PROSPERITY
A Gold-Copper Project of Taseko Mines Limited

Taseko Prosperity Gold-Copper Project

Appendix 5-4-F

Taseko Mines Limited

Soils/Geology/Terrain Baseline Scope of Work: Prosperity Project 2006

GAP ANALYSIS AND WORKPLAN

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1 Introduction

The Prosperity Project is a gold copper mine located in the Chilcotin region of British Columbia, south-west of Williams Lake. Taseko Mines Limited (TML) is the project proponent and has retained Jacques Whitford Limited/AXYS Environmental Consulting Limited to complete a technical review of baseline data previously collected for the project and develop a workplan to complete or update existing baseline information and complete concurrent applications for an EA certificate and all other required regulatory authorizations.

Considerable information was collected in the 1990s toward development of an Environmental Assessment Report, following Project Report Specifications issued by federal and provincial authorities. The project was put on hold in 2000, but has been activated again, and submission of an Application for an Environmental Assessment Certificate is planned for spring 2007.

This document focuses on the soils, surficial geology and terrain discipline. It summarizes the review of historic information for its ability to meet Project Report Specifications and more recent criteria for vegetation assessments for the mining industry. Based on this review, a workplan and sampling program is described for work in 2006 to fill identified data gaps and ensure provision of current, comprehensive baseline data for the environmental assessment.

As a terrain gap analysis has previously been submitted (see Appendix A), this document will focus on the soils component and any surficial geology components related to the development of bioterrain baseline mapping. From here forward these three components will be fully integrated in a common, coordinated baseline data collection program that will support an integrated approach in the EA submission.

The objective of the baseline study is to provide a database that can be used to characterize the range of soils, surficial geology and terrain characteristics in the study area. This will include baseline bioterrain mapping for the minesite, road corridor and transmission corridor as well as soil chemistry and texture information to support reclamation planning and terrain assessments for specific sites as described in Appendix A.

2 Baseline Data Gap Analysis

Data and preliminary baseline reports previously prepared by Talisman and Hallam Knight Piesold (HKP) for the Prosperity Copper Gold Mine environmental assessment were reviewed and compared with requirements for soils, surficial geology and terrain data described in the Project Report Specifications. These specifications were issued under the harmonized *B.C. Environmental Assessment Act* and *Canadian Environmental Assessment Act* in 1998. The Talisman and HKP reports summarized the work conducted in support of the Prosperity mine assessment during the 1990s for the minesite study area, transmission corridor and road access corridor and are summarized in some detail as they pertain to terrain in Appendix A. This historic information was also reviewed in light of current requirements and practice for proposed projects (e.g., Kemess North Mine) and existing regulations (i.e., Mines Act Permit Application [MAPA] requirements) pertaining to B.C. mining operations to anticipate current regulatory requirements that must be met for the environmental assessment or to facilitate concurrent permit acquisition.

Since completion of the baseline studies, the Terms of Reference for an environmental assessment of the Kemess North Mine have been published. The Kemess North mine proposed for central B.C. includes similar options for tailings disposal in a lake and is being assessed through the same joint B.C.EAA/CEAA Panel Review process, and therefore provides up-to-date guidance from regulatory agencies on collection and interpretation of baseline data.

The soils/geology/terrain data gap analysis assessed completeness of the baseline information relative to the standards described.

Overview level results of the review of historic data and reports are as follows:

- methods, site selection, sampling frequency and reporting followed the Project Report Specifications;
- methods and reporting are in accordance with standards in effect at the time;
- baseline TEM (minesite) adequately reflects conditions to 1998 at a scale and sampling intensity suitable for the EA; and
- quality assurance/quality control (QA/QC) generally indicate acceptable data quality for TEM.

Additional studies are recommended for 2006 to better define baseline conditions, address new data collection standards and to meet current regulatory requirements for both the EA and regulatory requirements under MAPA.

Other considerations in drawing up the 2006 study plan include:

1. a requirement for baseline mapping of the access road corridor to support impact assessment for all terrestrial disciplines;
2. requirements for more detailed mapping (larger map compilation scale and higher survey intensity level) to meet MAPA requirements in the minesite area;
3. reclamation requirements to map soil depth by horizon within the minesite area to support soil salvage and reclamation efforts.

3 Sampling Program (Workplan)

The 2006 soils baseline data collection program has been designed to augment the data collected and reports prepared in the 1990s and summarized by Madrone and to support reclamation planning. The design focuses on the area potentially affected by development of the Prosperity Mine, including the minesite area, transmission corridor and the road access corridor from Lee's Corner. Each of these will be treated as a separate study area for the purposes of baseline data collection and mapping. The baseline data collection program employs methods consistent with previous studies and currently accepted provincial and federal sampling and mapping procedures. This baseline study will include the following:

- Complete/refine/update baseline bioterrain mapping for all three study areas
- Supplement soils field data collection in all three study areas
- Complete detailed soils data collection as required to supplement soil chemistry and texture information to meet reclamation requirements and to upgrade map scale to current requirements
- Complete a terrain assessment

The 2006 baseline data will be integrated with previous bioterrain mapping and data reports to provide a seamless, comprehensive and complete soils/geology/terrain baseline data package to support the impact assessment as well as incremental regulatory requirements.

The study design is summarized in Table 3-1 and described in detail in subsequent sections.

Budgets have been prepared based on one season of field work. Additional sampling may be subsequently required to address site-specific issues (e.g., sediment control planning). These costs will be provided at a later date.

Table 3-1 Study Design Summary, Prosperity Project Soils/Geology/Terrain Baseline Studies, 2006

Field Survey Program	Description	Field Sampling Timing	Regulatory/EIA Rationale
Minesite TEM	Refine existing bioterrain to a map compilation scale of 1:10,000 and SIL 2	June/July 2006	• MAPA • PRS
Transmission Corridor SEI	Field verify and update SEI mapping	June 2006	• PRS • RISC (new standard)
Transmission Corridor TEM	Complete bioterrain mapping at a map compilation scale of 1:20,000 and SIL 5	June/July 2006	• EIA
Terrain Assessment	Terrain Assessment as per Appendix A	July/August 2006	
Soil Survey and Salvage Assessment	Complete soil suitability mapping and salvage assessment report	August 2006	• MAPA • Kemess

Field sampling, data analysis and mapping methods and deliverables are discussed in subsequent sections.

3.1 Minesite TEM

The existing terrestrial ecosystem mapping (TEM) in the minesite area followed the B.C. standard (RIC 1998) was developed to meet the requirements of an impact assessment. It is characterized as follows:

- Terrestrial ecosystem mapping of the ~18,000 ha minesite areas was completed by Madrone Consultants in 1997 using 1993 (1:15,000 scale) colour photography and was presented at 1:20,000 scale. Mapping was completed directly onto hardcopy airphotos.
- The field program sampled 33% of the 1252 polygons (survey intensity level [SIL] 3)
- In the footprint of the current mine, 36% of the estimated 500 polygons were checked (SIL 3)

The B.C. Mines Act requires terrestrial ecosystem mapping of the mine footprint to the following specifications in support of an Application for a Mines Act Permit:

"*Terrestrial Ecosystem Mapping (TEM) must be prepared for the minesite using the most current RIC standards (section 2.6.1). The TEM must be provided at a scale of 1:5,000 or better. RIC standards require a survey intensity level of 1 for this scale of mapping, however, depending upon site variability, a survey intensity level of 2 may be appropriate. Alterations from the level 1 intensity should be discussed with the Mines Branch (Mines Inspector - Reclamation and Permitting) prior to implementation*."[1]

Based on precedents at other mines (Kemess, NEMI Trend and Galore Creek), and past correspondence with MEM and MoE regulators it has been determined that a map compilation scale of 1:10,000 and a survey intensity of 2 will be undertaken for the minesite area. Updated aerial photography has now been acquired (colour 1997 - 1:15000 scale and colour 2005 - 1:20000 scale). Mapping will be performed using 3D mapping tool (Purview or Diap) and will revise the existing mapping to the larger scale by subdividing and reclassifying polygons as required. Survey intensity will then be calculated based on the resultant number of polygons. Incremental sampling will be planned to bring the total # of polygons sampled above 50% of the total in the minesite

[1] http://www.em.gov.B.C..ca/mining/MinePer/envimngt/minperm/rperm98bt.htm#Appendix%201

area (as required for SIL 2). Minesite TEM sampling will be completed in June and July 2006 followed by data entry and map revisions. An estimate of the requirement for incremental sampling is summarised in Table 1, which projects a requirement for 140 additional samples.

The deliverables for this component will include:

- 1:10,000 bioterrain mapping for the minesite area
- Updated expanded legend

Table 3-2 Minesite TEM Sampling Estimation

	Number of Polygons	Number of Unique Inspections	% Sample	SIL
Current 1:20,000 scale TEM from 1997	350	140	40%	3
2006 Update to 1:10,000 scale	500	140	28%	3
2006 Fieldwork 1:10,000 scale	500	140+120=260	52%	2

3.2 Transmission Corridor SEI

The existing SEI mapping used a methodology adapted from coastal SEI mapping initiatives and is characterized as follows:

- SEI completed for a 3km wide corridor centered on the 118 km transmission corridor by Madrone Consultants in 1997 using 1993 and 1995 (1:15000 scale) colour aerial photography and presented at 1:20,000 scale. Mapping was completed directly onto hardcopy airphotos.
- 381 field checks were completed from a total population of 1106 identified polygons (34%) equivalent to SIL 3.

A revised SEI standards document (version 10.0) has been released by the Resource Inventory Standards Committee (RISC) in 2006 (RISC 2006). Regulators have requested that the existing SEI mapping of the transmission corridor be updated to utilize this standard. This update will require reclassification of the map labels for the existing polygons. A disturbance coverage will be overlain with the mapping to update the status of polygons that may have been disturbed by fire or forest harvesting in the time since the original SEI mapping was completed.

The deliverables for this component will include:

- Updated 1:20,000 SEI mapping for the transmission corridor to 2006 SEI standards
- Updated expanded legend

3.3 Access Road TEM

The access road to the minesite will follow an existing logging road south from Lee's Corner to the minesite. There is no existing baseline ecosystem mapping available for this area. An initial scoping exercise with the wildlife discipline lead and the project regulatory specialist has determined that a TEM mapping product will be required to characterize habitat values in a 1 km corridor centered on the road. Mapping will be completed at a scale of 1:20,000 from 1997 colour 1:15,000 scale photos using a DiAP or PurView system. Field sampling will be completed to a SIL 5 standard requiring surveys be completed in 5-14% of polygons. It is estimated that the study area corridor will be approximately 10,000 ha and that there will be approximately 1,000 polygons requiring at least 50 sample plots.

Deliverables for this project component will include:

- 1:20,000 bioterrain mapping
- Expanded legend report (may be integrated with minesite TEM report)

3.4 Terrain Assessment

3.4.1 Overview

The baseline information on vegetation, soils, and terrain that will be collected as part of the TEM work will be used to predict and assess potential effects prior to development of the mine, and to monitor and assess change during construction, operation, closure and post-closure. A review of the work completed in the 1990s found that the following items require further study, and assessment, and have therefore been included in the workplan:

- definition of the study area (terrain assessment boundaries);
- review of all current available mapping (including TEM) and aerial photographs to identify new roads, quarries, and other disturbances to the physical landscape that may impact the cumulative effects assessment;
- further field and desktop assessment of some potential hazard locations identified during the TEM work and subsequent review of the TEM products;
- creation of maps to reflect changes to the physical landscape since the late 1990s;
- identification of all drainage divides (to be included in TEM and hydrology work);
- mapping of the slope along the transmission line corridor (this data has likely already been collected and compiled, but has not been seen yet); and
- terrain stability assessment in relation to construction/maintenance activities associated with access roads, based on roadwork upgrade requirements proposed by Taseko's engineering team.

3.4.2 Work Plan

Issues for terrain and soils are characterized by three (3) primary potential effects: terrain instability, flooding, and surface erosion. The work completed for the TEM program will be utilized in completing the environmental assessment, in conjunction with the following:

3.4.2.1 Review of Existing Mapping, TEM, and Aerial Photos

The objective of this review is to identify changes to the physical landscape that have occurred since the previous studies were completed by Talisman Land Resource Consultants in 1997. Such changes might include new roads that have been constructed, rock quarries or borrow pits, blasting, and bridge construction. The results of this data review will be used to identify specific areas requiring further field investigation beyond the scope of the TEM, and to document the terrain features of those areas (*i.e.*, access roads) not previously assessed. The information collected will be used in completing the EA and will provide insight into areas that may potentially be impacted during the construction, operation, and/or post-closure phases of the Project.

Existing mapping to be reviewed includes, but is not limited to:

- TEM created as part of the overall Project;
- DIAP imaging;
- preliminary soil and terrain manuscript maps published by the BC Ministry of Environment;
- forest cover maps;
- Terrain Resource Information Management maps;
- surficial geology maps; and
- Lidar and Digital Elevation Model information;

3.4.2.2 Terrain Assessment

The field investigation will focus on specific areas of concern along the transmission line corridor and within the mine site, with respect to instability, flooding and erosion, where there is the potential for significant impacts to the landscape. The field investigation will also allow for the identification of mitigation options, or for providing the client with suggestions for areas of avoidance.

The deliverables for this component will include:

- terrain assessment report; and
- terrain hazards and assessment maps

3.4.3 Not included in this scope of work:

1. The Project Report Specifications outline the requirement for a terrain stability assessment relating to timber harvesting. At the permitting stage, Taseko will be required to complete a terrain stability assessment in support of any timber harvesting or construction/maintenance activities associated with roads and the transmission line. The Ministry of Forests should be contacted to provide advice as to how to

proceed. As this is a permitting requirement, and as specific areas of harvesting are not known, it has not been budgeted for at this time.

2. Talisman indicated in their Transmission Line Report that detailed geotechnical studies that include deep inspection pits or drilling and sampling may be required to assess areas of potential instability of unconsolidated and consolidated material at the Fraser River Crossing, Big Creek, Bambrick Creek, and Tete Angela Creek. Foundation stability in wet terrain will be the subject of further geotechnical investigations. This work is beyond the scope of the terrain assessment and should be considered by the Taseko engineering team.
3. Identifying new roadways and road constraints is beyond the scope of the terrain environmental assessment and should be considered by the Taseko engineering team.

3.5 Soil Survey and Salvage Assessment

The B.C. Mines Act requires that a soil survey be conducted as follows:

"A soil survey for the proposed mine 'footprint' must be completed at a scale of 1:5,000 following the methodologies and soil survey procedures presented in 'Field Manual for Describing Terrestrial Ecosystems', MELP Manual 11, (Luttmerding et al, 1998)."

The objectives of the soil survey are stated in the Mines Act Regulations as:

- *identify and map the location of soil units and their distribution throughout the survey area;*
- *characterize topsoil and subsoil for suitability as a growth medium for reclamation;*
- *assist in establishing pre-mine capability and productivity;*
- *determine location, depth and volume of the soil types;*
- *identify areas from which soil and subsoil must be salvaged;*
- *formulate the criteria necessary to achieve end land use capability/productivity objectives; and*
- *form the basis for the soil salvage and storage plan.*

The intent of this assessment will therefore be to describe the variability and extent of soil map units (SMUs) in the vicinity of the Prosperity minesite area and to establish baseline conditions and support the development of a soil handling/salvage plan for use during reclamation. Ratings will be assigned to each of the soil mapping units in regards to their salvage potential based on morphological, physical and analytical data.

The deliverables for this component will include:

- A Soil Survey and Salvage Assessment Report
- A thematic soils map with SMUs delineated and soil salvage suitability ratings indicated

3.6 Baseline Report Preparation

Baseline data from the 2006 field season will be reviewed, compiled and summarized in the soils/geology/terrain baseline report, which will serve as the baseline section for the

associated component of the EA submission. Results will be integrated with information from the earlier baseline reports and data summaries completed by Talisman and HKP.

4 Soils/Geology/Terrain Impact Assessment

Following completion of the data review and field studies, a soils/geology/terrain impact assessment will be completed as a chapter of the EA, based on a rational approach and recognized methods. The soils/geology/terrain component of the EA will be completed in accordance with standard methodologies to be established for the Project. This will include:

- development of residual environmental effects evaluation criteria;
- identification of potential interactions between the Project and soils/geology/terrain at the construction, operation and decommissioning/reclamation phases;
- recommendations for appropriate mitigation to avoid, reduce or eliminate adverse environmental effects;
- determination of residual environmental effects, considering magnitude, duration, frequency, geographic extent, reversibility, and context of the effect;
- consideration of cumulative environmental effects (effects of the Project and the effects of other projects and activities in the area) with respect to terrain; and
- requirements for follow-up studies or monitoring.

Following the guidelines set out for the Kemess North Project, the EA will describe the soils, terrain and surficial geology of lands disturbed by the Project. The EA will identify potential effects of the Project on the environment when bedrock, unconsolidated deposits, soils or sediments are disturbed.

Time will be allocated to consult with applicable provincial and federal agencies (*i.e.*, Land and Water British Columbia, Ministry of Forests, Ministry of Environment, Fisheries and Oceans Canada) as necessary to identify concerns that these agencies may have with respect to potential impacts to terrain resulting from the Project.

5 Reclamation Planning

The format of the scope and cost estimate follows the application requirements for a permit pursuant to the Mines Act, and EA certificate.

This workplan reflects the fact that the reclamation planning programs needed to complete the regulatory submissions will require an integrated approach by all working on the project to ensure coordinated data gathering and sharing. Areas of information coordination involve incorporating erosion control and water management features, materials handling, wildlife habitat capability and forest capability onto the final conceptual reclamation plan.

5.1.1 Assumptions

This workplan and the associated budget have been prepared based on the assumption that the Mine Plan and other requirements will be completed by others as per the summary of roles and responsibilities.

5.1.2 Baseline Information

The AXYS reclamation planning lead will assist with the design of the field programs to ensure information collected will adequately support reclamation planning and development of post-mine land capability objectives. Specific information requirements include; background metal levels in soils and vegetation; terrain and soil survey information for characterization of soil suitability for reclamation; and vegetation and forest productivity measurements that are compatible with reclamation monitoring standards.

AXYS will compile soils information from all available sources, which include terrain mapping, soil survey data, geotechnical test pit data, and exploration drill logs to complete soil characterization for reclamation. This information will provide the basis for the soil handling plan.

5.1.3 Reclamation Program

5.1.3.1 Soil Handling Plan

AXYS will contribute, in consultation with Taseko's mine engineers, to the soil handling plan, including salvage requirements, soil replacement depths required and salvage/stockpile methods.

5.1.3.2 Conceptual Final Reclamation Plan

AXYS will develop the Conceptual Final Reclamation Plan, based on the identified end land use objectives, which typically consist of wildlife habitat and commercial forestry. This component will include discussion and definition of post-mine capability objectives, and reclamation planning for various waste material and access structures. This component will be based on a projection of post-mining end land uses on the reclaimed landscape, which will in turn form the basis of the residual impact statement for these values, and for soils, vegetation, and terrain. This component will also include discussion

of operational and post-closure monitoring requirements from the terrestrial ecology/reclamation perspective.

5.1.3.3 Detailed Five Year Reclamation Planning

AXYS will develop, in consultation with Taseko's mine engineers, a detailed reclamation plan, which will be concurrent with the projects detailed five year mine plan. The MEM permit application requires the plans mapped at 1:5000 or better and tabular form. In addition, this component includes time for compilation of applicable information into appendices in support of the concurrent application, and for word processing in support of report production.

6 References

Luttmerding, H., D.A. Demarchi, E.C. Lea, D.V. Meidinger and T. Vold. 1998 (Revised). Field Manual for Describing Terrestrial Ecosystems. MELP Manual 11. B.C. Ministry of Environment, Lands and Parks and B.C. Ministry of Forests. Victoria, B.C.

Resources Inventory Committee (RIC). 1998. Standards for Terrestrial Ecosystem Mapping in British Columbia. Published by the Resources Inventory Committee. Victoria, B.C..

Resource Inventory Standards Committee (RISC) 2006. Standard for mapping Ecosystems at Risk in British Columbia (Version 10): An Approach to Mapping Ecosystems at Risk and Other Sensitive Ecosystems. Prepared by the B.C. Ministry of Environment Ecosystems Section for RISC.

Appendix A Reclamation ToC and Responsibilities

Report Component	Responsibility	Lead
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2. BASELINE INFORMATION	AXYS/Jacques	Natalie Tashe
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2.2.2 Detailed Geology	Knight Piesold	Greg Smythe
2.3 Topography and Surface Drainage Features	Knight Piesold	Greg Smythe
2.4 Water Quality	AXYS/Jacques	Karen Munro
2.5 Fisheries and Aquatic Resources	AXYS/Jacques	Mike Whelen
2.6 Surficial Geology, Terrain and Soils Mapping	AXYS/Jacques	Natalie Tashe
2.6.1 Surficial Geology and Terrain Mapping	AXYS/Jacques	Natalie Tashe
2.6.2 Soil Survey and Soil Characterization for Reclamation	AXYS/Jacques	Natalie Tashe
2.7 Vegetation and Wildlife	AXYS/Jacques	Scott Trusler
2.8 Land Status and Use	Lionsgate Consulting	Gary Robinson
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3.8 Mine Water Use	Knight Piesold	Greg Smythe
3.9 Watercourse and Water Quality Protection	Knight Piesold	Greg Smythe
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4.2 Environmental Monitoring and Surveillance	AXYS/Jacques	Natalie Tashe
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4.4.2 Productivity or Capability Objectives	AXYS/Jacques	Natalie Tashe
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4.4.8 Watercourse Reclamation	SRK	Steve Day
4.4.9 Sealing of Underground Workings	Knight Piesold	Greg Smythe

Report Component	Responsibility	Lead
4.4.10 Road Reclamation	AXYS/Jacques	Natalie Tashe
4.4.11 Trace Element in Soils and Uptake in Vegetation	AXYS/Jacques	Natalie Tashe
4.4.12 Disposal of Toxic Chemicals	Knight Piesold	Greg Smythe
4.4.13 Operational and Post-Closure Monitoring	Knight Piesold	Greg Smythe
4.5 Detailed Five Year Mine Plan	Knight Piesold	Greg Smythe
4.6 Detailed Five Year Reclamation Plan	Knight Piesold	Greg Smythe
5. ACID ROCK DRAINAGE AND METAL LEACHING ASSESSMENT	SRK	Steve Day
6. RECLAMATION COST ESTIMATES	AXYS/Jacques	Natalie Tashe
7. OTHER COMMENTS	Knight Piesold	Greg Smythe
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