Ag mg/L	Al mg/L	As mg/L	Ca mg/L	Cd mg/L	Cl mg/L	Co mg/L	Cu mg/L	Fe mg/L	K mg/L	Mg mg/L	Mn mg/L	Na mg/L	Ni mg/L	Pb mg/L	SO4 mg/L	Zn mg/L
Jan	1222	0.00010	0.066	0.0017	22.9	0.00112	0.0001	0.0015	0.0089	0.482	2.3	5.1	0.0303	5.2	0.0057	0.0061	36.2	0.137
Feb	906	0.00010	0.068	0.0019	21.4	0.00134	0.0001	0.0017	0.0104	0.575	2.6	4.8	0.0312	5.9	0.0067	0.0071	42.0	0.179
Mar	923	0.00010	0.072	0.0020	20.7	0.00143	0.0001	0.0018	0.0118	0.668	2.7	4.6	0.0320	6.1	0.0072	0.0075	44.4	0.217
Apr	1680	0.00010	0.071	0.0015	24.8	0.00086	0.0002	0.0012	0.0091	0.509	1.9	5.5	0.0305	4.3	0.0043	0.0048	29.1	0.139
May	14401	0.00010	0.066	0.0011	28.8	0.00028	0.0002	0.0007	0.0055	0.295	1.0	6.4	0.0284	2.5	0.0015	0.0021	13.7	0.040
Jun	14815	0.00010	0.066	0.0010	28.7	0.00027	0.0002	0.0007	0.0055	0.292	1.0	6.3	0.0282	2.5	0.0015	0.0020	13.6	0.040
Jul	10337	0.00010	0.066	0.0011	28.4	0.00031	0.0002	0.0007	0.0056	0.299	1.1	6.3	0.0283	2.6	0.0016	0.0022	14.5	0.043
Aug	7243	0.00010	0.066	0.0011	28.1	0.00035	0.0002	0.0007	0.0059	0.319	1.1	6.2	0.0285	2.7	0.0019	0.0024	15.8	0.052
Sep	9768	0.00010	0.066	0.0011	28.4	0.00031	0.0002	0.0007	0.0056	0.301	1.1	6.3	0.0283	2.6	0.0016	0.0022	14.6	0.044
Oct	5133	0.00010	0.066	0.0012	27.6	0.00042	0.0002	0.0008	0.0061	0.331	1.2	6.1	0.0285	2.9	0.0022	0.0027	17.4	0.059
Nov	2376	0.00010	0.065	0.0014	25.8	0.00066	0.0002	0.0010	0.0068	0.366	1.6	5.7	0.0288	3.7	0.0033	0.0038	23.7	0.080
Dec	1776	0.00010	0.064	0.0015	24.8	0.00083	0.0002	0.0012	0.0073	0.388	1.8	5.5	0.0293	4.3	0.0042	0.0047	28.5	0.093
Total	70579																	

Location: Mouth of Rose Creek

	Flows (x 1000 m3)	Ag mg/L	Al mg/L	As mg/L	Ca mg/L	Cd mg/L	Cl mg/L	Co mg/L	Cu mg/L	Fe mg/L	K mg/L	Mg mg/L	Mn mg/L	Na mg/L	Ni mg/L	Pb mg/L	SO4 mg/L	Zn mg/L
Jan	1658	0.00010	0.066	0.0015	24.7	0.00088	0.0002	0.0013	0.0079	0.424	1.9	5.5	0.0298	4.4	0.0045	0.0049	29.8	0.108
Feb	1224	0.00010	0.068	0.0017	23.5	0.00104	0.0002	0.0014	0.0090	0.494	2.1	5.2	0.0305	4.9	0.0053	0.0057	34.1	0.139
Mar	1243	0.00010	0.070	0.0017	23.0	0.00111	0.0001	0.0015	0.0101	0.564	2.2	5.1	0.0310	5.1	0.0056	0.0060	36.0	0.168
Apr	2297	0.00010	0.069	0.0014	26.1	0.00068	0.0002	0.0011	0.0080	0.443	1.6	5.8	0.0299	3.8	0.0035	0.0039	24.5	0.108
May	19913	0.00010	0.066	0.0010	29.0	0.00026	0.0002	0.0007	0.0054	0.287	1.0	6.4	0.0284	2.4	0.0014	0.0020	13.2	0.036
Jun	20485	0.00010	0.066	0.0010	28.9	0.00025	0.0002	0.0006	0.0053	0.284	1.0	6.4	0.0282	2.4	0.0014	0.0019	13.0	0.036
Jul	14289	0.00010	0.066	0.0011	28.8	0.00028	0.0002	0.0007	0.0054	0.289	1.0	6.4	0.0283	2.5	0.0015	0.0021	13.7	0.038
Aug	10007	0.00010	0.066	0.0011	28.5	0.00031	0.0002	0.0007	0.0057	0.303	1.1	6.3	0.0285	2.6	0.0017	0.0022	14.6	0.045
Sep	13489	0.00010	0.066	0.0011	28.7	0.00028	0.0002	0.0007	0.0054	0.291	1.0	6.4	0.0283	2.5	0.0015	0.0021	13.8	0.039
Oct	7072	0.00010	0.066	0.0011	28.1	0.00036	0.0002	0.0008	0.0058	0.313	1.1	6.2	0.0285	2.7	0.0019	0.0024	15.9	0.050
Nov	3255	0.00010	0.065	0.0013	26.8	0.00053	0.0002	0.0009	0.0063	0.339	1.4	5.9	0.0287	3.3	0.0027	0.0033	20.5	0.065
Dec	2423	0.00010	0.065	0.0014	26.1	0.00066	0.0002	0.0010	0.0067	0.355	1.6	5.8	0.0291	3.7	0.0034	0.0039	24.0	0.075
Total	97354																	

Location: Mouth of Anvil Creek

	Flows (x 1000 m3)	Ag mg/L	Al mg/L	As mg/L	Ca mg/L	Cd mg/L	Cl mg/L	Co mg/L	Cu mg/L	Fe mg/L	K mg/L	Mg mg/L	Mn mg/L	Na mg/L	Ni mg/L	Pb mg/L	SO4 mg/L	Zn mg/L
Jan	4462	0.00010	0.066	0.0012	27.8	0.00045	0.0002	0.0008	0.0061	0.324	1.3	6.1	0.0289	3.1	0.0023	0.0029	18.4	0.056
Feb	3266	0.00010	0.067	0.0013	27.3	0.00052	0.0002	0.0009	0.0065	0.350	1.4	6.0	0.0291	3.3	0.0027	0.0032	20.1	0.068
Mar	3304	0.00010	0.068	0.0013	27.1	0.00054	0.0002	0.0009	0.0069	0.377	1.4	6.0	0.0293	3.3	0.0028	0.0033	20.9	0.079
Apr	6270	0.00010	0.067	0.0011	28.3	0.00038	0.0002	0.0008	0.0061	0.330	1.2	6.3	0.0289	2.8	0.0020	0.0025	16.4	0.056
May	55389	0.00010	0.066	0.0010	29.4	0.00022	0.0002	0.0006	0.0051	0.272	0.9	6.5	0.0283	2.3	0.0012	0.0018	12.2	0.029
Jun	56975	0.00010	0.066	0.0010	29.4	0.00022	0.0002	0.0006	0.0051	0.271	0.9	6.5	0.0283	2.3	0.0012	0.0018	12.2	0.029
Jul	39728	0.00010	0.066	0.0010	29.3	0.00023	0.0002	0.0006	0.0051	0.273	1.0	6.5	0.0283	2.3	0.0012	0.0018	12.4	0.030
Aug	27798	0.00010	0.066	0.0010	29.2	0.00024	0.0002	0.0006	0.0052	0.278	1.0	6.5	0.0284	2.4	0.0013	0.0019	12.8	0.032
Sep	37439	0.00010	0.066	0.0010	29.3	0.00023	0.0002	0.0006	0.0052	0.274	1.0	6.5	0.0283	2.4	0.0012	0.0018	12.5	0.030
Oct	19552	0.00010	0.066	0.0010	29.1	0.00026	0.0002	0.0007	0.0053	0.282	1.0	6.4	0.0284	2.4	0.0014	0.0020	13.2	0.034
Nov	8908	0.00010	0.066	0.0011	28.6	0.00032	0.0002	0.0007	0.0055	0.291	1.1	6.3	0.0284	2.6	0.0017	0.0023	14.9	0.040
Dec	6587	0.00010	0.065	0.0011	28.3	0.00037	0.0002	0.0008	0.0056	0.298	1.2	6.3	0.0286	2.8	0.0019	0.0025	16.2	0.044
Total	269678																	

RCT03 - Rose Creek Tailings - Partial Relocation
Summary Tables
Conditions Future 2
Location X2

	Flows	Ag	Al	As	Ca	Cd	Cl	Co	Cu	Fe	K	Mg	Mn	Na	Ni	Pb	SO4	Zn
	(x 1000 m3)	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L
Jan	624	0.00009	0.060	0.0009	26.8	0.00018	0.0002	0.0005	0.0045	0.239	0.8	5.9	0.0256	2.1	0.0010	0.0015	10.6	0.023
Feb	465	0.00009	0.059	0.0009	26.3	0.00018	0.0002	0.0005	0.0044	0.235	0.8	5.8	0.0252	2.0	0.0010	0.0015	10.4	0.023
Mar	471	0.00009	0.058	0.0009	26.2	0.00018	0.0002	0.0005	0.0044	0.234	0.8	5.8	0.0250	2.0	0.0010	0.0015	10.4	0.023
Apr	831	0.00009	0.062	0.0009	28.0	0.00019	0.0002	0.0006	0.0047	0.250	0.9	6.2	0.0268	2.1	0.0010	0.0016	11.1	0.024
May	7150	0.00010	0.065	0.0010	29.0	0.00020	0.0002	0.0006	0.0049	0.259	0.9	6.4	0.0277	2.2	0.0011	0.0017	11.5	0.025
Jun	7431	0.00010	0.064	0.0010	28.8	0.00019	0.0002	0.0006	0.0049	0.257	0.9	6.4	0.0275	2.2	0.0011	0.0017	11.4	0.025
Jul	5197	0.00010	0.064	0.0010	28.7	0.00019	0.0002	0.0006	0.0048	0.256	0.9	6.3	0.0274	2.2	0.0011	0.0016	11.4	0.025
Aug	3652	0.00010	0.064	0.0010	28.6	0.00019	0.0002	0.0006	0.0048	0.255	0.9	6.3	0.0273	2.2	0.0011	0.0016	11.3	0.025
Sep	4907	0.00010	0.064	0.0010	28.6	0.00019	0.0002	0.0006	0.0048	0.255	0.9	6.3	0.0274	2.2	0.0011	0.0016	11.3	0.025
Oct	2616	0.00010	0.063	0.0010	28.1	0.00019	0.0002	0.0006	0.0048	0.251	0.9	6.2	0.0269	2.2	0.0010	0.0016	11.1	0.024
Nov	1224	0.00009	0.061	0.0009	27.4	0.00019	0.0002	0.0006	0.0046	0.245	0.9	6.1	0.0262	2.1	0.0010	0.0016	10.9	0.024
Dec	897	0.00009	0.061	0.0009	27.5	0.00019	0.0002	0.0006	0.0046	0.245	0.9	6.1	0.0263	2.1	0.0010	0.0016	10.9	0.024
Total	35467																	

Location X14

	Flows	Ag	Al	As	Ca	Cd	Cl	Co	Cu	Fe	K	Mg	Mn	Na	Ni	Pb	SO4	Zn
	(x 1000 m3)	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L
Jan	1222	0.00010	0.072	0.0018	23.3	0.00113	0.0001	0.0015	0.0105	0.590	2.3	5.2	0.0313	5.2	0.0057	0.0061	46.5	0.180
Feb	906	0.00010	0.076	0.0019	21.9	0.00135	0.0001	0.0017	0.0126	0.724	2.6	4.9	0.0326	5.9	0.0067	0.0071	54.6	0.238
Mar	923	0.00011	0.082	0.0020	21.3	0.00144	0.0001	0.0019	0.0146	0.855	2.7	4.8	0.0337	6.1	0.0072	0.0075	58.1	0.291
Apr	1680	0.00010	0.077	0.0016	25.1	0.00086	0.0002	0.0013	0.0107	0.620	1.9	5.6	0.0315	4.3	0.0043	0.0048	36.4	0.183
May	14401	0.00010	0.067	0.0011	28.8	0.00028	0.0002	0.0007	0.0057	0.310	1.0	6.4	0.0285	2.5	0.0015	0.0021	14.6	0.046
Jun	14815	0.00010	0.067	0.0011	28.7	0.00027	0.0002	0.0007	0.0057	0.306	1.0	6.3	0.0283	2.5	0.0015	0.0020	14.4	0.045
Jul	10337	0.00010	0.067	0.0011	28.5	0.00031	0.0002	0.0007	0.0058	0.316	1.1	6.3	0.0284	2.6	0.0016	0.0022	15.7	0.050
Aug	7243	0.00010	0.068	0.0011	28.2	0.00036	0.0002	0.0008	0.0063	0.345	1.1	6.2	0.0287	2.7	0.0019	0.0024	17.5	0.062
Sep	9768	0.00010	0.067	0.0011	28.5	0.00031	0.0002	0.0007	0.0059	0.320	1.1	6.3	0.0285	2.6	0.0016	0.0022	15.8	0.051
Oct	5133	0.00010	0.068	0.0012	27.7	0.00042	0.0002	0.0008	0.0066	0.365	1.2	6.1	0.0288	2.9	0.0022	0.0027	19.9	0.072
Nov	2376	0.00010	0.068	0.0014	26.0	0.00066	0.0002	0.0010	0.0076	0.419	1.6	5.8	0.0293	3.7	0.0034	0.0038	28.8	0.101
Dec	1776	0.00010	0.068	0.0015	25.1	0.00084	0.0002	0.0012	0.0082	0.454	1.8	5.6	0.0299	4.3	0.0042	0.0047	35.5	0.119
Total	70579																	

Location Mouth of Rose Creek

	Flows	Ag	Al	As	Ca	Cd	Cl	Co	Cu	Fe	K	Mg	Mn	Na	Ni	Pb	SO4	Zn
	(x 1000 m3)	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L
Jan	1658	0.00010	0.070	0.0016	25.0	0.00089	0.0002	0.0013	0.0090	0.504	1.9	5.5	0.0305	4.4	0.0045	0.0049	37.4	0.139
Feb	1224	0.00010	0.074	0.0017	23.9	0.00105	0.0002	0.0014	0.0106	0.605	2.1	5.3	0.0314	4.9	0.0053	0.0057	43.5	0.183
Mar	1243	0.00011	0.078	0.0018	23.4	0.00112	0.0001	0.0015	0.0121	0.703	2.2	5.2	0.0323	5.1	0.0056	0.0060	46.2	0.223
Apr	2297	0.00010	0.074	0.0014	26.3	0.00068	0.0002	0.0011	0.0092	0.524	1.6	5.8	0.0306	3.8	0.0035	0.0040	29.8	0.141
May	19913	0.00010	0.067	0.0010	29.0	0.00026	0.0002	0.0007	0.0055	0.297	1.0	6.4	0.0285	2.4	0.0014	0.0020	13.8	0.041
Jun	20485	0.00010	0.066	0.0010	29.0	0.00025	0.0002	0.0007	0.0055	0.295	1.0	6.4	0.0283	2.4	0.0014	0.0019	13.6	0.040
Jul	14289	0.00010	0.066	0.0011	28.8	0.00028	0.0002	0.0007	0.0056	0.302	1.0	6.4	0.0284	2.5	0.0015	0.0021	14.6	0.043
Aug	10007	0.00010	0.067	0.0011	28.6	0.00031	0.0002	0.0007	0.0059	0.322	1.1	6.3	0.0286	2.6	0.0017	0.0022	15.9	0.052
Sep	13489	0.00010	0.067	0.0011	28.8	0.00028	0.0002	0.0007	0.0056	0.304	1.0	6.4	0.0284	2.5	0.0015	0.0021	14.7	0.044
Oct	7072	0.00010	0.067	0.0011	28.2	0.00036	0.0002	0.0008	0.0062	0.337	1.1	6.2	0.0287	2.7	0.0019	0.0024	17.6	0.059
Nov	3255	0.00010	0.067	0.0013	27.0	0.00054	0.0002	0.0009	0.0069	0.377	1.4	6.0	0.0290	3.3	0.0027	0.0033	24.2	0.081
Dec	2423	0.00010	0.067	0.0014	26.3	0.00067	0.0002	0.0011	0.0074	0.403	1.6	5.8	0.0295	3.7	0.0034	0.0039	29.2	0.094
Total	97354																	

Location Mouth of Anvil Creek

	Flows	Ag	Al	As	Ca	Cd	Cl	Co	Cu	Fe	K	Mg	Mn	Na	Ni	Pb	SO4	Zn
	(x 1000 m3)	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L
Jan	4462	0.00010	0.067	0.0012	27.9	0.00045	0.0002	0.0009	0.0065	0.353	1.3	6.2	0.0291	3.1	0.0024	0.0029	21.2	0.068
Feb	3266	0.00010	0.069	0.0013	27.5	0.00052	0.0002	0.0009	0.0071	0.392	1.4	6.1	0.0295	3.3	0.0027	0.0032	23.6	0.085
Mar	3304	0.00010	0.070	0.0013	27.3	0.00055	0.0002	0.0010	0.0077	0.429	1.4	6.0	0.0298	3.3	0.0028	0.0033	24.7	0.100
Apr	6270	0.00010	0.069	0.0011	28.4	0.00038	0.0002	0.0008	0.0065	0.359	1.2	6.3	0.0291	2.8	0.0020	0.0025	18.3	0.068
May	55389	0.00010	0.066	0.0010	29.4	0.00022	0.0002	0.0006	0.0052	0.276	0.9	6.5	0.0284	2.3	0.0012	0.0018	12.5	0.031
Jun	56975	0.00010	0.066	0.0010	29.4	0.00022	0.0002	0.0006	0.0052	0.275	0.9	6.5	0.0283	2.3	0.0012	0.0018	12.4	0.031
Jul	39728	0.00010	0.066	0.0010	29.3	0.00023	0.0002	0.0006	0.0052	0.278	1.0	6.5	0.0283	2.3	0.0012	0.0018	12.8	0.032
Aug	27798	0.00010	0.066	0.0010	29.2	0.00024	0.0002	0.0006	0.0053	0.285	1.0	6.5	0.0284	2.4	0.0013	0.0019	13.2	0.035
Sep	37439	0.00010	0.066	0.0010	29.3	0.00023	0.0002	0.0006	0.0052	0.279	1.0	6.5	0.0284	2.4	0.0012	0.0018	12.8	0.032
Oct	19552	0.00010	0.066	0.0010	29.1	0.00026	0.0002	0.0007	0.0054	0.290	1.0	6.4	0.0284	2.4	0.0014	0.0020	13.9	0.038
Nov	8908	0.00010	0.066	0.0011	28.6	0.00032	0.0002	0.0007	0.0057	0.305	1.1	6.3	0.0286	2.6	0.0017	0.0023	16.3	0.046
Dec	6587	0.00010	0.066	0.0011	28.4	0.00037	0.0002	0.0008	0.0059	0.315	1.2	6.3	0.0287	2.8	0.0019	0.0025	18.1	0.051
Total	269678.3																	

RCT03 - Rose Creek Tailings - Partial Relocation
Summary Tables

Conditions: Future 3

Location: X2

	Flows (x 1000 m3)	Ag mg/L	Al mg/L	As mg/L	Ca mg/L	Cd mg/L	Cl mg/L	Co mg/L	Cu mg/L	Fe mg/L	K mg/L	Mg mg/L	Mn mg/L	Na mg/L	Ni mg/L	Pb mg/L	SO4 mg/L	Zn mg/L
Jan	624	0.00009	0.060	0.0009	26.8	0.00018	0.0002	0.0005	0.0045	0.239	0.8	5.9	0.0256	2.1	0.0010	0.0015	10.6	0.023
Feb	465	0.00009	0.059	0.0009	26.3	0.00018	0.0002	0.0005	0.0044	0.235	0.8	5.8	0.0252	2.0	0.0010	0.0015	10.4	0.023
Mar	471	0.00009	0.058	0.0009	26.2	0.00018	0.0002	0.0005	0.0044	0.234	0.8	5.8	0.0250	2.0	0.0010	0.0015	10.4	0.023
Apr	831	0.00009	0.062	0.0009	28.0	0.00019	0.0002	0.0006	0.0047	0.250	0.9	6.2	0.0268	2.1	0.0010	0.0016	11.1	0.024
May	7150	0.00010	0.065	0.0010	29.0	0.00020	0.0002	0.0006	0.0049	0.259	0.9	6.4	0.0277	2.2	0.0011	0.0017	11.5	0.025
Jun	7431	0.00010	0.064	0.0010	28.8	0.00019	0.0002	0.0006	0.0049	0.257	0.9	6.4	0.0275	2.2	0.0011	0.0017	11.4	0.025
Jul	5197	0.00010	0.064	0.0010	28.7	0.00019	0.0002	0.0006	0.0048	0.256	0.9	6.3	0.0274	2.2	0.0011	0.0016	11.4	0.025
Aug	3652	0.00010	0.064	0.0010	28.6	0.00019	0.0002	0.0006	0.0048	0.255	0.9	6.3	0.0273	2.2	0.0011	0.0016	11.3	0.025
Sep	4907	0.00010	0.064	0.0010	28.6	0.00019	0.0002	0.0006	0.0048	0.255	0.9	6.3	0.0274	2.2	0.0011	0.0016	11.3	0.025
Oct	2616	0.00010	0.063	0.0010	28.1	0.00019	0.0002	0.0006	0.0048	0.251	0.9	6.2	0.0269	2.2	0.0010	0.0016	11.1	0.024
Nov	1224	0.00009	0.061	0.0009	27.4	0.00019	0.0002	0.0006	0.0046	0.245	0.9	6.1	0.0262	2.1	0.0010	0.0016	10.9	0.024
Dec	897	0.00009	0.061	0.0009	27.5	0.00019	0.0002	0.0006	0.0046	0.245	0.9	6.1	0.0263	2.1	0.0010	0.0016	10.9	0.024
Total	35467																	

Location: X14

	Flows (x 1000 m3)	Ag mg/L	Al mg/L	As mg/L	Ca mg/L	Cd mg/L	Cl mg/L	Co mg/L	Cu mg/L	Fe mg/L	K mg/L	Mg mg/L	Mn mg/L	Na mg/L	Ni mg/L	Pb mg/L	SO4 mg/L	Zn mg/L
Jan	1222	0.00012	0.107	0.0019	25.9	0.00117	0.0001	0.0017	0.0200	1.233	2.3	5.8	0.0371	5.2	0.0058	0.0061	113.7	0.374
Feb	906	0.00013	0.125	0.0021	25.1	0.00140	0.0001	0.0020	0.0258	1.613	2.6	5.7	0.0405	5.9	0.0069	0.0071	137.4	0.506
Mar	923	0.00014	0.143	0.0022	24.7	0.00151	0.0001	0.0022	0.0312	1.970	2.7	5.6	0.0437	6.1	0.0074	0.0076	147.6	0.627
Apr	1680	0.00012	0.113	0.0017	26.9	0.00090	0.0002	0.0015	0.0206	1.283	1.9	6.0	0.0374	4.3	0.0045	0.0048	84.2	0.383
May	14401	0.00010	0.072	0.0011	29.1	0.00028	0.0002	0.0007	0.0070	0.398	1.0	6.4	0.0293	2.5	0.0015	0.0021	20.4	0.073
Jun	14815	0.00010	0.071	0.0011	28.9	0.00028	0.0002	0.0007	0.0069	0.390	1.0	6.4	0.0291	2.5	0.0015	0.0020	19.8	0.070
Jul	10337	0.00010	0.072	0.0011	28.8	0.00032	0.0002	0.0007	0.0074	0.419	1.1	6.4	0.0294	2.6	0.0016	0.0022	23.7	0.081
Aug	7243	0.00010	0.076	0.0011	28.6	0.00037	0.0002	0.0008	0.0086	0.500	1.1	6.3	0.0301	2.7	0.0019	0.0024	29.0	0.109
Sep	9768	0.00010	0.073	0.0011	28.8	0.00032	0.0002	0.0007	0.0075	0.430	1.1	6.4	0.0295	2.6	0.0017	0.0022	24.0	0.085
Oct	5133	0.00010	0.078	0.0012	28.3	0.00043	0.0002	0.0009	0.0096	0.562	1.2	6.3	0.0306	2.9	0.0022	0.0027	36.0	0.132
Nov	2376	0.00011	0.085	0.0014	27.3	0.00068	0.0002	0.0011	0.0123	0.734	1.6	6.1	0.0322	3.7	0.0034	0.0039	62.3	0.196
Dec	1776	0.00011	0.089	0.0016	26.9	0.00086	0.0002	0.0013	0.0140	0.842	1.8	6.0	0.0334	4.3	0.0043	0.0047	81.7	0.236
Total	70579																	

Location: Mouth of Rose Creek

	Flows (x 1000 m3)	Ag mg/L	Al mg/L	As mg/L	Ca mg/L	Cd mg/L	Cl mg/L	Co mg/L	Cu mg/L	Fe mg/L	K mg/L	Mg mg/L	Mn mg/L	Na mg/L	Ni mg/L	Pb mg/L	SO4 mg/L	Zn mg/L
Jan	1658	0.00011	0.096	0.0016	26.9	0.00092	0.0002	0.0014	0.0161	0.979	1.9	6.0	0.0348	4.4	0.0046	0.0049	86.9	0.282
Feb	1224	0.00012	0.109	0.0018	26.3	0.00109	0.0002	0.0016	0.0204	1.263	2.1	5.9	0.0374	4.9	0.0054	0.0057	104.8	0.381
Mar	1243	0.00013	0.123	0.0019	25.9	0.00117	0.0001	0.0018	0.0245	1.530	2.2	5.8	0.0397	5.1	0.0058	0.0061	112.6	0.472
Apr	2297	0.00012	0.100	0.0015	27.6	0.00072	0.0002	0.0012	0.0164	1.009	1.6	6.2	0.0350	3.8	0.0036	0.0040	64.7	0.287
May	19913	0.00010	0.070	0.0011	29.2	0.00026	0.0002	0.0007	0.0065	0.361	1.0	6.5	0.0290	2.4	0.0014	0.0020	18.0	0.060
Jun	20485	0.00010	0.070	0.0010	29.1	0.00026	0.0002	0.0007	0.0064	0.355	1.0	6.4	0.0289	2.4	0.0014	0.0019	17.6	0.058
Jul	14289	0.00010	0.071	0.0011	29.0	0.00028	0.0002	0.0007	0.0067	0.376	1.0	6.4	0.0291	2.5	0.0015	0.0021	20.4	0.066
Aug	10007	0.00010	0.073	0.0011	28.9	0.00032	0.0002	0.0007	0.0076	0.435	1.1	6.4	0.0296	2.6	0.0017	0.0022	24.2	0.086
Sep	13489	0.00010	0.071	0.0011	29.0	0.00029	0.0002	0.0007	0.0068	0.384	1.0	6.4	0.0292	2.5	0.0015	0.0021	20.6	0.068
Oct	7072	0.00010	0.075	0.0011	28.6	0.00037	0.0002	0.0008	0.0083	0.480	1.1	6.3	0.0300	2.7	0.0019	0.0024	29.3	0.103
Nov	3255	0.00011	0.080	0.0013	27.9	0.00055	0.0002	0.0010	0.0103	0.608	1.4	6.2	0.0311	3.3	0.0028	0.0033	48.6	0.150
Dec	2423	0.00011	0.083	0.0014	27.6	0.00068	0.0002	0.0011	0.0116	0.688	1.6	6.2	0.0320	3.7	0.0035	0.0039	63.0	0.180
Total	97354																	

Location: Mouth of Anvil Creek

	Flows (x 1000 m3)	Ag mg/L	Al mg/L	As mg/L	Ca mg/L	Cd mg/L	Cl mg/L	Co mg/L	Cu mg/L	Fe mg/L	K mg/L	Mg mg/L	Mn mg/L	Na mg/L	Ni mg/L	Pb mg/L	SO4 mg/L	Zn mg/L
Jan	4462	0.00011	0.077	0.0012	28.6	0.00047	0.0002	0.0009	0.0091	0.530	1.3	6.3	0.0307	3.1	0.0024	0.0029	39.7	0.121
Feb	3266	0.00011	0.082	0.0013	28.3	0.00053	0.0002	0.0010	0.0108	0.638	1.4	6.3	0.0317	3.3	0.0027	0.0032	46.6	0.159
Mar	3304	0.00011	0.087	0.0013	28.2	0.00057	0.0002	0.0010	0.0123	0.741	1.4	6.3	0.0326	3.3	0.0029	0.0033	49.7	0.194
Apr	6270	0.00011	0.078	0.0012	28.9	0.00039	0.0002	0.0008	0.0092	0.537	1.2	6.4	0.0307	2.8	0.0020	0.0025	31.1	0.121
May	55389	0.00010	0.067	0.0010	29.5	0.00022	0.0002	0.0006	0.0055	0.299	0.9	6.5	0.0286	2.3	0.0012	0.0018	14.0	0.038
Jun	56975	0.00010	0.067	0.0010	29.4	0.00022	0.0002	0.0006	0.0055	0.297	0.9	6.5	0.0285	2.3	0.0012	0.0018	13.8	0.037
Jul	39728	0.00010	0.068	0.0010	29.4	0.00023	0.0002	0.0006	0.0056	0.305	1.0	6.5	0.0286	2.3	0.0012	0.0018	14.8	0.040
Aug	27798	0.00010	0.069	0.0010	29.3	0.00024	0.0002	0.0007	0.0059	0.326	1.0	6.5	0.0288	2.4	0.0013	0.0019	16.2	0.047
Sep	37439	0.00010	0.068	0.0010	29.4	0.00023	0.0002	0.0006	0.0057	0.307	1.0	6.5	0.0286	2.4	0.0012	0.0018	14.9	0.041
Oct	19552	0.00010	0.069	0.0011	29.3	0.00026	0.0002	0.0007	0.0062	0.342	1.0	6.5	0.0289	2.4	0.0014	0.0020	18.1	0.053
Nov	8908	0.00010	0.071	0.0011	29.0	0.00033	0.0002	0.0007	0.0069	0.390	1.1	6.4	0.0293	2.6	0.0017	0.0023	25.2	0.071
Dec	6587	0.00010	0.072	0.0012	28.9	0.00038	0.0002	0.0008	0.0074	0.420	1.2	6.4	0.0297	2.8	0.0020	0.0025	30.6	0.082
Total	269678.3																	

Appendix C

Vangorda-Grum Mine Site Base Case Results

VG01 - Backfill Vangorda Pit
Concentrations Estimates for Vangorda Creek Catchments
Note: Revision - Vangorda Pit loads removed - assume that backfill is limed; pit lake removal in Grum Pit added for Future 3 (Future 1 an 2 loads are insignificant)
Loading Future 1
Concentrations at V27

	Flow (x1000 m3)	Ag mg/L	Al mg/L	As mg/L	Ca mg/L	Cd mg/L	Cl mg/L	Co mg/L	Cu mg/L	Fe mg/L	K mg/L	Mg mg/L	Mn mg/L	Na mg/L	Ni mg/L	Pb mg/L	SO4 mg/L	Zn mg/L
Jan	87	0.00027	0.041	0.0042	28.7	0.00231	0.0417	0.0029	0.0089	0.088	3.5	10.7	0.0279	8.1	0.0158	0.0123	29.0	0.069
Feb	73	0.00026	0.039	0.0042	28.3	0.00241	0.0403	0.0029	0.0086	0.083	3.7	10.5	0.0281	8.4	0.0161	0.0127	28.0	0.068
Mar	85	0.00025	0.037	0.0043	28.0	0.00258	0.0402	0.0031	0.0082	0.077	4.0	10.4	0.0288	9.0	0.0169	0.0135	27.8	0.070
Apr	121	0.00026	0.039	0.0043	28.8	0.00248	0.0439	0.0030	0.0086	0.083	3.8	10.9	0.0291	8.6	0.0168	0.0131	30.0	0.072
May	463	0.00036	0.061	0.0037	33.0	0.00125	0.0542	0.0021	0.0121	0.135	1.7	12.7	0.0256	4.1	0.0117	0.0075	37.8	0.068
Jun	525	0.00035	0.059	0.0037	32.3	0.00130	0.0508	0.0021	0.0118	0.130	1.8	12.3	0.0252	4.4	0.0117	0.0077	35.7	0.066
Jul	392	0.00035	0.057	0.0038	31.9	0.00138	0.0491	0.0022	0.0116	0.126	2.0	12.1	0.0253	4.7	0.0119	0.0081	34.6	0.065
Aug	284	0.00035	0.057	0.0037	31.6	0.00137	0.0478	0.0022	0.0115	0.125	2.0	12.0	0.0250	4.7	0.0118	0.0081	33.9	0.064
Sep	344	0.00036	0.059	0.0037	32.3	0.00129	0.0508	0.0021	0.0119	0.131	1.8	12.3	0.0252	4.3	0.0116	0.0077	35.7	0.066
Oct	212	0.00034	0.056	0.0037	31.2	0.00141	0.0462	0.0022	0.0114	0.123	2.0	11.8	0.0249	4.8	0.0118	0.0082	32.9	0.063
Nov	130	0.00030	0.048	0.0039	29.8	0.00185	0.0427	0.0025	0.0101	0.105	2.8	11.1	0.0261	6.4	0.0137	0.0102	30.2	0.065
Dec	105	0.00028	0.044	0.0041	29.4	0.00219	0.0443	0.0028	0.0093	0.094	3.3	11.1	0.0279	7.6	0.0154	0.0118	30.7	0.070

Concentrations at V8

	Flow (x1000 m3)	Ag mg/L	Al mg/L	As mg/L	Ca mg/L	Cd mg/L	Cl mg/L	Co mg/L	Cu mg/L	Fe mg/L	K mg/L	Mg mg/L	Mn mg/L	Na mg/L	Ni mg/L	Pb mg/L	SO4 mg/L	Zn mg/L
Jan	380	0.00021	0.033	0.0020	16.6	0.00061	0.0096	0.0010	0.0072	0.073	1.0	5.6	0.0109	2.5	0.0047	0.0039	9.5	0.020
Feb	284	0.00020	0.032	0.0021	16.8	0.00070	0.0105	0.0011	0.0070	0.071	1.2	5.6	0.0115	2.8	0.0052	0.0043	9.9	0.021
Mar	296	0.00020	0.032	0.0022	17.0	0.00081	0.0116	0.0012	0.0069	0.069	1.3	5.8	0.0123	3.2	0.0058	0.0048	10.5	0.024
Apr	543	0.00021	0.033	0.0021	16.8	0.00064	0.0099	0.0010	0.0072	0.073	1.1	5.6	0.0112	2.6	0.0049	0.0040	9.7	0.020
May	4356	0.00022	0.036	0.0017	16.1	0.00024	0.0059	0.0006	0.0077	0.080	0.4	5.2	0.0084	1.2	0.0026	0.0021	7.6	0.012
Jun	4500	0.00022	0.036	0.0017	16.1	0.00026	0.0060	0.0006	0.0076	0.080	0.5	5.2	0.0085	1.3	0.0027	0.0022	7.7	0.013
Jul	3152	0.00022	0.036	0.0017	16.1	0.00028	0.0062	0.0007	0.0076	0.079	0.5	5.3	0.0087	1.3	0.0028	0.0023	7.8	0.013
Aug	2207	0.00022	0.036	0.0017	16.1	0.00028	0.0063	0.0007	0.0076	0.079	0.5	5.2	0.0087	1.4	0.0029	0.0023	7.8	0.013
Sep	2952	0.00022	0.036	0.0017	16.1	0.00026	0.0060	0.0006	0.0076	0.080	0.5	5.2	0.0085	1.3	0.0027	0.0022	7.7	0.012
Oct	1553	0.00021	0.036	0.0018	16.1	0.00029	0.0064	0.0007	0.0075	0.079	0.5	5.2	0.0087	1.4	0.0029	0.0024	7.8	0.013
Nov	728	0.00021	0.034	0.0019	16.3	0.00042	0.0077	0.0008	0.0074	0.076	0.7	5.4	0.0096	1.8	0.0037	0.0030	8.5	0.016
Dec	549	0.00021	0.034	0.0019	16.5	0.00051	0.00858	0.00088	0.00732	0.075	0.9	5.5	0.01029	2.1	0.0042	0.0034	9.0	0.018

VG01 - Backfill Vangorda Pit
LoadingFuture 2

Concentrations at V27

	Flow (x1000 m3)	Ag mg/L	Al mg/L	As mg/L	Ca mg/L	Cd mg/L	Cl mg/L	Co mg/L	Cu mg/L	Fe mg/L	K mg/L	Mg mg/L	Mn mg/L	Na mg/L	Ni mg/L	Pb mg/L	SO4 mg/L	Zn mg/L
Jan	87	0.00027	0.041	0.0042	29.3	0.00231	0.0484	0.0030	0.0089	0.090	3.6	11.6	0.0371	8.1	0.0171	0.0123	31.5	0.086
Feb	73	0.00026	0.039	0.0042	28.9	0.00241	0.0470	0.0031	0.0086	0.086	3.7	11.4	0.0373	8.5	0.0175	0.0127	30.5	0.086
Mar	85	0.00025	0.037	0.0043	28.6	0.00258	0.0472	0.0032	0.0082	0.080	4.0	11.4	0.0384	9.1	0.0183	0.0135	30.4	0.089
Apr	121	0.00026	0.039	0.0043	29.4	0.00249	0.0510	0.0032	0.0086	0.086	3.8	11.8	0.0389	8.7	0.0182	0.0131	32.7	0.091
May	463	0.00036	0.061	0.0037	33.6	0.00126	0.0603	0.0022	0.0121	0.137	1.7	13.5	0.0340	4.1	0.0129	0.0075	40.1	0.085
Jun	525	0.00035	0.059	0.0037	32.8	0.00130	0.0567	0.0023	0.0118	0.132	1.8	13.1	0.0333	4.4	0.0128	0.0077	37.9	0.082
Jul	392	0.00035	0.057	0.0038	32.4	0.00138	0.0550	0.0023	0.0116	0.128	2.0	12.9	0.0333	4.7	0.0131	0.0081	36.8	0.081
Aug	284	0.00035	0.057	0.0037	32.1	0.00138	0.0536	0.0023	0.0115	0.127	2.0	12.7	0.0329	4.7	0.0129	0.0081	36.0	0.079
Sep	344	0.00036	0.059	0.0037	32.8	0.00129	0.0567	0.0022	0.0119	0.133	1.8	13.1	0.0332	4.3	0.0128	0.0077	37.9	0.081
Oct	212	0.00034	0.056	0.0037	31.7	0.00141	0.0519	0.0023	0.0114	0.125	2.1	12.5	0.0326	4.8	0.0130	0.0082	35.0	0.078
Nov	130	0.00030	0.048	0.0039	30.3	0.00185	0.0488	0.0026	0.0101	0.107	2.8	11.9	0.0344	6.5	0.0149	0.0102	32.4	0.081
Dec	105	0.00028	0.044	0.0041	30.0	0.00220	0.0511	0.0029	0.0093	0.096	3.3	12.0	0.0371	7.6	0.0168	0.0118	33.2	0.088

Concentrations at V8

	Flow (x1000 m3)	Ag mg/L	Al mg/L	As mg/L	Ca mg/L	Cd mg/L	Cl mg/L	Co mg/L	Cu mg/L	Fe mg/L	K mg/L	Mg mg/L	Mn mg/L	Na mg/L	Ni mg/L	Pb mg/L	SO4 mg/L	Zn mg/L
Jan	380	0.00021	0.033	0.0020	16.8	0.00061	0.0111	0.0010	0.0072	0.073	1.0	5.8	0.0130	2.5	0.0050	0.0039	10.0	0.024
Feb	284	0.00020	0.032	0.0021	16.9	0.00070	0.0122	0.0011	0.0070	0.071	1.2	5.9	0.0139	2.8	0.0056	0.0043	10.6	0.026
Mar	296	0.00020	0.032	0.0022	17.2	0.00082	0.0136	0.0012	0.0069	0.070	1.3	6.0	0.0151	3.2	0.0062	0.0048	11.3	0.029
Apr	543	0.00021	0.033	0.0021	17.0	0.00064	0.0115	0.0010	0.0072	0.073	1.1	5.8	0.0134	2.6	0.0052	0.0040	10.3	0.024
May	4356	0.00022	0.036	0.0017	16.2	0.00024	0.0065	0.0006	0.0077	0.080	0.4	5.3	0.0093	1.2	0.0028	0.0021	7.9	0.014
Jun	4500	0.00022	0.036	0.0017	16.2	0.00026	0.0067	0.0006	0.0076	0.080	0.5	5.3	0.0095	1.3	0.0029	0.0022	7.9	0.014
Jul	3152	0.00022	0.036	0.0017	16.2	0.00028	0.0069	0.0007	0.0076	0.079	0.5	5.3	0.0096	1.4	0.0030	0.0023	8.0	0.015
Aug	2207	0.00022	0.036	0.0017	16.2	0.00028	0.0070	0.0007	0.0076	0.079	0.5	5.3	0.0097	1.4	0.0030	0.0023	8.1	0.015
Sep	2952	0.00022	0.036	0.0017	16.2	0.00026	0.0067	0.0006	0.0076	0.080	0.5	5.3	0.0095	1.3	0.0029	0.0022	7.9	0.014
Oct	1553	0.00021	0.036	0.0018	16.1	0.00029	0.0072	0.0007	0.0075	0.079	0.5	5.4	0.0098	1.4	0.0031	0.0024	8.1	0.015
Nov	728	0.00021	0.034	0.0019	16.4	0.00042	0.0088	0.0008	0.0074	0.076	0.7	5.5	0.0111	1.8	0.0039	0.0030	8.9	0.019
Dec	549	0.00021	0.034	0.0019	16.7	0.00051	0.0099	0.0009	0.0073	0.075	0.9	5.7	0.0121	2.2	0.0044	0.0034	9.5	0.021

VG01 - Backfill Vangorda Pit

Loading Future 3

Concentrations at V27

	Flow (x1000 m3)	Ag mg/L	Al mg/L	As mg/L	Ca mg/L	Cd mg/L	Cl mg/L	Co mg/L	Cu mg/L	Fe mg/L	K mg/L	Mg mg/L	Mn mg/L	Na mg/L	Ni mg/L	Pb mg/L	SO4 mg/L	Zn mg/L
Jan	87	0.00038	0.364	0.0058	35.9	0.0104	0.1326	0.0306	0.1770	3.228	2.5	22.0	2.8015	5.5	0.051	0.0124	103.8	7.640
Feb	73	0.00037	0.368	0.0058	35.7	0.0106	0.1347	0.0311	0.1797	3.280	2.6	22.1	2.8514	5.7	0.052	0.013	105.2	7.777
Mar	85	0.00036	0.383	0.0060	35.8	0.0112	0.1413	0.0327	0.1880	3.438	2.7	22.7	2.9961	6.0	0.055	0.013	110.0	8.173
Apr	121	0.00038	0.386	0.0060	36.6	0.0112	0.1421	0.0327	0.1889	3.452	2.6	23.0	3.0040	5.8	0.055	0.013	110.7	8.194
May	463	0.00045	0.313	0.0053	37.7	0.0078	0.1074	0.0240	0.1447	2.601	1.4	20.4	2.2088	3.3	0.040	0.009	86.1	6.019
Jun	525	0.00044	0.307	0.0052	37.0	0.0078	0.1051	0.0236	0.1420	2.552	1.5	20.0	2.1684	3.4	0.039	0.009	84.3	5.909
Jul	392	0.00043	0.308	0.0052	36.7	0.0079	0.1060	0.0239	0.1432	2.577	1.6	20.0	2.1933	3.6	0.040	0.0090	84.9	5.977
Aug	284	0.00043	0.304	0.0052	36.4	0.0078	0.1043	0.0235	0.1411	2.537	1.6	19.7	2.1588	3.6	0.039	0.0089	83.6	5.883
Sep	344	0.00044	0.306	0.0052	36.9	0.0077	0.1047	0.0235	0.1414	2.541	1.5	19.9	2.1585	3.4	0.039	0.0087	84.0	5.882
Oct	212	0.00042	0.302	0.0052	36.0	0.0078	0.1035	0.0234	0.1402	2.523	1.6	19.6	2.1474	3.7	0.039	0.0090	83.0	5.852
Nov	130	0.00040	0.329	0.0054	35.7	0.0090	0.1163	0.0266	0.1564	2.834	2.0	20.6	2.4382	4.6	0.045	0.0106	92.0	6.647
Dec	105	0.00039	0.363	0.0058	36.4	0.0102	0.1315	0.0302	0.1754	3.195	2.4	22.0	2.7674	5.2	0.051	0.0120	103.0	7.547

Concentrations at V8

	Flow (x1000 m3)	Ag mg/L	Al mg/L	As mg/L	Ca mg/L	Cd mg/L	Cl mg/L	Co mg/L	Cu mg/L	Fe mg/L	K mg/L	Mg mg/L	Mn mg/L	Na mg/L	Ni mg/L	Pb mg/L	SO4 mg/L	Zn mg/L
Jan	380	0.00023	0.107	0.0024	18.3	0.0025	0.0303	0.0073	0.0454	0.788	0.8	8.1	0.6425	1.9	0.0128	0.0039	26.5	1.744
Feb	284	0.00023	0.117	0.002504	18.7	0.0028	0.0348	0.0083	0.0511	0.895	0.9	8.6	0.7392	2.1	0.0146	0.0043	29.8	2.008
Mar	296	0.00023	0.131	0.002663	19.3	0.0033	0.0405	0.0096	0.0583	1.031	1.0	9.3	0.8613	2.3	0.0168	0.0048	34.0	2.342
Apr	543	0.00023	0.111	0.002442	18.6	0.0026	0.0318	0.0076	0.0474	0.824	0.8	8.3	0.6749	2.0	0.0134	0.0040	27.7	1.832
May	4356	0.00023	0.063	0.001893	16.6	0.0009	0.0115	0.0029	0.0218	0.343	0.4	6.1	0.2407	1.1	0.0056	0.0023	12.8	0.645
Jun	4500	0.00023	0.065	0.0019	16.7	0.0010	0.0124	0.0031	0.0228	0.362	0.4	6.1	0.2588	1.2	0.0059	0.0023	13.4	0.695
Jul	3152	0.00023	0.067	0.0019	16.7	0.0011	0.0133	0.0034	0.0240	0.384	0.4	6.2	0.2783	1.2	0.0063	0.0024	14.0	0.748
Aug	2207	0.00023	0.068	0.0019	16.7	0.0011	0.0135	0.0034	0.0243	0.390	0.5	6.2	0.2836	1.2	0.0064	0.0024	14.2	0.763
Sep	2952	0.00023	0.065	0.0019	16.6	0.0010	0.0123	0.0031	0.0227	0.360	0.4	6.1	0.2568	1.2	0.0059	0.0023	13.3	0.689
Oct	1553	0.00023	0.069	0.0019	16.7	0.0012	0.0142	0.0036	0.0251	0.405	0.5	6.3	0.2978	1.2	0.0066	0.0025	14.7	0.801
Nov	728	0.00023	0.084	0.0021	17.3	0.0017	0.0208	0.0051	0.0334	0.562	0.6	7.0	0.4396	1.5	0.0092	0.0030	19.5	1.189
Dec	549	0.00023	0.095	0.0023	17.9	0.0021	0.0253	0.0061	0.0391	0.669	0.7	7.6	0.5348	1.7	0.0109	0.0035	22.8	1.449

VG02 - Vangorda Grum - Stabilize in Place
Concentrations Estimates for Vangorda Creek Catchments

Loadings: Future 1

Concentrations at V27

	Flow (x1000 m3)	Ag mg/L	Al mg/L	As mg/L	Ca mg/L	Cd mg/L	Cl mg/L	Co mg/L	Cu mg/L	Fe mg/L	K mg/L	Mg mg/L	Mn mg/L	Na mg/L	Ni mg/L	Pb mg/L	SO4 mg/L	Zn mg/L
Jan	137	0.00016	0.024	0.0048	41.1	0.00439	0.0172	0.0050	0.0081	0.084	6.8	24.2	0.0947	15.2	0.0232	0.0213	119.2	0.239
Feb	120	0.00016	0.022	0.0049	41.3	0.00452	0.0155	0.0052	0.0079	0.080	7.0	24.6	0.0964	15.7	0.0238	0.0219	121.9	0.243
Mar	131	0.00016	0.022	0.0050	41.4	0.00459	0.0158	0.0053	0.0080	0.086	7.1	24.8	0.1066	15.8	0.0241	0.0221	123.1	0.274
Apr	145	0.00019	0.029	0.0048	40.8	0.00420	0.0237	0.0051	0.0093	0.112	6.3	23.6	0.1208	14.1	0.0228	0.0200	114.5	0.321
May	428	0.00031	0.057	0.0035	37.5	0.00199	0.0485	0.0031	0.0123	0.149	2.7	17.4	0.0635	6.3	0.0140	0.0105	70.2	0.167
Jun	434	0.00031	0.058	0.0035	37.5	0.00197	0.0500	0.0031	0.0126	0.157	2.6	17.3	0.0726	6.1	0.0140	0.0103	69.5	0.195
Jul	339	0.00029	0.053	0.0037	38.0	0.00232	0.0455	0.0034	0.0120	0.147	3.2	18.3	0.0771	7.4	0.0153	0.0118	76.6	0.206
Aug	271	0.00027	0.048	0.0039	38.5	0.00265	0.0401	0.0036	0.0112	0.133	3.8	19.3	0.0741	8.8	0.0166	0.0134	83.7	0.193
Sep	322	0.00029	0.052	0.0037	38.0	0.00231	0.0442	0.0033	0.0117	0.140	3.3	18.3	0.0676	7.5	0.0152	0.0119	76.8	0.177
Oct	223	0.00024	0.042	0.0041	39.0	0.00301	0.0346	0.0039	0.0104	0.118	4.5	20.3	0.0731	10.2	0.0179	0.0151	91.2	0.187
Nov	159	0.00020	0.032	0.0045	40.3	0.00382	0.0251	0.0046	0.0092	0.102	5.8	22.6	0.0903	13.1	0.0211	0.0186	107.4	0.231
Dec	149	0.00018	0.028	0.0047	40.7	0.00412	0.0214	0.0049	0.0087	0.095	6.3	23.4	0.0956	14.1	0.0222	0.0200	113.5	0.245

Concentrations at V8

	Flow (x1000 m3)	Ag mg/L	Al mg/L	As mg/L	Ca mg/L	Cd mg/L	Cl mg/L	Co mg/L	Cu mg/L	Fe mg/L	K mg/L	Mg mg/L	Mn mg/L	Na mg/L	Ni mg/L	Pb mg/L	SO4 mg/L	Zn mg/L
Jan	430	0.00018	0.029	0.0025	22.0	0.00150	0.0056	0.0020	0.0073	0.079	2.3	10.5	0.0424	5.4	0.0085	0.0077	40.7	0.104
Feb	331	0.00017	0.027	0.0026	23.1	0.00175	0.0057	0.0022	0.0072	0.078	2.7	11.5	0.0483	6.2	0.0097	0.0088	46.9	0.120
Mar	342	0.00017	0.027	0.0027	23.6	0.00186	0.0062	0.0024	0.0073	0.082	2.9	11.9	0.0561	6.6	0.0102	0.0093	49.6	0.142
Apr	566	0.00019	0.031	0.0023	20.4	0.00119	0.0062	0.0017	0.0077	0.087	1.8	9.1	0.0449	4.2	0.0070	0.0062	32.3	0.114
May	4313	0.00021	0.036	0.0017	16.4	0.00031	0.0049	0.0007	0.0077	0.082	0.5	5.6	0.0135	1.4	0.0028	0.0024	10.6	0.026
Jun	4401	0.00021	0.035	0.0017	16.2	0.00031	0.0050	0.0007	0.0077	0.082	0.5	5.6	0.0147	1.4	0.0028	0.0023	10.5	0.030
Jul	3093	0.00021	0.035	0.0017	16.5	0.00037	0.0051	0.0008	0.0076	0.082	0.6	5.8	0.0163	1.6	0.0031	0.0026	12.0	0.034
Aug	2189	0.00020	0.034	0.0018	16.8	0.00044	0.0051	0.0009	0.0076	0.081	0.7	6.1	0.0169	1.8	0.0034	0.0029	13.8	0.035
Sep	2925	0.00021	0.035	0.0017	16.6	0.00037	0.0050	0.0008	0.0076	0.081	0.6	5.8	0.0148	1.6	0.0031	0.0026	12.0	0.030
Oct	1562	0.00020	0.034	0.0018	17.3	0.00054	0.0050	0.0009	0.0075	0.080	0.9	6.5	0.0183	2.2	0.0039	0.0034	16.4	0.039
Nov	756	0.00019	0.032	0.0021	19.0	0.00091	0.0054	0.0014	0.0074	0.080	1.4	8.0	0.0289	3.4	0.0057	0.0050	25.7	0.068
Dec	592	0.00019	0.031	0.0022	20.3	0.00115	0.0055	0.0016	0.0075	0.081	1.8	9.0	0.0353	4.2	0.0068	0.0061	31.6	0.085

VG02 - Vangorda Grum - Stabilize in Place
Loadings: Future 2

Concentrations at V27

	Flow (x1000 m3)	Ag mg/L	Al mg/L	As mg/L	Ca mg/L	Cd mg/L	Cl mg/L	Co mg/L	Cu mg/L	Fe mg/L	K mg/L	Mg mg/L	Mn mg/L	Na mg/L	Ni mg/L	Pb mg/L	SO4 mg/L	Zn mg/L
Jan	137	0.00016	0.040	0.0048	47.7	0.00468	0.0201	0.0059	0.0163	0.219	6.8	38.2	0.1911	15.2	0.0244	0.0214	173.8	0.485
Feb	120	0.00016	0.039	0.0049	48.1	0.00482	0.0184	0.0061	0.0162	0.218	7.0	39.1	0.1951	15.7	0.0250	0.0220	178.6	0.495
Mar	131	0.00016	0.041	0.0050	48.3	0.00494	0.0193	0.0063	0.0178	0.246	7.1	39.5	0.2214	15.9	0.0255	0.0222	180.6	0.566
Apr	145	0.00019	0.052	0.0048	46.9	0.00461	0.0278	0.0064	0.0211	0.306	6.3	36.6	0.2598	14.1	0.0245	0.0201	165.5	0.675
May	428	0.00031	0.066	0.0035	39.6	0.00215	0.0501	0.0036	0.0170	0.227	2.7	22.0	0.1196	6.4	0.0147	0.0105	88.2	0.310
Jun	434	0.00031	0.070	0.003503	39.5	0.00218	0.0521	0.0038	0.0186	0.256	2.6	21.8	0.1433	6.2	0.0149	0.0103	87.1	0.375
Jul	339	0.00029	0.066	0.003699	40.7	0.00255	0.0477	0.0041	0.0185	0.255	3.2	24.1	0.1537	7.4	0.0163	0.0119	99.5	0.401
Aug	271	0.00027	0.060	0.003867	41.8	0.00286	0.0422	0.0043	0.0171	0.231	3.8	26.5	0.1445	8.8	0.0174	0.0135	111.8	0.372
Sep	322	0.00029	0.063	0.00367	40.7	0.00249	0.0460	0.0039	0.0169	0.226	3.3	24.2	0.1289	7.6	0.0160	0.0120	99.7	0.333
Oct	223	0.00024	0.054	0.004054	43.1	0.00321	0.0366	0.0045	0.0161	0.212	4.5	29.0	0.1405	10.2	0.0187	0.0152	124.9	0.358
Nov	159	0.00020	0.047	0.0045	45.7	0.00409	0.0278	0.0054	0.0170	0.230	5.8	34.3	0.1819	13.1	0.0222	0.0187	153.2	0.465
Dec	149	0.00018	0.045	0.0047	46.7	0.00441	0.0243	0.0058	0.0171	0.233	6.3	36.3	0.1946	14.2	0.0235	0.0201	163.8	0.497

Concentrations at V8

	Flow (x1000 m3)	Ag mg/L	Al mg/L	As mg/L	Ca mg/L	Cd mg/L	Cl mg/L	Co mg/L	Cu mg/L	Fe mg/L	K mg/L	Mg mg/L	Mn mg/L	Na mg/L	Ni mg/L	Pb mg/L	SO4 mg/L	Zn mg/L
Jan	430	0.00018	0.036	0.0025	24.1	0.00163	0.0066	0.0024	0.0110	0.140	2.3	15.0	0.0859	5.4	0.0090	0.0078	58.3	0.215
Feb	331	0.00017	0.036	0.0026	25.6	0.00190	0.0069	0.0027	0.0116	0.150	2.7	16.8	0.0992	6.2	0.0102	0.0089	67.7	0.250
Mar	342	0.00017	0.038	0.0027	26.3	0.00205	0.0076	0.0030	0.0126	0.169	2.9	17.6	0.1182	6.6	0.0109	0.0093	71.8	0.301
Apr	566	0.00019	0.040	0.0023	22.0	0.00134	0.0074	0.0022	0.0120	0.158	1.8	12.5	0.0954	4.2	0.0076	0.0062	45.6	0.243
May	4313	0.00021	0.037	0.0017	16.6	0.00033	0.0051	0.0008	0.0084	0.093	0.5	6.1	0.0214	1.4	0.0029	0.0024	12.4	0.046
Jun	4401	0.00021	0.037	0.0017	16.5	0.00034	0.0053	0.0008	0.0085	0.096	0.5	6.0	0.0246	1.4	0.0029	0.0023	12.2	0.055
Jul	3093	0.00021	0.037	0.0017	16.8	0.00040	0.0054	0.0009	0.0086	0.099	0.6	6.5	0.0282	1.6	0.0032	0.0026	14.5	0.064
Aug	2189	0.00020	0.037	0.0018	17.2	0.00048	0.0053	0.0010	0.0086	0.098	0.7	7.0	0.0293	1.8	0.0035	0.0029	17.3	0.067
Sep	2925	0.00021	0.037	0.0017	16.9	0.00039	0.0052	0.0009	0.0084	0.095	0.6	6.5	0.0244	1.6	0.0032	0.0026	14.6	0.054
Oct	1562	0.00020	0.036	0.0018	17.8	0.00058	0.0054	0.0011	0.0086	0.099	0.9	7.8	0.0319	2.2	0.0040	0.0034	21.3	0.073
Nov	756	0.00019	0.036	0.0021	20.1	0.00099	0.0060	0.0016	0.0097	0.118	1.4	10.5	0.0561	3.4	0.0060	0.0051	35.4	0.137
Dec	592	0.00019	0.037	0.0022	21.8	0.00125	0.0063	0.0019	0.0105	0.131	1.8	12.3	0.0706	4.2	0.0072	0.0061	44.4	0.175

VG02 - Vangorda Grum - Stabilize in Place

Loadings: Future 3

Concentrations at V27

	Flow (x1000 m3)	Ag mg/L	Al mg/L	As mg/L	Ca mg/L	Cd mg/L	Cl mg/L	Co mg/L	Cu mg/L	Fe mg/L	K mg/L	Mg mg/L	Mn mg/L	Na mg/L	Ni mg/L	Pb mg/L	SO4 mg/L	Zn mg/L
Jan	137	0.00016	0.072	0.0048	49.3	0.00554	0.0206	0.0086	0.0335	0.534	6.8	50.4	0.4657	15.2	0.0270	0.0216	256.1	1.231
Feb	120	0.00016	0.072	0.0049	49.8	0.00570	0.0190	0.0088	0.0338	0.541	7.0	51.8	0.4760	15.7	0.0276	0.0222	263.9	1.258
Mar	131	0.00016	0.080	0.0050	50.1	0.00596	0.0199	0.0096	0.0382	0.621	7.1	52.3	0.5481	15.9	0.0286	0.0224	267.4	1.454
Apr	145	0.00019	0.099	0.0048	48.5	0.00586	0.0286	0.0103	0.0459	0.760	6.3	48.0	0.6558	14.1	0.0282	0.0205	242.8	1.751
May	428	0.00031	0.085	0.0035	40.2	0.00266	0.0505	0.0052	0.0270	0.410	2.7	26.0	0.2791	6.4	0.0161	0.0107	115.5	0.743
Jun	434	0.00031	0.093	0.0035	40.1	0.00281	0.0525	0.0058	0.0312	0.486	2.6	25.7	0.3445	6.2	0.0167	0.0105	113.8	0.922
Jul	339	0.00029	0.092	0.0037	41.4	0.00323	0.0482	0.0063	0.0322	0.505	3.2	29.2	0.3718	7.4	0.0183	0.0121	134.2	0.993
Aug	271	0.00027	0.083	0.0039	42.7	0.00349	0.0426	0.0063	0.0297	0.461	3.8	32.8	0.3449	8.8	0.0193	0.0137	154.4	0.917
Sep	322	0.00029	0.083	0.0037	41.4	0.00304	0.0464	0.0056	0.0279	0.426	3.3	29.3	0.3035	7.6	0.0176	0.0121	134.6	0.807
Oct	223	0.00024	0.076	0.0041	44.1	0.00382	0.0370	0.0064	0.0281	0.432	4.5	36.5	0.3322	10.2	0.0205	0.0154	175.9	0.879
Nov	159	0.00020	0.078	0.0045	47.1	0.00491	0.0283	0.0080	0.0333	0.529	5.8	44.5	0.4427	13.1	0.0246	0.0190	222.4	1.173
Dec	149	0.00018	0.078	0.0047	48.3	0.00530	0.0249	0.0085	0.0348	0.557	6.3	47.6	0.4765	14.2	0.0261	0.0203	239.8	1.263

Concentrations at V8

	Flow (x1000 m3)	Ag mg/L	Al mg/L	As mg/L	Ca mg/L	Cd mg/L	Cl mg/L	Co mg/L	Cu mg/L	Fe mg/L	K mg/L	Mg mg/L	Mn mg/L	Na mg/L	Ni mg/L	Pb mg/L	SO4 mg/L	Zn mg/L
Jan	430	0.00018	0.047	0.0025	24.6	0.00192	0.0068	0.0033	0.0168	0.245	2.4	18.8	0.1770	5.4	0.0098	0.0078	84.5	0.462
Feb	331	0.00017	0.049	0.0026	26.2	0.00224	0.0071	0.0037	0.0183	0.272	2.7	21.4	0.2056	6.2	0.0112	0.0090	98.8	0.539
Mar	342	0.00017	0.053	0.0027	26.9	0.00246	0.0079	0.0042	0.0209	0.319	2.9	22.5	0.2484	6.6	0.0121	0.0094	105.1	0.655
Apr	566	0.00019	0.052	0.0023	22.4	0.00168	0.0076	0.0032	0.0187	0.279	1.8	15.4	0.2009	4.2	0.0086	0.0063	65.4	0.529
May	4313	0.00021	0.039	0.0017	16.7	0.00039	0.0051	0.0010	0.0094	0.112	0.5	6.5	0.0379	1.4	0.0031	0.0024	15.1	0.091
Jun	4401	0.00021	0.040	0.0017	16.5	0.00040	0.0053	0.0010	0.0098	0.120	0.5	6.4	0.0453	1.4	0.0031	0.0024	14.9	0.111
Jul	3093	0.00021	0.040	0.0017	16.9	0.00048	0.0054	0.0011	0.0102	0.127	0.6	7.0	0.0531	1.6	0.0034	0.0026	18.3	0.132
Aug	2189	0.00020	0.040	0.0018	17.3	0.00056	0.0054	0.0012	0.0102	0.128	0.7	7.8	0.0550	1.8	0.0038	0.0030	22.6	0.137
Sep	2925	0.00021	0.039	0.0017	16.9	0.00046	0.0052	0.0011	0.0097	0.118	0.6	7.1	0.0444	1.6	0.0034	0.0026	18.4	0.108
Oct	1562	0.00020	0.039	0.0018	18.0	0.00067	0.0054	0.0014	0.0104	0.132	0.9	8.8	0.0604	2.2	0.0043	0.0034	28.6	0.151
Nov	756	0.00019	0.043	0.0021	20.4	0.00117	0.0061	0.0022	0.0133	0.184	1.4	12.6	0.1132	3.4	0.0065	0.0051	50.0	0.292
Dec	592	0.00019	0.046	0.0022	22.2	0.00149	0.0065	0.0027	0.0152	0.216	1.8	15.1	0.1446	4.2	0.0079	0.0062	63.6	0.376

Appendix D
Results for Sensitivity Runs

SF01 - Faro Mine Site - Sensitivity Assessment - Seepage Collection Efficiency - Waste Rock Area

Conditions FUTURE 1

Location X2

	Flows (x 1000 m3)	Ag mg/L	Al mg/L	As mg/L	Ca mg/L	Cd mg/L	Cl mg/L	Co mg/L	Cu mg/L	Fe mg/L	K mg/L	Mg mg/L	Mn mg/L	Na mg/L	Ni mg/L	Pb mg/L	SO4 mg/L	Zn mg/L
Jan	554	0.00011	0.071	0.00127	30.0	0.00029	0.0051	0.0007	0.0057	0.289	0.9	6.9	0.035	2.3	0.0015	0.0019	14.4	0.0831
Feb	404	0.00012	0.072	0.00133	30.1	0.00031	0.0062	0.0008	0.0059	0.295	0.9	7.0	0.037	2.3	0.0016	0.0020	15.1	0.0965
Mar	408	0.00012	0.074	0.00142	30.2	0.00034	0.0078	0.0008	0.0061	0.303	0.9	7.1	0.039	2.3	0.0017	0.0021	15.9	0.1143
Apr	786	0.00011	0.071	0.00129	30.0	0.00029	0.0055	0.0008	0.0057	0.291	0.9	6.9	0.036	2.3	0.0015	0.0020	14.7	0.0875
May	6993	0.00010	0.067	0.00104	29.7	0.00021	0.0009	0.0006	0.0051	0.268	0.9	6.6	0.029	2.3	0.0012	0.0017	12.1	0.0339
Jun	7194	0.00010	0.067	0.00105	29.7	0.00022	0.0011	0.0006	0.0051	0.269	0.9	6.6	0.030	2.3	0.0012	0.0017	12.2	0.0359
Jul	5016	0.00010	0.067	0.00106	29.7	0.00022	0.0013	0.0006	0.0051	0.270	0.9	6.6	0.030	2.3	0.0012	0.0018	12.3	0.0381
Aug	3508	0.00010	0.067	0.00106	29.7	0.00022	0.0013	0.0006	0.0052	0.270	0.9	6.6	0.030	2.3	0.0012	0.0018	12.3	0.0387
Sep	4721	0.00010	0.067	0.00105	29.7	0.00022	0.0011	0.0006	0.0051	0.268	0.9	6.6	0.029	2.3	0.0012	0.0017	12.2	0.0357
Oct	2461	0.00010	0.067	0.00107	29.7	0.00022	0.0015	0.0006	0.0052	0.270	0.9	6.6	0.030	2.3	0.0012	0.0018	12.4	0.0403
Nov	1116	0.00011	0.069	0.00115	29.8	0.00025	0.0029	0.0007	0.0054	0.278	0.9	6.7	0.032	2.3	0.0013	0.0018	13.2	0.0571
Dec	822	0.00011	0.070	0.00120	29.9	0.00027	0.0039	0.0007	0.0055	0.283	0.9	6.8	0.033	2.3	0.0014	0.0019	13.8	0.0690
Total	33983																	

Location X14

	Flows (x 1000 m3)	Ag mg/L	Al mg/L	As mg/L	Ca mg/L	Cd mg/L	Cl mg/L	Co mg/L	Cu mg/L	Fe mg/L	K mg/L	Mg mg/L	Mn mg/L	Na mg/L	Ni mg/L	Pb mg/L	SO4 mg/L	Zn mg/L
Jan	1192	0.00008	0.046	0.00145	25.2	0.00081	0.0027	0.0011	0.0046	0.190	1.6	8.9	0.027	3.7	0.0039	0.0042	42.3	0.0768
Feb	912	0.00008	0.040	0.00149	23.3	0.00092	0.0031	0.0011	0.0043	0.166	1.7	9.1	0.026	3.9	0.0044	0.0047	47.7	0.0848
Mar	981	0.00007	0.037	0.00149	21.6	0.00094	0.0037	0.0011	0.0042	0.153	1.7	8.9	0.025	3.8	0.0045	0.0046	48.0	0.0944
Apr	1785	0.00008	0.050	0.00129	24.7	0.00061	0.0028	0.0009	0.0047	0.204	1.3	7.7	0.027	3.0	0.0029	0.0033	31.2	0.0769
May	14480	0.00010	0.064	0.00104	28.9	0.00025	0.0006	0.0006	0.0050	0.256	1.0	6.7	0.028	2.4	0.0013	0.0019	14.2	0.0331
Jun	14798	0.00010	0.064	0.00105	28.9	0.00025	0.0007	0.0006	0.0050	0.257	1.0	6.7	0.028	2.4	0.0013	0.0019	14.1	0.0352
Jul	10302	0.00010	0.063	0.00106	28.8	0.00028	0.0008	0.0007	0.0050	0.255	1.0	6.8	0.028	2.4	0.0014	0.0020	15.3	0.0373
Aug	7268	0.00010	0.062	0.00107	28.4	0.00030	0.0008	0.0007	0.0049	0.249	1.0	6.8	0.028	2.5	0.0016	0.0021	16.6	0.0375
Sep	9748	0.00010	0.063	0.00105	28.7	0.00028	0.0007	0.0007	0.0049	0.253	1.0	6.8	0.028	2.4	0.0014	0.0020	15.3	0.0348
Oct	5108	0.00009	0.060	0.00109	28.1	0.00034	0.0009	0.0007	0.0048	0.243	1.1	7.0	0.028	2.6	0.0018	0.0023	18.7	0.0388
Nov	2302	0.00009	0.056	0.00124	27.5	0.00051	0.0016	0.0008	0.0049	0.229	1.3	7.8	0.028	3.0	0.0025	0.0030	27.1	0.0550
Dec	1704	0.00009	0.054	0.00135	27.2	0.00064	0.0022	0.0010	0.0049	0.219	1.4	8.3	0.028	3.3	0.0031	0.0035	33.4	0.0664
Total	70579																	

Location Mouth of Rose Creek

	Flows (x 1000 m3)	Ag mg/L	Al mg/L	As mg/L	Ca mg/L	Cd mg/L	Cl mg/L	Co mg/L	Cu mg/L	Fe mg/L	K mg/L	Mg mg/L	Mn mg/L	Na mg/L	Ni mg/L	Pb mg/L	SO4 mg/L	Zn mg/L
Jan	1628	0.00009	0.052	0.00133	26.4	0.00065	0.0020	0.0010	0.0047	0.210	1.4	8.3	0.027	3.3	0.0032	0.0036	34.1	0.0631
Feb	1229	0.00008	0.047	0.00137	24.9	0.00074	0.0024	0.0010	0.0045	0.191	1.5	8.5	0.026	3.5	0.0036	0.0039	38.4	0.0695
Mar	1301	0.00008	0.044	0.00137	23.6	0.00076	0.0028	0.0010	0.0044	0.180	1.5	8.3	0.026	3.4	0.0036	0.0039	39.1	0.0775
Apr	2402	0.00009	0.054	0.00122	26.0	0.00051	0.0021	0.0008	0.0048	0.220	1.2	7.4	0.027	2.8	0.0025	0.0029	26.2	0.0637
May	19992	0.00010	0.064	0.00103	29.1	0.00024	0.0005	0.0006	0.0050	0.258	1.0	6.6	0.028	2.3	0.0013	0.0018	13.5	0.0310
Jun	20467	0.00010	0.064	0.00103	29.1	0.00024	0.0005	0.0006	0.0050	0.259	1.0	6.6	0.028	2.3	0.0013	0.0018	13.5	0.0325
Jul	14255	0.00010	0.064	0.00105	29.0	0.00026	0.0006	0.0006	0.0050	0.258	1.0	6.7	0.028	2.4	0.0013	0.0019	14.3	0.0340
Aug	10032	0.00010	0.063	0.00105	28.7	0.00027	0.0006	0.0007	0.0049	0.253	1.0	6.7	0.028	2.4	0.0014	0.0020	15.3	0.0342
Sep	13469	0.00010	0.064	0.00104	29.0	0.00025	0.0005	0.0006	0.0050	0.256	1.0	6.7	0.028	2.4	0.0013	0.0019	14.3	0.0323
Oct	7047	0.00010	0.062	0.00107	28.5	0.00030	0.0007	0.0007	0.0049	0.249	1.0	6.9	0.028	2.5	0.0016	0.0021	16.8	0.0352
Nov	3181	0.00009	0.059	0.00117	28.1	0.00043	0.0012	0.0008	0.0049	0.238	1.2	7.4	0.028	2.8	0.0021	0.0026	22.9	0.0469
Dec	2351	0.00009	0.057	0.00125	27.8	0.00052	0.0016	0.0009	0.0049	0.231	1.3	7.8	0.028	3.0	0.0026	0.0030	27.5	0.0552
Total	97354																	

Location Mouth of Anvil Creek

	Flows (x 1000 m3)	Ag mg/L	Al mg/L	As mg/L	Ca mg/L	Cd mg/L	Cl mg/L	Co mg/L	Cu mg/L	Fe mg/L	K mg/L	Mg mg/L	Mn mg/L	Na mg/L	Ni mg/L	Pb mg/L	SO4 mg/L	Zn mg/L
Jan	4432	0.00010	0.061	0.00112	28.4	0.00037	0.0009	0.0007	0.0049	0.244	1.1	7.2	0.028	2.6	0.0019	0.0024	19.9	0.0394
Feb	3271	0.00009	0.059	0.00114	27.8	0.00040	0.0010	0.0008	0.0048	0.237	1.1	7.3	0.028	2.7	0.0020	0.0025	21.7	0.0421
Mar	3362	0.00009	0.057	0.00114	27.3	0.00042	0.0012	0.0008	0.0048	0.232	1.1	7.2	0.027	2.7	0.0021	0.0026	22.3	0.0457
Apr	6375	0.00010	0.061	0.00108	28.2	0.00032	0.0009	0.0007	0.0049	0.247	1.0	6.9	0.028	2.5	0.0016	0.0021	17.2	0.0400
May	55468	0.00010	0.065	0.00101	29.4	0.00021	0.0003	0.0006	0.0050	0.262	0.9	6.6	0.028	2.3	0.0012	0.0018	12.4	0.0276
Jun	56958	0.00010	0.065	0.00101	29.4	0.00021	0.0003	0.0006	0.0050	0.262	0.9	6.6	0.028	2.3	0.0012	0.0017	12.3	0.0281
Jul	39694	0.00010	0.065	0.00102	29.4	0.00022	0.0003	0.0006	0.0050	0.262	0.9	6.6	0.028	2.3	0.0012	0.0018	12.6	0.0286
Aug	27824	0.00010	0.065	0.00102	29.3	0.00023	0.0004	0.0006	0.0050	0.260	0.9	6.6	0.028	2.3	0.0012	0.0018	13.0	0.0287
Sep	37419	0.00010	0.065	0.00101	29.4	0.00022	0.0003	0.0006	0.0050	0.261	0.9	6.6	0.028	2.3	0.0012	0.0018	12.6	0.0280
Oct	19527	0.00010	0.064	0.00102	29.2	0.00024	0.0004	0.0006	0.0050	0.259	1.0	6.7	0.028	2.3	0.0013	0.0018	13.5	0.0291
Nov	8834	0.00010	0.063	0.00106	29.0	0.00028	0.0006	0.0007	0.0050	0.255	1.0	6.9	0.028	2.5	0.0015	0.0020	15.7	0.0333
Dec	6515	0.00010	0.063	0.00109	29.0	0.00032	0.0007	0.0007	0.0050	0.252	1.0	7.0	0.028	2.5	0.0016	0.0022	17.4	0.0363
Total	269678																	

SF01 - Faro Mine Site - Sensitivity Assessment - Seepage Collection Efficiency - Waste Rock Area
Conditions FUTURE 2

Location X2

	Flows (x 1000 m3)	Ag mg/L	Al mg/L	As mg/L	Ca mg/L	Cd mg/L	Cl mg/L	Co mg/L	Cu mg/L	Fe mg/L	K mg/L	Mg mg/L	Mn mg/L	Na mg/L	Ni mg/L	Pb mg/L	SO4 mg/L	Zn mg/L
Jan	554	0.00012	0.091	0.00140	30.4	0.00055	0.0148	0.0012	0.0079	0.411	1.0	7.5	0.063	2.5	0.0027	0.0025	18.5	0.3096
Feb	404	0.00012	0.096	0.00149	30.6	0.00064	0.0182	0.0014	0.0086	0.445	1.0	7.7	0.071	2.5	0.0030	0.0027	20.0	0.3756
Mar	408	0.00013	0.104	0.00161	30.8	0.00074	0.0227	0.0015	0.0095	0.491	1.0	8.0	0.082	2.6	0.0035	0.0030	22.1	0.4637
Apr	786	0.00012	0.092	0.00143	30.5	0.00058	0.0159	0.0013	0.0082	0.423	1.0	7.6	0.066	2.5	0.0028	0.0026	19.0	0.3313
May	6993	0.00010	0.069	0.00106	29.7	0.00025	0.0023	0.0007	0.0054	0.285	0.9	6.7	0.033	2.3	0.0013	0.0018	12.7	0.0684
Jun	7194	0.00010	0.070	0.00107	29.7	0.00026	0.0028	0.0007	0.0055	0.290	0.9	6.7	0.035	2.3	0.0014	0.0018	12.9	0.0764
Jul	5016	0.00010	0.071	0.00109	29.8	0.00028	0.0034	0.0007	0.0056	0.296	0.9	6.7	0.036	2.3	0.0014	0.0019	13.2	0.0873
Aug	3508	0.00010	0.072	0.00109	29.8	0.00028	0.0035	0.0007	0.0057	0.298	0.9	6.8	0.036	2.3	0.0015	0.0019	13.3	0.0903
Sep	4721	0.00010	0.070	0.00107	29.7	0.00026	0.0028	0.0007	0.0055	0.290	0.9	6.7	0.034	2.3	0.0014	0.0018	12.9	0.0753
Oct	2461	0.00011	0.072	0.00110	29.8	0.00029	0.0039	0.0008	0.0058	0.302	0.9	6.8	0.037	2.3	0.0015	0.0019	13.4	0.0982
Nov	1116	0.00011	0.079	0.00122	30.0	0.00039	0.0082	0.0009	0.0066	0.345	0.9	7.1	0.047	2.4	0.0020	0.0022	15.4	0.1810
Dec	822	0.00011	0.084	0.00130	30.2	0.00047	0.0112	0.0011	0.0072	0.375	0.9	7.3	0.055	2.4	0.0023	0.0023	16.8	0.2397
Total	33983																	

Location X14

	Flows (x 1000 m3)	Ag mg/L	Al mg/L	As mg/L	Ca mg/L	Cd mg/L	Cl mg/L	Co mg/L	Cu mg/L	Fe mg/L	K mg/L	Mg mg/L	Mn mg/L	Na mg/L	Ni mg/L	Pb mg/L	SO4 mg/L	Zn mg/L
Jan	1192	0.00009	0.057	0.00156	28.5	0.00096	0.0083	0.0013	0.0061	0.261	1.6	13.5	0.043	3.8	0.0046	0.0045	71.8	0.1982
Feb	912	0.00008	0.053	0.00162	27.2	0.00109	0.0097	0.0014	0.0060	0.249	1.7	14.5	0.044	4.0	0.0052	0.0050	82.9	0.2274
Mar	981	0.00008	0.051	0.00164	25.6	0.00114	0.0114	0.0015	0.0062	0.251	1.7	14.4	0.047	3.9	0.0053	0.0051	84.3	0.2619
Apr	1785	0.00009	0.061	0.00141	26.9	0.00076	0.0085	0.0012	0.0062	0.277	1.3	10.7	0.043	3.1	0.0036	0.0036	51.1	0.2006
May	14480	0.00010	0.065	0.00105	29.2	0.00028	0.0014	0.0007	0.0052	0.267	1.0	7.1	0.031	2.4	0.0014	0.0019	16.8	0.0512
Jun	14798	0.00010	0.066	0.00107	29.2	0.00028	0.0017	0.0007	0.0053	0.271	1.0	7.1	0.031	2.4	0.0014	0.0019	16.7	0.0579
Jul	10302	0.00010	0.066	0.00109	29.2	0.00031	0.0021	0.0007	0.0053	0.271	1.0	7.3	0.032	2.4	0.0016	0.0021	19.0	0.0649
Aug	7268	0.00010	0.064	0.00110	28.9	0.00034	0.0021	0.0007	0.0053	0.266	1.0	7.6	0.032	2.5	0.0017	0.0022	21.6	0.0661
Sep	9748	0.00010	0.065	0.00107	29.1	0.00030	0.0017	0.0007	0.0052	0.266	1.0	7.3	0.031	2.4	0.0016	0.0020	18.9	0.0570
Oct	5108	0.00010	0.063	0.00112	28.9	0.00038	0.0024	0.0008	0.0052	0.262	1.1	8.1	0.032	2.6	0.0019	0.0023	25.7	0.0710
Nov	2302	0.00009	0.063	0.00130	29.1	0.00060	0.0048	0.0010	0.0057	0.269	1.3	10.1	0.037	3.0	0.0029	0.0032	42.1	0.1243
Dec	1704	0.00009	0.062	0.00144	29.4	0.00075	0.0066	0.0012	0.0060	0.275	1.4	11.6	0.041	3.4	0.0036	0.0038	54.3	0.1614
Total	70579																	

Location Mouth of Rose Creek

	Flows (x 1000 m3)	Ag mg/L	Al mg/L	As mg/L	Ca mg/L	Cd mg/L	Cl mg/L	Co mg/L	Cu mg/L	Fe mg/L	K mg/L	Mg mg/L	Mn mg/L	Na mg/L	Ni mg/L	Pb mg/L	SO4 mg/L	Zn mg/L
Jan	1628	0.00009	0.059	0.00141	28.8	0.00075	0.0062	0.0011	0.0058	0.262	1.4	11.6	0.039	3.4	0.0036	0.0038	55.7	0.1520
Feb	1229	0.00009	0.056	0.00146	27.8	0.00086	0.0073	0.0012	0.0058	0.253	1.5	12.5	0.040	3.5	0.0041	0.0042	64.5	0.1753
Mar	1301	0.00008	0.055	0.00148	26.6	0.00091	0.0087	0.0013	0.0059	0.254	1.5	12.5	0.042	3.5	0.0043	0.0042	66.5	0.2038
Apr	2402	0.00009	0.062	0.00130	27.6	0.00062	0.0064	0.0010	0.0059	0.273	1.2	9.7	0.039	2.9	0.0029	0.0031	41.0	0.1556
May	19992	0.00010	0.065	0.00104	29.3	0.00025	0.0011	0.0007	0.0051	0.266	1.0	6.9	0.030	2.3	0.0013	0.0019	15.4	0.0442
Jun	20467	0.00010	0.066	0.00105	29.3	0.00026	0.0013	0.0007	0.0052	0.269	1.0	6.9	0.030	2.3	0.0014	0.0019	15.3	0.0489
Jul	14255	0.00010	0.066	0.00106	29.3	0.00028	0.0015	0.0007	0.0052	0.269	1.0	7.1	0.031	2.4	0.0014	0.0020	17.0	0.0540
Aug	10032	0.00010	0.065	0.00107	29.1	0.00030	0.0016	0.0007	0.0052	0.265	1.0	7.3	0.031	2.4	0.0015	0.0020	18.9	0.0550
Sep	13469	0.00010	0.065	0.00105	29.3	0.00027	0.0013	0.0007	0.0052	0.266	1.0	7.1	0.030	2.4	0.0014	0.0019	16.9	0.0483
Oct	7047	0.00010	0.064	0.00109	29.1	0.00033	0.0018	0.0007	0.0052	0.263	1.0	7.6	0.031	2.5	0.0017	0.0022	21.8	0.0585
Nov	3181	0.00010	0.063	0.00122	29.2	0.00049	0.0036	0.0009	0.0055	0.268	1.2	9.1	0.035	2.8	0.0024	0.0028	33.7	0.0970
Dec	2351	0.00010	0.063	0.00132	29.5	0.00060	0.0048	0.0010	0.0057	0.272	1.3	10.2	0.037	3.1	0.0029	0.0032	42.6	0.1240
Total	97354																	

Location Mouth of Anvil Creek

	Flows (x 1000 m3)	Ag mg/L	Al mg/L	As mg/L	Ca mg/L	Cd mg/L	Cl mg/L	Co mg/L	Cu mg/L	Fe mg/L	K mg/L	Mg mg/L	Mn mg/L	Na mg/L	Ni mg/L	Pb mg/L	SO4 mg/L	Zn mg/L
Jan	4432	0.00010	0.064	0.00115	29.3	0.00040	0.0024	0.0008	0.0053	0.263	1.1	8.4	0.032	2.7	0.0020	0.0025	27.9	0.0720
Feb	3271	0.00009	0.062	0.00117	28.9	0.00045	0.0029	0.0008	0.0053	0.260	1.1	8.8	0.033	2.7	0.0022	0.0026	31.5	0.0818
Mar	3362	0.00009	0.062	0.00119	28.4	0.00047	0.0035	0.0009	0.0054	0.260	1.1	8.8	0.034	2.7	0.0023	0.0027	32.9	0.0946
Apr	6375	0.00010	0.064	0.00111	28.8	0.00036	0.0025	0.0008	0.0053	0.268	1.0	7.7	0.032	2.5	0.0018	0.0022	22.7	0.0746
May	55468	0.00010	0.066	0.00101	29.5	0.00022	0.0005	0.0006	0.0050	0.265	0.9	6.7	0.029	2.3	0.0012	0.0018	13.0	0.0323
Jun	56958	0.00010	0.066	0.00102	29.5	0.00022	0.0006	0.0006	0.0051	0.266	0.9	6.7	0.029	2.3	0.0012	0.0018	13.0	0.0340
Jul	39694	0.00010	0.066	0.00102	29.5	0.00023	0.0007	0.0006	0.0051	0.266	0.9	6.7	0.029	2.3	0.0012	0.0018	13.6	0.0358
Aug	27824	0.00010	0.065	0.00103	29.4	0.00024	0.0007	0.0006	0.0051	0.264	0.9	6.8	0.029	2.3	0.0013	0.0018	14.3	0.0362
Sep	37419	0.00010	0.066	0.00102	29.5	0.00023	0.0006	0.0006	0.0051	0.265	0.9	6.7	0.029	2.3	0.0012	0.0018	13.6	0.0338
Oct	19527	0.00010	0.065	0.00103	29.4	0.00025	0.0008	0.0006	0.0051	0.264	1.0	6.9	0.029	2.3	0.0013	0.0019	15.4	0.0375
Nov	8834	0.00010	0.065	0.00108	29.5	0.00030	0.0014	0.0007	0.0052	0.265	1.0	7.5	0.031	2.5	0.0016	0.0021	19.6	0.0513
Dec	6515	0.00010	0.065	0.00111	29.6	0.00034	0.0019	0.0007	0.0053	0.267	1.1	7.8	0.032	2.6	0.0018	0.0022	22.9	0.0611
Total	269678																	

SF01 - Faro Mine Site - Sensitivity Assessment - Seepage Collection Efficiency - Waste Rock Area

Conditions: FUTURE 3

Location: X2

	Flows	Ag	Al	As	Ca	Cd	Cl	Co	Cu	Fe	K	Mg	Mn	Na	Ni	Pb	SO4	Zn
	(x 1000 m3)	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L
Jan	554	0.00041	0.817	0.04475	30.7	0.01436	0.5000	0.0166	0.2737	10.045	1.0	9.5	1.399	2.5	0.0141	0.0057	67.0	10.2720
Feb	404	0.00048	0.991	0.05492	30.9	0.01765	0.6162	0.0203	0.3361	12.318	1.1	10.2	1.718	2.5	0.0172	0.0066	79.9	12.6532
Mar	408	0.00057	1.224	0.06849	31.2	0.02205	0.7712	0.0252	0.4195	15.351	1.1	11.1	2.143	2.6	0.0212	0.0078	97.1	15.8310
Apr	786	0.00043	0.874	0.04809	30.7	0.01544	0.5382	0.0178	0.2942	10.792	1.0	9.7	1.504	2.5	0.0151	0.0060	71.3	11.0548
May	6993	0.00014	0.174	0.00729	29.7	0.00224	0.0721	0.0029	0.0436	1.670	0.9	7.0	0.225	2.3	0.0030	0.0023	19.7	1.4986
Jun	7194	0.00015	0.200	0.00883	29.8	0.00273	0.0896	0.0035	0.0531	2.014	0.9	7.1	0.274	2.3	0.0034	0.0024	21.6	1.8589
Jul	5016	0.00017	0.229	0.01051	29.8	0.00328	0.1088	0.0041	0.0634	2.389	0.9	7.2	0.326	2.3	0.0039	0.0026	23.7	2.2520
Aug	3508	0.00017	0.237	0.01096	29.8	0.00342	0.1140	0.0042	0.0662	2.491	0.9	7.2	0.340	2.3	0.0041	0.0026	24.3	2.3582
Sep	4721	0.00015	0.197	0.00866	29.8	0.00268	0.0877	0.0034	0.0521	1.977	0.9	7.1	0.268	2.3	0.0034	0.0024	21.4	1.8199
Oct	2461	0.00018	0.258	0.01219	29.9	0.00382	0.1280	0.0047	0.0737	2.766	1.0	7.3	0.379	2.3	0.0044	0.0027	25.9	2.6464
Nov	1116	0.00027	0.477	0.02494	30.2	0.00795	0.2737	0.0093	0.1521	5.617	1.0	8.2	0.778	2.4	0.0082	0.0039	42.0	5.6331
Dec	822	0.00033	0.632	0.03399	30.4	0.01088	0.3770	0.0126	0.2076	7.639	1.0	8.8	1.062	2.4	0.0109	0.0047	53.4	7.7513
Total	33983																	

Location: X14

	Flows	Ag	Al	As	Ca	Cd	Cl	Co	Cu	Fe	K	Mg	Mn	Na	Ni	Pb	SO4	Zn
	(x 1000 m3)	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L
Jan	1192	0.00023	0.423	0.02347	29.8	0.00789	0.2544	0.0091	0.1404	5.126	1.6	25.1	0.718	3.8	0.0103	0.0061	272.4	5.1996
Feb	912	0.00025	0.483	0.02736	28.7	0.00923	0.2987	0.0105	0.1638	5.963	1.7	28.4	0.837	4.0	0.0120	0.0069	321.4	6.1008
Mar	981	0.00028	0.557	0.03187	27.2	0.01070	0.3510	0.0122	0.1916	6.965	1.7	28.7	0.979	3.9	0.0133	0.0072	332.0	7.1632
Apr	1785	0.00023	0.434	0.02373	27.8	0.00782	0.2592	0.0090	0.1431	5.233	1.3	18.6	0.731	3.1	0.0095	0.0052	189.8	5.2959
May	14480	0.00012	0.120	0.00433	29.3	0.00131	0.0382	0.0018	0.0252	0.993	1.0	8.1	0.131	2.4	0.0023	0.0022	34.9	0.7978
Jun	14798	0.00013	0.134	0.00516	29.3	0.00158	0.0478	0.0021	0.0304	1.181	1.0	8.1	0.158	2.4	0.0025	0.0022	35.0	0.9933
Jul	10302	0.00013	0.149	0.00607	29.4	0.00189	0.0580	0.0025	0.0359	1.378	1.0	8.8	0.186	2.4	0.0029	0.0024	44.9	1.2025
Aug	7268	0.00013	0.151	0.00627	29.2	0.00197	0.0603	0.0026	0.0370	1.415	1.0	9.6	0.191	2.5	0.0031	0.0025	56.3	1.2477
Sep	9748	0.00012	0.132	0.00507	29.3	0.00157	0.0466	0.0021	0.0297	1.154	1.0	8.7	0.154	2.4	0.0026	0.0023	44.2	0.9691
Oct	5108	0.00013	0.160	0.00693	29.2	0.00222	0.0676	0.0028	0.0408	1.551	1.1	10.8	0.211	2.6	0.0034	0.0028	73.2	1.3963
Nov	2302	0.00018	0.271	0.01380	29.8	0.00455	0.1452	0.0054	0.0823	3.044	1.3	15.9	0.422	3.0	0.0062	0.0041	144.3	2.9767
Dec	1704	0.00021	0.349	0.01858	30.4	0.00617	0.1991	0.0072	0.1112	4.081	1.4	19.8	0.569	3.4	0.0081	0.0050	196.6	4.0742
Total	70579																	

Location: Mouth of Rose Creek

	Flows	Ag	Al	As	Ca	Cd	Cl	Co	Cu	Fe	K	Mg	Mn	Na	Ni	Pb	SO4	Zn
	(x 1000 m3)	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L
Jan	1628	0.00020	0.328	0.01745	29.7	0.00583	0.1864	0.0068	0.1042	3.825	1.4	20.1	0.533	3.4	0.0079	0.0049	202.6	3.8145
Feb	1229	0.00021	0.375	0.02055	29.0	0.00690	0.2217	0.0080	0.1228	4.492	1.5	22.7	0.628	3.5	0.0092	0.0055	241.4	4.5322
Mar	1301	0.00023	0.436	0.02428	27.8	0.00812	0.2647	0.0093	0.1457	5.316	1.5	23.3	0.745	3.5	0.0103	0.0059	253.2	5.4068
Apr	2402	0.00020	0.339	0.01789	28.2	0.00586	0.1926	0.0069	0.1076	3.956	1.2	15.5	0.551	2.9	0.0073	0.0043	144.0	3.9415
May	19992	0.00011	0.105	0.00341	29.4	0.00100	0.0277	0.0015	0.0197	0.792	1.0	7.7	0.103	2.3	0.0020	0.0020	28.5	0.5849
Jun	20467	0.00012	0.115	0.00401	29.4	0.00120	0.0346	0.0017	0.0234	0.927	1.0	7.6	0.122	2.3	0.0021	0.0021	28.5	0.7252
Jul	14255	0.00012	0.126	0.00467	29.4	0.00142	0.0420	0.0020	0.0273	1.069	1.0	8.2	0.142	2.4	0.0024	0.0022	35.7	0.8762
Aug	10032	0.00012	0.127	0.00482	29.3	0.00149	0.0437	0.0020	0.0282	1.098	1.0	8.7	0.146	2.4	0.0025	0.0023	44.0	0.9110
Sep	13469	0.00012	0.114	0.00395	29.4	0.00119	0.0338	0.0017	0.0229	0.908	1.0	8.1	0.119	2.4	0.0022	0.0022	35.2	0.7084
Oct	7047	0.00012	0.134	0.00530	29.3	0.00166	0.0490	0.0022	0.0310	1.197	1.0	9.6	0.161	2.5	0.0028	0.0025	56.3	1.0191
Nov	3181	0.00016	0.215	0.01026	29.7	0.00335	0.1052	0.0041	0.0610	2.276	1.2	13.3	0.313	2.8	0.0048	0.0034	107.7	2.1617
Dec	2351	0.00018	0.271	0.01374	30.1	0.00453	0.1444	0.0054	0.0819	3.031	1.3	16.1	0.420	3.1	0.0062	0.0041	145.7	2.9602
Total	97354																	

Location: Mouth of Anvil Creek

	Flows	Ag	Al	As	Ca	Cd	Cl	Co	Cu	Fe	K	Mg	Mn	Na	Ni	Pb	SO4	Zn
	(x 1000 m3)	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L
Jan	4432	0.00014	0.162	0.00704	29.6	0.00227	0.0686	0.0029	0.0414	1.572	1.1	11.5	0.214	2.7	0.0036	0.0029	81.8	1.4171
Feb	3271	0.00014	0.182	0.00835	29.4	0.00272	0.0834	0.0034	0.0493	1.852	1.2	12.6	0.254	2.7	0.0041	0.0031	98.0	1.7187
Mar	3362	0.00015	0.209	0.01001	28.9	0.00326	0.1026	0.0040	0.0595	2.219	1.2	13.0	0.306	2.7	0.0047	0.0033	105.2	2.1083
Apr	6375	0.00014	0.169	0.00736	29.1	0.00233	0.0727	0.0030	0.0437	1.655	1.0	9.9	0.225	2.5	0.0034	0.0027	61.6	1.5010
May	55468	0.00011	0.080	0.00187	29.5	0.00049	0.0101	0.0009	0.0103	0.454	0.9	6.9	0.055	2.3	0.0014	0.0018	17.8	0.2272
Jun	56958	0.00011	0.084	0.00208	29.5	0.00056	0.0126	0.0010	0.0116	0.502	0.9	6.9	0.062	2.3	0.0015	0.0018	17.8	0.2770
Jul	39694	0.00011	0.087	0.00232	29.5	0.00064	0.0152	0.0011	0.0130	0.553	0.9	7.1	0.069	2.3	0.0016	0.0019	20.3	0.3311
Aug	27824	0.00011	0.088	0.00238	29.5	0.00066	0.0159	0.0011	0.0134	0.565	0.9	7.3	0.071	2.3	0.0016	0.0019	23.4	0.3448
Sep	37419	0.00011	0.083	0.00206	29.5	0.00056	0.0123	0.0010	0.0114	0.496	0.9	7.1	0.061	2.3	0.0015	0.0019	20.2	0.2714
Oct	19527	0.00011	0.091	0.00255	29.5	0.00073	0.0178	0.0012	0.0144	0.601	1.0	7.7	0.076	2.3	0.0017	0.0020	27.8	0.3841
Nov	8834	0.00012	0.119	0.00434	29.6	0.00133	0.0380	0.0019	0.0252	0.989	1.0	9.0	0.131	2.5	0.0024	0.0023	46.3	0.7947
Dec	6515	0.00013	0.140	0.00560	29.8	0.00176	0.0522	0.0023	0.0328	1.263	1.1	10.0	0.170	2.6	0.0029	0.0026	60.1	1.0847
Total	269678																	

SF02 - Faro Mine Site - Sensitivity Assessment - Seepage Collection Efficiency - Waste Rock Area

Conditions FUTURE 1

Location X2

	Flows (x 1000 m3)	Ag mg/L	Al mg/L	As mg/L	Ca mg/L	Cd mg/L	Cl mg/L	Co mg/L	Cu mg/L	Fe mg/L	K mg/L	Mg mg/L	Mn mg/L	Na mg/L	Ni mg/L	Pb mg/L	SO4 mg/L	Zn mg/L
Jan	553	0.00010	0.067	0.00107	29.7	0.00022	0.0014	0.0006	0.0051	0.269	0.9	6.6	0.030	2.3	0.0012	0.0018	12.5	0.0390
Feb	403	0.00010	0.067	0.00108	29.7	0.00022	0.0016	0.0006	0.0052	0.270	0.9	6.7	0.030	2.3	0.0012	0.0018	12.7	0.0422
Mar	406	0.00011	0.067	0.00111	29.8	0.00023	0.0020	0.0007	0.0052	0.272	0.9	6.7	0.031	2.3	0.0012	0.0018	12.9	0.0464
Apr	783	0.00010	0.067	0.00107	29.7	0.00022	0.0015	0.0006	0.0051	0.269	0.9	6.6	0.030	2.3	0.0012	0.0018	12.5	0.0401
May	6990	0.00010	0.066	0.00101	29.6	0.00020	0.0004	0.0006	0.0050	0.265	0.9	6.6	0.029	2.3	0.0011	0.0017	11.8	0.0275
Jun	7190	0.00010	0.066	0.00101	29.6	0.00020	0.0004	0.0006	0.0050	0.265	0.9	6.6	0.029	2.3	0.0011	0.0017	11.9	0.0280
Jul	5013	0.00010	0.066	0.00101	29.6	0.00020	0.0005	0.0006	0.0050	0.265	0.9	6.6	0.029	2.3	0.0011	0.0017	11.9	0.0285
Aug	3506	0.00010	0.066	0.00102	29.6	0.00020	0.0005	0.0006	0.0050	0.265	0.9	6.6	0.029	2.3	0.0011	0.0017	11.9	0.0287
Sep	4719	0.00010	0.066	0.00101	29.6	0.00020	0.0004	0.0006	0.0050	0.265	0.9	6.6	0.029	2.3	0.0011	0.0017	11.9	0.0279
Oct	2459	0.00010	0.066	0.00102	29.6	0.00021	0.0005	0.0006	0.0050	0.265	0.9	6.6	0.029	2.3	0.0011	0.0017	11.9	0.0290
Nov	1114	0.00010	0.066	0.00104	29.7	0.00021	0.0008	0.0006	0.0051	0.267	0.9	6.6	0.029	2.3	0.0012	0.0017	12.1	0.0329
Dec	821	0.00010	0.067	0.00105	29.7	0.00022	0.0011	0.0006	0.0051	0.268	0.9	6.6	0.030	2.3	0.0012	0.0017	12.3	0.0357
Total	33959																	

Location X14

	Flows (x 1000 m3)	Ag mg/L	Al mg/L	As mg/L	Ca mg/L	Cd mg/L	Cl mg/L	Co mg/L	Cu mg/L	Fe mg/L	K mg/L	Mg mg/L	Mn mg/L	Na mg/L	Ni mg/L	Pb mg/L	SO4 mg/L	Zn mg/L
Jan	1193	0.00008	0.044	0.00136	25.3	0.00079	0.0010	0.0010	0.0043	0.180	1.6	9.0	0.025	3.7	0.0038	0.0042	42.6	0.0564
Feb	912	0.00007	0.038	0.00139	23.4	0.00090	0.0011	0.0011	0.0040	0.154	1.7	9.2	0.023	3.9	0.0043	0.0046	48.1	0.0608
Mar	981	0.00007	0.034	0.00136	21.7	0.00091	0.0013	0.0011	0.0038	0.140	1.7	8.9	0.022	3.8	0.0043	0.0046	48.3	0.0662
Apr	1784	0.00008	0.048	0.00120	24.7	0.00059	0.0010	0.0009	0.0044	0.194	1.3	7.7	0.025	3.0	0.0028	0.0032	31.1	0.0561
May	14480	0.00010	0.063	0.00102	28.9	0.00025	0.0003	0.0006	0.0049	0.255	1.0	6.7	0.028	2.4	0.0013	0.0019	14.2	0.0301
Jun	14796	0.00010	0.064	0.00103	28.9	0.00025	0.0004	0.0006	0.0049	0.255	1.0	6.7	0.028	2.4	0.0013	0.0019	14.1	0.0313
Jul	10301	0.00010	0.063	0.00104	28.8	0.00027	0.0004	0.0006	0.0049	0.253	1.0	6.8	0.028	2.4	0.0014	0.0020	15.2	0.0326
Aug	7268	0.00010	0.061	0.00105	28.4	0.00030	0.0004	0.0007	0.0048	0.247	1.0	6.8	0.027	2.5	0.0015	0.0021	16.6	0.0326
Sep	9748	0.00010	0.063	0.00104	28.7	0.00027	0.0003	0.0006	0.0049	0.252	1.0	6.8	0.028	2.4	0.0014	0.0020	15.3	0.0311
Oct	5108	0.00009	0.060	0.00107	28.1	0.00034	0.0004	0.0007	0.0048	0.241	1.1	7.0	0.027	2.6	0.0017	0.0023	18.8	0.0334
Nov	2303	0.00009	0.055	0.00119	27.5	0.00050	0.0006	0.0008	0.0047	0.223	1.3	7.8	0.027	3.0	0.0025	0.0030	27.3	0.0434
Dec	1705	0.00009	0.052	0.00128	27.2	0.00062	0.0008	0.0009	0.0047	0.211	1.4	8.4	0.026	3.3	0.0030	0.0035	33.6	0.0504
Total	70579																	

Location Mouth of Rose Creek

	Flows (x 1000 m3)	Ag mg/L	Al mg/L	As mg/L	Ca mg/L	Cd mg/L	Cl mg/L	Co mg/L	Cu mg/L	Fe mg/L	K mg/L	Mg mg/L	Mn mg/L	Na mg/L	Ni mg/L	Pb mg/L	SO4 mg/L	Zn mg/L
Jan	1628	0.00008	0.050	0.00126	26.4	0.00063	0.0008	0.0009	0.0045	0.202	1.4	8.3	0.026	3.3	0.0031	0.0035	34.3	0.0481
Feb	1230	0.00008	0.045	0.00129	25.0	0.00072	0.0009	0.0010	0.0043	0.183	1.5	8.5	0.024	3.5	0.0035	0.0039	38.7	0.0517
Mar	1301	0.00007	0.042	0.00128	23.6	0.00073	0.0010	0.0010	0.0041	0.170	1.5	8.3	0.023	3.4	0.0035	0.0039	39.3	0.0562
Apr	2402	0.00009	0.052	0.00115	26.0	0.00049	0.0008	0.0008	0.0046	0.212	1.2	7.4	0.026	2.8	0.0024	0.0028	26.1	0.0482
May	19992	0.00010	0.064	0.00102	29.1	0.00024	0.0003	0.0006	0.0049	0.257	1.0	6.6	0.028	2.3	0.0013	0.0018	13.5	0.0288
Jun	20466	0.00010	0.064	0.00102	29.1	0.00024	0.0003	0.0006	0.0050	0.258	1.0	6.6	0.028	2.3	0.0013	0.0018	13.4	0.0297
Jul	14254	0.00010	0.064	0.00103	29.0	0.00025	0.0003	0.0006	0.0050	0.256	1.0	6.7	0.028	2.4	0.0013	0.0019	14.3	0.0307
Aug	10032	0.00010	0.063	0.00104	28.7	0.00027	0.0003	0.0006	0.0049	0.251	1.0	6.7	0.028	2.4	0.0014	0.0020	15.3	0.0307
Sep	13469	0.00010	0.064	0.00103	29.0	0.00025	0.0003	0.0006	0.0049	0.255	1.0	6.7	0.028	2.4	0.0013	0.0019	14.3	0.0296
Oct	7047	0.00010	0.062	0.00105	28.5	0.00030	0.0003	0.0007	0.0048	0.247	1.0	6.9	0.027	2.5	0.0016	0.0021	16.8	0.0313
Nov	3181	0.00009	0.058	0.00114	28.1	0.00042	0.0005	0.0008	0.0048	0.234	1.2	7.4	0.027	2.8	0.0021	0.0026	23.0	0.0385
Dec	2352	0.00009	0.056	0.00120	27.8	0.00051	0.0006	0.0008	0.0048	0.226	1.3	7.9	0.027	3.0	0.0025	0.0030	27.6	0.0436
Total	97354																	

Location Mouth of Anvil Creek

	Flows (x 1000 m3)	Ag mg/L	Al mg/L	As mg/L	Ca mg/L	Cd mg/L	Cl mg/L	Co mg/L	Cu mg/L	Fe mg/L	K mg/L	Mg mg/L	Mn mg/L	Na mg/L	Ni mg/L	Pb mg/L	SO4 mg/L	Zn mg/L
Jan	4432	0.00009	0.060	0.00110	28.4	0.00036	0.0004	0.0007	0.0048	0.241	1.1	7.2	0.027	2.7	0.0018	0.0024	20.0	0.0339
Feb	3272	0.00009	0.058	0.00111	27.9	0.00039	0.0005	0.0007	0.0047	0.234	1.1	7.3	0.027	2.7	0.0020	0.0025	21.9	0.0354
Mar	3362	0.00009	0.057	0.00111	27.3	0.00041	0.0005	0.0007	0.0047	0.228	1.1	7.2	0.026	2.7	0.0020	0.0025	22.4	0.0374
Apr	6375	0.00009	0.061	0.00106	28.2	0.00031	0.0004	0.0007	0.0048	0.245	1.0	6.9	0.027	2.5	0.0016	0.0021	17.1	0.0341
May	55468	0.00010	0.065	0.00101	29.4	0.00021	0.0002	0.0006	0.0050	0.262	0.9	6.6	0.028	2.3	0.0012	0.0017	12.4	0.0268
Jun	56956	0.00010	0.065	0.00101	29.4	0.00021	0.0002	0.0006	0.0050	0.262	0.9	6.6	0.028	2.3	0.0012	0.0017	12.3	0.0271
Jul	39693	0.00010	0.065	0.00101	29.4	0.00022	0.0002	0.0006	0.0050	0.261	0.9	6.6	0.028	2.3	0.0012	0.0018	12.6	0.0274
Aug	27824	0.00010	0.065	0.00101	29.3	0.00023	0.0002	0.0006	0.0050	0.260	0.9	6.6	0.028	2.3	0.0012	0.0018	13.0	0.0274
Sep	37419	0.00010	0.065	0.00101	29.4	0.00022	0.0002	0.0006	0.0050	0.261	0.9	6.6	0.028	2.3	0.0012	0.0018	12.6	0.0270
Oct	19528	0.00010	0.064	0.00102	29.2	0.00024	0.0003	0.0006	0.0049	0.258	1.0	6.7	0.028	2.3	0.0013	0.0018	13.6	0.0276
Nov	8835	0.00010	0.063	0.00105	29.0	0.00028	0.0003	0.0007	0.0049	0.253	1.0	6.9	0.028	2.5	0.0015	0.0020	15.8	0.0302
Dec	6515	0.00010	0.062	0.00107	29.0	0.00031	0.0004	0.0007	0.0049	0.250	1.0	7.0	0.028	2.5	0.0016	0.0022	17.4	0.0321
Total	269878																	

SF02 - Faro Mine Site - Sensitivity Assessment - Seepage Collection Efficiency - Waste Rock Area
Conditions FUTURE 2

Location X2

	Flows	Ag	Al	As	Ca	Cd	Cl	Co	Cu	Fe	K	Mg	Mn	Na	Ni	Pb	SO4	Zn
	(x 1000 m3)	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L
Jan	553	0.00010	0.071	0.00110	29.8	0.00028	0.0035	0.0007	0.0056	0.294	0.9	6.8	0.037	2.3	0.0015	0.0019	13.5	0.0851
Feb	403	0.00011	0.072	0.00112	29.9	0.00029	0.0043	0.0008	0.0058	0.301	0.9	6.9	0.038	2.3	0.0015	0.0019	14.0	0.0989
Mar	406	0.00011	0.073	0.00115	29.9	0.00032	0.0054	0.0008	0.0059	0.310	0.9	6.9	0.041	2.4	0.0017	0.0020	14.5	0.1174
Apr	783	0.00011	0.071	0.00111	29.8	0.00028	0.0038	0.0007	0.0057	0.296	0.9	6.8	0.037	2.3	0.0015	0.0019	13.7	0.0896
May	6990	0.00010	0.067	0.00101	29.6	0.00021	0.0007	0.0006	0.0051	0.268	0.9	6.6	0.029	2.3	0.0012	0.0017	12.0	0.0341
Jun	7190	0.00010	0.067	0.00102	29.6	0.00021	0.0008	0.0006	0.0051	0.269	0.9	6.6	0.030	2.3	0.0012	0.0017	12.0	0.0362
Jul	5013	0.00010	0.067	0.00102	29.6	0.00022	0.0009	0.0006	0.0051	0.271	0.9	6.6	0.030	2.3	0.0012	0.0017	12.1	0.0385
Aug	3506	0.00010	0.067	0.00102	29.6	0.00022	0.0010	0.0006	0.0051	0.271	0.9	6.6	0.030	2.3	0.0012	0.0017	12.1	0.0391
Sep	4719	0.00010	0.067	0.00102	29.6	0.00021	0.0008	0.0006	0.0051	0.269	0.9	6.6	0.030	2.3	0.0012	0.0017	12.0	0.0360
Oct	2459	0.00010	0.067	0.00103	29.7	0.00022	0.0011	0.0006	0.0052	0.272	0.9	6.6	0.030	2.3	0.0012	0.0017	12.2	0.0408
Nov	1114	0.00010	0.069	0.00105	29.7	0.00024	0.0020	0.0007	0.0053	0.281	0.9	6.7	0.033	2.3	0.0013	0.0018	12.7	0.0581
Dec	821	0.00010	0.070	0.00108	29.8	0.00026	0.0027	0.0007	0.0055	0.287	0.9	6.7	0.035	2.3	0.0014	0.0018	13.1	0.0704
Total	33959																	

Location X14

	Flows	Ag	Al	As	Ca	Cd	Cl	Co	Cu	Fe	K	Mg	Mn	Na	Ni	Pb	SO4	Zn
	(x 1000 m3)	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L
Jan	1193	0.00008	0.048	0.00143	28.6	0.00084	0.0031	0.0011	0.0050	0.206	1.6	13.6	0.030	3.7	0.0040	0.0043	72.6	0.0937
Feb	912	0.00007	0.042	0.00147	27.3	0.00095	0.0036	0.0012	0.0048	0.185	1.7	14.7	0.030	3.9	0.0046	0.0047	83.8	0.1047
Mar	981	0.00007	0.039	0.00146	25.7	0.00097	0.0042	0.0012	0.0047	0.175	1.7	14.6	0.030	3.9	0.0046	0.0047	84.9	0.1178
Apr	1784	0.00008	0.051	0.00127	26.9	0.00063	0.0032	0.0009	0.0051	0.221	1.3	10.7	0.031	3.1	0.0030	0.0033	50.7	0.0942
May	14480	0.00010	0.064	0.00103	29.2	0.00026	0.0006	0.0006	0.0050	0.258	1.0	7.1	0.029	2.4	0.0013	0.0019	16.7	0.0356
Jun	14796	0.00010	0.064	0.00104	29.2	0.00026	0.0007	0.0006	0.0051	0.260	1.0	7.0	0.029	2.4	0.0013	0.0019	16.5	0.0383
Jul	10301	0.00010	0.064	0.00106	29.2	0.00028	0.0009	0.0007	0.0051	0.259	1.0	7.3	0.029	2.4	0.0015	0.0020	18.8	0.0411
Aug	7268	0.00010	0.062	0.00107	28.9	0.00031	0.0009	0.0007	0.0050	0.253	1.0	7.6	0.029	2.5	0.0016	0.0021	21.6	0.0415
Sep	9748	0.00010	0.063	0.00105	29.1	0.00028	0.0007	0.0007	0.0050	0.256	1.0	7.3	0.029	2.4	0.0015	0.0020	18.9	0.0379
Oct	5108	0.00009	0.061	0.00109	28.9	0.00035	0.0010	0.0007	0.0049	0.247	1.1	8.1	0.029	2.6	0.0018	0.0023	25.8	0.0433
Nov	2303	0.00009	0.057	0.00123	29.1	0.00053	0.0019	0.0009	0.0051	0.238	1.3	10.1	0.030	3.0	0.0026	0.0030	42.3	0.0647
Dec	1705	0.00009	0.055	0.00133	29.5	0.00066	0.0025	0.0010	0.0052	0.232	1.4	11.6	0.031	3.3	0.0032	0.0036	54.7	0.0797
Total	70579																	

Location Mouth of Rose Creek

	Flows	Ag	Al	As	Ca	Cd	Cl	Co	Cu	Fe	K	Mg	Mn	Na	Ni	Pb	SO4	Zn
	(x 1000 m3)	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L
Jan	1628	0.00009	0.053	0.00131	28.8	0.00067	0.0023	0.0010	0.0050	0.221	1.4	11.7	0.030	3.3	0.0032	0.0036	56.3	0.0755
Feb	1230	0.00008	0.048	0.00135	27.9	0.00076	0.0027	0.0010	0.0048	0.205	1.5	12.6	0.029	3.5	0.0037	0.0039	65.2	0.0843
Mar	1301	0.00008	0.045	0.00135	26.7	0.00078	0.0032	0.0010	0.0048	0.197	1.5	12.6	0.029	3.5	0.0037	0.0040	66.9	0.0951
Apr	2402	0.00009	0.055	0.00120	27.6	0.00052	0.0024	0.0008	0.0050	0.232	1.2	9.6	0.030	2.9	0.0025	0.0029	40.7	0.0766
May	19992	0.00010	0.064	0.00103	29.3	0.00024	0.0005	0.0006	0.0050	0.260	1.0	6.9	0.029	2.3	0.0013	0.0018	15.3	0.0329
Jun	20466	0.00010	0.065	0.00103	29.3	0.00024	0.0006	0.0006	0.0050	0.261	1.0	6.9	0.029	2.3	0.0013	0.0018	15.2	0.0348
Jul	14254	0.00010	0.064	0.00104	29.3	0.00026	0.0007	0.0006	0.0051	0.260	1.0	7.1	0.029	2.4	0.0014	0.0019	16.8	0.0368
Aug	10032	0.00010	0.063	0.00105	29.1	0.00028	0.0007	0.0007	0.0050	0.256	1.0	7.3	0.029	2.4	0.0014	0.0020	18.9	0.0371
Sep	13469	0.00010	0.064	0.00104	29.3	0.00026	0.0006	0.0006	0.0050	0.259	1.0	7.1	0.029	2.4	0.0014	0.0019	16.9	0.0345
Oct	7047	0.00010	0.062	0.00106	29.1	0.00031	0.0008	0.0007	0.0050	0.252	1.0	7.7	0.029	2.5	0.0016	0.0021	21.9	0.0385
Nov	3181	0.00009	0.060	0.00117	29.3	0.00044	0.0014	0.0008	0.0051	0.245	1.2	9.1	0.030	2.8	0.0022	0.0026	33.9	0.0539
Dec	2352	0.00009	0.058	0.00124	29.5	0.00053	0.0019	0.0009	0.0051	0.241	1.3	10.2	0.030	3.0	0.0026	0.0030	42.8	0.0648
Total	97354																	

Location Mouth of Anvil Creek

	Flows	Ag	Al	As	Ca	Cd	Cl	Co	Cu	Fe	K	Mg	Mn	Na	Ni	Pb	SO4	Zn
	(x 1000 m3)	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L
Jan	4432	0.00009	0.061	0.00111	29.3	0.00037	0.0010	0.0007	0.0050	0.248	1.1	8.4	0.029	2.7	0.0019	0.0024	28.1	0.0439
Feb	3272	0.00009	0.059	0.00113	29.0	0.00041	0.0011	0.0008	0.0049	0.242	1.1	8.8	0.029	2.7	0.0021	0.0025	31.8	0.0476
Mar	3362	0.00009	0.058	0.00113	28.5	0.00043	0.0014	0.0008	0.0049	0.238	1.1	8.9	0.029	2.7	0.0021	0.0026	33.1	0.0525
Apr	6375	0.00009	0.062	0.00108	28.8	0.00032	0.0010	0.0007	0.0050	0.252	1.0	7.7	0.029	2.5	0.0016	0.0021	22.6	0.0448
May	55468	0.00010	0.065	0.00101	29.5	0.00021	0.0003	0.0006	0.0050	0.263	0.9	6.7	0.028	2.3	0.0012	0.0018	13.0	0.0282
Jun	56956	0.00010	0.065	0.00101	29.5	0.00022	0.0003	0.0006	0.0050	0.263	0.9	6.7	0.028	2.3	0.0012	0.0018	13.0	0.0289
Jul	39693	0.00010	0.065	0.00102	29.5	0.00022	0.0004	0.0006	0.0050	0.263	0.9	6.7	0.029	2.3	0.0012	0.0018	13.6	0.0296
Aug	27824	0.00010	0.065	0.00102	29.4	0.00023	0.0004	0.0006	0.0050	0.261	0.9	6.8	0.028	2.3	0.0012	0.0018	14.3	0.0297
Sep	37419	0.00010	0.065	0.00101	29.5	0.00022	0.0003	0.0006	0.0050	0.262	0.9	6.7	0.028	2.3	0.0012	0.0018	13.6	0.0288
Oct	19528	0.00010	0.065	0.00102	29.4	0.00024	0.0004	0.0006	0.0050	0.260	1.0	6.9	0.028	2.3	0.0013	0.0019	15.4	0.0302
Nov	8835	0.00010	0.064	0.00106	29.5	0.00028	0.0006	0.0007	0.0050	0.257	1.0	7.5	0.029	2.5	0.0015	0.0020	19.7	0.0358
Dec	6515	0.00010	0.063	0.00109	29.6	0.00032	0.0008	0.0007	0.0050	0.256	1.1	7.9	0.029	2.5	0.0016	0.0022	23.0	0.0397
Total	269678																	

SF02 - Faro Mine Site - Sensitivity Assessment - Seepage Collection Efficiency - Waste Rock Area

Conditions: FUTURE 3

Location: X2

	Flows (x 1000 m3)	Ag mg/L	Al mg/L	As mg/L	Ca mg/L	Cd mg/L	Cl mg/L	Co mg/L	Cu mg/L	Fe mg/L	K mg/L	Mg mg/L	Mn mg/L	Na mg/L	Ni mg/L	Pb mg/L	SO4 mg/L	Zn mg/L
Jan	553	0.00016	0.212	0.00925	29.9	0.00292	0.0960	0.0037	0.0560	2.128	0.9	7.2	0.291	2.3	0.0038	0.0026	22.8	2.0012
Feb	403	0.00017	0.246	0.01117	29.9	0.00355	0.1183	0.0044	0.0679	2.563	1.0	7.3	0.353	2.3	0.0044	0.0028	25.4	2.4618
Mar	406	0.00019	0.291	0.01374	30.0	0.00440	0.1482	0.0054	0.0838	3.143	1.0	7.5	0.435	2.3	0.0053	0.0030	28.8	3.0773
Apr	783	0.00016	0.223	0.00988	29.9	0.00313	0.1033	0.0039	0.0599	2.271	0.9	7.2	0.311	2.3	0.0040	0.0026	23.6	2.1526
May	6990	0.00011	0.087	0.00218	29.6	0.00059	0.0139	0.0010	0.0123	0.531	0.9	6.6	0.066	2.3	0.0015	0.0018	13.3	0.3090
Jun	7190	0.00011	0.092	0.00247	29.6	0.00069	0.0173	0.0012	0.0141	0.597	0.9	6.7	0.075	2.3	0.0016	0.0019	13.7	0.3784
Jul	5013	0.00011	0.097	0.00279	29.7	0.00079	0.0210	0.0013	0.0161	0.668	0.9	6.7	0.085	2.3	0.0017	0.0019	14.1	0.4540
Aug	3506	0.00011	0.099	0.00287	29.7	0.00082	0.0220	0.0013	0.0166	0.688	0.9	6.7	0.088	2.3	0.0017	0.0019	14.2	0.4745
Sep	4719	0.00011	0.091	0.00244	29.6	0.00068	0.0169	0.0011	0.0139	0.590	0.9	6.6	0.074	2.3	0.0016	0.0019	13.7	0.3708
Oct	2459	0.00012	0.103	0.00311	29.7	0.00089	0.0247	0.0014	0.0180	0.740	0.9	6.7	0.095	2.3	0.0018	0.0019	14.5	0.5300
Nov	1114	0.00013	0.146	0.00551	29.7	0.00169	0.0526	0.0023	0.0329	1.283	0.9	6.9	0.172	2.3	0.0026	0.0022	17.8	1.1055
Dec	821	0.00014	0.176	0.00722	29.8	0.00225	0.0724	0.0029	0.0434	1.669	0.9	7.0	0.226	2.3	0.0031	0.0024	20.1	1.5143
Total	33959																	

Location: X14

	Flows (x 1000 m3)	Ag mg/L	Al mg/L	As mg/L	Ca mg/L	Cd mg/L	Cl mg/L	Co mg/L	Cu mg/L	Fe mg/L	K mg/L	Mg mg/L	Mn mg/L	Na mg/L	Ni mg/L	Pb mg/L	SO4 mg/L	Zn mg/L
Jan	1193	0.00012	0.142	0.00695	29.9	0.00257	0.0664	0.0031	0.0391	1.441	1.6	25.5	0.203	3.7	0.0056	0.0047	272.9	1.3502
Feb	912	0.00011	0.152	0.00796	28.9	0.00298	0.0779	0.0035	0.0448	1.635	1.7	28.9	0.232	3.9	0.0063	0.0052	322.3	1.5800
Mar	981	0.00012	0.168	0.00908	27.4	0.00336	0.0915	0.0039	0.0518	1.880	1.7	29.1	0.267	3.8	0.0067	0.0053	329.3	1.8516
Apr	1784	0.00012	0.147	0.00690	27.7	0.00240	0.0677	0.0029	0.0399	1.480	1.3	18.5	0.206	3.1	0.0046	0.0037	182.6	1.3750
May	14480	0.00010	0.078	0.00186	29.3	0.00052	0.0101	0.0009	0.0101	0.443	1.0	8.1	0.054	2.4	0.0016	0.0020	33.6	0.2233
Jun	14796	0.00010	0.082	0.00208	29.3	0.00058	0.0126	0.0010	0.0115	0.492	1.0	8.0	0.061	2.4	0.0016	0.0020	32.8	0.2735
Jul	10301	0.00011	0.085	0.00232	29.4	0.00068	0.0153	0.0011	0.0128	0.540	1.0	8.7	0.068	2.4	0.0018	0.0021	42.7	0.3271
Aug	7268	0.00010	0.084	0.00237	29.2	0.00072	0.0158	0.0011	0.0131	0.545	1.0	9.6	0.069	2.5	0.0019	0.0022	54.9	0.3384
Sep	9748	0.00010	0.080	0.00206	29.3	0.00060	0.0123	0.0010	0.0112	0.482	1.0	8.7	0.060	2.4	0.0017	0.0021	43.0	0.2672
Oct	5108	0.00010	0.086	0.00255	29.2	0.00081	0.0177	0.0012	0.0140	0.575	1.1	10.9	0.074	2.6	0.0022	0.0024	72.7	0.3764
Nov	2303	0.00011	0.111	0.00438	29.8	0.00151	0.0380	0.0020	0.0245	0.943	1.3	16.1	0.128	3.0	0.0035	0.0033	143.1	0.7815
Dec	1705	0.00012	0.128	0.00566	30.4	0.00201	0.0520	0.0025	0.0319	1.168	1.4	20.0	0.166	3.3	0.0044	0.0039	195.3	1.0629
Total	70579																	

Location: Mouth of Rose Creek

	Flows (x 1000 m3)	Ag mg/L	Al mg/L	As mg/L	Ca mg/L	Cd mg/L	Cl mg/L	Co mg/L	Cu mg/L	Fe mg/L	K mg/L	Mg mg/L	Mn mg/L	Na mg/L	Ni mg/L	Pb mg/L	SO4 mg/L	Zn mg/L
Jan	1628	0.00011	0.121	0.00536	29.8	0.00193	0.0487	0.0024	0.0300	1.126	1.4	20.5	0.156	3.3	0.0044	0.0039	203.0	0.9957
Feb	1230	0.00011	0.130	0.00616	29.1	0.00227	0.0579	0.0028	0.0346	1.281	1.5	23.2	0.179	3.5	0.0050	0.0043	242.1	1.1788
Mar	1301	0.00011	0.143	0.00709	27.9	0.00258	0.0691	0.0031	0.0403	1.483	1.5	23.6	0.208	3.5	0.0053	0.0044	251.2	1.4024
Apr	2402	0.00011	0.126	0.00539	28.2	0.00183	0.0503	0.0023	0.0309	1.167	1.2	15.4	0.160	2.9	0.0037	0.0032	138.6	1.0282
May	19992	0.00010	0.075	0.00162	29.4	0.00043	0.0074	0.0008	0.0087	0.394	1.0	7.6	0.047	2.3	0.0014	0.0019	27.6	0.1688
Jun	20466	0.00010	0.077	0.00178	29.4	0.00048	0.0092	0.0009	0.0097	0.429	1.0	7.6	0.052	2.3	0.0015	0.0019	26.9	0.2048
Jul	14254	0.00010	0.080	0.00195	29.4	0.00054	0.0111	0.0010	0.0107	0.463	1.0	8.1	0.057	2.4	0.0016	0.0020	34.1	0.2435
Aug	10032	0.00010	0.079	0.00199	29.3	0.00057	0.0115	0.0010	0.0108	0.467	1.0	8.7	0.058	2.4	0.0017	0.0021	43.0	0.2522
Sep	13469	0.00010	0.076	0.00177	29.4	0.00049	0.0089	0.0009	0.0095	0.422	1.0	8.1	0.051	2.4	0.0016	0.0020	34.3	0.2004
Oct	7047	0.00010	0.080	0.00213	29.3	0.00064	0.0129	0.0011	0.0115	0.489	1.0	9.7	0.062	2.5	0.0019	0.0022	55.9	0.2799
Nov	3181	0.00011	0.098	0.00345	29.8	0.00115	0.0275	0.0016	0.0192	0.755	1.2	13.5	0.101	2.8	0.0028	0.0028	106.9	0.5728
Dec	2352	0.00011	0.111	0.00438	30.2	0.00151	0.0378	0.0020	0.0245	0.941	1.3	16.3	0.128	3.0	0.0035	0.0033	144.8	0.7775
Total	97354																	

Location: Mouth of Anvil Creek

	Flows (x 1000 m3)	Ag mg/L	Al mg/L	As mg/L	Ca mg/L	Cd mg/L	Cl mg/L	Co mg/L	Cu mg/L	Fe mg/L	K mg/L	Mg mg/L	Mn mg/L	Na mg/L	Ni mg/L	Pb mg/L	SO4 mg/L	Zn mg/L
Jan	4432	0.00010	0.086	0.00260	29.7	0.00084	0.0180	0.0013	0.0142	0.581	1.1	11.6	0.075	2.7	0.0023	0.0025	82.0	0.3820
Feb	3272	0.00010	0.090	0.00294	29.4	0.00098	0.0219	0.0014	0.0161	0.646	1.1	12.8	0.085	2.7	0.0026	0.0027	98.3	0.4590
Mar	3362	0.00010	0.096	0.00336	28.9	0.00112	0.0269	0.0016	0.0187	0.736	1.1	13.1	0.098	2.7	0.0027	0.0028	104.4	0.5586
Apr	6375	0.00010	0.089	0.00265	29.1	0.00082	0.0191	0.0013	0.0148	0.604	1.0	9.9	0.078	2.5	0.0021	0.0023	59.5	0.4033
May	55468	0.00010	0.069	0.00122	29.5	0.00028	0.0028	0.0007	0.0063	0.311	0.9	6.9	0.035	2.3	0.0012	0.0018	17.4	0.0772
Jun	56956	0.00010	0.070	0.00128	29.5	0.00030	0.0034	0.0007	0.0067	0.323	0.9	6.9	0.037	2.3	0.0012	0.0018	17.2	0.0900
Jul	39693	0.00010	0.071	0.00134	29.5	0.00032	0.0041	0.0007	0.0070	0.336	0.9	7.1	0.039	2.3	0.0013	0.0018	19.7	0.1038
Aug	27824	0.00010	0.071	0.00136	29.5	0.00034	0.0043	0.0007	0.0071	0.337	0.9	7.3	0.039	2.3	0.0013	0.0018	23.0	0.1073
Sep	37419	0.00010	0.070	0.00128	29.5	0.00030	0.0033	0.0007	0.0066	0.321	0.9	7.1	0.037	2.3	0.0013	0.0018	19.9	0.0885
Oct	19528	0.00010	0.071	0.00141	29.5	0.00036	0.0048	0.0008	0.0074	0.345	1.0	7.7	0.040	2.3	0.0014	0.0019	27.7	0.1174
Nov	8835	0.00010	0.078	0.00188	29.7	0.00054	0.0100	0.0010	0.0101	0.441	1.0	9.0	0.054	2.5	0.0017	0.0021	46.0	0.2226
Dec	6515	0.00010	0.082	0.00222	29.8	0.00067	0.0138	0.0011	0.0120	0.509	1.1	10.1	0.064	2.5	0.0020	0.0023	59.7	0.2970
Total	269678																	

SF03 - Faro Mine Site - Sensitivity Assessment - Seepage Collection Efficiency - ETA Area

Conditions FUTURE 1

Location X2

	Flows (x 1000 m3)	Ag mg/L	Al mg/L	As mg/L	Ca mg/L	Cd mg/L	Cl mg/L	Co mg/L	Cu mg/L	Fe mg/L	K mg/L	Mg mg/L	Mn mg/L	Na mg/L	Ni mg/L	Pb mg/L	SO4 mg/L	Zn mg/L
Jan	553	0.00011	0.068	0.00111	29.8	0.00023	0.0021	0.0007	0.0052	0.273	0.9	6.7	0.031	2.3	0.0012	0.0018	12.9	0.0479
Feb	403	0.00011	0.068	0.00113	29.8	0.00024	0.0026	0.0007	0.0053	0.275	0.9	6.7	0.032	2.3	0.0013	0.0018	13.2	0.0531
Mar	407	0.00011	0.069	0.00117	29.9	0.00025	0.0032	0.0007	0.0054	0.278	0.9	6.8	0.033	2.3	0.0013	0.0018	13.5	0.0600
Apr	784	0.00011	0.068	0.00112	29.8	0.00024	0.0023	0.0007	0.0053	0.274	0.9	6.7	0.031	2.3	0.0013	0.0018	13.0	0.0496
May	6991	0.00010	0.066	0.00102	29.6	0.00020	0.0005	0.0006	0.0050	0.265	0.9	6.6	0.029	2.3	0.0011	0.0017	11.9	0.0288
Jun	7191	0.00010	0.066	0.00102	29.6	0.00021	0.0005	0.0006	0.0050	0.266	0.9	6.6	0.029	2.3	0.0011	0.0017	11.9	0.0296
Jul	5013	0.00010	0.066	0.00102	29.6	0.00021	0.0006	0.0006	0.0051	0.266	0.9	6.6	0.029	2.3	0.0011	0.0017	12.0	0.0304
Aug	3506	0.00010	0.066	0.00102	29.6	0.00021	0.0006	0.0006	0.0051	0.266	0.9	6.6	0.029	2.3	0.0011	0.0017	12.0	0.0307
Sep	4720	0.00010	0.066	0.00102	29.6	0.00021	0.0005	0.0006	0.0050	0.266	0.9	6.6	0.029	2.3	0.0011	0.0017	11.9	0.0295
Oct	2460	0.00010	0.066	0.00103	29.6	0.00021	0.0007	0.0006	0.0051	0.266	0.9	6.6	0.029	2.3	0.0011	0.0017	12.0	0.0313
Nov	1115	0.00010	0.067	0.00106	29.7	0.00022	0.0012	0.0006	0.0051	0.269	0.9	6.6	0.030	2.3	0.0012	0.0018	12.4	0.0378
Dec	821	0.00010	0.067	0.00108	29.7	0.00023	0.0016	0.0006	0.0052	0.271	0.9	6.7	0.030	2.3	0.0012	0.0018	12.6	0.0424
Total	33964																	

Location X14

	Flows (x 1000 m3)	Ag mg/L	Al mg/L	As mg/L	Ca mg/L	Cd mg/L	Cl mg/L	Co mg/L	Cu mg/L	Fe mg/L	K mg/L	Mg mg/L	Mn mg/L	Na mg/L	Ni mg/L	Pb mg/L	SO4 mg/L	Zn mg/L
Jan	1192	0.00008	0.048	0.00168	25.2	0.00096	0.0025	0.0011	0.0063	0.212	1.6	8.9	0.030	3.7	0.0040	0.0042	42.4	0.1688
Feb	912	0.00008	0.042	0.00177	23.3	0.00109	0.0029	0.0012	0.0063	0.192	1.7	9.1	0.029	3.9	0.0045	0.0047	47.8	0.1928
Mar	981	0.00007	0.038	0.00181	21.6	0.00114	0.0034	0.0012	0.0065	0.183	1.7	8.9	0.029	3.8	0.0045	0.0046	48.2	0.2214
Apr	1785	0.00009	0.051	0.00154	24.7	0.00076	0.0026	0.0010	0.0064	0.226	1.3	7.7	0.030	3.0	0.0030	0.0033	31.3	0.1707
May	14480	0.00010	0.064	0.00107	28.9	0.00028	0.0006	0.0006	0.0052	0.259	1.0	6.7	0.029	2.4	0.0013	0.0019	14.2	0.0468
Jun	14797	0.00010	0.064	0.00109	28.9	0.00028	0.0006	0.0007	0.0053	0.261	1.0	6.7	0.029	2.4	0.0013	0.0019	14.2	0.0524
Jul	10302	0.00010	0.064	0.00112	28.8	0.00031	0.0007	0.0007	0.0054	0.260	1.0	6.8	0.029	2.4	0.0015	0.0020	15.3	0.0582
Aug	7268	0.00010	0.062	0.00113	28.4	0.00034	0.0008	0.0007	0.0053	0.254	1.0	6.8	0.029	2.5	0.0016	0.0021	16.7	0.0592
Sep	9748	0.00010	0.063	0.00110	28.7	0.00030	0.0006	0.0007	0.0053	0.257	1.0	6.8	0.029	2.4	0.0014	0.0020	15.3	0.0516
Oct	5108	0.00009	0.061	0.00116	28.1	0.00038	0.0008	0.0007	0.0053	0.249	1.1	7.0	0.029	2.6	0.0018	0.0023	18.7	0.0632
Nov	2302	0.00009	0.057	0.00138	27.5	0.00060	0.0015	0.0009	0.0058	0.241	1.3	7.8	0.030	3.0	0.0026	0.0030	27.2	0.1075
Dec	1704	0.00009	0.055	0.00154	27.2	0.00075	0.0020	0.0010	0.0062	0.236	1.4	8.3	0.031	3.3	0.0032	0.0035	33.5	0.1384
Total	70579																	

Location Mouth of Rose Creek

	Flows (x 1000 m3)	Ag mg/L	Al mg/L	As mg/L	Ca mg/L	Cd mg/L	Cl mg/L	Co mg/L	Cu mg/L	Fe mg/L	K mg/L	Mg mg/L	Mn mg/L	Na mg/L	Ni mg/L	Pb mg/L	SO4 mg/L	Zn mg/L
Jan	1628	0.00009	0.052	0.00150	26.4	0.00076	0.0019	0.0010	0.0059	0.226	1.4	8.3	0.030	3.3	0.0032	0.0036	34.2	0.1305
Feb	1229	0.00008	0.048	0.00157	24.9	0.00086	0.0022	0.0011	0.0060	0.210	1.5	8.5	0.029	3.5	0.0036	0.0039	38.5	0.1497
Mar	1301	0.00008	0.045	0.00161	23.6	0.00091	0.0026	0.0011	0.0061	0.203	1.5	8.3	0.029	3.4	0.0037	0.0039	39.2	0.1732
Apr	2402	0.00009	0.055	0.00140	26.0	0.00062	0.0020	0.0009	0.0060	0.236	1.2	7.4	0.030	2.8	0.0025	0.0029	26.3	0.1334
May	19992	0.00010	0.064	0.00105	29.1	0.00025	0.0005	0.0006	0.0052	0.261	1.0	6.6	0.029	2.3	0.0013	0.0018	13.5	0.0410
Jun	20467	0.00010	0.065	0.00106	29.1	0.00026	0.0005	0.0006	0.0052	0.262	1.0	6.6	0.029	2.3	0.0013	0.0018	13.5	0.0450
Jul	14255	0.00010	0.064	0.00109	29.0	0.00028	0.0006	0.0007	0.0053	0.261	1.0	6.7	0.029	2.4	0.0014	0.0019	14.3	0.0492
Aug	10032	0.00010	0.063	0.00109	28.7	0.00030	0.0006	0.0007	0.0052	0.257	1.0	6.7	0.029	2.4	0.0014	0.0020	15.3	0.0499
Sep	13469	0.00010	0.064	0.00107	29.0	0.00027	0.0005	0.0006	0.0052	0.259	1.0	6.7	0.029	2.4	0.0013	0.0019	14.3	0.0444
Oct	7047	0.00010	0.062	0.00111	28.5	0.00033	0.0006	0.0007	0.0052	0.253	1.0	6.9	0.028	2.5	0.0016	0.0021	16.8	0.0529
Nov	3181	0.00009	0.060	0.00127	28.1	0.00049	0.0012	0.0008	0.0056	0.247	1.2	7.4	0.029	2.8	0.0022	0.0026	22.9	0.0849
Dec	2351	0.00009	0.058	0.00139	27.8	0.00060	0.0015	0.0009	0.0059	0.244	1.3	7.8	0.030	3.0	0.0026	0.0030	27.5	0.1074
Total	97354																	

Location Mouth of Anvil Creek

	Flows (x 1000 m3)	Ag mg/L	Al mg/L	As mg/L	Ca mg/L	Cd mg/L	Cl mg/L	Co mg/L	Cu mg/L	Fe mg/L	K mg/L	Mg mg/L	Mn mg/L	Na mg/L	Ni mg/L	Pb mg/L	SO4 mg/L	Zn mg/L
Jan	4432	0.00010	0.061	0.00118	28.4	0.00040	0.0008	0.0007	0.0053	0.250	1.1	7.2	0.029	2.6	0.0019	0.0024	20.0	0.0641
Feb	3271	0.00009	0.059	0.00122	27.8	0.00045	0.0010	0.0008	0.0054	0.244	1.1	7.3	0.029	2.7	0.0020	0.0025	21.8	0.0722
Mar	3362	0.00009	0.058	0.00124	27.3	0.00047	0.0011	0.0008	0.0054	0.241	1.1	7.2	0.029	2.7	0.0021	0.0026	22.4	0.0827
Apr	6375	0.00010	0.062	0.00115	28.2	0.00036	0.0009	0.0007	0.0054	0.254	1.0	6.9	0.029	2.5	0.0016	0.0021	17.2	0.0662
May	55468	0.00010	0.065	0.00102	29.4	0.00022	0.0003	0.0006	0.0051	0.263	0.9	6.6	0.028	2.3	0.0012	0.0018	12.4	0.0311
Jun	56958	0.00010	0.065	0.00102	29.4	0.00022	0.0003	0.0006	0.0051	0.263	0.9	6.6	0.028	2.3	0.0012	0.0017	12.3	0.0326
Jul	39693	0.00010	0.065	0.00103	29.4	0.00023	0.0003	0.0006	0.0051	0.263	0.9	6.6	0.029	2.3	0.0012	0.0018	12.7	0.0341
Aug	27824	0.00010	0.065	0.00103	29.3	0.00024	0.0003	0.0006	0.0051	0.261	0.9	6.6	0.028	2.3	0.0012	0.0018	13.0	0.0344
Sep	37419	0.00010	0.065	0.00103	29.4	0.00023	0.0003	0.0006	0.0051	0.262	0.9	6.6	0.028	2.3	0.0012	0.0018	12.7	0.0324
Oct	19527	0.00010	0.065	0.00104	29.2	0.00025	0.0004	0.0006	0.0051	0.260	1.0	6.7	0.028	2.3	0.0013	0.0018	13.6	0.0354
Nov	8834	0.00010	0.064	0.00110	29.0	0.00030	0.0005	0.0007	0.0052	0.258	1.0	6.9	0.029	2.5	0.0015	0.0020	15.8	0.0469
Dec	6515	0.00010	0.063	0.00114	29.0	0.00034	0.0007	0.0007	0.0053	0.257	1.0	7.0	0.029	2.5	0.0016	0.0022	17.4	0.0551
Total	269678																	

SF03 - Faro Mine Site - Sensitivity Assessment - Seepage Collection Efficiency - ETA Area
Conditions FUTURE 2

Location X2

	Flows (x 1000 m3)	Ag mg/L	Al mg/L	As mg/L	Ca mg/L	Cd mg/L	Cl mg/L	Co mg/L	Cu mg/L	Fe mg/L	K mg/L	Mg mg/L	Mn mg/L	Na mg/L	Ni mg/L	Pb mg/L	SO4 mg/L	Zn mg/L
Jan	553	0.00011	0.075	0.00116	29.9	0.00033	0.0058	0.0008	0.0061	0.318	0.9	6.9	0.042	2.4	0.0017	0.0020	14.5	0.1301
Feb	403	0.00011	0.077	0.00120	30.0	0.00036	0.0071	0.0009	0.0063	0.330	0.9	7.0	0.045	2.4	0.0018	0.0021	15.2	0.1544
Mar	407	0.00011	0.080	0.00125	30.1	0.00040	0.0088	0.0010	0.0067	0.347	0.9	7.2	0.049	2.4	0.0020	0.0022	16.1	0.1869
Apr	784	0.00011	0.075	0.00117	30.0	0.00034	0.0062	0.0008	0.0062	0.322	0.9	7.0	0.043	2.4	0.0017	0.0020	14.7	0.1381
May	6991	0.00010	0.067	0.00102	29.6	0.00022	0.0010	0.0006	0.0052	0.272	0.9	6.6	0.030	2.3	0.0012	0.0017	12.1	0.0406
Jun	7191	0.00010	0.067	0.00103	29.7	0.00022	0.0012	0.0006	0.0052	0.274	0.9	6.6	0.031	2.3	0.0012	0.0018	12.2	0.0443
Jul	5013	0.00010	0.068	0.00103	29.7	0.00023	0.0014	0.0006	0.0052	0.276	0.9	6.6	0.031	2.3	0.0012	0.0018	12.3	0.0483
Aug	3506	0.00010	0.068	0.00104	29.7	0.00023	0.0015	0.0007	0.0052	0.276	0.9	6.6	0.031	2.3	0.0012	0.0018	12.4	0.0493
Sep	4720	0.00010	0.067	0.00103	29.7	0.00022	0.0012	0.0006	0.0052	0.273	0.9	6.6	0.031	2.3	0.0012	0.0018	12.2	0.0439
Oct	2460	0.00010	0.068	0.00104	29.7	0.00023	0.0016	0.0007	0.0053	0.278	0.9	6.6	0.032	2.3	0.0013	0.0018	12.4	0.0523
Nov	1115	0.00010	0.071	0.00109	29.8	0.00027	0.0033	0.0007	0.0056	0.293	0.9	6.8	0.036	2.3	0.0014	0.0019	13.3	0.0827
Dec	821	0.00011	0.073	0.00112	29.9	0.00030	0.0044	0.0008	0.0058	0.304	0.9	6.8	0.039	2.3	0.0016	0.0019	13.8	0.1043
Total	33964																	

Location X14

	Flows (x 1000 m3)	Ag mg/L	Al mg/L	As mg/L	Ca mg/L	Cd mg/L	Cl mg/L	Co mg/L	Cu mg/L	Fe mg/L	K mg/L	Mg mg/L	Mn mg/L	Na mg/L	Ni mg/L	Pb mg/L	SO4 mg/L	Zn mg/L
Jan	1192	0.00009	0.058	0.00197	28.5	0.00110	0.0098	0.0014	0.0087	0.304	1.6	13.5	0.049	3.8	0.0046	0.0045	72.0	0.2873
Feb	912	0.00008	0.054	0.00211	27.2	0.00126	0.0115	0.0015	0.0092	0.300	1.7	14.6	0.052	4.0	0.0052	0.0050	83.1	0.3319
Mar	981	0.00008	0.053	0.00221	25.6	0.00134	0.0135	0.0016	0.0099	0.310	1.7	14.5	0.056	3.9	0.0053	0.0050	84.5	0.3848
Apr	1785	0.00009	0.062	0.00183	26.9	0.00091	0.0100	0.0012	0.0089	0.320	1.3	10.7	0.050	3.1	0.0036	0.0035	51.2	0.2913
May	14480	0.00010	0.065	0.00112	29.2	0.00030	0.0016	0.0007	0.0056	0.273	1.0	7.1	0.032	2.4	0.0014	0.0019	16.8	0.0645
Jun	14797	0.00010	0.066	0.00114	29.2	0.00031	0.0020	0.0007	0.0058	0.279	1.0	7.1	0.033	2.4	0.0014	0.0019	16.7	0.0745
Jul	10302	0.00010	0.066	0.00118	29.2	0.00034	0.0024	0.0007	0.0059	0.281	1.0	7.3	0.033	2.4	0.0016	0.0021	19.0	0.0852
Aug	7268	0.00010	0.065	0.00120	28.9	0.00037	0.0025	0.0007	0.0059	0.276	1.0	7.6	0.033	2.5	0.0017	0.0022	21.7	0.0872
Sep	9748	0.00010	0.065	0.00115	29.1	0.00033	0.0020	0.0007	0.0057	0.274	1.0	7.3	0.032	2.4	0.0015	0.0020	19.0	0.0732
Oct	5108	0.00010	0.064	0.00123	28.9	0.00042	0.0028	0.0008	0.0059	0.273	1.1	8.1	0.034	2.6	0.0019	0.0023	25.7	0.0946
Nov	2302	0.00009	0.063	0.00154	29.1	0.00068	0.0057	0.0010	0.0072	0.294	1.3	10.1	0.041	3.0	0.0029	0.0031	42.2	0.1751
Dec	1704	0.00009	0.063	0.00176	29.4	0.00087	0.0077	0.0012	0.0081	0.308	1.4	11.6	0.046	3.4	0.0036	0.0037	54.4	0.2311
Total	70579																	

Location Mouth of Rose Creek

	Flows (x 1000 m3)	Ag mg/L	Al mg/L	As mg/L	Ca mg/L	Cd mg/L	Cl mg/L	Co mg/L	Cu mg/L	Fe mg/L	K mg/L	Mg mg/L	Mn mg/L	Na mg/L	Ni mg/L	Pb mg/L	SO4 mg/L	Zn mg/L
Jan	1628	0.00009	0.060	0.00171	28.8	0.00086	0.0073	0.0012	0.0077	0.293	1.4	11.6	0.044	3.4	0.0036	0.0038	55.9	0.2172
Feb	1229	0.00009	0.057	0.00182	27.8	0.00099	0.0086	0.0013	0.0081	0.290	1.5	12.5	0.046	3.5	0.0041	0.0041	64.6	0.2528
Mar	1301	0.00008	0.056	0.00191	26.6	0.00106	0.0102	0.0013	0.0087	0.299	1.5	12.5	0.049	3.5	0.0043	0.0042	66.6	0.2964
Apr	2402	0.00009	0.063	0.00162	27.6	0.00073	0.0075	0.0011	0.0079	0.306	1.2	9.7	0.044	2.9	0.0029	0.0031	41.1	0.2230
May	19992	0.00010	0.066	0.00108	29.3	0.00027	0.0012	0.0007	0.0054	0.271	1.0	6.9	0.031	2.3	0.0013	0.0019	15.4	0.0538
Jun	20467	0.00010	0.066	0.00110	29.3	0.00028	0.0015	0.0007	0.0056	0.275	1.0	6.9	0.031	2.3	0.0014	0.0019	15.3	0.0610
Jul	14255	0.00010	0.066	0.00113	29.3	0.00030	0.0018	0.0007	0.0057	0.276	1.0	7.1	0.032	2.4	0.0014	0.0020	17.0	0.0686
Aug	10032	0.00010	0.065	0.00114	29.1	0.00032	0.0018	0.0007	0.0056	0.273	1.0	7.3	0.032	2.4	0.0015	0.0020	18.9	0.0702
Sep	13469	0.00010	0.065	0.00111	29.3	0.00029	0.0015	0.0007	0.0055	0.271	1.0	7.1	0.031	2.4	0.0014	0.0019	17.0	0.0600
Oct	7047	0.00010	0.064	0.00117	29.1	0.00036	0.0020	0.0007	0.0057	0.271	1.0	7.6	0.032	2.5	0.0017	0.0022	21.9	0.0756
Nov	3181	0.00010	0.064	0.00139	29.2	0.00055	0.0042	0.0009	0.0066	0.285	1.2	9.1	0.037	2.8	0.0024	0.0027	33.8	0.1338
Dec	2351	0.00010	0.064	0.00155	29.5	0.00068	0.0057	0.0010	0.0073	0.296	1.3	10.2	0.041	3.1	0.0029	0.0032	42.7	0.1745
Total	97354																	

Location Mouth of Anvil Creek

	Flows (x 1000 m3)	Ag mg/L	Al mg/L	As mg/L	Ca mg/L	Cd mg/L	Cl mg/L	Co mg/L	Cu mg/L	Fe mg/L	K mg/L	Mg mg/L	Mn mg/L	Na mg/L	Ni mg/L	Pb mg/L	SO4 mg/L	Zn mg/L
Jan	4432	0.00010	0.064	0.00126	29.3	0.00044	0.0028	0.0008	0.0060	0.275	1.1	8.4	0.034	2.7	0.0020	0.0025	27.9	0.0960
Feb	3271	0.00009	0.063	0.00131	28.9	0.00050	0.0033	0.0009	0.0062	0.274	1.1	8.8	0.035	2.7	0.0022	0.0026	31.6	0.1110
Mar	3362	0.00009	0.062	0.00135	28.4	0.00053	0.0041	0.0009	0.0064	0.278	1.1	8.8	0.036	2.7	0.0023	0.0027	33.0	0.1304
Apr	6375	0.00010	0.065	0.00123	28.8	0.00040	0.0030	0.0008	0.0061	0.280	1.0	7.7	0.034	2.5	0.0018	0.0022	22.8	0.1000
May	55468	0.00010	0.066	0.00103	29.5	0.00023	0.0006	0.0006	0.0052	0.266	0.9	6.7	0.029	2.3	0.0012	0.0018	13.0	0.0358
Jun	56958	0.00010	0.066	0.00104	29.5	0.00023	0.0007	0.0006	0.0052	0.268	0.9	6.7	0.029	2.3	0.0012	0.0018	13.0	0.0383
Jul	39693	0.00010	0.066	0.00105	29.5	0.00024	0.0008	0.0006	0.0052	0.268	0.9	6.7	0.030	2.3	0.0012	0.0018	13.6	0.0411
Aug	27824	0.00010	0.066	0.00105	29.4	0.00024	0.0008	0.0006	0.0052	0.267	0.9	6.8	0.030	2.3	0.0013	0.0018	14.3	0.0417
Sep	37419	0.00010	0.066	0.00104	29.5	0.00023	0.0007	0.0006	0.0052	0.267	0.9	6.7	0.029	2.3	0.0012	0.0018	13.6	0.0380
Oct	19527	0.00010	0.065	0.00106	29.4	0.00026	0.0009	0.0006	0.0052	0.267	1.0	6.9	0.030	2.3	0.0013	0.0019	15.4	0.0437
Nov	8834	0.00010	0.065	0.00114	29.5	0.00032	0.0016	0.0007	0.0056	0.272	1.0	7.5	0.032	2.5	0.0016	0.0021	19.7	0.0646
Dec	6515	0.00010	0.065	0.00120	29.6	0.00037	0.0022	0.0008	0.0058	0.276	1.1	7.9	0.033	2.6	0.0018	0.0022	22.9	0.0793
Total	269678																	

SF03 - Faro Mine Site - Sensitivity Assessment - Seepage Collection Efficiency - ETA Area

Conditions FUTURE 3

Location X2

	Flows (x 1000 m3)	Ag mg/L	Al mg/L	As mg/L	Ca mg/L	Cd mg/L	Cl mg/L	Co mg/L	Cu mg/L	Fe mg/L	K mg/L	Mg mg/L	Mn mg/L	Na mg/L	Ni mg/L	Pb mg/L	SO4 mg/L	Zn mg/L
Jan	553	0.00021	0.333	0.01637	30.0	0.00521	0.1770	0.0063	0.0996	3.715	1.0	7.7	0.513	2.3	0.0059	0.0032	31.7	3.6587
Feb	403	0.00023	0.395	0.01994	30.1	0.00638	0.2181	0.0076	0.1217	4.519	1.0	7.9	0.626	2.4	0.0070	0.0035	36.3	4.5052
Mar	407	0.00027	0.478	0.02473	30.3	0.00794	0.2732	0.0094	0.1511	5.593	1.0	8.3	0.777	2.4	0.0085	0.0040	42.5	5.6360
Apr	784	0.00022	0.353	0.01754	30.1	0.00560	0.1905	0.0067	0.1069	3.979	1.0	7.7	0.550	2.4	0.0062	0.0033	33.2	3.9369
May	6991	0.00012	0.104	0.00321	29.7	0.00092	0.0256	0.0014	0.0186	0.759	0.9	6.7	0.098	2.3	0.0018	0.0019	14.6	0.5470
Jun	7191	0.00012	0.114	0.00374	29.7	0.00110	0.0318	0.0016	0.0219	0.880	0.9	6.7	0.115	2.3	0.0020	0.0020	15.3	0.6746
Jul	5013	0.00012	0.124	0.00433	29.7	0.00129	0.0385	0.0018	0.0255	1.013	0.9	6.8	0.134	2.3	0.0021	0.0020	16.0	0.8138
Aug	3506	0.00012	0.127	0.00449	29.7	0.00134	0.0404	0.0019	0.0265	1.048	0.9	6.8	0.139	2.3	0.0022	0.0020	16.3	0.8514
Sep	4720	0.00012	0.113	0.00369	29.7	0.00108	0.0311	0.0016	0.0215	0.867	0.9	6.7	0.113	2.3	0.0019	0.0020	15.2	0.6607
Oct	2460	0.00013	0.134	0.00492	29.7	0.00148	0.0453	0.0021	0.0292	1.145	0.9	6.8	0.152	2.3	0.0023	0.0021	16.8	0.9535
Nov	1115	0.00016	0.212	0.00940	29.8	0.00294	0.0968	0.0037	0.0567	2.151	0.9	7.1	0.293	2.3	0.0037	0.0025	22.6	2.0121
Dec	821	0.00018	0.267	0.01258	29.9	0.00398	0.1334	0.0049	0.0763	2.864	1.0	7.4	0.394	2.3	0.0047	0.0028	26.8	2.7636
Total	33964																	

Location X14

	Flows (x 1000 m3)	Ag mg/L	Al mg/L	As mg/L	Ca mg/L	Cd mg/L	Cl mg/L	Co mg/L	Cu mg/L	Fe mg/L	K mg/L	Mg mg/L	Mn mg/L	Na mg/L	Ni mg/L	Pb mg/L	SO4 mg/L	Zn mg/L
Jan	1192	0.00019	0.322	0.01777	29.8	0.00590	0.1914	0.0069	0.1060	3.806	1.6	25.2	0.538	3.8	0.0087	0.0056	272.5	3.7658
Feb	912	0.00020	0.364	0.02066	28.8	0.00690	0.2248	0.0080	0.1235	4.412	1.7	28.5	0.626	4.0	0.0100	0.0063	321.6	4.4170
Mar	981	0.00022	0.417	0.02401	27.3	0.00796	0.2641	0.0092	0.1442	5.143	1.7	28.8	0.731	3.9	0.0111	0.0066	330.9	5.1848
Apr	1785	0.00019	0.330	0.01792	27.8	0.00580	0.1950	0.0068	0.1080	3.888	1.3	18.6	0.548	3.1	0.0078	0.0047	187.1	3.8354
May	14480	0.00011	0.105	0.00347	29.3	0.00101	0.0287	0.0015	0.0201	0.796	1.0	8.1	0.104	2.4	0.0020	0.0021	34.4	0.5838
Jun	14797	0.00012	0.115	0.00410	29.3	0.00121	0.0360	0.0017	0.0240	0.934	1.0	8.0	0.124	2.4	0.0022	0.0022	34.2	0.7252
Jul	10302	0.00012	0.126	0.00478	29.4	0.00144	0.0437	0.0020	0.0281	1.078	1.0	8.8	0.145	2.4	0.0025	0.0023	44.1	0.8765
Aug	7268	0.00012	0.127	0.00493	29.2	0.00151	0.0454	0.0021	0.0289	1.103	1.0	9.6	0.149	2.5	0.0027	0.0024	55.8	0.9090
Sep	9748	0.00012	0.113	0.00403	29.3	0.00120	0.0351	0.0017	0.0234	0.913	1.0	8.7	0.121	2.4	0.0023	0.0022	43.8	0.7076
Oct	5108	0.00012	0.133	0.00542	29.2	0.00169	0.0509	0.0022	0.0317	1.201	1.1	10.8	0.163	2.6	0.0030	0.0026	73.0	1.0164
Nov	2302	0.00015	0.214	0.01055	29.8	0.00342	0.1093	0.0042	0.0627	2.291	1.3	16.0	0.320	3.0	0.0053	0.0038	143.8	2.1591
Dec	1704	0.00017	0.269	0.01412	30.4	0.00462	0.1498	0.0055	0.0843	3.048	1.4	19.8	0.428	3.4	0.0069	0.0046	196.0	2.9526
Total	70579																	

Location Mouth of Rose Creek

	Flows (x 1000 m3)	Ag mg/L	Al mg/L	As mg/L	Ca mg/L	Cd mg/L	Cl mg/L	Co mg/L	Cu mg/L	Fe mg/L	K mg/L	Mg mg/L	Mn mg/L	Na mg/L	Ni mg/L	Pb mg/L	SO4 mg/L	Zn mg/L
Jan	1628	0.00016	0.253	0.01328	29.7	0.00438	0.1402	0.0052	0.0790	2.858	1.4	20.2	0.402	3.4	0.0067	0.0046	202.7	2.7646
Feb	1229	0.00017	0.287	0.01558	29.0	0.00517	0.1668	0.0061	0.0929	3.341	1.5	22.9	0.472	3.5	0.0077	0.0051	241.6	3.2832
Mar	1301	0.00019	0.330	0.01835	27.8	0.00605	0.1991	0.0071	0.1099	3.942	1.5	23.4	0.558	3.5	0.0086	0.0054	252.4	3.9153
Apr	2402	0.00017	0.262	0.01357	28.2	0.00436	0.1450	0.0052	0.0816	2.957	1.2	15.5	0.415	2.9	0.0061	0.0039	142.0	2.8563
May	19992	0.00011	0.094	0.00279	29.4	0.00079	0.0209	0.0013	0.0159	0.649	1.0	7.6	0.083	2.3	0.0018	0.0020	28.2	0.4299
Jun	20467	0.00011	0.102	0.00324	29.4	0.00093	0.0261	0.0014	0.0187	0.748	1.0	7.6	0.097	2.3	0.0019	0.0020	27.9	0.5314
Jul	14255	0.00012	0.109	0.00373	29.4	0.00109	0.0316	0.0016	0.0217	0.852	1.0	8.1	0.112	2.4	0.0021	0.0021	35.1	0.6405
Aug	10032	0.00012	0.110	0.00385	29.3	0.00115	0.0329	0.0017	0.0223	0.872	1.0	8.7	0.116	2.4	0.0023	0.0022	43.6	0.6656
Sep	13469	0.00011	0.100	0.00319	29.4	0.00093	0.0254	0.0014	0.0183	0.734	1.0	8.1	0.096	2.4	0.0020	0.0021	34.9	0.5192
Oct	7047	0.00012	0.115	0.00420	29.3	0.00128	0.0369	0.0018	0.0244	0.943	1.0	9.6	0.126	2.5	0.0025	0.0024	56.2	0.7438
Nov	3181	0.00014	0.173	0.00791	29.7	0.00253	0.0792	0.0032	0.0468	1.731	1.2	13.4	0.239	2.8	0.0041	0.0032	107.3	1.5699
Dec	2351	0.00015	0.213	0.01051	30.2	0.00341	0.1087	0.0042	0.0624	2.282	1.3	16.2	0.318	3.1	0.0053	0.0038	145.3	2.1472
Total	97354																	

Location Mouth of Anvil Creek

	Flows (x 1000 m3)	Ag mg/L	Al mg/L	As mg/L	Ca mg/L	Cd mg/L	Cl mg/L	Co mg/L	Cu mg/L	Fe mg/L	K mg/L	Mg mg/L	Mn mg/L	Na mg/L	Ni mg/L	Pb mg/L	SO4 mg/L	Zn mg/L
Jan	4432	0.00012	0.135	0.00551	29.6	0.00173	0.0516	0.0023	0.0322	1.217	1.1	11.6	0.165	2.7	0.0031	0.0028	81.8	1.0316
Feb	3271	0.00013	0.149	0.00648	29.4	0.00207	0.0628	0.0027	0.0380	1.420	1.1	12.7	0.195	2.7	0.0036	0.0030	98.1	1.2495
Mar	3362	0.00013	0.168	0.00771	28.9	0.00247	0.0772	0.0031	0.0456	1.688	1.1	13.0	0.233	2.7	0.0040	0.0031	104.9	1.5310
Apr	6375	0.00013	0.140	0.00574	29.1	0.00177	0.0547	0.0023	0.0338	1.279	1.0	9.9	0.174	2.5	0.0030	0.0025	60.8	1.0922
May	55468	0.00010	0.076	0.00165	29.5	0.00041	0.0077	0.0008	0.0089	0.403	0.9	6.9	0.048	2.3	0.0013	0.0018	17.6	0.1713
Jun	56958	0.00010	0.079	0.00180	29.5	0.00046	0.0095	0.0009	0.0099	0.438	0.9	6.9	0.053	2.3	0.0014	0.0018	17.5	0.2073
Jul	39693	0.00011	0.081	0.00198	29.5	0.00052	0.0115	0.0010	0.0110	0.475	0.9	7.1	0.059	2.3	0.0015	0.0019	20.1	0.2464
Aug	27824	0.00011	0.082	0.00203	29.5	0.00054	0.0120	0.0010	0.0112	0.483	0.9	7.3	0.060	2.3	0.0015	0.0019	23.2	0.2564
Sep	37419	0.00010	0.078	0.00179	29.5	0.00046	0.0093	0.0009	0.0098	0.433	0.9	7.1	0.053	2.3	0.0014	0.0018	20.1	0.2033
Oct	19527	0.00011	0.084	0.00216	29.5	0.00059	0.0135	0.0010	0.0120	0.509	1.0	7.7	0.064	2.3	0.0016	0.0019	27.8	0.2848
Nov	8634	0.00011	0.104	0.00349	29.6	0.00104	0.0286	0.0015	0.0200	0.792	1.0	9.0	0.104	2.5	0.0022	0.0022	46.1	0.5816
Dec	6515	0.00012	0.119	0.00443	29.8	0.00136	0.0393	0.0019	0.0257	0.992	1.1	10.0	0.133	2.6	0.0026	0.0025	59.9	0.7913
Total	269678																	

SF04 - Faro Mine Site - Sensitivity Assessment - Seepage Collection Efficiency - ETA Area

Conditions FUTURE 1

Location X2

	Flows (x 1000 m3)	Ag mg/L	Al mg/L	As mg/L	Ca mg/L	Cd mg/L	Cl mg/L	Co mg/L	Cu mg/L	Fe mg/L	K mg/L	Mg mg/L	Mn mg/L	Na mg/L	Ni mg/L	Pb mg/L	SO4 mg/L	Zn mg/L
Jan	553	0.00011	0.068	0.00111	29.8	0.00023	0.0021	0.0007	0.0052	0.273	0.9	6.7	0.031	2.3	0.0012	0.0018	12.9	0.0479
Feb	403	0.00011	0.068	0.00113	29.8	0.00024	0.0026	0.0007	0.0053	0.275	0.9	6.7	0.032	2.3	0.0013	0.0018	13.2	0.0531
Mar	407	0.00011	0.069	0.00117	29.9	0.00025	0.0032	0.0007	0.0054	0.278	0.9	6.8	0.033	2.3	0.0013	0.0018	13.5	0.0600
Apr	784	0.00011	0.068	0.00112	29.8	0.00024	0.0023	0.0007	0.0053	0.274	0.9	6.7	0.031	2.3	0.0013	0.0018	13.0	0.0496
May	6991	0.00010	0.066	0.00102	29.6	0.00020	0.0005	0.0006	0.0050	0.265	0.9	6.6	0.029	2.3	0.0011	0.0017	11.9	0.0288
Jun	7191	0.00010	0.066	0.00102	29.6	0.00021	0.0005	0.0006	0.0050	0.266	0.9	6.6	0.029	2.3	0.0011	0.0017	11.9	0.0296
Jul	5013	0.00010	0.066	0.00102	29.6	0.00021	0.0006	0.0006	0.0051	0.266	0.9	6.6	0.029	2.3	0.0011	0.0017	12.0	0.0304
Aug	3506	0.00010	0.066	0.00102	29.6	0.00021	0.0006	0.0006	0.0051	0.266	0.9	6.6	0.029	2.3	0.0011	0.0017	12.0	0.0307
Sep	4720	0.00010	0.066	0.00102	29.6	0.00021	0.0005	0.0006	0.0050	0.266	0.9	6.6	0.029	2.3	0.0011	0.0017	11.9	0.0295
Oct	2460	0.00010	0.066	0.00103	29.6	0.00021	0.0007	0.0006	0.0051	0.266	0.9	6.6	0.029	2.3	0.0011	0.0017	12.0	0.0313
Nov	1115	0.00010	0.067	0.00106	29.7	0.00022	0.0012	0.0006	0.0051	0.269	0.9	6.6	0.030	2.3	0.0012	0.0018	12.4	0.0378
Dec	821	0.00010	0.067	0.00108	29.7	0.00023	0.0016	0.0006	0.0052	0.271	0.9	6.7	0.030	2.3	0.0012	0.0018	12.6	0.0424
Total	33964																	

Location X14

	Flows (x 1000 m3)	Ag mg/L	Al mg/L	As mg/L	Ca mg/L	Cd mg/L	Cl mg/L	Co mg/L	Cu mg/L	Fe mg/L	K mg/L	Mg mg/L	Mn mg/L	Na mg/L	Ni mg/L	Pb mg/L	SO4 mg/L	Zn mg/L
Jan	1192	0.00008	0.044	0.00134	25.3	0.00077	0.0012	0.0010	0.0042	0.178	1.6	9.0	0.024	3.7	0.0038	0.0042	42.6	0.0469
Feb	912	0.00007	0.038	0.00137	23.4	0.00088	0.0013	0.0011	0.0038	0.152	1.7	9.2	0.023	3.9	0.0043	0.0046	48.0	0.0497
Mar	981	0.00007	0.034	0.00134	21.7	0.00089	0.0015	0.0011	0.0036	0.137	1.7	8.9	0.021	3.8	0.0043	0.0046	48.3	0.0531
Apr	1784	0.00008	0.048	0.00118	24.7	0.00057	0.0012	0.0008	0.0042	0.193	1.3	7.7	0.024	3.0	0.0028	0.0032	31.1	0.0464
May	14480	0.00010	0.063	0.00102	28.9	0.00025	0.0003	0.0006	0.0049	0.254	1.0	6.7	0.028	2.4	0.0013	0.0019	14.2	0.0286
Jun	14796	0.00010	0.064	0.00102	28.9	0.00025	0.0004	0.0006	0.0049	0.255	1.0	6.7	0.028	2.4	0.0013	0.0019	14.1	0.0296
Jul	10301	0.00010	0.063	0.00104	28.8	0.00027	0.0004	0.0006	0.0049	0.252	1.0	6.8	0.028	2.4	0.0014	0.0020	15.2	0.0305
Aug	7268	0.00010	0.061	0.00105	28.4	0.00029	0.0004	0.0007	0.0048	0.246	1.0	6.8	0.027	2.5	0.0015	0.0021	16.6	0.0304
Sep	9748	0.00010	0.063	0.00103	28.7	0.00027	0.0004	0.0006	0.0049	0.251	1.0	6.8	0.028	2.4	0.0014	0.0020	15.3	0.0294
Oct	5108	0.00009	0.060	0.00107	28.1	0.00033	0.0005	0.0007	0.0047	0.240	1.1	7.0	0.027	2.6	0.0017	0.0023	18.7	0.0309
Nov	2303	0.00009	0.055	0.00118	27.5	0.00049	0.0008	0.0008	0.0046	0.222	1.3	7.8	0.027	3.0	0.0025	0.0030	27.2	0.0380
Dec	1705	0.00009	0.052	0.00126	27.2	0.00061	0.0010	0.0009	0.0045	0.210	1.4	8.4	0.026	3.3	0.0030	0.0035	33.6	0.0430
Total	70579																	

Location Mouth of Rose Creek

	Flows (x 1000 m3)	Ag mg/L	Al mg/L	As mg/L	Ca mg/L	Cd mg/L	Cl mg/L	Co mg/L	Cu mg/L	Fe mg/L	K mg/L	Mg mg/L	Mn mg/L	Na mg/L	Ni mg/L	Pb mg/L	SO4 mg/L	Zn mg/L
Jan	1628	0.00008	0.050	0.00125	26.4	0.00062	0.0009	0.0009	0.0044	0.201	1.4	8.3	0.025	3.3	0.0031	0.0035	34.3	0.0412
Feb	1230	0.00008	0.045	0.00127	25.0	0.00070	0.0010	0.0010	0.0041	0.181	1.5	8.5	0.024	3.5	0.0035	0.0039	38.7	0.0435
Mar	1301	0.00007	0.042	0.00125	23.6	0.00072	0.0012	0.0010	0.0039	0.169	1.5	8.3	0.023	3.4	0.0035	0.0039	39.3	0.0464
Apr	2402	0.00009	0.052	0.00113	26.0	0.00048	0.0009	0.0008	0.0044	0.211	1.2	7.4	0.025	2.8	0.0024	0.0028	26.1	0.0411
May	19992	0.00010	0.064	0.00102	29.1	0.00023	0.0003	0.0006	0.0049	0.257	1.0	6.6	0.028	2.3	0.0013	0.0018	13.5	0.0278
Jun	20466	0.00010	0.064	0.00102	29.1	0.00023	0.0003	0.0006	0.0049	0.258	1.0	6.6	0.028	2.3	0.0013	0.0018	13.4	0.0285
Jul	14254	0.00010	0.064	0.00103	29.0	0.00025	0.0004	0.0006	0.0049	0.256	1.0	6.7	0.028	2.4	0.0013	0.0019	14.3	0.0291
Aug	10032	0.00010	0.063	0.00103	28.7	0.00027	0.0004	0.0006	0.0049	0.251	1.0	6.7	0.028	2.4	0.0014	0.0020	15.3	0.0291
Sep	13469	0.00010	0.064	0.00102	29.0	0.00025	0.0003	0.0006	0.0049	0.255	1.0	6.7	0.028	2.4	0.0013	0.0019	14.3	0.0283
Oct	7047	0.00010	0.062	0.00105	28.5	0.00030	0.0004	0.0007	0.0048	0.247	1.0	6.9	0.027	2.5	0.0016	0.0021	16.8	0.0295
Nov	3181	0.00009	0.058	0.00113	28.1	0.00041	0.0006	0.0008	0.0047	0.234	1.2	7.4	0.027	2.8	0.0021	0.0026	23.0	0.0346
Dec	2352	0.00009	0.056	0.00119	27.8	0.00050	0.0008	0.0008	0.0047	0.225	1.3	7.9	0.027	3.0	0.0025	0.0030	27.6	0.0382
Total	97354																	

Location Mouth of Anvil Creek

	Flows (x 1000 m3)	Ag mg/L	Al mg/L	As mg/L	Ca mg/L	Cd mg/L	Cl mg/L	Co mg/L	Cu mg/L	Fe mg/L	K mg/L	Mg mg/L	Mn mg/L	Na mg/L	Ni mg/L	Pb mg/L	SO4 mg/L	Zn mg/L
Jan	4432	0.00009	0.060	0.00109	28.4	0.00035	0.0005	0.0007	0.0048	0.241	1.1	7.2	0.027	2.7	0.0018	0.0024	20.0	0.0313
Feb	3272	0.00009	0.058	0.00110	27.9	0.00039	0.0005	0.0007	0.0047	0.233	1.1	7.3	0.027	2.7	0.0020	0.0025	21.8	0.0323
Mar	3362	0.00009	0.057	0.00110	27.3	0.00040	0.0006	0.0007	0.0046	0.227	1.1	7.2	0.026	2.7	0.0020	0.0025	22.4	0.0336
Apr	6375	0.00009	0.061	0.00105	28.2	0.00030	0.0005	0.0007	0.0048	0.244	1.0	6.9	0.027	2.5	0.0016	0.0021	17.1	0.0314
May	55468	0.00010	0.065	0.00101	29.4	0.00021	0.0002	0.0006	0.0050	0.262	0.9	6.6	0.028	2.3	0.0012	0.0017	12.4	0.0264
Jun	56956	0.00010	0.065	0.00101	29.4	0.00021	0.0002	0.0006	0.0050	0.262	0.9	6.6	0.028	2.3	0.0012	0.0017	12.3	0.0266
Jul	39693	0.00010	0.065	0.00101	29.4	0.00022	0.0003	0.0006	0.0050	0.261	0.9	6.6	0.028	2.3	0.0012	0.0018	12.6	0.0269
Aug	27824	0.00010	0.065	0.00101	29.3	0.00022	0.0003	0.0006	0.0049	0.259	0.9	6.6	0.028	2.3	0.0012	0.0018	13.0	0.0269
Sep	37419	0.00010	0.065	0.00101	29.4	0.00022	0.0002	0.0006	0.0050	0.261	0.9	6.6	0.028	2.3	0.0012	0.0018	12.6	0.0266
Oct	19528	0.00010	0.064	0.00102	29.2	0.00023	0.0003	0.0006	0.0049	0.258	1.0	6.7	0.028	2.3	0.0013	0.0018	13.6	0.0270
Nov	8835	0.00010	0.063	0.00105	29.0	0.00028	0.0003	0.0007	0.0049	0.253	1.0	6.9	0.028	2.5	0.0015	0.0020	15.8	0.0288
Dec	6515	0.00010	0.062	0.00107	29.0	0.00031	0.0004	0.0007	0.0049	0.250	1.0	7.0	0.028	2.5	0.0016	0.0022	17.4	0.0302
Total	269678																	

SF04 - Faro Mine Site - Sensitivity Assessment - Seepage Collection Efficiency - ETA Area
Conditions FUTURE 2

Location X2

	Flows	Ag	Al	As	Ca	Cd	Cl	Co	Cu	Fe	K	Mg	Mn	Na	Ni	Pb	SO4	Zn
	(x 1000 m3)	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L
Jan	553	0.00011	0.075	0.00116	29.9	0.00033	0.0058	0.0008	0.0061	0.318	0.9	6.9	0.042	2.4	0.0017	0.0020	14.5	0.1301
Feb	403	0.00011	0.077	0.00120	30.0	0.00036	0.0071	0.0009	0.0063	0.330	0.9	7.0	0.045	2.4	0.0018	0.0021	15.2	0.1544
Mar	407	0.00011	0.080	0.00125	30.1	0.00040	0.0088	0.0010	0.0067	0.347	0.9	7.2	0.049	2.4	0.0020	0.0022	16.1	0.1869
Apr	784	0.00011	0.075	0.00117	30.0	0.00034	0.0062	0.0008	0.0062	0.322	0.9	7.0	0.043	2.4	0.0017	0.0020	14.7	0.1381
May	6991	0.00010	0.067	0.00102	29.6	0.00022	0.0010	0.0006	0.0052	0.272	0.9	6.6	0.030	2.3	0.0012	0.0017	12.1	0.0406
Jun	7191	0.00010	0.067	0.00103	29.7	0.00022	0.0012	0.0006	0.0052	0.274	0.9	6.6	0.031	2.3	0.0012	0.0018	12.2	0.0443
Jul	5013	0.00010	0.068	0.00103	29.7	0.00023	0.0014	0.0006	0.0052	0.276	0.9	6.6	0.031	2.3	0.0012	0.0018	12.3	0.0483
Aug	3506	0.00010	0.068	0.00104	29.7	0.00023	0.0015	0.0007	0.0052	0.276	0.9	6.6	0.031	2.3	0.0012	0.0018	12.4	0.0493
Sep	4720	0.00010	0.067	0.00103	29.7	0.00022	0.0012	0.0006	0.0052	0.273	0.9	6.6	0.031	2.3	0.0012	0.0018	12.2	0.0439
Oct	2460	0.00010	0.068	0.00104	29.7	0.00023	0.0016	0.0007	0.0053	0.278	0.9	6.6	0.032	2.3	0.0013	0.0018	12.4	0.0523
Nov	1115	0.00010	0.071	0.00109	29.8	0.00027	0.0033	0.0007	0.0056	0.293	0.9	6.8	0.036	2.3	0.0014	0.0019	13.3	0.0827
Dec	821	0.00011	0.073	0.00112	29.9	0.00030	0.0044	0.0008	0.0058	0.304	0.9	6.8	0.039	2.3	0.0016	0.0019	13.8	0.1043
Total	33964																	

Location X14

	Flows	Ag	Al	As	Ca	Cd	Cl	Co	Cu	Fe	K	Mg	Mn	Na	Ni	Pb	SO4	Zn
	(x 1000 m3)	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L
Jan	1192	0.00008	0.048	0.00139	28.6	0.00083	0.0034	0.0011	0.0047	0.206	1.6	13.6	0.031	3.7	0.0041	0.0043	72.5	0.0931
Feb	912	0.00007	0.043	0.00142	27.3	0.00094	0.0040	0.0012	0.0045	0.185	1.7	14.7	0.030	3.9	0.0046	0.0047	83.7	0.1039
Mar	981	0.00007	0.040	0.00140	25.7	0.00096	0.0047	0.0012	0.0044	0.176	1.7	14.6	0.030	3.9	0.0047	0.0047	84.8	0.1168
Apr	1784	0.00008	0.052	0.00123	26.9	0.00063	0.0035	0.0009	0.0048	0.221	1.3	10.7	0.031	3.1	0.0031	0.0033	50.8	0.0935
May	14480	0.00010	0.064	0.00103	29.2	0.00026	0.0007	0.0006	0.0050	0.258	1.0	7.1	0.029	2.4	0.0014	0.0019	16.7	0.0355
Jun	14796	0.00010	0.064	0.00103	29.2	0.00026	0.0008	0.0006	0.0050	0.260	1.0	7.0	0.029	2.4	0.0014	0.0019	16.5	0.0382
Jul	10301	0.00010	0.064	0.00105	29.2	0.00028	0.0009	0.0007	0.0050	0.259	1.0	7.3	0.029	2.4	0.0015	0.0020	18.8	0.0410
Aug	7268	0.00010	0.062	0.00106	28.9	0.00031	0.0010	0.0007	0.0049	0.253	1.0	7.6	0.029	2.5	0.0016	0.0021	21.6	0.0413
Sep	9748	0.00010	0.063	0.00104	29.1	0.00028	0.0008	0.0007	0.0050	0.256	1.0	7.3	0.029	2.4	0.0015	0.0020	18.9	0.0378
Oct	5108	0.00009	0.061	0.00108	28.9	0.00035	0.0011	0.0007	0.0049	0.247	1.1	8.1	0.029	2.6	0.0018	0.0023	25.8	0.0432
Nov	2303	0.00009	0.058	0.00121	29.1	0.00052	0.0021	0.0009	0.0049	0.238	1.3	10.1	0.030	3.0	0.0026	0.0030	42.3	0.0643
Dec	1705	0.00009	0.056	0.00130	29.5	0.00065	0.0027	0.0010	0.0050	0.232	1.4	11.6	0.031	3.3	0.0032	0.0036	54.6	0.0791
Total	70579																	

Location Mouth of Rose Creek

	Flows	Ag	Al	As	Ca	Cd	Cl	Co	Cu	Fe	K	Mg	Mn	Na	Ni	Pb	SO4	Zn
	(x 1000 m3)	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L
Jan	1628	0.00009	0.053	0.00128	28.8	0.00066	0.0026	0.0010	0.0048	0.222	1.4	11.7	0.030	3.3	0.0033	0.0036	56.2	0.0750
Feb	1230	0.00008	0.049	0.00132	27.9	0.00075	0.0030	0.0010	0.0046	0.205	1.5	12.6	0.030	3.5	0.0037	0.0040	65.1	0.0837
Mar	1301	0.00008	0.046	0.00131	26.7	0.00078	0.0036	0.0011	0.0045	0.197	1.5	12.6	0.030	3.5	0.0038	0.0040	66.8	0.0944
Apr	2402	0.00009	0.055	0.00117	27.6	0.00052	0.0027	0.0009	0.0049	0.232	1.2	9.6	0.030	2.9	0.0026	0.0029	40.7	0.0760
May	19992	0.00010	0.065	0.00102	29.3	0.00024	0.0006	0.0006	0.0050	0.260	1.0	6.9	0.029	2.3	0.0013	0.0018	15.3	0.0328
Jun	20466	0.00010	0.065	0.00102	29.3	0.00024	0.0006	0.0006	0.0050	0.261	1.0	6.9	0.029	2.3	0.0013	0.0018	15.2	0.0347
Jul	14254	0.00010	0.064	0.00104	29.3	0.00026	0.0007	0.0007	0.0050	0.260	1.0	7.1	0.029	2.4	0.0014	0.0019	16.8	0.0367
Aug	10032	0.00010	0.063	0.00104	29.1	0.00028	0.0008	0.0007	0.0050	0.256	1.0	7.3	0.029	2.4	0.0015	0.0020	18.9	0.0370
Sep	13469	0.00010	0.064	0.00103	29.3	0.00026	0.0006	0.0006	0.0050	0.259	1.0	7.1	0.029	2.4	0.0014	0.0019	16.9	0.0344
Oct	7047	0.00010	0.062	0.00106	29.1	0.00031	0.0008	0.0007	0.0049	0.252	1.0	7.7	0.029	2.5	0.0016	0.0021	21.9	0.0383
Nov	3181	0.00009	0.060	0.00115	29.3	0.00043	0.0015	0.0008	0.0050	0.245	1.2	9.1	0.030	2.8	0.0022	0.0027	33.9	0.0536
Dec	2352	0.00009	0.058	0.00122	29.5	0.00053	0.0020	0.0009	0.0050	0.241	1.3	10.2	0.031	3.1	0.0027	0.0031	42.8	0.0644
Total	97354																	

Location Mouth of Anvil Creek

	Flows	Ag	Al	As	Ca	Cd	Cl	Co	Cu	Fe	K	Mg	Mn	Na	Ni	Pb	SO4	Zn
	(x 1000 m3)	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L
Jan	4432	0.00009	0.061	0.00110	29.3	0.00037	0.0011	0.0007	0.0049	0.248	1.1	8.4	0.029	2.7	0.0019	0.0024	28.1	0.0437
Feb	3272	0.00009	0.059	0.00112	29.0	0.00041	0.0013	0.0008	0.0049	0.242	1.1	8.8	0.029	2.7	0.0021	0.0025	31.8	0.0474
Mar	3362	0.00009	0.058	0.00112	28.5	0.00042	0.0015	0.0008	0.0048	0.238	1.1	8.9	0.029	2.7	0.0021	0.0026	33.0	0.0522
Apr	6375	0.00009	0.062	0.00106	28.8	0.00032	0.0011	0.0007	0.0050	0.252	1.0	7.7	0.029	2.5	0.0017	0.0022	22.6	0.0446
May	55468	0.00010	0.065	0.00101	29.5	0.00021	0.0003	0.0006	0.0050	0.263	0.9	6.7	0.028	2.3	0.0012	0.0018	13.0	0.0282
Jun	56956	0.00010	0.065	0.00101	29.5	0.00021	0.0004	0.0006	0.0050	0.263	0.9	6.7	0.029	2.3	0.0012	0.0018	13.0	0.0289
Jul	39693	0.00010	0.065	0.00101	29.5	0.00022	0.0004	0.0006	0.0050	0.263	0.9	6.7	0.029	2.3	0.0012	0.0018	13.6	0.0296
Aug	27824	0.00010	0.065	0.00101	29.4	0.00023	0.0004	0.0006	0.0050	0.261	0.9	6.8	0.028	2.3	0.0012	0.0018	14.3	0.0297
Sep	37419	0.00010	0.065	0.00101	29.5	0.00022	0.0004	0.0006	0.0050	0.262	0.9	6.7	0.028	2.3	0.0012	0.0018	13.6	0.0288
Oct	19528	0.00010	0.065	0.00102	29.4	0.00024	0.0004	0.0006	0.0050	0.260	1.0	6.9	0.028	2.3	0.0013	0.0019	15.4	0.0302
Nov	8835	0.00010	0.064	0.00105	29.5	0.00028	0.0007	0.0007	0.0050	0.257	1.0	7.5	0.029	2.5	0.0015	0.0020	19.7	0.0357
Dec	6515	0.00010	0.063	0.00108	29.6	0.00032	0.0009	0.0007	0.0050	0.256	1.1	7.9	0.029	2.5	0.0017	0.0022	22.9	0.0396
Total	269678																	

SF04 - Faro Mine Site - Sensitivity Assessment - Seepage Collection Efficiency - ETA Area

Conditions: FUTURE 3

Location: X2

	Flows (x 1000 m3)	Ag mg/L	Al mg/L	As mg/L	Ca mg/L	Cd mg/L	Cl mg/L	Co mg/L	Cu mg/L	Fe mg/L	K mg/L	Mg mg/L	Mn mg/L	Na mg/L	Ni mg/L	Pb mg/L	SO4 mg/L	Zn mg/L
Jan	553	0.00021	0.333	0.01637	30.0	0.00521	0.1770	0.0063	0.0996	3.715	1.0	7.7	0.513	2.3	0.0059	0.0032	31.7	3.6587
Feb	403	0.00023	0.395	0.01994	30.1	0.00638	0.2181	0.0076	0.1217	4.519	1.0	7.9	0.626	2.4	0.0070	0.0035	36.3	4.5052
Mar	407	0.00027	0.478	0.02473	30.3	0.00794	0.2732	0.0094	0.1511	5.593	1.0	8.3	0.777	2.4	0.0085	0.0040	42.5	5.6360
Apr	784	0.00022	0.353	0.01754	30.1	0.00560	0.1905	0.0067	0.1069	3.979	1.0	7.7	0.550	2.4	0.0062	0.0033	33.2	3.9369
May	6991	0.00012	0.104	0.00321	29.7	0.00092	0.0256	0.0014	0.0186	0.759	0.9	6.7	0.098	2.3	0.0018	0.0019	14.6	0.5470
Jun	7191	0.00012	0.114	0.00374	29.7	0.00110	0.0318	0.0016	0.0219	0.880	0.9	6.7	0.115	2.3	0.0020	0.0020	15.3	0.6746
Jul	5013	0.00012	0.124	0.00433	29.7	0.00129	0.0385	0.0018	0.0255	1.013	0.9	6.8	0.134	2.3	0.0021	0.0020	16.0	0.8138
Aug	3506	0.00012	0.127	0.00449	29.7	0.00134	0.0404	0.0019	0.0265	1.048	0.9	6.8	0.139	2.3	0.0022	0.0020	16.3	0.8514
Sep	4720	0.00012	0.113	0.00369	29.7	0.00108	0.0311	0.0016	0.0215	0.867	0.9	6.7	0.113	2.3	0.0019	0.0020	15.2	0.6607
Oct	2460	0.00013	0.134	0.00492	29.7	0.00148	0.0453	0.0021	0.0292	1.145	0.9	6.8	0.152	2.3	0.0023	0.0021	16.8	0.9535
Nov	1115	0.00016	0.212	0.00940	29.8	0.00294	0.0968	0.0037	0.0567	2.151	0.9	7.1	0.293	2.3	0.0037	0.0025	22.6	2.0121
Dec	821	0.00018	0.267	0.01258	29.9	0.00398	0.1334	0.0049	0.0763	2.864	1.0	7.4	0.394	2.3	0.0047	0.0028	26.8	2.7636
Total	33964																	

Location: X14

	Flows (x 1000 m3)	Ag mg/L	Al mg/L	As mg/L	Ca mg/L	Cd mg/L	Cl mg/L	Co mg/L	Cu mg/L	Fe mg/L	K mg/L	Mg mg/L	Mn mg/L	Na mg/L	Ni mg/L	Pb mg/L	SO4 mg/L	Zn mg/L
Jan	1192	0.00013	0.183	0.00932	29.9	0.00335	0.0930	0.0040	0.0535	1.974	1.6	25.5	0.277	3.7	0.0062	0.0049	272.8	1.9140
Feb	912	0.00013	0.200	0.01073	28.9	0.00390	0.1092	0.0045	0.0618	2.262	1.7	28.9	0.319	3.9	0.0071	0.0055	322.2	2.2422
Mar	981	0.00014	0.225	0.01234	27.3	0.00444	0.1283	0.0051	0.0717	2.616	1.7	29.1	0.369	3.9	0.0077	0.0056	329.7	2.6298
Apr	1784	0.00014	0.189	0.00931	27.8	0.00319	0.0949	0.0038	0.0546	2.023	1.3	18.5	0.281	3.1	0.0053	0.0039	183.6	1.9497
May	14480	0.00011	0.084	0.00221	29.3	0.00063	0.0141	0.0011	0.0123	0.523	1.0	8.1	0.065	2.4	0.0017	0.0020	33.8	0.3075
Jun	14796	0.00011	0.089	0.00252	29.3	0.00073	0.0176	0.0012	0.0142	0.591	1.0	8.0	0.075	2.4	0.0018	0.0020	33.1	0.3790
Jul	10301	0.00011	0.094	0.00285	29.4	0.00085	0.0213	0.0013	0.0161	0.681	1.0	8.7	0.085	2.4	0.0020	0.0021	43.0	0.4554
Aug	7268	0.00011	0.094	0.00293	29.2	0.00090	0.0221	0.0014	0.0165	0.671	1.0	9.6	0.087	2.5	0.0021	0.0023	55.1	0.4717
Sep	9748	0.00011	0.088	0.00249	29.3	0.00074	0.0171	0.0012	0.0139	0.579	1.0	8.7	0.074	2.4	0.0019	0.0021	43.2	0.3700
Oct	5108	0.00011	0.096	0.00318	29.2	0.00101	0.0248	0.0015	0.0178	0.716	1.1	10.9	0.094	2.6	0.0024	0.0024	72.8	0.5259
Nov	2303	0.00012	0.134	0.00573	29.8	0.00196	0.0532	0.0025	0.0328	1.247	1.3	16.1	0.170	3.0	0.0039	0.0034	143.3	1.1032
Dec	1705	0.00013	0.160	0.00751	30.4	0.00262	0.0729	0.0032	0.0432	1.616	1.4	20.0	0.224	3.3	0.0049	0.0040	195.5	1.5041
Total	70579																	

Location: Mouth of Rose Creek

	Flows (x 1000 m3)	Ag mg/L	Al mg/L	As mg/L	Ca mg/L	Cd mg/L	Cl mg/L	Co mg/L	Cu mg/L	Fe mg/L	K mg/L	Mg mg/L	Mn mg/L	Na mg/L	Ni mg/L	Pb mg/L	SO4 mg/L	Zn mg/L
Jan	1628	0.00012	0.151	0.00709	29.8	0.00251	0.0682	0.0031	0.0405	1.517	1.4	20.4	0.210	3.3	0.0049	0.0041	203.0	1.4087
Feb	1230	0.00013	0.166	0.00822	29.1	0.00294	0.0811	0.0035	0.0471	1.746	1.5	23.1	0.244	3.5	0.0056	0.0045	242.1	1.6701
Mar	1301	0.00013	0.186	0.00955	27.9	0.00340	0.0968	0.0040	0.0553	2.037	1.5	23.5	0.285	3.5	0.0061	0.0046	251.5	1.9891
Apr	2402	0.00013	0.157	0.00718	28.2	0.00242	0.0705	0.0030	0.0418	1.571	1.2	15.4	0.216	2.9	0.0042	0.0034	139.4	1.4552
May	19992	0.00010	0.079	0.00188	29.4	0.00051	0.0102	0.0009	0.0103	0.451	1.0	7.6	0.055	2.3	0.0015	0.0019	27.7	0.2298
Jun	20466	0.00011	0.083	0.00210	29.4	0.00058	0.0128	0.0010	0.0116	0.501	1.0	7.6	0.062	2.3	0.0016	0.0019	27.2	0.2811
Jul	14254	0.00011	0.086	0.00234	29.4	0.00067	0.0155	0.0011	0.0130	0.551	1.0	8.1	0.069	2.4	0.0017	0.0020	34.3	0.3362
Aug	10032	0.00011	0.086	0.00240	29.3	0.00071	0.0161	0.0011	0.0133	0.559	1.0	8.7	0.071	2.4	0.0018	0.0021	43.2	0.3488
Sep	13469	0.00010	0.082	0.00208	29.4	0.00059	0.0125	0.0010	0.0114	0.492	1.0	8.1	0.061	2.4	0.0016	0.0020	34.5	0.2749
Oct	7047	0.00011	0.088	0.00258	29.3	0.00079	0.0180	0.0012	0.0143	0.592	1.0	9.7	0.076	2.5	0.0020	0.0022	56.0	0.3882
Nov	3181	0.00011	0.115	0.00442	29.8	0.00147	0.0385	0.0020	0.0251	0.975	1.2	13.4	0.131	2.8	0.0031	0.0029	107.0	0.8056
Dec	2352	0.00012	0.134	0.00572	30.2	0.00196	0.0529	0.0025	0.0327	1.244	1.3	16.3	0.170	3.0	0.0039	0.0034	144.9	1.0974
Total	97354																	

Location: Mouth of Anvil Creek

	Flows (x 1000 m3)	Ag mg/L	Al mg/L	As mg/L	Ca mg/L	Cd mg/L	Cl mg/L	Co mg/L	Cu mg/L	Fe mg/L	K mg/L	Mg mg/L	Mn mg/L	Na mg/L	Ni mg/L	Pb mg/L	SO4 mg/L	Zn mg/L
Jan	4432	0.00011	0.097	0.00324	29.7	0.00105	0.0252	0.0015	0.0181	0.724	1.1	11.6	0.095	2.7	0.0025	0.0026	82.0	0.5337
Feb	3272	0.00011	0.103	0.00371	29.4	0.00123	0.0306	0.0017	0.0208	0.821	1.1	12.8	0.109	2.7	0.0028	0.0027	98.3	0.6436
Mar	3362	0.00011	0.112	0.00431	28.9	0.00144	0.0376	0.0019	0.0245	0.951	1.1	13.1	0.128	2.7	0.0030	0.0028	104.5	0.7857
Apr	6375	0.00011	0.100	0.00333	29.1	0.00104	0.0267	0.0015	0.0189	0.757	1.0	9.9	0.099	2.5	0.0023	0.0023	59.8	0.5642
May	55468	0.00010	0.071	0.00132	29.5	0.00031	0.0038	0.0007	0.0069	0.332	0.9	6.9	0.038	2.3	0.0013	0.0018	17.5	0.0992
Jun	56956	0.00010	0.072	0.00139	29.5	0.00034	0.0047	0.0008	0.0074	0.349	0.9	6.9	0.040	2.3	0.0013	0.0018	17.3	0.1174
Jul	39693	0.00010	0.073	0.00148	29.5	0.00037	0.0057	0.0008	0.0079	0.367	0.9	7.1	0.043	2.3	0.0013	0.0018	19.8	0.1372
Aug	27824	0.00010	0.073	0.00150	29.5	0.00038	0.0059	0.0008	0.0080	0.370	0.9	7.3	0.044	2.3	0.0014	0.0018	23.1	0.1421
Sep	37419	0.00010	0.072	0.00139	29.5	0.00034	0.0046	0.0008	0.0073	0.346	0.9	7.1	0.040	2.3	0.0013	0.0018	19.9	0.1153
Oct	19528	0.00010	0.074	0.00157	29.5	0.00041	0.0066	0.0008	0.0084	0.382	1.0	7.7	0.045	2.3	0.0014	0.0019	27.7	0.1565
Nov	8835	0.00011	0.084	0.00223	29.7	0.00066	0.0140	0.0011	0.0122	0.520	1.0	9.0	0.065	2.5	0.0018	0.0021	46.0	0.3065
Dec	6515	0.00011	0.091	0.00270	29.8	0.00083	0.0192	0.0013	0.0150	0.618	1.1	10.0	0.079	2.5	0.0021	0.0023	59.8	0.4124
Total	269678																	

SF05 - Faro Mine Site - Combined Cover Infiltration Sensitivity Assessment

Conditions SF05 FUTURE 1

Location X2

	Flows (x 1000 m3)	Ag mg/L	Al mg/L	As mg/L	Ca mg/L	Cd mg/L	Cl mg/L	Co mg/L	Cu mg/L	Fe mg/L	K mg/L	Mg mg/L	Mn mg/L	Na mg/L	Ni mg/L	Pb mg/L	SO4 mg/L	Zn mg/L
Jan	553	0.00010	0.067	0.0011	29.7	0.00022	0.0	0.0006	0.0052	0.270	0.9	6.7	0.030	2.3	0.0012	0.0018	12.6	0.0419
Feb	403	0.00010	0.067	0.0011	29.7	0.00023	0.0	0.0007	0.0052	0.272	0.9	6.7	0.031	2.3	0.0012	0.0018	12.8	0.0457
Mar	407	0.00011	0.068	0.0011	29.8	0.00024	0.0	0.0007	0.0053	0.274	0.9	6.7	0.031	2.3	0.0013	0.0018	13.0	0.0507
Apr	784	0.00010	0.067	0.0011	29.7	0.00023	0.0	0.0006	0.0052	0.271	0.9	6.7	0.030	2.3	0.0012	0.0018	12.6	0.0431
May	6991	0.00010	0.066	0.0010	29.6	0.00020	0.0	0.0006	0.0050	0.265	0.9	6.6	0.029	2.3	0.0011	0.0017	11.8	0.0279
Jun	7191	0.00010	0.066	0.0010	29.6	0.00020	0.0	0.0006	0.0050	0.265	0.9	6.6	0.029	2.3	0.0011	0.0017	11.9	0.0285
Jul	5013	0.00010	0.066	0.0010	29.6	0.00021	0.0	0.0006	0.0050	0.265	0.9	6.6	0.029	2.3	0.0011	0.0017	11.9	0.0291
Aug	3506	0.00010	0.066	0.0010	29.6	0.00021	0.0	0.0006	0.0050	0.266	0.9	6.6	0.029	2.3	0.0011	0.0017	11.9	0.0293
Sep	4720	0.00010	0.066	0.0010	29.6	0.00020	0.0	0.0006	0.0050	0.265	0.9	6.6	0.029	2.3	0.0011	0.0017	11.9	0.0284
Oct	2460	0.00010	0.066	0.0010	29.6	0.00021	0.0	0.0006	0.0050	0.266	0.9	6.6	0.029	2.3	0.0011	0.0017	11.9	0.0298
Nov	1115	0.00010	0.067	0.0010	29.7	0.00021	0.0	0.0006	0.0051	0.268	0.9	6.6	0.029	2.3	0.0012	0.0017	12.2	0.0345
Dec	821	0.00010	0.067	0.0011	29.7	0.00022	0.0	0.0006	0.0051	0.269	0.9	6.6	0.030	2.3	0.0012	0.0018	12.4	0.0379
Total	33964																	

Location X14

	Flows (x 1000 m3)	Ag mg/L	Al mg/L	As mg/L	Ca mg/L	Cd mg/L	Cl mg/L	Co mg/L	Cu mg/L	Fe mg/L	K mg/L	Mg mg/L	Mn mg/L	Na mg/L	Ni mg/L	Pb mg/L	SO4 mg/L	Zn mg/L
Jan	1192	0.00008	0.044	0.0013	24.2	0.00078	0.0	0.0010	0.0042	0.179	1.6	8.1	0.024	3.7	0.0038	0.0042	36.4	0.0507
Feb	912	0.00007	0.038	0.0014	22.2	0.00088	0.0	0.0011	0.0039	0.153	1.7	8.2	0.023	3.9	0.0043	0.0046	40.7	0.0542
Mar	981	0.00007	0.034	0.0013	20.5	0.00089	0.0	0.0011	0.0037	0.138	1.7	7.9	0.021	3.8	0.0043	0.0046	40.7	0.0584
Apr	1784	0.00008	0.048	0.0012	24.0	0.00058	0.0	0.0008	0.0043	0.193	1.3	7.1	0.024	3.0	0.0028	0.0032	27.0	0.0503
May	14480	0.00010	0.063	0.0010	28.8	0.00025	0.0	0.0006	0.0049	0.254	1.0	6.6	0.028	2.4	0.0013	0.0019	13.6	0.0292
Jun	14796	0.00010	0.064	0.0010	28.8	0.00025	0.0	0.0006	0.0049	0.255	1.0	6.6	0.028	2.4	0.0013	0.0019	13.6	0.0303
Jul	10302	0.00010	0.063	0.0010	28.7	0.00027	0.0	0.0006	0.0049	0.253	1.0	6.7	0.028	2.4	0.0014	0.0020	14.5	0.0314
Aug	7268	0.00010	0.061	0.0010	28.2	0.00029	0.0	0.0007	0.0048	0.246	1.0	6.7	0.027	2.5	0.0015	0.0021	15.6	0.0313
Sep	9748	0.00010	0.063	0.0010	28.6	0.00027	0.0	0.0006	0.0049	0.251	1.0	6.7	0.028	2.4	0.0014	0.0020	14.5	0.0301
Oct	5108	0.00009	0.060	0.0011	27.9	0.00033	0.0	0.0007	0.0048	0.240	1.1	6.8	0.027	2.6	0.0017	0.0023	17.3	0.0319
Nov	2303	0.00009	0.055	0.0012	27.0	0.00049	0.0	0.0008	0.0047	0.222	1.3	7.3	0.026	3.0	0.0025	0.0029	24.1	0.0402
Dec	1705	0.00009	0.052	0.0013	26.5	0.00061	0.0	0.0009	0.0046	0.211	1.4	7.8	0.026	3.3	0.0030	0.0035	29.3	0.0460
Total	70579																	

Location Mouth of Rose Creek

	Flows (x 1000 m3)	Ag mg/L	Al mg/L	As mg/L	Ca mg/L	Cd mg/L	Cl mg/L	Co mg/L	Cu mg/L	Fe mg/L	K mg/L	Mg mg/L	Mn mg/L	Na mg/L	Ni mg/L	Pb mg/L	SO4 mg/L	Zn mg/L
Jan	1628	0.00008	0.050	0.0013	25.7	0.00062	0.0	0.0009	0.0044	0.202	1.4	7.7	0.025	3.3	0.0031	0.0035	29.8	0.0440
Feb	1230	0.00008	0.045	0.0013	24.1	0.00071	0.0	0.0010	0.0042	0.182	1.5	7.8	0.024	3.5	0.0035	0.0038	33.2	0.0468
Mar	1301	0.00007	0.042	0.0013	22.7	0.00072	0.0	0.0010	0.0040	0.169	1.5	7.5	0.023	3.4	0.0035	0.0039	33.6	0.0503
Apr	2402	0.00009	0.052	0.0011	25.5	0.00048	0.0	0.0008	0.0045	0.211	1.2	7.0	0.025	2.8	0.0024	0.0028	23.1	0.0440
May	19992	0.00010	0.064	0.0010	29.0	0.00023	0.0	0.0006	0.0049	0.257	1.0	6.6	0.028	2.3	0.0013	0.0018	13.1	0.0282
Jun	20466	0.00010	0.064	0.0010	29.0	0.00023	0.0	0.0006	0.0049	0.258	1.0	6.6	0.028	2.3	0.0013	0.0018	13.1	0.0290
Jul	14254	0.00010	0.064	0.0010	28.9	0.00025	0.0	0.0006	0.0049	0.256	1.0	6.6	0.028	2.4	0.0013	0.0019	13.7	0.0298
Aug	10032	0.00010	0.063	0.0010	28.6	0.00027	0.0	0.0006	0.0049	0.251	1.0	6.6	0.028	2.4	0.0014	0.0020	14.5	0.0297
Sep	13469	0.00010	0.064	0.0010	28.9	0.00025	0.0	0.0006	0.0049	0.255	1.0	6.6	0.028	2.4	0.0013	0.0019	13.8	0.0288
Oct	7047	0.00010	0.062	0.0010	28.3	0.00030	0.0	0.0007	0.0048	0.247	1.0	6.7	0.027	2.5	0.0016	0.0021	15.8	0.0302
Nov	3181	0.00009	0.058	0.0011	27.7	0.00041	0.0	0.0008	0.0048	0.234	1.2	7.1	0.027	2.8	0.0021	0.0026	20.7	0.0361
Dec	2352	0.00009	0.056	0.0012	27.3	0.00050	0.0	0.0008	0.0047	0.225	1.3	7.4	0.027	3.0	0.0025	0.0030	24.4	0.0404
Total	97354																	

Location Mouth of Anvil Creek

	Flows (x 1000 m3)	Ag mg/L	Al mg/L	As mg/L	Ca mg/L	Cd mg/L	Cl mg/L	Co mg/L	Cu mg/L	Fe mg/L	K mg/L	Mg mg/L	Mn mg/L	Na mg/L	Ni mg/L	Pb mg/L	SO4 mg/L	Zn mg/L
Jan	4432	0.00009	0.060	0.0011	28.2	0.00036	0.0	0.0007	0.0048	0.241	1.1	7.0	0.027	2.7	0.0018	0.0024	18.4	0.0324
Feb	3272	0.00009	0.058	0.0011	27.5	0.00039	0.0	0.0007	0.0047	0.233	1.1	7.0	0.027	2.7	0.0020	0.0025	19.8	0.0336
Mar	3362	0.00009	0.057	0.0011	26.9	0.00040	0.0	0.0007	0.0046	0.227	1.1	6.9	0.026	2.7	0.0020	0.0025	20.2	0.0352
Apr	6375	0.00009	0.061	0.0011	28.0	0.00031	0.0	0.0007	0.0048	0.244	1.0	6.7	0.027	2.5	0.0016	0.0021	16.0	0.0325
May	55468	0.00010	0.065	0.0010	29.4	0.00021	0.0	0.0006	0.0050	0.262	0.9	6.6	0.028	2.3	0.0012	0.0017	12.2	0.0265
Jun	56957	0.00010	0.065	0.0010	29.4	0.00021	0.0	0.0006	0.0050	0.262	0.9	6.5	0.028	2.3	0.0012	0.0017	12.2	0.0268
Jul	39693	0.00010	0.065	0.0010	29.4	0.00022	0.0	0.0006	0.0050	0.261	0.9	6.6	0.028	2.3	0.0012	0.0018	12.4	0.0271
Aug	27824	0.00010	0.065	0.0010	29.2	0.00022	0.0	0.0006	0.0050	0.259	0.9	6.6	0.028	2.3	0.0012	0.0018	12.7	0.0271
Sep	37419	0.00010	0.065	0.0010	29.3	0.00022	0.0	0.0006	0.0050	0.261	0.9	6.6	0.028	2.3	0.0012	0.0018	12.5	0.0268
Oct	19528	0.00010	0.064	0.0010	29.1	0.00023	0.0	0.0006	0.0049	0.258	1.0	6.6	0.028	2.3	0.0013	0.0018	13.2	0.0273
Nov	8835	0.00010	0.063	0.0010	28.9	0.00028	0.0	0.0007	0.0049	0.253	1.0	6.7	0.028	2.5	0.0015	0.0020	15.0	0.0294
Dec	6515	0.00010	0.062	0.0011	28.8	0.00031	0.0	0.0007	0.0049	0.250	1.0	6.9	0.028	2.5	0.0016	0.0022	16.3	0.0309
Total	269678																	

SF05 - Faro Mine Site - Combined Cover Infiltration Sensitivity Assessment
Conditions SF05 FUTURE 2

Location X2

	Flows (x 1000 m3)	Ag mg/L	Al mg/L	As mg/L	Ca mg/L	Cd mg/L	Cl mg/L	Co mg/L	Cu mg/L	Fe mg/L	K mg/L	Mg mg/L	Mn mg/L	Na mg/L	Ni mg/L	Pb mg/L	SO4 mg/L	Zn mg/L
Jan	553	0.00011	0.072	0.0011	29.8	0.00030	0.0	0.0008	0.0058	0.303	0.9	6.8	0.038	2.3	0.0015	0.0019	13.8	0.1011
Feb	403	0.00011	0.074	0.0011	29.9	0.00032	0.0	0.0008	0.0060	0.312	0.9	6.9	0.041	2.3	0.0016	0.0020	14.3	0.1186
Mar	407	0.00011	0.076	0.0012	30.0	0.00035	0.0	0.0009	0.0062	0.323	0.9	7.0	0.044	2.4	0.0018	0.0021	14.9	0.1421
Apr	784	0.00011	0.073	0.0011	29.9	0.00030	0.0	0.0008	0.0058	0.305	0.9	6.9	0.039	2.3	0.0016	0.0020	14.0	0.1068
May	6991	0.00010	0.067	0.0010	29.6	0.00021	0.0	0.0006	0.0051	0.270	0.9	6.6	0.030	2.3	0.0012	0.0017	12.0	0.0364
Jun	7191	0.00010	0.067	0.0010	29.6	0.00022	0.0	0.0006	0.0051	0.271	0.9	6.6	0.030	2.3	0.0012	0.0017	12.1	0.0391
Jul	5013	0.00010	0.067	0.0010	29.6	0.00022	0.0	0.0006	0.0052	0.272	0.9	6.6	0.030	2.3	0.0012	0.0018	12.2	0.0420
Aug	3506	0.00010	0.067	0.0010	29.7	0.00022	0.0	0.0006	0.0052	0.273	0.9	6.6	0.031	2.3	0.0012	0.0018	12.2	0.0428
Sep	4720	0.00010	0.067	0.0010	29.6	0.00022	0.0	0.0006	0.0051	0.271	0.9	6.6	0.030	2.3	0.0012	0.0017	12.1	0.0388
Oct	2460	0.00010	0.068	0.0010	29.7	0.00022	0.0	0.0006	0.0052	0.274	0.9	6.6	0.031	2.3	0.0012	0.0018	12.2	0.0449
Nov	1115	0.00010	0.069	0.0011	29.7	0.00025	0.0	0.0007	0.0054	0.285	0.9	6.7	0.034	2.3	0.0013	0.0018	12.9	0.0669
Dec	821	0.00010	0.071	0.0011	29.8	0.00027	0.0	0.0007	0.0056	0.293	0.9	6.8	0.036	2.3	0.0014	0.0019	13.3	0.0825
Total	33964																	

Location X14

	Flows (x 1000 m3)	Ag mg/L	Al mg/L	As mg/L	Ca mg/L	Cd mg/L	Cl mg/L	Co mg/L	Cu mg/L	Fe mg/L	K mg/L	Mg mg/L	Mn mg/L	Na mg/L	Ni mg/L	Pb mg/L	SO4 mg/L	Zn mg/L
Jan	1192	0.00008	0.048	0.0014	26.7	0.00083	0.0	0.0011	0.0048	0.204	1.6	11.5	0.030	3.7	0.0040	0.0043	58.6	0.0898
Feb	912	0.00007	0.042	0.0014	25.1	0.00094	0.0	0.0012	0.0046	0.182	1.7	12.3	0.029	3.9	0.0046	0.0047	67.1	0.1000
Mar	981	0.00007	0.039	0.0014	23.4	0.00096	0.0	0.0012	0.0045	0.173	1.7	12.1	0.029	3.9	0.0046	0.0047	67.8	0.1123
Apr	1784	0.00008	0.051	0.0012	25.7	0.00062	0.0	0.0009	0.0049	0.219	1.3	9.4	0.030	3.1	0.0030	0.0033	41.7	0.0901
May	14480	0.00010	0.064	0.0010	29.0	0.00026	0.0	0.0006	0.0050	0.258	1.0	6.9	0.029	2.4	0.0013	0.0019	15.5	0.0350
Jun	14796	0.00010	0.064	0.0010	29.0	0.00026	0.0	0.0006	0.0050	0.260	1.0	6.9	0.029	2.4	0.0013	0.0019	15.4	0.0376
Jul	10302	0.00010	0.064	0.0011	29.0	0.00028	0.0	0.0007	0.0050	0.258	1.0	7.1	0.029	2.4	0.0015	0.0020	17.2	0.0402
Aug	7268	0.00010	0.062	0.0011	28.6	0.00031	0.0	0.0007	0.0050	0.252	1.0	7.3	0.029	2.5	0.0016	0.0021	19.3	0.0405
Sep	9748	0.00010	0.063	0.0010	28.9	0.00028	0.0	0.0007	0.0050	0.256	1.0	7.1	0.029	2.4	0.0015	0.0020	17.2	0.0372
Oct	5108	0.00009	0.061	0.0011	28.4	0.00035	0.0	0.0007	0.0049	0.247	1.1	7.6	0.028	2.6	0.0018	0.0023	22.5	0.0423
Nov	2303	0.00009	0.057	0.0012	28.2	0.00052	0.0	0.0009	0.0050	0.237	1.3	9.1	0.030	3.0	0.0026	0.0030	35.3	0.0624
Dec	1705	0.00009	0.055	0.0013	28.2	0.00065	0.0	0.0010	0.0050	0.230	1.4	10.2	0.031	3.3	0.0032	0.0036	44.9	0.0766
Total	70579																	

Location Mouth of Rose Creek

	Flows (x 1000 m3)	Ag mg/L	Al mg/L	As mg/L	Ca mg/L	Cd mg/L	Cl mg/L	Co mg/L	Cu mg/L	Fe mg/L	K mg/L	Mg mg/L	Mn mg/L	Na mg/L	Ni mg/L	Pb mg/L	SO4 mg/L	Zn mg/L
Jan	1628	0.00009	0.053	0.0013	27.5	0.00066	0.0	0.0010	0.0049	0.220	1.4	10.2	0.030	3.3	0.0032	0.0036	46.0	0.0726
Feb	1230	0.00008	0.048	0.0013	26.3	0.00075	0.0	0.0010	0.0047	0.203	1.5	10.8	0.029	3.5	0.0037	0.0039	52.8	0.0808
Mar	1301	0.00008	0.045	0.0013	25.0	0.00077	0.0	0.0010	0.0046	0.195	1.5	10.7	0.029	3.5	0.0038	0.0040	54.0	0.0910
Apr	2402	0.00009	0.055	0.0012	26.7	0.00052	0.0	0.0008	0.0049	0.230	1.2	8.6	0.030	2.9	0.0025	0.0029	34.0	0.0736
May	19992	0.00010	0.064	0.0010	29.2	0.00024	0.0	0.0006	0.0050	0.260	1.0	6.8	0.029	2.3	0.0013	0.0018	14.5	0.0324
Jun	20466	0.00010	0.065	0.0010	29.2	0.00024	0.0	0.0006	0.0050	0.261	1.0	6.8	0.029	2.3	0.0013	0.0018	14.4	0.0343
Jul	14254	0.00010	0.064	0.0010	29.2	0.00026	0.0	0.0006	0.0050	0.260	1.0	6.9	0.029	2.4	0.0014	0.0019	15.7	0.0362
Aug	10032	0.00010	0.063	0.0010	28.9	0.00028	0.0	0.0007	0.0050	0.255	1.0	7.1	0.029	2.4	0.0015	0.0020	17.2	0.0364
Sep	13469	0.00010	0.064	0.0010	29.1	0.00026	0.0	0.0006	0.0050	0.258	1.0	6.9	0.029	2.4	0.0014	0.0019	15.7	0.0340
Oct	7047	0.00010	0.062	0.0011	28.8	0.00031	0.0	0.0007	0.0049	0.252	1.0	7.3	0.028	2.5	0.0016	0.0021	19.5	0.0377
Nov	3181	0.00009	0.060	0.0012	28.6	0.00043	0.0	0.0008	0.0050	0.244	1.2	8.4	0.029	2.8	0.0022	0.0026	28.8	0.0523
Dec	2352	0.00009	0.058	0.0012	28.6	0.00053	0.0	0.0009	0.0050	0.239	1.3	9.2	0.030	3.0	0.0026	0.0030	35.7	0.0625
Total	97354																	

Location Mouth of Anvil Creek

	Flows (x 1000 m3)	Ag mg/L	Al mg/L	As mg/L	Ca mg/L	Cd mg/L	Cl mg/L	Co mg/L	Cu mg/L	Fe mg/L	K mg/L	Mg mg/L	Mn mg/L	Na mg/L	Ni mg/L	Pb mg/L	SO4 mg/L	Zn mg/L
Jan	4432	0.00009	0.061	0.0011	28.8	0.00037	0.0	0.0007	0.0049	0.248	1.1	7.9	0.029	2.7	0.0019	0.0024	24.3	0.0429
Feb	3272	0.00009	0.059	0.0011	28.3	0.00041	0.0	0.0008	0.0049	0.241	1.1	8.1	0.029	2.7	0.0021	0.0025	27.2	0.0463
Mar	3362	0.00009	0.058	0.0011	27.8	0.00042	0.0	0.0008	0.0048	0.237	1.1	8.2	0.029	2.7	0.0021	0.0026	28.1	0.0509
Apr	6375	0.00009	0.062	0.0011	28.5	0.00032	0.0	0.0007	0.0050	0.251	1.0	7.3	0.029	2.5	0.0016	0.0021	20.1	0.0437
May	55468	0.00010	0.065	0.0010	29.4	0.00021	0.0	0.0006	0.0050	0.263	0.9	6.6	0.028	2.3	0.0012	0.0018	12.7	0.0281
Jun	56957	0.00010	0.065	0.0010	29.5	0.00021	0.0	0.0006	0.0050	0.263	0.9	6.6	0.028	2.3	0.0012	0.0018	12.7	0.0287
Jul	39693	0.00010	0.065	0.0010	29.4	0.00022	0.0	0.0006	0.0050	0.263	0.9	6.7	0.029	2.3	0.0012	0.0018	13.1	0.0294
Aug	27824	0.00010	0.065	0.0010	29.3	0.00023	0.0	0.0006	0.0050	0.261	0.9	6.7	0.028	2.3	0.0012	0.0018	13.7	0.0295
Sep	37419	0.00010	0.065	0.0010	29.4	0.00022	0.0	0.0006	0.0050	0.262	0.9	6.7	0.028	2.3	0.0012	0.0018	13.1	0.0286
Oct	19528	0.00010	0.065	0.0010	29.3	0.00024	0.0	0.0006	0.0050	0.260	1.0	6.8	0.028	2.3	0.0013	0.0019	14.5	0.0300
Nov	8835	0.00010	0.064	0.0011	29.2	0.00028	0.0	0.0007	0.0050	0.257	1.0	7.2	0.029	2.5	0.0015	0.0020	17.9	0.0352
Dec	6515	0.00010	0.063	0.0011	29.2	0.00032	0.0	0.0007	0.0050	0.255	1.0	7.5	0.029	2.5	0.0016	0.0022	20.4	0.0389
Total	269678																	

SF05 - Faro Mine Site - Combined Cover Infiltration Sensitivity Assessment

Conditions SF05 FUTURE 3

Location X2

	Flows (x 1000 m3)	Ag mg/L	Al mg/L	As mg/L	Ca mg/L	Cd mg/L	Cl mg/L	Co mg/L	Cu mg/L	Fe mg/L	K mg/L	Mg mg/L	Mn mg/L	Na mg/L	Ni mg/L	Pb mg/L	SO4 mg/L	Zn mg/L
Jan	553	0.00018	0.264	0.0124	29.9	0.00392	0.1	0.0048	0.0752	2.826	1.0	7.4	0.388	2.3	0.0047	0.0028	26.5	2.7238
Feb	403	0.00020	0.310	0.0151	30.0	0.00479	0.2	0.0058	0.0916	3.423	1.0	7.6	0.472	2.3	0.0055	0.0031	30.0	3.3525
Mar	407	0.00022	0.372	0.0186	30.1	0.00595	0.2	0.0071	0.1135	4.220	1.0	7.8	0.584	2.4	0.0066	0.0034	34.6	4.1923
Apr	784	0.00019	0.279	0.0133	29.9	0.00421	0.1	0.0051	0.0806	3.022	1.0	7.4	0.416	2.3	0.0049	0.0029	27.7	2.9304
May	6991	0.00011	0.094	0.0026	29.6	0.00073	0.0	0.0012	0.0151	0.632	0.9	6.7	0.080	2.3	0.0016	0.0019	13.8	0.4128
Jun	7191	0.00011	0.101	0.0030	29.7	0.00087	0.0	0.0014	0.0175	0.722	0.9	6.7	0.093	2.3	0.0017	0.0019	14.4	0.5076
Jul	5013	0.00012	0.109	0.0035	29.7	0.00101	0.0	0.0015	0.0202	0.820	0.9	6.7	0.106	2.3	0.0019	0.0019	14.9	0.6110
Aug	3506	0.00012	0.111	0.0036	29.7	0.00105	0.0	0.0016	0.0210	0.846	0.9	6.7	0.110	2.3	0.0019	0.0020	15.1	0.6389
Sep	4720	0.00011	0.101	0.0030	29.7	0.00085	0.0	0.0013	0.0173	0.712	0.9	6.7	0.091	2.3	0.0017	0.0019	14.3	0.4973
Oct	2460	0.00012	0.117	0.0039	29.7	0.00115	0.0	0.0017	0.0229	0.918	0.9	6.7	0.120	2.3	0.0020	0.0020	15.5	0.7147
Nov	1115	0.00014	0.174	0.0072	29.8	0.00224	0.1	0.0029	0.0434	1.665	0.9	7.0	0.225	2.3	0.0030	0.0023	19.8	1.5009
Dec	821	0.00016	0.215	0.0096	29.8	0.00301	0.1	0.0038	0.0579	2.195	0.9	7.2	0.300	2.3	0.0038	0.0025	22.9	2.0590
Total	33964																	

Location X14

	Flows (x 1000 m3)	Ag mg/L	Al mg/L	As mg/L	Ca mg/L	Cd mg/L	Cl mg/L	Co mg/L	Cu mg/L	Fe mg/L	K mg/L	Mg mg/L	Mn mg/L	Na mg/L	Ni mg/L	Pb mg/L	SO4 mg/L	Zn mg/L
Jan	1192	0.00012	0.158	0.0079	27.7	0.00289	0.1	0.0034	0.0451	1.662	1.6	20.4	0.233	3.7	0.0058	0.0048	207.9	1.5812
Feb	912	0.00012	0.172	0.0091	26.3	0.00336	0.1	0.0039	0.0519	1.894	1.7	22.8	0.267	3.9	0.0066	0.0053	244.8	1.8514
Mar	981	0.00013	0.191	0.0104	24.7	0.00380	0.1	0.0044	0.0601	2.185	1.7	22.9	0.309	3.8	0.0071	0.0054	250.5	2.1705
Apr	1784	0.00012	0.164	0.0079	26.3	0.00273	0.1	0.0033	0.0459	1.705	1.3	15.2	0.237	3.1	0.0048	0.0038	140.9	1.6104
May	14480	0.00010	0.080	0.0020	29.1	0.00056	0.0	0.0010	0.0110	0.476	1.0	7.6	0.059	2.4	0.0016	0.0020	28.3	0.2578
Jun	14796	0.00011	0.085	0.0023	29.1	0.00064	0.0	0.0011	0.0126	0.533	1.0	7.6	0.067	2.4	0.0017	0.0020	27.8	0.3167
Jul	10302	0.00011	0.089	0.0025	29.1	0.00075	0.0	0.0012	0.0142	0.590	1.0	8.1	0.075	2.4	0.0019	0.0021	35.3	0.3797
Aug	7268	0.00011	0.088	0.0026	28.8	0.00079	0.0	0.0012	0.0145	0.597	1.0	8.7	0.077	2.5	0.0020	0.0022	44.3	0.3930
Sep	9748	0.00010	0.083	0.0022	29.0	0.00065	0.0	0.0011	0.0123	0.522	1.0	8.1	0.066	2.4	0.0018	0.0021	35.4	0.3093
Oct	5108	0.00011	0.090	0.0028	28.7	0.00089	0.0	0.0013	0.0156	0.633	1.1	9.7	0.082	2.6	0.0022	0.0024	57.6	0.4376
Nov	2303	0.00011	0.120	0.0049	28.7	0.00170	0.0	0.0022	0.0280	1.068	1.3	13.5	0.145	3.0	0.0036	0.0033	110.6	0.9133
Dec	1705	0.00012	0.141	0.0064	28.9	0.00226	0.1	0.0028	0.0366	1.371	1.4	16.4	0.189	3.3	0.0046	0.0039	149.9	1.2437
Total	70579																	

Location Mouth of Rose Creek

	Flows (x 1000 m3)	Ag mg/L	Al mg/L	As mg/L	Ca mg/L	Cd mg/L	Cl mg/L	Co mg/L	Cu mg/L	Fe mg/L	K mg/L	Mg mg/L	Mn mg/L	Na mg/L	Ni mg/L	Pb mg/L	SO4 mg/L	Zn mg/L
Jan	1628	0.00012	0.134	0.0061	28.2	0.00217	0.1	0.0027	0.0343	1.288	1.4	16.7	0.178	3.3	0.0046	0.0040	155.4	1.1649
Feb	1230	0.00012	0.144	0.0070	27.1	0.00254	0.1	0.0031	0.0398	1.474	1.5	18.6	0.206	3.5	0.0052	0.0044	184.7	1.3802
Mar	1301	0.00012	0.160	0.0081	25.9	0.00292	0.1	0.0035	0.0465	1.712	1.5	18.9	0.240	3.5	0.0056	0.0045	191.7	1.6428
Apr	2402	0.00012	0.139	0.0061	27.2	0.00208	0.1	0.0026	0.0354	1.335	1.2	13.0	0.183	2.9	0.0039	0.0033	107.7	1.2031
May	19992	0.00010	0.076	0.0017	29.2	0.00046	0.0	0.0009	0.0093	0.418	1.0	7.3	0.050	2.3	0.0015	0.0019	23.7	0.1938
Jun	20466	0.00010	0.080	0.0019	29.3	0.00052	0.0	0.0009	0.0105	0.458	1.0	7.3	0.056	2.3	0.0015	0.0019	23.4	0.2360
Jul	14254	0.00010	0.082	0.0021	29.2	0.00060	0.0	0.0010	0.0117	0.500	1.0	7.7	0.062	2.4	0.0017	0.0020	28.7	0.2815
Aug	10032	0.00010	0.082	0.0022	29.0	0.00063	0.0	0.0011	0.0119	0.505	1.0	8.1	0.063	2.4	0.0018	0.0021	35.3	0.2918
Sep	13469	0.00010	0.079	0.0019	29.2	0.00053	0.0	0.0010	0.0103	0.451	1.0	7.7	0.055	2.4	0.0016	0.0020	28.8	0.2309
Oct	7047	0.00010	0.083	0.0023	28.9	0.00070	0.0	0.0011	0.0127	0.532	1.0	8.8	0.067	2.5	0.0019	0.0022	45.0	0.3243
Nov	3181	0.00011	0.105	0.0039	29.0	0.00128	0.0	0.0018	0.0216	0.846	1.2	11.6	0.113	2.8	0.0029	0.0028	83.3	0.6682
Dec	2352	0.00012	0.121	0.0049	29.1	0.00170	0.0	0.0022	0.0279	1.067	1.3	13.7	0.145	3.0	0.0036	0.0033	111.9	0.9086
Total	97354																	

Location Mouth of Anvil Creek

	Flows (x 1000 m3)	Ag mg/L	Al mg/L	As mg/L	Ca mg/L	Cd mg/L	Cl mg/L	Co mg/L	Cu mg/L	Fe mg/L	K mg/L	Mg mg/L	Mn mg/L	Na mg/L	Ni mg/L	Pb mg/L	SO4 mg/L	Zn mg/L
Jan	4432	0.00011	0.091	0.0029	29.1	0.00092	0.0	0.0014	0.0158	0.640	1.1	10.3	0.083	2.7	0.0024	0.0025	64.5	0.4441
Feb	3272	0.00011	0.095	0.0033	28.7	0.00108	0.0	0.0015	0.0181	0.719	1.1	11.1	0.095	2.7	0.0026	0.0027	76.7	0.5346
Mar	3362	0.00011	0.102	0.0038	28.2	0.00125	0.0	0.0017	0.0211	0.825	1.1	11.3	0.110	2.7	0.0028	0.0028	81.4	0.6516
Apr	6375	0.00011	0.093	0.0029	28.7	0.00091	0.0	0.0014	0.0165	0.667	1.0	9.0	0.087	2.5	0.0021	0.0023	47.9	0.4692
May	55468	0.00010	0.070	0.0013	29.5	0.00029	0.0	0.0007	0.0066	0.319	0.9	6.8	0.036	2.3	0.0012	0.0018	16.0	0.0862
Jun	56957	0.00010	0.071	0.0013	29.5	0.00031	0.0	0.0007	0.0070	0.334	0.9	6.8	0.038	2.3	0.0013	0.0018	16.9	0.1012
Jul	39693	0.00010	0.072	0.0014	29.5	0.00034	0.0	0.0008	0.0074	0.349	0.9	6.9	0.040	2.3	0.0013	0.0018	17.8	0.1175
Aug	27824	0.00010	0.072	0.0014	29.4	0.00035	0.0	0.0008	0.0075	0.351	0.9	7.1	0.041	2.3	0.0013	0.0018	20.2	0.1216
Sep	37419	0.00010	0.070	0.0013	29.4	0.00032	0.0	0.0007	0.0069	0.331	0.9	7.0	0.038	2.3	0.0013	0.0018	17.9	0.0995
Oct	19528	0.00010	0.072	0.0015	29.4	0.00038	0.0	0.0008	0.0078	0.361	1.0	7.4	0.042	2.3	0.0014	0.0019	23.7	0.1334
Nov	8835	0.00010	0.080	0.0020	29.4	0.00059	0.0	0.0010	0.0110	0.474	1.0	8.4	0.059	2.5	0.0018	0.0021	37.5	0.2570
Dec	6515	0.00011	0.086	0.0024	29.4	0.00074	0.0	0.0012	0.0133	0.554	1.1	9.1	0.070	2.5	0.0020	0.0023	47.9	0.3443
Total	269678																	

SF06 - Faro Mine Site - Combined Cover Infiltration Sensitivity Assessment

Conditions FUTURE 1

Location X2

	Flows (x 1000 m3)	Ag mg/L	Al mg/L	As mg/L	Ca mg/L	Cd mg/L	Cl mg/L	Co mg/L	Cu mg/L	Fe mg/L	K mg/L	Mg mg/L	Mn mg/L	Na mg/L	Ni mg/L	Pb mg/L	SO4 mg/L	Zn mg/L
Jan	553	0.00011	0.068	0.0011	29.8	0.00024	0.0	0.0007	0.0053	0.276	0.9	6.7	0.032	2.3	0.0013	0.0018	13.2	0.0544
Feb	403	0.00011	0.069	0.0012	29.9	0.00025	0.0	0.0007	0.0054	0.279	0.9	6.8	0.033	2.3	0.0013	0.0018	13.5	0.0611
Mar	407	0.00011	0.070	0.0012	29.9	0.00027	0.0	0.0007	0.0055	0.283	0.9	6.8	0.034	2.3	0.0014	0.0019	14.0	0.0701
Apr	784	0.00011	0.069	0.0011	29.8	0.00025	0.0	0.0007	0.0054	0.277	0.9	6.8	0.032	2.3	0.0013	0.0018	13.3	0.0566
May	6991	0.00010	0.066	0.0010	29.6	0.00021	0.0	0.0006	0.0050	0.266	0.9	6.6	0.029	2.3	0.0011	0.0017	11.9	0.0297
Jun	7191	0.00010	0.066	0.0010	29.6	0.00021	0.0	0.0006	0.0051	0.266	0.9	6.6	0.029	2.3	0.0011	0.0017	12.0	0.0307
Jul	5013	0.00010	0.066	0.0010	29.6	0.00021	0.0	0.0006	0.0051	0.267	0.9	6.6	0.029	2.3	0.0011	0.0017	12.0	0.0319
Aug	3506	0.00010	0.066	0.0010	29.6	0.00021	0.0	0.0006	0.0051	0.267	0.9	6.6	0.029	2.3	0.0011	0.0017	12.1	0.0322
Sep	4720	0.00010	0.066	0.0010	29.6	0.00021	0.0	0.0006	0.0051	0.266	0.9	6.6	0.029	2.3	0.0011	0.0017	12.0	0.0306
Oct	2460	0.00010	0.067	0.0010	29.7	0.00021	0.0	0.0006	0.0051	0.267	0.9	6.6	0.029	2.3	0.0011	0.0017	12.1	0.0330
Nov	1115	0.00010	0.067	0.0011	29.7	0.00022	0.0	0.0006	0.0052	0.271	0.9	6.6	0.030	2.3	0.0012	0.0018	12.5	0.0414
Dec	821	0.00011	0.068	0.0011	29.8	0.00023	0.0	0.0007	0.0052	0.273	0.9	6.7	0.031	2.3	0.0012	0.0018	12.8	0.0473
Total	33964																	

Location X14

	Flows (x 1000 m3)	Ag mg/L	Al mg/L	As mg/L	Ca mg/L	Cd mg/L	Cl mg/L	Co mg/L	Cu mg/L	Fe mg/L	K mg/L	Mg mg/L	Mn mg/L	Na mg/L	Ni mg/L	Pb mg/L	SO4 mg/L	Zn mg/L
Jan	1192	0.00008	0.045	0.0014	26.3	0.00081	0.0	0.0011	0.0046	0.186	1.6	9.8	0.026	3.7	0.0039	0.0042	48.9	0.0709
Feb	912	0.00007	0.039	0.0015	24.6	0.00092	0.0	0.0011	0.0043	0.161	1.7	10.2	0.024	3.9	0.0044	0.0046	55.6	0.0778
Mar	981	0.00007	0.035	0.0014	22.9	0.00094	0.0	0.0011	0.0041	0.147	1.7	10.0	0.023	3.8	0.0044	0.0046	56.0	0.0862
Apr	1784	0.00008	0.049	0.0013	25.4	0.00061	0.0	0.0009	0.0046	0.200	1.3	8.2	0.026	3.0	0.0029	0.0032	35.3	0.0709
May	14480	0.00010	0.064	0.0010	29.0	0.00025	0.0	0.0006	0.0050	0.255	1.0	6.7	0.028	2.4	0.0013	0.0019	14.7	0.0322
Jun	14796	0.00010	0.064	0.0010	29.0	0.00025	0.0	0.0006	0.0050	0.257	1.0	6.7	0.028	2.4	0.0013	0.0019	14.6	0.0341
Jul	10302	0.00010	0.063	0.0011	28.9	0.00028	0.0	0.0007	0.0050	0.254	1.0	6.9	0.028	2.4	0.0014	0.0020	16.0	0.0359
Aug	7268	0.00010	0.062	0.0011	28.6	0.00030	0.0	0.0007	0.0049	0.248	1.0	7.0	0.028	2.5	0.0015	0.0021	17.7	0.0361
Sep	9748	0.00010	0.063	0.0010	28.9	0.00027	0.0	0.0007	0.0049	0.253	1.0	6.9	0.028	2.4	0.0014	0.0020	16.0	0.0337
Oct	5108	0.00009	0.060	0.0011	28.4	0.00034	0.0	0.0007	0.0048	0.242	1.1	7.2	0.027	2.6	0.0017	0.0023	20.2	0.0373
Nov	2303	0.00009	0.056	0.0012	28.0	0.00051	0.0	0.0008	0.0048	0.226	1.3	8.2	0.027	3.0	0.0025	0.0030	30.4	0.0517
Dec	1705	0.00009	0.053	0.0013	27.9	0.00064	0.0	0.0009	0.0049	0.216	1.4	9.0	0.027	3.3	0.0031	0.0035	38.0	0.0618
Total	70579																	

Location Mouth of Rose Creek

	Flows (x 1000 m3)	Ag mg/L	Al mg/L	As mg/L	Ca mg/L	Cd mg/L	Cl mg/L	Co mg/L	Cu mg/L	Fe mg/L	K mg/L	Mg mg/L	Mn mg/L	Na mg/L	Ni mg/L	Pb mg/L	SO4 mg/L	Zn mg/L
Jan	1628	0.00009	0.051	0.0013	27.2	0.00065	0.0	0.0009	0.0047	0.207	1.4	8.9	0.026	3.3	0.0031	0.0035	38.9	0.0588
Feb	1230	0.00008	0.046	0.0013	25.9	0.00073	0.0	0.0010	0.0045	0.188	1.5	9.3	0.025	3.5	0.0035	0.0039	44.3	0.0644
Mar	1301	0.00008	0.043	0.0013	24.6	0.00076	0.0	0.0010	0.0043	0.176	1.5	9.1	0.024	3.4	0.0036	0.0039	45.1	0.0713
Apr	2402	0.00009	0.053	0.0012	26.5	0.00050	0.0	0.0008	0.0047	0.217	1.2	7.8	0.026	2.8	0.0024	0.0028	29.2	0.0592
May	19992	0.00010	0.064	0.0010	29.1	0.00024	0.0	0.0006	0.0050	0.258	1.0	6.7	0.028	2.3	0.0013	0.0018	13.9	0.0304
Jun	20466	0.00010	0.064	0.0010	29.2	0.00024	0.0	0.0006	0.0050	0.259	1.0	6.7	0.028	2.3	0.0013	0.0018	13.8	0.0317
Jul	14254	0.00010	0.064	0.0010	29.1	0.00026	0.0	0.0006	0.0050	0.257	1.0	6.8	0.028	2.4	0.0013	0.0019	14.8	0.0331
Aug	10032	0.00010	0.063	0.0010	28.8	0.00027	0.0	0.0007	0.0049	0.252	1.0	6.9	0.028	2.4	0.0014	0.0020	16.0	0.0332
Sep	13469	0.00010	0.064	0.0010	29.1	0.00025	0.0	0.0006	0.0050	0.256	1.0	6.8	0.028	2.4	0.0013	0.0019	14.8	0.0315
Oct	7047	0.00010	0.062	0.0011	28.7	0.00030	0.0	0.0007	0.0049	0.248	1.0	7.0	0.028	2.5	0.0016	0.0021	17.9	0.0341
Nov	3181	0.00009	0.059	0.0012	28.4	0.00043	0.0	0.0008	0.0049	0.237	1.2	7.7	0.028	2.8	0.0021	0.0026	25.3	0.0445
Dec	2352	0.00009	0.057	0.0012	28.4	0.00052	0.0	0.0008	0.0049	0.229	1.3	8.3	0.028	3.0	0.0025	0.0030	30.8	0.0518
Total	97354																	

Location Mouth of Anvil Creek

	Flows (x 1000 m3)	Ag mg/L	Al mg/L	As mg/L	Ca mg/L	Cd mg/L	Cl mg/L	Co mg/L	Cu mg/L	Fe mg/L	K mg/L	Mg mg/L	Mn mg/L	Na mg/L	Ni mg/L	Pb mg/L	SO4 mg/L	Zn mg/L
Jan	4432	0.00009	0.060	0.0011	28.7	0.00036	0.0	0.0007	0.0049	0.243	1.1	7.4	0.028	2.7	0.0018	0.0024	21.7	0.0378
Feb	3272	0.00009	0.058	0.0011	28.2	0.00040	0.0	0.0007	0.0048	0.235	1.1	7.6	0.027	2.7	0.0020	0.0025	23.9	0.0402
Mar	3362	0.00009	0.057	0.0011	27.7	0.00042	0.0	0.0007	0.0047	0.230	1.1	7.5	0.027	2.7	0.0021	0.0025	24.6	0.0433
Apr	6375	0.00009	0.061	0.0011	28.4	0.00031	0.0	0.0007	0.0049	0.246	1.0	7.0	0.028	2.5	0.0016	0.0021	18.3	0.0383
May	55468	0.00010	0.065	0.0010	29.4	0.00021	0.0	0.0006	0.0050	0.262	0.9	6.6	0.028	2.3	0.0012	0.0017	12.5	0.0273
Jun	56957	0.00010	0.065	0.0010	29.4	0.00021	0.0	0.0006	0.0050	0.262	0.9	6.6	0.028	2.3	0.0012	0.0017	12.5	0.0278
Jul	39693	0.00010	0.065	0.0010	29.4	0.00022	0.0	0.0006	0.0050	0.261	0.9	6.6	0.028	2.3	0.0012	0.0018	12.8	0.0283
Aug	27824	0.00010	0.065	0.0010	29.3	0.00023	0.0	0.0006	0.0050	0.260	0.9	6.6	0.028	2.3	0.0012	0.0018	13.3	0.0283
Sep	37419	0.00010	0.065	0.0010	29.4	0.00022	0.0	0.0006	0.0050	0.261	0.9	6.6	0.028	2.3	0.0012	0.0018	12.8	0.0277
Oct	19528	0.00010	0.064	0.0010	29.3	0.00024	0.0	0.0006	0.0050	0.258	1.0	6.7	0.028	2.3	0.0013	0.0018	13.9	0.0287
Nov	8835	0.00010	0.063	0.0011	29.2	0.00028	0.0	0.0007	0.0050	0.254	1.0	7.0	0.028	2.5	0.0015	0.0020	16.6	0.0324
Dec	6515	0.00010	0.063	0.0011	29.2	0.00031	0.0	0.0007	0.0050	0.251	1.0	7.2	0.028	2.5	0.0016	0.0022	18.6	0.0351
Total	269678																	

SF06 - Faro Mine Site - Combined Cover Infiltration Sensitivity Assessment
Conditions FUTURE 2

Location X2

	Flows (x 1000 m3)	Ag mg/L	Al mg/L	As mg/L	Ca mg/L	Cd mg/L	Cl mg/L	Co mg/L	Cu mg/L	Fe mg/L	K mg/L	Mg mg/L	Mn mg/L	Na mg/L	Ni mg/L	Pb mg/L	SO4 mg/L	Zn mg/L
Jan	553	0.00011	0.078	0.0012	30.0	0.00037	0.0	0.0009	0.0064	0.335	0.9	7.0	0.046	2.4	0.0019	0.0021	15.3	0.1629
Feb	403	0.00011	0.080	0.0012	30.1	0.00041	0.0	0.0010	0.0068	0.351	0.9	7.2	0.050	2.4	0.0021	0.0022	16.1	0.1949
Mar	407	0.00012	0.084	0.0013	30.3	0.00047	0.0	0.0011	0.0072	0.373	1.0	7.3	0.055	2.4	0.0023	0.0023	17.2	0.2376
Apr	784	0.00011	0.079	0.0012	30.1	0.00039	0.0	0.0009	0.0065	0.340	0.9	7.1	0.047	2.4	0.0019	0.0021	15.6	0.1734
May	6991	0.00010	0.068	0.0010	29.7	0.00022	0.0	0.0006	0.0052	0.274	0.9	6.6	0.031	2.3	0.0012	0.0018	12.2	0.0453
Jun	7191	0.00010	0.068	0.0010	29.7	0.00023	0.0	0.0007	0.0053	0.277	0.9	6.6	0.031	2.3	0.0012	0.0018	12.4	0.0501
Jul	5013	0.00010	0.068	0.0010	29.7	0.00024	0.0	0.0007	0.0053	0.279	0.9	6.6	0.032	2.3	0.0013	0.0018	12.5	0.0554
Aug	3506	0.00010	0.069	0.0010	29.7	0.00024	0.0	0.0007	0.0053	0.280	0.9	6.7	0.032	2.3	0.0013	0.0018	12.5	0.0568
Sep	4720	0.00010	0.068	0.0010	29.7	0.00023	0.0	0.0007	0.0052	0.276	0.9	6.6	0.031	2.3	0.0012	0.0018	12.3	0.0496
Oct	2460	0.00010	0.069	0.0011	29.7	0.00024	0.0	0.0007	0.0054	0.282	0.9	6.7	0.033	2.3	0.0013	0.0018	12.6	0.0607
Nov	1115	0.00011	0.072	0.0011	29.8	0.00029	0.0	0.0008	0.0058	0.303	0.9	6.8	0.038	2.3	0.0015	0.0019	13.7	0.1007
Dec	821	0.00011	0.075	0.0012	29.9	0.00033	0.0	0.0008	0.0061	0.317	0.9	6.9	0.042	2.4	0.0017	0.0020	14.4	0.1291
Total	33964																	

Location X14

	Flows (x 1000 m3)	Ag mg/L	Al mg/L	As mg/L	Ca mg/L	Cd mg/L	Cl mg/L	Co mg/L	Cu mg/L	Fe mg/L	K mg/L	Mg mg/L	Mn mg/L	Na mg/L	Ni mg/L	Pb mg/L	SO4 mg/L	Zn mg/L
Jan	1192	0.00008	0.052	0.0015	30.4	0.00090	0.0	0.0012	0.0057	0.233	1.6	15.7	0.036	3.8	0.0043	0.0044	86.9	0.1426
Feb	912	0.00008	0.046	0.0016	29.6	0.00102	0.0	0.0013	0.0056	0.216	1.7	17.2	0.036	4.0	0.0048	0.0048	100.9	0.1620
Mar	981	0.00007	0.044	0.0016	28.0	0.00106	0.0	0.0013	0.0056	0.212	1.7	17.1	0.038	3.9	0.0049	0.0049	102.4	0.1852
Apr	1784	0.00008	0.055	0.0014	28.1	0.00070	0.0	0.0010	0.0058	0.248	1.3	12.1	0.036	3.1	0.0032	0.0034	60.4	0.1440
May	14480	0.00010	0.064	0.0010	29.3	0.00027	0.0	0.0007	0.0051	0.262	1.0	7.2	0.030	2.4	0.0014	0.0019	17.9	0.0429
Jun	14796	0.00010	0.065	0.0011	29.3	0.00027	0.0	0.0007	0.0052	0.265	1.0	7.2	0.030	2.4	0.0014	0.0019	17.7	0.0475
Jul	10302	0.00010	0.065	0.0011	29.4	0.00030	0.0	0.0007	0.0052	0.265	1.0	7.6	0.030	2.4	0.0015	0.0020	20.6	0.0523
Aug	7268	0.00010	0.063	0.0011	29.3	0.00032	0.0	0.0007	0.0052	0.259	1.0	7.9	0.030	2.5	0.0016	0.0021	24.0	0.0530
Sep	9748	0.00010	0.064	0.0011	29.4	0.00029	0.0	0.0007	0.0051	0.261	1.0	7.6	0.030	2.4	0.0015	0.0020	20.6	0.0468
Oct	5108	0.00009	0.062	0.0011	29.3	0.00036	0.0	0.0007	0.0051	0.254	1.1	8.6	0.030	2.6	0.0018	0.0023	29.2	0.0563
Nov	2303	0.00009	0.059	0.0013	30.1	0.00056	0.0	0.0009	0.0055	0.253	1.3	11.1	0.033	3.0	0.0027	0.0031	49.6	0.0926
Dec	1705	0.00009	0.058	0.0014	30.8	0.00071	0.0	0.0011	0.0057	0.253	1.4	13.1	0.036	3.4	0.0034	0.0036	64.8	0.1179
Total	70579																	

Location Mouth of Rose Creek

	Flows (x 1000 m3)	Ag mg/L	Al mg/L	As mg/L	Ca mg/L	Cd mg/L	Cl mg/L	Co mg/L	Cu mg/L	Fe mg/L	K mg/L	Mg mg/L	Mn mg/L	Na mg/L	Ni mg/L	Pb mg/L	SO4 mg/L	Zn mg/L
Jan	1628	0.00009	0.055	0.0014	30.2	0.00071	0.0	0.0010	0.0055	0.241	1.4	13.2	0.034	3.4	0.0034	0.0037	66.8	0.1113
Feb	1230	0.00008	0.051	0.0014	29.6	0.00081	0.0	0.0011	0.0054	0.229	1.5	14.4	0.034	3.5	0.0039	0.0040	77.9	0.1268
Mar	1301	0.00008	0.049	0.0014	28.4	0.00085	0.0	0.0011	0.0055	0.225	1.5	14.5	0.035	3.5	0.0040	0.0041	80.1	0.1459
Apr	2402	0.00009	0.058	0.0013	28.5	0.00057	0.0	0.0009	0.0056	0.252	1.2	10.7	0.034	2.9	0.0027	0.0030	47.9	0.1135
May	19992	0.00010	0.065	0.0010	29.4	0.00025	0.0	0.0006	0.0051	0.263	1.0	7.0	0.029	2.3	0.0013	0.0019	16.2	0.0382
Jun	20466	0.00010	0.065	0.0010	29.4	0.00025	0.0	0.0006	0.0051	0.265	1.0	7.0	0.030	2.3	0.0013	0.0019	16.0	0.0414
Jul	14254	0.00010	0.065	0.0011	29.5	0.00027	0.0	0.0007	0.0052	0.265	1.0	7.3	0.030	2.4	0.0014	0.0019	18.1	0.0449
Aug	10032	0.00010	0.064	0.0011	29.3	0.00029	0.0	0.0007	0.0051	0.260	1.0	7.6	0.030	2.4	0.0015	0.0020	20.6	0.0455
Sep	13469	0.00010	0.065	0.0010	29.4	0.00027	0.0	0.0007	0.0051	0.262	1.0	7.3	0.029	2.4	0.0014	0.0019	18.2	0.0410
Oct	7047	0.00010	0.063	0.0011	29.4	0.00032	0.0	0.0007	0.0051	0.257	1.0	8.0	0.030	2.5	0.0016	0.0021	24.4	0.0478
Nov	3181	0.00009	0.061	0.0012	30.0	0.00046	0.0	0.0008	0.0053	0.256	1.2	9.9	0.032	2.8	0.0023	0.0027	39.1	0.0741
Dec	2352	0.00009	0.060	0.0013	30.5	0.00057	0.0	0.0009	0.0055	0.256	1.3	11.3	0.034	3.1	0.0027	0.0031	50.2	0.0925
Total	97354																	

Location Mouth of Anvil Creek

	Flows (x 1000 m3)	Ag mg/L	Al mg/L	As mg/L	Ca mg/L	Cd mg/L	Cl mg/L	Co mg/L	Cu mg/L	Fe mg/L	K mg/L	Mg mg/L	Mn mg/L	Na mg/L	Ni mg/L	Pb mg/L	SO4 mg/L	Zn mg/L
Jan	4432	0.00010	0.062	0.0011	29.8	0.00039	0.0	0.0008	0.0052	0.256	1.1	9.0	0.030	2.7	0.0019	0.0024	32.0	0.0571
Feb	3272	0.00009	0.060	0.0012	29.6	0.00043	0.0	0.0008	0.0052	0.251	1.1	9.5	0.031	2.7	0.0021	0.0026	36.6	0.0636
Mar	3362	0.00009	0.060	0.0012	29.1	0.00045	0.0	0.0008	0.0052	0.249	1.1	9.6	0.031	2.7	0.0022	0.0026	38.2	0.0722
Apr	6375	0.00010	0.063	0.0011	29.2	0.00034	0.0	0.0007	0.0052	0.260	1.0	8.1	0.031	2.5	0.0017	0.0022	25.3	0.0587
May	55468	0.00010	0.066	0.0010	29.5	0.00022	0.0	0.0006	0.0050	0.264	0.9	6.7	0.029	2.3	0.0012	0.0018	13.3	0.0301
Jun	56957	0.00010	0.066	0.0010	29.5	0.00022	0.0	0.0006	0.0051	0.264	0.9	6.7	0.029	2.3	0.0012	0.0018	13.3	0.0313
Jul	39693	0.00010	0.066	0.0010	29.6	0.00023	0.0	0.0006	0.0051	0.264	0.9	6.8	0.029	2.3	0.0012	0.0018	14.0	0.0325
Aug	27824	0.00010	0.065	0.0010	29.5	0.00023	0.0	0.0006	0.0050	0.263	0.9	6.9	0.029	2.3	0.0012	0.0018	14.9	0.0328
Sep	37419	0.00010	0.065	0.0010	29.5	0.00022	0.0	0.0006	0.0050	0.263	0.9	6.8	0.029	2.3	0.0012	0.0018	14.0	0.0311
Oct	19528	0.00010	0.065	0.0010	29.5	0.00024	0.0	0.0006	0.0050	0.262	1.0	7.1	0.029	2.3	0.0013	0.0019	16.3	0.0336
Nov	8835	0.00010	0.064	0.0011	29.7	0.00029	0.0	0.0007	0.0051	0.261	1.0	7.7	0.030	2.5	0.0015	0.0021	21.6	0.0431
Dec	6515	0.00010	0.064	0.0011	29.9	0.00033	0.0	0.0007	0.0052	0.261	1.1	8.2	0.030	2.6	0.0017	0.0022	25.6	0.0497
Total	269678																	

SF05 - Faro Mine Site - Combined Cover Infiltration Sensitivity Assessment

Conditions FUTURE 3

Location X2

	Flows (x 1000 m3)	Ag mg/L	Al mg/L	As mg/L	Ca mg/L	Cd mg/L	Cl mg/L	Co mg/L	Cu mg/L	Fe mg/L	K mg/L	Mg mg/L	Mn mg/L	Na mg/L	Ni mg/L	Pb mg/L	SO4 mg/L	Zn mg/L
Jan	553	0.00024	0.404	0.0205	30.2	0.00655	0.2	0.0078	0.1249	4.638	1.0	7.9	0.643	2.4	0.0071	0.0036	37.0	4.6290
Feb	403	0.00027	0.483	0.0250	30.3	0.00803	0.3	0.0095	0.1529	5.657	1.0	8.3	0.786	2.4	0.0085	0.0040	42.9	5.7015
Mar	407	0.00031	0.588	0.0311	30.5	0.01001	0.3	0.0117	0.1902	7.018	1.0	8.7	0.977	2.4	0.0104	0.0046	50.7	7.1344
Apr	784	0.00025	0.430	0.0220	30.2	0.00704	0.2	0.0083	0.1341	4.973	1.0	8.1	0.690	2.4	0.0076	0.0037	38.9	4.9815
May	6991	0.00012	0.114	0.0038	29.7	0.00111	0.0	0.0016	0.0222	0.892	0.9	6.7	0.117	2.3	0.0020	0.0020	15.3	0.6862
Jun	7191	0.00012	0.126	0.0045	29.7	0.00133	0.0	0.0019	0.0264	1.045	0.9	6.8	0.138	2.3	0.0022	0.0020	16.2	0.8479
Jul	5013	0.00013	0.139	0.0052	29.7	0.00158	0.0	0.0022	0.0310	1.213	0.9	6.8	0.162	2.3	0.0024	0.0021	17.2	1.0243
Aug	3506	0.00013	0.143	0.0054	29.7	0.00164	0.1	0.0022	0.0323	1.258	0.9	6.9	0.168	2.3	0.0025	0.0021	17.5	1.0720
Sep	4720	0.00012	0.125	0.0044	29.7	0.00131	0.0	0.0019	0.0260	1.029	0.9	6.8	0.136	2.3	0.0022	0.0020	16.1	0.8304
Oct	2460	0.00014	0.152	0.0060	29.7	0.00182	0.1	0.0024	0.0356	1.381	0.9	6.9	0.185	2.3	0.0026	0.0022	18.2	1.2013
Nov	1115	0.00018	0.251	0.0117	29.9	0.00367	0.1	0.0045	0.0706	2.655	1.0	7.3	0.364	2.3	0.0044	0.0027	25.5	2.5426
Dec	821	0.00020	0.321	0.0157	30.0	0.00499	0.2	0.0060	0.0954	3.560	1.0	7.6	0.492	2.3	0.0057	0.0031	30.8	3.4948
Total	33964																	

Location X14

	Flows (x 1000 m3)	Ag mg/L	Al mg/L	As mg/L	Ca mg/L	Cd mg/L	Cl mg/L	Co mg/L	Cu mg/L	Fe mg/L	K mg/L	Mg mg/L	Mn mg/L	Na mg/L	Ni mg/L	Pb mg/L	SO4 mg/L	Zn mg/L
Jan	1192	0.00016	0.239	0.0127	32.1	0.00440	0.1	0.0052	0.0742	2.713	1.6	29.3	0.381	3.8	0.0073	0.0052	334.5	2.6777
Feb	912	0.00016	0.267	0.0147	31.5	0.00514	0.2	0.0059	0.0861	3.129	1.7	33.4	0.442	4.0	0.0083	0.0058	395.6	3.1390
Mar	981	0.00017	0.303	0.0170	30.0	0.00589	0.2	0.0068	0.1002	3.636	1.7	33.8	0.514	3.9	0.0091	0.0060	405.3	3.6836
Apr	1784	0.00016	0.246	0.0127	29.2	0.00427	0.1	0.0051	0.0756	2.776	1.3	21.1	0.388	3.1	0.0063	0.0043	225.0	2.7280
May	14480	0.00011	0.092	0.0027	29.5	0.00079	0.0	0.0012	0.0154	0.633	1.0	8.4	0.081	2.4	0.0018	0.0020	39.1	0.4215
Jun	14796	0.00011	0.100	0.0031	29.5	0.00093	0.0	0.0014	0.0180	0.730	1.0	8.3	0.095	2.4	0.0019	0.0021	38.3	0.5219
Jul	10302	0.00011	0.107	0.0036	29.6	0.00109	0.0	0.0016	0.0208	0.829	1.0	9.2	0.109	2.4	0.0022	0.0022	50.6	0.6292
Aug	7268	0.00011	0.107	0.0037	29.6	0.00115	0.0	0.0016	0.0214	0.845	1.0	10.2	0.112	2.5	0.0023	0.0023	65.5	0.6522
Sep	9748	0.00011	0.098	0.0031	29.6	0.00093	0.0	0.0014	0.0176	0.714	1.0	9.2	0.093	2.4	0.0020	0.0022	50.7	0.5094
Oct	5108	0.00011	0.111	0.0041	29.7	0.00129	0.0	0.0018	0.0233	0.912	1.1	11.8	0.122	2.6	0.0026	0.0025	87.3	0.7283
Nov	2303	0.00013	0.166	0.0076	30.9	0.00256	0.1	0.0032	0.0446	1.668	1.3	18.0	0.230	3.0	0.0044	0.0035	174.5	1.5389
Dec	1705	0.00015	0.205	0.0101	32.0	0.00345	0.1	0.0041	0.0594	2.194	1.4	22.7	0.305	3.4	0.0057	0.0043	239.0	2.1017
Total	70579																	

Location Mouth of Rose Creek

	Flows (x 1000 m3)	Ag mg/L	Al mg/L	As mg/L	Ca mg/L	Cd mg/L	Cl mg/L	Co mg/L	Cu mg/L	Fe mg/L	K mg/L	Mg mg/L	Mn mg/L	Na mg/L	Ni mg/L	Pb mg/L	SO4 mg/L	Zn mg/L
Jan	1628	0.00014	0.193	0.0095	31.4	0.00328	0.1	0.0039	0.0557	2.058	1.4	23.2	0.287	3.4	0.0056	0.0043	248.1	1.9680
Feb	1230	0.00015	0.215	0.0111	31.0	0.00386	0.1	0.0046	0.0651	2.390	1.5	26.5	0.335	3.5	0.0065	0.0048	296.5	2.3354
Mar	1301	0.00015	0.245	0.0130	29.9	0.00449	0.1	0.0053	0.0768	2.806	1.5	27.1	0.394	3.5	0.0071	0.0049	308.5	2.7837
Apr	2402	0.00014	0.200	0.0097	29.3	0.00322	0.1	0.0039	0.0575	2.131	1.2	17.4	0.296	2.9	0.0050	0.0036	170.2	2.0335
May	19992	0.00011	0.085	0.0022	29.5	0.00063	0.0	0.0011	0.0125	0.531	1.0	7.9	0.066	2.3	0.0016	0.0019	31.6	0.3124
Jun	20466	0.00011	0.091	0.0025	29.5	0.00072	0.0	0.0012	0.0144	0.601	1.0	7.8	0.076	2.3	0.0017	0.0020	31.0	0.3844
Jul	14254	0.00011	0.096	0.0029	29.6	0.00085	0.0	0.0013	0.0164	0.673	1.0	8.5	0.087	2.4	0.0019	0.0021	39.8	0.4618
Aug	10032	0.00011	0.096	0.0030	29.5	0.00089	0.0	0.0014	0.0169	0.685	1.0	9.2	0.089	2.4	0.0020	0.0022	50.7	0.4795
Sep	13469	0.00011	0.089	0.0025	29.6	0.00073	0.0	0.0012	0.0142	0.590	1.0	8.5	0.075	2.4	0.0018	0.0020	39.9	0.3757
Oct	7047	0.00011	0.099	0.0032	29.7	0.00099	0.0	0.0015	0.0183	0.734	1.0	10.3	0.096	2.5	0.0022	0.0023	66.5	0.5349
Nov	3181	0.00012	0.139	0.0058	30.6	0.00191	0.1	0.0025	0.0336	1.281	1.2	14.9	0.174	2.8	0.0035	0.0030	129.6	1.1210
Dec	2352	0.00013	0.167	0.0076	31.3	0.00255	0.1	0.0032	0.0444	1.663	1.3	18.2	0.229	3.1	0.0044	0.0036	176.4	1.5305
Total	97354																	

Location Mouth of Anvil Creek

	Flows (x 1000 m3)	Ag mg/L	Al mg/L	As mg/L	Ca mg/L	Cd mg/L	Cl mg/L	Co mg/L	Cu mg/L	Fe mg/L	K mg/L	Mg mg/L	Mn mg/L	Na mg/L	Ni mg/L	Pb mg/L	SO4 mg/L	Zn mg/L
Jan	4432	0.00011	0.113	0.0041	30.3	0.00133	0.0	0.0018	0.0236	0.923	1.1	12.7	0.123	2.7	0.0028	0.0026	98.6	0.7391
Feb	3272	0.00012	0.122	0.0048	30.1	0.00158	0.0	0.0021	0.0276	1.063	1.1	14.0	0.144	2.7	0.0031	0.0028	118.7	0.8936
Mar	3362	0.00012	0.135	0.0057	29.7	0.00186	0.1	0.0024	0.0328	1.248	1.1	14.5	0.170	2.7	0.0034	0.0030	126.6	1.0932
Apr	6375	0.00012	0.116	0.0043	29.5	0.00134	0.0	0.0018	0.0248	0.967	1.0	10.6	0.129	2.5	0.0026	0.0024	71.4	0.7821
May	55468	0.00010	0.073	0.0014	29.6	0.00035	0.0	0.0008	0.0077	0.360	0.9	7.0	0.042	2.3	0.0013	0.0018	18.9	0.1290
Jun	56957	0.00010	0.075	0.0016	29.6	0.00039	0.0	0.0008	0.0084	0.385	0.9	7.0	0.046	2.3	0.0013	0.0018	18.6	0.1545
Jul	39693	0.00010	0.077	0.0017	29.6	0.00043	0.0	0.0009	0.0091	0.411	0.9	7.2	0.049	2.3	0.0014	0.0018	21.8	0.1823
Aug	27824	0.00010	0.077	0.0017	29.6	0.00045	0.0	0.0009	0.0093	0.416	0.9	7.5	0.050	2.3	0.0014	0.0019	25.8	0.1893
Sep	37419	0.00010	0.074	0.0015	29.6	0.00039	0.0	0.0008	0.0083	0.381	0.9	7.2	0.045	2.3	0.0013	0.0018	21.9	0.1516
Oct	19528	0.00010	0.078	0.0018	29.6	0.00049	0.0	0.0009	0.0098	0.434	1.0	7.9	0.053	2.3	0.0015	0.0019	31.5	0.2094
Nov	8835	0.00011	0.092	0.0027	29.9	0.00082	0.0	0.0013	0.0153	0.630	1.0	9.5	0.081	2.5	0.0020	0.0022	54.1	0.4200
Dec	6515	0.00011	0.102	0.0034	30.2	0.00105	0.0	0.0015	0.0192	0.769	1.1	10.8	0.101	2.6	0.0023	0.0024	71.2	0.5688
Total	269678																	

SF07 - Faro Mine Site - Rudimentary Cover Infiltration Sensitivity Assessment

Conditions FUTURE 1

Location X2

	Flows (x 1000 m3)	Ag mg/L	Al mg/L	As mg/L	Ca mg/L	Cd mg/L	Cl mg/L	Co mg/L	Cu mg/L	Fe mg/L	K mg/L	Mg mg/L	Mn mg/L	Na mg/L	Ni mg/L	Pb mg/L	SO4 mg/L	Zn mg/L
Jan	553	0.00010	0.067	0.0011	29.7	0.00023	0.0	0.0006	0.0052	0.271	0.9	6.7	0.030	2.3	0.0012	0.0018	12.6	0.0430
Feb	403	0.00011	0.068	0.0011	29.7	0.00023	0.0	0.0007	0.0052	0.273	0.9	6.7	0.031	2.3	0.0012	0.0018	12.8	0.0470
Mar	407	0.00011	0.068	0.0011	29.8	0.00024	0.0	0.0007	0.0053	0.275	0.9	6.7	0.032	2.3	0.0013	0.0018	13.1	0.0525
Apr	784	0.00010	0.067	0.0011	29.7	0.00023	0.0	0.0006	0.0052	0.272	0.9	6.7	0.031	2.3	0.0012	0.0018	12.7	0.0443
May	6991	0.00010	0.066	0.0010	29.6	0.00020	0.0	0.0006	0.0050	0.265	0.9	6.6	0.029	2.3	0.0011	0.0017	11.8	0.0281
Jun	7191	0.00010	0.066	0.0010	29.6	0.00020	0.0	0.0006	0.0050	0.265	0.9	6.6	0.029	2.3	0.0011	0.0017	11.9	0.0287
Jul	5013	0.00010	0.066	0.0010	29.6	0.00021	0.0	0.0006	0.0050	0.266	0.9	6.6	0.029	2.3	0.0011	0.0017	11.9	0.0294
Aug	3506	0.00010	0.066	0.0010	29.6	0.00021	0.0	0.0006	0.0050	0.266	0.9	6.6	0.029	2.3	0.0011	0.0017	11.9	0.0296
Sep	4720	0.00010	0.066	0.0010	29.6	0.00020	0.0	0.0006	0.0050	0.265	0.9	6.6	0.029	2.3	0.0011	0.0017	11.9	0.0286
Oct	2460	0.00010	0.066	0.0010	29.6	0.00021	0.0	0.0006	0.0051	0.266	0.9	6.6	0.029	2.3	0.0011	0.0017	11.9	0.0300
Nov	1115	0.00010	0.067	0.0010	29.7	0.00021	0.0	0.0006	0.0051	0.268	0.9	6.6	0.029	2.3	0.0012	0.0017	12.2	0.0351
Dec	821	0.00010	0.067	0.0011	29.7	0.00022	0.0	0.0006	0.0051	0.269	0.9	6.6	0.030	2.3	0.0012	0.0018	12.4	0.0387
Total	33964																	

Location X14

	Flows (x 1000 m3)	Ag mg/L	Al mg/L	As mg/L	Ca mg/L	Cd mg/L	Cl mg/L	Co mg/L	Cu mg/L	Fe mg/L	K mg/L	Mg mg/L	Mn mg/L	Na mg/L	Ni mg/L	Pb mg/L	SO4 mg/L	Zn mg/L
Jan	1192	0.00008	0.044	0.0013	24.3	0.00078	0.0	0.0010	0.0043	0.180	1.6	8.2	0.024	3.7	0.0038	0.0042	36.8	0.0522
Feb	912	0.00007	0.038	0.0014	22.2	0.00089	0.0	0.0011	0.0039	0.154	1.7	8.2	0.023	3.9	0.0043	0.0046	41.2	0.0559
Mar	981	0.00007	0.034	0.0013	20.5	0.00090	0.0	0.0011	0.0037	0.139	1.7	7.9	0.021	3.8	0.0043	0.0046	41.3	0.0604
Apr	1784	0.00008	0.048	0.0012	24.1	0.00058	0.0	0.0009	0.0043	0.194	1.3	7.1	0.025	3.0	0.0028	0.0032	27.3	0.0518
May	14480	0.00010	0.063	0.0010	28.8	0.00025	0.0	0.0006	0.0049	0.255	1.0	6.6	0.028	2.4	0.0013	0.0019	13.7	0.0294
Jun	14796	0.00010	0.064	0.0010	28.8	0.00025	0.0	0.0006	0.0049	0.255	1.0	6.6	0.028	2.4	0.0013	0.0019	13.6	0.0306
Jul	10302	0.00010	0.063	0.0010	28.7	0.00027	0.0	0.0006	0.0049	0.253	1.0	6.7	0.028	2.4	0.0014	0.0020	14.6	0.0317
Aug	7268	0.00010	0.061	0.0010	28.2	0.00030	0.0	0.0007	0.0048	0.246	1.0	6.7	0.027	2.5	0.0015	0.0021	15.7	0.0316
Sep	9748	0.00010	0.063	0.0010	28.6	0.00027	0.0	0.0006	0.0049	0.252	1.0	6.7	0.028	2.4	0.0014	0.0020	14.6	0.0303
Oct	5108	0.00009	0.060	0.0011	27.9	0.00033	0.0	0.0007	0.0048	0.240	1.1	6.8	0.027	2.6	0.0017	0.0023	17.4	0.0323
Nov	2303	0.00009	0.055	0.0012	27.0	0.00050	0.0	0.0008	0.0047	0.223	1.3	7.4	0.027	3.0	0.0025	0.0029	24.4	0.0410
Dec	1705	0.00009	0.052	0.0013	26.5	0.00062	0.0	0.0009	0.0046	0.211	1.4	7.8	0.026	3.3	0.0030	0.0035	29.6	0.0471
Total	70579																	

Location Mouth of Rose Creek

	Flows (x 1000 m3)	Ag mg/L	Al mg/L	As mg/L	Ca mg/L	Cd mg/L	Cl mg/L	Co mg/L	Cu mg/L	Fe mg/L	K mg/L	Mg mg/L	Mn mg/L	Na mg/L	Ni mg/L	Pb mg/L	SO4 mg/L	Zn mg/L
Jan	1628	0.00008	0.050	0.0013	25.7	0.00063	0.0	0.0009	0.0045	0.202	1.4	7.7	0.026	3.3	0.0031	0.0035	30.1	0.0451
Feb	1230	0.00008	0.045	0.0013	24.1	0.00071	0.0	0.0010	0.0042	0.182	1.5	7.8	0.024	3.5	0.0035	0.0038	33.6	0.0481
Mar	1301	0.00007	0.042	0.0013	22.7	0.00073	0.0	0.0010	0.0040	0.170	1.5	7.6	0.023	3.4	0.0035	0.0039	34.0	0.0518
Apr	2402	0.00009	0.052	0.0011	25.5	0.00048	0.0	0.0008	0.0045	0.212	1.2	7.0	0.026	2.8	0.0024	0.0028	23.3	0.0451
May	19992	0.00010	0.064	0.0010	29.0	0.00024	0.0	0.0006	0.0049	0.257	1.0	6.6	0.028	2.3	0.0013	0.0018	13.1	0.0284
Jun	20466	0.00010	0.064	0.0010	29.1	0.00023	0.0	0.0006	0.0050	0.258	1.0	6.6	0.028	2.3	0.0013	0.0018	13.1	0.0292
Jul	14254	0.00010	0.064	0.0010	28.9	0.00025	0.0	0.0006	0.0049	0.256	1.0	6.6	0.028	2.4	0.0013	0.0019	13.8	0.0300
Aug	10032	0.00010	0.063	0.0010	28.6	0.00027	0.0	0.0006	0.0049	0.251	1.0	6.7	0.028	2.4	0.0014	0.0020	14.6	0.0300
Sep	13469	0.00010	0.064	0.0010	28.9	0.00025	0.0	0.0006	0.0049	0.255	1.0	6.6	0.028	2.4	0.0013	0.0019	13.8	0.0290
Oct	7047	0.00010	0.062	0.0010	28.4	0.00030	0.0	0.0007	0.0048	0.247	1.0	6.7	0.027	2.5	0.0016	0.0021	15.8	0.0305
Nov	3181	0.00009	0.058	0.0011	27.7	0.00041	0.0	0.0008	0.0048	0.234	1.2	7.1	0.027	2.8	0.0021	0.0026	20.9	0.0367
Dec	2352	0.00009	0.056	0.0012	27.4	0.00050	0.0	0.0008	0.0047	0.226	1.3	7.5	0.027	3.0	0.0025	0.0030	24.7	0.0412
Total	97354																	

Location Mouth of Anvil Creek

	Flows (x 1000 m3)	Ag mg/L	Al mg/L	As mg/L	Ca mg/L	Cd mg/L	Cl mg/L	Co mg/L	Cu mg/L	Fe mg/L	K mg/L	Mg mg/L	Mn mg/L	Na mg/L	Ni mg/L	Pb mg/L	SO4 mg/L	Zn mg/L
Jan	4432	0.00009	0.060	0.0011	28.2	0.00036	0.0	0.0007	0.0048	0.241	1.1	7.0	0.027	2.7	0.0018	0.0024	18.5	0.0328
Feb	3272	0.00009	0.058	0.0011	27.5	0.00039	0.0	0.0007	0.0047	0.233	1.1	7.0	0.027	2.7	0.0020	0.0025	19.9	0.0340
Mar	3362	0.00009	0.057	0.0011	26.9	0.00040	0.0	0.0007	0.0046	0.228	1.1	6.9	0.026	2.7	0.0020	0.0025	20.3	0.0358
Apr	6375	0.00009	0.061	0.0011	28.0	0.00031	0.0	0.0007	0.0048	0.244	1.0	6.7	0.027	2.5	0.0016	0.0021	16.1	0.0329
May	55468	0.00010	0.065	0.0010	29.4	0.00021	0.0	0.0006	0.0050	0.262	0.9	6.6	0.028	2.3	0.0012	0.0017	12.2	0.0266
Jun	56957	0.00010	0.065	0.0010	29.4	0.00021	0.0	0.0006	0.0050	0.262	0.9	6.6	0.028	2.3	0.0012	0.0017	12.2	0.0269
Jul	39693	0.00010	0.065	0.0010	29.4	0.00022	0.0	0.0006	0.0050	0.261	0.9	6.6	0.028	2.3	0.0012	0.0018	12.5	0.0272
Aug	27824	0.00010	0.065	0.0010	29.2	0.00022	0.0	0.0006	0.0050	0.259	0.9	6.6	0.028	2.3	0.0012	0.0018	12.8	0.0272
Sep	37419	0.00010	0.065	0.0010	29.3	0.00022	0.0	0.0006	0.0050	0.261	0.9	6.6	0.028	2.3	0.0012	0.0018	12.5	0.0268
Oct	19528	0.00010	0.064	0.0010	29.1	0.00024	0.0	0.0006	0.0049	0.258	1.0	6.6	0.028	2.3	0.0013	0.0018	13.2	0.0274
Nov	8835	0.00010	0.063	0.0010	28.9	0.00028	0.0	0.0007	0.0049	0.253	1.0	6.8	0.028	2.5	0.0015	0.0020	15.0	0.0296
Dec	6515	0.00010	0.062	0.0011	28.8	0.00031	0.0	0.0007	0.0049	0.250	1.0	6.9	0.028	2.5	0.0016	0.0022	16.4	0.0312
Total	269678																	

SF07 - Faro Mine Site - Rudimentary Cover Infiltration Sensitivity Assessment
Conditions FUTURE 2

Location X2

	Flows (x 1000 m3)	Ag mg/L	Al mg/L	As mg/L	Ca mg/L	Cd mg/L	Cl mg/L	Co mg/L	Cu mg/L	Fe mg/L	K mg/L	Mg mg/L	Mn mg/L	Na mg/L	Ni mg/L	Pb mg/L	SO4 mg/L	Zn mg/L
Jan	553	0.00011	0.073	0.0011	29.8	0.00030	0.0	0.0008	0.0059	0.307	0.9	6.8	0.039	2.3	0.0016	0.0019	13.9	0.1087
Feb	403	0.00011	0.075	0.0011	29.9	0.00033	0.0	0.0008	0.0061	0.317	0.9	6.9	0.041	2.3	0.0017	0.0020	14.4	0.1281
Mar	407	0.00011	0.077	0.0012	30.0	0.00036	0.0	0.0009	0.0063	0.330	0.9	7.0	0.045	2.4	0.0018	0.0021	15.0	0.1540
Apr	784	0.00011	0.074	0.0011	29.9	0.00031	0.0	0.0008	0.0059	0.310	0.9	6.9	0.040	2.3	0.0016	0.0020	14.0	0.1151
May	6991	0.00010	0.067	0.0010	29.6	0.00021	0.0	0.0006	0.0051	0.270	0.9	6.6	0.030	2.3	0.0012	0.0017	12.0	0.0375
Jun	7191	0.00010	0.067	0.0010	29.6	0.00022	0.0	0.0006	0.0052	0.272	0.9	6.6	0.030	2.3	0.0012	0.0017	12.1	0.0405
Jul	5013	0.00010	0.067	0.0010	29.6	0.00022	0.0	0.0006	0.0052	0.273	0.9	6.6	0.031	2.3	0.0012	0.0018	12.2	0.0436
Aug	3506	0.00010	0.068	0.0010	29.7	0.00022	0.0	0.0006	0.0052	0.274	0.9	6.6	0.031	2.3	0.0012	0.0018	12.2	0.0445
Sep	4720	0.00010	0.067	0.0010	29.6	0.00022	0.0	0.0006	0.0052	0.272	0.9	6.6	0.030	2.3	0.0012	0.0017	12.1	0.0401
Oct	2460	0.00010	0.068	0.0010	29.7	0.00023	0.0	0.0006	0.0052	0.275	0.9	6.6	0.031	2.3	0.0012	0.0018	12.3	0.0468
Nov	1115	0.00010	0.070	0.0011	29.7	0.00026	0.0	0.0007	0.0055	0.287	0.9	6.7	0.034	2.3	0.0014	0.0018	12.9	0.0711
Dec	821	0.00010	0.071	0.0011	29.8	0.00028	0.0	0.0007	0.0056	0.296	0.9	6.8	0.036	2.3	0.0015	0.0019	13.3	0.0883
Total	33964																	

Location X14

	Flows (x 1000 m3)	Ag mg/L	Al mg/L	As mg/L	Ca mg/L	Cd mg/L	Cl mg/L	Co mg/L	Cu mg/L	Fe mg/L	K mg/L	Mg mg/L	Mn mg/L	Na mg/L	Ni mg/L	Pb mg/L	SO4 mg/L	Zn mg/L
Jan	1192	0.00008	0.048	0.0014	26.8	0.00084	0.0	0.0011	0.0050	0.209	1.6	11.7	0.031	3.7	0.0041	0.0043	59.8	0.0960
Feb	912	0.00007	0.043	0.0015	25.2	0.00095	0.0	0.0012	0.0048	0.188	1.7	12.4	0.030	3.9	0.0046	0.0047	68.6	0.1073
Mar	981	0.00007	0.040	0.0014	23.6	0.00097	0.0	0.0012	0.0047	0.180	1.7	12.2	0.030	3.9	0.0046	0.0047	69.4	0.1208
Apr	1784	0.00008	0.052	0.0013	25.7	0.00063	0.0	0.0009	0.0050	0.224	1.3	9.5	0.031	3.1	0.0030	0.0033	42.5	0.0965
May	14480	0.00010	0.064	0.0010	29.0	0.00026	0.0	0.0006	0.0050	0.259	1.0	6.9	0.029	2.4	0.0014	0.0019	15.6	0.0360
Jun	14796	0.00010	0.064	0.0010	29.0	0.00026	0.0	0.0006	0.0051	0.261	1.0	6.9	0.029	2.4	0.0014	0.0019	15.5	0.0388
Jul	10302	0.00010	0.064	0.0011	29.0	0.00028	0.0	0.0007	0.0051	0.259	1.0	7.1	0.029	2.4	0.0015	0.0020	17.3	0.0416
Aug	7268	0.00010	0.062	0.0011	28.6	0.00031	0.0	0.0007	0.0050	0.253	1.0	7.3	0.029	2.5	0.0016	0.0021	19.5	0.0420
Sep	9748	0.00010	0.063	0.0010	28.9	0.00028	0.0	0.0007	0.0050	0.257	1.0	7.1	0.029	2.4	0.0015	0.0020	17.4	0.0383
Oct	5108	0.00009	0.061	0.0011	28.5	0.00035	0.0	0.0007	0.0049	0.248	1.1	7.6	0.029	2.6	0.0018	0.0023	22.8	0.0439
Nov	2303	0.00009	0.058	0.0012	28.3	0.00053	0.0	0.0009	0.0051	0.240	1.3	9.1	0.030	3.0	0.0026	0.0030	35.9	0.0660
Dec	1705	0.00009	0.055	0.0013	28.3	0.00066	0.0	0.0010	0.0052	0.234	1.4	10.3	0.031	3.3	0.0032	0.0036	45.7	0.0814
Total	70579																	

Location Mouth of Rose Creek

	Flows (x 1000 m3)	Ag mg/L	Al mg/L	As mg/L	Ca mg/L	Cd mg/L	Cl mg/L	Co mg/L	Cu mg/L	Fe mg/L	K mg/L	Mg mg/L	Mn mg/L	Na mg/L	Ni mg/L	Pb mg/L	SO4 mg/L	Zn mg/L
Jan	1628	0.00009	0.053	0.0013	27.5	0.00067	0.0	0.0010	0.0050	0.224	1.4	10.3	0.030	3.3	0.0033	0.0036	47.0	0.0771
Feb	1230	0.00008	0.049	0.0013	26.3	0.00075	0.0	0.0010	0.0048	0.208	1.5	10.9	0.030	3.5	0.0037	0.0039	53.9	0.0862
Mar	1301	0.00008	0.046	0.0013	25.0	0.00078	0.0	0.0011	0.0048	0.201	1.5	10.8	0.030	3.5	0.0038	0.0040	55.2	0.0974
Apr	2402	0.00009	0.055	0.0012	26.7	0.00052	0.0	0.0009	0.0050	0.234	1.2	8.7	0.030	2.9	0.0025	0.0029	34.6	0.0782
May	19992	0.00010	0.065	0.0010	29.2	0.00024	0.0	0.0006	0.0050	0.260	1.0	6.8	0.029	2.3	0.0013	0.0018	14.5	0.0331
Jun	20466	0.00010	0.065	0.0010	29.2	0.00024	0.0	0.0006	0.0050	0.262	1.0	6.8	0.029	2.3	0.0013	0.0018	14.4	0.0351
Jul	14254	0.00010	0.064	0.0010	29.2	0.00026	0.0	0.0007	0.0051	0.261	1.0	6.9	0.029	2.4	0.0014	0.0019	15.8	0.0372
Aug	10032	0.00010	0.063	0.0010	28.9	0.00028	0.0	0.0007	0.0050	0.256	1.0	7.1	0.029	2.4	0.0015	0.0020	17.4	0.0375
Sep	13469	0.00010	0.064	0.0010	29.1	0.00026	0.0	0.0006	0.0050	0.259	1.0	6.9	0.029	2.4	0.0014	0.0019	15.8	0.0348
Oct	7047	0.00010	0.062	0.0011	28.8	0.00031	0.0	0.0007	0.0050	0.253	1.0	7.3	0.029	2.5	0.0016	0.0021	19.8	0.0389
Nov	3181	0.00009	0.060	0.0012	28.6	0.00044	0.0	0.0008	0.0050	0.246	1.2	8.4	0.030	2.8	0.0022	0.0026	29.3	0.0548
Dec	2352	0.00009	0.058	0.0012	28.6	0.00053	0.0	0.0009	0.0051	0.242	1.3	9.3	0.031	3.0	0.0026	0.0030	36.4	0.0661
Total	97354																	

Location Mouth of Anvil Creek

	Flows (x 1000 m3)	Ag mg/L	Al mg/L	As mg/L	Ca mg/L	Cd mg/L	Cl mg/L	Co mg/L	Cu mg/L	Fe mg/L	K mg/L	Mg mg/L	Mn mg/L	Na mg/L	Ni mg/L	Pb mg/L	SO4 mg/L	Zn mg/L
Jan	4432	0.00009	0.061	0.0011	28.8	0.00037	0.0	0.0007	0.0050	0.249	1.1	7.9	0.029	2.7	0.0019	0.0024	24.7	0.0445
Feb	3272	0.00009	0.059	0.0011	28.4	0.00041	0.0	0.0008	0.0049	0.243	1.1	8.2	0.029	2.7	0.0021	0.0025	27.6	0.0484
Mar	3362	0.00009	0.058	0.0011	27.8	0.00042	0.0	0.0008	0.0049	0.239	1.1	8.2	0.029	2.7	0.0021	0.0026	28.5	0.0534
Apr	6375	0.00009	0.062	0.0011	28.5	0.00032	0.0	0.0007	0.0050	0.253	1.0	7.4	0.029	2.5	0.0016	0.0022	20.3	0.0454
May	55468	0.00010	0.065	0.0010	29.4	0.00021	0.0	0.0006	0.0050	0.263	0.9	6.6	0.028	2.3	0.0012	0.0018	12.7	0.0283
Jun	56957	0.00010	0.065	0.0010	29.5	0.00022	0.0	0.0006	0.0050	0.263	0.9	6.6	0.029	2.3	0.0012	0.0018	12.7	0.0290
Jul	39693	0.00010	0.065	0.0010	29.4	0.00022	0.0	0.0006	0.0050	0.263	0.9	6.7	0.029	2.3	0.0012	0.0018	13.2	0.0298
Aug	27824	0.00010	0.065	0.0010	29.3	0.00023	0.0	0.0006	0.0050	0.261	0.9	6.7	0.028	2.3	0.0012	0.0018	13.8	0.0299
Sep	37419	0.00010	0.065	0.0010	29.4	0.00022	0.0	0.0006	0.0050	0.262	0.9	6.7	0.028	2.3	0.0012	0.0018	13.2	0.0289
Oct	19528	0.00010	0.065	0.0010	29.3	0.00024	0.0	0.0006	0.0050	0.260	1.0	6.8	0.028	2.3	0.0013	0.0019	14.6	0.0304
Nov	8835	0.00010	0.064	0.0011	29.2	0.00028	0.0	0.0007	0.0050	0.258	1.0	7.2	0.029	2.5	0.0015	0.0020	18.0	0.0361
Dec	6515	0.00010	0.063	0.0011	29.2	0.00032	0.0	0.0007	0.0050	0.256	1.1	7.5	0.029	2.5	0.0017	0.0022	20.6	0.0402
Total	269678																	

SF07 - Faro Mine Site - Rudimentary Cover Infiltration Sensitivity Assessment

Conditions: FUTURE 3

Location: X2

	Flows (x 1000 m3)	Ag mg/L	Al mg/L	As mg/L	Ca mg/L	Cd mg/L	Cl mg/L	Co mg/L	Cu mg/L	Fe mg/L	K mg/L	Mg mg/L	Mn mg/L	Na mg/L	Ni mg/L	Pb mg/L	SO4 mg/L	Zn mg/L
Jan	553	0.00018	0.269	0.0127	29.9	0.00402	0.1	0.0049	0.0772	2.895	1.0	7.4	0.398	2.3	0.0047	0.0028	26.9	2.7947
Feb	403	0.00020	0.317	0.0155	30.0	0.00491	0.2	0.0059	0.0940	3.508	1.0	7.6	0.484	2.3	0.0056	0.0031	30.4	3.4399
Mar	407	0.00023	0.380	0.0191	30.1	0.00610	0.2	0.0073	0.1164	4.327	1.0	7.8	0.599	2.4	0.0067	0.0034	35.2	4.3018
Apr	784	0.00019	0.285	0.0136	29.9	0.00431	0.1	0.0053	0.0827	3.097	1.0	7.4	0.426	2.3	0.0050	0.0029	28.1	3.0068
May	6991	0.00011	0.095	0.0027	29.6	0.00075	0.0	0.0012	0.0154	0.642	0.9	6.7	0.081	2.3	0.0016	0.0019	13.9	0.4230
Jun	7191	0.00011	0.102	0.0031	29.7	0.00088	0.0	0.0014	0.0179	0.734	0.9	6.7	0.094	2.3	0.0017	0.0019	14.4	0.5202
Jul	5013	0.00012	0.110	0.0035	29.7	0.00103	0.0	0.0015	0.0207	0.835	0.9	6.7	0.109	2.3	0.0019	0.0019	15.0	0.6263
Aug	3506	0.00012	0.112	0.0037	29.7	0.00107	0.0	0.0016	0.0214	0.862	0.9	6.7	0.112	2.3	0.0019	0.0020	15.2	0.6550
Sep	4720	0.00011	0.101	0.0030	29.7	0.00087	0.0	0.0014	0.0176	0.724	0.9	6.7	0.093	2.3	0.0017	0.0019	14.4	0.5097
Oct	2460	0.00012	0.118	0.0040	29.7	0.00118	0.0	0.0017	0.0234	0.936	0.9	6.8	0.123	2.3	0.0020	0.0020	15.6	0.7328
Nov	1115	0.00015	0.177	0.0074	29.8	0.00229	0.1	0.0030	0.0445	1.703	0.9	7.0	0.230	2.3	0.0031	0.0023	20.0	1.5397
Dec	821	0.00016	0.219	0.0098	29.8	0.00308	0.1	0.0039	0.0594	2.247	0.9	7.2	0.307	2.3	0.0038	0.0026	23.2	2.1125
Total	33964																	

Location: X14

	Flows (x 1000 m3)	Ag mg/L	Al mg/L	As mg/L	Ca mg/L	Cd mg/L	Cl mg/L	Co mg/L	Cu mg/L	Fe mg/L	K mg/L	Mg mg/L	Mn mg/L	Na mg/L	Ni mg/L	Pb mg/L	SO4 mg/L	Zn mg/L
Jan	1192	0.00012	0.161	0.0081	27.8	0.00294	0.1	0.0035	0.0462	1.701	1.6	20.7	0.238	3.7	0.0059	0.0048	211.7	1.6204
Feb	912	0.00012	0.175	0.0093	26.4	0.00342	0.1	0.0040	0.0532	1.940	1.7	23.1	0.274	3.9	0.0067	0.0053	249.4	1.8973
Mar	981	0.00013	0.195	0.0107	24.8	0.00388	0.1	0.0045	0.0616	2.238	1.7	23.2	0.317	3.8	0.0071	0.0054	255.1	2.2245
Apr	1784	0.00013	0.167	0.0081	26.4	0.00278	0.1	0.0034	0.0471	1.744	1.3	15.4	0.243	3.1	0.0049	0.0038	143.5	1.6503
May	14480	0.00010	0.081	0.0020	29.1	0.00057	0.0	0.0010	0.0112	0.482	1.0	7.7	0.060	2.4	0.0016	0.0020	28.6	0.2636
Jun	14796	0.00011	0.085	0.0023	29.1	0.00065	0.0	0.0011	0.0128	0.540	1.0	7.6	0.068	2.4	0.0017	0.0020	28.1	0.3240
Jul	10302	0.00011	0.089	0.0026	29.1	0.00076	0.0	0.0012	0.0145	0.599	1.0	8.2	0.076	2.4	0.0019	0.0021	35.7	0.3886
Aug	7268	0.00011	0.089	0.0026	28.8	0.00081	0.0	0.0012	0.0147	0.606	1.0	8.8	0.078	2.5	0.0020	0.0022	45.0	0.4023
Sep	9748	0.00010	0.084	0.0023	29.0	0.00066	0.0	0.0011	0.0125	0.529	1.0	8.2	0.067	2.4	0.0018	0.0021	35.8	0.3164
Oct	5108	0.00011	0.091	0.0029	28.7	0.00091	0.0	0.0013	0.0159	0.644	1.1	9.7	0.084	2.6	0.0023	0.0024	58.5	0.4480
Nov	2303	0.00012	0.122	0.0050	28.8	0.00173	0.0	0.0022	0.0286	1.091	1.3	13.7	0.149	3.0	0.0036	0.0033	112.6	0.9356
Dec	1705	0.00012	0.144	0.0066	29.0	0.00231	0.1	0.0028	0.0374	1.402	1.4	16.6	0.194	3.3	0.0046	0.0039	152.6	1.2743
Total	70579																	

Location: Mouth of Rose Creek

	Flows (x 1000 m3)	Ag mg/L	Al mg/L	As mg/L	Ca mg/L	Cd mg/L	Cl mg/L	Co mg/L	Cu mg/L	Fe mg/L	K mg/L	Mg mg/L	Mn mg/L	Na mg/L	Ni mg/L	Pb mg/L	SO4 mg/L	Zn mg/L
Jan	1628	0.00012	0.136	0.0062	28.3	0.00221	0.1	0.0027	0.0352	1.316	1.4	16.9	0.182	3.3	0.0046	0.0040	158.2	1.1936
Feb	1230	0.00012	0.147	0.0072	27.2	0.00259	0.1	0.0031	0.0407	1.508	1.5	18.9	0.210	3.5	0.0052	0.0044	188.0	1.4142
Mar	1301	0.00012	0.163	0.0083	26.0	0.00297	0.1	0.0035	0.0477	1.753	1.5	19.1	0.246	3.5	0.0056	0.0045	195.2	1.6835
Apr	2402	0.00012	0.141	0.0063	27.2	0.00212	0.1	0.0027	0.0363	1.364	1.2	13.1	0.187	2.9	0.0039	0.0033	109.6	1.2327
May	19992	0.00010	0.077	0.0017	29.2	0.00047	0.0	0.0009	0.0095	0.422	1.0	7.3	0.051	2.3	0.0015	0.0019	24.0	0.1980
Jun	20466	0.00010	0.080	0.0019	29.3	0.00053	0.0	0.0010	0.0106	0.464	1.0	7.3	0.057	2.3	0.0015	0.0019	23.6	0.2413
Jul	14254	0.00011	0.083	0.0021	29.2	0.00061	0.0	0.0010	0.0118	0.506	1.0	7.7	0.063	2.4	0.0017	0.0020	29.1	0.2879
Aug	10032	0.00010	0.083	0.0022	29.0	0.00064	0.0	0.0011	0.0121	0.512	1.0	8.2	0.064	2.4	0.0018	0.0021	35.8	0.2985
Sep	13469	0.00010	0.079	0.0019	29.2	0.00054	0.0	0.0010	0.0105	0.456	1.0	7.7	0.056	2.4	0.0016	0.0020	29.2	0.2361
Oct	7047	0.00010	0.084	0.0024	28.9	0.00071	0.0	0.0011	0.0129	0.539	1.0	8.9	0.068	2.5	0.0019	0.0022	45.6	0.3318
Nov	3181	0.00011	0.106	0.0039	29.0	0.00131	0.0	0.0018	0.0221	0.862	1.2	11.7	0.115	2.8	0.0029	0.0029	84.7	0.6843
Dec	2352	0.00012	0.122	0.0050	29.1	0.00173	0.0	0.0022	0.0285	1.089	1.3	13.8	0.148	3.0	0.0037	0.0033	113.8	0.9307
Total	97354																	

Location: Mouth of Anvil Creek

	Flows (x 1000 m3)	Ag mg/L	Al mg/L	As mg/L	Ca mg/L	Cd mg/L	Cl mg/L	Co mg/L	Cu mg/L	Fe mg/L	K mg/L	Mg mg/L	Mn mg/L	Na mg/L	Ni mg/L	Pb mg/L	SO4 mg/L	Zn mg/L
Jan	4432	0.00011	0.092	0.0029	29.1	0.00094	0.0	0.0014	0.0161	0.651	1.1	10.3	0.085	2.7	0.0024	0.0025	65.5	0.4546
Feb	3272	0.00011	0.096	0.0033	28.7	0.00110	0.0	0.0015	0.0184	0.731	1.1	11.2	0.097	2.7	0.0027	0.0027	78.0	0.5474
Mar	3362	0.00011	0.104	0.0038	28.2	0.00127	0.0	0.0017	0.0215	0.840	1.1	11.4	0.112	2.7	0.0029	0.0028	82.8	0.6674
Apr	6375	0.00011	0.094	0.0030	28.7	0.00092	0.0	0.0014	0.0168	0.679	1.0	9.0	0.088	2.5	0.0022	0.0023	48.6	0.4804
May	55468	0.00010	0.070	0.0013	29.5	0.00030	0.0	0.0007	0.0066	0.321	0.9	6.8	0.037	2.3	0.0012	0.0018	16.1	0.0877
Jun	56957	0.00010	0.071	0.0013	29.5	0.00032	0.0	0.0007	0.0070	0.336	0.9	6.8	0.039	2.3	0.0013	0.0018	16.0	0.1031
Jul	39693	0.00010	0.072	0.0014	29.5	0.00035	0.0	0.0008	0.0075	0.351	0.9	7.0	0.041	2.3	0.0013	0.0018	17.9	0.1198
Aug	27824	0.00010	0.072	0.0014	29.4	0.00036	0.0	0.0008	0.0075	0.353	0.9	7.1	0.041	2.3	0.0013	0.0018	20.4	0.1240
Sep	37419	0.00010	0.071	0.0013	29.5	0.00032	0.0	0.0007	0.0070	0.333	0.9	7.0	0.038	2.3	0.0013	0.0018	18.0	0.1014
Oct	19528	0.00010	0.072	0.0015	29.4	0.00038	0.0	0.0008	0.0078	0.363	1.0	7.4	0.043	2.3	0.0014	0.0019	24.0	0.1361
Nov	8835	0.00010	0.081	0.0021	29.4	0.00060	0.0	0.0010	0.0111	0.480	1.0	8.4	0.060	2.5	0.0018	0.0021	38.0	0.2628
Dec	6515	0.00011	0.086	0.0025	29.4	0.00075	0.0	0.0012	0.0135	0.562	1.1	9.2	0.072	2.5	0.0020	0.0023	48.6	0.3523
Total	269678																	

SF08 - Faro Mine Site - Rudimentary Cover Infiltration Sensitivity Assessment

Conditions: FUTURE 1

Location: X2

	Flows (x 1000 m3)	Ag mg/L	Al mg/L	As mg/L	Ca mg/L	Cd mg/L	Cl mg/L	Co mg/L	Cu mg/L	Fe mg/L	K mg/L	Mg mg/L	Mn mg/L	Na mg/L	Ni mg/L	Pb mg/L	SO4 mg/L	Zn mg/L
Jan	553	0.00011	0.068	0.0011	29.8	0.00024	0.0	0.0007	0.0053	0.275	0.9	6.7	0.032	2.3	0.0013	0.0018	13.2	0.0527
Feb	403	0.00011	0.069	0.0012	29.9	0.00025	0.0	0.0007	0.0054	0.277	0.9	6.8	0.032	2.3	0.0013	0.0018	13.5	0.0591
Mar	407	0.00011	0.069	0.0012	29.9	0.00026	0.0	0.0007	0.0055	0.281	0.9	6.8	0.033	2.3	0.0014	0.0019	14.0	0.0675
Apr	784	0.00011	0.068	0.0011	29.8	0.00024	0.0	0.0007	0.0053	0.276	0.9	6.8	0.032	2.3	0.0013	0.0018	13.3	0.0548
May	6991	0.00010	0.066	0.0010	29.6	0.00021	0.0	0.0006	0.0050	0.266	0.9	6.6	0.029	2.3	0.0011	0.0017	11.9	0.0295
Jun	7191	0.00010	0.066	0.0010	29.6	0.00021	0.0	0.0006	0.0051	0.266	0.9	6.6	0.029	2.3	0.0011	0.0017	12.0	0.0304
Jul	5013	0.00010	0.066	0.0010	29.6	0.00021	0.0	0.0006	0.0051	0.266	0.9	6.6	0.029	2.3	0.0011	0.0017	12.0	0.0315
Aug	3506	0.00010	0.066	0.0010	29.6	0.00021	0.0	0.0006	0.0051	0.267	0.9	6.6	0.029	2.3	0.0011	0.0017	12.0	0.0318
Sep	4720	0.00010	0.066	0.0010	29.6	0.00021	0.0	0.0006	0.0051	0.266	0.9	6.6	0.029	2.3	0.0011	0.0017	12.0	0.0303
Oct	2460	0.00010	0.066	0.0010	29.7	0.00021	0.0	0.0006	0.0051	0.267	0.9	6.6	0.029	2.3	0.0011	0.0017	12.1	0.0325
Nov	1115	0.00010	0.067	0.0011	29.7	0.00022	0.0	0.0006	0.0052	0.270	0.9	6.6	0.030	2.3	0.0012	0.0018	12.5	0.0404
Dec	821	0.00011	0.068	0.0011	29.8	0.00023	0.0	0.0007	0.0052	0.272	0.9	6.7	0.031	2.3	0.0012	0.0018	12.8	0.0461
Total	33964																	

Location: X14

	Flows (x 1000 m3)	Ag mg/L	Al mg/L	As mg/L	Ca mg/L	Cd mg/L	Cl mg/L	Co mg/L	Cu mg/L	Fe mg/L	K mg/L	Mg mg/L	Mn mg/L	Na mg/L	Ni mg/L	Pb mg/L	SO4 mg/L	Zn mg/L
Jan	1192	0.00008	0.045	0.0014	26.2	0.00081	0.0	0.0011	0.0045	0.184	1.6	9.8	0.026	3.7	0.0039	0.0042	48.3	0.0687
Feb	912	0.00007	0.039	0.0014	24.5	0.00092	0.0	0.0011	0.0042	0.159	1.7	10.1	0.024	3.9	0.0044	0.0046	54.8	0.0753
Mar	981	0.00007	0.035	0.0014	22.9	0.00093	0.0	0.0011	0.0041	0.145	1.7	9.9	0.023	3.8	0.0044	0.0046	55.2	0.0832
Apr	1784	0.00008	0.048	0.0012	25.3	0.00061	0.0	0.0009	0.0046	0.199	1.3	8.2	0.026	3.0	0.0029	0.0032	34.9	0.0687
May	14480	0.00010	0.064	0.0010	29.0	0.00025	0.0	0.0006	0.0049	0.255	1.0	6.7	0.028	2.4	0.0013	0.0019	14.6	0.0319
Jun	14796	0.00010	0.064	0.0010	29.0	0.00025	0.0	0.0006	0.0050	0.256	1.0	6.7	0.028	2.4	0.0013	0.0019	14.5	0.0336
Jul	10302	0.00010	0.063	0.0011	28.9	0.00028	0.0	0.0007	0.0050	0.254	1.0	6.9	0.028	2.4	0.0014	0.0020	15.9	0.0354
Aug	7268	0.00010	0.062	0.0011	28.6	0.00030	0.0	0.0007	0.0049	0.248	1.0	7.0	0.028	2.5	0.0015	0.0021	17.6	0.0355
Sep	9748	0.00010	0.063	0.0010	28.9	0.00027	0.0	0.0007	0.0049	0.252	1.0	6.8	0.028	2.4	0.0014	0.0020	16.0	0.0333
Oct	5108	0.00009	0.060	0.0011	28.3	0.00034	0.0	0.0007	0.0048	0.242	1.1	7.2	0.027	2.6	0.0017	0.0023	20.1	0.0367
Nov	2303	0.00009	0.056	0.0012	28.0	0.00051	0.0	0.0008	0.0048	0.225	1.3	8.2	0.027	3.0	0.0025	0.0030	30.1	0.0504
Dec	1705	0.00009	0.053	0.0013	27.9	0.00064	0.0	0.0009	0.0048	0.215	1.4	8.9	0.027	3.3	0.0031	0.0035	37.6	0.0601
Total	70579																	

Location: Mouth of Rose Creek

	Flows (x 1000 m3)	Ag mg/L	Al mg/L	As mg/L	Ca mg/L	Cd mg/L	Cl mg/L	Co mg/L	Cu mg/L	Fe mg/L	K mg/L	Mg mg/L	Mn mg/L	Na mg/L	Ni mg/L	Pb mg/L	SO4 mg/L	Zn mg/L
Jan	1628	0.00009	0.051	0.0013	27.1	0.00065	0.0	0.0009	0.0046	0.206	1.4	8.9	0.026	3.3	0.0031	0.0035	38.5	0.0572
Feb	1230	0.00008	0.046	0.0013	25.8	0.00073	0.0	0.0010	0.0044	0.186	1.5	9.2	0.025	3.5	0.0035	0.0039	43.7	0.0625
Mar	1301	0.00008	0.043	0.0013	24.5	0.00075	0.0	0.0010	0.0043	0.175	1.5	9.1	0.024	3.4	0.0036	0.0039	44.5	0.0690
Apr	2402	0.00009	0.053	0.0012	26.4	0.00050	0.0	0.0008	0.0047	0.215	1.2	7.8	0.026	2.8	0.0024	0.0028	28.9	0.0576
May	19992	0.00010	0.064	0.0010	29.1	0.00024	0.0	0.0006	0.0050	0.258	1.0	6.7	0.028	2.3	0.0013	0.0018	13.8	0.0302
Jun	20466	0.00010	0.064	0.0010	29.2	0.00024	0.0	0.0006	0.0050	0.258	1.0	6.7	0.028	2.3	0.0013	0.0018	13.8	0.0314
Jul	14254	0.00010	0.064	0.0010	29.1	0.00026	0.0	0.0006	0.0050	0.257	1.0	6.8	0.028	2.4	0.0013	0.0019	14.8	0.0327
Aug	10032	0.00010	0.063	0.0010	28.8	0.00027	0.0	0.0006	0.0049	0.252	1.0	6.8	0.028	2.4	0.0014	0.0020	16.0	0.0328
Sep	13469	0.00010	0.064	0.0010	29.1	0.00025	0.0	0.0006	0.0049	0.256	1.0	6.8	0.028	2.4	0.0013	0.0019	14.8	0.0312
Oct	7047	0.00010	0.062	0.0011	28.7	0.00030	0.0	0.0007	0.0049	0.248	1.0	7.0	0.028	2.5	0.0016	0.0021	17.8	0.0336
Nov	3181	0.00009	0.059	0.0012	28.4	0.00042	0.0	0.0008	0.0049	0.236	1.2	7.7	0.027	2.8	0.0021	0.0026	25.0	0.0436
Dec	2352	0.00009	0.056	0.0012	28.3	0.00052	0.0	0.0008	0.0049	0.228	1.3	8.3	0.028	3.0	0.0025	0.0030	30.5	0.0506
Total	97354																	

Location: Mouth of Anvil Creek

	Flows (x 1000 m3)	Ag mg/L	Al mg/L	As mg/L	Ca mg/L	Cd mg/L	Cl mg/L	Co mg/L	Cu mg/L	Fe mg/L	K mg/L	Mg mg/L	Mn mg/L	Na mg/L	Ni mg/L	Pb mg/L	SO4 mg/L	Zn mg/L
Jan	4432	0.00009	0.060	0.0011	28.7	0.00036	0.0	0.0007	0.0049	0.243	1.1	7.4	0.028	2.7	0.0018	0.0024	21.5	0.0372
Feb	3272	0.00009	0.058	0.0011	28.2	0.00040	0.0	0.0007	0.0048	0.235	1.1	7.5	0.027	2.7	0.0020	0.0025	23.7	0.0395
Mar	3362	0.00009	0.057	0.0011	27.6	0.00041	0.0	0.0007	0.0047	0.229	1.1	7.5	0.027	2.7	0.0021	0.0025	24.4	0.0424
Apr	6375	0.00009	0.061	0.0011	28.4	0.00031	0.0	0.0007	0.0049	0.246	1.0	7.0	0.028	2.5	0.0016	0.0021	18.2	0.0377
May	55468	0.00010	0.065	0.0010	29.4	0.00021	0.0	0.0006	0.0050	0.262	0.9	6.6	0.028	2.3	0.0012	0.0017	12.5	0.0272
Jun	56957	0.00010	0.065	0.0010	29.4	0.00021	0.0	0.0006	0.0050	0.262	0.9	6.6	0.028	2.3	0.0012	0.0017	12.4	0.0277
Jul	39693	0.00010	0.065	0.0010	29.4	0.00022	0.0	0.0006	0.0050	0.261	0.9	6.6	0.028	2.3	0.0012	0.0018	12.8	0.0282
Aug	27824	0.00010	0.065	0.0010	29.3	0.00023	0.0	0.0006	0.0050	0.260	0.9	6.6	0.028	2.3	0.0012	0.0018	13.2	0.0282
Sep	37419	0.00010	0.065	0.0010	29.4	0.00022	0.0	0.0006	0.0050	0.261	0.9	6.6	0.028	2.3	0.0012	0.0018	12.8	0.0276
Oct	19528	0.00010	0.064	0.0010	29.3	0.00024	0.0	0.0006	0.0050	0.258	1.0	6.7	0.028	2.3	0.0013	0.0018	13.9	0.0285
Nov	8835	0.00010	0.063	0.0011	29.2	0.00028	0.0	0.0007	0.0050	0.254	1.0	7.0	0.028	2.5	0.0015	0.0020	16.5	0.0321
Dec	6515	0.00010	0.062	0.0011	29.1	0.00031	0.0	0.0007	0.0050	0.251	1.0	7.2	0.028	2.5	0.0016	0.0022	18.5	0.0346
Total	269678																	

SF08 - Faro Mine Site - Rudimentary Cover Infiltration Sensitivity Assessment
Conditions FUTURE 2

Location X2

	Flows (x 1000 m3)	Ag mg/L	Al mg/L	As mg/L	Ca mg/L	Cd mg/L	Cl mg/L	Co mg/L	Cu mg/L	Fe mg/L	K mg/L	Mg mg/L	Mn mg/L	Na mg/L	Ni mg/L	Pb mg/L	SO4 mg/L	Zn mg/L
Jan	553	0.00011	0.077	0.0012	30.0	0.00036	0.0	0.0009	0.0063	0.328	0.9	7.0	0.045	2.4	0.0018	0.0021	15.2	0.1514
Feb	403	0.00011	0.079	0.0012	30.1	0.00040	0.0	0.0009	0.0066	0.343	0.9	7.2	0.049	2.4	0.0020	0.0022	16.0	0.1807
Mar	407	0.00012	0.082	0.0013	30.3	0.00045	0.0	0.0010	0.0070	0.363	1.0	7.3	0.054	2.4	0.0022	0.0023	17.1	0.2198
Apr	784	0.00011	0.077	0.0012	30.1	0.00037	0.0	0.0009	0.0064	0.333	0.9	7.1	0.046	2.4	0.0019	0.0021	15.5	0.1610
May	6991	0.00010	0.067	0.0010	29.7	0.00022	0.0	0.0006	0.0052	0.273	0.9	6.6	0.031	2.3	0.0012	0.0018	12.2	0.0437
Jun	7191	0.00010	0.068	0.0010	29.7	0.00023	0.0	0.0006	0.0052	0.276	0.9	6.6	0.031	2.3	0.0012	0.0018	12.3	0.0481
Jul	5013	0.00010	0.068	0.0010	29.7	0.00023	0.0	0.0007	0.0053	0.278	0.9	6.6	0.032	2.3	0.0013	0.0018	12.5	0.0529
Aug	3506	0.00010	0.068	0.0010	29.7	0.00024	0.0	0.0007	0.0053	0.279	0.9	6.6	0.032	2.3	0.0013	0.0018	12.5	0.0542
Sep	4720	0.00010	0.068	0.0010	29.7	0.00023	0.0	0.0006	0.0052	0.275	0.9	6.6	0.031	2.3	0.0012	0.0018	12.3	0.0476
Oct	2460	0.00010	0.069	0.0011	29.7	0.00024	0.0	0.0007	0.0053	0.281	0.9	6.7	0.033	2.3	0.0013	0.0018	12.6	0.0577
Nov	1115	0.00011	0.072	0.0011	29.8	0.00029	0.0	0.0008	0.0057	0.299	0.9	6.8	0.037	2.3	0.0015	0.0019	13.6	0.0944
Dec	821	0.00011	0.074	0.0011	29.9	0.00032	0.0	0.0008	0.0060	0.313	0.9	6.9	0.041	2.3	0.0017	0.0020	14.3	0.1204
Total	33964																	

Location X14

	Flows (x 1000 m3)	Ag mg/L	Al mg/L	As mg/L	Ca mg/L	Cd mg/L	Cl mg/L	Co mg/L	Cu mg/L	Fe mg/L	K mg/L	Mg mg/L	Mn mg/L	Na mg/L	Ni mg/L	Pb mg/L	SO4 mg/L	Zn mg/L
Jan	1192	0.00008	0.051	0.0015	30.3	0.00089	0.0	0.0012	0.0054	0.225	1.6	15.5	0.035	3.8	0.0042	0.0044	85.0	0.1333
Feb	912	0.00008	0.045	0.0015	29.4	0.00101	0.0	0.0013	0.0053	0.207	1.7	16.9	0.035	4.0	0.0048	0.0048	98.6	0.1511
Mar	981	0.00007	0.043	0.0015	27.8	0.00104	0.0	0.0013	0.0053	0.201	1.7	16.8	0.036	3.9	0.0049	0.0048	100.1	0.1723
Apr	1784	0.00008	0.054	0.0013	28.0	0.00068	0.0	0.0010	0.0055	0.240	1.3	12.0	0.035	3.1	0.0032	0.0034	59.1	0.1345
May	14480	0.00010	0.064	0.0010	29.3	0.00026	0.0	0.0007	0.0051	0.261	1.0	7.2	0.029	2.4	0.0014	0.0019	17.8	0.0415
Jun	14796	0.00010	0.065	0.0011	29.3	0.00027	0.0	0.0007	0.0052	0.264	1.0	7.2	0.030	2.4	0.0014	0.0019	17.5	0.0457
Jul	10302	0.00010	0.064	0.0011	29.4	0.00029	0.0	0.0007	0.0052	0.263	1.0	7.5	0.030	2.4	0.0015	0.0020	20.3	0.0501
Aug	7268	0.00010	0.063	0.0011	29.2	0.00032	0.0	0.0007	0.0051	0.257	1.0	7.9	0.030	2.5	0.0016	0.0021	23.7	0.0508
Sep	9748	0.00010	0.064	0.0011	29.4	0.00029	0.0	0.0007	0.0051	0.260	1.0	7.5	0.030	2.4	0.0015	0.0020	20.4	0.0451
Oct	5108	0.00009	0.062	0.0011	29.3	0.00036	0.0	0.0007	0.0051	0.252	1.1	8.5	0.030	2.6	0.0018	0.0023	28.7	0.0538
Nov	2303	0.00009	0.059	0.0013	30.0	0.00055	0.0	0.0009	0.0053	0.249	1.3	11.0	0.033	3.0	0.0027	0.0031	48.6	0.0873
Dec	1705	0.00009	0.057	0.0014	30.7	0.00070	0.0	0.0010	0.0055	0.246	1.4	12.9	0.035	3.4	0.0033	0.0036	63.4	0.1106
Total	70579																	

Location Mouth of Rose Creek

	Flows (x 1000 m3)	Ag mg/L	Al mg/L	As mg/L	Ca mg/L	Cd mg/L	Cl mg/L	Co mg/L	Cu mg/L	Fe mg/L	K mg/L	Mg mg/L	Mn mg/L	Na mg/L	Ni mg/L	Pb mg/L	SO4 mg/L	Zn mg/L
Jan	1628	0.00009	0.055	0.0014	30.1	0.00070	0.0	0.0010	0.0053	0.235	1.4	13.1	0.033	3.4	0.0034	0.0037	65.4	0.1045
Feb	1230	0.00008	0.051	0.0014	29.4	0.00080	0.0	0.0011	0.0052	0.222	1.5	14.3	0.033	3.5	0.0038	0.0040	76.2	0.1187
Mar	1301	0.00008	0.049	0.0014	28.3	0.00083	0.0	0.0011	0.0052	0.217	1.5	14.3	0.034	3.5	0.0039	0.0041	78.4	0.1362
Apr	2402	0.00009	0.057	0.0012	28.4	0.00056	0.0	0.0009	0.0054	0.246	1.2	10.6	0.033	2.9	0.0027	0.0030	46.9	0.1065
May	19992	0.00010	0.065	0.0010	29.4	0.00025	0.0	0.0006	0.0051	0.262	1.0	7.0	0.029	2.3	0.0013	0.0019	16.1	0.0371
Jun	20466	0.00010	0.065	0.0010	29.4	0.00025	0.0	0.0006	0.0051	0.264	1.0	7.0	0.029	2.3	0.0013	0.0019	15.9	0.0402
Jul	14254	0.00010	0.065	0.0011	29.5	0.00027	0.0	0.0007	0.0051	0.263	1.0	7.3	0.030	2.4	0.0014	0.0019	17.9	0.0433
Aug	10032	0.00010	0.064	0.0011	29.3	0.00029	0.0	0.0007	0.0051	0.259	1.0	7.5	0.029	2.4	0.0015	0.0020	20.4	0.0439
Sep	13469	0.00010	0.064	0.0010	29.4	0.00026	0.0	0.0007	0.0051	0.261	1.0	7.3	0.029	2.4	0.0014	0.0019	18.0	0.0397
Oct	7047	0.00010	0.063	0.0011	29.4	0.00032	0.0	0.0007	0.0051	0.256	1.0	8.0	0.029	2.5	0.0016	0.0021	24.0	0.0460
Nov	3181	0.00009	0.061	0.0012	29.9	0.00046	0.0	0.0008	0.0052	0.253	1.2	9.8	0.031	2.8	0.0023	0.0027	38.4	0.0702
Dec	2352	0.00009	0.060	0.0013	30.4	0.00056	0.0	0.0009	0.0054	0.251	1.3	11.2	0.033	3.1	0.0027	0.0031	49.2	0.0872
Total	97354																	

Location Mouth of Anvil Creek

	Flows (x 1000 m3)	Ag mg/L	Al mg/L	As mg/L	Ca mg/L	Cd mg/L	Cl mg/L	Co mg/L	Cu mg/L	Fe mg/L	K mg/L	Mg mg/L	Mn mg/L	Na mg/L	Ni mg/L	Pb mg/L	SO4 mg/L	Zn mg/L
Jan	4432	0.00010	0.062	0.0011	29.8	0.00038	0.0	0.0008	0.0051	0.253	1.1	8.9	0.030	2.7	0.0019	0.0024	31.4	0.0546
Feb	3272	0.00009	0.060	0.0012	29.5	0.00043	0.0	0.0008	0.0051	0.248	1.1	9.4	0.030	2.7	0.0021	0.0026	35.9	0.0606
Mar	3362	0.00009	0.059	0.0012	29.1	0.00045	0.0	0.0008	0.0051	0.246	1.1	9.5	0.031	2.7	0.0022	0.0026	37.5	0.0684
Apr	6375	0.00010	0.063	0.0011	29.2	0.00034	0.0	0.0007	0.0051	0.257	1.0	8.1	0.030	2.5	0.0017	0.0022	25.0	0.0561
May	55468	0.00010	0.065	0.0010	29.5	0.00022	0.0	0.0006	0.0050	0.263	0.9	6.7	0.029	2.3	0.0012	0.0018	13.3	0.0298
Jun	56957	0.00010	0.066	0.0010	29.5	0.00022	0.0	0.0006	0.0050	0.264	0.9	6.7	0.029	2.3	0.0012	0.0018	13.2	0.0308
Jul	39693	0.00010	0.065	0.0010	29.5	0.00022	0.0	0.0006	0.0050	0.264	0.9	6.8	0.029	2.3	0.0012	0.0018	14.0	0.0320
Aug	27824	0.00010	0.065	0.0010	29.5	0.00023	0.0	0.0006	0.0050	0.262	0.9	6.9	0.029	2.3	0.0012	0.0018	14.8	0.0322
Sep	37419	0.00010	0.065	0.0010	29.5	0.00022	0.0	0.0006	0.0050	0.263	0.9	6.8	0.029	2.3	0.0012	0.0018	14.0	0.0307
Oct	19528	0.00010	0.065	0.0010	29.5	0.00024	0.0	0.0006	0.0050	0.261	1.0	7.1	0.029	2.3	0.0013	0.0019	16.2	0.0330
Nov	8835	0.00010	0.064	0.0011	29.7	0.00029	0.0	0.0007	0.0051	0.260	1.0	7.7	0.029	2.5	0.0015	0.0021	21.3	0.0417
Dec	6515	0.00010	0.064	0.0011	29.9	0.00033	0.0	0.0007	0.0051	0.259	1.1	8.2	0.030	2.6	0.0017	0.0022	25.2	0.0478
Total	269678																	

SF08 - Faro Mine Site - Rudimentary Cover Infiltration Sensitivity Assessment

Conditions: FUTURE 3

Location: X2

	Flows (x 1000 m3)	Ag mg/L	Al mg/L	As mg/L	Ca mg/L	Cd mg/L	Cl mg/L	Co mg/L	Cu mg/L	Fe mg/L	K mg/L	Mg mg/L	Mn mg/L	Na mg/L	Ni mg/L	Pb mg/L	SO4 mg/L	Zn mg/L
Jan	553	0.00023	0.396	0.0200	30.1	0.00641	0.2	0.0076	0.1221	4.534	1.0	7.9	0.629	2.4	0.0070	0.0036	36.4	4.5227
Feb	403	0.00027	0.473	0.0244	30.3	0.00785	0.3	0.0093	0.1494	5.529	1.0	8.2	0.768	2.4	0.0084	0.0040	42.2	5.5704
Mar	407	0.00031	0.576	0.0304	30.5	0.00978	0.3	0.0115	0.1858	6.858	1.0	8.7	0.955	2.4	0.0102	0.0046	49.9	6.9702
Apr	784	0.00024	0.422	0.0215	30.2	0.00688	0.2	0.0082	0.1310	4.861	1.0	8.0	0.675	2.4	0.0075	0.0037	38.3	4.8670
May	6891	0.00012	0.113	0.0037	29.7	0.00109	0.0	0.0016	0.0218	0.877	0.9	6.7	0.114	2.3	0.0020	0.0020	15.3	0.6710
Jun	7191	0.00012	0.125	0.0044	29.7	0.00131	0.0	0.0019	0.0259	1.027	0.9	6.8	0.136	2.3	0.0022	0.0020	16.1	0.8289
Jul	5013	0.00013	0.138	0.0051	29.7	0.00155	0.0	0.0021	0.0304	1.190	0.9	6.8	0.159	2.3	0.0024	0.0021	17.1	1.0012
Aug	3506	0.00013	0.141	0.0053	29.7	0.00161	0.0	0.0022	0.0316	1.235	0.9	6.9	0.165	2.3	0.0024	0.0021	17.3	1.0478
Sep	4720	0.00012	0.124	0.0043	29.7	0.00128	0.0	0.0018	0.0255	1.011	0.9	6.8	0.133	2.3	0.0021	0.0020	16.0	0.8118
Oct	2460	0.00013	0.150	0.0059	29.7	0.00178	0.1	0.0024	0.0349	1.355	0.9	6.9	0.162	2.3	0.0026	0.0022	18.0	1.1741
Nov	1115	0.00017	0.247	0.0114	29.9	0.00359	0.1	0.0044	0.0690	2.599	1.0	7.3	0.357	2.3	0.0043	0.0027	25.2	2.4845
Dec	821	0.00020	0.315	0.0153	30.0	0.00488	0.2	0.0059	0.0932	3.482	1.0	7.6	0.481	2.3	0.0056	0.0031	30.3	3.4147
Total	33964																	

Location: X14

	Flows (x 1000 m3)	Ag mg/L	Al mg/L	As mg/L	Ca mg/L	Cd mg/L	Cl mg/L	Co mg/L	Cu mg/L	Fe mg/L	K mg/L	Mg mg/L	Mn mg/L	Na mg/L	Ni mg/L	Pb mg/L	SO4 mg/L	Zn mg/L
Jan	1192	0.00015	0.235	0.0124	32.0	0.00432	0.1	0.0051	0.0725	2.655	1.6	29.3	0.373	3.8	0.0072	0.0052	330.3	2.6191
Feb	912	0.00016	0.262	0.0143	31.4	0.00504	0.2	0.0058	0.0841	3.061	1.7	33.4	0.432	4.0	0.0083	0.0058	390.6	3.0701
Mar	981	0.00017	0.297	0.0166	29.9	0.00578	0.2	0.0066	0.0980	3.555	1.7	33.8	0.502	3.9	0.0090	0.0060	400.2	3.6027
Apr	1784	0.00016	0.242	0.0124	29.1	0.00419	0.1	0.0050	0.0739	2.717	1.3	21.1	0.380	3.1	0.0062	0.0042	222.2	2.6682
May	14480	0.00011	0.092	0.0027	29.5	0.00076	0.0	0.0012	0.0151	0.624	1.0	8.4	0.080	2.4	0.0018	0.0020	38.8	0.4128
Jun	14796	0.00011	0.099	0.0031	29.5	0.00091	0.0	0.0014	0.0177	0.719	1.0	8.3	0.093	2.4	0.0019	0.0021	38.0	0.5109
Jul	10302	0.00011	0.106	0.0036	29.6	0.00108	0.0	0.0016	0.0205	0.816	1.0	9.2	0.107	2.4	0.0022	0.0022	50.1	0.6158
Aug	7268	0.00011	0.106	0.0037	29.5	0.00113	0.0	0.0016	0.0210	0.831	1.0	10.2	0.110	2.5	0.0023	0.0023	64.8	0.6383
Sep	9748	0.00011	0.097	0.0031	29.6	0.00092	0.0	0.0014	0.0173	0.703	1.0	9.2	0.091	2.4	0.0020	0.0022	50.2	0.4987
Oct	5108	0.00011	0.110	0.0040	29.7	0.00127	0.0	0.0018	0.0229	0.897	1.1	11.8	0.119	2.6	0.0026	0.0025	86.4	0.7127
Nov	2303	0.00013	0.164	0.0075	30.9	0.00251	0.1	0.0031	0.0436	1.635	1.3	18.0	0.225	3.0	0.0044	0.0035	172.4	1.5054
Dec	1705	0.00015	0.201	0.0099	31.9	0.00338	0.1	0.0041	0.0581	2.148	1.4	22.7	0.299	3.4	0.0057	0.0043	236.0	2.0558
Total	70579																	

Location: Mouth of Rose Creek

	Flows (x 1000 m3)	Ag mg/L	Al mg/L	As mg/L	Ca mg/L	Cd mg/L	Cl mg/L	Co mg/L	Cu mg/L	Fe mg/L	K mg/L	Mg mg/L	Mn mg/L	Na mg/L	Ni mg/L	Pb mg/L	SO4 mg/L	Zn mg/L
Jan	1628	0.00014	0.190	0.0093	31.3	0.00322	0.1	0.0039	0.0545	2.015	1.4	23.2	0.281	3.4	0.0056	0.0043	245.1	1.9250
Feb	1230	0.00014	0.211	0.0109	30.9	0.00379	0.1	0.0045	0.0637	2.339	1.5	26.5	0.328	3.5	0.0064	0.0047	292.8	2.2843
Mar	1301	0.00015	0.240	0.0128	29.8	0.00441	0.1	0.0052	0.0751	2.745	1.5	27.1	0.386	3.5	0.0070	0.0049	304.6	2.7226
Apr	2402	0.00014	0.197	0.0095	29.3	0.00316	0.1	0.0038	0.0562	2.087	1.2	17.4	0.289	2.9	0.0049	0.0036	168.1	1.9890
May	19992	0.00011	0.085	0.0022	29.5	0.00062	0.0	0.0011	0.0123	0.525	1.0	7.9	0.066	2.3	0.0016	0.0019	31.3	0.3060
Jun	20466	0.00011	0.090	0.0025	29.5	0.00071	0.0	0.0012	0.0142	0.593	1.0	7.8	0.075	2.3	0.0017	0.0020	30.7	0.3764
Jul	14254	0.00011	0.095	0.0028	29.6	0.00083	0.0	0.0013	0.0162	0.663	1.0	8.5	0.085	2.4	0.0019	0.0021	39.4	0.4522
Aug	10032	0.00011	0.095	0.0029	29.5	0.00088	0.0	0.0013	0.0166	0.675	1.0	9.2	0.087	2.4	0.0020	0.0022	50.2	0.4695
Sep	13469	0.00011	0.089	0.0025	29.6	0.00072	0.0	0.0012	0.0139	0.582	1.0	8.5	0.074	2.4	0.0018	0.0020	39.6	0.3680
Oct	7047	0.00011	0.098	0.0032	29.7	0.00098	0.0	0.0014	0.0179	0.723	1.0	10.3	0.094	2.5	0.0022	0.0023	65.8	0.5237
Nov	3181	0.00012	0.137	0.0057	30.5	0.00168	0.1	0.0024	0.0330	1.256	1.2	14.8	0.171	2.8	0.0035	0.0030	128.0	1.0968
Dec	2352	0.00013	0.164	0.0075	31.3	0.00251	0.1	0.0031	0.0435	1.630	1.3	18.2	0.225	3.1	0.0044	0.0036	174.3	1.4972
Total	97354																	

Location: Mouth of Anvil Creek

	Flows (x 1000 m3)	Ag mg/L	Al mg/L	As mg/L	Ca mg/L	Cd mg/L	Cl mg/L	Co mg/L	Cu mg/L	Fe mg/L	K mg/L	Mg mg/L	Mn mg/L	Na mg/L	Ni mg/L	Pb mg/L	SO4 mg/L	Zn mg/L
Jan	4432	0.00011	0.111	0.0041	30.2	0.00131	0.0	0.0018	0.0232	0.907	1.1	12.7	0.121	2.7	0.0027	0.0026	97.4	0.7233
Feb	3272	0.00012	0.120	0.0047	30.1	0.00155	0.0	0.0021	0.0271	1.044	1.1	14.0	0.141	2.7	0.0031	0.0028	117.3	0.8744
Mar	3362	0.00012	0.133	0.0055	29.7	0.00183	0.1	0.0024	0.0321	1.225	1.1	14.5	0.167	2.7	0.0034	0.0029	125.1	1.0696
Apr	6375	0.00012	0.115	0.0042	29.5	0.00132	0.0	0.0018	0.0243	0.951	1.0	10.6	0.127	2.5	0.0025	0.0024	70.6	0.7654
May	55468	0.00010	0.073	0.0014	29.6	0.00035	0.0	0.0008	0.0076	0.358	0.9	7.0	0.042	2.3	0.0013	0.0018	18.8	0.1267
Jun	56957	0.00010	0.075	0.0015	29.6	0.00038	0.0	0.0008	0.0083	0.382	0.9	7.0	0.045	2.3	0.0013	0.0018	18.5	0.1517
Jul	39693	0.00010	0.076	0.0017	29.6	0.00043	0.0	0.0009	0.0090	0.407	0.9	7.2	0.049	2.3	0.0014	0.0018	21.7	0.1788
Aug	27824	0.00010	0.076	0.0017	29.6	0.00044	0.0	0.0009	0.0092	0.412	0.9	7.5	0.050	2.3	0.0014	0.0019	25.6	0.1857
Sep	37419	0.00010	0.074	0.0015	29.6	0.00039	0.0	0.0008	0.0082	0.378	0.9	7.2	0.045	2.3	0.0013	0.0018	21.7	0.1488
Oct	19528	0.00010	0.078	0.0018	29.6	0.00048	0.0	0.0009	0.0097	0.430	1.0	7.9	0.052	2.3	0.0015	0.0019	31.2	0.2053
Nov	8835	0.00011	0.091	0.0027	29.9	0.00080	0.0	0.0013	0.0151	0.621	1.0	9.5	0.080	2.5	0.0020	0.0022	53.6	0.4113
Dec	6515	0.00011	0.101	0.0033	30.2	0.00103	0.0	0.0015	0.0189	0.757	1.1	10.8	0.099	2.6	0.0023	0.0024	70.4	0.5568
Total	269678																	

SF09 - Faro Mine Site - Low Infiltration Cover Sensitivity Assessment

Conditions: FUTURE 1

Location: X2

	Flows (x 1000 m3)	Ag mg/L	Al mg/L	As mg/L	Ca mg/L	Cd mg/L	Cl mg/L	Co mg/L	Cu mg/L	Fe mg/L	K mg/L	Mg mg/L	Mn mg/L	Na mg/L	Ni mg/L	Pb mg/L	SO4 mg/L	Zn mg/L
Jan	553	0.00011	0.068	0.0011	29.8	0.00023	0.0	0.0007	0.0052	0.272	0.9	6.7	0.031	2.3	0.0012	0.0018	12.9	0.0468
Feb	403	0.00011	0.068	0.0011	29.8	0.00024	0.0	0.0007	0.0053	0.274	0.9	6.7	0.032	2.3	0.0013	0.0018	13.1	0.0517
Mar	407	0.00011	0.068	0.0012	29.9	0.00025	0.0	0.0007	0.0054	0.277	0.9	6.8	0.032	2.3	0.0013	0.0018	13.5	0.0583
Apr	784	0.00011	0.068	0.0011	29.8	0.00023	0.0	0.0007	0.0052	0.273	0.9	6.7	0.031	2.3	0.0013	0.0018	13.0	0.0484
May	6991	0.00010	0.066	0.0010	29.6	0.00020	0.0	0.0006	0.0050	0.265	0.9	6.6	0.029	2.3	0.0011	0.0017	11.9	0.0286
Jun	7191	0.00010	0.066	0.0010	29.6	0.00021	0.0	0.0006	0.0050	0.266	0.9	6.6	0.029	2.3	0.0011	0.0017	11.9	0.0294
Jul	5013	0.00010	0.066	0.0010	29.6	0.00021	0.0	0.0006	0.0050	0.266	0.9	6.6	0.029	2.3	0.0011	0.0017	12.0	0.0302
Aug	3506	0.00010	0.066	0.0010	29.6	0.00021	0.0	0.0006	0.0051	0.266	0.9	6.6	0.029	2.3	0.0011	0.0017	12.0	0.0304
Sep	4720	0.00010	0.066	0.0010	29.6	0.00021	0.0	0.0006	0.0050	0.266	0.9	6.6	0.029	2.3	0.0011	0.0017	11.9	0.0293
Oct	2460	0.00010	0.066	0.0010	29.6	0.00021	0.0	0.0006	0.0051	0.266	0.9	6.6	0.029	2.3	0.0011	0.0017	12.0	0.0310
Nov	1115	0.00010	0.067	0.0011	29.7	0.00022	0.0	0.0006	0.0051	0.269	0.9	6.6	0.030	2.3	0.0012	0.0017	12.3	0.0372
Dec	821	0.00010	0.067	0.0011	29.7	0.00022	0.0	0.0006	0.0052	0.270	0.9	6.7	0.030	2.3	0.0012	0.0018	12.6	0.0415
Total	33964																	

Location: X14

	Flows (x 1000 m3)	Ag mg/L	Al mg/L	As mg/L	Ca mg/L	Cd mg/L	Cl mg/L	Co mg/L	Cu mg/L	Fe mg/L	K mg/L	Mg mg/L	Mn mg/L	Na mg/L	Ni mg/L	Pb mg/L	SO4 mg/L	Zn mg/L
Jan	1192	0.00008	0.045	0.0014	25.2	0.00079	0.0	0.0010	0.0044	0.181	1.6	8.9	0.025	3.7	0.0039	0.0042	42.1	0.0590
Feb	912	0.00007	0.038	0.0014	23.3	0.00090	0.0	0.0011	0.0041	0.156	1.7	9.1	0.023	3.9	0.0043	0.0046	47.5	0.0639
Mar	981	0.00007	0.034	0.0014	21.6	0.00091	0.0	0.0011	0.0039	0.141	1.7	8.8	0.022	3.8	0.0044	0.0046	47.7	0.0698
Apr	1784	0.00008	0.048	0.0012	24.7	0.00059	0.0	0.0009	0.0044	0.195	1.3	7.6	0.025	3.0	0.0028	0.0032	30.8	0.0588
May	14480	0.00010	0.063	0.0010	28.9	0.00025	0.0	0.0006	0.0049	0.255	1.0	6.7	0.028	2.4	0.0013	0.0019	14.1	0.0304
Jun	14796	0.00010	0.064	0.0010	28.9	0.00025	0.0	0.0006	0.0050	0.256	1.0	6.7	0.028	2.4	0.0013	0.0019	14.0	0.0318
Jul	10302	0.00010	0.063	0.0010	28.8	0.00027	0.0	0.0007	0.0049	0.253	1.0	6.8	0.028	2.4	0.0014	0.0020	15.2	0.0332
Aug	7268	0.00010	0.061	0.0011	28.4	0.00030	0.0	0.0007	0.0049	0.247	1.0	6.8	0.027	2.5	0.0015	0.0021	16.6	0.0332
Sep	9748	0.00010	0.063	0.0010	28.7	0.00027	0.0	0.0006	0.0049	0.252	1.0	6.7	0.028	2.4	0.0014	0.0020	15.2	0.0316
Oct	5108	0.00009	0.060	0.0011	28.1	0.00034	0.0	0.0007	0.0048	0.241	1.1	7.0	0.027	2.6	0.0017	0.0023	18.6	0.0341
Nov	2303	0.00009	0.055	0.0012	27.5	0.00050	0.0	0.0008	0.0047	0.224	1.3	7.7	0.027	3.0	0.0025	0.0030	27.0	0.0449
Dec	1705	0.00009	0.053	0.0013	27.2	0.00062	0.0	0.0009	0.0047	0.212	1.4	8.3	0.027	3.3	0.0031	0.0035	33.3	0.0525
Total	70579																	

Location: Mouth of Rose Creek

	Flows (x 1000 m3)	Ag mg/L	Al mg/L	As mg/L	Ca mg/L	Cd mg/L	Cl mg/L	Co mg/L	Cu mg/L	Fe mg/L	K mg/L	Mg mg/L	Mn mg/L	Na mg/L	Ni mg/L	Pb mg/L	SO4 mg/L	Zn mg/L
Jan	1628	0.00009	0.050	0.0013	26.4	0.00063	0.0	0.0009	0.0045	0.203	1.4	8.3	0.026	3.3	0.0031	0.0035	34.0	0.0501
Feb	1230	0.00008	0.045	0.0013	25.0	0.00072	0.0	0.0010	0.0043	0.184	1.5	8.5	0.025	3.5	0.0035	0.0039	38.3	0.0540
Mar	1301	0.00007	0.042	0.0013	23.6	0.00074	0.0	0.0010	0.0041	0.171	1.5	8.3	0.024	3.4	0.0036	0.0039	38.9	0.0589
Apr	2402	0.00009	0.053	0.0012	25.9	0.00049	0.0	0.0008	0.0046	0.213	1.2	7.4	0.026	2.8	0.0024	0.0028	25.9	0.0502
May	19992	0.00010	0.064	0.0010	29.1	0.00024	0.0	0.0006	0.0049	0.257	1.0	6.6	0.028	2.3	0.0013	0.0018	13.5	0.0291
Jun	20466	0.00010	0.064	0.0010	29.1	0.00024	0.0	0.0006	0.0050	0.258	1.0	6.6	0.028	2.3	0.0013	0.0018	13.4	0.0301
Jul	14254	0.00010	0.064	0.0010	29.0	0.00025	0.0	0.0006	0.0050	0.256	1.0	6.7	0.028	2.4	0.0013	0.0019	14.2	0.0311
Aug	10032	0.00010	0.063	0.0010	28.7	0.00027	0.0	0.0006	0.0049	0.252	1.0	6.7	0.028	2.4	0.0014	0.0020	15.2	0.0311
Sep	13469	0.00010	0.064	0.0010	29.0	0.00025	0.0	0.0006	0.0049	0.255	1.0	6.7	0.028	2.4	0.0013	0.0019	14.3	0.0299
Oct	7047	0.00010	0.062	0.0011	28.5	0.00030	0.0	0.0007	0.0048	0.247	1.0	6.9	0.027	2.5	0.0016	0.0021	16.7	0.0318
Nov	3181	0.00009	0.058	0.0011	28.1	0.00042	0.0	0.0008	0.0048	0.235	1.2	7.4	0.027	2.8	0.0021	0.0026	22.8	0.0396
Dec	2352	0.00009	0.056	0.0012	27.8	0.00051	0.0	0.0008	0.0048	0.227	1.3	7.8	0.027	3.0	0.0025	0.0030	27.4	0.0451
Total	97354																	

Location: Mouth of Anvil Creek

	Flows (x 1000 m3)	Ag mg/L	Al mg/L	As mg/L	Ca mg/L	Cd mg/L	Cl mg/L	Co mg/L	Cu mg/L	Fe mg/L	K mg/L	Mg mg/L	Mn mg/L	Na mg/L	Ni mg/L	Pb mg/L	SO4 mg/L	Zn mg/L
Jan	4432	0.00009	0.060	0.0011	28.4	0.00036	0.0	0.0007	0.0048	0.242	1.1	7.2	0.027	2.7	0.0018	0.0024	19.9	0.0346
Feb	3272	0.00009	0.058	0.0011	27.9	0.00039	0.0	0.0007	0.0047	0.234	1.1	7.3	0.027	2.7	0.0020	0.0025	21.7	0.0363
Mar	3362	0.00009	0.057	0.0011	27.3	0.00041	0.0	0.0007	0.0047	0.228	1.1	7.2	0.026	2.7	0.0021	0.0025	22.2	0.0385
Apr	6375	0.00009	0.061	0.0011	28.2	0.00031	0.0	0.0007	0.0048	0.245	1.0	6.8	0.027	2.5	0.0016	0.0021	17.1	0.0349
May	55468	0.00010	0.065	0.0010	29.4	0.00021	0.0	0.0006	0.0050	0.262	0.9	6.6	0.028	2.3	0.0012	0.0017	12.3	0.0269
Jun	56957	0.00010	0.065	0.0010	29.4	0.00021	0.0	0.0006	0.0050	0.262	0.9	6.6	0.028	2.3	0.0012	0.0017	12.3	0.0272
Jul	39693	0.00010	0.065	0.0010	29.4	0.00022	0.0	0.0006	0.0050	0.261	0.9	6.6	0.028	2.3	0.0012	0.0018	12.6	0.0276
Aug	27824	0.00010	0.065	0.0010	29.3	0.00023	0.0	0.0006	0.0050	0.260	0.9	6.6	0.028	2.3	0.0012	0.0018	13.0	0.0276
Sep	37419	0.00010	0.065	0.0010	29.4	0.00022	0.0	0.0006	0.0050	0.261	0.9	6.6	0.028	2.3	0.0012	0.0018	12.6	0.0272
Oct	19528	0.00010	0.064	0.0010	29.2	0.00024	0.0	0.0006	0.0049	0.258	1.0	6.7	0.028	2.3	0.0013	0.0018	13.5	0.0278
Nov	8835	0.00010	0.063	0.0011	29.0	0.00028	0.0	0.0007	0.0049	0.254	1.0	6.9	0.028	2.5	0.0015	0.0020	15.7	0.0306
Dec	6515	0.00010	0.062	0.0011	29.0	0.00031	0.0	0.0007	0.0049	0.251	1.0	7.0	0.028	2.5	0.0016	0.0022	17.4	0.0326
Total	269678																	

SF09 - Faro Mine Site - Low Infiltration Cover Sensitivity Assessment
Conditions FUTURE 2

Location X2

	Flows (x 1000 m3)	Ag mg/L	Al mg/L	As mg/L	Ca mg/L	Cd mg/L	Cl mg/L	Co mg/L	Cu mg/L	Fe mg/L	K mg/L	Mg mg/L	Mn mg/L	Na mg/L	Ni mg/L	Pb mg/L	SO4 mg/L	Zn mg/L
Jan	553	0.00011	0.074	0.0012	29.9	0.00032	0.0	0.0008	0.0060	0.313	0.9	6.9	0.041	2.4	0.0017	0.0020	14.5	0.1224
Feb	403	0.00011	0.076	0.0012	30.0	0.00035	0.0	0.0009	0.0062	0.325	0.9	7.0	0.044	2.4	0.0018	0.0021	15.1	0.1449
Mar	407	0.00011	0.078	0.0012	30.1	0.00039	0.0	0.0009	0.0065	0.340	0.9	7.1	0.048	2.4	0.0020	0.0022	16.0	0.1750
Apr	784	0.00011	0.075	0.0012	30.0	0.00033	0.0	0.0008	0.0061	0.317	0.9	7.0	0.042	2.4	0.0017	0.0020	14.7	0.1298
May	6991	0.00010	0.067	0.0010	29.6	0.00022	0.0	0.0006	0.0051	0.271	0.9	6.6	0.030	2.3	0.0012	0.0017	12.1	0.0395
Jun	7191	0.00010	0.067	0.0010	29.7	0.00022	0.0	0.0006	0.0052	0.273	0.9	6.6	0.031	2.3	0.0012	0.0018	12.2	0.0429
Jul	5013	0.00010	0.068	0.0010	29.7	0.00023	0.0	0.0006	0.0052	0.275	0.9	6.6	0.031	2.3	0.0012	0.0018	12.3	0.0466
Aug	3506	0.00010	0.068	0.0010	29.7	0.00023	0.0	0.0006	0.0052	0.275	0.9	6.6	0.031	2.3	0.0012	0.0018	12.3	0.0476
Sep	4720	0.00010	0.067	0.0010	29.7	0.00022	0.0	0.0006	0.0052	0.273	0.9	6.6	0.031	2.3	0.0012	0.0018	12.2	0.0425
Oct	2460	0.00010	0.068	0.0010	29.7	0.00023	0.0	0.0007	0.0053	0.277	0.9	6.6	0.032	2.3	0.0012	0.0018	12.4	0.0503
Nov	1115	0.00010	0.070	0.0011	29.8	0.00027	0.0	0.0007	0.0055	0.291	0.9	6.8	0.035	2.3	0.0014	0.0019	13.2	0.0785
Dec	821	0.00011	0.072	0.0011	29.8	0.00029	0.0	0.0008	0.0058	0.301	0.9	6.8	0.038	2.3	0.0015	0.0019	13.8	0.0985
Total	33964																	

Location X14

	Flows (x 1000 m3)	Ag mg/L	Al mg/L	As mg/L	Ca mg/L	Cd mg/L	Cl mg/L	Co mg/L	Cu mg/L	Fe mg/L	K mg/L	Mg mg/L	Mn mg/L	Na mg/L	Ni mg/L	Pb mg/L	SO4 mg/L	Zn mg/L
Jan	1192	0.00008	0.049	0.0014	28.5	0.00085	0.0	0.0011	0.0050	0.212	1.6	13.4	0.032	3.7	0.0041	0.0043	71.2	0.1084
Feb	912	0.00007	0.043	0.0015	27.2	0.00097	0.0	0.0012	0.0048	0.192	1.7	14.5	0.032	3.9	0.0047	0.0048	82.1	0.1219
Mar	981	0.00007	0.040	0.0015	25.6	0.00099	0.0	0.0012	0.0048	0.183	1.7	14.4	0.032	3.9	0.0047	0.0048	83.2	0.1380
Apr	1784	0.00008	0.052	0.0013	26.8	0.00065	0.0	0.0010	0.0051	0.227	1.3	10.6	0.032	3.1	0.0031	0.0033	50.0	0.1091
May	14480	0.00010	0.064	0.0010	29.2	0.00026	0.0	0.0006	0.0050	0.259	1.0	7.0	0.029	2.4	0.0014	0.0019	16.6	0.0378
Jun	14796	0.00010	0.064	0.0010	29.2	0.00026	0.0	0.0007	0.0051	0.261	1.0	7.0	0.029	2.4	0.0014	0.0019	16.4	0.0411
Jul	10302	0.00010	0.064	0.0011	29.2	0.00029	0.0	0.0007	0.0051	0.260	1.0	7.3	0.030	2.4	0.0015	0.0020	18.7	0.0445
Aug	7268	0.00010	0.062	0.0011	28.9	0.00031	0.0	0.0007	0.0050	0.254	1.0	7.6	0.029	2.5	0.0016	0.0021	21.4	0.0449
Sep	9748	0.00010	0.063	0.0011	29.1	0.00028	0.0	0.0007	0.0050	0.257	1.0	7.3	0.029	2.4	0.0015	0.0020	18.7	0.0406
Oct	5108	0.00009	0.061	0.0011	28.9	0.00035	0.0	0.0007	0.0050	0.249	1.1	8.0	0.029	2.6	0.0018	0.0023	25.5	0.0472
Nov	2303	0.00009	0.058	0.0012	29.1	0.00054	0.0	0.0009	0.0051	0.241	1.3	10.0	0.031	3.0	0.0026	0.0030	41.7	0.0731
Dec	1705	0.00009	0.056	0.0013	29.4	0.00067	0.0	0.0010	0.0052	0.236	1.4	11.5	0.032	3.4	0.0033	0.0036	53.7	0.0912
Total	70579																	

Location Mouth of Rose Creek

	Flows (x 1000 m3)	Ag mg/L	Al mg/L	As mg/L	Ca mg/L	Cd mg/L	Cl mg/L	Co mg/L	Cu mg/L	Fe mg/L	K mg/L	Mg mg/L	Mn mg/L	Na mg/L	Ni mg/L	Pb mg/L	SO4 mg/L	Zn mg/L
Jan	1628	0.00009	0.054	0.0013	28.8	0.00068	0.0	0.0010	0.0050	0.226	1.4	11.6	0.031	3.3	0.0033	0.0036	55.3	0.0863
Feb	1230	0.00008	0.049	0.0014	27.8	0.00077	0.0	0.0011	0.0049	0.210	1.5	12.5	0.031	3.6	0.0037	0.0040	63.9	0.0971
Mar	1301	0.00008	0.047	0.0014	26.6	0.00080	0.0	0.0011	0.0048	0.203	1.5	12.4	0.031	3.5	0.0038	0.0040	65.6	0.1104
Apr	2402	0.00009	0.056	0.0012	27.5	0.00054	0.0	0.0009	0.0051	0.236	1.2	9.6	0.031	2.9	0.0026	0.0029	40.1	0.0877
May	19992	0.00010	0.065	0.0010	29.3	0.00024	0.0	0.0006	0.0050	0.261	1.0	6.9	0.029	2.3	0.0013	0.0019	15.2	0.0345
Jun	20466	0.00010	0.065	0.0010	29.3	0.00024	0.0	0.0006	0.0051	0.262	1.0	6.9	0.029	2.3	0.0013	0.0018	15.1	0.0368
Jul	14254	0.00010	0.064	0.0010	29.3	0.00026	0.0	0.0007	0.0051	0.261	1.0	7.1	0.029	2.4	0.0014	0.0019	16.7	0.0392
Aug	10032	0.00010	0.063	0.0010	29.1	0.00028	0.0	0.0007	0.0050	0.257	1.0	7.3	0.029	2.4	0.0015	0.0020	18.7	0.0396
Sep	13469	0.00010	0.064	0.0010	29.3	0.00026	0.0	0.0006	0.0050	0.259	1.0	7.1	0.029	2.4	0.0014	0.0019	16.8	0.0364
Oct	7047	0.00010	0.062	0.0011	29.1	0.00031	0.0	0.0007	0.0050	0.253	1.0	7.6	0.029	2.5	0.0016	0.0021	21.7	0.0413
Nov	3181	0.00009	0.060	0.0012	29.2	0.00044	0.0	0.0008	0.0051	0.247	1.2	9.1	0.030	2.8	0.0022	0.0027	33.4	0.0600
Dec	2352	0.00009	0.059	0.0012	29.5	0.00054	0.0	0.0009	0.0052	0.244	1.3	10.1	0.031	3.1	0.0027	0.0031	42.2	0.0731
Total	97354																	

Location Mouth of Anvil Creek

	Flows (x 1000 m3)	Ag mg/L	Al mg/L	As mg/L	Ca mg/L	Cd mg/L	Cl mg/L	Co mg/L	Cu mg/L	Fe mg/L	K mg/L	Mg mg/L	Mn mg/L	Na mg/L	Ni mg/L	Pb mg/L	SO4 mg/L	Zn mg/L
Jan	4432	0.00009	0.061	0.0011	29.3	0.00038	0.0	0.0007	0.0050	0.250	1.1	8.4	0.029	2.7	0.0019	0.0024	27.7	0.0479
Feb	3272	0.00009	0.060	0.0011	28.9	0.00041	0.0	0.0008	0.0050	0.244	1.1	8.8	0.029	2.7	0.0021	0.0026	31.3	0.0525
Mar	3362	0.00009	0.058	0.0011	28.4	0.00043	0.0	0.0008	0.0049	0.241	1.1	8.8	0.029	2.7	0.0022	0.0026	32.6	0.0584
Apr	6375	0.00010	0.062	0.0011	28.8	0.00033	0.0	0.0007	0.0050	0.254	1.0	7.7	0.029	2.5	0.0017	0.0022	22.4	0.0490
May	55468	0.00010	0.065	0.0010	29.5	0.00022	0.0	0.0006	0.0050	0.263	0.9	6.7	0.028	2.3	0.0012	0.0018	13.0	0.0268
Jun	56957	0.00010	0.066	0.0010	29.5	0.00022	0.0	0.0006	0.0050	0.263	0.9	6.7	0.029	2.3	0.0012	0.0018	12.9	0.0296
Jul	39693	0.00010	0.065	0.0010	29.5	0.00022	0.0	0.0006	0.0050	0.263	0.9	6.7	0.029	2.3	0.0012	0.0018	13.5	0.0305
Aug	27824	0.00010	0.065	0.0010	29.4	0.00023	0.0	0.0006	0.0050	0.261	0.9	6.8	0.029	2.3	0.0012	0.0018	14.2	0.0306
Sep	37419	0.00010	0.065	0.0010	29.5	0.00022	0.0	0.0006	0.0050	0.262	0.9	6.7	0.028	2.3	0.0012	0.0018	13.5	0.0295
Oct	19528	0.00010	0.065	0.0010	29.4	0.00024	0.0	0.0006	0.0050	0.260	1.0	6.9	0.028	2.3	0.0013	0.0019	15.3	0.0313
Nov	8835	0.00010	0.064	0.0011	29.5	0.00029	0.0	0.0007	0.0050	0.258	1.0	7.4	0.029	2.5	0.0015	0.0020	19.5	0.0380
Dec	6515	0.00010	0.063	0.0011	29.6	0.00032	0.0	0.0007	0.0051	0.257	1.1	7.8	0.029	2.5	0.0017	0.0022	22.7	0.0428
Total	269678																	

SF09 - Faro Mine Site - Low Infiltration Cover Sensitivity Assessment

Conditions: FUTURE 3

Location: X2

	Flows (x 1000 m3)	Ag mg/L	Al mg/L	As mg/L	Ca mg/L	Cd mg/L	Cl mg/L	Co mg/L	Cu mg/L	Fe mg/L	K mg/L	Mg mg/L	Mn mg/L	Na mg/L	Ni mg/L	Pb mg/L	SO4 mg/L	Zn mg/L
Jan	553	0.00021	0.328	0.0161	30.0	0.00511	0.2	0.0062	0.0977	3.646	1.0	7.6	0.504	2.3	0.0058	0.0032	31.3	3.5878
Feb	403	0.00023	0.389	0.0196	30.1	0.00626	0.2	0.0075	0.1193	4.433	1.0	7.9	0.615	2.4	0.0069	0.0035	35.9	4.4177
Mar	407	0.00026	0.470	0.0242	30.3	0.00779	0.3	0.0092	0.1482	5.486	1.0	8.2	0.762	2.4	0.0084	0.0040	42.0	5.5265
Apr	784	0.00021	0.348	0.0172	30.1	0.00549	0.2	0.0066	0.1048	3.905	1.0	7.7	0.540	2.4	0.0062	0.0033	32.8	3.8606
May	6991	0.00012	0.103	0.0032	29.7	0.00091	0.0	0.0014	0.0183	0.749	0.9	6.7	0.097	2.3	0.0018	0.0019	14.5	0.5368
Jun	7191	0.00012	0.113	0.0037	29.7	0.00108	0.0	0.0016	0.0216	0.868	0.9	6.7	0.113	2.3	0.0019	0.0020	15.2	0.6619
Jul	5013	0.00012	0.123	0.0043	29.7	0.00127	0.0	0.0018	0.0251	0.998	0.9	6.8	0.131	2.3	0.0021	0.0020	16.0	0.7984
Aug	3506	0.00012	0.125	0.0044	29.7	0.00132	0.0	0.0019	0.0261	1.033	0.9	6.8	0.136	2.3	0.0022	0.0020	16.2	0.8353
Sep	4720	0.00012	0.112	0.0036	29.7	0.00106	0.0	0.0016	0.0212	0.855	0.9	6.7	0.111	2.3	0.0019	0.0020	15.1	0.6483
Oct	2460	0.00013	0.133	0.0048	29.7	0.00146	0.0	0.0020	0.0287	1.128	0.9	6.8	0.150	2.3	0.0023	0.0021	16.7	0.9354
Nov	1115	0.00016	0.209	0.0092	29.8	0.00289	0.1	0.0036	0.0557	2.113	0.9	7.1	0.288	2.3	0.0037	0.0025	22.4	1.9733
Dec	821	0.00018	0.263	0.0123	29.9	0.00390	0.1	0.0048	0.0749	2.812	1.0	7.4	0.387	2.3	0.0046	0.0028	26.5	2.7101
Total	33964																	

Location: X14

	Flows (x 1000 m3)	Ag mg/L	Al mg/L	As mg/L	Ca mg/L	Cd mg/L	Cl mg/L	Co mg/L	Cu mg/L	Fe mg/L	K mg/L	Mg mg/L	Mn mg/L	Na mg/L	Ni mg/L	Pb mg/L	SO4 mg/L	Zn mg/L
Jan	1192	0.00014	0.195	0.0101	29.8	0.00358	0.1	0.0042	0.0583	2.139	1.6	25.2	0.300	3.7	0.0065	0.0050	269.0	2.0806
Feb	912	0.00014	0.215	0.0116	28.8	0.00417	0.1	0.0048	0.0673	2.455	1.7	28.5	0.346	3.9	0.0074	0.0055	317.6	2.4378
Mar	981	0.00015	0.242	0.0134	27.2	0.00475	0.1	0.0055	0.0782	2.843	1.7	28.7	0.402	3.9	0.0080	0.0057	325.2	2.8596
Apr	1784	0.00014	0.201	0.0101	27.7	0.00343	0.1	0.0041	0.0594	2.191	1.3	18.4	0.306	3.1	0.0055	0.0040	181.5	2.1194
May	14480	0.00011	0.086	0.0023	29.3	0.00067	0.0	0.0011	0.0130	0.547	1.0	8.0	0.069	2.4	0.0017	0.0020	33.5	0.3324
Jun	14796	0.00011	0.092	0.0027	29.3	0.00077	0.0	0.0012	0.0150	0.622	1.0	8.0	0.079	2.4	0.0018	0.0020	32.9	0.4101
Jul	10302	0.00011	0.097	0.0030	29.4	0.00091	0.0	0.0014	0.0172	0.699	1.0	8.7	0.091	2.4	0.0020	0.0022	42.6	0.4933
Aug	7268	0.00011	0.097	0.0031	29.1	0.00096	0.0	0.0014	0.0176	0.710	1.0	9.5	0.092	2.5	0.0022	0.0023	54.5	0.5111
Sep	9748	0.00011	0.090	0.0026	29.3	0.00078	0.0	0.0012	0.0147	0.609	1.0	8.7	0.078	2.4	0.0019	0.0021	42.8	0.4004
Oct	5108	0.00011	0.100	0.0034	29.2	0.00108	0.0	0.0015	0.0191	0.760	1.1	10.8	0.100	2.6	0.0024	0.0025	71.9	0.5700
Nov	2303	0.00012	0.141	0.0062	29.8	0.00209	0.1	0.0026	0.0355	1.341	1.3	15.9	0.184	3.0	0.0040	0.0034	141.4	1.1982
Dec	1705	0.00013	0.170	0.0081	30.4	0.00280	0.1	0.0034	0.0469	1.744	1.4	19.8	0.242	3.3	0.0051	0.0041	192.9	1.6344
Total	70579																	

Location: Mouth of Rose Creek

	Flows (x 1000 m3)	Ag mg/L	Al mg/L	As mg/L	Ca mg/L	Cd mg/L	Cl mg/L	Co mg/L	Cu mg/L	Fe mg/L	K mg/L	Mg mg/L	Mn mg/L	Na mg/L	Ni mg/L	Pb mg/L	SO4 mg/L	Zn mg/L
Jan	1628	0.00013	0.161	0.0076	29.7	0.00267	0.1	0.0033	0.0440	1.637	1.4	20.2	0.227	3.3	0.0050	0.0041	200.1	1.5307
Feb	1230	0.00013	0.177	0.0089	29.0	0.00314	0.1	0.0037	0.0512	1.889	1.5	22.8	0.264	3.5	0.0058	0.0045	238.6	1.8152
Mar	1301	0.00014	0.199	0.0103	27.8	0.00363	0.1	0.0043	0.0602	2.209	1.5	23.2	0.310	3.5	0.0063	0.0047	248.0	2.1624
Apr	2402	0.00013	0.167	0.0077	28.2	0.00260	0.1	0.0032	0.0454	1.696	1.2	15.3	0.234	2.9	0.0044	0.0034	137.8	1.5812
May	19992	0.00010	0.080	0.0020	29.4	0.00054	0.0	0.0010	0.0108	0.469	1.0	7.6	0.058	2.3	0.0015	0.0019	27.5	0.2478
Jun	20466	0.00011	0.085	0.0022	29.4	0.00061	0.0	0.0011	0.0123	0.523	1.0	7.6	0.065	2.3	0.0016	0.0019	27.0	0.3036
Jul	14254	0.00011	0.089	0.0025	29.4	0.00071	0.0	0.0012	0.0138	0.578	1.0	8.1	0.073	2.4	0.0018	0.0020	34.1	0.3636
Aug	10032	0.00011	0.088	0.0025	29.3	0.00075	0.0	0.0012	0.0141	0.587	1.0	8.7	0.075	2.4	0.0019	0.0021	42.7	0.3773
Sep	13469	0.00011	0.083	0.0022	29.4	0.00062	0.0	0.0011	0.0120	0.514	1.0	8.1	0.064	2.4	0.0017	0.0020	34.2	0.2969
Oct	7047	0.00011	0.090	0.0027	29.3	0.00083	0.0	0.0013	0.0152	0.623	1.0	9.6	0.080	2.5	0.0021	0.0023	55.4	0.4202
Nov	3181	0.00012	0.121	0.0047	29.7	0.00157	0.0	0.0021	0.0271	1.043	1.2	13.3	0.141	2.8	0.0032	0.0029	105.6	0.8744
Dec	2352	0.00012	0.142	0.0061	30.2	0.00209	0.1	0.0026	0.0354	1.337	1.3	16.1	0.183	3.0	0.0040	0.0034	143.0	1.1918
Total	97354																	

Location: Mouth of Anvil Creek

	Flows (x 1000 m3)	Ag mg/L	Al mg/L	As mg/L	Ca mg/L	Cd mg/L	Cl mg/L	Co mg/L	Cu mg/L	Fe mg/L	K mg/L	Mg mg/L	Mn mg/L	Na mg/L	Ni mg/L	Pb mg/L	SO4 mg/L	Zn mg/L
Jan	4432	0.00011	0.101	0.0034	29.6	0.00111	0.0	0.0016	0.0193	0.768	1.1	11.5	0.101	2.7	0.0025	0.0026	80.9	0.5785
Feb	3272	0.00011	0.107	0.0040	29.4	0.00131	0.0	0.0018	0.0224	0.875	1.1	12.7	0.117	2.7	0.0029	0.0028	97.0	0.6981
Mar	3362	0.00011	0.117	0.0046	28.9	0.00153	0.0	0.0020	0.0264	1.017	1.1	13.0	0.137	2.7	0.0031	0.0029	103.2	0.8527
Apr	6375	0.00011	0.104	0.0035	29.1	0.00110	0.0	0.0016	0.0202	0.804	1.0	9.8	0.106	2.5	0.0023	0.0023	59.2	0.6117
May	55468	0.00010	0.071	0.0013	29.5	0.00032	0.0	0.0007	0.0071	0.338	0.9	6.9	0.039	2.3	0.0013	0.0018	17.4	0.1057
Jun	56957	0.00010	0.073	0.0014	29.5	0.00035	0.0	0.0008	0.0076	0.357	0.9	6.9	0.042	2.3	0.0013	0.0018	17.2	0.1255
Jul	39693	0.00010	0.074	0.0015	29.5	0.00038	0.0	0.0008	0.0082	0.377	0.9	7.1	0.044	2.3	0.0013	0.0018	19.7	0.1470
Aug	27824	0.00010	0.074	0.0016	29.5	0.00040	0.0	0.0008	0.0083	0.380	0.9	7.3	0.045	2.3	0.0014	0.0018	22.9	0.1524
Sep	37419	0.00010	0.072	0.0014	29.5	0.00035	0.0	0.0008	0.0075	0.354	0.9	7.1	0.041	2.3	0.0013	0.0018	19.8	0.1232
Oct	19528	0.00010	0.075	0.0016	29.5	0.00043	0.0	0.0008	0.0087	0.394	1.0	7.7	0.047	2.3	0.0014	0.0019	27.5	0.1680
Nov	8835	0.00011	0.086	0.0023	29.6	0.00069	0.0	0.0011	0.0129	0.545	1.0	9.0	0.069	2.5	0.0019	0.0021	45.5	0.3312
Dec	6515	0.00011	0.093	0.0029	29.8	0.00088	0.0	0.0013	0.0160	0.651	1.1	10.0	0.084	2.5	0.0021	0.0023	59.1	0.4465
Total	269678																	

SF010 - Faro Mine Site - Low Infiltration Cover Sensitivity Assessment

Conditions: FUTURE 1

Location: X2

	Flows (x 1000 m3)	Ag mg/L	Al mg/L	As mg/L	Ca mg/L	Cd mg/L	Cl mg/L	Co mg/L	Cu mg/L	Fe mg/L	K mg/L	Mg mg/L	Mn mg/L	Na mg/L	Ni mg/L	Pb mg/L	SO4 mg/L	Zn mg/L
Jan	553	0.00011	0.068	0.0011	29.8	0.00024	0.0	0.0007	0.0053	0.274	0.9	6.7	0.031	2.3	0.0013	0.0018	12.9	0.0496
Feb	403	0.00011	0.068	0.0011	29.8	0.00024	0.0	0.0007	0.0053	0.277	0.9	6.7	0.032	2.3	0.0013	0.0018	13.2	0.0551
Mar	407	0.00011	0.069	0.0012	29.9	0.00026	0.0	0.0007	0.0054	0.280	0.9	6.8	0.033	2.3	0.0013	0.0019	13.6	0.0626
Apr	784	0.00011	0.068	0.0011	29.8	0.00024	0.0	0.0007	0.0053	0.275	0.9	6.7	0.031	2.3	0.0013	0.0018	13.0	0.0514
May	6991	0.00010	0.066	0.0010	29.6	0.00021	0.0	0.0006	0.0050	0.266	0.9	6.6	0.029	2.3	0.0011	0.0017	11.9	0.0290
Jun	7191	0.00010	0.066	0.0010	29.6	0.00021	0.0	0.0006	0.0050	0.266	0.9	6.6	0.029	2.3	0.0011	0.0017	11.9	0.0299
Jul	5013	0.00010	0.066	0.0010	29.6	0.00021	0.0	0.0006	0.0051	0.266	0.9	6.6	0.029	2.3	0.0011	0.0017	12.0	0.0308
Aug	3506	0.00010	0.066	0.0010	29.6	0.00021	0.0	0.0006	0.0051	0.266	0.9	6.6	0.029	2.3	0.0011	0.0017	12.0	0.0310
Sep	4720	0.00010	0.066	0.0010	29.6	0.00021	0.0	0.0006	0.0050	0.266	0.9	6.6	0.029	2.3	0.0011	0.0017	11.9	0.0298
Oct	2460	0.00010	0.066	0.0010	29.6	0.00021	0.0	0.0006	0.0051	0.267	0.9	6.6	0.029	2.3	0.0011	0.0017	12.0	0.0317
Nov	1115	0.00010	0.067	0.0011	29.7	0.00022	0.0	0.0006	0.0052	0.270	0.9	6.6	0.030	2.3	0.0012	0.0018	12.4	0.0387
Dec	821	0.00010	0.067	0.0011	29.7	0.00023	0.0	0.0006	0.0052	0.272	0.9	6.7	0.030	2.3	0.0012	0.0018	12.6	0.0437
Total	33964																	

Location: X14

	Flows (x 1000 m3)	Ag mg/L	Al mg/L	As mg/L	Ca mg/L	Cd mg/L	Cl mg/L	Co mg/L	Cu mg/L	Fe mg/L	K mg/L	Mg mg/L	Mn mg/L	Na mg/L	Ni mg/L	Pb mg/L	SO4 mg/L	Zn mg/L
Jan	1192	0.00008	0.045	0.0014	25.3	0.00080	0.0	0.0010	0.0044	0.183	1.6	9.0	0.025	3.7	0.0039	0.0042	43.2	0.0626
Feb	912	0.00007	0.039	0.0014	23.5	0.00091	0.0	0.0011	0.0041	0.158	1.7	9.3	0.024	3.9	0.0044	0.0046	48.8	0.0681
Mar	981	0.00007	0.035	0.0014	21.6	0.00092	0.0	0.0011	0.0040	0.144	1.7	9.0	0.022	3.8	0.0044	0.0046	49.0	0.0748
Apr	1784	0.00008	0.048	0.0012	24.7	0.00060	0.0	0.0009	0.0045	0.198	1.3	7.7	0.025	3.0	0.0028	0.0032	31.5	0.0625
May	14480	0.00010	0.063	0.0010	28.9	0.00025	0.0	0.0006	0.0049	0.255	1.0	6.7	0.028	2.4	0.0013	0.0019	14.2	0.0310
Jun	14796	0.00010	0.064	0.0010	28.9	0.00025	0.0	0.0006	0.0050	0.256	1.0	6.7	0.028	2.4	0.0013	0.0019	14.1	0.0325
Jul	10302	0.00010	0.063	0.0010	28.8	0.00027	0.0	0.0007	0.0050	0.254	1.0	6.8	0.028	2.4	0.0014	0.0020	15.3	0.0341
Aug	7268	0.00010	0.061	0.0011	28.4	0.00030	0.0	0.0007	0.0049	0.247	1.0	6.8	0.028	2.5	0.0015	0.0021	16.7	0.0341
Sep	9748	0.00010	0.063	0.0010	28.8	0.00027	0.0	0.0006	0.0049	0.252	1.0	6.8	0.028	2.4	0.0014	0.0020	15.4	0.0322
Oct	5108	0.00009	0.060	0.0011	28.1	0.00034	0.0	0.0007	0.0048	0.241	1.1	7.0	0.027	2.6	0.0017	0.0023	18.9	0.0351
Nov	2303	0.00009	0.056	0.0012	27.5	0.00050	0.0	0.0008	0.0048	0.225	1.3	7.8	0.027	3.0	0.0025	0.0030	27.6	0.0469
Dec	1705	0.00009	0.053	0.0013	27.2	0.00063	0.0	0.0009	0.0048	0.214	1.4	8.4	0.027	3.3	0.0031	0.0035	34.0	0.0553
Total	70579																	

Location: Mouth of Rose Creek

	Flows (x 1000 m3)	Ag mg/L	Al mg/L	As mg/L	Ca mg/L	Cd mg/L	Cl mg/L	Co mg/L	Cu mg/L	Fe mg/L	K mg/L	Mg mg/L	Mn mg/L	Na mg/L	Ni mg/L	Pb mg/L	SO4 mg/L	Zn mg/L
Jan	1628	0.00009	0.051	0.0013	26.5	0.00064	0.0	0.0009	0.0046	0.205	1.4	8.4	0.026	3.3	0.0031	0.0035	34.7	0.0527
Feb	1230	0.00008	0.046	0.0013	25.0	0.00072	0.0	0.0010	0.0044	0.186	1.5	8.6	0.025	3.5	0.0035	0.0039	39.2	0.0572
Mar	1301	0.00008	0.042	0.0013	23.7	0.00074	0.0	0.0010	0.0042	0.174	1.5	8.4	0.024	3.4	0.0036	0.0039	39.8	0.0627
Apr	2402	0.00009	0.053	0.0012	26.0	0.00049	0.0	0.0008	0.0046	0.215	1.2	7.4	0.026	2.8	0.0024	0.0028	26.4	0.0530
May	19992	0.00010	0.064	0.0010	29.1	0.00024	0.0	0.0006	0.0050	0.258	1.0	6.6	0.028	2.3	0.0013	0.0018	13.5	0.0295
Jun	20466	0.00010	0.064	0.0010	29.1	0.00024	0.0	0.0006	0.0050	0.258	1.0	6.6	0.028	2.3	0.0013	0.0018	13.5	0.0306
Jul	14254	0.00010	0.064	0.0010	29.0	0.00025	0.0	0.0006	0.0050	0.256	1.0	6.7	0.028	2.4	0.0013	0.0019	14.3	0.0317
Aug	10032	0.00010	0.063	0.0010	28.7	0.00027	0.0	0.0006	0.0049	0.252	1.0	6.8	0.028	2.4	0.0014	0.0020	15.4	0.0318
Sep	13469	0.00010	0.064	0.0010	29.0	0.00025	0.0	0.0006	0.0049	0.256	1.0	6.7	0.028	2.4	0.0013	0.0019	14.3	0.0304
Oct	7047	0.00010	0.062	0.0011	28.5	0.00030	0.0	0.0007	0.0049	0.248	1.0	6.9	0.028	2.5	0.0016	0.0021	16.9	0.0325
Nov	3181	0.00009	0.058	0.0011	28.1	0.00042	0.0	0.0008	0.0048	0.236	1.2	7.4	0.027	2.8	0.0021	0.0026	23.2	0.0411
Dec	2352	0.00009	0.056	0.0012	27.9	0.00051	0.0	0.0008	0.0048	0.228	1.3	7.9	0.027	3.0	0.0025	0.0030	27.9	0.0471
Total	97354																	

Location: Mouth of Anvil Creek

	Flows (x 1000 m3)	Ag mg/L	Al mg/L	As mg/L	Ca mg/L	Cd mg/L	Cl mg/L	Co mg/L	Cu mg/L	Fe mg/L	K mg/L	Mg mg/L	Mn mg/L	Na mg/L	Ni mg/L	Pb mg/L	SO4 mg/L	Zn mg/L
Jan	4432	0.00009	0.060	0.0011	28.4	0.00036	0.0	0.0007	0.0048	0.242	1.1	7.2	0.027	2.7	0.0018	0.0024	20.2	0.0356
Feb	3272	0.00009	0.058	0.0011	27.9	0.00040	0.0	0.0007	0.0048	0.235	1.1	7.3	0.027	2.7	0.0020	0.0025	22.0	0.0375
Mar	3362	0.00009	0.057	0.0011	27.3	0.00041	0.0	0.0007	0.0047	0.229	1.1	7.2	0.027	2.7	0.0021	0.0025	22.6	0.0400
Apr	6375	0.00009	0.061	0.0011	28.2	0.00031	0.0	0.0007	0.0049	0.246	1.0	6.9	0.027	2.5	0.0016	0.0021	17.3	0.0359
May	55468	0.00010	0.065	0.0010	29.4	0.00021	0.0	0.0006	0.0050	0.262	0.9	6.6	0.028	2.3	0.0012	0.0017	12.4	0.0270
Jun	56957	0.00010	0.065	0.0010	29.4	0.00021	0.0	0.0006	0.0050	0.262	0.9	6.6	0.028	2.3	0.0012	0.0017	12.3	0.0274
Jul	39693	0.00010	0.065	0.0010	29.4	0.00022	0.0	0.0006	0.0050	0.261	0.9	6.6	0.028	2.3	0.0012	0.0018	12.7	0.0278
Aug	27824	0.00010	0.065	0.0010	29.3	0.00023	0.0	0.0006	0.0050	0.260	0.9	6.6	0.028	2.3	0.0012	0.0018	13.0	0.0278
Sep	37419	0.00010	0.065	0.0010	29.4	0.00022	0.0	0.0006	0.0050	0.261	0.9	6.6	0.028	2.3	0.0012	0.0018	12.7	0.0273
Oct	19528	0.00010	0.064	0.0010	29.2	0.00024	0.0	0.0006	0.0049	0.258	1.0	6.7	0.028	2.3	0.0013	0.0018	13.6	0.0281
Nov	8835	0.00010	0.063	0.0011	29.1	0.00028	0.0	0.0007	0.0049	0.254	1.0	6.9	0.028	2.5	0.0015	0.0020	15.8	0.0312
Dec	6515	0.00010	0.062	0.0011	29.0	0.00031	0.0	0.0007	0.0049	0.251	1.0	7.0	0.028	2.5	0.0016	0.0022	17.6	0.0334
Total	269678																	

SF010 - Faro Mine Site - Low Infiltration Cover Sensitivity Assessment
Conditions FUTURE 2

Location X2

	Flows	Ag	Al	As	Ca	Cd	Cl	Co	Cu	Fe	K	Mg	Mn	Na	Ni	Pb	SO4	Zn
	(x 1000 m3)	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L
Jan	553	0.00011	0.076	0.0012	29.9	0.00034	0.0	0.0009	0.0062	0.324	0.9	6.9	0.043	2.4	0.0018	0.0020	14.6	0.1416
Feb	403	0.00011	0.078	0.0012	30.0	0.00038	0.0	0.0009	0.0065	0.338	0.9	7.0	0.046	2.4	0.0019	0.0021	15.3	0.1686
Mar	407	0.00011	0.081	0.0013	30.1	0.00042	0.0	0.0010	0.0069	0.357	0.9	7.2	0.051	2.4	0.0021	0.0022	16.2	0.2047
Apr	784	0.00011	0.077	0.0012	30.0	0.00036	0.0	0.0009	0.0063	0.329	0.9	7.0	0.044	2.4	0.0018	0.0021	14.8	0.1505
May	6991	0.00010	0.067	0.0010	29.6	0.00022	0.0	0.0006	0.0052	0.273	0.9	6.6	0.030	2.3	0.0012	0.0017	12.1	0.0422
Jun	7191	0.00010	0.068	0.0010	29.7	0.00023	0.0	0.0006	0.0052	0.275	0.9	6.6	0.031	2.3	0.0012	0.0018	12.2	0.0463
Jul	5013	0.00010	0.068	0.0010	29.7	0.00023	0.0	0.0007	0.0053	0.277	0.9	6.6	0.031	2.3	0.0012	0.0018	12.3	0.0508
Aug	3506	0.00010	0.068	0.0010	29.7	0.00023	0.0	0.0007	0.0053	0.278	0.9	6.6	0.032	2.3	0.0012	0.0018	12.4	0.0520
Sep	4720	0.00010	0.068	0.0010	29.7	0.00023	0.0	0.0006	0.0052	0.275	0.9	6.6	0.031	2.3	0.0012	0.0018	12.2	0.0459
Oct	2460	0.00010	0.068	0.0010	29.7	0.00024	0.0	0.0007	0.0053	0.279	0.9	6.6	0.032	2.3	0.0013	0.0018	12.5	0.0552
Nov	1115	0.00010	0.071	0.0011	29.8	0.00028	0.0	0.0007	0.0057	0.297	0.9	6.8	0.036	2.3	0.0015	0.0019	13.3	0.0890
Dec	821	0.00011	0.073	0.0011	29.9	0.00031	0.0	0.0008	0.0059	0.309	0.9	6.8	0.039	2.3	0.0016	0.0020	13.9	0.1130
Total	33964																	

Location X14

	Flows	Ag	Al	As	Ca	Cd	Cl	Co	Cu	Fe	K	Mg	Mn	Na	Ni	Pb	SO4	Zn
	(x 1000 m3)	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L
Jan	1192	0.00008	0.050	0.0015	28.7	0.00087	0.0	0.0012	0.0054	0.225	1.6	13.8	0.034	3.7	0.0042	0.0043	74.3	0.1239
Feb	912	0.00007	0.045	0.0015	27.5	0.00099	0.0	0.0013	0.0053	0.207	1.7	14.9	0.034	3.9	0.0047	0.0048	85.9	0.1401
Mar	981	0.00007	0.042	0.0015	25.9	0.00102	0.0	0.0013	0.0053	0.201	1.7	14.8	0.035	3.9	0.0048	0.0048	87.1	0.1594
Apr	1784	0.00008	0.054	0.0013	27.0	0.00067	0.0	0.0010	0.0055	0.240	1.3	10.8	0.034	3.1	0.0032	0.0034	52.1	0.1250
May	14480	0.00010	0.064	0.0010	29.2	0.00026	0.0	0.0007	0.0051	0.261	1.0	7.1	0.029	2.4	0.0014	0.0019	16.9	0.0401
Jun	14796	0.00010	0.065	0.0011	29.2	0.00026	0.0	0.0007	0.0052	0.264	1.0	7.1	0.030	2.4	0.0014	0.0019	16.7	0.0440
Jul	10302	0.00010	0.064	0.0011	29.2	0.00029	0.0	0.0007	0.0052	0.263	1.0	7.3	0.030	2.4	0.0015	0.0020	19.1	0.0480
Aug	7268	0.00010	0.063	0.0011	29.0	0.00032	0.0	0.0007	0.0051	0.257	1.0	7.6	0.030	2.5	0.0016	0.0021	21.9	0.0486
Sep	9748	0.00010	0.064	0.0011	29.2	0.00029	0.0	0.0007	0.0051	0.260	1.0	7.3	0.029	2.4	0.0015	0.0020	19.1	0.0434
Oct	5108	0.00009	0.061	0.0011	28.9	0.00036	0.0	0.0007	0.0051	0.252	1.1	8.1	0.030	2.6	0.0018	0.0023	26.2	0.0513
Nov	2303	0.00009	0.059	0.0013	29.2	0.00055	0.0	0.0009	0.0053	0.249	1.3	10.2	0.032	3.0	0.0027	0.0030	43.2	0.0819
Dec	1705	0.00009	0.057	0.0014	29.6	0.00069	0.0	0.0010	0.0055	0.246	1.4	11.8	0.034	3.4	0.0033	0.0036	55.9	0.1033
Total	70579																	

Location Mouth of Rose Creek

	Flows	Ag	Al	As	Ca	Cd	Cl	Co	Cu	Fe	K	Mg	Mn	Na	Ni	Pb	SO4	Zn
	(x 1000 m3)	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L
Jan	1628	0.00009	0.055	0.0014	28.9	0.00069	0.0	0.0010	0.0053	0.235	1.4	11.8	0.033	3.3	0.0033	0.0036	57.6	0.0976
Feb	1230	0.00008	0.050	0.0014	28.0	0.00079	0.0	0.0011	0.0052	0.222	1.5	12.8	0.033	3.5	0.0038	0.0040	66.7	0.1106
Mar	1301	0.00008	0.048	0.0014	26.8	0.00082	0.0	0.0011	0.0052	0.217	1.5	12.8	0.033	3.5	0.0039	0.0040	68.5	0.1265
Apr	2402	0.00009	0.057	0.0012	27.6	0.00055	0.0	0.0009	0.0054	0.246	1.2	9.7	0.033	2.9	0.0026	0.0029	41.7	0.0994
May	19992	0.00010	0.065	0.0010	29.3	0.00024	0.0	0.0006	0.0051	0.262	1.0	6.9	0.029	2.3	0.0013	0.0019	15.4	0.0361
Jun	20466	0.00010	0.065	0.0010	29.3	0.00025	0.0	0.0006	0.0051	0.264	1.0	6.9	0.029	2.3	0.0013	0.0019	15.3	0.0389
Jul	14254	0.00010	0.065	0.0011	29.3	0.00027	0.0	0.0007	0.0051	0.263	1.0	7.1	0.030	2.4	0.0014	0.0019	17.0	0.0418
Aug	10032	0.00010	0.064	0.0011	29.1	0.00028	0.0	0.0007	0.0051	0.259	1.0	7.3	0.029	2.4	0.0015	0.0020	19.1	0.0423
Sep	13469	0.00010	0.064	0.0010	29.3	0.00026	0.0	0.0007	0.0051	0.261	1.0	7.1	0.029	2.4	0.0014	0.0019	17.1	0.0385
Oct	7047	0.00010	0.063	0.0011	29.1	0.00031	0.0	0.0007	0.0051	0.256	1.0	7.7	0.029	2.5	0.0016	0.0021	22.2	0.0443
Nov	3181	0.00009	0.061	0.0012	29.3	0.00045	0.0	0.0008	0.0052	0.253	1.2	9.2	0.031	2.8	0.0022	0.0027	34.5	0.0664
Dec	2352	0.00009	0.059	0.0013	29.6	0.00055	0.0	0.0009	0.0054	0.251	1.3	10.3	0.032	3.1	0.0027	0.0031	43.8	0.0819
Total	97354																	

Location Mouth of Anvil Creek

	Flows	Ag	Al	As	Ca	Cd	Cl	Co	Cu	Fe	K	Mg	Mn	Na	Ni	Pb	SO4	Zn
	(x 1000 m3)	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L
Jan	4432	0.00010	0.062	0.0011	29.4	0.00038	0.0	0.0008	0.0051	0.253	1.1	8.5	0.030	2.7	0.0019	0.0024	28.6	0.0521
Feb	3272	0.00009	0.060	0.0011	29.0	0.00042	0.0	0.0008	0.0051	0.248	1.1	8.9	0.030	2.7	0.0021	0.0026	32.4	0.0575
Mar	3362	0.00009	0.059	0.0012	28.5	0.00044	0.0	0.0008	0.0051	0.246	1.1	8.9	0.030	2.7	0.0022	0.0026	33.7	0.0647
Apr	6375	0.00010	0.063	0.0011	28.9	0.00033	0.0	0.0007	0.0051	0.257	1.0	7.7	0.030	2.5	0.0017	0.0022	23.0	0.0534
May	55468	0.00010	0.065	0.0010	29.5	0.00022	0.0	0.0006	0.0050	0.263	0.9	6.7	0.029	2.3	0.0012	0.0018	13.1	0.0294
Jun	56957	0.00010	0.066	0.0010	29.5	0.00022	0.0	0.0006	0.0050	0.264	0.9	6.7	0.029	2.3	0.0012	0.0018	13.0	0.0304
Jul	39693	0.00010	0.065	0.0010	29.5	0.00022	0.0	0.0006	0.0050	0.264	0.9	6.7	0.029	2.3	0.0012	0.0018	13.6	0.0314
Aug	27824	0.00010	0.065	0.0010	29.4	0.00023	0.0	0.0006	0.0050	0.262	0.9	6.8	0.029	2.3	0.0012	0.0018	14.4	0.0316
Sep	37419	0.00010	0.065	0.0010	29.5	0.00022	0.0	0.0006	0.0050	0.263	0.9	6.7	0.029	2.3	0.0012	0.0018	13.6	0.0302
Oct	19528	0.00010	0.065	0.0010	29.4	0.00024	0.0	0.0006	0.0050	0.261	1.0	7.0	0.029	2.3	0.0013	0.0019	15.5	0.0323
Nov	8835	0.00010	0.064	0.0011	29.5	0.00029	0.0	0.0007	0.0051	0.260	1.0	7.5	0.029	2.5	0.0015	0.0021	19.9	0.0403
Dec	6515	0.00010	0.064	0.0011	29.6	0.00033	0.0	0.0007	0.0051	0.259	1.1	7.9	0.030	2.5	0.0017	0.0022	23.3	0.0459
Total	269678																	

SF010 - Faro Mine Site - Low Infiltration Cover Sensitivity Assessment

Conditions FUTURE 3

Location X2

	Flows (x 1000 m3)	Ag mg/L	Al mg/L	As mg/L	Ca mg/L	Cd mg/L	Cl mg/L	Co mg/L	Cu mg/L	Fe mg/L	K mg/L	Mg mg/L	Mn mg/L	Na mg/L	Ni mg/L	Pb mg/L	SO4 mg/L	Zn mg/L
Jan	553	0.00021	0.341	0.0168	30.0	0.00536	0.2	0.0064	0.1025	3.818	1.0	7.7	0.528	2.3	0.0060	0.0032	32.2	3.7651
Feb	403	0.00024	0.405	0.0205	30.1	0.00656	0.2	0.0078	0.1252	4.646	1.0	7.9	0.644	2.4	0.0071	0.0036	37.0	4.6363
Mar	407	0.00027	0.490	0.0255	30.3	0.00817	0.3	0.0096	0.1555	5.752	1.0	8.3	0.799	2.4	0.0087	0.0041	43.4	5.8002
Apr	784	0.00022	0.362	0.0180	30.1	0.00576	0.2	0.0069	0.1100	4.090	1.0	7.8	0.566	2.4	0.0064	0.0033	33.8	4.0514
May	6991	0.00012	0.105	0.0033	29.7	0.00094	0.0	0.0014	0.0190	0.774	0.9	6.7	0.100	2.3	0.0018	0.0019	14.7	0.5622
Jun	7191	0.00012	0.115	0.0038	29.7	0.00112	0.0	0.0016	0.0224	0.899	0.9	6.7	0.118	2.3	0.0020	0.0020	15.4	0.6936
Jul	5013	0.00012	0.125	0.0044	29.7	0.00132	0.0	0.0019	0.0261	1.035	0.9	6.8	0.137	2.3	0.0022	0.0020	16.2	0.8369
Aug	3506	0.00013	0.128	0.0046	29.7	0.00137	0.0	0.0019	0.0272	1.072	0.9	6.8	0.142	2.3	0.0022	0.0020	16.4	0.8756
Sep	4720	0.00012	0.114	0.0038	29.7	0.00110	0.0	0.0016	0.0220	0.885	0.9	6.7	0.116	2.3	0.0020	0.0020	15.3	0.6793
Oct	2460	0.00013	0.136	0.0050	29.7	0.00152	0.0	0.0021	0.0299	1.172	0.9	6.8	0.156	2.3	0.0024	0.0021	17.0	0.9806
Nov	1115	0.00016	0.216	0.0097	29.8	0.00302	0.1	0.0038	0.0583	2.207	0.9	7.2	0.301	2.3	0.0038	0.0025	22.9	2.0702
Dec	821	0.00018	0.273	0.0129	29.9	0.00409	0.1	0.0050	0.0785	2.943	1.0	7.4	0.405	2.3	0.0048	0.0028	27.2	2.8437
Total	33964																	

Location X14

	Flows (x 1000 m3)	Ag mg/L	Al mg/L	As mg/L	Ca mg/L	Cd mg/L	Cl mg/L	Co mg/L	Cu mg/L	Fe mg/L	K mg/L	Mg mg/L	Mn mg/L	Na mg/L	Ni mg/L	Pb mg/L	SO4 mg/L	Zn mg/L
Jan	1192	0.00014	0.202	0.0105	30.0	0.00371	0.1	0.0044	0.0610	2.236	1.6	25.9	0.314	3.7	0.0066	0.0050	278.5	2.1784
Feb	912	0.00014	0.223	0.0122	29.0	0.00433	0.1	0.0050	0.0706	2.569	1.7	29.3	0.362	3.9	0.0075	0.0056	328.9	2.5526
Mar	981	0.00015	0.252	0.0140	27.5	0.00494	0.1	0.0057	0.0820	2.977	1.7	29.5	0.421	3.9	0.0081	0.0057	336.8	2.9945
Apr	1784	0.00014	0.209	0.0105	27.8	0.00357	0.1	0.0043	0.0622	2.290	1.3	18.8	0.319	3.1	0.0056	0.0040	187.8	2.2191
May	14480	0.00011	0.087	0.0024	29.3	0.00069	0.0	0.0011	0.0134	0.562	1.0	8.1	0.071	2.4	0.0017	0.0020	34.3	0.3470
Jun	14796	0.00011	0.093	0.0027	29.3	0.00080	0.0	0.0013	0.0156	0.640	1.0	8.0	0.082	2.4	0.0018	0.0020	33.7	0.4284
Jul	10302	0.00011	0.099	0.0031	29.4	0.00094	0.0	0.0014	0.0178	0.721	1.0	8.8	0.094	2.4	0.0020	0.0022	43.8	0.5156
Aug	7268	0.00011	0.099	0.0032	29.2	0.00099	0.0	0.0015	0.0182	0.733	1.0	9.6	0.096	2.5	0.0022	0.0023	56.1	0.5342
Sep	9748	0.00011	0.091	0.0027	29.3	0.00080	0.0	0.0013	0.0152	0.627	1.0	8.8	0.080	2.4	0.0019	0.0021	43.9	0.4183
Oct	5108	0.00011	0.102	0.0035	29.2	0.00111	0.0	0.0016	0.0198	0.786	1.1	11.0	0.104	2.6	0.0025	0.0025	74.2	0.5959
Nov	2303	0.00012	0.145	0.0064	29.9	0.00217	0.1	0.0027	0.0370	1.396	1.3	16.3	0.192	3.0	0.0040	0.0034	146.3	1.2540
Dec	1705	0.00014	0.176	0.0085	30.5	0.00291	0.1	0.0035	0.0490	1.820	1.4	20.2	0.253	3.3	0.0052	0.0041	199.6	1.7109
Total	70579																	

Location Mouth of Rose Creek

	Flows (x 1000 m3)	Ag mg/L	Al mg/L	As mg/L	Ca mg/L	Cd mg/L	Cl mg/L	Co mg/L	Cu mg/L	Fe mg/L	K mg/L	Mg mg/L	Mn mg/L	Na mg/L	Ni mg/L	Pb mg/L	SO4 mg/L	Zn mg/L
Jan	1628	0.00013	0.166	0.0080	29.9	0.00277	0.1	0.0034	0.0460	1.708	1.4	20.7	0.237	3.3	0.0051	0.0041	207.1	1.6023
Feb	1230	0.00013	0.183	0.0093	29.2	0.00326	0.1	0.0039	0.0537	1.974	1.5	23.4	0.276	3.5	0.0059	0.0046	247.1	1.9004
Mar	1301	0.00014	0.206	0.0108	28.0	0.00378	0.1	0.0044	0.0631	2.310	1.5	23.9	0.324	3.5	0.0064	0.0047	256.9	2.2641
Apr	2402	0.00013	0.172	0.0081	28.3	0.00270	0.1	0.0033	0.0475	1.769	1.2	15.7	0.245	2.9	0.0045	0.0034	142.6	1.6553
May	19992	0.00010	0.081	0.0020	29.4	0.00055	0.0	0.0010	0.0111	0.480	1.0	7.7	0.059	2.3	0.0016	0.0019	28.1	0.2584
Jun	20466	0.00011	0.086	0.0023	29.4	0.00063	0.0	0.0011	0.0126	0.536	1.0	7.6	0.067	2.3	0.0016	0.0019	27.6	0.3168
Jul	14254	0.00011	0.090	0.0025	29.4	0.00073	0.0	0.0012	0.0143	0.594	1.0	8.2	0.076	2.4	0.0018	0.0020	34.9	0.3797
Aug	10032	0.00011	0.090	0.0026	29.3	0.00077	0.0	0.0012	0.0146	0.603	1.0	8.8	0.077	2.4	0.0019	0.0021	43.9	0.3940
Sep	13469	0.00011	0.084	0.0022	29.4	0.00064	0.0	0.0011	0.0124	0.527	1.0	8.2	0.066	2.4	0.0017	0.0020	35.0	0.3098
Oct	7047	0.00011	0.092	0.0028	29.3	0.00086	0.0	0.0013	0.0157	0.642	1.0	9.7	0.083	2.5	0.0021	0.0023	57.0	0.4390
Nov	3181	0.00012	0.123	0.0049	29.8	0.00162	0.0	0.0021	0.0282	1.084	1.2	13.6	0.147	2.8	0.0032	0.0029	109.1	0.9148
Dec	2352	0.00013	0.146	0.0064	30.3	0.00216	0.1	0.0027	0.0369	1.392	1.3	16.5	0.191	3.0	0.0041	0.0035	147.9	1.2473
Total	97354																	

Location Mouth of Anvil Creek

	Flows (x 1000 m3)	Ag mg/L	Al mg/L	As mg/L	Ca mg/L	Cd mg/L	Cl mg/L	Co mg/L	Cu mg/L	Fe mg/L	K mg/L	Mg mg/L	Mn mg/L	Na mg/L	Ni mg/L	Pb mg/L	SO4 mg/L	Zn mg/L
Jan	4432	0.00011	0.103	0.0036	29.7	0.00115	0.0	0.0016	0.0201	0.795	1.1	11.7	0.105	2.7	0.0026	0.0026	83.5	0.6048
Feb	3272	0.00011	0.110	0.0041	29.4	0.00135	0.0	0.0018	0.0233	0.907	1.1	12.9	0.121	2.7	0.0029	0.0028	100.2	0.7301
Mar	3362	0.00011	0.120	0.0048	29.0	0.00158	0.0	0.0021	0.0275	1.056	1.1	13.2	0.143	2.7	0.0032	0.0029	106.6	0.8921
Apr	6375	0.00011	0.106	0.0037	29.1	0.00114	0.0	0.0016	0.0210	0.831	1.0	10.0	0.110	2.5	0.0024	0.0024	61.0	0.6396
May	55468	0.00010	0.071	0.0014	29.5	0.00033	0.0	0.0007	0.0072	0.342	0.9	6.9	0.039	2.3	0.0013	0.0018	17.6	0.1095
Jun	56957	0.00010	0.073	0.0015	29.5	0.00035	0.0	0.0008	0.0077	0.362	0.9	6.9	0.042	2.3	0.0013	0.0018	17.4	0.1302
Jul	39693	0.00010	0.074	0.0016	29.5	0.00039	0.0	0.0008	0.0083	0.383	0.9	7.1	0.045	2.3	0.0013	0.0018	20.0	0.1528
Aug	27824	0.00010	0.074	0.0016	29.5	0.00041	0.0	0.0008	0.0085	0.386	0.9	7.3	0.046	2.3	0.0014	0.0019	23.3	0.1585
Sep	37419	0.00010	0.073	0.0014	29.5	0.00036	0.0	0.0008	0.0077	0.359	0.9	7.1	0.042	2.3	0.0013	0.0018	20.1	0.1279
Oct	19528	0.00010	0.075	0.0017	29.5	0.00044	0.0	0.0009	0.0089	0.401	1.0	7.7	0.048	2.3	0.0015	0.0019	28.1	0.1748
Nov	8835	0.00011	0.087	0.0024	29.7	0.00071	0.0	0.0012	0.0134	0.559	1.0	9.1	0.071	2.5	0.0019	0.0021	46.8	0.3458
Dec	6515	0.00011	0.095	0.0030	29.8	0.00091	0.0	0.0014	0.0165	0.671	1.1	10.1	0.087	2.5	0.0022	0.0023	60.9	0.4665
Total	269678																	

SF11 - Faro Site - Sensitivity Analysis - Load Increase for Rudimentary cover 50 %; load increase for Low Infiltration Cover 100 %

Summary Tables

Conditions: FUTURE 1

Location: X2

	Flows (x 1000 m3)	Ag mg/L	Al mg/L	As mg/L	Ca mg/L	Cd mg/L	Cl mg/L	Co mg/L	Cu mg/L	Fe mg/L	K mg/L	Mg mg/L	Mn mg/L	Na mg/L	Ni mg/L	Pb mg/L	SO4 mg/L	Zn mg/L
Jan	553	0.00011	0.0688	0.0012	29.9	0.00025	0.0	0.0007	0.0054	0.279	0.9	6.8	0.033	2.3	0.0013	0.0018	13.5	0.0604
Feb	403	0.00011	0.0695	0.0012	29.9	0.00027	0.0	0.0007	0.0055	0.282	0.9	6.8	0.034	2.3	0.0014	0.0019	13.9	0.0685
Mar	407	0.00011	0.0705	0.0013	30.0	0.00028	0.0	0.0007	0.0056	0.287	0.9	6.9	0.035	2.3	0.0015	0.0019	14.5	0.0794
Apr	784	0.00011	0.0691	0.0012	29.9	0.00026	0.0	0.0007	0.0054	0.280	0.9	6.8	0.033	2.3	0.0014	0.0019	13.6	0.0631
May	6991	0.00010	0.0663	0.0010	29.6	0.00021	0.0	0.0006	0.0051	0.266	0.9	6.6	0.029	2.3	0.0011	0.0017	12.0	0.0306
Jun	7191	0.00010	0.0664	0.0010	29.6	0.00021	0.0	0.0006	0.0051	0.267	0.9	6.6	0.029	2.3	0.0011	0.0017	12.0	0.0318
Jul	5013	0.00010	0.0665	0.0010	29.7	0.00021	0.0	0.0006	0.0051	0.267	0.9	6.6	0.029	2.3	0.0012	0.0017	12.1	0.0332
Aug	3506	0.00010	0.0666	0.0010	29.7	0.00021	0.0	0.0006	0.0051	0.267	0.9	6.6	0.029	2.3	0.0012	0.0017	12.1	0.0335
Sep	4720	0.00010	0.0664	0.0010	29.6	0.00021	0.0	0.0006	0.0051	0.267	0.9	6.6	0.029	2.3	0.0011	0.0017	12.0	0.0317
Oct	2460	0.00010	0.0667	0.0010	29.7	0.00021	0.0	0.0006	0.0051	0.268	0.9	6.6	0.029	2.3	0.0012	0.0017	12.2	0.0345
Nov	1115	0.00010	0.0675	0.0011	29.7	0.00023	0.0	0.0006	0.0052	0.272	0.9	6.7	0.031	2.3	0.0012	0.0018	12.7	0.0446
Dec	821	0.00011	0.0681	0.0011	29.8	0.00024	0.0	0.0007	0.0053	0.275	0.9	6.7	0.031	2.3	0.0013	0.0018	13.1	0.0518
Total	33964																	

Location: X14

	Flows (x 1000 m3)	Ag mg/L	Al mg/L	As mg/L	Ca mg/L	Cd mg/L	Cl mg/L	Co mg/L	Cu mg/L	Fe mg/L	K mg/L	Mg mg/L	Mn mg/L	Na mg/L	Ni mg/L	Pb mg/L	SO4 mg/L	Zn mg/L
Jan	1192	0.00008	0.0457	0.0014	27.3	0.00083	0.0	0.0011	0.0047	0.189	1.6	10.7	0.026	3.7	0.0039	0.0042	55.0	0.0806
Feb	912	0.00007	0.0395	0.0015	25.8	0.00094	0.0	0.0011	0.0045	0.165	1.7	11.2	0.025	3.9	0.0044	0.0046	62.9	0.0892
Mar	981	0.00007	0.0359	0.0015	24.2	0.00096	0.0	0.0011	0.0044	0.152	1.7	11.0	0.024	3.8	0.0044	0.0046	63.5	0.0996
Apr	1784	0.00008	0.0490	0.0013	26.0	0.00062	0.0	0.0009	0.0048	0.203	1.3	8.8	0.027	3.0	0.0029	0.0032	39.3	0.0808
May	14480	0.00010	0.0636	0.0010	29.1	0.00026	0.0	0.0006	0.0050	0.256	1.0	6.8	0.028	2.4	0.0013	0.0019	15.2	0.0337
Jun	14796	0.00010	0.0638	0.0010	29.1	0.00026	0.0	0.0006	0.0050	0.257	1.0	6.8	0.028	2.4	0.0013	0.0019	15.1	0.0359
Jul	10302	0.00010	0.0632	0.0011	29.1	0.00028	0.0	0.0007	0.0050	0.255	1.0	7.0	0.028	2.4	0.0014	0.0020	16.7	0.0382
Aug	7268	0.00010	0.0616	0.0011	28.7	0.00031	0.0	0.0007	0.0049	0.249	1.0	7.1	0.028	2.5	0.0016	0.0021	18.7	0.0384
Sep	9748	0.00010	0.0629	0.0011	29.0	0.00028	0.0	0.0007	0.0050	0.253	1.0	7.0	0.028	2.4	0.0014	0.0020	16.8	0.0355
Oct	5108	0.00009	0.0602	0.0011	28.6	0.00035	0.0	0.0007	0.0049	0.243	1.1	7.4	0.028	2.6	0.0017	0.0023	21.7	0.0399
Nov	2303	0.00009	0.0561	0.0012	28.5	0.00052	0.0	0.0008	0.0049	0.228	1.3	8.6	0.028	3.0	0.0025	0.0030	33.5	0.0572
Dec	1705	0.00009	0.0533	0.0013	28.6	0.00065	0.0	0.0009	0.0050	0.218	1.4	9.6	0.028	3.3	0.0031	0.0035	42.4	0.0694
Total	70579																	

Location: Mouth of Rose Creek

	Flows (x 1000 m3)	Ag mg/L	Al mg/L	As mg/L	Ca mg/L	Cd mg/L	Cl mg/L	Co mg/L	Cu mg/L	Fe mg/L	K mg/L	Mg mg/L	Mn mg/L	Na mg/L	Ni mg/L	Pb mg/L	SO4 mg/L	Zn mg/L
Jan	1628	0.00009	0.0511	0.0013	27.9	0.00066	0.0	0.0009	0.0048	0.209	1.4	9.6	0.027	3.3	0.0032	0.0036	43.4	0.0659
Feb	1230	0.00008	0.0463	0.0014	26.8	0.00075	0.0	0.0010	0.0046	0.190	1.5	10.0	0.026	3.5	0.0036	0.0039	49.7	0.0728
Mar	1301	0.00008	0.0432	0.0014	25.5	0.00077	0.0	0.0010	0.0045	0.179	1.5	9.9	0.025	3.4	0.0036	0.0039	50.8	0.0814
Apr	2402	0.00009	0.0534	0.0012	27.0	0.00052	0.0	0.0008	0.0048	0.219	1.2	8.2	0.027	2.8	0.0024	0.0028	32.2	0.0666
May	19992	0.00010	0.0642	0.0010	29.2	0.00024	0.0	0.0006	0.0050	0.258	1.0	6.7	0.028	2.3	0.0013	0.0018	14.3	0.0314
Jun	20466	0.00010	0.0644	0.0010	29.2	0.00024	0.0	0.0006	0.0050	0.259	1.0	6.7	0.028	2.3	0.0013	0.0018	14.2	0.0330
Jul	14254	0.00010	0.0639	0.0010	29.2	0.00026	0.0	0.0006	0.0050	0.257	1.0	6.8	0.028	2.4	0.0013	0.0019	15.3	0.0347
Aug	10032	0.00010	0.0628	0.0011	29.0	0.00028	0.0	0.0007	0.0050	0.253	1.0	7.0	0.028	2.4	0.0014	0.0020	16.8	0.0348
Sep	13469	0.00010	0.0637	0.0010	29.2	0.00026	0.0	0.0006	0.0050	0.256	1.0	6.8	0.028	2.4	0.0013	0.0019	15.4	0.0328
Oct	7047	0.00010	0.0618	0.0011	28.9	0.00031	0.0	0.0007	0.0049	0.249	1.0	7.2	0.028	2.5	0.0016	0.0021	18.9	0.0359
Nov	3181	0.00009	0.0588	0.0012	28.8	0.00043	0.0	0.0008	0.0049	0.238	1.2	8.0	0.028	2.8	0.0021	0.0026	27.5	0.0485
Dec	2352	0.00009	0.0568	0.0013	28.9	0.00053	0.0	0.0009	0.0050	0.231	1.3	8.7	0.028	3.0	0.0026	0.0030	33.9	0.0573
Total	97354																	

Location: Mouth of Anvil Creek

	Flows (x 1000 m3)	Ag mg/L	Al mg/L	As mg/L	Ca mg/L	Cd mg/L	Cl mg/L	Co mg/L	Cu mg/L	Fe mg/L	K mg/L	Mg mg/L	Mn mg/L	Na mg/L	Ni mg/L	Pb mg/L	SO4 mg/L	Zn mg/L
Jan	4432	0.00010	0.0605	0.0011	29.0	0.00037	0.0	0.0007	0.0049	0.244	1.1	7.6	0.028	2.7	0.0019	0.0024	23.4	0.0404
Feb	3272	0.00009	0.0585	0.0011	28.5	0.00041	0.0	0.0007	0.0049	0.236	1.1	7.8	0.027	2.7	0.0020	0.0025	26.0	0.0433
Mar	3362	0.00009	0.0571	0.0011	28.0	0.00042	0.0	0.0008	0.0048	0.231	1.1	7.8	0.027	2.7	0.0021	0.0026	26.8	0.0472
Apr	6375	0.00010	0.0612	0.0011	28.6	0.00032	0.0	0.0007	0.0049	0.247	1.0	7.2	0.028	2.5	0.0016	0.0021	19.4	0.0411
May	55468	0.00010	0.0653	0.0010	29.5	0.00021	0.0	0.0006	0.0050	0.262	0.9	6.6	0.028	2.3	0.0012	0.0018	12.6	0.0277
Jun	56957	0.00010	0.0654	0.0010	29.5	0.00021	0.0	0.0006	0.0050	0.262	0.9	6.6	0.028	2.3	0.0012	0.0017	12.6	0.0283
Jul	39693	0.00010	0.0652	0.0010	29.5	0.00022	0.0	0.0006	0.0050	0.262	0.9	6.6	0.028	2.3	0.0012	0.0018	13.0	0.0289
Aug	27824	0.00010	0.0648	0.0010	29.4	0.00023	0.0	0.0006	0.0050	0.260	0.9	6.7	0.028	2.3	0.0012	0.0018	13.5	0.0289
Sep	37419	0.00010	0.0651	0.0010	29.4	0.00022	0.0	0.0006	0.0050	0.261	0.9	6.6	0.028	2.3	0.0012	0.0018	13.0	0.0282
Oct	19528	0.00010	0.0644	0.0010	29.3	0.00024	0.0	0.0006	0.0050	0.259	1.0	6.8	0.028	2.3	0.0013	0.0018	14.3	0.0293
Nov	8835	0.00010	0.0633	0.0011	29.3	0.00028	0.0	0.0007	0.0050	0.255	1.0	7.1	0.028	2.5	0.0015	0.0020	17.4	0.0338
Dec	6515	0.00010	0.0626	0.0011	29.3	0.00032	0.0	0.0007	0.0050	0.252	1.0	7.3	0.028	2.5	0.0016	0.0022	19.7	0.0371
Total	269678																	

SF11 - Faro Site - Sensitivity Analysis - Load increase for Rudimentary cover 50 %; load increase for Low Infiltration Cover 100 %
Summary Tables
Conditions FUTURE 2

Location X2

	Flows (x 1000 m3)	Ag mg/L	Al mg/L	As mg/L	Ca mg/L	Cd mg/L	Cl mg/L	Co mg/L	Cu mg/L	Fe mg/L	K mg/L	Mg mg/L	Mn mg/L	Na mg/L	Ni mg/L	Pb mg/L	SO4 mg/L	Zn mg/L
Jan	553	0.00011	0.0802	0.0012	30.1	0.00041	0.0	0.0010	0.0067	0.350	0.9	7.1	0.050	2.4	0.0020	0.0022	16.0	0.1919
Feb	403	0.00011	0.0835	0.0013	30.3	0.00046	0.0	0.0010	0.0071	0.370	1.0	7.3	0.054	2.4	0.0023	0.0023	17.0	0.2307
Mar	407	0.00012	0.0879	0.0014	30.4	0.00052	0.0	0.0012	0.0077	0.397	1.0	7.5	0.061	2.5	0.0026	0.0025	18.3	0.2824
Apr	784	0.00011	0.0813	0.0013	30.2	0.00042	0.0	0.0010	0.0069	0.356	0.9	7.2	0.051	2.4	0.0021	0.0022	16.3	0.2046
May	6991	0.00010	0.0679	0.0010	29.7	0.00023	0.0	0.0007	0.0052	0.276	0.9	6.6	0.031	2.3	0.0012	0.0018	12.3	0.0495
Jun	7191	0.00010	0.0684	0.0010	29.7	0.00024	0.0	0.0007	0.0053	0.279	0.9	6.6	0.032	2.3	0.0013	0.0018	12.5	0.0553
Jul	5013	0.00010	0.0690	0.0011	29.7	0.00025	0.0	0.0007	0.0054	0.283	0.9	6.7	0.033	2.3	0.0013	0.0018	12.6	0.0617
Aug	3506	0.00010	0.0691	0.0011	29.7	0.00025	0.0	0.0007	0.0054	0.284	0.9	6.7	0.033	2.3	0.0013	0.0018	12.7	0.0634
Sep	4720	0.00010	0.0684	0.0010	29.7	0.00024	0.0	0.0007	0.0053	0.279	0.9	6.6	0.032	2.3	0.0013	0.0018	12.5	0.0547
Oct	2460	0.00010	0.0695	0.0011	29.7	0.00025	0.0	0.0007	0.0054	0.286	0.9	6.7	0.034	2.3	0.0013	0.0018	12.8	0.0681
Nov	1115	0.00011	0.0737	0.0011	29.9	0.00031	0.0	0.0008	0.0059	0.311	0.9	6.9	0.040	2.3	0.0016	0.0020	14.1	0.1165
Dec	821	0.00011	0.0767	0.0012	30.0	0.00036	0.0	0.0009	0.0063	0.329	0.9	7.0	0.044	2.4	0.0018	0.0021	15.0	0.1509
Total	33964																	

Location X14

	Flows (x 1000 m3)	Ag mg/L	Al mg/L	As mg/L	Ca mg/L	Cd mg/L	Cl mg/L	Co mg/L	Cu mg/L	Fe mg/L	K mg/L	Mg mg/L	Mn mg/L	Na mg/L	Ni mg/L	Pb mg/L	SO4 mg/L	Zn mg/L
Jan	1192	0.00008	0.0534	0.0016	32.3	0.00093	0.0	0.0013	0.0060	0.246	1.6	17.7	0.039	3.8	0.0044	0.0044	100.8	0.1674
Feb	912	0.00008	0.0485	0.0016	31.8	0.00106	0.0	0.0014	0.0060	0.232	1.7	19.6	0.040	4.0	0.0049	0.0049	117.4	0.1912
Mar	981	0.00007	0.0465	0.0017	30.3	0.00110	0.0	0.0014	0.0062	0.230	1.7	19.6	0.042	3.9	0.0051	0.0049	119.4	0.2195
Apr	1784	0.00009	0.0569	0.0014	29.3	0.00073	0.0	0.0011	0.0061	0.261	1.3	13.4	0.039	3.1	0.0034	0.0035	69.5	0.1693
May	14480	0.00010	0.0648	0.0011	29.5	0.00027	0.0	0.0007	0.0052	0.264	1.0	7.4	0.030	2.4	0.0014	0.0019	19.1	0.0466
Jun	14796	0.00010	0.0653	0.0011	29.5	0.00028	0.0	0.0007	0.0053	0.268	1.0	7.4	0.031	2.4	0.0014	0.0019	18.8	0.0521
Jul	10302	0.00010	0.0649	0.0011	29.6	0.00030	0.0	0.0007	0.0053	0.268	1.0	7.8	0.031	2.4	0.0015	0.0020	22.2	0.0579
Aug	7268	0.00010	0.0635	0.0011	29.6	0.00033	0.0	0.0007	0.0052	0.262	1.0	8.3	0.031	2.5	0.0017	0.0021	26.3	0.0589
Sep	9748	0.00010	0.0643	0.0011	29.6	0.00030	0.0	0.0007	0.0052	0.264	1.0	7.8	0.030	2.4	0.0015	0.0020	22.3	0.0513
Oct	5108	0.00009	0.0622	0.0011	29.8	0.00037	0.0	0.0008	0.0052	0.258	1.1	9.0	0.031	2.6	0.0019	0.0023	32.4	0.0629
Nov	2303	0.00009	0.0605	0.0013	31.0	0.00058	0.0	0.0009	0.0057	0.261	1.3	12.2	0.035	3.0	0.0028	0.0031	56.6	0.1067
Dec	1705	0.00009	0.0594	0.0014	32.1	0.00073	0.0	0.0011	0.0060	0.263	1.4	14.5	0.038	3.4	0.0035	0.0037	74.5	0.1373
Total	70579																	

Location Mouth of Rose Creek

	Flows (x 1000 m3)	Ag mg/L	Al mg/L	As mg/L	Ca mg/L	Cd mg/L	Cl mg/L	Co mg/L	Cu mg/L	Fe mg/L	K mg/L	Mg mg/L	Mn mg/L	Na mg/L	Ni mg/L	Pb mg/L	SO4 mg/L	Zn mg/L
Jan	1628	0.00009	0.0568	0.0014	31.6	0.00074	0.0	0.0011	0.0058	0.251	1.4	14.7	0.036	3.4	0.0035	0.0037	77.0	0.1295
Feb	1230	0.00008	0.0530	0.0015	31.2	0.00084	0.0	0.0012	0.0058	0.240	1.5	16.2	0.037	3.5	0.0039	0.0041	90.1	0.1485
Mar	1301	0.00008	0.0513	0.0015	30.1	0.00088	0.0	0.0012	0.0059	0.239	1.5	16.4	0.038	3.5	0.0041	0.0041	92.9	0.1718
Apr	2402	0.00009	0.0592	0.0013	29.4	0.00059	0.0	0.0010	0.0059	0.262	1.2	11.7	0.037	2.9	0.0028	0.0030	54.6	0.1324
May	19992	0.00010	0.0651	0.0010	29.5	0.00025	0.0	0.0006	0.0051	0.264	1.0	7.2	0.029	2.3	0.0013	0.0019	17.1	0.0408
Jun	20466	0.00010	0.0654	0.0010	29.5	0.00025	0.0	0.0007	0.0052	0.267	1.0	7.1	0.030	2.3	0.0013	0.0019	16.9	0.0448
Jul	14254	0.00010	0.0652	0.0011	29.6	0.00028	0.0	0.0007	0.0052	0.267	1.0	7.5	0.030	2.4	0.0014	0.0019	19.3	0.0490
Aug	10032	0.00010	0.0641	0.0011	29.6	0.00029	0.0	0.0007	0.0052	0.263	1.0	7.8	0.030	2.4	0.0015	0.0020	22.3	0.0497
Sep	13469	0.00010	0.0647	0.0011	29.6	0.00027	0.0	0.0007	0.0052	0.264	1.0	7.5	0.030	2.4	0.0014	0.0019	19.4	0.0442
Oct	7047	0.00010	0.0633	0.0011	29.7	0.00033	0.0	0.0007	0.0052	0.260	1.0	8.4	0.030	2.5	0.0017	0.0022	26.7	0.0526
Nov	3181	0.00009	0.0620	0.0012	30.6	0.00048	0.0	0.0009	0.0055	0.262	1.2	10.6	0.033	2.8	0.0023	0.0027	44.2	0.0843
Dec	2352	0.00009	0.0612	0.0013	31.4	0.00059	0.0	0.0010	0.0057	0.263	1.3	12.3	0.035	3.1	0.0028	0.0031	57.2	0.1066
Total	97354																	

Location Mouth of Anvil Creek

	Flows (x 1000 m3)	Ag mg/L	Al mg/L	As mg/L	Ca mg/L	Cd mg/L	Cl mg/L	Co mg/L	Cu mg/L	Fe mg/L	K mg/L	Mg mg/L	Mn mg/L	Na mg/L	Ni mg/L	Pb mg/L	SO4 mg/L	Zn mg/L
Jan	4432	0.00010	0.0625	0.0012	30.3	0.00040	0.0	0.0008	0.0053	0.259	1.1	9.5	0.031	2.7	0.0020	0.0024	35.7	0.0638
Feb	3272	0.00009	0.0611	0.0012	30.2	0.00044	0.0	0.0008	0.0053	0.255	1.1	10.2	0.032	2.7	0.0022	0.0026	41.2	0.0718
Mar	3362	0.00009	0.0602	0.0012	29.8	0.00046	0.0	0.0008	0.0053	0.254	1.1	10.3	0.032	2.7	0.0023	0.0026	43.1	0.0822
Apr	6375	0.00010	0.0634	0.0011	29.5	0.00035	0.0	0.0007	0.0053	0.263	1.0	8.5	0.031	2.5	0.0017	0.0022	27.9	0.0658
May	55468	0.00010	0.0656	0.0010	29.6	0.00022	0.0	0.0006	0.0050	0.264	0.9	6.8	0.029	2.3	0.0012	0.0018	13.6	0.0311
Jun	56957	0.00010	0.0657	0.0010	29.6	0.00022	0.0	0.0006	0.0051	0.265	0.9	6.8	0.029	2.3	0.0012	0.0018	13.6	0.0325
Jul	39693	0.00010	0.0656	0.0010	29.6	0.00023	0.0	0.0006	0.0051	0.265	0.9	6.9	0.029	2.3	0.0012	0.0018	14.4	0.0340
Aug	27824	0.00010	0.0653	0.0010	29.6	0.00023	0.0	0.0006	0.0051	0.264	0.9	7.0	0.029	2.3	0.0012	0.0018	15.5	0.0343
Sep	37419	0.00010	0.0655	0.0010	29.6	0.00023	0.0	0.0006	0.0051	0.264	0.9	6.9	0.029	2.3	0.0012	0.0018	14.5	0.0323
Oct	19528	0.00010	0.0649	0.0010	29.6	0.00025	0.0	0.0006	0.0051	0.262	1.0	7.2	0.029	2.3	0.0013	0.0019	17.1	0.0353
Nov	8635	0.00010	0.0645	0.0011	30.0	0.00030	0.0	0.0007	0.0052	0.263	1.0	8.0	0.030	2.5	0.0015	0.0021	23.4	0.0467
Dec	6515	0.00010	0.0642	0.0011	30.3	0.00034	0.0	0.0007	0.0053	0.264	1.1	8.6	0.031	2.6	0.0017	0.0022	28.1	0.0548
Total	269678																	

SF11 - Faro Site - Sensitivity Analysis - Load increase for Rudimentary cover 50 %; load increase for Low Infiltration Cover 100 %

Summary Tables

Conditions: FUTURE 3

Location: X2

	Flows (x 1000 m3)	Ag mg/L	Al mg/L	As mg/L	Ca mg/L	Cd mg/L	Cl mg/L	Co mg/L	Cu mg/L	Fe mg/L	K mg/L	Mg mg/L	Mn mg/L	Na mg/L	Ni mg/L	Pb mg/L	SO4 mg/L	Zn mg/L
Jan	553	0.00027	0.4728	0.0244	30.3	0.00784	0.3	0.0093	0.1493	5.526	1.0	8.2	0.768	2.4	0.0084	0.0040	42.1	5.5639
Feb	403	0.00030	0.5676	0.0299	30.4	0.00962	0.3	0.0113	0.1829	6.752	1.0	8.6	0.940	2.4	0.0101	0.0045	49.2	6.8542
Mar	407	0.00036	0.6942	0.0372	30.6	0.01200	0.4	0.0140	0.2279	8.390	1.0	9.2	1.170	2.5	0.0123	0.0052	58.6	8.5781
Apr	784	0.00028	0.5040	0.0262	30.3	0.00843	0.3	0.0099	0.1604	5.929	1.0	8.4	0.824	2.4	0.0089	0.0041	44.4	5.9880
May	6991	0.00012	0.1243	0.0044	29.7	0.00130	0.0	0.0018	0.0257	1.019	0.9	6.8	0.134	2.3	0.0021	0.0020	16.1	0.8204
Jun	7191	0.00013	0.1386	0.0052	29.7	0.00157	0.0	0.0021	0.0308	1.204	0.9	6.8	0.160	2.3	0.0024	0.0021	17.1	1.0149
Jul	5013	0.00014	0.1542	0.0061	29.7	0.00186	0.1	0.0025	0.0363	1.406	0.9	6.9	0.189	2.3	0.0027	0.0022	18.3	1.2271
Aug	3506	0.00014	0.1584	0.0063	29.7	0.00194	0.1	0.0026	0.0378	1.460	0.9	6.9	0.196	2.3	0.0028	0.0022	18.6	1.2844
Sep	4720	0.00013	0.1370	0.0051	29.7	0.00154	0.0	0.0021	0.0302	1.184	0.9	6.8	0.158	2.3	0.0024	0.0021	17.0	0.9938
Oct	2460	0.00014	0.1698	0.0070	29.8	0.00215	0.1	0.0028	0.0419	1.608	0.9	7.0	0.217	2.3	0.0030	0.0023	19.5	1.4401
Nov	1115	0.00019	0.2884	0.0138	30.0	0.00438	0.1	0.0053	0.0839	3.141	1.0	7.5	0.433	2.3	0.0051	0.0029	28.3	3.0538
Dec	821	0.00022	0.3725	0.0187	30.1	0.00596	0.2	0.0071	0.1138	4.230	1.0	7.8	0.586	2.4	0.0066	0.0034	34.6	4.1994
Total	33964																	

Location: X14

	Flows (x 1000 m3)	Ag mg/L	Al mg/L	As mg/L	Ca mg/L	Cd mg/L	Cl mg/L	Co mg/L	Cu mg/L	Fe mg/L	K mg/L	Mg mg/L	Mn mg/L	Na mg/L	Ni mg/L	Pb mg/L	SO4 mg/L	Zn mg/L
Jan	1192	0.00017	0.2790	0.0150	34.3	0.00515	0.2	0.0060	0.0885	3.229	1.6	29.5	0.454	3.8	0.0080	0.0054	380.1	3.2162
Feb	912	0.00018	0.3134	0.0174	34.1	0.00601	0.2	0.0069	0.1028	3.735	1.7	33.6	0.527	4.0	0.0092	0.0061	449.9	3.7713
Mar	981	0.00019	0.3577	0.0202	32.7	0.00692	0.2	0.0079	0.1200	4.348	1.7	34.0	0.614	3.9	0.0100	0.0063	461.3	4.4267
Apr	1784	0.00017	0.2868	0.0151	30.7	0.00503	0.2	0.0059	0.0902	3.302	1.3	21.3	0.462	3.1	0.0070	0.0045	255.7	3.2769
May	14480	0.00011	0.0984	0.0031	29.6	0.00090	0.0	0.0014	0.0175	0.710	1.0	8.4	0.092	2.4	0.0019	0.0021	43.1	0.5020
Jun	14796	0.00011	0.1075	0.0036	29.7	0.00106	0.0	0.0016	0.0207	0.826	1.0	8.4	0.108	2.4	0.0021	0.0021	42.2	0.6226
Jul	10302	0.00012	0.1163	0.0041	29.9	0.00126	0.0	0.0018	0.0241	0.947	1.0	9.2	0.126	2.4	0.0024	0.0023	56.2	0.7517
Aug	7268	0.00012	0.1168	0.0043	29.9	0.00133	0.0	0.0018	0.0247	0.967	1.0	10.3	0.129	2.5	0.0025	0.0024	73.2	0.7795
Sep	9748	0.00011	0.1055	0.0035	29.8	0.00107	0.0	0.0016	0.0203	0.808	1.0	9.2	0.106	2.4	0.0022	0.0022	56.3	0.6076
Oct	5108	0.00012	0.1220	0.0047	30.2	0.00149	0.0	0.0020	0.0271	1.049	1.1	11.8	0.141	2.6	0.0028	0.0026	98.1	0.8710
Nov	2303	0.00014	0.1891	0.0090	32.0	0.00298	0.1	0.0037	0.0527	1.963	1.3	18.1	0.272	3.0	0.0048	0.0037	197.6	1.8461
Dec	1705	0.00016	0.2359	0.0119	33.5	0.00403	0.1	0.0048	0.0705	2.598	1.4	22.8	0.362	3.4	0.0063	0.0045	271.1	2.5231
Total	70579																	

Location: Mouth of Rose Creek

	Flows (x 1000 m3)	Ag mg/L	Al mg/L	As mg/L	Ca mg/L	Cd mg/L	Cl mg/L	Co mg/L	Cu mg/L	Fe mg/L	K mg/L	Mg mg/L	Mn mg/L	Na mg/L	Ni mg/L	Pb mg/L	SO4 mg/L	Zn mg/L
Jan	1628	0.00015	0.2219	0.0112	33.0	0.00382	0.1	0.0046	0.0661	2.436	1.4	23.4	0.340	3.4	0.0061	0.0044	281.5	2.3624
Feb	1230	0.00016	0.2495	0.0132	33.0	0.00451	0.1	0.0053	0.0776	2.839	1.5	26.6	0.398	3.5	0.0071	0.0049	336.8	2.8045
Mar	1301	0.00017	0.2859	0.0154	31.9	0.00527	0.2	0.0061	0.0917	3.343	1.5	27.3	0.470	3.5	0.0078	0.0052	350.7	3.3440
Apr	2402	0.00016	0.2300	0.0115	30.4	0.00379	0.1	0.0046	0.0683	2.522	1.2	17.5	0.351	2.9	0.0055	0.0038	193.0	2.4413
May	19992	0.00011	0.0895	0.0025	29.6	0.00071	0.0	0.0012	0.0140	0.587	1.0	7.9	0.074	2.3	0.0017	0.0020	34.4	0.3706
Jun	20466	0.00011	0.0960	0.0029	29.6	0.00083	0.0	0.0013	0.0163	0.670	1.0	7.9	0.086	2.3	0.0018	0.0020	33.8	0.4572
Jul	14254	0.00011	0.1023	0.0033	29.8	0.00097	0.0	0.0015	0.0188	0.757	1.0	8.5	0.099	2.4	0.0020	0.0021	43.9	0.5504
Aug	10032	0.00011	0.1028	0.0034	29.8	0.00102	0.0	0.0015	0.0193	0.773	1.0	9.2	0.101	2.4	0.0021	0.0022	56.3	0.5717
Sep	13469	0.00011	0.0945	0.0028	29.8	0.00083	0.0	0.0013	0.0160	0.658	1.0	8.5	0.085	2.4	0.0019	0.0021	44.0	0.4468
Oct	7047	0.00011	0.1066	0.0037	30.1	0.00114	0.0	0.0016	0.0210	0.833	1.0	10.4	0.110	2.5	0.0023	0.0023	74.3	0.6384
Nov	3181	0.00013	0.1551	0.0068	31.4	0.00222	0.1	0.0028	0.0395	1.494	1.2	14.9	0.204	2.8	0.0038	0.0031	146.3	1.3434
Dec	2352	0.00014	0.1891	0.0089	32.4	0.00298	0.1	0.0037	0.0525	1.956	1.3	18.3	0.270	3.1	0.0048	0.0037	199.8	1.8360
Total	97354																	

Location: Mouth of Anvil Creek

	Flows (x 1000 m3)	Ag mg/L	Al mg/L	As mg/L	Ca mg/L	Cd mg/L	Cl mg/L	Co mg/L	Cu mg/L	Fe mg/L	K mg/L	Mg mg/L	Mn mg/L	Na mg/L	Ni mg/L	Pb mg/L	SO4 mg/L	Zn mg/L
Jan	4432	0.00012	0.1232	0.0048	30.9	0.00153	0.0	0.0021	0.0275	1.062	1.1	12.7	0.143	2.7	0.0029	0.0027	110.8	0.8840
Feb	3272	0.00012	0.1349	0.0056	30.9	0.00182	0.1	0.0024	0.0323	1.232	1.1	14.1	0.167	2.7	0.0033	0.0029	133.9	1.0699
Mar	3362	0.00013	0.1511	0.0066	30.5	0.00216	0.1	0.0027	0.0386	1.456	1.1	14.6	0.199	2.7	0.0037	0.0030	142.9	1.3101
Apr	6375	0.00012	0.1277	0.0049	29.9	0.00155	0.0	0.0021	0.0288	1.115	1.0	10.7	0.150	2.5	0.0028	0.0025	80.0	0.9358
May	55468	0.00010	0.0744	0.0015	29.6	0.00038	0.0	0.0008	0.0083	0.380	0.9	7.0	0.045	2.3	0.0013	0.0018	19.9	0.1500
Jun	56957	0.00010	0.0767	0.0017	29.6	0.00042	0.0	0.0008	0.0091	0.410	0.9	7.0	0.049	2.3	0.0014	0.0018	19.6	0.1807
Jul	39693	0.00010	0.0790	0.0018	29.7	0.00048	0.0	0.0009	0.0100	0.441	0.9	7.2	0.054	2.3	0.0014	0.0018	23.3	0.2141
Aug	27824	0.00010	0.0792	0.0019	29.7	0.00049	0.0	0.0009	0.0102	0.448	0.9	7.5	0.055	2.3	0.0015	0.0019	27.8	0.2225
Sep	37419	0.00010	0.0762	0.0017	29.7	0.00043	0.0	0.0008	0.0090	0.406	0.9	7.2	0.049	2.3	0.0014	0.0018	23.3	0.1772
Oct	19528	0.00010	0.0806	0.0020	29.8	0.00054	0.0	0.0010	0.0108	0.469	1.0	7.9	0.058	2.3	0.0015	0.0019	34.3	0.2468
Nov	8835	0.00011	0.0980	0.0031	30.2	0.00093	0.0	0.0014	0.0174	0.707	1.0	9.6	0.092	2.5	0.0021	0.0022	60.2	0.5001
Dec	6515	0.00012	0.1104	0.0039	30.6	0.00120	0.0	0.0017	0.0221	0.875	1.1	10.8	0.116	2.6	0.0025	0.0024	79.6	0.6790
Total	269678																	

SF12 - Faro Site - Sensitivity Analysis - Load increase for Rudimentary cover 50 %

Summary Tables

Conditions: FUTURE 1

Location: X2

	Flows	Ag	Al	As	Ca	Cd	Cl	Co	Cu	Fe	K	Mg	Mn	Na	Ni	Pb	SO4	Zn
	(x 1000 m3)	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L
Jan	553	0.00011	0.0685	0.0012	29.9	0.00025	0.0	0.0007	0.0053	0.277	0.9	6.8	0.032	2.3	0.0013	0.0018	13.4	0.0576
Feb	403	0.00011	0.0691	0.0012	29.9	0.00026	0.0	0.0007	0.0054	0.280	0.9	6.8	0.033	2.3	0.0014	0.0019	13.9	0.0651
Mar	407	0.00011	0.0699	0.0013	30.0	0.00028	0.0	0.0007	0.0055	0.284	0.9	6.9	0.034	2.3	0.0014	0.0019	14.4	0.0751
Apr	784	0.00011	0.0687	0.0012	29.9	0.00025	0.0	0.0007	0.0054	0.278	0.9	6.8	0.033	2.3	0.0013	0.0018	13.6	0.0601
May	6991	0.00010	0.0663	0.0010	29.6	0.00021	0.0	0.0006	0.0051	0.266	0.9	6.6	0.029	2.3	0.0011	0.0017	12.0	0.0302
Jun	7191	0.00010	0.0664	0.0010	29.6	0.00021	0.0	0.0006	0.0051	0.266	0.9	6.6	0.029	2.3	0.0011	0.0017	12.0	0.0313
Jul	5013	0.00010	0.0665	0.0010	29.7	0.00021	0.0	0.0006	0.0051	0.267	0.9	6.6	0.029	2.3	0.0011	0.0017	12.1	0.0325
Aug	3508	0.00010	0.0665	0.0010	29.7	0.00021	0.0	0.0006	0.0051	0.267	0.9	6.6	0.029	2.3	0.0011	0.0017	12.1	0.0329
Sep	4720	0.00010	0.0663	0.0010	29.6	0.00021	0.0	0.0006	0.0051	0.266	0.9	6.6	0.029	2.3	0.0011	0.0017	12.0	0.0312
Oct	2460	0.00010	0.0666	0.0010	29.7	0.00021	0.0	0.0006	0.0051	0.267	0.9	6.6	0.029	2.3	0.0012	0.0017	12.2	0.0338
Nov	1115	0.00010	0.0673	0.0011	29.7	0.00023	0.0	0.0006	0.0052	0.271	0.9	6.7	0.030	2.3	0.0012	0.0018	12.7	0.0431
Dec	821	0.00011	0.0678	0.0011	29.8	0.00024	0.0	0.0007	0.0053	0.274	0.9	6.7	0.031	2.3	0.0013	0.0018	13.0	0.0497
Total	33964																	

Location: X14

	Flows	Ag	Al	As	Ca	Cd	Cl	Co	Cu	Fe	K	Mg	Mn	Na	Ni	Pb	SO4	Zn
	(x 1000 m3)	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L
Jan	1192	0.00008	0.0454	0.0014	27.2	0.00082	0.0	0.0011	0.0046	0.186	1.6	10.6	0.026	3.7	0.0039	0.0042	54.0	0.0770
Feb	912	0.00007	0.0391	0.0015	25.7	0.00093	0.0	0.0011	0.0044	0.162	1.7	11.1	0.025	3.9	0.0044	0.0046	61.6	0.0850
Mar	981	0.00007	0.0354	0.0015	24.0	0.00095	0.0	0.0011	0.0042	0.149	1.7	10.9	0.024	3.8	0.0044	0.0046	62.2	0.0946
Apr	1784	0.00008	0.0487	0.0013	26.0	0.00062	0.0	0.0009	0.0047	0.201	1.3	8.7	0.026	3.0	0.0029	0.0032	38.6	0.0771
May	14480	0.00010	0.0636	0.0010	29.0	0.00025	0.0	0.0006	0.0050	0.256	1.0	6.8	0.028	2.4	0.0013	0.0019	15.1	0.0331
Jun	14796	0.00010	0.0638	0.0010	29.1	0.00026	0.0	0.0006	0.0050	0.257	1.0	6.8	0.028	2.4	0.0013	0.0019	15.0	0.0352
Jul	10302	0.00010	0.0631	0.0011	29.0	0.00028	0.0	0.0007	0.0050	0.254	1.0	7.0	0.028	2.4	0.0014	0.0020	16.6	0.0373
Aug	7268	0.00010	0.0616	0.0011	28.7	0.00030	0.0	0.0007	0.0049	0.248	1.0	7.1	0.028	2.5	0.0016	0.0021	18.5	0.0375
Sep	9748	0.00010	0.0628	0.0011	29.0	0.00028	0.0	0.0007	0.0050	0.253	1.0	6.9	0.028	2.4	0.0014	0.0020	16.7	0.0348
Oct	5108	0.00009	0.0601	0.0011	28.6	0.00034	0.0	0.0007	0.0049	0.242	1.1	7.4	0.027	2.6	0.0017	0.0023	21.4	0.0389
Nov	2303	0.00009	0.0559	0.0012	28.5	0.00052	0.0	0.0008	0.0049	0.227	1.3	8.6	0.027	3.0	0.0025	0.0030	33.0	0.0551
Dec	1705	0.00009	0.0531	0.0013	28.5	0.00065	0.0	0.0009	0.0049	0.216	1.4	9.5	0.028	3.3	0.0031	0.0035	41.6	0.0665
Total	70579																	

Location: Mouth of Rose Creek

	Flows	Ag	Al	As	Ca	Cd	Cl	Co	Cu	Fe	K	Mg	Mn	Na	Ni	Pb	SO4	Zn
	(x 1000 m3)	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L
Jan	1628	0.00009	0.0509	0.0013	27.8	0.00065	0.0	0.0009	0.0047	0.207	1.4	9.5	0.027	3.3	0.0032	0.0035	42.7	0.0632
Feb	1230	0.00008	0.0460	0.0014	26.7	0.00074	0.0	0.0010	0.0045	0.188	1.5	9.9	0.026	3.5	0.0035	0.0039	48.8	0.0697
Mar	1301	0.00008	0.0429	0.0014	25.4	0.00077	0.0	0.0010	0.0044	0.177	1.5	9.8	0.025	3.4	0.0036	0.0039	49.8	0.0776
Apr	2402	0.00009	0.0531	0.0012	26.9	0.00051	0.0	0.0008	0.0048	0.217	1.2	8.2	0.027	2.8	0.0024	0.0028	31.7	0.0639
May	19992	0.00010	0.0642	0.0010	29.2	0.00024	0.0	0.0006	0.0050	0.258	1.0	6.7	0.028	2.3	0.0013	0.0018	14.2	0.0311
Jun	20466	0.00010	0.0644	0.0010	29.2	0.00024	0.0	0.0006	0.0050	0.259	1.0	6.7	0.028	2.3	0.0013	0.0018	14.1	0.0325
Jul	14254	0.00010	0.0639	0.0010	29.2	0.00026	0.0	0.0006	0.0050	0.257	1.0	6.8	0.028	2.4	0.0013	0.0019	15.3	0.0341
Aug	10032	0.00010	0.0628	0.0010	29.0	0.00028	0.0	0.0007	0.0049	0.252	1.0	6.9	0.028	2.4	0.0014	0.0020	16.7	0.0342
Sep	13469	0.00010	0.0637	0.0010	29.1	0.00028	0.0	0.0006	0.0050	0.256	1.0	6.8	0.028	2.4	0.0013	0.0019	15.3	0.0323
Oct	7047	0.00010	0.0617	0.0011	28.8	0.00030	0.0	0.0007	0.0049	0.248	1.0	7.1	0.028	2.5	0.0016	0.0021	18.8	0.0352
Nov	3181	0.00009	0.0587	0.0012	28.8	0.00043	0.0	0.0008	0.0049	0.237	1.2	8.0	0.028	2.8	0.0021	0.0026	27.1	0.0470
Dec	2352	0.00009	0.0566	0.0012	28.8	0.00052	0.0	0.0008	0.0049	0.230	1.3	8.7	0.028	3.0	0.0025	0.0030	33.4	0.0553
Total	97354																	

Location: Mouth of Anvil Creek

	Flows	Ag	Al	As	Ca	Cd	Cl	Co	Cu	Fe	K	Mg	Mn	Na	Ni	Pb	SO4	Zn
	(x 1000 m3)	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L
Jan	4432	0.00009	0.0604	0.0011	28.9	0.00037	0.0	0.0007	0.0049	0.243	1.1	7.6	0.028	2.7	0.0019	0.0024	23.1	0.0394
Feb	3272	0.00009	0.0584	0.0011	28.5	0.00040	0.0	0.0007	0.0048	0.236	1.1	7.8	0.027	2.7	0.0020	0.0025	25.6	0.0422
Mar	3362	0.00009	0.0570	0.0011	28.0	0.00042	0.0	0.0008	0.0048	0.230	1.1	7.8	0.027	2.7	0.0021	0.0026	26.5	0.0457
Apr	6375	0.00010	0.0611	0.0011	28.6	0.00032	0.0	0.0007	0.0049	0.246	1.0	7.1	0.028	2.5	0.0016	0.0021	19.3	0.0400
May	55468	0.00010	0.0653	0.0010	29.5	0.00021	0.0	0.0006	0.0050	0.262	0.9	6.6	0.028	2.3	0.0012	0.0018	12.6	0.0276
Jun	56957	0.00010	0.0653	0.0010	29.5	0.00021	0.0	0.0006	0.0050	0.262	0.9	6.6	0.028	2.3	0.0012	0.0017	12.6	0.0281
Jul	39693	0.00010	0.0652	0.0010	29.5	0.00022	0.0	0.0006	0.0050	0.262	0.9	6.6	0.028	2.3	0.0012	0.0018	13.0	0.0286
Aug	27824	0.00010	0.0648	0.0010	29.4	0.00023	0.0	0.0006	0.0050	0.260	0.9	6.7	0.028	2.3	0.0012	0.0018	13.5	0.0287
Sep	37419	0.00010	0.0651	0.0010	29.4	0.00022	0.0	0.0006	0.0050	0.261	0.9	6.6	0.028	2.3	0.0012	0.0018	13.0	0.0280
Oct	19528	0.00010	0.0644	0.0010	29.3	0.00024	0.0	0.0006	0.0050	0.258	1.0	6.8	0.028	2.3	0.0013	0.0018	14.3	0.0291
Nov	8835	0.00010	0.0633	0.0011	29.3	0.00028	0.0	0.0007	0.0050	0.254	1.0	7.1	0.028	2.5	0.0015	0.0020	17.3	0.0333
Dec	6515	0.00010	0.0626	0.0011	29.3	0.00032	0.0	0.0007	0.0050	0.252	1.0	7.3	0.028	2.5	0.0016	0.0022	19.5	0.0363
Total	269678																	

SF12 - Faro Site - Sensitivity Analysis - Load increase for Rudimentary cover 50 %
Summary Tables
Conditions FUTURE 2

Location X2

	Flows (x 1000 m3)	Ag mg/L	Al mg/L	As mg/L	Ca mg/L	Cd mg/L	Cl mg/L	Co mg/L	Cu mg/L	Fe mg/L	K mg/L	Mg mg/L	Mn mg/L	Na mg/L	Ni mg/L	Pb mg/L	SO4 mg/L	Zn mg/L
Jan	553	0.00011	0.0783	0.0012	30.1	0.00039	0.0	0.0009	0.0065	0.339	0.9	7.1	0.048	2.4	0.0020	0.0022	15.9	0.1727
Feb	403	0.00011	0.0812	0.0013	30.2	0.00043	0.0	0.0010	0.0069	0.357	0.9	7.3	0.052	2.4	0.0022	0.0023	16.9	0.2070
Mar	407	0.00012	0.0851	0.0014	30.4	0.00049	0.0	0.0011	0.0073	0.380	1.0	7.5	0.059	2.5	0.0024	0.0024	18.2	0.2528
Apr	784	0.00011	0.0793	0.0013	30.2	0.00040	0.0	0.0009	0.0066	0.345	0.9	7.2	0.049	2.4	0.0020	0.0022	16.2	0.1840
May	6991	0.00010	0.0677	0.0010	29.7	0.00023	0.0	0.0006	0.0052	0.275	0.9	6.6	0.031	2.3	0.0012	0.0018	12.3	0.0467
Jun	7191	0.00010	0.0681	0.0010	29.7	0.00023	0.0	0.0007	0.0053	0.278	0.9	6.6	0.032	2.3	0.0013	0.0018	12.5	0.0519
Jul	5013	0.00010	0.0686	0.0011	29.7	0.00024	0.0	0.0007	0.0053	0.280	0.9	6.7	0.033	2.3	0.0013	0.0018	12.6	0.0575
Aug	3506	0.00010	0.0687	0.0011	29.7	0.00024	0.0	0.0007	0.0053	0.281	0.9	6.7	0.033	2.3	0.0013	0.0018	12.7	0.0590
Sep	4720	0.00010	0.0681	0.0010	29.7	0.00023	0.0	0.0007	0.0053	0.277	0.9	6.6	0.032	2.3	0.0013	0.0018	12.4	0.0513
Oct	2460	0.00010	0.0691	0.0011	29.7	0.00025	0.0	0.0007	0.0054	0.283	0.9	6.7	0.033	2.3	0.0013	0.0018	12.8	0.0632
Nov	1115	0.00011	0.0727	0.0011	29.9	0.00030	0.0	0.0008	0.0058	0.305	0.9	6.9	0.039	2.3	0.0016	0.0020	14.0	0.1060
Dec	821	0.00011	0.0753	0.0012	30.0	0.00034	0.0	0.0008	0.0061	0.321	0.9	7.0	0.043	2.4	0.0017	0.0020	14.9	0.1365
Total	33964																	

Location X14

	Flows (x 1000 m3)	Ag mg/L	Al mg/L	As mg/L	Ca mg/L	Cd mg/L	Cl mg/L	Co mg/L	Cu mg/L	Fe mg/L	K mg/L	Mg mg/L	Mn mg/L	Na mg/L	Ni mg/L	Pb mg/L	SO4 mg/L	Zn mg/L
Jan	1192	0.00008	0.0520	0.0015	32.1	0.00091	0.0	0.0012	0.0057	0.233	1.6	17.4	0.037	3.8	0.0043	0.0044	97.7	0.1519
Feb	912	0.00008	0.0468	0.0016	31.5	0.00104	0.0	0.0013	0.0056	0.216	1.7	19.2	0.037	4.0	0.0049	0.0049	113.6	0.1730
Mar	981	0.00007	0.0445	0.0016	30.0	0.00108	0.0	0.0013	0.0056	0.212	1.7	19.2	0.039	3.9	0.0050	0.0049	115.5	0.1981
Apr	1784	0.00009	0.0554	0.0014	29.2	0.00071	0.0	0.0010	0.0058	0.248	1.3	13.2	0.037	3.1	0.0033	0.0034	67.4	0.1535
May	14480	0.00010	0.0645	0.0010	29.5	0.00027	0.0	0.0007	0.0051	0.262	1.0	7.4	0.030	2.4	0.0014	0.0019	18.8	0.0443
Jun	14796	0.00010	0.0650	0.0011	29.5	0.00027	0.0	0.0007	0.0052	0.265	1.0	7.3	0.030	2.4	0.0014	0.0019	18.6	0.0492
Jul	10302	0.00010	0.0646	0.0011	29.6	0.00030	0.0	0.0007	0.0052	0.265	1.0	7.8	0.031	2.4	0.0015	0.0020	21.8	0.0544
Aug	7268	0.00010	0.0631	0.0011	29.5	0.00033	0.0	0.0007	0.0052	0.259	1.0	8.2	0.030	2.5	0.0016	0.0021	25.8	0.0552
Sep	9748	0.00010	0.0640	0.0011	29.6	0.00029	0.0	0.0007	0.0051	0.261	1.0	7.8	0.030	2.4	0.0015	0.0020	21.9	0.0485
Oct	5108	0.00009	0.0619	0.0011	29.7	0.00037	0.0	0.0007	0.0051	0.254	1.1	9.0	0.030	2.6	0.0018	0.0023	31.7	0.0588
Nov	2303	0.00009	0.0596	0.0013	30.9	0.00057	0.0	0.0009	0.0055	0.253	1.3	12.0	0.034	3.0	0.0027	0.0031	55.0	0.0979
Dec	1705	0.00009	0.0582	0.0014	32.0	0.00072	0.0	0.0011	0.0057	0.253	1.4	14.3	0.036	3.4	0.0034	0.0037	72.3	0.1252
Total	70579																	

Location Mouth of Rose Creek

	Flows (x 1000 m3)	Ag mg/L	Al mg/L	As mg/L	Ca mg/L	Cd mg/L	Cl mg/L	Co mg/L	Cu mg/L	Fe mg/L	K mg/L	Mg mg/L	Mn mg/L	Na mg/L	Ni mg/L	Pb mg/L	SO4 mg/L	Zn mg/L
Jan	1628	0.00009	0.0557	0.0014	31.4	0.00072	0.0	0.0011	0.0055	0.241	1.4	14.5	0.035	3.4	0.0034	0.0037	74.7	0.1181
Feb	1230	0.00008	0.0518	0.0014	31.0	0.00082	0.0	0.0011	0.0054	0.229	1.5	15.9	0.035	3.5	0.0039	0.0041	87.3	0.1350
Mar	1301	0.00008	0.0497	0.0014	29.9	0.00086	0.0	0.0012	0.0055	0.225	1.5	16.1	0.036	3.5	0.0040	0.0041	90.0	0.1556
Apr	2402	0.00009	0.0581	0.0013	29.3	0.00058	0.0	0.0009	0.0056	0.252	1.2	11.5	0.035	2.9	0.0027	0.0030	53.1	0.1206
May	18992	0.00010	0.0649	0.0010	29.5	0.00025	0.0	0.0006	0.0051	0.263	1.0	7.1	0.029	2.3	0.0013	0.0019	16.9	0.0392
Jun	20466	0.00010	0.0652	0.0010	29.5	0.00025	0.0	0.0006	0.0051	0.265	1.0	7.1	0.030	2.3	0.0013	0.0019	16.7	0.0427
Jul	14254	0.00010	0.0650	0.0011	29.6	0.00027	0.0	0.0007	0.0052	0.265	1.0	7.4	0.030	2.4	0.0014	0.0019	19.0	0.0464
Aug	10032	0.00010	0.0639	0.0011	29.5	0.00029	0.0	0.0007	0.0051	0.260	1.0	7.8	0.030	2.4	0.0015	0.0020	21.9	0.0471
Sep	13469	0.00010	0.0646	0.0010	29.6	0.00027	0.0	0.0007	0.0051	0.262	1.0	7.4	0.029	2.4	0.0014	0.0019	19.1	0.0422
Oct	7047	0.00010	0.0630	0.0011	29.7	0.00032	0.0	0.0007	0.0051	0.257	1.0	8.3	0.030	2.5	0.0016	0.0021	26.2	0.0496
Nov	3181	0.00009	0.0614	0.0012	30.5	0.00047	0.0	0.0008	0.0053	0.256	1.2	10.5	0.032	2.8	0.0023	0.0027	43.0	0.0779
Dec	2352	0.00009	0.0603	0.0013	31.3	0.00057	0.0	0.0009	0.0055	0.256	1.3	12.1	0.034	3.1	0.0028	0.0031	55.6	0.0978
Total	97354																	

Location Mouth of Anvil Creek

	Flows (x 1000 m3)	Ag mg/L	Al mg/L	As mg/L	Ca mg/L	Cd mg/L	Cl mg/L	Co mg/L	Cu mg/L	Fe mg/L	K mg/L	Mg mg/L	Mn mg/L	Na mg/L	Ni mg/L	Pb mg/L	SO4 mg/L	Zn mg/L
Jan	4432	0.00010	0.0621	0.0011	30.3	0.00039	0.0	0.0008	0.0052	0.256	1.1	9.4	0.031	2.7	0.0020	0.0024	34.8	0.0596
Feb	3272	0.00009	0.0606	0.0012	30.1	0.00043	0.0	0.0008	0.0052	0.251	1.1	10.1	0.031	2.7	0.0022	0.0026	40.1	0.0667
Mar	3362	0.00009	0.0596	0.0012	29.7	0.00046	0.0	0.0008	0.0052	0.249	1.1	10.2	0.031	2.7	0.0022	0.0026	42.0	0.0759
Apr	6375	0.00010	0.0630	0.0011	29.5	0.00034	0.0	0.0007	0.0052	0.260	1.0	8.4	0.031	2.5	0.0017	0.0022	27.3	0.0614
May	55468	0.00010	0.0655	0.0010	29.6	0.00022	0.0	0.0006	0.0050	0.264	0.9	6.8	0.029	2.3	0.0012	0.0018	13.6	0.0305
Jun	56957	0.00010	0.0657	0.0010	29.6	0.00022	0.0	0.0006	0.0051	0.264	0.9	6.7	0.029	2.3	0.0012	0.0018	13.5	0.0317
Jul	39693	0.00010	0.0656	0.0010	29.6	0.00023	0.0	0.0006	0.0051	0.264	0.9	6.9	0.029	2.3	0.0012	0.0018	14.3	0.0331
Aug	27824	0.00010	0.0652	0.0010	29.6	0.00023	0.0	0.0006	0.0050	0.263	0.9	7.0	0.029	2.3	0.0012	0.0018	15.4	0.0333
Sep	37419	0.00010	0.0654	0.0010	29.6	0.00022	0.0	0.0006	0.0050	0.263	0.9	6.9	0.029	2.3	0.0012	0.0018	14.4	0.0316
Oct	19528	0.00010	0.0648	0.0010	29.6	0.00024	0.0	0.0006	0.0050	0.262	1.0	7.2	0.029	2.3	0.0013	0.0019	16.9	0.0343
Nov	8835	0.00010	0.0643	0.0011	29.9	0.00030	0.0	0.0007	0.0051	0.261	1.0	8.0	0.030	2.5	0.0015	0.0021	23.0	0.0444
Dec	6515	0.00010	0.0639	0.0011	30.2	0.00034	0.0	0.0007	0.0052	0.261	1.1	8.6	0.030	2.6	0.0017	0.0022	27.6	0.0517
Total	269678																	

SF12 - Faro Site - Sensitivity Analysis - Load increase for Rudimentary cover 50 %
Summary Tables

Conditions: FUTURE 3

Location: X2

	Flows	Ag	Al	As	Ca	Cd	Cl	Co	Cu	Fe	K	Mg	Mn	Na	Ni	Pb	SO4	Zn
	(x 1000 m3)	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L
Jan	553	0.00026	0.4600	0.0237	30.3	0.00760	0.3	0.0090	0.1445	5.354	1.0	8.2	0.744	2.4	0.0082	0.0039	41.2	5.3867
Feb	403	0.00030	0.5518	0.0289	30.4	0.00932	0.3	0.0109	0.1771	6.540	1.0	8.6	0.911	2.4	0.0098	0.0044	48.1	6.6357
Mar	407	0.00035	0.6744	0.0360	30.6	0.01162	0.4	0.0136	0.2205	8.124	1.0	9.1	1.133	2.5	0.0120	0.0051	57.2	8.3044
Apr	784	0.00027	0.4901	0.0254	30.3	0.00816	0.3	0.0096	0.1552	5.744	1.0	8.3	0.799	2.4	0.0087	0.0041	43.5	5.7972
May	6991	0.00012	0.1225	0.0043	29.7	0.00126	0.0	0.0018	0.0250	0.995	0.9	6.8	0.131	2.3	0.0021	0.0020	15.9	0.7950
Jun	7191	0.00013	0.1363	0.0050	29.7	0.00152	0.0	0.0021	0.0299	1.173	0.9	6.8	0.156	2.3	0.0024	0.0021	17.0	0.9832
Jul	5013	0.00013	0.1514	0.0059	29.7	0.00180	0.1	0.0024	0.0353	1.368	0.9	6.9	0.184	2.3	0.0026	0.0022	18.1	1.1887
Aug	3506	0.00014	0.1555	0.0061	29.7	0.00188	0.1	0.0025	0.0367	1.421	0.9	6.9	0.191	2.3	0.0027	0.0022	18.4	1.2442
Sep	4720	0.00013	0.1348	0.0050	29.7	0.00149	0.0	0.0021	0.0294	1.154	0.9	6.8	0.153	2.3	0.0023	0.0021	16.9	0.9628
Oct	2460	0.00014	0.1665	0.0068	29.8	0.00209	0.1	0.0027	0.0406	1.564	0.9	7.0	0.211	2.3	0.0029	0.0023	19.2	1.3948
Nov	1115	0.00019	0.2814	0.0134	30.0	0.00424	0.1	0.0052	0.0813	3.047	1.0	7.4	0.420	2.3	0.0050	0.0029	27.8	2.9568
Dec	821	0.00022	0.3629	0.0181	30.1	0.00577	0.2	0.0069	0.1102	4.100	1.0	7.8	0.568	2.4	0.0064	0.0034	33.9	4.0658
Total	33964																	

Location: X14

	Flows	Ag	Al	As	Ca	Cd	Cl	Co	Cu	Fe	K	Mg	Mn	Na	Ni	Pb	SO4	Zn
	(x 1000 m3)	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L
Jan	1192	0.00017	0.2718	0.0145	34.1	0.00501	0.2	0.0059	0.0857	3.132	1.6	29.5	0.440	3.8	0.0078	0.0054	373.2	3.1184
Feb	912	0.00018	0.3049	0.0169	33.9	0.00585	0.2	0.0068	0.0996	3.621	1.7	33.6	0.511	4.0	0.0090	0.0060	441.6	3.6564
Mar	981	0.00019	0.3478	0.0195	32.4	0.00673	0.2	0.0077	0.1161	4.213	1.7	34.0	0.595	3.9	0.0099	0.0063	452.7	4.2918
Apr	1784	0.00017	0.2795	0.0146	30.5	0.00489	0.2	0.0058	0.0874	3.203	1.3	21.3	0.448	3.1	0.0069	0.0045	251.0	3.1772
May	14480	0.00011	0.0974	0.0030	29.6	0.00088	0.0	0.0014	0.0171	0.695	1.0	8.4	0.090	2.4	0.0019	0.0021	42.5	0.4874
Jun	14796	0.00011	0.1061	0.0035	29.6	0.00104	0.0	0.0015	0.0202	0.808	1.0	8.4	0.106	2.4	0.0021	0.0021	41.6	0.6043
Jul	10302	0.00012	0.1146	0.0040	29.9	0.00123	0.0	0.0017	0.0235	0.925	1.0	9.2	0.122	2.4	0.0023	0.0023	55.3	0.7295
Aug	7268	0.00012	0.1151	0.0042	29.9	0.00129	0.0	0.0018	0.0241	0.944	1.0	10.3	0.126	2.5	0.0025	0.0024	72.1	0.7564
Sep	9748	0.00011	0.1041	0.0034	29.8	0.00104	0.0	0.0015	0.0197	0.790	1.0	9.2	0.104	2.4	0.0021	0.0022	55.5	0.5898
Oct	5108	0.00012	0.1201	0.0046	30.2	0.00145	0.0	0.0020	0.0264	1.023	1.1	11.8	0.137	2.6	0.0028	0.0026	96.4	0.8451
Nov	2303	0.00014	0.1850	0.0087	31.9	0.00291	0.1	0.0036	0.0511	1.907	1.3	18.1	0.264	3.0	0.0048	0.0037	194.1	1.7903
Dec	1705	0.00016	0.2302	0.0116	33.4	0.00392	0.1	0.0047	0.0684	2.521	1.4	22.8	0.352	3.4	0.0062	0.0044	266.2	2.4465
Total	70579																	

Location: Mouth of Rose Creek

	Flows	Ag	Al	As	Ca	Cd	Cl	Co	Cu	Fe	K	Mg	Mn	Na	Ni	Pb	SO4	Zn
	(x 1000 m3)	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L
Jan	1628	0.00015	0.2167	0.0109	32.9	0.00372	0.1	0.0044	0.0641	2.364	1.4	23.3	0.330	3.4	0.0060	0.0044	276.5	2.2908
Feb	1230	0.00016	0.2433	0.0128	32.8	0.00439	0.1	0.0052	0.0752	2.754	1.5	26.6	0.386	3.5	0.0070	0.0049	330.7	2.7193
Mar	1301	0.00017	0.2785	0.0150	31.7	0.00512	0.2	0.0060	0.0888	3.242	1.5	27.2	0.456	3.5	0.0077	0.0051	344.2	3.2422
Apr	2402	0.00015	0.2246	0.0111	30.3	0.00368	0.1	0.0044	0.0662	2.448	1.2	17.5	0.340	2.9	0.0054	0.0037	189.5	2.3672
May	19992	0.00011	0.0887	0.0024	29.6	0.00069	0.0	0.0011	0.0137	0.577	1.0	7.9	0.073	2.3	0.0017	0.0020	34.0	0.3600
Jun	20466	0.00011	0.0950	0.0028	29.6	0.00081	0.0	0.0013	0.0160	0.657	1.0	7.8	0.084	2.3	0.0018	0.0020	33.3	0.4440
Jul	14254	0.00011	0.1011	0.0032	29.8	0.00095	0.0	0.0014	0.0183	0.741	1.0	8.5	0.096	2.4	0.0020	0.0021	43.2	0.5343
Aug	10032	0.00011	0.1015	0.0033	29.8	0.00099	0.0	0.0015	0.0188	0.757	1.0	9.2	0.099	2.4	0.0021	0.0022	55.4	0.5550
Sep	13469	0.00011	0.0936	0.0028	29.7	0.00081	0.0	0.0013	0.0157	0.645	1.0	8.5	0.083	2.4	0.0019	0.0021	43.4	0.4339
Oct	7047	0.00011	0.1052	0.0036	30.0	0.00111	0.0	0.0016	0.0205	0.814	1.0	10.4	0.107	2.5	0.0023	0.0023	73.1	0.6196
Nov	3181	0.00013	0.1521	0.0066	31.3	0.00216	0.1	0.0027	0.0384	1.453	1.2	14.9	0.199	2.8	0.0038	0.0031	143.7	1.3030
Dec	2352	0.00014	0.1850	0.0087	32.3	0.00290	0.1	0.0036	0.0509	1.900	1.3	18.3	0.263	3.1	0.0048	0.0037	196.2	1.7805
Total	97354																	

Location: Mouth of Anvil Creek

	Flows	Ag	Al	As	Ca	Cd	Cl	Co	Cu	Fe	K	Mg	Mn	Na	Ni	Pb	SO4	Zn
	(x 1000 m3)	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L
Jan	4432	0.00012	0.1213	0.0046	30.8	0.00149	0.0	0.0020	0.0267	1.036	1.1	12.7	0.139	2.7	0.0029	0.0027	109.0	0.8577
Feb	3272	0.00012	0.1325	0.0054	30.8	0.00178	0.1	0.0023	0.0314	1.200	1.1	14.1	0.163	2.7	0.0033	0.0029	131.6	1.0379
Mar	3362	0.00013	0.1482	0.0064	30.4	0.00211	0.1	0.0027	0.0374	1.417	1.1	14.5	0.194	2.7	0.0037	0.0030	140.4	1.2707
Apr	6375	0.00012	0.1257	0.0048	29.9	0.00151	0.0	0.0020	0.0281	1.087	1.0	10.7	0.146	2.5	0.0027	0.0025	78.7	0.9079
May	55468	0.00010	0.0741	0.0015	29.6	0.00038	0.0	0.0008	0.0082	0.377	0.9	7.0	0.044	2.3	0.0013	0.0018	19.7	0.1461
Jun	56957	0.00010	0.0763	0.0016	29.6	0.00042	0.0	0.0008	0.0089	0.405	0.9	7.0	0.048	2.3	0.0013	0.0018	19.5	0.1759
Jul	39693	0.00010	0.0785	0.0018	29.7	0.00047	0.0	0.0009	0.0098	0.436	0.9	7.2	0.053	2.3	0.0014	0.0018	23.0	0.2083
Aug	27824	0.00010	0.0787	0.0018	29.7	0.00049	0.0	0.0009	0.0100	0.442	0.9	7.5	0.054	2.3	0.0015	0.0019	27.5	0.2165
Sep	37419	0.00010	0.0759	0.0016	29.6	0.00042	0.0	0.0008	0.0088	0.401	0.9	7.2	0.048	2.3	0.0014	0.0018	23.1	0.1726
Oct	19528	0.00010	0.0801	0.0019	29.7	0.00053	0.0	0.0010	0.0106	0.463	1.0	7.9	0.057	2.3	0.0015	0.0019	33.9	0.2400
Nov	8835	0.00011	0.0970	0.0030	30.2	0.00091	0.0	0.0014	0.0170	0.692	1.0	9.6	0.090	2.5	0.0021	0.0022	59.2	0.4855
Dec	6515	0.00012	0.1089	0.0038	30.6	0.00117	0.0	0.0017	0.0216	0.855	1.1	10.8	0.113	2.6	0.0024	0.0024	78.3	0.6590
Total	269678																	

SF13 - Faro Site - Sensitivity Analysis - Load increase for Low Infiltration Cover 100 %
Summary Tables

Conditions FUTURE 1

Location X2

	Flows (x 1000 m3)	Ag mg/L	Al mg/L	As mg/L	Ca mg/L	Cd mg/L	Cl mg/L	Co mg/L	Cu mg/L	Fe mg/L	K mg/L	Mg mg/L	Mn mg/L	Na mg/L	Ni mg/L	Pb mg/L	SO4 mg/L	Zn mg/L
Jan	553	0.00011	0.0681	0.0011	29.8	0.00024	0.0	0.0007	0.0053	0.275	0.9	6.7	0.031	2.3	0.0013	0.0018	12.9	0.0507
Feb	403	0.00011	0.0686	0.0011	29.8	0.00025	0.0	0.0007	0.0054	0.278	0.9	6.7	0.032	2.3	0.0013	0.0018	13.2	0.0565
Mar	407	0.00011	0.0693	0.0012	29.9	0.00026	0.0	0.0007	0.0055	0.281	0.9	6.8	0.033	2.3	0.0014	0.0019	13.6	0.0643
Apr	784	0.00011	0.0683	0.0011	29.8	0.00024	0.0	0.0007	0.0053	0.276	0.9	6.7	0.032	2.3	0.0013	0.0018	13.0	0.0526
May	6991	0.00010	0.0662	0.0010	29.6	0.00021	0.0	0.0006	0.0050	0.266	0.9	6.6	0.029	2.3	0.0011	0.0017	11.9	0.0292
Jun	7191	0.00010	0.0663	0.0010	29.6	0.00021	0.0	0.0006	0.0051	0.266	0.9	6.6	0.029	2.3	0.0011	0.0017	11.9	0.0301
Jul	5013	0.00010	0.0664	0.0010	29.6	0.00021	0.0	0.0006	0.0051	0.266	0.9	6.6	0.029	2.3	0.0011	0.0017	12.0	0.0310
Aug	3506	0.00010	0.0664	0.0010	29.6	0.00021	0.0	0.0006	0.0051	0.267	0.9	6.6	0.029	2.3	0.0011	0.0017	12.0	0.0313
Sep	4720	0.00010	0.0663	0.0010	29.6	0.00021	0.0	0.0006	0.0051	0.266	0.9	6.6	0.029	2.3	0.0011	0.0017	11.9	0.0300
Oct	2460	0.00010	0.0665	0.0010	29.6	0.00021	0.0	0.0006	0.0051	0.267	0.9	6.6	0.029	2.3	0.0011	0.0017	12.0	0.0320
Nov	1115	0.00010	0.0671	0.0011	29.7	0.00022	0.0	0.0006	0.0052	0.270	0.9	6.6	0.030	2.3	0.0012	0.0018	12.4	0.0393
Dec	821	0.00010	0.0675	0.0011	29.7	0.00023	0.0	0.0006	0.0052	0.272	0.9	6.7	0.031	2.3	0.0012	0.0018	12.6	0.0445
Total	33964																	

Location X14

	Flows (x 1000 m3)	Ag mg/L	Al mg/L	As mg/L	Ca mg/L	Cd mg/L	Cl mg/L	Co mg/L	Cu mg/L	Fe mg/L	K mg/L	Mg mg/L	Mn mg/L	Na mg/L	Ni mg/L	Pb mg/L	SO4 mg/L	Zn mg/L
Jan	1192	0.00008	0.0451	0.0014	25.4	0.00080	0.0	0.0010	0.0045	0.184	1.6	9.1	0.025	3.7	0.0039	0.0042	43.6	0.0641
Feb	912	0.00007	0.0388	0.0014	23.5	0.00091	0.0	0.0011	0.0042	0.160	1.7	9.3	0.024	3.9	0.0044	0.0046	49.3	0.0698
Mar	981	0.00007	0.0350	0.0014	21.8	0.00092	0.0	0.0011	0.0040	0.146	1.7	9.0	0.023	3.8	0.0044	0.0046	49.5	0.0768
Apr	1784	0.00008	0.0484	0.0012	24.8	0.00060	0.0	0.0009	0.0045	0.199	1.3	7.7	0.025	3.0	0.0029	0.0032	31.8	0.0639
May	14480	0.00010	0.0635	0.0010	28.9	0.00025	0.0	0.0006	0.0049	0.255	1.0	6.7	0.028	2.4	0.0013	0.0019	14.3	0.0312
Jun	14796	0.00010	0.0637	0.0010	28.9	0.00025	0.0	0.0006	0.0050	0.256	1.0	6.7	0.028	2.4	0.0013	0.0019	14.2	0.0328
Jul	10302	0.00010	0.0630	0.0011	28.8	0.00027	0.0	0.0007	0.0050	0.254	1.0	6.8	0.028	2.4	0.0014	0.0020	15.4	0.0344
Aug	7268	0.00010	0.0615	0.0011	28.4	0.00030	0.0	0.0007	0.0049	0.248	1.0	6.8	0.028	2.5	0.0015	0.0021	16.8	0.0344
Sep	9748	0.00010	0.0628	0.0010	28.8	0.00027	0.0	0.0006	0.0049	0.252	1.0	6.8	0.028	2.4	0.0014	0.0020	15.4	0.0325
Oct	5108	0.00009	0.0600	0.0011	28.1	0.00034	0.0	0.0007	0.0048	0.242	1.1	7.0	0.027	2.6	0.0017	0.0023	19.0	0.0355
Nov	2303	0.00009	0.0557	0.0012	27.5	0.00051	0.0	0.0008	0.0048	0.226	1.3	7.8	0.027	3.0	0.0025	0.0030	27.8	0.0478
Dec	1705	0.00009	0.0529	0.0013	27.3	0.00063	0.0	0.0009	0.0048	0.215	1.4	8.4	0.027	3.3	0.0031	0.0035	34.3	0.0564
Total	70579																	

Location Mouth of Rose Creek

	Flows (x 1000 m3)	Ag mg/L	Al mg/L	As mg/L	Ca mg/L	Cd mg/L	Cl mg/L	Co mg/L	Cu mg/L	Fe mg/L	K mg/L	Mg mg/L	Mn mg/L	Na mg/L	Ni mg/L	Pb mg/L	SO4 mg/L	Zn mg/L
Jan	1628	0.00009	0.0507	0.0013	26.5	0.00064	0.0	0.0009	0.0046	0.206	1.4	8.4	0.026	3.3	0.0031	0.0035	35.1	0.0538
Feb	1230	0.00008	0.0458	0.0013	25.1	0.00072	0.0	0.0010	0.0044	0.187	1.5	8.6	0.025	3.5	0.0035	0.0039	39.6	0.0584
Mar	1301	0.00008	0.0426	0.0013	23.7	0.00074	0.0	0.0010	0.0042	0.175	1.5	8.4	0.024	3.4	0.0036	0.0039	40.2	0.0642
Apr	2402	0.00009	0.0529	0.0012	26.0	0.00050	0.0	0.0008	0.0047	0.216	1.2	7.4	0.026	2.8	0.0024	0.0028	26.6	0.0541
May	19992	0.00010	0.0642	0.0010	29.1	0.00024	0.0	0.0006	0.0050	0.258	1.0	6.6	0.028	2.3	0.0013	0.0018	13.6	0.0297
Jun	20466	0.00010	0.0643	0.0010	29.1	0.00024	0.0	0.0006	0.0050	0.258	1.0	6.6	0.028	2.3	0.0013	0.0018	13.5	0.0308
Jul	14254	0.00010	0.0638	0.0010	29.0	0.00025	0.0	0.0006	0.0050	0.257	1.0	6.7	0.028	2.4	0.0013	0.0019	14.4	0.0320
Aug	10032	0.00010	0.0627	0.0010	28.7	0.00027	0.0	0.0006	0.0049	0.252	1.0	6.8	0.028	2.4	0.0014	0.0020	15.4	0.0320
Sep	13469	0.00010	0.0636	0.0010	29.0	0.00025	0.0	0.0006	0.0049	0.256	1.0	6.7	0.028	2.4	0.0013	0.0019	14.4	0.0306
Oct	7047	0.00010	0.0617	0.0011	28.5	0.00030	0.0	0.0007	0.0049	0.248	1.0	6.9	0.028	2.5	0.0016	0.0021	17.0	0.0328
Nov	3181	0.00009	0.0585	0.0011	28.1	0.00042	0.0	0.0008	0.0048	0.236	1.2	7.5	0.027	2.8	0.0021	0.0026	23.3	0.0417
Dec	2352	0.00009	0.0564	0.0012	27.9	0.00051	0.0	0.0008	0.0048	0.228	1.3	7.9	0.027	3.0	0.0025	0.0030	28.1	0.0480
Total	97354																	

Location Mouth of Anvil Creek

	Flows (x 1000 m3)	Ag mg/L	Al mg/L	As mg/L	Ca mg/L	Cd mg/L	Cl mg/L	Co mg/L	Cu mg/L	Fe mg/L	K mg/L	Mg mg/L	Mn mg/L	Na mg/L	Ni mg/L	Pb mg/L	SO4 mg/L	Zn mg/L
Jan	4432	0.00009	0.0603	0.0011	28.5	0.00036	0.0	0.0007	0.0049	0.243	1.1	7.2	0.028	2.7	0.0018	0.0024	20.3	0.0360
Feb	3272	0.00009	0.0583	0.0011	27.9	0.00040	0.0	0.0007	0.0048	0.235	1.1	7.3	0.027	2.7	0.0020	0.0025	22.2	0.0379
Mar	3362	0.00009	0.0569	0.0011	27.3	0.00041	0.0	0.0007	0.0047	0.230	1.1	7.3	0.027	2.7	0.0021	0.0025	22.8	0.0405
Apr	6375	0.00009	0.0610	0.0011	28.2	0.00031	0.0	0.0007	0.0049	0.246	1.0	6.9	0.027	2.5	0.0016	0.0021	17.3	0.0363
May	55468	0.00010	0.0653	0.0010	29.4	0.00021	0.0	0.0006	0.0050	0.262	0.9	6.6	0.028	2.3	0.0012	0.0017	12.4	0.0271
Jun	56957	0.00010	0.0653	0.0010	29.4	0.00021	0.0	0.0006	0.0050	0.262	0.9	6.6	0.028	2.3	0.0012	0.0017	12.3	0.0275
Jul	39693	0.00010	0.0652	0.0010	29.4	0.00022	0.0	0.0006	0.0050	0.261	0.9	6.6	0.028	2.3	0.0012	0.0018	12.7	0.0279
Aug	27824	0.00010	0.0648	0.0010	29.3	0.00023	0.0	0.0006	0.0050	0.260	0.9	6.6	0.028	2.3	0.0012	0.0018	13.0	0.0279
Sep	37419	0.00010	0.0651	0.0010	29.4	0.00022	0.0	0.0006	0.0050	0.261	0.9	6.6	0.028	2.3	0.0012	0.0018	12.7	0.0274
Oct	19528	0.00010	0.0644	0.0010	29.2	0.00024	0.0	0.0006	0.0050	0.258	1.0	6.7	0.028	2.3	0.0013	0.0018	13.6	0.0282
Nov	8835	0.00010	0.0632	0.0011	29.1	0.00028	0.0	0.0007	0.0049	0.254	1.0	6.9	0.028	2.5	0.0015	0.0020	15.9	0.0314
Dec	6515	0.00010	0.0625	0.0011	29.0	0.00031	0.0	0.0007	0.0049	0.251	1.0	7.0	0.028	2.5	0.0016	0.0022	17.6	0.0337
Total	269678																	

SF13 - Faro Site - Sensitivity Analysis - Load increase for Low Infiltration Cover 100 %
Summary Tables
Conditions FUTURE 2

Location X2

	Flows	Ag	Al	As	Ca	Cd	Cl	Co	Cu	Fe	K	Mg	Mn	Na	Ni	Pb	SO4	Zn
	(x 1000 m3)	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L
Jan	553	0.00011	0.0766	0.0012	29.9	0.00035	0.0	0.0009	0.0063	0.328	0.9	6.9	0.044	2.4	0.0018	0.0021	14.7	0.1493
Feb	403	0.00011	0.0791	0.0012	30.0	0.00039	0.0	0.0009	0.0066	0.343	0.9	7.0	0.047	2.4	0.0019	0.0021	15.3	0.1781
Mar	407	0.00011	0.0825	0.0013	30.1	0.00044	0.0	0.0010	0.0070	0.363	0.9	7.2	0.052	2.4	0.0022	0.0023	16.3	0.2166
Apr	784	0.00011	0.0775	0.0012	30.0	0.00037	0.0	0.0009	0.0064	0.333	0.9	7.0	0.045	2.4	0.0018	0.0021	14.9	0.1587
May	6991	0.00010	0.0674	0.0010	29.6	0.00022	0.0	0.0006	0.0052	0.273	0.9	6.6	0.030	2.3	0.0012	0.0018	12.1	0.0433
Jun	7191	0.00010	0.0678	0.0010	29.7	0.00023	0.0	0.0006	0.0052	0.276	0.9	6.6	0.031	2.3	0.0012	0.0018	12.2	0.0477
Jul	5013	0.00010	0.0682	0.0010	29.7	0.00023	0.0	0.0007	0.0053	0.278	0.9	6.6	0.032	2.3	0.0012	0.0018	12.4	0.0524
Aug	3506	0.00010	0.0683	0.0010	29.7	0.00023	0.0	0.0007	0.0053	0.279	0.9	6.6	0.032	2.3	0.0013	0.0018	12.4	0.0537
Sep	4720	0.00010	0.0678	0.0010	29.7	0.00023	0.0	0.0006	0.0052	0.275	0.9	6.6	0.031	2.3	0.0012	0.0018	12.2	0.0472
Oct	2460	0.00010	0.0686	0.0010	29.7	0.00024	0.0	0.0007	0.0053	0.280	0.9	6.6	0.032	2.3	0.0013	0.0018	12.5	0.0572
Nov	1115	0.00010	0.0718	0.0011	29.8	0.00028	0.0	0.0007	0.0057	0.299	0.9	6.8	0.037	2.3	0.0015	0.0019	13.3	0.0932
Dec	821	0.00011	0.0740	0.0011	29.9	0.00032	0.0	0.0008	0.0060	0.312	0.9	6.8	0.040	2.3	0.0016	0.0020	13.9	0.1188
Total	33964																	

Location X14

	Flows	Ag	Al	As	Ca	Cd	Cl	Co	Cu	Fe	K	Mg	Mn	Na	Ni	Pb	SO4	Zn
	(x 1000 m3)	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L
Jan	1192	0.00008	0.0510	0.0015	28.8	0.00088	0.0	0.0012	0.0056	0.230	1.6	13.9	0.035	3.7	0.0042	0.0044	75.6	0.1301
Feb	912	0.00007	0.0458	0.0016	27.6	0.00100	0.0	0.0013	0.0055	0.213	1.7	15.1	0.035	3.9	0.0047	0.0048	87.4	0.1474
Mar	981	0.00007	0.0432	0.0016	26.0	0.00103	0.0	0.0013	0.0055	0.209	1.7	15.0	0.036	3.9	0.0048	0.0048	88.6	0.1680
Apr	1784	0.00008	0.0545	0.0013	27.0	0.00068	0.0	0.0010	0.0057	0.245	1.3	10.9	0.035	3.1	0.0032	0.0034	52.9	0.1313
May	14480	0.00010	0.0644	0.0010	29.2	0.00026	0.0	0.0007	0.0051	0.262	1.0	7.1	0.029	2.4	0.0014	0.0019	17.0	0.0411
Jun	14786	0.00010	0.0648	0.0011	29.2	0.00027	0.0	0.0007	0.0052	0.265	1.0	7.1	0.030	2.4	0.0014	0.0019	16.8	0.0451
Jul	10302	0.00010	0.0644	0.0011	29.2	0.00029	0.0	0.0007	0.0052	0.264	1.0	7.4	0.030	2.4	0.0015	0.0020	19.2	0.0494
Aug	7268	0.00010	0.0629	0.0011	29.0	0.00032	0.0	0.0007	0.0051	0.258	1.0	7.7	0.030	2.5	0.0016	0.0021	22.1	0.0501
Sep	9748	0.00010	0.0639	0.0011	29.2	0.00029	0.0	0.0007	0.0051	0.261	1.0	7.3	0.030	2.4	0.0015	0.0020	19.3	0.0445
Oct	5108	0.00009	0.0616	0.0011	28.9	0.00036	0.0	0.0007	0.0051	0.254	1.1	8.2	0.030	2.6	0.0018	0.0023	26.5	0.0530
Nov	2303	0.00009	0.0591	0.0013	29.3	0.00055	0.0	0.0009	0.0054	0.252	1.3	10.3	0.033	3.0	0.0027	0.0030	43.9	0.0855
Dec	1705	0.00009	0.0575	0.0014	29.7	0.00069	0.0	0.0010	0.0057	0.251	1.4	11.9	0.035	3.4	0.0033	0.0036	56.8	0.1081
Total	70579																	

Location Mouth of Rose Creek

	Flows	Ag	Al	As	Ca	Cd	Cl	Co	Cu	Fe	K	Mg	Mn	Na	Ni	Pb	SO4	Zn
	(x 1000 m3)	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L
Jan	1628	0.00009	0.0550	0.0014	29.0	0.00070	0.0	0.0010	0.0054	0.239	1.4	11.9	0.033	3.3	0.0034	0.0036	58.5	0.1022
Feb	1230	0.00008	0.0510	0.0014	28.1	0.00079	0.0	0.0011	0.0054	0.226	1.5	12.9	0.033	3.5	0.0038	0.0040	67.8	0.1160
Mar	1301	0.00008	0.0488	0.0014	26.9	0.00083	0.0	0.0011	0.0054	0.222	1.5	12.9	0.034	3.5	0.0039	0.0040	69.7	0.1330
Apr	2402	0.00009	0.0574	0.0013	27.7	0.00056	0.0	0.0009	0.0055	0.250	1.2	9.8	0.033	2.9	0.0026	0.0029	42.3	0.1041
May	19992	0.00010	0.0648	0.0010	29.3	0.00025	0.0	0.0006	0.0051	0.263	1.0	6.9	0.029	2.3	0.0013	0.0019	15.5	0.0368
Jun	20466	0.00010	0.0651	0.0010	29.3	0.00025	0.0	0.0006	0.0051	0.265	1.0	6.9	0.029	2.3	0.0013	0.0019	15.4	0.0397
Jul	14254	0.00010	0.0648	0.0011	29.3	0.00027	0.0	0.0007	0.0052	0.264	1.0	7.1	0.030	2.4	0.0014	0.0019	17.1	0.0428
Aug	10032	0.00010	0.0637	0.0011	29.1	0.00029	0.0	0.0007	0.0051	0.260	1.0	7.3	0.029	2.4	0.0015	0.0020	19.3	0.0433
Sep	13469	0.00010	0.0644	0.0010	29.3	0.00026	0.0	0.0007	0.0051	0.262	1.0	7.1	0.029	2.4	0.0014	0.0019	17.2	0.0393
Oct	7047	0.00010	0.0628	0.0011	29.1	0.00032	0.0	0.0007	0.0051	0.257	1.0	7.7	0.029	2.5	0.0016	0.0021	22.4	0.0454
Nov	3181	0.00009	0.0610	0.0012	29.3	0.00045	0.0	0.0008	0.0053	0.255	1.2	9.2	0.031	2.8	0.0022	0.0027	35.0	0.0689
Dec	2352	0.00009	0.0598	0.0013	29.6	0.00056	0.0	0.0009	0.0055	0.254	1.3	10.4	0.033	3.1	0.0027	0.0031	44.4	0.0854
Total	97354																	

Location Mouth of Anvil Creek

	Flows	Ag	Al	As	Ca	Cd	Cl	Co	Cu	Fe	K	Mg	Mn	Na	Ni	Pb	SO4	Zn
	(x 1000 m3)	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L
Jan	4432	0.00010	0.0619	0.0011	29.4	0.00038	0.0	0.0008	0.0052	0.255	1.1	8.5	0.030	2.7	0.0019	0.0024	28.9	0.0537
Feb	3272	0.00009	0.0603	0.0012	29.0	0.00042	0.0	0.0008	0.0051	0.250	1.1	8.9	0.030	2.7	0.0021	0.0026	32.8	0.0596
Mar	3362	0.00009	0.0593	0.0012	28.5	0.00044	0.0	0.0008	0.0052	0.248	1.1	9.0	0.031	2.7	0.0022	0.0026	34.2	0.0672
Apr	6375	0.00010	0.0627	0.0011	28.9	0.00033	0.0	0.0007	0.0052	0.259	1.0	7.8	0.030	2.5	0.0017	0.0022	23.2	0.0552
May	55468	0.00010	0.0655	0.0010	29.5	0.00022	0.0	0.0006	0.0050	0.264	0.9	6.7	0.029	2.3	0.0012	0.0018	13.1	0.0296
Jun	56957	0.00010	0.0656	0.0010	29.5	0.00022	0.0	0.0006	0.0050	0.264	0.9	6.7	0.029	2.3	0.0012	0.0018	13.0	0.0307
Jul	39693	0.00010	0.0655	0.0010	29.5	0.00022	0.0	0.0006	0.0051	0.264	0.9	6.7	0.029	2.3	0.0012	0.0018	13.7	0.0318
Aug	27824	0.00010	0.0651	0.0010	29.4	0.00023	0.0	0.0006	0.0050	0.263	0.9	6.8	0.029	2.3	0.0012	0.0018	14.4	0.0320
Sep	37419	0.00010	0.0654	0.0010	29.5	0.00022	0.0	0.0006	0.0050	0.263	0.9	6.7	0.029	2.3	0.0012	0.0018	13.7	0.0305
Oct	19528	0.00010	0.0648	0.0010	29.4	0.00024	0.0	0.0006	0.0050	0.261	1.0	7.0	0.029	2.3	0.0013	0.0019	15.6	0.0328
Nov	8835	0.00010	0.0641	0.0011	29.5	0.00029	0.0	0.0007	0.0051	0.261	1.0	7.5	0.029	2.5	0.0015	0.0021	20.1	0.0412
Dec	6515	0.00010	0.0637	0.0011	29.6	0.00033	0.0	0.0007	0.0052	0.261	1.1	7.9	0.030	2.5	0.0017	0.0022	23.5	0.0472
Total	269678																	

SF13 - Faro Site - Sensitivity Analysis - Load Increase for Low Infiltration Cover 100 %
Summary Tables

Conditions: FUTURE 3

Location: X2

	Flows (x 1000 m3)	Ag mg/L	Al mg/L	As mg/L	Ca mg/L	Cd mg/L	Cl mg/L	Co mg/L	Cu mg/L	Fe mg/L	K mg/L	Mg mg/L	Mn mg/L	Na mg/L	Ni mg/L	Pb mg/L	SO4 mg/L	Zn mg/L
Jan	553	0.00021	0.3457	0.0172	30.0	0.00546	0.2	0.0066	0.1044	3.887	1.0	7.7	0.537	2.3	0.0061	0.0032	32.6	3.8360
Feb	403	0.00024	0.4109	0.0209	30.1	0.00669	0.2	0.0079	0.1276	4.731	1.0	8.0	0.656	2.4	0.0072	0.0036	37.4	4.7237
Mar	407	0.00028	0.4980	0.0259	30.3	0.00832	0.3	0.0098	0.1585	5.859	1.0	8.3	0.814	2.4	0.0088	0.0041	43.9	5.9097
Apr	784	0.00022	0.3671	0.0184	30.1	0.00586	0.2	0.0070	0.1120	4.165	1.0	7.8	0.576	2.4	0.0065	0.0034	34.2	4.1277
May	6991	0.00012	0.1061	0.0033	29.7	0.00095	0.0	0.0015	0.0193	0.784	0.9	6.7	0.101	2.3	0.0018	0.0019	14.7	0.5724
Jun	7191	0.00012	0.1159	0.0039	29.7	0.00114	0.0	0.0017	0.0228	0.911	0.9	6.7	0.119	2.3	0.0020	0.0020	15.4	0.7062
Jul	5013	0.00012	0.1266	0.0045	29.7	0.00134	0.0	0.0019	0.0266	1.050	0.9	6.8	0.139	2.3	0.0022	0.0020	16.2	0.8522
Aug	3506	0.00013	0.1295	0.0047	29.7	0.00140	0.0	0.0020	0.0276	1.088	0.9	6.8	0.144	2.3	0.0022	0.0021	16.5	0.8917
Sep	4720	0.00012	0.1148	0.0038	29.7	0.00112	0.0	0.0016	0.0224	0.897	0.9	6.7	0.117	2.3	0.0020	0.0020	15.4	0.6917
Oct	2460	0.00013	0.1374	0.0051	29.7	0.00154	0.0	0.0021	0.0304	1.189	0.9	6.8	0.158	2.3	0.0024	0.0021	17.0	0.9987
Nov	1115	0.00016	0.2189	0.0098	29.8	0.00308	0.1	0.0039	0.0593	2.245	0.9	7.2	0.307	2.3	0.0038	0.0025	23.1	2.1090
Dec	821	0.00019	0.2768	0.0132	29.9	0.00416	0.1	0.0051	0.0799	2.995	1.0	7.4	0.412	2.3	0.0048	0.0029	27.4	2.8971
Total	33964																	

Location: X14

	Flows (x 1000 m3)	Ag mg/L	Al mg/L	As mg/L	Ca mg/L	Cd mg/L	Cl mg/L	Co mg/L	Cu mg/L	Fe mg/L	K mg/L	Mg mg/L	Mn mg/L	Na mg/L	Ni mg/L	Pb mg/L	SO4 mg/L	Zn mg/L
Jan	1192	0.00014	0.2052	0.0107	30.1	0.00377	0.1	0.0044	0.0621	2.275	1.6	26.1	0.319	3.7	0.0066	0.0050	282.3	2.2175
Feb	912	0.00014	0.2268	0.0124	29.1	0.00439	0.1	0.0051	0.0719	2.615	1.7	29.6	0.369	3.9	0.0076	0.0056	333.5	2.5985
Mar	981	0.00015	0.2560	0.0143	27.6	0.00502	0.2	0.0058	0.0836	3.031	1.7	29.9	0.428	3.9	0.0082	0.0057	341.5	3.0485
Apr	1784	0.00014	0.2116	0.0107	27.9	0.00362	0.1	0.0043	0.0633	2.330	1.3	19.0	0.325	3.1	0.0057	0.0041	190.4	2.2589
May	14480	0.00011	0.0874	0.0024	29.3	0.00069	0.0	0.0011	0.0136	0.567	1.0	8.1	0.072	2.4	0.0017	0.0020	34.7	0.3528
Jun	14796	0.00011	0.0937	0.0028	29.3	0.00081	0.0	0.0013	0.0158	0.648	1.0	8.1	0.083	2.4	0.0018	0.0020	34.0	0.4357
Jul	10302	0.00011	0.0995	0.0032	29.4	0.00095	0.0	0.0014	0.0181	0.730	1.0	8.8	0.095	2.4	0.0021	0.0022	44.3	0.5245
Aug	7268	0.00011	0.0993	0.0033	29.2	0.00100	0.0	0.0015	0.0185	0.742	1.0	9.7	0.097	2.5	0.0022	0.0023	56.8	0.5434
Sep	9748	0.00011	0.0920	0.0027	29.3	0.00081	0.0	0.0013	0.0154	0.634	1.0	8.8	0.081	2.4	0.0019	0.0021	44.4	0.4254
Oct	5108	0.00011	0.1025	0.0035	29.2	0.00113	0.0	0.0016	0.0201	0.796	1.1	11.0	0.105	2.6	0.0025	0.0025	75.1	0.6063
Nov	2303	0.00013	0.1471	0.0065	29.9	0.00220	0.1	0.0028	0.0377	1.418	1.3	16.4	0.195	3.0	0.0041	0.0034	148.2	1.2763
Dec	1705	0.00014	0.1782	0.0086	30.6	0.00295	0.1	0.0036	0.0499	1.851	1.4	20.4	0.257	3.3	0.0052	0.0041	202.3	1.7416
Total	70579																	

Location: Mouth of Rose Creek

	Flows (x 1000 m3)	Ag mg/L	Al mg/L	As mg/L	Ca mg/L	Cd mg/L	Cl mg/L	Co mg/L	Cu mg/L	Fe mg/L	K mg/L	Mg mg/L	Mn mg/L	Na mg/L	Ni mg/L	Pb mg/L	SO4 mg/L	Zn mg/L
Jan	1628	0.00013	0.1679	0.0081	30.0	0.00281	0.1	0.0034	0.0468	1.737	1.4	20.9	0.241	3.3	0.0052	0.0041	209.9	1.6309
Feb	1230	0.00013	0.1853	0.0094	29.3	0.00331	0.1	0.0039	0.0546	2.008	1.5	23.7	0.281	3.5	0.0059	0.0046	250.4	1.9345
Mar	1301	0.00014	0.2092	0.0110	28.1	0.00383	0.1	0.0045	0.0642	2.350	1.5	24.1	0.330	3.5	0.0065	0.0047	260.4	2.3048
Apr	2402	0.00013	0.1742	0.0082	28.3	0.00274	0.1	0.0034	0.0483	1.799	1.2	15.8	0.249	2.9	0.0045	0.0035	144.4	1.6849
May	19992	0.00010	0.0815	0.0020	29.4	0.00056	0.0	0.0010	0.0112	0.484	1.0	7.7	0.060	2.3	0.0016	0.0019	28.3	0.2626
Jun	20466	0.00011	0.0860	0.0023	29.4	0.00064	0.0	0.0011	0.0128	0.541	1.0	7.6	0.068	2.3	0.0016	0.0019	27.8	0.3221
Jul	14254	0.00011	0.0902	0.0026	29.4	0.00074	0.0	0.0012	0.0145	0.601	1.0	8.2	0.076	2.4	0.0018	0.0020	35.2	0.3861
Aug	10032	0.00011	0.0901	0.0026	29.3	0.00078	0.0	0.0012	0.0148	0.610	1.0	8.8	0.078	2.4	0.0019	0.0021	44.4	0.4007
Sep	13469	0.00011	0.0848	0.0023	29.4	0.00064	0.0	0.0011	0.0126	0.532	1.0	8.2	0.067	2.4	0.0017	0.0020	35.4	0.3149
Oct	7047	0.00011	0.0924	0.0028	29.3	0.00087	0.0	0.0013	0.0159	0.650	1.0	9.8	0.084	2.5	0.0021	0.0023	57.6	0.4465
Nov	3181	0.00012	0.1247	0.0050	29.8	0.00165	0.0	0.0022	0.0287	1.100	1.2	13.7	0.149	2.8	0.0033	0.0030	110.5	0.9309
Dec	2352	0.00013	0.1473	0.0065	30.3	0.00219	0.1	0.0028	0.0375	1.414	1.3	16.6	0.194	3.1	0.0041	0.0035	149.8	1.2695
Total	97354																	

Location: Mouth of Anvil Creek

	Flows (x 1000 m3)	Ag mg/L	Al mg/L	As mg/L	Ca mg/L	Cd mg/L	Cl mg/L	Co mg/L	Cu mg/L	Fe mg/L	K mg/L	Mg mg/L	Mn mg/L	Na mg/L	Ni mg/L	Pb mg/L	SO4 mg/L	Zn mg/L
Jan	4432	0.00011	0.1034	0.0036	29.7	0.00116	0.0	0.0016	0.0204	0.805	1.1	11.8	0.107	2.7	0.0026	0.0026	84.5	0.6153
Feb	3272	0.00011	0.1108	0.0042	29.5	0.00137	0.0	0.0019	0.0236	0.919	1.1	13.0	0.123	2.7	0.0029	0.0028	101.4	0.7429
Mar	3362	0.00012	0.1214	0.0049	29.0	0.00161	0.0	0.0021	0.0279	1.072	1.1	13.3	0.145	2.7	0.0032	0.0029	108.0	0.9079
Apr	6375	0.00011	0.1067	0.0037	29.1	0.00116	0.0	0.0016	0.0213	0.842	1.0	10.0	0.111	2.5	0.0024	0.0024	61.7	0.6508
May	55468	0.00010	0.0715	0.0014	29.5	0.00033	0.0	0.0007	0.0072	0.343	0.9	6.9	0.040	2.3	0.0013	0.0018	17.7	0.1110
Jun	56957	0.00010	0.0731	0.0015	29.5	0.00036	0.0	0.0008	0.0078	0.364	0.9	6.9	0.043	2.3	0.0013	0.0018	17.5	0.1321
Jul	39693	0.00010	0.0746	0.0016	29.5	0.00039	0.0	0.0008	0.0084	0.385	0.9	7.1	0.046	2.3	0.0013	0.0018	20.2	0.1551
Aug	27824	0.00010	0.0746	0.0016	29.5	0.00041	0.0	0.0008	0.0085	0.389	0.9	7.4	0.046	2.3	0.0014	0.0019	23.5	0.1609
Sep	37419	0.00010	0.0727	0.0015	29.5	0.00036	0.0	0.0008	0.0077	0.360	0.9	7.1	0.042	2.3	0.0013	0.0018	20.2	0.1297
Oct	19528	0.00010	0.0755	0.0017	29.5	0.00044	0.0	0.0009	0.0089	0.403	1.0	7.7	0.048	2.3	0.0015	0.0019	28.3	0.1775
Nov	8835	0.00011	0.0871	0.0024	29.7	0.00072	0.0	0.0012	0.0135	0.565	1.0	9.1	0.072	2.5	0.0019	0.0022	47.3	0.3516
Dec	6515	0.00011	0.0953	0.0030	29.9	0.00092	0.0	0.0014	0.0167	0.679	1.1	10.2	0.088	2.5	0.0022	0.0023	61.6	0.4745
Total	269678																	

SF15 - Rose Creek tailings Area - Sensitivity Assessment - Groundwater Capture Efficiency 97 %

Conditions: Future 1

Location: X2

	Flows (x 1000 m3)	Ag mg/L	Al mg/L	As mg/L	Ca mg/L	Cd mg/L	Cl mg/L	Co mg/L	Cu mg/L	Fe mg/L	K mg/L	Mg mg/L	Mn mg/L	Na mg/L	Ni mg/L	Pb mg/L	SO4 mg/L	Zn mg/L
Jan	661	0.0001	0.0603	0.0009	27.0898	0.0002	0.0002	0.0005	0.0046	0.2417	0.8431	5.9825	0.0259	2.0735	0.0010	0.0016	10.7242	0.0234
Feb	483	0.0001	0.0592	0.0009	26.5745	0.0002	0.0002	0.0005	0.0045	0.2371	0.8271	5.8687	0.0254	2.0341	0.0010	0.0015	10.5202	0.0230
Mar	485	0.0001	0.0589	0.0009	26.4674	0.0002	0.0002	0.0005	0.0045	0.2362	0.8238	5.8451	0.0253	2.0259	0.0010	0.0015	10.4778	0.0229
Apr	901	0.0001	0.0630	0.0010	28.2751	0.0002	0.0002	0.0006	0.0048	0.2523	0.8800	6.2443	0.0270	2.1643	0.0011	0.0016	11.1935	0.0245
May	8165	0.0001	0.0647	0.0010	29.0742	0.0002	0.0002	0.0006	0.0049	0.2595	0.9049	6.4208	0.0278	2.2254	0.0011	0.0017	11.5098	0.0251
Jun	8391	0.0001	0.0643	0.0010	28.8696	0.0002	0.0002	0.0006	0.0049	0.2576	0.8985	6.3756	0.0276	2.2098	0.0011	0.0017	11.4288	0.0250
Jul	5833	0.0001	0.0641	0.0010	28.8050	0.0002	0.0002	0.0006	0.0049	0.2571	0.8965	6.3613	0.0275	2.2048	0.0011	0.0017	11.4033	0.0249
Aug	4128	0.0001	0.0633	0.0010	28.4370	0.0002	0.0002	0.0006	0.0048	0.2538	0.8851	6.2801	0.0272	2.1767	0.0011	0.0016	11.2576	0.0246
Sep	5537	0.0001	0.0640	0.0010	28.7549	0.0002	0.0002	0.0006	0.0049	0.2566	0.8950	6.3503	0.0275	2.2010	0.0011	0.0017	11.3834	0.0249
Oct	2894	0.0001	0.0630	0.0010	28.3013	0.0002	0.0002	0.0006	0.0048	0.2526	0.8808	6.2501	0.0271	2.1663	0.0011	0.0016	11.2038	0.0245
Nov	1321	0.0001	0.0616	0.0009	27.6415	0.0002	0.0002	0.0006	0.0047	0.2467	0.8603	6.1044	0.0264	2.1158	0.0010	0.0016	10.9426	0.0239
Dec	977	0.0001	0.0618	0.0009	27.7370	0.0002	0.0002	0.0006	0.0047	0.2475	0.8633	6.1255	0.0265	2.1231	0.0010	0.0016	10.9804	0.0240
Total	39776																	

Location: X14

	Flows (x 1000 m3)	Ag mg/L	Al mg/L	As mg/L	Ca mg/L	Cd mg/L	Cl mg/L	Co mg/L	Cu mg/L	Fe mg/L	K mg/L	Mg mg/L	Mn mg/L	Na mg/L	Ni mg/L	Pb mg/L	SO4 mg/L	Zn mg/L
Jan	1223	0.0001	0.0722	0.0022	19.9458	0.0016	0.0001	0.0020	0.0123	0.6838	3.0219	4.4388	0.0332	6.8963	0.0082	0.0085	42.6905	0.1937
Feb	908	0.0001	0.0779	0.0025	17.7845	0.0020	0.0001	0.0024	0.0151	0.8573	3.5017	3.9694	0.0350	7.9543	0.0099	0.0101	49.9233	0.2564
Mar	925	0.0001	0.0855	0.0026	16.7969	0.0021	0.0001	0.0025	0.0177	1.0275	3.6974	3.7547	0.0365	8.3849	0.0105	0.0107	53.0858	0.3134
Apr	1681	0.0001	0.0792	0.0019	22.7259	0.0012	0.0001	0.0016	0.0126	0.7257	2.3976	5.0430	0.0331	5.5193	0.0061	0.0065	33.8362	0.1963
May	14405	0.0001	0.0674	0.0011	28.5411	0.0003	0.0002	0.0007	0.0060	0.3245	1.0922	6.3060	0.0287	2.6405	0.0017	0.0023	14.3087	0.0481
Jun	14818	0.0001	0.0669	0.0011	28.4400	0.0003	0.0002	0.0007	0.0059	0.3199	1.0769	6.2835	0.0285	2.6058	0.0017	0.0022	14.0913	0.0468
Jul	10338	0.0001	0.0670	0.0011	28.0859	0.0004	0.0002	0.0008	0.0061	0.3323	1.1582	6.2066	0.0287	2.7851	0.0019	0.0025	15.2805	0.0520
Aug	7298	0.0001	0.0679	0.0012	27.4885	0.0004	0.0002	0.0008	0.0067	0.3671	1.2580	6.0763	0.0290	3.0040	0.0023	0.0028	16.7904	0.0650
Sep	9771	0.0001	0.0672	0.0011	28.0623	0.0004	0.0002	0.0008	0.0062	0.3372	1.1643	6.2015	0.0288	2.7985	0.0020	0.0025	15.3775	0.0537
Oct	5136	0.0001	0.0683	0.0013	26.8567	0.0005	0.0002	0.0009	0.0072	0.3952	1.4078	5.9392	0.0293	3.3346	0.0028	0.0033	18.9921	0.0763
Nov	2377	0.0001	0.0678	0.0016	24.3348	0.0009	0.0002	0.0013	0.0085	0.4651	1.9531	5.3910	0.0302	4.5367	0.0046	0.0051	26.9525	0.1077
Dec	1777	0.0001	0.0676	0.0018	22.8228	0.0012	0.0001	0.0016	0.0093	0.5085	2.3639	5.0635	0.0311	5.4448	0.0060	0.0064	32.9062	0.1275
Total	70657																	

Location: Mouth of Rose Creek

	Flows (x 1000 m3)	Ag mg/L	Al mg/L	As mg/L	Ca mg/L	Cd mg/L	Cl mg/L	Co mg/L	Cu mg/L	Fe mg/L	K mg/L	Mg mg/L	Mn mg/L	Na mg/L	Ni mg/L	Pb mg/L	SO4 mg/L	Zn mg/L
Jan	1659	0.0001	0.0706	0.0019	22.4798	0.0013	0.0001	0.0016	0.0104	0.5736	2.4702	4.9895	0.0319	5.6802	0.0063	0.0067	34.5561	0.1495
Feb	1225	0.0001	0.0748	0.0021	20.8434	0.0015	0.0001	0.0019	0.0125	0.7037	2.8334	4.6341	0.0333	6.4809	0.0076	0.0079	40.0279	0.1966
Mar	1245	0.0001	0.0804	0.0022	20.0872	0.0016	0.0001	0.0020	0.0144	0.8312	2.9836	4.4697	0.0344	6.8116	0.0081	0.0084	42.4500	0.2394
Apr	2299	0.0001	0.0756	0.0016	24.5704	0.0010	0.0002	0.0014	0.0105	0.6017	2.0011	5.4438	0.0318	4.6455	0.0048	0.0052	27.8963	0.1504
May	19917	0.0001	0.0670	0.0011	28.8328	0.0003	0.0002	0.0007	0.0057	0.3078	1.0448	6.3696	0.0286	2.5367	0.0015	0.0021	13.5912	0.0419
Jun	20487	0.0001	0.0667	0.0011	28.7596	0.0003	0.0002	0.0007	0.0056	0.3044	1.0338	6.3533	0.0285	2.5116	0.0015	0.0021	13.4340	0.0409
Jul	14291	0.0001	0.0667	0.0011	28.5033	0.0003	0.0002	0.0007	0.0058	0.3134	1.0926	6.2976	0.0286	2.6413	0.0017	0.0023	14.2946	0.0447
Aug	10062	0.0001	0.0673	0.0011	28.0672	0.0004	0.0002	0.0008	0.0062	0.3388	1.1654	6.2026	0.0288	2.8011	0.0020	0.0025	15.3964	0.0542
Sep	13492	0.0001	0.0669	0.0011	28.4851	0.0003	0.0002	0.0007	0.0059	0.3170	1.0972	6.2937	0.0286	2.6514	0.0017	0.0023	14.3676	0.0459
Oct	7075	0.0001	0.0677	0.0012	27.6073	0.0004	0.0002	0.0008	0.0066	0.3593	1.2744	6.1027	0.0291	3.0415	0.0023	0.0029	16.9978	0.0624
Nov	3256	0.0001	0.0673	0.0014	25.7540	0.0007	0.0002	0.0011	0.0075	0.4109	1.6747	5.6999	0.0297	3.9238	0.0037	0.0042	22.8417	0.0855
Dec	2423	0.0001	0.0672	0.0016	24.6306	0.0009	0.0002	0.0013	0.0082	0.4432	1.9788	5.4566	0.0304	4.5960	0.0047	0.0051	27.2495	0.1003
Total	97432																	

Location: Mouth of Anvil Creek

	Flows (x 1000 m3)	Ag mg/L	Al mg/L	As mg/L	Ca mg/L	Cd mg/L	Cl mg/L	Co mg/L	Cu mg/L	Fe mg/L	K mg/L	Mg mg/L	Mn mg/L	Na mg/L	Ni mg/L	Pb mg/L	SO4 mg/L	Zn mg/L
Jan	4463	0.0001	0.0676	0.0013	26.9501	0.0006	0.0002	0.0010	0.0070	0.3791	1.4969	5.9610	0.0296	3.5347	0.0031	0.0036	20.2061	0.0717
Feb	3268	0.0001	0.0692	0.0014	26.3134	0.0007	0.0002	0.0011	0.0078	0.4289	1.6381	5.8227	0.0302	3.8460	0.0035	0.0040	22.3321	0.0897
Mar	3306	0.0001	0.0714	0.0015	26.0134	0.0007	0.0002	0.0011	0.0086	0.4777	1.6981	5.7575	0.0306	3.9779	0.0037	0.0042	23.2935	0.1061
Apr	6272	0.0001	0.0695	0.0012	27.7533	0.0005	0.0002	0.0009	0.0070	0.3879	1.3170	6.1356	0.0296	3.1377	0.0025	0.0030	17.6467	0.0714
May	55393	0.0001	0.0663	0.0010	29.3209	0.0002	0.0002	0.0006	0.0053	0.2798	0.9656	6.4760	0.0284	2.3629	0.0013	0.0018	12.3902	0.0315
Jun	56978	0.0001	0.0662	0.0010	29.2946	0.0002	0.0002	0.0006	0.0052	0.2786	0.9616	6.4702	0.0284	2.3538	0.0012	0.0018	12.3337	0.0311
Jul	39730	0.0001	0.0662	0.0010	29.2023	0.0002	0.0002	0.0006	0.0053	0.2818	0.9828	6.4501	0.0284	2.4006	0.0013	0.0019	12.6435	0.0325
Aug	27854	0.0001	0.0664	0.0010	29.0431	0.0003	0.0002	0.0007	0.0054	0.2911	1.0094	6.4154	0.0285	2.4588	0.0014	0.0020	13.0456	0.0359
Sep	37442	0.0001	0.0662	0.0010	29.1950	0.0002	0.0002	0.0006	0.0053	0.2832	0.9846	6.4486	0.0284	2.4044	0.0013	0.0019	12.6715	0.0329
Oct	19555	0.0001	0.0665	0.0011	28.8759	0.0003	0.0002	0.0007	0.0056	0.2985	1.0489	6.3791	0.0286	2.5461	0.0015	0.0021	13.6269	0.0389
Nov	8909	0.0001	0.0664	0.0012	28.1914	0.0004	0.0002	0.0008	0.0059	0.3177	1.1965	6.2303	0.0288	2.8714	0.0020	0.0026	15.7818	0.0475
Dec	6587	0.0001	0.0664	0.0012	27.7686	0.0005	0.0002	0.0009	0.0062	0.3300	1.3102	6.1387	0.0291	3.1228	0.0024	0.0030	17.4309	0.0531
Total	269756																	

SF15 - Rose Creek tailings Area - Sensitivity Assessment - Groundwater Capture Efficiency 97 %
Conditions Future 2

Location X2

	Flows (x 1000 m3)	Ag mg/L	Al mg/L	As mg/L	Ca mg/L	Cd mg/L	Cl mg/L	Co mg/L	Cu mg/L	Fe mg/L	K mg/L	Mg mg/L	Mn mg/L	Na mg/L	Ni mg/L	Pb mg/L	SO4 mg/L	Zn mg/L
Jan	661	0.0001	0.0603	0.0009	27.0898	0.0002	0.0002	0.0005	0.0046	0.2417	0.8431	5.9825	0.0259	2.0735	0.0010	0.0016	10.7242	0.0234
Feb	483	0.0001	0.0592	0.0009	26.5745	0.0002	0.0002	0.0005	0.0045	0.2371	0.8271	5.8687	0.0254	2.0341	0.0010	0.0015	10.5202	0.0230
Mar	485	0.0001	0.0589	0.0009	26.4674	0.0002	0.0002	0.0005	0.0045	0.2362	0.8238	5.8451	0.0253	2.0259	0.0010	0.0015	10.4778	0.0229
Apr	901	0.0001	0.0630	0.0010	28.2751	0.0002	0.0002	0.0006	0.0048	0.2523	0.8800	6.2443	0.0270	2.1643	0.0011	0.0016	11.1935	0.0245
May	8165	0.0001	0.0647	0.0010	29.0742	0.0002	0.0002	0.0006	0.0049	0.2595	0.9049	6.4208	0.0278	2.2254	0.0011	0.0017	11.5098	0.0251
Jun	8391	0.0001	0.0643	0.0010	28.8696	0.0002	0.0002	0.0006	0.0049	0.2576	0.8985	6.3756	0.0276	2.2098	0.0011	0.0017	11.4288	0.0250
Jul	5833	0.0001	0.0641	0.0010	28.8050	0.0002	0.0002	0.0006	0.0049	0.2571	0.8965	6.3613	0.0275	2.2048	0.0011	0.0017	11.4033	0.0249
Aug	4128	0.0001	0.0633	0.0010	28.4370	0.0002	0.0002	0.0006	0.0048	0.2538	0.8851	6.2801	0.0272	2.1767	0.0011	0.0016	11.2576	0.0246
Sep	5537	0.0001	0.0640	0.0010	28.7549	0.0002	0.0002	0.0006	0.0049	0.2566	0.8950	6.3503	0.0275	2.2010	0.0011	0.0017	11.3834	0.0249
Oct	2894	0.0001	0.0630	0.0010	28.3013	0.0002	0.0002	0.0006	0.0048	0.2526	0.8808	6.2501	0.0271	2.1663	0.0011	0.0016	11.2038	0.0245
Nov	1321	0.0001	0.0616	0.0009	27.6415	0.0002	0.0002	0.0006	0.0047	0.2467	0.8603	6.1044	0.0264	2.1158	0.0010	0.0016	10.9426	0.0239
Dec	977	0.0001	0.0618	0.0009	27.7370	0.0002	0.0002	0.0006	0.0047	0.2475	0.8633	6.1255	0.0265	2.1231	0.0010	0.0016	10.9804	0.0240
Total	39776																	

Location X14

	Flows (x 1000 m3)	Ag mg/L	Al mg/L	As mg/L	Ca mg/L	Cd mg/L	Cl mg/L	Co mg/L	Cu mg/L	Fe mg/L	K mg/L	Mg mg/L	Mn mg/L	Na mg/L	Ni mg/L	Pb mg/L	SO4 mg/L	Zn mg/L
Jan	1223	0.0001	0.0838	0.0022	20.5083	0.0017	0.0001	0.0021	0.0154	0.8969	3.0219	4.5771	0.0351	6.8963	0.0083	0.0085	55.1621	0.2953
Feb	908	0.0001	0.0939	0.0025	18.4773	0.0020	0.0001	0.0024	0.0194	1.1513	3.5017	4.1397	0.0376	7.9543	0.0099	0.0101	65.3039	0.3965
Mar	925	0.0001	0.1055	0.0027	17.5461	0.0021	0.0001	0.0026	0.0232	1.3960	3.6974	3.9389	0.0399	8.3849	0.0106	0.0108	69.7567	0.4891
Apr	1681	0.0001	0.0911	0.0019	23.1263	0.0012	0.0001	0.0017	0.0158	0.9450	2.3976	5.1414	0.0351	5.5193	0.0062	0.0065	42.7606	0.3008
May	14405	0.0001	0.0690	0.0011	28.5896	0.0003	0.0002	0.0007	0.0064	0.3537	1.0922	6.3179	0.0290	2.6405	0.0017	0.0023	15.3910	0.0620
Jun	14818	0.0001	0.0684	0.0011	28.4856	0.0003	0.0002	0.0007	0.0063	0.3475	1.0769	6.2947	0.0288	2.6058	0.0017	0.0022	15.1098	0.0600
Jul	10338	0.0001	0.0689	0.0011	28.1530	0.0004	0.0002	0.0008	0.0066	0.3666	1.1582	6.2231	0.0290	2.7851	0.0019	0.0025	16.7750	0.0684
Aug	7298	0.0001	0.0706	0.0012	27.5838	0.0004	0.0002	0.0009	0.0074	0.4182	1.2580	6.0998	0.0294	3.0040	0.0023	0.0028	18.9128	0.0893
Sep	9771	0.0001	0.0692	0.0011	28.1311	0.0004	0.0002	0.0008	0.0067	0.3736	1.1643	6.2184	0.0291	2.7985	0.0020	0.0025	16.9106	0.0710
Oct	5136	0.0001	0.0719	0.0013	26.9916	0.0005	0.0002	0.0010	0.0081	0.4606	1.4078	5.9724	0.0299	3.3346	0.0028	0.0033	21.9932	0.1074
Nov	2377	0.0001	0.0735	0.0016	24.6149	0.0009	0.0002	0.0013	0.0100	0.5696	1.9531	5.4599	0.0312	4.5367	0.0046	0.0051	33.1597	0.1575
Dec	1777	0.0001	0.0746	0.0018	23.2091	0.0012	0.0001	0.0016	0.0112	0.6372	2.3639	5.1585	0.0323	5.4448	0.0060	0.0064	41.4570	0.1889
Total	70657																	

Location Mouth of Rose Creek

	Flows (x 1000 m3)	Ag mg/L	Al mg/L	As mg/L	Ca mg/L	Cd mg/L	Cl mg/L	Co mg/L	Cu mg/L	Fe mg/L	K mg/L	Mg mg/L	Mn mg/L	Na mg/L	Ni mg/L	Pb mg/L	SO4 mg/L	Zn mg/L
Jan	1659	0.0001	0.0791	0.0019	22.8946	0.0013	0.0001	0.0017	0.0127	0.7307	2.4702	5.0915	0.0333	5.6802	0.0064	0.0067	43.7524	0.2244
Feb	1225	0.0001	0.0866	0.0021	21.3567	0.0015	0.0001	0.0020	0.0157	0.9215	2.8334	4.7603	0.0352	6.4809	0.0076	0.0079	51.4250	0.3004
Mar	1245	0.0001	0.0953	0.0022	20.6438	0.0016	0.0001	0.0021	0.0185	1.1050	2.9836	4.6065	0.0369	6.8116	0.0082	0.0084	54.6349	0.3699
Apr	2299	0.0001	0.0843	0.0017	24.8633	0.0010	0.0002	0.0014	0.0129	0.7622	2.0011	5.5159	0.0333	4.6455	0.0048	0.0052	34.4243	0.2269
May	19917	0.0001	0.0681	0.0011	28.8678	0.0003	0.0002	0.0007	0.0060	0.3289	1.0448	6.3782	0.0288	2.5367	0.0015	0.0021	14.3739	0.0520
Jun	20487	0.0001	0.0677	0.0011	28.7926	0.0003	0.0002	0.0007	0.0059	0.3244	1.0338	6.3614	0.0287	2.5116	0.0015	0.0021	14.1706	0.0504
Jul	14291	0.0001	0.0680	0.0011	28.5518	0.0003	0.0002	0.0007	0.0062	0.3382	1.0926	6.3096	0.0288	2.6413	0.0017	0.0023	15.3758	0.0565
Aug	10062	0.0001	0.0693	0.0011	28.1363	0.0004	0.0002	0.0008	0.0068	0.3758	1.1654	6.2196	0.0291	2.8011	0.0020	0.0025	16.9357	0.0718
Sep	13492	0.0001	0.0683	0.0011	28.5349	0.0003	0.0002	0.0007	0.0063	0.3434	1.0972	6.3059	0.0289	2.6514	0.0017	0.0023	15.4778	0.0585
Oct	7075	0.0001	0.0702	0.0012	27.7052	0.0005	0.0002	0.0009	0.0073	0.4067	1.2744	6.1268	0.0295	3.0415	0.0023	0.0029	19.1763	0.0850
Nov	3256	0.0001	0.0714	0.0014	25.9585	0.0007	0.0002	0.0011	0.0087	0.4872	1.6747	5.7502	0.0304	3.9238	0.0037	0.0042	27.3742	0.1219
Dec	2423	0.0001	0.0723	0.0016	24.9138	0.0009	0.0002	0.0013	0.0096	0.5376	1.9788	5.5262	0.0312	4.5960	0.0047	0.0051	33.5177	0.1453
Total	97432																	

Location Mouth of Anvil Creek

	Flows (x 1000 m3)	Ag mg/L	Al mg/L	As mg/L	Ca mg/L	Cd mg/L	Cl mg/L	Co mg/L	Cu mg/L	Fe mg/L	K mg/L	Mg mg/L	Mn mg/L	Na mg/L	Ni mg/L	Pb mg/L	SO4 mg/L	Zn mg/L
Jan	4463	0.0001	0.0708	0.0013	27.1043	0.0006	0.0002	0.0010	0.0079	0.4376	1.4969	5.9989	0.0302	3.5347	0.0031	0.0036	23.6246	0.0995
Feb	3268	0.0001	0.0737	0.0014	26.5059	0.0007	0.0002	0.0011	0.0090	0.5106	1.6381	5.8700	0.0309	3.8460	0.0035	0.0040	26.6056	0.1286
Mar	3306	0.0001	0.0770	0.0015	26.2231	0.0007	0.0002	0.0012	0.0101	0.5809	1.6981	5.8091	0.0315	3.9779	0.0038	0.0042	27.9588	0.1553
Apr	6272	0.0001	0.0727	0.0012	27.8607	0.0005	0.0002	0.0009	0.0079	0.4467	1.3170	6.1620	0.0301	3.1377	0.0025	0.0030	20.0394	0.0994
May	55393	0.0001	0.0667	0.0010	29.3335	0.0002	0.0002	0.0006	0.0054	0.2874	0.9656	6.4791	0.0285	2.3629	0.0013	0.0018	12.6717	0.0351
Jun	56978	0.0001	0.0666	0.0010	29.3065	0.0002	0.0002	0.0006	0.0053	0.2858	0.9616	6.4731	0.0284	2.3538	0.0012	0.0018	12.5986	0.0345
Jul	39730	0.0001	0.0667	0.0010	29.2198	0.0002	0.0002	0.0006	0.0054	0.2908	0.9828	6.4544	0.0285	2.4006	0.0013	0.0019	13.0325	0.0367
Aug	27854	0.0001	0.0671	0.0011	29.0680	0.0003	0.0002	0.0007	0.0056	0.3045	1.0094	6.4216	0.0286	2.4588	0.0014	0.0020	13.6017	0.0423
Sep	37442	0.0001	0.0668	0.0010	29.2130	0.0002	0.0002	0.0006	0.0055	0.2927	0.9846	6.4530	0.0285	2.4044	0.0013	0.0019	13.0716	0.0375
Oct	19555	0.0001	0.0675	0.0011	28.9113	0.0003	0.0002	0.0007	0.0058	0.3157	1.0489	6.3878	0.0287	2.5461	0.0015	0.0021	14.4150	0.0471
Nov	8909	0.0001	0.0679	0.0012	28.2661	0.0004	0.0002	0.0008	0.0063	0.3456	1.1965	6.2487	0.0291	2.8714	0.0020	0.0026	17.4381	0.0608
Dec	6587	0.0001	0.0682	0.0012	27.8728	0.0005	0.0002	0.0009	0.0067	0.3647	1.3102	6.1644	0.0294	3.1228	0.0024	0.0030	19.7370	0.0696
Total	269756																	

SF15 - Rose Creek tailings Area - Sensitivity Assessment - Groundwater Capture Efficiency 97 %

Conditions: Future 3

Location: X2

	Flows (x 1000 m3)	Ag mg/L	Al mg/L	As mg/L	Ca mg/L	Cd mg/L	Cl mg/L	Co mg/L	Cu mg/L	Fe mg/L	K mg/L	Mg mg/L	Mn mg/L	Na mg/L	Ni mg/L	Pb mg/L	SO4 mg/L	Zn mg/L
Jan	661	0.0001	0.0603	0.0009	27.0898	0.0002	0.0002	0.0005	0.0046	0.2417	0.8431	5.9825	0.0259	2.0735	0.0010	0.0016	10.7242	0.0234
Feb	483	0.0001	0.0592	0.0009	26.5745	0.0002	0.0002	0.0005	0.0045	0.2371	0.8271	5.8687	0.0254	2.0341	0.0010	0.0015	10.5202	0.0230
Mar	485	0.0001	0.0589	0.0009	26.4674	0.0002	0.0002	0.0005	0.0045	0.2362	0.8238	5.8451	0.0253	2.0259	0.0010	0.0015	10.4778	0.0229
Apr	901	0.0001	0.0630	0.0010	28.2751	0.0002	0.0002	0.0006	0.0048	0.2523	0.8800	6.2443	0.0270	2.1643	0.0011	0.0016	11.1935	0.0245
May	8165	0.0001	0.0647	0.0010	29.0742	0.0002	0.0002	0.0006	0.0049	0.2595	0.9049	6.4208	0.0278	2.2254	0.0011	0.0017	11.5098	0.0251
Jun	8391	0.0001	0.0643	0.0010	28.8696	0.0002	0.0002	0.0006	0.0049	0.2576	0.8985	6.3756	0.0276	2.2098	0.0011	0.0017	11.4288	0.0250
Jul	5833	0.0001	0.0641	0.0010	28.8050	0.0002	0.0002	0.0006	0.0049	0.2571	0.8965	6.3613	0.0275	2.2048	0.0011	0.0017	11.4033	0.0249
Aug	4128	0.0001	0.0633	0.0010	28.4370	0.0002	0.0002	0.0006	0.0048	0.2538	0.8851	6.2801	0.0272	2.1767	0.0011	0.0016	11.2576	0.0246
Sep	5537	0.0001	0.0640	0.0010	28.7549	0.0002	0.0002	0.0006	0.0049	0.2566	0.8950	6.3503	0.0275	2.2010	0.0011	0.0017	11.3834	0.0249
Oct	2894	0.0001	0.0630	0.0010	28.3013	0.0002	0.0002	0.0006	0.0048	0.2526	0.8808	6.2501	0.0271	2.1663	0.0011	0.0016	11.2038	0.0245
Nov	1321	0.0001	0.0616	0.0009	27.6415	0.0002	0.0002	0.0006	0.0047	0.2467	0.8603	6.1044	0.0264	2.1158	0.0010	0.0016	10.9426	0.0239
Dec	977	0.0001	0.0618	0.0009	27.7370	0.0002	0.0002	0.0006	0.0047	0.2475	0.8633	6.1255	0.0265	2.1231	0.0010	0.0016	10.9804	0.0240
Total	39776																	

Location: X14

	Flows (x 1000 m3)	Ag mg/L	Al mg/L	As mg/L	Ca mg/L	Cd mg/L	Cl mg/L	Co mg/L	Cu mg/L	Fe mg/L	K mg/L	Mg mg/L	Mn mg/L	Na mg/L	Ni mg/L	Pb mg/L	SO4 mg/L	Zn mg/L
Jan	1223	0.0001	0.1549	0.0024	23.9699	0.0017	0.0001	0.0025	0.0349	2.2085	3.0219	5.4284	0.0469	6.8963	0.0085	0.0086	148.2465	0.6614
Feb	908	0.0002	0.1920	0.0028	22.7400	0.0021	0.0001	0.0030	0.0464	2.9600	3.5017	5.1879	0.0539	7.9543	0.0103	0.0102	180.0150	0.9014
Mar	925	0.0002	0.2285	0.0030	22.1563	0.0023	0.0001	0.0033	0.0569	3.6640	3.6974	5.0726	0.0602	8.3849	0.0110	0.0109	193.9503	1.1222
Apr	1681	0.0001	0.1643	0.0021	25.5898	0.0013	0.0001	0.0021	0.0359	2.2946	2.3976	5.7472	0.0472	5.5193	0.0064	0.0066	109.1834	0.6776
May	14405	0.0001	0.0787	0.0011	28.8878	0.0003	0.0002	0.0008	0.0091	0.5336	1.0922	6.3912	0.0306	2.6405	0.0017	0.0023	23.4385	0.1123
Jun	14818	0.0001	0.0777	0.0011	28.7662	0.0003	0.0002	0.0008	0.0088	0.5179	1.0769	6.3637	0.0303	2.6058	0.0017	0.0022	22.6831	0.1075
Jul	10338	0.0001	0.0803	0.0012	28.5661	0.0004	0.0002	0.0008	0.0098	0.5775	1.1582	6.3247	0.0309	2.7851	0.0020	0.0025	27.9054	0.1272
Aug	7298	0.0001	0.0877	0.0012	28.1699	0.0005	0.0002	0.0009	0.0121	0.7325	1.2580	6.2439	0.0323	3.0040	0.0024	0.0028	34.7126	0.1771
Sep	9771	0.0001	0.0814	0.0012	28.5546	0.0004	0.0002	0.0008	0.0101	0.5978	1.1643	6.3225	0.0311	2.7985	0.0020	0.0025	28.3247	0.1336
Oct	5136	0.0001	0.0937	0.0014	27.8217	0.0006	0.0002	0.0011	0.0141	0.8628	1.4078	6.1765	0.0336	3.3346	0.0029	0.0033	44.3528	0.2197
Nov	2377	0.0001	0.1084	0.0017	26.3380	0.0010	0.0002	0.0015	0.0196	1.2127	1.9531	5.8836	0.0370	4.5367	0.0048	0.0051	79.4941	0.3370
Dec	1777	0.0001	0.1176	0.0020	25.5859	0.0012	0.0001	0.0018	0.0230	1.4292	2.3639	5.7430	0.0394	5.4448	0.0062	0.0064	105.3282	0.4100
Total	70657																	

Location: Mouth of Rose Creek

	Flows (x 1000 m3)	Ag mg/L	Al mg/L	As mg/L	Ca mg/L	Cd mg/L	Cl mg/L	Co mg/L	Cu mg/L	Fe mg/L	K mg/L	Mg mg/L	Mn mg/L	Na mg/L	Ni mg/L	Pb mg/L	SO4 mg/L	Zn mg/L
Jan	1659	0.0001	0.1315	0.0021	25.4471	0.0013	0.0001	0.0020	0.0271	1.6979	2.4702	5.7192	0.0420	5.6802	0.0066	0.0068	112.3928	0.4944
Feb	1225	0.0001	0.1593	0.0024	24.5154	0.0016	0.0001	0.0024	0.0356	2.2617	2.8334	5.5370	0.0473	6.4809	0.0079	0.0080	136.4266	0.6745
Mar	1245	0.0002	0.1867	0.0025	24.0687	0.0018	0.0001	0.0026	0.0436	2.7899	2.9836	5.4487	0.0520	6.8116	0.0085	0.0085	147.0994	0.8402
Apr	2299	0.0001	0.1379	0.0018	26.6653	0.0010	0.0002	0.0017	0.0276	1.7494	2.0011	5.9590	0.0422	4.6455	0.0050	0.0053	83.0108	0.5025
May	19917	0.0001	0.0752	0.0011	29.0835	0.0003	0.0002	0.0007	0.0080	0.4590	1.0448	6.4312	0.0300	2.5367	0.0016	0.0021	20.1943	0.0883
Jun	20487	0.0001	0.0744	0.0011	28.9956	0.0003	0.0002	0.0007	0.0078	0.4477	1.0338	6.4113	0.0298	2.5116	0.0015	0.0021	19.6480	0.0848
Jul	14291	0.0001	0.0763	0.0011	28.8506	0.0003	0.0002	0.0008	0.0084	0.4908	1.0926	6.3831	0.0302	2.6413	0.0017	0.0023	23.4278	0.0991
Aug	10062	0.0001	0.0817	0.0012	28.5614	0.0004	0.0002	0.0009	0.0102	0.6038	1.1654	6.3241	0.0312	2.8011	0.0020	0.0025	28.3950	0.1355
Sep	13492	0.0001	0.0771	0.0011	28.8416	0.0003	0.0002	0.0008	0.0087	0.5057	1.0972	6.3814	0.0303	2.6514	0.0018	0.0023	23.7438	0.1038
Oct	7075	0.0001	0.0861	0.0013	28.3078	0.0005	0.0002	0.0009	0.0116	0.6987	1.2744	6.2750	0.0321	3.0415	0.0024	0.0029	35.4074	0.1665
Nov	3256	0.0001	0.0969	0.0015	27.2168	0.0008	0.0002	0.0013	0.0157	0.9568	1.6747	6.0596	0.0346	3.9238	0.0038	0.0042	61.2076	0.2530
Dec	2423	0.0001	0.1038	0.0017	26.6562	0.0010	0.0002	0.0015	0.0182	1.1182	1.9788	5.9546	0.0364	4.5960	0.0048	0.0052	80.3386	0.3074
Total	97432																	

Location: Mouth of Anvil Creek

	Flows (x 1000 m3)	Ag mg/L	Al mg/L	As mg/L	Ca mg/L	Cd mg/L	Cl mg/L	Co mg/L	Cu mg/L	Fe mg/L	K mg/L	Mg mg/L	Mn mg/L	Na mg/L	Ni mg/L	Pb mg/L	SO4 mg/L	Zn mg/L
Jan	4463	0.0001	0.0903	0.0014	28.0532	0.0006	0.0002	0.0011	0.0132	0.7971	1.4969	6.2322	0.0334	3.5347	0.0031	0.0036	49.1396	0.1999
Feb	3268	0.0001	0.1009	0.0015	27.6903	0.0007	0.0002	0.0013	0.0165	1.0132	1.6381	6.1613	0.0354	3.8460	0.0036	0.0041	58.4787	0.2689
Mar	3306	0.0001	0.1114	0.0016	27.5133	0.0008	0.0002	0.0014	0.0195	1.2156	1.6981	6.1263	0.0372	3.9779	0.0039	0.0043	62.7147	0.3325
Apr	6272	0.0001	0.0923	0.0013	28.5212	0.0005	0.0002	0.0010	0.0133	0.8085	1.3170	6.3244	0.0334	3.1377	0.0025	0.0030	37.8482	0.2004
May	55393	0.0001	0.0692	0.0010	29.4111	0.0002	0.0002	0.0006	0.0061	0.3342	0.9656	6.4982	0.0289	2.3629	0.0013	0.0019	14.7644	0.0481
Jun	56978	0.0001	0.0690	0.0010	29.3795	0.0002	0.0002	0.0006	0.0060	0.3301	0.9616	6.4910	0.0288	2.3538	0.0013	0.0018	14.5681	0.0469
Jul	39730	0.0001	0.0696	0.0010	29.3273	0.0002	0.0002	0.0007	0.0062	0.3456	0.9828	6.4809	0.0290	2.4006	0.0013	0.0019	15.9288	0.0520
Aug	27854	0.0001	0.0716	0.0011	29.2216	0.0003	0.0002	0.0007	0.0069	0.3868	1.0094	6.4593	0.0293	2.4588	0.0014	0.0020	17.7414	0.0653
Sep	37442	0.0001	0.0699	0.0010	29.3235	0.0002	0.0002	0.0007	0.0063	0.3512	0.9846	6.4801	0.0290	2.4044	0.0013	0.0019	16.0501	0.0538
Oct	19555	0.0001	0.0732	0.0011	29.1293	0.0003	0.0002	0.0007	0.0074	0.4213	1.0489	6.4414	0.0297	2.5461	0.0016	0.0021	20.2872	0.0766
Nov	8909	0.0001	0.0772	0.0012	28.7259	0.0004	0.0002	0.0008	0.0089	0.5172	1.1965	6.3618	0.0306	2.8714	0.0021	0.0026	29.8022	0.1087
Dec	6587	0.0001	0.0798	0.0013	28.5138	0.0005	0.0002	0.0009	0.0099	0.5783	1.3102	6.3220	0.0313	3.1228	0.0025	0.0030	36.9627	0.1293
Total	269756																	

SF16 - Rose Creek tailings Area - Sensitivity Assessment - Groundwater Capture Efficiency 99 %

Conditions: Future 1

Location: X2

	Flows (x 1000 m3)	Ag mg/L	Al mg/L	As mg/L	Ca mg/L	Cd mg/L	Cl mg/L	Co mg/L	Cu mg/L	Fe mg/L	K mg/L	Mg mg/L	Mn mg/L	Na mg/L	Ni mg/L	Pb mg/L	SO4 mg/L	Zn mg/L
Jan	661	0.0001	0.0603	0.0009	27.0898	0.0002	0.0002	0.0005	0.0046	0.2417	0.8431	5.9825	0.0259	2.0735	0.0010	0.0016	10.7242	0.0234
Feb	483	0.0001	0.0592	0.0009	26.5745	0.0002	0.0002	0.0005	0.0045	0.2371	0.8271	5.8687	0.0254	2.0341	0.0010	0.0015	10.5202	0.0230
Mar	485	0.0001	0.0589	0.0009	26.4674	0.0002	0.0002	0.0005	0.0045	0.2362	0.8238	5.8451	0.0253	2.0259	0.0010	0.0015	10.4778	0.0229
Apr	901	0.0001	0.0630	0.0010	28.2751	0.0002	0.0002	0.0006	0.0048	0.2523	0.8800	6.2443	0.0270	2.1643	0.0011	0.0016	11.1935	0.0245
May	8165	0.0001	0.0647	0.0010	29.0742	0.0002	0.0002	0.0006	0.0049	0.2595	0.9049	6.4208	0.0278	2.2254	0.0011	0.0017	11.5098	0.0251
Jun	8391	0.0001	0.0643	0.0010	28.8696	0.0002	0.0002	0.0006	0.0049	0.2576	0.8985	6.3756	0.0276	2.2098	0.0011	0.0017	11.4288	0.0250
Jul	5833	0.0001	0.0641	0.0010	28.8050	0.0002	0.0002	0.0006	0.0049	0.2571	0.8965	6.3613	0.0275	2.2048	0.0011	0.0017	11.4033	0.0249
Aug	4128	0.0001	0.0633	0.0010	28.4370	0.0002	0.0002	0.0006	0.0048	0.2538	0.8851	6.2801	0.0272	2.1767	0.0011	0.0016	11.2576	0.0246
Sep	5537	0.0001	0.0640	0.0010	28.7549	0.0002	0.0002	0.0006	0.0049	0.2566	0.8950	6.3503	0.0275	2.2010	0.0011	0.0017	11.3834	0.0249
Oct	2894	0.0001	0.0630	0.0010	28.3013	0.0002	0.0002	0.0006	0.0048	0.2526	0.8808	6.2501	0.0271	2.1663	0.0011	0.0016	11.2038	0.0245
Nov	1321	0.0001	0.0616	0.0009	27.6415	0.0002	0.0002	0.0006	0.0047	0.2467	0.8603	6.1044	0.0264	2.1158	0.0010	0.0016	10.9426	0.0239
Dec	977	0.0001	0.0618	0.0009	27.7370	0.0002	0.0002	0.0006	0.0047	0.2475	0.8633	6.1255	0.0265	2.1231	0.0010	0.0016	10.9804	0.0240
Total	39776																	

Location: X14

	Flows (x 1000 m3)	Ag mg/L	Al mg/L	As mg/L	Ca mg/L	Cd mg/L	Cl mg/L	Co mg/L	Cu mg/L	Fe mg/L	K mg/L	Mg mg/L	Mn mg/L	Na mg/L	Ni mg/L	Pb mg/L	SO4 mg/L	Zn mg/L
Jan	1225	0.0001	0.0536	0.0022	19.9244	0.0017	0.0001	0.0019	0.0072	0.3411	3.0681	4.4342	0.0303	6.9996	0.0083	0.0086	42.6286	0.0863
Feb	909	0.0001	0.0524	0.0024	17.7716	0.0020	0.0001	0.0023	0.0081	0.3850	3.5601	3.9666	0.0310	8.0849	0.0099	0.0102	49.7637	0.1084
Mar	925	0.0001	0.0534	0.0026	16.7982	0.0021	0.0001	0.0024	0.0089	0.4358	3.7644	3.7550	0.0315	8.5351	0.0106	0.0109	52.7987	0.1279
Apr	1681	0.0001	0.0602	0.0018	22.7364	0.0012	0.0001	0.0016	0.0074	0.3737	2.4344	5.0452	0.0301	5.6020	0.0062	0.0066	33.6226	0.0859
May	14403	0.0001	0.0648	0.0011	28.5443	0.0003	0.0002	0.0007	0.0053	0.2776	1.0966	6.3067	0.0283	2.6505	0.0017	0.0023	14.2732	0.0334
Jun	14816	0.0001	0.0645	0.0011	28.4430	0.0003	0.0002	0.0007	0.0052	0.2754	1.0811	6.2841	0.0282	2.6151	0.0017	0.0022	14.0574	0.0328
Jul	10338	0.0001	0.0640	0.0011	28.0868	0.0004	0.0002	0.0008	0.0053	0.2773	1.1642	6.2068	0.0283	2.7985	0.0019	0.0025	15.2505	0.0348
Aug	7297	0.0001	0.0634	0.0012	27.4911	0.0004	0.0002	0.0008	0.0055	0.2851	1.2666	6.0769	0.0283	3.0232	0.0023	0.0028	16.7406	0.0393
Sep	9770	0.0001	0.0641	0.0011	28.0640	0.0004	0.0002	0.0008	0.0053	0.2788	1.1705	6.2018	0.0283	2.8124	0.0020	0.0025	15.3429	0.0353
Oct	5136	0.0001	0.0626	0.0013	26.8566	0.0005	0.0002	0.0009	0.0056	0.2903	1.4198	5.9392	0.0285	3.3615	0.0028	0.0033	18.9428	0.0434
Nov	2379	0.0001	0.0587	0.0016	24.3205	0.0009	0.0002	0.0013	0.0060	0.2971	1.9768	5.3879	0.0288	4.5695	0.0047	0.0051	26.9369	0.0551
Dec	1779	0.0001	0.0564	0.0018	22.7980	0.0012	0.0001	0.0015	0.0063	0.3014	2.3954	5.0582	0.0294	5.5151	0.0060	0.0065	32.9197	0.0628
Total	70657																	

Location: Mouth of Rose Creek

	Flows (x 1000 m3)	Ag mg/L	Al mg/L	As mg/L	Ca mg/L	Cd mg/L	Cl mg/L	Co mg/L	Cu mg/L	Fe mg/L	K mg/L	Mg mg/L	Mn mg/L	Na mg/L	Ni mg/L	Pb mg/L	SO4 mg/L	Zn mg/L
Jan	1661	0.0001	0.0569	0.0019	22.4615	0.0013	0.0001	0.0016	0.0066	0.3209	2.5048	4.9856	0.0297	5.7575	0.0064	0.0068	34.5187	0.0704
Feb	1226	0.0001	0.0559	0.0021	20.8315	0.0015	0.0001	0.0018	0.0073	0.3537	2.8771	4.6315	0.0303	6.5788	0.0077	0.0080	39.9167	0.0870
Mar	1245	0.0001	0.0567	0.0022	20.0884	0.0016	0.0001	0.0019	0.0079	0.3916	3.0334	4.4699	0.0307	6.9230	0.0082	0.0085	42.2358	0.1016
Apr	2298	0.0001	0.0617	0.0016	24.5789	0.0010	0.0002	0.0013	0.0067	0.3443	2.0279	5.4457	0.0296	4.7056	0.0048	0.0053	27.7376	0.0697
May	19915	0.0001	0.0651	0.0011	28.8351	0.0003	0.0002	0.0007	0.0052	0.2738	1.0480	6.3701	0.0283	2.5439	0.0015	0.0021	13.5654	0.0312
Jun	20485	0.0001	0.0649	0.0011	28.7618	0.0003	0.0002	0.0007	0.0052	0.2723	1.0368	6.3538	0.0282	2.5183	0.0015	0.0021	13.4093	0.0308
Jul	14291	0.0001	0.0645	0.0011	28.5039	0.0003	0.0002	0.0007	0.0052	0.2736	1.0970	6.2978	0.0283	2.6510	0.0017	0.0023	14.2729	0.0322
Aug	10062	0.0001	0.0641	0.0011	28.0691	0.0004	0.0002	0.0008	0.0053	0.2793	1.1716	6.2030	0.0283	2.8150	0.0020	0.0025	15.3601	0.0355
Sep	13491	0.0001	0.0646	0.0011	28.4863	0.0003	0.0002	0.0007	0.0052	0.2747	1.1017	6.2939	0.0283	2.6615	0.0017	0.0023	14.3425	0.0326
Oct	7075	0.0001	0.0635	0.0012	27.6072	0.0004	0.0002	0.0008	0.0055	0.2831	1.2831	6.1027	0.0284	3.0610	0.0023	0.0029	16.9620	0.0385
Nov	3258	0.0001	0.0606	0.0014	25.7428	0.0007	0.0002	0.0011	0.0057	0.2882	1.6921	5.6975	0.0287	3.9628	0.0037	0.0042	22.8325	0.0471
Dec	2426	0.0001	0.0589	0.0016	24.6107	0.0009	0.0002	0.0013	0.0059	0.2915	2.0022	5.4522	0.0291	4.6484	0.0047	0.0052	27.2650	0.0529
Total	97432																	

Location: Mouth of Anvil Creek

	Flows (x 1000 m3)	Ag mg/L	Al mg/L	As mg/L	Ca mg/L	Cd mg/L	Cl mg/L	Co mg/L	Cu mg/L	Fe mg/L	K mg/L	Mg mg/L	Mn mg/L	Na mg/L	Ni mg/L	Pb mg/L	SO4 mg/L	Zn mg/L
Jan	4465	0.0001	0.0625	0.0013	26.9416	0.0006	0.0002	0.0010	0.0056	0.2852	1.5102	5.9592	0.0288	3.5643	0.0031	0.0036	20.1976	0.0423
Feb	3268	0.0001	0.0621	0.0014	26.3075	0.0007	0.0002	0.0011	0.0059	0.2977	1.6549	5.8214	0.0290	3.8835	0.0036	0.0041	22.2952	0.0486
Mar	3306	0.0001	0.0624	0.0014	26.0141	0.0007	0.0002	0.0011	0.0061	0.3121	1.7167	5.7576	0.0292	4.0198	0.0038	0.0043	23.2122	0.0542
Apr	6271	0.0001	0.0644	0.0012	27.7569	0.0005	0.0002	0.0009	0.0056	0.2935	1.3267	6.1363	0.0288	3.1595	0.0025	0.0030	17.5870	0.0418
May	55391	0.0001	0.0656	0.0010	29.3218	0.0002	0.0002	0.0006	0.0051	0.2676	0.9667	6.4762	0.0283	2.3654	0.0013	0.0019	12.3809	0.0276
Jun	56976	0.0001	0.0655	0.0010	29.2954	0.0002	0.0002	0.0006	0.0051	0.2670	0.9627	6.4704	0.0283	2.3563	0.0012	0.0018	12.3248	0.0275
Jul	39729	0.0001	0.0654	0.0010	29.2025	0.0002	0.0002	0.0006	0.0051	0.2675	0.9844	6.4502	0.0283	2.4041	0.0013	0.0019	12.6357	0.0280
Aug	27853	0.0001	0.0653	0.0010	29.0438	0.0003	0.0002	0.0007	0.0051	0.2696	1.0116	6.4156	0.0283	2.4639	0.0014	0.0020	13.0324	0.0292
Sep	37441	0.0001	0.0654	0.0010	29.1955	0.0002	0.0002	0.0006	0.0051	0.2679	0.9862	6.4487	0.0283	2.4080	0.0013	0.0019	12.6624	0.0281
Oct	19555	0.0001	0.0650	0.0011	28.8758	0.0003	0.0002	0.0007	0.0052	0.2710	1.0521	6.3791	0.0283	2.5532	0.0015	0.0021	13.6139	0.0303
Nov	8911	0.0001	0.0640	0.0012	28.1868	0.0004	0.0002	0.0008	0.0053	0.2729	1.2030	6.2293	0.0284	2.8858	0.0021	0.0026	15.7798	0.0335
Dec	6590	0.0001	0.0633	0.0012	27.7601	0.0005	0.0002	0.0008	0.0053	0.2742	1.3191	6.1369	0.0286	3.1426	0.0024	0.0030	17.4402	0.0356
Total	269756																	

SF16 - Rose Creek tailings Area - Sensitivity Assessment - Groundwater Capture Efficiency 99 %
Conditions Future 2

Location X2

	Flows (x 1000 m3)	Ag mg/L	Al mg/L	As mg/L	Ca mg/L	Cd mg/L	Cl mg/L	Co mg/L	Cu mg/L	Fe mg/L	K mg/L	Mg mg/L	Mn mg/L	Na mg/L	Ni mg/L	Pb mg/L	SO4 mg/L	Zn mg/L
Jan	661	0.0001	0.0603	0.0009	27.0898	0.0002	0.0002	0.0005	0.0046	0.2417	0.8431	5.9825	0.0259	2.0735	0.0010	0.0016	10.7242	0.0234
Feb	483	0.0001	0.0592	0.0009	26.5745	0.0002	0.0002	0.0005	0.0045	0.2371	0.8271	5.8687	0.0254	2.0341	0.0010	0.0015	10.5202	0.0230
Mar	485	0.0001	0.0589	0.0009	26.4674	0.0002	0.0002	0.0005	0.0045	0.2362	0.8238	5.8451	0.0253	2.0259	0.0010	0.0015	10.4778	0.0229
Apr	901	0.0001	0.0630	0.0010	28.2751	0.0002	0.0002	0.0006	0.0048	0.2523	0.8800	6.2443	0.0270	2.1643	0.0011	0.0016	11.1935	0.0245
May	8165	0.0001	0.0647	0.0010	29.0742	0.0002	0.0002	0.0006	0.0049	0.2595	0.9049	6.4208	0.0278	2.2254	0.0011	0.0017	11.5098	0.0251
Jun	8391	0.0001	0.0643	0.0010	28.8696	0.0002	0.0002	0.0006	0.0049	0.2576	0.8985	6.3756	0.0276	2.2098	0.0011	0.0017	11.4288	0.0250
Jul	5833	0.0001	0.0641	0.0010	28.8050	0.0002	0.0002	0.0006	0.0049	0.2571	0.8965	6.3613	0.0275	2.2048	0.0011	0.0017	11.4033	0.0249
Aug	4128	0.0001	0.0633	0.0010	28.4370	0.0002	0.0002	0.0006	0.0048	0.2538	0.8851	6.2801	0.0272	2.1767	0.0011	0.0016	11.2576	0.0246
Sep	5537	0.0001	0.0640	0.0010	28.7549	0.0002	0.0002	0.0006	0.0049	0.2566	0.8950	6.3503	0.0275	2.2010	0.0011	0.0017	11.3834	0.0249
Oct	2894	0.0001	0.0630	0.0010	28.3013	0.0002	0.0002	0.0006	0.0048	0.2526	0.8808	6.2501	0.0271	2.1663	0.0011	0.0016	11.2038	0.0245
Nov	1321	0.0001	0.0616	0.0009	27.6415	0.0002	0.0002	0.0006	0.0047	0.2467	0.8603	6.1044	0.0264	2.1158	0.0010	0.0016	10.9426	0.0239
Dec	977	0.0001	0.0618	0.0009	27.7370	0.0002	0.0002	0.0006	0.0047	0.2475	0.8633	6.1255	0.0265	2.1231	0.0010	0.0016	10.9804	0.0240
Total	39776																	

Location X14

	Flows (x 1000 m3)	Ag mg/L	Al mg/L	As mg/L	Ca mg/L	Cd mg/L	Cl mg/L	Co mg/L	Cu mg/L	Fe mg/L	K mg/L	Mg mg/L	Mn mg/L	Na mg/L	Ni mg/L	Pb mg/L	SO4 mg/L	Zn mg/L
Jan	1225	0.0001	0.0575	0.0022	20.4888	0.0017	0.0001	0.0020	0.0082	0.4121	3.0681	4.5730	0.0309	6.9996	0.0083	0.0087	55.0365	0.1202
Feb	909	0.0001	0.0577	0.0025	18.4654	0.0020	0.0001	0.0023	0.0095	0.4829	3.5601	4.1372	0.0319	8.0849	0.0100	0.0102	65.0277	0.1550
Mar	925	0.0001	0.0601	0.0026	17.5473	0.0021	0.0001	0.0024	0.0108	0.5587	3.7644	3.9392	0.0326	8.5351	0.0107	0.0109	69.2899	0.1865
Apr	1681	0.0001	0.0641	0.0018	23.1359	0.0012	0.0001	0.0016	0.0085	0.4469	2.4344	5.1435	0.0308	5.6020	0.0062	0.0066	42.4235	0.1208
May	14403	0.0001	0.0654	0.0011	28.5925	0.0003	0.0002	0.0007	0.0054	0.2873	1.0966	6.3185	0.0284	2.6505	0.0017	0.0023	15.3363	0.0380
Jun	14816	0.0001	0.0650	0.0011	28.4884	0.0003	0.0002	0.0007	0.0054	0.2847	1.0811	6.2953	0.0283	2.6151	0.0017	0.0022	15.0576	0.0372
Jul	10338	0.0001	0.0647	0.0011	28.1539	0.0004	0.0002	0.0008	0.0055	0.2887	1.1642	6.2233	0.0284	2.7985	0.0019	0.0025	16.7271	0.0402
Aug	7297	0.0001	0.0644	0.0012	27.5861	0.0004	0.0002	0.0008	0.0057	0.3021	1.2666	6.1003	0.0284	3.0232	0.0023	0.0028	18.8342	0.0474
Sep	9770	0.0001	0.0647	0.0011	28.1327	0.0004	0.0002	0.0008	0.0055	0.2909	1.1705	6.2187	0.0284	2.8124	0.0020	0.0025	16.8558	0.0411
Oct	5136	0.0001	0.0638	0.0013	26.9916	0.0005	0.0002	0.0009	0.0059	0.3121	1.4198	5.9724	0.0287	3.3615	0.0028	0.0033	21.9126	0.0538
Nov	2379	0.0001	0.0606	0.0016	24.6016	0.0009	0.0002	0.0013	0.0065	0.3319	1.9768	5.4571	0.0291	4.5895	0.0047	0.0051	33.1187	0.0717
Dec	1779	0.0001	0.0587	0.0018	23.1863	0.0012	0.0001	0.0015	0.0069	0.3443	2.3954	5.1537	0.0298	5.5151	0.0061	0.0065	41.4519	0.0832
Total	70657																	

Location Mouth of Rose Creek

	Flows (x 1000 m3)	Ag mg/L	Al mg/L	As mg/L	Ca mg/L	Cd mg/L	Cl mg/L	Co mg/L	Cu mg/L	Fe mg/L	K mg/L	Mg mg/L	Mn mg/L	Na mg/L	Ni mg/L	Pb mg/L	SO4 mg/L	Zn mg/L
Jan	1661	0.0001	0.0597	0.0019	22.8778	0.0013	0.0001	0.0016	0.0074	0.3733	2.5048	5.0879	0.0302	5.7575	0.0064	0.0068	43.6714	0.0954
Feb	1226	0.0001	0.0598	0.0021	21.3458	0.0015	0.0001	0.0018	0.0084	0.4263	2.8771	4.7580	0.0309	6.5788	0.0077	0.0080	51.2302	0.1215
Mar	1245	0.0001	0.0616	0.0022	20.6449	0.0016	0.0001	0.0020	0.0093	0.4829	3.0334	4.6068	0.0315	6.9230	0.0082	0.0085	54.4869	0.1451
Apr	2298	0.0001	0.0646	0.0016	24.8711	0.0010	0.0002	0.0013	0.0075	0.3978	2.0279	5.5175	0.0301	4.7056	0.0048	0.0053	34.1743	0.0952
May	19915	0.0001	0.0655	0.0011	28.8700	0.0003	0.0002	0.0007	0.0053	0.2809	1.0480	6.3787	0.0284	2.5439	0.0015	0.0021	14.3342	0.0346
Jun	20485	0.0001	0.0653	0.0011	28.7947	0.0003	0.0002	0.0007	0.0053	0.2790	1.0368	6.3619	0.0283	2.5183	0.0015	0.0021	14.1327	0.0340
Jul	14291	0.0001	0.0650	0.0011	28.5525	0.0003	0.0002	0.0007	0.0053	0.2819	1.0970	6.3097	0.0283	2.6510	0.0017	0.0023	15.3411	0.0362
Aug	10062	0.0001	0.0648	0.0011	28.1380	0.0004	0.0002	0.0008	0.0055	0.2917	1.1716	6.2199	0.0284	2.8150	0.0020	0.0025	16.8785	0.0414
Sep	13491	0.0001	0.0651	0.0011	28.5360	0.0003	0.0002	0.0007	0.0054	0.2835	1.1017	6.3062	0.0284	2.6615	0.0017	0.0023	15.4381	0.0368
Oct	7075	0.0001	0.0644	0.0012	27.7051	0.0005	0.0002	0.0008	0.0057	0.2989	1.2831	6.1268	0.0286	3.0610	0.0023	0.0029	19.1178	0.0461
Nov	3258	0.0001	0.0620	0.0014	25.9481	0.0007	0.0002	0.0011	0.0061	0.3136	1.6921	5.7480	0.0289	3.9628	0.0037	0.0042	27.3473	0.0592
Dec	2426	0.0001	0.0606	0.0016	24.8954	0.0009	0.0002	0.0013	0.0064	0.3229	2.0022	5.5222	0.0294	4.6484	0.0047	0.0052	33.5218	0.0678
Total	97432																	

Location Mouth of Anvil Creek

	Flows (x 1000 m3)	Ag mg/L	Al mg/L	As mg/L	Ca mg/L	Cd mg/L	Cl mg/L	Co mg/L	Cu mg/L	Fe mg/L	K mg/L	Mg mg/L	Mn mg/L	Na mg/L	Ni mg/L	Pb mg/L	SO4 mg/L	Zn mg/L
Jan	4465	0.0001	0.0636	0.0013	27.0965	0.0006	0.0002	0.0010	0.0059	0.3047	1.5102	5.9973	0.0290	3.5643	0.0031	0.0036	23.6020	0.0515
Feb	3268	0.0001	0.0636	0.0014	26.5004	0.0007	0.0002	0.0011	0.0063	0.3249	1.6549	5.8689	0.0293	3.8835	0.0036	0.0041	26.5393	0.0616
Mar	3306	0.0001	0.0643	0.0014	26.2237	0.0007	0.0002	0.0011	0.0066	0.3465	1.7167	5.8092	0.0295	4.0198	0.0038	0.0043	27.8269	0.0706
Apr	6271	0.0001	0.0654	0.0012	27.8640	0.0005	0.0002	0.0009	0.0059	0.3131	1.3267	6.1627	0.0290	3.1595	0.0025	0.0030	19.9456	0.0511
May	55391	0.0001	0.0658	0.0010	29.3343	0.0002	0.0002	0.0006	0.0051	0.2701	0.9667	6.4793	0.0283	2.3654	0.0013	0.0019	12.6574	0.0288
Jun	56976	0.0001	0.0657	0.0010	29.3072	0.0002	0.0002	0.0006	0.0051	0.2694	0.9627	6.4733	0.0283	2.3563	0.0012	0.0018	12.5849	0.0286
Jul	39729	0.0001	0.0656	0.0010	29.2200	0.0002	0.0002	0.0006	0.0051	0.2705	0.9844	6.4545	0.0283	2.4041	0.0013	0.0019	13.0200	0.0294
Aug	27853	0.0001	0.0655	0.0010	29.0687	0.0003	0.0002	0.0007	0.0052	0.2741	1.0116	6.4217	0.0283	2.4639	0.0014	0.0020	13.5809	0.0313
Sep	37441	0.0001	0.0656	0.0010	29.2134	0.0002	0.0002	0.0006	0.0051	0.2711	0.9862	6.4531	0.0283	2.4080	0.0013	0.0019	13.0572	0.0297
Oct	19555	0.0001	0.0654	0.0011	28.9113	0.0003	0.0002	0.0007	0.0052	0.2767	1.0521	6.3878	0.0284	2.5532	0.0015	0.0021	14.3939	0.0330
Nov	8911	0.0001	0.0645	0.0012	28.2618	0.0004	0.0002	0.0008	0.0054	0.2822	1.2030	6.2478	0.0285	2.8858	0.0021	0.0026	17.4302	0.0379
Dec	6590	0.0001	0.0640	0.0012	27.8649	0.0005	0.0002	0.0009	0.0055	0.2857	1.3191	6.1627	0.0287	3.1426	0.0024	0.0030	19.7435	0.0411
Total	269756																	

SF16 - Rose Creek tailings Area - Sensitivity Assessment - Groundwater Capture Efficiency 99 %

Conditions: Future 3

Location: X2

	Flows (x 1000 m3)	Ag mg/L	Al mg/L	As mg/L	Ca mg/L	Cd mg/L	Cl mg/L	Co mg/L	Cu mg/L	Fe mg/L	K mg/L	Mg mg/L	Mn mg/L	Na mg/L	Ni mg/L	Pb mg/L	SO4 mg/L	Zn mg/L
Jan	661	0.0001	0.0603	0.0009	27.0898	0.0002	0.0002	0.0005	0.0046	0.2417	0.8431	5.9825	0.0259	2.0735	0.0010	0.0016	10.7242	0.0234
Feb	483	0.0001	0.0592	0.0009	26.5745	0.0002	0.0002	0.0005	0.0045	0.2371	0.8271	5.8687	0.0254	2.0341	0.0010	0.0015	10.5202	0.0230
Mar	485	0.0001	0.0589	0.0009	26.4674	0.0002	0.0002	0.0005	0.0045	0.2362	0.8238	5.8451	0.0253	2.0259	0.0010	0.0015	10.4778	0.0229
Apr	901	0.0001	0.0630	0.0010	28.2751	0.0002	0.0002	0.0006	0.0048	0.2523	0.8800	6.2443	0.0270	2.1643	0.0011	0.0016	11.1935	0.0245
May	8165	0.0001	0.0647	0.0010	29.0742	0.0002	0.0002	0.0006	0.0049	0.2595	0.9049	6.4208	0.0278	2.2254	0.0011	0.0017	11.5098	0.0251
Jun	8391	0.0001	0.0643	0.0010	28.8696	0.0002	0.0002	0.0006	0.0049	0.2576	0.8985	6.3756	0.0276	2.2098	0.0011	0.0017	11.4288	0.0250
Jul	5833	0.0001	0.0641	0.0010	28.8050	0.0002	0.0002	0.0006	0.0049	0.2571	0.8965	6.3613	0.0275	2.2048	0.0011	0.0017	11.4033	0.0249
Aug	4128	0.0001	0.0633	0.0010	28.4370	0.0002	0.0002	0.0006	0.0048	0.2538	0.8851	6.2801	0.0272	2.1767	0.0011	0.0016	11.2576	0.0246
Sep	5537	0.0001	0.0640	0.0010	28.7549	0.0002	0.0002	0.0006	0.0049	0.2566	0.8950	6.3503	0.0275	2.2010	0.0011	0.0017	11.3834	0.0249
Oct	2894	0.0001	0.0630	0.0010	28.3013	0.0002	0.0002	0.0006	0.0048	0.2526	0.8808	6.2501	0.0271	2.1663	0.0011	0.0016	11.2038	0.0245
Nov	1321	0.0001	0.0616	0.0009	27.6415	0.0002	0.0002	0.0006	0.0047	0.2467	0.8603	6.1044	0.0264	2.1158	0.0010	0.0016	10.9426	0.0239
Dec	977	0.0001	0.0618	0.0009	27.7370	0.0002	0.0002	0.0006	0.0047	0.2475	0.8633	6.1255	0.0265	2.1231	0.0010	0.0016	10.9804	0.0240
Total	39776																	

Location: X14

	Flows (x 1000 m3)	Ag mg/L	Al mg/L	As mg/L	Ca mg/L	Cd mg/L	Cl mg/L	Co mg/L	Cu mg/L	Fe mg/L	K mg/L	Mg mg/L	Mn mg/L	Na mg/L	Ni mg/L	Pb mg/L	SO4 mg/L	Zn mg/L
Jan	1225	0.0001	0.0812	0.0023	23.9613	0.0017	0.0001	0.0021	0.0147	0.8487	3.0681	5.4269	0.0348	6.9996	0.0084	0.0087	148.0450	0.2420
Feb	909	0.0001	0.0903	0.0026	22.7351	0.0020	0.0001	0.0025	0.0185	1.0852	3.5601	5.1871	0.0373	8.0849	0.0101	0.0103	179.4151	0.3232
Mar	925	0.0001	0.1011	0.0027	22.1567	0.0022	0.0001	0.0027	0.0220	1.3147	3.7644	5.0726	0.0394	8.5351	0.0108	0.0110	192.8259	0.3975
Apr	1681	0.0001	0.0886	0.0019	25.5943	0.0013	0.0001	0.0017	0.0152	0.8970	2.4344	5.7480	0.0348	5.6020	0.0063	0.0066	108.3303	0.2464
May	14403	0.0001	0.0686	0.0011	28.8893	0.0003	0.0002	0.0007	0.0063	0.3473	1.0966	6.3915	0.0290	2.6505	0.0017	0.0023	23.2944	0.0548
Jun	14816	0.0001	0.0681	0.0011	28.7676	0.0003	0.0002	0.0007	0.0062	0.3415	1.0811	6.3639	0.0288	2.6151	0.0017	0.0022	22.5452	0.0531
Jul	10338	0.0001	0.0685	0.0011	28.5665	0.0004	0.0002	0.0008	0.0065	0.3590	1.1642	6.3247	0.0290	2.7985	0.0020	0.0025	27.7869	0.0598
Aug	7297	0.0001	0.0700	0.0012	28.1710	0.0004	0.0002	0.0009	0.0073	0.4069	1.2666	6.2441	0.0294	3.0232	0.0023	0.0028	34.5136	0.0766
Sep	9770	0.0001	0.0688	0.0011	28.5554	0.0004	0.0002	0.0008	0.0066	0.3656	1.1705	6.3227	0.0291	2.8124	0.0020	0.0025	28.1867	0.0620
Oct	5136	0.0001	0.0711	0.0013	27.8217	0.0006	0.0002	0.0010	0.0079	0.4462	1.4198	6.1765	0.0299	3.3615	0.0028	0.0033	44.1601	0.0912
Nov	2379	0.0001	0.0722	0.0016	26.3318	0.0009	0.0002	0.0013	0.0097	0.5461	1.9768	5.8825	0.0311	4.5895	0.0047	0.0052	79.4586	0.1315
Dec	1779	0.0001	0.0730	0.0018	25.5753	0.0012	0.0001	0.0016	0.0108	0.6079	2.3954	5.7411	0.0321	5.5151	0.0061	0.0065	105.4250	0.1568
Total	70657																	

Location: Mouth of Rose Creek

	Flows (x 1000 m3)	Ag mg/L	Al mg/L	As mg/L	Ca mg/L	Cd mg/L	Cl mg/L	Co mg/L	Cu mg/L	Fe mg/L	K mg/L	Mg mg/L	Mn mg/L	Na mg/L	Ni mg/L	Pb mg/L	SO4 mg/L	Zn mg/L
Jan	1661	0.0001	0.0772	0.0019	25.4393	0.0013	0.0001	0.0017	0.0122	0.6953	2.5048	5.7178	0.0331	5.7575	0.0065	0.0068	112.2792	0.1853
Feb	1226	0.0001	0.0840	0.0022	24.5105	0.0016	0.0001	0.0020	0.0150	0.8727	2.8771	5.5362	0.0350	6.5788	0.0078	0.0081	136.0135	0.2462
Mar	1245	0.0001	0.0921	0.0023	24.0692	0.0017	0.0001	0.0021	0.0176	1.0446	3.0334	5.4488	0.0366	6.9230	0.0083	0.0086	146.2603	0.3019
Apr	2298	0.0001	0.0825	0.0017	26.6690	0.0010	0.0002	0.0014	0.0124	0.7270	2.0279	5.9596	0.0331	4.7056	0.0049	0.0053	82.3760	0.1871
May	19915	0.0001	0.0679	0.0011	29.0846	0.0003	0.0002	0.0007	0.0060	0.3243	1.0480	6.4314	0.0288	2.5439	0.0015	0.0021	20.0897	0.0467
Jun	20485	0.0001	0.0675	0.0011	28.9966	0.0003	0.0002	0.0007	0.0059	0.3200	1.0368	6.4115	0.0286	2.5183	0.0015	0.0021	19.5460	0.0455
Jul	14291	0.0001	0.0678	0.0011	28.8510	0.0003	0.0002	0.0007	0.0061	0.3327	1.0970	6.3831	0.0288	2.6510	0.0017	0.0023	23.3419	0.0504
Aug	10062	0.0001	0.0689	0.0011	28.5622	0.0004	0.0002	0.0008	0.0067	0.3677	1.1716	6.3242	0.0291	2.8150	0.0020	0.0025	28.2501	0.0626
Sep	13491	0.0001	0.0680	0.0011	28.8421	0.0003	0.0002	0.0007	0.0062	0.3376	1.1017	6.3815	0.0288	2.6615	0.0017	0.0023	23.6437	0.0519
Oct	7075	0.0001	0.0697	0.0012	28.3077	0.0005	0.0002	0.0009	0.0071	0.3963	1.2831	6.2750	0.0294	3.0610	0.0024	0.0029	35.2675	0.0732
Nov	3258	0.0001	0.0705	0.0014	27.2117	0.0007	0.0002	0.0011	0.0084	0.4701	1.6921	6.0587	0.0303	3.9628	0.0037	0.0042	61.1913	0.1029
Dec	2426	0.0001	0.0711	0.0016	26.6473	0.0009	0.0002	0.0013	0.0093	0.5162	2.0022	5.9530	0.0311	4.6484	0.0048	0.0052	80.4342	0.1218
Total	97432																	

Location: Mouth of Anvil Creek

	Flows (x 1000 m3)	Ag mg/L	Al mg/L	As mg/L	Ca mg/L	Cd mg/L	Cl mg/L	Co mg/L	Cu mg/L	Fe mg/L	K mg/L	Mg mg/L	Mn mg/L	Na mg/L	Ni mg/L	Pb mg/L	SO4 mg/L	Zn mg/L
Jan	4465	0.0001	0.0701	0.0013	28.0492	0.0006	0.0002	0.0010	0.0077	0.4245	1.5102	6.2315	0.0301	3.5643	0.0031	0.0036	49.1212	0.0850
Feb	3268	0.0001	0.0727	0.0014	27.6876	0.0007	0.0002	0.0011	0.0088	0.4924	1.6549	6.1608	0.0308	3.8835	0.0036	0.0041	58.3448	0.1083
Mar	3306	0.0001	0.0758	0.0015	27.5135	0.0008	0.0002	0.0012	0.0098	0.5581	1.7167	6.1264	0.0314	4.0198	0.0038	0.0043	62.3961	0.1297
Apr	6271	0.0001	0.0720	0.0012	28.5228	0.0005	0.0002	0.0009	0.0077	0.4337	1.3267	6.3247	0.0301	3.1595	0.0025	0.0030	37.6087	0.0848
May	55391	0.0001	0.0666	0.0010	29.4115	0.0002	0.0002	0.0006	0.0053	0.2857	0.9667	6.4983	0.0285	2.3654	0.0013	0.0019	14.7266	0.0332
Jun	56976	0.0001	0.0665	0.0010	29.3798	0.0002	0.0002	0.0006	0.0053	0.2842	0.9627	6.4911	0.0284	2.3563	0.0012	0.0018	14.5320	0.0327
Jul	39729	0.0001	0.0666	0.0010	29.3274	0.0002	0.0002	0.0006	0.0054	0.2888	0.9844	6.4809	0.0285	2.4041	0.0013	0.0019	15.8978	0.0345
Aug	27853	0.0001	0.0670	0.0011	29.2219	0.0003	0.0002	0.0007	0.0056	0.3015	1.0116	6.4594	0.0286	2.4639	0.0014	0.0020	17.6888	0.0390
Sep	37441	0.0001	0.0667	0.0010	29.3237	0.0002	0.0002	0.0006	0.0054	0.2906	0.9862	6.4802	0.0285	2.4080	0.0013	0.0019	16.0139	0.0351
Oct	19555	0.0001	0.0673	0.0011	29.1293	0.0003	0.0002	0.0007	0.0058	0.3119	1.0521	6.4414	0.0287	2.5532	0.0016	0.0021	20.2367	0.0428
Nov	8911	0.0001	0.0676	0.0012	28.7238	0.0004	0.0002	0.0008	0.0063	0.3394	1.2030	6.3614	0.0290	2.8858	0.0021	0.0026	29.8023	0.0539
Dec	6590	0.0001	0.0678	0.0012	28.5098	0.0005	0.0002	0.0009	0.0066	0.3569	1.3191	6.3213	0.0293	3.1426	0.0025	0.0030	37.0137	0.0610
Total	269756																	

SF17 - Rose Creek Tailings Area - Sensitivity Analysis - Cover Infiltration 5 % of MAP

Conditions Future 1 - SF17

Location X2

	Flows (x 1000 m3)	Ag mg/L	Al mg/L	As mg/L	Ca mg/L	Cd mg/L	Cl mg/L	Co mg/L	Cu mg/L	Fe mg/L	K mg/L	Mg mg/L	Mn mg/L	Na mg/L	Ni mg/L	Pb mg/L	SO4 mg/L	Zn mg/L
Jan	661	0.00009	0.0603	0.0009	27.1	0.00018	0.0	0.0005	0.0046	0.242	0.8	6.0	0.026	2.1	0.0010	0.0016	10.7	0.0234
Feb	483	0.00009	0.0592	0.0009	26.6	0.00018	0.0	0.0005	0.0045	0.237	0.8	5.9	0.025	2.0	0.0010	0.0015	10.5	0.0230
Mar	485	0.00009	0.0589	0.0009	26.5	0.00018	0.0	0.0005	0.0045	0.236	0.8	5.8	0.025	2.0	0.0010	0.0015	10.5	0.0229
Apr	901	0.00010	0.0630	0.0010	28.3	0.00019	0.0	0.0006	0.0048	0.252	0.9	6.2	0.027	2.2	0.0011	0.0016	11.2	0.0245
May	8165	0.00010	0.0647	0.0010	29.1	0.00020	0.0	0.0006	0.0049	0.259	0.9	6.4	0.028	2.2	0.0011	0.0017	11.5	0.0251
Jun	8391	0.00010	0.0643	0.0010	28.9	0.00020	0.0	0.0006	0.0049	0.258	0.9	6.4	0.028	2.2	0.0011	0.0017	11.4	0.0250
Jul	5833	0.00010	0.0641	0.0010	28.8	0.00019	0.0	0.0006	0.0049	0.257	0.9	6.4	0.028	2.2	0.0011	0.0017	11.4	0.0249
Aug	4128	0.00010	0.0633	0.0010	28.4	0.00019	0.0	0.0006	0.0048	0.254	0.9	6.3	0.027	2.2	0.0011	0.0016	11.3	0.0246
Sep	5537	0.00010	0.0640	0.0010	28.8	0.00019	0.0	0.0006	0.0049	0.257	0.9	6.4	0.027	2.2	0.0011	0.0017	11.4	0.0249
Oct	2894	0.00010	0.0630	0.0010	28.3	0.00019	0.0	0.0006	0.0048	0.253	0.9	6.3	0.027	2.2	0.0011	0.0016	11.2	0.0245
Nov	1321	0.00009	0.0616	0.0009	27.6	0.00019	0.0	0.0006	0.0047	0.247	0.9	6.1	0.026	2.1	0.0010	0.0016	10.9	0.0239
Dec	977	0.00009	0.0618	0.0009	27.7	0.00019	0.0	0.0006	0.0047	0.248	0.9	6.1	0.027	2.1	0.0010	0.0016	11.0	0.0240
Total	39776																	

Location X14

	Flows (x 1000 m3)	Ag mg/L	Al mg/L	As mg/L	Ca mg/L	Cd mg/L	Cl mg/L	Co mg/L	Cu mg/L	Fe mg/L	K mg/L	Mg mg/L	Mn mg/L	Na mg/L	Ni mg/L	Pb mg/L	SO4 mg/L	Zn mg/L
Jan	1224	0.00011	0.0809	0.0022	21.3	0.00167	0.0	0.0021	0.0147	0.844	3.0	4.8	0.035	6.9	0.0083	0.0086	76.6	0.2474
Feb	908	0.00011	0.0900	0.0025	19.4	0.00201	0.0	0.0024	0.0184	1.079	3.5	4.4	0.037	8.0	0.0100	0.0102	91.6	0.3305
Mar	925	0.00012	0.1006	0.0027	18.5	0.00216	0.0	0.0026	0.0219	1.306	3.7	4.2	0.039	8.5	0.0107	0.0109	98.1	0.4066
Apr	1681	0.00011	0.0882	0.0019	23.7	0.00125	0.0	0.0017	0.0151	0.891	2.4	5.3	0.035	5.6	0.0062	0.0066	57.8	0.2518
May	14404	0.00010	0.0686	0.0011	28.7	0.00033	0.0	0.0007	0.0063	0.347	1.1	6.3	0.029	2.6	0.0017	0.0023	17.2	0.0555
Jun	14817	0.00010	0.0681	0.0011	28.5	0.00032	0.0	0.0007	0.0062	0.341	1.1	6.3	0.029	2.6	0.0017	0.0022	16.8	0.0538
Jul	10338	0.00010	0.0684	0.0011	28.2	0.00037	0.0	0.0008	0.0065	0.358	1.2	6.2	0.029	2.8	0.0019	0.0025	19.3	0.0607
Aug	7298	0.00010	0.0700	0.0012	27.7	0.00045	0.0	0.0009	0.0073	0.406	1.3	6.1	0.029	3.0	0.0023	0.0028	22.5	0.0779
Sep	9770	0.00010	0.0687	0.0011	28.2	0.00038	0.0	0.0008	0.0066	0.365	1.2	6.2	0.029	2.8	0.0020	0.0025	19.5	0.0629
Oct	5136	0.00010	0.0710	0.0013	27.2	0.00055	0.0	0.0010	0.0079	0.445	1.4	6.0	0.030	3.3	0.0028	0.0033	27.1	0.0928
Nov	2378	0.00010	0.0721	0.0016	25.0	0.00093	0.0	0.0013	0.0097	0.544	2.0	5.6	0.031	4.6	0.0047	0.0051	43.8	0.1341
Dec	1778	0.00010	0.0728	0.0018	23.7	0.00121	0.0	0.0016	0.0108	0.605	2.4	5.3	0.032	5.5	0.0061	0.0064	56.2	0.1600
Total	70657																	

Location Mouth of Rose Creek

	Flows (x 1000 m3)	Ag mg/L	Al mg/L	As mg/L	Ca mg/L	Cd mg/L	Cl mg/L	Co mg/L	Cu mg/L	Fe mg/L	K mg/L	Mg mg/L	Mn mg/L	Na mg/L	Ni mg/L	Pb mg/L	SO4 mg/L	Zn mg/L
Jan	1660	0.00011	0.0770	0.0019	23.4	0.00128	0.0	0.0017	0.0121	0.692	2.5	5.2	0.033	5.7	0.0064	0.0068	59.5	0.1892
Feb	1226	0.00011	0.0837	0.0021	22.0	0.00154	0.0	0.0020	0.0149	0.868	2.9	4.9	0.035	6.5	0.0077	0.0080	70.9	0.2516
Mar	1245	0.00011	0.0917	0.0022	21.4	0.00166	0.0	0.0021	0.0175	1.038	3.0	4.8	0.036	6.9	0.0082	0.0085	75.9	0.3086
Apr	2298	0.00011	0.0822	0.0017	25.3	0.00097	0.0	0.0014	0.0124	0.723	2.0	5.6	0.033	4.7	0.0048	0.0053	45.5	0.1910
May	19916	0.00010	0.0678	0.0011	28.9	0.00029	0.0	0.0007	0.0059	0.324	1.0	6.4	0.029	2.5	0.0015	0.0021	15.7	0.0472
Jun	20486	0.00010	0.0675	0.0011	28.8	0.00028	0.0	0.0007	0.0059	0.320	1.0	6.4	0.029	2.5	0.0015	0.0021	15.4	0.0460
Jul	14291	0.00010	0.0677	0.0011	28.6	0.00033	0.0	0.0007	0.0061	0.332	1.1	6.3	0.029	2.6	0.0017	0.0023	17.2	0.0510
Aug	10062	0.00010	0.0689	0.0011	28.2	0.00038	0.0	0.0008	0.0066	0.367	1.2	6.2	0.029	2.8	0.0020	0.0025	19.5	0.0635
Sep	13492	0.00010	0.0680	0.0011	28.6	0.00033	0.0	0.0007	0.0062	0.337	1.1	6.3	0.029	2.7	0.0017	0.0023	17.4	0.0526
Oct	7075	0.00010	0.0696	0.0012	27.8	0.00045	0.0	0.0009	0.0071	0.395	1.3	6.2	0.029	3.1	0.0023	0.0029	22.9	0.0744
Nov	3257	0.00010	0.0704	0.0014	26.2	0.00073	0.0	0.0011	0.0084	0.468	1.7	5.8	0.030	3.9	0.0037	0.0042	35.2	0.1048
Dec	2425	0.00010	0.0710	0.0016	25.3	0.00094	0.0	0.0013	0.0092	0.514	2.0	5.6	0.031	4.6	0.0047	0.0052	44.3	0.1242
Total	97432																	

Location Mouth of Anvil Creek

	Flows (x 1000 m3)	Ag mg/L	Al mg/L	As mg/L	Ca mg/L	Cd mg/L	Cl mg/L	Co mg/L	Cu mg/L	Fe mg/L	K mg/L	Mg mg/L	Mn mg/L	Na mg/L	Ni mg/L	Pb mg/L	SO4 mg/L	Zn mg/L
Jan	4464	0.00010	0.0700	0.0013	27.3	0.00060	0.0	0.0010	0.0076	0.423	1.5	6.0	0.030	3.5	0.0031	0.0035	29.5	0.0864
Feb	3268	0.00010	0.0726	0.0014	26.8	0.00070	0.0	0.0011	0.0087	0.490	1.6	5.9	0.031	3.9	0.0036	0.0041	33.9	0.1104
Mar	3306	0.00011	0.0756	0.0015	26.5	0.00075	0.0	0.0012	0.0097	0.556	1.7	5.9	0.031	4.0	0.0038	0.0043	35.9	0.1322
Apr	6271	0.00010	0.0719	0.0012	28.0	0.00048	0.0	0.0009	0.0077	0.432	1.3	6.2	0.030	3.1	0.0025	0.0030	24.1	0.0862
May	55392	0.00010	0.0666	0.0010	29.4	0.00023	0.0	0.0006	0.0053	0.286	1.0	6.5	0.028	2.4	0.0013	0.0018	13.1	0.0334
Jun	56977	0.00010	0.0665	0.0010	29.3	0.00023	0.0	0.0006	0.0053	0.284	1.0	6.5	0.028	2.4	0.0012	0.0018	13.0	0.0329
Jul	39730	0.00010	0.0666	0.0010	29.2	0.00025	0.0	0.0006	0.0054	0.289	1.0	6.5	0.028	2.4	0.0013	0.0019	13.7	0.0347
Aug	27853	0.00010	0.0670	0.0011	29.1	0.00026	0.0	0.0007	0.0056	0.301	1.0	6.4	0.029	2.5	0.0014	0.0020	14.5	0.0393
Sep	37442	0.00010	0.0666	0.0010	29.2	0.00025	0.0	0.0006	0.0054	0.290	1.0	6.5	0.028	2.4	0.0013	0.0019	13.7	0.0353
Oct	19555	0.00010	0.0672	0.0011	29.0	0.00029	0.0	0.0007	0.0058	0.311	1.1	6.4	0.029	2.5	0.0015	0.0021	15.8	0.0432
Nov	8910	0.00010	0.0676	0.0012	28.4	0.00039	0.0	0.0008	0.0062	0.339	1.2	6.3	0.029	2.9	0.0021	0.0026	20.3	0.0545
Dec	6588	0.00010	0.0678	0.0012	28.0	0.00047	0.0	0.0009	0.0066	0.356	1.3	6.2	0.029	3.1	0.0024	0.0030	23.7	0.0619
Total	269756																	

SF17 - Rose Creek Tailings Area - Sensitivity Analysis - Cover Infiltration 5 % of MAP
Summary Tables
Conditions **Future 2 - SF17**

Location X2

	Flows (x 1000 m3)	Ag mg/L	Al mg/L	As mg/L	Ca mg/L	Cd mg/L	Cl mg/L	Co mg/L	Cu mg/L	Fe mg/L	K mg/L	Mg mg/L	Mn mg/L	Na mg/L	Ni mg/L	Pb mg/L	SO4 mg/L	Zn mg/L
Jan	661	0.00009	0.0603	0.0009	27.1	0.00018	0.0	0.0005	0.0046	0.242	0.8	6.0	0.026	2.1	0.0010	0.0016	10.7	0.0234
Feb	483	0.00009	0.0592	0.0009	26.6	0.00018	0.0	0.0005	0.0045	0.237	0.8	5.9	0.025	2.0	0.0010	0.0015	10.5	0.0230
Mar	485	0.00009	0.0589	0.0009	26.5	0.00018	0.0	0.0005	0.0045	0.236	0.8	5.8	0.025	2.0	0.0010	0.0015	10.5	0.0229
Apr	901	0.00010	0.0630	0.0010	28.3	0.00019	0.0	0.0006	0.0048	0.252	0.9	6.2	0.027	2.2	0.0011	0.0016	11.2	0.0245
May	8165	0.00010	0.0647	0.0010	29.1	0.00020	0.0	0.0006	0.0049	0.259	0.9	6.4	0.028	2.2	0.0011	0.0017	11.5	0.0251
Jun	8391	0.00010	0.0643	0.0010	28.9	0.00020	0.0	0.0006	0.0049	0.258	0.9	6.4	0.028	2.2	0.0011	0.0017	11.4	0.0250
Jul	5833	0.00010	0.0641	0.0010	28.8	0.00019	0.0	0.0006	0.0049	0.257	0.9	6.4	0.028	2.2	0.0011	0.0017	11.4	0.0249
Aug	4128	0.00010	0.0633	0.0010	28.4	0.00019	0.0	0.0006	0.0048	0.254	0.9	6.3	0.027	2.2	0.0011	0.0016	11.3	0.0246
Sep	5537	0.00010	0.0640	0.0010	28.8	0.00019	0.0	0.0006	0.0049	0.257	0.9	6.4	0.027	2.2	0.0011	0.0017	11.4	0.0249
Oct	2894	0.00010	0.0630	0.0010	28.3	0.00019	0.0	0.0006	0.0048	0.253	0.9	6.3	0.027	2.2	0.0011	0.0016	11.2	0.0245
Nov	1321	0.00009	0.0616	0.0009	27.6	0.00019	0.0	0.0006	0.0047	0.247	0.9	6.1	0.026	2.1	0.0010	0.0016	10.9	0.0239
Dec	977	0.00009	0.0618	0.0009	27.7	0.00019	0.0	0.0006	0.0047	0.248	0.9	6.1	0.027	2.1	0.0010	0.0016	11.0	0.0240
Total	39776																	

Location X14

	Flows (x 1000 m3)	Ag mg/L	Al mg/L	As mg/L	Ca mg/L	Cd mg/L	Cl mg/L	Co mg/L	Cu mg/L	Fe mg/L	K mg/L	Mg mg/L	Mn mg/L	Na mg/L	Ni mg/L	Pb mg/L	SO4 mg/L	Zn mg/L
Jan	1224	0.00012	0.0981	0.0023	22.5	0.00169	0.0	0.0022	0.0194	1.160	3.0	5.1	0.038	6.9	0.0084	0.0086	105.6	0.3839
Feb	908	0.00013	0.1136	0.0026	20.9	0.00204	0.0	0.0026	0.0249	1.515	3.5	4.7	0.041	8.0	0.0101	0.0102	127.4	0.5188
Mar	925	0.00013	0.1303	0.0028	20.2	0.00219	0.0	0.0028	0.0300	1.853	3.7	4.6	0.044	8.5	0.0108	0.0109	136.8	0.6427
Apr	1681	0.00012	0.1059	0.0020	24.6	0.00127	0.0	0.0018	0.0199	1.217	2.4	5.5	0.038	5.6	0.0063	0.0066	78.5	0.3923
May	14404	0.00010	0.0709	0.0011	28.8	0.00033	0.0	0.0007	0.0070	0.390	1.1	6.4	0.029	2.6	0.0017	0.0023	19.7	0.0742
Jun	14817	0.00010	0.0703	0.0011	28.6	0.00032	0.0	0.0007	0.0068	0.382	1.1	6.3	0.029	2.6	0.0017	0.0022	19.2	0.0715
Jul	10338	0.00010	0.0712	0.0011	28.4	0.00038	0.0	0.0008	0.0073	0.409	1.2	6.3	0.029	2.8	0.0020	0.0025	22.8	0.0826
Aug	7298	0.00010	0.0741	0.0012	27.9	0.00045	0.0	0.0009	0.0084	0.481	1.3	6.2	0.030	3.0	0.0023	0.0028	27.4	0.1106
Sep	9770	0.00010	0.0717	0.0012	28.4	0.00038	0.0	0.0008	0.0074	0.419	1.2	6.3	0.030	2.8	0.0020	0.0025	23.1	0.0862
Oct	5136	0.00010	0.0763	0.0013	27.5	0.00056	0.0	0.0010	0.0094	0.542	1.4	6.1	0.031	3.3	0.0028	0.0033	34.1	0.1347
Nov	2378	0.00011	0.0805	0.0016	25.6	0.00094	0.0	0.0014	0.0120	0.699	2.0	5.7	0.032	4.6	0.0047	0.0051	58.3	0.2010
Dec	1778	0.00011	0.0832	0.0019	24.6	0.00122	0.0	0.0017	0.0136	0.796	2.4	5.5	0.034	5.5	0.0061	0.0065	76.2	0.2424
Total	70657																	

Location Mouth of Rose Creek

	Flows (x 1000 m3)	Ag mg/L	Al mg/L	As mg/L	Ca mg/L	Cd mg/L	Cl mg/L	Co mg/L	Cu mg/L	Fe mg/L	K mg/L	Mg mg/L	Mn mg/L	Na mg/L	Ni mg/L	Pb mg/L	SO4 mg/L	Zn mg/L
Jan	1660	0.00011	0.0896	0.0020	24.4	0.00130	0.0	0.0018	0.0156	0.925	2.5	5.5	0.035	5.7	0.0065	0.0068	81.0	0.2898
Feb	1226	0.00012	0.1013	0.0022	23.2	0.00156	0.0	0.0021	0.0197	1.191	2.9	5.2	0.038	6.5	0.0077	0.0080	97.4	0.3911
Mar	1245	0.00013	0.1137	0.0023	22.6	0.00168	0.0	0.0022	0.0236	1.444	3.0	5.1	0.040	6.9	0.0083	0.0085	104.6	0.4841
Apr	2298	0.00011	0.0951	0.0017	25.9	0.00098	0.0	0.0015	0.0159	0.961	2.0	5.8	0.035	4.7	0.0049	0.0053	60.6	0.2938
May	19916	0.00010	0.0695	0.0011	29.0	0.00029	0.0	0.0007	0.0064	0.355	1.0	6.4	0.029	2.5	0.0015	0.0021	17.5	0.0608
Jun	20486	0.00010	0.0691	0.0011	28.9	0.00029	0.0	0.0007	0.0063	0.349	1.0	6.4	0.029	2.5	0.0015	0.0021	17.1	0.0588
Jul	14291	0.00010	0.0697	0.0011	28.7	0.00033	0.0	0.0007	0.0066	0.369	1.1	6.4	0.029	2.6	0.0017	0.0023	19.7	0.0669
Aug	10062	0.00010	0.0718	0.0012	28.4	0.00038	0.0	0.0008	0.0075	0.422	1.2	6.3	0.030	2.8	0.0020	0.0025	23.1	0.0873
Sep	13492	0.00010	0.0701	0.0011	28.7	0.00033	0.0	0.0007	0.0067	0.376	1.1	6.3	0.029	2.7	0.0017	0.0023	19.9	0.0695
Oct	7075	0.00010	0.0734	0.0012	28.1	0.00046	0.0	0.0009	0.0082	0.466	1.3	6.2	0.030	3.1	0.0024	0.0029	27.9	0.1048
Nov	3257	0.00011	0.0766	0.0015	26.7	0.00074	0.0	0.0012	0.0101	0.582	1.7	5.9	0.031	3.9	0.0037	0.0042	45.7	0.1537
Dec	2425	0.00011	0.0786	0.0016	25.9	0.00095	0.0	0.0014	0.0113	0.654	2.0	5.8	0.032	4.6	0.0048	0.0052	59.0	0.1846
Total	97432																	

Location Mouth of Anvil Creek

	Flows (x 1000 m3)	Ag mg/L	Al mg/L	As mg/L	Ca mg/L	Cd mg/L	Cl mg/L	Co mg/L	Cu mg/L	Fe mg/L	K mg/L	Mg mg/L	Mn mg/L	Na mg/L	Ni mg/L	Pb mg/L	SO4 mg/L	Zn mg/L
Jan	4464	0.00010	0.0747	0.0014	27.7	0.00061	0.0	0.0010	0.0089	0.510	1.5	6.1	0.031	3.5	0.0031	0.0036	37.5	0.1239
Feb	3268	0.00011	0.0792	0.0014	27.2	0.00071	0.0	0.0011	0.0105	0.612	1.6	6.0	0.032	3.9	0.0036	0.0041	43.9	0.1627
Mar	3306	0.00011	0.0839	0.0015	27.0	0.00076	0.0	0.0012	0.0120	0.709	1.7	6.0	0.033	4.0	0.0038	0.0043	46.7	0.1983
Apr	6271	0.00011	0.0766	0.0013	28.2	0.00049	0.0	0.0009	0.0080	0.520	1.3	6.3	0.031	3.1	0.0025	0.0030	29.6	0.1239
May	55392	0.00010	0.0672	0.0010	29.4	0.00023	0.0	0.0006	0.0055	0.297	1.0	6.5	0.029	2.4	0.0013	0.0019	13.8	0.0382
Jun	56977	0.00010	0.0670	0.0010	29.3	0.00023	0.0	0.0006	0.0055	0.295	1.0	6.5	0.029	2.4	0.0013	0.0018	13.7	0.0375
Jul	39730	0.00010	0.0673	0.0010	29.3	0.00025	0.0	0.0006	0.0056	0.302	1.0	6.5	0.029	2.4	0.0013	0.0019	14.6	0.0404
Aug	27853	0.00010	0.0680	0.0011	29.2	0.00027	0.0	0.0007	0.0059	0.321	1.0	6.4	0.029	2.5	0.0014	0.0020	15.8	0.0479
Sep	37442	0.00010	0.0674	0.0010	29.3	0.00025	0.0	0.0007	0.0056	0.304	1.0	6.5	0.029	2.4	0.0013	0.0019	14.7	0.0414
Oct	19555	0.00010	0.0686	0.0011	29.0	0.00029	0.0	0.0007	0.0061	0.337	1.1	6.4	0.029	2.5	0.0016	0.0021	17.6	0.0542
Nov	8910	0.00010	0.0698	0.0012	28.5	0.00040	0.0	0.0008	0.0069	0.380	1.2	6.3	0.029	2.9	0.0021	0.0026	24.1	0.0724
Dec	6588	0.00010	0.0706	0.0012	28.2	0.00047	0.0	0.0009	0.0073	0.408	1.3	6.3	0.030	3.1	0.0024	0.0030	29.1	0.0841
Total	269756																	

SF17 - Rose Creek Tailings Area - Sensitivity Analysis - Cover Infiltration 5 % of MAP
Summary Tables

Conditions: Future 3 - SF17

Location: X2

	Flows (x 1000 m3)	Ag mg/L	Al mg/L	As mg/L	Ca mg/L	Cd mg/L	Cl mg/L	Co mg/L	Cu mg/L	Fe mg/L	K mg/L	Mg mg/L	Mn mg/L	Na mg/L	Ni mg/L	Pb mg/L	SO4 mg/L	Zn mg/L
Jan	661	0.00009	0.0503	0.0009	27.1	0.00018	0.0	0.0005	0.0046	0.242	0.8	6.0	0.026	2.1	0.0010	0.0016	10.7	0.0234
Feb	483	0.00009	0.0592	0.0009	26.6	0.00018	0.0	0.0005	0.0045	0.237	0.8	5.9	0.025	2.0	0.0010	0.0015	10.5	0.0230
Mar	485	0.00009	0.0589	0.0009	26.5	0.00018	0.0	0.0005	0.0045	0.236	0.8	5.8	0.025	2.0	0.0010	0.0015	10.5	0.0229
Apr	901	0.00010	0.0630	0.0010	28.3	0.00019	0.0	0.0006	0.0048	0.252	0.9	6.2	0.027	2.2	0.0011	0.0016	11.2	0.0245
May	8165	0.00010	0.0647	0.0010	29.1	0.00020	0.0	0.0006	0.0049	0.259	0.9	6.4	0.028	2.2	0.0011	0.0017	11.5	0.0251
Jun	8391	0.00010	0.0643	0.0010	28.9	0.00020	0.0	0.0006	0.0049	0.258	0.9	6.4	0.028	2.2	0.0011	0.0017	11.4	0.0250
Jul	5833	0.00010	0.0641	0.0010	28.8	0.00019	0.0	0.0006	0.0049	0.257	0.9	6.4	0.028	2.2	0.0011	0.0017	11.4	0.0249
Aug	4128	0.00010	0.0633	0.0010	28.4	0.00019	0.0	0.0006	0.0048	0.254	0.9	6.3	0.027	2.2	0.0011	0.0016	11.3	0.0246
Sep	5537	0.00010	0.0640	0.0010	28.8	0.00019	0.0	0.0006	0.0049	0.257	0.9	6.4	0.027	2.2	0.0011	0.0017	11.4	0.0249
Oct	2894	0.00010	0.0630	0.0010	28.3	0.00019	0.0	0.0006	0.0048	0.253	0.9	6.3	0.027	2.2	0.0011	0.0016	11.2	0.0245
Nov	1321	0.00009	0.0616	0.0009	27.6	0.00019	0.0	0.0006	0.0047	0.247	0.9	6.1	0.026	2.1	0.0010	0.0016	10.9	0.0239
Dec	977	0.00009	0.0618	0.0009	27.7	0.00019	0.0	0.0006	0.0047	0.248	0.9	6.1	0.027	2.1	0.0010	0.0016	11.0	0.0240
Total	39776																	

Location: X14

	Flows (x 1000 m3)	Ag mg/L	Al mg/L	As mg/L	Ca mg/L	Cd mg/L	Cl mg/L	Co mg/L	Cu mg/L	Fe mg/L	K mg/L	Mg mg/L	Mn mg/L	Na mg/L	Ni mg/L	Pb mg/L	SO4 mg/L	Zn mg/L
Jan	1224	0.00016	0.1905	0.0026	29.3	0.00160	0.0	0.0027	0.0447	2.865	3.0	6.7	0.053	6.9	0.0087	0.0087	284.7	0.8857
Feb	908	0.00019	0.2412	0.0030	29.3	0.00219	0.0	0.0033	0.0598	3.866	3.5	6.8	0.062	8.0	0.0105	0.0104	347.9	1.2109
Mar	925	0.00021	0.2903	0.0033	29.2	0.00238	0.0	0.0037	0.0739	4.803	3.7	6.8	0.071	8.5	0.0114	0.0111	375.2	1.5110
Apr	1681	0.00016	0.2011	0.0022	29.4	0.00138	0.0	0.0023	0.0460	2.973	2.4	6.7	0.053	5.6	0.0066	0.0067	205.9	0.9092
May	14404	0.00011	0.0836	0.0011	29.3	0.00034	0.0	0.0008	0.0104	0.624	1.1	6.5	0.031	2.6	0.0018	0.0023	35.1	0.1431
Jun	14817	0.00011	0.0823	0.0011	29.2	0.00033	0.0	0.0008	0.0101	0.603	1.1	6.5	0.031	2.6	0.0017	0.0022	33.7	0.1367
Jul	10338	0.00011	0.0861	0.0012	29.2	0.00039	0.0	0.0009	0.0113	0.683	1.2	6.5	0.032	2.8	0.0020	0.0025	44.1	0.1634
Aug	7298	0.00011	0.0963	0.0013	29.1	0.00048	0.0	0.0010	0.0145	0.890	1.3	6.5	0.034	3.0	0.0024	0.0029	57.7	0.2310
Sep	9770	0.00011	0.0875	0.0012	29.2	0.00040	0.0	0.0009	0.0117	0.710	1.2	6.5	0.032	2.8	0.0020	0.0025	45.0	0.1720
Oct	5136	0.00012	0.1046	0.0014	29.1	0.00059	0.0	0.0011	0.0171	1.065	1.4	6.5	0.035	3.3	0.0029	0.0034	77.0	0.2886
Nov	2378	0.00013	0.1259	0.0018	29.0	0.00099	0.0	0.0016	0.0244	1.535	2.0	6.5	0.040	4.6	0.0049	0.0052	147.5	0.4471
Dec	1778	0.00014	0.1391	0.0020	29.2	0.00128	0.0	0.0020	0.0289	1.826	2.4	6.6	0.043	5.5	0.0063	0.0065	199.2	0.5454
Total	70657																	

Location: Mouth of Rose Creek

	Flows (x 1000 m3)	Ag mg/L	Al mg/L	As mg/L	Ca mg/L	Cd mg/L	Cl mg/L	Co mg/L	Cu mg/L	Fe mg/L	K mg/L	Mg mg/L	Mn mg/L	Na mg/L	Ni mg/L	Pb mg/L	SO4 mg/L	Zn mg/L
Jan	1660	0.00014	0.1578	0.0022	29.4	0.00138	0.0	0.0021	0.0343	2.182	2.5	6.7	0.046	5.7	0.0067	0.0069	213.1	0.6599
Feb	1226	0.00016	0.1958	0.0025	29.4	0.00167	0.0	0.0026	0.0456	2.934	2.9	6.7	0.053	6.5	0.0081	0.0081	260.8	0.9040
Mar	1245	0.00018	0.2326	0.0027	29.3	0.00182	0.0	0.0029	0.0562	3.636	3.0	6.7	0.060	6.9	0.0087	0.0087	281.8	1.1291
Apr	2298	0.00015	0.1648	0.0019	29.4	0.00106	0.0	0.0019	0.0350	2.246	2.0	6.6	0.047	4.7	0.0051	0.0054	153.7	0.6719
May	19916	0.00011	0.0787	0.0011	29.4	0.00030	0.0	0.0008	0.0089	0.524	1.0	6.5	0.031	2.5	0.0016	0.0021	28.6	0.1106
Jun	20486	0.00011	0.0778	0.0011	29.3	0.00030	0.0	0.0007	0.0087	0.510	1.0	6.5	0.030	2.5	0.0015	0.0021	27.6	0.1060
Jul	14291	0.00011	0.0805	0.0011	29.3	0.00034	0.0	0.0008	0.0096	0.567	1.1	6.5	0.031	2.6	0.0018	0.0023	35.2	0.1253
Aug	10062	0.00011	0.0879	0.0012	29.2	0.00040	0.0	0.0009	0.0119	0.718	1.2	6.5	0.032	2.8	0.0020	0.0025	45.1	0.1746
Sep	13492	0.00011	0.0815	0.0011	29.3	0.00034	0.0	0.0008	0.0099	0.587	1.1	6.5	0.031	2.7	0.0018	0.0023	35.8	0.1316
Oct	7075	0.00011	0.0940	0.0013	29.2	0.00048	0.0	0.0010	0.0138	0.845	1.3	6.5	0.033	3.1	0.0024	0.0029	59.1	0.2165
Nov	3257	0.00012	0.1097	0.0016	29.1	0.00078	0.0	0.0013	0.0192	1.192	1.7	6.5	0.037	3.9	0.0038	0.0042	110.9	0.3334
Dec	2425	0.00013	0.1195	0.0018	29.3	0.00099	0.0	0.0016	0.0225	1.409	2.0	6.6	0.039	4.6	0.0049	0.0052	149.2	0.4067
Total	97432																	

Location: Mouth of Anvil Creek

	Flows (x 1000 m3)	Ag mg/L	Al mg/L	As mg/L	Ca mg/L	Cd mg/L	Cl mg/L	Co mg/L	Cu mg/L	Fe mg/L	K mg/L	Mg mg/L	Mn mg/L	Na mg/L	Ni mg/L	Pb mg/L	SO4 mg/L	Zn mg/L
Jan	4464	0.00012	0.1001	0.0014	29.5	0.00064	0.0	0.0012	0.0159	0.977	1.5	6.6	0.035	3.5	0.0032	0.0036	86.6	0.2615
Feb	3268	0.00012	0.1146	0.0016	29.5	0.00075	0.0	0.0013	0.0202	1.265	1.6	6.6	0.038	3.9	0.0037	0.0041	105.1	0.3550
Mar	3306	0.00013	0.1287	0.0016	29.5	0.00081	0.0	0.0015	0.0243	1.534	1.7	6.6	0.040	4.0	0.0040	0.0043	113.4	0.4413
Apr	6271	0.00012	0.1022	0.0013	29.5	0.00052	0.0	0.0011	0.0160	0.990	1.3	6.6	0.035	3.1	0.0026	0.0030	63.8	0.2624
May	55392	0.00010	0.0705	0.0010	29.5	0.00024	0.0	0.0007	0.0064	0.358	1.0	6.5	0.029	2.4	0.0013	0.0019	17.8	0.0562
Jun	56977	0.00010	0.0702	0.0010	29.5	0.00023	0.0	0.0007	0.0063	0.352	1.0	6.5	0.029	2.4	0.0013	0.0018	17.4	0.0545
Jul	39730	0.00010	0.0711	0.0010	29.5	0.00025	0.0	0.0007	0.0067	0.373	1.0	6.5	0.029	2.4	0.0013	0.0019	20.2	0.0615
Aug	27853	0.00010	0.0739	0.0011	29.5	0.00027	0.0	0.0007	0.0075	0.428	1.0	6.5	0.030	2.5	0.0014	0.0020	23.8	0.0794
Sep	37442	0.00010	0.0715	0.0011	29.5	0.00025	0.0	0.0007	0.0068	0.381	1.0	6.5	0.029	2.4	0.0013	0.0019	20.4	0.0636
Oct	19555	0.00010	0.0761	0.0011	29.5	0.00030	0.0	0.0007	0.0082	0.474	1.1	6.5	0.030	2.5	0.0016	0.0021	28.9	0.0947
Nov	8910	0.00011	0.0819	0.0012	29.4	0.00041	0.0	0.0009	0.0102	0.603	1.2	6.5	0.031	2.9	0.0021	0.0026	48.0	0.1381
Dec	6588	0.00011	0.0856	0.0013	29.5	0.00049	0.0	0.0010	0.0115	0.685	1.3	6.6	0.032	3.1	0.0025	0.0030	62.3	0.1659
Total	269756																	

SF18 - Rose Creek Tailings Area - Sensitivity Analysis - Cover Infiltration 20 % of MAF

Conditions: Future 1 - SF18

Location: X2

	Flows (x 1000 m3)	Ag mg/L	Al mg/L	As mg/L	Ca mg/L	Cd mg/L	Cl mg/L	Co mg/L	Cu mg/L	Fe mg/L	K mg/L	Mg mg/L	Mn mg/L	Na mg/L	Ni mg/L	Pb mg/L	SO4 mg/L	Zn mg/L
Jan	661	0.00009	0.0603	0.0009	27.1	0.00018	0.0	0.0005	0.0046	0.242	0.8	6.0	0.026	2.1	0.0010	0.0016	10.7	0.0234
Feb	483	0.00009	0.0592	0.0009	26.6	0.00018	0.0	0.0005	0.0045	0.237	0.8	5.9	0.025	2.0	0.0010	0.0015	10.5	0.0230
Mar	485	0.00009	0.0589	0.0009	26.5	0.00018	0.0	0.0005	0.0045	0.236	0.8	5.8	0.025	2.0	0.0010	0.0015	10.5	0.0229
Apr	901	0.00010	0.0630	0.0010	28.3	0.00019	0.0	0.0006	0.0048	0.252	0.9	6.2	0.027	2.2	0.0011	0.0016	11.2	0.0245
May	8165	0.00010	0.0647	0.0010	29.1	0.00020	0.0	0.0006	0.0049	0.259	0.9	6.4	0.028	2.2	0.0011	0.0017	11.5	0.0251
Jun	8391	0.00010	0.0643	0.0010	28.9	0.00020	0.0	0.0006	0.0049	0.258	0.9	6.4	0.028	2.2	0.0011	0.0017	11.4	0.0250
Jul	5833	0.00010	0.0641	0.0010	28.8	0.00019	0.0	0.0006	0.0049	0.257	0.9	6.4	0.028	2.2	0.0011	0.0017	11.4	0.0249
Aug	4128	0.00010	0.0633	0.0010	28.4	0.00019	0.0	0.0006	0.0048	0.254	0.8	6.3	0.027	2.2	0.0011	0.0016	11.3	0.0246
Sep	5537	0.00010	0.0640	0.0010	28.6	0.00019	0.0	0.0006	0.0049	0.257	0.9	6.4	0.027	2.2	0.0011	0.0017	11.4	0.0249
Oct	2894	0.00010	0.0630	0.0010	28.3	0.00019	0.0	0.0006	0.0048	0.253	0.9	6.3	0.027	2.2	0.0011	0.0016	11.2	0.0245
Nov	1321	0.00009	0.0616	0.0009	27.6	0.00019	0.0	0.0006	0.0047	0.247	0.9	6.1	0.026	2.1	0.0010	0.0016	10.9	0.0239
Dec	977	0.00009	0.0618	0.0009	27.7	0.00019	0.0	0.0006	0.0047	0.248	0.9	6.1	0.027	2.1	0.0010	0.0016	11.0	0.0240
Total	39776																	

Location: X14

	Flows (x 1000 m3)	Ag mg/L	Al mg/L	As mg/L	Ca mg/L	Cd mg/L	Cl mg/L	Co mg/L	Cu mg/L	Fe mg/L	K mg/L	Mg mg/L	Mn mg/L	Na mg/L	Ni mg/L	Pb mg/L	SO4 mg/L	Zn mg/L
Jan	1224	0.00010	0.0531	0.0022	19.2	0.00164	0.0	0.0019	0.0070	0.332	3.0	4.3	0.030	6.9	0.0082	0.0086	23.5	0.0895
Feb	908	0.00010	0.0516	0.0024	16.9	0.00196	0.0	0.0022	0.0079	0.372	3.5	3.8	0.031	8.0	0.0098	0.0101	26.2	0.1127
Mar	925	0.00010	0.0525	0.0025	15.8	0.00210	0.0	0.0024	0.0087	0.420	3.7	3.5	0.031	8.5	0.0105	0.0108	27.4	0.1333
Apr	1681	0.00010	0.0596	0.0018	22.2	0.00121	0.0	0.0015	0.0072	0.364	2.4	4.9	0.030	5.6	0.0061	0.0065	20.1	0.0891
May	14404	0.00010	0.0648	0.0011	28.5	0.00032	0.0	0.0007	0.0053	0.276	1.1	6.3	0.028	2.6	0.0017	0.0023	12.6	0.0338
Jun	14817	0.00010	0.0645	0.0011	28.4	0.00031	0.0	0.0007	0.0052	0.274	1.1	6.3	0.028	2.6	0.0017	0.0022	12.5	0.0332
Jul	10338	0.00010	0.0639	0.0011	28.0	0.00037	0.0	0.0008	0.0053	0.276	1.2	6.2	0.028	2.8	0.0019	0.0025	13.0	0.0353
Aug	7298	0.00010	0.0633	0.0012	27.4	0.00044	0.0	0.0008	0.0054	0.283	1.3	6.0	0.028	3.0	0.0023	0.0028	13.5	0.0400
Sep	9770	0.00010	0.0640	0.0011	28.0	0.00037	0.0	0.0008	0.0053	0.277	1.2	6.2	0.028	2.8	0.0020	0.0025	13.0	0.0359
Oct	5136	0.00010	0.0625	0.0013	26.7	0.00054	0.0	0.0009	0.0056	0.287	1.4	5.9	0.028	3.3	0.0028	0.0033	14.4	0.0443
Nov	2378	0.00010	0.0585	0.0016	24.0	0.00091	0.0	0.0013	0.0059	0.293	2.0	5.3	0.029	4.6	0.0046	0.0051	17.4	0.0566
Dec	1778	0.00010	0.0561	0.0018	22.3	0.00119	0.0	0.0015	0.0062	0.296	2.4	4.9	0.029	5.5	0.0060	0.0064	19.7	0.0646
Total	70657																	

Location: Mouth of Rose Creek

	Flows (x 1000 m3)	Ag mg/L	Al mg/L	As mg/L	Ca mg/L	Cd mg/L	Cl mg/L	Co mg/L	Cu mg/L	Fe mg/L	K mg/L	Mg mg/L	Mn mg/L	Na mg/L	Ni mg/L	Pb mg/L	SO4 mg/L	Zn mg/L
Jan	1660	0.00010	0.0565	0.0019	21.9	0.00126	0.0	0.0016	0.0065	0.314	2.5	4.9	0.030	5.7	0.0064	0.0068	20.4	0.0727
Feb	1226	0.00010	0.0553	0.0021	20.2	0.00151	0.0	0.0018	0.0071	0.344	2.9	4.5	0.030	6.5	0.0076	0.0080	22.5	0.0901
Mar	1245	0.00010	0.0560	0.0021	19.4	0.00161	0.0	0.0019	0.0077	0.380	3.0	4.3	0.030	6.9	0.0081	0.0085	23.4	0.1056
Apr	2298	0.00010	0.0613	0.0016	24.2	0.00094	0.0	0.0013	0.0066	0.337	2.0	5.4	0.030	4.7	0.0048	0.0052	17.8	0.0720
May	19916	0.00010	0.0651	0.0011	28.8	0.00029	0.0	0.0007	0.0052	0.273	1.0	6.4	0.028	2.5	0.0015	0.0021	12.4	0.0315
Jun	20486	0.00010	0.0649	0.0011	28.7	0.00028	0.0	0.0007	0.0052	0.271	1.0	6.3	0.028	2.5	0.0015	0.0021	12.3	0.0311
Jul	14291	0.00010	0.0645	0.0011	28.4	0.00032	0.0	0.0007	0.0052	0.273	1.1	6.3	0.028	2.6	0.0017	0.0023	12.6	0.0326
Aug	10062	0.00010	0.0640	0.0011	28.0	0.00037	0.0	0.0008	0.0053	0.278	1.2	6.2	0.028	2.8	0.0020	0.0025	13.0	0.0360
Sep	13492	0.00010	0.0645	0.0011	28.4	0.00032	0.0	0.0007	0.0052	0.274	1.1	6.3	0.028	2.7	0.0017	0.0023	12.7	0.0330
Oct	7075	0.00010	0.0634	0.0012	27.5	0.00045	0.0	0.0008	0.0054	0.281	1.3	6.1	0.028	3.1	0.0023	0.0029	13.6	0.0392
Nov	3257	0.00010	0.0605	0.0014	25.5	0.00072	0.0	0.0011	0.0057	0.285	1.7	5.6	0.029	3.9	0.0037	0.0042	15.9	0.0482
Dec	2425	0.00010	0.0587	0.0016	24.3	0.00092	0.0	0.0013	0.0059	0.287	2.0	5.4	0.029	4.6	0.0047	0.0052	17.6	0.0542
Total	97432																	

Location: Mouth of Anvil Creek

	Flows (x 1000 m3)	Ag mg/L	Al mg/L	As mg/L	Ca mg/L	Cd mg/L	Cl mg/L	Co mg/L	Cu mg/L	Fe mg/L	K mg/L	Mg mg/L	Mn mg/L	Na mg/L	Ni mg/L	Pb mg/L	SO4 mg/L	Zn mg/L
Jan	4464	0.00010	0.0624	0.0013	26.7	0.00059	0.0	0.0010	0.0056	0.283	1.5	5.9	0.029	3.5	0.0031	0.0036	14.9	0.0431
Feb	3268	0.00010	0.0619	0.0014	26.1	0.00069	0.0	0.0011	0.0058	0.294	1.6	5.8	0.029	3.9	0.0035	0.0040	15.7	0.0498
Mar	3306	0.00010	0.0622	0.0014	25.7	0.00073	0.0	0.0011	0.0060	0.308	1.7	5.7	0.029	4.0	0.0037	0.0042	16.1	0.0557
Apr	6271	0.00010	0.0642	0.0012	27.6	0.00047	0.0	0.0009	0.0056	0.291	1.3	6.1	0.029	3.1	0.0024	0.0030	14.0	0.0426
May	55392	0.00010	0.0656	0.0010	29.3	0.00023	0.0	0.0006	0.0051	0.267	1.0	6.5	0.028	2.4	0.0013	0.0018	12.0	0.0277
Jun	56977	0.00010	0.0655	0.0010	29.3	0.00023	0.0	0.0006	0.0051	0.267	1.0	6.5	0.028	2.4	0.0012	0.0018	11.9	0.0276
Jul	39730	0.00010	0.0654	0.0010	29.2	0.00024	0.0	0.0006	0.0051	0.267	1.0	6.4	0.028	2.4	0.0013	0.0019	12.0	0.0281
Aug	27853	0.00010	0.0652	0.0010	29.0	0.00026	0.0	0.0007	0.0051	0.269	1.0	6.4	0.028	2.5	0.0014	0.0020	12.2	0.0294
Sep	37442	0.00010	0.0654	0.0010	29.2	0.00024	0.0	0.0006	0.0051	0.268	1.0	6.4	0.028	2.4	0.0013	0.0019	12.1	0.0283
Oct	19555	0.00010	0.0650	0.0011	28.8	0.00029	0.0	0.0007	0.0052	0.270	1.1	6.4	0.028	2.5	0.0015	0.0021	12.4	0.0305
Nov	8810	0.00010	0.0639	0.0011	28.1	0.00039	0.0	0.0008	0.0052	0.272	1.2	6.2	0.028	2.9	0.0020	0.0026	13.2	0.0339
Dec	6588	0.00010	0.0632	0.0012	27.6	0.00047	0.0	0.0008	0.0053	0.273	1.3	6.1	0.029	3.1	0.0024	0.0030	13.9	0.0361
Total	269756																	

SF18 - Rose Creek Tailings Area - Sensitivity Analysis - Cover Infiltration 20 % of MAF
Summary Tables
Conditions Future 2 - SF18

Location X2

	Flows	Ag	Al	As	Ca	Cd	Cl	Co	Cu	Fe	K	Mg	Mn	Na	Ni	Pb	SO4	Zn
	(x 1000 m3)	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L
Jan	661	0.00009	0.0603	0.0009	27.1	0.00018	0.0	0.0005	0.0046	0.242	0.8	6.0	0.026	2.1	0.0010	0.0016	10.7	0.0234
Feb	483	0.00009	0.0592	0.0009	26.6	0.00018	0.0	0.0005	0.0045	0.237	0.8	5.9	0.025	2.0	0.0010	0.0015	10.5	0.0230
Mar	485	0.00009	0.0589	0.0009	26.5	0.00018	0.0	0.0005	0.0045	0.236	0.8	5.8	0.025	2.0	0.0010	0.0015	10.5	0.0229
Apr	901	0.00010	0.0630	0.0010	28.3	0.00019	0.0	0.0006	0.0048	0.252	0.9	6.2	0.027	2.2	0.0011	0.0016	11.2	0.0245
May	8165	0.00010	0.0647	0.0010	29.1	0.00020	0.0	0.0006	0.0049	0.259	0.9	6.4	0.028	2.2	0.0011	0.0017	11.5	0.0251
Jun	8391	0.00010	0.0643	0.0010	28.9	0.00020	0.0	0.0006	0.0049	0.258	0.9	6.4	0.028	2.2	0.0011	0.0017	11.4	0.0250
Jul	5833	0.00010	0.0641	0.0010	28.8	0.00019	0.0	0.0006	0.0049	0.257	0.9	6.4	0.028	2.2	0.0011	0.0017	11.4	0.0249
Aug	4128	0.00010	0.0633	0.0010	28.4	0.00019	0.0	0.0006	0.0048	0.254	0.9	6.3	0.027	2.2	0.0011	0.0016	11.3	0.0246
Sep	5537	0.00010	0.0640	0.0010	28.8	0.00019	0.0	0.0006	0.0049	0.257	0.9	6.4	0.027	2.2	0.0011	0.0017	11.4	0.0249
Oct	2694	0.00010	0.0630	0.0010	28.3	0.00019	0.0	0.0006	0.0048	0.253	0.9	6.3	0.027	2.2	0.0011	0.0016	11.2	0.0245
Nov	1321	0.00009	0.0616	0.0009	27.6	0.00019	0.0	0.0006	0.0047	0.247	0.9	6.1	0.026	2.1	0.0010	0.0016	10.9	0.0239
Dec	977	0.00009	0.0618	0.0009	27.7	0.00019	0.0	0.0006	0.0047	0.248	0.9	6.1	0.027	2.1	0.0010	0.0016	11.0	0.0240
Total	39776																	

Location X14

	Flows	Ag	Al	As	Ca	Cd	Cl	Co	Cu	Fe	K	Mg	Mn	Na	Ni	Pb	SO4	Zn
	(x 1000 m3)	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L
Jan	1224	0.00010	0.0574	0.0022	19.5	0.00164	0.0	0.0019	0.0082	0.410	3.0	4.3	0.031	6.9	0.0082	0.0086	30.9	0.1195
Feb	908	0.00010	0.0575	0.0024	17.3	0.00197	0.0	0.0023	0.0095	0.480	3.5	3.8	0.032	8.0	0.0099	0.0102	35.4	0.1542
Mar	925	0.00010	0.0598	0.0026	16.3	0.00211	0.0	0.0024	0.0107	0.554	3.7	3.6	0.032	8.5	0.0106	0.0108	37.4	0.1653
Apr	1681	0.00010	0.0640	0.0018	22.4	0.00122	0.0	0.0016	0.0084	0.444	2.4	5.0	0.031	5.6	0.0061	0.0066	25.4	0.1201
May	14404	0.00010	0.0653	0.0011	28.5	0.00032	0.0	0.0007	0.0054	0.287	1.1	6.3	0.028	2.6	0.0017	0.0023	13.3	0.0379
Jun	14817	0.00010	0.0650	0.0011	28.4	0.00031	0.0	0.0007	0.0054	0.284	1.1	6.3	0.028	2.6	0.0017	0.0022	13.1	0.0371
Jul	10338	0.00010	0.0646	0.0011	28.0	0.00037	0.0	0.0008	0.0055	0.288	1.2	6.2	0.028	2.8	0.0019	0.0025	13.9	0.0401
Aug	7298	0.00010	0.0643	0.0012	27.4	0.00044	0.0	0.0008	0.0057	0.301	1.3	6.1	0.028	3.0	0.0023	0.0028	14.8	0.0472
Sep	9770	0.00010	0.0647	0.0011	28.0	0.00037	0.0	0.0008	0.0055	0.290	1.2	6.2	0.028	2.8	0.0020	0.0025	13.9	0.0410
Oct	5136	0.00010	0.0638	0.0013	26.8	0.00054	0.0	0.0009	0.0059	0.311	1.4	5.9	0.029	3.3	0.0028	0.0033	16.2	0.0536
Nov	2378	0.00010	0.0605	0.0016	24.1	0.00091	0.0	0.0013	0.0065	0.331	2.0	5.3	0.029	4.6	0.0046	0.0051	21.1	0.0713
Dec	1778	0.00010	0.0586	0.0018	22.5	0.00118	0.0	0.0015	0.0069	0.343	2.4	5.0	0.030	5.5	0.0060	0.0064	24.9	0.0828
Total	70857																	

Location Mouth of Rose Creek

	Flows	Ag	Al	As	Ca	Cd	Cl	Co	Cu	Fe	K	Mg	Mn	Na	Ni	Pb	SO4	Zn
	(x 1000 m3)	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L
Jan	1660	0.00010	0.0596	0.0019	22.2	0.00126	0.0	0.0016	0.0074	0.371	2.5	4.9	0.030	5.7	0.0064	0.0068	25.9	0.0949
Feb	1226	0.00010	0.0596	0.0021	20.5	0.00151	0.0	0.0018	0.0083	0.424	2.9	4.5	0.031	6.5	0.0076	0.0080	29.3	0.1209
Mar	1245	0.00010	0.0614	0.0022	19.7	0.00162	0.0	0.0019	0.0092	0.480	3.0	4.4	0.031	6.9	0.0081	0.0085	30.8	0.1443
Apr	2298	0.00010	0.0645	0.0016	24.4	0.00095	0.0	0.0013	0.0075	0.396	2.0	5.4	0.030	4.7	0.0048	0.0052	21.7	0.0947
May	19916	0.00010	0.0655	0.0011	28.8	0.00029	0.0	0.0007	0.0053	0.281	1.0	6.4	0.028	2.5	0.0015	0.0021	12.9	0.0345
Jun	20486	0.00010	0.0653	0.0011	28.7	0.00028	0.0	0.0007	0.0053	0.279	1.0	6.3	0.028	2.5	0.0015	0.0021	12.7	0.0339
Jul	14291	0.00010	0.0650	0.0011	28.5	0.00032	0.0	0.0007	0.0053	0.282	1.1	6.3	0.028	2.6	0.0017	0.0023	13.3	0.0361
Aug	10062	0.00010	0.0648	0.0011	28.0	0.00037	0.0	0.0008	0.0055	0.291	1.2	6.2	0.028	2.8	0.0020	0.0025	13.9	0.0413
Sep	13492	0.00010	0.0650	0.0011	28.4	0.00033	0.0	0.0007	0.0054	0.283	1.1	6.3	0.028	2.7	0.0017	0.0023	13.3	0.0368
Oct	7075	0.00010	0.0644	0.0012	27.5	0.00045	0.0	0.0008	0.0057	0.298	1.3	6.1	0.029	3.1	0.0023	0.0029	14.9	0.0459
Nov	3257	0.00010	0.0620	0.0014	25.6	0.00072	0.0	0.0011	0.0061	0.313	1.7	5.7	0.029	3.9	0.0037	0.0042	18.6	0.0590
Dec	2425	0.00010	0.0606	0.0016	24.4	0.00093	0.0	0.0013	0.0064	0.322	2.0	5.4	0.029	4.6	0.0047	0.0052	21.4	0.0675
Total	97432																	

Location Mouth of Anvil Creek

	Flows	Ag	Al	As	Ca	Cd	Cl	Co	Cu	Fe	K	Mg	Mn	Na	Ni	Pb	SO4	Zn
	(x 1000 m3)	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L
Jan	4464	0.00010	0.0636	0.0013	26.8	0.00059	0.0	0.0010	0.0059	0.304	1.5	5.9	0.029	3.5	0.0031	0.0036	17.0	0.0514
Feb	3268	0.00010	0.0636	0.0014	26.2	0.00069	0.0	0.0011	0.0062	0.324	1.6	5.8	0.029	3.9	0.0035	0.0041	18.3	0.0613
Mar	3306	0.00010	0.0642	0.0014	25.9	0.00074	0.0	0.0011	0.0066	0.345	1.7	5.7	0.029	4.0	0.0037	0.0042	18.9	0.0703
Apr	6271	0.00010	0.0654	0.0012	27.7	0.00047	0.0	0.0009	0.0059	0.312	1.3	6.1	0.029	3.1	0.0025	0.0030	15.4	0.0509
May	55392	0.00010	0.0658	0.0010	29.3	0.00023	0.0	0.0006	0.0051	0.270	1.0	6.5	0.028	2.4	0.0013	0.0018	12.1	0.0288
Jun	56977	0.00010	0.0657	0.0010	29.3	0.00023	0.0	0.0006	0.0051	0.269	1.0	6.5	0.028	2.4	0.0012	0.0018	12.1	0.0286
Jul	39730	0.00010	0.0656	0.0010	29.2	0.00024	0.0	0.0006	0.0051	0.270	1.0	6.4	0.028	2.4	0.0013	0.0019	12.3	0.0294
Aug	27853	0.00010	0.0655	0.0010	29.0	0.00026	0.0	0.0007	0.0052	0.274	1.0	6.4	0.028	2.5	0.0014	0.0020	12.5	0.0313
Sep	37442	0.00010	0.0656	0.0010	29.2	0.00025	0.0	0.0006	0.0051	0.271	1.0	6.4	0.028	2.4	0.0013	0.0019	12.3	0.0296
Oct	19555	0.00010	0.0653	0.0011	28.9	0.00029	0.0	0.0007	0.0052	0.276	1.1	6.4	0.028	2.5	0.0015	0.0021	12.9	0.0329
Nov	8910	0.00010	0.0645	0.0012	28.1	0.00039	0.0	0.0008	0.0054	0.282	1.2	6.2	0.029	2.9	0.0020	0.0026	14.2	0.0378
Dec	6588	0.00010	0.0639	0.0012	27.7	0.00047	0.0	0.0008	0.0055	0.285	1.3	6.1	0.029	3.1	0.0024	0.0030	15.3	0.0410
Total	269756																	

SF18 - Rose Creek Tailings Area - Sensitivity Analysis - Cover Infiltration 20 % of MAF

Summary Tables

Conditions: Future 3 - SF18

Location: X2

	Flows (x 1000 m3)	Ag mg/L	Al mg/L	As mg/L	Ca mg/L	Cd mg/L	Cl mg/L	Co mg/L	Cu mg/L	Fe mg/L	K mg/L	Mg mg/L	Mn mg/L	Na mg/L	Ni mg/L	Pb mg/L	SO4 mg/L	Zn mg/L
Jan	661	0.00009	0.0603	0.0009	27.1	0.00018	0.0	0.0005	0.0046	0.242	0.8	6.0	0.026	2.1	0.0010	0.0016	10.7	0.0234
Feb	483	0.00009	0.0592	0.0009	26.6	0.00018	0.0	0.0005	0.0045	0.237	0.8	5.9	0.025	2.0	0.0010	0.0015	10.5	0.0230
Mar	485	0.00009	0.0589	0.0009	26.5	0.00018	0.0	0.0005	0.0045	0.236	0.8	5.8	0.025	2.0	0.0010	0.0015	10.5	0.0229
Apr	901	0.00010	0.0630	0.0010	28.3	0.00019	0.0	0.0006	0.0048	0.252	0.9	6.2	0.027	2.2	0.0011	0.0016	11.2	0.0245
May	8165	0.00010	0.0647	0.0010	29.1	0.00020	0.0	0.0006	0.0049	0.259	0.9	6.4	0.028	2.2	0.0011	0.0017	11.5	0.0251
Jun	8391	0.00010	0.0643	0.0010	28.9	0.00020	0.0	0.0006	0.0049	0.258	0.9	6.4	0.028	2.2	0.0011	0.0017	11.4	0.0250
Jul	5833	0.00010	0.0641	0.0010	28.8	0.00019	0.0	0.0006	0.0049	0.257	0.9	6.4	0.028	2.2	0.0011	0.0017	11.4	0.0249
Aug	4128	0.00010	0.0633	0.0010	28.4	0.00019	0.0	0.0006	0.0048	0.254	0.9	6.3	0.027	2.2	0.0011	0.0016	11.3	0.0246
Sep	5537	0.00010	0.0640	0.0010	28.8	0.00019	0.0	0.0006	0.0049	0.257	0.9	6.4	0.027	2.2	0.0011	0.0017	11.4	0.0249
Oct	2894	0.00010	0.0630	0.0010	28.3	0.00019	0.0	0.0006	0.0048	0.253	0.9	6.3	0.027	2.2	0.0011	0.0016	11.2	0.0245
Nov	1321	0.00009	0.0616	0.0009	27.6	0.00019	0.0	0.0006	0.0047	0.247	0.9	6.1	0.026	2.1	0.0010	0.0016	10.9	0.0239
Dec	977	0.00009	0.0618	0.0009	27.7	0.00019	0.0	0.0006	0.0047	0.248	0.9	6.1	0.027	2.1	0.0010	0.0016	11.0	0.0240
Total	39776																	

Location: X14

	Flows (x 1000 m3)	Ag mg/L	Al mg/L	As mg/L	Ca mg/L	Cd mg/L	Cl mg/L	Co mg/L	Cu mg/L	Fe mg/L	K mg/L	Mg mg/L	Mn mg/L	Na mg/L	Ni mg/L	Pb mg/L	SO4 mg/L	Zn mg/L
Jan	1224	0.00010	0.0676	0.0022	29.3	0.00165	0.0	0.0020	0.0110	0.598	3.0	4.5	0.032	6.9	0.0053	0.0085	49.5	0.1883
Feb	908	0.00011	0.0716	0.0025	18.2	0.00199	0.0	0.0023	0.0133	0.740	3.5	4.1	0.034	8.0	0.0099	0.0102	58.3	0.2490
Mar	925	0.00011	0.0775	0.0026	17.3	0.00213	0.0	0.0025	0.0155	0.881	3.7	3.9	0.035	8.5	0.0106	0.0108	62.1	0.3043
Apr	1681	0.00011	0.0745	0.0019	23.0	0.00123	0.0	0.0016	0.0113	0.638	2.4	5.1	0.032	5.6	0.0052	0.0066	38.6	0.1909
May	14404	0.00010	0.0667	0.0011	28.6	0.00032	0.0	0.0007	0.0058	0.313	1.1	6.3	0.029	2.6	0.0017	0.0023	14.9	0.0474
Jun	14817	0.00010	0.0663	0.0011	28.5	0.00031	0.0	0.0007	0.0057	0.309	1.1	6.3	0.028	2.6	0.0017	0.0022	14.6	0.0461
Jul	10338	0.00010	0.0663	0.0011	28.1	0.00037	0.0	0.0008	0.0059	0.319	1.2	6.2	0.029	2.8	0.0019	0.0025	16.1	0.0512
Aug	7298	0.00010	0.0668	0.0012	27.5	0.00044	0.0	0.0008	0.0064	0.347	1.3	6.1	0.029	3.0	0.0023	0.0028	17.9	0.0637
Sep	9770	0.00010	0.0665	0.0011	28.1	0.00037	0.0	0.0008	0.0060	0.323	1.2	6.2	0.029	2.8	0.0020	0.0025	16.2	0.0528
Oct	5136	0.00010	0.0669	0.0013	26.9	0.00055	0.0	0.0009	0.0068	0.369	1.4	6.0	0.029	3.3	0.0028	0.0033	20.6	0.0747
Nov	2378	0.00010	0.0655	0.0016	24.5	0.00092	0.0	0.0013	0.0079	0.423	2.0	5.4	0.030	4.6	0.0047	0.0051	30.3	0.1051
Dec	1778	0.00010	0.0648	0.0018	23.0	0.00120	0.0	0.0016	0.0086	0.457	2.4	5.1	0.031	5.5	0.0060	0.0064	37.6	0.1243
Total	70657																	

Location: Mouth of Rose Creek

	Flows (x 1000 m3)	Ag mg/L	Al mg/L	As mg/L	Ca mg/L	Cd mg/L	Cl mg/L	Co mg/L	Cu mg/L	Fe mg/L	K mg/L	Mg mg/L	Mn mg/L	Na mg/L	Ni mg/L	Pb mg/L	SO4 mg/L	Zn mg/L
Jan	1660	0.00010	0.0671	0.0019	22.7	0.00127	0.0	0.0016	0.0094	0.511	2.5	5.0	0.031	5.7	0.0064	0.0068	39.6	0.1456
Feb	1226	0.00010	0.0701	0.0021	21.1	0.00153	0.0	0.0019	0.0112	0.617	2.9	4.7	0.033	6.5	0.0076	0.0080	46.2	0.1912
Mar	1245	0.00011	0.0745	0.0022	20.4	0.00164	0.0	0.0020	0.0128	0.722	3.0	4.6	0.034	6.9	0.0082	0.0085	49.1	0.2327
Apr	2298	0.00010	0.0722	0.0016	24.8	0.00095	0.0	0.0014	0.0096	0.538	2.0	5.5	0.031	4.7	0.0048	0.0053	31.4	0.1465
May	19916	0.00010	0.0665	0.0011	28.9	0.00029	0.0	0.0007	0.0056	0.299	1.0	6.4	0.029	2.5	0.0015	0.0021	14.0	0.0413
Jun	20486	0.00010	0.0662	0.0011	28.8	0.00028	0.0	0.0007	0.0055	0.296	1.0	6.4	0.028	2.5	0.0015	0.0021	13.8	0.0404
Jul	14291	0.00010	0.0662	0.0011	28.5	0.00032	0.0	0.0007	0.0057	0.304	1.1	6.3	0.029	2.6	0.0017	0.0023	14.9	0.0441
Aug	10062	0.00010	0.0665	0.0011	28.1	0.00038	0.0	0.0008	0.0060	0.324	1.2	6.2	0.029	2.8	0.0020	0.0025	16.2	0.0532
Sep	13492	0.00010	0.0663	0.0011	28.5	0.00033	0.0	0.0007	0.0057	0.307	1.1	6.3	0.029	2.7	0.0017	0.0023	15.0	0.0453
Oct	7075	0.00010	0.0666	0.0012	27.7	0.00045	0.0	0.0008	0.0063	0.340	1.3	6.1	0.029	3.1	0.0023	0.0029	18.2	0.0612
Nov	3257	0.00010	0.0656	0.0014	25.9	0.00073	0.0	0.0011	0.0071	0.380	1.7	5.7	0.029	3.9	0.0037	0.0042	25.3	0.0836
Dec	2425	0.00010	0.0651	0.0016	24.8	0.00093	0.0	0.0013	0.0076	0.405	2.0	5.5	0.030	4.6	0.0047	0.0052	30.7	0.0980
Total	97432																	

Location: Mouth of Anvil Creek

	Flows (x 1000 m3)	Ag mg/L	Al mg/L	As mg/L	Ca mg/L	Cd mg/L	Cl mg/L	Co mg/L	Cu mg/L	Fe mg/L	K mg/L	Mg mg/L	Mn mg/L	Na mg/L	Ni mg/L	Pb mg/L	SO4 mg/L	Zn mg/L
Jan	4464	0.00010	0.0664	0.0013	27.0	0.00060	0.0	0.0010	0.0066	0.356	1.5	6.0	0.029	3.5	0.0031	0.0036	22.1	0.0702
Feb	3268	0.00010	0.0675	0.0014	26.4	0.00070	0.0	0.0011	0.0073	0.396	1.6	5.9	0.030	3.9	0.0036	0.0041	24.7	0.0877
Mar	3306	0.00010	0.0692	0.0015	26.1	0.00074	0.0	0.0011	0.0079	0.437	1.7	5.8	0.030	4.0	0.0038	0.0043	25.8	0.1036
Apr	6271	0.00010	0.0682	0.0012	27.8	0.00046	0.0	0.0009	0.0067	0.364	1.3	6.2	0.029	3.1	0.0025	0.0030	18.9	0.0699
May	55392	0.00010	0.0661	0.0010	29.3	0.00023	0.0	0.0006	0.0052	0.277	1.0	6.5	0.028	2.4	0.0013	0.0018	12.5	0.0313
Jun	56977	0.00010	0.0660	0.0010	29.3	0.00023	0.0	0.0006	0.0052	0.276	1.0	6.5	0.028	2.4	0.0012	0.0018	12.5	0.0309
Jul	39730	0.00010	0.0660	0.0010	29.2	0.00024	0.0	0.0006	0.0052	0.278	1.0	6.5	0.028	2.4	0.0013	0.0019	12.9	0.0323
Aug	27853	0.00010	0.0661	0.0010	29.1	0.00026	0.0	0.0007	0.0054	0.286	1.0	6.4	0.028	2.5	0.0014	0.0020	13.3	0.0356
Sep	37442	0.00010	0.0660	0.0010	29.2	0.00025	0.0	0.0006	0.0053	0.279	1.0	6.5	0.028	2.4	0.0013	0.0019	12.9	0.0327
Oct	19555	0.00010	0.0662	0.0011	28.9	0.00029	0.0	0.0007	0.0055	0.292	1.1	6.4	0.029	2.5	0.0015	0.0021	14.1	0.0385
Nov	8910	0.00010	0.0658	0.0012	28.2	0.00039	0.0	0.0008	0.0058	0.307	1.2	6.2	0.029	2.9	0.0020	0.0026	16.7	0.0468
Dec	6588	0.00010	0.0656	0.0012	27.8	0.00047	0.0	0.0009	0.0060	0.316	1.3	6.2	0.029	3.1	0.0024	0.0030	18.7	0.0522
Total	269756																	

Appendix E
Results for Supplemental Runs

RCT04 - Supplemental Base Case - Rose Creek Tailings - Uncovered
Summary Tables
Conditions: Future 1

Location: X2

	Flows	Ag	Al	As	Ca	Cd	Cl	Co	Cu	Fe	K	Mg	Mn	Na	Ni	Pb	SO4	Zn
	(x 1000 m3)	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L
Jan	661	0.00009	0.0603	0.0009	27.1	0.00018	0.0	0.0005	0.0046	0.242	0.8	6.0	0.026	2.1	0.0010	0.0016	10.7	0.0234
Feb	483	0.00009	0.0592	0.0009	26.6	0.00018	0.0	0.0005	0.0045	0.237	0.8	5.9	0.025	2.0	0.0010	0.0015	10.5	0.0230
Mar	485	0.00009	0.0589	0.0009	26.5	0.00018	0.0	0.0005	0.0045	0.236	0.8	5.8	0.025	2.0	0.0010	0.0015	10.5	0.0229
Apr	901	0.00010	0.0630	0.0010	28.3	0.00019	0.0	0.0006	0.0048	0.252	0.9	6.2	0.027	2.2	0.0011	0.0016	11.2	0.0245
May	8165	0.00010	0.0647	0.0010	29.1	0.00020	0.0	0.0006	0.0049	0.259	0.9	6.4	0.028	2.2	0.0011	0.0017	11.5	0.0251
Jun	8391	0.00010	0.0643	0.0010	28.9	0.00020	0.0	0.0006	0.0049	0.258	0.9	6.4	0.028	2.2	0.0011	0.0017	11.4	0.0250
Jul	5833	0.00010	0.0641	0.0010	28.8	0.00019	0.0	0.0006	0.0049	0.257	0.9	6.4	0.028	2.2	0.0011	0.0017	11.4	0.0249
Aug	4128	0.00010	0.0633	0.0010	28.4	0.00019	0.0	0.0006	0.0048	0.254	0.9	6.3	0.027	2.2	0.0011	0.0016	11.3	0.0246
Sep	5537	0.00010	0.0640	0.0010	28.8	0.00019	0.0	0.0006	0.0049	0.257	0.9	6.4	0.027	2.2	0.0011	0.0017	11.4	0.0249
Oct	2894	0.00010	0.0630	0.0010	28.3	0.00019	0.0	0.0006	0.0048	0.253	0.9	6.3	0.027	2.2	0.0011	0.0016	11.2	0.0245
Nov	1321	0.00009	0.0616	0.0009	27.6	0.00019	0.0	0.0006	0.0047	0.247	0.9	6.1	0.026	2.1	0.0010	0.0016	10.9	0.0239
Dec	977	0.00009	0.0618	0.0009	27.7	0.00019	0.0	0.0006	0.0047	0.248	0.9	6.1	0.027	2.1	0.0010	0.0016	11.0	0.0240
Total	39776																	

Location: X14

	Flows	Ag	Al	As	Ca	Cd	Cl	Co	Cu	Fe	K	Mg	Mn	Na	Ni	Pb	SO4	Zn
	(x 1000 m3)	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L
Jan	1224	0.00011	0.0712	0.0022	20.5	0.00166	0.0	0.0020	0.0120	0.666	3.0	4.6	0.033	6.9	0.0083	0.0086	58.0	0.1937
Feb	908	0.00011	0.0766	0.0025	18.5	0.00199	0.0	0.0024	0.0147	0.833	3.5	4.2	0.035	8.0	0.0099	0.0102	68.7	0.2564
Mar	925	0.00011	0.0839	0.0026	17.6	0.00214	0.0	0.0025	0.0173	0.997	3.7	4.0	0.036	8.5	0.0106	0.0108	73.3	0.3136
Apr	1681	0.00011	0.0783	0.0019	23.2	0.00124	0.0	0.0016	0.0123	0.708	2.4	5.2	0.033	5.6	0.0062	0.0066	44.6	0.1964
May	14404	0.00010	0.0672	0.0011	28.6	0.00032	0.0	0.0007	0.0059	0.322	1.1	6.3	0.029	2.6	0.0017	0.0023	15.6	0.0481
Jun	14817	0.00010	0.0668	0.0011	28.5	0.00032	0.0	0.0007	0.0059	0.318	1.1	6.3	0.029	2.6	0.0017	0.0022	15.3	0.0468
Jul	10338	0.00010	0.0669	0.0011	28.2	0.00037	0.0	0.0008	0.0061	0.329	1.2	6.2	0.029	2.8	0.0019	0.0025	17.1	0.0520
Aug	7298	0.00010	0.0677	0.0012	27.6	0.00044	0.0	0.0008	0.0066	0.363	1.3	6.1	0.029	3.0	0.0023	0.0028	19.4	0.0650
Sep	9770	0.00010	0.0671	0.0011	28.1	0.00038	0.0	0.0008	0.0062	0.334	1.2	6.2	0.029	2.8	0.0020	0.0025	17.2	0.0537
Oct	5136	0.00010	0.0680	0.0013	27.0	0.00055	0.0	0.0009	0.0071	0.390	1.4	6.0	0.029	3.3	0.0028	0.0033	22.6	0.0763
Nov	2378	0.00010	0.0673	0.0016	24.6	0.00092	0.0	0.0013	0.0084	0.456	2.0	5.5	0.030	4.6	0.0047	0.0051	34.6	0.1077
Dec	1778	0.00010	0.0670	0.0018	23.2	0.00120	0.0	0.0016	0.0092	0.498	2.4	5.2	0.031	5.5	0.0060	0.0064	43.4	0.1276
Total	70657																	

Location: Mouth of Rose Creek

	Flows	Ag	Al	As	Ca	Cd	Cl	Co	Cu	Fe	K	Mg	Mn	Na	Ni	Pb	SO4	Zn
	(x 1000 m3)	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L
Jan	1660	0.00010	0.0698	0.0019	22.9	0.00127	0.0	0.0016	0.0102	0.560	2.5	5.1	0.032	5.7	0.0064	0.0068	45.8	0.1496
Feb	1226	0.00011	0.0738	0.0021	21.4	0.00153	0.0	0.0019	0.0122	0.685	2.9	4.8	0.033	6.5	0.0076	0.0080	53.9	0.1967
Mar	1245	0.00011	0.0792	0.0022	20.7	0.00164	0.0	0.0020	0.0141	0.809	3.0	4.6	0.034	6.9	0.0082	0.0085	57.5	0.2396
Apr	2298	0.00011	0.0749	0.0016	24.9	0.00096	0.0	0.0014	0.0104	0.589	2.0	5.5	0.032	4.7	0.0048	0.0053	35.8	0.1505
May	19916	0.00010	0.0669	0.0011	28.9	0.00029	0.0	0.0007	0.0057	0.306	1.0	6.4	0.029	2.5	0.0015	0.0021	14.5	0.0419
Jun	20486	0.00010	0.0666	0.0011	28.8	0.00028	0.0	0.0007	0.0056	0.303	1.0	6.4	0.028	2.5	0.0015	0.0021	14.3	0.0409
Jul	14291	0.00010	0.0666	0.0011	28.6	0.00032	0.0	0.0007	0.0058	0.311	1.1	6.3	0.029	2.6	0.0017	0.0023	15.6	0.0447
Aug	10062	0.00010	0.0672	0.0011	28.1	0.00038	0.0	0.0008	0.0062	0.336	1.2	6.2	0.029	2.8	0.0020	0.0025	17.3	0.0542
Sep	13492	0.00010	0.0668	0.0011	28.5	0.00033	0.0	0.0007	0.0058	0.315	1.1	6.3	0.029	2.7	0.0017	0.0023	15.7	0.0459
Oct	7075	0.00010	0.0675	0.0012	27.7	0.00045	0.0	0.0008	0.0065	0.355	1.3	6.1	0.029	3.1	0.0023	0.0029	19.6	0.0624
Nov	3257	0.00010	0.0670	0.0014	26.0	0.00073	0.0	0.0011	0.0075	0.404	1.7	5.8	0.030	3.9	0.0037	0.0042	28.4	0.0856
Dec	2425	0.00010	0.0667	0.0016	24.9	0.00093	0.0	0.0013	0.0081	0.435	2.0	5.5	0.030	4.6	0.0047	0.0052	35.0	0.1004
Total	97432																	

Location: Mouth of Anvil Creek

	Flows	Ag	Al	As	Ca	Cd	Cl	Co	Cu	Fe	K	Mg	Mn	Na	Ni	Pb	SO4	Zn
	(x 1000 m3)	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L
Jan	4464	0.00010	0.0674	0.0013	27.1	0.00060	0.0	0.0010	0.0069	0.374	1.5	6.0	0.030	3.5	0.0031	0.0036	24.4	0.0717
Feb	3268	0.00010	0.0689	0.0014	26.5	0.00070	0.0	0.0011	0.0077	0.422	1.6	5.9	0.030	3.9	0.0036	0.0041	27.5	0.0898
Mar	3306	0.00010	0.0709	0.0015	26.2	0.00074	0.0	0.0011	0.0084	0.469	1.7	5.8	0.031	4.0	0.0038	0.0043	29.0	0.1062
Apr	6271	0.00010	0.0692	0.0012	27.9	0.00048	0.0	0.0009	0.0070	0.383	1.3	6.2	0.030	3.1	0.0025	0.0030	20.5	0.0714
May	55392	0.00010	0.0662	0.0010	29.3	0.00023	0.0	0.0006	0.0052	0.279	1.0	6.5	0.028	2.4	0.0013	0.0018	12.7	0.0315
Jun	56977	0.00010	0.0661	0.0010	29.3	0.00023	0.0	0.0006	0.0052	0.278	1.0	6.5	0.028	2.4	0.0012	0.0018	12.7	0.0311
Jul	39730	0.00010	0.0661	0.0010	29.2	0.00024	0.0	0.0006	0.0053	0.281	1.0	6.5	0.028	2.4	0.0013	0.0019	13.1	0.0325
Aug	27853	0.00010	0.0664	0.0011	29.1	0.00026	0.0	0.0007	0.0054	0.290	1.0	6.4	0.028	2.5	0.0014	0.0020	13.7	0.0359
Sep	37442	0.00010	0.0662	0.0010	29.2	0.00025	0.0	0.0006	0.0053	0.282	1.0	6.5	0.028	2.4	0.0013	0.0019	13.2	0.0329
Oct	19555	0.00010	0.0665	0.0011	28.9	0.00029	0.0	0.0007	0.0056	0.297	1.1	6.4	0.029	2.5	0.0015	0.0021	14.6	0.0389
Nov	8910	0.00010	0.0663	0.0012	28.3	0.00039	0.0	0.0008	0.0059	0.315	1.2	6.2	0.029	2.9	0.0021	0.0026	17.8	0.0475
Dec	6588	0.00010	0.0662	0.0012	27.9	0.00047	0.0	0.0009	0.0061	0.327	1.3	6.2	0.029	3.1	0.0024	0.0030	20.3	0.0531
Total	269756																	

RCT04 - Supplemental Base Case - Rose Creek Tailings - Uncovered
Summary Tables
Conditions Future 2

Location X2

	Flows	Ag	Al	As	Ca	Cd	Cl	Co	Cu	Fe	K	Mg	Mn	Na	Ni	Pb	SO4	Zn
	(x 1000 m3)	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L
Jan	661	0.00009	0.0603	0.0009	27.1	0.00018	0.0	0.0005	0.0046	0.242	0.8	6.0	0.026	2.1	0.0010	0.0016	10.7	0.0234
Feb	483	0.00009	0.0592	0.0009	26.6	0.00018	0.0	0.0005	0.0045	0.237	0.8	5.9	0.025	2.0	0.0010	0.0015	10.5	0.0230
Mar	485	0.00009	0.0589	0.0009	26.5	0.00018	0.0	0.0005	0.0045	0.236	0.8	5.8	0.025	2.0	0.0010	0.0015	10.5	0.0229
Apr	901	0.00010	0.0630	0.0010	28.3	0.00019	0.0	0.0006	0.0048	0.252	0.9	6.2	0.027	2.2	0.0011	0.0016	11.2	0.0245
May	8165	0.00010	0.0647	0.0010	29.1	0.00020	0.0	0.0006	0.0049	0.259	0.9	6.4	0.028	2.2	0.0011	0.0017	11.5	0.0251
Jun	8391	0.00010	0.0643	0.0010	28.9	0.00020	0.0	0.0006	0.0049	0.258	0.9	6.4	0.028	2.2	0.0011	0.0017	11.4	0.0250
Jul	5833	0.00010	0.0641	0.0010	28.8	0.00019	0.0	0.0006	0.0049	0.257	0.9	6.4	0.028	2.2	0.0011	0.0017	11.4	0.0249
Aug	4128	0.00010	0.0633	0.0010	28.4	0.00019	0.0	0.0006	0.0048	0.254	0.9	6.3	0.027	2.2	0.0011	0.0016	11.3	0.0246
Sep	5537	0.00010	0.0640	0.0010	28.8	0.00019	0.0	0.0006	0.0049	0.257	0.9	6.4	0.027	2.2	0.0011	0.0017	11.4	0.0249
Oct	2894	0.00010	0.0630	0.0010	28.3	0.00019	0.0	0.0006	0.0048	0.253	0.9	6.3	0.027	2.2	0.0011	0.0016	11.2	0.0245
Nov	1321	0.00009	0.0616	0.0009	27.6	0.00019	0.0	0.0006	0.0047	0.247	0.9	6.1	0.026	2.1	0.0010	0.0016	10.9	0.0239
Dec	977	0.00009	0.0618	0.0009	27.7	0.00019	0.0	0.0006	0.0047	0.248	0.9	6.1	0.027	2.1	0.0010	0.0016	11.0	0.0240
Total	39776																	

Location X14

	Flows	Ag	Al	As	Ca	Cd	Cl	Co	Cu	Fe	K	Mg	Mn	Na	Ni	Pb	SO4	Zn
	(x 1000 m3)	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L
Jan	1224	0.00011	0.0818	0.0022	21.3	0.00167	0.0	0.0021	0.0149	0.860	3.0	4.8	0.035	6.9	0.0083	0.0086	74.5	0.2904
Feb	908	0.00012	0.0911	0.0025	19.5	0.00201	0.0	0.0025	0.0187	1.100	3.5	4.4	0.037	8.0	0.0100	0.0102	89.1	0.3898
Mar	925	0.00012	0.1021	0.0027	18.6	0.00216	0.0	0.0026	0.0223	1.333	3.7	4.2	0.039	8.5	0.0107	0.0109	95.4	0.4810
Apr	1681	0.00011	0.0891	0.0019	23.7	0.00125	0.0	0.0017	0.0153	0.907	2.4	5.3	0.035	5.6	0.0062	0.0066	56.4	0.2960
May	14404	0.00010	0.0687	0.0011	28.7	0.00033	0.0	0.0007	0.0063	0.349	1.1	6.3	0.029	2.6	0.0017	0.0023	17.0	0.0614
Jun	14817	0.00010	0.0682	0.0011	28.6	0.00032	0.0	0.0007	0.0062	0.343	1.1	6.3	0.029	2.6	0.0017	0.0022	16.7	0.0593
Jul	10338	0.00010	0.0686	0.0011	28.3	0.00037	0.0	0.0008	0.0065	0.361	1.2	6.2	0.029	2.8	0.0019	0.0025	19.1	0.0676
Aug	7298	0.00010	0.0702	0.0012	27.7	0.00045	0.0	0.0009	0.0073	0.409	1.3	6.1	0.029	3.0	0.0023	0.0028	22.2	0.0882
Sep	9770	0.00010	0.0689	0.0011	28.2	0.00038	0.0	0.0008	0.0066	0.367	1.2	6.2	0.029	2.8	0.0020	0.0025	19.3	0.0702
Oct	5136	0.00010	0.0713	0.0013	27.2	0.00055	0.0	0.0010	0.0080	0.449	1.4	6.0	0.030	3.3	0.0028	0.0033	26.6	0.1060
Nov	2378	0.00010	0.0725	0.0016	25.0	0.00093	0.0	0.0013	0.0098	0.551	2.0	5.6	0.031	4.6	0.0047	0.0051	42.8	0.1551
Dec	1778	0.00011	0.0734	0.0018	23.8	0.00121	0.0	0.0016	0.0109	0.615	2.4	5.3	0.032	5.5	0.0061	0.0064	54.8	0.1860
Total	70657																	

Location Mouth of Rose Creek

	Flows	Ag	Al	As	Ca	Cd	Cl	Co	Cu	Fe	K	Mg	Mn	Na	Ni	Pb	SO4	Zn
	(x 1000 m3)	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L
Jan	1660	0.00011	0.0776	0.0019	23.5	0.00128	0.0	0.0017	0.0123	0.703	2.5	5.2	0.033	5.7	0.0064	0.0068	58.0	0.2209
Feb	1226	0.00011	0.0846	0.0021	22.1	0.00154	0.0	0.0020	0.0152	0.884	2.9	4.9	0.035	6.5	0.0077	0.0080	69.1	0.2955
Mar	1245	0.00012	0.0928	0.0023	21.4	0.00166	0.0	0.0021	0.0178	1.058	3.0	4.8	0.037	6.9	0.0082	0.0085	73.9	0.3639
Apr	2298	0.00011	0.0829	0.0017	25.3	0.00097	0.0	0.0014	0.0125	0.735	2.0	5.6	0.033	4.7	0.0049	0.0053	44.4	0.2234
May	19916	0.00010	0.0679	0.0011	28.9	0.00029	0.0	0.0007	0.0060	0.325	1.0	6.4	0.029	2.5	0.0015	0.0021	15.6	0.0515
Jun	20486	0.00010	0.0676	0.0011	28.8	0.00028	0.0	0.0007	0.0059	0.321	1.0	6.4	0.029	2.5	0.0015	0.0021	15.3	0.0500
Jul	14291	0.00010	0.0678	0.0011	28.6	0.00033	0.0	0.0007	0.0061	0.334	1.1	6.3	0.029	2.6	0.0017	0.0023	17.0	0.0560
Aug	10062	0.00010	0.0690	0.0011	28.2	0.00038	0.0	0.0008	0.0067	0.369	1.2	6.2	0.029	2.8	0.0020	0.0025	19.3	0.0710
Sep	13492	0.00010	0.0681	0.0011	28.6	0.00033	0.0	0.0007	0.0062	0.339	1.1	6.3	0.029	2.7	0.0017	0.0023	17.2	0.0579
Oct	7075	0.00010	0.0698	0.0012	27.8	0.00045	0.0	0.0009	0.0072	0.399	1.3	6.2	0.029	3.1	0.0023	0.0029	22.5	0.0840
Nov	3257	0.00010	0.0707	0.0014	26.2	0.00073	0.0	0.0011	0.0085	0.474	1.7	5.8	0.030	3.9	0.0037	0.0042	34.4	0.1202
Dec	2425	0.00010	0.0714	0.0016	25.3	0.00094	0.0	0.0013	0.0093	0.521	2.0	5.6	0.031	4.6	0.0047	0.0052	43.3	0.1432
Total	97432																	

Location Mouth of Anvil Creek

	Flows	Ag	Al	As	Ca	Cd	Cl	Co	Cu	Fe	K	Mg	Mn	Na	Ni	Pb	SO4	Zn
	(x 1000 m3)	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L
Jan	4464	0.00010	0.0702	0.0013	27.3	0.00060	0.0	0.0010	0.0077	0.427	1.5	6.1	0.030	3.5	0.0031	0.0036	28.9	0.0982
Feb	3268	0.00010	0.0729	0.0014	26.8	0.00070	0.0	0.0011	0.0088	0.496	1.6	5.9	0.031	3.9	0.0036	0.0041	33.2	0.1268
Mar	3306	0.00011	0.0760	0.0015	26.5	0.00075	0.0	0.0012	0.0098	0.563	1.7	5.9	0.031	4.0	0.0038	0.0043	35.1	0.1530
Apr	6271	0.00010	0.0721	0.0012	28.0	0.00048	0.0	0.0009	0.0078	0.437	1.3	6.2	0.030	3.1	0.0025	0.0030	23.7	0.0981
May	55392	0.00010	0.0666	0.0010	29.4	0.00023	0.0	0.0006	0.0053	0.286	1.0	6.5	0.028	2.4	0.0013	0.0018	13.1	0.0349
Jun	56977	0.00010	0.0665	0.0010	29.3	0.00023	0.0	0.0006	0.0053	0.285	1.0	6.5	0.028	2.4	0.0012	0.0018	13.0	0.0344
Jul	39730	0.00010	0.0666	0.0010	29.2	0.00025	0.0	0.0006	0.0054	0.289	1.0	6.5	0.028	2.4	0.0013	0.0019	13.6	0.0365
Aug	27853	0.00010	0.0670	0.0011	29.1	0.00026	0.0	0.0007	0.0056	0.302	1.0	6.4	0.029	2.5	0.0014	0.0020	14.5	0.0420
Sep	37442	0.00010	0.0667	0.0010	29.2	0.00025	0.0	0.0006	0.0054	0.291	1.0	6.5	0.028	2.4	0.0013	0.0019	13.7	0.0372
Oct	19555	0.00010	0.0673	0.0011	29.0	0.00029	0.0	0.0007	0.0058	0.313	1.1	6.4	0.029	2.5	0.0016	0.0021	15.6	0.0467
Nov	8910	0.00010	0.0677	0.0012	28.4	0.00039	0.0	0.0008	0.0063	0.341	1.2	6.3	0.029	2.9	0.0021	0.0026	20.0	0.0602
Dec	6588	0.00010	0.0679	0.0012	28.0	0.00047	0.0	0.0009	0.0066	0.359	1.3	6.2	0.029	3.1	0.0024	0.0030	23.3	0.0689
Total	269756																	

RCT04 - Supplemental Base Case - Rose Creek Tailings - Uncovered

Conditions: Future 3

Location: X2

	Flows	Ag	Al	As	Ca	Cd	Cl	Co	Cu	Fe	K	Mg	Mn	Na	Ni	Pb	SO4	Zn
	(x 1000 m3)	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L
Jan	661	0.00009	0.0603	0.0009	27.1	0.00018	0.0	0.0005	0.0046	0.242	0.8	6.0	0.026	2.1	0.0010	0.0016	10.7	0.0234
Feb	483	0.00009	0.0592	0.0009	26.6	0.00018	0.0	0.0005	0.0045	0.237	0.8	5.9	0.025	2.0	0.0010	0.0015	10.5	0.0230
Mar	485	0.00009	0.0589	0.0009	26.5	0.00018	0.0	0.0005	0.0045	0.236	0.8	5.8	0.025	2.0	0.0010	0.0015	10.5	0.0229
Apr	901	0.00010	0.0630	0.0010	28.3	0.00019	0.0	0.0006	0.0048	0.252	0.9	6.2	0.027	2.2	0.0011	0.0016	11.2	0.0245
May	8165	0.00010	0.0647	0.0010	29.1	0.00020	0.0	0.0006	0.0049	0.259	0.9	6.4	0.028	2.2	0.0011	0.0017	11.5	0.0251
Jun	8391	0.00010	0.0643	0.0010	28.9	0.00020	0.0	0.0006	0.0049	0.258	0.9	6.4	0.028	2.2	0.0011	0.0017	11.4	0.0250
Jul	5833	0.00010	0.0641	0.0010	28.8	0.00019	0.0	0.0006	0.0049	0.257	0.9	6.4	0.028	2.2	0.0011	0.0017	11.4	0.0249
Aug	4128	0.00010	0.0633	0.0010	28.4	0.00019	0.0	0.0006	0.0048	0.254	0.9	6.3	0.027	2.2	0.0011	0.0016	11.3	0.0246
Sep	5537	0.00010	0.0640	0.0010	28.8	0.00019	0.0	0.0006	0.0049	0.257	0.9	6.4	0.027	2.2	0.0011	0.0017	11.4	0.0249
Oct	2894	0.00010	0.0630	0.0010	28.3	0.00019	0.0	0.0006	0.0048	0.253	0.9	6.3	0.027	2.2	0.0011	0.0016	11.2	0.0245
Nov	1321	0.00009	0.0616	0.0009	27.6	0.00019	0.0	0.0006	0.0047	0.247	0.9	6.1	0.026	2.1	0.0010	0.0016	10.9	0.0239
Dec	977	0.00009	0.0618	0.0009	27.7	0.00019	0.0	0.0006	0.0047	0.248	0.9	6.1	0.027	2.1	0.0010	0.0016	11.0	0.0240
Total	39776																	

Location: X14

	Flows	Ag	Al	As	Ca	Cd	Cl	Co	Cu	Fe	K	Mg	Mn	Na	Ni	Pb	SO4	Zn
	(x 1000 m3)	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L
Jan	1224	0.00013	0.1165	0.0023	23.9	0.00171	0.0	0.0023	0.0244	1.500	3.0	5.4	0.041	6.9	0.0084	0.0086	138.2	0.5160
Feb	908	0.00014	0.1390	0.0027	22.6	0.00207	0.0	0.0027	0.0318	1.983	3.5	5.2	0.045	8.0	0.0102	0.0102	167.5	0.7010
Mar	925	0.00015	0.1621	0.0029	22.0	0.00223	0.0	0.0030	0.0387	2.440	3.7	5.0	0.049	8.5	0.0109	0.0109	180.2	0.8714
Apr	1681	0.00013	0.1249	0.0020	25.5	0.00129	0.0	0.0019	0.0251	1.567	2.4	5.7	0.041	5.6	0.0064	0.0066	101.7	0.5285
May	14404	0.00010	0.0735	0.0011	28.9	0.00033	0.0	0.0008	0.0076	0.437	1.1	6.4	0.030	2.6	0.0017	0.0023	22.5	0.0924
Jun	14817	0.00010	0.0727	0.0011	28.8	0.00032	0.0	0.0007	0.0075	0.426	1.1	6.4	0.030	2.6	0.0017	0.0022	21.8	0.0887
Jul	10338	0.00010	0.0741	0.0012	28.6	0.00038	0.0	0.0008	0.0081	0.464	1.2	6.3	0.030	2.8	0.0020	0.0025	26.7	0.1039
Aug	7298	0.00011	0.0785	0.0012	28.2	0.00046	0.0	0.0009	0.0096	0.563	1.3	6.2	0.031	3.0	0.0023	0.0028	32.9	0.1423
Sep	9770	0.00010	0.0748	0.0012	28.5	0.00038	0.0	0.0008	0.0083	0.477	1.2	6.3	0.030	2.8	0.0020	0.0025	27.0	0.1088
Oct	5136	0.00011	0.0819	0.0013	27.8	0.00056	0.0	0.0010	0.0109	0.646	1.4	6.2	0.032	3.3	0.0029	0.0033	41.9	0.1752
Nov	2378	0.00011	0.0895	0.0017	26.3	0.00095	0.0	0.0014	0.0144	0.865	2.0	5.9	0.034	4.6	0.0047	0.0051	74.5	0.2658
Dec	1778	0.00011	0.0943	0.0019	25.5	0.00123	0.0	0.0017	0.0167	1.001	2.4	5.7	0.036	5.5	0.0061	0.0065	98.5	0.3222
Total	70657																	

Location: Mouth of Rose Creek

	Flows	Ag	Al	As	Ca	Cd	Cl	Co	Cu	Fe	K	Mg	Mn	Na	Ni	Pb	SO4	Zn
	(x 1000 m3)	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L
Jan	1660	0.00012	0.1032	0.0020	25.4	0.00131	0.0	0.0018	0.0193	1.175	2.5	5.7	0.037	5.7	0.0065	0.0068	105.0	0.3873
Feb	1226	0.00013	0.1201	0.0022	24.4	0.00158	0.0	0.0022	0.0249	1.538	2.9	5.5	0.041	6.5	0.0078	0.0080	127.1	0.5262
Mar	1245	0.00014	0.1374	0.0024	24.0	0.00171	0.0	0.0024	0.0301	1.881	3.0	5.4	0.044	6.9	0.0084	0.0086	136.9	0.6540
Apr	2298	0.00012	0.1090	0.0017	26.6	0.00100	0.0	0.0016	0.0197	1.217	2.0	5.9	0.037	4.7	0.0049	0.0053	77.5	0.3934
May	19916	0.00010	0.0714	0.0011	29.1	0.00029	0.0	0.0007	0.0069	0.389	1.0	6.4	0.029	2.5	0.0016	0.0021	19.5	0.0739
Jun	20486	0.00010	0.0708	0.0011	29.0	0.00029	0.0	0.0007	0.0068	0.381	1.0	6.4	0.029	2.5	0.0015	0.0021	19.0	0.0712
Jul	14291	0.00010	0.0719	0.0011	28.8	0.00033	0.0	0.0007	0.0072	0.408	1.1	6.4	0.029	2.6	0.0017	0.0023	22.5	0.0823
Aug	10062	0.00010	0.0750	0.0012	28.5	0.00039	0.0	0.0008	0.0083	0.481	1.2	6.3	0.030	2.8	0.0020	0.0025	27.1	0.1103
Sep	13492	0.00010	0.0724	0.0011	28.8	0.00033	0.0	0.0008	0.0074	0.418	1.1	6.4	0.030	2.7	0.0017	0.0023	22.8	0.0859
Oct	7075	0.00011	0.0775	0.0012	28.3	0.00046	0.0	0.0009	0.0093	0.541	1.3	6.3	0.031	3.1	0.0024	0.0029	33.6	0.1342
Nov	3257	0.00011	0.0832	0.0015	27.2	0.00075	0.0	0.0012	0.0119	0.703	1.7	6.0	0.032	3.9	0.0038	0.0042	57.6	0.2010
Dec	2425	0.00011	0.0867	0.0017	26.6	0.00096	0.0	0.0014	0.0136	0.804	2.0	5.9	0.034	4.6	0.0048	0.0052	75.4	0.2431
Total	97432																	

Location: Mouth of Anvil Creek

	Flows	Ag	Al	As	Ca	Cd	Cl	Co	Cu	Fe	K	Mg	Mn	Na	Ni	Pb	SO4	Zn
	(x 1000 m3)	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L
Jan	4464	0.00011	0.0798	0.0014	28.0	0.00061	0.0	0.0011	0.0103	0.603	1.5	6.2	0.032	3.5	0.0031	0.0036	46.4	0.1601
Feb	3268	0.00011	0.0862	0.0015	27.7	0.00072	0.0	0.0012	0.0125	0.742	1.6	6.2	0.033	3.9	0.0036	0.0041	55.0	0.2133
Mar	3306	0.00011	0.0928	0.0015	27.5	0.00077	0.0	0.0013	0.0144	0.873	1.7	6.1	0.034	4.0	0.0038	0.0043	58.9	0.2623
Apr	6271	0.00011	0.0817	0.0013	28.5	0.00049	0.0	0.0009	0.0104	0.613	1.3	6.3	0.032	3.1	0.0025	0.0030	35.8	0.1604
May	55392	0.00010	0.0679	0.0010	29.4	0.00023	0.0	0.0006	0.0057	0.309	1.0	6.5	0.029	2.4	0.0013	0.0019	14.5	0.0430
Jun	56977	0.00010	0.0677	0.0010	29.4	0.00023	0.0	0.0006	0.0056	0.306	1.0	6.5	0.029	2.4	0.0013	0.0018	14.3	0.0420
Jul	39730	0.00010	0.0680	0.0010	29.3	0.00025	0.0	0.0007	0.0058	0.316	1.0	6.5	0.029	2.4	0.0013	0.0019	15.6	0.0460
Aug	27853	0.00010	0.0692	0.0011	29.2	0.00027	0.0	0.0007	0.0062	0.342	1.0	6.5	0.029	2.5	0.0014	0.0020	17.3	0.0562
Sep	37442	0.00010	0.0682	0.0010	29.3	0.00025	0.0	0.0007	0.0059	0.320	1.0	6.5	0.029	2.4	0.0013	0.0019	15.7	0.0473
Oct	19555	0.00010	0.0701	0.0011	29.1	0.00030	0.0	0.0007	0.0066	0.364	1.1	6.4	0.029	2.5	0.0016	0.0021	19.6	0.0649
Nov	8910	0.00010	0.0722	0.0012	28.7	0.00040	0.0	0.0008	0.0075	0.425	1.2	6.4	0.030	2.9	0.0021	0.0026	28.5	0.0897
Dec	6588	0.00010	0.0736	0.0012	28.5	0.00048	0.0	0.0009	0.0081	0.463	1.3	6.3	0.030	3.1	0.0025	0.0030	35.1	0.1056
Total	269756																	

FSN01 - Sensitivity Run - Rose Creek Tailings - Groundwater Collection 99 %
Summary Tables

Conditions: Future 1

Location: X2

	Flows	Ag	Al	As	Ca	Cd	Cl	Co	Cu	Fe	K	Mg	Mn	Na	Ni	Pb	SO4	Zn
	(x 1000 m3)	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L
Jan	661	0.00009	0.0603	0.0009	27.1	0.00018	0.0	0.0005	0.0046	0.242	0.8	6.0	0.026	2.1	0.0010	0.0016	10.7	0.0234
Feb	483	0.00009	0.0592	0.0009	26.6	0.00018	0.0	0.0005	0.0045	0.237	0.8	5.9	0.025	2.0	0.0010	0.0015	10.5	0.0230
Mar	485	0.00009	0.0589	0.0009	26.5	0.00018	0.0	0.0005	0.0045	0.236	0.8	5.8	0.025	2.0	0.0010	0.0015	10.5	0.0229
Apr	901	0.00010	0.0630	0.0010	28.3	0.00019	0.0	0.0006	0.0048	0.252	0.9	6.2	0.027	2.2	0.0011	0.0016	11.2	0.0245
May	8165	0.00010	0.0647	0.0010	29.1	0.00020	0.0	0.0006	0.0049	0.259	0.9	6.4	0.028	2.2	0.0011	0.0017	11.5	0.0251
Jun	8391	0.00010	0.0643	0.0010	28.9	0.00020	0.0	0.0006	0.0049	0.258	0.9	6.4	0.028	2.2	0.0011	0.0017	11.4	0.0250
Jul	5833	0.00010	0.0641	0.0010	28.8	0.00019	0.0	0.0006	0.0049	0.257	0.9	6.4	0.028	2.2	0.0011	0.0017	11.4	0.0249
Aug	4128	0.00010	0.0633	0.0010	28.4	0.00019	0.0	0.0006	0.0048	0.254	0.9	6.3	0.027	2.2	0.0011	0.0016	11.3	0.0246
Sep	5537	0.00010	0.0640	0.0010	28.8	0.00019	0.0	0.0006	0.0049	0.257	0.9	6.4	0.027	2.2	0.0011	0.0017	11.4	0.0249
Oct	2894	0.00010	0.0630	0.0010	28.3	0.00019	0.0	0.0006	0.0048	0.253	0.9	6.3	0.027	2.2	0.0011	0.0016	11.2	0.0245
Nov	1321	0.00009	0.0616	0.0009	27.6	0.00019	0.0	0.0006	0.0047	0.247	0.9	6.1	0.026	2.1	0.0010	0.0016	10.9	0.0239
Dec	977	0.00009	0.0618	0.0009	27.7	0.00019	0.0	0.0006	0.0047	0.248	0.9	6.1	0.027	2.1	0.0010	0.0016	11.0	0.0240
Total	39776																	

Location: X14

	Flows	Ag	Al	As	Ca	Cd	Cl	Co	Cu	Fe	K	Mg	Mn	Na	Ni	Pb	SO4	Zn
	(x 1000 m3)	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L
Jan	1225	0.00010	0.0578	0.0022	20.5	0.00165	0.0	0.0020	0.0083	0.418	3.1	4.6	0.031	7.0	0.0083	0.0087	57.9	0.1132
Feb	909	0.00010	0.0581	0.0025	18.5	0.00199	0.0	0.0023	0.0097	0.491	3.6	4.2	0.032	8.1	0.0100	0.0102	68.6	0.1454
Mar	925	0.00010	0.0606	0.0026	17.6	0.00213	0.0	0.0024	0.0109	0.569	3.8	4.0	0.033	8.5	0.0107	0.0109	73.1	0.1744
Apr	1681	0.00010	0.0645	0.0018	23.2	0.00123	0.0	0.0016	0.0085	0.453	2.4	5.2	0.031	5.6	0.0062	0.0066	44.5	0.1136
May	14403	0.00010	0.0654	0.0011	28.6	0.00032	0.0	0.0007	0.0054	0.288	1.1	6.3	0.028	2.7	0.0017	0.0023	15.6	0.0371
Jun	14816	0.00010	0.0651	0.0011	28.5	0.00031	0.0	0.0007	0.0054	0.285	1.1	6.3	0.028	2.6	0.0017	0.0022	15.3	0.0363
Jul	10338	0.00010	0.0647	0.0011	28.2	0.00037	0.0	0.0008	0.0055	0.290	1.2	6.2	0.028	2.8	0.0019	0.0025	17.1	0.0391
Aug	7297	0.00010	0.0644	0.0012	27.6	0.00044	0.0	0.0008	0.0057	0.303	1.3	6.1	0.028	3.0	0.0023	0.0028	19.3	0.0457
Sep	9770	0.00010	0.0648	0.0011	28.1	0.00037	0.0	0.0008	0.0055	0.292	1.2	6.2	0.028	2.8	0.0020	0.0025	17.2	0.0399
Oct	5136	0.00010	0.0639	0.0013	27.0	0.00055	0.0	0.0009	0.0060	0.314	1.4	6.0	0.029	3.4	0.0028	0.0033	22.6	0.0516
Nov	2379	0.00010	0.0607	0.0016	24.6	0.00092	0.0	0.0013	0.0066	0.335	2.0	5.5	0.029	4.6	0.0047	0.0051	34.5	0.0682
Dec	1779	0.00010	0.0589	0.0018	23.2	0.00120	0.0	0.0015	0.0070	0.348	2.4	5.2	0.030	5.5	0.0061	0.0065	43.4	0.0790
Total	70657																	

Location: Mouth of Rose Creek

	Flows	Ag	Al	As	Ca	Cd	Cl	Co	Cu	Fe	K	Mg	Mn	Na	Ni	Pb	SO4	Zn
	(x 1000 m3)	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L
Jan	1661	0.00010	0.0599	0.0019	22.9	0.00127	0.0	0.0016	0.0075	0.377	2.5	5.1	0.030	5.8	0.0064	0.0068	45.8	0.0902
Feb	1226	0.00010	0.0601	0.0021	21.4	0.00153	0.0	0.0019	0.0085	0.432	2.9	4.8	0.031	6.6	0.0077	0.0080	53.8	0.1144
Mar	1245	0.00010	0.0620	0.0022	20.7	0.00164	0.0	0.0020	0.0094	0.490	3.0	4.6	0.032	6.9	0.0082	0.0085	57.3	0.1361
Apr	2298	0.00010	0.0649	0.0016	24.9	0.00095	0.0	0.0013	0.0076	0.402	2.0	5.5	0.030	4.7	0.0048	0.0053	35.7	0.0899
May	19915	0.00010	0.0655	0.0011	28.9	0.00029	0.0	0.0007	0.0053	0.281	1.0	6.4	0.028	2.5	0.0015	0.0021	14.5	0.0339
Jun	20485	0.00010	0.0653	0.0011	28.8	0.00028	0.0	0.0007	0.0053	0.280	1.0	6.4	0.028	2.5	0.0015	0.0021	14.3	0.0333
Jul	14291	0.00010	0.0650	0.0011	28.6	0.00032	0.0	0.0007	0.0054	0.283	1.1	6.3	0.028	2.7	0.0017	0.0023	15.6	0.0354
Aug	10062	0.00010	0.0648	0.0011	28.1	0.00038	0.0	0.0008	0.0055	0.293	1.2	6.2	0.028	2.8	0.0020	0.0025	17.2	0.0402
Sep	13491	0.00010	0.0651	0.0011	28.5	0.00033	0.0	0.0007	0.0054	0.284	1.1	6.3	0.028	2.7	0.0017	0.0023	15.7	0.0360
Oct	7075	0.00010	0.0645	0.0012	27.7	0.00045	0.0	0.0008	0.0057	0.300	1.3	6.1	0.029	3.1	0.0023	0.0029	19.6	0.0445
Nov	3258	0.00010	0.0621	0.0014	26.0	0.00073	0.0	0.0011	0.0061	0.316	1.7	5.8	0.029	4.0	0.0037	0.0042	28.4	0.0567
Dec	2426	0.00010	0.0607	0.0016	24.9	0.00093	0.0	0.0013	0.0064	0.325	2.0	5.5	0.029	4.6	0.0047	0.0052	35.0	0.0647
Total	97432																	

Location: Mouth of Anvil Creek

	Flows	Ag	Al	As	Ca	Cd	Cl	Co	Cu	Fe	K	Mg	Mn	Na	Ni	Pb	SO4	Zn
	(x 1000 m3)	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L
Jan	4465	0.00010	0.0637	0.0013	27.1	0.00060	0.0	0.0010	0.0059	0.306	1.5	6.0	0.029	3.6	0.0031	0.0036	24.4	0.0496
Feb	3268	0.00010	0.0637	0.0014	26.5	0.00070	0.0	0.0011	0.0063	0.327	1.7	5.9	0.029	3.9	0.0036	0.0041	27.5	0.0589
Mar	3306	0.00010	0.0644	0.0014	26.2	0.00074	0.0	0.0011	0.0067	0.349	1.7	5.8	0.030	4.0	0.0038	0.0043	28.9	0.0672
Apr	6271	0.00010	0.0655	0.0012	27.9	0.00048	0.0	0.0009	0.0059	0.315	1.3	6.2	0.029	3.2	0.0025	0.0030	20.5	0.0492
May	55391	0.00010	0.0658	0.0010	29.3	0.00023	0.0	0.0006	0.0051	0.270	1.0	6.5	0.028	2.4	0.0013	0.0019	12.7	0.0286
Jun	56976	0.00010	0.0657	0.0010	29.3	0.00023	0.0	0.0006	0.0051	0.270	1.0	6.5	0.028	2.4	0.0012	0.0018	12.6	0.0284
Jul	39729	0.00010	0.0656	0.0010	29.2	0.00024	0.0	0.0006	0.0051	0.271	1.0	6.5	0.028	2.4	0.0013	0.0019	13.1	0.0291
Aug	27853	0.00010	0.0655	0.0010	29.1	0.00026	0.0	0.0007	0.0052	0.274	1.0	6.4	0.028	2.5	0.0014	0.0020	13.7	0.0309
Sep	37441	0.00010	0.0656	0.0010	29.2	0.00025	0.0	0.0006	0.0051	0.271	1.0	6.5	0.028	2.4	0.0013	0.0019	13.1	0.0293
Oct	19555	0.00010	0.0654	0.0011	28.9	0.00029	0.0	0.0007	0.0053	0.277	1.1	6.4	0.028	2.6	0.0015	0.0021	14.6	0.0324
Nov	8911	0.00010	0.0645	0.0012	28.3	0.00039	0.0	0.0008	0.0054	0.283	1.2	6.2	0.029	2.9	0.0021	0.0026	17.8	0.0370
Dec	6590	0.00010	0.0640	0.0012	27.9	0.00047	0.0	0.0009	0.0055	0.287	1.3	6.2	0.029	3.1	0.0024	0.0030	20.3	0.0400
Total	269756																	

FSN01 - Sensitivity Run - Rose Creek Tailings - Groundwater Collection 99 %
Summary Tables
Conditions Future 2

Location X2

	Flows	Ag	Al	As	Ca	Cd	Cl	Co	Cu	Fe	K	Mg	Mn	Na	Ni	Pb	SO4	Zn
	(x 1000 m3)	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L
Jan	661	0.00009	0.0603	0.0009	27.1	0.00018	0.0	0.0005	0.0046	0.242	0.8	6.0	0.026	2.1	0.0010	0.0016	10.7	0.0234
Feb	483	0.00009	0.0592	0.0009	26.6	0.00018	0.0	0.0005	0.0045	0.237	0.8	5.9	0.025	2.0	0.0010	0.0015	10.5	0.0230
Mar	485	0.00009	0.0589	0.0009	26.5	0.00018	0.0	0.0005	0.0045	0.236	0.8	5.8	0.025	2.0	0.0010	0.0015	10.5	0.0229
Apr	901	0.00010	0.0630	0.0010	28.3	0.00019	0.0	0.0006	0.0048	0.252	0.9	6.2	0.027	2.2	0.0011	0.0016	11.2	0.0245
May	8165	0.00010	0.0647	0.0010	29.1	0.00020	0.0	0.0006	0.0049	0.259	0.9	6.4	0.028	2.2	0.0011	0.0017	11.5	0.0251
Jun	8391	0.00010	0.0643	0.0010	28.9	0.00020	0.0	0.0006	0.0049	0.258	0.9	6.4	0.028	2.2	0.0011	0.0017	11.4	0.0250
Jul	5833	0.00010	0.0641	0.0010	28.8	0.00019	0.0	0.0006	0.0049	0.257	0.9	6.4	0.028	2.2	0.0011	0.0017	11.4	0.0249
Aug	4128	0.00010	0.0633	0.0010	28.4	0.00019	0.0	0.0006	0.0048	0.254	0.9	6.3	0.027	2.2	0.0011	0.0016	11.3	0.0246
Sep	5537	0.00010	0.0640	0.0010	28.8	0.00019	0.0	0.0006	0.0049	0.257	0.9	6.4	0.027	2.2	0.0011	0.0017	11.4	0.0249
Oct	2894	0.00010	0.0630	0.0010	28.3	0.00019	0.0	0.0006	0.0048	0.253	0.9	6.3	0.027	2.2	0.0011	0.0016	11.2	0.0245
Nov	1321	0.00009	0.0616	0.0009	27.6	0.00019	0.0	0.0006	0.0047	0.247	0.9	6.1	0.026	2.1	0.0010	0.0016	10.9	0.0239
Dec	977	0.00009	0.0618	0.0009	27.7	0.00019	0.0	0.0006	0.0047	0.248	0.9	6.1	0.027	2.1	0.0010	0.0016	11.0	0.0240
Total	39776																	

Location X14

	Flows	Ag	Al	As	Ca	Cd	Cl	Co	Cu	Fe	K	Mg	Mn	Na	Ni	Pb	SO4	Zn
	(x 1000 m3)	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L
Jan	1225	0.00010	0.0630	0.0022	21.3	0.00166	0.0	0.0020	0.0098	0.515	3.1	4.8	0.032	7.0	0.0083	0.0087	74.4	0.1615
Feb	909	0.00010	0.0653	0.0025	19.5	0.00200	0.0	0.0023	0.0116	0.624	3.6	4.4	0.033	8.1	0.0100	0.0103	88.9	0.2121
Mar	925	0.00011	0.0697	0.0026	18.6	0.00214	0.0	0.0025	0.0134	0.736	3.8	4.2	0.034	8.5	0.0107	0.0109	95.1	0.2581
Apr	1681	0.00010	0.0699	0.0019	23.7	0.00124	0.0	0.0016	0.0100	0.553	2.4	5.3	0.032	5.6	0.0062	0.0066	56.2	0.1634
May	14403	0.00010	0.0661	0.0011	28.7	0.00032	0.0	0.0007	0.0056	0.301	1.1	6.3	0.029	2.7	0.0017	0.0023	17.0	0.0437
Jun	14816	0.00010	0.0658	0.0011	28.6	0.00032	0.0	0.0007	0.0056	0.298	1.1	6.3	0.028	2.6	0.0017	0.0022	16.6	0.0426
Jul	10338	0.00010	0.0655	0.0011	28.3	0.00037	0.0	0.0008	0.0057	0.305	1.2	6.2	0.029	2.8	0.0019	0.0025	19.0	0.0469
Aug	7297	0.00010	0.0657	0.0012	27.7	0.00044	0.0	0.0008	0.0061	0.327	1.3	6.1	0.029	3.0	0.0023	0.0028	22.1	0.0573
Sep	9770	0.00010	0.0657	0.0011	28.2	0.00038	0.0	0.0008	0.0058	0.308	1.2	6.2	0.029	2.8	0.0020	0.0025	19.2	0.0482
Oct	5136	0.00010	0.0655	0.0013	27.2	0.00055	0.0	0.0009	0.0064	0.344	1.4	6.0	0.029	3.4	0.0028	0.0033	26.6	0.0665
Nov	2379	0.00010	0.0633	0.0016	25.0	0.00092	0.0	0.0013	0.0073	0.382	2.0	5.6	0.030	4.6	0.0047	0.0051	42.8	0.0919
Dec	1779	0.00010	0.0620	0.0018	23.7	0.00120	0.0	0.0015	0.0078	0.406	2.4	5.3	0.030	5.5	0.0061	0.0065	54.8	0.1082
Total	70657																	

Location Mouth of Rose Creek

	Flows	Ag	Al	As	Ca	Cd	Cl	Co	Cu	Fe	K	Mg	Mn	Na	Ni	Pb	SO4	Zn
	(x 1000 m3)	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L
Jan	1661	0.00010	0.0638	0.0019	23.5	0.00128	0.0	0.0016	0.0085	0.449	2.5	5.2	0.031	5.8	0.0064	0.0068	58.0	0.1259
Feb	1226	0.00010	0.0655	0.0021	22.1	0.00153	0.0	0.0019	0.0099	0.531	2.9	4.9	0.032	6.6	0.0077	0.0080	68.9	0.1638
Mar	1245	0.00010	0.0688	0.0022	21.4	0.00164	0.0	0.0020	0.0112	0.615	3.0	4.8	0.033	6.9	0.0082	0.0086	73.6	0.1983
Apr	2298	0.00010	0.0688	0.0016	25.3	0.00096	0.0	0.0013	0.0087	0.475	2.0	5.6	0.031	4.7	0.0048	0.0053	44.2	0.1264
May	19915	0.00010	0.0661	0.0011	28.9	0.00029	0.0	0.0007	0.0055	0.291	1.0	6.4	0.028	2.5	0.0015	0.0021	15.5	0.0387
Jun	20485	0.00010	0.0658	0.0011	28.8	0.00028	0.0	0.0007	0.0054	0.289	1.0	6.4	0.028	2.5	0.0015	0.0021	15.3	0.0379
Jul	14291	0.00010	0.0656	0.0011	28.6	0.00032	0.0	0.0007	0.0055	0.294	1.1	6.3	0.028	2.7	0.0017	0.0023	17.0	0.0410
Aug	10062	0.00010	0.0658	0.0011	28.2	0.00038	0.0	0.0008	0.0058	0.310	1.2	6.2	0.029	2.8	0.0020	0.0025	19.3	0.0486
Sep	13491	0.00010	0.0657	0.0011	28.6	0.00033	0.0	0.0007	0.0056	0.296	1.1	6.3	0.028	2.7	0.0017	0.0023	17.1	0.0420
Oct	7075	0.00010	0.0656	0.0012	27.8	0.00045	0.0	0.0008	0.0060	0.322	1.3	6.2	0.029	3.1	0.0023	0.0029	22.5	0.0553
Nov	3258	0.00010	0.0640	0.0014	26.2	0.00073	0.0	0.0011	0.0067	0.350	1.7	5.8	0.029	4.0	0.0037	0.0042	34.4	0.0741
Dec	2426	0.00010	0.0631	0.0016	25.3	0.00094	0.0	0.0013	0.0071	0.368	2.0	5.6	0.030	4.6	0.0047	0.0052	43.3	0.0861
Total	97432																	

Location Mouth of Anvil Creek

	Flows	Ag	Al	As	Ca	Cd	Cl	Co	Cu	Fe	K	Mg	Mn	Na	Ni	Pb	SO4	Zn
	(x 1000 m3)	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L
Jan	4465	0.00010	0.0651	0.0013	27.3	0.00060	0.0	0.0010	0.0063	0.333	1.5	6.1	0.029	3.6	0.0031	0.0036	28.9	0.0629
Feb	3268	0.00010	0.0657	0.0014	26.8	0.00070	0.0	0.0011	0.0068	0.364	1.7	5.9	0.030	3.9	0.0036	0.0041	33.2	0.0774
Mar	3306	0.00010	0.0670	0.0015	26.5	0.00074	0.0	0.0011	0.0074	0.396	1.7	5.9	0.030	4.0	0.0038	0.0043	35.0	0.0907
Apr	6271	0.00010	0.0670	0.0012	28.0	0.00048	0.0	0.0009	0.0063	0.341	1.3	6.2	0.029	3.2	0.0025	0.0030	23.6	0.0625
May	55391	0.00010	0.0660	0.0010	29.4	0.00023	0.0	0.0006	0.0052	0.274	1.0	6.5	0.028	2.4	0.0013	0.0019	13.1	0.0303
Jun	56976	0.00010	0.0659	0.0010	29.3	0.00023	0.0	0.0006	0.0051	0.273	1.0	6.5	0.028	2.4	0.0012	0.0018	13.0	0.0300
Jul	39729	0.00010	0.0658	0.0010	29.2	0.00024	0.0	0.0006	0.0052	0.275	1.0	6.5	0.028	2.4	0.0013	0.0019	13.6	0.0311
Aug	27853	0.00010	0.0658	0.0010	29.1	0.00026	0.0	0.0007	0.0053	0.281	1.0	6.4	0.028	2.5	0.0014	0.0020	14.4	0.0339
Sep	37441	0.00010	0.0658	0.0010	29.2	0.00025	0.0	0.0006	0.0052	0.276	1.0	6.5	0.028	2.4	0.0013	0.0019	13.7	0.0315
Oct	19555	0.00010	0.0658	0.0011	29.0	0.00029	0.0	0.0007	0.0054	0.285	1.1	6.4	0.028	2.6	0.0015	0.0021	15.6	0.0363
Nov	8911	0.00010	0.0652	0.0012	28.4	0.00039	0.0	0.0008	0.0056	0.296	1.2	6.3	0.029	2.9	0.0021	0.0026	20.0	0.0433
Dec	6590	0.00010	0.0649	0.0012	28.0	0.00047	0.0	0.0009	0.0058	0.302	1.3	6.2	0.029	3.1	0.0024	0.0030	23.3	0.0479
Total	269756																	

FSN01 - Sensitivity Run - Rose Creek Tailings - Groundwater Collection 99 %

Conditions Future 3

Location X2

	Flows (x 1000 m3)	Ag mg/L	Al mg/L	As mg/L	Ca mg/L	Cd mg/L	Cl mg/L	Co mg/L	Cu mg/L	Fe mg/L	K mg/L	Mg mg/L	Mn mg/L	Na mg/L	Ni mg/L	Pb mg/L	SO4 mg/L	Zn mg/L
Jan	661	0.00009	0.0603	0.0009	27.1	0.00018	0.0	0.0005	0.0046	0.242	0.8	6.0	0.026	2.1	0.0010	0.0016	10.7	0.0234
Feb	483	0.00009	0.0592	0.0009	26.6	0.00018	0.0	0.0005	0.0045	0.237	0.8	5.9	0.025	2.0	0.0010	0.0015	10.5	0.0230
Mar	485	0.00009	0.0589	0.0009	26.5	0.00018	0.0	0.0005	0.0045	0.236	0.8	5.8	0.025	2.0	0.0010	0.0015	10.5	0.0229
Apr	901	0.00010	0.0630	0.0010	28.3	0.00019	0.0	0.0006	0.0048	0.252	0.9	6.2	0.027	2.2	0.0011	0.0016	11.2	0.0245
May	8165	0.00010	0.0647	0.0010	29.1	0.00020	0.0	0.0006	0.0049	0.259	0.9	6.4	0.028	2.2	0.0011	0.0017	11.5	0.0251
Jun	8391	0.00010	0.0643	0.0010	28.9	0.00020	0.0	0.0006	0.0049	0.258	0.9	6.4	0.028	2.2	0.0011	0.0017	11.4	0.0250
Jul	5833	0.00010	0.0641	0.0010	28.8	0.00019	0.0	0.0006	0.0049	0.257	0.9	6.4	0.028	2.2	0.0011	0.0017	11.4	0.0249
Aug	4128	0.00010	0.0633	0.0010	28.4	0.00019	0.0	0.0006	0.0048	0.254	0.9	6.3	0.027	2.2	0.0011	0.0016	11.3	0.0246
Sep	5537	0.00010	0.0640	0.0010	28.8	0.00019	0.0	0.0006	0.0049	0.257	0.9	6.4	0.027	2.2	0.0011	0.0017	11.4	0.0249
Oct	2894	0.00010	0.0630	0.0010	28.3	0.00019	0.0	0.0006	0.0048	0.253	0.9	6.3	0.027	2.2	0.0011	0.0016	11.2	0.0245
Nov	1321	0.00009	0.0616	0.0009	27.6	0.00019	0.0	0.0006	0.0047	0.247	0.9	6.1	0.026	2.1	0.0010	0.0016	10.9	0.0239
Dec	977	0.00009	0.0618	0.0009	27.7	0.00019	0.0	0.0006	0.0047	0.248	0.9	6.1	0.027	2.1	0.0010	0.0016	11.0	0.0240
Total	39776																	

Location X14

	Flows (x 1000 m3)	Ag mg/L	Al mg/L	As mg/L	Ca mg/L	Cd mg/L	Cl mg/L	Co mg/L	Cu mg/L	Fe mg/L	K mg/L	Mg mg/L	Mn mg/L	Na mg/L	Ni mg/L	Pb mg/L	SO4 mg/L	Zn mg/L
Jan	1225	0.00011	0.0804	0.0022	23.8	0.00168	0.0	0.0021	0.0145	0.834	3.1	5.4	0.035	7.0	0.0084	0.0087	138.0	0.2743
Feb	909	0.00011	0.0893	0.0026	22.6	0.00203	0.0	0.0025	0.0182	1.066	3.6	5.2	0.037	8.1	0.0101	0.0103	167.1	0.3676
Mar	925	0.00012	0.0998	0.0027	22.0	0.00218	0.0	0.0027	0.0216	1.290	3.8	5.0	0.039	8.5	0.0108	0.0110	179.5	0.4533
Apr	1681	0.00011	0.0878	0.0019	25.5	0.00126	0.0	0.0017	0.0149	0.882	2.4	5.7	0.035	5.6	0.0063	0.0066	101.2	0.2796
May	14403	0.00010	0.0685	0.0011	28.9	0.00033	0.0	0.0007	0.0063	0.345	1.1	6.4	0.029	2.7	0.0017	0.0023	22.4	0.0592
Jun	14816	0.00010	0.0680	0.0011	28.8	0.00032	0.0	0.0007	0.0062	0.340	1.1	6.4	0.029	2.6	0.0017	0.0022	21.7	0.0573
Jul	10338	0.00010	0.0683	0.0011	28.6	0.00037	0.0	0.0008	0.0065	0.357	1.2	6.3	0.029	2.8	0.0020	0.0025	26.6	0.0650
Aug	7297	0.00010	0.0699	0.0012	28.2	0.00045	0.0	0.0009	0.0072	0.403	1.3	6.2	0.029	3.0	0.0023	0.0028	32.8	0.0844
Sep	9770	0.00010	0.0687	0.0011	28.5	0.00038	0.0	0.0008	0.0066	0.363	1.2	6.3	0.029	2.8	0.0020	0.0025	27.0	0.0675
Oct	5136	0.00010	0.0709	0.0013	27.8	0.00055	0.0	0.0010	0.0079	0.442	1.4	6.2	0.030	3.4	0.0028	0.0033	41.8	0.1011
Nov	2379	0.00010	0.0718	0.0016	26.3	0.00093	0.0	0.0013	0.0096	0.539	2.0	5.9	0.031	4.6	0.0047	0.0052	74.5	0.1473
Dec	1779	0.00010	0.0725	0.0018	25.5	0.00122	0.0	0.0016	0.0107	0.599	2.4	5.7	0.032	5.5	0.0061	0.0065	98.5	0.1762
Total	70657																	

Location Mouth of Rose Creek

	Flows (x 1000 m3)	Ag mg/L	Al mg/L	As mg/L	Ca mg/L	Cd mg/L	Cl mg/L	Co mg/L	Cu mg/L	Fe mg/L	K mg/L	Mg mg/L	Mn mg/L	Na mg/L	Ni mg/L	Pb mg/L	SO4 mg/L	Zn mg/L
Jan	1661	0.00011	0.0766	0.0019	25.4	0.00129	0.0	0.0017	0.0120	0.685	2.5	5.7	0.033	5.8	0.0065	0.0068	104.9	0.2090
Feb	1226	0.00011	0.0832	0.0022	24.4	0.00155	0.0	0.0020	0.0148	0.858	2.9	5.5	0.035	6.6	0.0077	0.0081	126.9	0.2791
Mar	1245	0.00011	0.0911	0.0023	24.0	0.00167	0.0	0.0021	0.0174	1.026	3.0	5.4	0.036	6.9	0.0083	0.0086	136.4	0.3434
Apr	2298	0.00011	0.0819	0.0017	26.6	0.00097	0.0	0.0014	0.0123	0.716	2.0	5.9	0.033	4.7	0.0049	0.0053	77.2	0.2114
May	19915	0.00010	0.0678	0.0011	29.1	0.00029	0.0	0.0007	0.0059	0.323	1.0	6.4	0.029	2.5	0.0015	0.0021	19.5	0.0499
Jun	20485	0.00010	0.0674	0.0011	29.0	0.00029	0.0	0.0007	0.0059	0.319	1.0	6.4	0.029	2.5	0.0015	0.0021	19.0	0.0485
Jul	14291	0.00010	0.0677	0.0011	28.8	0.00033	0.0	0.0007	0.0061	0.331	1.1	6.4	0.029	2.7	0.0017	0.0023	22.5	0.0541
Aug	10062	0.00010	0.0688	0.0011	28.5	0.00038	0.0	0.0008	0.0066	0.365	1.2	6.3	0.029	2.8	0.0020	0.0025	27.0	0.0682
Sep	13491	0.00010	0.0679	0.0011	28.8	0.00033	0.0	0.0007	0.0061	0.336	1.1	6.4	0.029	2.7	0.0017	0.0023	22.8	0.0559
Oct	7075	0.00010	0.0695	0.0012	28.3	0.00046	0.0	0.0009	0.0071	0.393	1.3	6.3	0.029	3.1	0.0024	0.0029	33.5	0.0804
Nov	3258	0.00010	0.0702	0.0014	27.2	0.00074	0.0	0.0011	0.0084	0.465	1.7	6.0	0.030	4.0	0.0037	0.0042	57.5	0.1145
Dec	2426	0.00010	0.0708	0.0016	26.6	0.00094	0.0	0.0013	0.0092	0.510	2.0	5.9	0.031	4.6	0.0048	0.0052	75.4	0.1361
Total	97432																	

Location Mouth of Anvil Creek

	Flows (x 1000 m3)	Ag mg/L	Al mg/L	As mg/L	Ca mg/L	Cd mg/L	Cl mg/L	Co mg/L	Cu mg/L	Fe mg/L	K mg/L	Mg mg/L	Mn mg/L	Na mg/L	Ni mg/L	Pb mg/L	SO4 mg/L	Zn mg/L
Jan	4465	0.00010	0.0699	0.0013	28.0	0.00061	0.0	0.0010	0.0076	0.421	1.5	6.2	0.030	3.6	0.0031	0.0036	46.4	0.0938
Feb	3268	0.00010	0.0724	0.0014	27.6	0.00071	0.0	0.0011	0.0087	0.487	1.7	6.2	0.031	3.9	0.0036	0.0041	54.9	0.1207
Mar	3306	0.00011	0.0754	0.0015	27.5	0.00075	0.0	0.0012	0.0097	0.551	1.7	6.1	0.031	4.0	0.0038	0.0043	58.7	0.1453
Apr	6271	0.00010	0.0718	0.0012	28.5	0.00048	0.0	0.0009	0.0077	0.430	1.3	6.3	0.030	3.2	0.0025	0.0030	35.7	0.0937
May	55391	0.00010	0.0666	0.0010	29.4	0.00023	0.0	0.0006	0.0053	0.285	1.0	6.5	0.028	2.4	0.0013	0.0019	14.5	0.0343
Jun	56976	0.00010	0.0665	0.0010	29.4	0.00023	0.0	0.0006	0.0053	0.284	1.0	6.5	0.028	2.4	0.0012	0.0018	14.3	0.0338
Jul	39729	0.00010	0.0665	0.0010	29.3	0.00025	0.0	0.0006	0.0054	0.288	1.0	6.5	0.028	2.4	0.0013	0.0019	15.6	0.0359
Aug	27853	0.00010	0.0669	0.0011	29.2	0.00027	0.0	0.0007	0.0056	0.301	1.0	6.5	0.029	2.5	0.0014	0.0020	17.2	0.0410
Sep	37441	0.00010	0.0666	0.0010	29.3	0.00025	0.0	0.0006	0.0054	0.290	1.0	6.5	0.028	2.4	0.0013	0.0019	15.7	0.0365
Oct	19555	0.00010	0.0672	0.0011	29.1	0.00029	0.0	0.0007	0.0058	0.311	1.1	6.4	0.029	2.6	0.0016	0.0021	19.6	0.0454
Nov	8911	0.00010	0.0675	0.0012	28.7	0.00040	0.0	0.0008	0.0062	0.338	1.2	6.4	0.029	2.9	0.0021	0.0026	28.5	0.0581
Dec	6590	0.00010	0.0677	0.0012	28.5	0.00047	0.0	0.0009	0.0065	0.355	1.3	6.3	0.029	3.1	0.0025	0.0030	35.2	0.0663
Total	269756																	

FM04 - Supplemental Base Case - Faro Mine Site
Summary Tables
Conditions FUTURE1

Location X2

	Flows	Ag	Al	As	Ca	Cd	Cl	Co	Cu	Fe	K	Mg	Mn	Na	Ni	Pb	SO4	Zn
	(x 1000 m3)	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L
Jan	553	0.00011	0.0755	0.0016	29.8	0.00044	0.0	0.0008	0.0081	0.360	0.9	6.7	0.043	2.3	0.0014	0.0019	13.5	0.1798
Feb	403	0.00011	0.0778	0.0017	29.8	0.00049	0.0	0.0009	0.0088	0.383	0.9	6.8	0.046	2.3	0.0015	0.0019	13.9	0.2157
Mar	407	0.00012	0.0808	0.0019	29.9	0.00056	0.0	0.0010	0.0098	0.413	0.9	6.8	0.051	2.3	0.0016	0.0020	14.5	0.2637
Apr	784	0.00011	0.0763	0.0016	29.8	0.00045	0.0	0.0009	0.0083	0.368	0.9	6.7	0.044	2.3	0.0015	0.0019	13.6	0.1916
May	6991	0.00010	0.0673	0.0011	29.6	0.00023	0.0	0.0006	0.0054	0.278	0.9	6.6	0.030	2.3	0.0011	0.0017	12.0	0.0477
Jun	7191	0.00010	0.0676	0.0011	29.6	0.00024	0.0	0.0006	0.0055	0.281	0.9	6.6	0.031	2.3	0.0012	0.0017	12.0	0.0531
Jul	5013	0.00010	0.0680	0.0011	29.6	0.00025	0.0	0.0007	0.0057	0.285	0.9	6.6	0.031	2.3	0.0012	0.0017	12.1	0.0591
Aug	3506	0.00010	0.0681	0.0011	29.6	0.00025	0.0	0.0007	0.0057	0.286	0.9	6.6	0.032	2.3	0.0012	0.0017	12.1	0.0607
Sep	4720	0.00010	0.0676	0.0011	29.6	0.00024	0.0	0.0006	0.0055	0.281	0.9	6.6	0.031	2.3	0.0012	0.0017	12.0	0.0526
Oct	2460	0.00010	0.0684	0.0011	29.6	0.00026	0.0	0.0007	0.0058	0.289	0.9	6.6	0.032	2.3	0.0012	0.0017	12.2	0.0650
Nov	1115	0.00011	0.0712	0.0013	29.7	0.00033	0.0	0.0007	0.0067	0.317	0.9	6.6	0.036	2.3	0.0013	0.0018	12.7	0.1099
Dec	821	0.00011	0.0732	0.0014	29.7	0.00038	0.0	0.0008	0.0073	0.337	0.9	6.7	0.039	2.3	0.0014	0.0018	13.1	0.1418
Total	33964																	

Location X14

	Flows	Ag	Al	As	Ca	Cd	Cl	Co	Cu	Fe	K	Mg	Mn	Na	Ni	Pb	SO4	Zn
	(x 1000 m3)	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L
Jan	1192	0.00008	0.0484	0.0016	25.8	0.00089	0.0	0.0011	0.0057	0.221	1.6	9.8	0.030	3.7	0.0039	0.0042	54.2	0.1200
Feb	912	0.00007	0.0427	0.0016	24.0	0.00101	0.0	0.0012	0.0056	0.203	1.7	10.2	0.030	3.9	0.0044	0.0047	61.9	0.1355
Mar	981	0.00007	0.0396	0.0017	22.3	0.00104	0.0	0.0012	0.0057	0.197	1.7	10.0	0.030	3.8	0.0045	0.0047	62.5	0.1540
Apr	1784	0.00008	0.0518	0.0014	25.0	0.00068	0.0	0.0009	0.0058	0.236	1.3	8.2	0.031	3.0	0.0029	0.0033	38.8	0.1209
May	14480	0.00010	0.0640	0.0011	28.9	0.00026	0.0	0.0006	0.0051	0.261	1.0	6.7	0.029	2.4	0.0013	0.0019	15.1	0.0396
Jun	14796	0.00010	0.0643	0.0011	29.0	0.00027	0.0	0.0006	0.0052	0.263	1.0	6.7	0.029	2.4	0.0013	0.0019	15.0	0.0432
Jul	10302	0.00010	0.0638	0.0011	28.9	0.00029	0.0	0.0007	0.0052	0.262	1.0	6.9	0.029	2.4	0.0014	0.0020	16.6	0.0471
Aug	7268	0.00010	0.0623	0.0011	28.5	0.00032	0.0	0.0007	0.0052	0.256	1.0	7.0	0.029	2.5	0.0016	0.0021	18.6	0.0477
Sep	9748	0.00010	0.0634	0.0011	28.8	0.00029	0.0	0.0007	0.0051	0.259	1.0	6.9	0.029	2.4	0.0014	0.0020	16.7	0.0427
Oct	5108	0.00009	0.0609	0.0011	28.2	0.00036	0.0	0.0007	0.0051	0.251	1.1	7.2	0.029	2.6	0.0018	0.0023	21.5	0.0503
Nov	2303	0.00009	0.0576	0.0013	27.7	0.00055	0.0	0.0009	0.0055	0.247	1.3	8.2	0.030	3.0	0.0025	0.0030	33.1	0.0797
Dec	1705	0.00009	0.0555	0.0015	27.5	0.00070	0.0	0.0010	0.0057	0.244	1.4	9.0	0.031	3.3	0.0031	0.0035	41.8	0.1002
Total	70579																	

Location Mouth of Rose Creek

	Flows	Ag	Al	As	Ca	Cd	Cl	Co	Cu	Fe	K	Mg	Mn	Na	Ni	Pb	SO4	Zn
	(x 1000 m3)	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L
Jan	1628	0.00009	0.0531	0.0014	26.8	0.00070	0.0	0.0010	0.0055	0.233	1.4	9.0	0.030	3.3	0.0032	0.0036	42.9	0.0947
Feb	1230	0.00008	0.0487	0.0015	25.4	0.00080	0.0	0.0010	0.0054	0.219	1.5	9.3	0.029	3.5	0.0036	0.0039	49.0	0.1071
Mar	1301	0.00008	0.0461	0.0015	24.1	0.00083	0.0	0.0011	0.0055	0.213	1.5	9.1	0.029	3.4	0.0037	0.0039	50.0	0.1224
Apr	2402	0.00009	0.0554	0.0013	26.2	0.00056	0.0	0.0009	0.0056	0.244	1.2	7.8	0.030	2.8	0.0025	0.0029	31.8	0.0964
May	19992	0.00010	0.0645	0.0010	29.1	0.00025	0.0	0.0006	0.0051	0.262	1.0	6.7	0.029	2.3	0.0013	0.0018	14.2	0.0357
Jun	20466	0.00010	0.0648	0.0010	29.1	0.00025	0.0	0.0006	0.0051	0.263	1.0	6.7	0.029	2.3	0.0013	0.0018	14.1	0.0384
Jul	14254	0.00010	0.0644	0.0011	29.1	0.00027	0.0	0.0007	0.0052	0.263	1.0	6.8	0.029	2.4	0.0013	0.0019	15.3	0.0411
Aug	10032	0.00010	0.0633	0.0011	28.8	0.00029	0.0	0.0007	0.0051	0.258	1.0	6.9	0.029	2.4	0.0014	0.0020	16.7	0.0416
Sep	13469	0.00010	0.0641	0.0011	29.0	0.00026	0.0	0.0006	0.0051	0.261	1.0	6.8	0.029	2.4	0.0013	0.0019	15.3	0.0380
Oct	7047	0.00010	0.0623	0.0011	28.6	0.00032	0.0	0.0007	0.0051	0.255	1.0	7.0	0.029	2.5	0.0016	0.0021	18.8	0.0435
Nov	3181	0.00009	0.0599	0.0012	28.2	0.00046	0.0	0.0008	0.0053	0.251	1.2	7.7	0.029	2.8	0.0021	0.0026	27.2	0.0647
Dec	2352	0.00009	0.0583	0.0013	28.1	0.00056	0.0	0.0009	0.0055	0.249	1.3	8.3	0.030	3.0	0.0026	0.0030	33.5	0.0797
Total	97354																	

Location Mouth of Anvil Creek

	Flows	Ag	Al	As	Ca	Cd	Cl	Co	Cu	Fe	K	Mg	Mn	Na	Ni	Pb	SO4	Zn
	(x 1000 m3)	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L
Jan	4432	0.00010	0.0612	0.0012	28.6	0.00038	0.0	0.0007	0.0052	0.253	1.1	7.4	0.029	2.7	0.0019	0.0024	23.2	0.0510
Feb	3272	0.00009	0.0594	0.0012	28.0	0.00043	0.0	0.0008	0.0052	0.247	1.1	7.6	0.029	2.7	0.0020	0.0025	25.7	0.0562
Mar	3362	0.00009	0.0582	0.0012	27.5	0.00045	0.0	0.0008	0.0052	0.244	1.1	7.5	0.029	2.7	0.0021	0.0026	26.5	0.0631
Apr	6375	0.00010	0.0620	0.0011	28.3	0.00034	0.0	0.0007	0.0052	0.256	1.0	7.0	0.029	2.5	0.0016	0.0021	19.3	0.0523
May	55468	0.00010	0.0654	0.0010	29.4	0.00022	0.0	0.0006	0.0050	0.263	0.9	6.6	0.028	2.3	0.0012	0.0018	12.6	0.0292
Jun	56957	0.00010	0.0655	0.0010	29.4	0.00022	0.0	0.0006	0.0051	0.264	0.9	6.6	0.028	2.3	0.0012	0.0017	12.6	0.0302
Jul	39693	0.00010	0.0654	0.0010	29.4	0.00022	0.0	0.0006	0.0051	0.264	0.9	6.6	0.029	2.3	0.0012	0.0018	13.0	0.0312
Aug	27824	0.00010	0.0650	0.0010	29.3	0.00023	0.0	0.0006	0.0050	0.262	0.9	6.7	0.028	2.3	0.0012	0.0018	13.5	0.0314
Sep	37419	0.00010	0.0652	0.0010	29.4	0.00022	0.0	0.0006	0.0050	0.263	0.9	6.6	0.028	2.3	0.0012	0.0018	13.0	0.0301
Oct	19528	0.00010	0.0646	0.0010	29.2	0.00024	0.0	0.0006	0.0050	0.261	1.0	6.7	0.028	2.3	0.0013	0.0018	14.3	0.0321
Nov	8835	0.00010	0.0637	0.0011	29.1	0.00029	0.0	0.0007	0.0051	0.260	1.0	7.0	0.029	2.5	0.0015	0.0020	17.3	0.0397
Dec	6515	0.00010	0.0632	0.0011	29.1	0.00033	0.0	0.0007	0.0052	0.259	1.0	7.2	0.029	2.5	0.0016	0.0022	19.6	0.0451
Total	269678																	

FM04 - Supplemental Base Case - Faro Mine Site
Summary Tables
Conditions FUTURE 2

Location X2

	Flows (x 1000 m3)	Ag mg/L	Al mg/L	As mg/L	Ca mg/L	Cd mg/L	Cl mg/L	Co mg/L	Cu mg/L	Fe mg/L	K mg/L	Mg mg/L	Mn mg/L	Na mg/L	Ni mg/L	Pb mg/L	SO4 mg/L	Zn mg/L
Jan	553	0.00012	0.1122	0.0036	30.0	0.00088	0.0	0.0016	0.0226	0.792	0.9	7.1	0.115	2.3	0.0025	0.0023	16.5	0.5346
Feb	403	0.00012	0.1230	0.0042	30.1	0.00103	0.0	0.0018	0.0267	0.915	0.9	7.2	0.135	2.4	0.0029	0.0025	17.7	0.6532
Mar	407	0.00013	0.1375	0.0050	30.2	0.00125	0.1	0.0021	0.0322	1.079	0.9	7.3	0.163	2.4	0.0033	0.0027	19.2	0.8116
Apr	784	0.00012	0.1158	0.0038	30.0	0.00093	0.0	0.0017	0.0239	0.832	0.9	7.1	0.122	2.4	0.0027	0.0024	16.9	0.5736
May	6991	0.00010	0.0725	0.0014	29.7	0.00030	0.0	0.0007	0.0075	0.340	0.9	6.6	0.041	2.3	0.0013	0.0018	12.4	0.0986
Jun	7191	0.00010	0.0742	0.0015	29.7	0.00032	0.0	0.0008	0.0081	0.358	0.9	6.6	0.044	2.3	0.0014	0.0018	12.6	0.1165
Jul	5013	0.00010	0.0760	0.0016	29.7	0.00035	0.0	0.0008	0.0088	0.379	0.9	6.6	0.047	2.3	0.0014	0.0018	12.8	0.1360
Aug	3506	0.00010	0.0764	0.0016	29.7	0.00035	0.0	0.0008	0.0090	0.384	0.9	6.7	0.048	2.3	0.0014	0.0018	12.8	0.1413
Sep	4720	0.00010	0.0740	0.0015	29.7	0.00032	0.0	0.0008	0.0081	0.356	0.9	6.6	0.043	2.3	0.0014	0.0018	12.6	0.1146
Oct	2460	0.00010	0.0777	0.0017	29.7	0.00037	0.0	0.0009	0.0095	0.399	0.9	6.7	0.050	2.3	0.0015	0.0019	12.9	0.1556
Nov	1115	0.00011	0.0912	0.0024	29.8	0.00057	0.0	0.0011	0.0146	0.553	0.9	6.8	0.076	2.3	0.0019	0.0020	14.4	0.3039
Dec	821	0.00011	0.1008	0.0030	29.9	0.00071	0.0	0.0013	0.0183	0.662	0.9	6.9	0.094	2.3	0.0022	0.0022	15.4	0.4092
Total	33964																	

Location X14

	Flows (x 1000 m3)	Ag mg/L	Al mg/L	As mg/L	Ca mg/L	Cd mg/L	Cl mg/L	Co mg/L	Cu mg/L	Fe mg/L	K mg/L	Mg mg/L	Mn mg/L	Na mg/L	Ni mg/L	Pb mg/L	SO4 mg/L	Zn mg/L
Jan	1192	0.00009	0.0671	0.0025	29.5	0.00111	0.0	0.0015	0.0126	0.431	1.6	16.1	0.066	3.7	0.0046	0.0045	101.7	0.3029
Feb	912	0.00008	0.0646	0.0028	28.4	0.00127	0.0	0.0017	0.0137	0.450	1.7	17.6	0.072	3.9	0.0052	0.0050	118.5	0.3503
Mar	981	0.00008	0.0653	0.0030	26.8	0.00135	0.0	0.0017	0.0152	0.487	1.7	17.6	0.079	3.9	0.0053	0.0050	120.5	0.4064
Apr	1784	0.00009	0.0708	0.0024	27.5	0.00092	0.0	0.0013	0.0128	0.451	1.3	12.3	0.067	3.1	0.0036	0.0035	70.1	0.3074
May	14480	0.00010	0.0668	0.0012	29.2	0.00030	0.0	0.0007	0.0062	0.292	1.0	7.3	0.034	2.4	0.0014	0.0019	19.2	0.0669
Jun	14796	0.00010	0.0678	0.0012	29.3	0.00031	0.0	0.0007	0.0065	0.303	1.0	7.2	0.036	2.4	0.0014	0.0019	18.9	0.0775
Jul	10302	0.00010	0.0680	0.0013	29.3	0.00035	0.0	0.0008	0.0068	0.310	1.0	7.6	0.037	2.4	0.0016	0.0020	22.3	0.0887
Aug	7268	0.00010	0.0667	0.0013	29.1	0.00037	0.0	0.0008	0.0068	0.306	1.0	8.0	0.037	2.5	0.0017	0.0022	26.5	0.0909
Sep	9748	0.00010	0.0668	0.0013	29.3	0.00033	0.0	0.0007	0.0064	0.298	1.0	7.6	0.035	2.4	0.0015	0.0020	22.4	0.0761
Oct	5108	0.00010	0.0659	0.0014	29.1	0.00042	0.0	0.0008	0.0070	0.307	1.1	8.7	0.038	2.6	0.0019	0.0023	32.6	0.0988
Nov	2303	0.00009	0.0683	0.0019	29.6	0.00068	0.0	0.0011	0.0094	0.366	1.3	11.3	0.050	3.0	0.0029	0.0031	57.0	0.1840
Dec	1705	0.00009	0.0700	0.0022	30.1	0.00087	0.0	0.0013	0.0111	0.408	1.4	13.4	0.059	3.4	0.0036	0.0037	75.2	0.2434
Total	70579																	

Location Mouth of Rose Creek

	Flows (x 1000 m3)	Ag mg/L	Al mg/L	As mg/L	Ca mg/L	Cd mg/L	Cl mg/L	Co mg/L	Cu mg/L	Fe mg/L	K mg/L	Mg mg/L	Mn mg/L	Na mg/L	Ni mg/L	Pb mg/L	SO4 mg/L	Zn mg/L
Jan	1628	0.00009	0.0667	0.0021	29.5	0.00087	0.0	0.0013	0.0105	0.387	1.4	13.5	0.056	3.3	0.0036	0.0037	77.7	0.2287
Feb	1230	0.00009	0.0649	0.0023	28.7	0.00100	0.0	0.0014	0.0115	0.402	1.5	14.8	0.060	3.5	0.0041	0.0041	90.9	0.2665
Mar	1301	0.00008	0.0655	0.0025	27.5	0.00107	0.0	0.0015	0.0127	0.432	1.5	14.9	0.066	3.5	0.0043	0.0042	93.8	0.3127
Apr	2402	0.00009	0.0695	0.0020	28.0	0.00073	0.0	0.0012	0.0108	0.403	1.2	10.9	0.057	2.9	0.0029	0.0030	55.1	0.2350
May	19992	0.00010	0.0665	0.0011	29.3	0.00027	0.0	0.0007	0.0058	0.284	1.0	7.1	0.032	2.3	0.0013	0.0019	17.1	0.0555
Jun	20466	0.00010	0.0673	0.0012	29.4	0.00028	0.0	0.0007	0.0061	0.292	1.0	7.0	0.034	2.3	0.0013	0.0019	16.9	0.0631
Jul	14254	0.00010	0.0674	0.0012	29.4	0.00031	0.0	0.0007	0.0063	0.297	1.0	7.3	0.035	2.4	0.0014	0.0019	19.4	0.0712
Aug	10032	0.00010	0.0665	0.0012	29.2	0.00033	0.0	0.0007	0.0063	0.294	1.0	7.6	0.035	2.4	0.0015	0.0020	22.4	0.0729
Sep	13469	0.00010	0.0665	0.0012	29.3	0.00029	0.0	0.0007	0.0060	0.288	1.0	7.3	0.033	2.4	0.0014	0.0019	19.5	0.0621
Oct	7047	0.00010	0.0659	0.0013	29.2	0.00036	0.0	0.0008	0.0064	0.295	1.0	8.1	0.035	2.5	0.0017	0.0022	26.9	0.0786
Nov	3181	0.00010	0.0676	0.0016	29.6	0.00055	0.0	0.0010	0.0082	0.338	1.2	10.0	0.044	2.8	0.0024	0.0027	44.5	0.1403
Dec	2352	0.00010	0.0689	0.0019	30.0	0.00069	0.0	0.0011	0.0094	0.369	1.3	11.5	0.051	3.1	0.0029	0.0032	57.7	0.1834
Total	97354																	

Location Mouth of Anvil Creek

	Flows (x 1000 m3)	Ag mg/L	Al mg/L	As mg/L	Ca mg/L	Cd mg/L	Cl mg/L	Co mg/L	Cu mg/L	Fe mg/L	K mg/L	Mg mg/L	Mn mg/L	Na mg/L	Ni mg/L	Pb mg/L	SO4 mg/L	Zn mg/L
Jan	4432	0.00010	0.0662	0.0014	29.6	0.00045	0.0	0.0008	0.0070	0.309	1.1	9.1	0.038	2.7	0.0020	0.0024	35.9	0.1002
Feb	3272	0.00009	0.0655	0.0015	29.3	0.00050	0.0	0.0009	0.0074	0.316	1.1	9.6	0.040	2.7	0.0022	0.0026	41.5	0.1161
Mar	3362	0.00009	0.0657	0.0016	28.8	0.00054	0.0	0.0009	0.0080	0.329	1.1	9.8	0.043	2.7	0.0023	0.0027	43.5	0.1367
Apr	6375	0.00010	0.0673	0.0014	29.0	0.00040	0.0	0.0008	0.0072	0.316	1.0	8.2	0.039	2.5	0.0018	0.0022	28.1	0.1045
May	55468	0.00010	0.0661	0.0011	29.5	0.00023	0.0	0.0006	0.0053	0.271	0.9	6.7	0.030	2.3	0.0012	0.0018	13.7	0.0364
Jun	56957	0.00010	0.0664	0.0011	29.5	0.00023	0.0	0.0006	0.0054	0.274	0.9	6.7	0.030	2.3	0.0012	0.0018	13.6	0.0391
Jul	39693	0.00010	0.0665	0.0011	29.5	0.00024	0.0	0.0006	0.0055	0.276	0.9	6.8	0.031	2.3	0.0012	0.0018	14.5	0.0420
Aug	27824	0.00010	0.0661	0.0011	29.5	0.00025	0.0	0.0006	0.0055	0.275	0.9	6.9	0.031	2.3	0.0013	0.0018	15.6	0.0427
Sep	37419	0.00010	0.0661	0.0011	29.5	0.00023	0.0	0.0006	0.0054	0.273	0.9	6.8	0.030	2.3	0.0012	0.0018	14.5	0.0387
Oct	19528	0.00010	0.0659	0.0011	29.5	0.00026	0.0	0.0007	0.0055	0.275	1.0	7.1	0.031	2.3	0.0013	0.0019	17.2	0.0447
Nov	8835	0.00010	0.0665	0.0012	29.6	0.00033	0.0	0.0007	0.0062	0.291	1.0	7.8	0.034	2.5	0.0016	0.0021	23.5	0.0669
Dec	6515	0.00010	0.0670	0.0013	29.7	0.00038	0.0	0.0008	0.0066	0.302	1.1	8.3	0.036	2.5	0.0018	0.0022	28.3	0.0826
Total	269678																	

FM04 - Supplemental Base Case - Faro Mine Site

Conditions: FUTURE 3

Location: X2

	Flows (x 1000 m3)	Ag mg/L	Al mg/L	As mg/L	Ca mg/L	Cd mg/L	Cl mg/L	Co mg/L	Cu mg/L	Fe mg/L	K mg/L	Mg mg/L	Mn mg/L	Na mg/L	Ni mg/L	Pb mg/L	SO4 mg/L	Zn mg/L
Jan	553	0.00024	0.4268	0.0225	30.2	0.00689	0.2	0.0083	0.1384	4.986	1.0	8.0	0.699	2.4	0.0075	0.0037	38.2	4.8642
Feb	403	0.00028	0.5109	0.0276	30.3	0.00844	0.3	0.0100	0.1695	6.086	1.0	8.4	0.855	2.4	0.0090	0.0041	44.4	5.9915
Mar	407	0.00032	0.6232	0.0343	30.5	0.01053	0.4	0.0124	0.2110	7.555	1.0	8.8	1.064	2.4	0.0110	0.0047	52.6	7.4976
Apr	784	0.00025	0.4544	0.0242	30.2	0.00740	0.3	0.0088	0.1486	5.347	1.0	8.1	0.750	2.4	0.0080	0.0038	40.3	5.2347
May	6991	0.00012	0.1177	0.0041	29.7	0.00116	0.0	0.0017	0.0241	0.942	0.9	6.7	0.125	2.3	0.0020	0.0020	15.5	0.7200
Jun	7191	0.00013	0.1304	0.0048	29.7	0.00139	0.0	0.0020	0.0288	1.108	0.9	6.8	0.148	2.3	0.0022	0.0021	16.5	0.8899
Jul	5013	0.00013	0.1442	0.0057	29.7	0.00165	0.1	0.0023	0.0339	1.288	0.9	6.9	0.174	2.3	0.0025	0.0021	17.5	1.0753
Aug	3506	0.00013	0.1479	0.0059	29.7	0.00172	0.1	0.0023	0.0353	1.337	0.9	6.9	0.181	2.3	0.0026	0.0021	17.7	1.1254
Sep	4720	0.00013	0.1290	0.0048	29.7	0.00137	0.0	0.0019	0.0283	1.090	0.9	6.8	0.146	2.3	0.0022	0.0020	16.3	0.8715
Oct	2460	0.00014	0.1581	0.0065	29.7	0.00191	0.1	0.0026	0.0391	1.470	0.9	6.9	0.200	2.3	0.0027	0.0022	18.5	1.2614
Nov	1115	0.00018	0.2632	0.0128	29.9	0.00386	0.1	0.0048	0.0779	2.846	1.0	7.3	0.395	2.3	0.0046	0.0028	26.2	2.6712
Dec	821	0.00021	0.3379	0.0172	30.0	0.00524	0.2	0.0064	0.1055	3.822	1.0	7.7	0.534	2.3	0.0059	0.0032	31.7	3.6721
Total	33964																	

Location: X14

	Flows (x 1000 m3)	Ag mg/L	Al mg/L	As mg/L	Ca mg/L	Cd mg/L	Cl mg/L	Co mg/L	Cu mg/L	Fe mg/L	K mg/L	Mg mg/L	Mn mg/L	Na mg/L	Ni mg/L	Pb mg/L	SO4 mg/L	Zn mg/L
Jan	1192	0.00016	0.2448	0.0133	30.8	0.00447	0.1	0.0053	0.0784	2.808	1.6	29.1	0.397	3.8	0.0073	0.0052	323.5	2.7244
Feb	912	0.00016	0.2733	0.0154	29.9	0.00522	0.2	0.0061	0.0910	3.240	1.7	33.2	0.460	4.0	0.0084	0.0058	382.4	3.1937
Mar	981	0.00017	0.3106	0.0178	28.4	0.00599	0.2	0.0069	0.1060	3.766	1.7	33.5	0.536	3.9	0.0092	0.0060	391.9	3.7480
Apr	1784	0.00016	0.2520	0.0134	28.3	0.00434	0.1	0.0052	0.0799	2.873	1.3	21.0	0.405	3.1	0.0064	0.0043	218.0	2.7756
May	14480	0.00011	0.0933	0.0028	29.4	0.00080	0.0	0.0013	0.0160	0.647	1.0	8.4	0.083	2.4	0.0018	0.0020	38.2	0.4285
Jun	14796	0.00011	0.1011	0.0033	29.4	0.00094	0.0	0.0014	0.0188	0.747	1.0	8.3	0.098	2.4	0.0020	0.0021	37.5	0.5306
Jul	10302	0.00011	0.1085	0.0038	29.5	0.00111	0.0	0.0016	0.0218	0.851	1.0	9.2	0.113	2.4	0.0022	0.0022	49.3	0.6398
Aug	7268	0.00011	0.1087	0.0039	29.3	0.00117	0.0	0.0017	0.0223	0.868	1.0	10.2	0.115	2.5	0.0024	0.0023	63.7	0.6632
Sep	9748	0.00011	0.0992	0.0032	29.4	0.00094	0.0	0.0014	0.0184	0.731	1.0	9.2	0.096	2.4	0.0021	0.0022	49.4	0.5179
Oct	5108	0.00011	0.1130	0.0042	29.4	0.00131	0.0	0.0018	0.0244	0.937	1.1	11.7	0.126	2.6	0.0027	0.0025	84.8	0.7407
Nov	2303	0.00013	0.1697	0.0080	30.3	0.00260	0.1	0.0032	0.0470	1.722	1.3	17.9	0.239	3.0	0.0045	0.0035	169.0	1.5655
Dec	1705	0.00015	0.2091	0.0106	31.0	0.00350	0.1	0.0042	0.0626	2.268	1.4	22.5	0.318	3.4	0.0058	0.0043	231.3	2.1382
Total	70579																	

Location: Mouth of Rose Creek

	Flows (x 1000 m3)	Ag mg/L	Al mg/L	As mg/L	Ca mg/L	Cd mg/L	Cl mg/L	Co mg/L	Cu mg/L	Fe mg/L	K mg/L	Mg mg/L	Mn mg/L	Na mg/L	Ni mg/L	Pb mg/L	SO4 mg/L	Zn mg/L
Jan	1628	0.00014	0.1969	0.0100	30.4	0.00333	0.1	0.0040	0.0587	2.127	1.4	23.1	0.299	3.4	0.0057	0.0043	240.0	2.0022
Feb	1230	0.00015	0.2197	0.0117	29.8	0.00392	0.1	0.0047	0.0688	2.472	1.5	26.3	0.349	3.5	0.0065	0.0048	286.7	2.3760
Mar	1301	0.00015	0.2504	0.0137	28.7	0.00456	0.1	0.0054	0.0812	2.905	1.5	26.9	0.411	3.5	0.0072	0.0050	298.4	2.8322
Apr	2402	0.00014	0.2041	0.0102	28.7	0.00328	0.1	0.0040	0.0606	2.202	1.2	17.3	0.308	2.9	0.0050	0.0036	165.0	2.0688
May	19992	0.00011	0.0858	0.0023	29.4	0.00063	0.0	0.0011	0.0130	0.541	1.0	7.9	0.068	2.3	0.0016	0.0019	30.9	0.3174
Jun	20466	0.00011	0.0913	0.0026	29.4	0.00073	0.0	0.0012	0.0150	0.613	1.0	7.8	0.078	2.3	0.0017	0.0020	30.4	0.3907
Jul	14254	0.00011	0.0967	0.0030	29.5	0.00085	0.0	0.0013	0.0171	0.688	1.0	8.4	0.089	2.4	0.0019	0.0021	38.9	0.4695
Aug	10032	0.00011	0.0969	0.0031	29.4	0.00090	0.0	0.0014	0.0176	0.701	1.0	9.2	0.091	2.4	0.0020	0.0022	49.4	0.4875
Sep	13469	0.00011	0.0900	0.0026	29.5	0.00074	0.0	0.0012	0.0147	0.602	1.0	8.5	0.077	2.4	0.0018	0.0020	39.0	0.3819
Oct	7047	0.00011	0.1000	0.0033	29.5	0.00101	0.0	0.0015	0.0191	0.752	1.0	10.3	0.099	2.5	0.0022	0.0023	64.7	0.5439
Nov	3181	0.00012	0.1410	0.0061	30.1	0.00194	0.1	0.0025	0.0354	1.320	1.2	14.8	0.181	2.8	0.0035	0.0030	125.6	1.1402
Dec	2352	0.00013	0.1697	0.0080	30.6	0.00259	0.1	0.0032	0.0468	1.717	1.3	18.1	0.238	3.1	0.0045	0.0036	170.9	1.5570
Total	97354																	

Location: Mouth of Anvil Creek

	Flows (x 1000 m3)	Ag mg/L	Al mg/L	As mg/L	Ca mg/L	Cd mg/L	Cl mg/L	Co mg/L	Cu mg/L	Fe mg/L	K mg/L	Mg mg/L	Mn mg/L	Na mg/L	Ni mg/L	Pb mg/L	SO4 mg/L	Zn mg/L
Jan	4432	0.00012	0.1140	0.0043	29.9	0.00135	0.0	0.0019	0.0247	0.948	1.1	12.6	0.128	2.7	0.0028	0.0027	95.6	0.7517
Feb	3272	0.00012	0.1237	0.0050	29.7	0.00160	0.0	0.0021	0.0290	1.094	1.1	14.0	0.149	2.7	0.0031	0.0029	115.1	0.9089
Mar	3362	0.00012	0.1373	0.0059	29.2	0.00189	0.1	0.0024	0.0345	1.286	1.1	14.4	0.176	2.7	0.0035	0.0030	122.7	1.1120
Apr	6375	0.00012	0.1160	0.0045	29.2	0.00136	0.0	0.0019	0.0260	0.994	1.0	10.6	0.134	2.5	0.0026	0.0024	69.5	0.7954
May	55468	0.00010	0.0731	0.0015	29.5	0.00036	0.0	0.0008	0.0079	0.364	0.9	7.0	0.043	2.3	0.0013	0.0018	18.6	0.1308
Jun	56957	0.00010	0.0750	0.0016	29.5	0.00039	0.0	0.0008	0.0086	0.390	0.9	7.0	0.046	2.3	0.0013	0.0018	18.4	0.1568
Jul	39693	0.00010	0.0770	0.0017	29.6	0.00044	0.0	0.0009	0.0094	0.416	0.9	7.2	0.050	2.3	0.0014	0.0018	21.5	0.1850
Aug	27824	0.00010	0.0771	0.0017	29.5	0.00045	0.0	0.0009	0.0095	0.422	0.9	7.5	0.051	2.3	0.0014	0.0019	25.3	0.1922
Sep	37419	0.00010	0.0746	0.0016	29.5	0.00039	0.0	0.0008	0.0085	0.386	0.9	7.2	0.046	2.3	0.0013	0.0018	21.5	0.1538
Oct	19528	0.00010	0.0782	0.0018	29.5	0.00049	0.0	0.0009	0.0101	0.440	1.0	7.9	0.054	2.3	0.0015	0.0019	30.8	0.2126
Nov	8835	0.00011	0.0929	0.0028	29.8	0.00083	0.0	0.0013	0.0159	0.644	1.0	9.5	0.083	2.5	0.0020	0.0022	52.7	0.4270
Dec	6515	0.00011	0.1034	0.0035	30.0	0.00106	0.0	0.0016	0.0201	0.788	1.1	10.7	0.104	2.6	0.0023	0.0024	69.2	0.5783
Total	269678																	

FSN02 - Supplemental Sensitivity Run - Faro Mine Site - Groundwater Collection Efficiency
Summary Tables

Conditions: FUTURE 1

Location: X2

	Flows (x 1000 m3)	Ag mg/L	Al mg/L	As mg/L	Ca mg/L	Cd mg/L	Cl mg/L	Co mg/L	Cu mg/L	Fe mg/L	K mg/L	Mg mg/L	Mn mg/L	Na mg/L	Ni mg/L	Pb mg/L	SO4 mg/L	Zn mg/L
Jan	553	0.00011	0.0712	0.0013	29.7	0.00033	0.0	0.0007	0.0067	0.317	0.9	6.7	0.036	2.3	0.0013	0.0018	12.8	0.1101
Feb	403	0.00011	0.0724	0.0014	29.8	0.00036	0.0	0.0008	0.0071	0.329	0.9	6.7	0.038	2.3	0.0013	0.0018	13.0	0.1298
Mar	406	0.00011	0.0740	0.0015	29.8	0.00040	0.0	0.0008	0.0076	0.345	0.9	6.7	0.041	2.3	0.0014	0.0019	13.3	0.1562
Apr	783	0.00011	0.0716	0.0013	29.7	0.00034	0.0	0.0007	0.0068	0.321	0.9	6.7	0.037	2.3	0.0013	0.0018	12.8	0.1166
May	6990	0.00010	0.0667	0.0010	29.6	0.00022	0.0	0.0006	0.0052	0.272	0.9	6.6	0.029	2.3	0.0011	0.0017	11.9	0.0377
Jun	7190	0.00010	0.0668	0.0011	29.6	0.00022	0.0	0.0006	0.0053	0.273	0.9	6.6	0.030	2.3	0.0011	0.0017	11.9	0.0407
Jul	5013	0.00010	0.0670	0.0011	29.6	0.00023	0.0	0.0006	0.0054	0.275	0.9	6.6	0.030	2.3	0.0011	0.0017	11.9	0.0439
Aug	3506	0.00010	0.0671	0.0011	29.6	0.00023	0.0	0.0006	0.0054	0.276	0.9	6.6	0.030	2.3	0.0011	0.0017	12.0	0.0448
Sep	4719	0.00010	0.0668	0.0011	29.6	0.00022	0.0	0.0006	0.0053	0.273	0.9	6.6	0.030	2.3	0.0011	0.0017	11.9	0.0404
Oct	2459	0.00010	0.0672	0.0011	29.6	0.00023	0.0	0.0006	0.0054	0.277	0.9	6.6	0.030	2.3	0.0011	0.0017	12.0	0.0472
Nov	1114	0.00010	0.0688	0.0012	29.7	0.00027	0.0	0.0007	0.0059	0.293	0.9	6.6	0.033	2.3	0.0012	0.0018	12.3	0.0718
Dec	821	0.00010	0.0699	0.0012	29.7	0.00030	0.0	0.0007	0.0063	0.304	0.9	6.6	0.034	2.3	0.0012	0.0018	12.5	0.0893
Total	33959																	

Location: X14

	Flows (x 1000 m3)	Ag mg/L	Al mg/L	As mg/L	Ca mg/L	Cd mg/L	Cl mg/L	Co mg/L	Cu mg/L	Fe mg/L	K mg/L	Mg mg/L	Mn mg/L	Na mg/L	Ni mg/L	Pb mg/L	SO4 mg/L	Zn mg/L
Jan	1193	0.00008	0.0460	0.0014	25.8	0.00082	0.0	0.0011	0.0048	0.198	1.6	9.9	0.027	3.7	0.0039	0.0042	54.3	0.0749
Feb	912	0.00007	0.0399	0.0015	24.0	0.00093	0.0	0.0011	0.0046	0.175	1.7	10.3	0.025	3.9	0.0044	0.0046	62.1	0.0826
Mar	981	0.00007	0.0363	0.0015	22.3	0.00095	0.0	0.0011	0.0045	0.164	1.7	10.0	0.025	3.8	0.0044	0.0046	62.6	0.0918
Apr	1784	0.00008	0.0494	0.0013	25.0	0.00062	0.0	0.0009	0.0049	0.212	1.3	8.2	0.027	3.0	0.0029	0.0032	38.7	0.0750
May	14480	0.00010	0.0636	0.0010	28.9	0.00025	0.0	0.0006	0.0050	0.257	1.0	6.7	0.028	2.4	0.0013	0.0019	15.1	0.0328
Jun	14796	0.00010	0.0639	0.0010	29.0	0.00025	0.0	0.0006	0.0050	0.259	1.0	6.7	0.028	2.4	0.0013	0.0019	15.0	0.0348
Jul	10301	0.00010	0.0633	0.0011	28.9	0.00028	0.0	0.0007	0.0050	0.257	1.0	6.9	0.028	2.4	0.0014	0.0020	16.6	0.0369
Aug	7268	0.00010	0.0617	0.0011	28.5	0.00030	0.0	0.0007	0.0050	0.251	1.0	7.0	0.028	2.5	0.0015	0.0021	18.6	0.0370
Sep	9748	0.00010	0.0630	0.0011	28.8	0.00028	0.0	0.0007	0.0050	0.255	1.0	6.9	0.028	2.4	0.0014	0.0020	16.7	0.0345
Oct	5108	0.00009	0.0603	0.0011	28.2	0.00034	0.0	0.0007	0.0049	0.245	1.1	7.2	0.028	2.6	0.0017	0.0023	21.5	0.0383
Nov	2303	0.00009	0.0563	0.0012	27.7	0.00052	0.0	0.0008	0.0050	0.233	1.3	8.2	0.028	3.0	0.0025	0.0030	33.1	0.0540
Dec	1705	0.00009	0.0536	0.0013	27.5	0.00064	0.0	0.0009	0.0050	0.225	1.4	9.0	0.028	3.3	0.0031	0.0035	41.8	0.0649
Total	70579																	

Location: Mouth of Rose Creek

	Flows (x 1000 m3)	Ag mg/L	Al mg/L	As mg/L	Ca mg/L	Cd mg/L	Cl mg/L	Co mg/L	Cu mg/L	Fe mg/L	K mg/L	Mg mg/L	Mn mg/L	Na mg/L	Ni mg/L	Pb mg/L	SO4 mg/L	Zn mg/L
Jan	1628	0.00009	0.0513	0.0013	26.8	0.00065	0.0	0.0009	0.0049	0.215	1.4	9.0	0.027	3.3	0.0031	0.0035	42.9	0.0617
Feb	1230	0.00008	0.0466	0.0014	25.5	0.00074	0.0	0.0010	0.0047	0.198	1.5	9.3	0.026	3.5	0.0035	0.0039	49.1	0.0679
Mar	1302	0.00007	0.0436	0.0014	24.1	0.00076	0.0	0.0010	0.0046	0.189	1.5	9.1	0.025	3.4	0.0036	0.0039	50.1	0.0755
Apr	2402	0.00009	0.0536	0.0012	26.2	0.00051	0.0	0.0008	0.0049	0.226	1.2	7.8	0.027	2.8	0.0024	0.0028	31.7	0.0623
May	19992	0.00010	0.0643	0.0010	29.1	0.00024	0.0	0.0006	0.0050	0.259	1.0	6.7	0.028	2.3	0.0013	0.0018	14.2	0.0308
Jun	20466	0.00010	0.0644	0.0010	29.1	0.00024	0.0	0.0006	0.0050	0.260	1.0	6.7	0.028	2.3	0.0013	0.0018	14.1	0.0323
Jul	14254	0.00010	0.0640	0.0010	29.1	0.00026	0.0	0.0006	0.0050	0.259	1.0	6.8	0.028	2.4	0.0013	0.0019	15.2	0.0337
Aug	10032	0.00010	0.0629	0.0010	28.8	0.00028	0.0	0.0007	0.0050	0.254	1.0	6.9	0.028	2.4	0.0014	0.0020	16.7	0.0339
Sep	13469	0.00010	0.0638	0.0010	29.0	0.00026	0.0	0.0006	0.0050	0.257	1.0	6.8	0.028	2.4	0.0013	0.0019	15.3	0.0320
Oct	7047	0.00010	0.0618	0.0011	28.6	0.00030	0.0	0.0007	0.0049	0.250	1.0	7.0	0.028	2.5	0.0016	0.0021	18.8	0.0348
Nov	3181	0.00009	0.0589	0.0012	28.3	0.00043	0.0	0.0008	0.0050	0.242	1.2	7.8	0.028	2.8	0.0021	0.0026	27.2	0.0461
Dec	2352	0.00009	0.0570	0.0012	28.1	0.00052	0.0	0.0008	0.0050	0.236	1.3	8.3	0.028	3.0	0.0025	0.0030	33.5	0.0541
Total	97354																	

Location: Mouth of Anvil Creek

	Flows (x 1000 m3)	Ag mg/L	Al mg/L	As mg/L	Ca mg/L	Cd mg/L	Cl mg/L	Co mg/L	Cu mg/L	Fe mg/L	K mg/L	Mg mg/L	Mn mg/L	Na mg/L	Ni mg/L	Pb mg/L	SO4 mg/L	Zn mg/L
Jan	4432	0.00009	0.0606	0.0011	28.6	0.00037	0.0	0.0007	0.0049	0.246	1.1	7.4	0.028	2.7	0.0018	0.0024	23.2	0.0389
Feb	3272	0.00009	0.0586	0.0011	28.0	0.00040	0.0	0.0007	0.0049	0.239	1.1	7.6	0.027	2.7	0.0020	0.0025	25.8	0.0415
Mar	3362	0.00009	0.0573	0.0011	27.5	0.00042	0.0	0.0008	0.0048	0.235	1.1	7.5	0.027	2.7	0.0021	0.0025	26.6	0.0449
Apr	6375	0.00009	0.0613	0.0011	28.3	0.00032	0.0	0.0007	0.0050	0.250	1.0	7.0	0.028	2.5	0.0016	0.0021	19.3	0.0394
May	55468	0.00010	0.0653	0.0010	29.4	0.00021	0.0	0.0006	0.0050	0.262	0.9	6.6	0.028	2.3	0.0012	0.0017	12.6	0.0275
Jun	56956	0.00010	0.0654	0.0010	29.4	0.00021	0.0	0.0006	0.0050	0.263	0.9	6.6	0.028	2.3	0.0012	0.0017	12.6	0.0280
Jul	39693	0.00010	0.0652	0.0010	29.4	0.00022	0.0	0.0006	0.0050	0.262	0.9	6.6	0.028	2.3	0.0012	0.0018	13.0	0.0285
Aug	27824	0.00010	0.0648	0.0010	29.3	0.00023	0.0	0.0006	0.0050	0.261	0.9	6.7	0.028	2.3	0.0012	0.0018	13.5	0.0286
Sep	37419	0.00010	0.0651	0.0010	29.4	0.00022	0.0	0.0006	0.0050	0.262	0.9	6.6	0.028	2.3	0.0012	0.0018	13.0	0.0279
Oct	19528	0.00010	0.0644	0.0010	29.2	0.00024	0.0	0.0006	0.0050	0.259	1.0	6.7	0.028	2.3	0.0013	0.0018	14.3	0.0289
Nov	8835	0.00010	0.0634	0.0011	29.1	0.00028	0.0	0.0007	0.0050	0.256	1.0	7.0	0.028	2.5	0.0015	0.0020	17.3	0.0330
Dec	6515	0.00010	0.0627	0.0011	29.1	0.00032	0.0	0.0007	0.0050	0.254	1.0	7.2	0.028	2.5	0.0016	0.0022	19.6	0.0359
Total	269678																	

FSN02 - Supplemental Sensitivity Run - Faro Mine Site - Groundwater Collection Efficiency
Summary Tables
Conditions FUTURE 2

Location X2

	Flows	Ag	Al	As	Ca	Cd	Cl	Co	Cu	Fe	K	Mg	Mn	Na	Ni	Pb	SO4	Zn
	(x 1000 m3)	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L
Jan	553	0.00011	0.0910	0.0025	29.8	0.00057	0.0	0.0011	0.0146	0.552	0.9	6.8	0.076	2.3	0.0019	0.0020	14.4	0.3016
Feb	403	0.00011	0.0969	0.0028	29.9	0.00066	0.0	0.0013	0.0169	0.619	0.9	6.9	0.087	2.3	0.0021	0.0021	15.0	0.3659
Mar	406	0.00012	0.1047	0.0032	30.0	0.00077	0.0	0.0014	0.0199	0.709	0.9	7.0	0.101	2.3	0.0023	0.0022	15.9	0.4519
Apr	783	0.00011	0.0929	0.0026	29.8	0.00060	0.0	0.0012	0.0154	0.574	0.9	6.9	0.079	2.3	0.0019	0.0021	14.6	0.3227
May	6990	0.00010	0.0695	0.0012	29.6	0.00025	0.0	0.0007	0.0064	0.305	0.9	6.6	0.035	2.3	0.0012	0.0017	12.1	0.0652
Jun	7190	0.00010	0.0704	0.0013	29.6	0.00027	0.0	0.0007	0.0067	0.315	0.9	6.6	0.037	2.3	0.0012	0.0018	12.2	0.0749
Jul	5013	0.00010	0.0713	0.0013	29.6	0.00028	0.0	0.0007	0.0071	0.327	0.9	6.6	0.039	2.3	0.0013	0.0018	12.3	0.0854
Aug	3506	0.00010	0.0716	0.0013	29.6	0.00028	0.0	0.0007	0.0072	0.330	0.9	6.6	0.039	2.3	0.0013	0.0018	12.3	0.0883
Sep	4719	0.00010	0.0703	0.0013	29.6	0.00026	0.0	0.0007	0.0067	0.314	0.9	6.6	0.037	2.3	0.0012	0.0018	12.2	0.0738
Oct	2459	0.00010	0.0723	0.0014	29.7	0.00029	0.0	0.0007	0.0075	0.338	0.9	6.6	0.040	2.3	0.0013	0.0018	12.4	0.0961
Nov	1114	0.00011	0.0796	0.0018	29.7	0.00040	0.0	0.0009	0.0103	0.421	0.9	6.7	0.054	2.3	0.0015	0.0019	13.2	0.1765
Dec	821	0.00011	0.0848	0.0021	29.8	0.00048	0.0	0.0010	0.0123	0.481	0.9	6.8	0.064	2.3	0.0017	0.0020	13.7	0.2336
Total	33959																	

Location X14

	Flows	Ag	Al	As	Ca	Cd	Cl	Co	Cu	Fe	K	Mg	Mn	Na	Ni	Pb	SO4	Zn
	(x 1000 m3)	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L
Jan	1193	0.00008	0.0560	0.0020	29.5	0.00094	0.0	0.0013	0.0086	0.312	1.6	16.1	0.046	3.7	0.0042	0.0043	102.0	0.1729
Feb	912	0.00007	0.0516	0.0021	28.5	0.00107	0.0	0.0014	0.0090	0.309	1.7	17.7	0.048	3.9	0.0047	0.0048	118.8	0.1976
Mar	981	0.00007	0.0501	0.0022	26.9	0.00112	0.0	0.0014	0.0097	0.322	1.7	17.6	0.051	3.8	0.0048	0.0048	120.6	0.2270
Apr	1784	0.00008	0.0596	0.0018	27.5	0.00074	0.0	0.0011	0.0087	0.329	1.3	12.3	0.047	3.1	0.0032	0.0034	69.8	0.1749
May	14480	0.00010	0.0651	0.0011	29.2	0.00027	0.0	0.0007	0.0056	0.274	1.0	7.3	0.031	2.4	0.0014	0.0019	19.1	0.0475
Jun	14796	0.00010	0.0658	0.0011	29.3	0.00028	0.0	0.0007	0.0057	0.280	1.0	7.2	0.032	2.4	0.0014	0.0019	18.8	0.0531
Jul	10301	0.00010	0.0655	0.0012	29.3	0.00031	0.0	0.0007	0.0059	0.283	1.0	7.6	0.033	2.4	0.0015	0.0020	22.2	0.0592
Aug	7268	0.00010	0.0641	0.0012	29.1	0.00033	0.0	0.0007	0.0058	0.278	1.0	8.0	0.032	2.5	0.0016	0.0021	26.4	0.0602
Sep	9748	0.00010	0.0648	0.0011	29.2	0.00030	0.0	0.0007	0.0057	0.276	1.0	7.6	0.032	2.4	0.0015	0.0020	22.4	0.0523
Oct	5108	0.00009	0.0629	0.0012	29.1	0.00038	0.0	0.0008	0.0059	0.275	1.1	8.7	0.033	2.6	0.0018	0.0023	32.7	0.0643
Nov	2303	0.00009	0.0620	0.0015	29.6	0.00059	0.0	0.0010	0.0071	0.298	1.3	11.4	0.039	3.0	0.0027	0.0030	57.1	0.1098
Dec	1705	0.00009	0.0614	0.0018	30.2	0.00074	0.0	0.0011	0.0080	0.315	1.4	13.4	0.043	3.3	0.0033	0.0036	75.2	0.1416
Total	70579																	

Location Mouth of Rose Creek

	Flows	Ag	Al	As	Ca	Cd	Cl	Co	Cu	Fe	K	Mg	Mn	Na	Ni	Pb	SO4	Zn
	(x 1000 m3)	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L
Jan	1628	0.00009	0.0587	0.0017	29.5	0.00074	0.0	0.0011	0.0076	0.299	1.4	13.6	0.041	3.3	0.0034	0.0036	77.8	0.1335
Feb	1230	0.00008	0.0553	0.0018	28.8	0.00085	0.0	0.0012	0.0080	0.298	1.5	14.8	0.043	3.5	0.0038	0.0040	91.2	0.1532
Mar	1302	0.00008	0.0540	0.0019	27.5	0.00089	0.0	0.0012	0.0085	0.308	1.5	14.9	0.046	3.5	0.0039	0.0040	93.8	0.1774
Apr	2402	0.00009	0.0612	0.0016	28.0	0.00060	0.0	0.0010	0.0078	0.312	1.2	10.8	0.042	2.9	0.0026	0.0029	54.9	0.1365
May	19992	0.00010	0.0654	0.0011	29.3	0.00025	0.0	0.0006	0.0054	0.271	1.0	7.1	0.030	2.3	0.0013	0.0019	17.1	0.0414
Jun	20466	0.00010	0.0658	0.0011	29.4	0.00026	0.0	0.0007	0.0055	0.276	1.0	7.0	0.031	2.3	0.0013	0.0018	16.8	0.0455
Jul	14254	0.00010	0.0656	0.0011	29.4	0.00028	0.0	0.0007	0.0056	0.278	1.0	7.3	0.031	2.4	0.0014	0.0019	19.3	0.0498
Aug	10032	0.00010	0.0646	0.0011	29.2	0.00030	0.0	0.0007	0.0056	0.274	1.0	7.6	0.031	2.4	0.0015	0.0020	22.4	0.0506
Sep	13469	0.00010	0.0651	0.0011	29.3	0.00027	0.0	0.0007	0.0055	0.273	1.0	7.3	0.031	2.4	0.0014	0.0019	19.4	0.0450
Oct	7047	0.00010	0.0638	0.0012	29.2	0.00033	0.0	0.0007	0.0057	0.272	1.0	8.1	0.032	2.5	0.0016	0.0021	26.9	0.0537
Nov	3181	0.00009	0.0631	0.0014	29.6	0.00048	0.0	0.0009	0.0065	0.289	1.2	10.0	0.036	2.8	0.0022	0.0027	44.6	0.0866
Dec	2352	0.00009	0.0627	0.0015	30.0	0.00059	0.0	0.0010	0.0072	0.301	1.3	11.5	0.039	3.0	0.0027	0.0031	57.8	0.1097
Total	97354																	

Location Mouth of Anvil Creek

	Flows	Ag	Al	As	Ca	Cd	Cl	Co	Cu	Fe	K	Mg	Mn	Na	Ni	Pb	SO4	Zn
	(x 1000 m3)	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L
Jan	4432	0.00010	0.0632	0.0013	29.6	0.00040	0.0	0.0008	0.0060	0.277	1.1	9.1	0.033	2.7	0.0019	0.0024	36.0	0.0652
Feb	3272	0.00009	0.0619	0.0013	29.3	0.00044	0.0	0.0008	0.0061	0.277	1.1	9.7	0.034	2.7	0.0021	0.0026	41.6	0.0736
Mar	3362	0.00009	0.0613	0.0013	28.8	0.00047	0.0	0.0008	0.0064	0.281	1.1	9.8	0.035	2.7	0.0022	0.0026	43.5	0.0844
Apr	6375	0.00010	0.0641	0.0012	29.0	0.00035	0.0	0.0007	0.0060	0.282	1.0	8.2	0.033	2.5	0.0017	0.0022	28.0	0.0674
May	55468	0.00010	0.0657	0.0010	29.5	0.00022	0.0	0.0006	0.0051	0.267	0.9	6.7	0.029	2.3	0.0012	0.0018	13.6	0.0313
Jun	56956	0.00010	0.0659	0.0010	29.5	0.00022	0.0	0.0006	0.0052	0.268	0.9	6.7	0.029	2.3	0.0012	0.0018	13.6	0.0328
Jul	39693	0.00010	0.0658	0.0010	29.5	0.00023	0.0	0.0006	0.0052	0.269	0.9	6.8	0.029	2.3	0.0012	0.0018	14.4	0.0343
Aug	27824	0.00010	0.0654	0.0011	29.5	0.00023	0.0	0.0006	0.0052	0.268	0.9	6.9	0.029	2.3	0.0012	0.0018	15.6	0.0346
Sep	37419	0.00010	0.0656	0.0010	29.5	0.00023	0.0	0.0006	0.0052	0.267	0.9	6.8	0.029	2.3	0.0012	0.0018	14.5	0.0326
Oct	19528	0.00010	0.0651	0.0011	29.5	0.00025	0.0	0.0006	0.0052	0.267	1.0	7.1	0.029	2.3	0.0013	0.0019	17.2	0.0357
Nov	8835	0.00010	0.0649	0.0011	29.6	0.00030	0.0	0.0007	0.0056	0.273	1.0	7.8	0.031	2.5	0.0015	0.0020	23.5	0.0476
Dec	6515	0.00010	0.0647	0.0012	29.7	0.00034	0.0	0.0007	0.0058	0.277	1.1	8.3	0.032	2.5	0.0017	0.0022	28.3	0.0559
Total	269678																	

FSN02 - Supplemental Sensitivity Run - Faro Mine Site - Groundwater Collection Efficiency

Conditions: FUTURE 3

Location: X2

	Flows (x 1000 m3)	Ag mg/L	Al mg/L	As mg/L	Ca mg/L	Cd mg/L	Cl mg/L	Co mg/L	Cu mg/L	Fe mg/L	K mg/L	Mg mg/L	Mn mg/L	Na mg/L	Ni mg/L	Pb mg/L	SO4 mg/L	Zn mg/L
Jan	553	0.00018	0.2622	0.0123	30.0	0.00378	0.1	0.0048	0.0755	2.771	1.0	7.4	0.387	2.3	0.0049	0.0029	26.5	2.6322
Feb	403	0.00020	0.3079	0.0149	30.1	0.00462	0.2	0.0057	0.0920	3.356	1.0	7.6	0.471	2.4	0.0058	0.0032	29.9	3.2399
Mar	406	0.00022	0.3691	0.0184	30.2	0.00573	0.2	0.0070	0.1140	4.137	1.0	7.9	0.583	2.4	0.0069	0.0036	34.5	4.0520
Apr	783	0.00018	0.2772	0.0131	30.0	0.00406	0.1	0.0051	0.0809	2.964	1.0	7.5	0.415	2.3	0.0052	0.0030	27.6	2.8319
May	6990	0.00011	0.0941	0.0026	29.7	0.00071	0.0	0.0012	0.0151	0.624	0.9	6.7	0.080	2.3	0.0016	0.0019	13.8	0.3995
Jun	7190	0.00011	0.1009	0.0030	29.7	0.00084	0.0	0.0013	0.0176	0.712	0.9	6.7	0.092	2.3	0.0018	0.0019	14.4	0.4910
Jul	5013	0.00012	0.1085	0.0034	29.7	0.00098	0.0	0.0015	0.0203	0.808	0.9	6.7	0.106	2.3	0.0019	0.0020	14.9	0.5909
Aug	3506	0.00012	0.1105	0.0036	29.7	0.00101	0.0	0.0015	0.0210	0.834	0.9	6.7	0.110	2.3	0.0020	0.0020	15.1	0.6178
Sep	4719	0.00011	0.1002	0.0030	29.7	0.00083	0.0	0.0013	0.0173	0.702	0.9	6.7	0.091	2.3	0.0018	0.0019	14.3	0.4811
Oct	2459	0.00012	0.1160	0.0039	29.7	0.00111	0.0	0.0017	0.0230	0.904	0.9	6.8	0.120	2.3	0.0021	0.0020	15.5	0.6911
Nov	1114	0.00014	0.1732	0.0072	29.8	0.00216	0.1	0.0029	0.0436	1.635	0.9	7.0	0.224	2.3	0.0032	0.0024	19.8	1.4505
Dec	821	0.00016	0.2138	0.0095	29.9	0.00290	0.1	0.0037	0.0581	2.153	0.9	7.2	0.299	2.3	0.0039	0.0026	22.8	1.9897
Total	33959																	

Location: X14

	Flows (x 1000 m3)	Ag mg/L	Al mg/L	As mg/L	Ca mg/L	Cd mg/L	Cl mg/L	Co mg/L	Cu mg/L	Fe mg/L	K mg/L	Mg mg/L	Mn mg/L	Na mg/L	Ni mg/L	Pb mg/L	SO4 mg/L	Zn mg/L
Jan	1193	0.00012	0.1513	0.0075	30.8	0.00272	0.1	0.0033	0.0428	1.556	1.6	29.1	0.221	3.7	0.0058	0.0048	323.0	1.4598
Feb	912	0.00012	0.1635	0.0086	30.0	0.00316	0.1	0.0037	0.0492	1.770	1.7	33.2	0.253	3.9	0.0066	0.0053	381.9	1.7087
Mar	981	0.00012	0.1816	0.0098	28.4	0.00357	0.1	0.0042	0.0570	2.039	1.7	33.4	0.292	3.9	0.0071	0.0054	390.3	2.0029
Apr	1784	0.00012	0.1567	0.0075	28.3	0.00255	0.1	0.0032	0.0437	1.597	1.3	20.8	0.225	3.1	0.0048	0.0038	215.2	1.4868
May	14480	0.00010	0.0794	0.0019	29.3	0.00054	0.0	0.0010	0.0107	0.460	1.0	8.3	0.057	2.4	0.0016	0.0020	37.8	0.2397
Jun	14796	0.00010	0.0836	0.0022	29.4	0.00061	0.0	0.0011	0.0122	0.513	1.0	8.3	0.065	2.4	0.0017	0.0020	36.7	0.2940
Jul	10301	0.00011	0.0872	0.0024	29.5	0.00071	0.0	0.0012	0.0137	0.566	1.0	9.1	0.072	2.4	0.0019	0.0021	46.5	0.3521
Aug	7268	0.00010	0.0866	0.0025	29.3	0.00075	0.0	0.0012	0.0139	0.572	1.0	10.2	0.074	2.5	0.0020	0.0022	63.2	0.3644
Sep	9748	0.00010	0.0822	0.0022	29.4	0.00062	0.0	0.0011	0.0119	0.503	1.0	9.2	0.063	2.4	0.0018	0.0021	49.0	0.2872
Oct	5108	0.00010	0.0882	0.0027	29.4	0.00085	0.0	0.0013	0.0150	0.605	1.1	11.7	0.079	2.6	0.0022	0.0024	84.4	0.4055
Nov	2303	0.00011	0.1163	0.0047	30.3	0.00160	0.0	0.0021	0.0267	1.008	1.3	17.9	0.139	3.0	0.0036	0.0033	168.3	0.8441
Dec	1705	0.00012	0.1360	0.0061	31.1	0.00213	0.1	0.0027	0.0348	1.288	1.4	22.5	0.180	3.3	0.0046	0.0040	230.4	1.1487
Total	70579																	

Location: Mouth of Rose Creek

	Flows (x 1000 m3)	Ag mg/L	Al mg/L	As mg/L	Ca mg/L	Cd mg/L	Cl mg/L	Co mg/L	Cu mg/L	Fe mg/L	K mg/L	Mg mg/L	Mn mg/L	Na mg/L	Ni mg/L	Pb mg/L	SO4 mg/L	Zn mg/L
Jan	1628	0.00011	0.1284	0.0058	30.5	0.00204	0.1	0.0026	0.0327	1.210	1.4	23.1	0.169	3.3	0.0046	0.0040	239.7	1.0760
Feb	1230	0.00011	0.1383	0.0066	29.9	0.00239	0.1	0.0029	0.0378	1.382	1.5	26.3	0.195	3.5	0.0052	0.0044	286.4	1.2743
Mar	1302	0.00012	0.1531	0.0077	28.7	0.00274	0.1	0.0033	0.0442	1.602	1.5	26.8	0.227	3.5	0.0056	0.0045	297.1	1.5165
Apr	2402	0.00012	0.1333	0.0058	28.7	0.00195	0.1	0.0025	0.0337	1.255	1.2	17.2	0.174	2.9	0.0039	0.0033	162.9	1.1113
May	19992	0.00010	0.0757	0.0017	29.4	0.00044	0.0	0.0009	0.0091	0.406	1.0	7.8	0.049	2.3	0.0015	0.0019	30.6	0.1807
Jun	20466	0.00010	0.0787	0.0019	29.4	0.00050	0.0	0.0009	0.0102	0.444	1.0	7.8	0.055	2.3	0.0015	0.0019	29.8	0.2196
Jul	14254	0.00010	0.0813	0.0020	29.5	0.00057	0.0	0.0010	0.0113	0.482	1.0	8.4	0.060	2.4	0.0017	0.0020	38.3	0.2615
Aug	10032	0.00010	0.0809	0.0021	29.4	0.00060	0.0	0.0010	0.0115	0.487	1.0	9.2	0.061	2.4	0.0018	0.0021	49.0	0.2710
Sep	13469	0.00010	0.0777	0.0018	29.5	0.00051	0.0	0.0009	0.0100	0.437	1.0	8.4	0.054	2.4	0.0016	0.0020	38.7	0.2149
Oct	7047	0.00010	0.0821	0.0022	29.5	0.00067	0.0	0.0011	0.0122	0.511	1.0	10.3	0.065	2.5	0.0019	0.0022	64.4	0.3010
Nov	3181	0.00011	0.1024	0.0037	30.1	0.00121	0.0	0.0017	0.0207	0.803	1.2	14.8	0.108	2.8	0.0029	0.0029	125.1	0.6181
Dec	2352	0.00011	0.1167	0.0047	30.7	0.00160	0.0	0.0021	0.0266	1.007	1.3	18.1	0.138	3.0	0.0036	0.0033	170.2	0.8397
Total	97354																	

Location: Mouth of Anvil Creek

	Flows (x 1000 m3)	Ag mg/L	Al mg/L	As mg/L	Ca mg/L	Cd mg/L	Cl mg/L	Co mg/L	Cu mg/L	Fe mg/L	K mg/L	Mg mg/L	Mn mg/L	Na mg/L	Ni mg/L	Pb mg/L	SO4 mg/L	Zn mg/L
Jan	4432	0.00011	0.0889	0.0028	29.9	0.00088	0.0	0.0013	0.0152	0.612	1.1	12.6	0.080	2.7	0.0024	0.0025	95.5	0.4115
Feb	3272	0.00011	0.0931	0.0031	29.7	0.00102	0.0	0.0015	0.0173	0.684	1.1	14.0	0.091	2.7	0.0026	0.0027	114.9	0.4949
Mar	3362	0.00011	0.0997	0.0036	29.3	0.00118	0.0	0.0016	0.0202	0.782	1.1	14.4	0.105	2.7	0.0028	0.0028	122.2	0.6027
Apr	6375	0.00011	0.0913	0.0028	29.2	0.00086	0.0	0.0013	0.0158	0.637	1.0	10.5	0.083	2.5	0.0021	0.0023	68.7	0.4346
May	55468	0.00010	0.0694	0.0012	29.5	0.00029	0.0	0.0007	0.0065	0.315	0.9	7.0	0.036	2.3	0.0012	0.0018	18.5	0.0815
Jun	56956	0.00010	0.0705	0.0013	29.5	0.00031	0.0	0.0007	0.0069	0.329	0.9	7.0	0.038	2.3	0.0013	0.0018	18.2	0.0953
Jul	39693	0.00010	0.0714	0.0014	29.6	0.00033	0.0	0.0007	0.0073	0.342	0.9	7.2	0.040	2.3	0.0013	0.0018	21.3	0.1103
Aug	27824	0.00010	0.0713	0.0014	29.5	0.00034	0.0	0.0008	0.0073	0.344	0.9	7.5	0.040	2.3	0.0013	0.0018	25.2	0.1141
Sep	37419	0.00010	0.0701	0.0013	29.5	0.00031	0.0	0.0007	0.0068	0.326	0.9	7.2	0.037	2.3	0.0013	0.0018	21.4	0.0937
Oct	19528	0.00010	0.0717	0.0014	29.5	0.00037	0.0	0.0008	0.0076	0.353	1.0	7.9	0.042	2.3	0.0014	0.0019	30.7	0.1250
Nov	8835	0.00010	0.0790	0.0020	29.8	0.00056	0.0	0.0010	0.0107	0.458	1.0	9.5	0.057	2.5	0.0018	0.0021	52.5	0.2389
Dec	6515	0.00010	0.0842	0.0023	30.0	0.00070	0.0	0.0011	0.0128	0.532	1.1	10.7	0.068	2.5	0.0020	0.0023	68.9	0.3195
Total	269678																	

FSN03 - Supplemental Sensitivity Run - Faro Mine Site - Groundwater Collection Efficiency
Summary Tables

Conditions: FUTURE 1

Location: X2

	Flows (x 1000 m3)	Ag mg/L	Al mg/L	As mg/L	Ca mg/L	Cd mg/L	Cl mg/L	Co mg/L	Cu mg/L	Fe mg/L	K mg/L	Mg mg/L	Mn mg/L	Na mg/L	Ni mg/L	Pb mg/L	SO4 mg/L	Zn mg/L
Jan	553	0.00010	0.0685	0.0012	29.7	0.00027	0.0	0.0007	0.0058	0.290	0.9	6.6	0.032	2.3	0.0012	0.0018	12.3	0.0683
Feb	403	0.00011	0.0691	0.0012	29.7	0.00028	0.0	0.0007	0.0060	0.296	0.9	6.6	0.033	2.3	0.0012	0.0018	12.5	0.0782
Mar	406	0.00011	0.0699	0.0013	29.7	0.00030	0.0	0.0007	0.0063	0.305	0.9	6.7	0.034	2.3	0.0013	0.0018	12.7	0.0915
Apr	783	0.00010	0.0687	0.0012	29.7	0.00027	0.0	0.0007	0.0059	0.292	0.9	6.6	0.033	2.3	0.0012	0.0018	12.4	0.0715
May	6990	0.00010	0.0663	0.0010	29.6	0.00021	0.0	0.0006	0.0051	0.268	0.9	6.5	0.029	2.3	0.0011	0.0017	11.8	0.0317
Jun	7190	0.00010	0.0664	0.0010	29.6	0.00021	0.0	0.0006	0.0052	0.269	0.9	6.6	0.029	2.3	0.0011	0.0017	11.8	0.0332
Jul	5012	0.00010	0.0665	0.0010	29.6	0.00021	0.0	0.0006	0.0052	0.270	0.9	6.6	0.029	2.3	0.0011	0.0017	11.8	0.0349
Aug	3506	0.00010	0.0665	0.0010	29.6	0.00022	0.0	0.0006	0.0052	0.270	0.9	6.6	0.029	2.3	0.0011	0.0017	11.9	0.0353
Sep	4719	0.00010	0.0664	0.0010	29.6	0.00021	0.0	0.0006	0.0051	0.269	0.9	6.5	0.029	2.3	0.0011	0.0017	11.8	0.0331
Oct	2459	0.00010	0.0666	0.0010	29.6	0.00022	0.0	0.0006	0.0052	0.271	0.9	6.6	0.029	2.3	0.0011	0.0017	11.9	0.0365
Nov	1114	0.00010	0.0673	0.0011	29.6	0.00024	0.0	0.0006	0.0055	0.278	0.9	6.6	0.030	2.3	0.0012	0.0017	12.0	0.0489
Dec	821	0.00010	0.0679	0.0011	29.7	0.00025	0.0	0.0006	0.0056	0.284	0.9	6.6	0.031	2.3	0.0012	0.0017	12.2	0.0578
Total	33956																	

Location: X14

	Flows (x 1000 m3)	Ag mg/L	Al mg/L	As mg/L	Ca mg/L	Cd mg/L	Cl mg/L	Co mg/L	Cu mg/L	Fe mg/L	K mg/L	Mg mg/L	Mn mg/L	Na mg/L	Ni mg/L	Pb mg/L	SO4 mg/L	Zn mg/L
Jan	1193	0.00008	0.0448	0.0014	25.8	0.00079	0.0	0.0010	0.0044	0.185	1.6	9.9	0.025	3.7	0.0038	0.0042	54.4	0.0555
Feb	912	0.00007	0.0384	0.0014	24.0	0.00090	0.0	0.0011	0.0041	0.161	1.7	10.3	0.023	3.9	0.0043	0.0046	62.1	0.0598
Mar	981	0.00007	0.0346	0.0014	22.3	0.00091	0.0	0.0011	0.0039	0.147	1.7	10.0	0.022	3.8	0.0043	0.0046	62.6	0.0650
Apr	1784	0.00008	0.0481	0.0012	25.0	0.00059	0.0	0.0009	0.0045	0.200	1.3	8.2	0.025	3.0	0.0028	0.0032	38.6	0.0552
May	14480	0.00010	0.0635	0.0010	28.9	0.00025	0.0	0.0006	0.0049	0.255	1.0	6.7	0.028	2.4	0.0013	0.0019	15.1	0.0299
Jun	14796	0.00010	0.0637	0.0010	29.0	0.00025	0.0	0.0006	0.0050	0.257	1.0	6.7	0.028	2.4	0.0013	0.0019	15.0	0.0312
Jul	10301	0.00010	0.0630	0.0010	28.9	0.00027	0.0	0.0006	0.0049	0.254	1.0	6.9	0.028	2.4	0.0014	0.0020	16.6	0.0324
Aug	7268	0.00009	0.0614	0.0011	28.5	0.00030	0.0	0.0007	0.0049	0.248	1.0	7.0	0.027	2.5	0.0015	0.0021	18.5	0.0324
Sep	9748	0.00010	0.0627	0.0010	28.8	0.00027	0.0	0.0006	0.0049	0.253	1.0	6.9	0.028	2.4	0.0014	0.0020	16.7	0.0309
Oct	5108	0.00009	0.0600	0.0011	28.2	0.00034	0.0	0.0007	0.0048	0.242	1.1	7.2	0.027	2.6	0.0017	0.0023	21.5	0.0332
Nov	2303	0.00009	0.0556	0.0012	27.7	0.00050	0.0	0.0008	0.0048	0.226	1.3	8.2	0.027	3.0	0.0025	0.0030	33.2	0.0429
Dec	1705	0.00009	0.0526	0.0013	27.5	0.00062	0.0	0.0009	0.0047	0.216	1.4	9.0	0.027	3.3	0.0030	0.0035	41.8	0.0498
Total	70579																	

Location: Mouth of Rose Creek

	Flows (x 1000 m3)	Ag mg/L	Al mg/L	As mg/L	Ca mg/L	Cd mg/L	Cl mg/L	Co mg/L	Cu mg/L	Fe mg/L	K mg/L	Mg mg/L	Mn mg/L	Na mg/L	Ni mg/L	Pb mg/L	SO4 mg/L	Zn mg/L
Jan	1628	0.00008	0.0504	0.0013	26.8	0.00063	0.0	0.0009	0.0046	0.207	1.4	9.0	0.026	3.3	0.0031	0.0035	43.0	0.0475
Feb	1230	0.00008	0.0455	0.0013	25.5	0.00072	0.0	0.0010	0.0043	0.188	1.5	9.3	0.025	3.5	0.0035	0.0039	49.1	0.0510
Mar	1302	0.00007	0.0423	0.0013	24.1	0.00073	0.0	0.0010	0.0042	0.176	1.5	9.2	0.024	3.4	0.0035	0.0039	50.1	0.0553
Apr	2402	0.00009	0.0527	0.0012	26.2	0.00049	0.0	0.0008	0.0046	0.217	1.2	7.8	0.026	2.8	0.0024	0.0028	31.7	0.0476
May	19992	0.00010	0.0641	0.0010	29.1	0.00024	0.0	0.0006	0.0050	0.258	1.0	6.7	0.028	2.3	0.0013	0.0018	14.2	0.0287
Jun	20466	0.00010	0.0643	0.0010	29.1	0.00024	0.0	0.0006	0.0050	0.259	1.0	6.7	0.028	2.3	0.0013	0.0018	14.1	0.0296
Jul	14254	0.00010	0.0638	0.0010	29.1	0.00025	0.0	0.0006	0.0050	0.257	1.0	6.8	0.028	2.4	0.0013	0.0019	15.2	0.0305
Aug	10032	0.00010	0.0627	0.0010	28.8	0.00027	0.0	0.0006	0.0049	0.252	1.0	6.9	0.028	2.4	0.0014	0.0020	16.7	0.0305
Sep	13469	0.00010	0.0636	0.0010	29.0	0.00025	0.0	0.0006	0.0049	0.256	1.0	6.8	0.028	2.4	0.0013	0.0019	15.3	0.0295
Oct	7048	0.00010	0.0616	0.0011	28.6	0.00030	0.0	0.0007	0.0049	0.248	1.0	7.0	0.027	2.5	0.0016	0.0021	18.8	0.0311
Nov	3181	0.00009	0.0584	0.0011	28.3	0.00042	0.0	0.0008	0.0048	0.237	1.2	7.8	0.027	2.8	0.0021	0.0026	27.2	0.0381
Dec	2352	0.00009	0.0563	0.0012	28.1	0.00051	0.0	0.0008	0.0048	0.229	1.3	8.3	0.027	3.0	0.0025	0.0030	33.6	0.0431
Total	97354																	

Location: Mouth of Anvil Creek

	Flows (x 1000 m3)	Ag mg/L	Al mg/L	As mg/L	Ca mg/L	Cd mg/L	Cl mg/L	Co mg/L	Cu mg/L	Fe mg/L	K mg/L	Mg mg/L	Mn mg/L	Na mg/L	Ni mg/L	Pb mg/L	SO4 mg/L	Zn mg/L
Jan	4432	0.00009	0.0602	0.0011	28.6	0.00036	0.0	0.0007	0.0048	0.243	1.1	7.4	0.027	2.7	0.0018	0.0024	23.2	0.0337
Feb	3272	0.00009	0.0582	0.0011	28.0	0.00039	0.0	0.0007	0.0048	0.235	1.1	7.6	0.027	2.7	0.0020	0.0025	25.8	0.0351
Mar	3362	0.00009	0.0568	0.0011	27.5	0.00041	0.0	0.0007	0.0047	0.230	1.1	7.5	0.026	2.7	0.0020	0.0025	26.6	0.0371
Apr	6375	0.00009	0.0609	0.0011	28.3	0.00031	0.0	0.0007	0.0049	0.246	1.0	7.0	0.027	2.5	0.0016	0.0021	19.2	0.0339
May	55468	0.00010	0.0653	0.0010	29.4	0.00021	0.0	0.0006	0.0050	0.262	0.9	6.6	0.028	2.3	0.0012	0.0017	12.6	0.0267
Jun	56956	0.00010	0.0653	0.0010	29.4	0.00021	0.0	0.0006	0.0050	0.262	0.9	6.6	0.028	2.3	0.0012	0.0017	12.6	0.0270
Jul	39693	0.00010	0.0651	0.0010	29.4	0.00022	0.0	0.0006	0.0050	0.261	0.9	6.6	0.028	2.3	0.0012	0.0018	13.0	0.0274
Aug	27824	0.00010	0.0647	0.0010	29.3	0.00023	0.0	0.0006	0.0050	0.260	0.9	6.7	0.028	2.3	0.0012	0.0018	13.5	0.0274
Sep	37419	0.00010	0.0651	0.0010	29.4	0.00022	0.0	0.0006	0.0050	0.261	0.9	6.6	0.028	2.3	0.0012	0.0018	13.0	0.0270
Oct	19528	0.00010	0.0643	0.0010	29.2	0.00024	0.0	0.0006	0.0049	0.258	1.0	6.7	0.028	2.3	0.0013	0.0018	14.3	0.0276
Nov	8835	0.00010	0.0632	0.0011	29.1	0.00028	0.0	0.0007	0.0049	0.254	1.0	7.0	0.028	2.5	0.0015	0.0020	17.3	0.0301
Dec	6515	0.00010	0.0624	0.0011	29.1	0.00031	0.0	0.0007	0.0049	0.251	1.0	7.2	0.028	2.5	0.0016	0.0022	19.6	0.0319
Total	269678																	

FSN03 - Supplemental Sensitivity Run - Faro Mine Site - Groundwater Collection Efficiency
Summary Tables
Conditions FUTURE 2

Location X2

	Flows (x 1000 m3)	Ag mg/L	Al mg/L	As mg/L	Ca mg/L	Cd mg/L	Cl mg/L	Co mg/L	Cu mg/L	Fe mg/L	K mg/L	Mg mg/L	Mn mg/L	Na mg/L	Ni mg/L	Pb mg/L	SO4 mg/L	Zn mg/L
Jan	553	0.00011	0.0783	0.0018	29.7	0.00038	0.0	0.0009	0.0099	0.408	0.9	6.7	0.052	2.3	0.0015	0.0019	13.1	0.1616
Feb	403	0.00011	0.0812	0.0019	29.8	0.00043	0.0	0.0009	0.0110	0.442	0.9	6.7	0.057	2.3	0.0016	0.0019	13.4	0.1934
Mar	406	0.00011	0.0850	0.0022	29.8	0.00048	0.0	0.0010	0.0125	0.486	0.9	6.8	0.065	2.3	0.0017	0.0020	13.9	0.2358
Apr	783	0.00011	0.0792	0.0018	29.7	0.00040	0.0	0.0009	0.0102	0.419	0.9	6.7	0.054	2.3	0.0015	0.0019	13.2	0.1721
May	6990	0.00010	0.0677	0.0011	29.6	0.00023	0.0	0.0006	0.0057	0.285	0.9	6.6	0.032	2.3	0.0012	0.0017	11.9	0.0451
Jun	7190	0.00010	0.0681	0.0011	29.6	0.00023	0.0	0.0006	0.0059	0.290	0.9	6.6	0.033	2.3	0.0012	0.0017	12.0	0.0499
Jul	5012	0.00010	0.0686	0.0012	29.6	0.00024	0.0	0.0007	0.0061	0.295	0.9	6.6	0.033	2.3	0.0012	0.0017	12.0	0.0551
Aug	3506	0.00010	0.0687	0.0012	29.6	0.00024	0.0	0.0007	0.0061	0.297	0.9	6.6	0.034	2.3	0.0012	0.0017	12.0	0.0565
Sep	4719	0.00010	0.0681	0.0011	29.6	0.00023	0.0	0.0006	0.0058	0.289	0.9	6.6	0.032	2.3	0.0012	0.0017	12.0	0.0494
Oct	2459	0.00010	0.0691	0.0012	29.6	0.00025	0.0	0.0007	0.0062	0.301	0.9	6.6	0.034	2.3	0.0012	0.0017	12.1	0.0603
Nov	1114	0.00010	0.0727	0.0014	29.7	0.00030	0.0	0.0007	0.0077	0.343	0.9	6.6	0.041	2.3	0.0013	0.0018	12.5	0.1000
Dec	821	0.00010	0.0752	0.0016	29.7	0.00034	0.0	0.0008	0.0087	0.373	0.9	6.7	0.046	2.3	0.0014	0.0018	12.8	0.1281
Total	33956																	

Location X14

	Flows (x 1000 m3)	Ag mg/L	Al mg/L	As mg/L	Ca mg/L	Cd mg/L	Cl mg/L	Co mg/L	Cu mg/L	Fe mg/L	K mg/L	Mg mg/L	Mn mg/L	Na mg/L	Ni mg/L	Pb mg/L	SO4 mg/L	Zn mg/L
Jan	1193	0.00008	0.0501	0.0016	29.5	0.00086	0.0	0.0011	0.0064	0.245	1.6	16.1	0.035	3.7	0.0040	0.0043	102.1	0.1080
Feb	912	0.00007	0.0447	0.0017	28.5	0.00097	0.0	0.0012	0.0064	0.231	1.7	17.8	0.035	3.9	0.0045	0.0047	119.0	0.1214
Mar	981	0.00007	0.0419	0.0018	26.9	0.00100	0.0	0.0012	0.0066	0.230	1.7	17.6	0.036	3.8	0.0046	0.0047	120.7	0.1374
Apr	1784	0.00008	0.0535	0.0015	27.5	0.00065	0.0	0.0010	0.0065	0.261	1.3	12.3	0.035	3.1	0.0030	0.0033	69.7	0.1087
May	14480	0.00010	0.0643	0.0011	29.2	0.00026	0.0	0.0006	0.0052	0.264	1.0	7.3	0.029	2.4	0.0013	0.0019	19.1	0.0378
Jun	14796	0.00010	0.0646	0.0011	29.3	0.00026	0.0	0.0007	0.0053	0.268	1.0	7.2	0.030	2.4	0.0013	0.0019	18.7	0.0410
Jul	10301	0.00010	0.0642	0.0011	29.3	0.00029	0.0	0.0007	0.0054	0.268	1.0	7.6	0.030	2.4	0.0015	0.0020	22.2	0.0444
Aug	7268	0.00010	0.0627	0.0011	29.1	0.00031	0.0	0.0007	0.0053	0.262	1.0	8.0	0.030	2.5	0.0016	0.0021	26.4	0.0448
Sep	9748	0.00010	0.0637	0.0011	29.2	0.00028	0.0	0.0007	0.0053	0.264	1.0	7.6	0.030	2.4	0.0014	0.0020	22.3	0.0405
Oct	5108	0.00009	0.0614	0.0011	29.1	0.00035	0.0	0.0007	0.0053	0.258	1.1	8.7	0.030	2.6	0.0018	0.0023	32.7	0.0471
Nov	2303	0.00009	0.0586	0.0014	29.6	0.00054	0.0	0.0009	0.0059	0.260	1.3	11.4	0.033	3.0	0.0026	0.0030	57.1	0.0728
Dec	1705	0.00009	0.0568	0.0015	30.2	0.00067	0.0	0.0010	0.0063	0.262	1.4	13.4	0.035	3.3	0.0032	0.0035	75.3	0.0908
Total	70579																	

Location Mouth of Rose Creek

	Flows (x 1000 m3)	Ag mg/L	Al mg/L	As mg/L	Ca mg/L	Cd mg/L	Cl mg/L	Co mg/L	Cu mg/L	Fe mg/L	K mg/L	Mg mg/L	Mn mg/L	Na mg/L	Ni mg/L	Pb mg/L	SO4 mg/L	Zn mg/L
Jan	1628	0.00009	0.0543	0.0015	29.6	0.00068	0.0	0.0010	0.0060	0.250	1.4	13.6	0.033	3.3	0.0032	0.0036	77.9	0.0859
Feb	1230	0.00008	0.0501	0.0015	28.8	0.00077	0.0	0.0011	0.0060	0.239	1.5	14.9	0.033	3.5	0.0036	0.0039	91.3	0.0967
Mar	1302	0.00008	0.0478	0.0016	27.6	0.00080	0.0	0.0011	0.0062	0.238	1.5	14.9	0.034	3.4	0.0037	0.0039	93.9	0.1099
Apr	2402	0.00009	0.0567	0.0014	28.0	0.00054	0.0	0.0009	0.0061	0.262	1.2	10.8	0.034	2.8	0.0025	0.0029	54.8	0.0873
May	19992	0.00010	0.0647	0.0010	29.3	0.00024	0.0	0.0006	0.0052	0.264	1.0	7.1	0.029	2.3	0.0013	0.0018	17.1	0.0344
Jun	20466	0.00010	0.0650	0.0011	29.3	0.00024	0.0	0.0006	0.0052	0.267	1.0	7.0	0.029	2.3	0.0013	0.0018	16.8	0.0367
Jul	14254	0.00010	0.0647	0.0011	29.4	0.00026	0.0	0.0007	0.0053	0.267	1.0	7.3	0.030	2.4	0.0014	0.0019	19.3	0.0392
Aug	10032	0.00010	0.0636	0.0011	29.2	0.00028	0.0	0.0007	0.0052	0.263	1.0	7.6	0.029	2.4	0.0014	0.0020	22.4	0.0395
Sep	13469	0.00010	0.0643	0.0011	29.3	0.00026	0.0	0.0006	0.0052	0.264	1.0	7.3	0.029	2.4	0.0014	0.0019	19.4	0.0364
Oct	7048	0.00010	0.0626	0.0011	29.2	0.00031	0.0	0.0007	0.0052	0.260	1.0	8.1	0.029	2.5	0.0016	0.0021	26.9	0.0412
Nov	3181	0.00009	0.0606	0.0013	29.6	0.00044	0.0	0.0008	0.0056	0.261	1.2	10.0	0.031	2.8	0.0022	0.0026	44.6	0.0598
Dec	2352	0.00009	0.0593	0.0014	30.0	0.00054	0.0	0.0009	0.0059	0.263	1.3	11.5	0.033	3.0	0.0026	0.0030	57.8	0.0729
Total	97354																	

Location Mouth of Anvil Creek

	Flows (x 1000 m3)	Ag mg/L	Al mg/L	As mg/L	Ca mg/L	Cd mg/L	Cl mg/L	Co mg/L	Cu mg/L	Fe mg/L	K mg/L	Mg mg/L	Mn mg/L	Na mg/L	Ni mg/L	Pb mg/L	SO4 mg/L	Zn mg/L
Jan	4432	0.00009	0.0617	0.0012	29.6	0.00038	0.0	0.0007	0.0054	0.259	1.1	9.1	0.030	2.7	0.0019	0.0024	36.0	0.0478
Feb	3272	0.00009	0.0600	0.0012	29.3	0.00042	0.0	0.0008	0.0054	0.255	1.1	9.7	0.030	2.7	0.0021	0.0025	41.6	0.0523
Mar	3362	0.00009	0.0589	0.0012	28.8	0.00043	0.0	0.0008	0.0055	0.254	1.1	9.8	0.031	2.7	0.0021	0.0026	43.5	0.0582
Apr	6375	0.00009	0.0624	0.0011	29.0	0.00033	0.0	0.0007	0.0054	0.263	1.0	8.2	0.030	2.5	0.0016	0.0021	27.9	0.0489
May	55468	0.00010	0.0655	0.0010	29.5	0.00022	0.0	0.0006	0.0051	0.264	0.9	6.7	0.029	2.3	0.0012	0.0018	13.6	0.0288
Jun	56956	0.00010	0.0656	0.0010	29.5	0.00022	0.0	0.0006	0.0051	0.265	0.9	6.7	0.029	2.3	0.0012	0.0017	13.5	0.0296
Jul	39693	0.00010	0.0655	0.0010	29.5	0.00022	0.0	0.0006	0.0051	0.265	0.9	6.8	0.029	2.3	0.0012	0.0018	14.4	0.0305
Aug	27824	0.00010	0.0651	0.0010	29.5	0.00023	0.0	0.0006	0.0051	0.264	0.9	6.9	0.029	2.3	0.0012	0.0018	15.6	0.0306
Sep	37419	0.00010	0.0653	0.0010	29.5	0.00022	0.0	0.0006	0.0051	0.264	0.9	6.8	0.029	2.3	0.0012	0.0018	14.5	0.0295
Oct	19528	0.00010	0.0647	0.0010	29.5	0.00024	0.0	0.0006	0.0051	0.262	1.0	7.1	0.029	2.3	0.0013	0.0019	17.2	0.0312
Nov	8835	0.00010	0.0640	0.0011	29.6	0.00029	0.0	0.0007	0.0052	0.263	1.0	7.8	0.029	2.5	0.0015	0.0020	23.5	0.0379
Dec	6515	0.00010	0.0635	0.0011	29.7	0.00032	0.0	0.0007	0.0053	0.264	1.1	8.3	0.030	2.5	0.0016	0.0022	28.3	0.0427
Total	269678																	

FSN03 - Supplemental Sensitivity Run - Faro Mine Site - Groundwater Collection Efficiency

Conditions: FUTURE 3

Location: X2

	Flows (x 1000 m3)	Ag mg/L	Al mg/L	As mg/L	Ca mg/L	Cd mg/L	Cl mg/L	Co mg/L	Cu mg/L	Fe mg/L	K mg/L	Mg mg/L	Mn mg/L	Na mg/L	Ni mg/L	Pb mg/L	SO4 mg/L	Zn mg/L
Jan	553	0.00014	0.1633	0.0061	29.9	0.00192	0.1	0.0027	0.0378	1.442	0.9	7.1	0.200	2.3	0.0033	0.0025	19.4	1.2919
Feb	403	0.00015	0.1860	0.0073	30.0	0.00232	0.1	0.0032	0.0454	1.717	0.9	7.2	0.240	2.3	0.0038	0.0027	21.2	1.5872
Mar	406	0.00016	0.2164	0.0089	30.1	0.00285	0.1	0.0038	0.0556	2.084	0.9	7.4	0.293	2.3	0.0045	0.0029	23.7	1.9819
Apr	783	0.00014	0.1708	0.0065	29.9	0.00205	0.1	0.0028	0.0403	1.532	0.9	7.1	0.213	2.3	0.0035	0.0026	20.0	1.3889
May	6990	0.00011	0.0799	0.0017	29.6	0.00045	0.0	0.0009	0.0097	0.433	0.9	6.6	0.053	2.3	0.0014	0.0018	12.8	0.2072
Jun	7190	0.00011	0.0833	0.0019	29.7	0.00051	0.0	0.0010	0.0109	0.474	0.9	6.6	0.059	2.3	0.0015	0.0018	13.1	0.2516
Jul	5012	0.00011	0.0870	0.0021	29.7	0.00057	0.0	0.0011	0.0121	0.519	0.9	6.7	0.066	2.3	0.0016	0.0019	13.4	0.3001
Aug	3506	0.00011	0.0880	0.0022	29.7	0.00059	0.0	0.0011	0.0124	0.532	0.9	6.7	0.067	2.3	0.0016	0.0019	13.5	0.3132
Sep	4719	0.00011	0.0829	0.0019	29.7	0.00050	0.0	0.0010	0.0107	0.470	0.9	6.6	0.058	2.3	0.0015	0.0018	13.1	0.2468
Oct	2459	0.00011	0.0908	0.0023	29.7	0.00064	0.0	0.0011	0.0134	0.565	0.9	6.7	0.072	2.3	0.0017	0.0019	13.7	0.3488
Nov	1114	0.00012	0.1191	0.0038	29.8	0.00114	0.0	0.0017	0.0229	0.908	0.9	6.8	0.122	2.3	0.0023	0.0021	15.9	0.7177
Dec	821	0.00013	0.1393	0.0049	29.8	0.00150	0.0	0.0022	0.0297	1.152	0.9	6.9	0.158	2.3	0.0027	0.0023	17.5	0.9797
Total	33956																	

Location: X14

	Flows (x 1000 m3)	Ag mg/L	Al mg/L	As mg/L	Ca mg/L	Cd mg/L	Cl mg/L	Co mg/L	Cu mg/L	Fe mg/L	K mg/L	Mg mg/L	Mn mg/L	Na mg/L	Ni mg/L	Pb mg/L	SO4 mg/L	Zn mg/L
Jan	1193	0.00010	0.1054	0.0046	30.8	0.00185	0.0	0.0023	0.0253	0.940	1.6	29.0	0.134	3.7	0.0051	0.0046	322.3	0.8381
Feb	912	0.00010	0.1096	0.0053	30.0	0.00214	0.0	0.0026	0.0287	1.046	1.7	33.0	0.151	3.9	0.0058	0.0051	381.1	0.9788
Mar	981	0.00010	0.1183	0.0059	28.5	0.00237	0.1	0.0029	0.0328	1.188	1.7	33.3	0.172	3.9	0.0061	0.0052	388.9	1.1451
Apr	1784	0.00010	0.1099	0.0046	28.3	0.00167	0.0	0.0022	0.0258	0.969	1.3	20.7	0.136	3.1	0.0041	0.0036	213.6	0.8532
May	14480	0.00010	0.0725	0.0015	29.3	0.00041	0.0	0.0008	0.0081	0.368	1.0	8.3	0.044	2.4	0.0015	0.0019	37.5	0.1468
Jun	14796	0.00010	0.0750	0.0016	29.4	0.00045	0.0	0.0009	0.0089	0.398	1.0	8.2	0.048	2.4	0.0015	0.0020	36.3	0.1777
Jul	10301	0.00010	0.0768	0.0018	29.5	0.00051	0.0	0.0009	0.0097	0.426	1.0	9.1	0.053	2.4	0.0017	0.0021	48.1	0.2106
Aug	7268	0.00010	0.0758	0.0018	29.3	0.00055	0.0	0.0010	0.0098	0.426	1.0	10.1	0.053	2.5	0.0018	0.0022	62.8	0.2174
Sep	9748	0.00010	0.0738	0.0016	29.4	0.00046	0.0	0.0009	0.0087	0.390	1.0	9.1	0.048	2.4	0.0016	0.0021	48.7	0.1737
Oct	5108	0.00010	0.0760	0.0019	29.4	0.00062	0.0	0.0010	0.0103	0.442	1.1	11.7	0.056	2.6	0.0021	0.0024	84.2	0.2407
Nov	2303	0.00010	0.0901	0.0031	30.3	0.00111	0.0	0.0016	0.0167	0.656	1.3	17.8	0.089	3.0	0.0032	0.0032	167.7	0.4894
Dec	1705	0.00010	0.1001	0.0039	31.1	0.00145	0.0	0.0019	0.0211	0.806	1.4	22.4	0.112	3.3	0.0040	0.0038	229.6	0.6622
Total	70579																	

Location: Mouth of Rose Creek

	Flows (x 1000 m3)	Ag mg/L	Al mg/L	As mg/L	Ca mg/L	Cd mg/L	Cl mg/L	Co mg/L	Cu mg/L	Fe mg/L	K mg/L	Mg mg/L	Mn mg/L	Na mg/L	Ni mg/L	Pb mg/L	SO4 mg/L	Zn mg/L
Jan	1628	0.00010	0.0949	0.0037	30.5	0.00141	0.0	0.0019	0.0199	0.759	1.4	23.0	0.106	3.3	0.0040	0.0038	239.2	0.6207
Feb	1230	0.00010	0.0983	0.0042	29.9	0.00164	0.0	0.0021	0.0226	0.844	1.5	26.2	0.119	3.5	0.0046	0.0042	285.8	0.7328
Mar	1302	0.00010	0.1054	0.0047	28.7	0.00184	0.0	0.0023	0.0260	0.961	1.5	26.7	0.137	3.5	0.0048	0.0043	296.1	0.8697
Apr	2402	0.00010	0.0986	0.0036	28.7	0.00129	0.0	0.0018	0.0205	0.788	1.2	17.1	0.108	2.9	0.0033	0.0031	161.7	0.6405
May	19992	0.00010	0.0707	0.0014	29.4	0.00035	0.0	0.0008	0.0072	0.339	1.0	7.8	0.040	2.3	0.0014	0.0019	30.4	0.1134
Jun	20466	0.00010	0.0725	0.0015	29.4	0.00038	0.0	0.0008	0.0078	0.361	1.0	7.8	0.043	2.3	0.0014	0.0019	29.5	0.1355
Jul	14254	0.00010	0.0738	0.0016	29.5	0.00043	0.0	0.0008	0.0084	0.381	1.0	8.4	0.046	2.4	0.0015	0.0020	38.0	0.1593
Aug	10032	0.00010	0.0730	0.0016	29.4	0.00045	0.0	0.0009	0.0085	0.381	1.0	9.1	0.046	2.4	0.0016	0.0020	48.7	0.1646
Sep	13469	0.00010	0.0716	0.0015	29.5	0.00039	0.0	0.0008	0.0077	0.355	1.0	8.4	0.042	2.4	0.0015	0.0020	38.5	0.1328
Oct	7048	0.00010	0.0732	0.0017	29.5	0.00050	0.0	0.0009	0.0089	0.393	1.0	10.3	0.048	2.5	0.0018	0.0022	64.2	0.1815
Nov	3181	0.00010	0.0835	0.0025	30.1	0.00086	0.0	0.0013	0.0135	0.548	1.2	14.7	0.072	2.8	0.0026	0.0028	124.6	0.3614
Dec	2352	0.00010	0.0907	0.0031	30.7	0.00111	0.0	0.0016	0.0167	0.657	1.3	18.0	0.089	3.0	0.0032	0.0032	169.7	0.4871
Total	97354																	

Location: Mouth of Anvil Creek

	Flows (x 1000 m3)	Ag mg/L	Al mg/L	As mg/L	Ca mg/L	Cd mg/L	Cl mg/L	Co mg/L	Cu mg/L	Fe mg/L	K mg/L	Mg mg/L	Mn mg/L	Na mg/L	Ni mg/L	Pb mg/L	SO4 mg/L	Zn mg/L
Jan	4432	0.00010	0.0765	0.0020	29.9	0.00064	0.0	0.0011	0.0105	0.446	1.1	12.6	0.057	2.7	0.0022	0.0025	95.3	0.2442
Feb	3272	0.00010	0.0781	0.0022	29.7	0.00074	0.0	0.0012	0.0116	0.482	1.1	13.9	0.063	2.7	0.0024	0.0026	114.7	0.2914
Mar	3362	0.00010	0.0812	0.0024	29.3	0.00083	0.0	0.0013	0.0131	0.534	1.1	14.3	0.070	2.7	0.0025	0.0027	121.8	0.3524
Apr	6375	0.00010	0.0782	0.0020	29.2	0.00061	0.0	0.0010	0.0108	0.461	1.0	10.5	0.058	2.5	0.0019	0.0022	68.2	0.2573
May	55468	0.00010	0.0676	0.0011	29.5	0.00025	0.0	0.0007	0.0058	0.291	0.9	7.0	0.032	2.3	0.0012	0.0018	18.4	0.0572
Jun	56956	0.00010	0.0683	0.0012	29.5	0.00026	0.0	0.0007	0.0060	0.299	0.9	7.0	0.034	2.3	0.0012	0.0018	18.1	0.0651
Jul	39693	0.00010	0.0687	0.0012	29.6	0.00028	0.0	0.0007	0.0062	0.306	0.9	7.2	0.035	2.3	0.0013	0.0018	21.2	0.0736
Aug	27824	0.00010	0.0685	0.0012	29.5	0.00029	0.0	0.0007	0.0063	0.306	0.9	7.5	0.035	2.3	0.0013	0.0018	25.1	0.0757
Sep	37419	0.00010	0.0680	0.0012	29.5	0.00027	0.0	0.0007	0.0060	0.297	0.9	7.2	0.033	2.3	0.0012	0.0018	21.3	0.0642
Oct	19528	0.00010	0.0686	0.0012	29.5	0.00031	0.0	0.0007	0.0064	0.311	1.0	7.9	0.036	2.3	0.0013	0.0019	30.7	0.0819
Nov	8835	0.00010	0.0722	0.0015	29.8	0.00044	0.0	0.0008	0.0080	0.366	1.0	9.5	0.044	2.5	0.0016	0.0021	52.4	0.1465
Dec	6515	0.00010	0.0748	0.0017	30.0	0.00053	0.0	0.0009	0.0092	0.406	1.1	10.7	0.050	2.5	0.0019	0.0023	68.7	0.1922
Total	269678																	

FM04 - Supplemental Base Case - Faro Mine Site
Summary Tables

Conditions: FUTURE 1

Location: X2

	Flows (x 1000 m3)	Ag mg/L	Al mg/L	As mg/L	Ca mg/L	Cd mg/L	Cl mg/L	Co mg/L	Cu mg/L	Fe mg/L	K mg/L	Mg mg/L	Mn mg/L	Na mg/L	Ni mg/L	Pb mg/L	SO4 mg/L	Zn mg/L
Jan	554	0.00010	0.0665	0.0010	29.6	0.00021	0.0	0.0006	0.0051	0.267	0.9	6.6	0.029	2.3	0.0011	0.0017	11.9	0.0319
Feb	404	0.00010	0.0667	0.0010	29.6	0.00021	0.0	0.0006	0.0051	0.268	0.9	6.6	0.029	2.3	0.0011	0.0017	12.0	0.0333
Mar	407	0.00010	0.0669	0.0010	29.6	0.00021	0.0	0.0006	0.0051	0.269	0.9	6.6	0.029	2.3	0.0012	0.0017	12.1	0.0353
Apr	785	0.00010	0.0666	0.0010	29.6	0.00021	0.0	0.0006	0.0051	0.268	0.9	6.6	0.029	2.3	0.0011	0.0017	12.0	0.0324
May	7012	0.00010	0.0660	0.0010	29.6	0.00020	0.0	0.0006	0.0050	0.265	0.9	6.5	0.028	2.3	0.0011	0.0017	11.7	0.0265
Jun	7212	0.00010	0.0660	0.0010	29.6	0.00020	0.0	0.0006	0.0050	0.265	0.9	6.5	0.028	2.3	0.0011	0.0017	11.8	0.0267
Jul	5028	0.00010	0.0660	0.0010	29.6	0.00020	0.0	0.0006	0.0050	0.265	0.9	6.5	0.028	2.3	0.0011	0.0017	11.8	0.0270
Aug	3516	0.00010	0.0660	0.0010	29.6	0.00020	0.0	0.0006	0.0050	0.265	0.9	6.5	0.028	2.3	0.0011	0.0017	11.8	0.0270
Sep	4734	0.00010	0.0660	0.0010	29.6	0.00020	0.0	0.0006	0.0050	0.265	0.9	6.5	0.028	2.3	0.0011	0.0017	11.8	0.0267
Oct	2467	0.00010	0.0661	0.0010	29.6	0.00020	0.0	0.0006	0.0050	0.265	0.9	6.5	0.028	2.3	0.0011	0.0017	11.8	0.0272
Nov	1117	0.00010	0.0662	0.0010	29.6	0.00020	0.0	0.0006	0.0050	0.266	0.9	6.6	0.029	2.3	0.0011	0.0017	11.8	0.0290
Dec	823	0.00010	0.0664	0.0010	29.6	0.00021	0.0	0.0006	0.0051	0.266	0.9	6.6	0.029	2.3	0.0011	0.0017	11.9	0.0303
Total	34060																	

Location: X14

	Flows (x 1000 m3)	Ag mg/L	Al mg/L	As mg/L	Ca mg/L	Cd mg/L	Cl mg/L	Co mg/L	Cu mg/L	Fe mg/L	K mg/L	Mg mg/L	Mn mg/L	Na mg/L	Ni mg/L	Pb mg/L	SO4 mg/L	Zn mg/L
Jan	1112	0.00007	0.0614	0.0008	20.7	0.00058	0.0	0.0008	0.0089	0.349	0.6	5.2	0.044	1.7	0.0014	0.0016	15.2	0.2912
Feb	836	0.00006	0.0549	0.0007	18.2	0.00055	0.0	0.0008	0.0083	0.320	0.6	4.7	0.040	1.5	0.0013	0.0014	15.0	0.2813
Mar	891	0.00005	0.0489	0.0007	16.4	0.00049	0.0	0.0007	0.0074	0.283	0.5	4.3	0.036	1.3	0.0012	0.0013	14.2	0.2475
Apr	1681	0.00007	0.0587	0.0008	21.6	0.00045	0.0	0.0007	0.0074	0.306	0.7	5.2	0.037	1.7	0.0012	0.0015	13.2	0.2080
May	14558	0.00009	0.0751	0.0010	26.8	0.00057	0.0	0.0009	0.0096	0.395	0.8	6.2	0.048	2.1	0.0015	0.0019	13.6	0.2714
Jun	14956	0.00009	0.0751	0.0010	26.9	0.00057	0.0	0.0009	0.0096	0.394	0.8	6.2	0.048	2.1	0.0015	0.0019	13.6	0.2693
Jul	10377	0.00009	0.0744	0.0010	26.7	0.00056	0.0	0.0009	0.0094	0.389	0.8	6.2	0.047	2.1	0.0015	0.0019	13.6	0.2644
Aug	7295	0.00009	0.0730	0.0010	26.2	0.00055	0.0	0.0009	0.0093	0.383	0.8	6.1	0.046	2.1	0.0015	0.0018	13.5	0.2613
Sep	9834	0.00009	0.0748	0.0010	26.6	0.00058	0.0	0.0009	0.0097	0.396	0.8	6.1	0.048	2.1	0.0015	0.0019	13.7	0.2776
Oct	5136	0.00009	0.0728	0.0010	25.7	0.00058	0.0	0.0009	0.0096	0.389	0.8	6.0	0.047	2.1	0.0015	0.0018	13.8	0.2791
Nov	2272	0.00008	0.0702	0.0010	24.4	0.00059	0.0	0.0009	0.0095	0.382	0.8	5.8	0.047	2.0	0.0015	0.0018	14.5	0.2894
Dec	1632	0.00008	0.0683	0.0009	23.5	0.00060	0.0	0.0009	0.0095	0.377	0.7	5.7	0.047	1.9	0.0015	0.0017	15.0	0.2961
Total	70579																	

Location: Mouth of Rose Creek

	Flows (x 1000 m3)	Ag mg/L	Al mg/L	As mg/L	Ca mg/L	Cd mg/L	Cl mg/L	Co mg/L	Cu mg/L	Fe mg/L	K mg/L	Mg mg/L	Mn mg/L	Na mg/L	Ni mg/L	Pb mg/L	SO4 mg/L	Zn mg/L
Jan	1548	0.00008	0.0627	0.0009	23.2	0.00047	0.0	0.0008	0.0076	0.325	0.7	5.6	0.039	1.8	0.0013	0.0016	14.2	0.2165
Feb	1153	0.00007	0.0579	0.0008	21.3	0.00045	0.0	0.0007	0.0074	0.304	0.7	5.2	0.037	1.7	0.0013	0.0015	14.1	0.2109
Mar	1211	0.00007	0.0534	0.0008	19.9	0.00041	0.0	0.0007	0.0067	0.278	0.6	4.9	0.034	1.6	0.0012	0.0014	13.5	0.1888
Apr	2298	0.00008	0.0606	0.0009	23.7	0.00038	0.0	0.0007	0.0068	0.295	0.7	5.5	0.035	1.9	0.0012	0.0016	12.8	0.1590
May	20070	0.00009	0.0725	0.0010	27.6	0.00047	0.0	0.0008	0.0083	0.359	0.9	6.3	0.042	2.2	0.0014	0.0018	13.1	0.2039
Jun	20625	0.00009	0.0726	0.0010	27.6	0.00047	0.0	0.0008	0.0083	0.358	0.9	6.3	0.042	2.2	0.0014	0.0018	13.1	0.2023
Jul	14330	0.00009	0.0720	0.0010	27.5	0.00046	0.0	0.0008	0.0082	0.355	0.9	6.3	0.042	2.2	0.0014	0.0018	13.1	0.1986
Aug	10060	0.00009	0.0711	0.0010	27.2	0.00046	0.0	0.0008	0.0081	0.350	0.8	6.2	0.041	2.1	0.0014	0.0018	13.0	0.1965
Sep	13555	0.00009	0.0724	0.0010	27.4	0.00048	0.0	0.0008	0.0084	0.360	0.9	6.2	0.043	2.2	0.0014	0.0018	13.1	0.2084
Oct	7075	0.00009	0.0709	0.0010	26.8	0.00048	0.0	0.0008	0.0083	0.355	0.8	6.1	0.042	2.1	0.0014	0.0018	13.2	0.2096
Nov	3150	0.00009	0.0690	0.0010	25.8	0.00048	0.0	0.0008	0.0083	0.349	0.8	6.0	0.042	2.0	0.0014	0.0018	13.7	0.2158
Dec	2279	0.00008	0.0676	0.0009	25.2	0.00049	0.0	0.0008	0.0082	0.345	0.8	5.9	0.041	2.0	0.0014	0.0017	14.1	0.2193
Total	97354																	

Location: Mouth of Anvil Creek

	Flows (x 1000 m3)	Ag mg/L	Al mg/L	As mg/L	Ca mg/L	Cd mg/L	Cl mg/L	Co mg/L	Cu mg/L	Fe mg/L	K mg/L	Mg mg/L	Mn mg/L	Na mg/L	Ni mg/L	Pb mg/L	SO4 mg/L	Zn mg/L
Jan	4352	0.00009	0.0647	0.0010	27.3	0.00030	0.0	0.0007	0.0060	0.286	0.9	6.2	0.032	2.1	0.0012	0.0017	12.6	0.0935
Feb	3196	0.00009	0.0630	0.0009	26.6	0.00029	0.0	0.0006	0.0059	0.279	0.8	6.1	0.031	2.1	0.0012	0.0016	12.6	0.0925
Mar	3272	0.00009	0.0613	0.0009	26.0	0.00028	0.0	0.0006	0.0056	0.269	0.8	5.9	0.030	2.0	0.0011	0.0016	12.4	0.0860
Apr	6271	0.00009	0.0640	0.0010	27.4	0.00027	0.0	0.0006	0.0056	0.275	0.9	6.2	0.031	2.1	0.0011	0.0017	12.1	0.0745
May	55546	0.00010	0.0683	0.0010	28.9	0.00030	0.0	0.0007	0.0062	0.298	0.9	6.4	0.033	2.2	0.0012	0.0017	12.2	0.0900
Jun	57116	0.00010	0.0683	0.0010	28.9	0.00030	0.0	0.0007	0.0062	0.298	0.9	6.4	0.033	2.2	0.0012	0.0017	12.2	0.0894
Jul	39768	0.00010	0.0681	0.0010	28.9	0.00029	0.0	0.0007	0.0062	0.297	0.9	6.4	0.033	2.2	0.0012	0.0017	12.2	0.0879
Aug	27851	0.00010	0.0678	0.0010	28.7	0.00029	0.0	0.0007	0.0061	0.295	0.9	6.4	0.033	2.2	0.0012	0.0017	12.2	0.0873
Sep	37505	0.00010	0.0682	0.0010	28.8	0.00030	0.0	0.0007	0.0062	0.299	0.9	6.4	0.033	2.2	0.0012	0.0017	12.2	0.0917
Oct	19555	0.00010	0.0677	0.0010	28.6	0.00030	0.0	0.0007	0.0062	0.297	0.9	6.4	0.033	2.2	0.0012	0.0017	12.3	0.0922
Nov	8803	0.00010	0.0670	0.0010	28.3	0.00030	0.0	0.0007	0.0062	0.295	0.9	6.3	0.033	2.2	0.0012	0.0017	12.4	0.0937
Dec	6442	0.00009	0.0665	0.0010	28.0	0.00030	0.0	0.0007	0.0061	0.293	0.9	6.3	0.033	2.2	0.0012	0.0017	12.6	0.0941
Total	269678																	

FM04 - Supplemental Base Case - Faro Mine Site
Summary Tables
Conditions FUTURE 2

Location X2

	Flows	Ag	Al	As	Ca	Cd	Cl	Co	Cu	Fe	K	Mg	Mn	Na	Ni	Pb	SO4	Zn
	(x 1000 m3)	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L
Jan	554	0.00010	0.0690	0.0010	29.7	0.00024	0.0	0.0007	0.0054	0.282	0.9	6.6	0.032	2.3	0.0013	0.0018	12.3	0.0596
Feb	404	0.00010	0.0697	0.0010	29.7	0.00025	0.0	0.0007	0.0054	0.286	0.9	6.6	0.033	2.3	0.0013	0.0018	12.5	0.0676
Mar	407	0.00010	0.0706	0.0011	29.7	0.00026	0.0	0.0007	0.0056	0.292	0.9	6.7	0.034	2.3	0.0014	0.0018	12.7	0.0782
Apr	785	0.00010	0.0692	0.0010	29.7	0.00024	0.0	0.0007	0.0054	0.284	0.9	6.6	0.032	2.3	0.0013	0.0018	12.4	0.0622
May	7012	0.00010	0.0663	0.0010	29.6	0.00021	0.0	0.0006	0.0051	0.267	0.9	6.5	0.029	2.3	0.0011	0.0017	11.8	0.0305
Jun	7212	0.00010	0.0664	0.0010	29.6	0.00021	0.0	0.0006	0.0051	0.267	0.9	6.6	0.029	2.3	0.0011	0.0017	11.8	0.0317
Jul	5028	0.00010	0.0666	0.0010	29.6	0.00021	0.0	0.0006	0.0051	0.268	0.9	6.6	0.029	2.3	0.0011	0.0017	11.8	0.0330
Aug	3516	0.00010	0.0666	0.0010	29.6	0.00021	0.0	0.0006	0.0051	0.268	0.9	6.6	0.029	2.3	0.0011	0.0017	11.9	0.0333
Sep	4734	0.00010	0.0664	0.0010	29.6	0.00021	0.0	0.0006	0.0051	0.267	0.9	6.6	0.029	2.3	0.0011	0.0017	11.8	0.0315
Oct	2467	0.00010	0.0667	0.0010	29.6	0.00021	0.0	0.0006	0.0051	0.269	0.9	6.6	0.029	2.3	0.0011	0.0017	11.9	0.0343
Nov	1117	0.00010	0.0676	0.0010	29.6	0.00022	0.0	0.0006	0.0052	0.274	0.9	6.6	0.030	2.3	0.0012	0.0017	12.1	0.0442
Dec	823	0.00010	0.0682	0.0010	29.6	0.00023	0.0	0.0007	0.0053	0.278	0.9	6.6	0.031	2.3	0.0012	0.0018	12.2	0.0512
Total	34060																	

Location X14

	Flows	Ag	Al	As	Ca	Cd	Cl	Co	Cu	Fe	K	Mg	Mn	Na	Ni	Pb	SO4	Zn
	(x 1000 m3)	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L
Jan	1112	0.00007	0.0709	0.0014	21.2	0.00069	0.0	0.0010	0.0130	0.466	0.7	5.3	0.063	1.7	0.0017	0.0017	17.8	0.3620
Feb	836	0.00006	0.0645	0.0013	18.8	0.00067	0.0	0.0010	0.0123	0.435	0.6	4.8	0.060	1.5	0.0016	0.0015	18.0	0.3728
Mar	891	0.00006	0.0578	0.0012	17.1	0.00060	0.0	0.0009	0.0109	0.387	0.5	4.4	0.054	1.3	0.0015	0.0014	17.2	0.3335
Apr	1681	0.00007	0.0657	0.0012	21.9	0.00053	0.0	0.0009	0.0102	0.389	0.7	5.2	0.051	1.7	0.0015	0.0016	15.0	0.2756
May	14558	0.00009	0.0827	0.0016	26.9	0.00066	0.0	0.0011	0.0132	0.495	0.8	6.2	0.064	2.1	0.0017	0.0019	14.2	0.3420
Jun	14956	0.00009	0.0827	0.0015	27.0	0.00066	0.0	0.0011	0.0131	0.494	0.8	6.2	0.064	2.2	0.0017	0.0019	14.2	0.3399
Jul	10377	0.00009	0.0819	0.0015	26.8	0.00065	0.0	0.0011	0.0129	0.488	0.8	6.2	0.063	2.1	0.0017	0.0019	14.3	0.3343
Aug	7295	0.00009	0.0805	0.0015	26.4	0.00064	0.0	0.0010	0.0127	0.480	0.8	6.1	0.062	2.1	0.0017	0.0019	14.3	0.3306
Sep	9834	0.00009	0.0827	0.0016	26.7	0.00068	0.0	0.0011	0.0134	0.500	0.8	6.2	0.065	2.1	0.0017	0.0019	14.4	0.3505
Oct	5136	0.00009	0.0809	0.0015	25.8	0.00068	0.0	0.0011	0.0133	0.494	0.8	6.0	0.065	2.1	0.0017	0.0019	14.7	0.3537
Nov	2272	0.00008	0.0789	0.0015	24.7	0.00070	0.0	0.0011	0.0134	0.494	0.8	5.9	0.066	2.0	0.0017	0.0019	16.0	0.3717
Dec	1632	0.00008	0.0776	0.0015	23.9	0.00071	0.0	0.0011	0.0135	0.494	0.7	5.8	0.066	1.9	0.0018	0.0018	17.0	0.3839
Total	70579																	

Location Mouth of Rose Creek

	Flows	Ag	Al	As	Ca	Cd	Cl	Co	Cu	Fe	K	Mg	Mn	Na	Ni	Pb	SO4	Zn
	(x 1000 m3)	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L
Jan	1548	0.00008	0.0695	0.0013	23.6	0.00055	0.0	0.0009	0.0107	0.409	0.7	5.6	0.053	1.8	0.0015	0.0017	16.1	0.2817
Feb	1153	0.00007	0.0649	0.0012	21.8	0.00054	0.0	0.0009	0.0103	0.388	0.7	5.3	0.051	1.7	0.0015	0.0016	16.3	0.2773
Mar	1211	0.00007	0.0599	0.0011	20.4	0.00049	0.0	0.0008	0.0093	0.355	0.6	5.0	0.047	1.6	0.0014	0.0015	15.7	0.2521
Apr	2298	0.00008	0.0658	0.0012	24.0	0.00044	0.0	0.0008	0.0088	0.356	0.7	5.6	0.045	1.9	0.0014	0.0016	14.1	0.2085
May	20070	0.00010	0.0781	0.0014	27.6	0.00054	0.0	0.0009	0.0109	0.432	0.9	6.3	0.054	2.2	0.0016	0.0019	13.5	0.2551
Jun	20625	0.00010	0.0781	0.0014	27.7	0.00053	0.0	0.0009	0.0109	0.431	0.9	6.3	0.054	2.2	0.0016	0.0019	13.5	0.2535
Jul	14330	0.00009	0.0775	0.0014	27.6	0.00053	0.0	0.0009	0.0107	0.426	0.9	6.3	0.054	2.2	0.0015	0.0019	13.6	0.2491
Aug	10060	0.00009	0.0765	0.0014	27.2	0.00052	0.0	0.0009	0.0106	0.421	0.8	6.2	0.053	2.1	0.0015	0.0018	13.6	0.2468
Sep	13555	0.00009	0.0781	0.0014	27.5	0.00054	0.0	0.0010	0.0111	0.435	0.9	6.3	0.055	2.2	0.0016	0.0019	13.7	0.2613
Oct	7075	0.00009	0.0768	0.0014	26.9	0.00055	0.0	0.0009	0.0110	0.431	0.8	6.2	0.055	2.1	0.0016	0.0018	13.9	0.2638
Nov	3150	0.00009	0.0753	0.0014	26.0	0.00056	0.0	0.0009	0.0111	0.430	0.8	6.1	0.055	2.0	0.0016	0.0018	14.8	0.2752
Dec	2279	0.00009	0.0743	0.0014	25.5	0.00057	0.0	0.0009	0.0111	0.429	0.8	6.0	0.055	2.0	0.0016	0.0018	15.5	0.2822
Total	97354																	

Location Mouth of Anvil Creek

	Flows	Ag	Al	As	Ca	Cd	Cl	Co	Cu	Fe	K	Mg	Mn	Na	Ni	Pb	SO4	Zn
	(x 1000 m3)	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L
Jan	4352	0.00009	0.0672	0.0011	27.5	0.00033	0.0	0.0007	0.0070	0.316	0.9	6.2	0.037	2.1	0.0012	0.0017	13.3	0.1167
Feb	3196	0.00009	0.0655	0.0011	26.8	0.00032	0.0	0.0007	0.0069	0.309	0.8	6.1	0.037	2.1	0.0012	0.0017	13.4	0.1165
Mar	3272	0.00009	0.0637	0.0010	26.2	0.00031	0.0	0.0007	0.0066	0.298	0.8	6.0	0.035	2.0	0.0012	0.0016	13.2	0.1095
Apr	6271	0.00009	0.0659	0.0011	27.5	0.00029	0.0	0.0007	0.0064	0.298	0.9	6.2	0.034	2.1	0.0012	0.0017	12.6	0.0926
May	55546	0.00010	0.0703	0.0011	28.9	0.00032	0.0	0.0007	0.0071	0.325	0.9	6.5	0.038	2.2	0.0013	0.0018	12.4	0.1085
Jun	57116	0.00010	0.0703	0.0011	28.9	0.00032	0.0	0.0007	0.0071	0.324	0.9	6.5	0.038	2.2	0.0013	0.0018	12.4	0.1079
Jul	39768	0.00010	0.0701	0.0011	28.9	0.00032	0.0	0.0007	0.0071	0.322	0.9	6.4	0.037	2.2	0.0013	0.0018	12.4	0.1061
Aug	27851	0.00010	0.0697	0.0011	28.7	0.00032	0.0	0.0007	0.0070	0.321	0.9	6.4	0.037	2.2	0.0013	0.0018	12.4	0.1055
Sep	37505	0.00010	0.0703	0.0011	28.8	0.00032	0.0	0.0007	0.0072	0.326	0.9	6.4	0.038	2.2	0.0013	0.0018	12.4	0.1108
Oct	19555	0.00010	0.0698	0.0011	28.6	0.00032	0.0	0.0007	0.0072	0.324	0.9	6.4	0.038	2.2	0.0013	0.0018	12.5	0.1118
Nov	8803	0.00010	0.0693	0.0011	28.3	0.00033	0.0	0.0007	0.0072	0.323	0.9	6.4	0.038	2.2	0.0013	0.0017	12.8	0.1149
Dec	6442	0.00010	0.0689	0.0011	28.1	0.00033	0.0	0.0007	0.0072	0.322	0.9	6.3	0.038	2.2	0.0013	0.0017	13.0	0.1164
Total	269678																	

FM04 - Supplemental Base Case - Faro Mine Site

Conditions: FUTURE 3

Location: X2

	Flows (x 1000 m3)	Ag mg/L	Al mg/L	As mg/L	Ca mg/L	Cd mg/L	Cl mg/L	Co mg/L	Cu mg/L	Fe mg/L	K mg/L	Mg mg/L	Mn mg/L	Na mg/L	Ni mg/L	Pb mg/L	SO4 mg/L	Zn mg/L
Jan	554	0.00013	0.1320	0.0050	29.7	0.00146	0.0	0.0020	0.0292	1.142	0.9	6.8	0.151	2.3	0.0022	0.0020	16.5	0.9350
Feb	404	0.00013	0.1475	0.0059	29.7	0.00176	0.1	0.0023	0.0349	1.347	0.9	6.8	0.179	2.3	0.0024	0.0021	17.6	1.1472
Mar	407	0.00014	0.1681	0.0071	29.7	0.00215	0.1	0.0028	0.0424	1.621	0.9	6.9	0.218	2.3	0.0028	0.0022	19.1	1.4309
Apr	785	0.00013	0.1371	0.0053	29.7	0.00156	0.0	0.0021	0.0311	1.210	0.9	6.8	0.160	2.3	0.0023	0.0020	16.9	1.0048
May	7012	0.00010	0.0754	0.0016	29.6	0.00038	0.0	0.0008	0.0085	0.390	0.9	6.6	0.046	2.3	0.0013	0.0017	12.4	0.1560
Jun	7212	0.00010	0.0777	0.0017	29.6	0.00043	0.0	0.0009	0.0093	0.421	0.9	6.6	0.050	2.3	0.0013	0.0018	12.6	0.1679
Jul	5028	0.00011	0.0802	0.0019	29.6	0.00047	0.0	0.0009	0.0103	0.454	0.9	6.6	0.055	2.3	0.0013	0.0018	12.8	0.2227
Aug	3516	0.00011	0.0809	0.0019	29.6	0.00049	0.0	0.0009	0.0105	0.464	0.9	6.6	0.056	2.3	0.0013	0.0018	12.8	0.2321
Sep	4734	0.00010	0.0775	0.0017	29.6	0.00042	0.0	0.0008	0.0092	0.417	0.9	6.6	0.050	2.3	0.0013	0.0018	12.6	0.1844
Oct	2467	0.00011	0.0828	0.0020	29.6	0.00052	0.0	0.0010	0.0112	0.488	0.9	6.6	0.060	2.3	0.0014	0.0018	12.9	0.2577
Nov	1117	0.00011	0.1020	0.0032	29.6	0.00089	0.0	0.0014	0.0182	0.744	0.9	6.7	0.095	2.3	0.0017	0.0019	14.3	0.5226
Dec	823	0.00012	0.1157	0.0040	29.6	0.00115	0.0	0.0017	0.0233	0.926	0.9	6.7	0.121	2.3	0.0019	0.0019	15.3	0.7108
Total	34060																	

Location: X14

	Flows (x 1000 m3)	Ag mg/L	Al mg/L	As mg/L	Ca mg/L	Cd mg/L	Cl mg/L	Co mg/L	Cu mg/L	Fe mg/L	K mg/L	Mg mg/L	Mn mg/L	Na mg/L	Ni mg/L	Pb mg/L	SO4 mg/L	Zn mg/L
Jan	1112	0.00010	0.1355	0.0051	21.3	0.00190	0.1	0.0024	0.0357	1.297	0.7	5.5	0.180	1.7	0.0028	0.0020	51.9	1.2584
Feb	836	0.00009	0.1356	0.0054	18.9	0.00200	0.1	0.0025	0.0375	1.356	0.6	5.0	0.189	1.5	0.0028	0.0019	58.8	1.3404
Mar	891	0.00009	0.1341	0.0056	17.1	0.00203	0.1	0.0025	0.0382	1.384	0.5	4.6	0.193	1.3	0.0027	0.0018	59.3	1.3748
Apr	1681	0.00010	0.1224	0.0045	22.0	0.00160	0.1	0.0021	0.0305	1.126	0.7	5.4	0.154	1.7	0.0024	0.0019	37.8	1.0472
May	14558	0.00010	0.1124	0.0031	27.0	0.00120	0.0	0.0017	0.0230	0.856	0.8	6.3	0.116	2.2	0.0023	0.0022	18.7	0.7374
Jun	14956	0.00010	0.1135	0.0032	27.0	0.00122	0.0	0.0017	0.0233	0.872	0.8	6.4	0.118	2.2	0.0024	0.0022	18.6	0.7503
Jul	10377	0.00010	0.1137	0.0032	26.9	0.00123	0.0	0.0017	0.0235	0.879	0.8	6.3	0.119	2.1	0.0024	0.0021	19.8	0.7583
Aug	7295	0.00010	0.1123	0.0032	26.4	0.00122	0.0	0.0017	0.0234	0.873	0.8	6.2	0.118	2.1	0.0023	0.0021	21.2	0.7557
Sep	9834	0.00010	0.1142	0.0032	26.7	0.00125	0.0	0.0018	0.0238	0.885	0.8	6.3	0.120	2.1	0.0024	0.0022	20.0	0.7699
Oct	5136	0.00010	0.1155	0.0034	25.9	0.00131	0.0	0.0018	0.0249	0.922	0.8	6.2	0.125	2.1	0.0024	0.0021	23.7	0.8163
Nov	2272	0.00010	0.1257	0.0041	24.7	0.00156	0.0	0.0021	0.0295	1.085	0.8	6.0	0.149	2.0	0.0026	0.0021	33.3	1.0018
Dec	1632	0.00010	0.1335	0.0046	23.9	0.00175	0.1	0.0023	0.0330	1.207	0.7	6.0	0.166	1.9	0.0028	0.0022	41.1	1.1399
Total	70579																	

Location: Mouth of Rose Creek

	Flows (x 1000 m3)	Ag mg/L	Al mg/L	As mg/L	Ca mg/L	Cd mg/L	Cl mg/L	Co mg/L	Cu mg/L	Fe mg/L	K mg/L	Mg mg/L	Mn mg/L	Na mg/L	Ni mg/L	Pb mg/L	SO4 mg/L	Zn mg/L
Jan	1548	0.00010	0.1159	0.0039	23.6	0.00142	0.0	0.0019	0.0271	1.006	0.7	5.8	0.137	1.9	0.0023	0.0019	40.6	0.9114
Feb	1153	0.00009	0.1165	0.0042	21.8	0.00151	0.0	0.0020	0.0286	1.056	0.7	5.5	0.145	1.7	0.0024	0.0019	45.8	0.9787
Mar	1211	0.00009	0.1161	0.0044	20.4	0.00155	0.0	0.0020	0.0295	1.088	0.6	5.1	0.149	1.6	0.0023	0.0018	46.7	1.0181
Apr	2298	0.00010	0.1072	0.0036	24.0	0.00122	0.0	0.0017	0.0236	0.895	0.7	5.7	0.120	1.9	0.0021	0.0018	30.8	0.7728
May	20070	0.00010	0.0997	0.0025	27.7	0.00093	0.0	0.0014	0.0180	0.695	0.9	6.4	0.092	2.2	0.0020	0.0020	16.8	0.5419
Jun	20625	0.00010	0.1004	0.0026	27.7	0.00094	0.0	0.0014	0.0183	0.705	0.9	6.4	0.093	2.2	0.0020	0.0020	16.7	0.5511
Jul	14330	0.00010	0.1005	0.0026	27.6	0.00095	0.0	0.0014	0.0184	0.710	0.9	6.4	0.094	2.2	0.0020	0.0020	17.6	0.5562
Aug	10060	0.00010	0.0996	0.0026	27.3	0.00094	0.0	0.0014	0.0183	0.706	0.9	6.3	0.093	2.2	0.0020	0.0020	18.6	0.5551
Sep	13555	0.00010	0.1009	0.0026	27.5	0.00096	0.0	0.0014	0.0186	0.715	0.9	6.4	0.095	2.2	0.0020	0.0020	17.7	0.5656
Oct	7075	0.00010	0.1019	0.0027	26.9	0.00100	0.0	0.0015	0.0194	0.741	0.8	6.3	0.099	2.1	0.0021	0.0020	20.4	0.5996
Nov	3150	0.00010	0.1091	0.0032	26.1	0.00118	0.0	0.0017	0.0227	0.856	0.8	6.2	0.115	2.1	0.0022	0.0020	27.3	0.7296
Dec	2279	0.00010	0.1143	0.0036	25.5	0.00131	0.0	0.0018	0.0251	0.939	0.8	6.1	0.127	2.0	0.0023	0.0020	32.7	0.8235
Total	97354																	

Location: Mouth of Anvil Creek

	Flows (x 1000 m3)	Ag mg/L	Al mg/L	As mg/L	Ca mg/L	Cd mg/L	Cl mg/L	Co mg/L	Cu mg/L	Fe mg/L	K mg/L	Mg mg/L	Mn mg/L	Na mg/L	Ni mg/L	Pb mg/L	SO4 mg/L	Zn mg/L
Jan	4352	0.00010	0.0837	0.0020	27.5	0.00063	0.0	0.0011	0.0129	0.528	0.9	6.3	0.067	2.1	0.0015	0.0018	22.0	0.3406
Feb	3196	0.00010	0.0841	0.0021	26.8	0.00067	0.0	0.0011	0.0135	0.550	0.8	6.1	0.070	2.1	0.0016	0.0018	24.0	0.3696
Mar	3272	0.00010	0.0845	0.0023	26.2	0.00070	0.0	0.0011	0.0141	0.569	0.8	6.0	0.073	2.0	0.0015	0.0017	24.7	0.3930
Apr	6271	0.00010	0.0810	0.0019	27.6	0.00057	0.0	0.0010	0.0118	0.495	0.9	6.2	0.062	2.1	0.0015	0.0017	18.7	0.2994
May	55546	0.00010	0.0781	0.0015	28.9	0.00046	0.0	0.0009	0.0097	0.420	0.9	6.5	0.051	2.2	0.0014	0.0018	13.5	0.2122
Jun	57116	0.00010	0.0784	0.0016	28.9	0.00047	0.0	0.0009	0.0098	0.423	0.9	6.5	0.052	2.2	0.0014	0.0018	13.5	0.2154
Jul	39768	0.00010	0.0784	0.0016	28.9	0.00047	0.0	0.0009	0.0098	0.425	0.9	6.5	0.052	2.2	0.0014	0.0018	13.8	0.2168
Aug	27851	0.00010	0.0781	0.0016	28.8	0.00047	0.0	0.0009	0.0098	0.424	0.9	6.5	0.052	2.2	0.0014	0.0018	14.2	0.2168
Sep	37505	0.00010	0.0786	0.0016	28.8	0.00047	0.0	0.0009	0.0099	0.427	0.9	6.5	0.052	2.2	0.0014	0.0018	13.9	0.2208
Oct	19555	0.00010	0.0789	0.0016	28.6	0.00049	0.0	0.0009	0.0102	0.437	0.9	6.4	0.054	2.2	0.0014	0.0018	14.9	0.2333
Nov	8803	0.00010	0.0813	0.0018	28.3	0.00055	0.0	0.0010	0.0113	0.476	0.9	6.4	0.059	2.2	0.0015	0.0018	17.3	0.2775
Dec	6442	0.00010	0.0830	0.0019	28.2	0.00059	0.0	0.0010	0.0121	0.503	0.9	6.4	0.063	2.2	0.0015	0.0018	19.2	0.3078
Total	269678																	

FSN06 - Supplemental Base Case - Sensitivity Run - Faro Mine Site - Collectionr Efficiency
Summary Tables

Conditions: FUTURE1

Location: X2

	Flows (x 1000 m3)	Ag mg/L	Al mg/L	As mg/L	Ca mg/L	Cd mg/L	Cl mg/L	Co mg/L	Cu mg/L	Fe mg/L	K mg/L	Mg mg/L	Mn mg/L	Na mg/L	Ni mg/L	Pb mg/L	SO4 mg/L	Zn mg/L
Jan	554	0.00010	0.0671	0.0010	29.7	0.00022	0.0	0.0006	0.0052	0.270	0.9	6.6	0.030	2.3	0.0012	0.0017	12.2	0.0382
Feb	404	0.00010	0.0674	0.0010	29.7	0.00022	0.0	0.0006	0.0052	0.272	0.9	6.6	0.030	2.3	0.0012	0.0018	12.3	0.0411
Mar	407	0.00010	0.0678	0.0011	29.7	0.00023	0.0	0.0006	0.0053	0.274	0.9	6.6	0.031	2.3	0.0012	0.0018	12.4	0.0450
Apr	785	0.00010	0.0672	0.0010	29.7	0.00022	0.0	0.0006	0.0052	0.271	0.9	6.6	0.030	2.3	0.0012	0.0017	12.2	0.0391
May	7012	0.00010	0.0661	0.0010	29.6	0.00020	0.0	0.0006	0.0050	0.265	0.9	6.5	0.029	2.3	0.0011	0.0017	11.8	0.0274
Jun	7212	0.00010	0.0661	0.0010	29.6	0.00020	0.0	0.0006	0.0050	0.265	0.9	6.5	0.029	2.3	0.0011	0.0017	11.8	0.0278
Jul	5028	0.00010	0.0662	0.0010	29.6	0.00020	0.0	0.0006	0.0050	0.265	0.9	6.5	0.029	2.3	0.0011	0.0017	11.8	0.0283
Aug	3516	0.00010	0.0662	0.0010	29.6	0.00020	0.0	0.0006	0.0050	0.266	0.9	6.5	0.029	2.3	0.0011	0.0017	11.8	0.0285
Sep	4734	0.00010	0.0661	0.0010	29.6	0.00020	0.0	0.0006	0.0050	0.265	0.9	6.5	0.029	2.3	0.0011	0.0017	11.8	0.0278
Oct	2467	0.00010	0.0662	0.0010	29.6	0.00020	0.0	0.0006	0.0050	0.266	0.9	6.6	0.029	2.3	0.0011	0.0017	11.8	0.0288
Nov	1118	0.00010	0.0666	0.0010	29.6	0.00021	0.0	0.0006	0.0051	0.268	0.9	6.6	0.029	2.3	0.0011	0.0017	12.0	0.0325
Dec	823	0.00010	0.0668	0.0010	29.6	0.00021	0.0	0.0006	0.0051	0.269	0.9	6.6	0.029	2.3	0.0012	0.0017	12.1	0.0351
Total	34061																	

Location: X14

	Flows (x 1000 m3)	Ag mg/L	Al mg/L	As mg/L	Ca mg/L	Cd mg/L	Cl mg/L	Co mg/L	Cu mg/L	Fe mg/L	K mg/L	Mg mg/L	Mn mg/L	Na mg/L	Ni mg/L	Pb mg/L	SO4 mg/L	Zn mg/L
Jan	1112	0.00007	0.0618	0.0008	20.7	0.00058	0.0	0.0008	0.0090	0.351	0.6	5.2	0.044	1.7	0.0014	0.0016	15.2	0.2957
Feb	836	0.00006	0.0554	0.0008	18.2	0.00056	0.0	0.0008	0.0084	0.322	0.6	4.7	0.041	1.5	0.0013	0.0015	15.0	0.2865
Mar	891	0.00005	0.0495	0.0007	16.4	0.00050	0.0	0.0007	0.0074	0.286	0.5	4.3	0.037	1.3	0.0012	0.0013	14.1	0.2537
Apr	1681	0.00007	0.0591	0.0008	21.6	0.00046	0.0	0.0007	0.0075	0.308	0.7	5.2	0.038	1.7	0.0013	0.0015	13.3	0.2124
May	14558	0.00009	0.0751	0.0010	26.8	0.00057	0.0	0.0009	0.0096	0.395	0.8	6.2	0.048	2.1	0.0015	0.0019	13.6	0.2720
Jun	14956	0.00009	0.0752	0.0010	26.9	0.00057	0.0	0.0009	0.0096	0.394	0.8	6.2	0.048	2.1	0.0015	0.0019	13.6	0.2701
Jul	10377	0.00009	0.0745	0.0010	26.7	0.00056	0.0	0.0009	0.0095	0.390	0.8	6.2	0.047	2.1	0.0015	0.0019	13.6	0.2654
Aug	7295	0.00009	0.0731	0.0010	26.2	0.00056	0.0	0.0009	0.0093	0.383	0.8	6.1	0.046	2.1	0.0015	0.0018	13.6	0.2623
Sep	9834	0.00009	0.0749	0.0010	26.6	0.00058	0.0	0.0009	0.0097	0.396	0.8	6.1	0.048	2.1	0.0015	0.0019	13.7	0.2783
Oct	5136	0.00009	0.0729	0.0010	25.7	0.00058	0.0	0.0009	0.0096	0.389	0.8	6.0	0.048	2.1	0.0015	0.0018	13.8	0.2801
Nov	2272	0.00008	0.0704	0.0010	24.4	0.00059	0.0	0.0009	0.0096	0.383	0.8	5.8	0.047	2.0	0.0015	0.0018	14.4	0.2918
Dec	1632	0.00008	0.0686	0.0009	23.5	0.00060	0.0	0.0009	0.0096	0.379	0.7	5.7	0.047	1.9	0.0015	0.0018	15.0	0.2995
Total	70579																	

Location: Mouth of Rose Creek

	Flows (x 1000 m3)	Ag mg/L	Al mg/L	As mg/L	Ca mg/L	Cd mg/L	Cl mg/L	Co mg/L	Cu mg/L	Fe mg/L	K mg/L	Mg mg/L	Mn mg/L	Na mg/L	Ni mg/L	Pb mg/L	SO4 mg/L	Zn mg/L
Jan	1548	0.00008	0.0629	0.0009	23.2	0.00048	0.0	0.0008	0.0079	0.326	0.7	5.6	0.040	1.8	0.0013	0.0016	14.2	0.2196
Feb	1153	0.00007	0.0583	0.0008	21.3	0.00046	0.0	0.0007	0.0075	0.306	0.7	5.2	0.038	1.7	0.0013	0.0015	14.1	0.2147
Mar	1211	0.00007	0.0538	0.0008	19.9	0.00042	0.0	0.0007	0.0068	0.280	0.6	4.9	0.034	1.6	0.0012	0.0014	13.5	0.1934
Apr	2298	0.00008	0.0609	0.0009	23.7	0.00039	0.0	0.0007	0.0068	0.296	0.7	5.5	0.035	1.9	0.0012	0.0016	12.9	0.1623
May	20070	0.00009	0.0726	0.0010	27.6	0.00047	0.0	0.0008	0.0083	0.359	0.9	6.3	0.042	2.2	0.0014	0.0018	13.1	0.2043
Jun	20626	0.00009	0.0726	0.0010	27.6	0.00047	0.0	0.0008	0.0083	0.358	0.9	6.3	0.042	2.2	0.0014	0.0018	13.1	0.2029
Jul	14330	0.00009	0.0721	0.0010	27.5	0.00046	0.0	0.0008	0.0082	0.355	0.9	6.3	0.042	2.2	0.0014	0.0018	13.1	0.1992
Aug	10060	0.00009	0.0711	0.0010	27.2	0.00046	0.0	0.0008	0.0081	0.351	0.8	6.2	0.041	2.1	0.0014	0.0018	13.0	0.1972
Sep	13555	0.00009	0.0724	0.0010	27.4	0.00048	0.0	0.0008	0.0084	0.360	0.9	6.2	0.043	2.2	0.0014	0.0018	13.1	0.2089
Oct	7075	0.00009	0.0710	0.0010	26.8	0.00048	0.0	0.0008	0.0083	0.355	0.8	6.1	0.042	2.1	0.0014	0.0018	13.2	0.2104
Nov	3150	0.00009	0.0691	0.0010	25.8	0.00048	0.0	0.0008	0.0083	0.350	0.8	6.0	0.042	2.0	0.0014	0.0018	13.7	0.2175
Dec	2279	0.00009	0.0678	0.0010	25.2	0.00049	0.0	0.0008	0.0083	0.346	0.8	5.9	0.042	2.0	0.0014	0.0017	14.1	0.2217
Total	97354																	

Location: Mouth of Anvil Creek

	Flows (x 1000 m3)	Ag mg/L	Al mg/L	As mg/L	Ca mg/L	Cd mg/L	Cl mg/L	Co mg/L	Cu mg/L	Fe mg/L	K mg/L	Mg mg/L	Mn mg/L	Na mg/L	Ni mg/L	Pb mg/L	SO4 mg/L	Zn mg/L
Jan	4352	0.00009	0.0648	0.0010	27.3	0.00030	0.0	0.0007	0.0060	0.286	0.9	6.2	0.032	2.1	0.0012	0.0017	12.6	0.0946
Feb	3196	0.00009	0.0631	0.0009	26.6	0.00029	0.0	0.0006	0.0059	0.279	0.8	6.1	0.032	2.1	0.0012	0.0016	12.6	0.0939
Mar	3272	0.00009	0.0614	0.0009	26.0	0.00028	0.0	0.0006	0.0057	0.270	0.8	5.9	0.031	2.0	0.0011	0.0016	12.4	0.0877
Apr	6271	0.00009	0.0641	0.0010	27.4	0.00027	0.0	0.0006	0.0057	0.276	0.9	6.2	0.031	2.1	0.0011	0.0017	12.1	0.0757
May	55546	0.00010	0.0683	0.0010	28.9	0.00030	0.0	0.0007	0.0062	0.298	0.9	6.4	0.033	2.2	0.0012	0.0017	12.2	0.0902
Jun	57116	0.00010	0.0683	0.0010	28.9	0.00030	0.0	0.0007	0.0062	0.298	0.9	6.4	0.033	2.2	0.0012	0.0017	12.2	0.0896
Jul	39768	0.00010	0.0681	0.0010	28.9	0.00029	0.0	0.0007	0.0062	0.297	0.9	6.4	0.033	2.2	0.0012	0.0017	12.2	0.0882
Aug	27851	0.00010	0.0678	0.0010	28.7	0.00029	0.0	0.0007	0.0061	0.295	0.9	6.4	0.033	2.2	0.0012	0.0017	12.2	0.0876
Sep	37505	0.00010	0.0683	0.0010	28.8	0.00030	0.0	0.0007	0.0062	0.299	0.9	6.4	0.034	2.2	0.0012	0.0017	12.2	0.0919
Oct	19555	0.00010	0.0677	0.0010	28.6	0.00030	0.0	0.0007	0.0062	0.297	0.9	6.4	0.033	2.2	0.0012	0.0017	12.3	0.0925
Nov	8803	0.00010	0.0671	0.0010	28.2	0.00030	0.0	0.0007	0.0062	0.295	0.9	6.3	0.033	2.2	0.0012	0.0017	12.4	0.0943
Dec	6442	0.00009	0.0666	0.0010	28.0	0.00030	0.0	0.0007	0.0062	0.293	0.9	6.3	0.033	2.2	0.0012	0.0017	12.6	0.0950
Total	269678																	

FSN06 - Supplemental Base Case - Sensitivity Run - Faro Mine Site - Collectionr Efficiency
Summary Tables
Conditions FUTURE 2

Location X2

	Flows (x 1000 m3)	Ag mg/L	Al mg/L	As mg/L	Ca mg/L	Cd mg/L	Cl mg/L	Co mg/L	Cu mg/L	Fe mg/L	K mg/L	Mg mg/L	Mn mg/L	Na mg/L	Ni mg/L	Pb mg/L	SO4 mg/L	Zn mg/L
Jan	554	0.00010	0.0720	0.0011	29.7	0.00028	0.0	0.0007	0.0057	0.300	0.9	6.7	0.036	2.3	0.0014	0.0019	12.9	0.0936
Feb	404	0.00010	0.0734	0.0011	29.8	0.00030	0.0	0.0008	0.0059	0.309	0.9	6.7	0.038	2.3	0.0015	0.0019	13.2	0.1095
Mar	407	0.00010	0.0753	0.0011	29.8	0.00033	0.0	0.0008	0.0061	0.320	0.9	6.8	0.040	2.3	0.0016	0.0020	13.6	0.1307
Apr	785	0.00010	0.0725	0.0011	29.8	0.00029	0.0	0.0008	0.0058	0.303	0.9	6.7	0.037	2.3	0.0015	0.0019	13.0	0.0988
May	7012	0.00010	0.0668	0.0010	29.6	0.00021	0.0	0.0006	0.0051	0.269	0.9	6.6	0.029	2.3	0.0012	0.0017	11.9	0.0354
Jun	7212	0.00010	0.0670	0.0010	29.6	0.00021	0.0	0.0006	0.0051	0.271	0.9	6.6	0.030	2.3	0.0012	0.0017	11.9	0.0377
Jul	5028	0.00010	0.0672	0.0010	29.6	0.00022	0.0	0.0006	0.0052	0.272	0.9	6.6	0.030	2.3	0.0012	0.0017	12.0	0.0403
Aug	3516	0.00010	0.0673	0.0010	29.6	0.00022	0.0	0.0006	0.0052	0.272	0.9	6.6	0.030	2.3	0.0012	0.0017	12.0	0.0410
Sep	4734	0.00010	0.0670	0.0010	29.6	0.00021	0.0	0.0006	0.0051	0.270	0.9	6.6	0.030	2.3	0.0012	0.0017	11.9	0.0375
Oct	2467	0.00010	0.0675	0.0010	29.6	0.00022	0.0	0.0006	0.0052	0.273	0.9	6.6	0.030	2.3	0.0012	0.0017	12.0	0.0430
Nov	1118	0.00010	0.0692	0.0010	29.7	0.00024	0.0	0.0007	0.0054	0.284	0.9	6.6	0.033	2.3	0.0013	0.0018	12.4	0.0628
Dec	823	0.00010	0.0705	0.0010	29.7	0.00026	0.0	0.0007	0.0055	0.291	0.9	6.7	0.034	2.3	0.0014	0.0018	12.6	0.0769
Total	34061																	

Location X14

	Flows (x 1000 m3)	Ag mg/L	Al mg/L	As mg/L	Ca mg/L	Cd mg/L	Cl mg/L	Co mg/L	Cu mg/L	Fe mg/L	K mg/L	Mg mg/L	Mn mg/L	Na mg/L	Ni mg/L	Pb mg/L	SO4 mg/L	Zn mg/L
Jan	1112	0.00007	0.0728	0.0014	21.2	0.00072	0.0	0.0011	0.0132	0.477	0.7	5.3	0.066	1.7	0.0018	0.0017	17.9	0.4038
Feb	836	0.00006	0.0667	0.0013	18.8	0.00070	0.0	0.0010	0.0125	0.449	0.6	4.8	0.063	1.5	0.0017	0.0016	18.1	0.3989
Mar	891	0.00006	0.0605	0.0012	17.1	0.00063	0.0	0.0009	0.0112	0.403	0.5	4.5	0.057	1.4	0.0016	0.0015	17.4	0.3645
Apr	1681	0.00008	0.0676	0.0012	21.9	0.00056	0.0	0.0009	0.0105	0.401	0.7	5.3	0.054	1.7	0.0016	0.0017	15.2	0.2977
May	14558	0.00009	0.0830	0.0016	26.9	0.00067	0.0	0.0011	0.0132	0.497	0.8	6.2	0.065	2.1	0.0017	0.0019	14.3	0.3451
Jun	14956	0.00009	0.0830	0.0016	27.0	0.00067	0.0	0.0011	0.0132	0.496	0.8	6.2	0.065	2.2	0.0017	0.0019	14.3	0.3437
Jul	10377	0.00009	0.0823	0.0015	26.8	0.00066	0.0	0.0011	0.0130	0.490	0.8	6.2	0.064	2.1	0.0017	0.0019	14.4	0.3389
Aug	7295	0.00009	0.0809	0.0015	26.4	0.00065	0.0	0.0011	0.0128	0.483	0.8	6.1	0.063	2.1	0.0017	0.0019	14.4	0.3354
Sep	9834	0.00009	0.0830	0.0016	26.7	0.00068	0.0	0.0011	0.0134	0.502	0.8	6.2	0.066	2.1	0.0018	0.0019	14.4	0.3541
Oct	5136	0.00009	0.0813	0.0015	25.8	0.00068	0.0	0.0011	0.0133	0.497	0.8	6.0	0.065	2.1	0.0017	0.0019	14.8	0.3591
Nov	2272	0.00009	0.0800	0.0015	24.7	0.00071	0.0	0.0011	0.0136	0.500	0.8	5.9	0.067	2.0	0.0018	0.0019	16.1	0.3835
Dec	1632	0.00008	0.0790	0.0015	23.9	0.00073	0.0	0.0011	0.0137	0.503	0.7	5.8	0.068	1.9	0.0018	0.0019	17.1	0.4006
Total	70579																	

Location Mouth of Rose Creek

	Flows (x 1000 m3)	Ag mg/L	Al mg/L	As mg/L	Ca mg/L	Cd mg/L	Cl mg/L	Co mg/L	Cu mg/L	Fe mg/L	K mg/L	Mg mg/L	Mn mg/L	Na mg/L	Ni mg/L	Pb mg/L	SO4 mg/L	Zn mg/L
Jan	1548	0.00008	0.0709	0.0013	23.6	0.00057	0.0	0.0009	0.0109	0.417	0.7	5.7	0.055	1.9	0.0016	0.0017	16.2	0.2974
Feb	1153	0.00007	0.0665	0.0012	21.8	0.00056	0.0	0.0009	0.0105	0.398	0.7	5.3	0.054	1.7	0.0016	0.0016	16.4	0.2962
Mar	1211	0.00007	0.0619	0.0011	20.4	0.00052	0.0	0.0008	0.0095	0.367	0.6	5.0	0.050	1.6	0.0015	0.0015	15.9	0.2749
Apr	2298	0.00008	0.0672	0.0012	24.0	0.00046	0.0	0.0008	0.0090	0.364	0.7	5.6	0.047	1.9	0.0015	0.0017	14.3	0.2246
May	20070	0.00010	0.0783	0.0014	27.6	0.00054	0.0	0.0009	0.0110	0.433	0.9	6.3	0.055	2.2	0.0016	0.0019	13.6	0.2573
Jun	20626	0.00010	0.0783	0.0014	27.7	0.00054	0.0	0.0009	0.0109	0.432	0.9	6.3	0.055	2.2	0.0016	0.0019	13.6	0.2563
Jul	14330	0.00009	0.0778	0.0014	27.6	0.00053	0.0	0.0009	0.0108	0.428	0.9	6.3	0.054	2.2	0.0016	0.0019	13.6	0.2525
Aug	10060	0.00009	0.0768	0.0014	27.2	0.00053	0.0	0.0009	0.0106	0.423	0.9	6.2	0.053	2.1	0.0015	0.0019	13.7	0.2502
Sep	13555	0.00009	0.0783	0.0014	27.5	0.00055	0.0	0.0010	0.0111	0.436	0.9	6.3	0.055	2.2	0.0016	0.0019	13.7	0.2639
Oct	7075	0.00009	0.0771	0.0014	26.9	0.00055	0.0	0.0010	0.0110	0.433	0.8	6.2	0.055	2.1	0.0016	0.0019	13.9	0.2677
Nov	3150	0.00009	0.0760	0.0014	26.0	0.00057	0.0	0.0010	0.0112	0.434	0.8	6.1	0.056	2.1	0.0016	0.0018	14.8	0.2837
Dec	2279	0.00009	0.0753	0.0014	25.5	0.00058	0.0	0.0010	0.0112	0.435	0.8	6.0	0.057	2.0	0.0016	0.0018	15.6	0.2941
Total	97354																	

Location Mouth of Anvil Creek

	Flows (x 1000 m3)	Ag mg/L	Al mg/L	As mg/L	Ca mg/L	Cd mg/L	Cl mg/L	Co mg/L	Cu mg/L	Fe mg/L	K mg/L	Mg mg/L	Mn mg/L	Na mg/L	Ni mg/L	Pb mg/L	SO4 mg/L	Zn mg/L
Jan	4352	0.00009	0.0677	0.0011	27.5	0.00033	0.0	0.0007	0.0071	0.319	0.9	6.2	0.038	2.1	0.0013	0.0017	13.3	0.1223
Feb	3196	0.00009	0.0661	0.0011	26.8	0.00033	0.0	0.0007	0.0070	0.312	0.8	6.1	0.037	2.1	0.0013	0.0017	13.4	0.1233
Mar	3272	0.00009	0.0644	0.0011	26.2	0.00032	0.0	0.0007	0.0067	0.302	0.8	6.0	0.036	2.0	0.0012	0.0016	13.3	0.1179
Apr	6271	0.00009	0.0664	0.0011	27.5	0.00030	0.0	0.0007	0.0065	0.301	0.9	6.2	0.035	2.1	0.0012	0.0017	12.7	0.0985
May	55546	0.00010	0.0704	0.0011	28.9	0.00032	0.0	0.0007	0.0072	0.325	0.9	6.5	0.038	2.2	0.0013	0.0018	12.4	0.1093
Jun	57116	0.00010	0.0704	0.0011	28.9	0.00032	0.0	0.0007	0.0071	0.325	0.9	6.5	0.038	2.2	0.0013	0.0018	12.4	0.1089
Jul	39768	0.00010	0.0702	0.0011	28.9	0.00032	0.0	0.0007	0.0071	0.323	0.9	6.5	0.038	2.2	0.0013	0.0018	12.4	0.1073
Aug	27851	0.00010	0.0698	0.0011	28.7	0.00032	0.0	0.0007	0.0070	0.321	0.9	6.4	0.037	2.2	0.0013	0.0018	12.4	0.1067
Sep	37505	0.00010	0.0704	0.0011	28.8	0.00033	0.0	0.0007	0.0072	0.326	0.9	6.4	0.038	2.2	0.0013	0.0018	12.4	0.1117
Oct	19555	0.00010	0.0700	0.0011	28.6	0.00033	0.0	0.0007	0.0072	0.325	0.9	6.4	0.038	2.2	0.0013	0.0018	12.5	0.1132
Nov	8803	0.00010	0.0695	0.0011	28.3	0.00033	0.0	0.0007	0.0072	0.325	0.9	6.4	0.038	2.2	0.0013	0.0017	12.8	0.1179
Dec	6442	0.00010	0.0692	0.0011	28.1	0.00033	0.0	0.0007	0.0072	0.325	0.9	6.3	0.038	2.2	0.0013	0.0017	13.1	0.1206
Total	269678																	

FSN06 - Supplemental Base Case - Sensitivity Run - Faro Mine Site - Collectionr Efficiency

Conditions: FUTURE 3

Location: X2

	Flows	Ag	Al	As	Ca	Cd	Cl	Co	Cu	Fe	K	Mg	Mn	Na	Ni	Pb	SO4	Zn
	(x 1000 m3)	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L
Jan	554	0.00015	0.1982	0.0089	29.7	0.00272	0.1	0.0034	0.0535	2.020	0.9	7.0	0.273	2.3	0.0032	0.0023	21.3	1.8443
Feb	404	0.00017	0.2290	0.0108	29.8	0.00331	0.1	0.0041	0.0648	2.430	0.9	7.1	0.330	2.3	0.0038	0.0025	23.5	2.2685
Mar	407	0.00018	0.2703	0.0133	29.8	0.00410	0.1	0.0049	0.0799	2.978	1.0	7.3	0.407	2.3	0.0044	0.0026	26.5	2.8357
Apr	785	0.00016	0.2083	0.0096	29.8	0.00292	0.1	0.0036	0.0572	2.155	0.9	7.1	0.292	2.3	0.0034	0.0024	22.0	1.9837
May	7012	0.00011	0.0849	0.0021	29.6	0.00056	0.0	0.0010	0.0119	0.516	0.9	6.6	0.063	2.3	0.0014	0.0018	13.1	0.2864
Jun	7212	0.00011	0.0895	0.0024	29.6	0.00065	0.0	0.0011	0.0136	0.578	0.9	6.6	0.072	2.3	0.0015	0.0018	13.4	0.3502
Jul	5028	0.00011	0.0946	0.0027	29.6	0.00075	0.0	0.0012	0.0155	0.645	0.9	6.6	0.081	2.3	0.0016	0.0018	13.8	0.4198
Aug	3516	0.00011	0.0959	0.0028	29.6	0.00077	0.0	0.0012	0.0160	0.663	0.9	6.6	0.084	2.3	0.0016	0.0018	13.9	0.4386
Sep	4734	0.00011	0.0890	0.0024	29.6	0.00064	0.0	0.0011	0.0135	0.571	0.9	6.6	0.071	2.3	0.0015	0.0018	13.4	0.3433
Oct	2467	0.00011	0.0997	0.0030	29.6	0.00084	0.0	0.0013	0.0174	0.712	0.9	6.7	0.091	2.3	0.0016	0.0019	14.2	0.4897
Nov	1118	0.00013	0.1382	0.0053	29.7	0.00158	0.0	0.0021	0.0315	1.224	0.9	6.8	0.162	2.3	0.0023	0.0020	17.0	1.0195
Dec	823	0.00014	0.1656	0.0070	29.7	0.00210	0.1	0.0027	0.0415	1.587	0.9	6.9	0.213	2.3	0.0027	0.0022	18.9	1.3958
Total	34061																	

Location: X14

	Flows	Ag	Al	As	Ca	Cd	Cl	Co	Cu	Fe	K	Mg	Mn	Na	Ni	Pb	SO4	Zn
	(x 1000 m3)	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L
Jan	1112	0.00011	0.1786	0.0076	21.3	0.00272	0.1	0.0033	0.0514	1.864	0.7	5.6	0.259	1.7	0.0036	0.0022	52.6	1.8492
Feb	836	0.00011	0.1871	0.0084	18.9	0.00298	0.1	0.0036	0.0562	2.034	0.6	5.2	0.284	1.5	0.0037	0.0022	59.7	2.0463
Mar	891	0.00011	0.1952	0.0092	17.1	0.00319	0.1	0.0038	0.0604	2.188	0.5	4.8	0.305	1.4	0.0038	0.0021	60.8	2.2121
Apr	1681	0.00011	0.1659	0.0071	22.0	0.00242	0.1	0.0030	0.0462	1.699	0.7	5.6	0.234	1.7	0.0032	0.0021	39.5	1.6434
May	14558	0.00011	0.1184	0.0034	27.0	0.00131	0.0	0.0018	0.0251	0.937	0.8	6.4	0.127	2.2	0.0024	0.0022	18.9	0.8193
Jun	14956	0.00011	0.1209	0.0036	27.0	0.00136	0.0	0.0019	0.0260	0.970	0.8	6.4	0.132	2.2	0.0025	0.0022	19.0	0.8523
Jul	10377	0.00011	0.1228	0.0037	26.9	0.00140	0.0	0.0019	0.0268	0.999	0.8	6.4	0.136	2.1	0.0025	0.0022	20.2	0.8827
Aug	7295	0.00011	0.1218	0.0037	26.4	0.00140	0.0	0.0019	0.0268	0.998	0.8	6.3	0.136	2.1	0.0025	0.0022	21.5	0.8854
Sep	9834	0.00011	0.1215	0.0036	26.7	0.00138	0.0	0.0019	0.0264	0.981	0.8	6.3	0.133	2.1	0.0025	0.0022	20.2	0.8695
Oct	5136	0.00011	0.1261	0.0040	25.9	0.00151	0.0	0.0020	0.0287	1.061	0.8	6.2	0.145	2.1	0.0026	0.0022	23.9	0.9616
Nov	2272	0.00011	0.1490	0.0055	24.7	0.00200	0.1	0.0026	0.0380	1.391	0.8	6.1	0.192	2.0	0.0030	0.0023	33.9	1.3205
Dec	1632	0.00012	0.1664	0.0066	23.9	0.00237	0.1	0.0030	0.0449	1.640	0.7	6.1	0.227	1.9	0.0033	0.0023	41.9	1.5903
Total	70579																	

Location: Mouth of Rose Creek

	Flows	Ag	Al	As	Ca	Cd	Cl	Co	Cu	Fe	K	Mg	Mn	Na	Ni	Pb	SO4	Zn
	(x 1000 m3)	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L
Jan	1548	0.00011	0.1469	0.0058	23.6	0.00201	0.1	0.0026	0.0383	1.414	0.7	5.9	0.194	1.9	0.0029	0.0021	41.1	1.3359
Feb	1153	0.00011	0.1538	0.0064	21.8	0.00221	0.1	0.0028	0.0421	1.547	0.7	5.6	0.213	1.7	0.0030	0.0020	46.5	1.4904
Mar	1211	0.00011	0.1610	0.0070	20.4	0.00240	0.1	0.0029	0.0457	1.679	0.6	5.3	0.232	1.6	0.0031	0.0020	47.8	1.6341
Apr	2298	0.00011	0.1390	0.0054	24.0	0.00183	0.1	0.0024	0.0352	1.313	0.8	5.8	0.179	1.9	0.0026	0.0020	32.0	1.2089
May	20070	0.00010	0.1040	0.0028	27.7	0.00101	0.0	0.0015	0.0196	0.752	0.9	6.4	0.100	2.2	0.0021	0.0020	16.9	0.6013
Jun	20626	0.00011	0.1058	0.0029	27.7	0.00104	0.0	0.0015	0.0202	0.776	0.9	6.4	0.103	2.2	0.0021	0.0021	17.0	0.6251
Jul	14330	0.00011	0.1071	0.0030	27.6	0.00107	0.0	0.0016	0.0208	0.796	0.9	6.4	0.106	2.2	0.0021	0.0021	17.9	0.6463
Aug	10060	0.00010	0.1064	0.0030	27.3	0.00107	0.0	0.0016	0.0208	0.796	0.9	6.3	0.106	2.2	0.0021	0.0020	18.8	0.6491
Sep	13555	0.00010	0.1062	0.0029	27.5	0.00106	0.0	0.0016	0.0205	0.784	0.9	6.4	0.105	2.2	0.0021	0.0021	17.9	0.6378
Oct	7075	0.00010	0.1096	0.0032	26.9	0.00115	0.0	0.0016	0.0222	0.843	0.8	6.3	0.113	2.1	0.0022	0.0020	20.6	0.7050
Nov	3150	0.00011	0.1258	0.0042	26.1	0.00150	0.0	0.0020	0.0288	1.077	0.8	6.2	0.146	2.1	0.0025	0.0021	27.7	0.9594
Dec	2279	0.00011	0.1379	0.0050	25.5	0.00176	0.1	0.0023	0.0336	1.249	0.8	6.2	0.171	2.0	0.0027	0.0021	33.3	1.1461
Total	97354																	

Location: Mouth of Anvil Creek

	Flows	Ag	Al	As	Ca	Cd	Cl	Co	Cu	Fe	K	Mg	Mn	Na	Ni	Pb	SO4	Zn
	(x 1000 m3)	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L
Jan	4352	0.00010	0.0947	0.0027	27.5	0.00084	0.0	0.0013	0.0168	0.673	0.9	6.3	0.087	2.1	0.0017	0.0018	22.2	0.4916
Feb	3196	0.00010	0.0976	0.0029	26.8	0.00093	0.0	0.0014	0.0184	0.727	0.8	6.2	0.095	2.1	0.0018	0.0018	24.3	0.5543
Mar	3272	0.00010	0.1011	0.0032	26.2	0.00102	0.0	0.0015	0.0201	0.788	0.8	6.1	0.104	2.0	0.0018	0.0018	25.1	0.6211
Apr	6271	0.00010	0.0927	0.0026	27.6	0.00080	0.0	0.0012	0.0161	0.649	0.9	6.3	0.084	2.1	0.0017	0.0018	19.2	0.4592
May	55546	0.00010	0.0797	0.0016	28.9	0.00049	0.0	0.0009	0.0103	0.440	0.9	6.5	0.054	2.2	0.0015	0.0018	13.6	0.2336
Jun	57116	0.00010	0.0803	0.0017	28.9	0.00050	0.0	0.0009	0.0105	0.449	0.9	6.5	0.055	2.2	0.0015	0.0018	13.6	0.2421
Jul	39768	0.00010	0.0807	0.0017	28.9	0.00051	0.0	0.0009	0.0107	0.456	0.9	6.5	0.056	2.2	0.0015	0.0018	13.9	0.2493
Aug	27851	0.00010	0.0805	0.0017	28.8	0.00051	0.0	0.0009	0.0107	0.456	0.9	6.5	0.056	2.2	0.0015	0.0018	14.3	0.2508
Sep	37505	0.00010	0.0805	0.0017	28.8	0.00051	0.0	0.0009	0.0106	0.452	0.9	6.5	0.056	2.2	0.0015	0.0018	13.9	0.2469
Oct	19555	0.00010	0.0817	0.0018	28.6	0.00054	0.0	0.0010	0.0112	0.473	0.9	6.5	0.059	2.2	0.0015	0.0018	14.9	0.2714
Nov	8803	0.00010	0.0873	0.0022	28.3	0.00066	0.0	0.0011	0.0135	0.555	0.9	6.4	0.070	2.2	0.0016	0.0018	17.4	0.3597
Dec	6442	0.00010	0.0914	0.0024	28.2	0.00075	0.0	0.0012	0.0151	0.612	0.9	6.4	0.079	2.2	0.0017	0.0019	19.4	0.4219
Total	269678																	

FSN07 - Supplemental Base Case - Sensitivity Run - Faro Mine Site
Summary Tables

Conditions: FUTURE 1

Location: X2

	Flows (x 1000 m3)	Ag mg/L	Al mg/L	As mg/L	Ca mg/L	Cd mg/L	Cl mg/L	Co mg/L	Cu mg/L	Fe mg/L	K mg/L	Mg mg/L	Mn mg/L	Na mg/L	Ni mg/L	Pb mg/L	SO4 mg/L	Zn mg/L
Jan	554	0.00010	0.0671	0.0010	29.7	0.00022	0.0	0.0006	0.0052	0.270	0.9	6.6	0.030	2.3	0.0012	0.0017	12.2	0.0382
Feb	404	0.00010	0.0674	0.0010	29.7	0.00022	0.0	0.0006	0.0052	0.272	0.9	6.6	0.030	2.3	0.0012	0.0018	12.3	0.0411
Mar	407	0.00010	0.0678	0.0011	29.7	0.00023	0.0	0.0006	0.0053	0.274	0.9	6.6	0.031	2.3	0.0012	0.0018	12.4	0.0450
Apr	785	0.00010	0.0672	0.0010	29.7	0.00022	0.0	0.0006	0.0052	0.271	0.9	6.6	0.030	2.3	0.0012	0.0017	12.2	0.0391
May	7012	0.00010	0.0661	0.0010	29.6	0.00020	0.0	0.0006	0.0050	0.265	0.9	6.5	0.029	2.3	0.0011	0.0017	11.8	0.0274
Jun	7212	0.00010	0.0661	0.0010	29.6	0.00020	0.0	0.0006	0.0050	0.265	0.9	6.5	0.029	2.3	0.0011	0.0017	11.8	0.0278
Jul	5028	0.00010	0.0662	0.0010	29.6	0.00020	0.0	0.0006	0.0050	0.265	0.9	6.5	0.029	2.3	0.0011	0.0017	11.8	0.0283
Aug	3516	0.00010	0.0662	0.0010	29.6	0.00020	0.0	0.0006	0.0050	0.266	0.9	6.5	0.029	2.3	0.0011	0.0017	11.8	0.0285
Sep	4734	0.00010	0.0661	0.0010	29.6	0.00020	0.0	0.0006	0.0050	0.265	0.9	6.5	0.029	2.3	0.0011	0.0017	11.8	0.0278
Oct	2467	0.00010	0.0662	0.0010	29.6	0.00020	0.0	0.0006	0.0050	0.266	0.9	6.6	0.029	2.3	0.0011	0.0017	11.8	0.0288
Nov	1118	0.00010	0.0666	0.0010	29.6	0.00021	0.0	0.0006	0.0051	0.268	0.9	6.6	0.029	2.3	0.0011	0.0017	12.0	0.0325
Dec	823	0.00010	0.0668	0.0010	29.6	0.00021	0.0	0.0006	0.0051	0.269	0.9	6.6	0.029	2.3	0.0012	0.0017	12.1	0.0351
Total	34061																	

Location: X14

	Flows (x 1000 m3)	Ag mg/L	Al mg/L	As mg/L	Ca mg/L	Cd mg/L	Cl mg/L	Co mg/L	Cu mg/L	Fe mg/L	K mg/L	Mg mg/L	Mn mg/L	Na mg/L	Ni mg/L	Pb mg/L	SO4 mg/L	Zn mg/L
Jan	1173	0.00008	0.0447	0.0012	22.6	0.00066	0.0	0.0009	0.0039	0.177	1.5	6.5	0.023	3.4	0.0034	0.0037	24.1	0.0303
Feb	893	0.00007	0.0382	0.0012	20.2	0.00074	0.0	0.0010	0.0035	0.151	1.5	6.3	0.021	3.5	0.0038	0.0041	26.2	0.0302
Mar	960	0.00006	0.0341	0.0012	18.4	0.00075	0.0	0.0010	0.0032	0.135	1.5	5.9	0.020	3.4	0.0038	0.0040	25.9	0.0304
Apr	1767	0.00008	0.0478	0.0011	23.0	0.00048	0.0	0.0008	0.0040	0.191	1.2	6.1	0.023	2.8	0.0025	0.0029	19.0	0.0297
May	14515	0.00010	0.0634	0.0010	28.7	0.00024	0.0	0.0006	0.0049	0.254	1.0	6.5	0.028	2.3	0.0013	0.0018	12.6	0.0262
Jun	14834	0.00010	0.0636	0.0010	28.7	0.00023	0.0	0.0006	0.0049	0.255	1.0	6.5	0.028	2.3	0.0013	0.0018	12.6	0.0265
Jul	10320	0.00010	0.0629	0.0010	28.5	0.00025	0.0	0.0006	0.0048	0.252	1.0	6.5	0.028	2.4	0.0014	0.0019	13.0	0.0268
Aug	7274	0.00009	0.0614	0.0010	28.0	0.00027	0.0	0.0006	0.0047	0.246	1.0	6.4	0.027	2.4	0.0014	0.0020	13.5	0.0265
Sep	9805	0.00010	0.0658	0.0010	28.4	0.00033	0.0	0.0007	0.0056	0.282	1.0	6.5	0.032	2.4	0.0015	0.0020	13.6	0.0759
Oct	5136	0.00009	0.0644	0.0011	27.5	0.00041	0.0	0.0008	0.0061	0.285	1.0	6.5	0.033	2.5	0.0018	0.0022	15.1	0.0982
Nov	2288	0.00009	0.0556	0.0011	26.2	0.00043	0.0	0.0008	0.0045	0.222	1.2	6.5	0.026	2.8	0.0022	0.0027	17.9	0.0285
Dec	1687	0.00009	0.0526	0.0012	25.4	0.00052	0.0	0.0008	0.0043	0.210	1.3	6.7	0.025	3.1	0.0027	0.0031	20.6	0.0301
Total	70651																	

Location: Mouth of Rose Creek

	Flows (x 1000 m3)	Ag mg/L	Al mg/L	As mg/L	Ca mg/L	Cd mg/L	Cl mg/L	Co mg/L	Cu mg/L	Fe mg/L	K mg/L	Mg mg/L	Mn mg/L	Na mg/L	Ni mg/L	Pb mg/L	SO4 mg/L	Zn mg/L
Jan	1608	0.00008	0.0505	0.0011	24.5	0.00054	0.0	0.0008	0.0042	0.201	1.3	6.5	0.025	3.1	0.0027	0.0032	20.8	0.0291
Feb	1211	0.00008	0.0455	0.0011	22.7	0.00060	0.0	0.0009	0.0039	0.181	1.4	6.3	0.023	3.2	0.0031	0.0034	22.4	0.0290
Mar	1280	0.00007	0.0421	0.0011	21.2	0.00061	0.0	0.0009	0.0036	0.167	1.3	6.1	0.022	3.1	0.0031	0.0034	22.3	0.0292
Apr	2384	0.00008	0.0525	0.0010	24.7	0.00041	0.0	0.0007	0.0042	0.210	1.1	6.2	0.025	2.7	0.0021	0.0026	17.1	0.0287
May	20027	0.00010	0.0641	0.0010	28.9	0.00023	0.0	0.0006	0.0049	0.257	0.9	6.5	0.028	2.3	0.0012	0.0018	12.4	0.0260
Jun	20504	0.00010	0.0642	0.0010	29.0	0.00022	0.0	0.0006	0.0049	0.257	0.9	6.5	0.028	2.3	0.0012	0.0018	12.3	0.0263
Jul	14272	0.00010	0.0637	0.0010	28.8	0.00024	0.0	0.0006	0.0049	0.255	1.0	6.5	0.028	2.3	0.0013	0.0019	12.7	0.0264
Aug	10038	0.00010	0.0627	0.0010	28.4	0.00025	0.0	0.0006	0.0048	0.251	1.0	6.5	0.027	2.4	0.0014	0.0019	13.0	0.0263
Sep	13527	0.00010	0.0658	0.0010	28.8	0.00029	0.0	0.0007	0.0056	0.277	1.0	6.5	0.031	2.4	0.0014	0.0019	13.0	0.0620
Oct	7075	0.00010	0.0648	0.0010	28.1	0.00036	0.0	0.0007	0.0058	0.279	1.0	6.5	0.032	2.4	0.0016	0.0021	14.2	0.0783
Nov	3167	0.00009	0.0584	0.0011	27.1	0.00037	0.0	0.0007	0.0046	0.234	1.1	6.5	0.027	2.7	0.0019	0.0024	16.2	0.0277
Dec	2334	0.00009	0.0563	0.0011	26.5	0.00043	0.0	0.0008	0.0045	0.225	1.2	6.6	0.026	2.9	0.0023	0.0027	18.2	0.0288
Total	97426																	

Location: Mouth of Anvil Creek

	Flows (x 1000 m3)	Ag mg/L	Al mg/L	As mg/L	Ca mg/L	Cd mg/L	Cl mg/L	Co mg/L	Cu mg/L	Fe mg/L	K mg/L	Mg mg/L	Mn mg/L	Na mg/L	Ni mg/L	Pb mg/L	SO4 mg/L	Zn mg/L
Jan	4412	0.00009	0.0603	0.0011	27.7	0.00032	0.0	0.0007	0.0047	0.241	1.1	6.5	0.027	2.6	0.0017	0.0022	15.0	0.0269
Feb	3253	0.00009	0.0583	0.0011	27.0	0.00035	0.0	0.0007	0.0046	0.233	1.1	6.5	0.026	2.6	0.0018	0.0023	15.7	0.0269
Mar	3341	0.00009	0.0568	0.0010	26.4	0.00036	0.0	0.0007	0.0045	0.227	1.1	6.4	0.026	2.6	0.0019	0.0024	15.8	0.0270
Apr	6357	0.00009	0.0609	0.0010	27.8	0.00028	0.0	0.0006	0.0047	0.244	1.0	6.4	0.027	2.4	0.0015	0.0020	13.7	0.0268
May	55503	0.00010	0.0653	0.0010	29.4	0.00021	0.0	0.0006	0.0050	0.261	0.9	6.5	0.028	2.3	0.0011	0.0017	11.9	0.0258
Jun	56994	0.00010	0.0653	0.0010	29.4	0.00021	0.0	0.0006	0.0050	0.262	0.9	6.5	0.028	2.3	0.0011	0.0017	11.9	0.0258
Jul	39711	0.00010	0.0651	0.0010	29.3	0.00021	0.0	0.0006	0.0050	0.261	0.9	6.5	0.028	2.3	0.0012	0.0018	12.1	0.0259
Aug	27829	0.00010	0.0647	0.0010	29.2	0.00022	0.0	0.0006	0.0049	0.259	0.9	6.5	0.028	2.3	0.0012	0.0018	12.2	0.0258
Sep	37477	0.00010	0.0659	0.0010	29.3	0.00023	0.0	0.0006	0.0052	0.269	0.9	6.5	0.029	2.3	0.0012	0.0018	12.2	0.0388
Oct	19555	0.00010	0.0655	0.0010	29.0	0.00026	0.0	0.0006	0.0053	0.270	0.9	6.5	0.030	2.3	0.0013	0.0018	12.6	0.0447
Nov	8820	0.00010	0.0632	0.0010	28.7	0.00026	0.0	0.0006	0.0049	0.253	1.0	6.5	0.028	2.4	0.0014	0.0020	13.3	0.0264
Dec	6498	0.00010	0.0625	0.0010	28.5	0.00028	0.0	0.0007	0.0048	0.250	1.0	6.6	0.028	2.5	0.0015	0.0021	14.0	0.0268
Total	269750																	

FSN07 - Supplemental Base Case - Sensitivity Run - Faro Mine Site
Summary Tables
Conditions **FUTURE 2**

Location **X2**

	Flows	Ag	Al	As	Ca	Cd	Cl	Co	Cu	Fe	K	Mg	Mn	Na	Ni	Pb	SO4	Zn
	(x 1000 m3)	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L
Jan	554	0.00010	0.0720	0.0011	29.7	0.00028	0.0	0.0007	0.0057	0.300	0.9	6.7	0.036	2.3	0.0014	0.0019	12.9	0.0936
Feb	404	0.00010	0.0734	0.0011	29.8	0.00030	0.0	0.0008	0.0059	0.309	0.9	6.7	0.038	2.3	0.0015	0.0019	13.2	0.1095
Mar	407	0.00010	0.0753	0.0011	29.8	0.00033	0.0	0.0008	0.0061	0.320	0.9	6.8	0.040	2.3	0.0016	0.0020	13.6	0.1307
Apr	785	0.00010	0.0725	0.0011	29.8	0.00029	0.0	0.0008	0.0058	0.303	0.9	6.7	0.037	2.3	0.0015	0.0019	13.0	0.0988
May	7012	0.00010	0.0668	0.0010	29.6	0.00021	0.0	0.0006	0.0051	0.269	0.9	6.6	0.029	2.3	0.0012	0.0017	11.9	0.0354
Jun	7212	0.00010	0.0670	0.0010	29.6	0.00021	0.0	0.0006	0.0051	0.271	0.9	6.6	0.030	2.3	0.0012	0.0017	11.9	0.0377
Jul	5028	0.00010	0.0672	0.0010	29.6	0.00022	0.0	0.0006	0.0052	0.272	0.9	6.6	0.030	2.3	0.0012	0.0017	12.0	0.0403
Aug	3516	0.00010	0.0673	0.0010	29.6	0.00022	0.0	0.0006	0.0052	0.272	0.9	6.6	0.030	2.3	0.0012	0.0017	12.0	0.0410
Sep	4734	0.00010	0.0670	0.0010	29.6	0.00021	0.0	0.0006	0.0051	0.270	0.9	6.6	0.030	2.3	0.0012	0.0017	11.9	0.0375
Oct	2467	0.00010	0.0675	0.0010	29.6	0.00022	0.0	0.0006	0.0052	0.273	0.9	6.6	0.030	2.3	0.0012	0.0017	12.0	0.0430
Nov	1118	0.00010	0.0692	0.0010	29.7	0.00024	0.0	0.0007	0.0054	0.284	0.9	6.6	0.033	2.3	0.0013	0.0018	12.4	0.0628
Dec	823	0.00010	0.0705	0.0010	29.7	0.00026	0.0	0.0007	0.0055	0.291	0.9	6.7	0.034	2.3	0.0014	0.0018	12.6	0.0769
Total	34061																	

Location **X14**

	Flows	Ag	Al	As	Ca	Cd	Cl	Co	Cu	Fe	K	Mg	Mn	Na	Ni	Pb	SO4	Zn
	(x 1000 m3)	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L
Jan	1173	0.00008	0.0475	0.0012	23.4	0.00070	0.0	0.0010	0.0042	0.195	1.5	7.7	0.027	3.4	0.0035	0.0038	32.1	0.0622
Feb	893	0.00007	0.0415	0.0012	21.2	0.00079	0.0	0.0010	0.0039	0.171	1.5	7.7	0.026	3.6	0.0040	0.0042	35.7	0.0678
Mar	960	0.00008	0.0380	0.0012	19.4	0.00080	0.0	0.0010	0.0036	0.159	1.5	7.4	0.025	3.5	0.0040	0.0041	35.7	0.0746
Apr	1767	0.00008	0.0506	0.0011	23.5	0.00052	0.0	0.0008	0.0043	0.208	1.2	6.8	0.027	2.8	0.0027	0.0030	24.3	0.0620
May	14515	0.00010	0.0638	0.0010	28.7	0.00024	0.0	0.0006	0.0049	0.257	1.0	6.6	0.028	2.3	0.0013	0.0019	13.3	0.0309
Jun	14834	0.00010	0.0641	0.0010	28.8	0.00024	0.0	0.0006	0.0049	0.258	1.0	6.6	0.028	2.3	0.0013	0.0019	13.2	0.0324
Jul	10320	0.00010	0.0635	0.0010	28.6	0.00026	0.0	0.0006	0.0049	0.256	1.0	6.6	0.028	2.4	0.0014	0.0019	14.0	0.0339
Aug	7274	0.00009	0.0621	0.0010	28.1	0.00028	0.0	0.0007	0.0048	0.250	1.0	6.6	0.028	2.4	0.0015	0.0020	14.9	0.0339
Sep	9805	0.00010	0.0678	0.0011	28.5	0.00035	0.0	0.0007	0.0066	0.305	1.0	6.6	0.036	2.4	0.0015	0.0020	14.6	0.0952
Oct	5136	0.00009	0.0673	0.0012	27.7	0.00045	0.0	0.0008	0.0072	0.318	1.0	6.8	0.039	2.5	0.0018	0.0023	17.1	0.1263
Nov	2288	0.00009	0.0571	0.0011	26.6	0.00045	0.0	0.0008	0.0046	0.232	1.2	7.1	0.028	2.8	0.0023	0.0028	21.9	0.0466
Dec	1687	0.00009	0.0548	0.0012	25.9	0.00055	0.0	0.0009	0.0046	0.223	1.3	7.5	0.028	3.1	0.0028	0.0032	26.2	0.0549
Total	70651																	

Location **Mouth of Rose Creek**

	Flows	Ag	Al	As	Ca	Cd	Cl	Co	Cu	Fe	K	Mg	Mn	Na	Ni	Pb	SO4	Zn
	(x 1000 m3)	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L
Jan	1608	0.00008	0.0525	0.0012	25.1	0.00056	0.0	0.0009	0.0044	0.214	1.3	7.4	0.027	3.1	0.0029	0.0032	26.6	0.0523
Feb	1211	0.00008	0.0479	0.0012	23.4	0.00063	0.0	0.0009	0.0042	0.196	1.4	7.4	0.026	3.2	0.0032	0.0035	29.4	0.0568
Mar	1280	0.00007	0.0450	0.0011	21.9	0.00065	0.0	0.0009	0.0040	0.185	1.3	7.1	0.026	3.2	0.0033	0.0035	29.7	0.0624
Apr	2384	0.00008	0.0546	0.0011	25.1	0.00044	0.0	0.0008	0.0045	0.223	1.1	6.8	0.028	2.7	0.0023	0.0026	21.0	0.0526
May	20027	0.00010	0.0644	0.0010	29.0	0.00023	0.0	0.0006	0.0049	0.259	0.9	6.6	0.028	2.3	0.0012	0.0018	12.8	0.0294
Jun	20504	0.00010	0.0646	0.0010	29.0	0.00023	0.0	0.0006	0.0049	0.260	0.9	6.6	0.028	2.3	0.0012	0.0018	12.8	0.0305
Jul	14272	0.00010	0.0642	0.0010	28.9	0.00024	0.0	0.0006	0.0049	0.258	1.0	6.6	0.028	2.3	0.0013	0.0019	13.4	0.0316
Aug	10038	0.00010	0.0631	0.0010	28.5	0.00026	0.0	0.0006	0.0049	0.254	1.0	6.6	0.028	2.4	0.0014	0.0019	14.0	0.0316
Sep	13527	0.00010	0.0672	0.0011	28.8	0.00031	0.0	0.0007	0.0062	0.294	1.0	6.6	0.034	2.4	0.0014	0.0019	13.8	0.0761
Oct	7075	0.00010	0.0669	0.0012	28.2	0.00038	0.0	0.0008	0.0066	0.303	1.0	6.7	0.036	2.4	0.0016	0.0021	15.6	0.0987
Nov	3167	0.00009	0.0596	0.0011	27.4	0.00038	0.0	0.0007	0.0047	0.241	1.1	7.0	0.028	2.7	0.0020	0.0025	19.1	0.0407
Dec	2334	0.00009	0.0579	0.0011	27.0	0.00046	0.0	0.0008	0.0047	0.234	1.2	7.2	0.028	2.9	0.0023	0.0028	22.2	0.0468
Total	97426																	

Location **Mouth of Anvil Creek**

	Flows	Ag	Al	As	Ca	Cd	Cl	Co	Cu	Fe	K	Mg	Mn	Na	Ni	Pb	SO4	Zn
	(x 1000 m3)	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L
Jan	4412	0.00009	0.0610	0.0011	28.0	0.00033	0.0	0.0007	0.0048	0.246	1.1	6.8	0.028	2.6	0.0017	0.0023	17.1	0.0353
Feb	3253	0.00009	0.0592	0.0011	27.3	0.00036	0.0	0.0007	0.0047	0.239	1.1	6.8	0.028	2.6	0.0019	0.0024	18.3	0.0372
Mar	3341	0.00009	0.0579	0.0011	26.7	0.00037	0.0	0.0007	0.0046	0.234	1.1	6.8	0.027	2.6	0.0019	0.0024	18.6	0.0397
Apr	6357	0.00009	0.0617	0.0010	27.9	0.00029	0.0	0.0007	0.0048	0.249	1.0	6.6	0.028	2.4	0.0015	0.0021	15.2	0.0357
May	55503	0.00010	0.0654	0.0010	29.4	0.00021	0.0	0.0006	0.0050	0.262	0.9	6.5	0.028	2.3	0.0012	0.0017	12.1	0.0270
Jun	56994	0.00010	0.0654	0.0010	29.4	0.00021	0.0	0.0006	0.0050	0.262	0.9	6.5	0.028	2.3	0.0012	0.0017	12.1	0.0274
Jul	39711	0.00010	0.0653	0.0010	29.3	0.00022	0.0	0.0006	0.0050	0.262	0.9	6.6	0.028	2.3	0.0012	0.0018	12.3	0.0278
Aug	27829	0.00010	0.0649	0.0010	29.2	0.00022	0.0	0.0006	0.0050	0.260	0.9	6.6	0.028	2.3	0.0012	0.0018	12.5	0.0278
Sep	37477	0.00010	0.0664	0.0010	29.3	0.00024	0.0	0.0006	0.0054	0.275	0.9	6.6	0.030	2.3	0.0012	0.0018	12.5	0.0438
Oct	19555	0.00010	0.0663	0.0011	29.1	0.00027	0.0	0.0007	0.0056	0.278	0.9	6.6	0.031	2.3	0.0013	0.0018	13.1	0.0520
Nov	8820	0.00010	0.0636	0.0010	28.8	0.00026	0.0	0.0007	0.0049	0.256	1.0	6.7	0.028	2.4	0.0014	0.0020	14.4	0.0310
Dec	6498	0.00010	0.0630	0.0010	28.6	0.00029	0.0	0.0007	0.0049	0.253	1.0	6.8	0.028	2.5	0.0015	0.0021	15.5	0.0332
Total	269750																	

FSN07 - Supplemental Base Case - Sensitivity Run - Faro Mine Site

Conditions: FUTURE 3

Location: X2

	Flows	Ag	Al	As	Ca	Cd	Cl	Co	Cu	Fe	K	Mg	Mn	Na	Ni	Pb	SO4	Zn
	(x 1000 m3)	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L
Jan	554	0.00015	0.1982	0.0089	29.7	0.00272	0.1	0.0034	0.0535	2.020	0.9	7.0	0.273	2.3	0.0032	0.0023	21.3	1.8443
Feb	404	0.00017	0.2290	0.0108	29.8	0.00331	0.1	0.0041	0.0648	2.430	0.9	7.1	0.330	2.3	0.0038	0.0025	23.5	2.2685
Mar	407	0.00018	0.2703	0.0133	29.8	0.00410	0.1	0.0049	0.0799	2.978	1.0	7.3	0.407	2.3	0.0044	0.0026	26.5	2.8357
Apr	785	0.00016	0.2083	0.0096	29.8	0.00292	0.1	0.0036	0.0572	2.155	0.9	7.1	0.292	2.3	0.0034	0.0024	22.0	1.9837
May	7012	0.00011	0.0849	0.0021	29.6	0.00056	0.0	0.0010	0.0119	0.516	0.9	6.6	0.063	2.3	0.0014	0.0018	13.1	0.2864
Jun	7212	0.00011	0.0895	0.0024	29.6	0.00065	0.0	0.0011	0.0136	0.578	0.9	6.6	0.072	2.3	0.0015	0.0018	13.4	0.3502
Jul	5028	0.00011	0.0946	0.0027	29.6	0.00075	0.0	0.0012	0.0155	0.645	0.9	6.6	0.081	2.3	0.0016	0.0018	13.8	0.4198
Aug	3516	0.00011	0.0959	0.0028	29.6	0.00077	0.0	0.0012	0.0160	0.663	0.9	6.6	0.084	2.3	0.0016	0.0018	13.9	0.4386
Sep	4734	0.00011	0.0890	0.0024	29.6	0.00064	0.0	0.0011	0.0135	0.571	0.9	6.6	0.071	2.3	0.0015	0.0018	13.4	0.3433
Oct	2467	0.00011	0.0997	0.0030	29.6	0.00084	0.0	0.0013	0.0174	0.712	0.9	6.7	0.091	2.3	0.0016	0.0019	14.2	0.4897
Nov	1118	0.00013	0.1382	0.0053	29.7	0.00158	0.0	0.0021	0.0315	1.224	0.9	6.8	0.162	2.3	0.0023	0.0020	17.0	1.0195
Dec	823	0.00014	0.1656	0.0070	29.7	0.00210	0.1	0.0027	0.0415	1.587	0.9	6.9	0.213	2.3	0.0027	0.0022	18.9	1.3958
Total	34061																	

Location: X14

	Flows	Ag	Al	As	Ca	Cd	Cl	Co	Cu	Fe	K	Mg	Mn	Na	Ni	Pb	SO4	Zn
	(x 1000 m3)	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L
Jan	1173	0.00011	0.1226	0.0058	23.7	0.00214	0.1	0.0026	0.0323	1.209	1.5	10.3	0.167	3.4	0.0046	0.0041	77.1	1.0995
Feb	893	0.00011	0.1300	0.0067	21.5	0.00249	0.1	0.0029	0.0370	1.367	1.5	10.8	0.191	3.5	0.0053	0.0045	89.4	1.2910
Mar	960	0.00011	0.1421	0.0076	19.7	0.00280	0.1	0.0032	0.0426	1.565	1.5	10.5	0.219	3.5	0.0055	0.0045	91.4	1.5133
Apr	1767	0.00011	0.1266	0.0058	23.7	0.00198	0.1	0.0024	0.0327	1.235	1.2	8.6	0.169	2.8	0.0038	0.0033	55.0	1.1120
May	14515	0.00010	0.0748	0.0017	28.8	0.00045	0.0	0.0009	0.0090	0.405	1.0	6.8	0.049	2.3	0.0015	0.0019	17.2	0.1828
Jun	14834	0.00010	0.0779	0.0019	28.8	0.00051	0.0	0.0009	0.0101	0.444	1.0	6.8	0.054	2.3	0.0015	0.0019	17.2	0.2227
Jul	10320	0.00010	0.0803	0.0021	28.6	0.00058	0.0	0.0010	0.0112	0.482	1.0	6.9	0.060	2.4	0.0016	0.0020	19.7	0.2656
Aug	7274	0.00010	0.0795	0.0021	28.2	0.00062	0.0	0.0010	0.0113	0.485	1.0	7.0	0.060	2.4	0.0017	0.0021	22.5	0.2748
Sep	9805	0.00010	0.0860	0.0022	28.6	0.00070	0.0	0.0011	0.0132	0.544	1.0	7.0	0.069	2.4	0.0018	0.0021	20.5	0.3448
Oct	5136	0.00010	0.0939	0.0028	27.8	0.00095	0.0	0.0014	0.0168	0.666	1.0	7.4	0.087	2.5	0.0023	0.0024	28.0	0.4886
Nov	2288	0.00011	0.0995	0.0037	26.8	0.00127	0.0	0.0017	0.0205	0.804	1.2	8.4	0.107	2.8	0.0029	0.0029	44.5	0.6321
Dec	1687	0.00011	0.1132	0.0048	26.2	0.00168	0.0	0.0021	0.0264	1.012	1.3	9.3	0.137	3.1	0.0037	0.0034	57.9	0.8614
Total	70651																	

Location: Mouth of Rose Creek

	Flows	Ag	Al	As	Ca	Cd	Cl	Co	Cu	Fe	K	Mg	Mn	Na	Ni	Pb	SO4	Zn
	(x 1000 m3)	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L
Jan	1608	0.00011	0.1072	0.0045	25.3	0.00162	0.0	0.0020	0.0249	0.953	1.3	9.3	0.129	3.1	0.0037	0.0034	59.4	0.8085
Feb	1211	0.00010	0.1132	0.0052	23.6	0.00189	0.0	0.0023	0.0286	1.078	1.4	9.7	0.148	3.2	0.0042	0.0038	69.0	0.9593
Mar	1280	0.00010	0.1231	0.0059	22.2	0.00215	0.1	0.0026	0.0332	1.240	1.4	9.5	0.171	3.2	0.0044	0.0038	71.5	1.1412
Apr	2384	0.00011	0.1109	0.0045	25.3	0.00152	0.0	0.0020	0.0255	0.983	1.1	8.0	0.132	2.7	0.0031	0.0029	43.8	0.8307
May	20027	0.00010	0.0724	0.0015	29.0	0.00038	0.0	0.0008	0.0079	0.366	0.9	6.7	0.043	2.3	0.0014	0.0018	15.7	0.1396
Jun	20504	0.00010	0.0746	0.0016	29.0	0.00042	0.0	0.0008	0.0087	0.394	0.9	6.7	0.047	2.3	0.0014	0.0018	15.7	0.1682
Jul	14272	0.00010	0.0763	0.0018	28.9	0.00048	0.0	0.0009	0.0095	0.422	1.0	6.8	0.051	2.3	0.0015	0.0019	17.5	0.1991
Aug	10038	0.00010	0.0758	0.0018	28.6	0.00050	0.0	0.0009	0.0096	0.425	1.0	6.9	0.052	2.4	0.0016	0.0020	19.5	0.2062
Sep	13527	0.00010	0.0805	0.0019	28.9	0.00056	0.0	0.0010	0.0109	0.467	1.0	6.9	0.058	2.4	0.0016	0.0020	18.1	0.2570
Oct	7075	0.00010	0.0862	0.0023	28.3	0.00074	0.0	0.0012	0.0136	0.556	1.0	7.2	0.071	2.4	0.0020	0.0022	23.6	0.3617
Nov	3167	0.00010	0.0902	0.0030	27.5	0.00097	0.0	0.0014	0.0162	0.654	1.1	7.9	0.085	2.7	0.0024	0.0026	35.4	0.4638
Dec	2334	0.00011	0.1001	0.0037	27.1	0.00127	0.0	0.0017	0.0205	0.804	1.2	8.5	0.107	2.9	0.0030	0.0029	45.1	0.6297
Total	97426																	

Location: Mouth of Anvil Creek

	Flows	Ag	Al	As	Ca	Cd	Cl	Co	Cu	Fe	K	Mg	Mn	Na	Ni	Pb	SO4	Zn
	(x 1000 m3)	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L
Jan	4412	0.00010	0.0810	0.0023	28.0	0.00072	0.0	0.0011	0.0123	0.515	1.1	7.5	0.065	2.6	0.0020	0.0023	29.1	0.3110
Feb	3253	0.00010	0.0835	0.0026	27.4	0.00083	0.0	0.0012	0.0138	0.567	1.1	7.7	0.073	2.6	0.0022	0.0025	33.0	0.3731
Mar	3341	0.00010	0.0878	0.0029	26.8	0.00095	0.0	0.0014	0.0158	0.638	1.1	7.7	0.083	2.6	0.0024	0.0025	34.6	0.4531
Apr	6357	0.00010	0.0828	0.0023	28.0	0.00070	0.0	0.0011	0.0127	0.534	1.0	7.1	0.067	2.4	0.0018	0.0021	23.7	0.3276
May	55503	0.00010	0.0682	0.0012	29.4	0.00027	0.0	0.0007	0.0061	0.301	0.9	6.6	0.034	2.3	0.0012	0.0018	13.2	0.0667
Jun	56994	0.00010	0.0690	0.0012	29.4	0.00028	0.0	0.0007	0.0063	0.311	0.9	6.6	0.035	2.3	0.0012	0.0018	13.1	0.0769
Jul	39711	0.00010	0.0696	0.0013	29.3	0.00030	0.0	0.0007	0.0066	0.321	0.9	6.6	0.036	2.3	0.0012	0.0018	13.8	0.0880
Aug	27829	0.00010	0.0695	0.0013	29.2	0.00031	0.0	0.0007	0.0067	0.322	0.9	6.7	0.037	2.3	0.0013	0.0018	14.5	0.0907
Sep	37477	0.00010	0.0712	0.0013	29.3	0.00033	0.0	0.0007	0.0071	0.337	0.9	6.7	0.039	2.3	0.0013	0.0018	14.0	0.1091
Oct	19555	0.00010	0.0732	0.0015	29.1	0.00040	0.0	0.0008	0.0081	0.370	1.0	6.8	0.044	2.3	0.0014	0.0019	16.0	0.1472
Nov	8820	0.00010	0.0746	0.0017	28.9	0.00048	0.0	0.0009	0.0090	0.404	1.0	7.0	0.049	2.4	0.0016	0.0020	20.2	0.1829
Dec	6498	0.00010	0.0762	0.0020	28.7	0.00058	0.0	0.0010	0.0106	0.458	1.0	7.3	0.057	2.5	0.0018	0.0021	23.7	0.2426
Total	269750																	

VG03 - Vangorda- Grum Area - Supplemental Base Case
Concentrations Estimates for Vangorda Creek Catchments

Loadings: Future 1

Concentrations at V27

	Flow (x1000 m3)	Ag mg/L	Al mg/L	As mg/L	Ca mg/L	Cd mg/L	Cl mg/L	Co mg/L	Cu mg/L	Fe mg/L	K mg/L	Mg mg/L	Mn mg/L	Na mg/L	Ni mg/L	Pb mg/L	SO4 mg/L	Zn mg/L
Jan	137	0.00017	0.030	0.0049	49.7	0.00499	0.0	0.0070	0.0128	0.210	6.8	39.6	0.275	15.2	0.025	0.032	215.7	0.761
Feb	120	0.00016	0.029	0.0050	50.2	0.00514	0.0	0.0071	0.0127	0.209	7.0	40.5	0.281	15.7	0.026	0.031	223.5	0.779
Mar	131	0.00016	0.030	0.0051	50.4	0.00531	0.0	0.0076	0.0136	0.236	7.1	40.9	0.322	15.9	0.027	0.030	226.7	0.898
Apr	145	0.00019	0.038	0.0049	48.8	0.00507	0.0	0.0079	0.0161	0.293	6.3	37.8	0.381	14.1	0.026	0.034	201.7	1.074
May	428	0.00031	0.061	0.0035	40.3	0.00234	0.0	0.0042	0.0150	0.222	2.7	22.4	0.168	6.3	0.015	0.053	76.0	0.437
Jun	434	0.00031	0.063	0.0036	40.2	0.00241	0.1	0.0045	0.0160	0.249	2.6	22.2	0.205	6.2	0.016	0.054	74.1	0.545
Jul	343	0.00030	0.062	0.0039	41.6	0.00315	0.0	0.0061	0.0185	0.323	3.2	24.9	0.327	7.4	0.018	0.050	96.4	0.908
Aug	287	0.00030	0.076	0.0046	43.4	0.00511	0.1	0.0116	0.0308	0.668	3.7	28.2	0.826	8.4	0.026	0.046	125.4	2.393
Sep	345	0.00033	0.084	0.0045	42.3	0.00513	0.1	0.0124	0.0339	0.748	3.1	26.1	0.922	7.2	0.026	0.048	109.2	2.676
Oct	223	0.00025	0.047	0.0041	44.3	0.00344	0.0	0.0052	0.0137	0.206	4.5	29.8	0.199	10.2	0.019	0.044	136.1	0.531
Nov	159	0.00020	0.038	0.0046	47.4	0.00439	0.0	0.0064	0.0136	0.222	5.8	35.4	0.262	13.1	0.023	0.037	182.1	0.719
Dec	149	0.00019	0.035	0.0048	48.6	0.00474	0.0	0.0068	0.0135	0.224	6.3	37.6	0.281	14.2	0.024	0.035	199.3	0.777

Concentrations at V8

	Flow (x1000 m3)	Ag mg/L	Al mg/L	As mg/L	Ca mg/L	Cd mg/L	Cl mg/L	Co mg/L	Cu mg/L	Fe mg/L	K mg/L	Mg mg/L	Mn mg/L	Na mg/L	Ni mg/L	Pb mg/L	SO4 mg/L	Zn mg/L
Jan	430	0.00018	0.0319	0.0025	24.8	0.00178	0.0	0.0028	0.0094	0.1361	2.3	15.4	0.1244	5.4	0.0094	0.0112	71.9	0.3419
Feb	331	0.00017	0.0310	0.0027	26.4	0.00207	0.0	0.0033	0.0097	0.1450	2.7	17.3	0.1442	6.2	0.0108	0.0121	84.4	0.3987
Mar	342	0.00017	0.0314	0.0028	27.1	0.00226	0.0	0.0036	0.0104	0.1633	2.9	18.1	0.1733	6.6	0.0116	0.0125	89.9	0.4840
Apr	566	0.00019	0.0347	0.0023	22.5	0.00151	0.0	0.0027	0.0101	0.1534	1.8	12.8	0.1400	4.2	0.0081	0.0099	55.2	0.3902
May	4313	0.00021	0.0362	0.0017	16.7	0.00036	0.0	0.0009	0.0081	0.0924	0.5	6.1	0.0284	1.4	0.0030	0.0066	11.3	0.0657
Jun	4401	0.00021	0.0361	0.0017	16.5	0.00037	0.0	0.0009	0.0081	0.0953	0.5	6.1	0.0333	1.4	0.0030	0.0066	11.0	0.0805
Jul	3097	0.00021	0.0363	0.0017	16.9	0.00048	0.0	0.0012	0.0085	0.1063	0.6	6.6	0.0506	1.6	0.0035	0.0069	14.3	0.1315
Aug	2205	0.00021	0.0385	0.0019	17.6	0.00080	0.0	0.0020	0.0103	0.1558	0.7	7.4	0.1220	1.8	0.0048	0.0072	19.9	0.3427
Sep	2948	0.00021	0.0391	0.0018	17.2	0.00073	0.0	0.0019	0.0104	0.1566	0.6	6.9	0.1205	1.6	0.0045	0.0070	16.4	0.3386
Oct	1562	0.00020	0.0347	0.0018	18.0	0.00062	0.0	0.0012	0.0082	0.0977	0.9	7.9	0.0439	2.2	0.0042	0.0076	22.9	0.1104
Nov	756	0.00019	0.0336	0.0021	20.5	0.00108	0.0	0.0019	0.0087	0.1157	1.4	10.7	0.0803	3.4	0.0062	0.0090	41.6	0.2154
Dec	592	0.00019	0.0335	0.0023	22.3	0.00137	0.0	0.0023	0.0092	0.1276	1.8	12.6	0.1019	4.2	0.0076	0.0098	53.6	0.2777

VG03 - Vangorda- Grum Area - Supplemental Base Case
Loadings: **Future 2**

Concentrations at V27

	Flow (x1000 m3)	Ag mg/L	Al mg/L	As mg/L	Ca mg/L	Cd mg/L	Cl mg/L	Co mg/L	Cu mg/L	Fe mg/L	K mg/L	Mg mg/L	Mn mg/L	Na mg/L	Ni mg/L	Pb mg/L	SO4 mg/L	Zn mg/L
Jan	137	0.00017	0.095	0.0049	58.1	0.00614	0.0	0.0104	0.0455	0.748	6.8	68.4	0.652	15.2	0.029	0.032	358.6	1.727
Feb	120	0.00016	0.095	0.0050	58.9	0.00631	0.0	0.0106	0.0461	0.760	7.0	70.5	0.667	15.7	0.029	0.031	371.8	1.767
Mar	131	0.00016	0.107	0.0051	59.3	0.00667	0.0	0.0117	0.0525	0.876	7.1	71.3	0.770	15.9	0.031	0.031	377.3	2.048
Apr	145	0.00019	0.132	0.0049	56.6	0.00672	0.0	0.0128	0.0632	1.069	6.3	64.7	0.925	14.1	0.031	0.035	335.3	2.467
May	428	0.00031	0.098	0.0035	43.0	0.00300	0.1	0.0062	0.0340	0.535	2.7	31.9	0.388	6.4	0.017	0.054	123.2	0.999
Jun	434	0.00031	0.110	0.0036	42.8	0.00325	0.1	0.0071	0.0400	0.644	2.7	31.4	0.481	6.2	0.018	0.054	120.0	1.254
Jul	343	0.00030	0.142	0.0039	45.2	0.00455	0.1	0.0103	0.0587	0.985	3.2	37.1	0.790	7.4	0.023	0.051	158.0	2.095
Aug	287	0.00030	0.288	0.0046	48.1	0.00885	0.1	0.0228	0.1379	2.429	3.7	44.1	2.058	8.4	0.037	0.047	208.3	5.550
Sep	345	0.00033	0.322	0.0045	46.2	0.00931	0.1	0.0249	0.1539	2.721	3.2	39.7	2.302	7.2	0.038	0.050	181.2	6.213
Oct	223	0.00025	0.092	0.0041	49.5	0.00423	0.0	0.0076	0.0365	0.582	4.5	47.6	0.462	10.2	0.022	0.044	224.4	1.206
Nov	159	0.00020	0.100	0.0046	54.5	0.00548	0.0	0.0097	0.0447	0.733	5.8	59.6	0.620	13.1	0.026	0.038	302.0	1.637
Dec	149	0.00019	0.101	0.0048	56.3	0.00591	0.0	0.0104	0.0471	0.777	6.3	64.1	0.668	14.2	0.028	0.035	331.1	1.769

Concentrations at V8

	Flow (x1000 m3)	Ag mg/L	Al mg/L	As mg/L	Ca mg/L	Cd mg/L	Cl mg/L	Co mg/L	Cu mg/L	Fe mg/L	K mg/L	Mg mg/L	Mn mg/L	Na mg/L	Ni mg/L	Pb mg/L	SO4 mg/L	Zn mg/L
Jan	430	0.00018	0.0614	0.0025	27.4	0.00230	0.0	0.0044	0.0243	0.3808	2.4	24.7	0.2954	5.4	0.0109	0.0113	118.1	0.7802
Feb	331	0.00017	0.0654	0.0027	29.6	0.00268	0.0	0.0051	0.0271	0.4308	2.7	28.3	0.3439	6.2	0.0125	0.0123	139.0	0.9107
Mar	342	0.00017	0.0735	0.0028	30.5	0.00300	0.0	0.0059	0.0316	0.5129	2.9	29.9	0.4177	6.6	0.0137	0.0127	148.4	1.1104
Apr	566	0.00019	0.0688	0.0023	24.5	0.00211	0.0	0.0045	0.0274	0.4370	1.8	19.8	0.3382	4.3	0.0099	0.0101	90.1	0.8981
May	4313	0.00021	0.0415	0.0017	17.0	0.00045	0.0	0.0012	0.0108	0.1367	0.5	7.1	0.0593	1.4	0.0033	0.0067	16.1	0.1449
Jun	4401	0.00021	0.0428	0.0017	16.8	0.00049	0.0	0.0013	0.0115	0.1508	0.5	7.0	0.0721	1.4	0.0034	0.0067	15.7	0.1799
Jul	3097	0.00021	0.0475	0.0017	17.3	0.00068	0.0	0.0017	0.0142	0.1994	0.6	7.9	0.1158	1.6	0.0041	0.0069	21.3	0.2984
Aug	2205	0.00021	0.0686	0.0019	18.2	0.00133	0.0	0.0036	0.0255	0.4052	0.7	9.5	0.2964	1.9	0.0064	0.0074	30.8	0.7898
Sep	2948	0.00021	0.0689	0.0018	17.7	0.00125	0.0	0.0035	0.0254	0.4032	0.6	8.5	0.2929	1.6	0.0060	0.0071	25.0	0.7804
Oct	1562	0.00020	0.0439	0.0018	18.8	0.00079	0.0	0.0017	0.0128	0.1742	0.9	10.4	0.0974	2.2	0.0046	0.0076	35.7	0.2474
Nov	756	0.00019	0.0521	0.0021	22.0	0.00141	0.0	0.0029	0.0181	0.2690	1.4	15.9	0.1874	3.4	0.0072	0.0090	67.2	0.4901
Dec	592	0.00019	0.0574	0.0023	24.3	0.00179	0.0	0.0036	0.0213	0.3263	1.8	19.4	0.2408	4.2	0.0088	0.0099	87.3	0.6336

VG03 - Vangorda- Grum Area - Supplemental Base Case

Loadings: Future 3

Concentrations at V27

	Flow (x1000 m3)	Ag mg/L	Al mg/L	As mg/L	Ca mg/L	Cd mg/L	Cl mg/L	Co mg/L	Cu mg/L	Fe mg/L	K mg/L	Mg mg/L	Mn mg/L	Na mg/L	Ni mg/L	Pb mg/L	SO4 mg/L	Zn mg/L
Jan	137	0.00017	0.225	0.0049	60.9	0.00942	0.0	0.0193	0.1144	1.928	6.8	107.8	1.665	15.3	0.036	0.033	628.3	4.454
Feb	120	0.00016	0.228	0.0050	61.9	0.00967	0.0	0.0198	0.1166	1.967	7.0	111.3	1.703	15.7	0.037	0.032	651.5	4.557
Mar	131	0.00016	0.261	0.0051	62.3	0.01058	0.0	0.0223	0.1345	2.281	7.1	112.7	1.976	15.9	0.039	0.032	661.8	5.294
Apr	145	0.00019	0.319	0.0049	59.3	0.01145	0.0	0.0257	0.1626	2.772	6.3	101.4	2.386	14.1	0.041	0.036	588.9	6.401
May	428	0.00031	0.174	0.0035	44.0	0.00491	0.1	0.0114	0.0741	1.221	2.7	44.9	0.976	6.4	0.021	0.054	213.0	2.584
Jun	434	0.00031	0.205	0.0036	43.8	0.00566	0.1	0.0136	0.0905	1.509	2.7	43.9	1.224	6.2	0.023	0.055	207.9	3.253
Jul	343	0.00030	0.290	0.0039	46.4	0.00830	0.1	0.0205	0.1374	2.332	3.2	53.8	1.946	7.4	0.031	0.052	275.4	5.209
Aug	287	0.00030	0.647	0.0046	49.6	0.01792	0.1	0.0473	0.3283	5.688	3.7	65.8	4.854	8.5	0.056	0.050	366.5	13.079
Sep	345	0.00033	0.719	0.0045	47.6	0.01936	0.1	0.0521	0.3649	6.330	3.2	58.3	5.398	7.2	0.060	0.053	319.3	14.551
Oct	223	0.00025	0.183	0.0041	51.3	0.00653	0.0	0.0138	0.0846	1.406	4.5	71.9	1.170	10.2	0.027	0.045	391.3	3.111
Nov	159	0.00020	0.223	0.0046	56.9	0.00860	0.0	0.0182	0.1102	1.854	5.8	92.6	1.582	13.1	0.033	0.038	528.6	4.229
Dec	149	0.00019	0.234	0.0048	59.0	0.00928	0.0	0.0195	0.1178	1.988	6.3	100.4	1.708	14.2	0.035	0.036	580.1	4.569

Concentrations at V8

	Flow (x1000 m3)	Ag mg/L	Al mg/L	As mg/L	Ca mg/L	Cd mg/L	Cl mg/L	Co mg/L	Cu mg/L	Fe mg/L	K mg/L	Mg mg/L	Mn mg/L	Na mg/L	Ni mg/L	Pb mg/L	SO4 mg/L	Zn mg/L
Jan	430	0.00018	0.1047	0.0025	28.3	0.00339	0.0	0.0074	0.0473	0.7740	2.4	37.3	0.6327	5.4	0.0132	0.0116	204.2	1.6882
Feb	331	0.00017	0.1160	0.0027	30.7	0.00395	0.0	0.0085	0.0540	0.8902	2.7	43.2	0.7379	6.2	0.0152	0.0127	241.1	1.9713
Mar	342	0.00017	0.1354	0.0028	31.7	0.00456	0.0	0.0101	0.0645	1.0749	2.9	45.8	0.8996	6.6	0.0170	0.0132	257.5	2.4079
Apr	566	0.00019	0.1190	0.0023	25.2	0.00338	0.0	0.0080	0.0541	0.8927	1.8	29.2	0.7290	4.3	0.0125	0.0104	155.3	1.9503
May	4313	0.00021	0.0494	0.0017	17.1	0.00065	0.0	0.0017	0.0149	0.2078	0.5	8.4	0.1203	1.4	0.0037	0.0067	25.0	0.3091
Jun	4401	0.00021	0.0526	0.0017	16.9	0.00074	0.0	0.0019	0.0167	0.2401	0.5	8.2	0.1486	1.4	0.0039	0.0067	24.4	0.3859
Jul	3097	0.00021	0.0645	0.0017	17.5	0.00111	0.0	0.0029	0.0232	0.3532	0.6	9.8	0.2476	1.6	0.0050	0.0071	34.4	0.6534
Aug	2205	0.00021	0.1157	0.0019	18.4	0.00252	0.0	0.0068	0.0505	0.8336	0.7	12.3	0.6639	1.9	0.0089	0.0077	51.4	1.7792
Sep	2948	0.00021	0.1157	0.0018	17.9	0.00244	0.0	0.0067	0.0503	0.8288	0.6	10.6	0.6580	1.6	0.0085	0.0075	41.1	1.7635
Oct	1562	0.00020	0.0575	0.0018	19.0	0.00113	0.0	0.0026	0.0200	0.2971	0.9	13.9	0.2028	2.2	0.0054	0.0077	59.6	0.5313
Nov	756	0.00019	0.0792	0.0021	22.5	0.00209	0.0	0.0047	0.0325	0.5154	1.4	22.8	0.3987	3.4	0.0086	0.0092	115.0	1.0590
Dec	592	0.00019	0.0926	0.0023	25.0	0.00268	0.0	0.0060	0.0400	0.6455	1.8	28.5	0.5146	4.2	0.0106	0.0102	150.3	1.3708

FSN04 - Vangorda- Grum Area - Supplemental Base Case - Sensitivity Run Collection Efficiency
Concentrations Estimates for Vangorda Creek Catchments

Loadings: Future 1

Concentrations at V27

	Flow (x1000 m3)	Ag mg/L	Al mg/L	As mg/L	Ca mg/L	Cd mg/L	Cl mg/L	Co mg/L	Cu mg/L	Fe mg/L	K mg/L	Mg mg/L	Mn mg/L	Na mg/L	Ni mg/L	Pb mg/L	SO4 mg/L	Zn mg/L
Jan	139	0.00016	0.025	0.0047	49.1	0.00456	0.0	0.0055	0.0091	0.110	6.9	39.2	0.133	15.4	0.024	0.032	213.3	0.340
Feb	122	0.00015	0.023	0.0048	49.6	0.00470	0.0	0.0056	0.0089	0.107	7.1	40.1	0.136	15.9	0.024	0.031	220.8	0.348
Mar	133	0.00015	0.023	0.0049	49.8	0.00479	0.0	0.0058	0.0092	0.117	7.2	40.4	0.152	16.1	0.024	0.030	223.6	0.397
Apr	146	0.00018	0.030	0.0047	48.2	0.00444	0.0	0.0058	0.0107	0.150	6.4	37.4	0.177	14.4	0.023	0.034	198.6	0.469
May	425	0.00030	0.057	0.0034	40.1	0.00211	0.0	0.0034	0.0128	0.164	2.8	22.4	0.087	6.5	0.014	0.054	75.6	0.196
Jun	431	0.00031	0.058	0.0034	40.0	0.00211	0.0	0.0035	0.0133	0.177	2.7	22.1	0.102	6.3	0.014	0.054	73.1	0.242
Jul	343	0.00029	0.060	0.0038	41.5	0.00303	0.0	0.0056	0.0172	0.290	3.3	24.9	0.279	7.5	0.018	0.050	96.7	0.768
Aug	287	0.00029	0.072	0.0045	43.2	0.00482	0.1	0.0105	0.0280	0.595	3.8	28.1	0.724	8.6	0.025	0.046	124.8	2.090
Sep	344	0.00032	0.080	0.0044	42.1	0.00490	0.1	0.0116	0.0317	0.690	3.2	26.1	0.841	7.3	0.025	0.049	108.8	2.437
Oct	224	0.00024	0.043	0.0040	44.0	0.00316	0.0	0.0042	0.0110	0.136	4.6	29.7	0.101	10.4	0.018	0.044	135.7	0.240
Nov	161	0.00019	0.033	0.0044	47.0	0.00399	0.0	0.0050	0.0101	0.127	5.9	35.2	0.127	13.3	0.021	0.037	180.5	0.321
Dec	151	0.00017	0.029	0.0046	48.1	0.00430	0.0	0.0053	0.0097	0.122	6.4	37.2	0.135	14.4	0.023	0.034	197.3	0.346

Concentrations at V8

	Flow (x1000 m3)	Ag mg/L	Al mg/L	As mg/L	Ca mg/L	Cd mg/L	Cl mg/L	Co mg/L	Cu mg/L	Fe mg/L	K mg/L	Mg mg/L	Mn mg/L	Na mg/L	Ni mg/L	Pb mg/L	SO4 mg/L	Zn mg/L
Jan	432	0.00018	0.0300	0.0025	24.7	0.00165	0.0	0.0024	0.0082	0.1036	2.4	15.4	0.0784	5.5	0.0089	0.0113	71.8	0.2055
Feb	333	0.00017	0.0287	0.0026	26.3	0.00192	0.0	0.0027	0.0083	0.1070	2.8	17.3	0.0903	6.4	0.0102	0.0122	84.2	0.2390
Mar	344	0.00017	0.0287	0.0027	27.0	0.00207	0.0	0.0030	0.0086	0.1169	2.9	18.1	0.1073	6.7	0.0108	0.0126	89.5	0.2887
Apr	567	0.00019	0.0325	0.0023	22.4	0.00135	0.0	0.0022	0.0088	0.1160	1.9	12.8	0.0867	4.3	0.0075	0.0099	54.7	0.2325
May	4310	0.00021	0.0358	0.0017	16.7	0.00034	0.0	0.0008	0.0079	0.0866	0.5	6.1	0.0201	1.4	0.0029	0.0067	11.2	0.0412
Jun	4397	0.00021	0.0357	0.0017	16.5	0.00034	0.0	0.0008	0.0079	0.0880	0.5	6.1	0.0229	1.4	0.0029	0.0066	10.9	0.0497
Jul	3097	0.00021	0.0360	0.0017	16.9	0.00047	0.0	0.0011	0.0084	0.1025	0.6	6.6	0.0452	1.6	0.0034	0.0069	14.4	0.1153
Aug	2205	0.00021	0.0379	0.0018	17.6	0.00076	0.0	0.0018	0.0099	0.1461	0.7	7.4	0.1085	1.9	0.0047	0.0073	19.8	0.3026
Sep	2947	0.00021	0.0387	0.0018	17.2	0.00070	0.0	0.0018	0.0101	0.1496	0.6	6.8	0.1107	1.6	0.0044	0.0070	16.3	0.3096
Oct	1563	0.00020	0.0341	0.0018	18.0	0.00059	0.0	0.0011	0.0078	0.0875	0.9	7.9	0.0296	2.2	0.0040	0.0076	23.0	0.0680
Nov	758	0.00019	0.0324	0.0021	20.5	0.00100	0.0	0.0016	0.0080	0.0954	1.5	10.7	0.0515	3.5	0.0059	0.0090	41.6	0.1303
Dec	594	0.00019	0.0319	0.0022	22.3	0.00127	0.0	0.0019	0.0082	0.1012	1.8	12.6	0.0646	4.3	0.0071	0.0099	53.5	0.1672

FSN04 - Vangorda- Grum Area - Supplemental Base Case - Sensitivity Run Collection Efficiency
Loadings: Future 2

Concentrations at V27

	Flow (x1000 m3)	Ag mg/L	Al mg/L	As mg/L	Ca mg/L	Cd mg/L	Cl mg/L	Co mg/L	Cu mg/L	Fe mg/L	K mg/L	Mg mg/L	Mn mg/L	Na mg/L	Ni mg/L	Pb mg/L	SO4 mg/L	Zn mg/L
Jan	139	0.00016	0.051	0.0047	57.4	0.00503	0.0	0.0069	0.0224	0.330	6.9	67.8	0.288	15.5	0.025	0.032	354.3	0.736
Feb	122	0.00015	0.050	0.0048	58.2	0.00518	0.0	0.0070	0.0225	0.332	7.1	69.8	0.293	15.9	0.026	0.031	366.9	0.752
Mar	133	0.00015	0.054	0.0049	58.5	0.00535	0.0	0.0075	0.0251	0.379	7.2	70.5	0.336	16.1	0.026	0.031	371.6	0.868
Apr	146	0.00018	0.069	0.0047	55.9	0.00512	0.0	0.0078	0.0302	0.470	6.4	63.9	0.401	14.4	0.025	0.035	329.6	1.044
May	425	0.00030	0.073	0.0034	42.9	0.00238	0.0	0.0042	0.0208	0.295	2.8	31.9	0.179	6.5	0.015	0.054	122.3	0.431
Jun	431	0.00031	0.078	0.0034	42.6	0.00246	0.0	0.0045	0.0233	0.342	2.7	31.2	0.218	6.3	0.015	0.054	118.1	0.539
Jul	343	0.00029	0.127	0.0038	45.0	0.00420	0.1	0.0091	0.0508	0.844	3.3	37.2	0.667	7.6	0.021	0.051	158.4	1.761
Aug	287	0.00029	0.256	0.0045	47.8	0.00807	0.1	0.0203	0.1213	2.128	3.8	44.0	1.797	8.6	0.034	0.047	207.0	4.839
Sep	344	0.00032	0.296	0.0044	46.0	0.00870	0.1	0.0229	0.1408	2.483	3.2	39.7	2.095	7.4	0.036	0.050	180.5	5.651
Oct	224	0.00024	0.061	0.0040	49.2	0.00349	0.0	0.0052	0.0205	0.292	4.6	47.6	0.210	10.4	0.019	0.044	223.5	0.520
Nov	161	0.00019	0.058	0.0044	54.0	0.00444	0.0	0.0064	0.0229	0.337	5.9	59.3	0.275	13.3	0.023	0.037	299.1	0.699
Dec	151	0.00017	0.056	0.0046	55.8	0.00478	0.0	0.0068	0.0235	0.349	6.4	63.6	0.294	14.4	0.024	0.035	327.3	0.754

Concentrations at V8

	Flow (x1000 m3)	Ag mg/L	Al mg/L	As mg/L	Ca mg/L	Cd mg/L	Cl mg/L	Co mg/L	Cu mg/L	Fe mg/L	K mg/L	Mg mg/L	Mn mg/L	Na mg/L	Ni mg/L	Pb mg/L	SO4 mg/L	Zn mg/L
Jan	432	0.00018	0.0470	0.0025	27.4	0.00195	0.0	0.0033	0.0168	0.2451	2.4	24.7	0.1772	5.5	0.0098	0.0113	117.8	0.4588
Feb	333	0.00017	0.0487	0.0026	29.5	0.00227	0.0	0.0037	0.0184	0.2721	2.8	28.3	0.2056	6.4	0.0111	0.0123	138.6	0.5346
Mar	344	0.00017	0.0531	0.0027	30.4	0.00250	0.0	0.0042	0.0209	0.3189	2.9	29.8	0.2484	6.7	0.0120	0.0127	147.5	0.6503
Apr	567	0.00019	0.0524	0.0023	24.4	0.00170	0.0	0.0032	0.0188	0.2805	1.9	19.7	0.2016	4.3	0.0085	0.0100	89.2	0.5268
May	4310	0.00021	0.0390	0.0017	16.9	0.00039	0.0	0.0010	0.0094	0.1123	0.5	7.1	0.0380	1.4	0.0030	0.0067	15.9	0.0872
Jun	4397	0.00021	0.0396	0.0017	16.7	0.00041	0.0	0.0010	0.0098	0.1203	0.5	7.0	0.0455	1.4	0.0031	0.0067	15.4	0.1075
Jul	3097	0.00021	0.0458	0.0017	17.3	0.00064	0.0	0.0016	0.0133	0.1832	0.6	7.9	0.1016	1.6	0.0039	0.0069	21.4	0.2599
Aug	2205	0.00021	0.0643	0.0018	18.2	0.00122	0.0	0.0032	0.0233	0.3653	0.7	9.4	0.2618	1.9	0.0060	0.0074	30.7	0.6955
Sep	2947	0.00021	0.0658	0.0018	17.7	0.00118	0.0	0.0032	0.0238	0.3744	0.6	8.5	0.2678	1.6	0.0058	0.0071	24.8	0.7123
Oct	1563	0.00020	0.0395	0.0018	18.8	0.00068	0.0	0.0014	0.0105	0.1319	0.9	10.5	0.0607	2.2	0.0043	0.0076	35.7	0.1476
Nov	758	0.00019	0.0431	0.0021	21.9	0.00119	0.0	0.0022	0.0134	0.1843	1.5	15.9	0.1136	3.5	0.0065	0.0091	67.1	0.2894
Dec	594	0.00019	0.0458	0.0022	24.2	0.00151	0.0	0.0027	0.0152	0.2164	1.8	19.4	0.1450	4.3	0.0078	0.0099	87.1	0.3732

FSN04 - Vangorda- Grum Area - Supplemental Base Case - Sensitivity Run Collection Efficiency

Loadings: Future 3

Concentrations at V27

	Flow (x1000 m3)	Ag mg/L	Al mg/L	As mg/L	Ca mg/L	Cd mg/L	Cl mg/L	Co mg/L	Cu mg/L	Fe mg/L	K mg/L	Mg mg/L	Mn mg/L	Na mg/L	Ni mg/L	Pb mg/L	SO4 mg/L	Zn mg/L
Jan	139	0.00016	0.111	0.0047	60.3	0.00655	0.0	0.0110	0.0542	0.875	6.9	106.9	0.756	15.5	0.028	0.033	619.8	1.996
Feb	122	0.00015	0.111	0.0048	61.2	0.00673	0.0	0.0113	0.0550	0.889	7.1	110.3	0.772	15.9	0.029	0.031	642.1	2.040
Mar	133	0.00015	0.126	0.0049	61.5	0.00716	0.0	0.0124	0.0629	1.028	7.2	111.5	0.893	16.1	0.030	0.031	650.6	2.368
Apr	146	0.00018	0.156	0.0047	58.6	0.00733	0.0	0.0138	0.0763	1.261	6.4	100.2	1.081	14.4	0.030	0.035	577.3	2.874
May	425	0.00030	0.108	0.0034	43.8	0.00328	0.0	0.0066	0.0396	0.619	2.8	44.8	0.457	6.5	0.017	0.054	210.8	1.179
Jun	431	0.00031	0.123	0.0034	43.5	0.00360	0.1	0.0076	0.0472	0.751	2.7	43.7	0.569	6.3	0.018	0.055	203.7	1.484
Jul	343	0.00029	0.248	0.0038	46.3	0.00727	0.1	0.0174	0.1152	1.945	3.3	54.0	1.612	7.6	0.028	0.052	275.6	4.306
Aug	287	0.00029	0.566	0.0045	49.4	0.01591	0.1	0.0415	0.2857	4.941	3.8	65.7	4.210	8.6	0.051	0.049	363.6	11.338
Sep	344	0.00032	0.655	0.0044	47.4	0.01777	0.1	0.0475	0.3312	5.739	3.3	58.3	4.889	7.4	0.056	0.052	317.5	13.174
Oct	224	0.00024	0.104	0.0040	51.0	0.00456	0.0	0.0081	0.0429	0.677	4.6	71.9	0.540	10.4	0.022	0.045	389.1	1.410
Nov	161	0.00019	0.115	0.0044	56.4	0.00589	0.0	0.0103	0.0533	0.858	5.9	92.1	0.722	13.3	0.026	0.038	522.6	1.903
Dec	151	0.00017	0.118	0.0046	58.4	0.00634	0.0	0.0110	0.0562	0.910	6.4	99.7	0.776	14.4	0.027	0.035	572.4	2.052

Concentrations at V8

	Flow (x1000 m3)	Ag mg/L	Al mg/L	As mg/L	Ca mg/L	Cd mg/L	Cl mg/L	Co mg/L	Cu mg/L	Fe mg/L	K mg/L	Mg mg/L	Mn mg/L	Na mg/L	Ni mg/L	Pb mg/L	SO4 mg/L	Zn mg/L
Jan	432	0.00018	0.0682	0.0025	28.3	0.00249	0.0	0.0047	0.0281	0.4371	2.4	37.3	0.3418	5.5	0.0109	0.0115	203.5	0.9019
Feb	333	0.00017	0.0734	0.0026	30.6	0.00290	0.0	0.0054	0.0315	0.4962	2.8	43.2	0.3976	6.4	0.0124	0.0125	240.1	1.0516
Mar	344	0.00017	0.0833	0.0027	31.5	0.00326	0.0	0.0063	0.0370	0.5930	2.9	45.7	0.4834	6.7	0.0136	0.0129	255.6	1.2828
Apr	567	0.00019	0.0770	0.0023	25.1	0.00232	0.0	0.0049	0.0319	0.5036	1.9	29.1	0.3928	4.3	0.0098	0.0102	153.3	1.0416
May	4310	0.00021	0.0428	0.0017	17.0	0.00049	0.0	0.0012	0.0115	0.1472	0.5	8.4	0.0680	1.4	0.0032	0.0067	24.7	0.1678
Jun	4397	0.00021	0.0444	0.0017	16.8	0.00053	0.0	0.0013	0.0124	0.1641	0.5	8.2	0.0830	1.4	0.0033	0.0067	23.9	0.2086
Jul	3097	0.00021	0.0597	0.0017	17.4	0.00099	0.0	0.0026	0.0207	0.3097	0.6	9.8	0.2101	1.6	0.0047	0.0071	34.4	0.5521
Aug	2205	0.00021	0.1051	0.0018	18.4	0.00226	0.0	0.0060	0.0450	0.7358	0.7	12.3	0.5795	1.9	0.0082	0.0077	51.1	1.5511
Sep	2947	0.00021	0.1081	0.0018	17.8	0.00225	0.0	0.0061	0.0462	0.7582	0.6	10.6	0.5970	1.6	0.0080	0.0074	40.9	1.5988
Oct	1563	0.00020	0.0461	0.0018	19.0	0.00085	0.0	0.0018	0.0140	0.1922	0.9	14.0	0.1123	2.2	0.0046	0.0077	59.5	0.2867
Nov	758	0.00019	0.0564	0.0021	22.4	0.00153	0.0	0.0031	0.0205	0.3050	1.5	22.8	0.2170	3.5	0.0072	0.0091	114.6	0.5679
Dec	594	0.00019	0.0631	0.0022	24.9	0.00195	0.0	0.0038	0.0244	0.3726	1.8	28.6	0.2789	4.3	0.0087	0.0101	149.6	0.7337

FSN05 - Vangorda- Grum Area - Supplemental Base Case - Sensitivity Run Collection Efficiency
Concentrations Estimates for Vangorda Creek Catchments

Loadings: Future 1

Concentrations at V27

	Flow (x1000 m3)	Ag mg/L	Al mg/L	As mg/L	Ca mg/L	Cd mg/L	Cl mg/L	Co mg/L	Cu mg/L	Fe mg/L	K mg/L	Mg mg/L	Mn mg/L	Na mg/L	Ni mg/L	Pb mg/L	SO4 mg/L	Zn mg/L
Jan	141	0.00015	0.022	0.0047	48.9	0.00438	0.0	0.0048	0.0074	0.065	6.9	39.1	0.070	15.6	0.023	0.032	212.9	0.152
Feb	124	0.00014	0.020	0.0047	49.4	0.00451	0.0	0.0049	0.0072	0.062	7.1	40.0	0.071	16.0	0.023	0.031	220.3	0.156
Mar	134	0.00014	0.020	0.0048	49.6	0.00457	0.0	0.0050	0.0072	0.064	7.2	40.3	0.077	16.2	0.023	0.030	222.9	0.174
Apr	147	0.00017	0.026	0.0045	48.0	0.00417	0.0	0.0048	0.0083	0.086	6.5	37.3	0.085	14.5	0.022	0.034	198.0	0.198
May	424	0.00030	0.055	0.0034	40.1	0.00200	0.0	0.0030	0.0118	0.138	2.8	22.4	0.050	6.6	0.014	0.054	75.8	0.086
Jun	430	0.00030	0.056	0.0034	39.9	0.00197	0.0	0.0030	0.0121	0.143	2.8	22.1	0.055	6.4	0.014	0.054	73.0	0.102
Jul	344	0.00029	0.059	0.0038	41.4	0.00301	0.0	0.0055	0.0168	0.281	3.3	25.0	0.267	7.6	0.018	0.050	97.5	0.732
Aug	287	0.00029	0.069	0.0044	43.1	0.00470	0.0	0.0101	0.0268	0.563	3.8	28.1	0.679	8.7	0.024	0.046	125.1	1.957
Sep	344	0.00032	0.079	0.0044	42.0	0.00481	0.1	0.0112	0.0308	0.666	3.3	26.1	0.807	7.4	0.025	0.049	109.2	2.337
Oct	225	0.00023	0.041	0.0039	44.0	0.00304	0.0	0.0038	0.0098	0.104	4.6	29.8	0.056	10.5	0.018	0.044	136.1	0.108
Nov	162	0.00018	0.030	0.0044	46.8	0.00382	0.0	0.0044	0.0085	0.084	6.0	35.2	0.067	13.4	0.021	0.037	180.6	0.142
Dec	152	0.00017	0.026	0.0045	47.9	0.00411	0.0	0.0047	0.0080	0.076	6.4	37.2	0.070	14.5	0.022	0.034	197.1	0.153

Concentrations at V8

	Flow (x1000 m3)	Ag mg/L	Al mg/L	As mg/L	Ca mg/L	Cd mg/L	Cl mg/L	Co mg/L	Cu mg/L	Fe mg/L	K mg/L	Mg mg/L	Mn mg/L	Na mg/L	Ni mg/L	Pb mg/L	SO4 mg/L	Zn mg/L
Jan	433	0.00017	0.0286	0.0024	24.7	0.00155	0.0	0.0020	0.0073	0.0788	2.4	15.4	0.0432	5.6	0.0085	0.0113	71.9	0.1014
Feb	334	0.00017	0.0271	0.0026	26.3	0.00180	0.0	0.0023	0.0072	0.0781	2.8	17.3	0.0492	6.5	0.0097	0.0122	84.3	0.1175
Mar	345	0.00016	0.0267	0.0027	27.0	0.00192	0.0	0.0024	0.0073	0.0816	3.0	18.1	0.0570	6.8	0.0103	0.0126	89.4	0.1400
Apr	568	0.00018	0.0309	0.0022	22.3	0.00123	0.0	0.0018	0.0077	0.0874	1.9	12.8	0.0458	4.4	0.0070	0.0100	54.5	0.1116
May	4308	0.00021	0.0356	0.0017	16.6	0.00032	0.0	0.0007	0.0077	0.0820	0.5	6.1	0.0137	1.5	0.0028	0.0067	11.1	0.0223
Jun	4395	0.00021	0.0353	0.0017	16.5	0.00031	0.0	0.0007	0.0077	0.0823	0.5	6.0	0.0149	1.4	0.0028	0.0066	10.8	0.0260
Jul	3097	0.00021	0.0358	0.0017	16.9	0.00045	0.0	0.0010	0.0082	0.0987	0.6	6.6	0.0398	1.6	0.0034	0.0069	14.4	0.0994
Aug	2205	0.00021	0.0375	0.0018	17.6	0.00073	0.0	0.0017	0.0097	0.1390	0.7	7.4	0.0985	1.9	0.0045	0.0073	19.8	0.2730
Sep	2946	0.00021	0.0384	0.0018	17.2	0.00068	0.0	0.0017	0.0099	0.1445	0.6	6.8	0.1034	1.6	0.0043	0.0070	16.3	0.2882
Oct	1563	0.00020	0.0336	0.0018	18.0	0.00055	0.0	0.0010	0.0075	0.0797	0.9	7.9	0.0186	2.3	0.0039	0.0076	23.0	0.0354
Nov	758	0.00019	0.0315	0.0020	20.5	0.00094	0.0	0.0014	0.0074	0.0798	1.5	10.7	0.0294	3.5	0.0057	0.0090	41.7	0.0649
Dec	595	0.00019	0.0308	0.0022	22.3	0.00118	0.0	0.0016	0.0075	0.0811	1.9	12.6	0.0360	4.4	0.0068	0.0099	53.6	0.0826

FSN05 - Vangorda- Grum Area - Supplemental Base Case - Sensitivity Run Collection Efficiency
Loadings: Future 2

Concentrations at V27

	Flow (x1000 m3)	Ag mg/L	Al mg/L	As mg/L	Ca mg/L	Cd mg/L	Cl mg/L	Co mg/L	Cu mg/L	Fe mg/L	K mg/L	Mg mg/L	Mn mg/L	Na mg/L	Ni mg/L	Pb mg/L	SO4 mg/L	Zn mg/L
Jan	141	0.00015	0.032	0.0047	57.2	0.00455	0.0	0.0053	0.0122	0.144	6.9	67.8	0.125	15.6	0.023	0.032	353.6	0.294
Feb	124	0.00014	0.030	0.0047	58.0	0.00468	0.0	0.0055	0.0121	0.142	7.1	69.7	0.128	16.0	0.024	0.031	366.0	0.301
Mar	134	0.00014	0.031	0.0048	58.3	0.00477	0.0	0.0056	0.0129	0.158	7.2	70.4	0.143	16.2	0.024	0.030	370.4	0.343
Apr	147	0.00017	0.040	0.0045	55.7	0.00442	0.0	0.0056	0.0153	0.201	6.5	63.8	0.166	14.5	0.023	0.034	328.4	0.405
May	424	0.00030	0.061	0.0034	42.8	0.00210	0.0	0.0033	0.0147	0.185	2.8	32.0	0.083	6.6	0.014	0.054	122.6	0.171
Jun	430	0.00030	0.064	0.0034	42.5	0.00210	0.0	0.0034	0.0157	0.203	2.8	31.2	0.098	6.4	0.014	0.054	117.9	0.210
Jul	344	0.00029	0.122	0.0038	45.0	0.00413	0.1	0.0088	0.0488	0.807	3.3	37.4	0.635	7.6	0.021	0.051	159.8	1.674
Aug	287	0.00029	0.242	0.0044	47.7	0.00774	0.1	0.0192	0.1140	1.995	3.9	44.1	1.681	8.7	0.033	0.047	207.4	4.525
Sep	344	0.00032	0.286	0.0044	46.0	0.00845	0.1	0.0221	0.1353	2.383	3.3	39.8	2.009	7.5	0.036	0.050	181.1	5.415
Oct	225	0.00023	0.047	0.0039	49.2	0.00316	0.0	0.0041	0.0132	0.160	4.6	47.7	0.096	10.5	0.018	0.044	224.2	0.209
Nov	162	0.00018	0.039	0.0044	53.8	0.00398	0.0	0.0049	0.0131	0.160	6.0	59.3	0.120	13.4	0.021	0.037	299.0	0.278
Dec	152	0.00017	0.036	0.0045	55.6	0.00429	0.0	0.0052	0.0129	0.157	6.5	63.6	0.127	14.5	0.022	0.034	326.9	0.299

Concentrations at V8

	Flow (x1000 m3)	Ag mg/L	Al mg/L	As mg/L	Ca mg/L	Cd mg/L	Cl mg/L	Co mg/L	Cu mg/L	Fe mg/L	K mg/L	Mg mg/L	Mn mg/L	Na mg/L	Ni mg/L	Pb mg/L	SO4 mg/L	Zn mg/L
Jan	433	0.00017	0.0361	0.0024	27.4	0.00168	0.0	0.0024	0.0111	0.1415	2.4	24.8	0.0869	5.6	0.0089	0.0113	117.9	0.2135
Feb	334	0.00017	0.0359	0.0026	29.5	0.00196	0.0	0.0027	0.0117	0.1511	2.8	28.4	0.1002	6.5	0.0101	0.0123	138.6	0.2482
Mar	345	0.00016	0.0375	0.0027	30.4	0.00211	0.0	0.0030	0.0128	0.1709	3.0	29.8	0.1194	6.8	0.0108	0.0127	147.2	0.2999
Apr	568	0.00018	0.0397	0.0022	24.3	0.00139	0.0	0.0022	0.0121	0.1603	1.9	19.7	0.0967	4.4	0.0075	0.0100	88.7	0.2421
May	4308	0.00021	0.0370	0.0017	16.9	0.00034	0.0	0.0008	0.0084	0.0934	0.5	7.1	0.0217	1.5	0.0029	0.0067	15.8	0.0427
Jun	4395	0.00021	0.0371	0.0017	16.7	0.00034	0.0	0.0008	0.0085	0.0967	0.5	6.9	0.0249	1.4	0.0029	0.0067	15.2	0.0517
Jul	3097	0.00021	0.0441	0.0017	17.3	0.00060	0.0	0.0015	0.0124	0.1672	0.6	8.0	0.0877	1.6	0.0038	0.0070	21.4	0.2222
Aug	2205	0.00021	0.0612	0.0018	18.2	0.00115	0.0	0.0030	0.0217	0.3359	0.8	9.4	0.2361	1.9	0.0058	0.0074	30.6	0.6259
Sep	2946	0.00021	0.0635	0.0018	17.7	0.00112	0.0	0.0031	0.0226	0.3531	0.6	8.5	0.2493	1.7	0.0056	0.0071	24.8	0.6620
Oct	1563	0.00020	0.0360	0.0018	18.8	0.00060	0.0	0.0011	0.0087	0.0994	0.9	10.5	0.0324	2.3	0.0040	0.0076	35.7	0.0707
Nov	758	0.00019	0.0363	0.0020	21.9	0.00102	0.0	0.0016	0.0098	0.1192	1.5	15.9	0.0569	3.5	0.0059	0.0090	67.1	0.1355
Dec	595	0.00019	0.0370	0.0022	24.3	0.00129	0.0	0.0020	0.0106	0.1321	1.9	19.4	0.0716	4.4	0.0071	0.0099	87.1	0.1738

FSN05 - Vangorda- Grum Area - Supplemental Base Case - Sensitivity Run Collection Efficiency

Loadings: Future 3

Concentrations at V27

	Flow (x1000 m3)	Ag mg/L	Al mg/L	As mg/L	Ca mg/L	Cd mg/L	Cl mg/L	Co mg/L	Cu mg/L	Fe mg/L	K mg/L	Mg mg/L	Mn mg/L	Na mg/L	Ni mg/L	Pb mg/L	SO4 mg/L	Zn mg/L
Jan	141	0.00015	0.055	0.0047	60.1	0.00515	0.0	0.0070	0.0248	0.360	6.9	106.8	0.311	15.6	0.025	0.032	617.6	0.794
Feb	124	0.00014	0.054	0.0047	61.0	0.00529	0.0	0.0071	0.0249	0.363	7.1	110.1	0.317	16.0	0.025	0.031	639.6	0.811
Mar	134	0.00014	0.059	0.0048	61.3	0.00548	0.0	0.0076	0.0279	0.415	7.2	111.3	0.363	16.2	0.026	0.031	647.3	0.937
Apr	147	0.00017	0.075	0.0045	58.3	0.00529	0.0	0.0079	0.0337	0.515	6.5	100.0	0.436	14.6	0.025	0.035	573.7	1.132
May	424	0.00030	0.075	0.0034	43.8	0.00247	0.0	0.0043	0.0223	0.315	2.8	45.0	0.195	6.6	0.015	0.054	210.7	0.471
Jun	430	0.00030	0.082	0.0034	43.5	0.00256	0.0	0.0046	0.0253	0.367	2.8	43.7	0.238	6.4	0.015	0.055	202.5	0.589
Jul	344	0.00029	0.231	0.0038	46.3	0.00688	0.1	0.0163	0.1065	1.795	3.3	54.3	1.483	7.6	0.027	0.052	277.5	3.958
Aug	287	0.00029	0.526	0.0044	49.3	0.01493	0.1	0.0386	0.2649	4.577	3.9	65.9	3.896	8.8	0.048	0.049	363.7	10.489
Sep	344	0.00032	0.624	0.0044	47.4	0.01702	0.1	0.0453	0.3152	5.460	3.3	58.5	4.648	7.5	0.054	0.052	318.0	12.523
Oct	225	0.00023	0.064	0.0039	51.0	0.00359	0.0	0.0053	0.0222	0.314	4.6	72.2	0.227	10.6	0.019	0.044	389.7	0.564
Nov	162	0.00018	0.062	0.0044	56.2	0.00456	0.0	0.0065	0.0251	0.366	6.0	92.2	0.298	13.4	0.022	0.037	521.6	0.757
Dec	152	0.00017	0.060	0.0045	58.2	0.00490	0.0	0.0069	0.0259	0.380	6.5	99.6	0.319	14.5	0.024	0.035	570.7	0.814

Concentrations at V8

	Flow (x1000 m3)	Ag mg/L	Al mg/L	As mg/L	Ca mg/L	Cd mg/L	Cl mg/L	Co mg/L	Cu mg/L	Fe mg/L	K mg/L	Mg mg/L	Mn mg/L	Na mg/L	Ni mg/L	Pb mg/L	SO4 mg/L	Zn mg/L
Jan	433	0.00017	0.0448	0.0024	28.3	0.00190	0.0	0.0030	0.0157	0.2201	2.4	37.4	0.1543	5.6	0.0094	0.0114	203.6	0.3949
Feb	334	0.00017	0.0461	0.0026	30.6	0.00221	0.0	0.0034	0.0171	0.2428	2.8	43.4	0.1787	6.5	0.0107	0.0124	240.1	0.4597
Mar	345	0.00016	0.0499	0.0027	31.5	0.00242	0.0	0.0038	0.0194	0.2831	3.0	45.8	0.2156	6.8	0.0114	0.0128	255.1	0.5587
Apr	568	0.00018	0.0498	0.0022	25.0	0.00164	0.0	0.0029	0.0175	0.2518	1.9	29.1	0.1752	4.4	0.0080	0.0101	152.4	0.4531
May	4308	0.00021	0.0385	0.0017	17.0	0.00038	0.0	0.0009	0.0092	0.1078	0.5	8.4	0.0339	1.5	0.0030	0.0067	24.5	0.0758
Jun	4395	0.00021	0.0391	0.0017	16.8	0.00039	0.0	0.0010	0.0096	0.1147	0.5	8.2	0.0403	1.4	0.0030	0.0067	23.5	0.0932
Jul	3097	0.00021	0.0564	0.0017	17.4	0.00091	0.0	0.0023	0.0190	0.2793	0.6	9.8	0.1838	1.6	0.0045	0.0070	34.5	0.4810
Aug	2205	0.00021	0.0985	0.0018	18.4	0.00209	0.0	0.0055	0.0415	0.6743	0.8	12.3	0.5264	1.9	0.0078	0.0077	50.9	1.4075
Sep	2946	0.00021	0.1033	0.0018	17.8	0.00213	0.0	0.0058	0.0437	0.7141	0.6	10.6	0.5590	1.7	0.0077	0.0074	40.8	1.4960
Oct	1563	0.00020	0.0388	0.0018	19.0	0.00067	0.0	0.0013	0.0101	0.1241	0.9	14.0	0.0536	2.3	0.0042	0.0076	59.5	0.1277
Nov	758	0.00019	0.0417	0.0020	22.5	0.00116	0.0	0.0020	0.0127	0.1687	1.5	22.9	0.0993	3.5	0.0062	0.0091	114.6	0.2496
Dec	595	0.00019	0.0440	0.0022	24.9	0.00147	0.0	0.0024	0.0143	0.1961	1.9	28.7	0.1265	4.4	0.0075	0.0100	149.6	0.3215

Attachment E

Construction Details and Cost Estimates

Attachment E

Summary

Table 1 Estimated Capital Costs

Primary Alternative	Direct Capital	Indirect Capital	Total Capital
Faro Mine Area			
Flow-through Faro Pit	$55,100,000	$25,800,000	$80,900,000
Ugrade Faro Ck Diversion	$53,900,000	$25,300,000	$79,300,000
Minimize Up-Front Construction	$23,700,000	$11,400,000	$35,000,000
Minimize Water Treatment	$146,600,000	$67,900,000	$214,500,000
Rose Creek Tailings			
Complete Relocation	$286,300,000	$132,200,000	$418,500,000
Stabilization in place	$89,300,000	$41,600,000	$130,900,000
Partial Relocation	$173,300,000	$80,200,000	$253,500,000
Minimize Up-Front Construction	$38,700,000	$18,300,000	$57,000,000
Vangorda/Grum			
Vangorda Pit Backfill	$57,800,000	$28,500,000	$86,400,000
Stabilize Current Situation	$22,800,000	$11,500,000	$34,300,000
Minimize Up-Front Construction	$8,400,000	$4,600,000	$12,900,000
Minimize Water Treatment	$69,500,000	$34,200,000	$103,700,000

Table 2 Estimated Water Treatment and Post-Closure Costs

Primary Alternative	Capital	Average Annual	NPV Total
Faro Mine Area			
Flow-through Faro Pit	$0	$1,150,000	$38,400,000
Ugrade Faro Ck Diversion	$3,500,000	$1,110,000	$36,800,000
Minimize Up-Front Construction	$3,400,000	$1,150,000	$38,400,000
Minimize Water Treatment	$2,800,000	$1,130,000	$36,900,000
Rose Creek Tailings			
Complete Relocation	$3,400,000	$640,000	$24,600,000
Stabilization in place	$5,200,000	$1,730,000	$52,800,000
Partial Relocation	$3,900,000	$1,440,000	$41,800,000
Minimize Up-Front Construction	$5,300,000	$1,910,000	$56,800,000
Vangorda/Grum			
Vangorda Pit Backfill	$0	$610,000	$17,200,000
Stabilize Current Situation	$2,700,000	$950,000	$30,700,000
Minimize Up-Front Construction	$3,900,000	$970,000	$32,200,000
Minimize Water Treatment	$6,400,000	$670,000	$18,600,000

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Summary

Table 3 Total Estimated Costs

Primary Alternative	Total Capital	Water Treatment + Post-Closure NPV	Total NPV
Faro Mine Area			
Flow-through Faro Pit	$80,900,000	$38,400,000	$119,300,000
Ugrade Faro Ck Diversion	$79,300,000	$36,800,000	$116,100,000
Minimize Up-Front Construction	$35,000,000	$38,400,000	$73,400,000
Minimize Water Treatment	$214,500,000	$36,900,000	$251,400,000
Rose Creek Tailings			
Complete Relocation	$418,500,000	$24,600,000	$443,100,000
Stabilization in place	$130,900,000	$52,800,000	$183,700,000
Partial Relocation	$253,500,000	$41,800,000	$295,400,000
Minimize Up-Front Construction	$57,000,000	$56,800,000	$113,800,000
Vangorda/Grum			
Vangorda Pit Backfill	$86,400,000	$17,200,000	$103,600,000
Stabilize Current Situation	$34,300,000	$30,700,000	$65,000,000
Minimize Up-Front Construction	$12,900,000	$32,200,000	$45,200,000
Minimize Water Treatment	$103,700,000	$18,600,000	$122,300,000

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Summary

Table A.1 Breakdown of Direct Costs by Category

Primary Alternative	Direct Capital	Labour Cost	Material Cost	Equipment Cost	Fuel Cost	Power Cost
Faro Mine Area						
Flow-through Faro Pit	$55,100,000	$10,800,000	$4,900,000	$24,300,000	$15,100,000	$0
Ugrade Faro Ck Diversion	$53,900,000	$10,300,000	$5,000,000	$23,800,000	$14,900,000	$0
Minimize Up-Front Construction	$23,700,000	$5,100,000	$1,100,000	$10,800,000	$6,700,000	$0
Minimize Water Treatment	$146,600,000	$22,000,000	$14,700,000	$67,000,000	$42,800,000	$0
Rose Creek Tailings						
Complete Relocation	$286,300,000	$40,900,000	$192,200,000	$19,900,000	$13,200,000	$20,000,000
Stabilization in place	$89,300,000	$14,400,000	$18,900,000	$34,900,000	$21,100,000	$0
Partial Relocation	$173,300,000	$28,700,000	$87,600,000	$30,200,000	$18,800,000	$8,000,000
Minimize Up-Front Construction	$38,700,000	$5,500,000	$19,300,000	$8,800,000	$5,100,000	$0
Vangorda/Grum						
Vangorda Pit Backfill	$57,800,000	$11,200,000	$8,200,000	$23,200,000	$15,100,000	$0
Stabilize Current Situation	$22,800,000	$3,900,000	$2,500,000	$10,100,000	$6,300,000	$0
Minimize Up-Front Construction	$8,400,000	$1,800,000	$1,900,000	$3,000,000	$1,700,000	$0
Minimize Water Treatment	$69,500,000	$12,800,000	$8,200,000	$29,100,000	$19,300,000	$0

Table A.2 Percentage of Direct Costs by Category

Primary Alternative	Direct Capital	Labour Cost	Material Cost	Equipment Cost	Fuel Cost	Power Cost
Faro Mine Area						
Flow-through Faro Pit	100%	20%	9%	44%	27%	0%
Ugrade Faro Ck Diversion	100%	19%	9%	44%	28%	0%
Minimize Up-Front Construction	100%	22%	5%	46%	28%	0%
Minimize Water Treatment	100%	15%	10%	46%	29%	0%
Rose Creek Tailings						
Complete Relocation	100%	14%	67%	7%	5%	7%
Stabilization in place	100%	16%	21%	39%	24%	0%
Partial Relocation	100%	17%	51%	17%	11%	5%
Minimize Up-Front Construction	100%	14%	50%	23%	13%	0%
Vangorda/Grum						
Vangorda Pit Backfill	100%	19%	14%	40%	26%	0%
Stabilize Current Situation	100%	17%	11%	44%	28%	0%
Minimize Up-Front Construction	100%	21%	23%	36%	20%	0%
Minimize Water Treatment	100%	18%	12%	42%	28%	0%

Attachment E

Summary

Table A.3 Estimated Local Expenditure

Assumptions

Local portion of labour cost	90%
Local portion of material cost	10%
Local portion of equipment cost	10%
Local portion of fuel cost	10%
Local portion of power cost	50%
Local portion of water treatment capital	20%
Local portion of operating	60%

Primary Alternative	Local Direct Capital	Local Labour	Local Material	Local Equipment	Local Fuel	Local Power	Local Treatment Capital	Local Operating NPV	Local Capital + NPV Operating	Percentage of Total Capital +
Faro Mine Area										
Flow-through Faro Pit	$14,100,000	$9,700,000	$500,000	$2,400,000	$1,500,000	$0	$0	$23,000,000	$37,100,000	31%
Ugrade Faro Ck Diversion	$13,700,000	$9,300,000	$500,000	$2,400,000	$1,500,000	$0	$700,000	$20,000,000	$34,400,000	30%
Minimize Up-Front Construction	$6,500,000	$4,600,000	$100,000	$1,100,000	$700,000	$0	$700,000	$21,000,000	$28,200,000	38%
Minimize Water Treatment	$32,300,000	$19,800,000	$1,500,000	$6,700,000	$4,300,000	$0	$600,000	$20,400,000	$53,300,000	21%
Rose Creek Tailings										
Complete Relocation	$69,300,000	$36,800,000	$19,200,000	$2,000,000	$1,300,000	$10,000,000	$700,000	$12,700,000	$82,700,000	19%
Stabilization in place	$20,500,000	$13,000,000	$1,900,000	$3,500,000	$2,100,000	$0	$1,000,000	$28,500,000	$50,000,000	27%
Partial Relocation	$43,500,000	$25,800,000	$8,800,000	$3,000,000	$1,900,000	$4,000,000	$800,000	$22,700,000	$67,000,000	23%
Minimize Up-Front Construction	$8,200,000	$4,900,000	$1,900,000	$900,000	$500,000	$0	$1,100,000	$30,900,000	$40,200,000	35%
Vangorda/Grum										
Vangorda Pit Backfill	$14,700,000	$10,100,000	$800,000	$2,300,000	$1,500,000	$0	$0	$10,300,000	$25,000,000	24%
Stabilize Current Situation	$5,300,000	$3,500,000	$200,000	$1,000,000	$600,000	$0	$500,000	$16,800,000	$22,600,000	35%
Minimize Up-Front Construction	$2,300,000	$1,600,000	$200,000	$300,000	$200,000	$0	$800,000	$17,000,000	$20,100,000	45%
Minimize Water Treatment	$17,100,000	$11,500,000	$800,000	$2,900,000	$1,900,000	$0	$1,300,000	$7,400,000	$25,800,000	21%

Table A.4 Local Expenditures for Combined Alternatives

Combination	Faro	Tailings	Vangorda/Grum	No Contingency	With 20% Contingency
Minimize Up-Front Construction	Minimize Up-Front Construction	Minimize Up-Front Construction	Minimize Up-Front Construction	$73,800,000	$88,500,000
Physical Stabilization 1	Upgrade Faro Creek Diversion	Stabilize in Place	Stabilize Current Situation	$89,200,000	$107,000,000
Physical Stabilization 2	Upgrade Faro Creek Diversion	Stabilize in Place	Vangorda Pit Backfill	$91,200,000	$109,400,000
Physical Stabilization 3	Upgrade Faro Creek Diversion	Partial Relocation	Stabilize Current Situation	$103,300,000	$124,000,000
Physical Stabilization 4	Upgrade Faro Creek Diversion	Partial Relocation	Vangorda Pit Backfill	$105,300,000	$126,400,000
Relocate Tailings & Minimize Water Tmt	Minimize Water Treatment	Complete Relocation	Minimize Water Treatment	$134,800,000	$161,800,000

Attachment E

Summary NPV Calculations for Faro Mine Area Alternatives

NPV: Faro Mine Area Alternative 1 - Flow-Through Pit

Closure Costs	Direct Cost	Indirect Cost	Contingency	Total	% of Total	NPV- 2010	Year 1 2011	Year 2 2012	Year 3 2013	Year 4 2014	Year 5 2015	Year 6 2016	Year 7 2017	2018	2019	2020	2021	2022	2023	2024	2025
Faro Pit	$2,111,785	$568,226	$422,357	$3,102,368	4%	$2,978,420	$2,792,131	$0	$0	$0	$310,237	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0
Faro Creek	$3,842,842	$1,034,009	$768,568	$5,645,420	7%	$5,040,479	$564,542	$0	$0	$4,234,065	$846,813	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0
Zone II Pit	$558,859	$150,374	$111,772	$821,006	1%	$687,579	$0	$0	$0	$0	$0	$821,006	$0	$0	$0	$0	$0	$0	$0	$0	$0
Oxide Fines/LGSP	$7,666,340	$2,062,813	$1,533,268	$11,262,421	14%	$10,647,760	$1,126,242	$10,136,179	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0
ETA Tailings	$1,381,107	$371,620	$276,221	$2,028,948	3%	$1,814,376	$0	$1,095,632	$0	$0	$0	$933,316	$0	$0	$0	$0	$0	$0	$0	$0	$0
Waste Rock	$31,825,962	$8,563,538	$6,365,192	$46,754,692	58%	$41,811,588	$0	$0	$19,987,631	$17,533,010	$8,766,505	$0	$467,547	$0	$0	$0	$0	$0	$0	$0	$0
Groundwater	$2,450,082	$659,253	$490,016	$3,599,352	4%	$3,059,801	$0	$431,922	$0	$0	$0	$3,167,430	$0	$0	$0	$0	$0	$0	$0	$0	$0
Miscellaneous (Demolition, contaminated soils, etc.)	$5,265,648	$1,416,849	$1,053,130	$7,735,627	10%	$7,251,498	$0	$7,426,202	$0	$0	$0	$0	$309,425	$0	$0	$0	$0	$0	$0	$0	$0
Closure Costs Subtotal	**$55,102,626**	**$14,826,683**	**$11,020,525**	**$80,949,834**		**$73,291,501**	**$4,482,915**	**$19,089,935**	**$19,987,631**	**$21,767,074**	**$9,923,555**	**$4,921,752**	**$776,972**	**$0**	**$0**	**$0**	**$0**	**$0**	**$0**	**$0**	**$0**
Post Closure Costs																					
Earthworks Inspection and Maintenance						$2,976,078	$0	$0	$0	$0	$0	$0	$0	$227,235	$227,235	$227,235	$227,235	$227,235	$227,235	$227,235	$227,235
Water Management Pumping Costs						$3,072,526	$0	$0	$0	$0	$0	$0	$0	$120,875	$120,875	$120,875	$120,875	$120,875	$120,875	$120,875	$120,875
Water Treatment System Operation						$6,135,710	$0	$200,000	$200,000	$200,000	$200,000	$200,000	$200,000	$200,000	$200,000	$200,000	$200,000	$200,000	$200,000	$200,000	$200,000
Environmental Management						$7,346,131	$0	$0	$0	$0	$0	$0	$0	$289,000	$289,000	$289,000	$289,000	$289,000	$289,000	$289,000	$289,000
Post Closure Costs Subtotal						$19,530,445	**$0**	**$200,000**	**$200,000**	**$200,000**	**$200,000**	**$200,000**	**$200,000**	**$837,109**	**$837,109**	**$837,109**	**$837,109**	**$837,109**	**$837,109**	**$837,109**	**$837,109**
TOTAL						$92,821,946	$4,482,915	$19,289,935	$20,187,631	$21,967,074	$10,123,555	$5,121,752	$976,972	$837,109	$837,109	$837,109	$837,109	$837,109	$837,109	$837,109	$837,109

NPV: Faro Mine Area Alternative 2 - Upgrade Faro Creek Diversion

Closure Costs	Direct Cost	Indirect Cost	Contingency	Total	% of Total	NPV- 2010	Year 1 2011	Year 2 2012	Year 3 2013	Year 4 2014	Year 5 2015	Year 6 2016	Year 7 2017	2018	2019	2020	2021	2022	2023	2024	2025
Faro Pit	$743,609	$200,230	$148,722	$1,092,561	1%	$694,303	$0	$0	$0	$0	$120,182	$0	$972,379	$0	$0	$0	$0	$0	$0	$0	$0
Faro Creek	$4,801,483	$1,292,888	$960,297	$7,054,668	9%	$6,240,597	$0	$0	$0	$5,996,468	$1,058,200	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0
Zone II Pit	$343,698	$92,547	$68,740	$504,984	1%	$422,916	$0	$0	$0	$0	$0	$504,984	$0	$0	$0	$0	$0	$0	$0	$0	$0
Oxide Fines/LGSP	$7,666,340	$2,064,304	$1,533,268	$11,263,912	14%	$10,649,169	$1,126,391	$10,137,521	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0
ETA Tailings	$1,452,818	$391,198	$290,564	$2,134,580	3%	$1,920,055	$0	$1,259,402	$0	$0	$0	$875,178	$0	$0	$0	$0	$0	$0	$0	$0	$0
Waste Rock	$31,656,430	$8,524,078	$6,331,286	$46,511,794	59%	$41,594,370	$0	$0	$19,883,792	$17,441,923	$8,720,961	$0	$465,118	$0	$0	$0	$0	$0	$0	$0	$0
Groundwater	$2,016,390	$542,950	$403,278	$2,962,618	4%	$2,801,243	$2,399,720	$0	$0	$0	$0	$562,897	$0	$0	$0	$0	$0	$0	$0	$0	$0
Miscellaneous (Demolition, contaminated soils, etc.)	$5,265,648	$1,417,873	$1,053,130	$7,736,651	10%	$7,455,938	$7,349,819	$0	$0	$0	$0	$232,100	$154,733	$0	$0	$0	$0	$0	$0	$0	$0
Closure Costs Subtotal	**$53,946,416**	**$14,526,068**	**$10,789,283**	**$79,261,768**		**$71,978,592**	**$10,875,930**	**$11,396,923**	**$19,883,792**	**$23,438,391**	**$9,899,343**	**$2,175,159**	**$1,592,230**	**$0**	**$0**	**$0**	**$0**	**$0**	**$0**	**$0**	**$0**
Post Closure Costs																					
Earthworks Inspection and Maintenance						$2,889,463	$0	$0	$0	$0	$0	$0	$0	$220,621	$220,621	$220,621	$220,621	$220,621	$220,621	$220,621	$220,621
Water Management Pumping Costs						$1,801,431	$0	$0	$0	$0	$0	$0	$0	$70,869	$70,869	$70,869	$70,869	$70,869	$70,869	$70,869	$70,869
Water Treatment System Construction						$3,485,437	$3,590,000	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0
Water Treatment System Operation						$21,116,523	$0	$688,316	$688,316	$688,316	$688,316	$688,316	$688,316	$688,316	$688,316	$688,316	$688,316	$688,316	$688,316	$688,316	$688,316
Environmental Management						$7,346,131	$0	$0	$0	$0	$0	$0	$0	$289,000	$289,000	$289,000	$289,000	$289,000	$289,000	$289,000	$289,000
Post Closure Costs Subtotal						$36,638,985	$3,590,000	$688,316	$688,316	$688,316	$688,316	$688,316	$688,316	$1,268,806	$1,268,806	$1,268,806	$1,268,806	$1,268,806	$1,268,806	$1,268,806	$1,268,806
TOTAL						$108,617,577	$14,465,930	$12,085,238	$20,572,107	$24,126,706	$10,587,659	$2,863,474	$2,280,546	$1,268,806	$1,268,806	$1,268,806	$1,268,806	$1,268,806	$1,268,806	$1,268,806	$1,268,806

NPV: Faro Mine Area Alternative 3 - Minimize Up-Front Construction

Closure Costs	Direct Cost	Indirect Cost	Contingency	Total	% of Total	NPV- 2010	Year 1 2011	Year 2 2012	Year 3 2013	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025
Faro Pit	$743,609	$209,050	$148,722	$1,101,381	1%	$1,007,920	$0	$0	$1,101,381	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0
Faro Creek	$64,437	$18,115	$12,887	$95,440	0%	$92,660	$95,440	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0
Zone II Pit	$343,698	$96,624	$68,740	$509,061	1%	$465,863	$0	$0	$509,061	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0
Waste Rock	$16,823,112	$4,729,475	$3,364,622	$24,917,209	31%	$23,571,617	$3,239,237	$21,428,800	$249,172	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0
Groundwater	$422,982	$118,913	$84,596	$626,491	1%	$573,328	$0	$0	$626,491	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0
Miscellaneous (Demolition, contaminated soils, etc.)	$5,265,648	$1,480,330	$1,053,130	$7,799,108	10%	$7,550,216	$7,409,152	$0	$389,955	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0
Closure Costs Subtotal	**$23,663,486**	**$6,652,506**	**$4,732,697**	**$35,048,690**		**$33,261,604**	**$10,743,830**	**$21,428,800**	**$2,876,061**	**$0**	**$0**	**$0**	**$0**	**$0**	**$0**	**$0**	**$0**	**$0**	**$0**	**$0**	**$0**
Post Closure Costs																					
Earthworks Inspection and Maintenance						$1,305,690	$0	$0	$0	$88,156	$88,156	$88,156	$88,156	$88,156	$88,156	$88,156	$88,156	$88,156	$88,156	$29,385	$29,385
Water Management Pumping Costs						$1,231,662	$0	$0	$0	$42,735	$42,735	$42,735	$42,735	$42,735	$42,735	$42,735	$42,735	$42,735	$42,735	$42,735	$42,735
Water Treatment System Construction						$3,357,282	$3,458,000	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0
Water Treatment System Operation						$24,153,700	$0	$787,316	$787,316	$787,316	$787,316	$787,316	$787,316	$787,316	$787,316	$787,316	$787,316	$787,316	$787,316	$787,316	$787,316
Environmental Management						$8,329,214	$0	$0	$0	$289,000	$289,000	$289,000	$289,000	$289,000	$289,000	$289,000	$289,000	$289,000	$289,000	$289,000	$289,000
Post Closure Costs Subtotal						$38,377,548	**$3,458,000**	**$787,316**	**$787,316**	**$1,207,207**	**$1,207,207**	**$1,207,207**	**$1,207,207**	**$1,207,207**	**$1,207,207**	**$1,207,207**	**$1,207,207**	**$1,207,207**	**$1,207,207**	**$1,148,436**	**$1,148,436**
TOTAL						$71,639,152	$14,201,830	$22,216,115	$3,663,376	$1,207,207	$1,207,207	$1,207,207	$1,207,207	$1,207,207	$1,207,207	$1,207,207	$1,207,207	$1,207,207	$1,207,207	$1,148,436	$1,148,436

NPV: Faro Mine Area Alternative 4 - Minimize Water Treatment

Closure Costs	Direct Cost	Indirect Cost	Contingency	Total	% of Total	NPV- 2010	Year 1 2011	Year 2 2012	Year 3 2013	Year 4 2014	Year 5 2015	Year 6 2016	Year 7 2017	Year 8 2018	2019	2020	2021	2022	2023	2024	2025
Faro Pit	$2,687,811	$708,000	$537,562	$3,933,373	2%	$3,617,843	$2,635,360	$0	$0	$0	$0	$157,335	$1,140,678	$0	$0	$0	$0	$0	$0	$0	$0
Faro Creek	$3,836,958	$1,010,699	$767,392	$5,615,048	3%	$5,081,076	$56,150	$505,354	$4,323,587	$0	$0	$0	$729,956	$0	$0	$0	$0	$0	$0	$0	$0
Zone II Pit	$343,698	$90,534	$68,740	$502,971	0%	$408,962	$0	$0	$0	$0	$0	$0	$502,971	$0	$0	$0	$0	$0	$0	$0	$0
Oxide Fines/LGSP	$18,118,849	$4,772,712	$3,623,770	$26,515,331	12%	$24,993,243	$0	$26,515,331	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0
ETA Tailings	$1,381,107	$363,799	$276,221	$2,021,128	1%	$1,815,567	$1,091,409	$0	$0	$0	$0	$0	$929,719	$0	$0	$0	$0	$0	$0	$0	$0
Waste Rock	$112,481,105	$29,628,811	$22,496,221	$164,606,137	77%	$145,355,226	$0	$6,584,245	$54,320,025	$34,018,602	$34,018,602	$35,664,663	$0	$0	$0	$0	$0	$0	$0	$0	$0
Groundwater	$2,450,082	$645,380	$490,016	$3,585,479	2%	$3,211,410	$537,822	$0	$35,855	$2,366,416	$0	$0	$681,241	$0	$0	$0	$0	$0	$0	$0	$0
Miscellaneous (Demolition, contaminated soils, etc.)	$5,265,648	$1,387,032	$1,053,130	$7,705,810	4%	$7,411,453	$7,320,520	$0	$0	$0	$0	$0	$0	$385,291	$0	$0	$0	$0	$0	$0	$0
Closure Costs Subtotal	**$146,565,258**	**$38,606,967**	**$29,313,052**	**$214,485,277**		**$191,894,779**	**$11,641,261**	**$33,604,931**	**$58,679,467**	**$36,385,018**	**$34,018,602**	**$35,821,998**	**$3,984,565**	**$385,291**	**$0**	**$0**	**$0**	**$0**	**$0**	**$0**	**$0**
Post Closure Costs																					
Earthworks Inspection and Maintenance						$7,556,352	$0	$0	$0	$0	$0	$0	$0	$0	$595,029	$595,029	$595,029	$595,029	$595,029	$595,029	$595,029
Water Management Pumping Costs						$1,745,486	$0	$0	$0	$0	$0	$0	$0	$0	$70,869	$70,869	$70,869	$70,869	$70,869	$70,869	$70,869
Water Treatment System Construction						$2,801,942	$2,886,000	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0
Water Treatment System Operation						$17,435,098	$0	$568,316	$568,316	$568,316	$568,316	$568,316	$568,316	$568,316	$568,316	$568,316	$568,316	$568,316	$568,316	$568,316	$568,316
Environmental Management						$7,117,992	$0	$0	$0	$0	$0	$0	$0	$0	$289,000	$289,000	$289,000	$289,000	$289,000	$289,000	$289,000
Post Closure Costs Subtotal						$36,656,869	$2,886,000	$568,316	$568,316	$568,316	$568,316	$568,316	$568,316	$568,316	$1,523,214	$1,523,214	$1,523,214	$1,523,214	$1,523,214	$1,523,214	$1,523,214
TOTAL						$228,551,649	$14,527,261	$34,173,247	$59,247,783	$36,953,333	$34,586,917	$36,390,314	$4,552,881	$953,606	$1,523,214	$1,523,214	$1,523,214	$1,523,214	$1,523,214	$1,523,214	$1,523,214

Attachment E

Summary NPV Calculations for Faro Mine Area Alternatives

NPV: Faro Mine Area Alternative 1 - Flow-Through Pit

Closure Costs	Direct Cost	Indirect Cost	Contingency	Total	% of Total	NPV- 2010	Year 1 2011	Year 2 2012	Year 3 2013	Year 4 2014	Year 5 2015	Year 6 2016	Year 7 2017	2018	2019	2020	2021	2022	2023	2024	2025
Faro Pit	$2,111,785	$568,226	$422,357	$3,102,368	4%	$2,978,420	$2,792,131	$0	$0	$0	$310,237	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0
Faro Creek	$3,842,842	$1,034,009	$768,568	$5,645,420	7%	$5,040,479	$564,542	$0	$0	$4,234,065	$846,813	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0
Zone II Pit	$558,859	$150,374	$111,772	$821,006	1%	$687,579	$0	$0	$0	$0	$0	$821,006	$0	$0	$0	$0	$0	$0	$0	$0	$0
Oxide Fines/LGSP	$7,666,340	$2,062,813	$1,533,268	$11,262,421	14%	$10,647,760	$1,126,242	$10,136,179	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0
ETA Tailings	$1,381,107	$371,620	$276,221	$2,028,948	3%	$1,814,376	$0	$1,095,632	$0	$0	$0	$933,316	$0	$0	$0	$0	$0	$0	$0	$0	$0
Waste Rock	$31,825,962	$8,563,538	$6,365,192	$46,754,692	58%	$41,811,588	$0	$0	$19,987,631	$17,533,010	$8,766,505	$0	$467,547	$0	$0	$0	$0	$0	$0	$0	$0
Groundwater	$2,450,082	$659,253	$490,016	$3,599,352	4%	$3,059,801	$0	$431,922	$0	$0	$0	$3,167,430	$0	$0	$0	$0	$0	$0	$0	$0	$0
Miscellaneous (Demolition, contaminated soils, etc.)	$5,265,648	$1,416,849	$1,053,130	$7,735,627	10%	$7,251,498	$0	$7,426,202	$0	$0	$0	$0	$309,425	$0	$0	$0	$0	$0	$0	$0	$0
Closure Costs Subtotal	**$55,102,626**	**$14,826,683**	**$11,020,525**	**$80,949,834**		**$73,291,501**	**$4,482,915**	**$19,089,935**	**$19,987,631**	**$21,767,074**	**$9,923,555**	**$4,921,752**	**$776,972**	**$0**	**$0**	**$0**	**$0**	**$0**	**$0**	**$0**	**$0**
Post Closure Costs																					
Earthworks Inspection and Maintenance						$2,976,078	$0	$0	$0	$0	$0	$0	$0	$227,235	$227,235	$227,235	$227,235	$227,235	$227,235	$227,235	$227,235
Water Management Pumping Costs						$3,072,526	$0	$0	$0	$0	$0	$0	$0	$120,875	$120,875	$120,875	$120,875	$120,875	$120,875	$120,875	$120,875
Water Treatment System Operation						$6,135,710	$0	$200,000	$200,000	$200,000	$200,000	$200,000	$200,000	$200,000	$200,000	$200,000	$200,000	$200,000	$200,000	$200,000	$200,000
Environmental Management						$7,346,131	$0	$0	$0	$0	$0	$0	$0	$289,000	$289,000	$289,000	$289,000	$289,000	$289,000	$289,000	$289,000
Post Closure Costs Subtotal						$19,530,445	**$0**	**$200,000**	**$200,000**	**$200,000**	**$200,000**	**$200,000**	**$200,000**	**$837,109**	**$837,109**	**$837,109**	**$837,109**	**$837,109**	**$837,109**	**$837,109**	**$837,109**
TOTAL						$92,821,946	$4,482,915	$19,289,935	$20,187,631	$21,967,074	$10,123,555	$5,121,752	$976,972	$837,109	$837,109	$837,109	$837,109	$837,109	$837,109	$837,109	$837,109

NPV: Faro Mine Area Alternative 2 - Upgrade Faro Creek Diversion

Closure Costs	Direct Cost	Indirect Cost	Contingency	Total	% of Total	NPV- 2010	Year 1 2011	Year 2 2012	Year 3 2013	Year 4 2014	Year 5 2015	Year 6 2016	Year 7 2017	2018	2019	2020	2021	2022	2023	2024	2025
Faro Pit	$743,609	$200,230	$148,722	$1,092,561	1%	$894,303	$0	$0	$0	$0	$120,182	$0	$972,379	$0	$0	$0	$0	$0	$0	$0	$0
Faro Creek	$4,801,483	$1,292,888	$960,297	$7,054,668	9%	$6,240,597	$0	$0	$0	$5,996,466	$1,058,200	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0
Zone II Pit	$343,698	$92,547	$68,740	$504,984	1%	$422,916	$0	$0	$0	$0	$0	$504,984	$0	$0	$0	$0	$0	$0	$0	$0	$0
Oxide Fines/LGSP	$7,666,340	$2,064,304	$1,533,268	$11,263,912	14%	$10,649,169	$1,126,391	$10,137,521	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0
ETA Tailings	$1,452,818	$391,198	$290,564	$2,134,580	3%	$1,920,055	$0	$1,259,402	$0	$0	$0	$875,178	$0	$0	$0	$0	$0	$0	$0	$0	$0
Waste Rock	$31,656,430	$8,524,078	$6,331,286	$46,511,794	59%	$41,594,370	$0	$0	$19,883,792	$17,441,923	$8,720,961	$0	$465,118	$0	$0	$0	$0	$0	$0	$0	$0
Groundwater	$2,016,390	$542,950	$403,278	$2,962,618	4%	$2,801,243	$2,399,720	$0	$0	$0	$0	$562,897	$0	$0	$0	$0	$0	$0	$0	$0	$0
Miscellaneous (Demolition, contaminated soils, etc.)	$5,265,648	$1,417,873	$1,053,130	$7,736,651	10%	$7,455,938	$7,349,819	$0	$0	$0	$0	$232,100	$154,733	$0	$0	$0	$0	$0	$0	$0	$0
Closure Costs Subtotal	**$53,946,416**	**$14,526,068**	**$10,789,283**	**$79,261,768**		**$71,978,592**	**$10,875,930**	**$11,396,923**	**$19,883,792**	**$23,438,391**	**$9,899,343**	**$2,175,159**	**$1,592,230**	**$0**	**$0**	**$0**	**$0**	**$0**	**$0**	**$0**	**$0**
Post Closure Costs																					
Earthworks Inspection and Maintenance						$2,889,463	$0	$0	$0	$0	$0	$0	$0	$220,621	$220,621	$220,621	$220,621	$220,621	$220,621	$220,621	$220,621
Water Management Pumping Costs						$1,801,431	$0	$0	$0	$0	$0	$0	$0	$70,869	$70,869	$70,869	$70,869	$70,869	$70,869	$70,869	$70,869
Water Treatment System Construction						$3,485,437	$3,590,000	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0
Water Treatment System Operation						$21,116,523	$0	$688,316	$688,316	$688,316	$688,316	$688,316	$688,316	$688,316	$688,316	$688,316	$688,316	$688,316	$688,316	$688,316	$688,316
Environmental Management						$7,346,131	$0	$0	$0	$0	$0	$0	$0	$289,000	$289,000	$289,000	$289,000	$289,000	$289,000	$289,000	$289,000
Post Closure Costs Subtotal						$36,638,985	$3,590,000	$688,316	$688,316	$688,316	$688,316	$688,316	$688,316	$1,268,806	$1,268,806	$1,268,806	$1,268,806	$1,268,806	$1,268,806	$1,268,806	$1,268,806
TOTAL						$108,617,577	$14,465,930	$12,085,238	$20,572,107	$24,126,706	$10,587,659	$2,863,474	$2,280,546	$1,268,806	$1,268,806	$1,268,806	$1,268,806	$1,268,806	$1,268,806	$1,268,806	$1,268,806

NPV: Faro Mine Area Alternative 3 - Minimize Up-Front Construction

Closure Costs	Direct Cost	Indirect Cost	Contingency	Total	% of Total	NPV- 2010	Year 1 2011	Year 2 2012	Year 3 2013	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025
Faro Pit	$743,609	$209,050	$148,722	$1,101,381	1%	$1,007,920	$0	$0	$1,101,381	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0
Faro Creek	$64,437	$18,115	$12,887	$95,440	0%	$92,660	$95,440	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0
Zone II Pit	$343,698	$96,624	$68,740	$509,061	1%	$465,863	$0	$0	$509,061	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0
Waste Rock	$16,823,112	$4,729,475	$3,364,622	$24,917,209	31%	$23,571,617	$3,239,237	$21,428,800	$249,172	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0
Groundwater	$422,982	$118,913	$84,596	$626,491	1%	$573,328	$0	$0	$626,491	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0
Miscellaneous (Demolition, contaminated soils, etc.)	$5,265,648	$1,480,330	$1,053,130	$7,799,108	10%	$7,550,216	$7,409,152	$0	$389,955	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0
Closure Costs Subtotal	**$23,663,486**	**$6,652,506**	**$4,732,697**	**$35,048,690**		**$33,261,604**	**$10,743,830**	**$21,428,800**	**$2,876,061**	**$0**	**$0**	**$0**	**$0**	**$0**	**$0**	**$0**	**$0**	**$0**	**$0**	**$0**	**$0**
Post Closure Costs																					
Earthworks Inspection and Maintenance						$1,305,690	$0	$0	$0	$88,156	$88,156	$88,156	$88,156	$88,156	$88,156	$88,156	$88,156	$88,156	$88,156	$29,385	$29,385
Water Management Pumping Costs						$1,231,662	$0	$0	$0	$42,735	$42,735	$42,735	$42,735	$42,735	$42,735	$42,735	$42,735	$42,735	$42,735	$42,735	$42,735
Water Treatment System Construction						$3,357,282	$3,458,000	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0
Water Treatment System Operation						$24,153,700	$0	$787,316	$787,316	$787,316	$787,316	$787,316	$787,316	$787,316	$787,316	$787,316	$787,316	$787,316	$787,316	$787,316	$787,316
Environmental Management						$8,329,214	$0	$0	$0	$289,000	$289,000	$289,000	$289,000	$289,000	$289,000	$289,000	$289,000	$289,000	$289,000	$289,000	$289,000
Post Closure Costs Subtotal						$38,377,548	**$3,458,000**	**$787,316**	**$787,316**	**$1,207,207**	**$1,207,207**	**$1,207,207**	**$1,207,207**	**$1,207,207**	**$1,207,207**	**$1,207,207**	**$1,207,207**	**$1,207,207**	**$1,207,207**	**$1,148,436**	**$1,148,436**
TOTAL						$71,639,152	$14,201,830	$22,216,115	$3,663,376	$1,207,207	$1,207,207	$1,207,207	$1,207,207	$1,207,207	$1,207,207	$1,207,207	$1,207,207	$1,207,207	$1,207,207	$1,148,436	$1,148,436

NPV: Faro Mine Area Alternative 4 - Minimize Water Treatment

Closure Costs	Direct Cost	Indirect Cost	Contingency	Total	% of Total	NPV- 2010	Year 1 2011	Year 2 2012	Year 3 2013	Year 4 2014	Year 5 2015	Year 6 2016	Year 7 2017	Year 8 2018	2019	2020	2021	2022	2023	2024	2025
Faro Pit	$2,687,811	$708,000	$537,562	$3,933,373	2%	$3,617,843	$2,635,360	$0	$0	$0	$0	$157,335	$1,140,678	$0	$0	$0	$0	$0	$0	$0	$0
Faro Creek	$3,836,958	$1,010,699	$767,392	$5,615,048	3%	$5,081,076	$56,150	$505,354	$4,323,587	$0	$0	$0	$729,956	$0	$0	$0	$0	$0	$0	$0	$0
Zone II Pit	$343,698	$90,534	$68,740	$502,971	0%	$408,962	$0	$0	$0	$0	$0	$0	$502,971	$0	$0	$0	$0	$0	$0	$0	$0
Oxide Fines/LGSP	$18,118,849	$4,772,712	$3,623,770	$26,515,331	12%	$24,993,243	$0	$26,515,331	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0
ETA Tailings	$1,381,107	$363,799	$276,221	$2,021,128	1%	$1,815,567	$1,091,409	$0	$0	$0	$0	$0	$929,719	$0	$0	$0	$0	$0	$0	$0	$0
Waste Rock	$112,481,105	$29,628,811	$22,496,221	$164,606,137	77%	$145,355,226	$0	$6,584,245	$54,320,025	$34,018,602	$34,018,602	$35,664,663	$0	$0	$0	$0	$0	$0	$0	$0	$0
Groundwater	$2,450,082	$645,380	$490,016	$3,585,479	2%	$3,211,410	$537,822	$0	$35,855	$2,366,416	$0	$0	$681,241	$0	$0	$0	$0	$0	$0	$0	$0
Miscellaneous (Demolition, contaminated soils, etc.)	$5,265,648	$1,387,032	$1,053,130	$7,705,810	4%	$7,411,453	$7,320,520	$0	$0	$0	$0	$0	$0	$385,291	$0	$0	$0	$0	$0	$0	$0
Closure Costs Subtotal	**$146,565,258**	**$38,606,967**	**$29,313,052**	**$214,485,277**		**$191,894,779**	**$11,641,261**	**$33,604,931**	**$58,679,467**	**$36,385,018**	**$34,018,602**	**$35,821,998**	**$3,984,565**	**$385,291**	**$0**	**$0**	**$0**	**$0**	**$0**	**$0**	**$0**
Post Closure Costs																					
Earthworks Inspection and Maintenance						$7,556,352	$0	$0	$0	$0	$0	$0	$0	$0	$595,029	$595,029	$595,029	$595,029	$595,029	$595,029	$595,029
Water Management Pumping Costs						$1,745,486	$0	$0	$0	$0	$0	$0	$0	$0	$70,869	$70,869	$70,869	$70,869	$70,869	$70,869	$70,869
Water Treatment System Construction						$2,801,942	$2,886,000	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0
Water Treatment System Operation						$17,435,098	$0	$568,316	$568,316	$568,316	$568,316	$568,316	$568,316	$568,316	$568,316	$568,316	$568,316	$568,316	$568,316	$568,316	$568,316
Environmental Management						$7,117,992	$0	$0	$0	$0	$0	$0	$0	$0	$289,000	$289,000	$289,000	$289,000	$289,000	$289,000	$289,000
Post Closure Costs Subtotal						$36,656,869	$2,886,000	$568,316	$568,316	$568,316	$568,316	$568,316	$568,316	$568,316	$1,523,214	$1,523,214	$1,523,214	$1,523,214	$1,523,214	$1,523,214	$1,523,214
TOTAL						$228,551,649	$14,527,261	$34,173,247	$59,247,783	$36,953,333	$34,586,917	$36,390,314	$4,552,881	$953,606	$1,523,214	$1,523,214	$1,523,214	$1,523,214	$1,523,214	$1,523,214	$1,523,214

Faro Mine Area Alternative 1 - Flow-Through Pit

Activity	Task	Quantity	Unit	Cost Code	Unit Mhrs	Total Mhrs	Labour Rate	Labour Cost	Unit Matl	Material Cost	Unit Equip.	Equipment Cost	Unit Fuel	Fuel Consumed (L)	Fuel Cost	Power Rate ($/Unit)	Power Cost	Total Unit Cost	Activity Total	Subtotals	Source / Comments
CLOSURE COSTS - DIRECT CAPITAL																					
Faro Pit																					1CD003.046
Water Treatment																				$0	
Interim chemical treatment	Water treatment costed separately	1	ls	-	0.000	0.0	$ -	$ -	$ -	$ -	$ -	$ -	$ -	0	$ -	$ -	$ -	$ -	$ -		
Construct Plug Dam																				$1,981,626	
Foundation preparation	Bulk stripping: Excavate, load, haul, dump overburden	3700	Bm3	R.040	0.030	110.1	$ 1.09	$ 4,030	$ -	$ -	$ 3.04	$ 11,257	$ 1.54	4,380	$ 5,694	$ -	$ -	$ 5.67	$ 20,982		1CD003.052 (BGC) (SRK Library - BKG-254)
	Rock excavation: Core trench rock	4500	Bm3	C.2.15	0.173	780.0	$ 6.34	$ 28,548	$ -	$ -	$ 9.13	$ 41,074	$ 3.69	12,770	$ 16,601	$ -	$ -	$ 19.16	$ 86,223		
	Foundation preparation	1600	m2	C.2.17	0.318	509.1	$ 13.47	$ 21,556	$ -	$ -	$ 17.95	$ 28,715	$ 8.86	10,910	$ 14,183	$ -	$ -	$ 40.28	$ 64,455		
	Relocate Zone II Pit pump well discharge pipe	50	m	C.3.09	3.000	150.0	$ 150.00	$ 7,500	$ -	$ -	$ 26.07	$ 1,304	$ 18.59	715	$ 930	$ -	$ -	$ 194.66	$ 9,733		
	Foundation/Abutment grouting: Drilling of grout holes	4664	m	C.2.09	2.000	9328.0	$ 102.13	$ 476,350	$ -	$ -	$ 100.85	$ 470,376	$ 22.08	79,216	$ 102,981	$ -	$ -	$ 225.07	$ 1,049,707		
	Foundation/Abutment grouting: Water pressure testing	350	hrs	C.3.16	3.500	1225.0	$ 170.70	$ 59,745	$ -	$ -	$ 92.28	$ 32,298	$ 36.34	9,784	$ 12,719	$ -	$ -	$ 299.32	$ 104,762		
	Foundation/Abutment grouting: Setting packers	1400	ea.	C.2.19	0.214	300.0	$ 10.94	$ 15,320	$ -	$ -	$ 6.59	$ 9,228	$ 2.60	2,705	$ 3,634	$ -	$ -	$ 20.13	$ 28,182		
	Foundation/Abutment grouting: Cement	200000	kg	M.04	0.000	0.0	$ -	$ -	0.50	100,000	$ -	$ -	$ -	0	$ -	$ -	$ -	0.50	$ 100,000		
Place core material	Load, haul, dump, compact impervious core material (Till)	16540	Bm3	R.041	0.054	890.6	$ 1.97	$ 32,597	$ -	$ -	$ 4.75	$ 78,644	$ 2.32	29,555	$ 38,421	$ -	$ -	$ 9.05	$ 149,661		
Place filter material	Produce, screen and stockpile fine and coarse filter materials	10870	Bm3	C.2.02	0.010	108.7	$ 0.37	$ 3,978	$ -	$ -	$ 1.61	$ 17,486	$ 1.13	9,444	$ 12,277	$ -	$ -	$ 3.10	$ 33,741		
	Load, haul, dump, compact fine filter material	5740	Bm3	R.042	0.039	221.5	$ 1.41	$ 8,109	$ -	$ -	$ 3.41	$ 19,563	$ 1.67	7,352	$ 9,557	$ -	$ -	$ 6.49	$ 37,229		
	Load, haul, dump, compact coarse filter material	5130	Bm3	R.042	0.039	198.0	$ 1.41	$ 7,247	$ -	$ -	$ 3.41	$ 17,484	$ 1.67	6,571	$ 8,542	$ -	$ -	$ 6.49	$ 33,272		
Place rockfill	Load, haul, dump, and compact	48,500	Bm3	R.043	0.032	1569.1	$ 1.18	$ 57,430	$ -	$ -	$ 2.85	$ 138,557	$ 1.40	52,071	$ 67,692	$ -	$ -	$ 5.44	$ 263,679		
Safety Berm																				$130,159	
Construct access road	Clear access road area	3,500	m2	C.2.05	0.015	50.9	$ 0.53	$ 1,863	$ -	$ -	$ 0.94	$ 3,273	$ 0.62	1,661	$ 2,160	$ -	$ -	$ 2.08	$ 7,296		
	Construct access road	700	m	C.2.27	0.131	91.9	$ 4.80	$ 3,363	$ -	$ -	$ 10.14	$ 7,100	$ 5.33	2,868	$ 3,728	$ -	$ -	$ 20.27	$ 14,191		
Place berm materials	Load, haul, dump berm material	22,000	Lm3	R.044	0.023	498.2	$ 0.83	$ 18,235	$ -	$ -	$ 1.07	$ 43,331	$ 0.91	15,366	$ 19,976	$ -	$ -	$ 3.71	$ 81,542		
	Final Shaping of material with dozer	4,400	m	C.2.03	0.020	88.0	$ 0.73	$ 3,221	$ -	$ -	$ 3.43	$ 15,106	$ 2.00	6,772	$ 8,804	$ -	$ -	$ 6.17	$ 27,130		
Subtotal Direct Costs - Faro Pit						16,119		$749,092		$100,000		$934,795		252,229	$327,898		$0			$2,111,785	
Faro Creek																				$510,560	
Route into Faro Pit (East & West Channel)																					
Construct access road	Clear access road area	1,800	m2	C.2.04	0.004	6.5	$ 0.13	$ 240	$ -	$ -	$ 0.62	$ 1,124	$ 0.36	504	$ 655	$ -	$ -	$ 1.12	$ 2,018		
	Construct access road	600	m	C.2.27	0.131	78.8	$ 4.80	$ 2,882	$ -	$ -	$ 10.14	$ 6,086	$ 5.33	2,458	$ 3,195	$ -	$ -	$ 20.27	$ 12,164		
Head-works dam	Load, haul, dump, place and compact till at headworks	54	Bm3	R.046	0.088	4.7	$ 3.20	$ 173	$ -	$ -	$ 7.52	$ 406	$ 3.60	150	$ 194	$ -	$ -	$ 14.32	$773		
Excavate channel	Soil excavation: Load, haul and dump locally	6,614	Bm3	C.2.10	0.032	211.7	$ 1.17	$ 7,747	$ -	$ -	$ 2.72	$ 17,963	$ 1.27	6,452	$ 8,388	$ -	$ -	$ 5.16	$34,097		
	Rock excavation: Drill, blast, load, haul and dump	4,863	Bm3	C.2.15	0.173	842.9	$ 6.34	$ 30,849	$ -	$ -	$ 9.13	$ 44,385	$ 3.69	13,799	$ 17,939	$ -	$ -	$ 19.16	$93,172		
Fill material	Placed as part of soil excavation, compact by hand	1,365	m2	C.2.06	0.016	21.8	$ 0.57	$ 782	$ -	$ -	$ 0.02	$ 29	$ 0.02	17	$ 22	$ -	$ -	$ 0.61	$833		
Place till	Till: Load, haul, dump place, compact	3,992	Bm3	R.046	0.088	349.3	$ 3.20	$ 12,786	$ -	$ -	$ 7.52	$ 30,010	$ 3.60	11,057	$ 14,374	$ -	$ -	$ 14.32	$57,170		
Place geotextile	Supply and place geotextile	3,142	m2	C.4.07	0.071	224.4	$ 2.52	$ 7,927	$ 3.50	10,997	$ 0.82	$ 2,561	$ 0.53	1,276	$ 1,659	$ -	$ -	$ 7.37	$23,144		
Place bedding layer	Produce, screen and stockpile	3,992	Bm3	C.2.02	0.010	39.9	$ 0.37	$ 1,461	$ -	$ -	$ 1.61	$ 6,422	$ 1.13	3,468	$ 4,509	$ -	$ -	$ 3.10	$12,393		
	Load, haul, place and compact	3,992	Bm3	R.047	0.069	274.5	$ 2.52	$ 10,046	$ -	$ -	$ 5.22	$ 20,821	$ 2.40	7,367	$ 9,578	$ -	$ -	$ 10.13	$40,444		
Place rip-rap	Rip-rap (angular, high quality): Screen and stockpile	9,726	Bm3	C.2.25	0.057	555.8	$ 2.09	$ 20,341	$ -	$ -	$ 9.19	$ 89,403	$ 6.45	48,283	$ 62,768	$ -	$ -	$ 17.74	$172,512		
	Rip-rap: Load, haul, dump	9,726	Bm3	R.048	0.028	274.6	$ 1.03	$ 10,051	$ -	$ -	$ 2.42	$ 23,507	$ 1.09	8,169	$ 10,620	$ -	$ -	$ 4.54	$44,178		
	Rip-rap: Place and secure	9,726	Bm3	C.2.26	0.013	121.6	$ 0.46	$ 4,450	$ -	$ -	$ 0.89	$ 8,650	$ 0.47	3,509	$ 4,561	$ -	$ -	$ 1.82	$17,661		
Rip rap protection at pit inlet																				$14,457	
Place rip-rap	Rip-rap (angular, high quality): Screen and stockpile	600	Bm3	C.2.25	0.057	34.3	$ 2.09	$ 1,255	$ -	$ -	$ 0.19	$ 5,515	$ 6.45	2,979	$ 3,872	$ -	$ -	$ 17.74	$10,642		
	Rip-rap: Load, haul, dump	600	Bm3	R.048	0.028	16.9	$ 1.03	$ 620	$ -	$ -	$ 2.42	$ 1,450	$ 1.09	504	$ 655	$ -	$ -	$ 4.54	$2,725		
	Rip-rap: Place and secure	600	Bm3	C.2.26	0.013	7.5	$ 0.46	$ 275	$ -	$ -	$ 0.89	$ 534	$ 0.47	216	$ 281	$ -	$ -	$ 1.82	$1,090		
Route out of Pit																				$2,721,025	
Excavate channel	Bulk excavate soil/waste rock (dump locally)	277,181	Bm3	C.2.10	0.032	8869.8	$ 1.17	$ 324,635	$ -	$ -	$ 2.72	$ 752,758	$ 1.27	270,393	$ 351,510	$ -	$ -	$ 5.16	$1,428,903		
	Rock excavation: Drill, blast, muck, load haul dump	5,584	Bm3	C.2.15	0.173	967.8	$ 6.34	$ 35,423	$ -	$ -	$ 9.13	$ 50,966	$ 3.69	15,845	$ 20,599	$ -	$ -	$ 19.16	$106,987		
Place till	Till: Load, haul, dump place, compact	17,569	Bm3	R.049	0.074	1294.5	$ 2.70	$ 47,380	$ -	$ -	$ 5.50	$ 98,200	$ 2.57	34,748	$ 45,172	$ -	$ -	$ 10.86	$190,752		
Place geotextile	Supply and place geotextile	12,089	m2	C.4.07	0.071	863.5	$ 2.52	$ 30,499	$ 3.50	42,311	$ 0.82	$ 9,856	$ 0.53	4,911	$ 6,385	$ -	$ -	$ 7.37	$89,050		
Place bedding layer	Produce and stockpile (screen) bedding layer	17,569	Bm3	C.2.02	0.010	175.7	$ 0.37	$ 6,430	$ -	$ -	$ 1.61	$ 28,262	$ 1.13	15,263	$ 19,842	$ -	$ -	$ 3.10	$54,534		
	Load, Haul, Place and Compact bedding layer	17,569	Bm3	R.050	0.067	1171.3	$ 2.44	$ 42,868	$ -	$ -	$ 5.06	$ 88,848	$ 2.33	31,438	$ 40,870	$ -	$ -	$ 9.82	$172,585		
Place rip-rap	Rip-rap (angular, high quality): Screen and stockpile	29,402	Bm3	C.2.25	0.057	1680.1	$ 2.09	$ 61,491	$ -	$ -	$ 9.19	$ 270,266	$ 6.45	145,961	$ 189,749	$ -	$ -	$ 17.74	$521,506		
	Rip-rap: Load, haul, dump	29,402	Bm3	R.051	0.021	622.6	$ 0.78	$ 22,788	$ -	$ -	$ 1.88	$ 55,285	$ 0.89	20,110	$ 26,143	$ -	$ -	$ 3.54	$104,216		
	Rip-rap: Place and secure	29,402	Bm3	C.2.26	0.013	367.5	$ 0.46	$ 13,451	$ -	$ -	$ 0.89	$ 26,150	$ 0.47	10,607	$ 13,789	$ -	$ -	$ 1.82	$53,390		
Siphon allowance																				$302,393	
Siphon for creek 'Out of pit'	Piping: Supply and install steel piping	1,130	m	C.3.14	0.300	339.0	$ 16.66	$ 18,826	$ 237.06	267,878	$ 1.40	$ 1,586	$ 1.67	1,450	$ 1,855	$ -	$ -	$ 256.79	$290,175		
	Pumps: supply and install	2	ea.	C.3.10	12.000	24.0	$ 600.00	$ 1,200	$ 1,629.00	3,658	$ -	$ -	$ -	0	$ -	$ -	$ -	$ 2,429.00	$4,858		
	Install protective housing (shack)	2	ea.	C.3.12	30.000	60.0	$ 1,950.00	$ 3,900	$ 1,730.00	3,460	$ -	$ -	$ -	0	$ -	$ -	$ -	$ 3,680.00	$7,360		
Upgrade North Wall Intercepter																				$293,508	
Excavate channel	Soil Excavation: load, haul and dump locally	7,500	Bm3	C.2.10	0.032	240.0	$ 1.17	$ 8,784	$ -	$ -	$ 2.72	$ 20,368	$ 1.27	7,316	$ 9,511	$ -	$ -	$ 5.16	$38,663		assume same upgrade as Improved Creek option
Place rip-rap	Rip-rap (angular, high quality): Screen and stockpile	10,800	Bm3	C.2.25	0.057	617.1	$ 2.09	$ 22,587	$ -	$ -	$ 9.19	$ 99,276	$ 6.45	53,615	$ 69,700	$ -	$ -	$ 17.74	$191,564		
	Rip-rap: Load, haul, dump	10,800	Bm3	R.052	0.025	266.8	$ 0.80	$ 9,766	$ -	$ -	$ 2.15	$ 23,205	$ 0.99	8,229	$ 10,698	$ -	$ -	$ 4.04	$43,669		
	Rip-rap: Place and secure	10,800	Bm3	C.2.26	0.013	135.0	$ 0.46	$ 4,941	$ -	$ -	$ 0.89	$ 9,605	$ 0.47	3,896	$ 5,065	$ -	$ -	$ 1.82	$10,612		
Subtotal Direct Costs - Faro Creek						20,760		$766,852		$328,304		$1,703,495		733,993	$954,191		$0			$3,842,842	
Zone II Pit																				$558,859	
Water Management																					
Groundwater Wells	Drill wells (Air Rotary Drill Rig, ~90m depth)	90	m	C.2.09	2.000	180.0	$ 102.13	$ 9,192	$ -	$ -	$ 100.85	$ 9,077	$ 22.08	1,529	$ 1,987	$ -	$ -	$ 225.07	$20,256		Pump and treat Zone II Pit water
	Install 6" stainless steel well casing & screen	90	m	C.3.17	0.150	13.5	$ 7.66	$ 689	$ 232.60	20,934	$ 7.56	$ 681	$ 1.66	115	$ 149	$ -	$ -	$ 249.48	$22,453		
	Install 6" Submersible Pump with controls	1	ea.	C.3.07	12.000	12.0	$ 600.00	$ 600	$ 6,842.00	6,842	$ -	$ -	$ -	0	$ -	$ -	$ -	$ 7,442.00	$7,442		
	Install protective housing (shack)	90	m	C.3.13	20.000	1800.0	$ 1,300.00	$ 117,000	$ 445.00	40,050	$ -	$ -	$ -	0	$ -	$ -	$ -	$ 1,745.00	$157,050		
Monitoring wells	Drill wells (Air Rotary Drill Rig, ~90m depth)	180	m	C.2.09	2.000	360.0	$ 102.13	$ 18,384	$ -	$ -	$ 100.85	$ 18,153	$ 22.08	3,057	$ 3,974	$ -	$ -	$ 225.07	$40,512		
	Install 6" stainless steel well casing & screen	180	m	C.3.17	0.150	27.0	$ 7.66	$ 1,379	$ 232.60	41,868	$ 7.56	$ 1,362	$ 1.66	229	$ 298	$ -	$ -	$ 249.48	$44,906		
	Install protective well cover	180	ea.	C.3.18	1.333	240.0	$ 48.60	$ 8,784	$ 164.54	29,617	$ 100.85	$ 18,153	$ 22.08	3,057	$ 3,974	$ -	$ -	$ 336.27	$60,529		
Piping system	Excavate piping trench	4,200	Bm3	C.2.13	0.020	84.0	$ 0.73	$ 3,074	$ -	$ -	$ 1.42	$ 5,977	$ 0.75	2,424	$ 3,152	$ -	$ -	$ 2.91	$12,203		
	Supply and install insulated 150mm HDPE pipe	700	m	C.3.03	0.250	175.0	$ 8.75	$ 6,125	$ 155.84	109,088	$ -	$ -	$ -	0	$ -	$ -	$ -	$ 164.59	$115,213		
	Bedding layer: Produce, screen and stockpile	273	Bm3	C.2.02	0.010	2.7	$ 0.37	$ 100	$ -	$ -	$ 1.61	$ 439	$ 1.13	237	$ 308	$ -	$ -	$ 3.10	$847		
	Bedding layer: Load, haul, place and compact	273	Bm3	R.061	0.034	9.4	$ 1.26	$ 343	$ -	$ -	$ 2.61	$ 712	$ 1.20	252	$ 327	$ -	$ -	$ 5.07	$1,383		
	Backfill ditches	4,200	Bm3	C.2.01	0.030	126.0	$ 1.08	$ 4,544	$ -	$ -	$ 0.74	$ 3,099	$ 0.40	1,278	$ 1,661	$ -	$ -	$ 2.22	$9,304		
Heat tracing	Supply and install heat trace in HDPE pipe	700	m	C.3.04	0.250	175.0	$ 12.50	$ 8,750	$ 21.32	14,924	$ -	$ -	$ -	0	$ -	$ -	$ -	$ 33.82	$23,674		
	Supply/Install heat tracing power feed kit	1	ea.	C.3.05	4.000	4.0	$ 230.00	$ 230	$ 396.84	397	$ -	$ -	$ -	0	$ -	$ -	$ -	$ 626.84	$627		
	Supply/Install electrical thermostats for heat tracing	1	ea.	C.3.06	1.000	1.0	$ 57.50	$ 58	$ 1,025.00	1,025	$ -	$ -	$ -	0	$ -	$ -	$ -	$ 1,082.50	$1,083		
Provide electricity from WTP to pumps	Supply/Install treated power poles	29	ea.	C.4.03	4.545	131.8	$ 297.86	$ 8,638	$ 325.96	9,453	$ 85.85	$ 2,490	$ 28.17	828	$ 817	$ -	$ -	$ 737.86	$21,398		
	Supply/Install overhead conductor	2,200	m	C.4.02	0.032	70.4	$ 2.21	$ 4,868	$ 1.41	3,102	$ 0.45	$ 997	$ 0.15	252	$ 327	$ -	$ -	$ 4.22	$9,295		
	Supply/Install transformers	1	ea.	C.4.04	20.000	20.0	$ 1,383.00	$ 1,383	$ 8,934.00	8,934	$ 224.98	$ 225	$ 143.00	110	$ 143	$ -	$ -	$ 10,684.98	$10,685		
Subtotal Direct Costs - Zone II Pit						3,432		$194,143		$286,234		$61,364		13,168	$17,119		$0			$558,859	
Oxide Fines / LGSP																				$770,373	
Consolidate oxide fines																					
Relocate to Low Grade Stockpile C	Load, haul, place and compact oxide materials	262,315	Bm3	R.068	0.012	3119.4	$ 0.44	$ 114,171	$ -	$ -	$ 1.51	$ 396,927	$ 0.99	199,442	$ 259,275	$ -	$ -	$ 2.94	$770,373		
Medium-Grade Stockpile																				$1,130,719	
Regrade	Flattened surfaces	59	hrs	C.2.22	1.000	59.2	$ 36.60	$ 2,166	$ -	$ -	$ 173.28	$ 10,255	$149.18	6,791	$ 8,829	$ -	$ -	$ 359.06	$21,249		
	Regrade slopes	27	hrs	C.2.22	1.000	27.4	$ 36.60	$ 1,004	$ -	$ -	$ 173.28	$ 4,753	$149.18	3,148	$ 4,092	$ -	$ -	$ 359.06	$9,849		
Place HDPE Cover	Bedding layer: Produce, screen and stockpile	13,800	Bm3	C.2.02	0.010	138.0	$ 0.37	$ 5,051	$ -	$ -	$ 1.61	$ 22,199	$ 1.13	11,989	$ 15,586	$ -	$ -	$ 3.10	$42,836		
	Bedding layer: Load, haul, place (0.3m)	13,800	Bm3	R.065	0.042	583.8	$ 1.55	$ 21,360	$ -	$ -	$ 3.21	$ 44,289	$ 1.48	15,671	$ 20,373	$ -	$ -	$ 6.23	$86,030		
	Supply and place HDPE liner	27,600	m2	C.4.10	0.143	3942.9	$ 6.33	$ 174,747	$ 12.77	352,452	$ 1.63	$ 45,002	$ 1.06	22,426	$ 29,153	$ -	$ -	$ 21.79	$601,355		
	Load, haul, place loose till (1.0m)	27,600	Bm3	R.064	0.050	1391.0	$ 1.84	$ 50,912	$ -	$ -	$ 6.95	$ 191,710	$ 4.49	95,200	$ 123,877	$ -	$ -	$ 13.28	$366,499		
Revegetate	Seed/Fertilize, helicopter low application rate	27,600	m2	C.5.02	0.000	3.5	$ 0.00	$ 124	$ 0.05	1,255	$ 0.05	$ 1,504	$ 0.00	14	$ 18	$ -	$ -	$ 0.11	$2,901		
Low Grade Stockpile "A"																				$1,383,037	
Re-grade	Flattened surfaces	7	hrs	C.2.22	1.000	6.8	$ 36.60	$ 249	$ -	$ -	$ 173.28	$ 1,178	$149.18	780	$ 1,014	$ -	$ -	$ 359.06	$2,442		
	Re-grade slopes	15	hrs	C.2.22	1.000	15.5	$ 36.60	$ 567	$ -	$ -	$ 173.28	$ 2,683	$149.18	1,777	$ 2,310	$ -	$ -	$ 359.06	$5,560		
Place HDPE cover	Bedding layer: Produce, screen and stockpile	10,842	m3	C.2.02	0.010	108.4	$ 0.37	$ 3,968	$ -	$ -	$ 1.61	$ 17,440	$ 1.13	9,419	$ 12,245	$ -	$ -	$ 3.10	$33,653		
	Bedding layer: Load, haul, place (0.3m)	10,842	m3	R.066	0.044	477.0	$ 1.61	$ 17,459	$ -	$ -	$ 3.34	$ 36,186	$ 1.54	12,804	$ 16,646	$ -	$ -	$ 6.48	$70,291		
	Supply and place HDPE liner	36,139	m2	C.4.10	0.143	5162.7	$ 6.33	$ 228,811	$ 12.77	461,495	$ 1.63	$ 58,925	$ 1.06	29,364	$ 38,173	$ -	$ -	$ 21.79	$787,404		
	Load, haul, place till (1.0m)	36,139	Bm3	R.064	0.050	1821.4	$ 1.84	$ 66,663	$ -	$ -	$ 6.95	$ 251,022	$ 4.49	124,771	$ 162,202	$ -	$ -	$ 13.28	$479,887		
Revegetate	Seed/Fertilize, helicopter low application rate	36,150	m2	C.5.02	0.000	4.5	$ 0.00	$ 162	$ 0.05	1,643	$ 0.05	$ 1,970	$ 0.00	18	$ 24	$ -	$ -	$ 0.11	$3,800		
Low Grade Stockpile "C"																				$4,382,212	
Re-grade	Flattened surfaces	27	hrs	C.2.22	1.000	26.9	$ 36.60	$ 983	$ -	$ -	$ 173.28	$ 4,653	$149.18	3,081	$ 4,005	$ -	$ -	$ 359.06	$9,641		
	Re-grade slopes	46	hrs	C.2.22	1.000	46.1	$ 36.60	$ 1,688	$ -	$ -	$ 173.28	$ 7,992	$149.18	5,293	$ 6,881	$ -	$ -	$ 359.06	$16,561		
Place HDPE cover	Bedding layer: Produce, screen and stockpile	54,770	Bm3	C.2.02	0.010	547.7	$ 0.37	$ 20,046	$ -	$ -	$ 1.61	$ 88,106	$ 1.13	47,583	$ 61,858	$ -	$ -	$ 3.10	$170,009		
	Bedding layer: Load, haul, place (0.3m)	54,770	Bm3	R.067	0.040	2190.8	$ 1.46	$ 80,184	$ -	$ -	$ 3.03	$ 166,188	$ 1.40	59,805	$ 76,446	$ -	$ -	$ 5.89	$322,818		
	Supply and place HDPE liner	109,541	m2	C.4.10	0.143	15648.7	$ 6.33	$ 693,551	$ 12.77	1,398,839	$ 1.63	$ 178,606	$ 1.06	89,005	$ 115,707	$ -	$ -	$ 21.79	$2,386,703		

Attachment E

Example Alternatives - Cost Estimate

Activity	Task	Quantity	Unit	Cost Code	Unit Mhrs	Total Mhrs	Labour Rate	Labor Cost	Unit Matl	Material Cost	Unit Equip.	Equipment Cost	Unit Fuel	Fuel Consumed (L)	Fuel Cost	Power Rate ($/Unit)	Power Cost	Total Unit Cost	Activity Total	Subtotals	Source / Comments
	Load, haul, place till (1.0m)	109,541	Bm3	R.064	0.050	5520.9	$ 1.84	$ 202,063	$ -	$ -	$ 6.95	$ 760,872	$ 4.49	378,192	$ 491,650	$ -	$ -	$ 13.28	$1,454,585		
Surface runoff management: Rock drains	Excavate channel for rock drains	610	Bm3	C.2.12	0.024	14.4	$ 0.86	$ 525	$ -	$ -	$ 2.00	$ 1,218	$ 0.93	438	$ 569	$ -	$ -	$ 3.79	$2,312		
	Rip-rap (rounded, low quality): Screen and stockpile	454	Bm3	C.2.24	0.040	18.2	$ 1.46	$ 664	$ -	$ -	$ 6.43	$ 2,920	$ 4.52	1,577	$ 2,050	$ -	$ -	$ 12.42	$5,635		
	Rip-rap: Load, haul, dump	454	Bm3	R.069	0.021	9.6	$ 0.78	$ 352	$ -	$ -	$ 1.88	$ 853	$ 0.89	310	$ 404	$ -	$ -	$ 3.54	$1,609		
	Rip-rap: Place and secure	454	Bm3	C.2.26	0.013	5.7	$ 0.46	$ 208	$ -	$ -	$ 0.89	$ 404	$ 0.47	164	$ 213	$ -	$ -	$ 1.82	$824		
Revegetate	Seed/Fertilize, helicopter low application rate	109,550	m2	C.5.02	0.000	13.7	$ 0.00	$ 492	$ 0.05	$ 4,980	$ 0.05	$ 5,971	$ 0.00	56	$ 73	$ -	$ -	$ 0.11	$11,515		
Subtotal Direct Costs - Oxide Fines						40,904		$1,688,180		$2,220,664		$2,303,826		1,118,208	$1,453,671		$0			$7,666,340	
ETA Tailings																					
Option 1: Pump Tailings to Faro Pit																				$662,124	
Hydraulic monitoring with lime addition	Operate Hydraulic monitoring system	64,000	m3	C.7.04	0.020	1284.5	$ 1	$ 57,163	$ 0	$ 16,473	$ 0	$ 1,014	$ 0	496	$ 645	$ 0.27	$ 17,145	$ 1.44	$92,439		
	Operate Slurry Pumping System	64,000	m3	C.7.18	0.008	540.8	$ 0	$ 27,042	$ 0	$ 20,756	$ -	$ -	$ -	0	$ -	$ 0.54	$ 34,479	$ 1.29	$82,278		
	lime addition - qnty in tonnes per CaOH eq	1,088	ton	C.2.21	0.036	38.9	$ 1.59	$ 1,735	$ 320.00	$ 348,160	$ 1.67	$ 1,815	$ 0.98	819	$ 1,065	$ -	$ -	$ 324.24	$352,775		
Truck contaminated soils to Faro Pit	Load, haul, dump remaining contaminated material to Faro Pit	12,800	m3	R.071	0.053	672.0	$ 1.92	$ 24,595	$ -	$ -	$ 5.31	$ 68,008	$ 2.59	25,547	$ 33,211	$ -	$ -	$ 9.83	$125,814		
	Regrade area to form detention pond	19	hrs	C.2.22	1.000	19.1	$ 36.60	$ 699	$ -	$ -	$ 173.28	$ 3,311	$149.18	2,193	$ 2,851	$ -	$ -	$ 359.06	$6,861		
Revegetate	Seed/Fertilize, helicopter high application rate	13,000	m2	C.5.01	0.000	1.6	$ 0.00	$ 58	$ 0.09	$ 1,182	$ 0.05	$ 709	$ 0.00	7	$ 9	$ -	$ -	$ 0.15	$1,957		
Option 2: Haul Tailings to Rose Creek Tailings Deposi																				$725,144	
Truck to tailings impoundment	Excavate, load, haul, dump and place	64,000	m3	R.074	0.026	1667.0	$ 0.95	$ 61,011	$ -	$ -	$ 2.54	$ 162,621	$ 1.24	61,021	$ 79,327	$ -	$ -	$ 4.73	$302,959		
Lime addition	Add lime to waste rock (qnty= tonnes CaOH eq)	1,088	ton	C.2.21	0.036	38.9	$ 1.59	$ 1,735	$ 320.00	$ 348,160	$ 1.67	$ 1,815	$ 0.98	819	$ 1,065	$ -	$ -	$ 324.24	$352,775		
Truck contaminated soils to Faro Pit	Load, haul, dump remaining contaminated material to Tailings Imp.	12,800	m3	R.074	0.026	333.4	$ 0.95	$ 12,202	$ -	$ -	$ 2.54	$ 32,524	$ 1.24	12,204	$ 15,865	$ -	$ -	$ 4.73	$60,592		
	Regrade area to form detention pond	19	hrs	C.2.22	1.000	19.1	$ 36.60	$ 699	$ -	$ -	$ 173.28	$ 3,311	$149.18	2,193	$ 2,851	$ -	$ -	$ 359.06	$6,861		
Revegetate	Seed/Fertilize, helicopter high application rate	13,000	m2	C.5.01	0.000	1.6	$ 0.00	$ 58	$ 0.09	$ 1,182	$ 0.05	$ 709	$ 0.00	7	$ 9	$ -	$ -	$ 0.15	$1,957		
ETA Collection System (to Pit)																				$655,962	
Groundwater wells	Drill wells (Air Rotary Drill Rig, ~20m depth)	100	m	C.2.09	2.000	200.0	$ 102.13	$ 10,213	$ -	$ -	$ 100.85	$ 10,085	$ 22.08	1,698	$ 2,208	$ -	$ -	$ 225.07	$22,507		
	Install 6" stainless steel well casing & screen	100	m	C.3.17	0.150	15.0	$ 7.66	$ 766	$ 232.60	$ 23,260	$ 7.56	$ 756	$ 1.66	127	$ 166	$ -	$ -	$ 249.48	$24,948		
	Install 6" Submersible Pump with controls	5	ea.	C.3.07	12.000	60.0	$ 600.00	$ 3,000	$ 6,842.00	$ 34,210	$ -	$ -	$ -	0	$ -	$ -	$ -	$ 7,442.00	$37,210		
	Install protective housing (shack)	5	ea.	C.3.13	20.000	100.0	$ 1,300.00	$ 6,500	$ 445.00	$ 2,225	$ -	$ -	$ -	0	$ -	$ -	$ -	$ 1,745.00	$8,725		
Monitoring wells	Drill wells (Air Rotary Drill Rig, ~20m depth)	60	m	C.2.09	2.000	120.0	$ 102.13	$ 6,128	$ -	$ -	$ 100.85	$ 6,051	$ 22.08	1,019	$ 1,325	$ -	$ -	$ 225.07	$13,504		
	Install 6" stainless steel well casing & screen	60	m	C.3.17	0.150	9.0	$ 7.66	$ 460	$ 232.60	$ 13,956	$ 7.56	$ 454	$ 1.66	76	$ 99	$ -	$ -	$ 249.48	$14,969		
	Install protective well cover	3	ea.	C.3.18	1.333	4.0	$ 48.80	$ 146	$ 164.54	$ 494	$ 100.85	$ 303	$ 22.08	51	$ 66	$ -	$ -	$ 336.27	$1,009		
Pumping station	Excavate sump for manholes	200	m3	C.2.12	0.024	4.7	$ 0.86	$ 172	$ -	$ -	$ 2.00	$ 399	$ 0.93	143	$ 186	$ -	$ -	$ 3.79	$758		
	Supply and place precast concrete manhole	1	ea.	C.3.08	16.000	16.0	$ 746.40	$ 746	$ 1,344.68	$ 1,345	$ 72.47	$ 72	$ 62.92	48	$ 63	$ -	$ -	$ 2,226.47	$2,226		
	Backfill and compact around manhole	200	m3	C.2.01	0.030	6.0	$ 1.08	$ 216	$ -	$ -	$ 0.74	$ 148	$ 0.40	61	$ 79	$ -	$ -	$ 2.22	$443		
	Install primary pump	1	ea.	C.3.10	12.000	12.0	$ 600.00	$ 600	$ 1,829.00	$ 1,829	$ -	$ -	$ -	0	$ -	$ -	$ -	$ 2,429.00	$2,429		
Piping system	Excavate piping trench	13,200	m3	C.2.13	0.020	264.0	$ 0.73	$ 9,662	$ -	$ -	$ 1.42	$ 18,784	$ 0.75	7,619	$ 9,905	$ -	$ -	$ 2.91	$38,352		
	Supply and install insulated 150mm HDPE pipe	2,200	m	C.3.03	0.250	550.0	$ 8.75	$ 19,250	$ 155.84	$ 342,848	$ -	$ -	$ -	0	$ -	$ -	$ -	$ 164.59	$362,098		
	Bedding layer: Produce, screen and stockpile	858	m3	C.2.02	0.010	8.6	$ 0.37	$ 314	$ -	$ -	$ 1.61	$ 1,380	$ 1.13	745	$ 969	$ -	$ -	$ 3.10	$2,663		
	Bedding layer: Load, haul, place and compact	858	m3	R.073	0.031	26.2	$ 1.12	$ 960	$ -	$ -	$ 2.32	$ 1,989	$ 1.07	704	$ 915	$ -	$ -	$ 4.50	$3,863		
	Backfill ditches	13,200	m3	C.2.01	0.030	396.0	$ 1.08	$ 14,282	$ -	$ -	$ 0.74	$ 9,739	$ 0.40	4,016	$ 5,221	$ -	$ -	$ 2.22	$29,242		
Heat tracing	Supply and install heat trace in HDPE pipe	2,200	m	C.3.04	0.250	550.0	$ 12.50	$ 27,500	$ 21.32	$ 46,904	$ -	$ -	$ -	0	$ -	$ -	$ -	$ 33.82	$74,404		
	Supply/Install heat tracing power feed kit	1	ea.	C.3.05	4.000	4.0	$ 230.00	$ 230	$ 396.84	$ 397	$ -	$ -	$ -	0	$ -	$ -	$ -	$ 626.84	$627		
	Supply/Install electrical thermostat for heat tracing	1	ea.	C.3.06	1.000	1.0	$ 57.50	$ 58	$ 1,025.00	$ 1,025	$ -	$ -	$ -	0	$ -	$ -	$ -	$ 1,082.50	$1,083		
Provide electricity from WTP to pumps	Supply/Install treated power poles	4	ea.	C.4.03	4.545	18.2	$ 297.88	$ 1,192	$ 325.96	$ 1,304	$ 85.85	$ 343	$ 28.17	87	$ 113	$ -	$ -	$ 737.86	$2,951		
	Supply/Install overhead conductor	300	m	C.4.02	0.032	9.6	$ 2.21	$ 664	$ 1.41	$ 423	$ 0.45	$ 136	$ 0.15	34	$ 45	$ -	$ -	$ 4.22	$1,267		
	Supply/Install transformers	1	ea.	C.4.04	20.000	20.0	$ 1,383.00	$ 1,383	$ 8,034.00	$ 8,934	$ 224.98	$ 225	$143.00	110	$ 143	$ -	$ -	$ 10,684.98	$10,685		
Subtotal Direct Costs - ETA (Maximum of Option 1 & 2)						4,454		$180,149		$826,495		$251,844		92,784	$120,619		$0			$1,381,107	
Waste Rock																					
Re-slope Waste Rock																				$3,857,323	
Remove vegetation at WR toe	Clear/grub forest area around toe	60,000	m2	C.2.05	0.015	872.7	$ 0.53	$ 31,942	$ -	$ -	$ 0.94	$ 56,103	$ 0.62	28,478	$ 37,021	$ -	$ -	$ 2.08	$125,066		
Re-grade	Flattened surfaces (enhance surface runoff)	429	hrs	C.2.22	1.000	429.0	$ 36.60	$ 15,702	$ -	$ -	$ 173.28	$ 74,341	$149.18	49,232	$ 64,002	$ -	$ -	$ 359.06	$154,045		
	Flatten bubble dump surfaces	769	hrs	C.2.22	1.000	769.0	$ 36.60	$ 28,146	$ -	$ -	$ 173.28	$ 133,252	$149.18	88,246	$ 114,720	$ -	$ -	$ 359.06	$276,117		
	Re-grade slopes	7,329	hrs	C.2.22	1.000	7329.4	$ 36.60	$ 268,255	$ -	$ -	$ 173.28	$ 1,270,021	$149.18	841,074	$ 1,093,397	$ -	$ -	$ 359.06	$2,631,673		
Pull-back slopes not able to be re-sloped	Load, haul, dump, place at top of dump	195,750	m3	R.077	0.012	2437.6	$ 0.46	$ 89,218	$ -	$ -	$ 1.80	$ 352,187	$ 1.17	176,166	$ 229,016	$ -	$ -	$ 3.42	$670,422		
Sulphide Cell																				$3,851,716	
Low Infiltration Cover	Load, haul, place compacted till (0.5m) (South cells)	86,823	m3	R.075	0.056	4862.1	$ 2.05	$ 177,953	$ -	$ -	$ 7.09	$ 616,001	$ 4.61	307,977	$ 400,370	$ -	$ -	$ 13.76	$1,194,325		
	Load, haul, place loose till (1.5m) (South cells)	173,647	m3	R.076	0.050	8751.8	$ 1.84	$ 320,316	$ -	$ -	$ 6.95	$ 1,206,153	$ 4.49	599,520	$ 779,376	$ -	$ -	$ 13.28	$2,305,845		
	Load, haul, place compacted till (0.5m) (East cell)	8,720	m3	R.075	0.056	488.3	$ 2.05	$ 17,873	$ -	$ -	$ 7.09	$ 61,869	$ 4.61	30,932	$ 40,212	$ -	$ -	$ 13.76	$119,954		
	Load, haul, place loose till (1.5m) (East cell)	17,441	m3	R.076	0.050	879.0	$ 1.84	$ 32,171	$ -	$ -	$ 6.95	$ 121,142	$ 4.49	60,214	$ 78,278	$ -	$ -	$ 13.28	$231,592		
Waste Rock Cover																				$23,572,431	
Place rudimentary cover	Load, haul, place loose till (0.5m)	1,775,173	m3	R.076	0.050	88468.7	$ 1.84	$ 3,274,555	$ -	$ -	$ 6.95	$ 12,330,389	$ 4.49	6,128,836	$ 7,967,487	$ -	$ -	$ 13.28	$23,572,431		
Steep Runoff channels																				$77,316	
Surface runoff management: Rock drains	Excavate channel for rock drains	4,375	m3	C.2.13	0.020	87.5	$ 0.73	$ 3,203	$ -	$ -	$ 1.42	$ 6,226	$ 0.75	2,525	$ 3,283	$ -	$ -	$ 2.91	$12,711		
	Rip-rap (rounded, low quality): Screen and stockpile	3,255	m3	C.2.24	0.040	130.2	$ 1.46	$ 4,765	$ -	$ -	$ 6.43	$ 20,944	$ 4.52	11,311	$ 14,705	$ -	$ -	$ 12.42	$40,415		
	Rip-rap: Load, haul, dump	3,255	m3	R.078	0.035	113.6	$ 1.28	$ 4,159	$ -	$ -	$ 2.99	$ 9,726	$ 1.35	3,380	$ 4,394	$ -	$ -	$ 5.62	$18,280		
	Rip-rap: Place and secure	3,255	m3	C.2.26	0.013	40.7	$ 0.46	$ 1,489	$ -	$ -	$ 0.89	$ 2,895	$ 0.47	1,174	$ 1,527	$ -	$ -	$ 1.82	$5,911		
Revegetate																				$467,177	
Revegetate WR Dumps	Seed/Fertilize, helicopter low application rate	4,444,400	m2	C.5.02	0.000	555.6	$ 0.00	$ 19,952	$ 0.05	$ 202,042	$ 0.05	$ 242,231	$ 0.00	2,270	$ 2,951	$ -	$ -	$ 0.11	$467,177		
	Note: Removal of North Fork Rock Drain included in Tailings Alternative																				
Subtotal Direct Costs - Waste Rock						117,215		$4,289,699		$202,042		$10,503,482		8,331,338	$10,830,739		$0			$31,825,962	
Groundwater																					
Upgrade North Fork Rose Creek																				$1,294,796	
Construct access road	Clear access road area	6,600	m2	C.2.04	0.004	24.0	$ 0.13	$ 878	$ -	$ -	$ 0.62	$ 4,120	$ 0.36	1,847	$ 2,401	$ -	$ -	$ 1.12	$7,399		
	Construct access road	2,200	m	C.2.27	0.131	288.8	$ 4.80	$ 10,568	$ -	$ -	$ 10.14	$ 22,315	$ 5.33	9,013	$ 11,717	$ -	$ -	$ 20.27	$44,600		
Construct channe	Load, haul, dump granular material along channel thalweg.	21,750	m3	R.081	0.028	614.1	$ 1.03	$ 22,477	$ -	$ -	$ 2.75	$ 59,910	$ 1.34	22,480	$ 29,224	$ -	$ -	$ 5.13	$111,611		
	Load, haul, dump till to create channel berms	35,980	m3	R.082	0.032	1133.4	$ 1.15	$ 41,481	$ -	$ -	$ 2.82	$ 101,628	$ 1.41	39,006	$ 50,708	$ -	$ -	$ 5.39	$193,817		
Place geotextile	Supply and place geotextile	42,858	m2	C.4.05	0.016	685.7	$ 0.57	$ 24,275	$ 3.50	$ 150,003	$ 0.23	$ 9,783	$ 0.15	4,875	$ 6,338	$ -	$ -	$ 4.44	$190,399		
Place 0.3m till layer	Till: Load, haul, dump and place	12,857	m3	R.083	0.028	360.0	$ 1.02	$ 13,176	$ -	$ -	$ 2.38	$ 30,596	$ 1.11	11,014	$ 14,318	$ -	$ -	$ 4.52	$58,090		
	Till: Compact with vibrating drum roller	12,857	m2	C.2.06	0.016	205.7	$ 0.57	$ 7,364	$ -	$ -	$ 0.02	$ 270	$ 0.02	161	$ 209	$ -	$ -	$ 0.61	$7,843		
Place geotextile	Supply and place geotextile	42,858	m2	C.4.05	0.016	685.7	$ 0.57	$ 24,275	$ 3.50	$ 150,003	$ 0.23	$ 9,783	$ 0.15	4,875	$ 6,338	$ -	$ -	$ 4.44	$190,399		
Place bedding layer	Bedding layer: Produce, screen and stockpile	12,857	m3	C.2.02	0.010	128.6	$ 0.37	$ 4,706	$ -	$ -	$ 1.61	$ 20,682	$ 1.13	11,170	$ 14,521	$ -	$ -	$ 3.10	$39,909		
	Bedding layer: Load, haul, place and compact	12,857	m3	R.084	0.029	374.4	$ 1.07	$ 13,702	$ -	$ -	$ 2.21	$ 28,392	$ 1.04	10,246	$ 13,320	$ -	$ -	$ 4.31	$55,413		
Place rip-rap	Rip-rap (angular, high quality): Screen and stockpile	15,914	m3	C.2.25	0.057	909.4	$ 2.09	$ 33,283	$ -	$ -	$ 9.19	$ 146,285	$ 6.45	79,003	$ 102,704	$ -	$ -	$ 17.74	$282,272		
	Rip-rap: Load, haul, dump	15,914	m3	R.085	0.032	514.1	$ 1.18	$ 18,818	$ -	$ -	$ 2.81	$ 44,714	$ 1.30	15,857	$ 20,614	$ -	$ -	$ 5.29	$84,146		
	Rip-rap: Place and secure	15,914	m3	C.2.26	0.013	198.9	$ 0.46	$ 7,281	$ -	$ -	$ 0.89	$ 14,154	$ 0.47	5,741	$ 7,464	$ -	$ -	$ 1.82	$28,898		
Outwash material																				$287,728	
Relocate to Intermediate Dump	Load, haul, dump outwash materia	76,350	m3	R.062	0.023	1758.1	$ 0.84	$ 64,345	$ -	$ -	$ 2.00	$ 152,695	$ 0.92	54,222	$ 70,488	$ -	$ -	$ 3.77	$287,728		
North Fork Rose Creek Detention Pond																				$10,883	
Excavate basin	Excavate sedimentation basin	2,592	m3	C.2.12	0.024	61.0	$ 0.86	$ 2,232	$ -	$ -	$ 2.00	$ 5,176	$ 0.93	1,859	$ 2,417	$ -	$ -	$ 3.79	$9,825		
Place rip-rap	Rip-rap (rounded, low quality): Screen and stockpile	52	m3	C.2.24	0.040	2.1	$ 1.46	$ 76	$ -	$ -	$ 6.43	$ 335	$ 4.52	181	$ 235	$ -	$ -	$ 12.42	$646		
	Rip-rap: Load, haul, dump	52	m3	R.086	0.037	1.9	$ 1.37	$ 71	$ -	$ -	$ 3.25	$ 169	$ 1.50	60	$ 78	$ -	$ -	$ 6.11	$318		
	Rip-rap: Place and secure	52	m3	C.2.26	0.013	0.7	$ 0.46	$ 24	$ -	$ -	$ 0.89	$ 46	$ 0.47	19	$ 24	$ -	$ -	$ 1.82	$94		
North Fork Rose Creek Collection System (to Pit)																				$541,110	
Groundwater wells	Drill wells (Air Rotary Drill Rig, ~20m depth)	100	m	C.2.09	2.000	200.0	$ 102.13	$ 10,213	$ -	$ -	$ 100.85	$ 10,085	$ 22.08	1,698	$ 2,208	$ -	$ -	$ 225.07	$22,507		
	Install 6" stainless steel well casing & screen	100	m	C.3.17	0.150	15.0	$ 7.66	$ 766	$ 232.60	$ 23,260	$ 7.56	$ 756	$ 1.66	127	$ 166	$ -	$ -	$ 249.48	$24,948		
	Install 6" Submersible Pump with controls	3	ea.	C.3.07	12.000	36.0	$ 600.00	$ 1,800	$ 6,842.00	$ 20,526	$ -	$ -	$ -	0	$ -	$ -	$ -	$ 7,442.00	$22,326		
	Install protective housing (shack)	3	ea.	C.3.13	20.000	60.0	$ 1,300.00	$ 3,900	$ 445.00	$ 1,335	$ -	$ -	$ -	0	$ -	$ -	$ -	$ 1,745.00	$5,235		
Pumping station	Excavate sump for manholes	200	m3	C.2.12	0.024	4.7	$ 0.86	$ 172	$ -	$ -	$ 2.00	$ 399	$ 0.93	143	$ 186	$ -	$ -	$ 3.79	$758		
	Supply and place precast concrete manhole	1	ea.	C.3.08	16.000	16.0	$ 746.40	$ 746	$ 1,344.68	$ 1,345	$ 72.47	$ 72	$ 62.92	48	$ 63	$ -	$ -	$ 2,226.47	$2,226		
	Backfill and compact around manhole	200	m3	C.2.01	0.030	6.0	$ 1.08	$ 216	$ -	$ -	$ 0.74	$ 148	$ 0.40	61	$ 79	$ -	$ -	$ 2.22	$443		
	Install primary pump	1	ea.	C.3.10	12.000	12.0	$ 600.00	$ 600	$ 1,829.00	$ 1,829	$ -	$ -	$ -	0	$ -	$ -	$ -	$ 2,429.00	$2,429		
Piping system	Excavate piping trench	11,400	m3	C.2.13	0.020	228.0	$ 0.73	$ 8,345	$ -	$ -	$ 1.42	$ 16,223	$ 0.75	6,580	$ 8,555	$ -	$ -	$ 2.91	$33,122		
	Supply and install insulated 150mm HDPE pipe	1,900	m	C.3.03	0.250	475.0	$ 8.75	$ 16,625	$ 155.84	$ 296,096	$ -	$ -	$ -	0	$ -	$ -	$ -	$ 164.59	$312,721		
	Bedding layer: Produce, screen and stockpile	741	m3	C.2.02	0.010	7.4	$ 0.37	$ 271	$ -	$ -	$ 1.61	$ 1,192	$ 1.13	644	$ 837	$ -	$ -	$ 3.10	$2,300		
	Bedding layer: Load, haul, place and compact	741	m3	R.087	0.037	27.6	$ 1.36	$ 1,011	$ -	$ -	$ 2.83	$ 2,096	$ 1.30	742	$ 964	$ -	$ -	$ 5.49	$4,071		
	Backfill ditches	11,400	m3	C.2.01	0.030	342.0	$ 1.08	$ 12,335	$ -	$ -	$ 0.74	$ 8,411	$ 0.40	3,468	$ 4,509	$ -	$ -	$ 2.22	$25,254		
Heat tracing	Supply and install heat trace in HDPE pipe	1,900	m	C.3.04	0.250	475.0	$ 12.50	$ 23,750	$ 21.32	$ 40,508	$ -	$ -	$ -	0	$ -	$ -	$ -	$ 33.82	$64,258		
	Supply/Install heat tracing power feed kit	1	ea.	C.3.05	4.000	4.0	$ 230.00	$ 230	$ 396.84	$ 397	$ -	$ -	$ -	0	$ -	$ -	$ -	$ 626.84	$627		
	Supply/Install electrical thermostat for heat tracing	1	ea.	C.3.06	1.000	1.0	$ 57.50	$ 58	$ 1,025.00	$ 1,025	$ -	$ -	$ -	0	$ -	$ -	$ -	$ 1,082.50	$1,083		
Provide electricity from WTP to pumps	Supply/Install treated power poles	6	ea.	C.4.03	4.545	27.3	$ 297.88	$ 1,787	$ 325.96	$ 1,956	$ 85.85	$ 515	$ 28.17	130	$ 169	$ -	$ -	$ 737.86	$4,427		
	Supply/Install overhead conductor	400	m	C.4.02	0.032	12.8	$ 2.21	$ 885	$ 1.41	$ 564	$ 0.45	$ 181	$ 0.15	46	$ 59	$ -	$ -	$ 4.22	$1,690		
	Supply/Install transformers	1	ea.	C.4.04	20.000	20.0	$ 1,383.00	$ 1,383	$ 8,934.00	$ 8,934	$ 224.98	$ 225	$143.00	110	$ 143	$ -	$ -	$ 10,684.98	$10,685		
S-Cluster Collection System (to Pit)																				$315,565	
Construct access roads	Clear access road area	2,950	m2	C.2.04	0.004	10.7	$ 0.13	$ 393	$ -	$ -	$ 0.62	$ 1,841	$ 0.36	826	$ 1,073	$ -	$ -	$ 1.12	$3,307		

Attachment E
Example Alternatives - Cost Estimate

Faro Mine Area Alternative 3 - Minimize Up-Front Construction

Contract Code	Work Area Code	Item	Task	Sub-task	Estimate Type	Activity	Task	Quantity	Unit	Cost Code	Unit Mhrs	Total Mhrs	Labour Rate	Labor Cost	Unit Matl	Material Cost	Unit Equip.	Equipment Cost	Unit Fuel	Fuel Consumed (L)	Fuel Cost	Power Rate ($/Unit)	Power Cost	Unit Cost	Activity Total	Subtotals	Source / Comments
CLOSURE COSTS - DIRECT CAPITAL																											
Faro Pit																											
Water Treatment																										$613,450	
	1	1	1	430		Construct Water Treatment Plant	Water treatment costed separately	1	ls	-	0.000	0.0	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	0	$ -	$ -	$ -	$ -	$0	
	1	1	2	1	430	Place pipeline from pit to treatment plant	Excavate piping trench	15,000	Bm3	C.2.13	0.020	300.0	$ 0.73	$ 10,980	$ -	$ -	$ 1.42	$ 21,345	$ 0.75	8,658	$ 11,256	$ -	$ -	$ 2.91	$43,581		
	1	1	2	2	500		Supply and place pump	1	ea.	C.3.10	12.000	12.0	$ 600.00	$ 600	$ 1,829.00	$ 1,829	$ -	$ -	$ -	0	$ -	$ -	$ -	$ 2,429.00	$2,429		
	1	1	2	3	500		Build and install housing for primary pump	1	ea.	C.3.12	30.000	30.0	$ 1,950.00	$ 1,950	$ 1,730.00	$ 1,730	$ -	$ -	$ -	0	$ -	$ -	$ -	$ 3,680.00	$3,680		
	1	1	2	4	510		Supply and install insulated 150mm HDPE pipe	2,500	m	C.3.03	0.250	625.0	$ 8.75	$ 21,875	$ 155.84	$ 389,600	$ -	$ -	$ -	0	$ -	$ -	$ -	$ 164.59	$411,475		
	1	1	2	5	430		Bedding layer: Produce, screen and stockpile	975	Bm3	C.2.02	0.010	9.8	$ 0.37	$ 357	$ -	$ -	$ 1.61	$ 1,568	$ 1.13	847	$ 1,101	$ -	$ -	$ 3.10	$3,026		
	1	1	2	6	430		Bedding layer: Load, haul, place and compact	975	Bm3	R.045	0.037	35.8	$ 1.34	$ 1,308	$ -	$ -	$ 2.78	$ 2,712	$ 1.28	960	$ 1,247	$ -	$ -	$ 5.40	$5,268		
	1	1	2	7	430		Backfill ditches	15,000	Bm3	C.2.01	0.030	450.0	$ 1.08	$ 16,230	$ -	$ -	$ 0.74	$ 11,067	$ 0.40	4,563	$ 5,933	$ -	$ -	$ 2.22	$33,229		
	1	1	3	1	510	Heat tracing	Supply and install heat trace in HDPE pipe	2,500	m	C.3.04	0.250	625.0	$ 12.50	$ 31,250	$ 21.32	$ 53,300	$ -	$ -	$ -	0	$ -	$ -	$ -	$ 33.82	$84,550		
	1	1	3	2	510		Supply/install heat tracing power feed kit	1	ea.	C.3.05	4.000	4.0	$ 230.00	$ 230	$ 396.84	$ 397	$ -	$ -	$ -	0	$ -	$ -	$ -	$ 626.84	$627		
	1	1	3	3	510		Supply/install electrical thermostate for heat tracing	1	ea.	C.3.06	1.000	1.0	$ 57.50	$ 58	$ 1,025.00	$ 1,025	$ -	$ -	$ -	0	$ -	$ -	$ -	$ 1,082.50	$1,083		
	1	1	4	1	510	Provide electricity from WTP to pump	Supply/install treated power poles	13	ea.	C.4.03	4.545	59.1	$ 297.88	$ 3,872	$ 325.96	$ 4,237	$ 85.85	$ 1,116	$ 28.17	282	$ 366	$ -	$ -	$ 737.86	$9,592		
	1	1	4	2	510		Supply/install overhead conductor	1,000	m	C.4.02	0.032	32.0	$ 2.21	$ 2,213	$ 1.41	$ 1,410	$ 0.45	$ 453	$ 0.15	114	$ 140	$ -	$ -	$ 4.22	$4,225		
	1	1	4	3	510		Supply/install transformers	1	ea.	C.4.04	20.000	20.0	$ 1,383.00	$ 1,383	$ 8,934.00	$ 8,934	$ 224.98	$ 225	$ 143.00	110	$ 143	$ -	$ -	$ 10,684.98	$10,685		
Safety Berm																										$130,159	
	1	2	1	1	430	Construct access road	Clear access road area	3,500	m2	C.2.05	0.015	50.9	$ 0.53	$ 1,863	$ -	$ -	$ 0.94	$ 3,273	$ 0.62	1,651	$ 2,160	$ -	$ -	$ 2.08	$7,296		
	1	2	1	2	430		Construct access road	700	m	C.2.27	0.131	91.9	$ 4.80	$ 3,363	$ -	$ -	$ 10.14	$ 7,100	$ 5.33	2,858	$ 3,728	$ -	$ -	$ 20.27	$14,191		
	1	2	2	1	430	Place berm materials	Load, haul, dump berm material	22,000	Lm3	R.044	0.023	498.2	$ 0.83	$ 18,235	$ -	$ -	$ 1.97	$ 43,331	$ 0.91	15,366	$ 19,976	$ -	$ -	$ 3.71	$81,542		
	1	2	2	2	430		Final Shaping of material with dozer	4,400	m	C.2.03	0.020	88.0	$ 0.73	$ 3,221	$ -	$ -	$ 3.43	$ 15,106	$ 2.00	6,772	$ 8,804	$ -	$ -	$ 6.17	$27,130		
Subtotal Direct Costs - Faro Pit												2,933		$118,088		$462,462		$107,296		42,202	$54,863		$0			$743,609	
Faro Creek																											Golder report (Feb. 2004)
Improve/Maintain Faro Creek Diversion																										$64,437	
	2	1	1	1	430	Widen channel	Soil excavation: Load, haul and dump locall	5,000	Bm3	C.2.10	0.032	160.0	$ 1.17	$ 5,856	$ -	$ -	$ 2.72	$ 13,579	$ 1.27	4,878	$ 6,341	$ -	$ -	$ 5.16	$25,776		
	2	1	2	1	430	Place bedding layer	Bedding layer: Produce, screen and stockpile	1,000	Bm3	C.2.02	0.010	10.0	$ 0.37	$ 366	$ -	$ -	$ 1.61	$ 1,609	$ 1.13	869	$ 1,129	$ -	$ -	$ 3.10	$3,104		
	2	1	2	2	430		Bedding layer: Load, haul, place and compact	1,000	Bm3	R.053	0.076	75.9	$ 2.78	$ 2,777	$ -	$ -	$ 5.75	$ 5,755	$ 2.65	2,036	$ 2,647	$ -	$ -	$ 11.18	$11,178		
	2	1	3	1	430	Place rip-rap	Rip-Rap (angular, high quality): Screen and Stockpile	1,000	Bm3	C.2.25	0.057	57.1	$ 2.09	$ 2,091	$ -	$ -	$ 9.19	$ 9,192	$ 6.45	4,964	$ 6,454	$ -	$ -	$ 17.74	$17,737		2700m * 10m avg. * 0.25m
	2	1	3	2	430		Rip-rap: Load, haul, dump	1,000	Bm3	R.054	0.030	30.0	$ 1.10	$ 1,098	$ -	$ -	$ 2.57	$ 2,568	$ 1.16	892	$ 1,160	$ -	$ -	$ 4.83	$4,826		
	2	1	3	3	430		Rip-rap: Place and secure	1,000	Bm3	C.2.26	0.013	12.5	$ 0.46	$ 458	$ -	$ -	$ 0.89	$ 889	$ 0.47	361	$ 469	$ -	$ -	$ 1.82	$1,816		
Subtotal Direct Costs - Faro Creek												346		$12,645		$0		$33,592		14,000	$18,200		$0			$64,437	
Zone II Pit																										$343,698	
Water Management																											
	3	1	1	1	430	Groundwater Wells	Drill wells (Air Rotary Drill Rig, ~15m depth)	90	m	C.2.09	2.000	180.0	$ 102.13	$ 9,192	$ -	$ -	$ 100.85	$ 9,077	$ 22.08	1,529	$ 1,987	$ -	$ -	$ 225.07	$20,256		Pump and treat Zone II Pit water
	3	1	1	2	500		Install 6" stainless steel well casing & screen	90	m	C.3.17	0.150	13.5	$ 7.66	$ 689	$ 232.60	$ 20,934	$ 7.56	$ 681	$ 1.66	115	$ 149	$ -	$ -	$ 249.48	$22,453		
	3	1	1	3	500		Install 6" Submersible Pump with controls	1	ea.	C.3.07	12.000	12.0	$ 600.00	$ 600	$ 6,842.00	$ 6,842	$ -	$ -	$ -	0	$ -	$ -	$ -	$ 7,442.00	$7,442		
	3	1	1	4	500		Install protective housing (shack)	1	ea.	C.3.13	20.000	20.0	$ 1,300.00	$ 1,300	$ 445.00	$ 445	$ -	$ -	$ -	0	$ -	$ -	$ -	$ 1,745.00	$1,745		
	3	1	2	1	500	Monitoring wells	Drill wells (Air Rotary Drill Rig, ~90m depth)	180	m	C.2.09	2.000	360.0	$ 102.13	$ 18,384	$ -	$ -	$ 100.85	$ 18,153	$ 22.08	3,057	$ 3,974	$ -	$ -	$ 225.07	$40,512		
	3	1	2	2	500		Install 6" stainless steel well casing & screen	180	m	C.3.17	0.150	27.0	$ 7.66	$ 1,379	$ 232.60	$ 41,868	$ 7.56	$ 1,362	$ 1.66	229	$ 298	$ -	$ -	$ 249.48	$44,906		
	3	1	2	3	500		Install protective well cover	2	ea.	C.3.18	1.333	2.7	$ 48.80	$ 98	$ 164.54	$ 329	$ 100.85	$ 202	$ 22.08	34	$ 44	$ -	$ -	$ 336.27	$673		
	3	1	3	1	430	Piping system	Excavate piping trench	4,200	Bm3	C.2.13	0.020	84.0	$ 0.73	$ 3,074	$ -	$ -	$ 1.42	$ 5,977	$ 0.75	2,424	$ 3,152	$ -	$ -	$ 2.91	$12,203		
	3	1	3	2	510		Supply and install insulated 150mm HDPE pipe	700	m	C.3.03	0.250	175.0	$ 8.75	$ 6,125	$ 155.84	$ 109,088	$ -	$ -	$ -	0	$ -	$ -	$ -	$ 164.59	$115,213		
	3	1	3	3	430		Bedding layer: Produce, screen and stockpile	273	Bm3	C.2.02	0.010	2.7	$ 0.37	$ 100	$ -	$ -	$ 1.61	$ 439	$ 1.13	237	$ 308	$ -	$ -	$ 3.10	$847		
	3	1	3	4	430		Bedding layer: Load, haul, place and compact	273	Bm3	R.061	0.034	9.4	$ 1.26	$ 343	$ -	$ -	$ 2.61	$ 712	$ 1.20	252	$ 327	$ -	$ -	$ 5.07	$1,383		
	3	1	3	7	430		Backfill ditches	4,200	Bm3	C.2.01	0.030	126.0	$ 1.08	$ 4,544	$ -	$ -	$ 0.74	$ 3,099	$ 0.40	1,278	$ 1,661	$ -	$ -	$ 2.22	$9,304		
	3	1	4	1	510	Heat tracing	Supply and install heat trace in HDPE pipe	700	m	C.3.04	0.250	175.0	$ 12.50	$ 8,750	$ 21.32	$ 14,924	$ -	$ -	$ -	0	$ -	$ -	$ -	$ 33.82	$23,674		
	3	1	4	2	510		Supply/install heat tracing power feed kit	1	ea.	C.3.05	4.000	4.0	$ 230.00	$ 230	$ 396.84	$ 397	$ -	$ -	$ -	0	$ -	$ -	$ -	$ 626.84	$627		
	3	1	4	3	510		Supply/install electrical thermostate for heat tracing	1	ea.	C.3.06	1.000	1.0	$ 57.50	$ 58	$ 1,025.00	$ 1,025	$ -	$ -	$ -	0	$ -	$ -	$ -	$ 1,082.50	$1,083		
	3	1	5	1	510	Provide electricity from WTP to pumps	Supply/install treated power poles	29	ea.	C.4.03	4.545	131.8	$ 297.88	$ 8,638	$ 325.96	$ 9,453	$ 85.85	$ 2,490	$ 28.17	628	$ 817	$ -	$ -	$ 737.86	$21,398		
	3	1	5	2	510		Supply/install overhead conductor	2,200	m	C.4.02	0.032	70.4	$ 2.21	$ 4,868	$ 1.41	$ 3,102	$ 0.45	$ 997	$ 0.15	252	$ 327	$ -	$ -	$ 4.22	$9,295		
	3	1	5	3	510		Supply/install transformers	1	ea.	C.4.04	20.000	20.0	$ 1,383.00	$ 1,383	$ 8,934.00	$ 8,934	$ 224.98	$ 225	$ 143.00	110	$ 143	$ -	$ -	$ 10,684.98	$10,685		
Subtotal Direct Costs - Zone II Pit												1,414		$69,756		$217,341		$43,412		10,145	$13,188		$0			$343,698	
Oxide Fines / LGSP																										$0	
Covered In Place																											
	4	1	1	1	430	Covered in place (included under Waste Rock Section		1	ls	-	0.000	0.0	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	0	$ -	$ -	$ -	$ -	$0	
Subtotal Direct Costs - Oxide Fines												0		$0		$0		$0			$0		$0			$0	
ETA Tailings																										$0	
Left In Place																											
	5	1	1	1	430	GW collection dependant on Cross-Valley Dam system		1	ls	-	0.000	0.0	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	0	$ -	$ -	$ -	$ -	$0	
Subtotal Direct Costs - ETA												0		$0		$0		$0			$0		$0			$0	
Waste Rock																											
Regrade Waste Rock																										$154,045	
	6	1	2	1	430	Regrade	Flattened surfaces (enhance surface runoff)	429	hrs	C.2.22	1.000	429.0	$ 36.60	$ 15,702	$ -	$ -	$ 173.28	$ 74,341	$ 149.18	49,232	$ 64,002	$ -	$ -	$ 359.06	$154,045		
Waste Rock Cover																										$16,409,276	
	6	3	1	1	430	Place cover on flattened surfaces	Load, haul, place loose till (0.5m)	1,235,736	m3	R.076	0.050	62281.1	$ 1.84	$ 2,279,488	$ -	$ -	$ 6.95	$ 8,583,449	$ 4.49	4,266,415	$ 5,546,339	$ -	$ -	$ 13.28	$16,409,276		
Revegetate																										$259,791	
	6	6	1	1	610	Revegetate WR dumps	Seed/Fertilize, helicopter low application rate	2,471,472	m2	C.5.02	0.000	308.9	$ 0.00	$ 11,095	$ 0.05	$ 112,353	$ 0.05	$ 134,702	$ 0.00	1,262	$ 1,641	$ -	$ -	$ 0.11	$259,791		
							Note: Removal of North Fork Rock Drain included in Tailings Alternative																				
Subtotal Direct Costs - Waste Rock												63,019		$2,306,286		$112,353		$8,792,491		4,316,909	$5,611,982		$0			$16,823,112	
Groundwater																											1CD003.053
North Fork Rose Creek Collection System (to Plant)																										$139,439	
	7	4	1	1	430	Groundwater wells	Drill wells (Air Rotary Drill Rig, ~20m depth)	100	m	C.2.09	2.000	200.0	$ 102.13	$ 10,213	$ -	$ -	$ 100.85	$ 10,085	$ 22.08	1,698	$ 2,208	$ -	$ -	$ 225.07	$22,507		
	7	4	1	2	500		Install 6" stainless steel well casing & screen	100	m	C.3.17	0.150	15.0	$ 7.66	$ 766	$ 232.60	$ 23,260	$ 7.56	$ 756	$ 1.66	127	$ 166	$ -	$ -	$ 249.48	$24,948		
	7	4	1	3	500		Install 6" Submersible Pump with controls	3	ea.	C.3.07	12.000	36.0	$ 600.00	$ 1,800	$ 6,842.00	$ 20,526	$ -	$ -	$ -	0	$ -	$ -	$ -	$ 7,442.00	$22,326		
	7	4	1	4	500		Install protective housing (shack)	3	ea.	C.3.13	20.000	60.0	$ 1,300.00	$ 3,900	$ 445.00	$ 1,335	$ -	$ -	$ -	0	$ -	$ -	$ -	$ 1,745.00	$5,235		
	7	4	2	1	430	Pumping station	Excavate sump for manholes	200	m3	C.2.12	0.024	4.7	$ 0.86	$ 172	$ -	$ -	$ 2.00	$ 399	$ 0.93	143	$ 186	$ -	$ -	$ 3.79	$758		
	7	4	2	2	500		Supply and place precast concrete manhole	1	ea.	C.3.08	16.000	16.0	$ 746.40	$ 746	$ 1,344.68	$ 1,345	$ 72.47	$ 72	$ 62.92	48	$ 63	$ -	$ -	$ 2,226.47	$2,226		
	7	4	2	3	430		Backfill and compact around manhole	200	m3	C.2.01	0.030	6.0	$ 1.08	$ 216	$ -	$ -	$ 0.74	$ 148	$ 0.40	61	$ 79	$ -	$ -	$ 2.22	$443		
	7	4	2	4	500		Install primary pump	1	ea.	C.3.10	12.000	12.0	$ 600.00	$ 600	$ 1,829.00	$ 1,829	$ -	$ -	$ -	0	$ -	$ -	$ -	$ 2,429.00	$2,429		
	7	4	3	1	430	Piping system	Excavate piping trench	1,080	m3	C.2.13	0.020	21.6	$ 0.73	$ 791	$ -	$ -	$ 1.42	$ 1,537	$ 0.75	623	$ 810	$ -	$ -	$ 2.91	$3,138		
	7	4	3	2	510		Supply and install insulated 150mm HDPE pipe	180	m	C.3.03	0.250	45.0	$ 8.75	$ 1,575	$ 155.84	$ 28,051	$ -	$ -	$ -	0	$ -	$ -	$ -	$ 164.59	$29,626		
	7	4	3	6	430		Bedding layer: Produce, screen and stockpile	70	m3	C.2.02	0.010	0.7	$ 0.37	$ 26	$ -	$ -	$ 1.61	$ 113	$ 1.13	61	$ 79	$ -	$ -	$ 3.10	$218		
	7	4	3	7	430		Bedding layer: Load, haul, place and compact	70	m3	R.089	0.029	2.0	$ 1.07	$ 75	$ -	$ -	$ 2.21	$ 155	$ 1.04	58	$ 73	$ -	$ -	$ 4.31	$303		
	7	4	3	8	430		Backfill ditches	1,080	m3	C.2.01	0.030	32.4	$ 1.08	$ 1,169	$ -	$ -	$ 0.74	$ 797	$ 0.40	329	$ 427	$ -	$ -	$ 2.22	$2,392		
	7	4	4	1	510	Heat tracing	Supply and install heat trace in HDPE pipe	180	m	C.3.04	0.250	45.0	$ 12.50	$ 2,250	$ 21.32	$ 3,838	$ -	$ -	$ -	0	$ -	$ -	$ -	$ 33.82	$6,088		
0	7	4	5	1	510	Provide electricity from WTP to pumps	Supply/install treated power poles	6	ea.	C.4.03	4.545	27.3	$ 297.88	$ 1,787	$ 325.96	$ 1,956	$ 85.85	$ 515	$ 28.17	130	$ 169	$ -	$ -	$ 737.86	$4,427		
	7	4	5	2	510		Supply/install overhead conductor	400	m	C.4.02	0.032	12.8	$ 2.21	$ 885	$ 1.41	$ 564	$ 0.45	$ 181	$ 0.15	40	$ 59	$ -	$ -	$ 4.22	$1,690		
	7	4	5	3	510		Supply/install transformers	1	ea.	C.4.04	20.000	20.0	$ 1,383.00	$ 1,383	$ 8,934.00	$ 8,934	$ 224.98	$ 225	$ 143.00	110	$ 143	$ -	$ -	$ 10,684.98	$10,685		
S-Cluster Collection System (to Plant)																										$283,543	
	7	5	1	1	430	Construct access roads	Clear access road area	2,950	m2	C.2.04	0.004	10.7	$ 0.13	$ 393	$ -	$ -	$ 0.62	$ 1,841	$ 0.36	826	$ 1,073	$ -	$ -	$ 1.12	$3,307		
	7	5	1	2	430		Construct access road	590	m	C.2.27	0.131	77.4	$ 4.80	$ 2,834	$ -	$ -	$ 10.14	$ 5,984	$ 5.33	2,417	$ 3,142	$ -	$ -	$ 20.27	$11,961		
	7	5	2	1	430	Pumping wells	Drill wells (Air Rotary Drill Rig, ~10m depth)	50	m	C.2.09	2.000	100.0	$ 102.13	$ 5,107	$ -	$ -	$ 100.85	$ 5,043	$ 22.08	849	$ 1,104	$ -	$ -	$ 225.07	$11,253		
	7	5	2	2	500		Install 6" stainless steel well casing & screen	50	m	C.3.17	0.150	7.5	$ 7.66	$ 383	$ 232.60	$ 11,630	$ 7.56	$ 378	$ 1.66	84	$ 83	$ -	$ -	$ 249.48	$12,474		
	7	5	2	3	500		Install 6" Submersible Pump with controls	5	ea.	C.3.07	12.000	60.0	$ 600.00	$ 3,000	$ 6,842.00	$ 34,210	$ -	$ -	$ -	0	$ -	$ -	$ -	$ 7,442.00	$37,210		
	7	5	2	4	500		Install protective housing (shack)	5	ea.	C.3.13	20.000	100.0	$ 1,300.00	$ 6,500	$ 445.00	$ 2,225	$ -	$ -	$ -	0	$ -	$ -	$ -	$ 1,745.00	$8,725		
	7	5	4	1	430	Monitoring wells	Drill wells (Air Rotary Drill Rig, ~15m depth)	30	m	C.2.09	2.000	60.0	$ 102.13	$ 3,064	$ -	$ -	$ 100.85	$ 3,026	$ 22.08	510	$ 662	$ -	$ -	$ 225.07	$6,752		
	7	5	4	2	500		Install 6" stainless steel well casing & screen	30	m	C.3.17	0.150	4.5	$ 7.66	$ 230	$ 232.60	$ 6,978	$ 7.56	$ 227	$ 1.66	38	$ 50	$ -	$ -	$ 249.48	$7,484		
	7	5	4	3	500		Install protective well cover	2	ea.	C.3.13	20.000	40.0	$ 1,300.00	$ 2,600	$ 445.00	$ 890	$ -	$ -	$ -	0	$ -	$ -	$ -	$ 1,745.00	$3,490		
	7	5	5	1	430	Pumping Station	Excavate sump for manhole	200	m3	C.2.12	0.024	4.7	$ 0.86	$ 172	$ -	$ -	$ 2.00	$ 399	$ 0.93	143	$ 186	$ -	$ -	$ 3.79	$758		
	7	5	5	2	500		Supply and place precast concrete manhole	1	ea.	C.3.08	16.000	16.0	$ 746.40	$ 746	$ 1,344.68	$ 1,345	$ 72.47	$ 72	$ 62.92	48	$ 63	$ -	$ -	$ 2,226.47	$2,226		
	7	5	5	3	430		Backfill and compact around manhole	200	m3	C.2.01	0.030	6.0	$ 1.08	$ 216	$ -	$ -	$ 0.74	$ 148	$ 0.40	61	$ 79	$ -	$ -	$ 2.22	$443		
	7	5	5	4	500		Install Primary pump	1	ea.	C.3.10	12.000	12.0	$ 600.00	$ 600	$ 1,829.00	$ 1,829	$ -	$ -	$ -	0	$ -	$ -	$ -	$ 2,429.00	$2,429		
	7	5	6	1	430	Piping	Excavate piping trench	4,200	m3	C.2.13	0.020	84.0	$ 0.73	$ 3,074	$ -	$ -	$ 1.42	$ 5,977	$ 0.75	2,424	$ 3,152	$ -	$ -	$ 2.91	$12,203		
	7	5	6	2	510		Supply and install insulated 150mm HDPE pipe	700	m	C.3.03	0.250	175.0	$ 8.75	$ 6,125	$ 155.84	$ 109,088	$ -	$ -	$ -	0	$ -	$ -	$ -	$ 164.59	$115,213		
	7	5	6	3	430		Bedding layer: Produce, screen and stockpile	273	m3	C.2.02	0.010	2.7	$ 0.37	$ 100	$ -	$ -	$ 1.61	$ 439	$ 1.13	237	$ 308	$ -	$ -	$ 3.10	$847		
	7	5	6	4	430		Bedding Layer: Load, haul, place and compact	273	m3	R.090	0.029	7.9	$ 1.07	$ 291	$ -	$ -	$ 2.21	$ 603	$ 1.04	218	$ 283	$ -	$ -	$ 4.31	$1,177		
	7	5	6	5	430		Backfill and compact ditches	3,927	m3	C.2.01	0.030	117.8	$ 1.08	$ 4,249	$ -	$ -	$ 0.74	$ 2,897	$ 0.40	1,195	$ 1,553	$ -	$ -	$ 2.22	$8,699		

Example Alternatives - Cost Estimate

Activity	Task	Quantity	Unit	Cost Code	Unit Mhrs	Total Mhrs	Labour Rate	Labor Cost	Unit Matl	Material Cost	Unit Equip.	Equipment Cost	Unit Fuel	Fuel Consumed (L)	Fuel Cost	Power Rate ($/Unit)	Power Cost	Total Unit Cost	Activity Total	Subtotals	Source / Comments
	Construct access road	590	m	C.2.27	0.131	77.4	$ 4.80	$ 2,834	$ -	$ -	$ 10.14	$ 5,984	$ 5.33	2,417	$ 3,142	$ -	$ -	$ 20.27	$11,961		
Pumping wells	Drill wells (Air Rotary Drill Rig, ~10m depth)	50	m	C.2.09	2.000	100.0	$ 102.13	$ 5,107	$ -	$ -	$ 100.85	$ 5,043	$ 22.08	840	$ 1,104	$ -	$ -	$ 225.07	$11,253		
	Install 6" stainless steel well casing & screen	50	m	C.3.17	0.150	7.5	$ 7.66	$ 383	$ 232.60	$ 11,630	$ 7.56	$ 378	$ 1.66	64	$ 83	$ -	$ -	$ 249.48	$12,474		
	Install 6" Submersible Pump with controls	5	ea.	C.3.07	12.000	60.0	$ 600.00	$ 3,000	$ 6,842.00	$ 34,210	$ -	$ -	$ -	0	$ -	$ -	$ -	$ 7,442.00	$37,210		
	Install protective housing (shack)	5	ea.	C.3.13	20.000	100.0	$ 1,300.00	$ 6,500	$ 445.00	$ 2,225	$ -	$ -	$ -	0	$ -	$ -	$ -	$ 1,745.00	$8,725		
Monitoring wells	Drill wells (Air Rotary Drill Rig, ~15m depth)	30	m	C.2.09	2.000	60.0	$ 102.13	$ 3,064	$ -	$ -	$ 100.85	$ 3,026	$ 22.08	510	$ 662	$ -	$ -	$ 225.07	$6,752		
	Install 6" stainless steel well casing & screen	30	m	C.3.17	0.150	4.5	$ 7.66	$ 230	$ 232.60	$ 6,978	$ 7.56	$ 227	$ 1.66	38	$ 50	$ -	$ -	$ 249.48	$7,484		
	Install protective well cover	2	ea.	C.3.13	20.000	40.0	$ 1,300.00	$ 2,600	$ 445.00	$ 890	$ -	$ -	$ -	0	$ -	$ -	$ -	$ 1,745.00	$3,490		
Pumping Station	Excavate sump for manhole	200	m3	C.2.12	0.024	4.7	$ 0.86	$ 172	$ -	$ -	$ 2.00	$ 399	$ 0.93	143	$ 186	$ -	$ -	$ 3.79	$758		
	Supply and place precast concrete manhole	1	ea.	C.3.08	16.000	16.0	$ 746.40	$ 746	$ 1,344.68	$ 1,345	$ 72.47	$ 72	$ 62.92	48	$ 63	$ -	$ -	$ 2,226.47	$2,226		
	Backfill and compact around manhole	200	m3	C.2.01	0.030	6.0	$ 1.08	$ 216	$ -	$ -	$ 0.74	$ 148	$ 0.40	61	$ 79	$ -	$ -	$ 2.22	$443		
	Install Primary pump	1	ea.	C.3.10	12.000	12.0	$ 600.00	$ 600	$ 1,829.00	$ 1,829	$ -	$ -	$ -	0	$ -	$ -	$ -	$ 2,429.00	$2,429		
Piping	Excavate piping trench	4,800	m3	C.2.13	0.020	96.0	$ 0.73	$ 3,514	$ -	$ -	$ 1.42	$ 6,831	$ 0.75	2,771	$ 3,602	$ -	$ -	$ 2.91	$13,946		
	Supply and install insulated 150mm HDPE pipe	800	m	C.3.03	0.250	200.0	$ 8.75	$ 7,000	$ 155.84	$ 124,672	$ -	$ -	$ -	0	$ -	$ -	$ -	$ 164.59	$131,672		
	Bedding layer: Produce, screen and stockpile	312	m3	C.2.02	0.010	3.1	$ 0.37	$ 114	$ -	$ -	$ 1.61	$ 502	$ 1.13	271	$ 352	$ -	$ -	$ 3.10	$968		
	Bedding Layer: Load, haul, place and compact	312	m3	R.088	0.037	11.4	$ 1.34	$ 419	$ -	$ -	$ 2.78	$ 868	$ 1.28	307	$ 399	$ -	$ -	$ 5.40	$1,686		
	Backfill and compact ditches	4,488	m3	C.2.01	0.030	134.6	$ 1.08	$ 4,856	$ -	$ -	$ 0.74	$ 3,311	$ 0.40	1,365	$ 1,775	$ -	$ -	$ 2.22	$9,942		
Heat Tracing	Supply and install heat trace in HDPE pipe	800	m	C.3.04	0.250	200.0	$ 12.50	$ 10,000	$ 21.32	$ 17,056	$ -	$ -	$ -	0	$ -	$ -	$ -	$ 33.82	$27,056		
	Supply/Install heat tracing power feed kit	1	ea.	C.3.05	4.000	4.0	$ 230.00	$ 230	$ 396.84	$ 397	$ -	$ -	$ -	0	$ -	$ -	$ -	$ 626.84	$627		
	Supply/Install electrical thermostat for heat tracing	1	ea.	C.3.06	1.000	1.0	$ 57.50	$ 58	$ 1,025.00	$ 1,025	$ -	$ -	$ -	0	$ -	$ -	$ -	$ 1,082.50	$1,083		
Provide Electricity from WTP to pumps	Supply/Install treated power poles	9	ea.	C.4.03	4.545	40.9	$ 207.86	$ 2,681	$ 325.96	$ 2,934	$ 85.85	$ 773	$ 28.17	195	$ 254	$ -	$ -	$ 737.86	$6,641		
	Supply/Install overhead conductor	650	m	C.4.02	0.032	20.8	$ 2.21	$ 1,438	$ 1.41	$ 917	$ 0.45	295	$ 0.15	74	$ 97	$ -	$ -	$ 4.22	$2,746		
	Supply/Install transformers	1	ea.	C.4.04	20.000	20.0	$ 1,363.00	$ 1,363	$ 8,934.00	$ 8,934	$ 224.98	$ 225	$ 143.00	110	$ 143	$ -	$ -	$ 10,684.98	$10,685		
Subtotal Direct Costs - Groundwater						11,147		$431,663		$912,821		$721,478		295,477	$384,120		$0			$2,450,082	
Miscellaneous																					
Roads																				$12,639	
Reclaim unnecessary roads	Remove culverts and breach stream crossing	2,240	m3	C.2.12	0.024	52.7	$ 0.86	$ 1,929	$ -	$ -	$ 2.00	$ 4,473	$ 0.93	1,607	$ 2,089	$ -	$ -	$ 3.79	$8,490.78		
	Scarify road surfaces	10,500	m2	C.2.29	0.003	26.3	$ 0.69	$ 961	$ -	$ -	$ 0.10	$ 1,056	$ 0.10	790	$ 1,027	$ -	$ -	$ 0.20	$3,044.27		
	Seed/Fertilize, helicopter low application rate	10,500	m2	C.5.02	0.000	1.3	$ 0.00	$ 47	$ 0.05	$ 477	$ 0.05	$ 572	$ 0.00	5	$ 7	$ -	$ -	$ 0.11	$1,103.72		
Buildings																				$4,980,737	
Building decontamination	Remove hazardous materials	56,400	m3	C.1.01	0.556	31333.3	$ 24.44	$ 1,378,667	$ -	$ -	$ 2.17	$ 122,536	$ 1.55	67,210	$ 87,373	$ -	$ -	$ 28.17	$1,588,578		
Building demolition	Building demolition: 'empty buildings'	24,600	m2	C.1.02	0.310	7627.9	$ 11.10	$ 273,079	$ -	$ -	$ 15.54	$ 382,319	$ 8.55	161,880	$ 210,444	$ -	$ -	$ 35.20	$865,843		
	Building demolition: 'full buildings'	47,700	m2	C.1.03	0.465	22186.0	$ 16.65	$ 794,260	$ -	$ -	$ 23.31	$ 1,111,989	$ 12.83	470,835	$ 612,085	$ -	$ -	$ 52.80	$2,518,335		
	Puncture concrete foundations	20	m	C.1.04	0.182	3.6	$ 6.65	$ 133	$ -	$ -	$ 20.26	$ 405	$ 13.15	202	$ 263	$ -	$ -	$ 40.07	$801		
	Re-grade over demolished buildings	20	hrs	C.2.22	1.000	20.0	$ 36.60	$ 732	$ -	$ -	$ 173.28	$ 3,466	$ 149.18	2,285	$ 2,984	$ -	$ -	$ 359.06	$7,181		
Contaminated soils																				$125,599	
Remove contaminated soils	Excavate, haul and place hydrocarbon contaminated soils in landfarm	15,000	m3	R.091	0.030	450.0	$ 1.10	$ 16,470	$ -	$ -	$ 2.94	$ 44,035	$ 1.44	16,574	$ 21,547	$ -	$ -	$ 5.47	$82,052		
	Excavate metal contaminated soil to Low-Grade Stockpile 'C'	7,500	m3	R.091	0.030	225.0	$ 1.10	$ 8,235	$ -	$ -	$ 2.94	$ 22,018	$ 1.44	8,287	$ 10,773	$ -	$ -	$ 5.47	$41,026		
	Regrade contaminated areas for drainage	10,000	m2	C.2.18	0.002	21.7	$ 0.08	$ 796	$ -	$ -	$ 0.09	$ 875	$ 0.09	654	$ 851	$ -	$ -	$ 0.25	$2,521		
Landfarm																				$45,657	
Contruct landfarm	Excavate and create berms for use as the bioremediation cell	8,000	m3	C.2.11	0.013	106.7	$ 0.49	$ 3,904	$ -	$ -	$ 0.95	$ 7,590	$ 0.50	3,079	$ 4,002	$ -	$ -	$ 1.94	$15,496		
Operate Landfarm (3yrs)	Excavator Cat 330BL/235B (mixing)	80	hrs	C.2.22	1.000	80.0	$ 36.60	$ 2,928	$ -	$ -	$ 173.28	$ 13,862	$ 149.18	9,180	$ 11,934	$ -	$ -	$ 359.06	$28,725		
Decommision landfarm	Excavate soils for use as cover	1	ls	-	0.000	0.0	$ -	$ -	$ -	$ -	$ -	$ -	$ -	0	$ -	$ -	$ -	$ -	$0		costed elsewhere
	Remove berms (dozer)	4	hrs	C.2.22	1.000	4.0	$ 36.60	$ 146	$ -	$ -	$ 173.28	$ 693	$ 149.18	459	$ 597	$ -	$ -	$ 359.06	$1,436		
Borrow Sources																				$101,017	
Develop borrow sources	Clear (grub access road)	1,500	m2	C.2.05	0.015	21.8	$ 0.53	$ 799	$ -	$ -	$ 0.94	$ 1,403	$ 0.62	712	$ 926	$ -	$ -	$ 2.08	$3,127		
	Construct access road	500	m	C.2.28	0.225	112.5	$ 8.24	$ 4,118	$ -	$ -	$ 29.67	$ 14,837	$ 19.48	7,493	$ 9,741	$ -	$ -	$ 57.39	$28,696		
Decommission borrow sources	Re-grade borrow source slopes	11	hrs	C.2.22	1.000	10.9	$ 36.60	$ 399	$ -	$ -	$ 173.28	$ 1,890	$ 149.18	1,252	$ 1,628	$ -	$ -	$ 359.06	$3,917		
	Seed/Fertilize, helicopter low application rate	621,000	m2	C.5.02	0.000	77.6	$ 0.00	$ 2,788	$ 0.05	$ 28,231	$ 0.05	$ 33,846	$ 0.00	317	$ 412	$ -	$ -	$ 0.11	$65,277		
Subtotal Direct Costs - Miscellaneous						62,361		$2,490,390		$28,708		$1,767,867		752,833	$978,683		$0			$5,265,648	
Subtotal Direct Costs																					
	Subtotal direct costs					276,393		$10,700,167		$4,907,268		$24,338,151		11,590,031	$15,067,040		$0			$55,102,626	
CLOSURE COSTS - INDIRECT																					
Project Management	5.0% of direct costs															$55,102,626	x	5.0%		$2,755,131	
Field Supervision	(included in major tasks)																			$0	
Contractor profit and home office overhead	10% of direct costs															$55,102,626	x	10.0%		$5,510,263	
Insurance	0.5% of direct costs															$55,102,626	x	0.5%		$275,513	
Bonding	0.5% of direct costs															$55,102,626	x	0.5%		$275,513	
Field Engineering and QA	10% of direct costs															$55,102,626	x	10.0%		$5,510,263	
Mob - Demob																1	lump	$500,000		$500,000	
Living out allowances	(included in heavy equipment costs)																			$0	
Subtotal Indirect Costs																					
Subtotal indirect costs																				$14,826,683	
CLOSURE COSTS - CONTINGENCY																					
Contingency	20% of direct costs															$55,102,626	x	20.0%		$11,020,525	
CLOSURE COSTS - TOTAL																					
Total direct and indirect costs																				$80,949,834	

Attachment E

Example Alternatives - Cost Estimate

Faro Mine Area Alternative 2 - Upgrade Faro Creek Diversion

Contract Code	Activity	Task	Quantity	Unit	Cost Code	Unit Mhrs	Total Mhrs	Labour Rate	Labor Cost	Unit Matl	Material Cost	Unit Equip.	Equipment Cost	Unit Fuel	Fuel Consumed (L)	Fuel Cost	Power Rate ($/Unit)	Power Cost	Unit Cost	Activity Total	Subtotals	Source / Comments
CLOSURE COSTS - DIRECT CAPITAL																						
Faro Pit																						
Water Treatment																					$613,450	
	Place pipeline from pit to treatment plant	Excavate piping trench	15,000	Bm3	C.2.13	0.020	300.0	$ 0.73	$ 10,980	$ -	$ -	$ 1.42	$ 21,345	$ 0.75	8,658	$ 11,256	$ -	$ -	$ 2.91	$43,581		
		Supply and place pump	1	ea.	C.3.10	12.000	12.0	$ 600.00	$ 600	$ 1,829.00	$ 1,829	$ -	$ -	$ -	0	$ -	$ -	$ -	$ 2,429.00	$2,429		
		Build and install housing for primary pump	1	ea.	C.3.12	30.000	30.0	$ 1,950.00	$ 1,950	$ 1,730.00	$ 1,730	$ -	$ -	$ -	0	$ -	$ -	$ -	$ 3,680.00	$3,680		
		Supply and install insulated 150mm HDPE pipe	2,500	m	C.3.03	0.250	625.0	$ 8.75	$ 21,875	$ 155.84	$ 389,600	$ -	$ -	$ -	0	$ -	$ -	$ -	$ 164.59	$411,475		
		Bedding layer: Produce, screen and stockpile	975	Bm3	C.2.02	0.010	9.8	$ 0.37	$ 357	$ -	$ -	$ 1.61	$ 1,568	$ 1.13	847	$ 1,101	$ -	$ -	$ 3.10	$3,026		
		Bedding layer: Load, haul, place and compact	975	Bm3	R.045	0.037	35.8	$ 1.34	$ 1,308	$ -	$ -	$ 2.78	$ 2,712	$ 1.28	960	$ 1,247	$ -	$ -	$ 5.40	$5,268		
		Backfill ditches	15,000	Bm3	C.2.01	0.030	450.0	$ 1.08	$ 16,230	$ -	$ -	$ 0.74	$ 11,067	$ 0.40	4,563	$ 5,933	$ -	$ -	$ 2.22	$33,229		
	Heat tracing	Supply and install heat trace in HDPE pipe	2,500	m	C.3.04	0.250	625.0	$ 12.50	$ 31,250	$ 21.32	$ 53,300	$ -	$ -	$ -	0	$ -	$ -	$ -	$ 33.82	$84,550		
		Supply/install heat tracing power feed kit	1	ea.	C.3.05	4.000	4.0	$ 230.00	$ 230	$ 396.84	$ 397	$ -	$ -	$ -	0	$ -	$ -	$ -	$ 626.84	$627		
		Supply/install electrical thermostate for heat tracing	1	ea.	C.3.06	1.000	1.0	$ 57.50	$ 58	$ 1,025.00	$ 1,025	$ -	$ -	$ -	0	$ -	$ -	$ -	$ 1,082.50	$1,083		
	Provide electricity from WTP to pump	Supply/install treated power poles	13	ea.	C.4.03	4.545	59.1	$ 267.88	$ 3,872	$ 325.96	$ 4,237	$ 85.85	$ 1,116	$ 28.17	282	$ 366	$ -	$ -	$ 737.86	$9,592		
		Supply/install overhead conductor	1,000	m	C.4.02	0.032	32.0	$ 2.21	$ 2,213	$ 1.41	$ 1,410	$ 0.45	$ 453	$ 0.15	114	$ 149	$ -	$ -	$ 4.22	$4,225		
		Supply/install transformers	1	ea.	C.4.04	20.000	20.0	$ 1,383.00	$ 1,383	$ 8,934.00	$ 8,934	$ 224.98	$ 225	$ 143.00	110	$ 143	$ -	$ -	$ 10,684.98	$10,685		
Safety Berm																					$130,159	
	Construct access road	Clear access road area	3,500	m2	C.2.05	0.015	50.9	$ 0.53	$ 1,863	$ -	$ -	$ 0.94	$ 3,273	$ 0.62	1,661	$ 2,160	$ -	$ -	$ 2.08	$7,296		
		Construct access road	700	m	C.2.27	0.131	91.9	$ 4.80	$ 3,363	$ -	$ -	$ 10.14	$ 7,100	$ 5.33	2,868	$ 3,728	$ -	$ -	$ 20.27	$14,191		
	Place berm materials	Load, haul, dump berm material	22,000	Lm3	R.044	0.023	498.2	$ 0.83	$ 18,235	$ -	$ -	$ 1.97	$ 43,331	$ 0.91	15,366	$ 19,976	$ -	$ -	$ 3.71	$81,542		
		Final Shaping of material with dozer	4,400	m	C.2.03	0.020	88.0	$ 0.73	$ 3,221	$ -	$ -	$ 3.43	$ 15,106	$ 2.00	6,772	$ 8,804	$ -	$ -	$ 6.17	$27,130		
Subtotal Direct Costs - Faro Pit							2,933		$118,988		$462,462		$107,296		42,202	$54,863		$0			$743,609	
Faro Creek																						Golder report (Feb. 2004)
Construct East Interceptor																					$4,063,839	
	Construct access road	Clear access road area	135,000	m2	C.2.04	0.004	490.9	$ 0.13	$ 17,967	$ -	$ -	$ 0.62	$ 84,268	$ 0.36	37,777	$ 49,111	$ -	$ -	$ 1.12	$151,346		2700m * 50m avg
		Construct access road	3,057	m	C.2.27	0.131	401.2	$ 4.80	$ 14,685	$ -	$ -	$ 10.14	$ 31,007	$ 5.33	12,524	$ 16,281	$ -	$ -	$ 20.27	$61,973		
		Soil excavation: Load, haul and dump locall	230,000	Bm3	C.2.10	0.032	7360.8	$ 1.17	$ 269,376	$ -	$ -	$ 2.72	$ 624,625	$ 1.27	224,387	$ 291,677	$ -	$ -	$ 5.16	$1,185,677		
	Excavate channe	Granular fill: Produce, screen and stockpile	81,000	Bm3	C.2.02	0.010	810.0	$ 0.37	$ 29,646	$ -	$ -	$ 1.61	$ 130,300	$ 1.13	70,370	$ 91,481	$ -	$ -	$ 3.10	$251,427		2700m * 20m avg. * 1.5m
	Place thermal blanket	Granular fill: Load, haul, place and compact on uphill cut slope	81,000	Bm3	R.053	0.076	6144.8	$ 2.78	$ 224,901	$ -	$ -	$ 5.75	$ 466,125	$ 2.65	164,937	$ 214,418	$ -	$ -	$ 11.18	$905,444		
	Place GCL	Supply and place GCL	27,000	m2	C.4.08	0.143	3857.1	$ 6.33	$ 170,949	$ 16.00	$ 432,000	$ 1.63	$ 44,023	$ 1.06	21,938	$ 28,520	$ -	$ -	$ 25.02	$675,492		2700m * 10m avg.
	Place bedding layer	Bedding layer: Produce, screen and stockpile	8,100	Bm3	C.2.02	0.010	81.0	$ 0.37	$ 2,965	$ -	$ -	$ 1.61	$ 13,030	$ 1.13	7,037	$ 9,148	$ -	$ -	$ 3.10	$25,143		
		Bedding layer: Load, haul, place and compact	8,100	Bm3	R.053	0.076	614.5	$ 2.78	$ 22,490	$ -	$ -	$ 5.75	$ 46,613	$ 2.65	16,494	$ 21,442	$ -	$ -	$ 11.18	$90,544		
	Place rip-rap	Rip-Rap (angular, high quality): Screen and Stockpile	29,402	Bm3	C.2.25	0.057	1680.1	$ 2.09	$ 61,491	$ -	$ -	$ 9.19	$ 270,266	$ 6.45	145,961	$ 189,749	$ -	$ -	$ 17.74	$521,506		2700m * 10m avg. * 0.25m
		Rip-rap: Load, haul, dump	29,402	Bm3	R.054	0.030	882.0	$ 1.10	$ 32,283	$ -	$ -	$ 2.57	$ 75,502	$ 1.16	26,240	$ 34,112	$ -	$ -	$ 4.83	$141,897		
		Rip-rap: Place and secure	29,402	Bm3	C.2.26	0.013	367.5	$ 0.46	$ 13,451	$ -	$ -	$ 0.89	$ 26,150	$ 0.47	10,607	$ 13,789	$ -	$ -	$ 1.82	$53,390		
Optional Extension across west of Faro Valley																					$737,645	
	Construct access road	Clear access road area	20,300	m2	C.2.05	0.015	295.3	$ 0.53	$ 10,807	$ -	$ -	$ 0.84	$ 18,882	$ 0.62	9,635	$ 12,525	$ -	$ -	$ 2.08	$42,314		
		Construct access road	2,100	m	C.2.27	0.131	275.6	$ 4.80	$ 10,088	$ -	$ -	$ 10.14	$ 21,300	$ 5.33	8,603	$ 11,184	$ -	$ -	$ 20.27	$42,572		
	Excavate channel	Soil excavation: Load, haul and dump locally	93,076	Bm3	C.2.10	0.032	2978.4	$ 1.17	$ 109,010	$ -	$ -	$ 2.72	$ 252,771	$ 1.27	90,796	$ 118,035	$ -	$ -	$ 5.16	$470,815		
	Place bedding layer	Bedding layer: Produce, screen and stockpile	4,263	Bm3	C.2.02	0.010	42.6	$ 0.37	$ 1,560	$ -	$ -	$ 1.61	$ 6,858	$ 1.13	3,704	$ 4,815	$ -	$ -	$ 3.10	$13,233		
		Bedding layer: Load, haul, place and compact	4,263	Bm3	R.055	0.100	426.3	$ 3.66	$ 15,603	$ -	$ -	$ 7.59	$ 32,338	$ 3.49	11,443	$ 14,875	$ -	$ -	$ 14.74	$62,816		
	Place rip-rap	Rip-Rap (angular, high quality): Screen and Stockpile	3,553	Bm3	C.2.25	0.057	203.0	$ 2.09	$ 7,430	$ -	$ -	$ 9.19	$ 32,655	$ 6.45	17,636	$ 22,927	$ -	$ -	$ 17.74	$63,012		
		Rip-rap: Load, haul, dump	3,553	Bm3	R.056	0.048	170.5	$ 1.76	$ 6,241	$ -	$ -	$ 4.11	$ 14,596	$ 1.86	5,073	$ 6,595	$ -	$ -	$ 7.72	$27,432		
		Rip-rap: Place and secure	3,553	Bm3	C.2.26	0.013	44.4	$ 0.46	$ 1,625	$ -	$ -	$ 0.89	$ 3,160	$ 0.47	1,282	$ 1,666	$ -	$ -	$ 1.82	$6,451		
Subtotal Direct Costs - Faro Creek							27,125		$1,022,567		$432,000		$2,104,567		886,423	$1,152,349		$0			$4,801,483	
Zone II Pit																						
Water Management																					$343,698	
	Groundwater Wells	Drill wells (Air Rotary Drill Rig, ~15m depth)	90	m	C.2.09	2.000	180.0	$ 102.13	$ 9,192	$ -	$ -	$ 100.85	$ 9,077	$ 22.08	1,529	$ 1,987	$ -	$ -	$ 225.07	$20,256		Pump and treat Zone II Pit water
		Install 6" stainless steel well casing & screen	90	m	C.3.17	0.150	13.5	$ 7.66	$ 689	$ 232.60	$ 20,934	$ 7.56	$ 681	$ 1.66	115	$ 149	$ -	$ -	$ 249.48	$22,453		
		Install 6" Submersible Pump with controls	1	ea.	C.3.07	12.000	12.0	$ 600.00	$ 600	$ 6,842.00	$ 6,842	$ -	$ -	$ -	0	$ -	$ -	$ -	$ 7,442.00	$7,442		
		Install protective housing (shack)	1	ea.	C.3.13	20.000	20.0	$ 1,300.00	$ 1,300	$ 445.00	$ 445	$ -	$ -	$ -	0	$ -	$ -	$ -	$ 1,745.00	$1,745		
	Monitoring wells	Drill wells (Air Rotary Drill Rig, ~90m depth)	180	m	C.2.09	2.000	360.0	$ 102.13	$ 18,384	$ -	$ -	$ 100.85	$ 18,153	$ 22.08	3,057	$ 3,974	$ -	$ -	$ 225.07	$40,512		
		Install 6" stainless steel well casing & screen	180	m	C.3.17	0.150	27.0	$ 7.66	$ 1,379	$ 232.60	$ 41,868	$ 7.56	$ 1,362	$ 1.66	229	$ 298	$ -	$ -	$ 249.48	$44,906		
		Install protective well cover	2	ea.	C.3.18	1.333	2.7	$ 46.80	$ 98	$ 164.54	$ 329	$ 100.85	$ 202	$ 22.08	34	$ 44	$ -	$ -	$ 335.27	$673		
	Piping system	Excavate piping trench	4,200	Bm3	C.2.13	0.020	84.0	$ 0.73	$ 3,074	$ -	$ -	$ 1.42	$ 5,977	$ 0.75	2,424	$ 3,152	$ -	$ -	$ 2.91	$12,203		
		Supply and install insulated 150mm HDPE pipe	700	m	C.3.03	0.250	175.0	$ 8.75	$ 6,125	$ 155.84	$ 109,088	$ -	$ -	$ -	0	$ -	$ -	$ -	$ 164.59	$115,213		
		Bedding layer: Produce, screen and stockpile	273	Bm3	C.2.02	0.010	2.7	$ 0.37	$ 100	$ -	$ -	$ 1.61	$ 439	$ 1.13	237	$ 309	$ -	$ -	$ 3.10	$847		
		Bedding layer: Load, haul, place and compact	273	Bm3	R.061	0.034	9.4	$ 1.26	$ 343	$ -	$ -	$ 2.61	$ 712	$ 1.20	252	$ 327	$ -	$ -	$ 5.07	$1,383		
		Backfill ditches	4,200	Bm3	C.2.01	0.030	126.0	$ 1.08	$ 4,544	$ -	$ -	$ 0.74	$ 3,099	$ 0.40	1,278	$ 1,661	$ -	$ -	$ 2.22	$9,304		
	Heat tracing	Supply and install heat trace in HDPE pipe	700	m	C.3.04	0.250	175.0	$ 12.50	$ 8,750	$ 21.32	$ 14,924	$ -	$ -	$ -	0	$ -	$ -	$ -	$ 33.82	$23,674		
		Supply/install heat tracing power feed kit	1	ea.	C.3.05	4.000	4.0	$ 230.00	$ 230	$ 396.84	$ 397	$ -	$ -	$ -	0	$ -	$ -	$ -	$ 626.84	$627		
		Supply/install electrical thermostate for heat tracing	1	ea.	C.3.06	1.000	1.0	$ 57.50	$ 58	$ 1,025.00	$ 1,025	$ -	$ -	$ -	0	$ -	$ -	$ -	$ 1,082.50	$1,083		
	Provide electricity from WTP to pumps	Supply/install treated power poles	29	ea.	C.4.03	4.545	131.8	$ 267.88	$ 8,638	$ 325.96	$ 9,453	$ 85.85	$ 2,490	$ 28.17	628	$ 817	$ -	$ -	$ 737.86	$21,398		
		Supply/install overhead conductor	2,200	m	C.4.02	0.032	70.4	$ 2.21	$ 4,868	$ 1.41	$ 3,102	$ 0.45	$ 997	$ 0.15	252	$ 327	$ -	$ -	$ 4.22	$9,295		
		Supply/install transformers	1	ea.	C.4.04	20.000	20.0	$ 1,383.00	$ 1,383	$ 8,934.00	$ 8,934	$ 224.98	$ 225	$ 143.00	110	$ 143	$ -	$ -	$ 10,684.98	$10,685		
Subtotal Direct Costs - Zone II Pit							1,414		$69,756		$217,341		$43,412		10,145	$13,188		$0			$343,698	
Oxide Fines / LGSP																						
Consolidate oxide fines																					$770,373	
	Relocate to Low Grade Stockpile C	Load, haul, place and compact oxide materials	262,315	m3	R.068	0.012	3119.4	$ 0.44	$ 114,171	$ -	$ -	$ 1.51	$ 396,927	$ 0.99	199,442	$ 259,275	$ -	$ -	$ 2.94	$770,373		
Medium-Grade Stockpile																					$1,130,719	
	Regrade	Flattened surfaces	59	hrs	C.2.22	1.000	59.2	$ 36.60	$ 2,166	$ -	$ -	$ 173.28	$ 10,255	$ 149.18	6,791	$ 8,829	$ -	$ -	$ 359.06	$21,249		
		Regrade slopes	27	hrs	C.2.22	1.000	27.4	$ 36.60	$ 1,004	$ -	$ -	$ 173.28	$ 4,753	$ 149.18	3,146	$ 4,092	$ -	$ -	$ 359.06	$9,849		
	Place HDPE Cover	Bedding layer: Produce, screen and stockpile	13,800	m3	C.2.02	0.010	138.0	$ 0.37	$ 5,051	$ -	$ -	$ 1.61	$ 22,199	$ 1.13	11,989	$ 15,586	$ -	$ -	$ 3.10	$42,836		
		Bedding layer: Load, haul, place (0.3m)	13,800	m3	R.065	0.042	583.8	$ 1.55	$ 21,369	$ -	$ -	$ 3.21	$ 44,289	$ 1.48	15,671	$ 20,373	$ -	$ -	$ 6.23	$86,030		
		Supply and place HDPE liner	27,600	m2	C.4.10	0.143	3942.9	$ 6.33	$ 174,747	$ 12.77	$ 352,452	$ 1.63	$ 45,002	$ 1.06	22,426	$ 29,153	$ -	$ -	$ 21.79	$601,355		
		Load, haul, place loose till (1.0m)	27,600	Bm3	R.064	0.050	1391.0	$ 1.84	$ 50,912	$ -	$ -	$ 6.95	$ 191,710	$ 4.49	95,290	$ 123,877	$ -	$ -	$ 13.28	$366,499		
	Revegetate	Seed/Fertilize, helicopter low application rate	27,600	m2	C.5.02	0.000	3.5	$ 0.00	$ 124	$ 0.05	$ 1,255	$ 0.05	$ 1,504	$ 0.00	14	$ 18	$ -	$ -	$ 0.11	$2,901		
Low Grade Stockpile "A"																					$1,383,037	
	Re-grade	Flattened surfaces	7	hrs	C.2.22	1.000	6.8	$ 36.60	$ 249	$ -	$ -	$ 173.28	$ 1,178	$ 149.18	780	$ 1,014	$ -	$ -	$ 359.06	$2,442		
		Re-grade slopes	15	hrs	C.2.22	1.000	15.5	$ 36.60	$ 567	$ -	$ -	$ 173.28	$ 2,683	$ 149.18	1,777	$ 2,310	$ -	$ -	$ 359.06	$5,560		
	Place HDPE cover	Bedding layer: Produce, screen and stockpile	10,842	m3	C.2.02	0.010	108.4	$ 0.37	$ 3,968	$ -	$ -	$ 1.61	$ 17,440	$ 1.13	9,419	$ 12,245	$ -	$ -	$ 3.10	$33,653		
		Bedding layer: Load, haul, place (0.3m)	10,842	m3	R.066	0.044	477.0	$ 1.61	$ 17,459	$ -	$ -	$ 3.34	$ 36,186	$ 1.54	12,804	$ 16,646	$ -	$ -	$ 6.48	$70,291		
		Supply and place HDPE liner	36,139	m2	C.4.10	0.143	5162.7	$ 6.33	$ 228,811	$ 12.77	$ 461,495	$ 1.63	$ 58,925	$ 1.06	29,364	$ 38,173	$ -	$ -	$ 21.79	$787,404		
		Load, haul, place till (1.0m)	36,139	Bm3	R.064	0.050	1821.4	$ 1.84	$ 66,663	$ -	$ -	$ 6.95	$ 251,022	$ 4.49	124,771	$ 162,202	$ -	$ -	$ 13.28	$479,887		
	Revegetate	Seed/Fertilize, helicopter low application rate	36,150	m2	C.5.02	0.000	4.5	$ 0.00	$ 162	$ 0.05	$ 1,643	$ 0.05	$ 1,970	$ 0.00	18	$ 24	$ -	$ -	$ 0.11	$3,800		
Low Grade Stockpile "C"																					$4,382,212	
	Re-grade	Flattened surfaces	27	hrs	C.2.22	1.000	26.9	$ 36.60	$ 983	$ -	$ -	$ 173.28	$ 4,653	$ 149.18	3,981	$ 4,995	$ -	$ -	$ 359.06	$9,641		
		Re-grade slopes	46	hrs	C.2.22	1.000	46.1	$ 36.60	$ 1,688	$ -	$ -	$ 173.28	$ 7,992	$ 149.18	5,293	$ 6,881	$ -	$ -	$ 359.06	$16,561		
	Place HDPE cover	Bedding layer: Produce, screen and stockpile	54,770	m3	C.2.02	0.010	547.7	$ 0.37	$ 20,046	$ -	$ -	$ 1.61	$ 88,106	$ 1.13	47,583	$ 61,858	$ -	$ -	$ 3.10	$170,009		
		Bedding layer: Load, haul, place (0.3m)	54,770	m3	R.067	0.040	2190.8	$ 1.46	$ 80,184	$ -	$ -	$ 3.03	$ 166,188	$ 1.40	58,805	$ 76,446	$ -	$ -	$ 5.89	$322,818		
		Supply and place HDPE liner	109,541	m2	C.4.10	0.143	15648.7	$ 6.33	$ 693,551	$ 12.77	$ 1,398,839	$ 1.63	$ 178,606	$ 1.06	89,005	$ 115,707	$ -	$ -	$ 21.79	$2,386,703		
		Load, haul, place till (1.0m)	109,541	m3	R.064	0.050	5520.9	$ 1.84	$ 202,063	$ -	$ -	$ 6.95	$ 760,872	$ 4.49	378,192	$ 491,650	$ -	$ -	$ 13.28	$1,454,585		
	Surface runoff management: Rock drains	Excavate channel for rock drains	610	m3	C.2.12	0.024	14.4	$ 0.86	$ 525	$ -	$ -	$ 2.00	$ 1,218	$ 0.93	438	$ 569	$ -	$ -	$ 3.79	$2,312		
		Rip-rap (rounded, low quality): Screen and stockpile	454	m3	C.2.24	0.040	18.2	$ 1.46	$ 664	$ -	$ -	$ 6.43	$ 2,920	$ 4.52	1,577	$ 2,050	$ -	$ -	$ 12.42	$5,635		
		Rip-rap: Load, haul, dump	454	m3	R.069	0.021	9.6	$ 0.78	$ 352	$ -	$ -	$ 1.88	$ 853	$ 0.89	310	$ 404	$ -	$ -	$ 3.54	$1,609		
		Rip-rap: Place and secure	454	m3	C.2.26	0.013	5.7	$ 0.46	$ 208	$ -	$ -	$ 0.89	$ 404	$ 0.47	164	$ 213	$ -	$ -	$ 1.82	$824		
	Revegetate	Seed/Fertilize, helicopter low application rate	109,550	m2	C.5.02	0.000	13.7	$ 0.00	$ 492	$ 0.05	$ 4,980	$ 0.05	$ 5,971	$ 0.00	58	$ 73	$ -	$ -	$ 0.11	$11,515		
Subtotal Direct Costs - Oxide Fines							40,904		$1,688,180		$2,220,664		$2,303,826		1,118,208	$1,453,671		$0			$7,666,340	

Attachment E

Example Alternatives - Cost Estimate

ETA Tailings																									
Option 1: Pump Tailings to Faro Pit																									$662,124
Hydraulic monitoring with lime addition	Operate Hydraulic monitoring system	64,000	m3	C.7.04	0.020	1284.5	$ 0.89	$ 57,163	$ 0.26	$ 16,473	$ 0.02	$ 1,014	$ 0.01	496	$ 645	$ 0.27	$ 17,145	$ 1.44	$92,439						
	Operate Slurry Pumping System	64,000	m3	C.7.16	0.008	540.8	$ 0.42	$ 27,042	$ 0.32	$ 20,756	$ -	$ -	$ -	0	$ -	$ 0.54	$ 34,479	$ 1.29	$82,278						
	lime addition - qnty in tonnes per CaOH	1,088	ton	C.2.21	0.036	38.9	$ 1.59	$ 1,735	$ 320.00	$ 348,160	$ 1.67	$ 1,815	$ 0.98	819	$ 1,065	$ -	$ -	$ 324.24	$352,775						
Truck contaminated soils to Faro Pit	Load, haul, dump remaining contaminated material to Faro Pit	12,800	m3	R.071	0.053	672.0	$ 1.92	$ 24,595	$ -	$ -	$ 5.31	$ 68,008	$ 2.59	25,547	$ 33,211	$ -	$ -	$ 9.83	$125,814						
	Regrade area to form detention pond	19	hrs	C.2.22	1.000	19.1	$ 36.60	$ 699	$ -	$ -	$ 173.28	$ 3,311	$ 149.18	2,193	$ 2,851	$ -	$ -	$ 359.06	$6,861						
Revegetate	Seed/Fertilize, helicopter high application rate	13,000	m2	C.5.01	0.000	1.6	$ 0.00	$ 58	$ 0.09	$ 1,182	$ 0.05	$ 709	$ 0.00	7	$ 9	$ -	$ -	$ 0.15	$1,957						
Option 2: Haul Tailings to Rose Creek Tailings Deposi																									$725,144
Truck to tailings impoundment	Excavate, load, haul, dump and place	64,000	m3	R.074	0.026	1667.0	$ 0.95	$ 61,011	$ -	$ -	$ 2.54	$ 162,621	$ 1.24	61,021	$ 79,327	$ -	$ -	$ 4.73	$302,959						
Lime addition	Add lime to waste rock (qnty= tonnes CaOH)	1,088	ton	C.2.21	0.036	38.9	$ 1.59	$ 1,735	$ 320.00	$ 348,160	$ 1.67	$ 1,815	$ 0.98	819	$ 1,065	$ -	$ -	$ 324.24	$352,775						
Truck contaminated soils to Faro Pit	Load, haul, dump remaining contaminated material to Tailings Imp.	12,800	m3	R.074	0.026	333.4	$ 0.95	$ 12,202	$ -	$ -	$ 2.54	$ 32,524	$ 1.24	12,204	$ 15,865	$ -	$ -	$ 4.73	$60,592						
	Regrade area to form detention pond	19	hrs	C.2.22	1.000	19.1	$ 36.60	$ 699	$ -	$ -	$ 173.28	$ 3,311	$ 149.18	2,193	$ 2,851	$ -	$ -	$ 359.06	$6,861						
Revegetate	Seed/Fertilize, helicopter high application rate	13,000	m2	C.5.01	0.000	1.6	$ 0.00	$ 58	$ 0.09	$ 1,182	$ 0.05	$ 709	$ 0.00	7	$ 9	$ -	$ -	$ 0.15	$1,957						
Groundwater Collection System (to Plant)																									$727,673
Groundwater wells	Drill wells (Air Rotary Drill Rig, ~20m depth)	100	m	C.2.09	2.000	200.0	$ 102.13	$ 10,213	$ -	$ -	$ 100.85	$ 10,085	$ 22.08	1,698	$ 2,208	$ -	$ -	$ 225.07	$22,507						
	Install 6" stainless steel well casing & screen	100	m	C.3.17	0.150	15.0	$ 7.66	$ 766	$ 232.60	$ 23,260	$ 7.56	$ 756	$ 1.66	127	$ 166	$ -	$ -	$ 249.48	$24,948						
	Install 6" Submersible Pump with controls	5	ea.	C.3.07	12.000	60.0	$ 600.00	$ 3,000	$ 6,842.00	$ 34,210	$ -	$ -	$ -	0	$ -	$ -	$ -	$ 7,442.00	$37,210						
	Install protective housing (shack)	100	m	C.3.13	20.000	2000.0	$ 1,300.00	$ 130,000	$ 445.00	$ 44,500	$ -	$ -	$ -	0	$ -	$ -	$ -	$ 1,745.00	$174,500						
Monitoring wells	Drill wells (Air Rotary Drill Rig, ~20m depth)	3	ea.	C.2.09	2.000	6.0	$ 102.13	$ 306	$ -	$ -	$ 100.85	$ 303	$ 22.08	51	$ 66	$ -	$ -	$ 225.07	$675						
	Install 6" stainless steel well casing & screen	60	m	C.3.17	0.150	9.0	$ 7.66	$ 460	$ 232.60	$ 13,956	$ 7.56	$ 454	$ 1.66	76	$ 99	$ -	$ -	$ 249.48	$14,969						
	Install protective well cover	3	ea.	C.3.18	1.333	4.0	$ 48.80	$ 146	$ 164.54	$ 494	$ 100.85	$ 303	$ 22.08	51	$ 66	$ -	$ -	$ 336.27	$1,009						
Pumping station	Excavate sump for manholes	200	m3	C.2.12	0.024	4.7	$ 0.86	$ 172	$ -	$ -	$ 2.00	$ 399	$ 0.93	143	$ 186	$ -	$ -	$ 3.79	$758						
	Supply and place precast concrete manhole	1	ea.	C.3.08	16.000	16.0	$ 746.40	$ 746	$ 1,344.68	$ 1,345	$ 72.47	$ 72	$ 62.92	48	$ 63	$ -	$ -	$ 2,226.47	$2,226						
	Backfill and compact around manhole	200	m3	C.2.01	0.030	6.0	$ 1.08	$ 216	$ -	$ -	$ 0.74	$ 148	$ 0.40	61	$ 79	$ -	$ -	$ 2.22	$443						
	Install primary pump	1	ea.	C.3.10	12.000	12.0	$ 600.00	$ 600	$ 1,829.00	$ 1,829	$ -	$ -	$ -	0	$ -	$ -	$ -	$ 2,429.00	$2,429						
Piping system	Excavate piping trench	11,100	m3	C.2.13	0.020	222.0	$ 0.73	$ 8,125	$ -	$ -	$ 1.42	$ 15,706	$ 0.75	6,407	$ 8,329	$ -	$ -	$ 2.91	$32,259						
	Supply and install insulated 150mm HDPE pipe	1,850	m	C.3.03	0.250	462.5	$ 8.75	$ 16,188	$ 155.84	$ 288,304	$ -	$ -	$ -	0	$ -	$ -	$ -	$ 164.59	$304,492						
	Bedding layer: Produce, screen and stockpile	722	m3	C.2.02	0.010	7.2	$ 0.37	$ 264	$ -	$ -	$ 1.61	$ 1,161	$ 1.13	627	$ 815	$ -	$ -	$ 3.10	$2,240						
	Bedding layer: Load, haul, place and compact	722	m3	R.073	0.031	22.0	$ 1.12	$ 807	$ -	$ -	$ 2.32	$ 1,672	$ 1.07	592	$ 769	$ -	$ -	$ 4.50	$3,248						
	Backfill ditches	11,100	m3	C.2.01	0.030	333.0	$ 1.08	$ 12,010	$ -	$ -	$ 0.74	$ 8,189	$ 0.40	3,377	$ 4,390	$ -	$ -	$ 2.22	$24,589						
Heat tracing	Supply and install heat trace in HDPE pipe	1,850	m	C.3.04	0.250	462.5	$ 12.50	$ 23,125	$ 21.32	$ 39,442	$ -	$ -	$ -	0	$ -	$ -	$ -	$ 33.82	$62,567						
	Supply/install heat tracing power feed kit	1	ea.	C.3.05	4.000	4.0	$ 230.00	$ 230	$ 396.84	$ 397	$ -	$ -	$ -	0	$ -	$ -	$ -	$ 626.84	$627						
	Supply/install electrical thermostate for heat tracing	1	ea.	C.3.06	1.000	1.0	$ 57.50	$ 58	$ 1,025.00	$ 1,025	$ -	$ -	$ -	0	$ -	$ -	$ -	$ 1,082.50	$1,083						
Provide electricity from WTP to pumps	Supply/install treated power poles	4	ea.	C.4.03	4.545	18.2	$ 297.88	$ 1,192	$ 325.96	$ 1,304	$ 85.85	$ 343	$ 28.17	87	$ 113	$ -	$ -	$ 737.86	$2,951						
	Supply/install overhead conductor	300	m	C.4.02	0.032	9.6	$ 2.21	$ 664	$ 1.41	$ 423	$ 0.45	$ 136	$ 0.15	34	$ 45	$ -	$ -	$ 4.22	$1,267						
	Supply/install transformers	1	ea.	C.4.04	20.000	20.0	$ 1,383.00	$ 1,383	$ 8,934.00	$ 8,934	$ 224.98	$ 225	$ 143.00	110	$ 143	$ -	$ -	$ 10,684.98	$10,685						
Subtotal Direct Costs - ETA (Maximum of Option 1 & 2)						5,955		$286,377		$808,764		$241,022		89,734	$116,655		$0			$1,452,818					
Waste Rock																									
Reslope Waste Rock																									$3,687,791
Remove vegetation at WR toe	Clear/grub forest area around toe	60,000	m2	C.2.05	0.015	872.7	$ 0.53	$ 31,942	$ -	$ -	$ 0.94	$ 56,103	$ 0.62	28,476	$ 37,021	$ -	$ -	$ 2.08	$125,066						
Regrade	Flattened surfaces (enhance surface runoff)	429	hrs	C.2.22	1.000	429.0	$ 36.60	$ 15,702	$ -	$ -	$ 173.28	$ 74,341	$ 149.18	49,232	$ 64,002	$ -	$ -	$ 359.06	$154,045						
	Regrade slopes	769	hrs	C.2.22	1.000	769.0	$ 36.60	$ 28,146	$ -	$ -	$ 173.28	$ 133,252	$ 149.18	88,246	$ 114,720	$ -	$ -	$ 359.06	$276,117						
	Regrade Slopes	7,329	hrs	C.2.22	1.000	7329.4	$ 36.60	$ 268,255	$ -	$ -	$ 173.28	$ 1,270,021	$ 149.18	841,074	$ 1,093,397	$ -	$ -	$ 359.06	$2,631,673						
Pull-back slopes not able to be re-sloped	Load, haul, dump, place at top of dump	146,250	m3	R.077	0.012	1821.2	$ 0.46	$ 66,657	$ -	$ -	$ 1.80	$ 263,129	$ 1.17	131,619	$ 171,104	$ -	$ -	$ 3.42	$500,890						
Sulphide Cell																									$3,851,716
Low infiltration cover	Load, haul, place compacted till (0.5m) (South cells)	86,823	m3	R.075	0.056	4862.1	$ 2.05	$ 177,953	$ -	$ -	$ 7.09	$ 616,001	$ 4.61	307,977	$ 400,370	$ -	$ -	$ 13.76	$1,194,325						
	Load, haul, place loose till (1.5m) (South cells)	173,647	m3	R.076	0.050	8751.8	$ 1.84	$ 320,316	$ -	$ -	$ 6.65	$ 1,206,153	$ 4.49	599,520	$ 779,376	$ -	$ -	$ 13.28	$2,305,845						
	Load, haul, place compacted till (0.5m) (East cell)	8,720	m3	R.075	0.056	488.3	$ 2.05	$ 17,873	$ -	$ -	$ 7.09	$ 61,869	$ 4.61	30,932	$ 40,212	$ -	$ -	$ 13.76	$119,954						
	Load, haul, place loose till (1.5m) (East cell)	17,441	m3	R.076	0.050	870.0	$ 1.84	$ 32,171	$ -	$ -	$ 6.65	$ 121,142	$ 4.49	60,214	$ 78,278	$ -	$ -	$ 13.28	$231,592						
Waste Rock Cover																									$23,572,431
Place rudimentary cover	Load, haul, place loose till (0.5m)	1,775,173	m3	R.076	0.050	89468.7	$ 1.84	$ 3,274,555	$ -	$ -	$ 6.65	$ 12,330,389	$ 4.49	6,128,836	$ 7,967,487	$ -	$ -	$ 13.28	$23,572,431						
Steep Runoff Channels																									$77,316
Install rock drains (runoff management)	Excavate channel for rock drains	4,375	m3	C.2.13	0.020	87.5	$ 0.73	$ 3,203	$ -	$ -	$ 1.42	$ 6,226	$ 0.75	2,525	$ 3,283	$ -	$ -	$ 2.91	$12,711						
	Rip-rap (rounded, low quality): Screen and stockpile	3,255	m3	C.2.24	0.040	130.2	$ 1.46	$ 4,765	$ -	$ -	$ 6.43	$ 20,944	$ 4.52	11,311	$ 14,705	$ -	$ -	$ 12.42	$40,415						
	Rip-rap: Load, haul, dump	3,255	m3	R.078	0.035	113.6	$ 1.28	$ 4,159	$ -	$ -	$ 2.99	$ 9,726	$ 1.35	3,380	$ 4,394	$ -	$ -	$ 5.62	$18,280						
	Rip-rap: Place and secure	3,255	m3	C.2.26	0.013	40.7	$ 0.46	$ 1,489	$ -	$ -	$ 0.89	$ 2,895	$ 0.47	1,174	$ 1,527	$ -	$ -	$ 1.82	$5,911						
Revegetate																									$467,177
Revegetate WR dumps	Seed/Fertilize, helicopter low application rate	4,444,400	m2	C.5.02	0.000	555.6	$ 0.00	$ 19,952	$ 0.05	$ 202,042	$ 0.05	$ 242,231	$ 0.00	2,270	$ 2,951	$ -	$ -	$ 0.11	$467,177						
	Note: Removal of North Fork Rock Drain included in Tailings Alternative																								
Subtotal Direct Costs - Waste Rock						116,599		$4,267,138		$202,042		$16,414,423		8,286,790	$10,772,827		$0			$31,656,430					
Groundwater																									1CD003.053
Upgrade North Fork Rose Creek																									$1,294,796
Construct access road	Clear access road area	6,600	m2	C.2.04	0.004	24.0	$ 0.13	$ 878	$ -	$ -	$ 0.62	$ 4,120	$ 0.36	1,847	$ 2,401	$ -	$ -	$ 1.12	$7,399						
	Construct access road	2,200	m	C.2.27	0.131	288.8	$ 4.80	$ 10,568	$ -	$ -	$ 10.14	$ 22,315	$ 5.33	9,013	$ 11,717	$ -	$ -	$ 20.27	$44,600						
Construct channe	Load, haul, dump granular material along channel thalweg.	21,750	m3	R.081	0.028	614.1	$ 1.03	$ 22,477	$ -	$ -	$ 2.75	$ 59,910	$ 1.34	22,480	$ 29,224	$ -	$ -	$ 5.13	$111,611						
	Load, haul, dump till to create channel berms	35,980	m3	R.082	0.032	1133.4	$ 1.15	$ 41,481	$ -	$ -	$ 2.82	$ 101,628	$ 1.41	39,006	$ 50,708	$ -	$ -	$ 5.39	$193,817						
Place geotextile	Supply and place geotextile	42,858	m2	C.4.06	0.016	685.7	$ 0.57	$ 24,275	$ 3.50	$ 150,003	$ 0.23	$ 9,783	$ 0.15	4,875	$ 6,338	$ -	$ -	$ 4.44	$190,399						
Place 0.3m till layer	Till: Load, haul, dump and place	12,857	m3	R.083	0.028	360.0	$ 1.02	$ 13,176	$ -	$ -	$ 2.38	$ 30,596	$ 1.11	11,014	$ 14,318	$ -	$ -	$ 4.52	$58,090						
	Till: Compact with vibrating drum roller	12,857	m2	C.2.06	0.016	205.7	$ 0.57	$ 7,364	$ -	$ -	$ 0.02	$ 270	$ 0.02	161	$ 209	$ -	$ -	$ 0.61	$7,843						
Place geotextile	Supply and place geotextile	42,858	m2	C.4.06	0.016	685.7	$ 0.57	$ 24,275	$ 3.50	$ 150,003	$ 0.23	$ 9,783	$ 0.15	4,875	$ 6,338	$ -	$ -	$ 4.44	$190,399						
Place bedding layer	Produce, screen and stockpile	12,857	m3	C.2.02	0.010	128.6	$ 0.37	$ 4,706	$ -	$ -	$ 1.61	$ 20,662	$ 1.13	11,170	$ 14,521	$ -	$ -	$ 3.10	$39,909						
	Load, haul, place and compact bedding layer	12,857	m3	R.084	0.029	374.4	$ 1.07	$ 13,702	$ -	$ -	$ 2.21	$ 28,392	$ 1.04	10,246	$ 13,320	$ -	$ -	$ 4.31	$55,413						
Place rip-rap	Rip-Rap (angular, high quality): Screen and Stockpile	15,914	m3	C.2.25	0.057	909.4	$ 2.09	$ 33,283	$ -	$ -	$ 9.19	$ 146,285	$ 6.45	79,003	$ 102,704	$ -	$ -	$ 17.74	$282,272						
	Rip-rap: Load, haul, dump	15,914	m3	R.085	0.032	514.1	$ 1.18	$ 18,818	$ -	$ -	$ 2.81	$ 44,714	$ 1.30	15,857	$ 20,614	$ -	$ -	$ 5.29	$84,146						
	Rip-rap: Place and secure	15,914	m3	C.2.26	0.013	198.9	$ 0.46	$ 7,281	$ -	$ -	$ 0.89	$ 14,154	$ 0.47	5,741	$ 7,464	$ -	$ -	$ 1.82	$28,898						
Outwash material																									$287,728
Relocate to Intermediate Dump	Load, Haul, Dump Outwash Materia	76,350	m3	R.062	0.023	1758.1	$ 0.84	$ 64,345	$ -	$ -	$ 2.00	$ 152,895	$ 0.92	54,222	$ 70,488	$ -	$ -	$ 3.77	$287,728						
North Fork Rose Creek Detention Pond																									$10,883
Excavate Basin	Excavate sedimentation basin	2,592	m3	C.2.12	0.024	61.0	$ 0.86	$ 2,232	$ -	$ -	$ 2.00	$ 5,176	$ 0.93	1,859	$ 2,417	$ -	$ -	$ 3.79	$9,825						
Place Rip-Rap	Rip-rap (rounded, low quality): Screen and stockpile	52	m3	C.2.24	0.040	2.1	$ 1.46	$ 76	$ -	$ -	$ 6.43	$ 335	$ 4.52	181	$ 235	$ -	$ -	$ 12.42	$646						
	Rip-rap: Load, Haul, Dump	52	m3	R.086	0.037	1.9	$ 1.37	$ 71	$ -	$ -	$ 3.25	$ 169	$ 1.50	60	$ 78	$ -	$ -	$ 6.11	$318						
	Rip-Rap: Place and Secure	52	m3	C.2.26	0.013	0.7	$ 0.46	$ 24	$ -	$ -	$ 0.89	$ 46	$ 0.47	19	$ 24	$ -	$ -	$ 1.82	$94						
North Fork Rose Creek Collection System (to Plant)																									$139,439
Groundwater wells	Drill wells (Air Rotary Drill Rig, ~20m depth)	100	m	C.2.09	2.000	200.0	$ 102.13	$ 10,213	$ -	$ -	$ 100.85	$ 10,085	$ 22.08	1,698	$ 2,208	$ -	$ -	$ 225.07	$22,507						
	Install 6" stainless steel well casing & screen	100	m	C.3.17	0.150	15.0	$ 7.66	$ 766	$ 232.60	$ 23,260	$ 7.56	$ 756	$ 1.66	127	$ 166	$ -	$ -	$ 249.48	$24,948						
	Install 6" Submersible Pump with controls	3	ea.	C.3.07	12.000	36.0	$ 600.00	$ 1,800	$ 6,842.00	$ 20,526	$ -	$ -	$ -	0	$ -	$ -	$ -	$ 7,442.00	$22,326						
	Install protective housing (shack)	3	ea.	C.3.13	20.000	60.0	$ 1,300.00	$ 3,900	$ 445.00	$ 1,335	$ -	$ -	$ -	0	$ -	$ -	$ -	$ 1,745.00	$5,235						
Pumping station	Excavate sump for manholes	200	m3	C.2.12	0.024	4.7	$ 0.86	$ 172	$ -	$ -	$ 2.00	$ 399	$ 0.93	143	$ 186	$ -	$ -	$ 3.79	$758						
	Supply and place precast concrete manhole	1	ea.	C.3.08	16.000	16.0	$ 746.40	$ 746	$ 1,344.68	$ 1,345	$ 72.47	$ 72	$ 62.92	48	$ 63	$ -	$ -	$ 2,226.47	$2,226						
	Backfill and compact around manhole	200	m3	C.2.01	0.030	6.0	$ 1.08	$ 216	$ -	$ -	$ 0.74	$ 148	$ 0.40	61	$ 79	$ -	$ -	$ 2.22	$443						
	Install primary pump	1	ea.	C.3.10	12.000	12.0	$ 600.00	$ 600	$ 1,829.00	$ 1,829	$ -	$ -	$ -	0	$ -	$ -	$ -	$ 2,429.00	$2,429						
Piping system	Excavate piping trench	1,080	m3	C.2.13	0.020	21.6	$ 0.73	$ 791	$ -	$ -	$ 1.42	$ 1,537	$ 0.75	623	$ 810	$ -	$ -	$ 2.91	$3,138						
	Supply and install insulated 150mm HDPE pipe	180	m	C.3.03	0.250	45.0	$ 8.75	$ 1,575	$ 155.84	$ 28,051	$ -	$ -	$ -	0	$ -	$ -	$ -	$ 164.59	$29,626						
	Bedding layer: Produce, screen and stockpile	70	m3	C.2.02	0.010	0.7	$ 0.37	$ 26	$ -	$ -	$ 1.61	$ 113	$ 1.13	61	$ 79	$ -	$ -	$ 3.10	$218						
	Bedding layer: Load, haul, place and compact	70	m3	R.069	0.029	2.0	$ 1.07	$ 75	$ -	$ -	$ 2.21	$ 155	$ 1.04	56	$ 73	$ -	$ -	$ 4.31	$303						
	Backfill ditches	1,080	m3	C.2.01	0.030	32.4	$ 1.08	$ 1,169	$ -	$ -	$ 0.74	$ 797	$ 0.40	329	$ 427	$ -	$ -	$ 2.22	$2,392						
Heat tracing	Supply and install heat trace in HDPE pipe	180	m	C.3.04	0.250	45.0	$ 12.50	$ 2,250	$ 21.32	$ 3,838	$ -	$ -	$ -	0	$ -	$ -	$ -	$ 33.82	$6,088						
Provide electricity from WTP to pumps	Supply/Install treated power poles	6	ea.	C.4.03	4.545	27.3	$ 297.88	$ 1,787	$ 325.96	$ 1,956	$ 85.85	$ 515	$ 28.17	130	$ 169	$ -	$ -	$ 737.86	$4,427						
	Supply/Install overhead conductor	400	m	C.4.02	0.032	12.8	$ 2.21	$ 885	$ 1.41	$ 564	$ 0.45	$ 181	$ 0.15	46	$ 59	$ -	$ -	$ 4.22	$1,690						
	Supply/Install transformers	1	ea.	C.4.04	20.000	20.0	$ 1,383.00	$ 1,383	$ 8,934.00	$ 8,934	$ 224.98	$ 225	$ 143.00	110	$ 143	$ -	$ -	$ 10,684.98	$10,685						
5-Cluster Collection System (to Plant)																									$283,543

Example Alternatives - Cost Estimate

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7	5	7	1	510	Heat Tracing	Supply and install heat trace in HDPE pipe	700	m	C.3.04	0.250	175.0	$ 12.50	$ 8,750	$ 21.32	$ 14,924	$ -	$ -	$ -	0	$ -	$ -	$ -	$ 33.82	$23,674		
7	5	7	2	510		Supply/install heat tracing power feed kit	1	ea.	C.3.05	4.000	4.0	$ 230.00	$ 230	$ 386.84	$ 387	$ -	$ -	$ -	0	$ -	$ -	$ -	$ 626.84	$627		
7	5	7	3	510		Supply/install electrical thermostat for heat tracing	1	ea.	C.3.06	1.000	1.0	$ 57.50	$ 58	$ 1,025.00	$ 1,025	$ -	$ -	$ -	0	$ -	$ -	$ -	$ 1,082.50	$1,083		
7	5	8	1	510	Provide Electricity from WTP to pumps	Supply/install treated power poles	1	ea.	C.4.03	4.545	4.5	$ 297.88	$ 298	$ 325.96	$ 326	$ 85.85	$ 86	$ 28.17	22	$ 28	$ -	$ -	$ 737.86	$738		
7	5	8	2	510		Supply/install overhead conductor	20	m	C.4.02	0.032	0.6	$ 2.21	$ 44	$ 1.41	$ 28	$ 0.45	$ 9	$ 0.15	2	$ 3	$ -	$ -	$ 4.22	$84		
7	5	8	3	510		Supply/install transformers	1	ea.	C.4.04	20.000	20.0	$ 1,383.00	$ 1,383	$ 8,934.00	$ 8,934	$ 224.98	$ 225	$ 143.00	110	$ 143	$ -	$ -	$ 10,684.98	$10,685		
Subtotal Direct Costs - Groundwater											1,646		$78,802		$285,466		$42,338		12,597	$16,376		$0			$422,982		
Miscellaneous																													
Roads																										$12,639			
8	1	1	1	430	Reclaim unnecessary roads	Remove culverts and breach stream crossing	2,240	m3	C.2.12	0.024	52.7	$ 0.86	$ 1,929	$ -	$ -	$ 2.00	$ 4,473	$ 0.93	1,607	$ 2,089	$ -	$ -	$ 3.79	$8,490.78		
8	1	1	2	430		Scarify road surfaces	10,500	m2	C.2.29	0.003	26.3	$ 0.09	$ 961	$ -	$ -	$ 0.10	$ 1,056	$ 0.10	700	$ 1,027	$ -	$ -	$ 0.29	$3,044.27		
8	1	1	3	610		Seed/Fertilize, helicopter low application rate	10,500	m2	C.5.02	0.000	1.3	$ 0.00	$ 47	$ 0.05	$ 477	$ 0.05	$ 572	$ 0.00	5	$ 7	$ -	$ -	$ 0.11	$1,103.72		
Buildings																										$4,980,737			
8	2	1	1	220	Building decontamination	Remove hazardous materials	56,400	m3	C.1.01	0.556	31333.3	$ 24.44	$ 1,378,667	$ -	$ -	$ 2.17	$ 122,538	$ 1.55	87,210	$ 87,373	$ -	$ -	$ 28.17	$1,588,578		
8	2	2	1	220	Building demolition	Building demolition: 'empty buildings'	24,600	m2	C.1.02	0.310	7627.9	$ 11.10	$ 273,079	$ -	$ -	$ 15.54	$ 382,319	$ 8.55	161,880	$ 210,444	$ -	$ -	$ 35.20	$865,843		
8	2	2	2	430		Building demolition: 'full buildings'	47,700	m2	C.1.03	0.465	22186.0	$ 16.65	$ 794,260	$ -	$ -	$ 23.31	$ 1,111,988	$ 12.83	470,935	$ 612,085	$ -	$ -	$ 52.80	$2,518,335		
8	2	2	3	430		Puncture concrete foundations	20	m	C.1.04	0.182	3.6	$ 6.65	$ 133	$ -	$ -	$ 20.26	$ 405	$ 13.15	202	$ 263	$ -	$ -	$ 40.07	$801		
8	2	2	4	430		Re-grade over demolished buildings	20	hrs	C.2.22	1.000	20.0	$ 36.60	$ 732	$ -	$ -	$ 173.28	$ 3,466	$ 149.18	2,295	$ 2,984	$ -	$ -	$ 359.06	$7,181		
Contaminated soils																										$125,599			
8	3	1	1	600	Remove contaminated soils	Excavate, haul and place hydrocarbon contaminated soils in landfarm	15,000	m3	R.091	0.030	450.0	$ 1.10	$ 16,470	$ -	$ -	$ 2.94	$ 44,035	$ 1.44	16,574	$ 21,547	$ -	$ -	$ 5.47	$82,052		
8	3	1	2	600		Excavate metal contaminated soil to Low-Grade Stockpile 'C'	7,500	m3	R.091	0.030	225.0	$ 1.10	$ 8,235	$ -	$ -	$ 2.94	$ 22,018	$ 1.44	8,287	$ 10,773	$ -	$ -	$ 5.47	$41,026		
8	3	1	3	600		Regrade contaminated areas for drainage	10,000	m2	C.2.18	0.002	21.7	$ 0.08	$ 796	$ -	$ -	$ 0.09	$ 875	$ 0.09	654	$ 851	$ -	$ -	$ 0.25	$2,521		
Landfarm																										$45,657			
8	4	1	1	430	Contruct landfarm	Excavate and create berms for use as the bioremediation cell	8,000	m3	C.2.11	0.013	106.7	$ 0.49	$ 3,904	$ -	$ -	$ 0.95	$ 7,590	$ 0.50	3,079	$ 4,002	$ -	$ -	$ 1.94	$15,496		
8	4	2	1	430	Operate Landfarm (3yrs)	Excavator Cat 330BL/235B (mixing)	80	hrs	C.2.22	1.000	80.0	$ 36.60	$ 2,928	$ -	$ -	$ 173.28	$ 13,862	$ 149.18	9,180	$ 11,934	$ -	$ -	$ 359.06	$28,725		
8	4	3	1	430	Decommision landfarm	Excavate soils for use as cover	1	m3	$0.00	0.000	0.0	$ -	$ -	$ -	$ -	$ -	$ -	$ -	0	$ -	$ -	$ -	$ -	$0		costed elsewhere
8	4	3	2	430		Remove berms (dozer)	4	hrs	C.2.22	1.000	4.0	$ 36.60	$ 146	$ -	$ -	$ 173.28	$ 693	$ 149.18	459	$ 597	$ -	$ -	$ 359.06	$1,436		
Borrow Sources																										$101,017			
8	5	1	1	600	Develop borrow sources	Clear (grub access road)	1,500	m2	C.2.05	0.015	21.8	$ 0.53	$ 799	$ -	$ -	$ 0.94	$ 1,403	$ 0.62	712	$ 926	$ -	$ -	$ 2.08	$3,127		
8	5	1	2	600		Construct access road	500	m	C.2.28	0.225	112.5	$ 8.24	$ 4,118	$ -	$ -	$ 29.67	$ 14,837	$ 19.48	7,493	$ 9,741	$ -	$ -	$ 57.39	$28,696		
8	5	2	1	600	Decommission borrow sources	Re-grade borrow source slopes	11	hrs	C.2.22	1.000	10.9	$ 36.60	$ 399	$ -	$ -	$ 173.28	$ 1,890	$ 149.18	1,252	$ 1,628	$ -	$ -	$ 359.06	$3,917		
8	5	2	2	610		Seed/Fertilize, helicopter low application rate	621,000	m2	C.5.02	0.000	77.6	$ 0.00	$ 2,788	$ 0.05	$ 28,231	$ 0.05	$ 33,846	$ 0.00	317	$ 412	$ -	$ -	$ 0.11	$65,277		
Subtotal Direct Costs - Miscellaneous											62,361		$2,490,390		$28,708		$1,767,867		752,833	$978,683		$0			$5,265,648		
Subtotal Direct Costs						Subtotal direct costs					131,721		$5,076,867		$1,106,330		$10,786,997		5,148,686	$6,693,292		$0			$23,663,486		
CLOSURE COSTS - INDIRECT																													
100	100	1	1		Project Management	5.0% of direct costs															$ 23,663,486	x	5.0%			$1,183,174			
100	100	2	1		Field Supervision	(included in major tasks)																				$0			
100	100	3	1		Contractor profit and home office overhead	10% of direct costs															$ 23,663,486	x	10.0%			$2,366,349			
100	100	4	1		Insurance	0.5% of direct costs															$ 23,663,486	x	0.5%			$118,317			
100	100	5	1		Bonding	0.5% of direct costs															$ 23,663,486	x	0.5%			$118,317			
100	100	6	1		Field Engineering and QA	10% of direct costs															$ 23,663,486	x	10.0%			$2,366,349			
100	100	7	1		Mob - Demob																1	lump	$500,000			$500,000			
100	100	8	1		Living out allowances	(included in heavy equipment costs)																				$0			
Subtotal Indirect Costs						Subtotal indirect costs																				$6,652,506			
CLOSURE COSTS - CONTINGENCY																													
						Contingency															$23,663,486	x	20.0%			$4,732,697			
CLOSURE COSTS - TOTAL																													
						Total direct and indirect costs																				$35,048,690			

Faro Mine Area Alternative 4 - Minimize Water Treatment

Contract Code	Work Area Code	Item	Task	Sub-task	Estimate Type	Activity	Task	Quantity	Unit	Cost Code	Unit Mhrs	Total Mhrs	Labour Rate	Labour Cost	Unit Matl	Material Cost	Unit Equip.	Equipment Cost	Unit Fuel	Fuel Consumed (L)	Fuel Cost	Power Rate ($/Unit)	Power Cost	Unit Cost	Activity Total	Subtotals	Source / Comments
CLOSURE COSTS - DIRECT CAPITAL																											1CD003.046
Faro Pit																										$585,759	
Water Treatment																											
	1	1	1	1	430	Construct Water Treatment Plant	Water treatment costed separately	1	ls	-	0.000	0.0	$ -	$ -	$ -	$ -	$ -	$ -	$ -	0	$ -	$ -	$ -	$ -	$0		
	1	1	2	1	430	Place pipeline from pit to treatment plant	Excavate piping trench	15,000	Bm3	C.2.13	0.020	300.0	$ 0.73	$ 10,980	$ -	$ -	$ 1.42	$ 21,345	$ 0.75	8,658	$ 11,256	$ -	$ -	$ 2.91	$43,581		
	1	1	2	2	500		Supply and place pump	1	ea.	C.3.10	12.000	12.0	$ 600.00	$ 600	$ 1,829.00	$ 1,829	$ -	$ -	$ -	0	$ -	$ -	$ -	$ 2,429.00	$2,429		
	1	1	2	3	500		Build and install housing for primary pump	1	ea.	C.3.12	30.000	30.0	$ 1,050.00	$ 1,950	$ 1,730.00	$ 1,730	$ -	$ -	$ -	0	$ -	$ -	$ -	$ 3,680.00	$3,680		
	1	1	2	4	510		Supply and install insulated 150mm HDPE pipe	2,500	m	C.3.03	0.250	625.0	$ 8.75	$ 21,875	$ 155.84	$ 389,600	$ -	$ -	$ -	0	$ -	$ -	$ -	$ 164.59	$411,475		
	1	1	2	5	430		Bedding layer: Produce, screen and stockpile	975	Bm3	C.2.02	0.010	9.8	$ 0.37	$ 357	$ -	$ -	$ 1.61	$ 1,568	$ 1.13	847	$ 1,101	$ -	$ -	$ 3.10	$3,026		
	1	1	2	6	430		Bedding layer: Load, haul, place and compact	975	Bm3	R.045	0.037	35.8	$ 1.34	$ 1,308	$ -	$ -	$ 2.78	$ 2,712	$ 1.28	960	$ 1,247	$ -	$ -	$ 5.40	$5,268		
	1	1	2	7	430		Backfill ditches	2,500	Bm3	C.2.01	0.030	75.0	$ 1.08	$ 2,705	$ -	$ -	$ 0.74	$ 1,844	$ 0.40	761	$ 989	$ -	$ -	$ 2.22	$5,538		
	1	1	3	1	510	Heat tracing	Supply and install heat trace in HDPE pipe	2,500	m	C.3.04	0.250	625.0	$ 12.50	$ 31,250	$ 21.32	$ 53,300	$ -	$ -	$ -	0	$ -	$ -	$ -	$ 33.82	$84,550		
	1	1	3	2	510		Supply/install heat tracing power feed kit	1	ea.	C.3.05	4.000	4.0	$ 230.00	$ 230	$ 396.84	$ 397	$ -	$ -	$ -	0	$ -	$ -	$ -	$ 626.84	$627		
	1	1	3	3	510		Supply/install electrical thermostats for heat tracing	1	ea.	C.3.06	1.000	1.0	$ 57.50	$ 58	$ 1,025.00	$ 1,025	$ -	$ -	$ -	0	$ -	$ -	$ -	$ 1,082.50	$1,083		
	1	1	4	1	510	Provide electricity from WTP to pump	Supply/install treated power poles	13	ea.	C.4.03	4.545	59.1	$ 297.88	$ 3,872	$ 325.96	$ 4,237	$ 85.85	$ 1,116	$ 28.17	282	$ 366	$ -	$ -	$ 737.86	$9,592		
	1	1	4	2	510		Supply/install overhead conductor	1,000	m	C.4.02	0.032	32.0	$ 2.21	$ 2,213	$ 1.41	$ 1,410	$ 0.45	$ 453	$ 0.15	114	$ 149	$ -	$ -	$ 4.22	$4,225		
	1	1	4	3	510		Supply/install transformers	1	ea.	C.4.04	20.000	20.0	$ 1,383.00	$ 1,383	$ 8,934.00	$ 8,934	$ 224.98	$ 225	$ 143.00	110	$ 143	$ -	$ -	$ 10,684.98	$10,685		
Construct Plug Dam																										$1,971,893	
	1	2	1	1	430	Foundation preparation	Bulk stripping: Excavate, load, haul, dump overburden	3700	Bm3	R.040	0.030	110.1	$ 1.09	$ 4,030	$ -	$ -	$ 3.04	$ 11,257	$ 1.54	4,360	$ 5,694	$ -	$ -	$ 5.67	$20,982		1CD003.052 (BGC) (SRK Library - BKG-254)
	1	2	1	2	430		Rock excavation: Core trench rock	4500	Bm3	C.2.15	0.173	780.0	$ 6.34	$ 28,548	$ -	$ -	$ 9.13	$ 41,074	$ 3.69	12,770	$ 16,601	$ -	$ -	$ 19.16	$86,223		
	1	2	1	4	430		Foundation preparation	1600	m2	C.2.17	0.318	509.1	$ 13.47	$ 21,556	$ -	$ -	$ 17.05	$ 28,715	$ 8.86	10,910	$ 14,183	$ -	$ -	$ 40.28	$64,456		
	1	2	1	5	600		Relocate Zone II Pit pump well discharge pipe	1	ls	-	0.000	0.0	$ -	$ -	$ -	$ -	$ -	$ -	$ -	0	$ -	$ -	$ -	$ -	$0		
	1	2	1	6	520		Foundation/Abutment grouting: Drilling of grout holes	4664	m	C.2.09	2.000	9328.0	$ 102.13	$ 476,350	$ -	$ -	$ 100.85	$ 470,376	$ 22.08	79,216	$ 102,981	$ -	$ -	$ 225.07	$1,049,707		
	1	2	1	7	430		Foundation/Abutment grouting: Water pressure testing	350	hrs	C.3.16	3.500	1225.0	$ 170.70	$ 59,745	$ -	$ -	$ 92.28	$ 32,298	$ 36.34	9,784	$ 12,719	$ -	$ -	$ 299.32	$104,762		
	1	2	1	8	600		Foundation/Abutment grouting: Setting packers	1400	ea.	C.2.19	0.214	300.0	$ 10.94	$ 15,320	$ -	$ -	$ 6.59	$ 9,228	$ 2.60	2,795	$ 3,634	$ -	$ -	$ 20.13	$28,182		
	1	2	1	9	600		Foundation/Abutment grouting: Cement	200000	kg	M.04	0.000	0.0	$ -	$ -	$ 0.50	$ 100,000	$ -	$ -	$ -	0	$ -	$ -	$ -	$ 0.50	$100,000		
	1	2	2	1	430	Place core material	Load, haul, dump, compact impervious core material (Till)	16540	Bm3	R.041	0.054	890.6	$ 1.97	$ 32,597	$ -	$ -	$ 4.75	$ 78,644	$ 2.32	29,555	$ 38,421	$ -	$ -	$ 9.05	$149,661		
	1	2	3	1	430	Place filter material	Produce, screen and stockpile fine and coarse filter materials	10870	Bm3	C.2.02	0.010	108.7	$ 0.37	$ 3,978	$ -	$ -	$ 1.61	$ 17,486	$ 1.13	9,444	$ 12,277	$ -	$ -	$ 3.10	$33,741		
	1	2	3	2	430		Load, haul, dump, compact fine filter material	5740	Bm3	R.042	0.039	221.5	$ 1.41	$ 8,100	$ -	$ -	$ 3.41	$ 19,563	$ 1.67	7,352	$ 9,557	$ -	$ -	$ 6.49	$37,220		
	1	2	3	3	430		Load, haul, dump, compact coarse filter material	5130	Bm3	R.042	0.039	198.0	$ 1.41	$ 7,247	$ -	$ -	$ 3.41	$ 17,484	$ 1.67	6,571	$ 8,542	$ -	$ -	$ 6.49	$33,272		
	1	2	4	1	430	Place rockfill	Load, haul, dump, and compact	48,500	Bm3	R.043	0.032	1569.1	$ 1.18	$ 57,430	$ -	$ -	$ 2.86	$ 138,557	$ 1.40	52,071	$ 67,692	$ -	$ -	$ 5.44	$263,679		
Safety Berm																										$130,159	
	1	3	1	1	430	Construct access road	Clear access road area	3,500	m2	C.2.05	0.015	50.9	$ 0.53	$ 1,863	$ -	$ -	$ 0.94	$ 3,273	$ 0.62	1,661	$ 2,160	$ -	$ -	$ 2.08	$7,296		
	1	3	1	2	220		Construct access road	700	m	C.2.27	0.131	91.9	$ 4.80	$ 3,363	$ -	$ -	$ 10.14	$ 7,100	$ 5.33	2,868	$ 3,728	$ -	$ -	$ 20.27	$14,191		
	1	3	2	1	430	Place berm materials	Load, haul, dump berm material	22,000	Lm3	R.044	0.023	498.2	$ 0.83	$ 18,235	$ -	$ -	$ 1.97	$ 43,331	$ 0.91	15,366	$ 19,976	$ -	$ -	$ 3.71	$81,542		
	1	3	2	2	430		Final Shaping of material with dozer	4,400	m	C.2.03	0.020	88.0	$ 0.73	$ 3,221	$ -	$ -	$ 3.43	$ 15,106	$ 2.00	6,772	$ 8,804	$ -	$ -	$ 6.17	$27,130		
Subtotal Direct Costs - Faro Pit												17,798		$820,373		$562,462		$962,756		263,246	$342,220		$0			$2,687,811	
Faro Creek																										$510,560	
Route into Faro Pit (East & West Channel)																											
	2	1	1	1	430	Construct access road	Clear access road area	1,800	m2	C.2.04	0.004	6.5	$ 0.13	$ 240	$ -	$ -	$ 0.62	$ 1,124	$ 0.36	504	$ 655	$ -	$ -	$ 1.12	$2,018		
	2	1	1	2	430		Construct access road	600	m	C.2.27	0.131	78.8	$ 4.80	$ 2,882	$ -	$ -	$ 10.14	$ 6,086	$ 5.33	2,458	$ 3,195	$ -	$ -	$ 20.27	$12,164		
	2	1	2	1	430	Head-works dam	Load, haul, dump, place and compact till at headworks	54	Bm3	R.046	0.088	4.7	$ 3.20	$ 173	$ -	$ -	$ 7.52	$ 406	$ 3.60	150	$ 194	$ -	$ -	$ 14.32	$773		
	2	1	3	1	430	Excavate channel	Soil excavation: Load, haul and dump locally	6,614	Bm3	C.2.10	0.032	211.7	$ 1.17	$ 7,747	$ -	$ -	$ 2.72	$ 17,963	$ 1.27	6,452	$ 8,388	$ -	$ -	$ 5.16	$34,097		
	2	1	3	2	430		Rock excavation: Drill, blast, load, haul and dump	4,863	Bm3	C.2.15	0.173	842.9	$ 6.34	$ 30,840	$ -	$ -	$ 9.13	$ 44,385	$ 3.69	13,799	$ 17,939	$ -	$ -	$ 19.16	$93,172		
	2	1	3	1	430	Fill material	Placed as part of soil excavation, compact by hand	1,365	m2	C.2.06	0.016	21.8	$ 0.57	$ 782	$ -	$ -	$ 0.02	$ 29	$ 0.02	17	$ 22	$ -	$ -	$ 0.61	$833		
	2	1	4	1	430	Place till	Till: Load, haul, dump place, compact	3,992	Bm3	R.046	0.088	349.3	$ 3.20	$ 12,786	$ -	$ -	$ 7.52	$ 30,010	$ 3.60	11,057	$ 14,374	$ -	$ -	$ 14.32	$57,170		
	2	1	5	1	430	Place geotextile	Supply and place geotextile	3,142	m2	C.4.07	0.071	224.4	$ 2.52	$ 7,927	$ 3.50	$ 10,997	$ 0.82	$ 2,561	$ 0.53	1,276	$ 1,659	$ -	$ -	$ 7.37	$23,144		
	2	1	6	1	430	Place bedding layer	Produce, screen and stockpile	3,992	Bm3	C.2.02	0.010	39.9	$ 0.37	$ 1,461	$ -	$ -	$ 1.61	$ 6,422	$ 1.13	3,468	$ 4,509	$ -	$ -	$ 3.10	$12,393		
	2	1	6	2	430		Load, haul, place and compact	3,992	Bm3	R.047	0.069	274.5	$ 2.52	$ 10,046	$ -	$ -	$ 5.22	$ 20,821	$ 2.40	7,367	$ 9,578	$ -	$ -	$ 10.13	$40,444		
	2	1	7	1	430	Place rip-rap	Rip-rap (angular, high quality): Screen and stockpile	9,726	Bm3	C.2.25	0.057	555.8	$ 2.09	$ 20,341	$ -	$ -	$ 9.19	$ 89,403	$ 6.45	48,283	$ 62,768	$ -	$ -	$ 17.74	$172,512		
	2	1	7	2	430		Rip-rap: Load, haul, dump	9,726	Bm3	R.048	0.028	274.6	$ 1.03	$ 10,051	$ -	$ -	$ 2.42	$ 23,507	$ 1.09	8,169	$ 10,620	$ -	$ -	$ 4.54	$44,178		
	2	1	7	3	430		Rip-rap: Place and secure	9,726	Bm3	C.2.26	0.013	121.6	$ 0.46	$ 4,450	$ -	$ -	$ 0.89	$ 8,650	$ 0.47	3,509	$ 4,561	$ -	$ -	$ 1.82	$17,661		
Rip rap protection at pit inlet																										$14,457	
	2	2	1	1	430	Place rip-rap	Rip-rap (angular, high quality): Screen and stockpile	600	Bm3	C.2.25	0.057	34.3	$ 2.09	$ 1,255	$ -	$ -	$ 9.19	$ 5,515	$ 6.45	2,978	$ 3,872	$ -	$ -	$ 17.74	$10,642		
	2	2	1	2	430		Rip-rap: Load, haul, dump	600	Bm3	R.048	0.028	16.9	$ 1.03	$ 620	$ -	$ -	$ 2.42	$ 1,450	$ 1.09	504	$ 655	$ -	$ -	$ 4.54	$2,725		
	2	2	1	3	430		Rip-rap: Place and secure	600	Bm3	C.2.26	0.013	7.5	$ 0.46	$ 275	$ -	$ -	$ 0.89	$ 534	$ 0.47	216	$ 281	$ -	$ -	$ 1.82	$1,090		
Route out of Pit																										$2,721,925	
	2	3	1	1	430	Excavate channel	Bulk excavate soil/waste rock (dump locally)	277,181	Bm3	C.2.10	0.032	8869.8	$ 1.17	$ 324,635	$ -	$ -	$ 2.72	$ 752,758	$ 1.27	270,393	$ 351,510	$ -	$ -	$ 5.16	$1,428,903		
	2	3	1	2	430		Rock excavation: Drill, blast, muck, load haul dump	5,584	Bm3	C.2.15	0.173	967.8	$ 6.34	$ 35,423	$ -	$ -	$ 9.13	$ 50,966	$ 3.69	15,845	$ 20,599	$ -	$ -	$ 19.16	$106,987		
	2	3	2	1	430	Place till	Till: Load, haul, dump place, compact	17,569	Bm3	R.049	0.074	1294.5	$ 2.70	$ 47,380	$ -	$ -	$ 5.59	$ 98,200	$ 2.57	34,746	$ 45,172	$ -	$ -	$ 10.86	$190,752		
	2	3	3	1	430	Place geotextile	Supply and place geotextile	12,089	m2	C.4.07	0.071	863.5	$ 2.52	$ 30,499	$ 3.50	$ 42,311	$ 0.82	$ 9,856	$ 0.53	4,011	$ 5,385	$ -	$ -	$ 7.37	$89,050		
	2	3	4	1	430	Place bedding layer	Produce and stockpile (screen) bedding layer	17,569	Bm3	C.2.02	0.010	175.7	$ 0.37	$ 6,430	$ -	$ -	$ 1.61	$ 28,262	$ 1.13	15,263	$ 19,842	$ -	$ -	$ 3.10	$54,534		
	2	3	4	2	430		Load, Haul, Place and Compact bedding layer	17,569	Bm3	R.050	0.057	1171.3	$ 2.44	$ 42,868	$ -	$ -	$ 5.06	$ 88,848	$ 2.33	31,438	$ 40,870	$ -	$ -	$ 9.82	$172,585		
	2	3	5	1	430	Place rip-rap	Rip-rap (angular, high quality): Screen and stockpile	29,402	Bm3	C.2.25	0.057	1680.1	$ 2.09	$ 61,491	$ -	$ -	$ 9.19	$ 270,266	$ 6.45	145,961	$ 189,749	$ -	$ -	$ 17.74	$521,506		
	2	3	5	2	430		Rip-rap: Load, haul, dump	29,402	Bm3	R.051	0.021	622.6	$ 0.78	$ 22,788	$ -	$ -	$ 1.88	$ 55,285	$ 0.89	20,110	$ 26,143	$ -	$ -	$ 3.54	$104,216		
	2	3	5	3	430		Rip-rap: Place and secure	29,402	Bm3	C.2.26	0.013	367.5	$ 0.46	$ 13,451	$ -	$ -	$ 0.89	$ 26,150	$ 0.47	10,607	$ 13,789	$ -	$ -	$ 1.82	$53,390		
Siphon allowance																										$296,509	
	2	4	1	1	430	Siphon for creek 'Out of pit'	Piping: Supply and install steel piping	1,130	m	C.3.14	0.300	339.0	$ 16.66	$ 18,826	$ 237.06	$ 267,878	$ 1.40	$ 1,586	$ 1.67	1,450	$ 1,885	$ -	$ -	$ 256.70	$290,175		
	2	4	1	2	500		Pumps: supply and install	2	ea.	C.3.10	12.000	24.0	$ 600.00	$ 1,200	$ 1,829.00	$ 3,658	$ -	$ -	$ -	0	$ -	$ -	$ -	$ 2,429.00	$4,858		
	2	4	1	3	500		Install protective housing (shack)	2	ea.	C.4.03	4.545	9.1	$ 297.88	$ 596	$ 325.96	$ 652	$ 85.85	$ 172	$ 28.17	43	$ 56	$ -	$ -	$ 737.86	$1,476		
Upgrade North Wall Interceptor																										$293,508	
	2	4	1	1	430	Excavate channel	Soil Excavation: load, haul and dump locally	7,500	Bm3	C.2.10	0.032	240.0	$ 1.17	$ 8,784	$ -	$ -	$ 2.72	$ 20,368	$ 1.27	7,316	$ 9,511	$ -	$ -	$ 5.16	$38,663		assume same upgrade as Improved Creek
	2	4	2	1	430	Place rip-rap	Rip-rap (angular, high quality): Screen and stockpile	10,800	Bm3	C.2.25	0.057	617.1	$ 2.09	$ 22,587	$ -	$ -	$ 9.19	$ 99,276	$ 6.45	53,615	$ 69,700	$ -	$ -	$ 17.74	$191,564		option
	2	4	2	2	430		Rip-rap: Load, haul, dump	10,800	Bm3	R.052	0.025	266.8	$ 0.90	$ 9,766	$ -	$ -	$ 2.15	$ 23,205	$ 0.99	8,229	$ 10,698	$ -	$ -	$ 4.04	$43,669		
	2	4	2	3	430		Rip-rap: Place and secure	10,800	Bm3	C.2.26	0.013	135.0	$ 0.46	$ 4,941	$ -	$ -	$ 0.89	$ 9,605	$ 0.47	3,806	$ 5,065	$ -	$ -	$ 1.82	$19,612		
Subtotal Direct Costs - Faro Creek												20,709		$763,548		$325,496		$1,793,667		734,037	$954,247		$0			$3,836,958	
Zone II Pit																										$343,698	
Water Management																											
	3	1	1	1	430	Groundwater Wells	Drill wells (Air Rotary Drill Rig, ~90m depth)	90	m	C.2.09	2.000	180.0	$ 102.13	$ 9,192	$ -	$ -	$ 100.85	$ 9,077	$ 22.08	1,529	$ 1,987	$ -	$ -	$ 225.07	$20,256		Pump and treat Zone II Pit water
	3	1	1	2	500		Install 6" stainless steel well casing & screen	90	m	C.3.17	0.150	13.5	$ 7.66	$ 689	$ 232.60	$ 20,934	$ 7.56	$ 681	$ 1.66	115	$ 149	$ -	$ -	$ 249.48	$22,453		
	3	1	1	3	500		Install 6" Submersible Pump with controls	1	ea.	C.3.07	12.000	12.0	$ 600.00	$ 600	$ 6,842.00	$ 6,842	$ -	$ -	$ -	0	$ -	$ -	$ -	$ 7,442.00	$7,442		
	3	1	1	4	500		Install protective housing (shack)	1	ea.	C.3.13	20.000	20.0	$ 1,300.00	$ 1,300	$ 445.00	$ 445	$ -	$ -	$ -	0	$ -	$ -	$ -	$ 1,745.00	$1,745		
	3	1	2	1	500	Monitoring wells	Drill wells (Air Rotary Drill Rig, ~90m depth)	180	m	C.2.09	2.000	360.0	$ 102.13	$ 18,384	$ -	$ -	$ 100.85	$ 18,153	$ 22.08	3,057	$ 3,974	$ -	$ -	$ 225.07	$40,512		
	3	1	2	2	500		Install 6" stainless steel well casing & screen	180	m	C.3.17	0.150	27.0	$ 7.66	$ 1,379	$ 232.60	$ 41,868	$ 7.56	$ 1,362	$ 1.66	229	$ 298	$ -	$ -	$ 249.48	$44,906		
	3	1	2	3	500		Install protective well cover	2	ea.	C.3.18	1.333	2.7	$ 48.80	$ 98	$ 164.54	$ 329	$ 100.85	$ 202	$ 22.08	34	$ 44	$ -	$ -	$ 336.27	$673		
	3	1	3	1	430	Piping system	Excavate piping trench	4,200	Bm3	C.2.13	0.020	84.0	$ 0.73	$ 3,074	$ -	$ -	$ 1.42	$ 5,977	$ 0.75	2,424	$ 3,152	$ -	$ -	$ 2.91	$12,203		
	3	1	3	2	510		Supply and install insulated 150mm HDPE pipe	700	m	C.3.03	0.250	175.0	$ 8.75	$ 6,125	$ 155.84	$ 109,088	$ -	$ -	$ -	0	$ -	$ -	$ -	$ 164.59	$115,213		
	3	1	3	3	430		Bedding layer: Produce, screen and stockpile	273	Bm3	C.2.02	0.010	2.7	$ 0.37	$ 100	$ -	$ -	$ 1.61	$ 439	$ 1.13	237	$ 308	$ -	$ -	$ 3.10	$847		
	3	1	3	4	430		Bedding layer: Load, haul, place and compact	273	Bm3	R.061	0.034	9.4	$ 1.26	$ 343	$ -	$ -	$ 2.61	$ 712	$ 1.20	252	$ 327	$ -	$ -	$ 5.07	$1,383		
	3	1	3	7	430		Backfill ditches	4,200	Bm3	C.2.01	0.030	126.0	$ 1.08	$ 4,544	$ -	$ -	$ 0.74	$ 3,099	$ 0.40	1,278	$ 1,661	$ -	$ -	$ 2.22	$9,304		
	3	1	4	1	510	Heat tracing	Supply and install heat trace in HDPE pipe	700	m	C.3.04	0.250	175.0	$ 12.50	$ 8,750	$ 21.32	$ 14,924	$ -	$ -	$ -	0	$ -	$ -	$ -	$ 33.82	$23,674		
	3	1	4	2	510		Supply/install heat tracing power feed kit	1	ea.	C.3.05	4.000	4.0	$ 230.00	$ 230	$ 396.84	$ 397	$ -	$ -	$ -	0	$ -	$ -	$ -	$ 626.84	$627		
	3	1	4	3	510		Supply/install electrical thermostats for heat tracing	1	ea.	C.3.06	1.000	1.0	$ 57.50	$ 58	$ 1,025.00	$ 1,025	$ -	$ -	$ -	0	$ -	$ -	$ -	$ 1,082.50	$1,083		
	3	1	5	1	510	Provide electricity from WTP to pumps	Supply/install treated power poles	20	ea.	C.4.03	4.545	131.8	$ 297.88	$ 8,638	$ 325.96	$ 9,453	$ 85.85	$ 2,490	$ 28.17	628	$ 817	$ -	$ -	$ 737.86	$21,398		
	3	1	5	2	510		Supply/install overhead conductor	2,200	m	C.4.02	0.032	70.4	$ 2.21	$ 4,868	$ 1.41	$ 3,102	$ 0.45	$ 997	$ 0.15	252	$ 327	$ -	$ -	$ 4.22	$9,295		
	3	1	5	3	510		Supply/install transformers	1	ea.	C.4.04	20.000	20.0	$ 1,383.00	$ 1,383	$ 8,934.00	$ 8,934	$ 224.98	$ 225	$ 143.00	110	$ 143	$ -	$ -	$ 10,684.98	$10,685		
Subtotal Direct Costs - Zone II Pit												1,414		$69,756		$217,341		$43,412		10,145	$13,188		$0			$343,698	
Oxide Fines / LGSP																										$2,548,012	
Oxide Fines																											
	4	1	1	1	430	Relocate to in Faro Pit with lime addition	Load, haul, place and compact oxide materials	262,315	m3	R.070	0.013	3297.7	$ 0.46	$ 120,695	$ -	$ -	$ 1.60	$ 419,609	$ 1.04	210,839	$ 274,090	$ -	$ -	$ 3.10	$814,394		
	4	1	2	1	510	Lime addition	Add lime to oxide fines	4,459	tonnes	C.2.21	0.036	159.3	$ 1.59	$ 7,109	$ 320.00	$ 1,426,904	$ 1.67	$ 7,440	$ 0.98	3,357	$ 4,364	$ -	$ -	$ 324.24	$1,445,907		
	4	1	2	2	010		Survey requirements (grid for testing)	525	hrs	P.02	1.000	524.6	$ 35.00	$ 18,362	$ -	$ -	$ -	$ -	$ -	0	$ -	$ -	$ -	$ 35.00	$18,362		
	4	1	2	3	010		Material testing (to verify lime addition dosage)	525	hrs	P.03	1.000	524.6	$ 100.00	$ 52,463	$ -	$ -	$ -	$ -	$ -	0	$ -	$ -	$ -	$ 100.00	$52,463		
	4	1	3	4	970	Lime addition contingency	15% contingency	669	tonnes	C.2.21	0.036	23.9	$ 1.59	$ 1,056	$ 320.00	$ 214,049	$ 1.67	$ 1,116	$ 0.98	504	$ 655	$ -	$ -	$ 324.24	$216,886		
Medium-Grade Stockpile																										$6,731,497	
	4	1	1	1	430	Relocate to in Faro Pit with lime addition	Load, haul, place and compact	693,000	m3	R.070	0.013	8712.0	$ 0.46	$ 318,850	$ -	$ -	$ 1.60	$ 1,108,549	$ 1.04	557,007	$ 724,109	$ -	$ -	$ 3.10	$2,151,517		
	4	1	2	1	510	Lime addition	Add lime	11,781	tonnes	C.2.21	0.036	420.8	$ 1.59	$ 18,782	$ 320.00	$ 3,769,920	$ 1.67	$ 19,655	$ 0.98	8,869	$ 11,529	$ -	$ -	$ 324.24	$3,819,887		
	4	1	2	2	010		Survey requirements (grid for testing)	1,386	hrs	P.02	1.000	1386.0	$ 35.00	$ 48,510	$ -	$ -	$ -	$ -	$ -	0	$ -	$ -	$ -	$ 35.00	$48,510		
	4	1	2	3	010		Material testing (to verify lime addition dosage)	1,386	hrs	P.03	1.000	1386.0	$ 100.00	$ 138,600	$ -	$ -	$ -	$ -	$ -	0	$ -	$ -	$ -	$ 100.00	$138,600		

Attachment E

Example Alternatives - Cost Estimate

4	1	3	4	970	Lime addition contingency	15% contingency	1,767	tonnes	C.2.21	0.036	63.1	$ 1.59	$ 2,817	$ 320.00	$ 565,488	$ 1.67	$ 2,948	$ 0.98	1,330	$ 1,729	$ -	$ -	$ 324.24	$572,983		
Low Grade Stockpile "A"																									$2,486,671	
4	1	1	1	430	Relocate to in Faro Pit with lime addition	Load, haul, place and compact	256,000	m3	R.070	0.013	3218.3	$ 0.46	$ 117,789	$ -	$ -	$ 1.60	$ 409,507	$ 1.04	205,763	$ 267,492	$ -	$ -	$ 3.10	$794,788		
4	1	2	1	510	Lime addition	Add lime	4,352	tonnes	C.2.21	0.036	155.4	$ 1.59	$ 6,938	$ 320.00	$ 1,392,640	$ 1.67	$ 7,261	$ 0.98	3,276	$ 4,259	$ -	$ -	$ 324.24	$1,411,098		
4	1	2	2	010		Survey requirements (grid for testing)	512	hrs	P.02	1.000	512.0	$ 35.00	$ 17,920	$ -	$ -	$ -	$ -	$ -	0	$ -	$ -	$ -	$ 35.00	$17,920		
4	1	2	3	010		Material testing (to verify lime addition dosage)	512	hrs	P.03	1.000	512.0	$ 100.00	$ 51,200	$ -	$ -	$ -	$ -	$ -	0	$ -	$ -	$ -	$ 100.00	$51,200		
4	1	3	4	970	Lime addition contingency	15% contingency	653	tonnes	C.2.21	0.036	23.3	$ 1.59	$ 1,041	$ 320.00	$ 208,896	$ 1.67	$ 1,089	$ 0.98	491	$ 639	$ -	$ -	$ 324.24	$211,865		
Low Grade Stockpile "C"																									$6,352,668	
4	1	1	1	430	Relocate to in Faro Pit with lime addition	Load, haul, place and compact	654,000	m3	R.070	0.013	8221.7	$ 0.46	$ 300,915	$ -	$ -	$ 1.60	$ 1,046,163	$ 1.04	525,660	$ 683,358	$ -	$ -	$ 3.10	$2,030,436		
4	1	2	1	510	Lime addition	Add lime	11,118	tonnes	C.2.21	0.036	397.1	$ 1.59	$ 17,725	$ 320.00	$ 3,557,760	$ 1.67	$ 18,549	$ 0.98	8,370	$ 10,881	$ -	$ -	$ 324.24	$3,604,915		
4	1	2	2	010		Survey requirements (grid for testing)	1,308	hrs	P.02	1.000	1308.0	$ 35.00	$ 45,780	$ -	$ -	$ -	$ -	$ -	0	$ -	$ -	$ -	$ 35.00	$45,780		
4	1	2	3	010		Material testing (to verify lime addition dosage)	1,308	hrs	P.03	1.000	1308.0	$ 100.00	$ 130,800	$ -	$ -	$ -	$ -	$ -	0	$ -	$ -	$ -	$ 100.00	$130,800		
4	1	3	4	970	Lime addition contingency	15% contingency	1,668	tonnes	C.2.21	0.036	59.6	$ 1.59	$ 2,659	$ 320.00	$ 533,664	$ 1.67	$ 2,782	$ 0.98	1,255	$ 1,632	$ -	$ -	$ 324.24	$540,737		
Subtotal Direct Costs - Oxide Fines											32,213		$1,420,032		$11,669,411		$3,044,669		1,526,721	$1,084,737		$0			$18,118,849	
ETA Tailings																										
Option 1: Pump Tailings to Faro Pit																									$662,124	
5	1	1	1	430	Hydraulic monitoring with lime addition	Operate Hydraulic monitoring system	64,000	m3	C.7.04	0.020	1284.5	$ 0.89	$ 57,163	$ 0.26	$ 16,473	$ 0.02	$ 1,014	$ 0.01	496	$ 645	$ 0.27	$ 17,145	$ 1.44	$92,439		
5	1	1	2	430		Operate Slurry Pumping System	64,000	m3	C.7.18	0.008	540.8	$ 0.42	$ 27,042	$ 0.32	$ 20,750	$ -	$ -	$ -	0	$ -	$ 0.54	$ 34,470	$ 1.29	$82,278		
5	1	1	3	430		lime addition - qnty in tonnes per CaOH	1,088	ton	C.2.21	0.036	38.9	$ 1.59	$ 1,735	$ 320.00	$ 348,160	$ 1.67	$ 1,815	$ 0.98	819	$ 1,065	$ -	$ -	$ 324.24	$352,775		
5	1	2	1	430	Truck contaminated soils to Faro Pit	Load, haul, dump remaining contaminated material to Faro Pit	12,800	m3	R.071	0.053	672.0	$ 1.92	$ 24,595	$ -	$ -	$ 5.31	$ 68,008	$ 2.59	25,547	$ 33,211	$ -	$ -	$ 9.83	$125,814		
5	1	2	2	430		Regrade area to form detention pond	19	hrs	C.2.22	1.000	19.1	$ 36.60	$ 699	$ -	$ -	$ 173.28	$ 3,311	$ 149.18	2,193	$ 2,851	$ -	$ -	$ 359.06	$6,861		
5	1	3	1	610	Revegetate	Seed/Fertilize, helicopter high application rate	13,000	m2	C.5.01	0.000	1.6	$ 0.00	$ 58	$ 0.09	$ 1,182	$ 0.05	$ 709	$ 0.00	7	$ 9	$ -	$ -	$ 0.15	$1,957		
Option 2: Haul Tailings to Rose Creek Tailings Deposi																									$725,144	
5	2	1	1	430	Truck to tailings impoundment	Excavate, load, haul, dump and place	64,000	m3	R.074	0.026	1667.0	$ 0.95	$ 61,011	$ -	$ -	$ 2.54	$ 162,621	$ 1.24	61,021	$ 79,327	$ -	$ -	$ 4.73	$302,959		
5	2	2	1	430	Lime addition	Add lime to waste rock (qnty= tonnes CaOH eq)	1,088	ton	C.2.21	0.036	38.9	$ 1.59	$ 1,735	$ 320.00	$ 348,160	$ 1.67	$ 1,815	$ 0.98	819	$ 1,065	$ -	$ -	$ 324.24	$352,775		
5	2	3	1	430	Truck contaminated soils to Faro Pit	Load, haul, dump remaining contaminated material to Tailings I	12,800	m3	R.074	0.026	333.4	$ 0.95	$ 12,202	$ -	$ -	$ 2.54	$ 32,524	$ 1.24	12,204	$ 15,865	$ -	$ -	$ 4.73	$60,592		
5	2	3	2	430		Regrade area to form detention pond	19	hrs	C.2.22	1.000	19.1	$ 36.60	$ 699	$ -	$ -	$ 173.28	$ 3,311	$ 149.18	2,193	$ 2,851	$ -	$ -	$ 359.06	$6,861		
5	2	4	1	610	Revegetate	Seed/Fertilize, helicopter high application rate	13,000	m2	C.5.01	0.000	1.6	$ 0.00	$ 58	$ 0.09	$ 1,182	$ 0.05	$ 709	$ 0.00	7	$ 9	$ -	$ -	$ 0.15	$1,957		
ETA Collection System (to Pit)																									$655,962	
5	3	1	1	500	Groundwater wells	Drill wells (Air Rotary Drill Rig, ~20m depth)	100	m	C.2.09	2.000	200.0	$ 102.13	$ 10,213	$ -	$ -	$ 100.85	$ 10,085	$ 22.08	1,698	$ 2,208	$ -	$ -	$ 225.07	$22,507		
5	3	1	2	500		Install 6" stainless steel well casing & screen	100	m	C.3.17	0.150	15.0	$ 7.66	$ 766	$ 232.60	$ 23,260	$ 7.56	$ 756	$ 1.66	127	$ 166	$ -	$ -	$ 249.48	$24,948		
5	3	1	3	500		Install 6" Submersible Pump with controls	5	ea.	C.3.07	12.000	60.0	$ 600.00	$ 3,000	$ 6,842.00	$ 34,210	$ -	$ -	$ -	0	$ -	$ -	$ -	$ 7,442.00	$37,210		
5	3	1	4	500		Install protective housing (shack)	5	ea.	C.3.13	20.000	100.0	$ 1,300.00	$ 6,500	$ 445.00	$ 2,225	$ -	$ -	$ -	0	$ -	$ -	$ -	$ 1,745.00	$8,725		
5	3	2	1	500	Monitoring wells	Drill wells (Air Rotary Drill Rig, ~20m depth)	60	m	C.2.09	2.000	120.0	$ 102.13	$ 6,128	$ -	$ -	$ 100.85	$ 6,051	$ 22.08	1,019	$ 1,325	$ -	$ -	$ 225.07	$13,504		
5	3	2	2	500		Install 6" stainless steel well casing & screen	60	m	C.3.17	0.150	9.0	$ 7.66	$ 460	$ 232.60	$ 13,956	$ 7.56	$ 454	$ 1.66	76	$ 99	$ -	$ -	$ 249.48	$14,969		
5	3	2	3	500		Install protective well cover	3	ea.	C.3.18	1.333	4.0	$ 48.80	$ 146	$ 164.54	$ 494	$ 100.85	$ 303	$ 22.08	51	$ 66	$ -	$ -	$ 336.27	$1,009		
5	3	3	1	430	Pumping station	Excavate sump for manholes	200	m3	C.2.12	0.024	4.7	$ 0.86	$ 172	$ -	$ -	$ 2.00	$ 399	$ 0.93	143	$ 186	$ -	$ -	$ 3.79	$758		
5	3	3	2	500		Supply and place precast concrete manhole	1	ea.	C.3.08	16.000	16.0	$ 746.40	$ 746	$ 1,344.68	$ 1,345	$ 72.47	$ 72	$ 62.92	48	$ 63	$ -	$ -	$ 2,226.47	$2,226		
5	3	3	3	430		Backfill and compact around manhole	200	m3	C.2.01	0.030	6.0	$ 1.08	$ 216	$ -	$ -	$ 0.74	$ 148	$ 0.40	61	$ 79	$ -	$ -	$ 2.22	$443		
5	3	3	4	500		Install primary pump	1	ea.	C.3.10	12.000	12.0	$ 600.00	$ 600	$ 1,829.00	$ 1,829	$ -	$ -	$ -	0	$ -	$ -	$ -	$ 2,429.00	$2,429		
5	3	4	1	430	Piping system	Excavate piping trench	13,200	m3	C.2.13	0.020	264.0	$ 0.73	$ 6,662	$ -	$ -	$ 1.42	$ 18,784	$ 0.75	7,619	$ 9,905	$ -	$ -	$ 2.91	$38,352		
5	3	4	2	510		Supply and install insulated 150mm HDPE pipe	2,200	m	C.3.03	0.250	550.0	$ 8.75	$ 19,250	$ 155.84	$ 342,848	$ -	$ -	$ -	0	$ -	$ -	$ -	$ 164.59	$362,098		
5	3	4	5	430		Bedding layer: Produce, screen and stockpile	858	m3	C.2.02	0.010	8.6	$ 0.37	$ 314	$ -	$ -	$ 1.61	$ 1,380	$ 1.13	745	$ 969	$ -	$ -	$ 3.10	$2,663		
5	3	4	6	430		Bedding layer: Load, haul, place and compact	858	m3	R.073	0.031	26.2	$ 1.12	$ 960	$ -	$ -	$ 2.32	$ 1,989	$ 1.07	704	$ 915	$ -	$ -	$ 4.50	$3,863		
5	3	4	7	430		Backfill ditches	13,200	m3	C.2.01	0.030	396.0	$ 1.08	$ 14,282	$ -	$ -	$ 0.74	$ 9,739	$ 0.40	4,016	$ 5,221	$ -	$ -	$ 2.22	$29,242		
5	3	5	1	510	Heat tracing	Supply and install heat trace in HDPE pipe	2,200	m	C.3.04	0.250	550.0	$ 12.50	$ 27,500	$ 21.32	$ 46,904	$ -	$ -	$ -	0	$ -	$ -	$ -	$ 33.82	$74,404		
5	3	5	2	510		Supply/Install heat tracing power feed kit	1	ea.	C.3.05	4.000	4.0	$ 230.00	$ 230	$ 396.84	$ 397	$ -	$ -	$ -	0	$ -	$ -	$ -	$ 626.84	$627		
5	3	5	3	510		Supply/Install electrical thermostate for heat tracing	1	ea.	C.3.06	1.000	1.0	$ 57.50	$ 58	$ 1,025.00	$ 1,025	$ -	$ -	$ -	0	$ -	$ -	$ -	$ 1,082.50	$1,083		
5	3	6	1	510	Provide electricity from WTP to pumps	Supply/Install treated power poles	4	ea.	C.4.03	4.545	18.2	$ 297.88	$ 1,192	$ 325.96	$ 1,304	$ 85.85	$ 343	$ 28.17	87	$ 113	$ -	$ -	$ 737.86	$2,951		
5	3	6	2	510		Supply/Install overhead conductor	300	m	C.4.02	0.032	9.6	$ 2.21	$ 664	$ 1.41	$ 423	$ 0.45	$ 136	$ 0.15	34	$ 45	$ -	$ -	$ 4.22	$1,267		
5	3	6	3	510		Supply/Install transformers	1	ea.	C.4.04	20.000	20.0	$ 1,383.00	$ 1,383	$ 8,934.00	$ 8,934	$ 224.98	$ 225	$ 143.00	110	$ 143	$ -	$ -	$ 10,684.98	$10,685		
Subtotal Direct Costs - ETA (Maximum of Option 1 & 2)											4,454		$180,149		$828,495		$251,844		92,784	$120,619		$0			$1,381,107	
Waste Rock																										
Faro Valley Dump																									$3,565,757	
6	2	1	1	430	Relocate to Main Sulphide Cell	Load, haul, dump, place, compact	923,760	m3	R.080	0.016	14516.2	$ 0.58	$ 531,294	$ -	$ -	$ 1.99	$ 1,839,124	$ 1.29	919,491	$ 1,195,339	$ -	$ -	$ 3.86	$3,565,757		estimated as AutoCAD outline X2 with a depth of 30m
Re-slope Waste Rock																									$3,857,323	
6	1	1	1	430	Remove vegetation at WR toe	Clear/grub forest area around toe	60,000	m2	C.2.05	0.015	872.7	$ 0.53	$ 31,942	$ -	$ -	$ 0.94	$ 56,103	$ 0.62	28,478	$ 37,021	$ -	$ -	$ 2.08	$125,066		
6	1	2	1	430	Re-grade	Flattened surfaces (enhance surface runoff)	429	hrs	C.2.22	1.000	429.0	$ 36.60	$ 15,702	$ -	$ -	$ 173.28	$ 74,341	$ 149.18	49,232	$ 64,002	$ -	$ -	$ 359.06	$154,045		
6	1	2	2	430		Flatten bubble dump surfaces	769	hrs	C.2.22	1.000	769.0	$ 36.60	$ 28,146	$ -	$ -	$ 173.28	$ 133,252	$ 149.18	88,246	$ 114,720	$ -	$ -	$ 359.06	$276,117		
6	1	2	3	430		Re-grade slopes	7,329	hrs	C.2.22	1.000	7329.4	$ 36.60	$ 268,255	$ -	$ -	$ 173.28	$ 1,270,021	$ 149.18	841,074	$ 1,093,397	$ -	$ -	$ 359.06	$2,631,673		
6	1	3	1	430	Pull-back slopes not able to be re-sloped	Load, haul, dump, place at top of dump	195,750	m3	R.077	0.012	2437.6	$ 0.46	$ 89,218	$ -	$ -	$ 1.80	$ 352,187	$ 1.17	176,166	$ 229,016	$ -	$ -	$ 3.42	$670,422		
Sulphide Cells																									$31,258,735	
6	2	1	1	430	Relocate east Cell to Main Sulphide Cell	Load, haul, dump, place, compact	1,080,000	m3	R.079	0.014	15274.3	$ 0.52	$ 559,039	$ -	$ -	$ 1.80	$ 1,938,897	$ 1.17	971,536	$ 1,262,997	$ -	$ -	$ 3.48	$3,760,932		estimated as AutoCAD outline X2 with a depth of 30m
6	2	2	1	430	Very Low Infiltration Cover	Load, haul, place compacted till (1.0m) (South cells)	816,583	m3	R.075	0.056	45728.6	$ 2.05	$ 1,673,669	$ -	$ -	$ 7.09	$ 5,793,562	$ 4.61	2,896,558	$ 3,765,526	$ -	$ -	$ 13.76	$11,232,756		
6	2	2	2	430		Load, haul, place loose till (1.5m) (South cells)	1,224,875	m3	R.076	0.050	61733.7	$ 1.84	$ 2,259,452	$ -	$ -	$ 6.95	$ 8,508,005	$ 4.49	4,228,915	$ 5,497,590	$ -	$ -	$ 13.28	$16,265,047		
Waste Rock Cover																									$73,254,798	
6	3	1	1	430	Place low infiltration cove	Load, haul, place compacted till (0.5m)	1,366,881	m3	R.075	0.056	76545.4	$ 2.05	$ 2,801,560	$ -	$ -	$ 7.09	$ 9,697,865	$ 4.61	4,848,559	$ 6,303,127	$ -	$ -	$ 13.76	$18,802,552		
6	3	1	2	430		Load, haul, place loose till (1..5m)	4,100,644	m3	R.076	0.050	206672.5	$ 1.84	$ 7,564,212	$ -	$ -	$ 6.95	$ 28,483,162	$ 4.49	14,157,593	$ 18,404,871	$ -	$ -	$ 13.28	$54,452,245		
Steep Runoff channels																									$77,316	
6	4	1	1	430	Surface runoff management: Rock drains	Excavate channel for rock drains	4,375	m3	C.2.13	0.020	87.5	$ 0.73	$ 3,203	$ -	$ -	$ 1.42	$ 6,226	$ 0.75	2,525	$ 3,283	$ -	$ -	$ 2.91	$12,711		
6	4	1	2	430		Rip-rap (rounded, low quality): Screen and stockpile	3,255	m3	C.2.24	0.040	130.2	$ 1.46	$ 4,765	$ -	$ -	$ 6.43	$ 20,944	$ 4.52	11,311	$ 14,705	$ -	$ -	$ 12.42	$40,415		
6	4	1	3	430		Rip-rap: Load, haul, dump	3,255	m3	R.078	0.035	113.6	$ 1.28	$ 4,159	$ -	$ -	$ 2.99	$ 9,726	$ 1.35	3,380	$ 4,394	$ -	$ -	$ 5.62	$18,280		
6	4	1	4	430		Rip-rap: Place and secure	3,255	m3	C.2.26	0.013	40.7	$ 0.46	$ 1,489	$ -	$ -	$ 0.89	$ 2,895	$ 0.47	1,174	$ 1,527	$ -	$ -	$ 1.82	$5,911		
Revegetate																									$467,177	
6	6	1	1	610	Revegetate WR Dumps	Seed/Fertilize, helicopter low application rate	4,444,400	m2	C.5.02	0.000	555.6	$ 0.00	$ 19,952	$ 0.05	$ 202,042	$ 0.05	$ 242,231	$ 0.00	2,270	$ 2,951	$ -	$ -	$ 0.11	$467,177		
						Note: Removal of North Fork Rock Drain included in Tailings Alternative																				
Subtotal Direct Costs - Waste Rock											433,236		$15,856,056		$202,042		$58,428,541		29,226,512	$37,994,465		$0			$112,481,105	
Groundwater																										
Upgrade North Fork Rose Creek																									$1,294,796	
7	1	1	1	430	Construct access road	Clear access road area	6,600	m2	C.2.04	0.004	24.0	$ 0.13	$ 878	$ -	$ -	$ 0.62	$ 4,120	$ 0.36	1,847	$ 2,401	$ -	$ -	$ 1.12	$7,399		
7	1	1	2	430		Construct access road	2,200	m	C.2.27	0.131	288.8	$ 4.80	$ 10,568	$ -	$ -	$ 10.14	$ 22,315	$ 5.33	9,013	$ 11,717	$ -	$ -	$ 20.27	$44,600		
7	1	2	1	430	Construct channe	Load, haul, dump granular material along channel thalweg.	21,750	m3	R.081	0.028	614.1	$ 1.03	$ 22,477	$ -	$ -	$ 2.75	$ 59,910	$ 1.34	22,480	$ 29,224	$ -	$ -	$ 5.13	$111,611		
7	1	2	2	430		Load, haul, dump till to create channel berms	35,980	m3	R.082	0.032	1133.4	$ 1.15	$ 41,481	$ -	$ -	$ 2.82	$ 101,628	$ 1.41	39,006	$ 50,708	$ -	$ -	$ 5.39	$193,817		
7	1	3	1	430	Place geotextile	Supply and place geotextile	42,858	m2	C.4.06	0.016	685.7	$ 0.57	$ 24,275	$ 3.50	$ 150,003	$ 0.23	$ 9,783	$ 0.15	4,875	$ 6,338	$ -	$ -	$ 4.44	$190,399		
7	1	4	1	430	Place 0.3m till layer	Till: Load, haul, dump and place	12,857	m3	R.083	0.028	360.0	$ 1.02	$ 13,176	$ -	$ -	$ 2.38	$ 30,596	$ 1.11	11,014	$ 14,318	$ -	$ -	$ 4.52	$58,090		
7	1	4	2	430		Till: Compact with vibrating drum roller	12,857	m2	C.2.06	0.016	205.7	$ 0.57	$ 7,364	$ -	$ -	$ 0.02	$ 270	$ 0.02	161	$ 209	$ -	$ -	$ 0.61	$7,843		
7	1	5	1	430	Place geotextile	Supply and place geotextile	42,858	m2	C.4.06	0.016	685.7	$ 0.57	$ 24,275	$ 3.50	$ 150,003	$ 0.23	$ 9,783	$ 0.15	4,875	$ 6,338	$ -	$ -	$ 4.44	$190,399		
7	1	6	1	430	Place bedding layer	Bedding layer: Produce, screen and stockpile	12,857	m3	C.2.02	0.010	128.6	$ 0.37	$ 4,706	$ -	$ -	$ 1.61	$ 20,682	$ 1.13	11,170	$ 14,521	$ -	$ -	$ 3.10	$39,909		
7	1	6	2	430		Bedding layer: Load, haul, place and compact	12,857	m3	R.084	0.029	374.4	$ 1.07	$ 13,702	$ -	$ -	$ 2.21	$ 28,392	$ 1.04	10,246	$ 13,320	$ -	$ -	$ 4.31	$55,413		
7	1	7	1	430	Place rip-rap	Rip-rap (angular, high quality): Screen and stockpile	15,914	m3	C.2.25	0.057	909.4	$ 2.09	$ 33,283	$ -	$ -	$ 9.19	$ 146,285	$ 6.45	79,003	$ 102,704	$ -	$ -	$ 17.74	$282,272		
7	1	7	2	430		Rip-rap: Load, haul, dump	15,914	m3	R.085	0.032	514.1	$ 1.18	$ 18,818	$ -	$ -	$ 2.81	$ 44,714	$ 1.30	15,857	$ 20,614	$ -	$ -	$ 5.29	$84,146		
7	1	7	3	430		Rip-rap: Place and secure	15,914	m3	C.2.26	0.013	198.9	$ 0.46	$ 7,281	$ -	$ -	$ 0.89	$ 14,154	$ 0.47	5,741	$ 7,464	$ -	$ -	$ 1.82	$28,898		
Outwash material																									$287,728	
7	2	1	1	430	Relocate to Intermediate Dump	Load, haul, dump outwash materia	76,350	m3	R.062	0.023	1758.1	$ 0.84	$ 64,345	$ -	$ -	$ 2.00	$ 152,895	$ 0.92	54,222	$ 70,488	$ -	$ -	$ 3.77	$287,728		
North Fork Rose Creek Detention Pond																									$10,883	
7	3	1	1	430	Excavate basin	Excavate sedimentation basin	2,592	m3	C.2.12	0.024	61.0	$ 0.86	$ 2,232	$ -	$ -	$ 2.00	$ 5,176	$ 0.93	1,859	$ 2,417	$ -	$ -	$ 3.79	$9,825		
7	3	2	1	430	Place rip-rap	Rip-rap (rounded, low quality): Screen and stockpile	52	m3	C.2.24	0.040	2.1	$ 1.46	$ 76	$ -	$ -	$ 6.43	$ 335	$ 4.52	181	$ 235	$ -	$ -	$ 12.42	$646		
7	3	2	2	430		Rip-rap: Load, haul, dump	52	m3	R.086	0.037	1.9	$ 1.37	$ 71	$ -	$ -	$ 3.25	$ 169	$ 1.50	60	$ 78	$ -	$ -	$ 6.11	$318		
7	3	2	3	430		Rip-rap: Place and secure	52	m3	C.2.26	0.013	0.7	$ 0.46	$ 24	$ -	$ -	$ 0.89	$ 46	$ 0.47	19	$ 24	$ -	$ -	$ 1.82	$94		
North Fork Rose Creek Collection System (to Pit)																									$541,110	
7	4	1	1	430	Groundwater wells	Drill wells (Air Rotary Drill Rig, ~20m depth)	100	m	C.2.09	2.000	200.0	$ 102.13	$ 10,213	$ -	$ -	$ 100.85	$ 10,085	$ 22.08	1,698	$ 2,208	$ -	$ -	$ 225.07	$22,507		
7	4	1	2	500		Install 6" stainless steel well casing & screen	100	m	C.3.17	0.150	15.0	$ 7.66	$ 766	$ 232.60	$ 23,260	$ 7.56	$ 756	$ 1.66	127	$ 166	$ -	$ -	$ 249.48	$24,948		
7	4	1	3	500		Install 6" Submersible Pump with controls	3	ea.	C.3.07	12.000	36.0	$ 600.00	$ 1,800	$ 6,842.00	$ 20,526	$ -	$ -	$ -	0	$ -	$ -	$ -	$ 7,442.00	$22,326		
7	4	1	4	500		Install protective housing (shack)	3	ea.	C.3.13	20.000	60.0	$ 1,300.00	$ 3,900	$ 445.00	$ 1,335	$ -	$ -	$ -	0	$ -	$ -	$ -	$ 1,745.00	$5,235		
7	4	2	1	430	Pumping station	Excavate sump for manholes	200	m3	C.2.12	0.024	4.7	$ 0.86	$ 172	$ -	$ -	$ 2.00	$ 399	$ 0.93	143	$ 186	$ -	$ -	$ 3.79	$758		
7	4	2	2	500		Supply and place precast concrete manhole	1	ea.	C.3.08	16.000	16.0	$ 746.40	$ 746	$ 1,344.68	$ 1,345	$ 72.47	$ 72	$ 62.92	48	$ 63	$ -	$ -	$ 2,226.47	$2,226		
7	4	2	3	430		Backfill and compact around manhole	200	m3	C.2.01	0.030	6.0	$ 1.08	$ 216	$ -	$ -	$ 0.74	$ 148	$ 0.40	61	$ 79	$ -	$ -	$ 2.22	$443		
7	4	2	4	500		Install primary pump	1	ea.	C.3.10	12.000	12.0	$ 600.00	$ 600	$ 1,829.00	$ 1,829	$ -	$ -	$ -	0	$ -	$ -	$ -	$ 2,429.00	$2,429		
7	4	3	1	430	Piping system	Excavate piping trench	11,400	m3	C.2.13	0.020	228.0	$ 0.73	$ 8,345	$ -	$ -	$ 1.42	$ 16,223	$ 0.75	6,580	$ 8,555	$ -	$ -	$ 2.91	$33,122		
7	4	3	2	510		Supply and install insulated 150mm HDPE pipe	1,900	m	C.3.03	0.250	475.0	$ 8.75	$ 16,625	$ 155.84	$ 296,096	$ -	$ -	$ -	0	$ -	$ -	$ -	$ 164.59	$312,721		
7	4	3	6	430		Bedding layer: Produce, screen and stockpile	741	m3	C.2.02	0.010	7.4	$ 0.37	$ 271	$ -	$ -	$ 1.61	$ 1,192	$ 1.13	644	$ 837	$ -	$ -	$ 3.10	$2,300		
7	4	3	7	430		Bedding layer: Load, haul, place and compact	741	m3	R.087	0.037	27.6	$ 1.36	$ 1,011	$ -	$ -	$ 2.83	$ 2,096	$ 1.30	742	$ 964	$ -	$ -	$ 5.49	$4,071		
7	4	3	8	430		Backfill ditches	11,400	m3	C.2.01	0.030	342.0	$ 1.08	$ 12,335	$ -	$ -	$ 0.74	$ 8,411	$ 0.40	3,468	$ 4,509	$ -	$ -	$ 2.22	$25,254		
7	4	4	1	510	Heat tracing	Supply and install heat trace in HDPE pipe	1,900	m	C.3.04	0.250	475.0	$ 12.50	$ 23,750	$ 21.32	$ 40,508	$ -	$ -	$ -	0	$ -	$ -	$ -	$ 33.82	$64,258		
7	4	4	2	510		Supply/Install heat tracing power feed kit	1	ea.	C.3.05	4.000	4.0	$ 230.00	$ 230	$ 396.84	$ 397	$ -	$ -	$ -	0	$ -	$ -	$ -	$ 626.84	$627		

Example Alternatives - Cost Estimate

7	4	4	3	510		Supply/install electrical thermostat for heat tracing	1	ea.	C.3.06	1.000	1.0	$ 57.50	$ 58	$ 1,025.00	$ 1,025	$ -	$ -	$ -	0	$ -	$ -	$ -	$ -	$ 1,082.50	$1,083		
7	4	5	1	510	Provide electricity from WTP to pumps	Supply/install treated power poles	6	ea.	C.4.03	4.545	27.3	$ 297.88	$ 1,787	$ 325.96	$ 1,956	$ 85.85	$ 515	$ 28.17	130	$ 169	$ -	$ -	$ -	$ 737.86	$4,427		
7	4	5	2	510		Supply/install overhead conductor	400	m	C.4.02	0.032	12.8	$ 2.21	$ 885	$ 1.41	$ 564	$ 0.45	$ 181	$ 0.15	45	$ 59	$ -	$ -	$ -	$ 4.22	$1,690		
7	4	5	3	510		Supply/install transformers	1	ea.	C.4.04	20.000	20.0	$ 1,383.00	$ 1,383	$ 8,934.00	$ 8,934	$ 224.98	$ 225	$ 143.00	110	$ 143	$ -	$ -	$ -	$ 10,684.98	$10,685		
S-Cluster Collection System (to Pit)																										$315,565		
7	5	1	1	430	Construct access roads	Clear access road area	2,950	m2	C.2.04	0.004	10.7	$ 0.13	$ 393	$ -	$ -	$ 0.62	$ 1,841	$ 0.36	826	$ 1,073	$ -	$ -	$ -	$ 1.12	$3,307		
7	5	1	2	430		Construct access road	590	m	C.2.27	0.131	77.4	$ 4.80	$ 2,834	$ -	$ -	$ 10.14	$ 5,984	$ 5.33	2,417	$ 3,142	$ -	$ -	$ -	$ 20.27	$11,961		
7	5	2	1	430	Pumping wells	Drill wells (Air Rotary Drill Rig, ~10m depth)	50	m	C.2.09	2.000	100.0	$ 102.13	$ 5,107	$ -	$ -	$ 100.85	$ 5,043	$ 22.08	849	$ 1,104	$ -	$ -	$ -	$ 225.07	$11,253		
7	5	2	2	500		Install 6" stainless steel well casing & screen	50	m	C.3.17	0.150	7.5	$ 7.66	$ 383	$ 232.60	$ 11,630	$ 7.56	$ 378	$ 1.66	64	$ 83	$ -	$ -	$ -	$ 249.48	$12,474		
7	5	2	3	500		Install 6" Submersible Pump with controls	5	ea.	C.3.07	12.000	60.0	$ 600.00	$ 3,000	$ 6,842.00	$ 34,210	$ -	$ -	$ -	0	$ -	$ -	$ -	$ -	$ 7,442.00	$37,210		
7	5	2	4	500		Install protective housing (shack)	5	ea.	C.3.13	20.000	100.0	$ 1,300.00	$ 6,500	$ 445.00	$ 2,225	$ -	$ -	$ -	0	$ -	$ -	$ -	$ -	$ 1,745.00	$8,725		
7	5	4	1	430	Monitoring wells	Drill wells (Air Rotary Drill Rig, ~15m depth)	30	m	C.2.09	2.000	60.0	$ 102.13	$ 3,064	$ -	$ -	$ 100.85	$ 3,026	$ 22.08	510	$ 662	$ -	$ -	$ -	$ 225.07	$6,752		
7	5	4	2	500		Install 6" stainless steel well casing & screen	30	m	C.3.17	0.150	4.5	$ 7.66	$ 230	$ 232.60	$ 6,978	$ 7.56	$ 227	$ 1.66	38	$ 50	$ -	$ -	$ -	$ 249.48	$7,484		
7	5	4	3	500		Install protective well cover	2	ea.	C.3.13	20.000	40.0	$ 1,300.00	$ 2,600	$ 445.00	$ 890	$ -	$ -	$ -	0	$ -	$ -	$ -	$ -	$ 1,745.00	$3,490		
7	5	5	1	430	Pumping Station	Excavate sump for manhole	200	m3	C.2.12	0.024	4.7	$ 0.86	$ 172	$ -	$ -	$ 2.00	$ 399	$ 0.93	143	$ 186	$ -	$ -	$ -	$ 3.79	$758		
7	5	5	2	500		Supply and place precast concrete manhole	1	ea.	C.3.08	16.000	16.0	$ 746.40	$ 746	$ 1,344.68	$ 1,345	$ 72.47	$ 72	$ 62.92	48	$ 63	$ -	$ -	$ -	$ 2,226.47	$2,226		
7	5	5	3	430		Backfill and compact around manhole	200	m3	C.2.01	0.030	6.0	$ 1.08	$ 216	$ -	$ -	$ 0.74	$ 148	$ 0.40	61	$ 79	$ -	$ -	$ -	$ 2.22	$443		
7	5	5	4	500		Install Primary pump	1	ea.	C.3.10	12.000	12.0	$ 600.00	$ 600	$ 1,829.00	$ 1,829	$ -	$ -	$ -	0	$ -	$ -	$ -	$ -	$ 2,429.00	$2,429		
7	5	6	1	430	Piping	Excavate piping trench	4,800	m3	C.2.13	0.020	96.0	$ 0.73	$ 3,514	$ -	$ -	$ 1.42	$ 6,831	$ 0.75	2,771	$ 3,602	$ -	$ -	$ -	$ 2.91	$13,946		
7	5	6	2	510		Supply and install insulated 150mm HDPE pipe	800	m	C.3.03	0.250	200.0	$ 8.75	$ 7,000	$ 155.84	$ 124,672	$ -	$ -	$ -	0	$ -	$ -	$ -	$ -	$ 164.59	$131,672		
7	5	6	3	430		Bedding layer: Produce, screen and stockpile	312	m3	C.2.02	0.010	3.1	$ 0.37	$ 114	$ -	$ -	$ 1.61	$ 502	$ 1.13	271	$ 352	$ -	$ -	$ -	$ 3.10	$968		
7	5	6	4	430		Bedding Layer: Load, haul, place and compact	312	m3	R.088	0.037	11.4	$ 1.34	$ 419	$ -	$ -	$ 2.78	$ 868	$ 1.28	307	$ 399	$ -	$ -	$ -	$ 5.40	$1,686		
7	5	6	5	430		Backfill and compact ditches	4,488	m3	C.2.01	0.030	134.6	$ 1.08	$ 4,856	$ -	$ -	$ 0.74	$ 3,311	$ 0.40	1,365	$ 1,775	$ -	$ -	$ -	$ 2.22	$9,942		
7	5	7	1	510	Heat Tracing	Supply and install heat trace in HDPE pipe	800	m	C.3.04	0.250	200.0	$ 12.50	$ 10,000	$ 21.32	$ 17,056	$ -	$ -	$ -	0	$ -	$ -	$ -	$ -	$ 33.82	$27,056		
7	5	7	2	510		Supply/install heat tracing power feed kit	1	ea.	C.3.05	4.000	4.0	$ 230.00	$ 230	$ 396.84	$ 397	$ -	$ -	$ -	0	$ -	$ -	$ -	$ -	$ 626.84	$627		
7	5	7	3	510		Supply/install electrical thermostat for heat tracing	1	ea.	C.3.06	1.000	1.0	$ 57.50	$ 58	$ 1,025.00	$ 1,025	$ -	$ -	$ -	0	$ -	$ -	$ -	$ -	$ 1,082.50	$1,083		
7	5	8	1	510	Provide Electricity from WTP to pumps	Supply/install treated power poles	9	ea.	C.4.03	4.545	40.9	$ 297.88	$ 2,681	$ 325.96	$ 2,934	$ 85.85	$ 773	$ 28.17	195	$ 254	$ -	$ -	$ -	$ 737.86	$6,641		
7	5	8	2	510		Supply/install overhead conductor	650	m	C.4.02	0.032	20.8	$ 2.21	$ 1,438	$ 1.41	$ 917	$ 0.45	$ 295	$ 0.15	74	$ 97	$ -	$ -	$ -	$ 4.22	$2,746		
7	5	8	3	510		Supply/install transformers	1	ea.	C.4.04	20.000	20.0	$ 1,383.00	$ 1,383	$ 8,934.00	$ 8,934	$ 224.98	$ 225	$ 143.00	110	$ 143	$ -	$ -	$ -	$ 10,684.98	$10,685		
Subtotal Direct Costs - Groundwater											11,147		$431,663		$912,821		$721,478		295,477	$384,120			$0			$2,450,082		
Miscellaneous																													
Roads																										$12,639		
8	1	1	1	430	Reclaim unnecessary roads	Remove culverts and breach stream crossing	2,240	m3	C.2.12	0.024	52.7	$ 0.86	$ 1,929	$ -	$ -	$ 2.00	$ 4,473	$ 0.93	1,607	$ 2,089	$ -	$ -	$ -	$ 3.79	$8,499.78		
8	1	1	2	430		Scarify road surfaces	10,500	m2	C.2.29	0.003	26.3	$ 0.09	$ 961	$ -	$ -	$ 0.10	$ 1,056	$ 0.10	790	$ 1,027	$ -	$ -	$ -	$ 0.29	$3,044.27		
8	1	1	3	610		Seed/Fertilize, helicopter low application rate	10,500	m2	C.5.02	0.000	1.3	$ 0.00	$ 47	$ 0.05	$ 477	$ 0.05	$ 572	$ 0.00	5	$ 7	$ -	$ -	$ -	$ 0.11	$1,103.72		
Buildings																										$4,980,737		
8	2	1	1	220	Building decontamination	Remove hazardous materials	56,400	m3	C.1.01	0.556	31333.3	$ 24.44	$ 1,378,667	$ -	$ -	$ 2.17	$ 122,538	$ 1.55	67,210	$ 87,373	$ -	$ -	$ -	$ 28.17	$1,588,578		
8	2	2	1	220	Building demolition	Building demolition: 'empty buildings'	24,600	m2	C.1.02	0.310	7627.0	$ 11.10	$ 273,079	$ -	$ -	$ 15.54	$ 382,319	$ 8.55	161,880	$ 210,444	$ -	$ -	$ -	$ 35.20	$865,843		
8	2	2	2	430		Building demolition: 'full buildings'	47,700	m2	C.1.03	0.465	22186.0	$ 16.65	$ 794,280	$ -	$ -	$ 23.31	$ 1,111,989	$ 12.83	470,835	$ 612,085	$ -	$ -	$ -	$ 52.80	$2,518,335		
8	2	2	3	430		Puncture concrete foundations	20	m	C.1.04	0.182	3.6	$ 6.65	$ 133	$ -	$ -	$ 20.26	$ 405	$ 13.15	202	$ 263	$ -	$ -	$ -	$ 40.07	$801		
8	2	2	4	430		Re-grade over demolished buildings	20	hrs	C.2.22	1.000	20.0	$ 36.60	$ 732	$ -	$ -	$ 173.28	$ 3,466	$ 149.18	2,295	$ 2,984	$ -	$ -	$ -	$ 359.06	$7,181		
Contaminated soils																										$125,599		
8	3	1	1	600	Remove contaminated soils	Excavate, haul and place hydrocarbon contaminated soils in lar	15,000	m3	R.091	0.030	450.0	$ 1.10	$ 16,470	$ -	$ -	$ 2.94	$ 44,035	$ 1.44	16,574	$ 21,547	$ -	$ -	$ -	$ 5.47	$82,052		
8	3	1	2	600		Excavate metal contaminated soil to Low-Grade Stockpile 'C'	7,500	m3	R.091	0.030	225.0	$ 1.10	$ 8,235	$ -	$ -	$ 2.94	$ 22,018	$ 1.44	8,287	$ 10,773	$ -	$ -	$ -	$ 5.47	$41,026		
8	3	1	3	600		Regrade contaminated areas for drainage	10,000	m2	C.2.18	0.002	21.7	$ 0.08	$ 796	$ -	$ -	$ 0.09	$ 875	$ 0.09	654	$ 851	$ -	$ -	$ -	$ 0.25	$2,521		
Landfarm																										$45,657		
8	4	1	1	430	Contruct landfarm	Excavate and create berms for use as the bioremediation cell	8,000	m3	C.2.11	0.013	106.7	$ 0.49	$ 3,904	$ -	$ -	$ 0.95	$ 7,590	$ 0.50	3,079	$ 4,002	$ -	$ -	$ -	$ 1.94	$15,496		
8	4	2	1	430	Operate Landfarm (3yrs)	Excavator Cat 330BL/235B (mixing)	80	hrs	C.2.22	1.000	80.0	$ 36.60	$ 2,928	$ -	$ -	$ 173.28	$ 13,862	$ 149.18	9,180	$ 11,934	$ -	$ -	$ -	$ 359.06	$28,725		
8	4	3	1	430	Decommision landfarm	Excavate soils for use as cover	1	m3	$0.00	0.000	0.0	$ -	$ -	$ -	$ -	$ -	$ -	$ -	0	$ -	$ -	$ -	$ -	$ -	$0		costed elsewhere
8	4	3	2	430		Remove berms (dozer)	4	hrs	C.2.22	1.000	4.0	$ 36.60	$ 146	$ -	$ -	$ 173.28	$ 693	$ 149.18	459	$ 597	$ -	$ -	$ -	$ 359.06	$1,436		
Borrow Sources																										$101,017		
8	5	1	1	600	Develop borrow sources	Clear (grub access road)	1,500	m2	C.2.05	0.015	21.8	$ 0.53	$ 799	$ -	$ -	$ 0.94	$ 1,403	$ 0.62	712	$ 926	$ -	$ -	$ -	$ 2.08	$3,127		
8	5	1	2	600		Construct access road	500	m	C.2.28	0.225	112.5	$ 8.24	$ 4,118	$ -	$ -	$ 29.67	$ 14,837	$ 19.48	7,403	$ 9,741	$ -	$ -	$ -	$ 57.39	$26,696		
8	5	2	1	600	Decommission borrow sources	Re-grade borrow source slopes	11	hrs	C.2.22	1.000	10.9	$ 36.60	$ 399	$ -	$ -	$ 173.28	$ 1,890	$ 149.18	1,252	$ 1,628	$ -	$ -	$ -	$ 359.06	$3,917		
8	5	2	2	610		Seed/Fertilize, helicopter low application rate	621,000	m2	C.5.02	0.000	77.6	$ 0.00	$ 2,788	$ 0.05	$ 28,231	$ 0.05	$ 33,846	$ 0.00	317	$ 412	$ -	$ -	$ -	$ 0.11	$65,277		
Subtotal Direct Costs - Miscellaneous											62,361		$2,490,390		$28,708		$1,767,867		752,833	$978,683			$0			$5,265,648		
Subtotal Direct Costs																													
						Subtotal direct costs					583,334		$22,031,967		$14,746,776		$67,014,235		32,901,754	$42,772,280			$0			$146,565,258		
CLOSURE COSTS - INDIRECT																													
100	100	1	1		Project Management	5.0% of direct costs															$ 146,565,258	x	5.0%			$7,328,263		
100	100	2	1		Field Supervision	(included in major tasks)																				$0		
100	100	3	1		Contractor profit and home office overhead	10% of direct costs															$ 146,565,258	x	10.0%			$14,656,526		
100	100	4	1		Insurance	0.5% of direct costs															$ 146,565,258	x	0.5%			$732,826		
100	100	5	1		Bonding	0.5% of direct costs															$ 146,565,258	x	0.5%			$732,826		
100	100	6	1		Field Engineering and QA	10% of direct costs															$ 146,565,258	x	10.0%			$14,656,526		
100	100	7	1		Mob - Demob																1	lump	$500,000			$500,000		
100	100	8	1		Living out allowances	(included in heavy equipment costs)																				$0		
Subtotal Indirect Costs																													
						Subtotal indirect costs																				$38,606,967		
CLOSURE COSTS - CONTINGENCY																													
						Contingency	20% of direct costs														$146,565,258	x	20.0%			$29,313,052		
CLOSURE COSTS - TOTAL																													
						Total direct and indirect costs																				$214,485,277		

Faro Mine Area Post Closure Costs

Costs in 2006 dollars

Notes

1 Groundwater pumping costs include maintenance on the pumps

2 Environmental management costs split evenly between the Faro Mine, Tailings Area and Vangorda/Grum Mine site.

3.1 Flow-Through Pit

		Closure Period							Post-Closure Period																
	NPV 3%	Year 1 2011	Year 2 2012	Year 3 2013	Year 4 2014	Year 5 2015	Year 6 2016	Year 7 2017	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030	2031	2032	2033
Earthworks Inspection and Maintenance	$2,990,301	$0	$0	$0	$0	$0	$0	$0	$227,235	$227,235	$227,235	$227,235	$227,235	$227,235	$227,235	$227,235	$227,235	$227,235	$227,235	$75,745	$75,745	$75,745	$75,745	$75,745
Water Management and Pumping Costs[1]																								
ETA Groundwater Collection System	$1,241,134	$0	$0	$0	$0	$0	$0	$0	$48,469	$48,469	$48,469	$48,469	$48,469	$48,469	$48,469	$48,469	$48,469	$48,469	$48,469	$48,469	$48,469	$48,469	$48,469	$48,469
S-Cluster Groundwater Collection System	$716,959	$0	$0	$0	$0	$0	$0	$0	$27,999	$27,999	$27,999	$27,999	$27,999	$27,999	$27,999	$27,999	$27,999	$27,999	$27,999	$27,999	$27,999	$27,999	$27,999	$27,999
NFRC Groundwater Collection System	$881,403	$0	$0	$0	$0	$0	$0	$0	$34,421	$34,421	$34,421	$34,421	$34,421	$34,421	$34,421	$34,421	$34,421	$34,421	$34,421	$34,421	$34,421	$34,421	$34,421	$34,421
Zone II Pit Groundwater Collection System	$255,727	$0	$0	$0	$0	$0	$0	$0	$9,987	$9,987	$9,987	$9,987	$9,987	$9,987	$9,987	$9,987	$9,987	$9,987	$9,987	$9,987	$9,987	$9,987	$9,987	$9,987
Subtotal	$3,095,223	$0	$0	$0	$0	$0	$0	$0	$120,875	$120,875	$120,875	$120,875	$120,875	$120,875	$120,875	$120,875	$120,875	$120,875	$120,875	$120,875	$120,875	$120,875	$120,875	$120,875
Water Treatment System Operation	$6,173,265	$0	$200,000	$200,000	$200,000	$200,000	$200,000	$200,000	$200,000	$200,000	$200,000	$200,000	$200,000	$200,000	$200,000	$200,000	$200,000	$200,000	$200,000	$200,000	$200,000	$200,000	$200,000	$200,000
Environmental Management[2]																								
Full-Time Site Manager	$896,242	0	$0	$0	$0	$0	$0	$0	$35,000	$35,000	$35,000	$35,000	$35,000	$35,000	$35,000	$35,000	$35,000	$35,000	$35,000	$35,000	$35,000	$35,000	$35,000	$35,000
Full-Time Assistant Manager	$640,173	0	$0	$0	$0	$0	$0	$0	$25,000	$25,000	$25,000	$25,000	$25,000	$25,000	$25,000	$25,000	$25,000	$25,000	$25,000	$25,000	$25,000	$25,000	$25,000	$25,000
Full-Time Technician	$640,173	$0	$0	$0	$0	$0	$0	$0	$25,000	$25,000	$25,000	$25,000	$25,000	$25,000	$25,000	$25,000	$25,000	$25,000	$25,000	$25,000	$25,000	$25,000	$25,000	$25,000
Full-Time Vehicles (2	$204,855	$0	$0	$0	$0	$0	$0	$0	$8,000	$8,000	$8,000	$8,000	$8,000	$8,000	$8,000	$8,000	$8,000	$8,000	$8,000	$8,000	$8,000	$8,000	$8,000	$8,000
Part-Time Administration	$179,248	$0	$0	$0	$0	$0	$0	$0	$7,000	$7,000	$7,000	$7,000	$7,000	$7,000	$7,000	$7,000	$7,000	$7,000	$7,000	$7,000	$7,000	$7,000	$7,000	$7,000
Part-Time Technicians (2	$640,173	$0	$0	$0	$0	$0	$0	$0	$25,000	$25,000	$25,000	$25,000	$25,000	$25,000	$25,000	$25,000	$25,000	$25,000	$25,000	$25,000	$25,000	$25,000	$25,000	$25,000
Part-Time Tradesmen (4	$1,280,346	$0	$0	$0	$0	$0	$0	$0	$50,000	$50,000	$50,000	$50,000	$50,000	$50,000	$50,000	$50,000	$50,000	$50,000	$50,000	$50,000	$50,000	$50,000	$50,000	$50,000
Part-Time Vehicles (4)	$409,711	$0	$0	$0	$0	$0	$0	$0	$16,000	$16,000	$16,000	$16,000	$16,000	$16,000	$16,000	$16,000	$16,000	$16,000	$16,000	$16,000	$16,000	$16,000	$16,000	$16,000
Office	$332,890	$0	$0	$0	$0	$0	$0	$0	$13,000	$13,000	$13,000	$13,000	$13,000	$13,000	$13,000	$13,000	$13,000	$13,000	$13,000	$13,000	$13,000	$13,000	$13,000	$13,000
Analytical costs	$2,176,588	$0	$0	$0	$0	$0	$0	$0	$85,000	$85,000	$85,000	$85,000	$85,000	$85,000	$85,000	$85,000	$85,000	$85,000	$85,000	$85,000	$85,000	$85,000	$85,000	$85,000
Subtotal	$7,400,399	$0	$0	$0	$0	$0	$0	$0	$289,000	$289,000	$289,000	$289,000	$289,000	$289,000	$289,000	$289,000	$289,000	$289,000	$289,000	$289,000	$289,000	$289,000	$289,000	$289,000
Total	$19,659,189	$0	$200,000	$200,000	$200,000	$200,000	$200,000	$200,000	$837,109	$837,109	$837,109	$837,109	$837,109	$837,109	$837,109	$837,109	$837,109	$837,109	$837,109	$685,619	$685,619	$685,619	$685,619	$685,619

3.2 Upgrade Faro Creek Diversion

		Closure Period							Post-Closure Period																
	NPV 3%	Year 1 2011	Year 2 2012	Year 3 2013	Year 4 2014	Year 5 2015	Year 6 2016	Year 7 2017	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030	2031	2032	2033
Earthworks Inspection and Maintenance	$2,903,272	$0	$0	$0	$0	$0	$0	$0	$220,621	$220,621	$220,621	$220,621	$220,621	$220,621	$220,621	$220,621	$220,621	$220,621	$73,540	$73,540	$73,540	$73,540	$73,540	$73,540
Water Management and Pumping Costs[1]																								
ETA Groundwater Collection System	$720,423	$0	$0	$0	$0	$0	$0	$0	$28,134	$28,134	$28,134	$28,134	$28,134	$28,134	$28,134	$28,134	$28,134	$28,134	$28,134	$28,134	$28,134	$28,134	$28,134	$28,134
S-Cluster Groundwater Collection System	$432,110	$0	$0	$0	$0	$0	$0	$0	$16,875	$16,875	$16,875	$16,875	$16,875	$16,875	$16,875	$16,875	$16,875	$16,875	$16,875	$16,875	$16,875	$16,875	$16,875	$16,875
NFRC Groundwater Collection System	$406,478	$0	$0	$0	$0	$0	$0	$0	$15,874	$15,874	$15,874	$15,874	$15,874	$15,874	$15,874	$15,874	$15,874	$15,874	$15,874	$15,874	$15,874	$15,874	$15,874	$15,874
Zone II Pit Groundwater Collection System	$255,727	$0	$0	$0	$0	$0	$0	$0	$9,987	$9,987	$9,987	$9,987	$9,987	$9,987	$9,987	$9,987	$9,987	$9,987	$9,987	$9,987	$9,987	$9,987	$9,987	$9,987
Subtotal	$1,814,738	$0	$0	$0	$0	$0	$0	$0	$70,869	$70,869	$70,869	$70,869	$70,869	$70,869	$70,869	$70,869	$70,869	$70,869	$70,869	$70,869	$70,869	$70,869	$70,869	$70,869
Water Treatment System Construction	$3,485,437	$3,590,000	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0
Water Treatment System Operation																								
Pipes and pumps[1]	$3,651,968	$0	$118,316	$118,316	$118,316	$118,316	$118,316	$118,316	$118,316	$118,316	$118,316	$118,316	$118,316	$118,316	$118,316	$118,316	$118,316	$118,316	$118,316	$118,316	$118,316	$118,316	$118,316	$118,316
Plant	$17,593,806	$0	$570,000	$570,000	$570,000	$570,000	$570,000	$570,000	$570,000	$570,000	$570,000	$570,000	$570,000	$570,000	$570,000	$570,000	$570,000	$570,000	$570,000	$570,000	$570,000	$570,000	$570,000	$570,000
Subtotal	$21,245,774	$0	$688,316	$688,316	$688,316	$688,316	$688,316	$688,316	$688,316	$688,316	$688,316	$688,316	$688,316	$688,316	$688,316	$688,316	$688,316	$688,316	$688,316	$688,316	$688,316	$688,316	$688,316	$688,316
Environmental Management[2]																								
Full-Time Site Manager	$896,242	0	$0	$0	$0	$0	$0	$0	$35,000	$35,000	$35,000	$35,000	$35,000	$35,000	$35,000	$35,000	$35,000	$35,000	$35,000	$35,000	$35,000	$35,000	$35,000	$35,000
Full-Time Assistant Manager	$640,173	0	$0	$0	$0	$0	$0	$0	$25,000	$25,000	$25,000	$25,000	$25,000	$25,000	$25,000	$25,000	$25,000	$25,000	$25,000	$25,000	$25,000	$25,000	$25,000	$25,000
Full-Time Technician	$640,173	$0	$0	$0	$0	$0	$0	$0	$25,000	$25,000	$25,000	$25,000	$25,000	$25,000	$25,000	$25,000	$25,000	$25,000	$25,000	$25,000	$25,000	$25,000	$25,000	$25,000
Full-Time Vehicles (2	$204,855	$0	$0	$0	$0	$0	$0	$0	$8,000	$8,000	$8,000	$8,000	$8,000	$8,000	$8,000	$8,000	$8,000	$8,000	$8,000	$8,000	$8,000	$8,000	$8,000	$8,000
Part-Time Administration	$179,248	$0	$0	$0	$0	$0	$0	$0	$7,000	$7,000	$7,000	$7,000	$7,000	$7,000	$7,000	$7,000	$7,000	$7,000	$7,000	$7,000	$7,000	$7,000	$7,000	$7,000
Part-Time Technicians (2	$640,173	$0	$0	$0	$0	$0	$0	$0	$25,000	$25,000	$25,000	$25,000	$25,000	$25,000	$25,000	$25,000	$25,000	$25,000	$25,000	$25,000	$25,000	$25,000	$25,000	$25,000
Part-Time Tradesmen (4	$1,280,346	$0	$0	$0	$0	$0	$0	$0	$50,000	$50,000	$50,000	$50,000	$50,000	$50,000	$50,000	$50,000	$50,000	$50,000	$50,000	$50,000	$50,000	$50,000	$50,000	$50,000
Part-Time Vehicles (4)	$409,711	$0	$0	$0	$0	$0	$0	$0	$16,000	$16,000	$16,000	$16,000	$16,000	$16,000	$16,000	$16,000	$16,000	$16,000	$16,000	$16,000	$16,000	$16,000	$16,000	$16,000
Office	$332,890	$0	$0	$0	$0	$0	$0	$0	$13,000	$13,000	$13,000	$13,000	$13,000	$13,000	$13,000	$13,000	$13,000	$13,000	$13,000	$13,000	$13,000	$13,000	$13,000	$13,000
Analytical costs	$2,176,589	$0	$0	$0	$0	$0	$0	$0	$85,000	$85,000	$85,000	$85,000	$85,000	$85,000	$85,000	$85,000	$85,000	$85,000	$85,000	$85,000	$85,000	$85,000	$85,000	$85,000
Subtotal	$7,400,399	$0	$0	$0	$0	$0	$0	$0	$289,000	$289,000	$289,000	$289,000	$289,000	$289,000	$289,000	$289,000	$289,000	$289,000	$289,000	$289,000	$289,000	$289,000	$289,000	$289,000
Total	$36,849,629	$3,590,000	$688,316	$688,316	$688,316	$688,316	$688,316	$688,316	$1,268,806	$1,268,806	$1,268,806	$1,268,806	$1,268,806	$1,268,806	$1,268,806	$1,268,806	$1,268,806	$1,268,806	$1,121,725	$1,121,725	$1,121,725	$1,121,725	$1,121,725	$1,121,725

3.3 Minimize Up-Front Construction

		Closure Period			Post-Closure Period																				
	NPV 3%	Year 1	Year 2	Year 3	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030	2031	2032	2033	2034	2035	2036	2037
		2011	2012	2013																				
Earthworks Inspection and Maintenance	$1,365,699	$0	$0	$0	$88,156	$88,156	$88,156	$88,156	$88,156	$88,156	$88,156	$88,156	$88,156	$88,156	$29,385	$29,385	$29,385	$29,385	$29,385	$29,385	$29,385	$29,385	$29,385	$29,385
Water Management and Pumping Costs[1]																								
S-Cluster Groundwater Collection System	$488,344	$0	$0	$0	$16,875	$16,875	$16,875	$16,875	$16,875	$16,875	$16,875	$16,875	$16,875	$16,875	$16,875	$16,875	$16,875	$16,875	$16,875	$16,875	$16,875	$16,875	$16,875	$16,875
NFRC Groundwater Collection System	$457,495	$0	$0	$0	$15,874	$15,874	$15,874	$15,874	$15,874	$15,874	$15,874	$15,874	$15,874	$15,874	$15,874	$15,874	$15,874	$15,874	$15,874	$15,874	$15,874	$15,874	$15,874	$15,874
Zone II Pit Groundwater Collection System	$287,823	$0	$0	$0	$9,987	$9,987	$9,987	$9,987	$9,987	$9,987	$9,987	$9,987	$9,987	$9,987	$9,987	$9,987	$9,987	$9,987	$9,987	$9,987	$9,987	$9,987	$9,987	$9,987
Subtotal	$1,231,662	$0	$0	$0	$42,735	$42,735	$42,735	$42,735	$42,735	$42,735	$42,735	$42,735	$42,735	$42,735	$42,735	$42,735	$42,735	$42,735	$42,735	$42,735	$42,735	$42,735	$42,735	$42,735
Water Treatment System Construction	$3,357,782	$3,458,000	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0
Water Treatment System Operation																								
Pipes and pumps[1]	$3,629,751	$0	$118,316	$118,316	$118,316	$118,316	$118,316	$118,316	$118,316	$118,316	$118,316	$118,316	$118,316	$118,316	$118,316	$118,316	$118,316	$118,316	$118,316	$118,316	$118,316	$118,316	$118,316	$118,316
Plant	$20,523,949	$0	$669,000	$669,000	$669,000	$669,000	$669,000	$669,000	$669,000	$669,000	$669,000	$669,000	$669,000	$669,000	$669,000	$669,000	$669,000	$669,000	$669,000	$669,000	$669,000	$669,000	$669,000	$669,000
Subtotal	$24,153,700	$0	$787,316	$787,316	$787,316	$787,316	$787,316	$787,316	$787,316	$787,316	$787,316	$787,316	$787,316	$787,316	$787,316	$787,316	$787,316	$787,316	$787,316	$787,316	$787,316	$787,316	$787,316	$787,316
Environmental Management[2]																								
Full-Time Site Manager	$1,008,728	0	$0	$0	$35,000	$35,000	$35,000	$35,000	$35,000	$35,000	$35,000	$35,000	$35,000	$35,000	$35,000	$35,000	$35,000	$35,000	$35,000	$35,000	$35,000	$35,000	$35,000	$35,000
Full-Time Assistant Manager	$720,520	0	$0	$0	$25,000	$25,000	$25,000	$25,000	$25,000	$25,000	$25,000	$25,000	$25,000	$25,000	$25,000	$25,000	$25,000	$25,000	$25,000	$25,000	$25,000	$25,000	$25,000	$25,000
Full-Time Technician	$720,520	$0	$0	$0	$25,000	$25,000	$25,000	$25,000	$25,000	$25,000	$25,000	$25,000	$25,000	$25,000	$25,000	$25,000	$25,000	$25,000	$25,000	$25,000	$25,000	$25,000	$25,000	$25,000
Full-Time Vehicles (2	$230,566	$0	$0	$0	$8,000	$8,000	$8,000	$8,000	$8,000	$8,000	$8,000	$8,000	$8,000	$8,000	$8,000	$8,000	$8,000	$8,000	$8,000	$8,000	$8,000	$8,000	$8,000	$8,000
Part-Time Administration	$201,748	$0	$0	$0	$7,000	$7,000	$7,000	$7,000	$7,000	$7,000	$7,000	$7,000	$7,000	$7,000	$7,000	$7,000	$7,000	$7,000	$7,000	$7,000	$7,000	$7,000	$7,000	$7,000
Part-Time Technicians (2	$720,520	$0	$0	$0	$25,000	$25,000	$25,000	$25,000	$25,000	$25,000	$25,000	$25,000	$25,000	$25,000	$25,000	$25,000	$25,000	$25,000	$25,000	$25,000	$25,000	$25,000	$25,000	$25,000
Part-Time Tradesmen (4	$1,441,041	$0	$0	$0	$50,000	$50,000	$50,000	$50,000	$50,000	$50,000	$50,000	$50,000	$50,000	$50,000	$50,000	$50,000	$50,000	$50,000	$50,000	$50,000	$50,000	$50,000	$50,000	$50,000
Part-Time Vehicles (4)	$461,133	$0	$0	$0	$16,000	$16,000	$16,000	$16,000	$16,000	$16,000	$16,000	$16,000	$16,000	$16,000	$16,000	$16,000	$16,000	$16,000	$16,000	$16,000	$16,000	$16,000	$16,000	$16,000
Office	$374,671	$0	$0	$0	$13,000	$13,000	$13,000	$13,000	$13,000	$13,000	$13,000	$13,000	$13,000	$13,000	$13,000	$13,000	$13,000	$13,000	$13,000	$13,000	$13,000	$13,000	$13,000	$13,000
Analytical costs	$2,449,769	$0	$0	$0	$85,000	$85,000	$85,000	$85,000	$85,000	$85,000	$85,000	$85,000	$85,000	$85,000	$85,000	$85,000	$85,000	$85,000	$85,000	$85,000	$85,000	$85,000	$85,000	$85,000
Subtotal	$8,329,214	$0	$0	$0	$289,000	$289,000	$289,000	$289,000	$289,000	$289,000	$289,000	$289,000	$289,000	$289,000	$289,000	$289,000	$289,000	$289,000	$289,000	$289,000	$289,000	$289,000	$289,000	$289,000
Total	$38,377,546	$3,458,000	$787,316	$787,316	$1,207,207	$1,207,207	$1,207,207	$1,207,207	$1,207,207	$1,207,207	$1,207,207	$1,207,207	$1,207,207	$1,207,207	$1,148,436	$1,148,436	$1,148,436	$1,148,436	$1,148,436	$1,148,436	$1,148,436	$1,148,436	$1,148,436	$1,148,436

3.4 Minimize Water Treatment

		Closure Period								Post-Closure Period														
	NPV 3%	Year 1 2011	Year 2 2012	Year 3 2013	Year 4 2014	Year 5 2015	Year 6 2016	Year 7 2017	Year 8 2018	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030	2031	2032	2033
Earthworks Inspection and Maintenance	$7,593,596	$0	$0	$0	$0	$0	$0	$0	$0	$595,029	$595,029	$595,029	$595,029	$595,029	$595,029	$595,029	$595,029	$595,029	$595,029	$198,343	$198,343	$198,343	$198,343	$198,343
Water Management and Pumping Costs[1]																								
ETA Groundwater Collection System	$698,214	$0	$0	$0	$0	$0	$0	$0	$0	$28,134	$28,134	$28,134	$28,134	$28,134	$28,134	$28,134	$28,134	$28,134	$28,134	$28,134	$28,134	$28,134	$28,134	$28,134
S-Cluster Groundwater Collection System	$418,789	$0	$0	$0	$0	$0	$0	$0	$0	$16,875	$16,875	$16,875	$16,875	$16,875	$16,875	$16,875	$16,875	$16,875	$16,875	$16,875	$16,875	$16,875	$16,875	$16,875
NFRC Groundwater Collection System	$393,946	$0	$0	$0	$0	$0	$0	$0	$0	$15,874	$15,874	$15,874	$15,874	$15,874	$15,874	$15,874	$15,874	$15,874	$15,874	$15,874	$15,874	$15,874	$15,874	$15,874
Zone II Pit Groundwater Collection System	$247,844	$0	$0	$0	$0	$0	$0	$0	$0	$9,987	$9,987	$9,987	$9,987	$9,987	$9,987	$9,987	$9,987	$9,987	$9,987	$9,987	$9,987	$9,987	$9,987	$9,987
Subtotal	$1,758,794	$0	$0	$0	$0	$0	$0	$0	$0	$70,869	$70,869	$70,869	$70,869	$70,869	$70,869	$70,869	$70,869	$70,869	$70,869	$70,869	$70,869	$70,869	$70,869	$70,869
Water Treatment System Construction	$2,601,942	$2,866,000	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0
Water Treatment System Operation																								
Pipes and pumps[1]	$3,651,968	$0	$118,316	$118,316	$118,316	$118,316	$118,316	$118,316	$118,316	$118,316	$118,316	$118,316	$118,316	$118,316	$118,316	$118,316	$118,316	$118,316	$118,316	$118,316	$118,316	$118,316	$118,316	$118,316
Plant	$13,889,847	$0	$450,000	$450,000	$450,000	$450,000	$450,000	$450,000	$450,000	$450,000	$450,000	$450,000	$450,000	$450,000	$450,000	$450,000	$450,000	$450,000	$450,000	$450,000	$450,000	$450,000	$450,000	$450,000
Subtotal	$17,541,815	$0	$568,316	$568,316	$568,316	$568,316	$568,316	$568,316	$568,316	$568,316	$568,316	$568,316	$568,316	$568,316	$568,316	$568,316	$568,316	$568,316	$568,316	$568,316	$568,316	$568,316	$568,316	$568,316
Environmental Management[2]																								
Full-Time Site Manager	$868,613	0	$0	$0	$0	$0	$0	$0	$0	$35,000	$35,000	$35,000	$35,000	$35,000	$35,000	$35,000	$35,000	$35,000	$35,000	$35,000	$35,000	$35,000	$35,000	$35,000
Full-Time Assistant Manager	$620,438	0	$0	$0	$0	$0	$0	$0	$0	$25,000	$25,000	$25,000	$25,000	$25,000	$25,000	$25,000	$25,000	$25,000	$25,000	$25,000	$25,000	$25,000	$25,000	$25,000
Full-Time Technician	$620,438	$0	$0	$0	$0	$0	$0	$0	$0	$25,000	$25,000	$25,000	$25,000	$25,000	$25,000	$25,000	$25,000	$25,000	$25,000	$25,000	$25,000	$25,000	$25,000	$25,000
Full-Time Vehicles (2	$198,540	$0	$0	$0	$0	$0	$0	$0	$0	$8,000	$8,000	$8,000	$8,000	$8,000	$8,000	$8,000	$8,000	$8,000	$8,000	$8,000	$8,000	$8,000	$8,000	$8,000
Part-Time Administration	$173,723	$0	$0	$0	$0	$0	$0	$0	$0	$7,000	$7,000	$7,000	$7,000	$7,000	$7,000	$7,000	$7,000	$7,000	$7,000	$7,000	$7,000	$7,000	$7,000	$7,000
Part-Time Technicians (2	$620,438	$0	$0	$0	$0	$0	$0	$0	$0	$25,000	$25,000	$25,000	$25,000	$25,000	$25,000	$25,000	$25,000	$25,000	$25,000	$25,000	$25,000	$25,000	$25,000	$25,000
Part-Time Tradesmen (4	$1,240,875	$0	$0	$0	$0	$0	$0	$0	$0	$50,000	$50,000	$50,000	$50,000	$50,000	$50,000	$50,000	$50,000	$50,000	$50,000	$50,000	$50,000	$50,000	$50,000	$50,000
Part-Time Vehicles (4)	$397,080	$0	$0	$0	$0	$0	$0	$0	$0	$16,000	$16,000	$16,000	$16,000	$16,000	$16,000	$16,000	$16,000	$16,000	$16,000	$16,000	$16,000	$16,000	$16,000	$16,000
Office	$322,628	$0	$0	$0	$0	$0	$0	$0	$0	$13,000	$13,000	$13,000	$13,000	$13,000	$13,000	$13,000	$13,000	$13,000	$13,000	$13,000	$13,000	$13,000	$13,000	$13,000
Analytical costs	$2,109,488	$0	$0	$0	$0	$0	$0	$0	$0	$85,000	$85,000	$85,000	$85,000	$85,000	$85,000	$85,000	$85,000	$85,000	$85,000	$85,000	$85,000	$85,000	$85,000	$85,000
Subtotal	$7,172,260	$0	$0	$0	$0	$0	$0	$0	$0	$289,000	$289,000	$289,000	$289,000	$289,000	$289,000	$289,000	$289,000	$289,000	$289,000	$289,000	$289,000	$289,000	$289,000	$289,000
Total	$36,868,406	$2,866,000	$568,316	$568,316	$568,316	$568,316	$568,316	$568,316	$568,316	$1,523,214	$1,523,214	$1,523,214	$1,523,214	$1,523,214	$1,523,214	$1,523,214	$1,523,214	$1,523,214	$1,523,214	$1,126,528	$1,126,528	$1,126,528	$1,126,528	$1,126,528

Summary NPV Calculations for Tailings Area Alternatives

NPV: Tailings Alternative 1 - Stabilize In Place

Closure Costs	Direct Cost	Indirect Cost	Contingency	Total	% of Total	NPV- 2010	Year 1 2011	Year 2 2012	Year 3 2013	Year 4 2014	Year 5 2015	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025
Dams	$5,120,206	$1,359,920	$1,024,041	$7,504,167	0%	$7,183,742	$3,902,167	$3,602,000	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0
Tailings	$50,878,524	$13,513,265	$10,175,705	$74,567,495	57%	$69,088,915	$16,777,686	$16,777,686	$20,506,061	$20,506,061	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0
Rose Creek Diversion Channel	$31,409,090	$8,342,211	$6,281,818	$46,033,119	35%	$42,675,047	$0	$30,381,659	$12,428,942	$3,222,316	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0
Groundwater	$1,897,921	$504,085	$379,584	$2,781,590	2%	$2,454,131	$0	$0	$0	$2,114,009	$907,582	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0
Miscellaneous (Demolition, contaminated soils, etc.)	$2,143	$569	$429	$3,141	0%	$2,710	$0	$0	$0	$0	$3,141	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0
Closure Costs Subtotal	$89,307,885	$23,720,050	$17,861,577	$130,889,513		$121,604,544	$20,679,853	$50,761,545	$32,935,003	$25,842,386	$910,723	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0
Post Closure Costs																					
Earthworks Inspection and Maintenance						$6,087,397	$0	$0	$0	$0	$0	$437,039	$437,039	$437,039	$437,039	$437,039	$437,039	$437,039	$437,039	$437,039	$437,039
Water Management Pumping Costs						$2,074,791	$0	$0	$0	$0	$0	$76,646	$76,646	$76,646	$76,646	$76,646	$76,646	$76,646	$76,646	$76,646	$76,646
Water Treatment System Construction						$5,100,727	$0	$0	$0	$0	$0	$5,198,000	$0	$0	$0	$0	$0	$0	$0	$0	$0
Water Treatment System Operation						$31,268,820	$0	$0	$0	$0	$0	$0	$1,192,000	$1,192,000	$1,192,000	$1,192,000	$1,192,000	$1,192,000	$1,192,000	$1,192,000	$1,192,000
Environmental Management						$7,823,148	$0	$0	$0	$0	$0	$289,000	$289,000	$289,000	$289,000	$289,000	$289,000	$289,000	$289,000	$289,000	$289,000
Post Closure Costs Subtotal						$52,444,883	$0	$0	$0	$0	$0	$7,000,685	$1,994,685	$1,994,685	$1,994,685	$1,994,685	$1,994,685	$1,994,685	$1,994,685	$1,994,685	$1,994,685
TOTAL						$174,049,428	$20,679,853	$50,761,545	$32,935,003	$25,842,386	$670,723	$7,000,685	$1,994,685	$1,994,685	$1,994,685	$1,994,685	$1,994,685	$1,994,685	$1,994,685	$1,994,685	$1,994,685

NPV: Tailings Alternative 2 - Complete Relocation

Closure Costs	Direct Cost	Indirect Cost	Contingency	Total	% of Total	NPV- 2010	Year 1 2011	Year 2 2012	Year 3 2013	Year 4 2014	Year 5 2015	Year 6 2016	Year 7 2017	Year 8 2018	Year 9 2019	Year 10 2020	Year 11 2021	Year 12 2022	Year 13 2023	Year 14 2024	2025
Dams	$3,205,059	$838,912	$641,012	$4,684,982	1%	$4,088,874	$2,342,491	$0	$0	$0	$749,597	$0	$0	$0	$0	$786,447	$786,447	$0	$0	$0	$0
Tailings	$277,099,168	$72,705,278	$55,599,834	$405,364,280	97%	$333,457,405	$31,831,869	$31,831,869	$31,831,869	$31,831,869	$31,831,869	$31,831,869	$31,831,869	$31,831,869	$31,831,869	$31,831,869	$31,831,869	$31,831,869	$24,381,857	$0	$0
Rose Creek Diversion Channel	$2,234,812	$584,954	$446,962	$3,266,729	1%	$2,153,402	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$2,040,056	$326,673
Groundwater	$2,803,885	$749,612	$572,777	$4,186,274	1%	$2,638,619	$0	$2,218,725	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$1,130,294	$0
Miscellaneous (Demolition, contaminated soils, etc.)	$2,143	$561	$429	$3,133	0%	$2,071	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$3,133	$0
Closure Costs Subtotal	$285,305,066	$74,939,317	$57,261,013	$418,505,397		$342,540,371	$34,174,359	$34,050,594	$31,831,869	$31,831,869	$32,581,466	$31,831,869	$31,831,869	$31,831,869	$31,831,869	$32,628,315	$32,628,315	$31,831,869	$24,381,857	$4,073,483	$326,673
Post Closure Costs																					
Earthworks Inspection and Maintenance						$277,095	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0
Water Management Pumping Costs						$2,341,250	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0
Water Treatment System Construction						$3,382,499	$0	$0	$0	$0	$0	$4,015,000	$0	$0	$0	$0	$0	$0	$0	$0	$0
Water Treatment System Operation						$12,865,345	$0	$0	$0	$0	$0	$0	$693,000	$693,000	$693,000	$693,000	$693,000	$693,000	$693,000	$693,000	$693,000
Environmental Management						$5,696,020	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0
Post Closure Costs Subtotal						$24,543,708	$0	$0	$0	$0	$0	$4,015,000	$693,000	$693,000	$693,000	$693,000	$693,000	$693,000	$693,000	$693,000	$693,000
TOTAL						$367,084,079	$34,174,359	$34,050,594	$31,831,869	$31,831,869	$32,581,466	$35,846,869	$32,524,869	$32,524,869	$32,524,869	$33,321,315	$33,321,315	$32,524,869	$25,074,857	$4,766,483	$1,019,673

NPV: Tailings Alternative 3 - Partial Relocation

Closure Costs	Direct Cost	Indirect Cost	Contingency	Total	% of Total	NPV- 2010	Year 1 2011	Year 2 2012	Year 3 2013	Year 4 2014	Year 5 2015	Year 6 2016	Year 7 2017	Year 8 2018	2019	2020	2021	2022	2023	2024	2025
Dams	$10,166,807	$2,677,981	$2,037,379	$14,902,257	6%	$11,863,751	$2,235,339	$0	$0	$0	$0	$0	$11,921,806	$0	$0	$0	$0	$0	$0	$0	$0
Tailings	$148,057,584	$39,079,926	$29,731,517	$217,468,028	86%	$192,819,740	$33,925,153	$33,925,153	$33,925,153	$33,925,153	$33,925,153	$15,222,825	$28,270,961	$2,174,669	$0	$0	$0	$0	$0	$0	$0
Rose Creek Diversion Channel	$11,669,687	$3,067,784	$2,333,937	$17,071,408	7%	$14,658,488	$0	$0	$0	$13,827,840	$0	$0	$512,142	$2,731,425	$0	$0	$0	$0	$0	$0	$0
Groundwater	$2,803,059	$736,881	$560,611	$4,100,548	2%	$3,496,309	$0	$0	$2,298,307	$0	$0	$0	$574,077	$738,099	$0	$0	$328,044	$0	$0	$164,022	$0
Miscellaneous (Demolition, contaminated soils, etc.)	$2,143	$563	$429	$3,136	0%	$2,475	$0	$0	$0	$0	$0	$0	$0	$3,136	$0	$0	$0	$0	$0	$0	$0
Closure Costs Subtotal	$173,319,367	$45,563,038	$34,663,873	$253,546,376		$223,840,762	$36,160,491	$33,925,153	$36,221,460	$47,752,993	$33,925,153	$15,222,825	$41,278,985	$5,647,349	$0	$0	$328,044	$0	$0	$164,022	$0
Post Closure Costs																					
Earthworks Inspection and Maintenance						$2,842,493	$0	$0	$0	$0	$0	$0	$0	$0	$223,834	$223,834	$223,834	$223,834	$223,834	$223,834	$223,834
Water Management Pumping Costs						$3,068,166	$0	$0	$0	$0	$0	$0	$0	$0	$116,529	$116,529	$122,847	$122,847	$122,847	$122,847	$125,627
Water Treatment System Construction						$3,907,702	$0	$0	$0	$0	$0	$4,666,000	$0	$0	$0	$0	$0	$0	$0	$0	$0
Water Treatment System Operation						$24,719,762	$0	$0	$0	$0	$0	$0	$942,000	$942,000	$942,000	$942,000	$942,000	$942,000	$942,000	$942,000	$942,000
Environmental Management						$7,117,992	$0	$0	$0	$0	$0	$0	$0	$0	$289,000	$289,000	$289,000	$289,000	$289,000	$289,000	$289,000
Post Closure Costs Subtotal						$41,647,115	$0	$0	$0	$0	$0	$4,666,000	$942,000	$942,000	$1,571,362	$1,571,362	$1,577,681	$1,577,681	$1,577,681	$1,577,681	$1,580,461
TOTAL						$264,687,878	$36,160,491	$33,925,153	$36,221,460	$47,752,993	$33,925,153	$19,888,825	$42,220,985	$6,589,349	$1,571,362	$1,571,362	$1,889,406	$1,577,681	$1,577,681	$1,741,703	$1,580,461

NPV: Tailings Alternative 4 - Minimize Up-Front Construction

Closure Costs	Direct Cost	Indirect Cost	Contingency	Total	% of Total	NPV- 2010	Year 1 2011	Year 2 2012	Year 3 2013	Year 4 2014	Year 5 2015	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025
Dams	$4,650,700	$1,209,260	$930,140	$6,850,108	12%	$6,621,535	$5,822,592	$1,027,516	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0
Tailings	$1,180,759	$322,253	$236,152	$1,739,163	3%	$1,639,328	$0	$1,739,163	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0
Rose Creek Diversion Channel	$31,409,090	$8,572,168	$6,281,818	$46,263,075	81%	$43,089,226	$0	$30,533,029	$12,491,030	$3,238,415	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0
Groundwater	$1,457,234	$397,708	$291,447	$2,146,389	4%	$1,851,494	$0	$0	$0	$0	$2,146,389	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0
Miscellaneous (Demolition, contaminated soils, etc.)	$2,143	$585	$429	$3,157	0%	$2,723	$0	$0	$0	$0	$3,157	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0
Closure Costs Subtotal	$38,699,926	$10,501,981	$7,739,985	$57,001,892		$53,204,306	$5,822,592	$33,300,309	$12,491,030	$3,238,415	$2,149,546	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0
Post Closure Costs																					
Earthworks Inspection and Maintenance						$2,511,334	$0	$0	$0	$0	$0	$180,299	$180,299	$180,299	$180,299	$180,299	$180,299	$180,299	$180,299	$180,299	$180,299
Tailings Dust Suppression						$3,533,368	$0	$0	$0	$0	$0	$130,528	$130,528	$130,528	$130,528	$130,528	$130,528	$130,528	$130,528	$130,528	$130,528
Water Management Pumping Costs						$1,872,234	$0	$0	$0	$0	$0	$69,163	$69,163	$69,163	$69,163	$69,163	$69,163	$69,163	$69,163	$69,163	$69,163
Water Treatment System Construction						$5,338,125	$0	$0	$0	$0	$0	$8,374,000	$0	$0	$0	$0	$0	$0	$0	$0	$0
Water Treatment System Operation						$35,544,673	$0	$0	$0	$0	$0	$0	$1,355,000	$1,355,000	$1,355,000	$1,355,000	$1,355,000	$1,355,000	$1,355,000	$1,355,000	$1,355,000
Environmental Management						$7,823,148	$0	$0	$0	$0	$0	$289,000	$289,000	$289,000	$289,000	$289,000	$289,000	$289,000	$289,000	$289,000	$289,000
Post Closure Costs Subtotal						$56,622,881	$0	$0	$0	$0	$0	$7,042,991	$2,023,991	$2,023,991	$2,023,991	$2,023,991	$2,023,991	$2,023,991	$2,023,991	$2,023,991	$2,023,991
TOTAL						$109,827,187	$5,822,592	$33,300,309	$12,491,030	$3,238,415	$2,149,546	$7,042,991	$2,023,991	$2,023,991	$2,023,991	$2,023,991	$2,023,991	$2,023,991	$2,023,991	$2,023,991	$2,023,991

Tailings Alternative 1 - Stabilize In Place

Contract Code	Work Area Code	Item	Task	Sub-task	Estimate Type	Task	Activity	Quantity	Unit	Cost Code	Unit Mhrs	Total Mhrs	Labour Rate	Labour Cost	Unit Matl	Material Cost	Unit Equip.	Equipment Cost	Unit Fuel	Fuel Consumed (L)	Fuel Cost	Power Rate ($/Unit)	Power Cost	Unit Cost	Activity Total	Subtotals	Source / Comments
CLOSURE COSTS - DIRECT CAPITAL																											
Dams																											
Cross Valley Dam																										$1,974,281	
	1	1	1	1	600	Remove pond	Pump pond water to discharge	140	days	C.3.11	2.410	337.3	$ 84.34	$ 11,807	$ -	$ -	$ 130.72	$ 18,301	$ 40.72	4,386	$ 5,701	$ -	$ -	$ 255.76	$35,810		
	1	1	2	1	430	Remove impounded sludge	Excavate and create berms for use as sludge cell on top of tailings	1,445	m3	C.2.12	0.024	34.0	$ 0.86	$ 1,244	$ -	$ -	$ 2.00	$ 2,885	$ 0.93	1,036	$ 1,347	$ -	$ -	$ 3.79	$5,477		
	1	1	2	2	430		Load, haul and place sludge material	1,600	m3	R.093	0.040	64.0	$ 1.46	$ 2,342	$ -	$ -	$ 3.91	$ 6,263	$ 1.92	2,357	$ 3,064	$ -	$ -	$ 7.29	$11,670		1CD003.45_SludgeManagement
	1	1	3	1	430	Remove contaminated soil	Excavate, load, haul and place contaminated soils to mill area	322,650	m3	R.096	0.014	4360.1	$ 0.49	$ 159,581	$ -	$ -	$ 1.88	$ 608,165	$ 1.22	392,785	$ 393,622	$ -	$ -	$ 3.60	$1,161,368		
	1	1	4	1	430	Prepare spoil area	Clear and grub	5,000	m2	C.2.05	0.015	72.7	$ 0.53	$ 2,662	$ -	$ -	$ 0.94	$ 4,675	$ 0.62	2,373	$ 3,085	$ -	$ -	$ 2.08	$10,422		
	1	1	4	2	430		Prepare access roads	200	m	C.2.27	0.131	26.3	$ 4.80	$ 961	$ -	$ -	$ 10.14	$ 2,029	$ 5.33	819	$ 1,065	$ -	$ -	$ 20.27	$4,055		
	1	1	5	1	430	Remove dam	Excavate, load, haul and place dam material not used for Int. Dam toe berm	185,086	m3	R.094	0.020	3653.1	$ 0.72	$ 133,702	$ -	$ -	$ 2.07	$ 382,604	$ 1.06	151,386	$ 196,802	$ -	$ -	$ 3.85	$713,108		
	1	1	7	1	610	Revegetate dam footprint and impoundment	Seed/Fertilize, helicopter high application rate	214,983	m2	C.5.01	0.000	26.9	$ 0.00	$ 965	$ 0.09	$ 19,546	$ 0.05	$ 11,717	$ 0.00	110	$ 143	$ -	$ -	$ 0.15	$32,371		
Intermediate Dam																										$2,444,243	1CD003.59_Rose_Creek_Dam_Upgrades
	1	2	1	1	430	Ground densification	Gravel: supply and stockpile locally	6,493	m3	C.2.02	0.010	64.9	$ 0.37	$ 2,376	$ -	$ -	$ 1.61	$ 10,444	$ 1.13	5,641	$ 7,333	$ -	$ -	$ 3.10	$20,153		
	1	2	1	2	430		Gravel: load, haul, dump	6,493	m3	R.097	0.028	178.5	$ 1.01	$ 6,535	$ -	$ -	$ 2.34	$ 15,175	$ 1.09	5,463	$ 7,101	$ -	$ -	$ 4.44	$28,811		
	1	2	1	2	510		Drill vibro-replacement stone columns	74,400	m3	C.9.01	0.267	19840.0	$ 12.55	$ 933,472	$ -	$ -	$ 6.80	$ 506,230	$ 4.37	250,175	$ 325,227	$ -	$ -	$ 23.72	$1,764,929		
	1	2	1	2	600		Verification testing	1	ls	C.9.02	530.639	530.6	$ 37,845.16	$ 37,845	$ -	$ -	$ 9,410.91	$ 9,411	$ 2,743.93	2,111	$ 2,744	$ -	$ -	$ 50,000.00	$50,000		
	1	2	2	1	430	Construct berm at toe	Excavate, load, haul and place material from Cross Valley Dam	150,000	m3	R.094	0.020	2960.5	$ 0.72	$ 108,355	$ -	$ -	$ 2.07	$ 310,072	$ 1.06	122,687	$ 159,493	$ -	$ -	$ 3.85	$577,921		
	1	2	3	1	600	Install pond level control	Install pumping system to manage pond levels	1	ls	C.3.10	12.000	12.0	$ 600.00	$ 600	$ 1,829.00	$ 1,829	$ -	$ -	$ -	0	$ -	$ -	$ -	$ 2,429.00	$2,429		
	1	2	3	2	600		Modify spillway - lower or add stop logs (completed during C&M)	1	ls	-	0.000	0.0	$ -	$ -	$ -	$ -	$ -	$ -	$ -	0	$ -	$ -	$ -	$ -	$0		
	1	2	4	1	600	Construct channel - spillway to Rose Cr.	Completed during care and maintenance	1	ls	-	0.000	0.0	$ -	$ -	$ -	$ -	$ -	$ -	$ -	0	$ -	$ -	$ -	$ -	$0		
Secondary Dam																										$701,662	
	1	3	1	1	430	Ground densification (East Limb)	Gravel: supply and stockpile locally	2,339	m3	C.2.02	0.010	23.4	$ 0.37	$ 856	$ -	$ -	$ 1.61	$ 3,762	$ 1.13	2,032	$ 2,641	$ -	$ -	$ 3.10	$7,260		
	1	3	1	2	430		Gravel: load, haul, dump	2,339	m3	R.098	0.023	53.0	$ 0.83	$ 1,939	$ -	$ -	$ 1.97	$ 4,606	$ 0.91	1,634	$ 2,124	$ -	$ -	$ 3.71	$8,668		
	1	3	1	3	510		Drill vibro-replacement stone columns	26,800	m3	C.9.01	0.267	7146.7	$ 12.55	$ 336,251	$ -	$ -	$ 6.80	$ 182,352	$ 4.37	90,117	$ 117,152	$ -	$ -	$ 23.72	$635,754		
	1	3	1	4	600		Verification testing	1	ls	C.9.02	530.639	530.6	$ 37,845.16	$ 37,845	$ -	$ -	$ 9,410.91	$ 9,411	$ 2,743.93	2,111	$ 2,744	$ -	$ -	$ 50,000.00	$50,000		
Subtotal Direct Costs - Dams												39,915		$1,779,338		$21,375		$2,088,103		947,223	$1,231,390		$0			$5,120,206	
Tailings																											
Intermediate Tailings																										$27,466,347	
	2	1	2	1	600	De-water	Pump pond water to Fare Pit or water treatment facility	267,000	m3	C.8.01	0.004	1176.2	$ 0.15	$ 41,167	$ 0.02	$ 6,206	$ 0.01	$ 1,533	$ 0.00	841	$ 1,093	$ -	$ -	$ 0.19	$50,000		
	2	1	3	1	600	Upgrade roads	Upgrade road from tailings area to waste rock source	1,350	m	C.2.28	0.225	303.8	$ 8.24	$ 11,117	$ -	$ -	$ 29.67	$ 40,060	$ 19.48	20,232	$ 26,301	$ -	$ -	$ 57.39	$77,478		
	2	1	3	2	600		Construct new access road where necessary	1,000	m	C.2.27	0.131	131.3	$ 4.80	$ 4,604	$ -	$ -	$ 10.14	$ 10,143	$ 5.33	4,097	$ 5,326	$ -	$ -	$ 20.27	$20,273		
	2	1	4	1	430	Cover tailings	Waste Rock (0.5m): Load, haul dump to tailing impoundment edge	504,665	m3	R.105	0.017	8689.0	$ 0.63	$ 318,016	$ -	$ -	$ 2.38	$ 1,199,067	$ 1.63	631,714	$ 821,228	$ -	$ -	$ 4.63	$2,338,313		
	2	1	4	2	430		Waste Rock (0.5m): Use small equipment to place on tailings	504,665	m3	R.106	0.021	10408.7	$ 0.75	$ 380,959	$ -	$ -	$ 1.51	$ 761,677	$ 0.67	258,897	$ 336,566	$ -	$ -	$ 2.93	$1,479,402		
	2	1	4	3	430		Till (1.5m): Load, haul dump to tailing impoundment edge	1,513,995	m3	R.107	0.043	65780.5	$ 1.59	$ 2,407,565	$ -	$ -	$ 6.00	$ 9,077,577	$ 4.11	4,782,409	$ 6,217,132	$ -	$ -	$ 11.69	$17,702,274		
	2	1	4	4	430		Till (1.5m): Use small equipment to place on tailings	1,513,995	m3	R.108	0.026	39742.4	$ 0.96	$ 1,454,571	$ -	$ -	$ 1.92	$ 2,908,866	$ 0.85	998,515	$ 1,285,069	$ -	$ -	$ 3.73	$5,648,626		
	2	1	5	1	610	Revegetate till-covered areas	Seed/Fertilize, helicopter high application rate	1,009,330	m2	C.5.01	0.000	126.2	$ 0.00	$ 4,531	$ 0.09	$ 91,768	$ 0.05	$ 55,011	$ 0.00	515	$ 670	$ -	$ -	$ 0.15	$151,981		
Secondary & Original Impoundment Tailings																										$22,910,177	
	2	2	1	1	600	Upgrade roads	Upgrade road from tailings area to waste rock source	935	m	C.2.28	0.225	210.4	$ 8.24	$ 7,700	$ -	$ -	$ 29.67	$ 27,745	$ 19.48	14,012	$ 18,216	$ -	$ -	$ 57.39	$53,661		
	2	2	1	2	600		Construct new access road where necessary	1,000	m	C.2.27	0.131	131.3	$ 4.80	$ 4,604	$ -	$ -	$ 10.14	$ 10,143	$ 5.33	4,097	$ 5,326	$ -	$ -	$ 20.27	$20,273		
	2	2	2	1	430	Cover tailings	Waste Rock (0.5m): Load, haul dump to tailing impoundment edge	451,150	m3	R.105	0.017	7762.5	$ 0.63	$ 284,108	$ -	$ -	$ 2.38	$ 1,071,784	$ 1.63	564,723	$ 734,140	$ -	$ -	$ 4.13	$2,090,032		
	2	2	2	2	430		Waste Rock (0.5m): Use small equipment to place on tailings	451,150	m3	R.106	0.021	9305.0	$ 0.75	$ 340,502	$ -	$ -	$ 1.51	$ 681,087	$ 0.67	231,443	$ 300,876	$ -	$ -	$ 2.63	$1,322,525		
	2	2	2	3	430		Till (1.5m): Load, haul dump to tailing impoundment edge	1,353,450	m3	R.110	0.039	53292.1	$ 1.44	$ 1,650,491	$ -	$ -	$ 5.43	$ 7,354,205	$ 3.72	3,874,472	$ 5,036,813	$ -	$ -	$ 10.60	$14,341,509		
	2	2	2	4	430		Till (1.5m): Use small equipment to place on tailings	1,353,450	m3	R.108	0.026	35528.1	$ 0.96	$ 1,300,327	$ -	$ -	$ 1.92	$ 2,600,515	$ 0.85	883,692	$ 1,148,800	$ -	$ -	$ 3.73	$5,049,642		
	2	2	3	1	610	Revegetate till-covered areas	Seed/Fertilize, helicopter high application rate	902,300	m2	C.5.01	0.000	112.8	$ 0.00	$ 4,051	$ 0.09	$ 82,037	$ 0.05	$ 49,178	$ 0.00	451	$ 599	$ -	$ -	$ 0.15	$135,865		
Allowance for construction delays from differential settlement/erosion																										$500,000	
	2	3	1	1	600	Cost of mobilization/demobilization		1	ls	C.7.02	9509.524	9509.5	$ 441,717.38	$ 441,717	$ -	$ -	$ 30,235.47	$ 30,235	$ 28,047.15	21,575	$ 28,047	$ -	$ -	$ 500,000.00	$500,000		
Subtotal Direct Costs - Tailings												241,629		$8,942,581		$180,612		$25,826,128		12,253,694	$15,929,893		$0			$50,878,524	
Rose Creek Diversion Channel																											
Upgrade to PMF (670m3/s)																										$11,441,497	RCDC costs to be revised
	3	1	1	1	430	Clear and grub	Dozer: D10R/N	272,961	m2	C.2.05	0.015	3970.3	$ 0.53	$ 145,315	$ -	$ -	$ 0.94	$ 255,233	$ 0.62	129,555	$ 168,422	$ -	$ -	$ 2.08	$568,969		
	3	1	2	1	430	Excavate channel	Bulk excavate	240,568	m3	C.2.12	0.024	5660.8	$ 0.86	$ 207,157	$ -	$ -	$ 2.00	$ 480,422	$ 0.93	172,569	$ 224,339	$ -	$ -	$ 3.79	$911,848		
	3	1	2	2	430		Pilot Channel: Soil excavation	26,600	m3	C.2.12	0.024	625.9	$ 0.86	$ 22,907	$ -	$ -	$ 2.00	$ 53,117	$ 0.93	19,080	$ 24,804	$ -	$ -	$ 3.79	$100,828		
	3	1	3	1	430	Place till layer	Till: Load, haul, dump, place	94,885	m3	R.112	0.038	3590.2	$ 1.38	$ 131,403	$ -	$ -	$ 2.96	$ 280,945	$ 1.40	101,875	$ 132,437	$ -	$ -	$ 5.74	$544,784		
	3	1	3	2	430		Till: compact with vibrating drum roller	316,283	m2	C.2.06	0.016	5060.5	$ 0.57	$ 181,167	$ -	$ -	$ 0.02	$ 6,642	$ 0.02	3,951	$ 5,136	$ -	$ -	$ 0.61	$192,946		
	3	1	4	1	430	Place crushed rock transition material	Crushed Rock: Drill, blast, stockpile	7,503	m3	C.2.23	0.045	337.6	$ 1.62	$ 12,177	$ 15.72	$ 117,947	$ 2.64	$ 19,803	$ 1.38	7,871	$ 10,233	$ -	$ -	$ 21.35	$160,160		
	3	1	4	2	430		Crushed Rock: Load in crusher and stockpile	7,503	m3	C.2.07	0.024	180.1	$ 0.88	$ 6,591	$ -	$ -	$ 2.10	$ 15,738	$ 0.90	5,198	$ 6,755	$ -	$ -	$ 3.88	$29,083		186
	3	1	4	3	430		Crushed Rock: Load, haul, dump place	7,503	m3	R.100	0.023	168.8	$ 0.82	$ 6,179	$ -	$ -	$ 2.00	$ 14,990	$ 0.94	5,453	$ 7,088	$ -	$ -	$ 3.77	$28,257		
	3	1	5	1	430	Place gravel transition material	Gravel: Excavate, screen and stockpile	11,560	m3	C.2.02	0.010	115.6	$ 0.37	$ 4,231	$ -	$ -	$ 1.61	$ 18,596	$ 1.13	10,043	$ 13,056	$ -	$ -	$ 3.10	$35,883		
	3	1	5	2	430		Gravel: load , haul, place	11,560	m3	R.113	0.039	445.9	$ 1.41	$ 16,310	$ -	$ -	$ 3.24	$ 37,451	$ 1.49	13,221	$ 17,187	$ -	$ -	$ 6.14	$70,958		
	3	1	6	1	430	Place sand and gravel material	Sand/Gravel: Produce, screen and stockpile	207,668	m3	C.2.02	0.010	2076.7	$ 0.37	$ 76,006	$ -	$ -	$ 1.61	$ 334,063	$ 1.13	180,416	$ 234,540	$ -	$ -	$ 3.10	$644,609		
	3	1	6	2	430		Sand/Gravel: Load, haul, dump and place	207,668	m3	R.113	0.039	8010.1	$ 1.41	$ 293,166	$ -	$ -	$ 3.24	$ 672,791	$ 1.49	237,501	$ 308,752	$ -	$ -	$ 6.14	$1,274,711		
	3	1	7	1	430	Place rockfill shell	Load, haul, dump and place waste rock	408,099	m3	R.114	0.049	19951.5	$ 1.79	$ 730,225	$ -	$ -	$ 4.32	$ 1,761,773	$ 2.11	662,083	$ 860,706	$ -	$ -	$ 8.22	$3,352,707		
	3	1	8	1	430	Place rip-rap	Rip-Rap: Screen and stockpile (from locally blasted material)	149,730	m3	C.2.25	0.057	8384.6	$ 2.09	$ 306,875	$ -	$ -	$ 9.19	$ 1,348,774	$ 6.45	728,426	$ 946,953	$ -	$ -	$ 17.74	$2,602,003		
	3	1	8	2	430		Rip-rap: Load, haul, dump	148,730	m3	R.100	0.023	3301.4	$ 0.82	$ 120,832	$ -	$ -	$ 2.00	$ 293,148	$ 0.94	106,632	$ 136,621	$ -	$ -	$ 3.77	$552,602		
	3	1	8	3	430		Rip-rap: Place and secure	148,730	m3	C.2.26	0.013	1834.1	$ 0.46	$ 67,129	$ -	$ -	$ 0.89	$ 130,501	$ 0.47	52,938	$ 68,816	$ -	$ -	$ 1.82	$266,448		
	3	1	9	1	430	Thermal blanket allowance	Over excavate for thermal protection layer	7,980	m3	C.2.12	0.024	197.8	$ 0.86	$ 6,872	$ -	$ -	$ 2.00	$ 15,935	$ 0.93	5,724	$ 7,441	$ -	$ -	$ 3.79	$30,248		
	3	1	9	2	430		Granular Fill: Produce, screen and stockpile	7,980	m3	C.2.02	0.010	79.8	$ 0.37	$ 2,921	$ -	$ -	$ 1.61	$ 12,837	$ 1.13	6,933	$ 9,013	$ -	$ -	$ 3.10	$24,770		
	3	1	9	3	430		Granular Fill: Load, haul, dump and place	7,980	m3	R.113	0.039	307.8	$ 1.41	$ 11,265	$ -	$ -	$ 3.24	$ 25,853	$ 1.49	9,120	$ 11,864	$ -	$ -	$ 6.14	$48,983		
North Fork Rock Drain																										$1,667,594	
	3	2	1	1	430	Construct ramp up to haul road	Excavate and doze WR material	22,500	m3	R.115	0.028	618.8	$ 1.01	$ 22,648	$ -	$ -	$ 2.59	$ 58,267	$ 1.23	21,299	$ 27,689	$ -	$ -	$ 4.83	$108,602		
	3	2	1	2	430		Grade road	15,000	m2	C.2.18	0.002	32.6	$ 0.05	$ 1,193	$ -	$ -	$ 0.09	$ 1,312	$ 0.09	982	$ 1,276	$ -	$ -	$ 0.25	$3,782		
	3	2	2	1	430	Breach drain	Excavate, load, haul and place breach material in Fare WR Dump	402,357	m3	R.116	0.012	5394.2	$ 0.43	$ 197,425	$ -	$ -	$ 1.65	$ 763,943	$ 1.07	381,124	$ 495,461	$ -	$ -	$ 3.15	$1,456,831		3.85
	3	2	3	1	430	Create channel	Excavate channel	6,104	m3	C.2.12	0.024	143.6	$ 0.86	$ 5,257	$ -	$ -	$ 2.00	$ 12,189	$ 0.93	4,378	$ 5,692	$ -	$ -	$ 3.79	$23,137		
	3	2	3	2	430		Supply and place geotextile	3,924	m2	C.4.06	0.016	62.8	$ 0.57	$ 2,223	$ 3.50	$ 13,734	$ 0.23	$ 896	$ 0.15	446	$ 580	$ -	$ -	$ 4.44	$17,433		
	3	2	3	3	430		Bedding layer: Screen and stockpile	1,177	m3	C.2.02	0.010	11.8	$ 0.37	$ 431	$ -	$ -	$ 1.61	$ 1,894	$ 1.13	1,023	$ 1,330	$ -	$ -	$ 3.10	$3,654		
	3	2	3	4	430		Bedding layer: Load, haul, dump and place	1,177	m3	R.084	0.029	34.3	$ 1.07	$ 1,255	$ -	$ -	$ 2.21	$ 2,600	$ 1.04	938	$ 1,220	$ -	$ -	$ 4.31	$5,074		
	3	2	3	6	430		Rip-Rap (angular, high quality): Screen and Stockpile (from NFRD)	1,962	m3	C.2.25	0.057	112.1	$ 2.09	$ 4,103	$ -	$ -	$ 9.19	$ 18,035	$ 6.45	9,740	$ 12,662	$ -	$ -	$ 17.74	$34,801		
	3	2	3	7	430		Rip-rap: Load, haul, dump	1,962	m3	R.085	0.032	63.4	$ 1.18	$ 2,320	$ -	$ -	$ 2.81	$ 5,513	$ 1.30	1,955	$ 2,541	$ -	$ -	$ 5.29	$10,374		
	3	2	3	8	430		Rip-rap: Place and secure	1,962	m3	C.2.26	0.013	24.5	$ 0.46	$ 898	$ -	$ -	$ 0.89	$ 1,745	$ 0.47	708	$ 920	$ -	$ -	$ 1.82	$3,563		
	3	2	4	1	430	Revegetate disturbed areas	Seed/Fertilize, helicopter low application rate	3270	m2	C.5.02	0.000	0.4	$ 0.00	$ 15	$ 0.05	$ 149	$ 0.05	$ 178	$ 0.00	2	$ 2	$ -	$ -	$ 0.11	$344		
Spillway Allowance																										$17,400,000	
	3	3	1	1	600	Construction of spillway		1	ls	C.2.30	16000.000	16000.0	$ 746,400.00	$ 746,400	$ 16,416,591.40	$ 16,416,591	$ 125,888.60	$ 125,889	$ 111,120.00	85,477	$ 111,120	$ -	$ -	$ 17,400,000.00	$17,400,000		NHC-BGC 2004 report (1CD003.35)
Fish By-Pass Allowance																										$900,000	
	3	4	1	1	600	Fish ladder construction	Scenario 1b from NHC report	1	ls	C.2.16	840.000	840.0	$ 34,444.00	$ 34,444	$ 825,252.41	$ 825,252	$ 26,580.99	$ 26,581	$ 13,722.60	10,556	$ 13,723	$ -	$ -	$ 900,000.00	$900,000		
Subtotal Direct Costs - Rose Creek Diversion Channel												87,628		$3,367,380		$17,373,674		$6,797,654		2,977,217	$3,870,382		$0			$31,409,090	
Groundwater Collection																											
Collect groundwater below CVD																										$1,457,234	
	4	1	1	1	500	Groundwater wells	Drill wells (Air Rotary Drill Rig, ~20m depth)	140	m	C.2.09	2.000	280.0	$ 102.13	$ 14,299	$ -	$ -	$ 100.65	$ 14,119	$ 22.08	2,378	$ 3,091	$ -	$ -	$ 225.07	$31,509		
	4	1	1	2	500		Install 6" stainless steel well casing & screen	140	m	C.3.17	0.150	21.0	$ 7.66	$ 1,072	$ 232.60	$ 32,564	$ 7.56	$ 1,059	$ 1.66	178	$ 232	$ -	$ -	$ 249.48	$34,927		
	4	1	1	3	500		Install 6" Submersible Pump with controls	7	ea.	C.3.07	12.000	84.0	$ 600.00	$ 4,200	$ 6,842.00	$ 47,894	$ -	$ -	$ -	0	$ -	$ -	$ -	$ 7,442.00	$52,094		
	4	1	1	4	500		Install protective housing (shack)	7	ea.	C.3.13	20.000	140.0	$ 1,300.00	$ 9,100	$ 445.00	$ 3,115	$ -	$ -	$ -	0	$ -	$ -	$ -	$ 1,745.00	$12,215		
	4	1	2	1	430	Pumping station	Excavate sump for manholes	200	m3	C.2.11	0.013	2.7	$ 0.49	$ 98	$ -	$ -	$ 0.95	$ 190	$ 0.50	77	$ 100	$ -	$ -	$ 1.94	$397		
	4	1	2	2	500		Supply and place precast concrete manhole	1	ea.	C.3.08	16.000	16.0	$ 746.40	$ 746	$ 1,344.68	$ 1,345	$ 72.47	$ 72	$ 62.92	46	$ 63	$ -	$ -	$ 2,226.47	$2,226		
	4	1	2	3	430		Backfill and compact around manhole	200	m3	C.2.04	0.030	6.0	$ 1.08	$ 216	$ -	$ -	$ 0.74	$ 148	$ 0.40	61	$ 79	$ -	$ -	$ 2.22	$443		
	4	1	2	4	500		Install primary pump	1	ea.	C.3.10	12.000	12.0	$ 600.00	$ 600	$ 1,829.00	$ 1,829	$ -	$ -	$ -	0	$ -	$ -	$ -	$ 2,429.00	$2,429		
	4	1	3	1	610	Piping system	Excavate piping trench	31,200	m3	C.2.13	0.020	624.0	$ 0.73	$ 22,838	$ -	$ -	$ 1.42	$ 44,399	$ 0.75	18,010	$ 23,412	$ -	$ -	$ 2.91	$90,649		
	4	1	3	2	510		Supply and install insulated 150mm HDPE pipe	5,200	m	C.3.03	0.250	1300.0	$ 8.75	$ 45,500	$ 155.84	$ 810,368	$ -	$ -	$ -	0	$ -	$ -	$ -	$ 164.59	$855,868		
	4	1	3	4	430		Bedding layer: Produce, screen and stockpile	2,028	m3	C.2.02	0.010	20.3	$ 0.37	$ 742	$ -	$ -	$ 1.61	$ 3,262	$ 1.13	1,762	$ 2,290	$ -	$ -	$ 3.10	$6,295		
	4	1	3	5	430		Bedding layer: Load, haul, place and compact	2,028	m3	R.102	0.032	64.9	$ 1.17	$ 2,375	$ -	$ -	$ 2.74	$ 5,555	$ 1.24	1,931	$ 2,510	$ -	$ -	$ 5.15	$10,440		
	4	1	3	6	430		Backfill ditches	29,172	m3	C.2.01	0.030	875.2	$ 1.08	$ 31,564	$ -	$ -	$ 0.74	$ 21,522	$ 0.40	8,875	$ 11,538	$ -	$ -	$ 2.22	$64,624		
	4	1	4	1	510	Heat tracing	Supply and install heat trace in HDPE pipe	5,200	m	C.3.04	0.250	1300.0	$ 12.50	$ 65,000	$ 21.32	$ 110,864	$ -	$ -	$ -	0	$ -	$ -	$ -	$ 33.82	$175,864		
	4	1	4	2	510		Supply/Install heat tracing power food kit	4	ea.	C.3.05	4.000	16.0	$ 230.00	$ 920	$ 396.84	$ 1,587	$ -	$ -	$ -	0	$ -	$ -	$ -	$ 626.84	$2,507		
	4	1	4	3	510		Supply/Install electrical thermostats for heat tracing	1	ea.	C.3.06	1.000	1.0	$ 57.50	$ 58	$ 1,025.00	$ 1,025	$ -	$ -	$ -	0	$ -	$ -	$ -	$ 1,082.50	$1,083		
	4	1	5	1	510	Provide Electricity from WTP to pumps	Supply/Install treated power poles	39	ea.	C.4.03	4.545	177.3	$ 297.88	$ 11,617	$ 325.96	$ 12,712	$ 65.85	$ 3,348	$ 28.17	845	$ 1,099	$ -	$ -	$ 737.86	$28,776		
	4	1	5	2	510		Supply/Install overhead conductor	3,000	m	C.4.02	0.032	96.0	$ 2.21	$ 6,638	$ 1.41	$ 4,230	$ 0.45	$ 1,360	$ 0.15	343	$ 446	$ -	$ -	$ 4.22	$12,674		
	4	1	5	3	510		Supply/Install transformers	4	ea.	C.4.04	20.000	80.0	$ 1,383.00	$ 5,532	$ 8,934.00	$ 35,736	$ 224.98	$ 900	$ 143.00	440	$ 572	$ -	$ -	$ 10,684.98	$42,740		
	4	1	6	1	510	Monitoring wells	Drill wells (Air Rotary Drill Rig, ~15m depth)	60	m	C.2.09	2.000	120.0	$ 102.13	$ 6,128	$ -	$ -	$ 100.65	$ 6,051	$ 22.08	1,019	$ 1,325	$ -	$ -	$ 225.07	$13,504		
	4	1	6	2	510		Install 6" stainless steel well casing & screen	60	m	C.3.17	0.150	9.0	$ 7.66	$ 460	$ 232.60	$ 13,956	$ 7.56	$ 454	$ 1.66	76	$ 99	$ -	$ -	$ 249.48	$14,969		
	4	1	6	3	510		Install protective well cover	3	ea.	C.3.18	1.333	4.0	$ 48.80	$ 146	$ 164.54	$ 494	$ 100.85	$ 303	$ 22.08	51	$ 66	$ -	$ -	$ 336.27	$1,009		
Seepage Collection System above Intermediate Dam																										$211,521	
	4	2	1	1	430	Place collection sumps	Excavate sump	600	m3	C.2.11	0.013	8.0	$ 0.49	$ 293	$ -	$ -	$ 0.95	$ 569	$ 0.50	231	$ 300	$ -	$ -	$ 1.94	$1,162		
	4	2	1	2	510		Supply and place perforated HDPE sump	3	ea.	C.3.15	4.000	12.0	$ 186.60	$ 560	$ 1,925.00	$ 5,775	$ 18.12	$ 54	$ 15.73	36	$ 47	$ -	$ -	$ 2,145.45	$6,436		
	4	2	1	3	510

Contract Code	Work Area Code	Item	Task	Sub-task	Estimate Type	Task	Activity	Quantity	Unit	Cost Code	Unit Mhrs	Total Mhrs	Labour Rate	Labor Cost	Unit Matl	Material Cost	Unit Equip.	Equipment Cost	Unit Fuel	Fuel Consumed (L)	Fuel Cost	Power Rate ($/Unit)	Power Cost	Unit Cost	Activity Total	Subtotals	Source / Comments
	4	2	2	3	430		Bedding layer: Produce, screen and stockpile	242	m3	C.2.02	0.010	2.4	$ 0.37	$ 88	$ -	$ -	$ 1.61	$ 389	$ 1.13	210	$ 273	$ -	$ -	$ 3.10	$751		
	4	2	2	4	430		Bedding Layer: Load, haul, place and compact	242	m3	R.097	0.028	6.6	$ 1.01	$ 243	$ -	$ -	$ 2.34	$ 565	$ 1.09	203	$ 264	$ -	$ -	$ 4.44	$1,073		
	4	2	2	5	430		Backfill and compact ditches	3,478	m3	C.2.01	0.030	104.3	$ 1.08	$ 3,763	$ -	$ -	$ 0.74	$ 2,566	$ 0.40	1,056	$ 1,376	$ -	$ -	$ 2.22	$7,705		
	4	2	3	1	510	Heat tracing	Supply and install heat trace in HDPE pipe	620	m	C.3.04	0.250	155.0	$ 12.50	$ 7,750	$ 21.32	$ 13,218	$ -	$ -	$ -	0	$ -	$ -	$ -	$ 33.82	$20,968		
	4	2	3	2	510		Supply/install heat tracing power feed kit	1	ea.	C.3.05	4.000	4.0	$ 230.00	$ 230	$ 396.84	$ 397	$ -	$ -	$ -	0	$ -	$ -	$ -	$ 626.64	$627		
	4	2	3	3	510		Supply/install electrical thermostats for heat tracing	1	ea.	C.3.06	1.000	1.0	$ 57.50	$ 58	$ 1,025.00	$ 1,025	$ -	$ -	$ -	0	$ -	$ -	$ -	$ 1,082.50	$1,083		
	4	2	4	1	510	Provide Electricity from WTP to pumps	Supply/install treated power poles	8	ea.	C.4.03	4.545	36.4	$ 297.88	$ 2,383	$ 325.96	$ 2,608	$ 85.85	$ 687	$ 28.17	173	$ 225	$ -	$ -	$ 737.86	$5,903		
	4	2	4	2	510		Supply/install overhead conductor	610	m	C.4.02	0.032	19.5	$ 2.21	$ 1,350	$ 1.41	$ 860	$ 0.45	$ 277	$ 0.15	70	$ 91	$ -	$ -	$ 4.22	$2,577		
	4	2	4	3	510		Supply/install transformers	3	ea.	C.4.04	20.000	60.0	$ 1,383.00	$ 4,149	$ 8,934.00	$ 26,802	$ 224.98	$ 675	$ 143.00	330	$ 429	$ -	$ -	$ 10,684.98	$32,055		
Slurry Wall																										$229,167	
	4	3	1	1	430	Level and compact a working surface	Clear and grub working surface	3,000	m2	C.2.05	0.015	43.6	$ 0.53	$ 1,597	$ -	$ -	$ 0.94	$ 2,805	$ 0.62	1,424	$ 1,851	$ -	$ -	$ 2.08	$6,253		
	4	3	1	2	430		Level and compact surface	1,500	m3	C.2.20	0.013	18.8	$ 0.46	$ 686	$ -	$ -	$ 2.15	$ 3,219	$ 1.25	1,443	$ 1,676	$ -	$ -	$ 3.85	$5,781		
	4	3	2	1	600	Slurry wall	Install cut-off wall (all-inclusive)	2,000	m2	C.2.08	0.500	1000.0	$ 26.82	$ 53,640	$ 48.60	$ 97,200	$ 20.47	$ 40,945	$ 12.67	19,468	$ 25,348	$ -	$ -	$ 108.57	$217,133		
Subtotal Direct Costs - Groundwater Collection												7,076		$322,439		$1,332,802		$160,786		62,919	$81,794		$0			$1,897,921	
Miscellaneous																											
Reclaim unnecessary roads																										$2,143	
	6	1	1	1		Reclaim unnecessary roads	Scarify road surfaces	6,000	m2	C.2.18	0.002	13.0	$ 0.08	$ 477	$ -	$ -	$ 0.09	$ 525	$ 0.09	393	$ 510	$ -	$ -	$ 0.25	$1,513		
	6	1	1	2			Seed/Fertilize, helicopter low application rate	6,000	m2	C.5.02	0.000	0.8	$ 0.00	$ 27	$ 0.05	$ 273	$ 0.05	$ 327	$ 0.00	3	$ 4	$ -	$ -	$ 0.11	$631		
Subtotal Direct Costs - Miscellaneous												14		$504		$273		$852		396	$514		$0			$2,143	
Subtotal Direct Costs																											
							Subtotal direct costs					376,462		$14,412,244		$18,908,235		$34,873,523		16,241,449	$21,113,883		$0			$89,307,885	
CLOSURE COSTS - INDIRECT																											
	100	100	1	1		Project Management	5.0% of direct costs															$ 89,307,885	x	5.0%		$4,465,394	
	100	100	2	1		Field Supervision	(included in major tasks)																			$0	
	100	100	3	1		Contractor profit and home office overhead	10% of direct costs															$ 89,307,885	x	10.0%		$8,930,789	
	100	100	4	1		Insurance	0.5% of direct costs															$ 89,307,885	x	0.5%		$446,539	
	100	100	5	1		Bonding	0.5% of direct costs															$ 89,307,885	x	0.5%		$446,539	
	100	100	6	1		Field Engineering and QA	10% of direct costs															$ 89,307,885	x	10.0%		$8,930,789	
	100	100	7	1		Mob - Demob																1	lump	$500,000		$500,000	
	100	100	8	1		Living out allowances	(included in heavy equipment costs)																			$0	
Subtotal Indirect Costs																											
							Subtotal indirect costs																			$23,720,050	
CLOSURE COSTS - CONTINGENCY																											
							Contingency	20% of direct costs														$89,307,885	x	20.0%		$17,861,577	
CLOSURE COSTS - TOTAL																											
							Total direct and indirect costs																			$130,889,513	

Tailings Alternative 2 - Complete Relocation

Contract Code	Work Area Code	Item	Task	Sub-task	Estimate Type	Task	Activity	Quantity	Unit	Cost Code	Unit Mhrs	Total Mhrs	Labour Rate	Labour Cost	Unit Matl	Material Cost	Unit Equip.	Equipment Cost	Unit Fuel	Fuel Consumed (L)	Fuel Cost	Power Rate ($/Unit)	Power Cost	Unit Cost	Activity Total	Subtotals	Source / Comments
CLOSURE COSTS - DIRECT CAPITAL																											
Dams																											
Cross Valley Dam																										$1,622,884	
	1	1	1	1	600	Remove pond	Pump pond water to discharge	140	days	C.3.11	2.410	337.3	$ 84.34	$ 11,807	$ -	$ -	$ 130.72	$ 18,301	$ 40.72	4,386	$ 5,701	$ -	$ -	$ 255.78	$35,810		
	1	1	2	1	430	Remove contaminated soil	Excavate, load, haul and place contaminated soils to mill area	322,650	m3	R.096	0.014	4360.1	$ 0.49	$ 159,581	$ -	$ -	$ 1.88	$ 608,165	$ 1.22	302,786	$ 393,622	$ -	$ -	$ 3.60	$1,161,368		
	1	1	3	1	430	Prepare spoil area	Clear and grub	1,000	m2	C.2.05	0.015	14.5	$ 0.53	$ 532	$ -	$ -	$ 0.94	$ 935	$ 0.62	475	$ 617	$ -	$ -	$ 2.08	$2,084		
	1	1	3	2	430		Prepare access roads	200	m	C.2.27	0.131	26.3	$ 4.80	$ 961	$ -	$ -	$ 10.14	$ 2,029	$ 5.33	819	$ 1,065	$ -	$ -	$ 20.27	$4,055		
	1	1	4	1	430	Breach dam	Excavate, load, haul and dump at pit	72,500	m3	R.095	0.020	1469.6	$ 0.74	$ 53,797	$ -	$ -	$ 2.79	$ 202,536	$ 1.61	100,671	$ 130,872	$ -	$ -	$ 5.34	$387,196		
	1	1	5	1	610	Revegetate dam footprint and impoundment	Seed/Fertilize, helicopter high application rate	214,983	m2	C.5.01	0.000	26.9	$ 0.00	$ 965	$ 0.09	$ 19,546	$ 0.05	$ 11,717	$ 0.00	110	$ 143	$ -	$ -	$ 0.15	$32,371		
Breach Intermediate Dam																										$518,955	
	1	2	1	1	430	Prepare spoil area	Clear and grub	1000	m2	C.2.05	0.015	14.5	$ 0.53	$ 532	$ -	$ -	$ 0.94	$ 935	$ 0.62	475	$ 617	$ -	$ -	$ 2.08	$2,084		
	1	2	1	2	430		Prepare access roads	300	m	C.2.27	0.131	39.4	$ 4.80	$ 1,441	$ -	$ -	$ 10.14	$ 3,043	$ 5.33	1,229	$ 1,598	$ -	$ -	$ 20.27	$6,082		
	1	2	2	1	430	Breach dam	Excavate, load, haul and dump breach material	72,500	m3	C.2.12	0.024	1705.9	$ 0.86	$ 62,435	$ -	$ -	$ 2.00	$ 144,774	$ 0.93	52,003	$ 67,604	$ -	$ -	$ 3.79	$274,813		
	1	2	3	1	430	Create channel	Excavate channel	5,200	m3	C.2.12	0.024	122.4	$ 0.86	$ 4,476	$ -	$ -	$ 2.00	$ 10,384	$ 0.93	3,730	$ 4,849	$ -	$ -	$ 3.79	$19,711		
	1	2	3	2	510		Supply and place geotextile	1,300	m2	C.4.06	0.016	20.8	$ 0.57	$ 736	$ 3.50	$ 4,550	$ 0.23	$ 297	$ 0.15	148	$ 192	$ -	$ -	$ 4.44	$5,775		
	1	2	3	3	430		Bedding layer: Screen and stockpile	500	m3	C.2.02	0.010	5.0	$ 0.37	$ 183	$ -	$ -	$ 1.61	$ 804	$ 1.13	434	$ 565	$ -	$ -	$ 3.10	$1,552		
	1	2	3	4	430		Bedding layer: Load, haul, dump and place	500	m3	R.099	0.029	14.6	$ 1.07	$ 533	$ -	$ -	$ 2.45	$ 1,223	$ 1.12	432	$ 561	$ -	$ -	$ 4.63	$2,317		
	1	2	3	5	430		Rip-rap: Drill, blast and stockpile	4,600	m3	C.2.23	0.045	207.0	$ 1.62	$ 7,466	$ 15.72	$ 72,312	$ 2.64	$ 12,141	$ 1.36	4,826	$ 6,273	$ -	$ -	$ 21.35	$98,192		
	1	2	3	6	430		Rip-rap (angular, high quality): Screen and stockpile	4,600	m3	C.2.25	0.057	262.9	$ 2.09	$ 9,621	$ -	$ -	$ 9.19	$ 42,284	$ 6.45	22,836	$ 29,687	$ -	$ -	$ 17.74	$81,592		
	1	2	3	7	430		Rip-rap: Load, haul, dump	4,600	m3	R.100	0.023	103.5	$ 0.82	$ 3,788	$ -	$ -	$ 2.00	$ 9,190	$ 0.94	3,343	$ 4,346	$ -	$ -	$ 3.77	$17,324		
	1	2	3	8	430		Rip-rap: Place and secure	4,600	m3	C.2.26	0.013	57.5	$ 0.46	$ 2,105	$ -	$ -	$ 0.89	$ 4,091	$ 0.47	1,660	$ 2,157	$ -	$ -	$ 1.82	$8,353		
	1	2	4	1	610	Revegetate disturbed areas	Seed/Fertilize, helicopter high application rate	7700	m2	C.5.01	0.000	1.0	$ 0.00	$ 35	$ 0.09	$ 700	$ 0.05	$ 420	$ 0.00	4	$ 5	$ -	$ -	$ 0.15	$1,159		
Breach Secondary Dam																										$529,914	
	1	3	1	1	430	Prepare spoil area	Clear and grub	1000	m2	C.2.05	0.015	14.5	$ 0.53	$ 532	$ -	$ -	$ 0.94	$ 935	$ 0.62	475	$ 617	$ -	$ -	$ 2.08	$2,084		
	1	3	1	2	430		Prepare access roads	500	m	C.2.27	0.131	65.6	$ 4.80	$ 2,402	$ -	$ -	$ 10.14	$ 5,072	$ 5.33	2,048	$ 2,663	$ -	$ -	$ 20.27	$10,136		
	1	3	2	1	430	Breach dam	Excavate, load, haul and dump breach material	72,500	m3	C.2.12	0.024	1705.9	$ 0.86	$ 62,435	$ -	$ -	$ 2.00	$ 144,774	$ 0.93	52,003	$ 67,604	$ -	$ -	$ 3.79	$274,813		
	1	3	3	1	430	Create channel	Excavate channel	5,200	m3	C.2.12	0.024	122.4	$ 0.86	$ 4,476	$ -	$ -	$ 2.00	$ 10,384	$ 0.93	3,730	$ 4,849	$ -	$ -	$ 3.79	$19,711		
	1	3	3	2	520		Supply and place geotextile	1,300	m2	C.4.06	0.016	20.8	$ 0.57	$ 736	$ 3.50	$ 4,550	$ 0.23	$ 297	$ 0.15	148	$ 192	$ -	$ -	$ 4.44	$5,775		
	1	3	3	3	430		Bedding layer: Screen and stockpile	500	m3	C.2.02	0.010	5.0	$ 0.37	$ 183	$ -	$ -	$ 1.61	$ 804	$ 1.13	434	$ 565	$ -	$ -	$ 3.10	$1,552		
	1	3	3	4	430		Bedding layer: Load, haul, dump and place	500	m3	R.101	0.036	18.0	$ 1.32	$ 659	$ -	$ -	$ 3.02	$ 1,512	$ 1.39	534	$ 694	$ -	$ -	$ 5.73	$2,865		
	1	3	3	5	430		Rip-rap: Drill, blast and stockpile	4,600	m3	C.2.23	0.045	207.0	$ 1.62	$ 7,466	$ 15.72	$ 72,312	$ 2.64	$ 12,141	$ 1.36	4,826	$ 6,273	$ -	$ -	$ 21.35	$98,192		
	1	3	3	6	430		Rip-rap (angular, high quality): Screen and stockpile	4,600	m3	C.2.25	0.057	262.9	$ 2.09	$ 9,621	$ -	$ -	$ 9.19	$ 42,284	$ 6.45	22,836	$ 29,687	$ -	$ -	$ 17.74	$81,592		
	1	3	3	7	430		Rip-rap: Load, haul, dump	4,600	m3	R.102	0.032	147.2	$ 1.17	$ 5,386	$ -	$ -	$ 2.74	$ 12,609	$ 1.24	4,379	$ 5,693	$ -	$ -	$ 5.15	$23,680		
	1	3	3	8	430		Rip-rap: Place and secure	4,600	m3	C.2.26	0.013	57.5	$ 0.46	$ 2,105	$ -	$ -	$ 0.89	$ 4,091	$ 0.47	1,660	$ 2,157	$ -	$ -	$ 1.82	$8,353		
	1	3	4	1	610	Revegetate disturbed areas	Seed/Fertilize, helicopter high application rate	7700	m2	C.5.01	0.000	1.0	$ 0.00	$ 35	$ 0.09	$ 700	$ 0.05	$ 420	$ 0.00	4	$ 5	$ -	$ -	$ 0.15	$1,159		
Breach Original Dam																										$533,305	
	1	3	1	1	430	Prepare spoil area	Clear and grub	1000	m2	C.2.05	0.015	14.5	$ 0.53	$ 532	$ -	$ -	$ 0.94	$ 935	$ 0.62	475	$ 617	$ -	$ -	$ 2.08	$2,084		
	1	3	1	2	430		Prepare access roads	540	m	C.2.27	0.131	70.9	$ 4.80	$ 2,594	$ -	$ -	$ 10.14	$ 5,477	$ 5.33	2,212	$ 2,876	$ -	$ -	$ 20.27	$10,947		
	1	3	2	1	430	Breach dam	Excavate, load, haul and dump breach material	72,500	m3	C.2.12	0.024	1705.9	$ 0.86	$ 62,435	$ -	$ -	$ 2.00	$ 144,774	$ 0.93	52,003	$ 67,604	$ -	$ -	$ 3.79	$274,813		
	1	3	3	1	430	Create channel	Excavate channel	5,200	m3	C.2.12	0.024	122.4	$ 0.86	$ 4,476	$ -	$ -	$ 2.00	$ 10,384	$ 0.93	3,730	$ 4,849	$ -	$ -	$ 3.79	$19,711		
	1	3	3	2	520		Supply and place geotextile	1,300	m2	C.4.06	0.016	20.8	$ 0.57	$ 736	$ 3.50	$ 4,550	$ 0.23	$ 297	$ 0.15	148	$ 192	$ -	$ -	$ 4.44	$5,775		
	1	3	3	3	430		Bedding layer: Screen and stockpile	500	m3	C.2.02	0.010	5.0	$ 0.37	$ 183	$ -	$ -	$ 1.61	$ 804	$ 1.13	434	$ 565	$ -	$ -	$ 3.10	$1,552		
	1	3	3	4	430		Bedding layer: Load, haul, dump and place	500	m3	R.103	0.029	14.6	$ 1.07	$ 533	$ -	$ -	$ 2.45	$ 1,223	$ 1.12	432	$ 561	$ -	$ -	$ 4.63	$2,317		
	1	3	3	5	430		Rip-rap: Drill, blast and stockpile	4,600	m3	C.2.23	0.045	207.0	$ 1.62	$ 7,466	$ 15.72	$ 72,312	$ 2.64	$ 12,141	$ 1.36	4,826	$ 6,273	$ -	$ -	$ 21.35	$98,192		
	1	3	3	6	430		Rip-rap (angular, high quality): Screen and stockpile	4,600	m3	C.2.25	0.057	262.9	$ 2.09	$ 9,621	$ -	$ -	$ 9.19	$ 42,284	$ 6.45	22,836	$ 29,687	$ -	$ -	$ 17.74	$81,592		
	1	3	3	7	430		Rip-rap: Load, haul, dump	4,600	m3	R.104	0.036	166.6	$ 1.33	$ 6,099	$ -	$ -	$ 3.10	$ 14,264	$ 1.40	4,957	$ 6,445	$ -	$ -	$ 5.83	$26,808		
	1	3	3	8	430		Rip-rap: Place and secure	4,600	m3	C.2.26	0.013	57.5	$ 0.46	$ 2,105	$ -	$ -	$ 0.89	$ 4,091	$ 0.47	1,660	$ 2,157	$ -	$ -	$ 1.82	$8,353		
	1	3	4	1	610	Revegetate disturbed areas	Seed/Fertilize, helicopter high application rate	7700	m2	C.5.01	0.000	1.0	$ 0.00	$ 35	$ 0.09	$ 700	$ 0.05	$ 420	$ 0.00	4	$ 5	$ -	$ -	$ 0.15	$1,159		
Subtotal Direct Costs - Dams												14,066		$513,841		$252,233		$1,545,677		687,159	$893,307		$0			$3,205,058	
Tailings																											
Pump Tailings to Faro Pit																										$214,689,551	
	2	1	1	1	510	Hydraulic monitoring system	Pumps: Supply and install Vertical Turbine Pump	3	ea.	C.7.15	105.000	315.0	$ 5,483.00	$ 16,449	$ 100,000.00	$ 300,000	$ 224.98	$ 675	$ 143.00	330	$ 429	$ -	$ -	$ 105,850.98	$317,553		
	2	1	1	2	510		Pipelines: Primary pipeline 24" sched. 20 steel	3,500	m	C.7.09	1.611	5638.9	$ 76.83	$ 268,917	$ 237.06	$ 829,710	$ 4.35	$ 15,235	$ 4.53	12,192	$ 15,849	$ -	$ -	$ 322.77	$1,129,710		1CD003.041
	2	1	1	3	510		Pipelines: Secondary pipeline 16" sched. 20 steel	2,000	m	C.7.07	0.773	1545.5	$ 35.59	$ 71,182	$ 153.28	$ 306,560	$ 3.56	$ 7,123	$ 3.71	5,700	$ 7,410	$ -	$ -	$ 196.14	$392,275		
	2	1	1	4	510		Pipelines: Tertiary pipeline 6" sched. 20 steel	2,000	m	C.7.06	0.367	733.3	$ 18.99	$ 37,987	$ 66.95	$ 133,900	$ 1.40	$ 2,808	$ 1.67	2,567	$ 3,337	$ -	$ -	$ 89.02	$178,031		
	2	1	1	5	510		Hydraulic monitors: Supply and install	9	ea.	C.7.03	55.000	495.0	$ 3,283.00	$ 29,547	$ 139,444.22	$ 1,254,998	$ 159.74	$ 1,438	$ 185.90	1,267	$ 1,673	$ -	$ -	$ 143,072.86	$1,287,656		
	2	1	1	6	510		Mobile equipment: Purchase	1	ls	M.30	0.000	0.0	$ -	$ -	$ 1,020,000.00	$ 1,020,000	$ -	$ -	$ -	0	$ -	$ -	$ -	$ 1,020,000.00	$1,020,000		
	2	1	2	1	510	Slurry pumping system	Sump Pump: Supply and install	4	ea.	C.7.14	21.000	84.0	$ 1,096.60	$ 4,386	$ 75,000.00	$ 300,000	$ 5.88	$ 24	$ 18.59	57	$ 74	$ -	$ -	$ 76,121.07	$304,484		
	2	1	2	2	510		Sump Pump: Supply and install support structure	1	ea.	C.7.16	87.027	87.0	$ 3,892.42	$ 3,892	$ 95,000.00	$ 95,000	$ 678.72	$ 679	$ 428.86	330	$ 429	$ -	$ -	$ 100,000.00	$100,000		
	2	1	2	3	510		Slurry booster pumps: supply and install	4	ea.	C.7.13	105.000	420.0	$ 5,483.00	$ 21,932	$ 175,000.00	$ 700,000	$ 29.38	$ 118	$ 92.95	286	$ 372	$ -	$ -	$ 180,605.33	$722,421		
	2	1	2	4	510		Pump station: supply and install	1	ea.	C.7.17	81.769	81.8	$ 4,024.29	$ 4,024	$ 200,000.00	$ 200,000	$ 537.68	$ 538	$ 438.03	337	$ 438	$ -	$ -	$ 205,000.00	$205,000		
	2	1	2	5	510		Trash screen and support: supply and install	1	ea.	C.7.22	188.679	188.7	$ 10,000.00	$ 10,000	$ 500,000.00	$ 500,000	$ -	$ -	$ -	0	$ -	$ -	$ -	$ 510,000.00	$510,000		
	2	1	2	6	510		Booster pump box and support: Supply and install	1	ea.	C.7.01	73.122	73.1	$ 3,675.61	$ 3,676	$ 75,000.00	$ 75,000	$ 667.13	$ 667	$ 457.26	352	$ 457	$ -	$ -	$ 80,000.00	$80,000		
	2	1	2	7	510		Gland water pumps: supply and install	3	ea.	C.7.12	105.000	315.0	$ 5,483.00	$ 16,449	$ 6,000.00	$ 18,000	$ 29.38	$ 88	$ 92.95	215	$ 279	$ -	$ -	$ 11,605.33	$34,816		
	2	1	2	8	510		Sump pump pipeline: Supply and install 300mm HDPE	6,000	m	C.7.10	0.325	1950.0	$ 15.92	$ 95,490	$ 140.75	$ 844,500	$ 0.15	$ 882	$ 0.46	2,145	$ 2,789	$ -	$ -	$ 157.28	$943,660		
	2	1	2	9	510		Booster pump pipeline: Supply and install 550mm standard wall steel	500	m	C.7.08	1.688	843.8	$ 81.86	$ 40,931	$ 463.00	$ 231,500	$ 2.63	$ 1,316	$ 3.13	1,203	$ 1,564	$ -	$ -	$ 550.62	$275,311		
	2	1	2	10	510		Booster pump pipeline: Supply and install 650mm SDR9 HDPE	2,500	m	C.7.11	1.611	4027.8	$ 76.83	$ 192,083	$ 697.20	$ 1,743,000	$ 4.35	$ 10,882	$ 4.53	8,708	$ 11,321	$ -	$ -	$ 782.91	$1,957,286		
	2	1	3	1	600	Lime addition system	Procure and install lime addition system - Allowance	1	ea.	C.7.05	1779.000	1779.0	$ 86,701.08	$ 86,701	$ 424,000.00	$ 424,000	$ 5,309.31	$ 5,309	$ 4,223.95	3,249	$ 4,224	$ -	$ -	$ 520,234.34	$520,234		
	2	1	4	1	510	Tailings relocation operation	Operate hydraulic monitoring system	24,776,740	m3	C.7.04	0.020	497279.6	$ 0.89	$ 22,129,616	$ 0.26	$ 6,377,286	$ 0.02	$ 392,546	$ 0.01	191,932	$ 249,512	$ 0.27	$ 6,637,375	$ 1.44	$35,786,535		Excludes bottom 2.0m of tailings
	2	1	4	2	510		Operate slurry pumping system	24,776,740	m3	C.7.18	0.008	209380.9	$ 0.42	$ 10,466,045	$ 0.17	$ 8,035,674	$ -	$ -	$ -	0	$ -	$ 0.54	$ 13,348,032	$ 1.01	$31,852,651		
	2	1	4	4	600		Purchase lime and operate lime addition system (qnty = tonnes Ca(OH) eq.)	421,205	tonnes*	C.2.21	0.036	15043.0	$ 1.59	$ 671,520	$ 320.00	$ 134,785,466	$ 1.67	$ 702,732	$ 0.98	317,084	$ 412,209	$ -	$ -	$ 324.24	$136,571,927		Need new estimates of lime requirements from JTC/DDS
	2	1	4	5	510		System decommissioning and removal	1	ls	C.7.02	9509.524	9509.5	$ 441,717.38	$ 441,717	$ -	$ -	$ 30,235.47	$ 30,235	$ 28,047.15	21,575	$ 28,047	$ -	$ -	$ 500,000.00	$500,000		
Excavate contaminated material to Faro Pit																										$62,060,948	
	2	2	1	1	600	Truck contaminated soils to Faro Pit	Construct local access roads	3500	m	C.2.27	0.131	459.4	$ 4.80	$ 16,813	$ -	$ -	$ 10.14	$ 35,501	$ 5.33	14,399	$ 18,640	$ -	$ -	$ 20.27	$70,954		
	2	2	1	2	430		Load, haul, dump remaining contaminated material to Faro Pit	5,734,890	m3	R.111	0.019	111168.6	$ 0.71	$ 4,068,772	$ -	$ -	$ 2.68	$ 15,341,055	$ 1.83	8,082,245	$ 10,506,918	$ -	$ -	$ 5.22	$29,916,746		Excavate bottom 2.0m of tailings + 1.0m of foundation soil
	2	2	1	3	610		Purchase lime and operate lime addition system (qnty = tonnes Ca(OH) eq.)	97,493	tonnes*	C.2.21	0.036	3481.9	$ 1.59	$ 155,432	$ 320.00	$ 31,197,802	$ 1.67	$ 162,656	$ 0.98	73,393	$ 95,411	$ -	$ -	$ 324.24	$31,611,301		
	2	2	1	4	430		Regrade stripped areas for drainage	1,911,630	m2	C.2.18	0.002	4155.7	$ 0.09	$ 152,099	$ -	$ -	$ 0.09	$ 167,235	$ 0.09	125,087	$ 162,613	$ -	$ -	$ 0.25	$481,947		Use remaining dam materials for fill where necessary
Revegetate																										$287,845	
	2	3	1	1	610	Revegetate disturbed areas	Seed/Fertilize, helicopter high application rate	1,911,630	m2	C.5.01	0.000	239.0	$ 0.00	$ 8,582	$ 0.09	$ 173,805	$ 0.05	$ 104,189	$ 0.00	976	$ 1,269	$ -	$ -	$ 0.15	$287,845		
Slurry Thickener Allowance																										$358,874	
	2	4	1	1	610	Construct slurry thickener	Slurry Thickener	1	ls	C.7.19	1178.571	1178.6	$ 67,021.43	$ 67,021	$ 118,600.00	$ 118,600	$ 3,469.24	$ 3,469	$ 2,349.29	1,607	$ 2,349	$ -	$ -	$ 191,439.96	$191,440		
	2	4	1	2	610		Slurry Thickener O/F Pump Box	2	ea.	C.7.20	300.000	600.0	$ 15,665.71	$ 31,331	$ 50,000.00	$ 100,000	$ 642.79	$ 1,286	$ 408.57	629	$ 817	$ -	$ -	$ 50,717.07	$133,434		
	2	4	1	3	610		Slurry Thickener O/F Pump	2	ea.	C.7.21	40.000	80.0	$ 2,000.00	$ 4,000	$ 15,000.00	$ 30,000	$ -	$ -	$ -	0	$ -	$ -	$ -	$ 17,000.00	$34,000		
Tailing cleanups and pipline repair allowance																										$81,950	
	2	5	1	1	430	Assume 1 pipeline failure per year	Excavate, haul, dump spilled tailings to tailings impoundment	9804	m3	C.2.31	0.067	653.6	$ 2.44	$ 23,922	$ -	$ -	$ 2.48	$ 24,305	$ 1.87	14,689	$ 18,315	$ -	$ -	$ 6.79	$66,542		qnty= 1hr of slurry spilled at max flow rate x # of seasons
	2	5	1	2	600		Repair pipeline	60	m	C.3.14	0.300	18.0	$ 16.66	$ 1,000	$ 237.06	$ 14,224	$ 1.40	$ 84	$ 1.67	77	$ 100	$ -	$ -	$ 256.79	$15,408		5m of larges pipeline replaced per yr.
Allowance for short term stop in funding																										$500,000	
	2	6	1	1	600	Cost of mobilization/demobilization		1	ls	C.7.02	9509.524	9509.5	$ 441,717.38	$ 441,717	$ -	$ -	$ 30,235.47	$ 30,235	$ 28,047.15	21,575	$ 28,047	$ -	$ -	$ 500,000.00	$500,000		
Subtotal Direct Costs - Tailings												881,335		$39,586,430		$189,898,923		$17,043,508		8,903,764	$11,574,894		$19,985,407			$277,999,168	
Rose Creek																										$356,277	
Restore Rose Creek																											
	3	1	1	1	600	Maintain entire RCDC	Maintain RCDC during period of tailings relocation and groundwater cleanup	1	ls	-	0.000	0.0	$ -	$ -	$ -	$ -	$ -	$ -	$ -	0	$ -	$ -	$ -	$ -	$0		
	3	1	2	1	430	Redirect flow into thalweg	Breach RCDC downstream of Secondary Dam	41,052	m3	C.2.12	0.024	965.9	$ 0.86	$ 35,353	$ -	$ -	$ 2.00	$ 81,976	$ 0.93	29,446	$ 38,280	$ -	$ -	$ 3.79	$155,609		
	3	1	2	2	430		Breach diversions where stream enter from south	30,000	m3	C.2.12	0.024	705.9	$ 0.86	$ 25,835	$ -	$ -	$ 2.00	$ 59,906	$ 0.93	21,519	$ 27,974	$ -	$ -	$ 3.79	$113,716		
	3	1	2	3	430		Regrade channel and dykes to create stable slopes	76	hrs	C.2.22	1.000	76.3	$ 36.60	$ 2,792	$ -	$ -	$ 173.28	$ 13,216	$ 149.18	8,753	$ 11,378	$ -	$ -	$ 359.06	$27,386		
	3	1	3	1	430	Fish habitat enhancement	Install riffles along restored channel	1,000	m3	C.2.12	0.024	23.5	$ 0.86	$ 861	$ -	$ -	$ 2.00	$ 1,997	$ 0.93	717	$ 932	$ -	$ -	$ 3.79	$3,791		
	3	1	3	2	430		Excavate pools	5,500	m3	C.2.12	0.024	129.4	$ 0.86	$ 4,736	$ -	$ -	$ 2.00	$ 10,983	$ 0.93	3,945	$ 5,129	$ -	$ -	$ 3.79	$20,848		
	3	1	4	1	600	Reclamation	Plant willows along restored stream channel	55,500	m2	C.5.04	0.004	222.0	$ 0.14	$ 7,770	$ 0.40	$ 22,200	$ 0.05	$ 2,894	$ 0.04	1,587	$ 2,063	$ -	$ -	$ 0.63	$34,927		
North Fork Rock Drain																										$1,567,594	
	3	2	1	1	430	Construct ramp up to haul road	Excavate and doze WR material	22,500	m3	R.115	0.028	618.8	$ 1.01	$ 22,646	$ -	$ -	$ 2.59	$ 58,267	$ 1.23	21,299	$ 27,689	$ -	$ -	$ 4.83	$108,602		
	3	2	1	2	430		Grade road	15,000	m2	C.2.18	0.002	32.6	$ 0.08	$ 1,193	$ -	$ -	$ 0.09	$ 1,312	$ 0.09	982	$ 1,276	$ -	$ -	$ 0.25	$3,782		
	3	2	2	1	430	Breach drain	Excavate, load, haul and place breach material in Faro WR Dump	462,357	m3	R.116	0.012	5394.2	$ 0.43	$ 197,426	$ -	$ -	$ 1.65	$ 763,943	$ 1.07	381,124	$ 495,461	$ -	$ -	$ 3.15	$1,456,831		
	3	2	3	1	430	Create channel	Excavate channel	6,104	m3	C.2.12	0.024	143.6	$ 0.86	$ 5,257	$ -	$ -	$ 2.00	$ 12,189	$ 0.93	4,378	$ 5,692	$ -	$ -	$ 3.79	$23,137		
	3	2	3	2	520		Supply and place geotextile	3,924	m2	C.4.06	0.016	62.8	$ 0.57	$ 2,223	$ 3.50	$ 13,734	$ 0.23	$ 896	$ 0.15	449	$ 580	$ -	$ -	$ 4.44	$17,433		
	3	2	3	3	430		Bedding layer: Screen and stockpile	1,177	m3	C.2.02	0.010	11.8	$ 0.37	$ 431	$ -	$ -	$ 1.61	$ 1,894	$ 1.13	1,023	$ 1,330	$ -	$ -	$ 3.10	$3,654		
	3	2	3	4	430		Bedding layer: Load, haul, dump and place	1,177	m3	R.094	0.029	34.3	$ 1.07	$ 1,255	$ -	$ -	$ 2.21	$ 2,600	$ 1.64	938	$ 1,220	$ -	$ -	$ 4.31	$5,074		
	3	2	3	6	430		Rip-rap (angular, high quality): Screen and stockpile	1,962	m3	C.2.25	0.057	112.1	$ 2.09	$ 4,103	$ -	$ -	$ 9.19	$ 18,035	$ 6.45	9,740	$ 12,662	$ -	$ -	$ 17.74	$34,801		
	3	2	3	7	430		Rip-rap: Load, haul, dump	1,962	m3	R.085	0.032	63.4	$ 1.18	$ 2,320	$ -	$ -	$ 2.81	$ 5,513	$ 1.30	1,955	$ 2,541	$ -	$ -	$ 5.29	$10,374		
	3	2	3	8	430		Rip-rap: Place and secure	1,962	m3	C.2.26	0.013	24.5	$ 0.46	$ 898	$ -	$ -	$ 0.89	$ 1,745	$ 0.47	708	$ 920	$ -	$ -	$ 1.82	$3,563		
	3	2	4	1	610	Revegetate disturbed areas	Seed/Fertilize, helicopter high application rate	3270	m2	C.5.02	0.000	0.4	$ 0.00	$ 15	$ 0.05	$ 149	$ 0.05	$ 178	$ 0.00	2	$ 2	$ -	$ -	$ 0.11	$344		
Reconstruction of Rose Creek Allowance																										$210,942	

3	3	3	2	430		Over excavation for placement of floodplain erosion protection	1800	m3	C.2.12	0.024	42.4	$ 0.86	$ 1,550	$ -	$ -	$ 2.00	$ 3,594	$ 0.93	1,291	$ 1,678	$ -	$ -	$ 3.79	$6,823		
3	3	3	3	430		Excavation for residual structure erosion protection	1300	m3	C.2.12	0.024	30.6	$ 0.86	$ 1,120	$ -	$ -	$ 2.00	$ 2,596	$ 0.93	932	$ 1,212	$ -	$ -	$ 3.79	$4,928		
3	3	4	1	430	Place rip-rap	Rip-rap: Drill, blast and stockpile	2600	m3	C.2.23	0.045	117.0	$ 1.62	$ 4,220	$ 15.72	$ 40,872	$ 2.64	$ 6,862	$ 1.36	2,728	$ 3,546	$ -	$ -	$ 21.35	$55,500		
3	3	4	2	430		Rip-rap (angular, high quality): Screen and stockpile	2600	m3	C.2.25	0.057	148.6	$ 2.09	$ 5,438	$ -	$ -	$ 9.19	$ 23,900	$ 6.45	12,007	$ 16,780	$ -	$ -	$ 17.74	$46,117		
3	3	4	3	430		Rip-rap: Load, haul, dump	2600	m3	R.102	0.032	83.2	$ 1.17	$ 3,045	$ -	$ -	$ 2.74	$ 7,122	$ 1.24	2,475	$ 3,218	$ -	$ -	$ 5.15	$13,385		
3	3	4	4	430		Rip-rap: Place and secure	2600	m3	C.2.26	0.013	32.5	$ 0.46	$ 1,190	$ -	$ -	$ 0.89	$ 2,312	$ 0.47	938	$ 1,219	$ -	$ -	$ 1.82	$4,721		
3	3	5	1	430	Place gravel substrate	Gravel: Screen and stockpile	500	m3	C.2.02	0.010	5.0	$ 0.37	$ 183	$ -	$ -	$ 1.61	$ 804	$ 1.13	434	$ 565	$ -	$ -	$ 3.10	$1,552		
3	3	5	2	430		Gravel: Load, haul, dump and place	500	m3	R.113	0.039	19.3	$ 1.41	$ 706	$ -	$ -	$ 3.24	$ 1,620	$ 1.49	572	$ 743	$ -	$ -	$ 6.14	$3,069		
3	3	6	1	430	Removal of cofferdam	Excavate material and spoil locally	1600	m3	C.2.12	0.024	37.6	$ 0.86	$ 1,378	$ -	$ -	$ 2.00	$ 3,195	$ 0.93	1,148	$ 1,492	$ -	$ -	$ 3.79	$6,065		
3	3	7	1	600	Revegetation of riparian area	Revegetation	10000	m2	C.5.04	0.004	40.0	$ 0.14	$ 1,400	$ 0.40	$ 4,000	$ 0.05	$ 521	$ 0.04	266	$ 372	$ -	$ -	$ 0.63	$6,293		
Subtotal Direct Costs - Rose Creek											9,622		$352,455		$80,955		$1,120,799		523,541	$680,604	$0					$2,234,812
Groundwater																												
Collect groundwater below CVD																												$1,457,234
4	1	1	1	500	Groundwater wells	Drill wells (Air Rotary Drill Rig, ~20m depth)	140	m	C.2.09	2.000	280.0	$ 102.13	$ 14,299	$ -	$ -	$ 100.85	$ 14,119	$ 22.08	2,378	$ 3,091	$ -	$ -	$ 225.07	$31,509		
4	1	1	2	500		Install 6" stainless steel well casing & screen	140	m	C.3.17	0.150	21.0	$ 7.66	$ 1,072	$ 232.60	$ 32,564	$ 7.56	$ 1,059	$ 1.66	178	$ 232	$ -	$ -	$ 249.48	$34,927		
4	1	1	3	500		Install 6" Submersible Pump with controls	7	ea.	C.3.07	12.000	84.0	$ 600.00	$ 4,200	$ 6,842.00	$ 47,894	$ -	$ -	$ -	0	$ -	$ -	$ -	$ 7,442.00	$52,094		
4	1	1	4	500		Install protective housing (shack)	7	ea.	C.3.13	20.000	140.0	$ 1,300.00	$ 9,100	$ 445.00	$ 3,115	$ -	$ -	$ -	0	$ -	$ -	$ -	$ 1,745.00	$12,215		
4	1	2	1	430	Pumping station	Excavate sump for manholes	200	m3	C.2.11	0.013	2.7	$ 0.49	$ 98	$ -	$ -	$ 0.95	$ 190	$ 0.50	77	$ 100	$ -	$ -	$ 1.94	$387		
4	1	2	2	500		Supply and place precast concrete manhole	1	ea.	C.3.08	16.000	16.0	$ 746.40	$ 746	$ 1,344.68	$ 1,345	$ 72.47	$ 72	$ 62.92	48	$ 63	$ -	$ -	$ 2,226.47	$2,226		
4	1	2	3	430		Backfill and compact around manhole	200	m3	C.2.01	0.030	6.0	$ 1.08	$ 216	$ -	$ -	$ 0.74	$ 148	$ 0.40	61	$ 79	$ -	$ -	$ 2.22	$443		
4	1	2	4	500		Install primary pump	1	ea.	C.3.10	12.000	12.0	$ 600.00	$ 600	$ 1,829.00	$ 1,829	$ -	$ -	$ -	0	$ -	$ -	$ -	$ 2,429.00	$2,429		
4	1	3	1	610	Piping system	Excavate piping trench	31,200	m3	C.2.13	0.020	624.0	$ 0.73	$ 22,838	$ -	$ -	$ 1.42	$ 44,399	$ 0.75	18,010	$ 23,412	$ -	$ -	$ 2.91	$90,649		
4	1	3	2	510		Supply and install insulated 150mm HDPE pipe	5,200	m	C.3.03	0.250	1300.0	$ 8.75	$ 45,500	$ 155.84	$ 810,368	$ -	$ -	$ -	0	$ -	$ -	$ -	$ 164.59	$855,868		
4	1	3	4	430		Bedding layer: Produce, screen and stockpile	2,028	m3	C.2.02	0.010	20.3	$ 0.37	$ 742	$ -	$ -	$ 1.61	$ 3,263	$ 1.13	1,762	$ 2,290	$ -	$ -	$ 3.10	$6,295		
4	1	3	5	430		Bedding layer: Load, haul, place and compact	2,028	m3	R.102	0.032	64.9	$ 1.17	$ 2,375	$ -	$ -	$ 2.74	$ 5,555	$ 1.24	1,931	$ 2,510	$ -	$ -	$ 5.15	$10,440		
4	1	3	6	430		Backfill ditches	29,172	m3	C.2.01	0.030	875.2	$ 1.08	$ 31,564	$ -	$ -	$ 0.74	$ 21,522	$ 0.40	8,675	$ 11,538	$ -	$ -	$ 2.22	$64,624		
4	1	4	1	510	Heat tracing	Supply and install heat trace in HDPE pipe	5,200	m	C.3.04	0.250	1300.0	$ 12.50	$ 65,000	$ 21.32	$ 110,864	$ -	$ -	$ -	0	$ -	$ -	$ -	$ 33.82	$175,864		
4	1	4	2	510		Supply/install heat tracing power feed kit	4	ea.	C.3.05	4.000	16.0	$ 230.00	$ 920	$ 396.84	$ 1,587	$ -	$ -	$ -	0	$ -	$ -	$ -	$ 626.84	$2,507		
4	1	4	3	510		Supply/install electrical thermostate for heat tracing	1	ea.	C.3.06	1.000	1.0	$ 57.50	$ 58	$ 1,025.00	$ 1,025	$ -	$ -	$ -	0	$ -	$ -	$ -	$ 1,082.50	$1,083		
4	1	5	1	510	Provide Electricity from WTP to pumps	Supply/install treated power poles	39	ea.	C.4.03	4.545	177.3	$ 297.88	$ 11,617	$ 325.96	$ 12,712	$ 85.85	$ 3,348	$ 28.17	845	$ 1,099	$ -	$ -	$ 737.86	$28,776		
4	1	5	2	510		Supply/install overhead conductor	3,000	m	C.4.02	0.032	96.0	$ 2.21	$ 6,630	$ 1.41	$ 4,230	$ 0.45	$ 1,360	$ 0.15	343	$ 446	$ -	$ -	$ 4.22	$12,674		
4	1	5	3	510		Supply/install transformers	4	ea.	C.4.04	20.000	80.0	$ 1,383.00	$ 5,532	$ 8,934.00	$ 35,736	$ 224.98	$ 900	$ 143.00	440	$ 572	$ -	$ -	$ 10,684.98	$42,740		
4	1	6	1	510	Monitoring wells	Drill wells (Air Rotary Drill Rig, ~15m depth)	60	m	C.2.09	2.000	120.0	$ 102.13	$ 6,128	$ -	$ -	$ 100.85	$ 6,051	$ 22.08	1,019	$ 1,325	$ -	$ -	$ 225.07	$13,504		
4	1	6	2	510		Install 6" stainless steel well casing & screen	60	m	C.3.17	0.150	9.0	$ 7.66	$ 460	$ 232.60	$ 13,956	$ 7.56	$ 454	$ 1.66	76	$ 99	$ -	$ -	$ 249.48	$14,969		
4	1	6	3	510		Install protective well cover	3	ea.	C.3.18	1.333	4.0	$ 48.80	$ 146	$ 164.54	$ 494	$ 100.85	$ 303	$ 22.08	51	$ 66	$ -	$ -	$ 336.27	$1,009		
Adaptive Management Phase 1																												$627,394
4	2	1	1	500	Install shallow extraction wells	Construct Access Roads	1168	m	C.2.27	0.131	153.3	$ 4.80	$ 5,611	$ -	$ -	$ 10.14	$ 11,847	$ 5.33	4,785	$ 6,221	$ -	$ -	$ 20.27	$23,678		
4	2	1	2	500		Drill wells (Air Rotary Drill Rig, ~10m depth)	100	m	C.2.09	2.000	200.0	$ 102.13	$ 10,213	$ -	$ -	$ 100.85	$ 10,085	$ 22.08	1,698	$ 2,208	$ -	$ -	$ 225.07	$22,507		
4	2	1	3	500		Install 6" stainless steel well casing & screen	100	m	C.3.17	0.150	15.0	$ 7.66	$ 766	$ 232.60	$ 23,260	$ 7.56	$ 756	$ 1.66	127	$ 166	$ -	$ -	$ 249.48	$24,948		
4	2	1	4	500		Install 6" Submersible Pump with controls	10	ea.	C.3.07	12.000	120.0	$ 600.00	$ 6,000	$ 6,842.00	$ 68,420	$ -	$ -	$ -	0	$ -	$ -	$ -	$ 7,442.00	$74,420		
4	2	1	5	500		Install protective housing (shack)	10	ea.	C.3.13	20.000	200.0	$ 1,300.00	$ 13,000	$ 445.00	$ 4,450	$ -	$ -	$ -	0	$ -	$ -	$ -	$ 1,745.00	$17,450		
4	2	2	1	430	Install piping to CVD collection system	Excavate piping trench	11,730	m3	C.2.13	0.020	234.6	$ 0.73	$ 8,586	$ -	$ -	$ 1.42	$ 16,692	$ 0.75	6,771	$ 8,802	$ -	$ -	$ 2.91	$34,081		
4	2	2	2	510		Supply and install insulated 150mm HDPE pipe	1,955	m	C.3.03	0.250	488.8	$ 8.75	$ 17,106	$ 155.84	$ 304,667	$ -	$ -	$ -	0	$ -	$ -	$ -	$ 164.59	$321,773		
4	2	2	3	430		Bedding layer: Produce, screen and stockpile	762	m3	C.2.02	0.010	7.6	$ 0.37	$ 279	$ -	$ -	$ 1.61	$ 1,227	$ 1.13	662	$ 861	$ -	$ -	$ 3.10	$2,367		
4	2	2	4	430		Bedding Layer: Load, haul, place and compact	762	m3	R.103	0.029	22.2	$ 1.07	$ 813	$ -	$ -	$ 2.45	$ 1,865	$ 1.12	658	$ 856	$ -	$ -	$ 4.63	$3,533		
4	2	2	5	430		Backfill and compact ditches	10,968	m3	C.2.01	0.030	329.0	$ 1.08	$ 11,867	$ -	$ -	$ 0.74	$ 8,091	$ 0.40	3,337	$ 4,338	$ -	$ -	$ 2.22	$24,296		
4	2	2	6	510		Heat Trace: Supply and install heat trace in HDPE pipe	1,955	m	C.3.04	0.250	488.8	$ 12.50	$ 24,438	$ 21.32	$ 41,681	$ -	$ -	$ -	0	$ -	$ -	$ -	$ 33.82	$66,118		
4	2	2	7	510		Heat Trace: Supply/install heat tracing power feed kit	100	ea.	C.3.05	4.000	400.0	$ 230.00	$ 23,000	$ 396.84	$ 39,684	$ -	$ -	$ -	0	$ -	$ -	$ -	$ 626.84	$62,684		
4	2	3	1	500	Provide Electricity from WTP to pumps	Supply/install treated power poles	26	ea.	C.4.03	4.545	118.2	$ 297.88	$ 7,745	$ 325.96	$ 8,475	$ 85.85	$ 2,232	$ 28.17	563	$ 732	$ -	$ -	$ 737.86	$19,184		
4	2	3	2	500		Supply/install overhead conductor	1,955	m	C.4.02	0.032	62.6	$ 2.21	$ 4,326	$ 1.41	$ 2,757	$ 0.45	$ 886	$ 0.15	224	$ 291	$ -	$ -	$ 4.22	$8,260		
4	2	3	3	500		Supply/install transformers	10	ea.	C.4.04	20.000	200.0	$ 1,383.00	$ 13,830	$ 8,934.00	$ 89,340	$ 224.98	$ 2,250	$ 143.00	1,100	$ 1,430	$ -	$ -	$ 10,684.98	$106,850		
4	2	4	1	500	Monitoring wells	Drill wells (Air Rotary Drill Rig, ~10m depth)	30	m	C.2.09	2.000	60.0	$ 102.13	$ 3,064	$ -	$ -	$ 100.85	$ 3,026	$ 22.08	510	$ 662	$ -	$ -	$ 225.07	$6,752		
4	2	4	2	500		Install 6" stainless steel well casing & screen	30	m	C.3.17	0.150	4.5	$ 7.66	$ 230	$ 232.60	$ 6,978	$ 7.56	$ 227	$ 1.66	38	$ 50	$ -	$ -	$ 249.48	$7,484		
4	2	4	3	500		Install protective well cover	3	ea.	C.3.18	1.333	4.0	$ 48.80	$ 146	$ 164.54	$ 494	$ 100.85	$ 303	$ 22.08	51	$ 66	$ -	$ -	$ 336.27	$1,009		
Adaptive Management Phase 2																												$411,156
4	3	1	1	500	Install shallow extraction wells	Construct Access Roads	584	m	C.2.27	0.131	76.7	$ 4.80	$ 2,805	$ -	$ -	$ 10.14	$ 5,924	$ 5.33	2,393	$ 3,110	$ -	$ -	$ 20.27	$11,839		
4	3	1	2	500		Drill wells (Air Rotary Drill Rig, ~10m depth)	50	m	C.2.09	2.000	100.0	$ 102.13	$ 5,107	$ -	$ -	$ 100.85	$ 5,043	$ 22.08	849	$ 1,104	$ -	$ -	$ 225.07	$11,253		
4	3	1	3	500		Install 6" stainless steel well casing & screen	50	m	C.3.17	0.150	7.5	$ 7.66	$ 383	$ 232.60	$ 11,630	$ 7.56	$ 378	$ 1.66	64	$ 83	$ -	$ -	$ 249.48	$12,474		
4	3	1	4	500		Install 6" Submersible Pump with controls	5	ea.	C.3.07	12.000	60.0	$ 600.00	$ 3,000	$ 6,842.00	$ 34,210	$ -	$ -	$ -	0	$ -	$ -	$ -	$ 7,442.00	$37,210		
4	3	1	5	500		Install protective housing (shack)	5	ea.	C.3.13	20.000	100.0	$ 1,300.00	$ 6,500	$ 445.00	$ 2,225	$ -	$ -	$ -	0	$ -	$ -	$ -	$ 1,745.00	$8,725		
4	3	2	1	430	Install piping to CVD collection system	Excavate piping trench	5,865	m3	C.2.13	0.020	117.3	$ 0.73	$ 4,293	$ -	$ -	$ 1.42	$ 8,346	$ 0.75	3,385	$ 4,401	$ -	$ -	$ 2.91	$17,040		
4	3	2	2	510		Supply and install insulated 150mm HDPE pipe	978	m	C.3.03	0.250	244.4	$ 8.75	$ 8,553	$ 155.84	$ 152,334	$ -	$ -	$ -	0	$ -	$ -	$ -	$ 164.59	$160,887		
4	3	2	3	430		Bedding layer: Produce, screen and stockpile	381	m3	C.2.02	0.010	3.8	$ 0.37	$ 140	$ -	$ -	$ 1.61	$ 613	$ 1.13	331	$ 431	$ -	$ -	$ 3.10	$1,183		
4	3	2	4	430		Bedding Layer: Load, haul, place and compact	381	m3	R.103	0.029	11.1	$ 1.07	$ 406	$ -	$ -	$ 2.45	$ 932	$ 1.12	329	$ 428	$ -	$ -	$ 4.63	$1,767		
4	3	2	5	430		Backfill and compact ditches	5,484	m3	C.2.01	0.030	164.5	$ 1.08	$ 5,933	$ -	$ -	$ 0.74	$ 4,046	$ 0.40	1,668	$ 2,169	$ -	$ -	$ 2.22	$12,148		
4	3	2	6	510		Heat Trace: Supply and install heat trace in HDPE pipe	978	m	C.3.04	0.250	244.4	$ 12.50	$ 12,219	$ 21.32	$ 20,840	$ -	$ -	$ -	0	$ -	$ -	$ -	$ 33.82	$33,059		
4	3	2	7	510		Heat Trace: Supply/install heat tracing power feed kit	50	ea.	C.3.05	4.000	200.0	$ 230.00	$ 11,500	$ 396.84	$ 19,842	$ -	$ -	$ -	0	$ -	$ -	$ -	$ 626.84	$31,342		
4	3	3	1	500	Provide Electricity from WTP to pumps	Supply/install treated power poles	13	ea.	C.4.03	4.545	59.1	$ 297.88	$ 3,672	$ 325.96	$ 4,237	$ 85.85	$ 1,116	$ 28.17	282	$ 366	$ -	$ -	$ 737.66	$9,592		
4	3	3	2	500		Supply/install overhead conductor	978	m	C.4.02	0.032	31.3	$ 2.21	$ 2,163	$ 1.41	$ 1,378	$ 0.45	$ 443	$ 0.15	112	$ 145	$ -	$ -	$ 4.22	$4,130		
4	3	3	3	500		Supply/install transformers	5	ea.	C.4.04	20.000	100.0	$ 1,383.00	$ 6,915	$ 8,934.00	$ 44,670	$ 224.98	$ 1,125	$ 143.00	550	$ 715	$ -	$ -	$ 10,684.98	$53,425		
4	3	4	1	500	Monitoring wells	Drill wells (Air Rotary Drill Rig, ~10m depth)	10	m	C.2.09	2.000	20.0	$ 102.13	$ 1,021	$ -	$ -	$ 100.85	$ 1,009	$ 22.08	170	$ 221	$ -	$ -	$ 225.07	$2,251		
4	3	4	2	500		Install 6" stainless steel well casing & screen	10	m	C.3.17	0.150	1.5	$ 7.66	$ 77	$ 232.60	$ 2,326	$ 7.56	$ 76	$ 1.66	13	$ 17	$ -	$ -	$ 249.48	$2,495		
4	3	4	3	500		Install protective well cover	1	ea.	C.3.18	1.333	1.3	$ 48.80	$ 49	$ 164.54	$ 165	$ 100.85	$ 101	$ 22.08	17	$ 22	$ -	$ -	$ 336.27	$336		
Adaptive Management Phase 3																												$168,102
4	4	1	1	500	Install shallow extraction wells	Construct Access Roads	234	m	C.2.27	0.131	30.7	$ 4.80	$ 1,122	$ -	$ -	$ 10.14	$ 2,369	$ 5.33	957	$ 1,244	$ -	$ -	$ 20.27	$4,736		
4	4	1	2	500		Drill wells (Air Rotary Drill Rig, ~10m depth)	20	m	C.2.09	2.000	40.0	$ 102.13	$ 2,043	$ -	$ -	$ 100.85	$ 2,017	$ 22.08	340	$ 442	$ -	$ -	$ 225.07	$4,501		
4	4	1	3	500		Install 6" stainless steel well casing & screen	20	m	C.3.17	0.150	3.0	$ 7.66	$ 153	$ 232.60	$ 4,652	$ 7.56	$ 151	$ 1.66	25	$ 33	$ -	$ -	$ 249.48	$4,990		
4	4	1	4	500		Install 6" Submersible Pump with controls	2	ea.	C.3.07	12.000	24.0	$ 600.00	$ 1,200	$ 6,842.00	$ 13,684	$ -	$ -	$ -	0	$ -	$ -	$ -	$ 7,442.00	$14,884		
4	4	1	5	500		Install protective housing (shack)	2	ea.	C.3.13	20.000	40.0	$ 1,300.00	$ 2,600	$ 445.00	$ 890	$ -	$ -	$ -	0	$ -	$ -	$ -	$ 1,745.00	$3,490		
4	4	2	1	430	Install piping to CVD collection system	Excavate piping trench	2,346	m3	C.2.13	0.020	46.9	$ 0.73	$ 1,717	$ -	$ -	$ 1.42	$ 3,338	$ 0.75	1,354	$ 1,760	$ -	$ -	$ 2.91	$6,816		
4	4	2	2	510		Supply and install insulated 150mm HDPE pipe	391	m	C.3.03	0.250	97.8	$ 8.75	$ 3,421	$ 155.84	$ 60,933	$ -	$ -	$ -	0	$ -	$ -	$ -	$ 164.59	$64,355		
4	4	2	3	430		Bedding layer: Produce, screen and stockpile	152	m3	C.2.02	0.010	1.5	$ 0.37	$ 56	$ -	$ -	$ 1.61	$ 245	$ 1.13	132	$ 172	$ -	$ -	$ 3.10	$473		
4	4	2	4	430		Bedding Layer: Load, haul, place and compact	152	m3	R.103	0.029	4.4	$ 1.07	$ 163	$ -	$ -	$ 2.45	$ 373	$ 1.12	132	$ 171	$ -	$ -	$ 4.63	$707		
4	4	2	5	430		Backfill and compact ditches	2,194	m3	C.2.01	0.030	65.8	$ 1.08	$ 2,373	$ -	$ -	$ 0.74	$ 1,618	$ 0.40	667	$ 868	$ -	$ -	$ 2.22	$4,859		
4	4	2	6	510		Heat Trace: Supply and install heat trace in HDPE pipe	391	m	C.3.04	0.250	97.8	$ 12.50	$ 4,888	$ 21.32	$ 8,336	$ -	$ -	$ -	0	$ -	$ -	$ -	$ 33.82	$13,224		
4	4	2	7	510		Heat Trace: Supply/install heat tracing power feed kit	20	ea.	C.3.05	4.000	80.0	$ 230.00	$ 4,600	$ 396.84	$ 7,937	$ -	$ -	$ -	0	$ -	$ -	$ -	$ 626.84	$12,537		
4	4	3	1	500	Provide Electricity from WTP to pumps	Supply/install treated power poles	6	ea.	C.4.03	4.545	27.3	$ 297.88	$ 1,767	$ 325.96	$ 1,956	$ 85.85	$ 515	$ 28.17	130	$ 169	$ -	$ -	$ 737.86	$4,427		
4	4	3	2	500		Supply/install overhead conductor	391	m	C.4.02	0.032	12.5	$ 2.21	$ 865	$ 1.41	$ 551	$ 0.45	$ 177	$ 0.15	45	$ 58	$ -	$ -	$ 4.22	$1,652		
4	4	3	3	500		Supply/install transformers	2	ea.	C.4.04	20.000	40.0	$ 1,383.00	$ 2,766	$ 8,934.00	$ 17,868	$ 224.98	$ 450	$ 143.00	220	$ 286	$ -	$ -	$ 10,684.98	$21,370		
4	4	4	1	500	Monitoring wells	Drill wells (Air Rotary Drill Rig, ~10m depth)	10	m	C.2.09	2.000	20.0	$ 102.13	$ 1,021	$ -	$ -	$ 100.85	$ 1,009	$ 22.08	170	$ 221	$ -	$ -	$ 225.07	$2,251		
4	4	4	2	500		Install 6" stainless steel well casing & screen	10	m	C.3.17	0.150	1.5	$ 7.66	$ 77	$ 232.60	$ 2,326	$ 7.56	$ 76	$ 1.66	13	$ 17	$ -	$ -	$ 249.48	$2,495		
4	4	4	3	500		Install protective well cover	1	ea.	C.3.18	1.333	1.3	$ 48.80	$ 49	$ 164.54	$ 165	$ 100.85	$ 101	$ 22.08	17	$ 22	$ -	$ -	$ 336.27	$336		
Subtotal Direct Costs - Groundwater Collection											10,535		$486,708		$2,081,079		$203,819		70,984	$92,279	$0					$2,863,885
Miscellaneous																												
Reclaim unnecessary roads																												$2,143
6	1	1	1		Reclaim unnecessary roads	Scarify road surfaces	6,000	m2	C.2.18	0.002	13.0	$ 0.08	$ 477	$ -	$ -	$ 0.09	$ 525	$ 0.09	393	$ 510	$ -	$ -	$ 0.25	$1,513		
6	1	1	2			Seed/Fertilize, helicopter low application rate	6,000	m2	C.5.02	0.000	0.8	$ 0.00	$ 27	$ 0.05	$ 273	$ 0.05	$ 327	$ 0.00	3	$ 4	$ -	$ -	$ 0.11	$631		
Subtotal Direct Costs - Miscellaneous											14		$504		$273		$852		396	$514	$0					$2,143
Subtotal Direct Costs																												
						Subtotal direct costs					915,571		$40,939,945		$192,223,463		$19,914,655		10,185,844	$13,241,597		$19,985,407				$286,305,066
CLOSURE COSTS - INDIRECT																												
100	100	1	1		Project Management	5.0% of direct costs																$ 286,305,066	x	5.0%		$14,315,253	
100	100	2	1		Field Supervision	(included in major tasks)																				$0	
100	100	3	1		Contractor profit and home office overhead	10% of direct costs																$ 286,305,066	x	10.0%		$28,630,507	
100	100	4	1		Insurance	0.5% of direct costs																$ 286,305,066	x	0.5%		$1,431,525	
100	100	5	1		Bonding	0.5% of direct costs																$ 286,305,066	x	0.5%		$1,431,525	
100	100	6	1		Field Engineering and QA	10% of direct costs																$ 286,305,066	x	10.0%		$28,630,507	
100	100	7	1		Mob - Demob																	1	lump	$500,000		$500,000	
100	100	8	1		Living out allowances	(included in heavy equipment costs)																				$0	
Subtotal Indirect Costs																												
						Subtotal indirect costs																						$74,939,317
CLOSURE COSTS - CONTINGENCY																												
						Contingency																$286,305,066	x	20.0%		$57,261,013	
CLOSURE COSTS - TOTAL																												
						Total direct and indirect costs																						$418,505,397

Tailings Alternative 3 - Partial Relocation

Contract Code	Work Area Code	Item	Task	Sub-task	Estimate Type	Task	Activity	Quantity	Unit	Cost Code	Unit Mhrs	Total Mhrs	Labour Rate	Labour Cost	Unit Matl	Material Cost	Unit Equip.	Equipment Cost	Unit Fuel	Fuel Consumed (L)	Fuel Cost	Power Rate ($/Unit)	Power Cost	Unit Cost	Activity Total	Subtotals	Source / Comments
CLOSURE COSTS - DIRECT CAPITAL																											
Dams																											
Cross Valley Dam																										$1,622,884	
	1	1	1	600		Remove pond	Pump pond water to discharge	140	days	C.3.11	2.410	337.3	$ 84.34	$ 11,807	$ -	$ -	$ 130.72	$ 18,301	$ 40.72	4,386	$ 5,701	$ -	$ -	$ 255.78	$35,810		
	1	1	3	1	430	Remove contaminated soil	Excavate, load, haul and place contaminated soils to mill area	322,650	m3	R.096	0.014	4360.1	$ 0.49	$ 159,581	$ -	$ -	$ 1.88	$ 606,165	$ 1.22	392,786	$ 393,622	$ -	$ -	$ 3.60	$1,161,368		
	1	1	4	1	430	Prepare spoil area	Clear and grub	1,000	m2	C.2.05	0.015	14.5	$ 0.53	$ 532	$ -	$ -	$ 0.94	$ 935	$ 0.62	475	$ 617	$ -	$ -	$ 2.08	$2,084		
	1	1	4	2	430		Prepare access roads	200	m	C.2.12	0.131	26.3	$ 4.80	$ 961	$ -	$ -	$ 10.14	$ 2,029	$ 5.33	819	$ 1,069	$ -	$ -	$ 20.27	$4,055		
	1	1	5	1	430	Breach Dam	Excavate, load, haul and dump at pit	72,500	m3	R.095	0.020	1469.6	$ 0.74	$ 53,787	$ -	$ -	$ 2.79	$ 202,536	$ 1.81	100,671	$ 130,872	$ -	$ -	$ 5.34	$387,196		
	1	1	7	1	610	Revegetate dam footprint and impoundment	Seed/Fertilize, helicopter high application rate	214,983	m2	C.5.01	0.000	26.9	$ 0.00	$ 965	$ 0.09	$ 19,546	$ 0.05	$ 11,717	$ 0.00	110	$ 143	$ -	$ -	$ 0.15	$32,371		
Breach Intermediate Dam																										$518,955	
	1	2	1	1	430	Prepare spoil area	Clear and grub	1000	m2	C.2.05	0.015	14.5	$ 0.53	$ 532	$ -	$ -	$ 0.94	$ 935	$ 0.62	475	$ 617	$ -	$ -	$ 2.08	$2,084		
	1	2	1	2	430		Prepare access roads	300	m	C.2.27	0.131	39.4	$ 4.80	$ 1,441	$ -	$ -	$ 10.14	$ 3,043	$ 5.33	1,229	$ 1,596	$ -	$ -	$ 20.27	$6,082		
	1	2	2	1	430	Breach dam	Excavate, load, haul and dump breach material	72,500	m3	C.2.12	0.024	1705.9	$ 0.86	$ 62,435	$ -	$ -	$ 2.00	$ 144,774	$ 0.93	52,003	$ 67,604	$ -	$ -	$ 3.79	$274,813		
	1	2	3	1	430	Create channel	Excavate channel	5,200	m3	C.2.12	0.024	122.4	$ 0.86	$ 4,478	$ -	$ -	$ 2.00	$ 10,384	$ 0.93	3,730	$ 4,849	$ -	$ -	$ 3.79	$19,711		
	1	2	3	2	510		Supply and place geotextile	1,300	m2	C.4.06	0.016	20.8	$ 0.57	$ 736	$ 3.50	$ 4,550	$ 0.23	$ 297	$ 0.15	148	$ 192	$ -	$ -	$ 4.44	$5,775		
	1	2	3	3	430		Bedding layer: Screen and stockpile	500	m3	C.2.02	0.010	5.0	$ 0.37	$ 183	$ -	$ -	$ 1.61	$ 804	$ 1.13	434	$ 565	$ -	$ -	$ 3.10	$1,552		
	1	2	3	4	430		Bedding layer: Load, haul, dump and place	500	m3	R.099	0.029	14.6	$ 1.07	$ 533	$ -	$ -	$ 2.45	$ 1,223	$ 1.12	432	$ 561	$ -	$ -	$ 4.63	$2,317		
	1	2	3	5	430		Rip-rap: Drill, blast and stockpile	4,600	m3	C.2.23	0.045	207.0	$ 1.62	$ 7,466	$ 15.72	$ 72,312	$ 2.64	$ 12,141	$ 1.36	4,826	$ 6,273	$ -	$ -	$ 21.35	$98,192		
	1	2	3	6	430		Rip-rap (angular, high quality): Screen and stockpile	4,600	m3	C.2.25	0.057	262.9	$ 2.09	$ 9,621	$ -	$ -	$ 9.19	$ 42,284	$ 6.45	22,836	$ 29,687	$ -	$ -	$ 17.74	$81,592		
	1	2	3	7	430		Rip-rap: Load, haul, dump	4,600	m3	R.100	0.023	103.5	$ 0.82	$ 3,788	$ -	$ -	$ 2.00	$ 9,190	$ 0.94	3,343	$ 4,346	$ -	$ -	$ 3.77	$17,324		
	1	2	3	8	430		Rip-rap: Place and secure	4,600	m3	C.2.26	0.013	57.5	$ 0.46	$ 2,105	$ -	$ -	$ 0.89	$ 4,091	$ 0.47	1,660	$ 2,157	$ -	$ -	$ 1.82	$8,353		
	1	2	4	1	610	Revegetate disturbed areas	Seed/Fertilize, helicopter high application rate	7700	m2	C.5.01	0.000	1.0	$ 0.00	$ 35	$ 0.09	$ 700	$ 0.05	$ 420	$ 0.00	4	$ 5	$ -	$ -	$ 0.15	$1,159		
Secondary Dam																										$8,045,056	
	1	3	1	1	430	Ground densification (East Limb)	Gravel: supply and stockpile locally	2,339	m3	C.2.02	0.010	23.4	$ 0.37	$ 856	$ -	$ -	$ 1.61	$ 3,762	$ 1.13	2,032	$ 2,641	$ -	$ -	$ 3.10	$7,260		
	1	3	1	2	430		Gravel: load, haul, place	2,339	m3	R.098	0.023	53.0	$ 0.83	$ 1,939	$ -	$ -	$ 1.97	$ 4,606	$ 0.91	1,634	$ 2,124	$ -	$ -	$ 3.71	$8,668		
	1	3	1	3	510		Drill vibro-replacement stone columns	26,800	m3	C.9.01	0.267	7146.7	$ 12.55	$ 336,251	$ -	$ -	$ 6.80	$ 182,352	$ 4.37	90,117	$ 117,152	$ -	$ -	$ 23.72	$635,754		
	1	3	1	4	600		Verification testing	1	ls	C.9.02	530.639	530.6	$ 37,845.16	$ 37,845	$ -	$ -	$ 9,410.91	$ 9,411	$ 2,743.93	2,111	$ 2,744	$ -	$ -	$ 50,000.00	$50,000		
	1	3	2	1	430	Ground densification (West Limb)	Construct Workpad	68,075	m3	C.2.12	0.024	2072.4	$ 0.86	$ 75,848	$ -	$ -	$ 2.00	$ 175,675	$ 0.93	63,175	$ 82,127	$ -	$ -	$ 3.79	$333,651		
	1	3	2	2	430		Gravel: supply and stockpile locally	24,796	m3	C.2.02	0.010	248.0	$ 0.37	$ 9,075	$ -	$ -	$ 1.61	$ 39,888	$ 1.13	21,542	$ 28,005	$ -	$ -	$ 3.10	$76,968		
	1	3	2	3	430		Gravel: load, haul, place	24,796	m3	R.101	0.036	892.7	$ 1.32	$ 32,671	$ -	$ -	$ 3.02	$ 74,978	$ 1.39	26,468	$ 34,408	$ -	$ -	$ 5.73	$142,057		
	1	3	2	4	510		Drill vibro-replacement stone columns	284,144	m3	C.9.01	0.267	75771.6	$ 12.55	$ 3,565,054	$ -	$ -	$ 6.80	$ 1,933,359	$ 4.37	955,451	$ 1,242,086	$ -	$ -	$ 23.72	$6,740,499		
	1	3	2	5	600		Verification testing	1	ls	C.9.02	530.639	530.6	$ 37,845.16	$ 37,845	$ -	$ -	$ 9,410.91	$ 9,411	$ 2,743.93	2,111	$ 2,744	$ -	$ -	$ 50,000.00	$50,000		
Subtotal Direct Costs - Dams												**96,058**		**$4,418,370**		**$97,108**		**$3,506,912**		**1,665,005**	**$2,164,506**		**$0**			**$10,186,897**	
Tailings																											
Pump Intermediate Tailings to Faro Pit																										$91,920,929	
	2	1	1	1	510	Hydraulic monitoring system	Pumps: Supply and install Vertical Turbine Pump	3	ea.	C.7.15	105.000	315.0	$ 5,483.00	$ 16,449	$ 100,000.00	$ 300,000	$ 224.98	$ 675	$ 143.00	330	$ 429	$ -	$ -	$ 105,850.98	$317,553		
	2	1	1	2	510		Pipelines: Primary pipeline 24" sched. 20 steel	3,500	m	C.7.09	1.611	5638.9	$ 76.83	$ 268,917	$ 237.06	$ 829,710	$ 4.35	$ 15,235	$ 4.53	12,192	$ 15,849	$ -	$ -	$ 322.77	$1,129,710		1CD003.041
	2	1	1	3	510		Pipelines: Secondary pipeline 16" sched. 20 steel	2,000	m	C.7.07	0.773	1545.5	$ 35.59	$ 71,182	$ 153.28	$ 306,560	$ 3.56	$ 7,123	$ 3.71	5,700	$ 7,410	$ -	$ -	$ 196.14	$392,275		
	2	1	1	4	510		Pipelines: Tertiary pipeline 8" sched. 20 steel	2,000	m	C.7.06	0.367	733.3	$ 18.99	$ 37,987	$ 66.95	$ 133,900	$ 1.40	$ 2,808	$ 1.67	2,567	$ 3,337	$ -	$ -	$ 69.02	$178,031		
	2	1	1	5	510		Hydraulic monitors: Supply and install	9	ea.	C.7.03	55.000	495.0	$ 3,263.00	$ 29,547	$ 139,444.22	$ 1,254,998	$ 159.74	$ 1,438	$ 185.90	1,287	$ 1,673	$ -	$ -	$ 143,072.86	$1,287,655		
	2	1	1	6	510		Mobile equipment: Purchase	1	ls	M.30	0.000	0.0	$ -	$ -	$ 1,020,000.00	$ 1,020,000	$ -	$ -	$ -	0	$ -	$ -	$ -	$ 1,020,000.00	$1,020,000		
	2	1	2	1	510	Slurry pumping system	Sump Pump: Supply and install	4	ea.	C.7.16	87.027	348.0	$ 1,096.66	$ 4,386	$ 75,000.00	$ 300,000	$ 5.88	$ 24	$ 18.59	57	$ 74	$ -	$ -	$ 76,121.07	$304,484		
	2	1	2	2	510		Sump Pump: Supply and install support structure	1	ea.	C.7.16	87.027	87.0	$ 3,892.42	$ 3,892	$ 95,000.00	$ 95,000	$ 678.72	$ 679	$ 428.86	330	$ 429	$ -	$ -	$ 100,000.00	$100,000		
	2	1	2	3	510		Slurry booster pumps: supply and install	4	ea.	C.7.13	105.000	420.0	$ 5,483.00	$ 21,932	$ 175,000.00	$ 700,000	$ 29.38	$ 118	$ 92.95	286	$ 372	$ -	$ -	$ 180,605.33	$722,421		
	2	1	2	4	510		Pump station: supply and install	1	ea.	C.7.17	81.769	81.8	$ 4,024.29	$ 4,024	$ 200,000.00	$ 200,000	$ 537.66	$ 538	$ 438.03	337	$ 438	$ -	$ -	$ 205,000.00	$205,000		
	2	1	2	5	510		Trash screen and support: supply and install	1	ea.	C.7.22	188.679	188.7	$ 10,000.00	$ 10,000	$ 500,000.00	$ 500,000	$ -	$ -	$ -	0	$ -	$ -	$ -	$ 510,000.00	$510,000		
	2	1	2	6	510		Booster pump box and support: Supply and install	1	ea.	C.7.01	73.122	73.1	$ 3,675.61	$ 3,676	$ 75,000.00	$ 75,000	$ 867.13	$ 867	$ 457.26	352	$ 457	$ -	$ -	$ 80,000.00	$80,000		
	2	1	2	7	510		Gland water pumps: supply and install	3	ea.	C.7.12	105.000	315.0	$ 5,483.00	$ 16,449	$ 6,000.00	$ 18,000	$ 29.38	$ 88	$ 92.95	215	$ 279	$ -	$ -	$ 11,695.33	$34,616		
	2	1	2	8	510		Sump pump pipeline: Supply and install 300mm HDPE	6,000	m	C.7.10	0.325	1950.0	$ 15.92	$ 95,499	$ 140.75	$ 844,500	$ 0.15	$ 882	$ 0.46	2,145	$ 2,769	$ -	$ -	$ 157.28	$943,669		
	2	1	2	9	510		Booster pump pipeline: Supply and install 550mm standard wall steel	500	m	C.7.08	1.688	843.8	$ 81.86	$ 40,931	$ 463.00	$ 231,500	$ 2.63	$ 1,316	$ 3.13	1,203	$ 1,564	$ -	$ -	$ 550.62	$275,311		
	2	1	2	10	510		Booster pump pipeline: Supply and install 650mm SDR9 HDPE	2,500	m	C.7.11	1.611	4027.8	$ 76.63	$ 192,083	$ 697.20	$ 1,743,000	$ 4.35	$ 10,882	$ 4.53	8,708	$ 11,321	$ -	$ -	$ 782.91	$1,957,286		
	2	1	3	1	600	Lime addition system	Procure and install lime addition system - Allowance	1	ea.	C.7.05	1779.000	1779.0	$ 86,701.08	$ 86,701	$ 424,000.00	$ 424,000	$ 5,309.31	$ 5,309	$ 4,223.95	3,249	$ 4,224	$ -	$ -	$ 520,234.34	$520,234		
	2	1	4	1	510	Tailings relocation operation	Operate hydraulic monitoring system	9,881,340	m3	C.7.04	0.020	198322.7	$ 0.89	$ 8,825,707	$ 0.26	$ 2,543,358	$ 0.02	$ 156,553	$ 0.01	76,546	$ 99,509	$ 0.27	$ 2,647,086	$ 1.44	$14,272,213		
	2	1	4	2	510		Operate slurry pumping system	9,881,340	m3	C.7.18	0.008	83504.3	$ 0.42	$ 4,175,214	$ 0.32	$ 3,204,709	$ -	$ -	$ -	0	$ -	$ 0.54	$ 5,323,396	$ 1.29	$12,703,321		
	2	1	4	3	600		Purchase lime and operate lime addition system (qnty = tonnes Ca(OH) eq.)	167,963	tonnes*	C.2.21	0.036	5999.4	$ 1.59	$ 267,813	$ 320.00	$ 53,754,490	$ 1.67	$ 280,260	$ 0.98	126,458	$ 164,395	$ -	$ -	$ 324.24	$54,466,957		
	2	1	4	4	510		System decommissioning and removal	1	ls	C.7.02	9509.524	9509.5	$ 441,717.38	$ 441,717	$ -	$ -	$ 30,235.47	$ 30,235	$ 28,047.15	21,575	$ 28,047	$ -	$ -	$ 500,000.00	$500,000		
Excavate contaminated material to Faro Pit																										$32,781,477	
	2	2	1	1	600	Truck contaminated soils to Faro Pit	Construct local access roads	2000	m	C.2.27	0.131	262.6	$ 4.80	$ 9,608	$ -	$ -	$ 10.14	$ 20,286	$ 5.33	8,194	$ 10,652	$ -	$ -	$ 20.27	$40,545		
	2	2	1	2	430		Load, haul, dump remaining contaminated material to Faro Pit	3,027,990	m3	R.111	0.019	58696.4	$ 0.71	$ 2,148,289	$ -	$ -	$ 2.68	$ 8,099,992	$ 1.83	4,267,360	$ 5,547,594	$ -	$ -	$ 5.22	$15,795,875		
	2	2	1	3	600		Purchase lime and operate lime addition system (qnty = tonnes Ca(OH) eq.)	51,476	tonnes*	C.2.21	0.036	1838.4	$ 1.59	$ 82,067	$ 320.00	$ 16,472,266	$ 1.67	$ 85,882	$ 0.98	38,751	$ 50,376	$ -	$ -	$ 324.24	$16,690,591		
	2	2	1	4	430		Regrade stripped areas for drainage	1,009,330	m2	C.2.16	0.002	2194.2	$ 0.08	$ 80,308	$ -	$ -	$ 0.09	$ 88,299	$ 0.09	66,045	$ 85,859	$ -	$ -	$ 0.25	$254,466		Use remaining dam materials for fill where necessary
Revegetate Intermediate Tailings																										$151,981	
	2	3	1	1	610	Revegetate disturbed areas	Seed/Fertilize, helicopter high application rate	1,009,330	m2	C.5.01	0.000	126.2	$ 0.00	$ 4,531	$ 0.09	$ 91,768	$ 0.05	$ 55,011	$ 0.00	516	$ 670	$ -	$ -	$ 0.15	$151,981		
Secondary & Original Impoundment Tailings Cover																										$22,910,177	
	2	4	1	1	600	Upgrade Roads	Upgrade road from tailings area to waste rock source	935	m	C.2.28	0.225	210.4	$ 8.24	$ 7,700	$ -	$ -	$ 29.67	$ 27,745	$ 19.48	14,012	$ 18,216	$ -	$ -	$ 57.39	$53,661		
	2	4	1	2	600		Construct new access road where necessary	1,000	m	C.2.27	0.131	131.3	$ 4.80	$ 4,804	$ -	$ -	$ 10.14	$ 10,143	$ 5.33	4,097	$ 5,326	$ -	$ -	$ 20.27	$20,273		
	2	4	2	1	430	Cover Tailings	Waste Rock (0.5m): Load, haul dump to tailing impoundment edge	451,150	m3	R.109	0.016	7382.5	$ 0.60	$ 270,198	$ -	$ -	$ 2.26	$ 1,018,764	$ 1.55	536,723	$ 697,740	$ -	$ -	$ 4.40	$1,986,703		360.92
	2	4	2	2	430		Waste Rock (0.5m): Use small equipment to place on tailings	451,150	m3	R.106	0.021	9305.0	$ 0.75	$ 340,562	$ -	$ -	$ 1.51	$ 681,087	$ 0.67	231,443	$ 300,876	$ -	$ -	$ 2.93	$1,322,525		
	2	4	2	3	430		Till (1.5m): Load, haul dump to tailing impoundment edge	1,353,450	m3	R.110	0.039	53292.1	$ 1.44	$ 1,950,491	$ -	$ -	$ 5.43	$ 7,354,205	$ 3.72	3,874,472	$ 5,036,813	$ -	$ -	$ 10.60	$14,341,509		
	2	4	2	4	430		Till (1.5m): Use small equipment to place on tailings	1,353,450	m3	R.106	0.026	35528.1	$ 0.96	$ 1,300,327	$ -	$ -	$ 1.92	$ 2,600,515	$ 0.98	883,692	$ 1,148,800	$ -	$ -	$ 3.73	$5,049,642		
	2	4	3	1	610	Revegetate till-covered areas	Seed/Fertilize, helicopter high application rate	902,300	m2	C.5.01	0.000	112.8	$ 0.00	$ 4,051	$ 0.09	$ 82,037	$ 0.05	$ 49,178	$ 0.00	461	$ 599	$ -	$ -	$ 0.15	$135,865		
Slurry Thickener Allowance																										$358,874	
	2	5	1	1	610	Construct slurry thickener	Slurry Thickener	1	ls	C.7.19	1178.571	1178.6	$ 67,021.43	$ 67,021	$ 118,600.00	$ 118,600	$ 3,469.24	$ 3,469	$ 2,349.29	1,807	$ 2,349	$ -	$ -	$ 191,439.96	$191,440		
	2	5	1	2	610		Slurry Thickener O/F Pump Box	2	ea.	C.7.20	300.000	600.0	$ 15,665.71	$ 31,331	$ 50,000.00	$ 100,000	$ 642.79	$ 1,286	$ 408.57	629	$ 817	$ -	$ -	$ 66,717.07	$133,434		
	2	5	1	3	610		Slurry Thickener O/F Pump	2	ea.	C.7.21	40.000	80.0	$ 2,000.00	$ 4,000	$ 15,000.00	$ 30,000	$ -	$ -	$ -	0	$ -	$ -	$ -	$ 17,000.00	$34,000		
Tailing cleanups and pipline repair allowance																										$34,148	
	2	6	1	1	430	Assume 1 pipeline failure per year	Excavate, haul, dump spilled tailings to tailings impoundment	4085	m3	C.2.31	0.067	272.3	$ 2.44	$ 9,967	$ -	$ -	$ 2.48	$ 10,127	$ 1.87	5,870	$ 7,631	$ -	$ -	$ 6.79	$27,726		qnay= 1hr of slurry spilled at max flow rate x # of seasons
	2	6	1	2	600		Repair pipeline	25	m	C.3.14	0.300	7.5	$ 16.66	$ 417	237.06	$ 5,927	$ 1.40	$ 35	$ 1.67	32	$ 42	$ -	$ -	$ 256.79	$6,420		5m of largest pipeline replaced per yr.
Allowance for short term stop in funding																										$500,000	
	2	7	1	1	600	Cost of mobilization/demobilization		1	ls	C.7.02	9509.524	9509.5	$ 441,717.38	$ 441,717	$ -	$ -	$ 30,235.47	$ 30,235	$ 28,047.15	21,575	$ 28,047	$ -	$ -	$ 500,000.00	$500,000		
Subtotal Direct Costs - Tailings												**496,641**		**$21,371,465**		**$85,379,322**		**$20,651,288**		**$13,285,005**			**$7,970,484**			**$148,657,584**	
Rose Creek																											
Upgrade Upstream portion to PMF (670 m3/s)																										$9,457,560	RCDC costs to be revised
	3	1	1	1	430	Clear and grub	Dozer: D10R/N	265,310	m2	C.2.05	0.015	3859.1	$ 0.53	$ 141,241	$ -	$ -	$ 0.94	$ 248,079	$ 0.62	125,924	$ 163,701	$ -	$ -	$ 2.08	$553,021		
	3	1	2	1	430	Excavate channel	Bulk excavate	205,009	m3	C.2.12	0.024	4844.9	$ 0.86	$ 177,324	$ -	$ -	$ 2.00	$ 411,176	$ 0.93	147,695	$ 192,004	$ -	$ -	$ 3.79	$760,504		
	3	1	2	2	430		Pilot Channel: Soil excavation	15,014	m3	C.2.12	0.024	353.3	$ 0.86	$ 12,930	$ -	$ -	$ 2.00	$ 29,982	$ 0.93	10,770	$ 14,000	$ -	$ -	$ 3.79	$56,912		
	3	1	3	1	430	Place fill layer	Till: Load, haul, dump, place	88,345	m3	R.112	0.038	3342.8	$ 1.38	$ 122,346	$ -	$ -	$ 2.66	$ 261,580	$ 1.40	94,853	$ 123,309	$ -	$ -	$ 5.74	$507,235		
	3	1	3	2	430		Till: compact with vibrating drum roller	294,483	m2	C.2.06	0.016	4711.7	$ 0.57	$ 168,680	$ -	$ -	$ 0.02	$ 6,184	$ 0.02	3,679	$ 4,782	$ -	$ -	$ 0.61	$179,647		
	3	1	4	1	430	Place crushed rock transition material	Crushed Rock: Drill, blast, stockpile	5,984	m3	C.2.23	0.045	269.3	$ 1.62	$ 9,712	$ 15.72	$ 94,066	$ 2.64	$ 15,794	$ 1.36	6,278	$ 8,161	$ -	$ -	$ 21.35	$127,735		
	3	1	4	2	430		Crushed Rock: Load in crusher and stockpile	5,984	m3	C.2.07	0.024	143.6	$ 0.88	$ 5,256	$ -	$ -	$ 2.10	$ 12,552	$ 0.90	4,144	$ 5,387	$ -	$ -	$ 3.88	$23,195		
	3	1	4	3	430		Crushed Rock: Load, haul, dump place	5,984	m3	R.100	0.023	134.6	$ 0.82	$ 4,928	$ -	$ -	$ 2.00	$ 11,955	$ 0.94	4,349	$ 5,653	$ -	$ -	$ 3.77	$22,536		
	3	1	5	1	430	Place gravel transition material	Gravel: Excavate, screen and stockpile	3,091	m3	C.2.02	0.010	30.9	$ 0.37	$ 1,131	$ -	$ -	$ 1.61	$ 4,972	$ 1.13	2,685	$ 3,491	$ -	$ -	$ 3.10	$9,595		
	3	1	5	2	430		Gravel: load , haul, place	3,091	m3	R.113	0.039	119.2	$ 1.41	$ 4,364	$ -	$ -	$ 3.24	$ 10,014	$ 1.49	3,535	$ 4,596	$ -	$ -	$ 6.14	$18,973		
	3	1	6	1	430	Place sand and gravel material	Sand/Gravel: Produce, screen and stockpile	200,056	m3	C.2.02	0.010	2000.6	$ 0.37	$ 73,551	$ -	$ -	$ 1.61	$ 323,289	$ 1.13	174,586	$ 226,962	$ -	$ -	$ 3.10	$623,781		
	3	1	6	2	430		Sand/Gravel: Load, haul, dump and place	200,056	m3	R.113	0.039	7751.2	$ 1.41	$ 283,695	$ -	$ -	$ 3.24	$ 651,052	$ 1.49	229,827	$ 298,776	$ -	$ -	$ 6.14	$1,233,523		
	3	1	7	1	430	Place rockfill shell	Load, haul, dump and place waste rock	344,604	m3	R.114	0.049	16847.3	$ 1.79	$ 616,611	$ -	$ -	$ 4.32	$ 1,487,664	$ 2.11	559,071	$ 726,793	$ -	$ -	$ 8.22	$2,831,068		
	3	1	8	1	430	Place rip-rap	Rip-rap: Screen and stockpile (from locally blasted material)	103,074	m3	C.2.25	0.057	5889.9	$ 2.09	$ 215,572	$ -	$ -	$ 9.19	$ 947,479	$ 6.45	511,700	$ 665,210	$ -	$ -	$ 17.74	$1,828,261		
	3	1	8	2	430		Rip-rap: Load, haul, dump	103,074	m3	R.100	0.023	2319.2	$ 0.82	$ 84,881	$ -	$ -	$ 2.00	$ 205,929	$ 0.94	74,906	$ 97,378	$ -	$ -	$ 3.77	$388,188		
	3	1	8	3	430		Rip-rap: Place and secure	103,074	m3	C.2.26	0.013	1288.4	$ 0.46	$ 47,156	$ -	$ -	$ 0.89	$ 91,673	$ 0.47	37,186	$ 48,342	$ -	$ -	$ 1.82	$187,172		
	3	1	9	1	430	Thermal blanket allowance	Over excavate for thermal protection layer	6,615	m3	C.2.12	0.024	155.6	$ 0.86	$ 5,697	$ -	$ -	$ 2.00	$ 13,209	$ 0.93	4,745	$ 6,169	$ -	$ -	$ 3.79	$25,074		
	3	1	9	2	430		Granular Fill: Produce, screen and stockpile	6,615	m3	C.2.02	0.010	66.2	$ 0.37	$ 2,421	$ -	$ -	$ 1.61	$ 10,641	$ 1.13	5,747	$ 7,471	$ -	$ -	$ 3.10	$20,533		
	3	1	9	3	430		Granular Fill: Load, haul, dump and place	6,615	m3	R.113	0.039	255.2	$ 1.41	$ 9,338	$ -	$ -	$ 3.24	$ 21,431	$ 1.49	7,505	$ 9,835	$ -	$ -	$ 6.14	$40,604		
Restore Lower Portion Rose Creek																										$333,591	
	3	2	1	1	600	Maintain entire RCDC	Maintain RCDC during period of tailings relocation and groundwater cleanup	1	ls	-	0.000	0.0	$ -	$ -	$ -	$ -	$ -	$ -	$ -	0	$ -	$ -	$ -	$ -	$0		
	3	2	2	1	430	Redirect flow into thalweg	Breach RCDC downstream of Secondary Dam	41,052	m3	C.2.12	0.024	965.9	$ 0.86	$ 35,353	$ -	$ -	$ 2.00	$ 81,976	$ 0.93	29,446	$ 38,260	$ -	$ -	$ 3.79	$155,609		
	3	2	2	2	430		Breach diversions where stream enter from south	30,000	m3	C.2.12	0.024	705.9	$ 0.86	$ 25,835	$ -	$ -	$ 2.00	$ 59,906	$ 0.93	21,519	$ 27,974	$ -	$ -	$ 3.79	$113,716		
	3	2	2	3	430		Regrade channel and dykes to create stable slopes	65	hrs	C.2.22	1.000	64.8	$ 36.60	$ 2,373	$ -	$ -	$ 173.28	$ 11,234	$ 149.18	7,440	$ 9,672	$ -	$ -	$ 359.06	$23,278		
	3	2	3	1	430	Fish habitat enhancement	Install riffles along restored channel	1,000	m3	C.2.12	0.024	23.5	$ 0.86	$ 861	$ -	$ -	$ 2.00	$ 1,997	$ 0.93	717	$ 932	$ -	$ -	$ 3.79	$3,791		
	3	2	3	2	430		Excavate pools	5,500	m3	C.2.12	0.024	129.4	$ 0.86	$ 4,736	$ -	$ -	$ 2.00	$ 10,983	$ 0.93	3,945	$ 5,129	$ -	$ -	$ 3.79	$20,848		

3	3	3	6	430		Rip-rap (angular, high quality): Screen and stockpile	1,962	m3	C.2.25	0.057	112.1	$ 2.09	$ 4,103	$ -	$ -	$ 9.19	$ 18,035	$ 6.45	9,740	$ 12,662	$ -	$ -	$ 17.74	$34,801		
3	3	3	7	430		Load Haul and Dump Rip-Rap	1,962	m3	R.065	0.032	63.4	$ 1.16	$ 2,320	$ -	$ -	$ 2.81	$ 5,513	$ 1.30	1,955	$ 2,541	$ -	$ -	$ 5.29	$10,374		
3	3	3	8	430		Place and secure Rip-Rap	1,962	m3	C.2.26	0.013	24.5	$ 0.46	$ 898	$ -	$ -	$ 0.89	$ 1,745	$ 0.47	708	$ 920	$ -	$ -	$ 1.82	$3,563		
3	3	4	1	610	Revegetate disturbed areas	Seed/Fertilize, helicopter high application rate	3270	m2	C.5.02	0.000	0.4	$ 0.00	$ 15	$ 0.05	$ 149	$ 0.05	$ 178	$ 0.00	2	$ 2	$ -	$ -	$ 0.11	$344		
Reconstruction of Rose Creek Allowance																												$210,942	
3	4	1	1	600	Access roads	Prepare access roads	500	m	C.2.27	0.131	65.6	$ 4.80	$ 2,402	$ -	$ -	$ 10.14	$ 5,072	$ 5.33	2,046	$ 2,663	$ -	$ -	$ 20.27	$10,136		
3	4	2	1	610	Construct cofferdam	Cofferdam foundation preparation	500	m2	C.2.17	0.318	159.1	$ 13.47	$ 6,736	$ -	$ -	$ 17.95	$ 8,973	$ 8.66	3,409	$ 4,432	$ -	$ -	$ 40.28	$20,142		
3	4	2	2	610		Install main cofferdam	1600	m3	R.112	0.038	60.5	$ 1.38	$ 2,216	$ -	$ -	$ 2.96	$ 4,737	$ 1.40	1,716	$ 2,233	$ -	$ -	$ 5.74	$9,186		
3	4	2	3	610		Seepage collection ditch and berm	2000	m3	R.112	0.038	75.7	$ 1.38	$ 2,770	$ -	$ -	$ 2.96	$ 5,922	$ 1.40	2,147	$ 2,792	$ -	$ -	$ 5.74	$11,483		
3	4	2	4	610		Supply and operate pumps for removing seepage	1	mths	C.3.12	2.410	33.7	$ 84.34	$ 1,181	$ -	$ -	$ 130.72	$ 1,830	$ 40.72	439	$ 570	$ -	$ -	$ 255.78	$3,581		
3	4	3	1	610	Channel construction	Excavate Channel	2100	m3	C.2.12	0.024	49.4	$ 0.86	$ 1,808	$ -	$ -	$ 2.00	$ 4,193	$ 0.93	1,506	$ 1,958	$ -	$ -	$ 3.79	$7,960		
3	4	3	2	610		Over excavation for placement of floodplain erosion protection	1800	m3	C.2.12	0.024	42.4	$ 0.86	$ 1,550	$ -	$ -	$ 2.00	$ 3,594	$ 0.93	1,291	$ 1,678	$ -	$ -	$ 3.79	$6,823		
3	4	3	3	610		Excavation for residual structure erosion protection	1300	m3	C.2.12	0.024	30.6	$ 0.86	$ 1,120	$ -	$ -	$ 2.00	$ 2,596	$ 0.93	932	$ 1,212	$ -	$ -	$ 3.79	$4,928		
3	4	4	1	610	Place rip-rap	Rip-rap: Drill, blast and stockpile	2600	m3	C.2.23	0.045	117.0	$ 1.62	$ 4,220	$ 15.72	$ 40,872	$ 2.64	$ 6,862	$ 1.36	2,728	$ 3,546	$ -	$ -	$ 21.35	$55,500		
3	4	4	2	610		Rip-rap (angular, high quality): Screen and stockpile	2600	m3	C.2.25	0.057	148.6	$ 2.09	$ 5,438	$ -	$ -	$ 9.19	$ 23,900	$ 6.45	12,907	$ 16,780	$ -	$ -	$ 17.74	$46,117		
3	4	4	3	610		Rip-rap: Load, haul, dump	2600	m3	R.102	0.032	83.2	$ 1.17	$ 3,045	$ -	$ -	$ 2.74	$ 7,122	$ 1.24	2,475	$ 3,218	$ -	$ -	$ 5.15	$13,385		
3	4	4	4	610		Rip-rap: Place and secure	2600	m3	C.2.26	0.013	32.5	$ 0.46	$ 1,190	$ -	$ -	$ 0.89	$ 2,312	$ 0.47	938	$ 1,219	$ -	$ -	$ 1.82	$4,721		
3	4	5	1	610	Place gravel substrate	Gravel: Screen and stockpile	500	m3	C.2.02	0.010	5.0	$ 0.37	$ 183	$ -	$ -	$ 1.61	$ 804	$ 1.13	434	$ 565	$ -	$ -	$ 3.10	$1,552		
3	4	5	2	610		Gravel: Load, haul, dump and place	500	m3	R.113	0.039	19.3	$ 1.41	$ 706	$ -	$ -	$ 3.24	$ 1,620	$ 1.49	572	$ 743	$ -	$ -	$ 6.14	$3,069		
3	4	6	1	610	Removal of cofferdam	Excavate material and spoil locally	1600	m3	C.2.12	0.024	37.6	$ 0.86	$ 1,378	$ -	$ -	$ 2.00	$ 3,195	$ 0.93	1,148	$ 1,492	$ -	$ -	$ 3.79	$6,065		
3	4	7	1	610	Revegetation of riparian area	Revegetation	10000	m2	C.5.04	0.004	40.0	$ 0.14	$ 1,400	$ 0.40	$ 4,000	$ 0.05	$ 521	$ 0.04	286	$ 372	$ -	$ -	$ 0.63	$6,293		
Subtotal Direct Costs - Rose Creek											63,884		$2,334,739		$103,215		$5,881,914			$3,289,818	$0				$11,669,687	
Groundwater																													
Collect groundwater below CVD																												$1,457,234	
4	1	1	1	500	Groundwater wells	Drill wells (Air Rotary Drill Rig, ~20m depth)	140	m	C.2.09	2.000	280.0	$ 102.13	$ 14,299	$ -	$ -	$ 100.85	$ 14,119	$ 22.08	2,378	$ 3,091	$ -	$ -	$ 225.07	$31,509		
4	1	1	2	500		Install 6" stainless steel well casing & screen	140	m	C.3.17	0.150	21.0	$ 7.66	$ 1,072	$ 232.60	$ 32,564	$ 7.56	$ 1,059	$ 1.66	178	$ 232	$ -	$ -	$ 249.48	$34,927		
4	1	1	3	500		Install 6" Submersible Pump with controls	7	ea.	C.3.07	12.000	84.0	$ 600.00	$ 4,200	$ 6,842.00	$ 47,894	$ -	$ -	$ -	0	$ -	$ -	$ -	$ 7,442.00	$52,094		
4	1	1	4	500		Install protective housing (shack)	7	ea.	C.3.13	20.000	140.0	$ 1,300.00	$ 9,100	$ 445.00	$ 3,115	$ -	$ -	$ -	0	$ -	$ -	$ -	$ 1,745.00	$12,215		
4	1	2	1	430	Pumping station	Excavate sump for manholes	200	m3	C.2.11	0.013	2.7	$ 0.49	$ 98	$ -	$ -	$ 0.95	$ 190	$ 0.50	77	$ 100	$ -	$ -	$ 1.94	$387		
4	1	2	2	500		Supply and place precast concrete manhole	1	ea.	C.3.08	16.000	16.0	$ 746.40	$ 746	$ 1,344.68	$ 1,345	$ 72.47	$ 72	$ 62.92	48	$ 63	$ -	$ -	$ 2,226.47	$2,226		
4	1	2	3	430		Backfill and compact around manhole	200	m3	C.2.01	0.030	6.0	$ 1.08	$ 216	$ -	$ -	$ 0.74	$ 148	$ 0.40	61	$ 79	$ -	$ -	$ 2.22	$443		
4	1	2	4	500		Install primary pump	1	ea.	C.3.10	12.000	12.0	$ 600.00	$ 600	$ 1,829.00	$ 1,829	$ -	$ -	$ -	0	$ -	$ -	$ -	$ 2,429.00	$2,429		
4	1	3	1	610	Piping system	Excavate piping trench	31,200	m3	C.2.13	0.020	624.0	$ 0.73	$ 22,838	$ -	$ -	$ 1.42	$ 44,399	$ 0.75	18,010	$ 23,412	$ -	$ -	$ 2.91	$90,649		
4	1	3	2	510		Supply and install insulated 150mm HDPE pipe	5,200	m	C.3.03	0.250	1300.0	$ 8.75	$ 45,500	$ 155.84	$ 810,368	$ -	$ -	$ -	0	$ -	$ -	$ -	$ 164.59	$855,868		
4	1	3	4	430		Bedding layer: Produce, screen and stockpile	2,028	m3	C.2.02	0.010	20.3	$ 0.37	$ 742	$ -	$ -	$ 1.61	$ 3,262	$ 1.13	1,762	$ 2,290	$ -	$ -	$ 3.10	$6,295		
4	1	3	5	430		Bedding layer: Load, haul, place and compact	2,028	m3	R.102	0.032	64.9	$ 1.17	$ 2,375	$ -	$ -	$ 2.74	$ 5,555	$ 1.24	1,931	$ 2,510	$ -	$ -	$ 5.15	$10,440		
4	1	3	6	430		Backfill ditches	29,172	m3	C.2.01	0.030	876.2	$ 1.08	$ 31,564	$ -	$ -	$ 0.74	$ 21,522	$ 0.40	8,875	$ 11,538	$ -	$ -	$ 2.22	$64,624		
4	1	4	1	510	Heat tracing	Supply and install heat trace in HDPE pipe	5,200	m	C.3.04	0.250	1300.0	$ 12.50	$ 65,000	$ 21.32	$ 110,864	$ -	$ -	$ -	0	$ -	$ -	$ -	$ 33.82	$175,864		
4	1	4	2	510		Supply/Install heat tracing power feed kit	4	ea.	C.3.05	4.000	16.0	$ 230.00	$ 920	$ 396.84	$ 1,587	$ -	$ -	$ -	0	$ -	$ -	$ -	$ 626.84	$2,507		
4	1	4	3	510		Supply/Install electrical thermostats for heat tracing	1	ea.	C.3.06	1.000	1.0	$ 57.50	$ 58	$ 1,025.00	$ 1,025	$ -	$ -	$ -	0	$ -	$ -	$ -	$ 1,082.50	$1,083		
4	1	5	1	510	Provide Electricity from WTP to pumps	Supply/Install treated power poles	39	ea.	C.4.03	4.545	177.3	$ 297.88	$ 11,617	$ 325.96	$ 12,712	$ 85.85	$ 3,348	$ 28.17	845	$ 1,099	$ -	$ -	$ 737.86	$28,776		
4	1	5	2	510		Supply/Install overhead conductor	3,000	m	C.4.02	0.032	96.0	$ 2.21	$ 6,638	$ 1.41	$ 4,230	$ 0.45	$ 1,360	$ 0.15	343	$ 446	$ -	$ -	$ 4.22	$12,674		
4	1	5	3	510		Supply/Install transformers	4	ea.	C.4.04	20.000	80.0	$ 1,383.00	$ 5,532	$ 8,934.00	$ 35,736	$ 224.98	$ 900	$ 143.00	440	$ 572	$ -	$ -	$ 10,684.98	$42,740		
4	1	6	1	510	Monitoring wells	Drill wells (Air Rotary Drill Rig, ~15m depth)	60	m	C.2.09	2.000	120.0	$ 102.13	$ 6,128	$ -	$ -	$ 100.85	$ 6,051	$ 22.08	1,019	$ 1,325	$ -	$ -	$ 225.07	$13,504		
4	1	6	2	510		Install 6" stainless steel well casing & screen	60	m	C.3.17	0.150	9.0	$ 7.66	$ 460	$ 232.60	$ 13,956	$ 7.56	$ 454	$ 1.66	76	$ 99	$ -	$ -	$ 249.48	$14,969		
4	1	6	3	510		Install protective well cover	3	ea.	C.3.18	1.333	4.0	$ 48.80	$ 146	$ 164.54	$ 494	$ 100.85	$ 303	$ 22.08	51	$ 66	$ -	$ -	$ 336.27	$1,009		
Collect groundwater below Secondary Dam																												$521,892	
4	2	2	1	500	Groundwater Wells	Drill wells (Air Rotary Drill Rig, ~20m depth)	100	m	C.2.09	2.000	200.0	$ 102.13	$ 10,213	$ -	$ -	$ 100.85	$ 10,085	$ 22.08	1,698	$ 2,208	$ -	$ -	$ 225.07	$22,507		
4	2	2	2	500		Install 6" stainless steel well casing & screen	100	m	C.3.17	0.150	15.0	$ 7.66	$ 766	$ 232.60	$ 23,260	$ 7.56	$ 756	$ 1.66	127	$ 166	$ -	$ -	$ 249.48	$24,948		
4	2	2	3	500		Install 6" Submersible Pump with controls	5	ea.	C.3.07	12.000	60.0	$ 600.00	$ 3,000	$ 6,842.00	$ 34,210	$ -	$ -	$ -	0	$ -	$ -	$ -	$ 7,442.00	$37,210		
4	2	2	4	500		Install protective housing (shack)	100	ea.	C.3.13	20.000	2000.0	$ 1,300.00	$ 130,000	$ 445.00	$ 44,500	$ -	$ -	$ -	0	$ -	$ -	$ -	$ 1,745.00	$174,500		
4	2	1	1	430	Pumping station	Excavate sump for manholes	200	m3	C.2.11	0.013	2.7	$ 0.49	$ 98	$ -	$ -	$ 0.95	$ 190	$ 0.50	77	$ 100	$ -	$ -	$ 1.94	$387		
4	2	1	2	500		Supply and place precast concrete manhole	1	ea.	C.3.08	16.000	16.0	$ 746.40	$ 746	$ 1,344.68	$ 1,345	$ 72.47	$ 72	$ 62.92	48	$ 63	$ -	$ -	$ 2,226.47	$2,226		
4	2	1	3	430		Backfill and compact around manhole	200	m3	C.2.01	0.030	6.0	$ 1.08	$ 216	$ -	$ -	$ 0.74	$ 148	$ 0.40	61	$ 79	$ -	$ -	$ 2.22	$443		
4	2	1	4	500		Install primary pump	1	m	C.3.10	12.000	12.0	$ 600.00	$ 600	$ 1,829.00	$ 1,829	$ -	$ -	$ -	0	$ -	$ -	$ -	$ 2,429.00	$2,429		
4	2	3	1	610	Piping to CVD collection system	Excavate piping trench	5,400	m3	C.2.12	0.024	127.1	$ 0.86	$ 4,650	$ -	$ -	$ 2.00	$ 10,783	$ 0.93	3,873	$ 5,035	$ -	$ -	$ 3.79	$20,469		
4	2	3	2	510		Supply and install insulated 150mm HDPE pipe	900	m	C.3.03	0.250	225.0	$ 8.75	$ 7,875	$ 155.84	$ 140,256	$ -	$ -	$ -	0	$ -	$ -	$ -	$ 164.59	$148,131		
4	2	3	4	430		Bedding layer: Produce, screen and stockpile	351	m3	C.2.02	0.010	3.5	$ 0.37	$ 128	$ -	$ -	$ 1.61	$ 565	$ 1.13	395	$ 396	$ -	$ -	$ 3.10	$1,090		
4	2	3	5	430		Bedding layer: Load, haul, place and compact	351	m3	R.102	0.032	11.2	$ 1.17	$ 411	$ -	$ -	$ 2.74	$ 961	$ 1.24	334	$ 434	$ -	$ -	$ 5.15	$1,807		
4	2	3	6	430		Backfill ditches	4,500	m3	C.2.01	0.030	135.0	$ 1.08	$ 4,869	$ -	$ -	$ 0.74	$ 3,320	$ 0.40	1,369	$ 1,780	$ -	$ -	$ 2.22	$9,969		
4	2	4	1	510	Heat tracing	Supply and install heat trace in HDPE pipe	900	m	C.3.04	0.250	225.0	$ 12.50	$ 11,250	$ 21.32	$ 19,188	$ -	$ -	$ -	0	$ -	$ -	$ -	$ 33.82	$30,438		
4	2	4	2	510		Supply/Install heat tracing power feed kit	1	ea.	C.3.05	4.000	4.0	$ 230.00	$ 230	$ 396.84	$ 397	$ -	$ -	$ -	0	$ -	$ -	$ -	$ 626.84	$627		
4	2	5	1	510	Provide Electricity from WTP to pumps	Supply/Install treated power poles	12	ea.	C.4.03	4.545	54.5	$ 297.88	$ 3,575	$ 325.96	$ 3,912	$ 85.85	$ 1,030	$ 28.17	260	$ 338	$ -	$ -	$ 737.86	$8,854		
4	2	5	2	510		Supply/Install overhead conductor	900	m	C.4.02	0.032	28.8	$ 2.21	$ 1,992	$ 1.41	$ 1,269	$ 0.45	$ 408	$ 0.15	103	$ 134	$ -	$ -	$ 4.22	$3,802		
4	2	5	3	510		Supply/Install transformers	3	ea.	C.4.04	20.000	60.0	$ 1,383.00	$ 4,149	$ 8,934.00	$ 26,802	$ 224.98	$ 675	$ 143.00	330	$ 429	$ -	$ -	$ 10,684.98	$32,055		
Adaptive Management Phase 1																												$506,549	
4	3	1	1	500	Install shallow extraction wells	Construct Access Roads	1153	m	C.2.27	0.131	151.3	$ 4.80	$ 5,539	$ -	$ -	$ 10.14	$ 11,695	$ 5.33	4,724	$ 6,141	$ -	$ -	$ 20.27	$23,374		
4	3	1	2	500		Drill wells (Air Rotary Drill Rig, ~10m depth)	60	m	C.2.09	2.000	120.0	$ 102.13	$ 6,128	$ -	$ -	$ 100.85	$ 6,051	$ 22.08	1,019	$ 1,325	$ -	$ -	$ 225.07	$13,504		
4	3	1	3	500		Install 6" stainless steel well casing & screen	60	m	C.3.17	0.150	9.0	$ 7.66	$ 460	$ 232.60	$ 13,956	$ 7.56	$ 454	$ 1.66	76	$ 99	$ -	$ -	$ 249.48	$14,969		
4	3	1	4	500		Install 6" Submersible Pump with controls	6	ea.	C.3.07	12.000	72.0	$ 600.00	$ 3,600	$ 6,842.00	$ 41,052	$ -	$ -	$ -	0	$ -	$ -	$ -	$ 7,442.00	$44,652		
4	3	1	5	500		Install protective housing (shack)	6	ea.	C.3.13	20.000	120.0	$ 1,300.00	$ 7,800	$ 445.00	$ 2,670	$ -	$ -	$ -	0	$ -	$ -	$ -	$ 1,745.00	$10,470		
4	3	2	1	430	Install piping to CVD collection system	Excavate piping trench	6,916	m3	C.2.13	0.020	138.4	$ 0.73	$ 5,064	$ -	$ -	$ 1.42	$ 9,845	$ 0.75	3,993	$ 5,191	$ -	$ -	$ 2.91	$20,100		
4	3	2	2	510		Supply and install insulated 150mm HDPE pipe	1,153	m	C.3.03	0.250	288.3	$ 8.75	$ 10,089	$ 155.84	$ 179,684	$ -	$ -	$ -	0	$ -	$ -	$ -	$ 164.59	$189,772		
4	3	2	3	430		Bedding layer: Produce, screen and stockpile	450	m3	C.2.02	0.010	4.5	$ 0.37	$ 165	$ -	$ -	$ 1.61	$ 723	$ 1.13	391	$ 508	$ -	$ -	$ 3.10	$1,396		
4	3	2	4	430		Bedding Layer: Load, haul, place and compact	450	m3	R.103	0.029	13.1	$ 1.07	$ 479	$ -	$ -	$ 2.45	$ 1,100	$ 1.12	388	$ 505	$ -	$ -	$ 4.63	$2,084		
4	3	2	5	430		Backfill and compact ditches	6,468	m3	C.2.01	0.030	194.0	$ 1.08	$ 6,999	$ -	$ -	$ 0.74	$ 4,772	$ 0.40	1,968	$ 2,558	$ -	$ -	$ 2.22	$14,329		
4	3	2	6	510		Heat Trace: Supply and install heat trace in HDPE pipe	1,153	m	C.3.04	0.250	288.3	$ 12.50	$ 14,413	$ 21.32	$ 24,582	$ -	$ -	$ -	0	$ -	$ -	$ -	$ 33.82	$38,994		
4	3	2	7	510		Heat Trace: Supply/Install heat tracing power feed kit	60	ea.	C.3.05	4.000	240.0	$ 230.00	$ 13,800	$ 396.84	$ 23,810	$ -	$ -	$ -	0	$ -	$ -	$ -	$ 626.84	$37,610		
4	3	3	1	500	Provide Electricity from WTP to pumps	Supply/Install treated power poles	15	ea.	C.4.03	4.545	68.2	$ 297.88	$ 4,468	$ 325.96	$ 4,889	$ 85.85	$ 1,288	$ 28.17	325	$ 423	$ -	$ -	$ 737.86	$11,068		
4	3	3	2	500		Supply/Install overhead conductor	1,153	m	C.4.02	0.032	36.9	$ 2.21	$ 2,551	$ 1.41	$ 1,626	$ 0.45	$ 523	$ 0.15	132	$ 171	$ -	$ -	$ 4.22	$4,871		
4	3	3	3	500		Supply/Install transformers	6	ea.	C.4.04	20.000	120.0	$ 1,383.00	$ 8,298	$ 8,934.00	$ 53,604	$ 224.98	$ 1,350	$ 143.00	660	$ 858	$ -	$ -	$ 10,684.98	$64,110		
4	3	4	1	500	Monitoring wells	Drill wells (Air Rotary Drill Rig, ~10m depth)	30	m	C.2.09	2.000	60.0	$ 102.13	$ 3,064	$ -	$ -	$ 100.85	$ 3,026	$ 22.08	510	$ 662	$ -	$ -	$ 225.07	$6,752		
4	3	4	2	500		Install 6" stainless steel well casing & screen	30	m	C.3.17	0.150	4.5	$ 7.66	$ 230	$ 232.60	$ 6,978	$ 7.56	$ 227	$ 1.66	38	$ 50	$ -	$ -	$ 249.48	$7,484		
4	3	4	3	500		Install protective well cover	3	ea.	C.3.18	1.333	4.0	$ 48.80	$ 146	$ 164.54	$ 494	$ 100.85	$ 303	$ 22.08	51	$ 66	$ -	$ -	$ 336.27	$1,009		
Adaptive Management Phase 2																												$220,217	
4	4	1	1	500	Install shallow extraction wells	Construct Access Roads	577	m	C.2.27	0.131	75.7	$ 4.80	$ 2,769	$ -	$ -	$ 10.14	$ 5,847	$ 5.33	2,362	$ 3,070	$ -	$ -	$ 20.27	$11,687		
4	4	1	2	500		Drill wells (Air Rotary Drill Rig, ~10m depth)	20	m	C.2.09	2.000	40.0	$ 102.13	$ 2,043	$ -	$ -	$ 100.85	$ 2,017	$ 22.08	340	$ 442	$ -	$ -	$ 225.07	$4,501		
4	4	1	3	500		Install 6" stainless steel well casing & screen	20	m	C.3.17	0.150	3.0	$ 7.66	$ 153	$ 232.60	$ 4,652	$ 7.56	$ 151	$ 1.66	25	$ 33	$ -	$ -	$ 249.48	$4,990		
4	4	1	4	500		Install 6" Submersible Pump with controls	2	ea.	C.3.07	12.000	24.0	$ 600.00	$ 1,200	$ 6,842.00	$ 13,684	$ -	$ -	$ -	0	$ -	$ -	$ -	$ 7,442.00	$14,884		
4	4	1	5	500		Install protective housing (shack)	2	ea.	C.3.13	20.000	40.0	$ 1,300.00	$ 2,600	$ 445.00	$ 890	$ -	$ -	$ -	0	$ -	$ -	$ -	$ 1,745.00	$3,490		
4	4	2	1	430	Install piping to CVD collection system	Excavate piping trench	3,459	m3	C.2.13	0.020	69.2	$ 0.73	$ 2,532	$ -	$ -	$ 1.42	$ 4,922	$ 0.75	1,997	$ 2,596	$ -	$ -	$ 2.91	$10,050		
4	4	2	2	510		Supply and install insulated 150mm HDPE pipe	577	m	C.3.03	0.250	144.1	$ 8.75	$ 5,044	$ 155.84	$ 89,842	$ -	$ -	$ -	0	$ -	$ -	$ -	$ 164.59	$94,886		
4	4	2	3	430		Bedding layer: Produce, screen and stockpile	225	m3	C.2.02	0.010	2.2	$ 0.37	$ 82	$ -	$ -	$ 1.61	$ 362	$ 1.13	195	$ 254	$ -	$ -	$ 3.10	$698		
4	4	2	4	430		Bedding Layer: Load, haul, place and compact	225	m3	R.103	0.029	6.5	$ 1.07	$ 240	$ -	$ -	$ 2.45	$ 550	$ 1.12	194	$ 252	$ -	$ -	$ 4.63	$1,042		
4	4	2	5	430		Backfill and compact ditches	3,234	m3	C.2.01	0.030	97.0	$ 1.08	$ 3,499	$ -	$ -	$ 0.74	$ 2,386	$ 0.40	984	$ 1,279	$ -	$ -	$ 2.22	$7,165		
4	4	2	6	510		Heat Trace: Supply and install heat trace in HDPE pipe	577	m	C.3.04	0.250	144.1	$ 12.50	$ 7,206	$ 21.32	$ 12,291	$ -	$ -	$ -	0	$ -	$ -	$ -	$ 33.82	$19,497		
4	4	2	7	510		Heat Trace: Supply/Install heat tracing power feed kit	20	ea.	C.3.05	4.000	80.0	$ 230.00	$ 4,600	$ 396.84	$ 7,937	$ -	$ -	$ -	0	$ -	$ -	$ -	$ 626.84	$12,537		
4	4	3	1	500	Provide Electricity from WTP to pumps	Supply/Install treated power poles	8	ea.	C.4.03	4.545	36.4	$ 297.88	$ 2,383	$ 325.96	$ 2,608	$ 85.85	$ 687	$ 28.17	173	$ 225	$ -	$ -	$ 737.86	$5,903		
4	4	3	2	500		Supply/Install overhead conductor	577	m	C.4.02	0.032	18.4	$ 2.21	$ 1,276	$ 1.41	$ 813	$ 0.45	$ 261	$ 0.15	66	$ 86	$ -	$ -	$ 4.22	$2,436		
4	4	3	3	500		Supply/Install transformers	2	ea.	C.4.04	20.000	40.0	$ 1,383.00	$ 2,766	$ 8,934.00	$ 17,868	$ 224.98	$ 450	$ 143.00	220	$ 286	$ -	$ -	$ 10,684.98	$21,370		
4	4	4	1	500	Monitoring wells	Drill wells (Air Rotary Drill Rig, ~10m depth)	10	m	C.2.09	2.000	20.0	$ 102.13	$ 1,021	$ -	$ -	$ 100.85	$ 1,009	$ 22.08	170	$ 221	$ -	$ -	$ 225.07	$2,251		
4	4	4	2	500		Install 6" stainless steel well casing & screen	10	m	C.3.17	0.150	1.5	$ 7.66	$ 77	$ 232.60	$ 2,326	$ 7.56	$ 76	$ 1.66	13	$ 17	$ -	$ -	$ 249.48	$2,495		
4	4	4	3	500		Install protective well cover	1	ea.	C.3.18	1.333	1.3	$ 48.80	$ 49	$ 164.54	$ 165	$ 100.85	$ 101	$ 22.08	17	$ 22	$ -	$ -	$ 336.27	$336		

Adaptive Management Phase 3																													$97,165
4	5	1	1	500	Install shallow extraction wells	Construct Access Roads	231	m	C.2.27	0.131	30.3	$ 4.80	$ 1,108	$ -	$ -	$ 10.14	$ 2,339	$ 5.33	945	$ 1,226	$ -	$ -	$ 20.27	$4,675		
4	5	1	2	500		Drill wells (Air Rotary Drill Rig, ~10m depth)	10	m	C.2.09	2.000	20.0	$ 102.13	$ 1,021	$ -	$ -	$ 100.85	$ 1,009	$ 22.08	170	$ 221	$ -	$ -	$ 225.07	$2,251		
4	5	1	3	500		Install 6" stainless steel well casing & screen	10	m	C.3.17	0.150	1.5	$ 7.66	$ 77	$ 232.60	$ 2,326	$ 7.56	$ 76	$ 1.66	13	$ 17	$ -	$ -	$ 249.48	$2,495		
4	5	1	4	500		Install 6" Submersible Pump with controls	1	ea.	C.3.07	12.000	12.0	$ 600.00	$ 600	$ 6,842.00	$ 6,842	$ -	$ -	$ -	0	$ -	$ -	$ -	$ 7,442.00	$7,442		
4	5	1	5	500		Install protective housing (shack)	1	ea.	C.3.13	20.000	20.0	$ 1,300.00	$ 1,300	$ 445.00	$ 445	$ -	$ -	$ -	0	$ -	$ -	$ -	$ 1,745.00	$1,745		
4	5	2	1	430	Install piping to CVD collection system	Excavate piping trench	1,384	m3	C.2.13	0.020	27.7	$ 0.73	$ 1,013	$ -	$ -	$ 1.42	$ 1,969	$ 0.75	799	$ 1,038	$ -	$ -	$ 2.91	$4,020		
4	5	2	2	510		Supply and install insulated 150mm HDPE pipe	231	m	C.3.03	0.250	57.7	$ 8.75	$ 2,018	$ 155.84	$ 35,937	$ -	$ -	$ -	0	$ -	$ -	$ -	$ 164.59	$37,954		
4	5	2	3	430		Bedding layer: Produce, screen and stockpile	90	m3	C.2.02	0.010	0.9	$ 0.37	$ 33	$ -	$ -	$ 1.61	$ 145	$ 1.13	78	$ 102	$ -	$ -	$ 3.10	$279		
4	5	2	4	430		Bedding Layer: Load, haul, place and compact	90	m3	R.103	0.029	2.6	$ 1.07	$ 96	$ -	$ -	$ 2.45	$ 220	$ 1.12	76	$ 101	$ -	$ -	$ 4.63	$417		
4	5	2	5	430		Backfill and compact ditches	1,294	m3	C.2.01	0.030	38.8	$ 1.08	$ 1,400	$ -	$ -	$ 0.74	$ 954	$ 0.40	394	$ 512	$ -	$ -	$ 2.22	$2,866		
4	5	2	6	510		Heat Trace: Supply and install heat trace in HDPE pipe	231	m	C.3.04	0.250	57.7	$ 12.50	$ 2,883	$ 21.32	$ 4,916	$ -	$ -	$ -	0	$ -	$ -	$ -	$ 33.82	$7,799		
4	5	2	7	510		Heat Trace: Supply/Install heat tracing power feed kit	10	ea.	C.3.05	4.000	40.0	$ 230.00	$ 2,300	$ 396.84	$ 3,968	$ -	$ -	$ -	0	$ -	$ -	$ -	$ 626.84	$6,268		
4	5	3	1	500	Provide Electricity from WTP to pumps	Supply/Install treated power poles	3	ea.	C.4.03	4.545	13.6	$ 297.68	$ 894	$ 325.96	$ 978	$ 85.85	$ 258	$ 28.17	65	$ 85	$ -	$ -	$ 737.86	$2,214		
4	5	3	2	500		Supply/Install overhead conductor	231	m	C.4.02	0.032	7.4	$ 2.21	$ 510	$ 1.41	$ 325	$ 0.45	$ 105	$ 0.15	26	$ 34	$ -	$ -	$ 4.22	$974		
4	5	3	3	500		Supply/Install transformers	1	ea.	C.4.04	20.000	20.0	$ 1,383.00	$ 1,383	$ 8,934.00	$ 8,934	$ 224.98	$ 225	$ 143.00	110	$ 143	$ -	$ -	$ 10,684.98	$10,685		
4	5	4	1	500	Monitoring wells	Drill wells (Air Rotary Drill Rig, ~10m depth)	10	m	C.2.09	2.000	20.0	$ 102.13	$ 1,021	$ -	$ -	$ 100.85	$ 1,009	$ 22.08	170	$ 221	$ -	$ -	$ 225.07	$2,251		
4	5	4	2	500		Install 6" stainless steel well casing & screen	10	m	C.3.17	0.150	1.5	$ 7.66	$ 77	$ 232.60	$ 2,326	$ 7.56	$ 76	$ 1.66	13	$ 17	$ -	$ -	$ 249.48	$2,495		
4	5	4	3	500		Install protective well cover	1	ea.	C.3.18	1.333	1.3	$ 48.80	$ 49	$ 164.54	$ 165	$ 100.85	$ 101	$ 22.08	17	$ 22	$ -	$ -	$ 336.27	$336		
Subtotal Direct Costs - Groundwater											11,584		$565,233		$1,948,267		$200,392		68,587	$89,164		$0					$2,803,056
Miscellaneous																													
Reclaim unnecessary roads																													$2,143
6	1	1	1		Reclaim unnecessary roads	Scarify road surfaces	6,000	m2	C.2.18	0.002	13.0	$ 0.08	$ 477	$ -	$ -	$ 0.09	$ 525	$ 0.09	393	$ 510	$ -	$ -	$ 0.25	$1,513		
6	1	1	2			Seed/Fertilize, helicopter low application rate	6,000	m2	C.5.02	0.000	0.8	$ 0.00	$ 27	$ 0.05	$ 273	$ 0.05	$ 327	$ 0.00	3	$ 4	$ -	$ -	$ 0.11	$631		
Subtotal Direct Costs - Miscellaneous											14		$504		$273		$852		396	$514		$0					$2,143
Subtotal Direct Costs																													
						Subtotal direct costs					668,181		$28,690,332		$87,588,186		$30,241,358		1,733,988	$18,629,007		$7,970,484					$173,319,367
CLOSURE COSTS - INDIRECT																													
100	100	1	1		Project Management	5.0% of direct costs															$ 173,319,367	x	5.0%		$8,665,968		
100	100	2	1		Field Supervision	(included in major tasks)																			$0		
100	100	3	1		Contractor profit and home office overhead	10% of direct costs															$ 173,319,367	x	10.0%		$17,331,937		
100	100	4	1		Insurance	0.5% of direct costs															$ 173,319,367	x	0.5%		$866,597		
100	100	5	1		Bonding	0.5% of direct costs															$ 173,319,367	x	0.5%		$866,597		
100	100	6	1		Field Engineering and QA	10% of direct costs															$ 173,319,367	x	10.0%		$17,331,937		
100	100	7	1		Mob - Demob																1	lump	$500,000		$500,000		
100	100	8	1		Living out allowances	(included in heavy equipment costs)																			$0		
Subtotal Indirect Costs																													
						Subtotal indirect costs																							$45,563,036
CLOSURE COSTS - CONTINGENCY																													
						Contingency															$173,319,367	x	20.0%		$34,663,873		
CLOSURE COSTS - TOTAL																													
						Total direct and indirect costs																							$253,546,276

Tailings Alternative 4 - Minimize Up-Front Construction

Contract Code	Work Area Code	Item	Task	Sub-task	Estimate Type	Task	Activity	Quantity	Unit	Cost Code	Unit Mhrs	Total Mhrs	Labour Rate	Labour Cost	Unit Mat'l	Material Cost	Unit Equip.	Equipment Cost	Unit Fuel	Fuel Consumed (L)	Fuel Cost	Power Rate ($/Unit)	Power Cost	Unit Cost	Activity Total	Subtotals	Source / Comments
CLOSURE COSTS - DIRECT CAPITAL																											
Dams																											
Breach Cross Valley Dam																										$1,504,774	
	1	1	1	1	600	Remove pond	Pump pond water to discharge	140	days	C.3.11	2.410	337.3	$ 84.34	$ 11,607	$ -	$ -	$ 130.72	$ 18,301	$ 40.72	4,386	$ 5,701	$ -	$ -	$ 255.78	$35,810		
	1	1	2	1	430	Remove Impounded Sludge	Excavate and create berms for use as sludge cell on top of tailings	1,445	m3	C.2.12	0.024	34.0	$ 0.86	$ 1,244	$ -	$ -	$ 2.00	$ 2,885	$ 0.93	1,036	$ 1,347	$ -	$ -	$ 3.79	$5,477		
	1	1	2	2	430		Load, haul and place sludge material	1,600	m3	R.093	0.040	64.0	$ 1.46	$ 2,342	$ -	$ -	$ 3.91	$ 6,263	$ 1.92	2,357	$ 3,064	$ -	$ -	$ 7.29	$11,670		1CD003.45_SludgeManagement
	1	1	3	1	430	Remove contaminated soil	Excavate, load, haul and place contaminated soils to mill area	322,650	m3	R.096	0.014	4360.1	$ 0.49	$ 159,581	$ -	$ -	$ 1.88	$ 608,165	$ 1.22	392,766	$ 393,622	$ -	$ -	$ 3.60	$1,161,368		
	1	1	4	1	430	Prepare spoil area	Clear and grub	5,000	m2	C.2.05	0.015	72.7	$ 0.53	$ 2,662	$ -	$ -	$ 0.94	$ 4,675	$ 0.62	2,373	$ 3,085	$ -	$ -	$ 2.08	$10,422		
	1	1	4	2	430		prepare access roads	200	m	C.2.27	0.131	26.3	$ 4.80	$ 961	$ -	$ -	$ 10.14	$ 2,029	$ 5.33	819	$ 1,065	$ -	$ -	$ 20.27	$4,055		
	1	2	2	1	430	Breach dam	Excavate, load, haul and dump breach material	72,500	m3	C.2.12	0.024	1705.9	$ 0.86	$ 62,435	$ -	$ -	$ 2.00	$ 144,774	$ 0.93	52,003	$ 67,604	$ -	$ -	$ 3.79	$274,813		
	1	2	4	1	610	Revegetate disturbed areas	Seed/Fertilize, helicopter high application rate	7700	m2	C.5.01	0.000	1.0	$ 0.00	$ 35	$ 0.09	$ 700	$ 0.05	$ 420	$ 0.00	4	$ 5	$ -	$ -	$ 0.15	$1,159		
Intermediate Dam																										$2,444,243	1CD003.59_Rose_Creek_Dam_Upgrades
	1	2	1	1	430	Ground densification	Gravel: supply and stockpile locally	6,493	m3	C.2.02	0.010	64.9	$ 0.37	$ 2,376	$ -	$ -	$ 1.61	$ 10,444	$ 1.13	5,641	$ 7,333	$ -	$ -	$ 3.10	$20,153		
	1	2	1	2	430		Gravel: load, haul, dump	6,493	m3	R.097	0.028	178.5	$ 1.01	$ 6,535	$ -	$ -	$ 2.34	$ 15,175	$ 1.09	5,403	$ 7,101	$ -	$ -	$ 4.44	$28,811		
	1	2	1	2	510		Drill vibro-replacement stone columns	74,400	m3	C.9.01	0.267	19840.0	$ 12.55	$ 933,472	$ -	$ -	$ 6.80	$ 506,230	$ 4.37	250,175	$ 325,227	$ -	$ -	$ 23.72	$1,764,929		
	1	2	1	2	600		Verification testing	1	ls	C.9.02	530.639	530.6	$ 37,845.16	$ 37,845	$ -	$ -	$ 9,410.91	$ 9,411	$ 2,743.93	2,111	$ 2,744	$ -	$ -	$ 50,000.00	$50,000		
	1	2	2	1	430	Construct berm at toe	Excavate, load, haul and place material from Cross Valley Dam	150,000	m3	R.094	0.020	2960.5	$ 0.72	$ 108,355	$ -	$ -	$ 2.07	$ 310,072	$ 1.06	122,687	$ 159,493	$ -	$ -	$ 3.85	$577,921		
	1	2	3	1	600	Install pond level control	Install pumping system to manage pond levels	1	ls	C.3.10	12.000	12.0	$ 600.00	$ 600	$ 1,829.00	$ 1,829	$ -	$ -	$ -	0	$ -	$ -	$ -	$ 2,429.00	$2,429		
	1	2	3	2	600		Modify spillway - lower or add stop logs (completed during C&M)	1	ls	-	0.000	0.0	$ -	$ -	$ -	$ -	$ -	$ -	$ -	0	$ -	$ -	$ -	$ -	$0		
	1	2	4	1	600	Construct channel - spillway to Rose Cr.	Completed during care and maintenance	1	ls	-	0.000	0.0	$ -	$ -	$ -	$ -	$ -	$ -	$ -	0	$ -	$ -	$ -	$ -	$0		
Secondary Dam																										$701,582	
	1	3	1	1	430	Ground densification (East Limb)	Gravel: supply and stockpile locally	2,339	m3	C.2.02	0.010	23.4	$ 0.37	$ 856	$ -	$ -	$ 1.61	$ 3,762	$ 1.13	2,032	$ 2,641	$ -	$ -	$ 3.10	$7,260		
	1	3	1	2	430		Gravel: load, haul, place	2,339	m3	R.098	0.023	53.0	$ 0.83	$ 1,939	$ -	$ -	$ 1.97	$ 4,606	$ 0.91	1,634	$ 2,124	$ -	$ -	$ 3.71	$8,668		
	1	3	1	3	510		Drill vibro-replacement stone columns	26,800	m3	C.9.01	0.267	7146.7	$ 12.55	$ 336,251	$ -	$ -	$ 6.80	$ 182,352	$ 4.37	90,117	$ 117,152	$ -	$ -	$ 23.72	$635,754		
	1	3	1	4	600		Verification testing	1	ls	C.9.02	530.639	530.6	$ 37,845.16	$ 37,845	$ -	$ -	$ 9,410.91	$ 9,411	$ 2,743.93	2,111	$ 2,744	$ -	$ -	$ 50,000.00	$50,000		
Subtotal Direct Costs - Dams												37,942		$1,707,141		$2,529		$1,838,975		647,734	$1,102,054		$0			$4,650,700	
Tailings																											
Intermediate Tailings																										$146,012	
	2	1	2	1	600	Annually treat water	Pump pond water to Faro Pit or water treatment facility	1	ls	-	0.000	0.0	$ -	$ -	$ -	$ -	$ -	$ -	$ -	0	$ -	$ -	$ -	$ -	$0		Annual cost included in Post Closure Costs
	2	1	3	1	600	Apply Surface dust suppresant	Purchase and apply	1,009,330	m2	C.4.01	0.002	2018.7	$ 0.07	$ 70,653	$ 0.03	$ 30,280	$ 0.03	$ 26,315	$ 0.02	14,433	$ 18,763	$ -	$ -	$ 0.14	$146,012		Annual cost included in Post Closure Costs
Secondary & Original Impoundment Tailings																										$130,528	
	2	2	1	1	600	Apply Surface dust suppresant	Purchase and apply	902,300	m2	C.4.01	0.002	1804.6	$ 0.07	$ 63,161	$ 0.03	$ 27,069	$ 0.03	$ 23,525	$ 0.02	12,903	$ 16,774	$ -	$ -	$ 0.14	$130,528		
Construct Perimeter Fence																										$904,219	
	2	3	1	1	600	Supply and install fence around tailing perime	7' Galvanized Chain-link Fence	7,900	m	C.4.05	0.175	1382.5	$ 0.13	$ 48,366	$ 106.10	$ 838,190	$ 1.30	$ 10,298	$ 0.93	5,649	$ 7,343	$ -	$ -	$ 114.46	$904,219		
Subtotal Direct Costs - Tailings												5,206		$182,202		$895,539		$60,138		32,985	$42,880		$0			$1,180,759	
Rose Creek Diversion Channel																											
Upgrade to PMF (670m3/s)																										$11,441,497	RCDC costs to be revised
	3	1	1	1	430	Clear and grub	Dozer: D10R/N	272,961	m2	C.2.05	0.015	3970.3	$ 0.53	$ 145,315	$ -	$ -	$ 0.94	$ 255,233	$ 0.62	129,555	$ 168,422	$ -	$ -	$ 2.08	$568,969		
	3	1	2	1	430	Excavate channel	Bulk excavate	240,588	m3	C.2.12	0.024	5669.8	$ 0.86	$ 207,187	$ -	$ -	$ 2.00	$ 480,422	$ 0.93	172,560	$ 224,339	$ -	$ -	$ 3.79	$911,948		
	3	1	2	2	430		Pilot Channel: Soil excavation	26,600	m3	C.2.12	0.024	625.9	$ 0.86	$ 22,907	$ -	$ -	$ 2.00	$ 53,117	$ 0.93	19,080	$ 24,804	$ -	$ -	$ 3.79	$100,828		
	3	1	3	1	430	Place till layer	Till: Load, haul, dump, place	94,885	m3	R.112	0.038	3590.2	$ 1.38	$ 131,403	$ -	$ -	$ 2.66	$ 260,945	$ 1.40	101,875	$ 132,437	$ -	$ -	$ 5.74	$544,784		
	3	1	3	2	430		Till: compact with vibrating drum roller	316,283	m2	C.2.06	0.016	5060.5	$ 0.57	$ 181,167	$ -	$ -	$ 0.02	$ 6,642	$ 0.02	3,951	$ 5,136	$ -	$ -	$ 0.61	$192,946		
	3	1	4	1	430	Place crushed rock transition material	Crushed Rock: Drill, blast, stockpile	7,503	m3	C.2.23	0.045	337.6	$ 1.62	$ 12,177	$ 15.72	$ 117,947	$ 2.64	$ 19,803	$ 1.36	7,871	$ 10,233	$ -	$ -	$ 21.35	$160,160		
	3	1	4	2	430		Crushed Rock: Load in crusher and stockpile	7,503	m3	C.2.07	0.024	180.1	$ 0.88	$ 6,591	$ -	$ -	$ 2.10	$ 15,738	$ 0.90	5,106	$ 6,755	$ -	$ -	$ 3.88	$29,083		
	3	1	4	3	430		Crushed Rock: Load, haul, dump place	7,503	m3	R.100	0.023	168.8	$ 0.82	$ 6,179	$ -	$ -	$ 2.00	$ 14,990	$ 0.94	5,453	$ 7,088	$ -	$ -	$ 3.77	$28,257		
	3	1	5	1	430	Place gravel transition material	Gravel: Excavate, screen and stockpile	11,560	m3	C.2.02	0.010	115.6	$ 0.37	$ 4,231	$ -	$ -	$ 1.61	$ 18,596	$ 1.13	10,043	$ 13,056	$ -	$ -	$ 3.10	$35,883		
	3	1	5	2	430		Gravel: load , haul, place	11,560	m3	R.113	0.039	445.0	$ 1.41	$ 16,310	$ -	$ -	$ 3.24	$ 37,451	$ 1.49	13,221	$ 17,187	$ -	$ -	$ 6.14	$70,958		
	3	1	6	1	430	Place sand and gravel material	Sand/Gravel: Produce, screen and stockpile	207,668	m3	C.2.02	0.010	2076.7	$ 0.37	$ 76,006	$ -	$ -	$ 1.61	$ 334,063	$ 1.13	180,416	$ 234,540	$ -	$ -	$ 3.10	$644,609		
	3	1	6	2	430		Sand/Gravel: Load, haul, dump and place	207,668	m3	R.113	0.039	8010.1	$ 1.41	$ 293,168	$ -	$ -	$ 3.24	$ 672,791	$ 1.49	237,501	$ 308,752	$ -	$ -	$ 6.14	$1,274,711		
	3	1	7	1	430	Place rockfill shell	Load, haul, dump and place waste rock	408,099	m3	R.114	0.049	19951.5	$ 1.79	$ 730,225	$ -	$ -	$ 4.32	$ 1,761,773	$ 2.11	662,083	$ 860,708	$ -	$ -	$ 8.22	$3,352,707		
	3	1	8	1	430	Place rip-rap	Rip-Rap: Screen and stockpile (from locally blasted material)	146,730	m3	C.2.25	0.057	8384.6	$ 2.09	$ 306,675	$ -	$ -	$ 9.19	$ 1,348,774	$ 6.45	728,426	$ 946,953	$ -	$ -	$ 17.74	$2,602,603		
	3	1	8	2	430		Rip-rap: Load, haul, dump	146,730	m3	R.100	0.023	3301.4	$ 0.82	$ 120,632	$ -	$ -	$ 2.00	$ 293,148	$ 0.94	106,632	$ 138,621	$ -	$ -	$ 3.77	$552,602		
	3	1	8	3	430		Rip-rap: Place and secure	146,730	m3	C.2.26	0.013	1834.1	$ 0.46	$ 67,129	$ -	$ -	$ 0.89	$ 130,501	$ 0.47	52,936	$ 68,816	$ -	$ -	$ 1.82	$266,446		
	3	1	9	1	430	Thermal blanket allowance	Over excavate for thermal protection layer	7,980	m3	C.2.12	0.024	187.8	$ 0.86	$ 6,872	$ -	$ -	$ 2.00	$ 15,935	$ 0.93	5,724	$ 7,441	$ -	$ -	$ 3.79	$30,248		
	3	1	9	2	430		Granular Fill: Produce, screen and stockpile	7,980	m3	C.2.02	0.010	79.8	$ 0.37	$ 2,921	$ -	$ -	$ 1.61	$ 12,837	$ 1.13	6,933	$ 9,013	$ -	$ -	$ 3.10	$24,770		
	3	1	9	3	430		Granular Fill: Load, haul, dump and place	7,980	m3	R.113	0.039	307.8	$ 1.41	$ 11,265	$ -	$ -	$ 3.24	$ 25,853	$ 1.49	9,126	$ 11,864	$ -	$ -	$ 6.14	$48,983		
North Fork Rock Drain																										$1,667,594	
	3	2	1	1	430	Construct ramp up to haul road	Excavate and doze WR material	22,500	m3	R.115	0.028	618.8	$ 1.01	$ 22,646	$ -	$ -	$ 2.59	$ 58,267	$ 1.23	21,299	$ 27,689	$ -	$ -	$ 4.83	$108,602		
	3	2	1	2	430		Grade road	15,000	m2	C.2.18	0.002	32.6	$ 0.08	$ 1,193	$ -	$ -	$ 0.09	$ 1,312	$ 0.09	982	$ 1,276	$ -	$ -	$ 0.25	$3,782		
	3	2	2	1	430	Breach drain	Excavate, load, haul and place breach material in Faro WR Dump	462,357	m3	R.116	0.012	5394.2	$ 0.43	$ 197,426	$ -	$ -	$ 1.65	$ 763,043	$ 1.07	381,124	$ 495,461	$ -	$ -	$ 3.15	$1,456,831		
	3	2	3	1	430	Create channel	Excavate channel	6,104	m3	C.2.12	0.024	143.6	$ 0.86	$ 5,257	$ -	$ -	$ 2.00	$ 12,189	$ 0.93	4,378	$ 5,692	$ -	$ -	$ 3.79	$23,137		
	3	2	3	2	430		Supply and place geotextile	3,924	m2	C.4.06	0.016	62.8	$ 0.57	$ 2,223	$ 3.50	$ 13,734	$ 0.23	$ 896	$ 0.15	448	$ 580	$ -	$ -	$ 4.44	$17,433		
	3	2	3	3	430		Bedding layer: Screen and stockpile	1,177	m3	C.2.02	0.010	11.8	$ 0.37	$ 431	$ -	$ -	$ 1.61	$ 1,894	$ 1.13	1,023	$ 1,330	$ -	$ -	$ 3.10	$3,654		
	3	2	3	4	430		Bedding layer: Load, haul, dump and place	1,177	m3	R.084	0.029	34.3	$ 1.07	$ 1,255	$ -	$ -	$ 2.21	$ 2,600	$ 1.04	938	$ 1,220	$ -	$ -	$ 4.31	$5,074		
	3	2	3	6	430		Rip-Rap (angular, high quality): Screen and Stockpile (from NFRD)	1,962	m3	C.2.25	0.057	112.1	$ 2.09	$ 4,103	$ -	$ -	$ 9.19	$ 18,035	$ 6.45	9,740	$ 12,662	$ -	$ -	$ 17.74	$34,801		
	3	2	3	7	430		Rip-rap: Load, haul, dump	1,962	m3	R.085	0.032	63.4	$ 1.18	$ 2,320	$ -	$ -	$ 2.81	$ 5,513	$ 1.30	1,955	$ 2,541	$ -	$ -	$ 5.29	$10,374		
	3	2	3	8	430		Rip-rap: Place and secure	1,962	m3	C.2.26	0.013	24.5	$ 0.46	$ 898	$ -	$ -	$ 0.89	$ 1,745	$ 0.47	708	$ 920	$ -	$ -	$ 1.82	$3,563		
	3	2	4	1	430	Revegetate disturbed areas	Seed/Fertilize, helicopter low application rate	3270	m2	C.5.02	0.000	0.4	$ 0.00	$ 15	$ 0.05	$ 149	$ 0.05	$ 178	$ 0.00	2	$ 2	$ -	$ -	$ 0.11	$344		
Spillway Allowance																										$17,400,000	
	3	3	1	1	600	Construction of spillway		1	ls	C.2.30	16000.000	16000.0	$ 746,400.00	$ 746,400	$ 16,416,591.40	$ 16,416,591	$ 125,888.60	$ 125,889	$ 111,120.00	85,477	$ 111,120	$ -	$ -	$ 17,400,000.00	$17,400,000		NHC-BGC 2004 report (1CD003.35)
Fish By-Pass Allowance																										$900,000	
	3	4	1	1	600	Fish ladder construction	Scenario 1b from NHC report	1	ls	C.2.16	840.000	840.0	$ 34,444.00	$ 34,444	$ 825,252.41	$ 825,252	$ 26,580.99	$ 26,581	$ 13,722.60	10,556	$ 13,723	$ -	$ -	$ 900,000.00	$900,000		
Subtotal Direct Costs - Rose Creek Diversion Channel												87,628		$3,367,380		$17,373,674		$6,797,654		2,977,217	$3,870,382		$0			$31,409,090	

Contract Code	Work Area Code	Item	Task	Sub-task	Estimate Type	Task	Activity	Quantity	Unit	Cost Code	Unit Mhrs	Total Mhrs	Labour Rate	Labor Cost	Unit Matl	Material Cost	Unit Equip.	Equipment Cost	Unit Fuel	Fuel Consumed (L)	Fuel Cost	Power Rate ($/Unit)	Power Cost	Unit Cost	Activity Total	Subtotals	Source / Comments
Groundwater Collection																											
Collect groundwater below CVD																										$1,457,234	
	4	1	1	1	500	Groundwater wells	Drill wells (Air Rotary Drill Rig, ~20m depth)	140	m	C.2.09	2.000	280.0	$ 102.13	$ 14,299	$ -	$ -	$ 100.85	$ 14,119	$ 22.08	2,378	$ 3,091	$ -	$ -	$ 225.07	$31,509		
	4	1	1	2	500		Install 6" stainless steel well casing & screen	140	m	C.3.17	0.150	21.0	$ 7.66	$ 1,072	$ 232.60	$ 32,564	$ 7.56	$ 1,059	$ 1.66	178	$ 232	$ -	$ -	$ 249.48	$34,927		
	4	1	1	3	500		Install 6" Submersible Pump with controls	7	ea.	C.3.07	12.000	84.0	$ 600.00	$ 4,200	$ 6,842.00	$ 47,894	$ -	$ -	$ -	0	$ -	$ -	$ -	$ 7,442.00	$52,094		
	4	1	1	4	500		Install protective housing (shack)	7	ea.	C.3.13	20.000	140.0	$ 1,300.00	$ 9,100	$ 445.00	$ 3,115	$ -	$ -	$ -	0	$ -	$ -	$ -	$ 1,745.00	$12,215		
	4	1	2	1	430	Pumping station	Excavate sump for manholes	200	m3	C.2.11	0.013	2.7	$ 0.49	$ 98	$ -	$ -	$ 0.95	$ 190	$ 0.50	77	$ 100	$ -	$ -	$ 1.94	$387		
	4	1	2	2	500		Supply and place precast concrete manhole	1	ea.	C.3.08	16.000	16.0	$ 746.40	$ 746	$ 1,344.68	$ 1,345	$ 72.47	$ 72	$ 62.92	48	$ 63	$ -	$ -	$ 2,226.47	$2,226		
	4	1	2	3	430		Backfill and compact around manhole	200	m3	C.2.01	0.030	6.0	$ 1.08	$ 216	$ -	$ -	$ 0.74	$ 148	$ 0.40	61	$ 79	$ -	$ -	$ 2.22	$443		
	4	1	2	4	500		Install primary pump	1	ea.	C.3.10	12.000	12.0	$ 600.00	$ 600	$ 1,829.00	$ 1,829	$ -	$ -	$ -	0	$ -	$ -	$ -	$ 2,429.00	$2,429		
	4	1	3	1	610	Piping system	Excavate piping trench	31,200	m3	C.2.13	0.020	624.0	$ 0.73	$ 22,838	$ -	$ -	$ 1.42	$ 44,399	$ 0.75	18,010	$ 23,412	$ -	$ -	$ 2.91	$90,649		
	4	1	3	2	510		Supply and install insulated 150mm HDPE pipe	5,200	m	C.3.03	0.250	1300.0	$ 8.75	$ 45,500	$ 155.84	$ 810,368	$ -	$ -	$ -	0	$ -	$ -	$ -	$ 164.59	$855,868		
	4	1	3	4	430		Bedding layer: Produce, screen and stockpile	2,028	m3	C.2.02	0.010	20.3	$ 0.37	$ 742	$ -	$ -	$ 1.61	$ 3,262	$ 1.13	1,782	$ 2,290	$ -	$ -	$ 3.10	$6,295		
	4	1	3	5	430		Bedding layer: Load, haul, place and compact	2,028	m3	R.102	0.032	64.9	$ 1.17	$ 2,375	$ -	$ -	$ 2.74	$ 5,555	$ 1.24	1,931	$ 2,510	$ -	$ -	$ 5.15	$10,440		
	4	1	3	6	430		Backfill ditches	29,172	m3	C.2.01	0.030	875.2	$ 1.08	$ 31,564	$ -	$ -	$ 0.74	$ 21,522	$ 0.40	8,875	$ 11,538	$ -	$ -	$ 2.22	$64,624		
	4	1	4	1	510	Heat tracing	Supply and install heat trace in HDPE pipe	5,200	m	C.3.04	0.250	1300.0	$ 12.50	$ 65,000	$ 21.32	$ 110,864	$ -	$ -	$ -	0	$ -	$ -	$ -	$ 33.82	$175,864		
	4	1	4	2	510		Supply/install heat tracing power feed kit	4	ea.	C.3.05	4.000	16.0	$ 230.00	$ 920	$ 396.84	$ 1,587	$ -	$ -	$ -	0	$ -	$ -	$ -	$ 626.84	$2,507		
	4	1	4	3	510		Supply/install electrical thermostats for heat tracing	1	ea.	C.3.06	1.000	1.0	$ 57.50	$ 58	$ 1,025.00	$ 1,025	$ -	$ -	$ -	0	$ -	$ -	$ -	$ 1,082.50	$1,083		
	4	1	5	1	510	Provide Electricity from WTP to pumps	Supply/install treated power poles	39	ea.	C.4.03	4.545	177.3	$ 287.88	$ 11,617	$ 325.96	$ 12,712	$ 85.85	$ 3,348	$ 28.17	845	$ 1,099	$ -	$ -	$ 737.86	$28,776		
	4	1	5	2	510		Supply/install overhead conductor	3,000	m	C.4.02	0.032	96.0	$ 2.21	$ 6,638	$ 1.41	$ 4,230	$ 0.45	$ 1,360	$ 0.15	343	$ 446	$ -	$ -	$ 4.22	$12,674		
	4	1	5	3	510		Supply/install transformers	4	ea.	C.4.04	20.000	80.0	$ 1,383.00	$ 5,532	$ 8,934.00	$ 35,736	$ 224.98	$ 900	$ 143.00	440	$ 572	$ -	$ -	$ 10,684.98	$42,740		
	4	1	6	1	510	Monitoring wells	Drill wells (Air Rotary Drill Rig, ~15m depth)	60	m	C.2.09	2.000	120.0	$ 102.13	$ 6,128	$ -	$ -	$ 100.85	$ 6,051	$ 22.08	1,019	$ 1,325	$ -	$ -	$ 225.07	$13,504		
	4	1	6	2	510		Install 6" stainless steel well casing & screen	60	m	C.3.17	0.150	9.0	$ 7.66	$ 460	$ 232.60	$ 13,956	$ 7.56	$ 454	$ 1.66	76	$ 99	$ -	$ -	$ 249.48	$14,969		
	4	1	6	3	510		Install protective well cover	3	ea.	C.3.18	1.333	4.0	$ 46.80	$ 146	$ 164.54	$ 494	$ 100.85	$ 303	$ 22.08	51	$ 66	$ -	$ -	$ 336.27	$1,009		
Subtotal Direct Costs - Groundwater Collection												5,249		$229,851		$1,077,719		$102,742		36,094	$46,922		$0			$1,457,234	
Miscellaneous																											
Reclaim unnecessary roads																										$2,143	
	6	1	1	1		Reclaim unnecessary roads	Scarify road surfaces	6,000	m2	C.2.18	0.002	13.0	$ 0.08	$ 477	$ -	$ -	$ 0.09	$ 525	$ 0.09	393	$ 510	$ -	$ -	$ 0.25	$1,513		
	6	1	1	2			Seed/Fertilize, helicopter low application rate	6,000	m2	C.5.02	0.000	0.8	$ 0.00	$ 27	$ 0.05	$ 273	$ 0.05	$ 327	$ 0.00	3	$ 4	$ -	$ -	$ 0.11	$631		
Subtotal Direct Costs - Miscellaneous												14		$504		$273		$852		396	$514		$0			$2,143	
Subtotal Direct Costs																											
							Subtotal direct costs					136,038		$5,467,078		$10,349,733		$8,800,361		3,894,425	$5,062,753		$0			$38,699,926	
CLOSURE COSTS - INDIRECT																											
	100	100	1	1		Project Management	5.0% of direct costs															$ 38,699,926	x	5.0%		$1,934,996	
	100	100	2	1		Field Supervision	(included in major tasks)																			$0	
	100	100	3	1		Contractor profit and home office overhead	10% of direct costs															$ 38,699,926	x	10.0%		$3,869,993	
	100	100	4	1		Insurance	0.5% of direct costs															$ 38,699,926	x	0.5%		$193,500	
	100	100	5	1		Bonding	0.5% of direct costs															$ 38,699,926	x	0.5%		$193,500	
	100	100	6	1		Field Engineering and QA	10% of direct costs															$ 38,699,926	x	10.0%		$3,869,993	
	100	100	7	1		Mob - Demob																1	lump	$500,000		$500,000	
	100	100	8	1		Living out allowances	(included in heavy equipment costs)																			$0	
Subtotal Indirect Costs																											
							Subtotal indirect costs																			$10,561,981	
CLOSURE COSTS - CONTINGENCY																											
							Contingency	20% of direct costs														$38,699,926	x	20.0%		$7,739,985	
CLOSURE COSTS - TOTAL																											
							Total direct and indirect costs																			$57,001,892	

Tailings Area Post Closure Costs

Costs in 2006 dollars

Notes:

1 Groundwater pumping costs include maintenance on the pumps

2 Environmental management costs split evenly between the Fiaro Mine, Tailings Area and Vangorda/Grum Mine sits.

4.1 Stabilize In Place

		Closure Period					Post-Closure Period														
	NPV	Year 1	Year 2	Year 3	Year 4	Year 5															
	3%	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030
Earthworks Inspection and Maintenance																					
	$6,114,752	$0	$0	$0	$0	$0	$437,039	$437,039	$437,039	$437,039	$437,039	$437,039	$437,039	$437,039	$437,039	$437,039	$145,680	$145,680	$145,680	$145,680	$145,680
Water Management and Pumping Costs [1]																					
CVD Groundwater Collection System	$1,885,221	$0	$0	$0	$0	$0	$69,163	$69,163	$69,163	$69,163	$69,163	$69,163	$69,163	$69,163	$69,163	$69,163	$69,163	$69,163	$69,163	$69,163	$69,163
Intermediate Dam Seepage Collection System	$203,963	$0	$0	$0	$0	$0	$7,483	$7,483	$7,483	$7,483	$7,483	$7,483	$7,483	$7,483	$7,483	$7,483	$7,483	$7,483	$7,483	$7,483	$7,483
Subtotal	$2,089,184	$0	$0	$0	$0	$0	$76,646	$76,646	$76,646	$76,646	$76,646	$76,646	$76,646	$76,646	$76,646	$76,646	$76,646	$76,646	$76,646	$76,646	$76,646
Water Treatment System Construction																					
	$5,190,727	$0	$0	$0	$0	$0	$6,198,000	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0
Water Treatment System Operation																					
	$31,492,651	$0	$0	$0	$0	$0	$0	$1,192,000	$1,192,000	$1,192,000	$1,192,000	$1,192,000	$1,192,000	$1,192,000	$1,192,000	$1,192,000	$1,192,000	$1,192,000	$1,192,000	$1,192,000	$1,192,000
Environmental Management [2]																					
Full-Time Site Manager	$954,012	0	$0	$0	$0	$0	$35,000	$35,000	$35,000	$35,000	$35,000	$35,000	$35,000	$35,000	$35,000	$35,000	$35,000	$35,000	$35,000	$35,000	$35,000
Full-Time Assistant Manager	$681,437	0	$0	$0	$0	$0	$25,000	$25,000	$25,000	$25,000	$25,000	$25,000	$25,000	$25,000	$25,000	$25,000	$25,000	$25,000	$25,000	$25,000	$25,000
Full-Time Technician	$681,437	$0	$0	$0	$0	$0	$25,000	$25,000	$25,000	$25,000	$25,000	$25,000	$25,000	$25,000	$25,000	$25,000	$25,000	$25,000	$25,000	$25,000	$25,000
Full-Time Vehicles (2)	$216,060	$0	$0	$0	$0	$0	$8,000	$8,000	$8,000	$8,000	$8,000	$8,000	$8,000	$8,000	$8,000	$8,000	$8,000	$8,000	$8,000	$8,000	$8,000
Part-Time Administration	$190,802	$0	$0	$0	$0	$0	$7,000	$7,000	$7,000	$7,000	$7,000	$7,000	$7,000	$7,000	$7,000	$7,000	$7,000	$7,000	$7,000	$7,000	$7,000
Part-Time Technicians (2)	$681,437	$0	$0	$0	$0	$0	$25,000	$25,000	$25,000	$25,000	$25,000	$25,000	$25,000	$25,000	$25,000	$25,000	$25,000	$25,000	$25,000	$25,000	$25,000
Part-Time Tradesmen (4)	$1,362,875	$0	$0	$0	$0	$0	$50,000	$50,000	$50,000	$50,000	$50,000	$50,000	$50,000	$50,000	$50,000	$50,000	$50,000	$50,000	$50,000	$50,000	$50,000
Part-Time Vehicles (4)	$436,120	$0	$0	$0	$0	$0	$16,000	$16,000	$16,000	$16,000	$16,000	$16,000	$16,000	$16,000	$16,000	$16,000	$16,000	$16,000	$16,000	$16,000	$16,000
Office	$354,347	$0	$0	$0	$0	$0	$13,000	$13,000	$13,000	$13,000	$13,000	$13,000	$13,000	$13,000	$13,000	$13,000	$13,000	$13,000	$13,000	$13,000	$13,000
Analytical costs	$2,316,887	$0	$0	$0	$0	$0	$85,000	$85,000	$85,000	$85,000	$85,000	$85,000	$85,000	$85,000	$85,000	$85,000	$85,000	$85,000	$85,000	$85,000	$85,000
Subtotal	$7,877,416	$0	$0	$0	$0	$0	$289,000	$289,000	$289,000	$289,000	$289,000	$289,000	$289,000	$289,000	$289,000	$289,000	$289,000	$289,000	$289,000	$289,000	$289,000
Total	$52,764,730	$0	$0	$0	$0	$0	$7,000,685	$1,994,685	$1,994,685	$1,994,685	$1,994,685	$1,994,685	$1,994,685	$1,994,685	$1,994,685	$1,994,685	$1,703,326	$1,703,326	$1,703,326	$1,703,326	$1,703,326

4.2 Complete Relocation

		Start of Closure																			
	NPV	Year 1	Year 2	Year 3	Year 4	Year 5	Year 6	Year 7	Year 8	Year 9	Year 10	Year 11	Year 12	Year 13	Year 14	Year 15					
	3%	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030
Earthworks Inspection and Maintenance																					
	$278,871	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$27,199	$27,199	$27,199	$27,199	$27,199
Water Management and Pumping Costs [1]																					
CVD Groundwater Collection System	$1,369,999	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$69,163	$69,163	$69,163	$69,163	$69,163
Adaptive Management Phase I	$607,124	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$30,650	$30,650	$30,650	$30,650	$30,650
Adaptive Management Phase II	$275,738	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$15,325	$15,325
Adaptive Management Phase III	$100,110	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0
Subtotal	$2,352,972	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$99,814	$99,814	$99,814	$115,139	$115,139
Water Treatment System Construction																					
	$3,362,499	$0	$0	$0	$0	$0	$4,015,000	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0
Water Treatment System Operation																					
	$12,865,345	$0	$0	$0	$0	$0	$0	$693,000	$693,000	$693,000	$693,000	$693,000	$693,000	$693,000	$693,000	$693,000	$693,000	$693,000	$693,000	$693,000	$693,000
Environmental Management [2]																					
Full-Time Site Manager	$686,941	0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$35,000	$35,000	$35,000	$35,000	$35,000
Full-Time Assistant Manager	$490,672	0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$25,000	$25,000	$25,000	$25,000	$25,000
Full-Time Technician	$490,672	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$25,000	$25,000	$25,000	$25,000	$25,000
Full-Time Vehicles (2)	$157,015	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$8,000	$8,000	$8,000	$8,000	$8,000
Part-Time Administration	$137,388	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$7,000	$7,000	$7,000	$7,000	$7,000
Part-Time Technicians (2)	$490,672	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$25,000	$25,000	$25,000	$25,000	$25,000
Part-Time Tradesmen (4)	$981,345	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$50,000	$50,000	$50,000	$50,000	$50,000
Part-Time Vehicles (4)	$314,030	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$16,000	$16,000	$16,000	$16,000	$16,000
Office	$255,159	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$13,000	$13,000	$13,000	$13,000	$13,000
Analytical costs	$1,691,438	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$85,000	$85,000	$85,000	$85,000	$85,000
Subtotal	$5,750,888	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$289,000	$289,000	$289,000	$289,000	$289,000
Total	$24,610,575	$0	$0	$0	$0	$0	$4,015,000	$693,000	$693,000	$693,000	$693,000	$693,000	$693,000	$693,000	$693,000	$693,000	$1,109,013	$1,109,013	$1,109,013	$1,124,338	$1,124,338

4.3 Partial Relocation

		Start of Closure																			
	NPV	Year 1	Year 2	Year 3	Year 4	Year 5	Year 6	Year 7	Year 8												
	3%	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030
Earthworks Inspection and Maintenance																					
	$2,849,705	$0	$0	$0	$0	$0	$0	$0	$0	$223,834	$223,834	$223,834	$223,834	$223,834	$223,834	$223,834	$223,834	$223,834	$223,834	$74,611	$74,611
Water Management and Pumping Costs [1]																					
CVD Groundwater Collection System	$1,710,162	$0	$0	$0	$0	$0	$0	$0	$0	$69,163	$69,163	$69,163	$69,163	$69,163	$69,163	$69,163	$69,163	$69,163	$69,163	$69,163	$69,163
Secondary Dam Collection System	$796,148	$0	$0	$0	$0	$0	$0	$0	$0	$32,198	$32,198	$32,198	$32,198	$32,198	$32,198	$32,198	$32,198	$32,198	$32,198	$32,198	$32,198
Adaptive Management Phase I	$375,025	$0	$0	$0	$0	$0	$0	$0	$0	$15,167	$15,167	$15,167	$15,167	$15,167	$15,167	$15,167	$15,167	$15,167	$15,167	$15,167	$15,167
Adaptive Management Phase II	$142,118	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$6,318	$6,318	$6,318	$6,318	$6,318	$6,318	$6,318	$6,318	$6,318
Adaptive Management Phase III	$56,858	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$2,780	$2,780	$2,780	$2,780	$2,780
Subtotal	$3,080,310	$0	$0	$0	$0	$0	$0	$0	$0	$116,529	$116,529	$116,529	$122,847	$122,847	$122,847	$125,627	$125,627	$125,627	$125,627	$125,627	$125,627
Water Treatment System Construction																					
	$3,907,702	$0	$0	$0	$0	$0	$4,666,000	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0
Water Treatment System Operation																					
	$24,801,819	$0	$0	$0	$0	$0	$0	$942,000	$942,000	$942,000	$942,000	$942,000	$942,000	$942,000	$942,000	$942,000	$942,000	$942,000	$942,000	$942,000	$942,000
Environmental Management [2]																					
Full-Time Site Manager	$868,613	0	$0	$0	$0	$0	$0	$0	$0	$35,000	$35,000	$35,000	$35,000	$35,000	$35,000	$35,000	$35,000	$35,000	$35,000	$35,000	$35,000
Full-Time Assistant Manager	$620,438	0	$0	$0	$0	$0	$0	$0	$0	$25,000	$25,000	$25,000	$25,000	$25,000	$25,000	$25,000	$25,000	$25,000	$25,000	$25,000	$25,000
Full-Time Technician	$620,438	$0	$0	$0	$0	$0	$0	$0	$0	$25,000	$25,000	$25,000	$25,000	$25,000	$25,000	$25,000	$25,000	$25,000	$25,000	$25,000	$25,000
Full-Time Vehicles (2)	$198,540	$0	$0	$0	$0	$0	$0	$0	$0	$8,000	$8,000	$8,000	$8,000	$8,000	$8,000	$8,000	$8,000	$8,000	$8,000	$8,000	$8,000
Part-Time Administration	$173,723	$0	$0	$0	$0	$0	$0	$0	$0	$7,000	$7,000	$7,000	$7,000	$7,000	$7,000	$7,000	$7,000	$7,000	$7,000	$7,000	$7,000
Part-Time Technicians (2)	$620,438	$0	$0	$0	$0	$0	$0	$0	$0	$25,000	$25,000	$25,000	$25,000	$25,000	$25,000	$25,000	$25,000	$25,000	$25,000	$25,000	$25,000
Part-Time Tradesmen (4)	$1,240,875	$0	$0	$0	$0	$0	$0	$0	$0	$50,000	$50,000	$50,000	$50,000	$50,000	$50,000	$50,000	$50,000	$50,000	$50,000	$50,000	$50,000
Part-Time Vehicles (4)	$397,080	$0	$0	$0	$0	$0	$0	$0	$0	$16,000	$16,000	$16,000	$16,000	$16,000	$16,000	$16,000	$16,000	$16,000	$16,000	$16,000	$16,000
Office	$322,628	$0	$0	$0	$0	$0	$0	$0	$0	$13,000	$13,000	$13,000	$13,000	$13,000	$13,000	$13,000	$13,000	$13,000	$13,000	$13,000	$13,000
Analytical costs	$2,109,488	$0	$0	$0	$0	$0	$0	$0	$0	$85,000	$85,000	$85,000	$85,000	$85,000	$85,000	$85,000	$85,000	$85,000	$85,000	$85,000	$85,000
Subtotal	$7,172,260	$0	$0	$0	$0	$0	$0	$0	$0	$289,000	$289,000	$289,000	$289,000	$289,000	$289,000	$289,000	$289,000	$289,000	$289,000	$289,000	$289,000
Total	$41,811,796	$0	$0	$0	$0	$0	$4,666,000	$942,000	$942,000	$1,571,362	$1,571,362	$1,571,362	$1,577,681	$1,577,681	$1,577,681	$1,580,461	$1,580,461	$1,580,461	$1,580,461	$1,431,238	$1,431,238

4.4 Minimize Up-Front Construction

		Start of Closure																			
	NPV	Year 1	Year 2	Year 3	Year 4	Year 5															
	3%	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030
Earthworks Inspection and Maintenance																					
	$2,517,144	$0	$0	$0	$0	$0	$180,299	$180,299	$180,299	$180,299	$180,299	$180,299	$180,299	$180,299	$180,299	$180,299	$60,100	$60,100	$60,100	$60,100	$60,100
Tailings Dust Suppression																					
	$3,545,985	$0	$0	$0	$0	$0	$130,528	$130,528	$130,528	$130,528	$130,528	$130,528	$130,528	$130,528	$130,528	$130,528	$130,528	$130,528	$130,528	$130,528	$130,528
Water Management and Pumping Costs [1]																					
CVD Groundwater Collection System	$1,878,919	$0	$0	$0	$0	$0	$69,163	$69,163	$69,163	$69,163	$69,163	$69,163	$69,163	$69,163	$69,163	$69,163	$69,163	$69,163	$69,163	$69,163	$69,163
Water Treatment System Construction																					
	$5,338,125	$0	$0	$0	$0	$0	$6,374,000	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0
Water Treatment System Operation																					
	$35,675,652	$0	$0	$0	$0	$0	$0	$1,355,000	$1,355,000	$1,355,000	$1,355,000	$1,355,000	$1,355,000	$1,355,000	$1,355,000	$1,355,000	$1,355,000	$1,355,000	$1,355,000	$1,355,000	$1,355,000
Environmental Management [2]																					
Full-Time Site Manager	$954,012	0	$0	$0	$0	$0	$35,000	$35,000	$35,000	$35,000	$35,000	$35,000	$35,000	$35,000	$35,000	$35,000	$35,000	$35,000	$35,000	$35,000	$35,000
Full-Time Assistant Manager	$681,437	0	$0	$0	$0	$0	$25,000	$25,000	$25,000	$25,000	$25,000	$25,000	$25,000	$25,000	$25,000	$25,000	$25,000	$25,000	$25,000	$25,000	$25,000
Full-Time Technician	$681,437	$0	$0	$0	$0	$0	$25,000	$25,000	$25,000	$25,000	$25,000	$25,000	$25,000	$25,000	$25,000	$25,000	$25,000	$25,000	$25,000	$25,000	$25,000
Full-Time Vehicles (2)	$216,060	$0	$0	$0	$0	$0	$8,000	$8,000	$8,000	$8,000	$8,000	$8,000	$8,000	$8,000	$8,000	$8,000	$8,000	$8,000	$8,000	$8,000	$8,000
Part-Time Administration	$190,802	$0	$0	$0	$0	$0	$7,000	$7,000	$7,000	$7,000	$7,000	$7,000	$7,000	$7,000	$7,000	$7,000	$7,000	$7,000	$7,000	$7,000	$7,000
Part-Time Technicians (2)	$681,437	$0	$0	$0	$0	$0	$25,000	$25,000	$25,000	$25,000	$25,000	$25,000	$25,000	$25,000	$25,000	$25,000	$25,000	$25,000	$25,000	$25,000	$25,000
Part-Time Tradesmen (4)	$1,362,875	$0	$0	$0	$0	$0	$50,000	$50,000	$50,000	$50,000	$50,000	$50,000	$50,000	$50,000	$50,000	$50,000	$50,000	$50,000	$50,000	$50,000	$50,000
Part-Time Vehicles (4)	$436,120	$0	$0	$0	$0	$0	$16,000	$16,000	$16,000	$16,000	$16,000	$16,000	$16,000	$16,000	$16,000	$16,000	$16,000	$16,000	$16,000	$16,000	$16,000
Office	$354,347	$0	$0	$0	$0	$0	$13,000	$13,000	$13,000	$13,000	$13,000	$13,000	$13,000	$13,000	$13,000	$13,000	$13,000	$13,000	$13,000	$13,000	$13,000
Analytical costs	$2,316,887	$0	$0	$0	$0	$0	$85,000	$85,000	$85,000	$85,000	$85,000	$85,000	$85,000	$85,000	$85,000	$85,000	$85,000	$85,000	$85,000	$85,000	$85,000
Subtotal	$7,877,416	$0	$0	$0	$0	$0	$289,000	$289,000	$289,000	$289,000	$289,000	$289,000	$289,000	$289,000	$289,000	$289,000	$289,000	$289,000	$289,000	$289,000	$289,000
Total	$56,866,908	$0	$0	$0	$0	$0	$7,042,991	$2,023,991	$2,023,991	$2,023,991	$2,023,991	$2,023,991	$2,023,991	$2,023,991	$2,023,991	$2,023,991	$1,903,791	$1,903,791	$1,903,791	$1,903,791	$1,903,791

Summary NPV Calculations for Vangorda/Grum Area Alternatives

NPV: Vangorda/Grum Alternative 1 - Backfill Vangorda Pit

Closure Costs	Direct Cost	Indirect Cost	Contingency	Total	% of Total
Vangorda Pit	$43,098,876	$12,655,815	$8,619,775	$64,374,466	75%
Vangorda Dump	$160,311	$47,075	$32,062	$239,448	0%
Vangorda Creek Diversion	$658,791	$193,451	$131,758	$984,001	1%
Grum Pit	$458,708	$134,698	$91,742	$685,148	1%
Grum Dump	$6,856,649	$2,013,428	$1,371,330	$10,241,408	12%
Overburden Dump	$207,299	$60,873	$41,460	$309,631	0%
Ore Transfer Pad	$1,780,568	$522,857	$356,114	$2,659,539	3%
Groundwater	$2,604,028	$764,663	$520,806	$3,889,497	5%
Vangorda Haul Road	$1,106,227	$324,839	$221,245	$1,652,312	2%
Miscellaneous (Demolition, contaminated soils, etc.)	$898,285	$263,778	$179,657	$1,341,719	2%
Closure Costs Subtotal	$57,829,743	$16,981,477	$11,565,949	$86,377,168	
Post Closure Costs					
Earthworks Inspection and Maintenance					
Water Management Pumping Costs					
Water Treatment System Operation					
Environmental Management					
Post Closure Costs Subtotal					
TOTAL					

	Year 1	Year 2	Year 3	Year 4	Year 5	Year 6	Year 7									
NPV- 2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025	
$59,649,893	$15,449,872	$15,449,872	$15,449,872	$15,449,872	$2,574,979	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	
$220,656	$150,852	$0	$0	$0	$0	$88,596	$0	$0	$0	$0	$0	$0	$0	$0	$0	
$848,808	$0	$0	$0	$0	$984,001	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	
$574,568	$0	$0	$171,287	$0	$0	$0	$513,861	$0	$0	$0	$0	$0	$0	$0	$0	
$8,681,346	$0	$1,741,039	$0	$0	$2,867,594	$2,867,594	$2,662,766	$0	$0	$0	$0	$0	$0	$0	$0	
$251,759	$0	$0	$0	$0	$0	$0	$309,631	$0	$0	$0	$0	$0	$0	$0	$0	
$3,726,336	$0	$0	$3,670,164	$0	$0	$0	$452,122	$0	$0	$0	$0	$0	$0	$0	$0	
$3,520,904	$0	$0	$1,789,169	$1,478,009	$661,214	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	
$1,383,785	$0	$0	$0	$0	$0	$1,652,312	$0	$0	$0	$0	$0	$0	$0	$0	$0	
$1,218,361	$0	$925,786	$0	$0	$0	$308,595	$107,338	$0	$0	$0	$0	$0	$0	$0	$0	
$80,076,415	$15,600,724	$18,116,697	$21,080,491	$16,927,881	$7,087,788	$4,917,097	$4,045,717	$0	$0	$0	$0	$0	$0	$0	$0	
$837,837	$0	$0	$0	$0	$0	$0	$0	$63,972	$63,972	$63,972	$63,972	$63,972	$63,972	$63,972	$63,972	
$3,553,526	$0	$0	$0	$0	$0	$0	$0	$139,797	$139,797	$139,797	$139,797	$139,797	$139,797	$139,797	$139,797	
$6,329,885	$200,000	$200,000	$200,000	$200,000	$200,000	$200,000	$200,000	$200,000	$200,000	$200,000	$200,000	$200,000	$200,000	$200,000	$200,000	
$6,401,373	$0	$0	$0	$0	$0	$0	$0	$289,000	$289,000	$289,000	$289,000	$289,000	$260,667	$260,667	$260,667	
$17,122,620	$200,000	$200,000	$200,000	$200,000	$200,000	$200,000	$200,000	$692,769	$692,769	$692,769	$692,769	$692,769	$664,436	$664,436	$664,436	
$97,199,035	$15,800,724	$18,316,697	$21,280,491	$17,127,881	$7,287,788	$5,117,097	$4,245,717	$692,769	$692,769	$692,769	$692,769	$692,769	$664,436	$664,436	$664,436	

NPV: Vangorda/Grum Alternative 2 - Stabilize In Place

Closure Costs	Direct Cost	Indirect Cost	Contingency	Total	% of Total
Vangorda Pit	$922,948	$283,295	$184,590	$1,390,833	4%
Vangorda Dump	$5,586,312	$1,714,695	$1,117,262	$8,418,269	25%
Vangorda Creek Diversion	$2,590,285	$795,077	$518,057	$3,903,419	11%
Grum Pit	$455,728	$139,884	$91,146	$686,757	2%
Grum Dump	$6,924,555	$2,125,463	$1,384,911	$10,434,929	30%
Overburden Dump	$104,857	$32,185	$20,971	$158,013	0%
Ore Transfer Pad	$1,433,557	$440,024	$286,711	$2,160,293	6%
Groundwater	$2,768,861	$849,890	$553,772	$4,172,524	12%
Vangorda Haul Road	$1,098,044	$337,040	$219,609	$1,654,693	5%
Miscellaneous (Demolition, contaminated soils, etc.)	$898,285	$275,725	$179,657	$1,353,666	4%
Closure Costs Subtotal	$22,783,432	$6,993,278	$4,556,686	$34,333,397	
Post Closure Costs					
Earthworks Inspection and Maintenance					
Water Management Pumping Costs					
Water Treatment System Construction					
Water Treatment System Operation					
Environmental Management					
Post Closure Costs Subtotal					
TOTAL					

	Year 1	Year 2	Year 3	Year 4	Year 5											
NPV- 2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025	
$1,343,244	$1,140,483	$250,350	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	
$7,940,062	$420,913	$7,828,990	$84,183	$84,183	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	
$3,732,330	$1,873,641	$2,029,778	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	
$601,783	$0	$0	$178,557	$0	$508,200	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	
$9,560,852	$1,773,938	$0	$5,582,687	$2,869,606	$208,699	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	
$138,304	$0	$0	$0	$0	$158,013	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	
$2,024,421	$0	$1,728,234	$432,059	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	
$3,705,977	$0	$0	$1,627,284	$2,211,438	$292,077	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	
$1,427,353	$0	$0	$0	$0	$1,654,693	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	
$1,268,807	$934,030	$0	$0	$0	$419,636	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	
$31,741,133	$6,143,005	$11,837,352	$7,904,770	$5,165,226	$3,241,318	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	
$1,320,775	$0	$0	$0	$0	$0	$95,057	$95,057	$95,057	$95,057	$95,057	$95,057	$95,057	$95,057	$95,057	$95,057	
$2,619,604	$0	$0	$0	$0	$0	$97,140	$97,140	$97,140	$97,140	$97,140	$97,140	$97,140	$97,140	$97,140	$97,140	
$2,666,019	$2,746,000	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	
$16,020,401	$0	$523,953	$523,953	$523,953	$523,953	$523,953	$523,953	$523,953	$523,953	$523,953	$523,953	$523,953	$523,953	$523,953	$523,953	
$7,793,511	$0	$0	$0	$0	$0	$289,000	$289,000	$289,000	$289,000	$289,000	$289,000	$289,000	$289,000	$289,000	$289,000	
$30,420,310	$2,746,000	$523,953	$523,953	$523,953	$523,953	$1,005,151	$1,005,151	$1,005,151	$1,005,151	$1,005,151	$1,005,151	$1,005,151	$1,005,151	$1,005,151	$1,005,151	
$62,161,443	$8,889,005	$12,361,306	$8,428,723	$5,689,180	$3,765,272	$1,005,151	$1,005,151	$1,005,151	$1,005,151	$1,005,151	$1,005,151	$1,005,151	$1,005,151	$1,005,151	$1,005,151	

NPV: Vangorda/Grum Alternative 3 - Minimize Up-Front Construction

Closure Costs	Direct Cost	Indirect Cost	Contingency	Total	% of Total
Vangorda Pit	$280,077	$96,527	$56,015	$432,619	3%
Vangorda Dump	$1,676,341	$577,741	$335,268	$2,589,350	20%
Vangorda Creek Diversion	$1,305,232	$449,840	$261,046	$2,016,118	16%
Grum Pit	$455,728	$157,064	$91,146	$703,937	5%
Overburden Dump	$104,857	$36,138	$20,971	$161,966	1%
Groundwater	$2,768,861	$954,272	$553,772	$4,276,906	33%
Vangorda Haul Road	$1,098,044	$378,435	$219,609	$1,696,088	13%
Miscellaneous (Demolition, contaminated soils, etc.)	$693,908	$239,151	$138,782	$1,071,841	8%
Closure Costs Subtotal	$8,383,047	$2,889,168	$1,676,609	$12,948,825	
Post Closure Costs					
Earthworks Inspection and Maintenance					
Water Management Pumping Costs					
Water Treatment System Construction					
Water Treatment System Operation					
Environmental Management					
Post Closure Costs Subtotal					
TOTAL					

	Year 1	Year 2	Year 3													
NPV- 2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025	
$414,881	$250,919	$181,700	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	
$2,450,293	$414,296	$2,097,373	$77,680	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	
$1,904,946	$161,289	$1,854,829	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	
$668,704	$183,024	$520,914	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	
$148,222	$0	$0	$161,966	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	
$4,045,684	$1,667,993	$1,411,379	$1,197,534	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	
$1,552,160	$0	$0	$1,696,088	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	
$1,028,872	$739,570	$246,523	$85,747	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	
$12,213,762	$3,417,092	$6,312,718	$3,219,015	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	
$355,787	$0	$0	$0	$24,077	$24,077	$24,077	$24,077	$24,077	$24,077	$24,077	$24,077	$24,077	$24,077	$8,026	$8,026	
$2,789,706	$0	$0	$0	$97,140	$97,140	$97,140	$97,140	$97,140	$97,140	$97,140	$97,140	$97,140	$97,140	$97,140	$97,140	
$3,866,232	$2,746,000	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	
$16,631,921	$0	$543,953	$543,953	$543,953	$543,953	$543,953	$543,953	$543,953	$543,953	$543,953	$543,953	$543,953	$543,953	$543,953	$543,953	
$8,299,577	$0	$0	$0	$289,000	$289,000	$289,000	$289,000	$289,000	$289,000	$289,000	$289,000	$289,000	$289,000	$289,000	$289,000	
$31,943,224	$2,746,000	$543,953	$543,953	$954,171	$954,171	$954,171	$954,171	$954,171	$954,171	$954,171	$954,171	$954,171	$954,171	$938,120	$938,120	
$44,156,986	$6,163,092	$6,856,672	$3,762,969	$954,171	$954,171	$954,171	$954,171	$954,171	$954,171	$954,171	$954,171	$954,171	$954,171	$938,120	$938,120	

NPV: Vangorda/Grum Alternative 4 - Minimize Water Treatment

Closure Costs	Direct Cost	Indirect Cost	Contingency	Total	% of Total
Vangorda Pit	$43,098,876	$12,593,245	$8,619,775	$64,311,896	62%
Vangorda Dump	$160,311	$46,842	$32,062	$239,216	0%
Vangorda Creek Diversion	$658,791	$192,495	$131,758	$983,044	1%
Grum Pit	$458,708	$134,032	$91,742	$684,482	1%
Grum Dump	$18,526,522	$5,413,344	$3,705,304	$27,645,170	27%
Overburden Dump	$207,299	$60,572	$41,460	$309,330	0%
Ore Transfer Pad	$1,780,568	$520,272	$356,114	$2,656,954	3%
Groundwater	$2,604,028	$760,882	$520,806	$3,885,716	4%
Vangorda Haul Road	$1,106,227	$323,233	$221,245	$1,650,706	2%
Miscellaneous (Demolition, contaminated soils, etc.)	$898,285	$262,474	$179,657	$1,340,415	1%
Closure Costs Subtotal	$69,499,615	$20,307,390	$13,899,923	$103,706,928	
Post Closure Costs					
Earthworks Inspection and Maintenance					
Water Management Pumping Costs					
Water Treatment System Operation					
Environmental Management					
Post Closure Costs Subtotal					
TOTAL					

	Year 1	Year 2	Year 3	Year 4	Year 5	Year 6	Year 7									
NPV- 2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025	
$59,591,915	$15,434,855	$15,434,855	$15,434,855	$15,434,855	$2,572,476	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	
$214,141	$0	$0	$148,314	$0	$90,902	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	
$847,983	$0	$0	$0	$0	$983,044	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	
$574,009	$0	$0	$171,120	$0	$0	$0	$513,361	$0	$0	$0	$0	$0	$0	$0	$0	
$23,372,435	$1,658,710	$0	$0	$0	$7,556,346	$10,597,315	$7,832,798	$0	$0	$0	$0	$0	$0	$0	$0	
$251,514	$0	$0	$0	$0	$0	$0	$309,330	$0	$0	$0	$0	$0	$0	$0	$0	
$2,415,201	$0	$0	$2,045,854	$611,099	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	
$3,520,775	$0	$1,593,144	$0	$1,942,858	$0	$349,714	$0	$0	$0	$0	$0	$0	$0	$0	$0	
$1,382,440	$0	$0	$0	$0	$0	$1,650,706	$0	$0	$0	$0	$0	$0	$0	$0	$0	
$1,249,583	$0	$1,233,182	$0	$0	$0	$0	$107,233	$0	$0	$0	$0	$0	$0	$0	$0	
$93,419,995	$17,093,565	$18,261,181	$17,800,144	$17,988,813	$11,202,769	$12,597,735	$8,762,723	$0	$0	$0	$0	$0	$0	$0	$0	
$1,288,662	$0	$0	$0	$0	$0	$0	$0	$98,394	$98,394	$98,394	$98,394	$98,394	$98,394	$98,394	$98,394	
$3,553,526	$0	$0	$0	$0	$0	$0	$0	$139,797	$139,797	$139,797	$139,797	$139,797	$139,797	$139,797	$139,797	
$6,329,885	$200,000	$200,000	$200,000	$200,000	$200,000	$200,000	$200,000	$200,000	$200,000	$200,000	$200,000	$200,000	$200,000	$200,000	$200,000	
$7,346,131	$0	$0	$0	$0	$0	$0	$0	$289,000	$289,000	$289,000	$289,000	$289,000	$289,000	$289,000	$289,000	
$18,518,204	$200,000	$200,000	$200,000	$200,000	$200,000	$200,000	$200,000	$727,191	$727,191	$727,191	$727,191	$727,191	$727,191	$727,191	$727,191	
$111,938,200	$17,293,565	$18,461,181	$18,000,144	$18,188,813	$11,402,769	$12,797,735	$8,962,723	$727,191	$727,191	$727,191	$727,191	$727,191	$727,191	$727,191	$727,191	

Vangorda/Grum Alternative 1 - Backfill Vangorda Pit

Contract Code	Work Area Code	Item	Task	Sub-task	Estimate Type	Activity	Task	Quantity	Unit	Cost Code	Unit Mhrs	Total Mhrs	Labour Rate	Labour Cost	Unit Matl	Material Cost	Unit Equip.	Equipment Cost	Unit Fuel	Fuel Consumed (L)	Fuel Cost	Power Rate ($/Unit)	Power Cost	Unit Cost	Activity Total	Subtotals	Source / Comments
CLOSURE COSTS - DIRECT CAPITAL																											
Vangorda Pit																											1CD003.48_VangordaBackfill
Water Management																										$430,714	
	1	1	1	1	610	Pump and treat Vangorda Pit Water	Pump to existing treatment plant	2,300,000	m3	C.8.01	0.004	10132.2	$ 0.15	$ 354,626	$ 0.02	$ 53,462	$ 0.01	$ 13,208	$ 0.00	7,244	$ 9,416	$ -	$ -	$ 0.19	$430,714		(115mg/L Zn)
Pit Ramp																										$17,744	
	1	2	1	1	430	Upgrade ramp for 777 traffic	Load, haul, dump (locally) waste rock above present waterline	1,000	Bm3	R.001	0.032	61.4	$ 1.18	$ 2,248	$ -	$ -	$ 3.29	$ 6,273	$ 1.66	2,441	$ 3,173	$ -	$ -	$ 6.13	$11,693		
	1	2	1	2	430		Grade ramp	24,000	m2	C.2.18	0.002	52.2	$ 0.03	$ 1,910	$ -	$ -	$ 0.09	$ 2,100	$ 0.09	1,570	$ 2,042	$ -	$ -	$ 0.25	$6,051		
Backfill Pit																										$40,877,284	
	1	3	1	1	430	Backfill pit	Load, haul and place Backfill and Oxide Fines	260,000	Bm3	R.002	0.013	3595.4	$ 0.46	$ 131,593	$ -	$ -	$ 1.46	$ 422,274	$ 0.97	214,101	$ 278,331	$ -	$ -	$ 2.91	$832,198		
	1	3	1	2	430		Load, haul and place high sulphide area west of the dump ramp	1,300,000	Bm3	R.003	0.013	18342.9	$ 0.46	$ 668,149	$ -	$ -	$ 1.46	$ 1,919,428	$ 0.97	973,186	$ 1,265,141	$ -	$ -	$ 2.91	$3,782,718		
	1	3	1	3	430		Load, haul and place ore transfer pad material	321,260	Bm3	-	0.000	0.0	$ -	$ -	$ -	$ -	$ -	$ -	$ -	0	$ -	$ -	$ -	$ -	$0		Included in Ore Transfer Pad Costs
	1	3	1	4	430		Load, haul and place Main Waste Rock Dump (over-excavate)	8,787,000	Bm3	R.002	0.013	110465.1	$ 0.46	$ 4,043,024	$ -	$ -	$ 1.46	$ 12,973,859	$ 0.97	6,577,987	$ 8,551,383	$ -	$ -	$ 2.91	$25,568,267		
	1	3	1	5	430		Load, haul and place till from base of Waste Rock Dump	504,150	Bm3	R.002	0.013	6337.9	$ 0.46	$ 231,967	$ -	$ -	$ 1.46	$ 744,359	$ 0.97	377,499	$ 490,832	$ -	$ -	$ 2.91	$1,466,997		
	1	3	2	1	510	Lime addition	Add lime to waste rock	12,540	tonnes	C.2.21	0.036	448.1	$ 1.59	$ 20,005	$ 320.00	$ 4,015,360	$ 1.67	$ 20,935	$ 0.98	9,448	$ 12,282	$ -	$ -	$ 324.24	$4,068,580		
	1	3	2	2	510		Add lime to Baritic and Oxide Fines	4,680	tonnes	C.2.21	0.036	148.0	$ 1.59	$ 6,519	$ 320.00	$ 1,305,480	$ 1.67	$ 6,822	$ 0.98	3,078	$ 4,002	$ -	$ -	$ 324.24	$1,325,823		
	1	3	2	3	010		Survey requirements (grid for testing)	22,397	hrs	P.02	1.000	22398.8	$ 35.00	$ 783,889	$ -	$ -	$ -	$ -	$ -	0	$ -	$ -	$ -	$ 35.00	$783,889		
	1	3	2	4	010		Material testing (to verify lime addition dosage)	22,397	hrs	P.03	1.000	22398.8	$ 100.00	$ 2,239,682	$ -	$ -	$ -	$ -	$ -	0	$ -	$ -	$ -	$ 100.00	$2,239,682		
	1	3	2	4	970	Lime addition contingency	15% contingency	2,490	tonnes	C.2.21	0.036	89.1	$ 1.59	$ 3,979	$ 320.00	$ 796,576	$ 1.67	$ 4,164	$ 0.98	1,879	$ 2,442	$ -	$ -	$ 324.24	$809,160		
Regrade waste for drainage																										$53,791	
	1	4	1	1	430	Regrade	Shape to enhance runoff to ditches	150	hrs	C.2.22	1.000	149.8	$ 35.60	$ 5,483	$ -	$ -	$ 173.28	$ 25,959	$ 149.18	17,191	$ 22,349	$ -	$ -	$ 359.06	$53,791		
Cover with Low Infiltration Cover																										$1,681,950	
	1	5	1	1	430	Place low infiltration cover	Load, haul, place and compact till (0.5m)	150,000	Bm3	R.005	0.014	2036.4	$ 0.50	$ 74,531	$ -	$ -	$ 1.59	$ 239,166	$ 1.05	121,262	$ 157,640	$ -	$ -	$ 3.14	$471,337		
	1	5	1	2	430		Load, haul, place loose till (1.5m)	450,000	Bm3	R.006	0.010	4561.8	$ 0.37	$ 167,695	$ -	$ -	$ 1.34	$ 602,128	$ 0.88	304,321	$ 395,617	$ -	$ -	$ 2.59	$1,165,440		120
	1	5	1	1	610	Vegetate WR dumps	Seed/Fertilize, helicopter high application rate	300,000	m2	C.5.01	0.000	37.5	$ 0.00	$ 1,347	$ 0.09	$ 27,276	$ 0.05	$ 16,351	$ 0.00	153	$ 199	$ -	$ -	$ 0.15	$45,173		
Safety Berms																										$37,393	
	1	7	1	1	430	Construct access road	Clear access road area	1,281	m2	C.2.04	0.004	4.7	$ 0.13	$ 170	$ -	$ -	$ 0.62	$ 800	$ 0.36	356	$ 466	$ -	$ -	$ 1.12	$1,436		
	1	7	1	2	220		Construct access road	427	m	C.2.27	0.131	56.0	$ 4.80	$ 2,051	$ -	$ -	$ 10.14	$ 4,331	$ 5.33	1,740	$ 2,274	$ -	$ -	$ 20.27	$5,656		
	1	7	2	1	430	Place berm materials	Load, haul, dump berm material	4,150	Bm3	R.007	0.056	232.4	$ 2.05	$ 8,506	$ -	$ -	$ 1.73	$ 7,196	$ 1.56	4,985	$ 6,481	$ -	$ -	$ 5.35	$22,183		
	1	7	2	2	430		Final Shaping of material with dozer	830	m	C.2.03	0.020	16.8	$ 0.73	$ 608	$ -	$ -	$ 3.43	$ 2,849	$ 2.00	1,277	$ 1,661	$ -	$ -	$ 8.17	$5,118		
Subtotal Direct Costs - Vangorda Pit												99,579		$8,677,977		$6,203,154		$17,012,213		8,619,636	$11,205,531		$0			$43,098,876	
Vangorda Dump																										$84,398	1CD003.48_VangordaBackfill
Little Creek Dam																										$75,913	VanWasteDumpTillBerm.xls
	2	1	1	1	430	Breach dam	Load, haul and dump locally	22,268	Bm3	C.2.12	0.024	529.9	$ 0.88	$ 19,175	$ -	$ -	$ 2.00	$ 44,402	$ 0.93	15,971	$ 20,762	$ -	$ -	$ 3.78	$84,398		
Revegetate Dump																										$160,311	
	2	2	1	1	610	Revegetate dump footprint	Seed/Fertilize, helicopter high application rate	504,150	m2	C.5.01	0.000	83.0	$ 0.00	$ 2,263	$ 0.00	$ 45,837	$ 0.05	$ 27,477	$ 0.00	257	$ 335	$ -	$ -	$ 0.15	$75,913		
Subtotal Direct Costs - Vangorda Dump												587		$21,438		$45,837		$71,939		16,228	$21,097		$0			$160,311	
Vangorda Creek Diversion																										$658,791	Channel designed to 1:500 yr event (Design flow 31m³/s)
Vangorda Creek																											
	3	1	1	1	430	Excavate channel	5m wide, 2:1 side slopes	29,815	m3	C.2.10	0.032	958.1	$ 1.17	$ 31,466	$ -	$ -	$ 2.72	$ 72,623	$ 1.27	28,158	$ 34,000	$ -	$ -	$ 5.16	$138,235		
	3	1	3	1	430	Place till	Till: Load, haul, dump and place	3,740	Bm3	R.015	0.034	125.7	$ 1.23	$ 4,599	$ -	$ -	$ 2.82	$ 10,555	$ 1.30	3,720	$ 4,844	$ -	$ -	$ 5.35	$19,998		
	3	1	3	2	430		Till: Compact with vibrating drum roller	12,467	m2	C.2.06	0.016	199.5	$ 0.57	$ 7,141	$ -	$ -	$ 0.02	$ 202	$ 0.02	156	$ 202	$ -	$ -	$ 0.61	$7,605		10,154
	3	1	2	1	430	Place geotextile	Supply and place geotextile	6,220	m2	C.4.06	0.016	99.6	$ 0.57	$ 3,526	$ 3.50	$ 21,759	$ 0.23	$ 1,421	$ 0.16	708	$ 921	$ -	$ -	$ 4.44	$27,657		(or bitumen?)
	3	1	4	1	430	Place rip-rap	Rip-Rap: Drill, blast and stockpile	9,830	Bm3	C.2.23	0.045	442.4	$ 1.62	$ 15,954	$ 15.72	$ 154,528	$ 2.64	$ 25,945	$ 1.36	10,312	$ 13,406	$ -	$ -	$ 21.35	$209,833		Some rip-rap needs to belarge to disperse energy at bottom of channel
	3	1	4	2	430		Rip-rap (angular, high quality): Screen and stockpile	9,830	Bm3	C.2.25	0.057	561.7	$ 2.09	$ 20,559	$ -	$ -	$ 9.19	$ 90,360	$ 6.45	48,800	$ 63,440	$ -	$ -	$ 17.74	$174,358		
	3	1	4	4	430		Rip-Rap: Load, haul and dump	9,830	Bm3	R.014	0.040	393.2	$ 1.48	$ 14,391	$ -	$ -	$ 3.42	$ 33,657	$ 1.55	11,697	$ 15,207	$ -	$ -	$ 6.43	$63,255		
	3	1	4	5	430		Rip-Rap: Place and secure	9,830	Bm3	C.2.26	0.013	122.9	$ 0.46	$ 4,497	$ -	$ -	$ 0.89	$ 8,743	$ 0.47	3,546	$ 4,610	$ -	$ -	$ 1.82	$17,850		
Subtotal Direct Costs - Vangorda Creek Diversion												2,803		$102,073		$176,317		$243,765			$135,626		$0			$658,791	
Grum Pit																										$0	1CD003.46_PitLakesTreat
Water Treatment																										$152,739	
	4	1	1	1	610	Biological treatment	Note: Water treatment costs estimated seperately	1	ls	-	0.000	0.0	$ -	$ -	$ -	$ -	$ -	$ -	$ -	0	$ -	$ -	$ -	$ -	$0		
Safety Berms																											
	4	2	1	1	430	Construct access road	Clear access road area	3,750	m2	C.2.04	0.004	13.8	$ 0.13	$ 499	$ -	$ -	$ 0.62	$ 2,341	$ 0.36	1,049	$ 1,364	$ -	$ -	$ 1.12	$4,204		
	4	2	1	2	220		Construct access road	1,250	m	C.2.27	0.131	164.1	$ 4.80	$ 6,005	$ -	$ -	$ 10.14	$ 12,679	$ 5.33	5,121	$ 6,657	$ -	$ -	$ 20.27	$25,341		
	4	2	2	1	430	Place berm materials	Load, haul, dump berm material	20,000	Bm3	R.019	0.049	980.0	$ 1.79	$ 35,868	$ -	$ -	$ 1.68	$ 33,677	$ 1.45	22,297	$ 28,980	$ -	$ -	$ 4.93	$98,531		
	4	2	2	2	430		Final Shaping of material with dozer	4,000	m	C.2.03	0.020	80.0	$ 0.73	$ 2,928	$ -	$ -	$ 3.43	$ 13,733	$ 2.00	6,158	$ 8,003	$ -	$ -	$ 8.17	$24,664		
Subtotal Direct Costs - Grum Pit												1,238		$45,300		$0		$62,429		34,623	$45,010		$0			$152,739	
Grum Interceptor Ditch																										$88,484	1CD003.46_PitLakesTreat
Route into Grum Pit																											assumed channel from vangorda creek diversion (1CD003.11
	5	1	1	1	430	Access road	Clear access road area	600	m2	C.2.04	0.004	2.2	$ 0.13	$ 80	$ -	$ -	$ 0.62	$ 375	$ 0.36	168	$ 218	$ -	$ -	$ 1.12	$673		
	5	1	1	2	220		Construct access road	200	m	C.2.27	0.131	26.3	$ 4.80	$ 961	$ -	$ -	$ 10.14	$ 2,029	$ 5.33	819	$ 1,065	$ -	$ -	$ 20.27	$4,055		
	5	1	2	1	430	Headworks dam	Load, haul, dump, place and compact till	24	Bm3	R.020	0.030	0.7	$ 1.11	$ 27	$ -	$ -	$ 2.17	$ 52	$ 1.07	20	$ 26	$ -	$ -	$ 4.35	$104		
	5	1	3	1	430	Excavate channel	Excavate diversion channel (soils)	2,017	Bm3	C.2.10	0.032	64.5	$ 1.17	$ 2,362	$ -	$ -	$ 2.72	$ 5,477	$ 1.27	1,967	$ 2,558	$ -	$ -	$ 5.16	$10,397		15.21280459
	5	1	3	2	430		Excavate diversion channel (bedrock)	382	Bm3	C.2.15	0.173	62.7	$ 6.34	$ 2,294	$ -	$ -	$ 9.13	$ 3,301	$ 3.89	1,026	$ 1,334	$ -	$ -	$ 19.16	$6,929		
	5	1	4	1	430	Place bedding layer	Produce and stockpile locally	623	Bm3	C.2.02	0.010	6.2	$ 0.37	$ 228	$ -	$ -	$ 1.81	$ 1,002	$ 1.13	541	$ 703	$ -	$ -	$ 3.10	$1,933		
	5	1	4	2	430		Load , haul, place and compact	623	Bm3	R.021	0.040	30.4	$ 1.79	$ 1,114	$ -	$ -	$ 3.71	$ 2,309	$ 1.71	817	$ 1,062	$ -	$ -	$ 7.20	$4,485		
	5	1	5	1	430	Place rip-rap	Rip-Rap: Drill, blast and stockpile	1,212	Bm3	C.2.23	0.045	54.6	$ 1.62	$ 1,968	$ 15.72	$ 19,059	$ 2.64	$ 3,200	$ 1.36	1,272	$ 1,653	$ -	$ -	$ 21.35	$25,880		
	5	1	5	2	430		Rip-rap (angular, high quality): Screen and stockpile	1,212	Bm3	C.2.25	0.057	69.3	$ 2.09	$ 2,536	$ -	$ -	$ 9.19	$ 11,145	$ 6.45	6,019	$ 7,825	$ -	$ -	$ 17.74	$21,505		
	5	1	5	3	430		Rip-Rap: Load, haul and dump	1,212	Bm3	R.022	0.043	51.7	$ 1.56	$ 1,893	$ -	$ -	$ 3.65	$ 4,428	$ 1.65	1,539	$ 2,001	$ -	$ -	$ 6.86	$8,322		
	5	1	5	4	430		Rip-Rap: Place and secure	1,212	Bm3	C.2.26	0.013	15.2	$ 0.46	$ 555	$ -	$ -	$ 0.89	$ 1,078	$ 0.47	437	$ 569	$ -	$ -	$ 1.82	$2,202		
Algae Filter																										$2,980	
	5	2	6	1	430	Place waste rock from Grum Dump at slot out	WR: Load, haul, dump	468	Bm3	R.023	0.028	13.2	$ 1.03	$ 484	$ -	$ -	$ 2.42	$ 1,133	$ 1.09	394	$ 512	$ -	$ -	$ 4.54	$2,129		
	5	2	6	2	430		WR: Place and secure	468	Bm3	C.2.26	0.013	5.9	$ 0.46	$ 214	$ -	$ -	$ 0.89	$ 417	$ 0.47	169	$ 220	$ -	$ -	$ 1.82	$851		
Route out of Pit via slot cut																										$216,505	
	5	3	1	1	430	Access road	Clear access road area	150	m2	C.2.04	0.004	0.5	$ 0.13	$ 20	$ -	$ -	$ 0.62	$ 94	$ 0.36	42	$ 55	$ -	$ -	$ 1.12	$168		
	5	3	1	2	220		Construct access road	50	m	C.2.27	0.131	6.6	$ 4.80	$ 240	$ -	$ -	$ 10.14	$ 507	$ 5.33	205	$ 266	$ -	$ -	$ 20.27	$1,014		
	5	3	2	1	430	Excavate channel	Excavate diversion channel (soils)	9,222	Bm3	C.2.10	0.032	295.1	$ 1.17	$ 10,801	$ -	$ -	$ 2.72	$ 25,049	$ 1.27	8,997	$ 11,698	$ -	$ -	$ 5.16	$47,548		
	5	3	3	1	430	Place bedding layer	Produce and stockpile locally	1,736	Bm3	C.2.02	0.010	17.4	$ 0.37	$ 635	$ -	$ -	$ 1.81	$ 2,793	$ 1.13	1,508	$ 1,961	$ -	$ -	$ 3.10	$5,389		
	5	3	3	2	430		Load , haul, place and compact	1,736	Bm3	R.024	0.035	61.2	$ 1.29	$ 2,240	$ -	$ -	$ 2.67	$ 4,643	$ 1.23	1,643	$ 2,136	$ -	$ -	$ 5.20	$9,020		
	5	3	4	1	430	Place rip-rap	Rip-Rap: Drill, blast and stockpile	3,375	Bm3	C.2.23	0.045	151.9	$ 1.62	$ 5,478	$ 15.72	$ 53,057	$ 2.64	$ 8,908	$ 1.36	3,541	$ 4,603	$ -	$ -	$ 21.35	$72,046		
	5	3	4	2	430		Rip-rap (angular, high quality): Screen and stockpile	3,375	Bm3	C.2.25	0.057	192.9	$ 2.09	$ 7,056	$ -	$ -	$ 9.19	$ 31,025	$ 6.45	16,755	$ 21,782	$ -	$ -	$ 17.74	$58,860		
	5	3	4	3	430		Rip-Rap: Load, haul and dump	3,375	Bm3	R.025	0.028	95.3	$ 1.03	$ 3,468	$ -	$ -	$ 2.42	$ 8,157	$ 1.09	2,835	$ 3,686	$ -	$ -	$ 4.54	$15,311		
	5	3	4	4	430		Rip-Rap: Place and secure	3,375	Bm3	C.2.26	0.013	42.2	$ 0.46	$ 1,544	$ -	$ -	$ 0.89	$ 3,002	$ 0.47	1,218	$ 1,583	$ -	$ -	$ 1.82	$6,129		
Subtotal Direct Costs - Grum Interceptor Ditch												1,266		$46,222		$72,116		$126,120		51,932	$67,512		$0			$305,969	
Grum Dump																										$1,145,320	
Reslope Dump																										$1,718,877	
	6	1	1	1	430	Clear/grub	Clear/grub forest area around to	13,200	m2	C.2.05	0.015	192.0	$ 0.53	$ 7,027	$ -	$ -	$ 0.84	$ 12,343	$ 0.62	6,269	$ 8,145	$ -	$ -	$ 2.08	$27,515		
	6	1	2	1	430	Regrade	Flattened surfaces	337	hrs	C.2.22	1.000	337.3	$ 36.60	$ 12,347	$ -	$ -	$ 173.28	$ 58,453	$ 149.18	36,711	$ 50,324	$ -	$ -	$ 359.06	$121,124		137.1276346
	6	1	2	2	430		Flatten bubble dump surfaces	296	hrs	C.2.22	1.000	296.5	$ 36.60	$ 10,852	$ -	$ -	$ 173.28	$ 51,377	$ 149.18	34,024	$ 44,232	$ -	$ -	$ 359.06	$106,460		
	6	1	2	3	430		Regrade Slopes	737	hrs	C.2.22	1.000	737.4	$ 36.60	$ 26,990	$ -	$ -	$ 173.28	$ 127,762	$ 149.18	84,024	$ 110,011	$ -	$ -	$ 359.06	$264,764		
	6	1	3	1	430	Pull-back slopes not able to be re-sloped	Load, haul, dump, place at top of dump	165,000	Bm3	C.2.12	0.024	3882.4	$ 0.88	$ 142,084	$ -	$ -	$ 2.00	$ 329,488	$ 0.93	118,352	$ 153,656	$ -	$ -	$ 3.79	$625,437		
Sulphide Cell																										$439,919	
	6	2	1	1	430	Low Infiltration Cove	Load, haul, place compacted till (0.5m)	98,725	Bm3	R.026	0.017	1676.3	$ 0.62	$ 61,317	$ -	$ -	$ 2.24	$ 220,700	$ 1.60	121,453	$ 157,902	$ -	$ -	$ 4.46	$439,919		78.98
	6	2	1	2	430		Load, haul, place loose till (1.5m)	290,175	Bm3	R.027	0.015	4523.4	$ 0.56	$ 165,556	$ -	$ -	$ 2.19	$ 648,738	$ 1.56	355,805	$ 462,683	$ -	$ -	$ 4.31	$1,276,978		
Waste Rock Cover																										$3,858,977	
	6	3	1	1	430	Place Rudimentary Cove	Load, haul, place loose till (0.5m)	858,625	Bm3	R.027	0.015	13113.5	$ 0.56	$ 479,950	$ -	$ -	$ 2.19	$ 1,880,722	$ 1.56	1,031,756	$ 1,341,283	$ -	$ -	$ 4.31	$3,701,955		470.476
	6	0	1	1	610	Revegetate WR Dumps	Seed/Fertilize, helicopter low application rate	1,493,750	m2	C.5.02	0.000	186.7	$ 0.00	$ 6,705	$ 0.05	$ 67,906	$ 0.05	$ 81,413	$ 0.00	763	$ 992	$ -	$ -	$ 0.11	$157,017		15.6825
Steep Runoff channels																										$123,025	
	6	4	1	1	430	Install rock drains (runoff management)	Excavate channel	3,500	Bm3	C.2.12	0.024	82.4	$ 0.88	$ 3,014	$ -	$ -	$ 2.00	$ 6,989	$ 0.93	2,510	$ 3,264	$ -	$ -	$ 3.79	$13,267		
	6	4	1	2	430		Rip-Rap: Drill, blast and stockpile	2,004	Bm3	C.2.23	0.045	117.2	$ 1.62	$ 4,226	$ 15.72	$ 40,935	$ 2.64	$ 6,873	$ 1.36	2,732	$ 3,551	$ -	$ -	$ 21.35	$55,585		
	6	4	1	3	430		Rip-rap (rounded, low quality): Screen and stockpile	2,004	Bm3	C.2.24	0.040	104.2	$ 1.48	$ 3,812	$ -	$ -	$ 5.43	$ 10,760	$ 4.52	9,048	$ 11,764	$ -	$ -	$ 12.42	$32,336		
	6	4	1	4	430		Rip-Rap: Load, haul and dump	2,004	Bm3	R.033	0.041	106.4	$ 1.50	$ 3,853	$ -	$ -	$ 3.50	$ 9,106	$ 1.58	3,165	$ 4,114	$ -	$ -	$ 6.57	$17,113		
	6	4	1	5	430		Rip-Rap: Place and secure	2,004	Bm3	C.2.26	0.013	32.6	$ 0.46	$ 1,191	$ -	$ -	$ 0.89	$ 2,316	$ 0.47	939	$ 1,221	$ -	$ -	$ 1.82	$4,729		
Sediment Basins																										$12,450	
	6	5	2	1	430	Sedimentation Basins (at bottom of runoff chann	Excavate sedimentation basin	2,128	Bm3	C.2.12	0.024	50.1	$ 0.88	$ 1,833	$ -	$ -	$ 2.00	$ 4,249	$ 0.93	1,526	$ 1,984	$ -	$ -	$ 3.79	$8,066		
	6	5	2	2	430		Rip-Rap: Drill, blast and stockpile	104	Bm3	C.2.23	0.045	4.7	$ 1.62	$ 169	$ 15.72	$ 1,635	$ 2.64	$ 274	$ 1.36	109	$ 142	$ -	$ -	$ 21.35	$2,220		
	6	5	2	3	430		Rip-rap (rounded, low quality): Screen and stockpile	104	Bm3	C.2.24	0.040	4.2	$ 1.48	$ 152	$ -	$ -	$ 6.43	$ 669	$ 4.52	561	$ 470	$ -	$ -	$ 12.42	$1,291		
	6	5	2	4	430		Rip-Rap: Load, haul and dump	104	Bm3	R.033	0.041	4.2	$ 1.50	$ 155	$ -	$ -	$ 3.50	$ 364	$ 1.58	126	$ 164	$ -	$ -	$ 6.57	$683		
	6	5	2	5	430		Rip-Rap: Place and secure	104	Bm3	C.2.26	0.013	1.3	$ 0.46	$ 48	$ -	$ -	$ 0.89	$ 92	$ 0.47	36	$ 49	$ -	$ -	$ 1.82	$189		
Subtotal Direct Costs - Grum Dump												25,452		$931,339		$110,476		$3,458,702		1,812,409	$2,356,132		$0			$6,856,649	
Overburden Dump																										$153,664	
Reslope Dump																										$53,635	
	7	2	1	1	430	Regrade	Flattened surfaces	77	hrs	C.2.22	1.000	77.2	$ 36.60	$ 2,824	$ -	$ -	$ 173.28	$ 13,371	$ 149.18	8,855	$ 11,511	$ -	$ -	$ 359.06	$27,707		42.8
	7	2	1	2	430		Flatten bubble dump surfaces	351	hrs	C.2.22	1.000	350.8	$ 36.60	$ 12,839	$ -	$ -	$ 173.28	$ 60,785	$ 149.18	40,255	$ 52,332	$ -	$ -	$ 359.06	$125,957		
Revegetate																										$53,635	
	7	3	1	1	610	Revegetate WR Dumps	Seed/Fertilize, helicopter low application rate	510,250	m2	C.5.02	0.000	63.8	$ 0.00	$ 2,291	$ 0.05	$ 23,199	$ 0.05	$ 27,810	$ 0.00	261	$ 339	$ -	$ -	$ 0.11	$53,635		
Subtotal Direct Costs - Overburden Dump												492		$17,954		$23,199		$101,967		49,371	$64,182		$0			$207,299	
Ore Transfer Pad																										$1,429,516	
Relocate to Vangorda Pit																										$40,795	
	8	1	1	1	430	Excavate acidic material (over-excavate)	Load, haul, place and compact in pit	321,260	Bm3	R.004	0.019	6112.0	$ 0.70	$ 223,700	$ -	$ -	$ 2.27	$ 729,591	$ 1.48	366,328	$ 476,227	$ -	$ -	$ 4.45	$1,429,518		64.252
Reslope Pad for drainage																										$286,560	
	8	2	1	1	430	Regrade	Flattened surfaces	52	hrs	C.2.22	1.000	51.9	$ 36.60	$ 1,900	$ -	$ -	$ 173.28	$ 8,993	$ 149.18	5,956	$ 7,742	$ -	$ -	$ 359.06	$18,635		
	8	2	1	2	430		Flatten bubble dump surfaces	62	hrs	C.2.22	1.000	61.7	$ 36.60	$ 2,259	$ -	$ -	$ 173.28	$ 10,694	$ 149.18	7,082	$ 9,207	$ -	$ -	$ 359.06	$22,160		
Rudementary Cover																										$10,188	
	8	3	1	1	430	Place Rudimentary Cover	Load, haul, place loose till (0.5m)	73,050	Bm3	R.030	0.014	1050.8	$ 0.52	$ 38,459	$ -	$ -	$ 1.99	$ 145,782	$ 1.38	77,037	$ 101,318	$ -	$ -	$ 3.89	$285,560		
Sediment Control Ditches																											

	8	4	1	1	430	Sediment Control Ditch	Excavation of ditch	1,791	Bm3	C.2.10	0.032	57.3	$ 1.17	$ 2,098	$ -	$ -	$ 2.72	$ 4,884	$ 1.27	1,747	$ 2,271	$ -	$ -	$ -	$ 5.16	$9,233		
	8	4	2	1	430	Sedimentation Basin	Excavate sedimentation basin	252	Bm3	C.2.12	0.024	5.9	$ 0.88	$ 217	$ -	$ -	$ 2.00	$ 503	$ 0.93	181	$ 235	$ -	$ -	$ -	$ 3.70	$955		
Revegetate																											$13,508		
	8	5	1	1	610	Revegetate	Seed/Fertilize, helicopter low application rate	128,504	m2	C.5.02	0.000	10.1	$ 0.00	$ 577	$ 0.05	$ 6,842	$ 0.05	$ 7,004	$ 0.00	60	$ 85	$ -	$ -	$ -	$ 0.11	$13,508		
Subtotal Direct Costs - Ore Transfer Pad												7,356		$269,209		$5,842		$908,432		459,297	$597,086		$0				**$1,780,568**	
Groundwater																														
Grum Dump Groundwater Collection to Holding Pond																												$506,884		
	9	1	1	1	430	Access road	Clear access road area	1,950	m2	C.2.04	0.004	7.1	$ 0.13	$ 250	$ -	$ -	$ 0.62	$ 1,217	$ 0.36	546	$ 709	$ -	$ -	$ -	$ 1.12	$2,186		
	9	1	1	1	430		Construct Access road	650	m	C.2.27	0.131	85.3	$ 4.80	$ 3,122	$ -	$ -	$ 10.14	$ 6,593	$ 5.33	2,663	$ 3,462	$ -	$ -	$ -	$ 20.27	$13,177		
	9	1	2	1	430	Groundwater wells	Drill wells (Air Rotary Drill Rig, ~20m depth)	140	m	C.2.09	2.000	280.0	$ 102.13	$ 14,299	$ -	$ -	$ 100.85	$ 14,119	$ 22.08	2,378	$ 3,091	$ -	$ -	$ -	$ 225.07	$31,509		no preliminary design done.
	9	1	2	2	500		Install 6" stainless steel well casing & screen	140	m	C.3.17	0.150	21.0	$ 7.66	$ 1,072	$ 232.60	$ 32,564	$ 7.58	$ 1,059	$ 1.66	178	$ 232	$ -	$ -	$ -	$ 249.48	$34,927		
	9	1	2	3	500		Install 6" Submersible Pump with controls	7	ea.	C.3.07	12.000	84.0	$ 600.00	$ 4,200	$ 6,842.00	$ 47,894	$ -	$ -	$ -	0	$ -	$ -	$ -	$ -	$ 7,442.00	$52,094		
	9	1	2	4	500		Install protective housing (shack)	7	ea.	C.3.13	20.000	140.0	$ 1,300.00	$ 9,100	$ 445.00	$ 3,115	$ -	$ -	$ -	0	$ -	$ -	$ -	$ -	$ 1,745.00	$12,215		
	9	1	3	1	430	Piping system	Excavate Piping Trench	7,452	Bm3	C.2.13	0.020	149.0	$ 0.73	$ 5,455	$ -	$ -	$ 1.42	$ 10,604	$ 0.75	4,302	$ 5,502	$ -	$ -	$ -	$ 2.91	$21,051		
	9	1	3	2	510		Supply and install insulated 150mm HDPE pipe	1,242	m	C.3.03	0.250	310.5	$ 8.75	$ 8,868	$ 155.84	$ 193,553	$ -	$ -	$ -	0	$ -	$ -	$ -	$ -	$ 164.59	$204,421		
	9	1	3	3	430		Bedding: Produce and stockpile (screen)	484	Bm3	C.2.02	0.010	4.8	$ 0.37	$ 177	$ -	$ -	$ 1.81	$ 770	$ 1.13	421	$ 547	$ -	$ -	$ -	$ 3.10	$1,504		
	9	1	3	4	430		Bedding: Load, haul, place and compact	484	Bm3	R.031	0.024	11.8	$ 0.88	$ 433	$ -	$ -	$ 1.85	$ 898	$ 0.69	332	$ 431	$ -	$ -	$ -	$ 3.64	$1,762		
	9	1	3	5	430		Backfill and compact ditches	7,452	Bm3	C.2.01	0.030	223.6	$ 1.09	$ 8,063	$ -	$ -	$ 0.74	$ 5,498	$ 0.40	2,267	$ 2,947	$ -	$ -	$ -	$ 2.22	$16,508		
	9	1	4	1	510	Heat tracing	Supply and install heat trace in HDPE pipe	1,242	m	C.3.04	0.250	310.5	$ 12.50	$ 15,525	$ 21.32	$ 26,479	$ -	$ -	$ -	0	$ -	$ -	$ -	$ -	$ 33.82	$42,004		
	9	1	4	2	510		Supply/Install heat tracing power feed kit	1	ea.	C.3.05	4.000	4.0	$ 230.00	$ 230	$ 396.84	$ 397	$ -	$ -	$ -	0	$ -	$ -	$ -	$ -	$ 626.84	$627		
	9	1	4	3	510		Supply/Install electrical thermostate for heat tracing	1	ea.	C.3.06	1.000	1.0	$ 57.50	$ 58	$ 1,025.00	$ 1,025	$ -	$ -	$ -	0	$ -	$ -	$ -	$ -	$ 1,082.50	$1,083		
	9	1	5	1	510	Provide electricity from holding pond to pumps	Supply/Install treated power poles	17	ea.	C.4.03	4.545	77.3	$ 297.88	$ 5,064	$ 325.96	$ 5,541	$ 85.85	$ 1,459	$ 28.17	358	$ 479	$ -	$ -	$ -	$ 737.88	$12,544		
	9	1	5	2	510		Supply/Install overhead conductor	1,242	m	C.4.02	0.032	39.7	$ 2.21	$ 2,746	$ 1.41	$ 1,751	$ 0.45	$ 563	$ 0.15	142	$ 185	$ -	$ -	$ -	$ 4.22	$5,247		
	9	1	5	3	510		Supply/Install transformers	5	ea.	C.4.04	20.000	100.0	$ 1,363.00	$ 6,815	$ 8,934.00	$ 44,670	$ 224.98	$ 1,125	$ 143.00	550	$ 715	$ -	$ -	$ -	$ 10,684.98	$53,425		
Grum Dump Groundwater Holding Pond																												$106,157		
	9	2	1	1	430	Excavate pond	Excavate Holding Pond	10,848	Bm3	C.2.12	0.024	255.2	$ 0.88	$ 9,342	$ -	$ -	$ 2.00	$ 21,692	$ 0.93	7,781	$ 10,115	$ -	$ -	$ -	$ 3.70	$41,120		
	9	2	2	1	430	Place till	Till: Load, haul, dump and place	1,476	Bm3	R.032	0.048	71.5	$ 1.77	$ 2,618	$ -	$ -	$ 4.07	$ 6,009	$ 1.87	2,121	$ 2,757	$ -	$ -	$ -	$ 7.71	$11,385		
	9	2	2	2	430		Till: Compact with vibrating drum roller	4,921	m2	C.2.06	0.016	78.7	$ 0.57	$ 2,812	$ -	$ -	$ 0.02	$ 103	$ 0.02	61	$ 80	$ -	$ -	$ -	$ 0.61	$3,002		
	9	2	3	1	430	Place geotextile	Supply and place geotextile	3,054	m2	C.4.06	0.010	48.9	$ 0.57	$ 1,730	$ 3.50	$ 10,689	$ 0.23	$ 697	$ 0.15	347	$ 452	$ -	$ -	$ -	$ 4.44	$13,567		
	9	2	4	1	430	Place bedding layer	Bedding: Produce and stockpile (screen)	1,476	Bm3	C.2.02	0.010	14.8	$ 0.37	$ 549	$ -	$ -	$ 1.61	$ 2,375	$ 1.13	1,282	$ 1,667	$ -	$ -	$ -	$ 3.10	$4,582		
	9	2	4	2	430		Bedding: Load, haul, place and compact	1,476	Bm3	R.031	0.024	35.1	$ 0.89	$ 1,321	$ -	$ -	$ 1.85	$ 2,738	$ 0.69	1,011	$ 1,315	$ -	$ -	$ -	$ 3.64	$5,371		
	9	2	5	1	500	Place pump	Supply and place pump	1	ea.	C.3.10	12.000	12.0	$ 600.00	$ 600	$ 1,829.00	$ 1,829	$ -	$ -	$ -	0	$ -	$ -	$ -	$ -	$ 2,429.00	$2,429		
	9	2	5	2	500		Build and install housing for primary pump	1	ea.	C.3.12	30.000	30.0	$ 1,950.00	$ 1,950	$ 1,730.00	$ 1,730	$ -	$ -	$ -	0	$ -	$ -	$ -	$ -	$ 3,680.00	$3,680		
	9	2	6	1	510	Provide electricity to holding pond	Supply/Install treated power poles	19	ea.	C.4.03	4.545	45.5	$ 297.88	$ 2,970	$ 325.96	$ 3,250	$ 85.85	$ 859	$ 28.17	217	$ 282	$ -	$ -	$ -	$ 737.88	$7,379		
	9	2	6	2	510		Supply/Install overhead conductor	709	m	C.4.02	0.032	22.4	$ 2.21	$ 1,549	$ 1.41	$ 987	$ 0.45	$ 317	$ 0.15	80	$ 104	$ -	$ -	$ -	$ 4.22	$2,957		
	9	2	6	3	510		Supply/Install transformers	1	ea.	C.4.04	20.000	20.0	$ 1,363.00	$ 1,363	$ 8,934.00	$ 8,934	$ 224.98	$ 225	$ 143.00	110	$ 143	$ -	$ -	$ -	$ 10,684.98	$10,685		
Groundwater Collection System to Grum Pit																												$662,735		
	9	3	1	1	430	Piping system	Excavate piping trench	17,160	Bm3	C.2.13	0.020	343.2	$ 0.73	$ 12,561	$ -	$ -	$ 1.42	$ 24,419	$ 0.75	9,905	$ 12,677	$ -	$ -	$ -	$ 2.91	$48,857		
	9	3	1	2	510		Supply and install insulated 150mm HDPE pipe	2,860	m	C.3.03	0.250	715.0	$ 8.75	$ 25,025	$ 155.84	$ 445,702	$ -	$ -	$ -	0	$ -	$ -	$ -	$ -	$ 164.59	$470,727		
	9	3	1	3	430		Bedding: Produce and stockpile (screen)	1,115	Bm3	C.2.02	0.010	11.2	$ 0.37	$ 408	$ -	$ -	$ 1.81	$ 1,794	$ 1.13	969	$ 1,260	$ -	$ -	$ -	$ 3.10	$3,462		
	9	3	1	4	430		Bedding: Load, haul, place and compact	1,115	Bm3	R.034	0.024	26.5	$ 0.87	$ 971	$ -	$ -	$ 1.85	$ 2,011	$ 0.67	744	$ 967	$ -	$ -	$ -	$ 3.54	$3,949		
	9	3	1	5	430		Backfill and compact ditches	17,160	Bm3	C.2.01	0.030	514.8	$ 1.09	$ 18,567	$ -	$ -	$ 0.74	$ 12,660	$ 0.40	5,221	$ 6,787	$ -	$ -	$ -	$ 2.22	$38,014		
	9	3	2	1	510	Heat tracing	Supply and install heat trace in HDPE pipe	2,860	m	C.3.04	0.250	715.0	$ 12.50	$ 35,750	$ 21.32	$ 60,975	$ -	$ -	$ -	0	$ -	$ -	$ -	$ -	$ 33.82	$96,725		
Contingency - Vangorda Pit Groundwater System																												$305,299		
	9	4	1	1	430	Groundwater wells	Drill wells (Air Rotary Drill Rig, ~90m depth)	270	m	C.2.09	2.000	540.0	$ 102.13	$ 27,576	$ -	$ -	$ 100.85	$ 27,230	$ 22.08	4,588	$ 5,962	$ -	$ -	$ -	$ 225.07	$60,768		no preliminary design done.
	9	4	1	2	500		Install 6" stainless steel well casing & screen	270	m	C.3.17	0.150	40.5	$ 7.66	$ 2,068	$ 232.60	$ 62,802	$ 7.58	$ 2,042	$ 1.66	344	$ 447	$ -	$ -	$ -	$ 249.48	$67,360		
	9	4	1	3	500		Install 6" Submersible Pump with controls	3	ea.	C.3.07	12.000	36.0	$ 600.00	$ 1,800	$ 6,842.00	$ 20,526	$ -	$ -	$ -	0	$ -	$ -	$ -	$ -	$ 7,442.00	$22,326		
	9	4	1	4	500		Install protective housing (shack)	3	ea.	C.3.13	20.000	60.0	$ 1,300.00	$ 3,900	$ 445.00	$ 1,335	$ -	$ -	$ -	0	$ -	$ -	$ -	$ -	$ 1,745.00	$5,235		
	9	4	2	1	510	Provide electricity to pumps	Supply/Install treated power poles	4	ea.	C.4.03	4.545	18.2	$ 297.88	$ 1,192	$ 325.96	$ 1,304	$ 85.85	$ 343	$ 28.17	87	$ 113	$ -	$ -	$ -	$ 737.88	$2,951		
	9	4	2	2	510		Supply/Install overhead conductor	300	m	C.4.02	0.032	9.6	$ 2.21	$ 664	$ 1.41	$ 423	$ 0.45	$ 136	$ 0.15	34	$ 45	$ -	$ -	$ -	$ 4.22	$1,267		
	9	4	2	3	510		Supply/Install transformers	1	ea.	C.4.04	20.000	20.0	$ 1,363.00	$ 1,363	$ 8,934.00	$ 8,934	$ 224.98	$ 225	$ 143.00	110	$ 143	$ -	$ -	$ -	$ 10,684.98	$10,685		
	9	4	3	1	430	Piping system	Excavate piping trench	5,460	Bm3	C.2.13	0.020	109.2	$ 0.73	$ 3,993	$ -	$ -	$ 1.42	$ 7,754	$ 0.75	3,117	$ 4,052	$ -	$ -	$ -	$ 2.91	$15,800		
	9	4	3	2	500		Supply and install insulated 150mm HDPE pipe	900	m	C.3.03	0.250	225.0	$ 8.75	$ 7,875	$ 155.84	$ 140,256	$ -	$ -	$ -	0	$ -	$ -	$ -	$ -	$ 164.59	$148,131		
	9	4	3	3	430		Bedding: Produce and stockpile (screen)	351	Bm3	C.2.02	0.010	3.5	$ 0.37	$ 128	$ -	$ -	$ 1.81	$ 565	$ 1.13	305	$ 396	$ -	$ -	$ -	$ 3.10	$1,090		
	9	4	3	4	430		Bedding: Load, haul, place	351	Bm3	R.035	0.031	10.7	$ 1.12	$ 393	$ -	$ -	$ 2.32	$ 814	$ 1.07	288	$ 374	$ -	$ -	$ -	$ 4.50	$1,580		
	9	4	3	5	430		Backfill and compact ditches	5,049	Bm3	C.2.01	0.030	151.5	$ 1.09	$ 5,463	$ -	$ -	$ 0.74	$ 3,725	$ 0.40	1,536	$ 1,997	$ -	$ -	$ -	$ 2.22	$11,185		
	9	4	4	1	510	Heat tracing	Supply and install heat trace in HDPE pipe	900	m	C.3.04	0.250	225.0	$ 12.50	$ 11,250	$ 21.32	$ 19,188	$ -	$ -	$ -	0	$ -	$ -	$ -	$ -	$ 33.82	$30,438		
	9	4	4	2	510		Supply/Install heat tracing power feed kit	1	ea.	C.3.05	4.000	4.0	$ 230.00	$ 230	$ 396.84	$ 397	$ -	$ -	$ -	0	$ -	$ -	$ -	$ -	$ 626.84	$627		
	9	4	4	3	510		Supply/Install electrical thermostate for heat tracing	1	ea.	C.3.06	1.000	1.0	$ 57.50	$ 58	$ 1,025.00	$ 1,025	$ -	$ -	$ -	0	$ -	$ -	$ -	$ -	$ 1,082.50	$1,083		
	9	4	5	1	430	Groundwater holding pond	Excavate holding pond	676	Bm3	C.2.12	0.024	20.6	$ 0.88	$ 754	$ -	$ -	$ 2.00	$ 1,749	$ 0.93	628	$ 817	$ -	$ -	$ -	$ 3.79	$3,321		
	9	4	5	2	430		Till: Load, haul, dump and place	229	Bm3	R.015	0.034	7.7	$ 1.23	$ 281	$ -	$ -	$ 2.82	$ 646	$ 1.30	228	$ 296	$ -	$ -	$ -	$ 5.35	$1,223		
	9	4	5	3	430		Till: Compact with vibrating drum roller	229	m2	C.2.06	0.016	3.7	$ 0.57	$ 131	$ -	$ -	$ 0.02	$ 5	$ 0.02	3	$ 4	$ -	$ -	$ -	$ 0.61	$140		
	9	4	5	4	430		Supply and place geotextile	529	m2	C.4.06	0.010	8.5	$ 0.57	$ 300	$ 3.50	$ 1,853	$ 0.23	$ 121	$ 0.15	60	$ 78	$ -	$ -	$ -	$ 4.44	$2,352		
	9	4	5	5	430		Bedding layer: Produce, screen and stockpile	229	Bm3	C.2.02	0.010	2.3	$ 0.37	$ 84	$ -	$ -	$ 1.81	$ 368	$ 1.13	199	$ 258	$ -	$ -	$ -	$ 3.10	$710		
	9	4	5	6	430		Bedding Layer: Load, haul, place and compact	229	Bm3	R.035	0.031	7.0	$ 1.12	$ 256	$ 2.32	$ 530	$ 2.32	$ 530	$ 1.07	188	$ 244	$ -	$ -	$ -	$ 4.50	$1,030		
	9	4	5	7	500		Pump: Install primary pump	1	ea.	C.3.10	12.000	12.0	$ 600.00	$ 600	$ 1,829.00	$ 1,829	$ -	$ -	$ -	0	$ -	$ -	$ -	$ -	$ 2,429.00	$2,429		
	9	4	5	8	500		Pump: Build and install housing for pump	1	ea.	C.3.12	30.000	30.0	$ 1,950.00	$ 1,950	$ 1,730.00	$ 1,730	$ -	$ -	$ -	0	$ -	$ -	$ -	$ -	$ 3,680.00	$3,680		
Contingency - Grum Dump Cut-off Wall																												$932,954		
	9	5	1	1		Level and compact a working surface	Clear and grub working surface	6,750	m2	C.2.05	0.015	98.2	$ 0.53	$ 3,593	$ -	$ -	$ 0.94	$ 6,312	$ 0.62	3,204	$ 4,165	$ -	$ -	$ -	$ 2.08	$14,070		
	9	5	1	2			Level and compact surface	3,375	Bm3	C.2.20	0.013	42.2	$ 0.46	$ 1,544	$ -	$ -	$ 2.15	$ 7,242	$ 1.25	3,248	$ 4,220	$ -	$ -	$ -	$ 3.85	$13,006		
	9	5	2	1		Cut-off wall	Install cut-off wall (all-inclusive)	8,344	m2	C.2.08	0.500	4172.0	$ 26.82	$ 223,788	$ 48.50	$ 405,516	$ 20.47	$ 170,821	$ 12.67	81,349	$ 105,752	$ -	$ -	$ -	$ 108.57	$905,877		
Subtotal Direct Costs - Groundwater												10,668		$508,913		$1,558,216		$350,340		143,507	$186,559		$0				**$2,604,028**	
Vangorda Haul Road																														
Remove Culverts																												$1,018,439		
	10	1	1	1	430	Remove culverts	Excavate haul road	268,650	m3	C.2.12	0.024	6321.9	$ 0.88	$ 231,381	$ -	$ -	$ 2.09	$ 530,522	$ 0.93	192,720	$ 250,536	$ -	$ -	$ -	$ 3.79	$1,018,439		107,472
Reclaim Haul Road																												$87,788		
	10	2	1	1	430	Remove berms	Doze berms over road edges	60	hrs	C.2.22	1.000	60.0	$ 36.60	$ 2,196	$ -	$ -	$ 173.28	$ 10,397	$ 149.18	8,855	$ 8,951	$ -	$ -	$ -	$ 359.06	$21,543		
	10	2	2	1	430	Scarify road	Scarify road surfaces	135,000	m2	C.2.29	0.003	337.5	$ 0.09	$ 12,353	$ -	$ -	$ 0.10	$ 13,582	$ 0.10	10,159	$ 13,206	$ -	$ -	$ -	$ 0.29	$39,141		
	10	2	3	1	610	Revegetate	Seed/Fertilize, helicopter high application rate	180,000	m2	C.5.01	0.000	22.5	$ 0.00	$ 808	$ 0.09	$ 16,366	$ 0.05	$ 9,810	$ 0.00	92	$ 120	$ -	$ -	$ -	$ 0.15	$27,104		
Subtotal Direct Costs - Vangorda Haul Road												6,742		$246,737		$16,366		$570,311		209,856	$272,813		$0				**$1,106,227**	
Miscellaneous																														
Buildings																												$559,060		
	10	1	1	1	220	Building decontamination	Remove hazardous material:	6,902	m3	C.1.01	0.556	3834.4	$ 24.44	$ 168,716	$ -	$ -	$ 2.17	$ 14,996	$ 1.55	8,225	$ 10,692	$ -	$ -	$ -	$ 28.17	$194,404		
	10	1	2	1	220	Building demolition	Building demolition: "empty buildings"	10,008	m2	C.1.02	0.310	3103.3	$ 11.16	$ 111,997	$ -	$ -	$ 15.54	$ 155,539	$ 8.55	85,658	$ 85,615	$ -	$ -	$ -	$ 35.26	$352,250		
	10	1	2	2	430		Building demolition: "full buildings"	345	m2	C.1.03	0.465	160.5	$ 16.65	$ 5,745	$ -	$ -	$ 23.31	$ 8,043	$ 12.83	3,405	$ 4,427	$ -	$ -	$ -	$ 52.80	$18,214		
	10	1	2	3	430		Puncture concrete foundations	15	m	C.1.04	0.182	2.7	$ 6.65	$ 100	$ -	$ -	$ 20.28	$ 304	$ 13.15	152	$ 197	$ -	$ -	$ -	$ 40.07	$601		
	10	1	2	4	430		Re-grade over demolished buildings	10	hrs	C.2.22	1.000	10.0	$ 36.60	$ 366	$ -	$ -	$ 173.28	$ 1,733	$ 149.18	1,148	$ 1,492	$ -	$ -	$ -	$ 359.06	$3,591		
Sludge Pond																												$133,287		
	10	2	1	1	430	Cover Sludge Pond	Load, haul, and place till	30,000	Bm3	R.036	0.025	750.0	$ 0.93	$ 27,949	$ -	$ -	$ 2.33	$ 70,005	$ 1.18	27,179	$ 35,332	$ -	$ -	$ -	$ 4.44	$133,287		
Existing Bioremediation Cell																												$1,794		
	10	3	1	1	430	Cover Existing Bioremediation Cell	Doze material	1,600	m2	C.2.04	0.004	5.8	$ 0.13	$ 213	$ -	$ -	$ 0.62	$ 999	$ 0.36	448	$ 582	$ -	$ -	$ -	$ 1.12	$1,794		
Dams																												$3,791		
	10	4	1	1	430	Breach all Dams (2)	Excavate, haul and dump locally	1,000	Bm3	C.2.12	0.024	23.5	$ 0.88	$ 881	$ -	$ -	$ 2.00	$ 1,997	$ 0.93	717	$ 932	$ -	$ -	$ -	$ 3.79	$3,791		
WTP Settling Pond																												$5,052		
	10	5	1	1	430	Breach WTP Settling Pond	Excavate, haul and dump locally	1,491	Bm3	C.2.12	0.024	35.1	$ 0.88	$ 1,284	$ -	$ -	$ 2.00	$ 2,977	$ 0.93	1,069	$ 1,390	$ -	$ -	$ -	$ 3.79	$5,652		
Contaminated soils																												$27,499		
	10	6	1	1	600	Remove Contaminated soils	Excavate, haul and place contaminated soils in bio-remediation cell	3,750	Bm3	R.039	0.034	127.5	$ 1.25	$ 4,679	$ -	$ -	$ 3.88	$ 14,548	$ 2.04	5,877	$ 7,641	$ -	$ -	$ -	$ 7.16	$26,868		
	10	6	1	2	600		Regrade excavated areas for drainage	2,500	m2	C.2.18	0.002	5.4	$ 0.08	$ 199	$ -	$ -	$ 0.09	$ 219	$ 0.09	164	$ 213	$ -	$ -	$ -	$ 0.25	$630		
Bioremediation Cell																												$51,420		
	10	7	1	1	430	Construct Bioremediation Cell	Excavate and create berms for use as the bioremediation cell	6,000	Bm3	C.2.11	0.013	100.7	$ 0.49	$ 3,904	$ -	$ -	$ 0.95	$ 7,590	$ 0.50	3,079	$ 4,002	$ -	$ -	$ -	$ 1.94	$15,496		
	10	7	1	2	430		Place HDPE liner for remediation cell	1,600	m2	C.4.10	0.143	228.8	$ 6.33	$ 10,130	$ 12.77	$ 20,432	$ 1.63	$ 2,609	$ 1.06	1,696	$ 1,690	$ -	$ -	$ -	$ 21.79	$34,861		
	10	7	1	3	430		Bedding: Load, haul, place (use local overburden material)	460	Bm3	C.2.01	0.030	14.4	$ 1.08	$ 519	$ -	$ -	$ 0.74	$ 354	$ 0.40	148	$ 190	$ -	$ -	$ -	$ 2.22	$1,063		
Roads																												$20,785		
	10	8	1	1	430	Reclaim unnecessary roads	Remove culverts and breach stream crossing	3,920	Bm3	C.2.12	0.024	92.2	$ 0.88	$ 3,376	$ -	$ -	$ 2.00	$ 7,828	$ 0.93	2,812	$ 3,655	$ -	$ -	$ -	$ 3.79	$14,850		
	10	8	1	2	430		Scarify road surfaces	15,000	m2	C.2.29	0.003	37.5	$ 0.09	$ 1,373	$ -	$ -	$ 0.10	$ 1,509	$ 0.10	1,129	$ 1,467	$ -	$ -	$ -	$ 0.29	$4,349		
	10	8	1	3	610		Seed/Fertilize, helicopter low application rate	15,000	m2	C.5.02	0.000	1.9	$ 0.00	$ 67	$ 0.05	$ 682	$ 0.05	$ 618	$ 0.00	8	$ 10	$ -	$ -	$ -	$ 0.11	$1,377		
Borrow Sources																												$85,000		
	10	9	1	1	600	Develop Borrow Sources	Clear and grub	3,000	m2	C.2.05	0.015	43.6	$ 0.53	$ 1,597	$ -	$ -	$ 0.94	$ 2,805	$ 0.62	1,424	$ 1,851	$ -	$ -	$ -	$ 2.08	$6,253		
	10	9	1	2	600		Construct haul road	1,000	m	C.2.28	0.225	225.0	$ 8.24	$ 8,235	$ -	$ -	$ 29.67	$ 29,674	$ 19.48	14,988	$ 19,482	$ -	$ -	$ -	$ 57.39	$57,391		
	10	9	2	1	600	Decommission Borrow Sources	Regrade Borrow source slopes	10	hrs	C.2.22	1.000	10.0	$ 36.60	$ 366	$ -	$ -	$ 173.28	$ 1,733	$ 149.18	1,148	$ 1,492	$ -	$ -	$ -	$ 359.06	$3,591		
	10	9	2	2	610		Seed/Fertilize, helicopter low application rate	169,000	m2	C.5.02	0.000	21.1	$ 0.00	$ 759	$ 0.05	$ 7,663	$ 0.05	$ 9,211	$ 0.00	80	$ 112	$ -	$ -	$ -	$ 0.11	$17,785		
Subtotal Direct Costs - Miscellaneous												8,853		$351,534		$28,797		$335,495		140,358	$182,466		$0				**$898,285**	
Subtotal Direct Costs																														
							Subtotal direct costs					265,034		$11,218,697		$8,240,316		$23,235,707		11,537,221	$15,135,023		$0				**$57,829,743**	
CLOSURE COSTS - INDIRECT																														
	100	100	1	1		Project Management	5.0% of direct costs															$ 57,829,743	x	5.0%				$2,891,487		
	100	100	2	1		Field Supervision	2.5% of direct costs															$ 57,829,743	x	2.5%				$1,445,744		
	100	100	3	1		Contractor profit and home office overhead	10% of direct costs															$ 57,829,743	x	10.0%				$5,782,974		
	100	100	4	1		Insurance	0.5% of direct costs															$ 57,829,743	x	0.5%				$289,149		
	100	100	5	1		Bonding	0.5% of direct costs															$ 57,829,743	x	0.5%				$289,149		
	100	100	6	1		Field Engineering and QA	10% of direct costs															$ 57,829,743	x	10.0%				$5,782,974		
	100

Attachment E
Example Alternatives - Cost Estimate

Vangorda/Grum Alternative 2 - Stabilize In Place

Contract Code	Work Area Code	Item	Task	Sub-task	Estimate Type	Activity	Task	Quantity	Unit	Cost Code	Unit Mhrs	Total Mhrs	Labour Rate	Labour Cost	Unit Mat$	Material Cost	Unit Equip	Equipment Cost	Unit Fuel	Fuel Consumed (L)	Fuel Cost	Power Rate ($/Unit)	Power Cost	Unit Cost	Activity Total	Subtotals	Source / Comments
CLOSURE COSTS - DIRECT CAPITAL																											
Vangorda Pit																											
Water Treatment																										$316,444	
	1	1	1	1	430	Construct Water Treatment Plant	Water treatment costed separately	1	ls	-	0.000	0.0	$ -	$ -	$ -	$ -	$ -	$ -	$ -	0	$ -	$ -	$ -	$ -	$ -	$0	
	1	1	2	1	430	Construct pipeline to and from Treatment Plant	Excavate piping trench	7,950	Bm3	C.2.13	0.000	159.0	$ 0.73	$ 5,819	$ -	$ -	$ 1.42	$ 11,313	$ 0.75	4,589	$ 5,966	$ -	$ -	$ 2.01	$23,099	
	1	1	2	2	500		Supply and place pump	1	ea	C.3.10	12.000	12.0	$ 600.00	$ 600	$ 1,829.00	$ 1,829	$ -	$ -	$ -	0	$ -	$ -	$ -	$ -	$ 2,429.00	$2,429	
	1	1	2	3	500		Build and install housing for primary pump	1	ea	C.3.12	30.000	30.0	$ 1,950.00	$ 1,950	$ 1,730.00	$ 1,730	$ -	$ -	$ -	0	$ -	$ -	$ -	$ -	$ 3,680.00	$3,680	
	1	1	2	4	510		Supply and install insulated 150mm HDPE pipe	1,325	m	C.3.03	0.250	331.3	$ 0.76	$ 11,604	$ 155.84	$ 206,488	$ -	$ -	$ -	0	$ -	$ -	$ -	$ -	$ 164.50	$218,092	
	1	1	2	5	430		Bedding layer: Produce, screen and stockpile	517	Bm3	C.2.02	0.010	5.2	$ 0.37	$ 189	$ -	$ -	$ 1.91	$ 831	$ 1.13	448	$ 584	$ -	$ -	$ 3.10	$1,604	
	1	1	2	6	430		Bedding layer: Load, haul, place and compact	517	Bm3	R.045	0.007	18.9	$ 1.34	$ 603	$ -	$ -	$ 2.78	$ 1,437	$ 1.28	508	$ 661	$ -	$ -	$ 5.40	$2,792	
	1	1	2	7	430		Backfill ditches	7,950	Bm3	C.2.01	0.030	238.5	$ 1.08	$ 8,602	$ -	$ -	$ 0.74	$ 5,865	$ 0.40	2,419	$ 3,144	$ -	$ -	$ 2.22	$17,611	
	1	1	3	1	510	Heat tracing	Supply and install heat trace in HDPE pipe	1,325	m	C.3.04	0.250	331.3	$ 12.50	$ 16,563	$ 21.32	$ 28,249	$ -	$ -	$ -	0	$ -	$ -	$ -	$ -	$ 33.82	$44,812	
	1	1	3	2	510		Supply/install heat tracing power feed kit	2	ea	C.3.05	4.000	8.0	$ 230.00	$ 460	$ 306.84	$ 794	$ -	$ -	$ -	0	$ -	$ -	$ -	$ -	$ 626.84	$1,254	
	1	1	3	3	510		Supply/install electrical thermostate for heat tracing	1	ea	C.3.06	1.000	1.0	$ 57.50	$ 58	$ 1,025.00	$ 1,025	$ -	$ -	$ -	0	$ -	$ -	$ -	$ -	$ 1,082.50	$1,083	
Safety Berm																										$ 137,140	
	2	1	1	1	430	Construct access road	Clear access road area	4,350	m	C.2.05	0.015	63.3	$ 0.53	$ 2,318	$ -	$ -	$ 0.94	$ 4,097	$ 0.62	2,666	$ 2,684	$ -	$ -	$ 2.08	$ 9,097		
	2	1	1	2	430		Construct access road	1,450	m	C.2.27	0.131	190.3	$ 4.60	$ 8,665	$ -	$ -	$ 10.14	$ 14,707	$ 5.33	5,940	$ 7,722	$ -	$ -	$ 20.27	$ 29,395		
	2	1	2	1	430	Place berm materials	Load, haul, dump berm material	15,000	Lm3	R.007	0.050	540.0	$ 2.05	$ 30,744	$ -	$ -	$ 1.73	$ 29,010	$ 1.66	18,620	$ 23,426	$ -	$ -	$ 5.35	$ 80,180		
	2	2	2	2	430		Final Shaping of material with dozer	3,000	m	C.2.03	0.020	60.0	$ 0.73	$ 2,190	$ -	$ -	$ 3.43	$ 10,293	$ 2.00	4,617	$ 6,002	$ -	$ -	$ 6.17	$ 18,485		
Vangorda Pit Waste Rock Piles																										$ 409,364	
	1	3	1	1	430	Regrade	Flattened surfaces	13	hrs	C.2.22	1.000	13.0	$ 36.00	$ 476	$ -	$ -	$ 173.28	$ 2,253	$ 149.18	1,492	$ 1,940	$ -	$ -	$ 359.06	$ 4,669		39.96330991
	1	3	1	2	430		Flatten bubble dump surfaces	10	hrs	C.2.22	1.000	10.0	$ 36.00	$ 363	$ -	$ -	$ 173.28	$ 1,679	$ 149.18	1,109	$ 1,438	$ -	$ -	$ 359.06	$ 3,480		
	1	3	1	3	430		Regrade Slopes	28	hrs	C.2.22	1.000	27.7	$ 36.00	$ 1,014	$ -	$ -	$ 173.28	$ 4,809	$ 149.18	3,179	$ 4,122	$ -	$ -	$ 359.06	$ 9,945		
	1	3	2	1	430	Place low infiltration cover	Load, haul, place compacted till (0.5m)	32,412	Bm3	R.009	0.014	453.8	$ 0.51	$ 16,908	$ -	$ -	$ 1.70	$ 57,911	$ 1.17	29,204	$ 37,865	$ -	$ -	$ 3.47	$ 112,459		
	1	3	2	2	430		Load, haul, place loose till (1.5m)	97,235	Bm3	R.003	0.012	1166.8	$ 0.44	$ 42,705	$ -	$ -	$ 1.73	$ 169,520	$ 1.13	84,325	$ 109,622	$ -	$ -	$ 3.30	$ 320,997		
	1	3	3	1	610	Revegetate	Seed/Fertilize, helicopter high application rate	118,625	m2	C.5.01	0.000	14.9	$ 0.00	$ 533	$ 0.69	$ 10,604	$ 0.05	$ 6,476	$ 0.00	81	$ 79	$ -	$ -	$ 0.15	$ 17,802		
Subtotal Direct Costs - Vangorda Pit												3,974		$159,436		$259,918		$316,227		157,973	$265,365		$0			$ 922,948	
Vangorda Dump																										$ 265,537	
Reslope Dump																											
	2	1	1	1	430	Regrade (shape to enhance runoff to ditches)	Flattened surfaces	40	hrs	C.2.22	1.000	39.6	$ 36.00	$ 1,449	$ -	$ -	$ 173.28	$ 6,862	$ 149.18	4,544	$ 5,907	$ -	$ -	$ 359.06	$ 14,218		
	2	1	1	2	430		Flatten bubble dump surfaces	102	hrs	C.2.22	1.000	102.0	$ 36.00	$ 3,731	$ -	$ -	$ 173.28	$ 17,668	$ 149.18	11,699	$ 15,209	$ -	$ -	$ 359.06	$ 36,607		
	2	1	1	3	430		Regrade slopes	596	hrs	C.2.22	1.000	596.0	$ 36.00	$ 21,806	$ -	$ -	$ 173.28	$ 103,618	$ 149.18	68,621	$ 89,208	$ -	$ -	$ 359.06	$ 214,712		73.95384859
Waste Rock Cover																										$ 5,107,878	
	2	2	1	1	430	Place low infiltration cover	Load, haul, place compacted till (0.5m)	320,663	Bm3	R.010	0.017	5431.4	$ 0.62	$ 198,708	$ -	$ -	$ 2.15	$ 688,123	$ 1.40	344,035	$ 447,246	$ -	$ -	$ 4.17	$ 1,334,157		250.05
	2	2	1	2	430		Load, haul, place loose till (1.5m)	990,188	Bm3	R.011	0.015	14864.7	$ 0.50	$ 536,727	$ -	$ -	$ 2.10	$ 2,021,055	$ 1.30	1,004,568	$ 1,305,939	$ -	$ -	$ 4.02	$ 3,863,722		
Rock Drains																										$ 44,973	
	2	3	1	1	430	Install rock drains (runoff management)	Excavate channel for rock drains	1,313	Bm3	C.2.13	0.020	26.3	$ 0.73	$ 991	$ -	$ -	$ 1.42	$ 1,868	$ 0.75	758	$ 985	$ -	$ -	$ 2.01	$3,813		
	2	3	1	2	430		Construct access road	977	Bm3	C.2.23	0.045	43.9	$ 1.62	$ 1,585	$ 15.72	$ 15,351	$ 2.64	$ 2,577	$ 1.30	1,024	$ 1,332	$ -	$ -	$ 21.35	$20,845		
	2	3	1	3	430		Rip-rap (rounded, low quality): Screen and stockpile	977	Bm3	C.2.24	0.040	39.1	$ 1.40	$ 1,430	$ -	$ -	$ 6.43	$ 6,283	$ 4.52	3,303	$ 4,411	$ -	$ -	$ 12.42	$12,124		
	2	3	1	4	430		Rip-Rap: Load, haul, dump to Vangorda Stockpile Area	977	Bm3	R.012	0.041	39.9	$ 1.50	$ 1,460	$ -	$ -	$ 3.50	$ 3,419	$ 1.58	1,187	$ 1,543	$ -	$ -	$ 6.57	$6,417		
	2	3	1	5	430		Rip-Rap: Place and secure	977	Bm3	C.2.26	0.013	12.2	$ 0.46	$ 447	$ -	$ -	$ 0.89	$ 868	$ 0.47	352	$ 456	$ -	$ -	$ 1.82	$1,773		
Sediment Control Ditches																										$ 2,010	
	2	4	1	1	430	Vangorda dump sediment control ditch	Load, haul and dump locally	300	Bm3	C.2.10	0.032	12.5	$ 1.17	$ 457	$ -	$ -	$ 2.72	$ 1,050	$ 1.27	360	$ 465	$ -	$ -	$ 5.16	$ 2,010		
Revegetate																										$ 75,913	
	2	5	1	1	610	Revegetate dump footprint	Seed/Fertilize, helicopter high application rate	504,150	m2	C.5.01	0.000	63.0	$ 0.00	$ 2,293	$ 0.69	$ 45,837	$ 0.05	$ 27,477	$ 0.00	257	$ 335	$ -	$ -	$ 0.15	$ 75,913		
Subtotal Direct Costs - Vangorda Dump												21,072		$771,184		$61,188		$2,880,873		1,440,821	$1,873,067		$0			$ 5,586,312	
Vangorda Creek																										$ 1,259,554	1CD000.15_ Vangorda Creek Diversion
Relocate North of Pit																											Channel designed to 1:500 yr event (Design flow 31m³/s)
	3	1	1	1	430	Excavate channel	Rock Excavation: drill, blast, muck, load, haul and dump	19,348	Bm3	C.2.15	0.173	3353.3	$ 0.34	$ 122,731	$ -	$ -	$ 9.13	$ 176,683	$ 3.69	54,699	$ 71,309	$ -	$ -	$ 19.16	$ 370,682		
	3	1	1	2	430		Soil Excavation: Excavate, haul, dump	78,001	Bm3	C.2.10	0.032	2496.0	$ 1.17	$ 91,428	$ -	$ -	$ 2.72	$ 211,996	$ 1.27	76,140	$ 98,994	$ -	$ -	$ 5.16	$ 402,418		
	3	1	2	1	430	Place fill material	Placed from soil layer above, compact by hand	500	m2	C.2.09	0.010	5.0	$ 0.37	$ 184	$ -	$ -	$ 0.02	$ 10	$ 0.02	12	$ 16	$ -	$ -	$ 0.61	$ 200		
	3	1	3	1	430	Place bedding layer	Bedding: Produce and stockpile locally	3,194	Bm3	C.2.02	0.010	31.9	$ 0.37	$ 1,160	$ -	$ -	$ 1.91	$ 6,138	$ 1.13	2,775	$ 3,607	$ -	$ -	$ 3.10	$ 9,915		
	3	1	3	2	430		Bedding layer: Load , haul, place and compact	3,194	Bm3	R.016	0.031	97.6	$ 1.12	$ 3,572	$ -	$ -	$ 2.32	$ 7,403	$ 1.07	2,620	$ 3,406	$ -	$ -	$ 4.50	$ 14,381		
	3	1	4	1	430	Place rip-rap	Rip-Rap: Drill, blast and stockpile	9,004	Bm3	C.2.23	0.045	400.2	$ 1.62	$ 15,733	$ 15.72	$ 152,369	$ 2.64	$ 25,586	$ 1.30	10,170	$ 13,221	$ -	$ -	$ 21.35	$ 206,909		
	3	1	4	2	430		Rip-rap (angular, high quality): Screen and stockpile	9,004	Bm3	C.2.25	0.057	503.9	$ 2.09	$ 20,274	$ -	$ -	$ 9.19	$ 89,109	$ 6.45	48,125	$ 62,562	$ -	$ -	$ 17.74	$ 171,946		
	3	1	4	4	430		Rip-Rap: Load, haul and dump	9,004	Bm3	R.017	0.042	404.6	$ 1.53	$ 14,809	$ -	$ -	$ 3.57	$ 34,535	$ 1.61	12,037	$ 15,648	$ -	$ -	$ 6.71	$ 65,002		
	3	1	4	5	430		Rip-Rap: Place and secure	9,004	Bm3	C.2.26	0.013	121.2	$ 0.46	$ 4,435	$ -	$ -	$ 0.89	$ 8,622	$ 0.47	3,497	$ 4,548	$ -	$ -	$ 1.82	$ 17,603		
Plunge Pool																										$ 55,141	
	3	2	1	1	430	Excavate pool	Plunge pool excavation	2,700	Bm3	C.2.12	0.024	63.5	$ 0.50	$ 2,325	$ -	$ -	$ 2.00	$ 5,302	$ 0.93	1,007	$ 2,516	$ -	$ -	$ 3.70	$ 10,234		
	3	2	2	1	430	Place bedding layer	Bedding: Produce and stockpile locally	270	Bm3	C.2.02	0.010	2.7	$ 0.37	$ 99	$ -	$ -	$ 1.91	$ 434	$ 1.13	235	$ 305	$ -	$ -	$ 3.10	$ 838		
	3	2	2	3	430		Bedding: Load, haul, place and compact	270	Bm3	R.016	0.031	8.3	$ 1.12	$ 302	$ -	$ -	$ 2.32	$ 626	$ 1.07	221	$ 288	$ -	$ -	$ 4.50	$ 1,216		
	3	2	3	1	430	Place rip-rap	Rip-Rap: Drill, blast and stockpile	900	Bm3	C.2.23	0.045	40.5	$ 1.62	$ 1,401	$ 15.72	$ 14,148	$ 2.64	$ 2,376	$ 1.30	944	$ 1,227	$ -	$ -	$ 21.35	$ 19,212		
	3	2	3	2	430		Rip-rap (angular, high quality): Screen and stockpile	900	Bm3	C.2.25	0.057	51.4	$ 2.09	$ 1,682	$ -	$ -	$ 9.19	$ 8,273	$ 6.45	4,468	$ 5,808	$ -	$ -	$ 17.74	$ 15,964		
	3	2	3	3	430		Rip-Rap: Load, haul and dump	900	Bm3	R.017	0.042	37.8	$ 1.53	$ 1,378	$ -	$ -	$ 3.57	$ 3,210	$ 1.61	1,118	$ 1,453	$ -	$ -	$ 6.71	$ 6,043		
	3	2	3	4	430		Rip-Rap: Place and secure	900	Bm3	C.2.26	0.013	11.3	$ 0.46	$ 412	$ -	$ -	$ 0.89	$ 800	$ 0.47	325	$ 422	$ -	$ -	$ 1.82	$ 1,634		
Diversion to Dixon Creek																										$ 25,776	
	3	3	1	1		Upgrade existing diversion to Dixon creek	Excavate channel and spoil locally	5,000	Bm3	C.2.10	0.032	160.0	$ 1.17	$ 5,858	$ -	$ -	$ 2.72	$ 13,579	$ 1.27	4,878	$ 6,341	$ -	$ -	$ 5.16	$ 25,778		
Allowance: Buttress the North Vangorda Pit Wal																										$ 1,249,815	
	3	4	1	1		Butress North Vangorda Pit Wall	Load, haul, dump	250,654	Bm3	R.010	0.030	7769.0	$ 1.11	$ 264,345	$ -	$ -	$ 2.59	$ 665,014	$ 1.17	231,120	$ 300,456	$ -	$ -	$ 4.87	$ 1,249,815		
Subtotal Direct Costs - Vangorda Creek												15,656		$572,700		$166,537		$1,258,801		455,528	$592,187		$0			$ 2,590,285	
Grum Pit																											1CD003.46_PitLakesTreat
Water Management																										$ -	
	4	1	1	1	610	Biological treatment	Note: Water treatment costs estimated seperately	1	ls	-	0.000	0.0	$ -	$ -	$ -	$ -	$ -	$ -	$ -	0	$ -	$ -	$ -	$ -	$ -	$0	
Safety Berm																										$ 152,739	
	4	2	1	1	430	Construct access road	Access road: clearing and grubbing	3,750	m	C.2.04	0.004	13.6	$ 0.13	$ 499	$ -	$ -	$ 0.62	$ 2,341	$ 0.36	1,049	$ 1,364	$ -	$ -	$ 1.12	$ 4,204		
	4	2	1	2	220		Access road: construction	1,250	m	C.2.27	0.131	164.1	$ 4.60	$ 6,005	$ -	$ -	$ 10.14	$ 12,679	$ 5.33	5,121	$ 6,667	$ -	$ -	$ 20.27	$ 25,341		
	4	2	2	1	430	Place berm materials	Load, haul, dump berm material	20,000	Lm3	R.019	0.049	980.0	$ 1.79	$ 35,808	$ -	$ -	$ 1.66	$ 33,077	$ 1.45	22,297	$ 28,986	$ -	$ -	$ 4.03	$ 98,531		
	4	2	2	2	430		Final Shaping of material with dozer	4,000	m	C.2.03	0.020	80.0	$ 0.73	$ 2,928	$ -	$ -	$ 3.43	$ 13,733	$ 2.00	6,156	$ 8,003	$ -	$ -	$ 6.17	$ 24,664		
Subtotal Direct Costs - Grum Pit												1,238		$45,360		$0		$62,429			$45,010		$0			$ 152,739	
Grum Interceptor Ditch																										$ 88,484	1CD000.46_PitLakesTreat
Route into Grum Pit																											assumed channel from vangorda creek diversion (1CD003.15
	5	1	1	1	430	Access road	Access road: clearing and grubbing	900	m2	C.2.04	0.004	2.2	$ 0.13	$ 80	$ -	$ -	$ 0.62	$ 375	$ 0.36	168	$ 219	$ -	$ -	$ 1.12	$673		
	5	1	1	2	220		Access road: construction	900	m	C.2.27	0.131	26.3	$ 4.60	$ 961	$ -	$ -	$ 10.14	$ 2,029	$ 5.33	810	$ 1,055	$ -	$ -	$ 20.27	$ 4,055		
	5	1	2	1	430	Headworks dam	Construct earth dam at headworks (LHD till)	24	Bm3	R.020	0.030	0.7	$ 1.11	$ 27	$ -	$ -	$ 2.32	$ 52	$ 1.07	20	$ 26	$ -	$ -	$ 4.50	$ 104		
	5	1	3	1	430	Excavate channel	Excavate diversion channel (soils)	2,017	Bm3	C.2.10	0.032	64.5	$ 1.17	$ 2,362	$ -	$ -	$ 2.72	$ 5,477	$ 1.27	1,907	$ 2,556	$ -	$ -	$ 5.16	$ 10,397		
	5	1	3	2	430		Excavate diversion channel (bedrock)	362	Bm3	C.2.15	0.173	62.7	$ 0.34	$ 2,264	$ -	$ -	$ 9.13	$ 3,301	$ 3.69	1,020	$ 1,334	$ -	$ -	$ 19.16	$ 6,929		
	5	1	4	1	430	Place bedding layer	Bedding: Produce and stockpile locally	623	Bm3	C.2.02	0.010	6.2	$ 0.37	$ 224	$ -	$ -	$ 1.91	$ 1,202	$ 1.13	541	$ 703	$ -	$ -	$ 3.10	$ 1,933		
	5	1	4	2	430		Bedding: Load , haul, place and compact	623	Bm3	R.021	0.049	30.4	$ 1.79	$ 1,114	$ -	$ -	$ 3.71	$ 2,309	$ 1.71	817	$ 1,062	$ -	$ -	$ 7.20	$ 4,485		
	5	1	5	1	430	Place rip-rap	Rip-Rap: Drill, blast and stockpile	1,212	Bm3	C.2.23	0.045	54.6	$ 1.62	$ 1,968	$ 15.72	$ 19,059	$ 2.64	$ 3,200	$ 1.30	1,272	$ 1,653	$ -	$ -	$ 21.35	$ 25,880		
	5	1	5	2	430		Rip-rap (angular, high quality): Screen and stockpile	1,212	Bm3	C.2.25	0.057	69.2	$ 2.09	$ 2,508	$ -	$ -	$ 9.19	$ 11,145	$ 6.45	6,019	$ 7,825	$ -	$ -	$ 17.74	$ 21,505		
	5	1	5	3	430		Rip-Rap: Load, haul and dump	1,212	Bm3	R.022	0.043	51.7	$ 1.56	$ 1,893	$ -	$ -	$ 3.65	$ 4,428	$ 1.65	1,535	$ 2,001	$ -	$ -	$ 6.86	$ 8,322		
	5	1	5	4	430		Rip-Rap: Place and secure	1,212	Bm3	C.2.26	0.013	15.2	$ 0.46	$ 555	$ -	$ -	$ 0.89	$ 1,078	$ 0.47	437	$ 569	$ -	$ -	$ 1.82	$ 2,202		
Route out of Pit via slot cut																										$ 216,506	
	5	3	1	1	430	Access road	Access road: clearing and grubbing	150	m2	C.2.04	0.004	0.5	$ 0.13	$ 20	$ -	$ -	$ 0.62	$ 94	$ 0.36	42	$ 55	$ -	$ -	$ 1.12	$ 168		
	5	3	1	2	220		Access road: construction	50	m	C.2.27	0.131	6.6	$ 4.60	$ 240	$ -	$ -	$ 10.14	$ 507	$ 5.33	205	$ 269	$ -	$ -	$ 20.27	$ 1,014		
	5	3	2	1	430	Excavate channel	Excavate diversion channel (soils)	9,222	Bm3	C.2.10	0.032	295.1	$ 1.17	$ 10,801	$ -	$ -	$ 2.72	$ 25,048	$ 1.27	8,997	$ 11,899	$ -	$ -	$ 5.16	$ 47,643		
	5	3	3	1	430	Place bedding layer	Bedding: Produce and stockpile locally	1,736	Bm3	C.2.02	0.010	17.4	$ 0.37	$ 633	$ -	$ -	$ 1.91	$ 3,293	$ 1.13	1,500	$ 1,961	$ -	$ -	$ 3.10	$ 5,386		
	5	3	3	2	430		Bedding: load , haul, place and compact	1,736	Bm3	R.024	0.035	61.2	$ 1.20	$ 2,240	$ -	$ -	$ 2.67	$ 4,643	$ 1.23	1,843	$ 2,436	$ -	$ -	$ 5.20	$ 9,020		
	5	3	4	1	430	Place rip-rap	Rip-Rap: Drill, blast and stockpile	3,375	Bm3	C.2.23	0.045	151.9	$ 1.62	$ 5,478	$ 15.72	$ 53,057	$ 2.64	$ 8,908	$ 1.30	3,541	$ 4,603	$ -	$ -	$ 21.35	$ 72,046		
	5	3	4	2	430		Rip-rap (angular, high quality): Screen and stockpile	3,375	Bm3	C.2.25	0.057	192.9	$ 2.09	$ 7,009	$ -	$ -	$ 9.19	$ 31,025	$ 6.45	16,755	$ 21,782	$ -	$ -	$ 17.74	$ 59,816		
	5	3	4	3	430		Rip-Rap: Load, haul and dump	3,375	Bm3	R.025	0.028	95.3	$ 1.03	$ 3,458	$ -	$ -	$ 2.42	$ 8,157	$ 1.09	2,635	$ 3,680	$ -	$ -	$ 4.54	$ 15,331		
	5	3	4	4	430		Rip-Rap: Place and secure	3,375	Bm3	C.2.26	0.013	42.2	$ 0.46	$ 1,544	$ -	$ -	$ 0.89	$ 3,002	$ 0.47	1,218	$ 1,583	$ -	$ -	$ 1.82	$ 6,129		
Subtotal Direct Costs - Grum Interceptor Ditch												1,247		$45,523		$72,116		$118,570			$66,780		$0			$302,988	
Grum Dump																										$1,145,320	
Reslope Dump																											
	6	1	1	1	430	Clear/grub	Clear/grub forest area around to	13,200	m2	C.2.05	0.015	192.0	$ 0.53	$ 7,027	$ -	$ -	$ 0.94	$ 12,343	$ 0.62	8,265	$ 8,145	$ -	$ -	$ 2.08	$27,515		
	6	1	1	1	430	Regrade	Flattened surfaces	337	hrs	C.2.22	1.000	337.0	$ 36.00	$ 12,347	$ -	$ -	$ 173.28	$ 58,453	$ 149.18	38,711	$ 50,324	$ -	$ -	$ 359.06	$121,124		
	6	1	1	2	430		Flatten bubble dump surfaces	296	hrs	C.2.22	1.000	296.0	$ 36.00	$ 10,852	$ -	$ -	$ 173.28	$ 51,377	$ 149.18	34,024	$ 44,232	$ -	$ -	$ 359.06	$106,460		
	6	1	1	3	430		Regrade slopes	737	hrs	C.2.22	1.000	737.4	$ 36.00	$ 26,990	$ -	$ -	$ 173.28	$ 127,782	$ 149.18	84,624	$ 110,011	$ -	$ -	$ 359.06	$264,784		
	6	1	3	1	430	Pull-back slopes not able to be re-sloped	Load, haul, dump, place at top of dump	165,000	Bm3	C.2.12	0.024	3962.4	$ 0.86	$ 142,094	$ -	$ -	$ 2.00	$ 329,466	$ 0.93	178,352	$ 153,858	$ -	$ -	$ 3.79	$625,437		
Sulphide Cell																										$1,710,877	
	6	2	1	1	430	Low infiltration cover	Load, haul, place compacted till (0.5m)	96,725	Bm3	R.026	0.017	1675.3	$ 0.62	$ 61,317	$ -	$ -	$ 2.24	$ 220,700	$ 1.50	121,483	$ 157,902	$ -	$ -	$ 4.46	$439,919		
	6	2	1	2	430		Load, haul, place loose till (1.5m)	296,175	Bm3	R.027	0.015	4523.4	$ 0.56	$ 165,556	$ -	$ -	$ 2.19	$ 649,738	$ 1.50	355,895	$ 462,663	$ -	$ -	$ 4.31	$1,278,958		
Waste Rock Cover																										$3,701,900	
	6	3	1	1	430	Place rudimentary cover	Load, haul, place loose till (0.5m)	858,025	Bm3	R.027	0.015	13113.5	$ 0.56	$ 479,956	$ -	$ -	$ 2.19	$ 1,880,722	$ 1.50	1,031,756	$ 1,341,283	$ -	$ -	$ 4.31	$3,701,900		
Steep Runoff channels																										$123,025	
	6	4	1	1	430	Install rock drains (runoff management)	Excavate channel for rock drains	3,500	Bm3	C.2.12	0.024	82.4	$ 0.50	$ 3,014	$ -	$ -	$ 2.00	$ 6,880	$ 0.93	2,610	$ 3,264	$ -	$ -	$ 3.79	$13,267		
	6	4	1	2	430		Rip-Rap: Drill, blast and stockpile	2,004	Bm3	C.2.23	0.045	117.2	$ 1.62	$ 4,224	$ 15.72	$ 40,935	$ 2.64	$ 5,973	$ 1.30	2,732	$ 3,551	$ -	$ -	$ 21.35	$ 55,685		
	6	4	1	3	430		Rip-rap (rounded, low quality): Screen and stockpile	2,004	Bm3	C.2.24	0.040	104.2	$ 1.40	$ 3,812	$ -	$ -	$ 6.43	$ 16,756	$ 4.52	9,040	$ 11,764	$ -	$ -	$ 12.42	$32,332		
	6	4	1	4	430		Rip-Rap: Load, haul and dump	2,004	Bm3	R.033	0.041	166.4	$ 1.50	$ 3,803	$ -	$ -	$ 3.50	$ 9,106	$ 1.58	3,165	$ 4,114	$ -	$ -	$ 6.57	$17,113		
	6	4	1	5	430		Rip-Rap: Place and secure	2,004	Bm3	C.2.

	8	2	1	1	430	Regrade	Flattened surfaces	52	hrs	C.2.22	1.000	51.9	$ 30.00	$ 1,000	$ -	$ -	$ 173.28	$ 8,993	$ 149.18	7,750	$ 7,742	$ -	$ -	$ -	$ 359.06	$18,635		
	8	2	1	2	430		Regrade slopes	62	hrs	C.2.22	1.000	61.7	$ 30.00	$ 2,250	$ -	$ -	$ 173.28	$ 10,694	$ 149.18	9,202	$ 9,207	$ -	$ -	$ -	$ 359.06	$22,100		
Rudimentary Cover																												$266,560		
	8	3	1	1	430	Place rudimentary cover	Load, haul, place loose till (0.5m)	73,850	Bm3	R.030	0.014	1050.8	$ 0.52	$ 38,450	$ -	$ -	$ 1.99	$ 146,782	$ 1.38	77,937	$ 101,318	$ -	$ -	$ -	$ 3.89	$286,560		
Sediment Control Ditches																												$10,188		
	8	4	1	1	430	Sediment control ditch	Excavation of ditch	1,701	Bm3	C.2.10	0.032	57.3	$ 1.17	$ 2,008	$ -	$ -	$ 2.72	$ 4,664	$ 1.27	1,747	$ 2,271	$ -	$ -	$ -	$ 5.16	$8,233		
	8	4	2	1	430	Sedimentation basin	Excavate sedimentation basin	252	Bm3	C.2.12	0.024	5.9	$ 0.86	$ 217	$ -	$ -	$ 2.00	$ 503	$ 0.93	181	$ 235	$ -	$ -	$ -	$ 3.79	$955		
Revegetate																												$13,508		
	8	5	1	1	610	Revegetate	Seed/Fertilize, helicopter low application rate	120,504	m2	C.5.02	0.000	10.1	$ 0.00	$ 577	$ 0.05	$ 5,842	$ 0.05	$ 7,004	$ 0.00	66	$ 85	$ -	$ -	$ -	$ 0.11	$13,508		
Subtotal Direct Costs - Ore Transfer Pad												5,642		$292,814		$5,842		$725,189		384,395	$499,713		$0				$1,433,557		
Groundwater																													1CD003.37 Grum Seepage Collection	
Grum Dump Groundwater Collection to Holding Pond																												$506,884		
	9	1	1	1	430	Access road	Clear access road area	1,950	m2	C.2.04	0.004	7.1	$ 0.13	$ 260	$ -	$ -	$ 0.62	$ 1,217	$ 0.36	549	$ 709	$ -	$ -	$ -	$ 1.12	$2,186		
	9	1	2	1	430		Construct Access road	650	m	C.2.27	0.131	85.3	$ 4.80	$ 3,122	$ -	$ -	$ 10.14	$ 6,593	$ 5.33	2,903	$ 3,462	$ -	$ -	$ -	$ 20.27	$13,177		
	9	1	2	1	430	Groundwater wells	Drill wells (Air Rotary Drill Rig, ~20m depth)	140	m	C.2.09	2.000	280.0	$ 102.13	$ 14,299	$ -	$ -	$ 100.85	$ 14,119	$ 22.08	2,378	$ 3,091	$ -	$ -	$ -	$ 225.07	$31,509		no preliminary design done.
	9	1	2	2	500		Install 6" stainless steel well casing & screen	140	m	C.3.17	0.150	21.0	$ 7.60	$ 1,072	$ 232.60	$ 32,564	$ 7.50	$ 1,050	$ 1.60	178	$ 232	$ -	$ -	$ -	$ 249.48	$34,937		
	9	1	2	3	500		Install 6" Submersible Pump with controls	7	ea.	C.3.07	12,000	84.0	$ 600.00	$ 4,200	$ 8,842.00	$ 47,684	$ -	$ -	$ -	0	$ -	$ -	$ -	$ -	$ 7,442.00	$52,084		
	9	1	2	4	500		Install protective housing (shack)	7	ea.	C.3.13	20,000	140.0	$ 1,300.00	$ 9,100	$ 445.00	$ 3,115	$ -	$ -	$ -	0	$ -	$ -	$ -	$ -	$ 1,745.00	$12,215		
	9	1	3	1	430	Piping system	Excavate Piping Trench	7,452	Bm3	C.2.13	0.020	149.0	$ 0.73	$ 5,455	$ -	$ -	$ 1.42	$ 10,604	$ 0.75	4,302	$ 5,592	$ -	$ -	$ -	$ 2.91	$21,651		
	9	1	3	2	510		Supply and install insulated 150mm HDPE pipe	1,242	m	C.3.03	0.250	310.5	$ 8.75	$ 10,868	$ 155.84	$ 193,553	$ -	$ -	$ -	0	$ -	$ -	$ -	$ -	$ 164.59	$204,421		
	9	1	3	3	430		Bedding: Produce and stockpile (screen)	484	Bm3	C.2.02	0.010	4.8	$ 0.37	$ 177	$ -	$ -	$ 1.61	$ 779	$ 1.13	421	$ 547	$ -	$ -	$ -	$ 3.10	$1,504		
	9	1	3	4	430		Bedding: Load, haul, place	484	Bm3	R.031	0.031	11.8	$ 0.89	$ 433	$ -	$ -	$ 1.85	$ 898	$ 0.89	332	$ 431	$ -	$ -	$ -	$ 3.64	$1,762		
	9	1	3	5	430		Backfill and compact ditches	7,452	Bm3	C.2.01	0.030	223.6	$ 1.08	$ 8,053	$ -	$ -	$ 0.74	$ 5,498	$ 0.40	2,297	$ 2,947	$ -	$ -	$ -	$ 2.22	$10,506		
	9	1	4	1	510	Heat tracing	Supply and install heat trace in HDPE pipe	1,242	m	C.3.04	0.250	310.5	$ 12.50	$ 15,525	$ 21.32	$ 26,470	$ -	$ -	$ -	0	$ -	$ -	$ -	$ -	$ 33.82	$42,004		
	9	1	4	2	510		Supply/Install heat tracing power feed kit	1	ea.	C.3.05	4.000	4.0	$ 230.00	$ 230	$ 306.84	$ 307	$ -	$ -	$ -	0	$ -	$ -	$ -	$ -	$ 620.84	$627		
	9	1	4	3	510		Supply/Install electrical thermostats for heat tracing	1	ea.	C.3.06	1.000	1.0	$ 57.50	$ 58	$ 1,025.00	$ 1,025	$ -	$ -	$ -	0	$ -	$ -	$ -	$ -	$ 1,082.50	$1,083		
	9	1	5	1	510	Provide electricity from holding pond to pumps	Supply/Install treated power poles	17	ea.	C.4.03	4.545	77.3	$ 297.88	$ 5,064	$ 325.96	$ 5,541	$ 65.85	$ 1,459	$ 28.17	366	$ 479	$ -	$ -	$ -	$ 737.88	$12,544		
	9	1	5	2	510		Supply/Install overhead conductor	1,242	m	C.4.02	0.032	39.7	$ 2.21	$ 2,748	$ 1.41	$ 1,751	$ 0.45	$ 563	$ 0.15	142	$ 185	$ -	$ -	$ -	$ 4.22	$5,247		
	9	1	5	3	510		Supply/Install transformers	5	ea.	C.4.04	20.000	100.0	$ 1,383.00	$ 6,915	$ 8,934.00	$ 44,670	$ 224.98	$ 1,125	$ 143.00	550	$ 715	$ -	$ -	$ -	$ 10,684.98	$53,425		
Grum Dump Groundwater Holding Pond																												$106,157		
	9	2	1	1	430	Excavate pond	Excavate Holding Pond	10,848	Bm3	C.2.12	0.024	260.2	$ 0.86	$ 9,342	$ -	$ -	$ 2.00	$ 21,662	$ 0.93	7,761	$ 10,115	$ -	$ -	$ -	$ 3.79	$41,120		
	9	2	2	1	430	Place till	Till: Load, haul, dump and place	1,476	Bm3	R.032	0.048	71.5	$ 1.77	$ 2,618	$ -	$ -	$ 4.07	$ 6,009	$ 1.87	2,121	$ 2,767	$ -	$ -	$ -	$ 7.71	$11,395		
	9	2	2	2	430		Till: Compact with vibrating drum roller	4,921	m2	C.2.06	0.016	78.7	$ 0.57	$ 2,819	$ -	$ -	$ 0.02	$ 103	$ 0.02	61	$ 80	$ -	$ -	$ -	$ 0.61	$3,002		
	9	2	3	1	430	Place geotextile	Supply and place geotextile	3,054	m2	C.4.00	0.016	48.9	$ 0.57	$ 1,730	$ 3.50	$ 10,689	$ 0.23	$ 697	$ 0.15	347	$ 452	$ -	$ -	$ -	$ 4.44	$13,567		
	9	2	4	1	430	Place bedding layer	Bedding: Produce and stockpile (screen)	1,476	Bm3	C.2.02	0.010	14.8	$ 0.37	$ 540	$ -	$ -	$ 1.61	$ 2,375	$ 1.13	1,282	$ 1,667	$ -	$ -	$ -	$ 3.10	$4,582		
	9	2	4	2	430		Bedding: Load, haul, place and compact	1,476	Bm3	R.031	0.024	36.1	$ 0.89	$ 1,321	$ -	$ -	$ 1.85	$ 2,736	$ 0.89	1,011	$ 1,315	$ -	$ -	$ -	$ 3.64	$5,371		
	9	2	5	1	500	Place pump	Supply and place pump	1	ea.	C.3.10	12.000	12.0	$ 600.00	$ 600	$ 1,820.00	$ 1,820	$ -	$ -	$ -	0	$ -	$ -	$ -	$ -	$ 2,420.00	$2,420		
	9	2	5	2	500		Build and install housing for primary pump	1	ea.	C.3.12	30.000	30.0	$ 1,050.00	$ 1,050	$ 1,730.00	$ 1,730	$ -	$ -	$ -	0	$ -	$ -	$ -	$ -	$ 3,660.00	$3,660		
	9	2	6	1	510	Provide electricity to holding pond	Supply/Install treated power poles	10	ea.	C.4.03	4.545	45.5	$ 297.88	$ 2,979	$ 325.96	$ 3,260	$ 65.85	$ 859	$ 28.17	215	$ 282	$ -	$ -	$ -	$ 737.88	$7,370		
	9	2	6	2	510		Supply/Install overhead conductor	700	m	C.4.02	0.032	22.4	$ 2.21	$ 1,549	$ 1.41	$ 987	$ 0.45	$ 317	$ 0.15	80	$ 104	$ -	$ -	$ -	$ 4.22	$2,957		
	9	2	6	3	510		Supply/Install transformers	1	ea.	C.4.04	20.000	20.0	$ 1,383.00	$ 1,383	$ 8,934.00	$ 8,934	$ 224.98	$ 225	$ 143.00	110	$ 143	$ -	$ -	$ -	$ 10,684.98	$10,685		
Grum Dump: Groundwater Collection from Holding Pond to Vangorda Pit																												$290,564		
	9	3	1	1	430	Piping System	Excavate Piping Trench	7,524	Bm3	C.2.13	0.020	150.5	$ 0.73	$ 5,506	$ -	$ -	$ 1.42	$ 10,707	$ 0.75	4,343	$ 5,648	$ -	$ -	$ -	$ 2.91	$21,860		
	9	3	1	2	510		Supply and install insulated 150mm HDPE pipe	1,254	m	C.3.03	0.250	313.5	$ 8.75	$ 10,973	$ 155.84	$ 195,429	$ -	$ -	$ -	0	$ -	$ -	$ -	$ -	$ 164.59	$206,396		
	9	3	1	3	430		Bedding: Produce and stockpile (screen)	489	Bm3	C.2.02	0.010	4.9	$ 0.37	$ 179	$ -	$ -	$ 1.61	$ 787	$ 1.13	425	$ 552	$ -	$ -	$ -	$ 3.10	$1,518		
	9	3	1	4	430		Bedding: Load, haul, place	489	Bm3	R.031	0.031	11.8	$ 0.89	$ 429	$ -	$ -	$ 1.85	$ 906	$ 0.89	335	$ 424	$ -	$ -	$ -	$ 3.64	$1,731		
	9	3	1	5	430		Backfill and compact ditches	7,524	Bm3	C.2.01	0.030	225.7	$ 1.08	$ 8,141	$ -	$ -	$ 0.74	$ 5,551	$ 0.40	2,280	$ 2,978	$ -	$ -	$ -	$ 2.22	$16,668		
	9	3	2	1	510	Heat tracing	Supply and install heat trace in HDPE pipe	1,254	m	C.3.04	0.250	313.5	$ 12.50	$ 15,675	$ 21.32	$ 26,735	$ -	$ -	$ -	0	$ -	$ -	$ -	$ -	$ 33.82	$42,410		
Vangorda WR Dump Seepage Collection to Pit																												$927,519		
	9	4	1	1	430	Access road	Construct access roads	650	m	C.2.27	0.131	85.3	$ 4.80	$ 3,122	$ -	$ -	$ 10.14	$ 6,593	$ 5.33	2,903	$ 3,462	$ -	$ -	$ -	$ 20.27	$13,177		
	9	4	2	1	430	Groundwater wells	Drill wells (Air Rotary Drill Rig, ~10m depth)	70	m	C.2.09	2.000	140.0	$ 102.13	$ 7,149	$ -	$ -	$ 100.85	$ 7,060	$ 22.08	1,189	$ 1,546	$ -	$ -	$ -	$ 225.07	$15,755		no preliminary design done.
	9	4	2	2	500		Install 6" stainless steel well casing & screen	70	m	C.3.17	0.150	10.5	$ 7.60	$ 536	$ 232.60	$ 16,282	$ 7.50	$ 529	$ 1.60	89	$ 119	$ -	$ -	$ -	$ 249.48	$17,466		
	9	4	2	3	500		Install 6" Submersible Pump with controls	7	ea.	C.3.07	12.000	84.0	$ 600.00	$ 4,200	$ 8,842.00	$ 47,684	$ -	$ -	$ -	0	$ -	$ -	$ -	$ -	$ 7,442.00	$52,084		
	9	4	2	4	500		Install protective housing (shack)	7	ea.	C.3.13	20.000	140.0	$ 1,300.00	$ 9,100	$ 445.00	$ 3,115	$ -	$ -	$ -	0	$ -	$ -	$ -	$ -	$ 1,745.00	$12,215		
	9	4	3	1	430	Piping system	Excavate piping trench	10,824	Bm3	C.2.13	0.020	216.5	$ 0.73	$ 7,923	$ -	$ -	$ 1.42	$ 15,403	$ 0.75	6,248	$ 8,122	$ -	$ -	$ -	$ 2.91	$31,446		
	9	4	3	2	510		Supply and install insulated 150mm HDPE pipe	1,804	m	C.3.03	0.250	451.0	$ 8.75	$ 15,785	$ 155.84	$ 281,135	$ -	$ -	$ -	0	$ -	$ -	$ -	$ -	$ 164.59	$296,920		
	9	4	3	4	430		Bedding layer: Produce, screen and stockpile	704	Bm3	C.2.02	0.010	7.0	$ 0.37	$ 258	$ -	$ -	$ 1.61	$ 1,132	$ 1.13	611	$ 795	$ -	$ -	$ -	$ 3.10	$2,184		
	9	4	3	5	430		Bedding Layer: Load, haul, place and compact	704	Bm3	R.030	0.030	27.0	$ 1.44	$ 1,012	$ -	$ -	$ 2.98	$ 2,097	$ 1.37	742	$ 964	$ -	$ -	$ -	$ 5.79	$4,073		
	9	4	3	6	430		Backfill ditches	10,120	Bm3	C.2.01	0.030	303.6	$ 1.08	$ 10,950	$ -	$ -	$ 0.74	$ 7,467	$ 0.40	3,079	$ 4,003	$ -	$ -	$ -	$ 2.22	$22,419		
	9	4	4	1	510	Heat tracing	Supply and install heat trace in HDPE pipe	1,804	m	C.3.04	0.250	451.0	$ 12.50	$ 22,550	$ 21.32	$ 38,461	$ -	$ -	$ -	0	$ -	$ -	$ -	$ -	$ 33.82	$61,011		
	9	4	4	2	510		Supply/Install heat tracing power feed kit	1	ea.	C.3.05	4.000	4.0	$ 230.00	$ 230	$ 306.84	$ 307	$ -	$ -	$ -	0	$ -	$ -	$ -	$ -	$ 620.84	$627		
	9	4	4	3	510		Supply/Install electrical thermostats for heat tracing	1	ea.	C.3.06	1.000	1.0	$ 57.50	$ 58	$ 1,025.00	$ 1,025	$ -	$ -	$ -	0	$ -	$ -	$ -	$ -	$ 1,082.50	$1,083		
	9	4	5	1	510	Provide electricity to pumps	Supply/Install treated power poles	21	ea.	C.4.03	4.545	95.5	$ 297.88	$ 6,255	$ 325.96	$ 6,845	$ 65.85	$ 1,803	$ 28.17	455	$ 592	$ -	$ -	$ -	$ 737.88	$15,495		
	9	4	5	2	510		Supply/Install overhead conductor	1,600	m	C.4.02	0.032	51.2	$ 2.21	$ 3,546	$ 1.41	$ 2,258	$ 0.45	$ 725	$ 0.15	183	$ 238	$ -	$ -	$ -	$ 4.22	$8,766		
	9	4	5	3	510		Supply/Install transformers	7	ea.	C.4.04	20.000	140.0	$ 1,383.00	$ 9,681	$ 8,934.00	$ 62,538	$ 224.98	$ 1,576	$ 143.00	770	$ 1,001	$ -	$ -	$ -	$ 10,684.98	$74,795		
Contingency - Grum Dump Cut-off Wall																												$932,954		
	9	5	1	1	430	Level and compact a working surface	Clear and grub working surface	6,750	m2	C.2.05	0.015	98.2	$ 0.53	$ 3,603	$ -	$ -	$ 0.94	$ 6,312	$ 0.62	3,204	$ 4,165	$ -	$ -	$ -	$ 2.08	$14,076		
	9	5	1	2	430		Level and compact surface	3,375	Bm3	C.2.20	0.013	42.2	$ 0.40	$ 1,544	$ -	$ -	$ 2.15	$ 7,242	$ 1.25	3,248	$ 4,220	$ -	$ -	$ -	$ 3.85	$13,006		
	9	5	2	1	500	Cut-off wall	Install cut-off wall (all-inclusive)	8,344	m2	C.2.08	0.500	4172.0	$ 26.82	$ 223,786	$ 48.80	$ 405,518	$ 20.47	$ 170,821	$ 12.67	81,348	$ 105,752	$ -	$ -	$ -	$ 108.57	$905,877		
Contingency Vangorda Pit Groundwater Collection																												$304,764		
	9	6	1	1	430	Access road	Construct access road	50	m	C.2.27	0.131	6.6	$ 4.80	$ 240	$ -	$ -	$ 10.14	$ 507	$ 5.33	265	$ 266	$ -	$ -	$ -	$ 20.27	$1,014		
	9	6	2	1	430	Groundwater Wells	Drill wells (Air Rotary Drill Rig, ~10m depth)	150	m	C.2.09	2.000	300.0	$ 102.13	$ 15,344	$ -	$ -	$ 100.85	$ 15,153	$ 22.08	3,057	$ 3,974	$ -	$ -	$ -	$ 225.07	$40,512		no preliminary design done.
	9	6	2	2	500		Install 6" stainless steel well casing & screen	150	m	C.3.17	0.150	27.0	$ 7.60	$ 1,378	$ 232.60	$ 41,868	$ 7.50	$ 1,362	$ 1.60	229	$ 298	$ -	$ -	$ -	$ 249.48	$44,906		
	9	6	2	3	500		Install 6" Submersible Pump with controls	2	ea.	C.3.07	12.000	24.0	$ 600.00	$ 1,200	$ 8,842.00	$ 13,684	$ -	$ -	$ -	0	$ -	$ -	$ -	$ -	$ 7,442.00	$14,884		
	9	6	2	4	500		Install protective housing (shack)	2	ea.	C.3.13	20.000	40.0	$ 1,300.00	$ 2,600	$ 445.00	$ 890	$ -	$ -	$ -	0	$ -	$ -	$ -	$ -	$ 1,745.00	$3,490		
	9	6	3	1	430	Piping system	Excavate piping trench	1,638	Bm3	C.2.13	0.020	32.8	$ 0.73	$ 1,199	$ -	$ -	$ 1.42	$ 2,331	$ 0.75	945	$ 1,229	$ -	$ -	$ -	$ 2.91	$4,759		
	9	6	3	2	510		Supply and install insulated 150mm HDPE pipe	273	m	C.3.03	0.250	68.3	$ 8.75	$ 2,388	$ 155.84	$ 42,544	$ -	$ -	$ -	0	$ -	$ -	$ -	$ -	$ 164.59	$44,933		
	9	6	3	3	430		Bedding layer: Produce, screen and stockpile	106	Bm3	C.2.02	0.010	1.1	$ 0.37	$ 39	$ -	$ -	$ 1.61	$ 171	$ 1.13	92	$ 120	$ -	$ -	$ -	$ 3.10	$330		
	9	6	3	4	430		Bedding Layer: Load, haul, place and compact	106	Bm3	R.035	0.031	3.3	$ 1.12	$ 119	$ -	$ -	$ 2.32	$ 247	$ 1.07	87	$ 114	$ -	$ -	$ -	$ 4.50	$479		
	9	6	3	5	430		Backfill ditches	1,532	Bm3	C.2.01	0.030	45.9	$ 1.08	$ 1,657	$ -	$ -	$ 0.74	$ 1,130	$ 0.40	466	$ 606	$ -	$ -	$ -	$ 2.22	$3,393		
	9	6	4	1	510	Heat tracing	Supply and install heat trace in HDPE pipe	273	m	C.3.04	0.250	68.3	$ 12.50	$ 3,413	$ 21.32	$ 5,820	$ -	$ -	$ -	0	$ -	$ -	$ -	$ -	$ 33.82	$9,233		
	9	6	4	2	510		Supply/Install heat tracing power feed kit	160	ea.	C.3.05	4.000	720.0	$ 230.00	$ 41,400	$ 306.84	$ 71,431	$ -	$ -	$ -	0	$ -	$ -	$ -	$ -	$ 620.84	$112,831		
	9	6	5	1	510	Provide electricity to pumps	Supply/Install treated power poles	2	ea.	C.4.03	4.545	9.1	$ 297.88	$ 596	$ 325.96	$ 652	$ 65.85	$ 172	$ 28.17	43	$ 56	$ -	$ -	$ -	$ 737.88	$1,476		
	9	6	5	2	510		Supply/Install overhead conductor	273	m	C.4.02	0.032	8.7	$ 2.21	$ 604	$ 1.41	$ 385	$ 0.45	$ 124	$ 0.15	31	$ 41	$ -	$ -	$ -	$ 4.22	$1,153		
	9	6	5	3	510		Supply/Install transformers	2	ea.	C.4.04	20.000	40.0	$ 1,383.00	$ 2,766	$ 8,934.00	$ 17,868	$ 224.98	$ 450	$ 143.00	229	$ 296	$ -	$ -	$ -	$ 10,684.98	$21,370		
Subtotal Direct Costs - Groundwater												11,440		$564,578		$1,667,187		$350,228		143,745	$185,869		$0				$2,768,861		
Vangorda Haul Road																														
Remove Culverts																												$1,018,439		
	10	1	1	1	430	Remove culverts	Excavate haul road	268,680	Bm3	C.2.12	0.024	6321.9	$ 0.86	$ 231,381	$ -	$ -	$ 2.00	$ 536,522	$ 0.93	192,720	$ 250,536	$ -	$ -	$ -	$ 3.79	$1,018,439		
Reclaim Haul Road																												$70,605		
	10	2	1	1	430	Remove berms	Doze berms over road edges	60	hrs	C.2.22	1.000	60.0	$ 30.00	$ 2,106	$ -	$ -	$ 173.28	$ 10,397	$ 149.18	8,885	$ 8,951	$ -	$ -	$ -	$ 359.06	$21,543		
	10	2	2	1	430	Scarify road	Scarify road surfaces	135,000	m2	C.2.29	0.003	337.5	$ 0.00	$ 12,363	$ -	$ -	$ 0.10	$ 13,582	$ 0.10	10,169	$ 13,206	$ -	$ -	$ -	$ 0.29	$39,141		
	10	2	3	1	610	Revegetate	Seed/Fertilize, helicopter low application rate	180,000	m2	C.5.02	0.000	22.5	$ 0.00	$ 2,706	$ 0.05	$ 8,183	$ 0.05	$ 9,610	$ 0.00	92	$ 120	$ -	$ -	$ -	$ 0.11	$18,021		
Subtotal Direct Costs - Vangorda Haul Road												6,742		$246,737		$8,183		$370,311		209,866	$272,813		$0				$1,098,044		
Miscellaneous																														
Buildings																												$600,090		
	10	1	1	1	220	Building decontamination	Remove hazardous materials	6,902	m3	C.1.01	0.556	3834.4	$ 24.44	$ 168,716	$ -	$ -	$ 2.17	$ 14,996	$ 1.55	8,225	$ 10,662	$ -	$ -	$ -	$ 28.17	$104,404		
	10	1	2	1	220	Building demolition	Building demolition: "empty buildings"	10,008	m2	C.1.02	0.310	3103.3	$ 11.10	$ 111,097	$ -	$ -	$ 15.54	$ 155,530	$ 8.55	85,856	$ 85,615	$ -	$ -	$ -	$ 35.20	$352,250		
	10	1	2	2	430		Building demolition: "full buildings"	345	m2	C.1.03	0.405	139.5	$ 18.65	$ 6,745	$ -	$ -	$ 20.31	$ 8,043	$ 12.83	3,466	$ 4,427	$ -	$ -	$ -	$ 52.80	$18,214		
	10	1	2	3	430		Puncture concrete foundations	15	m	C.1.04	0.182	2.7	$ 6.65	$ 100	$ -	$ -	$ 20.25	$ 304	$ 13.15	152	$ 197	$ -	$ -	$ -	$ 40.07	$601		
	10	1	2	4	430		Re-grade over demolished buildings	10	hrs	C.2.22	1.000	10.0	$ 30.00	$ 300	$ -	$ -	$ 173.28	$ 1,733	$ 149.18	1,148	$ 1,492	$ -	$ -	$ -	$ 359.06	$3,591		
Sludge Pond																												$133,287		
	10	2	1	1	430	Cover sludge pond	Till: Load, haul, dump and place	30,000	Bm3	R.036	0.025	763.0	$ 0.93	$ 27,949	$ -	$ -	$ 2.33	$ 70,005	$ 1.18	27,179	$ 35,332	$ -	$ -	$ -	$ 4.44	$133,287		
Existing Bioremediation Cel																												$1,704		
	10	3	1	1	430	Cover existing bioremediation cell	Doze material	1,500	m2	C.2.04	0.004	5.8	$ 0.13	$ 213	$ -	$ -	$ 0.62	$ 909	$ 0.36	448	$ 582	$ -	$ -	$ -	$ 1.12	$1,704		
Dams																												$3,791		
	10	4	1	1	430	Breach silt dams (except Little Creek Dam)	Excavate, haul and dump locally	1,000	Bm3	C.2.12	0.024	23.5	$ 0.86	$ 861	$ -	$ -	$ 2.00	$ 1,997	$ 0.93	717	$ 952	$ -	$ -	$ -	$ 3.79	$3,791		
WTP Settling Pond																												$5,052		
	10	5	1	1	430	Breach WTP settling pond	Excavate, haul and dump locally	1,491	Bm3	C.2.12	0.024	35.1	$ 0.86	$ 1,284	$ -	$ -	$ 2.00	$ 2,977	$ 0.93	1,009	$ 1,300	$ -	$ -	$ -	$ 3.79	$5,052		
Contaminated soils																												$27,498		
	10	6	1	1	500	Remove contaminated soils	Excavate, haul and place contaminated soils in bio-remediation cell	3,750	Bm3	R.030	0.034	127.8	$ 1.25	$ 4,679	$ -	$ -	$ 3.88	$ 14,548	$ 2.04	5,877	$ 7,641	$ -	$ -	$ -	$ 7.16	$26,868		
	10	6	1	2	500		Regrade excavated areas for drainage	2,500	m2	C.2.18	0.002	5.4	$ 0.08	$ 199	$ -	$ -	$ 0.09	$ 219	$ 0.09	164	$ 213	$ -	$ -	$ -	$ 0.25	$630		
Bioremediation Cel																												$51,420		
	10	7	1	1	430	Construct bioremediation cell	Excavate and cradle berms for use as the bioremediation cell	8,000	Bm3	C.2.11	0.013	108.7	$ 0.49	$ 3,904	$ -	$ -	$ 0.95	$ 7,590	$ 0.50	3,078	$ 4,002	$ -	$ -	$ -	$ 1.94	$15,496		
	10	7	1	2	430		Place HDPE liner for remediation Cell	1,600	m2	C.4.10	0.143	228.8	$ 6.33	$ 10,130	$ 12.77	$ 20,432	$ 1.63	$ 2,609	$ 1.06	1,696	$ 1,690	$ -	$ -	$ -	$ 21.79	$34,861		
	10	7	1	3	430		Bedding: Load, haul, place (use local overburden material)	480	Bm3	C.2.01	0.030	14.4	$ 1.08	$ 519	$ -	$ -	$ 0.74	$ 354	$ 0.40	146	$ 190	$ -	$ -	$ -	$ 2.22	$1,063		
Roads																												$20,785		
	10	8	1	1

Attachment E

Example Alternatives - Cost Estimate

Vangorda/Grum Alternative 3 - Minimize Up-Front Construction

Contract Code	Work Area Code	Item	Task	Sub-task	Estimate Type	Activity	Task	Quantity	Unit	Cost Code	Unit Mhrs	Total Mhrs	Labour Rate	Labor Cost	Unit Matl	Material Cost	Unit Equip.	Equipment Cost	Unit Fuel	Fuel Consumed (L)	Fuel Cost	Power Rate ($/Unit)	Power Cost	Unit Cost	Activity Total	Subtotals	Source / Comments
CLOSURE COSTS - DIRECT CAPITAL																											
Vangorda Pit																											
Water Management																										$ -	
	1	1	1	600		Use existing plant as long as possible	Note: Water treatment costs estimated seperately	1	ls	-	0.000	0.0	$ -	$ -	$ -	$ -	$ -	$ -	$ -	0	$ -	$ -	$ -	$ -	$0		
Safety Berm																										$ 137,140	
	1	2	1	430		Construct access road	Clear access road area	4,350	m	C.2.05	0.015	63.3	$ 0.53	$ 2,316	$ -	$ -	$ 0.94	$ 4,067	$ 0.62	2,065	$ 2,684	$ -	$ -	$ 2.08	$ 9,067		
	1	2	1	430			Construct access road	1,450	m	C.2.27	0.131	190.3	$ 4.80	$ 6,965	$ -	$ -	$ 10.14	$ 14,707	$ 5.33	5,940	$ 7,722	$ -	$ -	$ 20.27	$ 29,395		
	1	2	2	430		Place berm materials	Load, haul, dump berm material	15,000	Lm3	R.007	0.056	840.0	$ 2.05	$ 30,744	$ -	$ -	$ 1.73	$ 26,010	$ 1.56	18,020	$ 23,426	$ -	$ -	$ 5.35	$ 80,180		
	1	2	2	430			Final Shaping of material with dozer	3,000	m	C.2.03	0.020	60.0	$ 0.73	$ 2,196	$ -	$ -	$ 3.43	$ 10,289	$ 2.00	4,617	$ 6,002	$ -	$ -	$ 6.17	$ 18,498		
Vangorda Pit Waste Rock Piles																										$ 142,937	
	1	3	1	430		Regrade	Flattened surfaces	13	hrs	C.2.22	1.000	13.0	$ 36.60	$ 476	$ -	$ -	$ 173.28	$ 2,253	$ 149.18	1,492	$ 1,940	$ -	$ -	$ 359.06	$ 4,669		
	1	3	1	430			Flatten bubble dump surfaces	10	hrs	C.2.22	1.000	9.6	$ 36.60	$ 353	$ -	$ -	$ 173.28	$ 1,670	$ 149.18	1,106	$ 1,438	$ -	$ -	$ 359.06	$ 3,460		
	1	3	1	430			Regrade slopes	28	hrs	C.2.22	1.000	27.7	$ 36.60	$ 1,014	$ -	$ -	$ 173.28	$ 4,800	$ 149.18	3,179	$ 4,132	$ -	$ -	$ 359.06	$ 9,946		
	1	3	2	1	430	Place rudimentary cover	Load, haul, place loose till (0.5m)	32,412	Bm3	R.008	0.012	388.9	$ 0.44	$ 14,235	$ -	$ -	$ 1.73	$ 56,193	$ 1.13	28,108	$ 36,541	$ -	$ -	$ 3.30	$ 106,969		
	1	3	3	1	610	Revegetate	Seed/Fertilize, helicopter high application rate	110,825	m2	C.5.01	0.000	14.9	$ 0.00	$ 533	$ 0.09	$ 10,804	$ 0.05	$ 6,476	$ 0.00	61	$ 79	$ -	$ -	$ 0.15	$ 17,892		
Subtotal Direct Costs - Vangorda Pit												1,668		$58,832		$10,804		$126,477		64,588	$83,964		$0			$ 280,077	
Vangorda Dump																										$ 265,537	
Reslope Dump																											
	2	1	1	430		Regrade (shape to enhance runoff to ditches)	Flattened surfaces	40	hrs	C.2.22	1.000	39.6	$ 36.60	$ 1,449	$ -	$ -	$ 173.28	$ 6,862	$ 149.18	4,544	$ 5,907	$ -	$ -	$ 359.06	$ 14,218		
	2	1	1	2	430		Flatten bubble dump surfaces	102	hrs	C.2.22	1.000	102.0	$ 36.60	$ 3,731	$ -	$ -	$ 173.28	$ 17,686	$ 149.18	11,899	$ 15,209	$ -	$ -	$ 359.06	$ 36,607		
	2	1	1	3	430		Regrade slopes	598	hrs	C.2.22	1.000	598.0	$ 36.60	$ 21,886	$ -	$ -	$ 173.28	$ 103,618	$ 149.18	69,621	$ 89,208	$ -	$ -	$ 359.06	$ 214,712		
Waste Rock Cover																										$ 1,287,907	
	2	2	1	1	430	Place rudimentary cover	Load, haul, place loose till (0.5m)	320,063	Bm3	R.011	0.015	4688.2	$ 0.56	$ 178,909	$ -	$ -	$ 2.10	$ 673,685	$ 1.36	334,656	$ 435,313	$ -	$ -	$ 4.02	$ 1,287,907		
Rock Drains																										$ 44,973	
	2	3	1	1	430	Install rock drains (runoff management)	Excavate channel for rock drains	1,313	Bm3	C.2.13	0.020	26.3	$ 0.73	$ 961	$ -	$ -	$ 1.42	$ 1,868	$ 0.75	756	$ 985	$ -	$ -	$ 2.91	$3,813		
	2	3	1	2	430		Construct access road	977	Bm3	C.2.23	0.045	43.9	$ 1.62	$ 1,585	$ 15.72	$ 15,351	$ 2.64	$ 2,577	$ 1.36	1,024	$ 1,332	$ -	$ -	$ 21.35	$20,845		
	2	3	1	3	430		Rip-rap (rounded, low quality): Screen and stockpile	977	Bm3	C.2.24	0.040	39.1	$ 1.46	$ 1,430	$ -	$ -	$ 6.43	$ 6,283	$ 4.52	3,393	$ 4,411	$ -	$ -	$ 12.42	$12,124		
	2	3	1	5	430		Rip-Rap: Load, haul and dump	977	Bm3	R.012	0.041	39.9	$ 1.50	$ 1,460	$ -	$ -	$ 3.50	$ 3,415	$ 1.58	1,187	$ 1,543	$ -	$ -	$ 6.57	$6,417		
	2	3	1	6	430		Rip-Rap: Place and secure	977	Bm3	C.2.26	0.013	12.2	$ 0.46	$ 447	$ -	$ -	$ 0.89	$ 868	$ 0.47	352	$ 458	$ -	$ -	$ 1.82	$1,773		
Sediment Control Ditches																										$ 2,010	
	2	4	1	1	430	Vangorda dump sediment control ditch	Load, haul and dump locally	390	Bm3	C.2.10	0.032	12.5	$ 1.17	$ 457	$ -	$ -	$ 2.72	$ 1,059	$ 1.27	380	$ 495	$ -	$ -	$ 5.16	$ 2,010		
Revegetate																										$ 75,913	
	2	5	1	1	610	Revegetate dump footprint	Seed/Fertilize, helicopter high application rate	504,150	m2	C.5.01	0.000	63.0	$ 0.00	$ 2,263	$ 0.09	$ 45,837	$ 0.05	$ 27,477	$ 0.00	257	$ 335	$ -	$ -	$ 0.15	$ 75,913		
Subtotal Direct Costs - Vangorda Dump												5,665		$214,578		$61,188		$845,376		427,073	$555,195		$0			$ 1,676,341	
Vangorda Creek																										$ 23,893	1CD003.15_Vangorda Creek Diversion
Minor Upgrades to Vangorda Creek in Current Alignment																											
	3	1	1	1	430	Widen existing channel	Soil Excavation: Excavate, haul, dump	1,100	Bm3	C.2.10	0.032	35.2	$ 1.17	$ 1,288	$ -	$ -	$ 2.72	$ 2,987	$ 1.27	1,073	$ 1,395	$ -	$ -	$ 5.16	$ 5,671		
	3	1	3	1	430	Place bedding layer	Bedding: Produce and stockpile locally	330	Bm3	C.2.02	0.010	3.3	$ 0.37	$ 121	$ -	$ -	$ 1.61	$ 531	$ 1.13	287	$ 373	$ -	$ -	$ 3.10	$ 1,024		
	3	1	3	2	430		Bedding: load , haul, place and compact	330	Bm3	R.016	0.031	10.1	$ 1.12	$ 369	$ -	$ -	$ 2.32	$ 765	$ 1.07	271	$ 352	$ -	$ -	$ 4.50	$ 1,486		
	3	1	4	1	430	Place rip-rap	Rip-Rap: Drill, blast and stockpile	330	Bm3	C.2.23	0.045	14.9	$ 1.62	$ 536	$ 15.72	$ 5,188	$ 2.64	$ 871	$ 1.36	346	$ 450	$ -	$ -	$ 21.35	$ 7,044		
	3	1	4	2	430		Rip-rap (angular, high quality): Screen and stockpile	330	Bm3	C.2.25	0.057	18.9	$ 2.09	$ 690	$ -	$ -	$ 9.19	$ 3,033	$ 6.45	1,638	$ 2,130	$ -	$ -	$ 17.74	$ 5,853		
	3	1	4	3	430		Rip-Rap: Load, haul and dump	330	Bm3	R.017	0.042	13.8	$ 1.53	$ 504	$ -	$ -	$ 3.57	$ 1,179	$ 1.61	410	$ 533	$ -	$ -	$ 6.71	$ 2,216		
	3	1	4	4	430		Rip-Rap: Place and secure	330	Bm3	C.2.26	0.013	4.1	$ 0.46	$ 151	$ -	$ -	$ 0.89	$ 294	$ 0.47	119	$ 155	$ -	$ -	$ 1.82	$ 599		
Upgrade Plunge Pool																										$ 5,748	
	3	2	1	1	430	Excavate pool	Plunge pool excavation	200	Bm3	C.2.12	0.024	4.7	$ 0.86	$ 172	$ -	$ -	$ 2.00	$ 399	$ 0.93	143	$ 186	$ -	$ -	$ 3.79	$ 758		
	3	2	2	1	430	Place bedding layer	Bedding: Produce and stockpile locally	30	Bm3	C.2.02	0.010	0.3	$ 0.37	$ 11	$ -	$ -	$ 1.61	$ 48	$ 1.13	26	$ 34	$ -	$ -	$ 3.10	$ 93		
	3	2	2	2	430		Bedding: Load, haul, place and compact	30	Bm3	R.016	0.031	0.9	$ 1.12	$ 34	$ -	$ -	$ 2.32	$ 70	$ 1.07	25	$ 32	$ -	$ -	$ 4.50	$ 135		
	3	2	3	1	430	Place rip-rap	Rip-Rap: Drill, blast and stockpile	100	Bm3	C.2.23	0.045	4.5	$ 1.62	$ 162	$ 15.72	$ 1,572	$ 2.64	$ 264	$ 1.36	105	$ 136	$ -	$ -	$ 21.35	$ 2,135		
	3	2	3	2	430		Rip-rap (angular, high quality): Screen and stockpile	100	Bm3	C.2.25	0.057	5.7	$ 2.09	$ 209	$ -	$ -	$ 9.19	$ 919	$ 6.45	496	$ 645	$ -	$ -	$ 17.74	$ 1,774		
	3	2	3	3	430		Rip-Rap: Load, haul and dump	100	Bm3	R.017	0.042	4.2	$ 1.53	$ 153	$ -	$ -	$ 3.57	$ 357	$ 1.61	124	$ 161	$ -	$ -	$ 6.71	$ 671		
	3	2	3	4	430		Rip-Rap: Place and secure	100	Bm3	C.2.26	0.013	1.3	$ 0.46	$ 46	$ -	$ -	$ 0.89	$ 89	$ 0.47	36	$ 47	$ -	$ -	$ 1.82	$ 182		
Upgrade Diversion to Dixon Creek																										$ 25,776	
	3	3	1	1		Upgrade existing diversion to Dixon creek	Excavate channel and spoil locally	5,000	Bm3	C.2.10	0.032	160.0	$ 1.17	$ 5,856	$ -	$ -	$ 2.72	$ 13,579	$ 1.27	4,878	$ 6,341	$ -	$ -	$ 5.16	$ 25,776		
Allowance: Buttress the North Vangorda Pit Wall																										$ 1,249,815	
	3	4	1	1		Buttress North Vangorda Pit Wall	Load, haul, dump	256,654	Bm3	R.018	0.030	7769.0	$ 1.11	$ 284,345	$ -	$ -	$ 2.59	$ 665,014	$ 1.17	231,120	$ 300,456	$ -	$ -	$ 4.87	$ 1,249,815		
Subtotal Direct Costs - Vangorda Creek												8,051		$294,647		$6,760		$690,399		241,097	$313,426		$0			$ 1,305,232	
Grum Pit																											1CD003.46_PitLakesTreat
Water Management																										$ -	
	4	1	1	610		Biological treatment	Note: Water treatment costs estimated seperately	1	ls	-	0.000	0.0	$ -	$ -	$ -	$ -	$ -	$ -	$ -	0	$ -	$ -	$ -	$ -	$0		
Safety Berm																										$ 152,739	
	4	2	1	430		Construct access road	Access road: clearing and grubbing	3,750	m	C.2.04	0.004	13.6	$ 0.13	$ 499	$ -	$ -	$ 0.62	$ 2,341	$ 0.36	1,049	$ 1,364	$ -	$ -	$ 1.12	$ 4,204		
	4	2	1	2	220		Access road: construction	1,250	m	C.2.27	0.131	164.1	$ 4.80	$ 6,005	$ -	$ -	$ 10.14	$ 12,670	$ 5.33	5,121	$ 6,657	$ -	$ -	$ 20.27	$ 25,341		
	4	2	2	1	430	Place berm materials	Load, haul, dump berm material	20,000	Lm3	R.010	0.049	980.0	$ 1.79	$ 35,866	$ -	$ -	$ 1.65	$ 33,077	$ 1.45	22,297	$ 28,986	$ -	$ -	$ 4.63	$ 98,531		
	4	2	2	2	430		Final Shaping of material with dozer	4,000	m	C.2.03	0.020	80.0	$ 0.73	$ 2,928	$ -	$ -	$ 3.43	$ 13,733	$ 2.00	6,159	$ 8,003	$ -	$ -	$ 6.17	$ 24,664		
Subtotal Direct Costs - Grum Pit												1,238		$45,300		$0		$62,429		34,623	$45,010		$0			$ 152,739	
Grum Interceptor Ditch																										$ 88,484	1CD003.46_PitLakesTreat assumed channel from vangorda creek diversion (1CD003.15)
Route into Grum Pit																											
	5	1	1	430		Access road	Access road: clearing and grubbing	600	m2	C.2.04	0.004	2.2	$ 0.13	$ 80	$ -	$ -	$ 0.62	$ 375	$ 0.36	168	$ 218	$ -	$ -	$ 1.12	$673		
	5	1	1	2	220		Access road: construction	200	m	C.2.27	0.131	26.3	$ 4.80	$ 961	$ -	$ -	$ 10.14	$ 2,029	$ 5.33	810	$ 1,065	$ -	$ -	$ 20.27	$4,055		
	5	1	2	1	430	Headworks dam	Construct earth dam at headworks (LHD III)	24	Bm3	R.020	0.030	0.7	$ 1.11	$ 27	$ -	$ -	$ 2.17	$ 52	$ 1.07	20	$ 26	$ -	$ -	$ 4.35	$104		
	5	1	3	1	430	Excavate channel	Excavate diversion channel (soils)	2,017	Bm3	C.2.10	0.032	64.5	$ 1.17	$ 2,362	$ -	$ -	$ 2.72	$ 5,477	$ 1.27	1,997	$ 2,558	$ -	$ -	$ 5.16	$10,397		
	5	1	3	2	430		Excavate diversion channel (bedrock)	362	Bm3	C.2.15	0.173	62.7	$ 6.34	$ 2,294	$ -	$ -	$ 9.13	$ 3,301	$ 3.69	1,026	$ 1,334	$ -	$ -	$ 19.16	$6,929		
	5	1	4	1	430	Place bedding layer	Bedding: Produce and stockpile locally	623	Bm3	C.2.02	0.010	6.2	$ 0.37	$ 228	$ -	$ -	$ 1.61	$ 1,002	$ 1.13	541	$ 703	$ -	$ -	$ 3.10	$1,933		
	5	1	4	2	430		Bedding: Load , haul, place and compact	623	Bm3	R.021	0.049	30.4	$ 1.79	$ 1,114	$ -	$ -	$ 3.71	$ 2,309	$ 1.71	817	$ 1,062	$ -	$ -	$ 7.20	$4,485		
	5	1	5	1	430	Place rip-rap	Rip-Rap: Drill, blast and stockpile	1,212	Bm3	C.2.23	0.045	54.6	$ 1.62	$ 1,968	$ 15.72	$ 19,059	$ 2.64	$ 3,200	$ 1.36	1,272	$ 1,653	$ -	$ -	$ 21.35	$25,880		
	5	1	5	2	430		Rip-rap (angular, high quality): Screen and stockpile	1,212	Bm3	C.2.25	0.057	69.3	$ 2.09	$ 2,538	$ -	$ -	$ 9.19	$ 11,145	$ 6.45	6,019	$ 7,825	$ -	$ -	$ 17.74	$21,505		
	5	1	5	3	430		Rip-Rap: Load, haul and dump	1,212	Bm3	R.022	0.043	51.7	$ 1.56	$ 1,893	$ -	$ -	$ 3.65	$ 4,428	$ 1.65	1,539	$ 2,001	$ -	$ -	$ 6.86	$8,322		
	5	1	5	4	430		Rip-Rap: Place and secure	1,212	Bm3	C.2.26	0.013	15.2	$ 0.46	$ 555	$ -	$ -	$ 0.89	$ 1,078	$ 0.47	437	$ 569	$ -	$ -	$ 1.82	$2,202		
Route out of Pit via slot cut																										$ 216,505	
	5	3	1	1	430	Access road	Access road: clearing and grubbing	150	m2	C.2.04	0.004	0.5	$ 0.13	$ 20	$ -	$ -	$ 0.62	$ 94	$ 0.36	42	$ 55	$ -	$ -	$ 1.12	$169		
	5	3	1	2	220		Access road: construction	50	m	C.2.27	0.131	6.6	$ 4.80	$ 240	$ -	$ -	$ 10.14	$ 507	$ 5.33	205	$ 266	$ -	$ -	$ 20.27	$1,014		
	5	3	2	1	430	Excavate channel	Excavate diversion channel (soils)	9,222	Bm3	C.2.10	0.032	295.1	$ 1.17	$ 10,801	$ -	$ -	$ 2.72	$ 25,046	$ 1.27	8,997	$ 11,698	$ -	$ -	$ 5.16	$47,543		
	5	3	3	1	430	Place bedding layer	Bedding: Produce and stockpile locally	1,736	Bm3	C.2.02	0.010	17.4	$ 0.37	$ 635	$ -	$ -	$ 1.61	$ 2,793	$ 1.13	1,508	$ 1,961	$ -	$ -	$ 3.10	$5,389		
	5	3	3	2	430		Bedding: load , haul, place and compact	1,736	Bm3	R.024	0.035	61.2	$ 1.29	$ 2,240	$ -	$ -	$ 2.67	$ 4,643	$ 1.23	1,643	$ 2,136	$ -	$ -	$ 5.20	$9,020		
	5	3	4	1	430	Place rip-rap	Rip-Rap: Drill, blast and stockpile	3,375	Bm3	C.2.23	0.045	151.9	$ 1.62	$ 5,478	$ 15.72	$ 53,057	$ 2.64	$ 8,908	$ 1.36	3,541	$ 4,603	$ -	$ -	$ 21.35	$72,046		
	5	3	4	2	430		Rip-rap (angular, high quality): Screen and stockpile	3,375	Bm3	C.2.25	0.057	192.9	$ 2.09	$ 7,059	$ -	$ -	$ 9.19	$ 31,025	$ 6.45	16,755	$ 21,782	$ -	$ -	$ 17.74	$59,886		
	5	3	4	3	430		Rip-Rap: Load, haul and dump	3,375	Bm3	R.025	0.028	95.3	$ 1.03	$ 3,468	$ -	$ -	$ 2.42	$ 8,157	$ 1.09	2,835	$ 3,686	$ -	$ -	$ 4.54	$15,331		
	5	3	4	4	430		Rip-Rap: Place and secure	3,375	Bm3	C.2.26	0.013	42.2	$ 0.46	$ 1,544	$ -	$ -	$ 0.89	$ 3,002	$ 0.47	1,218	$ 1,583	$ -	$ -	$ 1.82	$6,129		
Subtotal Direct Costs - Grum Interceptor Ditch												1,247		$45,523		$72,116		$118,570		51,369	$66,780		$0			$ 302,988	
Overburden Dump																										$ 51,221	
Reslope Dump																											
	7	2	1	1	430	Regrade	Flattened surfaces	26	hrs	C.2.22	1.000	25.7	$ 36.60	$ 941	$ -	$ -	$ 173.28	$ 4,457	$ 149.18	2,952	$ 3,837	$ -	$ -	$ 359.06	$9,236		
	7	2	1	2	430		Regrade slopes	117	hrs	C.2.22	1.000	116.9	$ 36.60	$ 4,280	$ -	$ -	$ 173.28	$ 20,262	$ 149.18	13,418	$ 17,444	$ -	$ -	$ 359.06	$41,988		
Revegetate																										$ 53,635	
	7	3	1	1	610	Revegetate WR dumps	Seed/Fertilize, helicopter low application rate	510,250	m2	C.5.02	0.000	63.8	$ 0.00	$ 2,291	$ 0.05	$ 23,196	$ 0.05	$ 27,810	$ 0.00	261	$ 339	$ -	$ -	$ 0.11	$53,635		
Subtotal Direct Costs - Overburden Dump												206		$7,512		$23,196		$52,529		16,631	$21,620		$0			$ 104,857	
Groundwater																										$ 506,884	1CD003.37 Grum Seepage Collection
Grum Dump Groundwater Collection to Holding Pond																											
	9	1	1	1	430	Access road	Clear access road area	1,950	m2	C.2.04	0.004	7.1	$ 0.13	$ 260	$ -	$ -	$ 0.62	$ 1,217	$ 0.36	546	$ 709	$ -	$ -	$ 1.12	$2,188		
	9	1	1	1	430		Construct Access road	650	m	C.2.27	0.131	85.3	$ 4.80	$ 3,122	$ -	$ -	$ 10.14	$ 6,593	$ 5.33	2,663	$ 3,462	$ -	$ -	$ 20.27	$13,177		
	9	1	2	1	430	Groundwater wells	Drill wells (Air Rotary Drill Rig, ~20m depth)	140	m	C.2.09	2.000	280.0	$ 102.13	$ 14,299	$ -	$ -	$ 100.85	$ 14,119	$ 22.08	2,378	$ 3,091	$ -	$ -	$ 225.07	$31,509	no preliminary design done.
	9	1	2	2	500		Install 6" stainless steel well casing & screen	140	m	C.3.17	0.150	21.0	$ 7.66	$ 1,072	$ 232.00	$ 32,564	$ 7.56	$ 1,059	$ 1.66	178	$ 232	$ -	$ -	$ 249.48	$34,927		
	9	1	2	3	500		Install 6" Submersible Pump with controls	7	ea.	C.3.07	12.000	84.0	$ 600.00	$ 4,200	$ 6,842.00	$ 47,894	$ -	$ -	$ -	0	$ -	$ -	$ -	$ 7,442.00	$52,094		
	9	1	2	4	500		Install protective housing (shack)	7	ea.	C.3.13	20.000	140.0	$ 1,300.00	$ 9,100	$ 445.00	$ 3,115	$ -	$ -	$ -	0	$ -	$ -	$ -	$ 1,745.00	$12,215		
	9	1	3	1	430	Piping system	Excavate Piping Trench	7,452	Bm3	C.2.13	0.020	149.0	$ 0.73	$ 5,455	$ -	$ -	$ 1.42	$ 10,604	$ 0.75	4,302	$ 5,592	$ -	$ -	$ 2.91	$21,651		
	9	1	3	2	510		Supply and install insulated 150mm HDPE pipe	1,242	m	C.3.03	0.250	310.5	$ 8.75	$ 10,868	$ 155.84	$ 193,553	$ -	$ -	$ -	0	$ -	$ -	$ -	$ 164.59	$204,421		
	9	1	3	3	430		Bedding: Produce and stockpile (screen)	484	Bm3	C.2.02	0.010	4.8	$ 0.37	$ 177	$ -	$ -	$ 1.61	$ 779	$ 1.13	421	$ 547	$ -	$ -	$ 3.10	$1,504		
	9	1	3	4	430		Bedding: Load, haul, place and compact	484	Bm3	R.031	0.024	11.8	$ 0.89	$ 433	$ 1.85	$ 895	$ 1.85	$ 895	$ 0.89	332	$ 431	$ -	$ -	$ 5.64	$1,762		
	9	1	3	5	430		Backfill and compact ditches	7,452	Bm3	C.2.01	0.030	223.6	$ 1.08	$ 8,003	$ -	$ -	$ 0.74	$ 5,498	$ 0.40	2,267	$ 2,947	$ -	$ -	$ 2.22	$16,508		
	9	1	4	1	510	Heat tracing	Supply and install heat trace in HDPE pipe	1,242	m	C.3.04	0.250	310.5	$ 12.50	$ 15,525	$ 21.32	$ 26,479	$ -	$ -	$ -	0	$ -	$ -	$ -	$ 33.82	$42,004		
	9	1	4	2	510		Supply/Install heat tracing power feed kit	1	ea.	C.3.05	4.000	4.0	$ 230.00	$ 230	$ 396.84	$ 397	$ -	$ -	$ -	0	$ -	$ -	$ -	$ 626.84	$627		
	9	1	4	3	510		Supply/Install electrical thermostate for heat tracing	1	ea.	C.3.06	1.000	1.0	$ 57.50	$ 58	$ 1,025.00	$ 1,025	$ -	$ -	$ -	0	$ -	$ -	$ -	$ 1,082.50	$1,083		
	9	1	5	1	510	Provide electricity from holding pond to pumps	Supply/Install treated power poles	17	ea.	C.4.03	4.545	77.3	$ 297.88	$ 5,064	$ 325.96	$ 5,541	$ 85.85	$ 1,459	$ 28.17	369	$ 479	$ -	$ -	$ 737.86	$12,544		
	9	1	5	2	510		Supply/Install overhead conductor	1,242	m	C.4.02	0.032	39.7	$ 2.21	$ 2,748	$ 1.41	$ 1,751	$ 0.45	$ 563	$ 0.15	142	$ 185	$ -	$ -	$ 4.22	$5,247		
	9	1	5	3	510		Supply/Install transformers	5	ea.	C.4.04	20.000	100.0	$ 1,383.00	$ 6,915	$ 8,934.00	$ 44,670	$ 224.98	$ 1,125	$ 143.00	550	$ 715	$ -	$ -	$ 10,684.98	$53,425		

Attachment E

Example Alternatives - Cost Estimate

Grum Dump Groundwater Holding Pond																															
	9	2	1	1	430	Excavate pond	Excavate Holding Pond	10,848	Bm3	C.2.12	0.024	255.2	$ 0.86	$ 9,342	$ -	$ -	$ 2.00	$ 21,662	$ 0.93	7,781	$ 10,115	$ -	$ -	$ -	$ 3.79	$41,120	$100,157		
	9	2	2	1	430	Place till	Till: Load, haul, dump and place	1,476	Bm3	R.032	0.048	71.5	$ 1.77	$ 2,618	$ -	$ -	$ 4.07	$ 6,009	$ 1.87	2,121	$ 2,757	$ -	$ -	$ -	$ 7.71	$11,385			
	9	2	2	2	430		Till: Compact with vibrating drum roller	4,921	m2	C.2.06	0.016	78.7	$ 0.57	$ 2,819	$ -	$ -	$ 0.02	$ 103	$ 0.02	81	$ 80	$ -	$ -	$ -	$ 0.01	$3,002			
	9	2	3	1	430	Place geotextile	Supply and place geotextile	3,054	m2	C.4.06	0.016	48.9	$ 0.57	$ 1,730	$ 3.50	$ 10,689	$ 0.23	$ 697	$ 0.15	347	$ 452	$ -	$ -	$ -	$ 4.44	$13,567			
	9	2	4	1	430	Place bedding layer	Bedding: Produce and stockpile (screen)	1,476	Bm3	C.2.02	0.010	14.8	$ 0.37	$ 540	$ -	$ -	$ 1.61	$ 2,375	$ 1.13	1,282	$ 1,667	$ -	$ -	$ -	$ 3.10	$4,582			
	9	2	4	2	430		Bedding: Load, haul, place and compact	1,476	Bm3	R.031	0.024	36.1	$ 0.89	$ 1,321	$ -	$ -	$ 1.85	$ 2,730	$ 0.89	1,011	$ 1,315	$ -	$ -	$ -	$ 3.64	$5,371			
	9	2	5	1	500	Place pump	Supply and place pump	1	ea.	C.3.10	12.000	12.0	$ 600.00	$ 600	$ 1,829.00	$ 1,829	$ -	$ -	$ -	0	$ -	$ -	$ -	$ -	$ 2,429.00	$2,429			
	9	2	5	2	500		Build and install housing for primary pump	1	ea.	C.3.12	30.000	30.0	$ 1,950.00	$ 1,950	$ 1,730.00	$ 1,730	$ -	$ -	$ -	0	$ -	$ -	$ -	$ -	$ 3,680.00	$3,680			
	9	2	6	1	510	Provide electricity to holding pond	Supply/install treated power poles	10	ea.	C.4.03	4.545	45.5	$ 297.88	$ 2,979	$ 325.96	$ 3,260	$ 85.85	$ 859	$ 28.17	217	$ 282	$ -	$ -	$ -	$ 737.86	$7,379			
	9	2	6	2	510		Supply/install overhead conductor	700	m	C.4.02	0.032	22.4	$ 2.21	$ 1,549	$ 1.41	$ 987	$ 0.45	$ 317	$ 0.15	80	$ 104	$ -	$ -	$ -	$ 4.22	$2,957			
	9	2	6	3	510		Supply/install transformers	1	ea.	C.4.04	20.000	20.0	$ 1,383.00	$ 1,383	$ 8,934.00	$ 8,934	$ 224.98	$ 225	$ 143.00	110	$ 143	$ -	$ -	$ -	$ 10,684.98	$10,685			
Grum Dump: Groundwater Collection from Holding Pond to Vangorda Pit																															
	9	3	1	1	430	Piping System	Excavate Piping Trench	7,524	Bm3	C.2.13	0.020	150.5	$ 0.73	$ 5,508	$ -	$ -	$ 1.42	$ 10,707	$ 0.75	4,343	$ 5,646	$ -	$ -	$ -	$ 2.91	$21,860	$280,584		
	9	3	1	2	510		Supply and install insulated 150mm HDPE pipe	1,254	m	C.3.03	0.250	313.5	$ 8.75	$ 10,973	$ 155.84	$ 195,423	$ -	$ -	$ -	0	$ -	$ -	$ -	$ -	$ 164.59	$206,396			
	9	3	1	6	430		Bedding: Produce and stockpile (screen)	489	Bm3	C.2.02	0.010	4.9	$ 0.37	$ 179	$ -	$ -	$ 1.61	$ 787	$ 1.13	425	$ 552	$ -	$ -	$ -	$ 3.10	$1,518			
	9	3	1	7	430		Bedding: Load, haul, place	489	Bm3	R.034	0.024	11.6	$ 0.87	$ 426	$ -	$ -	$ 1.80	$ 882	$ 0.87	326	$ 424	$ -	$ -	$ -	$ 3.54	$1,731			
	9	3	1	8	430		Backfill and compact ditches	7,524	Bm3	C.2.01	0.030	225.7	$ 1.08	$ 8,141	$ -	$ -	$ 0.74	$ 5,551	$ 0.40	2,280	$ 2,976	$ -	$ -	$ -	$ 2.22	$16,668			
	9	3	2	1	510	Heat tracing	Supply and install heat trace in HDPE pipe	1,254	m	C.3.04	0.250	313.5	$ 12.50	$ 15,675	$ 21.32	$ 26,735	$ -	$ -	$ -	0	$ -	$ -	$ -	$ -	$ 33.82	$42,410			
Vangorda WR Dump Seepage Collection to Pit (defer as long as possible)																															
	9	4	1	1	430	Access road	Construct access roads	650	m	C.2.27	0.131	85.3	$ 4.80	$ 3,122	$ -	$ -	$ 10.14	$ 6,593	$ 5.33	2,663	$ 3,462	$ -	$ -	$ -	$ 20.27	$13,177	$627,519		
	9	4	2	1	430	Groundwater wells	Drill wells (Air Rotary Drill Rig, ~10m depth)	70	m	C.2.09	2.000	140.0	$ 102.13	$ 7,149	$ -	$ -	$ 100.85	$ 7,060	$ 22.08	1,189	$ 1,546	$ -	$ -	$ -	$ 225.07	$15,755		no preliminary design done.	
	9	4	2	2	500		Install 6" stainless steel well casing & screen	70	m	C.3.17	0.150	10.5	$ 7.66	$ 536	$ 232.60	$ 16,282	$ 7.56	$ 529	$ 1.66	89	$ 116	$ -	$ -	$ -	$ 249.48	$17,464			
	9	4	2	3	500		Install 6" Submersible Pump with controls	7	ea.	C.3.07	12.000	84.0	$ 600.00	$ 4,200	$ 6,842.00	$ 47,894	$ -	$ -	$ -	0	$ -	$ -	$ -	$ -	$ 7,442.00	$52,094			
	9	4	2	4	500		Install protective housing (shack)	7	ea.	C.3.13	20.000	140.0	$ 1,300.00	$ 9,100	$ 445.00	$ 3,115	$ -	$ -	$ -	0	$ -	$ -	$ -	$ -	$ 1,745.00	$12,215			
	9	4	3	1	430	Piping system	Excavate piping trench	10,824	Bm3	C.2.13	0.020	216.5	$ 0.73	$ 7,923	$ -	$ -	$ 1.42	$ 15,403	$ 0.75	6,248	$ 8,122	$ -	$ -	$ -	$ 2.91	$31,448			
	9	4	3	2	510		Supply and install insulated 150mm HDPE pipe	1,504	m	C.3.03	0.250	451.0	$ 8.75	$ 15,785	$ 155.84	$ 281,435	$ -	$ -	$ -	0	$ -	$ -	$ -	$ -	$ 164.59	$296,920			
	9	4	3	4	430		Bedding layer: Produce, screen and stockpile	704	Bm3	C.2.02	0.010	7.0	$ 0.37	$ 258	$ -	$ -	$ 1.61	$ 1,132	$ 1.13	611	$ 795	$ -	$ -	$ -	$ 3.10	$2,184			
	9	4	3	5	430		Bedding Layer: Load, haul, place and compact	704	Bm3	R.036	0.039	27.6	$ 1.44	$ 1,012	$ -	$ -	$ 2.96	$ 2,097	$ 1.37	742	$ 964	$ -	$ -	$ -	$ 5.79	$4,073			
	9	4	3	6	430		Backfill ditches	10,120	Bm3	C.2.01	0.030	303.6	$ 1.08	$ 10,950	$ -	$ -	$ 0.74	$ 7,467	$ 0.40	3,079	$ 4,003	$ -	$ -	$ -	$ 2.22	$22,419			
	9	4	4	1	510	Heat tracing	Supply and install heat trace in HDPE pipe	1,504	m	C.3.04	0.250	451.0	$ 12.50	$ 22,550	$ 21.32	$ 38,461	$ -	$ -	$ -	0	$ -	$ -	$ -	$ -	$ 33.82	$61,011			
	9	4	4	2	510		Supply/install heat tracing power feed kit	1	ea.	C.3.05	4.000	4.0	$ 230.00	$ 230	$ 396.84	$ 397	$ -	$ -	$ -	0	$ -	$ -	$ -	$ -	$ 626.84	$627			
	9	4	4	3	510		Supply/install electrical thermostats for heat tracing	1	ea.	C.3.06	1.000	1.0	$ 57.50	$ 58	$ 1,025.00	$ 1,025	$ -	$ -	$ -	0	$ -	$ -	$ -	$ -	$ 1,082.50	$1,083			
	9	4	5	1	510	Provide electricity to pumps	Supply/install treated power poles	21	ea.	C.4.03	4.545	95.5	$ 297.88	$ 6,255	$ 325.96	$ 6,845	$ 85.85	$ 1,803	$ 28.17	455	$ 592	$ -	$ -	$ -	$ 737.86	$15,495			
	9	4	5	2	510		Supply/install overhead conductor	1,600	m	C.4.02	0.032	51.2	$ 2.21	$ 3,540	$ 1.41	$ 2,256	$ 0.45	$ 725	$ 0.15	183	$ 238	$ -	$ -	$ -	$ 4.22	$6,760			
	9	4	5	3	510		Supply/install transformers	7	ea.	C.4.04	20.000	140.0	$ 1,383.00	$ 9,681	$ 8,934.00	$ 62,538	$ 224.98	$ 1,575	$ 143.00	770	$ 1,001	$ -	$ -	$ -	$ 10,684.98	$74,795			
Contingency - Grum Dump Cut-off Wall																															
	9	5	1	1	430	Level and compact a working surface	Clear and grub working surface	6,750	m2	C.2.05	0.015	98.2	$ 0.53	$ 3,593	$ -	$ -	$ 0.94	$ 6,312	$ 0.62	3,204	$ 4,165	$ -	$ -	$ -	$ 2.08	$14,070	$932,954		
	9	5	1	2	430		Level and compact surface	3,375	Bm3	C.2.20	0.013	42.2	$ 0.46	$ 1,544	$ -	$ -	$ 2.15	$ 7,242	$ 1.25	3,246	$ 4,220	$ -	$ -	$ -	$ 3.85	$13,009			
	9	5	2	1	600	Cut-off wall	Install cut-off wall (all-inclusive)	8,344	m2	C.2.08	0.500	4172.0	$ 26.82	$ 223,786	$ 48.60	$ 405,518	$ 20.47	$ 170,821	$ 12.67	81,348	$ 105,752	$ -	$ -	$ -	$ 108.57	$905,877			
Contingency Vangorda Pit Groundwater Collection																															
	9	6	1	1	430	Access road	Construct access road	50	m	C.2.27	0.131	6.6	$ 4.80	$ 240	$ -	$ -	$ 10.14	$ 507	$ 5.33	265	$ 269	$ -	$ -	$ -	$ 20.27	$1,014	$304,764		
	9	6	2	1	430	Groundwater Wells	Drill wells (Air Rotary Drill Rig, ~10m depth)	180	m	C.2.09	2.000	360.0	$ 102.13	$ 18,384	$ -	$ -	$ 100.85	$ 18,153	$ 22.08	3,057	$ 3,974	$ -	$ -	$ -	$ 225.07	$40,512		no preliminary design done.	
	9	6	2	2	500		Install 6" stainless steel well casing & screen	180	m	C.3.17	0.150	27.0	$ 7.66	$ 1,379	$ 232.60	$ 41,868	$ 7.56	$ 1,362	$ 1.66	229	$ 298	$ -	$ -	$ -	$ 249.48	$44,906			
	9	6	2	3	500		Install 6" Submersible Pump with controls	2	ea.	C.3.07	12.000	24.0	$ 600.00	$ 1,200	$ 6,842.00	$ 13,684	$ -	$ -	$ -	0	$ -	$ -	$ -	$ -	$ 7,442.00	$14,884			
	9	6	2	4	500		Install protective housing (shack)	2	ea.	C.3.13	20.000	40.0	$ 1,300.00	$ 2,600	$ 445.00	$ 890	$ -	$ -	$ -	0	$ -	$ -	$ -	$ -	$ 1,745.00	$3,490			
	9	6	3	1	430	Piping system	Excavate piping trench	1,638	Bm3	C.2.13	0.020	32.8	$ 0.73	$ 1,199	$ -	$ -	$ 1.42	$ 2,331	$ 0.75	946	$ 1,229	$ -	$ -	$ -	$ 2.91	$4,759	$44,933		
	9	6	3	2	510		Supply and install insulated 150mm HDPE pipe	273	m	C.3.03	0.250	68.3	$ 8.75	$ 2,389	$ 155.84	$ 42,544	$ -	$ -	$ -	0	$ -	$ -	$ -	$ -	$ 164.59	$44,933			
	9	6	3	3	430		Bedding layer: Produce, screen and stockpile	106	Bm3	C.2.02	0.010	1.1	$ 0.37	$ 39	$ -	$ -	$ 1.61	$ 171	$ 1.13	92	$ 120	$ -	$ -	$ -	$ 3.10	$330			
	9	6	3	4	430		Bedding Layer: Load, haul, place and compact	106	Bm3	R.035	0.031	3.3	$ 1.12	$ 119	$ -	$ -	$ 2.32	$ 247	$ 1.07	87	$ 114	$ -	$ -	$ -	$ 4.50	$476			
	9	6	3	5	430		Backfill ditches	1,532	Bm3	C.2.01	0.030	45.9	$ 1.08	$ 1,657	$ -	$ -	$ 0.74	$ 1,130	$ 0.40	466	$ 606	$ -	$ -	$ -	$ 2.22	$3,393			
	9	6	4	1	510	Heat tracing	Supply and install heat trace in HDPE pipe	273	m	C.3.04	0.250	68.3	$ 12.50	$ 3,413	$ 21.32	$ 5,820	$ -	$ -	$ -	0	$ -	$ -	$ -	$ -	$ 33.82	$9,233			
	9	6	4	2	510		Supply/install heat tracing power feed kit	180	ea.	C.3.05	4.000	720.0	$ 230.00	$ 41,400	$ 396.84	$ 71,431	$ -	$ -	$ -	0	$ -	$ -	$ -	$ -	$ 626.84	$112,831			
	9	6	5	1	510	Provide electricity to pumps	Supply/install treated power poles	2	ea.	C.4.03	4.545	9.1	$ 297.88	$ 598	$ 325.96	$ 652	$ 85.85	$ 172	$ 28.17	43	$ 56	$ -	$ -	$ -	$ 737.86	$1,470	$1,153		
	9	6	5	2	510		Supply/install overhead conductor	273	m	C.4.02	0.032	8.7	$ 2.21	$ 604	$ 1.41	$ 385	$ 0.45	$ 124	$ 0.15	31	$ 41	$ -	$ -	$ -	$ 4.22	$1,153			
	9	6	5	3	510		Supply/install transformers	2	ea.	C.4.04	20.000	40.0	$ 1,383.00	$ 2,766	$ 8,934.00	$ 17,868	$ 224.98	$ 450	$ 143.00	220	$ 286	$ -	$ -	$ -	$ 10,684.98	$21,370			
Subtotal Direct Costs - Groundwater											11,480		$564,578		$1,667,167			$350,228		143,745	$186,869		$0			$2,768,861			
Vangorda Haul Road																															
Remove Culverts																														$1,018,439	
	10	1	1	1	430	Remove culverts	Excavate haul road	266,680	Bm3	C.2.12	0.024	6321.9	$ 0.86	$ 231,381	$ -	$ -	$ 2.00	$ 536,522	$ 0.93	192,720	$ 250,536	$ -	$ -	$ -	$ 3.79	$1,018,439			
Reclaim Haul Road																														$70,605	
	10	2	1	1	430	Remove berms	Doze berms over road edges	60	hrs	C.2.22	1.000	60.0	$ 36.60	$ 2,196	$ -	$ -	$ 173.28	$ 10,397	$ 149.18	8,865	$ 8,951	$ -	$ -	$ -	$ 359.06	$21,543			
	10	2	2	1	430	Scarify road	Scarify road surfaces	135,000	m2	C.2.20	0.003	337.5	$ 0.09	$ 12,353	$ -	$ -	$ 0.10	$ 13,582	$ 0.10	10,150	$ 13,206	$ -	$ -	$ -	$ 0.29	$39,141			
	10	2	3	1	610	Revegetate	Seed/Fertilize, helicopter low application rate	180,000	m2	C.5.02	0.000	22.5	$ 0.00	$ 608	$ 0.05	$ 8,183	$ 0.05	$ 9,810	$ 0.00	92	$ 120	$ -	$ -	$ -	$ 0.11	$18,921			
Subtotal Direct Costs - Vangorda Haul Road											6,742		$246,737		$8,183			$570,311		209,856	$272,813		$0			$1,098,044			
Miscellaneous																															
Buildings																														$569,060	
	10	1	1	1	220	Building decontamination	Remove hazardous materials	6,902	m3	C.1.01	0.556	3834.4	$ 24.44	$ 168,716	$ -	$ -	$ 2.17	$ 14,998	$ 1.55	8,225	$ 10,692	$ -	$ -	$ -	$ 28.17	$194,404			
	10	1	2	1	220	Building demolition	Building demolition: 'empty buildings'	10,008	m2	C.1.02	0.310	3103.3	$ 11.10	$ 111,097	$ -	$ -	$ 15.54	$ 155,539	$ 8.55	85,656	$ 85,615	$ -	$ -	$ -	$ 35.20	$352,250			
	10	1	2	2	430		Building demolition: 'full buildings'	345	m2	C.1.03	0.465	160.5	$ 16.65	$ 5,745	$ -	$ -	$ 23.31	$ 8,043	$ 12.83	3,405	$ 4,427	$ -	$ -	$ -	$ 52.80	$18,214			
	10	1	2	3	430		Puncture concrete foundations	15	m	C.1.04	0.182	2.7	$ 6.65	$ 100	$ -	$ -	$ 20.26	$ 304	$ 13.15	152	$ 197	$ -	$ -	$ -	$ 40.07	$601			
	10	1	2	4	430		Re-grade over demolished buildings	10	hrs	C.2.22	1.000	10.0	$ 36.60	$ 366	$ -	$ -	$ 173.28	$ 1,733	$ 149.18	1,148	$ 1,492	$ -	$ -	$ -	$ 359.06	$3,591			
Dams																														$3,791	
	10	4	1	1	430	Breach all dams (except Little Creek Dam)	Excavate, haul and dump locally	1,000	Bm3	C.2.12	0.024	23.5	$ 0.86	$ 861	$ -	$ -	$ 2.00	$ 1,997	$ 0.93	717	$ 932	$ -	$ -	$ -	$ 3.79	$3,791			
Contaminated soils																														$27,498	
	10	6	1	1	600	Remove contaminated soils	Excavate, haul and place contaminated soils in bio-remediation cell	3,750	Bm3	R.039	0.034	127.8	$ 1.25	$ 4,679	$ -	$ -	$ 3.88	$ 14,548	$ 2.04	5,677	$ 7,641	$ -	$ -	$ -	$ 7.16	$26,868			
	10	6	1	2	600		Regrade excavated areas for drainage	2,500	m2	C.2.18	0.002	5.4	$ 0.08	$ 199	$ -	$ -	$ 0.09	$ 219	$ 0.09	164	$ 213	$ -	$ -	$ -	$ 0.25	$630			
Bioremediation Cell																														$51,420	
	10	7	1	1	430	Construct bioremediation cell	Excavate and create berms for use as the bioremediation cell	8,000	Bm3	C.2.11	0.013	100.7	$ 0.49	$ 3,904	$ -	$ -	$ 0.95	$ 7,590	$ 0.50	3,079	$ 4,002	$ -	$ -	$ -	$ 1.94	$15,496			
	10	7	1	2	430		Place HDPE liner for remediation Cell	1,600	m2	C.4.10	0.143	228.6	$ 6.33	$ 10,130	$ 12.77	$ 20,432	$ 1.63	$ 2,609	$ 1.06	1,300	$ 1,690	$ -	$ -	$ -	$ 21.79	$34,861			
	10	7	1	3	430		Bedding: Load, haul, place (use local overburden material)	480	Bm3	C.2.01	0.030	14.4	$ 1.08	$ 519	$ -	$ -	$ 0.74	$ 354	$ 0.40	146	$ 190	$ -	$ -	$ -	$ 2.22	$1,063			
Roads																														$20,785	
	10	8	1	1	430	Reclaim unnecessary roads	Remove culverts and breach stream crossing	3,920	Bm3	C.2.12	0.024	92.2	$ 0.86	$ 3,376	$ -	$ -	$ 2.00	$ 7,828	$ 0.93	2,812	$ 3,655	$ -	$ -	$ -	$ 3.79	$14,859			
	10	8	1	2	430		Scarify road surfaces	15,000	m2	C.2.20	0.003	37.5	$ 0.09	$ 1,373	$ -	$ -	$ 0.10	$ 1,509	$ 0.10	1,129	$ 1,467	$ -	$ -	$ -	$ 0.29	$4,349			
	10	8	1	3	610		Seed/Fertilize, helicopter low application rate	15,000	m2	C.5.02	0.000	1.9	$ 0.00	$ 67	$ 0.05	$ 682	$ 0.05	$ 818	$ 0.00	8	$ 10	$ -	$ -	$ -	$ 0.11	$1,577			
Borrow Sources																														$21,355	
	10	9	2	1	600	Decommission borrow sources	Regrade borrow source slopes	10	hrs	C.2.22	1.000	10.0	$ 36.60	$ 366	$ -	$ -	$ 173.28	$ 1,733	$ 149.18	1,148	$ 1,492	$ -	$ -	$ -	$ 359.06	$3,591			
	10	9	2	2	610		Seed/Fertilize, helicopter low application rate	159,000	m2	C.5.02	0.000	21.1	$ 0.00	$ 759	$ 0.05	$ 7,683	$ 0.05	$ 9,211	$ 0.00	86	$ 112	$ -	$ -	$ -	$ 0.11	$17,785			
Subtotal Direct Costs - Miscellaneous											7,780		$312,256		$28,797			$229,028		95,252	$123,828		$0			$693,908			
Subtotal Direct Costs							Subtotal direct costs				44,216		$1,789,962		$1,678,229			$3,045,351		1,284,235	$1,669,505		$0			$8,383,047			
CLOSURE COSTS - INDIRECT																															
	100	100	1	1		Project Management	5.0% of direct costs															$ 8,383,047	x	5.0%		$419,152			
	100	100	2	1		Field Supervision	2.5% of direct costs															$ 8,383,047	x	2.5%		$209,576			
	100	100	3	1		Contractor profit and home office overhead	10% of direct costs															$ 8,383,047	x	10.0%		$838,305			
	100	100	4	1		Insurance	0.5% of direct costs															$ 8,383,047	x	0.5%		$41,915			
	100	100	5	1		Bonding	0.5% of direct costs															$ 8,383,047	x	0.5%		$41,915			
	100	100	6	1		Field Engineering and QA	10% of direct costs															$ 8,383,047	x	10.0%		$838,305			
	100	100	7	1		Mob - Demob																1	lump	$500,000		$500,000			
	100	100	8	1		Living out allowances	(included in heavy equipment costs)																			$0			
Subtotal Indirect Costs							Subtotal indirect costs																			$2,889,168			
CLOSURE COSTS - CONTINGENCY																															
							Contingency	20% of direct costs														$8,383,047	x	20.0%		$1,676,609			
CLOSURE COSTS - TOTAL																															
							Total direct and indirect costs																			$12,948,825			

Attachment E

Example Alternatives - Cost Estimate

Vangorda/Grum Alternative 4 - Minimize Water Treatment

Contract Code	Work Area Code	Item	Task	Sub-task	Estimate Type	Activity	Task	Quantity	Unit	Cost Code	Unit Mhrs	Total Mhrs	Labour Rate	Labor Cost	Unit Matl	Material Cost	Unit Equip.	Equipment Cost	Unit Fuel	Fuel Consumed (L)	Fuel Cost	Power Rate ($/Unit)	Power Cost	Unit Cost	Activity Total	Subtotals	Source / Comments
CLOSURE COSTS - DIRECT CAPITAL																											
Vangorda Pit																											1CD003.48_VangordaBackfill
Water Management																										$430,714	(115mg/L Zn)
	1	1	1	1	610	Pump and treat Vangorda Pit Water	Pump to existing treatment plant	2,300,000	m3	C.8.01	0.004	10132.2	$ 0.15	$ 354,626	$ 0.02	$ 53,462	$ 0.01	$ 13,208	$ 0.09	7,244	$ 9,418	$ -	$ -	$ 0.19	$430,714		
Pit Ramp																										$17,744	
	1	2	1	1	430	Upgrade ramp for 777 belfic	Load, haul, dump (locally) waste rock above present waterline	1,908	Bm3	R.001	0.032	61.4	$ 1.18	$ 2,246	$ -	$ -	$ 3.29	$ 6,273	$ 1.68	2,441	$ 3,173	$ -	$ -	$ 6.13	$11,693		
	1	2	1	2	430		Grade ramp	24,000	m2	C.2.18	0.002	52.2	$ 0.08	$ 1,910	$ -	$ -	$ 0.09	$ 2,100	$ 0.09	1,570	$ 2,042	$ -	$ -	$ 0.25	$4,051		
Backfill Pit																										$40,877,284	
	1	3	1	1	430	Backfill pit	Load, haul and place Baritic and Oxide Fines	280,000	Bm3	R.002	0.013	3505.4	$ 0.40	$ 131,593	$ -	$ -	$ 1.48	$ 422,274	$ 0.97	214,101	$ 278,331	$ -	$ -	$ 2.91	$832,198		
	1	3	1	2	430		Load, haul and place high sulphide area west of the dump ramp	1,300,000	Bm3	R.003	0.013	16342.9	$ 0.40	$ 598,149	$ -	$ -	$ 1.48	$ 1,919,428	$ 0.97	973,186	$ 1,265,141	$ -	$ -	$ 2.91	$3,782,718		
	1	3	1	3	430		Load, haul and place ore transfer pad material	321,200	Bm3	-	0.000	0.0	$ -	$ -	$ -	$ -	$ -	$ -	$ -	0	$ -	$ -	$ -	$ -	$ -		
	1	3	1	4	430		Load, haul and place Main Waste Rock Dump (over-excavate)	8,787,000	Bm3	R.002	0.013	110465.1	$ 0.40	$ 4,043,024	$ -	$ -	$ 1.48	$ 12,973,859	$ 0.97	6,577,987	$ 8,551,383	$ -	$ -	$ 2.91	$25,568,267		
	1	3	1	5	430		Load, haul and place till from base of Waste Rock Dump	504,150	Bm3	R.002	0.013	6337.9	$ 0.40	$ 231,997	$ -	$ -	$ 1.48	$ 744,369	$ 0.97	377,409	$ 490,632	$ -	$ -	$ 2.91	$1,466,997		
	1	3	2	1	510	Lime addition	Add lime to waste rock	12,548	tonnes	C.2.21	0.038	446.1	$ 1.59	$ 20,005	$ 320.00	$ 4,015,360	$ 1.67	$ 20,935	$ 0.98	9,446	$ 12,280	$ -	$ -	$ 324.24	$4,068,580		
	1	3	2	2	510		Add lime to Baritic and Oxide Fines	4,082	tonnes	C.2.21	0.038	146.0	$ 1.59	$ 6,519	$ 320.00	$ 1,306,480	$ 1.67	$ 6,822	$ 0.98	3,078	$ 4,002	$ -	$ -	$ 324.24	$1,325,823		
	1	3	2	3	010		Survey requirements (grid for testing)	22,397	hrs	P.02	1.000	22396.8	$ 35.00	$ 783,888	$ -	$ -	$ -	$ -	$ -	0	$ -	$ -	$ -	$ 35.00	$783,880		
	1	3	2	4	010		Material testing (to verify lime addition dosage)	22,397	hrs	P.03	1.000	22396.8	$ 100.00	$ 2,239,682	$ -	$ -	$ -	$ -	$ -	0	$ -	$ -	$ -	$ 100.00	$2,239,682		
	1	3	2	4	970	Lime addition contingency	15% contingency	2,496	tonnes	C.2.21	0.038	89.1	$ 1.59	$ 3,979	$ 320.00	$ 798,576	$ 1.67	$ 4,164	$ 0.98	1,879	$ 2,442	$ -	$ -	$ 324.24	$809,160		
Regrade waste for drainage																										$53,791	
	1	4	1	1	430	Regrade	Shape to enhance runoff to ditches	150	hrs	C.2.22	1.000	149.8	$ 36.60	$ 5,483	$ -	$ -	$ 173.28	$ 25,959	$ 149.18	17,101	$ 22,349	$ -	$ -	$ 359.06	$53,791		
Cover with Low Infiltration Cover																										$1,681,950	
	1	5	1	1	430	Place low infiltration cover	Load, haul, place and compact till (0.5m)	150,000	Bm3	R.005	0.014	2036.4	$ 0.58	$ 74,531	$ -	$ -	$ 1.59	$ 239,166	$ 1.05	121,262	$ 157,640	$ -	$ -	$ 3.14	$471,337		
	1	5	1	2	430		Load, haul, place loose till (1.5m)	450,000	Bm3	R.006	0.010	4581.8	$ 0.37	$ 167,605	$ -	$ -	$ 1.34	$ 602,128	$ 0.88	304,321	$ 395,617	$ -	$ -	$ 2.59	$1,165,440		
	1	5	1	1	610	Vegetate WR dumps	Seed/Fertilize, helicopter high application rate	300,000	m2	C.5.01	0.000	37.5	$ 0.00	$ 1,247	$ 0.00	$ 27,276	$ 0.05	$ 16,351	$ 0.00	153	$ 199	$ -	$ -	$ 0.15	$45,173		
Safety Berms																										$37,393	
	1	7	1	1	430	Construct access road	Clear access road area	1,281	m2	C.2.04	0.004	4.7	$ 0.13	$ 170	$ -	$ -	$ 0.62	$ 800	$ 0.36	368	$ 466	$ -	$ -	$ 1.12	$1,436		
	1	7	1	2	220		Construct access road	427	m	C.2.27	0.131	56.0	$ 4.80	$ 2,051	$ -	$ -	$ 10.14	$ 4,331	$ 5.33	1,749	$ 2,274	$ -	$ -	$ 20.27	$8,656		
	1	7	2	1	430	Place berm materials	Load, haul, dump berm material	4,150	Lm3	R.007	0.058	232.4	$ 2.05	$ 8,506	$ -	$ -	$ 1.73	$ 7,196	$ 1.56	4,985	$ 6,481	$ -	$ -	$ 5.35	$22,183		
	1	7	2	2	430		Final Shaping of material with dozer	830	m	C.2.03	0.020	16.6	$ 0.73	$ 606	$ -	$ -	$ 3.43	$ 2,849	$ 2.00	1,277	$ 1,661	$ -	$ -	$ 6.17	$5,118		
Subtotal Direct Costs - Vangorda Pit												199,579		$8,677,077		$6,203,154		$17,012,213		8,619,636	$11,205,531		$0			$43,098,876	
Vangorda Dump																											1CD003.48_VangordaBackfill
Little Creek Dam																										$84,398	VanWasteDumpTillBerm.xls
	2	1	1	1	430	Breach dam	Load, haul and dump locally	22,266	Bm3	C.2.12	0.024	523.9	$ 0.80	$ 19,175	$ -	$ -	$ 2.00	$ 44,462	$ 0.93	15,971	$ 20,762	$ -	$ -	$ 3.79	$84,398		
Revegetate Dump																										$75,913	
	2	2	1	1	610	Revegetate dump footprint	Seed/Fertilize, helicopter high application rate	504,150	m2	C.5.01	0.000	63.0	$ 0.00	$ 2,263	$ 0.09	$ 45,837	$ 0.05	$ 27,477	$ 0.00	257	$ 335	$ -	$ -	$ 0.15	$75,913		
Subtotal Direct Costs - Vangorda Dump												587		$21,438		$45,837		$71,939		16,228	$21,097		$0			$160,311	
Vangorda Creek Diversion																											Channel designed to 1:500 yr event (Design flow 31m³/s)
Vangorda Creek																										$658,791	
	3	1	1	1	430	Excavate channel	5m wide, 2:1 side slopes	26,815	m3	C.2.10	0.032	858.1	$ 1.17	$ 31,406	$ -	$ -	$ 2.72	$ 72,823	$ 1.27	26,158	$ 34,006	$ -	$ -	$ 5.16	$138,235		
	3	1	3	1	430	Place till	Till: Load, haul, dump and place	3,740	Bm3	R.015	0.034	125.7	$ 1.23	$ 4,599	$ -	$ -	$ 2.82	$ 10,555	$ 1.30	3,726	$ 4,844	$ -	$ -	$ 5.35	$19,998		
	3	1	3	2	430		Till: Compact with vibrating drum roller	12,467	m2	C.2.09	0.010	199.5	$ 0.57	$ 7,141	$ -	$ -	$ 0.02	$ 262	$ 0.02	156	$ 202	$ -	$ -	$ 0.61	$7,605		
	3	1	2	1	430	Place geotextile	Supply and place geotextile	6,226	m2	C.4.06	0.010	99.5	$ 0.57	$ 3,526	$ 3.50	$ 21,789	$ 0.23	$ 1,421	$ 0.15	709	$ 921	$ -	$ -	$ 4.44	$27,657	(or bitumen?)	
	3	1	4	1	430	Place rip-rap	Rip-Rap: Drill, blast and stockpile	9,830	Bm3	C.2.23	0.045	442.4	$ 1.52	$ 15,054	$ 15.72	$ 154,528	$ 2.64	$ 25,945	$ 1.36	10,312	$ 13,406	$ -	$ -	$ 21.35	$209,833	Some rip-rap needs to belarge to disperse energy at bottom of channel	
	3	1	4	2	430		Rip-rap (angular, high quality): Screen and stockpile	9,830	Bm3	C.2.25	0.057	561.7	$ 2.09	$ 20,550	$ -	$ -	$ 9.19	$ 90,360	$ 6.45	48,800	$ 63,440	$ -	$ -	$ 17.74	$174,358		
	3	1	4	4	430		Rip-Rap: Load, haul and dump	9,830	Bm3	R.014	0.040	393.2	$ 1.46	$ 14,391	$ -	$ -	$ 3.42	$ 33,657	$ 1.55	11,697	$ 15,207	$ -	$ -	$ 6.43	$63,255		
	3	1	4	5	430		Rip-Rap: Place and secure	9,830	Bm3	C.2.26	0.013	122.9	$ 0.46	$ 4,497	$ -	$ -	$ 0.89	$ 8,743	$ 0.47	3,546	$ 4,610	$ -	$ -	$ 1.82	$17,850		
Subtotal Direct Costs - Vangorda Creek Diversion												2,803		$102,073		$176,317		$243,765		105,104	$136,636		$0			$658,791	
Grum Pit																											1CD003.48_PitLakesTreat
Water Treatment																										$0	
	4	1	1	1	610	Biological treatment	Note: Water treatment costs estimated seperately	1	ls	-	0.000	0.0	$ -	$ -	$ -	$ -	$ -	$ -	$ -	0	$ -	$ -	$ -	$ -	$ -		
Safety Berms																										$152,739	
	4	2	1	1	430	Construct access road	Clear access road area	3,750	m2	C.2.04	0.004	13.8	$ 0.13	$ 499	$ -	$ -	$ 0.62	$ 2,341	$ 0.36	1,049	$ 1,364	$ -	$ -	$ 1.12	$4,204		
	4	2	1	2	220		Construct access road	1,250	m	C.2.27	0.131	164.1	$ 4.80	$ 6,005	$ -	$ -	$ 10.14	$ 12,678	$ 5.33	5,121	$ 6,657	$ -	$ -	$ 20.27	$25,341		
	4	2	2	1	430	Place berm materials	Load, haul, dump berm material	20,000	Lm3	R.019	0.049	980.0	$ 1.79	$ 35,868	$ -	$ -	$ 1.68	$ 33,677	$ 1.45	22,297	$ 28,988	$ -	$ -	$ 4.93	$98,531		
	4	2	2	2	430		Final Shaping of material with dozer	4,000	m	C.2.03	0.020	80.0	$ 0.73	$ 2,926	$ -	$ -	$ 3.43	$ 13,733	$ 2.00	6,156	$ 8,003	$ -	$ -	$ 6.17	$24,664		
Subtotal Direct Costs - Grum Pit												1,238		$45,300		$0		$62,429			$45,010		$0			$152,739	
Grum Interceptor Ditch																											1CD003.48_PitLakesTreat
Route into Grum Pit																										$86,484	assumed channel from vangorda creek diversion (1CD003.15
	5	1	1	1	430	Access road	Clear access road area	600	m2	C.2.04	0.004	2.2	$ 0.13	$ 80	$ -	$ -	$ 0.62	$ 375	$ 0.36	168	$ 218	$ -	$ -	$ 1.12	$673		
	5	1	1	2	220		Construct access road	200	m	C.2.27	0.131	26.3	$ 4.80	$ 961	$ -	$ -	$ 10.14	$ 2,029	$ 5.33	819	$ 1,065	$ -	$ -	$ 20.27	$4,055		
	5	1	2	1	430	Headworks dam	Load, haul, dump, place and compact till	24	Bm3	R.020	0.030	0.7	$ 1.11	$ 27	$ -	$ -	$ 2.17	$ 52	$ 1.07	20	$ 26	$ -	$ -	$ 4.35	$104		
	5	1	3	1	430	Excavate channel	Excavate diversion channel (soils)	2,017	Bm3	C.2.10	0.032	64.5	$ 1.17	$ 2,302	$ -	$ -	$ 2.72	$ 5,477	$ 1.27	1,997	$ 2,558	$ -	$ -	$ 5.16	$10,337		
	5	1	3	2	430		Excavate diversion channel (bedrock)	302	Bm3	C.2.15	0.173	52.7	$ 6.34	$ 2,294	$ -	$ -	$ 9.13	$ 3,301	$ 3.69	1,026	$ 1,334	$ -	$ -	$ 19.16	$6,929		
	5	1	4	1	430	Place bedding layer	Produce and stockpile locally	623	Bm3	C.2.02	0.010	6.2	$ 0.37	$ 228	$ -	$ -	$ 1.61	$ 1,002	$ 1.13	541	$ 703	$ -	$ -	$ 3.10	$1,933		
	5	1	4	2	430		Load , haul, place and compact	623	Bm3	R.021	0.049	30.4	$ 1.79	$ 1,114	$ -	$ -	$ 3.71	$ 2,309	$ 1.71	817	$ 1,062	$ -	$ -	$ 7.20	$4,485		
	5	1	5	1	430	Place rip-rap	Rip-Rap: Drill, blast and stockpile	1,212	Bm3	C.2.23	0.045	54.6	$ 1.52	$ 1,856	$ 15.72	$ 19,059	$ 2.64	$ 3,200	$ 1.36	1,272	$ 1,653	$ -	$ -	$ 21.35	$25,860		
	5	1	5	2	430		Rip-rap (angular, high quality): Screen and stockpile	1,212	Bm3	C.2.25	0.057	69.3	$ 2.09	$ 2,535	$ -	$ -	$ 9.19	$ 11,145	$ 6.45	6,019	$ 7,825	$ -	$ -	$ 17.74	$21,505		
	5	1	5	3	430		Rip-Rap: Load, haul and dump	1,212	Bm3	R.022	0.043	51.7	$ 1.58	$ 1,893	$ -	$ -	$ 3.65	$ 4,428	$ 1.65	1,539	$ 2,001	$ -	$ -	$ 6.86	$8,322		
	5	1	5	4	430		Rip-Rap: Place and secure	1,212	Bm3	C.2.26	0.013	15.2	$ 0.46	$ 555	$ -	$ -	$ 0.89	$ 1,078	$ 0.47	437	$ 569	$ -	$ -	$ 1.82	$2,202		
Algae Filter																										$2,980	
	5	2	0	1	430	Place waste rock from Grum Dump at slot cut	WR: Load, haul, dump	400	Bm3	R.023	0.028	13.2	$ 1.03	$ 484	$ -	$ -	$ 2.42	$ 1,133	$ 1.00	304	$ 512	$ -	$ -	$ 4.54	$2,129		
	5	2	0	2	430		WR: Place and secure	400	Bm3	C.2.26	0.013	5.9	$ 0.46	$ 214	$ -	$ -	$ 0.89	$ 417	$ 0.47	190	$ 220	$ -	$ -	$ 1.82	$851		
Route out of Pit via slot cut																										$216,505	
	5	3	1	1	430	Access road	Clear access road area	150	m2	C.2.04	0.004	0.5	$ 0.13	$ 20	$ -	$ -	$ 0.62	$ 94	$ 0.36	42	$ 55	$ -	$ -	$ 1.12	$168		
	5	3	1	2	220		Construct access road	50	m	C.2.27	0.131	6.6	$ 4.80	$ 240	$ -	$ -	$ 10.14	$ 507	$ 5.33	205	$ 266	$ -	$ -	$ 20.27	$1,014		
	5	3	2	1	430	Excavate channel	Excavate diversion channel (soils)	9,222	Bm3	C.2.10	0.032	295.1	$ 1.17	$ 10,601	$ -	$ -	$ 2.72	$ 25,046	$ 1.27	8,907	$ 11,696	$ -	$ -	$ 5.16	$47,543		
	5	3	3	1	430	Place bedding layer	Produce and stockpile locally	1,736	Bm3	C.2.02	0.010	17.4	$ 0.37	$ 635	$ -	$ -	$ 1.61	$ 2,793	$ 1.13	1,508	$ 1,961	$ -	$ -	$ 3.10	$5,389		
	5	3	3	2	430		Load , haul, place and compact	1,736	Bm3	R.024	0.035	61.2	$ 1.29	$ 2,240	$ -	$ -	$ 2.67	$ 4,643	$ 1.23	1,643	$ 2,138	$ -	$ -	$ 5.20	$9,020		
	5	3	4	1	430	Place rip-rap	Rip-Rap: Drill, blast and stockpile	3,375	Bm3	C.2.23	0.045	151.9	$ 1.52	$ 5,478	$ 15.72	$ 53,057	$ 2.64	$ 8,908	$ 1.36	3,541	$ 4,603	$ -	$ -	$ 21.35	$72,040		
	5	3	4	2	430		Rip-rap (angular, high quality): Screen and stockpile	3,375	Bm3	C.2.25	0.057	192.9	$ 2.09	$ 7,059	$ -	$ -	$ 9.19	$ 31,025	$ 6.45	16,755	$ 21,782	$ -	$ -	$ 17.74	$59,866		
	5	3	4	3	430		Rip-Rap: Load, haul and dump	3,375	Bm3	R.025	0.029	95.3	$ 1.03	$ 3,488	$ -	$ -	$ 2.42	$ 8,157	$ 1.09	2,835	$ 3,686	$ -	$ -	$ 4.54	$15,331		
	5	3	4	4	430		Rip-Rap: Place and secure	3,375	Bm3	C.2.26	0.013	42.2	$ 0.46	$ 1,544	$ -	$ -	$ 0.89	$ 3,002	$ 0.47	1,216	$ 1,583	$ -	$ -	$ 1.82	$6,129		
Subtotal Direct Costs - Grum Interceptor Ditch												1,266		$46,222		$72,116		$120,120		51,932	$67,512		$0			$305,969	
Grum Dump																											
Reslope Dump																										$1,145,320	
	6	1	1	1	430	Clear/grub	Clear/grub forest area around toe	13,200	m2	C.2.05	0.015	192.0	$ 0.53	$ 7,027	$ -	$ -	$ 0.94	$ 12,343	$ 0.62	6,265	$ 8,145	$ -	$ -	$ 2.08	$27,515		
	6	1	2	1	430	Regrade	Flattened surfaces	337	hrs	C.2.22	1.000	337.3	$ 36.60	$ 12,347	$ -	$ -	$ 173.28	$ 58,453	$ 149.18	38,711	$ 50,324	$ -	$ -	$ 359.06	$121,124		
	6	1	2	2	430		Flatten bubble dump surfaces	296	hrs	C.2.22	1.000	296.5	$ 36.60	$ 10,852	$ -	$ -	$ 173.28	$ 51,377	$ 149.18	34,024	$ 44,232	$ -	$ -	$ 359.06	$106,460		
	6	1	2	3	430		Regrade Slopes	737	hrs	C.2.22	1.000	737.4	$ 36.60	$ 26,990	$ -	$ -	$ 173.28	$ 127,782	$ 149.18	84,624	$ 110,011	$ -	$ -	$ 359.06	$264,784		
	6	1	3	1	430	Put-back slopes not able to be re-sloped	Load, haul, dump, place at top of dump	165,000	Bm3	C.2.12	0.024	3882.4	$ 0.80	$ 142,094	$ -	$ -	$ 2.00	$ 329,488	$ 0.93	118,352	$ 153,858	$ -	$ -	$ 3.79	$625,437		
Sulphide Cell																										$2,156,795	
	6	2	1	1	430	Very low infiltration cove	Load, haul, place compacted till (1.0m)	197,450	Bm3	R.026	0.017	3350.7	$ 0.62	$ 122,634	$ -	$ -	$ 2.24	$ 441,399	$ 1.60	242,026	$ 315,604	$ -	$ -	$ 4.46	$879,637		70.51785714
	6	2	1	2	430		Load, haul, place loose till (1.5m)	298,175	Bm3	R.027	0.015	4523.4	$ 0.58	$ 165,556	$ -	$ -	$ 2.19	$ 648,738	$ 1.56	355,805	$ 462,663	$ -	$ -	$ 4.31	$1,276,958		
Waste Rock Cover																										$15,088,931	
	6	3	1	1	430	Low infiltration cove	Load, haul, place compacted till (0.5m)	858,625	Bm3	R.026	0.017	14570.6	$ 0.62	$ 533,264	$ -	$ -	$ 2.24	$ 1,919,455	$ 1.60	1,050,380	$ 1,373,294	$ -	$ -	$ 4.46	$3,826,033		572.4196667
							Load, haul, place loose till (1.5m)	2,575,875	Bm3	R.027	0.015	39340.6	$ 0.58	$ 1,439,867	$ -	$ -	$ 2.19	$ 5,642,166	$ 1.56	3,095,267	$ 4,023,848	$ -	$ -	$ 4.31	$11,105,881		19.08055556
	6	0	1	1	610	Revegetate WR Dumps	Seed/Fertilize, helicopter low application rate	1,403,750	m2	C.5.02	0.000	186.7	$ 0.00	$ 6,706	$ 0.05	$ 67,906	$ 0.05	$ 41,413	$ 0.00	763	$ 992	$ -	$ -	$ 0.11	$157,017		
Steep Runoff channels																										$123,025	
	6	4	1	1	430	Install rock drains (runoff management)	Excavate channel	3,500	Bm3	C.2.12	0.024	82.4	$ 0.86	$ 3,014	$ -	$ -	$ 2.00	$ 6,989	$ 0.93	2,510	$ 3,264	$ -	$ -	$ 3.79	$13,267		
	6	4	1	2	430		Rip-Rap: Drill, blast and stockpile	2,604	Bm3	C.2.23	0.045	117.2	$ 1.52	$ 4,226	$ 15.72	$ 40,935	$ 2.64	$ 6,873	$ 1.36	2,732	$ 3,551	$ -	$ -	$ 21.35	$55,585		
	6	4	1	3	430		Rip-rap (rounded, low quality): Screen and stockpile	2,604	Bm3	C.2.24	0.040	104.2	$ 1.46	$ 3,812	$ -	$ -	$ 6.43	$ 16,756	$ 4.52	9,049	$ 11,764	$ -	$ -	$ 12.42	$32,332		
	6	4	1	4	430		Rip-Rap: Load, haul and dump	2,604	Bm3	R.033	0.041	106.4	$ 1.50	$ 3,893	$ -	$ -	$ 3.50	$ 9,106	$ 1.58	3,165	$ 4,114	$ -	$ -	$ 6.57	$17,113		
	6	4	1	5	430		Rip-Rap: Place and secure	2,604	Bm3	C.2.26	0.013	32.6	$ 0.46	$ 1,191	$ -	$ -	$ 0.89	$ 2,318	$ 0.47	930	$ 1,221	$ -	$ -	$ 1.82	$4,729		
Sediment Basins																										$12,450	
	6	5	2	1	430	Sedimentation Basins (at bottom of runoff chann	Excavate sedimentation basin	2,128	Bm3	C.2.12	0.024	50.1	$ 0.86	$ 1,833	$ -	$ -	$ 2.00	$ 4,249	$ 0.93	1,526	$ 1,984	$ -	$ -	$ 3.79	$8,066		
	6	5	2	2	430		Rip-Rap: Drill, blast and stockpile	104	Bm3	C.2.23	0.045	4.7	$ 1.52	$ 169	$ 15.72	$ 1,635	$ 2.64	$ 274	$ 1.36	109	$ 142	$ -	$ -	$ 21.35	$2,220		
	6	5	2	3	430		Rip-rap (rounded, low quality): Screen and stockpile	104	Bm3	C.2.24	0.040	4.2	$ 1.46	$ 152	$ -	$ -	$ 6.43	$ 669	$ 4.52	361	$ 470	$ -	$ -	$ 12.42	$1,291		
	6	5	2	4	430		Rip-Rap: Load, haul and dump	104	Bm3	R.033	0.041	4.2	$ 1.50	$ 155	$ -	$ -	$ 3.50	$ 364	$ 1.58	126	$ 164	$ -	$ -	$ 6.57	$683		
	6	5	2	5	430		Rip-Rap: Place and secure	104	Bm3	C.2.26	0.013	1.3	$ 0.46	$ 48	$ -	$ -	$ 0.89	$ 92	$ 0.47	38	$ 49	$ -	$ -	$ 1.82	$189		
Subtotal Direct Costs - Grum Dump												67,925		$2,485,852		$110,476		$9,360,300			$6,569,893		$0			$18,526,522	
Overburden Dump																											
Reslope Dump																										$153,664	
	7	2	1	1	430	Regrade	Flattened surfaces	77	hrs	C.2.22	1.000	77.2	$ 36.60	$ 2,824	$ -	$ -	$ 173.28	$ 13,371	$ 149.18	8,855	$ 11,511	$ -	$ -	$ 359.06	$27,707		
	7	2	1	2	430		Flatten bubble dump surfaces	351	hrs	C.2.22	1.000	350.8	$ 36.60	$ 12,839	$ -	$ -	$ 173.28	$ 60,786	$ 149.18	40,255	$ 52,332	$ -	$ -	$ 359.06	$125,957		
Revegetate																										$53,635	
	7	3	1	1	610	Revegetate WR Dumps	Seed/Fertilize, helicopter low application rate	510,250	m2	C.5.02	0.000	63.8	$ 0.00	$ 2,291	$ 0.05	$ 23,196	$ 0.05	$ 27,810	$ 0.00	261	$ 339	$ -	$ -	$ 0.11	$53,635		
Subtotal Direct Costs - Overburden Dump												492		$17,954		$23,196		$101,957		49,371	$64,182		$0			$207,299	
Ore Transfer Pad																											
Relocate to Vangorda Pit																										$1,429,518	
	8	1	1	1	430	Excavate acidic material (over-excavate)	Load, haul, place and compact in pit	321,200	Bm3	R.004	0.019	6112.0	$ 0.70	$ 223,700	$ -	$ -	$ 2.27	$ 729,591	$ 1.48	360,328	$ 470,227	$ -	$ -	$ 4.45	$1,429,518		
Reslope Pad for drainage																										$40,795	
	8	2	1	1	430	Regrade	Flattened surfaces	52	hrs	C.2.22	1.000	51.9	$ 36.60	$ 1,900	$ -	$ -	$ 173.28	$ 8,993	$ 149.18	5,956	$ 7,742	$ -	$ -	$ 359.06	$18,635		
	8	2	1	2	430		Flatten bubble dump surfaces	62	hrs	C.2.22	1.000	61.7	$ 36.60	$ 2,259	$ -	$ -	$ 173.28	$ 10,694	$ 149.18	7,082	$ 9,207	$ -	$ -	$ 359.06	$22,160		
Rudementary Cover																										$286,560	
	8	3	1	1	430	Place Rudimentary Cover	Load, haul, place loose till (0.5m)	73,650	Bm3	R.030	0.014	1050.8	$ 0.52	$ 38,450	$ -	$ -	$ 1.99	$ 146,782	$ 1.38	77,937	$ 101,318	$ -	$ -	$ 3.89	$286,560		
Sediment Control Ditches																										$10,188	
	8	4	1	1	430	Sediment Control Ditch	Excavation of ditch

Attachment E

Example Alternatives - Cost Estimate

	9	4	2	1	430	Sedimentation Basin	Excavate sedimentation basin	252	Bm3	C.2.12	0.024	5.9	$ 0.86	$ 217	$ -	$ -	$ 2.00	$ 503	$ 0.93	181	$ 235	$ -	$ -	$ 3.79	$955			
Revegetate																										$13,598				
	9	5	1	1	610	Revegetate	Seed/Fertilize, helicopter low application rate	128,504	m2	C.5.02	0.000	16.1	$ 0.00	$ 577	$ 0.05	$ 5,842	$ 0.05	$ 7,004	$ 0.00	68	$ 85	$ -	$ -	$ 0.11	$13,598			
Subtotal Direct Costs - Ore Transfer Pad												7,356		$269,209		$5,842		$968,432		459,297	$597,056		$0			$1,780,568			
Groundwater																														
Grum Dump Groundwater Collection to Holding Pond																										$506,884				
	9	1	1	1	430	Access road	Clear access road area	1,950	m2	C.2.04	0.004	7.1	$ 0.13	$ 269	$ -	$ -	$ 0.02	$ 1,217	$ 0.36	546	$ 709	$ -	$ -	$ 1.12	$2,186			
	9	1	1	1	430		Construct Access road	650	m	C.2.27	0.131	85.3	$ 4.80	$ 3,122	$ -	$ -	$ 10.14	$ 6,593	$ 5.33	2,663	$ 3,462	$ -	$ -	$ 20.27	$13,177			
	9	1	2	1	430	Groundwater wells	Drill wells (Air Rotary Drill Rig, ~20m depth)	140	m	C.2.09	2.000	280.0	$ 102.13	$ 14,299	$ -	$ -	$ 100.85	$ 14,119	$ 22.08	2,378	$ 3,091	$ -	$ -	$ 225.07	$31,509			no preliminary design done
	9	1	2	2	560		Install 6" stainless steel well casing & screen	140	m	C.3.17	0.150	21.0	$ 7.66	$ 1,072	$ 232.60	$ 32,564	$ 7.56	$ 1,059	$ 1.66	178	$ 232	$ -	$ -	$ 249.48	$34,927			
	9	1	2	3	560		Install 6" Submersible Pump with controls	7	ea.	C.3.07	12.000	84.0	$ 600.00	$ 4,200	$ 6,842.00	$ 47,894	$ -	$ -	$ -	0	$ -	$ -	$ -	$ 7,442.00	$52,094			
	9	1	2	4	500		Install protective housing (shack)	1	ea.	C.3.13	1,000.00	14.0	$ 1,300.00	$ 9,100	$ 445.00	$ 3,115	$ -	$ -	$ -	0	$ -	$ -	$ -	$ 1,745.00	$12,215			
	9	1	3	1	430	Piping system	Excavate Piping Trench	7,452	Bm3	C.2.13	0.020	149.0	$ 0.73	$ 5,455	$ -	$ -	$ 1.42	$ 10,604	$ 0.75	4,202	$ 5,592	$ -	$ -	$ 2.91	$21,651			
	9	1	3	2	510		Supply and install insulated 150mm HDPE pipe	1,242	m	C.3.03	0.250	310.5	$ 8.75	$ 10,868	$ 155.84	$ 193,553	$ -	$ -	$ -	0	$ -	$ -	$ -	$ 164.59	$204,421			
	9	1	3	3	430		Bedding: Produce and stockpile (screen)	484	Bm3	C.2.02	0.010	4.8	$ 0.37	$ 177	$ -	$ -	$ 1.01	$ 779	$ 1.13	421	$ 547	$ -	$ -	$ 3.10	$1,504			
	9	1	3	4	430		Bedding: Load, haul, place and compact	484	Bm3	R.031	0.024	11.6	$ 0.89	$ 433	$ -	$ -	$ 1.85	$ 888	$ 0.89	332	$ 431	$ -	$ -	$ 3.64	$1,762			
	9	1	3	5	430		Backfill and compact ditches	7,452	Bm3	C.2.01	0.030	223.6	$ 1.08	$ 8,063	$ -	$ -	$ 0.74	$ 5,498	$ 0.40	2,267	$ 2,947	$ -	$ -	$ 2.22	$10,509			
	9	1	4	1	510	Heat tracing	Supply and install heat trace in HDPE pipe	1,242	m	C.3.04	0.250	310.5	$ 12.50	$ 15,525	$ 21.32	$ 26,479	$ -	$ -	$ -	0	$ -	$ -	$ -	$ 33.82	$42,004			
	9	1	4	2	510		Supply/Install heat tracing power feed kit	1	ea.	C.3.05	4.000	4.0	$ 230.00	$ 230	$ 396.84	$ 397	$ -	$ -	$ -	0	$ -	$ -	$ -	$ 626.84	$627			
	9	1	4	3	510		Supply/Install electrical thermostate for heat tracing	1	ea.	C.3.06	1.000	1.0	$ 57.50	$ 58	$ 1,025.00	$ 1,025	$ -	$ -	$ -	0	$ -	$ -	$ -	$ 1,082.50	$1,083			
	9	1	5	1	510	Provide electricity from holding pond to pumps	Supply/Install treated power poles	17	ea.	C.4.03	4.545	77.3	$ 297.88	$ 5,064	$ 325.90	$ 5,541	$ 85.85	$ 1,459	$ 28.17	368	$ 479	$ -	$ -	$ 737.88	$12,544			
	9	1	5	2	510		Supply/Install overhead conductor	1,242	m	C.4.02	0.032	39.7	$ 2.21	$ 2,748	$ 1.41	$ 1,751	$ 0.45	$ 563	$ 0.15	142	$ 185	$ -	$ -	$ 4.22	$5,247			
	9	1	5	3	510		Supply/Install transformers	5	ea.	C.4.04	20.000	100.0	$ 1,383.00	$ 6,915	$ 8,934.00	$ 44,670	$ 224.98	$ 1,125	$ 143.00	550	$ 715	$ -	$ -	$ 10,684.98	$53,425			
Grum Dump Groundwater Holding Pond																										$108,157				
	9	2	1	1	430	Excavate pond	Excavate Holding Pond	10,848	Bm3	C.2.12	0.024	255.2	$ 0.86	$ 9,342	$ -	$ -	$ 2.00	$ 21,662	$ 0.93	7,781	$ 10,115	$ -	$ -	$ 3.79	$41,120			
	9	2	2	1	430	Place till	Till: Load, haul, dump and place	1,476	Bm3	R.032	0.048	71.5	$ 1.77	$ 2,618	$ -	$ -	$ 4.07	$ 6,009	$ 1.87	2,121	$ 2,757	$ -	$ -	$ 7.71	$11,385			
	9	2	2	2	430		Till: Compact with vibrating drum roller	4,921	m2	C.2.06	0.016	78.7	$ 0.57	$ 2,819	$ -	$ -	$ 0.02	$ 103	$ 0.02	61	$ 80	$ -	$ -	$ 0.61	$3,002			
	9	2	3	1	430	Place geotextile	Supply and place geotextile	3,054	m2	C.4.06	0.016	48.9	$ 0.57	$ 1,730	$ 3.50	$ 10,689	$ 0.23	$ 697	$ 0.15	347	$ 452	$ -	$ -	$ 4.44	$13,567			
	9	2	4	1	430	Place bedding layer	Bedding: Produce and stockpile (screen)	1,476	Bm3	C.2.02	0.010	14.8	$ 0.37	$ 540	$ -	$ -	$ 1.01	$ 2,375	$ 1.13	1,282	$ 1,667	$ -	$ -	$ 3.10	$4,582			
	9	2	4	2	430		Bedding: Load, haul, place and compact	1,476	Bm3	R.031	0.024	36.1	$ 0.89	$ 1,321	$ -	$ -	$ 1.85	$ 2,736	$ 0.89	1,011	$ 1,315	$ -	$ -	$ 3.64	$5,371			
	9	2	5	1	500	Place pump	Supply and place pump	1	ea.	C.3.10	12.000	12.0	$ 600.00	$ 600	$ 1,829.00	$ 1,829	$ -	$ -	$ -	0	$ -	$ -	$ -	$ 2,429.00	$2,429			
	9	2	5	2	500		Build and install housing for primary pump	1	ea.	C.3.12	30.000	30.0	$ 1,950.00	$ 1,950	$ 1,730.00	$ 1,730	$ -	$ -	$ -	0	$ -	$ -	$ -	$ 3,680.00	$3,680			
	9	2	6	1	510	Provide electricity to holding pond	Supply/Install treated power poles	10	ea.	C.4.03	4.545	45.5	$ 297.88	$ 2,979	$ 325.90	$ 3,260	$ 85.85	$ 859	$ 28.17	217	$ 282	$ -	$ -	$ 737.88	$7,370			
	9	2	6	2	510		Supply/Install overhead conductor	760	m	C.4.02	0.032	22.4	$ 2.21	$ 1,549	$ 1.41	$ 987	$ 0.45	$ 317	$ 0.15	80	$ 104	$ -	$ -	$ 4.22	$2,957			
	9	2	6	3	510		Supply/Install transformers	1	ea.	C.4.04	20.000	20.0	$ 1,383.00	$ 1,383	$ 8,934.00	$ 8,934	$ 224.98	$ 225	$ 143.00	110	$ 143	$ -	$ -	$ 10,684.98	$10,685			
Groundwater Collection System to Grum Pit																										$682,735				
	9	3	1	1	430	Piping system	Excavate piping trench	17,160	Bm3	C.2.13	0.020	343.2	$ 0.73	$ 12,561	$ -	$ -	$ 1.42	$ 24,419	$ 0.75	9,665	$ 12,877	$ -	$ -	$ 2.91	$49,857			
	9	3	1	2	510		Supply and install insulated 150mm HDPE pipe	2,600	m	C.3.03	0.250	715.0	$ 8.75	$ 25,025	$ 155.84	$ 445,702	$ -	$ -	$ -	0	$ -	$ -	$ -	$ 164.59	$470,727			
	9	3	1	3	430		Bedding: Produce and stockpile (screen)	1,115	Bm3	C.2.02	0.010	11.2	$ 0.37	$ 408	$ -	$ -	$ 1.01	$ 1,794	$ 1.13	969	$ 1,260	$ -	$ -	$ 3.10	$3,462			
	9	3	1	4	430		Bedding: Load, haul, place and compact	1,115	Bm3	R.034	0.024	26.5	$ 0.87	$ 971	$ -	$ -	$ 1.80	$ 2,011	$ 0.87	744	$ 967	$ -	$ -	$ 3.54	$3,949			
	9	3	1	5	430		Backfill and compact ditches	17,160	Bm3	C.2.01	0.030	514.8	$ 1.08	$ 18,567	$ -	$ -	$ 0.74	$ 12,660	$ 0.40	5,221	$ 6,787	$ -	$ -	$ 2.22	$30,014			
	9	3	2	1	510	Heat tracing	Supply and install heat trace in HDPE pipe	2,600	m	C.3.04	0.250	715.0	$ 12.50	$ 35,750	$ 21.32	$ 60,675	$ -	$ -	$ -	0	$ -	$ -	$ -	$ 33.82	$96,725			
Contingency - Vangorda Pit Groundwater System																										$395,299				
	9	4	1	1	430	Groundwater wells	Drill wells (Air Rotary Drill Rig, ~90m depth)	270	m	C.2.09	2.000	540.0	$ 102.13	$ 27,576	$ -	$ -	$ 100.85	$ 27,230	$ 22.08	4,586	$ 5,962	$ -	$ -	$ 225.07	$60,768			no preliminary design done.
	9	4	1	2	500		Install 6" stainless steel well casing & screen	270	m	C.3.17	0.150	40.5	$ 7.66	$ 2,068	$ 232.60	$ 62,802	$ 7.56	$ 2,042	$ 1.66	344	$ 447	$ -	$ -	$ 249.48	$67,360			
	9	4	1	3	500		Install 6" Submersible Pump with controls	3	ea	C.3.07	12.000	36.0	$ 600.00	$ 1,800	$ 6,842.00	$ 20,526	$ -	$ -	$ -	0	$ -	$ -	$ -	$ 7,442.00	$22,326			
	9	4	1	4	500		Install protective housing (shack)	3	ea	C.3.13	20.000	60.0	$ 1,300.00	$ 3,900	$ 445.00	$ 1,335	$ -	$ -	$ -	0	$ -	$ -	$ -	$ 1,745.00	$5,235			
	9	4	2	1	510	Provide electricity to pumps	Supply/Install treated power poles	4	ea.	C.4.03	4.545	18.2	$ 297.88	$ 1,192	$ 325.90	$ 1,304	$ 85.85	$ 343	$ 28.17	87	$ 113	$ -	$ -	$ 737.88	$2,951			
	9	4	2	2	510		Supply/Install overhead conductor	300	m	C.4.02	0.032	9.6	$ 2.21	$ 664	$ 1.41	$ 423	$ 0.45	$ 136	$ 0.15	34	$ 45	$ -	$ -	$ 4.22	$1,267			
	9	4	2	3	510		Supply/Install transformers	1	ea.	C.4.04	20.000	20.0	$ 1,383.00	$ 1,383	$ 8,934.00	$ 8,934	$ 224.98	$ 225	$ 143.00	110	$ 143	$ -	$ -	$ 10,684.98	$10,685			
	9	4	3	1	430	Piping system	Excavate piping trench	5,400	Bm3	C.2.13	0.020	108.0	$ 0.73	$ 3,953	$ -	$ -	$ 1.42	$ 7,684	$ 0.75	3,117	$ 4,052	$ -	$ -	$ 2.91	$15,689			
	9	4	3	2	500		Supply and install insulated 150mm HDPE pipe	900	m	C.3.03	0.250	225.0	$ 8.75	$ 7,875	$ 155.84	$ 140,256	$ -	$ -	$ -	0	$ -	$ -	$ -	$ 164.59	$148,131			
	9	4	3	3	430		Bedding: Produce and stockpile (screen)	351	Bm3	C.2.02	0.010	3.5	$ 0.37	$ 128	$ -	$ -	$ 1.01	$ 565	$ 1.13	305	$ 396	$ -	$ -	$ 3.10	$1,090			
	9	4	3	4	430		Bedding: Load, haul, place	351	Bm3	R.035	0.031	10.7	$ 1.12	$ 393	$ -	$ -	$ 2.32	$ 814	$ 1.07	268	$ 374	$ -	$ -	$ 4.50	$1,580			
	9	4	3	5	430		Backfill and compact ditches	5,049	Bm3	C.2.01	0.030	151.5	$ 1.08	$ 5,463	$ -	$ -	$ 0.74	$ 3,725	$ 0.40	1,536	$ 1,997	$ -	$ -	$ 2.22	$11,185			
	9	4	4	1	510	Heat tracing	Supply and install heat trace in HDPE pipe	900	m	C.3.04	0.250	225.0	$ 12.50	$ 11,250	$ 21.32	$ 19,188	$ -	$ -	$ -	0	$ -	$ -	$ -	$ 33.82	$30,438			
	9	4	4	2	510		Supply/Install heat tracing power feed kit	1	ea.	C.3.05	4.000	4.0	$ 230.00	$ 230	$ 396.84	$ 397	$ -	$ -	$ -	0	$ -	$ -	$ -	$ 626.84	$627			
	9	4	4	3	510		Supply/Install electrical thermostate for heat tracing	1	ea.	C.3.06	1.000	1.0	$ 57.50	$ 58	$ 1,025.00	$ 1,025	$ -	$ -	$ -	0	$ -	$ -	$ -	$ 1,082.50	$1,083			
	9	4	5	1	430	Groundwater holding pond	Excavate holding pond	876	Bm3	C.2.12	0.024	20.6	$ 0.86	$ 754	$ -	$ -	$ 2.00	$ 1,749	$ 0.93	628	$ 817	$ -	$ -	$ 3.79	$3,321			
	9	4	5	2	430		Till: Load, haul, dump and place	229	Bm3	R.015	0.024	7.7	$ 1.23	$ 281	$ -	$ -	$ 2.82	$ 646	$ 1.30	220	$ 286	$ -	$ -	$ 5.35	$1,223			
	9	4	5	3	430		Till: Compact with vibrating drum roller	229	m2	C.2.06	0.016	3.7	$ 0.57	$ 131	$ -	$ -	$ 0.02	$ 5	$ 0.02	3	$ 4	$ -	$ -	$ 0.61	$140			
	9	4	5	4	430		Supply and place geotextile	529	m2	C.4.06	0.016	8.5	$ 0.57	$ 300	$ 3.50	$ 1,853	$ 0.23	$ 121	$ 0.15	60	$ 78	$ -	$ -	$ 4.44	$2,352			
	9	4	5	5	430		Bedding layer: Produce, screen and stockpile	229	Bm3	C.2.02	0.010	2.3	$ 0.37	$ 84	$ -	$ -	$ 1.01	$ 368	$ 1.13	199	$ 258	$ -	$ -	$ 3.10	$710			
	9	4	5	6	430		Bedding Layer: Load, haul, place and compact	229	Bm3	R.035	0.031	7.0	$ 1.12	$ 256	$ -	$ -	$ 2.32	$ 530	$ 1.07	188	$ 244	$ -	$ -	$ 4.50	$1,030			
	9	4	5	7	500		Pump: Install primary pump	1	ea.	C.3.10	12.000	12.0	$ 600.00	$ 600	$ 1,829.00	$ 1,829	$ -	$ -	$ -	0	$ -	$ -	$ -	$ 2,429.00	$2,429			
	9	4	5	8	500		Pump: Build and install housing for pump	1	ea.	C.3.12	30.000	30.0	$ 1,950.00	$ 1,950	$ 1,730.00	$ 1,730	$ -	$ -	$ -	0	$ -	$ -	$ -	$ 3,680.00	$3,680			
Contingency - Grum Dump Cut-off Wall																										$332,954				
	9	5	1	1		Level and compact a working surface	Clear and grub working surface	6,750	m2	C.2.05	0.015	98.2	$ 0.53	$ 3,593	$ -	$ -	$ 0.94	$ 6,312	$ 0.62	3,204	$ 4,165	$ -	$ -	$ 2.08	$14,070			
	9	5	1	2			Level and compact surface	3,375	Bm3	C.2.20	0.013	42.2	$ 0.46	$ 1,544	$ -	$ -	$ 2.15	$ 7,242	$ 1.25	3,246	$ 4,220	$ -	$ -	$ 3.85	$13,006			
	9	5	2	1		Cut-off wall	Install cut-off wall (all-inclusive)	8,344	m2	C.2.08	0.500	4172.0	$ 26.82	$ 223,786	$ 48.60	$ 405,516	$ 20.47	$ 170,821	$ 12.67	81,348	$ 105,752	$ -	$ -	$ 108.57	$905,877			
Subtotal Direct Costs - Groundwater												10,668		$508,913		$1,558,216		$350,340		143,507	$186,559		$0			$2,604,028			
Vangorda Haul Road																														
Remove Culverts																										$1,016,439				
	10	1	1	1	430	Remove culverts	Excavate haul road	268,660	m3	C.2.12	0.024	6321.9	$ 0.86	$ 231,381	$ -	$ -	$ 2.00	$ 536,522	$ 0.93	192,720	$ 250,536	$ -	$ -	$ 3.79	$1,016,439			
Reclaim Haul Road																										$87,788				
	10	2	1	1	430	Remove berms	Doze berms over road edges	60	hrs	C.2.22	1.000	60.0	$ 30.60	$ 2,196	$ -	$ -	$ 173.28	$ 10,397	$ 149.18	8,955	$ 8,951	$ -	$ -	$ 359.06	$21,543			
	10	2	2	1	430		Scarify road surfaces	135,000	m2	C.2.29	0.003	337.5	$ 0.09	$ 12,353	$ -	$ -	$ 0.10	$ 13,582	$ 0.10	10,159	$ 13,206	$ -	$ -	$ 0.29	$39,141			
	10	2	3	1	610	Revegetate	Seed/Fertilize, helicopter high application rate	180,000	m2	C.5.01	0.000	22.5	$ 0.00	$ 608	$ 0.00	$ 16,366	$ 0.05	$ 9,810	$ 0.00	92	$ 120	$ -	$ -	$ 0.15	$27,104			
Subtotal Direct Costs - Vangorda Haul Road												6,742		$246,737		$16,366		$370,311		208,856	$272,813		$0			$1,106,227			
Miscellaneous																														
Buildings																										$569,060				
	10	1	1	1	220	Building decontamination	Remove hazardous material:	6,002	m3	C.1.01	0.556	3834.4	$ 24.44	$ 168,718	$ -	$ -	$ 2.17	$ 14,090	$ 1.55	8,225	$ 10,892	$ -	$ -	$ 28.17	$194,404			
	10	1	2	1	220	Building demolition	Building demolition: 'empty buildings'	10,008	m2	C.1.02	0.310	3103.3	$ 11.10	$ 111,097	$ -	$ -	$ 15.54	$ 155,539	$ 8.55	65,858	$ 85,815	$ -	$ -	$ 35.20	$352,250			
	10	1	2	2	430		Building demolition: 'full buildings'	345	m2	C.1.02	0.465	160.5	$ 16.65	$ 5,745	$ -	$ -	$ 23.31	$ 8,043	$ 12.83	3,405	$ 4,427	$ -	$ -	$ 52.80	$18,214			
	10	1	2	3	430		Puncture concrete foundations	15	m	C.1.04	0.182	2.7	$ 6.65	$ 100	$ -	$ -	$ 20.26	$ 304	$ 13.15	152	$ 197	$ -	$ -	$ 40.07	$601			
	10	1	2	4	430		Re-grade over demolished buildings	10	hrs	C.2.22	1.000	10.0	$ 30.60	$ 306	$ -	$ -	$ 173.28	$ 1,733	$ 149.18	1,148	$ 1,492	$ -	$ -	$ 359.06	$3,591			
Sludge Pond																										$133,287				
	10	2	1	1	430	Cover Sludge Pond	Load, haul, and place till	30,000	Bm3	R.038	0.025	763.6	$ 0.93	$ 27,940	$ -	$ -	$ 2.33	$ 70,005	$ 1.16	27,170	$ 35,332	$ -	$ -	$ 4.44	$133,287			
Existing Bioremediation Cell																										$1,784				
	10	3	1	1	430	Cover Existing Bioremediation Cell	Doze material	1,600	m2	C.2.04	0.004	5.8	$ 0.13	$ 213	$ -	$ -	$ 0.62	$ 999	$ 0.36	448	$ 582	$ -	$ -	$ 1.12	$1,784			
Dams																										$3,791				
	10	4	1	1	430	Breach all Dams (2)	Excavate, haul and dump locally	1,000	Bm3	C.2.12	0.024	23.5	$ 0.86	$ 861	$ -	$ -	$ 2.00	$ 1,997	$ 0.93	717	$ 932	$ -	$ -	$ 3.79	$3,791			
WTP Settling Pond																										$5,652				
	10	5	1	1	430	Breach WTP Settling Pond	Excavate, haul and dump locally	1,491	Bm3	C.2.12	0.024	35.1	$ 0.86	$ 1,284	$ -	$ -	$ 2.00	$ 2,977	$ 0.93	1,069	$ 1,390	$ -	$ -	$ 3.79	$5,652			
Contaminated soils																										$27,498				
	10	6	1	1	600	Remove Contaminated soils	Excavate, haul and place contaminated soils in bio-remediation cell	3,750	Bm3	R.039	0.034	127.8	$ 1.25	$ 4,679	$ -	$ -	$ 3.88	$ 14,548	$ 2.04	5,877	$ 7,641	$ -	$ -	$ 7.16	$26,868			
	10	6	1	2	600		Regrade excavated areas for drainage	2,500	m2	C.2.16	0.002	5.4	$ 0.08	$ 199	$ -	$ -	$ 0.09	$ 219	$ 0.09	164	$ 213	$ -	$ -	$ 0.25	$630			
Bioremediation Cell																										$51,420				
	10	7	1	1	430	Construct Bioremediation Cell	Excavate and create berms for use as the bioremediation cell	8,000	Bm3	C.2.11	0.013	108.7	$ 0.49	$ 3,904	$ -	$ -	$ 0.95	$ 7,590	$ 0.50	3,070	$ 4,002	$ -	$ -	$ 1.94	$15,496			
	10	7	1	2	430		Place HDPE liner for remediation cell	1,600	m2	C.4.10	0.143	228.8	$ 6.33	$ 10,130	$ 12.77	$ 20,432	$ 1.63	$ 2,609	$ 1.08	1,300	$ 1,690	$ -	$ -	$ 21.79	$34,861			
	10	7	1	3	430		Bedding: Load, haul, place (use local overburden material)	460	Bm3	C.2.01	0.030	14.4	$ 1.08	$ 512	$ -	$ -	$ 0.74	$ 354	$ 0.40	146	$ 190	$ -	$ -	$ 2.22	$1,063			
Roads																										$20,765				
	10	8	1	1	430	Reclaim unnecessary roads	Remove culverts and breach stream crossing	3,920	Bm3	C.2.12	0.024	92.2	$ 0.86	$ 3,370	$ -	$ -	$ 2.00	$ 7,828	$ 0.93	2,812	$ 3,655	$ -	$ -	$ 3.79	$14,850			
	10	8	1	2	430		Scarify road surfaces	15,000	m2	C.2.29	0.003	37.5	$ 0.09	$ 1,373	$ -	$ -	$ 0.10	$ 1,509	$ 0.10	1,129	$ 1,467	$ -	$ -	$ 0.29	$4,349			
	10	8	1	3	610		Seed/Fertilize, helicopter low application rate	15,000	m2	C.5.02	0.000	1.9	$ 0.00	$ 67	$ 0.05	$ 682	$ 0.05	$ 818	$ 0.00	8	$ 10	$ -	$ -	$ 0.11	$1,577			
Borrow Sources																										$65,000				
	10	9	1	1	600	Develop Borrow Sources	Clear and grub	3,000	m2	C.2.05	0.015	43.6	$ 0.53	$ 1,597	$ -	$ -	$ 0.94	$ 2,805	$ 0.62	1,424	$ 1,851	$ -	$ -	$ 2.08	$6,253			
	10	9	1	2	600		Construct haul road	1,000	m	C.2.28	0.225	225.0	$ 8.24	$ 8,235	$ -	$ -	$ 29.87	$ 29,874	$ 19.48	14,886	$ 19,482	$ -	$ -	$ 57.59	$57,391			
	10	9	2	1	600	Decommission Borrow Sources	Regrade Borrow source slopes	10	hrs	C.2.22	1.000	10.0	$ 30.60	$ 306	$ -	$ -	$ 173.28	$ 1,733	$ 149.18	1,148	$ 1,492	$ -	$ -	$ 359.06	$3,591			
	10	9	2	2	610		Seed/Fertilize, helicopter low application rate	189,000	m2	C.5.02	0.000	21.1	$ 0.00	$ 758	$ 0.05	$ 7,883	$ 0.05	$ 9,211	$ 0.00	86	$ 112	$ -	$ -	$ 0.11	$17,765			
Subtotal Direct Costs - Miscellaneous												8,853		$351,534		$28,797		$335,468		140,358	$182,466		$0			$898,285			
Subtotal Direct Costs																														
							Subtotal direct costs					307,508		$12,773,210		$8,240,316		$29,137,366		9,795,292	$19,348,784		$0			$69,499,615			
CLOSURE COSTS - INDIRECT																														
	100	100	1	1		Project Management	5.0% of direct costs															$ 69,499,615	x	5.0%		$3,474,981			
	100	100	2	1		Field Supervision	2.5% of direct costs															$ 69,499,615	x	2.5%		$1,737,490			
	100	100	3	1		Contractor profit and home office overhead	10% of direct costs															$ 69,499,615	x	10.0%		$6,949,962			
	100	100	4	1		Insurance	0.5% of direct costs															$ 69,499,615	x	0.5%		$347,498			
	100	100	5	1		Bonding	0.5% of direct costs															$ 69,499,615	x	0.5%		$347,498			
	100	100	6	1		Field Engineering and QA	10% of direct costs															$ 69,499,615	x	10.0%		$6,949,962			
	100	100	7	1		Mob - Demob																	1	lump	$500,000	$500,000			
	100	100	8	1		Living out allowances	(included in heavy equipment costs)																			$0			
Subtotal Indirect Costs																														
							Subtotal indirect costs																			$20,307,390			
CLOSURE COSTS - CONTINGENCY																														
							Contingency	20% of direct costs															$69,499,615	x	20.0%		$13,899,923			
CLOSURE COSTS - TOTAL																														
							Total direct and indirect costs																			$103,706,928			

Primary_Alternative_C

Vangorda/Grum Area Post Closure Costs

Costs in 2006 dollars

Notes:
1 Groundwater pumping costs include maintenance on the pumps
2 Environmental management costs split evenly between the Faro Mine, Tailings Area and Vangorda/Grum Mine site.

5.1 Backfill Vangorda Pit

		Closure Period							Post-Closure Period														
	NPV 3%	Year 1 2011	Year 2 2012	Year 3 2013	Year 4 2014	Year 5 2015	Year 6 2016	Year 7 2017	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030	2031	2032
Earthworks Inspection and Maintenance	$841,641	$0	$0	$0	$0	$0	$0	$0	$63,972	$63,972	$63,972	$63,972	$63,972	$63,972	$63,972	$63,972	$63,972	$63,972	$21,324	$21,324	$21,324	$21,324	$21,324
Water Management and Pumping Costs [1]																							
Grum Dump Groundwater Collection System	$2,740,908	$0	$0	$0	$0	$0	$0	$0	$107,038	$107,038	$107,038	$107,038	$107,038	$107,038	$107,038	$107,038	$107,038	$107,038	$107,038	$107,038	$107,038	$107,038	$107,038
Vangorda Pit Groundwater Collection System	$838,869	$0	$0	$0	$0	$0	$0	$0	$32,759	$32,759	$32,759	$32,759	$32,759	$32,759	$32,759	$32,759	$32,759	$32,759	$32,759	$32,759	$32,759	$32,759	$32,759
Subtotal	$3,579,777	$0	$0	$0	$0	$0	$0	$0	$139,797	$139,797	$139,797	$139,797	$139,797	$139,797	$139,797	$139,797	$139,797	$139,797	$139,797	$139,797	$139,797	$139,797	$139,797
Water Treatment System Operation	$6,367,440	$200,000	$200,000	$200,000	$200,000	$200,000	$200,000	$200,000	$200,000	$200,000	$200,000	$200,000	$200,000	$200,000	$200,000	$200,000	$200,000	$200,000	$200,000	$200,000	$200,000	$200,000	$200,000
Environmental Management [2]																							
Full-Time Site Manager	$896,242	0	$0	$0	$0	$0	$0	$0	$35,000	$35,000	$35,000	$35,000	$35,000	$35,000	$35,000	$35,000	$35,000	$35,000	$35,000	$35,000	$35,000	$35,000	$35,000
Full-Time Assistant Manager	$640,173	0	$0	$0	$0	$0	$0	$0	$25,000	$25,000	$25,000	$25,000	$25,000	$25,000	$25,000	$25,000	$25,000	$25,000	$25,000	$25,000	$25,000	$25,000	$25,000
Full-Time Technician	$640,173	$0	$0	$0	$0	$0	$0	$0	$25,000	$25,000	$25,000	$25,000	$25,000	$25,000	$25,000	$25,000	$25,000	$25,000	$25,000	$25,000	$25,000	$25,000	$25,000
Full-Time Vehicles (2)	$204,855	$0	$0	$0	$0	$0	$0	$0	$8,000	$8,000	$8,000	$8,000	$8,000	$8,000	$8,000	$8,000	$8,000	$8,000	$8,000	$8,000	$8,000	$8,000	$8,000
Part-Time Administration	$179,248	$0	$0	$0	$0	$0	$0	$0	$7,000	$7,000	$7,000	$7,000	$7,000	$7,000	$7,000	$7,000	$7,000	$7,000	$7,000	$7,000	$7,000	$7,000	$7,000
Part-Time Technicians (2)	$640,173	$0	$0	$0	$0	$0	$0	$0	$25,000	$25,000	$25,000	$25,000	$25,000	$25,000	$25,000	$25,000	$25,000	$25,000	$25,000	$25,000	$25,000	$25,000	$25,000
Part-Time Tradesmen (4)	$1,280,346	$0	$0	$0	$0	$0	$0	$0	$50,000	$50,000	$50,000	$50,000	$50,000	$50,000	$50,000	$50,000	$50,000	$50,000	$50,000	$50,000	$50,000	$50,000	$50,000
Part-Time Vehicles (4)	$409,711	$0	$0	$0	$0	$0	$0	$0	$16,000	$16,000	$16,000	$16,000	$16,000	$16,000	$16,000	$16,000	$16,000	$16,000	$16,000	$16,000	$16,000	$16,000	$16,000
Office	$332,690	$0	$0	$0	$0	$0	$0	$0	$13,000	$13,000	$13,000	$13,000	$13,000	$13,000	$13,000	$13,000	$13,000	$13,000	$13,000	$13,000	$13,000	$13,000	$13,000
Analytical costs	$1,221,169	$0	$0	$0	$0	$0	$0	$0	$65,000	$65,000	$65,000	$65,000	$65,000	$56,667	$56,667	$56,667	$56,667	$56,667	$56,667	$56,667	$56,667	$56,667	$56,667
Subtotal	$6,445,090	$0	$0	$0	$0	$0	$0	$0	$269,000	$269,000	$269,000	$269,000	$269,000	$260,667	$260,667	$260,667	$260,667	$260,667	$260,667	$260,667	$260,667	$260,667	$260,667
Total	$17,234,958	$200,000	$200,000	$200,000	$200,000	$200,000	$200,000	$200,000	$692,769	$692,769	$692,769	$692,769	$692,769	$664,436	$664,436	$664,436	$664,436	$664,436	$621,788	$621,788	$621,788	$621,788	$621,788

5.2 Stabilize In Place

		Closure Period					Post-Closure Period																
	NPV 3%	Year 1 2011	Year 2 2012	Year 3 2013	Year 4 2014	Year 5 2015	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030	2031	2032
Earthworks Inspection and Maintenance	$1,329,975	$0	$0	$0	$0	$0	$95,057	$95,057	$95,057	$95,057	$95,057	$95,057	$95,057	$95,057	$95,057	$95,057	$31,686	$31,686	$31,686	$31,686	$31,686	$31,686	$31,686
Water Management and Pumping Costs [1]																							
Grum Dump Groundwater Collection System	$1,499,304	$0	$0	$0	$0	$0	$55,005	$55,005	$55,005	$55,005	$55,005	$55,005	$55,005	$55,005	$55,005	$55,005	$55,005	$55,005	$55,005	$55,005	$55,005	$55,005	$55,005
Vangorda Dump Groundwater Collection System	$805,906	$0	$0	$0	$0	$0	$29,566	$29,566	$29,566	$29,566	$29,566	$29,566	$29,566	$29,566	$29,566	$29,566	$29,566	$29,566	$29,566	$29,566	$29,566	$29,566	$29,566
Vangorda Pit Groundwater Collection System	$342,597	$0	$0	$0	$0	$0	$12,569	$12,569	$12,569	$12,569	$12,569	$12,569	$12,569	$12,569	$12,569	$12,569	$12,569	$12,569	$12,569	$12,569	$12,569	$12,569	$12,569
Subtotal	$2,647,806	$0	$0	$0	$0	$0	$97,140	$97,140	$97,140	$97,140	$97,140	$97,140	$97,140	$97,140	$97,140	$97,140	$97,140	$97,140	$97,140	$97,140	$97,140	$97,140	$97,140
Water Treatment System Construction	$2,666,019	$2,746,000	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0
Water Treatment System Operation																							
Pipes and pumps [1]	$2,745,667	$0	$88,953	$88,953	$88,953	$88,953	$88,953	$88,953	$88,953	$88,953	$88,953	$88,953	$88,953	$88,953	$88,953	$88,953	$88,953	$88,953	$88,953	$88,953	$88,953	$88,953	$88,953
Plant	$13,426,852	$0	$435,000	$435,000	$435,000	$435,000	$435,000	$435,000	$435,000	$435,000	$435,000	$435,000	$435,000	$435,000	$435,000	$435,000	$435,000	$435,000	$435,000	$435,000	$435,000	$435,000	$435,000
Subtotal	$16,172,519	$0	$523,953	$523,953	$523,953	$523,953	$523,953	$523,953	$523,953	$523,953	$523,953	$523,953	$523,953	$523,953	$523,953	$523,953	$523,953	$523,953	$523,953	$523,953	$523,953	$523,953	$523,953
Environmental Management [2]																							
Full-Time Site Manager	$954,012	0	$0	$0	$0	$0	$35,000	$35,000	$35,000	$35,000	$35,000	$35,000	$35,000	$35,000	$35,000	$35,000	$35,000	$35,000	$35,000	$35,000	$35,000	$35,000	$35,000
Full-Time Assistant Manager	$681,437	0	$0	$0	$0	$0	$25,000	$25,000	$25,000	$25,000	$25,000	$25,000	$25,000	$25,000	$25,000	$25,000	$25,000	$25,000	$25,000	$25,000	$25,000	$25,000	$25,000
Full-Time Technician	$681,437	$0	$0	$0	$0	$0	$25,000	$25,000	$25,000	$25,000	$25,000	$25,000	$25,000	$25,000	$25,000	$25,000	$25,000	$25,000	$25,000	$25,000	$25,000	$25,000	$25,000
Full-Time Vehicles (2)	$218,060	$0	$0	$0	$0	$0	$8,000	$8,000	$8,000	$8,000	$8,000	$8,000	$8,000	$8,000	$8,000	$8,000	$8,000	$8,000	$8,000	$8,000	$8,000	$8,000	$8,000
Part-Time Administration	$190,602	$0	$0	$0	$0	$0	$7,000	$7,000	$7,000	$7,000	$7,000	$7,000	$7,000	$7,000	$7,000	$7,000	$7,000	$7,000	$7,000	$7,000	$7,000	$7,000	$7,000
Part-Time Technicians (2)	$681,437	$0	$0	$0	$0	$0	$25,000	$25,000	$25,000	$25,000	$25,000	$25,000	$25,000	$25,000	$25,000	$25,000	$25,000	$25,000	$25,000	$25,000	$25,000	$25,000	$25,000
Part-Time Tradesmen (4)	$1,362,875	$0	$0	$0	$0	$0	$50,000	$50,000	$50,000	$50,000	$50,000	$50,000	$50,000	$50,000	$50,000	$50,000	$50,000	$50,000	$50,000	$50,000	$50,000	$50,000	$50,000
Part-Time Vehicles (4)	$436,120	$0	$0	$0	$0	$0	$16,000	$16,000	$16,000	$16,000	$16,000	$16,000	$16,000	$16,000	$16,000	$16,000	$16,000	$16,000	$16,000	$16,000	$16,000	$16,000	$16,000
Office	$354,347	$0	$0	$0	$0	$0	$13,000	$13,000	$13,000	$13,000	$13,000	$13,000	$13,000	$13,000	$13,000	$13,000	$13,000	$13,000	$13,000	$13,000	$13,000	$13,000	$13,000
Analytical costs	$2,316,687	$0	$0	$0	$0	$0	$85,000	$85,000	$85,000	$85,000	$85,000	$85,000	$85,000	$85,000	$85,000	$85,000	$85,000	$85,000	$85,000	$85,000	$85,000	$85,000	$85,000
Subtotal	$7,877,416	$0	$0	$0	$0	$0	$269,000	$269,000	$269,000	$269,000	$269,000	$269,000	$269,000	$269,000	$269,000	$269,000	$269,000	$269,000	$269,000	$269,000	$269,000	$269,000	$269,000
Total	$30,693,735	$2,746,000	$523,953	$523,953	$523,953	$523,953	$1,005,151	$1,005,151	$1,005,151	$1,005,151	$1,005,151	$1,005,151	$1,005,151	$1,005,151	$1,005,151	$1,005,151	$941,780	$941,780	$941,780	$941,780	$941,780	$941,780	$941,780

5.3 Minimize Up-Front Construction

		Closure Period			Post-Closure Period																		
	NPV 3%	Year 1 2011	Year 2 2012	Year 3 2013	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030	2031	2032	2033	2034
Earthworks Inspection and Maintenance	$358,117	$0	$0	$0	$24,077	$24,077	$24,077	$24,077	$24,077	$24,077	$24,077	$24,077	$24,077	$24,077	$8,026	$8,026	$8,026	$8,026	$8,026	$8,026	$8,026	$8,026	$8,026
Water Management and Pumping Costs [1]																							
Grum Dump Groundwater Collection System	$1,595,623	$0	$0	$0	$55,005	$55,005	$55,005	$55,005	$55,005	$55,005	$55,005	$55,005	$55,005	$55,005	$55,005	$55,005	$55,005	$55,005	$55,005	$55,005	$55,005	$55,005	$55,005
Vangorda Dump Groundwater Collection System	$857,679	$0	$0	$0	$29,566	$29,566	$29,566	$29,566	$29,566	$29,566	$29,566	$29,566	$29,566	$29,566	$29,566	$29,566	$29,566	$29,566	$29,566	$29,566	$29,566	$29,566	$29,566
Vangorda Pit Groundwater Collection System	$364,606	$0	$0	$0	$12,569	$12,569	$12,569	$12,569	$12,569	$12,569	$12,569	$12,569	$12,569	$12,569	$12,569	$12,569	$12,569	$12,569	$12,569	$12,569	$12,569	$12,569	$12,569
Subtotal	$2,817,909	$0	$0	$0	$97,140	$97,140	$97,140	$97,140	$97,140	$97,140	$97,140	$97,140	$97,140	$97,140	$97,140	$97,140	$97,140	$97,140	$97,140	$97,140	$97,140	$97,140	$97,140
Water Treatment System Construction	$3,666,232	$2,746,000	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0
Water Treatment System Operation																							
Pipes and pumps [1]	$2,745,667	$0	$88,953	$88,953	$88,953	$88,953	$88,953	$88,953	$88,953	$88,953	$88,953	$88,953	$88,953	$88,953	$88,953	$88,953	$88,953	$88,953	$88,953	$88,953	$88,953	$88,953	$88,953
Plant	$14,044,179	$0	$455,000	$455,000	$455,000	$455,000	$455,000	$455,000	$455,000	$455,000	$455,000	$455,000	$455,000	$455,000	$455,000	$455,000	$455,000	$455,000	$455,000	$455,000	$455,000	$455,000	$455,000
Subtotal	$16,789,846	$0	$543,953	$543,953	$543,953	$543,953	$543,953	$543,953	$543,953	$543,953	$543,953	$543,953	$543,953	$543,953	$543,953	$543,953	$543,953	$543,953	$543,953	$543,953	$543,953	$543,953	$543,953
Environmental Management [2]																							
Full-Time Site Manager	$1,015,301	0	$0	$0	$35,000	$35,000	$35,000	$35,000	$35,000	$35,000	$35,000	$35,000	$35,000	$35,000	$35,000	$35,000	$35,000	$35,000	$35,000	$35,000	$35,000	$35,000	$35,000
Full-Time Assistant Manager	$725,215	0	$0	$0	$25,000	$25,000	$25,000	$25,000	$25,000	$25,000	$25,000	$25,000	$25,000	$25,000	$25,000	$25,000	$25,000	$25,000	$25,000	$25,000	$25,000	$25,000	$25,000
Full-Time Technician	$725,215	$0	$0	$0	$25,000	$25,000	$25,000	$25,000	$25,000	$25,000	$25,000	$25,000	$25,000	$25,000	$25,000	$25,000	$25,000	$25,000	$25,000	$25,000	$25,000	$25,000	$25,000
Full-Time Vehicles (2)	$232,069	$0	$0	$0	$8,000	$8,000	$8,000	$8,000	$8,000	$8,000	$8,000	$8,000	$8,000	$8,000	$8,000	$8,000	$8,000	$8,000	$8,000	$8,000	$8,000	$8,000	$8,000
Part-Time Administration	$203,066	$0	$0	$0	$7,000	$7,000	$7,000	$7,000	$7,000	$7,000	$7,000	$7,000	$7,000	$7,000	$7,000	$7,000	$7,000	$7,000	$7,000	$7,000	$7,000	$7,000	$7,000
Part-Time Technicians (2)	$725,215	$0	$0	$0	$25,000	$25,000	$25,000	$25,000	$25,000	$25,000	$25,000	$25,000	$25,000	$25,000	$25,000	$25,000	$25,000	$25,000	$25,000	$25,000	$25,000	$25,000	$25,000
Part-Time Tradesmen (4)	$1,450,429	$0	$0	$0	$50,000	$50,000	$50,000	$50,000	$50,000	$50,000	$50,000	$50,000	$50,000	$50,000	$50,000	$50,000	$50,000	$50,000	$50,000	$50,000	$50,000	$50,000	$50,000
Part-Time Vehicles (4)	$464,137	$0	$0	$0	$16,000	$16,000	$16,000	$16,000	$16,000	$16,000	$16,000	$16,000	$16,000	$16,000	$16,000	$16,000	$16,000	$16,000	$16,000	$16,000	$16,000	$16,000	$16,000
Office	$377,112	$0	$0	$0	$13,000	$13,000	$13,000	$13,000	$13,000	$13,000	$13,000	$13,000	$13,000	$13,000	$13,000	$13,000	$13,000	$13,000	$13,000	$13,000	$13,000	$13,000	$13,000
Analytical costs	$2,465,730	$0	$0	$0	$85,000	$85,000	$85,000	$85,000	$85,000	$85,000	$85,000	$85,000	$85,000	$85,000	$85,000	$85,000	$85,000	$85,000	$85,000	$85,000	$85,000	$85,000	$85,000
Subtotal	$8,383,482	$0	$0	$0	$289,000	$289,000	$289,000	$289,000	$289,000	$289,000	$289,000	$289,000	$289,000	$289,000	$289,000	$289,000	$289,000	$289,000	$289,000	$289,000	$289,000	$289,000	$289,000
Total	$32,215,566	$2,746,000	$543,953	$543,953	$954,171	$954,171	$954,171	$954,171	$954,171	$954,171	$954,171	$954,171	$954,171	$954,171	$938,120	$938,120	$938,120	$938,120	$938,120	$938,120	$938,120	$938,120	$938,120

5.4 Minimize Water Treatment

		Closure Period							Post-Closure Period														
	NPV 3%	Year 1 2011	Year 2 2012	Year 3 2013	Year 4 2014	Year 5 2015	Year 6 2016	Year 7 2017	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030	2031	2032
Earthworks Inspection and Maintenance	$1,294,821	$0	$0	$0	$0	$0	$0	$0	$98,394	$98,394	$98,394	$98,394	$98,394	$98,394	$98,394	$98,394	$98,394	$98,394	$32,798	$32,798	$32,798	$32,798	$32,798
Water Management and Pumping Costs [1]																							
Grum Dump Groundwater Collection System	$2,740,908	$0	$0	$0	$0	$0	$0	$0	$107,038	$107,038	$107,038	$107,038	$107,038	$107,038	$107,038	$107,038	$107,038	$107,038	$107,038	$107,038	$107,038	$107,038	$107,038
Vangorda Pit Groundwater Collection System	$838,869	$0	$0	$0	$0	$0	$0	$0	$32,759	$32,759	$32,759	$32,759	$32,759	$32,759	$32,759	$32,759	$32,759	$32,759	$32,759	$32,759	$32,759	$32,759	$32,759
Subtotal	$3,579,777	$0	$0	$0	$0	$0	$0	$0	$139,797	$139,797	$139,797	$139,797	$139,797	$139,797	$139,797	$139,797	$139,797	$139,797	$139,797	$139,797	$139,797	$139,797	$139,797
Water Treatment System Operation	$6,367,440	$200,000	$200,000	$200,000	$200,000	$200,000	$200,000	$200,000	$200,000	$200,000	$200,000	$200,000	$200,000	$200,000	$200,000	$200,000	$200,000	$200,000	$200,000	$200,000	$200,000	$200,000	$200,000
Environmental Management [2]																							
Full-Time Site Manager	$896,242	0	$0	$0	$0	$0	$0	$0	$35,000	$35,000	$35,000	$35,000	$35,000	$35,000	$35,000	$35,000	$35,000	$35,000	$35,000	$35,000	$35,000	$35,000	$35,000
Full-Time Assistant Manager	$640,173	0	$0	$0	$0	$0	$0	$0	$25,000	$25,000	$25,000	$25,000	$25,000	$25,000	$25,000	$25,000	$25,000	$25,000	$25,000	$25,000	$25,000	$25,000	$25,000
Full-Time Technician	$640,173	$0	$0	$0	$0	$0	$0	$0	$25,000	$25,000	$25,000	$25,000	$25,000	$25,000	$25,000	$25,000	$25,000	$25,000	$25,000	$25,000	$25,000	$25,000	$25,000
Full-Time Vehicles (2)	$204,855	$0	$0	$0	$0	$0	$0	$0	$8,000	$8,000	$8,000	$8,000	$8,000	$8,000	$8,000	$8,000	$8,000	$8,000	$8,000	$8,000	$8,000	$8,000	$8,000
Part-Time Administration	$179,248	$0	$0	$0	$0	$0	$0	$0	$7,000	$7,000	$7,000	$7,000	$7,000	$7,000	$7,000	$7,000	$7,000	$7,000	$7,000	$7,000	$7,000	$7,000	$7,000
Part-Time Technicians (2)	$640,173	$0	$0	$0	$0	$0	$0	$0	$25,000	$25,000	$25,000	$25,000	$25,000	$25,000	$25,000	$25,000	$25,000	$25,000	$25,000	$25,000	$25,000	$25,000	$25,000
Part-Time Tradesmen (4)	$1,280,346	$0	$0	$0	$0	$0	$0	$0	$50,000	$50,000	$50,000	$50,000	$50,000	$50,000	$50,000	$50,000	$50,000	$50,000	$50,000	$50,000	$50,000	$50,000	$50,000
Part-Time Vehicles (4)	$409,711	$0	$0	$0	$0	$0	$0	$0	$16,000	$16,000	$16,000	$16,000	$16,000	$16,000	$16,000	$16,000	$16,000	$16,000	$16,000	$16,000	$16,000	$16,000	$16,000
Office	$332,690	$0	$0	$0	$0	$0	$0	$0	$13,000	$13,000	$13,000	$13,000	$13,000	$13,000	$13,000	$13,000	$13,000	$13,000	$13,000	$13,000	$13,000	$13,000	$13,000
Analytical costs	$2,176,588	$0	$0	$0	$0	$0	$0	$0	$85,000	$85,000	$85,000	$85,000	$85,000	$85,000	$85,000	$85,000	$85,000	$85,000	$85,000	$85,000	$85,000	$85,000	$85,000
Subtotal	$7,409,399	$0	$0	$0	$0	$0	$0	$0	$289,000	$289,000	$289,000	$289,000	$289,000	$289,000	$289,000	$289,000	$289,000	$289,000	$289,000	$289,000	$289,000	$289,000	$289,000
Total	$18,842,437	$200,000	$200,000	$200,000	$200,000	$200,000	$200,000	$200,000	$727,191	$727,191	$727,191	$727,191	$727,191	$727,191	$727,191	$727,191	$727,191	$727,191	$661,595	$661,595	$661,595	$661,595	$661,595