Attachment 2

Description of the Project and the Activities

Project Description & Activities

1. Overview

The Project is referred to as the Whiterock Quarry and Managed Fill. The landowner of the Project site and FTAA referral Applicant is Whiterock Lime Limited.

The Project site is located at 150, 154 and 174 Quarry Road, Loburn, in Canterbury. Currently on site there is a lime quarry and processing operation, this has operated continuously since the 1940's.

The Applicant is proposing to construct and operate a Class 3 Managed Fill facility, utilising the existing quarry pit area on site. Overburden quarrying and limestone extraction will continue to shape the managed fill floor and sides within 150 Quarry Road and part of 174 Quarry Road.

2. Access, Security and Hours of Operation

The site is accessed from a single point off Quarry Road via a legal road which extends from Quarry Road up to the Karetu River.

Access to the site will remain from the existing public access road off Quarry Road. The Project includes installing a 23 m single span bridge for vehicular access to the site, to replace the current ford river crossing access through the Karetu River. The design will ensure that a 5% Annual Exceedance Probability (AEP) flood event does not cause any increase in upstream water levels while the soffit will be higher than the top of the riverbanks and be at least 1000 mm above the 5% AEP flood level (with climate change).

Security fencing in the form of a deer type fence will be installed around the entire site with a locked gate for access to the site.

Operating hours of the site will be 0700 to 1900 hours (hrs) Monday to Saturday (excluding public holidays). As part of the quarrying and lime processing activities, a rotary kiln will operate for 8 hrs per day between 0800 to 1600 hrs.

The site is to be locked outside of operating hours preventing access to the site and security cameras maintained to monitor the site for any attempts or successful unauthorised access.

3. Lime Extraction and Processing

The lime handling and processing includes screening, crushing and drying via a diesel fired onsite rotary kiln. The lime is primarily for use in the agriculture industry (AgLime). Bulk hard lime rock may be taken off site unprocessed.

The quarrying activity and handing of materials at the site will continue over a duration of approximately 10 years during the staged development of the managed fill facility.

4. Managed Fill Capacity, Staging and Lifespan

The proposed managed fill site occupies a total area of approximately 5.3 hectares, based on a 1V:3H (max.) batter plan and 1V:20 (max.) top of fill profile. The lined managed fill area (i.e., waste materials placement footprint) is approximately 4.0 hectares. This design allows for stability of the managed fill. The managed fill will provide a nominal usable airspace of approximately 500,000 cubic metres. The proposed development of the managed fill site is segmented into two stages with a total of seven development steps, as shown in Figure 1 and briefly described as follows:

1. **Stage 1 Subgrade Preparation:** Initial earthworks to prepare the managed fill subgrade
2. **Base Liner Installation for Stage 1:** Construction of the Stage 1 managed fill liner system
3. **Stage 1 Waste Filling and Stage 2 Subgrade Preparation:** Concurrent waste deposition in Stage 1 and earthworks for construction of Stage 2 subgrade

4 **Stage 1 Intermediate Cover & Stage 2 Base Liner Installation:** Implementing intermediate cover for Stage 1 while constructing the managed fill liner for Stage 2

5 **Stage 1 Final Capping & Stage 2 Intermediate Cover and Waste Filling:** Constructing the final cap for Stage 1 while progressing with waste filling and intermediate cover in Stage 2

6 **Final Capping for Stage 1 & Intermediate Cover for Stage 2:** Finalising the capping of Stage 1 and continue interim capping for Stage 2

7 **Final Capping for Stage 2:** Completion of the final capping for Stage 2

The development steps, while indicative and based on standard managed fill development practices, remain flexible and may adapt to operational requirements and adaption to evolving market and waste volume conditions.

The maximum waste thickness within the final landform will be approximately 25 m. A cross section of the managed fill form in relation to existing ground level is depicted in Figure 2.

The managed fill activity is proposed to commence at the site upon completion of constructing the first stage liner of the managed fill (development step 2 above), and is anticipated to operate for a period of approximately 20 years depending on disposal demand and availability of managed fill capacity.

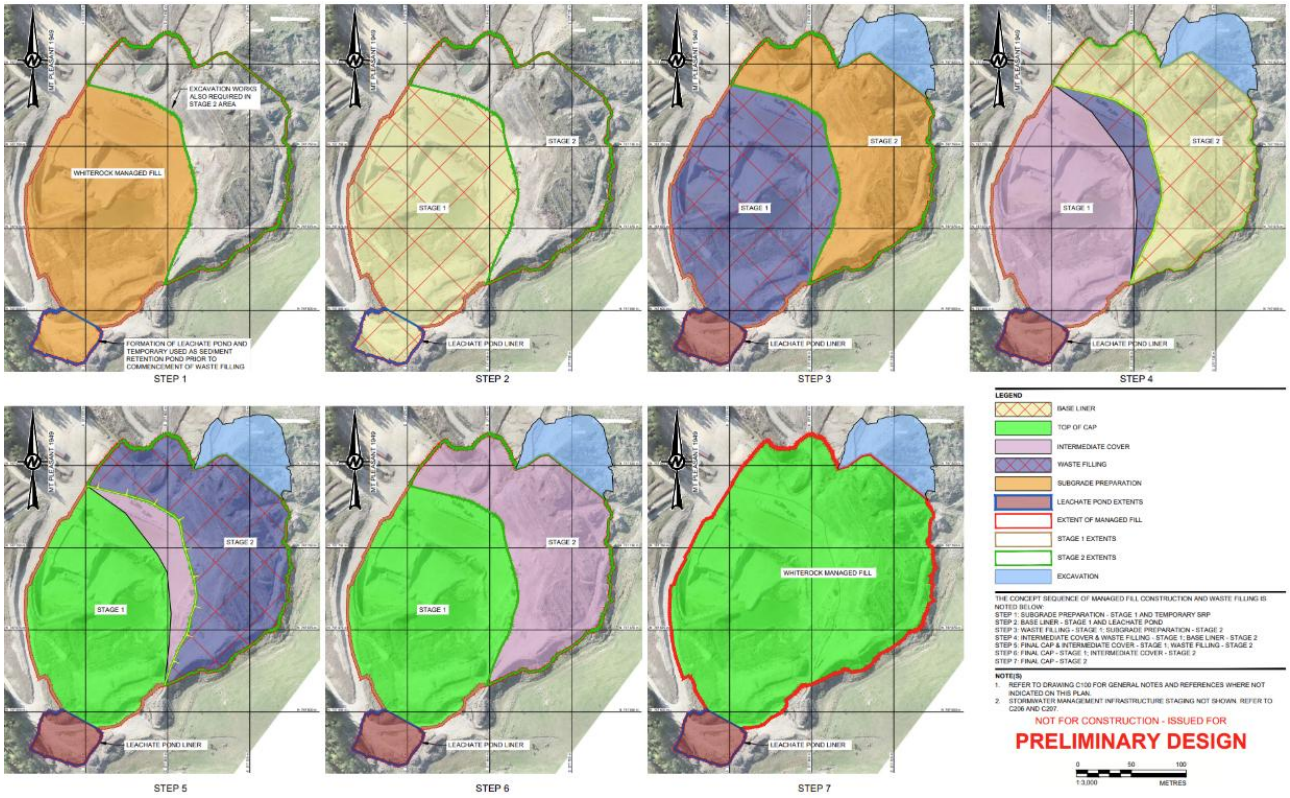


Figure 1. Concept sequence of construction, waste filling and rehabilitation (Source: WSP Preliminary Design Drawings)

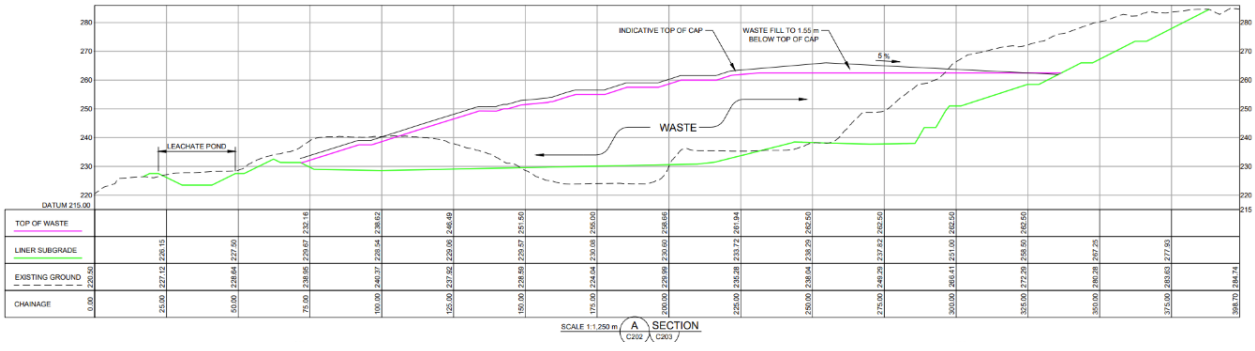


Figure 2. Landfill cross section (Source: WSP Preliminary Design Drawings)

5. Managed Fill Waste Acceptance

A specific and suitable Waste Acceptance Criteria (WAC) has been developed for the proposed Class 3 Managed Fill facility. The WAC outlines the types of materials that can be disposed of at the site, including selected inert construction and demolition (C&D) materials, specific inert materials (e.g. asbestos and cured asphalt impacted by coal tar binders), contaminated soil (CS) material, and cleanfill.

Procedures for the handing and placement of waste will be within a Whiterock Quarry and Managed Fill Site Management Plan (SMP).

The WAC will be fixed and cannot be amended without going through a resource consent process. However, the operation will be able to still exclude any emerging contaminants from acceptance.

The managed fill site will be available to both the operators and accredited external users. Waste acceptance will occur using a Waste Disposal Permit (WDP) system that is initiated prior to any waste arrival and this applies to WLL and approved external users. This system includes:

- All external waste generators must have a contract with WLL.
- All waste haulers must be approved, and fully inducted, before entering the site.
- All waste from contaminated sites must be certified as complying with the WAC by a Suitably Qualified and Experienced Person (SQEP).
- Every batch of waste must be approved before being dispatched from its source.
- Every load must be prebooked in advance and must be accompanied by a WLL manifest.

External users will require accreditation prior to transport to and disposal of waste at the site.

6. Vehicle Movements

Vehicle movements day associated with the Project will be a mix of heavy vehicle and light vehicle activity. Heavy vehicle movements will primarily consist of:

- truck and trailer units transporting lime product and managed fill
- service trucks associated with site operations.

Light vehicle movements will comprise staff travel to and from the site and servicing, inspection and operational support visits.

On an average day of operation, overall traffic generation is expected to be modest, comprising a combination of heavy and light vehicle movements associated with both quarrying and managed fill activities. Movements will vary depending on operational demand, stage of quarry development, and managed fill intake volumes.

7. Managed Fill Liner and Cap Design

The design of the Managed Fill liner has been based on the Class 1 Landfill standard liner design of WasteMINZ[1] (Section 5, Figure 5-2, Class 1-Type 1).

The liner comprises (bottom to top): liner subgrade (limestone, greensand or compacted structural fill); 600 mm of compacted cohesive soil; high-density polyethylene (HDPE) geomembrane textured on both sides, Cushion geotextile to be placed above the geomembrane, drainage aggregate and separation geotextile placed above the drainage aggregate.

[1] Technical Guidelines for Disposal to Land (Revision 3.1) Waste Management Institute New Zealand (WasteMINZ) September 2023

Contaminated soil or other suitable fine-grained waste is to be placed above the separation geotextile, to a minimum of 500 mm thickness. This is to ensure protection of the liner and leachate collection system from any large objects within the waste.

The final landfill cap aims to limit water ingress and to rehabilitate the landfill surface for its end use. The key element includes a minimum 600 mm low permeable layer of cohesive soil (<10-9 m/s) that is to be obtained from existing extracted overburden stored on site and further overburden extraction to shape the managed fill sides.

The composition of the floor liner and cap is depicted in Figure 3 and Figure 4 respectively.

Two other liner types will be used to account for the slope of the subgrade design. A batter liner will be used for areas sloped 3H:1V and a wall liner for steeply sloping walls (1H:1.75V). Both of these liner types include a 1.5 mm HDPE geomembrane.

The detailed design of the Managed Fill base liner (comprising floor liner, batter liner and wall liner) will include a technical specification that sets out material and construction requirements along with requirements for a quality assurance and quality control program for the liner foundation, liner and leachate collection system.

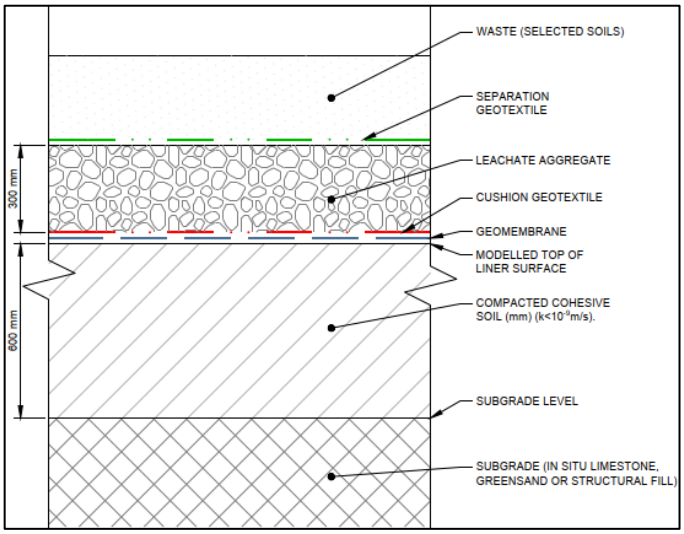


Figure 3. Floor liner typical detail

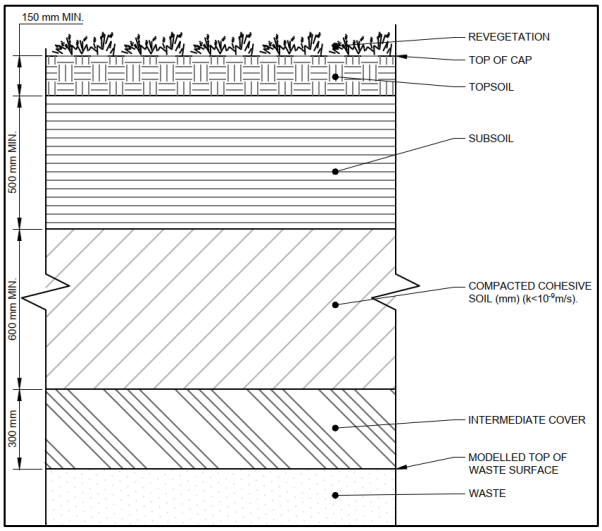


Figure 4. Capping Layer typical detail

As part of the RMA application process, a review of the proposed design was provided as part of the Canterbury Regional Council (CRC) s42a report. A summary of the matters raised in the s42a report, and a summary of the primary concerns raised, and the mitigations proposed is provided in Table 1.

Table 1. Summary of s42A managed fill design issues raised and mitigations proposed

Theme	Issue raised	Mitigation measures
Liner and barrier integrity, performance and durability	Low service life of polyurea membrane. Potential breakdown products of polyurea. Wall liner does not include composite liner as required by WasteMINZ for class 1 liner.	Remove use of polyurea membrane. Replace in wall liner with Geosynthetic Clay liner (GCL) such that the wall liner comprises a composite Geomembrane/GCL liner. The primary intent of this change is to address concerns that the polyurea membrane will have low service life. Wall liner design includes groundwater under drainage below the shotcrete layer.
	Design is not clear if compacted cohesive soil permeability testing	Clarification added that compacted cohesive soil permeability testing must

Theme	Issue raised	Mitigation measures
	should be completed with sample recovered from field compaction rather than laboratory re compacted sample.	be performed on field-compacted sample.
	A robust construction quality assurance (CQA) program for liner construction. Electrical liner integrity survey should be included as part of CQA process.	CQA program included for geosynthetic liner, compacted cohesive soil and foundation construction with full time independent CQA monitoring and reporting on these construction activities. Liner integrity survey included as part of CQA requirements.
Geotechnical/Geological hazards	Management of karstic features if present.	If karstic features are identified during site preparation, replacement with engineered fill or grouting should be implemented. Treatment measures are, however, to be determined by suitably qualified and experienced engineering geologist or geotechnical engineer.
	Potential wall instability.	Rock wall areas are very limited. Wall stabilising measures are to be implemented if required by geotechnical assessment during detailed design stage.
	Need for cap subsoil drainage for capping layer veneer stability.	Cap subsoil drainage required for adequate cap veneer stability in sloping areas. Thickness of cap over subsoil drainage may need to be increased over subsoil drainage pipes if determined required in detailed design.
Leachate Drainage performance and durability	Leachate drainage from stage 2 area is reliant on Stage 1 sump with long leachate flow path length from the stage 2 area.	Amendments to Sump 2 to reduce reliance on Stage 1 sump and shorten leachate flow path length from Stage 2 area. Overspill pipe between Stage 1 and Stage 2 included to add contingency flow path for leachate from stage 2 area.
Groundwater Drainage System long term performance	Long term performance of groundwater underdrainage system may require inspection and maintenance accessibility.	Inspection access points for groundwater underdrainage system added to facilitate periodic inspection and cleanout activities.

8. Groundwater Management

Groundwater levels that will rise due to backfilling of the existing quarry pit pond will be controlled to maintain at least 1.0 m separation from the geomembrane floor liner using an underdrainage system. This will avoid

groundwater pressure build up at the bottom of the liner, groundwater seepage coming into contact with managed fill material and increasing leachate volumes while preventing decline in liner integrity.

Initially a site dewatering activity to take and discharge a higher rate of the shallow groundwater to construct the underdrainage system will be required.

Groundwater collected (via gravity) by the underdrainage system will be discharged onto land where it will ultimately drain into the shallow groundwater near the Karetu River or follow a flow path to the Karetu River. This discharge and informal drainage area and flow path will be planted with wet tolerant indigenous species.

9. Leachate Management

The leachate collection system design is to be consistent with the requirements for Class 1 and 2 landfills given in the WasteMINZ (2023) Technical Guidelines for Disposal to Land (WasteMINZ Guidelines) and exceeds the Class 3 Managed Fill requirements which do not require leachate collection.

Perforated HDPE leachate collection pipes in the floor liner will be installed within a drainage blanket. Due to slope steepness of cell wall areas (1.75H:1V) a drainage blanket is not required in these areas. Collected leachate will drain via gravity flow to internal managed fill sumps and into the leachate pond prior to disposal.

The leachate pond will have a primary and secondary geomembrane liner with a geonet leakage detector between the double lining. The system will have a leak detection system to detect seepage through the primary geomembrane liner (top geomembrane) and will limit potential leachate head buildup on, and therefore leakage through, the secondary liner. The leachate pond will have a minimum capacity of 800 m^3. Additional contingency storage will be available in occasional events.

Leachate will be pumped from the leachate pond to a leachate loading area with buffer tank and trucked offsite to an appropriate treatment facility. Some recirculation of leachate within the managed fill waste may occur if climatic and site conditions allow, provided this does not cause the leachate depth above the liner to exceed acceptable levels.

10. Liner Leakage Rate

Potential leachate leakage through the managed fill liner has been estimated using an analytical approach which incorporates aspects such as liner defects, wrinkles in the liner, and cases of both good and poor contact of the HDPE layer with the compacted cohesive soil liner.

11. Stormwater Management

A ‘toolbox’ and best practicable option approach is to be implemented for the operational stormwater management to the Plant and Operations area. Source control is considered as the most beneficial means of stormwater and sediment management.

The proposed stormwater management recommendations for the quarrying and associated earthworks to develop the managed fill will mainly utilise Environment Canterbury’s online Erosion and Sediment Control Toolbox (ESCT) and will meet the main objectives outlined in the WasteMINZ Guidelines.

The stormwater management of the managed fill will adhere to the WasteMINZ Guidelines and utilise the ESCT for sediment retention pond (SRP) sizing and function. Design resilience has also been added due to the SRPs long-term use. Monitoring of the discharges and receiving environment is proposed.

12. Water Supply for Dust Suppression

Water is required on the Whiterock site for dust suppression during managed filling activities. It is estimated that the area which will require dust suppression during filling will be 1.4 ha, which includes the following areas:

- Main haul roads: 200 m long x 10 m wide = 0.2 ha.
- Backfilling for managed fill floor with cohesive soils for Stage 1, assuming 25% of a total area of 2.7 ha would be the active waste-filling footprint at any time posing a dust risk: 0.7 ha.

– Active material storage (not stabilised *with polymer/grass) and ancillary earthworks areas: 0.5 ha.*

A water balance has been developed to estimate the volume of water required daily, and how much onsite water storage is required. Daily water demands were modelled for a representative period from 31 October 2005 to 31 August 2019.

The estimated the water demand for dust suppression would be up to 185 m^3/day if there would be no water supply deficit (i.e., water in storage would never be fully depleted) during the modelled period. However, if the water supply is limited to the permitted activity level (100 m^3/day), the site would require 400 m^3 water storage on site to provide sufficient water to suppress dust over 1.4 hectares

Alternative dust suppression methods (e.g., polymers or grass on stockpiled materials) could be considered to mitigate dust from other areas and lower the water requirement for dust suppression. Alternative water sourcing options in addition to groundwater abstraction (e.g., water carting). However, this may be difficult during dry periods when water restrictions are in place.

13. Design and Peer Review

The detailed design for each stage of the managed fill will be carried out under the direction of a suitably experienced Chartered Professional Engineer (CPEng) in landfill design. An independent peer review of the final designs for the staged managed fill construction will be carried out by a suitably qualified and experienced professional in landfill design.

14. Operational and Contingency Management Plans

The Project will operate in accordance with its approvals and a certified Site Management Plan (SMP). At times specified, the SMP will be updated and re-certified by the CRC and Waimakariri District Council. Certification by the local authorities will depend on:

– Compliance with the relevant technical guidelines for NZ (or any subsequent updates or replacement documents) for the relevant matters for each local authority.

– Confirming that the SMP is consistent with, and adequately gives effect to, the relevant conditions of consent.

Other proposed future operational Management Plans are to be developed to address performance standards set out in consents and specific mitigation conditions of consent. These are:

– A Construction Management Plan (CMP) that shows the sequence of construction events and quality control.

– Erosion and Sediment Control Plans (ESCPs) for each development step of the managed fill site will be prepared by a suitably qualified person with experience in erosion and sediment control and in accordance with recognised guidelines.

– A Principal Hazard Management Plan (PHMP) will be prepared and maintained during managed fill construction and operations to control and remediate any occurrences of unforeseen slope instability during excavation. This document will be compiled by a suitably qualified engineering geologist or geotechnical engineer familiar with the geological conditions of the site, likely failure mechanisms and the general managed fill excavation staging.

– A Fish Recovery and Release Plan (if required) for works in Karetu River (e.g. ford crossing removal). This is to be prepared by suitably qualified and experienced aquatic ecologist.

These other management plans are to be submitted to the relevant local authority for certification that they will achieve their purpose and relevant performance standards and conditions of consent.

15. Environmental Monitoring

The activities for the Project that require a high level of water related environmental monitoring include stormwater discharges, the solid waste discharge to land and unintended leachate leakage through the liner. Potential environmental effects include impacts on groundwater quality, groundwater flows to a wetland, surface water quality and aquatic ecological health. Figure 5 presents the water quality monitoring locations.

An environmental baseline establishment (in addition to that already undertaken) and ongoing monitoring programme will occur. This environmental monitoring is consistent with the WasteMINZ Guidelines requirements. A placeholder for cultural health monitoring has been included in the programme should this arise through the consent processing.

Trigger levels for environmental monitoring will be set and these are an environmental management tool whereby an exceedance of a trigger level initiates a tiered action and response protocol (TARP).

Generally, the actions and responses are resampling to confirm, site inspection, environmental significance assessment, remediation and on-going monitoring to confirm effectiveness of the response.

Due to the acceptance of Asbestos Containing Materials (ACM) at the managed fill site, routine monitoring will include analysis of asbestos fibres in air, with limits set in accordance with the NZ Health and Safety legislation.

As a managed fill facility which only accepts inert materials and soils, it is highly unlikely that deposited inert materials and contaminated soils will generate any Landfill Gas (LFG) or hydrogen sulphide. Therefore, and in accordance with the WasteMINZ Guidelines, there will not be any ongoing monitoring for LFG.

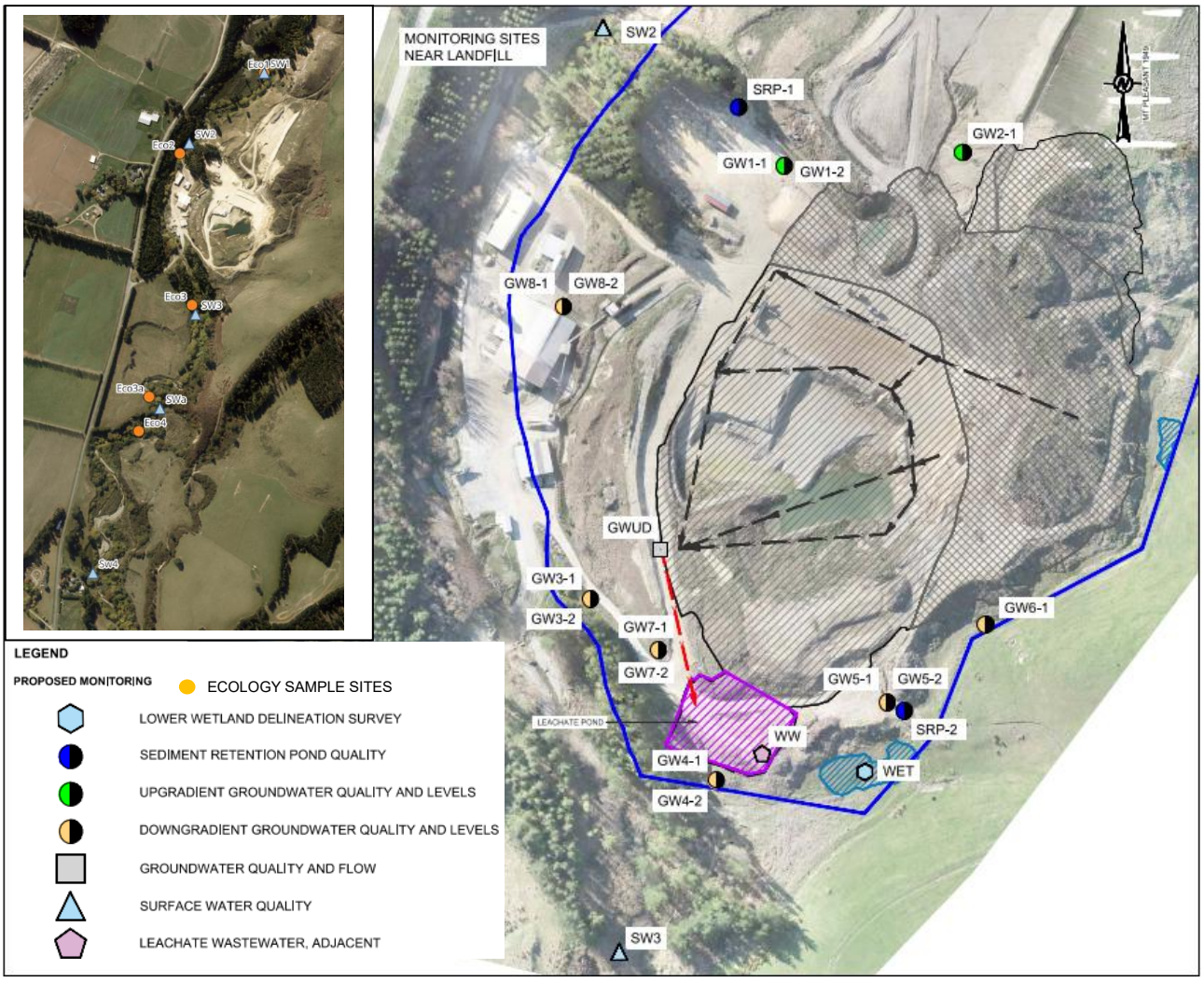


Figure 5. Water quality monitoring locations

16. Quarry Restoration, Managed Fill Closure and Aftercare

The managed fill activity will enable the restoration of the existing quarry void into the hill to achieve a more natural landform. The final managed fill form will be covered with a low permeability engineered cap consisting of the overburden material and topsoils, which will be contoured. Vegetation can either be tussocks or pasture for grazing consistent with the adjoining land use.

A Managed Fill Closure and Aftercare Plan will be prepared within 5 years of the managed fill operation commencing and updated every 5 years thereafter. This is to detail the activities required for closure of the managed fill site and during the aftercare period.

17. Wetland Restoration

The predicted effects of reduced baseflow to the lower wetland is not a reduction in total extent but a likely decrease in permanently wet habitat and a corresponding increase of intermittently wet habitat. This may result in a potential change of ecological values. This is restricted to the small number of indigenous plants within a 230 m^2 area of permanently wet habitat of the lower wetland. Applying the effects hierarchy, remediation is the most appropriate action, to enhance indigenous biodiversity values associated with the area of permanently wet habitat.

These actions can occur immediately because the Resource Management (National Environmental Standards for Freshwater) Regulations 2020 (NES:F) does not restrict or limit restoration actions as long as the work is encompassed within a Wetland Restoration Plan (consistent with Schedule 2 of NES:F). As such a Wetland Restoration Plan for both the lower and upper wetlands will be implemented to remediate potential effects and enhance values. Implementation of this will occur at the earliest possible time.

Remediation will involve careful control of all exotic wetland plants within the lower part of the upper wetland, ensuring no loss of indigenous species currently present. Following this the planting of suitable native wetland plants should occur with ongoing weed control to ensure high establishment success. Ideally seeds from existing plants or from wetlands nearby should be used for cultivating plants. Species recommended for planting include the following sedges: *Carex secta, C. geminata, C. virgata, C. maorica* and *Eleocharis acuta*. It is expected that if the 230 m^2 area of permanently wet habitat is remediated into indigenous dominant habitat, then the values will be more resilient to future changes in hydrology. Whilst some loss of obligate wetland plant values may occur over the duration of the Project, the effect of this is expected to be greatly reduced and be better than the current baseline degraded state.

Mingimingi appeared to be very common in 1970 and the impacts of wetland loss has almost resulted in local extinction of this species. For this reason, it was further recommended by the wetland expert that mingimingi, cabbage trees and other woody wetland species are planted around the margin of both wetlands. Greater benefits could be gained through planting a greater diversity of wetland plants potentially including kahikatea (*Dacrycarpus dacrydioides*), flax (*Phormium tenax*), toitoi (*Austroderia richardii*) potentially along with regionally rare species such as *Coprosma pedicillata*.

18. Management of the Significant Natural Area and Ecology

The operative and proposed district plans have mapped the same Significant Natural Area (SNA) on the property to the north being: (SNA V074) Shrubs and grasslands on cliffs and rock outcrops / (SNA 039) Whiterock Limestone Vegetation, respectively. This SNA is well outside the managed fill / quarry footprint and will be actively managed to improve the local lizard populations and indigenous vegetation.

For the purposes of achieving biodiversity and landscape enhancement across the site, a conservation covenant with the Department of Conservation is to be registered across the SNA.

Other stock proof fencing outside the secure managed fill facility will be installed to protect areas of ecology including the eastern watercourse and wetlands.

The riparian margin along the Karetu River, and the eastern watercourse along the boundary and the associated two small natural wetland areas, will be subject to restoration through indigenous planting and maintenance. Mass planting of suitable habitat (rank grass) for targeted lizard species is to occur in an identified area.

A Lizard Management Plan (LMP) for the capture, handling and relocation / release of lizards from the site to the SNA has already been approved by the Department of Conservation - Wildlife Authority reference 107310-FAU.

19. Anticipated Construction and Commencement and Completion Dates

The 23 m single span bridge over the Karetu River is made up of several prefabricated components. On- site construction of the piles and abutments and bridge assembly would commence once approvals have been obtained and the entire bridge would be completed within 6 to 8 weeks.

The construction of the Stage 1 Managed Fill subgrade preparation and liner installation and ancillary works including erosion and sediment control measures, upgrade of haulage roads would commence after the completion of the detailed design, the independent peer review, and certification by the local authorities. The certification process with local authorities is expected to take 1 month after commencement of approvals (if granted). The Stage 1 Managed Fill construction would be expected to commence shortly after the approvals are obtained and be completed within 6 months. Stage 2 Managed Fill subgrade and battering of side walls preparation is anticipated to commence concurrently with the Stage 1 waste deposition.