Memorandum

To:	Kate Graham	**Date:**	10 October 2024
From:	Richard Young	**Our Ref:**	3338703-691807897-6910
Copy:	Bryce Carter	**:**	
Subject:	Package 2 - SH1 Rolleston Access Improvements - Geotechnical Technical Assessment, Overpass and balance of works		

1 Introduction

1.1 Background and Scope

The objective of the State Highway 1 (SH1) Rolleston Access Improvements project is to improve road safety and connectivity for the Rolleston community and includes a range of interventions.

This memo relates to Package 2 which includes the overpass linking the residential and industrial zones over State Highway 1 and the Main South Line (Railway) and the balance of works not covered in the "*Package 1 - SH1 Rolleston Access Improvements- Geotechnical Technical Assessment, Dunns Crossing Road Roundabout and associated works*" memo. It summarises the geotechnical environmental effects, risks and mitigations in relation to the Notice of Requirement and resource consents for Package 2.

1.2 Proposed Works

In summary the concept design for the proposed works comprises:

- Construction of a multi span overpass supported on piled foundations and mechanically stabilised earth walls at the abutments
- Construction of access ramps to and from SH1
- Formation of associated embankment slopes and construction of low-height retaining walls
- Construction of stormwater infiltration basins
- Realignment of SH1, Jones Road, Two Chain Road, Rolleston Drive, Hoskyns Road, and Kidman Street
- At grade rail level crossing(s)
- Utility and services relocation

The proposed works are expected to be built using conventional construction techniques such as; bored piling rigs, standard excavators, in situ concreting (concrete mixers, pumps, formwork), earth working plant (graders, rollers) and pavement placement.

2 Geotechnical Assessment

2.1 Overview of Geotechnical Risk

The geotechnical aspects of the design and construction of the subject works are relatively straightforward. The risks associated with the ground conditions are generally low, based on:

- the flat topography
- consistent alluvial geology comprising a thin surficial layer of silt overlying competent gravel
- groundwater at approximately 9.5m below ground level
- well understood seismic setting, indicating low potential for ground rupture and liquefaction

2.2 Environmental Effects, Risks and Mitigations

Mitigation of permanent and operational risks and effects associated with ground conditions will be addressed through detailed investigation and design. Effects of the Project during the construction period will be addressed through the construction methodology, including preparation of, and adherence to, various management plans.

Appropriate engineering and construction management practices will mitigate the effect of these activities on the environment through management plans and on-going monitoring.

The environmental effects of the permanent design are summarised in the following table along with the associated risks and the mitigation measures:

Environmental Effect	Risks	Mitigations
Construction noise and vibration	Adversely affects neighbours, noting the dense gravel is not expected to attenuate vibration.	Preparation of, and adherence to, the Contractors Construction Noise and Vibration Management Plan
Erosion, sediment and dust control	Erosion and sediment adversely affect watercourses and dust adversely affects neighbours	Preparation of, and adherence to, the Contractors Earthworks Management Plan (EMP) for erosion and sediment control and the Air Quality Management Plan for dust
Stormwater infiltration	Risk that it will adversely raise the groundwater level and/or affect groundwater quality to the detriment of neighbours and/or abstractors.	Risk will be assessed and mitigated through design, including monitoring of adverse mounding and water quality to determine quality at the point of abstraction.
Piling	Temporarily affects the immediate groundwater environment (also noise and vibration as covered above). Dewatering may be required for the piling which may result in the need for additional consents.	Piles will be bored with equal internal and external water levels, hence limited groundwater/grout flow is expected. Potential adverse effects identified through design will be monitored, including water quality to determine quality at the point of abstraction.
Earthworks	Risk of instability and/or erosion and/or that imported fill materials may adversely affect the receiving environment	Slopes to be formed at an appropriate angle to plant / maintain to reduce erosion or surface water runoff and to mitigate instability or slippage. Constructor to implement a Construction Environmental Management Plan (CEMP) to address the effects of imported fill.

Richard Young (Chc)

Technical Director - Geotechnical

Phone Number: +64 3 374 3714

Email: Richard.Young@beca.com