WILLIAMSON
WATER & LAND ADVISORY

Macraes Operation, MP4 Project

Interim Contaminated Site Management Plan

OCEANA GOLD (NEW ZEALAND) LTD

WWLA1659 | Rev. 0

26 August 2026

Interim Contaminated Site Management Plan

Project no:	WWLA1659
Revision:	0
Date:	26 August 2026
Client name:	Oceana Gold (New Zealand) Ltd
Project manager:	Lauren Windross
Author(s):	Lauren Windross
File name:	G:\Shared drives\Projects\Oceana Gold\WWLA1659_Macraes Fast Track Phase 4 CL\Deliverables\SMP\WWLA1659_Rpt_Interim SMP Macraes_Rev0_260826.docx

Williamson Water & Land Advisory

Auckland | Whangārei | Tauranga
New Zealand
www.wwla.kiwi

Document history and status

Rev	Date	Description	By	Review	Approved
0	26 August 2026	Interim Site Management Plan	Shane Moore	Wendi Williamson	Wendi Williamson

Distribution of copies

Rev	Date issued	Issued to	Comments
0	26 August 2026	OGNZL, Mitchell Daysh	For lodgement

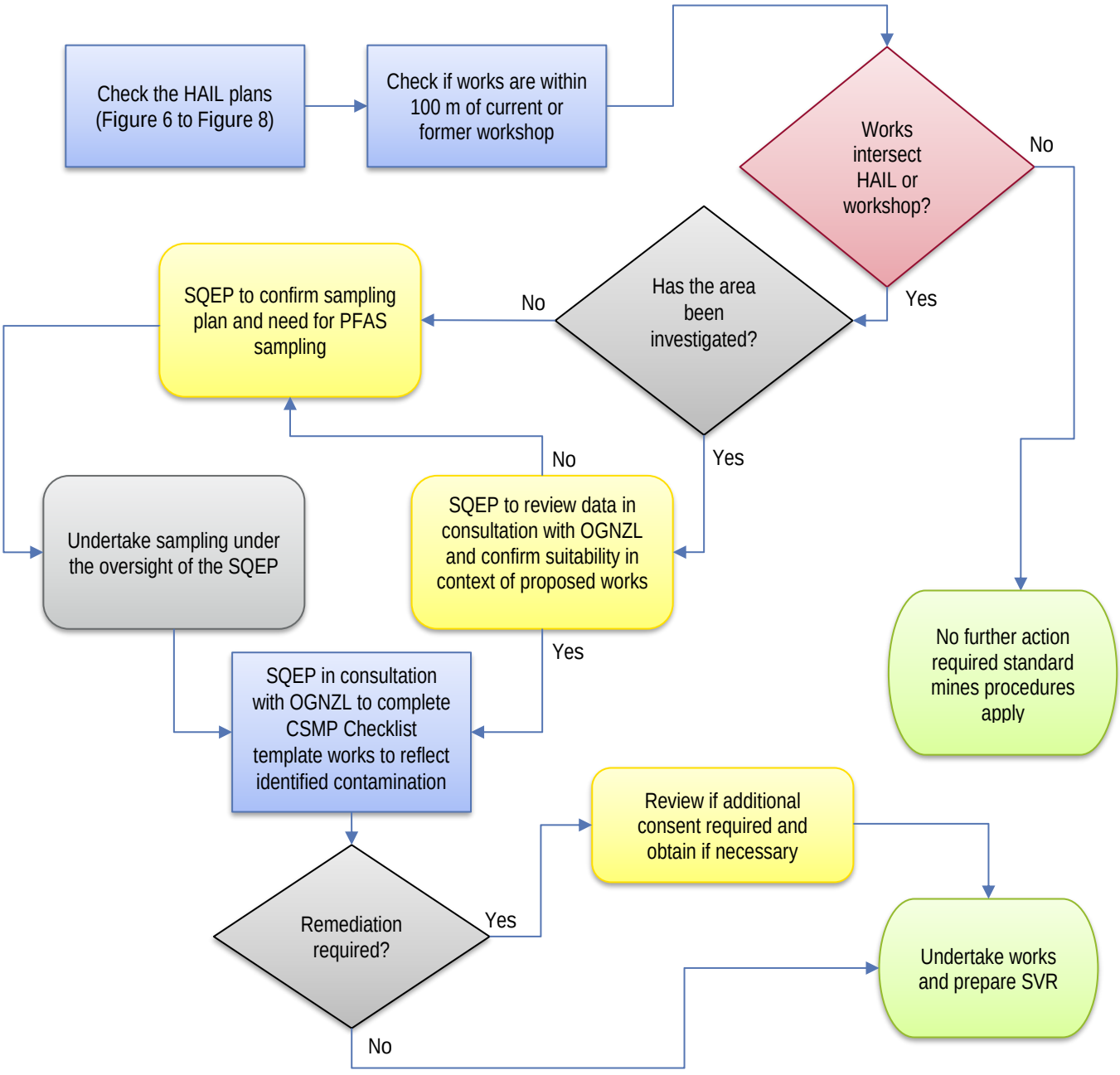
Cover image: Otago Daily Times

Executive Summary

Williamson Water & Land Advisory ("WWLA") has prepared this Contaminated Site Management Plan ("CSMP") to assist Oceana Gold (New Zealand) Limited ("OGNZL") in obtaining resource consent approvals under the Fast Track Approvals Act 2024 ("FTAA") as part of the Macraes Phase 4 Project ("MP4" or "the Project").

This CSMP is intended to be implemented in areas where discrete potentially contaminating activities have been identified. It is designed to address localised impacts of ground contamination associated with these sources.

The following flowchart has been developed as a tool for OGNZL to determine if further contamination-related advice is required for each stage or phase of the MP4 Project. The tool sets out when OGNZL needs to contact a SQEP, if investigation is required, and if consent or contamination-specific matters should be considered.



Contents

Figures

Appendices

Appendices

1. Introduction

OGNZL (New Zealand) Limited ("OGNZL") currently undertakes open pit and underground gold mining operations at the Macraes Operation located at Golden Point Road, Macraes, East Otago (see **Figure 1** overpage). As part of their ongoing operations, OGNZL continually review the remaining life of the Macraes Operation in light of updated knowledge of the gold resource and the economics of mining.

Reflecting recent exploration success and optimisation work, together with higher gold prices, the Macraes Phase Four Project ("MP4" or "the Project") seeks to extend the life of mining at the Macraes Operation until at least 2039. The Project, which will enable ongoing gold production at a rate of approximately 130,000 ounces per annum, is identified as a Listed Project in Schedule 2 of the Fast-track Approvals Act 2024 ("FTAA") as a project providing significant national or regional benefits.

To support the development of the substantive application for the Project, OGNZL has engaged Williamson Water and Land Advisory ("WWLA") to provide an assessment of ground contamination in the context of the Project and, to the extent required, identify any necessary management and operation measures to address any such effects.

This Contaminated Site Management Plan ("CSMP") has been prepared to guide pre-works investigations to characterise contamination in areas where potentially contaminating activities are identified, inform contractors of their requirements when handling contaminated soils on site, and to support resource consent under the FTAA.

Prior to preparation of this CSMP, a Preliminary Site Investigation ("PSI")[1] was undertaken to determine where potentially contaminating activities (those listed on the Ministry for the Environments (MfE's) Hazardous Activities and Industries List; "HAIL"[2]) have occurred or have likely occurred within the footprint of MP4.

The contaminated land management framework in New Zealand (the NESCS[3]), requires land development projects to determine if HAIL activities are present as part of the consent process. If they are present *and* land use change, soil disturbance, subdivision, soil sampling or fuel system removal is proposed, then investigation (testing of potentially impacted soils, known as a detailed site investigation or DSI) is required to determine the level of contamination present. Recommendations for soil management are then determined from the soil testing data (i.e. can the soil be retained on site or reused, or does it require specific management to mitigate potential environmental or human health effects). These soil management recommendations are communicated to Councils and Contractors via a CSMP (this document).

The Otago Regional Plan: Waste (Regional Waste Plan) for Otago also considers discharges from contaminated sites. This CSMP sets out how potential discharges from remediation activities will be captured within the existing Mine Water Management System so that no new off-site discharges occur and remediation meets the Permitted Activity Standards of the Regional Waste Plan.

This CSMP should be read in conjunction with the PSI report as that sets out the basis for this document and provides key information regarding the site history.

This CSMP will support resource consent, but also informs contractors of their obligations during the development earthworks. An example CSMP Checklist to assist contractors in complying with this document is provided in Appendix A and addresses remediation requirements for the Mining Workshop.

Staged contaminated land investigations will occur as works progress. The findings of these will be reflected in an updated CSMP Checklist for each of the works areas if contamiantion management/remediation is required.

[1] WWLA,6 May 2026. Macraes Operation, Preliminary Site Investigation (Ground Contamination). Prepared for Oceana Gold (New Zealand) Ltd. Ref WWLA1659, rev 3.
[2] https://environment.govt.nz/publications/hazardous-activities-and-industries-list-hail/
[3] Resource Management (National Environmental Standards for Assessing and Managing Contaminants in Soil to Protect Human Health) Regulations 2011 (NESCS).

1.1 Applicability of this CSMP

This CSMP is intended to be implemented in areas where discrete potentially contaminating activities have been identified within the MP4 Project area. It is designed to address localised impacts of ground contamination associated with these sources, for example, the Project proposes to relocate the Open Pit Mining Workshop and decommission some fuel farms. It also provides unexpected contamination protocols for instances where previously unidentified contamination is encountered during soil disturbance activities of any scale.

Routine mining related ground disturbance, including re-mobilisation of large stockpiles of waste rock, or re-processing of ore stockpiles, will be carried out under mining-specific plans, controls and associated conditions of consent and are NOT intended to be addressed by this CSMP.

There is no requirement to implement the CSMP or undertake an investigation if soil disturbance is occurring where no HAIL activities have occurred. Nor is there a requirement to implement the CSMP or investigate areas with HAIL activities that are outside of the MP4 area Soil disturbance for activities unrelated to MP4 will be subject to separate assessment of ground contamination requirements.

1.2 Background

The Project is made up of the following proposed key activities:

- **Open pit extensions** at Coronation, Coronation North, Innes Mills, and Golden Bar.
- **Underground mine expansion through** further development of the Golden Point Underground mine ("GPUG").
- **Tailings management,** including:
  - Construction of the Frasers Tailings Storage Facility ("FTSF") Stage 3 to accommodate a total tailings storage of up to 153 Mt; and
  - Hydraulic mining and relocation of tailings from the Mixed Tailings Impoundment ("MTI"), Southern Pit Option 10 TSF ("SP10"), and Southern Pit Option 11A TSF ("SP11") to FTSF.
- **Waste rock disposal**, including increased storage capacity within open pits and at existing waste rock stacks at Coronation, Coronation North, Innes Mills, Golden Bar, Golden Point, and Frasers.
- **Water management infrastructure and operations**, including:
  - Construction of Camp Creek and Coal Creek water storage dams for flow and water quality management;
  - Construction, operation and maintenance of a Water Treatment Plant; and
  - Ongoing operation and maintenance of the Mine Water Management System ("MWMS").
- **Infrastructure and roading works**, including:
  - Realignment of Macraes Road in two stages; and
  - Relocation of the Open Pit Mining Workshop.
- **Ecological enhancements**, including establishment of:
  - Murphys Ecological Enhancement Area ("MEEA") near Murphys Creek, including predator fencing, access tracks, and site facilities;
  - Mt Highlay restoration area;
  - Cranky Jims Link shrubland enhancement area;
  - Murphys Link tussock protection area; and
  - Additional compensation measures for residual ecological impacts.
- **Mine closure and rehabilitation activities**, including rehabilitation of mining landforms, creation of pit lakes, dry capping of tailings storage facilities, and revegetation in accordance with closure objectives.

The location and key features of the Macraes Operation are shown in **Figure 1**. An overview of the proposed activities which make up the Project is shown in **Figure 2** below.

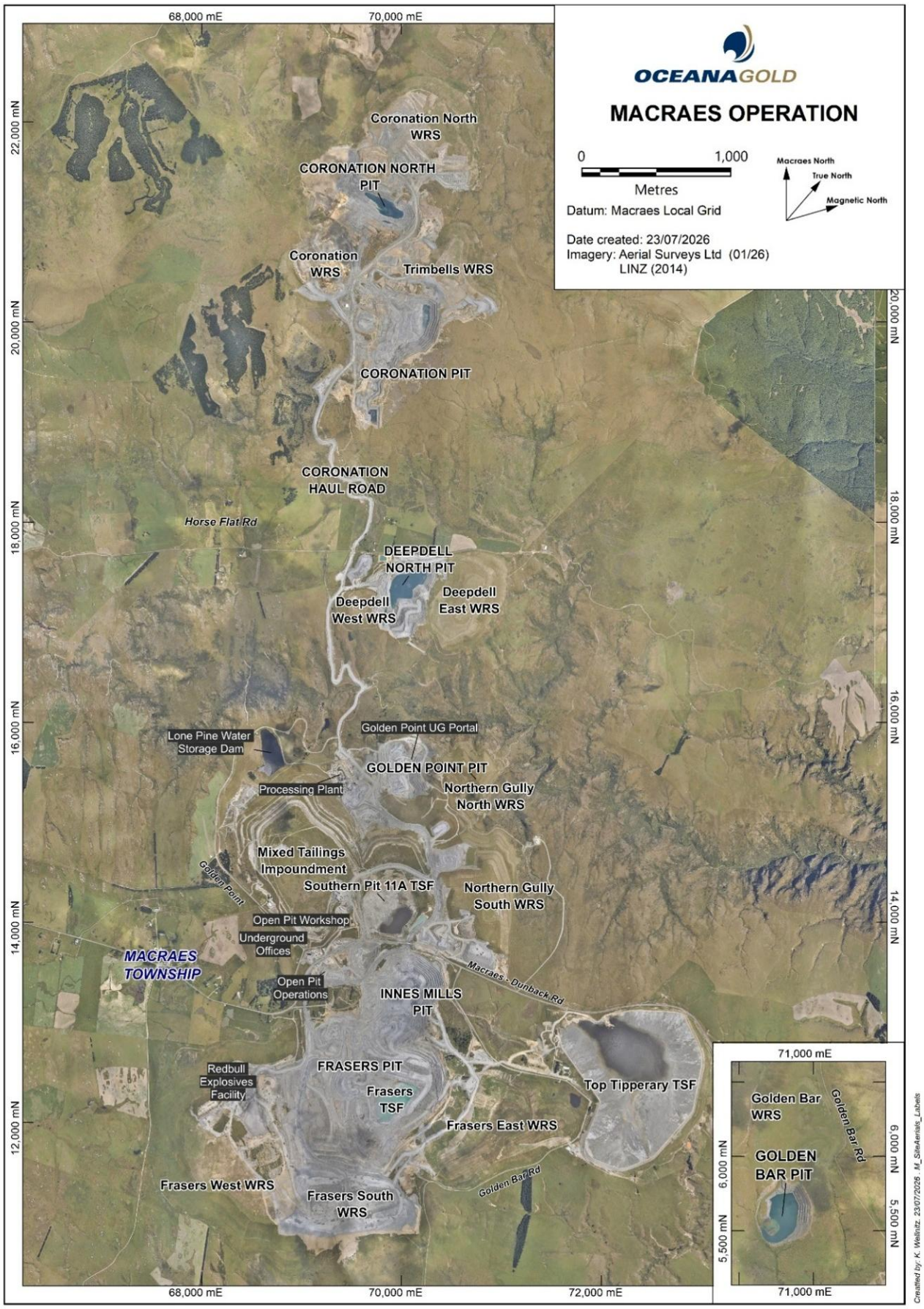


Figure 1. Macraes Operation location and key features (source: OGNZL)

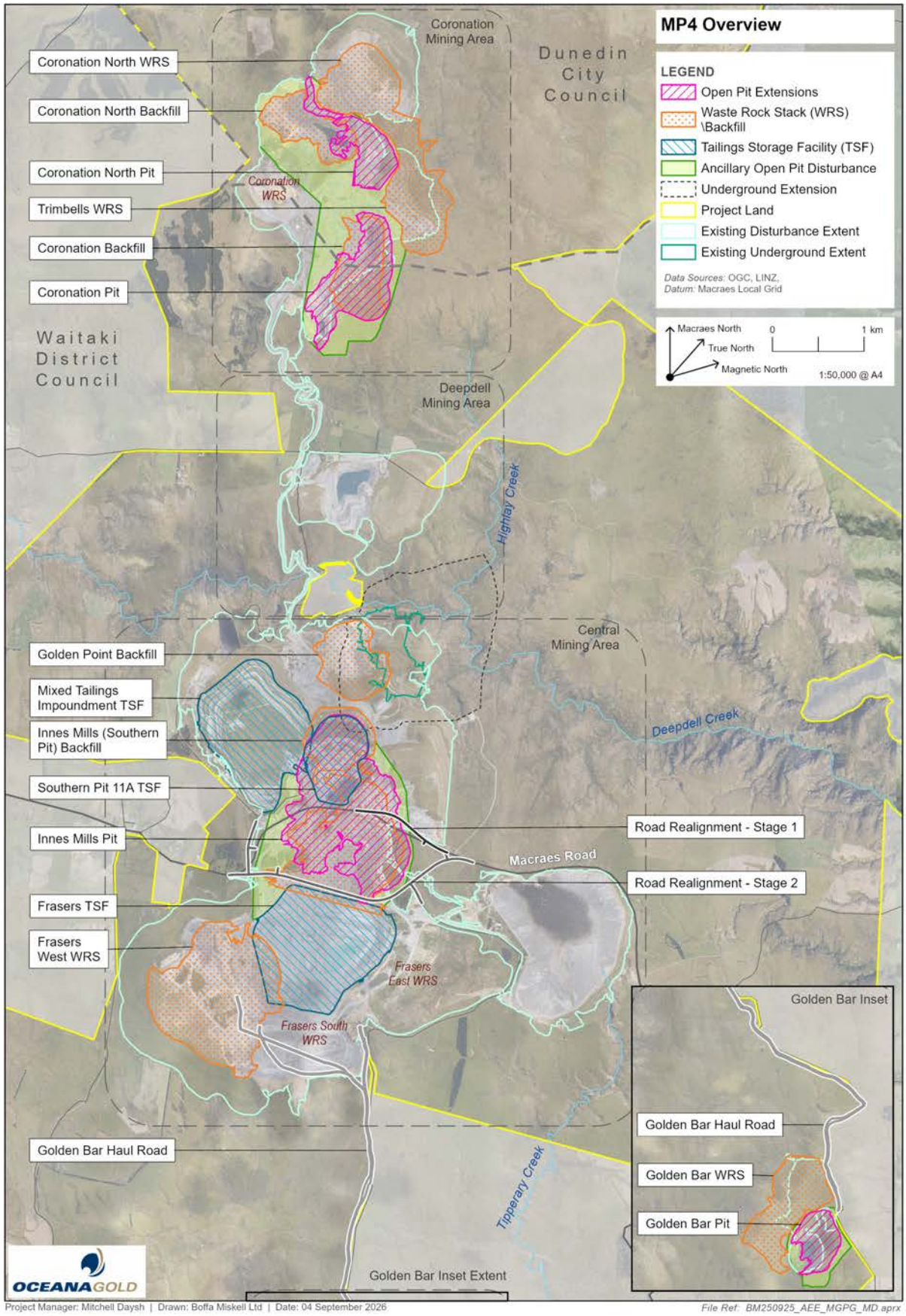


Figure 2. MP4 Project overview plan (source: OGNZL)

1.3 Objectives and Scope of this Plan

The objectives of this CSMP are to:

- Outline the known site history and expected contamination conditions as well as the investigation methodology for additional sampling to be undertaken prior to the project works commencement.
- Outline contaminated land-related soil management requirements.
- Provide procedures to guide contractors in materials management, reuse, disposal, health and safety and response to unexpected contamination encounters.

A summary of the sections of this CSMP are provided below:

Sections 1 to 2	A summary of key information documented in the PSI and used to inform the requirements of this CSMP.
Section 3	Contamination management overview including rationale, soil management strategies and remediation strategies.
Section 4	Pre-works testing requirements for all stages/ areas.
Section 5	Contamination specific requirements for the contractor establishing the site and procedures prepared to ensure soils are handled, contained or disposed of appropriately and discharges are mitigated. A range of procedures are provided to reflect the types of contamination that may be present in different stages/ areas.
Section 6	Health and safety. As contamination levels are expected to vary across the different areas/ stages, a range of health and safety procedures have been provided. The procedures needed for each stage of works will be determined by the Suitably Qualified Environmental Practitioner ("SQEP").
Section 7	Contingency measures are provided in the event that unexpected ground conditions are encountered, discharges occur and / or complaints are received during site works.
Section 8	Monitoring requirements during remediation activities.
Section 9	Lists the information the contractor is required to provide at the end of the project to be included in the ground contamination-related site validation reports.
Appendix A	A **CSMP Checklist** is provided to assist Contractors with compliance with this document. The current checklist is an example for the Open Pit Mining Workshop. A new version of this will be prepared by the SQEP for each development stage/ area once the corresponding contaminated land investigation is complete. The CSMP Checklist highlights which sections of the CSMP are relevant to the works being undertaken, depending on the level of contamination identified.
Appendix B	OGNZL-provided management plans and health and safety plans.

1.4 Legislative Requirements

WWLA has prepared this CSMP in accordance with requirements of the NESCS, NZ Asbestos Guidelines[4], and MfE Contaminated Land Guidelines (CLMGs) 1[5] and 5[6]. The persons preparing and certifying this CSMP are suitably qualified and experienced practitioners ("SQEPs") as defined in the NESCS Users Guide (2012).

1.5 Plan Management and Control

Contaminated land-related responsibilities during development of the site, including management, distribution and implementation of this plan are as set out in **Table 1**.

Table 1. Roles and responsibilities under this plan

Organisation	Role and responsibilities
OGNZL	Land owner. - PCBU as defined in the Health and Safety at Work Act 2015 (Health and Safety Regulation).
Lead Contractor (TBC; may be different lead contractors for different aspects of the Project)	Responsible for: - Distribution of this plan to sub-contractors and ensuring they understand their obligations under the plan; - Compliance with resource consent conditions; and - Implementation of this plan.
Contractor's Site Manager	Responsible for: - Liaising with the Contaminated Land Specialist to ensure appropriate inspections are undertaken at the key times (refer **Section 5** and CSMP Checklist, **Appendix A**); - Monitoring compliance with consent conditions; - Ensuring disposal of surplus materials is to an appropriate location; and - Monitoring earthworks controls.
OGNZL Health and Safety Officer(s)	Responsible for: - Ensuring adequacy of health and safety provisions during unexpected contamination encounters in collaboration with contractors.
Subcontractors	Responsible for adhering to procedures and requirements of this plan.
Contaminated land specialist/ SQEP	Responsible for: - Undertaking investigations set out in **Section 3.5**, including soil sampling and reporting; - Observing remedial actions if required; - Inspections and advice during the works, including soil and water sampling and scheduling (if required); - Works closure reporting.
Otago Regional Council, Waitaki District Council and Dunedin District Council	Responsible for monitoring compliance with resource consent conditions.
Worksafe NZ	Responsible for overseeing compliance with the Health and Safety at Work Act (2015) and if applicable the Health and Safety at Work (Asbestos) Regulation (2016).

[4] New Zealand Guidelines for Assessing and Managing Asbestos in Soil, BRANZ 2024.
[5] Ministry for the Environment, Contaminated Land Management Guideline No. 1: Reporting on Contaminated Sites in New Zealand (Revised 2021).
[6] Ministry for the Environment, Contaminated Land Management Guidelines No. 5: Site Investigation and Analysis of Soils (Revised 2021).

1.6 Users Guide

This CSMP has been prepared to support a resource consent application and provide procedures for Contractors undertaking the groundworks.

While Contractors are expected to review the document in its entirety, the CSMP Checklist has been prepared to assist Contractors (and OGNZL staff) with compliance with this document. The checklist in **Appendix A** is an example that has been prepared to reflect investigations undertaken at the Mining Workshop[7]. It shows the key actions and relevant sections to enable Contractors to comply with this CSMP as appropriate to the work they are undertaking.

The SQEP will review the checklist following the contaminated land investigations for each works area, update the checklist and discuss it with the Contractor at the establishment phase as indicated in **Section 5.1**.

Where relevant, existing health and safety and soil management procedures used by OGNZL have been incorporated. These are appended in **Appendix B** and referred to throughout where relevant.

Throughout this report, times when the SQEP is required to be consulted are highlighted for easy reference.

1.7 Abbreviations

The following table is an alphabetical list of all abbreviations used within this report

Table 2. Abbreviation list

Abbreviation	Full text
ACM	Asbestos Containing Material
AF/FA	Asbestos Fibres/ Friable Asbestos
AST	Above-ground storage tank
BTEX	Benzene, Toluene, Ethylene, Xylene
CLMG	Ministry for the Environment's Contaminated Land Management Guidelines
CSM	Conceptual Site Model
DCC	Dunedin City Council
DSI	Detailed Site Investigation
FTAA	Fast-track Approvals Act 2024
FRBF	Frasers Backfill Embankment
FSWRS	Frasers South Waste Rock Stack
FWWRS	Frasers West Waste Rock Stack
GBWRS	Golden Bar Waste Rock Stack
GPBF	Golden Point Backfill
GPUG	Golden Point Underground
HAIL	Ministry for the Environment's Hazardous Activities and Industries List
HMP	OGNZL's Hydrocarbon Management Plan (10 September 2024; ref MAC-206-PLN-003, and subsequent revisions)
IMBF	Innes Mills Backfill
JHA	Risk Assessment and/or Job Hazard Assessment

[7] WWLA, 23 April 2026. Macraes Operation, Detailed Site Investigation (Ground Contamination): Open Pit Mining Workshop. Prepared for Oceana Gold (New Zealand) Ltd, ref WWLA1659, Rev 3

Abbreviation	Full text
LEL	Lower Explosive Limit
LTMP	Long Term Management Plan
MEEA	Murphys Ecological Enhancement Area
MfE	Ministry for the Environment
MGP	Macraes Gold Project
MP4	Macraes Phase 4
MTI	Mixed Tailings Impoundment
MWMS	Mine Water Management System
NESCS	Resource Management (National Environmental Standards for Assessing and Managing Contaminants in Soil to Protect Human Health) Regulations, 2011
OGNZL	Oceana Gold (New Zealand) Ltd
ORC	Otago Regional Council
PAC	Polyaluminium Chloride
PAH	Polycyclic Aromatic Hydrocarbons
PCB	Polychlorinated Biphenyls
PCBU	Person Conducting a Business Undertaking
PID	Photoionisation Detector
PPE	Personal Protective Equipment
PPM	Parts Per Million
PSI	Preliminary Site Investigation
CSMP	Site Management Plan (Ground Contamination)
SPBF	Southern Pit Backfill
SPH	Separate Phase Hydrocarbon
SQEP	Suitably Qualified and Experienced Practitioner
SSSP	Site Specific Health and Safety Plan
SWP	Safe Works Practices
SVR	Site Validation Report
TPH	Total Petroleum Hydrocarbons
TSFs	Tailings Storage Facilities
UST	Underground Storage Tank (typically in relation to hydrocarbon storage)
WDC	Waitaki District Council
WRS	Waste Rock Stack
WWLA	Williamson Water and Land Advisory

2. Environmental Setting

The environmental setting as documented in the PSI report is reproduced for ease of reference in **Table 3**. The features of the environmental setting are considered in the context of their potential to affect the distribution, mobility and form of contaminants (if present). These features set the scene and inform the sampling plans in **Section 3.5**.

Table 3. Environmental setting

Topography	*Site topography influences where contaminants might migrate to if present.* The topography of the area surrounding the Macraes Operation is that of an ancient erosional surface, or peneplain, which is expressed as gently rolling hills, between approximately 500 and 550 m RL, bisected by deeply incised streams. The topography generally falls to the northeast steepening nearer the Shag River valley. Within the mine, the supporting facilities like the Processing Plant, workshops etc. have generally been cut into flat benches, with the remainder of the site dominated by the large pits, waste rock stacks and TSFs.
Surrounding land use	*Surrounding land may include HAIL activities that can contaminate soil or groundwater on properties nearby.* Surrounding land is predominantly pasture, most of which is being farmed but with some areas of reserve/public conservation land. The township of Macraes is approximately 1 km southwest of the mine offices. There are no large-scale sources of contamination on immediately surrounding land holdings but localised impacts from typical farming (and forestry) activities such as sheep dips, farm dumps, refuelling facilities and related to use of asbestos and lead-based paints on buildings/structures can be expected.
Geology	*Geological conditions are considered in the context of describing the CSM (Section 4 of the PSI), should a potential for contamination be identified by this desk study. For example, more porous soils can enable contaminants (if present) to move more quickly and potentially further than clay-rich soils that retain/bind or prevent penetration of contaminants.* Macraes Operation is located within Rakaia terrane Otago Schist; ancient seabed deposits that became metamorphosed and mineralised approximately 130-140 million years ago. Gold is concentrated in mineralised 'shoots' within the Hyde-Macraes Shear Zone. Within the wider area there are small pockets of Quaternary sediments and Miocene volcanics (**Figure 3**). Exploratory and geotechnical drilling and landform comparison indicates that a thin layer of loess covers much of the Macraes Operation area. The loess soils comprise a very stiff, light yellow grey silt, sandy silt or silty fine sand. Investigations typically encounter 0.2m to 0.4m of soils.
Hydrogeology	*Hydrogeological conditions affect the potential risk of contaminants (if present) entering and being transported in groundwater*. Depth to groundwater is expected to be highly variable across the project area based on the topographic variations and mining activities (e.g. presence of pits). However, we understand that the open pits at Macraes produce only a small quantity of groundwater. Dewatering wells are not used, with the occasional exception of depressurisation bores to reduce the risk of slope instability. Groundwater is managed by pumping from pit sumps to the surface water management network. Groundwater flow is expected to follow topography and discharge to the surface water bodies described below.

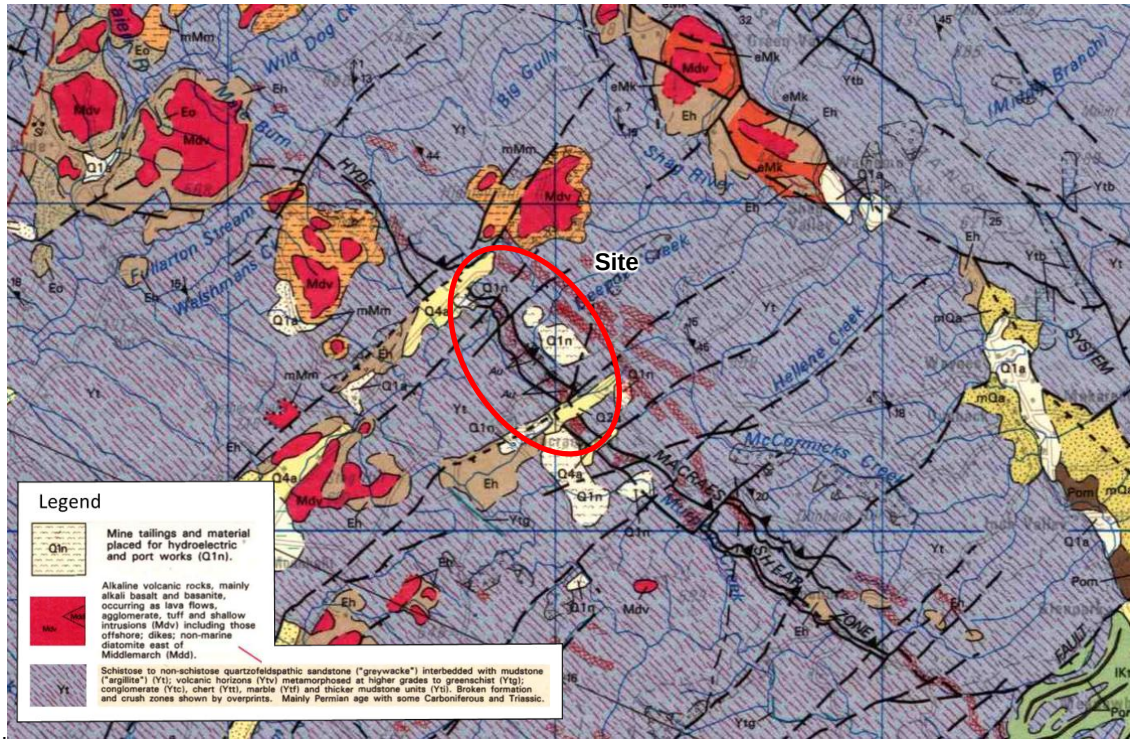


Figure 3. Published geology of the Macraes area (Source: Forsyth, P.J. (compiler) 2001. Geology of the Waitaki area. Institute of Geological and Nuclear Sciences 1:250,000 geological map 19.

Surface water bodies

Surface water features are potential receiving environments, should contaminants be present on a site.

Within the mine, surface water is managed by:

- Diverting clean water away from active working areas; and
- Collecting runoff water in pit sumps or silt ponds and either using it for dust suppression or pumping it into the Mine Water Management System.

There are several natural watercourses within the wider area of the Macraes Operation (**Figure 4**). These include:

- North Branch Waikouaiti River drains surface water and shallow groundwater from the central western extent of the Macraes operation particularly around the Frasers West Waste Rock Stack.
- Murphy's Creek catchment drains surface water and shallow groundwater from the southern extent of the central Macraes operation, particularly around the Frasers Waste Rock Stacks. It eventually flows into the North Branch Waikouaiti River.
- The Tipperary Creek is located south of the Top Tipperary TSF and west of Macraes Road.
- The Shag River (Waihemo) is the main watercourse on the eastern side of the mine complex, receiving water from Deepdell Creek and other water courses, and via seepage from the Frasers Innes Mills Open Pit lake.
- Deepdell Creek bisects the site from east to west, between the Golden Point Pit/Underground Portal in the south and the Deepdell pit and associated rock stacks in the north.
- To the north of the site, Trimbells Gully, Coal Creek and several other small tributaries drain into Mare Burn.
- Near Golden Bar in the south, Clydesdale Creek and Golden Bar Creek form the main surface water features.

Sensitive receptors

Sensitive environmental receptors could include aquatic or terrestrial ecosystems. This is not an ecological assessment but is instead an initial review of the surrounding environment to assess where contaminants (if present) on the site could migrate to and the specific receptors potentially affected. Sensitive human receptors could, for example, be children at a school or kindergarten on or adjacent to a site. Workers on industrial land on or adjacent to a site would be considered less sensitive. This people receptor interpretation informs the CSM and future guideline value selection for evaluation of soil data.

The key sensitive receptors surrounding and within the Macraes Operation are:

- Mine workers, contractors and visitors;
- The residents of Macraes township and surrounding farms;

- Terrestrial and aquatic ecosystems such as the various creeks and rivers;
- The trout within the on-site trout hatchery.

Figure 4. Streams and creeks around Macraes Mine (Source: Google Earth and TopoNZ)

3. Contamination Management

3.1 Overview

This section sets out the rationale for the procedures provided in this CSMP and strategies for managing contamination from the HAIL activities identified in the MP4 Project area. Contamination that requires specific management is that which exceeds the applicable human health and/ or environmental criteria set out in **Section 4.2.2**. In these cases, specific management of the potential exposure pathways will be necessary to mitigate effects on receptors (site workers or the environment), this may include the need to remediate the contamination.

Contamination concentrations that exceed expected background concentrations, but do not present a risk to human health or the environment, are expected to be managed using standard mine-related dust, erosion and sediment controls. No additional contamination-specific controls are proposed in this instance; this will be assessed by the SQEP on completion of pre-works sampling (**Section 3.5**).

At the time of CSMP preparation, some contaminant testing data has been collected at the Open Pit Mining Workshop ("the Workshop") and its associated fuel farm, which provide an indication of the typical contamination associated with these activities. The data collected to date indicates that only isolated areas require remediation at the Workshop. That data has been used to inform likely contamination management requirements, in conjunction with WWLA's experience at similar sites such as OGNZL's Waihi operation.

Further investigations are proposed as part of the MP4 Project to address known data gaps, including potential for per- and polyfluoroalkyl substances (PFAS) associated with the use of Aqueous Film-Forming Foams (AFFF). AFFF has historically and continues to be used for fire protection in the Macraes Operations, as is typical in the mining and other industries that have heighted risk of fires associated with use of heavy equipment. In accordance with changes in regulations, AFFF used at the mine is now fluorine free and does not contain per- and polyfluoroalkyl substances (PFAS). But PFAS containing AFFF use has historically occurred. There is therefore potential for contamination by PFAS, a group of environmental persistent and hazardous substances, to have arisen at the Macraes Operation because of historic lawful use of PFAS containing AFFF.

A preliminary assessment of the risk associated with PFAS is provided under separate cover[8] and a concurrent process to further quantify these risks is in progress. For this reason, PFAS is not addressed in detail this CSMP, but in summary the assessment completed to date indicates that the mine workshops are a potential source of PFAS contamination as they were (and still are) the locations where most of the servicing of the fire suppression systems fitted to the mine heavy vehicle fleet occurred. More diffuse contamination may also be present more widely across the Macraes Operations due remote servicing of mine equipment and/or activation of fire suppression systems.

Note that if NO contamination is identified in pre-works sampling (i.e. all contaminants of concern are at background levels), then this CSMP is not required. In this case, the SQEP can confirm via the sampling report that the mines standard earthworks controls and procedures are applicable to the works.

The following is the sequence of works to be implemented to manage contamination (if present) during ground disturbance within the MP4 development areas. The process is also show graphically in Figure 5:

1. The MP4 Project Manager will notify the SQEP to arrange investigations when works are proposed:
   - That intersect the identified HAIL areas shown in **Figure 6** to **Figure 8**; OR
   - Within a 100 m radius of a current or former or current workshop location.
2. The SQEP will review the development plans against existing data (if any) and if necessary, revise the sampling plan (**Section 4**). The sampling plan will be provided to the Project Manager to support pre-works planning and approvals.

[8] Macraes Operation – Preliminary Assessment of PFAS Risk. Report prepared for OGNZL by WWLA, dated 21 August 2026.

3. Once works approvals are received the SQEP (or delegate) will undertake the agreed sampling and reporting. Reporting will include review of the CSMP procedures relevant to the contamination (if any) identified and the CSMP Checklist template revised with site-specific controls for provision to the lead contractor.
4. If contamination-related remedial works are required, the need for additional consents shall be determined and consents obtained where required. The SQEP will oversee the remedial works, typically this during the enabling works package as per **Section 5**.
5. Following completion of any remedial actions or contaminated soil management implementation, a site validation report ("SVR") for the stage/ area will be completed (**Section 9**).
6. The SVR will be provided to OGNZL and the relevant regulatory authorities in compliance with expected resource consent conditions.

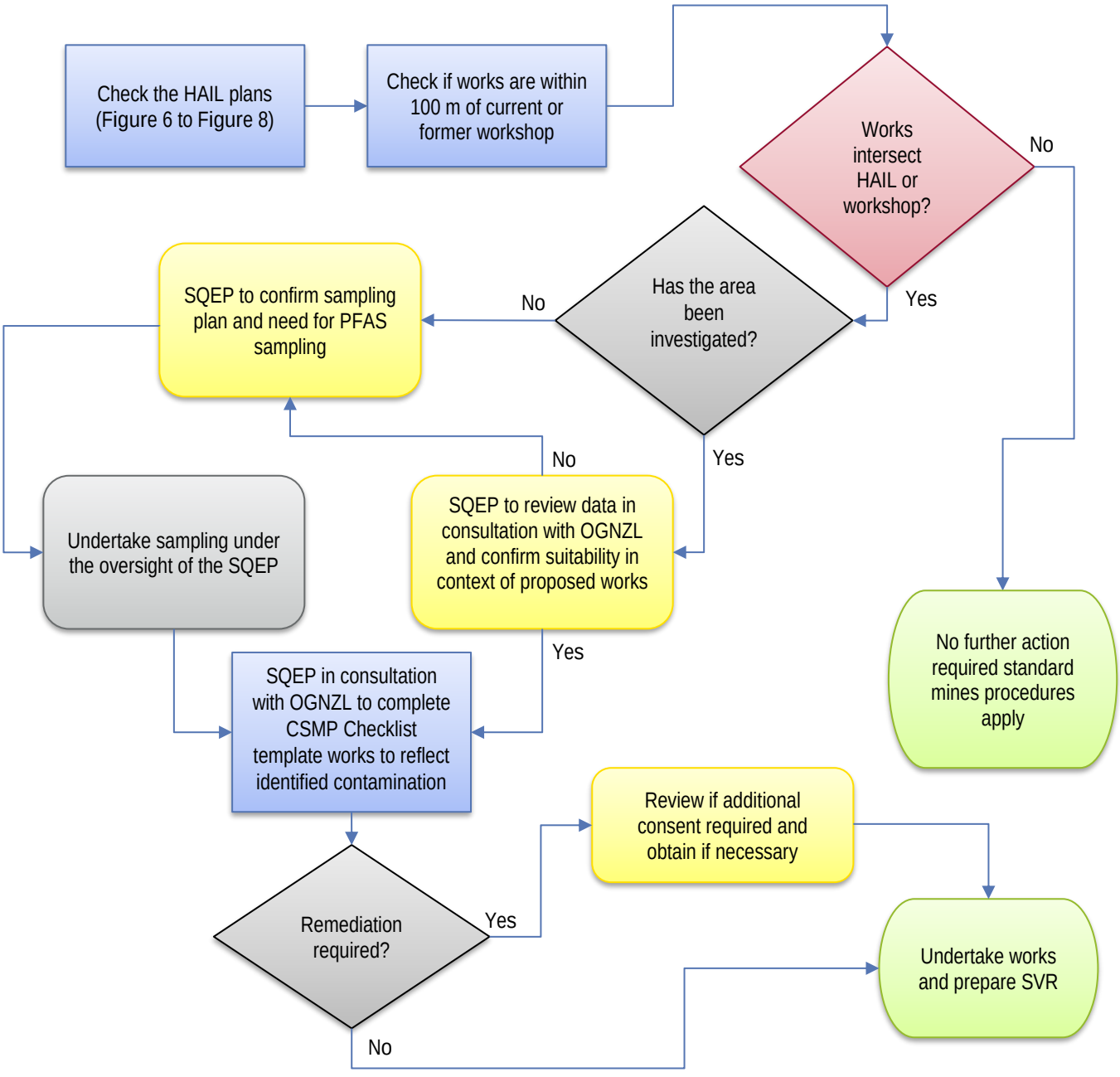
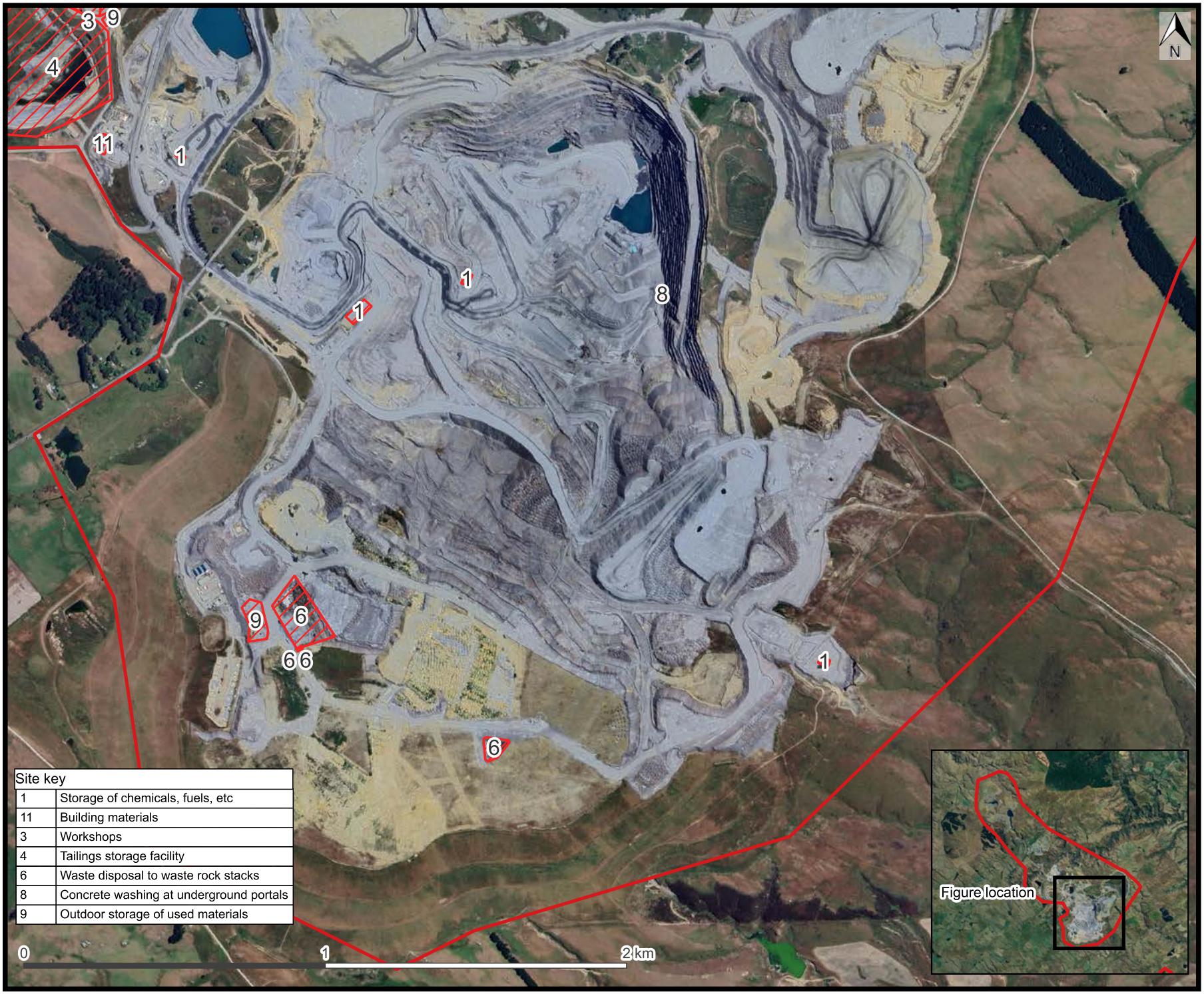


Figure 5. Flowchart summarising the contamination management process



Site key	
1	Storage of chemicals, fuels, etc
11	Building materials
3	Workshops
4	Tailings storage facility
6	Waste disposal to waste rock stacks
8	Concrete washing at underground portals
9	Outdoor storage of used materials

Map Title:
Potentially contaminated sites

Project:
MP4 PSI

Client:
Oceana Gold (New Zealand) Ltd

Legend
- Site boundary
- Potential contamination

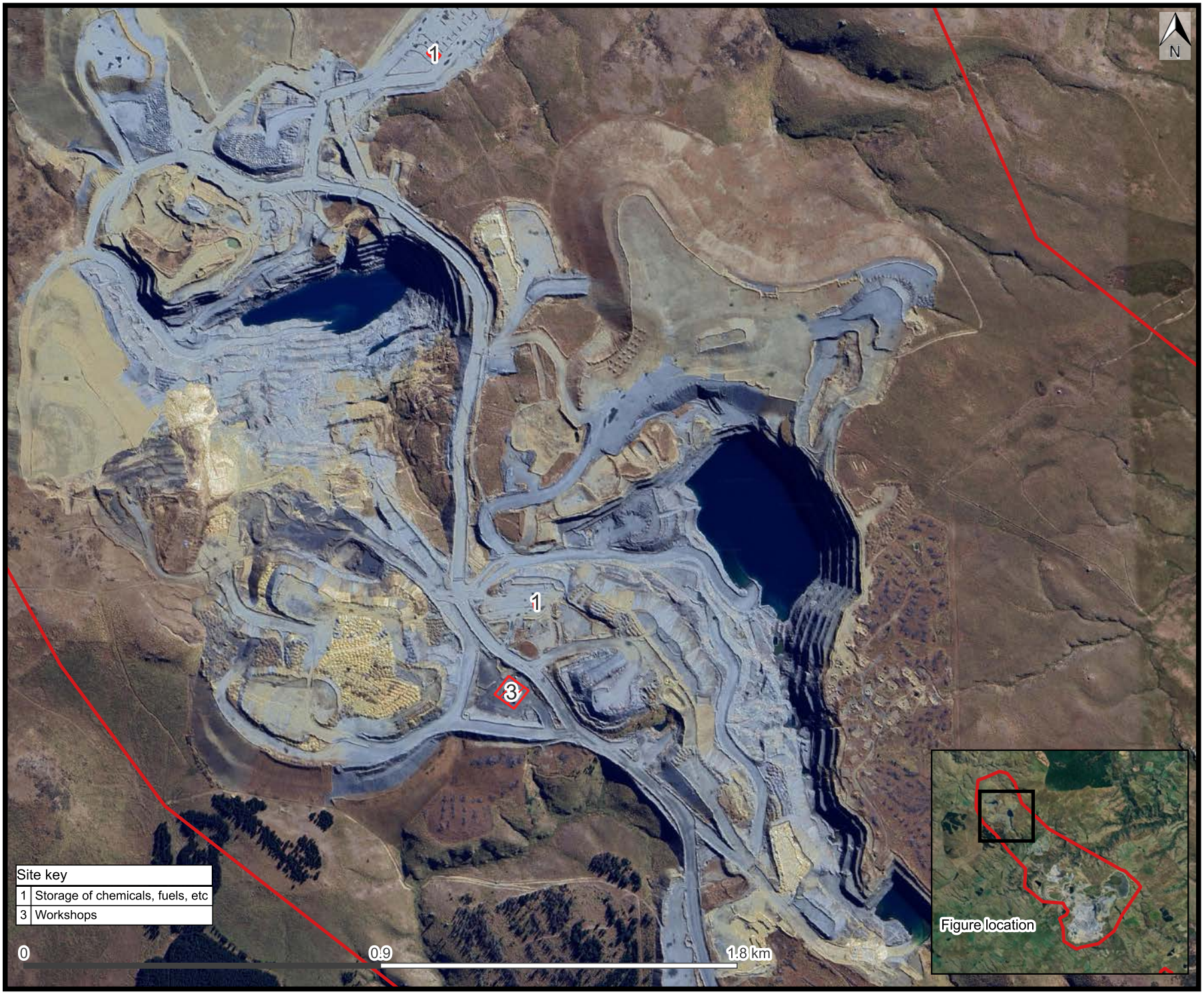
Data Provenance
Aerial imagery from Google Earth

Drawn by: Lauren Windross
05/05/2026

Layout Name
Contaminated sites template

WILLIAMSON WATER & LAND ADVISORY

Figure 6



Map Title:
Potentially contaminated sites

Project:
MP4 PSI

Client:
Oceana Gold (New Zealand) Ltd

Legend

Site boundary

Potential contamination

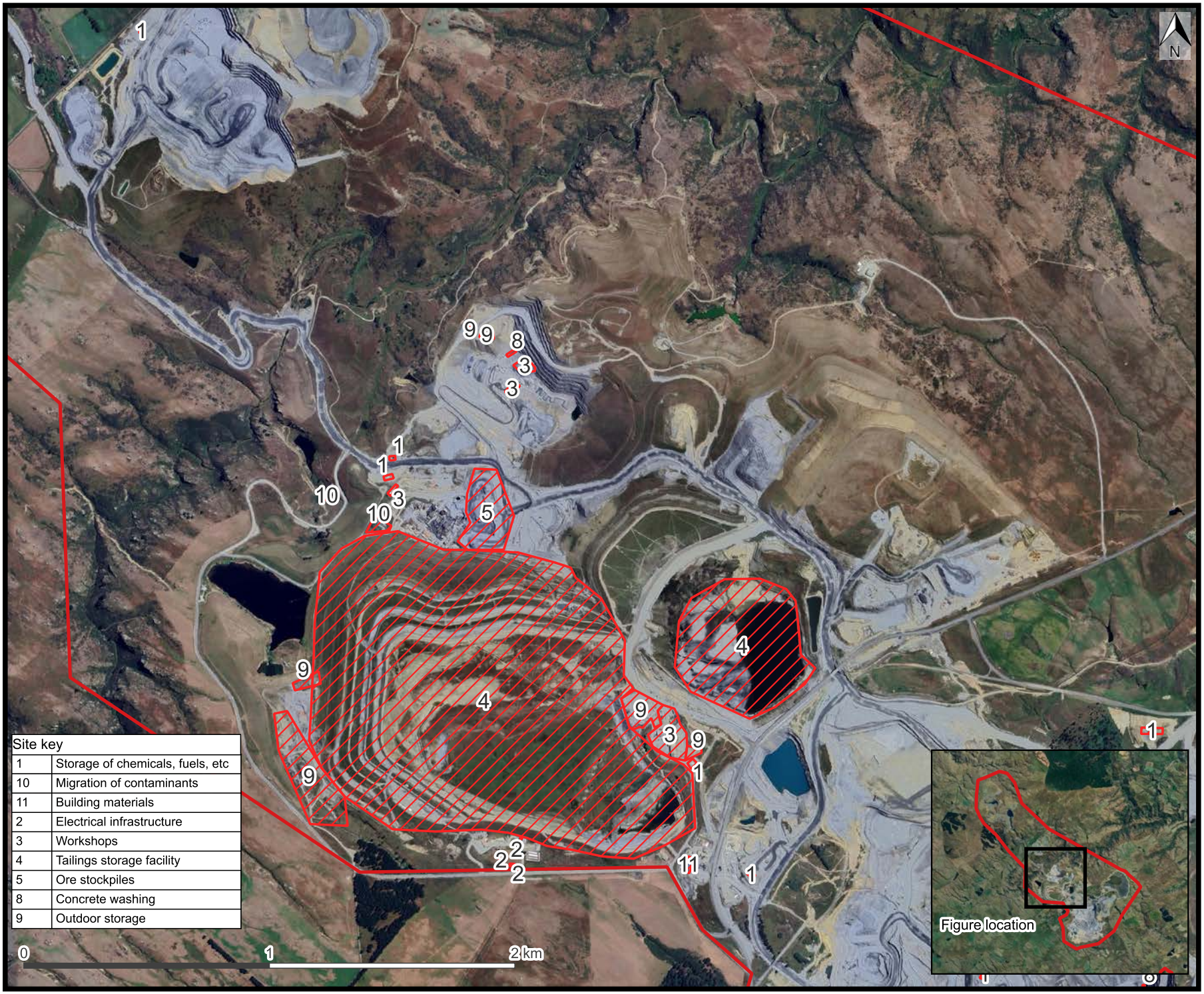
Data Provenance
Aerial imagery from Google Earth

Drawn by: Lauren Windross
05/05/2026

Layout Name
Contaminated sites template

WILLIAMSON WATER & LAND ADVISORY

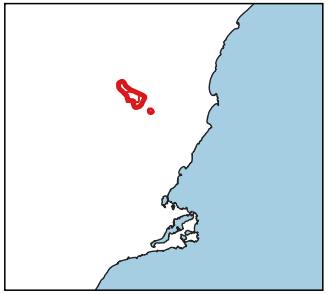
Figure 7



Map Title:
Potentially contaminated sites

Project:
MP4 PSI

Client:
Oceana Gold (New Zealand) Ltd



Legend
- Site boundary
- Potential contamination

Data Provenance
Aerial imagery from Google Earth

Drawn by: Lauren Windross
06/05/2026

Layout Name
Contaminated sites template

WILLIAMSON WATER & LAND ADVISORY

Figure 8

3.2 Rationale

The rationale for soil management strategies and procedures provided in this CSMP are based on the nature and distribution (lateral extent) of HAIL activities identified by the PSI, the risk assessment (conceptual site model; "CSM") as set out in the PSI, and the expertise of the SQEPs preparing and certifying this document. The strategies reflect current industry practice as relevant to the MP4's environmental setting (**Section 2**). The rationale for selection of contamination management strategies is as follows:

Risk factors	• The primary receptors for MP4 are ecological receptors in nearby streams/ watercourses, as human receptors are largely either isolated due to distance from the works (for neighbouring site occupants) or risks are mitigated through health and safety procedures (for OGNZL staff). • Many of the key contaminants used at Macraes Mine, for example diesel, oils, grease, have low mobility in the environment. They are strongly absorbed to soils, and also having low solubility. Unless released in large volumes (hundreds of litres or more) once spilt to ground are unlikely to discharge to surface or groundwater at concentrations that cause unacceptable effects. • Ground conditions are an important factor in the ability of contaminants to migrate in the environment. For example, more porous soils can enable contaminants to move more quickly and potentially further than clay-rich soils that retain/bind or prevent penetration of contaminants. - Most of the working area of the mine comprises a very thin veneer of crushed and powdered rock over either insitu or reworked rock. While the surficial material is expected to have a strong affinity for absorbing contaminants its capacity is limited by its volume. As a result, large or ongoing spills could soak into the underlying insitu or reworked rock. - While it is possible that large or ongoing leaks of contaminants could soak almost directly into rock, the depth of groundwater and/or influence on groundwater flow created by mining operations means that flow paths are likely to be lengthy, promoting attenuation of contamination inground (i.e. there is a low potential for direct connection between contaminant sources areas and the receiving environment). In a similar manner to groundwater, many mine facilities have perimeter drains that feed into a range of surface water collection/retention ponds/systems, thereby minimising the potential for direct discharges to streams and natural waterways. • Due to their mobility in ground and surface water, and persistence in the environment, PFAS are an exception to the above considerations. An assessment process will be implemented to understand the PFAS impacts on surface and groundwater at the mine. *We note that arsenic concentrations are naturally elevated in Macraes host rocks, typically above concentrations that are considered a risk to human health in a commercial/ industrial context. However, OGNZL has standard procedures to protect site workers from arsenic contamination so arsenic is not considered further. Refer to* ***Section 4.2.2****.*
Effects/ risk to the environment	Potential risks to the environment will be managed as follows: • Investigate HAIL areas prior to soil disturbance to identify any risks to ecosystems, such as those associated with water bodies like drains, streams and rivers (**Section 5**). • Mitigate discharges to the environment including dust, surface water and sediment runoff from contaminated areas and to groundwater. • Ensure contaminated materials are not left exposed on completion of works to prevent ongoing discharges affecting downgradient/ adjacent ecosystems and groundwater.
Effects/ risk to people (on the MP4 site and on surrounding land)	Potential risks to human health will be managed as follows: • Investigate HAIL areas prior to soil disturbance to identify any risks to site workers or surrounding land occupants (**Section 5**). • Use of OGNZL standard health and safety procedures to mitigate the majority of contamination-related risks present. • Control discharges during remedial activities and during soil handling and management to prevent discharges that may affect people, such as to air (dust), via dermal (skin) contact with contaminated media, ingestion of contaminated materials through improper works or hygiene practices. • Remove or retain in a safe manner any contaminated soils or materials to prevent discharges or contact with people in the future (post development of mining and operation of the new facilities).

3.3 General Management Strategies

The following strategies are relevant to all works involving contaminated soils and water. The aim is to protect site workers and future site users from the effects of contaminated soil and water, and minimise discharges to the environment, while minimising programme and cost implications.

Key management strategies in this CSMP include:

- Pre-works testing to inform actual contamination conditions (**Section 5**).
- Manage contamination that presents a human health or environmental risk as a priority during each earthworks phase followed by post-remediation validation sampling, if required (refer **Section 4.4** for specific remediation strategies). This means contamination-specific controls can be removed prior to bulk earthworks (or mining operations) commencing.
- Use of largely standard earthworks controls and procedures during bulk earthworks in soils with low levels of contamination, with a focus on appropriate disposal of surplus soil and minimising generation of potentially contaminated sediment-laden stormwater during disturbance of contaminated materials. This will be confirmed by the SQEP following each pre-works sampling round.
- Prompt response and management of unexpected contamination (**Section 5.5**).
- Regular communication between the project managers, the site managers and SQEP to ensure that contaminated soil is appropriately managed without delay to the programme.
- Works completion reporting to satisfy Council requirements on completion of each stage of earthworks.

All key contractor requirements are summarised in the **CSMP Checklist** prepared for the contractor. An example checklist is in **Appendix A**. A copy will be produced after every round of pre-works testing to confirm the controls required for that stage/ area of works.

3.4 Soil Remediation Strategies

Remediation will be required for soils that exceed industrial/ commercial land use standards for assessing effects on people/ human health (considered high level contamination).

A range of remediation strategies are available to OGNZL, depending on the location, type and magnitude of the contamination present. **Table 4** summarises commonly used remediation strategies for the types of contaminants expected to be encountered in the MP4 Project area, with a summary of the benefits and disadvantages of each. *The SQEP will determine the best remediation strategy in conjunction with OGNZL following each sampling phase*. In accordance with CLMG No.1, this will include consideration of the following:

- The remediation objectives, both for the immediate project and in the long term.
- Consent requirements. Depending on the nature and scale of remedial works proposed, additional consents, beyond those obtained for the MP4 project, may need to be obtained to approve the remedial works under the NESCS and/or Otago Regional Plan(s).
- Exposure to site workers both during remediation and in the long term.
- Practicality and onsite management considerations.
- Sustainable remediation objectives.
- Whether field trials may be required to prove the methodology.

Note that methods of remediation other than those in **Table 4** are available, and others may become commercially available within the lifetime of the MP4. A remedial options assessment should be conducted to confirm the efficacy of any alternative methods being considered. A remedial options assessment evaluates factors such as technical applicability (e.g. proven conditions and scale appropriate to the situation), regulatory

and stakeholder acceptance, time, cost etc., to support the selection of methodologies that meet the defined criteria and contamination and site-specific considerations.

Table 4. Potential remediation strategies

Strategy	Benefits	Disadvantages	Contamination types
Excavation and removal: Removal of the contaminated soil from site via mechanical means. In the case of MP4, this would largely be to the TSFs, although asbestos and significant hydrocarbon contamination[9] would require disposal to a consented landfill facility.	• Completely removes the contamination from the project area. • No further consideration for contamination required. • MP4 has the benefit of having TSFs for low-level contaminants, thereby reducing offsite disposal costs.	• Costs of trucking. • Offsite disposal to a landfill would come at a relatively high cost.	• Suitable for the bulk of the contamination likely to be encountered (noting asbestos and significant hydrocarbon contamination is not suitable for TSFs).
Encapsulation: Contamination is left in situ below a layer of cleanfill material, or beneath a building or paving/ concrete (i.e. car park). Encapsulation requires management of the cap to ensure it remains in good condition. This option is suitable for areas that are not proposed to be disturbed further, but is unlikely to be practical for much of MP4. It is also typically not appropriate for significant hydrocarbon contamination or any contamination in/ near water courses.	• Reduced offsite disposal costs. • Reduced trucking/ handling costs.	• Requires ongoing management and monitoring of the cap. • Not suitable for areas where a second stage of soil disturbance is likely to occur (i.e. should only be used where cap is likely to be maintained in the long term).	• Suitable for the bulk of the contamination likely to be encountered, except for significant hydrocarbon contamination or any contamination in/ near water courses.
Soil mixing: Soil mixing reduces contamination levels in soil by mixing it with clean soil. It is only suitable for silty and sandy materials (i.e. some types of topsoil or overburden), it is not effective with clays which do not mix well. Mixing is undertaken using an excavator (or other mixing equipment) to manually blend two stockpiles together, or to mix contaminated surface soils with clean underlying materials.	• Can be cost effective, particularly for small areas of contamination.	• Must be carefully designed to avoid resulting in a larger volume of soil with contamination levels exceeding the desired thresholds. • Not suitable for asbestos contamination or very high levels of contamination. • Requires particular soil types that will mix well together.	• Small areas of metal or hydrocarbon contamination in silty/ sandy soils. • Unlikely to be suitable for large areas of contaminated soil.
Remediation via Processing Plant The Processing Plant has the ability to remove a range of contaminants (including metals and hydrocarbons), but this comes at a cost of reduced production output. While this is likely to be an option for much of the contamination present, it is not always practical and may still need to be used in conjunction with another option.	• Can enable subsequent placement to TSFs, thereby reducing transport costs.	• Likely to reduce production output, so may not be cost effective.	• Likely suitable for all contamination present (except asbestos).

[9] That exceeding human health and/ or environmental criteria applicable to the site.

Strategy	Benefits	Disadvantages	Contamination types
Natural attenuation / bioremediation WWLA has recently prepared a hydrocarbon treatment plan which describes this option in more detail[10]. In summary a dedicated treatment pad would be established to allow soils containing hydrocarbon contamination to be treated onsite using natural biological and attenuation processes.	• Can be a more sustainable option as it relies on natural processes and minimises handling and processing relative to other options.	• Requires development and monitoring of treatment pad. • Treatment is expected to take longer than the other options.	• Hydrocarbons and other organic compounds.

3.5 Water Management Strategies

Water management strategies are not discussed in this CSMP, other than in the context of PFAS (**Section 3.6**), as water discharges are addressed by the MWMS. This system is designed to address the typical contaminants expected to be associated with the mining operations, metals, hydrocarbons etc. Therefore, if specific water management is required it is expected that the discharge will be directed to the MWMS for appropriate treatment. If additional mitigation of typical mining related contaminants is required these can be evaluated alongside the existing water quality and flow mitigation measures contemplated in relation to the project (as set out in GHD, 2026[11]). In summary these including cover systems, seepage capture and further water treatment (such as reverse osmosis).

3.6 PFAS Management Strategies

There are a wide range of existing and developing technologies for addressing PFAS in various media if mitigation of these discharges is required. The ITRC provides a summary of the technologies that are currently available, or in various stages of development, for various media[12]. It categorises the technologies by degree of development and implementation documented in practice or in peer-reviewed literature, regulatory acceptance, and a consensus process, as follows:

- Field-implemented technologies – technologies that have been demonstrated at multiple sites, under diverse conditions, by multiple practitioners, are commercially available, and are well documented in practice or peer-reviewed literature. Field-implemented technologies have been demonstrated to meet site-specific PFAS treatment objectives, at the intended final application scale, and are widely accepted in the regulatory and scientific community.
- Limited-application technologies – technologies that have been implemented on a limited number of sites, by a limited number of practitioners, either at full-scale or field pilot-scale. Limited application technologies are supported by a growing body of evidence that they are effective at treating PFAS.
- Developing technologies – technologies that have been researched only at the laboratory or bench scale.

For the purposes of this assessment only field implemented and limited-application technologies have been considered. Developing technologies have been excluded as they are either yet to be verified and/or are not currently available at commercial scale. Applying this process identified that the following technologies might be applicable:

- **Treatment of solids** includes stabilisation, incineration, soil washing or disposal in a landfill. For the following reasons this leaves stabilisation and soil washing as potential options in the context of the Macraes Operations:
  - Review of offsite disposal options for PFAS identifies the following constraints:
    - As far as we are aware only Taiko and Kate Valley landfills in Canterbury are willing to accept PFAS contaminated soils. Transport distances, and therefore costs, are significant. In addition, disposal costs are typically very high $100s per tonne and may also require pretreatment. This

[10] Macraes Mine Hydrocarbon Treatment Plan. Prepared for Oceana Gold Ltd by Williamson Water & Land Advisory Ltd, dated 7 December 2023. Reference: WWLA1007, Revision 1.
[11] Macraes Phase 4 FTA, Surface and Groundwater Assessment. Report prepared for OGNZL by GHD Limited, dated August 2026.
[12] https://pfas-1.itrcweb.org/wp-content/uploads/2023/10/ITRC_PFAS_Treatment-Technology-Table_Sept2023_final.xlsx

option is therefore unlikely to be economically viable for anything other than very small volumes of material.

  - Materials can be sent to France (and possibly Australia) for high temperature incineration. However, the costs (ranging from ~$2,000 to $10,000 per tonne) make this prohibitive for larger quantities of materials.

- The operation of a high-temperature hazardous waste incinerators is currently prohibited by the NES Air Quality[13] to three specifically identified sites. We understand these sites are no longer operational. Further, there is significant opposition to the establishment of new sites with a proposal to establish Project Kea a waste to energy (incineration) facility in Waimate was referred to the Environmental Protection Agency as a project of national significance almost one year on from the consent applications being lodged, and subsequently failed after the landowner advised that the project no longer fit its future growth plans. While the current applications relate to municipal waste incineration rather than soil remediation, proposals to incinerate PFAS wastes might face similar challenges. Because of an anticipated protracted approval process high temperature treatment either on or offsite is unlikely to be viable in the near future.
- Portable high temperature treatment systems (thermal desorption) are available, and preliminary trials suggest that these could be effective in treating PFAS contaminated materials. However, the cost of importing, consenting and operating such equipment is considered to be prohibitive at the current time.

Our experience with airport fire training facilities, where much greater volumes of AFFF have been used, is that it is rare for PFAS to be present at concentrations that exceeds the available standards for the protection of the health of site workers under a commercial / industrial land use scenario. The large scale of Macrae Operations also means that significant attenuation is available, reducing the potential for effects on environmental receptors. These factors mean that it is unlikely that large scale remediation of soils will be required.

- **Water treatment technologies** may include incineration, supercritical water oxidation, separation/removal using activated carbon, foam fractionation, zeolites / clay minerals, ion exchange resin, or high-pressure membranes (for example reverse osmosis). The resulting residuals (spent activated carbon, resins, and concentrates) must be managed through further treatment, destruction, or disposal. As noted above, incineration is unlikely to be available, however, the remaining technologies could potentially be applied at Macraes Operation.

  We note that some of these technologies, e.g. absorption onto activated carbon, are not dissimilar to the techniques currently used to process gold at the mine, although the fate of PFAS in this process needs to be confirmed. The mitigation measures proposed in relation to general mine discharges (**Section 3.5**) are also expected to be effective at addressing PFAS discharges if required.

In the interests of brevity detailed descriptions of the remedial technologies are not provided in this report. Further detail can be provided on request and is also available via ITRC's resources, including its treatment technologies factsheet[14] and Section 12 of its PFAS Guidance[15].

It is proposed that suitable management strategies will be confirmed (if required) following completion of the process to further quantify these risks.

[13] Clause 12 of the Resource Management (National Environmental Standards for Air Quality) Regulations 2004.
[14] https://pfas-1.itrcweb.org/wp-content/uploads/2023/10/TreatmentTech_PFAS__FactSheet_Sept2023_final.pdf
[15] https://pfas-1.itrcweb.org/12-treatment-technologies/

4. Pre-Works Sampling

4.1 Overview

Targeted soil sampling is required for a selection MP4 components where HAIL activities occur to inform soil management decisions. The PSI identified moderate and high-risk areas where investigation is required before any soil disturbance commences:

- Fuel farms that are being relocated or decommissioned.
- “Finger” storage areas that are being relocated.
- Waste burial areas that are being disturbed.
- Mining Workshop.

Targeted soil sampling has already been undertaken at the Mining Workshop and its associated fuel farm. As an example, the sampling plan used for this area is provided in **Figure 9**. Investigations for other areas will be undertaken in a similar manner (in accordance with MfE’s CLMG No. 5, Site Investigation and Analysis of Soils) by a SQEP and where possible will occur prior to soil disturbance in that area.

Section 5.2 discusses the sampling methodology, evaluation criteria and reporting requirements applicable to all investigation areas. Based on the site walkover assessment and PSI findings, testing of other media (i.e. sediment, surface water or groundwater) is not expected to be required. However, if during the soil investigations a pathway for effects on these media are identified then the SQEP will undertake sampling. Provision for these media is included below.

As noted in **Section 3.1**, further assessment of surface and groundwater is proposed to understand the potential for PFAS contamination at the mine. Quantification of the presence of PFAS in soils and water is recommended, as follows:

1. Targeted soil sampling should be conducted around current and former workshop facilities, in areas affected by runoff from these, and any other areas where PFAS containing AFFF use and/or discharge may have occurred regularly or at high volumes / concentrations.
2. In discharges from TSFs, particularly the MTI.
3. In process water, including an assessment of the transfer of PFAS to byproducts such as tailings and spent activated carbon.
4. In surface water in the streams and creeks surrounding Macraes Operations. OGNZL’s existing compliance monitoring points (or a subset of them) can be utilised for this purpose.
5. In groundwater to provide both coverage across the wider mine operations and to investigate the primary zones of groundwater discharge from it. OGNZL’s existing compliance monitoring wells (or a subset of them) can be utilised for this purpose.

4.2 Sampling and analysis plan

4.2.1 Methodologies

All sampling shall be undertaken in accordance with the principles set out in MfE’s CLMG No. 5 by an experienced field technician meeting the definition of a SQEP as per the NESCS User’s Guide (2012).

Table 5. Sampling methodologies

Soil sampling procedures	The soil sampling methodology shall be confirmed by the SEQP during development of the sampling plan, but the following general principles are expected to apply: • Soil sampling is expected to be primarily conducted using test pits given the rock substrate throughout the Macraes Operation. However, if geotechnical investigations are being undertaken at the same time as contamination testing, deeper ground conditions can be observed and if necessary sampled from

	the geotechnical boreholes, if they are appropriately located for the HAIL activities that require investigation. • As a minimum samples shall be collected at ground surface then immediately below topsoil/ surface coverings, and at depths where visual or olfactory evidence of contamination is observed. • Composite soil sampling can be used for stockpile sampling or where surface soils in a defined area would be better represented by this method. Composite sampling will involve collection of no more than four sub-samples of the same soil type. Composite sub-samples will be collected into separate soil jars and labelled A to D respectively. The laboratory will prepare the composite sample for testing from the supplied sub-samples.
Sediment sampling	• At this stage sediment sampling is not expected but this will be assessed during planning for each investigation. • Sediment samples would usually be collected from ponds or drains where there is potential for contaminated surface water/ sediment runoff to have occurred. • Sediment samples shall be collected using a method that minimises loss of fines.
Water sampling procedures	• Surface or groundwater sampling is required to assess PFAS contamination. As for sediment, water sampling for other contaminants is unlikely, but if deeper soil contamination is identified or runoff potential for impacts on surface is noted, sampling may need to be undertaken. • Surface water samples shall be collected using a grab sampler, while groundwater samples will be collected using a method appropriate to the water depth and type of piezometer installation (examples, ranked from those that produce the lowest to highest quality of samples include bailers, inertial pumps and peristaltic pumps). • All water samples shall have field parameters (temperature, electrical conductivity, pH, dissolved oxygen) measured at the time of sampling using a calibrated field meter. • Care must be taken to ensure that the groundwater sample represents actual conditions and not stagnant water in the piezometer / bore. For low flow sampling this is typically achieved by purging before sampling with samples collected after field readings have stabilised. Other methods may be required if sampling with a bailer. • Owing to the trace levels of contamination being measured, PFAS sampling may require the implementation of clean hands-dirty hands procedures. The MfE's draft sampling protocols[16] should be consulted as appropriate.
Sample collection and transport methods	• Appropriate personal protective equipment shall be worn by staff collecting the samples. This includes gloves, long sleeves and long pants for all contaminant and sample types, with the addition of a P2 dust mask for asbestos sampling (where concentrations are not known). Other PPE may be specified by OGNZL depending on the location where sampling is taking place. • All non-dedicated equipment used to collect samples shall be decontaminated between sample locations using phosphate-free detergent and freshwater rinses. • A fresh pair of gloves shall be used for collection of each sample. • Samples shall be held and transported in chilled conditions to an IANZ accredited laboratory with chain of custody documentation.

4.2.2 Evaluation criteria

Table 6 sets out the default evaluation criteria for investigations. Site specific criteria may be derived if relevant. Human health and environmental criteria also provide the remediation criteria should remediation be undertaken.

Table 6. Evaluation Criteria

Protection of Human Health	• NESCS contaminant standards for commercial/industrial land use as a conservative proxy to screen potential effects on construction workers undertaking relocation works and future site workers. However, consistent with

[16] https://environment.govt.nz/assets/publications/land/draft-sampling-protocols-guidance.pdf

	the approach set out in Section 3.2.1 of the NESCS Methodology[17], worker safety is addressed by the relevant health and safety regulations not by the NESCS. So, an exceedance of the NESCS standards does not necessarily indicate a risk where appropriate health and safety protocols are in place. • Where NESCS standards were not provided, guidance was obtained from MfE's "Contaminated Land Management Guideline No. 2, Hierarchy and Application in New Zealand of Environmental Guideline Values (Revised 2011)" including: - The [Australian] National Environment Protection (Assessment of Site Contamination) Measure 1999, updated 2013 for commercial use (construction workers) as appropriate; and - MfE, 1999. Guidelines for Assessing and Managing Petroleum Hydrocarbon Contaminated Sites in New Zealand. Values used were for industrial/commercial sites, sandy silt (as a proxy for silty gravel), contamination at <1 m depth, and groundwater at 8 m depth - For asbestos, the New Zealand Guidelines for Assessing and Managing Asbestos in Soil (BRANZ, 2024), all users criteria (and commercial/ industrial criteria for bonded ACM) to assess both effects on people and remediation requirements. - For PFAS, the HEPA 2025, PFAS National Environmental Management Plan Version 3.1, Heads of EPA Australia and New Zealand 2025 (NEMP 3.1). - For contaminants not listed in the above, the United States Environmental Protection Agency (USEPA) Superfund Soil Screening Guidance for the appropriate pathway and receptors. *Note: arsenic concentrations in mineralized areas of the MP4 Project naturally exceed the NESCS SCS for commercial/ industrial use with typical values averaging ~278 mg/kg compared to a regional background of 70 mg/kg[18]. OGNZL has extensive health and safety protocols to protect site workers from the primary pathways of dust inhalation, dermal contact and ingestion. Therefore, arsenic is not considered a human health risk in the context of the operational mine environment.*
Discharges to the Environment	• In the absence of a National Environmental Standard or ORC derived values for assessing contamination effects on the environment, we recommend use of the Maanaki Whenua Landcare Research, 2023. An implementation framework for ecological soil guideline values. Envirolink Tools Grant: C09X2206. Prepared for: Contaminated Land and Waste Special Interest Group and Land Monitoring Forum, July 2023. Guideline values, derived using ACL for commercial / industrial land use plus local background from Craw (2002, see below). • For sediment and water, OGNZL has compliance limits set by consents for some silt ponds and discharge points. These compliance limits take priority over any nationally-derived standard or guideline value for those particular features, until the time at which the consent expires (or is renewed and new compliance limits set). • For PFAS, NEMP 3.1 but noting that not all standards and guidelines presented in this document are relevant to New Zealand environmental receptors.
Background criteria	• The mineralized nature of the MP4 project means that nationally-derived datasets for background concentrations of metals are not applicable. Instead, site-specific background values, such as that derived by Craw[18], should be considered. • There are no background values currently derived or nationally recognised for organic contaminants or asbestos. If being taken offsite the compounds should be assessed against the background conditions at the receiving site, including any consented limits.

4.2.3 Reporting

The results of sampling for each stage of the investigation shall be reported in a form that is commensurate with a DSI as outlined in the NESCS Users Guide. Small-scale investigations can use an alternative format (i.e. investigation template agreed with Councils). The report shall be prepared, reviewed and authorised by a SQEP. Results shall be forwarded to Otago Regional Council ("ORC"), Waitaki District Council ("WDC") or Dunedin City Council ("DCC") (as appropriate to their boundaries) for reference prior to works commencing.

[17] MfE, 2011. Methodology for Deriving Standards for Contaminants in Soil to Protect Human Health. Wellington: Ministry for the Environment.
[18] Craw, D., 2002. Geochmistry of late metamorphic hydrothermal alteration and graphitisation of host rock, Macraes gold mine, Otago Schist, New Zealand. Published in Chemical Geology, 191, 257-275

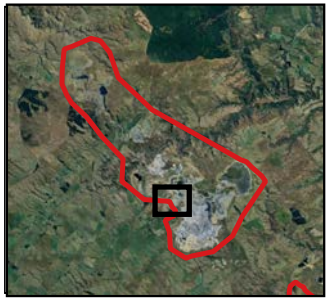
On completion of each stage of sampling, the **CSMP Checklist** will be prepared by the contaminated land specialist to reflect the confirmed contamination conditions. All checklists shall be provided to the Councils listed above for reference prior to works commencing for that stage. A CSMP Checklist example for the Mining Workshop is provided in **Appendix A**[19].

[19] We note that the criteria for requiring remediation were not met for non-PFAS contaminants at the Mining Workshop, but an opportunity was identified to manage soils so that cross-contamination of other parts of MP4 did not occur. The SMP Summary Checklist reflects this lower level of contamination and does not require validation sampling on completion of works; instead visual validation is proposed. This assessment may change subject to the findings of the PFAS assessment.

Map Title:
Workshop Sampling Locations

Project:
Macraes Mine, Site Management Plan (Contamination)

Client:
Oceana Gold (New Zealand) Ltd



Legend

- Site boundary
- Discrete sample
- Composite sample

Workshop HAIL Activities

- A17. Storage tanks/ drums
- F4. Motor vehicle workshop
- F7. Commercial refuelling
- I. Intentional or accidential release (various)
- H. Migration of a contaminant

Data Provenance
Aerial imagery from Google Earth

Drawn by: Lauren Windross
19/05/2026

Layout Name
Workshop sampling

WILLIAMSON WATER & LAND ADVISORY

Figure 9

5. Remediation Procedures

The following procedures are provided in the event that remedial works are required prior to bulk earthworks occurring (i.e. high concentrations of contamination are present). This will be confirmed on completion of pre-works testing as per Section 5.

If no remediation is required, disregard this section.

The following will be considered during remediation planning:

1. Media involved; soil, groundwater, surface water, sediment;
2. Type of contaminant and the magnitude present (addressed in this section);
3. Remediation strategy (e.g. use of processing plant, offsite disposal, encapsulation or soil mixing; see **Section 4.4**).

While the remediation strategy may vary between each works area depending on the nature of the activity being undertaken and the contamination present, the controls required for each contaminant will be largely the same regardless of the remediation strategy. The SQEP, in conjunction with OGNZL, will determine the remediation strategy being used for each works area as per **Section 3.4**.

It is expected based on the PSI that soil is the primary media expected to be affected and require remediation. There are a range of contamination types that may need remediation throughout the life of the MP4 Project. These can be categorised into; asbestos, hydrocarbons including volatile organics, metals and other (non-hydrocarbon) organic compounds, and unexpected contamination. A summary of each of these is outlined below, along with a reference to which controls need to be implemented. The SQEP will confirm the controls are applicable to the level of contamination present prior to remedial works commencing.

Table 7. Guide to remediation types and controls required

Remediation type	Description	Controls required
Asbestos remediation	Asbestos fibres or bulk asbestos identified in soils. This is most likely to be required around older farm buildings or dwellings, or if farm dumps are encountered. Potential for this type of contamination is low. *Note: Does not relate to asbestos on buildings themselves, only in soil. Asbestos in buildings is addressed under separate legislation and is not within the scope of this report.*	Site Establishment: **Section 5.1** Asbestos remediation: **Section 5.2**
Hydrocarbon remediation	May occur in isolated areas around workshops or fuel storage facilities.	Site Establishment: **Section 5.1** Hydrocarbon remediation: **Section 5.3**
General metals remediation	Includes contamination associated with general metals contamination around dwellings or operational areas. Only required when contamination levels exceed the evaluation criteria in **Section 4.2.2**. Expected to be the bulk of the remediation required during MP4.	Site Establishment: **Section 5.1** General soils remediation: **Section 5.4**
Unexpected contamination	Contamination which is identified during bulk earthworks that requires remediation before bulk earthworks can recommence in the impacted area.	**Section 5.5**

The control tables are set out below. The CSMP Checklist (example in **Appendix A**) will be completed by the SQEP prior to each stage of works commencing and will specify what controls are applicable to that stage.

5.1 Site establishment for remediation

Site establishment (**Table 8**) is applicable to all remediation methods.

Table 8. Site Establishment for remediation

1. Notify Council	Advise ORC, WDC and DCC five (5) days prior to the commencement of works.
2. Permits	Obtain permits if contaminated soil is to be taken offsite (*the SQEP will provide a Soil Disposal Certificate to aid this process*). Follow OGNZL internal tracking/ recording processes for any soil being taken to TSFs. Notify disposal destinations of expected dates of disposal.
3. Signage and fencing	The remediation area shall be fenced or otherwise cordoned off from the wider mine operations and only site workers essential to the specific tasks being undertaken shall be admitted. Suitable signage (e.g. a hazard board) shall identify the contamination present and remediation method being used.
4. Induction	Site workers shall complete an induction specific to the contamination being remediated. Induction topics are addressed in each of the remediation control tables below.
5. Erosion and sediment control	Depending on the works being undertaken, additional erosion and sediment control may be required for the remediation area. This is to ensure contamination does not migrate over uncontaminated parts of the site. This will be determined on a case-by-case basis as it will be largely dependent on the nature of the contamination, the remediation method, and the configuration of the surrounding area. Discharges of stormwater shall be diverted to the Mine Water Management System or allowed to soak to ground within the remediation area. OGNZL's standard mining-related dust, water, sediment and erosion controls may be suitable for the remediation; this will be reviewed and determined by the SQEP prior to site establishment in each scenario. Should additional controls (e.g. water management) be required, *these shall also be determined by the SQEP and included in the CSMP Checklist*.

5.2 Asbestos remediation

Asbestos-in-soils controls are defined in the NZAG[20]. There are several classes of works depending on the concentration of asbestos in the soil and its potential to generate airborne asbestos.

Where asbestos-in-soils are identified, a *SQEP shall be engaged to define the level of control and requirements under the NZAG and Asbestos Regulations*. A summary of the works controls under each risk level is provided in **Table 9**. The reader should refer to the NZAG (Tables 6 and 7) for the full detail of the controls required.

For health and safety requirements, also refer to the controls in **Section 5.5**.

Table 9. Asbestos remediation: Summary of asbestos works categorisation and controls required

Works category	Definition	Worksafe notification required?	Licensed removalist required?	Supervision level	Air monitoring required?	PPE required	Key controls
Trace asbestos works	For soils with ≤0.001% w/w AF/FA and/or ≤0.01% w/w bonded ACM	No	No	SQEP	No	No asbestos specific PPE is required.	Standard earthworks controls

[20] Branz, 2024. New Zealand Guidelines for Assessing and Managing Asbestos in Soil ("NZAG")

Works category	Definition	Worksafe notification required?	Licensed removalist required?	Supervision level	Air monitoring required?	PPE required	Key controls
Low-level asbestos works	For soils with >0.001% w/w AF/FA and/or 0.01% w/w bonded ACM	No	No	SQEP	No	No asbestos specific PPE is required but a P2 dust mask is recommended.	Standard earthworks controls with additional vigilance regarding dust emissions.
Class B Works	For soils with >0.01% w/w AF/FA and/or 1% w/w bonded ACM	Yes	Yes	SQEP meeting competency under Regulation 41(3) Asbestos Regulations	Recommended	Half face P3 mask and disposable overalls and boot covers. Decontamination tent needed.	Consider application of polymers/ surfactants to soil prior to excavation.
Class A Works	For soils with >1% w/w AF/FA (friable)	Yes	Yes	SQEP meeting competency under Regulation 41(3) Asbestos Regulations	Yes	Full face P3 mask and disposable overalls and boot covers. Decontamination tent needed.	Application of polymers/ surfactants to soil prior to excavation is recommended.

Following remediation works, *the SQEP shall validate the excavated area* using a sampling density relevant to the nature and extent of contamination. The remediation/ evaluation criteria are set out in **Table 6** (human health criteria only). Sampling shall be undertaken as per the asbestos sampling procedure set out in **Section 4.2**.

5.3 Hydrocarbon remediation

Although unlikely to be required based on existing site knowledge, **Table 10** provides procedures for the removal of underground storage tanks ("USTs") should any be encountered during investigations, as well as above ground storage tank ("AST") removal (including fuel farms). These procedures may also be relevant if buried fuel tanks are encountered in any former waste disposal areas.

Table 11 includes procedures for remediation of hydrocarbon impacted soils, but also including management of separate phase hydrocarbons (SPH) and management of odours and vapours. We note that OGNZL is considering future installation of a Hydrocarbon Treatment Pad for bioremediation of hydrocarbon contaminated materials within the Macraes Operation. If consented and established, this will likely provide the main remediation method for hydrocarbon contamination for the Project. This CSMP can be updated to reflect use of a treatment pad in future.

For health and safety requirements, also refer to the controls in **Section 8** and OGNZL's Hydrocarbon Management Plan ("HMP"; attached in **Appendix B3**).

Table 10. Procedures for fuel storage tank removal

1. **Pre-removal establishment**	• *Contaminated Land Specialist (SQEP) to be notified*. • Tank removal subcontractor appointed (if necessary) and disposal location for contaminated soil notified. • Area of tank/ structure removal cordoned off from the rest of the site.
2. Methodology	1. Concrete and surface coverings removed and surface excavated to the top of the tank/ structure. 2. Tank/ structure inspected to determine if any fuel or contaminated water remains. If so, it shall be pumped out to a liquid waste disposal facility before works continue.

	3. Remove the tank and dispose offsite to a licensed waste facility (steel recycling may be possible). Tracking documents need to be retained for validation reporting. 4. Excavate contaminated soils around the tank *under the guidance of the SQEP*. 5. Validation testing and further removal if required. 6. Backfill the excavation under guidance by a geotechnical engineer.
3. Health and safety	• Access to the removal area should be restricted to those that are necessary for the works. • Standard PPE is applicable, with half-face respirators fitted with volatile organic cartridges available should they be required. • The *SQEP shall carry out ongoing monitoring* to ensure vapour concentrations are at safe working levels. • No one shall enter any tank pit excavation unless they are appropriately certified for confined spaces work and carry a personal photoionisation detector ("PID") and multi-meter for gas monitoring. • Workers shall be aware of the potential risks and be confident to cease works as soon as there is any sign of a headache or nausea • Excavations shall be kept open and able to naturally vent periodically when being worked.
4. Monitoring	The *SQEP shall undertake monitoring using a portable PID and multi-gas meter* during removal of infrastructure that has contained petrol or kerosene range hydrocarbons or waste oils. The trigger levels at which stop-works procedures should be implemented are set out in **Table 12** below.
5. Stop works procedure	If one of the above trigger levels is reached, the UST/ structure removal works shall immediately cease and the area will be vacated until monitoring shows that the level of the exceeding substance has decreased to safe levels. If ongoing triggers occur, active ventilation may need to be considered.
6. Validation sampling	On completion of tank/ structure and soil removal, *the SQEP shall carry out validation testing* on the walls and base of the pit, at spacings appropriate to the size of the excavation. Any underground pipework (including vent and fill lines) and dispensers/ pumps shall also be sampled at appropriate intervals. The excavator bucket will be used to collect samples so that the tank pit is not entered. Testing shall be for Total Petroleum Hydrocarbons (TPH), with results required to meet the human health and environmental evaluation criteria in **Table 6**. Benzene, Toluene, Ethylene, Xylen (BTEX) analysis shall be included for infrastructure that has contained petrol or kerosene range hydrocarbons or waste oils. The tank excavation shall remain open and fenced off until satisfactory results are received.

Table 11. Controls for hydrocarbon remediation

1. Soil disposal and reuse	• Soil sampling (**Section 5**) will assist with informing soil reuse and disposal options. Where it is shown that the soils meet the relevant evaluation criteria they can be reused on site from a contamination perspective. Higher concentrations of contaminants may require disposal to TSFs (including with treatment via the Processing Plant or any future hydrocarbon treatment pad where necessary) or disposal to appropriate offsite facilities. Note that, as per the HMP, soils with high levels of hydrocarbons (above human health or environmental criteria) cannot be disposed of to TSFs without prior treatment. Evaluation of disposal options should consider relevant factors such as cost, sustainability and long-term liability alongside input from *the SQEP* on effects of the options being evaluated. • Odours may restrict the locations in which soil can be disposed. • All trucks removing soil from site shall be loaded within the area of erosion and sediment controls and submit tracking documentation so that the volumes of soil disposed of at each disposal site are recorded for validation reporting (**Section 11**).
2. Stockpiling	Stockpiling of soils/ rock material containing separate phase hydrocarbons or odorous petroleum hydrocarbons shall not take place. These materials shall be removed directly offsite or contained within designated bins until collection (as per the HMP). The HMP sets out requirements for disposal of liquid waste and of solids such as filters, hoses, booms, rags, etc.
3. Separate phase hydrocarbon ("SPH") management	The key issues during the disturbance or removal of soils containing SPH are: 1. Development of hazardous atmospheres, particularly within excavations/voids; 2. Odour generation; and

	3. Soil handling, transport and disposal management. Given the nature of fuel storage within the Macraes Operation, the volume of soils with SPH (if any) is expected to be small. However, the odour created from even a small volume can be significant, so care is required. Procedures for odorous materials are outlined below.
4. Odorous materials procedure	The following procedures shall be implemented to minimise odour/vapour effects to workers and surrounding properties during disturbance and disposal of soils impacted by hydrocarbon contamination: • Monitoring weather conditions including wind direction and wind speed on-site. • Minimising the generation of odour and vapour by maintaining minimal open areas. This will include reducing the volume of material being excavated during wind conditions that have a greater potential for odour effects (e.g. specific wind directions, low wind speeds, early morning during warming conditions). • Application of dust/vapour/odour suppression measures such as: - Use of water sprays; and/or - Use of deodorisers delivered via demisting sprays around the excavation plant if water sprays are insufficient. Air Repair FS Gold odour suppressants (or equivalent) will be used conservatively assuming a dosing rate of 100:1. • Ongoing monitoring of vapour by the contractor, with recording of the odour in accordance with the levels shown in **Table 13**. If the works reach the 'Very Strong' level, works shall cease and controls shall be reviewed with the objective of reducing the odour back to safe working levels. Works will not recommence until odours are sufficiently reduced. If an odour is detected at the remediation area site boundary, an assessment should be made to determine if it has potential to affect nearby workers or site users/ occupants, and if so, the contingency measures in **Section 7.4.1** shall be implemented.
5. Hydrocarbon monitoring	The Contractor or *SQEP shall undertake monitoring using a portable PID and Multi-gas meter* during remediation where kerosene or petrol-range products have been used/ stored. The trigger levels at which stop-works procedures should be implemented are set out in **Table 12** below and contingency procedures are set out in **Section 8.4.2**. The Contractor shall also undertake ongoing monitoring (at the remediation area boundary, or the nearest receptor such as proximal site workers or occupiers) to ensure that during the remediation works: 1. No discharges from any activity on site shall give rise to visible emissions, other than water vapour, to an extent which is noxious, dangerous, offensive or objectionable. 2. Beyond the boundary of the MP4 Project, there shall be no hazardous air pollutant, caused by discharges from the site that causes, or is likely to cause, adverse effects on human health, environment or property. 3. There is no discharge of hydrocarbons to any stormwater system or water body. This can be undertaken by regular boundary checks (walking around the perimeter of the remediation area), with the use of monitoring devices such as a PID or LEL meter if odours/ vapours are suspected.
6. Vehicle decontamination	For machinery that is used for remediation (e.g. excavators, rollers, stabilising equipment) decontamination shall comprise washing prior to leaving the site. Washing shall be undertaken within the area of erosion and sediment controls. Successful decontamination of all machinery/equipment used for soil disturbance of material shall be confirmed by visual assessment *undertaken by the SQEP* prior to the machinery/equipment leaving site.
7. Validation sampling	*The SQEP shall collect validation samples* in the areas where remediation has been undertaken. The density of sampling will depend on the size of the remediation, but a minimum of two validation samples will be collected per remediation area. Validation sampling shall be as per the sampling methodologies set out in **Section 5.3** with the remediation criteria set out in **Section 5.4** (human health and environmental criteria).

Table 12. Vapour monitoring trigger values

Vapour	Action level	Measure with
Explosive gases	10 % LEL[1] 0 % LEL for hot works/ mechanical activities (piling, excavation)[3]	Multi-gas meter

Vapour	Action level	Measure with
O2	>19.5 %[2]	Multi-gas meter
H2S	10 ppm[2]	Multi-gas meter
VOCs	5 ppm[4]	PID

Notes:

1 AS/NZS 60079.10.:2009 Part 10.1: Classification of areas – Explosive gas atmospheres.

2. Worksafe Exposure Standard TWA.

3. Any hot works at or below ground level shall only be carried out when no combustible gases are detected. As defined by WorkSafe New Zealand, hot works includes welding, thermal or oxygen cutting, heating, including fire-producing or spark-producing operations that may increase the risk of fire or explosion.

4. Only a limited number of compounds have New Zealand Workplace Exposure Standards (WES) lower than 5 ppm and it is unlikely that these compounds will be present in sufficient quantities to exceed their individual WES. 5 ppm has therefore been adopted as a practical screening level to avoid false positives associated with weather effects and instrument drift.

Table 13. Odour intensity evaluation descriptions

Very strong	Offensive odour that is unable to be tolerated. May cause headaches. Strong, clearly recognised type of odour and may be uncomfortable. Works shall cease and passive or active treatment provided (**Section 8.4.2**).
Moderate	The type of odour is easily recognised but not uncomfortable
Slight	May be difficult to identify the type of odour
Very slight	The type of odour not able to be discerned nor is the source
Not detected	No measurable odour

5.4 General contaminated soils remediation

General remediation of contaminated soils can be undertaken with standard earthworks controls and procedures, but with additional focus on minimising the potential for discharges from site (i.e. stormwater runoff, dust generation), and a focus on worker safety (refer **Section 6**). General soil remediation controls are identified in **Table 14**.

Table 14. General soil remediation controls

1. Key Controls	• Site establishment, with the remediation area fenced or otherwise cordoned off from the wider mine operations, and with appropriate erosion and sediment controls, will be the key controls to prevent discharges of contaminated runoff onto clean ground, and protect site works. • Where project-specific dust management is required for the works, the controls should be consistent with the above plan and the Ministry for the Environment's *Good Practice Guide for Assessing and Managing Dust,* (2016). It should consider the nearest site receptors and if required, potential use of water for dust suppression, avoidance of work in windy or very dry conditions if possible, and covering of stockpiles and truck bins.
2. Stockpiling	• Stockpiling should be avoided if possible, with contaminated soil loaded directly into trucks if offsite disposal is occurring. If contaminated soil requires stockpiling, it shall be: - Within the area of dedicated erosion and sediment control. - Covered with tarpaulins/ polythene, appropriately anchored against the weather outside working hours and during periods of heavy rain. - If required, light misting of water applied to suppress dust (with management of runoff that considers potential sensitive receptors). .
3. SQEP involvement	*The SQEP shall make regular site visits during remediation works, or be in regular contact with site workers* to observe that the appropriate controls are in place and collect validation samples as required.
4. Validation sampling	If validation sampling is required, *it shall be undertaken by the SQEP* in accordance with the methodology in **Section 9.1**. The evaluation criteria are set out in **Section 4.2.2**.

5.5 PFAS remediation

As described in **Section 3.6**, the need for and type of remediation required to mitigate PFAS contamination will be evaluated based on the findings of the assessment process implemented to understand PFAS at the mine. This CSMP will be updated accordingly.

6. Health and Safety

6.1 Overview

Health and safety management for the works is informed by:

1. OGNZL's overarching health and safety framework, including 'STOP and THINK' processes prior to commencing tasks to identify key hazards and verify critical controls, requirements for personal protective equipment and protective measures for arsenic exposure (included in **Appendix B**).
2. The site Risk Assessment and/or Job Hazard Assessment ("JHA"). These are developed by the contractor/s in conjunction with OGNZL supervisors and are available in the site office and attached to the daily contractor and visitor sign-in book.
3. The Site-Specific Health and Safety Plan ("SSSP") for the site including an Emergency Plan, Training and Induction Plan, Incident Reporting Form and the aforementioned Risk Assessment / JHA. Attached to the daily contractor and visitor sign in book.
4. Contractor works-specific SSSPs. These documents are produced by the contractor, and include any Safe Works Practices ("SWPs") specific to their activities.
5. The Contamination-specific requirements related to hydrocarbon and asbestos remediation as discussed in **Section 5** and this section.

6.2 Induction and training

All contractors and visitors to the MP4 Project sites shall be inducted as per OGNZL's routine induction requirements specific to the works area being visited. Access to contaminated land works sites will require additional induction as per **Section 5.1**.

Site workers shall avoid unnecessary direct contact with soil or water. OGNZL will ensure that all workers are trained in the identification of contamination (refer **Section 7.1**).

6.3 Health and safety controls

Standard good hygiene practices should be followed during all earthworks activities, including washing hands before eating/ drinking/ smoking, and separation of works areas from break areas.

During remediation activities (**Section 6**), the health and safety requirements in **Table 15** will apply to site workers. Note that specific requirements for asbestos and hydrocarbon remediation are set out in **Section 5.2** and **5.3** respectively.

Table 15. General health and safety requirements during remediation/ handling of contaminated soils

1. General	• Works areas shall be clearly separated from break/ smoko areas. No eating, drinking or smoking shall occur within the works area. • Hand washing facilities shall be provided so all workers can wash hands prior to eating and drinking.

2. Personal decontamination	All personnel involved in remediation or ground disturbance activities associated with contamination must complete decontamination before leaving the site. Decontamination facilities shall comprise, as a minimum: 1. Facilities for storing and changing PPE. 2. Boot wash facilities. 3. A hand and face wash facility. 4. Bins for disposal of contaminated gloves and other consumables. All personnel need to complete the personal decontamination procedures whenever they stop work, i.e. for meal breaks, toilet breaks etc. Decontamination shall be undertaken immediately in the event of any body parts coming in direct contact with any soil and/or groundwater. Personnel decontamination shall comprise: 1. Rinsing and/or scrubbing of boots, gloves and other PPE to remove dirt and dust residues. 2. Removal of all PPE with disposable items such as gloves and dust mask (if worn) placed in a plastic bag or drum for waste collection. 3. Thorough washing of hands and face with soap and water. All waste materials shall be considered as contaminated and disposed appropriately.
3. Asbestos	Asbestos remediation works may have a more stringent decontamination requirements. The relevant level of asbestos control takes precedence over the controls in this section.

Following completion of any remedial works as described in **Section 5**, there are not expected to be any health and safety requirements in respect of ground contamination. The only exception to this would be if unexpected contamination is encountered. Unexpected contamination procedures are provided in **Section 7**.

7. Contingency Measures

Contingency measures are provided in the event that unexpected ground conditions are encountered, discharges occur and/ or complaints related to contamination are received during site works. The following sections set out the triggers for contingency measures to be implemented, who is responsible for implementing them, and the emergency and complaints procedures for the site.

7.1 Contingency Triggers

Unexpected contamination, complaints or an uncontrolled discharge will trigger implementation of contingency measures. Key identifiers for *unexpected contamination* that will trigger these measures include (refer images below in **Table 16**):

- Bulk asbestos fibres and/ or demolition wastes.
- Odours such as hydrocarbons or solvents.
- Discoloured soil such as black, blue or green staining, or any staining that appears out of the ordinary.
- Underground structures such as fuel or other tanks.
- Fill materials – generally visibly different from natural ground and potentially identifiable via the presence of buried topsoil, refuse and/or brick/ concrete/ timber/ pipe fragments.

Uncontrolled discharges are any discharge of soil, water, sediment, or hydrocarbons/ chemicals from the site that is unexpected and not able to be controlled/ retained by standard erosion and sediment control measures.

Table 16: Unexpected contamination identifiers

 Odours/sheen such as hydrocarbons or solvents.	 Asbestos fibres and/or building products.
 Discoloured soil such as black, blue or green staining, or any staining that appears out of the ordinary.	 Underground structures such as fuel tanks/drums.


Fill materials.


Fill materials.

7.2 Contingency Responsibilities

Mitigation measures must be applied in accordance with the hierarchy of control described in the Health and Safety at Work Act (2015) (or subsequent amendments) – Eliminate, Substitute, Isolate, Minimise (including engineering controls, administrative controls, personal protective equipment).

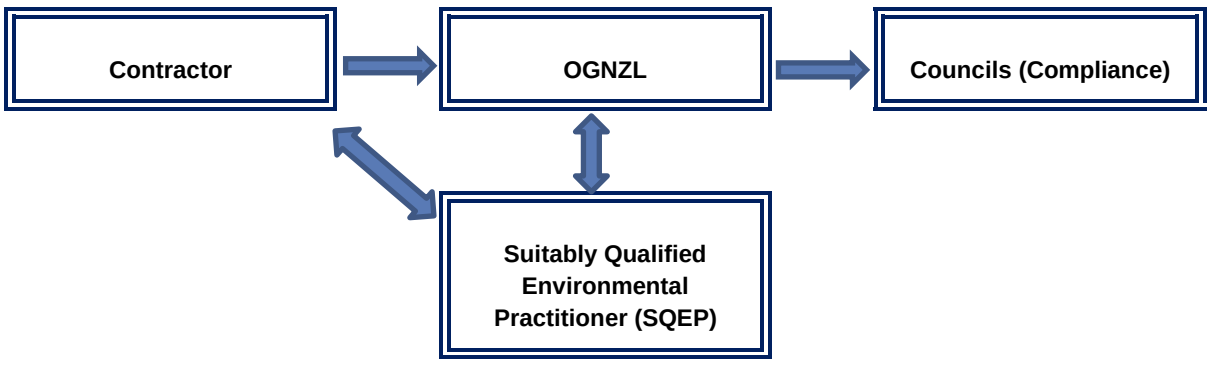
Responsibility for identifying the need for contingency measures, commencing the notification process and enacting onsite measures lies with the Contractor. The Contractor shall:

a) Apply the notification process outlined below.

b) Notify OGNZL and the SQEP immediately in the event that any unexpected contamination is identified or, contingency measures are required to be implemented.

c) ORC and WDC/DCC shall be notified by OGNZL (or the SQEP if formally delegated) in writing as soon as practicable after contingency measures are implemented.

d) Worksafe NZ may need to be notified, depending on the nature of contamination or possible exposure by workers. *The SQEP shall make the decision whether or not Worksafe notification is required*.



7.3 Unexpected Contamination Procedure

In the event that unexpected contamination is identified as illustrated in **Section 7.1**, the following shall be implemented by the Contractor (or OGNZL Site/ Project Manager if works are being undertaken using internal resources):

STOP WORK (in the immediate area)	• Remove all unnecessary site staff from the immediate area of unexpected contamination.
ISOLATE	• Install temporary fencing, taping, or cones to identify the area.

NOTIFY	• Advise the OGNZL Site Manager. • *Liaise with the SQEP*. • Update the site signage (e.g. hazard board) to warn workers and visitors.
REVIEW CONTROLS	• The SQEP shall review controls with the Site Manager and determine any external notification requirement. • The Contractor shall implement additional controls if required. These may include contingency mitigation controls.
ASBESTOS	• If asbestos is observed P2 dust masks shall be provided to all workers required to enter the isolated area. • The level of control *shall be reviewed by the SQEP*. This shall include inspection and review of the works. • Additional testing may be required, and this shall be undertaken in accordance with the NZAG. • If the above assessment indicates that it is possible that asbestos in soil will be encountered at concentrations exceeding the relevant standards, an Asbestos Removal Control Plan shall be prepared to support removal of the materials. In this event a Licensed Asbestos Removal Supervisor shall be engaged.

7.4 Emergency Response

Should an incident occur on site which may result in any uncontrolled or unauthorised discharges (water, soil, vapour, hydrocarbons etc.), the OGNZL project/ site manager will take control of the situation and coordinate the efforts of all on site to minimise the impact. *The SQEP shall be notified and inspect the discharges and advise on mitigation*.

In the unlikely event that sustained uncontrolled discharges occur from the site, emergency response and evacuation procedures, including provisions for notifying and managing neighbouring site users, shall be implemented.

The emergency response and evacuation procedures shall be specified in the project specific health and safety plan.

7.4.1 Odour discharges

The following hierarchy of actions is proposed in the event that odour discharges occur from the works/ remediation area (very strong level in **Table 13**):

- Increase wetting of the exposed materials by use of water carts or hosing etc.
- Minimise the open areas of excavations as much as practicable, including whenever possible covering or temporarily backfilling excavations when not excavating.

If these measures do not address odour discharges, works in the area of the discharges shall be suspended, if possible the exposed soils covered, and *the SQEP consulted to define alternative mitigation measures.* These may include:

1. The use of automated suppression systems such as rotary atomisers or spray line systems with and suitable, approved, odour suppressants.
2. Observation of the odours around the works by a person whose nose has been calibrated in accordance with the AS/NZS 4323.3:2001, Stationary Source Emissions – Determination of Odour Concentration by Dynamic Olfactometry.

7.4.2 Vapour monitoring triggers exceeded

The following hierarchy of actions shall be implemented if vapour monitoring triggers (**Table 12**) are exceeded:

CEASE WORKS (in the immediate area)	• Switch off all mechanical and electrical equipment. • Evacuate the immediate area and, assuming discharges are not extending beyond the remediation/ site boundary, allow the area to ventilate for at least 15 minutes, then resample. • If conditions fall and remain below the required level works can be recommenced, otherwise additional mitigation measures shall be implemented with *advice from the SQEP*. • If discharges are impinging on the boundary of the works area or proximal receptors (including environmental receptors, mine staff or adjacent land occupiers) additional control measures, as described in the following sections, shall be implemented immediately.
VENTILATE	• Increase ventilation to the area using ducted fans or other additional mechanical ventilation. The effect of discharges from these systems on other receptors must be considered before implementation.
PPE review	• Half mask respirators with organic filter cartridges maybe provided to protect personnel from elevated vapour concentrations. • This method should only be considered after other engineering controls (for example ventilation) have been implemented. The use of respirators requires documented procedures to demonstrate that appropriate training, fit testing, inspection and maintenance, including the frequency of cartridge changes, are implemented appropriately.
TESTING (if required)	• Additional testing may be required including use of compound specific detector tubes to confirm the contaminants of concern and associated concentrations with revision of vapour monitoring and action levels to reflect these.

7.4.3 Water discharges

If uncontrolled water discharges are occurring the following shall occur:

1. Construct temporary bunding or pits to contain water within the remediation area, or as close as possible to it.
2. Contact the SQEP to provide advice on testing and management requirements.
3. Water testing shall occur to determine if treatment is required prior to pumping/ drainage to the MWMS. The testing suite shall depend on the nature of contamination present.
4. Following receipt of test results, the SQEP and OGNZL will determine if treatment is required prior to discharge to the MWMS. If treatment is required it shall then be designed and implemented before any water is discharged.
5. Alternatively, water may be removed from site via tanker trucks for disposal to a licensed liquid waste facility.

7.5 Complaints Procedure

Any complaints related to the ground contamination covered by this CSMP shall as soon as practicable be notified to the OGNZL Company Liaison Officer to investigate and report.

The Company Liaison Officer shall maintain and keep a complaints register for any complaints received from any member of the community. The register shall record the following (where available):

- The date, time, and details of the incident that has resulted in a complaint,
- The location of the complainant when the incident was detected,
- The possible cause of the incident,
- Any corrective action taken by the consent holder in response to the complaint, including timing of that corrective action; and
- Communication with the complainant in response to the complaint.

The complaints register shall be made available to the Councils on request or as otherwise specified by specific conditions of relevant resource consents.

8. Monitoring

The following applies to remediation activities. For general earthworks or mining-related works, OGNZL has existing monitoring requirements. The requirements in this section do not replace any of OGNZL's pre-existing monitoring requirements. The requirements for monitoring vapour and odour during hydrocarbon remediation are set out in **Section 5.3**. Requirements for monitoring during asbestos remediation will are set out in **Section 5.2**.

Table 17. Monitoring requirements

Contractor obligations	The Contractor is responsible for general site monitoring and maintaining records to confirm monitoring was carried out. We recommend this is via a daily log form. Monitoring includes for erosion and sediment controls, dust controls, noise and odour discharges from site. The Contractor shall ensure that during the works: 1) No discharges from any activity on site shall give rise to visible emissions, other than water vapour, to an extent which is noxious, dangerous, offensive or objectionable. 2) Beyond the boundary of the site, there shall be no hazardous air pollutant, caused by discharges from the site that causes, or is likely to cause, adverse effects on human health, environment or property. 3) There is no discharge of hydrocarbons to the MWMS or surrounding receiving environments.
Contaminated Land Specialist obligations (SQEP)	*The SQEP shall communicate with OGNZL staff on a regular basis* to confirm the procedures in this CSMP are being followed and to respond to issues of unexpected contamination. A nominated OGNZL environmental staff member shall also visit site and maintain site visit records of each visit for inclusion in the site validation report (SVR) outlined in **Section 9**. *This staff member shall be trained in monitoring obligations by the SQEP, and refer to the SQEP to respond to any questions or queries they have during inspections*. *The SQEP will also assist in monitoring* as described in **Section 5.2** and **5.3** for asbestos and hydrocarbon remediation.

9. Validation/ Closure Reporting

Site validation processes are covered off under each remediation heading in **Section 5**. The following summarises the sampling requirements and provides reporting procedures for the SQEP to complete following each remediation activity. It is acknowledged that validation and associated reporting may be staged to reflect the nature of the development work being undertaken. Remediation standards are as per the evaluation criteria (human health and environmental) for pre-works testing in **Section 4.2.2**.

9.1 Validation sampling

Asbestos remediation validation sampling	Samples shall be collected using a sampling density determined by the SQEP to be relevant to the nature and extent of contamination. Where remedial actions included bonded ACM fragments only (i.e., in an absence of asbestos fines in soil) validation shall be visual involving a detailed site walkover including 3 passes of the remediated area, with one pass at right angles to the other two.
Hydrocarbon infrastructure removal	The SQEP shall determine the sampling plan in line with MfE's Hydrocarbon Guidelines. As a minimum it will include the base of tanks (and walls of USTs), dispensers and underground pipe work (including vent and fill lines).
Hydrocarbon remediation validation sampling	Samples shall be collected using a sampling density determined by the SQEP to be relevant to the nature and extent of contamination. A minimum of two validation samples will be collected per remediation area.
General soils remediation sampling	Samples shall be collected using a sampling density determined by the SQEP to be relevant to the nature and extent of contamination. A minimum of two validation samples will be collected per remediation area.
Unexpected contamination validation sampling	The requirements for unexpected contamination will largely depend on the nature of the contamination encountered.

Sampling procedures set out in **Section 4.2.1** are applicable for collection of validation samples.

9.2 Site validation report

Upon completion of each stage of work, a Site Validation Report (SVR) shall be prepared confirming the works were undertaken according to this CSMP, unexpected contamination encounters (if any) and any remedial measures implemented.

The following list sets out the information the Contractor is required to provide the SQEP, and the SQEP is required to address for each reporting situation:

- Asbestos in building clearance certificates, if relevant (may be from a separate demolition contractor).
- Tank removal and offsite disposal tracking, if relevant.
- Copies of weigh bridge summaries for the disposal destination of any surplus soil or water generated during the remediation works (that is taken offsite, not relevant for materials remaining onsite).
- Records of visits by Council representatives.
- Details of any complaints regarding contamination and actions in response to these.
- Details of any health and safety incident related to the contamination and how they were resolved.
- Details of unexpected encounters/events related to contamination and the action taken.
- Any contingency or emergency actions implemented that relate to contamination.
- Validation testing data, including analysis against remediation/ evaluation criteria.
- Records of site visits by the SQEP.
- A summary of compliance with the CSMP.

The Contractor shall provide the *required information to the SQEP* within one month of completion of groundworks.

The SVR shall be submitted to ORC, WDC and/or DCC and shall be prepared to generally comply with the MfE CLMG No. 1.

9.3 Long term monitoring plan (LTMP)

If, on completion of works of works authorised by the MP4 project, residual contamination remains at concentrations that present a potential risk to human health or the environment (e.g. if contamination is encapsulated), *the SQEP shall prepare a Long Term Monitoring Plan ("LTMP")* in accordance with MfE CLMG No. 1.

The LTMP shall include as a minimum:

- A summary of the contamination remaining on the site, including the validation results in the context of effects on site workers and the environment,
- The location of contamination on the site, including a plan with suitable scale and orientation information.
- An asbestos management plan for asbestos remaining on site prepared in accordance with the Asbestos Regulations if asbestos remains on the site.
- Appropriate management measures for the site cover (if applicable), and for future ground disturbing work.

Where required the LTMP shall be submitted to ORC, WDC and/or DCC following completion of works with long term contamination implications.

Appendix A. Example Contractor Checklist

WILLIAMSON
WATER & LAND ADVISORY

Auckland | Bay of Plenty | Whangarei
T +64 21 613 408
E contamination@wwla.kiwi
W www.wwla.kiwi

Macraes Mining Workshop: Contamination Site Management Plan (Summary Checklist)

Site ID:	*OGNZL Macraes Mining Workshop*	Revision/ Date:	*Revision 1, 19 May 2026*

Overview:

The Mining Workshop for the Macraes Operation requires relocation to accommodate the MP4 Project. Relocation will involve demolition of structures, removal of in-ground infrastructure, and localised management of identified contamination.

Investigations have been undertaken by WWLA and confirmed:

- Remediation is not required in any of the Mining Workshop facilities as there are no exceedances of applicable human health or environmental criteria, but decommissioning of the infrastructure provides an opportunity for targeted management of arsenic and hydrocarbons as follows (refer Management Areas shaded orange in **Figure 1**):
  - Sediment in **wash bays** contains hydrocarbons. While this doesn't present an unacceptable risk to human health or the environment, disposal of sediment should be managed so that it does not result in contamination of other areas of the Macraes Operation. Disposal to tailings or a consented offsite disposal location is recommended.
  - Surface soils in the adjoining **swale** have higher arsenic concentrations than the rest of the workshop site. However, because the swale discharges into the Mixed Tailings Impoundment, which currently meets its discharge criteria, downstream impacts are unlikely. However, surface sediment could be removed for disposal at a tailings facility or consented offsite location. Alternatively, OGNZL could establish more vegetation to suppress dust and runoff.
- Management of identified contaminants can largely occur using OGNZL's existing controls for arsenic and hydrocarbons. These have been incorporated and are attached.
- Should unexpected contamination be identified, this SMP will be *revised by the SQEP* to include additional controls (where required).

Figure 1. Management areas, shaded orange (image source: Google Earth)

This SMP has been prepared to support the MP4 Project, and specifically the relocation of the Mining Workshop. It includes procedures to ensure that risks to human health and the environment are appropriately mitigated and provides for post-works reporting.

OGNZL will be responsible for overseeing the implementation of this SMP, although the primary day-to-day responsibility will sit with the lead contractor [insert contractor name]. Where input from a Suitably Qualified and Experienced Practitioner (SQEP) is required it is highlighted blue.

Soil Management Procedures

SMP induction by (SQEP):……..	Date: ……
Actioned by (Contractor's Site Manager):……..	Date: ……

Section	Description	Check
1. Site Establishment	• Establish OGNZL's general earthworks controls for bulk earthworks and the relevant. • Where a project-specific erosion and sediment control plan ("ESCP") is required for the works, its controls should be consistent with Auckland Council's *Erosion and Sediment Control Guide for Soil Disturbing Activities in the Auckland Region (GD05, June 2016),* which Otago Regional Council has adopted.	☐
	• Establish OGNZL's standard dust controls as per the Macraes Operation Dust Management Plan (ref MAC-210-Plan-000). • Where a project-specific dust management is required for the works, the controls should be consistent with the above plan and the Ministry for the Environment's *Good Practice Guide for Assessing and Managing Dust,* (2016). It should consider the nearest site receptors and potential use of water for dust suppression, avoidance of work in windy or very dry conditions, and covering of stockpiles and truck bins. • Filter fabric may be used on site fencing to further reduce dust if necessary.	☐
	• Arrange disposal permits before any soil leaves the site (whether internally to tailings storage facilities ("TSFs") or to a non-OGNZL site). *If in doubt about disposal requirements contact the SQEP.*	☐
	• Induct any new workers or subcontractors to the requirements of the SMP as works progress. *The initial induction shall be led by the SQEP (in person or online)*, e.g. WWLA (subsequent inductions may be by the Site Manager) and shall cover: - Spoil management to minimise discharges to the environment. - Material disposal constraints and reuse opportunities. - Health and safety requirements for site workers. - Procedures for responding to unexpected contamination.	☐
2. General Earthworks Requirements	**Staging:** 1. Remove wash bay infrastructure and associated sediment (including all that with an odour or visible staining) first to prevent cross-contamination of these materials with cleaner soils. 2. Undertake the remainder of the Mining Workshop decommissioning and removal works. 3. Finally, if swale sediment is to be removed, undertake this last so that it also removes any additional contamination that may have resulted during decommissioning (i.e. if there was an unexpected discharge).	☐
	• Maintain the approved erosion, sediment, surface water and dust controls until an erosion-free surface is reinstated. • The focus should be on minimisation of dust, containment of sediment-laden runoff, and clean-water diversion, to minimise runoff potential.	☐

Section	Description	Check
	• OGNZL's Project Manager (or delegate) shall undertake daily inspections to ensure compliance with the ESCP and dust procedures and controls.	☐
	• Keep records of disposal volumes and destinations for inclusion in the site validation report ("SVR").	☐
	• Imported material: ensure any materials imported from offsite are directly sourced from a quarry or have been classified as clean. *These must be verified by the SQEP* as being either quarry-sourced or cleanfill as defined by the Ministry for the Environment **before** being imported to site. • Material introduced from existing waste rock stacks within the Macraes Operation does not require testing if it is placed in accordance with the mine management requirements.	☐
	• No water is to discharge outside of the Macraes Operation without prior testing, and if necessary, approval by ORC. Water should be contained within the works area and may discharge to ground within the works area or to the Mixed Tailings Impoundment ("MTI") if practical. *Contact the SQEP to undertake testing if necessary.*	☐
3. Health and Safety Requirements	• OGNZL has a Worker Health Control Plan (ref MAC-256-PCP-000-21) and associated Personal Protective Equipment (PPE) Guidance (ref MAC-257-PRO-009), PPE Matrix and an Arsenic Information Sheet (ref MAC-250-GUI-009). The Arsenic Information Sheet and PPE Matrix are **attached** and provide guidance on protection of worker health in a high-arsenic environment. • The above control plan provides suitable protection for the level and type of hydrocarbon contamination present in the Workshop area. • There should be a focus on good hygiene practices – washing hands before eating/drinking, avoiding eating/drinking in works areas and brushing down boots before entering vehicles and site sheds. • Workers should have PPE appropriate to the task being carried out – the attached matrix has "dusty environments" highlighted as being the most appropriate controls in this case. • Workers should have the opportunity to shower and leave contaminated PPE at the Macraes Operation before returning home.	☐
4. Soil disposal/ reuse	Materials that have *not* been impacted by hydrocarbons (e.g. swale soils, other soils/ rock) can be reused anywhere within the Macraes Operation site or disposed of to TSFs.	☐
	For hydrocarbon-impacted materials (those in the wash bays), refer to OGNZL's Hydrocarbon Management Plan (ref MAC-206-PLN-003), specifically: • For infrastructure such as sumps and pipework: - Disposal offsite to a facility consented to take the materials. • For sediment/ rock: - Disposal to TSFs, either with pre-treatment (i.e. aeration pad or processing plant) or without (pre-treatment is not required as hydrocarbon concentrations do not present an unacceptable risk to human health or the environment). - Disposal offsite to a facility consented to take the levels of contamination present.	☐
5. Unexpected Contamination Response	• *Liaise with the SQEP should any unexpected contamination be identified* and implement mitigation measures advised by the SQEP. Signs of soil contamination may include: – Odorous materials (i.e. hydrocarbons, solvent odour). – Discoloured soil (green, black, blue). – Asbestos cement board fragments. – Refuse, putrescible or demolition materials.	☐
	• If unexpected contamination is encountered, or a discharge occurs, the following steps must be taken by the Contractor:	☐

Section	Description	Check
	– Cease works in the immediate vicinity of the suspected contamination and tape or cone off. – Notify the project manager/OGNZL representative and the SQEP. – Implement any additional contaminated land-related health and safety procedures and PPE if deemed necessary by the SQEP. – If a hydrocarbon spill has occurred, implement the procedures in the attached Macraes Hydrocarbon Management Plan (ref MAC-206-PLN-003). – Update the Hazard Board to direct site workers should continued exclusion of the area be required. – Implement and maintain any additional controls required by the SQEP to manage contamination. • If asbestos is identified, requirements of the Health and Safety at Work (Asbestos) Regulations 2016 must be followed. *The SQEP shall provide direction* and if required, a licensed asbestos contractor engaged.	
	• Notify ORC *via the SQEP* as soon as practicable after implementing any contamination mitigation measures.	☐
6. Contamination examples	 Liquid hydrocarbons or solvents.	
	 Asbestos fibres and/or building products.	
	 Discoloured soil such as black, blue or green staining, or any staining that appears out of the ordinary.	
	 Uncontrolled fill materials.	
7. Validation	• As contamination does not present an unacceptable risk to human health or the environment, no validation sampling is required to confirm its removal. However, *visual validation is recommended by an OGNZL staff member on completion of works, with review of observations by a SQEP*. This can be staged to visually validate the wash bays, then the swale. • Validation shall include observation of the soils to confirm that no visual or olfactory evidence of contamination remains at the wash bays, and that surface soils have been removed in the swale (if carried out; alternatively, that vegetation cover has been improved since the DSI site visit).	☐

Section	Description	Check
	• Any unexpected contamination should be validated by soil sampling; this will *be determined by the SQEP* on a case-by-case basis. • Results shall be documented in a SVR which will be *prepared by the SQEP* on completion of works.	
8. Post Works (*Provide to SQEP* to prepare works completion/ site validation report)	• Weighbridge summary of all materials disposed from and introduced to site (including soil and water).	☐
	• Details of any health and safety or environmental incidents related to contaminated land (if any).	☐
	• Details of mitigation measures implemented (if any).	☐
	• Details of visits by Council representatives.	☐

Attached:

OGNZL Arsenic Information Sheet

OGNZL PPE Matrix

OGNZL Hydrocarbon Management Plan

Appendix B. OGNZL Documentation

B.1 Arsenic management

B.2 PPE guidelines

B.3 Hydrocarbon Management Plan

What is Arsenic?

Arsenic is a naturally occurring element widely distributed in the earth's crust. **EXPOSURE TO ARSENIC IS KNOWN TO CAUSE CANCER, AS WELL AS MANY OTHER SERIOUS HEALTH PROBLEMS.**

There are two forms of arsenic: –

Inorganic arsenic is found in minerals, rocks and mine tailings. Inorganic arsenic compounds are mainly used to preserve wood.

Organic arsenic is found in fish and shellfish. It is sometimes called 'fish arsenic'.

Both types can be toxic at high levels. But inorganic arsenic is much more toxic.

How does arsenic enter and leave the body?

- Arsenic commonly enters the body in food and water – most usually in food. It also enters the body when we swallow soil or dust. Arsenic in soil or dust is usually not as well absorbed by the body as arsenic in food or water. This is because arsenic is often held firmly inside the soil particles and is not as easily dissolved in the stomach. Arsenic can also be inhaled as a gas or fumes
- Some arsenic compounds can be absorbed through the skin.
- Arsenic does cross the placenta in pregnant women
- Smoking is also a source of arsenic exposure (refer below)
- Arsenic is excreted by the body in urine, this is used as a measure of arsenic exposure

How might I be exposed to arsenic?

- Ingesting small amounts present in your food and water or breathing air containing arsenic
- Breathing sawdust or burning smoke from wood treated with arsenic (CCA Treated pine or hardword)
- Living in areas with unusually high natural levels of arsenic in rock or geothermal regions
- Working in a job that involves arsenic production or use, such as gold mining, copper or lead smelting, wood treating or pesticide application
- Smoking smokers breathe in approximately 0.8 to 2.4 micrograms of inorganic **arsenic** per pack of 20 **cigarettes**, with approximately 40 percent of it being deposited in the respiratory tract

How can arsenic affect my health?

- Breathing high levels of inorganic arsenic can give you a sore throat or irritated lungs
- Ingesting very high levels of arsenic can result in death. Exposure to lower levels can cause nausea and vomiting, decreased production of red and white blood cells, abnormal heart rhythm, damage to blood vessels, and a sensation of "pins and needles" in hands and feet
- Ingesting or breathing low levels of inorganic arsenic for a long time can cause a darkening of the skin and the appearance of small "corns" or "warts" on the palms, soles, and torso. It can also increase the risk of skin cancer and cancer in the liver, bladder, and lungs.
- Skin contact with inorganic arsenic may cause redness and swelling.
- There is very limited information regarding health effects of organic arsenic compounds in humans

How can I reduce my risk of exposure to arsenic?

- If you work in a job that may expose you to arsenic, be aware that you may carry arsenic home on your clothing, skin, hair, or tools. Be sure to shower and change clothes before going home
- If you use arsenic-treated wood in home projects, you should wear dust masks, gloves, and protective clothing to decrease exposure to sawdust
- If you live in an area with high levels of arsenic in water or soil, you should use cleaner sources of water and limit contact with soil

BE ESPECIALLY CAREFUL THAT YOU CORRECTLY USE ALL PPE PROVIDED WHEN IN AREAS ON SITE WHERE THERE IS POTENTIAL FOR ARSENIC EXPOSURE

REFERENCES:

NZ Ministry of Health- Arsenic and Health 2018

Agency for Toxic Substances and Disease Registry (ATSDR), (August 2007).

California Air Resources Board and Department of Health Services, (Jul 5, 2019)

OCEANAGOLD PERSONAL PROTECTIVE EQUIPMENT (PPE) MATRIX — Defines the minimum PPE requirements for the Macraes site

Document Number: MAC-250-MTX-001.1 | Revision: 2 - Issue Date: Jun 2025 / Review Date: Jun 2027 | Document Owner: Manager - Health & Safety Macraes

TASK / TOOL / CONDITION	EYES / FACE					EARS		RESPIRATORY					HANDS					BODY											HEAD			
	Safety Glasses	Face Shield	Safety Glasses & Welding Helmet	Goggles	Oxy Goggles	Ear Plugs	Ear Muffs	P2 Disposable Filter / Dust Mask	Organic Vapour Mask	N95 / N99 Mask	PAPR - Adflo Speedglass, Versaflo	Ventilation Required	Class 2/B Cut Resistant	Welding Gauntlets	Cold Resistant Gloves	PVC / Chemical Gloves	Anti-Vibration Gloves	Leather Jacket	Kevlar Sleeves	Overalls or Long sleeved Work Shirts and Work Trousers	Full Wet Weather Gear	Boily Snood	Leather Spats	Leather Chaps / Apron	Steel Toe Safety Boots	Steel Toe Gum Boots	PVC Apron / Disposable Overall	Safety Harness	Tool Belt / Bag	Hard Hat	Hard Hat With Chin Strap	Hair Net for Long Hair	Hard hat fitted with sun brim / beanie or liner
Air / Electric Buffs	X	X		X*		X or	X	X*			X*		X							X						X				X		X	
Angle Grinders	X	X	X*	X*		X or	X	X or			X*		X							X		X*			X					X		X	
Die Grinding General	X	X	X*	X*		X or	X						X							X					X	X*				X		X	
Die Grinding Steel / De-Bur	X	X		X*		X or	X						X							X		X*			X					X		X	
Drop Saw / Friction Cut Off	X	X	X*	X*		X or	X	X*				X	X							X					X					X		X	
Pedestal Grinders	X	X	X*	X*		X or	X	X*				X	X							X					X					X		X	
Pedestal Drills	X	X*		X*		X or	X						X							X					X					X		X	
Magnetic Base Drill	X	X*		X*		X or	X						X							X					X					X		X	
Impact / Rattle Gun	X					X or	X						X		X*		X			X					X					X		X	
Air Impact Chisel	X	X	X*	X*		X or	X						X or				X*			X					X					X		X	
Pressing	X	X	X*	X*		X or	X						X							X					X					X		X	
Using Liquid Nitrogen	X	X		X*		X* or	X*					X			X					X				X	X					X		X	
Abrasive (sand / bead) Blasting			X*			X or	X				X	X	X							X					X					X*		X	
Paint & Solvents	X	X*		X*		X* or	X*		X			X	X or			X				X					X		X*			X		X	
High Pressure / Flow Water Wash	X	X*				X or	X						X or			X				X	X*				X or	X	X*			X		X	
Overhead Welding	X		X*			X or	X				X	X		X				X		X		X	X*	X*	X							X	
Arc Air Gouging	X		X*			X or	X				X	X		X				X		X		X	X	X	X							X	
Welding Stick / Mig	X		X*			X or	X				X	X		X				X*		X		X	X*		X							X	
Welding Flux Cored Gasless	X		X*			X or	X				X	X		X				X		X		X	X*		X							X	
Welder Plasma			X*		X	X or	X				X	X		X				X*		X		X	X	X*	X							X	
Welder Tig	X		X*			X or	X				X	X		X						X		X	X*		X							X	
Oxy Acetyl/Propane Cutting or Welding	X				X*	X or	X				X	X		X				X		X		X	X	X*	X					X		X	
Oxy Gouging	X				X*	X or	X				X	X		X				X		X		X	X	X*	X					X		X	
Thermal Lancing	X					X or	X				X	X		X				X		X		X	X	X	X							X	
Working at Height	X					X* or	X*						X							X					X			X	X*		X	X	
Working in Heat / Direct Sunlight	X					X* or	X*						X							X					X					X		X	X*
Working in Cold	X					X* or	X*						X or		X					X					X					X		X	X*
Wet Environment	X					X* or	X*						X or		X	X				X	X*				X or	X				X		X	
Dusty Environment	X			X*		X* or	X*	X*		X*			X*							X					X					X		X	
Elevated Work Platform (EWP)	X					X* or	X*						X							X					X			X	X*	X	X	X	
Breaking Chemical Flanges (Process Plant)	X	X		X*		X* or	X*	X*				X	X or			X				X	X*						X			X		X	
Tyre Skiving						X or	X		X			X	X				X*	X*	X	X		X*			X							X	
High Torque	X					X or	X													X					X					X		X	

NOTES:

1) Refer Personal Protective Equipment SOP MAC-257-PRO-009.

2) Beanies / Hard Hat Liners supplied by OGL may be worn under hard hats provided the wearer is unable to dislodge the hard hat in movement. In the absence of a built-in restraint mechanism a chin strap will be worn.

3) Bump caps may be used in areas after a risk assessment has been completed and approval has been given from both the Departmental Manager and Health & Safety Manager.

4) Natural or mechanical ventilation to be used in enclosed work spaces where toxic fumes are produced.

5) Where any conflict exists between this PPE Matrix and a procedure / work instruction the PPE Matrix is to take precedence.

6) Working at Heights - Specific working at height helmets should be used if available otherwise standard hard hats may be used, provided, they are equipped with a chin strap to secure the hard hat.

LEGEND: * Optional / Recommended

Hydrocarbon Management Plan

10th September 2024

Document Reference: MAC-206-PLN-003

Department	Environment & Social Performance
Location/Site	Macraes

Approval table

	Position title	Name	Date
Authored by	Environmental Advisor	Jessie Callaghan	26/02/2024
Reviewed by	Environmental Superintendent	Stephanie Hayton	02/05/2024
Approved by	Manager - Environment & Social Performance	Suzanne Watt	10/09/2024

Document issuance and revision history

Document name: Hydrocarbon Management Plan

Document id: MAC-200-PLN-010

Revision number	Revision date	Section	Page	Description	Effective Date
0	26/02/2024	All	All	Initial document creation	10/09/2024

Table of Contents

Purpose

The purpose of the Hydrocarbon Management Plan is to provide information to ensure the storge, use, disposal, spillage and reuse of hydrocarbons are conducted in a sustainable manner that meets relevant legislation, standards, permits and license conditions to;

- Protect human health and safety.
- Avoid and mitigate potential hydrocarbon contamination of the natural environment.
- Comply with OceanaGold Corporate standards and regulatory requirements.
- Comply with applicable legislation and regulations.
- Comply to the OceanaGold's Environmental Material Risk Standards particularly 6. Hazardous Materials and Chemical Substances; and Operational Environmental Standards, 8. Hydrocarbon Management, and 11. Waste Management.
- Comply to the relevant World Gold Council's Responsible Gold Mining Principles: Cyanide and Hazardous Materials (*where applicable*).

1.1 Environmental Performance Standards

For the Macraes Operation, the minimum standards are that:

- Macraes shall document systems and processes demonstrating how hydrocarbons are managed.
- Hydrocarbons must be stored and handled in accordance with a recognised standard AS1940 (or equivalent), including
    - Storage facility and containment requirements
    - Operating Procedures
    - Emergency planning and fire protection
- Any leaks or spills shall be dealt with immediately and reported in accordance with incident management procedures and enable external notification and reporting requirements to be met.
- Third-party used oil recyclers, processors and transporters shall be appropriately certified and comply with all relevant regulatory requirements.
- Macraes shall conduct audits of used oil, waste grease, oil filter and oil rag processors and recyclers to ensure correct standards of transport, storage and processing are met before they are contracted to receive waste hydrocarbons.
- Oils that contain PCB shall not be used - *(as at 1 July 2024, the Macraes Operation has no oils that contain PCB.).*
- Macraes shall establish a register of transformers known to contain PCB oils and develop a work programme to remove the oil from the site. - *(as at 1 July 2024, the Macraes Operation has no transformers known to contain PCB oils).*
- Used oil burned as fuel for heating or power generation shall be used in an approved designed boiler, furnace or an oil-fired space heater, and is to be properly vented to correctly and safely burn the oil.
- Disposal of hydrocarbon contaminated material shall be in accordance with local regulations including any conditions of resource consent.
- Third parties that collect and dispose of hydrocarbon affected material shall report waste category volumes to the Macraes Operation with the appropriate records.

2.0 SCOPE

This plan describes the management of all hydrocarbon products, waste and related infrastructure at OceanaGold New Zealand Limited's Macraes Operation and applies to all personnel, including contractors. The main areas where hydrocarbon activities take place, and the focus of this plan are:

- Light vehicle/open pit workshop
- Underground workshop
- Underground laydown
- Processing plant
- Open Pit
- Underground
- Mobile tanks
- Fuel farms

3.0 RISK

Hydrocarbon transport and use poses a risk to the environment and personal safety when products are spilt, leaked, misused or when storage facilities are inadequate, not suitably maintained, or are subjected to damage.

Hydrocarbons are used daily to refuel, operate, and maintain heavy and light machinery across site and at the processing plant. Spills can occur during handling, maintenance activities, business as usual operation (from burst hydraulic hoses), refuelling, and from damaged or leaking tanks and pipes/hoses.

Incidents can occur during the transport or transfer of bulk supplies, and there is a risk of fire or explosion if material is not appropriately handled. They can also occur from improper storage and handling of small fuel containers.

Hydrocarbon spills and leaks can contaminate soils, surface and ground water, adversely impact flora and fauna, and present a human health risk. While disturbed sites such as in the active mine may not be adversely impacted directly by hydrocarbon contamination, other negative impacts include the following:

- Contamination of ore can reduce the gold recovery processes.
- Remedial treatment, storage, and disposal of contaminated rock and materials is an unbudgeted extra cost and precaution.
- Storage of contaminated rock and material on site is a potential risk to the environment if contaminants are transported to surface water through rainfall entrainment.
- Potential breach of regulatory requirements with enforcement action outcomes and risk to reputation.

A risk assessment is to be undertaken on hydrocarbon management at the OceanaGold Macraes site to support this management Plan.

4.0 REFERENCE/COMPLIANCE/SOP'S

Level	Source
Legislation or Guidelines	• Health and Safety at Work (Hazardous Substances) Regulations 2017
	• Hazardous Facilities Screening Procedure (HFSP)

	• AS 1940:2017 The storage and handling of flammable and combustible liquids.
	• Hazardous Substances and New Organisms Act (HSNO) 1996 (and amendments
	• Hazardous Substances (Hazardous Property Controls) Notice 2017
Corporate	• OceanaGold Environmental Performance Standards Manual (OGC-450-STD-019-0)
Site	• Principal Hazard management Plan – Hazardous Substances (MAC-257-PHM-007)4
	• Standard Operating Procedure - Trigger Action Response Plans (TARPs) (MAC-253-TRP-003)
	• Standard Operating Procedure - Hydrocarbon Spill Response (MAC-209-PRO-014)
	• Standard Operating Procedure - Transferring of Hydrocarbons and other liquids (MAC-380-PRO-036)
	• Standard Operating Procedure - Transfer waste products into Intermediate Bulk Containers (MAC-380-PRO-052)
	• Macraes Operation Waste Management Plan (MAC-206-PLN-002)

5.0 LEGAL REQUIREMENTS

Fuels are controlled under New Zealand law by the Hazardous Substances and New Organisms Act (HSNO) 1996 and associated regulations. All large above-ground diesel and LPG tanks (capacity greater than 5000 litres) on site require a Hazardous Substances Location Compliance Certificate. A Location Compliance Certificate demonstrates that bulk fuel tanks meet requirements regarding their design, construction, and installation.

No consents are held by the company authorising the discharge of hydrocarbons to the environment or anywhere on site. All hydrocarbon contaminated material exceeding applicable environmental or human health thresholds is to be removed from site to an appropriate disposal facility.

6.0 INTRODUCTION OF NEW PRODUCTS TO SITE

New products or chemicals, including new hydrocarbon products must undergo a product evaluation prior to usage. The Hazardous Substances Approval For Use Form MAC-255-FOR-008 must be completed and signoffs obtained from the relevant Department Heads, Health & Safety and Environment.

OceanaGold's Hazardous Materials and Chemical Substances Standard section 8.9.15 requires all new installations with environmentally hazardous chemicals to be stored in low permeability, bunded compounds. These areas must comply with *AS 1940-2004 The Storage and Handling of Flammable and Combustible Liquids*.

7.0 HYDROCARBON STORAGE

All hazardous substances shall have a form of secondary containment and where possible be stored in bunded compounds with low permeability in compliance with AS/NZ standards, such as AS 1940-2004 The Storage and Handling of Flammable and Combustible Liquids. Provision shall be made to contain any leakage or spillage from the tank storage facility and to prevent it from contaminating the surrounding soil or from entering any watercourse or water drainage system for quantities greater than 200L.

7.1.1 Bulk Storage Facilities

All bulk oil, waste oil, grease, coolants etc are to be stored in impermeable fully bunded areas with the minimum secondary containment capacity for the substance class. The net capacity of a compound shall be at least 110% of the capacity of the largest tank or 25% of the total capacity of all tanks within the bund whichever is the greater. If two or more tanks are operated as a single unit, then the capacity of all such tanks shall be used when calculating the capacity of the compound. Where this requirement is not able to be met, the Macraes Operation shall detail additional controls in applicable operational plans, outlining appropriate protection for workers and the environment, that complies with the relevant national and local legislation. Bulk storage areas have location compliance certificates. Re-certification is required if the container system is repaired, altered, relocated or there is a change in the containers contents.

7.1.2 Open Pit Workshop

The open pit workshop has four 10,000L oil storage tanks which are fully bunded. Grease drums and coolant are also stored within this bund. There is one 50,000L waste oil storage tank that is used for heating the workshop. There is also a container at the front of the workshop which can hold up to 24 IBC's of oil (equivalent to 24,000L). This container is never full as it is a backup storage in case the workshop runs out of oil in the main tanks. The container has been modified to form a bund.

7.1.3 Underground Workshop

The underground workshop has five double skinned oil tanks totalling 30,000L, stored in a container. Waste oil at the underground workshop is stored in a 5,000L tank, with additional IBC's available as necessary. This tank is fully bunded and coolant and drums of grease are also stored in this location. There is no permanent storage of diesel at the underground workshop.

7.1.4 Processing Plant

The processing plant manages a number of hazardous substances including hydrocarbons, as such the majority of the ground at the processing plant is concrete, or asphalt sealed with in-ground or above ground bunding.

The main storage areas within the processing plant are a double skinned 20,000L Kerosene (Exxsol D40) Tank, and a double skinned diesel generator tank with a maximum capacity of 2,500L. There are up to 80 x 209L waste oil drums stored on site at a time, these are kept in a small bunded area while awaiting removal for disposal; drum numbers often exceed the capacity of this area. There are two containers used as storage for oil used at the plant, these containers are not bunded and cannot currently be closed/sealed. The risks from these non or inadequately bunded areas are currently managed through the Process Plant sump, which acts as a secondary containment area, capturing all surface water and runoff from the processing plant, including any spill from outside a bunded location.

7.1.5 Site Wide

There are multiple double skinned, above ground diesel storage tanks located across the site, used for refuelling vehicles and machinery, refer to appendix 2 showing Diesel tank locations. Where possible bunds and V-drains are cut to aid in the recovery of liquids, spill containment and the prevention of seepage to waterways.

These fuel farms are mobile and are moved around site as pit mining locations change over time.

7.2 Miscellaneous Storage

There are numerous smaller miscellaneous products such as petrol, open oil, kerosene etc, across site which are all stored in bunded containers or hazardous substances sheds. Any small mobile tankers are to be kept in bunded locations. Jerry cans in use are to be kept away from receiving environments and open waterways. They are also to be kept in good condition.

7.3 Storage Maintenance

All storage facilities such as fuel farms and stationary tanks are routinely inspected and maintained regularly to ensure they are structurally sound and in working order. Ad-hoc maintenance tasks are also completed as necessary and tracked through standard hazard reporting and Pronto maintenance systems.

Storage vessels for large volumes of hazardous substances are required to be certified and inspected annually by an external provider and have labels identifying the hazardous substance visible.

Multiple stationary containers across site require location compliance certificates to certify that the tank and associated equipment is safe and complies with applicable legislation and rules. If the container system is repaired, altered, relocated or there is a change in the contents it needs to be recertified.

8.0 HANDLING HYDROCARBONS

Hydrocarbons should be handled with care and per relevant SOP’s, MAC-380-PRO-036 and MAC-380-PRO-052 to prevent the risk of any spillage.

When refuelling, operators maintain constant observation of the fuel lines to minimise the occurrence of spillages. Dispensing pump nozzles contain automatic shut-off valves (tripped by pressure) as a precautionary measure to reduce the likelihood of overfilling. All fuel and oil dispensers are also required to be fitted with non-return valves in accordance with land use consent WDC 201.2016.779 condition 17. These include conventional fuelling nozzles for light vehicles and Wiggins breathers for heavy underground vehicles.

Refuelling using mobile equipment or jerry cans is to be undertaken where possible on level locations where there is bunding or V-drains to allow for spill captures. No refuelling is to occur within 5 meters of any open water such as streams, or ponds etc. Fuel containers are not to be left unattended across site.

Spills can be controlled by immediately shutting down the source of a leak and kits are available in heavy vehicles, and adjacent to refuelling facilities to contain spills. Spill response procedures (MAC-209-PRO-014) should be followed.

9.0 TREATMENT

The open pit workshop has a three-tiered submerged drawdown baffle tank which provides treatment to surface water runoff from the workshop, and the truck and light vehicle wash pads. This baffle tank is proposed for upgrade in 2024. Sediments accumulated in the baffle tanks are emptied as necessary by Skevington's vaccum trucks at the request of OceanaGold staff and removed from site for disposal at an approved hydrocarbon disposal facility.

The underground workshop wash pad has a proprietary oil/water separator system for treating water from the vehicle wash facilities. The waste/wash water is transferred to the inlet of the separator via a floating weir suction skimmer located in the pump well and pumped via a 20 m3/hr progressing cavity pump. The oil exiting the separator is stored in three 1m^3 IBC containers which are stored within a bunded area. Sludge and sediments are removed by Skevington's contractors as necessary at the request of OceanaGold staff for off-site disposal at an approved hydrocarbon disposal facility. Surface runoff collected in sumps from the general underground workshop area and offices uphill of the treatment system is directed into the separator for treatment. Treated wastewater discharging from the separator is discharged to the Mixed Tailings Impoundment under RM20.089.01.

10.0 HYDROCARBON WASTE

Disposal of hydrocarbons and hydrocarbon containing substances shall be in accordance with regulations and directions given on the Safety Data Sheet (SDS) for the substance. The methods shall also be consistent with Local Authority waste disposal practices and the EPA Hazardous Substances Disposal Notice 2017.

All contractors and waste disposal facilities used by Macraes must ensure their transport, storage and disposal methods and facilities are designed and operated in a fashion that is protective of human health and the environment. New waste service providers must be approved by the Environmental department to ensure adherence to relevant legislation, practises and corporate standards. Audits of used oil, waste grease, oil filter and oil rag processors and recyclers to ensure correct standards of transport, storage and processing are met before they are contracted to receive hydrocarbon waste. Further details can be found in the Waste Management Plan (MAC-206-PLN-002).

10.1 Liquid Waste

All bulk hydrocarbons and hydrocarbon contaminated waste is stored in appropriate bunded tanks and containers while awaiting collection and disposal. Waste oil is re-used on site for heat generation, there are four burners across site. The waste oil fired heater OWH-500 at the Core Shed, and two Clean Burn CB-5000's and one CB-550-CE 5W at the open pit workshop. These areas are properly ventilated, and the burners are registered on the WorkSafe clean burn register. Excess waste oils and other hydrocarbon liquid wastes are collected from their designated storage areas.

10.2 Solid Waste

Bins containing hydrocarbon contaminated materials (crushed oil filters / hoses / pads / booms / rags and contaminated soils or other material) are collected and emptied into the Hydrocarbon waste container at the front of the Open Pit workshop prior to removal from site for disposal.

10.3 Contaminated water, sumps and sludges

There are no consents held for the disposal of sump or sludge material on site.

Sumps typically contain water, fine sediments, and contaminants from activities within the immediate catchment area. Contaminants commonly mobilised into sumps are from activities such as the washing down of machinery at vehicle wash bays, washing of machinery parts, hosing down workshop floors, rainwater build up in bunded areas and any leaks or spills.

OGL workshops and processing plant have drainage systems which connect to sumps, baffle tanks or oil water separators providing primary sediment capture and treatment to surface water. All areas require regular maintenance and cleaning out with vacuum trucks, or other mechanical means to ensure functionality of the systems. Removed accumulated sediments are then disposed of in line with their contaminant levels following sampling to assess acceptance criteria. Some sumps at the processing plant are able to be processed through the plant.

Macraes Environmental Department assists across site with sampling, interpretation of results and advice in appropriate disposal options.

10.4 Recording & Management

Each department within the Macraes site manages their hydrocarbon waste independently. Where hydrocarbon products are being sent for off-site disposal collection dockets and or disposal certificates are to be supplied by the contractor or disposal agency to their key OGL representative and the environmental department administration.

These are used for recording, audits and annual sustainability reporting and are filed on the GL Network under I:\Enviro&Community\1.0 Consents, Permits & Reporting\1.3 Reports\1.3.6 Sustainability Reporting\ [YEAR] \Hazardous Waste\ [CONTRACTOR or FACILITY] \Disposal Certificates.

Table 1: Departmental hydrocarbon waste contractors and disposal facilities

Contractor	OGL Contact	Waste Type	Location
Prime Environmental	Processing Plant & Enviro Department	Drums of used grease	Underground, Processing Plant

	Processing Plant & Enviro Department	Drums of waste oil	Underground, Processing Plant
Waste Management	Department Workshop	Waste Oil	Underground Workshop, Open Pit Workshop
Whitestone Contracting Limited & Waste Management	Enviro Department Stores for transport via Mainfreight	Hydrocarbon contaminated waste	Open Pit Workshop, Underground Workshops & Open pit contaminated material
Skevington Contracting Limited	Department Workshop & Enviro Department	Sump contaminated material	Site Wide

11.0 SPILL MANAGEMENT

The management of hydrocarbon spills is detailed in the Standard Operating Procedure - Hydrocarbon Spill Response (MAC-209-PRO-014) and the Standard Operating Procedure - Trigger Action Response Plans (TARPs) (MAC-253-TRP-003). Key response points are summarised below.

Spills not considered emergencies are to be responded to by following the 5 basic steps of **Control, Contain, Clean-up, Dispose and Report.** All staff are instructed in these steps and procedures for spill clean-up and appropriate disposal in the General site Induction. Spill response training for specific roles is undertaken by relevant departments in conjunction with the environmental and Emergency Response Team.

Emergency procedures under the Trigger Action Response Plans (MAC-253-TRP-003) are to be initiated if there is a likelihood of human hazard, the spill entering drains, or streams or the leaking of bulk storage facilities.

11.1 Spill Kits

All work areas where hydrocarbons are routinely used have clearly identifiable spill kits which display basic clean-up instructions on the inside lid and the types and quantities of products to be maintained (e.g. socks, pillows, pads, and drain mats etc). It is the responsibility of each department/contractor to keep their spill kits relevant, up to date and restocked. The Environmental Department will conduct random checks in line with industrial inspections to ensure spill kits are adequately stocked. Records of these inspections will be logged in INX.

Spill response equipment is also to be carried by vehicles which transport fuel or store hazardous substances such as service carts, maintenance vehicles. Stores hold a moderate level of inventory for re-stocking spill kits and bulk supplies can be obtained at short notice from NZ Safety Blackwoods for very large spills.

The emergency response team also holds a skimmer for removing hydrocarbon from surface water bodies.

11.2 Reporting of Spills

All spill reporting is through INX InControl as an environmental event and is to include the following details:

- Date, time, and location of the spill
- Name of and estimated volume of the spilt material,
- The cause / events leading to the spill,
- Actions taken to control, clean up and dispose of the spilt material and associated contamination.
- Did the spill reach any natural areas waterways etc?
- photos to document the event and clean up (post clean up photos are also necessary).
- Any measures to be implemented to prevent a reoccurrence.

These details are also in the Standard Operating Procedure - Hydrocarbon Spill Response (MAC-209-PRO-014)

For spills over 20L, supervisors and the environmental department must be informed as soon as practical, and an InControl report completed that day. Timely reporting to supervisors, the environmental department, and through InControl ensures appropriate action and timely notification to regulatory authorities in line with resource consent conditions where applicable.

Table 2: Hydrocarbon spill scaling, required action response & additional notifications.

Scale	Criteria	Notification action	Action Response
Small spill	Cleaned up by one person and a hand shovel.	• INX entry.	• Containment of spills using spill kits • Contaminated soils /peat or absorbent litter to be collected and deposited into identified IBC. • All spill events 20L and greater, must be logged in INX before the end of shift as an **Environment event**. Please include an estimate of the volume and nature of the discharged hydrocarbon and a good description of the situation – photos are helpful and are required for medium spills.
Medium spill	Clean up by two or more people or by mechanical means. Contaminated material would fill only 1 IBC	• Emergency Response team notified. • INX entry.	• As above and • Medium spills required a call to Emergency Response team as they may need to organise more spill kit material or provide support
Large spill	Mechanical means for clean-up.	• Emergency Response team called. • Environment Manager or superintendent	• The spill should be contained using a spill kit with the support of the Emergency Response Team • Otago Vacuum services should be called to suck up liquid and dispose of at an authorised facility. • Contaminated soils should be collected and deposited into a skip or shipping container. One may need to be sourced from Whitestone Contracting for this scale of spill.

	ER team called to support containment and clean-up. Environment Manager called for Regional Council response and management.	called. • INX Entry.	• All spills should be logged in INX as an **Environment event** with an estimate of the volume of discharged hydrocarbon and there should be photos taken to document the clean-up if possible, or at minimum post clean-up • Environmental Manager or environmental superintendent must be contacted in any large spill event to ensure notification to the Otago Regional Council within 24 hours of the discharge event.

11.3 Contaminated Soil

No consents are held by the company authorising the discharge or disposal of hydrocarbons to the environment or anywhere on site at Macraes.

All hydrocarbon contaminated soil and clean up materials are to be stored within identified hydrocarbon bins or IBC's until the material is collected from site by contractors for disposal at an appropriate and approved facility.

Details relating to the disposal of contaminated soils are detailed in Section 10.0 Hydrocarbon waste Collection, Section 11.2 Reporting of Spills, in the spill response SOP, and in the waste management plan (MAC-206-PLN-002). For large scale spills temporary containment via earthworks may be required, with vacuum trucks and disposal containers brought onto site as needed for the clean-up.

12.0 MONITORING & MEASUREMENT

All areas of hydrocarbon storage and/or use, including contractor facilities, must be routinely inspected to verify that hydrocarbon management complies with this plan and ensure that housekeeping of hydrocarbon products and storage tanks and containers is of a high standard.

The Environment department inspect all Macraes industrial operational areas, including hydrocarbon use, storage and waste management as part of a scheduled inspection regime, occurring quarterly.

Other OGNZL inspections or supervision that include areas of hydrocarbon storage or use are:

- Department inspections
- Management Inspections.
- Inspection and drainage of diesel storage facilities.
- Task observations

OGNZL personnel conduct periodic inspections of contractors involved in the transport and disposal of hydrocarbon materials to ensure they are complying with relevant corporate standards and legal requirements. The following information will be requested from companies that transport hydrocarbon products:

- Dangerous goods licences and evidence that their drivers are appropriately trained.
- Environmental Policy that demonstrates their commitment to environmental management.

- Copy of procedures and/or management plans on request covering: Emergencies, incident and accident reporting and spill management.

12.1 Hydrocarbon Accounting System and Sustainability Reporting

Individual departments are responsible for maintaining their own records in relation to hydrocarbon balances across site. The following records are to be kept as a minimum:

- Balance of hydrocarbon products in bulk storage facilities (Stores - monthly)
- Volume booked out of store (for contractors, amount bought to site) (Stores - as & when);
- Waste volumes in storage (Stores - as & when);
- Waste volumes shipped off site (Stores - as & when);
- Losses as spillage (Incident Database/INX); and
- Incident reference for spillages (Incident Database/INX).

Hydrocarbon balances are used for the site's hydrocarbon accounting and sustainability reporting. Hydrocarbons used on site, removed from site as waste, and hydrocarbon spills greater than 20 litres are reported in OGC's annual Sustainability Report in accordance with the Global Reporting Initiative (GRI) standards. All data provided in the report is externally assured. The following hydrocarbon data must be provided for external assurance during annual reporting:

KPI	GRI/G4 Indicator	Description	Data to be collected	Units	Data retrieved from
Energy Consumption	302(1)	Report direct energy consumption by primary energy source. Direct energy consumption relates to energy that is consumed within the site boundary.	Diesel fuel	Litres	Fuel supplier (BP)
			Petroleum fuel	Litres	Fuel supplier (BP)
			LPG	Litres	Fuel supplier (BP and Rockgas)
Effluents and waste	306(3)	For spills that were reported in the organization's financial statements.	Spill details	Number of spills	InControl event reports
Hazardous waste	306(4)	Report on transport and treatment of hazardous waste. Specify in how this was treated and where it was transported.	Waste oil	Litres	Waste contractor reports (WPC)
			Waste oil (oily water)	Litres	Waste contractor reports (Waste Management)
			Solid contaminated oil	Litres	Waste contractor reports (Waste Management)

13.0 TRAINING

All employees, including contractors, are made aware of hydrocarbon management including spill response kits and procedures through inductions, toolbox meetings or, where applicable, as part of formal training connected to their job.

It is the responsibility of each supervisor to ensure that staff are knowledgeable in hydrocarbon management and are provided with the appropriate instruction and supervision.

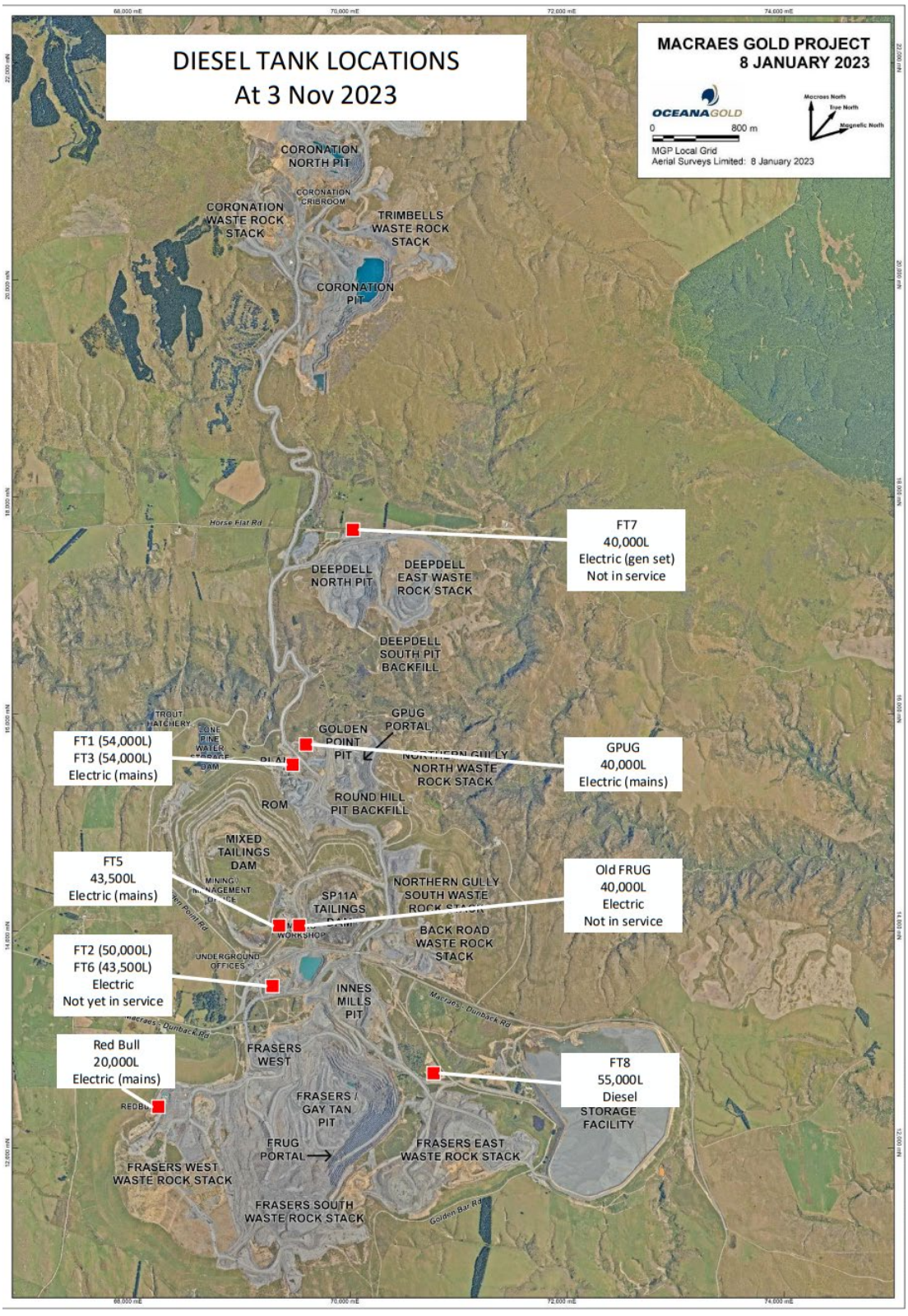
13.1 Emergency Response Team

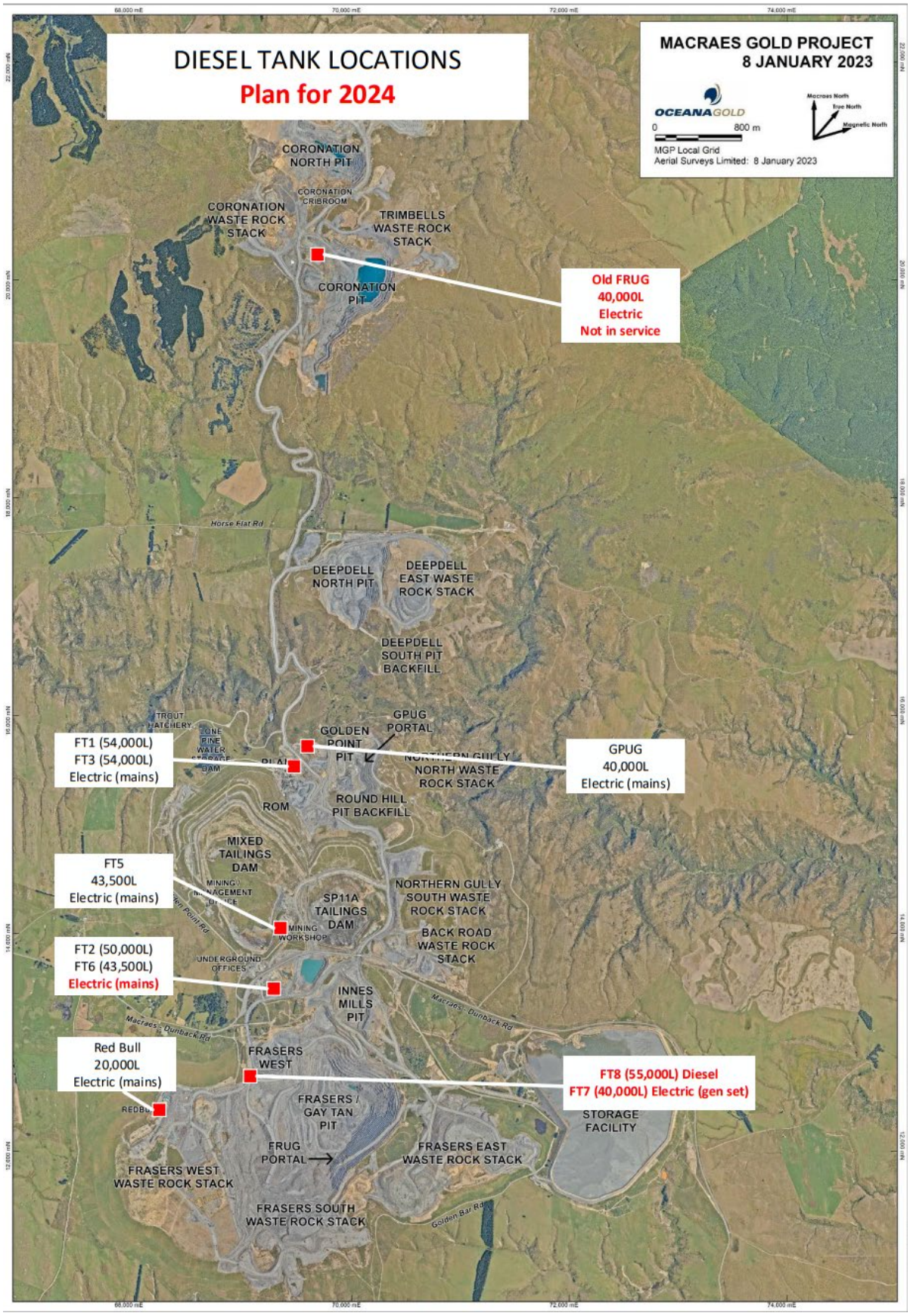
The Emergency Response Team is trained in chemical and hydrocarbon containment procedures (HazChem). This training utilises diverse containment and clean up procedures and includes trial callouts to emergency situations. The team can respond to significant spills, implementing safety procedures, containment, and clean-up.

APPENDIX A - OCEANAGOLD CORPORATE STANDARDS

	Minimum Standard	**Compliance**
8.1	Business Unit shall document systems and processes demonstrating how hydrocarbons are managed (Site)	Throughout.
8.2	Hydrocarbons must be stored and handle in accordance with a recognised standard e.g. AS1940 (or equivalent), including: - Storage facility and containment requirements - Operating procedures - Emergency planning and fire protection	Section 4.0 Section 5.0 Section 7.0 Section 8.0
8.3	Any leaks or spills shall be dealt with immediately and reported in accordance with Business Unit incident management procedures and external reporting requirements.(site)	Section 11.0
8.4	Third-party used oil recyclers, processors and transporters utilised by Business Units shall be appropriately certified and comply with all relevant regulatory requirements. (Site)	Section 10.0
8.5	Business Units shall conduct audits of used oil, waste grease, oil filter and oil rag processors and recyclers to ensure correct standards of transport, storage and processing are met before they are contracted to receive waste hydrocarbons. (Site)	Completed through contractor onboarding process. Section 10.0
8.6	Oils that contain PCB shall not be used by Business Units. (Sites)	N/A
8.7	Business Units shall establish a register of transformers known to contain PCB oils and develop a work program to remove the oil from the Business Unit. (site)	N/A
8.8	Used oil burned as fuel oil for heating or power generation shall be used in an approved designed boiler, furnace or an oil-fired space heater, and is to be properly vented to correctly and safely burn the oil. (Site)	Section 1.1
8.9	Disposal of hydrocarbon contaminated material shall be in accordance with local regulations. (Site)	Section 5.0 and section 10.0
8.10	Third Parties that collect and dispose of hydrocarbon affected material shall report waste category volumes to the Business Unit with the appropriate records. (Site)	Section 10.3

APPENDIX B – FUEL FARM LOCATION




DIESEL TANK LOCATIONS
Plan for 2024
MACRAES GOLD PROJECT
8 JANUARY 2023
OCEANAGOLD
0
800 m
MGP Local Grid
Aerial Surveys Limited: 8 January 2023
CORONATION NORTH PIT
CORONATION CRIBROOM
CORONATION WASTE ROCK STACK
TRIMBELLS WASTE ROCK STACK
CORONATION PIT
Old FRUG
40,000L
Electric
Not in service
Horse Flat Rd
DEEPDELL NORTH PIT
DEEPDELL EAST WASTE ROCK STACK
DEEPDELL SOUTH PIT BACKFILL
TROUT HATCHERY
GPUG PORTAL
GOLDEN POINT PIT
FT1 (54,000L)
FT3 (54,000L)
Electric (mains)
GPUG
40,000L
Electric (mains)
NORTHERN GULLY NORTH WASTE ROCK STACK
ROUND HILL PIT BACKFILL
ROM
MIXED TAILINGS DAM
FT5
43,500L
Electric (mains)
MINING MANAGEMENT OFFICE
SP11A TAILINGS DAM
NORTHERN GULLY SOUTH WASTE ROCK STACK
MINING WORKSHOP
BACK ROAD WASTE ROCK STACK
FT2 (50,000L)
FT6 (43,500L)
Electric (mains)
UNDERGROUND OFFICES
INNES MILLS PIT
Macraes - Dunback Rd
Red Bull
20,000L
Electric (mains)
FRASERS WEST
FT8 (55,000L) Diesel
FT7 (40,000L) Electric (gen set)
STORAGE FACILITY
FRASERS / GAY TAN PIT
FRUG PORTAL
FRASERS EAST WASTE ROCK STACK
FRASERS WEST WASTE ROCK STACK
FRASERS SOUTH WASTE ROCK STACK
Golden Bar Rd

APPENDIX C - HYDROCARBON STORAGE LOCATIONS PROCESSING PLANT

APPENDIX D – HYDROCARBON STORAGE LOCATION OPEN PIT WORKSHOP

APPENDIX E – HYDROCARBON STORAGE LOCATIONS UNDERGROUND OFFICES AND WORKSHOP