FREEPORT-MCMORAN
COPPER & GOLD

Chino Mines Company
Box 10
Bayard, NM 88023

June 3, 2014

Certified Mail #70123050000053966476
Return Receipt Requested

Ms. Erika Schwender, Director
New Mexico Environment Department
Resource Protection Division
P.O. Box 5469
Santa Fe, New Mexico 87502

Dear Ms. Schwender:

Re: Groundhog No. 5 Stockpile Workplan
Hanover and Whitewater Creeks Investigation Unit- Chino AOC

Freeport-McMoRan Chino Mines Company (Chino) submits under separate cover the *Groundhog No. 5 Stockpile Interim Remedial Action Workplan for Additional Characterization and Controls* for the Hanover and Whitewater Creeks Investigation Unit under the Chino Administrative Order on Consent (AOC). This submittal is a revised workplan in response to New Mexico Environment Department (NMED) comments received in a letter dated May 15, 2014 on the draft workplan submitted April 28, 2014. The revised workplan and Chino's response document to NMED comments was submitted via email today to Mr. Matt Schultz.

Please contact Mr. Ned Hall at (520) 393-2292 if you have any questions regarding this workplan.

Sincerely,

Sherry Burt-Kested

Sherry Burt-Kested, Manager
Environmental Services

SBK:pp

c: Matt Schultz, NMED (via email)
Joseph Fox, NMED (via email)
Petra Sanchez, EPA (via email)
Chris Eustice, NM Mines and Mineral Department (via email)
Ned Hall, FCX (via email)
Tom Shelley, FCX (via email)

20140603-001

Response to New Mexico Environment Department Comments on the Draft Groundhog No. 5 Stockpile Work Plan for Additional Characterization and Controls, Hanover/Whitewater Creek Investigation Unit

June 3, 2014

This document presents Freeport-McMoRan Chino Mines Company's (Chino) response to comments received from the New Mexico Environment Department (NMED) on the *Draft Groundhog No. 5 Stockpile Work Plan* in a letter dated May 15, 2014. The draft work plan under the Hanover/Whitewater Creek Investigation Unit (HWCIU) was developed in accordance with the Administrative Order on Consent (AOC) between Chino and the NMED dated December 23, 1994. Chino's responses are in **bold** text following NMED comments received May 20, 2014.

1. The second paragraph in Section 2.0 includes a detailed description of the stockpile material and Hernon, R., et al (1964) are cited as the source of the information. The citation refers to a document titled *Geology of the Santa Rita Quadrangle*. Please clarify how a regional geologic quadrangle map would include detailed descriptions of stockpile material.

   Chino Response: ***Hernon, R., et al (1964) was cited because the document includes a cross section that includes the Groundhog No. 5 shaft, showing the units intersected by the shaft excavation. However, the reference has been replaced in the text with the most recent investigation report (Golder 2009) as it has the most detailed descriptions of the waste rock material based on test pit logging.***

2. The second paragraph on Page 3 refers to a supplemental investigation conducted by Golder in 2006, and indicates that the results of this supplemental investigation confirmed the results of the 2005 site investigation report by Golder that the stockpile materials near the surface are not acid generating and the stockpile materials are not a significant source of leachable metals. A 2009 report by Golder titled *Administrative Order on Consent Site Investigation Report Addendum Groundhog No. 5 Stockpile Hanover and Whitewater Creeks Investigation Unit* concludes that stockpile materials near the re-graded surface are not acid generating and the stockpile materials are not a significant source of leachable metals. Based on this information, it is unclear to NMED if only the stockpile materials near the surface are not acid generating, or are these statements meant to imply that the entire stockpile is not acid generating. Additionally, it is not clear to NMED what is meant by the stockpile material not being a significant source of leachable metals. Please clarify.

   Chino Response: ***The investigation performed 2004 and reported in the 2005 site investigation report by Golder included characterization of all material types in the***

stockpile from the surface and at depth. None of the materials within the stockpile were found to be acid generating or to leach metals in concentrations above groundwater or surface water standards based on acid base accounting and synthetic precipitation leachate procedure results. The supplemental investigation conducted in 2006 and reported in the 2009 report was performed at the request of NMED to confirm that materials sampled at depth prior to regrading of the stockpile in 2006, and now exposed at the surface, are not acid generating and do not leach metals above water quality standards.

3. Figure 3 is a diagrammatic cross section through the stockpile showing a conceptual model for water inflows and outflows for the area of Groundhog No.5. The cross section uses blue arrows to show that precipitation falling on the stockpile infiltrates to the base of the stockpile and flows along the top of the underlying colluvium where it exits at the toe of the stockpile. However, the third paragraph of Section 3.0 indicates that infiltration into the stockpile that reaches a depth below the influence of evaporation will migrate downward to the colluvium and either flow along the top of the colluvium, along the colluvium-bedrock contact, or downward into the regional groundwater in the bedrock. Please clarify why the diagrammatic cross section shows water that infiltrates into the stockpile flows along the stockpile-colluvium contact, but the text indicates this is likely not the case. Additionally, please discuss the possibility that the reason monitoring well GH-97-04 often contains very little or no water is because water that infiltrates into the stockpile may be migrating downward through the colluvium into the regional water table.

   <u>Chino Response:</u> ***Figure 3 has been revised to include the possible flow paths of infiltrating precipitation along the top of the bedrock contact and downward into the groundwater. Based on observations made during the May 2014 trench excavation, well GH-97-04 may not be excavated deep enough to intersect unweathered bedrock. The trench was excavated several feet downhill from the well, but the bedrock depth appears to indicate that the well screen is still more than 3 to 4 feet above competent bedrock. The bedrock surface was observed to be weathered and stained in only the upper two to three inches, and hard and unweathered beneath, indicating flow does occur along the bedrock contact. The hydraulic conductivity of the volcanic bedrock of the North Mine Area is known to be the lowest of any of the major bedrock units in this area (Golder, 2007). The geometric mean the hydraulic conductivity of the Sugarlump Tuff, which underlies the stockpile is 8.2E-4 feet per day (ft/d) (2.9E-7 centimeters per second) (Golder, 2007). Based on this information, it is not likely that significant seepage is occurring into the regional groundwater.***

4. The third paragraph in Section 3.0 indicates that up-gradient surface water has been diverted around the stockpile in diversion ditches constructed during re-grading of the stockpile in 2006, and the only known inflow of water to the stockpile is incident

precipitation. Figure 2 shows that the diversion ditches are immediately adjacent to the stockpile and Figure 3 indicates that the diversion ditches were excavated into colluvium, with stockpile material exposed on the inner wall of the diversion ditches. In addition to the Work Plan indicating water may be infiltrating through the stockpile and colluvium to regional groundwater in the bedrock (see Comment 3 above), descriptions of material encountered in the test pit logs from previous reports indicate the stockpile and colluvium are likely highly permeable. As such, it is NMED's opinion that water from the diversion ditches is likely infiltrating into the stockpile, contrary to Section 3.0 indicating the only known inflow of water to the stockpile is incident precipitation. Please discuss.

Chino Response: ***Figure 3 and the text have been revised to show a possible flow path from the upgradient diversion ditch into the colluvium. The ditches are sloped to drain upgradient runoff and divert it away from the stockpile. The residence time of water in the ditch is therefore limited to short periods of time during storm events that generate runoff. Therefore this flow into the stockpile is expected to be negligible. Additionally, as illustrated in the revised Figure 2, run-on diversions channeled in bedrock on the top flatter area of the stockpile now route most of the runoff stormwater away from the stockpile. This rerouting of the upgradient 2006 stormwater controls occurred earlier this year due to erosion of the original drainage system from high precipitation events in 2013. Drainage on the upper portion of the stockpile, which the draft workplan proposed to field fit as discussed below in NMED comment #5, is also routed to those rock channels.***

5. Section 4.0 of the Work Plan indicates that additional surface water drainage channels are in the process of being constructed at the top of the stockpile where the surface gradient is shallow to shed incident precipitation more quickly during rainfall events, and the channels will be *field fit.* The Work Plan does not indicate that the top surface will be re- graded to direct surface flows to the channels. It is not clear to NMED how the channels will collect water from the top surface if the top surface is not regarded to direct runoff to the channels. Please discuss. Additionally, if the channels are going to be *field fit,* please indicate at what gradient the channels will be constructed and discuss what measures will be taken to insure that the gradient of the channels will be adequate to minimize infiltration of water into the stockpile. It has been NMED's experience that top surface channels can be a significant source of infiltration.

   Chino Response: ***The channels have been constructed to drain runoff from the top of the stockpile to the existing diversion channels. The channel configurations are shown on the revised Figure 2. The channels are sloped at approximately 11%.***

6. Section 5.0 indicates that once samples are collected from the proposed seepage collection trench, a geochemical model will be developed to evaluate the relationship of the stockpile on the final water quality at the toe of the stockpile, using a simple mass balance and mass loading model, and estimates of infiltration through the stockpile will be made based on the quantity of water reporting to the seepage collection trench. It is not clear to NMED how the results of the model will be applied and what variables will be introduced into the model, such as the likely possibility that water from the diversion ditches infiltrates into the stockpile and colluvium, and water in the stockpile may infiltrate through the stockpile into the underlying regional groundwater. Please discuss these issues and provide additional information regarding the model and how it will be applied to the Groundhog No.5 stockpile.

   Chino Response: ***The geochemical model will be used to evaluate whether the water quality in the trench can be attributed to the stockpile material. The model will also potentially be used to predict the mass loading rate attributable to the stockpile for various rainfall events. Based on the observation of the depth and condition of the bedrock surface in the recently excavated trench, the majority of any incident precipitation and infiltration from the upgradient portion of the diversion ditches is expected to flow along the bedrock contact into the seepage collection trench. The hydraulic conductivity of the unweathered bedrock surface is much lower than the colluvium or the stockpile material, and the bedrock surface was stained and weathered in the upper 2 to 3 inches, indicating the flow of water over time. The loss of water flowing along the bedrock to groundwater via fractures is expected to be negligible. Therefore, the most accurate method of estimating the flow of seepage from the stockpile is to measure the actual amount of water that accumulates in the trench following various rainfall events. Estimates of evaporation from the stockpile, infiltration into the stockpile, and runoff from the stockpile can also be used to estimate mass flow rate, but with a higher level of uncertainty. These methods will be used as well, and compared to actual seepage measurements, and further discussed with NMED when the data become available.***

7. Figure 2 (topographic map) does not include a scale. Any maps or aerial photos submitted to NMED should have appropriate scales included with them.

   Chino Response: ***Figure 2 has been revised to include a scale.***

8. Figure 4 is an aerial photograph showing the location of the proposed collection trench. Based on the photo, it is not clear to NMED if the proposed collection trench will extend across the entire toe of the stockpile, including the west end of the stockpile. Please indicate if the proposed seepage collection trench will extend across the entire toe of the stockpile, and if not, the reason why it will not.

Chino Response: ***The as-built drawing has been included in Figure 4. The draft work plan proposed to extend the trench along most of the toe of the stockpile but as documented in the revised workplan, the trench was field fitted to the actual geomorphology of the bedrock contact that was amenable to the proposed engineering design for the trench.***

REPORT

GROUNDHOG NO. 5 STOCKPILE

Interim Remedial Action Work Plan for Additional Characterization and Controls

Hanover and Whitewater Creek Investigation Units

Submitted To: Freeport-McMoRan Chino Mines Company
PO Box 10
Bayard, New Mexico 88023 USA

Submitted By: Golder Associates Inc.
301 W. College Avenue, Suite 8
Silver City, NM 88061 USA

June 3, 2014 **140-3873**

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1.0 INTRODUCTION

This work plan for additional characterization and controls for the Groundhog No. 5 Stockpile was prepared by Golder Associates Inc. (Golder) for Freeport-McMoRan Chino Mines Company (Chino) to comply with a request by the New Mexico Environment Department (NMED) in a letter dated March 12, 2014. This request by NMED followed discussions with Chino representatives about water quality samples collected in 2013 from the shallow well at the toe of the stockpile (GH-97-04) which exceeded the New Mexico Water Quality Control Commission groundwater quality standards for sulfate and total dissolved solids (TDS). The NMED requested a Work Plan to include additional characterization, monitoring, and mitigation of potential impacts to groundwater associated with the stockpile.

This Work Plan is organized into the following six sections as follows:

- Section 1 – Introduction - provides the context and organization of this Work Plan.
- Section 2 – Site Description - summarizes the history and physical setting of the stockpile.
- Section 3 – Conceptual Hydrogeologic Model – describes the groundwater and surface water flow paths based on the current understanding of the stockpile area.
- Section 4 – Surface Water and Seepage Collection Upgrades – presents the additional controls that will be constructed to reduce infiltration into the stockpile and collect representative samples of seepage from the toe of the stockpile.
- Section 5 – Additional Proposed Characterization – describes additional data collection and geochemical modeling proposed to determine the source and nature of the seepage collected at the toe of the stockpile.
- Section 6 – References – includes references cited in the text.

2.0 SITE DESCRIPTION

The Groundhog No. 5 Stockpile is a small waste rock stockpile (footprint of less than 2 acres) associated with the Groundhog No. 5 Shaft located on the north wall of Lucky Bill Canyon near its confluence with Bayard Canyon (Figure 1). The primary ores extracted from the Groundhog No. 5 Shaft consist of lead and zinc sulfides occurring in mineralized veins below the Sugarlump and Kneeling Nun Tuff Formations that are exposed along the surface in the canyon. The tuffs overlie Cretaceous-Tertiary sediments (the Colorado Formation), which in turn overlie a series of Paleozoic limestones and shales. Stockpile material types at the site include limestone, granodiorite, diorite, quartz monzonite, and tuff (Golder 2009). Iron staining is minimal and restricted to small, isolated locations in the stockpile associated with finer-grained, mineralized material. The stockpile was regraded in 2006. The current stockpile configuration is shown on Figure 2.

The previous site configuration and details of the November 10, 2004 site investigation were presented in the Site Investigation Report (Golder, 2005). The previous investigation included three test pits in the stockpile prior to regrading. The purpose of the 2004 site test pit investigation was to estimate the lateral and vertical extent of the stockpile material and to characterize the chemical nature of the material with respect to expected environmental behavior and suitability of the stockpile material for vegetation substrate.

Results of the 2004 investigation demonstrated that the stockpile material is non-acid generating, with minor amounts of mineralized materials present. Prior to regrading, the upper layer of the stockpile was composed primarily of angular limestone gravel with minor sulfide mineralization and iron staining. The limestone was generally underlain by unmineralized granodiorite and quart monzonite stockpile material and the pre-mining surface (tuff bedrock and colluvium). The acid-base-accounting (ABA) results showed that the stockpile materials are not acid generating. The synthetic precipitation leaching procedure (SPLP) leach test results did not yield leachate constituent concentrations (metals or other constituents) above New Mexico surface water or groundwater standards, with the exception of one exceedance of TDS. The TDS exceedance was likely due to laboratory analytical error, as the TDS value could not be reproduced by summing all of the dissolved ions (Golder, 2004).

No saturated zones were observed in test pits, and no seeps were identified during the 2004 investigation. A shallow seepage collection well (GH-97-04) is located at the toe of the stockpile. This well was installed under the Administrative Order on Consent (AOC) in 1997 to collect samples of shallow groundwater (Daniel B. Stephens and Associates, Inc [DBS&A], 1997). The well was installed using a backhoe to excavate to bedrock and installing horizontal perforated pipe attached to a riser pipe. The DBS&A report includes the following description of the materials encountered during installation of GH-97-04:

“Overbank alluvium of well-graded poorly sorted fine sands to angular subangular boulders, less than 1 ft in size, slightly moist, no evidence of subsurface water flow, no staining or alteration”

A supplemental investigation test pit investigation was conducted in 2006 after the stockpile was regarded to a 3 Horizontal to 1 Vertical slope. The regrading had the effect of mixing and thinning the stockpile materials and increasing the footprint area of the stockpile. The results of this supplemental investigation confirmed the conclusions and recommendations of the Site Investigation Report (Golder, 2005). Based on ABA results, the stockpile materials near the regraded surface are not acid generating and exhibit a high neutralization capacity. SPLP leachate concentrations did not exceed any WQCC groundwater or surface water standards, and therefore the stockpile materials are not a significant source of leachable metals.

GH-97-04 often contains no water, or not enough water to purge the well prior to sampling. However, in 2013, after a typical monsoon season, the well contained enough water to purge and collect a sample. The sample indicated exceedances for New Mexico Water Quality Control Commission groundwater quality standards for sulfate and TDS.

3.0 HYDROGEOLOGIC CONCEPTUAL MODEL

The Groundhog No. 5 Stockpile is a coarse textured waste rock pile. Based on test pits excavated after the stockpile was regarded, the materials on the top of the stockpile are generally finer in texture (oversize fraction less than 10 percent in Test Pits GH5-4 and GH5-5) and predominantly angular limestone gravel. The fraction of oversize material and the amount of quartz monzonite gravel is greater on the regraded slope than on the top of the stockpile. Some finer soils have formed or been deposited by wind on the stockpile surface.

Figure 3 shows a conceptual model for water inflows and outflows for the area of the Groundhog No. 5 Stockpile. The stockpile is underlain by colluvium on the hillside, which is underlain by bedrock (Sugarlump Tuff). Groundwater is expected to be several feet below the colluvium in the bedrock based on site wide groundwater studies (Golder, 2008). Water was not observed in the colluvium during test pit excavation, and there are no springs daylighting on the hillsides adjacent to the stockpile. Therefore, upwelling of groundwater into the stockpile is unlikely. The degree to which groundwater may flow into the colluvium when groundwater levels are high is uncertain. However, this may occur near the stockpile toe, and where depth to groundwater is shallow.

Upgradient surface water has been diverted around the stockpile in diversion ditches constructed during regrading of the stockpile in 2006. While negligible amounts of water may enter the colluvium at the upgradient portion of the drainage ditch during rainfall events that generate runoff, the majority of water inflow to the stockpile is due to incident precipitation. Precipitation onto the stockpile surface will either evaporate (evapotranspiration), infiltrate into the stockpile, or run off the stockpile surface. Infiltration into the stockpile that reaches a depth below the influence of evaporation will migrate downward to the colluvium, and either flow along the top of the colluvium or along the colluvium/bedrock contact toward the stockpile toe, or downward into the regional groundwater. The two test pit investigations were performed during winter months when there had been no recent rainfall, and the colluvium, underlying the stockpile material was fairly dry. No water was present in the well at the stockpile toe during these investigations.

Based on observations made during the May 2014 seepage collection trench excavation, well GH-97-04 may not be excavated deep enough to intersect unweathered bedrock. The trench was excavated several feet downhill from the well, but the bedrock depth appears to indicate that the well screen is still more than 3 to 4 feet above competent bedrock. The bedrock surface was observed to be weathered and stained in only the upper two to three inches, and hard and unweathered beneath, indicating flow does occur along the bedrock contact. The hydraulic conductivity of the volcanic bedrock of the North Mine Area is known to be the lowest of any of the major bedrock units in this area (Golder, 2007). The geometric mean the hydraulic conductivity of the Sugarlump Tuff, which underlies the stockpile is 8.2E-4 feet per day (ft/d) (2.9E-7 centimeters per second) (Golder, 2007). Based on this information, it is not likely that significant seepage is occurring into the regional groundwater.

Groundwater near the stockpile exhibits an upward gradient along the stream channel in Lucky Bill Canyon as illustrated on Figure 3. This upward gradient beneath the drainages in the North Mine Area has been determined from the installation of numerous monitoring wells along Hanover Creek, Whitewater Creek, and in the Lampbright Area (Tributaries 1 and 2) (Golder, 2008). This characteristic upward gradient along major drainages is further demonstrated by the site wide groundwater modeling results that includes the Lucky Bill Canyon area (Golder, 2008), and as evidenced by intermittent flow in the stream and a thick riparian zone along the centerline of the valley. A large portion of the shallow groundwater along the riparian zone and surface water in the stream channel is lost to evapotranspiration.

Groundwater impacts throughout the North Mine Area are being addressed specifically as part of the site wide groundwater abatement investigation. This includes specifically the Lucky Bill Canyon area. Chino anticipates submitting a revised final stage 1 site wide abatement investigation report this year.

4.0 SURFACE WATER DIVERSION AND SEEP COLLECTION UPGRADES

Chino installed additional controls to enhance surface water drainage from the stockpile and collection of stockpile seepage (Figure 2). Stormwater run-on drainages were modified in early 2014 to divert runoff away from the stockpile to improve erosion control of the downgradient segments of the drainages as documented. Later in March 2014, additional surface water drainage channel improvements were constructed at the top of the stockpile where the surface gradient was shallow to shed incident precipitation more quickly during rainfall events as a result of a site meeting discussion with NMED and MMD in late February. These channels were constructed at approximately 11 percent slopes, and drain to the existing diversion channels.

The seepage collection trench was constructed along the toe of the stockpile to increase the collection of seepage water from the single point at well GH-97-4 to the entire length of the stockpile toe that is practical (Figure 4). The trench extends from the soil surface at the base of the stockpile material to the top of bedrock, profiling the colluvium interval. Perforated lateral piping was installed along the length of the trench. The trench was filled with drain rock filter pack and drains to one collection point accessible through a standpipe. A geologic cross section captures the trench profile documenting the Sugarlump Tuff bedrock contact with the overlying colluvium soils, in Figure 5. Design and as-built details are illustrated in Figure 6.

5.0 ADDITIONAL PROPOSED CHARACTERIZATION

Additional characterization of the groundwater and geochemical modeling are proposed to evaluate the stockpile as a source of sulfates and TDS to the groundwater. Previously, the only groundwater sampling location available to evaluate the potential impacts of the stockpile to the groundwater was well GH-97-4, which has only produced enough water to allow purging and sampling once since its installation in 1997. The representativeness of this sample to evaluate the impacts of seepage from the stockpile was therefore uncertain. During the development of the seepage collection trench, it was discovered that GH-97-4 seepage collection point was several feet above the bedrock interface. The water sample collected from the well in September 2013, indicating elevated sulfate and TDS concentrations may be affected by the stockpile, the colluvium, or the bedrock, and concentrations may be high due to evapo-concentration in the stockpile and shallow groundwater at the stockpile toe.

During the excavation of the seepage collection trench, the stockpile materials, colluvium, and bedrock surface were visually inspected to check for any indication of stockpile impacts and seepage or groundwater flow paths. The trench was logged for soil classification, lithology of rock fragments, zones of moisture, and presence of secondary mineralization or precipitates. The colluvium was approximately 7.5 feet to 9 feet deep along the trench alignment. The upper 3 feet was silty to clayey sand with gravel. Below 3 feet, the colluvium was a silty sand with gravel matrix with 25 to 60 percent oversized material (greater than 3 inches in diameter). The lithology of the clasts and boulders was primarily Sugarlump Tuff, but some mineralized jasperoid, fine grained intrusives, and granodiorite were present. Mineralization within the cobbles included limonite, goethite, pyrite, and iron staining. The presence of these sulfide bearing clasts indicates that the colluvium is derived from tuff and intrusive dikes prevalent in the area. No zones of moisture were encountered, except along the top 2 to 3 inches of the Sugarlump Tuff bedrock surface, where the tuff has been weathered to soft and stained slightly yellow orange.

The seepage collection trench was installed prior to the summer monsoon rains, which will allow opportunities to observe the response in the trench to storm events and collect more representative samples of seepage water at the stockpile toe. The seepage water will be sampled and analyzed following high magnitude storm events, typically in the summer and fall for three consecutive years. Seepage water will be analyzed for aluminum, arsenic, cadmium, cobalt, chromium, copper, iron, manganese, nickel, lead, zinc, calcium, chloride, fluoride, potassium, magnesium, sodium, sulfate, TDS, pH, and alkalinity. Once representative seepage water samples have been collected and analyzed during the first year of monitoring, a geochemical model will be developed to evaluate the relationship of the stockpile on the final water quality at the toe of the stockpile. The geochemical model approach to be used to evaluate the stockpile water quality involves the construction of a simple mass balance and mass loading model as follows:

- Estimates of stockpile mass, volume, and surface area, and site precipitation data will be used to develop a range of possible water/rock ratios in the stockpile.
- Estimates of infiltration through the stockpile will be made based on the quantity of water reporting to the seepage collection trench following rainfall events.
- Mass loading from the stockpile to its leachate will be quantified using existing field and laboratory data (including but not limited to SPLP results from previous test pit investigations in 2004 and 2006).

Chino anticipates submitting results of this additional characterization as well as water quality data to NMED by the end of December 2014, provided representative seepage samples can be collected in 2014 given the current drought conditions cycle.

6.0 REFERENCES

Daniel B. Stephens and Associates, 1997. Shallow Groundwater Monitoring Wells at the Groundhog Site. Prepared for Chino Mines Company, Hurley, New Mexico. October 17, 1997.

Golder Associates Inc., 2005. Interim Remedial Action, Groundhog No. 5 Stockpile, Site Investigation Report, Hanover and Whitewater Creeks, Investigation Units. Prepared for Chino Mines Company, Hurley, New Mexico. June 3, 2005.

Golder Associates Inc., 2007. Chino Mines Company DP-1340 Condition 83 – Hydrologic Study Final Report. Prepared for Freeport McMoRan Chino Mines Company Hurley New Mexico. June 28, 2007.

Golder Associates Inc., 2008. Chino Mines Company Site Wide Stage 1 Abatement Final Investigation Report. Prepared for Freeport McMoRan Chino Mines Company Hurley New Mexico . July 18, 2008.

Golder Associates Inc., 2009. Site Investigation Report Addendum, Groundhog No. 5 Stockpile, Hanover and Whitewater Creeks, Investigation Units. Prepared for Chino Mines Company, Hurley, New Mexico. June 3, 2005.

Established in 1960, Golder Associates is a global, employee-owned organization that helps clients find sustainable solutions to the challenges of finite resources, energy and water supply and management, waste management, urbanization, and climate change. We provide a wide range of independent consulting, design, and construction services in our specialist areas of earth, environment, and energy. By building strong relationships and meeting the needs of clients, our people have created one of the most trusted professional services organizations in the world.

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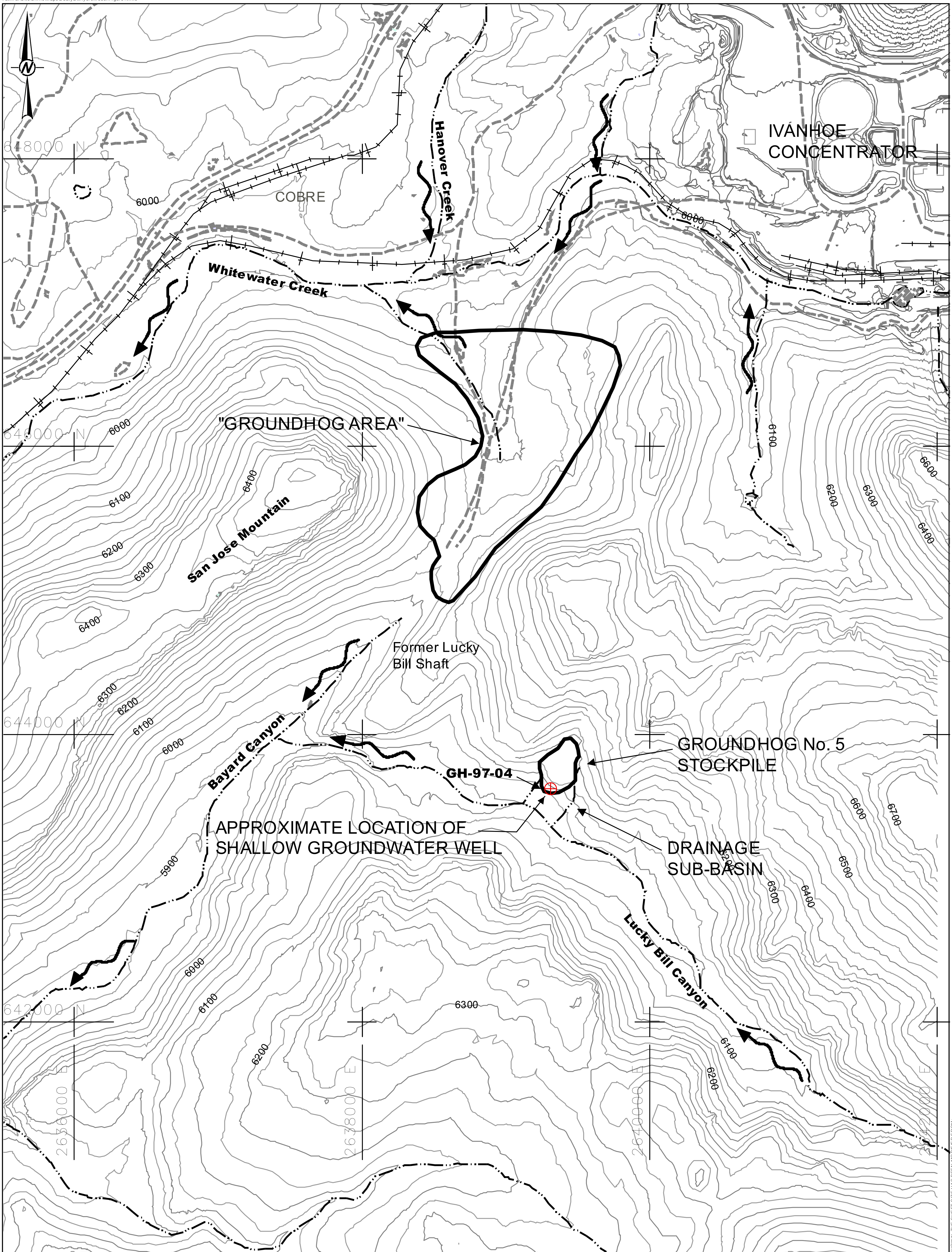
Golder Associates

Engineering Earth's Development, Preserving Earth's Integrity



LEGEND

- SHALLOW GROUNDWATER WELL
- APPROXIMATE SURFACE WATER SAMPLING LOCATION
- WATER COURSE
- DIRECTION OF FLOW

NOTES

1. CONTOUR INTERVAL = 25 FEET

REFERENCE

COORDINATE SYSTEM: NAD 1983 STATEPLANE NEW MEXICO WEST FIPS 3003 FEET

CLIENT
FREEPORT-MCMORAN CHINO MINES COMPANY
HURLEY, NEW MEXICO

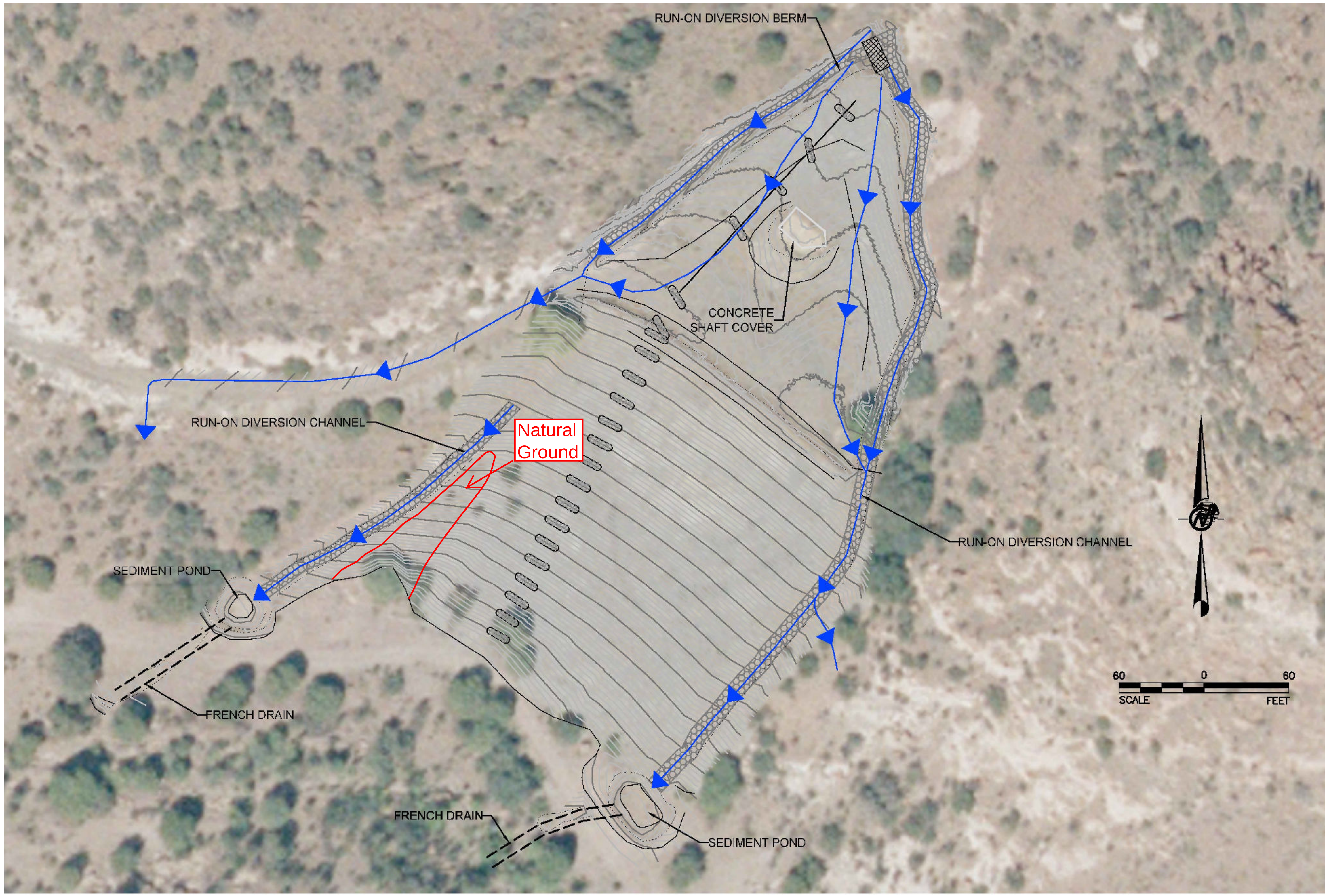
PROJECT
GROUNDHOG NO. 5 WORK PLAN FOR ADDITIONAL CHARACTERIZATION AND CONTROLS

TITLE
GROUNDHOG NO. 5 STOCKPILE LOCATION

CONSULTANT
Golder Associates

YYYY-MM-DD	2014-04-28
PREPARED	DZF
DESIGN	DZF
REVIEW	JP
APPROVED	MB

PROJECT No.	REVIEW	FIGURE
1403873	0	1



LEGEND

FLOW

NOTES

REFERENCE

1. DRAWING PROVIDED BY TELESTO SOLUTIONS INCORPORATION AFTER REGRADING IN 2006

CLIENT
FREEPORT-MCMORAN CHINO MINES COMPANY
HURLEY, NEW MEXICO

PROJECT
GROUNDHOG NO. 5 WORK PLAN FOR ADDITIONAL CHARACTERIZATION AND CONTROLS

TITLE
GROUNDHOG NO. 5 STOCKPILE – 2014 IMPROVED DRAINAGE MODIFICATION

CONSULTANT

Golder Associates

YYYY-MM-DD	2014-06-03
PREPARED	DZF
DESIGN	DZF
REVIEW	JP
APPROVED	MB

PROJECT No. 1403873 | Rev. 1 | FIGURE 2

Path: L:\Site\Chino\Maps\LuckyBill\HydroModel\Figure2.mxd

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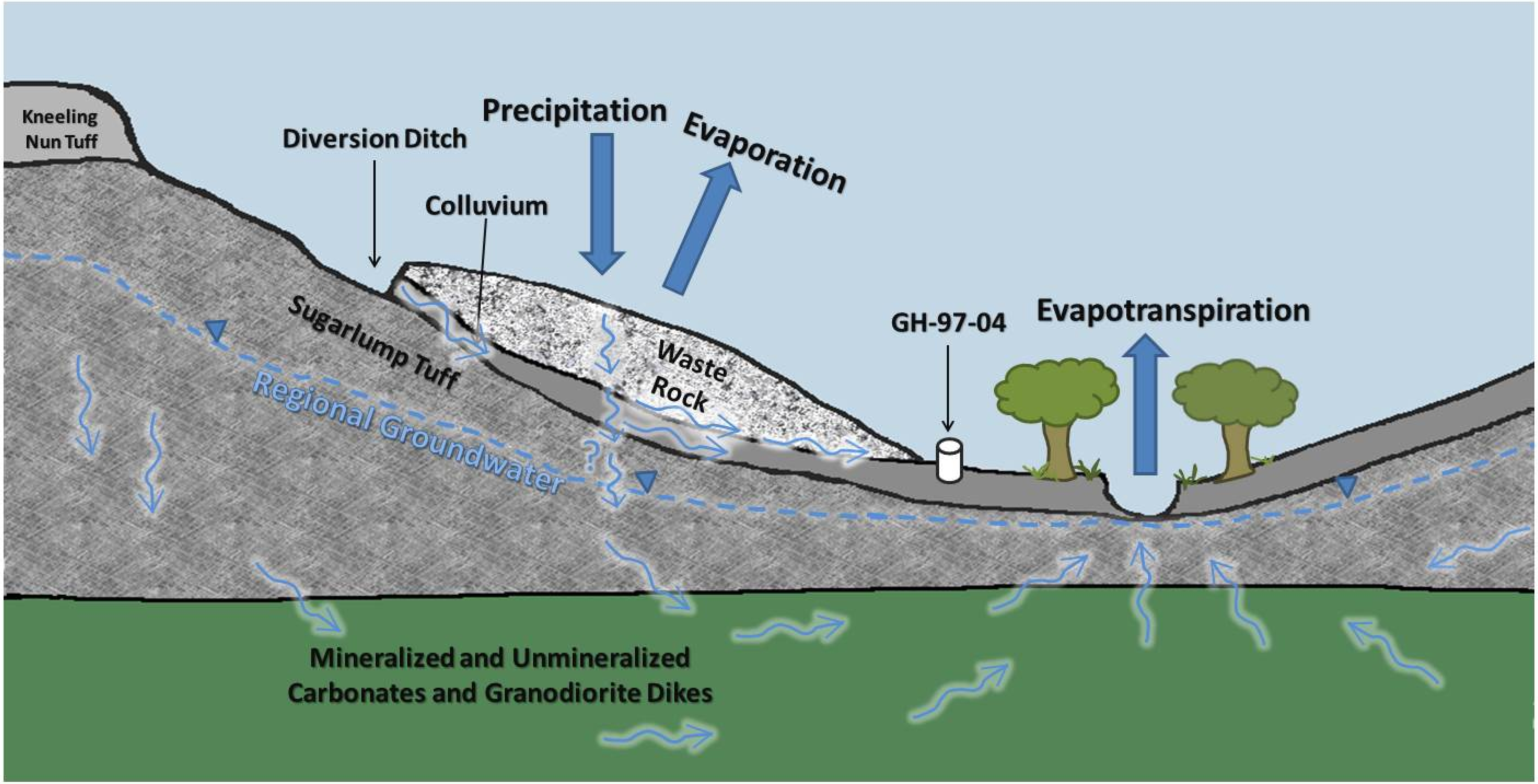


CLIENT
FREEPORT-MCMORAN CHINO MINES COMPANY
HURLEY, NEW MEXICO

PROJECT
GROUNDHOG NO. 5 WORK PLAN FOR ADDITIONAL CHARACTERIZATION AND CONTROLS

TITLE
HYDROGEOLOGIC CONCEPTUAL MODEL
GROUNDHOG NO.5 STOCKPILE

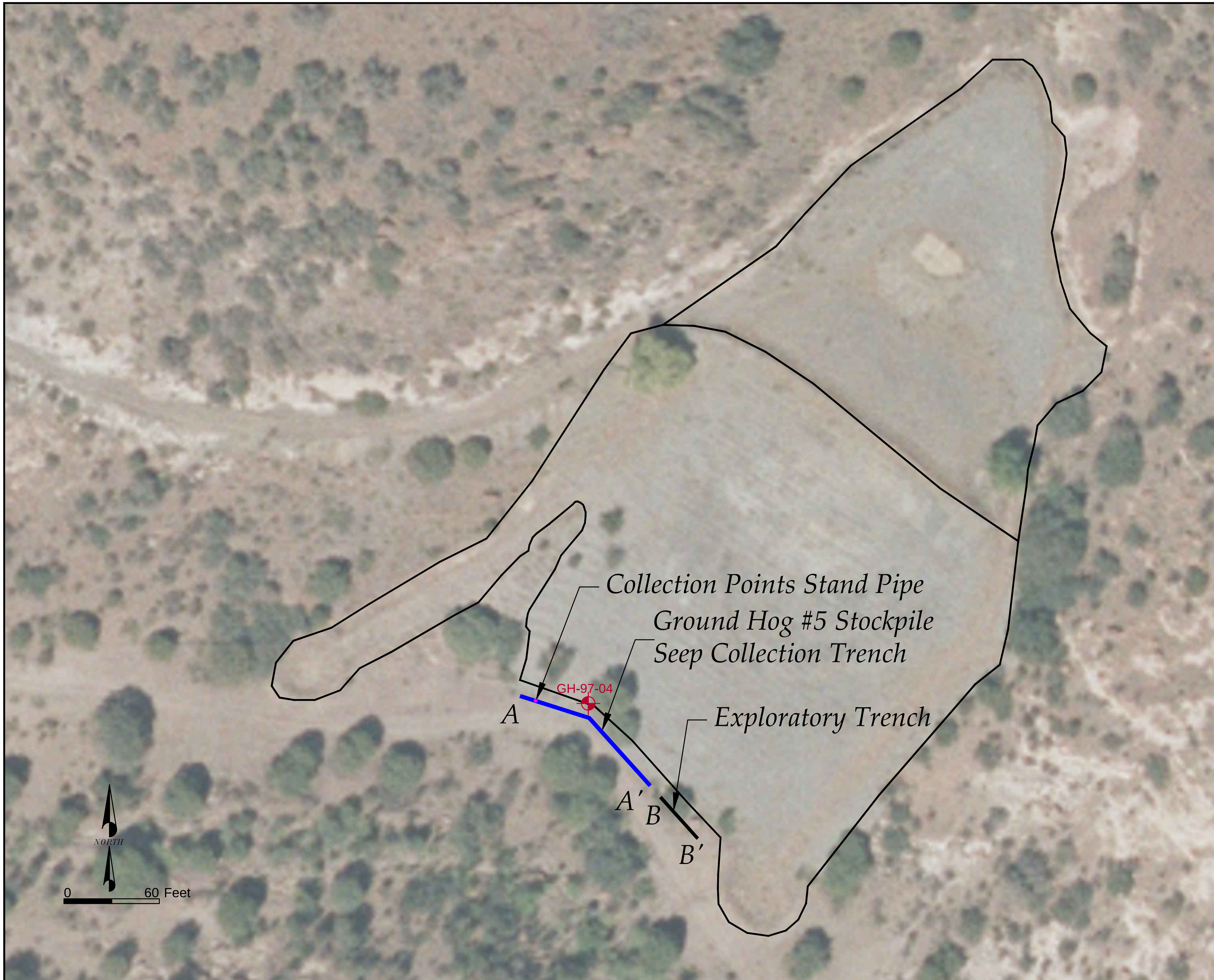
CONSULTANT
Golder Associates

YYYY-MM-DD	2014-04-28
PREPARED	DZF
DESIGN	DZF
REVIEW	JP
APPROVED	MB

PROJECT No. 1403873

Rev. 0

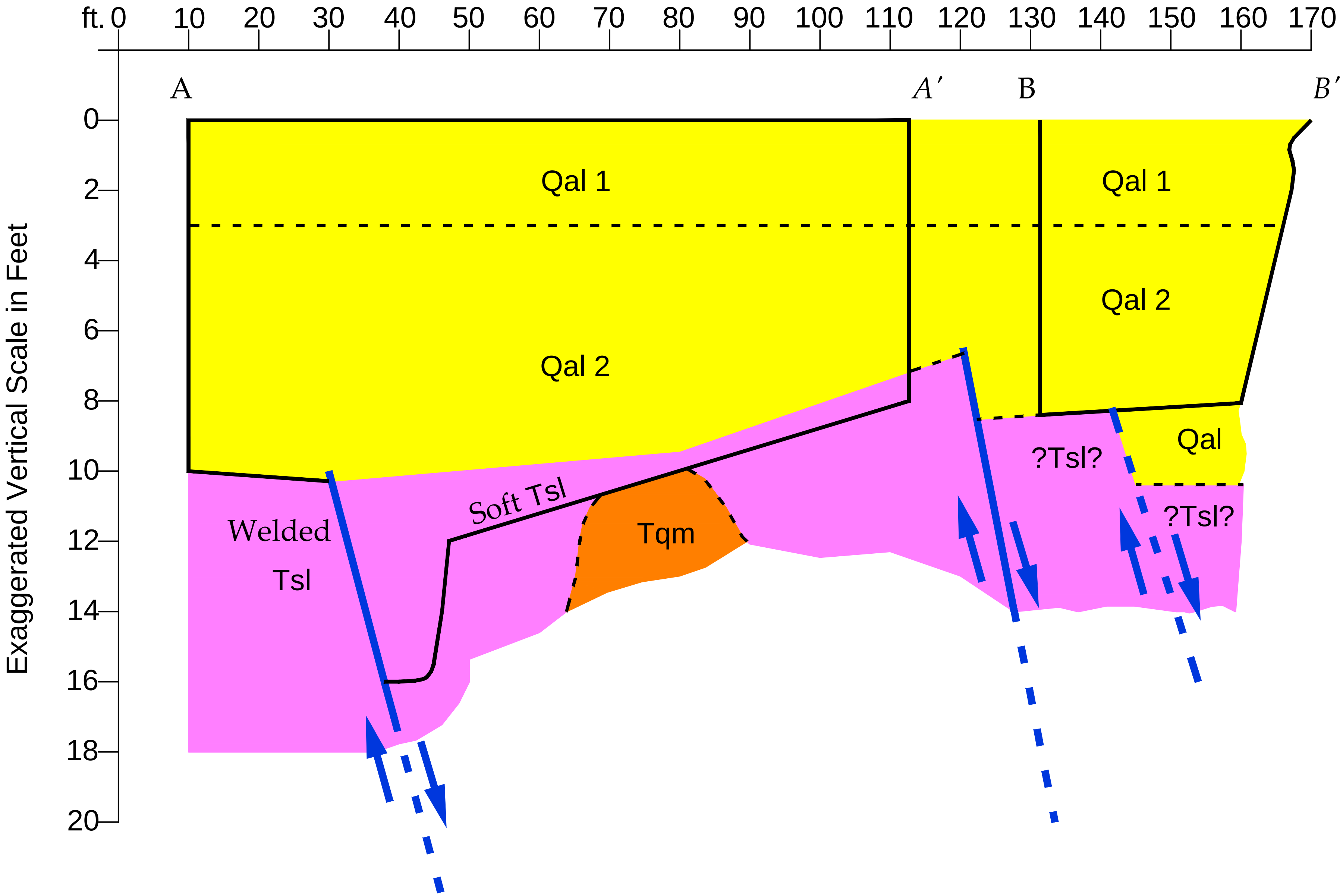
FIGURE **3**



FREEPORT-McMoRAN COPPER & GOLD

Groundhog #5 Stockpile Trench Alignment

Scale: As Noted	Date: 6-2-2014	Notes:
Dept. Environmental Services		Figure 4
Drawn By: SMG	Checked By: PDP	



Legend

Qal 1	Silty Sand and Clayey Sand with Gravel
Qal 2	Silty Sand with Gravel Matrix and 25-60% Cobbles and Boulders
Tsl	Sugarlump Formation - Welded and Soft Welded Rhyolite Tuff
Tqm	Quartz Monzonite
Fault (blue dashed line)	Fault
Trench Boundary (black line)	Trench Boundary

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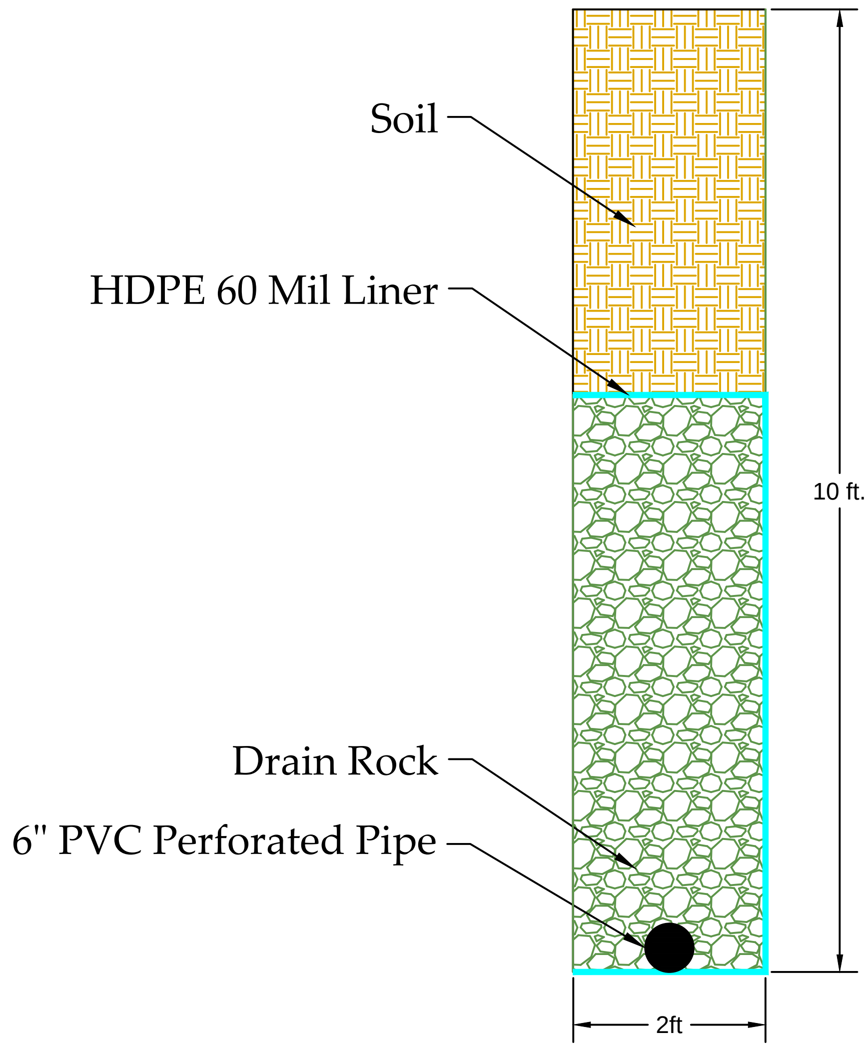
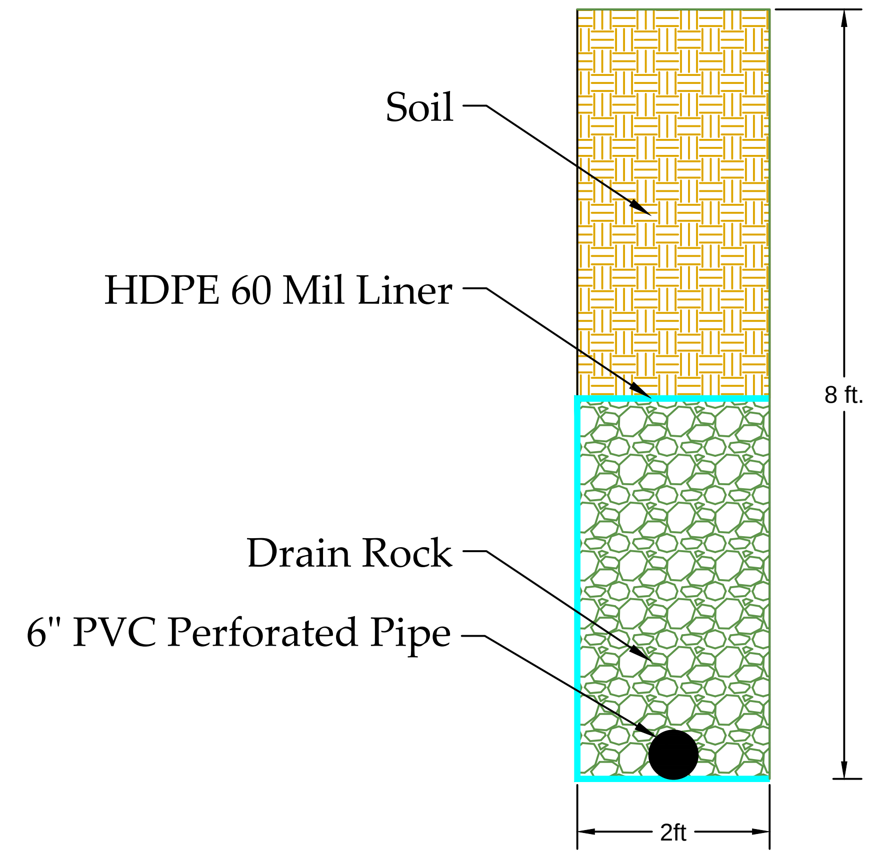
Figure 5 – Groundhog #5 Stockpile Seepage Collection Trench Geology

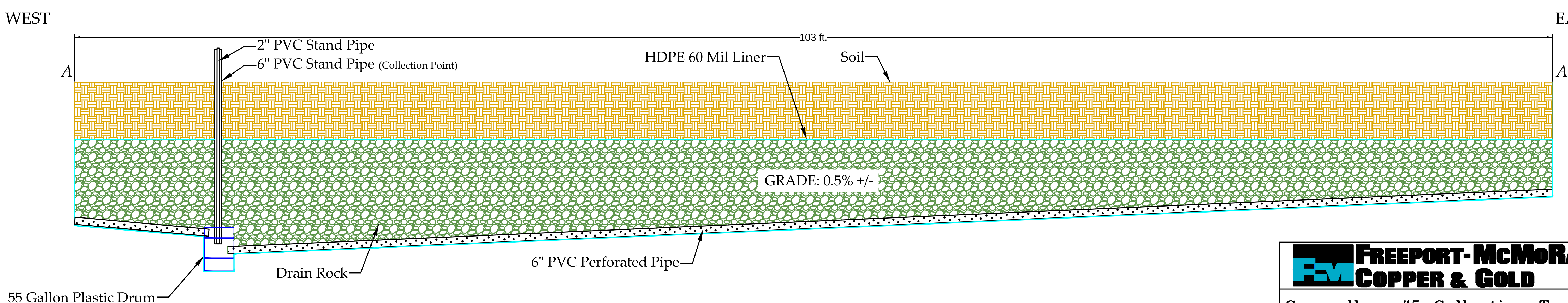
Scale: As Noted	Date: 6-3-2014	Notes: Mapped By Jen Pepe and Pam Pinson
Dept. Environment, Land & Water		
Drawn By: SMG	Checked By: PDP	



West End of Trench



East End of Trench



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Groundhog #5 Collection Trench

Scale: Not To Scale | Date: 6-2-2014 | Notes:
Dept. Environmental Services
Drawn By: SMG | Checked By: PDP

Figure 6