EnviroGold Global

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EnviroGold Global Hellyer Tailings Project
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List of Abbreviations

%	percent
°	degrees of angle
AU$	Australian Dollar
°C	degrees Celsius
CA$	Canadian Dollar
3D	three-dimensional
AU$	Australian dollars
Aberfoyle	Aberfoyle Resources Pty Ltd
Ag	silver
ALS	ALS Laboratories
AMD	Acidic and Metalliferous Drainage
As	arsenic
Au	gold
AusIMM	Australasian Institute of Mining and Metallurgy
AusGEMCO	AusGEMCO Pty Ltd
Bass Metals	Bass Metals Pty Ltd
CAPEX	capital expenditure
CM Insight	Commodity and Mining Insight Ltd
Como	Como Engineering Pty Ltd
CPI	Consumer Price Index
CPR	Competent Persons Report
CSA Global	CSA Global (UK) Limited
CSV	comma separated values
CVC	Central Volcanic Complex
Cu	copper
DCF	discounted cash flow
DFS	definitive feasibility study
dmt	dry metric tonne(s)
DPEMP	Development Proposal and Environmental Management Plan
DTM	digital terrain model
EMP	Environmental Management Plan
EPA	Environmental Protection Authority
FOB	Free on Board
g	gram(s)
g/t	grams per tonne
G&A	general and administration
GBPM	geological block profit modelling
GPS	global positioning system
ha	hectares
HDPE	high-density polyethylene
HGM	Hellyer Gold Mine Pty Ltd
HZCJV	Hellyer Zinc Concentrate Project Joint Venture
IRR	internal rate of return
Ivy Resources	Ivy Resources Pty Ltd
km	kilometres
km^2	square kilometres
koz	kilo-ounce(s)
kt	kilo-tonne(s)
LOM	life of mine
m	metre(s)
m/s	metres per second
M	million(s)
m^3	cubic metre(s)
Ma	million years ago

mE	metres east
mg/L	milligrams per litre
ML	Mining Lease
mm	millimetre(s)
mN	metres north
MRDA	Mineral Resources Development Act 1995
MRV	Mount Read Volcanics
t	metric tonne(s)
Mt	million tonnes
Mtpa	million metric tonnes per annum
NPV	net present value
NQM	NQ Minerals Plc
OPEX	operating expenditure
NVRO	EnviroGold Global Limited
oz	ounces
Pb	lead
PCE	Permit Condition – Environmental
PEV	protected environmental value
Polymetals	Polymetals Group
ppm	parts per million; 1 ppm = 1 g/t
PRT	process residue tailings
QAQC	quality assurance/quality control
QHV	Que Hellyer Volcanics
RL	Relative level
ROM	run of mine
S	sulfur
SAG	semi-autogenous grind
SEM	scanning electron microscope
SG	specific gravity
SiD	safety in design
t/m^3	tonnes per cubic metre
tpa	metric tonnes per annum
tph	tonnes per (operating) hour
tpm	tonnes per month
TSF	tailing storage facility
US$	United States dollars
Western Metals	Western Metals Ltd
wmt	wet metric tonne(s)
XRF	x-ray fluorescence
Zn	zinc

1 Executive Summary

1.1 Introduction

This Technical Report has been prepared to meet the requirements defined by National Instrument 43-101 ("NI 43-101") and Form 43-101F1 for EnviroGold Global (NVRO) (listed on the Canadian Securities Exchange) in describing the results of a Preliminary Economic Assessment ("PEA") and Mineral Resource Estimate for the Hellyer Tailings Project (the "Project"). This technical report also discloses other financial and technical aspects of the Project that NVRO proposes at the Hellyer Gold Mine (HGM).

The Hellyer Gold Mine is in north-west Tasmania, Australia. The tailings storage facility (TSF) at the Hellyer Gold Mine contains 9 million tonnes (Mt) of tailings.

This PEA is preliminary in nature and includes Inferred Mineral Resources that are considered too speculative geologically to have the economic considerations applied to them that would enable them to be categorized as Mineral Reserves, and there is no certainty that the PEA will be realized.

1.2 Property Description and Location

The Hellyer Project is in north-western Tasmania, Australia, approximately 60 km south-southwest of Burnie and about 200 km northwest from Hobart. It is adjacent to the A10 Murchison Highway, which connects the north coast with Queenstown and Rosebery.

The current mining tenure is Combined Mining Lease CML103M/1987 covering an area of 1,695 hectares held by HGM. The lease was renewed in 2020 for a further 10-year period, now expiring on 30 June 2030. The background tenure is State Forest. CML 103M/87 is the consolidated mining lease (Figure 1-1). The mining lease encompasses the area at Hellyer where the tailings impoundment and processing plant are situated.

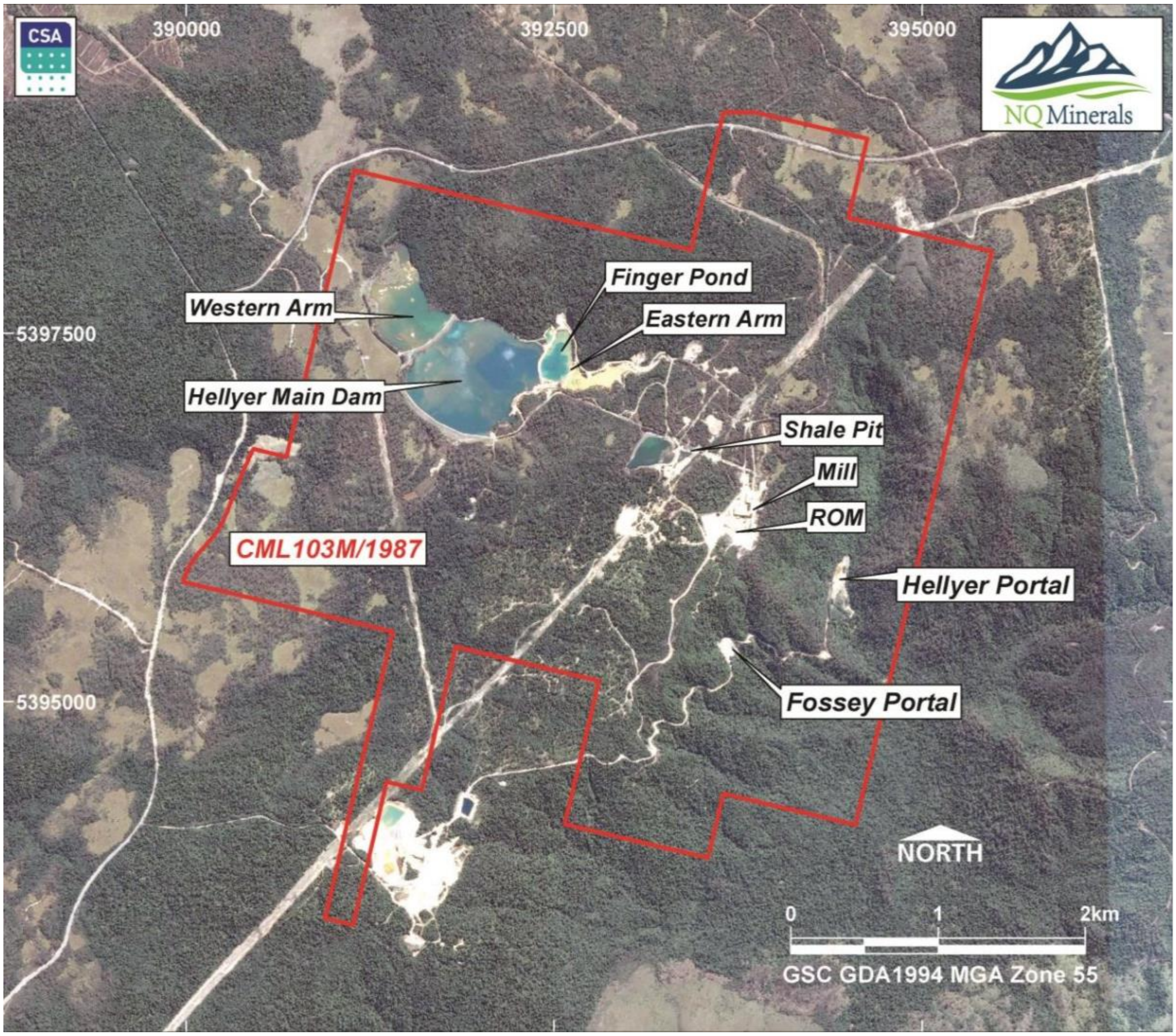


Figure 1-1. Lease CML 103M/1987 for the Hellyer Gold Miner and key infrastructure

(Source: R317.2020 NQMCPR02 CPR Update - NQ Minerals Hellyer Tailings Retreatment)

EnviroGold Global has entered into a tailings processing operations agreement with HGM. The agreement contains milestones for the development of the project and targets for production and costs. EnviroGold Global expects to meet the project development targets as well as the production and costs targets. Within the tailings processing operations agreement, HGM must maintain the licences, environmental approvals, environmental management plans etc. and must provide access to the site for the construction and operation of the NVRO metal recovery plant.

EnviroGold Global has an agreement for the re-processing of the tailings at the Hellyer Gold Mine (TPOA). The agreement is toll treatment with a net profit return to the owner. The tailings that are processed by NVRO are returned to the owner for safe storage.

N.B. The liability for the site, including all and any tailings, remains fully with HGM. At the closure of its operations, NVRO will remove its plant and rehabilitate the footprint.

Hellyer Gold Mines has all the required permits and approvals for its current operations.

1.3 Accessibility, Climate, Local Resources, and Infrastructure

Road Access to the site turns off the sealed Belvoir Road (C132), 4 km east of its junction with the main, all-weather highway (A10), which connects Burnie and district with Rosebery and Queenstown to the south. Travel times to Burnie are route-dependent but vary between 60 and 90 minutes (80 to 100 km).

Burnie is the key industrial port on the north coast of Tasmania. The Hellyer site is also served by a rail siding that was purpose-built for concentrate shipments. Current HGM operations do not use the rail siding, instead using trucks to transport the concentrates to Burnie.

Hellyer is not currently operated as a fly-in/fly-out operation, all workers reside in the nearby towns. There is no camp at the Hellyer Gold Mine. The nearest commercial airport is Burnie Airport.

The relevant project supporting infrastructure and services include but are not limited to the following:

- Hellyer mining lease intersects Tas Networks' 110 kV and 220 kV high tension power lines that supply the northern part of Tasmania.
- A newly upgraded 22 kV substation located adjacent to the Que River Mine was recently installed.
- Approximately 8 km of 22kV line connects the Hellyer site where it is transformed down to 3.3 kV and 415 volts for use at the current HGM plant and dredging operations.
- Water is to be supplied from the original TSF as well as recycled water from the two thickeners at the plant; there is an excess of water in the overall system.
- Access to the site from government-maintained roads is via two privately owned and maintained unsealed access roads. Currently, all HGM product concentrates are trucked to the Burnie port on this road.
- There are office facilities existing at Hellyer which are more than sufficient to supply the needs of HGM (Behre Dolbear Australia, 2019).

The site is situated in the cool temperate climatic zone. At approximately 700 metres above sea level measured by Australian Height Datum (AHD), the Hellyer area has a climate characterised by cool temperatures and high annual rainfall. Annual average precipitation is 2,180 mm (Bureau of Meteorology, Waratah), generally falling throughout the year, although higher falls, and snowfall, occur over winter months. Drought conditions are rare.

The mean maximum temperature ranges from 29°C in January to 11°C in July. The prevailing winds are north-westerly to south-westerly.

The area surrounding the project is mainly forest reserve with some farmland. There has been extensive historical and recent mining activity in the area, including the Hellyer base metals mine located adjacent to the current HGM Hellyer site.

The underlying land tenure is Crown land. HGM's proposed tailings storage facility 2 (TSF2) sits within the boundary of an area of Permanent Timber Production Zone Land, under management of Sustainable Timber Tasmania (formerly Forestry Tasmania). As no new land disturbance is under consideration for the ongoing HGM operations nor for future NVRO operations, there are no anticipated issues relating to the Timber Production Zone Land.

The area surrounding the lease has been zoned Rural Resource by the Waratah–Wynyard Council (according to the Waratah–Wynyard Interim Planning Scheme 2013). The zone purpose of Rural Resource is to provide for the sustainable use or development of resources for agriculture, aquaculture, forestry, mining, and other primary industries, including opportunities for resource processing. In previous studies, 129 taxa of higher plants were observed at the Hellyer site; 28 species were endemic to Tasmania.

The nearest sensitive human land uses are the tourist hotels along the Cradle Mountain Road (C132), which are about 17 km to the east, the township of Tullah located more than 20km to the south and the township of Waratah some 21 km to the north-west.

The Hellyer Gold Mine is south of the town of Burnie. There are several other mining operations on the Island of Tasmania and HGM is currently reprocessing tailings. Skilled and unskilled labour is readily available within commuting distance of the planned NVRO operation. Therefore, the inability to staff the Project is deemed to be low risk.

1.4 History

The Hellyer deposit was discovered by Aberfoyle Ltd in August 1983 and mine development commenced in 1986, with operations starting in 1989. The economic metals mined at Hellyer were lead, zinc, copper, gold, and silver. The Hellyer deposit was mined by underground methods during the period 1989 to 2000. Operations ceased in 2000, when economically available ore was exhausted. The processing plant was placed on care and maintenance.

During its life, the Hellyer Mine produced 15 million tonnes of ore and yielded 601,000 tonnes of bulk concentrate, 2.7 million tonnes of zinc concentrate, and 728,000 tonnes of lead concentrate. The mine employed about 300 personnel and created AUD$1.3 billion in gross revenue. When the Hellyer mine closed, there were an estimated 10.9 million tonnes (Mt) of mine tailings at the Hellyer site grading ~2.6 g/t of gold and ~2.8% zinc (Pitt and Sherry, 2020) .

The Hellyer operation was subsequently acquired by a subsidiary of Polymetals Group (Intec Ltd.) who completed the refurbishment of the plant in late 2006 to allow re-treatment of the tailings. In September 2008 the operation closed due to low zinc prices after processing approximately 1.8 million tonnes of tailings.

The processing plant was sold to Bass Metals Ltd. in 2008, who sold the property in January 2013 to Ivy Resources Pty Ltd., which undertook extensive feasibility and metallurgical test-work. NQ Minerals (NQM) acquired Ivy Resources Pty Ltd. in 2016, and switched the processing focus back to sequential flotation.

HGM commenced retreatment of tailings from the historic main tailings storage facility (TSF1) in September 2018 and are currently running the Hellyer treatment plant on a dredged supply of tailings from the old tailings storage facility. Current plant throughput is 250,000-300,000 tonnes per quarter (2,500 -3,000 tonnes per day). In FY 2020, HGM achieved production of 1.1 million tonnes of tailings retreatment, producing 38 kt Pb concentrates, 19 kt of Zn concentrates, 1.1 Moz Ag and 5.4 koz Au (Hellyer Gold Mines Management Reports).

The HGM plant is currently using a two-stage sequential flotation process on the recovered tailings from the main tailings storage facility. The first stage produces a lead flotation concentrate product with all other material going into the second flotation cells to produce a zinc flotation concentrate product. All other 'after-base metal concentrate' material (other than the two base metal concentrate products) is called Zinc Scavenger Tailings (ZST). This represents approximately 95% of the HGM flotation plant feed material, and is pumped to the HGM tailings storage facilities.

The HGM parent company, NQ Minerals Plc, was placed into Administration on 9 August 2021 by a unanimous vote of the Directors of the Company. Munich Partners of Sydney Australia successfully purchased Keen Pacific (the HGM holding company) out of Administration.

In November 2021, NVRO and HGM Mines signed an MOU for the implementation of the NVRO Tailings Project. A formal contract was signed in February 2022 between HGM and EnviroGold Tasmania Pty Ltd. The Tailings Processing Operations Agreement (TPOA) provides an approach for NVRO to design, build, install and operate a metal recovery plant using, initially, tailings directly from the current HGM operation and, following the closure of the HGM operation, then from the tailings storage facility.

1.5 Geological Setting and Mineralization

The Hellyer deposit is hosted by the Que-Hellyer Volcanics of the Mount Read Volcanics (Corbett and Komyshan, 1989), which is a 200 km- by 20 km belt of highly-mineralised, volcanic dominated rocks striking north from Elliott Bay on the south-west coast, through Queenstown and Rosebery, and arcing north-east through Que River and Hellyer before passing beneath younger cover sequences and striking east-west through the Sheffield region (Figure 1-2).

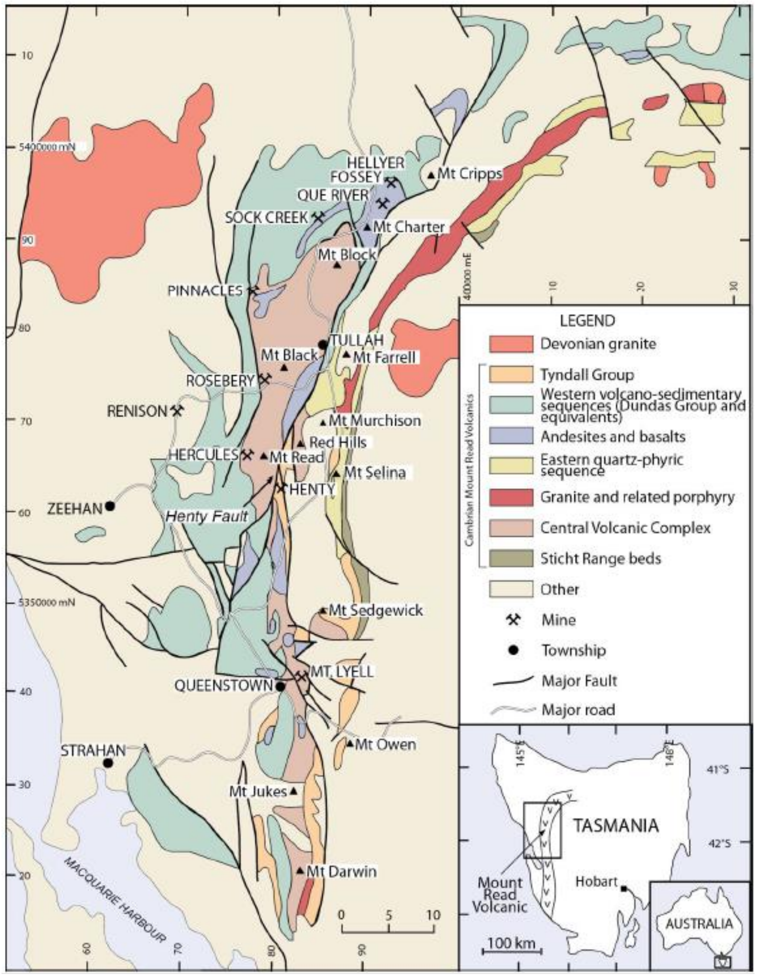


Figure 1-2. Geological map of the Mount Read Volcanic belt in central western Tasmania

(after Gifkins et al., 2005, from Wu, 2014)

Locally, the Que Hellyer Volcanics (QHV) outcrop over an elliptical area some 9 km by 4 km with a prevailing SSW-NNE trend. The detailed QHV stratigraphic succession around Hellyer comprises the following:

- “Lower basalt”
- “Feldspar-phyric sequence”
- “Mixed sequence” or “hanging wall volcaniclastic sequence”
- “Upper basalt” or “pillow lava sequence”
- “Que River Shale”
- Southwell Subgroup or “upper rhyolitic sequence” (Scott, 1988)

The Hellyer deposit is the most significant VHMS mineralisation within the Que-Hellyer district. Wu (2014) describes it as “an irregular elongate massive sulfide body that has been roughly bisected by sinistral displacement of the north-south striking, sub-vertical Jack Fault (McArthur, 1996; Figure 1-3). The orebody is about 830 m long (730 m pre-Jack Fault) and up to 200 m wide. It has an average thickness of 43 m.

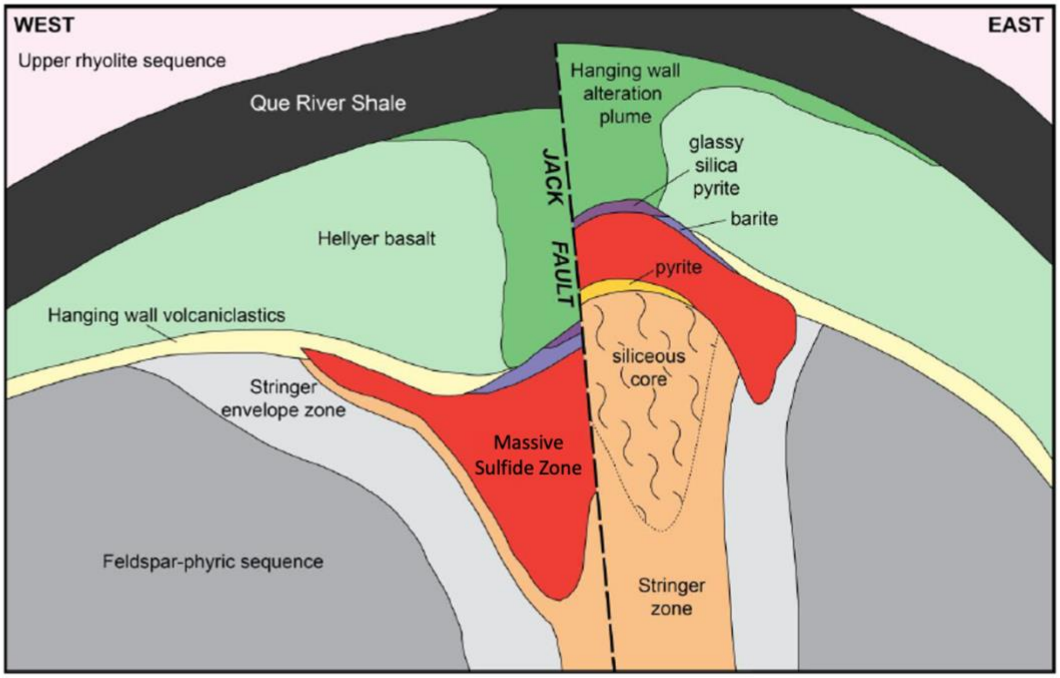


Figure 1-3. Schematic x-section on the Hellyer deposit

Modified from company image courtesy of Bass Metals Ltd (after Wu, 2014).

Wu (2014) described the Hellyer deposit as being "dominated by massive sulfide ores with an average of 54% pyrite, 20% sphalerite, 8% galena, 2% arsenopyrite, and 1% chalcopyrite with minor tetrahedrite (McArthur and Dronseika, 1990). Gangue minerals including quartz, barite, calcite, chlorite, sericite, and siderite make up the remaining ~15% of the orebody.

1.6 Deposit Types

The original Hellyer massive sulfide deposit has been interpreted by most previous workers as a classic, seafloor, mound-style, VMS deposit, developed in a similar manner to the classic Kuroko deposit (Gemmell and Large, 1992; Large, 1992; McArthur, 1996).

However, the deposit under review is the tailings in the Hellyer tailings storage facility, comprised of sediments pumped into a natural depression with a compacted earth-fill embankment constructed to contain the material. The tailings sediments were produced by the adjacent Hellyer Mine processing facility that processed polymetallic ore sourced from the Hellyer underground mine.

The Hellyer tailings are predominantly crushed and ground waste products from the processed ore, with the bulk of the volume being sands, with lesser amounts of sulfides and some free metals. The processed Hellyer tailings now comprise a localised, recent sedimentary sequence deposited within an artificial basin confined by the retaining embankment of the Hellyer TSF. Previous evaluation of this recent anthropogenic deposit has been by a series of coring programmes using vertical holes to recover cores of the sediment.

1.7 Exploration

Comments in this section relate solely to exploration work undertaken to evaluate the residual tailings deposit in the Hellyer TSF. Exploration work undertaken to evaluate the original hard-rock Hellyer and Fossey deposits is not considered relevant.

The Hellyer TSF has been cored to define the mineralized resource. Sampling of the TSF was undertaken in two phases during 1998 and 2000 using the Vibracoring method in which the Vibracore drill rig is mounted on a barge and moored above each drillhole. The method uses a core tube (commonly with an inner PVC tube) that is inserted under gravity into the soft sediments by means of a vibrating mechanism (Vibrahead) at the top of the rod string to assist the process. When the insertion is complete, the Vibracorer is switched off and the core tube is recovered. Minimal information is available for the 1998 or 2000 drilling campaigns, with respect to detailing the type of Vibracorer, core width, core recoveries or geological logging.

1.8 Drilling

During the 1998 programme a total of 549.6 metres of sampling was completed in 55 holes with a further 5,880 m of drilling completed in 50 holes during the 2000 programme (total number of holes: 105, Combined sampling length: 1,129.6 m). All drill samples were assayed either as individual samples (1998 programme) or as pre-composited samples (2000 programme).

1.9 Sampling Method, Preparation, Analyses, and Security

Drill sampling of the tailings storage facility was undertaken using the Vibracore method as described briefly in Section 1.8. The tailings samples were taken within the tailings storage facility, so eliminating the possibility of preserving the collar for the sample location.

Sampling for the currently declared Inferred Mineral Resource involved analytical work being carried out over a period of almost 4 years on daily tailings samples from the Hellyer treatment plant. These samples are routinely collected while milling operations are underway and despatched for analysis to ALS Burnie, Tasmania.

The tailings samples on which the currently declared Inferred Mineral Resource is based are production style samples and thus are generally not subject to detailed QAQC procedures and techniques as is customary for primary exploration.

Hellyer mill process samples are routinely transported to Burnie for analysis but, by virtue of their routine production character, any security risk is low.

1.10 Data Verification

NVRO considers that the independent mineralogical work carried out is sufficient to confirm the basic mineralogical premise that the remnant precious metals within the Hellyer tailings are present as sub microscopic particles within, primarily, pyrite and arsenopyrite or in “solid-solution” form within the pyrite and arsenopyrite lattice.

Considering the various historical estimates reported by HGM; NVRO considers the various historical estimates carried out over the last 12 years, primarily by CSA Global, to have been developed by competent personnel, and that all relevant data has been adequately considered. NVRO considers that the most recent historical estimate (CSA Global, 2020) meets the requirements of the JORC (2012) guidelines and is compatible with the requirements outlined in the NI 43-101.

An in-house assessment of production statistics from mill operations for the period between the start of operations and end November 2011 gives further confidence in the declared grade character of the tailings deposit and has allowed a non-JORC estimate of a pre-processing inventory to be quantified. Additional assessment of HGM’s monthly production figures to the end of April 2022, and nominal production forecasts have allowed NVRO to estimate the quantity of tailings anticipated to be available for ongoing HGM operations.

1.11 Mineral Processing and Metallurgical Testing

NVRO has developed a hybrid, two-stage leach process for re-processing the Hellyer tailings using low acid concentrations, low to moderate reaction temperatures, and normal atmospheric pressure. These key parameters support the potential for low capital costs for construction materials and ameliorate concerns of material corrosion observed previously in Nitrox pilot plants.

NVRO has undertaken, both at its own laboratory and through Core Resources (Core) laboratory (in Brisbane), a series of alternative and combinations of leaches with a view to optimising the recovery of both precious (gold and silver) and base metals by-products (zinc, lead and copper).

From September 2020, metallurgical test programs were carried out on selected samples of recovered raw tailings, as well as post mill process samples (HGM flotation tailings) collected for metallurgical testing. These tests focussed mostly on assessing the feasibility of using an acid leach pre-treatment to liberate and recover the base metals, gold, and silver from the tailings.

Most of the metallurgical program was devoted to the acid pre-leaching stage of the process, more particularly acid pre-leach optimisation.

The initial scouting work explored blended acid concentrations and residence times on extraction of Pb, Zn, Ag, and Au on re-floated zinc scavenger tailings (ZST) from Hellyer Gold Mines (HGM). The purpose was to determine the extraction kinetics of Pb, Zn, and Ag, while leaving the gold in the residue for further downstream processing.

The second stage of testing observed extraction of precious metals in the blended acid leach residues. Process pathways on the acid-leach residues explored lixiviants such as cyanide, glycine, and hypochlorite on Ag and Au recovery. A cyanide leach of acid leach residues proved to be the preferred option for maximum precious metal extraction.

The initial cyanide leach tests were conducted as a 2-hour stirred beaker test. Gold recovery was approximately 59% and silver recovery was approximately 90%.

In December 2021, Core undertook additional test work on the residue material from the acid pre-leach test work toward investigating the possibility of additional precious metal recovery through longer cyanidation residence time. Gold recovery was increased to indicatively 83.5% and silver recovery was indicatively 94.6%.

The results of the test program were used to determine the preferred leach configuration, together with expected cyanide leach recoveries for gold and silver. Deductions to the test work extractions were applied to expected zinc and copper reporting to the acid pre-leach Pregnant Leach Solution (PLS) and recoveries to simulate scale-up to a commercial production facility were modelled using METSIM modelling software.

Additional bench scale test work is planned at NVRO's own laboratory at Tingalpa and external laboratories to further optimise acid pre-leach conditions, cyanidation of acid pre-leach residue, and to further test downstream processing options for the extraction of base and precious metals from the acid pre-leach PLS stream, together with reagent optimisation test work for all path streams. This work will lead to laboratory pilot-scale testing prior to site construction of commercial scale plant.

1.12 Mineral Resource Estimates

Following the site visit in January 2022 by members of the NVRO Team, the NVRO Team prepared a schematic (Figure 1-4) showing the various mineralized material (by source) processed at Hellyer and the various tailings storage areas where the post HGM processing tailings have been deposited, historically, currently, and in the future (all future tailings later in 2022 to TSF2).

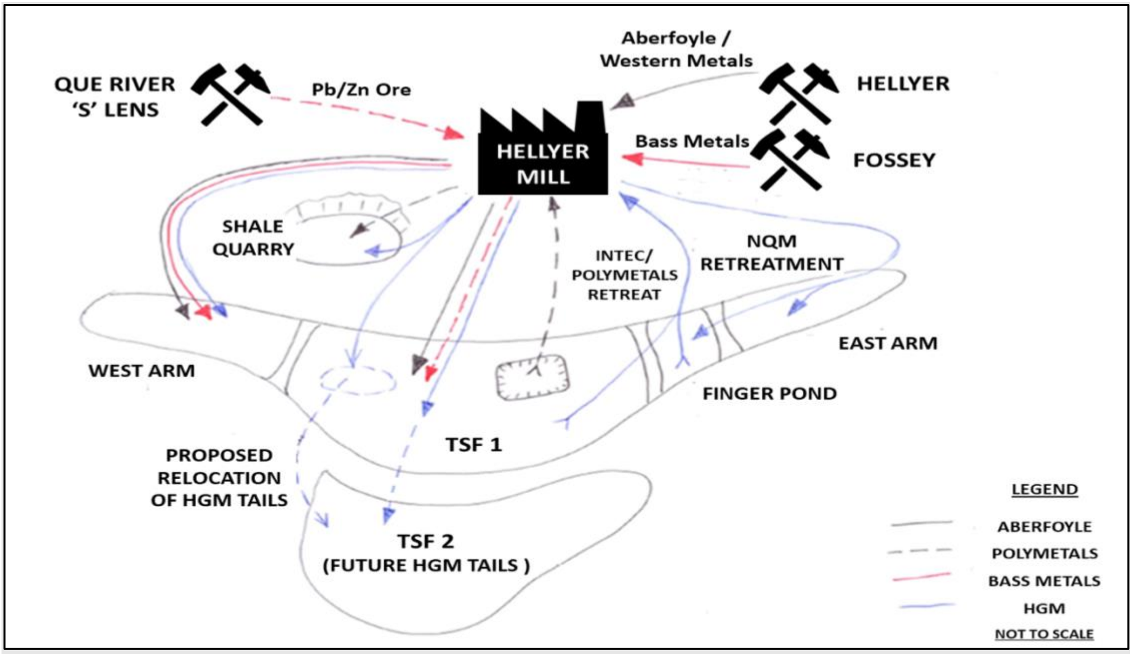


Figure 1-4. Schematic of Historic, Current and Future Hellyer Ore & Mineralized Material Sources and Tailings Emplacement

(Source: NVRO – colored arrows indicate flows of material per company in the legend)

The target feed material for the NVRO Project is tailings from previous and current operations at the Hellyer Gold Mine, which are unconsolidated as most of the tailings were deposited sub-aqueously and remain covered in water. The NVRO Team completed a comprehensive literature review, laboratory testing, and mineragraphic analysis of samples from Hellyer, and has concluded that gold and silver predominantly occur within the crystalline lattice structure of the pyritic minerals within the Hellyer mineralized material, and hence, the Hellyer tailings.

The initial stages of the NVRO Project's reprocessing will be targeting the current ZST output as feed stock. Subsequent processing is then scheduled to switch to previously reprocessed tailings such as those quantified in the Intec historical estimate, and those generated since HGM started operations in late 2018.

A preliminary materials inventory of the reprocessed tailings quantities produced by the Hellyer treatment plant was completed by Hodkinson (2021a). This represented material processed through the Hellyer plant since HGM commenced operations is late 2018 through to the end of November 2021.

A statistical review of tailings grade estimates based on processing plant samples has also been completed for the key economic elements (including As, the principal deleterious element, Fe, and S). The statistical review is a filtered data set in which clearly-erroneous data have been removed and evaluated for days for which a full suite of analyses was available. The data set covers 938 sets of tailings analytical data for the period 1/1/2019 through to 30/11/2021 (1,065 days during which period 83 days of nil production were recorded), and thus represents >95% of the total operational period and is a significant number of representative analyses. Key statistical parameters for the tailings data set are shown in Table 1-1 (not tonnage weighted).

Table 1-1. Basic Statistical Parameters, Hellyer Reprocessed Tailings Samples (n=938)

Parameter	Au g/t	Ag g/t	Pb %	Zn%	Cu %	As %	Fe %	S%
Minimum	0.73	28.0	0.55	0.39	0.03	0.52	18.76	20.20
Maximum	3.80	150.0	3.69	7.22	0.34	1.86	33.10	38.80
Mean	2.29	58.6	1.45	1.04	0.09	1.09	27.76	31.15
Median	2.33	59.0	1.43	0.99	0.08	1.10	27.70	31.20
Mode	2.41	57.0	1.48	1.00	0.10	1.21	27.30	29.90
Std. Dev.	0.27	12.3	0.36	0.59	0.03	0.19	1.78	2.35

NVRO should be able to access all tailings resources from the past, current, and future HGM tailings retreatment operations within the Hellyer site. This provides a total projection of about 9 Mt of tailings resource for the NVRO operations. This calculation is explained in detail below.

The Mineral Resource statement has been divided into two categories based on the current HGM operations:

- Type 1: tailings already processed by the HGM tailings operation and placed in the current HGM tailings storage facility available for NVRO to recovery at the end of the HGM project life
- Type 2: tailings that are available for processing and can reasonably be expected to be processed by HGM and will be available a during the first 5 years of the Project.

NVRO's proposed operations at Hellyer will be undertaken using tailings material from two distinct operations:

- Zinc scavenger tailings recovered from the TSFs (Type 1 inferred mineral resource) - following the closure of the HGM reprocessing operation, NVRO will likely perform its own tailings recovery work (either directly or through a contract) via its own dredging operation (or other recovery method, such as hydro-mining).
- Zinc scavenger tailings direct feed from HGM's Plant (Type 2 inferred mineral resource) - the Project will use a reprocessing plant tailings line to the NVRO Plant fed from the ongoing HGM Mill operations as the source of ZST feed material. This source of tailings will be used until HGM completes its tailings extraction and milling operations (estimated to be in operation for the next four to six years).

1.12.1 Type 1 Tailings

These are tailings that have been processed by HGM and placed in the current TSFs or will be processed by HGM and placed in the TSF before the start of the Project. The total Type 1 (processed tailings) Mineral Resource estimate is reported in accordance with NI 43-101 Guidelines and May 2014 CIM Definition Standards and has an effective date of April 30, 2022 (Table 1-2).

Table 1-2. Hellyer Reprocessed Tailings Type 1 Inferred Mineral Resource Estimate as at end April 2022.

Resource Category	Tonnage (Mt)	Au g/t	Ag g/t	Pb %	Zn %	Cu %
end November 2021	3.29	2.30	59	1.45	1.04	0.19
End August 2023*	2.20	2.30	59	1.45	1.04	0.19
Total Inferred	5.49					

**Expected grades following HGM processing*

1.12.2 Type 2 Tailings

Tailings that will remain in Type 2 at the planned start of processing of tailings by the Project (Tailings that are yet to be processed), the volumes of tailings still to be processed (Type 2) by HGM and then by NVRO are reported in accordance with NI 43-101 Guidelines in Table 1-3.

Table 1-3. Hellyer Unprocessed Tailings Type 2 Inferred Mineral Resource Estimate as at end April 2022.

Resource Category	Tonnage (Mt)	Au g/t	Ag g/t	Pb %	Zn %	Cu %
Estimated to end November 2021	6.04	2.30	59	1.45	1.04	0.19
Less Actual + Forecast to End August 2023*	2.31	2.30	59	1.45	1.04	0.19
Total Inferred	3.73	2.30	59	1.45	1.04	0.19

**Expected grades following HGM processing*

1.12.3 Estimated Total Tailings Feed Material

The estimated total available tailings feed for the Project is about 5.49 Mt of Type 1 tailings, and 3.73 Mt of Type 2 tailings for a total NI 43-101 inferred resource of ~9 Mt (Table 1-4). The Mineral Resource estimate is reported in accordance with NI 43-101 Guidelines for current Type 1 and Type 2 tailings and has an effective date of April 30, 2022.

Table 1-4 Total Inferred Mineral Resource Estimate for the EnviroGold Global Hellyer Tailings Project (Type 1 and Type 2).

Resource Category	Tonnage (Mt)	Au g/t	Ag g/t	Pb %	Zn %	Cu %
Type 1 Tailings						
end November 2021	3.29	2.30	59	1.45	1.04	0.19
End August 2023*	2.20	2.30	59	1.45	1.04	0.19
Total Inferred Type 1	5.49	2.30	59	1.45	1.04	0.19
Type 2 Tailings						
Estimated to end November 2021	6.04	2.30	59	1.45	1.04	0.19
Less Actual + Forecast to End August 2023*	2.31	2.30	59	1.45	1.04	0.19
Total Inferred Type 2 Tailings	3.73	2.30	59	1.45	1.04	0.19
Total Tailings Inferred Resource (Type 1 and Type 2)	9.22	2.30	59	1.45	1.04	0.19

**Expected grades following HGM processing*

Mineral resources that are not mineral reserves do not have demonstrated economic viability. The QP's are not aware of any known legal, political, environmental, or other risks that could materially affect the potential development of the mineral resources.

1.13 Mining Methods

The HGM mining method employs cutter suction dredges to excavate tailings and transport them to shore via a floating pipeline. The dredged tailings is delivered to surge tanks and pumped via 300 mm diameter high-density polyethylene (HDPE) pipelines to the HGM processing plant.

HGM currently operates two dredges for tailings recovery from the TSF:

- “Seabird III” 300kW dredge with Warman10/8 main pump (10-inch inlet, 8 inch discharge) with nominal operating depth of up to 19 m has been operating since 2018, and has been feeding 110 tonnes per hour to the processing plant.
- IHC “Beaver 40” dredge with 483kW Installed power, pump suction and discharge diameters of 390 mm, provides additional tailing recovery capacity at Hellyer with a nominal operating depth of up to 10 metres and capacity of 180 tph.

The use of two dredges enhances the project in two ways:

1. It covers any extended production losses from any major dredge downtime
2. Provides the ability to blend grades from different mining blocks to smooth out the grade of material delivered to the process plant.

CSA Global prepared a review of mine design and production scheduling as part of its earlier reviews and resource estimate work (CSA Global, 2020, 2018).

HGM commissioned consulting engineers, Pitt and Sherry, to prepare updated dredging and tailings recovery plans, sequencing and schedules, including an assessment of resource losses and dilution, as well as potential sterilization due to safety barriers etc.

HGM is currently in the process of establishing a new tailings storage facility (TSF2) which is designed to take the HGM tailings for the balance of the HGM projected operations.

The initial stages of NVRO’s Operations at Hellyer will use a reprocessing plant tailings line from the ongoing HGM processing plant as the source of ZST feed material. This will continue for the period until HGM completes the extraction and milling operations (estimated to be in operation for the next four to six years). Hence, during this period, NVRO operations will not be undertaking any “mining” operations.

During its second operational Phase NVRO will likely perform its own, or sub-contract, tailings recovery work via its own dredging operation (or other recovery method, such as hydro-mining). The current plan during this second phase of NVRO operations is to acquire (either directly or via a lease) the current HGM dredging, materials handling, and processing plant equipment. For these operations, the existing costs for the HGM operation will be incorporated into the overall costs of the Project.

1.14 Recovery Methods

EnviroGold Global will operate a hydrometallurgical process at Hellyer to re-process tailings from former and current Pb/Zn flotation operations. The initial stages of reprocessing will target the current HGM operations' ZST as feed to the hydrometallurgical processing plant.

The NVRO operations at Hellyer will be undertaken in two stages. The first stage operation is designed to treat 500 tonnes per day (tpd), with the second stage expansion designed to treat 3,500 tpd, at a nominal throughput rate of 156 tph (dry) and 93.5% availability. The same flowsheet has been used for stage 1, and the stage 2 expansion.

The processing facility will consist of the following main sections:

- Feed dewatering/ thickening
- Nitric acid regeneration and gypsum precipitation
- Acid pre-leach
- Acid pre-leach solid-liquid separation
- Acid pre-leach solid residue cyanidation for gold and silver recovery
- Goethite and scorodite precipitation from acid pre-leach filtrate
- Copper recovery from acid pre-leach filtrate by solvent extraction
- Zinc recovery from acid pre-leach filtrate by precipitation
- Tailings dewatering and filtration for deposition in the TSF

The processing schedule based on the tailing's reclamation plan, metals contents, and metals recoveries per year are summarized in Table 1-5 below.

Table 1-5. Processing Schedule Quantities for the NVRO Tailings Reprocessing Project

	Unit	**Production Schedule**									
Production Period		Year 1	Year 2	Year 3	Year 4	Year 5	Year 6	Year 7	Year 8	Year 9	Total
Tonnes Processed	kt	238	1,150	1,150	1,150	1,150	1,150	1,150	1,150	714	9,000
Feed Grade											
Au	g/t	2.44	2.44	2.44	2.44	2.44	2.44	2.44	2.44	2.44	
Ag	g/t	64.40	64.40	64.40	64.40	64.40	64.40	64.40	64.40	64.40	
Cu	%	0.13	0.13	0.13	0.13	0.13	0.13	0.13	0.13	0.13	
Zn	%	1.41	1.41	1.41	1.41	1.41	1.41	1.41	1.41	1.41	
Feed Metal Content											
Au	oz	18,658	90,251	90,251	90,251	90,251	90,251	90,251	90,251	56,033	706,447
Ag	oz	492,157	2,380,565	2,380,565	2,380,565	2,380,565	2,380,565	2,380,565	2,380,565	1,478,005	18,634,116
Cu	kt	0.32	1.53	1.53	1.53	1.53	1.53	1.53	1.53	0.95	11.97
Zn	kt	3.35	16.21	16.21	16.21	16.21	16.21	16.21	16.21	10.07	126.90
Recovery											
Au	%	72.8	72.8	72.8	72.8	72.8	72.8	72.8	72.8	72.8	72.8
Ag	%	87.3	87.3	87.3	87.3	87.3	87.3	87.3	87.3	87.3	87.3
Cu	%	84.8	84.8	84.8	84.8	84.8	84.8	84.8	84.8	84.8	84.8
Zn	%	83.0	83.0	83.0	83.0	83.0	83.0	83.0	83.0	83.0	83.0
Metal Recovered											
Au	oz	13,574	65,657	65,657	65,657	65,657	65,657	65,657	65,657	40,764	513,940
Ag	oz	429,653	2,078,233	2,078,233	2,078,233	2,078,233	2,078,233	2,078,233	2,078,233	1,290,298	16,267,583
Cu	kt	0.27	1.30	1.30	1.30	1.30	1.30	1.30	1.30	0.80	10.15
Zn	kt	2.78	13.46	13.46	13.46	13.46	13.46	13.46	13.46	8.35	105.32

1.15 Project Infrastructure

The Hellyer Tailings Reprocessing Project will be established at the Hellyer Gold Mine Site. The Hellyer site has extensive existing infrastructure that has been adequately maintained over the life of the project.

NQ Minerals re-established the site during 2018, commenced retreatment of tailings in October 2018 and has been operating continuously since that time. Key features of the infrastructure include:

- A recently upgraded 22 kV substation located adjacent to the Que River Mine with 8 km of 22 kV line connecting to the Hellyer site. Renewable power[1] at Hellyer site substation where power is transformed down to 3.3 kV and 415 volts.
- Access to the site from government-maintained roads, from which the site is accessible via two privately owned and maintained un-sealed access tracks: the gravel track from the Cradle Mountain Link Road is the main track used to access the site.
- 3’6” gauge railway spur 11 km into the Hellyer plant.
- Available dedicated space within existing HGM industrial area for NVRO plant, equipment & materials and reagent storage, administration and workshop buildings etc
- Process water from the HGM plant operations, supplied from the existing Tailings Storage Facility (TSF1) and / or recycle water from the HGM plant’s thickeners.
- Existing tailings storage facilities as required.
- Satellite internet connection, potable water supply, emergency services etc.

1.15.1 Site Layout

The HGM has existing tailings reprocessing operation where tailings are removed from the TSF by dredging, pumped to the processing plant for metal concentrate recovery before being returned to the TSF. To align with receiving the ZST directly from the current HGM flotation plant, the NVRO operations are planned to be located adjacent to the existing HGM processing plant.

Once HGM operations are completed, the second stage of NVRO’s operations is proposed to be based on recovery of tailings material deposited in storage facilities by HGM from September 2018 to the start of NVRO operations.

NVRO currently envisages utilising similar dredging mining methodologies and equipment that has been proven to perform satisfactorily at the Hellyer site by HGM.

The major buildings on Hellyer site are the processing plant, warehouse, concentrate shed and offices and support buildings.

There is no waste rock storage associated with the Hellyer Tailings Project.

1.16 Environmental Studies, Permitting, and Social or Community Impact

The environmental and social baseline for the HGM site is extensive. The development of the mining operation, processing of the ore and then storage of the waste in the tailings storage facilities provided both opportunities (e.g. employment) and environmental effects (e.g. footprint effects, acidic and metalliferous drainage).

NVRO has a contract for the treatment of the Hellyer tailings. Therefore, the tailings remain the responsibility of Hellyer Gold Mines Pty Ltd. Any liability for the tailings closure, ongoing management of the tailings storage facilities etc. remains with HGM.

[1] In 2020, Tasmania announced that it met the 100% renewable energy target

NVRO understands that the Hellyer Gold Mine has all the operating permits required for its current operations. HGM has provided NVRO with a copy of the Environmental Management Plan (2020), and the "Independent Technical Due Diligence Review" of Behre Dolbear (2019).

1.16.1 Permitting Requirements

In Tasmania, mining and mineral processing developments are classed as Level 2 activities and are regulated by the Tasmanian Environment Protection Authority (EPA) in accordance with the Environmental Management and Pollution Control Act 1994 (EMPCA).

The EPA has an independent Board as a decision-maker for approvals, which is supported by the staff of the EPA Division of the Department of Primary Industries, Water and Environment. The EPA Division makes recommendations to the EPA Board, who make the statutory decisions on new or major amendments to regulated activities.

1.16.2 Surface Water Management

The TSF1 and TSF2 spillways are the licensed discharge points at Hellyer. The sulfate and total arsenic limits are currently suspended. The minimum pH limits reflect the use of lime dosing and pH to co precipitate metals out of solution.

1.16.3 Tailings

The contract that NVRO has with HGM is for the re-processing of the tailings. The management of the tailings resulting from the Project will be deposited in the current HGM TSFs. All management and responsibility for compliance remain with HGM.

1.16.4 Approval Summary

The approval for the Project will be made through an application by HGM to amend the EMP The prerequisites for this application are outlined as follows:

- The Waratah-Wynyard Municipality does not require a new permit and DA.
- EPA is comfortable that the potential operation and that the impacts fall within the scope of the existing reprocessing operation.
- HGM has sufficient tailings storage capacity for the tailings generated.
- Laboratory scale test work data demonstrates that the tailings will not create an adverse impact on the TSFs or on discharges and seepage.
- Confirmed information on the proposed process flow sheet from the lab scale test work data:
- Concentrations and constituents of the waste streams: wastewater, tailings, solid waste
- Air emissions and the temperature and pressure of the leach process and pH adjustment.

If the EPA does not accept HGM amending their current permit to allow the construction, commissioning, and operation of the plant, an EER submission will be completed.

1.16.5 Treatment & Storage of NVRO Tailings

The NVRO, Chief Technology Officer is of the opinion that post NVRO process tailings are likely to not require sub-aqueous deposition due to the process breaking down the pyrite and the formation of stable sulfates as part of the proposed leaching, sulfidation, and neutralisation process steps. Additional work is required to confirm this assumption.

The Hellyer Gold Mine has a current EMP approved that includes the management of existing and new tailings produced from the ongoing HGM operations. The initial feed for the Project for the first several years will be directly from the HGM tailings that are currently being produced. The tailings will pass through the Project. Within the NVRO Plant, metals will be removed, sulfides will be oxidized and any acid-generated will be neutralized.

An adverse effect on the operation of the current HGM TSFs is not anticipated.

1.16.6 25 Environmental Setting

The Hellyer operation (comprising the mineral processing facilities and infrastructure, the former Hellyer underground mine and the Fossey development) is on the Que River plateau at approximately 700 m asl. The plateau is bounded to the east by the Southwell River valley, which is steeply sloping with thick rainforest cover, descending to around 400 m asl. To the west of the divide, the site slopes generally to the west where the Que and Bulgobac rivers flow to the south and west.

1.16.7 26 Environmental and Social Issues

1.16.7.1 Acidic Drainage

In 2006, Polymetals identified geochemical issues and acidic supernatant water in the TSF as the biggest risk on site, with tailings embankment failure being the next biggest risk. In 2009, BSM identified similar risks and risk levels but identified AMD from sulfidic tailings oxidation more specifically than Polymetals.

From the environmental management plans, HGM believes that these aspects remain the major environmental risks at the Hellyer site. In its work to characterize and control these risks, HGM applies advanced AMD characterisation and mitigation techniques.

Surface run-off and seepage from this area drained to the TSF via Mill Creek. Geo Environmental Management estimated an acidity load of 0.3 t/day from this area. Since that time, the ore stockpiles have been removed and the ROM capped with a compacted lime mix.

The potential for acidic drainage remains at the HGM due to the pyritic material in the old tailings and the tailings that have been re-processed as part of the HGM tailings re-processing operation from 2018 to the present. The management of these tailings is focussed on preventing the oxidation of the material by covering them with about 2 m of water, which restricts the entry of oxygen so not allowing the oxidation reaction to occur.

1.16.7.2 Surface Water

There are local effects to surface water mainly on the Que River due to seepage and discharges from the TSF.

1.16.7.3 Groundwater

Groundwater quality has been affected by the development of the Hellyer and Fossey underground mines as well as by seepage from the tailings storage facility.

1.16.7.4 Visual / Landscape

The Hellyer Mine is not a conspicuous visual intrusion in the landscape. The Que River and Hellyer operations have been operating or disturbed since 1980.

1.16.8 Environmental and Social Management

The site operates under an approved Environmental Management Plan. Environmental Management Plan and Rehabilitation and Closure Plan Review 25 February, 2022.

The Project is an additional process that will be installed and operated as part of the existing and ongoing HGM tailings treatment operation. The area where the Project will be installed is part of a brownfields site. Therefore, no additional areas will be disturbed by the Project.

EnviroGold Global will operate the Project in complete alignment with the current operating HGM project using the same (or better) operational parameters for the Project.

1.16.9 Closure Planning

The rehabilitation and closure plan for the Hellyer Gold Mine was developed in accordance with key objectives of the Strategic Framework for Mine Closure (ANZMEC, 2000):

- Protect the environment, public health, and safety by using safe and responsible closure practices
- Reduce or eliminate adverse environmental impacts as part of mine closure

- Establish conditions which are consistent with the Hellyer lease area becoming a healthy modified ecosystem.
- Reduce the need for long-term monitoring and maintenance by establishing effective physical and chemical stability of disturbed areas.

Caloundra Environmental conducted a preliminary assessment to identify key environmental aspects associated with the site for the 2017 EMP. Environmental aspects were assessed by identifying and reviewing known emissions from the site since its closure in 2000. An environmental financial assurance (bond) of approximately $1,900,000 is held by Mineral Resources Tasmania against the tenement.

The final closure plan allows for five years of monitoring and maintenance. This includes surface water quality monitoring and dam safety inspections. Surface water sampling is expected to involve three sites: Southwell River below Portal, Combined Discharge at H1 and Combined TSF discharge downstream of the two embankments, sampled monthly for the first 12 months, then quarterly. Photo monitoring of revegetation and site inspections for weeds will also be necessary.

The closure of the Project will follow the required guidelines. As part of the TPOA, NVRO will provide a security bond for the demobilization and rehabilitation of the project infrastructure.

1.16.10 Social/Political

Tasmania has remarkable geological diversity and more than a century's history as a significant minerals producer. The State exports ores and concentrates of iron, copper, lead, zinc, tin, high-grade silica and tungsten. The total value of mining and metallurgical production in Tasmania was $1.82 billion in 2016/17 (www.mrt.tas.gov.au).

Tasmania is an attractive location for investment. The political environment in Tasmania and Australia is generally supportive towards mining developments, and tenement, title and environmental approvals to date have been forthcoming as required. The Project has several environmental and social advantages that will be shared with the local stakeholders as part of the Project communication plan. The benefits of reduced acidity in the tailings are the key.

The current HGM operation is a material net contributor to the local economy and sources much of its workforce locally. NVRO anticipates its on-site management, laboratory and operational staffing requirements would directly employ around 48 people, with most sourced from the local Tasmanian community. These employment opportunities and the extension of the life of the Hellyer Project by several years seem likely to be viewed as positive locally. Net benefits include job creation, spin-off jobs, increased life of Project, and taxes paid to the Tasmanian and Australian governments.

1.17 Capital and Operating Cost

The capital cost estimate is a prediction of the total of the facility; the principal elements are the direct cost, indirect cost, owner's cost, and contingency. Table 1-6 presents the capital estimate summary for initial capital cost with no escalation.

Table 1-6. Capital cost summary for the construction of the NVRO Plant (US$M)

Area	**Initial Capital**	**LOM Total**	
	Stage 1	Stage 2 Expansion	
Processing Plant	8.94	46.72	55.66
EPCM	1.34	7.01	8.35
Owner Costs & Indirect Costs	1.65	6.29	7.94
On-Site Infrastructure	0.20	0.65	0.85
Contingency & Other Provisions	3.03	15.17	18.20
Initial Capita Cost	15.16	75.84	91.00

LOM project capital costs consist of the initial capital development which includes all costs to develop the property to production, tailings reclamation and processing rate of approximately 500 tpd during Stage 1 and 3,500 tpd for

Stage 2. The capital cost estimate was compiled using a combination of database costs from projects developed in Australia and South Africa, scaling factors and factoring.

The capital cost estimates are considered equivalent to an AACE International Class 4 estimates (-20% / +30%), with the overall project's definition estimated to be 10%.

The annual operating cost (Opex) for the stage 2 processing operations, fixed 3,500 tonnes per day plant feed production schedule, are summarized in Table 1-7.

Table 1-7. Total Operating Cost Summary – NVRO 3500 tpd processing plant

Cost Type	Total	
	US$/Annum	US$/t Ore
Mining - Tailings Reclamation*	5,110,000	4.00
Processing Plant	90,989,270	71.22
Tailings Emplacement (Deposition)	9,129,643	7.15
General & Administration (G&A)	2,289,669	1.79
Total Operating Costs (exclusive of Mining)	102,408,583	80.16

*Modelled after year 5 when HGM tailings processing stops

The Opex estimates are based on combination of test work results, experiential judgment, reference to other operating projects with similar processing equipment and factors as appropriate with a PEA study.

1.18 Economic Analysis

The Hellyer Tailings Project is estimated to generate after-tax net cash flows of approximately US$350 million over the 8-year operating life of the project. Total expected investment of US$92 million (including FEED of US$1 million) will yield a pre-tax internal rate of return of 96% (after tax 66%) and annual EBITDA contribution of approximately US$77 million when producing at the 3,500 tpd throughput rate. The net present value at 10% of the unlevered (no debt, all equity) pre-tax cash flows is US$262,791,000 (after-tax US$175 million). A total of 965,000 ounces (Au equivalent) of gold, silver, copper and zinc will be produced at an all-in sustaining cost (AISC) US$1,127 per ounce.

1.19 Interpretation and Conclusions

Based on the data in this report, the Qualified Persons conclude that the information has been interpreted appropriately and that it supports the economic analysis. The following interpretations and conclusions are made by the Qualified Persons in their respective areas of expertise. The following conclusions are drawn:

- The Project will be completed under a tailings processing operations agreement that is in place with HGM. Additional consents will be obtained from the HGM debt holders.
- Based on the test work to date, the application of NVRO developed process is technically feasible at the production scale contemplated in this study.
- Mineral Resource Estimates
    - No cut-off grade is used and the stated resource essentially represents the complete tailings accumulation at the reported date.
    - The tailings mineralization averages a grade of 2.3 g/t Au and is significantly in excess of the indicative break-even grade as this calculation does not consider the silver and the base metals.
    - The estimated total available tailings feed for the Project is about 9 Mt.
- The tailings resources are contained within the tailings storage facility. Dredging of the tailings has been successfully implemented by HGM since 2018.The installation of the second dredge will provide additional tailings recovery capacity that exceeds the existing HGM plant throughput
- Environmental Permitting and Social Considerations
    - The environmental approvals for the current HGM tailings reprocessing operation are in place.

- Management of the environmental effects for the current operation is through the implementation of an approved environmental management plan.
- It is expected that the Project will reduce the overall environmental liability at the mine be reducing the potential for acidic drainage and the associated metal leaching.

2 Introduction

2.1 Issuer

This document is prepared for EnviroGold Global, which is a company listed on the Canadian Securities Exchange under the ticker NVRO.

2.2 Terms of Reference

This Technical Report has been prepared to meet the requirements defined by National Instrument 43-101 (“NI 43-101”) and Form 43-101F1 for EnviroGold Global (NVRO) (listed on the Canadian Securities Exchange) in describing the results of a Preliminary Economic Assessment (“PEA”) and Mineral Resource Estimate for the Hellyer Tailings Project (the “Project”). This technical report also discloses other financial and technical aspects of the Project that NVRO proposes at the Hellyer Gold Mine (HGM).

This technical report focuses on the Project assessment completed to date, the evaluation of using complimentary technology for enhanced metal recovery from the HGM zinc scavenger tailings, the mineral processing methodologies proposed to be used, and the design, engineering, and construction planning to be undertaken towards development of the Project. Specifically, input and reviews are as follows:

- HGM Financial Model and Model Inputs
- Mining/dredging and mineral processing activities of HGM’s operations at Hellyer Gold Mine September 2018
- Processing, recovery, and reconciliation performance for HGM since September 2018
- Preparation of an updated balance of Mineral Resources and Ore Reserves following depletion by production
- Available cost information for NVRO inputs
- Proposed mineral processing options for the Project
- Capital (CAPEX) and operating cost (OPEX) assumptions
- Current NVRO’s Financial model with projects cash flows

2.3 Hellyer Tailings Project

The Hellyer Gold Mine is in north-west Tasmania, Australia (see Section 4.1). The underground mine shut down in 2010. The tailings storage facility (TSF) at the Hellyer Gold Mine contains some 9 Mt of tailings. In 2018, Hellyer Gold Mines Ltd began reprocessing the tailings to produce a lead concentrate and a zinc concentrate. For this operation, tailings are removed from the TSF using dredges and then, following pre-screening and polishing, are sent to the flotation circuit where the two concentrates are produced. The resulting zinc scavenger tailings are returned to specific locations within the TSF. EnviroGold Global has been assigned the rights to reprocess the tailings (zinc scavenger tailings and other general tailings) for the recovery of residual value in the precious, strategic, and critical metals.

2.4 Principal Sources of Information

This Technical Report has been prepared by EnviroGold Global based on:

- Information made available to NVRO by HGM, along with laboratory test work and technical reports prepared by consultants, previous tenement holders, and other relevant published and unpublished data.
- Discussions with HGM’s management, as well as previous company and consultants reports for information contained within this assessment.
- Project site visit during March 2021 in the company of HGM’s on-site General Manager Operations, and Project Co-ordinator.
- Due Diligence site visit during January 2022 in the company of HGM’s on-site General Manager Operations, and discussions with other staff.

- Documents made available by NQ Minerals and HGM through their online Data Room.
- External information for project input costs (e.g., electricity, reagents, labour).

NVRO has endeavoured, by making all reasonable enquiries, to confirm the authenticity, accuracy, and completeness of the technical data upon which this report is based.

Unless otherwise stated, information and data contained in this technical report or used in its preparation has been provided by HGM in the form of documentation, information that is generally available (e.g., power costs from electricity retailers), from data obtained and observations made during the site visit, or from laboratory test work and technical reports prepared by consultants.

Descriptions of the mineral tenements, environmental permitting, and other historical data have been provided by HGM. NVRO has assumed that the information provided for preparation of this report correctly represents all information material to the mineral assets.

Section 27 contains the references.

2.5 Qualified Persons and Report Contributors

The following people contributed to the development of the document (Table 2-1).

Table 2-1. Qualified Persons and Contributors to this Technical Report

Name	Company	Position	Subject Matter	Qualified Person	Independent	Sections	Date of Last Site Visit
Independent Qualified Persons							
Jacques Houle	Jacques Houle P.Eng. Mineral Exploration Consulting	Principal Mineral Exploration Consultant	Geology	Yes	Yes	6, 7, 8, 9, 10, 11, 12, 14, 15, 23, 26	No
Rossen Halatchev	AusGEMCO Pty Ltd	Director Mining and Principal Consultant	Geology, Resources, Technical	Yes	Yes	1, 2, 3, 4, 5, 16, 18, 19,20, 24, 25, 26, 27	2017-06-28 - 29
Rodrigo Carneiro	RCarneiro Mineral Engineering & Consultant LLC	Metallurgical Consultant	Mineral Processing	Yes	Yes	13, 17, 21, 22,26	No

2.5.1 QP Personal Inspection

A site inspection was completed by Rossen Halatchev (AusGEMCO Pty Ltd, Director Mining and Principal Consultant), QP, in June 2017. Dr. Halatchev visited all existing infrastructure: all dams (and inspected walls), the processing plant, dredge, pipelines, storages, buildings, railway, as well as the Fossey Underground Mine. He had meetings with the managers of Hellyer and visited the Burnie port.

His observations confirm the physical presence of the tailings dam, mining equipment (dredge), pipelines, treatment plant and all facilities as outlined in the report by AusGEMCO and other studies detailed below.

3 Reliance on Other Experts

In preparation of this report, NVRO has relied on numerous reports, data, test results and technical literature prepared by others (who are not qualified persons) in various technical fields in the areas of legal, political, environmental, socio-economic, and tax. While NVRO has taken reasonable steps to verify the information from these references, the company generally accepts that the data, assumptions, and opinions represented in these reports are accurate and adequately supported by background technical assessment.

4 Property Description and Location

4.1 Hellyer Project Location

The Hellyer Project is in north-western Tasmania, Australia, approximately 60 km south-southwest of Burnie and about 200 km northwest from Hobart. It is adjacent to the A10 Murchison Highway, which connects the north coast with Queenstown and Rosebery (Figure 4-1). A rail spur also extends to the HGM site.

The coordinates for the Hellyer Gold mine are UTM Zone 55G 393794E and 5396352N (Latitude: 41°34”38.87” S, Longitude 145°43’33.59” E) at an elevation of 691 m (above mean sea level).

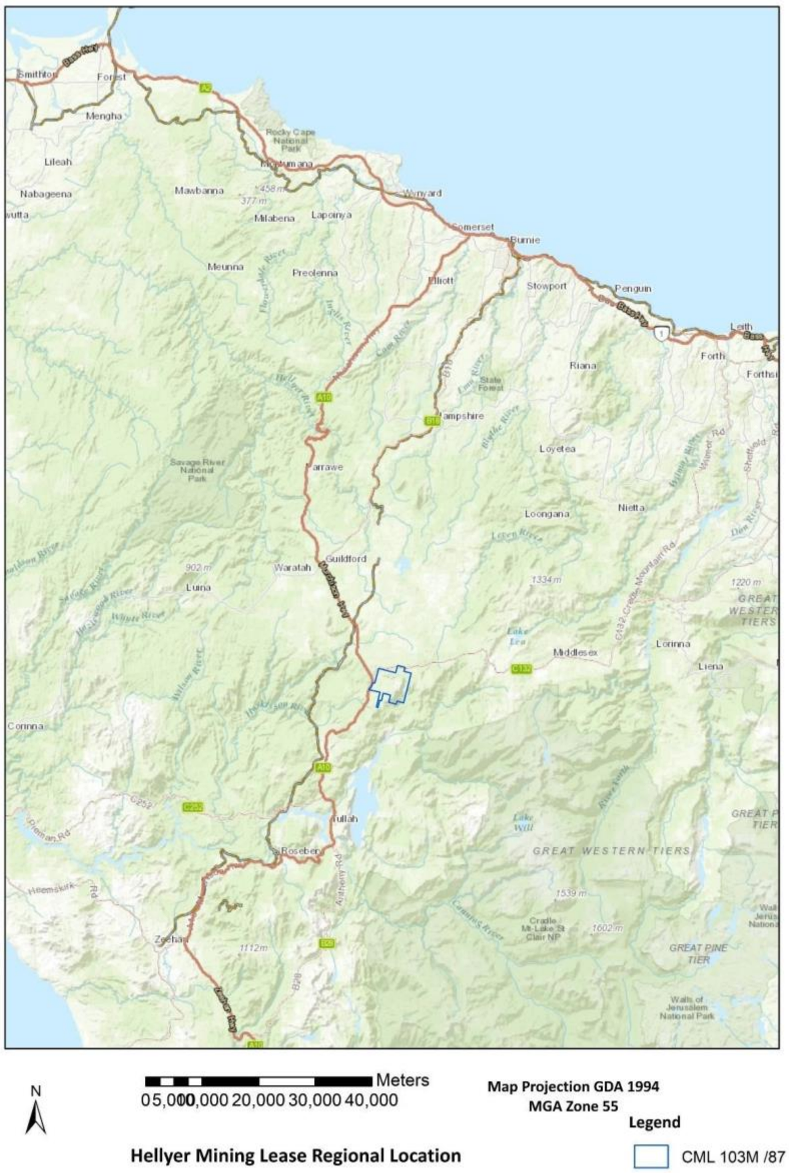


Figure 4-1. Hellyer Location, NW Tasmania

(Source: Environmental Management Plan and Rehabilitation and Closure Plan Review, February 2020)

HGM has informed NVRO that it holds relevant rights for its current and proposed mineral recovery and reprocessing operations, including approved processing plant site and tailings storage areas.

The current mining tenure is Combined Mining Lease CML103M/1987 covering an area of 1,695 ha held by HGM. The lease was recently renewed for a further 10-year period, now expiring on 30 June 2030. The background tenure is State Forest.

Figure 4-2 shows an annotated aerial photograph of the Hellyer Mine Site identifying the various tailings storage areas and other key points.

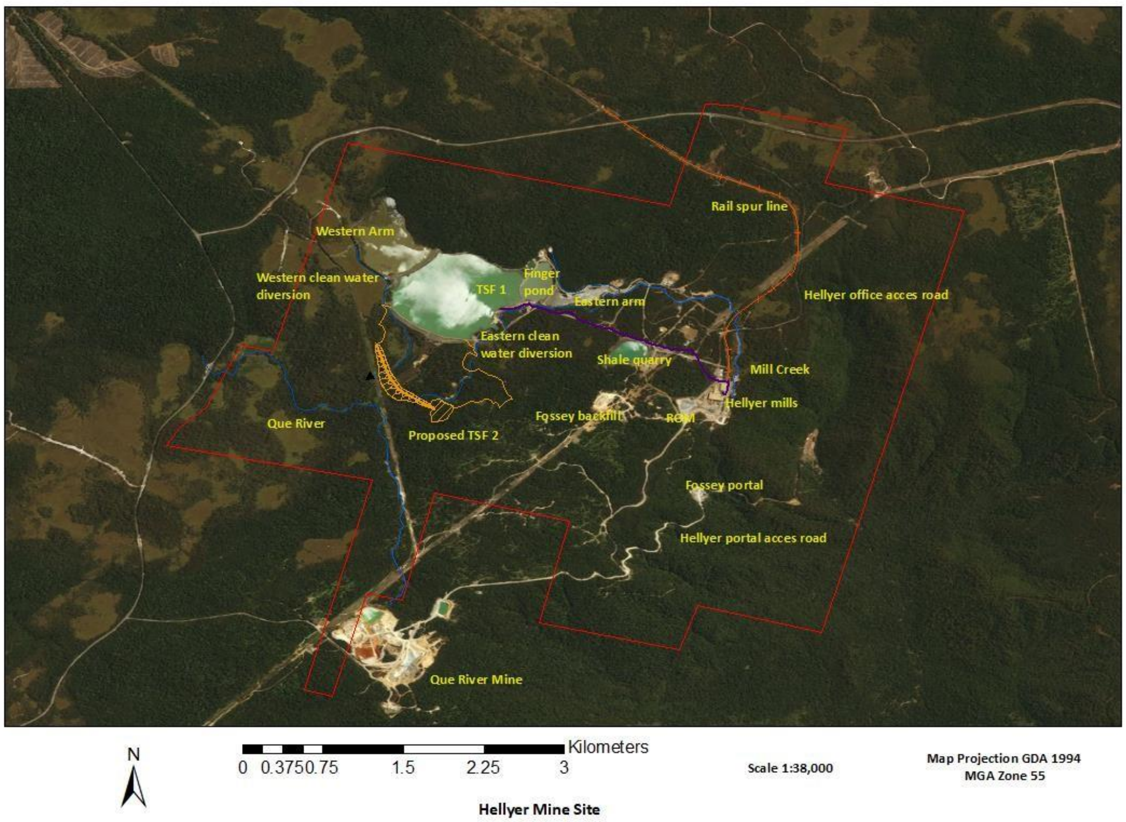


Figure 4-2. Hellyer Mine Site – Aerial Photograph

(Source: Environmental Management Plan and Rehabilitation and Closure Plan Review, February 2020)

The Hellyer Project requires government approvals to operate and, as such, a permit currently exists for the reprocessing of tailings (2 Mtpa) at Hellyer (PCE 7386). In October 2017, following a request by HGM the EPA of Tasmania approved the 2017 EMP for implementation of the Hellyer Project, in accordance with the Condition G7 of PCE 7386, as contained in Permit No. DA 138/2006. As a result, all permits and approvals required for the tailings reclaim and retreatment operation are in place.

The Project is based on a tailings storage facility (TSF) located entirely within the Hellyer Gold Mine Mining Lease. The tailings to be mined are the residues from the Hellyer processing plant and comprise a significant value of zinc, lead, gold, and silver.

There is a dredge (Seabird III) currently anchored in the Main Tailings Storage Facility which was used initially by PolyMetals to dredge tailings for reprocessing during the period 2006 - 2008.

Approximately 2.0 million tonnes of tailings material were re-processed through the Hellyer processing plant during that period, producing 89,700 tonnes of concentrates for shipment and sale. The tailings were dredged from the following areas:

- Western Arm Dam
- Eastern Arm Dam
- Main Tailings Storage Facility

The post treatment residues were redeposited in the following areas: Shale Pit (1.31 Mt) and Western Arm Dam (0.605 Mt).

4.2 Mineral Rights

CML 103M/87 is the consolidated mining lease (Figure 4-3). The mining lease encompasses the area at Hellyer where the tailings impoundment and processing plant are situated. The original lease was granted on 24 February 1988. It was renewed and extended on 14 September 2020. It is currently valid until 30 June 2030.

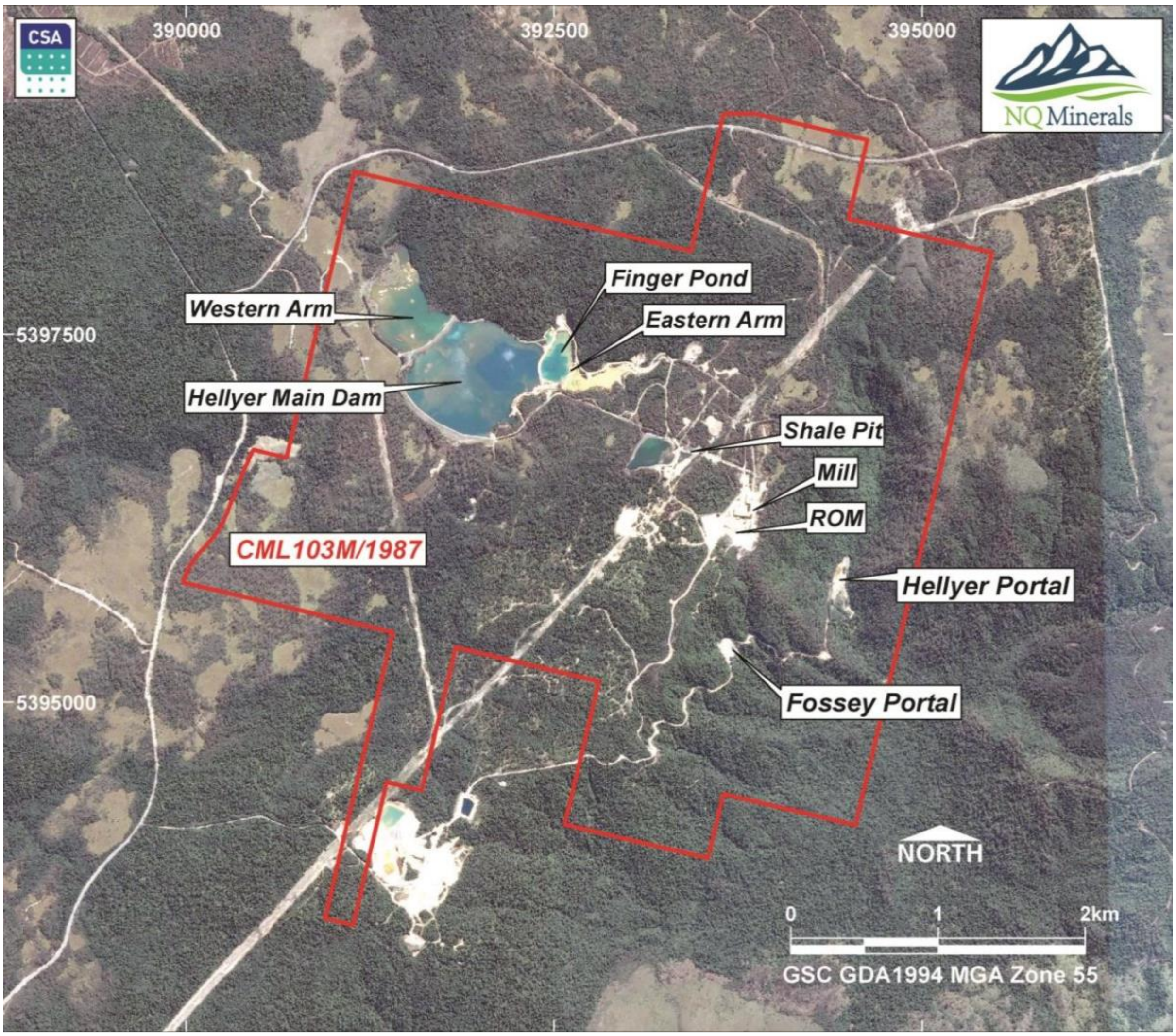


Figure 4-3. Lease CML 103M/1987 for the Hellyer Gold Miner and key infrastructure

(Source: R317.2020 NQMCPR02 CPR Update - NQ Minerals Hellyer Tailings Retreatment)

The lease renewal in 2020 set out "special provision" associated with the renewal which includes the payment, in stages, of a security deposit totalling AU$7,900 which comprises an amount of AU$2,000 already paid, AU$1,000 due by 29 January 2021, AU$1,000 due by 30 June 2021, AU$1,000 due by 30 June 2022 and AU$2,900 due by 30 June 2023. Tenure details are presented inTable 4-1, and the tenement outline is shown regionally in Figure 4-3.

Table 4-1. Tenure details for the Hellyer Gold Mine

Asset	Holder	Interest	Status	Lease expiry date	Lease area	Comments
Australia, Hellyer Gold Mine	Hellyer Gold Mines Pty Ltd	100%	Production	2030-06-30	1695 ha	Final permitting for tailings retreatment complete (PCE 7386)

(Source: R317.2020 NQMCPR02 CPR Update - NQ Minerals Hellyer Tailings Retreatment)

Subject to a sub-lease agreement between HGM and Pieman Resources Pty Ltd (dated 30 November 2020), ownership of the Hellyer assets is split between the two companies:

- HGM's rights within CML103M/1987 include ownership of the tailings resource in the various Tailings Storage Facilities (TSFs), ownership of the infrastructure, and rights to any "gold deposits" which may be discovered in CML103M/1987. The term "gold deposits" is taken to mean in situ mineralisation or resource where the highest economic value elements are precious metals (gold and silver). HGM also has the rights to any precious metals remaining in any tailings produced by Pieman.
- Pieman retains the rights to any "base metal deposits', those rights having been assigned from Bass Metals Ltd. to Pieman Resources on 8 January 2020. A "base metal deposit" is defined as in situ mineralisation or resource where the base metal grades have a greater economic value than precious metals, including any mineral deposit that is not a gold deposit or tailings. Pieman Resources Pty Ltd also acquired the rights to EL48/2003, the surrounding exploration tenement, from Bass Metals Ltd in January 2020.

4.2.1 EnviroGold Global's Rights to Process the Hellyer Tailings

EnviroGold Global has entered into a tailings processing operations agreement with HGM. The agreement contains milestones for the development of the project and targets for production and costs. EnviroGold Global expects to meet the project development targets as well as the production and costs targets. Details of the agreement are presented in Section 7.6.

Within the tailings processing operations agreement (TPOA: Section 7.6), HGM must maintain the licences, environmental approvals, environmental management plans etc. and must provide access to the site for the construction and operation of the NVRO metal recovery plant.

4.3 Royalties and Other Payments

There are several debts on the HGM Property. For completeness, a high-level overview is presented here. However, it should be noted that these debts, once the consents to sell the mineral concentrates have been received by the Project, do not affect the Project. EnviroGold Global and HGM are working to obtain the consents from the debt holders. There is a reasonable expectation that these consents will be obtained.

Current debt holders of HGM include:

- ING Bank N.V., Amsterdam, Lancy/Geneva Branch
- AU$ley Funding PLC a company incorporated under the laws of England with registration number 10364982 (Original Bondholder)
- RIVI Opportunity Fund, LP (a limited partnership formed under the laws of the State of Delaware, USA) (RIVI)
- RCA NQ LLC (a limited liability company formed under the laws of the State of Delaware, USA) (RCA)

There are varying levels of debt held by each of the above. N.B. These are debt on the HGM operation and are not a debt on the Project. Under the agreement between EnviroGold Global and HGM, payment is made to HGM and then HGM distributes the monies as defined in the Priority, Subordination and Consent deed to which the above-mentioned are party.

In addition to the debt held by HGM, there is a royalty (Gold Purchase Deed and a Silver Purchase Deed) in place with HGM by RIVI and RCA for the gold and silver production, respectively. HGM maintains the opinion that the

RIVA and RCA contracts are with HGM and, therefore, HGM is responsible for the payment of the royalties on the gold and silver produced by the Project. The Tailings Processing Operation Agreement (TPOA) defines the responsibility for the payment of the royalties (Section 7.6).

4.4 Historic Environmental Liability and Indemnity

EnviroGold Global has an agreement for the re-processing of the tailings at the Hellyer Gold Mine. The agreement is toll treatment with a net profit return to the owner. The tailings that are processed by NVRO are returned to the owner for safe storage.

N.B. The liability at the site for the site, including all and any tailings, remains fully with HGM. At the closure of its operations, NVRO will remove its plant and rehabilitate the footprint.

For completeness and in acknowledgement that the Hellyer Gold Mine is a brownfields site, information is provided on the current rehabilitation and closure requirements for the site that pertain to Hellyer Gold Mines Pty Ltd.

The Hellyer Gold Mine's closure plan was last updated in the EMP review submitted to the EPA in February 2020 with the following key costs:

- Final Rehabilitation and Closure Estimate: AU$7,861,431
- Bond Estimate: AU$986,000

There were changes in the estimate for prevention of environmental harm (on which HGM's current bond is assessed), which decreased from AU$1,508,000 to AU$986,000 primarily due to the deeper water cover now available over Aberfoyle tailings in the main section of TSF1.

It should be noted that there is an environmental financial assurance (bond) of "approximately AU$1,900,000" held by Mineral Resources Tasmania against the tenement (as of 2020) and that the estimate included in the 2020 EMP review does not include any bond or closure cost estimates for TSF2.

4.4.1 Underground Mines

The Hellyer and Fossey underground mines were sealed in 2000 and 2012, respectively. Periodic study and monitoring underground mine conditions continues; however there is no estimate for their closure liability/costs. The underground mines are not accounted for in the closure or bond estimates.

4.4.2 Other Liabilities

The Shale quarry has a direct hydraulic connection to the Hellyer void in the north-eastern corner of the quarry. Since the shale quarry dam wall was raised in 2006, seepage into the Hellyer void has increased due to the extra head, which accounts for ~50% of bond estimates.

Hellyer has a legacy of acidic drainage. This will continue to be a challenge unless the acid generating potential of the tailings can be reduced.

Mill Creek contains historical runoff slurry from the mill that is oxidizing in the creek. The problem is localized to this creek and HGM has plans to clean the creek.

4.4.3 Final Rehabilitation Cost Estimates

On permanent closure, the rehabilitation items and domains will need to be addressed by HGM. These costs are for the site owner and not to the account of NVRO.

4.4.4 Tailings Storage and Bond Estimates

The following is excerpted from Cranfield et al., 2020. The Qualified Persons authoring this report verify its accuracy.

> The property under study is a tailings dam with a capacity of approximately 10 Mt at an in-situ density of approximately 1.9 t/m3. The tailings are the waste product from the Hellyer mill and

comprise fine sands containing significant values of zinc, lead, copper, gold and silver, a portion of which can possibly be recovered by further milling and retreatment by flotation and other means.

The depth of the tailings varies from 1 m below water level to approximately 20 m below water level at the deepest point beside the dam wall. There is an environmental constraint to maintain a minimum water cover of 1 m over the surface of the tailings during operations and to provide a minimum water cover over the surface of the tailings of 2m at closure. The tailings contain sulfides susceptible to oxidation and the formation of acids if exposed to the atmosphere. This imposes a constraint on the mining method, resulting in the choice of a dredge as the most suitable means of mining. Following refurbishment in 2018, a Seabird III 300 kW Electric Drive Cutter Suction Dredge was used in August 2018 to transfer 120,000 Mt of material from the Finger Pond into the Main Tailings Storage Facility and subsequently as the main mining unit to produce approximately 1.6 Mt as feed to the Process Plant from September 2018 until July 2020. A second dredge, on hire, was utilised to relocate existing tailings material and to cover any excess maintenance downtime in the Seabird dredge.

The process plant throughput rate met the proposed annual production rate of 1,200,000 tpa in 2019-2020. With a streamlined process to recover base metals only (lead and zinc), the plant demonstrated the capacity for 150 tph during September 2020. Through incremental adjustments it is proposed that the throughput rate be increased to 180 tph by March 2021, equivalent to 1,450,000 tpa.

To meet this process rate, the dredge on hire will be replaced with a higher capacity unit utilising a 10/8 size Warman pump, similar to the Seabird dredge. This will ensure production rates can be met, and permit blending of feed grades from different blocks which assists in maintaining steady feed conditions to the plant, thus enabling enhanced metal recoveries.

The current status for the tailings storage areas are provided in Table 4-2.

Table 4-2. Tailings storage facilities and condition at the Hellyer Gold Mine

Location	Tailings	Condition/comment
Shale quarry	Polymetals tailings	Needs water delivery to maintain tailings under water cover
TSF1	Original Hellyer tailings, Fossey tailings	Tailings under several metres of water
Eastern arm impoundment	Original Hellyer tailings, Fossey tailings	Tailings exposed in upper recaches or under less than 500 mm water cover near embankment wall
Western arm impoundment	Polymetals tailings, original Hellyer tailings, Fossey tailings and since Jan 20 processed residual tailings (PRT)	Embankment wall leaks, meaning that water delivery to inundate tailings is required

(Source: HGM Environmental Management Plan and Rehabilitation and Closure Plan Review by Caloundra Environmental, 2020)

An environmental financial assurance (bond) of approximately AU$1,900,000 is held by Mineral Resources Tasmania against the tenement. The key environmental aspects of concern are related to surface water emissions and are mainly caused by acidic drainage from exposed or oxidizing sulfidic tailings (Table 4-3).

Table 4-3. Bond estimate summary for the tailings storage facilities at the Hellyer Gold Mine.

Item	Works	Cost estimate (AU$)
Shale quarry	Bentonite seal tailings and edges to reduce wall fissure seepage, limestone cover tailings	$471,827
Eastern Arm	Remove exposed tailings from Mill Creek and upper eastern arm and passivate and store in TSF1 under water, passivate remnants by application of limestone over residuals in eastern arm	$159,952
Western Arm	Limestone, sand cover over tailings	$116,086

Item	Works	Cost estimate (AU$)
EFB	Cover tailings with 25 mm limestone, sand mixture	$111,215
Total estimated FA requirement		*$986,373*

(Source: HGM Environmental Management Plan and Rehabilitation and Closure Plan Review by Caloundra Environmental, 2020)

4.5 Permits and Authorizations

4.5.1 Environmental Permitting History

Intec and Polymetals formed the Hellyer Zinc Concentrate Project Joint Venture (HZCJV) in 2006. Under this agreement, Polymetals obtained PCE 7386, refurbished the Hellyer Processing Plant and acted as the operators of the HZCJV until the HZCJV ceased on 31 August 2008. The Hellyer operation continued under Intec control until 9 September 2008 when it was placed into care and maintenance by Intec.

Intec sold the Hellyer site to Bass Metals in early 2009. Bass Metals operated the site, obtained PCE 7785 and PCE 7759 and developed the Fossey underground mine, which operated until March 2012 when the site was placed into care and maintenance due to low metal prices, lower-than-planned metal recoveries and higher than-expected operating costs.

4.5.2 Environmental Licences and Permits

Key permits and approvals are provided in Table 4-4.

Table 4-4. Summary of Key Environmental Development Approvals for the Hellyer Gold Mine

Environmental Approval, Licence or Permit	Issuing Authority	Requirements and Comments	Relevant Legislation or Instrument
Decision to conduct mineral works activity Granted 10 October 2006. Permit Conditions Environmental (PCE) 7386 issued	Tasmanian Environmental Protection Authority (EPA)	The activity was assessed as a Level 2 activity under the Environmental Management and Pollution Control Act 1994. Covering dredging and reprocessing tailings and use of all plant and infrastructure at the Hellyer mine site	Environmental Management and Pollution Control Act 1994. Section 25
Land Tenure for Mining CML 103M/87. Granted 24 February 1988	Land Tenure for Mining CML 103M/87. Granted 24 February 1988	Consolidated Mining Lease. Mining leases have been granted and have been approved for all proposed mining areas	Tasmanian Mining Act 1978. Section 28. Now Mineral Resources Development Act 1995
Planning Permit DA 138/2006 approved. Granted 16 October 2006	Waratah Wynyard Council	Approval granted to operate tailings reprocessing activity at Hellyer	Land Use Planning and Approvals Act 1993, Environmental Management and Pollution Control Act 1994 and the Waratah Wynyard Council Planning Scheme 2000
Decision to approve 2017. Environmental Management Plan. Granted 17 October 2017	Tasmanian Environmental Protection Authority (EPA)	Approval under Condition G7 of PCE No. 7386	Environmental Management and Pollution Control Act 1994
Decision that the project (construction and operation of TSF2) is a not a Controlled Action Granted 22 June 2018	Commonwealth of Australia Department of the Environment and Energy ("DoEE"). Previously Department of the Environment from September 2013 to July 2016 (DoE)	Referral to DoEE occurred on 18 January 2018	Commonwealth of Australia Environment Protection and Biodiversity Conservation Act 1999 (section 75)

Environmental Approval, Licence or Permit	Issuing Authority	Requirements and Comments	Relevant Legislation or Instrument
Decision to operate a waste depot. Granted 5 February 2019 PCE 9789 issued.	Tasmanian Environmental Protection Authority (EPA)	Approval to construct and operate a tailings storage facility (TSF2)	Environmental Management and Pollution Control Act 1994. Section 25
Planning Permit DA 108/2018 approved. Granted 2 April 2019	Planning Permit DA 108/2018 approved. Granted 2 April 2019	Approval to construct and operate a tailings storage facility (TSF2)	Land Use Planning and Approvals Act 1993, Environmental Management and Pollution Control Act 1994 and the Waratah Wynyard Council Planning Scheme 2000
Environmental Management Plan and Rehabilitation and Closure Plan Review 2020	Environmental Protection Authority (EPA) of Tasmania	Approval of the environmental management plan and rehabilitation and closure plan. Most recent 3 year review of EMP and Closure Plan was accepted by EPA on 13 March 2020	Environmental Management and Pollution Control Act 1994

(Source: Behre Dolbear Australia "Independent Technical Due Diligence Review" August 2019)

4.5.2.1 PCE 7386 and DA 138/2006

PCE 7386 is the principle operational environmental permit for tailings reprocessing and was issued by the Tasmanian EPA on 10 October 2006. DA 138/2006 issued by the Waratah Wynyard Council. This conditionally authorises tailings dredging and reprocessing at Hellyer. Condition G7 of the PCE 7386 requires that a comprehensive EMP review and environmental rehabilitation plan review must be submitted to the Director of the EPA 12 months after the commencement of mining, and for every three years thereafter, by the third yearly anniversary. The next EMP review will be due in March 2023.

4.5.2.2 PCE 9789 and DA 108/2018

PCE 9789 conditionally authorises construction of and tailings storage in TSF2 at Hellyer and was issued by the Tasmanian EPA on 8 February 2019. DA 108/2018 issued by the Waratah Wynyard Council. PCE 9789 contains conditions pertaining to the construction use and reporting relating to the TSF2. HGM has also received authorisation from the Department of Primary Industries, Parks, Water and Environment, Water and Marine Resources Division under Section 165F of the Water Management Act 1999. This stipulates dam design and engineering related conditions for TSF2.

The Environmental Protection Authority (EPA) of Tasmania approved the Hellyer Gold Mine Environmental Management Plan (EMP) on 13 March 2020.

To implement the project, an amendment will be required to the EMP. It is reasonably expected that this amendment can be obtained.

4.6 Other Factors and Risks

The Project is being installed, initially, as an add-on to an existing metal recovery operation. The Hellyer tailings reprocessing operation has been operating successfully since 2018. The addition of the Project at the site would be similar to an upgrade to a processing plant at another operation. In this case, the upgrade is being contracted to EnviroGold Global as a toll treatment operation. While the HGM metal recovery plant is operating, the Project will receive the zinc scavenger tailings directly from the plant. It is envisaged that, if the HGM operation winds down, EnviroGold Global will take over the operation of the existing dredges so that tailings can continue to be processed by the Project.

EnviroGold Global has a contract with Hellyer Gold Mines for the reprocessing of the tailings (see Section 7.6). The tailings produced by the Project remain the property and responsibility of HGM. As such, this document is focussed on the initial operations, which is, in essence, the production of metals concentrates from the tailings delivered to the Project.

Risks currently identified and associated with the Project are discussed in Section 25.2.

5 Accessibility, Climate, Local Resources, Infrastructure and Physiography

5.1 Accessibility and Infrastructure

Road Access to the site turns off the sealed Belvoir Road (C132), 4 km east of its junction with the main, all-weather highway (A10), which connects Burnie and district with Rosebery and Queenstown to the south. Travel times to Burnie are route-dependent but vary between 60 and 90 minutes (80 to 100 km).

Burnie is the key industrial port on the north coast of Tasmania (Figure 5-1). The Hellyer site is also served by a rail siding purpose-built for concentrate shipments. Current HGM operations do not use the rail siding, instead utilising trucks to transport the concentrates products to Burnie.

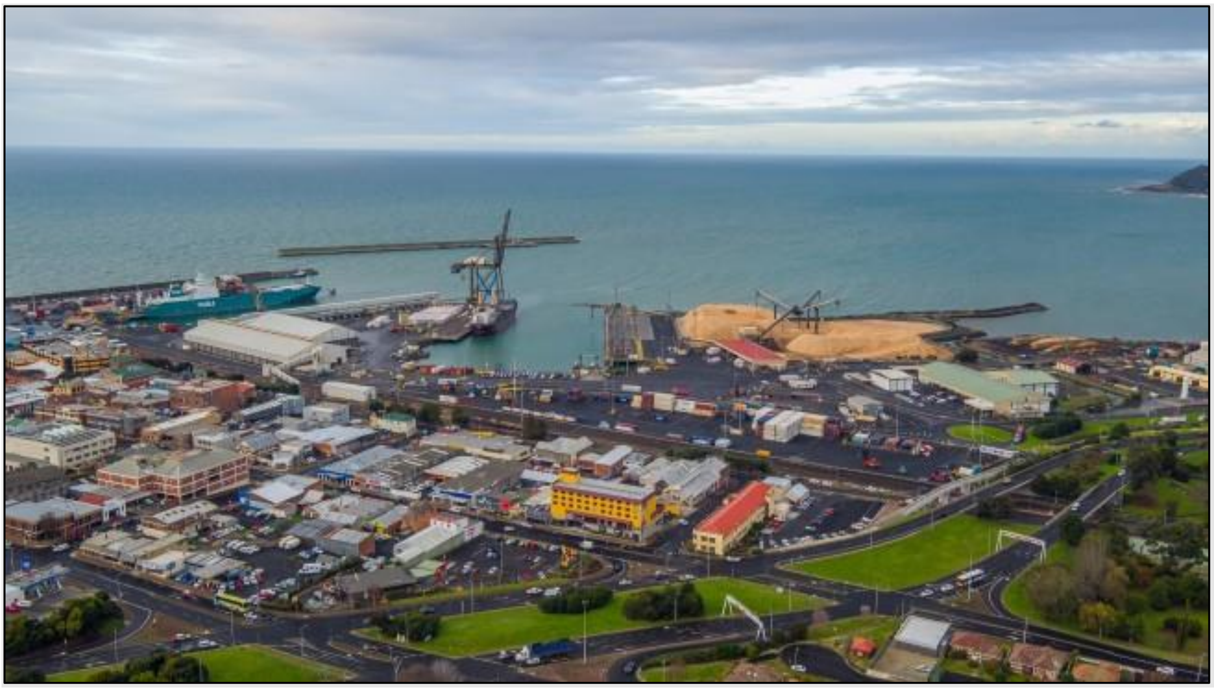


Figure 5-1. Burnie Port

(Source: Tasmanian Business Reporter, September, 2018)

Hellyer is not currently operated as a fly-in/fly-out operation, all workers reside in the nearby towns. There is no camp at the Hellyer Gold Mine.

The nearest commercial airport is Burnie Airport.

In August 2019, HGM engaged Behre Dolbear Australia (minerals industry consultants) to undertake an Independent Technical Due Diligence Review on the Hellyer Tailings Retreatment Project. That review included an assessment of the relevant project supporting infrastructure and services. A summary of the key points is as follows:

- Hellyer mining lease intersects Tas Networks' 110 kV and 220 kV high tension power lines that supply the northern part of Tasmania.
- A newly upgraded 22 kV substation located adjacent to the Que River Mine was recently installed
- Approximately 8 km of 22 kV line connects the Hellyer site where it is transformed down to 3.3 kV and 415 volts for use at the current HGM plant and dredging operations.
- Water is to be supplied from the original TSF as well as recycle water from the two thickeners at the plant.
- There is an excess of water in the overall system.

- If required, water can also be drawn from the Southwell River via electric pumps located below the plateau and within the north-eastern boundary of the lease.
- Access to the site from government-maintained roads is via two privately owned and maintained unsealed access roads. Currently, all HGM product concentrates are trucked to the Burnie port on this road.
- There is an existing 11 km 3'6" gauge railway spur into the Hellyer plant that is owned by the Tasmanian Government and links the operation to the Port of Burnie line. This is currently not operational.
- There is a 100-pair cable delivering phone and fax services to site. There is also a fibre-optic server connection between the mill and the current main office/administration building that is currently connected and capable of sharing files and data. Mobile phone coverage across the site is poor. Internet access is provided by two satellite connections.
- There are office facilities existing at Hellyer which are more than sufficient to supply the needs of HGM.
- A large, enclosed store and warehouse exists at the Hellyer Processing Plant, along with an enclosed concentrate storage shed.

From information provided by HGM to NVRO the above summary points remain valid to current HGM operations and should provide sufficient key infrastructure and services for future NVRO operations.

5.2 Surrounding Lands

The area surrounding the project is mainly forest reserve with some farmland (Figure 5-2). There has been extensive historical and recent mining activity in the area, including the Hellyer base metals mine located adjacent to the current HGM Hellyer site.

Figure 5-2. Example of the land and vegetation around the Hellyer Gold Mine [__~1 km__]

(Source: Google maps)

HGM owns CML 103M/87, within which the Hellyer project currently operates and in which NVRO operations will be undertaken. The underlying land tenure is Crown land. HGM's proposed tailings storage facility 2 (TSF2) sits within the boundary of an area of Permanent Timber Production Zone Land, under management of Sustainable Timber Tasmania (formerly Forestry Tasmania). As no new land disturbance is under consideration for the ongoing HGM operations nor for future NVRO operations, there are no anticipated issues relating to the Timber Production Zone Land.

The area surrounding the lease has been zoned Rural Resource by the Waratah–Wynyard Council (according to the Waratah–Wynyard Interim Planning Scheme 2013). The zone purpose of Rural Resource is to provide for the sustainable use or development of resources for agriculture, aquaculture, forestry, mining, and other primary industries, including opportunities for resource processing. In previous studies, 129 taxa of higher plants were observed at the Hellyer site; 28 species were endemic to Tasmania.

The plant communities are typical of north-western Tasmania. These communities characteristically form a complex mosaic of different stages of successful development. These are a function of time since last burning, together with local effects of elevation, soil types and drainage.

The Hellyer area has a habitat structure of dense temperate rainforest interspersed with wet sclerophyll forest, which is common along the Tasmanian west coast.

The nearest sensitive human land uses are the tourist hotels along the Cradle Mountain Road (C132), which are about 17 km to the east, the township of Tullah located more than 20km to the south and the township of Waratah some 21 km to the north-west (Figure 5-3).

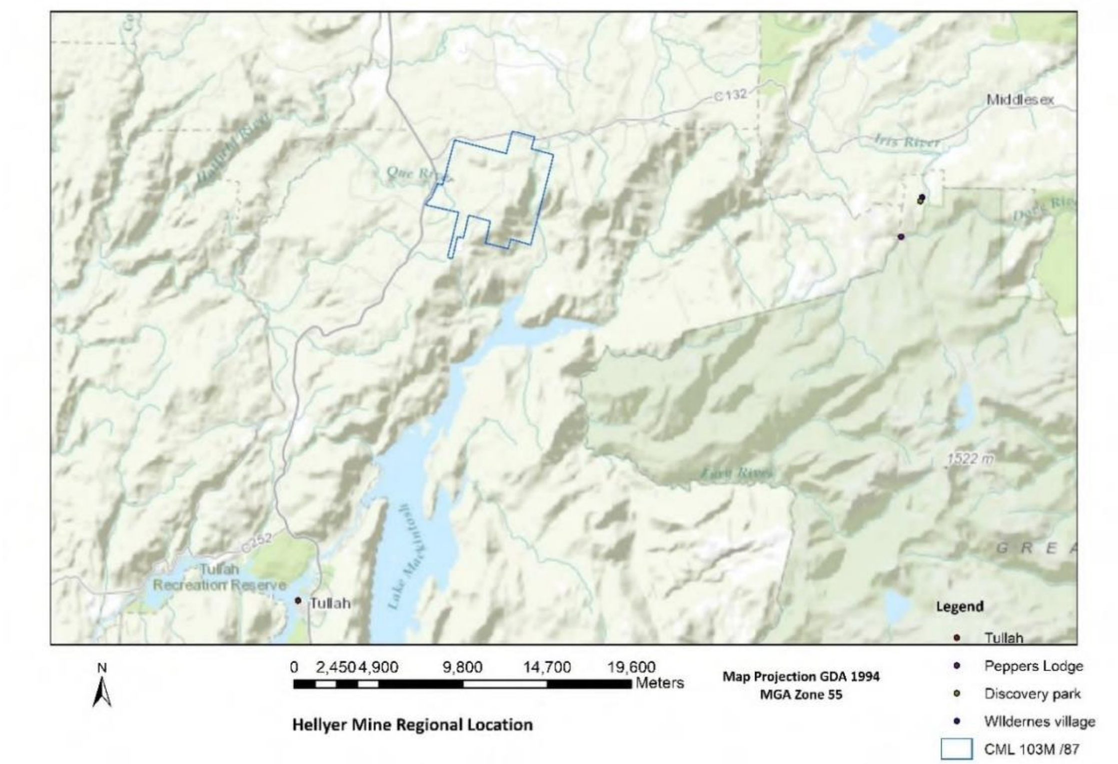


Figure 5-3. Regional setting and closest sensitive human land uses

(Source: Hellyer Tailings EMP 2017)

A number of regional reserves are located in the surrounding area:

- Reynolds Falls Nature Reserve is situated 9.5 km to the south-west of the site
- Hatfield River Forest Reserve is located 8.9 km to the west
- Granite Tor Conservation Area is located 8.8 km to the south on the southern side of Lake Mackintosh
- Vale of Belvoir Conservation Area is approximately 17 km to the east
- Cradle Mountain – Lake St Clair National Park is approximately 20 km to the east

5.3 Climate

The site is situated in the cool temperate climatic zone. At approximately 700 metres above sea level measured by Australian Height Datum (AHD), the Hellyer area has a climate characterised by cool temperatures and high annual rainfall. Annual average precipitation is 2,180 mm (Bureau of Meteorology, Waratah), generally falling throughout the year, although higher falls, and snowfall, occur over winter months. Drought conditions are rare.

The mean maximum temperature ranges from 29°C in January to 11°C in July. The prevailing winds are north-westerly to south-westerly.

Weather records were kept on site between 1985 and 1994. Temperature, rainfall, and evaporation data from this time are provided in Figure 5-4. Rainfall exceeded evaporation by more than 4:1 with no months where evaporation exceeded rainfall. Average monthly rainfall figures for the Hellyer site exhibit a range from approximately 85 mm in February to 270 mm in August.

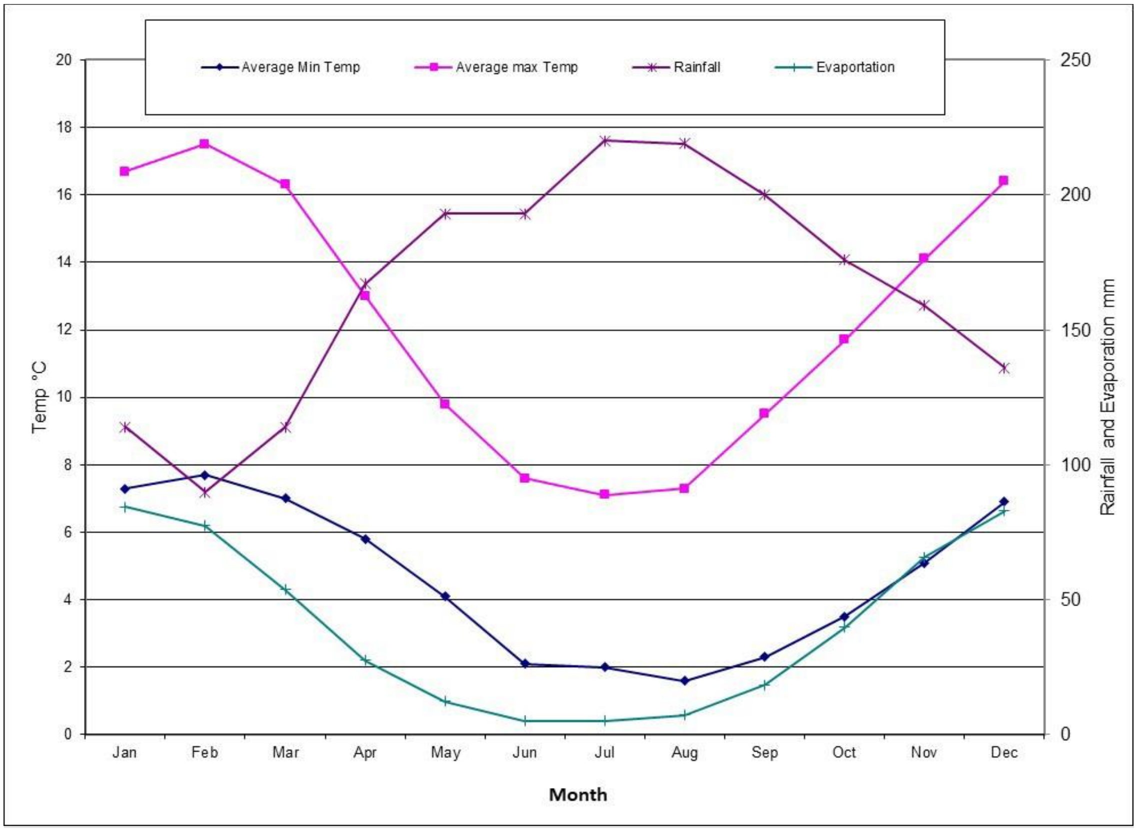


Figure 5-4. Hellyer Mine Site - Temperature, Rainfall and Evaporation Data (1985 to 1994)

(Source: Caloundra Environmental "Hellyer Gold Mines Tailings Reprocessing EMP" Sep 2017)

The closest active Bureau of Meteorology (BoM) weather station is located at Waratah (Mount Road, 12 km to the west of the site at an altitude of 609 m AHD). The average rainfall and temperature records for Waratah are shown in Table 5-1. Annual rainfall is like that at Waratah (Figure 5-5).

Table 5-1. Long-term averages for Waratah (1957 to 2018)

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Ann
Mean Max (°C)	18.3	18.5	16.2	12.7	9.7	8.3	7.2	8	9.5	12.3	13.7	16.2	12.4
Mean Min (°C)	7.3	7.7	6.7	5.1	3.3	2.5	1.7	1.6	2.1	3.3	4.4	6	4.2
Mean Rain (mm)	106	92.1	122.4	175.5	219.4	225.6	248.1	260.1	225.3	197.1	160.4	136.1	2157.1
Median Rain (mm)	101.1	82.8	109	182	200.7	220.7	238.4	242.9	224.2	188.4	162.6	126.8	2198.9

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Ann
Mean Rain Days	14.9	12.8	17.4	20.4	23.2	23.4	24.8	24.6	23.1	21.8	18.3	17.1	241.9

(Source: https://www.farmonlineweather.com.au/climate/station.jsp?lt=siteandlc=97014)

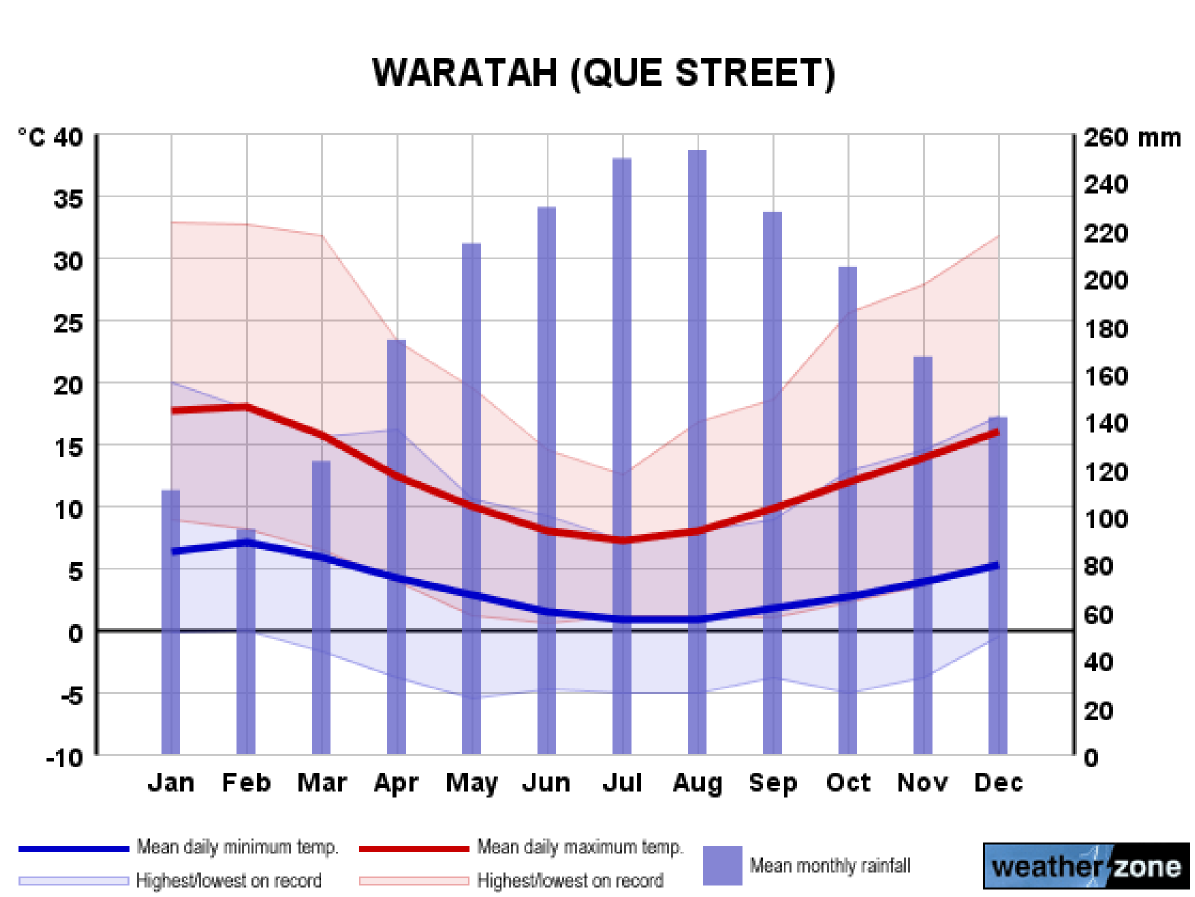


Figure 5-5. Weather summary for Waratah (closest station for Hellyer Gold Mines)

(Source: https://www.farmonlineweather.com.au/climate/station.jsp?lt=siteandlc=97014)

5.4 Staffing

The Hellyer Gold Mine is south of the town of Burnie. There are several other mining operations on the Island of Tasmania and HGM is currently reprocessing tailings. Skilled and unskilled labour is readily available within commuting distance of the planned NVRO operation. Therefore, the inability to staff the Project is deemed to be low risk.

6 History

1.1 Years 1983 – 2017

The Hellyer deposit was discovered by Aberfoyle Ltd in August 1983 and mine development commenced in 1986, with operations starting in 1989. The economic metals mined at Hellyer were lead, zinc, copper, gold, and silver. The Hellyer deposit was mined by underground methods during the period 1989 to 2000. Operations ceased in 2000, when economically available ore was exhausted. The processing plant was placed on care and maintenance.

During its life, the Hellyer Mine produced 15 million tonnes of ore and yielded 601,000 tonnes of bulk concentrate, 2.7 million tonnes of zinc concentrate, and 728,000 tonnes of lead concentrate. The mine employed about 300 personnel and created AU$1.3 billion in gross revenue. When the Hellyer mine closed, there were an estimated 10.9 Mt of mine tailings at the Hellyer site grading ~2.6 g/t of gold and ~2.8% zinc (Davies, Cranfield and Williams, 2010) based on metallurgical accounting estimates conducted by Aberfoyle and Western Metals during the period of operations between 1989 and 2003.

The Hellyer operation was subsequently acquired by a subsidiary of Polymetals Group (Intec Ltd.) who completed the refurbishment of the plant in late 2006 to allow re-treatment of the tailings. In September 2008 the operation closed due to low zinc prices. Approximately 1.8 million tonnes of tailings were reprocessed in the upgraded plant.

The processing plant was sold in 2008 to Bass Metals Ltd. who developed the Fossey Mine adjacent to Hellyer and processed over 0.5 million tonnes of underground ore through the Hellyer plant during 2011-2012. The Fossey deposit extends down plunge from the Hellyer deposit and was mined by Bass Metals between 2010 and 2012.

Bass Metals sold the property in January 2013 to Ivy Resources Pty Ltd., who undertook extensive feasibility and metallurgical test-work with a heavy focus on improving gold extraction, including evaluating a cyanide leach process and the Albion process.

NQ Minerals acquired Ivy Resources Pty Ltd. in 2016, and switched the processing focus back to sequential flotation (Figure 6-1).

Figure 6-1. Flotation cells at the plant at the Hellyer Gold Mine

(Source: EnviroGold Global site visit)

6.1.1 Tailings Management

Tailings from the initial milling operations were deposited in a regulated tailings storage facility (TSF1) located within a topographic depression approximately 1 km to the west of the Hellyer mill. The tailings were flooded with water to prevent oxidation of the sulfide species present in the tailings. The tailings are typically stratified, having been deposited from discharge pipes set around the dam (spigoting). The sedimentary stratification is also reflected in a mild variation in grades of zinc and lead, with grades typically higher in the deeper parts of the tailings and decreasing at shallower depths. As they were largely managed under water, the tailings sediments are largely unconsolidated. The pyrite within the tailings is managed in accord with an approved EMP to prevent its oxidation and potential acid forming (PAF) nature, which could result in acid drainage issues. There is an emergency spillway for the TSF (Figure 6-2).

Figure 6-2. Emergency spillway at the tailings storage facility for Hellyer Gold Mines

(Source: EnviroGold Global site visit)

6.2 Historical Resource Estimates

Two separate, historical resource quantities and estimates are discussed below:

- Hellyer TSF historical resource estimate (Section 14.1.1)
- Smaller historical resource estimate representing a sub-set of the tailings that were reprocessed by Intec Ltd between 2006 and 2008 (Section 14.1.2).

The two historical resources (the former unprocessed, the latter reprocessed) represent two quite distinct and separate quantities of material.

NVRO is not treating the below historical estimates as current Mineral Resource estimates and the Qualified Persons have not done sufficient work to classify historical estimates as current Mineral Resource estimates.

N.B. Historical estimates should not be relied on and are presented for historical reference only.

6.2.1 Hellyer TSF Historical Resource Estimate (2020)

The original Hellyer Tailings Mineral Resource Estimate is based on a 3D block model constrained by the dam construction topography and an upper tailings surface derived by topographic survey and soundings respectively (Cranfield et al 2020).

A block model with parent cell sizes 25 mE x 25 mN x 5 mRL was constructed, with sub-celling to 5 mE x 5 mN x 2.5 mRL, sufficient to provide resolution at the wireframe domain boundaries. The block model was split in the vertical direction with 5 m parent cell resolution, in cognizance of the observed vertical stratification of the assay grades for the key metal elements being modelled.

Drill samples were composited to 8 m lengths and statistically analyzed, and block metal grades were interpolated from the composited sample grades for the key elements comprising copper (%), zinc (%), lead (%), silver (g/t), and gold (g/t). An average bulk density value of 1.93 t/m3 was applied to each block so that a tonnage may be calculated from the known block volumes. The block model was classified in accordance with the Australasian JORC Code (2012) and the tonnes and grades in the Mineral Resource model were previously reported by Williams and Cranfield (2017) and presented in Table 6-1.

Table 6-1. Hellyer TSF, Historical Mineral Resource Estimate, April 2017.

JORC Classification	Tonnage (Mt)	Zn %	Pb %	Ag g/t	Au g/t	Cu %
Measured	2.05	3.31	3.35	94	2.63	0.20
Indicated	5.99	2.29	2.95	93	2.55	0.18
Inferred	1.21	1.00	2.60	86	2.57	0.19
Total	9.25	2.35	2.99	92	2.57	0.19

(after Williams and Cranfield, 2017)

Note: No lower cut-off was applied to the reported Mineral Resource Estimate.

The most recent published Mineral Resource Estimate by HGM was developed by CSA Global (Cranfield et al., 2020) and represented a remaining resource as at the end of August 2020. The estimate was derived by depletion of the previously-declared mineral resource estimate (Table 6-1) published before the start of HGM's operation in late 2018. The most recent (2020) remaining Mineral Resource Estimate (reported in accordance with the JORC Code, 2012) is shown in Table 6-2.

Table 6-2. Hellyer TSF, Historical Mineral Resource estimate, depleted to end August 2020

JORC Classification	Tonnage (Mt)	Zn %	Pb %	Ag g/t	Au g/t	Cu %
Measured	1.55	3.44	3.45	98	2.71	0.20
Indicated	4.82	2.31	2.97	95	2.57	0.18
Inferred	1.21	1.00	2.60	86	2.57	0.19
Total	7.57	2.33	3.01	94	2.60	0.19

(Source: CSA Global, 2020; after Cranfield et al., 2020)

Note: No lower cut-off was applied to the reported Mineral Resource Estimate.

The above resource quantity only pertains to remaining material that had yet to be treated by HGM at the time of the CSA Global report (August 2020). It does not include material already processed by HGM.

NVRO updated this table further to reflect the continued processing of material from August 2020 to November 2021 using reported process tonnages and grades. Table 6-3 shows the projected remaining mineral inventory[2] for the Hellyer TSF as at end November 2021.

Table 6-3. Hellyer Projected Remaining Mineral Resource Estimate as at end November 2021.

Tonnage (Mt)	Au (g/t)	Zn (%)	Pb (%)	Ag (g/t)	Cu (%)
6.04	2.63	2.41	3.10	97	0.19

6.2.2 Intec Reprocessed Tailings Historical Resource Estimate

Prior to HGM's involvement at Hellyer, ASX-listed company Intec Ltd. undertook tailings retreatment over almost two years from December 2006 to September 2008. An analysis of reported production statistics from that period indicates that slightly more than 2Mt of tailings were processed. These were redeposited back in, firstly, the Shale Pit (an existing excavation for underground fill) and, secondly, the Western Arm of the TSF (Figure 14-1). Production statistics for the last 9 weeks (Qtr. 3, 2008) are incomplete but indicated plant feed (Cu and Au grades were not publicly reported) for the period of operations is estimated at:

- 2.016Mt @ 2.78% Zn, 2.99% Pb, 88.4 g/t Ag

Based on reported recoveries and concentrate sales figures during the period of operation, the following tailings quantities and grades are estimated:

- 1.924 Mt @ 1.10% Zn, 2.46% Pb, 84 g/t Ag

Intec were focused on zinc recovery, possibly at the expense of Pb/Ag recovery, as confirmed by the reduction of Zn grade between the feed grade estimate and tailings grade estimate. The relatively limited recovery of Pb and Ag is also evident by the same means.

Pitt and Sherry (2020) reviewed Hellyer mill tailings discharge records for the period 2006 to 2008 and reported the following processed tailings quantity:

- 1.9 Mt @ 1.15% Zn, 2.58% Pb, 84 g/t Ag, 2.56 g/t Au, 0.14% Cu.

The closeness of the grade estimates derived by the two separate methods is noted and adds considerable confidence to NVRO's assertion that the latter estimate can be meaningfully reported as an Inferred Mineral Resource, although it was never previously reported as such. Pitt and Sherry (2020), based on analysis of the tailings discharge records, further subdivided the quantity based on the discharge site:

- 1.3 Mt in the Shale Quarry and 0.6 Mt in the Western Arm.

Table 6-4. Polymetals' dredging operation production physicals for 2006 – 2008.

Zone	Tonnes (Mt)	Cu %	Pb %	Zn %	Ag g/t	Au g/t
TSF1 Plant Feed	2.0	0.16	2.98	2.77	89	2.58
		2006 – 2008 Hellyer Mill tailings discharge records				
Western Arm	0.6					
Shale Pit	1.3					
Total	*1.9*	*0.14*	*2.58*	*1.15*	*84*	*2.56*

(Source: Pitt and Sherry, 2020)

NVRO believes that this reprocessed material has a similar character to the current tailings being generated by the HGM processing plant. Thus, it is believed that this material could ultimately be processed through the proposed NVRO plant. However, for the purposes of this report, the resource is being defined as a single inferred resource pending a review of the mill production data from 2006 to 2008.

6.3 Historical Exploration

Comments in this section relate solely to exploration work undertaken by previous operators to evaluate the residual tailings deposit in the Hellyer TSF. Exploration work undertaken to evaluate the original hard-rock Hellyer and Fossey deposits is not considered relevant.

6.3.1 Grids and Surveying

Exploration activities across the Hellyer TSF used a local mine grid to locate drill hole collars, probably by means of hand-held GPS.

Elevation control has generally been derived by surveying the water level at the time of drilling and by soundings to determine water depth.

6.3.2 Drilling

All drilling undertaken on the Hellyer TSF was completed by previous operators using the Vibracore method. During the 1998 programme a total of 549.6 metres of sampling was completed in 55 holes with a further 588 m of drilling completed in 50 holes during the 2000 programme. That brings the total number of holes to 105 for a combined sampling length of 1129.6 m. The drilling methodology is outlined below.

Williams and Cranfield for CSA (2017) reviewed the previous drilling undertaken in the Hellyer TSF to evaluate the remaining metal grades within the tailings.

Sampling of the tailings storage facility was undertaken in two phases during 1998 and 2000 using the Vibracoring method in which the Vibracore drill rig is mounted on a barge and moored above each drillhole. The method uses a core tube (commonly with an inner PVC tube) that is inserted under gravity into soft sediments by means of a vibrating mechanism (Vibrahead) at the top of the rod string to assist the process. When the insertion is complete, the Vibracorer is switched off and the core tube is recovered. Minimal information is available for the 1998 or 2000 drilling campaigns, with respect to detailing the type of Vibracorer, core width, core recoveries, or geological logging.

Figure 6-3 shows the location and distribution of drillhole locations by year of the Vibracore drilling carried out in 1998 and 2000, across the TSF. Figure 9-1 also shows that drilling was concentrated through the centre of the dam and into the Eastern Arm, with relatively few holes testing the western quarter of the dam. None of the drill collars were preserved following completion of sample coring, due to the water covering the tailings sediments.

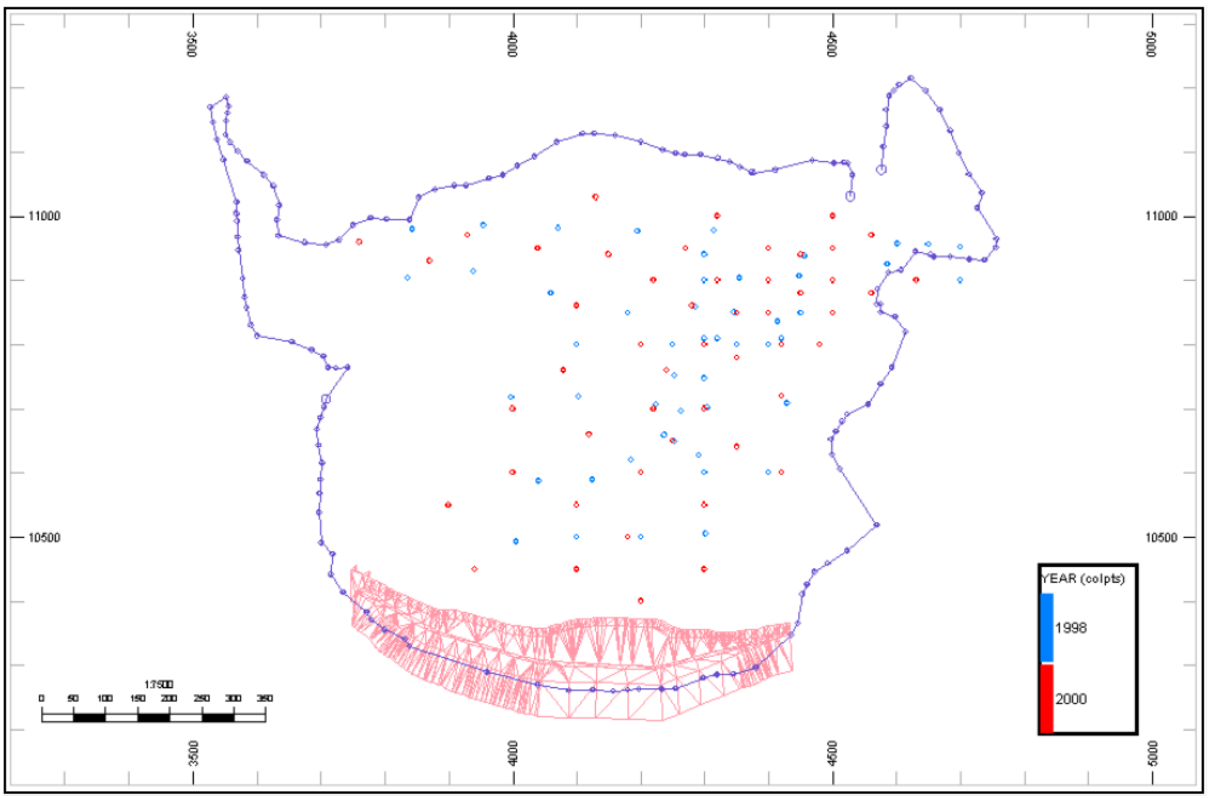


Figure 6-3. Location and Distribution of Vibracore drill holes in the Hellyer TSF

Tailings deposition from the Hellyer processing plant continued after completion of the 1998 drilling campaign, therefore the 1998 collars are generally located at a lower elevation than the final 2000 depositional surface. As a result, some samples from the 2000 series are located at a higher elevation than the collars of the 1998 data set.

Davies and Devlin (1998) for Western Metals reported that sampling activities were carried out by Nick Poltock Field Exploration. No details of the drilling contractor have been found. No details of the sample core diameter have been located. As noted above, no exploration has been undertaken for the purposes of the NVRO Project.

NVRO has relied on results and technical assessments of previous drilling and sampling work by CSA Global as reported in the Competent Person's report by CSA Global (Williams and Cranfield, 2017) and a subsequent update (Cranfield *et al*, 2020).

Proposed drilling programmes have been designed for the Western Arm of TSF1 and the Shale Quarry and are pending approval by HGM management. The objective of the drilling is to improve confidence in the resource in these two areas and to obtain samples for metallurgical test-work with the ultimate objective of converting these resources to ore reserve status.

6.3.2.1 Sampling

Williams and Cranfield (2017) reported that each complete core sample was removed from the PVC core and placed into plastic buckets, then sealed and individually numbered. All samples were wet and unconsolidated sediments. For the 1998 programme, samples ranged in length from 0.5 m to 3.0 m with an average of 1.74 m. Reasons for the varying sample lengths in the 1998 drilling do not appear to have been documented at time of drilling, and the compositing methodology is unclear. However, it is thought that sample compositing took place at the drill rig during the 2000 drilling campaign.

The sample preparation technique is considered appropriate for the style of mineralisation and sample sizes are considered to be appropriate, bearing in mind the fine (generally <50 µm) grain size of the material being sampled.

Summary statistics for the 1998 drilling are shown in Table 6-5 and Table 6-6 for the raw data and composite data, respectively. Individual samples were analysed for the main element suite, but it appears that Au and Ag were only analysed for on the 55 composited samples. Approximately 25 SG results were discarded since they were clearly erroneous.

Table 6-5. Summary Statistics, 1998 drilling data, raw samples.

Parameter	Pb %	Zn %	Cu %	Ag g/t	Au g/t	Ba %	As %	Fe%	SG	Length
Number	316	316	316	316	316	316	316	316	291	316
Minimum	0.38	1.20	0.13	80	2.14	0.15	0.37	21.1	1.10	0.5
Maximum	5.42	7.06	0.43	120	2.89	7.90	2.01	35.7	3.10	3.0
Mean	3.47	3.44	0.22	97.4	2.58	2.10	1.43	28.4	1.94	1.74
Median	3.47	3.02	0.21	95	2.56	1.64	1.44	28.5	1.91	1.80
Std. Dev.	0.61	1.32	0.06	6.0	0.14	1.68	0.23	2.52	0.45	2

Table 6-6. Summary Statistics, 1998 drilling data, composite samples.

Parameter	Pb %	Zn %	Cu %	Ag g/t	Au g/t	Ba %	As %	Fe%	SG	Length
Number	55	55	55	55	55	55	55	55	55	55
Minimum	2.17	1.89	0.15	80	2.32	1.00	1.13	24.8	1.03	1.00
Maximum	4.06	4.48	0.26	120	2.89	4.90	1.81	30.8	3.24	16.50
Mean	3.45	3.22	0.21	97	2.57	2.42	1.45	28.3	1.84	9.99
Median	3.43	3.05	0.21	95	2.56	2.20	1.45	28.5	1.83	10.50
Std. Dev.	0.30	0.69	0.03	6.8	0.40	0.85	0.14	1.28	0.40	4.30

(from Davies and Devlin, 1998)

Summary statistics for the 2000 drilling are shown in Table 6-7 and Table 6-8 for the raw data and composite data, respectively. A smaller range of analyses were conducted for the 2000 samples and no individual sample SGs were determined.

Table 6-7. Summary Statistics, 2000 drilling data, raw samples.

Parameter	Pb %	Zn %	Cu %	Ag g/t	Au g/t	Length
Number	90	90	90	90	90	90
Minimum	1.69	1.46	0.10	72.6	2.08	2
Maximum	4.8	5.6	0.30	143.3	4.39	9.8
Mean	3.21	2.96	0.19	106.5	2.67	6.44
Median	3.18	2.57	0.19	106.3	2.63	7

Parameter	Pb %	Zn %	Cu %	Ag g/t	Au g/t	Length
Std Deviation	0.64	1.13	0.04	14.47	0.33	1.76

Table 6-8. Summary Statistics, 2000 drilling data, composite samples.

Parameter	Pb %	Zn %	Cu %	Ag g/t	Au g/t	Length
Number	50	50	50	50	50	50
Minimum	2.04	1.65	0.10	76.8	2.28	2
Maximum	3.72	3.76	0.24	123.3	3.37	21
Mean	3.11	2.79	0.19	104.9	2.64	11.6
Median	3.21	2.78	0.19	105.1	2.62	11
Std Deviation	0.40	0.62	0.02	8.75	0.21	4.7

6.3.2.2 Drill Recovery

No records of sample recovery have been sighted and records do not appear to exist in this regard. According to Williams and Cranfield (2017), records indicate that the drilling contractor added varying quantities of water to the samples during drilling to get sample return, especially from the deeper, more consolidated (and drier) tailings sediments.

6.3.2.3 Duplicate Sampling

Williams and Cranfield (2017) report that there are no records of field duplicates or field repeat samples having been taken. Assay results show low variability and it was their opinion that “sample duplicates would not have provided additional quality assurance to the data’. More broadly, sample assay grades are also of similar tenor to the tailings assays as recorded by the project operators at time of ore processing and subsequent reprocessing head grades from the TSF.

6.3.2.4 Logging

There are no records of the samples having been geologically logged. All samples would have contained a relatively homogeneous mixture of gangue sands and sulfide minerals with limited variation in sulfide content generally not discernible to the human eye and as subsequently evidenced by the analytical results.

6.3.2.5 Analytical Results

All drill samples were assayed either as individual samples (1998 programme) or as pre-composited samples (2000 programme). More complete details of the analytical methods are given in the following section.

The individual samples from the 1998 drilling programme were analysed for a range of elements and, for the most part, show a strong unimodal character with limited ranges. Figure 6-4 through Figure 6-7 show frequency distributions of the principal base metals (Cu, Pb, and Zn) and the key contaminant (As).

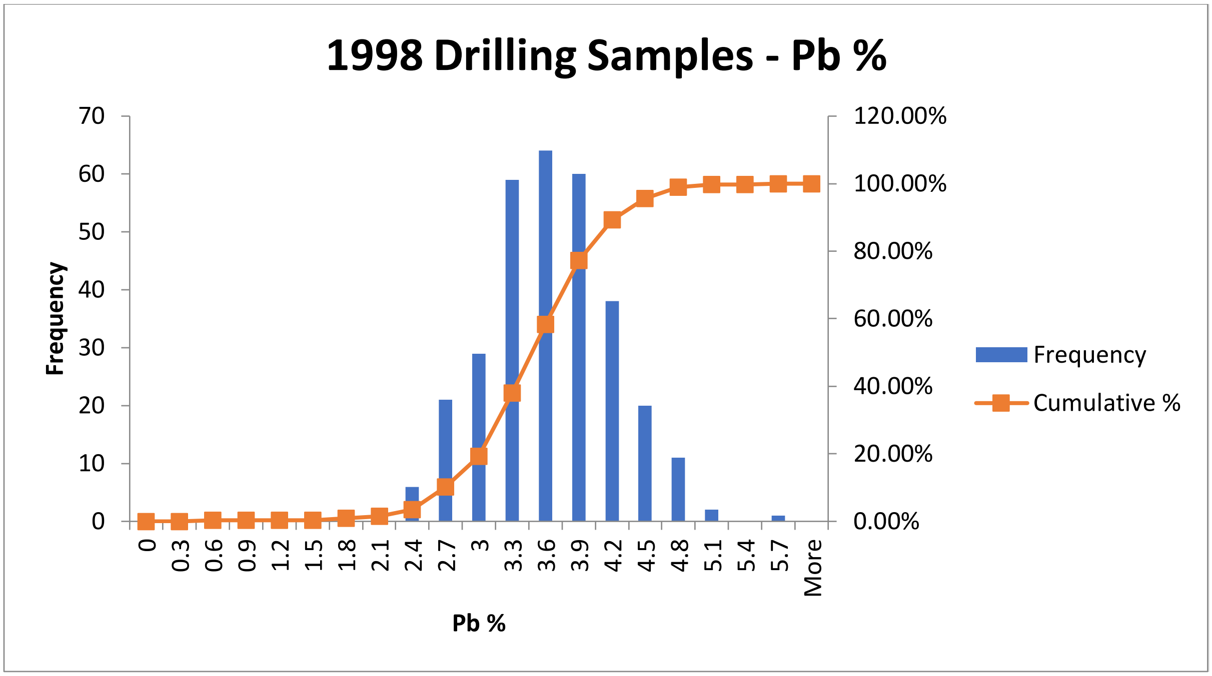


Figure 6-4. Western Metals 1998 Drilling Samples Pb% Frequency Distribution.

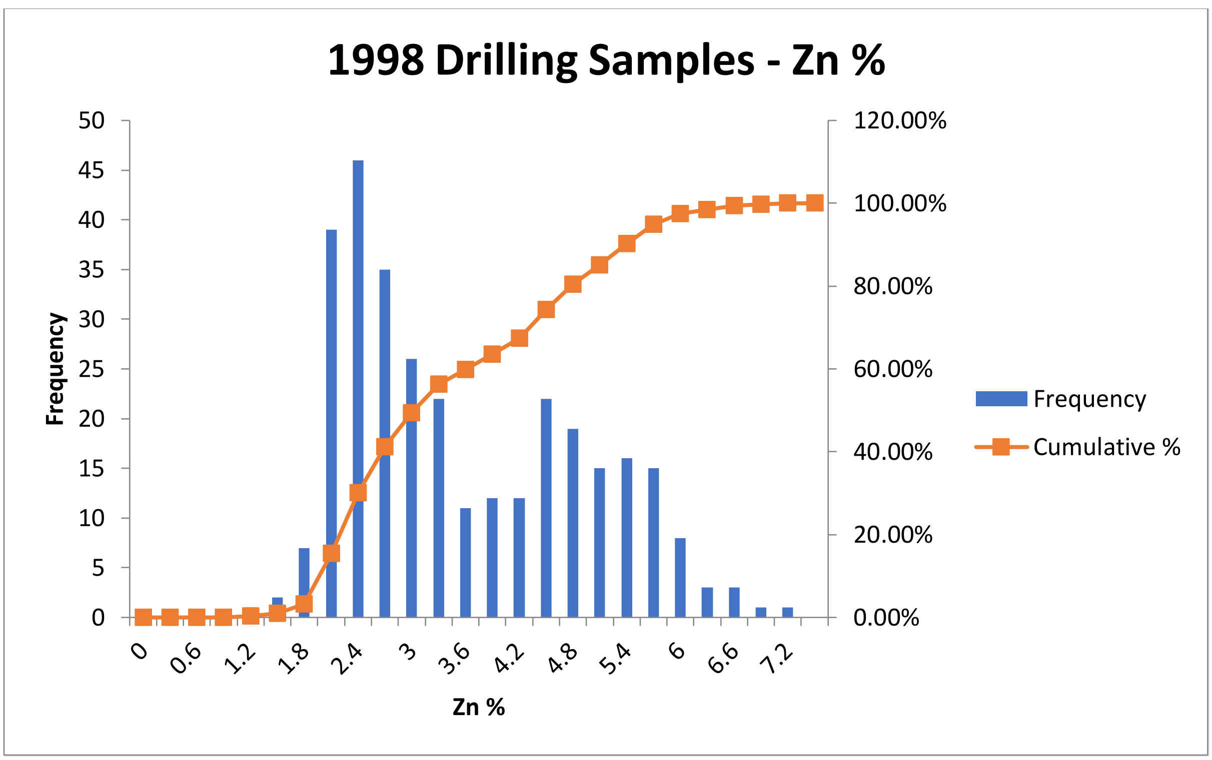


Figure 6-5. Western Metals 1998 Drilling Samples Zn%, Frequency Distribution.

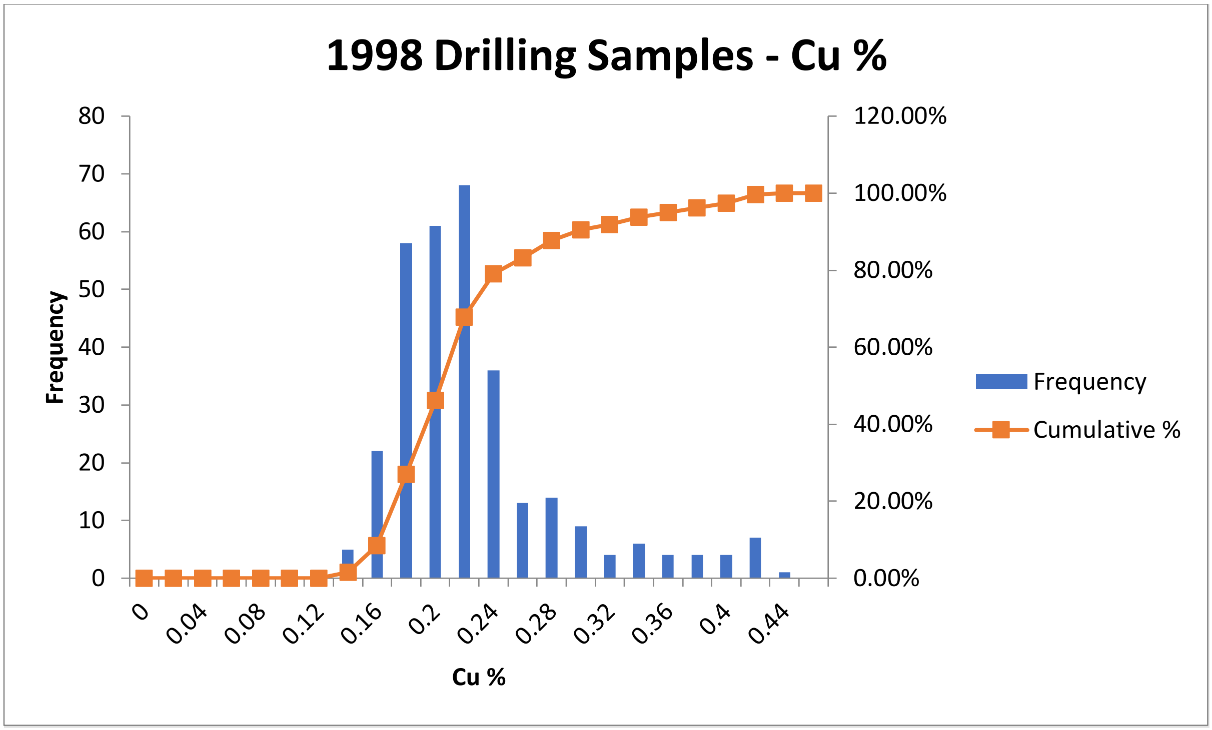


Figure 6-6. Western Metals 1998 Drilling Samples Cu%, Frequency Distribution.

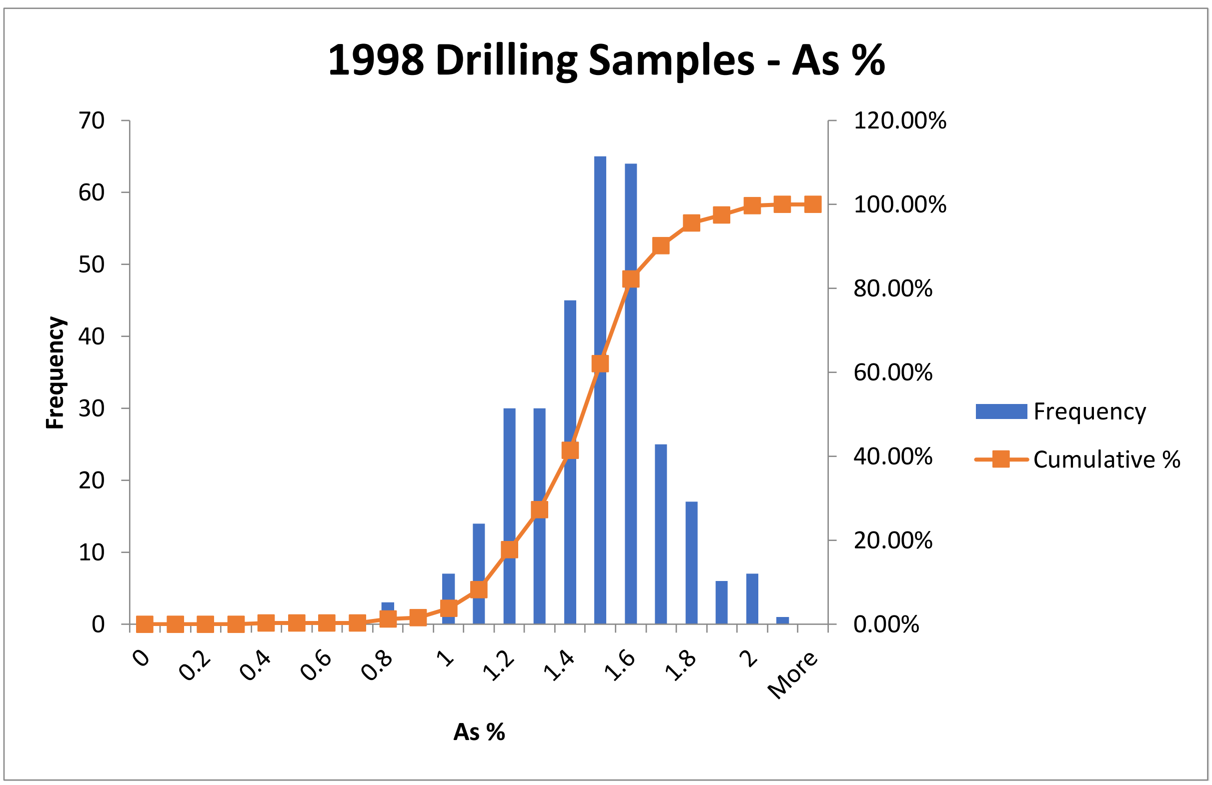


Figure 6-7. Western Metals 1998 Drilling Samples As%, Frequency Distribution.

The unimodal character of the Cu, Pb and As results is very evident and increases confidence in the mean value indicated by the statistical data. The reason for the obviously bimodal nature of the Zn distribution is unclear. For completeness, equivalent histograms are shown for Au and Ag values although it is stressed that these are composited data (full hole composites) rather than individual sample results with a correspondingly reduced variance and, for Ag, the meaningfulness of the presentation is reduced by the analytical reporting in 5 g/t Ag increments (Figure 6-8 and Figure 6-9, respectively).

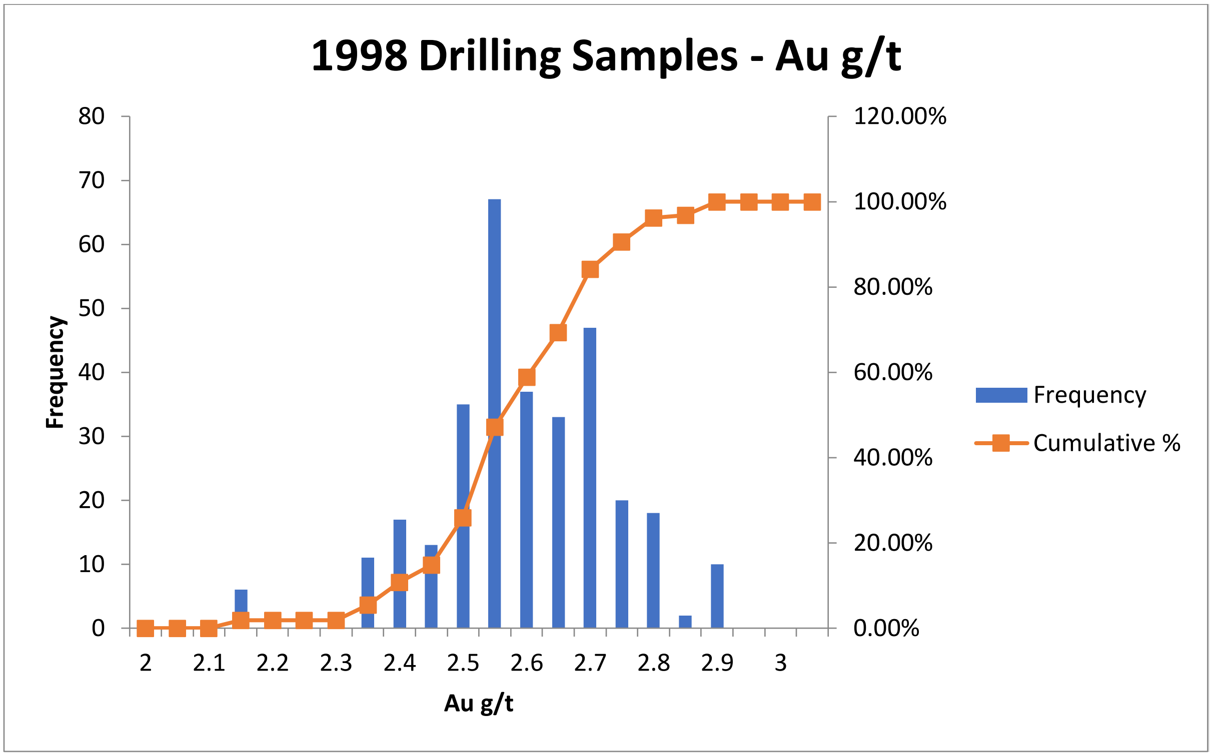


Figure 6-8. Western Metals 1998 Drilling Samples Au g/t, Frequency Distribution.

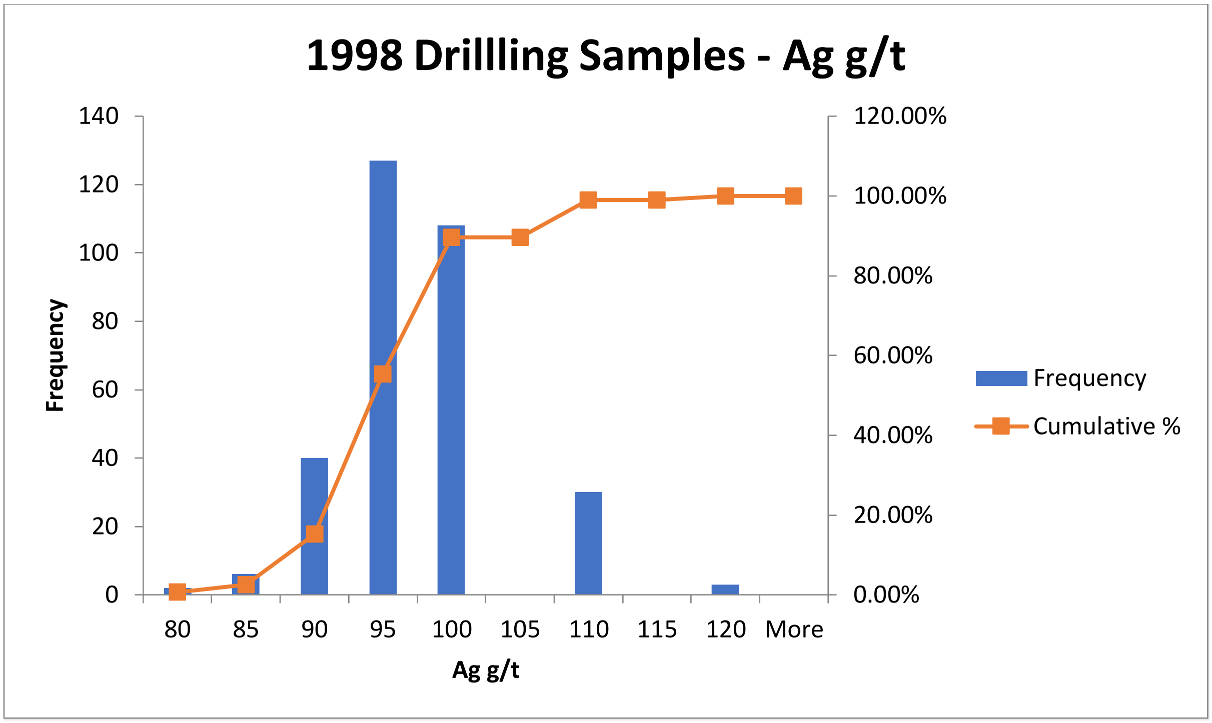


Figure 6-9. Western Metals 1998 Drilling Samples Ag g/t, Frequency Distribution.

6.3.2.6 Bulk Density Determinations

Davies and Devlin (1998) reviewed the tailings density for Western Metals with SG determinations done on samples from the original drilling programme. Bulk density measurements were undertaken for the complete data set, but a number of readings were clearly erroneous (too light or too heavy) and have been discarded for this study (<1.1 and >3.2). The frequency distribution histogram of all individual SG readings from the partial bulk density data set is shown in (Figure 6-10).

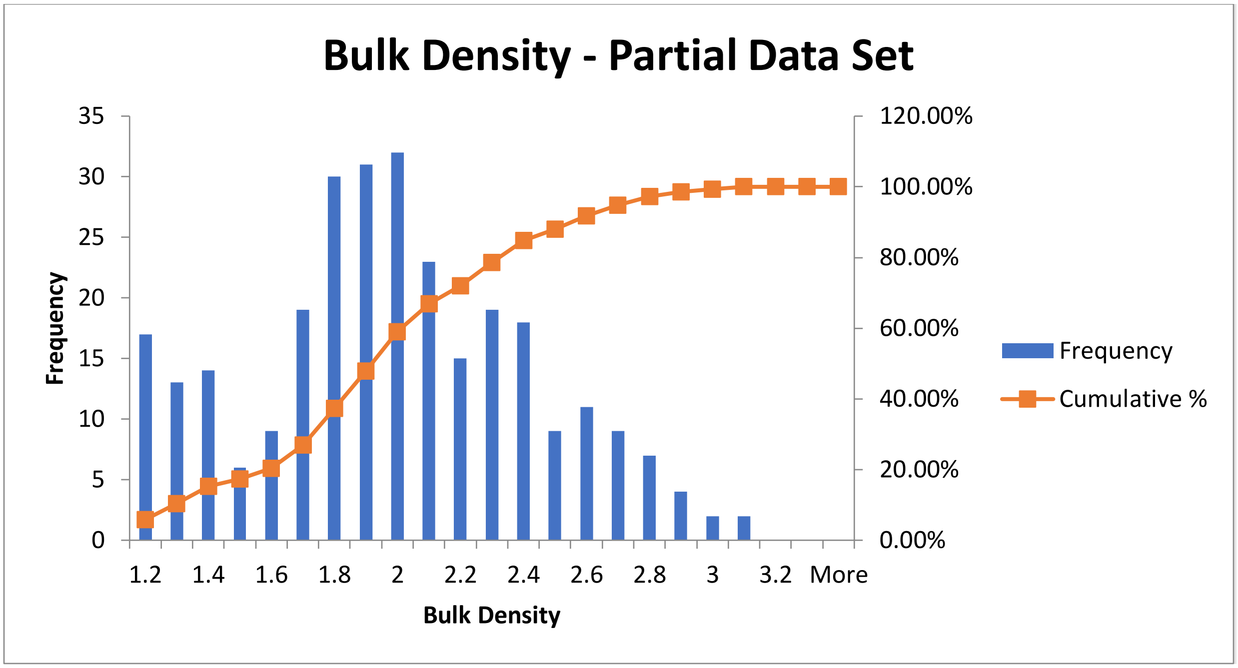


Figure 6-10. Western Metals Bulk Density Data, Partial Set, Frequency Distribution.

6.3.2.7 Representativeness of Drilling`

All drilling was vertically orientated and thus is approximately perpendicular to any sedimentary layering that the tailings may have developed during deposition in the TSF. The drill orientation is optimal for the style of mineralisation; and the sampling methods and recovery are adequate for any subsequent resource estimation work which might be undertaken.

It is noted that the drilling information reported in this section pertains solely to earlier drill programmes to evaluate the "primary" or original tailings in the Hellyer TSF. While the review reports average grades and bulk densities which display limited variability and thus have a high level of statistical coherence and confidence, the material in question is not the material proposed to be processed by NVRO which will take a re-processed feed from the Hellyer treatment plant. This feed will have been subjected to a series of flotation recovery processes which will reduce the metal grades and have a grade distribution defined by the prevailing tailings grade from the treatment plant.

The information above is however included for completeness and for the confidence which it provides in terms of an understanding of the consistency of feed grade and character into the Hellyer processing plant.

6.3.3 TSF Core Samples Security & Analyses

The information provided in the CSA Global Report Nº: R317.2020 NQ Minerals PLC, Competent Persons Report – Hellyer Tailings Retreatment Project, Tasmania (2020) is summarized below.

Drill sampling of the tailings storage facility was undertaken during 1998 and 2000 using the Vibracore method where a core tube that is inserted into soft sediments assisted by the Vibrahead (a vibrating mechanism that exploits the thixotropic nature of the tailings). After the required depth of core is achieved, the core tube is recovered. The distribution by year for the sampling program is provided in Figure 6-3. The tailings samples were taken within the tailings storage facility, so eliminating the possibility of preserving the collar for the sample location.

Tailings deposition from the Hellyer processing plant continued after completion of the 1998 drilling campaign. Therefore, there are samples from the 2000 series located at a higher elevation than the collars of the 1998 data. Drill collars were surveyed using a handheld global positioning system (GPS) device at the drill collar during coring and the dam water level was surveyed by a licensed surveyor, so allowing the elevations to be used as a proxy for the collar elevations.

A review of documentation gives no indication of how the Vibracore samples were prepared for despatch other than the comment by Williams and Cranfield (2017) that “the complete core sample was removed from the PVC core and placed into plastic buckets, then sealed and individually numbered.” Given the undoubtedly wet and unconsolidated nature of the samples this is a valid approach.

Drill samples were assayed at AMMTEC Research Laboratory (Burnie) using XRF to analyse most elements, while gold was analysed by fire assay. Williams and Cranfield (2017) report that the original analyses were carried out by XRF method (laboratory as opposed to pXRF) and although not the standard wet chemical approach, the total character of the analysis renders it appropriate for the style of mineralisation and grade reporting. No details of sample preparation, charge weights or other analytical procedures and techniques are given in Davies and Devlin’s (1998) report nor in subsequent documentation.

No records of quality assurance/quality control (QAQC) testing or results are known to exist from the drilling programs.

Williams and Cranfield (2017) report that “there are no records of certified standards or blanks used during the sampling.” Similarly, there appear to be no records for laboratory repeats. The authors of that report state that other QAQC information is limited and restricted to comparisons of Au assays by fire assay and Neutron Activation Analysis (NAA); and a comparison of Ag assays by XRF and NAA.

Williams and Cranfield (2017) report that “chain of custody for sample security is believed to have been maintained by Western Metals Resources at the time of drilling. All samples were ticketed and then transported by truck to the analytical laboratory in Burnie, where they came under the security of the lab.” No further details would appear to be available.

7 Sampling Method, Preparation, Analyses, and Security

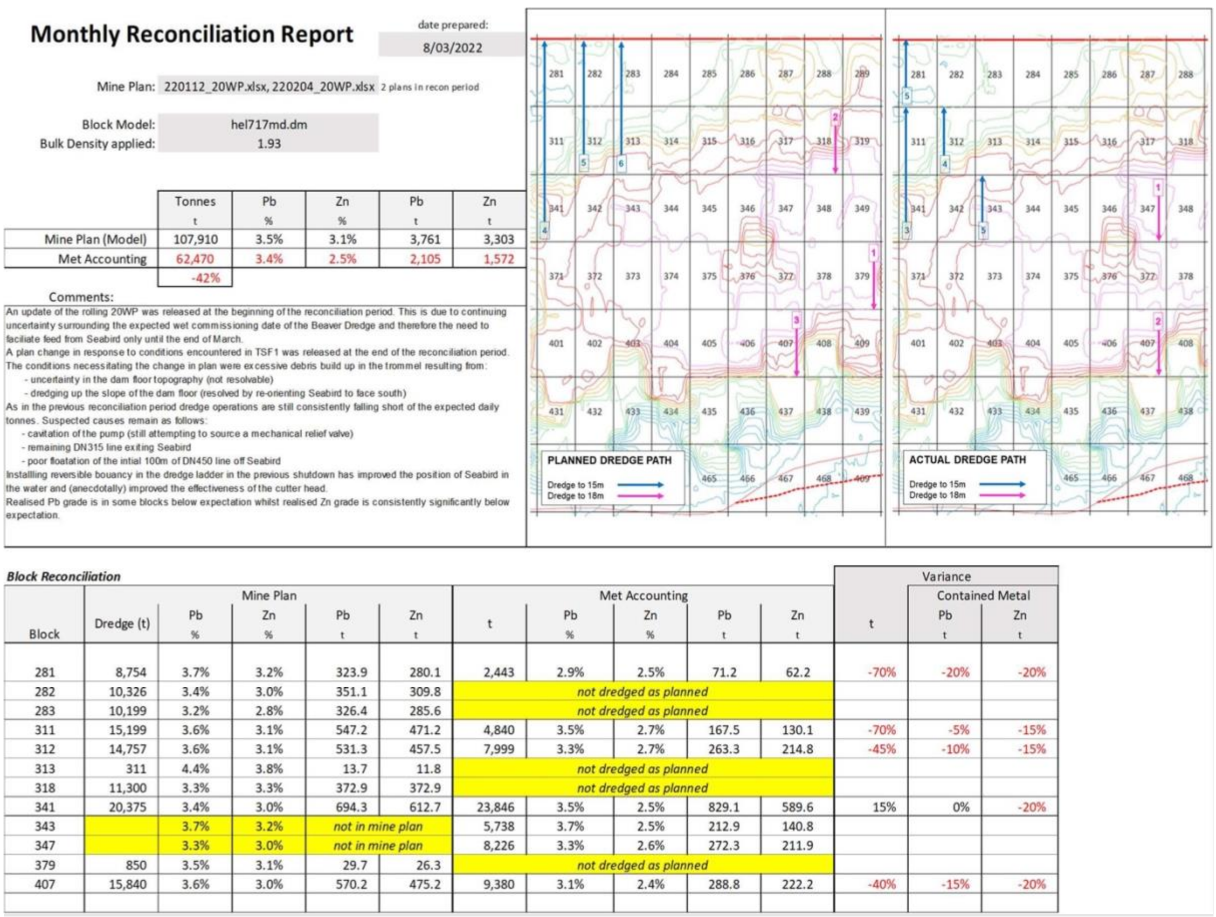
Sample preparation and analysis details completed by previous and current operators are given below for the current tailings samples which represent a reprocessed equivalent of the tailings material.

Historical method, preparation, analyses, and security of drilling samples is detailed in Section 6.3.3.

7.1 Tailings Assay Sample Preparation and Analysis

Sampling for the currently declared Inferred Mineral Resource has involved analytical work being carried out over a period of almost 4 years on daily tailings samples from the Hellyer treatment plant. These samples are routinely collected while milling operations are underway and despatched for analysis to ALS Burnie, Tasmania. Note: Need to add analytical methods used by ALS, and a sample analytical report showing all target metals, including Au and Ag.

The monthly reports generated by HGM indicate that daily sampling is completed for the head grade and the tailings grade, and the on-site team produces a block model reconciliation as shown in Figure 7-1. The sampling for the evaluation of the contained metal is in the millions of tonnes and is reported monthly internally with external reporting for the required disclosures to the stock market.



Monthly Reconciliation Report

date prepared: 8/03/2022

Mine Plan: 220112_20WP.xlsx, 220204_20WP.xlsx 2 plans in recon period

Block Model: hel717md.dm

Bulk Density applied: 1.93

	Tonnes t	Pb %	Zn %	Pb t	Zn t
Mine Plan (Model)	107,910	3.5%	3.1%	3,761	3,303
Met Accounting	62,470	3.4%	2.5%	2,105	1,572
	-42%				

Comments:

An update of the rolling 20WP was released at the beginning of the reconciliation period. This is due to continuing uncertainty surrounding the expected wet commissioning date of the Beaver Dredge and therefore the need to faciliate feed from Seabird only until the end of March.

A plan change in response to conditions encountered in TSF1 was released at the end of the reconciliation period. The conditions necessitating the change in plan were excessive debris build up in the trommel resulting from:

- uncertainty in the dam floor topography (not resolvable)
- dredging up the slope of the dam floor (resolved by re-orienting Seabird to face south)

As in the previous reconciliation period dredge operations are still consistently falling short of the expected daily tonnes. Suspected causes remain as follows:

- cavitation of the pump (still attempting to source a mechanical relief valve)
- remaining DN315 line exiting Seabird
- poor floatation of the intial 100m of DN450 line off Seabird

Installling reversible bouancy in the dredge ladder in the previous shutdown has improved the position of Seabird in the water and (anecdotally) improved the effectiveness of the cutter head.

Realised Pb grade is in some blocks below expectation whilst realised Zn grade is consistently significantly below expectation.

Block Reconciliation

Block	Dredge (t)	Mine Plan Pb %	Mine Plan Zn %	Mine Plan Pb t	Mine Plan Zn t	Met Accounting t	Met Accounting Pb %	Met Accounting Zn %	Met Accounting Pb t	Met Accounting Zn t	Variance t	Variance Contained Metal Pb t	Variance Contained Metal Zn t
281	8,754	3.7%	3.2%	323.9	280.1	2,443	2.9%	2.5%	71.2	62.2	-70%	-20%	-20%
282	10,326	3.4%	3.0%	351.1	309.8	*not dredged as planned*							
283	10,199	3.2%	2.8%	326.4	285.6	*not dredged as planned*							
311	15,199	3.6%	3.1%	547.2	471.2	4,840	3.5%	2.7%	167.5	130.1	-70%	-5%	-15%
312	14,757	3.6%	3.1%	531.3	457.5	7,999	3.3%	2.7%	263.3	214.8	-45%	-10%	-15%
313	311	4.4%	3.8%	13.7	11.8	*not dredged as planned*							
318	11,300	3.3%	3.3%	372.9	372.9	*not dredged as planned*							
341	20,375	3.4%	3.0%	694.3	612.7	23,846	3.5%	2.5%	829.1	589.6	15%	0%	-20%
343		3.7%	3.2%	*not in mine plan*		5,738	3.7%	2.5%	212.9	140.8			
347		3.3%	3.0%	*not in mine plan*		8,226	3.3%	2.6%	272.3	211.9			
379	850	3.5%	3.1%	29.7	26.3	*not dredged as planned*							
407	15,840	3.6%	3.0%	570.2	475.2	9,380	3.1%	2.4%	288.8	222.2	-40%	-15%	-20%

Figure 7-1. Example of monthly reconciliation report from the Hellyer Gold Mine

(Source: HGM Month-end Report February 2022)

7.2 Tailings Samples Quality Assurance/Quality Control Programmes

Details of Quality Assurance and Quality Control (QAQC) methods and programmes are given below for both the original TSF drilling samples and for the current tailings samples, which represent a reprocessed equivalent of the tailings material.

The tailings samples on which the currently declared Inferred Mineral Resource is based are considered to be production style samples and thus are generally not subject to detailed QAQC procedures and techniques as primary exploration might be.

7.3 Tailings Sample Security

Hellyer mill process samples are routinely transported to Burnie for analysis but, by virtue of their routine production character, any security risk is low.

7.4 Current Operations

Before the start of tailings retreatment operations, CSA Global (Williams and Cranfield, 2017) reported a total combined JORC 2012 Mineral Resource Estimate of 9.25 million tonnes at 2.35% Zn, 2.99% Pb, 92 g/t Ag, 2.57 g/t Au, and 0.19% Cu. This estimate did not include material from Bass Metals' later Fossey operations.

Note: Mineral resources that are not mineral reserves do not have demonstrated economic viability. The QP author is not aware of any known legal, political, environmental, or other risks that could materially affect the potential development of the mineral resources.

HGM commenced retreatment of tailings from the historic main tailings storage facility (TSF1) in October 2018 and are currently running the Hellyer treatment plant (Figure 7-2) on a dredged supply of tailings from the old tailings storage facility. Current plant throughput is 250,000-300,000 tonnes per quarter (2,500 -3,000 tonnes per day).

Figure 7-2. Hellyer Processing Plant and Surrounds

(Source: AusGEMCO Pty Ltd "Hellyer Tailings Retreatment Project - Ore Estimate Report" Oct 2018)

In FY 2020, HGM achieved production of 1.1 Mt of tailings retreatment, producing 38 kt Pb concentrates, 19 kt of Zn concentrates (Figure 7-3), 1.1 Moz Ag and 5.4 koz Au. Production for FY 2021 is estimated to be 1.4 Mt with plans to Increase production to 1.5 Mt per year in the 2022 FY (source -https://nqminerals.com/hellyer). HGM has retreated approximately 3.2 Mt between September 2018 and February 2022. The silver and gold are contained within the lead concentrate, with HGM receiving "precious metal credits" for that content from the concentrate smelter.

Figure 7-3. Concentrate load out shed at the Hellyer Gold Mine

(Source: EnviroGold Global site visit)

The HGM plant is currently using a two-stage sequential flotation process on the recovered tailings from the main tailings storage facility (Figure 7-4). The first stage produces a lead flotation concentrate product with all other material going into the second flotation cells to produce a zinc flotation concentrate product. All other “after-base metal concentrate” material (other than the two base metal concentrate products) is called Zinc Scavenger Tailings (ZST). This represents approximately 95% of the HGM flotation plant feed material and is pumped to the HGM tailings storage facilities (Figure 7-5).

Figure 7-4. Hellyer Processing Plant General View

(Source: EnviroGold Global site visit)

Figure 7-5. Hellyer Tailings Storage Facility (TSF1) showing new "Beaver" Dredge commissioning site

(Source: NVRO Team Site Visit)

A simplified diagrammatic representation of the stages of the current HGM operations is shown in (Figure 7-6).

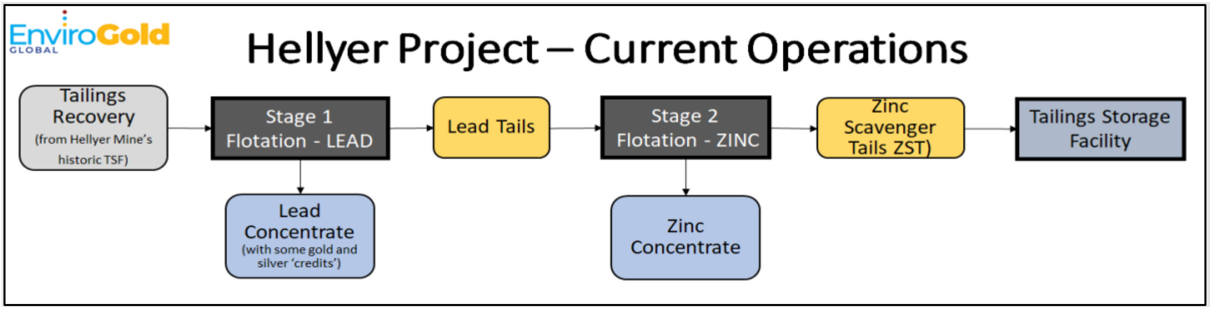


Figure 7-6. HGM's Current Processing Operations - Block Diagram

(Source: NVRO)

7.5 Parent Company Receivership and Sale

The HGM parent company (NQ Minerals PLC) (Figure 7-7) was placed into Administration on 9 August 2021 by a unanimous vote of the Directors of the Company. As of that date, Paul Cooper and Paul Appleton, U.K. restructuring specialists from Begbies Traynor Group plc, were appointed as Joint Administrators of the Company.

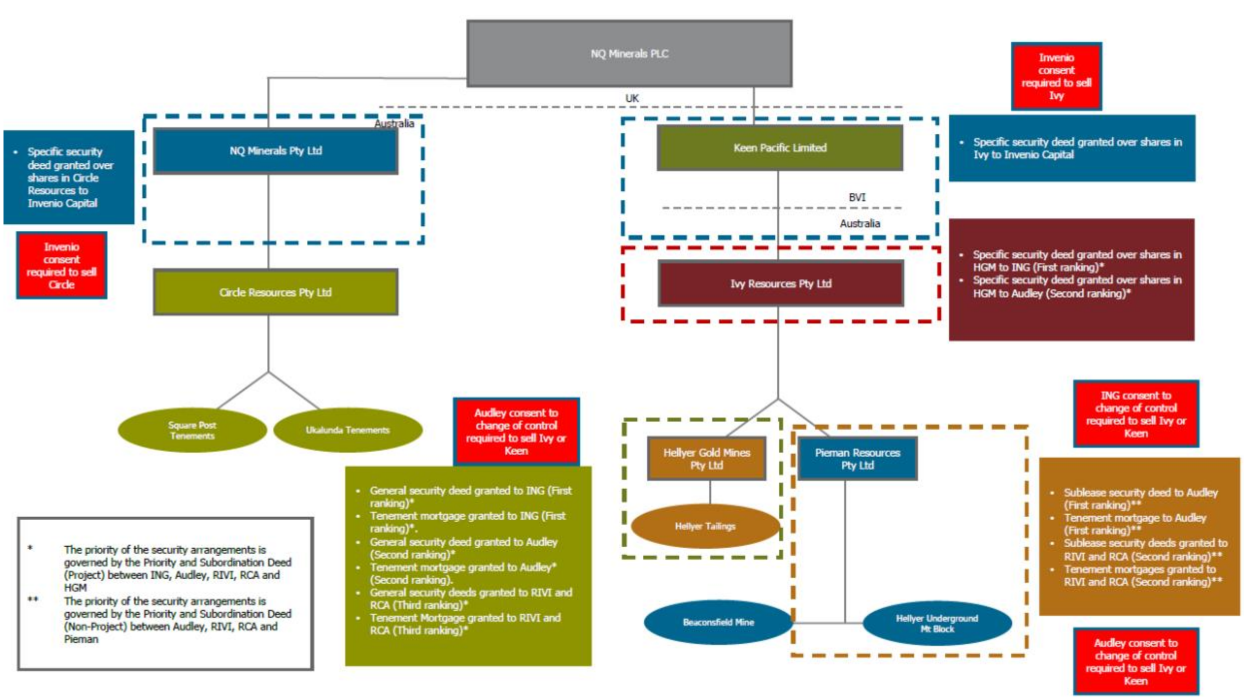


Figure 7-7. Structure of NQ Minerals as put into Administration

Source: NVRO

Over the ensuing several months, the Administrators worked with the debt holders to find a solution. The company was then opened for offers in November 2021, with a management bid being accepted as the winning bid. The management bid failed, and the bids were opened again with the closure of the purchase occurring in July 2022.

Munich Partners of Sydney Australia successfully purchased Keen Pacific (the HGM holding company - Figure 7-7) out of Administration.

7.6 HGM – NVRO Tailings Processing Operations Agreement for Hellyer Site (Operating Companies)

Following an extended work program on the part of HGM that was unable to unlock the residual value in the tailings, the assistance of NVRO was sought to help to understand the behaviour of gold and silver in the tailings, and to develop an approach that would liberate the gold and silver for recovery.

In November 2021, NVRO and HGM Mines signed an MOU for the implementation of the NVRO Tailings Project. A formal contract was signed in February 2022 between HGM and EnviroGold Tasmania Pty Ltd.

The tailings processing operations agreement (TPOA) provides an approach for NVRO to design, build, install and operate a metal recovery plant using, initially, tailings directly from the current HGM operation and, following the closure of the HGM operation, then from the tailings storage facility. The TPOA outlines the approach to the metal recovery in the following broad terms:

1. NVRO will develop the approach to the recovery of the metals, finance, build and install the processing plant
2. HGM will lead the work with NVRO to obtain the required approvals for the commercialization of the metal concentrates by NVRO
3. HGM will maintain the required operating licences and approvals relevant to its operations and those of NVRO, as well as provide access to the site and to the tailings for NVRO to process
4. Milestones for the design, installation, and operation of the NVRO plant
5. Split of the free cash flow from the operation of the NVRO plant
6. Miscellaneous other provisions including but not limited to intellectual property, liability, insurance, dispute resolution, and force majeure

The TPOA is, essentially, a toll treatment agreement where NVRO has a right to process the tailings and then returns the subsequent reprocessed tailings to HGM for safe and secure long-term storage.

8 Geological Setting and Mineralization

The Hellyer deposit is hosted by the Que-Hellyer Volcanics of the Mount Read Volcanics (Corbett and Komyshan, 1989). The Cambrian Mount Read Volcanics (MRV) were initially recognised by Campana and King (1963) and the units have been described in detail by numerous workers, e.g., Corbett (1981, 1992, 2002), McPhie and Allen (1992), White and McPhie (1996), Waters and Wallace (1992), and Crawford et al. (1992). Much of the following information is taken from Wu (2014).

8.1 Regional Geological Setting

The Mount Read Volcanics of western Tasmania is a 200-km by 20-km belt of highly mineralised volcanic dominated rocks striking north from Elliott Bay on the south-west coast, through Queenstown and Rosebery and arcing north-east through Que River and Hellyer before passing beneath younger cover sequences and striking east-west through the Sheffield region. The MRV lie along the eastern margin of the Dundas Trough between the Tyennan Precambrian block of central Tasmania and the Rocky Cape Precambrian block to the northwest (Figure 8-1. Geological map of the Mount Read Volcanic belt in central western Tasmania

(after Gifkins et al., 2005, from Wu, 2014).

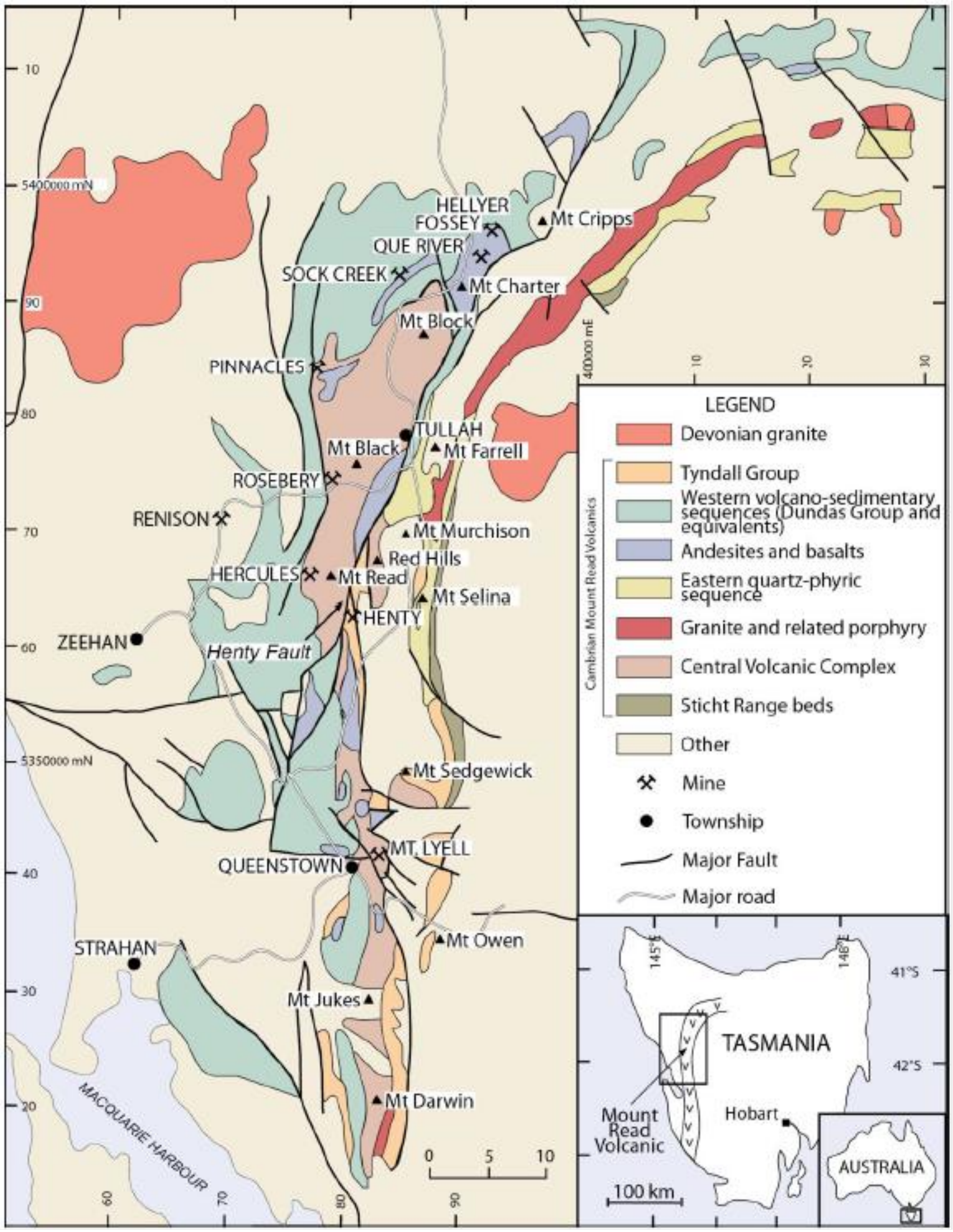


Figure 8-1. Geological map of the Mount Read Volcanic belt in central western Tasmania

(after Gifkins et al., 2005, from Wu, 2014).

The MRV are divided into five major lithological associations: the Sticht Range beds, the Eastern Quartz-Phyric Sequence (formerly Murchison Volcanics), the Central Volcanic Complex (CVC), the Western Volcano-sedimentary Sequences (including the Dundas Group, White Spur Formation, Mount Charter Group, and Yolande River Sequence), the Tyndall Group (Corbett, 1992). Minor andesitic-basaltic volcanics and associated intrusions, tholeiitic basaltic rocks, and granites and associated porphyries are also present within the MRV (Corbett, 1992). The volcanic belt is asymmetrical in most areas, where the eastern central part consists predominantly of volcanic and intrusive rocks and the western mostly of volcano-sedimentary sequences (Corbett, 1992). The sequences are displaced along the major north-northeast trending Henty Fault (Berry, 1989) and the lithostratigraphy of the MRV varies north and south of the fault zone (Figure 8-2).

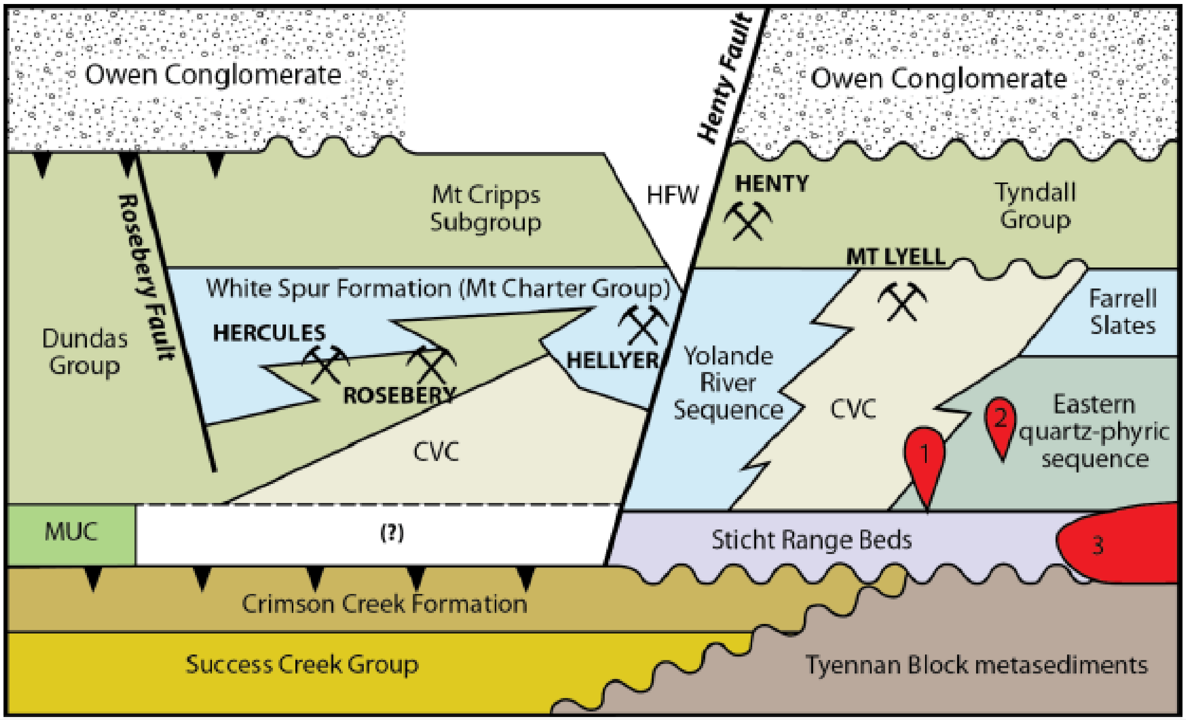


Figure 8-2. Distribution of major lithostratigraphic units in the Mount Read Volcanics to the north and west, and south and east of the Henty Fault

(after Wu, 2014)

MUC = Mafic-Ultramafic Complexes; CVC = Central Volcanic Complex; HFW = Henty Fault Wedge. The numbered units are the Darwin (1) and Murchison (2) granites and the Bonds Range Porphyry (3).

The Mt. Lyell, Rosebery and Hercules deposits are hosted by the Central Volcanic Complex while the Que River and Hellyer deposits lie within the Que-Hellyer Volcanics of the Mt. Charter Group.

8.2 Local Geological Setting

The Que Hellyer Volcanics (QHV) outcrop over an elliptical area some 9 km by 4 km with a prevailing SSW-NNE trend (Figure 8-3). The following description of the local geological setting is largely taken from McArthur and Dronseika (1990) and Corbett (1992).

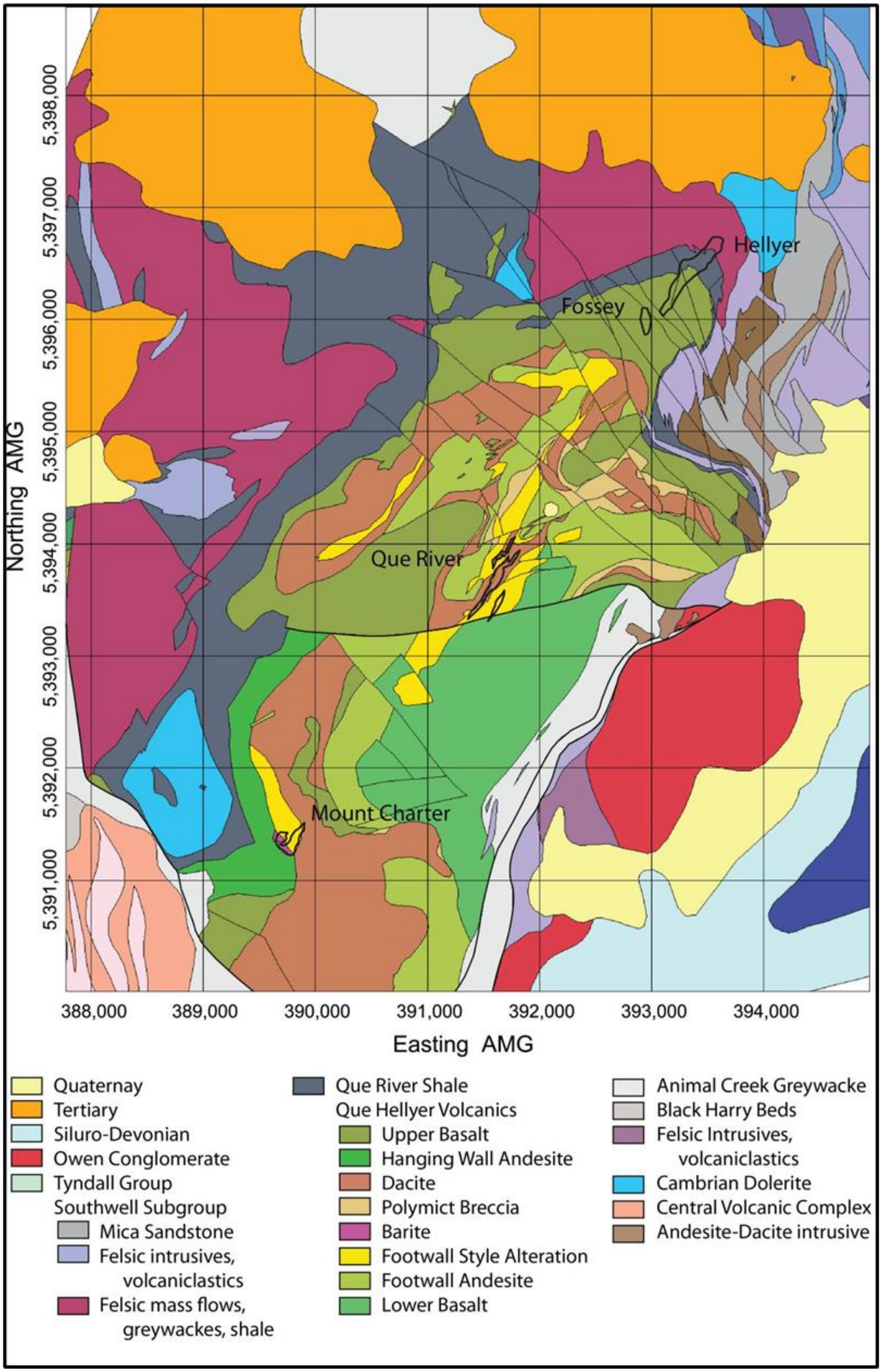


Figure 8-3. Geological map of the Que-Hellyer district

(modified after Denwer et al., 2009 and Wu, 2014).

The detailed QHV stratigraphic succession around Hellyer comprises:

- Lower basalt: variable thickness of calc-alkaline, dark grey-green basalts and volcaniclastics mainly known south of the Que Fault from poor surface exposure and several exploration drillholes. Occurrence and thickness appear to be rigidly controlled by subordinate basement faults. Gradational with andesites above but contact is sometimes marked by discontinuous polymictic mass-flow breccias.
- Feldspar-phyric sequence: highly variable thickness of calc-alkaline grey andesite (minor basalt) lavas, autobreccias and volcaniclastics, occasionally vesicular. Very thick at Que River but thinning to only a few metres at the QHV western margin. Partially or completely absent where large dacite domes occur, e.g., Mt. Charter. Frequently cut transgressively by mineralised hydrothermal alteration zones (especially Que River and Hellyer). This unit generally has a sharp contact with the volcaniclastic unit above.
- Mixed sequence or "hanging wall volcaniclastic sequence": up to 250m thickness of polymictic mass flow breccias, ash volcaniclastics and minor shale with flows and dome-like bodies of feldspar phyric dacite. Hosts the Que River massive sulfide lenses and lies semi-conformably on the hanging wall of the Hellyer massive sulfide. Contains massive sulfide boulders, especially in the "'switchback" area south-east of Hellyer. There is a general trend for this unit to thin to the west but locally thickness is strongly controlled by original seafloor topography. The upper contact with the basalts is very sharp and conformable.
- Upper basalt or "pillow lava sequence": up to 400m of basalt and andesite (suite III) as sheet lavas, pillow lavas and hyaloclastite breccias (Waters, 1995) with minor shale. North and west of Hellyer this unit thins dramatically and interdigitates with Que River Shale. Hydrothermally altered above the Hellyer massive sulfide. This unit has a sharp semi-conformable contact with the overlying shales.
- Que River Shale: usual 100m thickness of well bedded black carbonaceous shale and siltstone that can be much thicker to the north of Hellyer where the pillow lava sequence is all but absent. Pyritic, especially in the lower parts near the basalt. Agnostid trilobite fossils indicate a Middle Cambrian age (Jago, 1979). Sinclair (1994) concludes from the presence of complete trilobites, carbonaceous pyritic content, and degree of pyritization measurements that the QRS was deposited in quiet reducing conditions from an andesitic/basaltic local provenance. This unit marks a distinct hiatus between the basaltic/andesitic proximal volcanism below and the more distal felsic volcaniclastics above. The upper contact with the Southwell Subgroup is sharp and conformable.
- Southwell Subgroup or "upper rhyolitic sequence": about 1 km thickness of interbedded quartz-feldspar phyric pumaceous massflow breccia, sandstone, greywacke turbidite and massive shale with sill-like bodies of rhyolite lava (Scott, 1988).

A vesicular tholeiitic basalt lava unconformably overlying the Que River Shale and Upper Rhyolite sequence north of Hellyer increasing in thickness further north is of probable Tertiary age.

The south-eastern margin of the QHV block is controlled by the steep west-dipping Henty fault which appears offset by the Mt. Cripps/Que Fault north of Que River. The Mt. Charter fault in the south-west marks a distinct break, with clear thickness variations of equivalent units either side. Within the QHV basin, numerous Cambrian faults are interpreted to strongly control occurrence and thickness of the volcanic units. The QHV are thickest at Que River (approx. 1 km) but thin dramatically over several km to the north-west. Some of this thickening is due to Middle Devonian deformation. The significant fold axes are aligned NNE-SSW with a shallow NNE plunge common. An earlier open WNW-ESE cross-fold has led to local plunge reversals, particularly west and north-west of Que River. Fold style varies from tight, often asymmetric forms in the east to open and symmetric in the west (partly due to strain partitioning in altered rocks).

A later, brittle deformation event in the Mesozoic (Berry, 1989) formed wrench faults in association with sinistral movement along the Henty fault.

All units of the QHV (apart from the strongly conductive massive sulfide bodies and mineralised footwall alteration zones) are geophysically non-responsive. The carbonaceous and pyritic QRS is moderately conductive as are the water-laden gravels basal to and interbedded with the Tertiary basalt, making deeper geophysical exploration difficult.

The local metamorphic grade has been determined by Offler and Whitford (1992) to be prehnite-pumpellyite facies.

Recent deposition of processed tailings into the Hellyer tailings pond has created an unlithified, sulfide-rich sediment sequence of anthropogenic origin.

8.3 Hellyer Property Geology

The Hellyer deposit is the most significant VHMS mineralisation within the Que-Hellyer district. Wu (2014) describes it as "an irregular elongate massive sulfide body that has been roughly bisected by sinistral displacement of the north-south striking, sub-vertical Jack Fault (McArthur, 1996; Figure 8-3). The orebody is about 830 m long (730 m pre-Jack Fault) and up to 200 m wide. It has an average thickness of 43 m, and the pre-mining resource was 16.5 Mt at 0.4% Cu, 7.2% Pb, 13.9% Zn, 169 g/t Ag and 2.6 g/t Au (Western Metals, 2000). The Hellyer deposit is buried and blind and the shallowest portion, at the southern end, is approximately 60 m below the surface. The orebody plunges at 20˚ to the NNE and the deepest parts are at 500 m below the surface (McArthur, 1996).

'The immediate footwall to the Hellyer mineralisation is a sequence of andesitic lavas with primary to redeposited volcaniclastic debris collectively known as the feldspar-phyric sequence (FPS). Beneath the sulfide body, these andesitic volcanic rocks are intensely altered and form a vertically extensive stringer zone (McArthur and Dronseika, 1990).

The mixed sequence occurs directly over the FPS and the massive sulfide orebody and at Hellyer is referred to as the hanging wall volcaniclastic sequence (HVS). Where the baritic and siliceous caps are present at Hellyer, the contact with the mixed sequence is sharp and the mixed sequence is strongly sericite altered (Sharpe, 1991). The volcaniclastic rocks are the thickest above the mineralisation and thin out laterally away from the mineralisation.

Immediately above the mixed sequence is the Hellyer basalt. Evidence for shallow emplacement of the Hellyer basalt in to wet, unconsolidated sediments was provided by Waters (1995). Further investigation on the extent of the intrusive nature of the basalt by Tomes (2011) shows that the Hellyer basalt is largely intrusive near the Hellyer deposit.

The Hellyer deposit is an excellent example of a polymetallic, mound-style VHMS deposit that has well developed and preserved footwall and hanging wall alteration halos (Large, 1992). The geology of the Hellyer mine area is shown in Figure 8-4.

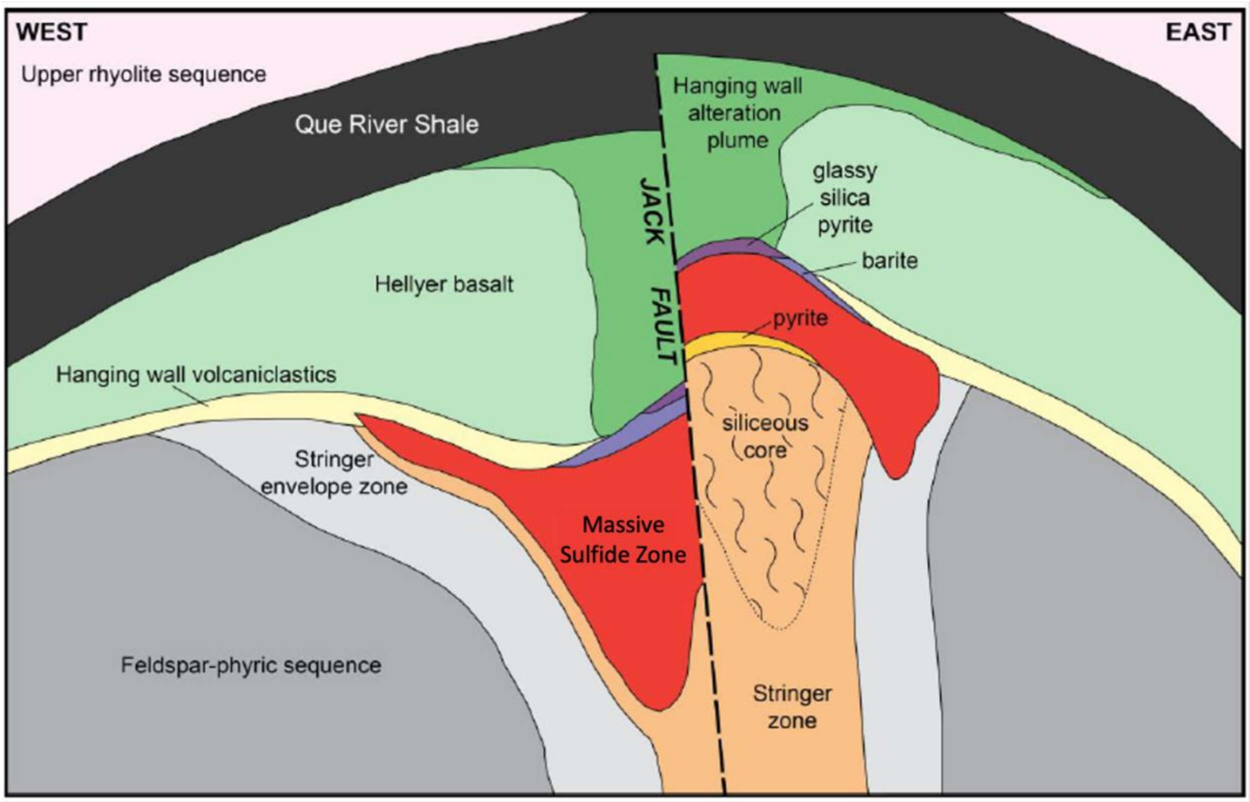


Figure 8-4. Schematic cross section on the Hellyer deposit. Modified from company image courtesy of Bass Metals Ltd

(after Wu, 2014)

8.3.1 Hellyer Mineralisation

Wu (2014) described the Hellyer deposit as being "dominated by massive sulfide ores with an average of 54% pyrite, 20% sphalerite, 8% galena, 2% arsenopyrite, and 1% chalcopyrite with minor tetrahedrite (McArthur and Dronseika, 1990). Gangue minerals including quartz, barite, calcite, chlorite, sericite, and siderite make up the remaining ~15% of the orebody. Sulfide accumulation is restricted to a single lens that has been bisected by faulting, but with essentially no internal waste.

The massive sulfide ores were subdivided into four types by McArthur and Dronseika (1990):

1. Footwall Depleted Zone – inner footwall portion with <100 ppm Ag, elevated Fe, Cu
2. Hanging-wall Enriched Zone – hanging wall portion and outer regions with >100 ppm Ag, elevated Pb, Zn, Ag, Au, As
3. Baritic Cap – massive barite with minor massive sulfide "slugs', stratigraphically above the hanging wall enriched zone
4. Siliceous Cap – pyritic "chert', stratigraphically above the hanging wall enriched zone

Textural variations in sulfide mineralogy at Hellyer are complex and macro- and microscopic features were documented comprehensively by McArthur (1996). Macroscopically, the massive sulfide texture is classified into six endmembers: massive, banded, boxwork veining, fragmental, recrystallised, and shrinkage shadows (McArthur, 1996). Massive textures are dominant throughout, but the richer ores in the hanging wall enriched zone tend to be banded and vary from alternating planar layers of pyrite and sphalerite ± galena ± arsenopyrite, to contorted discontinuous layers, to fine, wispy sphalerite ± galena in a pyrite matrix (McArthur and Dronseika, 1990).

Recrystallised textures are concentrated proximally over the interpreted core of the footwall alteration zone (Gemmell and Large, 1992) while banded and shrinkage shadow textures are more common in distal positions.

Fragmental ores concentrate at the footwall in topographic lows on the seafloor as reconstructed by Downs (1993).

Microscopically, the sulfide textures are diverse and very fine-grained with many delicate depositional textures preserved (McArthur, 1996). Pyrite occurrence ranges from spongy, melnikovite, to anhedral with interstitial galena, to well-developed cubes. Colloform and ultrafine intergrowths of pyrite with other sulfides are commonly observed, especially with galena and arsenopyrite (McArthur, 1996). Sphalerite also occurs as fine-grained masses with intergrowths of pyrite, galena, and arsenopyrite. Chalcopyrite disease in sphalerite is most strongly developed towards the footwall (McArthur and Dronseika, 1990). Sphalerite intergrowths with chlorite are also common, but not with any other gangue minerals (McArthur, 1996). Galena is generally more coarse-grained and occurs as partly re-crystallised clusters, thin veins and minute blebs throughout the sulfide matrix; intergrowths of galena with sericite are also common. Near the hanging wall, tetrahedrite is present as intergrowths with galena, as veinlets cutting galena, sphalerite and pyrite, as shells around colloform pyrite, or as minute grains within sphalerite (McArthur and Dronseika, 1990).

Literature review and mineragraphic analysis of samples from Hellyer suggest that historical low levels of precious metals recovery from Hellyer ore is due to the gold and silver predominantly occurring in "solid solution', a solid mixture containing a minor component uniformly distributed within the crystalline lattice structure of (at Hellyer) pyrite and arsenopyrite (Teale, 2021). Such occurrences are not amenable to recovery via the industry standard milling and processing methods utilised at Hellyer.

Stratigraphically above the massive sulfides is the baritic cap, which is largely composed of massive barite layers up to 15 m thick with irregular bands and clots of sphalerite, galena and tetrahedrite (McArthur and Dronseika, 1990). The barite cap is bounded by the orebody extremities and forms a semi-continuous elongate lens above the massive sulfide mineralisation. The contacts between the barite cap and massive sulfides vary from sharp and irregular to diffuse (Sharpe, 1991). Barite occurs as massive interlocking grains to well-formed crystalline tabular laths up to 10 cm in size (Sharpe, 1991). Intergrowths of barite are common and radiating barite aggregates are also observed. Barite grains in zones with high sulfide content tend to be rounded and fractured, suggesting some degree of redeposition and dissolution (Sharpe, 1991).

Overlying the barite, and to a lesser extent, there is a thin layer of highly siliceous precious metal-rich ore with approximately 40% sulfides and well preserved primary colloform and framboidal textures (McArthur and Dronseika, 1990; Sharpe, 1991). This siliceous cap is also known as the glassy silica pyrite (GSP) unit for its distinctive pyritic textures in a grey, glassy siliceous matrix. The occurrence of the GSP is discontinuous, but generally correlates with that of the barite cap, with the exception of a few lenses where the GSP lies directly on top of the massive mineralisation (Sharpe, 1991). Interdigitating contacts, siliceous vein transect the barite cap and fragmental barite in the GSP suggest the formation of the barite and GSP were near contemporaneous (Sharpe, 1991).

Beneath the massive sulfide body is a stringer zone which contains sub-economic vein mineralisation. Mineralisation is restricted to pyrite veins with significant amounts of coarse-grained barite, sphalerite, galena, and chalcopyrite (McArthur and Dronseika, 1990).

8.3.2 Hellyer Alteration

Extensive hydrothermal alteration occurs in the hanging wall, immediate footwall, and regional footwall. Wu (2014) reported that the "alteration in the regional footwall is generally weak and limited to irregular zones of quartz, albite, chlorite and minor patchy sericite, epidote and hematite (Gemmell and Fulton, 2001).

Compared to the immediate footwall, hydrothermal alteration in the hanging wall is less intense and only affects the hanging wall basalt immediately above the massive sulfide orebody. In the hanging wall alteration halo, there is a distinct bright green mica that is locally referred to as "fuchsite'. Five alteration zones are recognised within the hanging wall, namely the fuchsite, chlorite, carbonate, quartz-albite, and sericite zones (Jack, 1989; Gemmell and Fulton, 2001). The fuchsite-dominated alteration zone sits directly above the main ore zone and is surrounded by zones of chlorite- and carbonate-dominated alteration. Intense and pervasive carbonate alteration is closely associated with chlorite and occurs near the orebody; however, the chlorite zone tends to extend above and lateral to the carbonate. Outward from the inner alteration zones is the quartz-albite alteration zone, which is characterised by the white to pink, bleached appearance of the basalt.

The outermost alteration zone is dominated by sericite, occurring as weak, patchy to pervasive alteration around the margins of the quartz-albite zone. Well-developed alteration zones in the hanging wall basalts suggests that hydrothermal activity continued after the formation of the Hellyer deposit (Jack, 1989).

The Hellyer deposit is underlain by an extensive, well-developed, and well-preserved alteration zone and stringer system that has not been overprinted or deformed significantly by subsequent tectonic events. In a study on the stringer zone and footwall alteration, Gemmell and Large (1992) have characterised the zonation of alteration minerals within the footwall alteration pipe, starting with a siliceous core at the centre, outwards to an inner chlorite-sericite zone, and a peripheral sericite-quartz zone (Figure 8-5). The three zones are best developed in the northern part of the footwall alteration system. In the central and southern part of the system, the sericite-chlorite alteration zone is missing, and the inner alteration zone is defined by intense quartz and sulfide veining. This constitutes the stringer zone of the footwall alteration system, and the stringer envelope zones refers to the peripheral sericite-quartz zone with lesser veining (Gemmell and Fulton, 2001).'

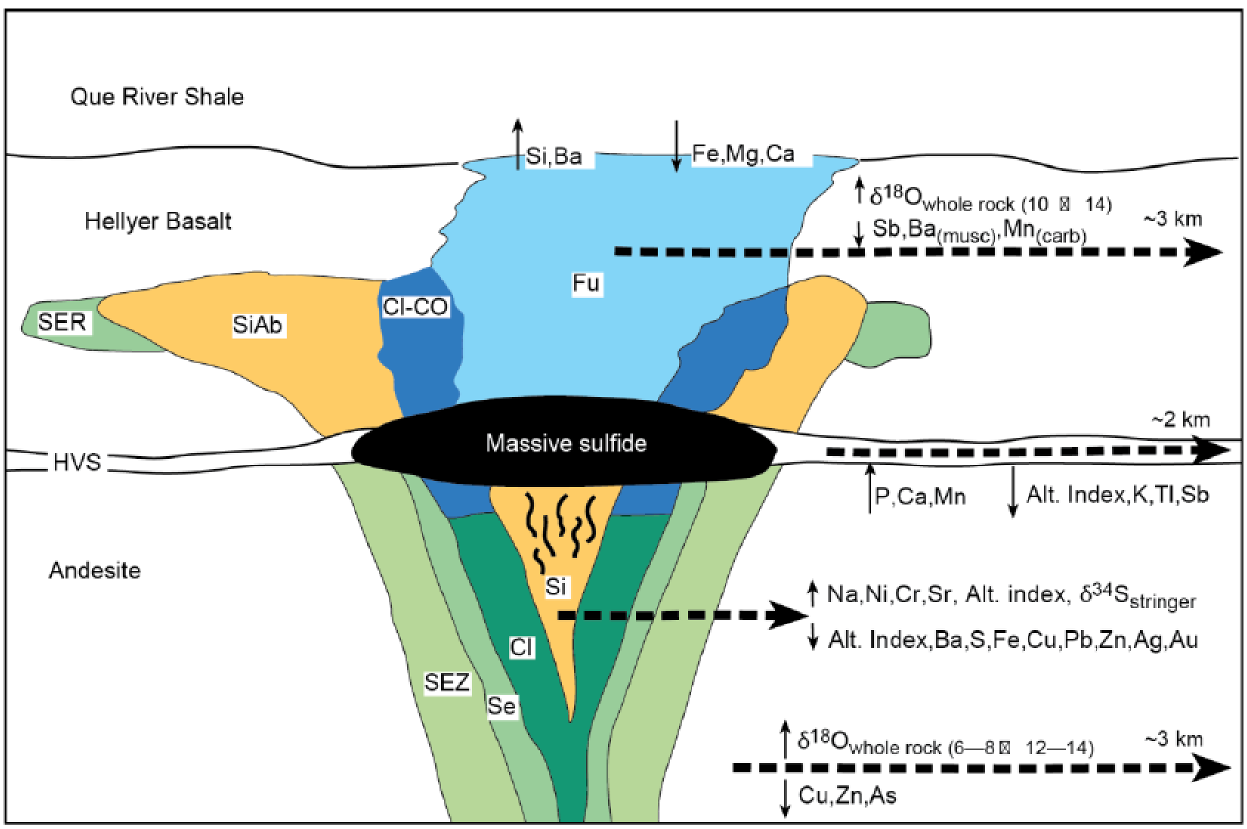


Figure 8-5. Schematic representation of the hanging wall and footwall alteration zones with directional trends of progressive enrichment and depletion of element

(after Gemmell and Fulton, 2001 and Wu, 2014).

9 Deposit Types

The original Hellyer massive sulfide deposit has been interpreted by most previous workers as a classic, seafloor, mound-style, VHMS deposit, developed in a similar manner to the classic Kuroko deposit (Gemmell and Large, 1992; Large, 1992; McArthur, 1996). Gemmell and Large (1992) described the hydrothermal alteration zonation pattern centred around the stringer zone and interpreted the metal zonation of the deposit to delineate the main feeder zones. McArthur (1996) examined the metal content, mineralogy, macroscopic and microscopic textures, and mineral trace element composition of the massive sulfide deposit in detail and supported the formation of the sulfide mound by deposition of sulfides at or near the seafloor with in-situ recrystallisation, intra-mound veining, upward deposition, and thermal retraction. This mound building and zone refining process, described by Eldridge et al. (1983), is responsible for the Cu-rich base of the deposit with an upward and outward increase in Zn and Pb content. Mineralisation is comprised predominantly of pyrite and sphalerite, with lesser galena and arsenopyrite.

The deposit under review is a tailings dam, comprised of sediments pumped into a natural depression within a compacted earth-fill dam. The tailings sediments were sourced from the adjacent Hellyer Mine processing facility which processed polymetallic ore sourced mainly from the Hellyer underground mine plus some from the Fossey mine and the Que River mine. The tailings are predominantly crushed and ground waste products from the processed ore, with the bulk of the volume being sands, with lesser amounts of sulfides and some free metals. The processed Hellyer tailings now comprise a localised sedimentary sequence deposited within an artificial basin confined by the retaining wall of the Hellyer TSF. Previous evaluation of this recent anthropogenic deposit has been by a series of drill programmes using vertical drill holes to recover cores of the sediment.

10 Exploration

Historical exploration is detailed in Section 6.3.

11 Drilling

Historical drilling results are detailed in Section 6.3.

12 Data Verification

NVRO considers that the independent mineralogical work carried out is sufficient to confirm the basic mineralogical premise that the remnant precious metals within the Hellyer tailings are present as sub-microscopic particles within, primarily, pyrite and arsenopyrite or in “solid-solution” form within the pyrite and arsenopyrite lattice (see Section 13 Mineral Processing and Metallurgical Testing)

Regarding the various mineral resource estimates reported by HGM, NVRO considers the various mineral resource estimates carried out over the last 12 years, primarily by CSA, to have been developed by competent personnel, and that all relevant data has been adequately considered.

NVRO did not have access to original resource data to carry out its own verification procedures for the purposes of this report. However, NVRO considers that the most recent resource reporting (CSA, 2020) meets the requirements of the JORC (2012) guidelines and is compatible with the requirements outlined in the NI 43-101 guidelines. The QP author considers that the CSA (2020) resource reporting is adequate for the purposes of this report. An in-house assessment of production statistics from mill operations for the period between commencement of operations and end November 2011 gives further confidence in the declared grade character of the tailings deposit and has allowed an estimate of a pre-processing inventory to be quantified. Additional assessment of HGM’s monthly production figures to end April 2022 and nominal production forecasts has allowed NVRO to estimate the quantity of tailings anticipated to be available for ongoing HGM operations from end December 2022. The QP author considers that the in-house assessment of production statistics is adequate for the purposes of this report.

13 Mineral Processing and Metallurgical Testing

The Project metal recovery process is founded on a previously developed acid leaching process with additional updates for catalyst recycling and modern construction materials. The following sections provide the background to the development of the process and the metallurgical testing completed to date both by NVRO and by Core Resources.

13.1 Literature Review on Refractory Sulfide

EnviroGold Global (NVRO) carried out an extensive literature review on refractory sulfide ores in general and, more specifically, the Hellyer ore and tailings. NVRO commissioned its own scanning electron microscope (SEM) investigation on the Hellyer tailings material (Teale, 2021). The results from the SEM work indicate that gold is encapsulated as fine-grained particles and sub-microscopic inclusions within the crystal structure of the arsenopyrite and pyrite mineral matrix of the Hellyer ore.

Hellyer Gold Mines previously investigated other oxidation processes to determine their suitability for improved gold recovery. Both roasting and high-pressure oxidation methods were rejected for the reasons that typically limit their implementation.

Hellyer Gold Mines also considered the neutral leach Albion Process™, licensed by Glencore Technologies but did not proceed with that methodology as, according to HGM staff, it was prohibitively costly when external operational factors were considered.

The rejection of previously tried recovery-improvement processes at Hellyer led NVRO to believe that the appropriate hydrometallurgical process would need to operate in air, at atmospheric pressure, and with fast reaction rates. None of the commercial processes previously evaluated by HGM met these requirements.

NVRO, having first reviewed previously unavailable SEM data referred to above, developed a hybrid, catalysed, hydrometallurgical technique based on weak acid oxidation of the pyritic mineral matrix of the Hellyer ore at atmospheric pressure. After considering and testing multiple options, NVRO focused its pre-treatment process development for Hellyer tailings ore on the use of mixed acids, including nitric acid, commonly recognised as a strong oxidant for refractory sulfide ores.

NVRO's research identified that nitric acid oxidation of pyrite generally occurs as described in the chemical equations below:

$$2FeS_2 + 10HNO_3 = H_2SO_4 + Fe_2(SO_4)_3 + 10NO + 4H_2O \text{ (Equation 1)}$$

Nitric oxide gas produced is further oxidized:

$$2NO + O_2 = 2NO_2 \text{ (Equation 2)}$$

Nitrogen dioxide can then be absorbed in water to regenerate nitric acid:

$$3NO_2 + H_2O = 2HNO_3 + NO \text{ (Equation 3)}$$

The overall reaction is shown in following equation:

$$4FeS_2 + 15O_2 + 2H_2O = 2H_2SO_4 + 2Fe_2(SO_4)_3 \text{ (Equation 4)}$$

As described in the equations above, the process can mostly recover the nitric acid, and when recycled efficiently, can be considered to function simply as a catalyst, with losses typically as low as 2%, (*i.e.*, essentially unconsumed in the reaction).

Arsenopyrite reacts like pyrite but it is more reactive, and oxidation is possible at ambient temperatures depending on the nitric acid concentration. The decomposition of arsenopyrite in nitric acid generates elemental sulfur:

$$3FeAsS + 12\ NHO_3 = 3FeAsO_4 + 2SO_4 + 4\ H_2O + S + 12NO \text{ (Equation 5)}$$

Approximately up 70% of the contained sulfide may form elemental sulfur rather the more soluble sulfate species. By the addition of sulfuric acid, the following simplified chemical reaction follows:

$$FeAsS + 3H+ + 14NHO_3 = 3Fe_3+ + 3SO_4 + 3H_3AsO_4 + 14NO + 4H_2O \text{ (Equation 6)}$$

Although the addition of sulfuric acid helps to reduce sulfur formation, some sulfur is still formed and may coat the exposed gold surfaces, so reducing gold recovery.

13.2 Common Pre-Treatment Oxidation Processes

The term refractory is used to describe ores in which more than 80% of the gold cannot be extracted by conventional cyanidation, even after extensive fine grinding. A common cause of refractoriness is the encapsulation of gold as sub-microscopic inclusions within sulfide minerals, such as arsenopyrite and pyrite. Such encapsulation typically renders the metal inaccessible to conventional cyanidation, even with very fine grinding.

The last five decades have seen considerable progress in new gold leaching techniques for refractory ores, including:

- Intensive Cyanidation
- Pressure Cyanidation
- Carbon-in-Leach Cyanidation
- Carbon-in-Pulp

In some cases, to improve recovery, one of a variety of oxidative pre-treatment methods is required to break down or modify the sulfide matrix and release the precious metals prior to any conventional treatment, commonly:

- High temperature roasting
- High pressure chemical oxidation
- Autoclave oxidation
- Bacterial oxidation

These pre-treatment methods use oxidation processes to break down the structure of pyrite and arsenopyrite, and render the gold amenable to recovery, typically by subsequent cyanidation. Yet these methods have significant drawbacks—they are typically time and energy intensive, and costly in plant development, equipment, and reagents.

In general, the earliest commercial pre-treatment process, high temperature roasting, loses its advantage when cheap thermal energy is unavailable. Roasting also generates sulfur dioxide (SO_2) and arsenic trioxide (As_2O_3) in refractory ores, which cause environmental contamination when discharged to air. Further, even if scrubbed from the discharge air, economic markets for these by-products are non-existent. High pressure chemical oxidation and autoclave processes are also technically difficult and capital intensive, adding to both the duration and complexity of the process.

Bio-oxidation typically requires long pre-treatment times, and, being inherently biological, is limited by the arsenic, copper, chromium, and lead contents in the ore being treated, all of which may inhibit biologic processes.

13.3 Nitric Acid Oxidation Processes

Processes for nitric or nitrous acid leaching of sulfide ores have been thoroughly researched (Li, et al., 2007; Kholmogorov, *et al*., 2005; Posel, 1976a, b; Kunda, 1982; Raudsepp *et al*., 1989). Mixes of nitric, hydrochloric, and sulfuric acids are also used widely in the electroplating industries and are well understood. Mineral processes using nitric acid as an oxidant for processing refractory gold ores include:

- Atmospheric-pressure oxidation
- High-pressure oxidation
- Catalytically oxidizing technology of nitric oxide (NOx)

In the 1970s and 1980s, some effort was focussed on the potential use of nitric acid leaching of gold concentrates (in Canada in particular). The Arseno, Nitrox, and Redox processes were developed by companies including Hydrochem/Prochem in Brampton, Ontario, and the University of British Columbia.

13.3.1 Nitrox Process

The original Nitrox process was designed to treat ore for a 1- to 2-hour period in nitric acid in the presence of air at atmospheric pressure and below 100°C to oxidize pyrite and arsenopyrite as a pre-treatment prior to cyanidation. The gaseous oxides of nitrogen were recovered by wet scrubbing to nitrous or nitric acid in a separate step for recycle. Typically, higher elemental sulfur yields occur when arsenopyrite is present and oxidation was complete after 5 minutes. The formation of sulfur was regarded as passivating or slowing the oxidation of pyrite, typically oxidized after 50 minutes. There was limited understanding of the role of sulfur in the reaction.

The developers decided to accept the formation of elemental sulfur as part of the oxidation process on the basis that a "narrowly defined nitric acid oxidation regime" (Flatt, 1996) might not be compatible with a wide range of feedstocks. This decision complicated the original flowsheet, requiring sulfur separation and oxidation steps, usually at higher temperature and pressure. This complication, along with the then potentially limited range of feedstocks, contributed to the slowing of the development of the Nitrox process.

13.3.2 Redox Process

The Redox process was first proposed in 1981 and underwent several changes before the Australian firm Minproc bought the process, in 1991, from its Canadian developers.

The Redox process uses nitric acid at temperatures of 195°C - 210°C. This process is very effective at preventing the formation of elemental sulfur, rapidly oxidizing sulfide minerals and any elemental sulfur, and releasing gold for subsequent recovery by conventional methods. The process has the advantages of short retention time and, in the case of arsenic-bearing feeds, production of a stable ferric arsenate residue.

The Redox process also improves gold recoveries in subsequent cyanidation for both sulfidic refractory ores and "preg-robbing" carbonaceous ores. Recoveries from gold-bearing materials have shown improvements of up to 74%.

However, the process is difficult to simulate on a batch basis because of the short retention time and kinetics variation in a batch reactor. Development test work on the Redox process focussed on economic factors and included pilot plant operations at both Snow Lake, Manitoba, Canada and Bakyrchik, in eastern Kazakhstan.

The Bakyrchik pilot plant treated concentrate in a continuous 15 kg/hr facility over a three-month period in 1994, aiming to optimize process parameters and prove its effectiveness on that specific feedstock. The continuous flow plant allowed for nitric acid recycling, which is regenerated within the Redox reactor. However, there were stakeholder and management interests in using locally produced titanium metal alloys, which proved to be the Achilles heel of the ongoing program. High temperature nitric acid and high-pressure oxidation conditions led to weld-failures in the titanium used in construction.

A lower temperature variant was subsequently tested at Bakyrchik. The acid was allowed to fall to 125°C from its normal (180-210°C) range. Gold recovery fell from 85-95% to 50%, almost certainly due to the sulfur not fully oxidising at lower temperatures, resulting in more gold becoming occluded to the elemental sulfur. Disulfides bind strongly to the gold surface, and while the exact nature of the bond remains obscure, early research demonstrated that the bond's strength exceeds 126 kJ/mol. With such strong bond energy, the reaction is generally considered to be practically irreversible, hence dramatically reducing the effectiveness of cyanidation.

Other early test work on the Redox process focussed on economic factors rather than fundamental research, with some relevant findings concerning elemental sulfur. Apparently, the oxidation of sulfide, first to sulfur and subsequently to sulfate, dictates residence time, rather than the oxidation of metal sulfide to metal ions. This invariably led to the requirements for higher pressures to expedite the process.

Canterford (1994b) listed additional flowsheet considerations, beyond the pre-oxidation leaching stage, which he regarded as important in nitric acid processes for refractory gold. They included nitric acid regeneration, which he believed should be external to the leaching vessel for the low-temperature Redox variant. He also believed any

NOx in off-gases had to be catalytically oxidised (this was later found to be untrue). Researchers also concluded that effluent had to be treated as a component of conventional wastewater treatment and irrigation runoff to meet nitrate environmental standards.3

Added to these limitations, Bakyrchik pilot runs demonstrated a 1% to 2% nitrate loss, and the costs of construction materials, mass, and energy balance implications proved to be significant obstacles for full commercial development.

13.4 EnviroGold's Hybrid Hellyer Oxidation Pre-Treatment Process and Nitric Acid Recycling

Given the limitations of earlier nitric oxidation processes (as outlined above), NVRO sought a Hellyer-specific solution to improve gold recoveries of that specific feedstock. Essential to developing NVRO's process for the oxidation of the Hellyer tailings ore was understanding the nature of the gold-sulfur bond described above, since this chemical bond competes with the conventional use of carbon in the recovery of gold and silver from pregnant cyanide liquors.

Because the HGM operations focus on producing lead and zinc concentrates using froth flotation, NVRO wanted to best integrate the oxidation pre-treatment process with the existing infrastructure, while not interfering with HGM's ongoing operations.

To accomplish these goals, NVRO developed a hybrid two-stage leach process for the Hellyer tailings using low acid concentrations, low to moderate reaction temperatures, and normal atmospheric pressure. These key parameters support potential for low capital costs for materials of construction and ameliorate concerns of material corrosion observed previously in Nitrox pilots (perhaps in a processing plant that avoids the use of metallic materials in favour of reinforced advanced plastics).

A block flow diagram for the proposed flowsheet to re-treat Zinc Scavenger Tailings (ZST) is shown in Figure 13-1 below. A METSIM model for the proposed process has been developed according to the process design basis.

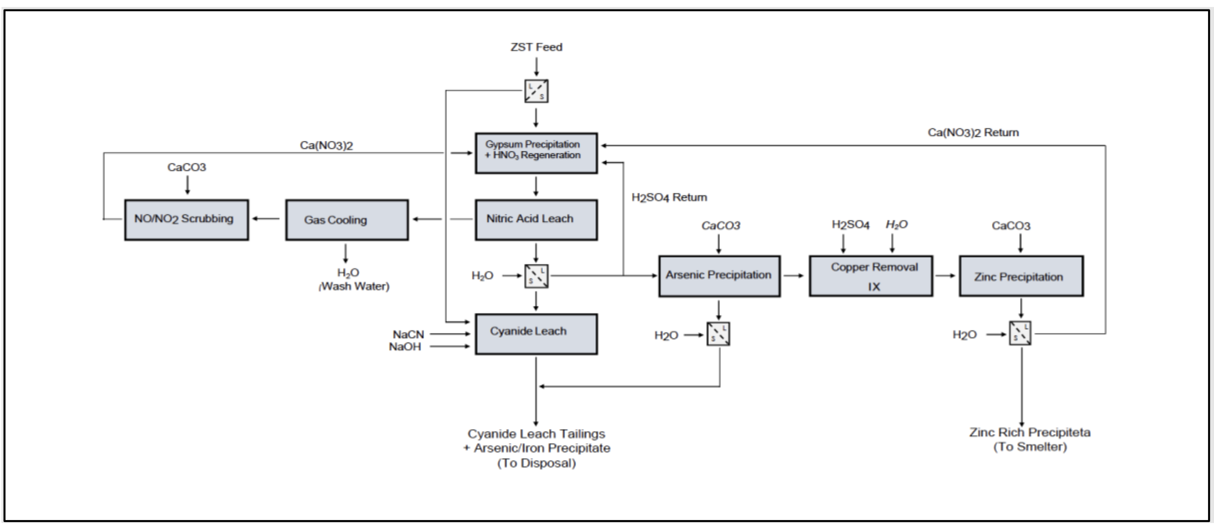


Figure 13-1. Simplified Block Diagram to Re-Treat Zinc Scavenger Tailings

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[3] Nitrate is an intermediate process component in almost all municipal wastewater treatment and is also commonly found in agricultural runoff. Conventional treatment is to denitrify it by anaerobic pond processes directly to the air.

(Source: Core Metallurgy Report No. 1302B-002)

The first stage leach, with an initial low acid concentration of approximately 10%, has been shown to initially oxidise the galena (PbS) component of the Hellyer tailings ore, and also commences oxidation of the sphalerite ((Zn,Fe)S) and chalcopyrite ($CuFeS_2$) components. Testing of this stage demonstrates a neutral reaction temperature of less than 30o°C.

The second leach, conducted at a slightly higher concentration of approximately 15%, completes the oxidation of the remaining sulfides, including the arsenopyrite and pyrite, which contain the bulk of the precious metals in their crystalline structures. Testing of this stage demonstrates an exothermic reaction with maximum temperatures reaching approximately 90o°C.

The post-leach residue has been shown to contain >90% of the gold and silver originally contained within the Hellyer Zinc Scavenger Tailings (ZST) feedstock, making these precious metals available for subsequent recovery via conventional cyanidation.

Nitric acid consumption was a major cost consideration in previous iterations of the Nitrox process due to the escape of NO and NO_2 gases. The potential for this is obviated by NVRO's modifications to the acid leach to incorporate cheaper sulfuric acid, and to rely on the nitrous ion as a catalyst, which is, therefore, not actually consumed in the reaction.

In addition, NVRO has incorporated an NO and NO_2 off-gas recovery-and-recycling circuit into the Hellyer process. Such nitric acid recycling was previously demonstrated at other locations and alleviates the potentially high cost of nitric acid as an oxidant.

The most widely used recycling technique was wet scrubbing using a water mist; however, the low solubility of nitrous oxide and nitrogen dioxide in water required multiple scrubbing stages. The NVRO hybrid process overcomes this by incorporating a weak calcium hydroxide alkali into the scrubbing liquor. The nitrogen oxides favourably dissolve to form chemically stable calcium nitrate. This solution was then used as the main scrubbing liquor, increasing the solubility of any escaping gases by several orders of magnitude. This virtually eliminated losses of nitrous oxides (NOx).

13.5 METSIM Modelling

METSIM is a software program used for modelling and simulating metallurgical processes. It is used by companies throughout the world to design, simulate and control metallurgical processes and operations from mine to tailings. METSIM is also used to create process flowsheets and incorporate data for the material being processed, including mineralogy, particle size analysis, grade by size or multicomponent size analysis, washability data, as well as mechanical, physical, and thermodynamic properties. The modelling is also used to provide mass and water balances as well as reagent usages, process, and tailings slurry densities etc.

NVRO is currently in the upgrading the METSIM Model for the Hellyer tailings pre-treatment oxidation, and subsequent cyanidation of the post oxidation leach residue. NVRO is collaborating on this work with experienced metallurgical consultants, Core Resources in Brisbane, Australia.

NVRO's research identified that nitric acid oxidation of pyrite generally occurs as described earlier (Section 13.1). These chemical reactions, described above, form one of the key input sequences into the METSIM model for the NVRO Hellyer oxidation pre-treatment process and nitric acid recycling.

Following the completion of the gold and silver recovery process model, which will include nitric acid recycling, a secondary model will be developed to illustrate the recovery of base metals (lead, zinc, and copper) that have been released into solution by the two-stage leach pre-treatment of the various sulfides present in the Hellyer tailings ore.

When completed, the METSIM model will illustrate the NVRO two-stage leach pre-treatment oxidation process and track the precious metal recovery through cyanidation. Detailed simulation outputs will be incorporated into NVRO's operating and financial modelling to provide support for the overall financial business case.

13.6 Gold Metallurgical Considerations

The fine nature of the gold and the intergrown nature of the ore mineralogy results in the gold reporting to all sulfide concentration components in varying degrees but also with a considerable amount still reporting to the final tail. Bass Metals commissioned McArthur in 2009 to undertake a laser ablation study of the Hellyer tailings which noted:

Gold in the tailings averaged 2.6 g/t Au and was associated mainly with arsenopyrite (55%), pyrite (30%) and electrum (15%). On the other hand, silver (88 g/t Ag) was associated mainly with pyrite (~50%), galena (~35%) and tetrahedrite (~15%).

13.7 Tailings Metal Resource: Mineralogy

Tailings from HGM's Hellyer Tailings Project contain residual gold entrained in pyrite, arsenopyrite, and siderite, as well as silver, copper, zinc, and lead present as sphalerite, galena, chalcopyrite, and related minerals as shown in Table 13-1.

Table 13-1. Mineral content of the Hellyer Tailings

Mineral	By Volume (%)	By Weight (%)	Specific Gravity (g/cm3)
Pyrite	47.5	53.1	5.0
Sphalerite	23.9	21.8	3.9-4.2
Galena	5.1	8.7	7.4
Arsenopyrite	1.0	1.4	6.1
Chalcopyrite	0.99	0.92	4.2
Quartz	6.8	4.0	2.65
Sericite	2.4	1.5	2.8- 2.9
Chlorite	1.8	1.1	2.6- 3.3
Calcite/Ankerite/Siderite	3.9	2.4	2.7 – 4.0
Barite	4.7	4.7	4.7
Tetrahedrite	0.21	0.20	4.9
Bournonite	0.04	0.05	5.8
Magnetite	0.03	0.03	3.9
Other	1.6 (void space)	0.12 unknown	
Total	*100%*	*100%*	

(Source: G.J. McArthur "Textural Evolution of the Hellyer Massive Sulfide Deposit" Aug 1996)

13.8 Structural Considerations with Tailings Material

EnviroGold Global conducted a comprehensive literature review and commissioned Teale & Associates (Teale, 2021) to perform detailed mineralogical analysis of samples from Hellyer to determine gold and silver locations within the mineral structures. The work confirmed the presence of Au and Ag within both the pyrite and arsenopyrite during later comparable laser ablation investigations. Teale reported Ag up to 54 ppm in idioblastic pyrite and up to 11 ppm Au.

Gold values in arsenopyrite averaged 2.94 ppm Au and ranged between 1 ppm Au and 11 ppm Au. Teale noted considerable difficulties in targeting pure mineral locations with the laser ablation method owing to the very fine grained and intergrown nature of the sulfide-rich grains. No individual gold particles were identified during the extensive microscopic work carried out, underlining the sub-microscopic size of most of the gold at Hellyer. Based on literature review and Teale's findings, NVRO concluded that gold and silver predominantly occur in "solid solution", a solid mixture containing a minor component uniformly distributed within the crystalline lattice structure of the pyritic minerals within the tailings.

This has important consequences for the geochemical behaviour of pyrite, in particular resulting in the gold remaining largely inert or refractory. Due to this structural format of the gold and silver in the Hellyer ore (and tailings), the pyritic mineral crystal structure needs to be disrupted to liberate the gold and silver. NVRO will use an advanced chemical oxidation process to “break” the rigid structural components of the pyritic minerals to release the precious metals.

13.9 Leaching Options for Gold and Silver Recovery

EnviroGold Global has undertaken, both at its own laboratory at Tingalpa and through Core Resources laboratory at Albion, a series of alternative and combinations of leaches with a view to optimising the recovery of both precious (gold and silver) and base metals (zinc, lead and copper).

A blend of mixed acids with additives was selected to generate an aggressive exothermic reaction with pyrite and galena-sphalerite blends, rapidly increasing leach temperature and substantially reducing leach times. A hypochlorite addition also potentially accelerates gold and silver dissolution as gold-chloride complexes from within the pyrite lattice structure without further grinding. NVRO also tested the potential use of electrochemically-generated chlorine and hypochlorite ions to improve gold dissolution.

Trials established an optimal blend of dilute acids for improved recovery of silver, lead, and zinc as well as rapid (<1 hour) exothermic degradation of pyrite ore to allow liberation of a large portion of the gold.

The laboratory test results of post acid leach amenability of gold to cyanide leaching validates NVRO’s hypothesis that the destruction of the strongly metamorphosed spinel pyritic/arsenopyrite structure is essential to improving gold liberation and, hence, the recovery of gold and silver.

13.10 Metallurgical Test Samples

In addition to the work undertaken by CSA Global (2018 and 2020), HGM provided NVRO with various samples of recovered raw tailings, as well as post HGM mill process samples for metallurgical testing. An initial batch of Hellyer samples was received by NVRO at its Brisbane laboratory in September 2020. The ~19 kg of samples comprised:

- 2 x ~3 kg bags of dried, current plant feed material
- 2 x ~3 kg bags of dried, current zinc scavenger tailings
- 2 x ~3 kg bags of dried pyrite concentrate, previously produced

A second batch of Hellyer samples was received in Brisbane in January 2021. These samples, all in slurry form, comprised:

- 5 x ~18 kg buckets of current mill feed
- 5 x ~18 kg buckets of current zinc scavenger tail
- 2 x ~18 kg buckets of pyrite concentrate

As the samples were received wet, they were believed to be “as sampled” from the Hellyer Processing Plant, as had been requested.

While NVRO’s Chief Technical Officer (CTO) was undertaking a site inspection in January 2021, the Hellyer Site General Manager provided NVRO’s CTO with a further 3-4 kg sample of dried pyrite concentrate.

EnviroGold Global considers that the sampling, chain of custody and delivery process is adequate for the purposes used in the technical report.

13.11 Laboratory Testing & Process Concepts

In December 2020, NVRO engaged Core Metallurgy Pty Ltd (Core) to provide metallurgical support to develop processing solutions for NVRO’s projects, including the Project. Core has undertaken test work related to treatment opportunities for the HGM tailings. The primary objective was to evaluate options for recovering the precious metals (gold and silver) and potential for other value add streams (lead and zinc).

The project was progressed in stages. A summary of the scope and purpose of each of the test work stages are provided below:

- **Stage 1 Test work - Precious Metal Liberation**: The initial scouting work explored blended acid concentrations and residence times on extraction of Pb, Zn, Ag, Au on re-floated tailings material from HGM. The purpose was to determine the extraction kinetics of Pb, Zn, Ag, while leaving the gold in residue for further downstream processing. Approximately 2 kg was provided (labelled as EnviroGold Project Z01 Sample A and B, stream relates to the Zinc Scavenger Tail (ZST) from the current tailing's re-treatment plant at HGM.
- **Stage 2 Test work - Precious Metal Recovery Options**: The second stage of testing was to observe extraction of precious metals in the blended acid leach residues. Process pathways on the residues explored lixiviants such as cyanide, glycine, hypochlorite on Ag and Au recovery. An additional 15 kg of ZST was provided for the evaluations and initial scouting tests were performed looking at options for reducing reagent requirements and to narrow processing flowsheet configurations to progress the development of the project.
- **Stage 3 - Concept Flowsheet Testing**: Based on the results to date, this stage of the project explored conceptual flowsheet options for the ZST material. Conceptual options included hypochlorite leach on the ZST for removing silver up-front prior to blended acid leach and cyanidation, with the other options involving a single- and multi-stage acid digests prior to cyanidation. Further flotation tests were performed targeting the gold and silver in residue following the acid leach to produce a high-grade lead concentrate with precious metal values, rather than requiring cyanide processing.
- **Stage 4 Follow-up - Cyanidation of leach residue from Stage 2 Test Work (above)**: In December 2021, Core undertook additional test work on the residue material from Stage 2 Precious Metal Recovery test work toward investigating the possibility of additional precious metal recovery through longer cyanidation residence time.

A summary from these four stages of work undertaken by Core on samples submitted for testing are reported below.

13.11.1 Stage 1 Test Work - Precious Metal Liberation

Core performed a total of five scouting tests in Stage 1, exploring the impact of varying acid concentrations as well as temperature impacts on the kinetics. The following is a summary of the key results and observations of the scouting tests exploring acid concentrations.

- At low blended acid concentrations, Pb is soluble but does not remain in solution at higher concentrations. At low acid strength under ambient conditions, after 3 hours the lead combines to form insoluble sulfate into the residue.
- Kinetically, the samples plateau quickly and do not appear to require longer than 1-2 hours acid leach at residence time using increased acid strength at the low solids density.
- Higher temperature improves kinetics.
- Minimal movement of silver and gold - the outcomes of Stage 1 were positive with upgraded precious metal content in the post acid leach residue (largely due to mass loss from solubilising of the Fe/As/Zn bearing minerals).

13.11.2 Stage 2 Test Work - Precious Metal Recovery Options

After the results of Stage 1, Core conducted tests at mid-point acid strength to generate sufficient mass to perform precious metals recovery work using cyanide, glycine, and hypochlorite. As the original intent was to destroy the sulfide matrix to access the refractory gold, the mid-point acid strength was selected as a reference point between the earlier acid tests, anticipating the Zn, As, and Fe will solubilise while leaving a Pb, Ag, and Au residue.

The acid leach (LCH-06) was performed batch wise using 1.2 kg in total of the original sample provided (Sample 1 from December 2020). The acid stage at the mid-point strength after 1.5 hours solubilised ~99% of the As, 90% of the Fe, 86% of the Zn, with ~11% of the Ag. Almost all the Pb and Au remained in the residue.

No kinetic samples were collected in this test as the purpose was to provide another reference point on acid strength impact on extraction of Pb/Zn/As/Fe and generate mass for precious metal recovery work. The residue assayed 5.6 g/t Au and 126 g/t Ag, with the upgrade a result of the mass loss from the acid stage (~67%). Sulfur speciation on the LCH-06 residue indicated 17% total sulfur, with approximately 11.6% as sulfide, and 4.6% as elemental sulfur.

The residue from LCH-06 was used to evaluate the following lixiviants for gold and silver recovery:

- Cyanide (LCH-07A, LCH-08, LCH-09)
- Glycine (LCH-07B)
- Hypochlorite mix of 1 g/L NaCl, 1% HCl, and 2% NaOCl (LCH-07C)

Tests were operated at 20% weight-per-weight (w/w) solids for a duration of 2 hours under excess reagent conditions(Table 13-2) with key observations below:

- Of the LCH-07 set of tests performed, cyanide resulted in the highest extraction of gold and silver combined. The hypochlorite leach test had minimal impact on gold extraction, though achieved similar silver extractions to the cyanide. However, the hypochlorite leach also solubilised to a lesser extent the As, Zn, and Cu.
- Two additional tests (LCH-08 and LCH-09) were performed with higher cyanide addition rates to observe whether there may be a passivation effect (from the sulfide/elemental sulfur) inhibiting maximum gold extraction. The excess cyanide leach using lime (LCH-08) and NaOH (LCH-09) showed an increase in gold and silver recovery compared to the baseline cyanide leach (LCH-07A) at the higher cyanide consumption rate. Overall, recoveries from the excess cyanide tests increased recoveries from 43% to ~54% for Au and 66% to 77% for Ag (Table 13-2).

Table 13-2. Summary of Precious Metal Recovery results on LCH-06 Residue

		Extractions, %						Consumption, kg/t			
TestID	Lixiviant	Au	Ag	As	Pb	Zn	Cu	NaCN	Lime	Chlorine	NaOH
LCH07A	Cyanide	43.27	65.5	0	0	0.13	2.81	19	14.8		
LCH07B	Glycine	1.5	0.02	0.05	0	0.01	0.22		50.1		
LCH07C	Hypochlorite Mix (1 g/L NaCl, 1% HCl, 2% NaOCl)	1.19	67.65	23.62	3.03	29.22	12.8			411.4	
LCH08	Cyanide with Lime	54.11	77.13	0	0.05	0.47	5.16	74.8	12.4		
LCH09	Cyanide with NaOH	51.81	76.97	0	0.04	0.45	4.97	73.2			11.2

(Source: Core Resources "CM 1302A-001 DRAFT Memorandum EnviroGold Global Project Z01" Sep 2021)

While the recovery of gold and silver was observed to increase with higher reagent additions, this would incur a large operating cost to achieve the extractions with only 5.6 g/t Au and 126 g/t Ag. Given the sulfide/elemental sulfur content in the LCH-06 residue, Core performed an initial sighter test to float the sulfide/elemental sulfur from the leach residue prior to cyanidation to reduce reagent requirements (if sulfur passivation was the mechanism).

Due to sample availability, the second sample that was received in March 2021 was used to perform further acid digest at low acid strength (LCH-10). Test was run for 1 hour, with a kinetic sample collected at the half hour point to provide better resolution on the Pb behaviour during the acid stage.

The residue generated was then floated (FT1) using pine oil only to target the naturally hydrophobic minerals (primarily elemental sulfur), with the tailings subjected to cyanidation (LCH-11).

The key observations are summarised below:

- Extraction profile for the acid stage indicates almost all the Pb is solubilised prior to 30 minutes at the low acid concentration tested. However, minimal other base metals are leached prior to the inflection point where the acid exothermic reaction occurs (gas liberation observed at the half hour mark). To maintain Pb extraction to leachate will mean the Zn, As is relatively untouched (<30% to 40% solubilised).

- Separation of Pb and Zn from the As and Fe was of interest, thus conceptual flowsheet involving a 2-stage weak followed by aggressive acid digest step was earmarked for evaluations.
- Performing flotation (FT1) on the acid digest residue to remove sulfur also results in significant base metals and precious metals concentrating to the sulfur stream. The float stage on the leach residue recovered 33% of the residue mass with 79% of the combined sulfide/elemental sulfur component.
- Approximately 50% of the Au and 62% of the Ag also were recovered in the flotation concentrate stream, along with approximately 75% of the Fe, Zn, Cu, and As.
- Economic trade-off and further optimisation work would be required to evaluate whether higher reagent consumption to maximise precious metal recovery is justified or separating the sulfur from the acid residue prior to any precious metals' treatment.
- Note the acid digest leach conditions (LCH-10) were at a lower acid concentration and thus less aggressive than previous LCH-06 test. Flotation on a more aggressive leach conditioned residue may not achieve as high deportment of the Au/Ag and Zn/Cu *etc.* to the concentrate and will need to be further tested in flowsheet optimisation stage.
- Kinetic profile of the cyanide leach also indicates 1 hour residence time appeared to leach significant portion of the Au/Ag. This was performed on the float tail which had significant sulfide and elemental sulfur removed. Once the up-front processing steps are defined, future cyanide leach tests will need to include further kinetic profiling as part of optimisation work.

13.11.3 Stage 4 Follow-up work on Cyanidation of leach residue.

The initial cyanide leach test (LCH-18) was conducted as a 2-hour stirred beaker test with background (NaCN) of 1000 mg/L. Gold recovery was approximately 59% and silver recovery was approximately 90%. Un-optimised reagent consumptions were 18.3 kg/t for NaCN and 3.8 kg/t for lime. The residue from this test was subject to gold diagnostic leaching and was further leached as a 24-hour bottle roll test with a background (NaCN) of 500 mg/L.

- Gold recovery was approximately 55% and silver recovery was approximately 32% and un-optimised reagent consumptions were 9.3 kg/t for NaCN and 5.6 kg/t for lime.

Considering the bottle roll test as an extension of the initial stirred beaker test, after 26-hour residence time, the overall gold recovery was indicatively 83.5% and the overall silver recovery was indicatively 94.6%. This demonstrates a significant improvement in gold recovery from that reported in LCH-18. Overall reagent consumptions were indicatively 27.6 kg/t for NaCN and 9.4 kg/t for lime. There was no attempt to optimise either in this round of testing.

13.11.4 Stage 3 Work Concept Flowsheet Testing

From the bench results to date, Core proposed the following conceptual pathways to identify areas for further optimisation:

- **Path 1**: Hypochlorite leach followed by acid leach and cyanidation. The purpose of this option was to evaluate removal of silver up-front, followed by solubilising the Zn, As, and Fe prior to sending the residue to Au and Ag recovery.
- **Path 2:** Single stage acid leach followed by cyanidation. The purpose of this option was to simplify the acid digest step into a single aggressive up-front removal of Zn, Fe, As and then recovery Au and Ag via cyanidation.
- **Path 3 (Updated):** Two stage acid leach followed by cyanidation. The purpose of this option was to explore the potential for a dilute stage 1 acid step to remove Pb, followed by aggressive second stage digest for the Zn, Fe, and As prior to sending the solids to cyanidation for recovery of the Au and Ag.

Separate to the above tests, a small number of flotation tests were performed on an acid digest residue (LCH-19, conducted at 15% acid for 1 hour) to evaluate precious metals recoveries into a flotation concentrate as a means of mitigating requirements for cyanide leaching, which was subsequently undertaken in two stages.

A summary of the test outputs exploring the three pathways are presented below.

13.11.4.1 Path 1:

Chlorine consumption is high ~300 kg/t, with poor selectivity of Ag/Pb over other base metals in the hypochlorite leach stage. The acid digest of the hypochlorite residue results in similar outcome of leaching the remaining As, Cu, Zn and leaving an enriched Pb-Au-Ag product.

Cyanide leaching the acid digest residue yields overall Au and Ag recoveries at 54% and 62%, respectively via this pathway (LCH12 hypochlorite > LCH15 AD > LCH17 cyanide). Given the poor selectivity between Pb/Ag, hypochlorite upfront does not appear beneficial for producing a Pb/Ag rich stream separate to the other base metals.

13.11.4.2 Path 2:

The outcome was much the same as earlier work, with overall recovery achieved via aggressive acid digest followed by cyanide leach at approximately 42% and 88% Au and Ag, respectively (LCH13 AD> LCH16 cyanide).

13.11.4.3 Path 3:

Silver remains in solid form under the dilute acid, with approximately 23% Pb reporting into leach solution (along with Zn, Fe, As, Cu). There was no selectivity benefit compared to the hypochlorite pathway. Importantly the updated (December 2021) cyanide leach post second stage acid gave the highest overall gold recovery of 83.5% compared to the other flowsheets (noting this was on limited number of tests), with excellent silver recovery of 94.6%. Total Cyanide consumption for the combined 26-hour leach (un-optimised) of the initial Path 3 (2 hours) and subsequent updated Path 3 (24 hours) are noted as being high at 27.3 kg/t).

This additional test work indicates an increase in precious metal recovery under Flowsheet Pathway 3. The updated test results of 83.5% Au and 94.6% Ag is most encouraging, albeit with high reagent consumption level. NVRO recognises that these updated recovery rates and reagent consummations are "un-optimised" and it is likely that improved outcomes could be demonstrated through further testing.

A process flow diagram of these various stages of the Updated Path 3 along with applicable results for the competed laboratory tests is shown in Figure 13-2.

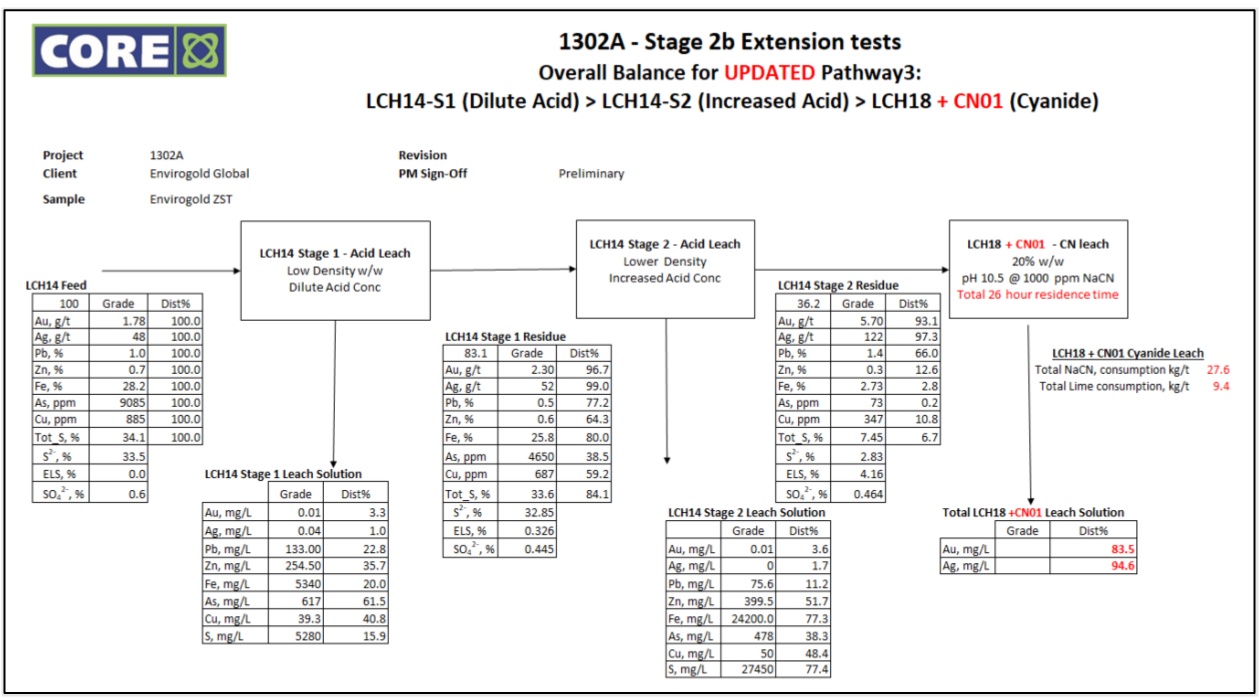

Figure 13-2. Updated Path 3 Testing Process Flow for the Recovery of Metals

(Source: Core Resources "CM 1302A-001 DRAFT Memorandum EnviroGold Global Project Z01" Sep 2021 and "CM 1302B-001 DRAFT Memorandum Update on Cyanidation Test work")

For the flotation tests, the following collectors were assessed along with pine oil as frother:

- FT2 – AERO MX 900 (modified dithiocarbamate)
- FT3 – AEROPHINE 3418A (dithiophosphate)
- FT4 – AERO 407 promoter (mercaptobenzothiozole formulation)
- FT5 – AERO 208 promoter (possibly dithiophosphate)

Flotation of the residue managed to upgrade the Au and Ag content to concentrate, though more than half of contained Au and Ag still reports to flotation tailings from these un-optimised tests.

From the sighter tests, reagent Aerophine 3418A appeared to provide the best uplift in Au/Ag relative to the other collectors tested as depicted in Figure 13-3.

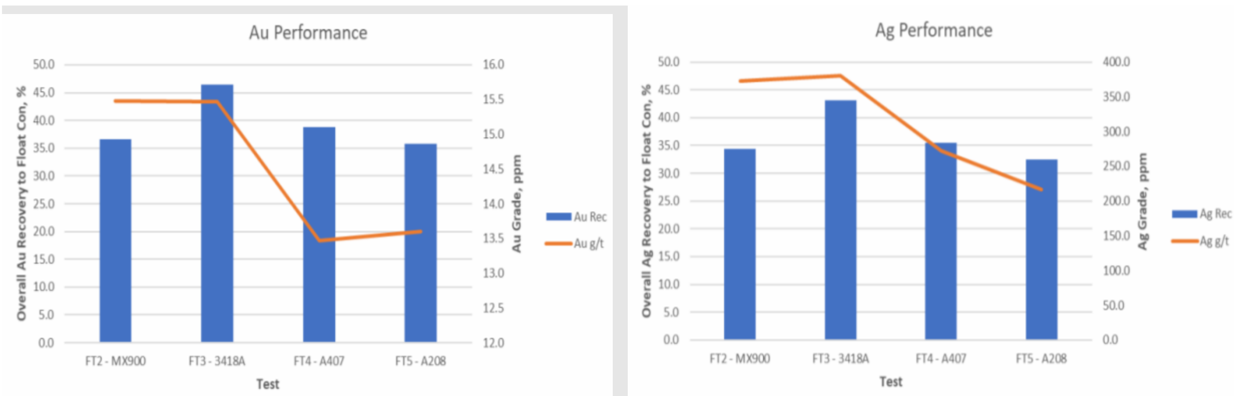

Figure 13-3. Au and Ag Performance on Post AD Flotation Tests

(Source: Core Resources "CM 1302A-001 DRAFT Memorandum EnviroGold Global Project Z01" Sep 2021)

A process flow diagram of these various stages of the Updated Path 3 along with applicable results for the competed laboratory tests is shown in Figure 13-4.

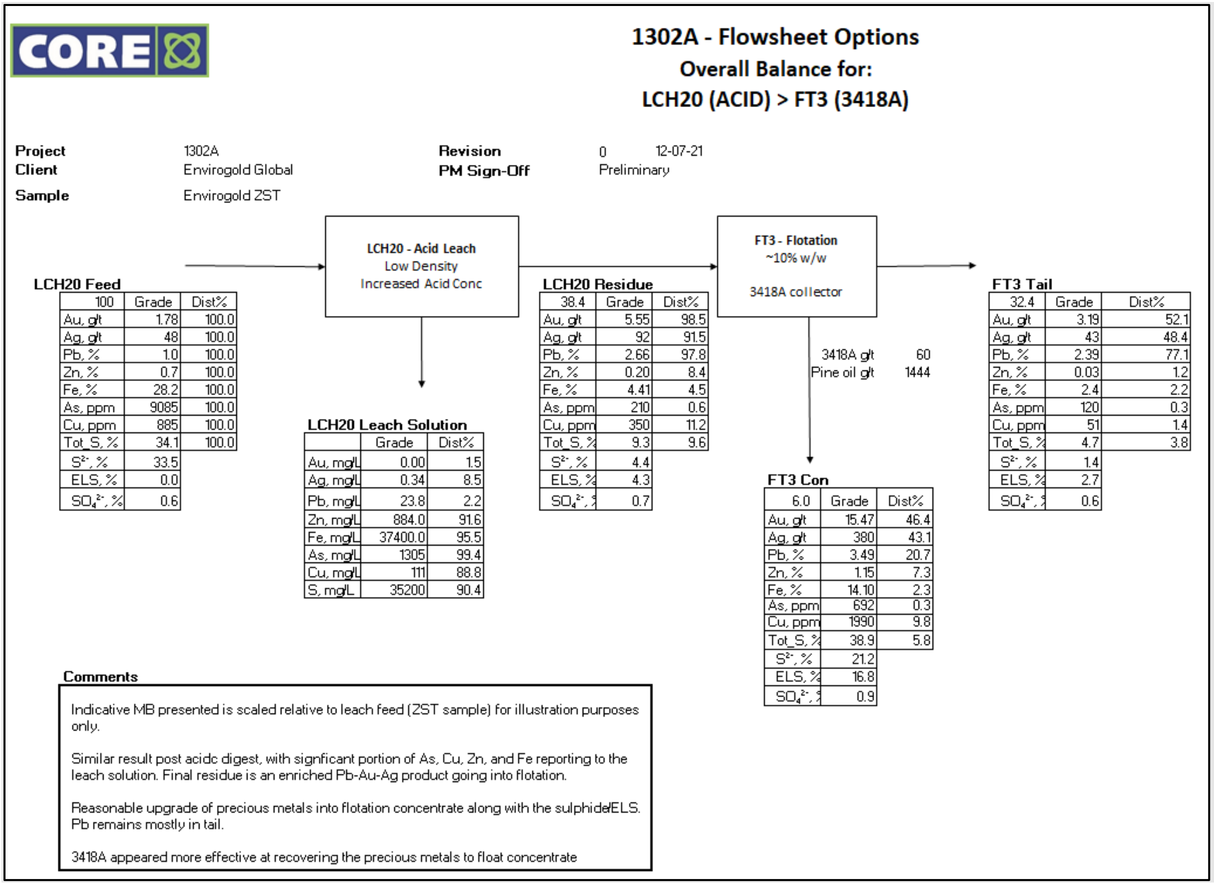

Figure 13-4. Updated Path 3 Testing Process Flow for the Recovery of Metals

(Source: Core Resources "CM 1302A-001 DRAFT Memorandum EnviroGold Global Project Z01" Sep 2021)

13.12 Precious Metal and Base Metal Recoveries

NVRO has undertaken, both at its own laboratory and through the Core Resources laboratory, a series of alternative and combinations of leach tests with a view to optimising the recovery of both precious (gold and silver) and base metals (zinc, lead and copper) as it was discussed in Section 13.11 above.

Based on the results to date, this stage of the project explored conceptual flowsheet options for processing the zinc scavenger tailings (ZST) from the current tailings re-treatment plant at HGM, the conceptual options included hypochlorite leach on the ZST for removing silver up-front prior to blended acid leach and cyanidation, with the other options involving a single- and multi-stage acid digests prior to cyanidation.

During the life of the project is estimate that 513,940 troy ounces of gold, 16,267,572 troy ounces of silver, 105,322 tonne of zinc and 294,902 tonne of copper are estimated to be recovered. The tables below summaries the estimated gold, silver, zinc and copper recoveries per tonne of zinc scavenger tailings processed.

The following Table 13-3, Table 13-4, and Table 13-5 summarise the estimated precious and base metals recoveries during the life of the project.

Table 13-3. Estimated Recoveries to Bullion

	Recovery (%)				
Recovery to Bullion*	Au	Ag	Pb	Zn	Cu
Post Stage 1 and 2 Leach Residue	93.1	97.3	66.0	12.6	10.8
Post Stage 3 Leach Solution	75.0	90.0	0.0	0.0	0.2

	Recovery (%)				
MC / CIP Recovery to Dore	97.0	97.0	0.0	0.0	0.0
Recovery to Dore	72.75	87.30	0.0	0.0	0.0
Recovery to Dore g/t ZST Feed	1.78	56.22	0.0	0.0	0.0
Troy Oz / tonne ZST (@ g/Troy Oz Conversion)	0.06	1.81			

** Recoveries based on Core Resources leach testing*

Table 13-4. Assumed Recoveries to Precipitation

	Recovery (%)				
Base Metal Recovery by Precipitation*	Au	Ag	Pb	Zn	Cu
Post Stage 1 and 2 Leach Solution	0.0	0.0	0.0	87.4	89.2
Sulfidization Recovery to Concentrate	95.0	95.0	95.0	95.0	95.0
Recovery % to Precipitate Concentrate	0.00	0.00	0.00	83.00	84.78
	(g/t)	(g/t)	(%)	(%)	(%)
Recovery to Precipitate Concentrate	0.00	0.00	0.00	1.17	0.11
Recovery /t of ZST Feed	Troy Oz	Troy Oz	(kg)	(kg)	(kg)
Recovery to Precipitate/t ZST	0.000	0.000	0.00	11.70	1.13
Base Metal Precipitate Concentrate			PbS	Zn(OH)2	CuSO4
% of Base Metal (by Mass)			78%	60%	36%
Kg of Base Metal Concentrate/t of ZST Feed			0.00	19.50	3.15
Tonne of Base Metal Concentrate at 500 tph of ZST Feed			0.00	9.75	1.57

** Recoveries based on LCH14 & LCH18_CN - see report "DRAFT CM1302B-001 Filenote - Cyanidation Update". Precipitate Product type for Zn & Cu based on METSIM*

Based on the assumed feed over the project life of 9 years, the following Table 13-5 summarises the estimated metals recoveries.

Table 13-5. Project Metals Recoveries Over the Life of the Project

						Metal Recovery
Process Feed	Life (year)	Au (Troy Oz)	Ag (Troy Oz)	Pb (tonne)	Zn (tonne)	Cu (tonne)
Feed	9.00	513,940	16,267,572	0.00	105,322	10,147

14 Mineral Resource Estimates

Following the site visit in January 2022 by members of the NVRO Team, and to provide some clarity to the various locations referenced in the following sections, the NVRO Team prepared a schematic (Figure 14-1) showing the various ores (by source) processed at Hellyer and the various tailings storage areas where the post HGM processing tailings have been deposited, historically, currently, and in the future (all future tailings after mid-2022 to TSF2).

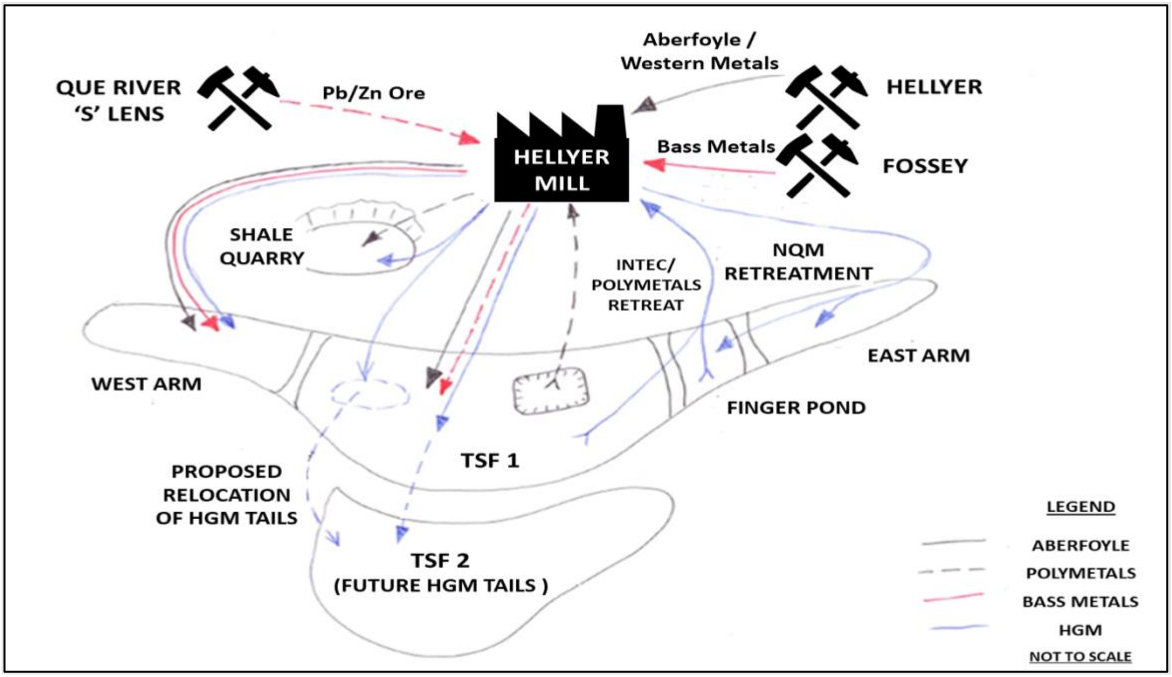

Figure 14-1. Schematic of Historic, Current and Future Hellyer Ore Sources and Tailings Emplacement

(Source: NVRO – colored arrows indicate flows of material per company in the legend)

Disclosure: As defined in Part 7 Use of Foreign Code of the NI 43-101 Standards of Disclosure for Mineral Project, information provided in this section includes reference to mineral resource and mineral reserve categories from Australia as the Hellyer Tailings Project is in Australia. A Joint Ore Reserve Committee (JORC) compliant document is referenced for the original tailings resource at the Hellyer Gold Mine (Hellyer TSF Historical Resource Estimate).

14.1 NVRO Resource Estimation

NVRO recognizes that the historical resources reported by HGM primarily represent the proposed feedstock for HGM's current base metal flotation operation, and the reported quantities in the Historical Resource Estimates (Section 6.2) do not directly represent the quantities of material considered available for processing by NVRO's intended processing methodology. However, the processed equivalent of this material does constitute the feedstock for NVRO's proposed operation and the previous resource estimate (Section 6.2.1) thus remains relevant. NVRO considers the original estimates to be reliable but not directly reflective of the modelled feed grade and tonnage for NVRO's proposed operations.

No prior independent Mineral Resource Estimate in compliance with the JORC Code (2012) of the material available for NVRO's proposed processing facility has previously been reported. However, two programs of work have been undertaken in-house to assess available quantities of potential feedstock for the NVRO process.

The work undertaken to detail the tonnage and grade available to NVRO are outlined in the following sections.

14.1.1 Resource Description

The target feed material for the NVRO Project is tailings from previous and current operations at the Hellyer Gold Mine site. The tailings were inundated with water to prevent oxidation of the sulfide species present in the tailings and are typically stratified, having been deposited from discharge pipes set around the facility – end discharge or spigots. The sedimentary stratification is also reflected in variation in grades of zinc and lead; with grades typically higher in the deeper parts of the tailings and decreasing with shallower depths. The tailings sediments are unconsolidated as most of the tailings are covered in water.

NVRO has completed a comprehensive literature review, laboratory testing, and mineragraphic analysis of samples from Hellyer, and has concluded that gold and silver predominantly occur within the crystalline lattice structure of the pyritic minerals within the Hellyer ore, and hence, the Hellyer tailings.

During the two-stage base metal flotation stages of the current Hellyer tailings reprocessing operations, the pyritic minerals are not being dissociated from the bulk of the Hellyer tailings (*i.e*., not floating with the lead and zinc concentrates) and, hence, pass through the Hellyer plant and are rejected with the rest of the material into the ZST. The ZST are deposited sub-aqueously into approved tailings storage areas to prevent the contained pyrite from oxidizing and reducing the potential to develop acid drainage issues.

The initial stages of the NVRO Project's reprocessing will be targeting the current ZST output as feed stock. Subsequent processing is then scheduled to switch to previously reprocessed tailings such as those quantified in the Intec historical estimate (Section 6.2.2) and those generated since HGM started operations in late 2018.

14.1.2 Reprocessed Tailings Tonnage and Grade Estimate

NVRO was provided with operational and production data by HGM covering the period since HGM started its reprocessing operations in September 2018. NVRO developed a desktop assessment of that data and calculated an estimate of the potential process feedstock that had been reprocessed.

A preliminary materials inventory of the reprocessed tailings quantities produced by the Hellyer treatment plant was completed by Hodkinson (2021a). This represented material processed through the Hellyer plant since HGM commenced operation is late 2018 through to the end of November 2021. Two separate approaches were used to determine the likely grade of the material:

1. A simple summation of reported tailings tonnages (by subtracting the tonnage of all concentrates produced from the reported milled tonnage) and grades derived from daily tailings samples. Weighted average grades were calculated. Missing data was largely substituted by using an average of the three previous days analytical results to give as full a data set as possible. This yielded a quantity and grade of reprocessed tailings as shown in Table 14-1.

Table 14-1. Initial Tailings Tonnage and Grade Estimate (excluding 2018 production)

Tonnage (Mt)	Au (g/t)	Ag (g/t)	Pb (%)	Zn (%)	Cu (%)
2.84	2.30	59.6	1.47	1.02	0.09

2. A confirmatory approach was more complex and involved determining residual tail grades by subtraction of concentrate tonnages and grades from the overall mill feed tonnage and reported grades (Hodkinson, 2021b). This methodology yielded a quantity and grades for the reprocessed tailings as shown in Table 14-2.

Table 14-2. Alternative Tailings Tonnage and Grade Estimate (including 2018 production)

Tonnage (Mt)	Au (g/t)	Ag (g/t)	Pb (%)	Zn (%)	Cu (%)
2.98	2.37	59.1	1.50	1.06	0.08

The tonnage difference is, in large part, due to the non-inclusion of that part of the production data from the last few months of 2018 (totaling ca. 185,000 tonnes of tailings) in for which daily grades were not available and thus could not be incorporated in the initial estimate.

A statistical review of tailings grade estimates based on process plant samples has also been completed for the key economic elements (including As, the principal deleterious element, Fe, and S). The statistical review is a filtered data set in which clearly erroneous data has been removed and evaluated for days for which a full suite of analyses was available. The data set covers 938 sets of tailings analytical data for the period 1/1/2019 through to 30/11/2021 (1,065 days during which period 83 days of nil production were recorded), and thus represents in excess of 95% of the total operational period and is a significant number of representative analyses. Key statistical parameters for the tailings data set are shown in Table 14-3 (not tonnage weighted).

Table 14-3. Basic Statistical Parameters, Hellyer Reprocessed Tailings Samples (n=938)

Parameter	Au g/t	Ag g/t	Pb %	Zn%	Cu %	As %	Fe %	S%
Minimum	0.73	28.0	0.55	0.39	0.03	0.52	18.76	20.20
Maximum	3.80	150.0	3.69	7.22	0.34	1.86	33.10	38.80
Mean	2.29	58.6	1.45	1.04	0.09	1.09	27.76	31.15
Median	2.33	59.0	1.43	0.99	0.08	1.10	27.70	31.20
Mode	2.41	57.0	1.48	1.00	0.10	1.21	27.30	29.90
Std. Dev.	0.27	12.3	0.36	0.59	0.03	0.19	1.78	2.35

The generally tight range reflected by the generally small standard deviation values and displayed by the data set is evident in frequency histograms of the data set. The frequency distribution for Au (Figure 14-2), Ag (Figure 14-3), Pb (Figure 14-4), Zn (Figure 14-5), Cu (Figure 14-6) and As (Figure 14-7) are shown below.

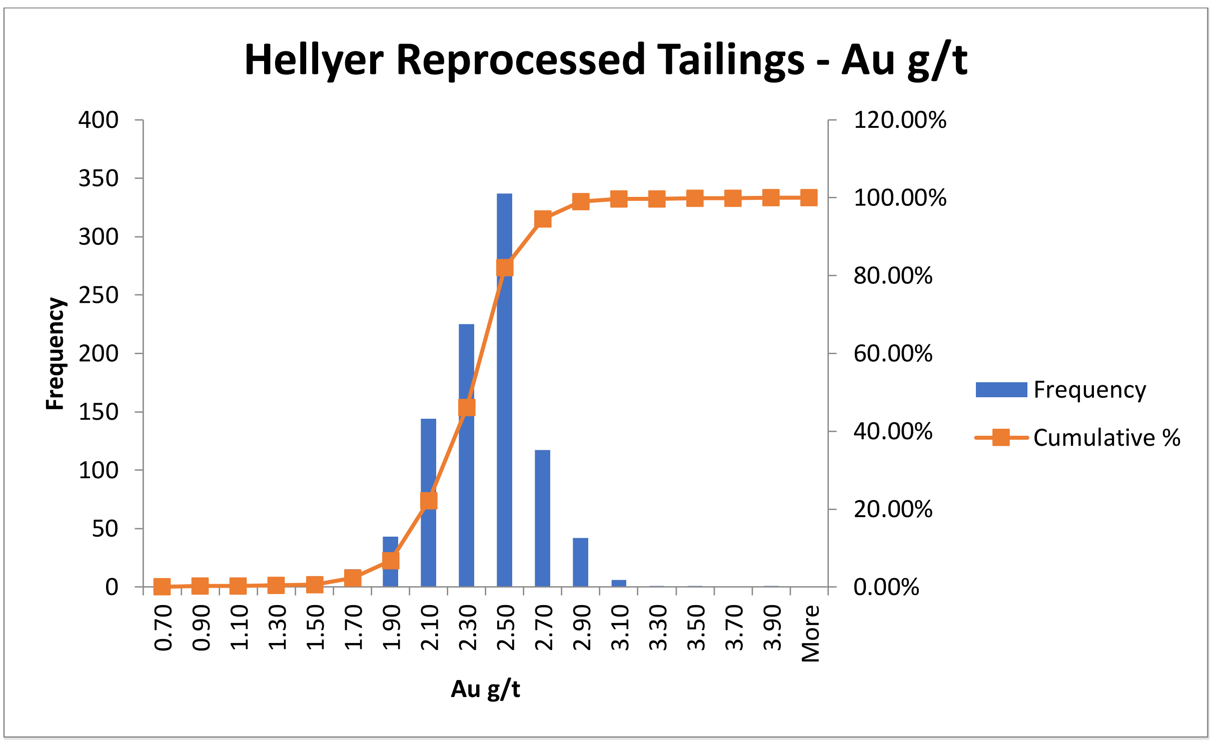

Figure 14-2. Hellyer Reprocessed Tailings, Au g/t Frequency Distribution.

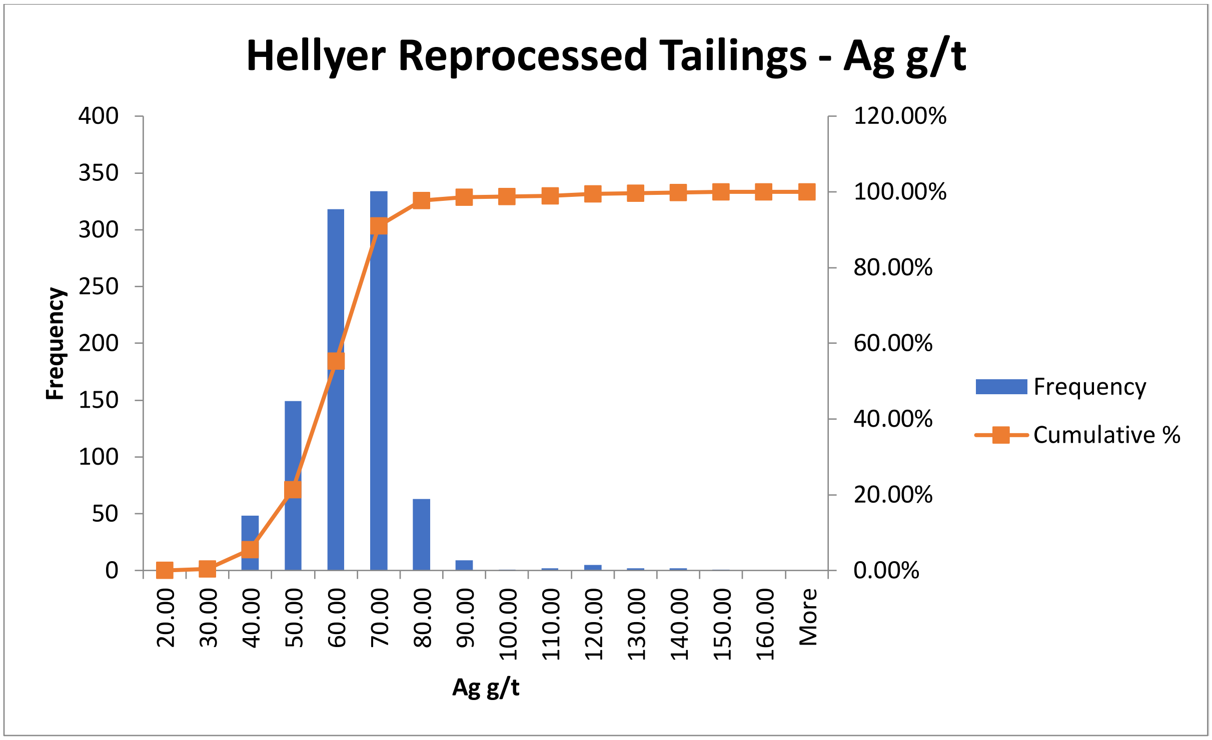

Figure 14-3. Hellyer Reprocessed Tailings, Ag g/t Frequency Distribution

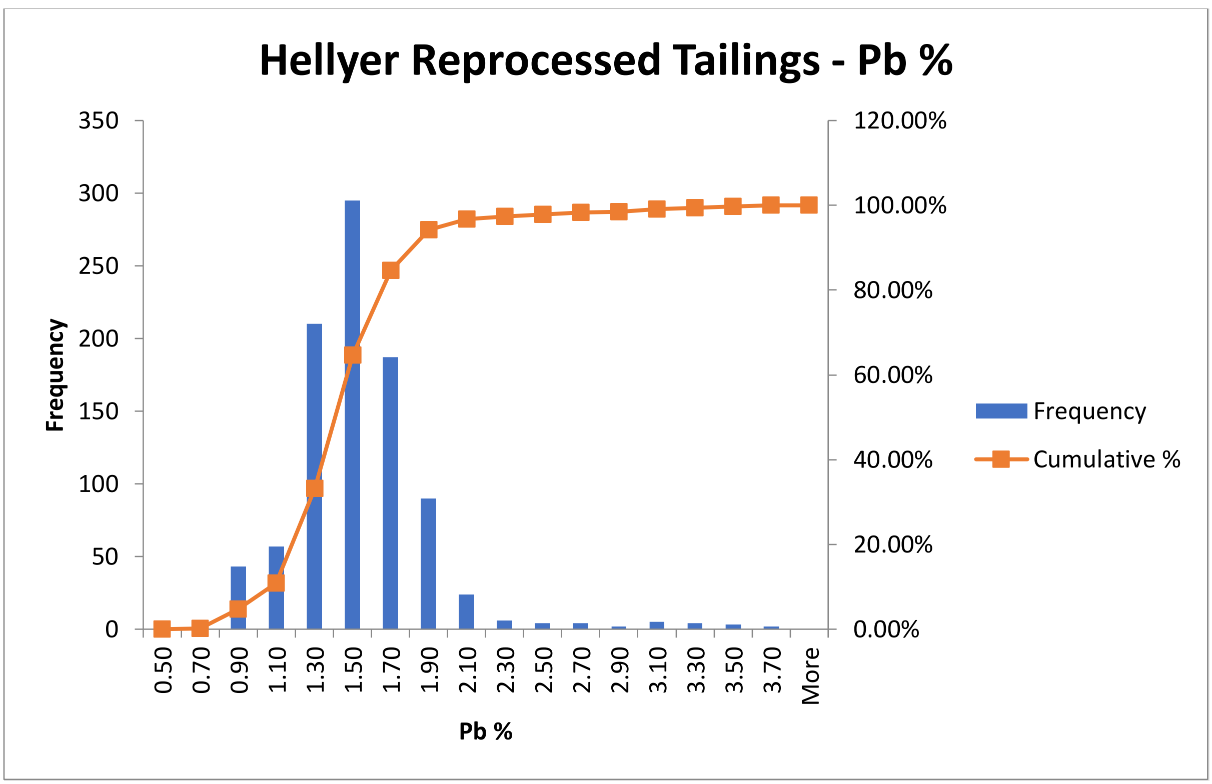

Figure 14-4. Hellyer Reprocessed Tailings, Pb % Frequency Distribution

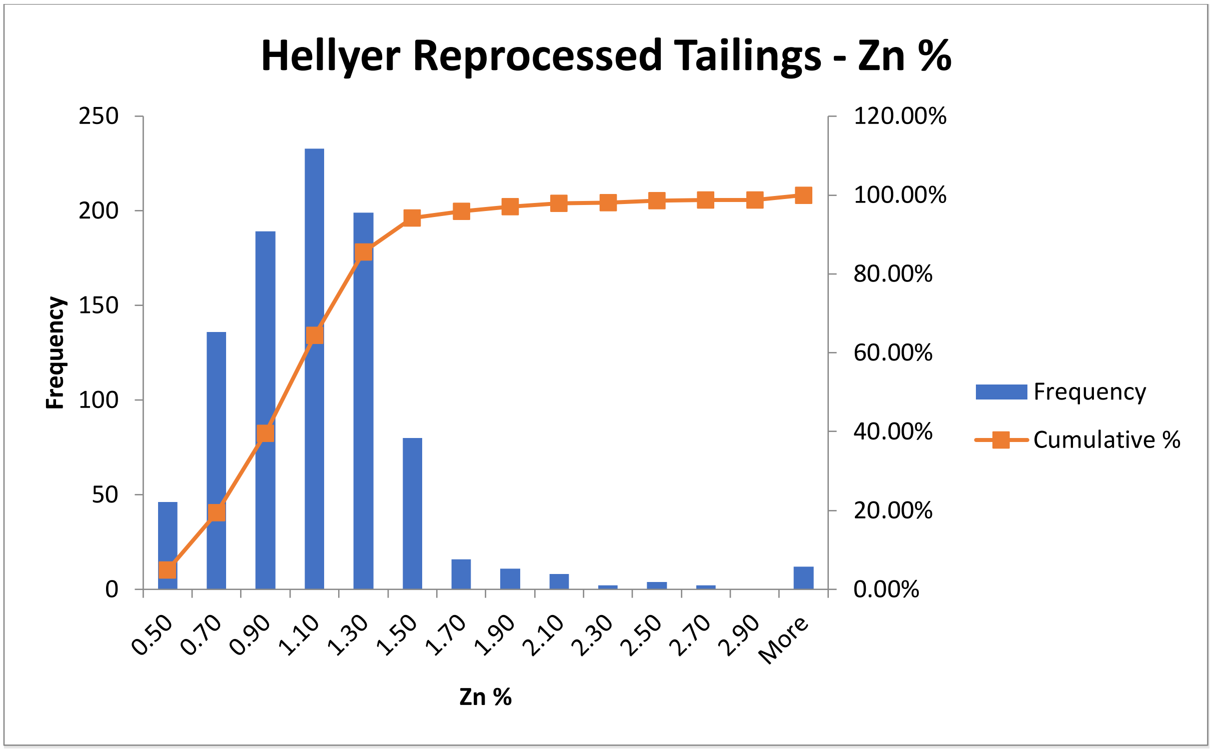

Figure 14-5. Hellyer Reprocessed Tailings, Zn % Frequency Distribution

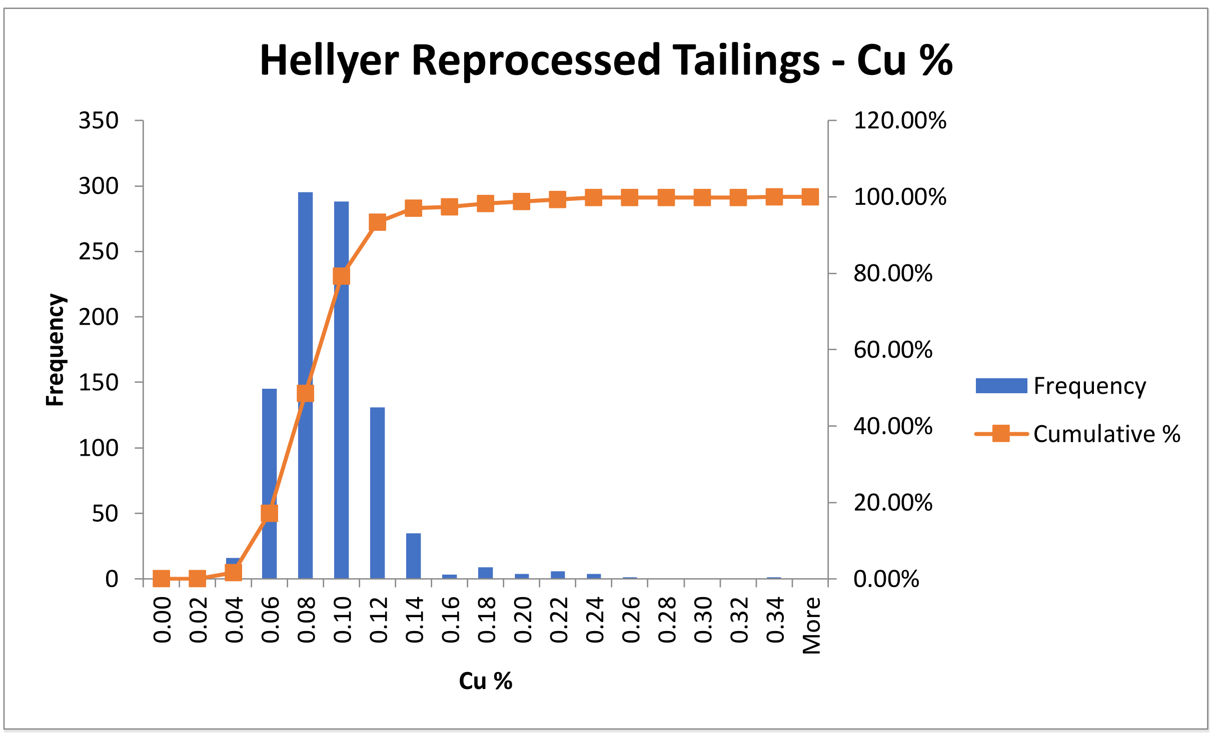

Figure 14-6. Hellyer Reprocessed Tailings, Cu % Frequency Distribution

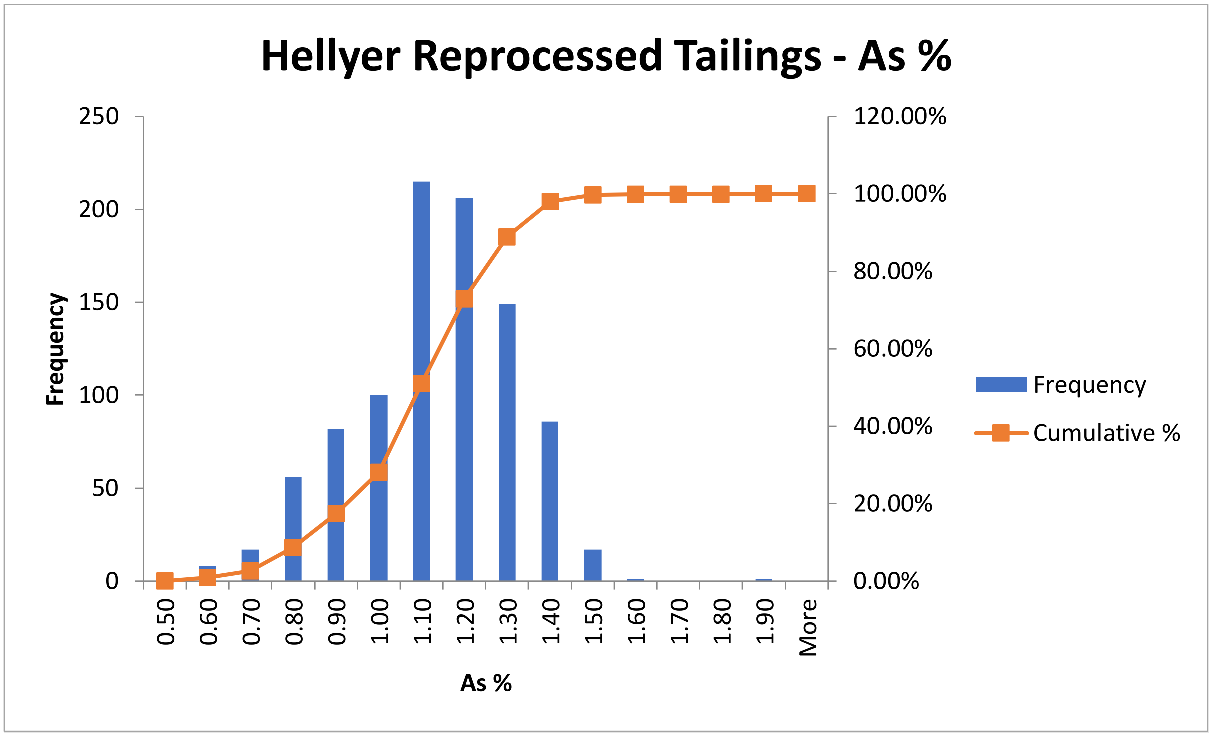

Figure 14-7. Hellyer Reprocessed Tailings, As % Frequency Distribution

14.2 NVRO Mineral Resource Statement

NVRO should be able to access all tailings resources from the past, current, and future HGM tailings retreatment operations within the Hellyer site. This provides a total projection of about 9 Mt of tailings resource for the NVRO operations. This calculation is explained in detail below.

The Mineral Resource statement has been divided into two categories based on the current HGM operations:

- Type 1: tailings already processed by the HGM tailings operation and placed in the current HGM tailings storage facility available for NVRO to recovery at the end of the HGM project life
- Type 2: tailings that are available for processing and can reasonably be expected to be processed by HGM and will be available a during the first 5 years of the Project.

NVRO's proposed operations at Hellyer will be undertaken using tailings material from two distinct operations:

- Zinc scavenger tailings recovered from the TSFs (Type 1 inferred mineral resource) - following the closure of the HGM reprocessing operation, NVRO will likely perform its own tailings recovery work (either directly or through a contract) via its own dredging operation (or other recovery method, such as hydro-mining).
- Zinc scavenger tailings direct feed from HGM's Plant (Type 2 inferred mineral resource) the Project will use a reprocessing plant tailings line to the NVRO Plant fed from the ongoing HGM Mill operations as the source of ZST feed material. This source of tailings will be used until HGM completes its tailings extraction and milling operations (estimated to be in operation for the next four to six years).

14.2.1 Type 1 Tailings

These are tailings that have been processed by HGM and placed in the current TSFs. This is estimated at 3.29 Mt as shown below.

The Mineral Resource estimate is reported in accordance with NI 43-101 Guidelines for current Type 1 tailings and has an effective date of April 30, 2022 (Table 14-4).

Table 14-4. Hellyer Reprocessed Tailings Mineral Resource Estimate as at end April 2022.

Resource Category	Tonnage (Mt)	Au g/t	Ag g/t	Pb %	Zn %	Cu %
Inferred	3.29	2.30	59	1.45	1.04	0.19

Additional inferred mineral resources can reasonably be expected to be in the Type 1 tailings category at the start of Project operations as follows.

To provide an estimate of HGM's processing quantity from the period November 2021 to the anticipated start of NVRO Stage 1 operations in September 2023, NVRO has used high level monthly production numbers for the months after November 2021 (sourced from HGM Monthly Management Reports) and nominal forecast month production figures for the period May 2022 to August 2023. The calculations are shown in Table 14-5.

Table 14-5. Projection Calculations for HGM Tailings Processed to August 2023

Parameter	000' tonnes
Estimate of Total Tailings Treated HGM at end November 2021	2,900
Actuals (from HGM Monthly Management Reports)	
21-Dec	83
22-Jan	97
22-Feb	62
22-Mar	93
22-Apr	59
Tailings treated by HGM to end April 2022	3,294
Forecast for period May 2022 to end August 2023	
Assumed Nominal HGM Forecast Monthly Processing Rate	120
Nominal Forecast Tonnage Processed for 16 months to end August 2023	1,920
Actual + Forecast for 21-month period to end August 2023	2,314
Forecast of Total HGM Tailings Treated by end August 2023	*5,214*

(Source: NVRO by calculation, HGM Monthly Reports)

There is a required correction factor of about -5% to produce the concentrates. Therefore, the actual tailings in Type 1 that can be reasonably expected based on the ongoing operation of the HGM plant is 2.314 Mt minus the concentrates that will be produced (5%) for a total of 2.20 Mt plus the 3.29 Mt identified above for a total of 5.488 Mt.

The total Type 1 (processed tailings) Mineral Resource estimate is reported in accordance with NI 43-101 Guidelines and has an effective date of April 30, 2022.

Table 14-6. Hellyer Reprocessed Tailings Type 1 Inferred Mineral Resource Estimate as at end April 2022.

Resource Category	Tonnage (Mt)	Au g/t	Ag g/t	Pb %	Zn %	Cu %
end November 2021	3.29	2.30	59	1.45	1.04	0.19
End August 2023*	2.20	2.30	59	1.45	1.04	0.19
Total Inferred	5.49	2.30	59	1.45	1.04	0.19

**Expected grades following HGM processing*

Note: Mineral resources that are not mineral reserves do not have demonstrated economic viability. The QP author is not aware of any known legal, political, environmental, or other risks that could materially affect the potential development of the mineral resources.

14.2.1.1 Cut-off Grade

The homogenized nature of the tailings deposit and the likely mining style (dredging or hydro-mining) largely precludes the ability to apply any cut-off which may, in the future, be determined based on project economics.

Accordingly, no cut-off grade is used, and the stated resource essentially represents the complete tailings accumulation at the reported date.

14.2.2 Values of the Type 2 Tailings

Tailings that will remain in Type 2 at the planned start of processing of tailings by the Project (Tailings that are yet to be processed), the volumes of tailings still to be processed (Type 2) by HGM and then by NVRO are provided in Table 14-7 and are reported in accordance with NI 43-101 Guidelines in Table 14-11.

Table 14-7. Projection Calculations for Tailings Remaining for HGM to mill at end August 2023

	000' tonnes
Estimated HGM Tailings remaining to be milled at end November 2021 (from Table 6-3)	6,040
Less Actual + Forecast for 21-month period to end August 2023 (from Table 14-5)	2,314
Projected Tailings Remaining to be milled by HGM at end August 2022	*3,726*

(Source: NVRO, by calculation)

Table 14-8. Hellyer Unprocessed Tailings Type 2 Inferred Mineral Resource Estimate as at end April 2022.

Resource Category	Tonnage (Mt)	Au g/t	Ag g/t	Pb %	Zn %	Cu %
Estimated to end November 2021	6.04	2.30	59	1.45	1.04	0.19
Less Actual + Forecast to End August 2023*	2.31	2.30	59	1.45	1.04	0.19
Total Inferred	3.73	2.30	59	1.45	1.04	0.19

**Expected grades following HGM processing*

NVRO's proposed operations at Hellyer will be undertaken using tailings material from two distinct operations:

- Zinc scavenger tailings direct feed from HGM's Plant
- Zinc scavenger tailings recovered from the TSFs

14.2.2.1 Cut-off Grade

The homogenized nature of the tailings deposit and the likely mining style (dredging or hydro-mining) largely precludes the ability to apply any cut-off which may, in the future, be determined based on project economics. Accordingly, no cut-off grade is used, and the stated resource essentially represents the complete tailings accumulation at the reported date.

14.2.3 Estimated Total Tailings Feed Material

The estimated total available tailings (NI 43-101 inferred resource) feed for the Project is about 5.488 Mt of Type 1 tailings, and 3.726 Mt of Type 2 tailings for a total inferred resource of ~9 Mt.

As indicated in the above sections, NVRO should be able to access all tailings resources from the past, current, and future HGM tailings retreatment operations within the Hellyer site. This provides a total projection of about 9 Mt of tailings resource for the NVRO operations.

14.2.4 Basis for Reasonable Prospects for Economic Extraction

The estimated cost for reclaiming, transporting, and processing the reprocessed HGM tailings stream in the NVRO process plant is estimated in this report to be approximately $80 per tonne (Table). Assuming a gold price of $1,650 /oz and a projected gold recovery of 85%, then the break-even cut-off for the mineralization is estimated at 1.51 g/t Au. The tailings mineralization averages a grade of 2.3 g/t Au and is significantly more than the indicative break-even grade as this calculation does not consider the silver and the base metals.

14.2.5 Factors That May Affect the Mineral Resources

Areas of uncertainty that may materially impact the Mineral Resource estimates include:

- Changes to long-term metal price assumptions
- Changes to the input values for mining, processing, and G&A costs to constrain the estimate
- Changes to physical and metallurgical recovery assumptions
- Changes in assumptions of marketability of the final product(s)
- Variations in geotechnical, hydrogeological and mining assumptions
- Changes to assumptions with an existing agreement or new agreements
- Changes to environmental, permitting, and social license assumptions

14.3 Mineral Resource Statement

The author is not aware of any environmental, legal, title, taxation, socio-economic, marketing, political or other relevant factors that would materially affect the estimation of Mineral Resources that are not discussed in this Report.

The author considers that a Mineral Resource estimate based on production quantities as determined by routine process analyses at the Hellyer treatment plant is equivalent to a stockpile resource estimated by prior production-based analyses and measurements.

The author is of the opinion that the Mineral Resources have been prepared in accordance with CIM Definition Standards for Mineral Resources and Mineral Reserves, adopted by the CIM Council on 10th May, 2014, and the CIM Estimation of Mineral Resources and Mineral Reserves Best Practice Guidelines, adopted by CIM Council on 29th November, 2019.

Technical and economic parameters and assumptions applied to the Mineral Resource estimates are based on a dredging/hydro-mining extraction method and the application of NVRO’s leach processing method.

14.4 Mineral Resource Risks

During estimation of the Mineral Resources, the following risks were identified:

- Inability to recover all the tailings from within the tailings storage facility
- Coordination of the placement of the tailings being processed through the end of the life of the HGM reprocessing operation so that the accessibility / costs of the recovery of the tailings from the tailings storage facilities meets the planned costs
- Changes made by HGM to their concentrator such that there is a decrease in the grades of metals reporting, initially to the tailings storage facility and then to the Project plant.
- The inferred resource is based partially on the production data (quantity and grade) provided by HGM (and published annually). These data may not correctly define the tonnages and grade.

Beyond the risks identified here and those in Section 25.2, no material risks have been identified.

15 Mineral Reserve Estimates

No Mineral Reserve Estimate has been prepared for the Hellyer processed tailings deposit at this stage of the study.

16 Mining Methods

16.1 HGM Operations

CSA Global prepared a review of mine design and production scheduling as part of its earlier reviews and Resource Estimate work (CSA Global, 2020 and 2018).

There is an environmental constraint to maintain a minimum water cover of 1.5m over the surface of the tailings to prevent oxidation. The tailings contain sulfides susceptible to oxidation and the formation of acids if exposed to the atmosphere. This imposes a constraint on the mining method, resulting in the choice of a dredge as the most suitable means of mining.

The HGM mining method employs cutter suction dredges to excavate tailings material and transport it to shore via a floating pipeline. The dredged material is delivered to surge tanks via trommel screens to remove debris in the form of oversize rocks and timber and other vegetable matter. From these surge tanks the material is pumped via 300 mm diameter high-density polyethylene (HDPE) pipelines to the processing plant.

The original “Seabird III” 300kW dredge (Figure 16-1) with Warman10/8 main pump (10 inch / 250mm inlet, 8 inch / 200mm discharge) has nominal operating depth of up to 19 metres, with a nominal operating capacity of 180tph. The Seabird III has operated since October 2018 and is currently feeding 110 tonnes per hour to the processing plant.

Figure 16-1. Seabird III dredge on Hellyer Tailings Dam

(Source: www.miningnews.net)

To maintain a feed rate of 100,000 tpm and more, given the potential of greater throughput in the processing plant following alterations to the flotation circuit, a second dredge has been commissioned in early 2022. This second unit should ensure steady feed rates with less interruptions for maintenance and unforeseen downtime events, the second dredge unit permits blending of feed material to the process plant. The “Seabird III” dredge specification is provided in Table 16-1.

Table 16-1. Specification of the existing SEABIRD III dredge

Dredge	Electric Cutter Suction Dredge
Name	‘SEABIRD III” MINING DREDGE M&H 4046
Manufacturer	CGC Dredging, Western Australia
Hull Length	21 metres in longest configuration
Hull Width	5.0 metres
Hull Construction	Steel construction with sealed compartments, extendable and demountable
Displacement	65 tonnes (10.5 metre cutter ladder option)

Dredge	Electric Cutter Suction Dredge
Digging Depth	Standard up to 10.5 metre digging depth (extendable to 16 metres)
Power	1,000V electric 300 kW @ 1,500 rpm (main engine)
Pump	Warman 10/8 FFGH dredge and gravel pump submerged on ladder
Pipeline	300 mm discharge line
Transmission	Hydrostatic transmission with sealed drive to main ladder pump
Controls	Electric, hydraulic and mechanical
Cutter	Crown head cutter 70 kW. Upgradable to higher power rating
Anchor Booms	Available, but not fitted
Anchor System	5 wire Xmas tree system
Electrical	12V DC, 24V DC, 240V AC and 1,000V AC are available on board. Circuit breakers and earth leakage protection is fitted
Flow/Density	Nuclear density measuring equipment and magnetic flow measurement are fitted. These give mass flow measurement (tonnes per hour) and cumulative tonnes
Container Workshop	A sea container has been converted into an on-site mobile workshop and spare parts storage facility

The dredge is powered by mains electricity and operates on a 1,000 V system. This is supplied by floating cable from a step-up transformer (415 V: 1,000 V) on the shore.

The dredge was designed for a excavation depth of 10.4m with a submerged 10/8 Warman pump fitted on the ladder and the revolving cutter head on the end of the ladder. This dredge is equipped with a removable ladder extension piece, allowing a maximum digging depth of 16m below water, though it is reported that the maximum practical working depth is 15.4 m. The main electric motor drives a hydraulic pump. The cutter head, main pump, and winches are hydraulically driven.

The second dredge is a diesel powered IHC Beaver 40’ dredge (Figure 16-3) with 483 kW installed power and pump suction and discharge diameters both being 390mm, to provide additional tailing recovery capacity at Hellyer with a nominal operating depth of up to 10 metres and capacity of 180 tph. The Beaver dredge was constructed on site in early 2022 (Figure 16-2), commissioned during March and was available for production in May 2022.

Figure 16-2. Beaver 40’ dredge, being constructed at Hellyer TSF1

(Source: EnviroGold Global site visit)

Figure 16-3. IHC Beaver 40 dredge

(Source: Royal IHC – royalihc.com)

The use of this second dredging unit enhances the project in two ways: it will cover any extended production losses from any major dredge downtime and it provides the ability to blend grades from different mining blocks to smooth out the grade of material delivered to the process plant. Feed of consistent grade material, without peaks and troughs, allows finer tuning of the process plant and improved metal recovery.

There is an environmental constraint to maintain a minimum water cover of 1.5 m over the surface of the tailings to prevent oxidation of the contained sulfides. This imposes a constraint on the mining method, resulting in the choice of a dredge as the most suitable means of mining.

CSA Global prepared a review of mine design and production scheduling as part of its earlier reviews and Resource Estimate work (CSA Global, 2020 and 2018). The observations and comments contained within those reports remain relevant to current production methods and the overall scheme of mining.

HGM has commissioned consulting engineers Pitt and Sherry to prepare updated dredging and tailings recovery plans, sequencing and schedules, including an assessment of resource losses and dilution, as well as potential sterilisation due to safety barriers etc.

To date, HGM has provided a copy of a dredging work plan schedule for the period March 2022 to July 2022 (in spreadsheet format) prepared by Pitt and Sherry showing block model outputs of tailings tonnes and grade along with planned location and depth for each of the two dredges and daily production tonnages and block model mineral grades (Pb, Zn, Au, and Ag).

NVRO will complete an operations risk assessment during the project development study process that will consider the potential for production feed stoppage or limitation risks from the HGM dredging and processing operations and identify appropriate mitigations against potential production stoppages.

HGM is currently in the process of establishing a new tailings storage facility (TSF2) which is designed to take the HGM tailings for the balance of the HGM projected operations.

16.1.1 Mineral Resource considered in Mine Plan

The Mineral Resource considered in the Mine plan is the one reported by CSA Global (2020). The estimate is provided in Section 14.3.

Tailings material defined as Type 2 in Section 14.2 is planned to be recovered by HGM in accordance with HGM's own mine plan and schedule which were reviewed by CSA Global as part of its earlier reviews and Resource Estimate work (CSA Global, 2020 and 2018) and detailed in the section below.

16.1.2 Mining locations

Dredging in the Main Tailings Storage Facility will be conducted initially to a depth of 15.4 m (Bench B1 followed by Bench B2) as described in the next Section 16.1.3. The dredging schedule design parameters are provided in Table 16-2.

Table 16-2. Parameters of mine design and bench quantities of mining area

Mining area	Bench	from RL, m	to RL, m	Depth, m
Main Tailings Storage Facility	B1	649.4*	639.0	10.4
	B2	639.0	634.0	5.0
	B3	634.0	629.0	5.0
	B4	629.0	627.5	1.5
Western Arm Dam	B1	653.0*	639.0	14.0
Finger Pond Dam	B1	650.0*	639.0	11.0
	B2	639.0	635.0	4.0
Shale Pit	B1	681.0*	665.0	16.0
	B2	665.0	650.0	15.0
	B3	650.0	645.0	5.0

(*) water level

The width of each dredge path is 30 m, which was used in the previous dredging operations (CSA Global, 2010). The blocks are designed with a length of 50 m each. A graphical illustration of the mine design of Main Tailings Storage Facility for Bench B1 and Bench B2 is shown in Figure 16-4 and Figure 16-5. The figure shows the boundaries of the working area, which was defined by two constraints: a safety buffer zone from the dam walls and a minimum dredging depth of 1.0 m. Two areas have been used to define the buffer zone in the Main Tailings Storage Facility:

- 300 m zone (red) from the Main Tailings Storage Facility wall and 50 m from the walls of Finger Pond Dam and Western Arm Dam plus 1.5 m minimum dredging depth, and
- 50 m zone (cyan) from the Main Tailings Storage Facility wall and 50 m from the walls of Finger Pond Dam and Western Arm Dam plus 1.5 m minimum dredging depth.

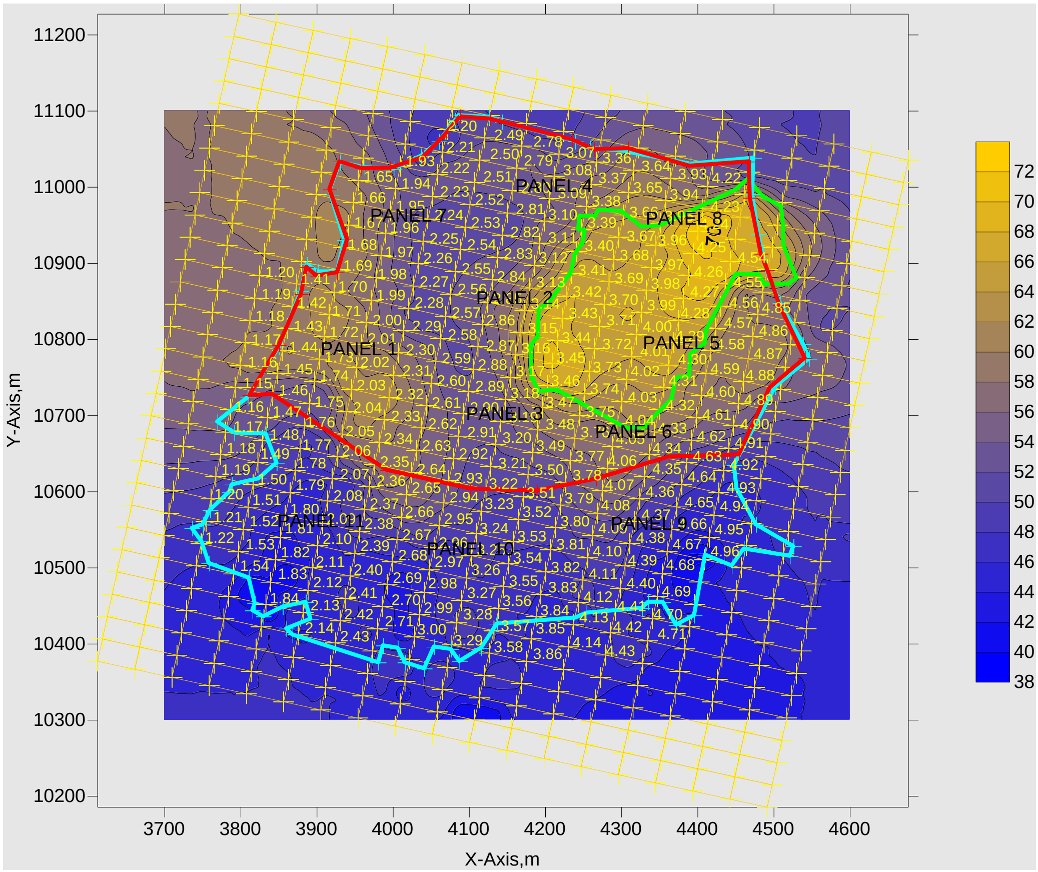

Figure 16-4. Grid of Main Tailings Storage Facility design for benches B1 & B2 of Main Tailings Storage Facility at the Hellyer Gold Mine

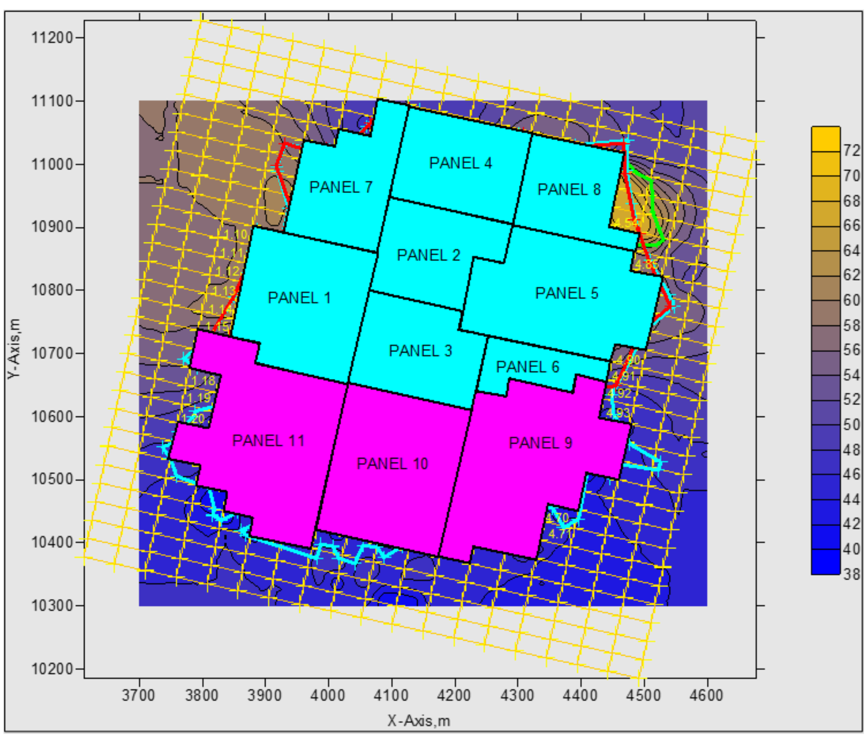

Figure 16-5. Mine sequence of Main Tailings Storage Facility for benches B1 & B2 at the Hellyer Gold Mine

The buffer zone of 300 m from the Main Tailings Storage Facility wall is a current constraint while the buffer zone of 50 m of the same dam reflects the expected area of dredging. The analysis of Figure 16-4 indicates the existence of a void due to old dredging operations (2006-2008). Figure 16-5 shows the design of the location of the mining panels.

The design of the working area for dredging of Bench B3 includes a buffer zone from the Main Tailings Storage Facility wall of 50 m. It was planned to remove the constraint of 300 m in conjunction with the Tasmanian Environmental Protection Agency.

Bench B3 is planned to store the tailings left after the release of the water off Bench B1 and Bench B2 and after hydraulic mining. This will include the un-dredged tailings left at the bottom of the area of Bench B1 and Bench B2, tailings from the buffer zone by the Main Tailings Storage Facility wall and tailings from the buffer zones in Finger Pond Dam and Western Arm Dam.

Bench B4 represents the lowest tailings layer of the TSF. The bench top has RL629 m while the bench bottom has RL627.5 m. This bench was selected because the shape and size of the working area is kept the same in depth until the bottom of the facility. The minimum distance in the narrowest part of the area is 80 m while the maximum distance is 195 m. This area is still suitable for dredging.

Bench B4 is planned to store the tailings left after the release of the water off Bench B3 and after using hydraulic mining.

The design of the working area of Western Arm Dam accounts for a 50m buffer zone from the wall and 1.5 m minimum dredging depth. The design of the working area of Finger Pond Dam comprises two 50 m buffer zones from the walls of the Main Tailings Storage Facility and Eastern Arm Dam, and 1.5 m minimum dredging depth.

16.1.3 Mine Sequence

Mine sequencing is organized following economic and technological requirements. There is a pre-dredging period for removing the tailings of the Finger Pond Facility into the old dredging area of the Main Tailings Storage Facility.

Production commences with dredging operations in the Main Tailings Storage Facility. Initially the dredge will take the top bench B1 to depth of 10.4 m across the entire working area of the dam outside the buffer zones of the existing walls. After that the dredge will take the next bench B2 reaching the depth of 15.4 m from the water level.

After completion of dredging of B1 and B2 of the Main Tailings Storage Facility, the mining operations will move to the Western Arm TSF, which is designed with a single bench. Upon completion of the Western Arm TSF, dredging will continue in the Main Tailings Storage Facility, taking the last two benches B3 and B4. The last dredging area is the Shale Pit.

Before the start of mining operations in bench B3, water has to be released with a simultaneous washing down the tailings left in the buffer zones and zones of 1.5 m dredging limit. These tailings will be accommodated in the working zone of bench B3.

The order of dredging is as follows:

- Finger Pond Dam – pre-production
- Main Tailings Storage Facility (B1 and B2) – production
- Western Arm Dam – production
- Main Tailings Storage Facility (B3 and B4) – production
- Shale Pit – production

At present, the permit for tailings extraction and re-processing at Hellyer prohibits dredging within 300 m from the Main Tailings Storage Facility wall. However, HGM has been advised that this limit could be reduced to 50 m following a suitably supported application to the EPA (Tasmania). This 300 m buffer zone was originally agreed by PolyMetals as a part of their application for a permit to reprocess Hellyer tailings. There are reports from external consultants proposing to reduce the 300m buffer zone to 50 m zone, (GHD, 2011; Ivy Resources, 2013).

The mine sequence includes the design of panels presented by several blocks The sequence arrangement is based on the results obtained for the Block Unit Profit of Main Tailings Storage Facility and benches B1 and B2.

The panels from 1 to 8 define the mine sequence of Phase 1 of Main Tailings Storage Facility exploitation while the rest panels define the mine sequence of the Phase 2 (Figure 16-5).

16.2 Proposed NVRO Operations

The initial stages of NVRO's Operations at Hellyer will use a reprocessing plant tailings line from the ongoing HGM recovery and milling of the Type 2 tailings (Defined in Section 14.2) as the source of ZST feed material. This will continue for the period until HGM completes its recovery and milling operations (estimated to be in operation for the next four to six years). Hence, during this period, NVRO operations will not be undertaking any tailings material recovery operations of its own.

During the Project's second operational Phase, NVRO will perform its own, or sub-contract, tailings recovery work via a dredging operation. The operations are likely to be aligned with current HGM operational methods (or other recovery method, such as hydro-mining). NVRO will look to acquire (either directly or via a lease) the current HGM dredging, materials handling, and processing plant equipment. For these operations, the existing costs for the HGM operation will be incorporated into the overall costs of the Project.

No tailings materials recovery operations planning or scheduling has been undertaken by NVRO for the second operational Phase. Additional drilling and testing of the Type 1 Tailings material will be undertaken as required to allow timely preparation of operations planning and scheduling.

17 Recovery Methods

17.1 Introduction

EnviroGold Global has carried out numerous leach tests in its own laboratory and over 20 acid pre-leach tests at Core Metallurgy Pty Ltd. in Brisbane, Australia.

From this work, two preferred "Pathways" to precious metal extraction were identified as a Base Case and Secondary Case to advance the project. These cases are summarised below:

- Base Case – Acid pre-leach and metal recovery on "whole" slurry feed.
- Secondary Case – Flotation pre-concentration of feed followed by acid pre-leach and metal recovery on the flotation concentrate.

EnviroGold Global has selected the Base Case for progressing to pilot plant testing prior to commercial development due to the higher extraction of the gold and the silver.

The initial two acid leach stages of the process "break" the pyritic minerals while dissolving large proportions of the lead, zinc, and copper.

The solid residue from the second acid stages, which contains the bulk of the precious metals, is then sent to a conventional cyanidation circuit and metal recovery stages. The recoverably base metals in solution (copper and zinc) following the acid pre-leach are recovered via conventional solvent extraction and precipitation processes.

17.1.1 Current HGM Operations

Hellyer Gold Mines started retreatment of tailings from the historic main tailings storage facility (TSF1) in October 2018 and are currently running the Hellyer treatment plant on a dredged supply of tailings from the TSF.

The HGM plant is currently using a two-stage sequential flotation process on the recovered tailings from the TSF:

- First stage produces a lead flotation concentrate product
- All tailings streams from the lead flotation circuit reporting to the zinc flotation circuit to produce a zinc flotation concentrate.

Final tailings from the zinc flotation are then pumped for final storage in the HGM TSF.

17.2 Plant Description

EnviroGold Global will operate a hydrometallurgical process at Hellyer to re-process tailings from former and current Pb/Zn flotation operations. The initial stages of reprocessing will be targeting the current HGM operations zinc flotation tailings, commonly referred to as ZST (Zinc Scavenger Tailings), as feed to the NVRO hydrometallurgical processing plant.

EnviroGold Global's operations at Hellyer are planned to be undertaken in two stages:

- Phase 1: 500 tonnes per day (tpd)
- Phase 2: Expansion designed to treat 3,500 tpd

The processing plant will operate 24 hours per day, 365 days per year at a nominal throughput rate of 156 tph (dry) and 93.5% availability for the full operation (Phase 2). The same flowsheet has been used for stage 1 and the stage 2 expansion.

Results from the metallurgical test program on Hellyer tailings, together with the METSIM model as summarized in Section 13, both completed at Core were used to develop the corresponding process design criteria, and conceptual flowsheet.

The processing facility will consist of the following main sections:

- Feed dewatering/ thickening

- Nitric acid regeneration and Gypsum precipitation
- Acid pre- leach
- Acid pre-leach solid-liquid separation
- Acid pre-leach solid residue cyanidation for gold and silver recovery
- Goethite and Scorodite precipitation from acid pre-leach filtrate
- Copper recovery from acid pre-leach filtrate by Solvent Extraction
- Zinc recovery from acid pre-leach filtrate by precipitation
- Tailings dewatering and filtration for deposition in the tailing's facility

The process flowsheet is summarized in Figure 17-1.

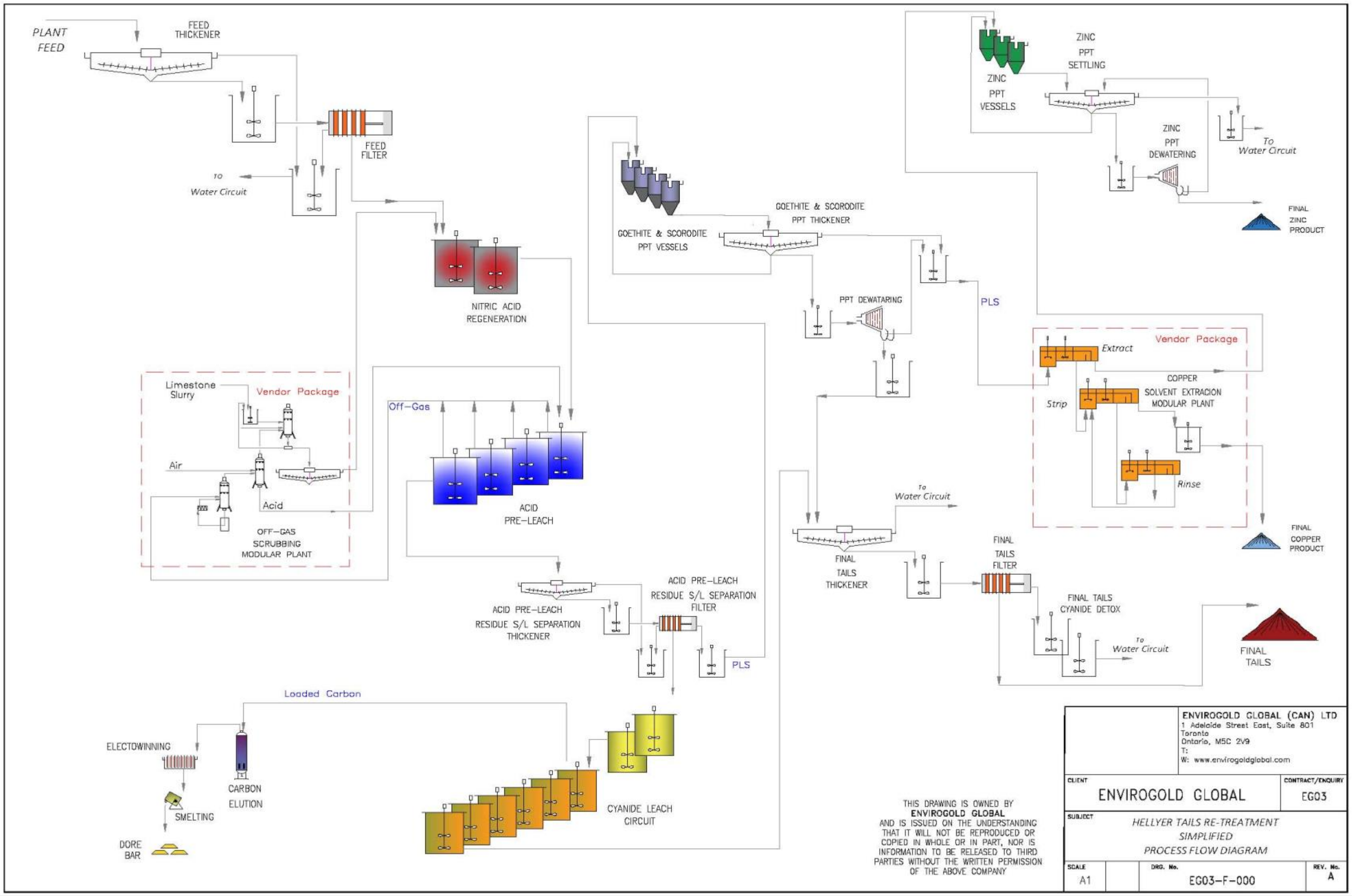

Figure 17-1. Overall Process Flow Sheet for the EnviroGold Global Metallurgical Plant

17.2.1 Feed Dewatering

The processing plant primary feed enters the pre-leach thickener as a slurry at 40% w/w solids and is then thickened using a flocculant to an underflow density of 60% w/w solids. The thickener underflow is pumped to an agitated holding tank and from there to a filter press. Filtrate from the filter and thickener overflow are pumped into a holding tank and reclaimed as process make-up water for the plant. Filter cake feeds into the Acid Regeneration and Gypsum precipitation circuit.

17.2.2 Nitric Acid Regeneration and Gypsum Precipitation

The filter cake from the feed dewatering circuit filter press is then repulped in an agitated tank using recycled wash water containing calcium nitrate to achieve a 40% w/w slurry.

Nitric acid is regenerated by adding calcium nitrate, sulfuric acid, and water to produce gypsum and nitric acid according to the following reaction:

$$Ca(NO_3)_2(aq) + H_2SO_4(aq) + 2H_2O(l) = CaSO_4.2\mathrm{H_2O}(l) + 2\mathrm{HNO_3(aq/g)}$$

This reaction occurs in a reaction tank where slurry from the repulped tank is transferred, together with water sourced from the scrubbing of nitrogen oxides from the gas. The sulfuric acid sources are from the nitric acid leach and a fresh stream of concentrated sulfuric acid make-up.

17.2.3 Nitric Acid Pre-Leach

Slurry from the nitric acid regeneration and gypsum precipitation area mainly containing gypsum and pyrite is fed to a series of agitated tanks at 21% w/w solids. The nitric acid reacts with pyrite and forms aqueous ferric sulfate, ferric nitrate, and sulfuric acid. Nitric oxide in both gaseous and aqueous forms is also produced.

Arsenopyrite, chalcopyrite, and sphalerite also react with nitric acid to generate their respective nitrates, arsenic acid, sulfuric acid, nitric oxide gas, and aqueous water.

Each agitated tank in the acid leach circuit produces nitric oxides, which are combined and then transported to the gas scrubbing area.

The reactions are highly exothermic, and most of the nitric oxides in the process are produced by these reactions.

17.2.4 Leach Solid-Liquid Separation

Slurry discharged from the nitric acid pre-leach area enters the acid pre-leach residue thickener at 8% w/w solids (and with discharge temperature from the acid pre-leach below 90°C). The thickener underflow at 45% w/w solids is pumped to an agitated holding tank prior to filtration. The slurry is then pumped to a filter press and washed to remove excess nitric acid remaining on the leach residue. After filtration, the filtrate is stored in a holding tank along with the thickener overflow, before it is distributed to the nitric acid regeneration circuit, and the goethite and scorodite precipitation circuit.

17.2.5 Gas Scrubbing

The gaseous streams from the nitric acid leach area contain a gaseous mixture of NO and water. The gaseous NO is removed from the stream through multi-phase scrubbing. This process regenerates HNO_3 from the NO gas.

The gaseous mixture from the nitric acid leach area enters the heat exchanger at approx. 90°C and is cooled to 45°C using water. Water from the gaseous stream is condensed, reducing the water fraction.

The cooled NO gas enters a water scrubbing unit, where the majority of NO_2 in the gaseous stream reacts with water to produce nitric acid and NO. The water scrubbing unit regenerates mostly nitric acid, which is recycled to the nitric acid leach process.

The off gas from the water scrubbing mainly consists of NO and oxygen. This stream enters the gas scrubbing unit where the remaining NO is oxidised to NO_2 using limestone, which enters the scrubber as a 20% w/w slurry to produce calcium nitrate and carbon dioxide.

The calcium nitrate solution produced is subsequently used in the nitric acid regeneration and gypsum precipitation area (see Section 17.2.2).

17.2.6 Goethite and Scorodite Precipitation

Filtrate or pregnant leach solution (PLS) from the nitric acid leach enters a series of tanks where a series of reactions occur to produce a goethite and scorodite precipitate together with sulfuric and nitric acid. Limestone slurry at 40% w/w solids enter the precipitation tanks, reacting with the nitric acid and sulfuric acid to produce calcium nitrate and calcium sulfate. Water and carbon dioxide are allowed to escape through the vent on the tank.

The precipitation product enters the thickener at 31% w/w solids and the underflow exits at 50% w/w solids. Ventilation is fitted to allow for the evaporation of the excess water. The underflow from the thickener is pumped into an agitated holding tank prior to filtration. The slurry then enters a filter press and is washed with fresh wash water to remove acid from the cake.

The filtrate is stored in a holding tank and distributed for use in nitric acid regeneration area and copper removal area through ion exchange.

17.2.7 Copper Removal and Recovery by Solvent Extraction

Copper is removed from the filtrate (PLS) produced from the nitric acid leach post goethite and scorodite precipitation through ion exchange. The PLS containing copper nitrate enters the extraction stage where the copper attaches itself to an organic compound in solution.

The PLS is first clarified before being sent to a solvent extraction for the recovery of copper. The PLS is contacted with an organic compound (ketoxime-based or aldoxime solvent extraction reagent such as LIX 984N and Acorga M5910 or similar) onto which copper will preferentially exchange. The loaded organic is scrubbed with dilute sulfuric acid to remove impurities. The copper is then stripped from the loaded organic compound with concentrated sulfuric acid.

17.2.8 Zinc Precipitation

The PLS solution stripped of copper then enters a series of agitated tanks where pH is elevated to promote precipitation of aqueous zinc sulfate and zinc nitrate as basic zinc sulfate and zinc hydroxide solids, according to the following main reactions.

$$4ZnSO_4(aq) + 9H_2O(aq) = BZS(s) + 3H_2SO_4(aq)$$

$$Zn(NO_3)_2 + 2H_2O(aq) = 2HNO_3(aq) + Zn(OH)_2(aq)$$

Residual copper sulfate from the ion exchange process hydrolyses to produce copper hydroxide solids and sulfuric acid. Nitric and sulfuric acids produced by the zinc precipitation reactions are neutralised with lime dosed at 30% w/w solids to produce calcium nitrate and calcium sulfate, respectively. The precipitate formed will mainly be composed of zinc hydroxide (72.6 %w/w) and gypsum (27.4%w/w) with an expected zinc grade of 47.5% based on the METSIM model.

17.2.9 Cyanidation Leach – CIP and Elution

Gold and silver recovery occurs in a conventional CIP plant. Cyanide leaching and CIP occur in two separate stages consisting of a series of agitated tanks. In the first stage, leaching of gold and silver using cyanide occurs. Residue slurry from the acid pre-leach, which has been rinsed of residual acid in the Solid-Liquid Separation area, is fed into the first tank of two cyanide leach tanks where cyanide solution is added together with lime, for pH control, and water to maintain a feed density of 43% w/w solids.

Air is introduced to both tanks to maintain dissolved oxygen levels above 6 ppm. Leached slurry then flows to a series of six agitated CIP tanks with a total retention time of 15 hours, for a combined total residence time of 24 hrs between the CIL and CIP circuit to ensure complete dissolution of gold and silver, and their subsequent adsorption onto activated carbon.

Stripped carbon from the carbon elution circuit is added to the last of the CIP tanks and is moved counter-current to the slurry flow using air lifts. Each CIP tank incorporates an interstage wedge wire cylindrical screens for retention of the activated carbon within the tank. Slurry from the final CIP tank flows to a vibrating carbon safety screen. Safety screen oversize is collected in an adjacent drum and the underflow flows to the cyanide tailings circuit.

Gold (and silver)-loaded carbon from the first CIL tank will be pumped by the interstage carbon transfer pump in CIP tank 1 onto the loaded carbon screen. The slurry will return to either CIP tank 1 or CIL tank 2, clean carbon is discharged as screen oversize product into the acid wash/elution column.

The gold and silver will be recovered from the carbon in a standard process consisting of carbon acid wash, pressure stripping, electrowinning, and smelting. The final product will be a gold doré bar suitable for final processing to 99.9% purity in an offsite refinery.

The loaded carbon batch will be back-washed with raw water to remove any light trash such as slimes, once back-washed, it will be acid washed with dilute hydrochloric acid. The duration of the acid wash operation and acid strength will depend on the severity of the scaling taking place and will be determined by optimisation test work.

Metals are desorbed from the carbon using the Anglo-American Research Laboratories (AARL) method with a strip solution, containing 3% NaCN and 2% NaOH, at 115 °C. A cool rinse is then pumped through the carbon before the carbon is transferred to the next stage in the process which can be either carbon regeneration at the regeneration kiln, or returned directly to the last CIP tank for adsorption.

Gold and silver are recovered from the pregnant solution by electrowinning and smelted to produce doré bars. The pregnant solution is pumped through two electrowinning cell with stainless steel mesh cathodes.

The gold-rich sludge is washed off the steel cathodes in the electrowinning cell using high-pressure spray water and gravitates to the sludge hopper. The sludge is filtered, dried, mixed with fluxes, and smelted in an electrical induction furnace to produce gold doré. The electrowinning and smelting process takes place within a secure and supervised gold room.

17.2.10 Tailings Thickening and Filtering

Tailings from the CIL/CIP process enters the tailings thickener at 43% w/w solids, the thickener underflow (65% w/w solid) is washed and filtered. The initial filtrate is stored in a cyanide-process water pond for re-use, while the wash is processed further for cyanide detoxification in a series of agitated tanks prior to being stored into the main process water pond.

Hydrogen peroxide and copper sulfate are added to the cyanide-destruction tanks to effect cyanide destruction.

Filtered tailings are then pumped as thickened paste to the Tailings Storage Facility (TSF) for final storage.

17.2.11 Reagents Handling and Storage

Reagents added to the various circuits will be prepared and distributed from the reagent handling facility. This area includes various mixing and storage tank units. All reagent areas will be bermed with installed sump pumps, which can transfer spills to the final tailings thickener, back to the corresponding mix tanks/ storage tanks, or process water pond. The reagents will be mixed, stored, and then delivered through individual supply loops with dosage controlled by flow meters and manual control valves. The reagent storage tanks have been sized with capacity to handle one day of production. The reagents will be delivered to the mine site either in powder form or as solutions.

The following sections outline the reagents that will be used.

17.2.11.1 Limestone Slurry

Solid powdered limestone is mixed with water to produce a slurry of 30% w/w solids for use in Goethite and scorodite precipitation circuit. A part of the limestone slurry is used for gas scrubbing and pH control.

17.2.11.2 Hydrated Lime Slurry

Hydrated lime will be delivered to site in bulk loads and pneumatically transferred to a lime silo. Hydrated lime is then fed into an agitated tank and is mixed with raw water. The slurry contains 20% w/w solid used for pH control and zinc precipitation. Lime slurry is also used in the CIL/CIP process and water recovery circuit.

17.2.11.3 Sulfuric Acid

The process is a net generator of sulfuric acid from the oxidation of pyrite. However there is a need for minor quantities of pure concentrated sulfuric acid delivered to site in 1 m^3 isotainers is held in a storage tank prior to use as a make-up feed in nitric acid regeneration. Sulfuric acid is also used for stripping copper in the copper removal process.

17.2.11.4 Nitric Acid

Concentrated nitric acid delivered to site in bulk loads is stored in a non-agitated tank prior to use in the nitric acid leach circuit.

17.2.11.5 Organic Extractant

Organic extractant is stored in a non-agitated tank is used for the recovery of copper.

17.2.11.6 Sodium Cyanide

Sodium cyanide and water are mixed to create a concentration of sodium cyanide. This is used directly in the CIL/CIP process and to create an eluate for the elution process to remove the gold and silver from the activated carbon.

Sodium cyanide will be delivered to site in 1 tonne bulk bags and will be made up daily to 20% solution. The Bulka bags will be hoisted to an enclosed cyanide bag breaker and solid cyanide dropped into the cyanide mixing tank. Once dissolved, cyanide solution will be pumped into the cyanide storage tank. Cyanide solution will be circulated in a ring main to the CIL circuit by one of the two sodium cyanide dosing pumps. The cyanide use area will meet the requirements of the International Cyanide Management Code.

17.2.11.7 Sodium Hydroxide

Sodium hydroxide delivered to site in 1 m^3 isotainers or bulk loads as concentrated liquid form and is stored in a non-agitated tank and is used to create an eluate for the elution process to remove the gold and silver from the activated carbon.

17.2.11.8 Hydrochloric Acid

Concentrated hydrochloric acid (32% w/w) will be delivered to site in 1 m^3 isotainers or 200 L drums and is then stored in a non-agitated tank. Diluted hydrochloric acid solution is then used for washing activated carbon prior to the elution process to remove the gold and silver from the activated carbon.

17.2.11.9 Copper Sulfate

Copper sulfate pentahydrate will be delivered to site in one metric tonne bulk bags. Anhydrous copper sulfate is generated from the mixture of copper sulfate pentahydrate and fresh water for use in the cyanide destruction process.

17.2.11.10 Hydrogen Peroxide

Hydrogen peroxide is stored in a non-agitated tank prior to use in the cyanide destruction process.

17.2.11.11 Flocculants

Flocculant for the thickeners will be delivered as a powder in bulk bags. The bulk bags will be loaded individually into a hopper for feeding into a proprietary powder flocculant mixing system. This system will automatically meter the powder and water into a wetting head and curing tank. After a batch has been mixed in the curing tank to a 0.25% mix strength, it will be transferred into the storage tank for dosing into the dewatering thickener and vacuum filter with progressive cavity pumps. The operation of the flocculant mixing system will be automatic.

17.2.11.12 Activated Carbon

Activated carbon will be delivered to site in 500 kg bulk bags. Carbon will be added directly to the last adsorption tank, as required for carbon make-up.

17.2.11.13 Antiscalant

Antiscalant will be delivered to site in either 200 L drums or 1 m^3 isotainers. Antiscalant may be added to the process or barren solution to prevent scaling in the tanks and pipes throughout the process plant.

17.2.11.14 Gold room Fluxes

A range of different fluxes will be delivered to site in either bags or small pails. The flux will be manually mixed with the electrowinning sludge, ahead of smelting.

17.2.12 Plant Services

It is anticipated that the following plant services (as a minimum) will be required. Wherever possible, the services will be connected to the existing HGM services (*e.g.* raw water).

17.2.12.1 Plant Air

The primary consumers of compressed air are the cyanidation circuit and the pressure filters. In addition, minor users of compressed air include dust collection / suppression, samplers, instrumentation, and air hose stations located throughout the plant.

The process plant air services area will comprise a duty / standby set of low-pressure blowers, which will generate low pressure air, as well as a duty / standby set of air compressors for the filters and plant compressed air distribution.

17.2.12.2 Raw Water

If required, raw water can be supplied from Southwell River via electric pumps located below the plateau and within the north-eastern boundary of the HGM lease. The water will be stored in the raw water tank. A raw water system will be used for reagent mixing, gland water, general services and process water make-up.

17.2.12.3 Process Water

The source of process water will be reclaimed from the thickener overflows and pressure filter filtrates. This will be used as make-up water throughout the plant. To ensure that different reagents and residual contaminants from the different circuits areas remain separate, the plant water services area will comprise two individual systems. Two main process water systems will be used, one for the acid pre-leach circuit and one for the CIP circuit.

17.2.12.4 Potable Water

Potable water will be supplied to the process plant and reticulated as required from the potable water tank.

17.2.13 Assay Laboratory

The Assay Laboratory will consist of a sample preparation / metallurgical module and a wet laboratory module. The two containers will be located adjacent to the process plant.

The Laboratory will perform assays for the plant feed from tailings reclaim, the processing plant, and environmental monitoring.

17.2.14 Opportunities for Flowsheet Improvement

In the future additional metallurgical tests will be conducted aimed at optimizing the process diagram and reagent consumption.

17.2.15 Tailings Management Facility

The tailings management facility is discussed elsewhere in the document as this is the source of feed for the NVRO Plan.

17.3 Process Design Criteria

A preliminary process design basis has been compiled representing the design requirements for the hydrometallurgical process plant design. The major sources of data are the metallurgical test work and the METSIM model.

A preliminary mechanical equipment list and facilities were developed from the flowsheets and mass balance from the METSIM model, together with the design criteria. The size and amount of equipment and facilities were then designed accordingly.

In addition to these sources, typical industry values, equipment supplier recommendations, values from similar projects or other NVRO experience were used to determine a likely criterion for design.

As the project advances, many of these assumed values will be confirmed either by specific test work or further design work. It must be noted that a specific process design criteria for the stage 1 has not been produced as the design criteria developed for stage 2 is mostly applicable to stage 1.

The principal criteria used for the design of the processing plant are summarized in Table 17-1.

Table 17-1. Process design basis summary for the EnviroGold Global Metallurgical Plant

Criteria	Units	Nominal Value Stage 1	Nominal Value Stage 2 Expansion
			General
Annual Tonnage Processed	tpa	182,500	1,277,500
Processing Feed rate	tpd	500	3500
Processing Feed rate	tph	8	156
Operating Philosophy		24 hrs /day, 7 days /week	24 hrs /day, 7 days /week
Total Hours Available	hrs	8760	8760
Total Operating time	hrs	8190	8190
Processing Plant Availability	%	93.5	93.5
Feed Slurry Density	%	40	40
Design feed grade - Au	g/t	2.44	2.44
Design feed grade - Ag	g/t	64.40	64.40
Design feed grade - Cu	%	0.13	0.13
Design feed grade - Zn	%	1.41	1.41
Overall, Gold Recovery	%	72.8	72.8
Overall, Silver Recovery	%	87.3	87.3
Overall, Copper Recovery	%	84.8	84.8
Overall Zinc Recovery	%	83.0	83.0
			Acid Pre-leach
Gold Recovery	%	93.1	93.1
Silver Recovery	%	97.3	97.3
Copper Recovery	%	89.2	89.2
Zinc Recovery	%	87.4	87.4
			Metal Recovery Circuit
Copper Recovery	%	95.0	95.0
Zinc Recovery	%	95.0	95.0
Gold Recovery	%	78.19	75.0
Silver Recovery	%	89.72	90.0

17.4 Processing Schedule

The processing schedule based on the tailing's reclamation plan, metals contents and metals recoveries per year are summarized in Table 17-2.

Table 17-2. Processing Schedule Quantities for the EnviroGold Global Hellyer Tailings Project

Production Period		Year 1	Year 2	Year 3	Year 4	Year 5	Year 6	Year 7	Year 8	Year 9	Total
Tonnes Processed	kt	238	1,150	1,150	1,150	1,150	1,150	1,150	1,150	714	9,000
Feed Grade											
Au	g/t	2.44	2.44	2.44	2.44	2.44	2.44	2.44	2.44	2.44	
Ag	g/t	64.40	64.40	64.40	64.40	64.40	64.40	64.40	64.40	64.40	
Cu	%	0.13	0.13	0.13	0.13	0.13	0.13	0.13	0.13	0.13	
Zn	%	1.41	1.41	1.41	1.41	1.41	1.41	1.41	1.41	1.41	
Feed Metal Content											
Au	oz	18,658	90,251	90,251	90,251	90,251	90,251	90,251	90,251	56,033	706,447
Ag	oz	492,157	2,380,565	2,380,565	2,380,565	2,380,565	2,380,565	2,380,565	2,380,565	1,478,005	18,634,116
Cu	kt	0.32	1.53	1.53	1.53	1.53	1.53	1.53	1.53	0.95	11.97
Zn	kt	3.35	16.21	16.21	16.21	16.21	16.21	16.21	16.21	10.07	126.90
Recovery											
Au	%	72.8	72.8	72.8	72.8	72.8	72.8	72.8	72.8	72.8	72.8
Ag	%	87.3	87.3	87.3	87.3	87.3	87.3	87.3	87.3	87.3	87.3
Cu	%	84.8	84.8	84.8	84.8	84.8	84.8	84.8	84.8	84.8	84.8
Zn	%	83.0	83.0	83.0	83.0	83.0	83.0	83.0	83.0	83.0	83.0
Metal Recovered											
Au	oz	13,574	65,657	65,657	65,657	65,657	65,657	65,657	65,657	40,764	513,940
Ag	oz	429,653	2,078,233	2,078,233	2,078,233	2,078,233	2,078,233	2,078,233	2,078,233	1,290,298	16,267,583
Cu	kt	0.27	1.30	1.30	1.30	1.30	1.30	1.30	1.30	0.80	10.15
Zn	kt	2.78	13.46	13.46	13.46	13.46	13.46	13.46	13.46	8.35	105.32

18 Project Infrastructure

The following paragraphs include the major project infrastructure require for reprocessing the Hellyer tailings.

18.1 Overview

The Project will be established at the Hellyer Gold Mine Site and it has extensive existing infrastructure (Figure 18-1), which has been generally adequately maintained during the various care and maintenance periods since the cessation of processing activity by Bass Metals (July 2012).

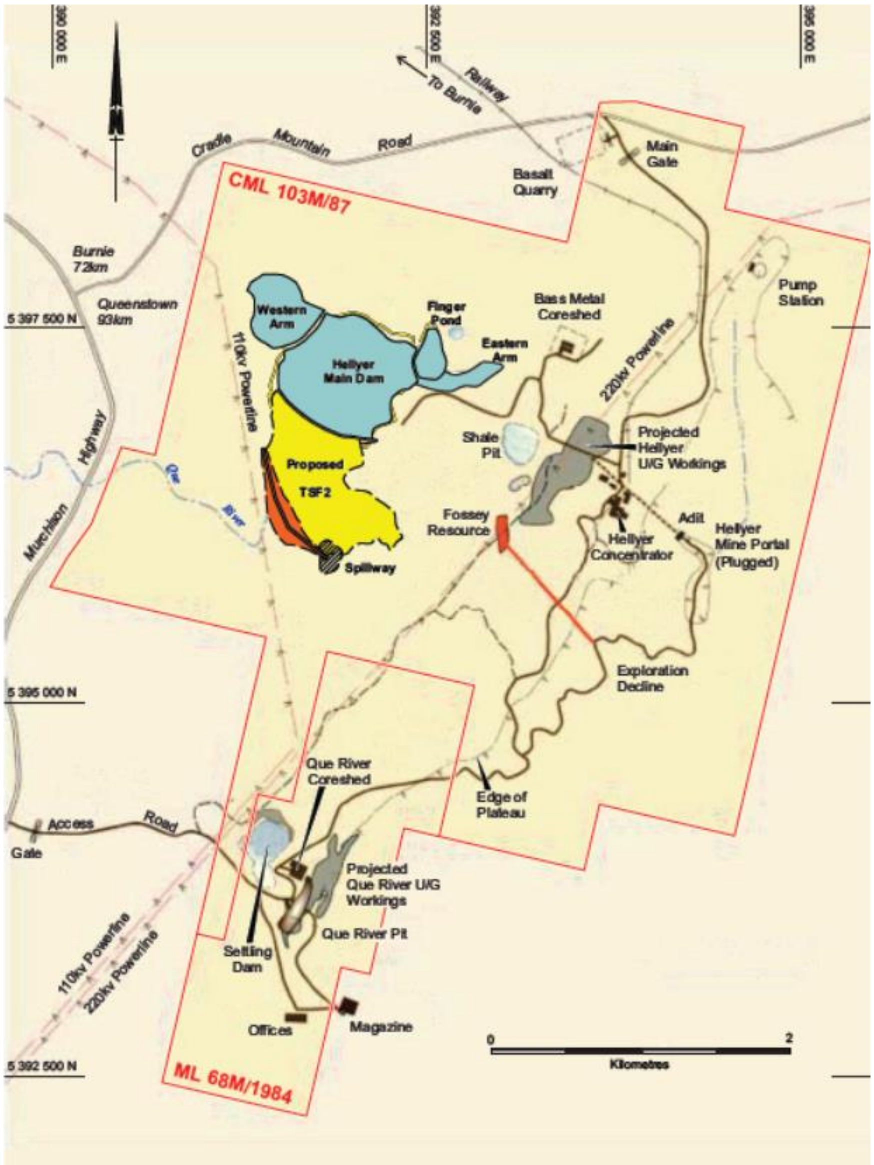

Figure 18-1. Hellyer Gold Mine - Site Infrastructure Map

(Source: Behre Dolbear Australia August 2019)

NQ Minerals re-established the site during 2018, commenced retreatment of tailings in October, 2018, and has been operating continuously since that time. Key features of the infrastructure include (with further descriptions below):

- The Hellyer mining lease intersects Tas Networks' 110 kV and 220 kV high tension power lines that supply the northern part of Tasmania. A recently upgraded 22 kV substation located adjacent to the Que River Mine is located approximately 8 km of 22 kV line connects the Hellyer site where it is transformed down to 3.3 kV and 415 volts for use at the HGM plant and dredge.
- Water is to be supplied from the TSF1, as well as recycle water from the two thickeners at the plant. There is an excess of water in the overall system. Should it be required, water can also be drawn from the Southwell River via electric pumps located below the plateau and within the north-eastern boundary of the lease. The water is of good quality and the licence conditions permit a maximum rate of extraction of 12.96 megalitres per day.
- Access to the site from government-maintained roads is via two privately owned and maintained unsealed access roads, with the preferred route being the gravel Hellyer mine site access road from the Cradle Mountain Link Road. Currently HGM trucks all concentrates to the Burnie port on this road.
- There is an existing 3'6" gauge railway spur into the Hellyer plant. This 11 km section of railway line onto the mine site is owned by the Tasmanian Government and links the operation to the Port of Burnie line. It is understood that an option has been considered to use this track to transport the concentrates to Burnie port in the future. NVRO is not aware of any study, budgets, or timetable for any recommencement of rail transport of concentrates.
- There is a 100-pair cable delivering phone and fax services to site. There is also a fibre-optic server connection between the mill and the current main office/administration building that is currently connected and capable of sharing files and data.
- Mobile phone coverage across the site is poor. Internet access is reasonable and provided by two satellite connections.
- There are good office facilities existing at Hellyer which are more than sufficient to HGM's operations.
- A large, enclosed store and warehouse exists at the Hellyer Processing Plant, along with an enclosed concentrate storage shed.
- There is 6-person overnight accommodation available in a converted demountable Administration building at the mill site for use by HGM staff.

The field visit by Mr. Brock Hill in March 2021 provided an opportunity for NVRO to understand the potential for the location of the NVRO's Tailings Reprocessing Project at the Hellyer site. It was observed that the site has good access, is connected to grid power, the local communities understand metal production and have skilled people to work at the plant. The suitable available infrastructure for NVRO project includes:

- Site access and security, via current Hellyer operations
- Available dedicated space within existing HGM industrial area for NVRO plant, equipment and materials and reagent storage, administration, and workshop buildings etc.
- Access to low cost, renewable power at Hellyer site substation where power is transformed down to 3.3 kV and 415 volts. NVRO understands from discussions with HGM that there is sufficient power available for the anticipated requirements for future NVRO operations
- Access to process water from the HGM plant operations, supplied from the existing Tailings Storage Facility (TSF1) and / or recycle water from the HGM plant's thickeners.
- Access to ZST feed direct from HGM plant tailings line (to the TSF)
- Access to existing HGM tailings pumps, pipes and associated equipment to nominated tailings storage areas
- Access to existing tailings storage facilities as required.
- Access to HGM's satellite internet connection, potable water supply, emergency services etc.

18.2 Site Layout

As outlined in Section 5, HGM has a tailings reprocessing operation at the Hellyer site where tailings are removed from the TSF by dredging, pumped to the processing plant for metal concentrate recovery before being returned to the TSF. To align with receiving the ZST directly from the current HGM flotation plant, the NVRO operations are planned to be located adjacent to the existing HGM processing plant (Figure 18-2).

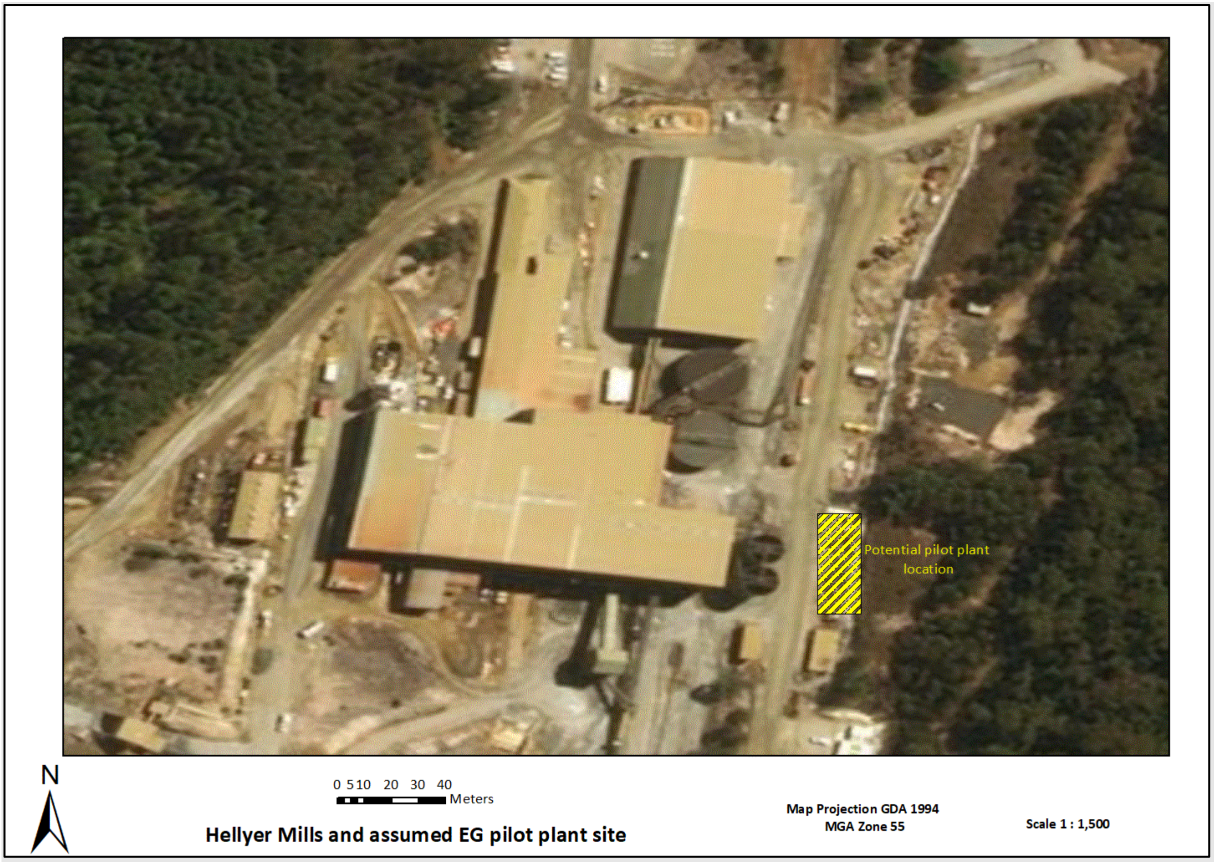

Figure 18-2. Hellyer Mill and Potential NVRO Stages 1 Plant Location

(Source: Caloundra Environmental "Desktop Assessment and Environmental Approvals" Dec 2021)

Once HGM operations are completed, the second stage of NVRO's operations is proposed to be based on recovery of tailings material deposited in storage facilities by HGM from September 2018 to the start of NVRO operations.

HGM is planning on locating future tailings from its ongoing operations into TSF2, which is still under construction (Figure 18-3). These "future" HGM tailings will need to be accessed by NVRO during NVRO's second phase of operations. It was noted during the site visit that Hellyer TSF2, under construction, included significant amounts of pushed down timber and waste vegetation material within the future TSF.

Figure 18-3. Hellyer TSF2 under construction, showing significant timber waste vegetation material

(Source: NVRO Site Visit)

NVRO currently envisages utilising similar dredging mining methodologies and equipment that has been proven to perform satisfactorily at the Hellyer site by HGM. Consideration may also be given to the potential application of hydro-mining methods since several parts of the resource (*e.g*. Western Arm) may lend themselves more readily to that extraction technique. NVRO will need to commission relevant dredging operational and scheduling studies well in advance of the commencement of the second stage of operations.

18.3 Roads

The Hellyer site is accessible via two privately owned and maintained un-sealed access tracks. The gravel road from the Cradle Mountain Link Road is the main track used to access the site. The Que River gravel access road intersecting with the Murchison Highway is the secondary access road.

18.3.1 Government Roads

The Department of Infrastructure, Energy and Resources (DIER) is responsible for the provision, management, and maintenance of State classified roads. Local councils also have the same responsibility for classified local highways in their municipality.

The Bass Highway is a National Highway and is a Category 1 Truck Road. Category 1 roads are major highways which are crucial to the functioning of Tasmania’s industries, commerce, and society (Table 18-1).

Table 18-1. Classification of State roads – Road Hierarchy Categories

Category	Type Roads	Road Characteristic
Category 1	Truck Roads	The most important roads interconnecting Tasmania
Category 2	Regional Freight Roads	Tasmania’s regional roads used for moving heavy freight
Category 3	Regional Access Roads	Main access roads to Tasmania’s regions but carrying less heavy freight traffic than Regional Freight Roads
Category 4	Feeder Roads	Safe travel between towns, major tourist destinations and industrial areas
Category 5	Other Roads	The rest of the roads in Tasmania

The Burnie Link Road to the Waratah turnoff is classified as a Category 2 Regional Freight Road. The Burnie Link road and other local Category 3 roads provide safe access to Tasmania’s regional areas.

The Murchison Highway from the Waratah turn-off and the Cradle Mountain Link Road to the mine access roads are Category 3 Regional Access Roads. They are of strategic importance to both regional and local economies and are used by all vehicles including heavy freight vehicles.

18.3.2 Site Access Roads

There is an extensive network of unsealed gravel roads on the Hellyer site, which provides access to all the necessary infrastructure on the mine site. The gravel tracks on the mine site are heavily used and have a well-developed gravel base. This ensures that they are useable in the adverse climate conditions, which are typical of the region.

The main access road is wide enough to facilitate easy access by all vehicles including freight vehicles. Its shoulders are cut-back and annually cleared to ensure that the road remains open (or not closed for an extended period of time) during times of significant snowfall.

18.3.3 Railway

An 11 km section of railway line connects the Hellyer site to the Main Melba Flats and Port of Burnie line (Figure 18-4). This is owned by the Tasmanian Government. This railway was used for the transport of the concentrates from the processing plant to the Port of Burnie. The 3’6” gauge railway spur into the Hellyer plant (concentrate shed) requires refurbishment.

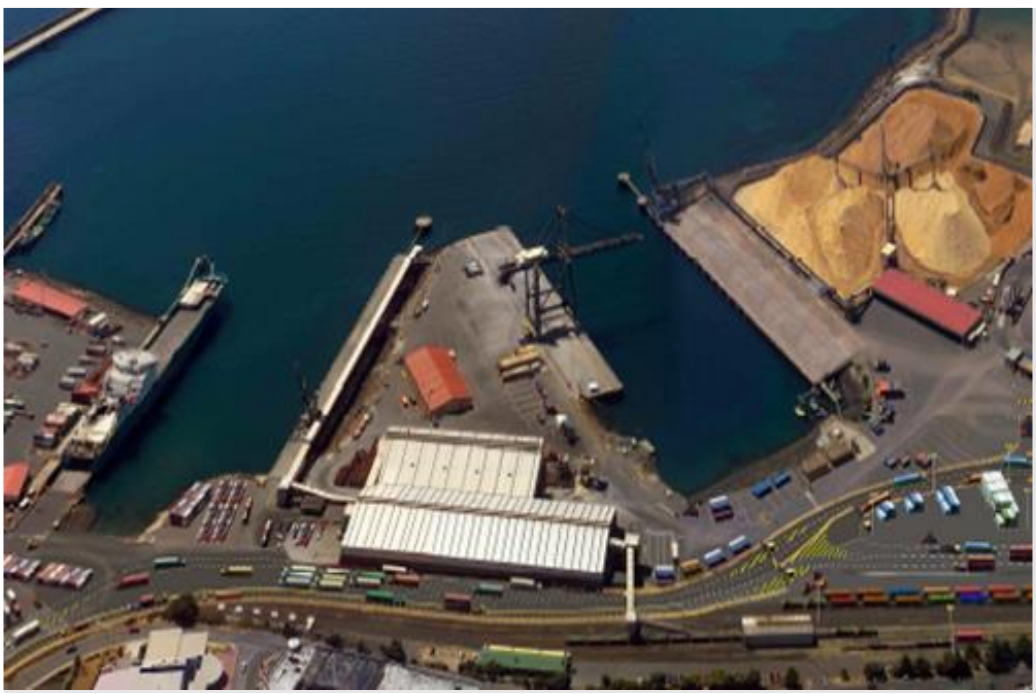

Figure 18-4. View of concentrate shipment facility in Burnie

(Source: AusGEMCO)

18.4 Buildings

The major buildings on Hellyer site are the processing plant, warehouse, concentrate shed, and offices and support buildings.

18.4.1 Processing Plant

The Hellyer processing plant is a building with all required equipment to produce concentrates (Figure 18-5, Figure 18-6). The flotation plant is currently used to produce lead and zinc concentrates from the Hellyer tailings.

Figure 18-5. View of Hellyer Mill from outside

(Source: Halatchev et al., 2017)

Figure 18-6. View of Hellyer Ball Mill and SAG Mill

(Source: Halatchev et al., 2017)

18.4.2 Workshops and Warehouses

The Hellyer processing site has a dedicated, secure, covered site store and warehousing facility, which is well laid out to support operations at the site.

18.4.3 Concentrate Shed

The concentrate shed is located near the processing plant and it is used for the storage of the concentrates for blending and shipment to the Port of Burnie. The shed has four isles which allow the separate storage of lead, zinc, and gold/silver/pyrite concentrates (Figure 18-7, Figure 18-8).

Figure 18-7. View of the concentrate shed from inside at the Bernie Port.

(Source: Halatchev et al., 2017)

Figure 18-8. View of the concentrate shed from outside at the Bernie Port

(Source: Halatchev et al., 2017)

18.4.4 Offices and Support Buildings

The processing plant has an office complex. There is a change house, which is available for employees at the site to use. There are existing workshops with tooling machines and benchtop equipment.

18.5 Electrical Infrastructure

Tas Networks' 110 kV and 220 kV high tension power lines that supply the northern part of Tasmania intersect the Hellyer Lease. Hellyer is connected to a 22 kV substation at Que River Mine via approximately 8 km of 22 kV line to the Hellyer site, where it is transformed down to 3.3 kV for the large electrical motors of the SAG, ball mills plus low-pressure flotation blowers and tower mill drives, and 415 volts for use at the HGM plant and dredge.

There is an existing 3-phase 415 V mains supply to the TSF, which feeds the motors of the surge tank pumps and trommel and supplies power to a step-up transformer from which the dredge draws its power.

18.6 Surface Water Management

The Hellyer Mine lies in the headwaters of the Que and Southwell River systems. The Que River flows from the mining lease in a south-westerly direction, where it joins the Huskisson River before flowing into the Pieman River. The Que River is a moderately to severely disturbed system, which has, for decades, received water discharge from both the Hellyer and Que River mines into its headwater.

All site discharge, except for seepage from around the Hellyer and Fossey adits, reports to the Que River.

Under current HGM operations, management of the TSF1 is critical to maintaining water quality off site, with discharge from the TSF1 reporting to the Que River. Surface water management focused on adding alkalinity to maintain the TSF1 supernatant water at ≥pH 8.0 to reduce Zn and other metal concentrations in the outflow. The primary method of alkalinity addition is to deliver a lime slurry directly into the TSF1 supernatant. Monitoring includes:

- A continuous recording pH monitoring TSF1
- A “daily check” procedure by dredging personnel

The procedure includes a visual assessment of the lime discharge points in the dam and daily recording of pH values

18.7 Water Supply and Water Balance

18.7.1 Water Supply

The TSF is supplied with water from two streams (east and west) that flow into the tailings dam. The two streams are controlled by weirs and a diversion dam as shown in Figure 18-9.

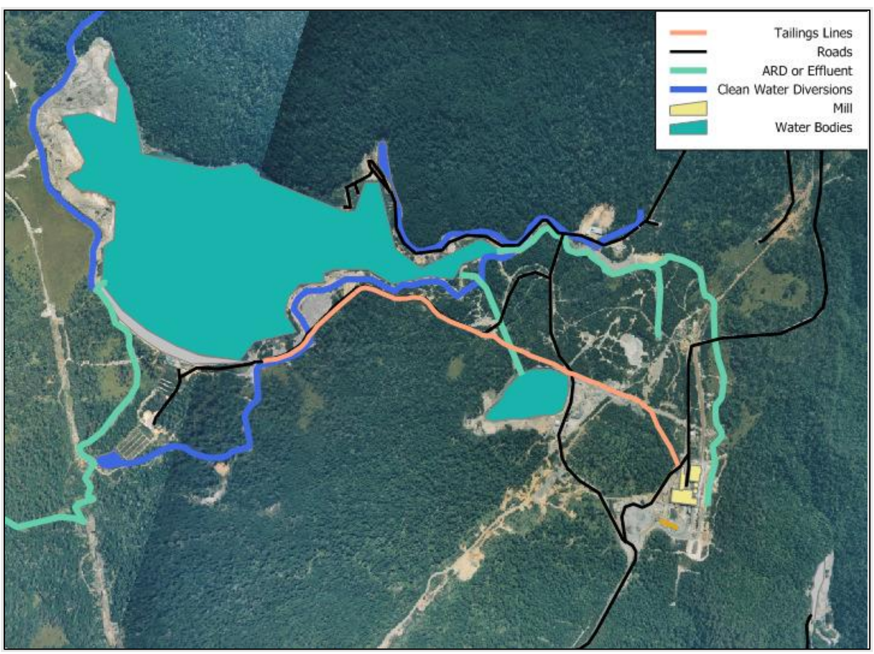

Figure 18-9. Aerial photo with main water flows, water bodies, roads, and tailings lines at the Hellyer Mine Site

(Source: After Aquatic Science, 2006)

The catchment area that flows into the Hellyer TSF is approximately 205 ha with storage facility having a surface area of 75 ha. The perimeter water diversion drains greatly reduces the dam catchment area.

The water of the Southwell River is also used for processing purposes. Two, five-stage electric pumps (located below the plateau and within the north-eastern boundary of the site) draw water from the Southwell River. This water delivered at approximately 130 L/s via a 315 mm poly pipeline to the tanks adjacent to the former ROM pad (the highest point near the processing infrastructure).

The holding capacity of the largest tank is 0.5 megalitres of process water. This includes return water from the TSF outflow, which is for use at the plant. The mill offices and administrative buildings are supplied by the smaller tank that is filled from Southwell River water only.

The maximum legal rate of water extraction is 12.96 megalitres per day. This provides sufficient water to meet the site processing (with return water) and other needs. During the summer, the water supply may be restricted due to a potential reduction of the natural flow rate of water.

Separation of clean water from process water, which is critical for improved environmental performance, has been successfully achieved at the mine site. Extensive works to divert clean water around the TSF have been installed. These water diversion works, which include the Eastern Cut-off Drain, Western Cut-off Drain, and the Northern Creek Diversion, divert most of clean water falling in the TSF catchment away from the facility.

18.7.2 Water Balance

It has been reported that the water balance in the TSF was maintained to a satisfactory level during previous tailings dredging operations, without the need to operate the downstream treatment plant to meet the water quality requirements prior to the discharge of water in the Que River (CSA Global, 2010).

18.8 Site Accommodation

There is no permanent on-site accommodation as the project is not residential. Team members return to their homes / off-site accommodation after each shift.

18.9 Waste Rock Storage

There is no waste rock storage associated with the NVRO Hellyer Tailings Project.

18.10 Tailings Storage

The source of feed for the existing HGM Plant and the Project is the TSF. This is discussed in detail in other areas of the report.

19 Market Studies and Contracts

19.1 Marketing Studies

Under NVRO's proposed processing methodologies, gold and silver are likely to be produced as metal on-site, following the cyanide leach in the base case (or potentially at a nearby mine, which is under investigation). There is a ready market for both gold and silver.

An alternate approach to access markets for the precious metals is to incorporate the recovered metals in a concentrate which can be combined with the ongoing HGM operations lead concentrate product for precious metal "credits" from the smelters.

The EnviroGold's Hellyer Tailings project is expected to produce the following salable products:

- Dore bullion, Gold and Silver;
- Zinc Hydroxide Concentrate and
- Copper Sulphate Concentrate, which is a commercial grade reagent.

No marketing studies for bullion are required. A brief marketing study for zinc hydroxide concentrate would be embarked on during the Feasibility Study of the project. The expectation is that the annual (or total) volume of mine metal production from both doré bullion and concentrates would not impact world supply, demand, or metal price. Each of the concentrates is expected to be commercial grade and widely marketable. For this Technical Report, lead recoveries are disregarded.

The concentrates produced would be sold into a world market at the market price for the metal contained.

The Australian domestic market is strong for copper sulfate concentrate, which could be sold to the mines located in Tasmania or Australia. Zinc hydroxide concentrate could be sold either directly to smelters or to traders. Smelters could buy the concentrate in expectation of using it as a reagent. Since the project is presently under early development, sales contracts for metal concentrates projected to be produced are premature. Therefore, at this stage the Company has not entered into any agreements.

Concentrates are assumed to be sold based on a payment, which is the sum of the addition of all the component "payable" metals (zinc and copper) less the sum of the treatment charges (TC) and the refining charges (RC), less the sum of any penalties and discounts. The amount of payable metal and TC/RCs vary depending on global supply, demand, and prices for contained metals. The estimated smelter terms and costs used for the purpose of this Report are presented in Section 22.

19.2 Metal Prices

The metal prices assumptions used in the Technical Report can be found in Table 19-1. The assumed metal prices were determined using best practice techniques suggested in the 2020 CIM Guidance on Commodity Pricing (CIM, 2020). Analysis of long-term historical pricing, analyst and peer consensus pricing were used to forecast long term metal prices in the context of the expected life of the Hellyer Tailings project.

Table 19-1. Forecast metal price assumptions used in the NVRO economic models

	Unit	Price
Gold	$/oz	$1,650
Silver	$/oz	$22
Zinc	$/t	$2,800
Copper	$/t	$9,000

19.3 Contracts

EnviroGold Global relies on the following contracts that are currently in place relative to the Hellyer Tailings project:

- Tailings Processing Operations Agreement (TPOA), general agreement with Hellyer Gold Mines Pty Ltd for processing and extraction of mineral concentrates from the tailings located at the Hellyer mine site.

All major contracts are within industry norms. Other than the above and as disclosed elsewhere in this Report, there are currently no contracts material to the issuer that are required for the development of the Project.

20 Environmental Studies, Permitting and Social or Community Impact

It is important to note that NVRO has a contract for the treatment of the Hellyer tailings. Therefore, the tailings remain the responsibility of Hellyer Gold Mines Pty Ltd. Any liability for the tailings closure, ongoing management of the tailings storage facilities etc. remains with HGM. EnviroGold Tasmania will be responsible for its operating site and the environmental management of the site, and for ensuring that its environmental management practices meet or exceed the requirements of the HGM operating permits. EnviroGold Tasmania remains responsible for the environmental management of its processing plant (and infrastructure) and for the removal of its infrastructure at the end of the project life. The site must be returned to equal or better environmental conditions are the closure of the NVRO Hellyer Tailings Project.

20.1 Relevant Legislation, Regulations, Codes and Polices

HGM operates in accordance with regulations and codes as follows:

- Aboriginal Relics Act 1975
- Crown Land Act 1976
- Environmental Management and Pollution Control Act 1994 (associated policies and regulations)
- Environment Protection Policy (Noise) 2009
- Environment Protection and Biodiversity Conservation Act 1999
- Forest Practices Act 1985
- Historic Cultural Heritage Act 1995
- Land Use Planning and Approvals Act 1993
- Mineral Resources Development Act 1995
- National Parks and Reserves Management Act 2002
- National Environment Protection Council (Tasmania) Act 1995
- Native Forestry Agreement Act 1980
- Native Title (Tasmania) Act 1994
- Forestry (Rebuilding the Forest Industry) Act 2014
- Resource Management and Planning Appeal Tribunal Act 1993 and associated amendments
- State Policy on Water Quality Management 1997
- Threatened Species Protection Act 1995
- Water Management Act 1999 and associated regulations
- Weed Management Act 1999
- Workplace Health and Safety Act 1995.

NVRO understands that the Hellyer Gold Mine has all the operating permits required for its current operations. HGM has provided NVRO with a copy of the Environmental Management Plan (2017), and the “Independent Technical Due Diligence Review” Behre Dolbear Australia, August 2019, which provide a summary of the Key Environmental Approvals in place for current HGM site and operations.

20.1.1 Permitting Requirements

NVRO engaged, environmental specialist and subject matter experts with Caloundra Environmental Pty Ltd, who are familiar HGM’s current operations and the environmental permitting and management plans, to undertake an initial desktop review of the approvals for the Project (Caloundra Environmental: Desktop Assessment, Environmental Approvals, EnviroGold Hellyer Tailings Reprocessing 2022). This section provides a summary of the 3rd party report.

In Tasmania, mining and mineral processing developments are classed as Level 2[4] activities and are regulated by the Tasmanian Environment Protection Authority (EPA) in accordance with the Environmental Management and Pollution Control Act 1994 (EMPCA). The EPA has an independent Board as a decision-maker for approvals. The EPA Board is supported by the staff of the EPA Division of the Department of Primary Industries, Water and Environment. The EPA Division makes recommendations to the EPA Board, who make the statutory decisions on new or major amendments to regulated activities. The Director of the EPA Division (the Director) also holds the statutory position of Director of Environmental Management under the EMPCA and has delegated authority to make many decisions without going to the EPA Board.

The regulation of mines is mostly through permit conditions that, in general include general conditions, of which the most significant for any operation wishing to change its business are:

- None of the following changes may take place in relation to the activity (or activities) authorised by this permit without the prior written approval of the Director[5] or a new permit from the relevant planning authority
- a change to a process used while carrying out the activity (or activities) that might cause or increase the emission of a "pollutant" or otherwise result in "environmental harm"
- the construction, installation, alteration or removal of any structure or equipment used while carrying out the activity (or activities) which may cause or increase the emission of a "pollutant", or otherwise result in "environmental harm"
- a change in the nature of materials dealt with or used in the course of carrying out the activity (or activities) which might cause or increase the emission of a "pollutant", or otherwise result in "environmental harm"
- Unless otherwise approved in writing by the Director, the premises must be operated and managed in accordance with the environmental management plan (EMP)

"The EMP" refers to the EMP drafted and approved in the environmental impact statement (EIS) or for earlier projects, the development proposal and environmental management plan (DPEMP) submitted with the original application for environmental and planning approval unless it has been superseded with updates and consequent approvals from the Director. The current EMP for the HGM tailings operation was approved in 2020.

In practice, this means that an operation is effectively limited to that described in its approved EMP but it does have the ability to enact minor change through regular EMP reviews as submitted to the EPA Mining Unit and through amendment applications to the Director.

For major changes, the following are required:

- Council agrees that the change does not need a new or revised planning permit. For significant proposed changes the Council Planner will defer to the EPA staff in making this decision
- Demonstrate to the EPA that the changes proposed will not increase emissions of pollutants off site and are low risk
- Project is robust
- Minimal risk to conservation or heritage values from the proposal. Conservation and heritage issues are handled by various branches of the Department of Primary Industries, Water and Environment

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[4] Level 2 activities are prescribed under the EMPCA. The relevant categories are 2(e) *Mineral Works*: the conduct of works for processing mineral ores, sands or earths processing 1,000 tonnes or more per year of raw materials; and 3(b) *Waste Depots*: the conduct of depots for the reception, storage, treatment or disposal of waste (for tailings storage).

[5] The general "rule" for process amendments able to be approved by the Director is an increase in production or waste production of ≤10% per annum. Increases greater than this will likely trigger a new approval.

- Proposed changes will not have a significant impact on matters of national environmental significance (MNES) and therefore will not trigger the EPBC Act

Amendments to existing permits through the Mining Unit and the EPA Director generally take 1–3 months. Mineral Resources Tasmania (MRT) is the mines inspector, which sets bonds for mining operations in conjunction with the EPA.

For the permitting of the Project, the Tasmanian Environment Protection Authority (EPA) will expect the key potential environmental issues identified below to be described, evaluated and able to be managed so that impacts can be successfully mitigated:

- Acid and metalliferous drainage (AMD) – Potential impacts on surface and groundwaters from oxidation of sulfidic tailings are yet to be identified. NVRO anticipates that the product from its processing plant will have much lower acid-generation potential than the current tailings. In short, the environmental liabilities are reduced.
- Wastewater – Potential impacts on surface and groundwaters from elevated metal concentrations, salinity and residue CN complexes and management measures to reduce metal dissolution, CN and EC and compliance with surface water emission limits at designated discharge points are yet to be identified.
- Air emissions - Potential for emissions to the airshed from reagents used or generated on site.
- Decommissioning and rehabilitation - Requirements for planned closure to ensure effective rehabilitation need to be determined. NVRO will plans to integrate its operational closure with HGM closure planning.

The Project's footprint will be within the current mining lease with the specific location to be determined by a site inspection. Preliminary locations are being evaluated adjacent to the current processing plant as the areas are already disturbed and have available power, water, compressed air *etc*.

Regardless of the location of the Project, key potential environmental effects will be addressed. The evaluation of the potential effects will include, but not be limited to, those presented in Table 20-1.

Table 20-1. The key environmental aspects that will be included in the environmental assessment that will be presented to the Tasmania Environmental Protection Agency (EPA)

Item	Potential environmental impact	Comment	Critical aspect	Initial Comments (EnviroGold Global)
1	Natural values	Impact on fauna, flora and geo-conservation with emphasis on threatened species and MNES.	Need to demonstrate no adverse significant impact on MNES.	The Project will be within the existing disturbance footprint (to the extent possible). The environmental management for natural values that is approved by the EPA for the current HGM operation will be implemented for the Project
2	Acid and metalliferous drainage (AMD)	Impact on surface and groundwaters from oxidation of sulfidic tailings.	Management measures to prevent sulfide oxidation and compliance with surface water emission limits at designated discharge points.	The metal recovery process used in the Project oxidizes the sulfides under controlled conditions. This will reduce the overall environmental liability related to acid drainage. There is not expected to be any additional volume of tailings as a result of the Project. Therefore, there will be sufficient capacity within the currently approved TSFs for the tailings from the Project.
3	Wastewater	Impact on surface and groundwaters from elevated metal concentrations, salinity and residue CN complexes.	Management measures to reduce metal dissolution, CN and EC and compliance with surface water emission limits at designated discharge points.	Most of the reagents and water will be recycled within the process. Any excess water will be treated for discharge. The NVRO team will not required within the process
4	Environmentally hazardous materials	Transport, storage and handling of hazardous material such as strong acids.	Management will need to comply with relevant legislation, standards and guidelines. Typically, a permit condition will stipulate "The storage, handling and transport of dangerous goods, explosives and dangerous substances must comply with the requirements of relevant State Acts and any regulations thereunder, including: 1.1 Work Health and Safety Act 2012 and subordinate regulations; 1.2 Explosives Act 2012 and subordinate regulations; and 1.3 Dangerous Goods (Road and Rail Transport) Act 2010 and subordinate regulations."	The current environmental management plan has storage requirements for hazardous materials. The NVRO process will use acids, amongst other reagents. The planned transportation, storage and use of hazardous reagents will align with the currently approved procedures. There will be no explosives used in the Project.
5	Waste management	Storage and handling of liquid and solid waste and controlled wastes.	Management will need to comply with relevant legislation, standards and guidelines.	Hazardous waste management and general waste management are already approved in the EMP. The Project will align with the existing, approved EMP

Item	Potential environmental impact	Comment	Critical aspect	Initial Comments (EnviroGold Global)
6	Air emissions	Potential for emissions to the airshed from NOx scrubber.	No nearby sensitive receptors. Gaussian plume dispersion modelling will need to demonstrate compliance with ground-level concentrations (GLCs) at the lease boundary.	The main plant to be used in the Project will be a closed circuit with recycling of reagents and catalysts. As such, minimal air emissions are expected. The NOx scrubber may vent to the atmosphere. There may be some air emissions associated with the tailings, which will be addressed with location-specific management plans.
7	Noise	Noise emissions from plant and equipment.	No nearby sensitive receptors. Desktop noise modelling should suffice.	The Project plant is located adjacent to the current HGM plant. It is not expected that there will be additional noise generated from the Project.
8	Decommissioning and rehabilitation	Requirements for planned closure to ensure effective rehabilitation.	Will need to integrate with HGM closure planning.	There is currently a rehabilitation and closure plan approved for the location on which the Project will be built. At closure, the Project equipment, machinery, connections will be removed and the site rehabilitated by NVRO to the specifications in the currently-approved closure plan.

20.1.2 Environmental Aspects of Wastewater Disposal

20.1.2.1 Sodium cyanide

During 2011 and 2012, Bass Metals processed ore from the Fossey mine in the Hellyer mills, with sodium cyanide used to maintain good galena (PbS) selectivity against sphalerite (Zn/FeS) and pyrite. Batch testing and modelling showed that the greater part of the cyanide dose was destroyed in the process; however, low concentrations of cyanide persisted in the supernatant following tailings settlement.

If cyanide is included in the Project plant, similar licence conditions to those included in the Henty permit review completed in 2020 (Environment Protection Notice 378/5) should be expected:

All tailings generated from processing operations must be detoxified prior to disposal. The leach residue will be deemed to be detoxified if the annual mean on-stream detoxification process control monitoring of WAD cyanide concentration is less than 1 mg/L, providing the WAD cyanide never exceeds 2 mg/L.

The emission limits set for discharge at Henty (and in the TSF supernatant) are WAD CN 0.1 mg/L and Free CN 0.05 mg/L.

Initially, NVRO is evaluating the option to have the gold and silver-bearing residues treated at a local processing plant that has excess capacity. Therefore, under this scenario, no cyanide will be used for the initial operation of the Project.

In the later phases of the production, NVRO is evaluating the option to produce doré (gold and silver), therefore, if required, a second assessment and update to the EMP will be completed. If CN is used in the Project, a CN destruction circuit will be included to meet the required discharge conditions.

20.1.2.2 Surface Water Management

HGM's current emission limits for the site are shown in Table 20-2.

Table 20-2. Hellyer Gold Mine surface water emission limits

Parameter	TSF1 maximum emission limit (mg/L)	TSF2 maximum emission limit (mg/L)
pH	8 (pH units) (minimum)	8.5 (pH units) (minimum)
Sulfate	300	300
Total lead	0.6	0.6
Total zinc	0.8	0.8
Total copper	0.2	0.2
Total aluminium	0.5	0.5
Total arsenic	0.02	0.02
Total suspended solids	30	30

TSF1 and TSF2 spillways are the licensed discharge points at Hellyer. The sulfate and total arsenic limits are currently suspended. The minimum pH limits reflect the use of lime dosing and pH to co-precipitate metals out of solution.

20.1.3 Tailings

The contract that NVRO has with HGM is for the re-processing of the tailings. The management of the tailings resulting from the Project will be deposited in the current HGM TSF. All management and responsibility for compliance remain with HGM. The tailings management as included in the 2022 EMP review is presented in Section 20.4.1.

20.1.4 Noise effects

The Project has the potential to generate external noise emissions from mobile equipment movements (loaders, stockpiles, etc.) and day-to-day truck deliveries or product movement off site. Internal noise sources will include motors, fans, compressors etc. and general product movements. Maintenance activities, such as fabrication, will also create noise sources during operations. Similar noise emissions currently emanate from existing operations with no adverse impact.

The nearest sensitive land uses are in the tourist hotels along the Cradle Mountain Road (C132) (more than 17 km to the east), the township of Tullah (more than 20 kilometres to the south) and the township of Waratah (some 21 kilometres to the north-west). The noise model for the site will be updated for the Project. Based on the current operations, it is anticipated that the Project will not change the results of the already-approved noise management plans that will be adapted for implementation at the Project.

20.1.5 Air effects

Sources of dust emissions will include road dust and some material movements. As with noise, similar dust emissions emanate from existing operations. These are mitigated by the high rainfall climate, and the distance to lease boundaries and to sensitive land uses.

20.1.5.1 NOx scrubber

The design of the NOx scrubber is currently at a preliminary engineering stage. If the NOx scrubber is not a closed-circuit operation, in-stack emissions will be designed to meet the concentrations listed in Table 20-3.

Table 20-3. Tasmanian Air Policy stack emissions (maximum in-stack concentration requirement)

Pollutant	mg/m3
NOx	2.0 g/m3
Particulate matter	100
Sulfur dioxide	7.2 g/m3
Sulfuric acid mist or sulfur trioxide or both	100 (as SO3 equivalent)
Hydrogen sulfide	5

In addition, to demonstrate that emissions are not likely to cause an environmental nuisance or material environmental harm, plume dispersion modelling will need to be undertaken to establish that the predicted maximum ground-level concentrations (GLCs) do not exceed those specified in Table 1 of Schedule 2 of the Tasmanian Air Policy. Table 20-4 provides the relevant GLCs from the policy. The EPA often seeks modelled data to provide assurance that non-standard conditions will not result in GLC exceedances. This may hold true for a closed-circuit scrubbing operation.

Table 20-4. Ground-level concentration design criteria (3-minute average unless otherwise specified)

Pollutant	ppm	mg/m3
Particulate matter (as PM10, 24-hour average)		0.150
Nitrogen dioxide (1-hour average)	0.16	
Sulfur dioxide (1-hour average)	0.20	
Sulfuric acid		0.033

20.2 Approval Summary

20.2.1 Plant

The approval for the plant will through an application by HGM to amend the EMP The prerequisites for this application are outlined as follows:

- The Waratah-Wynyard Municipality does not require a new permit and DA.
- EPA is comfortable that the potential operation and that the impacts fall within the scope of the existing reprocessing operation.
- HGM has sufficient tailings storage capacity for the tailings generated.

- Laboratory scale test work data demonstrates that the tailings will not create an adverse impact on the TSFs or on discharges and seepage.
- Confirmed information on the proposed process flow sheet from the lab scale test work data:
- Concentrations and constituents of the waste streams: wastewater, tailings, soldi waste
- Air emissions and the temperature and pressure of the leach process and pH adjustment.

If the EPA does not accept HGM amending their current permit to allow the construction, commissioning, and operation of the plant, an EER submission will be completed. Class 2A assessments are generally for low environmental risk, small scale projects with minimal adverse environmental effects that are local in extent, and which can be readily avoided or mitigated through management measures. Level 2A activities are expected to generate limited public interest.

Following the publication of this Technical Report, the NVRO Team will engage with the HGM team in an approach to the regulators that will further define the approach to obtaining the approvals.

20.3 International Requirements

All work will be completed to Australian standards. No international requirements have been considered in this work.

20.4 Treatment and Storage of NVRO Tailings

The NVRO Chief Technology Officer of the opinion that post NVRO process tailings are likely to not require sub-aqueous deposition due to the process breaking down the pyrite and the formation of stable sulfates as part of the proposed leaching, sulfidization, and neutralisation process steps. Additional work is required to confirm this assumption. If demonstrated to be correct, it will result in an increase in long term tailings storage space being available within HGM's current Tailings Storage Facilities (TSFs), which currently operate under the requirement for sub-aqueous deposition under a minimum of 2.0 metres of water.

The Hellyer Gold Mine has a current EMP approved that includes the management of existing and new tailings produced from the currently-operating HGM flotation plant. The initial feed for the Project for the first several years will be directly from the HGM tailings that are currently being produced. The tailings will pass through the Project. Within the NVRO Plant, metals will be removed, sulfides will be oxidized and any acid-generated will be neutralized. Therefore, an adverse effect on the operation of the current HGM TSF is not anticipated.

The following sections are from the current EMP approved in 2020.

20.4.1 HGM Tailings

Tailings storage at Hellyer is summarised in Table 14-5 and Table 14-7.

Subaqueous deposition of tailings has been used at Hellyer because the Hellyer tailings oxidise rapidly forming acidic drainage. After the site closed in 2000, water quality in and discharging from the TSF deteriorated, with low pH and high Pb and Zn concentrations

Existing tailings at Hellyer form the ore source for the current HGM mining and processing operation under the existing environmental approval. The initial resultant tailings were stored to be temporarily under water in the EFB with the dam wall raised by 4 m to 654 mRL to accommodate a total of 805,480 t of PRT at an assumed settled density of 1.3 t/m^3 projected as sufficient until the TSF2 was commissioned in May 2020.

In 2019, HGM developed an alternative tailings management plan because of work to evaluate the existing TSF:

- Bathymetric surveys in April and again in June showed that the tailings settled density was lower than the original estimate, theoretically reducing the capacity of the EFB.
- Pre-production dredging of the EFB storage area resulted in a lower storage volume than anticipated, again reducing the capacity of the EFB.
- Varying production and concentrate shipping rates.

Until TSF2 is commissioned, tailings will be stored in the Western Arm (Figure 18-1). The western arm embankment is a zoned earth, rock fill dam with an upstream clay core and downstream rockfill (shale) zone. A rock fill gravel filter layer of finer grade exists between the clay and the downstream zone rockfill. The original tailings management plan developed by GHD for Polymetals (PMH) in 2006 proposed that the western arm embankment be predominantly constructed out of a rockfill, and that minimal compaction would be undertaken on the clay core. Tailings would be placed behind the embankment to a maximum height of RL649 m, with water cover over the tailings to be maintained up to a wide, shallow spillway set slightly below the crest level. The tailings would be initially discharged from the upstream side of the embankment to help create a low permeability zone immediately upstream of the embankment.

In practice, when the western arm was used for tailings deposition by Intec and BSM, the tailings were deposited directly into the water body, thus creating a leaky aquitard allowing water in the western arm to flow through the semi permeable clay core of the embankment, which resulted in low water cover each summer when inflows reduce.

20.4.2 Mitigation of Adverse Effects

A critical factor in storage of tailings is the potential for further sulfide oxidation. The 2017 EMP noted that sulfide oxidation will be managed by:

- Tailings will deposited adjacent to and along the western arm embankment in accordance with the original TMP (GHD, 2006) to maximise supernatant water retention in the western arm. The low stress permeability of the tailings was measured at 1.0 x 10-8 m/s The permeability of the uncompacted clay is estimated at 1.0 x 10-6 m/s. The deposition of several meters of tailings will reduce the permeability of the embankment below the tailings level by at least two orders of magnitude.
- The tailings in the EFB will be submerged beneath a minimum of 1.0 m of water cover until final storage in TSF2.
- HGM will continue monitoring its active water quality management as described in the EMP and currently in force on site to maintain a minimum pH of 8.0 in the supernatant water of the TFS 1 with consequent low metal emission concentrations reporting to the Que River downstream of the site.
- The development dredge can be utilized to relocate tailings in the western arm to maximise sub aqueous storage before final relocation to TSF2.

20.5 Environmental and Social Setting

The Hellyer operation (comprising the mineral processing facilities and infrastructure, the former Hellyer underground mine and the Fossey development) is on the Que River plateau at approximately 700 m asl. The plateau is bounded to the east by the Southwell River valley, which is steeply sloping with thick rainforest cover, descending to around 400 m asl (Figure 20-1). To the west of the divide, the site slopes generally to the west where the Que and Bulgobac rivers flow to the south and west. The evenness of the topography to the west along the plateau is demonstrated by the presence of major power transmission lines, which cross the mining lease.

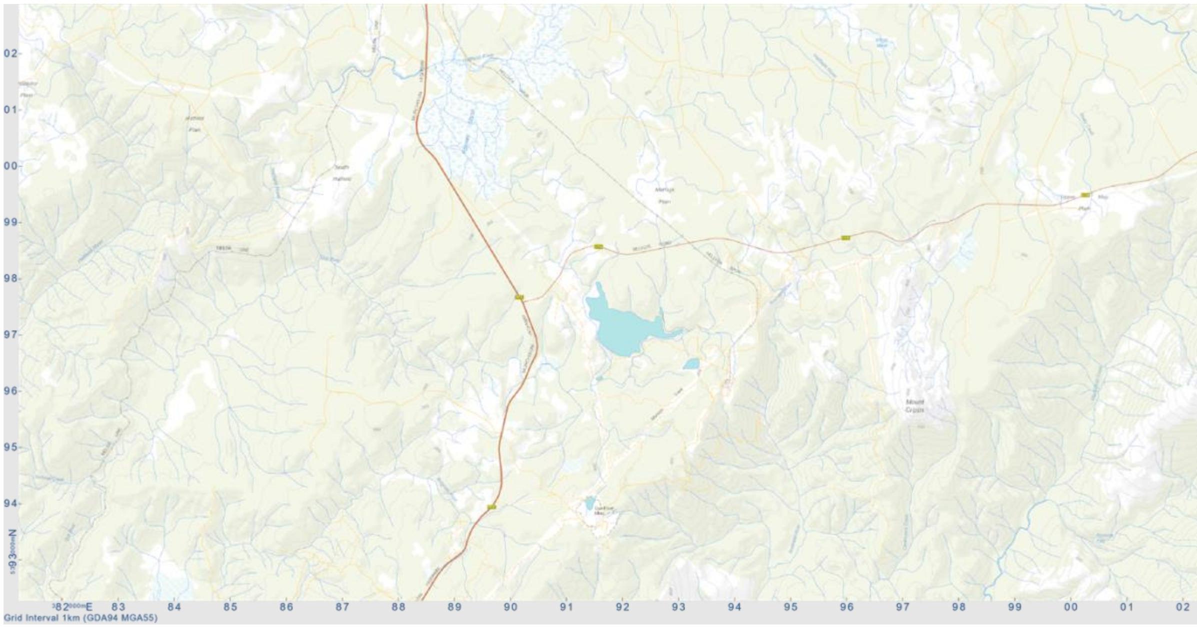

Figure 20-1. Local topography around the Hellyer Gold Mine

(Source: LIST Maps http://www.thelist.tas.gov.au/listmap)

20.5.1 Flora and Fauna

Miedecke (1987) described flora and fauna habitat surveys conducted in April 1987. One hundred and twenty-nine taxa of higher plants were observed at the Hellyer site. Twenty-eight species were endemic to Tasmania. The plant communities are typical of north-western Tasmania. These communities characteristically form a complex mosaic of different stages of successful development. These are a function of time since last burning, together with local effects of elevation, soil types, and drainage.

The Hellyer area has a habitat structure of dense temperate rainforest interspersed with wet sclerophyll forest, which is common along the Tasmanian west coast.

20.5.1.1 Rainforest

The rainforest area encompassing the site includes five communities. On the soils formed on basalt, the forests are either dominated by myrtle (*Nothofagus cunninghamii*) and sassafras (*Atherosperma moscahatum*) or by myrtle and tea tree (*Leptospermum lanigerum*).

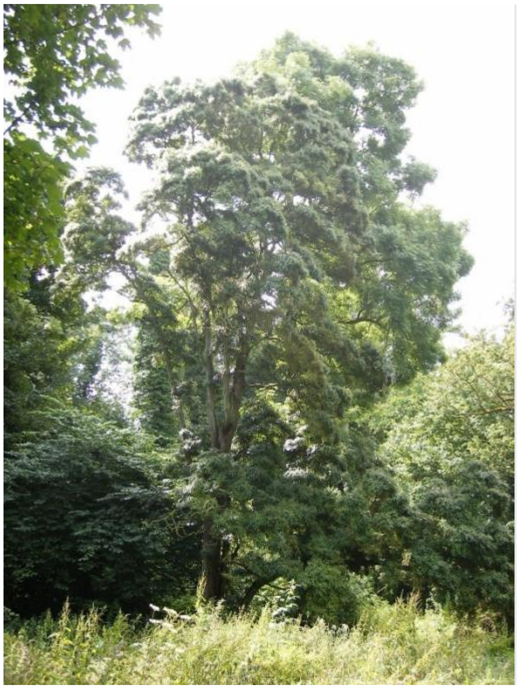

Figure 20-2. Example of myrtle (Nothofagus cunninghamii)

(Source: Trees and Shrubs Online)

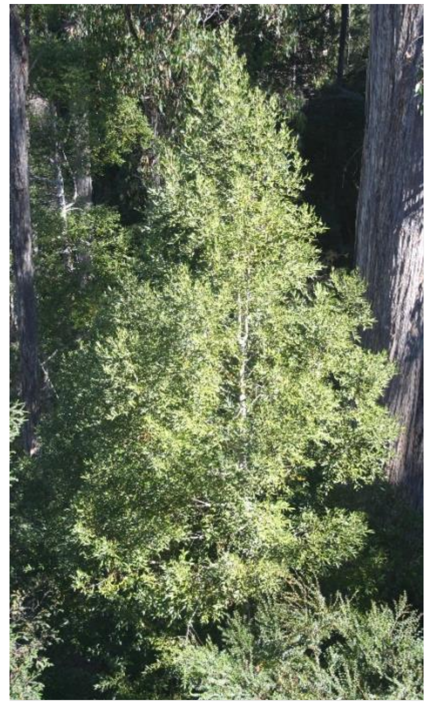

Figure 20-3. Example of and sassafras (Atherosperma moscahatum)

(Source: Trees and Shrubs Online)

On the soils formed on the Mt Read volcanics, three other rainforest communities are also found. The most common of these communities is dominated by myrtle, celery top pine (*Phyllocladus aspleniifolius*) and leatherwood (*Eucryphia lucida*). The second of these communities is dominated by myrtle and the third community is found where emergent eucalypts have died. It is dominated by celery top pine.

20.5.1.2 Open forest

Smithton peppermint (*Eucalyptus nitida*) – Brookers gum (*E. brookerana*). Smithton peppermint dominates this community over most of its area. Brookers gum occupies the more poorly drained sites. Epacrids, particularly goldiewood (*Monotoca glauca*), *Monotoca submutica*, and mountain berry (*Cyathodes parvifolia*) dominate the understorey of this community over most of the area. However, where fire has been recent native iris (*Diplarrena latifolia*) or other graminoids are dominant, and where fire has been absent for more than half a century, rainforest species, particularly celery top pine, dominate the understorey.

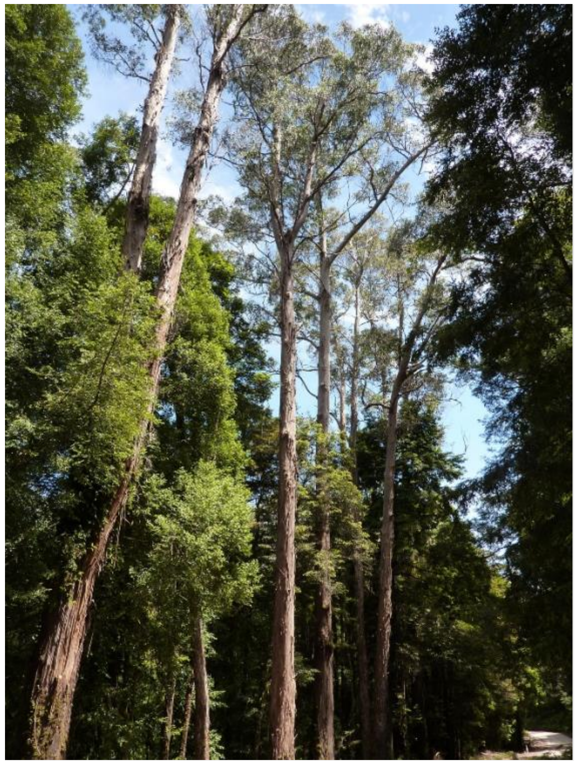

Figure 20-4. Example of Brookers gum (Eucalyptus brookerana).

(Source: Trees and Shrubs Online)

20.5.1.3 Tall open forest

Typically gum topped stringybark (*Eucalyptus delegatensis*); this community occupies the better sites in terms of drainage and fertility.

20.5.1.4 Sedgeland

Sedgeland is dominated by buttongrass (*Gymnoschoenus sphaerocephalus*). Sedgeland occupies the poorly drained and frequently burned sites on the Mt Read volcanics to the south and west of the existing main TSF. The buttongrass sedgeland found in this area is characterised by a relatively high cover of forbs and grasses and relatively low cover of shrubs when compared to the similar communities on quartzite.

20.5.1.5 Riparian complex

Fine textured and relatively fertile fluvial deposits are found along rivers and streams and below rainforest throughout the area. These spatially restricted environments support a large proportion of the species and communities recorded in the area. A community closely resembling a short alpine herbfield appears to be maintained by heavy grazing pressure of marsupials. The endemic herb, *Gunnera cordifolia* dominates most of the area of this community.

20.5.1.6 Fauna

The distribution of fauna at the Hellyer site reflects the fact that mining and processing operations have occurred in the vicinity since the early 1980s when the Que River Mine was established. Immediate habitat has been replaced by infrastructure and in some cases rehabilitated land. This favours some species, such as reptiles, at the expense of others.

Outside the immediate footprint of the mine and processing facilities, available habitat in the various vegetation communities is believed to be typical of the Tasmanian west coast.

20.5.2 Hydrology

The Hellyer Mine lies in the headwaters of the Que and Southwell river systems. The regional drainage pattern, including catchment boundaries and flow gauging stations (Figure 20-5). The Que River flows from the mining lease in a south-westerly direction, where it joins the Huskisson River before flowing into the Pieman River. The Southwell River flows in a southerly direction past the former Hellyer underground mine portal before emptying into Lake Mackintosh, a Hydro-Electric Corporation constructed storage.

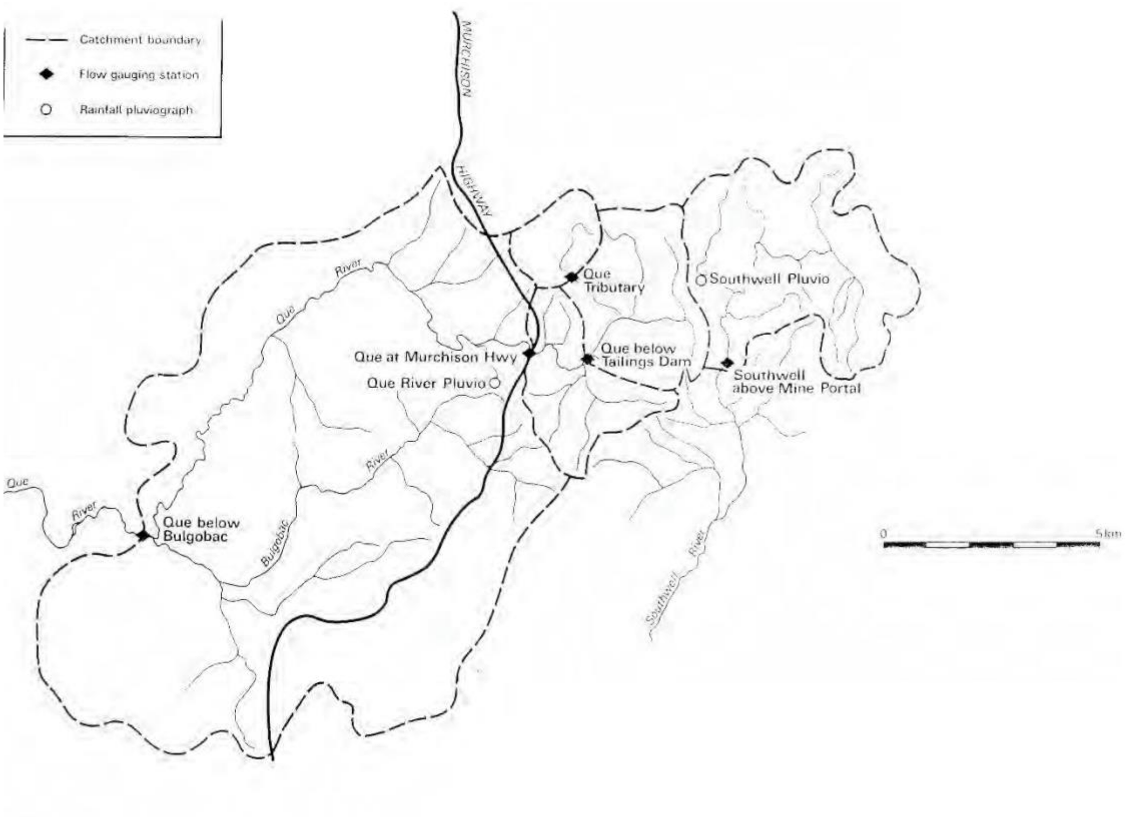

Figure 20-5. Catchment boundaries and hydrology around the Hellyer Gold Mine

(Source: Hellyer Gold Mines: Hellyer Tailings Reprocessing EMP - September 2017)

20.5.2.1 Que River catchment

This catchment contains the Hellyer concentrator site, existing main TSF, access roads and the closed Que River Mine to the south. The tributaries of the Que River dissect the Que River plateau, and flow in a generally south-westerly direction. Some areas of the Que River catchment have been substantially disturbed. In the west and north of the catchment are the Murchison Highway and the Cradle Mountain Link Road. To the north of the Cradle Mountain Link Road are eucalypt plantations on freehold land.

Major TasNetworks high voltage transmission line corridors are present. In the east, the native forests have been logged. The southern portion contains the Que River Mine.

Que River flows have been monitored at the Murchison Highway. Flow data from the Hydro Tasmania gauging station are summarised in Table 20-5.

Table 20-5. Flow data for the Que River

Location	Year span	Average monthly peak flows (m3/s)	Average monthly flow (m3/s)
Que River at Murchison Highway	1987–1998	3.20	1.07
Que below Bulgobac Creek	1987–1995	22.56	6.03

(Source: Hydro Tasmania)

20.5.2.2 Southwell River

The Southwell River has a catchment of approximately 16 km2. The Southwell River gorge is in a steep precipitous valley, which runs north–south and is thickly forested. The catchment has been disturbed to a limited extent by decades-old logging operations, tree plantation establishment, TasNetworks transmission line works and the Cradle Mountain Link Road.

The original Hellyer underground mine portal is close to the Southwell River, which then drains in a southerly direction to Lake Mackintosh.

20.5.3 Surface Water Quality

20.5.3.1 Southwell River

Reasonable quality creek water and uncontaminated intercepted groundwater are directed from the Hellyer Mine portal into the Southwell River.

The Southwell River is, in general, slightly acid in pH, low in conductivity (indicating organic acids) and carries low to moderate concentrations of most metals.

20.5.3.2 Que River

All site discharge except for seepage from around the Hellyer and Fossey adits reports to the Que River, which then reports to the Huskisson River and, in turn, to the Pieman River.

The Que River is a moderately to severely disturbed system, which has received water discharge from both the Hellyer and Que River mines into its headwaters for decades. Discharges from the Que River Mine emanate from its settling dam, which overflows regularly during winter and intermittently during summer. The Hellyer TSF, with its larger catchment discharges most days of the year. Comparing the calculated fluxes of metals and sulfates discharged from the Hellyer TSF and the Que River settlement dam shows that the mean fluxes from Que River generally exceed the fluxes from Hellyer by a factor of between 22.2:1 for Total Zn to 4.1:1 for Total Al, for the decade from 2006 to 2016.

Table 20-6 shows selected water quality parameters in the Que River at the Murchison Highway gauging station, which is 2.8 km below the Hellyer TSF outflow and 3.6 km below the Que River settlement dam outflow.

Table 20-6. Que River at Murchison Highway Sep 06 – May 17

Statistic	Acidity to pH 8.3 mg/L	pH (pH units)	Al (Total) mg/L	Cd (Total) mg/L	Cu (Total) mg/L	Pb (Total) mg/L	Ni (Total) mg/L	Zn (Total) mg/L
Mean	10.06	6.12	0.59	0.004	0.02	0.07	0.02	0.87
Median	8	6.21	0.47	0.002	0.01	0.05	0.019	0.68
Maximum	37	8.1	3.16	0.098	0.12	0.56	0.06	6.48
Std. deviation	7.29	0.88	0.44	0.01	0.01	0.08	0.01	0.71
90th percentile	22	7.2	1.04	0.006	0.03	0.14	0.04	1.69
75th percentile	12	6.77	0.72	0.004	0.02	0.08	0.03	1.02
20th percentile	5	5.37	0.28	0.0013	0.008	0.01	0.01	0.40
10th percentile	4	4.9	0.21	0.001	0.006	0.007	0.01	0.287
ANZECC*			0.15#	0.0008	0.0025	0.0094	0.017	0.031

**Australian and New Zealand Environment Conservation Council (ANZECC) guidelines for surface waters for the protection of 80% of species (disturbed ecosystem)*

 # Total Al guideline value for pH>6.5, which is above both the median and mean values at the site.

The total metal concentrations in are above the ANZECC trigger level values for the protection of 80% of species, except for the 10th percentile for total Pb. No specific water quality objectives currently exist for the Que River. Site-specific water quality objectives can be established where sufficient scientific data is available. Where data is not available, the water quality objectives default to the trigger values in the Australian and New Zealand Guidelines for Fresh and Marine Water Quality 2000 (ANZECC, 2000) and in a moderately to severely disturbed ecosystem such as the Que River, the default ANZECC guidelines of 80% species protection for aquatic ecosystems apply. The emission limits set for the Hellyer TSF outflow reflect the PEVs through the implementation of best practice environmental management as determined by the EPA in setting site limits.

20.5.4 Groundwater

The area has a high rainfall averaging 2.24 m/year (Section 5.3) and relatively low evaporation rate averaging 0.48 m/year. The mine site is located on a plateau which would have been a natural recharge area before mining. Groundwater would have discharged by seeps and springs in the valleys running out to the north-west and to the east. Based on observations in open boreholes away from the mine in 1998, the pre-mining groundwater levels above the orebody may have been in the range 675 m RL to 685 m RL.

Golder detailed natural discharge to the steeply incised Southwell River and its tributaries along the western valley side and to the broad Que River valley. The gullies show continuous water flow after days without rain, indicating groundwater base flow (Golder, 1999). The hydrogeological units at this site mainly constitute a fractured rock aquifer where groundwater is stored and transmitted by fractures, joints, and other discontinuities within the rock mass. Although the shale and sandstone and coarser grained sediments within the sequence may have primary porosity, secondary porosity mechanisms are expected to dominate flow processes. Reports have described groundwater flow as being from the south and east to the north, based on measured water levels and a consideration of the topography (Golder, 2006).

20.5.4.1 Hellyer Underground Mine

The mined Hellyer orebody lies in a north-plunging broad anticline of Cambrian volcanics. It extends over about 850 m north–south, plunging to the north. The mine excavations extend from about 100 m depth (600 m RL) at the southern end to 500 m depth (200 m RL) at the northern end. The main access to the mine was via a 1.2 km long adit from the Southwell River valley east of the mine at around 390 m RL (Geological Setting is included in Section 8.3).

The TSF centroid is 1.5 km west of Hellyer void with its spillway level invert and water surface at RL 649.50 m asl.

The adit slopes gently down away from the mine towards the portal. Groundwater inflow to the adit was estimated in 1998 at 9 L/s but a significant part of this came from shallow groundwater in the more weathered zone near the portal.

Mining ceased in 2000. A concrete plug was placed in the adit in November 2000 and final grouting of the plug completed in February 2001 to minimise the flow of water from the mine into the Southwell River. The plug is located approximately 580 m from the portal. The mine water level, as monitored by pressure transducer, rose from the adit plug level (390 m RL) in February 2001 to a relatively stable level of about 665 m RL in November 2002.

Mine drainage in 1997–1998 required an average pumping rate of 39 L/s. The majority of this was considered to come from groundwater seepage into the mine with smaller contributions from water used in mining and water entering from the surface via the crater over the north end of the mine. Direct rainfall into the crater was estimated to average 2 L/s.

Backfill for the mined excavations was obtained from the shale quarry developed just west of the orebody.

In 2006, the total recharge water supply to the mine and shale quarry was estimated at around 9 L/s. This estimate matches the outflow estimates of 4 L/s from the shale quarry and 5 L/s from Jed's Spring. Water injection test by Golders in September 2000 indicated typical hydraulic conductivity of the rock mass in the vicinity of 10-8m/s with localised more conducive zones of about 10-6m/s.

20.5.4.2 Fossey Underground Mine

The Fossey orebody is located south-west of the mined-out Hellyer orebody with a separation of about 150 m of rock between the two orebodies. The location of the Hellyer underground void and the Fossey void is shown in Figure 20-6. BSM established the Fossey underground mine in 2010 with a decline approximately 900 m long providing access to the planned stopes within the Fossey orebody. From the early stages of decline development, delays were caused by groundwater inflows. Excessive water inflows, increased costs and low metal recovery led to a mine shutdown in May 2012. A plug (designed by Pitt and Sherry), was inserted in the decline in July 2012 to allow the mine to flood, thereby reducing the potential for oxidation of sulfides that could generate AMD discharge.

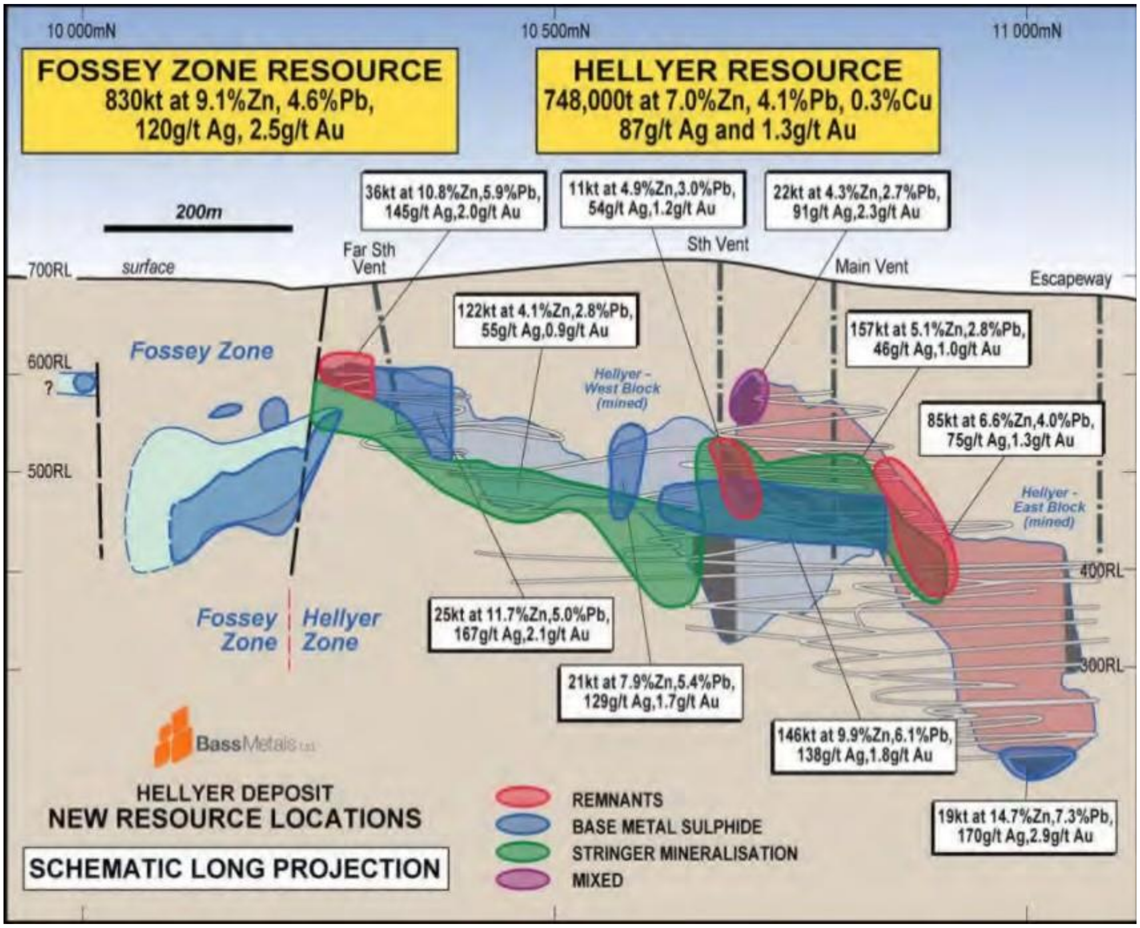

Figure 20-6. Schematic presentation of the Hellyer and Fossey Orebodies

(Source: Bass Metals)

20.5.4.3 Conceptual Groundwater Model Hellyer

During mining of Hellyer, a drawdown cone developed as groundwater seeping into the mine excavations was removed. Recharge to groundwater from rainfall would have locally increased due to ground deformations above the mine and particularly the development of the crater over the north end of the mine. It is not known how effectively the backfill in this crater was placed and compacted to shed water or minimise entry of water.

After mining, the adit plug appears to have been effective in minimising the flow of water from the mine to Southwell River. The mine water level in the void stabilised by November 2002.

Looking at the topographic catchment area around the mine, it is considered that recharge from rainfall over an area extending about 900 m north–south by 250 m to 450 m wide over the mine and along its east side, would be entering the groundwater system up-gradient of the mine. Assuming a relatively high recharge rate equal to 25% of average rainfall over this area, the contribution to groundwater would average 5.6 L/s (Golder, 2006).

Mining One (2013) identified three major faults in the area:

- Jack Fault: a steeply dipping fault which runs north-north-east along and through the Hellyer orebody, and runs along the east side of the Fossey orebody

- East Street Fault: This fault runs east-south-east across the south end of the Hellyer orebody and underlies the Fossey orebody
- Tailings Dam Fault: A steeply dipping fault passing south-south-east of the Fossey orebody.

These major faults can be seen in Figure 20-8.

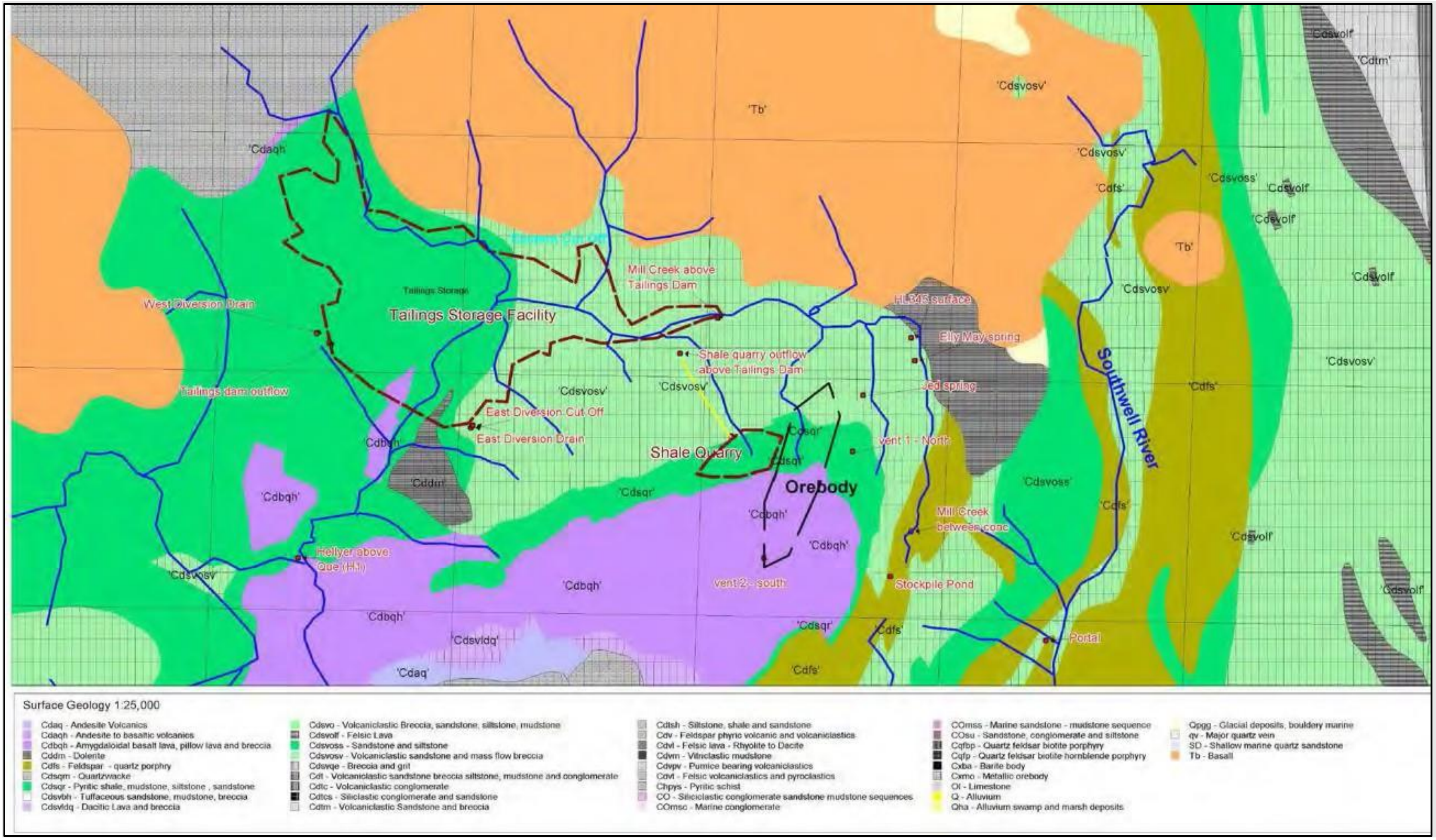

Figure 20-7. Location of the groundwater monitoring stations around the Hellyer Gold Mine

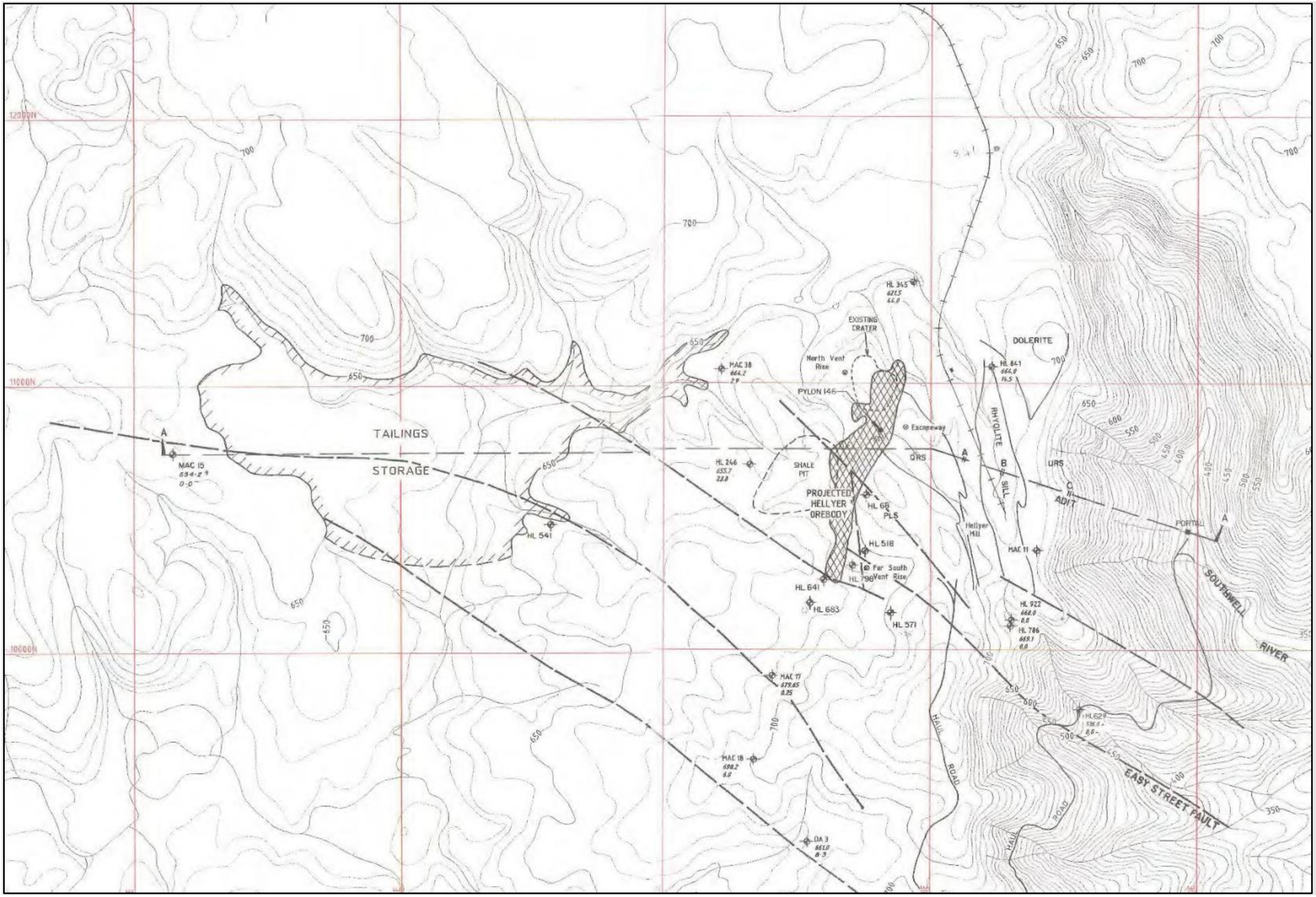

Figure 20-8. Contours and fault lines Hellyer Mine area 2006

20.5.4.4 Groundwater underground voids

Data on groundwater levels is provided from the various ventilation shafts connected to the Hellyer Mine and to the Fossey Mine, as well as groundwater monitoring wells around the area. Hydrographs built from historical and recent records show a decrease in groundwater levels from the period 2010 to mid-2011, then a sharp increase in groundwater level across the site since July 2011 (Figure 20-9).

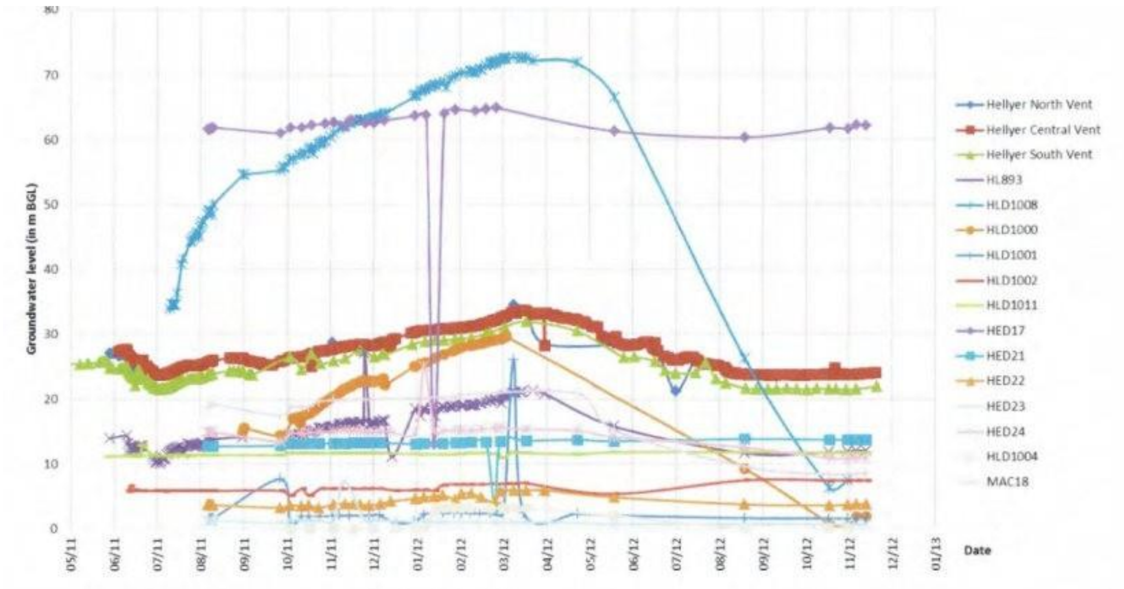

Figure 20-9. Groundwater level monitoring 2011–2012

The recovery (increase in water level to static conditions after the pumping stops) measured from ground level is more rapid for the bores located in the vicinity of the mine void, with hydrographs showing a greater amplitude. However, it is also noted that some bores located downstream, such as MAC18, HED17, HED23 and HED24, are impacted by both drawdown and recovery. It is likely these bores are somehow connected to the aquifer and are impacted by the mine development. The analysis of the recovery observed between March and November 2012 shows that levels have completely recovered since September 2012 (Figure 20-10).

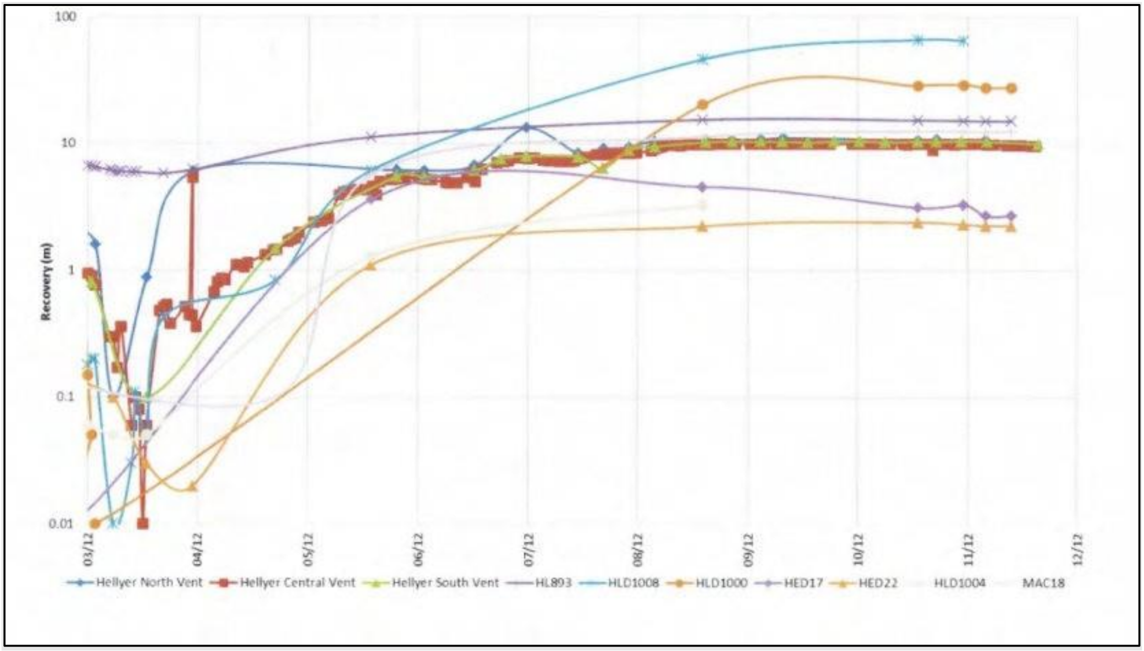

Figure 20-10. Groundwater monitoring showing recovery 2012

Based on the historical and current records, it is possible that the water quality from the Fossey void samples indicates some mixing of the water from Hellyer void and the surrounding recharge, with a variable proportion of dilution of the void waters by shallow, and hence fresher, groundwater.

Detailed profile sampling (every 50 m) was undertaken by Bass Metals in 2008 on the main vent and the south vent. Results show a strong increase in mineralisation with depth for the main vent, while the south vent records remain relatively unchanged with depth.

A comparison between the 2008 main vent results at a depth of 300 m and Jed's Spring two-year average (up to 2008) shows a strong relationship between both sampling points for the period. It is also considered that water travelling from the shale quarry to the Fossey void could be a possibility.

20.5.4.5 Groundwater quality

With regards to groundwater quality in the Hellyer void, the discharge from Jed's Spring is considered an important indicator. The results are summarised in with trends over time shown in Figure 20-11.

Table 20-7. Jed's Spring key water quality parameters 2006–2017

Statistic	Laboratory pH units	Acidity to pH 8.3 mg/L (CaCO3)	Alkalinity (Total) mg/L	Cadmium (Total) as Cd mg/L	Copper (Total) as Cu mg/L	Iron (Total) as Fe mg/L	Lead (Total) as Pb mg/L	Manganese (Total) as Mn mg/L	Nickel (Total) as Ni mg/L	Zinc (Total) as Zn mg/L	Sulfate as SO4 mg/L
Maximum	7.82	124	167	0.047	0.237	62.9	1.37	16.3	0.668	26.4	2480
90th percentile	6.97	97	150	0.01865	0.0675	46.2	0.2265	13.5	0.5385	19.85	1846
75th percentile	6.715	77.75	132	0.01	0.03775	42.875	0.13075	11.325	0.43	16.1	1750
Median	6.5	57	102	0.0058	0.015	38.35	0.062	8.875	0.343	11.2	1290
20th percentile	6.22	36	50	0.0025	0.004	30.4	0.035	6.55	0.285	9.26	1134
10th percentile	6.09	30.5	35	0.002	0.002	27.2	0.023	6.075	0.2635	8.01	928.4
Mean	6.44	60.31	93.59	0.01	0.03	37.82	0.13	9.11	0.37	12.84	1407.61
Std deviation	0.66	27.03	46.81	0.01	0.04	9.75	0.22	2.99	0.11	4.70	403.94

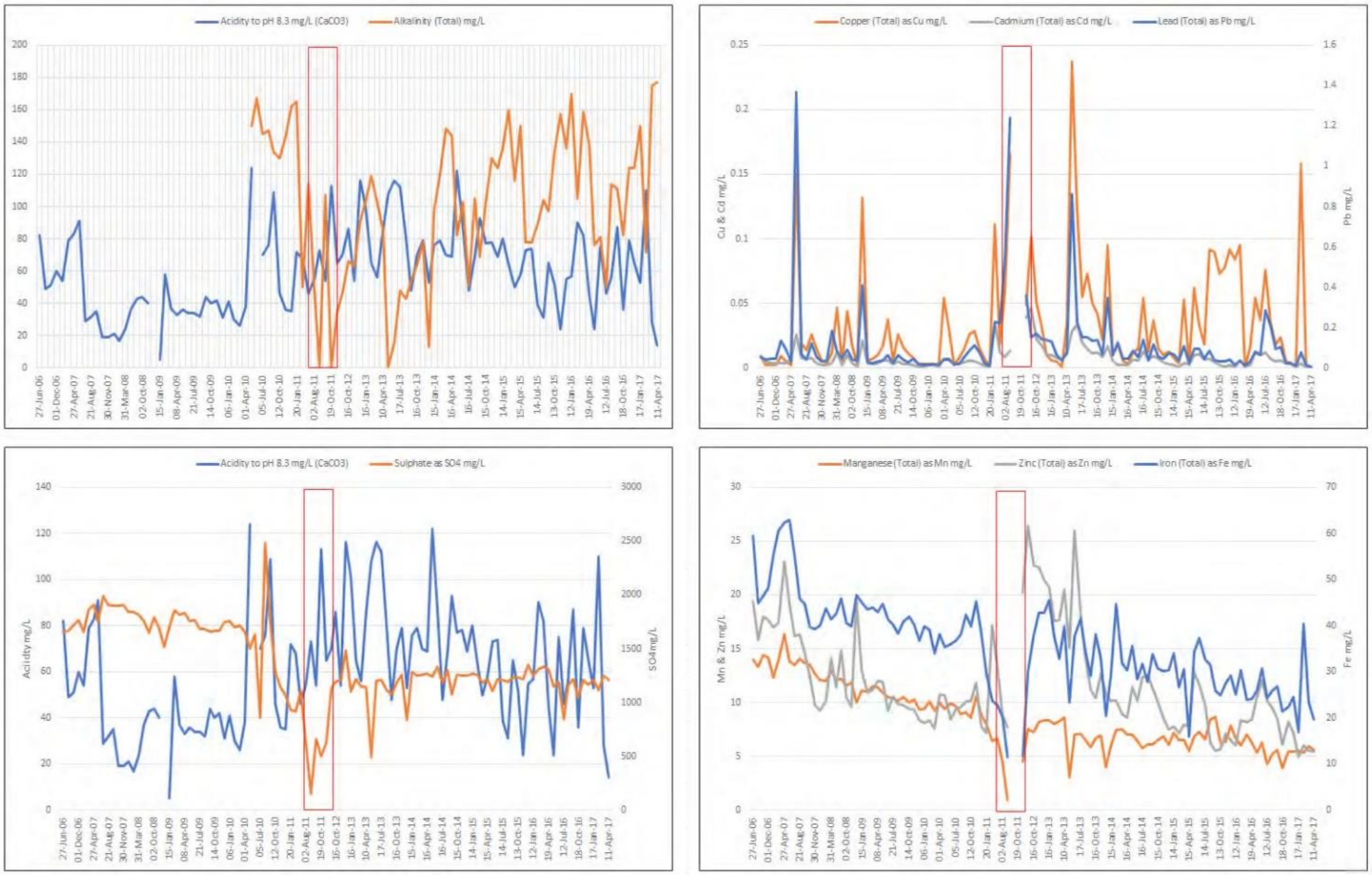

Figure 20-11. Jed's Spring water quality trends

In Figure 20-11, the red rectangle indicates the period when Fossey was mined, with the consequent in-rush of groundwater. This period seems to correlate with spikes in metal and acidity concentrations, indicating that groundwater in the Hellyer void had dropped, thus increasing AMD production, providing evidence for Mining One's theory of leakage from the Hellyer void into the Fossey void.

It was noted by Golder in 2006 that the local spring flows were clear and surrounded by deposited iron. From this it was inferred that ferrous iron is held in solution in the low-oxygen mine environment. When the mine water reaches the surface, oxygen levels increase and the iron deposits as ferric iron.

Site investigations in 2006 by Golder (2006) identified five groundwater discharge locations:

- Adit portal – pool of water showing iron staining – outflow of approximately 0.5 L/s overflow from the shale quarry
- Jed's Spring
- Elly May's Spring
- Borehole HL345 – small artesian flow.

The Project is unlikely to influence groundwater as there are no discharges from the NVRO processing plant to the receiving environment. All tailings remain the property of HGM and will be placed for storage in the existing, permitted TSFs.

20.5.5 General Social Setting

The Hellyer Gold Mine is in the Municipality of Waratah Wynyard. The Waratah Wynyard Council web site provides the history of the area (https://www.warwyn.tas.gov.au/our-place/history/), which is summarized in this section.

The Wynyard Municipality is on lands that once belonged to the Tommeginer tribe of Table Cape, one of the eight tribes that made up the north west linguistic group of Aborigines. These tribes formed a loose knit, social, and economic confederation that occupied a coastal strip extending from Table Cape to Cape Grim, and then down the West Coast to just north of the Macquarie Harbour. The tribes, each led by a chieftain, each numbered between 60 and 120 people and consisted of several hearth groups (families) who shared the same hut and campfires. Shelter for the North West Tribes consisted of permanent beehive huts at least 10 feet (~3 m) in diameter and 6 feet (~2 m) in height.

Little remains of the Tommeginer people's long-standing occupation. Evidence of their dependency on the sea is seen in middens along the coast and remains of the Aboriginal fish traps (as seen at Freestone Cove at Fossil Bluff). Women, who were expert divers and swimmers, played the dominant role in gathering sea bird eggs, hunting seals, and diving for shellfish. The baskets woven from grass or kelp were used in gathering food (*e.g*., crayfish, mussels, abalone, oysters). Hunting kangaroo and wallaby was a male activity, with the spear being the principal tool.

In more recent times, Table Cape (7 km north of Wynyard on Tasmania's north west coast), is flat-topped promontory with a sheer drop to the sea that was "discovered" and named by Matthew Flinders in 1798. The first settlements around Wynyard were named Table Cape. On May 2nd, 1827, explorer and surveyor Henry Hellyer named the Inglis river after James Inglis (Director the Van Diemen's Land Company). The first documented settler at Table Cape, was John King, who had been a farmer at Dunedin near Launceston. In 1841, King selected 200 acres of land on the northern banks of the Inglis River (including the area now used by the Wynyard Golf Club).

By about 1851, a small settlement grew up just north of the present Table Cape bridge. Joseph Alexander built a hotel with bricks made of clay obtained from the side of a nearby road. Frederick Matthias Alexander (1869-1955), the founder of the universal Alexander Technique, was born at Table Cape. In 1853, the first of several timber mills were constructed, which supplied timber during the gold rush. Messrs. J. Stutterd and Sons occupied the eastern side of Camp Creek with jetty, wharf, shop, store and residence from the mid 1860's. Houses and public buildings were erected in the immediate neighbourhood. This bustling new township was named Wynyard.

Wynyard was named after General Edward Buckley Wynyard, who arrived in Sydney as Commanding Officer of the British troops and had visited Van Diemen's Land in 1850 when the surveyor Peter Lette surveyed the town reserve. Table Cape Lighthouse was constructed in 1888 and converted to automatic acetylene in 1920. The last lighthouse keeper was withdrawn in 1923 and the cottages were demolished in 1926. In 1979, the beacon was converted to electricity.

Over the years the land north of the Inglis River and on top of Table Cape was cleared of large trees, uncovering the beautiful red loam soil suitable for the growing of potatoes, peas, onions and corn and the raising of sheep and cattle. More recently, Table Cape has become famous for the spectacular rows of vibrant tulips each spring.

20.5.6 2021 Census: Waratah- Wynyard (LGA65410)

The information presented in this section is summarized from the 2021 Census completed by the Australian Bureau of Statistics:

(https://www.abs.gov.au/census/find-census-data/quickstats/2021/LGA65410).

20.5.6.1 General Population Data

The population is 14,300 with 48.6% male and 51.4% female and a median age of 48. There were 3,970, with 1.9 children per family for families with children (0.6 children per family overall). For the 6,895 private dwellings, there was an average of 2.3 people per household. Median weekly household income was AU$1,138 with a monthly median mortgage payment of AU$1,200. Weekly median rent was AU$240, and there was an average of 1.9 vehicle per household. More specific data on populations are presented in Table 20-8. Population distribution data by age is presented in and marriage status is provided in Table 20-9 and in Figure 20-12.

Table 20-8. A summary of the people and population of Waratah-Wynyard relative to Tasmania and Australia.

All People	Waratah-Wynyard	%Waratah-Wynyard	Tasmania	%Tasmania	Australia	%Australia
Male	6,956	48.6	273,765	49.1	12,545,154	49.3
Female	7,345	51.4	283,804	50.9	12,877,635	50.7
Indigenous status (all people)						
Aboriginal and/or Torres Strait Islander	1,263	8.8	30,186	5.4	812,728	3.2
Non-Indigenous	12,270	85.8	501,521	89.9	23,375,949	91.9
Indigenous status not stated	768	5.4	25,851	4.6	1,234,112	4.9

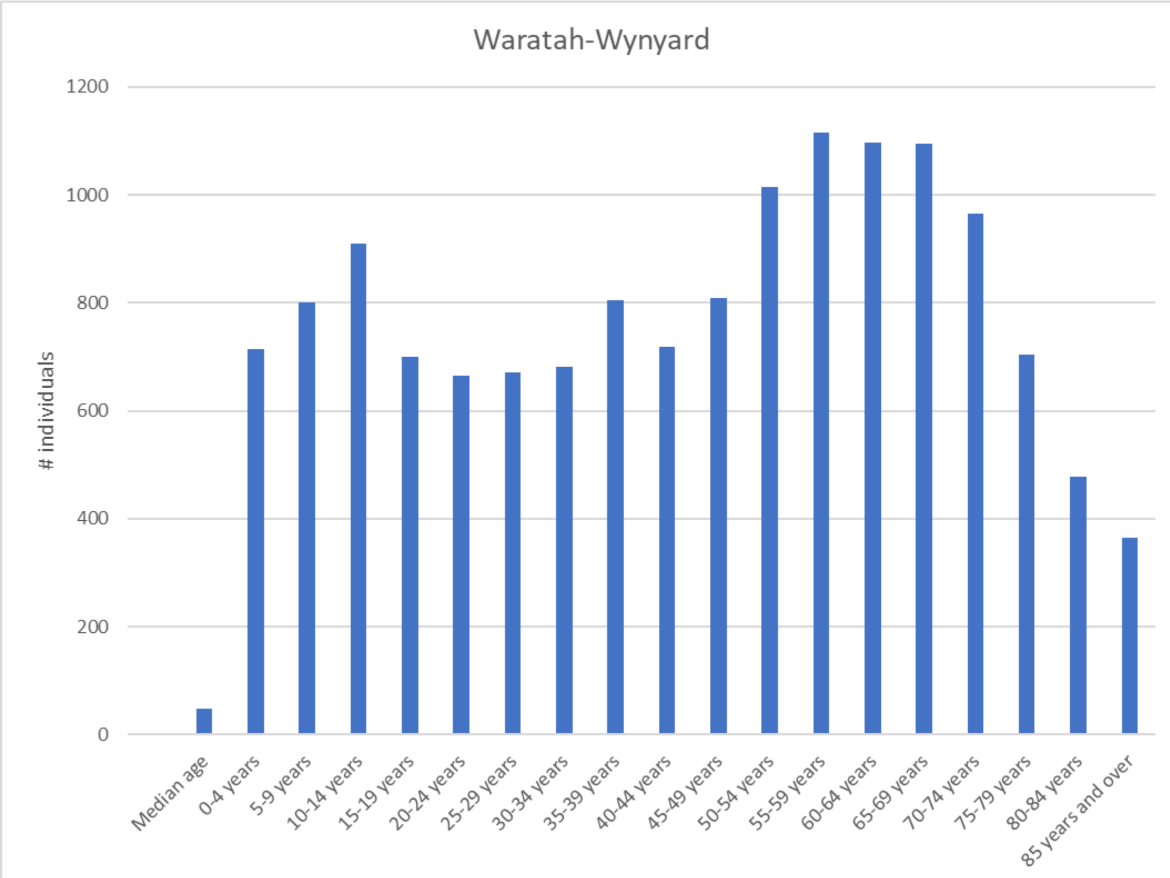

Figure 20-12. Population distribution data by age for the Waratah Wynyard Municipality

(Source: Australian Bureau of Statistics Census 2021)

Table 20-9. Registered marital status for the Waratah-Wynyard Municipality compared to Tasmania and Australia

Registered marital status People aged 15 years and over	Waratah-Wynyard	%Waratah-Wynyard	Tasmania	%Tasmania	Australia	%Australia
Married	5,617	47.3	206,403	44.4	9,665,708	46.5
Separated	427	3.6	15,471	3.3	674,590	3.2
Divorced	1,259	10.6	47,755	10.3	1,831,952	8.8
Widowed	863	7.3	27,690	6.0	1,029,142	5.0
Never married	3,707	31.2	167,621	36.1	7,583,393	36.5

(Source: Australian Bureau of Statistics Census 2021)

20.5.6.2 Dwellings

Information on dwelling numbers, occupancy, structure, *etc*. are presented in Table 20-10, Table 20-11 and Table 20-12.

Table 20-10. Dwellings and dwelling occupancy for the Waratah-Wynyard Municipality

Dwelling count Private dwellings (excl. visitor only and other non-classifiable households)	Waratah-Wynyard	%Waratah-Wynyard	Tasmania	%Tasmania	Australia	%Australia
Occupied private dwellings	5,850	89.1	218,412	88.2	9,275,217	89.9
Unoccupied private dwellings	708	10.8	29,185	11.8	1,043,776	10.1

(Source: Australian Bureau of Statistics Census 2021)

Table 20-11. Type of dwelling structure for the Waratah-Wynyard Municipality

Dwelling structure Occupied private dwellings (excl. visitor only and other non-classifiable households)	**Waratah-Wynyard**	**%Waratah-Wynyard**	**Tasmania**	**%Tasmania**	**Australia**	**%Australia**
Separate house	5,407	92.4	191,561	87.7	6,710,582	72.3
Semi-detached, row or terrace house, townhouse etc	355	6.1	13,402	6.1	1,168,860	12.6
Flat or apartment	21	0.4	11,575	5.3	1,319,095	14.2
Other dwelling	58	1.0	1,389	0.6	54,711	0.6

(Source: Australian Bureau of Statistics Census 2021)

Table 20-12. Tenure for dwellings in the Waratah-Wynyard Municipality

Tenure type Occupied private dwellings (excl. visitor only and other non-classifiable households)	**Waratah-Wynyard**	**%Waratah-Wynyard**	**Tasmania**	**%Tasmania**	**Australia**	**%Australia**
Owned outright	2,439	41.7	81,042	37.1	2,872,331	31.0
Owned with a mortgage (a)	1,838	31.4	72,157	33.0	3,242,449	35.0
Rented (b)	1,408	24.1	57,762	26.4	2,842,378	30.6
Other tenure type (c)	81	1.4	4,045	1.9	181,518	2.0
Tenure type not stated	87	1.5	3,403	1.6	136,538	1.5

(a) Includes dwellings purchased under a shared equity scheme.

(b) Excludes dwellings being occupied rent-free, this is not comparable to 2016 QuickStats data.

(c) Comprises dwellings occupied rent free, occupied under a life tenure scheme and other tenure type.

(Source: Australian Bureau of Statistics Census 2021)

20.5.6.3 Education

People currently attending an educational institute is provided in the following Table 20-13.

Table 20-13. Numbers of people and institution type for current attendance

Type of educational institution attending People attending an educational institution	**Waratah-Wynyard**	**%Waratah-Wynyard**	**Tasmania**	**%Tasmania**	**Australia**	**%Australia**
Preschool	135	3.7	6,495	4.2	484,185	6.3
Primary	null	null	null	null	null	null
Primary - Government	940	25.7	32,003	20.8	1,421,300	18.5
Primary – Catholic	227	6.2	8,393	5.4	396,758	5.2
Primary - other non-Government	29	0.8	4,774	3.1	254,043	3.3
Primary total (a)	1,197	32.8	45,209	29.3	2,075,224	27.0
Secondary	null	null	null	null	null	null
Secondary - Government	604	16.5	19,566	12.7	934,138	12.2
Secondary - Catholic	157	4.3	7,112	4.6	371,022	4.8
Secondary - other non-Government	20	0.5	5,449	3.5	322,314	4.2
Secondary total (b)	788	21.6	32,170	20.9	1,629,624	21.2
Tertiary	null	null	null	null	null	null
Tertiary - Vocational education (including TAFE and private training providers)	275	7.5	14,763	9.6	601,901	7.8
Tertiary - University or other higher education	271	7.4	19,814	12.8	1,185,450	15.4

Type of educational institution attending People attending an educational institution	Waratah-Wynyard	%Waratah-Wynyard	Tasmania	%Tasmania	Australia	%Australia
Tertiary total (c)	547	15.0	34,622	22.5	1,789,994	23.3
Other	74	2.0	4,810	3.1	242,821	3.2
Not stated	911	24.9	30,895	20.0	1,456,618	19.0

(Source: Australian Bureau of Statistics Census 2021)

20.5.6.4 Cultural Diversity

The top responses for ancestry are presented in Table 20-14. The Australian Aboriginal population in the Waratah-Wynyard Municipality is 3% higher than for Tasmania and almost 3x that for Australia.

Table 20-14. Ancestry reported in the 2021 Census

Ancestry, top responses All people	Waratah-Wynyard	%Waratah-Wynyard	Tasmania	%Tasmania	Australia	%Australia
English	6,497	45.4	243,587	43.7	8,385,928	33.0
Australian	6,473	45.3	225,198	40.4	7,596,753	29.9
Scottish	1,407	9.8	52,604	9.4	2,176,777	8.6
Irish	1,381	9.7	56,619	10.2	2,410,833	9.5
Australian Aboriginal	1,132	7.9	26,926	4.8	741,307	2.9

(Source: Australian Bureau of Statistics Census 2021)

20.5.6.5 Income and Work

Median weekly incomes for people aged 15 and over were AU$605, compared to AU$805 for Australian with both family and household weekly incomes being lower (AU$1,516 and AUS$1,138, respectively) than those for Tasmania (AU$1,702 and AU$1,358, respectively). For unpaid work and care, information is presented in Table 20-15.

Table 20-15. Summary of unpaid work and care for Waratah-Wynyard

Unpaid work and care People aged 15 years and over	Waratah-Wynyard	%Waratah-Wynyard	Tasmania	%Tasmania	Australia	%Australia
Did unpaid domestic work (week before Census Night)	8,238	69.4	323,348	69.5	14,077,657	67.7
Provided unpaid care for child/children (during two weeks before Census Night)	2,949	24.9	119,193	25.6	5,471,756	26.3
Provided unpaid assistance to a person with a disability, health condition or due to old age (during two weeks before Census Night)	1,671	14.1	59,864	12.9	2,476,681	11.9
Did voluntary work through an organisation or group (last 12 months)	1,920	16.2	83,646	18.0	2,933,646	14.1

(Source: Australian Bureau of Statistics Census 2021)

20.5.6.6 Health

When compared to the rest of Australia, the people in the Waratah-Wynyard Municipality have more health problems (Table 20-16).

Table 20-16. Long-term health conditions reported for the Waratah-Wynyard Municipality

Type of long-term health condition All people	Waratah-Wynyard	%Waratah-Wynyard	Tasmania	%Tasmania	Australia	%Australia
Arthritis	1,900	13.3	68,070	12.2	2,150,396	8.5
Asthma	1,570	11.0	52,171	9.4	2,068,020	8.1

Type of long-term health condition All people	Waratah-Wynyard	%Waratah-Wynyard	Tasmania	%Tasmania	Australia	%Australia
Cancer (including remission)	529	3.7	19,104	3.4	732,152	2.9
Dementia (including Alzheimer's)	117	0.8	4,395	0.8	189,162	0.7
Diabetes (excluding gestational diabetes)	1,007	7.0	28,394	5.1	1,198,721	4.7
Heart disease (including heart attack or angina)	787	5.5	25,185	4.5	999,096	3.9
Kidney disease	226	1.6	6,326	1.1	231,777	0.9
Lung condition (including COPD or emphysema)	468	3.3	14,027	2.5	441,109	1.7
Mental health condition (including depression or anxiety)	1,601	11.2	63,861	11.5	2,231,543	8.8
Stroke	215	1.5	6,836	1.2	234,609	0.9
Any other long-term health condition(s)	1,336	9.3	49,458	8.9	2,041,929	8.0
No long-term health condition(s)	7,361	51.5	305,093	54.7	15,292,718	60.2
Not stated	1,180	8.3	43,649	7.8	2,066,251	8.1

(Source: Australian Bureau of Statistics Census 2021)

20.6 Environmental and Social Issues

20.6.1 Environmental Issues

20.6.1.1 Acid Drainage

In 2006, Polymetals identified geochemical issues and acidic supernatant water in the TSF as the biggest risk on site, with tailings embankment failure being the next biggest risk. In 2009, BSM identified similar risks and risk levels but identified AMD from sulfidic tailings oxidation more specifically than Polymetals.

From the environmental management plans, HGM believes that these aspects remain the major environmental risks at the Hellyer site. In its work to characterize and control these risks, HGM applies advanced AMD characterisation and mitigation techniques.

20.6.1.1.1 Background

Since the closure of the Hellyer Mine by Western Metals in 2000, the receiving environment at Hellyer has been adversely affected by acidic drainage caused by the oxidation of exposed sulfide tailings. More specifically, the exposure of the tailings to oxidation has occurred in the eastern arm of the TSF. There tends to be seasonal emissions with autumn rains flushing acidity from the oxidising tailings into, and then out of, the main TSF.

Following the construction of the eastern arm embankment, tailings continued to be washed down Mill Creek after spilling from milling and processing operations (Figure 20-13). The tailings built up due to spillages in the processing plant that flowed into the creek. By November 2015 (Figure 20-14), the spillway of the eastern arm embankment has been raised to flood the tailings. Oxidation is evident in the distal reaches where tailings remain exposed, and less so against the embankment wall.

Figure 20-13. Mill Creek in September 2008 showing the deposition of the tailings (grey material)

(Source: HGM)

Figure 20-14. Eastern Arm in November 2015

(Source: Google Earth)

Water quality records for pH at the TSF outfall (Figure 20-15) show the pH:

- Dropping steadily after the Hellyer operation closed in 2000
- Increasing during the Polymetals operation
- Dropping during Intec's tenure
- Increasing under BSM
- Dropping from 2012 when the processing stopped delivering alkalinity to the TSF and the exposed tailings oxidised.

Since mid-2016, when IVY had raised the water level in the eastern arm and increased alkalinity dosing into the eastern arm spillway, the pH – although not reaching the target of pH 8.0 – stabilised.

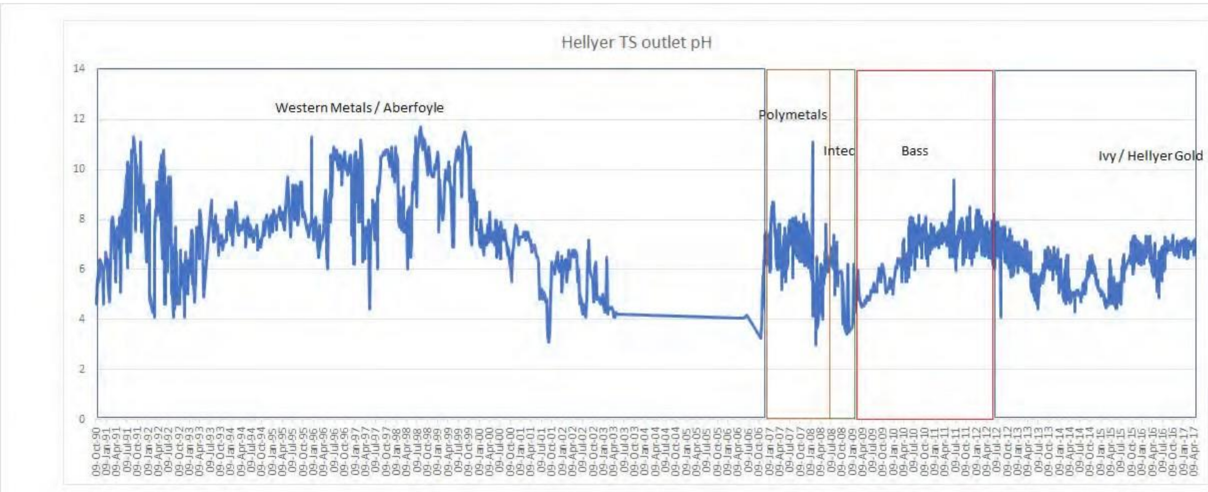

Figure 20-15. pH at the outfall from the Hellyer Tailings Storage Facility from 1990 to 2017

Acidic water drainage from the Hellyer ROM (run of mine) area and ore stockpiles also flowed down Mill Creek, adding to the acid and metal loadings to the receiving environment from 2006. More recently, the stockpiles were removed and the ROM area was capped with a compacted lime mixture.

20.6.1.1.2 Existing environment

At Hellyer there is a legacy of acidic drainage from past practices over several decades:

- The shale quarry dam walls contain some pyrites which oxidised after construction. This appears to have reduced in recent years.
- The ability of the shale quarry to hold water is compromised by a direct hydraulic connection to the Hellyer void in the north-eastern corner. Since the shale quarry dam wall was raised in 2006, seepage into the Hellyer void has increased due to the extra head.
- Parts of the western embankment wall contain pyrite, resulting in oxidation near the dam wall.
- Tailings in the western arm impoundment were not placed against the dam wall to reduce its permeability, as defined in the then tailings management plan. As a result, the western arm embankment acts as a leaky aquitard and the western arm impoundment does not hold water and needs water dosing during summer to keep tailings submerged.
- Issues with the eastern arm (as outlined above)

Geo Environmental Management (2006) identified AMD production in the run of mine (ROM) stockpile area, and at remnant ore stockpiles below the ROM. At that time, ore spread over the surface of the old ore stockpile pad and spillage along the old conveyor line had been left to oxidise since the Aberfoyle closure.

Surface run-off and seepage from this area drained to the TSF via Mill Creek. Geo Environmental Management estimated an acidity load of 0.3 t/day from this area. Since that time, the ore stockpiles have been removed and the ROM capped with a compacted lime mix.

PCE 7759 required Bass Metals to install a sump in Mill Creek to prevent tailings washing from the mills into Mill Creek and from there into the TSF. Figure 20-16 shows the location of the BSM sump and the proposed HGM replacement sump. No evidence has been found indicating whether the BSM sump was rehabilitated with its contents stored to prevent sulfide oxidation. It is assumed that at some stage the contents were removed to the TSF. It is possible that they remain in situ covered by clay or peat.

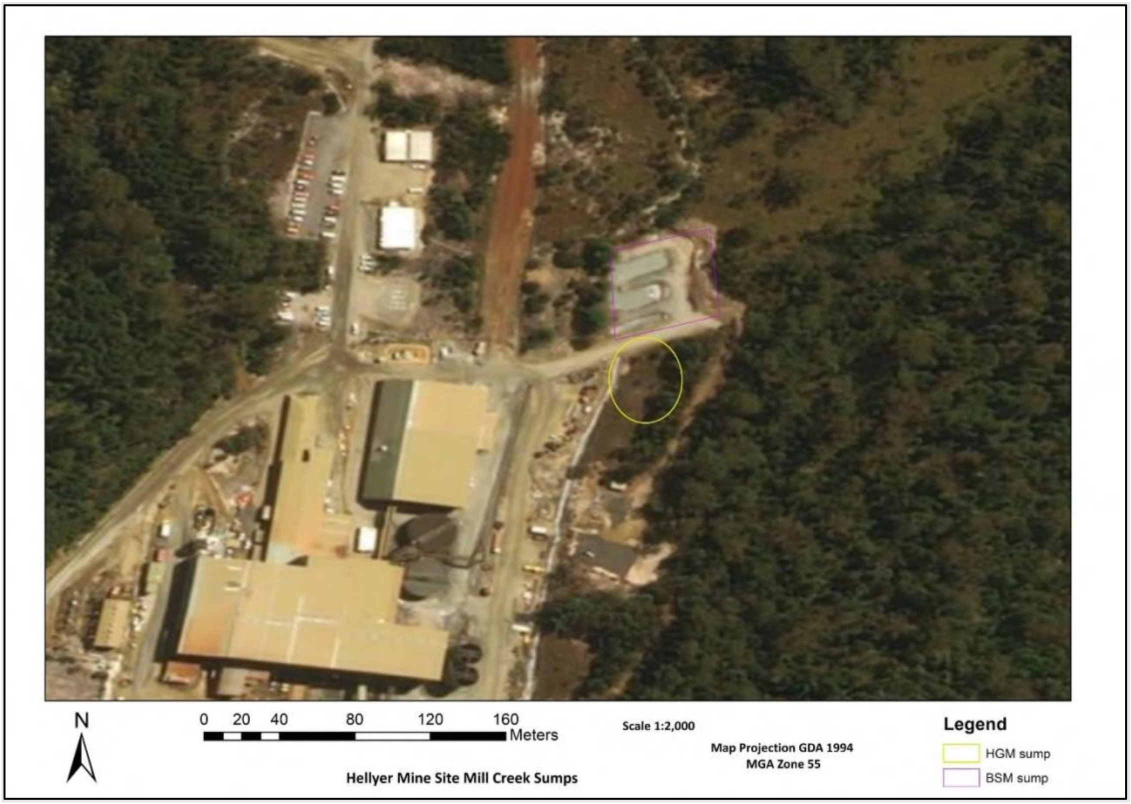

Figure 20-16. Location of the Mill Creek sump and the replacement sump at the Hellyer Gold Mine

(Source: Hellyer Gold Mines EMP 2017)

20.6.1.1.3 Summary

The potential for acidic drainage remains at the HGM due to the pyritic material in the old tailings and the tailings that have been re-processed as part of the HGM tailings re-processing operation from 2018 to the present. The management of these tailings is focussed on preventing the oxidation of the material by covering them with about 2 m of water, which restricts the entry of oxygen so not allowing the oxidation reaction to occur.

In addition to the managed tailings, there are other legacy locations around the site where poor management practices during the earlier operations have resulted in fugitive tailings in various locations around mine site. These tailings will need to be removed and then safely stored for long term closure.

20.6.1.2 Surface Water

The description of the surface water quality around the HGM is outlined in the Section 20.5.3. There are local effects, mainly on the Que River because of seepage and discharges from the TSF.

20.6.1.3 Ground Water

The ground water quality around the HGM site is outlined in Section 20.5.4. Groundwater quality has been affected by the development of the Hellyer and Fossey underground mines as will as by seepage from the TSF.

20.6.1.4 Visual / Landscape

The Hellyer Mine is not a conspicuous visual intrusion in the landscape. The Que River and Hellyer operations have been operating or disturbed since 1980. Figure 20-17 shows the Hellyer lease in relation to Mt Beercroft, which is one of the highest peaks in the district. Figure 20-18 provides a photo montage taken from the peak of Mt Beecroft in the mid-1990s. The site is not visible from the north or the west, where stands of vegetation block any views of the mine and facilities from both the Cradle Mountain Link Road and the Murchison Highway.

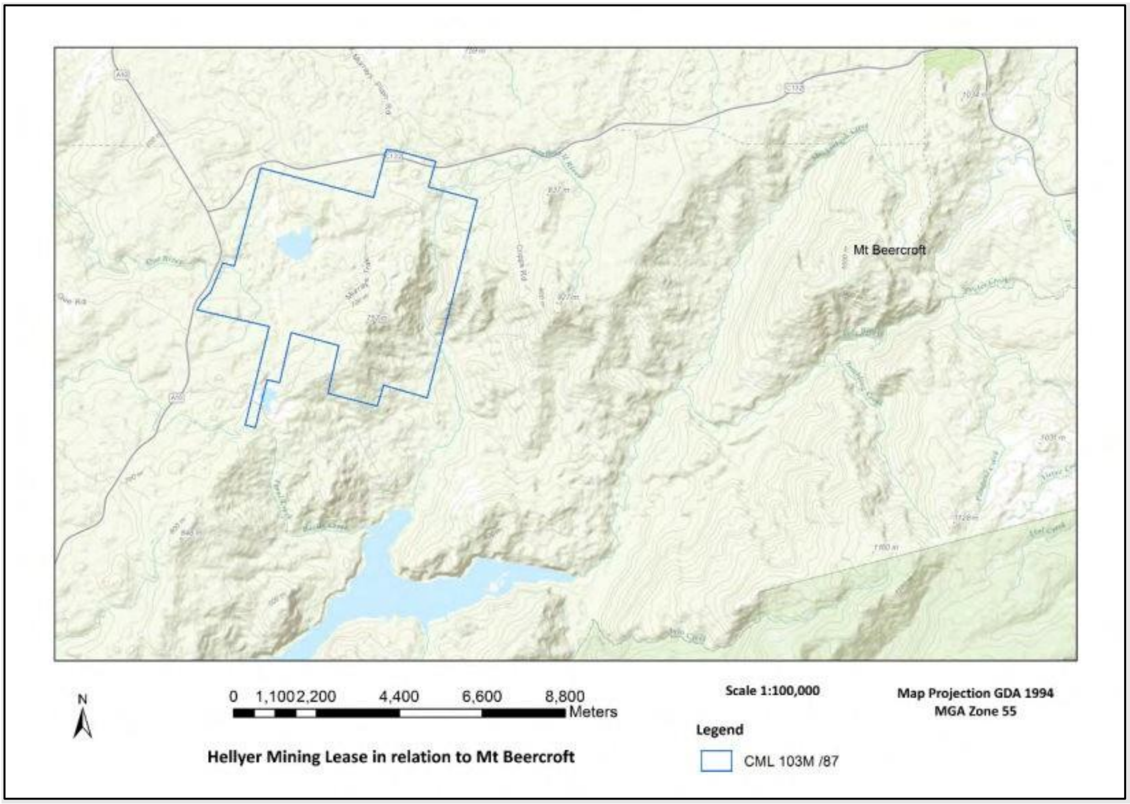

Figure 20-17. Hellyer mine lease relative to Mount Beercroft

(Source: EMP 2020)

Figure 20-18. View from Mount Beercroft of the location of the portal and the road for the Hellyer Gold Mine

(Source: EMP 2020)

20.7 Environmental and Social Management

20.7.1 Hellyer Gold Mines Environmental Management

The site operates under an approved environmental management plan outlined in the following review:

- Environmental Management Plan and Rehabilitation and Closure Plan Review 25 February 2022.

This review was prepared by Caloundra Environmental Pty Ltd, PO Box 242, Golden Beach Queensland 4551 in conjunction with Hellyer Gold Mines Pty Ltd Registered Address: Cradle Mountain Link Road, Waratah, Tasmania 7321

Details on the 60-page document are not included here. However, the key focus areas within the plan are the management of the following:

- Acidic and metalliferous drainage
- Surface water
- Ground water
- Tailings
- Biodiversity and natural values
- Rehabilitation and closure

20.7.2 EnviroGold Global Project Environmental Management

The Project is an additional process that will be installed and operated as part of an existing and ongoing tailings treatment operation. The area where the Project will be installed is part of a brownfields site. Therefore, no additional areas will be disturbed as part of the process.

EnviroGold Global will operate the Project in complete alignment with the current operating HGM project using the same (or better) operational parameters for the Project:

- Storage of reagents
- Control of potential atmospheric contaminants (off gases)
- Hazardous waste storage and disposal
- Non-hazardous waste storage and disposal

- Storage, use, and disposal of hydrocarbons
- Machinery and equipment maintenance and preventative maintenance
- Transportation of reagents and other consumables
- Establishing ESG targets

Detailed plans for the above, and other environmental considerations are approved and in use at the site. EnviroGold Global will develop additional management plans for additional areas of environmental concern as they are identified as the project engineering advances.

20.8 Closure Planning

The information included in this section is a summary of the rehabilitation and closure plan for the Hellyer Gold Mine included in the 2020 EMP. The following sections address the current closure liability for the Hellyer Gold Mine that is to be carried out by Hellyer Gold Mines Ltd. Pty.

A separate section addresses the closure of the NVRO Project.

20.8.1 Closure Planning Objectives

This rehabilitation and closure plan for the Hellyer Gold Mine was developed in accordance with key objectives of the Strategic Framework for Mine Closure (ANZMEC 2000):

- Protect the environment, public health, and safety by using safe and responsible closure practices
- Reduce or eliminate adverse environmental impacts as part of mine closure
- Establish conditions which are consistent with the Hellyer lease area becoming a healthy modified ecosystem
- Reduce the need for long-term monitoring and maintenance by establishing effective physical and chemical stability of disturbed areas.

20.8.2 Prevention of Environmental Harm

20.8.2.1 Financial assurance provision

Caloundra Environmental conducted a preliminary assessment to identify key environmental aspects associated with the site for the 2017 EMP. Environmental aspects were assessed by identifying and reviewing known emissions from the site since its closure in 2000. This assessment encompassed the environmental aspects of the site that have the capacity to cause environmental harm if the operation ceases before 2023.

An environmental financial assurance (bond) of approximately $1,900,000 is held by Mineral Resources Tasmania against the tenement. As described in the 2020 EMP, the key environmental aspects of concern are related to surface water emissions and are mainly caused by AMD from exposed or oxidising sulfidic tailings.

20.8.2.2 Environmental aspects

20.8.2.2.1 Tailings Embankment (TSF1)

The total TSF1 area covers around 70 ha. The middle TSF1 area covers approximately 50 ha.

The embankment was designed and constructed and is maintained to ANCOLD standards and is stable. However, since that time dam construction standards have changed. Dams are now required to have filter system to prevent piping failures. As it is virtually impossible to retrofit a filter system, HGM has approval for and plans to construct and operate TSF2 downstream of TSF1. All future and eventually current PRT will be stored in the TSF2.

The 2017 cost estimate reflected the need to keep tailings submerged and prevent remobilisation of sulfidic tailings into the water column with a shallow water cover (between 1.0 m and 2.0 m) at that time. The deep-water cover is considered sufficient to reduce the risk of environmental harm to acceptable levels in the event of unplanned closure.

20.8.2.2.2 Eastern arm (TSF)

The eastern arm of the TSF1 contains long-term exposed tailings. HGM plans to remove all eastern arm tailings and the embankment wall to TSF2 once this facility is operational.

Upon early or final closure, all exposed tailings in the eastern arm and remnant in Mill Creek will need to be removed. There is sufficient space in TSF1 to store the exposed tailings and potentially other potentially acid forming material recovered from Mill Creek.

20.8.2.2.3 Western arm (TSF)

Tailings from the Polymetals operation and the Fossey Mine were deposited into the western end of the western arm impoundment resulting in a leaky embankment wall through to the main TSF. The was corrected during the current operation with the placement of tailings adjacent to and along the western arm embankment in accordance with the original tailings management plan (TMP) (GHD, 2006). This approach maximizes water retention in the western arm and should provide for adequate cover at closure.

20.8.2.2.4 Shale quarry

The shale quarry was used as a TSF for the majority of the Polymetals operation and contains ~1.0 Mt of tailings. The capacity of the quarry was increased by constructing a water-retaining dam on the western side of the pit. After Polymetals ceased depositing tailings into the quarry, it was noted that the water cover was inadequate, with beaches forming over approximately half the tailings.

The shale quarry needs to be remediated to permanently inundate the tailings. In 2010, GHD proposed sealing the edge of the tailings using bentonite and clay to provide a low-permeability barrier between the water cover and the wall fissures.

20.8.3 Final HGM Rehabilitation Summary

On permanent closure, the rehabilitation items and domains noted below will need to be addressed. These have been predicated on stabilising the site and providing conditions that will facilitate restoration A summary of closure work is provided in Table 20-17.

Table 20-17. Final rehabilitation and closure work for the existing Hellyer Gold Mine and its Associated Infrastructure

Item	Works
Water treatment plant	Remove pumps, disconnect services
Hellyer mills, buildings, plant and equipment	Disassemble and remove buildings, clean free of hazardous goods
ROM area	Validate rehabilitation, revegetate
Mill Creek	Remove exposed tailings
Primary and secondary stockpile areas	Validate rehabilitation, revegetate
TSF1	Develop wetlands in shallow areas of western and eastern arms
TSF1	Maintain deep water cover
TSF2	Maintain deep water cover
Landfill	Validate rehabilitation, clay cap and revegetate
Core sheds	Remove buildings, revegetate
Roads	Rip, contour, revegetate
Subsidence areas	Fill, erect warning signs
Hydrocarbons	Remove hydrocarbons from bunds, bioremediate, validation sampling
Water pumps	Remove pumps, disconnect services
Hellyer mine adit	Security fencing, revegetation
Basalt quarry	Revegetation
Power supply infrastructure	Remove power lines, substations and switchyards
Geology centre	Remove buildings, revegetate
Administration building	Remove buildings, revegetate
Miscellaneous	Disconnect remote services, mobilisation and demobilisation, concrete removal, contamination assessment
Disturbed areas	Revegetation

Item	Works
Maintenance and monitoring plan	Five years' water monitoring and dam safety inspections
Initial FA against Env harm	
Total estimated closure cost	

The environmental aspects relating to permanent closure of the site are described below by area and where appropriate by item.

20.8.4 Water treatment plant

This plant sits below the TSF1 embankment wall and was designed to treat up to 220 L/s of dam discharge water. The plant will be removed in the early stages of TSF2 construction.

20.8.5 Hellyer concentrator buildings, plant and equipment

On final cessation of site activities, all plant, equipment, and buildings will need to be cleaned free of surplus reagents, chemicals, and hydrocarbons etc. Most reagents and chemicals will be returned to the appropriate suppliers. Radiation gauges will be removed, packed, transported and disposed of in compliance with the requirements of the Health and Physics Branch of the Department of Health and Human Services.

All buildings will need to be disassembled and removed. Cost has been allowed for concrete slabs and footings to be covered with 500 mm of topsoil to act as a bed for vegetative regrowth.

The main office building, which contains asbestos building materials, will be dismantled by a licensed asbestos removal contractor. Selected small concrete slabs will be broken up and assessed for recycling potential, with the remainder used as fill.

20.8.6 ROM area

BSM undertook rehabilitation of the ROM during 2012. PAF material was scraped off the area and disposed of on site. The ROM area was then covered with clays which were compacted with a sheep's foot roller. During the tenure of IVY, lime was placed over the clays to incorporating additional alkalinity. Sampling of runoff and seepage at Mill Creek below ROM suggests that this has significantly reduced AMD generation. Validation sampling, clean up, final capping and revegetation will be needed on mine closure.

20.8.7 TSF1

On final closure, any remnant tailings in the TSF1 will be covered more than 20 m of water. The distal reaches of what are now the eastern and western arms, however, will provide shallow areas where sulfidic tailings were once stored. To mitigate against any remnant sulfides oxidising, HGM will develop wetlands in these areas in line with the "mushy cover" method developed by Brett and French (2008) for the Henty Pond B to keep all remnant sulfides fully saturated.

20.8.8 Mill Creek

Following clean up, Mill Creek will be inspected, with sampling for traces of residual tailings or other waste from the milling operation. As required, waste will be placed under a deep water cover in TSF1 or TSF2.

20.8.9 Landfill

The landfill is to the north-east of the core sheds and was used by Aberfoyle and Western Metals to dispose of inert waste, mainly packaging materials (Western Metals, 2000). Drainage from the landfill flows into Mill Creek, and then to the eastern arm of the TSF. During these operations, hazardous, and contaminated wastes were removed by approved contractors and disposed of in licensed landfills.

This area was progressively rehabilitated by Western Metals as the working face of the tip advanced. The final area will need to be clay capped and revegetated on closure.

20.8.10 Core sheds

On final closure all buildings, plant and equipment in the area will be removed and the area revegetated.

20.8.11 Roads

There are approximately 13 km of site roads (excluding the haul road). This will increase once TSF2 has been constructed. It is expected that the major roads will be left intact so that TasNetworks can maintain the two major transmission lines that bisect the lease. Formal documentation of TasNetworks' requirements will be established closer to the time of permanent cessation. It is estimated that approximately 20 ha of roads and tracks will require rehabilitation on final closure. The owner of the land under the Crown, after the mining lease has been surrendered, will be Parks and Wildlife. Before any roads are removed, a consultation programme will take place regarding future requirements. It is likely that some minor roads and tracks will be retained for the future needs of other organisations, such as Telstra and apiarists. Other potential users include BSM, which has right of entry to Que River.

20.8.12 Subsidence areas

Some subsidence exists above the Hellyer orebody. There is a small area adjacent to the power lines along the entry road and a sinkhole to the south of the shale quarry (Figure 20-19).

Figure 20-19. The sinkhole to the south of the shale quarry at the Hellyer Gold Mine

(Source: Hellyer Gold Mines: Hellyer Tailings Reprocessing EMP, (September 2017))

The areas of subsidence on the lease need to be filled with rock and solids to make them safe, and to ensure that surface run-off is directed away from the area of broken ground.

20.8.13 Hydrocarbons

All hydrocarbon tanks on site are above ground. On final closure, the tanks will be removed and the areas sampled for contamination of surrounding soils. If validation sampling shows hydrocarbon contamination, bioremediation will be set up on concrete pads behind the current mill buildings. Any land farming/ treatment on site of contaminated material will require approval from the EPA.

20.8.14 Water pumps

On final cessation of site activities, the water supply system at the Southwell River, including water pumps and the pipes, will need to be removed and the area ripped to facilitate revegetation.

20.8.15 Hellyer Mine adit

When Western Metals closed the original Hellyer underground mine, the mine adit was sealed with a concrete plug some 800 m into the mine. The plug was fully engineered and specifically designed to accommodate a full hydraulic head of some 300 m plus appropriate safety factors. The plug and the interior of the adit were inspected during a validation period of three years. No concerns with the integrity or suitability of the plug have been uncovered.

Mine water seepage through or around the plug, and also where it seeps to the surface, is alkaline, indicating that pyrite within the mine is covered by water and is not oxidising. The water quality in the underground mine void reports to the surface at Jed's Spring and Elly May's Spring to the north of the shale quarry and from there to the eastern arm of the TSF. In 2006, Aquatic Science reviewed the water quality on site for the Polymetals DPEMP and noted that Jed's Spring was very high in iron. It was postulated that in the mine void the absence of oxygen would have prevented iron from falling out of solution. The iron is likely to be in the form of ferrous iron, which is soluble. When the spring surfaces, the iron would then come into contact with the oxygen in the air and start to precipitate. This precipitation would be quite rapid due to the high pH and the large quantity of ferric iron (a catalyst for the oxidation). It was also postulated that water emanating from these springs would improve in quality as the AMD that formed during the time taken for the void to fill was diluted with fresh groundwater. Vandal-proof barriers will need to be positioned once future access to the plug is not required.

The adit area contains settlement ponds, which intercept stormwater prior to it entering the Southwell River catchment. These ponds will be inspected and cleaned prior to cessation of operations.

20.8.16 Fossey underground mine

BSM operated the Fossey underground mine under PCE 7759 until it closed in 2012. The operation and closure of the Fossey underground mine are not associated with this EMP under the Permit.

20.8.17 Basalt quarry

The basalt quarry was used for road base during the Aberfoyle operation (Western Metals, 2000). It is located to the west of the entrance road to the site. When no longer needed, rehabilitation of this quarry will begin by replacing lost topsoil; subsequently, hydroseeding or hand seeding will be carried out.

20.8.18 Power supply infrastructure

Tower 146 is a part of Transend's main 220 kV transmission line between the Reece Dam on the Pieman River and Sheffield. It is considered critical to the security of the power supply to the north-west of the state and is likely to remain after mining ceases on the lease. The tower is inside the surface expression of subsidence. Significant ground movement ceased with the end of mining activity. Kevin Rosengren (1998) assessed this and believes that no further movement will occur.

Local power supply infrastructure will be removed once it is no longer needed for mining or ongoing rehabilitation and closure activities.

20.8.19 Geology centre

On closure, this facility will be sold and removed by the purchaser or disassembled and taken off site for disposal and the site will be rehabilitated.

20.8.20 Administration building

The administration office has been converted into temporary sleeping quarters for staff. It is a demountable building and is easy to remove. The area including the car park and mill surrounds will be ripped and contoured and then revegetated.

20.8.21 Miscellaneous

Tailings and water pipelines will be removed and disposed of in the on-site landfill as an inert waste. This section includes an allowance for mobilisation and demobilisation of contractors and heavy equipment.

20.8.22 Disturbed areas

Disturbed areas resulting from either recent or legacy activities, excluding roadways, constitute some 25 ha. Rehabilitation strategies vary for each area, dependent upon the existing substrate and the availability of rehabilitation substrate immediately adjacent to each area.

In general, disturbed areas will be ripped to a minimum of 300 mm depth, and 250 mm of soil/clay substrate will be spread to provide a revegetation substrate. During the autumn months, fertilisation and seeding with provenance species will take place.

Specific fertiliser mixes and seed types will be determined by experienced consultants prior to closure. The underlying tenement holder of the land, Parks and Wildlife, will be consulted prior to revegetation of individual areas to ensure consistency with final land use objectives.

Areas requiring vegetation are accounted for in the individual domain areas. In addition to these areas, miscellaneous cleared or severely disturbed areas requiring vegetation total approximately 20 ha. This has increased from the 15 ha reported in 2017 to account for the EFB borrow areas.

20.8.23 Rehabilitation maintenance and monitoring plan

The final closure plan allows for five years of monitoring and maintenance. This includes surface water quality monitoring and dam safety inspections. Surface water sampling is expected to involve three sites: Southwell River below Portal, Combined Discharge at H1 and Combined TSF discharge downstream of the two dams, sampled monthly for the first 12 months, then quarterly. Photo monitoring of revegetation and site inspections for weeds will also be necessary.

20.8.24 Project Closure Considerations

The closure of the Project will follow the guidelines provided in the previous part of Section 20.8. As part of the TPOA, NVRO will provide a security bond for the demobilization and rehabilitation of the project infrastructure. Following the closure of the project, any excess reagents, spare parts etc. will either be removed from the site by the vendors, sold, or disposed of by a licenced contractor. The plant will be then flushed with water and that water placed in the tailings storage facility. Following the guidance in Section 20.8.5, all the equipment, buildings etc. will be removed. Any remaining areas will be then ripped, capped and revegetated as outlined in Section 20.8.22. The closure of the tailings produced by the Project remains with HGM

20.9 Social/Political

Tasmania has remarkable geological diversity and more than a century's history as a significant minerals producer. The State exports ores and concentrates of iron, copper, lead, zinc, tin, high-grade silica and tungsten. The total value of mining and metallurgical production in Tasmania was $1.82 billion in 2016/17 (Mineral Resources Tasmania web page). The mineral extraction and processing sector is Tasmania's largest export industry and accounts for more than 50% of mercantile exports. The current, major operating mines are:

- Rosebery Mine: silver, lead, zinc mining
- Renison Mine: tin mining
- Savage River Mine: magnetite (iron ore) mine
- Henty Mine: gold mining
- Cornwall Coal: coal mining in northeast Tasmania

The Hellyer Gold Mine is considered on care and maintenance as it does not produce primary ore.

The Fraser Institute Annual Survey of Mining Companies 2020 listed Tasmania in the last quartile on its investment attractiveness index with a score of 55.46. This is compared to a score of 91.5 for Nevada, which was the highest investment attractiveness index score.

However, in general, Tasmania is an attractive location for investment. The political environment in Tasmania and Australia is generally supportive towards mining developments, and tenement, title and environmental approvals to date have been forthcoming as required.

The Project has several environmental and social advantages that will be shared with the local stakeholders as part of the Project communication plan. The benefits of reduced acidity in the tailings are the key

The current HGM operation is a material net contributor to the local economy and sources much of its workforce locally. NVRO anticipates its on-site management, laboratory and operational staffing requirements would directly employ around 48 people, with most sourced from the local Tasmanian community. These employment opportunities and the extension of the life of the Hellyer Project by several years seem likely to be viewed as positive locally. Net benefits include job creation, spin-off jobs, increased life of Project, and taxes paid to the Tasmanian and Australian governments.

21 Capital and Operating Costs

21.1 Summary of Capital Cost Estimates

The capital cost estimate is a prediction of the total of the facility described in Section 17.2 above, the principal elements are the direct cost, indirect cost, owner's cost, and contingency. Table 21-1 presents the capital estimate summary for the initial capital cost with no escalation.

Table 21-1. Capital cost summary for the construction of the NVRO Plant (US$M)

	Initial Capital		**LOM Total**
Area	Stage 1	Stage 2 Expansion	
Mining - Tailings Reclamation			
Processing Plant	8.94	46.72	55.66
EPCM	1.34	7.01	8.35
Owner Costs and Indirect Costs	1.65	6.29	7.94
On-Site Infrastructure	0.20	0.65	0.85
Contingency and Other Provisions	3.03	15.17	18.20
Initial Capita Cost	*15.16*	*75.84*	*91.00**

*(*Excluding FEED)*

LOM project capital costs consist of the following distinct components:

- Initial Capital Development – includes all costs to develop the property to production, a tailings reclamation and processing rate of approximately 500 tpd for Stage 1 and 3,500 tpd for Stage 2.
- Initial capital costs for the Stage 1 processing plant treating 500 tpd are expensed over a 11-month pre-production construction and commissioning period

The capital cost estimate was compiled using a combination of database costs, scaling factors and factoring.

21.1.1 Basis of Estimate

Capital cost estimates were prepared with the following bases:

- All capital costs are in Q2, 2022 US Dollars (US$)
- For the capital cost estimate, the following exchange rate was applied 1US$ = 1.40AU$
- Expenditures aligned to physical schedules over the life of the project
- No escalation has been applied to the capital cost estimate for costs occurring in the future

The following key assumptions were made during the development of the capital estimates:

- Feed for the approximately first 4-6 years will delivered to the plant from HGM operations (ZST from current processing operation). No capital cost incurred by NVRO for plant feed
- Tailings reclamation for processing plant feed delivery activities will be performed by contractors and included in operational costs after the closure of the current HGM operation
- All surface construction (civil, structural, architectural, mechanical, piping, electrical, and instrumentation) will be performed by contractors
- The estimate assumes there are no problems associated with the supply and availability of equipment and services during the execution phase

21.1.2 Capital Estimate Exclusions

The following items have been excluded from the capital cost estimate:

- Financing costs
- Currency fluctuations

- Additional costs for accelerated or decelerated deliveries of equipment, materials, or services resultant from a change in Project schedule
- Warehouse inventories, other than those supplied in initial fills, capital spares, or commissioning spares
- Any Project sunk costs -studies, exploration programs
- Federal and State sales tax
- Sustaining capital costs
- Closure bonding
- Escalation cost

The capital cost estimates are considered equivalent to an AACE International Class 4 estimates (-20% / +30%), with the overall project's definition estimated to be 10%.

21.1.3 Mining Capital Costs (Tailings Reclamation)

The initial stages of NVRO's Operations will use a reprocessing plant tailings line from the ongoing HGM flotation plant with no additional costs to NVRO expected during first 4-6 years because NVRO will not conduct any tailings reclamation. This will continue for the period until HGM completes their current tailings reclamation and processing operations.

A cost allowance has been included in the operational cost from year 5 of operations in the economic analysis, once HGM complete their operations, for NVRO to perform its own tailings reclamation via dredging operations (or other recovery method, such as hydro-mining) through a sub-contractor.

21.1.4 Processing Plant Capital Costs

The processing plant capital costs are provided in Table 21-2.

Table 21-2. NVRO Processing Plant Capital Cost (US$M)

	Initial Capital	LOM Total	
Processing Area/ Circuit	Stage 1	Stage 2 Expansion	
Feed Delivery and Dewatering	0.61	3.19	3.80
Acid pre-leach, Acid Regeneration and Solid/Liquid Separation	2.10	10.98	13.08
Goethite and Scorodite ppt	1.91	9.97	11.87
Cu Production	0.26	1.35	1.61
Zn Production	0.52	2.70	3.21
Tailings and Detoxification	0.67	3.48	4.15
Reagents	0.27	1.42	1.70
Water services	0.35	1.86	2.21
Air services	0.10	0.50	0.59
Cyanidation Leach and Precious Metal Production	2.12	11.11	13.23
General	0.03	0.17	0.20
Total Plant Direct Costs	8.94	46.72	55.66

21.1.4.1 Processing Plant Directs

The capital cost estimate was based on the conceptual design basis, flowsheet and METSIM model mass balance from which a major mechanical equipment list was developed, for the Stage 2 operations (3,500 tpd), and equipment sized accordingly. Capital costs were then estimated from a variety of sources including, database costs, scaling factors and factoring. Costs including structural steel, platework, pipework, electrical and instrumentation, mechanical equipment installation, earthworks, civil works and equipment delivery (Table 21-3).

Table 21-3. NVRO Processing Plant and Direct Costs (US$M)

Description	Initial Capital	LOM Total	
Direct Field Costs	Stage 1	Stage 2	
Earthworks	0.18	0.93	1.11

Description	Initial Capital	LOM Total	
Civil	0.36	1.87	2.23
Structural Steel Supply	0.89	4.67	5.57
Structural, Mechanical and Plate Work Installation and P and G	1.97	10.28	12.25
Mechanical Equipment Supply	4.02	21.03	25.05
Plate Work (Included in Mech equip)	0.00	0.00	0.00
Piping and Valves Supply, Delivery and Installation	0.63	3.27	3.90
Electrical, Instrumentation and Control Supply, Delivery and Installation	0.89	4.67	5.57
Total Direct Field Costs	*8.94*	*46.72*	*55.66*

21.1.5 EPCM

An allowance for project engineering, procurement, and construction management (EPCM) is included at 15% of the direct costs. The allowance covers work involved in the detailed design and construction of the project.

21.1.6 Owners Cost, On-Site Infrastructure, and Indirect Costs

Owner's costs are included within the operating costs during production, but during the construction period these items are included in the initial capital costs and are capitalized. Included in the initial owner's costs are:

- Plant and General and Administration Pre-production labour (3 months) including related expenses
- Capital spares (as 5% of plant mechanical equipment) for the initial start-up
- Reagent first fills
- Indirect Costs - Construction indirect costs consist of a 2% allowance on the direct costs for miscellaneous costs such as contractor mobilization.
- Buildings – Administration, warehouse, workshop, and laboratory buildings

The infrastructure costs allow for an administration building, cost for an assay lab building (contract lab), a warehouse and maintenance building for the plant, together with related support items, and electrical. The buildings are modular or steel frame.

Electrical costs which cover the main substation and connection to the main transmission line have been included as part of the on-site infrastructure indirect costs. Distribution and electrical components for the plant are included in the direct costs of the respective areas.

The owners, on-site infrastructure and indirect capital costs are provided in Table 21-4.

Table 21-4. NVRO Owners Cost, On-Site Infrastructure, and Indirect Costs (US$M)

Description	Initial Capital		LOM Total
Owners Costs	Stage 1	Stage 2	
Insurance Spares -% Plant Mech Equip	0.45	2.34	2.78
Mobile Equipment - (assumed hired and part of Opex)	0.00	0.00	0.00
Plant and Admin Pre-Production Labour (3 months)	0.47	1.24	1.71
First Fills - Reagents	0.31	1.00	1.31
Other -% Plant Mech Equip	0.18	0.93	1.11
General - Aux Buildings and Equipment	0.24	0.78	1.02
HV Power Supply and Distribution	0.20	0.65	0.85
Total Costs	1.85	6.94	8.79

21.1.7 Off-Site Infrastructure

No allowance has been made for off-site infrastructure costs. The current site has been operating for numerous years, and Tasmania and local area has established air, sea, and road access, together with grid power supply with additional capacity and raw water supply. Local area also has an established communications network, and availability of accommodation at nearby local towns.

21.1.8 Contingency

Contingency is included in the capital costs to allow for uncertainty in the estimates. Contingency of 25% was calculated on full initial capital and LOM expansion. EnviroGold Global believes these allowances are appropriate for the Project at this level.

21.1.9 Tailings Management

HGM is currently in the process of establishing a new tailings storage facility (TSF2), which is designed to take the HGM tailings for the balance of the HGM projected operations.

A cost allowance has been included in the operational cost from year 1 of operations for NVRO tailings Emplacement (Deposition). The operational cost allowance of US$7.15 (approx. US$64.3M for the LOM) cover costs for tailings transport, deposition, and embankment construction.

21.1.10 Closure Cost

The closure cost for the overall property is the responsibility of Hellyer Gold Mines. EnviroGold Global will remove the plant and clean up the areas used as for the Project. Details of the approach are provided in Section 20.8.

21.2 Summary of Operating Cost

The operating cost (OPEX) estimates are based on combination of test work results, experiential judgment, reference to other operating projects with similar processing equipment and factors as appropriate.

The following cost estimates and assumptions were used:

- Labour - prevailing rates for the area
- Fuel - delivered, basis of diesel at US$0.96 per litre
- Power - all-in rate of US$0.08 / kWh
- For the operating cost estimate, the following exchange rate was applied 1US$ = 1.40AU$
- Fixed 3,500 tonnes per day plant feed production schedule for the OPEX estimation

The annual costs for the stage 2 processing operations are summarized in Table 21-5.

Table 21-5. Total Operating Cost Summary for the NVRO 3500 tpd processing plant

Cost Type	Total	
	US$/Annum	US$/t Ore
Mining - Tailings Reclamation*	5,110,000	4.00
Processing Plant	90,989,270	71.22
Tailings Emplacement (Deposition)	9,129,643	7.15
General and Administration (G&A)	2,289,669	1.79
Total Operating Costs (exclusive of Mining)	*102,408,583*	*80.16*

** Cost incurred from production year 5 onward*

21.2.1 Mining - Tailings Reclamation Operating Cost

As described in Section 21.1, a cost allowance of US$4.00 has been included from year 5 of operations, once HGM complete their tailings reclamation, for NVRO to perform its own tailings reclamation via dredging operations (or other recovery method, such as hydro-mining) through a sub-contractor.

21.2.2 Processing Operating Cost

Processing costs are based on first principles. Consumption rates for diesel, power, reagents, and plant consumables were estimated and overall costs were based on price assumptions of diesel and electricity as shown above in section 21.2, and typical price for reagents unit rates and other plant consumables.

A breakdown of costs by area for the 3,500 tpd operating scenario is presented in Table 21-6.

Table 21-6. NVRO Processing Plant Operating Cost Summary - 3500 tpd

Cost Type	Total US$/Annum	US$/t Ore
Labour	4,185,343	3.28
Reagents and Consumables	83,199,177	65.13
Power	2,028,389	1.59
Maintenance Materials	636,845	0.50
Mobile Equipment	122,016	0.10
Laboratory	191,820	0.15
Plant Administration and Miscellaneous	625,680	0.49
Total Plant Operating Costs	*90,989,270*	*71.22*

21.2.2.1 Processing Plant Workforce

The workforce has been estimated for, plant operations, management, and administration. The plant operations staff list is presented in Table 21-7.

The proposed schedule for the plant is a rotational shift based on 12-hour shifts for the majority of plant shift employees. Whereas management, supervision and maintenance staff would work day-shift only. Technical and maintenance staff will be on stand-by after hours on a rotational basis.

An allowance has been made for additional contract maintenance during major shutdowns in the maintenance materials costs.

Table 21-7. NVRO Processing Plant Workforce – 3,500 tpd

Plant Staffing	No. of People
Plant Management	9
Maintenance Supervision	3
Feed Delivery/Control Room	8
Acid pre-leach, Acid Regeneration and solid/liquid separation	4
Goethite and Scorodite ppt	4
Cu Production	4
Zn Production	4
Pb Production	0
Cyanidation Leach	4
Tailings and Detoxification	0
Day Crew	4
Maintenance	4
Total Plant Staffing	*48*

21.2.2.2 Reagents and Consumables

Reagents consumption rates were estimated, and are based on

- Test work results for cyanide and lime consumption in cyanidation circuit test work
- Reference to other operating projects with similar processing equipment
- Combination of experiential judgment and literature search if test work results or reference to other operating projects with similar processing equipment could not be obtained (Table 21-8).

Table 21-8. NVRO Processing Plant Reagents and Consumables – 3,500 tpd

Plant Reagents and Consumables	Total US$/Annum	US$/t Ore
Flocculant	203,081	0.16
Nitric Acid	38,631,600	30.24
Antiscalent	201,781	0.16

Plant Reagents and Consumables	Total US$/Annum	US$/t Ore
Limestone	8,558,544	6.70
Sulfuric Acid	337,260	0.26
Sodium Hydroxide	476,380	0.37
Peroxide	348,119	0.27
Copper Sulfate	266,359	0.21
Sodium Cyanide	32,033,392	25.08
Hydrated Lime	465,083	0.36
Activated Carbon	165,564	0.13
Hydrochloric Acid	111,040	0.09
Gas	17,783	0.01
Raw Water	1,277,500	1.00
Gold room Fluxes and Other Consumables	105,692	0.08
Total	*83,199,177*	*65.13*

Reagent optimisation test work is planned in the next stage of metallurgical testing, and opportunities exist which may reduce reagents costs.

21.2.2.3 Power

The power cost estimate has been based on grid power at a unit cost of US$ 0.08/kWh.

The average continuous power draw has been determined from the installed power of the projected equipment requirements as detailed in the mechanical equipment list, with a load factor and % utilisation being applied to each drive.

The estimated average continuous power draw and power cost by plant area is summarised in Table 21-9.

Table 21-9. NVRO Processing Plant Power Cost - 3500 tpd

Area	Installed Power kW	Average Continuous Power Draw (kW)	Total US$/Annum	US$/t Ore
Feed Delivery and Dewatering	386	248	111,965	0.09
Acid pre-leach, Acid Regen and s/l separation	1176	1680	757,069	0.59
Goethite and Scorodite ppt	1280	898	404,587	0.32
Cu Production	109	87	39,258	0.03
Zn Production	351	269	121,160	0.09
Tailings and Detoxification	620	337	151,991	0.12
Reagents	91	73	24,581	0.02
Water services	751	356	160,645	0.13
Air services	244	99	33,535	0.03
Cyanidation Leach and Precious Metal Production	608	486	219,242	0.17
Workshop and store	15	12	3,005	0.002
Administration offices	11	7	1,352	0.001
Total Plant Power Costs	*5,640*	*4,553*	*2,028,389*	*1.59*

21.2.2.4 Maintenance and Consumables

Plant maintenance and supplies costs refer to the costs of operating spares and lubricants for the plant. It has been assumed that the plant will experience a moderate amount of wear and maintenance costs have been allowed at an annual rate of 5% of the major mechanical equipment costs.

The maintenance cost excludes payroll maintenance labour which is included in the labour cost, but it includes contract labour during plant shutdowns.

Allowances for plant building maintenance and general maintenance expenses (specialist maintenance software, maintenance manuals and control system licence fees) have also been made.

The allowance covers mechanical spares and wear parts, but excludes pressure filter wear components, and general consumables which are allowed for in the reagent consumables cost.

21.2.2.5 Mobile Equipment

Mobile equipment costs provide for the fuel and maintenance of the mobile equipment fleet (excluding the mining fleet and mining light vehicles) (Table 21-10).

Table 21-10. Mobile Equipment Operating Cost - 3500 tpd

Equipment	Total US$/Annum	US$/t Ore
Front End Loader (FEL)	33,152	0.03
Plant/Warehouse RTLV**	65,252	0.05
Light Vehicles	23,612	0.02
Total Mobile Equipment Costs	122,016	0.10

***RTLV - Rough Terrain TeleHandler, Forklift, or bobcat,*

21.2.2.6 Laboratory and Assays

The assays include plant and mine reclamation control requirements. Laboratory costs have been calculated based on assaying of the main process streams and contract lab assay unit cost based on on-site laboratories of a similar size (Table 21-11).

Table 21-11. Laboratory and assay costs for the NVRO 3,500 tpd Project

Cost Type	Total US$/Annum	US$/t Ore
Daily Control Samples	87,600	0.07
Monthly Control Samples	1,440	0.00
Cu/ Zn Final products and Bullion	22,500	0.02
Metallurgical Test work*	36,000	0.03
Grade Control/ Feed Monitoring	26,280	0.02
Environmental Analysis	18,000	0.01
Total Assay Costs	191,820	0.15

21.2.2.7 Plant Administration and Miscellaneous

An allowance has also been made to cater for miscellaneous items as shown in Table 21-12.

Table 21-12. Processing Plant Administration and Miscellaneous - 3500 tpd

Plant Administration and Miscellaneous	Total US$/Annum	US$/t Ore
Consultants and test work- Metallurgy	60,000	0.05
Other Consultants	-	0.00
Plant and equipment repairs	144,000	0.11
Freight and cartage	43,680	0.03
Vehicle expenses - parts/fuel/labour **	-	0.00
Consumables- general	72,000	0.06
Consumables-Safety and Hygiene	144,000	0.11
Tools and Equipment	6,000	0.00
Communications	10,000	0.01

Plant Administration and Miscellaneous	Total US$/Annum	US$/t Ore
Other contract services	26,000	0.02
Operator Training	48,000	0.04
General Plant Hire	72,000	0.06
Total Plant Overhead Costs	625,680	0.49
** under mobile equipment		

21.2.2.8 Tailings Emplacement/ Deposition

As indicated under Section 21.1.9, a cost allowance has been included in the operational cost from year 1 of operations for NVRO tailings emplacement (Deposition). The operational cost allowance of US$7.15 (approx. US$64.3M for the LOM) cover costs for tailings transport, deposition, and embankment construction.

21.2.3 General and Administration Operating Cost

General and administration costs were estimated to be US$ 1.79/t per annum. These costs cater for the following items:

- Training, including Safety
- Accounting and audit Fees
- Legal Fees
- Plant and equipment repairs
- Equipment Leasing (Vehicles)
- Consumables- general
- Other contract services
- Telecommunications
- Insurance ongoing as % of Project Direct
- Community Relations
- Government Charges
- Security
- On-site Administration labour

The overall estimated cost of site administration is summarised in Table 21-13, and the G&A staffing list is presented in Table 21-14.

Table 21-13. General and Administration Operating Costs – NVRO 3500 tpd Project

Cost Type	US$/Annum	US$/t Ore
Labour	1,147,369	0.90
Administration Consultants and Overheads	1,142,300	0.89
Total G&A Costs	2,289,669	1.79

Table 21-14. General and Administration Staffing – NVRO 3500 tpd Project

Administration Workforce	No. of People
General Manager	1
Admin Manager/ HR Manager	1
Accountant	1
Accounts Receivable Clerk	2
Receptionist/ Admin Assistant	1
Database/IT	1
Purchasing/ Warehouse	
Purchasing Officer	1

Administration Workforce	No. of People
Store-person	1
Safety and Environmental	
HSE Officer	1
First Aid	1
Environment and Relations Officer	1
Environmental assistant	1
Total On-site G&A Staffing	*13*

22 Economic Analysis

The Hellyer Project Economic Model has been prepared with all the information currently available including and assessment of the following:

- Cash flow forecasts on an annual basis using mineral resources estimates and an annual production schedule for the life of project
- Economic indicators, including net present value (NPV) and internal rate of return (IRR)
- Taxes, royalties, and other government levies or interests applicable to the mineral project or to production, and to revenue or income from the mineral project
- Sensitivity or other analysis utilizing changes in revenue, capital, and operating costs

The economic model is based on Stage 1 operations at 500 tonnes per day (tpd) and then upscaling to the full-scale tailings re-processing operations at a nominal rate of 3,500 tonnes per day, using the metallurgical processes outlined in this report and other key assumptions as detailed below:

- Project Operations Total Feed tonnage: 9.0Mt
- Project Operations Feed target rate:
  - Stage 1 – 500 tpd, commencing Q3-Q4 2023
  - Stage 2 - 3,500 tpd, commencing Q4 2023 -Q1 2024
- Zinc scavenger tailings as assumed feed material grades:
  - Gold Grade: 2.44 g/t
  - Silver Grade: 64.4 g/t
  - Lead Grade: 1.64%
  - Zinc Grade: 1.41%
  - Copper Grade: 0.13%
- Base Case Leach Recoveries:
  - Gold:72.8%
  - Silver: 87.3%
- Gold Recovery circuit assumption 90% for Au and Ag.
- Base Case Stage Sulfidization recoveries of zinc and copper base metals in the post acid leach liquors:
  - Zinc: 95%
  - Copper: 95%
- Constant Price Scenario:
  - Gold Price US$ $1,650/oz,
  - Silver Price US$ $22/oz.
  - Zinc Price US$2,800/t,
  - Copper Price US$9,000/t.
- Onsite Management, Laboratory and Operational staffing requirements of 48 people at full production level
- Australia Income Tax Rate: 30%
- Tasmania Government Royalty Rate: 5.35%
- Discount Rate: 10%
- Two-Stage Acid Leach Consumption Rate: 2%
- Opex and Capex Annual Escalation Rate: 0%
- Revenue Annual Escalation Rate: 0%
- Operator Margin: 20% of Total Labour Costs

HGM has streaming liabilities on gold and silver production from the Hellyer property. The potential streaming liability, if any, on gold and silver production from the NVRO Hellyer Tailings Project has not yet been established. These potential streaming costs are not included in the current economic model.

Please note: this PEA is preliminary in nature and includes Inferred Mineral Resources that are considered too speculative geologically to have the economic considerations applied to them that would enable them to be categorized as Mineral Reserves, and there is no certainty that the PEA will be realized.

22.1 Economic Indicators and Project Cash Flows

The Hellyer Economic Model economic indicators and unlevered project cashflows are summarised in below in Table 22-1 and Table 22-2. The capital and operating cost assumptions and estimates are summarised in Section 21.

Table 22-1. Project Summary from Hellyer Economic Model – Unlevered

Parameter	**Unit**
Tonnes Processed (thousands)	9,000
Total Gold Produced (troy ounces)	513,940
Total Silver Produced (troy ounces)	16,267,572
Total Lead Produced (tonnes)	-
Total Zinc Produced (tonnes)	105,322
Total Copper Produced (tonnes)	10,147
Gross Revenue (US$ thousands)	1,592,116
Operating Cash Flow (US$ thousands)	443,201
Capital Expenditures (US$ thousands)	(92,025)
Project Free Cash Flow (US$ thousands)	351,176
Pre-Tax Project NPV @ 10% (US$ thousands)	262,791
After-Tax Project NPV @ 10% (US$ thousands)	174,607
Project Pre-Tax IRR	96%
Project After-Tax IRR	*66%*

Source: NVRO "Hellyer Project Economics" (Updated 13 September 2022)

Note: Capital Expenditures number in table includes $1 million US for FEED.

Table 22-2. NVRO Project Unlevered Cash Flows

(US$ in 000s)	Total Revenue	Factor	Total	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030	2031
Tonnes Mined (000t)			9,000			237.7	1,149.8	1,149.8	1,149.8	1,149.8	1,149.8	1,149.8	1,149.8	713.8
Total Gold Produced (troy ounces)	848,001	53%	513,940			13,574	65,657	65,657	65,657	65,657	65,657	65,657	65,657	40,764
Gold Price ($ per troy ounce)						1,650	1,650	1,650	1,650	1,650	1,650	1,650	1,650	1,650
Total Silver Produced (troy ounces)	357,887	22%	16,267,572			429,653	2,078,232	2,078,232	2,078,232	2,078,232	2,078,232	2,078,232	2,078,232	1,290,297
Silver Price ($ per troy ounce)						22	22	22	22	22	22	22	22	22
Total Copper Produced (tonnes)	91,326	6%	10,147			268	1,296	1,296	1,296	1,296	1,296	1,296	1,296	805
Copper Price ($ per tonne)						9,000	9,000	9,000	9,000	9,000	9,000	9,000	9,000	9,000
Total Zinc Produced (tonnes)	294,902	19%	105,322			2,782	13,455	13,455	13,455	13,455	13,455	13,455	13,455	8,354
Zinc Price ($ per tonne)						2,800	2,800	2,800	2,800	2,800	2,800	2,800	2,800	2,800
Gross Revenue	177	1.0	1,592,116			42,050	203,398	203,398	203,398	203,398	203,398	203,398	203,398	126,282
Third-Party Tolling Commission		1.0	(109,096)			(2,881)	(13,937)	(13,937)	(13,937)	(13,937)	(13,937)	(13,937)	(13,937)	(8,653)
Net Revenue		1.0	1,483,020			39,169	189,460	189,460	189,460	189,460	189,460	189,460	189,460	117,629
Royalties		5.35%	(79,342)			(2,096)	(10,136)	(10,136)	(10,136)	(10,136)	(10,136)	(10,136)	(10,136)	(6,293)
Operating Costs	88	1.0	(792,770)			(22,413)	(98,489)	(98,489)	(98,489)	(101,186)	(103,088)	(103,088)	(103,088)	(64,437)
Operator Margin		1.42%	(11,268)			(319)	(1,400)	(1,400)	(1,400)	(1,438)	(1,465)	(1,465)	(1,465)	(916)
Project Development Expense			(2,807)	(275)	(1,900)	(632)								
Contribution Margin			596,833	(275)	(1,900)	13,710	79,435	79,435	79,435	76,700	74,770	74,770	74,770	45,983
Income and Other Taxes			(153,632)			(3,460)	(23,101)	(20,303)	(20,303)	(19,483)	(18,904)	(18,904)	(18,904)	(10,268)
Operating Cash Flow after Tax			443,201	(275)	(1,900)	10,249	56,333	59,131	59,131	57,217	55,866	55,866	55,866	35,715
Capital Expenditures		1.0	(92,025)			(92,025)								
Project Free Cash Flow - Unlevered - No Debt			351,176	(275)	(1,900)	(81,776)	56,333	59,131	59,131	57,217	55,866	55,866	55,866	35,715
Cumulative Project FCF				(275)	(2,175)	(83,951)	(27,617)	31,514	90,646	147,862	203,729	259,595	315,461	351,176
	NPV	10%	174,607					31,514	90,646	147,862	203,729	259,595	315,461	351,176
	IRR		66%					31,514	59,131	57,217	55,866	55,866	55,866	35,715

22.2 Sensitivity Analysis

Using the Hellyer Economic Model, NVRO has included sensitivity analysis on the total project economics cashflows, testing Capital Cost (±50% in 10% increments) and Revenue (±50% in 10% increments). The results of this sensitivity analysis are shown in Table 22-3.

Table 22-3. Sensitivity Analysis on CAPEX and Revenue for the NVRO Hellyer Tailings Project

UNLEVERED PROJECT IRRs

Unlevered Project IRR	66%
Revenue Factor	1.00
Capex Factor	1.00
Opex Factor	1.00

Green: IRR greater than 25%
Yellow: IRR between 10% and 25%
Red: IRR below 10%

Revenue >>

Capex	66%	**-50%** 0.5	**-40%** 0.6	**-30%** 0.7	**-20%** 0.8	**-10%** 0.9	**0%** 1.0	**10%** 1.1	**20%** 1.2	**30%** 1.3	**40%** 1.4	**50%** 1.5
-50%	0.5	NM	-8%	36%	69%	103%	140%	179%	222%	269%	319%	374%
-40%	0.6	NM	-11%	29%	57%	85%	115%	147%	181%	218%	258%	301%
-30%	0.7	NM	-14%	23%	48%	72%	97%	124%	152%	182%	215%	250%
-20%	0.8	NM	-17%	19%	41%	63%	84%	107%	131%	156%	183%	212%
-10%	0.9	NM	-19%	16%	36%	55%	74%	94%	115%	137%	160%	184%
0%	1.0	NM	-20%	13%	32%	49%	66%	84%	102%	121%	141%	163%
10%	1.1	NM	-22%	10%	28%	44%	60%	75%	92%	109%	127%	145%
20%	1.2	NM	-23%	8%	25%	40%	54%	69%	83%	99%	115%	131%
30%	1.3	NM	-25%	7%	22%	36%	49%	63%	76%	90%	105%	120%
40%	1.4	NM	-26%	5%	20%	33%	45%	58%	70%	83%	96%	110%
50%	1.5	NM	-27%	4%	18%	30%	42%	53%	65%	77%	89%	102%

Revenue >>

Opex	66%	**-50%** 0.5	**-40%** 0.6	**-30%** 0.7	**-20%** 0.8	**-10%** 0.9	**0%** 1.0	**10%** 1.1	**20%** 1.2	**30%** 1.3	**40%** 1.4	**50%** 1.5
-50%	0.5	27%	44%	61%	79%	97%	116%	136%	157%	179%	203%	228%
-40%	0.6	17%	35%	52%	69%	87%	106%	125%	145%	167%	190%	214%
-30%	0.7	5%	25%	43%	60%	78%	96%	114%	134%	155%	177%	201%
-20%	0.8	-13%	15%	33%	51%	68%	86%	104%	123%	144%	165%	188%
-10%	0.9	NM	3%	24%	41%	58%	76%	94%	113%	132%	153%	175%
0%	1.0	NM	-20%	13%	32%	49%	66%	84%	102%	121%	141%	163%
10%	1.1	NM	NM	0%	22%	39%	57%	74%	92%	111%	130%	151%
20%	1.2	NM	NM	NM	10%	30%	47%	64%	82%	100%	119%	139%
30%	1.3	NM	NM	NM	-4%	19%	38%	55%	72%	90%	108%	128%
40%	1.4	NM	NM	NM	NM	8%	28%	45%	62%	80%	98%	117%
50%	1.5	NM	NM	NM	NM	-10%	17%	36%	53%	70%	88%	106%

Source: NVRO "Hellyer Project Economics" (Updated 13 September 2022)

23 Adjacent Properties

Within the immediate Hellyer district there are several as yet unmined, or remnants of previously mined, mineral resources. In addition, Pieman Resources, HGM's sister company, formally holds rights to the exploration tenement (EL48/2003. Mt Block), which almost surrounds the Hellyer Mining Lease (ML103M/1987). An aerial photograph showing Hellyer ML and adjacent mineral properties is shown in Figure 23-1. All the mineral resources reported in this section constitute historical mineral resource estimates as per Section 2.4 of National Instrument 43-101.

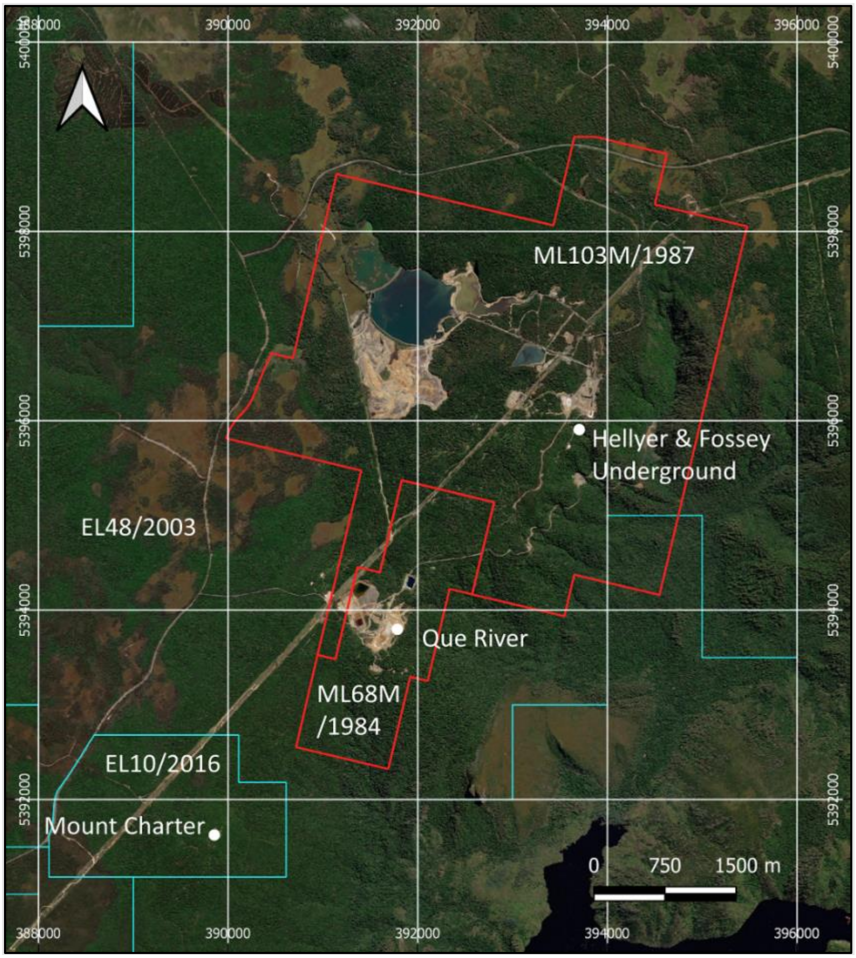

Figure 23-1. Aerial Photograph Showing Hellyer ML and Adjacent Mineral Properties

(Source: Mineral Resources Tasmania)

23.1 Hellyer Underground

The remaining underground resource at Hellyer was previously reported by Bass Metals in their 2012 Annual Report (Section 4.1 Table 2). The remaining mineral resource at Hellyer was estimated at:

- 750,000 tonnes at 0.3% Cu, 4.1% Pb, 7.0% Zn, 87 g/t Ag and 1.3 g/t Au

23.2 Fossey Underground

The remnant underground resource remaining when Fossey was put on care and maintenance was reported by Bass Metals in their 2012 Annual Report. The remaining JORC (2012) (Section 4.1 Table 2) combined mineral resource estimate at Fossey and Fossey East has been publicly reported several times:

- 425,000 tonnes at 0.5% Cu, 6.3% Pb, 11.4% Zn, 112 g/t Ag and 2.3 g/t Au

23.3 Que River Remnants

The Que River tenement (Mining Lease 68M/1984) is still held by Bass Metals Ltd. and lies immediately adjacent to the Hellyer mining lease on the southern side. In its 2012 Annual Report (Section 4.1 Table 2), Bass Metals Ltd. reported two JORC 2012 mineral resource estimates for the Que River Mine:

- Que River Basemetals - 3090,000 tonnes at 6.9% Zn, 4.0% Pb, 0.2% Cu, 100g/t Ag and 1.2 g/t Au and
- Que River S-Lens - 380,000 tonnes at 2.0% Cu, 3.4% Zn, 1.3% Pb, 63 g/t Ag and 0.3 g/t Au

It is unclear exactly what portions of the multi-lens Que River orebody to which those figures relate. The report date suggests that these estimates have been reworked to meet JORC 2012 compliancy although NVRO has been unable to verify these estimates.

It is important to note that neither HGM nor Pieman currently has any entitlement to the remnant Que River mineral resources.

23.4 Mount Charter

The Mount Charter prospect lies within Exploration Licence EL10/2016, a small exploration tenement, which replaced a former retention lease holding (RL 9711) and that is now held by Moina Gold Pty Ltd.

The Mt Charter area has been a focus of exploration since the 1970s due to the extensive silica-sericite-pyrite-(barite) alteration exposed at surface. This alteration is like the footwall alteration associated with the nearby Hellyer and Que River Volcanogenic Hosted Massive Sulfide (VHMS) Zn-Pb-Ag-Au deposits.

Seymour et al. (2006) for Mineral Resources Tasmania quoted in Introduction, Table 1, a historical mineral resource estimate of:

- 13.0Mt at 0.6% Zn, 0.3% Pb, 16 g/t Ag and 0.9 g/t Au.

Bass Metals2011 Annual Report (Section 2, Table 7) reported an estimateof“ 6.1 Mt at 1.2 g/t Au. 36 g/t Ag and 0.5% Zn’. As this historical resource estimate does not meet JORC (2012) standards it would require further review to confirm and report and is thus viewed as a historical mineral resource estimate.

The Mineral Resources Tasmania webpage mineral deposits search engine (mrt.tas.gov.au) indicates the following historical mineral resource category breakdown as of 30 October 2006 (Table 23-1).

Table 23-1. Historical Mineral Resource Estimate, Mt. Charter.

Resource Category	Tonnes	Au (g/t)	Ag (g/t)	Zn (%)	Ba (%)
Indicated	1,900,000	1.21	36.0	0.7	9.1
Inferred	4,200,000	1.22	35.0	0.4	10.0

(Source: Mineral Resources Tasmania)

23.5 Leases EL48/2003 and ML103M/1987

Extensive previous exploration activity has been undertaken within HGM and Pieman’s wholly owned exploration tenements surrounding the Hellyer Mine. Numerous exploration targets have been identified and remain only partially tested.

The Que River – Hellyer "Corridor" remains a very prospective zone for ongoing exploration with a reasonable chance of discovering additional polymetallic resources. Improvements in geophysical techniques, specifically gravity and airborne electromagnetic techniques, might reasonably be expected to provide a greater understanding of the prospectivity than was previously available. Ongoing exploration of the tenement package is not currently part of NVRO's operational proposals.

24 Other Relevant Data and Information

No other relevant data or information have been identified at this time.

25 Interpretation and Conclusions

25.1 Conclusions

Based on the data in this report, the Qualified Persons conclude that the information has been interpreted appropriately and that it supports the preliminary economic assessment results disclosed in this technical report.

The following interpretations and conclusions are made by the Qualified Persons in their respective areas of expertise, based on the review of data contained in this Technical Report.

25.1.1 Mineral Titles and Agreements

- The Project will be completed under a tailings processing operations agreement that is in place with HGM. The binding agreement between NVRO and HGM was signed in February 2022.
- Additional consents will be obtained from the HGM debt holders that will allow NVRO to monetize the metal concentrates produced by the Project.

25.1.2 Metallurgical Test Work

- Based on the test work to date, the application of NVRO developed acid pre-leach process for re-processing the Hellyer tailings using low acid concentrations, low to moderate reaction temperatures, and normal atmospheric pressure to liberate and recover base metals, gold and silver is technically feasible at the production scale contemplated in this study (3,500 t/d reclaimed tailings).
- Future additional metallurgical tests aimed at optimizing the process flowsheet and reagent consumption should generate opportunities to extract and recover additional by-products from the acid pre-leach PLS stream and precious metals also reporting to the PLS stream.

25.1.3 Mineral Resource Estimates

- No cut-off grade is used and the stated resource essentially represents the complete tailings accumulation at the reported date.
- The estimated cost for reclaiming, transporting, and processing the reprocessed HGM tailings stream in the NVRO process plant is estimated in this report to be approximately $80 per tonne.
- Assuming a gold price of $1,650/oz and a projected gold recovery of 85%, then the break-even cut-off for the mineralization is estimated at 1.51 g/t Au.
- The tailings mineralization averages a grade of 2.3 g/t Au and is significantly in excess of the indicative break-even grade as this calculation does not consider the silver and the base metals.
- Projected tailings tonnages available for direct plant feed are estimated to be 3.7 Mt and the projected tailings tonnages available under Phase 2 are 5.2 Mt
- The estimated total available tailings feed for the Project is about 9 Mt.

25.1.4 Mining Methods

- The tailings resources are contained within the tailings storage facility. Dredging of the tailings has been successfully implemented by HGM since 2018.
- The installation of the second dredge will provide additional tailings recovery capacity that exceeds the existing HGM plant throughput
- The HGM mine plan should provide sufficient feed for the HGM Plant for the first 4-6 years, thereafter, NVRO will operate (contract or owner) dredges to provide feed for the NVRO Project Plant.

25.1.5 Environmental Permitting and Social Considerations

- The environmental approvals for the current HGM tailings reprocessing operation are in place.
- Management of the environmental effects for the current operation is through the implementation of an approved environmental management plan

- The existing effects associated with the Hellyer mining operation and the current tailings reprocessing operation are well documented. Key amongst these effects are the effects and potential effects of acidic and metalliferous drainage.
- It is expected that the Project will reduce the overall environmental liability at the mine be reducing the potential for acidic drainage and the associated metal leaching.
- The Hellyer Gold Mine is an established operation that provides employment in the region. The extension of the operation with the incorporation of the Project will extend the operation, so benefiting the employees.
- The Project will result in increased and ongoing local and regional purchases and the payment of taxes to the state and federal governments.

25.2 Risks

The risks outlined in this section are project specific and do not include external risks such as metal price fluctuations or exchange rate risks.

25.2.1 Tailings Recovery and Processing

The following Table 25-1 provide the tailings recovery and processing risks for the Project.

Table 25-1. Tailings Recovery and Processing risks for the NVRO Tailings Project

Risk	Description	Risk Management / Mitigation
Insufficient feed for NVRO plant	Variability in the feed to the NVRO Plant from the HGM Plant / Dredging operations	Evaluation of feed efficiency. Option to stockpile tailings. Evaluate installation of NVRO dredge into TSF to supplement feed
Inability to recover all the tailings	There are restrictions on the locations for dredging as the structures are water retaining	Change in tailings characteristics should allow dry storage (reduced acid drainage potential). Appropriate planning and engineering will liberate the tailings.
Feed Variability	Detailed work has not been undertaken to establish variability in the Feed and as such the recoveries may vary from those stated within this Report	Additional metallurgical test work will determine variability in the feed and confirm recoveries with higher confidence
Acid Regeneration	Detailed work has not been undertaken to confirm acid regeneration and consumption stated within this Report	Additional bench scale test work and laboratory pilot plant test work will determine acid consumption with higher confidence
Reagent Consumption	Detailed work has not been undertaken to confirm reagent consumption for major reagents stated within this Report for cyanide leach circuit on Acid pre-leach residue and Acid pre-leach PLS streams for by-product metals recovery	Additional bench scale test work and laboratory pilot plant test work will determine reagent consumption with higher confidence
By-product Metal recovery	Detailed work has not been undertaken to confirm circuit configuration for the recovery of by-product metals (e.g. Cu, Zn) from Acid pre-leach PLS streams	Additional bench scale test work and laboratory pilot plant test work will determine circuit configuration with higher confidence
Equipment Selection/ sizing	Detailed work has not been undertaken for specific equipment sizing and materials of construction (gas scrubbing, thickening and filtration)	Additional bench scale test work and laboratory pilot plant test work will determine equipment selection with higher confidence

25.2.2 Economic

Table 25-2 outlines the economic risks for the Project.

Table 25-2. Economic risks for the NVRO Tailings Project

Risk	Description	Risk Management / Mitigation
Capital and Operating Costs	Realized capital and operating costs are significantly higher than expected, adversely impacting project value.	Future work and studies will determine costs and economic viability with higher confidence ahead of Final Investment Decision (FID).

25.2.3 Environmental and Social

Table 25-3 outlines the environmental and social risks for the Project.

Table 25-3. Environmental and Social risks for the NVRO Tailings Project

Risk	Description	Risk Management / Mitigation
Post NVRO tailings still have potential for acidic drainage	Within the Project, the oxidation of the potentially acid-forming material is incomplete	Longer residence time in the plant to complete oxidation. Continued storage of the material under water (status quo)
Local community discontent	Increase in traffic related to NVRO operations causing concerns locally	Registered and licenced transport. Deliveries during off-peak hours but within normal working hours.
Air pollution risk concern within local communities	Potential for gas escape / release to receiving environment	Closed vessels, options evaluation from gas control, maintenance of systems meets or exceeds manufacturer requirements
Wildlife killed on road	Additional traffic increases the risk to wildlife	Strict speed control and monitoring. Requirement for reporting by transport contractors
Community expectations not met	Community consultation increases community expectations for jobs, local purchases etc.	Clear expectations with community consultation. Written and verbal communication carefully controlled to provide clear message

25.3 Opportunities

25.3.1 Metal Recovery

Table 25-4. Metal Recovery Opportunities for the NVRO Tailings Project

Opportunity	Description	Realization
By- product metal recovery - Pb	Test work has indicated that feed contains Pb which has the potential to be recovered	Additional metallurgical test work may lead to supporting additional by-product metals which can be recovered from Acid pre-leach PLS stream and improve project revenues
Precious Metal Recovery	Test work indicated that longer cyanide leach cycle times on Acid pre-leach residue have the potential to improve upon modelled precious metal recoveries and positively impact project economics	Additional metallurgical test work may lead to supporting more aggressive metal recovery estimates and improve project revenues

Opportunity	Description	Realization
Precious Metal Recovery	Test work has indicated that Acid pre-leach PLS stream contains precious metals in solution which have the potential to be recovered	Additional metallurgical test work may lead to supporting additional precious metal recovery from Acid pre-leach PLS stream and improve project revenues
Reagent Optimization	Detailed work has not been undertaken to optimize reagent consumption	Additional metallurgical test work may lead to reduced reagent consumption as stated in this report and improve project revenues
Circuit Optimization	Once Acid pre-leach optimization studies are complete, review By-product metal recovery circuits from the acid pre-leach PLS stream	Additional metallurgical test work may lead to optimizing downstream circuit configuration and improve project revenues

25.3.2 ESG

Table 25-5. ESG Opportunities for the NVRO Tailings Project

Opportunity	Description	Realization
Reduced environmental liability	Oxidation of the pyrite within the NVRO Plant will reduce the acid generation potential of the tailings	Implementation of the Project. Full recovery of the available tailings
Reduced closure costs	Oxidation of pyrite within process reduces the potential for acid drainage	Possible dry closure with rehabilitation to forest
Improved local economic development	Extended life of project results in local employment and purchases	Implementation of the project with local hiring and purchasing commitment
Water management continuation	Project will extend the life of project with people at site	Project management plan for ongoing water management

26 Recommendations

Based on the positive results of the technical and economic analysis outlined within this Technical Report for the NVRO Hellyer Tailings Project, Technical Report team and the qualified persons recommend the actions outlined in the following sections.

26.1 Environmental

A detailed evaluation of environmental aspects of the proposed NVRO operations at Hellyer be undertaken, with particular focus on the nature of and potential environmental effects of the tailings produced by NVRO re-processing operations:

- NVRO Team and the HGM team approach the regulators that will further define the approach to obtaining the approvals.
- Assess the acid generation potential of the tailings post NVRO process to confirm that they are not potentially acid-generating.
- Geotechnical, hydrological, and other parameters relevant to tailing material recovery
- Define the location for tailings placement post the NVRO Plant so that the recovery of tailings within the TSF post HGM's operation is optimized.
- Complete a site-wide water balance for an in-depth understanding of the water treatment needs during the Project operation.

26.2 Socio-economic and Governance

- Establish a community liaison program for the Project
- Complete community consultation with local communities, leaders, businesses
- Integrate community concerns and an optimization for local purchases into the project implementation plan

26.3 Tailings Recovery Operations (Mining)

The work to mobilize the tailings through to year 5 of the Project is to be completed by HGM. However, additional studies as follows are recommended to be completed before year 2 of the Project for the overall project as tailings mobilization at the closure of the HGM operation will be completed by NVRO (or its contractors):

- Survey of tailings storage areas, depth of tailing and assumptions on nature of storage facilities bases
- HGM tailings locations, grades, access, and other recovery issues
- Production rates, expected mine life, mining dilution factors etc.
- Definition of the required dredging equipment and ancillary equipment
- Ongoing tailings placement (planning and responsibility)
- Updates to the mine closure and rehabilitation plans (HGM responsibility)

26.4 Metallurgical Testing

- Continue the bench-scale metallurgical test work to confirm the optimum leach parameters for application of NVRO developed acid pre-leach process and head grade variability test work.
- Continue the work for reagent optimisation through ongoing bench scale testing – program to be guided by the design engineering consultant
- Bench scale test work to investigate downstream processing options for the extraction of zinc, copper, and precious metals from the acid pre-leach PLS stream, with test work also aimed at extracting additional other by-products such as lead.
- Laboratory pilot scale testing once optimum parameters are determined at the bench scale to establish final flowsheet (with recycle stream) for input into the engineering design.

26.5 Marketing

- Marketing study for zinc hydroxide concentrate to be embarked on during the Feasibility Study of the project
- Obtain concentrates from the pilot scale testing for analysis and then marketing to potential refiners

26.6 Capital and Operating Costs

- Define the costs for tailings placement – current costs provide for full placement as a costs for NVRO as the base case
- Complete option and trade-off studies to optimize the project plan:
    - Resin recovery vs. precipitation for base metal concentrate production
    - Pre-treatment needs for tailings within TSF that have already been treated by HGM

26.7 Project Execution Plan

The project execution plan aims to address all the recommendations as above. The work is divided into three main areas:

- Pre-pilot plant work
- Pilot plant and preliminary engineering for Pre-Feasibility Study
- Detailed engineering for Bankable Feasibility Study

The following Table 26-1 Estimated costs for the next phases of the NVRO Hellyer Tailings Project

provides the estimated costs for the project execution plan:

Table 26-1 Estimated costs for the next phases of the NVRO Hellyer Tailings Project

Work Area	Cost (US$,000)
Phase 1 – Ongoing Lab Testing	
External Testing	20
Total Tingalpa Lab	20
Phase 2 – Hellyer Tailings Project PFS	
Pilot Plant Study	1,200
Concept Development Study	250
Bench-scale Confirmation Work	50
Qualified Person - MET	20
Qualified Person - Resource Confirmation	120
Environmental and Market study	25
Total Hellyer Project PFS	1,665
Phase 3 – Definitive Feasibility Study	
Hellyer Tailings Project Engineering Design	1,000
Feasibility Study Report	200
Total	*2,885*

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28 Certificates of Qualified Persons

28.1 Certificate of Qualified Person: Jacques Houle

I, Jacques Houle, do certify that:

1. I am an independent consultant working for EnviroGold and participating in the preparation of the Technical Report on the Hellyer Tailings Reprocessing Project.
2. I received a Bachelor's of Applied Science degree in Geological Engineering – Mineral Exploration Option in 1978 at the University of Toronto.
3. I am a Qualified Professional (QP) member with special expertise in mineral exploration, mine geology, economic geology and geochemistry registered and licensed with the Engineers and Geoscientists of British Columbia (License #25107, Permit to Practice #1000227).
4. I am a registered member of the Society of Economic Geologists, Association of Applied Geochemists, Association for Mineral Exploration British Columbia, Technical Advisory Committee and member of Geoscience BC, and advisory committee of the Earth Science Department of Vancouver Island University.
5. I have 44 years of experience as a mineral exploration consultant, exploration manager, mine geologist and government regional geologist.
6. I have read the definition of "Qualified Person" set out in the National Instrument 43-101 ("NI 43-101") standards for disclosure for mineral projects and certify that by reason of my education, affiliation with a professional association as defined in NI 43-101 and past relevant work experience, I fulfill the requirements to be a qualified person for the purposes of NI 43-101.
7. I am responsible for the preparation of Section 6 – History, Section 7 – Geological Setting and Mineralization, Section 8 – Deposit Types, Section 9 – Exploration, Section 10 – Drilling, Section 11 – Sampling, Section 12 – Data Verification, Section 14 Mineral Resource Estimates, Section 15 – Mineral Reserve Estimates, and Section 23 – Adjacent Properties.
8. I have not visited the site of the Hellyer Tailings Project in Tasmania, Australia.
9. As of the date of this certificate, to the best of my knowledge, information and belief, the Technical Report contains all scientific and technical information that is required to be disclosed to make the Technical Report not misleading.
10. I have read the National Instrument 43-101 and Form 43-101F1, and the above noted section of the Technical Report has been prepared in compliance with that instrument and form.
11. I consent to the filling of the Technical Report with stock exchange or any regulatory authority and any publication by them for regulatory purposes, including electronic publication in the public company files on their websites accessible by the public, of the Technical Report.

Signed at Nanaimo, British Columbia on the 30, September 2022

/S/ "Jacques Houle"
Signed By
Jacques Houle, P. Eng.

28.2 Certificate of Qualified Person: Rodrigo R. Carneiro

I, Rodrigo R Carneiro, do certify that:

1. I am an independent consultant working for EnviroGold and participating in the preparation of the Technical Report on the Hellyer Gold Mine Tailings Reprocessing Project.
2. I received a Bachelor's degree in Metallurgical Engineering in 1978 and Master of Science's degree in Mineral Processing in 1994.
3. I am a Qualified Professional (QP) member with special expertise in Metallurgy and Processing of **The Mining and Metallurgical Society of America (MMSA). MMSA Member Number 01381QP).**
4. I am a registered member of the **Society for Mining Metallurgy and Exploration Inc (SME). SME Registered Member 4028876RM.**
5. I have 43 years of experience as a metallurgical in the mineral processing and mining industry. My experience has been acquired working in the projects in USA, Venezuela, Peru, Colombia, Chile, Mexico, Mongolia, China, and Philippines.
6. I have read the definition of "Qualified Person" set out in the National Instrument 43-101 ("NI 43-101") standards for disclosure for mineral projects and certify that by reason of my education, affiliation with a professional association as defined in NI 43-101 and past relevant work experience, I fulfill the requirements to be a qualified person for the purposes of NI 43-10.
7. I am responsible for the preparation of Section 13, Mineral Processing and Metallurgical Testing, Section 17, Recovery Methods, Section 18, Project Infrastructure and Section 21, Capital and Operating Costs.
8. I have not visited the site of the Hellyer Gold Mine Tailings Reprocessing Project in Tasmania, Australia.
9. As of the date of this certificate, to the best of my knowledge, information and belief, the Technical Report contains all scientific and technical information that is required to be disclosed to make the Technical Report not misleading.
10. I have read the National Instrument 43-101 and Form 43-101F1, and the above noted section of the Technical Report has been prepared in compliance with that instrument and form.
11. I consent to the filling of the Technical Report with stock exchange or any regulatory authority and any publication by them for regulatory purposes, including electronic publication in the public company files on their websites accessible by the public, of the Technical Report.

Signed at Tucson, Arizona, on 30 September 2022

/S/ "Rodrigo Carneiro"
Signed By
Rodrigo R Carneiro, Engineer & MSc.

28.3 Certificate of Qualified Person: Rossen A. Halatchev

I, Dr. Rossen A. Halatchev, do certify that:

1. I am an independent consultant working for EnviroGold and participating in the preparation of the Technical Report on the Preliminary Economic Assessment for the Hellyer Gold Mine Tailings Reprocessing Project.
2. I received a Master's degree in Mining Engineering in 1981 and PhD's degree in Mining Engineering in 1987.
3. I am a Registered Member of the Australasian Institution of Mining and Metallurgy. Member No. 208219.
4. I am Chartered Professional in Mining (CP-Min) with the Australasian Institution of Mining and Metallurgy.
5. I am a Competent Person (CP) with special expertise in Ore Reserve Estimation.
6. I have 41 years of experience as a mining engineer and academic in the mining industry and education. My experience has been acquired working in the projects in Eastern Europe, Australia, Indonesia, Kingdom of Saudi Arabia and Papua New Guinea.
7. I have read the definition of "Qualified Person" set out in the National Instrument 43-101 ("NI 43-101") standards for disclosure for mineral projects and certify that by reason of my education, affiliation with a professional association as defined in NI 43-101 and past relevant work experience, I fulfill the requirements to be a qualified person for the purposes of NI 43-10.
8. I am responsible for the preparation of Section 4, Property Description and Location; Section 5, Accessibility, Climate, Local Resources, Infrastructure and Physiography; Section 6, History; Section 16, Mining Methods; Section 18, Project Infrastructure; Section 19, Market Studies and Contracts; Section 20, Environmental Studies, Permitting, and Social or Community Impact; Section 21, Capital and Operating Costs; and Section 23, Adjacent Properties in the Preliminary Economic Assessment on the on the Hellyer Gold Mine Tailings Reprocessing Project in Tasmania, Australia.
9. I visited the site of the Hellyer Gold Mine Tailings Reprocessing Project in Tasmania, Australia on 28-29 June 2017 and signed off the Ore Reserve Estimate statement.
10. As of the date of this certificate, to the best of my knowledge, information and belief, the Technical Report contains all scientific and technical information that is required to be disclosed to make the Technical Report not misleading.
11. I have read the National Instrument 43-101 and Form 43-101F1, and the above noted section of the Technical Report has been prepared in compliance with that instrument and form.
12. I consent to the filling of the Technical Report with stock exchange or any regulatory authority and any publication by them for regulatory purposes, including electronic publication in the public company files on their websites accessible by the public, of the Technical Report.

Signed at Brisbane, Australia, on 29 September 2022.

/S/ "Rossen A. Halatchev"
Signed By
Dr. Rossen A. Halatchev
Directory Mining and Principal Consultant
AusGEMCO Pty Ltd