Construction Environmental Management Plan

St Anthony's of Padua – Stage 4

Revision	*Date*	*Details of amendments*
1	06/07/2022	Added missing reports
2	12/07/2022	External Lighting requirement
3	01/08/2022	Updated CTPMP & TCP
4	15/09/2022	Updated for DEP Assessment

Approved for submission by:

Tim Calpito

Project Manager

Lipman Pty Ltd

LIPMAN

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Table of Contents

Introduction

Purpose

This Construction Environmental Management Plan describes how Lipman proposes to manage the demolition and construction activities at St Anthony's of Padua – Stage 4. These works relate to Development Consent Number SSD-8865-Mod-1.

This document is compliant with the Occupational Health & Safety Act 2000 and Regulation; Councils Policy for Waste Minimisation in New Developments 2005, the Waste Minimisation & Management Act 1995 and all other relevant acts and regulations.

Scope/ project description

The project is located within St Anthony's of Padua school at 140 Eleventh Avenue, Austral. The scope of Stage 4 is made up of multiple separable portions as follows:

- Remediation to groundworks with construction of Two (2) sporting ovals and six (6) courts
- Development and construction of general learning spaces, science facilities, administration spaces, outdoor learning spaces and library
- Mini hall and auditorium spaces
- External works including a community garden and additional carparks.
- Removal of current temporary learning structures

Operating Hours

Construction activities are to generally comply with Development Applications conditions. Generally, the working hours shall be as follows, in accordance with the DA:

Monday to Friday: 7am to 6:00pm

Saturday: 8 am to 1pm

Sunday & Public Holidays: No work permitted

Contact Details

Position: Project Manager

Name: Tim Calpito

Contact number: 0409 490 026

Position: Site Manager *(24hr contact)*

Name: Anton Obereigner

Contact number: 0411 599 954

Principle Contractor

Name: Lipman Pty Ltd

Address: Level 6, 66 Berry Street, North Sydney

Contact number: 9955 7000

Site Management

A Site Establishment Plan has been developed, refer Appendix A. This plan has been developed in consultation with Sydney Catholic Schools and specifically St Anthony's of Padua. The main driver of the plan was the safety of the school's students and staff. We have strategically placed access points and fencing to ensure limited interactions between construction staff and school stakeholders. This in turn should ensure the ongoing safety the school. A Construction Traffic and Pedestrian Management Plan has been developed (Appendix B) to provide a solution for traffic and pedestrian access to the construction site.

Construction Noise and Vibration Management

Lipman will be sure to manage and ensure all noise and vibration will meet the NSW Environmental Protection Authority and local council guidelines. All site activities which have the potential to create noise and vibration omissions will be controlled and suitable equipment is utilised to mitigate the associated disruption to the school and surrounding neighbours.

Please refer to Appendix D Construction Noise & Vibration Management Plan prepared by Acoustic Logic. All noise and vibration mitigation measures identified within this report are being implemented during this project.

We will implement a noise and vibration complaints procedure and in the event of a complaint, we will implement noise or vibration monitoring, whichever is applicable. These services will be provided by our acoustic consultant as required. We will then provide reports back to Sydney Catholic School and St Anthony's of Padua with the findings.

Air and Dust Management

Objective

To minimise the adverse effects on stakeholders of air quality (airborne dust and pollutants) in and around the construction site. Implementation of the following controls to be maintained at or above acceptable levels throughout the construction period.

The following activities may cause excessive dust or otherwise affect air quality:

- Demolition
- Excavation
- Landscaping
- High winds

Controls

The following controls shall be implemented to minimise dust and maintain air quality:

- The scaffold around the building will be encapsulated in shade cloth
- During excavation, piling and landscaping works, water will be used to wet down and minimise dust
- Materials transported in open trucks shall be covered to prevent generation of dust.
- Equipment powered by internal combustion engines shall be properly maintained and regularly serviced to prevent the discharge of excessive pollutants, including smoke and/or toxic fumes or odours and must meet acceptable noise levels
- All plant/equipment exhaust volumes shall be monitored by the Site Foreman to ensure they are kept to an acceptable level.
- Daily inspections of the site by the Site Manager

As part of the Construction Traffic and Pedestrian Management Plan, measures will be assessed and put in place to prevent the tracking of soil on surrounding roadways outside of the site. Some of these measures will include shaker grids to site entry/exits, wheel washing facilities, vehicle/machinery hosing and general cleaning where required.

Erosion and Sediment Control

Refer attached Appendix C sediment and erosion control plans. These measures will be implemented to minimise and eliminate contamination of stormwater and surrounding landscaped areas. The plans provided by Warren Smith and Partners also provide greater stormwater management from site to ensure controlled discharge during weather events.

Truck wash bays and shaker grids will be installed at all exits from the site. We will be installing road base hardstands throughout the site compound to ensure that vehicles entering and exiting the site are always on stable ground and therefore should not be tracking excess sediment out of the site either. Surrounding roadways will be checked regularly and cleaned as required to ensure the entry of sediment into stormwater is minimised.

Waste Classification and Validation

Refer to Appendix G for the sites Hazardous Materials Survey prepared by Alliance Geotechnical.

Also attached is Appendix I Geotechnical Report by Alliance Geotechnical. This report identifies that there is a layer of fill across the proposed excavation zone overlaying virgin material. The contaminated fill will be buried in a borrow pit below the sports fields and capped in accordance with the advice given within the Geotechnical Report and Remediation Action Plan by Alliance Geotechnical.

Construction waste is being managed by Pronto Bins, with monthly waste reports to be generated and maintained onsite as records of disposal.

External Lighting

External lighting installed during construction will be installed in compliance with *AS4282-2019 control of obtrusive lighting effects of outdoor lighting.* Consideration will be made with regards to light spill, particularly at night.

Construction lighting will be generally limited to LED batten lighting within the main construction spaces of the projects, along with Lipman's site amenities.

Lipman's Site Manager shall be responsible for ensuring that all lights do not cause light spill to neighbouring roadways and properties, particularly at night. Any security lights shall be aimed at the ground, where possible, rather than upwards.

Community Consultation and Complaints Handling

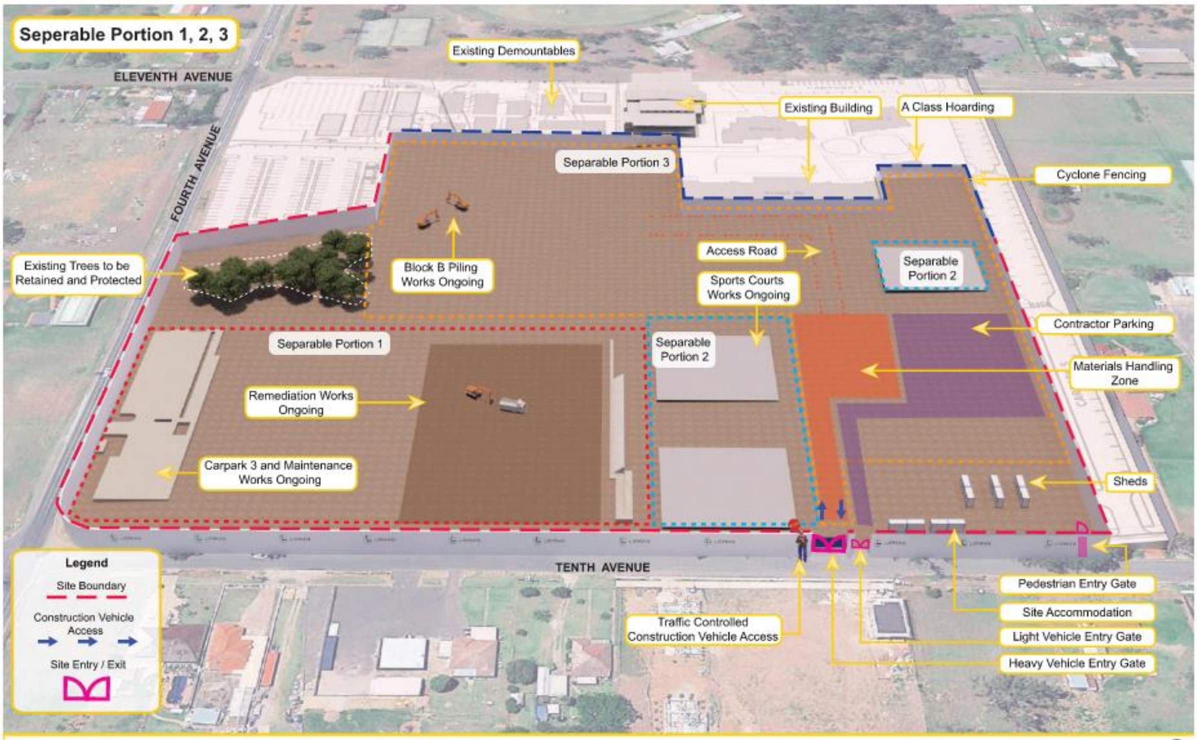
In accordance with the Development Application conditions, Lipman have engaged Urbis Pty Ltd as our community consultant and to work alongside Lipman and Sydney Catholic schools to provide appropriate avenues of communication and complaint management throughout the duration of the project.

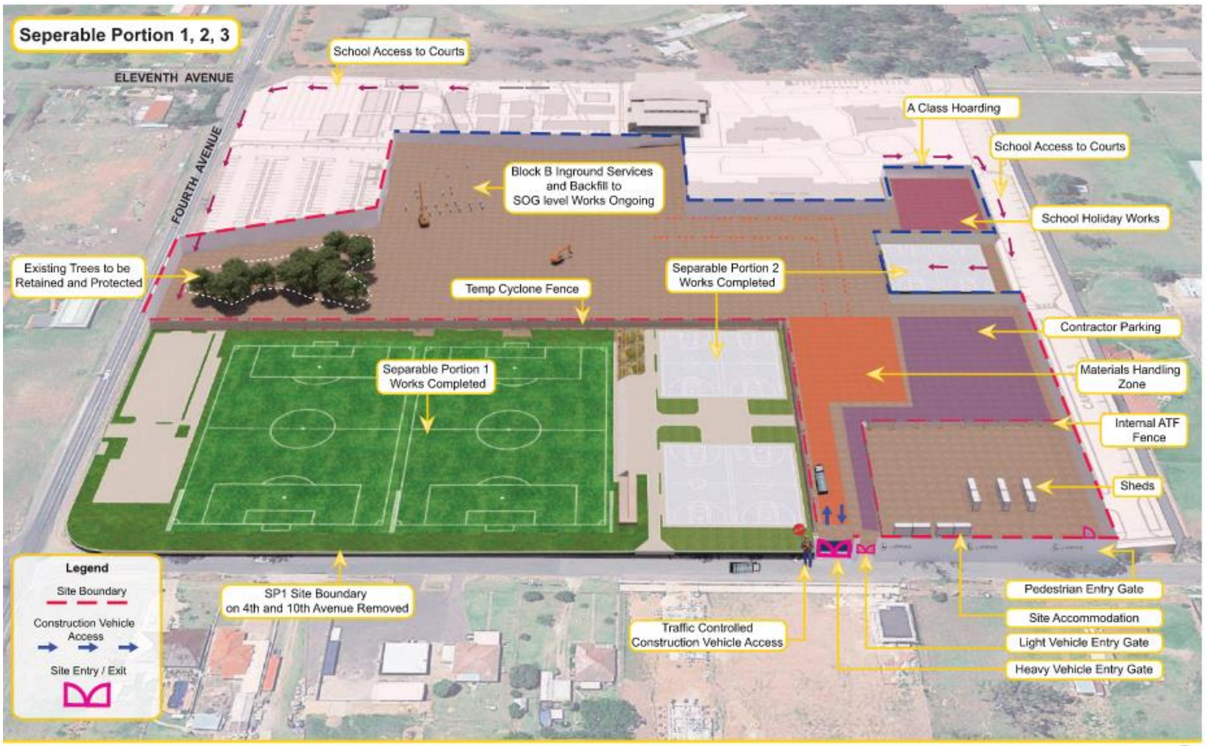
In reference to Appendix J – Community Communications Strategy, Urbis have reached a communication objective to keep the community informed of construction impacts. This objective will be achieved through several approaches including.

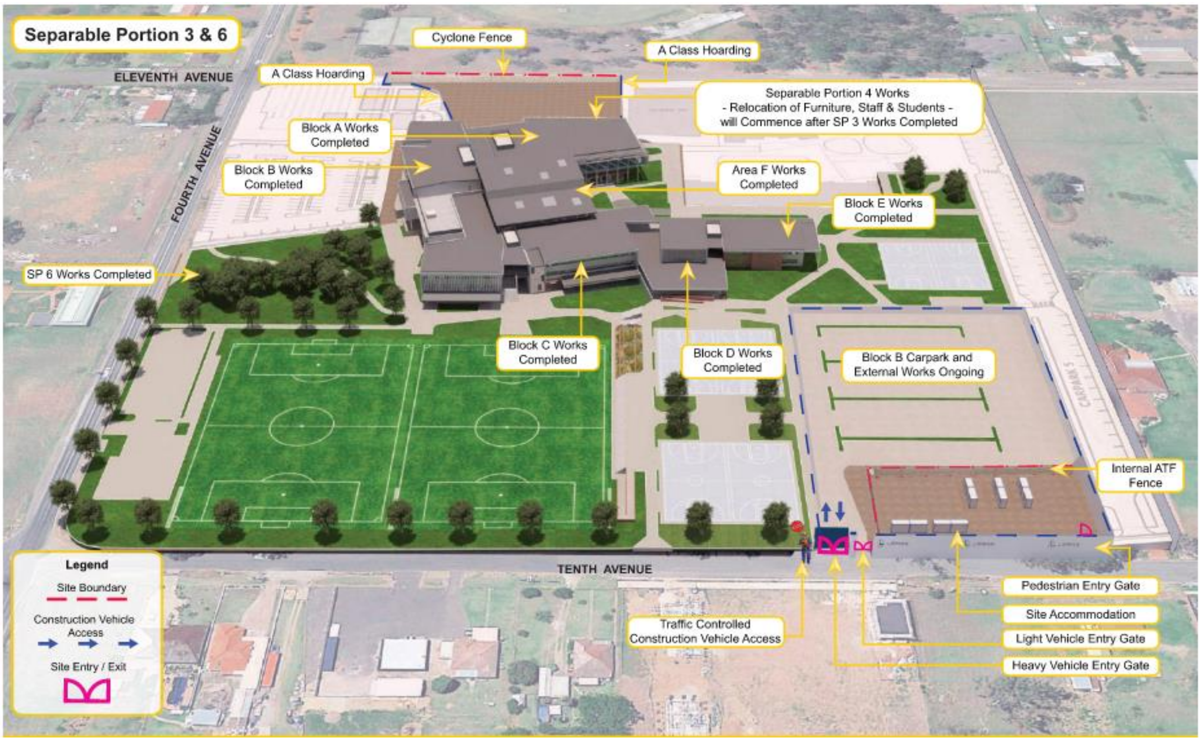
- Building key college community stakeholder relationships and maintain good will with impacted communities
- Managing community expectations and building trust by effectively managing enquiries and complaints
- Providing timely information to impacted stakeholders and broader communities
- Addressing and correcting misinformation within eh public domain
- Reducing the risk of project delays caused by negative third-party intervention
- Leaving a positive legacy in each community

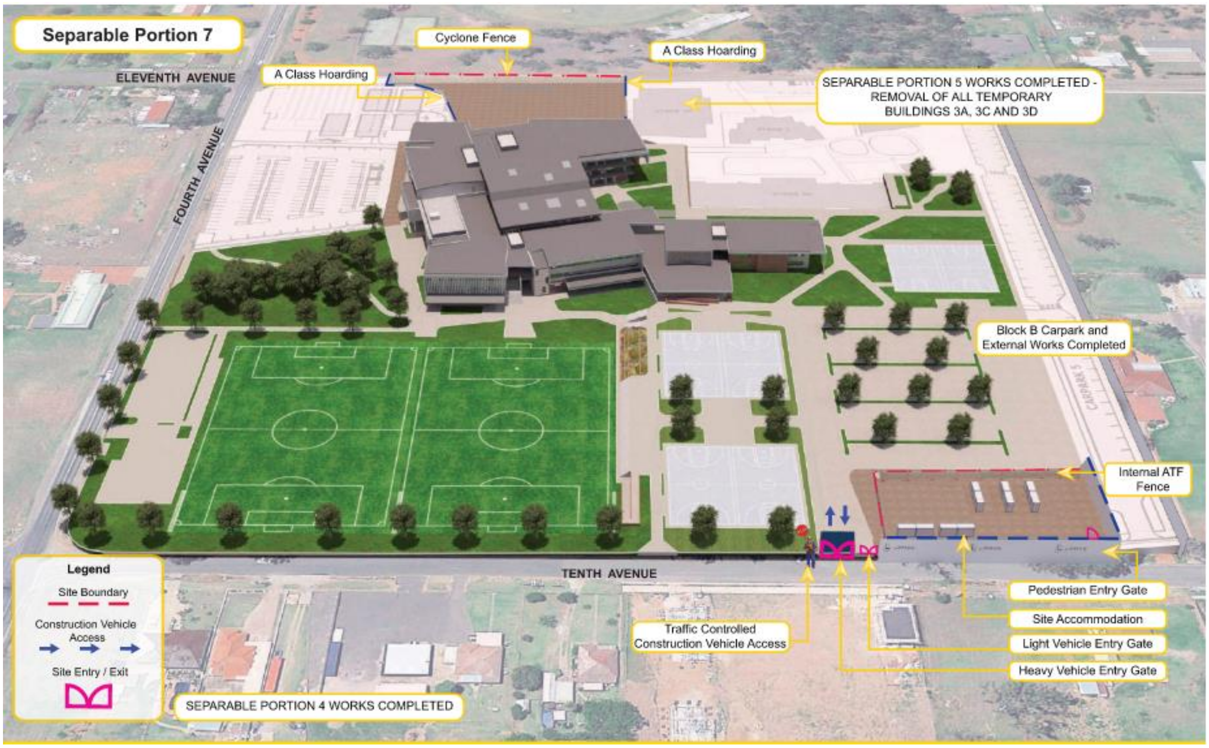
Lipman will also provide a construction sign board alongside the main entrance to the site providing the details of a 24-hour contact to ensure the surrounding community have direct contact regarding site related queries throughout the duration of the project.

APPENDIX A – Site Establishment Plan



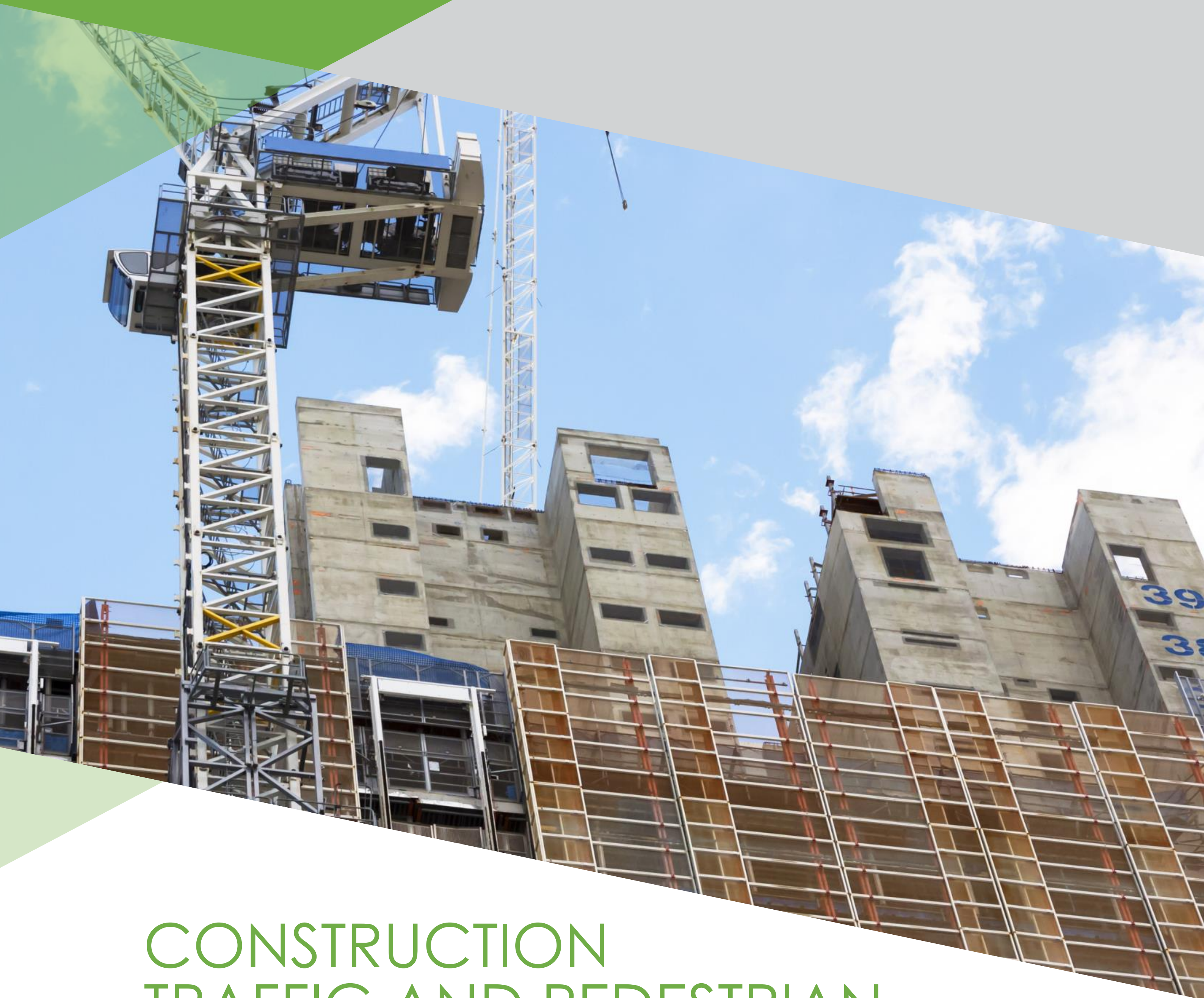



Separable Portion 3 & 6
Cyclone Fence
A Class Hoarding
ELEVENTH AVENUE
A Class Hoarding
Separable Portion 4 Works
- Relocation of Furniture, Staff & Students -
will Commence after SP 3 Works Completed
Block A Works
Completed
Block B Works
Completed
FOURTH AVENUE
Area F Works
Completed
Block E Works
Completed
SP 6 Works Completed
Block C Works
Completed
Block D Works
Completed
Block B Carpark and
External Works Ongoing
Internal ATF
Fence
Legend
Site Boundary
Construction Vehicle
Access
Site Entry / Exit
TENTH AVENUE
Pedestrian Entry Gate
Site Accommodation
Traffic Controlled
Construction Vehicle Access
Light Vehicle Entry Gate
Heavy Vehicle Entry Gate


Separable Portion 7
Cyclone Fence
A Class Hoarding
ELEVENTH AVENUE
A Class Hoarding
SEPARABLE PORTION 5 WORKS COMPLETED -
REMOVAL OF ALL TEMPORARY
BUILDINGS 3A, 3C AND 3D
FOURTH AVENUE
Block B Carpark and
External Works Completed
Internal ATF
Fence
Legend
Site Boundary
Construction Vehicle
Access
Site Entry / Exit
TENTH AVENUE
Pedestrian Entry Gate
Site Accommodation
Traffic Controlled
Construction Vehicle Access
Light Vehicle Entry Gate
Heavy Vehicle Entry Gate
SEPARABLE PORTION 4 WORKS COMPLETED

APPENDIX B - Construction Traffic & Pedestrian Management Plan

TRAFFIX
TRAFFIC AND TRANSPORT PLANNERS



CONSTRUCTION TRAFFIC AND PEDESTRIAN MANAGEMENT SUB-PLAN

St Anthony of Padua Catholic College – Stage 4
140 Eleventh Avenue, Austral

Reference: 22.212r01v04
Date: September 2022

Suite 2.08, 50 Holt St
Surry Hills, NSW 2010

t: (02) 8324 8700
w: www.traffix.com.au

DOCUMENT VERIFICATION

Job Number	22.212			
Project	140 Eleventh Avenue, Austral			
Client	Lipman Pty Ltd			
Revision	Date	Prepared By	Checked By	**Signed**
v04	09/09/2022	Neil Caga	Vince Doan	

SAFEWORK NSW CERTIFICATES

Prepare a Work Zone Traffic Management Plan			
Name	Vince Doan	Certificate No.	TCT0075627
	Neil Caga		0052281738

Reference should be made to the Curriculum Vitae (CV) provided in **Appendix A**.

CONTENTS

Appendices

1. INTRODUCTION

TRAFFIX has been commissioned Lipman Pty Ltd to prepare a Construction Traffic and Pedestrian Management Sub-Plan (CTPMSP) report for St Anthony of Padua Catholic College at 140 Eleventh Avenue, Austral. This State Significant Development (SSD) has been approved by the NSW Department of Planning (DPE) under SSD-8865.

This report documents the construction traffic management arrangements, methodology and traffic impacts associated with the bulk earthworks, structure and fitout & finishes stages of construction. This report should be read in conjunction with any other construction documentation prepared by Lipman Pty Ltd.

The report is structured as follows:

- Section 2: Outlines the CTPMSP requirements
- Section 3: Documents existing traffic conditions
- Section 4: Describes the overall construction program
- Section 5: Describes the proposed traffic management arrangements
- Section 6: Concludes the report

2. CTPMSP REQUIREMENTS

2.1 Traffic Guidance Scheme

The Traffic Guidance Scheme (TGS) that is included in this report, should be implemented taking due account of on-site conditions as will occur over the construction period. Accordingly, construction crew are expected to respond in a pro-active manner to ensure that this plan is implemented to maximum effect and with no obvious safety issues being overlooked. In particular, the following matters are considered noteworthy:

- All signs are to be placed where clear visibility is available;
- Installations should be checked intermittently during the course of the day/s; and
- SafeWork NSW certified Traffic Controllers shall be on-site during work hours to supervise vehicle movements, should vehicle movements equate to or exceed 10 truck movements (5 in, 5 out) per hour.

It is noted that TRAFFIX is responsible for the preparation of the TGS only and not for its implementation, which is the responsibility of the project manager/builder.

2.2 Development Consent

The Development Consent outlines a requirement for the preparation of a CTPMSP and in particular, Condition C20 states:

A Construction Traffic and Pedestrian Management Sub-Plan (CTPMSP) must be prepared to achieve the objective of ensuring safety and efficiency of the road network and address, but not be limited to, the following:

a) Be prepared by a suitably qualified and experienced person(s);

Refer to the 'Document Verification' page at the start of this report and Appendix A, which provides the SafeWork NSW Certificates and CVs, respectively.

b) Be prepared in consultation with Council;

Refer to Section 2.3 and Appendix B, which outlines the consultation and correspondence with Council.

c) *Detail the measures that are to be implemented to ensure road safety and network efficiency during construction in consideration of potential impacts on general traffic, cyclists and pedestrians and bus services; and*

Refer to Section 5 and Appendix E, which details the Traffic Management Arrangements and Traffic Guidance Scheme to manage vehicular access and pedestrian traffic, respectively.

d) *Detail heavy vehicle routes, access and parking arrangements.*

Refer to Sections 5.1, 5.2 and 5.5, which details the heavy vehicle routes, construction access and parking arrangements, respectively.

2.3 Council Consultation

In accordance with Condition C20 (b) of the Development Consent, this CTPMSP has been prepared in consultation with Council. Reference should be made to the correspondence with Council, dated 18 May 2022 and provided in **Appendix B**, noting the following relevant aspects:

- CTPMSP to be in accordance with Liverpool City Council's *Assessment of Construction Traffic Management Plan*; and
- Submission of the CTPMSP to Council is sufficient to satisfy Condition C20.

Accordingly, this CTPMSP has been prepared in accordance with Liverpool City Council's *Assessment of Construction Traffic Management Plan*.

2.4 Other Applications

Other applications will be required to be prepared at a later stage and submitted online to Council's Transport Management Unit for approval (where applicable):

- Road occupancy approval (including placement of construction plant) is required for any works within the public road reserve;
- Works zone applications and associated signposting plan;
- Footpath occupancy and hoarding installation;
- Road opening approval (including connections to existing services); and
- Each application will require work/site specific TGS plans.

3. EXISTING CONDITIONS

3.1 Location and Site

The subject site at 140 Eleventh Avenue, Austral is located approximately 11.0 kilometres west of Liverpool Railway Station and is legally identified within DP1232692 (Lot 1 and Lot 2) and DP2475 (Lot 810, Lot 811, Lot 812, Lot 840, Lot 841 and Lot 842). More specifically, it is situated on the northeast corner of the Fourth Avenue and Tenth Avenue intersection, approximately 2.0 kilometres north of Bringelly Road.

The site is irregular in configuration and has a site area of approximately 6.0 hectares. It has a northern boundary of 423.8 metres to the St Anthony of Padua Catholic College and an eastern boundary of 202.4 metres to the off-street carpark area, while the remaining western frontage of 173.3 metres and southern frontage of 285.3 metres are to Fourth Avenue and Tenth Avenue, respectively.

The site is currently vacant and provides a single vehicular access in the form of a dirt road from Tenth Avenue, approximately 160 metres east of Fourth Avenue.

A Location Plan is presented in **Figure 1**, with a Site Plan presented in **Figure 2**.

Figure 1: Location Plan

Figure 2: Site Plan

3.2 Road Network

The road hierarchy in the vicinity of the site is shown in **Figure 3** with the following roads of particular interest:

- Bringelly Road: a TfNSW Main Road (MR 647) that traverses east-west between Camden Valley Way in the east and Greendale Road in the west. Within the vicinity of the site, it is subject to 80km/h speed zoning and accommodates three (3) lanes of traffic in each direction. Bringelly Road does not permit on-street parking on either side of the road and has been identified by TfNSW as a 26.0 metre B-double route.
- Edmondson Avenue: a local road that traverses north-south between Fifteenth Avenue in the north and Bringelly Road in the south. It is subject to 60km/h speed zoning and accommodates a single lane of traffic in each direction. Edmondson Avenue permits unrestricted on-street parking along both sides of the road.
- Fourth Avenue: a local road that traverses north-south between a dead-end after Gurner Avenue in the north and Bringelly Road in the south. It is subject to 60km/h speed zoning and accommodates a single lane of traffic in each direction. Fourth Avenue permits unrestricted on-street parking along both sides of the road, with the northern section of the road identified by TfNSW as a 26.0 metre B-double route (between Fifteenth Avenue and Seventh Avenue).
- Tenth Avenue: a local road that traverses east-west between Twenty Ninth Avenue in the east and Kelly Street in the west. It is subject to 60km/h speed zoning and accommodates a single lane of traffic in each direction. Tenth Avenue permits unrestricted on-street parking along both sides of the road.

- Eleventh Avenue: a local road that traverses east-west between Twenty Ninth Avenue in the east and forms a dead-end after Fourth Avenue in the west. It is subject to 60km/h speed zoning and accommodates a single lane of traffic in each direction. Eleventh Avenue permits unrestricted on-street parking along both sides of the road.
- Fifteenth Avenue: a local road that traverses east-west between Cowpasture Road in the east and a dead-end after Wishart Road in the west. It is subject to 60km/h speed zoning and accommodates a single lane of traffic in each direction. Fifteenth Avenue permits unrestricted on-street parking along both sides of the road, with the western section of the road identified by TfNSW as a 26.0 metre B-double route (between Fourth Avenue and Ramsay Road)

It can be seen from **Figure 3** that the site is conveniently located with respect to the main collector road servicing the region, being Edmondson Avenue. As such, traffic can effectively be distributed onto the wider road network, minimising traffic impacts.

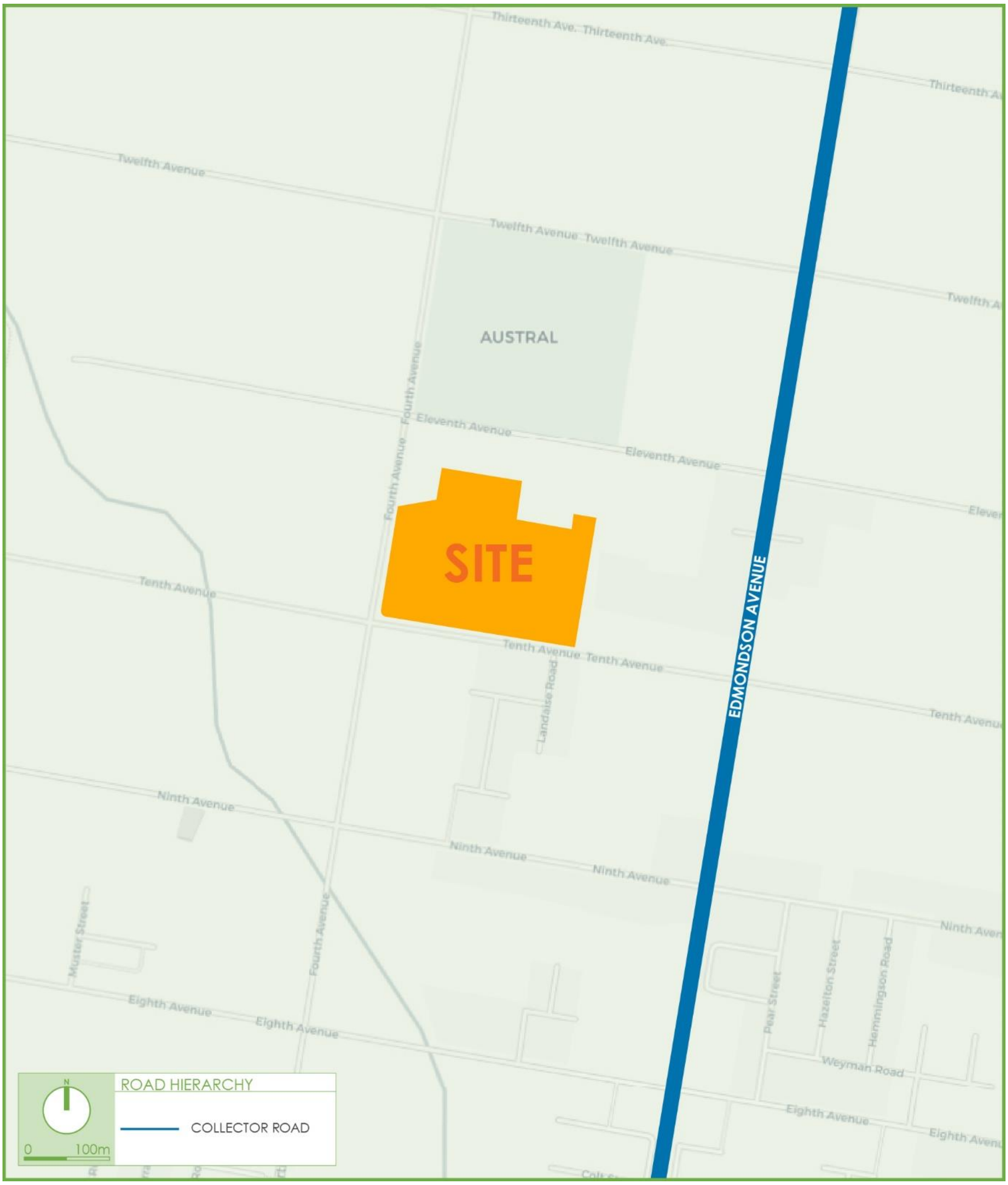


Figure 3: Road Hierarchy

3.3 Public Transport

The existing bus services operating within 400 metres (optimum walking distance) of the site is presented in **Figure 4**, with the closest situated along the southern frontage of the site. These bus stops provide regular services to the following routes:

- 855 – Rutleigh Park to Liverpool via Austral and Leppington Station
- 861 – Denham Court to Carnes Hill via Austral

Figure 4: Public Transport

4. OVERVIEW OF CONSTRUCTION PROGRAM

4.1 Times of Operation

The total construction period is expected to occur over an 18-month period, with the anticipated hours of operation summarised below.

- Monday to Friday — 7:00am to 6:00pm;
- Saturday — 8:00am to 1:00pm; and
- Sunday or Public Holiday — No building activities are to be carried out at any time.

4.2 Site Establishment Plans

Reference should be made to the Site Establishment Plans presented in **Appendix C**, which includes the proposed locations of:

- Site accommodation, sheds and pedestrian access;
- Disposable bins and materials handling zone;
- Light and heavy vehicle accesses;
- Contractor parking area;
- Internal access road; and
- Pedestrian controls (internal ATF fencing).

4.3 Overview of Construction Works

The proposed construction works during all stages of construction are summarised below.

4.3.1 Bulk Excavation Stage

This stage is anticipated to occur over a 3-month period and will involve a maximum of 50 workers on site at any given time, with an average of 35 workers. The maximum sized truck to be utilised during this stage will be 19.6 metre long truck and dog trailers (maximum 42.5 tonnes, as confirmed by the builder). It is noted that only vehicles with a mass of 50.0-60.5 tonnes require a permit from the National Heavy Vehicle Regulator (NHVR) or Performance Base Standard (PBS) approval. All bulk excavation works are proposed to occur within the site, with construction vehicle access proposed from a dedicated construction vehicle access via Tenth Avenue.

This stage will have an average of 100 trucks per day (100 in, 100 out) and a maximum of 12 trucks per hour (12 in, 12 out). This truck volume would equate to an average of 10 trucks per hour, which is considered moderate and will have minimal impacts on the surrounding key intersections. It should be noted that heavy vehicles with a length of 12.5-20.0 metres will be restricted to a maximum of six (6) trucks per hour (6 in, 6 out) between 7:00am-10:00am and 3:00pm-7:00pm on weekdays. Finally, no construction vehicle movements will be permissible during school peak periods, being 8:00am-9:00am and 2:30pm-3:30pm.

4.3.2 Structure Stage

This stage is anticipated to occur over a 12-month period and will involve a maximum of 150 workers on site at any given time, with an average of 120 workers. The maximum sized truck to be utilised during this stage will be 12.5 metre long heavy rigid vehicles (HRV). All structure works are proposed to occur within the site, with construction vehicle access proposed from a dedicated construction vehicle access off Tenth Avenue.

This stage will have an average of 20 trucks per day (20 in, 20 out) and a maximum of five (5) trucks per hour (5 in, 5 out). This truck volume would equate to an average of two (2) trucks per hour, which is considered minor and will have negligible impacts on the surrounding key intersections.

4.3.3 Fitout & Finishes Stage

This stage is anticipated to occur over a 12-month period and will involve a maximum of 150 workers on site at any given time, with an average of 130 workers. The maximum sized truck to be utilised during this stage will be 12.5 metre long HRVs. All fitout and finishes works are proposed to occur within the site, with construction vehicle access proposed from a dedicated construction vehicle access off Tenth Avenue.

This stage will have an average of 20 trucks per day (20 in, 20 out) and a maximum of five (5) trucks per hour (5 in, 5 out). This truck volume would equate to an average of two (2) trucks per hour, which is considered minor and will have negligible impacts on the surrounding key intersections.

5. TRAFFIC MANAGEMENT ARRANGEMENTS

5.1 Truck Routes

The proposed truck routes make use of TfNSW approved 26.0 metre B-double routes where possible, with a copy of the routes provided to all drivers prior to attending the site. The proposed truck routes are outlined below.

5.1.1 Left in-Left out Access Arrangement

The truck routes are presented in **Figure 5** and summarised as follows.

- Ingress to subject site: (*Inbound*)
  1. Trucks will arrive on Fifteenth Avenue, westbound.
  2. Turn left onto Fourth Avenue, southbound.
  3. Turn left onto Tenth Avenue, eastbound.
  4. Turn left onto site.
- Egress from the subject site: (*Outbound*)
  1. Trucks will turn left onto Tenth Avenue, eastbound.
  2. Turn right onto Edmondson Avenue, southbound.
  3. Turn onto Bringelly Road.

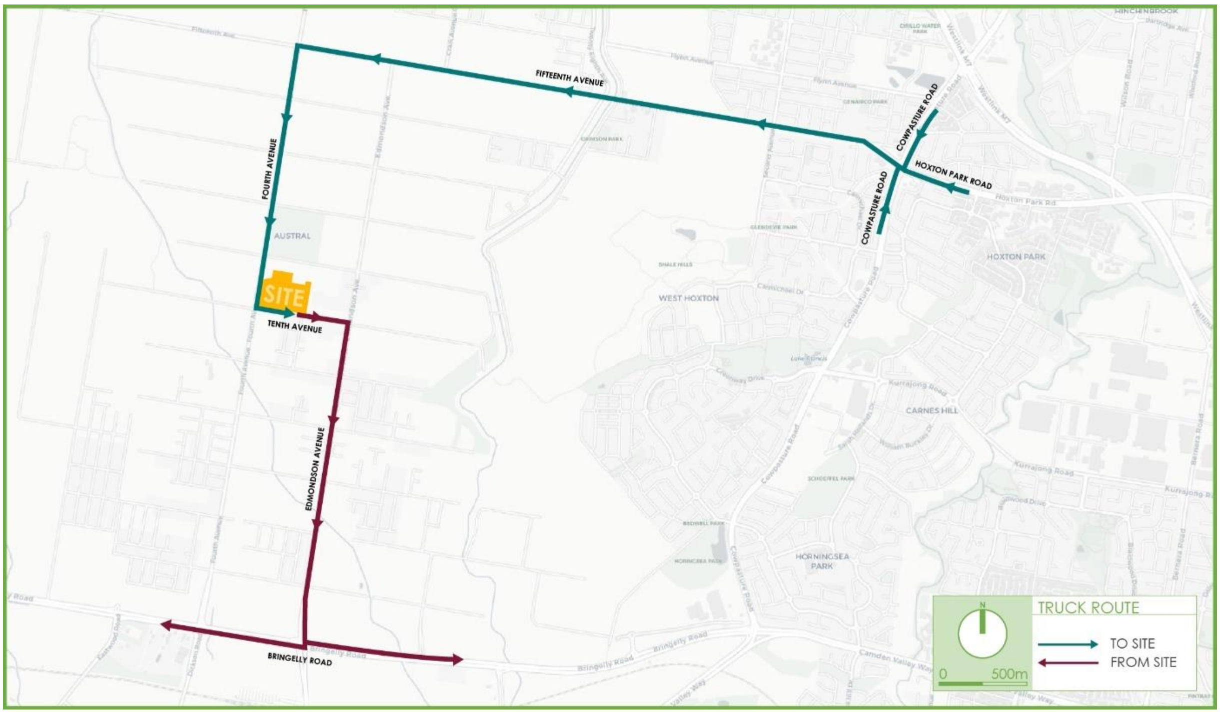


Figure 5: Proposed Truck Routes

5.1.2 Eastern Routes (via Edmondson Avenue)

The eastern truck routes are presented in **Figure 6** and summarised as follows.

- Ingress to subject site: (*Inbound*)
  1. Trucks will arrive on Fifteenth Avenue, westbound.
  2. Turn left onto Edmondson Avenue, southbound.
  3. Turn right onto Tenth Avenue, westbound.
  4. Turn right onto site.
- Egress from the subject site: (*Outbound*)
  1. Trucks will depart onto Tenth Avenue, eastbound.
  2. Turn right onto Edmondson Avenue, southbound.
  3. Turn onto Bringelly Road.

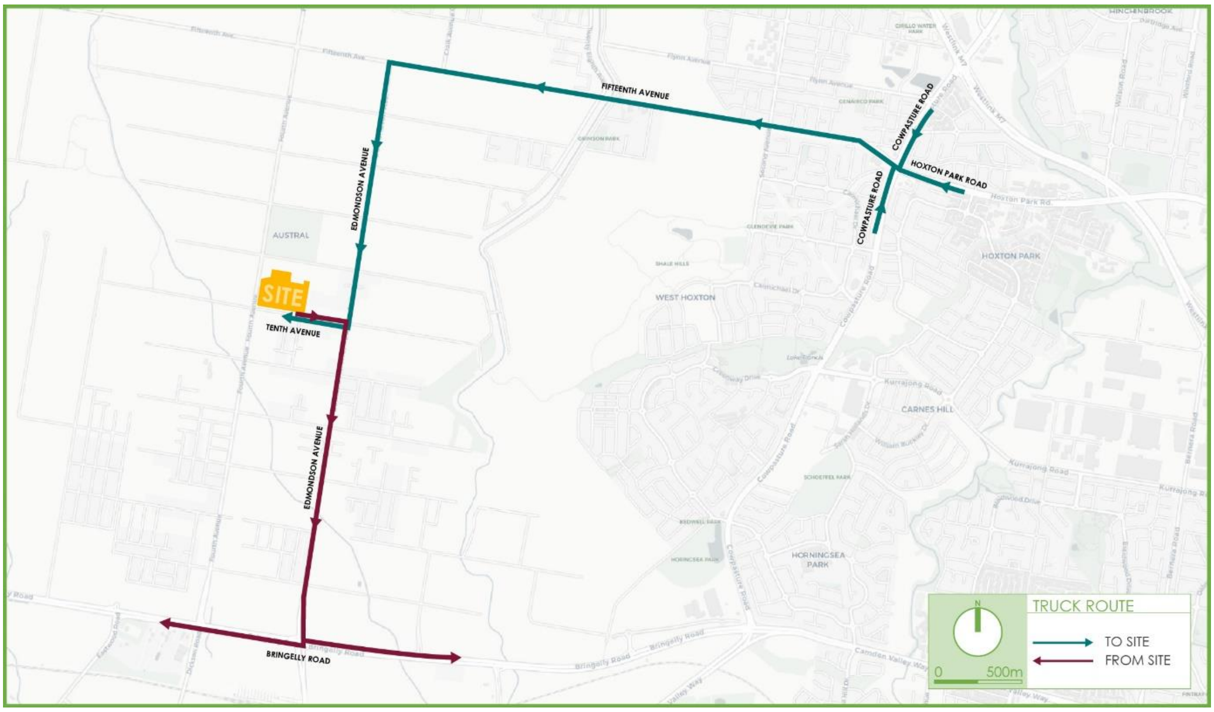


Figure 6: Proposed Eastern Truck Routes

5.2 Construction Access

All trucks will be linked via CB radio and/or hands-free mobile and will only be called onto site when required and when there is sufficient capacity to accommodate the proposed trucks. This management of loading / unloading or deliveries is envisaged to be the same throughout all stages of construction and will ensure no trucks would be required to queue or park on-street. The construction vehicle accesses to be utilised throughout all stages are outlined as follows:

- Heavy Vehicle Access
  - Situated on Tenth Avenue, approximately 225 metres east of Fourth Avenue;
  - 13.0m wide vehicular access at the property boundary;
  - Connected to the dedicated materials handling area;
  - 19.6 metre long truck and dog trailer maximum sized vehicles;
  - All vehicles required to enter and egress the site in a forward direction; and
  - SafeWork NSW certified Traffic Controllers to manage vehicular access.
- Light Vehicle Access
  - Situated on Tenth Avenue, approximately 235 metres east of Fourth Avenue;
  - 6.0m wide vehicular access at the property boundary;
  - Connected to the dedicated off-street contractor parking area;
  - B99 (vans and utes) maximum sized vehicles; and
  - All vehicles required to enter and egress the site in a forward direction.

A swept path analysis has been undertaken and included in **Appendix D**, demonstrating satisfactory vehicle movements of the largest size vehicle to be accommodated on-site being a truck and dog. In addition to the above, all construction vehicles will be restricted to the following:

- Site access will be restricted to left-in and left out, except during road upgrade works on Tenth Avenue (west of the access), where site access will be restricted to right-in and left-out;
- Heavy vehicles with a length of 12.5-20.0 metres will be restricted to a maximum of 6 trucks per hour (6 in, 6 out) on school days between 7:00am-10:00am and 3:00pm-7:00pm, with intermittent stoppages for construction access to be minimised;
- No construction vehicle movements will be permissible during school peak drop-off and pick-up periods, being 8:00am-9:00am and 2:30pm-3:30pm; and
- Stoppages or delays to buses will not be permissible, with bus stop access to be maintained at all times throughout all stages of construction.

5.3 Crane Requirements

Temporary cranes are proposed to be utilised during all construction stages. It is understood that all cranes and pumps will be wholly contained on-site at all times.

5.4 Pedestrian Control

Pedestrian and cyclists access surrounding the site will be managed safely during all construction stages, with A-Class hoarding and Cyclone fencing as per the site establishment plans. As mentioned above, SafeWork NSW certified Traffic Controllers would be on hand at the vehicular access to manage vehicle and pedestrian movements, should vehicle movements equate to or exceed 10 truck movements (5 in, 5 out) per hour. These arrangements are considered acceptable and will ensure pedestrian safety is maintained at all times.

5.5 Employee Parking

In accordance with the DA Consent Condition C28, construction workers will be permitted to park on-site throughout all stages of construction, with a dedicated contractor parking area, accessible via a separate light vehicle access from Tenth Avenue. Reference should be made to the Site Establishment Plans in **Appendix C**, with an extract presented in **Figure 7** that shows sufficient area to accommodate all contractor parking on-site and within the 'Carpark 4' area.

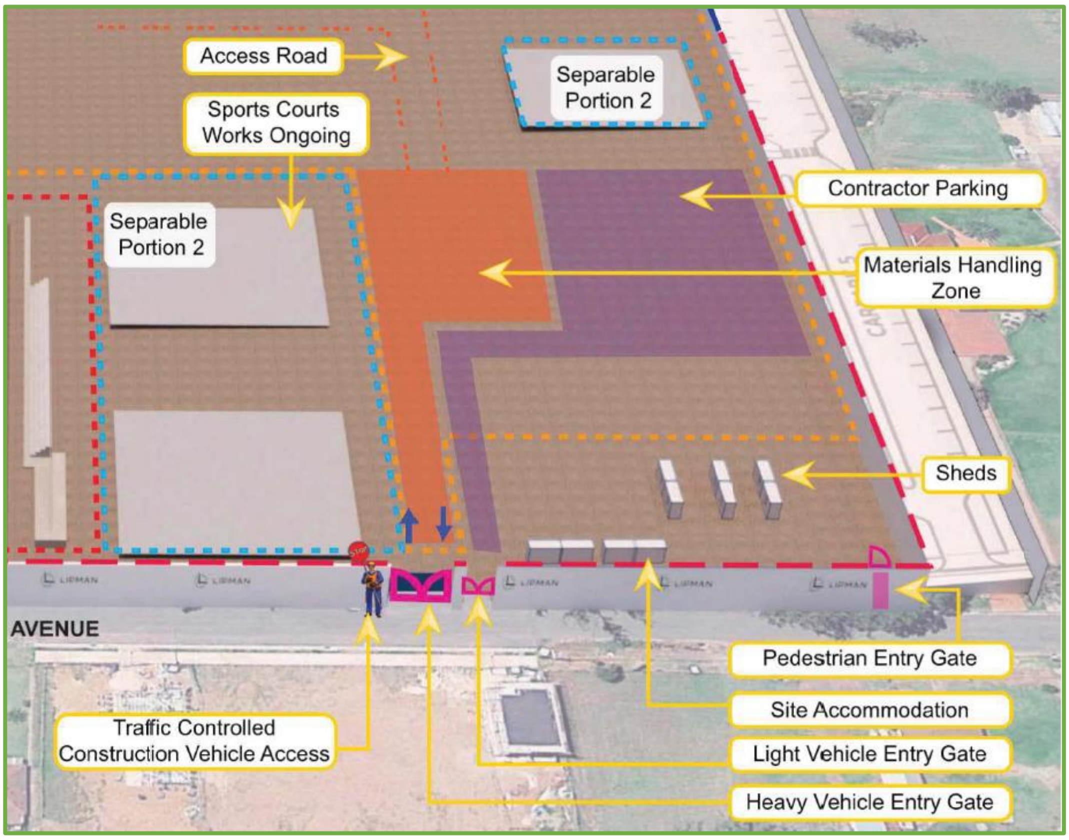


Figure 7: Contractor Parking Area

Accordingly, parking for all construction workers will be accommodated on- site. Nevertheless, workers will be encouraged to car-pool and utilise available public transport services in order to minimise the demand for surrounding on-street parking spaces. In the unlikely event workers park on-street, workers are to adhere to the signposted parking restrictions, NSW Road Rules and not obstruct residential access.

5.6 Community Contact

Appropriate signage with contact details (phone number and email) is to be installed at the site to allow local community members to make contacts in relation to work activities.

5.7 Driver Code of Conduct

All drivers will be required to adhere to the following driver code of conduct:

a) Minimise the impacts of earthworks and construction on the local and regional road network;
b) Minimise conflicts with other road users;
c) Minimise road traffic noise; and
d) Ensure truck drivers use specified routes – this will be addressed through the induction process.

5.8 Traffic Guidance Scheme

The TGS included in **Appendix E** demonstrate the proposed signage and traffic management measures to be adopted during all stages of construction. This TGS will ensure all vehicular access and pedestrian traffic is managed safely and efficiently, with copies of the TGS to be kept on-site at all times. This TGS has been designed in accordance with the *TfNSW Traffic Control at Works Sites Technical Manual*.

6. CONCLUSION

This report should be read in conjunction with other construction documentation prepared by Lipman Pty Ltd relating to the internal construction activities. The plan outlined above is considered satisfactory and will minimise any disruptions to the neighbouring developments. This plan meets all required of the *TfNSW Traffic Control at Work Sites Technical Manual* and is recommended for adoption.

APPENDIX A

Curriculum Vitae

TRAFFIX
TRAFFIC AND TRANSPORT PLANNERS

VINCE DOAN

DIRECTOR

Qualifications and Associations

- BE (Civil) University of Western Sydney
- Australian Institute of Traffic Planning and Management (AITPM), Committee Member
- Australian Institute of Company Directors, Member
- Registered Professional Engineer of Queensland (RPEQ)
- National Engineering Register (NER), Engineers Australia
- Senior Road Safety Auditor (Level 2)
- RMS Prepare a Work Zone Traffic Management Plan
- SIDRA Intersection Modelling (Advanced)

Areas of Expertise

Vince is one of TRAFFIX's directors with expertise in all areas of traffic engineering and transport planning.

Vince has been involved in various projects for both developers and government agencies ranging from traffic impact assessments, construction traffic management plans, master plans to infrastructure planning. This experience allows Vince to provide strategic and specialist advice on transport planning issues that ensure the best possible outcome on all projects. Vince also appears as an expert witness at the Land and Environment Court for Section 34 conciliations and court hearings.

Vince consults directly with architects, planners and developers to achieve optimal design outcomes for their projects, and can liaise directly with consent authorities on behalf of stakeholders to secure support on critical issues. He is also skilled in the analysis of traffic generation, trip distribution and intersection design.

Examples of typical projects completed by Vince can be seen below.

Relevant Experience

452-460 Willoughby Road, Willoughby

Vince has appeared as an expert witness at a Land and Environment Court hearing to give evidence on the traffic and parking impacts of a childcare centre at 452-460 Willoughby Road, Willoughby.

102-104 Bannockburn Road, Pymble

Vince has appeared as an expert witness at a Land and Environment Court hearing to give evidence on the traffic and parking impacts of an independent seniors living development at 102-104 Bannockburn Road, Pymble.

597 Darling Street, Rozelle

Vince has appeared as an expert witness at a Section 34 conciliation conference at the Land and Environment Court to give evidence on the traffic and parking impacts of a mixed-use development at 597 Darling Street, Rozelle.

44 Willis Street, Randwick

Vince has appeared as an expert witness at a Section 34 conciliation conference for the Land and Environment Court, to give evidence on the traffic and parking impacts of a boarding house development at 44 Willis Street, Randwick.

4-8 Marian Street, Killara

Vince has provided assessment of the traffic and parking impacts as an expert witness for a Section 34 conciliation conference at the Land and Environment Court for a residential flat building at 4-8 Marian Street, Killara.

Scottish Hospital

Vince has worked on numerous aged care facilities and seniors independent living units. Works for these projects consist of a Construction Traffic Management Plan for several stages, Construction Certificate and Occupation Certificate.

TOLL Expansion, MFive Industry Park

Vince has been involved in numerous industrial developments, including a Traffic Impact Assessment for the expansion of the TOLL facilities at the MFive Industry Park.

This study involved design review of circulation and loading dock facilities in addition to the traffic impact on the surrounding road network.

Wrigleys Warehouse, Asquith

This project included the relocation and extension of an existing parking area and the construction of handstand areas for trucks accessing the loading areas at the site.

Vince performed the traffic assessment for the site, which included the geometric design of a new site access in accordance with Austroads, investigation of existing car parking and operational vehicle patterns at the site and swept path assessment using AutoTrack for articulated vehicles accessing all loading areas at the site.

Orica, Denison Street, Banksmeadow

SIDRA intersection modelling of five intersections for Stage 1 Orica site.

The traffic study focused on the local Council road network, in particular its performance and condition. The model was developed to assess the impacts of the proposed industrial development along with the infrastructure improvements specifically providing signalisation of the priority intersection of Botany Road with Exell Street.

Vineyard Gateway Hotel, Windsor

Preparation of a Traffic Impact Assessment associated with the redevelopment, including review of parking demands, access and internal circulation design and traffic impacts on surrounding road network.

ALDI Distribution Centre, Minchinbury

Preparation of a Traffic Impact Assessment report in support of the expansion of the existing ALDI Distribution Centre in Minchinbury.

This study involved design review of circulation, parking areas and all loading facilities for commercial vehicles, as well as the analysis of parking requirements according to Council and state government requirements. In addition, SIDRA intersection modelling was undertaken for five intersections in the locality for light and heavy vehicle distributions. Developed the site-specific parking rate to project the future parking demand.

83-85 Percival Road, Smithfield

Vince has undertaken an assessment of the traffic and parking impacts of an industrial estate at 83-85 Percival Road, Smithfield.

This study involved design review of circulation, loading dock facilities and car parking.

Residential Rezoning, Gledswood Hills

Vince has assessed a number of residential subdivision projects including a Planning Proposal at Gledswood Hills.

Mixed-Use Development, Mowbray Road and Willoughby Road – Planning Proposal

Performed site investigation to obtain the existing traffic flow in the local area and undertook site surveys to obtain the existing traffic generation (for light and heavy vehicles) and the parking demand.

Developed the site-specific parking rate to project the future parking demand. Performed intersection performance testing using SIDRA Intersection to determine future level of service for the key intersections tested.

110-118 Bathurst St & 203 Castlereagh St, Sydney

Vince has worked on numerous stages of this project including the preparation of a Traffic Impact Assessment, a Construction Traffic and Pedestrian Management Plan (which involved consultation with CBD Coordination Office), road closure works on Bathurst Street and certification report for the Construction Certificate.

South Werrington

Vince has prepared a traffic study for the South Werrington Master Plan. This included numerous stages of assessment and SIDRA Intersection modelling. The modelling was required to take into account Werrington Arterial Road and future expansions.

159-161 Epping Road, Macquarie Park

Preparation of a Traffic Impact Assessment report in support of a residential development at 159-161 Epping Road, Macquarie Park.

This study involved design review of circulation, parking areas and all loading and refuse facilities. In addition, liaising with RMS to ensure a supportable vehicular access arrangement. SIDRA intersection modelling was also undertaken for the existing and future scenarios.

TRAFFIX
TRAFFIC AND TRANSPORT PLANNERS

NEIL CAGA
TRAFFIC ENGINEER

Qualifications and Associations

- Bachelor of Engineering Technology (Civil) Western Sydney University

Areas of Expertise

Neil is a traffic engineer who joined TRAFFIX in 2017 and has experience in areas related to the preparation of traffic impact assessments, planning proposals, green travel plans, construction traffic management plans (CTMPs) and internal management plans.

Neil is proficient in the analysis of traffic generation, trip distribution and traffic modelling using SIDRA Intersection. He has extensive knowledge of Australian Standards, Austroads Guidelines and Roads and Maritime Services requirements.

Relevant Experience

ALDI Distribution Centre, Minchinbury

Preparation of a Traffic Impact Assessment report in support of the expansion of the existing ALDI Distribution Centre in Minchinbury.

This study involved design review of circulation, parking areas and all loading facilities for commercial vehicles, as well as the analysis of parking requirements according to Council and state government requirements. In addition, SIDRA intersection modelling was undertaken for 5 intersections in the locality for light and heavy vehicle distributions.

Orica Southlands, Botany

Involvement in the production of a Traffic Impact Assessment report with a focus on swept path analysis and SIDRA intersection modelling for both light and commercial vehicles.

This traffic study was primarily aimed at 5 key intersections, in particular their performance and condition. The model was developed to assess the impacts of the proposed warehouse development.

Planning Proposal, Dundas

Preparation of a Traffic Impact Assessment report in support of a Planning Proposal for potential high density residential and retail uses within the Dundas Precinct.

Undertook trip distribution analysis of key signalised intersections at major arterial roads within the vicinity of the site under existing and future development scenarios.

Construction Traffic Management Plan, Prestons

Preparation of a CTMP for the construction of a warehouse development and an ancillary office.

This study involved the preparation of truck routes, Traffic Control Plans (TCPs) and design reviews for construction vehicle access to and from the subject site, as well as associated key intersections in the locality. A subsequent Design Compliance Statement was also prepared, which involved extensive swept path analysis of commercial vehicles to all loading facilities.

Mixed-Use Development, Mount Druitt

Preparation of a Traffic Impact Assessment report in support of a development application for a mixed-use development comprising of residential, commercial and retail components.

This study involved swept path analysis for light and service vehicles for 4 buildings, as well as analysis of parking requirements in accordance with Council and state government requirements. In addition, SIDRA Intersection modelling was undertaken for 2 key intersections along the frontage of the site.

Green Travel Plan, Mosman

Preparation of a Green Travel Plan for the Taronga Institute of Science and Learning involving Green Star requirements.

This study involved extensive research and surveys of existing travel modes, as well as public and active transport initiatives for both visitors and students of the development.

APPENDIX B

Council Consultation

Neil Caga

Subject: FW: SCS - St Anthony of Padua Catholic School - Stage 4 - SSDA Condition C20 [22.212]

From: Mahavir Arya
Sent: Wednesday, 18 May 2022 4:13 PM
To: Rocco Bombardiere; Charles Wiafe
Cc: Tim Calpito; Jim Gilvarry; Robin Merrick; Billy Vasiliou
Subject: Re: SCS - St Anthony of Padua Catholic School - Stage 4 - SSDA Condition C20

Hi Rocco

To satisfy this condition, please provide a copy of Construction Traffic Management Plan (CTMP) for Council comments. Please use Assessment of Construction Traffic Management Plan application form which is available on Council website indicates required information to be included with the CTMP. Submission of the CTMP will satisfy the consent condition C20.

In addition, Traffic Operational Plan is also required. This plan is to include pedestrian and traffic movements following completion of the construction activities and is regularly been reviewed in consultation with Council's Road Safety Officer to ensure road safety in and around the school.

Please contact me should you be having any further questions.

Regards
Mahavir
Mahavir Arya
Transport Engineer

LIVERPOOL CITY COUNCIL

02 8711 7592 | | AryaM@liverpool.nsw.gov.au
Customer Service: 1300 36 2170 | 33 Moore Street Liverpool, NSW 2170, Australia
www.liverpool.nsw.gov.au

From: Rocco Bombardiere
Sent: Wednesday, 18 May 2022 3:46 PM
To: Mahavir Arya; Charles Wiafe
Cc: Tim Calpito; Jim Gilvarry; Robin Merrick; Billy Vasiliou
Subject: SCS - St Anthony of Padua Catholic School - Stage 4 - SSDA Condition C20

Hi Mahavir & Charles,

Seek your assistance on a contact in Council who would assist with consultation on the Construction Traffic & Pedestrian Management Plan review.

C20	A Construction Traffic and Pedestrian Management Sub-Plan (CTPMSP) must be prepared to achieve the objective of ensuring safety and efficiency of the road network and address, but not be limited to, the following:
	(a) be prepared by a suitably qualified and experienced person(s);
	(b) be prepared in consultation with Council;
	(c) detail the measures that are to be implemented to ensure road safety and network efficiency during construction in consideration of potential impacts on general traffic, cyclists and pedestrians and bus services; and
	(d) detail heavy vehicle routes, access and parking arrangements.
	AED REQUIREMENTS
	• ***Provide a copy of the Construction Traffic and Pedestrian Management Sub-Plan (CTPMSP), prepared in accordance with this condition.***

Kind regards

Rocco

Rocco Bombardiere
Associate Director

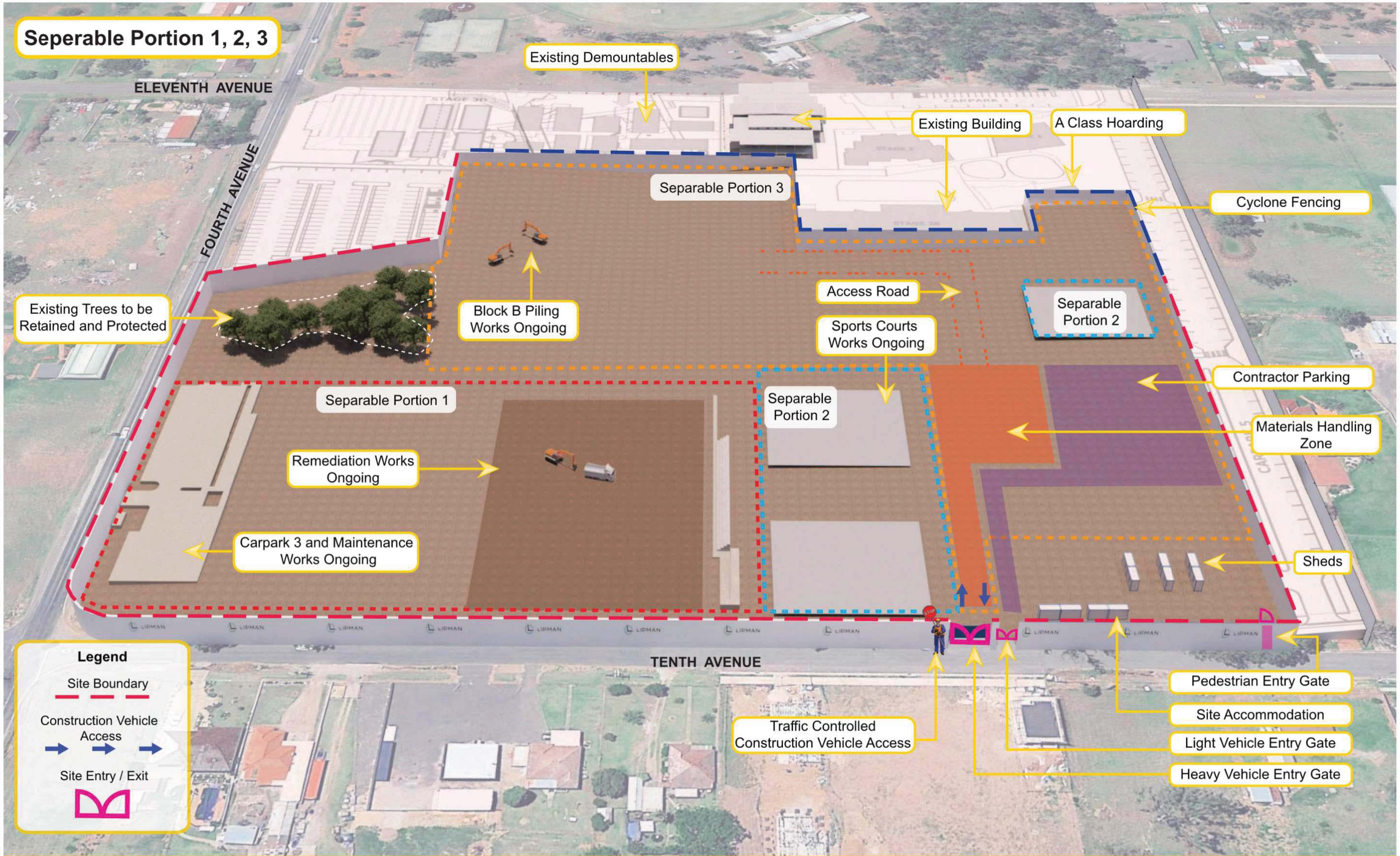
ctpg

Carmichael Tompkins Property Group
Suite 14.04, Level 14 Aurora Place, 88 Phillip Street, Sydney NSW 2000
T: +61 (0)2 9160 6305
M: +61 (0)438 678 912
E: rocco.bombardiere@ctpg.com.au
www.ctpg.com.au

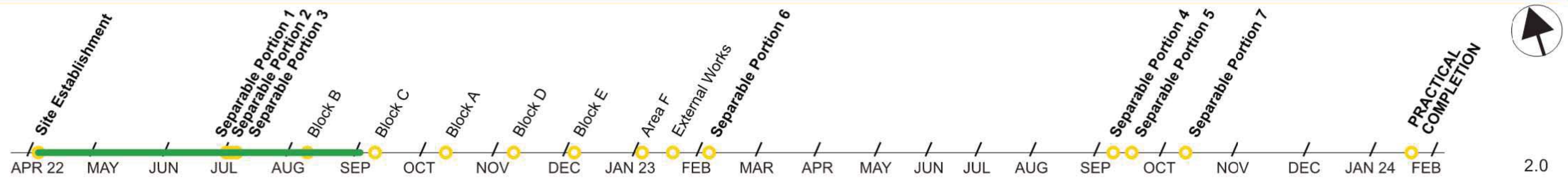
Sydney | Melbourne

APPENDIX C

Site Establishment Plans



LIPMAN
DESIGNED TO PERFORM • BUILT TO LAST



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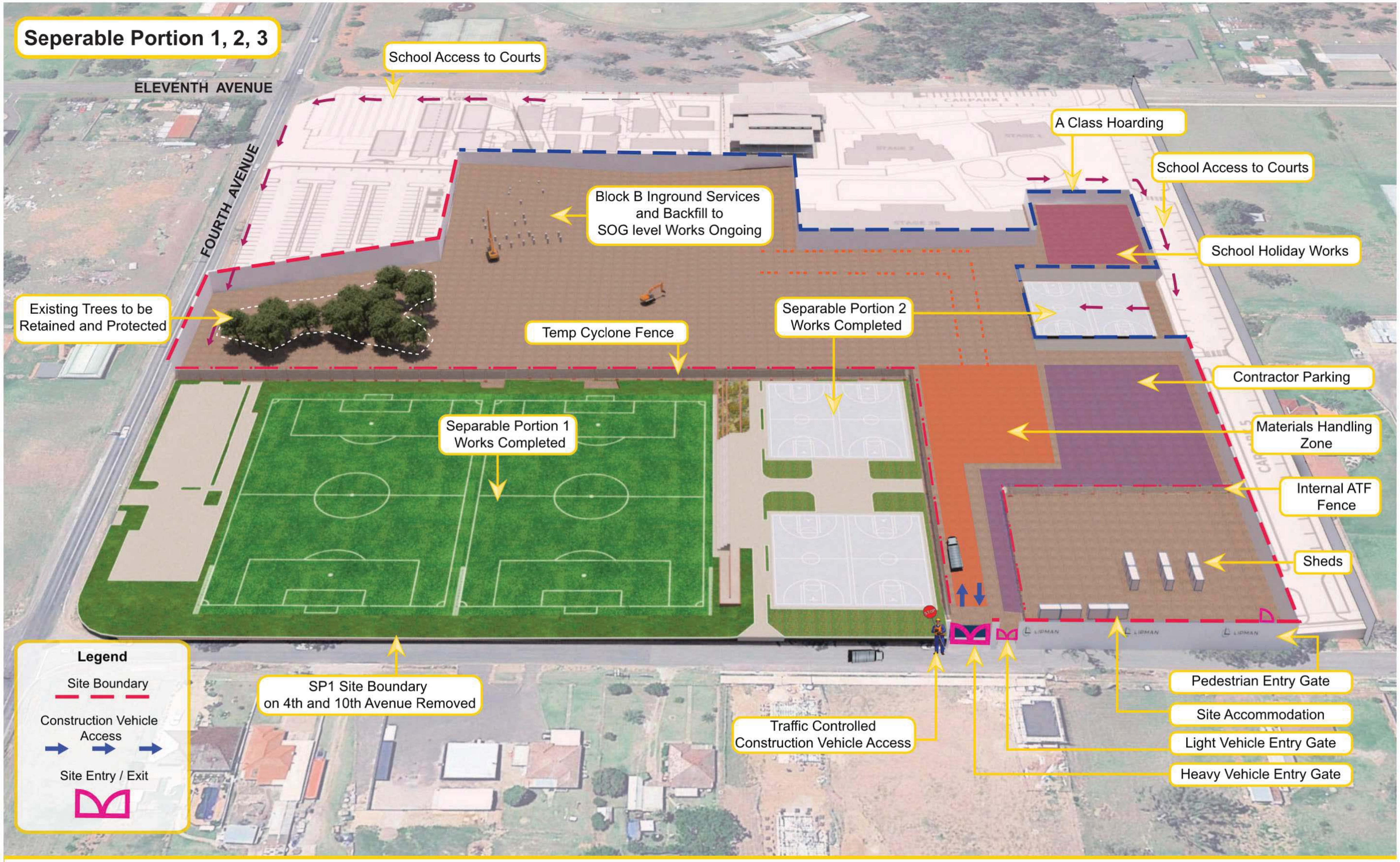
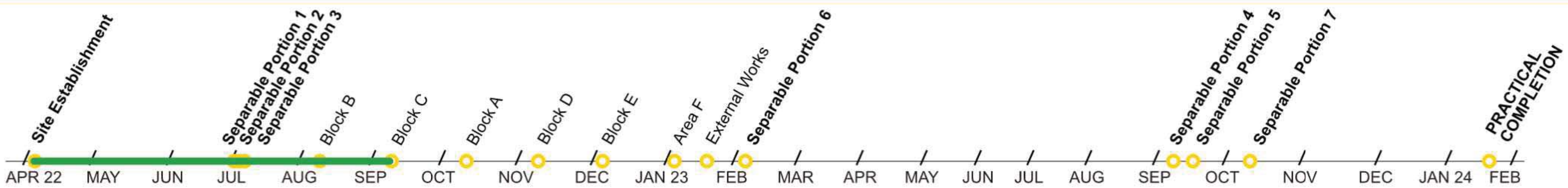


LIPMAN

DESIGNED TO PERFORM • BUILT TO LAST



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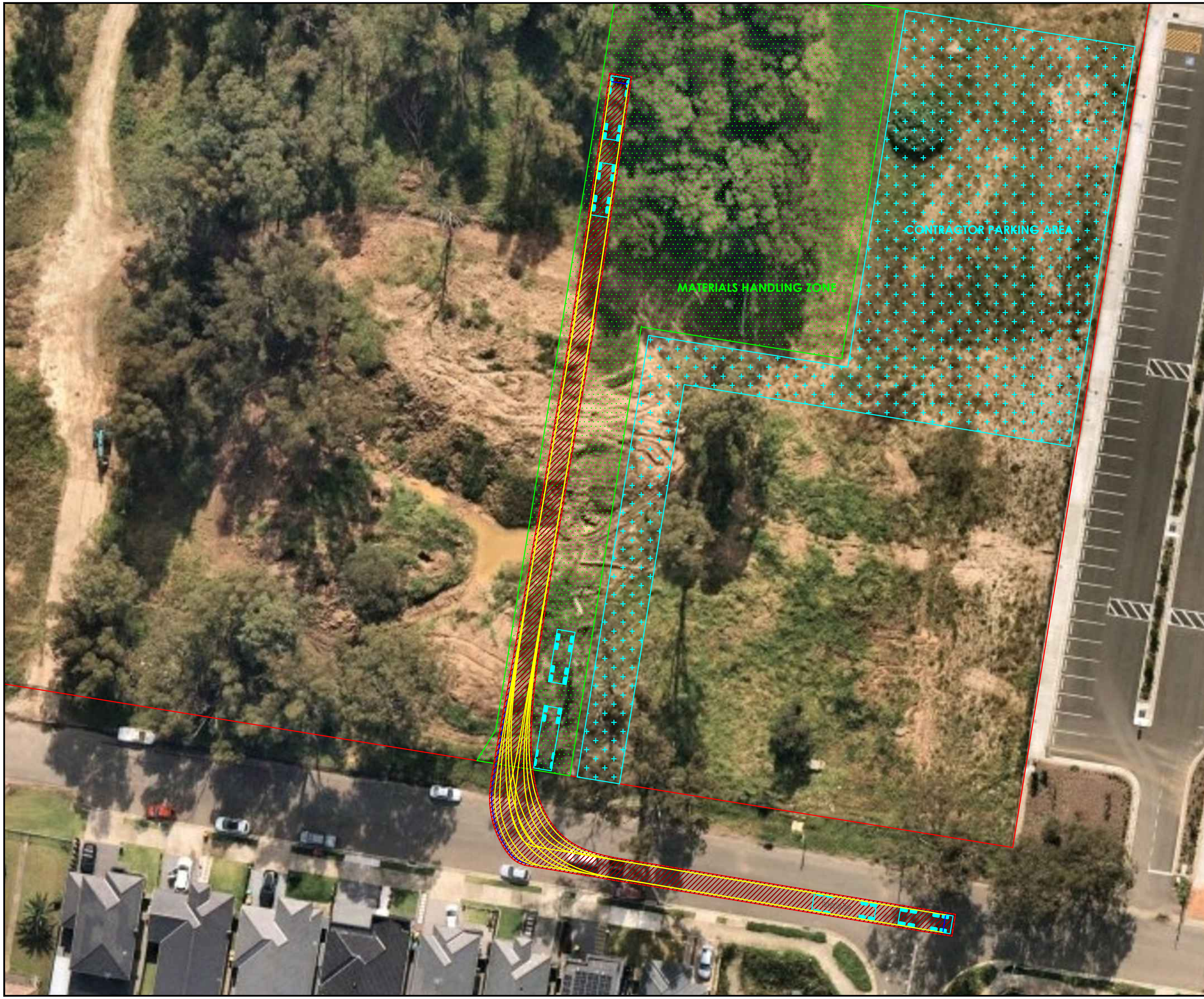
APPENDIX D

Swept Path Analysis



Notes:

This drawing is prepared for information purposes only. It is not to be used for construction.

TRAFFIX is responsible for vehicle swept path diagrams and/or drawing mark-ups only. Base drawing prepared by others.

Vehicle swept path diagrams prepared using computer generated turning path software and associated CAD drawing platforms. Vehicle data based upon relevant Australian Standards *(AS/NZS 2890.1:2004 Parking facilities - Off-street car parking*, and/or *AS2890.2:2002 Parking facilities - Off-street commercial vehicle facilities*). These standards embody a degree of tolerance, however the vehicle characteristics in these standards represent a suitable design vehicle and do not account for all variations in vehicle dimensions / specifications and/or driver ability or behaviour.

Rev.	Revision Note	By.	Date
A	Swept Path Analysis	NC	26-05-2022

Swept Path Legend

- Wheel Path
- Vehicle Body Envelope
- Clearance Envelope (300mm)

Architect

Client
Lipman Pty Ltd

Scale / Plan Orientation
0 5 10 15 20m
1:500 @ A3

Project Description
140 Eleventh Avenue
AUSTRAL NSW 2179

Drawing Prepared By

TRAFFIX
TRAFFIC AND TRANSPORT PLANNERS

Suite 2.08, 50 Holt Street
Surry Hills, NSW 2010
PO Box 1124
Strawberry Hills, NSW 2012
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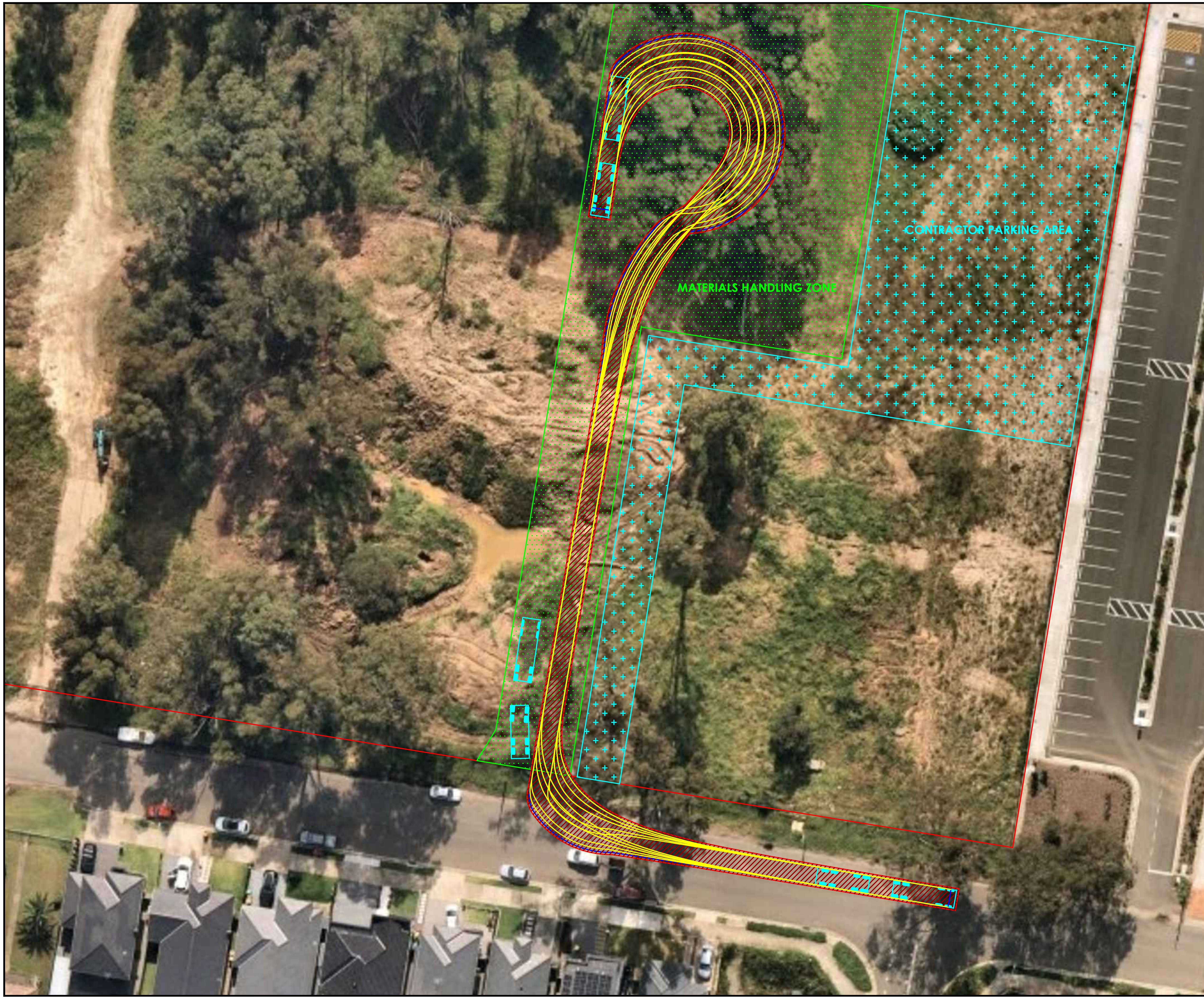
f: +61 2 9830 4481
w: www.traffix.com.au

Drawing Title
Swept Path Analysis
Construction Vehicle Access
19.6m Truck and Dog Trailer
Vehicle Entry Movement - Eastern Approach

Drawn: NC	Checked: VD	Date: 26-05-2022

22.212d01v01 TRAFFIX [CTPMSP] - Swept Path Analysis.dwg

Project No.	Drawing Phase	Drawing No.	Rev.
22.212	CTPMSP	TX.01	A



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Rev.	Revision Note	By.	Date
A	Swept Path Analysis	NC	26-05-2022

Swept Path Legend

- Wheel Path
- Vehicle Body Envelope
- Clearance Envelope (300mm)

Architect

Client
Lipman Pty Ltd

Scale / Plan Orientation

0 5 10 15 20m
1:500 @ A3

Project Description
140 Eleventh Avenue
AUSTRAL NSW 2179

Drawing Prepared By

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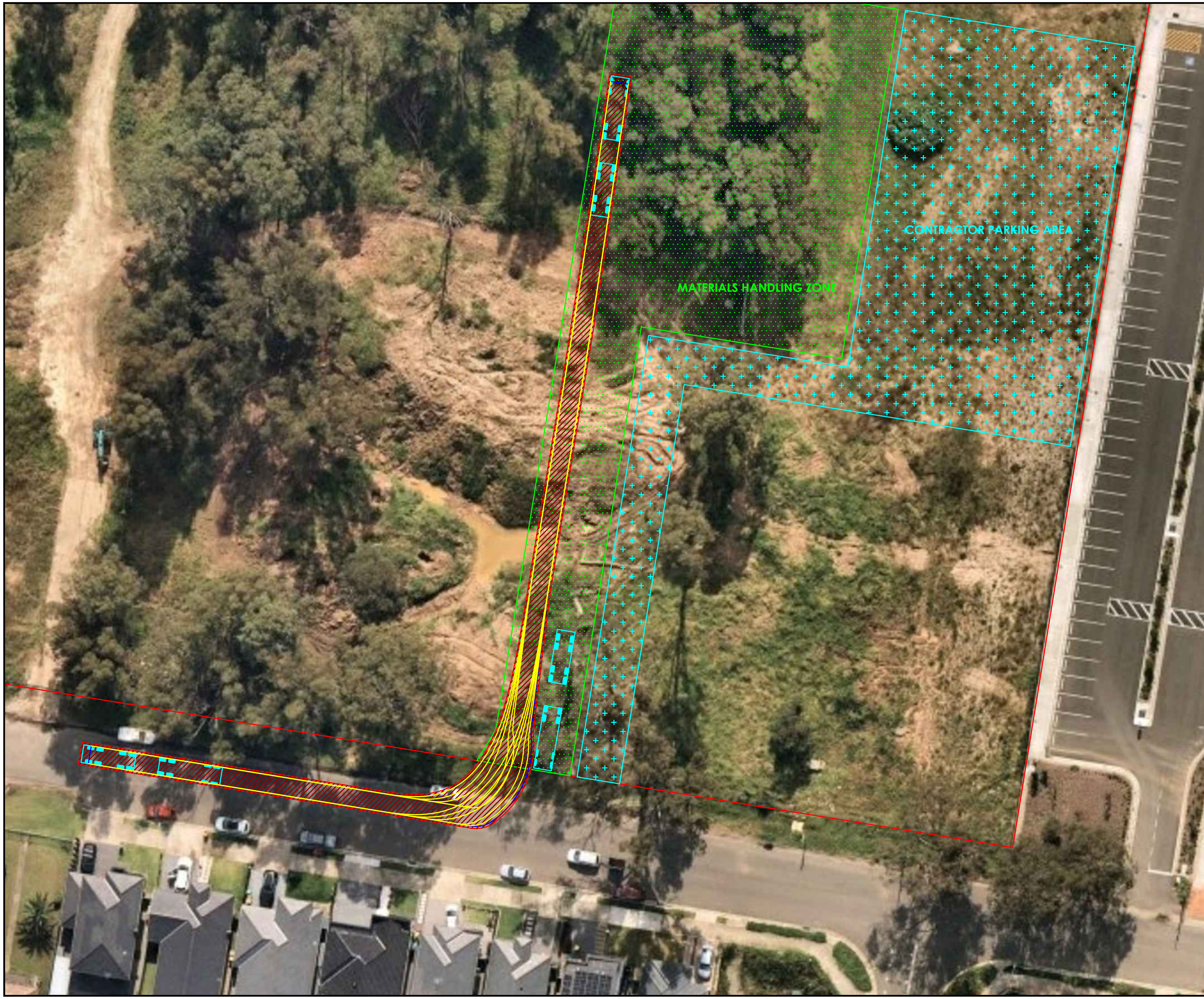
Strawberry Hills, NSW 2012
t: +61 2 8324 8700
f: +61 2 9830 4481
w: www.traffix.com.au

Drawing Title
Swept Path Analysis
Construction Vehicle Access
19.6m Truck and Dog Trailer
Vehicle Exit Movement - Eastbound

Drawn: NC	Checked: VD	Date: 26-05-2022

22.212d01v01 TRAFFIX [CTPMSP] - Swept Path Analysis.dwg

Project No.	Drawing Phase	Drawing No.	Rev.
22.212	CTPMSP	TX.02	A



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Rev.	Revision Note	By.	Date
A	Swept Path Analysis	NC	26-05-2022

Swept Path Legend

- Wheel Path
- Vehicle Body Envelope
- Clearance Envelope (300mm)

Architect

Client

Lipman Pty Ltd

Scale / Plan Orientation

0 5 10 15 20m

1:500 @ A3

Project Description

140 Eleventh Avenue
AUSTRAL NSW 2179

Drawing Prepared By

TRAFFIX
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w: www.traffix.com.au

Drawing Title

Swept Path Analysis
Construction Vehicle Access
19.6m Truck and Dog Trailer
Vehicle Entry Movement - Western Approach

Drawn: NC	Checked: VD	Date: 26-05-2022

22.212d01v01 TRAFFIX [CTPMSP] - Swept Path Analysis.dwg

Project No.	Drawing Phase	Drawing No.	Rev.
22.212	CTPMSP	TX.03	A

Notes:

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Rev.	Revision Note	By.	Date
A	Swept Path Analysis	NC	26-05-2022

Swept Path Legend

- Wheel Path
- Vehicle Body Envelope
- Clearance Envelope (300mm)

Architect

Client
Lipman Pty Ltd

Scale / Plan Orientation
0 5 10 15 20m
1:500 @ A3

Project Description
140 Eleventh Avenue
AUSTRAL NSW 2179

Drawing Prepared By

TRAFFIX
TRAFFIC AND TRANSPORT PLANNERS

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Surry Hills, NSW 2010
PO Box 1124
Strawberry Hills, NSW 2012

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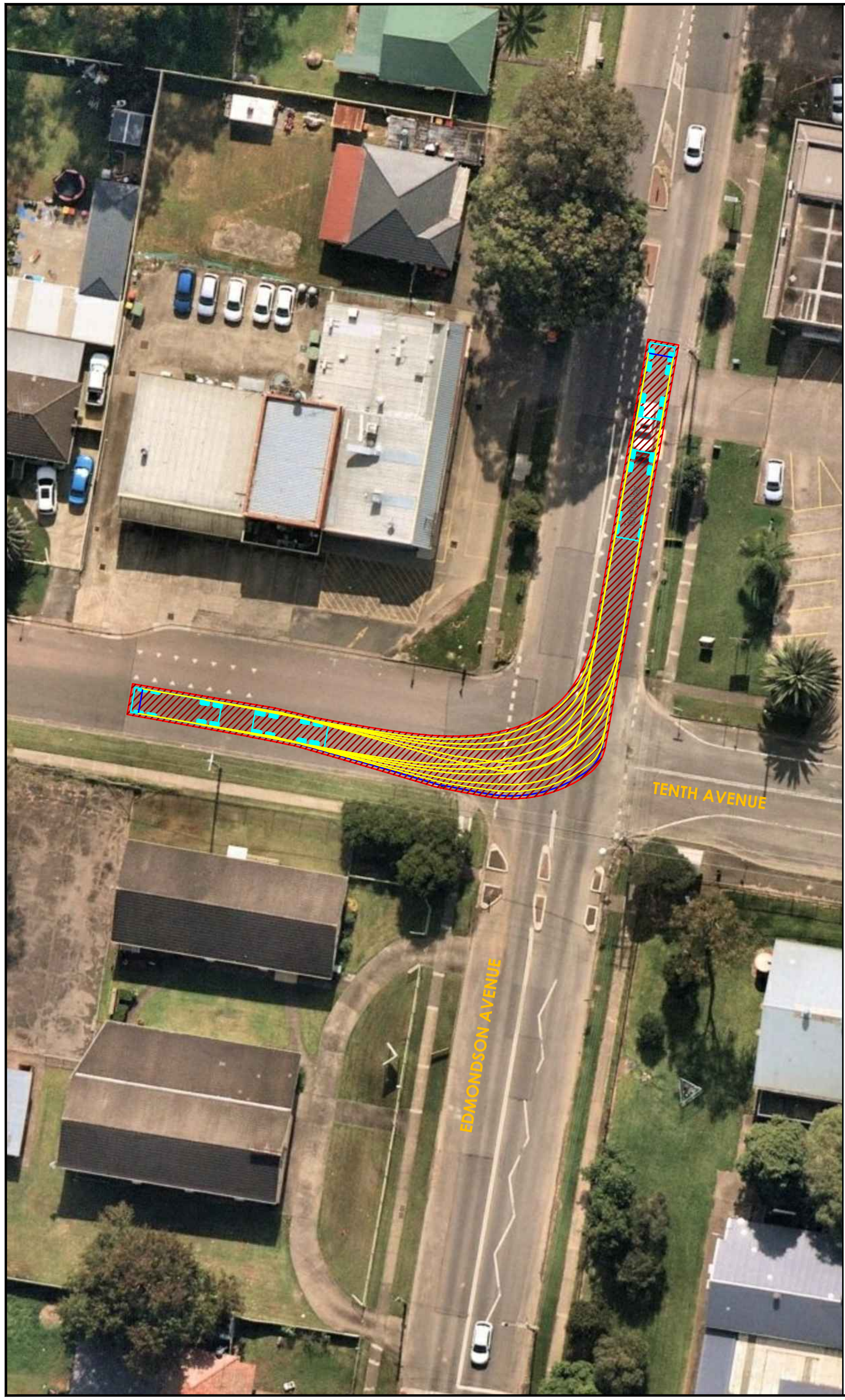
w: www.traffix.com.au

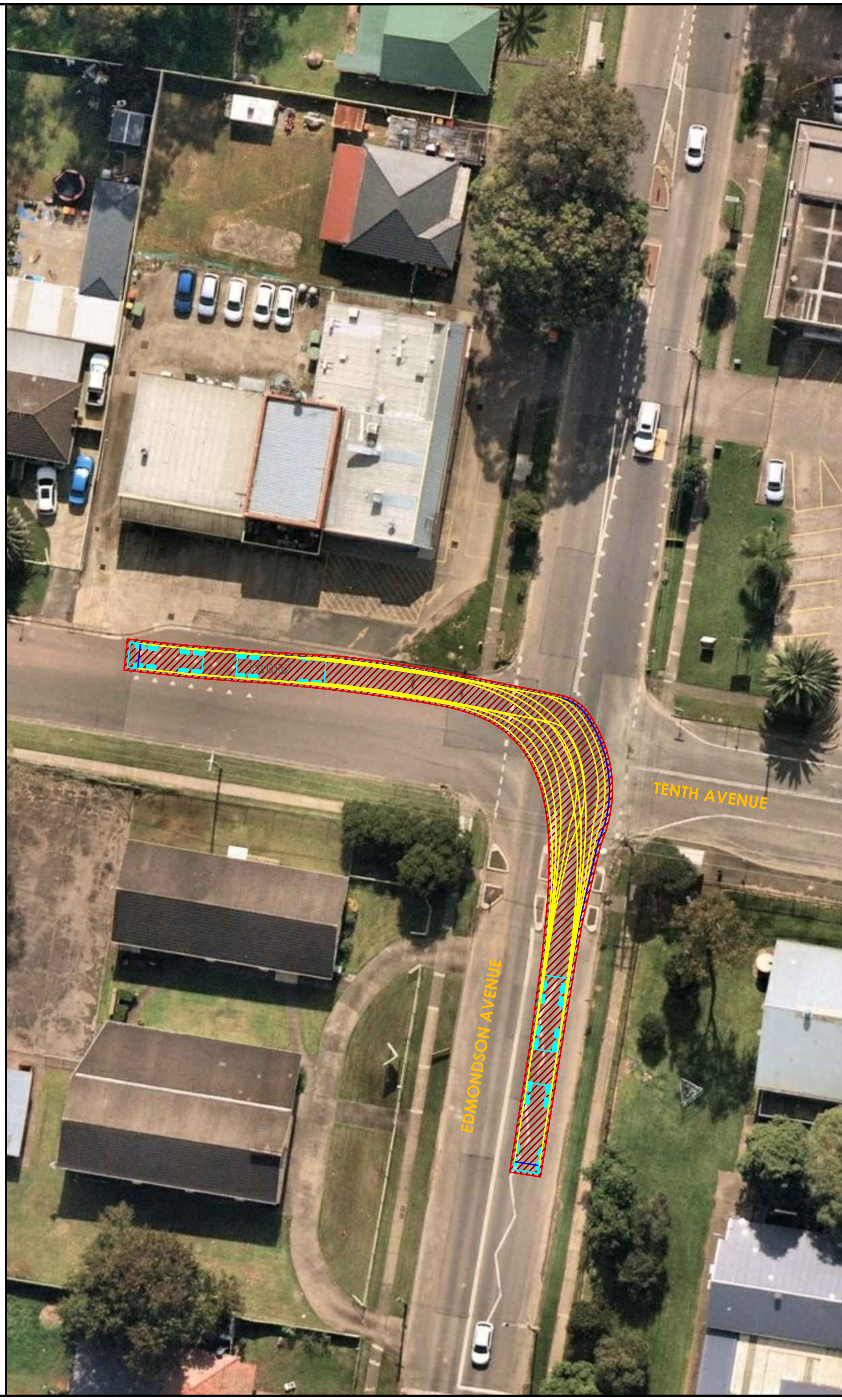
Drawing Title
Swept Path Analysis
Construction Vehicle Access
19.6m Truck and Dog Trailer
Vehicle Exit Movement - Westbound

Drawn: NC	Checked: VD	Date: 26-05-2022

22.212d01v01 TRAFFIX [CTPMSP] - Swept Path Analysis.dwg

Project No.	Drawing Phase	Drawing No.	Rev.
22.212	CTPMSP	TX.04	A





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Rev.	Revision Note	By.	Date
A	Swept Path Analysis	NC	26-05-2022

Swept Path Legend

- Wheel Path
- Vehicle Body Envelope
- Clearance Envelope (300mm)

Architect

Client
Lipman Pty Ltd

Scale / Plan Orientation

0 5 10 15 20m
1:500 @ A3

Project Description
140 Eleventh Avenue
AUSTRAL NSW 2179

Drawing Prepared By

TRAFFIX
TRAFFIC AND TRANSPORT PLANNERS

Suite 2.08, 50 Holt Street
Surry Hills, NSW 2010
PO Box 1124
Strawberry Hills, NSW 2012
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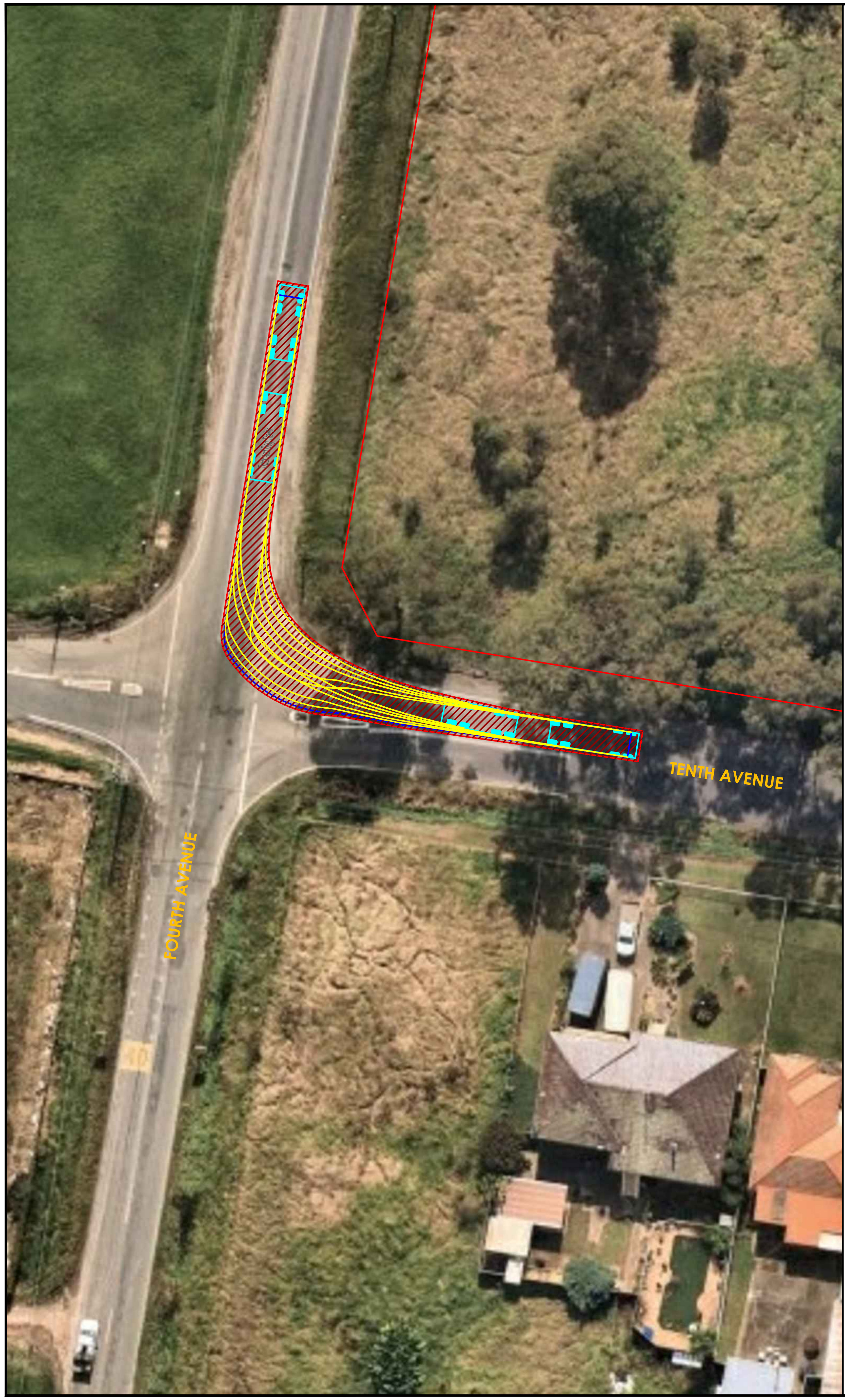
f: +61 2 9830 4481
w: www.traffix.com.au

Drawing Title
Swept Path Analysis - Truck Route (East)
Tenth Avenue and Edmondson Avenue
19.6m Truck and Dog Trailer
LEFT: Inbound Movement
RIGHT: Outbound Movement

Drawn: NC	Checked: VD	Date: 26-05-2022

22.212d01v01 TRAFFIX [CTPMSP] - Swept Path Analysis.dwg

Project No.	Drawing Phase	Drawing No.	Rev.
22.212	CTPMSP	TX.05	A



Notes:

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Rev.	Revision Note	By.	Date
A	Swept Path Analysis	NC	26-05-2022

Swept Path Legend
- Wheel Path
- Vehicle Body Envelope
- Clearance Envelope (300mm)

Architect

Client
Lipman Pty Ltd

Scale / Plan Orientation
0 5 10 15 20m
1:500 @ A3

Project Description
140 Eleventh Avenue
AUSTRAL NSW 2179

Drawing Prepared By
TRAFFIX
TRAFFIC AND TRANSPORT PLANNERS

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Surry Hills, NSW 2010
PO Box 1124
Strawberry Hills, NSW 2012
t: +61 2 8324 8700
f: +61 2 9830 4481
w: www.traffix.com.au

Drawing Title
Swept Path Analysis - Truck Route (West)
Tenth Avenue and Fourth Avenue
19.6m Truck and Dog Trailer
LEFT: Inbound Movement
RIGHT: Outbound Movement

Drawn: NC	Checked: VD	Date: 26-05-2022

22.212d01v01 TRAFFIX [CTPMSP] - Swept Path Analysis.dwg

Project No.	Drawing Phase	Drawing No.	Rev.
22.212	CTPMSP	TX.06	A

APPENDIX E

Traffic Guidance Scheme

TRAFFIX

TRAFFIC AND TRANSPORT PLANNERS

Suite 2.08, 50 Holt Street
Surry Hills, NSW 2010
(02) 8324 8700
info@traffix.com.au

LEGEND

- Construction Vehicle Access
- Contractor Vehicle Access
- Truck Movements to Site
- Truck Movements from Site

NOTES

- Plan not to scale.
- All signage dimension D shall comply with the minimum requirements of TfNSW TCAWS Technical Manual.
- Qualified personnel to undertake a site inspection prior to implementation.
- It must be noted that TRAFFIX is not responsible for the implementation of this TGS, which is the responsibility of the on-site qualified traffic controller.

PROJECT
140 ELEVENTH AVENUE AUSTRAL

PROJECT NUMBER
22.212

DATE
15.06.2022

CLIENT
LIPMAN

TGS 01
ALL STAGES OF CONSTRUCTION

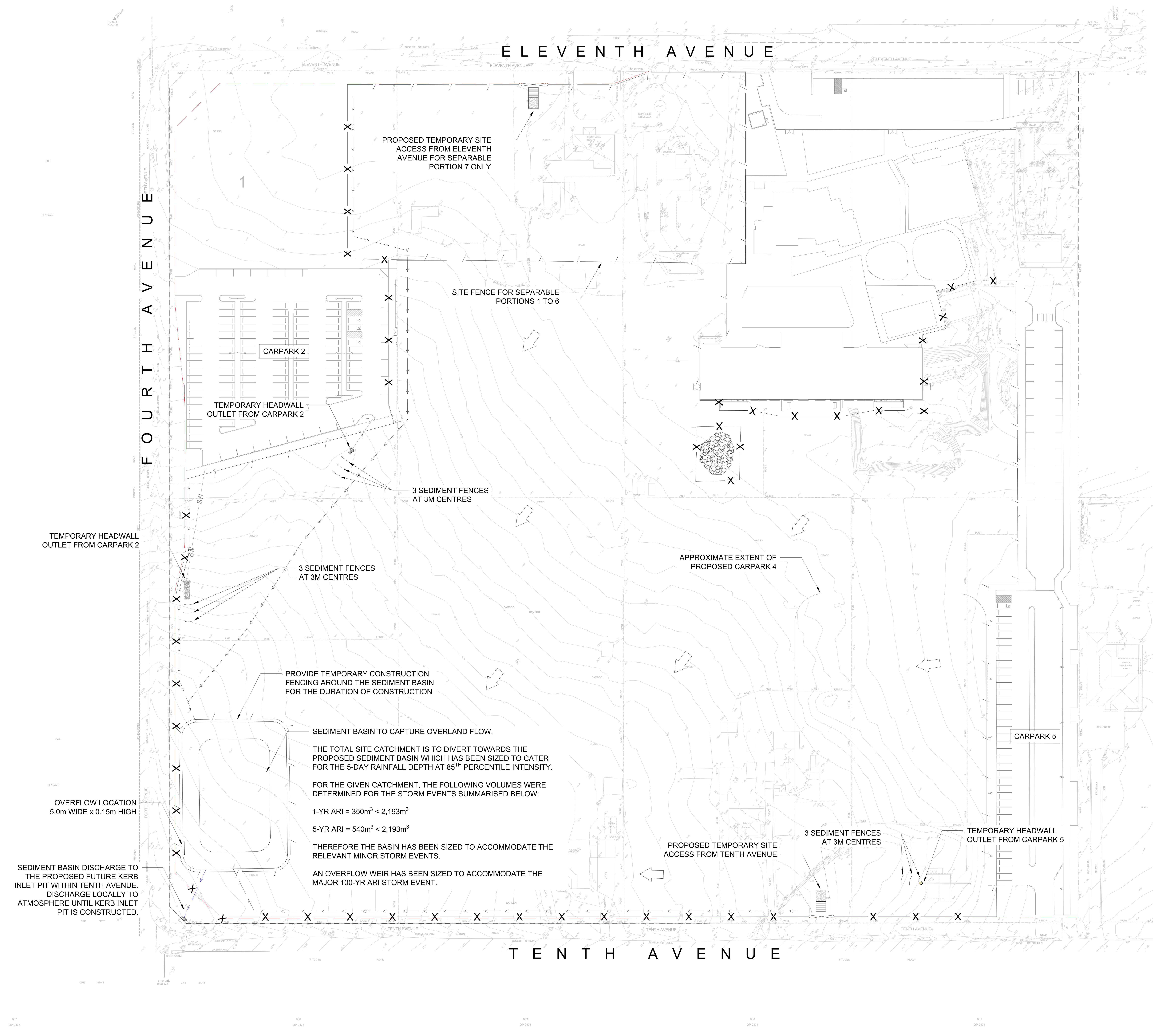
PREPARED BY
VINCE DOAN

APPROVED BY
VINCE DOAN

SAFEWORK NSW CARD NUMBER
TCT0075627

SIGNATURE

APPENDIX C – Sediment and Erosion Control Plans



SEDIMENTATION BASIN NOTES:

SEDIMENT BASIN HAS BEEN SIZED IN ACCORDANCE WITH THE 'SOILS AND CONSTRUCTION, MANAGING URBAN STORMWATER' (BLUE BOOK).

CAPACITY OF BASIN IS BASED ON 5-DAY RAINFALL DEPTH AT 85^{TH} PERCENTILE INTENSITY (32.2mm).

APPROXIMATE DISTURBED SITE AREA = 6.750 ha

REQUIRED SETTLING ZONE	= 1,391 m3
REQUIRED SEDIMENT STORAGE ZONE	= 696 m3
REQUIRED BASIN VOLUME	= 2087 m3
BASE DIMENSIONS	= 25m x 40m
TOP DIMENSIONS	= 37m x 52m
MAX. SIDE SLOPE	= 1V:4H
DEPTH	= 1.5 m
PROVIDED BASIN VOLUME	= 2,193 m3

CONSTRUCTION WORK MANAGEMENT IN WET- WEATHER EVENTS:

- ALL STOCKPILES TO BE CAPPED.
- CARPARK 4 TO BE UTILISED AS TEMPORARY MATERIALS HANDLING AND STORAGE AREA. AREA TO BE STABILISED BY DGB AND SEALED.
- DURING WET WEATHER ALL PLANT AND EQUIPMENT TO BE STORED ON CARPARK 4.
- STABLISED ACCESS ROADS TO BE INSTALLED FROM CARPARK 4 TO RELEVANT WORKFACES.
- AFTER EVERY RAIN EVENT, SAFETY INSPECTION TO BE CARRIED OUT PRIOR TO WORKS RECOMMENCING.

LEGEND

- EXISTING SITE BOUNDARY
- PROPOSED SITE BOUNDARY
- SITE FENCE
- SEDIMENT FENCE
- SITE GATE
- TEMPORARY CONSTRUCTION ACCESS
- SITE STOCKPILE
- GEOTEXTILE INLET FILTER - DROP INLET SEDIMENT TRAP
- DIVERSION DRAIN
- DISCHARGE FROM BASIN
- OVERLAND FLOW PATH

NOTES:

1. REFER TO PROJECT ARBORIST PLANS FOR TREES THAT ARE TO BE DEMOLISHED AND REMOVED FROM SITE.
2. IMPACTS AROUND EXISTING TREES SHOULD BE MINIMISED. PROPOSED LEVEL CHANGES IN THE VICINITY OF EXISTING TREES TO BE REVIEWED AND APPROVED BY PROJECT ARBORIST.
3. ALL WORKS AROUND EXISTING TREE ROOT PROTECTION ZONES TO BE CONFIRMED WITH PROJECT ARBORIST PRIOR TO COMMENCEMENT ON SITE.

SOIL AND WATER MANAGEMENT NOTES:

1. THIS PLAN HAS BEEN PREPARED IN ACCORDANCE WITH DEVELOPMENT CONSENT SSD-8865 TO ADDRESS ITEMS RELATING TO THE PREPARATION OF A CONSTRUCTION SOIL AND WATER MANAGEMENT PLAN.

2. ALL EROSION CONTROL MEASURES TO BE INSTALLED IN ACCORDANCE WITH LANDCOM MANAGING URBAN STORMWATER: SOILS AND CONSTRUCTION ('BLUE BOOK').

3. SEDIMENT FENCING TO BE PROVIDED IN ACCORDANCE WITH STANDARD DETAILS AS REQUIRED TO PREVENT SEDIMENT FROM LEAVING THE SITE. TEMPORARY CONSTRUCTION ENTRY/ EXIT SEDIMENT TRAPS ARE TO BE PROVIDED AT ENTRY/ EXIT LOCATIONS.

4. DIVERSION DRAINS TO BE PROVIDED TO DIVERT RUNOFF FROM DISTURBED AREAS TO THE SEDIMENT BASIN.

5. PIT INLET SEDIMENT TRAPS ARE TO BE PROVIDED AT ALL EXISTING STORMWATER INLET PITS LOCATION WITHIN AREA OF WORK.

SEDIMENT CONTROL CONDITIONS:

1. SEDIMENT FENCES WILL BE INSTALLED AS SHOWN AND ELSEWHERE AT THE DISCRETION OF THE SITE MANAGER TO CONTAIN COARSER SEDIMENT FRACTIONS INCLUDING AGGREGATED FINES AS CLOSE TO THE SOURCE AS PRACTICABLE.

2. SEDIMENT REMOVED FROM ANY TRAPPING DEVICE WILL BE RELOCATED WHERE FURTHER POLLUTION TO DOWNSTREAM LANDS AND WATERWAYS CANNOT OCCUR.

3. STOCKPILES WILL BE PLACED WHERE SHOWN ON PLAN OR ELSEWHERE AT THE DISCRETION OF THE SITE MANAGER, NOT WITHIN 5m OF ANY HAZARDOUS AREAS INCLUDING LIKELY AREAS OF HIGH VELOCITY FLOWS SUCH AS WATERWAYS, PAVED AREAS & DRIVEWAYS.

4. PIT INLET FILTERS (SEE DETAILS) WILL PREVENT WATER FROM DIRECTLY ENTERING THE PERMANENT DRAINAGE SYSTEM UNLESS IT IS FREE OF SEDIMENT.

5. TEMPORARY SEDIMENT TRAPS WILL BE RETAINED UNTIL AFTER THE LANDS THEY ARE PROTECTING ARE COMPLETELY REHABILITATED.

6. CONTRACTOR TO CONSTRUCT TEMPORARY SEDIMENT BASIN. WATER SHOULD BE ALLOWED TO SETTLE BEFORE DISCHARGE. CONTRACTOR MUST VERIFY THAT WATER QUALITY MEETS AUTHORITIES REQUIREMENTS PRIOR TO DISCHARGE. ACCUMULATED SEDIMENT SHOULD THEN BE REMOVED & DISPOSED OF IN ACCORDANCE WITH ENVIRONMENTAL MANAGEMENT PROCEDURES.

Xrefs: X-5914005-SU-Utilities; X-5914005-SU-Trees; X-5914005-SU-Ground; X-5914005-AR_Site Plan; X-5914005-DE_Road Contours; X-5914005-DE_Proposed Boundary; X-5914005-SU_Existing Boundary; X-5914005-TB_A1H - FOR LIPMAN
Plot Date: 01.07.2022@15:22:12 Login Name: NGupta Cad File: T:\5914005\Drawings\Aust\CAD\Civil\Design\Civil 20\Stage 4\C2.01 Construction Soil and Water Management Plan.dwg

NORTH

PLAN SCALE 1:750 A1 SHEET (12.5 0 5 10 15 20 25m)

REVISION	AMENDMENT	DATE
1	ISSUE FOR INFORMATION	27/05/22
2	ISSUE FOR CONSTRUCTION CERTIFICATE	30/05/22
3	CC1 - ISSUE FOR CONSTRUCTION CERTIFICATE	01/07/22

PROJECT: AUSTRAL SCHOOL STAGE 4

CLIENT: LIPMAN — DESIGNED TO PERFORM · BUILT TO LAST; ctpg

PREPARED BY: Warren Smith Consulting Engineers
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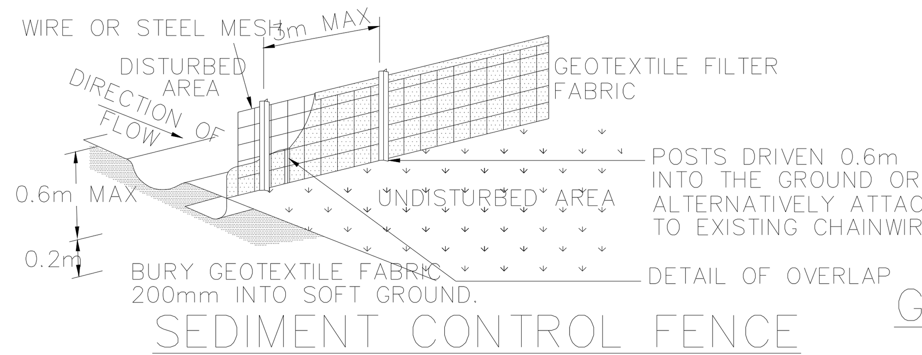
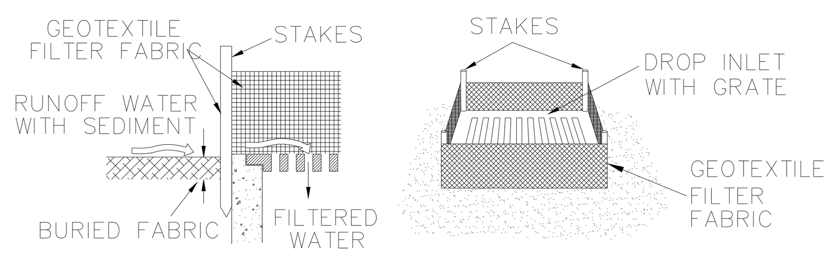
Hydraulic · Fire · Civil · Utilities Infrastructure
GCC ISO 9001 Certified

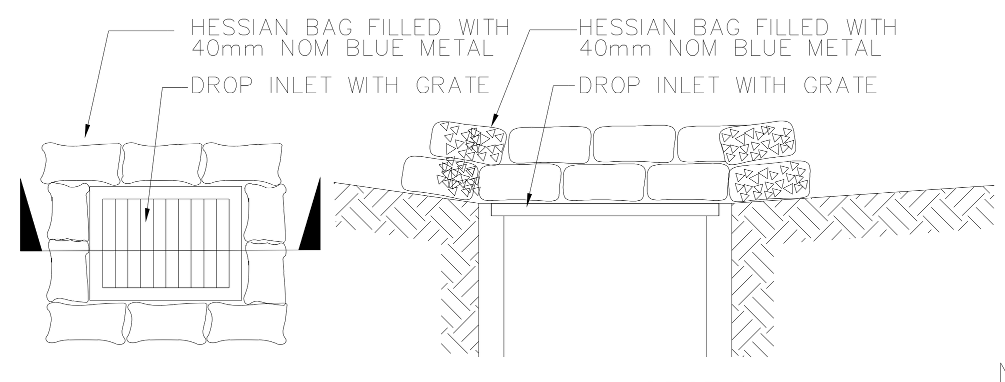
TITLE	CONSTRUCTION SOIL AND WATER MANAGEMENT PLAN			
SCALE: AS SHOWN	DRAWN: I.K.	DESIGNED: T.W.	CHECKED: J.G.	APPROVED: J.G.
JOB No.: 5914005		DRAWING No.: C2.01		ISSUE: 3
DATE: JULY 2022	STATUS: ISSUE FOR CONSTRUCTION CERTIFICATE			



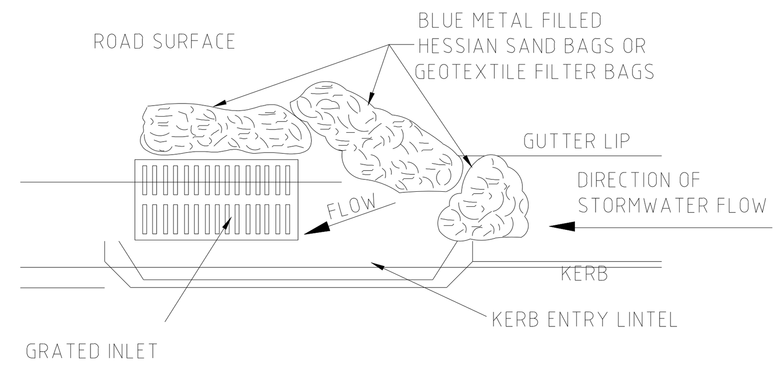
SEDIMENT CONTROL FENCE
NTS



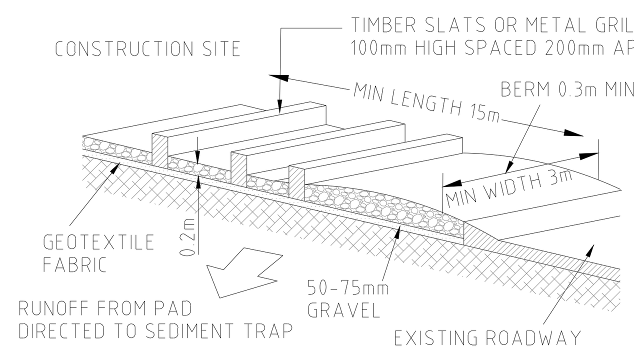
GEOTEXTILE FILTER FABRIC DROP INLET SEDIMENT TRAP
NTS



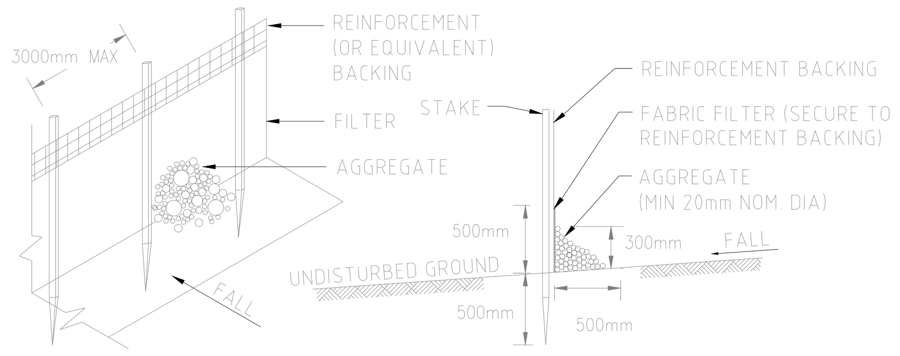
HESSIAN BAG DROP INLET SEDIMENT TRAP
NTS



NEW/EXISTING GRATED KERB ENTRY PIT SEDIMENT CONTROL BARRIER
NTS



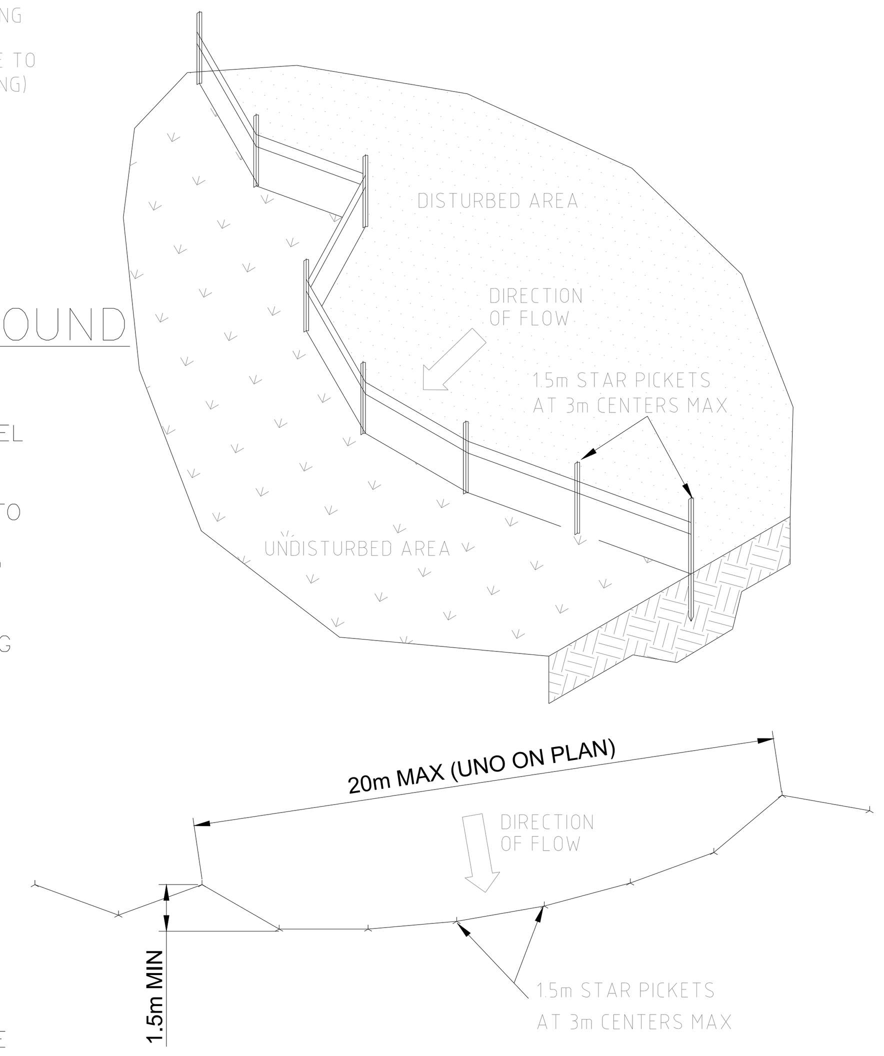
STABILIZED CONSTRUCTION SITE VEHICLE ENTRY/EXIT
NTS



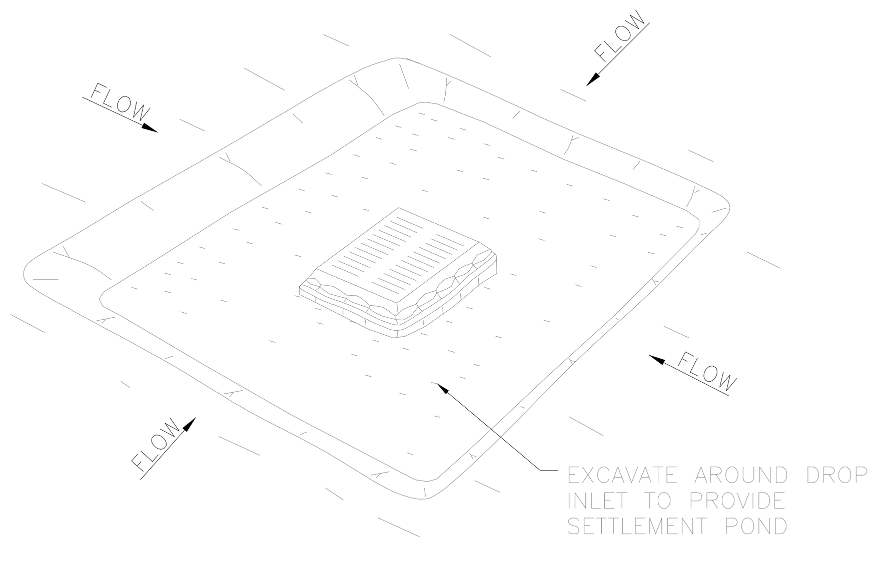
SEDIMENT FENCE DETAIL FOR ROCKY GROUND
NTS

SEDIMENT FENCE NOTES:–

1. CONSTRUCT SEDIMENT FENCE AS CLOSE AS POSSIBLE TO PARALLEL TO THE CONTOURS OF THE SITE OR AT THE TOE OF A SLOPE.
2. DRIVE 1.5 METRE LONG STAR PICKETS INTO GROUND SUFFICIENT TO PROVIDE RIGID SUPPORT, 3 METERS APART. WHERE THERE IS INSUFFICIENT SOIL DEPTH OVER ROCK, HOLES ARE TO BE DRILLED INTO ROCK TO ACCEPT THE STAR PICKETS.
3. ON SOFT GROUND MATERIALS, DIG A 150mm DEEP TRENCH ALONG THE UPSLOPE LINE OF THE FENCE FOR THE BOTTOM OF THE FABRIC TO BE ENTRENCHED.
4. BACKFILL TRENCH OVER BASE OF FABRIC & COMPACT.
5. FIX SELF–SUPPORTING GEOTEXTILE TO UPSLOPE SIDE OF POSTS WITH WIRE TIES OR AS RECOMMENDED BY THE GEOTEXTILE MANUFACTURER. USE A REINFORCEMENT BACKING WITH NON SELF–SUPPORTING GEOTEXTILE FABRIC.
6. JOIN SECTIONS OF FABRIC AT A SUPPORT POST WITH A 150mm OVERLAP.
7. ON HARD OR ROCKY GROUND, SMOOTH A 500mm WIDE STRIP UPSLOPE OF THE FENCE LINE. TURN THE BOTTOM 500mm OF THE FABRIC UPSLOPE AND ANCHOR IN PLACE WITH SUITABLE AGGREGATE.
8. WHERE A SEDIMENT FENCE IS CONSTRUCTED DOWN SLOPE FROM A DISTURBED BATTER THE FENCE SHOULD BE LOCATED 1.5 TO 2.0 METERS DOWN SLOPE FROM THE TOE OF THE BATTER.



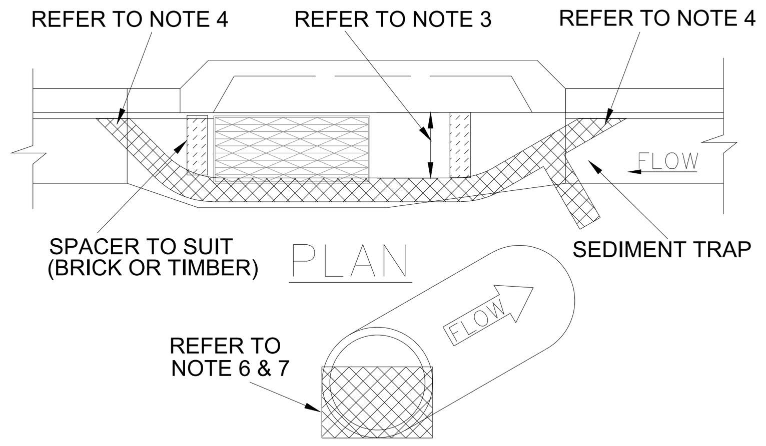
SEDIMENT FENCE LAYOUT PLAN
NTS



EXCAVATED SEDIMENT TRAP
NTS

EXCAVATED SEDIMENT TRAP NOTES:–

1. REMOVE THE SEDIMENT WHEN IT HAS ACCUMULATED TO HALF THE DESIGN DEPTH OF THE TRAP AND RESTORE THE TRAP TO ITS ORIGINAL DIMENSIONS.
2. PROVIDE 50 cu.m/Ha OF SEDIMENT STORAGE VOLUME.
3. REFER TO THE MAINTENANCE REQUIREMENTS.



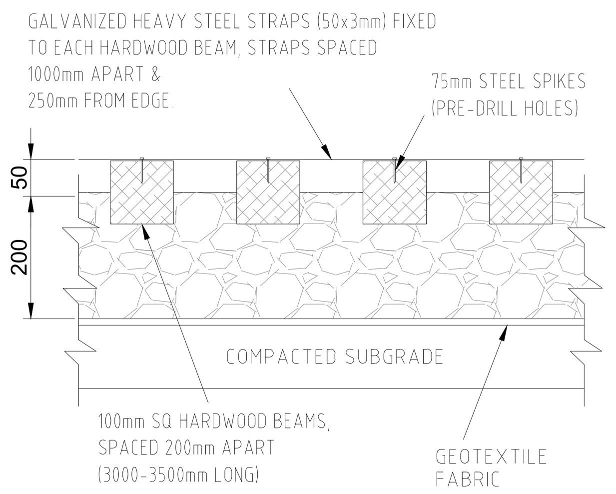
GEOTEXTILE FILTER BAGS
NTS

SEDIMENT BARRIER FOR PITS & PIPES, NOTES:–

1. SLEEVES ARE TO BE MADE FROM GEOTEXTILE FABRIC LONGER THEN THE LENGTH OF THE INLET PIT.
2. FILL SLEEVE WITH 5 OR 10mm CLEAN GRAVEL.
3. PLACE THE SLEEVE AT THE OPENING OF THE KERB INLET LEAVING A 100mm GAP TO ACT AS AN EMERGENCY OVERFLOW.
4. SLEEVE MUST BE PLACED AGAINST THE KERB TO PREVENT BYPASS.
5. FIT SLEEVE TO ALL INLETS DOWNSTREAM OF THE WORKS.
6. FOR DRAINAGE WORKS FIT GEOTEXTILE FABRIC OR GEO BAGS TO UPSTREAM FACE OF ALL OPEN PIPES.
7. MAINTAIN AN OPENING AT THE TOP OF THE PIPE OF 1/3 OF THE PIPE DIAMETER.
8. THE FILTERS ARE TO BE CLEANED AND MAINTAINED DAILY.
9. ALL CARE SHOULD BE TAKEN TO MINIMIZE SEDIMENT REACHING THE STORMWATER SYSTEM BY MINIMIZING EXCAVATION WORKS AND PREVENTING EXCESS WATER FLOW THROUGH WORKS.

SITE ENTRY/EXIT NOTES:–

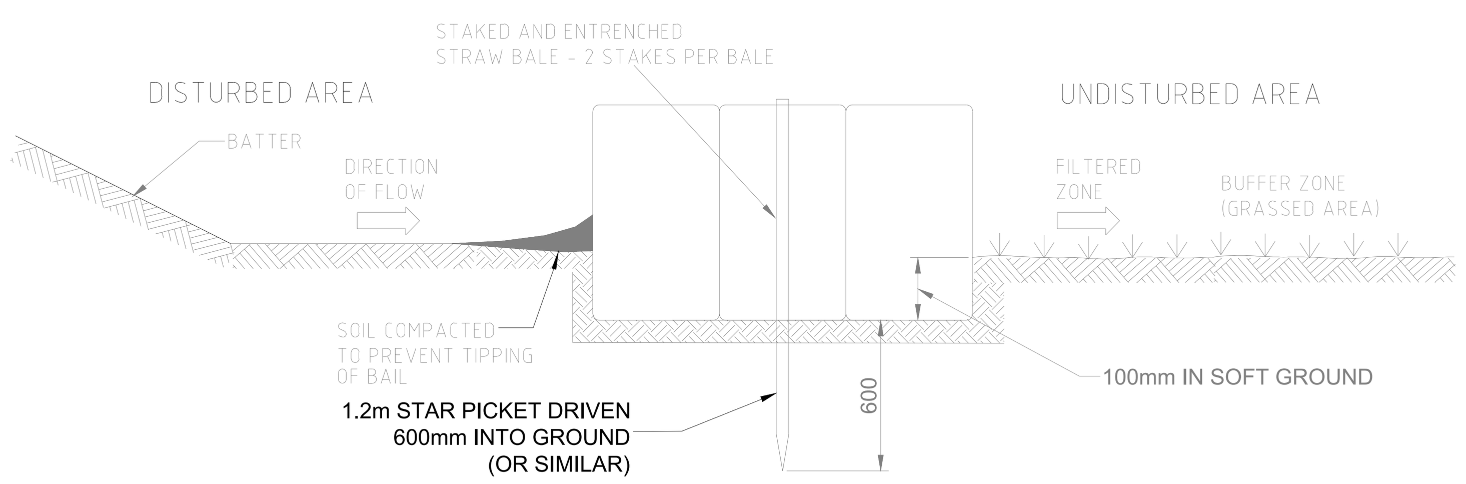
1. ALL VEHICLE ENTRANCES & EXITS TO THE CONSTRUCTION SITE MUST BE STABILIZED TO PREVENT THEM BECOMING A SOURCE OF SEDIMENT, BY PROVIDING A VEHICLE SHAKE AREA. THIS MAY CONSIST OF A TIMBER, CONCRETE OR STEEL SHAKER GRID OR RUBBLE AREA.
2. THE VEHICLE EXIT AREA IS TO BE MAINTAINED IN A CLEAN & SERVICEABLE CONDITION DURING THE TOTAL TIME OF USAGE.
3. ANY UNSEALED ROAD BETWEEN THE DEVICE AND COUNCILS ROADWAY IS TO BE TOPPED WITH 100mm THICK, 40mm NOMINAL SIZE AGGREGATE.
4. PUBLIC ROADS MUST BE KEPT FREE OF DIRT AND MUD. SEDIMENT TRACKED ONTO THE PUBLIC ROADWAY BY VEHICLES LEAVING THE CONSTRUCTION SITE IS TO BE SWEPT UP IMMEDIATELY.
5. FENCES SHOULD BE ERECTED TO ENSURE VEHICLES CAN NOT BYPASS THE STABILIZED ACCESS POINTS, UNLESS COMING FROM A STABILIZED AREA.



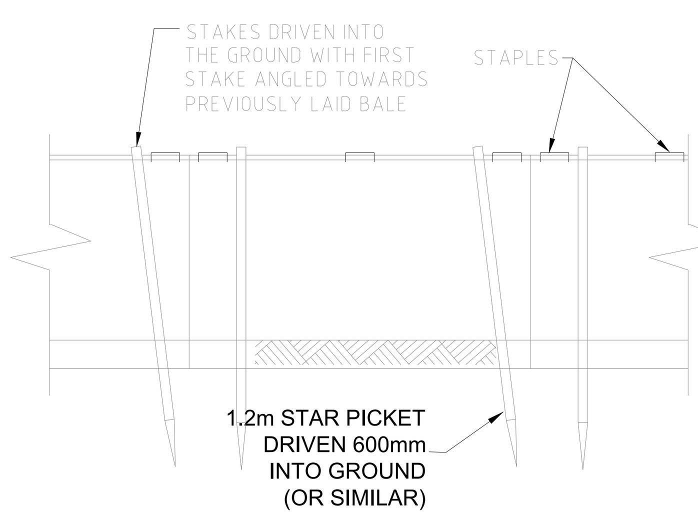
VEHICLE SHAKER GRID
NTS

SITE ENTRY/EXIT CONSTRUCTION NOTES:–

1. STRIP TOP SOIL & LEVEL SITE. PROVIDE CATCH DRAIN AT SIDES TO DIRECT RUNOFF WATER TO SEDIMENT TRAPS.
2. COMPACT SUBGRADE AND REMOVE ANY HIGH POINTS.
3. COVER AREA WITH GEOTEXTILE FABRIC. THIS MAY BE WOVEN OR NEEDLE PUNCHED PRODUCT WITH A MINIMUM CBR BURST STRENGTH (AS3706.4–90) OF 2500 N.
4. CONSTRUCT 200mm THICK RUBBLE PAD OVER GEOTEXTILE USING ROAD BASE OR 30–40mm AGGREGATE. MINIMUM LENGTH 15 METRES OR TO BUILDING ALIGNMENT. MINIMUM WIDTH 3 METRES. CONSTRUCT 300mm HIGH HUMP IMMEDIATELY WITHIN BOUNDARY TO DIVERT WATER TO A SEDIMENT TRAP.
5. WHERE GRIDS ARE USED FIRST CONSTRUCT A 150 THICK PAD OVER GEOTEXTILE FABRIC. LEVEL THIS IN BOTH DIRECTIONS. LOWER GRID ON TO THE PREPARED BASE AND ENSURE THAT NO PART IS SITTING ON ANY HIGH POINTS. BACKFILL THE SPACES BETWEEN THE GRIDS TO WITHIN 50mm OF THE TOP.
6. PROVIDE RAMPS AT ENDS AND SIDE OF GRIDS. IF DEPRESSIONS OCCUR IN THE RAMPS DURING USE. ADD ADDITIONAL MATERIAL.



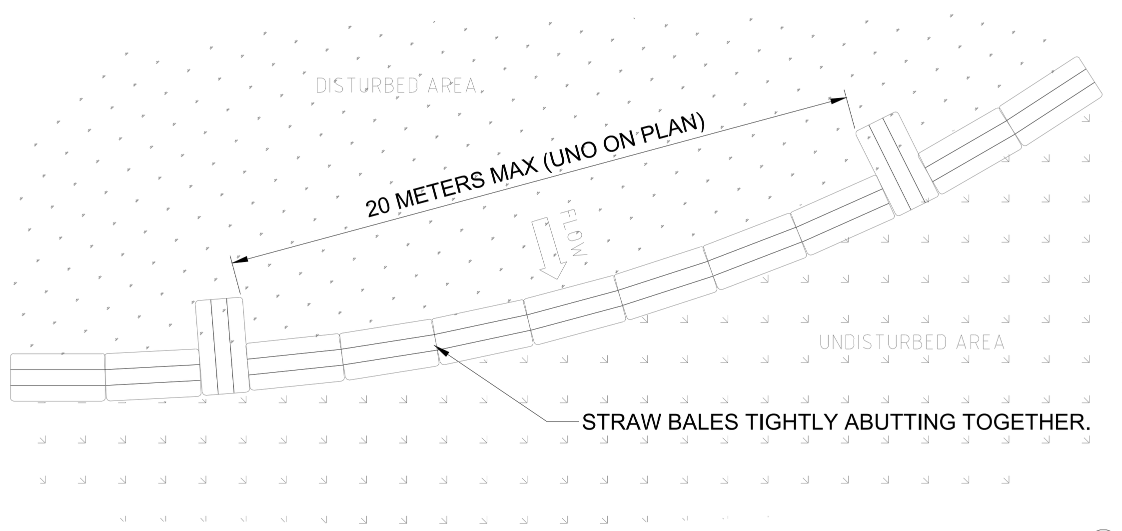
TYPICAL STRAW BALE SECTION
NTS



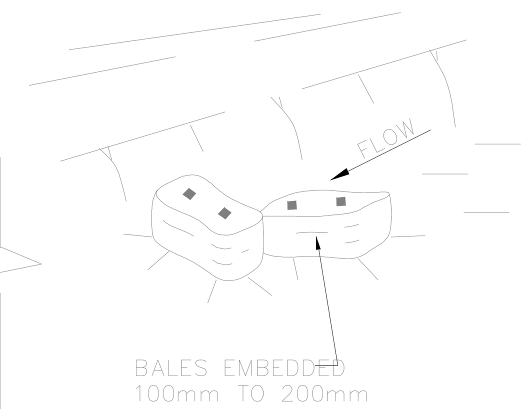
TYPICAL STRAW BALE DETAIL
NTS

STRAW BALE NOTES:–

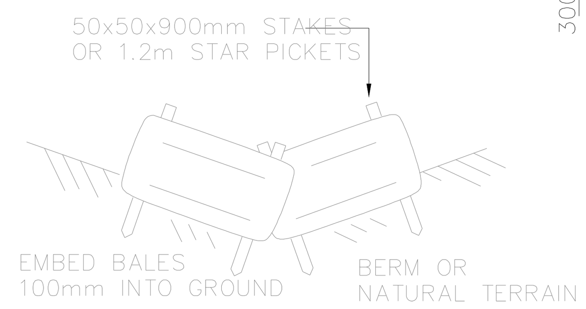
1. CONSTRUCT STRAW BALE FILTER AS CLOSE AS POSSIBLE TO PARALLEL TO THE CONTOURS OF THE SITE OR AT THE TOE OF A SLOPE.
2. PLACE BALES LENGTHWISE IN A ROW WITH ENDS TIGHTLY ABUTTING. USE STRAW TO FILL ANY GAPS BETWEEN BALES. STRAWS TO BE PLACED PARALLEL TO GROUND.
3. MAXIMUM HEIGHT OF FILTER IS ONE BALE.
4. ON SOFT MATERIALS, EMBED EACH BALE IN THE GROUND 75mm TO 100mm AND ANCHOR WITH TWO 1.2 METRE STAR PICKETS. ANGLE THE FIRST STAKE IN EACH BALE TOWARDS THE PREVIOUSLY LAID BAIL. DRIVE STAKES 600mm INTO THE GROUND AND FLUSH WITH THE TOP OF THE BALES.
5. WHERE A STRAW BALE FILTER IS CONSTRUCTED DOWN SLOPE FROM A DISTURBED BATTER THE BALES SHOULD BE LOCATED 1.5 TO 2.0 METERS DOWN SLOPE FROM THE TOE OF THE BATTER.
6. WHERE REQUIRED WRAP GEOTEXTILE FILTER FABRIC AROUND BALES AND STAPLE IN POSITION.



TYPICAL STRAW BALE LAYOUT PLAN
NTS



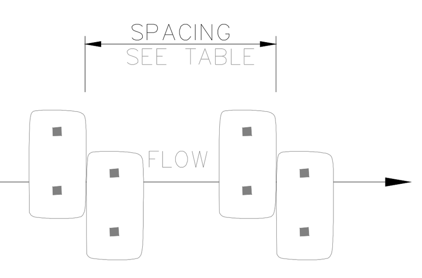
VIEW OF CHECK DAM



CHECK DAM SECTION

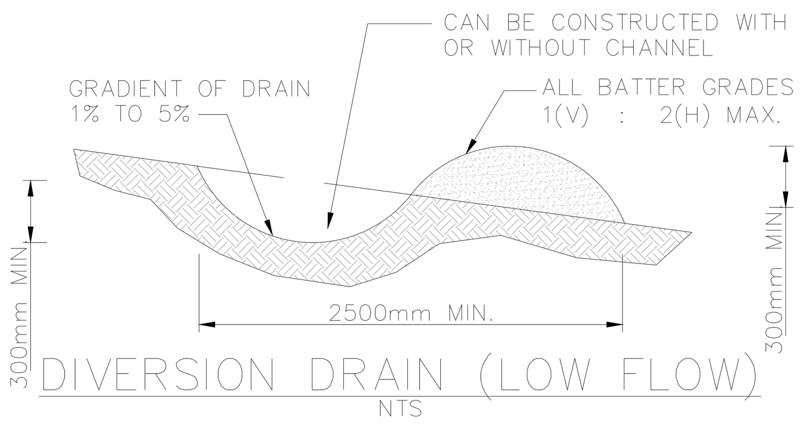
CHECK DAM SPACING TABLE

LONGITUDINAL GRADE (%)	SPACING (METERS)
0 – 5	40
5 –10	30
10 – 15	20
GREATER THAN 15	10



CHECK DAM PLAN

STRAW BALE CHECK DAM DETAILS
NTS



DIVERSION DRAIN (LOW FLOW)
NTS

DIVERSION DRAIN NOTES:–

1. CONSTRUCT WITH GRADIENT OF 1 PER CENT TO 5 PER CENT.
2. AVOID REMOVING TREES AND SHRUBS IF POSSIBLE.
3. DRAINS TO BE OF CIRCULAR, PARABOLIC OR TRAPEZOIDAL CROSS SECTION NOT V–SHAPED.
4. EARTH BANKS TO BE ADEQUATELY COMPACTED IN ORDER TO PREVENT FAILURE.
5. PERMANENT OR TEMPORARY STABILIZATION OF THE EARTH BANK TO BE COMPLETED WITHIN 10 DAYS OF CONSTRUCTION.
6. ALL OUTLETS FROM DISTURBED LANDS ARE TO FEED INTO A SEDIMENT BASIN OR SIMILAR.
7. DISCHARGE RUN OFF COLLECTED FROM UNDISTURBED LANDS ONTO EITHER A STABILIZED OR AN UNDISTURBED DISPOSAL SITE WITHIN THE SAME SUBCATCHMENT AREA FROM WHICH THE WATER ORIGINATED.
8. COMPACT BANK WITH A SUITABLE IMPLEMENT IN SITUATIONS WHERE THEY ARE REQUIRED TO FUNCTION FOR MORE THAN FIVE DAYS.
9. EARTH BANKS TO BE FREE OF PROJECTIONS OR OTHER IRREGULARITIES THAT WILL IMPEDE NORMAL FLOW.

MAINTENANCE REQUIREMENTS:–

1. ACCUMULATED SILT & SEDIMENT MUST BE REMOVED AT REGULAR INTERVALS AND AFTER EACH MAJOR STORM.
2. SILT & SEDIMENT MUST BE REMOVED FROM OFF THE SITE OR TO A COUNCIL APPROVED LOCATION WITHIN THE SITE, WHERE IT WILL NOT ERODE.
3. THE SEDIMENT FENCES, BALES & TRAPS SHALL BE REGULARLY INSPECTED, ESPECIALLY AFTER RAIN AND KEPT IN GOOD REPAIR AND FUNCTIONING CONDITION AT ALL TIMES.
4. CONSTRUCTION OPERATIONS SHALL BE CARRIED OUT IN SUCH A MANNER THAT SEDIMENT, EROSION & WATER POLLUTION SHALL BE MINIMIZED.
5. THE SEDIMENT TRAPS SHALL BE REMOVED AND THE AREA STABILIZED WHEN THE CONSTRUCTION AREA HAS BEEN PROPERLY STABILIZED.

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NOT TO SCALE

REVISION	AMENDMENT	DATE
1	ISSUE FOR INFORMATION	27/05/22
2	ISSUE FOR CONSTRUCTION CERTIFICATE	30/05/22
3	CC1 - ISSUE FOR CONSTRUCTION CERTIFICATE	01/07/22

PROJECT: AUSTRAL SCHOOL STAGE 4

CLIENT: LIPMAN

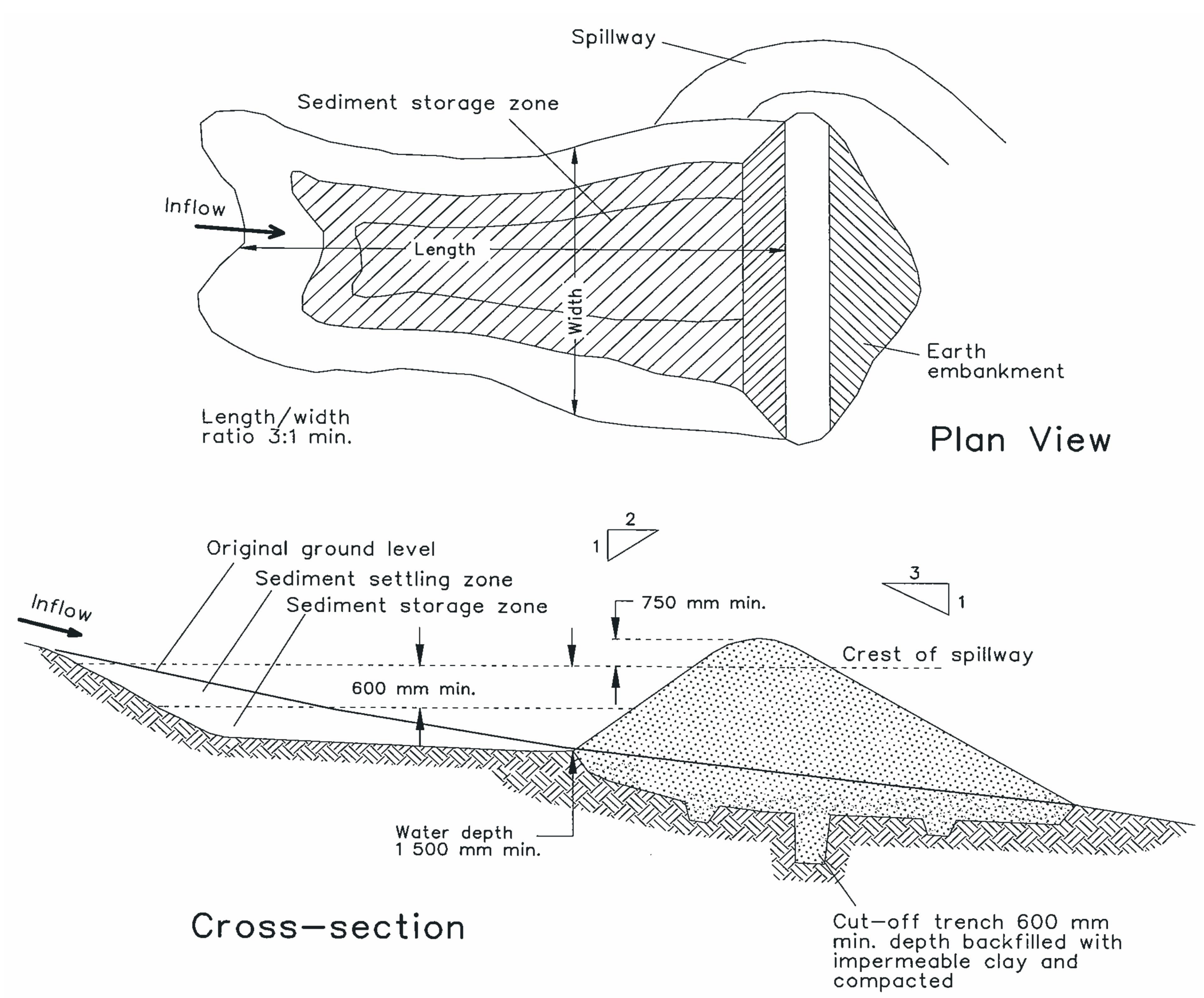
PREPARED BY: Warren Smith Consulting Engineers

TITLE: CONSTRUCTION SOIL AND WATER MANAGEMENT DETAILS - SHEET 1

SCALE	DRAWN	DESIGNED	CHECKED	APPROVED
NOT TO SCALE	I.K.	T.W.	J.G.	J.G.

JOB No.	DRAWING No.	ISSUE
5914005	C2.02	3

DATE: JULY 2022
STATUS: ISSUE FOR CONSTRUCTION CERTIFICATE

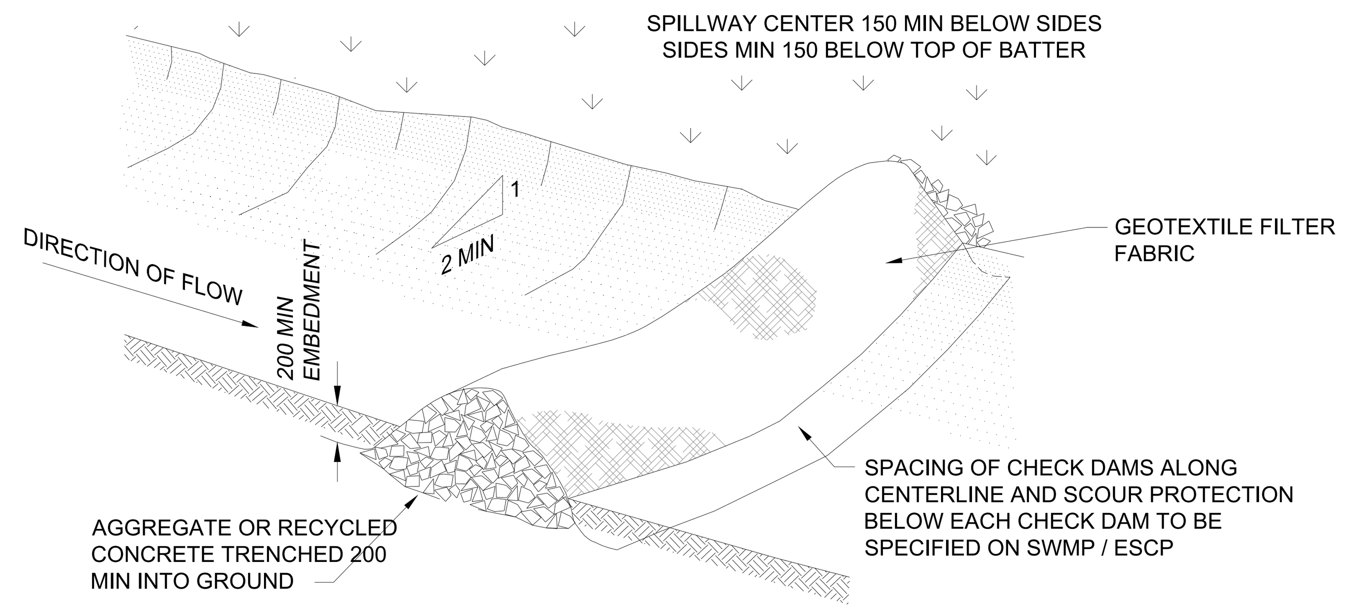


Construction Notes

1. Remove all vegetation and topsoil from under the dam wall and from within the storage area.
2. Construct a cut-off trench 500 mm deep and 1,200 mm wide along the centreline of the embankment extending to a point on the gully wall level with the riser crest.
3. Maintain the trench free of water and recompact the materials with equipment as specified in the SWMP to 95 per cent Standard Proctor Density.
4. Select fill following the SWMP that is free of roots, wood, rock, large stone or foreign material.
5. Prepare the site under the embankment by ripping to at least 100 mm to help bond compacted fill to the existing substrate.
6. Spread the fill in 100 mm to 150 mm layers and compact it at optimum moisture content following the SWMP.
7. Construct the emergency spillway.
8. Rehabilitate the structure following the SWMP.

SEDIMENT BASIN (TYPE D SOILS) - MANAGING URBAN STORMWATER - SD-4

NTS



CHECK DAM - ROCK

NTS

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REVISION	AMENDMENT	DATE
1	ISSUE FOR INFORMATION	27/05/22
2	ISSUE FOR CONSTRUCTION CERTIFICATE	30/05/22
3	CC1 - ISSUE FOR CONSTRUCTION CERTIFICATE	01/07/22

PROJECT: AUSTRAL SCHOOL STAGE 4

CLIENT: LIPMAN

PREPARED BY: Warren Smith Consulting Engineers

TITLE: CONSTRUCTION SOIL AND WATER MANAGEMENT DETAILS - SHEET 2

SCALE	DRAWN	DESIGNED	CHECKED	APPROVED
AS SHOWN	I.K.	T.W.	J.G.	J.G.

JOB No.	DRAWING No.	ISSUE
5914005	C2.03	3

DATE: JULY 2022 STATUS: ISSUE FOR CONSTRUCTION CERTIFICATE

APPENDIX D – Construction Noise and Vibration Management Plan

MATTHEW PALAVIDIS
VICTOR FATTORETTO
MATTHEW SHIELDS

St Anthony of Padua Catholic College, Austral

Construction Noise and Vibration Management Plan

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Project ID	20220605.1
Document Title	Construction Noise and Vibration Management
Attention To	Sydney Catholic Schools Ltd

Revision	**Date**	**Document Reference**	**Prepared By**	**Checked By**	**Approved By**
0	19/05/2022	20220605.1/1905A/R0/RG	RG		GW
1	8/09/2022	20220605.1/0809A/R1/RG	RG		GW

TABLE OF CONTENTS

1 INTRODUCTION

Acoustic Logic has been engaged to prepare a Noise and Vibration Management Plan for the demolition and construction works associated with St Anthony of Padua Catholic College, Austral to satisfy Condition C21 of SSD-8865-Mod-1 consolidated consent.

The issues which will be addressed in this report are:

- Identification of the noise and vibration standards which will be applicable to this project.
- Identification of potentially impacted nearby development.
- Identify likely sources of noise and vibration generation and predicted noise levels at nearby development.
- Formulation of a strategy to comply with the standards identified and mitigation treatments in the event that compliance is not achievable.

1.1 GUIDELINES AND DOCUMENTS

The following documents have been utilised in the preparation of this management plan:

- EPA Interim Construction Noise Guideline
- SSD-8865-Mod-1 Consolidated Development Consent (21st January 2022).
- Noise and Vibration Assessment for SSDA (SSD 8865) (Rev B, Dated 31/03/2021, Project No. 200489) prepared by JHA
- St Anthony of Padua Catholic College – Community Communications Strategy (30 May 2022) prepared by Urbis.

2 SITE DESCRIPTION

The proposed construction works include excavation and the construction of new school buildings. Typical works anticipated are as follows:

- Bulk and detailed excavation (clay / soft shale). It is expected that the duration of these works will be approximately 4 months.
- Bored piling of foundations, approximately 3 months concurrent with excavation.
- Use of mobile cranes, (see figure 1 for crane zone).
- Erection of building structures (powered hand tools for formwork, concrete pump, vibrators).
- Façade Installation (powered hand tools)
- Landscaping (front end loaders etc).
- Internal fit out.

Work hours are as follows:

Day	Building Construction / Excavation Works
Monday – Friday	7am – 6pm
Saturday	8am – 1pm
Sunday & Public Holidays	No Work

2.1 RECEIVER LOCATIONS

Sensitive receiver locations as presented in Figure 1 and detailed below. These locations will be used as a basis for this assessment.

- **S1 & S2:** Existing School classroom buildings immediately adjacent to the works zone;
- **R1**: Residential dwellings along Tenth Avenue to the south east;
- **R2**: Residential dwellings across Tenth Avenue to the south;
- **R3**: Residential dwellings across Fourth Avenue to the west;
- **R4**: Residential dwellings across Eleventh Avue to the north-east.

An aerial photo of the site, monitoring locations and surrounding receivers is shown in Figure 1.

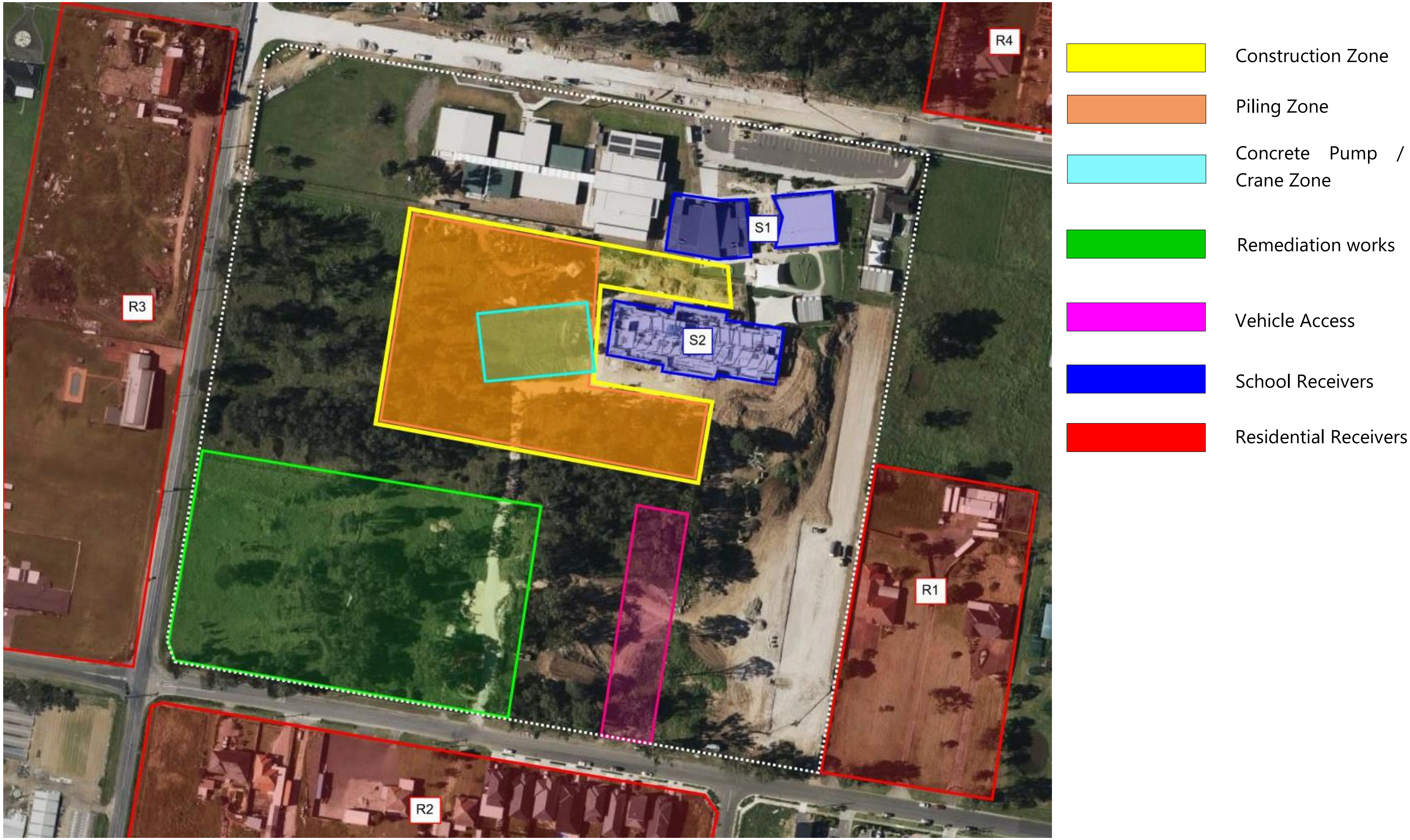


Figure 1 - Site Map and Receiver Locations

3 CONSENT CONDITIONS

3.1 SSD-8865-MOD-1

Table 1 – SSDA-8865 Condition C21

Consent Condition Reference	Consent Condition	Document Reference
C21	The Construction Noise Management Sub-Plan must address, but not limited to the following:	
(a)	Be prepared by a suitably qualified and experienced noise expert;	
(b)	Describe procedures for achieving the noise management levels in EPA's Interim Construction Noise Guideline (DECC, 2009);	5.6 5.7
(c)	incorporate the measures as recommended in the Noise and Vibration Impact Assessment report for (SSDA 8865) (Project No. 200489, Revision B dated 31 March 2021) prepared by JHA;	5.5
(d)	(Deleted);	
(e)	describe the measures to be implemented to manage high noise generating works such as piling, in close proximity to sensitive receivers;	5.6
(f)	Include strategies that have been developed with the community for managing high noise generating works;	8
(g)	describe the community consultation undertaken to develop the strategies in Schedule 3 condition C21(c);	8.2
(h)	include a complaints management system that would be implemented for the duration of the construction; and	8.3 8.4
(i)	include a program to monitor and report on the impacts and environmental performance of the development and the effectiveness of the management measures in accordance with Schedule 3 condition C21(c).	9

4 NOISE AND VIBRATION MANAGEMENT LEVEL

4.1 BACKGROUND NOISE MEASUREMENTS

4.1.1 External Background Noise Levels for Residential Receivers

Long term unattended and attended background noise measurements were undertaken by JHA at project approval stage as part of SSDA documentation. *Noise & Vibration Impact Assessment* prepared by JHA and approved by the consent authority (project number 200489, dated 31/03/2021) contains detailed noise monitoring. Results of background noise monitoring are presented in the table below.

Table 2 – Measured Background Noise Levels, dB(A) L_{90}

Location	Period / Time	Background Noise Level dB(A) L_{90}
Project Site	Day (7am to 6pm)	37

4.1.2 Internal Background Noise Measurements for School Receivers

Noise measurements were obtained using a Norsonic 140 Sound Level Analyser, set to A-weighted fast response. The sound level meter was calibrated before and after the measurements using a Norsonic 1251 Sound Level Calibrator. No significant drift was recorded.

Attended measurements were conducted within the classes closest to the proposed construction area to establish internal background noise levels during class.

Attended measurements were conducted on the 26th of May 2022 whilst classrooms were occupied.

The background noise levels established from the attended noise monitoring are detailed in the Table below.

Table 3 -Measured Internal Noise Levels – Australian Performing Arts Grammar School (255 Broadway, Glebe)

Tenancy/Room	Internal Noise Level, L_{90} dB(A)
Existing Years 1-4 Downstairs Collaboration Space	48
Existing Years 1-4 Downstairs Collaboration Space	49
Existing Years 1-4 Upstairs Collaboration Space	52
Year 5-6 Demountable Classroom	56

The mean internal noise level from the above measurements has been outlined in Table 4 below. The internal noise level for the demountable classroom has been excluded to represent the quietest / worst affected classrooms.

Table 4 -Average Internal Noise Level

Location	Internal Noise Level L_{90} dB(A)
School (Internal)	50

-

4.2 EPA INTERIM CONSTRUCTION NOISE GUIDELINE

The EPA Interim Construction Noise Guideline (ICNG) assessment requires:

- Determination of noise management levels (based on ambient noise monitoring).
- Review of operational noise levels at nearby development.
- If necessary, recommendation of noise controls strategies in the event that compliance with noise emission management levels is not possible.

4.2.1 Residential Receivers

EPA guidelines adopt differing strategies for noise control depending on the predicted noise level at the nearest residences:

- *"Noise affected" level*. Where construction noise is predicted to exceed the "noise effected" level at a nearby residence, the proponent should take reasonable/feasible work practices to ensure compliance with the "noise effected level". For residential properties, the "noise effected" level occurs when construction noise exceeds ambient levels by more than 10dB(A)$L_{eq(15min)}$.
- "*Highly noise affected level*". Where noise emissions are such that nearby properties are "highly noise effected", noise controls such as respite periods should be considered. For residential properties, the "highly noise effected" level occurs when construction noise exceeds 75dB(A)$L_{eq(15min)}$ at nearby residences.

A summary of the recommended noise levels from the ICNG is presented below in Table 5.

Table 5 – Noise Management Levels - Residential

Location	"Noise Affected" Level - dB(A)$L_{eq(15min)}$	"Highly Noise Affected" Level - dB(A)$L_{eq(15min)}$
All Surrounding Residents	47	75

If noise levels exceed the management levels identified in the tables above, reasonable and feasible noise management techniques will be reviewed.

4.2.2 School Receivers

The EPA ICNG outlines noise management levels for sensitive land use others than residences. The guideline provides the following noise levels applicable to the existing school still in operation:

- Classrooms – 45dB(A) Internal Noise Level
- Active Recreation Areas (Playgrounds, Outdoor Sport Areas) – 65dB(A) External Noise Level
- Noise management levels are summarised in the table below.

Table 6 - Noise Management Levels - School

Receiver	Location	Noise Management Level - $dB(A)L_{eq(15min)}$
School	Classrooms	45 - Internally
	Recreation Areas	65 - Externally

4.2.3 Achieving the ICNG Noise Management Levels

Section 5.2 compares the predicted noise emission levels against the formulated noise management levels. The ICNG outlines several noise management strategies that should be implemented to minimise noise impacts on surrounding receivers. Where it is expected that the noise management level may be exceeded, several recommendations have been formulated in section 5.6 based on the strategies outlined in section 6 of the ICNG. The guideline notes however, that as there are no prescribed noise emission controls for construction noise these practices should be used where reasonable and feasible to minimise noise impacts as much as practical.

4.3 AUSTRALIAN STANDARD AS 2436:2010 GUIDE TO NOISE CONTROL ON CONSTRUCTION, MAINTENANCE AND DEMOLITION SITES

Australian Standard AS 2436 provides guidance on noise and vibration control in respect to construction and demolition sites, the preparation of noise and vibration management plans, work method statements and impact studies.

The Standard states that:

- Some construction and demolition activities are by their very nature noisy. The authorities responsible for setting management levels for essential works will take note of the constraints imposed by such activities, especially when they are of short duration.

- Construction, demolition and maintenance works pose different problems of noise and vibration control when compared with most other types of industrial activity, since (a) they are mainly carried on in the open; (b) they are often temporary in nature although they may cause considerable disturbance whilst they last; (c) the noise and vibration arise from many different activities and kinds of plant, and their intensity and character may vary greatly during different phases of the work; and (d) the sites cannot be separated by planning controls, from areas that are sensitive to noise and vibration.

The standard provides advice and guidelines for the prediction of impacts and the methods available to manage impacts. The guideline promulgates feasible and reasonable mitigation strategies and controls, and stakeholder liaison, in the effort to reach a realistic compromise between site activities and impacts on neighbouring properties.

4.4 VIBRATION

Vibration caused by construction at any residence or structure outside the subject site must be limited to:

- For structural damage vibration, German Standard DIN 4150-3 *Structural Vibration: Effects of Vibration on Structures; and*
- For human exposure to vibration, the evaluation criteria presented in the British Standard BS 6472:1992 *Guide to Evaluate Human Exposure to Vibration in Buildings (1Hz to 80Hz)* for low probability of adverse comment.

4.4.1 Structure Borne Vibrations (Building Damage Criteria)

German Standard DIN 4150-3 (1999-02) provides vibration velocity guideline levels for use in evaluating the effects of vibration on structures. The criteria presented in DIN 4150-3 (1999-02) are presented in Table 4.

It is noted that the peak velocity is the value of the maximum of any of the three orthogonal component particle velocities as measured at the foundation, and the maximum levels measured in the x- and y-horizontal directions in the plane of the floor of the uppermost storey.

Table 7 – DIN 4150-3 (1999-02) Safe Limits for Building Vibration

<table>
<tr><th colspan="2" rowspan="3">TYPE OF STRUCTURE</th><th colspan="4">PEAK PARTICLE VELOCITY (mms^{-1})</th></tr>
<tr><th colspan="3">At Foundation at a Frequency of</th><th>Plane of Floor of Uppermost Storey</th></tr>
<tr><th>< 10Hz</th><th>10Hz to 50Hz</th><th>50Hz to 100Hz</th><th>All Frequencies</th></tr>
<tr><td>1</td><td>Buildings used in commercial purposes, industrial buildings and buildings of similar design</td><td>20</td><td>20 to 40</td><td>40 to 50</td><td>40</td></tr>
<tr><td>2</td><td>Dwellings and buildings of similar design and/or use</td><td>5</td><td>5 to 15</td><td>15 to 20</td><td>15</td></tr>
<tr><td>3</td><td>Structures that because of their particular sensitivity to vibration, do not correspond to those listed in Lines 1 or 2 and have intrinsic value (e.g. buildings that are under a preservation order)</td><td>3</td><td>3 to 8</td><td>8 to 10</td><td>8</td></tr>
</table>

Nearby residences would be classified as a type 2 structure.

4.4.2 Assessing Amenity

The NSW EPA document "*Assessing Vibration: A Technical Guideline*" provides procedures for assessing tactile vibration and regenerated noise within potentially affected buildings and is used in the assessment of vibration impact on amenity.

Relevant criteria are presented below.

Table 8 – EPA Recommended Vibration Criteria

		RMS acceleration (m/s^2)		RMS velocity (mm/s)		Peak velocity (mm/s)	
Place	Time	Preferred	Maximum	Preferred	Maximum	Preferred	Maximum
Continuous Vibration							
Residences	Daytime	0.01	0.02	0.2	0.4	0.28	0.56
Offices		0.02	0.04	0.4	0.8	0.56	1.1
Workshops		0.04	0.08	0.8	1.6	1.1	2.2
Impulsive Vibration							
Residences	Daytime	0.3	0.6	6.0	12.0	8.6	17.0
Offices		0.64	1.28	13.0	26.0	18.0	36.0
Workshops		0.64	1.28	13.0	26.0	18.0	36.0

5 NOISE AND VIBRATION ASSESSMENT AND RECOMMENDATIONS

5.1 ACTIVITIES TO BE CONDUCTED AND THE ASSOCIATED NOISE LEVELS

Typically, the most significant sources of noise generated during a construction project will be demolition, excavation, civil works and piling. A summary of sound power levels of major construction processes/equipment is detailed in Table 9.

Section 2 outlines the major works to be undertaken. The highest noise levels are likely to be generated during bulk excavation of the sandstone substrate.

With respect to construction noise, the impact on nearby development will be dependent on the activity in question and where on the site the activity is undertaken. The primary construction equipment and sound power levels associated with the works are as follows:

Table 9 - Sound Power Levels of the Proposed Equipment

Equipment / Process	Sound Power Level – dB(A)*
Bored Piling Rig	111
Excavator	110
Concrete Pump	108
Trucks	107
Crane (Mobile)	104
Materials Handling (Forklifts etc)	100
Powered Hand Tools	100

***Noise levels take into account correction factors (for tonality, intermittency where necessary).**

The noise levels presented in the above table are derived from the following sources, namely:

- Table A1 of Australian Standard 2436-2010.
- Data held by this office from other similar studies.

Noise levels take into account correction factors (for tonality, intermittency where necessary).

5.2 NOISE IMPACT ASSESMENT

The predicted noise levels during excavation and construction will depend on:

- The activity undertaken; and
- The distance between the work site and the receiver. For many of the work areas, the distance between the noise source and the receiver will vary depending on which end of the site the work is undertaken. For this reason, the predicted noise levels will be presented as a range.

Predicted noise levels are presented below. Predictions take into account the noise reduction as a result of distance and façade intrusion (for internal areas).

Table 10 – Predicted Noise Generation to S1 School Receiver

Activity	Predicted Level – dB(A) $L_{eq(15min)}$ (Internal Areas)	Comment
Bored Piling	42 – 55	Exceeds Noise Management Level when work occurs in proximity to building. Refer to Recommendations Section 5.6.
Excavator (in clay/soil)	41 – 55	
Concrete Pump	39 – 50	
Trucks	38 – 51	
Materials Handling (Forklifts etc)	33 – 55	
Powered Hand Tools	33 – 44	
Crane (Mobile)	35 - 46	

Table 11 – Predicted Noise Generation to S2 School Receiver

Activity	Predicted Level – dB(A) $L_{eq(15min)}$ (Internal Areas)	Comment
Bored Piling	44 – 69	Typically exceeds noise management level. Refer to Recommendations Section 5.5.
Excavator (in clay/soil)	43 – 68	
Concrete Pump	46 – 66	
Trucks	40 - 65	
Materials Handling (Forklifts etc)	33 – 58	
Powered Hand Tools	33 - 58	
Crane (Electric)	42 - 62	

Table 12 – Predicted Noise Generation to R1 Residential Receiver

Activity	Predicted Level – dB(A) $L_{eq(15min)}$ (External Areas)	Comment
Bored Piling	50 – 58	Meets highly noise affected management level at all times. Exceeds noise affected management level only when working close to eastern boundary. Refer to Recommendations Section 5.6
Excavator (in clay/soil)	49 – 57	
Concrete Pump	47 – 55	
Trucks	46 – 55	
Materials Handling (Forklifts etc)	37 – 44	Within ICNG noise management levels at all times.
Powered Hand Tools	37 – 44	
Crane (Electric)	44 - 47	

Table 13 – Predicted Noise Generation to R2 Residential Receiver

Activity	Predicted Level – dB(A) $L_{eq(15min)}$ (External Areas)	Comment
Bored Piling	50 – 54	Meets highly noise affected management level at all times. Generally exceeds noise affected management level. Refer to Recommendations Section 5.6
Excavator (in clay/soil)	49 – 53	
Concrete Pump	46 – 49	
Trucks	46 – 63	
Materials Handling (Forklifts etc)	39 – 59	Exceeds noise management level when working close to southern boundary.
Powered Hand Tools	39 – 44	Within ICNG noise management levels at all times.
Crane (Electric)	42 - 45	

Table 14 – Predicted Noise Generation to R3 Residential Receiver

Activity	Predicted Level – dB(A) $L_{eq(15min)}$ (External Areas)	Comment
Bored Piling	50 – 58	Meets highly noise affected management level at all times. Generally exceeds noise affected management level. Refer to Recommendations Section 5.6
Excavator (in clay/soil)	49 – 57	
Concrete Pump	47 – 52	
Trucks	46 – 58	
Materials Handling (Forklifts etc)	39 – 50	Generally meets ICNG noise management levels. Marginal exceedances may be expected when working close to southern boundary.
Powered Hand Tools	39 – 47	
Crane (Electric)	43 – 48	

Table 15 – Predicted Noise Generation to R4 Residential Receiver

Activity	Predicted Level – dB(A) $L_{eq(15min)}$ (External Areas)	Comment
Bored Piling	48 – 55	Meets highly noise affected management level at all times. Generally exceeds noise affected management level. Particularly when working close to the north-eastern boundary. Refer to Recommendations Section 5.6.
Excavator (in clay/soil)	47 – 54	
Concrete Pump	45 – 52	
Trucks	44 – 51	
Materials Handling (Forklifts etc)	37 – 44	Within ICNG noise management levels at all times.
Powered Hand Tools	37 – 44	
Crane (Electric)	43 – 46	

5.3 DISCUSSION – NOISE

Exceedances of the highly noise affected level for residential receivers are not expected to occur during construction. Due to the close proximity to the works zone, the noise management level for school receivers is expected to be exceeded. Exceedances of the noise management level are expected to occur during the majority of works.

Works with the highest potential to disturb the amenity of classrooms and recreational areas are piling and excavation activities. Given the 4-month duration of excavation, feasible and reasonable work practices should be implemented to minimise noise impacts on surrounding residents.

Other work practices which are above the noise affected management level (but generally below the 'highly noise affected level') are expected to be of a shorter duration (piling) or able to be effectively scheduled to minimise impact (concrete pump).

Once excavation/piling works have been completed, general construction works are expected to generally be of a lower noise level. A further noise reduction would be expected for any internal works once façade works have been completed.

Specific recommendations are detailed in Section 5.6

5.4 DISCUSSION - VIBRATION

Typically, rock hammering is the activity with the greatest potential for vibration generation. Given that rock hammering will not be occurring, vibration impacts on the school and nearby residential receivers are unlikely. Vibration monitoring will not be required for the proposed works.

5.5 NOISE AND VIBRATION IMPACT ASSESSMENT REPORT FOR (SSDA 8865)

5.5.1 Noise Mitigation Measures

The noise and vibration impact assessment report (for SSDA-8865) prepared by JHA (Project No. 200489, Revision B dated 31 March 2021) outlines general control measures to be considered in the management of construction noise and vibration. The recommendations from section 7.3.2 of the report, which should be considered in the construction methodology, have been summarised below:

- *Plant and equipment. In terms of both cost and results, controlling noise and vibration at the sources is one of the most effective methods of minimising the impacts from any work site activities. Work practices that will reduce noise and vibration at the source include:*
  - *Employing quieter techniques for all high noise activities such as rock breaking, concrete sawing, and using power and pneumatic tools.*
  - *Use quieter plant and equipment based on the optimal power and size to most efficiently perform the required tasks.*
  - *Regularly inspecting and maintain plant and equipment to minimise noise and vibration level increases, to ensure that all noise and vibration reduction devices are operating effectively.*
  - *Where appropriate, obtain acoustic test certificates for equipment.*

- *On site noise management. Practices that will reduce noise from the site include:*
  - *Maximising the distance between noise activities and noise sensitive receivers. Strategically locate equipment and plant.*
  - *Undertaking noisy fabrication work off-site where possible.*
  - *Avoid the use of reversing beeping alarms or provide for alternative systems, such as broadband reversing alarms, particularly during night or out-of-hours works.*
  - *Maintaining any pre-existing barriers or walls on a demolition or excavation site as long as possible to provide optimum sound propagation control.*
  - *Using temporary site building and material stockpiles as noise barriers. These can often be created using site earthworks and may be included as a part of final landscape design.*
  - *Installing purpose built noise barriers, acoustic sheds and enclosures.*
- *Work scheduling. Scheduling work during periods when people are least affected is an important way of reducing adverse impacts. The following scheduling aspects may reduce impacts:*
  - *Provide respite periods, including restricting very noisy activities to daytime, restricting the number of nights that after-hours work is conducted near residences, or by determining any specific requirements, particularly those needed for noise sensitive receivers such as teaching and study spaces.*
  - *Scheduling activities to minimise impacts by undertaking all possible work during hours that will least adversely affect sensitive receivers and by avoiding conflicts with other scheduled events (i.e. exam periods).*
  - *Scheduling work to coincide with non-sensitive periods (i.e. work during weekends or school holidays).*
  - *Scheduling noisy activities to coincide with high levels of neighbourhood noise so that noise from the activities is partially masked and not as intrusive.*
  - *Planning deliveries and access to the site to occur quietly and efficiently and organising parking only within designated areas located away from sensitive receivers.*
  - *Optimising the number of deliveries to the site by amalgamating loads where possible and scheduling arrivals within designated hours.*
  - *Designating, designing and maintaining access routes to the site to minimise impacts.*
  - *Including contract conditions that include penalties for non-compliance with reasonable instructions by the principal to minimise noise or arrange suitable scheduling.*
- *Consultation, notification and complaints handling.*
  - *Provide information to neighbours before and during construction.*
  - *Maintain good communication between the community and Project staff.*
  - *Have a documented complaints process and keep register of any complaints.*
  - *Give complaints a fair hearing and provide for a quick response.*
  - *Implement all feasible and reasonable measures to address the source of complaint. Implementation of all reasonable and feasible mitigation measures for all works will ensure that any adverse noise impacts to surrounding receivers are minimised when noise goals cannot be met due to safety or space constraints.*

5.6 SITE SPECIFIC NOISE MANAGEMENT RECOMMENDATIONS

In addition to the above control elements, to mitigate potential noise impacts from the development at St Anthony of Padua Catholic College, we recommend the following management controls be implemented:

5.6.1 Scheduling

- The scheduling of construction activities should be undertaken to reasonably minimise noise impacts to school and residential receivers. Where feasible, construction works should be concentrated within school holiday periods to reduce the length of construction noise impacts on the school.
- Respite periods are to be implemented for when excavation and piling works are required and will generate noise levels exceeding those in Table 2. It is recommended that 2-hours of respite should be arranged in consultation with the school.
  - An example of recommended excavation and piling times (with a respite period included) is:
    - Monday – Friday: 7am – 12pm
    - Monday – Friday: 2pm – 6pm
- Site Induction:
  - A copy of the Noise Management Plan is to be available to contractors. The location of the Noise Management Plan should be advised in any site induction.
  - Site induction should also detail the site contact to be notified in the event of noise complaint.

5.6.2 Excavation

- The primary noise generating activity at the site will be the bulk excavation period. As much as practicable, use of quieter excavation methods is adopted.
- Excavation is conducted initially using excavator with bucket (quietest excavation method), then use of rock rippers when rock strength permits.
- Vehicles to use a non-tonal reversing beacon (subject to OH&S requirements) to minimise potential disturbance of neighbours.

5.6.3 Concrete Pumps:

- Concrete pump trucks should generally be located away from the school buildings where feasible.
- Notification of adjacent residential development should be provided prior to days of concrete pours.
- Cement mixing trucks must turn off their engines when on site to reduce impacts on adjacent land use (unless truck engine needs to remain on during concrete pumping).

5.6.4 Materials Handling/Vehicles:

- Trucks and forklifts in general use on site are to use a non-tonal reversing beacon where possible (subject to OH&S requirements) to minimise potential disturbance of surrounding receivers;
- Avoid careless dropping of construction materials into empty trucks.
- Trucks, trailers and delivery vehicles are to turn off engines when idling to reduce noise impacts (unless required for concrete pumping or similar).

5.6.5 Community Interaction and Complaints Handling

- Community and school consultation is proposed be undertaken throughout the construction process. In this regard regular letterbox drops detailing site progress and scheduled works is proposed. In particular, these should detail the extent and times of high noise works (excavation an piling) which is planned to be undertaken.
- An after hours contact number is displayed outside of the building site, so that in the event that surrounding development believes that a noise breach is occurring, they may contact the site.
  - In the event of complaint, the procedures outlined in **Section 8** are adopted.

5.6.6 Noise Monitoring

- Noise monitoring to be undertaken throughout the construction process as per **section 9**.

5.7 ICNG NOISE MANAGEMENT CONTROLS

The ICNG provides examples of work practices that aim to manage noise impacts of construction on surrounding receivers. The following strategies taken from the guideline are recommended to be, or have already been, implemented in the construction methodology.

5.7.1 Identifying feasible and reasonable work practices

The construction proponent examined and documented work practices that are feasible, including:

- demolishing structures with jaw crushers and saws, as an alternative to using rock breakers
- using a lower noise and vibration generating form of piling, such as bored piling for retaining walls, instead of impact piling
- limiting noisy activities – piling and demolishing – to 9 am to 12 pm Monday to Saturday and 2 pm to 5 pm Monday to Friday to provide respite to surrounding residents
- selecting low noise equipment for site levelling works
- liaising with affected residents and informing them when noisy work will occur and what is being done to minimise the noise
- using less annoying alternatives to audible movement alarms that provide a safe system of work, or configuring the site to maximise forward movements of mobile plant.

5.7.2 Universal Work Practices

Avoid the use of radios or stereos outdoors where neighbours can be affected.

- Avoid the overuse of public address systems.
- Avoid shouting, and minimise talking loudly and slamming vehicle doors.
- Keep truck drivers informed of designated vehicle routes, parking locations, acceptable delivery hours or other relevant practices (for example, minimising the use of engine brakes, and no extended periods of engine idling).
- Develop a one-page summary of approval or consent conditions that relate to relevant work practices, and pin it to a noticeboard so that all site operators can quickly reference noise information.
- Workers may at times need to discuss or negotiate practices with their managers.

5.7.3 Consultation and Notification

Notification before and during construction

- Provide, reasonably ahead of time, information such as total building time, what works are expected to be noisy, their duration, what is being done to minimise noise and when respite periods will occur. For works outside standard hours, inform affected residents and other sensitive land use occupants between five and 14 days before commencement.
- Provide information to neighbours before and during construction through media such as letterbox drops, meetings or individual contact. In some areas, the proponent will need to provide notification in languages other than English. A website could also be established for the project to provide information.
- Use a site information board at the front of the site with the name of the organisation responsible for the site and their contact details, hours of operation and regular information updates. This signage should be clearly visible from the outside and include after hours emergency contact details.
- Maintain good communication between the community and project staff.
- Appoint a community liaison officer where required.
- For larger projects consider a regular newsletter with site news, significant project events and timing of different activities.
- Provide a toll-free contact phone number for enquiries during the works.
- Facilitate contact with people to ensure that everyone can see that the site manager understands potential issues, that a planned approach is in place and that there is an ongoing commitment to minimise noise.

Complaints handling

- Provide a readily accessible contact point, for example, through a 24 hour toll-free information and complaints line.
- Give complaints a fair hearing.
- Have a documented complaints process, including an escalation procedure so that if a complainant is not satisfied there is a clear path to follow.
- Call back as soon as possible to keep people informed of action to be taken to address noise problems. Call back at night-time only if requested by the complainant to avoid further disturbance.
- Provide a quick response to complaints, with complaint handling staff having both a good knowledge of the project and ready access to information.
- Implement all feasible and reasonable measures to address the source of complaint.
- Keep a register of any complaints, including details of the complaint such as date, time, person receiving complaint, complainant's contact number, person referred to, description of the complaint, work area (for larger projects), time of verbal response and timeframe for written response where appropriate.

5.7.4 Plant and Equipment

Use quieter methods

- Examine and implement, where feasible and reasonable, alternatives to rock-breaking work methods, such as hydraulic splitters for rock and concrete, hydraulic jaw crushers, chemical rock and concrete splitting, and controlled blasting such as penetrating cone fracture. The suitablility of alternative methods should be considered on a case-by-case basis.
- Use alternatives to diesel and petrol engines and pneumatic units, such as hydraulic or electric-controlled units where feasible and reasonable. Where there is no electricity supply, use an electrical generator located away from residences.

Operate plant in a quiet and efficient manner

- Reduce throttle setting and turn off equipment when not being used.
- Examine and implement, where feasible and reasonable, the option of reducing noise from metal chutes and bins by placing damping material in the bin.

Maintain equipment

- Regularly inspect and maintain equipment to ensure it is in good working order. Also check the condition of mufflers.
- Equipment must not be operated until it is maintained or repaired, where maintenance or repair would address the annoying character of noise identified.
- For machines with enclosures, check that doors and door seals are in good working order and that the doors close properly against the seals.
- Return any hired equipment that is causing noise that is not typical for the equipment – the increased noise may indicate the need for repair.
- Ensure air lines on pneumatic equipment do not leak.

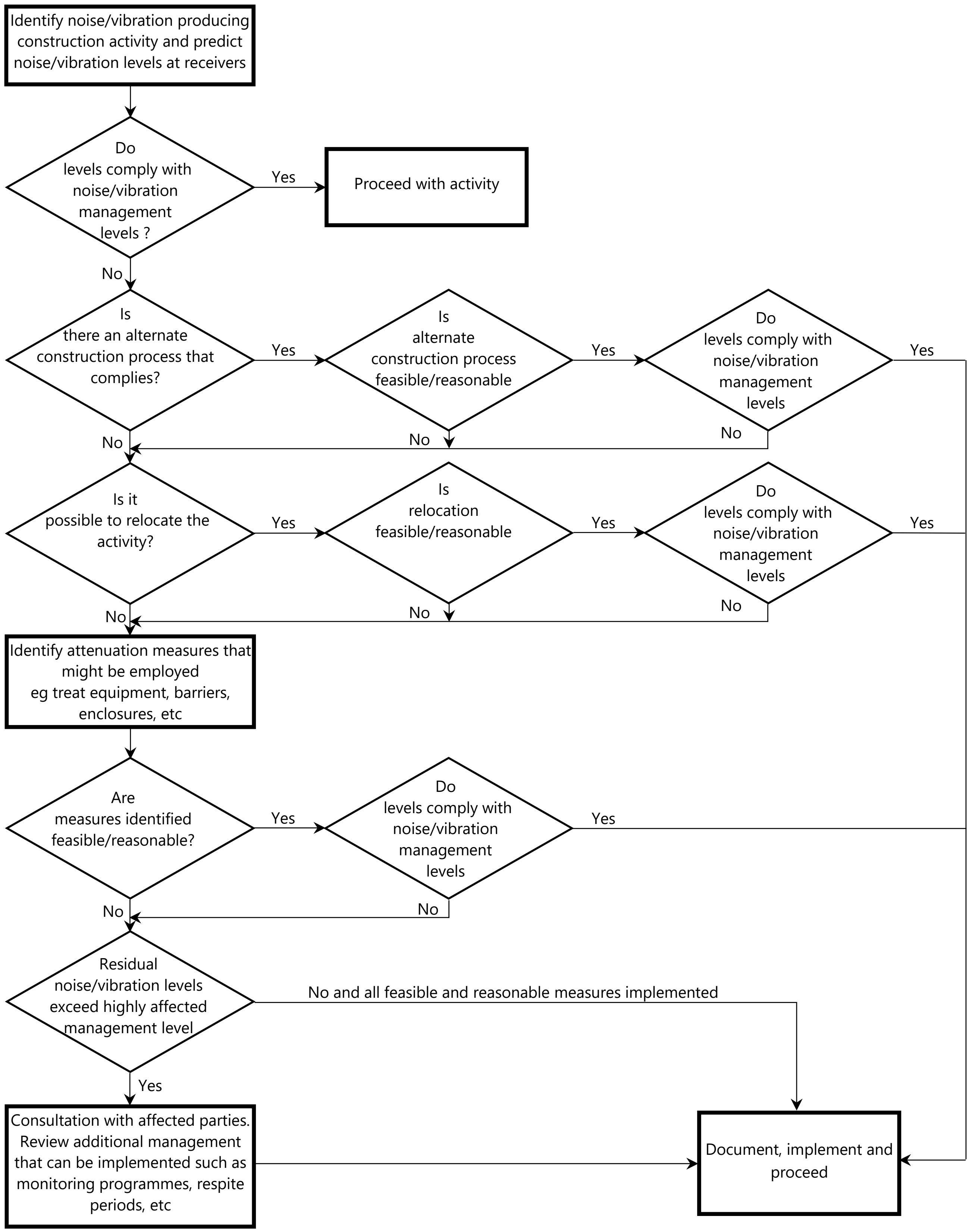
5.7.5 Transmission Path

Physical methods to reduce the transmission of noise between the construction works and residences or other sensitive land uses are generally suited to works where there is longer-term exposure to the noise.

- Reduce the line-of-sight noise transmission to residences or other sensitive land uses using temporary barriers.
- Temporary noise barriers can be constructed from hoarding (plywood boards, panels of steel sheeting or compressed fibre cement board) with no gaps between the panels at the site boundary. Stockpiles, shipping containers and site office transportables can be effective barriers.
- Erect temporary noise barriers before work commences to reduce noise from works as soon as possible.

6 ASSESSMENT METHODOLOGY AND MITIGATION METHODS

The flow chart presented below illustrates the process that will be followed in assessing construction activities.



7 ADDITIONAL NOISE AND VIBRATION CONTROL METHODS

In the event of complaints, there are a number of noise mitigation strategies available which can be considered. The determination of appropriate noise control measures will be dependent on the particular activities and construction appliances. This section provides an outline of available methods.

7.1.1 Selection of Alternate Appliance or Process

Where a particular activity or construction appliance is found to generate excessive noise levels, it may be possible to select an alternative approach or appliance.

7.1.2 Acoustic Barrier

Given the position of adjacent school buildings, it is unlikely that noise screens will provide significant acoustic benefit for upper levels but will provide noticeable improvement for those on ground level.

The placement of barriers at the source is generally only effective for static plant. Equipment which is on the move or working in rough or undulating terrain cannot be effectively attenuated by placing barriers at the source.

Barriers can also be placed between the source and the receiver.

The degree of noise reduction provided by barriers is dependent on the amount by which line of sight can be blocked by the barrier. If the receiver is totally shielded from the noise source reductions of up to 15dB(A) can be effected. Where only partial obstruction of line of sight occurs, noise reductions of 5 to 8dB(A) may be achieved. Where no line of sight is obstructed by the barrier, generally no noise reduction will occur.

As barriers are used to provide shielding and do not act as an enclosure, the material they are constructed from should have a noise reduction performance that is approximately 10dB(A) greater than the maximum reduction provided by the barrier. In this case the use of a material such as 10mm or 15mm thick plywood (radiata plywood) would be acceptable for the barriers.

7.1.3 Material Handling

The installation of rubber matting over material handling areas can reduce the sound of impacts due to material being dropped by up to 20dB(A).

7.1.4 Treatment of Specific Equipment

In certain cases it may be possible to specially treat a piece of equipment to dramatically reduce the sound levels emitted.

7.1.5 Establishment of Site Practices

This involves the formulation of work practices to reduce noise generation. A more detailed management plan will be developed for this project in accordance to the construction methodology outlining work procedures and methods for minimising noise.

7.1.6 Combination of Methods

In some cases it may be necessary that two or more control measures be implemented to minimise noise.

8 COMMUNITY INTERACTION AND COMPLAINTS HANDLING

8.1 ESTABLISHMENT OF DIRECT COMMUNICATION WITH AFFECTED PARTIES

In order for any construction noise management programme to work effectively, continuous communication is required between all parties, which may be potentially impacted upon, the builder and the regulatory authority. This establishes a dynamic response process which allows for the adjustment of control methods and criteria for the benefit of all parties.

The objective in undertaking a consultation process is to:

- Inform and educate the groups about the project and the noise controls being implemented;
- Increase understanding of all acoustic issues related to the project and options available;
- Identify group concerns generated by the project, so that they can be addressed; and
- Ensure that concerned individuals or groups are aware of and have access to a Constructions Complaints Register which will be used to address any construction noise related problems should they arise.

8.2 COMMUNITY CONSULTATION AND COMMUNICATION STRATEGY

A community communication strategy (CCS) report has been developed by Urbis. The report has been prepared to address concerns of the surrounding community identified during Environmental Impact Statement consultation. The relevant stakeholders identified in the report are as follows:

- Liverpool City Council
- North Ward Councillors
- Surrounding community, including individual households and businesses,
- St Anthony of Padua Catholic College (current and future staff, students and parents).

The CCS report outlines several mechanisms and procedures for maintaining community involvement to manage construction noise impacts on the surrounding community. These procedures are summarised below:

- Information provision:
    - Establishment of website to provide an overview of project details, construction updates, and enquiry contact details.
    - The community feedback, enquiries and complaints phone number and email address will be included on signage at the front of the site.
    - A community newsletter will be provided at the start of construction outlining the construction timeline, impacts and mitigation methods, and the community feedback contact details.
    - Meetings to be organised as required with key stakeholders and community groups to provide project information and environmental management issues.
    - Letterbox drops will be undertaken to notify surrounding sensitive receivers of high noise generating works ahead of time.
- Community based forums:
    - The principal contractor will consider establishing community based forums to consult with the community regarding their concerns.
- Enquiries and feedback response:
    - The following contact points will be provided:

Table 16 -Project Contact Points

Channel	Details
Point of contact	Tim Calpito Project Manager Lipman
Mailing address	Level 6, 66 Berry St North Sydney NSW 2060
Phone number	(02) 9955 7000
Email	stanthonyofpadua@lipman.com.au
Website	www.stapaustral.catholic.edu.au/

- Issues resolution and mediation of disputes
    - A complaints, issues and disputes resolution process has been established to minimise impacts on surrounding receivers. See section 8.3.1.

8.3 DEALING WITH COMPLAINTS

Should ongoing complaints of excessive noise or vibration occur, immediate measures shall be undertaken to investigate the complaint, the cause of the exceedances and identify the required changes to work practices.

The effectiveness of any changes shall be verified before continuing. Documentation and training of site staff shall occur to ensure the practices that produced the exceedances are not repeated.

If a noise complaint is received the complaint should be recorded on a Noise Complaint Form. The complaint form should list:

- The name and address of the complainant (if provided);
- The time and date the complaint was received;
- The nature of the complaint and the time and date the noise was heard;
- The name of the employee who received the complaint;
- Actions taken to investigate the complaint, and a summary of the results of the investigation;
- Required remedial action, if required;
- Validation of the remedial action; and
- Summary of feedback to the complainant.

A permanent register of complaints should be held. All complaints received should be fully investigated and reported to management. The complainant should also be notified of the results and actions arising from the investigation.

8.3.1 CCS Complaints Management System

The individuals responsible for handling complaints, as established in the CCS report, are summarised below.

Table 17 -Responsibility for Complaints Handling

<table>
<tr><th>Name</th><th>Position</th><th>Responsibility</th><th>Contact</th></tr>
<tr><td>Tim Calpito</td><td>Project Manager</td><td>Monitor and execute the complaint procedure as per this section.
Consult and provide feedback to the complainant.
Manage the compliant register.</td><td rowspan="2">Address: Level 6, 66 Berry St North Sydney NSW 2060

Phone number: (02) 9955 7000

Email address: stanthonyofpadua@lipman.com.au</td></tr>
<tr><td>Other Lipman team members</td><td>Varies</td><td>Notify Tim Calpito for the complaint.
Assist in recording the complaint.</td></tr>
</table>

The complaints resolution process established in the CCS report is as follows:

1. Community Relations Manager to record all required details about the issue in the Complaints Register.
2. Assign the issue to the appropriate staff or techniqual for resolution. Appropriate staff or techniqual lead would be determined upon nature/theme of complaint.
3. Investigate the issue and document actions / outcomes on the Complaints Register. Register to be managed by Community Relations Manager.
4. Advise the person who originally raised the issue of the resolution and how it has been closed out.
5. Follow-up after a week to ensure that the corrective measures are satisfactory.

Where the complaints resolution process identifies the issue as noise related, the following contingency plan should be implemented.

8.4 CONTINGENCY PLAN

8.4.1 Investigation

The investigation of a noise complaint shall involve where applicable;

1. Noise measurements at the affected receiver;
2. An investigation of the activities occurring at the time of the incident;
3. Inspection of the activity to determine whether any undue noise is being emitted by equipment; and
4. Whether work practices were being carried out either within established guidelines or outside these guidelines.

8.4.2 Management

Where non-compliances are identified the following methodology will be implemented.

1. Determine the offending plant/equipment/process.
2. Locate the plant/equipment/process further away from the affected receiver(s) if possible.
3. Implement additional acoustic treatment in the form of localised barriers, silencers etc where practical.
4. Selecting alternative equipment/processes where practical.

Where an item of plant is found to be emitting excessive noise, the cause is to be rectified as soon as possible. Noise measurements shall validate the results of any corrective actions arising from a complaint where applicable.

8.4.3 Reporting Requirements

The following shall be kept on site:

1. A register of complaints received/communication with the local community shall be maintained and kept on site with information as detailed in this report.
2. Where noise/vibration complaints require noise/vibration monitoring, results from monitoring shall be retained on site at all times.
3. Any noise exceedances occurring including, the actions taken and results of follow up monitoring.
4. A report detailing complaints received and actions taken shall be presented to the construction liaison committee.

9 NOISE MONITORING PROGRAM

The following program has been developed to monitor noise impacts on neighbouring receivers during the construction process. This program has been developed to:

- Quantify noise emissions,
- Determine the effectiveness of noise management measures implemented
- Identify noise exceedances in the event of complaint and appropriately address the source.
- Report on the effectiveness of mitigation measures in response to an identified exceedance.

9.1.1 Attended Noise Monitoring - Ongoing

Attended noise monitoring should be conducted regularly and at the beginning of each construction stage to quantify the level of construction noise typically emitted from the site. This may be used to inform any mitigation strategies which could be implemented. These attended noise measurements should be undertaken within school buildings and at surrounding properties.

Lipman will conduct the regular attended noise measurements within the company. The measurements should be conducted at the nearest receiver locations and results are utilised to compare against the predicted noise levels detailed in Section 5.2 of this report. Contingency plan should be implemented if the measured noise levels exceed the prediction in this report. These measurements will be conducted with a sound level meter retaining current calibration - either manufacturers' calibration or NATA certified calibration. Information is to be reported for each measurement as per section 9.1.4.

9.1.2 Attended Noise Monitoring – Complaint Response

In addition to the above, detailed attended noise monitoring should be conducted in response to any noise complaints as per the contingency plan methodology in section 8.4.

In the event of a noise complaint, measurements are to be conducted of the construction activity/activities which were identified as the source of the complaint. Measurements are to be conducted at the complainant and other nearby receivers which may also be affected. All complaint response measurements are to be conducted on site by Acoustic Logic and information reported as per section 9.1.4.

9.1.3 Unattended Noise Monitoring

In the event of ongoing complaints, unattended noise monitoring should be carried out to quantify and manage ongoing construction noise.

Real time noise monitors should be set up for the duration of the impacting works. They should have remote alerting capabilities by way of SMS and or email alerts. Normal alert configurations prioritise the machinery operator and site foreman to receive SMS alerts and for Management and Others to receive email alerts. The handling of alerts once verified that they have originated from the subject works will follow the procedures presented in Sections 6 and 8.4.

The location of the unattended noise monitors will depend on the location of affected receivers. Pending complaint responses, unattended noise monitoring may require up to three noise monitors. An example of noise monitoring locations has been presented in Figure 2.

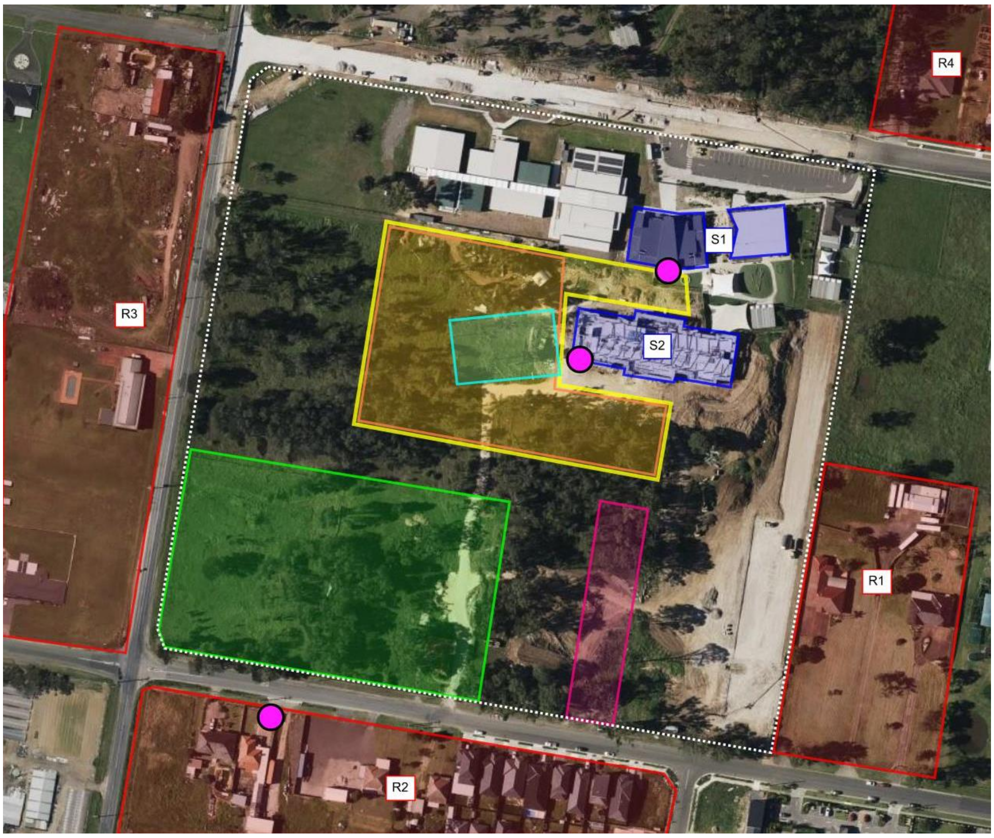


Figure 2 – Indicative Unattended Noise Monitoring Locations

Unattended Noise Monitor

9.1.4 Noise Monitoring Technique and Reporting

Where noise monitoring is undertaken (either by attended short term measurements or long term unattended noise monitoring), it should be conducted at a practical location representative of the impact to nearby noise sensitive receivers. Where this is not possible, noise measurements of construction processes should be taken such that noise levels can be accurately predicted to receivers.

A report should be prepared to present the results of the investigation. Any reporting of noise measurement results should include the following information:

- The date and time that the measurements were undertaken;
- The location of measurements, noise receivers and construction processes. A site map should be included for clarity.
- A description of the construction processes being undertaken during the measurement period.
- The measured noise construction noise levels in dB(A)$L_{eq(15\ minute)}$, and the noise level at the façade of nearby receivers (if noise levels are predicted).
- A comparison to the NSW EPA Interim Construction Noise Guideline noise management levels.

10 CONCLUSION

An assessment of noise from construction works associated with St Anthony of Padua Catholic College has been presented within this report to satisfy Condition C21 of SSD 8865.

The acoustic assessment of the proposed works has been made with reference to the existing consent conditions for the site and relevant policies & guidelines for construction noise – namely the *Interim Construction Noise Guideline*.

Based on the assessment, noise emissions from construction activities can generally meet the relevant noise emission levels to residential receivers. School receivers are expected to be impacted by various construction activities due to their close proximity and elevation. Recommendations have been provided to minimise the noise impacts on surrounding receivers.

A Construction Noise and Vibration Plan has been developed that will be used to minimise impacts on the surrounding properties. Provided that the mitigation techniques as recommended in sections 5.5, 5.6, and 5.7 of this report are adopted, and the complaints management and monitoring procedures in sections 8 and 9 are adhered to , noise and vibration impacts on the adjacent buildings are expected to be managed.

Please contact us should you have any further queries.

Yours faithfully,

Acoustic Logic Pty Ltd
Ruben Ghannoum

APPENDIX E – Construction Waste Management Plan

Waste and Recycling Management Plan

St Anthony's of Padua Stage 4

TABLE OF CONTENTS

1.0 INTRODUCTION

This Waste and Recycling Management Plan (WRMP) has been prepared to manage waste generated from the construction stage of the St Anthony's of Padua – Stage 4 project, in accordance with the relevant regulations, development consents and Client requirements.

The implementation of this WRMP provides for the effective management of solid and liquid waste, and details management practices for the reuse, recycling and lawful disposal of waste generated during construction.

The requirements of the following legal requirements have been addressed in this document:

- NSW Protection of the Environment Operations Act 2000,
- Waste Classification Guidelines Part 1: Classifying Waste, NSW EPA (2009) Aim or objective, and
- NSW Waste Avoidance and Recovery Act 2001.

CC Conditions

This report addresses the following CC Conditions

CC Condition C22 – The Construction Waste Management Plan must address but not limited to, the following	
	Report Section
a) Detail the quantities of each waste type generated during construction and the proposed resuse, recycling and disposal locations	Section 5.1
b) Removal of hazardous materials, particularly the method of containment and control of emissions of fibres to the air, and disposal at an approved waste disposal facility in accordance with the requirements of the relevant regislation, codes, standards and guidelines, prior to the	No Contaminated spoil was removed from site. All was stored and capped within Burrow Pit in accordance with the Alliance Geotechnical Advice.

2.0 DEFINITIONS

ASS – Acid Sulphate Soils.

EPA – NSW Environment Protection Authority.

POEO Act – Protection of the Environment Operations Act

SDS - Safety Data Sheet

WRMP – Project specific Waste and Recycling Management Plan (this document).

3.0 PURPOSE & OBJECTIVES

The purpose of the WRMP is to implement a waste management strategy for the effective management of waste generated during construction.

The goals for effective management of construction waste include:

- Prevention importing of waste on to the site,
- Prevent or mitigate construction generated waste in the following priority order.
  - Avoiding waste, then
  - Reusing materials, then
  - Recycling and reprocessing, then
  - Disposing waste (if first three measures are not possible).
- Continually monitor and improve waste management on the project,
- Ensure disposal of chemical, fuel and lubricant containers, solid and liquid wastes comply with requirements of the EPA and Council.
- Ensure resource recovery is undertaken effectively, and
- Ensure recycling is undertaken efficiently.

4.0 RESPONSIBILITIES & ACCOUNTABILITIES

Responsibilities for the effective implementation of the WRMP are provided below.

Action	Responsibility
Implementation of the WRMP	Lipman Project Manager
Document and implement control measures through project risk assessment.	Lipman Project Manager, Supervisors and Subcontractors
Supervise the implementation of mitigation measures.	Lipman Supervisors.
Implement methodology for managing and/or disposing construction waste.	Lipman Project Manager and/or Subcontractor
Monitor and report on performances and effectiveness of waste and recycling strategies.	Lipman Project Manager and Pronto Bins
Maintain internal records of inspection, monitoring, and reviews.	Lipman Project Manager
Identify and report on non-conformances and incidents.	All project stakeholders
Investigate and implement corrective actions to prevent incidents from re-occurring.	Lipman Project Manager and/or Subcontractor (as applicable)

5.0 WASTE MANAGEMENT

5.1 Identification and Classification

The EPA provides guidance on the classification of waste into groups that pose similar risks to the environment and human health and are classified under the Waste Classification Guidelines Part 1: Classifying Waste (EPA, 2009).

"General solid waste (non-putrescible)" class of waste is identified as the most significant contributor to waste generated during the construction phase.

The generation of any "Liquid Waste" is not anticipated other than wastewater from onsite amenities, which will be managed in accordance with Council requirements and applicable permits.

All Hazardous materials within the project; Asbestos Contaminated Material; was stored within the bu

Typical wastes and quantities that are anticipated to be generated during the construction phase of the project are indicated in the table below.

Waste Type	Classification	Expected quantity	Treatment
Cardboard, paper	General Solid Waste	5 Tonnes	Recycle
Timber (treated and untreated)	General Solid Waste	20 Tonnes	Reuse/Recycle where possible/Dispose

Glass and Plastics	General Solid Waste	2 Tonnes	Recycle where possible/Dispose
Metal	General Solid Waste	35 Tonnes	Recycle
Waste paints/glues and solvents	Liquid	150 Litres	Treatment/Dispose
Fill (Soil, clay, sand etc.)	General Solid Waste	15,000m^3	Reuse /Dispose
Concrete, Bricks, Blocks Rocks, tiles, etc.	General Solid Waste	120 Tonnes	Reuse/Recycle/Dispose
ACM	General Solid Waste (VENM if not oxidised)	6,500 m3	Reuse as capping material
Green waste (cleared vegetation)	General Solid Waste	300 Tonnes	Mulch/Reuse where possible/Recycle
Other general building waste	General Solid Waste	100 Tonnes	Dispose/re use

5.2 Objectives and Targets

The following targets have been established to minimise the volume of material that is disposed of in landfill. These targets will be documented within the Project Plan, responsibilities assigned and reviewed monthly to ensure the targets are being met.

Waste Type / Classification	Treatment Target	Treatment Location
General Solid Waste (Demolition, Excavation, and Construction)	Recycle 80% total volume	Waste Facility
Excavated fill	Reuse 100% total volume	On site

5.3 Separation, Storage and Handling

<u>Sorting and Separation</u>

Wastes of different classifications will be kept separate at all times. If small amounts become mixed with other wastes, the entire quantity of waste will be classified as the highest risk of classification of the waste stream.

Recyclable waste shall be kept separate in a designated area for later disposal at an appropriate recycling facility.

<u>Storage/Handling</u>

All general solid waste generated shall be stored in waste containers within the construction site and sent to the authorised waste facility for disposal, as appropriate.

Handling, storage and transport of hazardous materials and waste that may be encountered, shall be in accordance with the relevant Safety Data Sheet (SDS). Hazardous waste shall be stored in the dedicated waste containers located within the construction site compound and removed as required by a licensed waste contractor to an approved waste facility.

Waste shall be stored in an environmentally safe manner and shall not be stored or allowed to come in contact with any incompatible waste, where possible.

Storage of fuels and chemicals shall be in a purpose built secured bunded area. The capacity of the bunded area is to be at least 110% of the largest container stored within as per EPA requirements. An emergency response spill kit shall be located adjacent to the bunded area.

All storage containers and locations for the various wastes shall be clearly labelled to ensure that mixing of wastes is avoided.

Lipman's site Supervisor shall be consulted if the nature of a waste if it is unknown.

Recycling

Where appropriate, recycling of materials may be performed during the construction phase the project.

Where relevant and feasible, recyclable material generated from the project may be collected in designated bins for transport to an appropriate recycling facility. Where appropriate, recycled materials will be incorporated into the construction works

Scrap metal bins will be provided for the collection of any scrap metal. This metal will then be transported to a metal recycling facility.

Timber formwork shall be reused as many times as possible to avoid the excessive generation of timber waste.

Concrete (waste and/or rejected) shall be stored separately in a designated area within the site. Wherever possible, this concrete may either be utilised on site in the form of fill or disposed of in an appropriate recycling facility.

Excavated material from site shall be stored separately according to material type and either used to backfill or disposed within an approved waste facility.

Contaminated excavated materials from throughout the project will be stockpiled and then stored within a burrow pit below the sporting fields as per the Remediation Action Plan. The burrow pit will then be capped with geofabric material and VENM/ENM.

5.4 Energy Use

The most significant sources of energy consumption during construction will be from plant and equipment using diesel and other fuels, and from electricity use in the site offices facilities, if not generated onsite.

In order to limit the consumption of energy on the project the following measures may be implemented.

- Limit idling time of plant and equipment whilst on site.
- Maintenance and servicing of plant and equipment is to be undertaken as required by manufacturers' specifications to ensure maximum operation efficiency.
- Energy efficient equipment in office and amenities will be utilised where appropriate.

6.0 TRAINING & AWARENESS

All workers will undergo a Site Induction, outlining environmental aspects and controls to be implemented on the project. The induction will provide necessary awareness of waste and the procedures to follow for proper waste recycling and disposal on site.

Toolbox meetings will also be held to reinforce a positive attitude towards waste management.

7.0 EMERGENCY RESPONSE

In the event of an emergency such as a chemical spillage, it will be handled in accordance with the Emergency Response management procedures detailed in the Project Plan.

Incidents which are notifiable to authorities or requires evacuation of the project shall be investigated, reported and corrective actions implemented to prevent re-occurrence.

8.0 WASTE RECORDING AND REPORTING

Waste disposal records (including weighbridge dockets and monthly waste/recycling reports) will be obtained, filed, stored, and archived in accordance with the records control procedure.

The following information in relation to the storage, treatment and disposal of waste will be recorded in accordance with EPA requirements:

- Amount and type of waste transported,
- Name and licence plate number of the transporter,
- Date of transportation, and
- Name and location of the receiving waste facility.

Waste will be transported to an approved waste facility only.

Documentation including Transport Certificates will be completed if required.

The transporter will be informed of the nature of waste to be transported.

The EPA will be informed of any suspected breaches in the POEO Act with respect to transportation of waste.

Monthly project reports shall be prepared and provided to the Client outlining the project's performances against established objectives and targets (Refer Clause 5.2 above).

APPENDIX F – Aboriginal Culture Heritage Management Plan

Approved Development of St Anthony of Padua Catholic School at 135-165 Tenth Avenue and 170-140 Eleventh Avenue, Austral, Liverpool City Council LGA, NSW

Aboriginal Cultural Heritage Management Sub-Plan

Prepared for Lipman on behalf of The Catholic Archdiocese of Sydney

June 2022

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Document Status

Version No.	Purpose of Document	Orig	Review	Review Date	Approval for Issue	Date Issued
1.1	Internal Review	TJ & SC	NS	21/09/2020	NS	22/0/2020
1.2	Client Review	NS	CTPG	22/09/2020	SS	22/09/2020
1.3	RAP Review	NS	RAPs	22/09/2020	RAPs	30/09/2020
2.0	Final ACHMSP	NS	LS	30/09/2020	LS	30/09/2020
3.1	Internal Review	BA	NS	20/05/2022	NS	31/05/2022
3.2	Client Review	DA	TC	31/05/2022	TC	31/05/2022
3.3	RAP Review	DA	RAPS	31/05/2022		28/06/2022
3.4	Final Draft	NS	LS	31/05/2022	LS	31/05/2022
4.0	Final ACHMSP	NS	LS	29/06/2022	LS	30/06/2022

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1 INTRODUCTION

This Aboriginal Cultural Heritage Management Sub-Plan (ACHMSP) has been developed in order to manage impacts to Aboriginal heritage during the construction of the St Anthony of Padua Catholic School in Austral.

This ACHMSP has been prepared to Condition C23 and C30 of the Development Consent (SSD-8865) for the redevelopment of the St Anthony of Padua Catholic School (refer to Section 1.1).

1.1 Project Background

Kayandel (2018) prepared an Aboriginal Cultural Heritage Assessment Report (ACHAR) to support an Environmental Impact Statement (EIS) for the proposed redevelopment of St Anthony of Padua at 125-165 Tenth Avenue and 170-140 Eleventh Avenue, Austral.

The ACHAR was prepared to address the Secretary's Environmental Assessment Requirements (SEARs) issued by the Department of Planning and Environment (DPE).

The ACHAR was prepared in accordance with the:

- *Aboriginal Cultural Heritage Consultation Requirements for Proponents 2010* (DECCW, 2010a);
- The *Code of Practice for the Investigation of Aboriginal Objects in New South Wales* (DECCW, 2010b); and,
- *The Guide to Investigating, Assessing and Report on Aboriginal Cultural Heritage in NSW* (OEH, 2011).

The assessment included a field survey, and a review of background resources including soil landscapes, geology, hydrology and past reports and site records to inform predictive statements about the likelihood of Aboriginal heritage sites to occur within the Subject Area.

As part of preparing the ACHAR, a search of the Aboriginal Heritage Information Management System (AHIMS) was undertaken. No previously recorded Aboriginal sites have been documented within the Subject Area.

As part of undertaking the field survey, Kayandel (2018) did not identify any previously unrecorded Aboriginal sites or areas of Potential Archaeological Deposit (PAD) within the Subject Area.

Based on the sensitivity mapping undertaken by AMBS (2012) (refer to Figure 13 of Kayandel (2018)), and the results of the Kayandel field survey, the Subject Area was assessed as having low archaeological sensitivity.

Kayandel (2018) recommended the following:

1. No further assessment of the Aboriginal heritage within the Subject Area is required to inform the proposed State Significant Development (SSD) application (refer to Sections 1.2 and 1.3 of Kayandel (2018));
2. Should the proposed works be amended and result in potential impacts to areas previously not inspected as part of this assessment, further investigations may be required;
3. Consultation should continue with the Registered Aboriginal Parties (RAPs) at intervals not exceeding 6 months until such time as the works approved under the SSD have been completed;
4. Prior to the commencement of any ground disturbance works authorised by the SSD, an Aboriginal Cultural Heritage Management Plan (ACHMP) should be developed by a qualified and experienced practitioner in Aboriginal cultural heritage in consultation with the

Registered Aboriginal Parties (RAPs); this should include a provision for unexpected finds, and methodologies for further investigation and reporting where required;

5. The final ACHMP must be kept onsite so that it can be referred to in the event of an unexpected find being identified;
6. All relevant staff and contractors should be made aware of their statutory obligations for heritage under the *National Parks and Wildlife Act 1974*, which may be implemented as a heritage induction;
7. If, during the course of development works, suspected historic cultural heritage material is uncovered, work should cease in that area immediately. Heritage NSW (formerly the Heritage Branch, Office of Environment & Heritage) (Enviroline 131 555) should be notified and works only recommence when an approved management strategy has been developed; and,
8. A copy of the final report should be sent to the RAPs identified in Kayandel (2018, Table 3).

A draft copy of this ACHMSP was provided to the RAPs in September 2020.

1.2 Location of the Subject Area

The Subject Area is situated within the Liverpool City Council Local Government Areas (LGA), and is also within the Leppington North Precinct of the South West Growth Centre (see Figure 1).

The Subject Area comprises of the allotments listed below and covers approximately 10.92ha. The Subject Area extends along the southern side of Eleventh Avenue to Tenth Avenue and west from Fourth Avenue towards Edmondson Avenue in the east (see Figure 2):

- Lots 1 & 2 DP1232692; and,
- Lots 810-812, 840-842 DP2475.

1.3 General Scope of Development Works

The SSD application (SSD-8865) was for the concept development application for St Anthony of Padua School redevelopment including:

- A Concept Proposal for alterations and addition to the existing school to accommodate up to 2480 students and 200 staff members, in three stages comprising:
  - Retention of the existing buildings;
  - Maximum building envelopes for the school buildings, a childcare centre, a church and a trade training centre, site layout, access arrangements, car parking areas and landscaping;
  - Outline staging of the development;
- Stage 1 of the development for the detailed design, construction and use of the buildings, comprising:
  - Demolition works, tree removal and site remediation work;
  - A new two - four storey school building (central hub);
  - A bell tower at the entrance piazza;
  - A new two-storey building at the north-western corner to accommodate gymnasium / hall, indoor sport courts and indoor swimming pool / recreation centre;
  - Retention and use of existing single storey building for Kindergarten classrooms;
  - Accommodation of up to 2280 students (K – 12);
  - A canteen and café within the site;
  - Expansion of an existing building at the north-eastern corner to provide for a single storey 125-place childcare centre;

- Accommodation of up to and 200 staff members;
- Car parking areas for up to 326 car spaces, outdoor play areas, hard and soft landscaped areas;
- Associated external road works and intersection upgrades; and,
- Staged construction and use of the buildings in six construction phases.

1.4 Relevant Conditions of Consent for Concept Proposal

Table 1 identifies the Conditions of Consent that relate to Aboriginal heritage. The aforementioned Conditions of Consent have been addressed in this ACHMSP.

Part	Description	Location within ACHMSP
Condition C23 – Construction Environmental Management Plan		
(a)	be prepared by a suitably qualified and experienced expert in consultation with the Registered Aboriginal Parties (RAPs)	Section 1.6 Section 3 and Appendix II
(b)	include recommendations of the Aboriginal Cultural heritage Assessment Report (ACHAR) prepared by Kayandel dated August 2018.	Sections 1.1 and 6
Condition C30 – Aboriginal Heritage		
-	Prior to commencement of construction of a relevant stage, the Applicant must consult with RAPs to determine specific requirements and management measures to be used on site during construction, including protection of any objects or items in perpetuity.	Section 3 and Appendix II Section 6

Table 1: Conditions of Consent – Aboriginal heritage

1.5 Purpose and Objectives

The purpose of this ACHMSP is to describe how Aboriginal heritage will be protected and managed by Lipman on behalf of the Catholic Archdiocese of Sydney during the construction of the project.

A provision for managing impacts to unexpected historical heritage items has also been included as part of this ACHMSP (refer to Section 6.2.2).

Specific objectives include:

- An unexpected finds procedure developed in consultation with Heritage NSW and Registered Aboriginal Parties (RAPs) for the management of any previously unidentified Aboriginal heritage finds;
- A description of the measures that would be implemented for:
  - Ensuring workers on site receive suitable heritage inductions prior to carrying out any development on site, and that records are kept of these inductions;
  - Ongoing consultation with Aboriginal stakeholders during the implementation of the plan
- A program to monitor and report on the effectiveness of these measures and any heritage impacts of the project.

This ACHMSP should be read in conjunction with the following document:

- Proposed Redevelopment of St Anthony of Padua Catholic School 125-165 Tenth Avenue (Lot 2 DP1232692 and Lots 842-839 DP2475) and, 170-140 Eleventh (Lot 1 DP1232692 and Lots 810-

812 DP2475), Austral, Liverpool City Council LGA, NSW: Aboriginal Cultural Heritage Assessment Report (Kayandel, 2018).

1.6 Personnel

This ACHMSP has been prepared by Kayandel (refer to Table 2).

Person	Qualifications	Experience	Tasks
Britt Andrews	B. Arts (His. and Anc. His. and Arch.), B. Com. and Media Studies (Digital Media and Com.)	>1 year	Background research, report drafting
Steven Castell	B. Arts Ext (Arch/Anthro)	4 years	Background research, report drafting
Natalie Stiles	B. Arts (Arch/Palaeo), Grad Cert. Arts (Arch), MGIS&RemoteSens	>10 years	Mapping, ACHMSP review
Lance Syme	B. Arts (Arch/Palaeo), Grad. Dip. (Heritage Cons.), M. ICOMOS	>20 years	Project supervisor, quality control

Table 2: Kayandel personnel involved in the preparation of this ACHMSP

Figure 1: Project Location

Figure 2: Subject Area

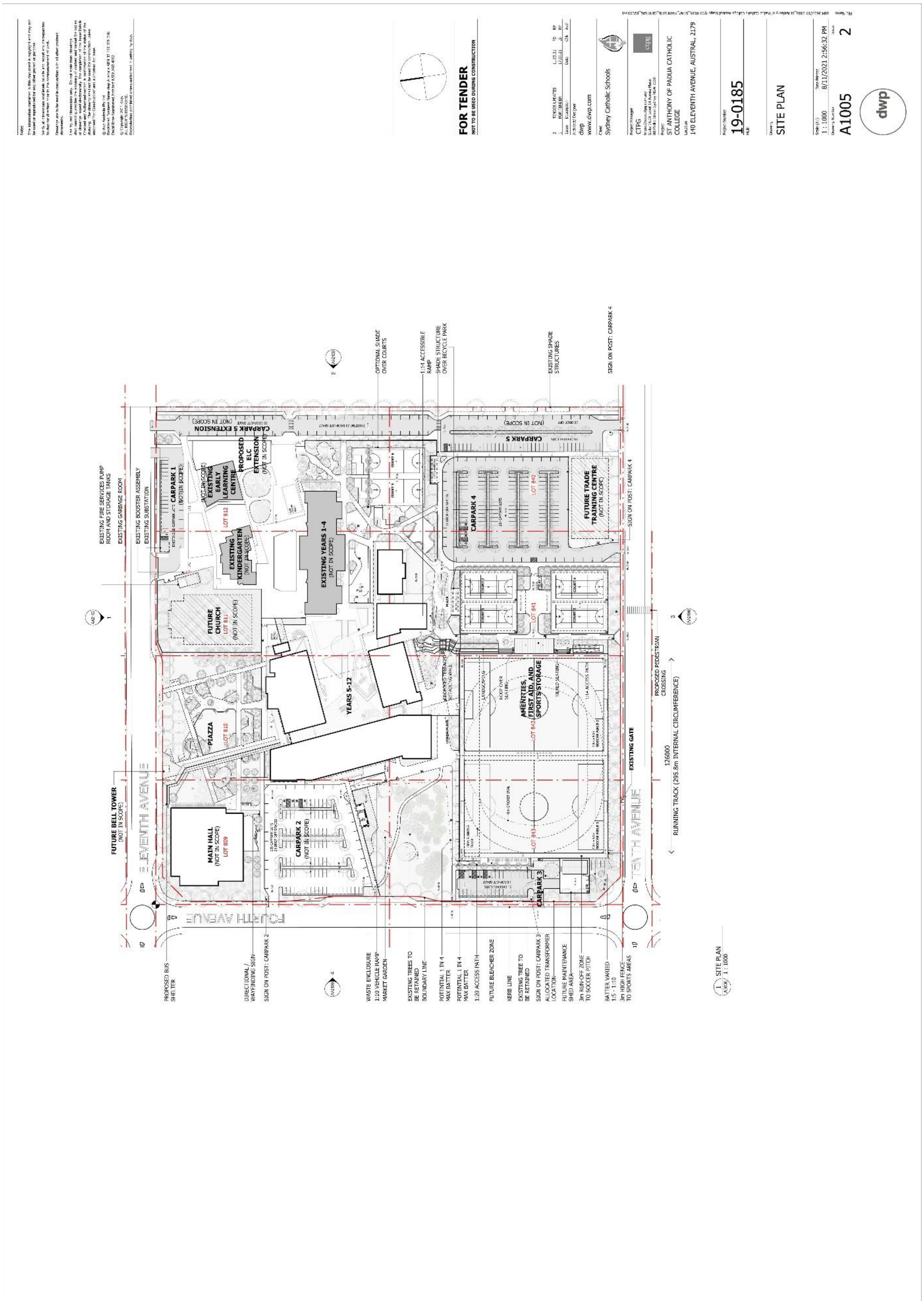

Figure 3: Approved Concept Design

2 ENVIRONMENTAL REQUIREMENTS

The following section outlines the environmental requirements of the project including relevant legislation and guidelines that have been used to aid in the formulation of this ACHMSP.

2.1 Relevant Legislation and Guidelines

Legislation relevant to heritage management includes:

- *Environmental Planning and Assessment Act 1979* (*EP&A Act*);
- *National Parks and Wildlife Act 1974* (*NPW Act*);

The main guidelines, specifications, and policy documents relevant to this ACHMSP include:

- *Aboriginal Cultural Heritage Consultation Requirements for Proponents 2010* (DECCW, 2010a);
- *The Burra Charter: The Australia ICOMOS Charter for Places of Cultural Significance* (Australia ICOMOS, 2013); and,
- The *Code of Practice for the Investigation of Aboriginal Objects in New South Wales* (DECCW, 2010b).

2.2 Commitment to Cultural Heritage Preservation

According to Allen and O'Connell (2003), Aboriginal people have inhabited the Australian continent for the last 50,000 years. New evidence out of the Northern Territory has pushed this date back to around 60,000 years with the Malakanunja II rock shelter dated at 61,000 +9000/-13,000 BP (Clarkson et al., 2015).

In NSW, according to Bowler et al. (2003), Aboriginal people have occupied the land for over 42,000 years. However, preliminary evidence presented by Biosis (2017) from a subsurface testing program in South-Western NSW suggests Aboriginal people may have occupied the semi-arid zone of the region for 50,000 years.

Without being part of the Aboriginal culture, and the productions of this culture, it is not possible for non-Aboriginal people to fully understand their meaning to Aboriginal people – only to move closer towards understanding this meaning with the help of the Aboriginal community. Similarly, definitions of Aboriginal culture and cultural heritage without this involvement constitute outsider interpretations.

With this preface, Aboriginal cultural heritage broadly refers to things that relate to Aboriginal culture and hold cultural meaning and significance to Aboriginal people (DECCW, 2010a, p. 3). There is an understanding in Aboriginal culture that everything is interconnected. In essence, Aboriginal cultural heritage can be viewed as potentially encompassing any part of the physical and/or mental landscape, that is, 'Country' (DECCW, 2010a, p. iii).

Aboriginal people's interpretation of cultural value is based on their "traditions, observance, lore, customs, beliefs and history" (DECCW, 2010a, p. 3). The things associated with Aboriginal cultural heritage are continually / actively being defined by Aboriginal people. These things can be associated with traditional, historical or contemporary Aboriginal culture (DEC, 2005, p. 1; DECCW, 2010a, p. 3).

2.2.1 Tangible Aboriginal Cultural Heritage

Three categories of tangible Aboriginal cultural heritage may be defined:

- Things that have been observably modified by Aboriginal people;

- Things that may have been modified by Aboriginal people, but no discernible traces of that activity remain; and/or,
- Things never physically modified by Aboriginal people (but associated with Dreamtime Ancestors who shaped those things).

2.2.2 Intangible Aboriginal Cultural Heritage

Examples of intangible Aboriginal cultural heritage would include memories of stories and 'ways of doing', which would include language and ceremonies (DECCW, 2010a, p. 3).

2.2.3 2.2.3 Statutory

Currently Aboriginal cultural heritage, as statutorily defined by the *NPW Act* consists of objects and places.

Aboriginal objects are defined as:

> *any deposit, object or material evidence…relating to the Aboriginal habitation of the area that comprises NSW, being habitation before or concurrent with (or both) the occupation of that area by persons of non-Aboriginal extraction, and includes Aboriginal remains.*

Aboriginal places are defined as a place that is or was of special Aboriginal cultural significance. Places are declared under section 84 of the *NPW Act*.

2.2.4 2.2.4 Values

Aboriginal cultural heritage is broadly valued by Aboriginal people as it is used to define their identity as both individuals and as part of a group (DEC, 2005, p. 1 & 3; DECCW, 2010b). More specifically it is used:

- To provide a:
  - "Connection and sense of belonging to Country" (DECCW, 2010a, p. 15);
  - "Link between the present and the past" (DECCW, 2010a, p. iii).
- As a learning tool to teach Aboriginal culture to younger Aboriginal generations and the general public (DECCW, 2010a, p. 3).

As further evidence of Aboriginal occupation prior to European settlement for people who do not understand the magnitude to which Aboriginal people occupied the continent (DECCW, 2010a, p. 3).

The NSW government and all of its entities are committed the protection and preservation of Aboriginal and non-Aboriginal cultural heritage in NSW.

3 ABORIGINAL COMMUNITY CONSULTATION

3.1 Aboriginal Consultation undertaken as part of the Project Approval

Consultation and collaboration with registered Aboriginal stakeholders has been integral to the assessment and management of Aboriginal cultural heritage for the project.

Consultation undertaken to date is outlined in the ACHAR (Kayandel, 2018), this was undertaken in accordance with the consultation requirements (DECCW, 2010a).

3.2 Ongoing Aboriginal consultation

Ongoing consultation between Lipman, the Catholic Archdiocese of Sydney, and Registered Aboriginal Parties (RAPs) regarding the management of Aboriginal cultural heritage associated with the project will continue throughout the life of this project.

Ongoing consultation will consist of the following actions:

- Outcomes for any proposed modification to the consent for the project;
- Outcomes of any unexpected Aboriginal finds;
- Outcomes for any unexpected Aboriginal archaeological features; and,
- Updates to this ACHMSP.

In the event of an unexpected Aboriginal heritage find, Lipman and/or the Catholic Archdiocese of Sydney, or a qualified Archaeologist will consult with RAPs regarding the management of Aboriginal heritage items.

Following consultation with the various stakeholders, the ACHMSP will be updated to include any comments raised and to document the consultation undertaken (refer to Appendix II).

3.2.1 ACHMSP RAP Review - 2020

A copy of version 1.3 of the ACHMSP was provided to RAPs for their review and comment.

Refer to Table 3 and Appendix II for a copy of the comments received from the RAPs in regard to v1.3 of the ACHMSP.

RAP	RAP's Comment(s)	Kayandel's Response
Thoorga Nura (received 24/09/2020)	Has no comments at this stage	N/A
Goobah (received 24/09/2020)	Agrees with the mitigation measures in the management plan and that he has no comments otherwise.	N/A
Wailwan Aboriginal Digging Group (received 25/09/2020)	At this point I do not have any more to add to this project. Everything seems to be satisfactory.	N/A
Kamilaroi-Yankuntjatjara Working Group (received 28/09/2020)	We agree & support your report & looking forward to working with you on this project	N/A
Darug Custodian Aboriginal Corporation (received 28/09/2020)	We support the recommendations in this Draft report	N/A
Barraby Cultural Services (received 29/09/2020)	Following on from my phone conversation I have reviewed and	N/A

RAP	RAP's Comment(s)	Kayandel's Response
	agree with the report associated with this project	
Yurrandaali Cultural Services (received 29/09/2020)	Happy for us to proceed with the project as it is.	N/A
Kawul Cultural Services (received 29/09/2020)	Happy with the recommendations and management strategies that are contained within the ACHMSP and that she does not have any additional management strategies to add	N/A
Didge Ngunawal Clan (received 29/09/2020)	Happy with the recommendations and management strategies that are contained within the ACHMSP and that they don't have any additional management strategies to add.	N/A
Cubbitch Barta Native Title Claimants Aboriginal Corporation (received 30/09/2020)	I would like to make comment on is that the usual unexpected finds and human remains statement is made in this document, who during the construction process has the knowledge to identify unexpected finds on site?	As part of Strategy 1 "Heritage Inductions and Toolbox" (refer to Section 6.2.1) there will be a discussion regarding the process of identifying unexpected Aboriginal finds, and unexpected Aboriginal remains. These processes are also detailed in Sections 6.2.2 and 6.2.3. The ACHMSP also includes Appendix I which provides reference examples of Aboriginal finds and remains for people on-site to refer to as part identifying any unexpected Aboriginal finds and/or Aboriginal remains.

Table 3: RAP comments on version 1.3 of the ACHMSP

3.2.2 ACHMSP RAP Review – 2022

A copy of version 3.3 of the ACHMSP was provided to RAPs for their review and comment.

Refer to Table 4 and Appendix III for a copy of the comments received from the RAPs in regard to v3.3 of the ACHMSP.

RAP	RAP's Comment	Kayandel's Response
Kamilaroi-Yankuntjatjara Working Group (received 28/09/2020)	The whole study area and surrounding area is of high significance to us Aboriginal Peoples, for tens of thousands of years the area has been occupied by Aboriginal Peoples, in turn We have a deep connection to the sky, water ways and land. The area would have been utilied for daily activites such as camping, hunting, fishing and ceremonial practices etc. There are water ways within the area that are utilised by Aboriginal Peoples. Yes, it's the	Thanks for sending through your comments detailing the cultural significance of the Subject Area and the surrounding area. We will pass your comments onto the Proponent so that they can be incorporated into any interpretative plan that may be being produced for the development.

RAP	RAP's Comment	Kayandel's Response
	tangible aspects that archaeology looks for but it's also the intangible and aesthetic aspects that must be considered when it comes to cultural heritage. There are stories of the dreaming and creations stories that should be sort when it comes to place and connecting to country.	
	The study area is significant due to the multiple water ways in an ecosystem rich. The main water way that is close by to the to the site are Kemps Creek. This water way runs across the land utilised by many for many reasons such as fresh water, bathing, gathering of food and for everyday life activities. Water is a giver of life without water we would not be here so we should respect, conserve and mange water ways as naturally as possible and keep them maintained. Aboriginal people have been following waterways for tens of thousands of years a sense of way finding and a deep connection we hold.	
	Is there a cultural interpretation plan for this project? due to the project being accessed by the wider community we believe there is an opportunity to archive connecting with country through design, art, digital displays, apps, native gardens, or landscaping. It is important to incorporate interpretation into you project as it educates the wider community and our next generations about the traditional owners of the land, a keeping place should also be sort to house artefacts on country. This is a way in which to close the gap and better our understanding of one of the oldest continuing cultures in the world.	
	We would like to agree to your report and look forward to furthering consultation for this project.	

Table 4: RAP comments on version 3.3 of the ACHMSP

4 EXISTING ENVIRONMENT

The following sections summarise what is known about Aboriginal heritage within and adjacent to the Subject Area based on information provided in:

- Proposed Redevelopment of St Anthony of Padua Catholic School 125-165 Tenth Avenue (Lot 2 DP1232692 and Lots 842-839 DP2475) and, 170-140 Eleventh (Lot 1 DP1232692 and Lots 810-812 DP2475), Austral, Liverpool City Council LGA, NSW: Aboriginal Cultural Heritage Assessment Report (Kayandel, 2018).

4.1 Aboriginal Cultural Heritage

No previously recorded Aboriginal sites have been documented within the Subject Area.

As part of preparing the ACHAR, Kayandel (2018) did not identify any previously unrecorded Aboriginal sites or areas of Potential Archaeological Deposit (PAD) within the Subject Area.

Based on the sensitivity mapping undertaken by AMBS (2012) (refer to Figure 13 of Kayandel (2018)), and the results of the Kayandel field survey, the Subject Area was assessed as having low archaeological sensitivity.

5 IMPACTS TO ABORIGINAL HERITAGE

The key construction activities and the associated impacts to Aboriginal heritage values were identified and assessed during the Aboriginal cultural heritage assessment process as per the Code of *Practice for Archaeological Investigation of Aboriginal Objects in New South Wales* (DECCW, 2010b), and the *Guide to Investigating, Assessing and Report on Aboriginal Cultural Heritage in NSW* (OEH, 2011).

The consequence and likelihood of each activity's impact on Aboriginal heritage values is detailed below.

5.1 Aboriginal Heritage Impacts

The potential impacts on Aboriginal heritage could include:

- Direct impacts and disturbance to the entire site or the majority of a site containing Aboriginal objects due to the construction of the project. This impact can be complete or partial.
- Indirect impacts to Aboriginal objects or cultural values, such as from development related changes to the landscape or scenic context of a site or item.

As noted in Section 4.1, no Aboriginal sites, or areas of Potential Archaeological Deposit (PAD) have been identified within the Subject Area, and as such the approved works will not result in direct and/or indirect to Aboriginal sites.

6 MITIGATION MEASURES

6.1 Construction Related Measures

Specific mitigation measures to address impacts on Aboriginal heritage are outlined in Table 5. Where required, further details of the proposed mitigation measures are provided in Section 6.2.

Strategy	Requirement	Personnel
1	Heritage inductions to be completed as part of the overall site induction	Project Manager / Archaeologist
2	Procedure to follow in case of unexpected Aboriginal finds	Construction contractor
3	Procedure to follow in case of the discovery of human remains	Construction contractor

Table 5: Construction Related Measures

6.2 Heritage Protection Management Strategies

6.2.1 Strategy 1: Heritage Inductions and Toolbox Talks

All contractors and staff working on site will undergo site induction training (or be supervised by a staff member that has had the relevant training) relating to Aboriginal heritage management issues. The induction training will address elements related to heritage management including:

- Requirements of this ACHMSP and relevant legislation;
- Roles and responsibilities for heritage management;
- Location of identified heritage sites;
- Proposed heritage management and protection measures;
- Basic identification skills for Aboriginal artefacts and human remains;
- Specific training for personnel working in the vicinity of Aboriginal heritage sites identified within the Subject Area;
- Procedure to follow in case of an unexpected heritage item find during construction works;
- Procedure to follow in case of discovery of human remains during construction works; and,
- Penalties and non-compliance with this ACHMSP.

Training records for all project personnel will be kept and maintained in a register detailing names, dates, content and type of training undertaken. This ACHMSP should be kept on site at all times and be readily accessible. The requirements of the ACHMSP and the unexpected finds protocols should be incorporated into toolbox talks, where works are commencing in the vicinity of heritage items or sites, the mapping presented in this report should be reviewed and management measures assessed to ensure no impacts beyond the project approval are likely to take place.

6.2.2 Strategy 2: Procedure to Follow in case of Unexpected Aboriginal Finds

As noted in Section 4.1, no Aboriginal sites, or areas of Potential Archaeological Deposit (PAD) have been recorded within the Subject Area.

Based on the sensitivity mapping undertaken by AMBS (2012) (refer to Figure 13 of Kayandel (2018)), and the results of the Kayandel field survey, the Subject Area was assessed as having low archaeological sensitivity.

Should further previously unrecorded Aboriginal sites, or archaeological features such as shell middens, or hearths be identified during the course of the development works, the following process should be followed:

- Works must cease in the vicinity and the find should not be moved until assessed by a qualified Archaeologist;
- The Archaeologist will investigate and assess the find to determine the nature, extent and significance of the find. This will enable recommendations to be provided on how work can proceed and whether any further work is required. The archaeologist must supply written advice to the Project Manager stating:
    - Determination of whether the find is an Aboriginal object;
    - Advice on how the project is to proceed and whether the establishment of any no-go areas is necessary;
    - Recommendation on further works that may be required and timeframe for completion of these works;
    - Any Aboriginal finds will be registered on the Aboriginal Heritage Information Management System (AHIMS). Where sites are impacted, a site impact form will be completed and lodged with AHIMS prior to impact.
- Create a no-go area around the find based upon the advice of the Archaeologist; and,
- The archaeologist's written advice will be supplied to Heritage NSW, the Secretary and RAPs for their review. This will include a statement concerning the find, management measures implemented and notification of any further works arising. RAPs are to be involved in any further assessments or works as required. Any comments made by Heritage NSW, the Secretary and RAPs will be incorporated into the written advice prior to finalisation and work proceeding.

Should any previously unidentified Aboriginal finds as outlined above be identified, this will trigger a review of this ACHMSP in accordance with Section 9.

Please note that Appendix I contains guidelines around the identification of Aboriginal objects and site types.

6.2.3 Strategy 3: Procedure to follow in case of the discovery of human remains

If any suspected human remains are discovered during the proposed works, all activity in the area must cease. The following process must be undertaken:

- Immediately cease all work at that location and not further move or disturb the remains;
- Notify the NSW Police, DPIE, and Heritage NSW's Environmental Line on **131 555** as soon as practicable and provide details of the remains and their location;
- Establish an appropriate no-go area. This will need to be established in consultation with NSW Police, Heritage NSW and if necessary, a qualified Archaeologist;
- Works will not be able to recommence within the location of the find until confirmation from NSW Police and Heritage NSW is obtained. If the remains are confirmed as not being human, then works may recommence. If the remains are human then consultation with NSW Police, Heritage NSW, and the RAPs to establish a plan of management will be required;
- Works in the vicinity of the remains will only be able to recommence once the plan of management has been established and approval has been obtained from all relevant parties; and,

- Should any human remains be identified, this will trigger a review of this ACHMSP in accordance with Section 9.

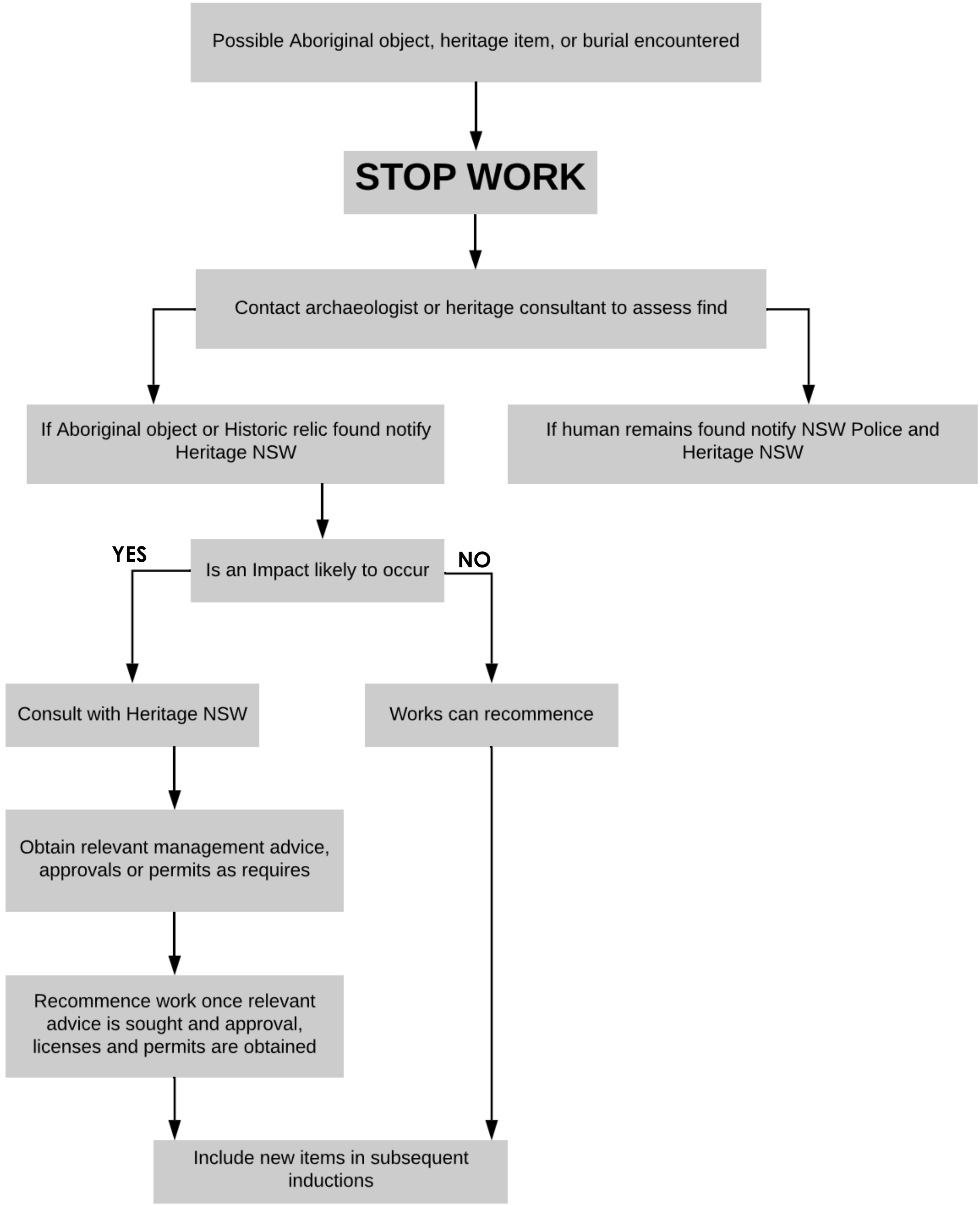

Figure 4: Decision Flowchart for Unexpected Aboriginal Finds

6.2.4 Strategy 4: Ongoing consultation with Aboriginal stakeholders

Consultation with Aboriginal stakeholders will be continued throughout the life of this project as outlined in Section 3 above.

6.2.5 Strategy 5: Monitoring and reporting

A program to monitor and report on the effectiveness of the measures and any heritage impacts will consist of reassessing the above listed strategies following the completion of works.

Upon completion of the works, a short report will be prepared, documenting:

- The effectiveness of the ACHMSP measures;
- A list of sites salvaged, harmed, and relocated;
- Confirmation the ASIRFs have been completed and submitted to AHIMS; and,
- A copy of the Aboriginal Site Impact Recording (ASIR) forms.

A copy of the report will be provided to Aboriginal stakeholders for the project, and Heritage NSW by email to heritagemailbox@environment.nsw.gov.au.

7 COMPLIANCE MANAGEMENT

7.1 Roles and Responsibilities

The Diocese Project Manager is responsible for ensuring all activities in this manual are carried out prior to and during construction, along with reporting any incidents to Heritage NSW.

The construction contractor must comply with the activities outlined in this manual and any deviation to activities outlined in this manual must be reported to the Diocese Project Manager.

Name	Role/Responsibility	Contact Details
Sydney Catholic Schools	Diocese Project Manager	Simon Romalis simon.romalis@lipman.com.au
Lipman	Construction Contractor	TBA
Heritage NSW	Regulator/Compliance	131555 heritagemailbox@environment.nsw.gov.au
Lance Syme	Kayandel Principal	(02) 4627 8622 info@kayandel.com.au

Table 6: Roles and Responsibilities and Contact Details

7.2 Recording Keeping

The following records must be kept by the archaeologist, construction contractor and the Diocese Project Manager:

- Any archaeological salvage of cultural material prior to and during construction; and,
- Any breaches of the approval conditions and/or this ACHMSP, and the incident report provided to Heritage NSW.

7.3 Incidents

If an incident occurs that results in actual or potential impacts on known heritage items and/or archaeological items that are discovered unexpectedly, Heritage NSW will be informed immediately.

The report to Heritage NSW should also be sent to the Diocese Project Manager and the archaeologist and include the following information:

- Any contravention to the strategies outlined in the ACHMSP;
- The nature of the incident;
- The actual or likely impact of the incident on Aboriginal objects and/or Aboriginal places;
- The nature and location of the Aboriginal objects and/or places, referring to and providing maps and photos where appropriate; and,
- The measures which have been taken or will be taken to prevent a recurrence of the incident.

7.4 Reporting

Reporting requirements and responsibilities of heritage related issues should be documented as outlined in Table 7 below:

Action	Responsibility
A short summary of the report	Archaeologist
Describe any ongoing consultation with or involvement of RAPs	Project Manager/Archaeologist
Provide details of the Aboriginal objects which were fully or partially harmed in the course of undertaking the construction	Construction contractor/Project Manager/Archaeologist
Detail any community collection of Aboriginal objects undertaken by the RAPs	Archaeologist
Comment on the effectiveness of any mitigation measures that were implemented	Construction contractor
Comment on the effectiveness of any mitigation plan which was in place	Construction contractor
If any Aboriginal objects were moved to a temporary storage location, a description of the nature and types of Aboriginal objects which are now at that location	Archaeologist
Detail the results of any analysis of Aboriginal objects	Archaeologist
Detail the long term management arrangements for any Aboriginal objects	Archaeologist

Table 7: Reporting Roles and Responsibilities

8 TRAINING AND AWARENESS

The construction contractor must comply with all Diocese WHS manuals and procedures. Prior to the commencement of construction, the construction contractor must undertake a cultural heritage induction which will include the following:

- A description of Aboriginal cultural heritage in Australia;
- A description of Aboriginal cultural heritage in the Cumberland Plains region;
- A description of the tangible and intangible aspects of Aboriginal heritage and why it is important;
- An overview of the *National Parks and Wildlife Act 1974* and the *Heritage Act 1977* and the implications and fines applicable for breaching the Acts;
- A general overview of cultural heritage site types (refer to Appendix I);
- The process for reporting unknown cultural heritage sites;
- The process for reporting damage to cultural sites; and,
- The process for reporting human remains.

9 REVIEW AND IMPROVEMENT

9.1 Continuous Improvement

Opportunities for the improvement of this CHMP will be found through the ongoing evaluation of environmental management performance against environmental policies, objectives and targets. The purpose of this is to:

- Identify opportunities for the improvement of environmental management and performance;
- Determine the cause or causes of non-conformances and deficiencies;
- Development and implementation of a plan of corrective and preventative actions to address any non-conformances and deficiencies in this ACHMSP;
- Corroborate the efficiency of the corrective and preventative actions;
- Document any changes in procedures resulting from process improvement; and,
- Revise the objectives and targets of this CHMP accordingly.

9.2 ACHMSP Update and Amendment

This will occur as needed. A copy of the updated ACHMSP and changes will be distributed to all relevant stakeholders in accordance with the approved document control procedure. The ACHMSP will also be updated and resubmitted for approval in the event a previously unidentified heritage item is found.

10REFERENCES

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OEH. (2011). *Guide to Investigating, Assessing and Report on Aboriginal Cultural Heritage in NSW*. South Sydney: Office of Environment and Heritage

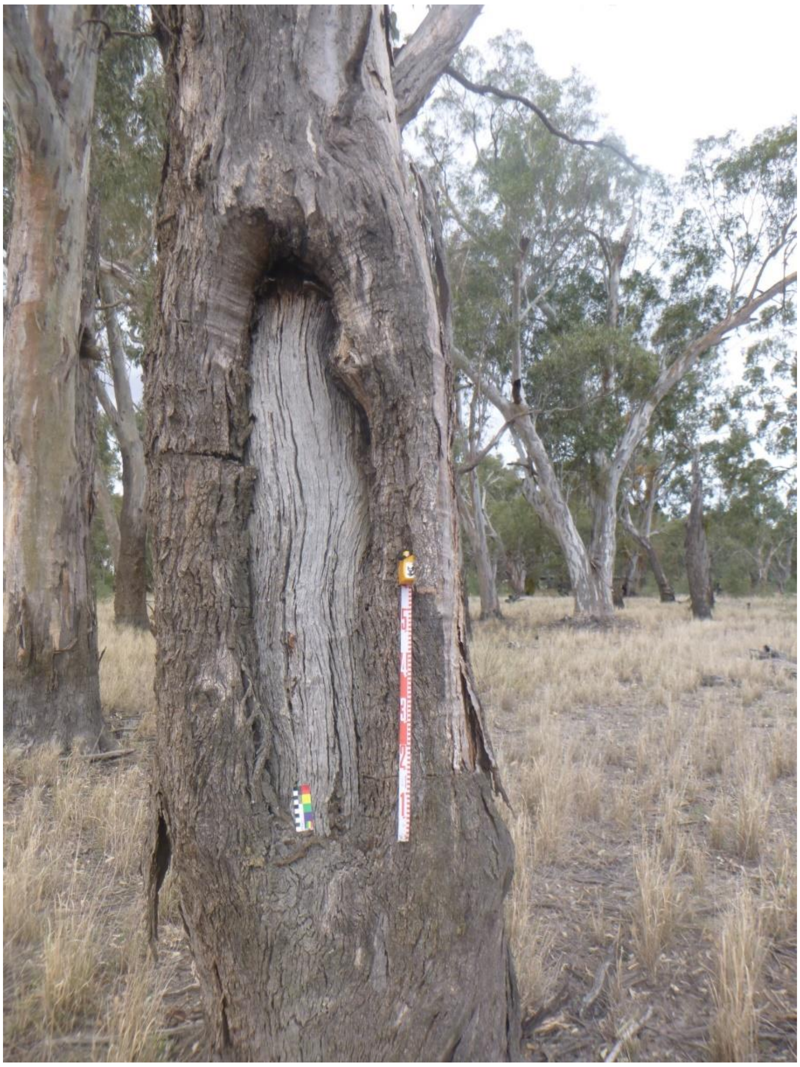
APPENDIX I. Identifying Aboriginal objects and site types

Isolated stone artefact

Stone artefact scatter

Shell midden

Stone Quarry



Modified/Carved Tree

Burial

Aboriginal gathering and resource location

Hearth

Appendix II. Aboriginal Consultation Log

Date	Time	Nature of consultation	Action taken by:
22/09/2020	6:17pm	Sent draft Aboriginal Cultural Heritage Management Sub-Plan (ACHMSP) to all 20 RAPs for comment to address Conditions 23 and 30 of the SSD approval.	NS
23/09/2020	8:30am	Received acknowledgment of receipt of ACHMSP from Wyanita Tranter of GLALC	NS
24/09/2020	1:00pm	Phone calls attempted to 14 RAPs Gandangara Local Aboriginal Land Council, Darug Land Observations Pty Ltd, Barraby Cultural Services, Yurrandaali Cultural Services, Phil Khan Didge Ngunawal Clan, Darug Tribal Aboriginal Corporation, Wailwan Aboriginal Digging Group, Cubbitch Barta Native Title Claimants Aboriginal Corporation, Goobah, THOORGA NURA, Darug Custodian Aboriginal Corporation, Butucarbin Aboriginal Corporation and Kawul Cultural Services to ask if they had received the ACHMSP and if they had had a chance to read it, results of calls is details below	SC
24/09/2020	1:00pm	Phone call made to Gandangara Local Aboriginal Land Council and spoke to reception, they stated they had passed the email on to the Heritage team, they took my number and said they would get someone to call me back	SC
24/09/2020	1:00pm	Phone call made to John Carriage of THOORGA NURA who said he has no comments at this stage	SC
24/09/2020	1:00pm	I spoke with Basil Smith of Goobah who said he had received the email and read the document. Basil said he agrees with the mitigation measures in the management plan and that he has no comments otherwise.	SC
25/09/2020	7:53am	Received email from Glenda Chalker of Cubbitch Barta Native Title Claimants Aboriginal Corporation requesting hard copy of ACHMSP to be sent to her	NS
25/09/2020	3:41pm	follow up emails sent to the 17 RAPs who we had not yet received comments from, to ask if they had any comments regarding the recommendations or management strategies within the ACHMSP	SC
25/09/2020	1:00pm	Received email from Phil Boney of Wailwan Aboriginal Digging Group who said at this point I do not have any more to add to this project. Everything seems to be satisfactory. Thank you.	SC
28/09/2020	8:34am	Received email from Vicki Slater of Kawul Cultural Services who said she will take a look at it today.	SC
28/09/2020	12:46am	Received email from Phil Khan of Kamilaroi-Yankuntjatjara Working Group who agree & support your report & looking forward to working with you on this project'.	SC
28/09/2020	-	Hard copy of ACHMSP sent to Glenda Chalker of Cubbitch Barta Native Title Claimants Aboriginal Corporation	SC
28/09/2020	11:16am	Received comments from Justine Coplin of Darug Custondian Aboriginal Corporation who support the recommendations in this Draft report	NS
29/09/2020	10:23am	I spoke to Bo Field who said he is happy for us to proceed with the project as it is.	SC
29/09/2020	10:23am	Spoke to Vicki Slater of Kawul Cultural Services who said that she is happy with the recommendations and management strategies that are contained within the ACHMSP and that she does not have any additional management strategies to add.	SC
29/09/2020	10:23am	Received email from Lee Field who stated that 'I have reviewed and agree with the report associated with this project'.	SC
29/09/2020	10:37am	Spoke to Paul Boyd and Lilly Carroll of Didge Ngunawal Clan who said that she is happy with the recommendations and management strategies that are contained within the ACHMSP and that he does not have any additional management strategies to add.	SC

30/09/2020	11:15am	Received comments from Cubbitch Barta Native Title Claimants Aboriginal Corporation via email	NS
1/10/2020	12:52pm	Issued final ACHMSP to all 20 RAPs via email (attached as pdf)	SC
20/05/2022	5:37pm	Sent the DRAFT Aboriginal Cultural Heritage Management Sub-Plan for review and comment to RAP	DA
2/06/2022	7:38am	Glenda Chalker (CBNTCAC) requested a hard copy of the ACHMSP be posted to her	DA
9/06/2022	10:16am	Received email from Justine Coplin (DCAC) advising she was having trouble opening the ACHMSP OneDrive link	DA
9/06/2022	12:32pm	Emailed Justine (DCAC) a pdf copy of the ACHMSP	DA
10/06/2022	-	Express posted a hard copy of the ACHMSP to Glenda Chalker (CBNTCAC)	NS
22/06/2022	11:15am	Sent a follow up for the DRAFT Aboriginal Cultural Heritage Management Sub-Plan's review and comment to RAP	DA
29/06/2022	11:38am	Received comments from Kadibulla Khan (Kamilaroi-Yankuntjatjara Working Group)	DA

Appendix III. 2022 RAP Comments

From: Phil Khan <philipkhan.acn@live.com.au>
Sent: Wednesday, June 29, 2022 11:38 AM
To: Divina Alfonso <divina.alfonso@kayandel.com.au>
Subject: Re: Kayandel Project - KA-175 St Anthony of Padua Catholic Schoolat 135-165 Tenth Avenue and170-140 Eleventh Avenue,Austral, Liverpool City Council LGA, NSW

Dear Divina,

Thank you for your St Anthony of Padua Catholic School at 135-165 Tenth Avenue and170-140 Eleventh Avenue,Austral, NSW.

The whole study area and surrounding area is of high significance to us Aboriginal Peoples, for tens of thousands of years the area has been occupied by Aboriginal Peoples, in turn We have a deep connection to the sky, water ways and land. The area would have been utilied for daily activites such as camping, hunting, fishing and ceremonial practices etc. There are water ways within the area that are utilised by Aboriginal Peoples. Yes, it's the tangible aspects that archaeology looks for but it's also the intangible and aesthetic aspects that must be considered when it comes to cultural heritage. There are stories of the dreaming and creations stories that should be sort when it comes to place and connecting to country.

Sky knowledge is a place to start understanding the sky is like a reflection of the land for Indigenous Peoples. An example that is relevant to the area is the dark emu in the sky (better known as the darks space within the milky way). The emu provides knowledge of what's happen on the land for instance hunting times, sessional change and travel routes can be recognised by looking into the night sky. It's this knowledge that get missed time and time again.

We can also understand the knowledge of sustainability and or agricultural practices along with aquaculture knowledge of occupation that occurred before colonisation, Australia is one big estate that was managed and cared for by Aboriginal Peoples still today. We must consider burials when excavating the land as we are unaware of the locations of such burials dure to colonisation and disposition of the land.

Fire played a big part in the Aboriginal lifestyle as the flora needs to be burnt to rejuvenate, this was known by Aboriginal people and was carried out seasonally. The Aboriginal people moved around seasonally and knew the land very well, in fact they could read the land navigating them around, like they used the sky to navigate around and to understand the weather from reading the sky and stars at night. We Aboriginal people hold a connection to the sky and many of our dreaming stories are told through the stars and consolations along with the land and wildlife.

The study area is significant due to the multiple water ways in an ecosystem rich. The main water way that is close by to the to the site are Kemps Creek. This water way runs across the land utilised by many for many reasons such as fresh water, bathing, gathering of food and for everyday life activities. Water is a giver of life without water we would not be here so we should respect, conserve and mange water ways as naturally as possible and keep them

1

maintained. Aboriginal people have been following waterways for tens of thousands of years a sense of way finding and a deep connection we hold.

Is there a cultural interpretation plan for this project? due to the project being accessed by the wider community we believe there is an opportunity to archive connecting with country through design, art, digital displays, apps, native gardens, or landscaping. It is important to incorporate interpretation into you project as it educates the wider community and our next generations about the traditional owners of the land, a keeping place should also be sort to house artefacts on country. This is a way in which to close the gap and better our understanding of one of the oldest continuing cultures in the world.

We would like to agree to your report and look forward to furthering consultation for this project.

Kind Regards
Kadibulla Khan

KAMILAROI-YANKUNTJATJARA WORKING GROUP
- Aboriginal Cultural Heritage
- Excavations and Walk Overs

78 Forbes St, Emu Plains NSW 2750
ABN 26 637 314 384
Ph: Phil Khan - 0434 545 982
Ph: Stefeanie - 0451 068 480
philipkhan.acn@live.com.au

From: Divina Alfonso <divina.alfonso@kayandel.com.au>
Sent: Friday, 24 June 2022 4:01 PM
To: Phil Khan <philipkhan.acn@live.com.au>
Subject: RE: Kayandel Project - KA-175 St Anthony of Padua Catholic Schoolat 135-165 Tenth Avenue and170-140 Eleventh Avenue,Austral, Liverpool City Council LGA, NSW

Hi Phil,

Sorry for this. Please see attached file for your checking.

Thank you.

Regards

Divina Alfonso
Assistant

kayandel archaeological services

PO Box 440, Picton NSW 2571
Tel. +61 (0)2 4627 8622 Fax. +61 (0)2 4605 0815
Please consider the environment when printing this email.

From: Phil Khan <philipkhan.acn@live.com.au>
Sent: Friday, June 24, 2022 1:55 PM
To: Divina Alfonso <divina.alfonso@kayandel.com.au>

2

APPENDIX G – Construction Soil and Water management Plan

CC Condition C24 - Item	Page Number
(a) Be prepared by a suitably qualified expert, in consultation with Council	
(b) Describe all erosion and sediment controls to be implemented during construction in accordance with the publication Managing Urban Stormwater: Soils and Construction commonly referred to as the 'Blue Book'	
(c) Provide a plan of how all construction works will be managed in a wet-weather events	
(d) Details of all off site flows from the site	
(e) Describe measures tat must be implemented to manage stormwater and flood flows for small and large sized events, including, but not limited to 1 in 1 year ARI, and 1 in 5 Year ARI	

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CONSTRUCTION SOIL & WATER MANAGEMENT PLAN

St Anthony's of Padua – Phase 3

135 Tenth Avenue, Austral

Prepared by:	Lachlan Ryan Project Engineer
Approved by:	Tim Calpito Project Manager

Document No.	LIPMAN-EN-PLN-00001
Revision No.	0
Date	06/07/2022

Introduction

The project is a design and construct project for Sydney Catholic Schools involving the construction of Years 5 to 12, Science facilities, TAS facilities, a Library, Mini Hall, Auditorium, Administration spaces, outdoor learning spaces, ovals and courts, and associated external works. The whole scope of works for the site is classified as Stage 4. Lipman are responsible for the delivery of Phase 3 as per the approved staging plans. Sydney Catholic Schools, through CTPG will complete the outstanding Phase 1 and 2 works.

Development Consent – Construction Soil & Water Requirements

The following conditions of consent relating to Construction Soil & Water Requirements within SSDA-8865 Modification 1 include,

C24. *The Applicant must prepare a Construction Soil and Water Management Plan (CSWMSP) and the plan must address, but not be limited to the following:*

(a) be prepared by a suitably qualified expert, in consultation with Council;

(b) describe all erosion and sediment controls to be implemented during construction in accordance with the publication Managing Urban Stormwater: Soils & Construction (4th edition, Landcom 2004) commonly referred to as the 'Blue Book';

(c) provide a plan of how all construction works will be managed in a wet-weather events (i.e. storage of equipment, stabilisation of the Site);

(d) detail all off-Site flows from the Site; and

(e) describe the measures that must be implemented to manage stormwater and flood flows for small and large sized events, including, but not limited to 1 in 1-year ARI, 1 in 5-year ARI.

Relevant CC Condition	Report Section
CC24, (a)	Appendix D – CV's
CC24, (b)	Appendix B – Drawing C2.01
CC24, (c)	Appendix B – Drawing C2.01
CC24, (d)	Appendix B – Drawing C2.01
CC24, (e)	Appendix B – Drawing C2.01

C26. *Prior to the commencement of construction of a relevant stage, the Applicant must:*

(a) install erosion and sediment controls on the site to manage wet weather events in accordance with the CSWMSP (Schedule 3 condition C24); and

(b) divert existing clean surface water around operational areas of the site.

C27. *Prior to the commencement of construction of a relevant stage, the Applicant must implement measures to manage Acid Sulfate Soils. These measures must include handling, treatment, monitoring of water quality at treatment areas and disposal of Acid Sulfate Soils.*

D33. *Adequate provisions must be made to collect and discharge stormwater drainage during construction of the building to the satisfaction of the Certifier. The prior written approval of Council must be obtained to connect or discharge site stormwater to Council's stormwater drainage system or street gutter.*

Purpose of the Construction Soil & Water Management Plan

The purpose of the Dewatering Management Plan is to;

- Provide a comprehensive soil & water management plan for the St Anthony's of Padua – Phase 3 project during its construction stage;
- Provide a practical and logical staging program for the implementation of erosion and sediment control measures;
- Protect water quality, by preventing sediment laden surface water generated by storms from entering sensitive receptors; and
- Comply with the relevant regulatory requirements including the DA conditions as referenced above.

Lipman responsibilities include;

- Overall implementation of the CSWMP
- Overall compliance with Lipman System Procedures (i.e. Proc. 15 – Erosion & Sedimentation Control)
- Induct site personnel on the site safety & environmental requirements of the CSWMP prior to commencing any work on site, develop specific work methods (as required) and create excavation permits for each activity
- Coordinate site environmental monitoring through site inspections & compile/maintain internal records.
- Identify non-conformances and notify relevant authorities should any occur.

Erosion & Sediment Control Plan

In accordance with regulatory requirements, the Erosion and Sediment Control Plan (ESCP) for the construction phase of the STAP project has been prepared to detail the following:

- Identification of construction activities on site causing soil erosion and generating sediment;
- Implementation of measures to minimise soil erosion and transport of sediment downstream of the STAP project during its construction phase;
- Identification of the location, function and capacity of any erosion and sediment control structures; and
- Maintenance of structures during construction.

The following erosion & sediment controls will be implemented on site during construction of the STAP project and are described in the following sub-sections;

- Stabilised Entry/Exit Point
- Temporary Sediment Basins
- Sediment Filter Fences
- Swales
- Stockpiles

Soil & Water Management Plans & Details have been prepared by WSCE and are appended to this plan as **Appendix B.** These plans will be reviewed and amended, if required, during construction stages.

Stabilised Entry/Exit Point

A stabilised entry/exit points will be established to reduce the likelihood of vehicles tracking soil materials onto the site access way and public roads. The nominated point is to be kept clean of any loose material by regular sweeping and cleaning. It is important to note that all vehicles entering or leaving the site will not be tracking across any excavated areas unnecessarily. Wheels of all vehicles will be cleaned prior to exiting the construction site to prevent the tracking of mud. In the unlikely event of spillage on public roads because of site construction activities, the area will be cleaned immediately.

Sediment Filter Fences

Sediment filter fences shall be installed, as required, around the perimeter of areas where the STAP project is to be constructed, with either the use of star pickets and filters to intercept water or the filters installed against the perimeter fence.
The filter fences will be checked after each storm event for damage or clogging by silt or debris and appropriate maintenance and/or repair actions taken.

Stockpile Management

Stockpiles will be constructed away from areas of drainage flows, as and when required. Stockpiles will be minimised through effective management of excavated or incoming fill material.
Where practicable, stockpile will be stabilised, if in place for more than ten days, and will be formed with sediment filters in place immediately downslope.

Other Site Controls

Other site controls to be employed may include:

- Receptacle bins will be provided for any lightweight litter with bins removed on a regular basis;
- Any concrete and mortar slurries will be collected and stockpiled at designated locations on site for incorporating into fill areas of the site or disposed of at a Licenced facility;
- Washout of concrete agitators (if necessary) is to be undertaken only in areas nominated by the Lipman;
- Any material removed during site stripping and grubbing works will be disposed of in an appropriate manner at an appropriately licensed facility, if not suitable for reuse;
- Temporary soil and water management structures will be removed only after the lands they are protecting are stabilised.

Dust Control

All practicable measures should be taken to reduce dust emanating from the site. Factors that contribute to dust production are:

- Wind over a cleared surface;
- Wind over stockpiled material; and
- Movement of machinery in unpaved areas.

Visible dust should not be present at the site boundary. Proposed measures to minimise the potential for dust generation include:

- Use of water sprays on unsealed or exposed soil surfaces;
- Covering/stablising of stockpiled materials and excavation faces (particularly during periods of site inactivity and/or during windy conditions);
- Establishment of dust screens consisting of a 1.8m high shade cloth or similar material secured to a chain wire fence at the perimeter of the site;
- Maintenance of dust control measures to keep the facilities in good operating condition;
- Stopping earthworks during strong winds where excessive dust is present; and
- Loading or unloading of dry soil as close as possible to stockpiles to prevent spreading of loose material around the development area.

Where stockpiles remain on-site or soil remains exposed for a period of longer than several days, dust monitoring should be undertaken at the site.

Dust is also produced during the transfer of material to and from the site. All material should be covered during transport and should be properly disposed of on delivery. No material is to be left in an exposed, un-monitored condition.

All equipment and machinery should be brushed or washed down before leaving the site to limit dust and sediment movement off-site. In the event of prolonged rain and lack of paved areas all vehicles should be washed down prior to exit from the site, and any soil or dirt on the wheels of the vehicles removed. Water used to clean the vehicles will be appropriately disposed as per the requirements of the relevant waste classification guidelines.

Dewatering

Surface Water

The following plans & details by Warren Smith Consulting Engineers document the required erosion & sediment control measures to be implemented for the St Anthony of Padua – Stage 3 project;

- WSAP-CIV-C2.01 Construction Soil and Water Management Plan [03]
- WSAP-CIV-C2.02 Construction Soil and Water Management Details - Sheet 1 [03]
- WSAP-CIV-C2.03 Construction Soil and Water Management Details - Sheet 2 [03]

A single sediment basin has been located at the corner of site between Fourth & Tenth Avenues, to capture overland flow from the project catchments and control the release of stormwater and sediment from the site during the proposed earthworks. The proposed basins have been sized in accordance with Landcom's "Managing Urban Stormwater - Soils and Construction (4th edition, Landcom 2004) commonly referred to as the 'Blue Book'". All overland flows will be conveyed to the sediment basins, which will subsequently be released to council existing infrastructure (drainage, road) on Tenth Avenue.

All stormwater runoff from the construction area will be stored within the nominated sediment basins and treated prior to any controlled discharge offsite. No uncontrolled discharge off-site will occur unless the design capacity for the sediment basins is exceeded during intensive rainfall events. Based on Environmental Protection Authority and Australian & New Zealand Guidelines for Fresh & Marine Water Quality and 'Urban Stormwater: Soils and Construction "The Blue Book" 2004 (4th edition), all controlled water releases off-site must meet the flowing requirements prior to discharge:

- pH within the range of 6.5 to 8.5;
- Suspended solids - no greater than 50mg/L;
- Oils and grease – no visible films or odour;
- Litter – no visible litter washed (or blown) from the site.

Water contained within the sediment basins will be treated with a coagulating/flocculating agent such as Aluminium Sulphate which will be distributed to the sediment basin in accordance with the relevant manufacturer's recommendations (Quantity added, Wait time prior to testing etc.).

Following this the water will be tested to the requirements of Environmental Protection Authority and Australian & New Zealand Guidelines for Fresh & Marine Water Quality using a pH meter, turbidity test tubes & via visual inspection to confirm no oils, grease & or litter present to confirm compliance with the requirements noted above. If the required criteria are met, then the water will be discharged from site.

Groundwater

As per Alliance Geotechnical Report contained within **Appendix C** ("Geotechnical Investigation Report No. 12483-GR-1-1 dated 13th July 2021, groundwater inflows are not expected within the lower ground excavations. However, as long term monitoring has not been undertaken to date, groundwater seepage may fluctuate with seasonal weather patterns, and as such, should minor groundwater be encountered, the inflows should be managed using simple sump & pump techniques. Should significant inflows be encountered, Lipman will liase directly with Alliance Geotechnical before dewatering.

Acid Sulphate Soils

Based on the findings in Alliance Geotechnical Report, it is not expected that Acid Sulphate Soils will be encountered within the project site. As such, development of measure for handling, treatment & monitoring of water will not be required.

Implementation of the CSWMP

Inspection

Lipman will inspect the site, providing particular attention to the following matters:

- Ensure the site is cleaned of any loose materials such as soil, sand and debris (or other materials) that may be a source of sediment or pollution.
- Construct additional erosion and/or sediment control works as might become necessary to ensure the desired protection is given to down slope lands and waterways.
- Remove trapped sediment from upslope of sediment fences and bales.
- Maintain erosion and sediment control measures in a functioning condition until all construction and other activities are completed and the site is rehabilitated.
- If any runoff is accidentally bypassing the sediment control structure, rectify immediately by diverting runoff to function as intended.
- Remove temporary soil conservation structures as a last activity in the rehabilitation program.

Recording

Lipman will keep the following records via our site diary system/site inspection sheets:

- Weather conditions (such as rainfall and wind speed/direction), if any.
- The condition of any soil and water management works.
- Any corrective actions or remedial works undertaken.

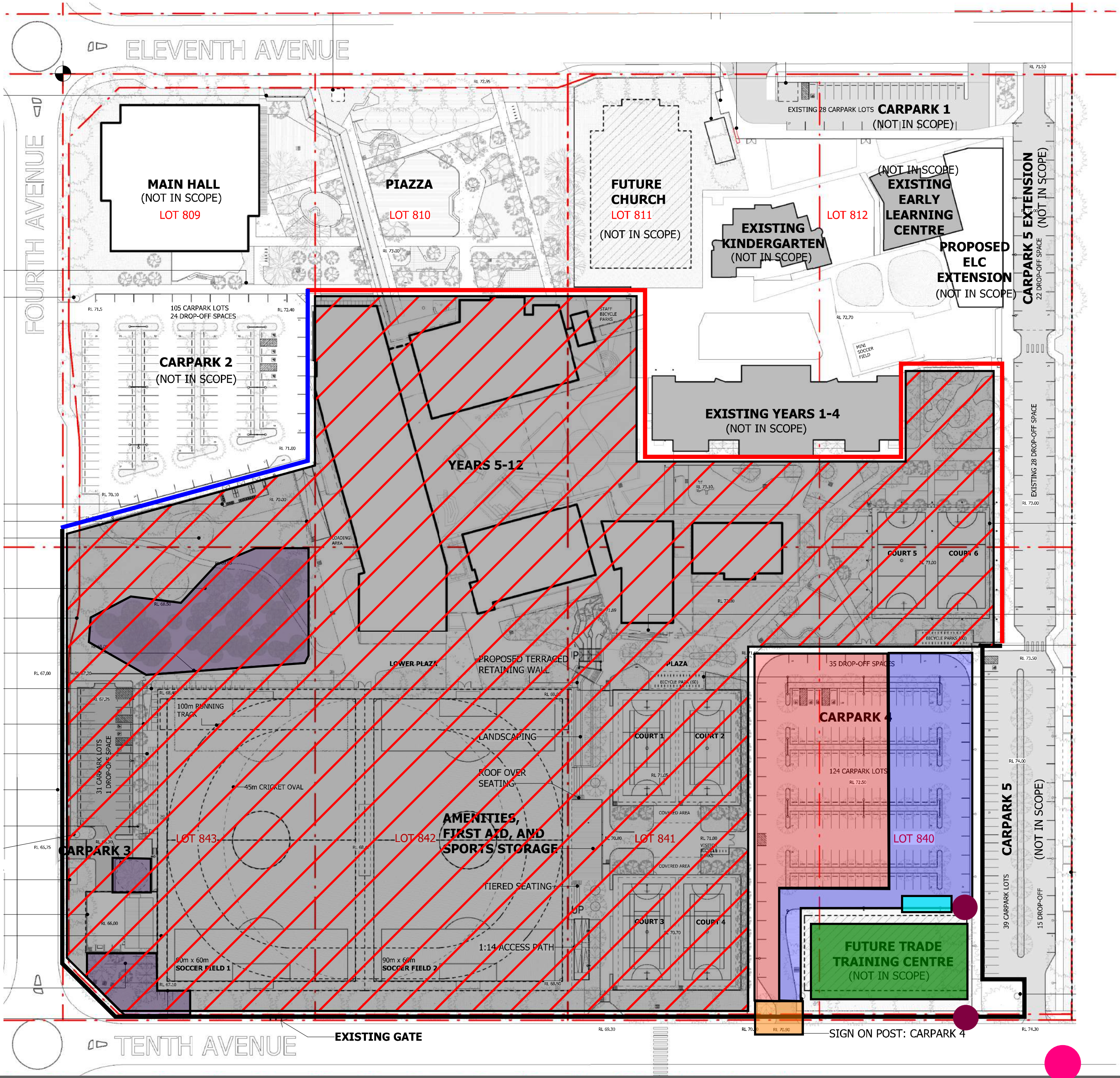
All records entered will be kept on-site and made available to Liverpool City Council as well as to the relevant authorities and/or any other authorised person on request.

Additional Management Practices

In addition to the management practices specified above, Lipman will further ensure that:

- The CSWMP is being implemented correctly;
- Erosion and sediment control measures are maintained in an effective condition until all earthwork activities are completed and the site stabilised;
- Essential modifications are made to the CSWMP, if and when necessary, to ensure the desired protection is given to down slope lands and waterways;
- Waste bins will be emptied as necessary and in an approved manner.
- The stormwater system that is constructed (temporary or permanent) will be kept in good, working condition.
- Any pollutants removed from the nominated storage and/or treatment devices will be disposed of in an approved manner, where further pollution to down slope lands and waterways should not occur.

Appendix A – Site Plan



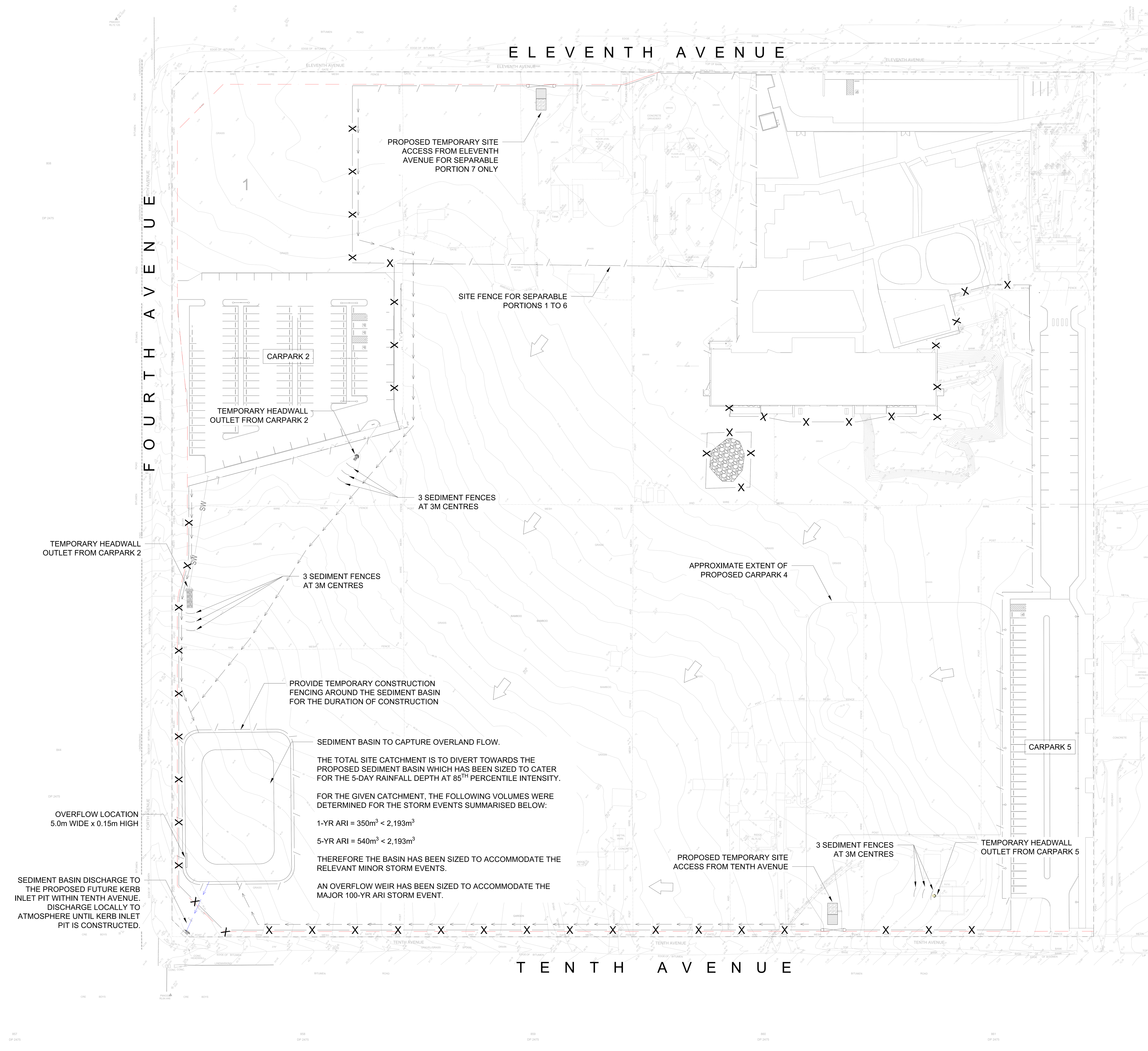
LEGEND

- Existing Boundary Fence
- A Class Hoarding
- Temporary Cyclone Fencing
- Site Complex including First Aid, Amenities, Induction Room, Site Office
- Pedestrian Entry Gates
- Vehicle Entry Gate & Cattle Grid
- Contractor Parking
- Emergency Vehicle Parking
- Heavy Vehicle Movement / Material Handling Zone
- Tree Protection Zones
- Excavation / Remediation Zone
- Evacuation Assembly Point

LIPMAN

ST ANTHONY OF PADUA - PHASE 3
SITE PLAN REV 0

Appendix B – WSCE Erosion & Sediment Control Plans



SEDIMENTATION BASIN NOTES:

SEDIMENT BASIN HAS BEEN SIZED IN ACCORDANCE WITH THE 'SOILS AND CONSTRUCTION, MANAGING URBAN STORMWATER' (BLUE BOOK).

CAPACITY OF BASIN IS BASED ON 5-DAY RAINFALL DEPTH AT 85TH PERCENTILE INTENSITY (32.2mm).

APPROXIMATE DISTURBED SITE AREA = 6.750 ha

REQUIRED SETTLING ZONE	= 1,391 m3
REQUIRED SEDIMENT STORAGE ZONE	= 696 m3
REQUIRED BASIN VOLUME	= 2087 m3
BASE DIMENSIONS	= 25m x 40m
TOP DIMENSIONS	= 37m x 52m
MAX. SIDE SLOPE	= 1V:4H
DEPTH	= 1.5 m
PROVIDED BASIN VOLUME	= 2,193 m3

LEGEND

- EXISTING SITE BOUNDARY
- PROPOSED SITE BOUNDARY
- SITE FENCE
- SEDIMENT FENCE
- SITE GATE
- TEMPORARY CONSTRUCTION ACCESS
- SITE STOCKPILE
- GEOTEXTILE INLET FILTER - DROP INLET SEDIMENT TRAP
- DIVERSION DRAIN
- DISCHARGE FROM BASIN
- OVERLAND FLOW PATH

CONSTRUCTION WORK MANAGEMENT IN WET- WEATHER EVENTS:

- ALL STOCKPILES TO BE CAPPED.
- CARPARK 4 TO BE UTILISED AS TEMPORARY MATERIALS HANDLING AND STORAGE AREA. AREA TO BE STABILISED BY DGB AND SEALED.
- DURING WET WEATHER ALL PLANT AND EQUIPMENT TO BE STORED ON CARPARK 4.
- STABLISED ACCESS ROADS TO BE INSTALLED FROM CARPARK 4 TO RELEVANT WORKFACES.
- AFTER EVERY RAIN EVENT, SAFETY INSPECTION TO BE CARRIED OUT PRIOR TO WORKS RECOMMENCING.

NOTES:

1. REFER TO PROJECT ARBORIST PLANS FOR TREES THAT ARE TO BE DEMOLISHED AND REMOVED FROM SITE.
2. IMPACTS AROUND EXISTING TREES SHOULD BE MINIMISED. PROPOSED LEVEL CHANGES IN THE VICINITY OF EXISTING TREES TO BE REVIEWED AND APPROVED BY PROJECT ARBORIST.
3. ALL WORKS AROUND EXISTING TREE ROOT PROTECTION ZONES TO BE CONFIRMED WITH PROJECT ARBORIST PRIOR TO COMMENCEMENT ON SITE.

SOIL AND WATER MANAGEMENT NOTES:

1. THIS PLAN HAS BEEN PREPARED IN ACCORDANCE WITH DEVELOPMENT CONSENT SSD-8865 TO ADDRESS ITEMS RELATING TO THE PREPARATION OF A CONSTRUCTION SOIL AND WATER MANAGEMENT PLAN.

2. ALL EROSION CONTROL MEASURES TO BE INSTALLED IN ACCORDANCE WITH LANDCOM MANAGING URBAN STORMWATER: SOILS AND CONSTRUCTION ('BLUE BOOK').

3. SEDIMENT FENCING TO BE PROVIDED IN ACCORDANCE WITH STANDARD DETAILS AS REQUIRED TO PREVENT SEDIMENT FROM LEAVING THE SITE. TEMPORARY CONSTRUCTION ENTRY/ EXIT SEDIMENT TRAPS ARE TO BE PROVIDED AT ENTRY/ EXIT LOCATIONS.

4. DIVERSION DRAINS TO BE PROVIDED TO DIVERT RUNOFF FROM DISTURBED AREAS TO THE SEDIMENT BASIN.

5. PIT INLET SEDIMENT TRAPS ARE TO BE PROVIDED AT ALL EXISTING STORMWATER INLET PITS LOCATION WITHIN AREA OF WORK.

SEDIMENT CONTROL CONDITIONS:

1. SEDIMENT FENCES WILL BE INSTALLED AS SHOWN AND ELSEWHERE AT THE DISCRETION OF THE SITE MANAGER TO CONTAIN COARSER SEDIMENT FRACTIONS INCLUDING AGGREGATED FINES AS CLOSE TO THE SOURCE AS PRACTICABLE.

2. SEDIMENT REMOVED FROM ANY TRAPPING DEVICE WILL BE RELOCATED WHERE FURTHER POLLUTION TO DOWNSTREAM LANDS AND WATERWAYS CANNOT OCCUR.

3. STOCKPILES WILL BE PLACED WHERE SHOWN ON PLAN OR ELSEWHERE AT THE DISCRETION OF THE SITE MANAGER, NOT WITHIN 5m OF ANY HAZARDOUS AREAS INCLUDING LIKELY AREAS OF HIGH VELOCITY FLOWS SUCH AS WATERWAYS, PAVED AREAS & DRIVEWAYS.

4. PIT INLET FILTERS (SEE DETAILS) WILL PREVENT WATER FROM DIRECTLY ENTERING THE PERMANENT DRAINAGE SYSTEM UNLESS IT IS FREE OF SEDIMENT.

5. TEMPORARY SEDIMENT TRAPS WILL BE RETAINED UNTIL AFTER THE LANDS THEY ARE PROTECTING ARE COMPLETELY REHABILITATED.

6. CONTRACTOR TO CONSTRUCT TEMPORARY SEDIMENT BASIN. WATER SHOULD BE ALLOWED TO SETTLE BEFORE DISCHARGE. CONTRACTOR MUST VERIFY THAT WATER QUALITY MEETS AUTHORITIES REQUIREMENTS PRIOR TO DISCHARGE. ACCUMULATED SEDIMENT SHOULD THEN BE REMOVED & DISPOSED OF IN ACCORDANCE WITH ENVIRONMENTAL MANAGEMENT PROCEDURES.

NORTH

PLAN SCALE 1:750 A1 SHEET

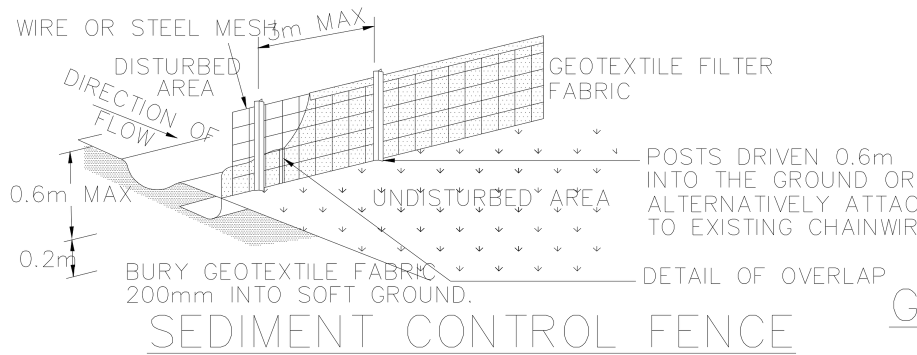
REVISION	AMENDMENT	DATE
1	ISSUE FOR INFORMATION	27/05/22
2	ISSUE FOR CONSTRUCTION CERTIFICATE	30/05/22
3	CC1 - ISSUE FOR CONSTRUCTION CERTIFICATE	01/07/22

PROJECT: AUSTRAL SCHOOL STAGE 4

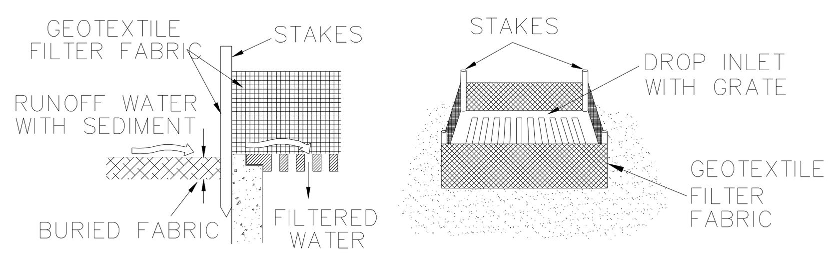
CLIENT: LIPMAN

PREPARED BY: WARREN SMITH CONSULTING ENGINEERS PTY LTD

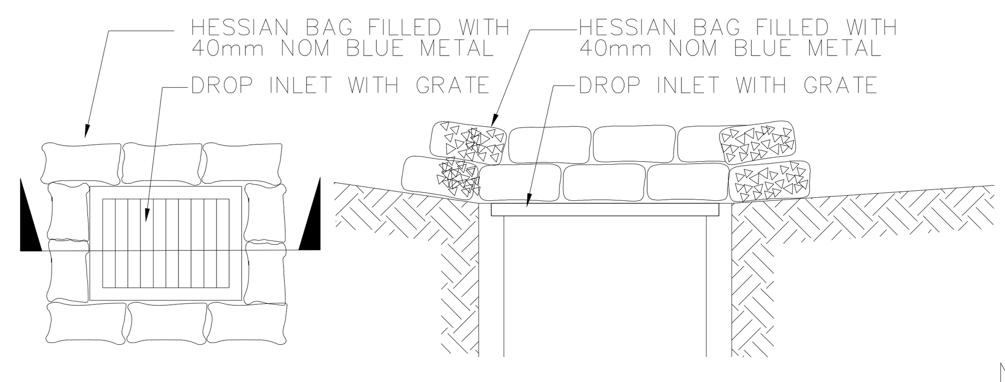
TITLE	CONSTRUCTION SOIL AND WATER MANAGEMENT PLAN
SCALE	AS SHOWN
DRAWN	I.K.
DESIGNED	T.W.
CHECKED	J.G.
APPROVED	J.G.
JOB No.	5914005
DRAWING No.	C2.01
ISSUE	3
DATE	JULY 2022
STATUS	ISSUE FOR CONSTRUCTION CERTIFICATE



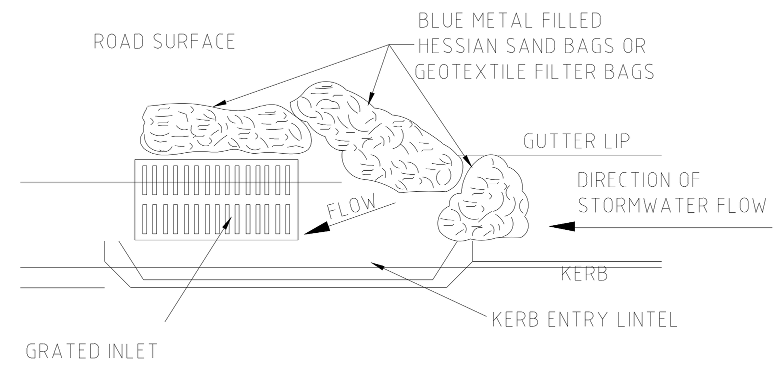
SEDIMENT CONTROL FENCE
NTS



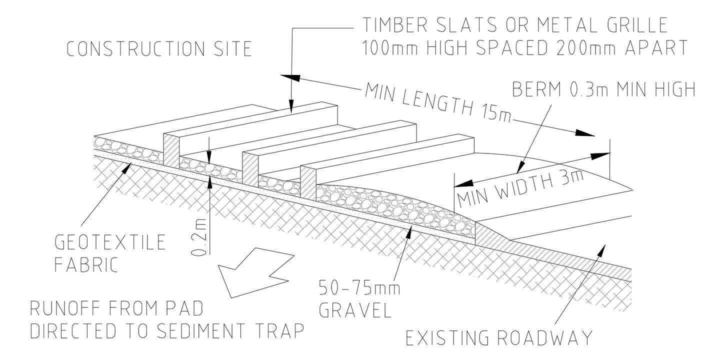
GEOTEXTILE FILTER FABRIC DROP INLET SEDIMENT TRAP
NTS



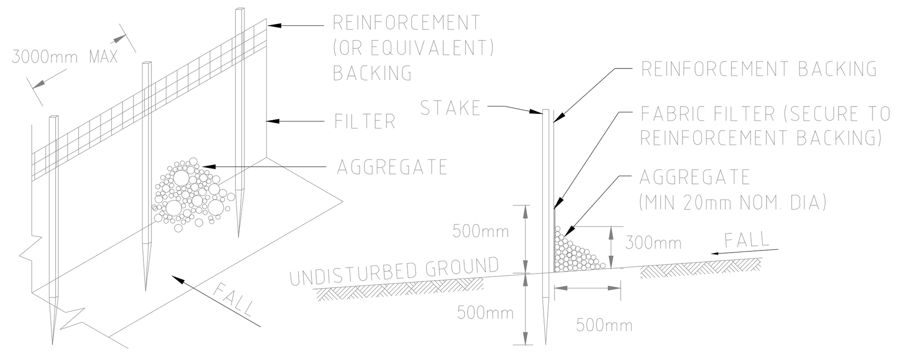
HESSIAN BAG DROP INLET SEDIMENT TRAP
NTS



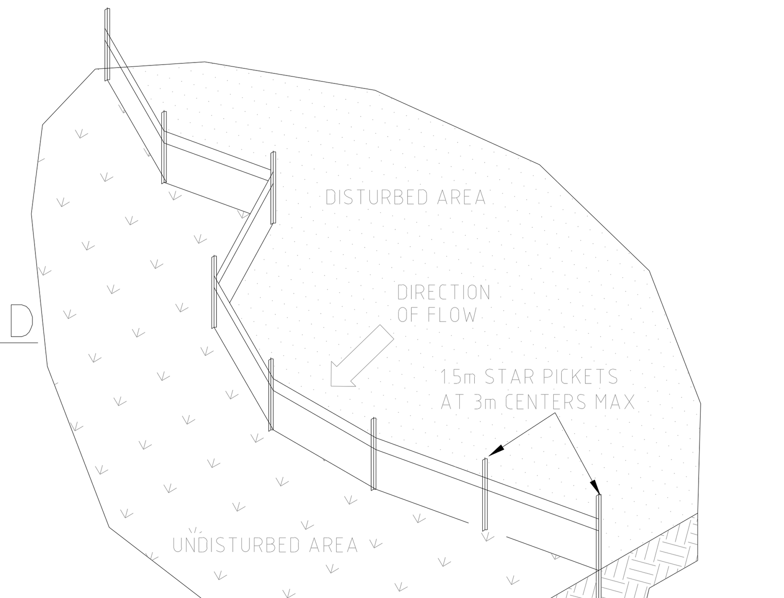
NEW/EXISTING GRATED KERB ENTRY PIT SEDIMENT CONTROL BARRIER
NTS

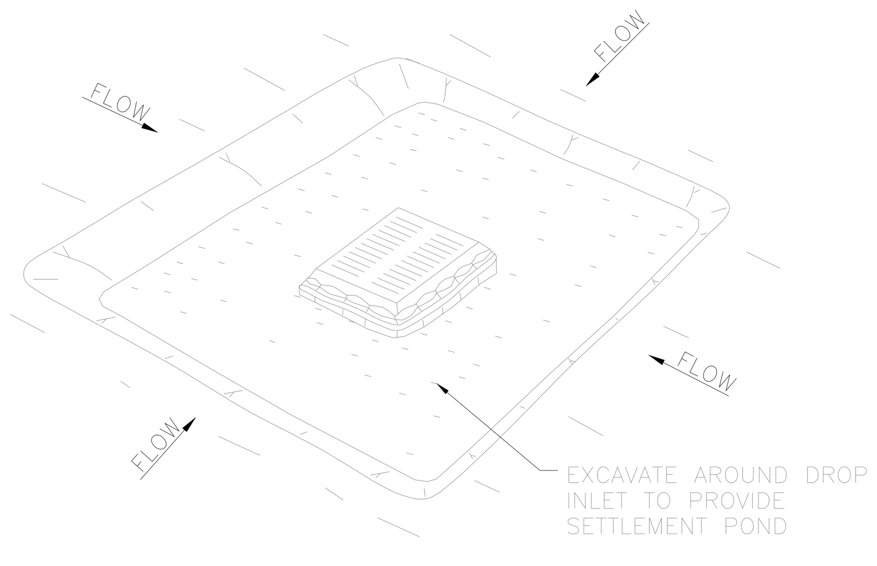


STABILIZED CONSTRUCTION SITE VEHICLE ENTRY/EXIT
NTS

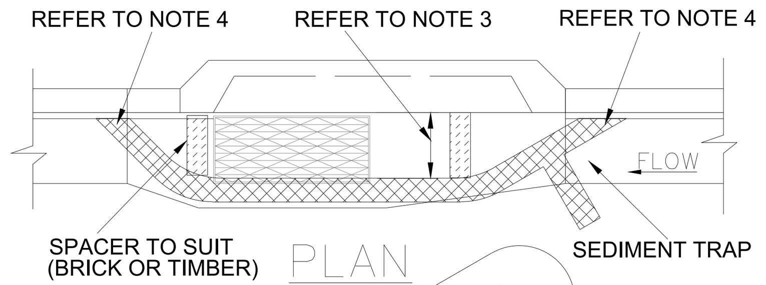


SEDIMENT FENCE DETAIL FOR ROCKY GROUND
NTS

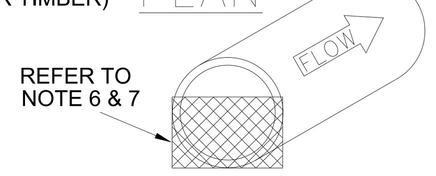




EXCAVATED SEDIMENT TRAP
NTS



PLAN



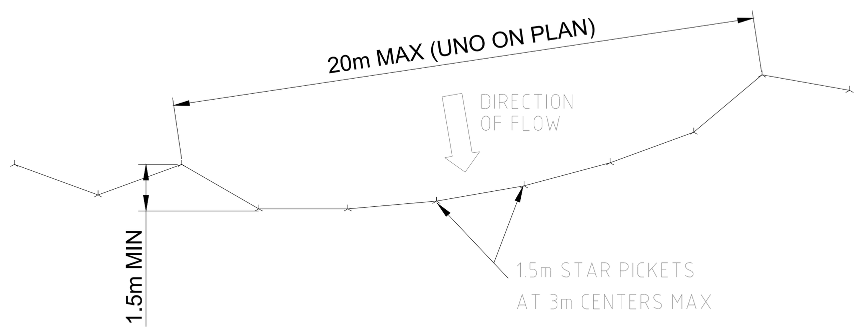
GEOTEXTILE FILTER BAGS
NTS

SITE ENTRY/EXIT NOTES:-

1. ALL VEHICLE ENTRANCES & EXITS TO THE CONSTRUCTION SITE MUST BE STABILIZED TO PREVENT THEM BECOMING A SOURCE OF SEDIMENT, BY PROVIDING A VEHICLE SHAKE AREA. THIS MAY CONSIST OF A TIMBER, CONCRETE OR STEEL SHAKER GRID OR RUBBLE AREA.
2. THE VEHICLE EXIT AREA IS TO BE MAINTAINED IN A CLEAN & SERVICEABLE CONDITION DURING THE TOTAL TIME OF USAGE.
3. ANY UNSEALED ROAD BETWEEN THE DEVICE AND COUNCILS ROADWAY IS TO BE TOPPED WITH 100mm THICK, 40mm NOMINAL SIZE AGGREGATE.
4. PUBLIC ROADS MUST BE KEPT FREE OF DIRT AND MUD. SEDIMENT TRACKED ONTO THE PUBLIC ROADWAY BY VEHICLES LEAVING THE CONSTRUCTION SITE IS TO BE SWEPT UP IMMEDIATELY.
5. FENCES SHOULD BE ERECTED TO ENSURE VEHICLES CAN NOT BYPASS THE STABILIZED ACCESS POINTS, UNLESS COMING FROM A STABILIZED AREA.

SEDIMENT FENCE NOTES:-

1. CONSTRUCT SEDIMENT FENCE AS CLOSE AS POSSIBLE TO PARALLEL TO THE CONTOURS OF THE SITE OR AT THE TOE OF A SLOPE.
2. DRIVE 1.5 METRE LONG STAR PICKETS INTO GROUND SUFFICIENT TO PROVIDE RIGID SUPPORT, 3 METERS APART. WHERE THERE IS INSUFFICIENT SOIL DEPTH OVER ROCK, HOLES ARE TO BE DRILLED INTO ROCK TO ACCEPT THE STAR PICKETS.
3. ON SOFT GROUND MATERIALS, DIG A 150mm DEEP TRENCH ALONG THE UPSLOPE LINE OF THE FENCE FOR THE BOTTOM OF THE FABRIC TO BE ENTRENCHED.
4. BACKFILL TRENCH OVER BASE OF FABRIC & COMPACT.
5. FIX SELF-SUPPORTING GEOTEXTILE TO UPSLOPE SIDE OF POSTS WITH WIRE TIES OR AS RECOMMENDED BY THE GEOTEXTILE MANUFACTURER. USE A REINFORCEMENT BACKING WITH NON SELF-SUPPORTING GEOTEXTILE FABRIC.
6. JOIN SECTIONS OF FABRIC AT A SUPPORT POST WITH A 150mm OVERLAP.
7. ON HARD OR ROCKY GROUND, SMOOTH A 500mm WIDE STRIP UPSLOPE OF THE FENCE LINE. TURN THE BOTTOM 500mm OF THE FABRIC UPSLOPE AND ANCHOR IN PLACE WITH SUITABLE AGGREGATE.
8. WHERE A SEDIMENT FENCE IS CONSTRUCTED DOWN SLOPE FROM A DISTURBED BATTER THE FENCE SHOULD BE LOCATED 1.5 TO 2.0 METERS DOWN SLOPE FROM THE TOE OF THE BATTER.



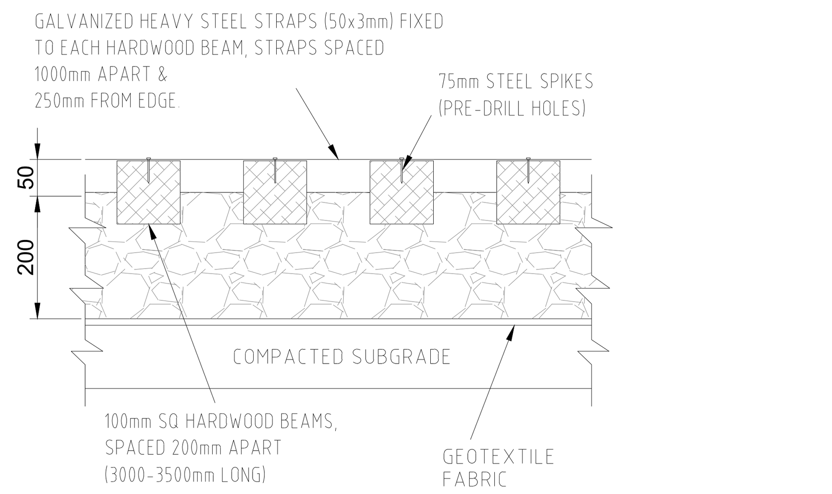
SEDIMENT FENCE LAYOUT PLAN
NTS

EXCAVATED SEDIMENT TRAP NOTES:-

1. REMOVE THE SEDIMENT WHEN IT HAS ACCUMULATED TO HALF THE DESIGN DEPTH OF THE TRAP AND RESTORE THE TRAP TO ITS ORIGINAL DIMENSIONS.
2. PROVIDE 50 cu.m/Ha OF SEDIMENT STORAGE VOLUME.
3. REFER TO THE MAINTENANCE REQUIREMENTS.

SEDIMENT BARRIER FOR PITS & PIPES, NOTES:-

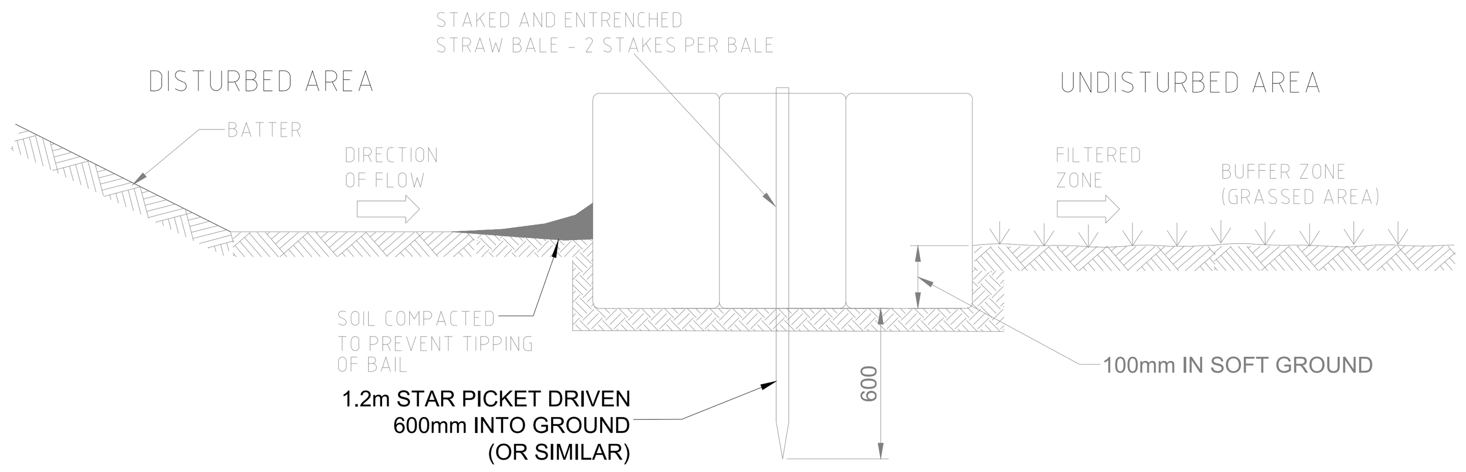
1. SLEEVES ARE TO BE MADE FROM GEOTEXTILE FABRIC LONGER THEN THE LENGTH OF THE INLET PIT.
2. FILL SLEEVE WITH 5 OR 10mm CLEAN GRAVEL.
3. PLACE THE SLEEVE AT THE OPENING OF THE KERB INLET LEAVING A 100mm GAP TO ACT AS AN EMERGENCY OVERFLOW.
4. SLEEVE MUST BE PLACED AGAINST THE KERB TO PREVENT BYPASS.
5. FIT SLEEVE TO ALL INLETS DOWNSTREAM OF THE WORKS.
6. FOR DRAINAGE WORKS FIT GEOTEXTILE FABRIC OR GEO BAGS TO UPSTREAM FACE OF ALL OPEN PIPES.
7. MAINTAIN AN OPENING AT THE TOP OF THE PIPE OF 1/3 OF THE PIPE DIAMETER.
8. THE FILTERS ARE TO BE CLEANED AND MAINTAINED DAILY.
9. ALL CARE SHOULD BE TAKEN TO MINIMIZE SEDIMENT REACHING THE STORMWATER SYSTEM BY MINIMIZING EXCAVATION WORKS AND PREVENTING EXCESS WATER FLOW THROUGH WORKS.



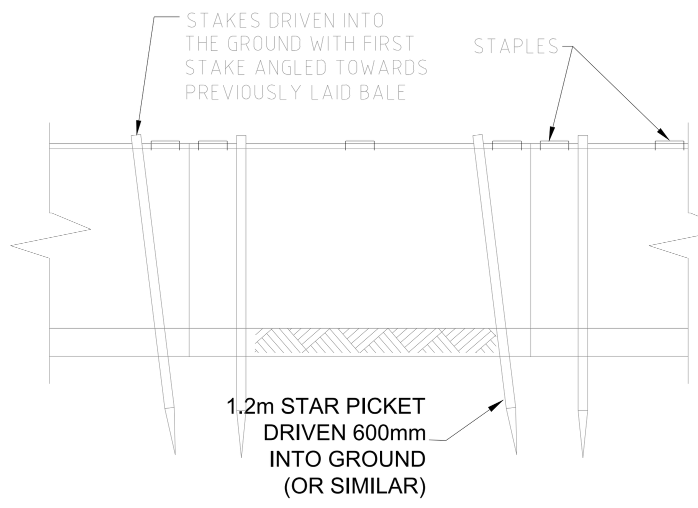
VEHICLE SHAKER GRID
NTS

SITE ENTRY/EXIT CONSTRUCTION NOTES:-

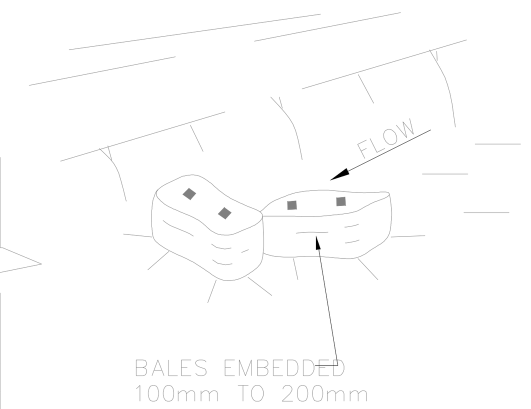
1. STRIP TOP SOIL & LEVEL SITE. PROVIDE CATCH DRAIN AT SIDES TO DIRECT RUNOFF WATER TO SEDIMENT TRAPS.
2. COMPACT SUBGRADE AND REMOVE ANY HIGH POINTS.
3. COVER AREA WITH GEOTEXTILE FABRIC. THIS MAY BE WOVEN OR NEEDLE PUNCHED PRODUCT WITH A MINIMUM CBR BURST STRENGTH (AS3706.4-90) OF 2500 N.
4. CONSTRUCT 200mm THICK RUBBLE PAD OVER GEOTEXTILE USING ROAD BASE OR 30-40mm AGGREGATE. MINIMUM LENGTH 15 METRES OR TO BUILDING ALIGNMENT. MINIMUM WIDTH 3 METRES. CONSTRUCT 300mm HIGH HUMP IMMEDIATELY WITHIN BOUNDARY TO DIVERT WATER TO A SEDIMENT TRAP.
5. WHERE GRIDS ARE USED FIRST CONSTRUCT A 150 THICK PAD OVER GEOTEXTILE FABRIC. LEVEL THIS IN BOTH DIRECTIONS. LOWER GRID ON TO THE PREPARED BASE AND ENSURE THAT NO PART IS SITTING ON ANY HIGH POINTS. BACKFILL THE SPACES BETWEEN THE GRIDS TO WITHIN 50mm OF THE TOP.
6. PROVIDE RAMPS AT ENDS AND SIDE OF GRIDS. IF DEPRESSIONS OCCUR IN THE RAMPS DURING USE, ADD ADDITIONAL MATERIAL.



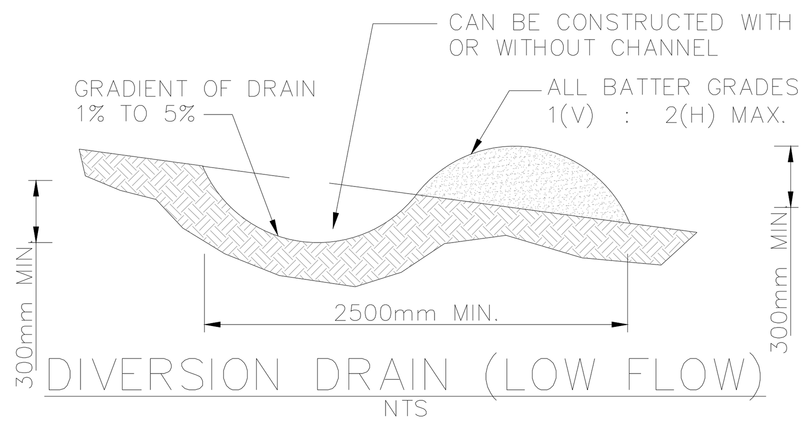
TYPICAL STRAW BALE SECTION
NTS



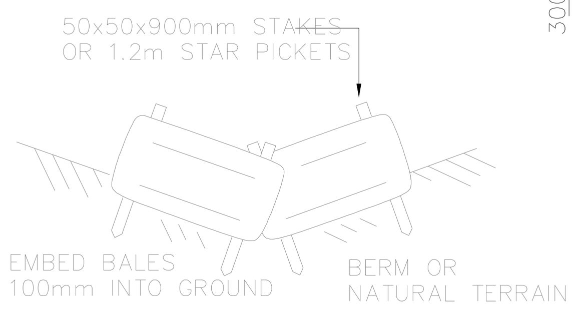
TYPICAL STRAW BALE DETAIL
NTS



VIEW OF CHECK DAM



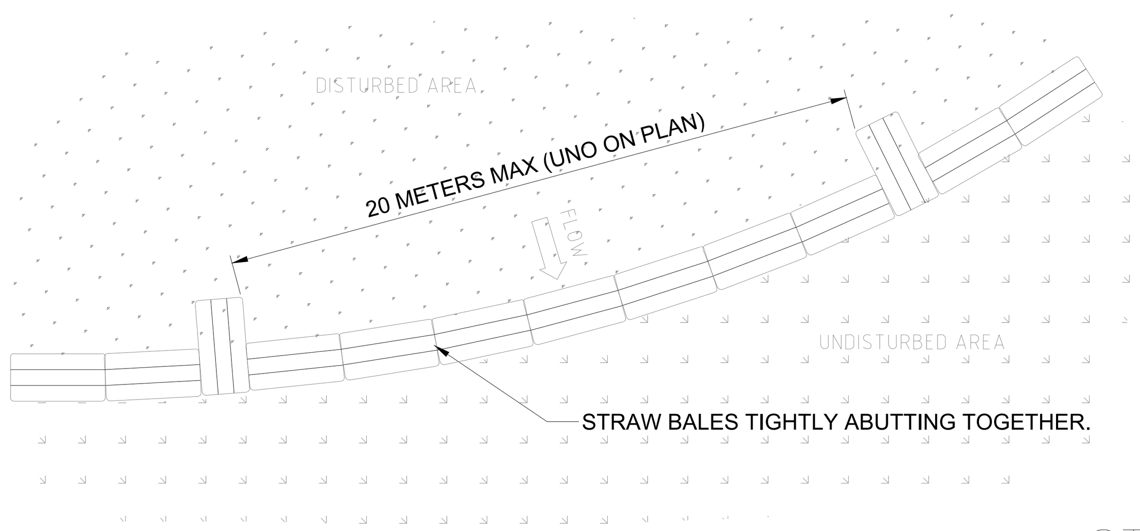
DIVERSION DRAIN (LOW FLOW)
NTS



CHECK DAM SECTION

STRAW BALE NOTES:-

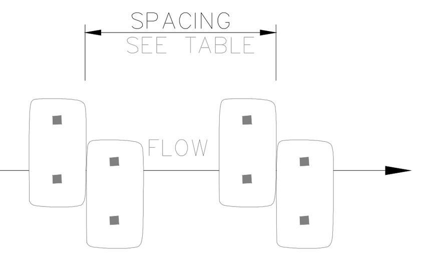
1. CONSTRUCT STRAW BALE FILTER AS CLOSE AS POSSIBLE TO PARALLEL TO THE CONTOURS OF THE SITE OR AT THE TOE OF A SLOPE.
2. PLACE BALES LENGTHWISE IN A ROW WITH ENDS TIGHTLY ABUTTING. USE STRAW TO FILL ANY GAPS BETWEEN BALES. STRAWS TO BE PLACED PARALLEL TO GROUND.
3. MAXIMUM HEIGHT OF FILTER IS ONE BALE.
4. ON SOFT MATERIALS, EMBED EACH BALE IN THE GROUND 75mm TO 100mm AND ANCHOR WITH TWO 1.2 METRE STAR PICKETS. ANGLE THE FIRST STAKE IN EACH BALE TOWARDS THE PREVIOUSLY LAID BAIL. DRIVE STAKES 600mm INTO THE GROUND AND FLUSH WITH THE TOP OF THE BALES.
5. WHERE A STRAW BALE FILTER IS CONSTRUCTED DOWN SLOPE FROM A DISTURBED BATTER THE BALES SHOULD BE LOCATED 1.5 TO 2.0 METERS DOWN SLOPE FROM THE TOE OF THE BATTER.
6. WHERE REQUIRED WRAP GEOTEXTILE FILTER FABRIC AROUND BALES AND STAPLE IN POSITION.



TYPICAL STRAW BALE LAYOUT PLAN
NTS

CHECK DAM SPACING TABLE

LONGITUDINAL GRADE (%)	SPACING (METERS)
0 - 5	40
5 -10	30
10 - 15	20
GREATER THAN 15	10



CHECK DAM PLAN

STRAW BALE CHECK DAM DETAILS
NTS

DIVERSION DRAIN NOTES:-

1. CONSTRUCT WITH GRADIENT OF 1 PER CENT TO 5 PER CENT.
2. AVOID REMOVING TREES AND SHRUBS IF POSSIBLE.
3. DRAINS TO BE OF CIRCULAR, PARABOLIC OR TRAPEZOIDAL CROSS SECTION NOT V-SHAPED.
4. EARTH BANKS TO BE ADEQUATELY COMPACTED IN ORDER TO PREVENT FAILURE.
5. PERMANENT OR TEMPORARY STABILIZATION OF THE EARTH BANK TO BE COMPLETED WITHIN 10 DAYS OF CONSTRUCTION.
6. ALL OUTLETS FROM DISTURBED LANDS ARE TO FEED INTO A SEDIMENT BASIN OR SIMILAR.
7. DISCHARGE RUN OFF COLLECTED FROM UNDISTURBED LANDS ONTO EITHER A STABILIZED OR AN UNDISTURBED DISPOSAL SITE WITHIN THE SAME SUBCATCHMENT AREA FROM WHICH THE WATER ORIGINATED.
8. COMPACT BANK WITH A SUITABLE IMPLEMENT IN SITUATIONS WHERE THEY ARE REQUIRED TO FUNCTION FOR MORE THAN FIVE DAYS.
9. EARTH BANKS TO BE FREE OF PROJECTIONS OR OTHER IRREGULARITIES THAT WILL IMPEDE NORMAL FLOW.

MAINTENANCE REQUIREMENTS:-

1. ACCUMULATED SILT & SEDIMENT MUST BE REMOVED AT REGULAR INTERVALS AND AFTER EACH MAJOR STORM.
2. SILT & SEDIMENT MUST BE REMOVED FROM OFF THE SITE OR TO A COUNCIL APPROVED LOCATION WITHIN THE SITE, WHERE IT WILL NOT ERODE.
3. THE SEDIMENT FENCES, BALES & TRAPS SHALL BE REGULARLY INSPECTED, ESPECIALLY AFTER RAIN AND KEPT IN GOOD REPAIR AND FUNCTIONING CONDITION AT ALL TIMES.
4. CONSTRUCTION OPERATIONS SHALL BE CARRIED OUT IN SUCH A MANNER THAT SEDIMENT, EROSION & WATER POLLUTION SHALL BE MINIMIZED.
5. THE SEDIMENT TRAPS SHALL BE REMOVED AND THE AREA STABILIZED WHEN THE CONSTRUCTION AREA HAS BEEN PROPERLY STABILIZED.

DO NOT SCALE FROM DRAWINGS, CHECK & VERIFY ALL DIMENSIONS & LEVELS BEFORE COMMENCEMENT OF ANY WORK.
THIS DRAWING IS NOT TO BE COPIED IN PART OR WHOLE WITHOUT WRITTEN PERMISSION FROM WARREN SMITH CONSULTING ENGINEERS.

NOT TO SCALE

REVISION	AMENDMENT	DATE
1	ISSUE FOR INFORMATION	27/05/22
2	ISSUE FOR CONSTRUCTION CERTIFICATE	30/05/22
3	CC1 - ISSUE FOR CONSTRUCTION CERTIFICATE	01/07/22

PROJECT
AUSTRAL SCHOOL
STAGE 4

CLIENT
LIPMAN

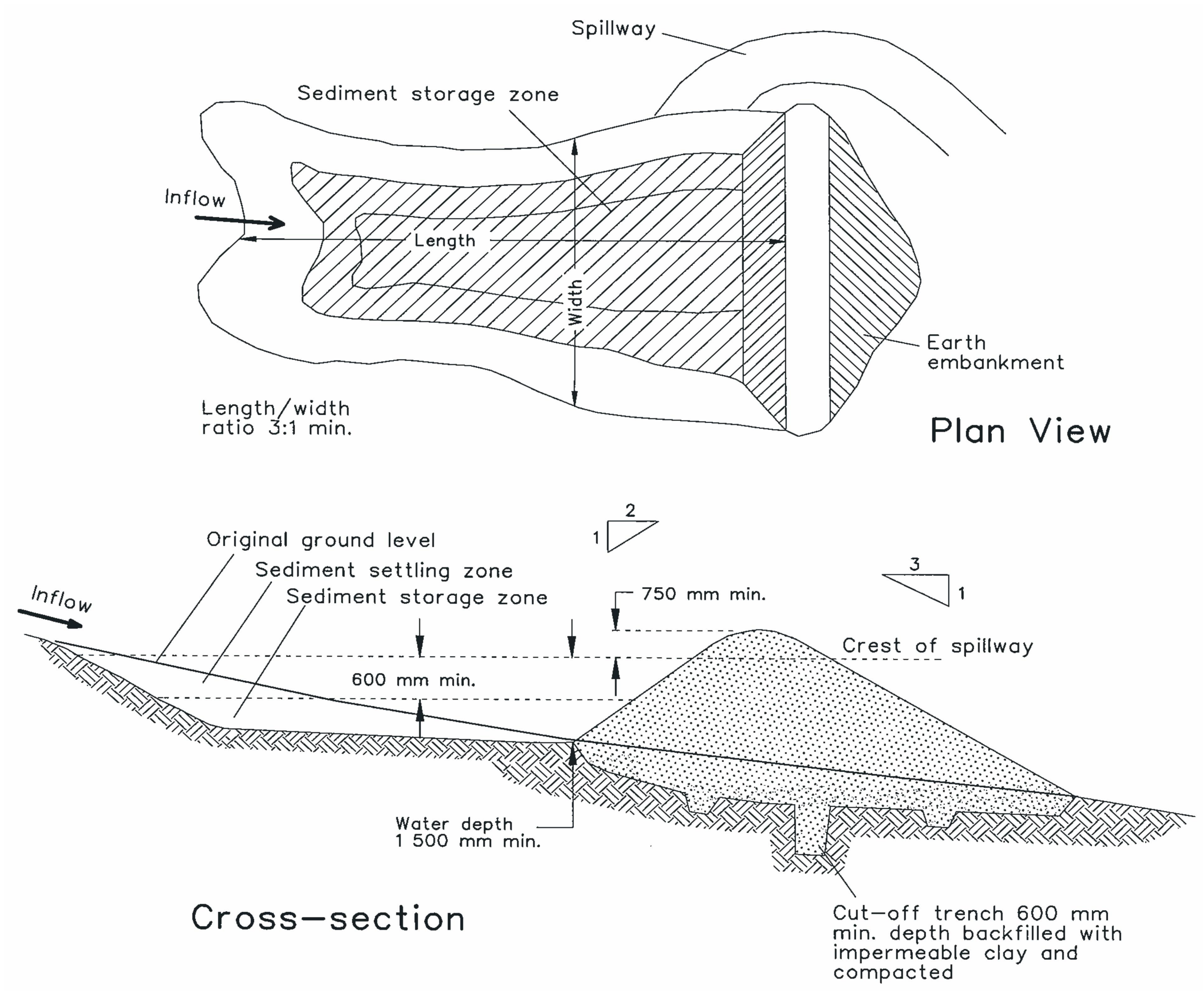
PREPARED BY
Warren Smith Consulting Engineers

TITLE
CONSTRUCTION SOIL AND WATER MANAGEMENT DETAILS - SHEET 1

SCALE	DRAWN	DESIGNED	CHECKED	APPROVED
NOT TO SCALE	I.K.	T.W.	J.G.	J.G.

JOB No.	DRAWING No.	ISSUE
5914005	C2.02	3

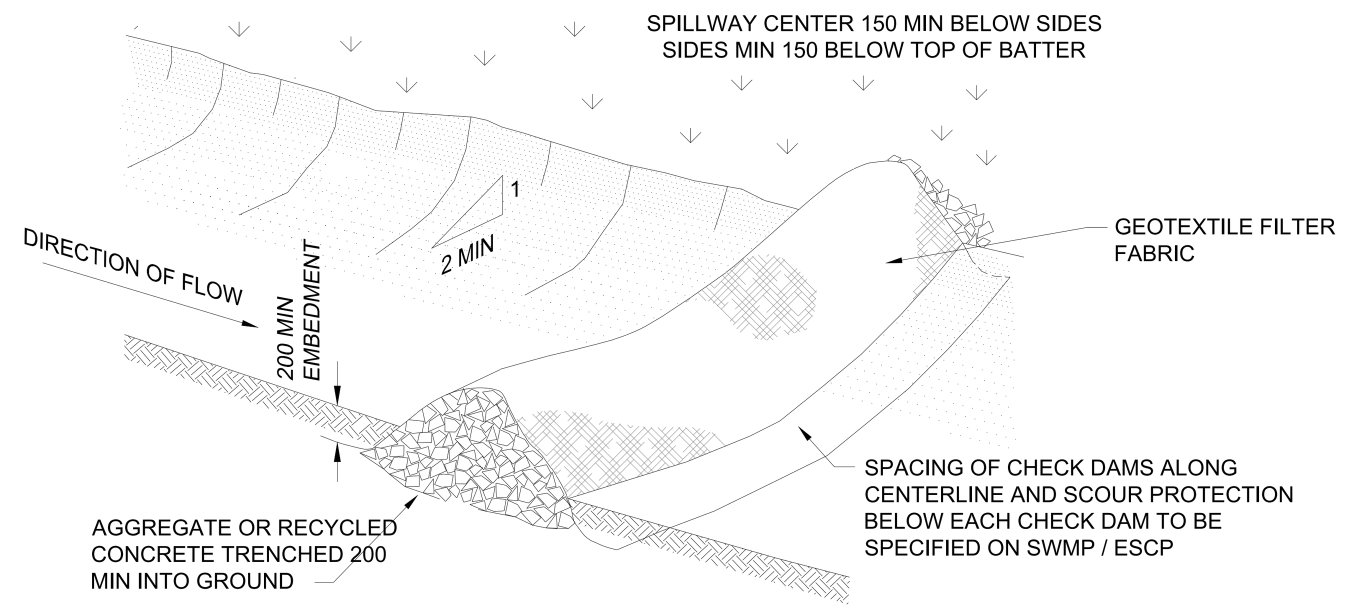
DATE: JULY 2022
STATUS: ISSUE FOR CONSTRUCTION CERTIFICATE



Construction Notes

1. Remove all vegetation and topsoil from under the dam wall and from within the storage area.
2. Construct a cut-off trench 500 mm deep and 1,200 mm wide along the centreline of the embankment extending to a point on the gully wall level with the riser crest.
3. Maintain the trench free of water and recompact the materials with equipment as specified in the SWMP to 95 per cent Standard Proctor Density.
4. Select fill following the SWMP that is free of roots, wood, rock, large stone or foreign material.
5. Prepare the site under the embankment by ripping to at least 100 mm to help bond compacted fill to the existing substrate.
6. Spread the fill in 100 mm to 150 mm layers and compact it at optimum moisture content following the SWMP.
7. Construct the emergency spillway.
8. Rehabilitate the structure following the SWMP.

SEDIMENT BASIN (TYPE D SOILS) - MANAGING URBAN STORMWATER - SD-4
NTS



CHECK DAM - ROCK
NTS

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NOT TO SCALE

REVISION	AMENDMENT	DATE
1	ISSUE FOR INFORMATION	27/05/22
2	ISSUE FOR CONSTRUCTION CERTIFICATE	30/05/22
3	CC1 - ISSUE FOR CONSTRUCTION CERTIFICATE	01/07/22

PROJECT: AUSTRAL SCHOOL STAGE 4

CLIENT: LIPMAN

PREPARED BY: Warren Smith Consulting Engineers

TITLE	CONSTRUCTION SOIL AND WATER MANAGEMENT DETAILS - SHEET 2			
SCALE: AS SHOWN	DRAWN: I.K.	DESIGNED: T.W.	CHECKED: J.G.	APPROVED: J.G.
JOB No.: 5914005		DRAWING No.: C2.03		ISSUE: 3
DATE: JULY 2022	STATUS: ISSUE FOR CONSTRUCTION CERTIFICATE			

Appendix C – Alliance Geotechnical “Geotechnical Investigation Report”

Geotechnical Investigation

Project

Proposed St Anthony Padua School Development - Stage 4
160 Eleventh Avenue, Austral NSW

Prepared for

Carmichael Tompkins Property Group

Date

13 July 2021

Report No

12483-GR-1-1

alliance
geotechnical & environmental solutions

Alliance Geotechnical Pty Ltd

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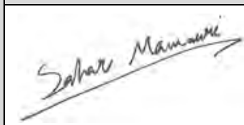
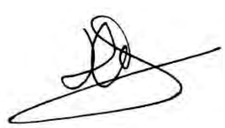
DOCUMENT CONTROL

Revision	Date	Description	Author	Reviewer
0	13 July 2021	Original Issue	SM	HA
A	24 September 2021	Revised to include cored boreholes and updated foundation and excavation conditions advice only	HP	

REVISION 0

	Author	Reviewer
Signature		
Name	Sahar Mamouri	Hadi Ajorlou
Title	BE (Civil), ME(Geotech) CPEng NER Senior Geotechnical Engineer	BE (Civil), ME(Geotech) CPEng NER Senior Geotechnical Engineer

REVISION A

	Author	Reviewer
Signature		
Name	Harshan Panchalingam	Lachlan Taylor
Title	BE (Civil), MEngSc(Geotech) Associate Geotechnical Engineer	BE(Civil) MIEAust CPEng NER Principal Geotechnical Engineer

Contents

Appendices

1 INTRODUCTION

This report presents the results of a geotechnical investigation undertaken by Alliance Geotechnical (Alliance) for Carmichael Tompkins Property Group (the Client) for St Anthony Padua School Development - Stage 4 at 160 Eleventh Avenue, Austral NSW (the site). Two recent investigations have been completed at this site. The first was undertaken in accordance with the scope of works outlined in Alliance's Estimate No. 4503, dated 17 February 2021. The second was undertaken in accordance with the scope of works outlined in Alliance's Estimate No. 5210, dated 19 July 2021. Alliance notes that the second investigation allowed for an additional day of investigation with up to a maximum of four cored boreholes, but due to time limitations only three were completed.

The proposed development includes the construction of a new three storey building (proposed years 5-12), including a lower ground built into the sloping land.

An older previous geotechnical investigation was undertaken at this site by Alliance Geotechnical in 2019 (ref. 6930-GR-1-1, dated 13 April 2018). The findings of the geotechnical investigation for 135-165 Tenth Avenue and 140 - 170 Eleventh Avenue, along with comments and recommendations regarding the proposed development were provided in this geotechnical report. During the previous geotechnical investigation, Alliance drilled 14 boreholes which four of them were located within Stage 4 footprint.

It is understood that the proposed development requires a geotechnical investigation to provide geotechnical design parameters for the structural design of footings and retaining structures.

The purpose of this report was to provide recommendations regarding:

- Existing geotechnical and groundwater conditions;
- Site Preparation and earthworks advice, including reuse of site won material
- Excavation conditions and temporary shoring system;
- Vibration management;
- Geotechnical design parameters for shallow and deep footings and retaining structures;
- Earthquake action recommendations in accordance to AS 1170.4
- Site classification in accordance with AS 2870;
- Soil aggresivity in relation to concrete and steel structures.

To achieve the project objectives, the following scope of work was carried out for the geotechnical investigation:

- Review of the geological maps and the provided drawings;
- Site walkover inspection by a geotechnical engineer;
- The drilling of 12 boreholes to a maximum depth of 2.4m;
- The drilling of 3 boreholes with at least 3m of rock core and point load strength index testing;
- Standard Penetration Tests (SPTs) in 1.5m depth intervals;
- Dynamic Cone Penetrometer (DCP) tests and Standard Penetration Tests (SPTs) to assess the soil consistency.

The results of this geotechnical investigation are provided in this report.

2 SITE DESCRIPTION & REGIONAL GEOLOGY

2.1 Site Location & Description

The site is located at 160 Eleventh Avenue, within the semi-rural area of Austral. The general site location is shown in Figure 1.

Figure 1- Site Location (extracted from Nearmap)

The site is located on a hill sloping towards Kemps Creek located approximately 300m to the southwest.

The site is bounded by semi-rural properties to the east, Eleventh Avenue to the north, Fourth Avenue to the west and Tenth Avenue to the south.

Alliance notes that the site investigation was limited to the footprint of the proposed years 5-12 buidling. At the time of carrying out the investigation, the site was covered by grass and trees with a few semi-rural dwellings on each lot. The site photos taken during the fieldwork are enclosed in Appendix A.

The site is located within an undulating terrain. The survey plan indicates that the current surface levels vary by approximately 5m over a distance of 250m. The highest section of the site is at an approximate RL 73m at the north-eastern side and varies to RL 68 m at the south-western corner. As such, the site has a general slope of 2 degrees to the southwest. It should be noted that all the real levels shown in this report are relative to AHD.

2.2 Regional Geology

The 1:100,000 NSW Department of Mineral Resources Geological Map of the Penrith Region indicates the site is underlain by Bringelly Shale (Rwb) of the Mesozoic dating back to the middle Triassic period.

The formation is described as *shale, carbonaceous claystone, claystone, laminate, fine to medium-grained lithic sandstone, rare coal and tuff.*

Bringelly Shale is a component of the Wianamatta group of sedimentary rocks in the Sydney basin. Residual soils derived from Bringelly Shale typically comprise high plasticity clays.

The investigation confirmed that the site is underlain by residual soils overlaying the Bringelly Shale unit. Figure 2 shows the site location on an extract of the geological map.

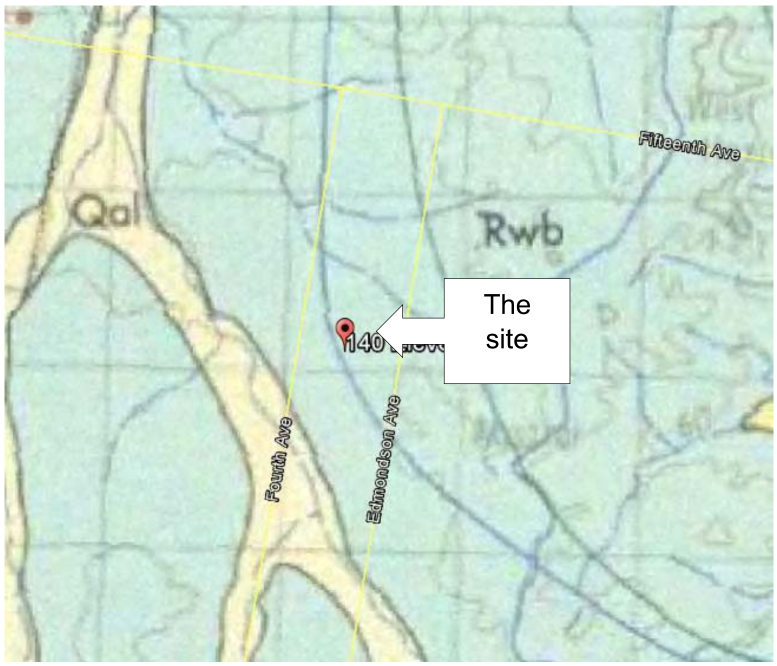


Figure 2- Site Location on Extract of Penrith Geological Map

3 FIELDWORK

3.1 Methods

The first phase of geotechnical site investigation was carried out over two days on 29 and 30 June 2021. The second phase was carried out on 26 August 2021. Selected site photographs taken during the fieldwork are presented in Appendix A.

The first phase of investigation comprised the drilling of four boreholes using a ute-mounted drilling rig operated by Alliance. Boreholes were advanced through the soil profile using solid flight augers fitted with a tungsten carbide bit (TC-bit). The boreholes were terminated upon refusal on hard material inferred as bedrock. Standard Penetration Tests (SPT) were undertaken at 1.5m depth intervals. Dynamic Cone Penetrometer (DCP) tests were undertaken beside the boreholes to assess the consistency of the near surface soil layers.

The second phase of investigation comprised the drilling of three boreholes using a Hanjin D&B 8D track mounted drilling rig operated by a subcontractor. Boreholes were advanced through the soil profile using solid flight augers fitted with a tungsten carbide bit (TC-bit) and continued in the underlying bedrock using NMLC coring methods. Point load strength index testing was completed on rock core at approximately 1m intervals or less. The boreholes were terminated at target depths.

The soil and rock materials encountered in the boreholes were logged by an experienced geotechnical engineer from Alliance.

The approximate borehole locations are shown on the Geotechnical Investigation Plan (Drawing 12483-GR-1-A) presented in Appendix B. The borehole log sheets are attached in Appendix C. These log sheets should be read in conjunction with the attached Explanatory Notes, which explain the terms, abbreviations and symbols used, together with the interpretation and limitation of the logging procedure.

3.2 Subsurface Conditions

A summary of the subsurface geotechnical units encountered is provided in Table 1. Reference to the individual borehole log sheets should be made for a full description of the subsurface conditions encountered at each borehole location.

Generally, the site subsurface profile comprises topsoil underlain by residual clay layers of various consistency (firm to hard) to a maximum depth of 3.5m underlain by shale bedrock. Based on the recovered soil cuttings, the bedrock was inferred to be highly weathered and very low strength .

3.3 Groundwater

Groundwater seepage was not observed during the auger drilling of the boreholes. However, it should be noted that groundwater seepage condition is subject to seasonal and climatic conditions and may vary across the site. It is expected the groundwater seepage occurs through the interface of residual soil and bedrock. Referring to the site topography and location, it may flow towards the southwest.

Table 1 - Summary of Subsurface Profile

Ground Profile	Consistency/ Strength	Borehole					
		BH01	BH02	BH03	BH04	BH5	BH6
Topsoil: Silty CLAY	--	0.0 – 0.3	0.0 – 0.2	0.0 – 0.1	0.0 – 0.2	0.0 – 0.2	0.0 – 0.2
Residual soil: CLAY	Firm	0.3 – 0.6	0.2 – 0.5	-	-	-	-
	Stiff	0.6 – 1.1	0.5 – 1.5	-	-	-	-
	Very Stiff	-	-	0.1 – 1.3	0.2 – 0.6	0.2 – 0.4	0.2 – 1.6
	Hard	-	-	-	0.6 – 1.2	0.4 – 1.0	-
Extremely to Highly Weathered Bedrock: SHALE	Hard to Very low strength	1.1 – 2.2	1.5 – 2.4	1.3 – 2.3	1.2 – 1.7	1.0 – 2.1	1.6 – 2.4

Ground Profile	Consistency/ Strength	Borehole					
		BH7	BH08	BH09	BH10	BH11	BH12
Topsoil: Silty CLAY	--	0.0 – 0.1	0.0 – 0.2	0.0 – 0.2	-	-	-
Fill: sand/silty CLAY, **well compacted**	Equivalent to medium dense	-	-	-	0.0 – 0.4	00 - 0.3	0.0 – 0.01
Residual soil: CLAY	Firm	-	-	-	-	-	-
	Stiff	-	-	-	-	-	-

	Very Stiff	0.1 – 1.3	0.2 – 0.9	0.2 – 1.5	0.4 -1.2	0.3 – 0.8	0.1 – 1.1
	Hard	-	-	-	-	-	-
Extremely to Highly Weathered Bedrock: SHALE	Hard to Very low strength	1.3 – 1.9	0.9 – 2.0	1.5 – 1.7	1.2 – 2.0	0.8 – 1.6	1.1 – 2.0

Ground Profile	Consistency/ Strength	Borehole		
		BH101	BH102	BH103
Topsoil: Silty CLAY	--	0.0 – 0.2	0.0 – 0.1	0.0 – 0.4
Residual soil: CLAY	--	0.2 – 1.6	0.1 – 2.0	0.4 – 3.5
Extremely to Highly Weathered Bedrock: SHALE	Hard to Very low strength	1.6 – 6.0	2.0 – 4.3	3.5 – 6.1
Moderately Weathered Bedrock: SHALE, highly weathered in parts, some clay seams	Low to high	6.0 – 8.8	4.3 – 7.4	6.1 – 11.0

4 L ABORATORY RESULTS

Three soil samples were sent to our NATA accredited laboratory for determination of their moisture content, Atterberg limits, and linear shrinkage. A summary of the test results is presented in Table 2. The laboratory test certificates are in Appendix E.

Table 2 - Summary of the Atterberg Limit Test

Sample Location	Moisture Content (%)	Liquid Limit (%)	Plastic Limit (%)	Plastic Index (%)	Linear Shrinkage (%)
BH01 0.5m-0.9m	23.7	55	16	39	10.0
BH08 0.3m-0.8m	19.4	63	16	47	10.5
BH10 0.6m-1.2m	18.1	65	21	44	14.5

Three soil aggressivity tests were performed for the purposes of durability design of concrete and steel piles in soil. The results are summarised in Table 3 and the laboratory test certificate and detailed results can be found in Attachment E.

Table 3- Soil Aggressivity Test Results

Test	Unit	**BH01 0.3m-0.8m BGL** Residual – clay	**BH08 0.3m-0.5m BGL** Residual – clay	**BH10 0.4m-0.6m BGL** Residual – clay
Chloride	mg/kg	330	55	390
Conductivity(1)	uS/cm	230	54	320
pH(1)	pH	5.6	6.1	5.1
Resistivity	Ohm.cm	4400	19000	3100
Sulfate (as SO_4)	mg/kg (ppm)	120	29	280
Moisture	%	13	8.8	7.7

Results[2]	In relation to concrete piles in soil	Non-Aggressive	Non-Aggressive	Mild
	In relation to steel piles in soil	Non-Aggressive	Non-Aggressive	Non-Aggressive

(1): Tests were undertaken on a 1:5 aqueous extract at 25°C as recorded.
(2): Assessed in accordance with AS 2159 – 2008, Table 6.4.2 (C) and Table 6.5.2 (C)

5 COMMENTS AND RECOMMENDATIONS5.1 Proposed development

Alliance was provided with the following documents by the client:

- Site survey plan, ref. No. 41240DT, sheet 1 to 11, prepared by LTS Lockley, dated 17/10/2014;
- A set of architectural drawings prepared by DWP, dated April 2021.

Based on the provided drawings, it was understood that the proposed development involves the construction of a three-storey building over a lower ground floor level which would be a cut in the slope. The lower ground floor finished level is at RL 69.1m. Assuming a 300mm excavation for structural slabs, the maximum excavation depth is approximately 4.3m below the existing ground surface.

The proposed excavation setback is more than 10m from the site boundaries.

5.2 Excavation Conditions

Based on the encountered subsurface conditions (summarised in Table 1), the lower ground excavation to an approximate depth of 4.2m, is anticipated to encounter stiff to hard residual clay and very low to low strength shale.

Excavations through the overlying soils are expected to be readily achievable using conventional earthworks equipment such as a tracked excavator with a tiger-toothed bucket. Due to natural ground variability and the presence of sandstone beds within the unit, the excavation may encounter low to medium strength rock close to the bottom of the excavation. This may require larger excavators (i.e. 30 tonnes) or the use of ripping.

The maximum 5 mm/s vibration limit is expected to be achieved provided that rock breaker equipment and excavation methods are restricted as indicated in Table 4.

Table 4 - Recommendations for Rock Breaking Equipment

Distance from Adjacent Structure (m)	Maximum Peak Particle Velocity 5 mm/s	
	Equipment	Operating Limit (% of Maximum Capacity)
1.5 to 2.5	hand-operated jack-hammer only	100
2.5 to 5.0	300 kg Rock Hammer	50
5.0 to 10.0	300 kg Rock Hammer or 600 kg Rock Hammer	100 50

If the encountered ground conditions are not in the line with the findings of this investigation, the project geotechnical engineer should be informed prior to advancing the construction works.

A dilapidation survey on nearby structures and infrastructure is recommended to be undertaken by a structural engineer prior to the commencement of any site excavations. The report should include precise measurements of the existing defects and cracks presented with the relevant photos.

5.3 Groundwater Control

Based on the findings of this investigation, groundwater is not anticipated to be encountered during the construction works. However, the observations were not based on long-term groundwater monitoring. Groundwater seepage may fluctuate with seasonal weather patterns. As such, the construction should be planned to manage seepage and surface runoff during the lower ground level excavation.

Minor seepage encountered during the excavation works could be controlled and managed by using simple sump pumping techniques. If significant groundwater seepage during construction be encountered, the project geotechnical engineer should be notified prior to carrying out any dewatering. It may also be required to install a shoring system prior to advancing the excavation if significant groundwater inflow be encountered during the excavation works.

Following the completion of construction, groundwater seepage should be controlled by an appropriately designed drainage system, including sub-floor drainage, to create a free-draining layer below the slab. Provision should be made in the design for a suitable long-term drainage system around the basement structure to avoid hydrostatic pressure built up between the slab and the soil.

5.4 Temporary Batter Slopes

Generally, the feasibility of adopting unsupported batter slopes will depend on the footing level of the adjoining structures and infrastructure, surrounding services invert levels, and should be assessed by a structural engineer. Given the proposed excavation setback from the site boundaries, the unsupported batter slope is considered feasible for the excavation.

Temporary batter slopes in the soil should not be extended below the 'zone of influence' of any adjacent structures, road and infrastructure (i.e. a 45° line drawn from the foundation level of any adjacent structure and infrastructure). The recommended maximum temporary batter slopes are presented in Table 5.

Table 5 - Maximum Recommended Dry Batter Slope Angles

Material	Maximum Dry Batter Slope (H: V)
	Temporary
Residual Soil: firm clay	2: 1
Residual Soil: stiff to hard clay	1: 1*
Very low to low strength shale	1: 2**

***Any temporary cuts in soils should be covered to maintain natural moisture and could remain unsupported for a duration of 3 to 4 weeks.**

**** Subject to inspection by a Geotechnical Engineer and carrying out remedial works if recommended (shotcrete, rock bolting, etc.).**

Surface protection of the batter faces will be needed to prevent erosion, loss of surface moisture and materials if it is proposed to leave the cut open for more than a week. The above-recommended batter slope is suitable for up to one month based on the provision that no surcharge is located along/near the cut crest and also there would not be any extended rainfall. Where excavations are proposed to be opened for an extended duration, the excavation support systems, must be considered.

5.5 Retaining Structures

Wherever temporary unsupported battered slopes are not feasible or desired, the proposed excavation should be supported by a properly designed shoring system along the site boundaries. One option for the shoring system would be a soldier pile wall with reinforced shotcrete infill panels. Weep holes or strip drains (e.g. vertical drains) must be provided behind the shotcrete to avoid a build-up of hydrostatic pressure in the retained strata that may cause a failure of the retaining structure. The shoring system piles would need to be extended below the proposed base excavation level. It is recommended that the minimum depth of embedment of the piles be 0.5m or one pile diameter, whichever is greater. The final socket depth of the shoring system should be determined by the design engineer based on the stability of the shoring wall and the applied lateral loads.

The stability of the shoring system may be provided by designing cantilever shoring piles or ground anchors.

The temporary shoring system or permanent retaining wall, should be designed in accordance with AS 4678 Earth Retaining Structures. If it is critical to limit the horizontal deformation an earth pressure coefficient ‘at rest’ (K_0) should be adopted. Where minor deflections are acceptable, active earth pressure coefficient (K_a) can be adopted. Since it is required to limit the horizontal soil deformation, an earth pressure coefficient of ‘at rest’ (K_0) should be adopted. Recommended design parameters for the design of temporary and permanent support are provided in Table 6 below.

Loads on cantilevered or singular braced / anchored retaining walls can be calculated based on a triangular earth pressure distribution. Loads on multi braced / anchored retaining walls can be calculated based on a pressure distribution of 6H if minor movement can be tolerated or 8H if minimal movement is required (where H is the height of the retained strata).

Table 6 – Recommended Parameters for Retention Design

Geotechnical Units	Depth	γ (kN/m^3)	c_u (kPa)	c’ (kPa)	Φ’ (degrees)	K_a	K_p	K_o	E’ (MPa)	ν
Residual CLAY, firm	Refer to borehole logs and Table 1	17	25	2	24	0.39	2.56	0.5**6**	8	0.3
Residual CLAY, stiff		18	50	5	26	0.39	2.56	0.56	15	0.3
Residual **CLAY, very stiff**		19	100	7	28	0.36	2.77	0.53	30	0.3
Residual CLAY, hard		20	200	10	28	0.36	2.77	0.53	60	0.3
Bedrock: very low strength shale		23	400	50	28	0.36	2.77	0.53	50	0.3

Legend:
γ: Bulk Unit Weight
C_u: Undrained Cohesion
c’: Effective Cohesion
$\emptyset'$: Effective Friction Angle

Ka: Active earth pressure
Kp: Passive earth pressure
Ko: Earth pressure at rest
E’: Elasticity Modulus
ν: Poisson’s Ratio

5.6 Footing Recommendations

5.6.1 Site Classification

FBased on the geological profile underlying the site, the site would be classified as Class H1 in accordance with AS2870-2011 “Residential Slabs and Footings”. Class H1 sites are described as highly reactive clay sites which may experience high ground movement from moisture changes with an estimated characteristic surface movement (ys) between 40mm and 60mm. The above classification has been given based on the current subsurface conditions encountered and any further regrading or earthworks may result in a need for the classification to be reassessed.

5.6.2 Shallow and Deep Footings

Given the proposed building layout, the lower ground floor and ground floor will be partially overlying residual soils and partially overlying extremely to highly weathered bedrock. To limit the effects of differential settlements, Alliance recommends that all footings be founded on the same geotechnical unit. Differential settlements also need to be considered if footings of different sizes within the same unit are adopted.

Shallow footings can be designed based on the parameters provided in Table 7. The settlements can be calculated based on the applied loads and final footing sizes.

Table 7 –Geotechnical Design Parameters for Shallow Pad/Strip Footings

Foundation Material	Minimum embedment depth (mm)	Bearing Pressure to limit settlement to <1% of minimum footing dimension (kPa)	Design Young’s Modulus (MPa)
Extremely to Highly Weathered Bedrock: SHALE, hard consistency to very low rock strength	300	700	50

If raft slabs are sought, settlements should be calculated considering the applied loads, depths and raft slab geometry. The above-provided parameters are not sufficient for the design of a raft footing.

The geotechnical design parameters for pile footings presented in Table 8 may be adopted.

Table 8 - Geotechnical Design Parameters for Pile Footings

Material	Effective Cohesion c’ (kPa)	Effective Internal Angle of Friction (degrees)	Bulk Unit Weight (kN/m^3)	Bearing Pressure to limit settlement to <1% of minimum footing dimension (kPa)	Allowable Shaft Adhesion (kPa)	Design Young's Modulus E' (MPa)
Extremely to Highly Weathered Bedrock: SHALE, hard consistency to very low rock strength	50	25	22	700	50	50
Moderately Weathered Bedrock: SHALE, highly weathered in parts, some clay seams (low strength)	NA	NA	24	1500	150	200

It should be noted that shaft adhesion is applicable to the length of the pile socketed into the target material, and piles should have a minimum socket depth of one pile diameter into the target foundation unit.

Pile design should incorporate an appropriate geotechnical strength reduction factor assessed in accordance with the requirements of Australian Standard “AS 2159-2009 Piling – Design and Installation”.

Bored piles are a suitable construction method for deep footings. If bored piles are adopted, the drilling and or excavations should be inspected by an experienced geotechnical engineer before concrete is poured to confirm the material and design parameters above, and also to confirm that the base of the footing excavations/pile holes are clean and free of soft, loose, wet or disturbed soils.

5.7 Construction Inspections

The inspections during the excavation should be undertaken in 2m intervals to assess the stability of the unsupported slopes and provide recommendations for any remedial works if required, particularly if a significant groundwater inflow be encountered.

5.8 Subgrade Preparation

The following general recommendations are provided for subgrade preparation for earthworks, pavements, slab-on-ground construction, and minor structures in cohesive soils:

- Strip existing fill and topsoil. Remove unsuitable materials from the site (e.g. material containing deleterious matter). Stockpile remainder for re-use as landscaping material or remove from site.
- Excavate residual clayey soils and rock, stockpiling for re-use as engineered fill or remove to spoil. Rock could be stockpiled separately from clayey soils, for select use beneath pavements.
- Where rock is exposed in bulk excavation level beneath pavements, rip a further 150mm.
- Where rock is exposed at footing invert level, it should be free of loose and softened material before concrete is poured.
- Where soil is exposed at bulk excavation level, compact the upper 150mm depth to a dry density ratio (AS1289.5.4.1–2007) not less than 100% Standard.
- Areas that show visible heave under compaction equipment should be over-excavated a further 0.3m and replaced with approved fill compacted to a dry density ratio not less than 100%.

Further advice should be sought where the filling is required to support major structures.

Any waste soils being removed from the site must be classified in accordance with current regulatory authority requirements to enable appropriate disposal to an appropriately licensed landfill facility.

5.9 Filling

If it is necessary to place and compact fill materials to establish the ground levels, all fill should be placed as defined in Australian Standard “AS 3798 -2007– Earthworks for residential and commercial developments”. All the fills should be a controlled fill for the later reclassify of the fill.

Filling materials should not contain vegetation or other organic matter. It is recommended that all compaction control testing in areas that will support structures and pavements be undertaken under appropriate supervision by an approved GITA.

Where a filing is required, place in horizontal layers over prepared subgrade and compact as per Table 9.

Table 9 – Compaction Specifications

Parameter	Cohesive Fill	Non-Cohesive Fill
Fill layer thickness (loose measurement): • Within 1.5m of the rear of retaining walls • Elsewhere	0.2m 0.3m	0.2m 0.3m
Density: • Beneath Pavements • Beneath Structures • Upper 150mm of subgrade	≥ 95% Std ≥ 98% Std ≥ 100% Std	≥ 70% ID ≥ 80% ID ≥ 80% ID
Moisture content during compaction	± 2% of optimum	Moist but not wet

Filling within 1.5m of the rear of any retaining walls should be compacted using lightweight equipment (e.g. hand-operated plate compactor or ride-on compactor not more than 3 tonnes static weight) to limit compaction-induced lateral pressures.

Site won material comprising high plasticity clay are not suitable material as an engineered fill. High plasticity clay is prone to swell and shrink following moisture changes and may experience settlement in long term. As such, clayey materials may be used for general filling for the purposes of landscaping or non-structural fill material. General filling with a compaction ratio of less than 98%, cannot be relied on as appropriate foundation strata for the shallow footings, to support pavement and subgrades.

Granular fill is preferred although clay soils may be suitable for general filling provided, they are of low to medium plasticity. The maximum particle size for any placed fill should be a 75mm nominal diameter. The granular fill shall be compacted to achieve a minimum density ratio of 70%. If it is proposed to use fine grained material, it should be low to medium plasticity clay with Plasticity Index (PI) less than 30%.

Design of pavements, driveways and other surfacing constructed on filled ground will need to cater for steps that would develop between such features and adjacent buildings founded on piles to bedrock. Flexible buried services should also be incorporated in the development, with consideration of differential movement where services cross beneath piled buildings. Furthermore, site drainage design should provide for steeper grades than normal to allow for future settlements.

Any soils to be imported onto the site for backfilling and reinstatement of excavated areas should be free of contamination and deleterious material and should include appropriate validation documentation in accordance with current regulatory authority requirements which confirms its suitability for the proposed land use

5.10 Subsoil Classification

Determination of the Site Sub-Soil Classification has been carried out in accordance with AS1170.4-2007 Structural Design Actions Part 4: Earthquake Actions in Australia.

Since the surface layer comprising soil profile and highly weathered very low strength shale is not more than 3m, the site is classified as Class B_e – Rock.

A Hazard Factor, z, of 0.08 for Sydney region is recommended.

6 LIMITATIONS

Alliance Geotechnical Pty Ltd (Alliance) has prepared this report in accordance with our fee proposal and Terms of Engagement. This geotechnical report has been prepared for Carmichael Tompkins Property Group for this project and for the purposes outlined in this report. This report cannot be relied on for other projects, other parties on this site or any other site. The comments and recommendations provided in this report are based on the assumption that the geotechnical recommendations contained in this report will be fully complied with during the design and construction of the proposed site development

The borehole investigation and testing results provided in this report are indicative of the subsurface conditions at the site only at the specific sampling and testing locations, and to the depths drilled at the time of the investigation. Subsurface conditions can change significantly due to geological and human processes. Where variations in conditions are encountered further geotechnical advice should be sought from Alliance.

APPENDIX A – Site Photograph

Photo 1 – General Site Overview – Borehole BH10 Location

APPENDIX B – Geotechnical Investigation Plan

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Site Plan Scale 1:1,000 on A3

Client Name:	Carmichael Tompkins Property Group	N 0 12.5 25 Metres	Figure Number:	12483-GR-1-A
Project Name:	St Anthony of Padua		Figure/Drawing Date:	20/09/2021
Project Location	140 Eleventh Avenue, Austral NSW		Report Number:	12483-GR-1-1

APPENDIX C – Borehole Logs & Explanatory Notes

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Explanatory Notes
Drill & Excavation Logs

General

Information obtained from site investigations is recorded on log sheets. Soils and very low strength rock are commonly drilled using a combination of solid-flight augers with a Tungsten-Carbide (TC) bit. Descriptions of these materials presented on the "Borehole Log" are based on a combination of regular sampling and in-situ testing. Rock coring techniques commences once material is encountered that cannot be penetrated using a combination of solid-flight augers and Tungsten-carbide bit. The "Cored Borehole Log" presents data from drilling where a core barrel has been used to recover material - commonly rock.

The "Excavation - Geological Log" presents data and drawings from exposures of soil and rock resulting from excavation of pits or trenches.

The heading of the log sheets contains information on Project Identification, Hole or Test Pit Identification, Location and Elevation. The main section of the logs contains information on methods and conditions, material description and structure presented as a series of columns in relation to depth below the ground surface which is plotted on the left side of the log sheet. The scale is presented in the depth column as metres below ground level.

As far as is practicable the data contained on the log sheets is factual. Some interpretation is included in the identification of material boundaries in areas of partial sampling, the location of areas of core loss, description and classification of material, estimation of strength and identification of drilling induced fractures, and geological unit. Material description and classifications are based on Australian Standard Geotechnical Site Investigations: AS 1726 - 2017 with some modifications as defined below.

These notes contain an explanation of the terms and abbreviations commonly used on the log sheets.

Drilling

Drilling, Casing and Excavating

Drilling methods deployed are abbreviated as follows

AS	Auger Screwing
ADV	Auger Drilling with V-Bit
ADT	Auger Drilling with TC Bit
BH	Backhoe
E	Excavator
HA	Hand Auger
HQ	HQ core barrel (~63.5 mm diameter core) *
HMLC	HMLC core barrel (~63.5 mm diameter core) *
NMLC	NMLC core barrel (~51.9 mm diameter core) *
NQ	NQ core barrel (~47.6 mm diameter core) *
RR	Rock Roller
WB	Wash-bore drilling

* Core diameters are approximate and vary due to the strength of material being drilled.

Drilling Fluid/Water

The drilling fluid used is identified and loss of return to the surface estimated as a percentage. It is introduced to assist with the drill process, in particular, when core drilling. The introduction of drill fluid/water does not allow for accurate identification of water seepages.

Drilling Penetration/Drill Depth

Core lifts are identified by a line and depth with core loss per run as a percentage. Ease of penetration in non-core drilling is abbreviated as follows:

VE	Very Easy
E	Easy
F	Firm
H	Hard
VH	Very Hard

Groundwater Levels

Date of measurement is shown.

▼ Standing water level measured in completed borehole

▽ Level taken during or immediately after drilling

► Groundwater inflow water level

Samples/Tests

Samples collected and testing undertaken are abbreviated as follows

ES	Environmental Sample
DS	Disturbed Sample
BS	Bulk Sample
U50	Undisturbed (50 mm diameter)
C	Core Sample
SPT	Standard Penetration Test
N	Result of SPT (*sample taken)
VS	Vane Shear Test
IMP	Borehole Impression Device
PBT	Plate Bearing Test
PZ	Piezometer Installation
HP	Hand Penetrometer Test
HB	Hammer Bouncing

Excavation Logs

Explanatory notes are provided at the bottom of drill log sheets. Information about the origin, geology and pedology may be entered in the "Structure and other Observations" column. The depth of the base of excavation (for the logged section) at the appropriate depth in the "Material Description" column. Refusal of excavation plant is noted should it occur. A sketch of the exposure may be added.

Material Description – Soil

Material Description - In accordance with AS 1726-2017

Classification Symbol - In accordance with the Unified Classification System (AS 1726-2017).

Abbreviation	Typical Names
GW	Well-graded gravels, gravel-sand mixtures, little or no fines.
GP	Poorly graded gravels and gravel-sand mixtures, little or no fines, uniform gravels
GM	Silty gravels, gravel-sand-silt mixtures
GC	Clayey gravels, gravel-sand-clay mixtures.
SW	Well graded sands, gravelly sands, little or no fines.
SP	Poorly graded sands and gravelly sands; little or no fines, uniform sands.
SM	Silty sand, sand-silt mixtures.
SC	Clayey sands, sand-clay mixtures.
ML	Inorganic silts and very fine sands, rock flour, silty or clayey fine sands or clayey silts with slight plasticity
CL, CI	Inorganic clays of low to medium plasticity, gravelly clays, sandy clays, silty clays, lean clays.
OL	Organic silts and organic silty clays of low plasticity. *
MH	Inorganic silts, micaceous or diatomaceous fine sandy or silty soils, clastic silts.
CH	Inorganic clays of high plasticity, fat clays
OH	Organic clays of medium to high plasticity, organic silts. *
Pt	Peat and other highly organic soils. *

* Additional details may be provided in accordance with the Von Post classification system (1922).

Organic Soils - Identification using laboratory testing:

Material	Organic Content - % of dry mass
Inorganic	<2
Organic Soil	<2 ≤ 25
Peat	> 25

Organic Soils - Descriptive terms for the degree of decomposition of peat:

Term	Decomposition	Remains	Squeeze
Fibrous	Little or none	Clearly recognizable	Only water No solid
Pseudo-fibrous	Moderate	Mixture of fibrous and amorphous	Turbid water < 50% solids
Amorphous	Full	Not recognizable	Paste > 50% solids

Particle Characteristics– Definitions are as follows:

Fraction	Component (& subdivision)		Size (mm)
Oversize	Boulders		> 200
	Cobbles		> 63 ≤ 200
Coarse grained soils	Gravel	Coarse	> 19 ≤ 63
		Medium	> 6.7 ≤ 19
		Fine	> 2.36 ≤ 6.7
	Sand	Coarse	> 0.6 ≤ 2.36
		Medium	> 0.2 ≤ 0.6
		Fine	> 0.075 ≤ 0.21
Fine grained soils	Silt		0.002 ≤ 0.075
	Clay		< 0.002

Secondary and minor soil components

In coarse grained soils – The proportions of secondary and minor components are generally estimated from a visual and tactile assessment of the soils. Descriptions for secondary and minor soil components in coarse grained soils are as follows.

Designation of components	Percentage fines	Terminology (as applicable)	Percentage accessory coarse fraction	Terminology (as applicable)
Minor	≤ 5	Trace clay / silt	≤ 5	Trace sand / gravel
	> 5 ≤12	With clay / silt	> 5 ≤12	With sand / gravel
Secondary	> 12	Silty or clayey	> 30	Sandy or gravelly

Descriptions for secondary and minor soil components in fine grained soils are as follows.

Designation of components	Percentage coarse grained soils	Terminology (as applicable)
Minor	≤ 5	Trace sand / gravel / silt / clay
	> 5 ≤12	With sand / gravel / silt / clay
Secondary	> 30	Sandy / gravelly / silty / clayey

Plasticity Terms – Definitions for fine grained soils are as follows:

Descriptive Term	Range of Liquid Limit for silt	Range of Liquid Limit for clay
Low Plasticity	≤ 50	≤ 35
Medium Plasticity	N/A	> 35 ≤50
High Plasticity	> 50%	> 50

Particle Characteristics

Particle shape and angularity are estimated from a visual assessment of coarse-grained soil particle characteristics. Terminology used includes the following:

Particle shape – spherical, platy, elongated,

Particle angularity –angular, sub-angular, sub-rounded, rounded.

Moisture Condition – Abbreviations are as follows:

D	Dry, looks and feels dry
M	Moist, No free water on remoulding
W	Wet, free water on remoulding

Moisture content of fine-grained soils is based on judgement of the soils moisture content relative to the plastic and liquid limit as follows:

MC < PL	Moist, dry of plastic limit
MC ≈ PL	Moist, near plastic limit
MC > PL	Moist, wet of plastic limit
MC ≈ LL	Wet, near liquid limit
MC > LL	Wet of liquid limit

Consistency - of cohesive soils in accordance with AS 1726-2017, Table 11 are abbreviated as follows:

Consistency Term	Abbreviation	Indicative Undrained Shear Strength Range (kPa)
Very Soft	**VS**	< 12
Soft	**S**	12 ≤ 25
Firm	**F**	25 ≤ 50
Stiff	**St**	50 ≤ 100
Very Stiff	**VSt**	100 ≤ 200
Hard	**H**	≥ 200
Friable	**Fr**	-

Density Index (%) of granular soils is estimated or is based on SPT results. Abbreviations are as follows:

Description	Abbreviation	Relative Density	SPT N
Very Loose	VL	< 15%	0 - 4
Loose	L	15 - 35%	4 - 10
Medium Dense	MD	35 - 65%	10 - 30
Dense	D	65 - 85%	30 - 50
Very Dense	VD	> 85%	> 50

Structures - Fissuring and other defects are described in accordance with AS 1726-2017 using the terminology for rock defects

Origin - Where practicable an assessment is provided of the probable origin of the soil, e.g. fill, topsoil, alluvium, colluvium, residual soil.

MATERIAL DESCRIPTION - ROCK

Material Description

Descriptions of rock for geotechnics and engineering geology in civil engineering

Identification of rock type, composition and texture based on visual features in accordance with AS 1726-2017.

Rock Naming – Where possible conventional geological names are used within the logs. Engineering properties cannot be inferred directly from the rock names in the table, but the use of a particular name provides an indicative range of characteristics to the reader. Lithological identification of rock is provided to appreciate the geology of an area, to correlate geological profiles seen in boreholes or to distinguish boulders from bedrock.

Grain Size – Grain size is done in accordance with AS1726-2017 as follows:

Coarse grained	Mainly 0.6 to 2 mm
Medium grained	0.2 – 0.6 mm
Fine grained	0.06 – 0.2 mm

Colour – Rock colour is described in the moist condition.

Texture and Fabric - Frequently used terms include:

Sedimentary Rock	Metamorphic Rock	Igneous
Bedded	Cleaved	Massive
Interbedded	Foliated	Flow banded
Laminated	Schistose	Folded
Folded	Banded	Lineated
Massive	Lineated	Porphyritic
Graded	Gneissose	Crystalline
Cross-bedded	Folded	Amorphous

Bedding and Laminated – AS 1726 – 2017 bedding and laminated rock descriptions are provided below with additional detail from BS EN ISO 14689-1 as guidance.

Description	Spacing (mm)
Very Thickly Bedded	> 2000
Thickly Bedded	> 600 ≤ 2000
Medium Bedded	> 200 ≤ 600
Thinly Bedded	> 60 ≤ 200
Very Thinly Bedded	> 20 ≤ 60
Thickly Laminated	> 6 ≤ 20
Thinly Laminated	< 6

Features, inclusions and minor components – Features, inclusions and minor components within the rock material shall be described where those features could be significant such as gas bubbles, mineral veins, carbonaceous material, salts, swelling minerals, mineral inclusions, ironstone or carbonate bands, cross-stratification or minerals the readily oxidise upon atmospheric exposure.

Moisture content – Where possible descriptions are made by the feel and appearance of the rock using one according to following terms:

Dry	Looks and feels dry.
Moist	Feels cool, darkened in colour, but no water is visible on the surface
Wet	Feels cool, darkened in colour, water film or droplets visible on the surface

The moisture content of rock cored with water may not be representative of its in-situ condition.

Durability – Descriptions of the materials durability such as tendency to develop cracks, break into smaller pieces or disintegrate upon exposure to air or in contact with water are provided where observed.

Rock Material Strength – The strength of the rock material is based on uniaxial compressive strength (UCS). The following terms are used:

Rock Strength Class	Abbreviation	UCS (MPa)	Point Load Strength Index, $I_{s\,(50)}$ (MPa)
Very Low	VL	> 0.6 ≤ 2	> 0.03 ≤ 0.1
Low	L	> 2 ≤ 6	> 0.1 ≤ 0.3
Medium	M	> 6 ≤ 20	> 0.3 ≤ 1
High	H	> 20 ≤ 60	> 1 ≤ 3
Very High	VH	> 60 ≤ 200	> 3 ≤ 10
Extremely High	EH	> 200	> 10

Strengths are estimated and where possible supported by Point Load Index Testing of representative samples. Test results are plotted on the graphical logs as follows:

D	Diametral Point Load Test
A	Axial Point Load Test

Where the estimated strength log covers more than one range it indicates the rock strength varies between the limits shown. Point Load Strength Index test results are presented as $I_{s\,(50)}$ values in MPa.

Weathering - Weathering classification assists in identification but does not imply engineering properties. Descriptions are as follows:

Term (Abbreviation)	Description
Fresh (FR)	No signs of mineral decomposition or colour change.
Slightly Weathered (SW)	partly stained or discoloured. Not or little change to strength from fresh rock.
Moderately Weathered (MW)	material is completely discoloured, little or no change of strength from fresh rock.
Highly Weathered (HW)	material is completely discoloured, significant decrease in strength from fresh rock.
Extremely Weathered (EW)	Material has soil properties. Mass structure, material texture and fabric of original rock are still visible.
Residual Soil (RS)	Material has soil properties. Mass structure and material texture and fabric of original rock not visible, but the soil has not been significantly transported.

Alteration – Physical and chemical changes of the rock material due to geological processes by fluids at depth at pressures and temperatures above atmospheric conditions. Unlike weathering, alteration shows no relationship to topography and may occur at any depth. When altered materials are recognized, the following terms are used:

<table>
<tr><th colspan="2">Term</th><th colspan="2">Abbreviation</th><th>Definition</th></tr>
<tr><td colspan="2">Extremely Altered</td><td colspan="2">XA</td><td>Material has soil properties.
Structure, texture and fabric of original rock are still visible.
The rock name is replaced with the name of the parent material, e.g. Extremely Altered basalt.
Soil descriptive terms are used.</td></tr>
<tr><td>Highly Altered</td><td rowspan="2">Distinctly altered</td><td>HA</td><td rowspan="2">DA</td><td>The whole of the rock material is discoloured.
Rock strength is changed by alteration.
Some primary minerals are altered to clay minerals.
Porosity may be higher or lower due to loss of minerals or precipitation of secondary minerals in pores.</td></tr>
<tr><td>Moderately Altered</td><td>MA</td><td>The whole of the rock material is discoloured
Little or no change of strength from fresh rock.
The term 'Distinctly Altered' is used where it is not practicable to distinguish between 'Highly Altered' and 'Moderately Altered'.
Distinctly Altered is defined as follows:
The rock may be highly discoloured;
Porosity may be higher due to mineral loss; or may be lower due to precipitation of secondary minerals in pores; and
Some change of rock strength.</td></tr>
<tr><td colspan="2">Slightly Altered</td><td colspan="2">SA</td><td>Rock is slightly discoloured
Little or no change of strength from fresh rock.</td></tr>
</table>

Alteration is only described in the context of the project where it has relevance to the civil and structural design.

Defect Descriptions

General and Detailed Descriptions – Defect descriptions are provided to suit project requirements. Generalized descriptions are used for some projects where it is unnecessary to describe each individual defect in a rock mass, or where multiple similar defects are present which are too numerous to log individually. The part of the rock mass to which this applies is delineated.

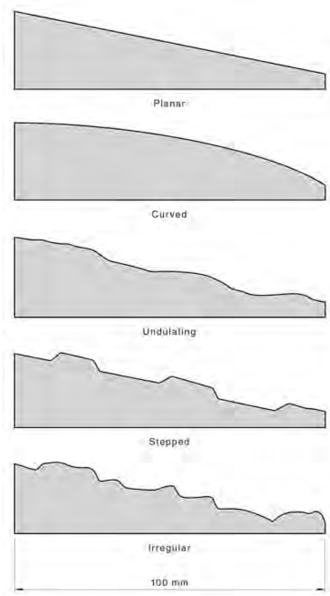
Detailed descriptions are given of defects judged to be particularly significant in the context of the project. For example, crushed seams in an apparently unstable slope. As a minimum, general descriptions outlining the number of defect sets within the rock mass and their broad characteristics are provided where it is possible to do so.

Defect Type – Defect abbreviations are as follows:

BP	Bedding Parting	FL	Foliation	SP	Shear Plane
CL	Cleavage	FZ	Fracture Zone	SZ	Shear Zone
CS	Crushed Seam	HB	Handling break	VN	Vein
DB	Drilling break	JT	Joint		
DL	Drill Lift	SM	Seam		

Defect Orientation – The dip and dip direction are recorded as a two-digit and three-digit number separated by a slash, e.g. 50/240 only when orientated core are collected and there is not core loss that could obscure core orientation. If alternative measurements are made, such as dip and strike or dip direction relative to magnetic north this shall be documented.

Surface Shape –At the medium scale of observation, description of the roughness of the surface shall be enhanced by description of the shape of the defect surface using the following terms, as illustrated below:



Defect Coatings and Seam Composition – Coatings are described using the following terms:

(a) *Clean* No visible coating.
(b) *Stained* No visible coating but surfaces are discoloured.
(c) *Veneer* A visible coating of soil or mineral, too thin to measure; may be patchy.
(d) *Coating* A visible coating up to 1 mm thick. Soil in-fill greater than 1 mm shall be described using defect terms (e.g. infilled seam). Defects greater than 1 mm aperture containing rock material great described as a vein.

Defect Spacing, Length, Openness and Thickness –described directly in millimetres and metres. In general descriptions, half order of magnitude categories are used, e.g. joint spacing typically 100 mm to 300 mm, sheared zones 1 m to 3 m thick.

Depending on project requirements and the scale of observation, spacing may be described as the mean spacing within a set of defects, or as the spacing between all defects within the rock mass. Where spacing is measured within a specific set of defects, measurements shall be made perpendicular to the defect set.

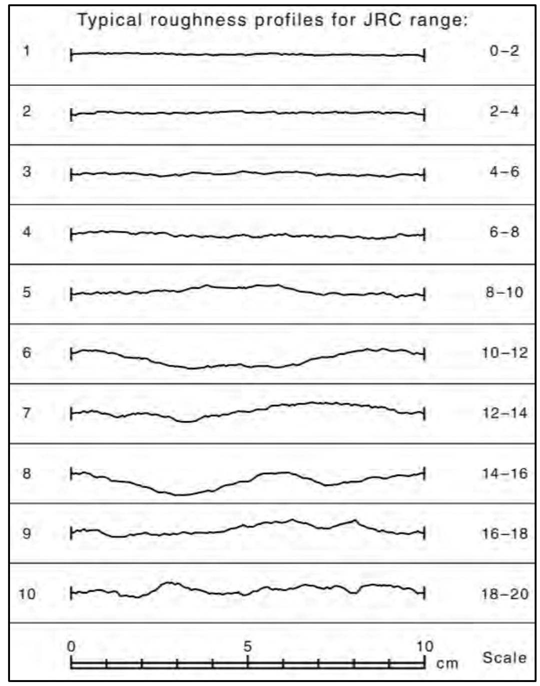
Defect spacing and length (sometimes called persistence), shall be described directly inmillimetres and metres.

Stratigraphic Unit - Geological maps related to the project are used for the designation of lithological formation name and, where possible geological unit name, e.g. Bringelly Shale, Potts Hill Sandstone Member.

Defect Roughness and Shape – Defect surface roughness is described as follows:

Very rough	Many large surface irregularities with amplitude generally more than 1 mm.
Rough	Many small surface irregularities with amplitude generally less than 1 mm.
Smooth	Smooth to touch. Few or no surface irregularities.
Polished	Shiny smooth surface
Slickensided	Grooved or striated surface, usually polished.

Where applicable Joint Roughness Range (JRC) is provided as follows:



Joint roughness profiles and corresponding JRC range based on Barton, N and Choubey, V. The Shear Strength of Rock Joints in Theory and Practice. *Rock Mechanics.* Vol. 10 (1977), pp. 1–54.

Where possible the mineralogy of the coating is identified.

Defect Infilling - abbreviated as follows:

CA	Calcite	KT	Chlorite
CN	Clean	MS	Secondary Mineral
Cy	Clay	MU	Unidentified Mineral
CS	Crushed Seam	Qz	Quartz
Fe	Iron Oxide	X	Carbonaceous

Parameters Related to Core Drilling

Total Core Recovery – T

Defect Spacing or Fracture Index – T

Rock Quality Designation – Y

Core Loss – Core loss occurs when material is lost during the drilling process It is shown at the bottom of the run unless otherwise indicated where core loss is known.

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Borehole Log

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BH No: BH01
Sheet: 1 of 1
Job No: 12483

Client: Carmichael Tompkins Property Group
Project: St Anthony of Padua Catholic School Stage 4
Location: 140 Eleventh Avenue, Austral NSW 2173
Started: 30/06/2021
Finished: 30/06/2021
Borehole Size 110 mm

Rig Type: TDLR
RL Surface: m
Hole Location: Refer to Drawing 12483-GR-1-A
Contractor: Alliance
Driller: SM
Bearing: ---
Logged: ZK
Checked: MAG

Method	Water	RL (m)	Depth (m)	Graphic Log	Classification Symbol	Material Description	Samples Tests Remarks	Moisture Condition	Consistency/ Density Index	Additional Observations
ADT	Not encountered during augering				- -	TOPSOIL: Silty CLAY. low plasticity, brown.		MC >~ PL	- -	TOPSOIL
			0.5		CI-CH	CLAY, medium to high plasticity, orange, trace fine gravel.		MC >~ PL	F	RESIDUAL
			1.0		CI	CLAY, medium plasticity, grey mottled orange.		MC >~ PL MC ~ PL	St	
			1.5 2.0		- -	SHALE, extremely weathered, recovered as CLAY, low to medium plasticity, grey-brown, with fine to medium gravel.	SPT 10 at 100mm N = R	- -	- -	EXTREMELY WEATHERED SHALE
			2.5 3.0			TC-bit refusal. Borehole BH01 terminated at 2.2m				

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Borehole Log

BH No: BH02
Sheet: 1 of 1
Job No: 12483

Client: Carmichael Tompkins Property Group
Project: St Anthony of Padua Catholic School Stage 4
Location: 140 Eleventh Avenue, Austral NSW 2173
Started: 30/06/2021
Finished: 30/06/2021
Borehole Size 110 mm

Rig Type: TDLR
Hole Location: Refer to Drawing 12483-GR-1-A
Driller: SM
Logged: ZK
RL Surface: m
Contractor: Alliance
Bearing: ---
Checked: MAG

Method	Water	RL (m)	Depth (m)	Graphic Log	Classification Symbol	Material Description	Samples Tests Remarks	Moisture Condition	Consistency/ Density Index	Additional Observations
ADT	Not encountered during augering				- -	TOPSOIL: Silty CLAY, low plasticity, brown.		MC >~ PL	- -	TOPSOIL
					CI-CH	CLAY, medium to high plasticity, orange, trace fine ironstone gravel.		MC >~ PL	F	RESIDUAL
			0.5		CI-CH	CLAY, medium to high plasticity, grey mottled orange.		MC >~ PL MC ~< PL	St - VSt	
			1.0							
			1.5		- -	SHALE, extremely weathered, recovered as CLAY, low to medium plasticity, grey-brown, with fine to medium gravel.	SPT 10 at 120mm N = R	- -	- -	EXTREMELY WEATHERED SHALE
			2.0							
			2.5			TC-bit refusal. Borehole BH02 terminated at 2.4m				
			3.0							

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BH No: BH03
Sheet: 1 of 1
Job No: 12483

Client: Carmichael Tompkins Property Group
Project: St Anthony of Padua Catholic School Stage 4
Location: 140 Eleventh Avenue, Austral NSW 2173
Started: 30/06/2021
Finished: 30/06/2021
Borehole Size 110 mm

Rig Type: TDLR
RL Surface: m
Hole Location: Refer to Drawing 12483-GR-1-A
Contractor: Alliance
Driller: SM
Bearing: ---
Logged: ZK
Checked: MAG

Method	Water	RL (m)	Depth (m)	Graphic Log	Classification Symbol	Material Description	Samples Tests Remarks	Moisture Condition	Consistency/ Density Index	Additional Observations
ADT	Not encountered during augering		0.0		- -	TOPSOIL: Silty CLAY, low plasticity, brown.		MC	- -	TOPSOIL
					CI	CLAY, medium plasticity, orange, trace fine ironstone gravel.		MC >~ PL / MC ~< PL	VSt	RESIDUAL
			0.5		CI-CH	CLAY, medium to high plasticity, grey mottled orange.		MC ~< PL	VSt	
			1.0							
					- -	SHALE, extremely weathered, recovered as CLAY, low to medium plasticity, grey-brown, with fine to medium gravel.		- -	- -	EXTREMELY WEATHERED SHALE
			1.5				SPT 10 at 130mm N = R			
			2.0							
						TC-bit refusal. Borehole BH03 terminated at 2.3m				
			2.5							
			3.0							

2. AUGERED BOREHOLE V2 12483 BH LOGS REV.GPJ GINT STD AUSTRALIA + TR, UNITS, TYPE V3.GDT 09/07/21

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Borehole Log

BH No: BH04
Sheet: 1 of 1
Job No: 12483

Client: Carmichael Tompkins Property Group
Project: St Anthony of Padua Catholic School Stage 4
Location: 140 Eleventh Avenue, Austral NSW 2173
Started: 30/06/2021
Finished: 30/06/2021
Borehole Size 110 mm

Rig Type: TDLR | **Hole Location:** Refer to Drawing 12483-GR-1-A | **Driller:** SM | **Logged:** ZK
RL Surface: m | **Contractor:** Alliance | **Bearing:** --- | **Checked:** MAG

Method	Water	RL (m)	Depth (m)	Graphic Log	Classification Symbol	Material Description	Samples Tests Remarks	Moisture Condition	Consistency/ Density Index	Additional Observations
ADT	Not encountered during augering				- -	TOPSOIL: Silty CLAY, low plasticity, brown.		MC ~< PL	- -	TOPSOIL
					CI-CH	CLAY, medium to high plasticity, orange, trace fine ironstone gravel.		MC >~ PL	VSt	RESIDUAL
			0.5		CI	CLAY, medium plasticity, brown.		MC ~ PL	H	
			1.0		- -	SHALE, extremely weathered, recovered as CLAY, low to medium plasticity, grey-brown, with fine to medium gravel.	SPT 8, 10 at 100mm N = R	- -	- -	EXTREMELY WEATHERED SHALE
			1.5			TC-bit refusal. Borehole BH04 terminated at 1.7m				
			2.0							
			2.5							
			3.0							

2. AUGERED BOREHOLE V2 12483 BH LOGS REV.GPJ GINT STD AUSTRALIA + TR, UNITS, TYPE V3.GDT 09/07/21

Borehole Log

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BH No: BH05
Sheet: 1 of 1
Job No: 12483

Client: Carmichael Tompkins Property Group
Project: St Anthony of Padua Catholic School Stage 4
Location: 140 Eleventh Avenue, Austral NSW 2173
Started: 29/06/2021
Finished: 29/06/2021
Borehole Size 110 mm

Rig Type: TDLR
Hole Location: Refer to Drawing 12483-GR-1-A
Driller: SM
Logged: ZK
RL Surface: m
Contractor: Alliance
Bearing: ---
Checked: MAG

Method	Water	RL (m)	Depth (m)	Graphic Log	Classification Symbol	Material Description	Samples Tests Remarks	Moisture Condition	Consistency/ Density Index	Additional Observations
ADT	Not encountered during augering				- -	TOPSOIL: Silty CLAY, low plasticity, brown.		MC >~ PL	- -	TOPSOIL
					CI	CLAY, medium plasticity, orange-brown.		MC ~ PL	Vst	RESIDUAL
			0.5		CI	CLAY, medium plasticity, orange-brown, trace fine gravel.		MC ~< PL	H	
			1.0 1.5 2.0		- -	SHALE, extremely weathered, recovered as CLAY, low to medium plasticity, grey-brown, with fine to medium gravel.	SPT 10 at 100mm N = R	- -	- -	EXTREMELY WEATHERED SHALE Introduced water to assist drilling.
			2.5 3.0			TC-bit refusal. Borehole BH05 terminated at 2.1m				

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Borehole Log

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BH No: BH06
Sheet: 1 of 1
Job No: 12483

Client: Carmichael Tompkins Property Group
Project: St Anthony of Padua Catholic School Stage 4
Location: 140 Eleventh Avenue, Austral NSW 2173
Started: 30/06/2021
Finished: 30/06/2021
Borehole Size 110 mm

Rig Type: TDLR
RL Surface: m
Hole Location: Refer to Drawing 12483-GR-1-A
Contractor: Alliance
Driller: SM
Bearing: ---
Logged: ZK
Checked: MAG

Method	Water	RL (m)	Depth (m)	Graphic Log	Classification Symbol	Material Description	Samples Tests Remarks	Moisture Condition	Consistency/ Density Index	Additional Observations
ADT	Not encountered during augering				- -	TOPSOIL: Silty CLAY, low plasticity, brown.		MC >~ PL	- -	TOPSOIL
			0.5		CI-CH	CLAY, medium to high plasticity, orange, trace fine to medium ironstone gravel.		MC >~ PL	VSt	RESIDUAL
			1.0		CI-CH	CLAY, medium to high plasticity, grey mottled orange.		MC >~ PL MC ~ PL	VSt	
			1.5 2.0		- -	SHALE, extremely weathered, recovered as CLAY, low to medium plasticity, grey-brown, with fine to medium gravel.	SPT 7, 10 at 120mm N = R	- -	- -	EXTREMELY WEATHERED SHALE
			2.5 3.0			TC-bit refusal. Borehole BH06 terminated at 2.4m				

2. AUGERED BOREHOLE V2 12483 BH LOGS REV.GPJ GINT STD AUSTRALIA + TR, UNITS, TYPE V3.GDT 09/07/21

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Borehole Log

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BH No: BH07
Sheet: 1 of 1
Job No: 12483

Client: Carmichael Tompkins Property Group
Project: St Anthony of Padua Catholic School Stage 4
Location: 140 Eleventh Avenue, Austral NSW 2173
Started: 29/06/2021
Finished: 29/06/2021
Borehole Size 110 mm

Rig Type: TDLR
RL Surface: m
Hole Location: Refer to Drawing 12483-GR-1-A
Contractor: Alliance
Driller: SM
Bearing: ---
Logged: ZK
Checked: MAG

Method	Water	RL (m)	Depth (m)	Graphic Log	Classification Symbol	Material Description	Samples Tests Remarks	Moisture Condition	Consistency/ Density Index	Additional Observations
ADT	Not encountered during augering				- -	TOPSOIL: Silty CLAY, low plasticity, brown.		MC ~< PL	- -	TOPSOIL
			0.5		CI-CH	CLAY, medium to high plasticity, orange, trace fine to medium ironstone gravel.		MC >~ PL	VSt	RESIDUAL
			1.0		CI-CH	CLAY, medium to high plasticity, grey.		MC >~ PL	VSt	
			1.5		- -	SHALE, extremely weathered, recovered as CLAY, low to medium plasticity, grey-brown, with fine to medium gravel.	SPT 10 at 80mm N = R	- -	- -	EXTREMELY WEATHERED SHALE
			2.0 2.5 3.0			TC-bit refusal. Borehole BH07 terminated at 1.9m				

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Borehole Log

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BH No: BH08
Sheet: 1 of 1
Job No: 12483

Client: Carmichael Tompkins Property Group
Project: St Anthony of Padua Catholic School Stage 4
Location: 140 Eleventh Avenue, Austral NSW 2173
Started: 29/06/2021
Finished: 29/06/2021
Borehole Size 110 mm

Rig Type: TDLR
RL Surface: m
Hole Location: Refer to Drawing 12483-GR-1-A
Contractor: Alliance
Driller: SM
Bearing: ---
Logged: ZK
Checked: MAG

Method	Water	RL (m)	Depth (m)	Graphic Log	Classification Symbol	Material Description	Samples Tests Remarks	Moisture Condition	Consistency/ Density Index	Additional Observations
ADT	Not encountered during augering				- -	TOPSOIL: Silty CLAY, low plasticity, brown.		MC ~< PL	- -	TOPSOIL
			0.5		CI-CH	CLAY, medium to high plasticity, orange, trace fine to medium ironstone gravel.		MC >~ PL	VSt	RESIDUAL
			1.0 / 1.5 / 2.0		- -	SHALE, extremely weathered, recovered as CLAY, low to medium plasticity, grey-brown, with fine to medium gravel.	SPT 10 at 130mm N = R	- -	- -	EXTREMELY WEATHERED SHALE
			2.5 / 3.0			TC-bit refusal. Borehole BH08 terminated at 2m				

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Borehole Log

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BH No: BH09
Sheet: 1 of 1
Job No: 12483

Client: Carmichael Tompkins Property Group
Project: St Anthony of Padua Catholic School Stage 4
Location: 140 Eleventh Avenue, Austral NSW 2173
Started: 29/06/2021
Finished: 29/06/2021
Borehole Size 110 mm

Rig Type: TDLR | **Hole Location:** Refer to Drawing 12483-GR-1-A | **Driller:** SM | **Logged:** ZK
RL Surface: m | **Contractor:** Alliance | **Bearing:** --- | **Checked:** MAG

Method	Water	RL (m)	Depth (m)	Graphic Log	Classification Symbol	Material Description	Samples Tests Remarks	Moisture Condition	Consistency/ Density Index	Additional Observations
ADT	Not encountered during augering				- -	TOPSOIL: Silty CLAY, low plasticity, brown.		MC >~ PL	- -	TOPSOIL
					CI-CH	CLAY, medium to high plasticity, orange, trace fine to medium ironstone gravel.		MC >~ PL	VSt	RESIDUAL
			0.5							
					CH	CLAY, high plasticity, grey mottled orange.		MC >~ PL	VSt	
			1.0							
			1.5		- -	SHALE, extremely weathered, recovered as CLAY, low to medium plasticity, grey-brown, with fine to medium gravel.	SPT 10 at 120mm N = R	- -	- -	EXTREMELY WEATHERED SHALE
						TC-bit refusal. Borehole BH09 terminated at 1.7m				
			2.0							
			2.5							
			3.0							

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Borehole Log

BH No: BH10
Sheet: 1 of 1
Job No: 12483

Client: Carmichael Tompkins Property Group
Project: St Anthony of Padua Catholic School Stage 4
Location: 140 Eleventh Avenue, Austral NSW 2173
Started: 29/06/2021
Finished: 29/06/2021
Borehole Size 110 mm

Rig Type: TDLR
Hole Location: Refer to Drawing 12483-GR-1-A
Driller: SM
Logged: ZK
RL Surface: m
Contractor: Alliance
Bearing: ---
Checked: MAG

Method	Water	RL (m)	Depth (m)	Graphic Log	Classification Symbol	Material Description	Samples Tests Remarks	Moisture Condition	Consistency/ Density Index	Additional Observations
ADT	Not encountered during augering				- -	FILL: SAND, fine to medium grained, grey-brown, with fine to coarse gravel. Appears well compacted.		M	- -	FILL
					- -	FILL: Silty CLAY, low plasticity, brown. Appears well compacted.		MC ~< PL	- -	
			0.5		CI-CH	CLAY, medium to high plasticity, orange, trace fine to medium ironstone gravel.		MC >~ PL	VSt	RESIDUAL
			1.0		CH	CLAY, high plasticity, pale grey.		MC >~ PL	H	
			1.5		- -	SHALE, extremely weathered, recovered as CLAY, low to medium plasticity, grey-brown, with fine to medium gravel.	SPT 10 at 100mm N = R	- -	- -	EXTREMELY WEATHERED SHALE
			2.0			TC-bit refusal. Borehole BH10 terminated at 2m				
			2.5							
			3.0							

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Borehole Log

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BH No: BH11
Sheet: 1 of 1
Job No: 12483

Client: Carmichael Tompkins Property Group
Project: St Anthony of Padua Catholic School Stage 4
Location: 140 Eleventh Avenue, Austral NSW 2173
Started: 29/06/2021
Finished: 29/06/2021
Borehole Size 110 mm

Rig Type: TDLR
Hole Location: Refer to Drawing 12483-GR-1-A
Driller: SM
Logged: ZK
RL Surface: m
Contractor: Alliance
Bearing: ---
Checked: MAG

Method	Water	RL (m)	Depth (m)	Graphic Log	Classification Symbol	Material Description	Samples Tests Remarks	Moisture Condition	Consistency/ Density Index	Additional Observations
ADT	Not encountered during augering				- -	FILL: Gravelly SAND, fine to medium grained, yellow-brown, fine to coarse crushed sandstone gravel. Appears well compacted.		M	- -	FILL
					- -	FILL: CLAY, low to medium plasticity, brown. Appears well compacted.		MC ~ PL	- -	
			0.5		CI	CLAY, medium plasticity, orange, trace fine to medium ironstone gravel.		MC > ~PL	VSt	RESIDUAL
			1.0 1.5		- -	SHALE, extremely weathered, recovered as CLAY, low to medium plasticity, grey, with fine to medium gravel.	SPT 10 at 100mm N = R	- -	- -	EXTREMELY WEATHERED SHALE
			2.0 2.5 3.0			TC-bit refusal. Borehole BH11 terminated at 1.6m				

2. AUGERED BOREHOLE V2 12483 BH LOGS REV.GPJ GINT STD AUSTRALIA + TR, UNITS, TYPE V3.GDT 09/07/21

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Borehole Log

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BH No: BH12
Sheet: 1 of 1
Job No: 12483

Client: Carmichael Tompkins Property Group
Project: St Anthony of Padua Catholic School Stage 4
Location: 140 Eleventh Avenue, Austral NSW 2173
Started: 29/09/2021
Finished: 29/09/2021
Borehole Size 110 mm

Rig Type: TDLR
RL Surface: m
Hole Location: Refer to Drawing 12483-GR-1-A
Contractor: Alliance
Driller: SM
Bearing: ---
Logged: ZK
Checked: MAG

Method	Water	RL (m)	Depth (m)	Graphic Log	Classification Symbol	Material Description	Samples Tests Remarks	Moisture Condition	Consistency/ Density Index	Additional Observations
ADT	Not encountered during augering				- -	FILL: Gravelly SAND, fine to medium grained, yellow-brown, with fine to coarse crushed sandstone gravel. Appears well compacted.		M	- -	FILL
			0.5 / 1.0		CI-CH	CLAY, medium to high plasticity, orange mottled grey, with fine to medium gravel.		MC > PL	VSt	RESIDUAL
			1.5 / 2.0		- -	SHALE, extremely weathered, recovered as CLAY, low to medium plasticity, light brown, with fine gravel.	SPT 10 at 130mm N = R	- -	- -	EXTREMELY WEATHERED SHALE
			2.5 / 3.0			TC-bit refusal. Borehole BH12 terminated at 2m				

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Borehole Log

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BH No: BH101

Job No: 12483

Client: Carmichael Tompkins Property Group
Project: St. Anthony de Padua Stage 3
Location: 140 Eleventh Avenue, Austral NSW
Started: 26/08/2021
Finished: 26/08/2021
Borehole Size 110 mm

Rig Type: Hanjin D&B 8D | **Hole Location:** Refer to 12483-GR-1-A | **Driller:** CB | **Logged:** KN
RL Surface: m | **Contractor:** BG Drilling Pty Ltd | **Bearing:** --- | **Checked:** MS

Method	Water	RL (m)	Depth (m)	Graphic Log	Classification Symbol	Material Description	Samples Tests Remarks	Moisture Condition	Consistency/ Density Index	Additional Observations
ADT	Not Encountered during Augering				- -	TOPSOIL: Silty CLAY, low plasticity, trace rootlets, MC ~ PL.		M		TOPSOIL
					CI - CH	CLAY, medium to high plasticity, orange, trace fine angular gravel, MC ~ PL.				RESIDUAL
			1		CI - CH	CLAY, medium to high plasticity, pale brown mottled orange, MC < PL.		D		
			2		- -	SHALE, extremely weathered, very low strength, recovered as Clay, medium plasticity, pale brown, trace fine to medium shale gravel.		- -		EXTREMELY WEATHERED SHALE
			3, 4		- -	SHALE, highly weathered, very low strength, brown and grey, interbedded with clay. 3.50m: becoming low strength, pale brown and grey.				BEDROCK 3.3m: increased drilling resistance
			5		- -	SHALE, highly weathered, low strength, pale brown.				
			6, 7, 8			Borehole BH101 continued as cored hole				

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Cored Borehole Log

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Client: Carmichael Tompkins Property Group
Project: St. Anthony de Padua Stage 3
Location: 140 Eleventh Avenue, Austral NSW
Hole Location: Refer to 12483-GR-1-A
Started: 26/08/2021
Finished: 26/08/2021
Borehole Size: 110 mm
Rig Type: Hanjin D&B 8D
Hole Coordinates E, N
Driller: CB
Logged: KN
RL Surface: m
Contractor: BG Drilling Pty Ltd
Bearing: ---
Checked: MS

Method	Water	RL (m)	Depth (m)	Graphic Log	Material Description	Weathering	Estimated Strength (● - Axial, ○ - Diametral; EL -0.03, VL -0.1, L -0.3, M -1, H -3, VH -10, EH)	Is(50) MPa (D- diametral, A- axial)	RQD %	Defect Spacing mm (30, 100, 300, 1000, 3000)	Additional Data
			0–5.9		Continued from non-cored borehole						
NMLC	Partial Water Loss		6		SHALE, brown and grey, laminated.	HW					*Unless otherwise noted all defects are closed bedding partings parallel to the bedding plane. 5.92 - BP, 0°, Undulating, Rough, Clay Stained. 5.95 - BP, 0°, Undulating, Rough, Clay Stained. 6.20 - BP, 0°, Undulating, Rough, Clean.
					SANDSTONE, medium to coarse grained, pale grey, with carbonaceous laminations at 0°-5°.	MW		D 0.39 A 1.03			
											6.75 - BP, 0°, Undulating, Rough, Clean.
			7					D 0.5 A 1.98	90		7.03 - BP, 0°, Undulating, Rough, Iron Stained.
								D 0.4 A 2.36			7.25 - 7.33 - BP, 90°, Curved, Rough, Clean.
											7.49 - BP, 0°, Planar, Rough, Iron Stained. 7.62 - BP, 0°, Planar, Rough, Clean.
			8					D 0.44 A 1.71			7.92 - BP, 0°, Planar, Rough, Clean.

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Cored Borehole Log

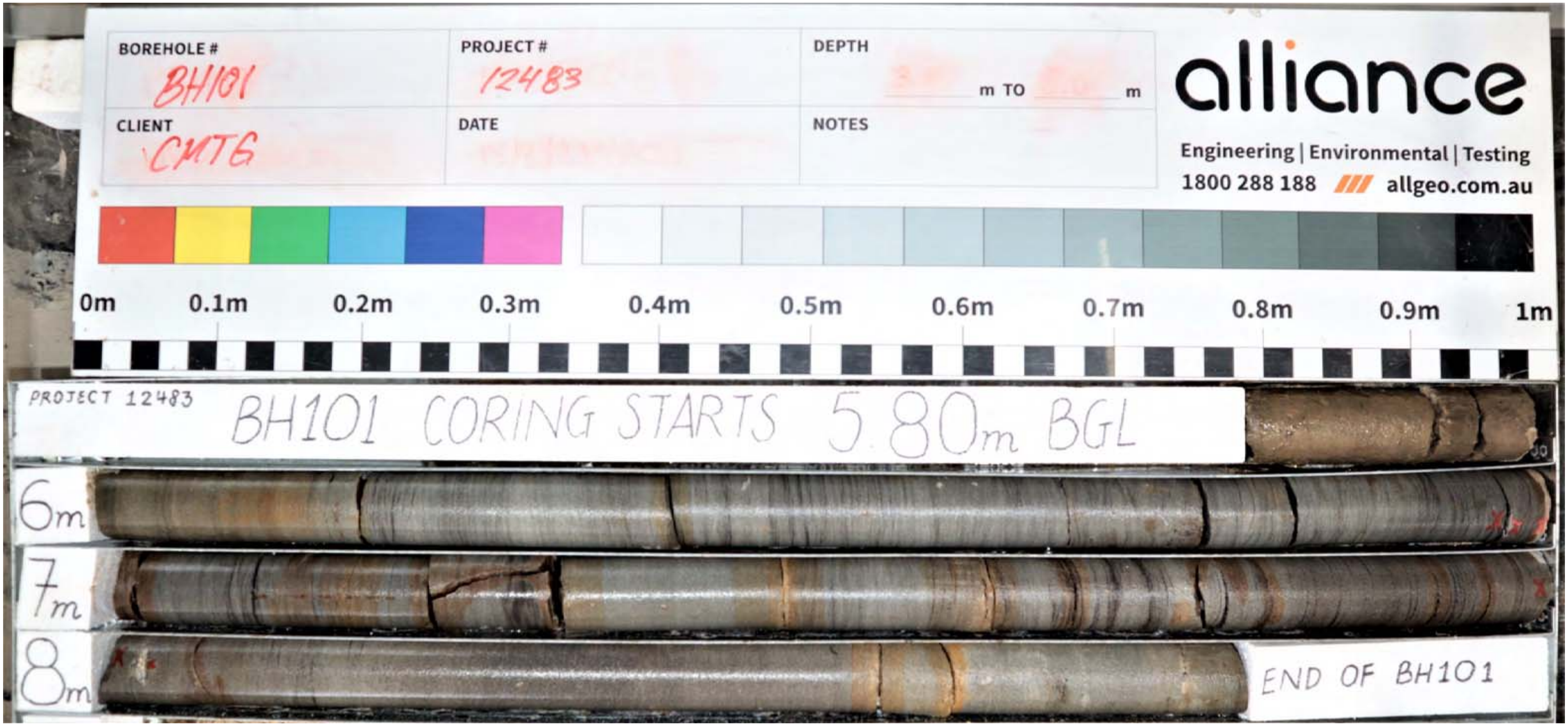
Alliance Geotechnical Pty Ltd
T: 02 9675 1777
F: 02 9675 1888
E: office@allgeo.com.au
W: www.allgeo.com.au

BH No: BH101

Job No: 12483

Client: Carmichael Tompkins Property Group		**Started:** 26/08/2021	
Project: St. Anthony de Padua Stage 3		**Finished:** 26/08/2021	
Location: 140 Eleventh Avenue, Austral NSW	**Hole Location:** Refer to 12483-GR-1-A	**Borehole Size:** 110 mm	
Rig Type: Hanjin D&B 8D	**Hole Coordinates** E, N	**Driller:** CB	**Logged:** KN
RL Surface: m	**Contractor:** BG Drilling Pty Ltd	**Bearing:** ---	**Checked:** MS

Method	Water	RL (m)	Depth (m)	Graphic Log	Material Description	Weathering	Estimated Strength (● - Axial, O - Diametral) EL -0.03 VL -0.1 L -0.3 M -1 H -3 VH -10 EH	Is(50) MPa D- diametral A- axial	RQD %	Defect Spacing mm 30 100 300 1000 3000	Additional Data
					SANDSTONE, medium to coarse grained, pale grey, with carbonaceous laminations at 0°-5°. *(continued)*	MW		D 4.8 A 3.15	90		7.95 - BP, 0°, Planar, Rough, Clean. 8.09 - BP, 0°, Curved, Rough, Clean. 8.55 - BP, 0°, Planar, Rough, Iron Stained. 8.60 - BP, 0°, Planar, Rough, Iron Stained.
			9		BH101 terminated at 8.8m						End of Borehole
			10								
			11								
			12								
			13								
			14								
			15								
			16								



Core Box Photo

alliance	Client Name:	Carmichael Tompkins Property Group	Figure / Drawing Number:	-
	Project Name:	St. Anthony of Padua Catholic School Stage 4	Figure / Drawing Date:	16/09/2021
	Project Location:	140 Eleventh Avenue, Austral NSW 2173	Report Number:	12483-GR-1-1

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Borehole Log

Alliance Geotechnical Pty Ltd
T: 1800 288 188
E: office@allgeo.com.au
W: www.allgeo.com.au

BH No: BH102
PAGE 1 OF 2
Job No: 12483

Client: Carmichael Tompkins Property Group | **Started:** 26/08/2021
Project: St. Anthony de Padua Stage 3 | **Finished:** 26/08/2021
Location: 140 Eleventh Avenue, Austral NSW | **Borehole Size** 110 mm

Rig Type: Hanjin D&B 8D | **Hole Location:** Refer to 12483-GR-1-A | **Driller:** CB | **Logged:** KN
RL Surface: m | **Contractor:** BG Drilling Pty Ltd | **Bearing:** --- | **Checked:** MS

Method	Water	RL (m)	Depth (m)	Graphic Log	Classification Symbol	Material Description	Samples Tests Remarks	Moisture Condition	Consistency/ Density Index	Additional Observations
ADT	Not Encountered during Augering				- -	TOPSOIL: CLAY, medium plasticity, dark brown, trace fine sub-angular gravel, MC > PL.		M		TOPSOIL
			1		CI - CH	CLAY, medium to high plasticity, orange yellow mottled pale grey, MC > PL.				RESIDUAL
			2		CI - CH	CLAY, pale brown, medium plasticity, trace fine to medium shale gravel, MC < PL.		D		
			3, 4		- -	SHALE, highly weathered, very low strength, pale brown and pale and dark grey.		- -		BEDROCK
			5, 6, 7, 8			Borehole BH102 continued as cored hole				

2.2. NON CORED BOREHOLE (NO COORD) 12483 REVISITED.GPJ GINT STD AUSTRALIA.GDT 20/9/21

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Cored Borehole Log

Alliance Geotechnical Pty Ltd
T: 02 9675 1777
F: 02 9675 1888
E: office@allgeo.com.au
W: www.allgeo.com.au

BH No: BH102

Job No: 12483

Client: Carmichael Tompkins Property Group
Project: St. Anthony de Padua Stage 3
Location: 140 Eleventh Avenue, Austral NSW
Hole Location: Refer to 12483-GR-1-A
Started: 26/08/2021
Finished: 26/08/2021
Borehole Size: 110 mm
Rig Type: Hanjin D&B 8D
Hole Coordinates E, N
Driller: CB
Logged: KN
RL Surface: m
Contractor: BG Drilling Pty Ltd
Bearing: ---
Checked: MS

Method	Water	RL (m)	Depth (m)	Material Description	Weathering	Is(50) MPa (D- diametral, A- axial)	RQD %	Additional Data
			0–4.2	Continued from non-cored borehole				
NMLC	Partial Water Loss		4.2–6.6	SANDSTONE, medium to coarse grained, pale grey and brown, with carbonaceous laminations at 0° - 5° . 4.30 - 4.50m: with ironstone and carbonaceous clasts.	MW	D 0.52, A 0.71; D 0.41, A 1.5; D 0.36, A 0.67; D 0.08, A 0.03	60	*Unless otherwise noted all defects are closed bedding partings parallel to the bedding plane. 4.43 - JT, 45°, Planar, Rough, Clay Stained. 4.73 - Clay Seam, 5mm. 5.00 - Clay Seam, 5mm. 5.32 - Clay Seam, 5mm. 5.53 - JT, 0°, Planar, Rough, Clean. 5.70 - Clay Seam, 30mm. 5.80 - JT, 0°, Planar, Rough, Veneer, CY. 5.81 - JT, 0°, Planar, Rough, Coating, CY. 6.12 - JT, 0°, Planar, Rough, Clean, CY. 6.30 - JT, 2°, Planar, Rough, Coating, CY. 6.32 - JT, 0°, Planar, Rough, Coating, CY. 6.38 - Clay Seam, 20mm. 6.46 - Clay Seam, 60mm. 6.65 - JT, 0°, Planar, Rough, Clean.
			6.6–7.42	SHALE, grey, laminated.	HW; MW/SW	D 0.25, A 1.1		6.80 - 7.25 EW Clay Seam, 450mm
			7.42	BH102 terminated at 7.42m				End of Borehole

Core Box Photo

alliance	Client Name:	Carmichael Tompkins Property Group	Figure / Drawing Number:	-
	Project Name:	St. Anthony of Padua Catholic School Stage 4	Figure / Drawing Date:	16/09/2021
	Project Location:	140 Eleventh Avenue, Austral NSW 2173	Report Number:	12483-GR-1-1

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Borehole Log

Alliance Geotechnical Pty Ltd
T: 1800 288 188
E: office@allgeo.com.au
W: www.allgeo.com.au

BH No: BH104

Job No: 12483

Client: Carmichael Tompkins Property Group
Project: St. Anthony de Padua Stage 3
Location: 140 Eleventh Avenue, Austral NSW
Started: 26/08/2021
Finished: 26/08/2021
Borehole Size 110 mm

Rig Type: Hanjin D&B 8D
Hole Location: Refer to 12483-GR-1-A
Driller: CB
Logged: KN
RL Surface: m
Contractor: BG Drilling Pty Ltd
Bearing: ---
Checked: MS

Method	Water	RL (m)	Depth (m)	Graphic Log	Classification Symbol	Material Description	Samples Tests Remarks	Moisture Condition	Consistency/ Density Index	Additional Observations
ADT	Not encountered during augering				- -	TOPSOIL: Silty CLAY, low to medium plasticity, trace fine grained sand, brown, MC ~ PL.		M		TOPSOIL
					CI - CH	CLAY, medium to high plasticity, orange mottled pale grey, MC ~ PL.				RESIDUAL
			1							
					CI - CH	CLAY, medium to high plasticity, pale grey mottled pale yellow and orange, MC << PL.		D		
			2							
			3							
					- -	SHALE, extremely weathered, very low strength, recovered as CLAY, medium plasticity, pale brown, with grey and dark grey shale fragments.		- -		EXTREMELY WEATHERED SHALE
			4							
			5							
			6							
						Borehole BH104 continued as cored hole				
			7							
			8							

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Cored Borehole Log

Alliance Geotechnical Pty Ltd
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W: www.allgeo.com.au

Client: Carmichael Tompkins Property Group		**Started:** 26/08/2021
Project: St. Anthony de Padua Stage 3		**Finished:** 26/08/2021
Location: 140 Eleventh Avenue, Austral NSW	**Hole Location:** Refer to 12483-GR-1-A	**Borehole Size:** 110 mm

Rig Type: Hanjin D&B 8D	**Hole Coordinates** E, N	**Driller:** CB	**Logged:** KN
RL Surface: m	**Contractor:** BG Drilling Pty Ltd	**Bearing:** ---	**Checked:** MS

Method	Water	RL (m)	Depth (m)	Graphic Log	Material Description	Weathering	Estimated Strength (● - Axial, O - Diametral; EL -0.03, VL -0.1, L -0.3, M -1, H -3, VH -10, EH)	$Is_{(50)}$ MPa (D- diametral, A- axial)	RQD %	Defect Spacing mm (30, 100, 300, 1000, 3000)	Additional Data
			1								
			2								
			3								
			4								
			5								
			6		Continued from non-cored borehole						
NMLC	Partial Water Loss				SHALE, highly weathered, very low strength, grey and pale brown, with siltstone and sandstone fragments.	HW					*Unless otherwise noted all defects are closed bedding partings parallel to the bedding plane. 6.00 - Crushed Clay Seam, 120mm.
					SANDSTONE, medium to coarse grained, pale grey. 6.15-6.25m: carbonaceous bedding at 0°	MW		D 0.98 A 1.08			6.39 - JT, 0°, Planar, Rough, Iron Stained. 6.50 - JT, 80°, Planar, Rough, Stained, X.
			7					D 0.44 A 1.68	57		
					7.25m: carbonaceous bedding at 60° 7.30m: with ironstaining.			D 0.45 A 0.58			7.22 - JT, 20°, Planar, Iron Stained. 7.35 - JT, Irregular, Rough, Iron Stained. 7.51 - JT, 45°, Coating, Cy.
			8								

alliance geotechnical & environmental solutions

Cored Borehole Log

Alliance Geotechnical Pty Ltd
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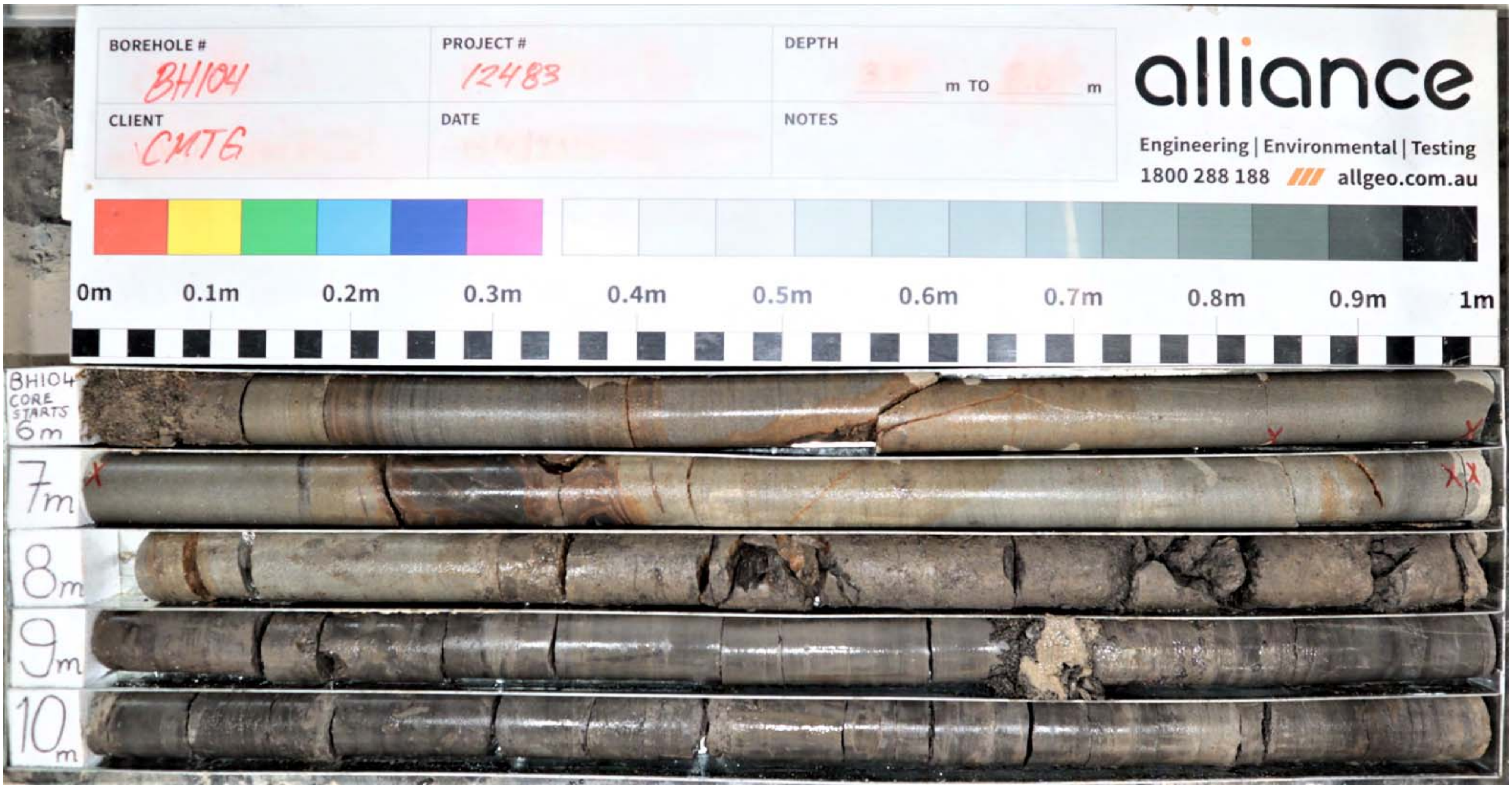
E: office@allgeo.com.au
W: www.allgeo.com.au

BH No: BH104

Job No: 12483

Client: Carmichael Tompkins Property Group		**Started:** 26/08/2021	
Project: St. Anthony de Padua Stage 3		**Finished:** 26/08/2021	
Location: 140 Eleventh Avenue, Austral NSW	**Hole Location:** Refer to 12483-GR-1-A	**Borehole Size:** 110 mm	
Rig Type: Hanjin D&B 8D	**Hole Coordinates** E, N	**Driller:** CB	**Logged:** KN
RL Surface: m	**Contractor:** BG Drilling Pty Ltd	**Bearing:** ---	**Checked:** MS

Method	Water	RL (m)	Depth (m)	Graphic Log	Material Description	Weathering	Estimated Strength (● - Axial, O - Diametral; EL -0.03, VL -0.1, L -0.3, M -1, H -3, VH -10, EH)	$Is_{(50)}$ MPa (D- diametral, A- axial)	RQD %	Defect Spacing mm (30, 100, 300, 1000, 3000)	Additional Data
					SANDSTONE, medium to coarse grained, pale grey. *(continued)*	MW		D 0.24, A 0.53			8.27 - Clay Seam, 20mm.
					SHALE, dark grey and grey, interbedded wih clay.	HW			57		8.39 - FZ. 80mm 8.56 - JT, Irregular, Rough, Clean. 8.59 - Clay Seam, 20mm. 8.67 - FZ. 150mm 8.90 - FZ. 20mm 8.92 - JT, 45°, Planar, Rough, Clay Stained.
			9		SHALE, dark grey and grey, laminated.	HW/MW		D 0.19, A 0.23	90		8.97 - JT, 0°, Planar, Rough, Clay Stained. 8.99 - JT, 0°, Planar, Rough, Clay Stained. 9.14 - JT, Planar, Rough, Clean. 9.31 - JT, Planar, Rough, Clean. 9.65 - FZ. 50mm
			10					D 0.33, A 0.36	69		10.09 - JT, Planar, Rough, Clean. 10.29 - JT, Planar, Rough, Clean. 10.36 - JT, 5°, Undulating, Rough, Clean. 10.43 - Clay Seam, 20mm. 10.56 - JT, Planar, Rough, Clean. 10.61 - FZ. 10mm 10.80 - Clay Seam, 40mm.
			11		BH104 terminated at 11m						End of Borehole
			12								
			13								
			14								
			15								
			16								



Core Box Photo

alliance	Client Name:	Carmichael Tompkins Property Group	Figure / Drawing Number:	-
	Project Name:	St. Anthony of Padua Catholic School Stage 4	Figure / Drawing Date:	16/09/2021
	Project Location:	140 Eleventh Avenue, Austral NSW 2173	Report Number:	12483-GR-1-1

APPENDIX D – Dynamic Cone Penetrometer Testing Results

alliance

Phone: 1800 288 188
Email: office@allgeo.com.au
Website: www.allgeo.com.au

Dynamic Cone Penetrometer (DCP) Test Report

Client	Carmichael Tompkins Property Group	**Report Number**	12843-GR-1-1
Project Name	St Anthony of Padua Catholic School Development Stage 4	**Project Number**	12843
Project Location	140 Eleventh Avenue, Austral NSW 2173	**Date Tested**	29-30 June 2021
Test Method	AS 1289.6.3.2		

Test Number	**DCP-01**	**DCP-02**	**DCP-03**	**DCP-04**	**DCP-05**	**DCP-06**
Test Location	Refer to Drawing 12483-GR-1-A					
Surface Material	Silty CLAY	Silty CLAY	Silty CLAY	Silty CLAY	Silty CLAY	Silty CLAY
Surface Conditions	MC ≥ PL	MC ≥ PL	MC ≥ PL	MC ≤ PL	MC ≥ PL	MC ≥ PL
Approximated RL (m AHD)						
0.00 – 0.15	2	3	9	17	7	9
0.15 – 0.30	2	3	11	13	8	13
0.30 – 0.45	4	4	13	9	9	14
0.45 – 0.60	4	4	14	9	19	13
0.60 – 0.75	9	5	13	17	27	13
0.75 – 0.90	25/100mm	6	15	17	Refusal	12
0.90 – 1.05	Refusal	9	16	14		11
1.05 – 1.20		14	19	14		15
1.20 – 1.35		18	25/100mm	25		18
1.35 – 1.50		25/90mm	Refusal	10/30mm		21
1.50 – 1.65		Refusal		Refusal		Target Depth
1.65 – 1.80						
1.80 – 1.95						
1.95 – 2.10						

Test Number	DCP-07	DCP-08	DCP-09	DCP-10	DCP-11	DCP-12
Test Location	Refer to Drawing 12483-GR-1-A					
Surface Material	Silty CLAY	Silty CLAY	Silty CLAY	Sand	Gravelly Sand	Gravelly Sand
Surface Conditions	MC ≤ PL	MC ≤ PL	MC ≥ PL	M	M	M
Approximated RL (m AHD)						
0.00 – 0.15	9	7	8	10	19	21
0.15 – 0.30	13	10	12	12	16	16
0.30 – 0.45	13	9	12	10	15	12
0.45 – 0.60	12	12	11	12	16	11
0.60 – 0.75	11	11	12	22	22	27
0.75 – 0.90	11	13	15	25/120mm	25/110mm	Refusal
0.90 – 1.05	13	20	16	Refusal		
1.05 – 1.20	14	25/100mm	22			
1.20 – 1.35	20/90mm	Refusal	25/110mm			
1.35 – 1.50	Refusal		Refusal			
1.50 – 1.65						
1.65 – 1.80						
1.80 – 1.95						
1.95 – 2.10						

Notes: This test report is intended to be read in conjunction with the geotechnical report by Alliance Geotechnical (ref: 12483-GR-1-1).

APPENDIX E – Laboratory Test Certificates

Material Test Report

alliance
geotechnical & environmental solutions
Alliance Geotechnical Pty Ltd
10 Welder Road Seven Hills NSW 2147
PO Box 275, Seven Hills NSW 1730
Phone: 1800 288 188
Email: paul@allgeo.com.au

Report Number: **12483-1**
Issue Number: 1
Date Issued: 13/07/2021
Client: Alliance Geotechnical
10 Welder Road, Seven Hills NSW 2147
Contact: Hadi Ajorlou
Project Number: 12483
Project Name: St Anthony of Padua
Project Location: 140 Eleventh Avenue, Austral
Contractor: Carmichael Tompkins Property Group
Work Request: 13856
Sample Number: 21-13856A
Date Sampled: 29/06/2021
Dates Tested: 01/07/2021 - 09/07/2021
Sampling Method: Sampled by Client
The results apply to the sample as received
Sample Location: **BH01 , Depth: 0.5-0.9m**
Material: CLAY, high plasticity, trace fine gravel, orange.

NATA
WORLD RECOGNISED ACCREDITATION

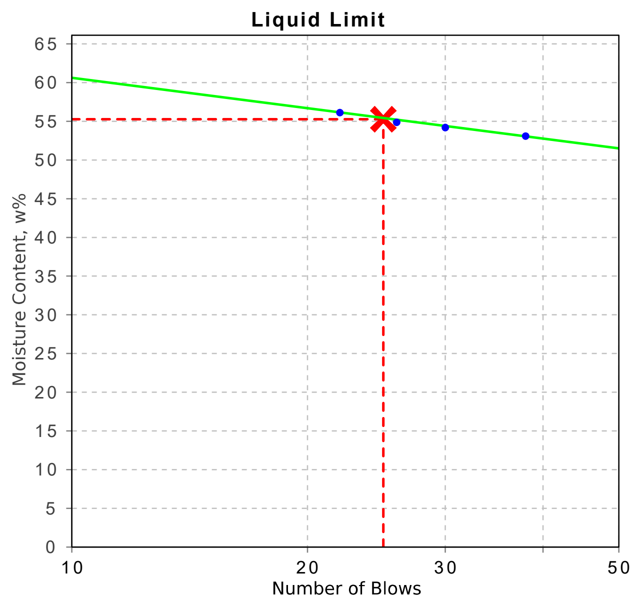
Accredited for compliance with ISO/IEC 17025 - Testing

Approved Signatory: Paul Haslam
Technical Manager - Testing
NATA Accredited Laboratory Number: 15100

Atterberg Limit (AS1289 3.1.1 & 3.2.1 & 3.3.1)		Min	Max
Sample History	Air Dried		
Preparation Method	Dry Sieve		
Liquid Limit (%)	55		
Plastic Limit (%)	16		
Plasticity Index (%)	**39**		

Linear Shrinkage (AS1289 3.4.1)		Min	Max
Moisture Condition Determined By	AS 1289.3.1.1		
Linear Shrinkage (%)	10.0		
Cracking Crumbling Curling	Cracking & Curling		

Moisture Content (AS 1289 2.1.1)	
Moisture Content (%)	23.7



Material Test Report

Report Number:	**12483-1**
Issue Number:	1
Date Issued:	13/07/2021
Client:	Alliance Geotechnical
	10 Welder Road, Seven Hills NSW 2147
Contact:	Hadi Ajorlou
Project Number:	12483
Project Name:	St Anthony of Padua
Project Location:	140 Eleventh Avenue, Austral
Contractor:	Carmichael Tompkins Property Group
Work Request:	13856
Sample Number:	21-13856B
Date Sampled:	29/06/2021
Dates Tested:	01/07/2021 - 09/07/2021
Sampling Method:	Sampled by Client
	The results apply to the sample as received
Sample Location:	**BH08 , Depth: 0.3-0.8m**
Material:	CLAY, high plasticity, orange, trace fine to medium ironstone gravel.

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Alliance Geotechnical Pty Ltd
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PO Box 275, Seven Hills NSW 1730
Phone: 1800 288 188
Email: paul@allgeo.com.au

Accredited for compliance with ISO/IEC 17025 - Testing

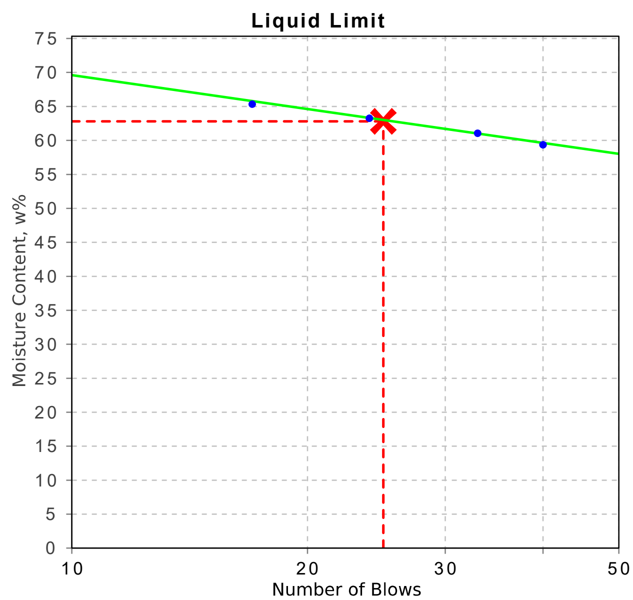
NATA
WORLD RECOGNISED ACCREDITATION

Approved Signatory: Paul Haslam
Technical Manager - Testing
NATA Accredited Laboratory Number: 15100

Atterberg Limit (AS1289 3.1.1 & 3.2.1 & 3.3.1)		Min	Max
Sample History	Air Dried		
Preparation Method	Dry Sieve		
Liquid Limit (%)	63		
Plastic Limit (%)	16		
Plasticity Index (%)	**47**		

Linear Shrinkage (AS1289 3.4.1)		Min	Max
Moisture Condition Determined By	AS 1289.3.1.1		
Linear Shrinkage (%)	10.5		
Cracking Crumbling Curling	Cracking & Curling		

Moisture Content (AS 1289 2.1.1)	
Moisture Content (%)	19.4



Material Test Report

alliance
geotechnical & environmental solutions
Alliance Geotechnical Pty Ltd
10 Welder Road Seven Hills NSW 2147
PO Box 275, Seven Hills NSW 1730
Phone: 1800 288 188
Email: paul@allgeo.com.au

Report Number:	**12483-1**
Issue Number:	1
Date Issued:	13/07/2021
Client:	Alliance Geotechnical
	10 Welder Road, Seven Hills NSW 2147
Contact:	Hadi Ajorlou
Project Number:	12483
Project Name:	St Anthony of Padua
Project Location:	140 Eleventh Avenue, Austral
Contractor:	Carmichael Tompkins Property Group
Work Request:	13856
Sample Number:	21-13856C
Date Sampled:	29/06/2021
Dates Tested:	01/07/2021 - 12/07/2021
Sampling Method:	Sampled by Client
	The results apply to the sample as received
Sample Location:	**BH10 , Depth: 0.6-1.2**
Material:	CLAY, high plasticity, orange, trace fine to medium ironstone gravel.

Accredited for compliance with ISO/IEC 17025 - Testing

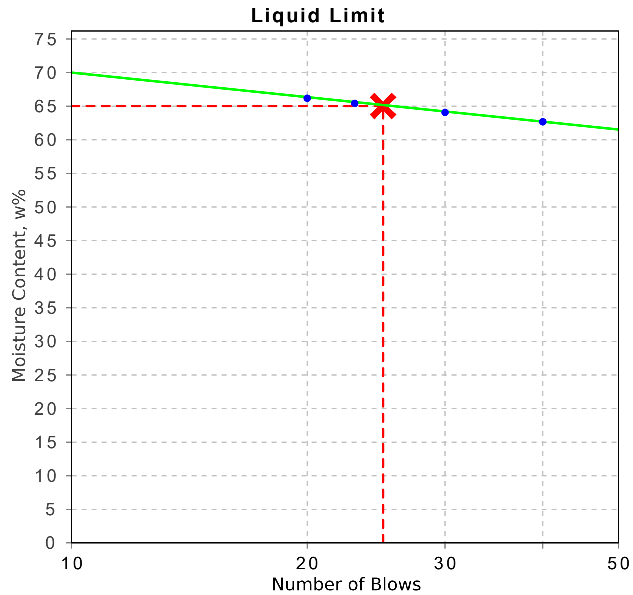
NATA
WORLD RECOGNISED ACCREDITATION

Approved Signatory: Paul Haslam
Technical Manager - Testing
NATA Accredited Laboratory Number: 15100

Atterberg Limit (AS1289 3.1.1 & 3.2.1 & 3.3.1)		Min	Max
Sample History	Air Dried		
Preparation Method	Dry Sieve		
Liquid Limit (%)	65		
Plastic Limit (%)	21		
Plasticity Index (%)	**44**		

Linear Shrinkage (AS1289 3.4.1)		Min	Max
Moisture Condition Determined By	AS 1289.3.1.1		
Linear Shrinkage (%)	14.5		
Cracking Crumbling Curling	Curling		

Moisture Content (AS 1289 2.1.1)	
Moisture Content (%)	18.1



Certificate of Analysis

Environment Testing

NATA Accredited
Accreditation Number 1261
Site Number 18217

Accredited for compliance with ISO/IEC 17025 – Testing
NATA is a signatory to the ILAC Mutual Recognition Arrangement for the mutual recognition of the equivalence of testing, medical testing, calibration, inspection, proficiency testing scheme providers and reference materials producers reports and certificates.

Alliance Geotechnical
10 Welder Road
Seven Hills
NSW 2147

Attention:	**Hadi Ajorlou**
Report	**807399-S**
Project name	140 ELEVENTH AVE AUSTRAL
Project ID	12483
Received Date	Jul 01, 2021

Client Sample ID			**BH01 0.3-0.5**	**BH08 0.3-0.5**	**BH10 0.4-0.6**
Sample Matrix			**Soil**	**Soil**	**Soil**
Eurofins Sample No.			**S21-JI01947**	**S21-JI01948**	**S21-JI01949**
Date Sampled			**Jun 29, 2021**	**Jun 29, 2021**	**Jun 30, 2021**
Test/Reference	LOR	Unit			
Chloride	10	mg/kg	330	55	390
Conductivity (1:5 aqueous extract at 25°C as rec.)	10	uS/cm	230	54	320
pH (1:5 Aqueous extract at 25°C as rec.)	0.1	pH Units	5.6	6.1	5.1
Resistivity*	0.5	ohm.m	44	190	31
Sulphate (as SO4)	10	mg/kg	120	29	280
% Moisture	1	%	13	8.8	7.7

Sample History

Where samples are submitted/analysed over several days, the last date of extraction is reported.

If the date and time of sampling are not provided, the Laboratory will not be responsible for compromised results should testing be performed outside the recommended holding time.

Description	Testing Site	Extracted	Holding Time
Chloride	Sydney	Jul 01, 2021	28 Days
- Method: LTM-INO-4090 Chloride by Discrete Analyser			
Conductivity (1:5 aqueous extract at 25°C as rec.)	Sydney	Jul 01, 2021	7 Days
- Method: LTM-INO-4030 Conductivity			
pH (1:5 Aqueous extract at 25°C as rec.)	Sydney	Jul 01, 2021	7 Days
- Method: LTM-GEN-7090 pH in soil by ISE			
Sulphate (as SO4)	Sydney	Jul 01, 2021	28 Days
- Method: E045 Anions by Ion Chromatography			
% Moisture	Sydney	Jul 01, 2021	14 Days
- Method: LTM-GEN-7080 Moisture			

Australia

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NATA # 1261
Site # 1254

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Lane Cove West NSW 2066
Phone : +61 2 9900 8400
NATA # 1261 Site # 18217

Brisbane
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Murarrie QLD 4172
Phone : +61 7 3902 4600
NATA # 1261 Site # 20794

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Welshpool WA 6106
Phone : +61 8 9251 9600
NATA # 1261
Site # 23736

Newcastle
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Mayfield East NSW 2304
PO Box 60 Wickham 2293
Phone : +61 2 4968 8448
NATA # 1261 Site # 25079

New Zealand

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Penrose, Auckland 1061
Phone : +64 9 526 45 51
IANZ # 1327

Christchurch
43 Detroit Drive
Rolleston, Christchurch 7675
Phone : 0800 856 450
IANZ # 1290

Company Name: Alliance Geotechnical
Address: 10 Welder Road
Seven Hills
NSW 2147

Project Name: 140 ELEVENTH AVE AUSTRAL
Project ID: 12483

Order No.:
Report #: 807399
Phone: 1800 288 188
Fax: 02 9675 1888

Received: Jul 1, 2021 5:22 PM
Due: Jul 8, 2021
Priority: 5 Day
Contact Name: Hadi Ajorlou

Eurofins Analytical Services Manager : Andrew Black

Sample Detail						Aggressivity Soil Set	Moisture Set
Melbourne Laboratory - NATA Site # 1254							
Sydney Laboratory - NATA Site # 18217						X	X
Brisbane Laboratory - NATA Site # 20794							
Perth Laboratory - NATA Site # 23736							
Mayfield Laboratory - NATA Site # 25079							
External Laboratory							
No	**Sample ID**	**Sample Date**	**Sampling Time**	**Matrix**	**LAB ID**		
1	BH01 0.3-0.5	Jun 29, 2021		Soil	S21-Jl01947	X	X
2	BH08 0.3-0.5	Jun 29, 2021		Soil	S21-Jl01948	X	X
3	BH10 0.4-0.6	Jun 30, 2021		Soil	S21-Jl01949	X	X
Test Counts						3	3

Internal Quality Control Review and Glossary

General

1. Laboratory QC results for Method Blanks, Duplicates, Matrix Spikes, and Laboratory Control Samples follows guidelines delineated in the National Environment Protection (Assessment of Site Contamination) Measure 1999, as amended May 2013 and are included in this QC report where applicable. Additional QC data may be available on request.
2. All soil/sediment/solid results are reported on a dry basis, unless otherwise stated.
3. All biota/food results are reported on a wet weight basis on the edible portion, unless otherwise stated.
4. Actual LORs are matrix dependant. Quoted LORs may be raised where sample extracts are diluted due to interferences.
5. Results are uncorrected for matrix spikes or surrogate recoveries except for PFAS compounds.
6. SVOC analysis on waters are performed on homogenised, unfiltered samples, unless noted otherwise.
7. Samples were analysed on an 'as received' basis.
8. Information identified on this report with blue colour, indicates data provided by customer, that may have an impact on the results.
9. This report replaces any interim results previously issued.

Holding Times

Please refer to 'Sample Preservation and Container Guide' for holding times (QS3001).

For samples received on the last day of holding time, notification of testing requirements should have been received at least 6 hours prior to sample receipt deadlines as stated on the SRA.

If the Laboratory did not receive the information in the required timeframe, and regardless of any other integrity issues, suitably qualified results may still be reported.

Holding times apply from the date of sampling, therefore compliance to these may be outside the laboratory's control.

For VOCs containing vinyl chloride, styrene and 2-chloroethyl vinyl ether the holding time is 7 days however for all other VOCs such as BTEX or C6-10 TRH then the holding time is 14 days.

****NOTE:** pH duplicates are reported as a range NOT as RPD

Units

mg/kg: milligrams per kilogram	**mg/L:** milligrams per litre	**ug/L:** micrograms per litre
ppm: Parts per million	**ppb:** Parts per billion	**%:** Percentage
org/100mL: Organisms per 100 millilitres	**NTU:** Nephelometric Turbidity Units	**MPN/100mL:** Most Probable Number of organisms per 100 millilitres

Terms

Dry	Where a moisture has been determined on a solid sample the result is expressed on a dry basis.
LOR	Limit of Reporting.
SPIKE	Addition of the analyte to the sample and reported as percentage recovery.
RPD	Relative Percent Difference between two Duplicate pieces of analysis.
LCS	Laboratory Control Sample - reported as percent recovery.
CRM	Certified Reference Material - reported as percent recovery.
Method Blank	In the case of solid samples these are performed on laboratory certified clean sands and in the case of water samples these are performed on de-ionised water.
Surr - Surrogate	The addition of a like compound to the analyte target and reported as percentage recovery.
Duplicate	A second piece of analysis from the same sample and reported in the same units as the result to show comparison.
USEPA	United States Environmental Protection Agency
APHA	American Public Health Association
TCLP	Toxicity Characteristic Leaching Procedure
COC	Chain of Custody
SRA	Sample Receipt Advice
QSM	US Department of Defense Quality Systems Manual Version 5.3
CP	Client Parent - QC was performed on samples pertaining to this report
NCP	Non-Client Parent - QC performed on samples not pertaining to this report, QC is representative of the sequence or batch that client samples were analysed within.
TEQ	Toxic Equivalency Quotient

QC - Acceptance Criteria

RPD Duplicates: Global RPD Duplicates Acceptance Criteria is 30% however the following acceptance guidelines are equally applicable:

Results <10 times the LOR : No Limit

Results between 10-20 times the LOR : RPD must lie between 0-50%

Results >20 times the LOR : RPD must lie between 0-30%

Surrogate Recoveries: Recoveries must lie between 20-130% Phenols & 50-150% PFASs

PFAS field samples that contain surrogate recoveries in excess of the QC limit designated in QSM 5.3 where no positive PFAS results have been reported have been reviewed and no data was affected.

WA DWER (n=10): PFBA, PFPeA, PFHxA, PFHpA, PFOA, PFBS, PFHxS, PFOS, 6:2 FTSA, 8:2 FTSA

QC Data General Comments

1. Where a result is reported as a less than (<), higher than the nominated LOR, this is due to either matrix interference, extract dilution required due to interferences or contaminant levels within the sample, high moisture content or insufficient sample provided.
2. Duplicate data shown within this report that states the word "BATCH" is a Batch Duplicate from outside of your sample batch, but within the laboratory sample batch at a 1:10 ratio. The Parent and Duplicate data shown is not data from your samples.
3. Organochlorine Pesticide analysis - where reporting LCS data, Toxaphene & Chlordane are not added to the LCS.
4. Organochlorine Pesticide analysis - where reporting Spike data, Toxaphene is not added to the Spike.
5. Total Recoverable Hydrocarbons - where reporting Spike & LCS data, a single spike of commercial Hydrocarbon products in the range of C12-C30 is added and it's Total Recovery is reported in the C10-C14 cell of the Report.
6. pH and Free Chlorine analysed in the laboratory - Analysis on this test must begin within 30 minutes of sampling.Therefore laboratory analysis is unlikely to be completed within holding time. Analysis will begin as soon as possible after sample receipt.
7. Recovery Data (Spikes & Surrogates) - where chromatographic interference does not allow the determination of Recovery the term "INT" appears against that analyte.
8. Polychlorinated Biphenyls are spiked only using Aroclor 1260 in Matrix Spikes and LCS.
9. For Matrix Spikes and LCS results a dash " -" in the report means that the specific analyte was not added to the QC sample.
10. Duplicate RPDs are calculated from raw analytical data thus it is possible to have two sets of data.

Quality Control Results

Test			Units	Result 1			Acceptance Limits	Pass Limits	Qualifying Code
Method Blank									
Chloride			mg/kg	< 10			10	Pass	
Conductivity (1:5 aqueous extract at 25°C as rec.)			uS/cm	< 10			10	Pass	
Sulphate (as SO4)			mg/kg	< 10			10	Pass	
LCS - % Recovery									
Chloride			%	94			70-130	Pass	
Conductivity (1:5 aqueous extract at 25°C as rec.)			%	91			70-130	Pass	
Resistivity*			%	91			70-130	Pass	
Sulphate (as SO4)			%	94			70-130	Pass	
Test	**Lab Sample ID**	**QA Source**	**Units**	**Result 1**			**Acceptance Limits**	**Pass Limits**	**Qualifying Code**
Spike - % Recovery									
				Result 1					
Chloride	S21-JI01948	CP	%	98			70-130	Pass	
Sulphate (as SO4)	S21-JI01948	CP	%	96			70-130	Pass	
Test	**Lab Sample ID**	**QA Source**	**Units**	**Result 1**			**Acceptance Limits**	**Pass Limits**	**Qualifying Code**
Duplicate									
				Result 1	Result 2	RPD			
Conductivity (1:5 aqueous extract at 25°C as rec.)	S21-JI00333	NCP	uS/cm	31	29	6.0	30%	Pass	
pH (1:5 Aqueous extract at 25°C as rec.)	S21-JI00333	NCP	pH Units	5.5	5.6	<1	30%	Pass	
Resistivity*	S21-JI00333	NCP	ohm.m	320	340	6.0	30%	Pass	
Duplicate									
				Result 1	Result 2	RPD			
Chloride	S21-JI01948	CP	mg/kg	55	55	<1	30%	Pass	
Sulphate (as SO4)	S21-JI01948	CP	mg/kg	29	28	1.0	30%	Pass	
% Moisture	S21-JI01948	CP	%	8.8	6.7	26	30%	Pass	

eurofins | Environment Testing

Comments

Sample Integrity

Custody Seals Intact (if used)	N/A
Attempt to Chill was evident	Yes
Sample correctly preserved	Yes
Appropriate sample containers have been used	Yes
Sample containers for volatile analysis received with minimal headspace	Yes
Samples received within HoldingTime	Yes
Some samples have been subcontracted	No

Authorised by:

Andrew Black	Analytical Services Manager
Charl Du Preez	Senior Analyst-Inorganic (NSW)

Glenn Jackson
General Manager

Final Report – this report replaces any previously issued Report

- Indicates Not Requested

* Indicates NATA accreditation does not cover the performance of this service

Measurement uncertainty of test data is available on request or please click here.

Eurofins shall not be liable for loss, cost, damages or expenses incurred by the client, or any other person or company, resulting from the use of any information or interpretation given in this report. In no case shall Eurofins be liable for consequential damages including, but not limited to, lost profits, damages for failure to meet deadlines and lost production arising from this report. This document shall not be reproduced except in full and relates only to the items tested. Unless indicated otherwise, the tests were performed on the samples as received.

Appendix D – CVs of members involved in production of report

15

YEARS EXPERIENCE

15

YEARS WITH LIPMAN

TIM CALPITO – PROJECT MANAGER

CAREER SUMMARY

Tim joined Lipman in 2007 working as an administrator on the Broadway Telstra Substation project. He completed his degree in Civil Engineering and Construction Management at the University of Technology, Sydney. In Tim's 15 years of service with Lipman he has worked on a number of our 'flagship' projects, including the D&C New College Postgraduate Student Accommodation at UNSW and the $52m Sydney International Airport Hotel.

Tim's sharp communication skills have been a tremendous asset on all of the projects he has been involved with. He has an impressive history of developing sound relationships with his team, subcontractors and clients ensuring favourable outcomes for all parties concerned.

EXPERIENCE

2016 - Present | Project Manager, Lipman
Responsible for the overall performance of the project, including programming, WHS, client liaison and site team management.

2007 - 2016 | Project Engineer/Project Cadet, Lipman

KEY PROJECTS

- CSU Joint Programme in Medicine - Orange, $15m
- Bella Vista Public School, $45m
- Macquarie University Incubator, $7.6m
- 580 George Street, Sydney, $15m
- University of Wollongong, Early Start Facility, $31.8m
- Sydney International Airport Hotel, $52.5m
- RT Health - Refurbishment of Existing Heritage Building, $7.8m
- UWS Student Accommodation Penrith & Campbelltown, $24.8m
- New College Postgraduate Student Accommodation, $34m
- Telstra, Liverpool & Mascot Substations

QUALIFICATIONS

Bachelor of Civil Engineering

Diploma in Engineering Practice

Bachelor of Construction Management

REFEREES

Marty Smith M: 0428 144 352
School Infrastructure NSW

8

YEARS EXPERIENCE

8

YEARS WITH LIPMAN

LACHLAN RYAN – PROJECT ENGINEER

CAREER SUMMARY

Since joining Lipman, Lachlan has gained valuable experience having been involved with a diverse range of projects in the commercial/residential and industrial sectors. Since becoming Project Engineer, he continues to develop his construction knowledge, procurement and subcontractor management skills as well as client relations.

Lachlan is a reliable, enthusiastic and hardworking professional with a constant thirst for personal development who shows a thorough understanding of all facets of subcontractor management and site coordination, ensuring that he is a pivotal member of the project team.

Lachlan's attention to detail, along with his careful and constant monitoring of the design, procurement and construction programs, makes him a key asset to the project team. Lachlan is a highly motivated and committed individual, whose diligence in upholding Lipman's core values assists to ensure that client expectations are exceeded time and time again.

EXPERIENCE

2018 - Present | Project Engineer, Lipman
Assists the Project Manager and Site Manager with design, administration, cost control, time management and quality management.

2015 - 2018 | Project Coordinator, Lipman

2014 - 2015 | Project Cadet, Lipman

KEY PROJECTS

- Parramatta Aquatic & Leisure Centre, $70m
- Anglicare SAHF Liverpool, $48m
- Tweed Hospital Holding Works. $3m
- Gallipoli RACF, Auburn. $28m
- Veolia Banksmeadow Waste Transfer Terminal. $18m
- Trinity Grammar School Aquatic Centre, Summer Hill. $25m
- St John's Residences, Paddington. $12.8m
- Anglicare Woodberry Village, Winston Hills. $16.7m

QUALIFICATIONS

Bachelor Degree in Civil Engineering

REFEREES

David Cummins M: 0450 303 047
CBRE

Curriculum Vitae

Warren Smith
Consulting Engineers

James Georgiades

Team Leader - Urban Development

Phone: +61 9299 1312
Mobile: +61 406 649 228
Email: jgeorgiades@warrensmith.com.au
Nationality: Australian

EXPERIENCE

2021 – Current
Team Leader – Urban Developer
Warren Smith Consulting Engineers

2015 – 2021
Associate Civil Engineer (2020 – 2021)
Senior Civil Engineer (2018 – 2020)
Civil Engineer (2017 – 2018)
Graduate Civil Engineer (2015 – 2017)
Woolacotts Consulting Engineers

July 2013 – December 2014
Construction Site Engineer
Alpene Group – Concrete & Structures Contractors

EDUCATION

- Bachelor of Engineering (Civil) Hons, Diploma in Engineering
  Practice University of Technology, Sydney. 2010 – 2014
- CPEng, NER Civil – Membership No. 5219706
- Member of Engineers Australia (MIEAust)
- BSB41415 Certificate IV in Work Health and Safety
  Training Aid Australia Pty Ltd 2016

KEY PROJECTS

Some of the more significant projects currently in progress and successfully undertaken and completed with involvement of James include:-

Educational and Tertiary

1. The Governors Centre For Excellence
2. Schofields Public School
3. Bella Vista Public School
4. Marist Kogarah, Art and Learning Centre
5. Cammeraygal High School
6. St Pius X College, New Learning Hub, Chatswood
7. NSW Secondary Schools Renewal Program
8. Cherrybrook Technology High School
9. Corrimal High School
10. Rainbow Street Public School Upgrade
11. Randwick Public School
12. Homebush West Public School
13. Bardia Public School Upgrade
14. Alexandria Park Community School Redevelopment

15. Ku Lance Community Preschool
16. Curl Curl North Public School
17. Proposed Sports Hall, Frensham School, Mittagong
18. Monaro High School Redevelopment
19. Riverbank Public School
20. Alexandria Park Community School Peer Review
21. Penshurst Public School

Community Infrastructure

1. Childcare Centre, City of Sydney
2. Coptic Church, Macquarie Fields
3. Church of Scientology, Chatswood
4. New Amenities Building at Campbell Park Chiswick
5. Review of proposed GPT Upgrade at Boundary Creek
6. Civic Park Pendle Hill
7. North Sydney Public Domain
8. Leichhardt and Camperdown Precincts Public Domain Masterplan
9. Eagle Stadium, Werribee VIC
10. Todd Park Aquatic & Leisure Centre
11. Sydney Olympic Park
12. Mick Doohan Reserve, Oran Park

Justice and Emergency

1. Clarence Correctional Centre
2. Parklea Correctional Centre
3. Outer Metropolitan Multi-Purpose Correctional Centre
4. Bathurst, Outer Metropolitan, Dillwynia, Cessnock Prisons
5. Dame Phyllis Frost Centre, Deer Park
6. Truganina MRC Infill Expansion
7. OMMPCC Demountables
8. Wellington Pop Up Correctional Centre

Health and Aged Care

1. Southern Cross Aged Care, Dandenong
2. Kiama Hospital Community Health Services Facility and Port Kembla Hospital
3. Port Macquarie Nursing Home
4. Cooranbong Aged Care Facility 383 Freemans Drive, Cooranbong

Industrial

1. Industrial Building at Yulong Close, Moorebank NSW
2. Goodman Fielder, Moorebank
3. RAAF Base Williamtown
4. Warehouse Extension, Lidcombe
5. Bunnings Rozelle

APPENDIX H – Unexpected Finds – Remediation Action Plan

Note: Environmental Consultant for St Anthony's of Padua is Alliance Geotechnical and Environmental Solutions.

Below flowchart has been extracted from the 'Revised Remediation Action Plan' by Alliance Geotechnical and Environmental Solutions dated 8/7/2022.

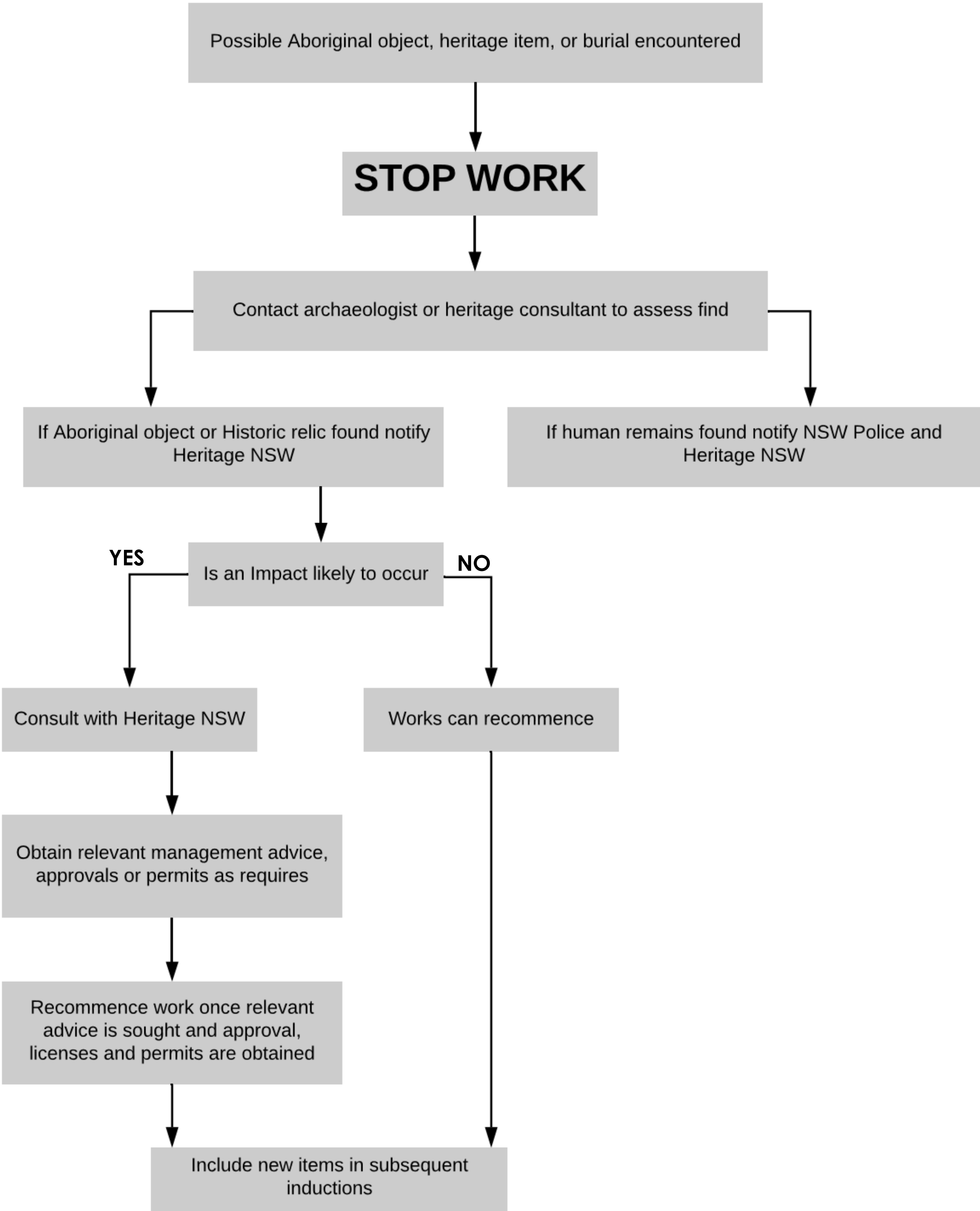

Figure 4: Decision Flowchart for Unexpected Aboriginal Finds

Unexpected Finds Protocol

In the event of an unexpected find, immediately cease work and contact the site foreman.

Site foreman to construct temporary high visibility barricading to prevent worker access to the area. Foreman to apply appropriate stormwater/sediment control measures.

Site foreman to take arrange an inspection by the Environmental Consultant

Environmental Consultant to undertake a detailed site inspection and collect representative samples for analysis as per documented sampling procedures outlined in this RAP.

Environmental Consultant to assess field screening and/or laboratory analytical results against documented site Clean-Up criteria outlined in this RAP

If substance is assessed as not presenting a risk to human health, then:

Site foreman to remove safety barricades and environmental controls and continue works

If substance is assessed as presenting a risk to human health, then:

Note: Results of testing and disposal location to be advised to the planning secretary

Environmental Consultant to supervise remediation & undertake validation sampling as required. An addendum to this RAP may be required.

Site foreman to remove safety barricades and environmental controls and continue works

Environmental Consultant to submit an assessment/validation/clearance to site foreman for distribution to Client and appropriate regulatory authorities.

APPENDIX I – Geotechnical Report

Geotechnical Investigation

Project

Proposed St Anthony Padua School Development - Stage 4
160 Eleventh Avenue, Austral NSW

Prepared for

Carmichael Tompkins Property Group

Date

13 July 2021

Report No

12483-GR-1-1

alliance
geotechnical & environmental solutions

Alliance Geotechnical Pty Ltd

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DOCUMENT CONTROL

Revision	Date	Description	Author	Reviewer
0	13 July 2021	Original Issue	SM	HA
A	24 September 2021	Revised to include cored boreholes and updated foundation and excavation conditions advice only	HP	

REVISION 0

	Author	Reviewer
Signature		
Name	Sahar Mamouri	Hadi Ajorlou
Title	BE (Civil), ME(Geotech) CPEng NER Senior Geotechnical Engineer	BE (Civil), ME(Geotech) CPEng NER Senior Geotechnical Engineer

REVISION A

	Author	Reviewer
Signature		
Name	Harshan Panchalingam	Lachlan Taylor
Title	BE (Civil), MEngSc(Geotech) Associate Geotechnical Engineer	BE(Civil) MIEAust CPEng NER Principal Geotechnical Engineer

Contents

Appendices

1 INTRODUCTION

This report presents the results of a geotechnical investigation undertaken by Alliance Geotechnical (Alliance) for Carmichael Tompkins Property Group (the Client) for St Anthony Padua School Development - Stage 4 at 160 Eleventh Avenue, Austral NSW (the site). Two recent investigations have been completed at this site. The first was undertaken in accordance with the scope of works outlined in Alliance's Estimate No. 4503, dated 17 February 2021. The second was undertaken in accordance with the scope of works outlined in Alliance's Estimate No. 5210, dated 19 July 2021. Alliance notes that the second investigation allowed for an additional day of investigation with up to a maximum of four cored boreholes, but due to time limitations only three were completed.

The proposed development includes the construction of a new three storey building (proposed years 5-12), including a lower ground built into the sloping land.

An older previous geotechnical investigation was undertaken at this site by Alliance Geotechnical in 2019 (ref. 6930-GR-1-1, dated 13 April 2018). The findings of the geotechnical investigation for 135-165 Tenth Avenue and 140 - 170 Eleventh Avenue, along with comments and recommendations regarding the proposed development were provided in this geotechnical report. During the previous geotechnical investigation, Alliance drilled 14 boreholes which four of them were located within Stage 4 footprint.

It is understood that the proposed development requires a geotechnical investigation to provide geotechnical design parameters for the structural design of footings and retaining structures.

The purpose of this report was to provide recommendations regarding:

- Existing geotechnical and groundwater conditions;
- Site Preparation and earthworks advice, including reuse of site won material
- Excavation conditions and temporary shoring system;
- Vibration management;
- Geotechnical design parameters for shallow and deep footings and retaining structures;
- Earthquake action recommendations in accordance to AS 1170.4
- Site classification in accordance with AS 2870;
- Soil aggresivity in relation to concrete and steel structures.

To achieve the project objectives, the following scope of work was carried out for the geotechnical investigation:

- Review of the geological maps and the provided drawings;
- Site walkover inspection by a geotechnical engineer;
- The drilling of 12 boreholes to a maximum depth of 2.4m;
- The drilling of 3 boreholes with at least 3m of rock core and point load strength index testing;
- Standard Penetration Tests (SPTs) in 1.5m depth intervals;
- Dynamic Cone Penetrometer (DCP) tests and Standard Penetration Tests (SPTs) to assess the soil consistency.

The results of this geotechnical investigation are provided in this report.

2 SITE DESCRIPTION & REGIONAL GEOLOGY

2.1 Site Location & Description

The site is located at 160 Eleventh Avenue, within the semi-rural area of Austral. The general site location is shown in Figure 1.

Figure 1- Site Location (extracted from Nearmap)

The site is located on a hill sloping towards Kemps Creek located approximately 300m to the southwest.

The site is bounded by semi-rural properties to the east, Eleventh Avenue to the north, Fourth Avenue to the west and Tenth Avenue to the south.

Alliance notes that the site investigation was limited to the footprint of the proposed years 5-12 buidling. At the time of carrying out the investigation, the site was covered by grass and trees with a few semi-rural dwellings on each lot. The site photos taken during the fieldwork are enclosed in Appendix A.

The site is located within an undulating terrain. The survey plan indicates that the current surface levels vary by approximately 5m over a distance of 250m. The highest section of the site is at an approximate RL 73m at the north-eastern side and varies to RL 68 m at the south-western corner. As such, the site has a general slope of 2 degrees to the southwest. It should be noted that all the real levels shown in this report are relative to AHD.

2.2 Regional Geology

The 1:100,000 NSW Department of Mineral Resources Geological Map of the Penrith Region indicates the site is underlain by Bringelly Shale (Rwb) of the Mesozoic dating back to the middle Triassic period.

The formation is described as *shale, carbonaceous claystone, claystone, laminate, fine to medium-grained lithic sandstone, rare coal and tuff.*

Bringelly Shale is a component of the Wianamatta group of sedimentary rocks in the Sydney basin. Residual soils derived from Bringelly Shale typically comprise high plasticity clays.

The investigation confirmed that the site is underlain by residual soils overlaying the Bringelly Shale unit. Figure 2 shows the site location on an extract of the geological map.

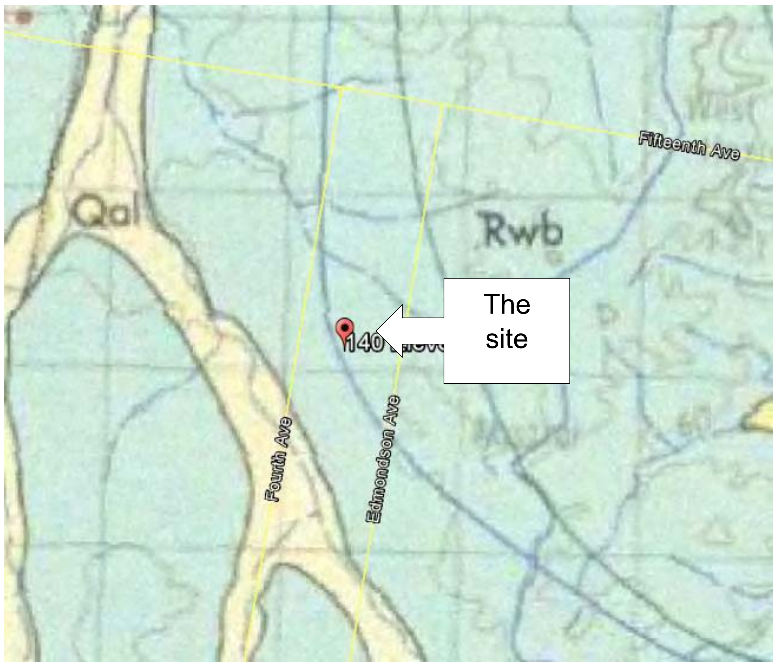

Figure 2- Site Location on Extract of Penrith Geological Map

3 FIELDWORK

3.1 Methods

The first phase of geotechnical site investigation was carried out over two days on 29 and 30 June 2021. The second phase was carried out on 26 August 2021. Selected site photographs taken during the fieldwork are presented in Appendix A.

The first phase of investigation comprised the drilling of four boreholes using a ute-mounted drilling rig operated by Alliance. Boreholes were advanced through the soil profile using solid flight augers fitted with a tungsten carbide bit (TC-bit). The boreholes were terminated upon refusal on hard material inferred as bedrock. Standard Penetration Tests (SPT) were undertaken at 1.5m depth intervals. Dynamic Cone Penetrometer (DCP) tests were undertaken beside the boreholes to assess the consistency of the near surface soil layers.

The second phase of investigation comprised the drilling of three boreholes using a Hanjin D&B 8D track mounted drilling rig operated by a subcontractor. Boreholes were advanced through the soil profile using solid flight augers fitted with a tungsten carbide bit (TC-bit) and continued in the underlying bedrock using NMLC coring methods. Point load strength index testing was completed on rock core at approximately 1m intervals or less. The boreholes were terminated at target depths.

The soil and rock materials encountered in the boreholes were logged by an experienced geotechnical engineer from Alliance.

The approximate borehole locations are shown on the Geotechnical Investigation Plan (Drawing 12483-GR-1-A) presented in Appendix B. The borehole log sheets are attached in Appendix C. These log sheets should be read in conjunction with the attached Explanatory Notes, which explain the terms, abbreviations and symbols used, together with the interpretation and limitation of the logging procedure.

3.2 Subsurface Conditions

A summary of the subsurface geotechnical units encountered is provided in Table 1. Reference to the individual borehole log sheets should be made for a full description of the subsurface conditions encountered at each borehole location.

Generally, the site subsurface profile comprises topsoil underlain by residual clay layers of various consistency (firm to hard) to a maximum depth of 3.5m underlain by shale bedrock. Based on the recovered soil cuttings, the bedrock was inferred to be highly weathered and very low strength .

3.3 Groundwater

Groundwater seepage was not observed during the auger drilling of the boreholes. However, it should be noted that groundwater seepage condition is subject to seasonal and climatic conditions and may vary across the site. It is expected the groundwater seepage occurs through the interface of residual soil and bedrock. Referring to the site topography and location, it may flow towards the southwest.

Table 1 - Summary of Subsurface Profile

Ground Profile	Consistency/ Strength	Borehole					
		BH01	BH02	BH03	BH04	BH5	BH6
Topsoil: Silty CLAY	--	0.0 – 0.3	0.0 – 0.2	0.0 – 0.1	0.0 – 0.2	0.0 – 0.2	0.0 – 0.2
Residual soil: CLAY	Firm	0.3 – 0.6	0.2 – 0.5	-	-	-	-
	Stiff	0.6 – 1.1	0.5 – 1.5	-	-	-	-
	Very Stiff	-	-	0.1 – 1.3	0.2 – 0.6	0.2 – 0.4	0.2 – 1.6
	Hard	-	-	-	0.6 – 1.2	0.4 – 1.0	-
Extremely to Highly Weathered Bedrock: SHALE	Hard to Very low strength	1.1 – 2.2	1.5 – 2.4	1.3 – 2.3	1.2 – 1.7	1.0 – 2.1	1.6 – 2.4

Ground Profile	Consistency/ Strength	Borehole					
		BH7	BH08	BH09	BH10	BH11	BH12
Topsoil: Silty CLAY	--	0.0 – 0.1	0.0 – 0.2	0.0 – 0.2	-	-	-
Fill: sand/silty CLAY, **well compacted**	Equivalent to medium dense	-	-	-	0.0 – 0.4	00 - 0.3	0.0 – 0.01
Residual soil: CLAY	Firm	-	-	-	-	-	-
	Stiff	-	-	-	-	-	-

	Very Stiff	0.1 – 1.3	0.2 – 0.9	0.2 – 1.5	0.4 -1.2	0.3 – 0.8	0.1 – 1.1
	Hard	-	-	-	-	-	-
Extremely to Highly Weathered Bedrock: SHALE	Hard to Very low strength	1.3 – 1.9	0.9 – 2.0	1.5 – 1.7	1.2 – 2.0	0.8 – 1.6	1.1 – 2.0

Ground Profile	Consistency/ Strength	Borehole		
		BH101	BH102	BH103
Topsoil: Silty CLAY	--	0.0 – 0.2	0.0 – 0.1	0.0 – 0.4
Residual soil: CLAY	--	0.2 – 1.6	0.1 – 2.0	0.4 – 3.5
Extremely to Highly Weathered Bedrock: SHALE	Hard to Very low strength	1.6 – 6.0	2.0 – 4.3	3.5 – 6.1
Moderately Weathered Bedrock: SHALE, highly weathered in parts, some clay seams	Low to high	6.0 – 8.8	4.3 – 7.4	6.1 – 11.0

4 L ABORATORY RESULTS

Three soil samples were sent to our NATA accredited laboratory for determination of their moisture content, Atterberg limits, and linear shrinkage. A summary of the test results is presented in Table 2. The laboratory test certificates are in Appendix E.

Table 2 - Summary of the Atterberg Limit Test

Sample Location	Moisture Content (%)	Liquid Limit (%)	Plastic Limit (%)	Plastic Index (%)	Linear Shrinkage (%)
BH01 0.5m-0.9m	23.7	55	16	39	10.0
BH08 0.3m-0.8m	19.4	63	16	47	10.5
BH10 0.6m-1.2m	18.1	65	21	44	14.5

Three soil aggressivity tests were performed for the purposes of durability design of concrete and steel piles in soil. The results are summarised in Table 3 and the laboratory test certificate and detailed results can be found in Attachment E.

Table 3- Soil Aggressivity Test Results

Test	Unit	**BH01 0.3m-0.8m BGL** Residual – clay	**BH08 0.3m-0.5m BGL** Residual – clay	**BH10 0.4m-0.6m BGL** Residual – clay
Chloride	mg/kg	330	55	390
Conductivity(1)	uS/cm	230	54	320
pH(1)	pH	5.6	6.1	5.1
Resistivity	Ohm.cm	4400	19000	3100
Sulfate (as SO_4)	mg/kg (ppm)	120	29	280
Moisture	%	13	8.8	7.7

Results(2)	In relation to concrete piles in soil	Non-Aggressive	Non-Aggressive	Mild
	In relation to steel piles in soil	Non-Aggressive	Non-Aggressive	Non-Aggressive

(1): Tests were undertaken on a 1:5 aqueous extract at 25°C as recorded.
(2): Assessed in accordance with AS 2159 – 2008, Table 6.4.2 (C) and Table 6.5.2 (C)

5 COMMENTS AND RECOMMENDATIONS5.1 Proposed development

Alliance was provided with the following documents by the client:

- Site survey plan, ref. No. 41240DT, sheet 1 to 11, prepared by LTS Lockley, dated 17/10/2014;
- A set of architectural drawings prepared by DWP, dated April 2021.

Based on the provided drawings, it was understood that the proposed development involves the construction of a three-storey building over a lower ground floor level which would be a cut in the slope. The lower ground floor finished level is at RL 69.1m. Assuming a 300mm excavation for structural slabs, the maximum excavation depth is approximately 4.3m below the existing ground surface.

The proposed excavation setback is more than 10m from the site boundaries.

5.2 Excavation Conditions

Based on the encountered subsurface conditions (summarised in Table 1), the lower ground excavation to an approximate depth of 4.2m, is anticipated to encounter stiff to hard residual clay and very low to low strength shale.

Excavations through the overlying soils are expected to be readily achievable using conventional earthworks equipment such as a tracked excavator with a tiger-toothed bucket. Due to natural ground variability and the presence of sandstone beds within the unit, the excavation may encounter low to medium strength rock close to the bottom of the excavation. This may require larger excavators (i.e. 30 tonnes) or the use of ripping.

The maximum 5 mm/s vibration limit is expected to be achieved provided that rock breaker equipment and excavation methods are restricted as indicated in Table 4.

Table 4 - Recommendations for Rock Breaking Equipment

Distance from Adjacent Structure (m)	Maximum Peak Particle Velocity 5 mm/s	
	Equipment	Operating Limit (% of Maximum Capacity)
1.5 to 2.5	hand-operated jack-hammer only	100
2.5 to 5.0	300 kg Rock Hammer	50
5.0 to 10.0	300 kg Rock Hammer or 600 kg Rock Hammer	100 50

If the encountered ground conditions are not in the line with the findings of this investigation, the project geotechnical engineer should be informed prior to advancing the construction works.

A dilapidation survey on nearby structures and infrastructure is recommended to be undertaken by a structural engineer prior to the commencement of any site excavations. The report should include precise measurements of the existing defects and cracks presented with the relevant photos.

5.3 Groundwater Control

Based on the findings of this investigation, groundwater is not anticipated to be encountered during the construction works. However, the observations were not based on long-term groundwater monitoring. Groundwater seepage may fluctuate with seasonal weather patterns. As such, the construction should be planned to manage seepage and surface runoff during the lower ground level excavation.

Minor seepage encountered during the excavation works could be controlled and managed by using simple sump pumping techniques. If significant groundwater seepage during construction be encountered, the project geotechnical engineer should be notified prior to carrying out any dewatering. It may also be required to install a shoring system prior to advancing the excavation if significant groundwater inflow be encountered during the excavation works.

Following the completion of construction, groundwater seepage should be controlled by an appropriately designed drainage system, including sub-floor drainage, to create a free-draining layer below the slab. Provision should be made in the design for a suitable long-term drainage system around the basement structure to avoid hydrostatic pressure built up between the slab and the soil.

5.4 Temporary Batter Slopes

Generally, the feasibility of adopting unsupported batter slopes will depend on the footing level of the adjoining structures and infrastructure, surrounding services invert levels, and should be assessed by a structural engineer. Given the proposed excavation setback from the site boundaries, the unsupported batter slope is considered feasible for the excavation.

Temporary batter slopes in the soil should not be extended below the ‘zone of influence’ of any adjacent structures, road and infrastructure (i.e. a 45° line drawn from the foundation level of any adjacent structure and infrastructure). The recommended maximum temporary batter slopes are presented in Table 5.

Table 5 - Maximum Recommended Dry Batter Slope Angles

Material	Maximum Dry Batter Slope (H: V)
	Temporary
Residual Soil: firm clay	2: 1
Residual Soil: stiff to hard clay	1: 1*
Very low to low strength shale	1: 2**

***Any temporary cuts in soils should be covered to maintain natural moisture and could remain unsupported for a duration of 3 to 4 weeks.**

**** Subject to inspection by a Geotechnical Engineer and carrying out remedial works if recommended (shotcrete, rock bolting, etc.).**

Surface protection of the batter faces will be needed to prevent erosion, loss of surface moisture and materials if it is proposed to leave the cut open for more than a week. The above-recommended batter slope is suitable for up to one month based on the provision that no surcharge is located along/near the cut crest and also there would not be any extended rainfall. Where excavations are proposed to be opened for an extended duration, the excavation support systems, must be considered.

5.5 Retaining Structures

Wherever temporary unsupported battered slopes are not feasible or desired, the proposed excavation should be supported by a properly designed shoring system along the site boundaries. One option for the shoring system would be a soldier pile wall with reinforced shotcrete infill panels. Weep holes or strip drains (e.g. vertical drains) must be provided behind the shotcrete to avoid a build-up of hydrostatic pressure in the retained strata that may cause a failure of the retaining structure. The shoring system piles would need to be extended below the proposed base excavation level. It is recommended that the minimum depth of embedment of the piles be 0.5m or one pile diameter, whichever is greater. The final socket depth of the shoring system should be determined by the design engineer based on the stability of the shoring wall and the applied lateral loads.

The stability of the shoring system may be provided by designing cantilever shoring piles or ground anchors.

The temporary shoring system or permanent retaining wall, should be designed in accordance with AS 4678 Earth Retaining Structures. If it is critical to limit the horizontal deformation an earth pressure coefficient 'at rest' (K_0) should be adopted. Where minor deflections are acceptable, active earth pressure coefficient (K_a) can be adopted. Since it is required to limit the horizontal soil deformation, an earth pressure coefficient of 'at rest' (K_0) should be adopted. Recommended design parameters for the design of temporary and permanent support are provided in Table 6 below.

Loads on cantilevered or singular braced / anchored retaining walls can be calculated based on a triangular earth pressure distribution. Loads on multi braced / anchored retaining walls can be calculated based on a pressure distribution of 6H if minor movement can be tolerated or 8H if minimal movement is required (where H is the height of the retained strata).

Table 6 – Recommended Parameters for Retention Design

Geotechnical Units	Depth	γ (kN/m^3)	c_u (kPa)	c' (kPa)	Φ' (degrees)	K_a	K_p	K_o	E' (MPa)	ν
Residual CLAY, firm	Refer to borehole logs and Table 1	17	25	2	24	0.39	2.56	0.5**6**	8	0.3
Residual CLAY, stiff		18	50	5	26	0.39	2.56	0.56	15	0.3
Residual **CLAY, very stiff**		19	100	7	28	0.36	2.77	0.53	30	0.3
Residual CLAY, hard		20	200	10	28	0.36	2.77	0.53	60	0.3
Bedrock: very low strength shale		23	400	50	28	0.36	2.77	0.53	50	0.3

Legend:
γ: Bulk Unit Weight
C_u: Undrained Cohesion
c': Effective Cohesion
$\emptyset'$: Effective Friction Angle

Ka: Active earth pressure
Kp: Passive earth pressure
Ko: Earth pressure at rest
E': Elasticity Modulus
ν: Poisson's Ratio

5.6 Footing Recommendations

5.6.1 Site Classification

FBased on the geological profile underlying the site, the site would be classified as Class H1 in accordance with AS2870-2011 “Residential Slabs and Footings”. Class H1 sites are described as highly reactive clay sites which may experience high ground movement from moisture changes with an estimated characteristic surface movement (ys) between 40mm and 60mm. The above classification has been given based on the current subsurface conditions encountered and any further regrading or earthworks may result in a need for the classification to be reassessed.

5.6.2 Shallow and Deep Footings

Given the proposed building layout, the lower ground floor and ground floor will be partially overlying residual soils and partially overlying extremely to highly weathered bedrock. To limit the effects of differential settlements, Alliance recommends that all footings be founded on the same geotechnical unit. Differential settlements also need to be considered if footings of different sizes within the same unit are adopted.

Shallow footings can be designed based on the parameters provided in Table 7. The settlements can be calculated based on the applied loads and final footing sizes.

Table 7 –Geotechnical Design Parameters for Shallow Pad/Strip Footings

Foundation Material	Minimum embedment depth (mm)	Bearing Pressure to limit settlement to <1% of minimum footing dimension (kPa)	Design Young’s Modulus (MPa)
Extremely to Highly Weathered Bedrock: SHALE, hard consistency to very low rock strength	300	700	50

If raft slabs are sought, settlements should be calculated considering the applied loads, depths and raft slab geometry. The above-provided parameters are not sufficient for the design of a raft footing.

The geotechnical design parameters for pile footings presented in Table 8 may be adopted.

Table 8 - Geotechnical Design Parameters for Pile Footings

Material	Effective Cohesion c’ (kPa)	Effective Internal Angle of Friction (degrees)	Bulk Unit Weight (kN/m^3)	Bearing Pressure to limit settlement to <1% of minimum footing dimension (kPa)	Allowable Shaft Adhesion (kPa)	Design Young's Modulus E' (MPa)
Extremely to Highly Weathered Bedrock: SHALE, hard consistency to very low rock strength	50	25	22	700	50	50
Moderately Weathered Bedrock: SHALE, highly weathered in parts, some clay seams (low strength)	NA	NA	24	1500	150	200

It should be noted that shaft adhesion is applicable to the length of the pile socketed into the target material, and piles should have a minimum socket depth of one pile diameter into the target foundation unit.

Pile design should incorporate an appropriate geotechnical strength reduction factor assessed in accordance with the requirements of Australian Standard “AS 2159-2009 Piling – Design and Installation”.

Bored piles are a suitable construction method for deep footings. If bored piles are adopted, the drilling and or excavations should be inspected by an experienced geotechnical engineer before concrete is poured to confirm the material and design parameters above, and also to confirm that the base of the footing excavations/pile holes are clean and free of soft, loose, wet or disturbed soils.

5.7 Construction Inspections

The inspections during the excavation should be undertaken in 2m intervals to assess the stability of the unsupported slopes and provide recommendations for any remedial works if required, particularly if a significant groundwater inflow be encountered.

5.8 Subgrade Preparation

The following general recommendations are provided for subgrade preparation for earthworks, pavements, slab-on-ground construction, and minor structures in cohesive soils:

- Strip existing fill and topsoil. Remove unsuitable materials from the site (e.g. material containing deleterious matter). Stockpile remainder for re-use as landscaping material or remove from site.
- Excavate residual clayey soils and rock, stockpiling for re-use as engineered fill or remove to spoil. Rock could be stockpiled separately from clayey soils, for select use beneath pavements.
- Where rock is exposed in bulk excavation level beneath pavements, rip a further 150mm.
- Where rock is exposed at footing invert level, it should be free of loose and softened material before concrete is poured.
- Where soil is exposed at bulk excavation level, compact the upper 150mm depth to a dry density ratio (AS1289.5.4.1–2007) not less than 100% Standard.
- Areas that show visible heave under compaction equipment should be over-excavated a further 0.3m and replaced with approved fill compacted to a dry density ratio not less than 100%.

Further advice should be sought where the filling is required to support major structures.

Any waste soils being removed from the site must be classified in accordance with current regulatory authority requirements to enable appropriate disposal to an appropriately licensed landfill facility.

5.9 Filling

If it is necessary to place and compact fill materials to establish the ground levels, all fill should be placed as defined in Australian Standard “AS 3798 -2007– Earthworks for residential and commercial developments”. All the fills should be a controlled fill for the later reclassify of the fill.

Filling materials should not contain vegetation or other organic matter. It is recommended that all compaction control testing in areas that will support structures and pavements be undertaken under appropriate supervision by an approved GITA.

Where a filing is required, place in horizontal layers over prepared subgrade and compact as per Table 9.

Table 9 – Compaction Specifications

Parameter	Cohesive Fill	Non-Cohesive Fill
Fill layer thickness (loose measurement): • Within 1.5m of the rear of retaining walls • Elsewhere	 0.2m 0.3m	 0.2m 0.3m
Density: • Beneath Pavements • Beneath Structures • Upper 150mm of subgrade	 ≥ 95% Std ≥ 98% Std ≥ 100% Std	 ≥ 70% ID ≥ 80% ID ≥ 80% ID
Moisture content during compaction	± 2% of optimum	Moist but not wet

Filling within 1.5m of the rear of any retaining walls should be compacted using lightweight equipment (e.g. hand-operated plate compactor or ride-on compactor not more than 3 tonnes static weight) to limit compaction-induced lateral pressures.

Site won material comprising high plasticity clay are not suitable material as an engineered fill. High plasticity clay is prone to swell and shrink following moisture changes and may experience settlement in long term. As such, clayey materials may be used for general filling for the purposes of landscaping or non-structural fill material. General filling with a compaction ratio of less than 98%, cannot be relied on as appropriate foundation strata for the shallow footings, to support pavement and subgrades.

Granular fill is preferred although clay soils may be suitable for general filling provided, they are of low to medium plasticity. The maximum particle size for any placed fill should be a 75mm nominal diameter. The granular fill shall be compacted to achieve a minimum density ratio of 70%. If it is proposed to use fine grained material, it should be low to medium plasticity clay with Plasticity Index (PI) less than 30%.

Design of pavements, driveways and other surfacing constructed on filled ground will need to cater for steps that would develop between such features and adjacent buildings founded on piles to bedrock. Flexible buried services should also be incorporated in the development, with consideration of differential movement where services cross beneath piled buildings. Furthermore, site drainage design should provide for steeper grades than normal to allow for future settlements.

Any soils to be imported onto the site for backfilling and reinstatement of excavated areas should be free of contamination and deleterious material and should include appropriate validation documentation in accordance with current regulatory authority requirements which confirms its suitability for the proposed land use

5.10 Subsoil Classification

Determination of the Site Sub-Soil Classification has been carried out in accordance with AS1170.4-2007 Structural Design Actions Part 4: Earthquake Actions in Australia.

Since the surface layer comprising soil profile and highly weathered very low strength shale is not more than 3m, the site is classified as Class B_e – Rock.

A Hazard Factor, z, of 0.08 for Sydney region is recommended.

6 LIMITATIONS

Alliance Geotechnical Pty Ltd (Alliance) has prepared this report in accordance with our fee proposal and Terms of Engagement. This geotechnical report has been prepared for Carmichael Tompkins Property Group for this project and for the purposes outlined in this report. This report cannot be relied on for other projects, other parties on this site or any other site. The comments and recommendations provided in this report are based on the assumption that the geotechnical recommendations contained in this report will be fully complied with during the design and construction of the proposed site development

The borehole investigation and testing results provided in this report are indicative of the subsurface conditions at the site only at the specific sampling and testing locations, and to the depths drilled at the time of the investigation. Subsurface conditions can change significantly due to geological and human processes. Where variations in conditions are encountered further geotechnical advice should be sought from Alliance.

APPENDIX A – Site Photograph

Photo 1 – General Site Overview – Borehole BH10 Location

APPENDIX B – Geotechnical Investigation Plan

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Site Plan Scale 1:1,000 on A3

Client Name:	Carmichael Tompkins Property Group	N 0 12.5 25 Metres	Figure Number:	12483-GR-1-A
Project Name:	St Anthony of Padua		Figure/Drawing Date:	20/09/2021
Project Location	140 Eleventh Avenue, Austral NSW		Report Number:	12483-GR-1-1

APPENDIX C – Borehole Logs & Explanatory Notes

Explanatory Notes
Drill & Excavation Logs

GENERAL

Information obtained from site investigations is recorded on log sheets. Soils and very low strength rock are commonly drilled using a combination of solid-flight augers with a Tungsten-Carbide (TC) bit. Descriptions of these materials presented on the “Borehole Log” are based on a combination of regular sampling and in-situ testing. Rock coring techniques commences once material is encountered that cannot be penetrated using a combination of solid-flight augers and Tungsten-carbide bit. The "Cored Borehole Log" presents data from drilling where a core barrel has been used to recover material - commonly rock.

The "Excavation - Geological Log" presents data and drawings from exposures of soil and rock resulting from excavation of pits or trenches.

The heading of the log sheets contains information on Project Identification, Hole or Test Pit Identification, Location and Elevation. The main section of the logs contains information on methods and conditions, material description and structure presented as a series of columns in relation to depth below the ground surface which is plotted on the left side of the log sheet. The scale is presented in the depth column as metres below ground level.

As far as is practicable the data contained on the log sheets is factual. Some interpretation is included in the identification of material boundaries in areas of partial sampling, the location of areas of core loss, description and classification of material, estimation of strength and identification of drilling induced fractures, and geological unit. Material description and classifications are based on Australian Standard Geotechnical Site Investigations: AS 1726 - 2017 with some modifications as defined below.

These notes contain an explanation of the terms and abbreviations commonly used on the log sheets.

DRILLING

Drilling, Casing and Excavating

Drilling methods deployed are abbreviated as follows

AS	Auger Screwing
ADV	Auger Drilling with V-Bit
ADT	Auger Drilling with TC Bit
BH	Backhoe
E	Excavator
HA	Hand Auger
HQ	HQ core barrel (~63.5 mm diameter core) *
HMLC	HMLC core barrel (~63.5 mm diameter core) *
NMLC	NMLC core barrel (~51.9 mm diameter core) *
NQ	NQ core barrel (~47.6 mm diameter core) *
RR	Rock Roller
WB	Wash-bore drilling

* Core diameters are approximate and vary due to the strength of material being drilled.

Drilling Fluid/Water

The drilling fluid used is identified and loss of return to the surface estimated as a percentage. It is introduced to assist with the drill process, in particular, when core drilling. The introduction of drill fluid/water does not allow for accurate identification of water seepages.

Drilling Penetration/Drill Depth

Core lifts are identified by a line and depth with core loss per run as a percentage. Ease of penetration in non-core drilling is abbreviated as follows:

VE	Very Easy
E	Easy
F	Firm
H	Hard
VH	Very Hard

GROUNDWATER LEVELS

Date of measurement is shown.

Standing water level measured in completed borehole

Level taken during or immediately after drilling

Groundwater inflow water level

SAMPLES/TESTS

Samples collected and testing undertaken are abbreviated as follows

ES	Environmental Sample
DS	Disturbed Sample
BS	Bulk Sample
U50	Undisturbed (50 mm diameter)
C	Core Sample
SPT	Standard Penetration Test
N	Result of SPT (*sample taken)
VS	Vane Shear Test
IMP	Borehole Impression Device
PBT	Plate Bearing Test
PZ	Piezometer Installation
HP	Hand Penetrometer Test
HB	Hammer Bouncing

EXCAVATION LOGS

Explanatory notes are provided at the bottom of drill log sheets. Information about the origin, geology and pedology may be entered in the "Structure and other Observations" column. The depth of the base of excavation (for the logged section) at the appropriate depth in the "Material Description" column. Refusal of excavation plant is noted should it occur. A sketch of the exposure may be added.

MATERIAL DESCRIPTION – SOIL

Material Description - In accordance with AS 1726-2017

Classification Symbol - In accordance with the Unified Classification System (AS 1726-2017).

Abbreviation	Typical Names
GW	Well-graded gravels, gravel-sand mixtures, little or no fines.
GP	Poorly graded gravels and gravel-sand mixtures, little or no fines, uniform gravels
GM	Silty gravels, gravel-sand-silt mixtures
GC	Clayey gravels, gravel-sand-clay mixtures.
SW	Well graded sands, gravelly sands, little or no fines.
SP	Poorly graded sands and gravelly sands; little or no fines, uniform sands.
SM	Silty sand, sand-silt mixtures.
SC	Clayey sands, sand-clay mixtures.
ML	Inorganic silts and very fine sands, rock flour, silty or clayey fine sands or clayey silts with slight plasticity
CL, CI	Inorganic clays of low to medium plasticity, gravelly clays, sandy clays, silty clays, lean clays.
OL	Organic silts and organic silty clays of low plasticity. *
MH	Inorganic silts, micaceous or diatomaceous fine sandy or silty soils, clastic silts.
CH	Inorganic clays of high plasticity, fat clays
OH	Organic clays of medium to high plasticity, organic silts. *
Pt	Peat and other highly organic soils. *

* Additional details may be provided in accordance with the Von Post classification system (1922).

Organic Soils - Identification using laboratory testing:

Material	Organic Content - % of dry mass
Inorganic	<2
Organic Soil	<2 ≤ 25
Peat	> 25

Organic Soils - Descriptive terms for the degree of decomposition of peat:

Term	Decomposition	Remains	Squeeze
Fibrous	Little or none	Clearly recognizable	Only water No solid
Pseudo-fibrous	Moderate	Mixture of fibrous and amorphous	Turbid water < 50% solids
Amorphous	Full	Not recognizable	Paste > 50% solids

Particle Characteristics– Definitions are as follows:

Fraction	Component (& subdivision)		Size (mm)
Oversize	Boulders		> 200
	Cobbles		> 63 ≤ 200
Coarse grained soils	Gravel	Coarse	> 19 ≤ 63
		Medium	> 6.7 ≤ 19
		Fine	> 2.36 ≤ 6.7
	Sand	Coarse	> 0.6 ≤ 2.36
		Medium	> 0.2 ≤ 0.6
		Fine	> 0.075 ≤ 0.21
Fine grained soils	Silt		0.002 ≤ 0.075
	Clay		< 0.002

Secondary and minor soil components

In coarse grained soils – The proportions of secondary and minor components are generally estimated from a visual and tactile assessment of the soils. Descriptions for secondary and minor soil components in coarse grained soils are as follows.

Designation of components	Percentage fines	Terminology (as applicable)	Percentage accessory coarse fraction	Terminology (as applicable)
Minor	≤ 5	Trace clay / silt	≤ 5	Trace sand / gravel
	> 5 ≤12	With clay / silt	> 5 ≤12	With sand / gravel
Secondary	> 12	Silty or clayey	> 30	Sandy or gravelly

Descriptions for secondary and minor soil components in fine grained soils are as follows.

Designation of components	Percentage coarse grained soils	Terminology (as applicable)
Minor	≤ 5	Trace sand / gravel / silt / clay
	> 5 ≤12	With sand / gravel / silt / clay
Secondary	> 30	Sandy / gravelly / silty / clayey

Plasticity Terms – Definitions for fine grained soils are as follows:

Descriptive Term	Range of Liquid Limit for silt	Range of Liquid Limit for clay
Low Plasticity	≤ 50	≤ 35
Medium Plasticity	N/A	> 35 ≤50
High Plasticity	> 50%	> 50

Particle Characteristics

Particle shape and angularity are estimated from a visual assessment of coarse-grained soil particle characteristics. Terminology used includes the following:

Particle shape – spherical, platy, elongated,

Particle angularity –angular, sub-angular, sub-rounded, rounded.

Moisture Condition – Abbreviations are as follows:

D	Dry, looks and feels dry
M	Moist, No free water on remoulding
W	Wet, free water on remoulding

Moisture content of fine-grained soils is based on judgement of the soils moisture content relative to the plastic and liquid limit as follows:

MC < PL	Moist, dry of plastic limit
MC ≈ PL	Moist, near plastic limit
MC > PL	Moist, wet of plastic limit
MC ≈ LL	Wet, near liquid limit
MC > LL	Wet of liquid limit

Consistency - of cohesive soils in accordance with AS 1726-2017, Table 11 are abbreviated as follows:

Consistency Term	Abbreviation	Indicative Undrained Shear Strength Range (kPa)
Very Soft	**VS**	< 12
Soft	**S**	12 ≤ 25
Firm	**F**	25 ≤ 50
Stiff	**St**	50 ≤ 100
Very Stiff	**VSt**	100 ≤ 200
Hard	**H**	≥ 200
Friable	**Fr**	-

Density Index (%) of granular soils is estimated or is based on SPT results. Abbreviations are as follows:

Description	Abbreviation	Relative Density	SPT N
Very Loose	VL	< 15%	0 - 4
Loose	L	15 - 35%	4 - 10
Medium Dense	MD	35 - 65%	10 - 30
Dense	D	65 - 85%	30 - 50
Very Dense	VD	> 85%	> 50

Structures - Fissuring and other defects are described in accordance with AS 1726-2017 using the terminology for rock defects

Origin - Where practicable an assessment is provided of the probable origin of the soil, e.g. fill, topsoil, alluvium, colluvium, residual soil.

MATERIAL DESCRIPTION - ROCK

Material Description

Descriptions of rock for geotechnics and engineering geology in civil engineering

Identification of rock type, composition and texture based on visual features in accordance with AS 1726-2017.

Rock Naming – Where possible conventional geological names are used within the logs. Engineering properties cannot be inferred directly from the rock names in the table, but the use of a particular name provides an indicative range of characteristics to the reader. Lithological identification of rock is provided to appreciate the geology of an area, to correlate geological profiles seen in boreholes or to distinguish boulders from bedrock.

Grain Size – Grain size is done in accordance with AS1726-2017 as follows:

Coarse grained	Mainly 0.6 to 2 mm
Medium grained	0.2 – 0.6 mm
Fine grained	0.06 – 0.2 mm

Colour – Rock colour is described in the moist condition.

Texture and Fabric - Frequently used terms include:

Sedimentary Rock	Metamorphic Rock	Igneous
Bedded	Cleaved	Massive
Interbedded	Foliated	Flow banded
Laminated	Schistose	Folded
Folded	Banded	Lineated
Massive	Lineated	Porphyritic
Graded	Gneissose	Crystalline
Cross-bedded	Folded	Amorphous

Bedding and Laminated – AS 1726 – 2017 bedding and laminated rock descriptions are provided below with additional detail from BS EN ISO 14689-1 as guidance.

Description	Spacing (mm)
Very Thickly Bedded	> 2000
Thickly Bedded	> 600 ≤ 2000
Medium Bedded	> 200 ≤ 600
Thinly Bedded	> 60 ≤ 200
Very Thinly Bedded	> 20 ≤ 60
Thickly Laminated	> 6 ≤ 20
Thinly Laminated	< 6

Features, inclusions and minor components – Features, inclusions and minor components within the rock material shall be described where those features could be significant such as gas bubbles, mineral veins, carbonaceous material, salts, swelling minerals, mineral inclusions, ironstone or carbonate bands, cross-stratification or minerals the readily oxidise upon atmospheric exposure.

Moisture content – Where possible descriptions are made by the feel and appearance of the rock using one according to following terms:

Dry	Looks and feels dry.
Moist	Feels cool, darkened in colour, but no water is visible on the surface
Wet	Feels cool, darkened in colour, water film or droplets visible on the surface

The moisture content of rock cored with water may not be representative of its in-situ condition.

Durability – Descriptions of the materials durability such as tendency to develop cracks, break into smaller pieces or disintegrate upon exposure to air or in contact with water are provided where observed.

Rock Material Strength – The strength of the rock material is based on uniaxial compressive strength (UCS). The following terms are used:

Rock Strength Class	Abbreviation	UCS (MPa)	Point Load Strength Index, $I_{s\,(50)}$ (MPa)
Very Low	VL	> 0.6 ≤ 2	> 0.03 ≤ 0.1
Low	L	> 2 ≤ 6	> 0.1 ≤ 0.3
Medium	M	> 6 ≤ 20	> 0.3 ≤ 1
High	H	> 20 ≤ 60	> 1 ≤ 3
Very High	VH	> 60 ≤ 200	> 3 ≤ 10
Extremely High	EH	> 200	> 10

Strengths are estimated and where possible supported by Point Load Index Testing of representative samples. Test results are plotted on the graphical logs as follows:

D	Diametral Point Load Test
A	Axial Point Load Test

Where the estimated strength log covers more than one range it indicates the rock strength varies between the limits shown. Point Load Strength Index test results are presented as $I_{s\,(50)}$ values in MPa.

Weathering - Weathering classification assists in identification but does not imply engineering properties. Descriptions are as follows:

Term (Abbreviation)	Description
Fresh (FR)	No signs of mineral decomposition or colour change.
Slightly Weathered (SW)	partly stained or discoloured. Not or little change to strength from fresh rock.
Moderately Weathered (MW)	material is completely discoloured, little or no change of strength from fresh rock.
Highly Weathered (HW)	material is completely discoloured, significant decrease in strength from fresh rock.
Extremely Weathered (EW)	Material has soil properties. Mass structure, material texture and fabric of original rock are still visible.
Residual Soil (RS)	Material has soil properties. Mass structure and material texture and fabric of original rock not visible, but the soil has not been significantly transported.

Alteration – Physical and chemical changes of the rock material due to geological processes by fluids at depth at pressures and temperatures above atmospheric conditions. Unlike weathering, alteration shows no relationship to topography and may occur at any depth. When altered materials are recognized, the following terms are used:

<table>
<tr><th colspan="2">Term</th><th colspan="2">Abbreviation</th><th>Definition</th></tr>
<tr><td colspan="2">Extremely Altered</td><td colspan="2">XA</td><td>Material has soil properties.
Structure, texture and fabric of original rock are still visible.
The rock name is replaced with the name of the parent material, e.g. Extremely Altered basalt.
Soil descriptive terms are used.</td></tr>
<tr><td>Highly Altered</td><td rowspan="2">Distinctly altered</td><td>HA</td><td rowspan="2">DA</td><td>The whole of the rock material is discoloured.
Rock strength is changed by alteration.
Some primary minerals are altered to clay minerals.
Porosity may be higher or lower due to loss of minerals or precipitation of secondary minerals in pores.</td></tr>
<tr><td>Moderately Altered</td><td>MA</td><td>The whole of the rock material is discoloured
Little or no change of strength from fresh rock.
The term 'Distinctly Altered' is used where it is not practicable to distinguish between 'Highly Altered' and 'Moderately Altered'.
Distinctly Altered is defined as follows:
The rock may be highly discoloured;
Porosity may be higher due to mineral loss; or may be lower due to precipitation of secondary minerals in pores; and
Some change of rock strength.</td></tr>
<tr><td colspan="2">Slightly Altered</td><td colspan="2">SA</td><td>Rock is slightly discoloured
Little or no change of strength from fresh rock.</td></tr>
</table>

Alteration is only described in the context of the project where it has relevance to the civil and structural design.

Defect Descriptions

General and Detailed Descriptions – Defect descriptions are provided to suit project requirements. Generalized descriptions are used for some projects where it is unnecessary to describe each individual defect in a rock mass, or where multiple similar defects are present which are too numerous to log individually. The part of the rock mass to which this applies is delineated.

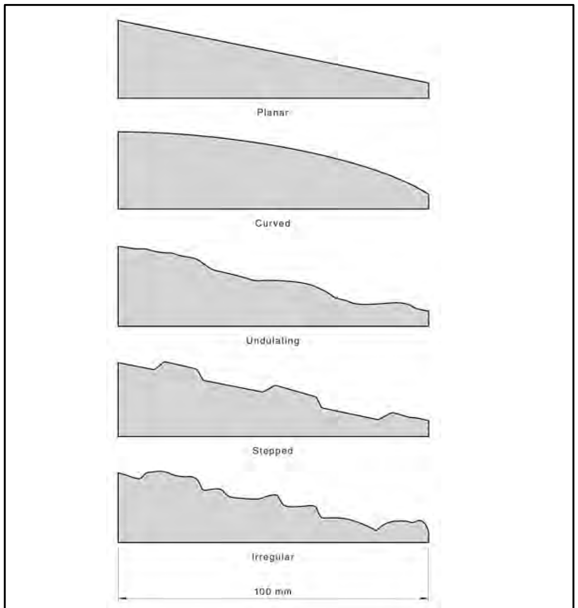
Detailed descriptions are given of defects judged to be particularly significant in the context of the project. For example, crushed seams in an apparently unstable slope. As a minimum, general descriptions outlining the number of defect sets within the rock mass and their broad characteristics are provided where it is possible to do so.

Defect Type – Defect abbreviations are as follows:

BP	Bedding Parting	FL	Foliation	SP	Shear Plane
CL	Cleavage	FZ	Fracture Zone	SZ	Shear Zone
CS	Crushed Seam	HB	Handling break	VN	Vein
DB	Drilling break	JT	Joint		
DL	Drill Lift	SM	Seam		

Defect Orientation – The dip and dip direction are recorded as a two-digit and three-digit number separated by a slash, e.g. 50/240 only when orientated core are collected and there is not core loss that could obscure core orientation. If alternative measurements are made, such as dip and strike or dip direction relative to magnetic north this shall be documented.

Surface Shape –At the medium scale of observation, description of the roughness of the surface shall be enhanced by description of the shape of the defect surface using the following terms, as illustrated below:



Defect Coatings and Seam Composition – Coatings are described using the following terms:

(a) *Clean* No visible coating.
(b) *Stained* No visible coating but surfaces are discoloured.
(c) *Veneer* A visible coating of soil or mineral, too thin to measure; may be patchy.
(d) *Coating* A visible coating up to 1 mm thick. Soil in-fill greater than 1 mm shall be described using defect terms (e.g. infilled seam). Defects greater than 1 mm aperture containing rock material great described as a vein.

Defect Spacing, Length, Openness and Thickness –described directly in millimetres and metres. In general descriptions, half order of magnitude categories are used, e.g. joint spacing typically 100 mm to 300 mm, sheared zones 1 m to 3 m thick.

Depending on project requirements and the scale of observation, spacing may be described as the mean spacing within a set of defects, or as the spacing between all defects within the rock mass. Where spacing is measured within a specific set of defects, measurements shall be made perpendicular to the defect set.

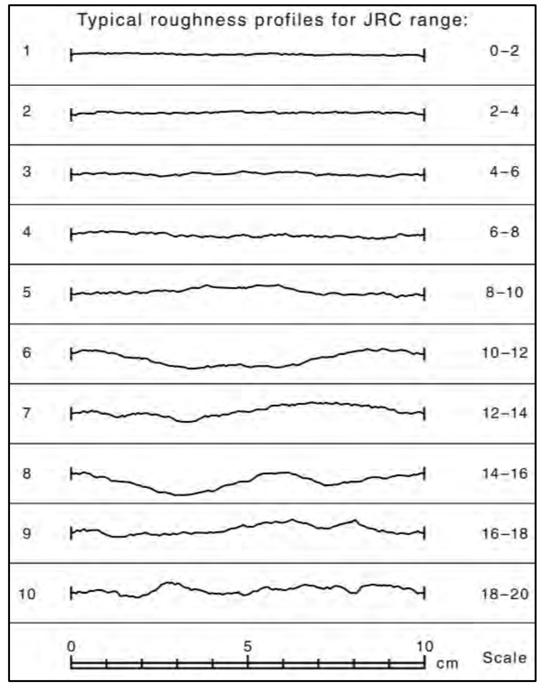
Defect spacing and length (sometimes called persistence), shall be described directly inmillimetres and metres.

Stratigraphic Unit - Geological maps related to the project are used for the designation of lithological formation name and, where possible geological unit name, e.g. Bringelly Shale, Potts Hill Sandstone Member.

Defect Roughness and Shape – Defect surface roughness is described as follows:

Very rough	Many large surface irregularities with amplitude generally more than 1 mm.
Rough	Many small surface irregularities with amplitude generally less than 1 mm.
Smooth	Smooth to touch. Few or no surface irregularities.
Polished	Shiny smooth surface
Slickensided	Grooved or striated surface, usually polished.

Where applicable Joint Roughness Range (JRC) is provided as follows:



Joint roughness profiles and corresponding JRC range based on Barton, N and Choubey, V. The Shear Strength of Rock Joints in Theory and Practice. *Rock Mechanics.* Vol. 10 (1977), pp. 1–54.

Where possible the mineralogy of the coating is identified.

Defect Infilling - abbreviated as follows:

CA	Calcite	KT	Chlorite
CN	Clean	MS	Secondary Mineral
Cy	Clay	MU	Unidentified Mineral
CS	Crushed Seam	Qz	Quartz
Fe	Iron Oxide	X	Carbonaceous

PARAMETERS RELATED TO CORE DRILLING

Total Core Recovery – T

Defect Spacing or Fracture Index – T

Rock Quality Designation – Y

Core Loss – Core loss occurs when material is lost during the drilling process It is shown at the bottom of the run unless otherwise indicated where core loss is known.

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Borehole Log

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BH No: BH01
Sheet: 1 of 1
Job No: 12483

Client: Carmichael Tompkins Property Group
Project: St Anthony of Padua Catholic School Stage 4
Location: 140 Eleventh Avenue, Austral NSW 2173

Started: 30/06/2021
Finished: 30/06/2021
Borehole Size 110 mm

Rig Type: TDLR | **Hole Location:** Refer to Drawing 12483-GR-1-A | **Driller:** SM | **Logged:** ZK
RL Surface: m | **Contractor:** Alliance | **Bearing:** --- | **Checked:** MAG

Method	Water	RL (m)	Depth (m)	Graphic Log	Classification Symbol	Material Description	Samples Tests Remarks	Moisture Condition	Consistency/ Density Index	Additional Observations
ADT	Not encountered during augering				- -	TOPSOIL: Silty CLAY. low plasticity, brown.		MC >~ PL	- -	TOPSOIL
			0.5		CI-CH	CLAY, medium to high plasticity, orange, trace fine gravel.		MC >~ PL	F	RESIDUAL
			1.0		CI	CLAY, medium plasticity, grey mottled orange.		MC >~ PL MC ~ PL	St	
			1.5 2.0		- -	SHALE, extremely weathered, recovered as CLAY, low to medium plasticity, grey-brown, with fine to medium gravel.	SPT 10 at 100mm N = R	- -	- -	EXTREMELY WEATHERED SHALE
			2.5 3.0			TC-bit refusal. Borehole BH01 terminated at 2.2m				

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BH No: BH02
Sheet: 1 of 1
Job No: 12483

Client: Carmichael Tompkins Property Group
Project: St Anthony of Padua Catholic School Stage 4
Location: 140 Eleventh Avenue, Austral NSW 2173

Started: 30/06/2021
Finished: 30/06/2021
Borehole Size 110 mm

Rig Type: TDLR
RL Surface: m
Hole Location: Refer to Drawing 12483-GR-1-A
Contractor: Alliance
Driller: SM
Bearing: ---
Logged: ZK
Checked: MAG

Method	Water	RL (m)	Depth (m)	Graphic Log	Classification Symbol	Material Description	Samples Tests Remarks	Moisture Condition	Consistency/ Density Index	Additional Observations
ADT	Not encountered during augering				- -	TOPSOIL: Silty CLAY, low plasticity, brown.		MC >~ PL	- -	TOPSOIL
					CI-CH	CLAY, medium to high plasticity, orange, trace fine ironstone gravel.		MC >~ PL	F	RESIDUAL
			0.5		CI-CH	CLAY, medium to high plasticity, grey mottled orange.		MC >~ PL	St - VSt	
			1.0					MC ~< PL		
			1.5		- -	SHALE, extremely weathered, recovered as CLAY, low to medium plasticity, grey-brown, with fine to medium gravel.	SPT 10 at 120mm N = R	- -	- -	EXTREMELY WEATHERED SHALE
			2.0							
			2.5			TC-bit refusal. Borehole BH02 terminated at 2.4m				
			3.0							

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BH No: BH03
Sheet: 1 of 1
Job No: 12483

Client: Carmichael Tompkins Property Group
Project: St Anthony of Padua Catholic School Stage 4
Location: 140 Eleventh Avenue, Austral NSW 2173
Started: 30/06/2021
Finished: 30/06/2021
Borehole Size 110 mm

Rig Type: TDLR
RL Surface: m
Hole Location: Refer to Drawing 12483-GR-1-A
Contractor: Alliance
Driller: SM
Bearing: ---
Logged: ZK
Checked: MAG

Method	Water	RL (m)	Depth (m)	Graphic Log	Classification Symbol	Material Description	Samples Tests Remarks	Moisture Condition	Consistency/ Density Index	Additional Observations
ADT	Not encountered during augering				- -	TOPSOIL: Silty CLAY, low plasticity, brown.		MC	- -	TOPSOIL
					CI	CLAY, medium plasticity, orange, trace fine ironstone gravel.		MC >~ PL / MC ~< PL	VSt	RESIDUAL
			0.5		CI-CH	CLAY, medium to high plasticity, grey mottled orange.		MC ~< PL	VSt	
			1.0							
					- -	SHALE, extremely weathered, recovered as CLAY, low to medium plasticity, grey-brown, with fine to medium gravel.		- -	- -	EXTREMELY WEATHERED SHALE
			1.5				SPT 10 at 130mm N = R			
			2.0							
						TC-bit refusal. Borehole BH03 terminated at 2.3m				
			2.5							
			3.0							

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BH No: BH04
Sheet: 1 of 1
Job No: 12483

Client: Carmichael Tompkins Property Group
Project: St Anthony of Padua Catholic School Stage 4
Location: 140 Eleventh Avenue, Austral NSW 2173
Started: 30/06/2021
Finished: 30/06/2021
Borehole Size 110 mm

Rig Type: TDLR
RL Surface: m
Hole Location: Refer to Drawing 12483-GR-1-A
Contractor: Alliance
Driller: SM
Bearing: ---
Logged: ZK
Checked: MAG

Method	Water	RL (m)	Depth (m)	Graphic Log	Classification Symbol	Material Description	Samples Tests Remarks	Moisture Condition	Consistency/ Density Index	Additional Observations
ADT	Not encountered during augering				- -	TOPSOIL: Silty CLAY, low plasticity, brown.		MC ~< PL	- -	TOPSOIL
			0.5		CI-CH	CLAY, medium to high plasticity, orange, trace fine ironstone gravel.		MC >~ PL	VSt	RESIDUAL
			1.0		CI	CLAY, medium plasticity, brown.		MC ~ PL	H	
			1.5		- -	SHALE, extremely weathered, recovered as CLAY, low to medium plasticity, grey-brown, with fine to medium gravel.	SPT 8, 10 at 100mm N = R	- -	- -	EXTREMELY WEATHERED SHALE
			2.0			TC-bit refusal. Borehole BH04 terminated at 1.7m				
			2.5							
			3.0							

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BH No: BH05
Sheet: 1 of 1
Job No: 12483

Client: Carmichael Tompkins Property Group
Project: St Anthony of Padua Catholic School Stage 4
Location: 140 Eleventh Avenue, Austral NSW 2173

Started: 29/06/2021
Finished: 29/06/2021
Borehole Size 110 mm

Rig Type: TDLR
RL Surface: m
Hole Location: Refer to Drawing 12483-GR-1-A
Contractor: Alliance
Driller: SM
Bearing: ---
Logged: ZK
Checked: MAG

Method	Water	RL (m)	Depth (m)	Graphic Log	Classification Symbol	Material Description	Samples Tests Remarks	Moisture Condition	Consistency/ Density Index	Additional Observations
ADT	Not encountered during augering				- -	TOPSOIL: Silty CLAY, low plasticity, brown.		MC >~ PL	- -	TOPSOIL
					CI	CLAY, medium plasticity, orange-brown.		MC ~ PL	Vst	RESIDUAL
			0.5		CI	CLAY, medium plasticity, orange-brown, trace fine gravel.		MC ~< PL	H	
			1.0		- -	SHALE, extremely weathered, recovered as CLAY, low to medium plasticity, grey-brown, with fine to medium gravel.	SPT 10 at 100mm N = R	- -	- -	EXTREMELY WEATHERED SHALE
			1.5							
			2.0							Introduced water to assist drilling.
						TC-bit refusal. Borehole BH05 terminated at 2.1m				
			2.5							
			3.0							

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BH No: BH06
Sheet: 1 of 1
Job No: 12483

Client: Carmichael Tompkins Property Group
Project: St Anthony of Padua Catholic School Stage 4
Location: 140 Eleventh Avenue, Austral NSW 2173
Started: 30/06/2021
Finished: 30/06/2021
Borehole Size 110 mm

Rig Type: TDLR | **Hole Location:** Refer to Drawing 12483-GR-1-A | **Driller:** SM | **Logged:** ZK
RL Surface: m | **Contractor:** Alliance | **Bearing:** --- | **Checked:** MAG

Method	Water	RL (m)	Depth (m)	Graphic Log	Classification Symbol	Material Description	Samples Tests Remarks	Moisture Condition	Consistency/ Density Index	Additional Observations
ADT	Not encountered during augering				- -	TOPSOIL: Silty CLAY, low plasticity, brown.		MC >~ PL	- -	TOPSOIL
			0.5		CI-CH	CLAY, medium to high plasticity, orange, trace fine to medium ironstone gravel.		MC >~ PL	VSt	RESIDUAL
			1.0 / 1.5		CI-CH	CLAY, medium to high plasticity, grey mottled orange.		MC >~ PL MC ~ PL	VSt	
			2.0		- -	SHALE, extremely weathered, recovered as CLAY, low to medium plasticity, grey-brown, with fine to medium gravel.	SPT 7, 10 at 120mm N = R	- -	- -	EXTREMELY WEATHERED SHALE
			2.5 / 3.0			TC-bit refusal. Borehole BH06 terminated at 2.4m				

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BH No: BH07
Sheet: 1 of 1
Job No: 12483

Client: Carmichael Tompkins Property Group
Project: St Anthony of Padua Catholic School Stage 4
Location: 140 Eleventh Avenue, Austral NSW 2173

Started: 29/06/2021
Finished: 29/06/2021
Borehole Size 110 mm

Rig Type: TDLR | **Hole Location:** Refer to Drawing 12483-GR-1-A | **Driller:** SM | **Logged:** ZK
RL Surface: m | **Contractor:** Alliance | **Bearing:** --- | **Checked:** MAG

Method	Water	RL (m)	Depth (m)	Graphic Log	Classification Symbol	Material Description	Samples Tests Remarks	Moisture Condition	Consistency/ Density Index	Additional Observations
ADT	Not encountered during augering				- -	TOPSOIL: Silty CLAY, low plasticity, brown.		MC ~< PL	- -	TOPSOIL
			0.5		CI-CH	CLAY, medium to high plasticity, orange, trace fine to medium ironstone gravel.		MC >~ PL	VSt	RESIDUAL
			1.0		CI-CH	CLAY, medium to high plasticity, grey.		MC >~ PL	VSt	
			1.5		- -	SHALE, extremely weathered, recovered as CLAY, low to medium plasticity, grey-brown, with fine to medium gravel.	SPT 10 at 80mm N = R	- -	- -	EXTREMELY WEATHERED SHALE
			2.0			TC-bit refusal. Borehole BH07 terminated at 1.9m				
			2.5							
			3.0							

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BH No: BH08
Sheet: 1 of 1
Job No: 12483

Client: Carmichael Tompkins Property Group
Project: St Anthony of Padua Catholic School Stage 4
Location: 140 Eleventh Avenue, Austral NSW 2173
Started: 29/06/2021
Finished: 29/06/2021
Borehole Size 110 mm

Rig Type: TDLR
RL Surface: m
Hole Location: Refer to Drawing 12483-GR-1-A
Contractor: Alliance
Driller: SM
Bearing: ---
Logged: ZK
Checked: MAG

Method	Water	RL (m)	Depth (m)	Graphic Log	Classification Symbol	Material Description	Samples Tests Remarks	Moisture Condition	Consistency/ Density Index	Additional Observations
ADT	Not encountered during augering				- -	TOPSOIL: Silty CLAY, low plasticity, brown.		MC ~< PL	- -	TOPSOIL
			0.5		CI-CH	CLAY, medium to high plasticity, orange, trace fine to medium ironstone gravel.		MC >~ PL	VSt	RESIDUAL
			1.0 / 1.5 / 2.0		- -	SHALE, extremely weathered, recovered as CLAY, low to medium plasticity, grey-brown, with fine to medium gravel.	SPT 10 at 130mm N = R	- -	- -	EXTREMELY WEATHERED SHALE
			2.5 / 3.0			TC-bit refusal. Borehole BH08 terminated at 2m				

2. AUGERED BOREHOLE V2 12483 BH LOGS REV.GPJ GINT STD AUSTRALIA + TR, UNITS, TYPE V3.GDT 09/07/21

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Borehole Log

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BH No: BH09
Sheet: 1 of 1
Job No: 12483

Client: Carmichael Tompkins Property Group
Project: St Anthony of Padua Catholic School Stage 4
Location: 140 Eleventh Avenue, Austral NSW 2173
Started: 29/06/2021
Finished: 29/06/2021
Borehole Size 110 mm

Rig Type: TDLR
RL Surface: m
Hole Location: Refer to Drawing 12483-GR-1-A
Contractor: Alliance
Driller: SM
Bearing: ---
Logged: ZK
Checked: MAG

Method	Water	RL (m)	Depth (m)	Graphic Log	Classification Symbol	Material Description	Samples Tests Remarks	Moisture Condition	Consistency/ Density Index	Additional Observations
ADT	Not encountered during augering				- -	TOPSOIL: Silty CLAY, low plasticity, brown.		MC >~ PL	- -	TOPSOIL
			0.5		CI-CH	CLAY, medium to high plasticity, orange, trace fine to medium ironstone gravel.		MC >~ PL	VSt	RESIDUAL
			1.0		CH	CLAY, high plasticity, grey mottled orange.		MC >~ PL	VSt	
			1.5		- -	SHALE, extremely weathered, recovered as CLAY, low to medium plasticity, grey-brown, with fine to medium gravel.	SPT 10 at 120mm N = R	- -	- -	EXTREMELY WEATHERED SHALE
			2.0			TC-bit refusal. Borehole BH09 terminated at 1.7m				
			2.5							
			3.0							

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BH No: BH10
Sheet: 1 of 1
Job No: 12483

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Borehole Log

Client: Carmichael Tompkins Property Group
Project: St Anthony of Padua Catholic School Stage 4
Location: 140 Eleventh Avenue, Austral NSW 2173
Started: 29/06/2021
Finished: 29/06/2021
Borehole Size 110 mm

Rig Type: TDLR
RL Surface: m
Hole Location: Refer to Drawing 12483-GR-1-A
Contractor: Alliance
Driller: SM
Bearing: ---
Logged: ZK
Checked: MAG

Method	Water	RL (m)	Depth (m)	Graphic Log	Classification Symbol	Material Description	Samples Tests Remarks	Moisture Condition	Consistency/ Density Index	Additional Observations
ADT	Not encountered during augering				- -	FILL: SAND, fine to medium grained, grey-brown, with fine to coarse gravel. Appears well compacted.		M	- -	FILL
					- -	FILL: Silty CLAY, low plasticity, brown. Appears well compacted.		MC ~< PL	- -	
			0.5		CI-CH	CLAY, medium to high plasticity, orange, trace fine to medium ironstone gravel.		MC >~ PL	VSt	RESIDUAL
			1.0		CH	CLAY, high plasticity, pale grey.		MC >~ PL	H	
			1.5		- -	SHALE, extremely weathered, recovered as CLAY, low to medium plasticity, grey-brown, with fine to medium gravel.	SPT 10 at 100mm N = R	- -	- -	EXTREMELY WEATHERED SHALE
			2.0			TC-bit refusal. Borehole BH10 terminated at 2m				
			2.5							
			3.0							

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Borehole Log

BH No: BH11
Sheet: 1 of 1
Job No: 12483

Client: Carmichael Tompkins Property Group
Project: St Anthony of Padua Catholic School Stage 4
Location: 140 Eleventh Avenue, Austral NSW 2173
Started: 29/06/2021
Finished: 29/06/2021
Borehole Size 110 mm

Rig Type: TDLR
RL Surface: m
Hole Location: Refer to Drawing 12483-GR-1-A
Contractor: Alliance
Driller: SM
Bearing: ---
Logged: ZK
Checked: MAG

Method	Water	RL (m)	Depth (m)	Graphic Log	Classification Symbol	Material Description	Samples Tests Remarks	Moisture Condition	Consistency/ Density Index	Additional Observations
ADT	Not encountered during augering				- -	FILL: Gravelly SAND, fine to medium grained, yellow-brown, fine to coarse crushed sandstone gravel. Appears well compacted.		M	- -	FILL
					- -	FILL: CLAY, low to medium plasticity, brown. Appears well compacted.		MC ~ PL	- -	
			0.5		CI	CLAY, medium plasticity, orange, trace fine to medium ironstone gravel.		MC > ~PL	VSt	RESIDUAL
			1.0, 1.5		- -	SHALE, extremely weathered, recovered as CLAY, low to medium plasticity, grey, with fine to medium gravel.	SPT 10 at 100mm N = R	- -	- -	EXTREMELY WEATHERED SHALE
			2.0, 2.5, 3.0			TC-bit refusal. Borehole BH11 terminated at 1.6m				

2. AUGERED BOREHOLE V2 12483 BH LOGS REV.GPJ GINT STD AUSTRALIA + TR, UNITS, TYPE V3.GDT 09/07/21

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Borehole Log

Alliance Geotechnical Pty Ltd
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BH No: BH12
Sheet: 1 of 1
Job No: 12483

Client: Carmichael Tompkins Property Group
Project: St Anthony of Padua Catholic School Stage 4
Location: 140 Eleventh Avenue, Austral NSW 2173
Started: 29/09/2021
Finished: 29/09/2021
Borehole Size 110 mm

Rig Type: TDLR
RL Surface: m
Hole Location: Refer to Drawing 12483-GR-1-A
Contractor: Alliance
Driller: SM
Bearing: ---
Logged: ZK
Checked: MAG

Method	Water	RL (m)	Depth (m)	Graphic Log	Classification Symbol	Material Description	Samples Tests Remarks	Moisture Condition	Consistency/ Density Index	Additional Observations
ADT	Not encountered during augering				- -	FILL: Gravelly SAND, fine to medium grained, yellow-brown, with fine to coarse crushed sandstone gravel. Appears well compacted.		M	- -	FILL
			0.5 1.0		CI-CH	CLAY, medium to high plasticity, orange mottled grey, with fine to medium gravel.		MC > PL	VSt	RESIDUAL
			1.5 2.0		- -	SHALE, extremely weathered, recovered as CLAY, low to medium plasticity, light brown, with fine gravel.	SPT 10 at 130mm N = R	- -	- -	EXTREMELY WEATHERED SHALE
			2.5 3.0			TC-bit refusal. Borehole BH12 terminated at 2m				

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Borehole Log

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BH No: BH101

Job No: 12483

Client: Carmichael Tompkins Property Group
Project: St. Anthony de Padua Stage 3
Location: 140 Eleventh Avenue, Austral NSW
Started: 26/08/2021
Finished: 26/08/2021
Borehole Size 110 mm

Rig Type: Hanjin D&B 8D
Hole Location: Refer to 12483-GR-1-A
Driller: CB
Logged: KN
RL Surface: m
Contractor: BG Drilling Pty Ltd
Bearing: ---
Checked: MS

Method	Water	RL (m)	Depth (m)	Graphic Log	Classification Symbol	Material Description	Samples Tests Remarks	Moisture Condition	Consistency/ Density Index	Additional Observations
ADT	Not Encountered during Augering				- -	TOPSOIL: Silty CLAY, low plasticity, trace rootlets, MC ~ PL.		M		TOPSOIL
					CI - CH	CLAY, medium to high plasticity, orange, trace fine angular gravel, MC ~ PL.				RESIDUAL
			1		CI - CH	CLAY, medium to high plasticity, pale brown mottled orange, MC < PL.		D		
			2		- -	SHALE, extremely weathered, very low strength, recovered as Clay, medium plasticity, pale brown, trace fine to medium shale gravel.		- -		EXTREMELY WEATHERED SHALE
			3, 4		- -	SHALE, highly weathered, very low strength, brown and grey, interbedded with clay. 3.50m: becoming low strength, pale brown and grey.				BEDROCK 3.3m: increased drilling resistance
			5		- -	SHALE, highly weathered, low strength, pale brown.				
			6, 7, 8			Borehole BH101 continued as cored hole				

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BH No: BH101
PAGE 2 OF 3
Job No: 12483

Cored Borehole Log

Client: Carmichael Tompkins Property Group
Project: St. Anthony de Padua Stage 3
Location: 140 Eleventh Avenue, Austral NSW
Hole Location: Refer to 12483-GR-1-A
Started: 26/08/2021
Finished: 26/08/2021
Borehole Size: 110 mm

Rig Type: Hanjin D&B 8D
Hole Coordinates E, N
Driller: CB
Logged: KN
RL Surface: m
Contractor: BG Drilling Pty Ltd
Bearing: ---
Checked: MS

Method	Water	RL (m)	Depth (m)	Graphic Log	Material Description	Weathering	Estimated Strength (● - Axial, ○ - Diametral; EL -0.03, VL -0.1, L -0.3, M -1, H -3, VH -10, EH)	Is(50) MPa (D- diametral, A- axial)	RQD %	Defect Spacing mm (30, 100, 300, 1000, 3000)	Additional Data
			1								
			2								
			3								
			4								
			5								
					Continued from non-cored borehole						
NMLC	Partial Water Loss		6		SHALE, brown and grey, laminated.	HW					*Unless otherwise noted all defects are closed bedding partings parallel to the bedding plane. 5.92 - BP, 0°, Undulating, Rough, Clay Stained. 5.95 - BP, 0°, Undulating, Rough, Clay Stained.
					SANDSTONE, medium to coarse grained, pale grey, with carbonaceous laminations at 0°-5°.	MW		D 0.39 A 1.03			6.20 - BP, 0°, Undulating, Rough, Clean.
											6.75 - BP, 0°, Undulating, Rough, Clean.
			7					D 0.5 A 1.98	90		7.03 - BP, 0°, Undulating, Rough, Iron Stained.
								D 0.4 A 2.36			7.25 - 7.33 - BP, 90°, Curved, Rough, Clean.
											7.49 - BP, 0°, Planar, Rough, Iron Stained. 7.62 - BP, 0°, Planar, Rough, Clean.
			8					D 0.44 A 1.71			7.92 - BP, 0°, Planar, Rough, Clean.

5. CORED BOREHOLE 12483 REVISITED.GPJ GINT STD AUSTRALIA.GDT 20/9/21

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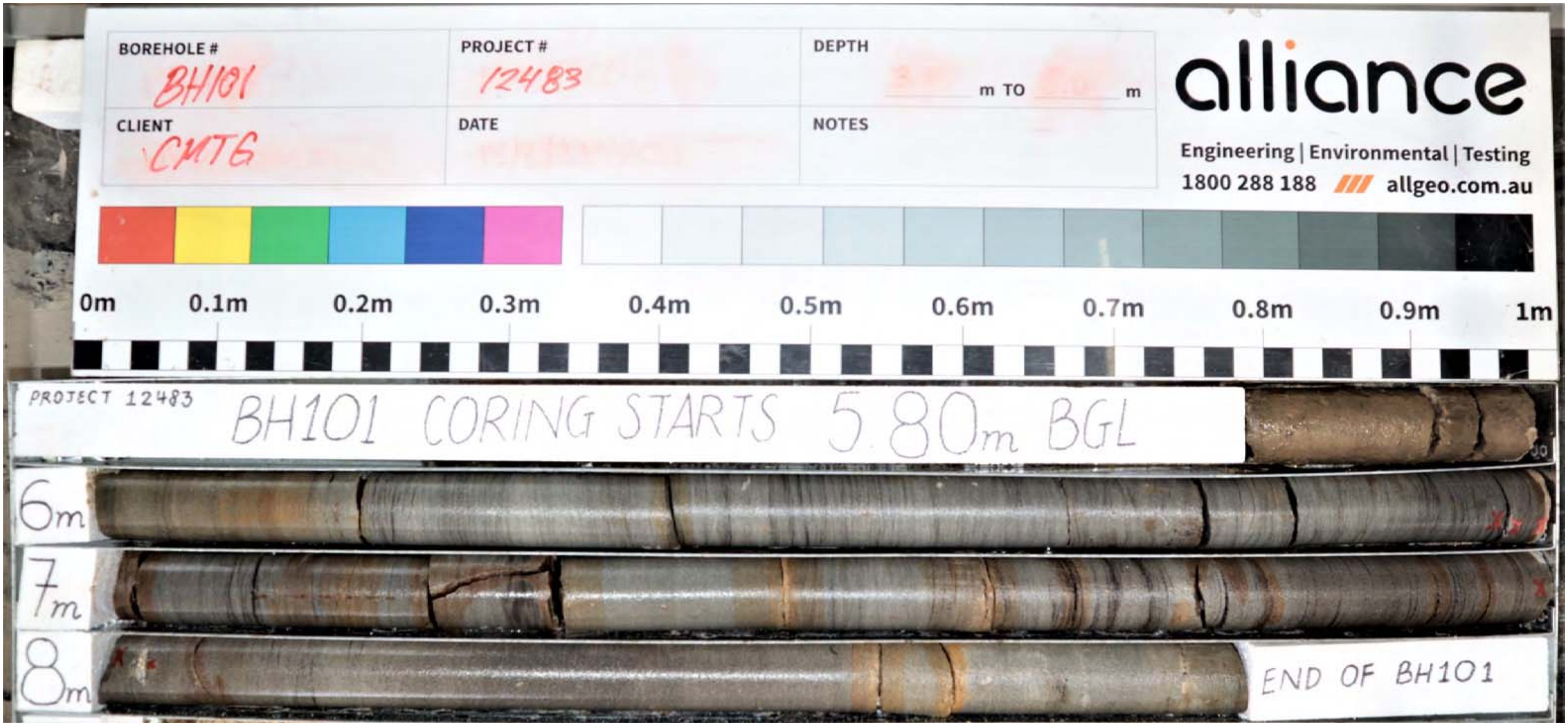
Cored Borehole Log

Client: Carmichael Tompkins Property Group | **Started:** 26/08/2021
Project: St. Anthony de Padua Stage 3 | **Finished:** 26/08/2021
Location: 140 Eleventh Avenue, Austral NSW | **Hole Location:** Refer to 12483-GR-1-A | **Borehole Size:** 110 mm

Rig Type: Hanjin D&B 8D | **Hole Coordinates** E, N | **Driller:** CB | **Logged:** KN
RL Surface: m | **Contractor:** BG Drilling Pty Ltd | **Bearing:** --- | **Checked:** MS

Method	Water	RL (m)	Depth (m)	Graphic Log	Material Description	Weathering	Estimated Strength (● - Axial, O - Diametral) EL -0.03 VL -0.1 L -0.3 M -1 H -3 VH -10 EH	$Is_{(50)}$ MPa D- diametral A- axial	RQD %	Defect Spacing mm (30 100 300 1000 3000)	Additional Data
					SANDSTONE, medium to coarse grained, pale grey, with carbonaceous laminations at 0°-5°. *(continued)*	MW		D 4.8 A 3.15	90		7.95 - BP, 0°, Planar, Rough, Clean. 8.09 - BP, 0°, Curved, Rough, Clean. 8.55 - BP, 0°, Planar, Rough, Iron Stained. 8.60 - BP, 0°, Planar, Rough, Iron Stained.
			9		BH101 terminated at 8.8m						End of Borehole
			10								
			11								
			12								
			13								
			14								
			15								
			16								



Core Box Photo

alliance	Client Name:	Carmichael Tompkins Property Group	Figure / Drawing Number:	-
	Project Name:	St. Anthony of Padua Catholic School Stage 4	Figure / Drawing Date:	16/09/2021
	Project Location:	140 Eleventh Avenue, Austral NSW 2173	Report Number:	12483-GR-1-1

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Borehole Log

BH No: BH102

Job No: 12483

Client: Carmichael Tompkins Property Group
Project: St. Anthony de Padua Stage 3
Location: 140 Eleventh Avenue, Austral NSW
Started: 26/08/2021
Finished: 26/08/2021
Borehole Size 110 mm

Rig Type: Hanjin D&B 8D
Hole Location: Refer to 12483-GR-1-A
Driller: CB
Logged: KN
RL Surface: m
Contractor: BG Drilling Pty Ltd
Bearing: ---
Checked: MS

Method	Water	RL (m)	Depth (m)	Graphic Log	Classification Symbol	Material Description	Samples Tests Remarks	Moisture Condition	Consistency/ Density Index	Additional Observations
ADT	Not Encountered during Augering				- -	TOPSOIL: CLAY, medium plasticity, dark brown, trace fine sub-angular gravel, MC > PL.		M		TOPSOIL
					CI - CH	CLAY, medium to high plasticity, orange yellow mottled pale grey, MC > PL.				RESIDUAL
			1							
					CI - CH	CLAY, pale brown, medium plasticity, trace fine to medium shale gravel, MC < PL.		D		
			2		- -	SHALE, highly weathered, very low strength, pale brown and pale and dark grey.		- -		BEDROCK
			3							
			4							
						Borehole BH102 continued as cored hole				
			5							
			6							
			7							
			8							

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Cored Borehole Log

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Client: Carmichael Tompkins Property Group
Project: St. Anthony de Padua Stage 3
Location: 140 Eleventh Avenue, Austral NSW
Hole Location: Refer to 12483-GR-1-A
Started: 26/08/2021
Finished: 26/08/2021
Borehole Size: 110 mm
Rig Type: Hanjin D&B 8D
Hole Coordinates E, N
Driller: CB
Logged: KN
RL Surface: m
Contractor: BG Drilling Pty Ltd
Bearing: ---
Checked: MS

Method	Water	RL (m)	Depth (m)	Material Description	Weathering	Is(50) MPa (D- diametral, A- axial)	RQD %	Additional Data
			1 – 4	Continued from non-cored borehole				
NMLC	Partial Water Loss			SANDSTONE, medium to coarse grained, pale grey and brown, with carbonaceous laminations at 0° - 5° . 4.30 - 4.50m: with ironstone and carbonaceous clasts.	MW	D 0.52 A 0.71; D 0.41 A 1.5; D 0.36 A 0.67; D 0.08 A 0.03	60	*Unless otherwise noted all defects are closed bedding partings parallel to the bedding plane. 4.43 - JT, 45°, Planar, Rough, Clay Stained. 4.73 - Clay Seam, 5mm. 5.00 - Clay Seam, 5mm. 5.32 - Clay Seam, 5mm. 5.53 - JT, 0°, Planar, Rough, Clean. 5.70 - Clay Seam, 30mm. 5.80 - JT, 0°, Planar, Rough, Veneer, CY. 5.81 - JT, 0°, Planar, Rough, Coating, CY. 6.12 - JT, 0°, Planar, Rough, Clean, CY. 6.30 - JT, 2°, Planar, Rough, Coating, CY. 6.32 - JT, 0°, Planar, Rough, Coating, CY. 6.38 - Clay Seam, 20mm. 6.46 - Clay Seam, 60mm. 6.65 - JT, 0°, Planar, Rough, Clean.
			7	SHALE, grey, laminated.	HW; MW/SW	D 0.25 A 1.1		6.80 - 7.25 EW Clay Seam, 450mm
			8	BH102 terminated at 7.42m				End of Borehole

Estimated Strength (● - Axial, O - Diametral): EL -0.03, VL -0.1, L -0.3, M -1, H -3, VH -10, EH
Defect Spacing mm: 30, 100, 300, 1000, 3000

Core Box Photo

alliance	Client Name:	Carmichael Tompkins Property Group	Figure / Drawing Number:	-
	Project Name:	St. Anthony of Padua Catholic School Stage 4	Figure / Drawing Date:	16/09/2021
	Project Location:	140 Eleventh Avenue, Austral NSW 2173	Report Number:	12483-GR-1-1

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Borehole Log

Alliance Geotechnical Pty Ltd
T: 1800 288 188
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BH No: BH104

Job No: 12483

Client: Carmichael Tompkins Property Group
Project: St. Anthony de Padua Stage 3
Location: 140 Eleventh Avenue, Austral NSW
Started: 26/08/2021
Finished: 26/08/2021
Borehole Size 110 mm

Rig Type: Hanjin D&B 8D
Hole Location: Refer to 12483-GR-1-A
Driller: CB
Logged: KN
RL Surface: m
Contractor: BG Drilling Pty Ltd
Bearing: ---
Checked: MS

Method	Water	RL (m)	Depth (m)	Graphic Log	Classification Symbol	Material Description	Samples Tests Remarks	Moisture Condition	Consistency/ Density Index	Additional Observations
ADT	Not encountered during augering				- -	TOPSOIL: Silty CLAY, low to medium plasticity, trace fine grained sand, brown, MC ~ PL.		M		TOPSOIL
			1		CI - CH	CLAY, medium to high plasticity, orange mottled pale grey, MC ~ PL.				RESIDUAL
			2, 3		CI - CH	CLAY, medium to high plasticity, pale grey mottled pale yellow and orange, MC << PL.		D		
			4, 5, 6		- -	SHALE, extremely weathered, very low strength, recovered as CLAY, medium plasticity, pale brown, with grey and dark grey shale fragments.		- -		EXTREMELY WEATHERED SHALE
			7, 8			Borehole BH104 continued as cored hole				

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Cored Borehole Log

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BH No: BH104

Job No: 12483

Client: Carmichael Tompkins Property Group | **Started:** 26/08/2021
Project: St. Anthony de Padua Stage 3 | **Finished:** 26/08/2021
Location: 140 Eleventh Avenue, Austral NSW | **Hole Location:** Refer to 12483-GR-1-A | **Borehole Size:** 110 mm

Rig Type: Hanjin D&B 8D | **Hole Coordinates** E, N | **Driller:** CB | **Logged:** KN
RL Surface: m | **Contractor:** BG Drilling Pty Ltd | **Bearing:** --- | **Checked:** MS

Method	Water	RL (m)	Depth (m)	Graphic Log	Material Description	Weathering	Estimated Strength (● - Axial, ○ - Diametral) EL -0.03, VL -0.1, L -0.3, M -1, H -3, VH -10, EH	$Is_{(50)}$ MPa (D- diametral, A- axial)	RQD %	Defect Spacing mm (30, 100, 300, 1000, 3000)	Additional Data
			1								
			2								
			3								
			4								
			5								
			6		Continued from non-cored borehole						
NMLC	Partial Water Loss				SHALE, highly weathered, very low strength, grey and pale brown, with siltstone and sandstone fragments.	HW					*Unless otherwise noted all defects are closed bedding partings parallel to the bedding plane. 6.00 - Crushed Clay Seam, 120mm.
					SANDSTONE, medium to coarse grained, pale grey. 6.15-6.25m: carbonaceous bedding at 0°	MW		D 0.98 A 1.08			6.39 - JT, 0°, Planar, Rough, Iron Stained. 6.50 - JT, 80°, Planar, Rough, Stained, X.
			7					D 0.44 A 1.68	57		
					7.25m: carbonaceous bedding at 60° 7.30m: with ironstaining.			D 0.45 A 0.58			7.22 - JT, 20°, Planar, Iron Stained. 7.35 - JT, Irregular, Rough, Iron Stained. 7.51 - JT, 45°, Coating, Cy.
			8								

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Cored Borehole Log

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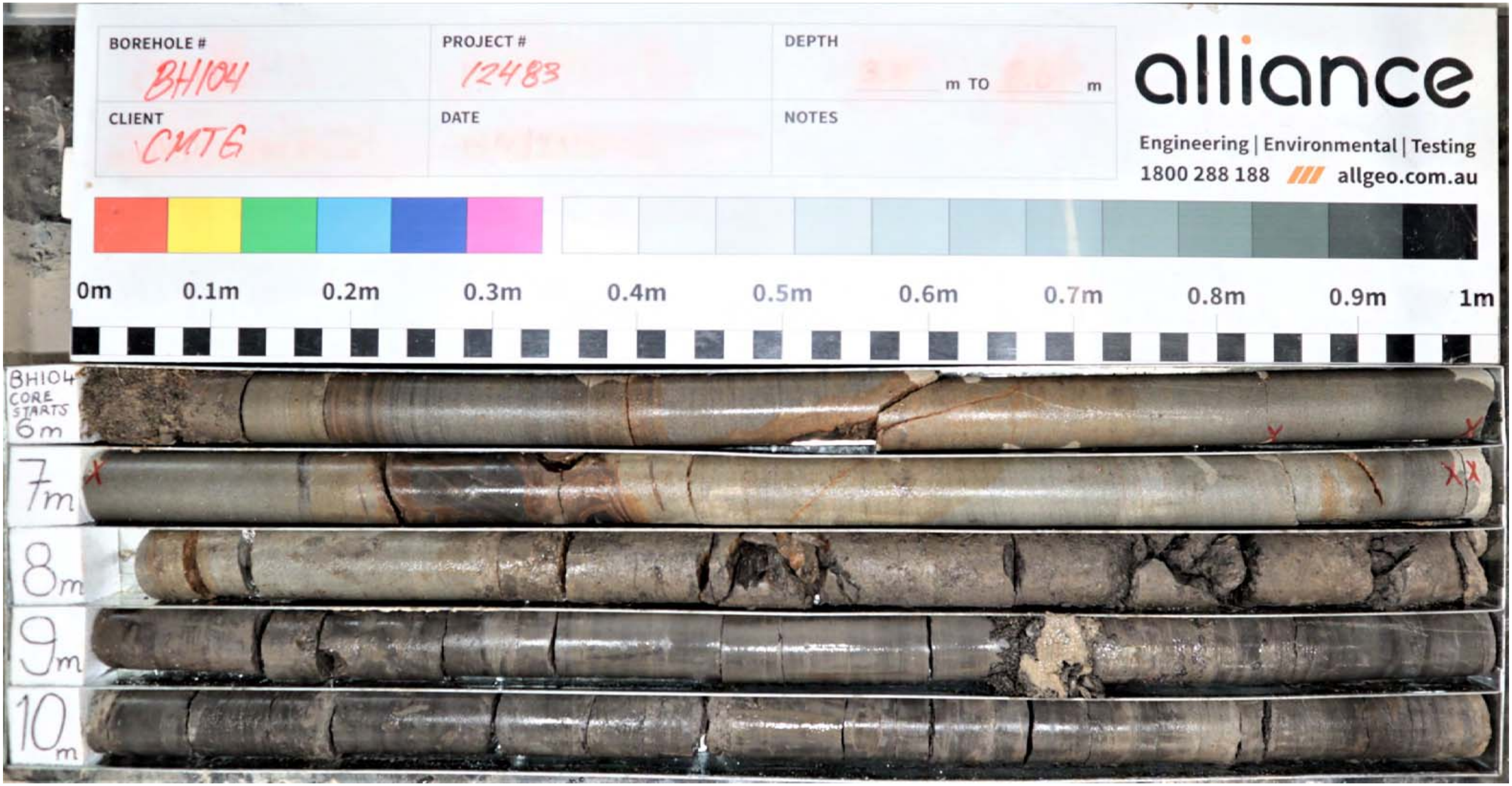
BH No: BH104

Job No: 12483

Client: Carmichael Tompkins Property Group	**Started:** 26/08/2021
Project: St. Anthony de Padua Stage 3	**Finished:** 26/08/2021
Location: 140 Eleventh Avenue, Austral NSW — **Hole Location:** Refer to 12483-GR-1-A	**Borehole Size:** 110 mm

Rig Type: Hanjin D&B 8D	**Hole Coordinates** E, N	**Driller:** CB	**Logged:** KN
RL Surface: m	**Contractor:** BG Drilling Pty Ltd	**Bearing:** ---	**Checked:** MS

Method	Water	RL (m)	Depth (m)	Graphic Log	Material Description	Weathering	Estimated Strength (● - Axial, O - Diametral; EL -0.03, VL -0.1, L -0.3, M -1, H -3, VH -10, EH)	$Is_{(50)}$ MPa (D- diametral, A- axial)	RQD %	Defect Spacing mm (30, 100, 300, 1000, 3000)	Additional Data
					SANDSTONE, medium to coarse grained, pale grey. *(continued)*	MW		D 0.24, A 0.53			8.27 - Clay Seam, 20mm. 8.39 - FZ. 80mm
			9		SHALE, dark grey and grey, interbedded wih clay.	HW			57		8.56 - JT, Irregular, Rough, Clean. 8.59 - Clay Seam, 20mm. 8.67 - FZ. 150mm 8.90 - FZ. 20mm 8.92 - JT, 45°, Planar, Rough, Clay Stained.
			10		SHALE, dark grey and grey, laminated.	HW/MW		D 0.19, A 0.23 D 0.33, A 0.36	90 69		8.97 - JT, 0°, Planar, Rough, Clay Stained. 8.99 - JT, 0°, Planar, Rough, Clay Stained. 9.14 - JT, Planar, Rough, Clean. 9.31 - JT, Planar, Rough, Clean. 9.65 - FZ. 50mm 10.09 - JT, Planar, Rough, Clean. 10.29 - JT, Planar, Rough, Clean. 10.36 - JT, 5°, Undulating, Rough, Clean. 10.43 - Clay Seam, 20mm. 10.56 - JT, Planar, Rough, Clean. 10.61 - FZ. 10mm 10.80 - Clay Seam, 40mm.
			11		BH104 terminated at 11m						End of Borehole
			12								
			13								
			14								
			15								
			16								



Core Box Photo

alliance	Client Name:	Carmichael Tompkins Property Group	Figure / Drawing Number:	-
	Project Name:	St. Anthony of Padua Catholic School Stage 4	Figure / Drawing Date:	16/09/2021
	Project Location:	140 Eleventh Avenue, Austral NSW 2173	Report Number:	12483-GR-1-1

APPENDIX D – Dynamic Cone Penetrometer Testing Results

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Website: www.allgeo.com.au

Dynamic Cone Penetrometer (DCP) Test Report

Client	Carmichael Tompkins Property Group	**Report Number**	12843-GR-1-1
Project Name	St Anthony of Padua Catholic School Development Stage 4	**Project Number**	12843
Project Location	140 Eleventh Avenue, Austral NSW 2173	**Date Tested**	29-30 June 2021
Test Method	AS 1289.6.3.2		

Test Number	**DCP-01**	**DCP-02**	**DCP-03**	**DCP-04**	**DCP-05**	**DCP-06**
Test Location	Refer to Drawing 12483-GR-1-A					
Surface Material	Silty CLAY	Silty CLAY	Silty CLAY	Silty CLAY	Silty CLAY	Silty CLAY
Surface Conditions	MC ≥ PL	MC ≥ PL	MC ≥ PL	MC ≤ PL	MC ≥ PL	MC ≥ PL
Approximated RL (m AHD)						
0.00 – 0.15	2	3	9	17	7	9
0.15 – 0.30	2	3	11	13	8	13
0.30 – 0.45	4	4	13	9	9	14
0.45 – 0.60	4	4	14	9	19	13
0.60 – 0.75	9	5	13	17	27	13
0.75 – 0.90	25/100mm	6	15	17	Refusal	12
0.90 – 1.05	Refusal	9	16	14		11
1.05 – 1.20		14	19	14		15
1.20 – 1.35		18	25/100mm	25		18
1.35 – 1.50		25/90mm	Refusal	10/30mm		21
1.50 – 1.65		Refusal		Refusal		Target Depth
1.65 – 1.80						
1.80 – 1.95						
1.95 – 2.10						

Test Number	DCP-07	DCP-08	DCP-09	DCP-10	DCP-11	DCP-12
Test Location	Refer to Drawing 12483-GR-1-A					
Surface Material	Silty CLAY	Silty CLAY	Silty CLAY	Sand	Gravelly Sand	Gravelly Sand
Surface Conditions	MC ≤ PL	MC ≤ PL	MC ≥ PL	M	M	M
Approximated RL (m AHD)						
0.00 – 0.15	9	7	8	10	19	21
0.15 – 0.30	13	10	12	12	16	16
0.30 – 0.45	13	9	12	10	15	12
0.45 – 0.60	12	12	11	12	16	11
0.60 – 0.75	11	11	12	22	22	27
0.75 – 0.90	11	13	15	25/120mm	25/110mm	Refusal
0.90 – 1.05	13	20	16	Refusal		
1.05 – 1.20	14	25/100mm	22			
1.20 – 1.35	20/90mm	Refusal	25/110mm			
1.35 – 1.50	Refusal		Refusal			
1.50 – 1.65						
1.65 – 1.80						
1.80 – 1.95						
1.95 – 2.10						

Notes: This test report is intended to be read in conjunction with the geotechnical report by Alliance Geotechnical (ref: 12483-GR-1-1).

APPENDIX E – Laboratory Test Certificates

Material Test Report

Report Number:	**12483-1**
Issue Number:	1
Date Issued:	13/07/2021
Client:	Alliance Geotechnical
	10 Welder Road, Seven Hills NSW 2147
Contact:	Hadi Ajorlou
Project Number:	12483
Project Name:	St Anthony of Padua
Project Location:	140 Eleventh Avenue, Austral
Contractor:	Carmichael Tompkins Property Group
Work Request:	13856
Sample Number:	21-13856A
Date Sampled:	29/06/2021
Dates Tested:	01/07/2021 - 09/07/2021
Sampling Method:	Sampled by Client
	The results apply to the sample as received
Sample Location:	**BH01 , Depth: 0.5-0.9m**
Material:	CLAY, high plasticity, trace fine gravel, orange.

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PO Box 275, Seven Hills NSW 1730
Phone: 1800 288 188
Email: paul@allgeo.com.au

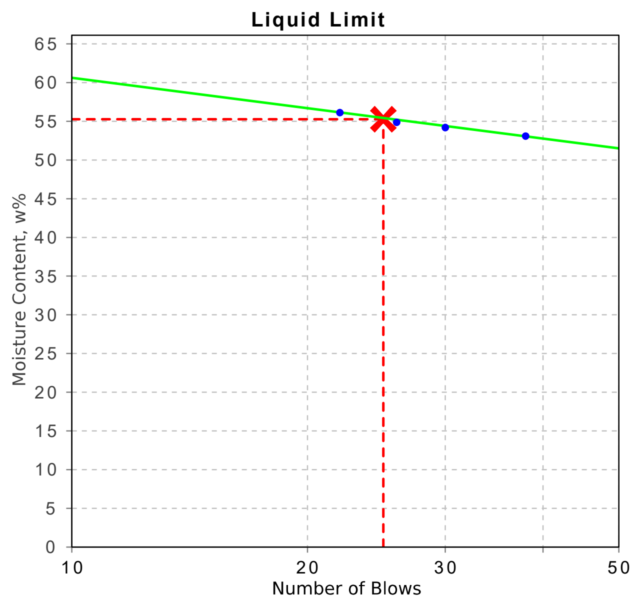
Accredited for compliance with ISO/IEC 17025 - Testing

Approved Signatory: Paul Haslam
Technical Manager - Testing
NATA Accredited Laboratory Number: 15100

Atterberg Limit (AS1289 3.1.1 & 3.2.1 & 3.3.1)		Min	Max
Sample History	Air Dried		
Preparation Method	Dry Sieve		
Liquid Limit (%)	55		
Plastic Limit (%)	16		
Plasticity Index (%)	**39**		

Linear Shrinkage (AS1289 3.4.1)		Min	Max
Moisture Condition Determined By	AS 1289.3.1.1		
Linear Shrinkage (%)	10.0		
Cracking Crumbling Curling	Cracking & Curling		

Moisture Content (AS 1289 2.1.1)	
Moisture Content (%)	23.7



Material Test Report

Report Number:	**12483-1**
Issue Number:	1
Date Issued:	13/07/2021
Client:	Alliance Geotechnical
	10 Welder Road, Seven Hills NSW 2147
Contact:	Hadi Ajorlou
Project Number:	12483
Project Name:	St Anthony of Padua
Project Location:	140 Eleventh Avenue, Austral
Contractor:	Carmichael Tompkins Property Group
Work Request:	13856
Sample Number:	21-13856B
Date Sampled:	29/06/2021
Dates Tested:	01/07/2021 - 09/07/2021
Sampling Method:	Sampled by Client
	The results apply to the sample as received
Sample Location:	**BH08 , Depth: 0.3-0.8m**
Material:	CLAY, high plasticity, orange, trace fine to medium ironstone gravel.

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NATA
WORLD RECOGNISED ACCREDITATION

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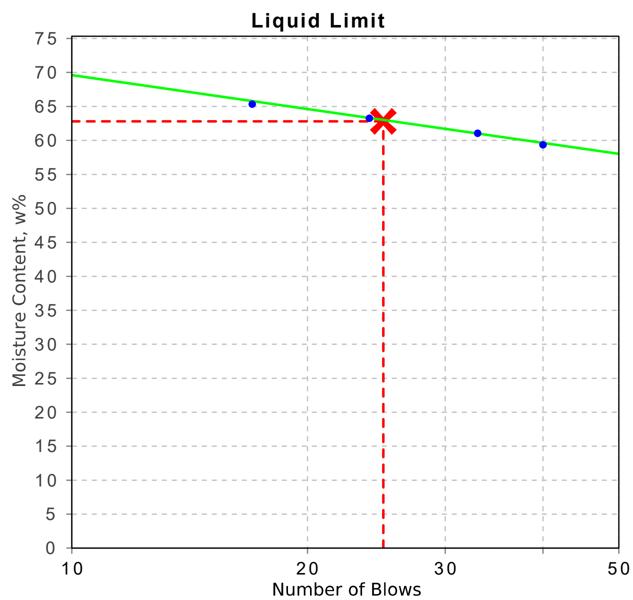
Approved Signatory: Paul Haslam
Technical Manager - Testing
NATA Accredited Laboratory Number: 15100

Atterberg Limit (AS1289 3.1.1 & 3.2.1 & 3.3.1)		Min	Max
Sample History	Air Dried		
Preparation Method	Dry Sieve		
Liquid Limit (%)	63		
Plastic Limit (%)	16		
Plasticity Index (%)	**47**		

Linear Shrinkage (AS1289 3.4.1)		Min	Max
Moisture Condition Determined By	AS 1289.3.1.1		
Linear Shrinkage (%)	10.5		
Cracking Crumbling Curling	Cracking & Curling		

Moisture Content (AS 1289 2.1.1)	
Moisture Content (%)	19.4



Material Test Report

Report Number:	**12483-1**
Issue Number:	1
Date Issued:	13/07/2021
Client:	Alliance Geotechnical
	10 Welder Road, Seven Hills NSW 2147
Contact:	Hadi Ajorlou
Project Number:	12483
Project Name:	St Anthony of Padua
Project Location:	140 Eleventh Avenue, Austral
Contractor:	Carmichael Tompkins Property Group
Work Request:	13856
Sample Number:	21-13856C
Date Sampled:	29/06/2021
Dates Tested:	01/07/2021 - 12/07/2021
Sampling Method:	Sampled by Client
	The results apply to the sample as received
Sample Location:	**BH10 , Depth: 0.6-1.2**
Material:	CLAY, high plasticity, orange, trace fine to medium ironstone gravel.

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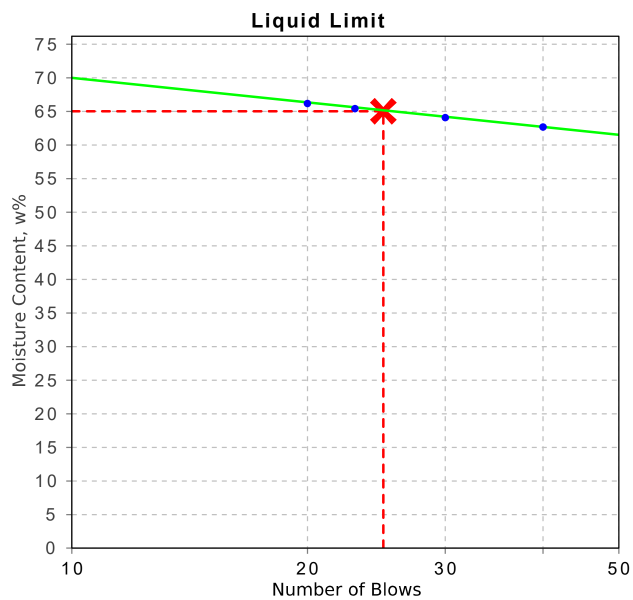
Approved Signatory: Paul Haslam
Technical Manager - Testing

NATA Accredited Laboratory Number: 15100

Atterberg Limit (AS1289 3.1.1 & 3.2.1 & 3.3.1)		Min	Max
Sample History	Air Dried		
Preparation Method	Dry Sieve		
Liquid Limit (%)	65		
Plastic Limit (%)	21		
Plasticity Index (%)	**44**		

Linear Shrinkage (AS1289 3.4.1)		Min	Max
Moisture Condition Determined By	AS 1289.3.1.1		
Linear Shrinkage (%)	14.5		
Cracking Crumbling Curling	Curling		

Moisture Content (AS 1289 2.1.1)	
Moisture Content (%)	18.1



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Certificate of Analysis

NATA Accredited
Accreditation Number 1261
Site Number 18217

Accredited for compliance with ISO/IEC 17025 – Testing
NATA is a signatory to the ILAC Mutual Recognition Arrangement for the mutual recognition of the equivalence of testing, medical testing, calibration, inspection, proficiency testing scheme providers and reference materials producers reports and certificates.

Alliance Geotechnical
10 Welder Road
Seven Hills
NSW 2147

Attention: **Hadi Ajorlou**

Report **807399-S**
Project name 140 ELEVENTH AVE AUSTRAL
Project ID 12483
Received Date Jul 01, 2021

Client Sample ID			**BH01 0.3-0.5**	**BH08 0.3-0.5**	**BH10 0.4-0.6**
Sample Matrix			**Soil**	**Soil**	**Soil**
Eurofins Sample No.			**S21-Jl01947**	**S21-Jl01948**	**S21-Jl01949**
Date Sampled			**Jun 29, 2021**	**Jun 29, 2021**	**Jun 30, 2021**
Test/Reference	LOR	Unit			
Chloride	10	mg/kg	330	55	390
Conductivity (1:5 aqueous extract at 25°C as rec.)	10	uS/cm	230	54	320
pH (1:5 Aqueous extract at 25°C as rec.)	0.1	pH Units	5.6	6.1	5.1
Resistivity*	0.5	ohm.m	44	190	31
Sulphate (as SO4)	10	mg/kg	120	29	280
% Moisture	1	%	13	8.8	7.7

Sample History

Where samples are submitted/analysed over several days, the last date of extraction is reported.

If the date and time of sampling are not provided, the Laboratory will not be responsible for compromised results should testing be performed outside the recommended holding time.

Description	Testing Site	Extracted	Holding Time
Chloride - Method: LTM-INO-4090 Chloride by Discrete Analyser	Sydney	Jul 01, 2021	28 Days
Conductivity (1:5 aqueous extract at 25°C as rec.) - Method: LTM-INO-4030 Conductivity	Sydney	Jul 01, 2021	7 Days
pH (1:5 Aqueous extract at 25°C as rec.) - Method: LTM-GEN-7090 pH in soil by ISE	Sydney	Jul 01, 2021	7 Days
Sulphate (as SO4) - Method: E045 Anions by Ion Chromatography	Sydney	Jul 01, 2021	28 Days
% Moisture - Method: LTM-GEN-7080 Moisture	Sydney	Jul 01, 2021	14 Days

Australia

Melbourne
6 Monterey Road
Dandenong South VIC 3175
Phone : +61 3 8564 5000
NATA # 1261
Site # 1254

Sydney
Unit F3, Building F
16 Mars Road
Lane Cove West NSW 2066
Phone : +61 2 9900 8400
NATA # 1261 Site # 18217

Brisbane
1/21 Smallwood Place
Murarrie QLD 4172
Phone : +61 7 3902 4600
NATA # 1261 Site # 20794

Perth
46-48 Banksia Road
Welshpool WA 6106
Phone : +61 8 9251 9600
NATA # 1261
Site # 23736

Newcastle
4/52 Industrial Drive
Mayfield East NSW 2304
PO Box 60 Wickham 2293
Phone : +61 2 4968 8448
NATA # 1261 Site # 25079

New Zealand

Auckland
35 O'Rorke Road
Penrose, Auckland 1061
Phone : +64 9 526 45 51
IANZ # 1327

Christchurch
43 Detroit Drive
Rolleston, Christchurch 7675
Phone : 0800 856 450
IANZ # 1290

Company Name:	Alliance Geotechnical	**Order No.:**		**Received:**	Jul 1, 2021 5:22 PM
Address:	10 Welder Road Seven Hills NSW 2147	**Report #:**	807399	**Due:**	Jul 8, 2021
		Phone:	1800 288 188	**Priority:**	5 Day
		Fax:	02 9675 1888	**Contact Name:**	Hadi Ajorlou
Project Name:	140 ELEVENTH AVE AUSTRAL				
Project ID:	12483				

Eurofins Analytical Services Manager : Andrew Black

Sample Detail						Aggressivity Soil Set	Moisture Set
Melbourne Laboratory - NATA Site # 1254							
Sydney Laboratory - NATA Site # 18217						X	X
Brisbane Laboratory - NATA Site # 20794							
Perth Laboratory - NATA Site # 23736							
Mayfield Laboratory - NATA Site # 25079							
External Laboratory							
No	**Sample ID**	**Sample Date**	**Sampling Time**	**Matrix**	**LAB ID**		
1	BH01 0.3-0.5	Jun 29, 2021		Soil	S21-Jl01947	X	X
2	BH08 0.3-0.5	Jun 29, 2021		Soil	S21-Jl01948	X	X
3	BH10 0.4-0.6	Jun 30, 2021		Soil	S21-Jl01949	X	X
Test Counts						3	3

Internal Quality Control Review and Glossary

General

1. Laboratory QC results for Method Blanks, Duplicates, Matrix Spikes, and Laboratory Control Samples follows guidelines delineated in the National Environment Protection (Assessment of Site Contamination) Measure 1999, as amended May 2013 and are included in this QC report where applicable. Additional QC data may be available on request.
2. All soil/sediment/solid results are reported on a dry basis, unless otherwise stated.
3. All biota/food results are reported on a wet weight basis on the edible portion, unless otherwise stated.
4. Actual LORs are matrix dependant. Quoted LORs may be raised where sample extracts are diluted due to interferences.
5. Results are uncorrected for matrix spikes or surrogate recoveries except for PFAS compounds.
6. SVOC analysis on waters are performed on homogenised, unfiltered samples, unless noted otherwise.
7. Samples were analysed on an 'as received' basis.
8. Information identified on this report with blue colour, indicates data provided by customer, that may have an impact on the results.
9. This report replaces any interim results previously issued.

Holding Times

Please refer to 'Sample Preservation and Container Guide' for holding times (QS3001).

For samples received on the last day of holding time, notification of testing requirements should have been received at least 6 hours prior to sample receipt deadlines as stated on the SRA.

If the Laboratory did not receive the information in the required timeframe, and regardless of any other integrity issues, suitably qualified results may still be reported.

Holding times apply from the date of sampling, therefore compliance to these may be outside the laboratory's control.

For VOCs containing vinyl chloride, styrene and 2-chloroethyl vinyl ether the holding time is 7 days however for all other VOCs such as BTEX or C6-10 TRH then the holding time is 14 days.

****NOTE:** pH duplicates are reported as a range NOT as RPD

Units

mg/kg: milligrams per kilogram	**mg/L:** milligrams per litre	**ug/L:** micrograms per litre
ppm: Parts per million	**ppb:** Parts per billion	**%:** Percentage
org/100mL: Organisms per 100 millilitres	**NTU:** Nephelometric Turbidity Units	**MPN/100mL:** Most Probable Number of organisms per 100 millilitres

Terms

Dry	Where a moisture has been determined on a solid sample the result is expressed on a dry basis.
LOR	Limit of Reporting.
SPIKE	Addition of the analyte to the sample and reported as percentage recovery.
RPD	Relative Percent Difference between two Duplicate pieces of analysis.
LCS	Laboratory Control Sample - reported as percent recovery.
CRM	Certified Reference Material - reported as percent recovery.
Method Blank	In the case of solid samples these are performed on laboratory certified clean sands and in the case of water samples these are performed on de-ionised water.
Surr - Surrogate	The addition of a like compound to the analyte target and reported as percentage recovery.
Duplicate	A second piece of analysis from the same sample and reported in the same units as the result to show comparison.
USEPA	United States Environmental Protection Agency
APHA	American Public Health Association
TCLP	Toxicity Characteristic Leaching Procedure
COC	Chain of Custody
SRA	Sample Receipt Advice
QSM	US Department of Defense Quality Systems Manual Version 5.3
CP	Client Parent - QC was performed on samples pertaining to this report
NCP	Non-Client Parent - QC performed on samples not pertaining to this report, QC is representative of the sequence or batch that client samples were analysed within.
TEQ	Toxic Equivalency Quotient

QC - Acceptance Criteria

RPD Duplicates: Global RPD Duplicates Acceptance Criteria is 30% however the following acceptance guidelines are equally applicable:

Results <10 times the LOR : No Limit

Results between 10-20 times the LOR : RPD must lie between 0-50%

Results >20 times the LOR : RPD must lie between 0-30%

Surrogate Recoveries: Recoveries must lie between 20-130% Phenols & 50-150% PFASs

PFAS field samples that contain surrogate recoveries in excess of the QC limit designated in QSM 5.3 where no positive PFAS results have been reported have been reviewed and no data was affected.

WA DWER (n=10): PFBA, PFPeA, PFHxA, PFHpA, PFOA, PFBS, PFHxS, PFOS, 6:2 FTSA, 8:2 FTSA

QC Data General Comments

1. Where a result is reported as a less than (<), higher than the nominated LOR, this is due to either matrix interference, extract dilution required due to interferences or contaminant levels within the sample, high moisture content or insufficient sample provided.
2. Duplicate data shown within this report that states the word "BATCH" is a Batch Duplicate from outside of your sample batch, but within the laboratory sample batch at a 1:10 ratio. The Parent and Duplicate data shown is not data from your samples.
3. Organochlorine Pesticide analysis - where reporting LCS data, Toxaphene & Chlordane are not added to the LCS.
4. Organochlorine Pesticide analysis - where reporting Spike data, Toxaphene is not added to the Spike.
5. Total Recoverable Hydrocarbons - where reporting Spike & LCS data, a single spike of commercial Hydrocarbon products in the range of C12-C30 is added and it's Total Recovery is reported in the C10-C14 cell of the Report.
6. pH and Free Chlorine analysed in the laboratory - Analysis on this test must begin within 30 minutes of sampling.Therefore laboratory analysis is unlikely to be completed within holding time. Analysis will begin as soon as possible after sample receipt.
7. Recovery Data (Spikes & Surrogates) - where chromatographic interference does not allow the determination of Recovery the term "INT" appears against that analyte.
8. Polychlorinated Biphenyls are spiked only using Aroclor 1260 in Matrix Spikes and LCS.
9. For Matrix Spikes and LCS results a dash " -" in the report means that the specific analyte was not added to the QC sample.
10. Duplicate RPDs are calculated from raw analytical data thus it is possible to have two sets of data.

Quality Control Results

Test	Lab Sample ID	QA Source	Units	Result 1			Acceptance Limits	Pass Limits	Qualifying Code
Method Blank									
Chloride			mg/kg	< 10			10	Pass	
Conductivity (1:5 aqueous extract at 25°C as rec.)			uS/cm	< 10			10	Pass	
Sulphate (as SO4)			mg/kg	< 10			10	Pass	
LCS - % Recovery									
Chloride			%	94			70-130	Pass	
Conductivity (1:5 aqueous extract at 25°C as rec.)			%	91			70-130	Pass	
Resistivity*			%	91			70-130	Pass	
Sulphate (as SO4)			%	94			70-130	Pass	
Test	**Lab Sample ID**	**QA Source**	**Units**	**Result 1**			**Acceptance Limits**	**Pass Limits**	**Qualifying Code**
Spike - % Recovery									
				Result 1					
Chloride	S21-Jl01948	CP	%	98			70-130	Pass	
Sulphate (as SO4)	S21-Jl01948	CP	%	96			70-130	Pass	
Test	**Lab Sample ID**	**QA Source**	**Units**	**Result 1**			**Acceptance Limits**	**Pass Limits**	**Qualifying Code**
Duplicate									
				Result 1	Result 2	RPD			
Conductivity (1:5 aqueous extract at 25°C as rec.)	S21-Jl00333	NCP	uS/cm	31	29	6.0	30%	Pass	
pH (1:5 Aqueous extract at 25°C as rec.)	S21-Jl00333	NCP	pH Units	5.5	5.6	<1	30%	Pass	
Resistivity*	S21-Jl00333	NCP	ohm.m	320	340	6.0	30%	Pass	
Duplicate									
				Result 1	Result 2	RPD			
Chloride	S21-Jl01948	CP	mg/kg	55	55	<1	30%	Pass	
Sulphate (as SO4)	S21-Jl01948	CP	mg/kg	29	28	1.0	30%	Pass	
% Moisture	S21-Jl01948	CP	%	8.8	6.7	26	30%	Pass	

eurofins | Environment Testing

Comments

Sample Integrity

Custody Seals Intact (if used)	N/A
Attempt to Chill was evident	Yes
Sample correctly preserved	Yes
Appropriate sample containers have been used	Yes
Sample containers for volatile analysis received with minimal headspace	Yes
Samples received within HoldingTime	Yes
Some samples have been subcontracted	No

Authorised by:

Andrew Black	Analytical Services Manager
Charl Du Preez	Senior Analyst-Inorganic (NSW)

Glenn Jackson
General Manager

Final Report – this report replaces any previously issued Report

- Indicates Not Requested

* Indicates NATA accreditation does not cover the performance of this service

Measurement uncertainty of test data is available on request or please click here.

Appendix J – Community Communications Strategy

ST ANTHONY OF PADUA CATHOLIC COLLEGE

Community Communications Strategy

Prepared for

LIPMAN ON BEHALF OF SYDNEY CATHOLIC SCHOOLS AND CARMICHAEL TOMPKINS PROPERTY GROUP (CTPG)

30 May 2022

URBIS STAFF RESPONSIBLE FOR THIS REPORT WERE:

Associate Director	Stephanie Potter
Consultant	Hayley Kardash
Project Code	P0040242
Report Number	Final

Urbis acknowledges the important contribution that Aboriginal and Torres Strait Islander people make in creating a strong and vibrant Australian society.

We acknowledge, in each of our offices, the Traditional Owners on whose land we stand.

CONTENTS

FIGURES

TABLES

1. INTRODUCTION

Sydney Catholic Schools is delivering a master plan for its St Anthony of Padua Catholic College campus at 140 Eleventh Ave, Austral NSW 2179 in City of Liverpool Council.

This Community Communication Strategy (CCS) has been prepared by Urbis Engagement, an engagement consultant, appointed by Lipman on behalf of Sydney Catholic Schools and Carmichael Tompkins Property Group (CTPG) (the proponent).

This Community Communication Strategy (CCS) has been prepared in line with the development consent C10 as part of the Development Consent for SSD-8865-Mod 1.

Sydney Catholic Schools received development consent on its Mod1 State Significant Development Application (SSDA) in January 2022.

The Mod1SSDA sought approval for the following:

- Updated project phasing relating to construction works and student capacities
- Amened built form
- Reduced total gross floor area
- Altered composition of recreational facilities
- Amended configuration of carparks and drop-off / pick-up area.

The modification application also sought approval for a minor modification to the site layout including relocation of the trade centre and to reflect the above amendments.

1.1. SCOPE OF THE COMMUNITY COMMUNICATION STRATEGY

A portion of work approved as part of the original SSD-8865 for Stage 1 has already been completed.

The table below shows all Stage 1 work that has been approved as part of the Mod1 SSDA and outlines the scope of construction work covered in this CCS. The CCS will be updated (or recreated) in line with future development consent to cover the additional approved elements of SSD-8865-Mod 1

Table 1 Scope of CCS

Approved SSD-8865-Mod 1 (Stage 1)	Stage 1 scope covered by this CCS
▪ Carpark 2 and carpark extensions ▪ Construction of all build forms and external works including carpark 4 ▪ Early learning centre extension ▪ External road works and intersection upgrades ▪ Piazza ▪ Removal of temporary buildings ▪ Sports courts ▪ Sports ovals, carpark 3 and maintenance area ▪ Community garden and woodland retention ▪ Relocation furniture staff and students.	▪ Construction of all build forms and external works including carpark 4 ▪ Piazza ▪ Removal of temporary buildings ▪ Sports courts ▪ Sports overs, carpark 3 and maintenance area ▪ Community garden and woodland retention ▪ Relocation furniture staff and students

1.2. CROSS-REFERENCE OF CONSENT REQUIREMENTS

Table 1 identifies the reference/s within this Strategy as they relate to the requirements under Development Consent Condition 8865 – Community Communication Strategy.

Table 2 Development Consent Condition 8865

Consent condition Reference	Consent condition	Report reference
C10	No later than two weeks before the commencement of any construction works on the site, a Community Communication Strategy must be submitted to the Planning Secretary for information prior to the commencement of construction or within another timeframe agreed with the Planning Secretary. The Community Communication Strategy must provide mechanisms to facilitate communication between the Applicant, the relevant Council and the community (including adjoining affected landowners and businesses, and others directly impacted by the development), during the design and construction of the development and for a minimum of 12 months following the completion of construction of all construction phases within Stage The Community Communication Strategy must:	This document submitted on 30 May 2022
C10. a)	identify people to be consulted during the design and construction phases;	Refer to section 4 of this document
C10. b)	set out procedures and mechanisms for the regular distribution of accessible information about or relevant to the development;	Refer to section 5 of this document
C10. c)	provide for the formation of community-based forums, if required, that focus on key environmental management issues for the development;	Refer to section 5.2 of this document
C10. d)	Set out procedures and mechanisms:	See below
C10. D.i.)	through which the community can discuss or provide feedback to the Applicant;	Refer to section 5 of this document
C10. D.ii.)	through which the Applicant will respond to enquiries or feedback from the community; and	Refer to section 5.3 of this document
C10. D.iii.)	to resolve any issues and mediate any disputes that may arise in relation to construction and operation of the development, including disputes regarding rectification or compensation.	Refer to section 5.4 of this document
C10. e)	include any specific requirements around traffic, noise and vibration, visual impacts, amenity, flora and fauna, soil and water and contamination.	Refer to section 5 of this document

2. PROJECT OVERVIEW

2.1. THE SITE

St Anthony of Padua Catholic College is located at 125-165 Tenth Avenue and 140-170 Eleventh Avenue, Austral (the site) in the Liverpool City Local Government Area (LGA). It is surrounded by a mix of newly constructed medium density homes, with some low density and semi-rural homes. It is located around 37 kilometres from Sydney's CBD and 10km west of Liverpool CBD.

The current land use mix reflects the area's transition as it reflects the 'Austral and Leppington North Precinct' of the South West Growth Area (SWGA), which is an emerging greenfield corridor with planned urban development for a range of residential, commercial and community uses.

The site is directly bound by Eleventh Avenue to the north, Tenth Avenue to the south, residential development to the east and Fourth Avenue to the west. To the north of the site and on the opposite side of Eleventh Avenue, is Craik Park, an open space with tennis courts and playing fields.

An existing church (St Anthony of Padua Church) adjoins to the east of Craik Park. The surrounding area is currently undergoing a significant transition from a semi-rural residential to a low to medium density residential area as part of NSW Government's plans for South West Growth Area (SWGA).

Figure 1 The site

2.2. THE PROJECT

Sydney Catholic Schools has developed a master plan for its St Anthony of Padua Catholic College campus at 125-165 Tenth Avenue and 140-170 Eleventh Avenue, Austral (the site) in the Liverpool City Local Government Area (LGA). The master plan is for a contemporary new campus with multipurpose kindergarten, primary and secondary College buildings. The overall it aims for the expansion of the college to up to 2,480 students and 200 staff.

Austral is a fast-growing suburb in Sydney's South West Growth Area, with over 75,000 students expected to be accommodated within the growth area over the next 20 years. Investment and planning in education infrastructure are required now to meet the demands of the community now and into the future.

2.2.1. SSDA history

The College prepared a master plan for a contemporary new campus with multipurpose kindergarten, primary and secondary college buildings. This State Significant Development Application (SSDA 8865) was approved in April 2020.

Since receiving this approval, Sydney Catholic Schools commissioned a new architect who has reduced the building footprint to maximize the use of space and create superior learning and recreational spaces, with improved pedestrian flow on campus. Because of this, Sydney Catholic Schools then lodged a modification to the approved SSDA.

3. OBJECTIVE AND APPROACH

The communication objective is to keep the community informed of construction impacts. To achieve this objective, the approach involves:

- Building key college community stakeholder relationships and maintain good will with impacted communities
- Managing community expectations and building trust by effectively managing enquiries and complaints
- Providing timely information to impacted stakeholders and broader communities
- Addressing and correcting misinformation in the public domain
- Reducing the risk of project delays caused by negative third-party intervention
- Leaving a positive legacy in each community.

3.1. COMMUNICATIONS INTERFACE (ROLES AND RESPONSIBILITIES)

The successful delivery of the project is contingent on a coordinated, consistent and considered approach to community communication and stakeholder engagement.

From the community's point of view, response on issues should appear seamless. In order to achieve this objective, the Community Relations Manager (point of contact) will work collaboratively with the Project Director and Construction Manager and the Colleges internal communications team to ensure all internal and external communications are in lockstep.

This approach will be implemented during Stage 1 (scope covered by this CCS) and for 12 months following completion.

4. STAKEHOLDERS – PEOPLE TO BE CONSULTED DURING DESIGN AND CONSTRUCTION

St Anthony of Padua Catholic College is surrounded by a mix of newly constructed medium density homes, with some low density and semi-rural homes. To the south is Tenth Avenue, to the east is Edmondson Avenue and to the west is Fourth Avenue. Other sites nearby of significance include:

- St Anthony's Catholic Church Austral
- RSL LifeCare - Tobruk Retirement Living
- Outer Liverpool Community Services
- Austral Community Preschool
- Kantarra Lifestyle Resort.

For the purpose of this CCS, people to be consulted during construction are referred to as stakeholders and the surrounding community.

It will be important to ensure that stakeholders and the surrounding community (including adjoining affected landowners and others directly impacted by the development) are well informed about construction activity and impacts. The near neighbours outlined in the figure below have been identified as the surrounding community due to their proximity to the site and likely impact during construction and operation.

This includes the nearby residents that could potentially be impacted by noise, traffic and access as a result of construction. The surrounding community are familiar with this development as St Anthony of Padua Catholic College undertook a comprehensive stakeholder engagement program throughout each stage of planning.

Therefore, engagement with stakeholders and the surrounding community will focus on the specific potential impacts of construction work associated with the scope of Stage 1 works included in this CCS. Likely impacts of construction include:

- Noise and traffic during construction
- Disruption to traffic flows on the local street system
- Out of hours of work
- Pedestrian safety as a result of changes to traffic flow in and around the College
- Perceived property damage due to dust
- Day-to-day operational impacts to the College community as a result of construction work on site.

Figure 2 The surrounding community

People who will be informed and consulted during construction (stakeholders and the surrounding community) are outlined in the table below. The table also outlines the dedicated engagement interface, communications activities, the potential concerns and their involvement. This table will be reviewed and updated as needed.

Table 3 Stakeholders, activities, and concerns

People to be consulted (Stakeholders)	Communication activities (see Section 4)	Concerns
Liverpool City Council ▪ Mayor Ned Mannoun **North Ward Councillors, including:** ▪ Councillor Mazhar Hadid ▪ Councillor Mel Goodman ▪ Councillor Nathan Hagarty ▪ Councillor Peter Harle ▪ Councillor Ali Karnib	▪ Enquires and feedback response ▪ Issues resolution and mediation of disputes ▪ Incident management ▪ Construction notifications as required ▪ Construction signage	▪ Traffic management ▪ Visual impacts ▪ Community concerns ▪ Permit approvals ▪ Impacts on local characteristics ▪ Impacts of construction activities including noise, dust and vibrations ▪ Impact on local on and off-street parking availability

People to be consulted (Stakeholders)	Communication activities (see Section 4)	Concerns
Surrounding community, including individual households and businesses: ▪ Thirteenth Avenue ▪ Twelfth Avenue ▪ Eleventh Avenue ▪ Tenth Avenue ▪ Ninth Avenue ▪ Eighth Avenue ▪ Edmondson Avenue ▪ Fourth Avenue ▪ Kelly Street	▪ Enquires and feedback response ▪ Issues resolution and mediation of disputes ▪ Incident management ▪ Construction notifications as required ▪ Construction signage	During Environmental Impact Statement (EIS) consultation, local residents and businesses identified very little concern regarding the proposed master plan. **Potential likely concerns during construction could be:** ▪ Traffic management ▪ Visual impacts ▪ Impacts on local characteristics, such as tree clearing ▪ Impacts of construction activities including noise, dust and vibrations ▪ Impact on local on and off street parking availability ▪ Concerns regarding the increase in pedestrian activity ▪ Construction timing including the expected finished date
St Anthony of Padua Catholic College ▪ Current and future parents ▪ Current and future staff ▪ Current and future students	▪ Enquires and feedback response ▪ Issues resolution and mediation of disputes ▪ Incident management ▪ Construction notifications as required ▪ Face to face meetings as required ▪ Construction signage.	▪ Day-to-day operational impacts as a result of construction ▪ Student safety as a result of changes to traffic flow and pedestrian infrastructure ▪ Impact on teaching as a result of construction noise and disturbances ▪ Changes to staff parking conditions ▪ Impacts of construction activities including noise, dust and vibrations

5. PROCEDURES AND MECHANISMS

5.1. INFORMATION PROVISION

Information about the project will be provided to stakeholder and the surrounding community in line with the requirements of Development Consent Condition C10 through the communication activities outlined in the Table 4 Communication activities for information provision.

Table 4 Communication activities for information provision.

Activity	Description	Stakeholder	Timing
Establishment of website, phone number and email	Project contact details and up to date project information will be provided for all communication activities. The college website will provide an overview of project details, construction related management documents, construction updates, and enquiry contact details. See Section 5.3 Table 5 Contact point for Stage 1 construction. Process for responding is outlined in Section 5.3 Table 6.	All stakeholders and the surrounding community	Information will be available online no less than 14 days before construction. Ongoing enquiry management and website content available for a minimum of 12 months following the completion of construction.
Access to Information	In accordance with Development Consent Condition A21, at least 48 hours before the commencement of construction until the completion of all works under this consent, or such other time as agreed by the Planning Secretary, information, and documents (as they are obtained or approved) will be made publicly available on the website.	Stakeholders and the surrounding community	No less than 48 hours before construction. Information available online (College's website) for a minimum of 12 months following the completion of construction.
Signage (site notices)	The community feedback, enquiries and complaints phone and email will be included on signage at the front of the site. In accordance with Development Consent Condition D1, the signage will be prominently displayed at the boundaries of the site during construction for the purposes of informing the public of project details.	Stakeholders and the surrounding community	Information and signage available on site throughout the duration of Stage 1 construction included in the scope outlined in the CCS.
Start of construction notification	In line with Development Consent C1, a community newsletter outlining construction timeline, impacts and mitigations, and community feedback,	Surrounding community (Individual	No less than 48 hours before start of construction.

Activity	Description	Stakeholder	Timing
letterbox drop (newsletter letter)	enquiries and complaints phone number and email.	households and businesses)	
Face-to-face meetings	Face-to-face project briefing with key stakeholders and community groups provide project information about environmental management issues for the development.	Stakeholders and the surrounding community	As required depending on the level of community interest and feedback.
Construction notification letterbox drop (out-of-hours and unplanned work)	Letter notification to inform changes to construction (out-of-hours and unplanned work). The letter would outline works, impacts and mitigations, and community feedback, enquiries and complaints phone number and email. In accordance with Development Consent Condition D13 and D14, notification of out of hours construction activities must be given to residents before undertaking the activities or as soon as is practical afterwards.	Immediate neighbours College community (parents, students and staff)	At least 72 hours before undertaking the activities or as soon as is practical afterwards.
Sensitive receiver consultation procedure	In line with Development Consent Condition C10 (e), for high noise generating works, vibration intensive activities or potential traffic disruptions, visual impacts, amenity, flora and fauna, soil and water, contamination, heritage, sensitive receivers will be informed via letterbox drop ahead of time.	Stakeholders and the surrounding community and the College community (parents, students, teachers)	Before undertaking the activities or as soon as is practical afterwards.

5.2. COMMUNITY BASED FORUMS

Depending on the level of stakeholder interest and feedback in the first three months of construction of Stage 1 works covered in this CCS, the principal contractor or their authorised representative will consider the establishment of community-based forums to enable deeper focus on key environmental management issues for the project.

Following the first three months of Stage 1 works covered in this CCS, this process will be reassessed every six months through to completion of these works. If required, public meetings and presentations will be held as frequently as required.

Meetings would include:

- Updating the community on the environmental management of the development works.
- Providing a direct face to face consultation between the project team and the concerned community members.
- Meetings and presentations will be held on a required basis to raise concerns by the local community members.

The above forums are considered appropriate to the scale of the development works. If required, we would recommend community-based forums be held on site at the College attended by at least one College representative, relevant technical leads and project managers.

Depending on the level of stakeholder interest and feedback in the first three months of construction, the principal contractor or their authorised representative will consider the establishment of community-based forums to enable deeper focus on key environmental management issues for the Project.

5.3. ENQUIRIES AND FEEDBACK RESPONSE

As outlined in Table 5, website, phone number and email will be established and maintained for design, construction and operation of the project.

Table 5 Project contact points

Channel	**Details**
Point of contact	Tim Calpito Project Manager Lipman
Mailing address	Level 6, 66 Berry St North Sydney NSW 2060
Phone number	(02) 9955 7000
Email	stanthonyofpadua@lipman.com.au
Website	www.stapaustral.catholic.edu.au/

While this CCS covers only a portion of work included in Stage 1 Mod, all enquiries and feedback relating to Stage 1 Mod works will be recorded in a Complaints Register managed by Lipman. Lipman will direct the enquiry to the relevant consultant. Refer to Section 5.4 for the details regarding the complaints, issues and disputes resolution process.

All feedback and enquiries during construction will be answered in accordance with the timeframes below.

Feedback and enquiries in relation to day-to-day College operations will be recorded and passed on to the College. The College will manage operational enquiries through the existing communications mechanism. All feedback and enquires will be answered in accordance with the timeframes below:

Table 6 Response times

Channel	**Response time**
Email	One business day (if contact is made outside of businesses hours, a response will be provided on the next business day)
On-site inquiry (in-person)	One business day (if contact is made outside of businesses hours, a response will be provided on the next business day)
Site phone line	Thirty minutes - during business hours (if contact is made outside of businesses hours, a response will be provided on the next business day)

Channel	Response time
Website contact	Three business days (if contact is made outside of businesses hours, a response will be provided on the next business day)

5.4. ISSUES RESOLUTION AND MEDIATION OF DISPUTES

Robust and timely enquiry and complaints management is integral to building and maintaining trust in the community. The College can build and maintain good will within the community through careful management of enquiries and complaints.

The below diagram outlines the enquiry and complaints management process. This plan provides a procedure for issues resolution and the mediation of disputes, targeting resolution within seven days from the date the issue was first raised.

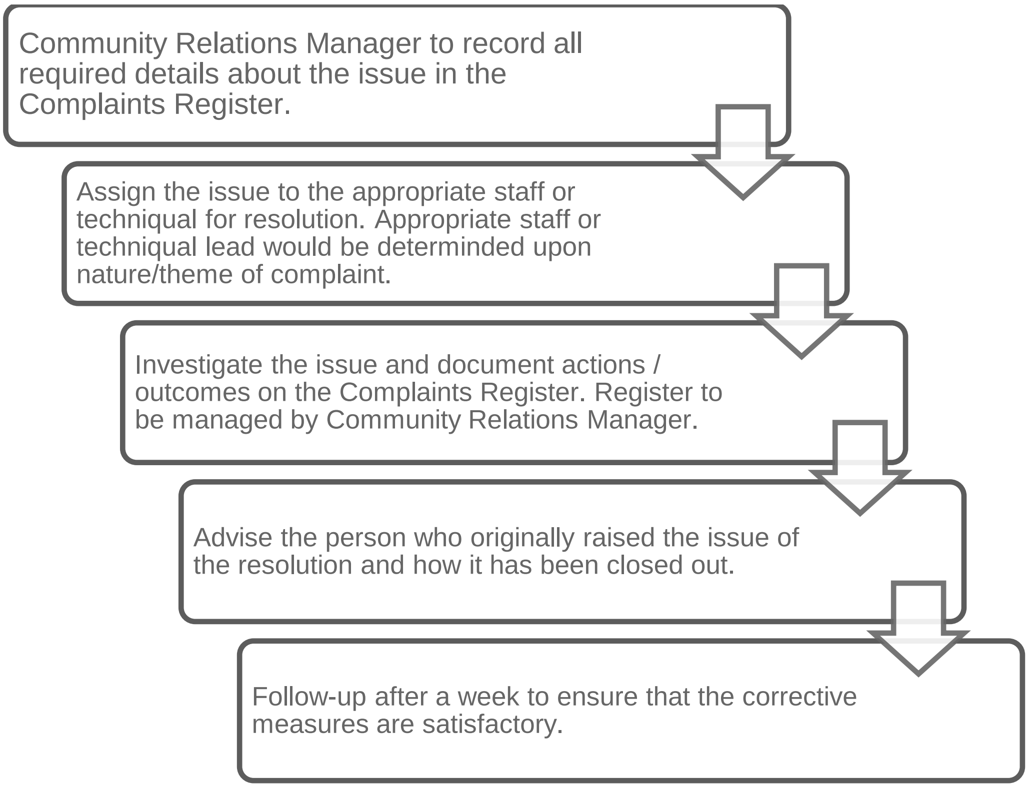
This mechanism in Figure 3 Complaints, issues, and disputes resolution process' allows for the identification and implementation of corrective measures in response to issues raised by the community, to minimise the likelihood of recurrence. All complaints will be recorded in a Complaints Register.

The following process will be implemented during Stage 1 works covered in this CCS and for 12 months following completion. Complaints, issues and disputes regarding School operations will be recorded and passed on to the College. The College will manage operational enquiries through the College's existing mechanism. Complaints, issues, and disputes that may require the implementation of this process if a reoccurring or unavoidable complaint is received.

Nature/ theme of concerns may include, but are not limited to the following:

- Noise and traffic during construction
- Disruption to traffic flows on the local street system
- Out of hours of work
- Pedestrian safety as a result of changes to traffic flow in and around the College
- Perceived property damage due to dust
- Day-to-day operational impacts to the College community as a result of construction work on site.

Figure 3 Complaints resolution process



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