

## Earthworks Assessment on Resource Consent Application

23 Feb 2023

Service Request No: 528330

Site Address: **1-23 Tasman St**

### Introduction:

This proposal is for a new multi-unit development at 1-23 Tasman St with associated earthworks.

### Legislative Requirements (i.e. District Plan / Standards / RMA):

106 Consent authority may refuse subdivision consent in certain circumstances

(1) A consent authority may refuse to grant a subdivision consent, or may grant a subdivision consent subject to conditions, if it considers that—

(a) there is a significant risk from natural hazards;...

RMA 1991	Applicable
Section 106 – Right of Refusal Subdivision Consent	No

### **District Plan 30.1.1 Earthworks in the:**

(i) Residential Area (except the Urban Coastal Edge shown on Map 62 and Map 63;

(ii) Centres and Business Areas (except the Churton Park Concept Area as shown in Appendix 1 to this chapter);

(iii) Institutional Precincts;

(iv) Rural Area (excluding the Ridgelines and Hilltops Overlay); and

(v) Open Space A and C Areas;

are Permitted Activities provided that they comply with the following conditions:

<b>30.1.1.1(b)</b>	
(i) The cut height or fill depth does not exceed 2.5m measured vertically; and	3m
(ii) The cut or fill is retained by a building or structure authorised by a building consent (which must be obtained prior to any earthworks commencing); and	Complies
(iii) The area to be cut and/or filled does not exceed 250m <sup>2</sup>	Exceeds
<b>30.1.1.2</b>	
The cut or fill is no closer than the following (measured on a horizontal plane) to a river (including streams), a wetland or the coastal marine area:	
• Rural Area 20m	
• Centres and Business Areas adjoining the Porirua Stream 10m	
• All other areas 5m	Complies
<b>30.1.1.3</b>	
The cut or fill is not in a Hazard (Flooding) Area;	Complies
<b>30.1.1.4</b>	
There is no visible evidence of settled dust beyond the boundaries of the site.	Complies
<b>30.1.1.5</b>	
i) The cut or fill is no closer than 12m to the closest visible edge of the foundation of a high voltage transmission line support structure;	Complies
(ii) earthworks do not reduce the clearance distance from conductor to ground to less than 10m within 12m of the centreline of an electricity transmission line (as shown on the Planning Maps).	Complies

## Assessment:

### Stability Assessment

A geotechnical statement has been supplied as part of the original application. The statement was developed by Tonkin and Taylor Ltd. (date 13 Sep 2021) and reviews the site in terms of the expected geology and high-level geotechnical risks. No specific recommendations are made for the development. However, the potential risk of localised liquefaction was identified and will need to be addressed as part of the foundation design at the building consent stage.

A second report was provided by Dunning Thornton that covered construction methodology for both the foundation and earthworks principals. Within this methodology is proposed battered design and structural elements to ensure stability of the earthworks. The Dunning Thornton approach is considered adequate in addressing both the long-term and short-term risks of instability in relation to earthworks.

This report is to be read in conjunction with the Construction Management Plan (CMP) that has been supplied by LT McGuinness in draft form. It is recommended that the methodology covered in the Dunning Thornton report is incorporated into the final CMP and is included into the conditions below.

Provided the following conditions of consent are adhered to the application is supported from an earthworks stability viewpoint.

### Erosion, Dust and Sediment Controls

Typically, the controls required to minimise the risk posed by erosion, sediment and dust loss from the site are documented in an Erosion and Sediment Control Plan (ESCP).

The area of earthworks does exceed the threshold of the district plan, which is a general indication that there may be adverse effects from the earthworks activity during the construction phase. As such an ESCP is considered to be required and is included as part of the conditions below. This may take the form of a CMP but will be required to cover the points of ESCP condition.

### Visual Amenity

The proposed area of earthworks exceeds the threshold triggering an assessment on the visual impact.

### Transport Management Plan (TMP)

The volume of earthworks is expected to exceed the threshold of the district plan. Therefore, advice from a transport engineer is expected to be required.

## Conclusion:

The proposal is supported from an earthworks point of view, as it is expected that standard industry methodologies will be implemented to minimise any potential earthworks effects.

The following conditions/advice notes are suggested to ensure that standard earthwork methodologies are implemented:

### Recommended Conditions

#### Chartered Professional Engineer:

(...) A suitably experienced and qualified Chartered Professional Engineer (CPEng) must be engaged by the consent holder for the monitoring earthworks, detailed design and construction phase of the project.

The CPEng must advise on:

- The methods to ensure the stability of the site and surrounding land
- The construction of cut faces, fill batters, staging, shoring, and benching as required for stability of the earthworks,
- The earthworks methodology to ensure consistency with the report by Dunning Thornton on the Structural Effects & Construction Methodology.

The consent holder must follow all the advice of the CPEng in a timely manner. If necessary, the Council's Compliance Monitoring Officer may require information regarding the engineer's monitoring and/or specific assessments to address any potential or actual instability issues in relation to earthworks.

#### Erosion and Sediment Control Plan:

(...) At least 10 working days prior to work commencing on site, an Erosion and Sediment Control Plan (ESCP) or Construction Management Plan (CMP) developed by the consent holder must be submitted to the Council's Compliance Monitoring Officer for certification.

Note: The CMP submitted with the application has been assessed and is supported. The CMP was developed by LT McGuinness, dated August 2021. It is expected that it will form the basis of the final CMP or ESCP submitted for certification.

(...) The ESCP or CMP must be consistent with the recommendations with the report by Dunning Thornton on the Structural Effects & Construction Methodology. It will include, but is not limited to, the following:

#### *Erosion and Sediment Controls*

- An illustrated plan that records the key features of the Erosion, sediment and dust including the approved area of earthworks (including the approved earthworks plan).
- A description of the broad approaches to be used to prevent erosion and minimise problems with dust and water-borne sediment.
- Measures to limit the area of earthworks exposed to the weather at any one time (sources of dust and sediment).
- Stabilisation of the site entrance(s) to minimise the tracking of earth by vehicles onto the adjoining roads.
- The type and location of silt fences to control water-borne sediment.
- Methods for protecting stormwater sumps from the infiltration of water-borne sediment.

- Covering of soil or other material that is stockpiled on the site or transported to, or from, the site, to prevent dust nuisance or erosion by rain and stormwater (creating water-borne sediment).

#### *Stability Controls*

- Measures to ensure temporary excavations remain stable. Slips or failures can significantly increase dust and sediment.

#### *Dust Controls*

- Measures to ensure that the discharge of dust created by earthworks, construction and transport activities are suitably controlled to minimise dust hazard or nuisance.
- Ceasing all dust generating activities if site dust is observed blowing beyond the site boundary.
- Stabilising exposed areas that are not being worked on, using mulch, hydroseeded grass, chemical stabilisers or other similar controls.

#### *Management of Controls*

- The methods for managing and monitoring the ESCP or CMP controls.
- Nomination of a site person responsible for the implementation and administration of the ESCP or CMP.

The CMP or ESCP must be reviewed by the CPEng prior to being submitted to the Council, to ensure that the methodology is in accordance with the geotechnical assessment, by Dunning Thornton on the Structural Effects & Construction Methodology.

- (...) Work must not commence on site until the ESCP or CMP is certified by the Council's Compliance Monitoring Officer. The earthworks and associated work must be carried out in accordance with the certified ESCP or CMP.
- (...) The erosion, dust and sediment control measures put in place must not be removed until the site is remediated to the satisfaction of the Council's Compliance Monitoring Officer. 'Remediated' means the ground surface of the areas of earthworks have been stabilised (no longer producing dust or water-borne sediment), and any problems with erosion, dust or sediment that occur during the work have been remedied.

Note: If necessary, the Compliance Monitoring Officer may require changes to the implementation of the ESCP or CMP to address any problem that occurs during the work or before the ground surface is stabilised.

#### Producer Statements:

- (...) A construction review statement must be supplied by a suitably experienced Chartered Professional Engineer (CPEng) to the Council's Compliance Monitoring Officer within one month of the earthworks being completed. The document must:
  - Include a statement of professional opinion that any un-retained cuts slopes and batters are considered stable with respect to the future use, and that the risk of instability is low as reasonably practicable.
- (...) A copy of the producer statement 'PS4 – Construction Review' and its accompanying documents for structures/buildings required for the stabilisation of earthworks and, prepared for the associated building consent process, must

be provided to the Council's Compliance Monitoring Officer within one month of the structures/buildings being completed.

Grassing of Earthworks:

- (...) All exposed areas of earthworks, unless otherwise built on, are to be grassed or re-vegetated within 1 month of completing each stage of the earthworks, to a level of establishment satisfactory to the Council's Compliance Monitoring Officer.

The Compliance Monitoring Officer may agree to a longer period than 1 month, if appropriate, and will approve it in writing.

General Earthworks Conditions:

- (...) Run-off must be controlled to prevent muddy water flowing, or earth slipping, onto neighbouring properties or the legal road. Sediment, earth or debris must not fall or collect on land beyond the site or enter the Council's stormwater system. Any material that falls on land beyond the site during work or transport must be cleaned up immediately (with the landowner's permission on land that isn't public road). The material must not be swept or washed into street channels or stormwater inlets, or dumped on the side of the road.

Note: As a minimum, 100 mm clarity is required to allow water to be discharged offsite. If clarity is less than 100mm then the water is considered to be muddy and must be captured and treated on site.

- (...) Dust created by earthworks, transport and construction activities must be controlled to minimise nuisance and hazard. The controls must be implemented for the duration of the site works and continue until the site stops producing dust.

**Author:**

John Davies

Earthworks Engineer

FW: Earthworks and Waka Kotahi - stability.

**JD** John Davies  
To Monique Zorn

Reply Reply All Forward ...

Tue 11/04/2023 8:14 am

Follow up. Start by Tuesday, 11 April 2023. Due by Tuesday, 11 April 2023.  
Click here to download pictures. To help protect your privacy, Outlook prevented automatic download of some pictures in this message.

CAN 01 - NZTA Geotechnical Queries[65].pdf  
.pdf File

1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25 26 27 28 29 30 31 32

Monique,

The comments and conclusion in relation to NZTA submission in the attached advice note from the geotechnical engineers Tonkin and Taylor Ltd. is considered to be reasonable.

I note that the applicants' engineers recommend that settlement monitoring be undertaken at the applicant's boundary, I would therefore suggest that this be formalised into a condition of consent, similar to the one included below.

1. At least 20 working days prior to any work commencing on site, the following documentation must be submitted to the Council's Compliance Monitoring Officer for certification in relation to any temporary works, foundations and earthworks, so as to ensure there is not uncontrolled instability or collapse affecting any neighbouring properties:
  - A ground movement monitoring plan prepare by a suitably qualified engineer to monitor induced ground displacements due to excavation and vibration in neighbouring properties prior, during and after completion of earthworks.
  - The monitoring plan must also include a schedule for the monitoring results to be regularly checked against the temporary works design model to confirm acceptability. All instruments and survey points are to be monitored against proposed "Alert", "Action", "Alarm" (AAA) levels, specified by the engineer. The consent holder shall develop contingency plans to respond to exceedance of "Action Values" and "Alarm Values".
  - Roles and responsibilities of key site personnel to ensure adherence to the monitoring plan and excavation sequence.

Regards,

**John Davies**  
Earthworks Engineer | MEngNZ | Wellington City Council  
021 70 80 60  
E John.Davies@wcc.govt.nz | W Wellington.govt.nz

# CONSULTANT'S ADVICE NOTE

CAN-01

CAN Subject:	Response to Waka Kotahi Geotechnical Queries		
Project/site:	Tasman Gardens, 1-23 Tasman Street, Wellington	Date:	3 April 2023
Client:	One Tasman Development Ltd Partnership	TT Project No:	1017965.0000
To:	Nick Owen		
Copy to:	Chris Speed (Dunning Thornton Consultant Ltd)		

## 1. Introduction

One Tasman Development Ltd Partnership has received a submission on resource consent application for the proposed Tasman Garden development dated 17 March 2023. This consultant advice note (CAN) is prepared to address the geotechnical queries raised in the submission (duplicated below) with respect to the Arras Tunnel approach retaining walls.

- Ground water changes;
- Settlement;
- Ground lateral deformations (lateral movement);
- Stability of site;
- Any additional load on the Arras Tunnel walls;
- If there is a need for additional monitoring (groundwater/movement); and
- Any other adverse effects the development could pose to the ongoing operation of the State Highway network.

## 2. Proposed Development

A site plan of the proposed development is shown in Figure 1 below. Figures 2 to 4 shows cross sections A to C showing the Arras Tunnel location relative to the proposed development. The Arras Tunnel approach retaining walls is approximately 12m to 14m away from the proposed building location. These buildings closest to the Arras Tunnel approach retaining walls does not have a basement. The proposed basement is approximately 20m away from the Arras Tunnel approach retaining walls (see Section C).

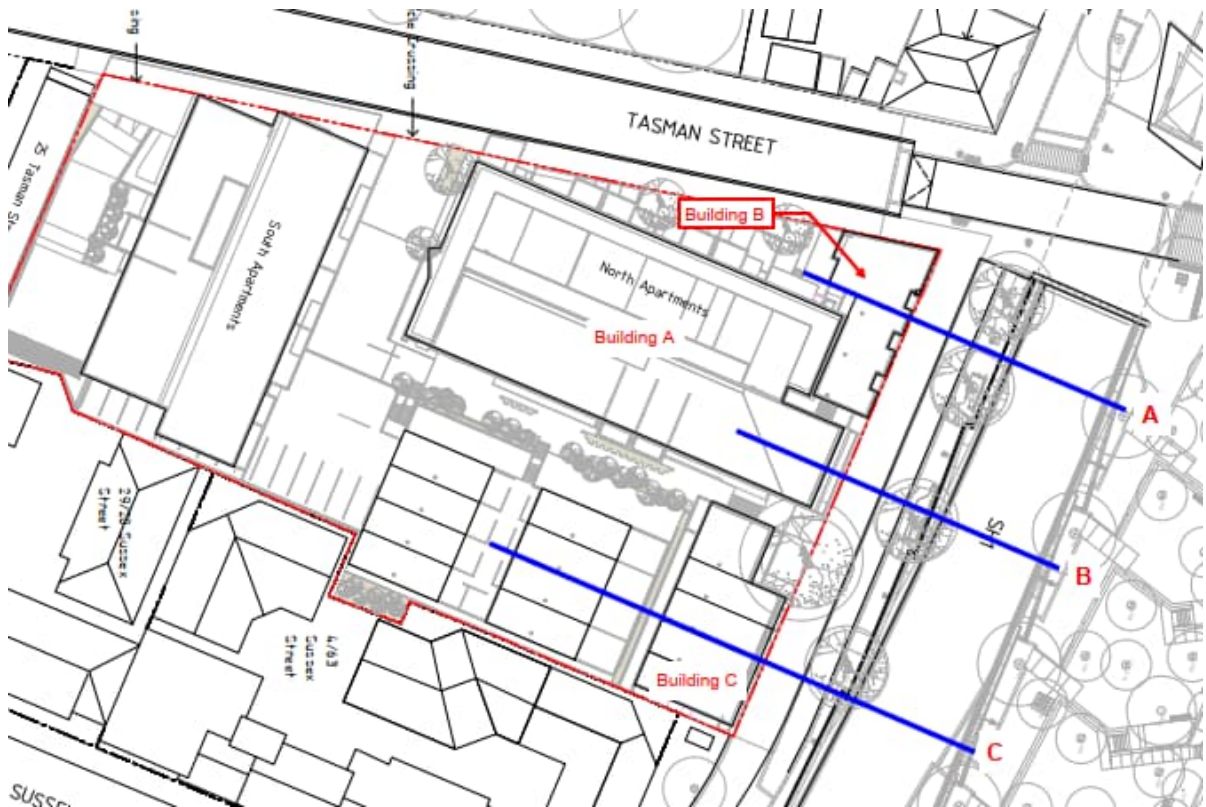


Figure 1: Proposed Development

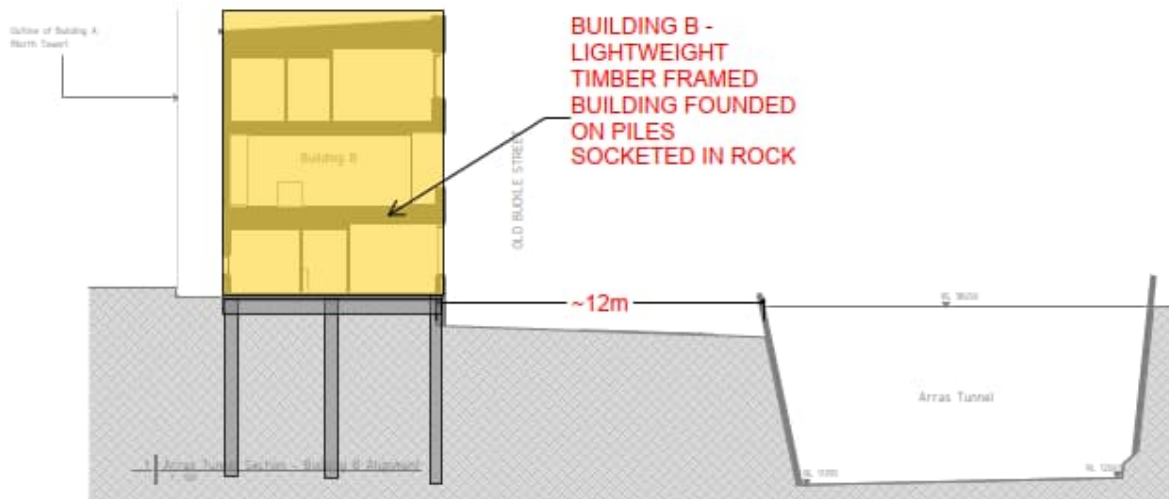


Figure 2: Cross Section A



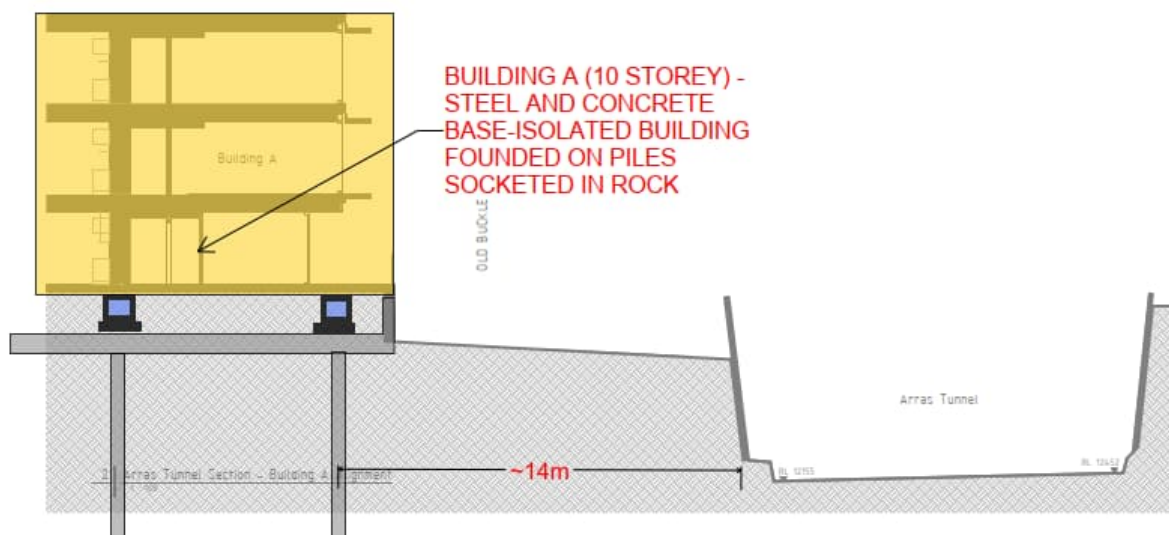


Figure 3: Cross Section B

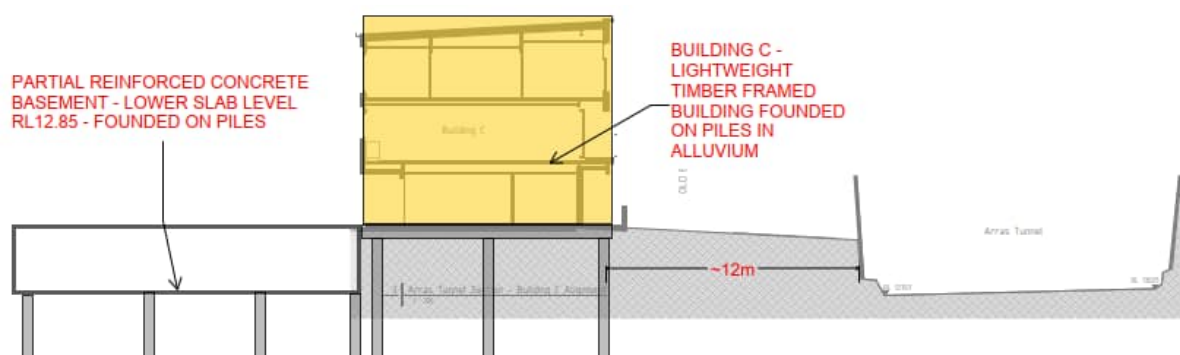


Figure 4: Cross Section C

### 3. Summary of Ground and Groundwater Conditions

The inferred ground profile at the site is as follows:

- 1) Fill: <1.5m thick; underlain by;
- 2) Alluvium/Colluvium (interbedded medium dense to very dense silty SAND/GRAVEL and firm to very stiff SILT/CLAY); 6m to 24m thick; underlain by;
- 3) Greywacke Rock.

Measured groundwater is 3.2m to 4m below ground level.

## 4. Geotechnical Assessment

The following sections provides the geotechnical assessment to address Waka Kotahi's geotechnical queries.

### 4.1 Groundwater Changes

Groundwater level across the site varies between 3.2m and 4m below ground. The lower level of the proposed basement is at a similar level to the carriageway (approx. 12mRL). The lower basement is horizontally separated from the Arras Tunnel portal by approx. 20m. The lower basement carpark is proposed as a "watertight" construction. This means that the basement will not rely on lowering of ground water levels through pumping for its use. Based on this design approach the ground water levels in the proximity of the basement are unlikely to be significantly affected. The proposed construction sequence for the construction of the lower basement is to install a full perimeter sheet-piling or similar system. This will significantly limit the inflow of any groundwater into the excavation.

Accordingly, we consider the impact of groundwater changes (if any) to be less than minor.

### 4.2 Ground Settlement

The activities that have been identified to have a potential to cause ground settlement are collapse of pile bore, pile driving, compaction of hardfill, deflections of retaining wall, groundwater drawdown and typical construction vibrations. Settlement (if any) induced by these activities is likely to be local to the activities. Proposed buildings are at least 12m away from the Arras Tunnel and the basement is about 20m away.

Accordingly, we consider the ground settlement affecting the Arras Tunnel to be less than minor.

### 4.3 Ground Lateral Deformations (Lateral Movement)

The activities that have been identified to cause lateral ground deformations are similar to those identified in Section 4.2 above and their effects are assessed to be local. Additionally, base shear takeout in a seismic event would require the passive resistance of the soil. The soil zone to develop the passive resistance is typically 4 times the pile diameter (4D) for dynamic loading and about 7 times the diameter (7D) for sustained loading. Using the conservative 7D rule, for a proposed pile diameter of up to 900mm along the building boundary, the lateral influence distance is 6.3m. (Note that the concept design pile diameter ranged from 450mm to 750mm).

Proposed building foundations are at least 12m away from the Arras Tunnel. Accordingly, we consider the ground lateral movement affecting the Arras Tunnel to be less than minor.

### 4.4 Stability of Site

As per our meeting of 29 March 2023, our understanding is that this item refers to the cut slopes and retaining structures in the proposed development. Retaining structures are likely required to enable the basement excavation but this is about 20m away from the Arras Tunnel. Additionally, the contractor will engage temporary works engineers to design any significant temporary cuts or retaining walls. Nonetheless, there is unlikely to be significant cuts or retaining structures (>1.5m) along the buildings close to Arras Tunnel.

We do not foresee any site instability. Accordingly, we consider the effect on the Arras Tunnel to be less than minor.

#### 4.5 Additional Load on Arras Tunnel Wall

Refer Sections 4.1 to 4.4. Additionally, the piles for the buildings (typically 450mm to 750mm) will be founded below the Arras Tunnel approach retaining walls within Dense Alluvium/Colluvium or Greywacke Rock and are at least 12m away.

We do not consider there will be additional load on the Arras Tunnel wall due to the activities for the proposed development.

#### 4.6 Need for Additional Monitoring (Groundwater/ Movement)

As highlighted above in Sections 4.1 to 4.5, we consider that the Arras Tunnel unlikely to be affected by the proposed development. Accordingly, we do not consider the need for additional monitoring. However, we propose to undertake ground settlement monitoring at our site boundary.

#### 4.7 Any Other Adverse Effects the Development Could Pose to the Ongoing Operation of the State Highway Network

Given the foregoing, we do not consider that the proposed development will affect the Arras Tunnel and affect this small section of the SH1.

### 5. Applicability

This Consultant's Advice Note has been prepared for the exclusive use of our client One Tasman Development Ltd Partnership, with respect to the particular brief given to us, and it may not be relied upon in other contexts or for any other purpose, or by any person other than our client, without our prior written agreement.

Recommendations and opinions in this report are based on data from 15 boreholes and 5 cone penetration tests. The nature and continuity of subsoil away from the boreholes and CPTs are inferred, and it must be appreciated that actual conditions could vary from the assumed model.

Tonkin & Taylor Ltd  
Environmental and Engineering Consultants

Prepared and authorised for Tonkin & Taylor Ltd by:



.....  
Dr Eng Liang Chin  
Project Director

Technical Reviewed by Richard Mulvad Cole, Technical Director

3-Apr-23  
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