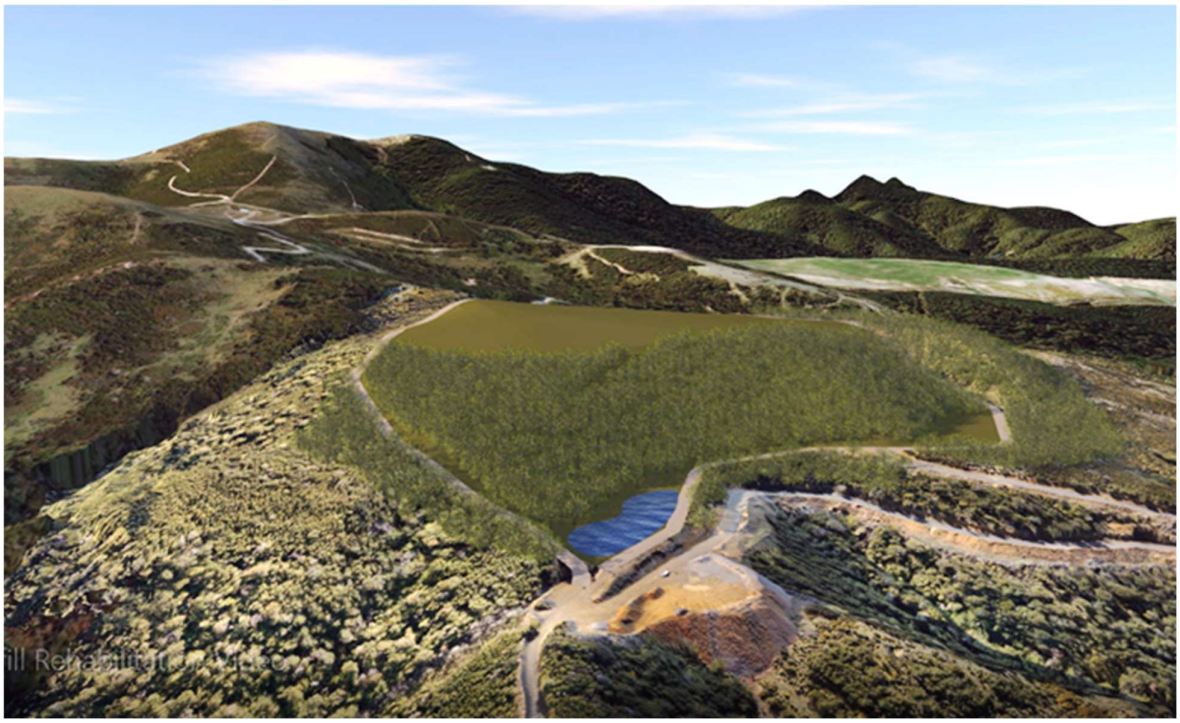
WOODSTOCK QUARRIES LIMITED

Appendix 6

Woodstock Landfill

Ecological Assessment Report



INDIGENOUS REGENERATION *through* INNOVATIVE LANDFILL PRACTICE

April 2021

Ecological Assessment

534 Trig Rd, Viewhill

Prepared for Woodstock Quarries Ltd

13 April 2021

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1. INTRODUCTION

This report[1], prepared by Ecology New Zealand Limited ('ENZL') for Woodstock Quarries Ltd ('the client') presents an ecological assessment (EA) of the current ecological values of the quarries situated approximately 9km north east of Springfield ('the site'). Specifically, this report details the wetlands present on-site, the ecological state of the area where existing surface water dispersal has been directed to. Furthermore, this report will also provide recommendations in terms of lizard management, pest control and surface water monitoring.

1.1. Background

Historically, the site comprises of indigenous forest. Large portions of the forest have been clear-felled for the development of a deer farm approximately 16 years ago. Since then, the deer farming practices has been abandoned and the Woodstock Quarries has been in operation for the last 8 years. The site comprises a total area of approximately c100ha.

1.2. Site Location, Description and Ecological Context

The site is located at 534 Trig Rd, Viewhill, Canterbury (Figure 1). The site is within the Oxford Ecological District of the Canterbury Foothills Ecological Region with current landcover classified as "Low Producing Exotic Grassland" and "Indigenous Forest". There are no areas classed as Significant Natural Area (SNA) within the vicinity of the site.

The site is mainly surrounded by indigenous forest with pastoral land to the south.

Figure 1: Location of Woodstock Quarries

[1] This report is subject to the Report Limitations provided in Appendix A.

2. METHODOLOGY

A desktop and site assessment were undertaken on the 19th of February 2021 by ENZL to confirm the presence of wetlands on-site. Furthermore, the site visit included assessment of the ecological state of the area where existing surface water dispersal has been directed to in order to determine erosion and sedimentation of the Woodstock Stream. A database search for herpetofauna was completed. The expansion footprint of the quarry was assessed for suitable lizard habitat.

2.1. Wetland and Sedimentation Assessment

A search of national and regional databases[2], were completed to ascertain existing information on wetland present on-site.

These areas were ground-truthed on-site. Wetland identification and delineation was done using the Landcare Research wetland delineation document[3].

The area where existing surface water dispersal has been directed to was visually assessed for erosion. The Woodstock Stream was visually inspected both up and downstream of the surface water outfall for sedimentation.

2.2. Herpetofauna Habitat Suitability Assessment

The proposed expansion area was assessed in terms of suitable habitat to support lizards. During the site walkover the quality of potential herpetofauna habitat was assessed and mapped based on visual inspections of the structure, composition and extent of the vegetation communities present. The quality of potential herpetofauna habitat was qualitatively classified as low, moderate or high. Any searchable potential habitats for native herpetofauna encountered during the site walkover was manually searched (e.g., logs were lifted to search for skinks) using Whitaker's (1994) 'searching by day' methodology.

[2] The Land Environments of New Zealand (LENZ) the land cover database (LCDB4) are available for download from http://lris.scinfo.org.nz/. Regional ecosystem mapping e.g. Indigenous terrestrial and wetland ecosystems of Auckland. Singers et al. 2017

[3] Landcare Research Manaaki Whenua: A vegetation tool for wetland delineation in New Zealand. Clarkson, B. 2013.

3. ECOLOGICAL ASSESSMENT

3.1. Wetland and Sedimentation Assessment

During the desktop review the Environment Canterbury (ECan) Wetland layer, indicated three wetlands present on-site (Figure 2). These wetlands were delineated from aerial imagery. During the site assessment, only one wetland could be confirmed on-site under the Landcare Research vegetation tool for wetlands (Figure 3).

Figure 2: ECan mapped wetlands (ECan: Maps of Canterbury)

Figure 3: Wetland Delineated on-site (Indicative)

During the time of the assessment, the most northern wetland as indicated by the Ecan layer comprised of a floodplain between two creeks (Figure 4). During high rainfall events, this area will get temporarily inundated. Due to the topography and stream gradient, this will occur for only a short period of time. During the time of assessment, flood debris and alluvial soil was present in this area and did not have typical wetland plant species.

Figure 4: Floodplain between two creeks

The wetland identified and delineated during the site assessment comprised of *Phormium tenax* (swamp flax), *Machaerina juncea* (bare twig-rush) and *Macherina rubiginosa* (soft twig rush) (Figure 5). Based on this ecological assessment, it seems that there is no hydrological linkage between the quarry and the wetland. The wetland is fed by surface water runoff from the surrounding areas. This can be confirmed by completing a hydrological assessment.

Figure 5: Delineated wetland

The area where existing surface water dispersal has been directed to, had no signs of erosion. Water dispersed across an area of approximately 20m wide and 30m down slope (Figure 6). The area of dispersal comprised of pioneer wetland plant species and dead mature beach trees were evident as a result of wet feet. All evidence of saturated soil disappeared approximately 120m from the bank of the Woodstock Stream (Figure 7). During the time of the assessment there were no evidence indicating sedimentation from the surface water dispersal in the Woodstock Stream. The Woodstock Stream was a hard bottomed permanent stream. The stream had an average width of 2m and depth of 30cm. Instream habitat was diverse and comprised of riffle, run and pool sequence. The reach was well shaded with native vegetation and undercut banks and aquatic macrophytes provided cover.

Figure 6: Dispersal zone.

Figure 7: Surface water dispersal zone

3.2. Herpetofauna Habitat Suitability Assessment

A review of the Department of Conservation (DOC) database for historical records of herpetofauna indicated the presence of three native lizards within 10km from the site (Figure8).

All native lizards within 10km radius of the site, had a conservation status of "Not Threatened". The *Oligosoma* sp recorded is likely *Oligosoma maccanni* (McCann's skink), which is widespread with the Canterbury region. The southern alps gecko (*Woodworthis* sp.) inhabits screes, rock piles and scrubby vegetation. Very few records from beech and kanuka forest are recorded. Common skinks prefer sunny habitats. They inhabit sunny rock piles and crevices.

Generally, the habitat within the expansion area is not suitable for the lizards that might be present on-site (Figure 9). During the site assessment, no lizards were found during manual habitat searches. No lizard management will be required within the proposed expansion area (Figure 10). The red shaded area indicates no lizard management. This is due to the historical clearing of the vegetation and not being suitable to sustain a lizard population. Recommendations in terms of lizard management will be discussed later in this report.

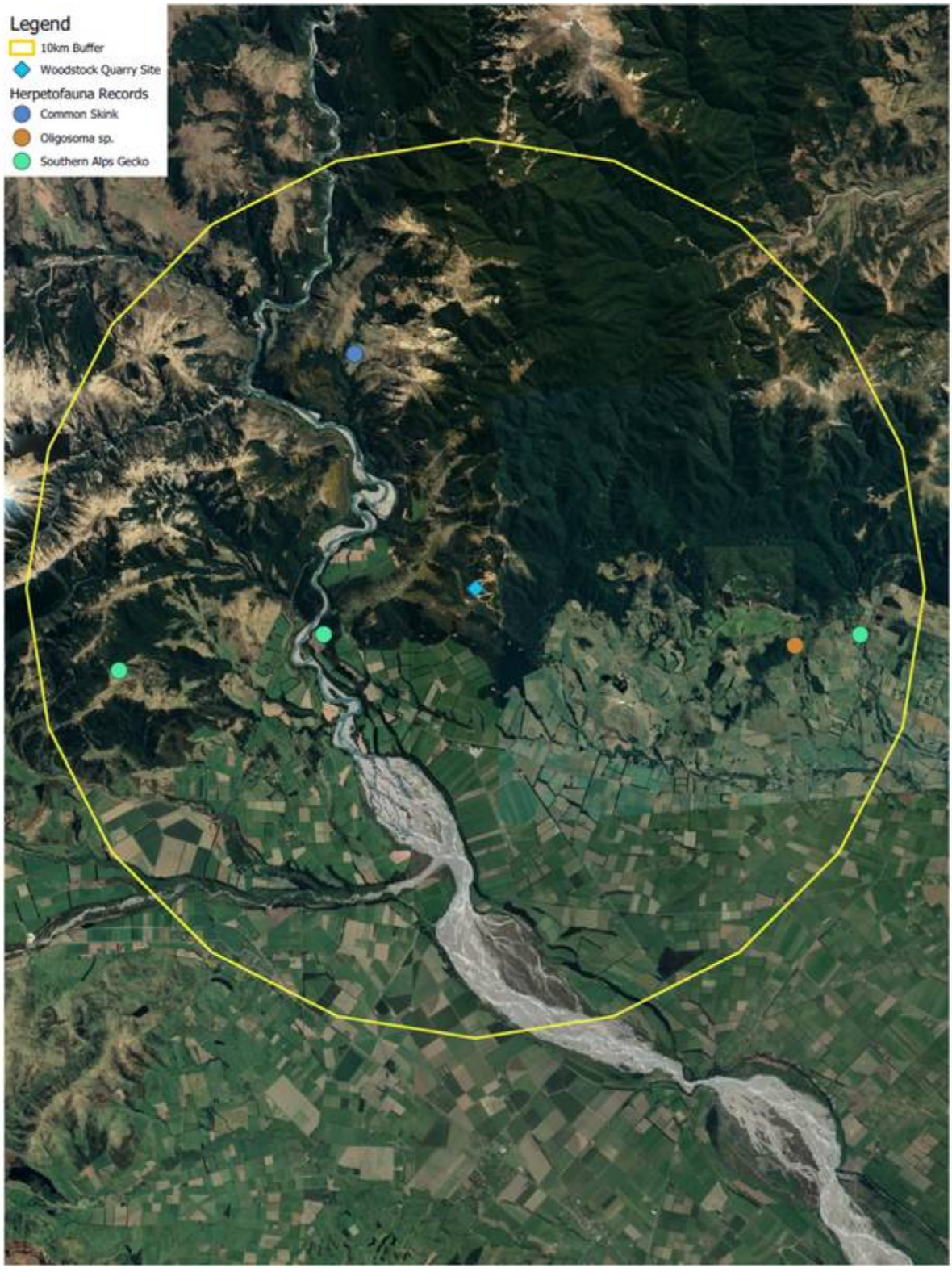

Figure 8: DOC Herpetofauna records

Figure 9: Typical habitat of the expansion site

Figure 10: Area where no lizard management will be required

4. RECOMMENDATIONS SUMMARY

- The following ecological actions are recommended to ensure that the potential ecological effects associated with the works can be adequately managed:
  - A site-specific Aquatic Monitoring Program for the Woodstock Stream should be compiled for the site which aims to manage potential impacts associated with surface water dispersion area. Macroinvertebrate Community Index (MCI) sampling should occur bi-annually. These samples should be collected both upstream and downstream of the dispersal area. This will allow the results to be compared and provide an indication of sedimentation. Water clarity measurements should also be undertaken at the same locations.
  - No lizard management is required within the proposed expansion area (Figure). The red shaded area indicates no likely lizard habitat and has been previously cleared.

However, it is advised that a lizard monitoring program is implemented to determine the presence of lizards. This should be implemented using a variety of sampling techniques including Artificial Cover Objects (ACOs, manual habitat searches and nocturnal spotlighting.

- Clearance/removal of any areas of potential lizard habitat should be supervised by a suitably qualified and experienced ecologist holding the relevant permits. Any native lizards seen should be salvaged and relocated to suitable habitat within the site but outside the works footprint. Records should be kept of all lizards salvaged and this data entered into the Department of Conservation's national herpetofauna database.
- A site specific pest animal survey should be completed to obtain baseline information on the number and diversity of pests present.

5. CONCLUSION

This EA report details the ecological features on-site at Woodstock Quarries. It describes the wetlands present, the sedimentation of the surface water dispersal zone and potential lizard habitat.

One wetland was identified to be present on-site, during this assessment. No sedimentation of the Woodstock Stream was evident as a result of the surface water dispersion area.

There was no suitable lizard habitat present within the proposed expansion zone.

Proposed recommendations were primarily by way of an aquatic monitoring program and lizard management, once the expansion zone ingresses into suitable habitat.

APPENDIX A

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