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Technical Memorandum

To:	<u>Kathy Arnold</u>	From:	<u>Amy L. Hudson, REM</u>
Company:	<u>Rosemont Copper Company</u>	Date:	<u>October 26, 2010</u>
Re:	<u>Rosemont Geochemical Sample Selection</u>	Doc #:	<u>257/10-320884-5.3</u>
CC:	<u>David Krizek, P.E. (Tetra Tech); Mark Williamson (Tetra Tech)</u>		

1.0 Introduction

Review comments from SRK Consulting (SRK, 2010) regarding the February 2010 *Geochemical Pit Lake Predictive Model* report (Tetra Tech, 2010) have indicated that the samples selected for geochemical characterization, which are related to waste rock in general and also to the pit highwalls for pit lake modeling, are concentrated in the center of the Rosemont deposit. The following response intends to provide additional detail and clarity regarding the approach to sampling and the spatial distribution of the waste rock and pit wall rock samples.

2.0 General Deposit Type

Based on the information derived during the characterization phase of the proposed Rosemont Copper Project (Project), including general geology (lithology, mineralization, and alteration styles), few rock types associated with the Project have the potential to generate acid rock drainage (ARD). Exceptions include localized non-calcareous portions of the arkose and andesite units of the Cretaceous Bisbee Group, higher sulfide portions of the porphyry, and rare lenses of massive sulfide skarn alteration. This low potential to generate ARD conditions is based on the characteristics of the Rosemont deposit. These characteristics include the following three (3) features which makes the Rosemont deposit different than many of the other Arizona copper deposits:

1. The Rosemont deposit is a skarn and is strongly alkaline;
2. The deposit is a low sulfur system dominated by copper-sulfides and pyrite is relatively scarce; and
3. Most of the porphyry system, including the pyrite shell, is absent due to structural controls.

3.0 Sampling Program

Rocks removed from the Open Pit will fall into three (3) categories depending on their copper grade and leachability: mill grade ore (>0.2 % sulfide copper), leach grade ore (other material, mostly Bisbee Group and quartz monzonite porphyry with 0.1 to 0.2 % copper), and waste rock. The goal of the geochemical characterization program was to assess the potential for environmental risks associated with the waste rock, leached ore, tailings, and the anticipated



rock types exposed on the walls of the final pit shell. The samples discussed herein, however, are either waste grade material or rock types associated with the final pit walls.

Approximately 250 samples were collected and analyzed via static testing methods in order to characterize the waste rock and rock types remaining in the final pit walls. The characterization program was initiated in 2006 and was conducted in multiple stages based on the availability of core samples.

In the first stage, approximately one-third of the samples thought necessary to characterize the waste rock were selected from drilling coarse rejects based on Augusta Resource Corporation (Augusta) exploration drilling program. The Augusta drilling program boreholes were generally located within the central area of the pit. Therefore, the area of the pit shell could only be intersected at depth. To supplement the Augusta core, additional stages of sampling were conducted using historic core that was re-logged and re-assayed by Augusta. Augusta is the parent company of Rosemont Copper.

The materials collected and submitted as the environmental geochemistry samples were 50-foot composites taken from selected core intervals. The selected core intervals represented a specific rock type and a portion of the formation. The intervals selected for geochemical testing were determined using the assay database provided by Augusta and the grade classifications described above. As presented in the 2006 Technical Memorandum titled *Preliminary Trip Report and Phase I Sampling & Analysis Plan* (Vector, 2006), the approximate number of target tests for characterizing the waste rock is shown in Table 1. Individual sample intervals were selected for testing based on the assay database queries and reviewing cross sections provided by Augusta. This was done to ensure complete coverage of the steeply dipping formations. In addition, information provided from the mine plan block model was used to verify the selections as waste and their position within the final pit layout.

Table 1: Original Number of Target Waste Rock Samples (Vector, 2006)

Abundance of Rock Type	Static tests (Sobek ABA, paste pH and NAG pH)	Whole rock multi-element chemistry	Element Mobility (EPA 1312)
Waste Rock Characterization			
> 35 % of total tonnage	70	35	10
10 to 35 % of tonnage	40	20	8
< 10 % of tonnage	20	10	5
Final Highwall Characterization			
> 35 % of total area	30	15	10
10 to 35 % of area	20	10	8
< 10 % of area	15	8	5

The original plan intended to complete a separate characterization and sample collection program for the pit highwall. However, it was determined that insufficient material would be



available to justify a separate program. Therefore, the highwall characterization was combined with the waste rock characterization sampling after the initial phase of collection.

The next phase of sampling, which started in the fall of 2006, involved Augusta's contract mine planner, Mr. Bill Rose, to ensure that the samples collected were in contact or within ± 50 feet of the base of pit and/or the ultimate pit walls. These samples were selected to characterize the effect that surface runoff from the highwall and groundwater inflow through the weathered highwall would have on the water quality of the anticipated pit lake.

As with the previous phase of sampling, the samples were originally identified through the assay database and the established grade classification system. In addition to the use of the assay database, the selected sample intervals were compared to the mine plan block model. This was a secondary check to ensure that the selected sample intervals were located within the proper locations prior to sample collection and analysis.

A great deal of care was taken to ensure that a good three-dimensional distribution was achieved during the waste rock and pit highwall characterization program. Figures 2, 3, and 4 provided in Attachment 1, originally taken from the report titled *Geochemical Characterization, Addendum I* (Tetra Tech, 2007) and updated as revision 1, present the sample locations and distribution of the samples taken prior to October 2007, as well as the approximately 60 samples collect after October 2007.

Figure 2 presents the borehole locations relative to the geologic map of the area. This presentation of the data was to provide an assessment of the sample distribution as compared to the geologic formations present at the surface. Figure 3 presents the sample locations relative to the final pit extents. In addition, information is provided regarding the sample depth interval and the rock type represented by the sample interval. This figure provides a snapshot of the sample distribution across the pit, and with depth. Finally, Figure 4 presents the sample locations along with the distribution of potentially acid generating (PAG), nonacid generating, and moderate/uncertain acid generating materials.



References

SRK Consulting, Ugorets V. and Day, S. (SRK, 2010). *Technical Review of (Tetra Tech, 2010) Geochemical Pit Lake Predictive Model, Rosemont Copper Project*. Technical Memorandum to Dale Ortman (SWCA). Technical Memorandum Dated May 3, 2010.

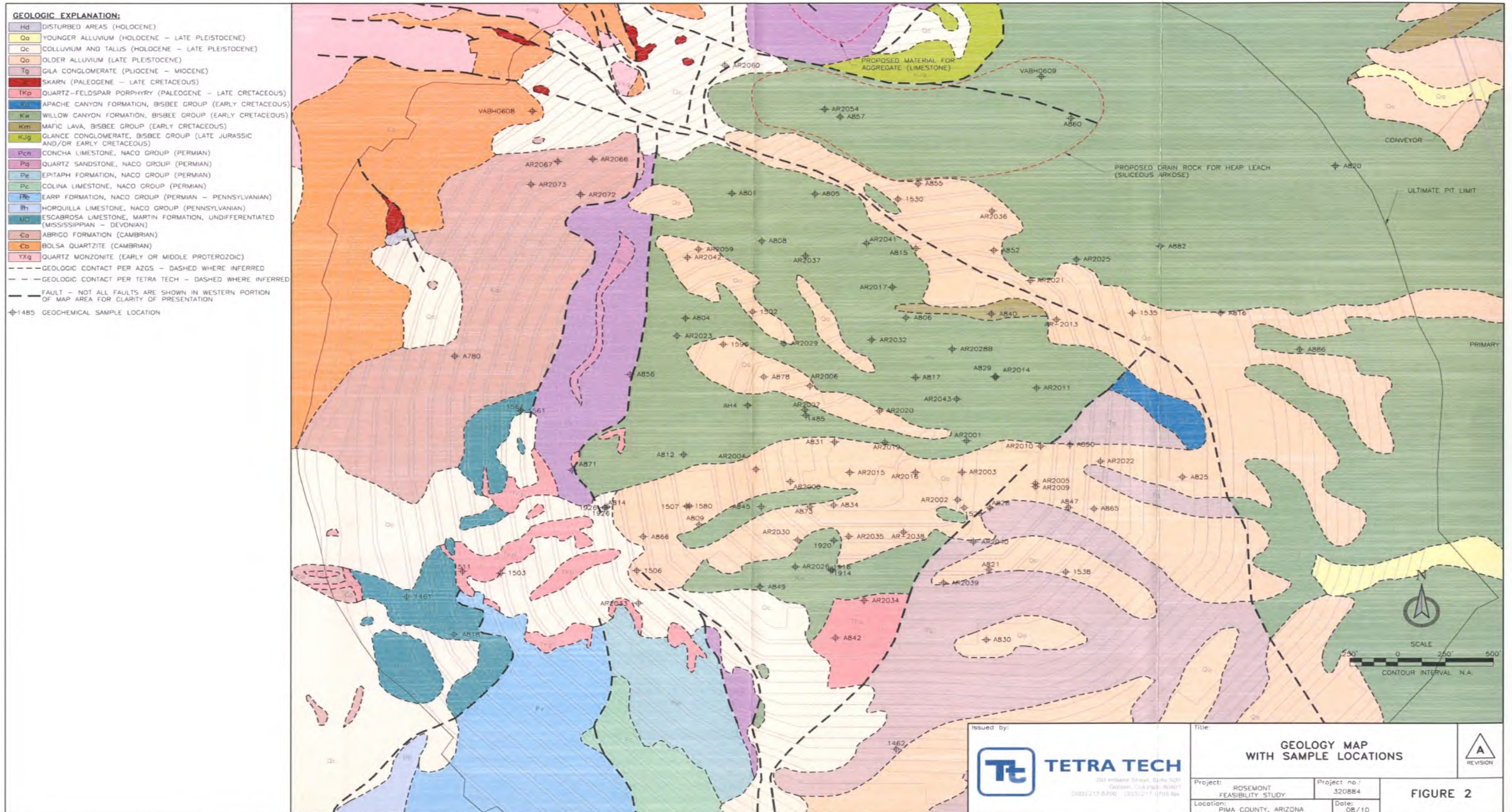
Tetra Tech (2007). *Geochemical Characterization, Addendum 1*. Prepared for Rosemont Copper Company. Report Dated October 2007.

Tetra Tech (2010). *Geochemical Pit Lake Predictive Model*. Prepared for Rosemont Copper Company. Report Dated February 2010.

Vector Arizona, Arnold, K. (2006) *Preliminary Trip Report and Phase I Sampling & Analysis Plan*. Technical Memorandum to Jamie Sturgess and Mike Pawlowski (Augusta Resources). Technical Memorandum Dated July 26, 2006.

ATTACHMENT 1

Attachment 1 – Rosemont Geochemical Sample Selection
 Updated Figures From Geochemical Characterization, Addendum 1 Report
 Page 1 of 3




- GEOLOGIC EXPLANATION:**
- Hd DISTURBED AREAS (HOLOCENE)
 - Qa YOUNGER ALLUVIUM (HOLOCENE – LATE PLEISTOCENE)
 - Qc COLLUVIUM AND TALUS (HOLOCENE – LATE PLEISTOCENE)
 - Qo OLDER ALLUVIUM (LATE PLEISTOCENE)
 - Tg GILA CONGLOMERATE (PLIOCENE – MIOCENE)
 - Sk SKARN (PALEOGENE – LATE CRETACEOUS)
 - TKp QUARTZ-FELDSPAR PORPHYRY (PALEOGENE – LATE CRETACEOUS)
 - Kc APACHE CANYON FORMATION, BISBEE GROUP (EARLY CRETACEOUS)
 - Kw WILLOW CANYON FORMATION, BISBEE GROUP (EARLY CRETACEOUS)
 - Km MAFIC LAVA, BISBEE GROUP (EARLY CRETACEOUS)
 - KJg GLANCE CONGLOMERATE, BISBEE GROUP (LATE JURASSIC AND/OR EARLY CRETACEOUS)
 - Pch CONCHA LIMESTONE, NACO GROUP (PERMIAN)
 - Pq QUARTZ SANDSTONE, NACO GROUP (PERMIAN)
 - Pe EPITAPH FORMATION, NACO GROUP (PERMIAN)
 - Pc COLINA LIMESTONE, NACO GROUP (PERMIAN)
 - Prp EARP FORMATION, NACO GROUP (PERMIAN – PENNSYLVANIAN)
 - Rh HOROQUILLA LIMESTONE, NACO GROUP (PENNSYLVANIAN)
 - U ESCABROSA LIMESTONE, MARTIN FORMATION, UNDIFFERENTIATED (MISSISSIPPIAN – DEVONIAN)
 - Ca ABRIGO FORMATION (CAMBRIAN)
 - Cb BOLSA QUARTZITE (CAMBRIAN)
 - YXq QUARTZ MONZONITE (EARLY OR MIDDLE PROTEROZOIC)
 - - - GEOLOGIC CONTACT PER AZGS – DASHED WHERE INFERRED
 - - - GEOLOGIC CONTACT PER TETRA TECH – DASHED WHERE INFERRED
 - - - FAULT – NOT ALL FAULTS ARE SHOWN IN WESTERN PORTION OF MAP AREA FOR CLARITY OF PRESENTATION
 - ◆1485 GEOCHEMICAL SAMPLE LOCATION

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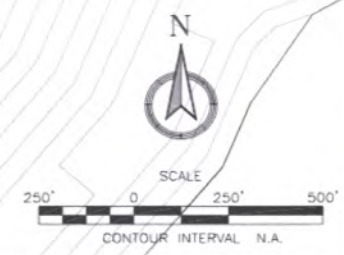
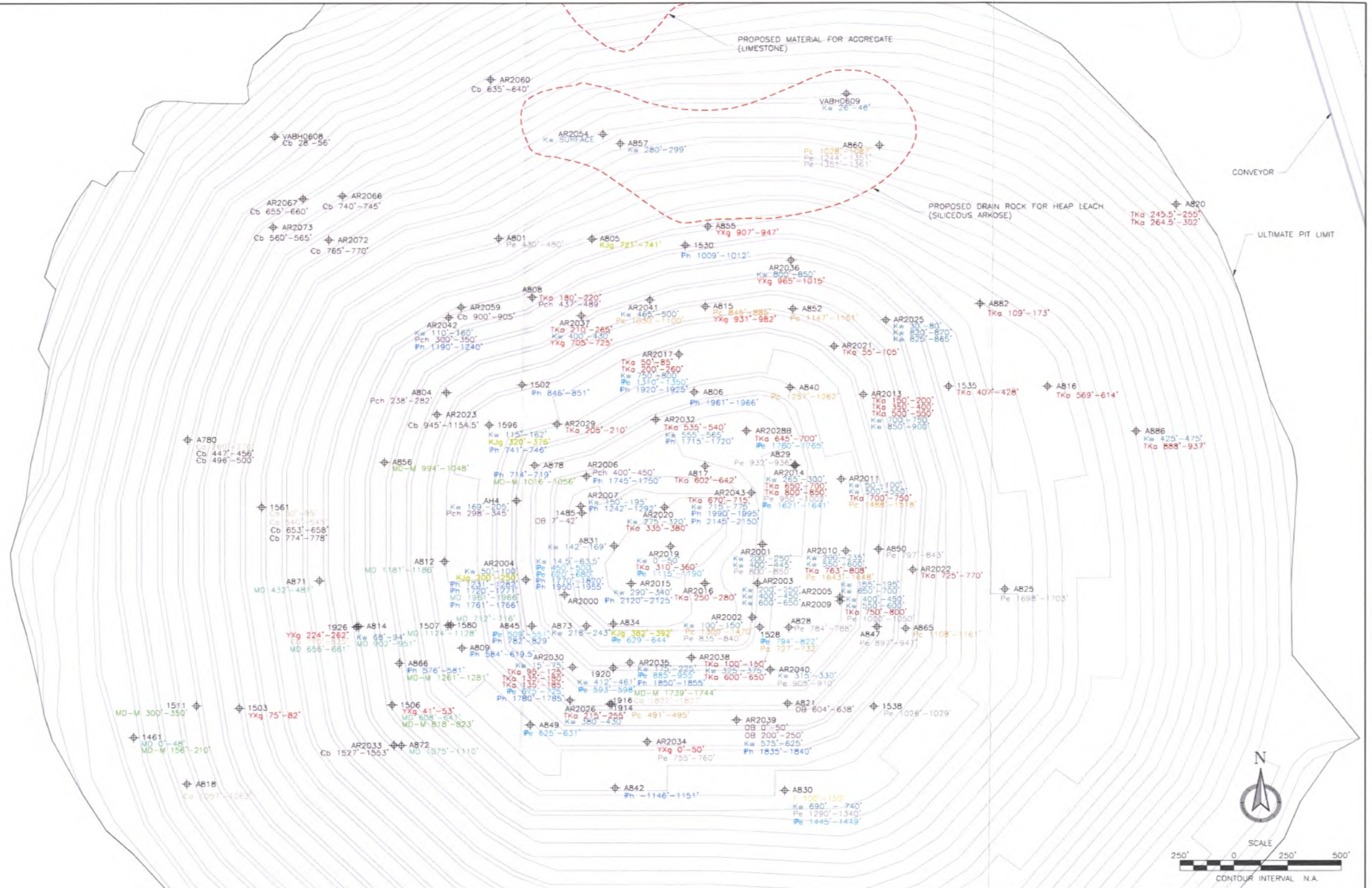
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<p>GEOLOGY MAP WITH SAMPLE LOCATIONS</p>		 REVISION
Project: ROSEMONT FEASIBILITY STUDY	Project no.: 320884	<p>FIGURE 2</p>
Location: PIMA COUNTY, ARIZONA	Date: 08/10	

Attachment 1 – Rosemont Geochemical Sample Selection
 Updated Figures From Geochemical Characterization, Addendum 1 Report
 Page 2 of 3

LEGEND:

- OB XX-XX OVERBURDEN
- Tka XX-XX ANDESITE
- Kw XX-XX ARKOSE
- Ykg XX-XX GLANCE
- Pch XX-XX CONCHA
- Pa XX-XX SCHERRER
- Pe XX-XX EPITAPH
- Pc XX-XX COLINA
- Ph XX-XX HORQUILLA
- MD XX-XX ESCABROSA
- MD-M XX-XX MARTIN
- Co XX-XX ABRIGO
- Cb XX-XX BOLSA
- Ykq XX-XX QUARTZ MONZONITE PORPHYRY - OMP
- XX-XX TERTIARY GRAVEL

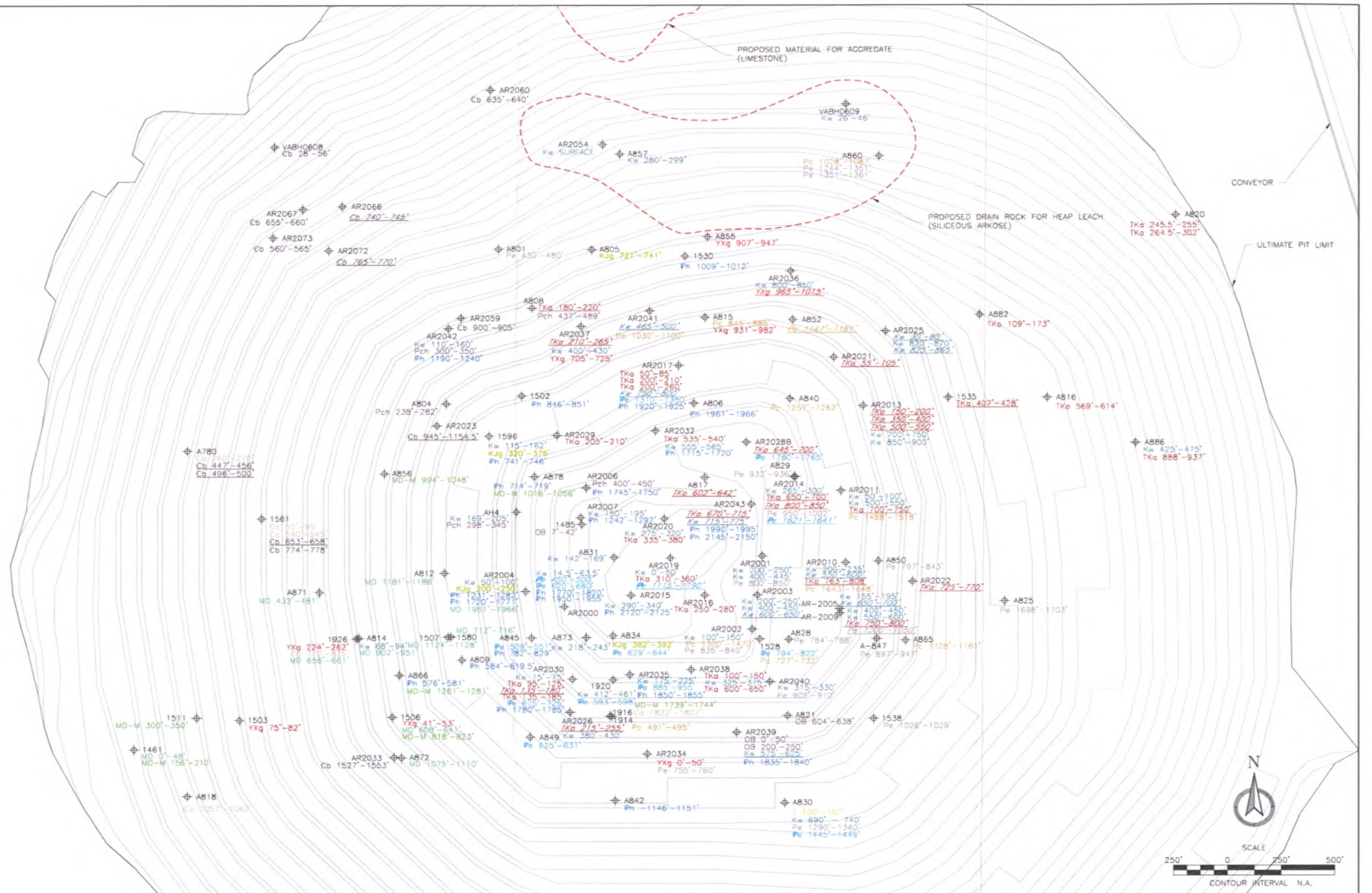


Issued by:		Title:	
TETRA TECH <small>350 Indiana Street, Suite 500 Golden, Colorado 80401 (303) 217-5700 (303) 217-5705 fax</small>		SAMPLE LOCATIONS AND ROCK TYPES WITH DEPTH	
Project:	ROSEMONT FEASIBILITY STUDY	Project no.:	320884
Location:	PIMA COUNTY, ARIZONA	Date:	08/10
FIGURE 3			 REVISION

Attachment 1 – Rosemont Geochemical Sample Selection
Updated Figures From Geochemical Characterization, Addendum 1 Report
 Page 3 of 3

LEGEND:

- OB XX-XX OVERBURDEN
- Tka XX-XX ANDESITE
- Kw XX-XX ARKOSE
- KJg XX-XX GLANCE
- Pch XX-XX CONCHA
- Pa XX-XX SCHERRER
- Pe XX-XX EPITAPH
- Ph XX-XX COLINA
- Pa XX-XX EARP
- Ph XX-XX HORQUILLA
- MD XX-XX ESCABROSA
- MD-M XX-XX MARTIN
- Cg XX-XX ABRICO
- Cb XX-XX BOLSA
- Ykq XX-XX QUARTZ MONZONITE PORPHYRY – QMP
- Ykq XX-XX TERTIARY GRAVEL
- Tka XX-XX POTENTIALLY ACID GENERATING (PAG)
- Ykq XX-XX UNCERTAIN/MODERATE ACID GENERATION



Issued by: TETRA TECH <small>350 Indiana Street, Suite 500 Golden, Colorado 80401 (303) 217-5700 (303) 217-5765 fax</small>		Title: SAMPLE LOCATIONS AND ROCK TYPES WITH DEPTH		 REVISION
Project: ROSEMONT FEASIBILITY STUDY		Project no.: 320884		FIGURE 4
Location: PIMA COUNTY, ARIZONA		Date: 08/10		