Roydon

Stormwater Management Plan

220 Jones Road

Templeton

Revision	Description	Prepared By	Checked By	Reviewed By	Approved by
1	Draft for comment	SE	RS	CLG	SE
2	Update following consultation	SE	RS	SE	SE
3	For Council Certification	SE	RS	SE	RS
4	Certified 15/3/2022	SE	RS	KWW	CRC

Initials	Name	Company
SE	Stuart Edwards	Fulton Hogan
CLG	Community Liaison Group	
RS	Richard Smith	Fulton Hogan
KWW	Kimberley Kovacs-Wilks	Ecan (CRC)
CRC	Canterbury Regional Council	

Next review due – Nov 2022 (following quarry operations starting)

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FULTON HOGAN GROUP POLICY | JUNE 2020

Environmental Policy

Protect our planet

It's the air we breathe, the water we drink, and land we enjoy. The environment we work in is the environment in which we live and play. We care for the planet, not only for ourselves, but also for future generations.

We will:

- Minimise our impact on the environmental footprint through innovation and being energy and resource efficient
- Always consider how to reduce, reuse and recycle
- Respect and care for our environment, encompassing diverse aspects including flora, fauna, water, community and cultural interests
- Work with our subcontractors and suppliers to help them meet our expectations
- Consider the environment when we design, plan and deliver our work
- Make proactive use of our environmental management systems
- Set measurable objectives and targets to ensure continual improvement

C W Bruyn
Managing Director

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1.0 INTRODUCTION

1.1 Background

Various resource consents (listed below) have been granted permitting the development and operation of the Roydon Quarry including CRC192412 to discharge stormwater into land in circumstances where contaminants may enter groundwater.

The development of the quarry will take place in a number of phases, comprising the following activities:

- Use of on-site material to create perimeter bunds, together with planting to establish boundary screening.
- Development of quarry pit area and initial extraction to develop a working pit.
- Construct site infrastructure such as site entrances, haul roads, establish processing plant and field conveyors, weighbridge, workshop, site offices and associated buildings
- Extraction of aggregate and
- Rehabilitation of worked out areas.

1.2 Document Purpose

This stormwater management plan (SWMP) has been developed to address key aspects of the management of stormwater at the site in order that all operations will be in accordance with the conditions of CRC192411 & CRC192412.

This SWMP is implemented alongside various other Management Plans (listed below) covering such matters as the management of dust and noise.

The Management Plans will be progressively expanded as the quarry development and operations proceed to subsequent phases and contains the following elements:

- site context and overview;
- receiving environment;
- stormwater management;
- auditing and conformance; and

- document review.

1.3 Overarching Stormwater Management & Design Philosophy

All stormwater controls implemented on site will be designed and managed to control the quality of stormwater runoff and ensures any potential adverse effects on the environment (including groundwater and the Christchurch International Airport (CIAL)) are minor or less than minor.

Construction phase stormwater control will be in accordance with best practice and incorporate, where appropriate, be consistent with ECAN Erosion & Sediment Control Toolbox for Canterbury guidelines.

Area	Primary Treatment
CPSA	As per road, roof and structures
Extraction area	Natural infiltration to ground – extraction floor is to slope
Cleanfill area	Natural infiltration to ground – fill levels managed to avoid ponding
Vehicle wash area	Specific consideration as below

The conceptual basis for the operational phase management of stormwater is to leave the existing pasture in place until extraction is underway in that area, and to capture stormwater wherever practicable for use in the irrigation of vegetation, dust suppression or vehicle washing. The designs put forward in this document generally have two options, attenuation to storage/recycling or to discharge to ground, after appropriate pre-treatment. The extent to which stormwater can be harvested on-site is dependent on the capital budget available for the quarry construction, and the physical constraints that may inhibit the full realisation of complete water recycling at the site.

1.4 Environmental Policy

Fulton Hogan is serious about its environmental obligations and seeks ongoing improvement in its environmental performance through ISO 14001 certified

environmental management system. Fulton Hogan's Environmental Policy is included as **Appendix 1**.

2.0 SITE CONTEXT AND OVERVIEW

2.1 Site Location

The site is located within a block of land bound by Curraghs Road, Dawsons Road, Maddisons Road, and Jones Road, and comprises an area of approximately 170 hectares, as shown on Figure 1. The site is located on the edge of the Selwyn District, with the opposite side of Dawsons Road being the western border of Christchurch City. The street addresses of the site are 107 Dawsons Road and 220 Jones Road.

2.2 Site Character and Proposed Activities

The existing site, comprised of multiple properties, is almost entirely used for pastoral grazing including sheep farming, whereas others serve as dairy support units for part of the year. Shelter belts exist along a number of the site boundaries including much of the northern boundary, part of the Dawsons Road boundary and along the entirety of the Curraghs Road boundary. Additional vegetation is located throughout the site, being of an exotic nature and for the most part located around existing dwellings on the property.

2.3 Surrounding Site Character

The surrounding area is generally rural in nature, although a number of indications of the Christchurch urban area are evident, including the site being within the noise contours associated with the Christchurch International Airport and close proximity to the Christchurch Southern Motorway. Templeton township lies approximately 700 m east of the site boundary.

Rural activities within the immediate vicinity include farming (both intensive and pastoral), horse training facilities and some forestry. These rural land uses often have a dwelling associated with them, including to the north and west along Maddisons and Curraghs Road. On Maddisons Road there is a Samadhi Buddhist Vihara facility and the Weedons NZCMA (Caravan Park) is located some 270 m west of the site at 286 Jones Road.

The neighbouring land to the east, adjacent to Dawsons Road is owned by Christchurch City Council and is in pasture. Fulton Hogan understands that the

Council's longer-term plans for this land may include playing fields, urban growth, greenspace and 60 ha proposed for a future cemetery. South of the site is a thin strip of berm between Jones Road and the Main South Line railway. To the south of the railway line, between Main South Road, is an industrial yard (Farm Chief, 10 Curraghs Road), a dwelling located at 1090 Main South Road and a small production woodlot.

2.4 Site Responsibility

The overall management of the site will be the responsibility of the Roydon Quarry Manager or delegated authority and will include:

- Ensuring compliance with relevant resource consents conditions;
- Communicating resource consent requirements to staff, contractors and all other relevant parties;
- Ensuring compliance with the SWMP and all other associated documents;
- Maintenance of the stormwater management devices.
- Investigating effectiveness of operating procedures and communicating if any changes need to be made;
- Implementation of inspection and maintenance activities;
- Holding records for any inspections and maintenance activities;
- Reviewing environmental incidents;
- Leading staff to ensure environmental responsibility is being practiced.

3.0 RECEIVING ENVIRONMENT

3.1 Geology and Soils

The Geological Map of New Zealand [1]identifies the geology of the site and the surrounding area as Holocene river deposits, comprising grey river alluvial gravels with minor sands, silts and clays beneath plains or low level terraces.

Information on the aggregate resource from existing quarries to the northeast and available bore log data (regional bores M36/0142 and M36/0202, site bores M26/0257 and BX23/0098)[2] indicates that high quality gravels exist to significant depths in this area. Bore logs from the available nearby well records show that the Springston Formation extends to around 15 to 16 m bgl and may be separated from the Riccarton Gravel by a thin layer of clay-bound sandy gravel. Bx23/0098 is a backfilled geotechnical bore on the site which shows gravel and silty gravels extending to 19 m depth. The bore log for M36/0257, which is relatively central to the site, shows the presence of tight gravels of the Springston Formation and Riccarton Gravel extending beyond the depth of quarrying.

The gravel is overlain by a shallow layer of superficial soils, typically in the vicinity of 0.5 to 1.0 m depth. Recent borehole installations (BX23/0833 BX23/0084, BX23/0085 and BX23/0086) at the site to 21 m depth showed a soil profile comprising thin topsoil underlain by sand and sandy gravel subsoil. While there is some variability in overburden depth across the site, the site exhibits between 0.4 and 1.1 m of topsoil and sand across the site.

The Landcare Canterbury Soil Information database[3] describes the soils as ‘Templeton moderately deep silty loam’ in the northwest part of the site and the ‘Eyre shallow stony loam’ in the southeast of the site.

The Canterbury Land and Water Regional Plan (LWRP) planning map (Map A-058) does not identify the site as being within a high soil erosion risk area.

1

2 https://ecan.govt.nz/services/online-services/tools-calculators/pages/well-card.aspx

3 Landcare Research S-map. https://smap.landcareresearch.co.nz

3.2 Groundwater

The quarry extraction site is located over unconfined aquifers which are significant natural features requiring protection and preservation

Groundwater levels in the surrounding area have seasonal variance, but in the long-term range between 10 and 14 m bgl. Maximum extraction depths are specified in CRC192408, and any ground dispersal systems will discharge above that depth.

The CRC wells considered in this analysis are somewhat distant from the site being between 1 and 2.5 km away and are situated to the south and southeast. Therefore, actual site conditions may differ from those determined from this information. For this reason, four new monitoring bores were installed at the site to provide water level information specific to the site. The bore logs for these indicated that clean gravels extend to beyond 21 m depth and groundwater levels were recorded between 14 and 15 m depth.

According to the CRC LiDAR dataset[4], the site has an elevation of between approximately 42.4 and 50.6 m above mean sea level (amsl). Regional piezometric contours developed by CRC indicated an expected shallow groundwater long-term average level of between approximately 38 and 28 m amsl across the site from northwest to southeast which equates to approximately 12.6 to 14.4 m bgl. The piezometric gradient across the site is 0.0056.

3.3 Surface Water

The closest natural waterbody to the site is the Waimakariri River which is approximately 12.5 km north, not specifically addressed in this Plan is hydraulically connected to the regional groundwater system.

Man-made surface water bodies run through the site and are used for irrigation, and stock water supply purposes. Man-made drains are present along some of the site road boundaries which carry water following periods of heavy rainfall. Stormwater will be managed to ensure it does not discharge to these structures.

[4] ECan LiDAR collections and LINZ national contour datasets

3.4 Existing Stormwater Network

The area is predominantly rural in character and consequently there is no reticulated stormwater infrastructure, with all stormwater, including that from impervious surfaces such as roads, infiltrated to ground.

4.0 STORMWATER MANAGEMENT

4.1 General Strategy

All stormwater which is not retained for reuse wil be infiltrated to ground on-site, treated as below. Infiltration will be provided to ensure the risk of bird strike from ponded water is mitigated.

Source	Primary Treatment	Secondary Treatment
Building rooves	Harvested to storage	Carry over to vegetated stormwater basin
Sealed roads	Vegetated roadside infiltration swales or formed channels	Carry over to vegetated stormwater basin
Unsealed areas	Natural infiltration to ground	Carry over to vegetated stormwater basin
Other structures	Specific consideration as below	N/A

. The stormwater treatment devices may include:

- Vegetated infiltration swales along sealed access road margins;
- Vegetated infiltration basin for stormwater discharges from the Central Processing Area;
- Infiltration to ground from unsealed quarry haul roads.

Stormwater treatment devices will be designed to treat stormwater discharges from a 50% AEP 24 hour event with capacity to hold discharges from a 10% AEP 10min rainfall event and in accordance with all SDC guidelines. The basin and swale infiltration rates will be such accumulated stormwater is fully infiltrated to ground within 48 hours of the cessation of a rainfall event.

4.2 Vegetated Swales and Basin

4.2.1 Swales

- Swales will have a two metre base and be 0.3m in depth and 3:1 battered sides. The swale will run the entire length of the sealed surface on both sides of the road. The swale will be finished with soil and vegetated with either grass maintained at a minimum length of between 50 and 150 millimetres, or be planted with other suitable vegetation.
- Alternatively the stormwater from sealed roads will be collected by a roadside channel and either discharged to an appropriately sized soak pit or collected in the water storage area in a tank to be used for dust suppression, vegetation irrigation, or vehicle wash-down. The preference is to wherever possible and practicable to recycle stormwater discharges within the quarry.
- Stormwater discharges from consolidated surfaces, such as unsealed haul roads, will be infiltrated to ground through the unconsolidated ground adjacent to the consolidated surface.

4.2.2 Basin

- The basin will be constructed at the low side of the pit area, with 3:1 battered sides. The basin will be finished with soil and vegetated with either grass maintained at a minimum length of 50 mm or be planted with other suitable vegetation.

4.2.3 Depths and Performance

- The swales and basin will be constructed and maintained to ensure that the required separation to groundwater and performance requirements of per CRC192411 & CRC192412 are provided, and located such that access for soil replacement is available.

4.3 Ancillary Structures

Specific details of these areas will be developed at a later date, with the general provisions outlined below.

4.3.1 Maintenance and Refuelling Areas

The maintenance and refuelling area will be sealed and roofed, to prevent the risk of discharge of contaminants to ground water.

4.3.2 Vehicle Washing

A designated roofed and sealed vehicle washing area will be provided and water treatment provided.

Discharge from wash areas will be recycled for re-use, with sediments and/or other contaminants separated for disposal at an approved facility.

4.3.3 Truck tray wash area:

At this place, only the decks of trucks and trailers will be washed with high volume low pressure water. A small settling pond will be provided to remove solids before re-use of the water. Surplus water will be disposed of to the vehicle wash system.

4.3.4 Vehicle wash-down area:

This area will be used to wash-down vehicles and equipment with high pressure water (jet-wash) prior to maintenance. The area will be walled to ensure all detritus is captured.

Wash water will be treated through an oil-water separator.

- The contaminants and hydrocarbons separated from water will be discharged to trade-waste at an appropriate site.
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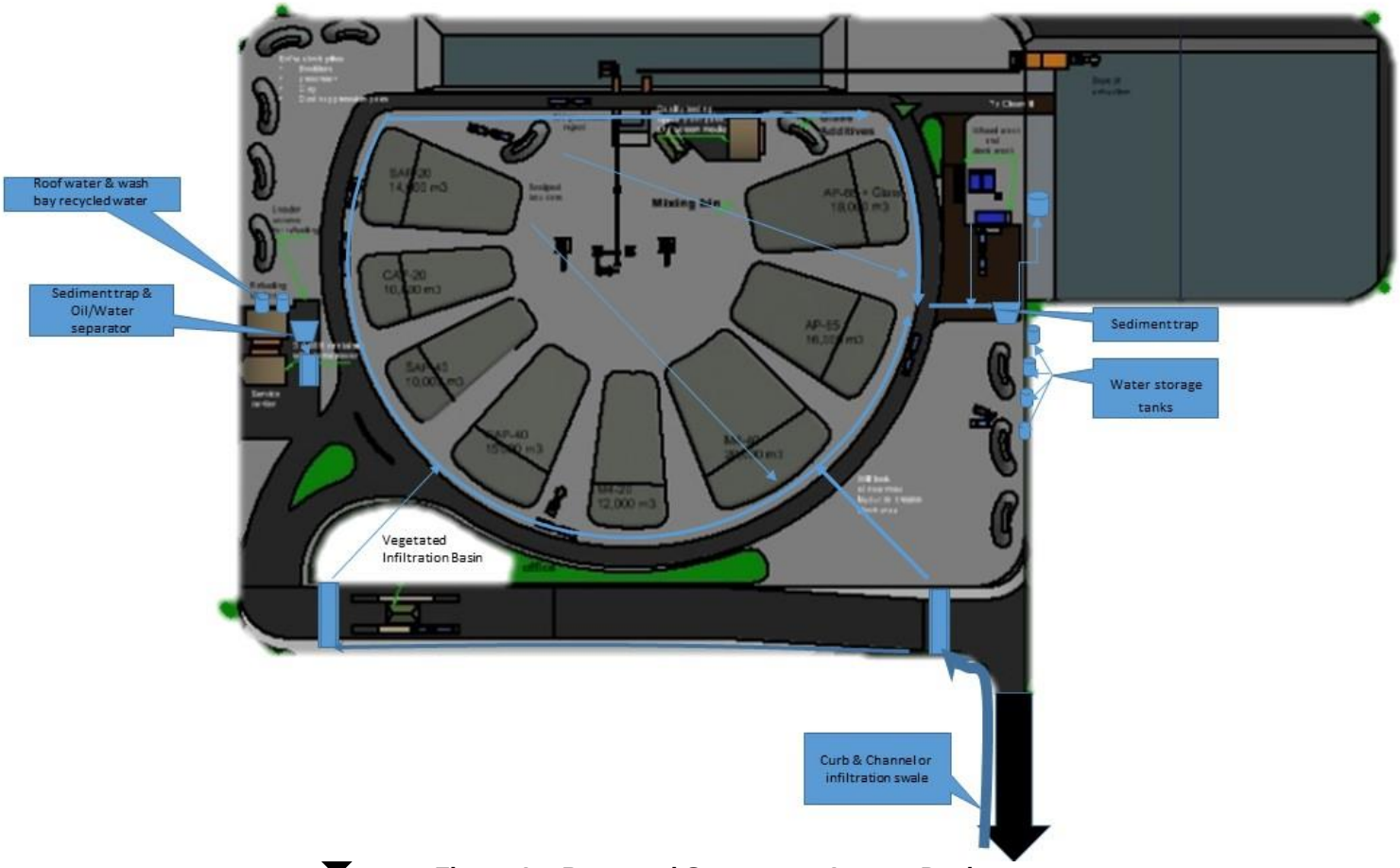

Figure 1: Proposed Stormwater Layout Design

5.0 ASSURANCE

5.1 Staff Training

The Quarry Manager will ensure that all staff and contractors on-site have been inducted to the requirements of this SWMP, and have undertaken any necessary training.

5.2 Inspection and Maintenance

The inspection and maintenance of the stormwater controls will be the responsibility of the Quarry Manager, with particular attention to ensuring all provisions are in good condition prior to and following heavy rainfall events.

Proprietary products will be maintained in accordance with the manufactures specifications and/or or best practice guidelines. Specifically, areas that require effective infiltration rates to ground will be inspected before and after a heavy rainfall event. Should control measures fail or be assessed as sub-standard, additional controls or maintenance will be deployed immediately.

5.3 Environmental Auditing

The Roydon Quarry site will be audited annually against its resource consent requirements, and associated management plans including the SWMP. In addition to formal inspections and compliance monitoring (SDC and Ecan), informal monitoring and audits will be conducted by the Roydon Quarry Manager or appropriate delegate, on an ongoing basis through the likes of Stay Safe Engagements or Spot Audits.

5.4 Non-Conformances and Complaint Response

All incidents including non-compliance with environmental controls, environmental incidents, complaints, hazards and near misses will be entered into the Fulton Hogan's incident management system (CAMs – Case and Action Management Systems) to allow recording, tracking, investigated and closed off when dealt with appropriately.

As well as the standard details recorded in CAMS, for complaints it will be ensured that the following details are recorded

- Complainant details;
- Information about the incident as described by the complaint;
- Who received the complaint and how it was received;
- Weather conditions at the time of the complaint;
- Details of any stormwater exiting site that may not meet quality standards by the person investigating the complaint;
- Identification of the possible cause of the complaint following the investigation;
- Details of the corrective action taken at the time to resolve the incident;
- Details of the preventative actions to be taken to ensure the likelihood of such events occurring in the future are minimised.

An investigation of the complaint will require the site manager or delegated staff member to make visual observations about activities occurring on site. This may include going to the location where the complainant observed the impact.

The Quarry Manager will lead all responses to the complainant

6.0 DOCUMENT REVIEW

Fulton Hogan will review this document on a five yearly basis, or under the following circumstances:

- For the purpose of improving the efficacy of spill management control measures at the site;
- Consistent with the conditions of Canterbury Regional Council consent requirements.
- Following significant environmental incidents;
- At the completion of environmental audits;

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