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Project Description

Terra Gold Mining Pty Ltd (Terra Gold), a wholly owned subsidiary of GBS Gold Australia Pty Ltd (GBS) proposes to commence mining activities at the previously worked Maud Creek Mine site, near Katherine, Northern Territory. As part of the approval process Terra Gold has prepared a draft environmental impact statement (EIS).

The Maud Creek Mine Project is one of a number of new gold mining projects that are proposed by Terra Gold Mining Pty Ltd, and its parent company GBS Gold Australia Pty Ltd (GBS) for the Pine Creek goldfields region. Other projects include currently operational mines such as the Zapopan Underground Project, and the Rising Tide and Fountain Head Open Pit Projects. Proposed mining operations include Mottrams, Chinese South Extension, Princess Louise and North Point open pit mines and the Cosmo Deeps underground mine. All these mines are expected to provide an ore source for the Union Reefs Gold Mine (URGM) processing plant.

Terra Gold plans to commence the construction activities at the Maud Creek Mine in September 2009 and work towards being in full production by mid-2010.

The Maud Creek project area is owned by Terra Gold under NT Freehold Title (NT Portion 4192, a subdivision of Portion 4159) and is run as a buffalo and cattle grazing enterprise known as Maud Creek Station covering an area of 6,738 ha. Maud Creek project area is located approximately 310 km south east of Darwin and 20 km east north east of the regional centre of Katherine in the NT (Figures 1 and 2).

Terra Gold proposes to develop an underground mine below the existing Maud Creek open pit. The upper sections of the mine will break through to the base of the pit. Full mining activities are planned to commence in 2010 and continue for an estimated 10 year period. The mine will be developed sequentially as each level is accessed and mined. The overall depth to the base of the ore body is approximately 290 m below ground level. The decline is planned to commence within a box cut at the northern end of the current pit and slope at approximately 1:7 to the orebody. Mining will intersect the water table and therefore pit dewatering and associated water management programs will be required.

Maud Creek will produce transition and primary ores containing refractory gold associated with sulphide mineralisation as arsenopyrite and pyrite. The global indicated resource is estimated to be 9.3 million tonnes of ore at a grade of 3.1 g/t for 0.9 million ounces of gold. The estimated ore production rate is 500,000 t per annum at 6.1 g/t.

Trucks will transport ore via an access road and the Stuart Highway to an ore processing facility at URGM. No ore processing is planned in the Maud Creek project area.

Waste rock produced as a result of the mining activities will be used as backfill within the mining operations. There is a requirement for a temporary waste rock stockpile on the surface during the development phase of the mine. The estimated 74,624 m^3 of waste rock on the temporary surface stockpile will be returned to the base of the pit. At closure, mining infrastructure will be removed and the site will be rehabilitated to a condition that is consistent with its beneficial use as a pastoral property.

Construction works required for the Maud Creek site include:

- run of mine pad (ROM);
- temporary waste rock stockpile;
- mine water dam;

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- irrigated mine water disposal system;
- flood protection bund;
- decline;
- underground stoping, escape and ventilation systems;
- amenities, including a temporary site office, temporary waste storage area and static and mobile ablution facilities;
- diesel storage area, temporary refuelling area, power generator area, and contractors' laydown areas;
- powerline; and
- access road.

Historical mining activity and agricultural development have had impacts on environmental quality in the project area. Consequently, while 18 ha of woodland will need to be cleared (15 ha of clearing for the preferred access road) this represents 16 % of the project footprint, i.e. 74 % of the project footprint is in existing cleared land. No potential impacts on rare or threatened species of flora or fauna are expected.

The location of the Maud Creek mine in the Katherine River catchment, upstream of the water supply point for the Katherine Township, was identified as a potential risk to public water supply, which has been a focus of stakeholder consultation and mine planning by Terra Gold. Consequently, the mine water management system is designed to provide a high level of assurance that beneficial use as a drinking water supply downstream of Maud Creek will not be impacted.

The border of the Maud Creek pastoral lease with a portion of the Nitmiluk National Park (NNP) was identified as a potential risk to environmental values beyond the mine area. The small environmental footprint of the project, geographic separation between the Maud Creek mine and the NNP boundary, as well as the environmental management plans for fire, pests and weeds effectively reduce this risk to a very low level.

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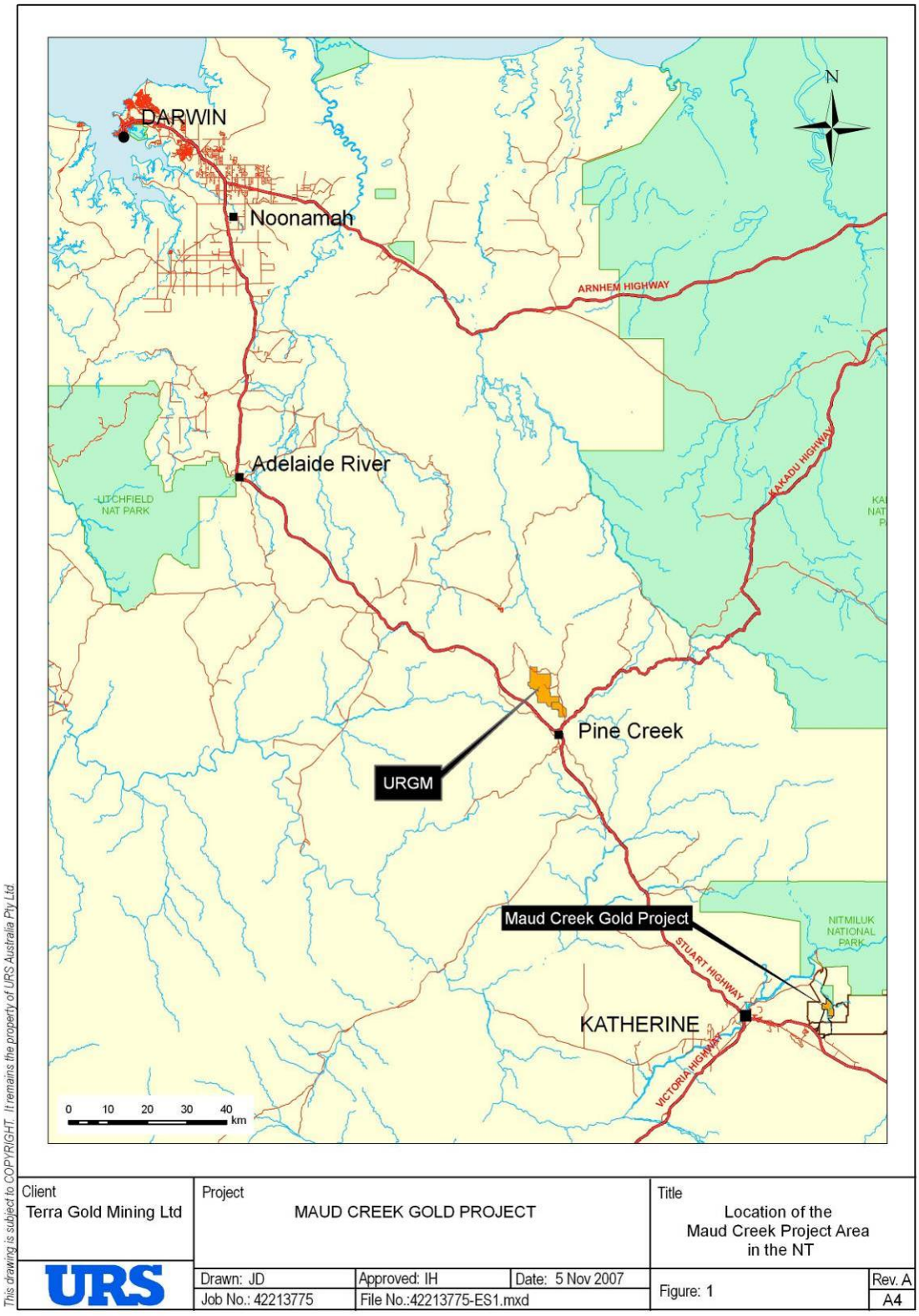

Figure 1 Location of the Maud Creek project area

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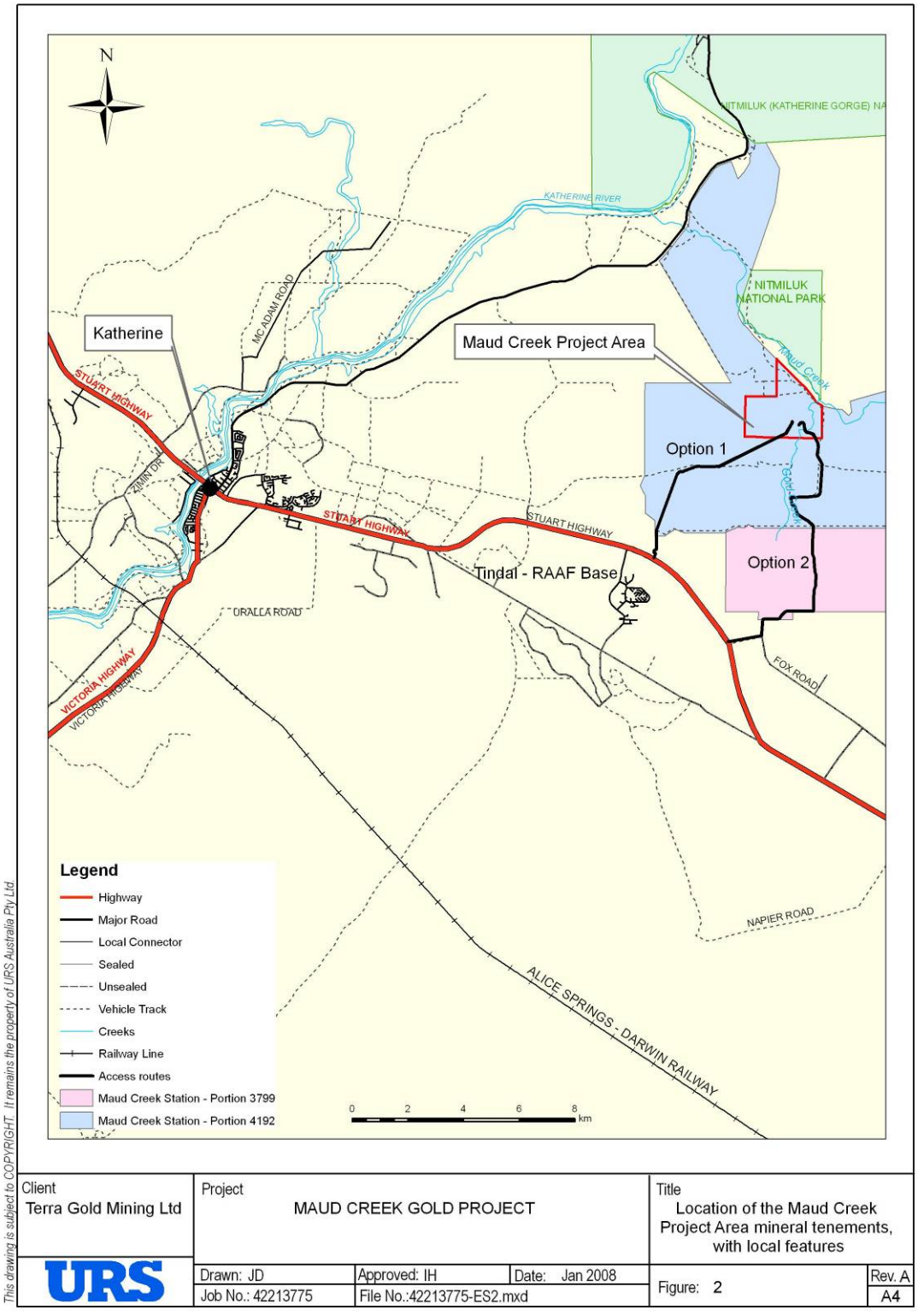

Figure 2 Location of the Maud Creek project area with local features

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History of mining at site

A gold bearing reef was discovered at Maud Creek in July 1887. By mid-1888, several more claims had been taken up in the immediate vicinity, shafts were being sunk, several new reefs had been located and arrangements were made to establish batteries at Maud Creek. Mining continued in a sporadic fashion throughout the years 1888-1893. The shortage of European workers led to the arrival of Chinese workers on the goldfields by 1889. The battery operated by French and Browne was closed in 1891 and by 1894 the leases at Maud Creek were abandoned.

The area was mined again for a short period in the 1930's by Jones and O'Shea. The field was virtually shut down by 1936 and is believed to have produced only a few ounces of gold in that time

In 1891 copper and silver were discovered but it was not until 1902 that work began at the Maud Creek copper mine located about 5 kilometres north west of the old Maud Creek goldfields. From 1966 to 1971, Western Nuclear Australia Limited undertook exploration in the Carpentaria Valley for uranium and copper mineralisation and defined several areas worthy of follow up work, although there is no record of production from this area. During 1973, Magnum Exploration NL also undertook exploration within the Maud Creek area principally for uranium and copper. Anomalous copper and molybdenum were detected. Copper mineralisation was intersected at the Maud Creek mine; however no gold was detected at that time.

In December 1997, Kilkenny Gold purchased the area from Kalmet Resources NL. In 1998, Kilkenny Gold NL undertook a series of feasibility studies for the establishment of an open-cut mine with an underground extension, a processing plant and a tailings storage facility. The proposed operation was to comprise open cut mining to an approximate depth of 110 m. A scoping study concluded underground mining was feasible given the high grade resources present at depth. This proposal did not go ahead due to a drop in the world gold price, and the operations were subsequently sold to AngloGold in 1999. Operating as Katherine Mining NL, AngloGold developed the Maud Creek Oxide Project and mined gold from an open pit to a depth of 26 m until 2000, when the mine was put under Care and Maintenance.

Proponent

Terra Gold purchased the Maud Creek Gold Project from Katherine Mining NL (Anglo Gold) in 2005 with a plan to mine the mineral resources by extending the existing open pit mine followed by the development of an underground mine. At the time of purchase the project was, and still remains, under Care and Maintenance. In 2006, GBS Gold Australia Pty Ltd (GBS) purchased Terra Gold. At this time GBS also purchased URGM and its associated gold processing plant. Terra Gold now operates as a subsidiary company to GBS Gold Australia Pty Ltd.

Land Tenure

Land uses in adjoining areas include buffalo grazing, nature conservation, cropping and mining exploration. Crops grown in the local area include millet, sorghum, mango, citrus, leucaena and melons.

Table 1 outlines the Maud Creek tenements.

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Table 1 Terra Gold Maud Creek Area Tenements

Tenements			
MLN 1978*	MCN 4150	MCN 4151	MCN 4152
MCN 4145	MCN 4146	MCN 4149	MCN 4218
MCN 4219	MCN 4220	MCN 4221	MCN 4222
MCN 4223	MCN 4224	MCN 4225	MCN 4343
MCN 4344	MCN 4345	MCN 4346	MCN 4347
MCN 4348	EL 10213	EL 25054	EL 25058
EL 25059	EL 9927 (sub SEL 9927)		

***** Maud Creek project area

Project Benefits and Justification

The Maud Creek Project will be of benefit at local, Territory, and national levels, due to its contribution of income through taxes, demand for local goods and services and employment. It is anticipated that the mine site will employee around 60 people, with around 40 personnel on site at any one time. An additional five personnel will be required at URGM. Terra Gold aims to source the workforce from Katherine and the surrounding region, and expects to create opportunities for local contractors and other supporting businesses. The project will also provide royalties to the NT Government. It is anticipated that the project will contribute between $400 and $500 million to the economy over a ten year mine life.

The Maud Creek project mine design approach is have as small an environmental footprint as is practicable, in line with best practice in the mining industry and guidelines for sustainable mine development. Mitigation measures will ensure that downstream public water supply values in the Katherine River catchment are not compromised. Consequently, environmental impacts will be localised during the construction, operational and closure phases and will be closely constrained to the mine site.

The pastoral land use capability of Maud Creek Station will be improved after completion of operations through:

- upgraded road access;
- weed and feral animal control; and
- irrigated pasture development.

Baseline environmental assessments undertaken in a previous EIS (1998) and this Draft EIS have also contributed to public environmental knowledge of the region. Terra Gold's commitment to monitoring and continuous improvement of environmental management systems could add more to this knowledge database over time,

The consequences of not proceeding with gold mining at Maud Creek would include the loss of the following benefits:

- income for the local community of Katherine, where mine personnel will live and some company offices are located;
- flow-on effects to local businesses directly engaged to work for GBS or via secondary business opportunities;

- training and skills development opportunities for the local people that will be of benefit to the community beyond the life of the mine;
- transport infrastructure development, including upgrades to roads as well as agricultural improvements including bores around the mine site;
- provision of royalties and taxes to the NT Government; and
- adding to environmental databases for the Pine Creek goldfields.

Development of Current Proposal

In the initial Notice of Intent (NOI), submitted in November 2006, Terra Gold proposed to expand the existing open-cut mine followed by the development of an underground mine at Maud Creek. Terra Gold also proposed to undertake primary processing on site, including crushing, grinding and flotation, and to haul the resulting flotation concentrate to the URGM processing plant. The intention of this approach was to minimise the number of truck movements through Katherine as well as to increase the input into the Katherine regional economy.

Options Analysis and Risk Assessment

During the period between submitting the Notice of Intent (NOI) to the Department of Primary Industry, Fisheries, and Mines (DPIFM) and receiving the draft Environmental Impact Statement (EIS) Guidelines, Terra Gold commenced an extensive community and government consultation program. Feedback from this consultation focussed on potential impacts of a large open cut mine and primary processing facility located in the Katherine River catchment on the security of the Katherine drinking water supply.

Consequently, after assessing a range of options Terra Gold revised its original proposal to an underground mine with processing off-site. The water management objective of the site is to have zero direct discharge of mine water to the surface drainage system, notably Gold Creek and Maud Creek, which flows into the Katherine River.

Alternative proposals were considered and either accepted or rejected using a best practice technology (BPT) approach based on that applied by Environment Australia within the National Strategy for Ecologically Sustainable Development (NSESD). The aim is to ensure optimal use of available resources to protect the environment through the application of relevant technologies, within a strategic environmental management system.

The EIS Guidelines stated that the primary environmental objectives at the Maud Creek mine site are:

- protection of Katherine town water supply;
- protection of Maud Creek and the Katherine River; and
- protection of Nitmiluk National Park.

In this context, the extent of the environmental footprint and risks to human health and facilities (given the high priority of water management issues) were key considerations in the options analysis. The components of the project that were analysed using BPT included the following:

- mine planning, processing & transport options;
- water management options; and
- decommissioning options.

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Options for each component were assessed against the above five criteria, and a performance ranking was applied (where 1 is 'poor'; 2 is 'fair'; and 3 is 'good'). By adding the scores from all five criteria, a total performance ranking was derived and a 'preferred' option was provided. Scores can range from 5 (a 'poor' ranking for each criterion) to 15 (a 'good' ranking for each criterion). Table 2 below details the options considered and the preferred options are displayed in bold.

This underground mining and off-site processing option significantly reduces the mine footprint and places potentially contaminating processing activities outside the Katherine water supply catchment. However, this option results in an increased risk associated with haulage of ore to the processing facility at URGM. Of the two haulage route options considered (Figure 2), the new road alignment (Option 1) connecting to the highway was chosen to reduce the interaction between mine vehicles and public traffic when compared with the alternative (Option 2).

Table 2 Options

Options	Score
Mining & Processing Options	
Not proceeding with project	11
Open cut mine + on site processing	13
Underground mine + off site processing	**14**
Transport Options	
Existing access track and Ross Road, with a crossing over Gold Creek for all weather haulage	15
New haul road across Maud Creek Station	**17**
Water Management Options	
Direct discharge into local waterways	9
Dry season irrigated new pasture on clay plain @ 10 mm/day + wet season storage in the mine water dam	12
Dry season irrigated old pasture on deep sandy loam @ 10 mm/day + wet season storage in the mine water dam	13
Year round irrigated old pasture on deep sandy loam @ 10 mm/day + emergency storage in the mine water dam	13.5
Dry season @ 10 mm/day & wet season 5 mm/day irrigated old pasture on deep sandy loam + reduced wet season storage in the mine water dam	**14**
Mine Closure Options	
Leave the mine water dam intact	8
Breach the walls of the mine water dam and drain	10
Remove walls of the mine water dam and reinstate a drained land surface	**12**

The water management option of year-round irrigation with reduced storage in the mine water dam reduces the footprint of the mine water dam. The 10 mm/day dry season irrigation rate is consistent with agricultural irrigation practices in the Katherine district and is not likely to lead to a rise in the water table and subsequent vegetation impacts or drainage discharge through surface water run off. However the impact on groundwater of also irrigating through the wet season at 10 mm/day is uncertain and a precautionary approach will be adopted initially with a reduced wet season application rate (5 mm/day).

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The mine closure option was influenced by an awareness of the need to limit the extent of potential mosquito breeding habitats and to minimise the environmental footprint of the project.

Revisions to Initial Proposal

The principal project revisions since the release of the NOI are:

- developing an underground mine rather than an open cut operation at the Maud Creek site, and therefore not adding to the waste rock stockpile on the surface in the long term;
- ore processing at URGM, which has eliminated the need for construction of a tailings storage facility at Maud Creek;
- eliminating the need to extend the waste stockpile facility by placing waste rock generated during the mining activities as backfill in the underground and the existing pit;
- locating the mine water dam on the existing waste rock stockpile, to avoid the need for additional land clearing; and
- avoiding mining in the existing pit and locating the flood protection bund so as to eliminate the need to re-align Gold Creek.

Risks to the receiving environment and recognised beneficial uses of the environment from the preferred options for the Maud Creek project were assessed according to Australian standards for qualitative risk assessment (AS/NZS 4360:2004). Environmental risk was addressed in terms of likelihood and consequence which then determined the risk severity and the level of Terra Gold management response required. The environmental management responses aim to reduce the residual risk to a low level through mitigation.

During the construction phase of the project, mitigation actions will be implemented to address the moderate to significant risks of environmental impact that are associated with clearing and earthmoving, road construction, power line construction and waterway disturbance, decline construction, water management and traffic to ensure a high level of environmental performance during the operational phase of the project.

During the operational phase, mitigation actions address the moderate to significant risks of impacts that are associated with the mining, ore transport, pest control (weeds and feral animals), fire management, water management and Nitmiluk National Park. Site security, maintenance and monitoring activities will be important components of the risk management system.

During the decommissioning phase of the project, mitigation actions will minimise the risk to water quality arising from land disturbance, pest management (weeds and feral animals), fire management, site contamination, site stability, water management, revegetation, socio-economic disruption and meeting stakeholder expectations of the closure process.

Structure of the EIS

The principal objective of this Environmental Impact Statement (EIS) is to identify and assess the environmental and related impacts that could potentially occur as a result of the construction and operation of the proposed mining project, and to develop and describe management strategies that will be employed to manage and mitigate those impacts.

The EIS includes outlines of Terra Gold's intended environmental management system and programs for the mine sites to demonstrate the company's commitment to on-going planning and management of its environmental responsibilities and objectives.

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The EIS is submitted for public review in a structure that addresses the EIS Guidelines issued by the NT Environment Protection Agency (EPA) Program (Appendix A) and allows for easy interpretation of the issues and impacts that have been identified for the Maud Creek Mine Project. The EIS is set out as follows:

1. **General Information** - provides information about the proponent, the project, the regulatory framework and presents Terra Gold's Environmental Policy.
2. **Project Description** - specific details of all aspects of the project.
3. **Description of the Existing Environment** – a number of sections form this part of the report, each of which provide detail on aspects of the existing environment and public health and safety in the project area or associated with the proposed activity.
4. **Risk Assessment** – A best practice technology (BPT) approach was used to select project options that achieve the maximum environmental benefit and the most efficient allocation of environmental protection resources. Then a standard risk assessment method (based on Australian Standards AS/NZ 4360:2004 and AS/NZ 4360:1999) was used to prioritise management plans and to identify management actions.
5. **Environmental Management Systems & Plans** - Terra Gold's EMS (Environmental Management System) and EMPs (Environmental Management Plans) designed to achieve environmental objectives and targets set by Terra Gold to manage environmental harm.
6. **Stakeholder Involvement & Consultation** - Terra Gold's stakeholder involvement and consultation supporting the EIS process and plans for ongoing consultation are presented.
7. **Commitments** – Terra Gold's commitments to protecting environmental values within the context of the EIS Guidelines for the Maud Creek project are presented.
8. **Acknowledgements, References & Limitations** - Contributions to the production of the EIS document are acknowledged. References supporting the impact assessment are listed. Limitations constraining liability regarding the recommendations of the report are described.
9. **Appendices** - Guidelines and independent studies that were used to develop and support the statement of environmental impact for Maud Creek project is presented in thirteen Appendices (A to M). These are available as a volume separate to the EIS.

Proposed Mining Process

The plan of the Maud Creek mine site is shown in Figure 3. The mine design and mining methods have been developed to be feasible, practical and safe. Figure 4 shows the 1000 Level stopes backfilled with rock to provide an inundation surge barrier. The down hole stope and fill mining method represented in Figure 4 also applies for the 1025 and 1050 Levels above the 1000 Level backfilled stope. The ore and waste rock will be extracted using long hole, sub-level retreat and open stoping techniques. Figure 5 shows a long Section of Lower Development, Stopes and Vertical Rises. Blasting will be required to fracture the ore and waste rock, which will be hauled to the surface in 50 t trucks via a 1:7 gradient decline and access portal, to surface. The ore will be stockpiled on the existing run-of-mine (ROM) pad. The initial development waste will be stockpiled on a temporary waste rock stockpile on the ROM pad before being returned to the base of the pit. Ore will be loaded for the ROM pad into road trains for transport to URGM.

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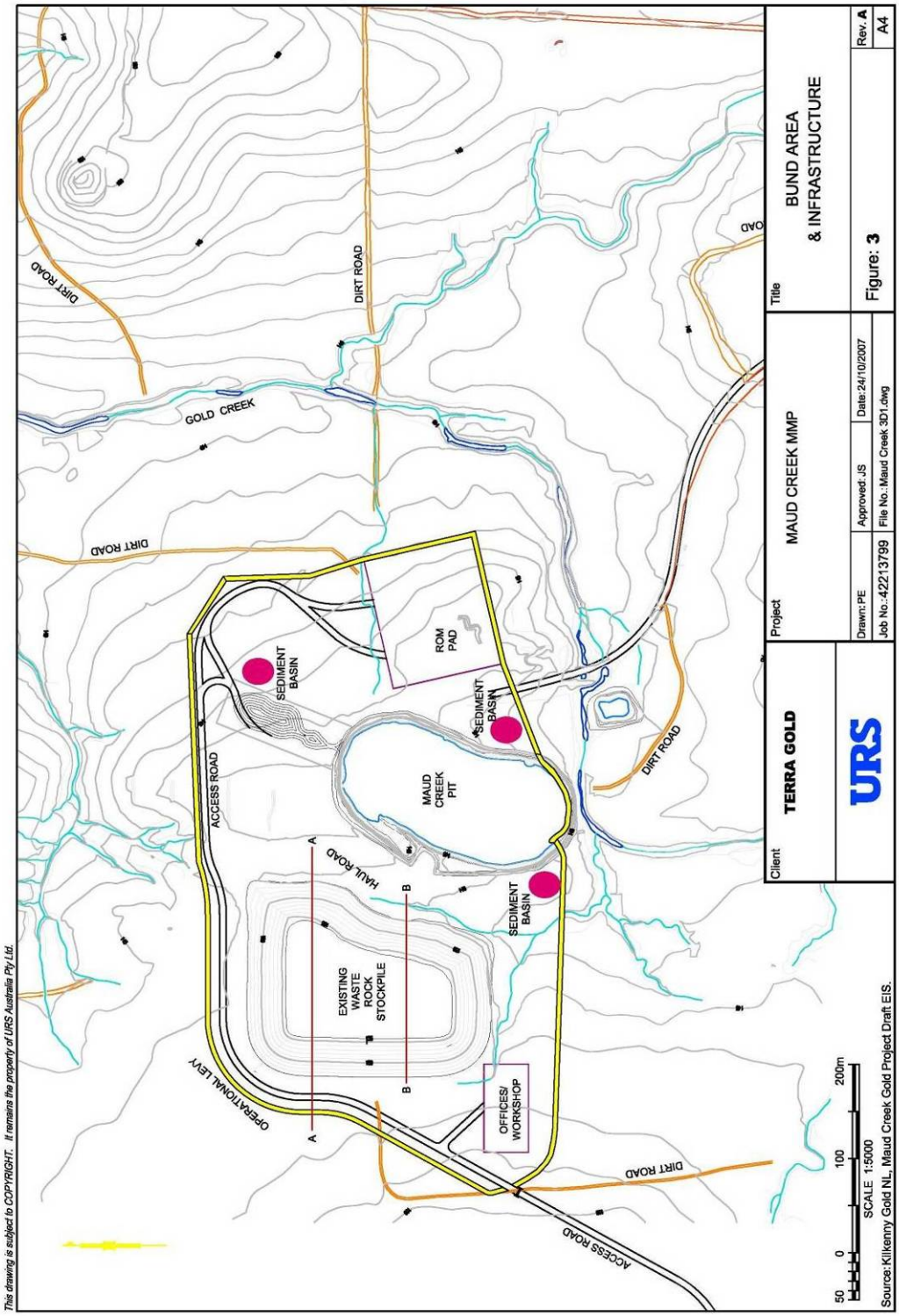

Figure 3 Bund area & infrastructure

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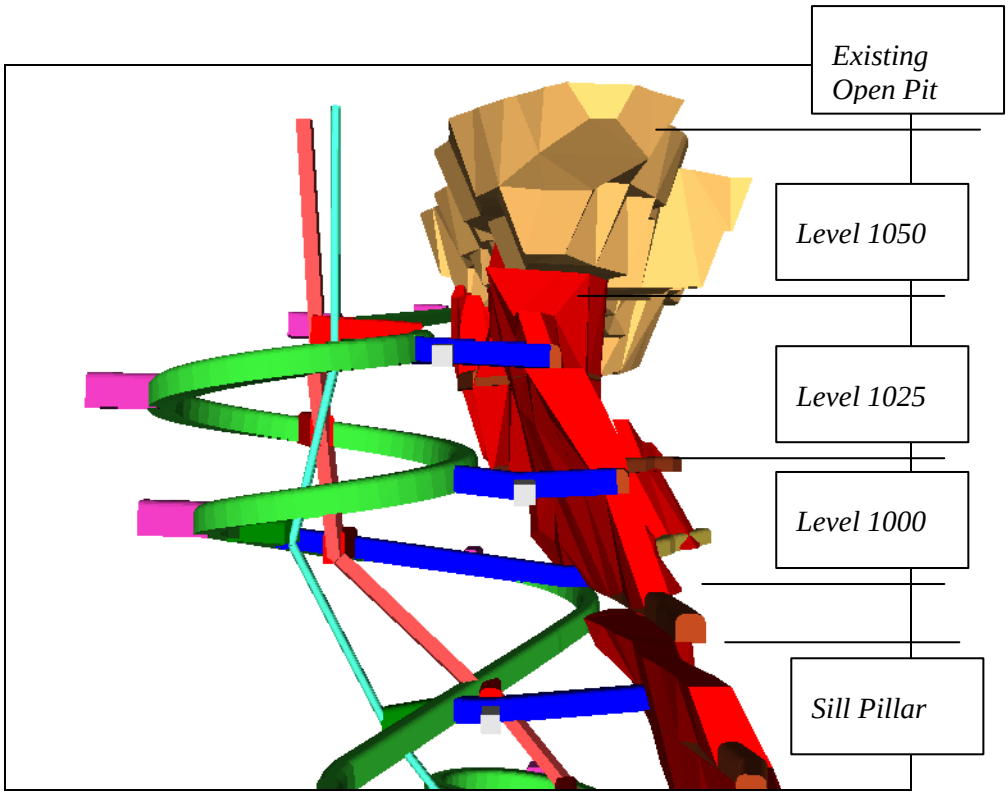
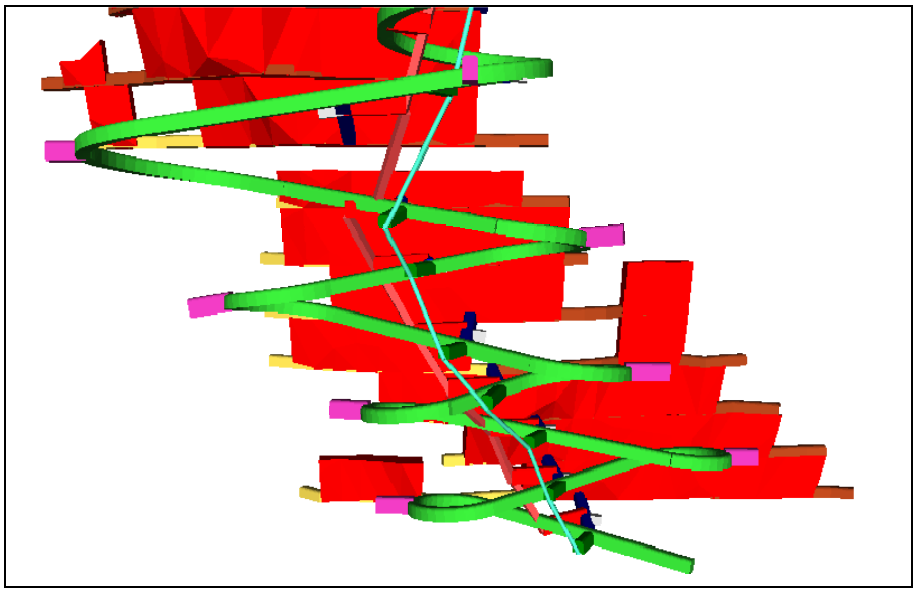


From Abel and Gerritsen (October 2007a)

Figure 4 Cross Section of Pit, Upper Development Stopes and Vertical Rises



From Abel and Gerritsen (October 2007a)

Figure 5 Long Section of Lower Development, Stopes and Vertical Rises

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Mining Method

Box Cut

A box cut will be excavated to below the weathered surface soil and rock to ensure that the mine portal is developed in competent rock. Waste rock removed from the box cut will be placed on a temporary waste stockpile on the crest of the existing open pit before being returned to the base of the pit when the opportunity arises. The bund wall around the operational mine area will extend around the box cut walls to secure the perimeter. Surface drainage structures will divert surface water away from the box cut to reduce water entering the portal and to maintain the integrity of the box cut walls. The box cut walls above the portal location will be supported with cable bolts, mesh and shotcrete.

Portal Development

Drilling and blasting will be used to develop the mine portal into the box cut wall. Blasted portal material will be added to the temporary waste stockpile. The portal excavation will be supported with mesh, cables, bolts and shotcrete until the decline is of sufficient length to install permanent means of support.

Decline Development

The decline will be developed down to the 1050, 1025 and 1000 Levels (mRL). Galvanised mesh and bolts will be used as part of the hanging wall support strategy to support the full length of the decline. Cable bolts will be used at access and stockpile intersections for added support unless ground conditions dictate the need to use shotcrete. Decline waste will be trucked to the temporary surface waste stockpile until the 1000 Level stope is available for backfilling.

As the decline progresses it will be necessary to extend power, compressed air and water reticulation services to the working faces and develop a dewatering system to extract excess water created by dust suppression systems and groundwater inflow. Initially a fan will be installed at the portal to supply fresh air which is ducted to the working faces.

Stope Development

The mine development and scheduling have been planned to reduce the risk of ground failure and water inundation. A crown pillar has been designed between the 1000 and 975mRL levels to protect the mine workings below. The stopes on Levels 1050 and 1025 have been designed to be backfilled to support the pit walls and the 1000 mRL stope is designed to be backfilled and provide sufficient inundation capacity to protect the lower levels when the mine is opened to the pit. The crown pillar appears as a 10 m break in the sequence of stopes (Figure 4).

Stope and Fill Mining

Stope and fill mining is sequenced from the bottom up, which delays the production of stope ore until the lowest development drive is completed. In the case of the Maud Creek Mine, this is necessary to provide inundation surge capacity on the 1000 Level, before the stopes above break into the open pit.

The 1025 and 1050 Level stopes will be extracted from the top of the backfilled 1000 Level stopes, as shown in the Figure 6. These stopes will be fired and extracted until the length of the open stope approaches a state of instability. Then the stopes will be backfilled from within the pit to support the walls and a further series of stope extraction and filling until the level is complete.

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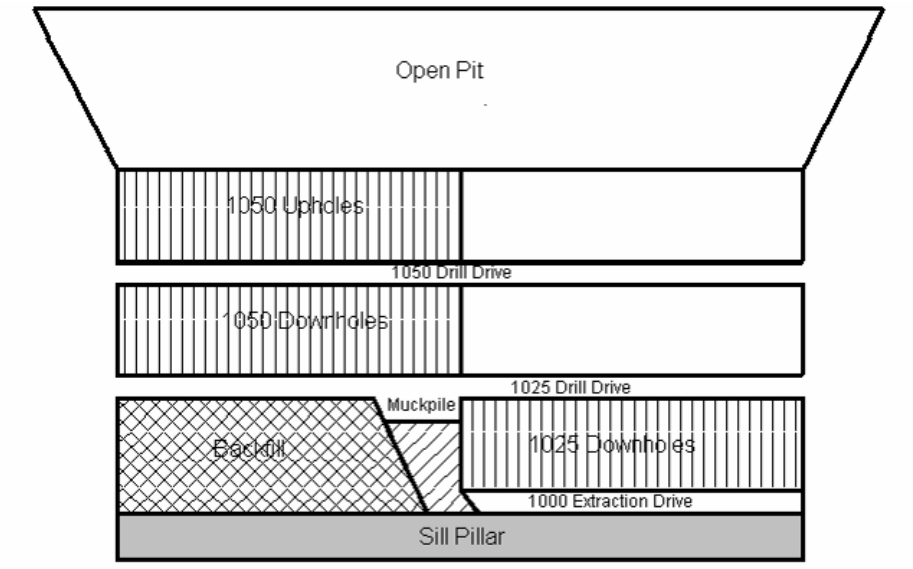

Figure 6 Down hole stope and fill mining method
From Abel and Gerritsen (October 2007a)

Level 1050, 1025 & 1000 Development

All horizontal development is to be supported with meshing and bolting.

Figure 4 shows the access through waste rock (blue) to ore development drives (brown and yellow) on the first three levels. Access to Level 1000 is taken off the decline at a higher elevation to maintain the inundation water surge capacity of the rock filled 1000 Level stope, while reducing risk of water flow to the decline and lower development. Particular aspects of the underground development are:

- stockpiles (pink and white) and return airway access are established on each level;
- sub-vertical return airways (dark pink) between Level 1050 and the surface and between each subsequent level; and
- an escape way access is established on each level and sub vertical escape ways (light blue) between Level 1050 and the surface and between at each subsequent level.

Level 1000

The first production ore is available after initial firing and extraction on Level 1000. Production holes for Level 1025 stoping will be drilled up from Level 1025. Once all the stope ore is hauled to the surface, backfilling of the stope with waste rock previously stockpiled on surface will commence. It will then be necessary to re-establish loader access to Level 1025 on the top of the backfilled stope. Figure 6 shows the 1000 Level stopes backfilled with rock to provide an inundation surge barrier.

Level 1050 & 1025 Stope Development Stage 2

The stoping sequence represented in Figure 6 also applies for the 1025 and 1050 Levels above the 1000 Level backfilled stope. The stopes are backfilled with development waste via the opening created in the pit when the 1050 Level stopes are fired. The backfill material provides support for the open stope walls

and the existing pit walls. Backfilling follows closely behind stope firing and ore extraction to minimise the spans of unsupported walls, and hence the risk of wall failure.

Sill Pillar – Level 975 Development

A 10 m sill pillar of low grade ore will remain intact between Levels 1000 and 975. The sill pillar marks the transition from backfilled stoping methods to uphole bench stoping. The pillar will be formed by drilling a 10 m high uphole stope from the 975 Level, instead of the full height 20 m stope.

Uphole Bench Stoping

Uphole bench stoping is a top down mining method designed to produce stope ore as each level of ore development is completed, leaving permanent island pillars in lower grade zones within the stopes. The sequencing for uphole bench stoping is illustrated by Figure 7.

Uphole bench stoping is used for isolated stopes and for early ore production as ore is made available at the completion of each development level. The location of island pillars is flexible, allowing their location in lower grade and/or less stable zones.

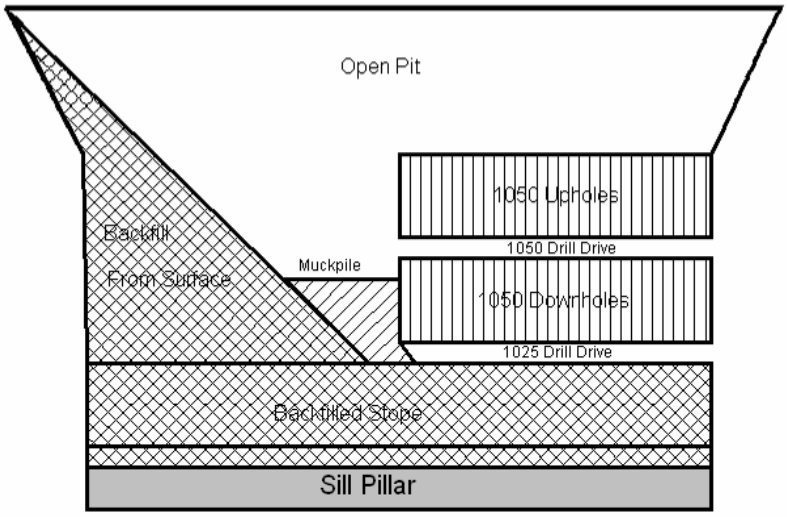

Figure 7 Uphole Bench Stoping
Adapted from Abel and Gerritsen (October 2007a)

Level Development

Figure 4 shows the uphole bench stoping areas below the 10 m sill/crown pillar. The development layout is similar to the stope and fill mining above, with access through waste (blue) to ore development drives (brown and yellow). Stockpiles (pink and white) and return airway accesses are established on each level. Sub vertical return airways (light red) are developed between each level. Escape way accesses and sub vertical escape ways (blue) are developed on and between each level. All horizontal development is to be supported with meshing and bolting.

Stope Development

The stope height for the 975 Level stopes is reduced to 10 m to maintain the 10 m crown pillar below the 1000 Level, all other stopes are 20 m in height – opening to the levels above. Production holes for each stoping level are drilled up from that level. Production ore is available after initial firing and extraction

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once stoping is completed on the level directly above. Stope wall stability is maintained by leaving island pillars within the stopes. This negates the requirement to import fill material when waste development is minimal in the later stages of the mine life.

Project Schedule

The schedules for other projects outlined in the Project Description will influence the project schedule for Maud Creek. At this stage Terra Gold proposes to commence construction work associated with the re-opening of the Maud Creek mine in September 2009, depending on Government approvals. Ore production is expected to re-commence in mid-2010 and is expected to continue for an estimated ten years. A proposed operational timeframe that includes construction, operation, rehabilitation and monitoring is presented in Table 3.

The potential mine footprint is greatly reduced due to underground operations and placing infrastructure in areas previously disturbed by agricultural development or past mining activity. The total mine footprint area is 113.9 ha, of which new disturbance (mainly for the new access road) is approximately 18.1 ha.

Table 3 Operational Timeframe

Year	2009	2010	2010	2011	2011	2012	2012	2013	2013	2014	2014	2015	2015	2016	2016	2017	2017	2018	2018	2019	2019	2020	2020	2021	2021	2022	2022	2023	2023	2024
Quarter	Q3	Q1	Q3	Q1	Q3	Q1	Q3	Q1	Q3	Q1	Q3	Q1	Q3	Q1	Q3	Q1	Q3	Q1	Q3	Q1	Q3	Q1	Q3	Q1	Q3	Q1	Q3	Q1	Q3	Q1
Activity																														
Site Preparation																														
Construction																														
Operations																														
Rehabilitation and monitoring																				Continued until decommissioning >>>>										

Rehabilitation and Decommissioning

A Rehabilitation and Mine Closure Plan (RMCP) will be developed according to current best practice for closure planning. The RMCP will include the existing open pit and waste rock stockpile. The mine infrastructure will be required for the duration of mining activities; therefore the rehabilitation activities are not planned to occur until mining operations have ceased.

A monitoring period of five years is proposed in the project schedule to demonstrate the effectiveness of the rehabilitation works. However, closure will be considered to be achieved when it is demonstrated that the site is rehabilitated to a level that is consistent with the closure criteria. The closure objective for the existing waste rock stockpile adjacent to the existing open cut mine pit will be to re-stabilise the landform and revegetate it with mixed native woodland consistent with surrounding native woodlands in rocky habitats.

Monitoring will assess soil contamination, surface water quality, groundwater quality, revegetation, site stability and mosquito habitat. The revegetation strategy is aimed at ensuring rapid revegetation of disturbed areas prior to the onset of heavy wet season rain. Weed control and fire management will be critical factors in the success of the revegetation strategy.

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Rehabilitation and Decommissioning Commitments

Terra Gold commits to rehabilitation in accordance with an approved RMCP.

Terra Gold commits to monitoring rehabilitation success with the aim of continually improving the quality of its rehabilitation and closure outcomes.

Terra Gold commits to consulting with relevant stakeholders on the potential use of the pit voids and mine water dam for stock watering, and whether or not to fence the pit voids and mine water dam around the abandonment bunds.

Terra Gold commits to documenting rehabilitation and closure requirements into a RMCP, consistent with DPIFM requirements for rehabilitation and closure, and to accounting for rehabilitation and mine closure costs. An outline of the RMCP will be included in the MMP.

Environmental Issues and Management Controls

Geology, Soils and Landforms

The major rock units represented near the mine site are metamorphosed sediments of the Tollis Formation, volcanic rocks namely Maud Dolerite and Antrim Plateau Volcanics and sedimentary sandstone and conglomerate members of the Kombolgie Formation. The Kombolgie Formation overlies the Tollis Formation and the Maud Dolerite. Antrim Plateau Volcanics are the most recent and overlie all other geological units. The orebody consists of transition and primary ores containing refractory gold, which is associated with sulphide mineralisation as arsenopyrite and pyrite. Although carbonates (principally calcite) provide buffering capacity in the waste rock.

The terrain at the Maud Creek site is undulating, mildly dissected lands with broadly rounded crests and low rises with slopes between one and three percent. Steep rugged, dissected plateaus and scarps associated with the Arnhem Plateau and underlying Kombolgie Sandstones form a sharp boundary immediately adjacent to, but outside, the site boundary on the northern side of Maud Creek.

The soils are varied and range in depth from shallow and rocky in sloping terrain to deep in level to gently sloping terrain over rock. Soil types vary with parent material. The metamorphic and sedimentary geologies produce loams and sands, sometimes sodic at depth (Kandosols, Sodosols). Carbonate parent materials of the Tindal Limestone produce calcareous soils (Calcarosols) some distance from the operational mine area. The volcanic geology produces cracking clays (Vertosols). Soils variation in physical and chemical properties is closely related to parent material. Kandosols and Sodosols are more extensive in the immediate mine area. Areas of basalt outcrop have produced localised Vertosols adjacent to the operational mine area.

Soils & Landforms Commitments

Terra Gold commits to undertake effective sediment and erosion control.

Groundwater

Groundwater levels in the Maud Creek area are between one and six metres below ground level, depending on topography. Groundwater flow is to the north east, towards Maud Creek. Seasonal variations in groundwater levels are expected to be between two and four metres.

Regional groundwater yields are low, in the areas of unfractured Tollis Formation, Maud Dolerite, and Antrim Plateau Volcanics. Yields are higher where cavernous limestone or fractured rock is intersected.

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Locally, within the Maud Creek Deposit, groundwater yields of up to 1,200 kL/day are reported (Dames and Moore, 1998).

Mine dewatering is required to stop the ingress of groundwater into the underground mine workings. The groundwater model has been used to estimate the extent of mine dewatering requirements. The proposed underground mine schedule is to be developed over a 10 year mine life, and this mine life has been included in the groundwater model to simulate the groundwater abstraction from the dewatering system.

The estimated total groundwater inflow rate for the first year is estimated at about 3,400 kL/day, with groundwater inflows progressively decreasing to 1,700 kL/day by the end of mining.

Drawdown caused by underground dewatering has the potential to lower groundwater levels near Gold Creek within the first two years of mining and potentially Maud Creek in the longer term. As a result, in areas where hydraulic connection exists between the creeks and underlying aquifers, there is a potential for reduced creek flows during the low stream flow periods in November to December and April to May due to groundwater drawdown.

However, during these periods, the flow in Gold Creek will rely more on groundwater discharge from the predominantly limestone aquifers in the upper part of the Gold Creek catchment rather than the local aquifer system in the vicinity of the mine. Groundwater levels in other areas of Gold Creek are generally below ground surface during the dry season, and provide insignificant seepage flow in the creek.

The groundwater is calcium/magnesium bicarbonate type, with a chemical composition typical of recently recharged groundwater. The pH of groundwater is slightly alkaline with measured pH values ranging between 7.8 and 8.2. Measured groundwater quality does not meet Australian drinking water guidelines for arsenic and in some locations selenium concentrations. Groundwater quality is acceptable for stock water supply.

Groundwater Commitments

Terra Gold commits to monitoring groundwater quality prior to commencement, during and following completion of mining activities.

Terra Gold commits to monitoring of groundwater levels fluctuations to assess any impacts of the underground mine dewatering, especially in areas where a lowered water table could occur.

Terra Gold commits to monitoring of groundwater levels fluctuations to assess any impacts of the irrigation area.

Terra Gold commits to monitoring of soil and groundwater quality to assess any impacts of the irrigation area, in particular in relation to arsenic levels, in particular in relation to arsenic levels.

Surface Water

The project area is located on Gold Creek, a tributary of Maud Creek, which flows into the Katherine River down stream of the Katherine Gorge and upstream of the Katherine Township and the Donkey Camp water supply extraction point. The Gold Creek catchment is approximately 23.5 km^2 in area, or 0.27% of the catchment area of the Katherine River, above the Donkey Camp pumping station. Beneficial use of surface waters in the project area is limited to small stock water supply dams. However, runoff from the Gold Creek and Maud Creek catchments contribute to flow in the Katherine River. The larger Katherine River catchment provides potable water supply to the town of Katherine via a water extraction point at Donkey Camp 30 km downstream from the mine site.

The operational area (pit, ROM pad, office, workshops, waste stockpile, etc) is surrounded by a flood protection bund (1:500 year flood event protection) and has a catchment size of approximately 22.4 ha.

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This represents less than 1 % of the Gold Creek Catchment. Runoff from this area will be directed via a mine water dam to an irrigated land application system.

The mine water management system is designed to isolate overland flow in the mine area from Gold and Maud Creeks, and to dispose of the mine water in a sustainable way. The operational area will be fully bunded, with sumps to collect surface water for transfer to a Mine Water Dam and then to irrigation. Through this strategy the potential risk to drinking water supply in the Katherine River and ecological values in Gold and Maud Creeks are reduced to a low level.

Surface Water Commitments

Terra Gold commits to implementing a water management system that does not directly discharge to the creek system.

Terra Gold commits to monitoring to detect surface water quality impacts on Maud Creek.

Terra Gold commits to monitoring and inspecting the irrigation system to demonstrate sustainable operation.

Terra Gold commits to inspecting and completing any maintenance required for bunds that surround the operational area and the creek systems.

Terra Gold commits to giving high priority to remediating any breach that compromises the integrity of the mine water management system.

Flora

A referral of Terra Gold's Maud Creek Mine Project under the EPBC Act was submitted to the Commonwealth Department of the Environment and Water Resources (DEWR) on 20th December 2006. A decision was made on 24th January 2007 that the proposed development was not a controlled action, and therefore no approval is required under the EPBC Act.

The main vegetation communities within the project area may be broadly grouped as either woodlands, low woodlands or low open woodlands, all of which were determined to be of low conservation significance. None of the communities likely to be impacted by construction and operation of the proposed operations site are habitats with exceptional ecological significance.

Road construction generally facilitates increased frequency of wildfires and controlled burns, lit for fire management purposes. Hence a potential indirect impact of road construction in fire-sensitive and fire-affected communities may be habitat degradation, due to increased frequency of fire. Road construction activities and road use could also facilitate the introduction of weeds into adjacent areas.

A search of the Northern Territory Government database for records of plant species collected from the Maud Creek Gold project area revealed no previous records. Expansion of the search to include an area of 0.1 degree latitude and 0.1 degree of longitude which encompassed the project area recorded a total of 51 plant species. All are classified as LC (least concern) in terms of conservation status.

None of the 153 plant species recorded during this survey are listed under Commonwealth legislation (EPBC Act) as vulnerable, threatened, rare or endangered (see IUCN categories and criteria at *http://www.redlist.org).*

Eight of the recorded plant species are listed as endemic to the Northern Territory and seven of these species are considered to be of least concern in terms of conservation value. One endemic species *Tephrosia humifusa,* recorded at five of the 16 study sites surveyed, is listed as NT (near threatened) on the Northern Territory database.

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All other plant species recorded during the flora survey are listed as LC and therefore of lower conservation significance. Plant species classified as LC are considered to be widespread and abundant with healthy populations that are not in decline. Near Threatened taxa are not yet classified as threatened, and exist either as small fragmented populations, or occur in populations thought to be in decline.

T. humifusa appeared to be locally common, occurring at over one quarter of full floristic study sites and in a range of habitat types from low open woodland to low woodland and open forest along riparian corridors. The Northern Territory Herbarium holds records of *T. humifusa* from 5 different locations in the Top End of the Northern Territory. The current known distribution for this species appears to span an area from Maningrida to the southern end of Kakadu National Park. The Maud Creek population represents a sixth location for this species and an extension of the known range.

A total of 19 exotic species were recorded during the 2007 vegetation assessment survey. Six species are declared as Class B under the Northern Territory *Weed Management Act 2001* indicating that the land owner must make a reasonable attempt to control and prevent the spread of these species. These species are: *Calotropis procera* (rubber bush), *Senna obtusifolia* (sicklepod), *Hyptis suaveolens* (hyptis), *Sida acuta* (spinyhead sida), *Themeda quadrivalvis* (grader grass) and *Pennisetum polystachion* (mission grass).

The remainder are environmental weeds, which do not have declared status under the *Weeds Management Act 2001*.

Flora Commitments

Terra Gold commits to minimising the area to be cleared during construction and mining operations.

Terra Gold commits to applying recognised best practice in its revegetation program.

Terra Gold commits to minimising dust impacts on native vegetation by regularly watering haul roads and run of mine areas to control dust.

Terra Gold commits to an active weed management and mitigation program for the project area.

Terra Gold commits to an active fire management program incorporating fuel reduction burns, fire break maintenance and control of high fire risk pasture grasses around the mine site to minimise the risk of hot wildfires, and to enhance biodiversity values where appropriate.

Terra Gold commits to managing the rate of water application to irrigated land so as to prevent land degradation, and potential off site environmental impacts.

Fauna

With the exception of limestone karst areas that are located near the access roads, there are no habitats present that are ecologically outstanding or display high levels of fauna diversity. The limestone karst areas are not as extensive or as spectacular as other examples in the Katherine region, however they are of local significance as specific wildlife habitat as well as being generally protected from fires and livestock.

A total of 144 native terrestrial vertebrate species and six introduced were recorded during the survey, including 30 mammal (including 16 microchiropteran bat species), 91 bird, 18 reptile, and eleven amphibian species.

Under Commonwealth legislation (EPBC Act), there are eleven bird species, one mammal, one fish and one reptile of conservation significance that could potentially occur in the vicinity of the project area. There is also one bird species listed for the project area under the NT legislation and PWC Act.

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Recorded sightings of threatened fauna (listed under the TPWC Act) in the vicinity of the project area include red goshawk (*Erythrotriorchis radiatus)* and Australian bustard (*Ardeotis australis)*. Eight of the nine bustard sightings are from the recent surveys conducted for this EIS, with the remaining sighting coming from NRETA records.

Consequently, the proposed mining development represents a localised and minor impact on the survival of these species. However, monitoring the activity of these species in the vicinity of the mine may contribute to their conservation.

Six introduced vertebrate fauna species were recorded during field surveys within the study area, including cattle (*Bos primigenius*), swamp buffalo (*Bubalus bubalis*), donkey (*Equus asinus*), feral cat (*Felis catus*), feral pig (*Sus scrofa*) and cane toad (*Bufo marinus*). While the dogs observed within the site appear to be reasonably pure dingoes (*Canis lupus dingo*), it is also likely that feral dogs are present in the local area and that local dingo populations have interbred with feral dogs.

Cane toads (*Bufo marinus*) are likely to have arrived in the Maud Creek – Cutta Cutta area in 2001. This species is now abundant within the project area.

Fauna Commitments

With respect to protecting terrestrial fauna:

Terra Gold commits to minimising areas of disturbance, particularly where native trees and vegetation exist.

Terra Gold commits to providing a buffer area of at least 50 m between the proposed new access road and the limestone karst areas along the alternative road access alignment.

Terra Gold commits to retaining large trees as nesting and refuge habitat where this is practical.

Terra Gold commits to conducting fuel reduction burns around the mine site during mining operations to minimise the risk of hot wildfires, and provide a spatial diversity of habitat structures.

Terra Gold commits to a 60 km/hr speed limit along access roads to the mine to minimise risk of injury to animals from mine vehicles.

Terra Gold commits to fencing off the mining area, and installing cattle grids on the access roads, to prevent entry to the site by buffalo and cattle.

Terra Gold commits to removing cattle and water buffalo from the project area during operation of the mine.

Terra Gold commits to reporting any identified mammal deaths and injuries that result from mining operations, and implementing mitigation strategies where required.

Terra Gold commits to assessing the quality of the water in the pit void for its suitability as a water source for livestock and native animals after mine closure, and to fencing off the pit void if it is unsuitable for drinking by animals.

Terra Gold commits to appropriate waste management strategies that reduce the population of feral animals on the mine site.

Terra Gold commits to controlling feral animals (buffaloes, pigs) and weeds in the vicinity of the mine.

With respect to protecting aquatic fauna:

Terra Gold commits to not realigning Gold Creek as part of this mine development.

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Terra Gold commits to buffering disturbed areas as far as practicable from the creek system and intercepting drainage from disturbed areas before it enters the creek.

Nitmiluk National Park

Development of the gold mining project at Maud Creek will not have a direct impact on the conservation, cultural or tourism values of Nitmiluk National Park. The mine site is located approximately two kilometres from the boundary of the southern section of the Park, and all mine haulage will be directed south of the mine site, away from the Park and access roads utilised by Park visitors. The underground nature of mining activities and the absence of processing facilities on site mean that impacts of noise, vibrations and dust will not extend to the Park boundary. Terra Gold will implement fire management, feral animal control and weed control plans to mitigate potential impacts on biodiversity values inside the park boundary. Mitigation of potential impacts on the park will require ongoing consultation with the Nitmiluk Park Board with reference to land management plans for the park and any issues associated with the mine.

Nitmiluk National Park Commitments

Terra Gold commits to ongoing, regular consultation with the Nitmiluk National Park Board, to ensure that any potential impacts of the mining operation on the Park's natural, cultural or tourism values are identified and managed as appropriate.

Terra Gold commits to preventing access by company employees to the detached area of Nitmiluk National Park across Maud Creek .

Air Quality and Noise

Due to the relatively remote location of the site, any risk of nuisance or potentially health-threatening effects of dust and noise to humans is minimal. However, appropriate measures will be taken to limit dust and noise impacts, to ensure site safety and prevent dust or noise nuisance.

The previously disturbed areas in the Maud Creek Project area have naturally revegetated leaving minimal exposed ground. Changes in dust emissions due to the Maud Creek Mine development are associated with construction and haulage on the unsealed access road to the mine rather than the underground mine. Any potential impact from dust on flora and fauna will be limited to within 20 to 30 metres of the access road during the dry season.

Dust generation is expected to peak during the construction period. Potential dust generating activities include: earthworks associated with clearing levelling and grading for facility construction; decline construction; stockpiling and other operations. Mitigation will include minimising the disturbed area and using water trucks to dampen exposed areas and roadways.

During mining operations, potential dust generating activities include: hauling ore from the underground; stockpiling and ore transport to the offsite processing plant at URGM.

Noise will be generated from surface mine vehicles and machinery, explosives and haul trucks. Noise levels will be within acceptable occupational health and safety standards.

Blast noise will be highest during initial construction of the mine portal (approximately two weeks). Thereafter, underground blasting will have negligible effect on above ground noise levels. Vibration from blasting may be felt within approximately one to two kilometres.

Ore haulage during operations will generate traffic noise along the haul route. The proposed route for transporting ore via an internal haul road connecting to the Stuart Highway through Katherine to URGM for processing is shown in Figure 8.

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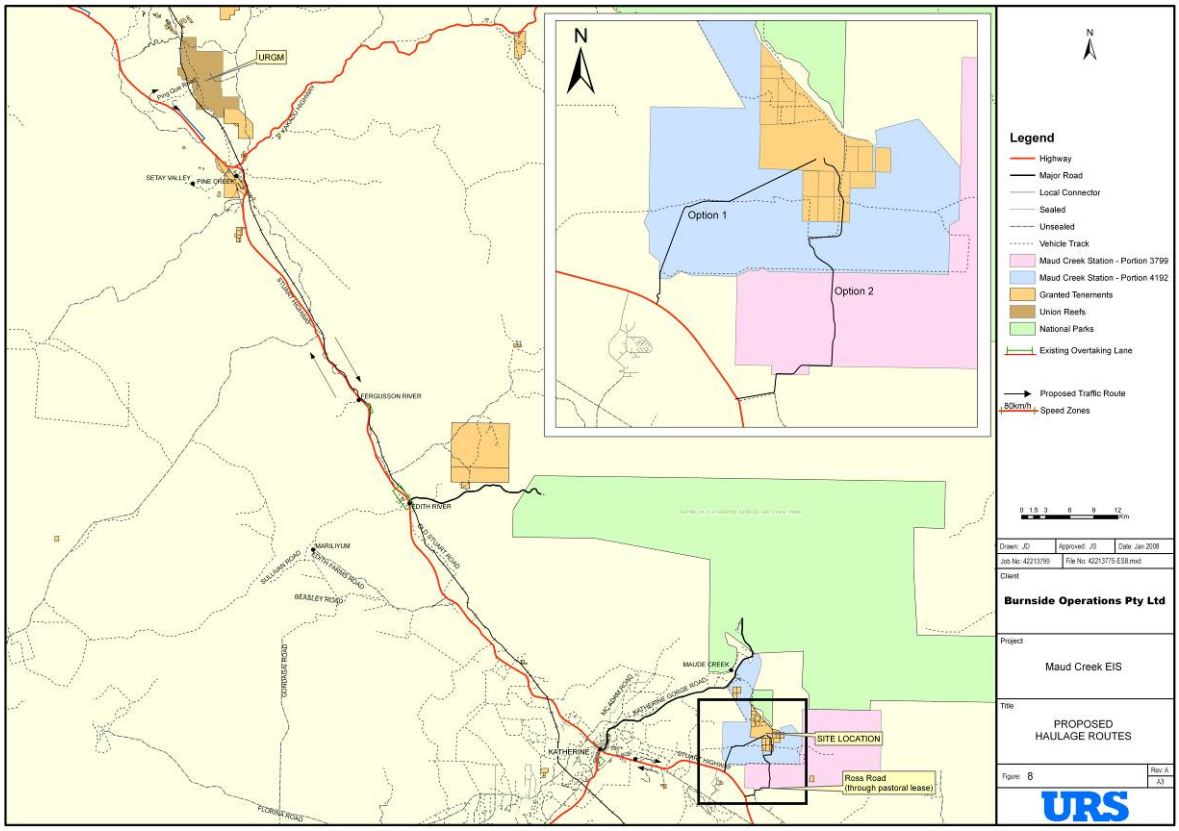

Figure 8 Proposed haulage routes

During the project, personnel will commute to and from the mine site daily, mainly from Katherine, which is located approximately 20 km west of the project site. The route taken by personnel will be via the Stuart Highway. Site supplies will also be transported from Katherine. Cars and minibuses will be used to commute between Katherine and the mine site for mine shift changes day and night, seven days a week, throughout the life of the mine.

Carbon dioxide equivalent emissions (CO_2^e) resulting from 18 ha of additional land clearing will be approximately 2,700 t during the development of the project, with approximately 1,090 expected to be sequestered through the rehabilitation and decommissioning phase. The operational phase will have emissions of approximately 121,000 t CO_2^e, mostly due to diesel (37,000 t CO_2^e) and electricity (79,000 t CO_2^e) consumption. Net emissions from the mine over the life of the operation are expected to be approximately 122,000 t CO_2^e, which is equivalent to 24.3 kg CO_2^e/t of ore produced.

Air Quality & Noise Commitments

Terra Gold commits to documenting and managing any complaints received about the mine's impact on air quality, noise and vibration using Terra Gold's incident reporting system.

Terra Gold commits to using water trucks and sprayers as required during dry or windy conditions to suppress dust from mine vehicles/haul trucks, stockpile deposition and haulage activities.

Terra Gold commits to covering the truck trailers for ore transport to URGM.

Terra Gold commits to bituminising the gazetted section of the access road.

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Terra Gold commits to installing soundproofing and/or noise abatement devices, where practicable.

Terra Gold commits to making hearing protection equipment available onsite in areas where noise reduction engineering controls are deemed ineffective or inappropriate.

Terra Gold commits to providing signage indicating areas of the operations where hearing protection is required to be worn.

Terra Gold commits to developing a program that monitors fuel and electricity use on a monthly basis.

Terra Gold commits to investigating options for increased energy efficiency through the life of operation of the project and during decommissioning.

Fire

The issue of weed control is intrinsically linked with fire management at Maud Creek. Fuel loads in the vicinity of the mine site and haul road will be managed through fuel reduction burning, usually early in the dry season. Bushfires Council NT has advised that this is currently the only effective method of providing adequate insurance against destructive late season fires. Fire breaks will be maintained around the perimeter of the mine site, with at least annual upgrades of grading and/or burning.

Fire Management Commitments

Terra Gold commits to a 'No Unauthorised Fire' policy within the mine area.

Terra Gold commits to developing a fire response procedure for accidental fire ignition or wildfire, and to maintaining fire-fighting equipment and accessible water resources on site at all times.

Terra Gold commits to maintaining firebreaks around the mine site.

Terra Gold commits to controlling grassy weeds around the mine site that may increase the fuel load and alter fire regimes.

Cultural and Historical Environment

Sixteen Aboriginal archaeological sites have been identified during field surveys in the Maud Creek project area. These include 14 stone artefact scatters and three stone quarries (one of the quarries is associated with an artefact scatter). Of the sixteen artefact scatters identified at Maud Creek, eight have been assigned 'high' archaeological significance, three have 'moderate' significance, and five have 'moderate to low' significance. Also, two of the three stone quarries were described as highly significant, due to the rarity of quarries appearing in the Maud Creek area and their potential to contribute to further research. One of the quarries and two of the scatters are close to the proposed mine site and it is therefore recommended that they be protected by fencing and temporary signage.

Over 240 isolated stone artefacts were identified in the four surveys of the broad project area, including along the proposed haul road. Of these, 162 were identified in the survey of the southern portion of the mining lease while three were identified in the survey of the access and haul road route.

In July 2007, Terra Gold was granted a clearance certificate from the Aboriginal Areas Protection Authority (AAPA) for the mining lease and proposed new haul road, confirming that no Aboriginal sacred sites exist in the area proposed to be disturbed. The area is not covered by any Native Title claim.

There are three sites of archaeological interest located close to the proposed mine footprint. These are all Aboriginal artefact scatters and are located near the existing or proposed site access roads. These sites are protected under the Northern Territory Heritage Conservation Act and require Ministerial approval to disturb. Up to 165 isolated artefacts could be disturbed by the proposed mining project. These artefacts

do not constitute official archaeological sites, but Ministerial permission is still required to disturb these before mining commences.

No sites registered on the Australian Heritage database occur in the project area.

Cultural & Historical Issues Commitments

Terra Gold commits to applying for Ministerial permission to disturb or destroy the three archaeological sites (Sites 1, 5 and MC13) and the various isolated artefacts that are located close to or within the development footprint.

Terra Gold commits to placing temporary fencing and signage around Sites 2, 3, 4, and 6 to protect them from disturbance.

Terra Gold commits to implementing an Archaeological Chance-Find Procedure to direct mine staff, contractors and visitors in the event that suspected archaeological material is discovered during mine construction or operation.

Terra Gold commits to restricting staff access to areas of NNP that are closed to the general public.

Traffic and Transport

Over the ten year life of the mine, all ore will be hauled to URGM, using 100 t capacity quad semi-trailers. There are two haulage route options available for transporting ore from the Maud Creek mine site to the Stuart Highway (figure 8).

- Option 1 - a proposed new access and haulage road leading south west from the mine pit and crossing the pastoral land on Maud Creek Station, before joining a short unnamed gazetted road, and exiting onto the Stuart Highway.
- Option 2 - the existing access road and Ross Road, which lead south east from the mine site to the Stuart Highway. With this option the access track will be upgraded and widened, and a crossing will be installed over Gold Creek, to enable haulage to continue during periods of high water flows in the creek.

For the majority of the mine life, Option 1 will be Terra Gold's preferred haulage route, as mine traffic will be separated from public road users on Ross Road, and the south west alignment reduces the total travel distance to the highway, and URGM. Option 2 is likely to be used at the commencement of operations, while the mine infrastructure and the Option 1 route are being developed.

With either of these options, the haul road from the mine site to Stuart Highway may be sealed to protect the road surface. It is not anticipated that upgrades to Ross Road or its intersection with the Stuart Highway will be required.

The intersection at Stuart Highway and the Option 1 route alignment provides over 600m of visibility along the Stuart Highway in both directions. This allows greater visibility than that available for traffic at the existing Ross Road intersection (Option 2), allowing more warning to vehicles travelling in both directions along the highway, that trucks are entering or turning off to the mine site. Adequate sight distances are important for road safety, as they allow vehicles warning time to slow down or stop if trucks break down or stall while turning.

Commencing in late 2008, haulage from Maud Creek to URGM is expected to occur year-round during daylight hours for the life of the mine. The mining operations are estimated to require 30 road train movements per day (15 full and 15 empty). The travel time between the mine site and URGM will be approximately 90 minutes.

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Site supplies will be transported to the Maud Creek mine site from Darwin, Cosmo Camp, Pine Creek and Katherine as required. Staff commuting to the mine site will mainly be travelling from Katherine, via cars and minibuses, with commuting occurring across a 24 hour period throughout the life of the mine. Approximately 15 small vehicles including one or two minibuses are likely to be used daily to transport employees to site.

Currently, 1,204 vehicles per day (both directions) use the section of the Stuart Highway between Ross Road (the turnoff to Maud Creek) and Ping Que Road (the turnoff to URGM); 882 small vehicles (mainly cars), 60 heavy vehicles (road trains), and 262 towed vehicles (caravans) or trucks of up to six axles.

As a result of Terra Gold's operations at Maud Creek, these numbers are expected to rise to 1,266 vehicles per day (both directions); an additional 32 quad road train movements (50% increase) and 32 small vehicle movements (3.6% increase). The small vehicles increase in the existing traffic levels is considered minor and is not anticipated to pose a significant safety or traffic issue.

The principal safety concern associated with the increased road train usage will be at the two highway intersections. Option 1 allows for greater visibility than the existing Ross Road intersection thus reducing the potential for accidents. Overtaking opportunities is another traffic management issue. Between Maud Creek and URGM, northbound there is a 3.1 km overtaking lane and southbound there are two overtaking lanes of 1.2 km and 3.1 km. There are also several other areas where overtaking road-trains is possible.

The increase in quad semi-trailer traffic will also apply to the Adelaide to Darwin Railway crossing near URGM. These rail crossings are fully signalled, to alert drivers and reduce the potential for accidents.

The load on a single truck axle with four tyres is called an equivalent single axle (ESA, measured in tonnes). For safety and to protect the road surface, the Department of Planning and Infrastructure (DPI) apply a load limit of 8.2 ESA (i.e. 8.2 tonnes per axle) to heavy vehicles. A typical loaded quad semi-trailer from Maud Creek mine site is expected to be 7.3 ESA, which is beneath the maximum limit set by the DPI.

Terra Gold does not anticipate that Ross Road will require upgrading or significant maintenance if used for mine haulage at the commencement of operations. The unsealed access road will be maintained as necessary during this time.

Quad semi-trailer traffic associated with Maud Creek mining operations will travel through the main street of the Katherine township. The proposed 30 quad semi-trailer movements daily between 6 a.m. and 6 p.m. equates to approximately one truck movement every 24 minutes. This represents an increase of 3.1% on the 953 large trucks that currently travel through Katherine daily. The small vehicle movements are expected to increase by only 0.5% (current movements – 5,990 per day).

The current speed limit through the township is 50 km/hr - this is set by the DPI and the Katherine Town Council. In response to perceived safety impacts due to increased semi-trailer traffic through Katherine, Terra Gold proposes to limit the speed of mine haulage trucks to 40 km/hr, to reduce risks to pedestrians and limit the need for air brakes within the town.

Traffic & Transport Management Commitments

Terra Gold commits to photographing the condition of Ross Road, prior to operations commencing, to provide a base level against which the road will be maintained once operations begin.

Terra Gold commits to finalising discussions with DPI regarding Stuart Highway and Ping Que Road and Ross Road intersection upgrades.

Terra Gold commits to implementing a thorough care and maintenance program during the operational period along Ross Road section of the haulage route (if Ross Road is used).

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Terra Gold commits to maintaining the road surfaces at the Stuart Highway intersections used by its ore haulage vehicles, if road conditions degrade due to heavy haulage.

Terra Gold commits to imposing a speed limit of 40km/hr for its quad semi-trailer trucks from the Katherine river bridge to the information centre.

Socio-Economic Issues

Although the proposed project is 20 km from the nearest town (Katherine) and is small in size, there are a number of potential issues and impacts that will need to be managed to ensure positive outcomes. During community and stakeholder consultations, the following were cited as the major items of concern: the creation of employment opportunities for local businesses or personnel living in the region; effects on the Nitmiluk National Park; safety on the Stuart Highway and maintenance of shared roads.

The project will be of indirect economic value as mining developments such as Maud Creek aid the expansion to local communities through local infrastructure development and improvement to facilities such as roads. The establishment of, and expansion to, local communities promotes activity in secondary industries such as tourism and recreation facilities.

Terra Gold personnel will bring increased business to the towns of Katherine, Pine Creek, Mataranka and Adelaide River, in particular through the demand for goods and services.

The mine site will use local skills and trades from within the Katherine business community. This will increase competition with current users. However, there is an expectation that the amount of work at the mine site will lead to some expansion of local business activity over the life of the mine.

Terra Gold are developing a Local Participation Plan in collaboration with Department of Business, Economic and Regional Development (DBERD), Northern Territory Industry Search and Opportunities (NTISO) and the Indigenous community to maximise local procurement opportunities. The Local Participation Plan will also specify the mechanisms that will be used to inform the local business community and workers of business and employment opportunities.

Socioeconomic Issues Commitments

Terra Gold commits to the development of a Local Participation Plan to maximise local employment and procurement opportunities.

Terra Gold commits to ongoing sponsorship of community events where appropriate.

Terra Gold commits to ongoing funding for two university scholarships a year in selected mining industry disciplines.

Terra Gold commits to consulting with stakeholders as required to address community concerns.

Biting Insects

A baseline biting insect assessment of the proposed Maud Creek mine site is being carried out. Several species have been recorded and there is potential for harm to human health from the diseases carried by these mosquitoes. Mitigation will include measures such as personal protection against the insects for the mine workforce, care regarding handling of equipment sourced from North Queensland and management of ponding water.

Executive Summary

Biting Insect Management Commitments

Terra Gold commits to advising all workers that pest and disease-carrying mosquito species may be periodically present at the Maud Creek mine site. Terra Gold will also provide advice on appropriate personal protection measures and ensure appropriate personal protection equipment is available in accordance with DHCS guidelines.

Terra Gold commits to ensuring that all water impoundments, access roads, sediment traps, pit dewatering activities, stockpile sites, and irrigation areas and mine infrastructure will be constructed and operated in accordance with DHCS guidelines.

Terra Gold commits to treating any equipment sourced from North Queensland that has previously held rainwater with a ten per cent chlorine solution or appropriate residual insecticide.

Terra Gold commits to the periodic inspections of artificial receptacles around the Maud Creek mine site in the wet season. Any receptacle that has the potential to pond water will be appropriately disposed of, stored under cover away from rain, will be fitted with drainage holes or treated with an appropriate larvicide, to prevent endemic mosquito breeding.

Terra Gold commits to the rehabilitation of Maud Creek mine site in accordance with DHCS guidelines.

Waste and Hazardous Goods Management

The planned mining operation will generate construction wastes, general operational waste and waste rock. However, due to off-site staff accommodation, off-site processing, the underground nature of the proposed mining operations the total waste volumes generated will be relatively low.

A waste disposal contractor from Katherine will conduct regular removal of rubbish from site. It is estimated that food scraps, office waste and general rubbish will give rise to approximately $10m^3$ of waste per month. Other inert wastes (such as packaging and pallets, and oily waste, batteries, etc.) are estimated to comprise a further 5 m^3 per month of waste. These wastes will be removed weekly for disposal at existing landfills at Katherine. The key principle for general waste disposal is segregation of waste for recycling.

Site personnel (up to 40 at any one time) will generate putrescible wastes, including solid waste, liquid waste and sewage. The solid waste stream will comprise putrescible waste from crib/office facilities, and from packaging. The liquid waste stream will comprise sewage and domestic waste water treated in a septic system that complies with the *Public Health and General Sanitation Regulation* (NT). The maintenance of the ablution facilities and septic tank/system will comply with Department of Health and Community Services guidelines.

During construction, hazardous goods will comprise general construction materials, hydrocarbons and other chemicals such as solvents, paints, cleaning products, sealants and adhesives. Most of these wastes will arise off-site, as pre-fabricated offices and ablution blocks, which will be brought to site.

During mining operations, hazardous goods will largely comprise explosives and fuel. Also, oxidising agents such as sodium hypochlorite (chlorine) solution will be used for potable water treatment and general domestic cleaning. Explosives and bulk fuel storage will be at existing facility

Dangerous goods will be transported according to the Australian Code for the Transport of Dangerous Goods by Road and Rail (1998). The mine will use diesel powered mining equipment. Diesel will also be used to power drills, pumps and generators. An 8,000 L mobile service fuel truck will be located on site during mining operations to refuel mine equipment including loaders, haul trucks and stationary diesel powered equipment. There will be a permanent 25,000 L fuel tank/station on site near the portal.

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All fuel storage areas will be bunded in conformance with the relevant Australian Standard to prevent contamination of the surrounding environment in the event of spillages. Maintenance of light vehicles will occur on site with some scheduled servicing taking place at established workshops at Katherine. Underground vehicles and site mobile equipment will be serviced on site in a dedicated workshop. One transport truck will be serviced at URGM. This strategy will minimise the contamination risks associated with hydrocarbons on site. All site fuel, chemicals and hazardous materials will be stored in accordance with the relevant Australia Standards.

Any chemical and/or oily waste will be collected in an identified 205 L drum and taken to Katherine for collection by a waste recycling and disposal contractor. Only very minor quantities are expected.

An explosives supplier will deliver bulk explosive material to the site where it will be stored in a magazine in accordance with the relevant Australian Standards. Explosives will arrive on site premixed and will be held in a magazine. The transport, management and laying of explosives will be carried out by the mining contractor. Magazine areas will be locked at all times and will be the responsibility of the contractor to maintain.

Appropriate training will be provided to personnel regarding hazardous goods. Appropriate measures will be put in place to ensure the safety of personnel and the environment with regard to hazardous goods. All hazardous and dangerous goods will be handled according to the information provided on the Material Safety Data Sheets (MSDS). Copies of the MSDS for each of the hazardous and dangerous goods used on site will be held at Maud Creek. Registers of all hazardous materials imported to Maud Creek site or generated as a result of site activities will be maintained and held on site. These will document the hazardous material's name, MSDS, location, approximate volume, storage method and where applicable, disposal method for the substance and containers.

Waste Rock and Minerals Management

There is an existing waste rock stockpile and an open cut mine pit at the Maud Creek site. The pit has a maximum depth of 40 m and the waste rock stockpile contains approximately 300,000 m^3 of oxidised non-mineralised rock, occupying an area of approximately 4.6 ha. The total waste rock stockpile volume will decrease as the existing stockpile is utilised for use as road base. The mine water dam will be constructed on the waste rock stockpile after the road base material has been extracted.

Approximately 75,000 m^3 of non-mineralised waste rock produced from the planned underground mine will need to be stockpiled temporarily before being used for backfilling of mined out stopes. Geochemical test work characterised this material as non-acid forming.

The acid-base accounting results from geochemical testing carried out from six backhoe pits (each one metre deep) identified the waste rock material from the stockpile as non-acid-forming (NAF). Total oxidisable sulphur content (in most cases less than 0.1%) were very low. The waste rock material is slightly alkaline and non-saline. Testing indicated that the waste rock material in the stockpile is benign, with little capacity to generate acid, and should generate pH-neutral runoff with a low concentration of soluble metals and salts. These results corroborate geochemical characterisation of waste rock materials that was undertaken in 1997 to support ongoing mining plans at Maud Creek.

Waste & Hazardous Goods Management Commitments

Terra Gold commits to all heath and environmental hazardous materials being disposed of in accordance with relevant legislation.

Terra Gold commits to the maintenance of mobile ablution facilities and sewage disposal in accordance with Department of Health and Community Services guidelines.

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Terra Gold commits to utilising a mobile fuel tanker and bunding fuel storage areas in accordance with AS1940 - 2004 Storage and Handling of Flammable Liquids and Combustibles.

Terra Gold commits to storing and handling explosives in accordance with AS2187.1-1998 Explosives - Storage, transport and use.

Terra Gold commits to handling all hazardous and dangerous goods in accordance with the relevant MSDS. Copies of all relevant MSDSs will be held at Maud Creek mine site.

Terra Gold commits to storing all fuel, chemicals and hazardous materials as per relevant Australian Standards.

Terra Gold commits to transporting dangerous goods in accordance with the Australian Code for the Transport of Dangerous Goods by Road and Rail (1998)

Terra Gold commits to maintaining a register of all hazardous materials imported to the site or generated as a result of site activities at Maud Creek.

Terra Gold commits to training all personnel in the appropriate handling, storage, disposal and containment practices for chemicals and hazardous goods, as relevant to their position.

Terra Gold commits to providing all personnel with appropriate safety equipment required for the correct handling of hazardous materials.

Terra Gold commits to providing spill response kits at Maud Creek mine site.

Terra Gold commits to developing an Emergency Response Procedure to ensure that the appropriate action is taken to minimise the environmental impact caused by incidents involving hazardous materials.

Terra Gold commits to placing waste rock mined from the portal during construction of the decline and underground mine development into the base of the open-pit or into a temporary stockpile for later placement underground or within the pit void.

Risk Management

Terra Gold is establishing strategic objectives and targets for the significant environmental risks identified in its Environmental Aspects and Impacts Register. For the purposes of this EIS, objectives and targets have been developed based on information in the 1998 EIS, additional baseline field surveys, consultation with key stakeholders, and the requirements listed in the EIS guidelines. Environmental risks will be regularly reassessed during the operational phases of mine development.

Risk Management Commitments

Terra Gold commits to an iterative process of risk assessment, where risks are reviewed on an ongoing basis to take account of changes in operational conditions, and community and stakeholder expectations.

Terra Gold commits to maintaining an emergency and crisis management system, providing a strategic framework for emergency prevention, as well as response in the event of an emergency situation.

Environmental Management System

Terra Gold has adopted the Environmental Policy of its parent company, GBS. Terra Gold and GBS are strongly committed to a high standard of site management and rehabilitation. Terra Gold's Environmental Policy has been developed, and committed to, at the highest level of management and is signed by the Chief Operating Officer, Tony Simpson. Terra Gold will systematically document the results of risk

assessments of the environmental aspects of their operations. These assessments will be documented in an Environmental Aspects and Impacts Register. For the purposes of this EIS, environmental issues and potential impacts have been drawn from information gathered from the 1998 EIS, while preparing the Maud Creek EPBC Referral, undertaking additional baseline field surveys, consultation with key stakeholders and reviewing the requirements listed in the EIS guidelines.

Environmental Management System Commitments

Terra Gold will implement an EMS at Maud Creek to enable systematic assessment and review of environmental impacts, targets and environmental performance measures with the aim of managing impacts in line with obligations and supporting continuous improvement.

Terra Gold will base its EMS on the AS/NZ ISO 14001:2004 Environmental Management System Standards, which are recognised worldwide and include a continuous improvement model.

Environmental Management Plans

Based on a preliminary assessment of the data gathered to date Terra Gold has developed the following EMPs for inclusion in this EIS:

- Groundwater;
- Surface Water;
- Flora;
- Fauna;
- Weeds and Pests;
- Biting Insects;
- Air Quality, Greenhouse Emissions and Noise;
- Fire and Fuel;
- Traffic and Transport;
- Cultural and Heritage Site Protection;
- Hazardous Substances;
- Domestic and Industrial Waste;
- Waste Rock and Ore Stockpile;
- Landform and Erosion Control.

Environmental Management Plans Commitments

Terra Gold will implement environmental management plans with the aim of reducing moderate to high level environmental risks and risks to public infrastructure, health and safety to a low level.

Stakeholder Involvement and Consultation

A comprehensive outline of the project was provided to many groups and individuals potentially affected by the project, or who perceived they could be affected. The emphasis of briefings was to encourage discussion, obtain feedback, listen to and understand concerns and respond to issues raised.

Community consultation for Maud Creek began after the Notice of Intent for Maud Creek was lodged in November 2006, with a briefing for key stakeholders held in Katherine in December 2006. During

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preparation of this EIS, consultation was undertaken with a wide range of stakeholders, including government agencies, non-government agencies and local businesses. The Jawoyn people identified their traditional hunting areas and agreed that the proposed mine should have no impact on them.

GBS Gold had a display at the 2007 Katherine Show, and manages a shopfront at a prominent location in Katherine.

The main issues raised by stakeholders during the current EIS preparation process were:

- the potential impact on the quality of Katherine's drinking water, through contamination of ground and surface water in the catchment;
- the potential for contaminated run-off from the site;
- the nature of processing on site, including the chemicals to be used;
- water turbidity during construction, the filtering capacity of the Power and Water Corporation's equipment, and the impact this could have on Katherine's water supply;
- waste rock storage and potential for acid mine drainage;
- the potential for seepage from tailings;
- the potential impact on Aboriginal sites of significance or hunting grounds;
- whether rehabilitation of the waste rock dump and tailings dam would be sufficient and what bonds would be paid by GBS;
- the social impacts on availability of housing and tradespeople;
- likely impacts of noise and dust from blasting and trucks;
- additional truck movements through Katherine;
- solute load issues;
- what jobs and training will be available to local people, including Indigenous employment and training programs; and
- the importance of baseline data so future impacts can be measured.

The project was considerably modified as a result of the comprehensive stakeholder consultation undertaken during preparation of the EIS.

Initially, it was proposed to conduct preliminary processing on site, to reduce the number of trucks carting ore through Katherine. However, the community's main concerns related to water quality, with a low tolerance for risk in relation to potential contamination of surface and ground water in the Maud Creek or Katherine River catchments. Therefore, all ore will now be transported directly from Maud Creek to Union Reefs near Pine Creek for processing. The significant reduction in potential environmental impacts to water quality was viewed favourably in subsequent stakeholder consultation.

All stakeholders were advised by letter of the changes and offered new briefings. It is important to note that the revised proposal negated many of the issues raised in the first rounds of community consultation, such as:

- waste rock storage and associated acid mine drainage,
- management of tailings,
- solute load issues in Maud Creek, which is a tributary of the Katherine River,
- potential for contamination of surface and ground water by chemicals used in initial processing, and
- acid mine drainage.

GBS has also noted advice given in community consultation meetings about the importance of an Indigenous employment strategy that goes beyond just making positions available to Indigenous people. GBS is now working with the Northern Land Council and Jawoyn Association to implement a comprehensive Indigenous and Employment Strategy that covers prevocational training, selection, and mentoring.

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Stakeholder Consultation Commitments

Terra Gold commits to maintaining stakeholder consultation by continuing to consult throughout the public review period and throughout the construction, operation and rehabilitation phase of the mining operations.

Terra Gold commits to developing a consultation strategy to ensure that current project information is delivered in a timely manner and in a way that is appropriate for all stakeholders.