Engineering Geology Ltd
CONSULTING GEOTECHNICAL, GEOLOGICAL AND EARTHQUAKE ENGINEERS

Unit 7C, Rosedale Office Park, 331 Rosedale Road
Albany, Auckland, New Zealand
PO Box 301054, Albany, North Shore 0752
Phone: 64 9 486 2546 Fax: 64 9 486 2556

Ref: 6846

Oceana Gold (NZ) Ltd
P O Box 5442
Moray Place
DUNEDIN 9058

2 May 2011

Attention: Mr M Hughes

Dear Marty,

RE: TTTSF LONG-TERM SEEPAGE DISPOSAL

This letter outlines options for and the preferred proposal for long-term management of seepage from the Top Tipperary Tailings Storage Facility (TTTSF). Tailings associated with the Macraes Gold Project – Phase III will be stored in the TTTSF over the period 2012 to 2020. The location of the TTTSF, relative to other components of the Macraes Gold Project, is shown in Figure 1. Seepage from the tailings stored in the TTTSF is collected via a network of subsurface drains located beneath the TTTSF (underdrains and upstream cutoff drains) and a chimney drain located within the embankment that forms the TTTSF. These drains discharge via pipes into a lined sump located immediately downstream of the TTTSF embankment. The locations of the subsurface drains and Seepage Collection Sump are shown in Figure 2.

During operation, seepage from the TTTSF is expected to be of the order of 1050m^3/day from both the underdrains and upstream cutoff drains and 750m^3/day from the chimney drain. Seepage collected in the Seepage Collection Sump will be pumped to the TTTSF and from here it is pumped to the Process Plant for use in processing the ore. At the completion of operation (i.e. closure) no water will be stored on top of the tailings and the TTTSF will be capped with soil and vegetated. Consequently the amount of seepage from the subsurface drains is expected to reduce with time to about half of that during operation within 10 years and in the longer term to about 120m3/day (1.4l/s) from both the underdrains and upstream cutoff drains and a similar quantity from the chimney drain.

Seepage from the TTTSF is expected to have levels of sulphate and arsenic that would preclude direct discharge to the Tipperary Creek in low flow conditions. Options for the disposal of the seepage have been reviewed by Golder (Ref.1). For the first 10-20 years following closure of the TTTSF seepage will be pumped directly to Frasers Pit. By this time seepage flows will have reduced significantly as noted above. The preferred options for disposal of seepage after this period are summarised below:

1. Construction of a water storage dam downstream of the TTTSF into which seepage would discharge and mix and be released at a regulated rate.
2. Construction of a seepage passive treatment 'wetland' based facility downstream of the TTTSF designed to reduce levels of sulphate and arsenic to acceptable levels for release in the downstream watercourse.
3. Disposal of seepage from the underdrains and upstream cutoff drains into Frasers Pit. This can be achieved by plugging the outlets of these drains where they discharge

downstream of the TTTSF and collecting seepage from the contingency outlets located on the western side of the TTTSF as shown in Figure 2. The seepage would be piped to the west beneath the Frasers East Rock Stack and discharge into Frasers Pit. The levels of the contingency outlets are about RL542 and so this would result in a higher level of long-term saturation of the tailings and increased seepage through the TTTSF embankment to the chimney drain. However, there would be an expectation of overall lower seepage discharge to Tipperary Creek. With this option the height of the chimney drain in the TTTSF embankment would require raising above its current design level of RL520.

4. Disposal into existing underground workings via a 750m deep inclined hole (engineered injection well) that discharges into a tunnel that connects with the Frasers underground workings.

The preferred option is Option 4. If however it is considered necessary to reduce the arsenic and iron levels in the seepage water before discharge into Frasers Underground a combination of Options 2 and 4 is feasible. This would therefore involve pre treatment of the seepage via a passive wetland (Option 2) followed by injection of seepage into Frasers underground workings (Option 4). The combined concept is shown in Figure 3.

The wetland consists of a passive aeration system followed by an aerobic reed bed populated by wetland plant species (Ref.1). The wetland should remove some of the iron and most of the arsenic. The wetland would extend for approximately 100m downstream of the Seepage Collection Sump. The downstream end of the wetland would be an engineered embankment so as to contain seepage. It would include a spillway to allow for overflow in extreme storms. Surface water diversion drains would be constructed either side of the wetland to prevent clean runoff from entering the wetland. At the downstream end of the wetland seepage would flow into a sump in which the injection well is located. The sump would consist of a perforated manhole structure surrounded by drainage aggregate. This arrangement would prevent debris from entering. In addition, the sump would have a cover to prevent direct entry of any objects and for security reasons. Access to the sump would be via a small causeway, constructed from rockfill, extending out into the wetland. This will allow vehicle access for maintenance of the injection well, including the ability to inspect by remote camera and to flush by high-pressure jetting if necessary.

The injection well consists of a 750m long hole that will connect with a tunnel advanced from the existing Fraser underground workings. The hole would be inclined at approximately 64 degrees below horizontal and be orientated in a northwest direction as shown in Figure 3. The hole would need to be diamond cored to achieve the required accuracy of alignment and would also need to be fully cased with conventional steel casing, and then a plastic liner installed inside the steel casing to provide long term durability. We recommend PN12/Class D PVC pressure pipe so as to minimise the risk of collapse due to vacuum or differential pressures and to provide long term durability. The nominal internal diameter of the PVC pipe is recommended to be 100mm. This is sufficient to take a flow of about 30litres/sec which is well in excess of that which is expected at 10-20 years after closure of the TTTSF. It allows for decrease in capacity due to build-up of any precipitates and for additional water collecting in the wetland due to incident rainfall and any local runoff. Seepage would discharge into the underground workings and infill the voids and mix with groundwater. Over time the groundwater will rise and re-establish at a new level. The expectation is that in the long term groundwater will flow towards Frasers Pit, which itself will become a lake with an estimated lake level of RL382.5 at 150 years after closure. Groundwater will have a component of tailings seepage, but further dilution will occur when mixed with the water in Frasers Pit and the discharge from the lake will meet acceptable surface water standards.

Goosenecks would be provided at the outlets of the subsurface drain pipes to restrict entry of oxygen and the likelihood of precipitate build up. Valves would be located on the outlets from the subsurface drains to temporarily stop flows to allow maintenance of the injection well. A siphon inlet is recommended at the entry to the injection well. The outlet from the injection well into the tunnel would have an elbow on it so as to prevent entry of oxygen into the well from the underground workings. This is to reduce the likelihood of precipitate build up in the well. An externally mounted flowmeter would be installed to allow monitoring of flows.

Yours sincerely
ENGINEERING GEOLOGY LTD

T Matuschka, CPEng

Encl: Figures 1 to 3

REFERENCE

Golder Associates (2011) 'Macraes Phase III Project, Water Quality Effects Mitigation Options', Report No.0978110-562 RO9.

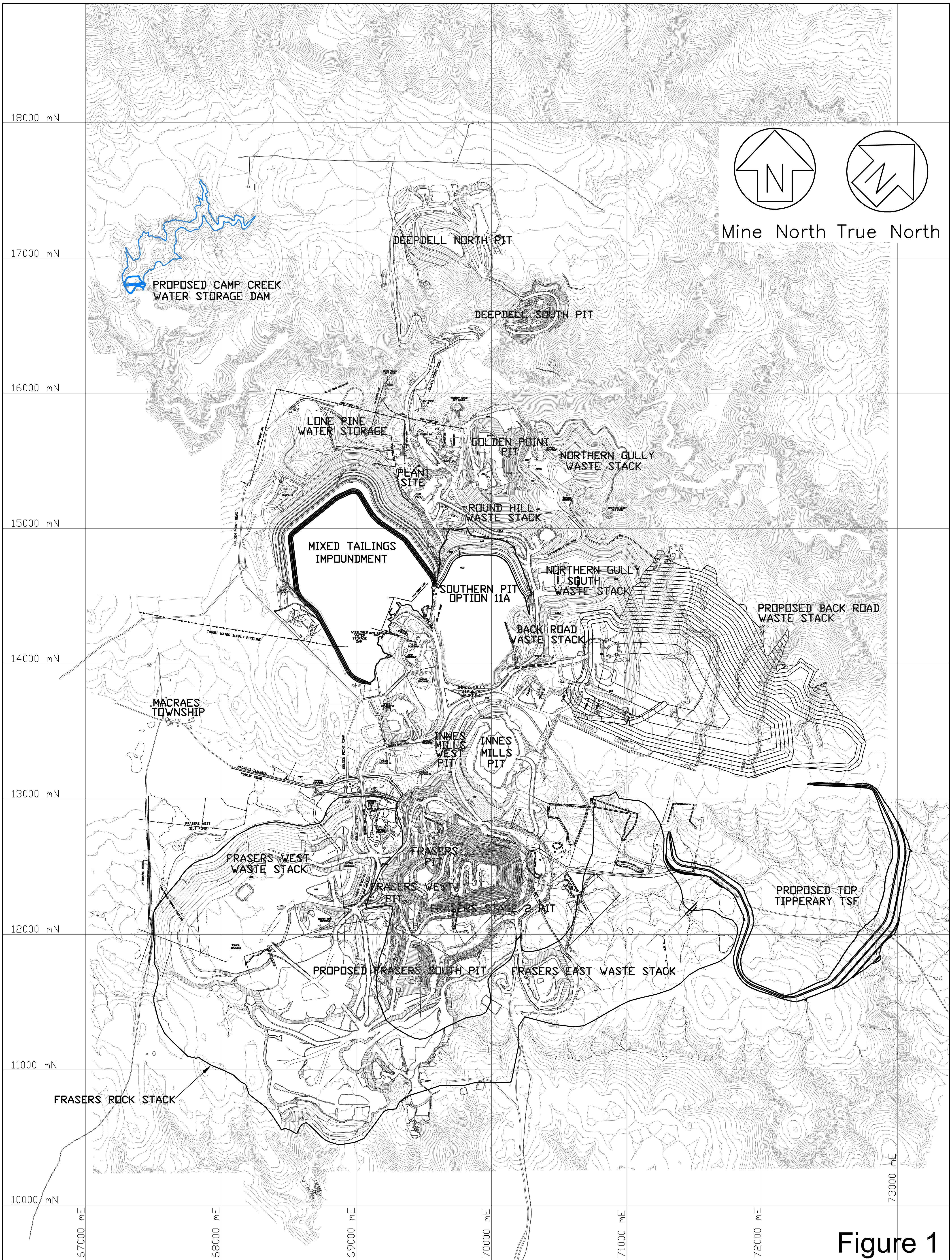
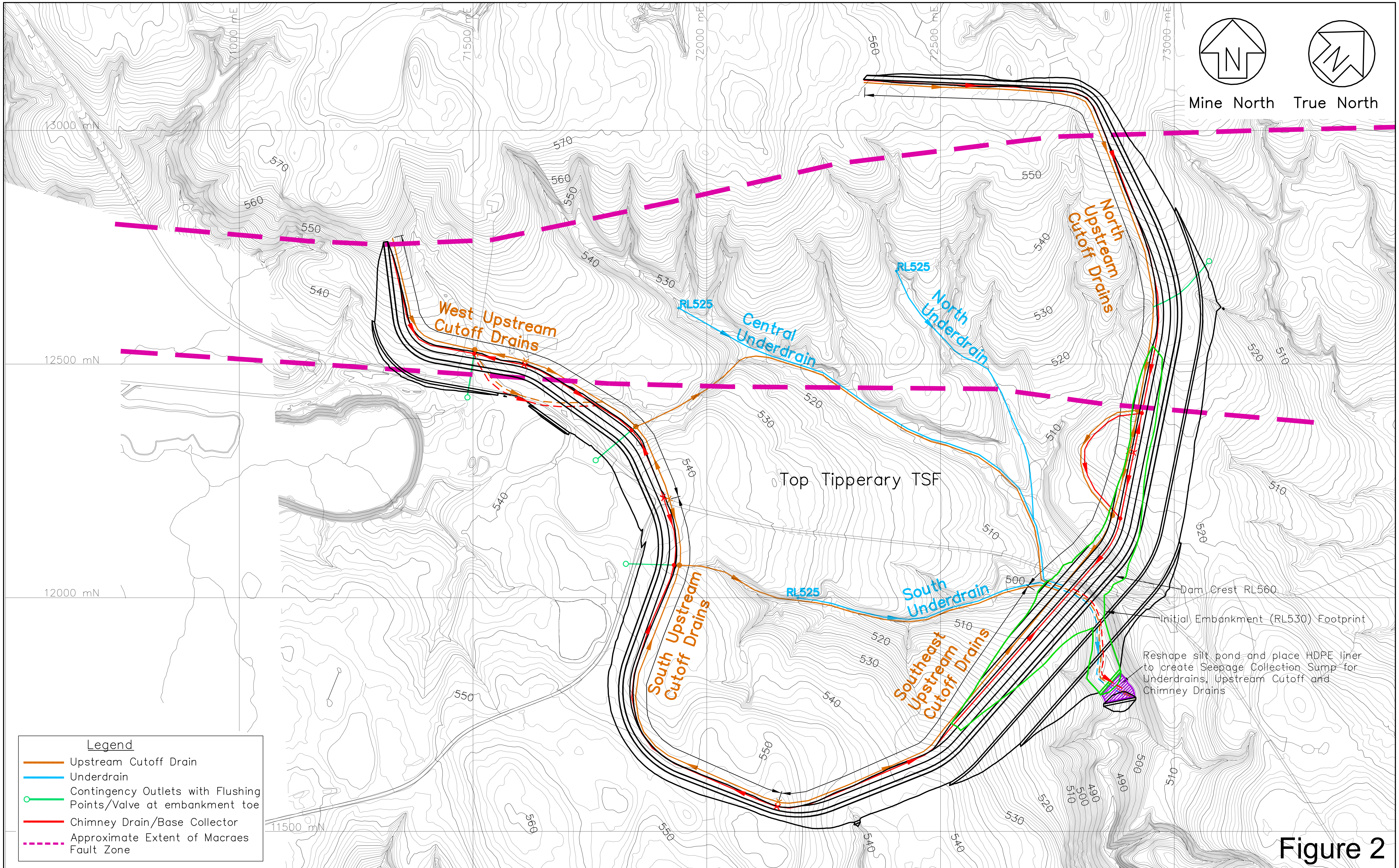


Figure 1

ENGINEERING GEOLOGY LTD
Unit 7C, 331 Rosedale Rd, PO Box 301054, Albany
Ph (09)486-2546, Fax (09)486-2556

OCEANA GOLD (NZ) LTD, MACRAES GOLD PROJECT
Top Tipperary TSF
Site Plan

Drawing No.	6846-Fig 1
Date:	15 April 2011
Drawn:	BL
Scale:	1:25000 (@A3)
Filename:	6846-Fig 1.dwg



ENGINEERING GEOLOGY LTD
Unit 7C, 331 Rosedale Rd, PO Box 301054, Albany
Ph (09)486-2546, Fax (09)486-2556

OCEANA GOLD (NZ) LTD, MACRAES GOLD PROJECT
Top Tipperary TSF
Sub - Surface Drainage Plan

Drawing No.	6846-Fig 12
Date:	27 Jan 2011
Drawn:	BL
Scale:	1:7500 (@A3)
Filename:	6846-Fig 12.dwg

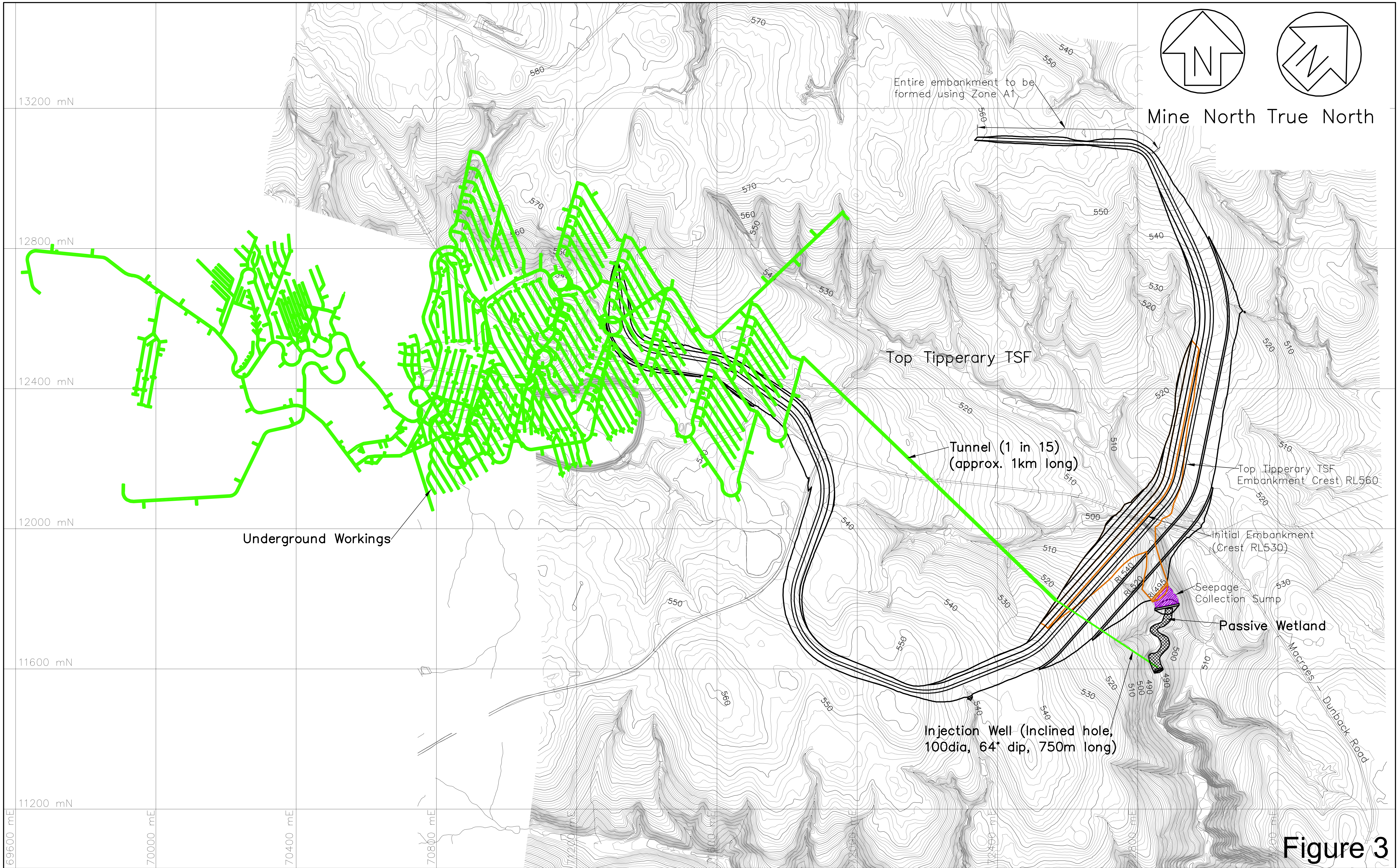


Figure 3

ENGINEERING GEOLOGY LTD
Unit 7C, 331 Rosedale Rd, PO Box 301054, Albany
Ph (09)486-2546, Fax (09)486-2556

OCEANA GOLD (NZ) LTD, MACRAES GOLD PROJECT
Top Tipperary TSF
Long - Term Seepage Disposal Plan

Drawing No.	6846-Fig 3
Date:	13 Jan 2011
Drawn:	BL
Scale:	1:10000 (@A3)
Filename:	6846-Fig 3.dwg