Construction Management Plan (CMP)

Santa Sophia Catholic College

"The Gables" Town Centre

12 April 2019

Revision	Date	Section	Revision Details
03	12 April 2019	All	Preliminary

Contents

INTRODUCTION

Overview

This Construction Management Plan (CMP) has been prepared by Buildcorp on behalf of the Catholic Education Diocese of Parramatta c/TSA Management Pty Ltd (the Applicant).

It accompanies an Environmental Impact Statement (EIS) in support of State Significant Development Application (SSD 18_9772) for the new Santa Sophia Catholic College on the corner of Fontana Drive and the future road 'B', between Red Gables Road and Fontana Drive, in Box Hill North (the site).

The new school will cater for approximately 1,920 primary and secondary school students, inclusive of a 60 student Catholic Early Learning Centre. The school will have 130 full-time equivalent staff.

The proposal seeks consent for approximately 15,000sqm of floor space across a part five and part six storey building. The building will present as three main hubs connected by terraced courtyards and garden spaces.

The school will include:

- Catholic Early learning centre for 60 students;
- General Learning Spaces for years Kindergarten to 12;
- Community Hub – knowledge centre and cafe;
- Creative Hub – art and applied science;
- Performance Hub – multipurpose hall and music, dance and drama spaces;
- Professional Hub – administrative space;
- Research Hub – science and fitness;
- Associated site landscaping and open space including a fence and sporting facilities;
- Bus drop off from Fontana Drive;
- Pick-up and drop-off zone from future road 'B';
- Pedestrian access points from Red Gables Road north, Fontana Drive and future road 'B';
- Staff parking for 110 vehicles provided off site in an adjacent location;
- Short term parking for pick up and drop off for Catholic Early Learning Centre from Red Gables Road; and
- Digital and non-digital signage to the school.

Purpose

The purpose of this Construction Management Plan (CMP) is to provide a summary of the project, what it entails and the proposed methodology on how the works will be undertaken whilst minimising the impacts of construction activities on:

- Neighbours & Nearby residents.
- Users of public footpaths and roads.
- Parking Surrounding the site.
- Surrounding streets used to access the site.
- The Environment.

Note

The CMP cannot be issued as a 'final' document until the specific development application conditions of consent are received.

Response to SEARs

This Construction Management Plan (CMP) is required by the Secretary's Environmental Assessment Requirements (SEARs) for SSD 18_9772. This table identifies the relevant SEARs requirement/s and corresponding reference/s within this report.

Table 1 – SEARs and Relevant Reference

SEARs Item	Report Reference
18. Sediment, Erosion and Dust Controls: Detail measures and procedures to minimise and manage the generation and off-site transmission of sediment, dust and fine particles. • Relevant Policies and Guidelines: • Managing Urban Stormwater – Soils & Construction Volume 1 2004 (Landcom) • Approved Methods for the Modelling and Assessment of Air Pollutants in NSW (EPA) Guidelines for development adjoining land and water managed by DECCW (OEH, 2013).	**Appendix B**
20. Waste: Identify, quantify and classify the likely waste streams to be generated during construction and operation and describe the measures to be implemented to manage, reuse, recycle and safely dispose of this waste. Identify appropriate servicing arrangements (including but not limited to, waste management, loading zones, mechanical plant) for the site.	**Appendix E**
21. Construction Hours: Identify proposed construction hours and provide details of the instances where it is expected that works will be required to be carried out outside the standard construction hours.	**Section 4.0: SITE ESTABLISHMENT, CONTROL & PROJECT STAGING**

1.0 PROJECT OVERVIEW

1.1 Project Location

Santa Sophia School is located within the new ‘The Gables’ development in the suburb of Box Hill NSW.

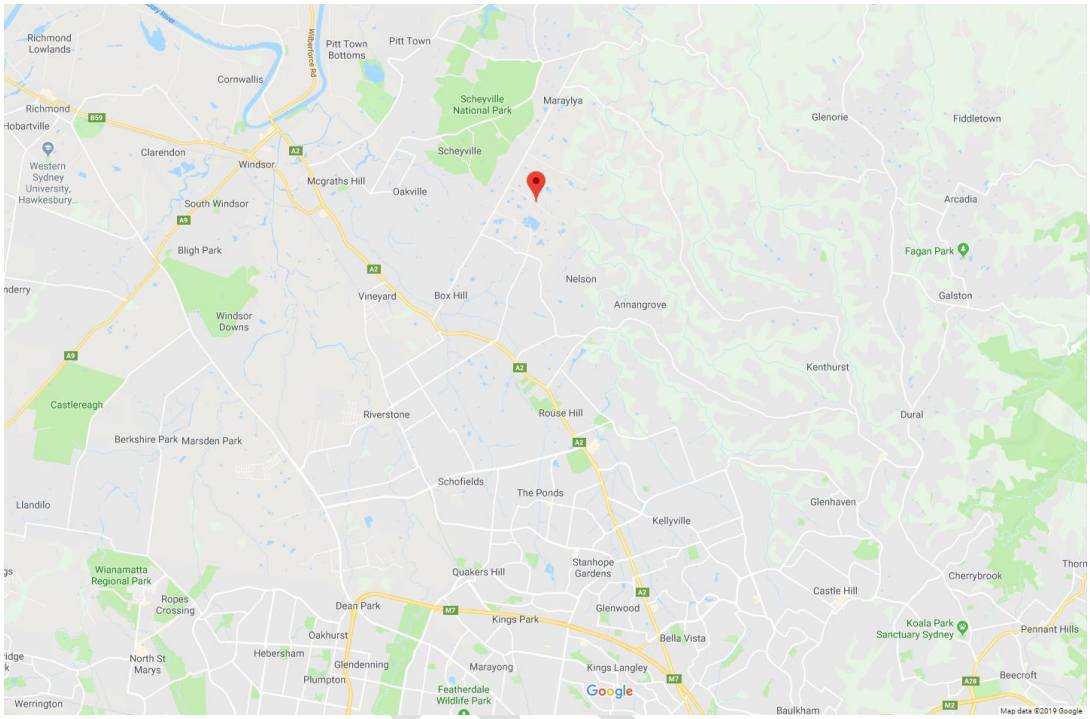

Figure 1 – Suburb Location.

Figure 2 – Location Plan of School

Figure 3 – Location Plan of School within The Gables development

The school site is located fronting Fontana Road to the West, and is adjacent the new 'Town Centre' of the Gables development.

1.2 Project Scope

The scope of the project can be identified as follows;

A new school that will cater for approximately 1,920 primary and secondary school students, inclusive of a 60 student Catholic Early Learning Centre.

The school will have 130 full-time equivalent staff.

The school consists approximately 15,000sqm of floor space across a part five and part six storey building. The building will present as three main hubs connected by terraced courtyards and garden spaces.

The school will include:

- Catholic Early learning centre for 60 students;
- General Learning Spaces for years Kindergarten to 12;
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- Associated site landscaping and open space including a fence and sporting facilities;
- Bus drop off from Fontana Drive;
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- Staff parking for 110 vehicles provided off site in an adjacent location;
- Short term parking for pick up and drop off for Catholic Early Learning Centre from Red Gables Road; and
- Digital and non-digital signage to the school.

2.0 PROJECT PROGRAM & MILESTONES

The Gables precinct subdivision is currently under construction by the developer.

The School site within the precinct will be prepared and handed to the Catholic Education Diocese of Parramatta as a 'greenfield' site free of any existing structures or services within the site boundary. New Infrastructure services will be located at the site boundary for connection of the future development.

Construction works for the new school are anticipated to commence in Q4 of 2019 and will target completion by October of 2020.

The overall duration of the project is expected to take approximately 12 months.

Target milestone dates are listed below:

Project Milestones	**Planned Completion Dates**
Site Establishment	Late 2019
Building Structure Complete	June 2020
Building Watertight	July 2020
Buildings Complete	October 2020
External Works Complete	October 2020
Project Completion Target	October 2020
Students Commence at The School	January 2021

3.0 COMMUNICATION & CONSULTATION

Catholic Education Diocese of Parramatta have established an appropriate communication plan which ensures all neighbours and relevant parties remained informed about the development.

Part of this plan provisions for a construction team member to be included in the liaison team with the subdivision developer, surrounding community, and relevant authorities.

The consultation process makes provision for community complaints about construction activities to be submitted, tracked and responded to via a register which forms part of the Project Control Group's reporting structure.

Project updates will be issued on a regular basis to proactively inform the local community.

4.0 SITE ESTABLISHMENT, CONTROL & PROJECT STAGING

4.1 Site Establishment

For details, refer to ***Appendix A - Site Establishment, Access and Material Handling Plan.***

4.1.1 Dilapidation Reporting

Prior to site establishment and construction commencement, Independent dilapidation reports of the surrounding structures, infrastructure and roads will be completed and issued to all relevant parties.

The report will include photographs and plans with location reference for ease of use. This report will form the basis for comparison with a dilapidation report that will be prepared after all construction works are completed.

4.1.2 Site Fencing, Hoardings & Security

The site will be appropriately secured by solid fences (wire mesh or similar), hoardings and gates during the entire duration of the construction work. Gates will be installed to control access to the site. Hoardings, gates and fences will be suitably lined to limit public viewing and ensure safe pedestrian flow. Attention will be paid to the ensure service vehicles and pedestrian travel paths are not obstructed at any time.

4.1.3 Signage

Signage specifying all safety, security measures and key contact details shall be erected on the perimeter of the construction site (i.e. attached to the building, fence or hoarding).

A 24-hour contact name and phone number shall be provided.

Delivery signage will be posted at the site entrances to ensure deliveries are coordinated and entering the correct locations.

4.1.4 Site Amenities

Site amenities and facilities will be provided for work personnel including offices, toilets, lunch rooms, first aid rooms and change rooms. The attached site plan in ***Appendix A*** notes these proposed positions. The location of the site facilities during construction may vary as construction progresses.

4.1.5 Site working hours

To mitigate impacts on surrounding neighbours the proposed work hours provide the greatest opportunity for the most efficient construction program as well as mitigating traffic impacts. The preferred working hours of the site are:

- 7.00am to 6.00pm Monday to Friday, (TBC in approval conditions).
- 7.00am to 5.00pm Saturday (TBC in approval conditions).
- No work on Sundays and Public Holidays. (TBC in approval conditions)

Outside these hours, works, such as special delivery of materials / machinery / specific site works may be required to be undertaken outside the approved hours of operation for the site. This would be

in line with the type of work, authority's requirements, or for safety reasons. For example, wide delivery loads that are required to meet RMS restrictions on public roads may need to be delivered outside the approved site hours, or large concrete pours that require time to pour and cure the concrete before it can be finished may extend beyond the approved hours on limited occasions.

Communication with relevant authorities and neighbours will be issued prior to these events occurring to all impacted stakeholders.

4.1.6 Stakeholder Management

The School will issue regular communication updates regarding the Project to relevant stakeholders, including local neighbours & relevant authorities. Stakeholders will have an open line of communication to the school project team in order to address any issues and concerns if they arise.

4.1.7 Contractor Parking

The site will be served by public transport at completion of the subdivision works. Contractors will be encouraged to use public transport where possible. All site personnel when inducted to the project will be informed of this requirement, including details of available services.

Additionally, temporary car parking shall be made available on a vacant plot of land directly adjacent the site to ensure contractors are not parking on the local road network.

Figure 5: Temporary parking area shown adjacent the School site.

4.1.8 Site Inductions

All site personnel will be site inducted prior to commencing work on site. The site inductions will be specific to the Santa Sophia School site and Buildcorp safety protocols including site specific requirements including:

- Site Safety
- Site Access, Site Amenities & Site Emergency Procedures
- Travel, Deliveries & Parking
- Client & Neighbour Requirements including; personnel behaviour; dust, vibration & noise controls.
- Head Contractor Policies & Procedures.
- Environmental considerations and rules**.**
- Other Specific School requirements.

The head contractor and all sub-contractors must induct their employees into their safe work procedures. Induction register & copies of site SWMS will be available on site when required.

4.1.9 Hazardous Materials

For works that require hazardous and/or flammable products, secure and appropriate storage shall be provided on site. The storage area shall be appropriately located away from emergency exits, amenities, neighbouring properties & stormwater pits.

Storage and handling of materials shall be in accordance with each of the products manufactures recommendations and Material Safety Data Sheet, the Occupational Health & Safety Act 2011 and the Occupational Health and Safety Regulations 2011.

Procedures will be implemented to control chemical storage and clean up and any spills if they were to occur.

4.1.10 Safety Inspections

OH&S meetings will be held on a regular basis on site. These meeting will be conducted as per head contractor's OHS procedures.

An OH&S information board will be erected, and a copy of the OH&S policy will be prominently displayed on the board. Safety inspection audit results will also be displayed.

Sub-contractors will be required to submit their OH&S Plan / SWMS to the Contractor for review prior to commencement as per Buildcorp's policy & procedures. The sub-contractor is to incorporate any feedback from the Contractor and Superintendent into the OH&S Plan.

4.1.11 First Aid Facilities

First aid facilities will be provided and maintained as per OH&S legislative requirements. There will always be at least one qualified first aider on site whenever any works are taking place.

4.1.12 Approved Plans to be on Site

A copy of the approved consent plans, specifications and documents incorporating conditions of approval and certification shall be kept on site at all times.

4.1.13 Public Domain

All footpaths and bicycle paths surrounding the site will be kept unobstructed and free of tripping hazards from hoarding, fences or construction related items.

Any works required within the public domain shall be undertaken in accordance with relevant authority approvals as required.

Where any construction related materials temporarily extend over footpaths, they will be covered and fitted with a ramp to facilitate safe pedestrian access including access for persons with disabilities.

The public shall be protected from all construction activities including vehicle loading and off-loading within the public domain with the implementation of a Construction Traffic Management Plan and qualified traffic control personnel.

4.1.14 Site Appearance

No materials shall be stored within the Public Domain areas surrounding the site.

Materials stored on site shall be adequately secured, organised and stacked to prevent unnecessary and unsightly views from surrounding public areas.

All construction generated rubbish and waste shall be sorted and placed into skip bins located within the site which will be removed on a regular basis.

Trucks leaving the site shall be cleaned to ensure soil, mud and other site debris is prevented from spilling onto adjoining roads and footpaths.

All loads shall be covered to prevent the accidental spilling of materials on roadways.

4.1.15 Site Personnel Behaviour

The head contractor will ensure that all site personnel conduct themselves appropriately and consciously of the neighbouring environment. During the site induction personnel will be inducted to these protocols. The requirements will include use of acceptable language, appropriate clothing, reporting of any incidents and compliance with required consent conditions.

4.1.16 Environmental Controls – sediment controls, tree protection & dust control

Sediment and Erosional Controls: Refer to ***Appendix B*** for the sediment control plans. All sediment controls will be installed prior to works commencing. Auditing / inspection and maintenance of these controls will occur regularly throughout the project duration.

These controls include the installation of silt control fabric at the low points of the site, at stormwater pit lids.

Tree protection: Refer to ***Appendix C*** for details of the site handover from the subdivision developer. No trees are present on the site that require tree protection.

Dust Control: Adequate dust control measures will be put in place throughout the project to control wind driven dust. Control measures shall include the covering of stockpiled soil materials, implementation of dust suppression measures such as watering the site, and the covering loads when they leave / arrive on site.

4.1.17 Site Access

Construction access will vary during the construction cycle. Details of construction access points is detailed in the Construction Traffic Management Plan in ***Appendix D.***

All site access points shall be controlled for security and safety purposes.

Environmental controls as stipulated in the Construction Environmental Management Plan will be established and maintained throughout the project lifespan as identified in ***Appendix B***.

4.1.18 Existing services infrastructure

All infrastructure services surrounding and serving the site are new and currently being constructed by the subdivision developer. Coordination is occurring between the school's design team and the developer's design team to ensure alignment of the project needs.

Accurate documentation and as built surveying information allows us to confirm their location and mitigate the risk of exposure to live services and or interruptions to these services that would affect others.

4.2 Project Staging

4.2.1 Demolition

A demolition phase of work is not applicable to this project.

The site will be provided to the School and head contractor by the subdivision developer free of any existing structures, services and vegetation.

4.2.2 Shoring & Excavation

An Early Works DA for final bulk excavation levels will be coordinated with the subdivision developer. This Early Works DA will address the majority of the civil works ensuring the site will be cut to the required levels. Shoring in addition to that detailed within the Early Works DA for bulk excavation will not be required.

Following completion of the Early Works DA, completed by others, detailed excavations will take place using large excavation plant and equipment with excess spoil transported off site.

Access for the remaining earthworks will be in accordance with the site access plan and Construction Traffic Management Plan attached at ***Appendix A, Appendix B*** and ***Appendix D.***

The duration to undertake these works will be approximately 6 weeks.

Access around the site is well serviced to allow the use of 'truck and trailers'. This will assist in reducing the number of truck movements for the earthworks phase by half.

At the time of writing this report it is envisaged that the spoil being removed off site would generally be transported to the outer regions of Sydney. The vast majority of the spoil being of VENM nature.

4.2.3 Foundation / Sub-Structure Phase

Piles and structural footings will be engineered and constructed in such a way as to mitigate the risk of noise and vibration wherever possible. The works will be occurring concurrently with the detailed excavation phase noted above, and thus within the same duration of approximately 6 weeks.

4.2.4 Structure Phase

With completion of the Foundations, the structure phase will commence.

The structure will be constructed in two phases, as it consists two structural systems;

Firstly, the GLA (classroom area) modules will be constructed on site from prefabricated structural steel and concrete floor slabs supported by prefabricated permanent steel formwork systems. This will see the building wings known as 'South', 'Central', 'North' and 'Knowledge Centre' all being erected to full structural height as individual elements in the first instance.

Secondly, once all building wings are erected and time critical follow on trades have commenced, the external slab areas which join the GLA modules will be constructed of prefabricated precast concrete to tie the GLA areas together.

Atop the building structure, plant rooms and roof areas will be constructed from prefabricated steel and concrete elements also to complete the building structure onsite in the shortest possible timeframe.

Construction of the structure shall be via the use of the sites tower cranes.

Traffic movements for this phase of work are identified in ***Appendix D***

4.2.5 Façade and Building Envelope Phase

Following completion of Phase 1 of the structure works, external facades and the building envelope works will commence.

Façade and envelope elements will consist of prefabricated curtain wall style panels constructed of steel, aluminium, glass and the like, which will clad each of the building wings prior to commencement of Phase 2 structural works (external slabs).

Construction of the façade and envelope shall be via the use of the sites tower cranes.

Traffic movements for this phase of work are identified in ***Appendix D***

4.2.6 Internal Fitout & Finishes Phase

Following installation of the building facades and envelope elements, the internal fitout and finishes will commence.

Typically starting with the installation of required building services, followed by internal walls, ceilings, joinery and then finishes to walls, floors etc.

Construction of the internal fitout & finishes shall be via the use of the sites tower cranes in part and the predominantly the sites material hoists.

Traffic movements for this phase of work are identified in ***Appendix D***

4.2.7 Connection of Services

Occurring in parallel with construction activities within the building, wherever possible connection of the developments services to the infrastructure surrounding the site will take place.

Critically these connections must be in place upon completion of the building works to allow all systems to be tested and commissioned ensuring they work as designed.

Specific locations for supply connections (water, recycled water, gas, electricity, communications, sewer, etc.) have yet to be resolved and agreed with the respective infrastructure authorities. Upon receipt of the development consent these applications will be submitted and locations agreed.

Importantly it should be noted that all connections to the supply infrastructure will be done with little disruption to the public domain and service supply to surrounding residents.

Connections shall be undertaken via the use of small scale and specific excavation equipment where necessary.

Traffic movements for this phase of work are identified in ***Appendix D***

4.2.8 Landscaping & External Works Phase

The landscaping and external works phase sees completion of the project from a visual perspective.

Upon completion of all works and removal of the site material handling equipment (tower cranes, hoists, scaffold etc), the landscape and external works surrounding the built form commence to complete it's integration with the property boundary line and streetscape.

These works will vary in design from footpaths and paved areas through to garden beds and grass areas.

Works shall be undertaken via the use of small-scale plant and construction equipment for material handling purposes now that the main site cranes etc have been removed.

Traffic movements for this phase of work are identified in ***Appendix D.***

5.0 CONSTRUCTION MATERIAL LOGISTICS

Note – refer to ***Appendix A – Site Establishment, Access, Material Handling Plan***

Materials handling involves the movement of material around the site to construct the building. The planning of this work upfront will allow the efficient construction of the building including safety, minimise double handling of materials and accelerate construction.

It is anticipated the main materials handling equipment will include:

- Forklifts to unload and relocate materials within the site compound.
- Cranes, both mobile cranes and tower cranes, to lift materials to relevant floor areas and install structure elements such as structural steel, formwork, reinforcement, precast concrete and façade panels.
- Concrete pumps for pouring concrete
- Man & materials hoists to relevant floor levels of the Building.

Appendix A shows the planned locations of the above equipment.

Off-site prefabrication methods will be utilised to minimise the amount of work conducted on site. This also minimises the logistical requirements of coordinating all components of an element as separate deliveries, into a single delivery for complete elements.

Where possible, as the floors are constructed, they will be preloaded with bulk fitout materials such as gyprock sheets, wall framework, services componentry, joinery and the like. This will reduce smaller deliveries later in the project.

Concrete pumping will take place from within the site to ensure no roads and footpaths are impacted by the process.

6.0 CONSTRUCTION TRAFFIC MANAGEMENT

NOTE: A detailed construction traffic management plan is included in Appendix D.

6.1 Estimate of construction vehicles

Details of the estimated number of construction vehicles for each stage of the works are outlined with the ***Appendix D*** report.

To minimise impact on local traffic routes the following will be encouraged with incoming and outgoing deliveries:

- Prefabrication of elements and components where possible (will reduce the number of workers on site & number of deliveries (e.g. Structural Steel, Precast Concrete, Prefabricated Curtain Wall Facades, etc).
- Sub-contractors to log in deliveries with the project team to ensure that there is no back log of deliveries arriving at a similar time.
- Incorporate lay/waiting areas within the site for trucks to stand whilst waiting to be unloaded.
- Traffic control measures to be placed at entry points to control traffic.
- Sequences to the construction works so that trade activates that rely on several deliveries to do their work do not happen on the same day. For example, a large concrete pour and removal of spoil from site will not be programmed for the same day.
- Refer to attached TCMP - public transport & site personnel parking.

6.2 Construction vehicles site access

Due to the topography, number of buildings, design and concurrently occurring works to surrounding main roads and infrastructure during the construction cycle, construction vehicle access points will change to suit. This is further detailed under the Traffic Management section of this report.

Red Gables Road Access: Predominantly the site access will be off Red Gables Road. This access provides for a gate for incoming traffic and a gate for outgoing traffic.

Road 'B' Access: In instances where there are separate road works occurring on Red Gables road by others, access to the site will temporarily be relocated to the opposing side of the site (North Side) via Road 'B'.

Future Road 'A' Access: In instances where appropriate and required, gates will allow access to the future Road A passage way. This passage way allows for an interim connection to either Red Gables road or Road B and provides flexibility to ensure coordination with all surrounding developments and stakeholders can be readily achieved.

6.3 Standing of Vehicles on Council Land.

The site establishment plan has been developed to ensure that generally standing of vehicles on public property not is required. All works, and vehicles will be contained within the site fencing line /

boundary line wherever possible. Should standing of vehicles be required on council land, appropriate approvals will be sought.

6.4 Standing of Equipment on Council Land.

It is anticipated that there will no need to stand construction plant or equipment on Council Property for most of the project duration. However, as the project develops, and available space is reduced there may be a need to stand some plant within Council land. If this is the case the then the necessary approvals to do so will be procured from the local Council. Such examples include:

- Dismantling of Materials Hoisting Equipment
- Dismantling of Tower Cranes
- Removal of Site Hoardings

6.5 Proposed road closures, temporary traffic routes and loss of pedestrian paths.

As noted above, the site establishment plan has been developed to ensure that generally standing of vehicles on public property not is required. All works, and vehicles will be contained within the site fencing line / boundary line. Given this no semi-permanent closure of roads, traffic routes or pedestrian paths is required for the primary development.

The following work activities may result in a short-term road closure or footpath closure. These will need to be confirmed as the design is finalised and await authority advice and advice from the relevant trade contractors:

- Construction of temporary and permanent laybacks and footpaths.
- Infrastructure services connections to the site. e.g. incoming high voltage power, sewer, telephone lines etc

Should any closures be required relevant authority paperwork will be submitted, including traffic control plans. From this any required conditions will then be put in place.

6.6 Emergency Access

Access to the construction area by emergency vehicles will always be available via the construction gates whilst the site is operational.

7.0 CONSTRUCTION WASTE MANAGEMENT

Refer to ***Appendix E*** for the detailed Waste Management Plan (WMP).

For Excavation Waste, excavated materials shall be reused on the site wherever possible. Any surplus materials needing to be exported from the site will be sorted into separate soil classifications and managed according to EPA requirements. Any hazardous materials identified will be disposed of in accordance with statutory and EPA requirements.

For Primary Building Elements, they will be prefabricated offsite in order to reduce waste and increase construction efficiency.

For Site Generated Waste, it shall be sorted into relevant bins located within the site prior to being collected by a licensed waste removal company/contractor.

8.0 CONSTRUCTION NOISE MANAGEMENT

A Noise and Vibration Management Plan will be prepared by the school acoustic consultant and head contractor once the project's design has been sufficiently detailed.

This summary assessment has been carried-out based on assumptions i.e. the types of equipment which would typically be used on similar projects. These typical sources of noise may be effectively controlled via:

- Appropriate hoardings around the site and strategically locating noisy items of plant away from sensitive receivers
- Selection of quieter construction methods wherever possible and appropriate, particularly for piling works
- Selection of low vibration construction work methods wherever possible and appropriate
- Vibration monitoring and management controls for heritage structures
- Coordination with the School and their relevant stakeholders / neighbours to minimise disruption wherever possible.
- Noise monitoring as required.

9.0 CONSTRUCTION NUISANCE MITIGATION MEASURES

The development site is currently isolated from any existing adjacent neighbours.

Given the distance to the closest adjacent neighbour to the site, it is unlikely the proposed development will have a nuisance impact on any residential properties in proximity to the development site.

Irrespective, adequate measures as nominated below are commonly implemented for sound Health and Safety reasons as well as nuisance prevention, thus in summary mitigation measures are as noted below.

Implementation of these measures shall be the responsibility of the Main Contractor.

Concerns	**Mitigation Measure**
1. Noise works eg rock hammering (demolition not applicable)	◥ Construction equipment may be fitted with noise mitigation equipment where possible and reasonable. ◥ Noisy work will be identified and communicated to relevant stakeholders and neighbours, giving them sufficient notice. ◥ Noisy equipment to be located further away from the direction of closest residential neighbours wherever possible.
2. Dust	◥ Appropriate site fencing and hoardings will be provided around the site. ◥ Ensure construction vehicles have been appropriately cleaned before exiting the site. ◥ Ensure sufficient wetting-down is completed during excavation activities. ◥ Ensure stockpiles are sufficiently protected and covered.
3. Hazardous materials being encountered	◥ Hazardous materials survey conducted prior to works commencing on site. ◥ Appropriately licenced contractors engaged to remove any hazardous materials found. ◥ Appropriate signage and exclusion zones maintained during applicable works if encountered.
4. Sediment run-off entering the storm water system or surrounding streets	◥ Follow prescribed sedimentation and erosion control measures as provided by the Civil Engineer. ◥ Conduct regular visual inspections of silt socks and all other sedimentation controls to ensure integrity of the systems are maintained at all times.

	◥ Provide dedicated wash-out facilities for use by relevant Subcontractors.
5. Unauthorised entry to Site	◥ Appropriate site fencing and hoardings will be provided which separate all construction activities from the public. ◥ Signage appropriately placed to warn of hazards.
6. Vibration during excavation, piling and structural works	◥ Maximise use of bored piles rather than driven piles. ◥ Saw cut rock where feasible to minimise rock breaking equipment. ◥ Applicable works will be identified and communicated to relevant stakeholders and neighbours giving them sufficient notice.
7. Construction vehicles, plant and equipment on public roads (arriving / leaving the site)	◥ Traffic controllers to manage construction vehicle movements to/from the site as required. ◥ Safe public access routes to be pre-agreed and maintained. ◥ Site plan and access diagrams provided to delivery drivers before reaching site, to minimise the time spent on public roadways surrounding the site.
8. Site personnel behaviour both inside and external of the site (eg language, rubbish left on streets, interaction with neighbours)	◥ Site inductions will include site requirements. These will include no inappropriate language, no throwing rubbish on streets, parking of vehicles legally and the requirement to wear appropriate clothing at all times etc. ◥ Weekly tool box talks will reinforce requirements. ◥ Daily check of surrounding streets.

Appendix A – Site Establishment, Access, Material Handling Plan

Site Compound Establishment

The project will have a project office, meeting rooms, site amenities & storage facilities located on the South-Western Corner of the site, adjacent Red Gables Road and Fontana Drive. All major site functions will be controlled from within this space, including all required site inductions that also are to be conducted within the site compound.

As the contractors will need to go through the standard security checks prior to coming on site, the team will conduct all inductions & checks of SWMS prior to any contractor commencing on site in accordance with the Buildcorp Contracting New South Wales (BCNSW) Safety system.

Site Access

Site access is via multiple secure gates entering predominantly from Red Gables Road.

Gates and may vary as the different construction stages are completed and works coordinated with external road construction activities occurring by others.

Heavy vehicle traffic is expected through the structure and façade enclosure stages.

Material Storage

The way that materials come to site will also play a part in the speed of constructing the project. All materials must come to site in a packaged type of way - for example, bulk materials i.e. bricks will need to be in pallets wrapped in safety plastic to allow the quick loading & unloading.

The site will have dedicated lifting zones for materials going directly into the buildings. It will also have dedicated storage zones for materials being delivered prior to lifting into the building.

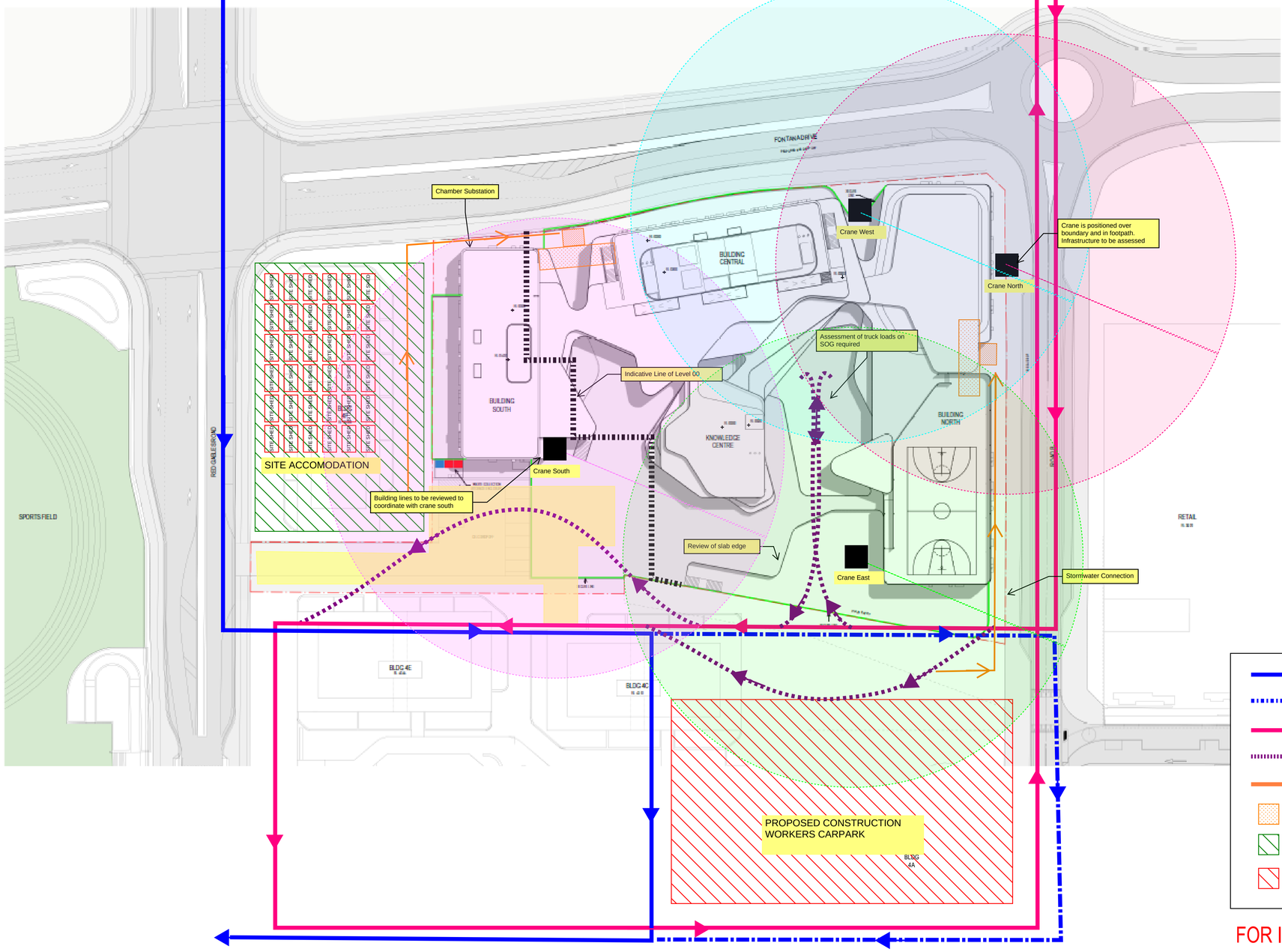
Materials Handling

Cranes;
The predominant material handling and vertical lifting for the project shall be via Tower Cranes located around the site (refer attached plan). Cranes will vary in size and boom length as required to perform their ultimate lifting capacity functions, however coordination of the cranes shall occur via computer software-controlled systems to ensure at no time are there risks of striking each other.

All Wheel Drive Forklifts;
Where materials are requiring unloading and loading onto trucks, as well as moving horizontally across the site, these functions shall predominantly occur with the use of all terrain forklifts.

Material Hoists;
Various materials also shall be moved to the required levels of the building via the use of material hoists. Typically, these materials are not suited to lifting via the sites tower cranes.

See attached Site Plan Identifying Site Amenities, Access and Material Handling Strategy



FOR INFORMATION ONLY

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NOTE
CONTRACTOR TO CHECK AND VERIFY ALL DIMENSIONS ON SITE PRIOR TO COMMENCEMENT OF WORK OR PREPARATION OF SHOP DRAWINGS. DO NOT SCALE THIS DRAWING.

ISSUE	DATE	FOR
1	05/04/19	TEST OF ADEQUACY
2	09/04/19	UPDATE TO ROADS
3	14/04/19	FOR INFORMATION

REFERENCED DRAWINGS: DATE:

ROTHELOWMEN CONTEXT DWG 18/09/18
ENSPIRE ROADS DWG 04/04/19

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PROJECT
SANTA SOPHIA CATHOLIC COLLEGE
THE GABLES TOWN CENTRE

BVN PROJECT NUMBER
1803009.000

TRUE NORTH PROJECT NORTH

GRAPHIC SCALE
0 2000 5000

SCALE
1 : 250@A0 DO NOT SCALE

STATUS
SSDA

DRAWING
SSDA_OVERALL SITE PLAN

DRAWING NUMBER
SS-A10-00-01

ISSUE
3

Appendix B – Sediment Control Plan

Introduction

Purpose

This Stormwater and Sediment Control Plans describe how Buildcorp proposes to manage stormwater, prevent erosion, control sediment and prevent pollution.

Scope

This plan describes the stormwater and sediment control aspects of the project, which will need to be managed to achieve the desired outcomes, within the constraints imposed by legislative, regulatory and contractual requirements, so that the desired outcomes are achieved.

Objectives

To prevent contamination of, or damage to, stormwater drains and waterways and ensure sediment from the building site is retained on-site during construction work.

Project Site

The project site is identified in the forward section of this report.

Project Description

The project proposes a new school facility as detailed in the forward sections of this report.

Site Specific Details

The construction site is located within 'The Gables' development of Box Hill, NSW as detailed in the forward sections of this report.

Operational Controls

- Stormwater shall be prevented from entering adjoining properties or into the sewerage system.
- Stormwater shall be captured and filtered in sediment control points before entering the legal point of discharge from the site.
- Rumble grids shall be cleaned daily with consideration given to water saving measures including recycling. Water run-off from cleaning the grid must be filtered prior to entering the legal point of discharge from the site.
- Stockpiles shall be located away from drainage lines and street drains and gutters. Where possible, stockpiles shall be located on the highest part of the site clear of main activity areas.
- Designated truck/vehicle/ equipment wash down areas shall be located near the site entrance and be designed to capture and treat water prior to discharge into the stormwater system. A water recycling system shall be installed if wash down areas exceed 3,000 litres per day.
- Wherever possible, natural vegetation shall be retained to absorb water flows and to minimise dust. Revegetation shall occur as soon as possible after the completion of works
- Natural rainwater run-off shall be controlled to prevent sediment draining into the stormwater system. Upslope water shall be diverted to prevent it from travelling through the site. Downpipes

shall be connected as soon as a roof is installed on the site. Natural falls of the site shall be identified and sediment filters such as straw bales filters, gravel surface barriers, sandbags, pit baskets or geo-textile mesh screens shall be installed at runoff points.

- Sediment shall be trapped and controlled prior to leaving the site boundary.
- Straw bales/geo-textile mesh screens shall be inspected and replaced on a regular basis so they remain effective.
- Sediment traps or filters shall be placed around any drain affected by construction works to prevent sediment entering the stormwater system. Sediment controls shall be checked regularly to ensure they are in place and operating properly. Additional inspections shall be undertaken immediately following or during heavy rain (10mm of more rainfall event) to confirm the operational adequacy of the facilities.
- Water shall not be discharged to the stormwater system if oil is visible on the surface, or if there is reason to suspect that the pit is contaminated with fuel, sewage or other contaminants. In this case the water shall be taken away to an oil separation facility (such as Lidcombe Liquid Waste Facility);
- Waste material, including liquid wastes such as paint, concrete slurries and chemicals, will not be discharged into a stormwater drain. Facilities shall be provided to enable paint brushes, rollers and spray equipment to be cleaned without any discharge of by-product into the stormwater system. Where possible, a depression or earth dam below brick, concrete or tile cutting shall be constructed. If this is not possible, site water shall be passed through a filtered pit.
- Buildcorp will monitor discharge from the sediment trap during design rain events (up to 5ear ARI) to ensure only visibly clean water is discharged from site. Additional measures such as the addition of flocculants to the sediment trap may be employed if necessary.
- Wastewaters which are still “dirty” or contaminated will not be discharged to stormwater systems, but instead collected and properly disposed.

Water Saving Measures

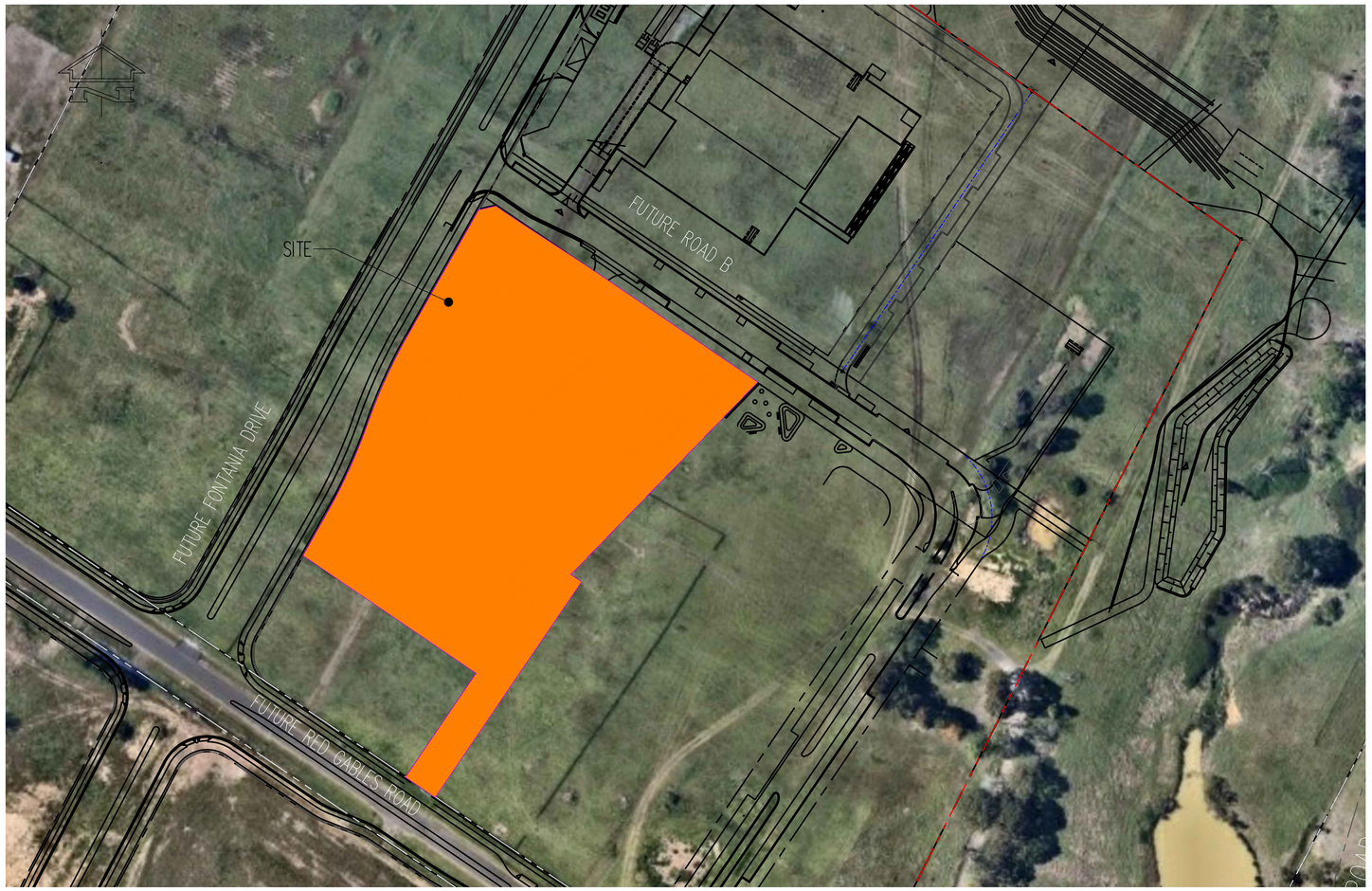
Permanent water saving measures shall be used on site. These include:

- All hoses must be in good condition and fitted with a trigger nozzle.
- A high-pressure water cleaning unit is to be used for all washdown activities.
- Where infrastructure is available the use of recycled water for washdown activities is to be used.

See attached Site Plan Identifying Control Measures

THIS DRAWING TO BE READ IN CONJUNCTION WITH ALL RELEVANT NOTES ON DRAWING

SANTA SOPHIA CATHOLIC COLLEGE, PARRAMATTA
CIVIL WORKS FOR SEAR'S APPROVAL



DRAWING LIST	
Drawing Number	**Drawing Title**
SKC01	COVER SHEET AND DRAWING LIST
SKC02	GENERAL NOTES
SKC03	SOIL AND WATER MANAGEMENT PLAN
SKC05	STORMWATER DETAILS
SKC06	SOIL AND WATER MANAGEMENT DETAILS
SKC104	SITEWORKS & STORMWATER PLAN LEVEL 0
SKC105	SITEWORKS & STORMWATER PLAN LEVEL 1

FileName: SKC01.dwg - USER: mskillb - Plot File Created: May 15, 2019 - 12:43pm

A1 0 1 2 3 4 5 6 7 8 9 10

FOR APPROVAL

Rev	Description	Eng	Draft	Date
P4	ISSUED FOR SEAR's SUBMISSION	NB	LS	15.05.19
P3	ISSUED FOR SEAR's SUBMISSION	NB	LS	02.04.19
P2	ISSUED FOR SEAR's SUBMISSION	NB	LS	04.03.19
P1	ISSUED FOR COMMENTS	NB	LS	01.03.19

Rev Description Eng Draft Date

Rev Description Eng Draft Date

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Project
SANTA SOPHIA CATHOLIC COLLEGE
THE GABLES TOWN CENTRE

Sheet Subject
COVER SHEET AND DRAWING LIST

Scale : A1 - | Drawn LS | Authorised

Job No 181896 | Drawing No SKC01 | Revision P4

Plot File Created: May 15, 2019 - 12:43pm

THIS DRAWING TO BE READ IN CONJUNCTION WITH ALL RELEVANT NOTES ON DRAWING

GENERAL NOTES

1. Contractor must verify all dimensions and existing levels on site prior to commencement of works. Any discrepancies to be reported to the .
2. Strip all topsoil from the construction area. All stripped topsoil shall be disposed of off-site unless directed otherwise.
3. Make smooth connection with all existing works.
4. Compact subgrade under buildings and pavements to minimum 98% standard maximum dry density in accordance with AS 1289 5.1.1. Compaction under buildings to extend 2m minimum beyond building footprint.
5. All work on public property, property which is to become public property, or any work which is to come under the control of the Statutory Authority; the Contractor is to ensure that the drawings used for construction have been approved by all relevant authorities prior to commencement site.
6. All work on public property, property which is to become public property, or any work which is to come under the control of the Statutory Authority is to be carried out in accordance with the requirements of the relevant Authority. The Contractor shall obtain these requirements from the Authority. Where the requirements of the Authority are different to the drawings and specifications, the requirements of the Authority shall be applicable.
7. For all temporary batters refer to geotechnical recommendations.

REFERENCE DRAWINGS

1. These drawings have been based from, and to be read in conjunction with the following Consultants drawings. Any conflict to the drawings must be notified immediately to the Engineer.

Dwg Title	Dwg No	Rev	Date
BVN OVERALL SITE PLAN	SS-A10-00-01	3	05.04.19
BVN OVERALL PLAN - LEVEL 00	SS-B10-00-01	1	04.04.19
BVN OVERALL PLAN - LEVEL 01	SS-B10-01-01	1	04.04.19

BOUNDARY AND EASEMENT NOTE

The property boundary and easement locations shown on Taylor Thomson Whitting drawing's have been based from information received from: PROUST & GARDNER CONSULTING PTY LTD SURVEYORS AND PLANNERS

Taylor Thomson Whitting makes no guarantees that the boundary or easement information shown is correct.
Taylor Thomson Whitting will accept no liabilities for boundary inaccuracies. The contractor/builder is advised to check/confirm all boundaries in relation to all proposed work prior to the commencement of construction. Boundary inaccuracies found are to be reported to the superintendent prior to construction starting.

CIVIL SAFETY IN DESIGN

Taylor Thomson Whitting (NSW) Pty Ltd operates under Safe Work Australia's Code of Conduct for the Safe Design of Structures.

These drawings shall be read in conjunction with the Taylor Thomson Whitting Transfer of Information Letter and Civil Risk and Solutions Register.

Under the Code of Conduct it is the Client's responsibility to provide a copy of the Civil Risk and Solutions Register to the Principal Contractor.

It is the Principal Contractor's responsibility to review the hazards and risks identified during the design process to ensure a safe workplace is maintained for the construction, maintenance and eventual demolition of the civil infrastructure.

SITEWORKS NOTES

1. All basecourse material to comply with RMS specification No 3051 and compacted to minimum 98% modified standard dry density in accordance with AS 1289 5.2.1.
2. All trench backfill material shall be compacted to the same density as the adjacent material.
3. All service trenches under vehicular pavements shall be backfilled with an approved select material and compacted to a minimum 98% standard maximum dry density in accordance with AS 1289 5.1.1

SAFETY IN DESIGN

Contractor to be aware existing services are located within the site. Location of all services to be verified by the Contractor prior to commencing works. Contractor to confirm with relevant authority regarding measures to be taken to ensure services are protected or procedures are in place to demolish and/or relocate.

EXISTING STRUCTURES

Contractor to be aware existing structures may exist within the site. To prevent damage to existing structure(s) and/or personnel, site works to be carried out as far as practicably possible from existing structure(s).

EXISTING TREES

Contractor to be aware existing trees exist within the site which need to be protected. To prevent damage to trees and/or personnel, site works to be carried out as far as practicably possible from existing trees. Advice needs to be sought from Arborist and/or Landscape Architect on measures required to protect trees.

GROUNDWATER

Contractor to be aware ground water levels are close to existing surface level. Temporary de-watering may be required during construction works.

EXCAVATIONS

Deep excavations due to stormwater drainage works is required. Contractor to ensure safe working procedures are in place for works. All excavations to be fenced off and batters adequately supported to approval of Geotechnical Engineer.

GROUND CONDITIONS

Contractor to be aware of the site geotechnical conditions. Refer to geotechnical report by DOUGLAS PARTNERS, refer to document 94526.00.R.001.Drft for details.

HAZARDOUS MATERIALS

Existing asbestos products & contaminated material may be present on site. Contractor to ensure all hazardous materials are identified prior to commencing works. Safe working practices as per relevant authority to be adopted and appropriate PPE to be used when handling all hazardous materials. Refer to geotechnical/environmental report by DOUGLAS PARTNERS, refer to document 94526.00.R.001.Drft for details.

CONFINED SPACES

Contractor to be aware of potential hazards due to working in confined spaces such as stormwater pits, trenches and/or tanks. Contractor to provide safe working methods and use appropriate PPE when entering confined spaces.

MANUAL HANDLING

Contractor to be aware manual handling may be required during construction. Contractor to take appropriate measures to ensure manual handling procedures and assessments are in place prior to commencing works.

WATER POLLUTION

Contractor to ensure appropriate measures are taken to prevent pollutants from construction works contaminating the surrounding environment.

SITE ACCESS/EGRESS

Contractor to be aware site works occur in close proximity to footpaths and roadways. Contractor to erect appropriate barriers and signage to protect site personnel and public.

VEHICLE MOVEMENT

Contractor to supply and comply with traffic management plan and provide adequate site traffic control including a certified traffic marshall to supervise vehicle movements where necessary.

SURVEY AND SERVICES INFORMATION

SURVEY

Origin of levels :SSM 17233, RL 39.003
Datum of levels : AHD
Coordinate system : MGA
Survey prepared by :PROUST&GARDNER CONSULTING PTY LTD, SURVEYORS & PLANNERS
Setout Points : E: 304761.994
N: 6277403.778

Taylor Thomson Whitting does not guarantee that the survey information shown on these drawings is accurate and will accept no liability for any inaccuracies in the survey information provided to us from any cause whatsoever.

UNDERGROUND SERVICES - WARNING

The locations of underground services shown on Taylor Thomson Whittings drawings have been plotted from diagrams provided by service authorities. This information has been prepared solely for the authorities own use and may not necessarily be updated or accurate.

The position of services as recorded by the authority at the time of installation may not reflect changes in the physical environment subsequent to installation.

Taylor Thomson Whitting does not guarantee that the services information shown on these drawings shows more than the presence or absence of services, and will accept no liability for inaccuracies in the services information shown from any cause whatsoever.

The Contractor must confirm the exact location and extent of services prior to construction and notify any conflict with the drawings immediately to the Engineer/Superintendent.

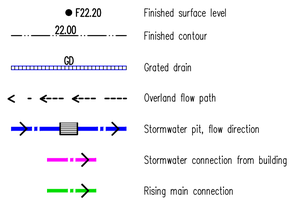
The contractor is to get approval from the relevant state survey department, to remove/adjust any survey mark. This includes but is not limited to; State Survey Marks (SSM), Permanent Marks (PM), cadastral reference marks or any other survey mark which is to be removed or adjusted in any way.
Taylor Thomson Whitting plans do not indicate the presence of any survey mark. The contractor is to undertake their own search.

STORMWATER DRAINAGE NOTES

1 Stormwater Design Criteria :
(A) Average recurrence interval –
1:100 years for roof drainage to first external pit
1:20 years for paved and landscaped areas
(B) Rainfall intensities –
Time of concentration: 6 minutes
1:100 years = – mm/hr
1:20 years = – mm/hr
(C) Runoff coefficients –
Roof areas: C∞ = –
Roads and paved areas: C20 = –
Landscaped areas: C20 = –

2. Pipes 300 dia and larger to be reinforced concrete Class "2" approved spigot and socket with rubber ring joints U.N.O.
3. Pipes up to 300 dia may be sewer grade uPVC with solvent welded joints, subject to approval by the engineer.
4. Equivalent strength VCP or FRP pipes may be used subject to approval.
5. Precast pits may be used external to the building subject to approval by –
6. Enlargers, connections and junctions to be manufactured fittings where pipes are less than 300 dia.
7. Where subsoil drains pass under floor slabs and vehicular pavements, unslotted uPVC sewer grade pipe is to be used.
8. Grates and covers shall conform with AS 3996-2006, and AS 1428.1 for access requirements.
9. Pipes are to be installed in accordance with AS 3725. All bedding to be type H2 U.N.O.
10. Care is to be taken with invert levels of stormwater lines. Grades shown are not to be reduced without approval.
11. All stormwater pipes to be 150 dia at 1.0% min fall U.N.O.
12. Subsoil drains to be slotted flexible uPVC U.N.O.
13. Adopt invert levels for pipe installation (grades shown are only nominal).

SITEWORKS LEGEND



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P4	ISSUED FOR SEAR's SUBMISSION	NB	LS	15.05.19
P3	ISSUED FOR SEAR's SUBMISSION	NB	LS	04.04.19
P2	ISSUED FOR SEAR's SUBMISSION	NB	LS	04.03.19
P1	ISSUED FOR COMMENTS	NB	LS	01.03.19

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THE GABLES TOWN CENTRE

Sheet Subject
GENERAL NOTES

Scale : A1 Drawn Authorised
Job No 181896
Drawing No SKC02
Revision P4
Plot File Created: May 15, 2019 - 7:05pm

FileName: SKC02.dwg - USER: duncanm - Plot File Created: May 15, 2019 - 7:05pm

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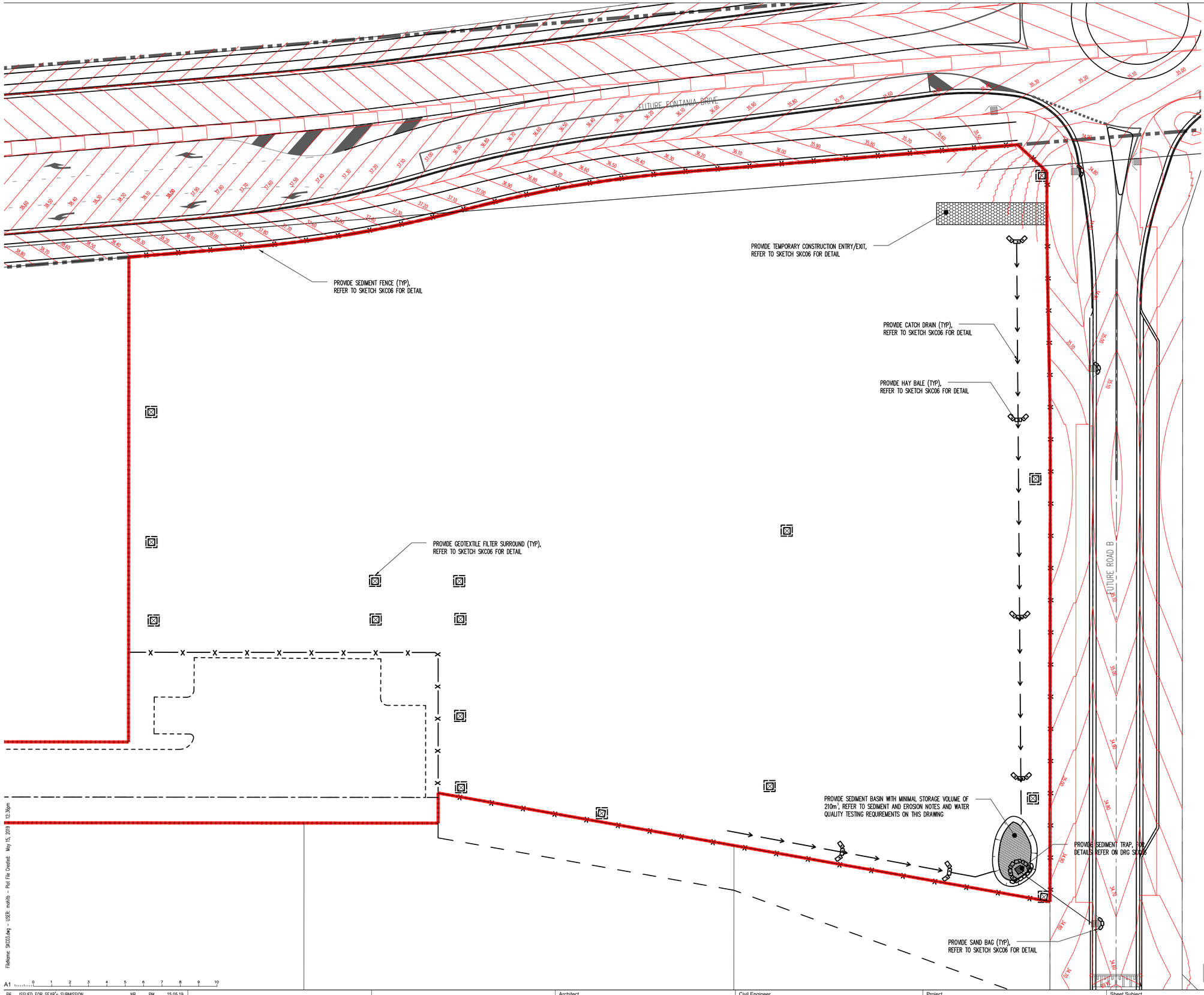

EROSION AND SEDIMENT CONTROL LEGEND

- Batter
- Siltation fence
- Stormwater pit with Geotextile filter surround
- Hay bale barriers
- Sandbag sediment trap
- Catch drain

EROSION AND SEDIMENT CONTROL NOTES

1. All work shall be generally carried out in accordance with
   (A) Local authority requirements,
   (B) EPA – Pollution control manual for urban stormwater,
   (C) LANDCOM NSW – Managing Urban Stormwater: Soils and Construction ("Blue Book").
2. Erosion and sediment control drawings and notes are provided for the whole of the works. Should the Contractor stage these works then the design may be required to be modified. Variation to these details may require approval by the relevant authorities.
   The erosion and sediment control plan shall be implemented and adapted to meet the varying situations as work on site progresses.
3. Maintain all erosion and sediment control devices to the satisfaction of the superintendent and the local authority.
4. When stormwater pits are constructed prevent site runoff entering the pits unless silt fences are erected around pits.
5. Minimise the area of site being disturbed at any one time.
6. Protect all stockpiles of materials from scour and erosion. Do not stockpile loose material in roadways, near drainage pits or in watercourses.
7. All soil and water control measures are to be put back in place at the end of each working day, and modified to best suit site conditions.
8. Control water from upstream of the site such that it does not enter the disturbed site.
9. All construction vehicles shall enter and exit the site via the temporary construction entry/exit.
10. All vehicles leaving the site shall be cleaned and inspected before leaving.
11. Maintain all stormwater pipes and pits clear of debris and sediment. Inspect stormwater system and clean out after each storm event.
12. Clean out all erosion and sediment control devices after each storm event.

Sequence Of Works

1. Prior to commencement of excavation the following soil management devices must be installed.
1.1. Construct silt fences below the site and across all potential runoff sites.
1.2. Construct temporary construction entry/exit and divert runoff to suitable control systems.
1.3. Construct measures to divert upstream flows into existing stormwater system.
1.4. Construct sedimentation traps/basin including outlet control and overflow.
1.5. Construct turf lined swales.
1.6. Provide sandbag sediment traps upstream of existing pits.
2. Construct geotextile filter pit surround around all proposed pits as they are constructed.
3. On completion of pavement provide sand bag kerb inlet sediment traps around pits.
4. Provide and maintain a strip of turf on both sides of all roads after the construction of kerbs.

WATER QUALITY TESTING REQUIREMENTS

Prior to discharge of site stormwater, groundwater and seepage water into council's stormwater system, contractors must undertake water quality tests in conjunction with a suitably qualified environment consultant outlining the following;

- Compliance with the criteria of the Australian and New Zealand Guidelines for Fresh and Marine Water Quality (2000)
- If required subject to the environmental consultants advice, provide remedial measures to improve the quality of water that is to be discharged into Councils storm water drainage system.This should include comments from a suitably qualified environmental consultant confirming the suitability of these remedial measures to manage the water discharged from the site into Councils storm water drainage system. Outlining the proposed, ongoing monitoring, contingency plans and validation program that will be in place to continually monitor the quality of water discharged from this site. This should outline the frequency of water quality testing that will be undertaken by a suitably qualified environmental consultant.

0 2.5 5 7.5 10 12.5 15 17.5 20m

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FOR APPROVAL

FileName: SKC03.dwg – USER: mohlib – Plot File Created: May 15, 2019 - 12:36pm

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P5	ISSUED FOR COMMENTS	NB	PM	11.04.19
P4	ISSUED FOR SEAR's SUBMISSION	NB	LS	04.04.19
P3	ISSUED FOR SEAR's SUBMISSION	NB	LS	02.04.19
P2	ISSUED FOR SEAR's SUBMISSION	NB	LS	04.03.19
P1	ISSUED FOR COMMENTS	NB	LS	01.03.19

Rev Description Eng Draft Date | Rev Description Eng Draft Date | Rev Description Eng Draft Date

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Project
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THE GABLES TOWN CENTRE

Sheet Subject
SOIL AND WATER MANAGEMENT PLAN

Scale : A1 1:250 | Drawn LS | Authorised

Job No 181896 | Drawing No SKC03 | Revision P6

Plot File Created: May 15, 2019 - 12:36pm

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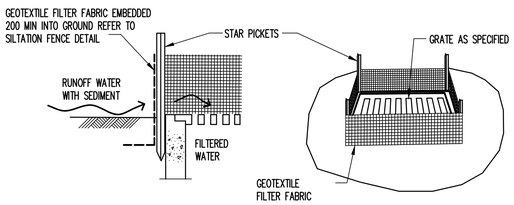
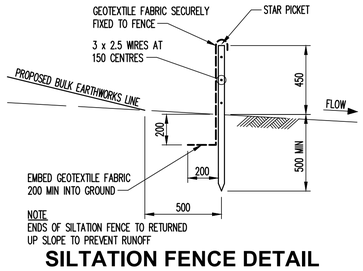


GEOTEXTILE FILTER PIT SURROUND
NTS



SILTATION FENCE DETAIL
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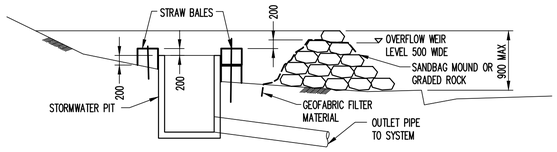

SEDIMENTATION TRAP
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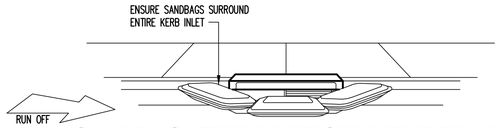
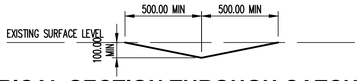


SANDBAG KERB INLET SEDIMENT TRAP
NTS



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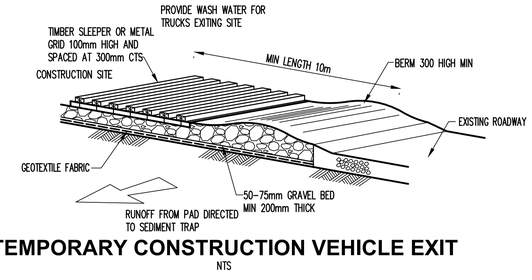

TEMPORARY CONSTRUCTION VEHICLE EXIT
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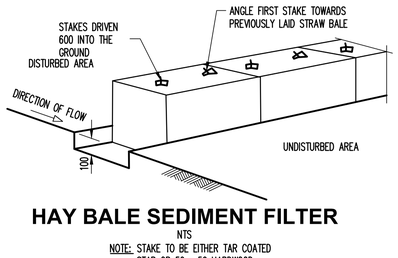
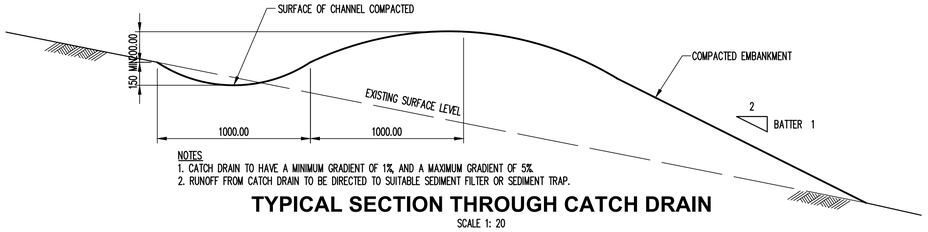


HAY BALE SEDIMENT FILTER
NTS
NOTE: STAKE TO BE EITHER TAR COATED STAR OR 50 x 50 HARDWOOD



TYPICAL SECTION THROUGH CATCH DRAIN
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1:20 A1 1:40 A3

FOR APPROVAL

Rev	Description	Eng	Draft	Date
P3	ISSUED FOR SEAR's SUBMISSION	NB	LS	15.05.19
P2	ISSUED FOR SEAR's SUBMISSION	NB	LS	04.03.19
P1	ISSUED FOR COMMENTS	NB	LS	01.03.19

Rev Description Eng Draft Date | Rev Description Eng Draft Date

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Project
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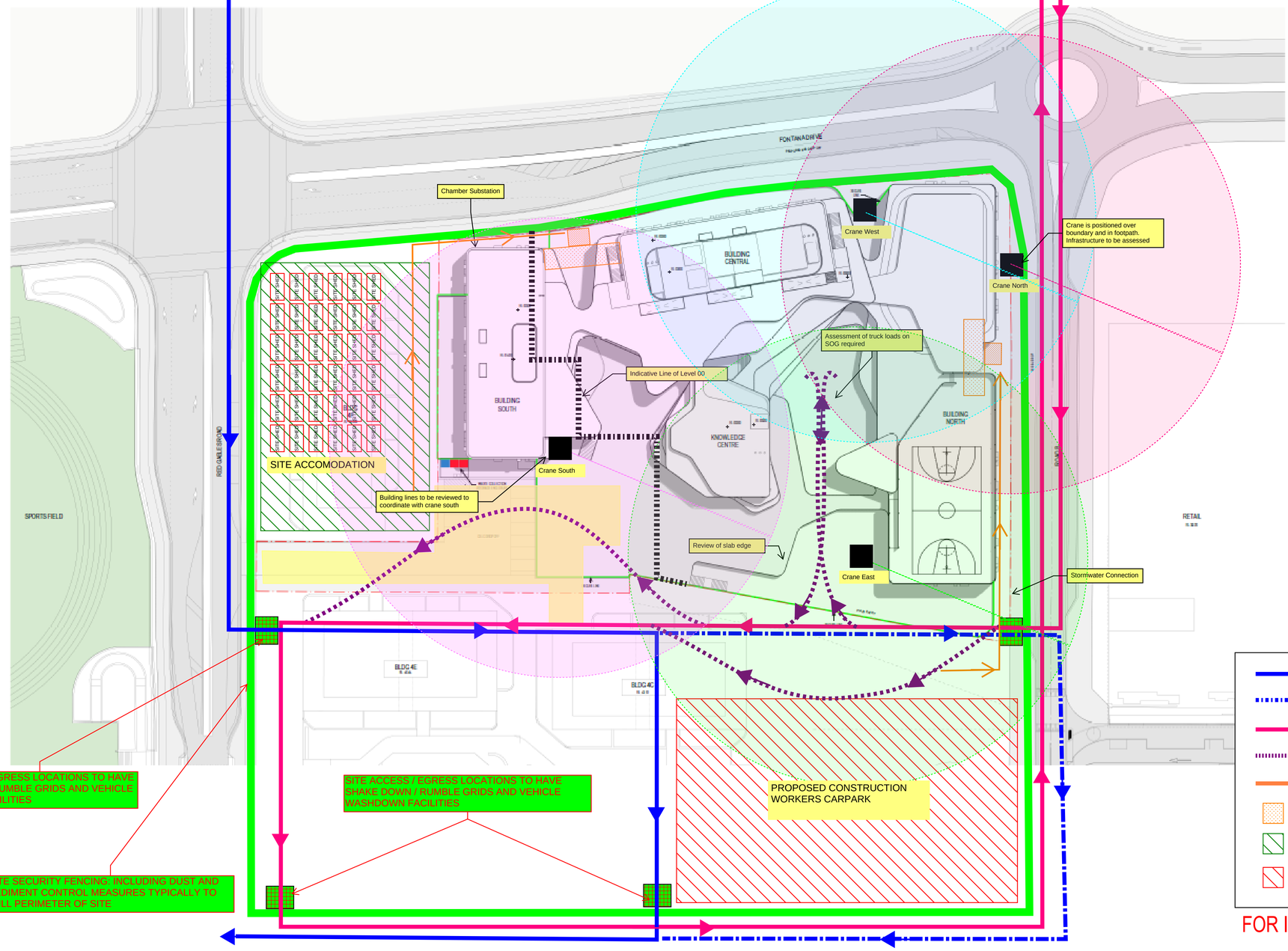
THE GABLES TOWN CENTRE

Sheet Subject
SOIL AND WATER MANAGEMENT DETAILS

Scale : A1 1:20 | Drawn LS | Authorised

Job No 181896 | Drawing No SKC06 | Revision P3

Plot File Created: May 15, 2019 - 12:37pm



FOR INFORMATION ONLY

BVN

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NOTE

CONTRACTOR TO CHECK AND VERIFY ALL DIMENSIONS ON SITE PRIOR TO COMMENCEMENT OF WORK OR PREPARATION OF SHOP DRAWINGS. DO NOT SCALE THIS DRAWING.

ISSUE	DATE	FOR
1	05/04/19	TEST OF ADEQUACY
2	09/04/19	UPDATE TO ROADS
3	14/04/19	FOR INFORMATION

REFERENCED DRAWINGS:	DATE:
ROTHELOWMEN CONTEXT DWG	18/09/18
ENSPIRE ROADS DWG	04/04/19

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PROJECT
SANTA SOPHIA CATHOLIC COLLEGE
THE GABLES TOWN CENTRE

BVN PROJECT NUMBER
1803009.000

TRUE NORTH | PROJECT NORTH

GRAPHIC SCALE
0 2000 5000

SCALE
1 : 250@A0 DO NOT SCALE

STATUS
SSDA

DRAWING
SSDA_OVERALL SITE PLAN

DRAWING NUMBER
SS-A10-00-01

ISSUE
3

THIS DRAWING TO BE READ IN CONJUNCTION WITH ALL RELEVANT NOTES ON DRAWING

FUTURE FONTANA DRIVE

FUTURE FONTANA DRIVE

FURURE ROAD B

INDICATIVE SUBDIVISION INGROUND STORMWATER PIPE SYSTEM BY ENSPIRE SOLUTIONS

IL33.91
Ø225 'Z'
1.0%
IL33.80

IL34.02
Ø600 'Z'
1.0%
IL33.58

IL33.55
Ø600 'Z'
1.0%
IL33.42

IL34.06
Ø450 'Z'
1.0%
IL33.83

IL34.23
Ø450 'Z'
1.0%
IL33.83

IL33.80
Ø600 'Z'
1.0%
IL33.40

IL33.37
Ø600 'Z'
1.0%
IL33.30

STORMWATER LINE TO PUMP SYSTEM TO HYDRAULIC ENGINEERS DETAIL

STORMWATER CONNECTION FROM BULDING

ALLOW FOR EXHAUST PENETRATION TO SOFFIT

RL 35.30

BUILDING CENTRAL

BUILDING NORTH

OPEN PLAN OFFICE

OPEN PLAY SPACE

MULTI-PURPOSE HALL

FOYER

REFLECTIVE SPACE

STORAGE

VISUAL ART

SENIOR ART

ART STORE

ENGINEERING

ELECTRONICS

FABRICATION

ART COLA

SPRAY BOOTH

KILN

CNC & LASER

MECH & CONDENSER PLANT ROOM

BULK STORE

ACTIVITY CLUB OFFICE

BOH CORRIDOR

FIRE PUMP ROOM

COMBINED FIRE HYDRANT & SPRINKLER TANK

MECH

TOILETS

COMMS

FOOD TECH

SEMINAR / CLA

HOSPITALITY

PREP

CAFE/CANTEEN

EQUIP STORE

LIFT 1

LIFT 2

STAIR 1

STAIR 2

CREST

SECURE LINE

KO

GD

FOR APPROVAL

Rev	Description	Eng	Draft	Date
P5	ISSUED FOR SEAR's SUBMISSION	NB	PM	15.05.19
P4	ISSUED FOR COMMENTS	NB	PM	11.04.19
P3	ISSUED FOR COMMENTS	NB	PM	04.04.19
P2	ISSUED FOR COMMENTS	NB	PM	02.04.19
P1	ISSUED FOR COMMENTS	NB	PM	29.03.19

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Project
SANTA SOPHIA CATHOLIC COLLEGE
THE GABLES TOWN CENTRE

Sheet Subject
SITEWORKS & STORMWATER PLAN
LEVEL 0

Scale : A1 1:250 | Drawn LS | Authorised

Job No 181896 | Drawing No SKC104 | Revision P5

Plot File Created: May 15, 2019 - 12:38pm

FileName: SKC104.dwg - USER: mohlib - Plot File Created: May 15, 2019 - 12:38pm

THIS DRAWING TO BE READ IN CONJUNCTION WITH ALL RELEVANT NOTES ON DRAWING

FUTURE FONTANA DRIVE

FUTURE FONTANA DRIVE

FUTURE ROAD B

ROAD B

BUILDING CENTRAL

BUILDING SOUTH

BUILDING NORTH

LEVEL 0 BELOW

LEVEL 0 BELOW

LEVEL 01 RL 39.30

RL 38.00

RL 39.30

RL 39.30

RL 39.30

RL 39.30

RL 38.00

SUSPENDED STRUCTURE

SUSPENDED STRUCTURE

SUSPENDED STRUCTURE

STORMWATER PITS REFER TO HYDRAULIC ENGINEERES

RISING MAIN FROM PUMP ROOM TO HYDRAULIC ENGINEERS DETAIL

IL38.37 ⌀225 '2' 1.0% IL38.20

IL38.17 ⌀225 '2' 1.0% IL37.98

IL37.95 ⌀300 '2' 1.0% IL37.65

IL38.20 ⌀375 '2' 1.0% IL38.15

IL37.62 ⌀375 '2' 1.0% IL37.51

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IL37.32 ⌀450 '2' 1.0% IL37.23

IL34.28 ⌀450 '2' 1.0% IL34.09

IL36.65 ⌀375 '2' 1.0% IL36.60

IL37.72 ⌀225 '2' 1.8% IL37.025

ASSUMED KIP TO BE PROVIDED BY CELESTINO

FOR APPROVAL

A1 0 1 2 3 4 5 6 7 8 9 10

Rev	Description	Eng	Draft	Date
P5	ISSUED FOR SEAR's SUBMISSION	NB	PM	15.05.19
P4	ISSUED FOR COMMENTS	NB	PM	11.04.19
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Project
SANTA SOPHIA CATHOLIC COLLEGE
THE GABLES TOWN CENTRE

Sheet Subject
SITEWORKS & STORMWATER PLAN
LEVEL 1

Scale : A1 | Drawn: LS | Authorised:
1:250

Job No: 181896 | Drawing No: SKC105 | Revision: P5

Plot File Created: May 15, 2019 - 12:38pm

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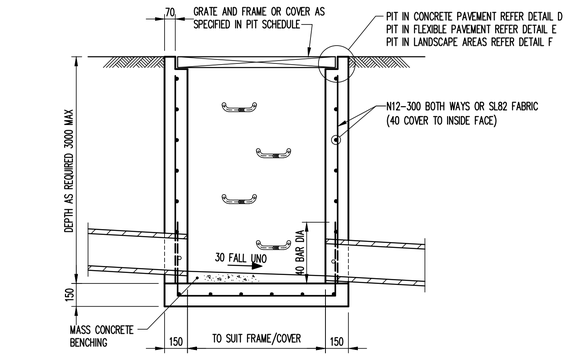

SECTION A-A

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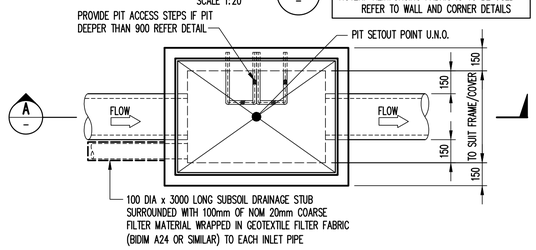
NOTE: IF REINFORCING FABRIC IS TO BE USED REFER TO WALL AND CORNER DETAILS



PLAN

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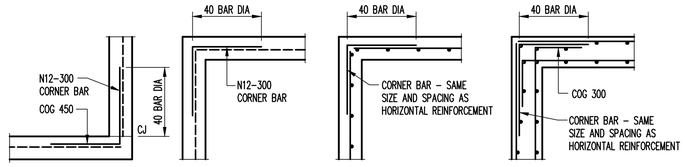

PIT CORNER DETAILS

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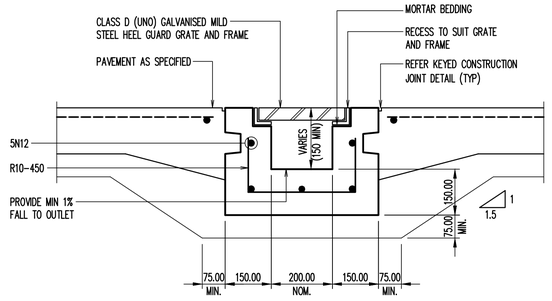

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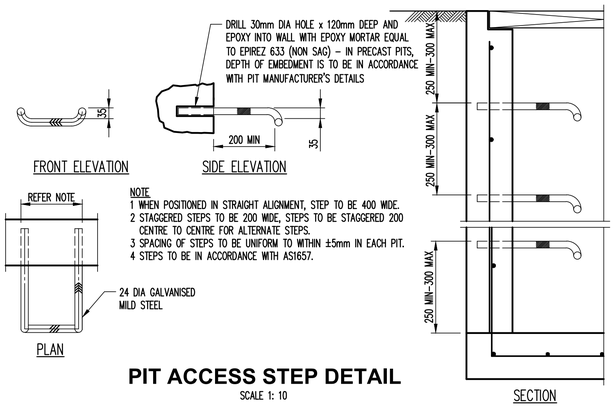
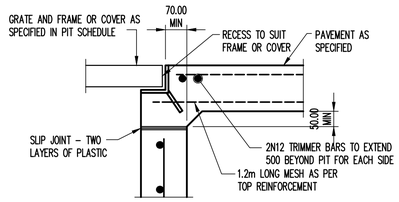


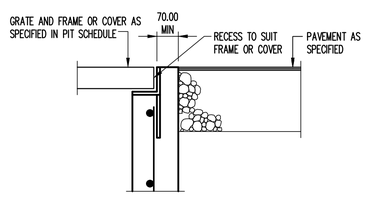
PIT ACCESS STEP DETAIL

SCALE 1: 10



DETAIL D

SCALE 1: 10



DETAIL E

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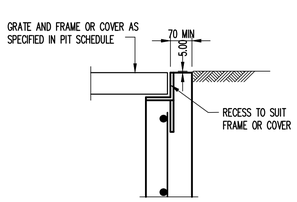

DETAIL F

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1:20 A1 1:40 A3

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1:10 A1 1:20 A3

FOR APPROVAL

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P1	ISSUED FOR COMMENTS	NB	LS	01.03.19

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THE GABLES TOWN CENTRE

Sheet Subject
STORMWATER DETAILS

Scale : A1 1:250 | Drawn LS | Authorised

Job No 181896 | Drawing No SKC05 | Revision P3

Plot File Created: May 15, 2019 - 12:36pm

Appendix C – Tree Protection Plan

(Not Used / Not Applicable – No existing trees are located on the site or within close proximity to any construction activities)

Appendix D – Construction Traffic Management Plan

During the construction of the proposed Project, Buildcorp shall engage the services of specialist Traffic Control Operators to ensure traffic and pedestrian flow is managed to the highest standards and with the utmost focus on safety. Buildcorp will allocate traffic controllers where required to direct all construction deliveries and to communicate changes to traffic conditions to the users of the precinct. All traffic control personnel will be certified as required.

Particular care will be taken to minimise any damage to the surrounding roads as a result of construction activity.

Public Safety and Security

Safety of the public is the highest priority. In order to reduce the safety risks to public, all potential risks need to be identified and eliminated or controlled. In summary, practices that will be initiated for this project to assist with public safety will include:

- Hoardings to the perimeter of the site to be used to eliminate the chance of public gaining access and to reduce the visual impact of the construction zone by utilizing shade cloth on perimeter fencing.
- Gates to the sites will be monitored at all times by appropriate staff.
- Each entry point will be carefully signposted and monitored to reduce accidental public access. Refer to attached site establishment plan.
- Daily monitoring of all public access ways and repair if required as a result of construction activities will be conducted.
- Surrounding access paths will be cleaned daily in order to reduce the occurrence of slip risk.
- A clearly defined traffic management plan will be implemented to ensure all motor vehicle movements to and from the site as a result of construction activities, do not impede on the operations of the parking of the general public.
- With the public's safety as our primary concern we will ensure licensed traffic controllers and the traffic management plan is approved by Buildcorp Contracting NSW management and is implemented.

Traffic Control Personnel

- Traffic control personnel and equipment will be established as required for the safe and effective control of traffic and pedestrians at all Gates leading into and from the site that interface with public space.
- Traffic control personnel will set-up roadside signage and equipment at the various locations specified and in accordance with guidelines stipulated by MUTCD.

Statement of Quality Assurance Compliance

Traffic Management:

- Will be conducted in a professional manner to minimise delays to reduce inconvenience to the public by authorised traffic controllers.
- Will maintain the traffic control equipment as required for the safe and effective control of traffic for the duration of the roadwork.

References

- Australian Standard AS 1742.3 - 1996
- MUTCD – Manual of Uniform Traffic Control Devices – Part 3
- Traffic Management Plan

Ingress and Egress of Vehicles to the Site

Vehicles will approach the site from the West along Red Gables Road. Entry and Exit Gates shall be provided to ensure all vehicles can always fully enter the site and not remain standing on public land. Inside the site waiting bays will be provided for vehicles requiring assistance unloading via any of the site material handling equipment.

For further information, please refer to the Site Establishment Plan in ***Annexure A***.

Management of Loading and Unloading of Materials

Loading and unloading of materials shall occur in nominated “Delivery and Set- Down Zones within the site.

Given all materials set-downs and deliveries are to be fully contained within the site and coordinated by the Project Supervisors, it is not anticipated that delays to surrounding public vehicular traffic or pedestrian movements should occur.

Where any activities are anticipated to affect normal vehicular and/or pedestrian movement, appropriate traffic management shall be provided. Appropriate notification shall be provided for any large or significant deliveries which may result in disruptions.

Numbers, Timing and Frequency of Vehicles Accessing the Site

The number of vehicles entering the site is to be restricted to deliveries wherever possible; no subcontractor parking will be permitted on site. A separate and isolated subcontractor parking zone shall be established on adjacent available private property via agreement with the subdivision developer.

The anticipated number of vehicular access into the site is detailed in the enclosed report.

Management Responsibility for Traffic Control

It is the responsibility of the senior traffic controller or nominated person on site to ensure that all traffic control equipment and its allocation is in accordance with the contract specifications and guidelines.

If required, Traffic delays will be kept to an “absolute maximum” of fifteen (15) minutes (as per MUTCD guidelines) for any single vehicle. Routine work delays to traffic flow shall be targeted to no more than sixty (60) seconds.

Any traffic delays shall be monitored on a regular daily basis and reported to the Site Supervisor. Areas of work under traffic control shall be programmed to achieve these times and other safety requirements. Any specified lengths of work under traffic shall be nominal distances only.

Queue congestion at closures will be monitored to ensure that any intersection and/or roundabout are not blocked at any time during the program unless unavoidable. Traffic Controllers and signage will direct traffic through the particular closure to ensure this is enforced and maintained.

Responsibility and Authority

Appropriately qualified personnel will undertake direct traffic control. The minimum qualification shall be a current Traffic Controllers’ ticket and General Safety (Blue Card) Induction Card. Traffic Controller’s will be responsible for ensuring traffic is not unduly delayed and that safety of the general public and workers on site is maintained.

Each traffic controller is required to take corrective action and notify the Site Supervisor if a problem occurs. The relevant parties will communicate via two-way radio, mobile telephone or direct oral communication.

The Traffic Controller’s on site, in consultation with Buildcorp Contracting NSW representative, will be responsible for the control of traffic.

The Traffic Management Plan is to be signed off by the representative prior to commencement of the project.

Personnel on-site will rectify any Non-Conformances immediately and the Operations Manager will respond to all necessary reports.

Selection of Site Traffic Control Modes.

The following factors have been considered in selecting the appropriate site control modes:

- Minimising hazard risk to the public and workers on site:
- Minimising interaction between public traffic and work-site pedestrian / construction vehicles.
- Minimising traffic delays as specified in the Traffic Control at Worksites - 1998.
- Minimising the occurrence of any traffic stoppages.

Specific Traffic Control Modes.

At the location/s outlined in the job specification, the traffic will be controlled by: -

- Traffic Controllers will maintain road/lane closures on the sections that are indicated as per Traffic Control Plan and/or contract details.
- A Buildcorp Contracting NSW representative prior to the commencement of any road/lane closures will complete any applicable application for Road Occupancy/Closure [if applicable] and all other relevant permits for closures.
- Buildcorp Contracting NSW – Traffic Control Plans / Traffic Management Plan.

Public Notification

Notification will be by way of signage approved and installed by Buildcorp Contracting NSW. Where appropriate written communication with surrounding residents may be utilised to notify of any major planned changes to traffic.

Time Restrictions

Shall be implemented as per Development Consent conditions.

Equipment List

Traffic Controller control personnel as required

All signage and equipment as required and as specified in the detailed Traffic Control Plans developed and approved for various scenarios.

Pedestrians flow

- Main pedestrian access shall be segregated from the vehicle entry points to the site.
- Pedestrians will be required to follow the same directions/detour as vehicles.
- No unauthorised personnel shall be allowed within the construction zone.
- All personnel (including authorised visitors) on site shall be required to wear as a minimum safety boots, hard hats and high visibility safety vests.

Transport & Accessibility Impact Assessment

Santa Sophia Catholic College
The Gables

Ref: 0760r01v4
15/05/2019

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Document Control

Project No: 0760

Project: Santa Sophia Catholic College, The Gables

Client: TSA Management

File Reference: 0760r01v4 TA_Santa Sophia Catholic College, The Gables; Issue II

Revision History

Revision	Date	Details	Author	Approved by
-	1/04/2019	Draft	V. Cheng & T. Lehmann	J. Mulhaire
I	5/04/2019	Test of Adequacy	T. Lehmann	T. Lehmann
II	10/04/2019	Test of Adequacy v2	T. Lehmann	T. Lehmann
III	8/05/2019	Issue I	T. Lehmann	T. Lehmann
IV	15/05/2019	Issue II	T. Lehmann	T. Lehmann

Table of Contents

1 Introduction

1.1 Overview

This Transport and Accessibility Impact Assessment (TAIA) has been prepared by Ason Group on behalf of the Catholic Education Diocese of Parramatta c/TSA Management Pty Ltd (the Applicant).

It accompanies an Environmental Impact Statement (EIS) in support of State Significant Development Application (SSD 18_9772) for the new Santa Sophia Catholic College on the corner of Fontana Drive and the future road 'B', between Red Gables Road and Fontana Drive, in Box Hill North (the site).

The new school will cater for approximately 1,920 primary and secondary school students, inclusive of a 60 student Catholic Early Learning Centre. The school will have 130 full-time equivalent staff.

The proposal seeks consent for approximately 15,000sqm of floor space across a part five and part six storey building. The building will present as three main hubs connected by terraced courtyards and garden spaces.

The school will include:

- Catholic Early learning centre for 60 students;
- General Learning Spaces for years Kindergarten to 12;
- Community Hub – knowledge centre and cafe;
- Creative Hub – art and applied science;
- Performance Hub – multipurpose hall and music, dance and drama spaces;
- Professional Hub – administrative space;
- Research Hub – science and fitness;
- Associated site landscaping and open space including a fence and sporting facilities;
- Bus drop off from Fontana Drive;
- Pick-up and drop-off zone from future Road 'B';
- Pedestrian access points from Red Gables Road north, Fontana Drive and future road 'B';
- Staff parking for 110 vehicles provided off site in an adjacent location;
- Short term parking for pick up and drop off for Catholic Early Learning Centre from Red Gables Road; and
- Digital and non-digital signage to the school.

Full details of the proposed development are provided within the Environmental Impact Statement which this TAIA accompanies.

1.2 TAIA Objectives

The key objectives of this TAIA are as follows:

- To provide an appropriate response to the SEARs;
- To demonstrate that the School proposal is consistent with the overall vision of the Box Hill North DCP as defined in Section D17 of the Box Hill North DCP 2012, primarily being to:

  To minimise vehicular usage by enhancing pedestrian and bicycle connections to the Town Centre, schools and parks.

  To locate public transport stops close to key nodes, community facilities, schools and medium density residential development.
- To establish that the School development is compliant and consistent with relevant DPE and Council planning guidelines;
- To demonstrate that there is an appropriate and sustainable allocation of car parking for School parking demands;
- To establish that the future trip generation of the School is commensurate with that determined in past assessments of the Gables Town Centre, and as such can be appropriately accommodated by completed and / or committed upgrades to the local road network;
- To demonstrate that proposed access driveways, car parks and service facilities are designed in accordance with the relevant Australian Standards.

1.3 Site & Location

The Site is situated within the proposed Gables Town Centre, Box Hill North, which is bounded by Red Gables Road to the south and Fontana Drive to the west. The Site is currently a greenfield site and is legally known as DP255616 within The Hills Shire Council Local Government Area, listed as B2 – Local Centre.

The Site lies approximately 39km kilometres north-west of the Sydney CBD, and 23 kilometres north-west of the Parramatta CBD. The broader Gables Town Centre in which the Site lies has an area of some 5 63,652 m^2 and is currently surrounding by greenfield / agricultural lands. The School is located just north of the North West Priority Growth Area (NWGA).

The Site and broader The Gable Town Centre are shown in **Figure 1**.

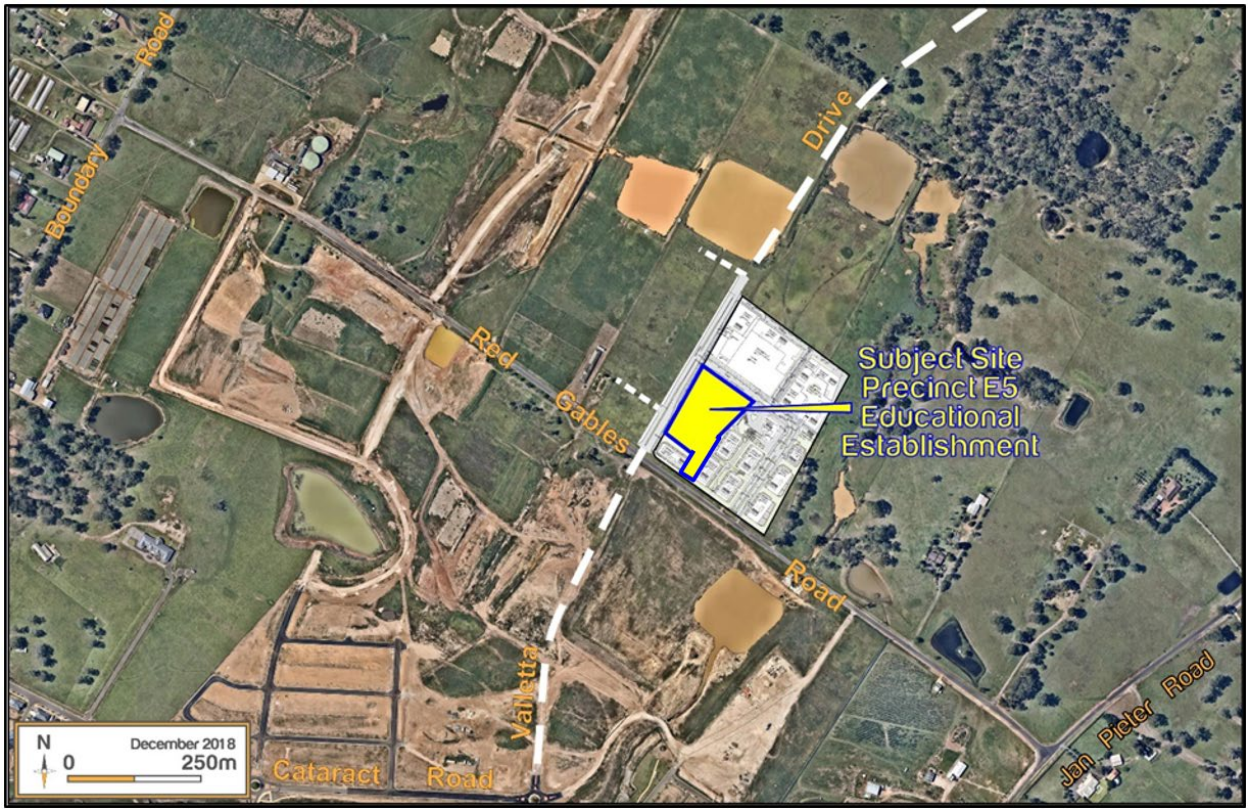


Figure 1: The Site

1.4 Secretary's Environmental Assessment Requirements

Secretary's Environmental Assessment Requirements (SEARs) were issued by the DPE on 21st December 2018 (SSD 9772) in regard to the School proposal. The SEARs outline the key areas for consideration in any subsequent development application (i.e. in the SSDA) with specific requirements providing the scope for an assessment of potential traffic and transport impacts arising from the School proposal.

It is important to note that the Site (and The Gables Town Centre) lies outside of the NWGA, and as such the SSDA is not subject to State Environmental Planning Policy (Growth Centres Development Control Plan 2017) development controls.

The SEARs specifically relating to the traffic and transport characteristics of the School are outlined in Table 1 below, which also provides a summary response to each SEAR, and reference to the section of this TAIA that provides a more detailed review of each requirement.

Table 1: Secretary's Environmental Assessment Requirements

SEARs - General	Summary Response	TA Section
The relevant planning policies and strategic objective to be addressed by Environmental Impact Statement include: ▪ NSW State Priorities; ▪ The Greater Sydney Regional Plan, A Metropolis of three cities; ▪ NSW Future Transport Strategy 2056; ▪ State Infrastructure Strategy 2018 – 2038 Building the Momentum; ▪ Sydney's Cycling Future 2013; ▪ Sydney's Walking Future 2013; ▪ Sydney's Bus Future 2013; ▪ Crime Prevention Through Environmental Design (CPTED) Principles; ▪ Healthy Urban Development Checklist, NSW Health; ▪ Better Placed – an integrated design policy for the build environment of NSW (GANSW, 2017); ▪ Central City District Plan; ▪ The Hills Development Control Plan 2012; ▪ The Hills Local Strategy and Directions 2010; and ▪ The Hills Section 7.12 Contributions Plan	The relevant planning policies and strategic objectives are considered within this Transport Assessment.	3
Accurate details of the current daily and peak hour vehicle, existing and future public transport networks and pedestrian and cycle movement provided on the road network located adjacent to the proposed development	The existing Site is a greenfield site primarily used for agricultural purposes and as such currently generates no traffic. Sections 6 and 7 provide an overview of public transport, pedestrian connectivity, bicycle networks and all traffic and transport facilities both existing and future located adjacent to the proposed development.	6 & 7
Details of estimated total daily and peak hour trips generated by the proposal, including vehicle, public transport, pedestrian and bicycle trips based on surveys of the existing and similar schools within the local area	A detailed assessment of the potential peak hour vehicle trip generation of the proposed School is provided in Section 9. Further information regarding public transport, pedestrian, and bicycle targets are detailed in Section 12.	9 & 12
The adequacy of existing public transport or any future public transport infrastructure within the vicinity of the site, pedestrian and bicycle networks and associated infrastructure to meet the likely future demand of the proposed development	Section 6 and 8 provide information regarding the future public transport infrastructure that will be available to the Site, including train and bus services. Information regarding service frequencies is currently not yet available. TfNSW Guidelines state that bus services influence the travel mode choices of sites within 400 metres (5 minutes' walk) of a bus stop; the Site will be accessible by a number of bus services operating along Fontana Drive, with bus stops currently proposed directly adjacent to the Site. The Site is accessible for pedestrians approaching from all directions with appropriate footpath facilities.	6 & 8

	Future students and staff would therefore be more than adequately catered for by the public and active transport amenities in the area. Consultation has been undertaken with TfNSW and Busways who have provided in principle and supporting feedback for the bus servicing of the site.	
Measures to integrate the development with the existing/future public transport network.	As discussed above, TfNSW Guidelines state that bus services influence the travel mode choices of sites within 400 metres (5 minutes' walk) of a train station. The Site is located within the influence zone of the future bus links in The Gables. 5 Bus Bays are provided on Fontana Drive along the western boundary. A GTP is proposed as part of the assessment to encourage students and staff to utilise the available public and active transport network.	6, 8 & 12
The impact of trips generated by the development on nearby intersections, with consideration of the cumulative impacts from other approved developments in the vicinity, and the need / associated funding for, and details of, upgrades or road improvement works, if required (Traffic modelling is to be undertaken using SIDRA network modelling for current and future years)	Section 9 details the methodology undertaken for the traffic assessment, including SIDRA modelling of the key internal Gable Town Centre intersections. Noting the School's location within The Gables Town Centre, the SIDRA analysis specifically considers all land uses within the town centre as well as the surrounding precincts' traffic generation. The analysis reviews the traffic generation of the Proposal at Year of Opening in 2021 and at full capacity.	9
The identification of infrastructure required to ameliorate any impacts on traffic efficiency and road safety impacts associated with the proposed development, including details on improvements required to affected intersections, additional school bus routes along bus capable roads (i.e. minimum 3.5 m wide travel lanes), additional bus stops or bus bays	No road works other than those already proposed for the Gables Town Centre are required, with the traffic analysis indicating that the forecast traffic demands arising from the Proposal are moderate and can be appropriately accommodated within the existing and committed road network. Civil plans have been provided detailing the proposed bus provisions along the western frontage on Fontana Drive in Section 8.	8 & 10
Details of travel demand management measures to minimise the impact on general traffic and bus operations, including details of a location-specific sustainable travel plan (Green Travel Plan and specific Workplace travel plan) and the provision of facilities to increase the non-car mode share for travel to and from the site	A Draft Green Travel Plan has been prepared in Section 12.4. The GTP is intended to develop a package of site-specific measures to promote and maximise the use of sustainable travel modes, including walking, cycling, public transport and car sharing. This draft package would be further developed at CC and OC stages, and it is expected that a suitable condition of consent would be imposed requiring approval by Council.	12
The proposed walking and cycling access arrangements and connections to public transport services	The active transport infrastructure is detailed in Section 6. Cycling and pedestrian paths have been provided throughout the Gables Precinct to encourage active transport. Section 6 also details future public transport services and their proximity to pedestrian and cycling.	6
The proposed access arrangements, including car and bus pick-up/drop-off facilities, and measures to mitigate any associated traffic impacts and impacts on public transport, pedestrian and bicycle networks, including pedestrian crossings and refuges and speed control devices and zones	A consolidated pick-up / drop-off facility and car park are accessed from the northern boundary road (Road B). As detailed in Section 11, all access and internal design components have been designed in accordance with the appropriate Australian Standards.	11
Proposed bicycle parking provision, including end of trip facilities, in secure, convenient, accessible areas close to main entries incorporating lighting and passive surveillance	A End-of-Trip Facility (EOT) with 252 bicycle parking spaces is proposed. Staff facilities include lockers, change rooms and showers. Bicycle parking facilities are to be located in secure, convenient, accessible and well illuminated areas close to the main School entry points, heightening passive surveillance.	8

Proposed number of on-site car parking spaces for teaching staff and visitors and corresponding compliance with existing parking codes and justification for the level of car parking provided on-site	As detailed in Section 8.2, the School will provide 110 staff parking spaces within the Gables Town Centre to the north of the Site and 10 pick-up / drop-off spaces for the ELC within the School's boundary. This is a 26-space deficiency for staff parking, and as such, a robust Green Travel Plan will be implemented to encourage staff to take alternative modes of transport. No visitor parking will be available on-site. As such, surveys of existing and similar schools were undertaken to determine appropriate parking rates for visitors. Based on these surveys, it was determined a visitor parking provision of 26 spaces is required. These visitor spaces can be readily accommodated on-street in the surrounding 400m radius of the School which is approximately less than 4% of all available on-street parking. No student parking is to be provided on-site, as the CEDP encourage alternative modes of transport to reduce total vehicle trips. This is further discussed in Section 12.	8 & 12
An assessment of the cumulative on-street parking impacts of cars and bus pick-up/drop-off, staff parking and any other parking demands associated with the development	As detailed in Section 8.2.4, all 25 visitor parking can be readily accommodated on-street in the surrounding 400m of the Site. Pick-up/drop-off facilities can accommodate the peak demand without impacting traffic flows in adjacent roads. This is discussed in Section 8.4. Dedicated bus bays have been provided along the western boundary of the Site on Fontana Drive in accordance with consultation with Busways and TfNSW.	8
An assessment of road and pedestrian safety adjacent to the proposed development and the details of required road safety measures and personal safety in line with CPTED	Crime prevention through environmental design (CPTED) is a multi-disciplinary approach to deterring criminal behaviour. The three principles of CPTED involve: ▪ Natural surveillance – this involves a design which places activities and physical features in a way that facilitates natural surveillance of that area. For example, if parking areas aren't located in locked, secured facilities they should have natural surveillance. ▪ Access Control – access can be restricted by physical barriers which can increase an effort to conduct a crime ▪ Ownership – criminal and antisocial behaviour thrive in isolated and unused places. Fences, paving, art, signs, good maintenance and landscaping are some physical ways to express ownership. Identifying intruders is much easier in a well-defined space. The CPTED principles that have been incorporated from a traffic and transport perspective to maintain road and personal safety are as follows: ▪ Compliance with Australian Standards (Access & Parking). Provision of access gates which can be closed during out of School hours.	8 & 11
Emergency vehicle access, service vehicle access, delivery and loading arrangements and estimated service vehicle movements (including vehicle type and the likely arrival and departure times)	Vehicles up to an including a 12.5m Heavy Rigid Vehicle have been demonstrated accessing the site via Red Gables Road. Vehicle sizes and delivery times / frequencies are detailed in Section 8.	8 & 11
Projected student population growth as the site develops	Section 2.3 details the expected population growth of the School as the Site develops from 2021 (School Opening) to 2030.	2
Details of design of the surrounding local road network per the Riverstone East planned precinct	The Riverstone East Planned Precinct is located approximately 6.5km to the southwest of the Proposal and as such the design of the surrounding road network is not considered to be applicable to the Proposal.	N/A

Estimated school catchment area (if any)	Section 2.2 illustrates the expected school catchment area of Santa Sophia Catholic College. It is expected that the school's catchment area would cover most of Box Hill and its neighbouring suburbs to the north of Windsor Road.	2
Trip generation and mode share estimates based on surveys and analysis of a similar development	Section 9.1 details the mode share surveys undertake for St. Mark's Catholic College at Stanhope Gardens. Trip generation and mode shares for Santa Sophia Catholic College has been estimated based on the St. Mark's Catholic College's data.	9
The preparation of a draft Construction Traffic Management Plan to demonstrate the proposed management of the impact.in relation to construction traffic addressing the following: ▪ assessment of cumulative impacts associated with other construction activities (if any); ▪ an assessment of road safety at key intersection and locations subject to heavy vehicle construction traffic movements and high pedestrian activity; ▪ details of construction program detailing the anticipated construction duration and highlighting significant and milestone stages and events during the construction process; ▪ details of anticipated peak hour and daily construction vehicle movements to and from the site; ▪ details of on-site car parking and access arrangements of construction vehicles, construction workers to and from the site, emergency vehicles and service vehicle; and ▪ details of temporary cycling and pedestrian access during construction	Section 10 provides an overview of a Draft CTMP addressing these key points.	10
Relevant Policies and Guidelines: ▪ Guide to Traffic Generating Developments (Roads and Maritime Services) ▪ EIS Guidelines – Road and Related Facilities (DoPI) ▪ Cycling Aspects of Austroads Guides ▪ NSW Planning Guidelines for Walking and Cycling ▪ Austroads Guide to Traffic Management Part 12: Traffic Impacts of Development ▪ Standards Australia AS2890.3 (Bicycle Parking Facilities)	The relevant policies and guidelines listed in the SEARs have been taken into consideration during the preparation of this report, as well as the others listed in Section 1.	1

1.5 Stakeholder Consultation

A meeting was held between Celestino, TSA Management, Ason Group, Winim Development, Transport for NSW (TfNSW) and Busways on 17th December 2018 to discuss the requirement for bus facilities on Fontana Drive along the western boundary of the Site. It was established that a minimum of 5 bus bays are to be provided along Fontana Drive to accommodate the future demand of the School. The bus bay facilities have been confirmed with the TfNSW and Busways and is discussed in further detail in Section 0.

A pre SSDA meeting was held with Council on 11th December 2018.

1.6 Reference Documentation

In preparing this TAIA, Ason Group has referenced key planning documents, these include

- The Hills Shire Development Control Plan 2012 (Council's DCP)
- The Hills Shire Local Environmental Plan 2012 (Council's LEP)
- Box Hill and Box Hill Industrial Precincts – Transport and Access Study prepared by GHD; February 2011 (the GHD Report)
- Box Hill North Planning Proposal – Transport and Access Impact Assessment Addendum Report prepared by GTA; 9 December 2013. (The Addendum Traffic Report)
- Box Hill Master Plan Development Application, Traffic Impact Assessment prepared by GTA; 1 May 2015. (The DA Traffic Report)
- Box Hill North – Precinct H Development Application, Traffic Impact Assessment prepared by GTA, 19 November 2015 (Precinct H Traffic Report)
- Planning Proposal Traffic Impact Assessment; The Gables Town Centre, Box Hill North prepared by Ason Group; 14 August 2018 (The Town Centre PP Report)
- Planning Proposal Transport Assessment; Precinct B & Precinct C, The Gables prepared by Ason Group; 14 December 2018 (The Precinct B/C Report)
- Revised Traffic & Pedestrian Assessment; The Gables – Fontana Drive / Red Gables Road Signalised Intersection prepared by Ason Group; 8 February 2019 (The Ason TPA Report)

This TIA also references general access, traffic, and parking guidelines, including:

- The Hills Local Environmental Plan (2012) (LEP 2012)
- The Hills Development Control Plan (2012) (DCP 2012)
- The Hills Development Control Plan (2012) (Part D – Section 17 Box Hill North)
- RMS (formerly RTA) Guide to Traffic Generating Developments (RMS Guide)
- RMS *Guide to Traffic Generating Developments: Updated Traffic Surveys*, 2013 (RMS Guide Update)
- Cycling Aspects of Austroads Guides
- NSW Planning Guidelines for Walking and Cycling
- Austroads Guide to Traffic Management Part 12: Traffic Impacts of Development
- Australian Standard 2890.1 (2004): Off-street Car Parking (AS2890.1)
- Australian Standard 2890.2 (2018): Off-street Commercial Vehicle Facilities (AS2890.2)

- Australian Standard 2890.3 (2015): Bicycle Parking (AS2890.3)
- Australian Standard 2890.6 (2009): Off-street Parking for People with Disabilities (AS2890.6)

1.7 Report Structure

- Section 2 provides an overview of the School proposal;
- Section 3 describes existing Site conditions and the currently sub-regional road network providing access for the Site;
- Section 4 details the State planning context of the Site;
- Section 5 outlines the strategic and regional context of the Site;
- Section 6 outlines existing and proposed public and active transport services and infrastructure;
- Section 7 describes the Gables Precinct and previous assessments;
- Section 8 outlines the parking requirements applicable to the proposed School, and proposed parking provision;
- Section 9 assesses the potential traffic impacts of the proposed School, including an assessment of trip generation and distribution, and future road network performance;
- Section 10 provides a preliminary Construction Traffic Management Plan;
- Section 11 discusses Site access and internal design;
- Section 12 outlines a preliminary Sustainable Transport Management and Green Travel Plan; and
- Section 13 provides a summary of the key conclusions.

2 Overview of Proposal

2.1 Proposal

As stated, a detailed description of the SSDA is provided in the SEE prepared by Urbis which this TAIA accompanies. In summary, the new school will cater for approximately 1,920 primary and secondary school students, inclusive of a 60 student Catholic Early Learning Centre. The school will have 130 full-time equivalent staff.

The proposal seeks consent for approximately 15,000sqm of floor space across a part five and part six storey building. The building will present as three main hubs connected by terraced courtyards and garden spaces.

The school will include:

- Catholic Early learning centre for 60 students;
- General Learning Spaces for years Kindergarten to 12;
- Community Hub – knowledge centre and cafe;
- Creative Hub – art and applied science;
- Performance Hub – multipurpose hall and music, dance and drama spaces;
- Professional Hub – administrative space;
- Research Hub – science and fitness;
- Associated site landscaping and open space including a fence and sporting facilities;
- Bus drop off from Fontana Drive;
- Pick-up and drop-off zone from future road 'B';
- Pedestrian access points from Red Gables Road north, Fontana Drive and future road 'B';
- Staff parking for 110 vehicles provided off site in an adjacent location;
- Short term parking for pick up and drop off for Catholic Early Learning Centre from Red Gables Road; and
- Digital and non-digital signage to the school.

An overview of the School proposal within its local context is provided in Figure 1, while detailed plans are provided elsewhere within the SEE.

2.2 Catchment Area

It is expected that the School would cover most of Box Hill and the surrounding area north of Windsor Road which would include Oakville, Scheyville, Maraylya, Cattai, parts of Vineyard and Nelson North. The following **Figure 2** showcases the expected catchment area of the School.

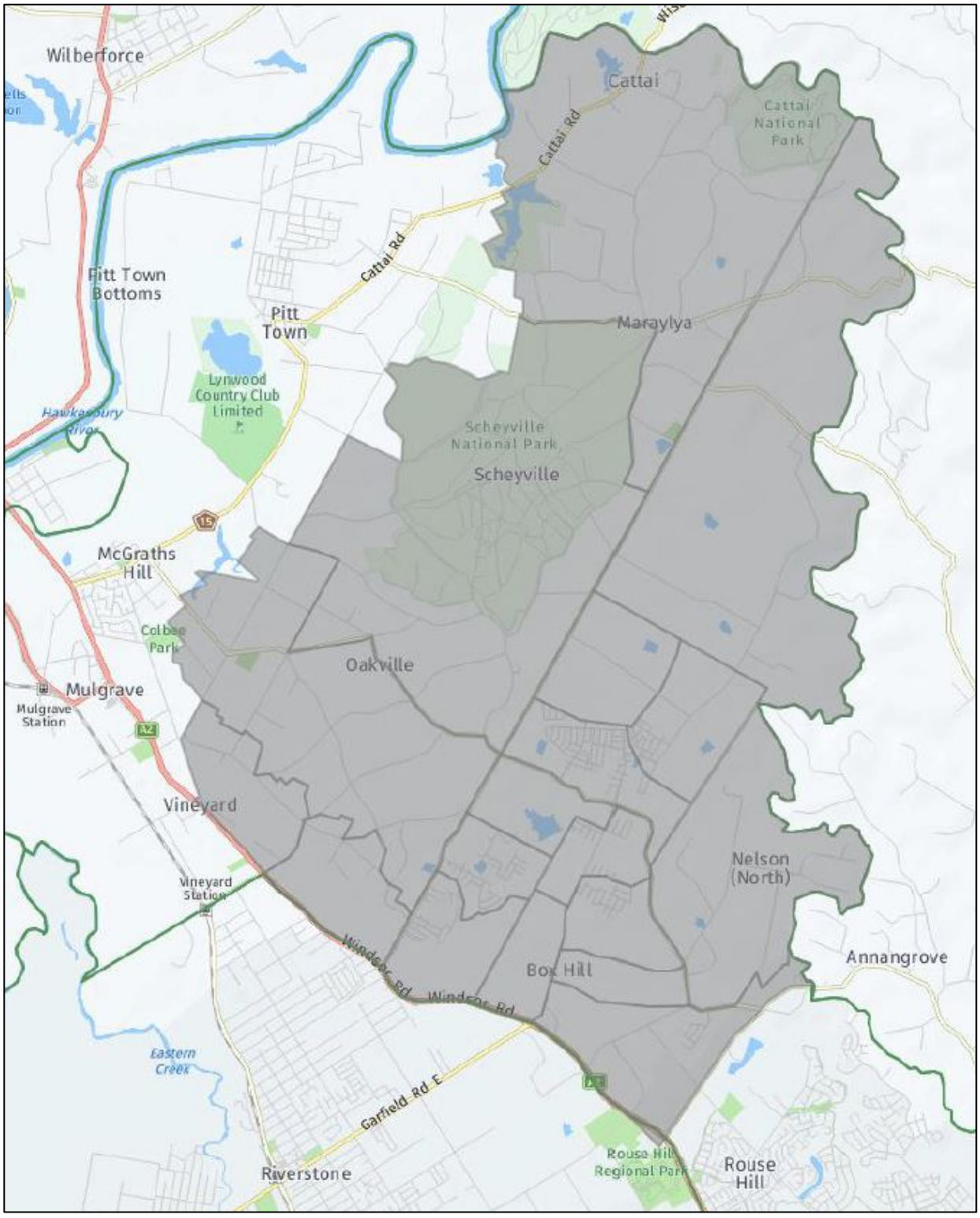


Figure 2: School Catchment Area

2.3 Expected Growth

Santa Sophia Catholic College has provided Ason Group with their expected School Growth Plan in the following tables below:

Table 2: Expected Student and Staff Growth

Years	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030
ELC	30	60	60	60	60	60	60	60	60	60
Primary	325	485	560	695	780	840	840	840	840	840
Secondary	195	356	515	661	782	877	949	985	1,002	1,018
Total Students	550	901	1,135	1,416	1,622	1,777	1,849	1,885	1,902	1,918
Staff	33	52	67	83	94	104	108	111	112	113
Total	583	953	1,202	1,499	1,716	1,881	1,957	1,996	2,014	2,031

As shown in the above table, it is expected by year 2030, the student and staff population of Santa Sophia Catholic College could reach 2,031 people.

3 Existing Conditions

3.1 Site & Location

The Site is located at 5-7 Red Gables Road, Box Hill North within The Hills Shire LGA in Box Hill North approximately 39 kilometres northwest of Sydney CBD and 23 kilometres northeast of Penrith. The Site has an area of 63,652 m^2 with greenfield sites surrounding the Site in all directions. The Site has a frontage to Red Gables Road to the south. A Site Plan is presented in **Figure 3** which provides an appreciation of the site and the existing conditions.

The Site is currently zoned B2 Local Centre under Council's LEP and is legally known as Lot 26 DP255616. The Site is presently vacant.

3.2 Road Hierarchy

The key roads providing in the vicinity of the site are summarised below:

- Windsor Road – A classified RMS Main Road (MR184) that generally runs in a northwest-southeast direction to the south of the Site. The road has a divided carriageway and is subject to an 80 km/h speed zoning. The road carries approximately 55,000 vehicles per day (vpd) (Station 71024)
- Boundary Road – An unclassified Regional Road (7205) that generally runs in a northeast-southeast direction to the west of the Site. It connects to Windsor Road in the south and Cattai Right Road to the north and carries one lane of traffic in each direction and is subject to a speed limit of 80 km/h.
- Old Pitt Town Road – A local collector road that traverses in an east-west direction to the south of the Site and is subject to a speed limit of 60 km/hr.
- Red Gables Road – A local road that runs parallel to Old Pitt Town Road and connects to Boundary Road in the west and Janpieter Road in the east. It forms the southern frontage of the Site and carries one lane of traffic in both directions with a speed limit of 60 km/hr.
- Fontana Drive – A future local road that runs parallel to Boundary Road which generally runs in the north-south direction and forms the western frontage of the Site. The road is proposed to have a divided carriageway. It should be noted that Fontana Drive is undergoing construction and construction has not yet commenced in vicinity of the Proposal.
- Internal Road A (Road A) – A future local road that runs parallel to Fontana Drive which generally runs in the north-south direction and to the east of the Site. The road is proposed to have a divided carriageway. It should be noted that Internal Road A has yet to be constructed.

- Internal Road B (Road B) – A future local road that runs parallel to Red Gables Road which generally runs in the east-west direction and along the northern frontage of the Site. It should be noted that Internal Road B has yet to be constructed.

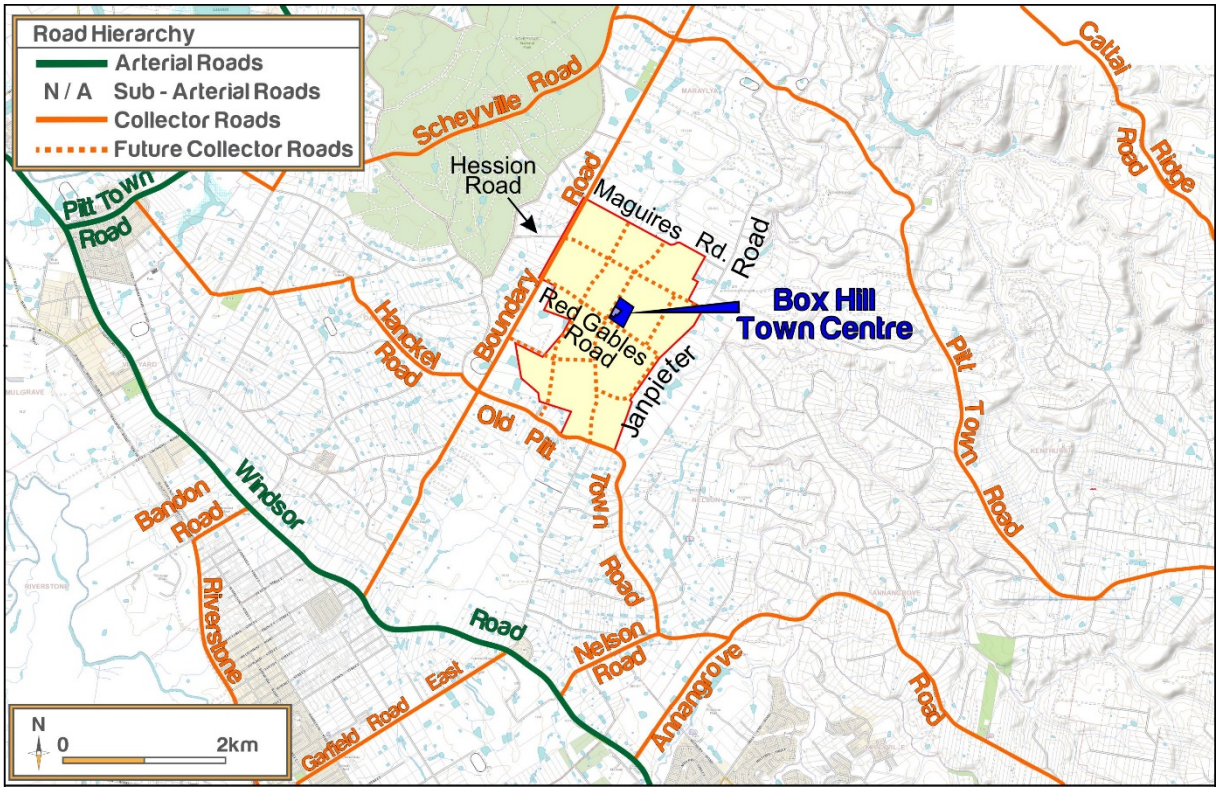


Figure 3: Site and Road Hierarchy

4 State Planning Context

The following tables summarise each of the relevant strategic state planning policies and their relevance to the Proposal.

4.1 NSW State Priorities

NSW State Priorities	
Organisation	NSW Government
Date	22 December 2017
Purpose	Improving outcomes for the people of NSW – with clear goals and accountability
Content	Building infrastructure Improving road travel reliability – to ensure consistency of journey times on key roads continues to improve, TfNSW are working to make better use of existing road infrastructure, build extra road capacity and encourage commuters to use public transport and to undertake off-peak travel more often. This will enable business and the community to move around the city with greater ease, reducing travel times, boosting productivity and reducing business costs. Ensure on-time running for public transport Maintain or improve reliability of public transport services over the next four years. Public transport services in Sydney are crucial in getting customers to their destinations. Although Sydney is undergoing a large amount of infrastructure construction, we are working to ensure that public transport services continue to run on time. The government is also improving integration across public transport services, updating timetables and providing clear information to get people to their destinations on time. Creating New Jobs 150,000 new jobs are to be created by 2019, and the NSW Government is assisting small businesses across NSW to grow and providing support for start-ups and fast-growth small and medium-sized enterprises.
Relevance to Santa Sophia College	Given the Site's location, connectivity and linkages to sustainable transport, the NSW State Priorities guidelines combined with the sustainable targets outlined in the proposed green travel planning would align with objectives set by the NSW Government. Further, the Proposal would facilitate jobs growth by providing employment within the education sector.

4.2 The NSW State Infrastructure Strategy 2018-2038

The NSW State Infrastructure Strategy 2018-2038 builds on the NSW Government's major long-term infrastructure plans over the last 7 years. It sets out the government's priorities for the next 20 years, and is underpinned by:

- NSW State Infrastructure Strategy 2018-2038: Building Momentum
- Greater Sydney Region Plan
- Future Transport Strategy 2056

NSW State Infrastructure Strategy 2018-2038: Building Momentum	
Organisation	Infrastructure NSW
Date	February 2018
Purpose	Infrastructure NSW's independent advice on the current state of NSW's infrastructure and the needs and priorities over the next 20 years.
Content	The Strategy sets six cross-sectoral strategic directions, each designed to achieve 'more with less' from the State's large infrastructure program and asset base. ▪ Continuously improve the integration of land and infrastructure planning ▪ Plan, prioritise and deliver an infrastructure program that represents the best possible investment ▪ Optimise the management, performance and use of State's assets. ▪ Ensure NSW's existing and future infrastructure is resilient ▪ Improve state-wide connectivity and realise the benefits of technology ▪ Drive high quality consumer-centric services and expand innovative service delivery models
Relevance to Santa Sophia College	Bus routes within the proximity of the Site are currently under investigation with TfNSW and Council.

Future Transport Strategy 2056	
Organisation	Transport for NSW
Date	March 2018
Purpose	The vision for how transport and land-use planning can support growth and the NSW economy. The Strategy is an update of the NSW Long Term Transport Master Plan.
Content	The Strategy is focused on six key outcomes for the future of mobility in the state, which together aim to positively impact the economy, communities and environment of NSW. ▪ Customer Focused – experiences are interactive and personalised, supported by technology ▪ Successful Places – success of communities and places are enhanced by transport ▪ Growing the Economy – transport system enables economic activity across the state ▪ Safety and Performance – Every customer enjoys safe travel across an efficient network ▪ Accessible Services – transport enables everyone to get the most out of life ▪ Sustainable – transport system is economically and environmentally sustainable. The projects set out by the 2012 Master Plan align with State Priorities to deliver better infrastructure and services, create safer communities, reduce road fatalities by more than 30 per cent by 2021 and improve road travel reliability and on time running. Improvements resulting from the 2012 Master Plan have created a solid foundation for the deployment of new technology and innovative service models. Through Future Transport 2056, NSW will maximise the benefits of emerging technologies and innovation in delivering outcomes.
Relevance to Santa Sophia College	The Strategy aims to increase the mode share of public transport services and reduce the use of single occupant vehicles. The Proposal will look to reduce private vehicle travel and aligning with the objectives of the Strategy.

Greater Sydney Region Plan: A Metropolis of Three Cities – Connecting People	
Organisation	Greater Sydney Commission
Date	March 2018
Purpose	Supports the vision for a metropolis of three cities that will rebalance growth and deliver its benefits more equally and equitably to residents across Greater Sydney.
Content	Conceptualises Greater Sydney as a metropolis of three cities: ▪ Established Eastern City ▪ Developing Central City ▪ Emerging Western City The Plan aspire to create a 30-minute city, where jobs services and quality public spaces are in easy reach of people's homes.
Relevance to Santa Sophia College	The Site is ideally located to contribute towards creating a 30-minute city. The mix of uses provided by the Gables Town Centre means Santa Sophia College is ideally located to accommodate students within the local area. The Site's links with future public transport means that students and staff will be able to access the Site within a 30-minute travel time, thereby increasing the catchment area and increasingly the availability of accessible education. The Site thus aligns with the objects of the Plan.

4.3 Sydney's Bus Future 2013

Sydney's Bus Future 2013	
Organisation	NSW Government
Date	December 2013
Purpose	Deliver simpler, faster and better bus services for customers, and attract more customers to use bus services throughout Sydney
Content	Three-tiered network will operate with each level delivering a defined level of service consistency and reliability. ▪ Rapid service routes ▪ Suburban service routes ▪ Local service routes The three stages of Sydney's Bus Future: ▪ Improve bus customers' experience ▪ Integrate bus service across Sydney ▪ Serve future growth
Relevance to Santa Sophia College	Bus routes within the Gables Precinct are currently under investigation with TfNSW and Council. It is noted that bus bays have been provided along the western boundary of the Site.

4.4 Sydney's Cycling Future 2013

Sydney's Cycling Future 2013	
Organisation	NSW Government
Date	December 2013
Purpose	Making bicycle riding a safer and more convenient option and to encourage residents to ride bikes for everyday transport.
Content	Outlines how the bicycle network will be improved. Three pillars of Sydney's Cycling Future: ▪ CONNECT Safe, connected networks ▪ PROMOTE Better use of existing Infrastructure ▪ ENGAGE Policy and partnerships
Relevance to Santa Sophia College	Bicycle network plans will be developed with councils within five-kilometre catchments of Major Centres, including Penrith. Priority routes have been identified to provide better cycle access to St Marys. Existing bike paths within the vicinity of the Site are found along Mamre Road, Elizabeth Drive, and the Northern Road. Luddenham Road provides no infrastructure to accommodate bicycles, however a key deliverable of the SSP is the provision of safe cycleways to facilitate bicycle movements around the Site. End-of-Trip facilities will be provided and, as discussed in Section 8, a parking quantum of 252 bicycle spaces will be provided as part of the development, which will encourage travel to the Site by bicycle.

4.5 Sydney's Walking Future 2013

Sydney's Walking Future 2013	
Organisation	NSW Government
Date	December 2013
Purpose	Getting people in Sydney walking more through actions that make it a more convenient, better connected and safer mode of transport
Content	Walking is a fundamental part of an integrated transport systems, enabling more people to make more walking trips will ease pressure on public transport and reduce traffic congestion. Three pillars of Sydney's Walking Future: ▪ PROMOTE benefits and provide information ▪ CONNECT through infrastructure and technology ▪ ENGAGE through policy and partnerships
Relevance to Santa Sophia College	Focus is on investing in connected walking routes with two kilometres of centres and public transport interchanges. Creating precincts that are easy to move within encourages walking and reduces congestion. The Town Centre and Santa Sophia College have been designed so it integrates community facilities, education, shopping and employment opportunities within comfortable walking distances, thereby promoting pedestrian movements.

5 Strategic & Planning Context

5.1 North West Priority Growth Area

The Site is located to the north of the North West Growth Area (NWGA), which spreads across The Hills Shire, Blacktown City and Hawksbury City local government areas identified by the NSW State Government for broad urban development. The NWGA is divided into 16 'Precincts' which include the Box Hill Precinct and the Box Hill Industrial Precinct which are located to the south of the site. Over time, it is estimated that the NWGA will accommodate some 33,000 dwellings and 250,000 residents. Fundamentally, the NWGA is supported – and indeed to a large extent made possible – by the future provision of the new Sydney Metro Northwest infrastructure at Tallawong and Rouse Hill, which will be delivered in 2019 along with other regional infrastructure upgrades. The broader NWGA is shown in **Figure 4**.

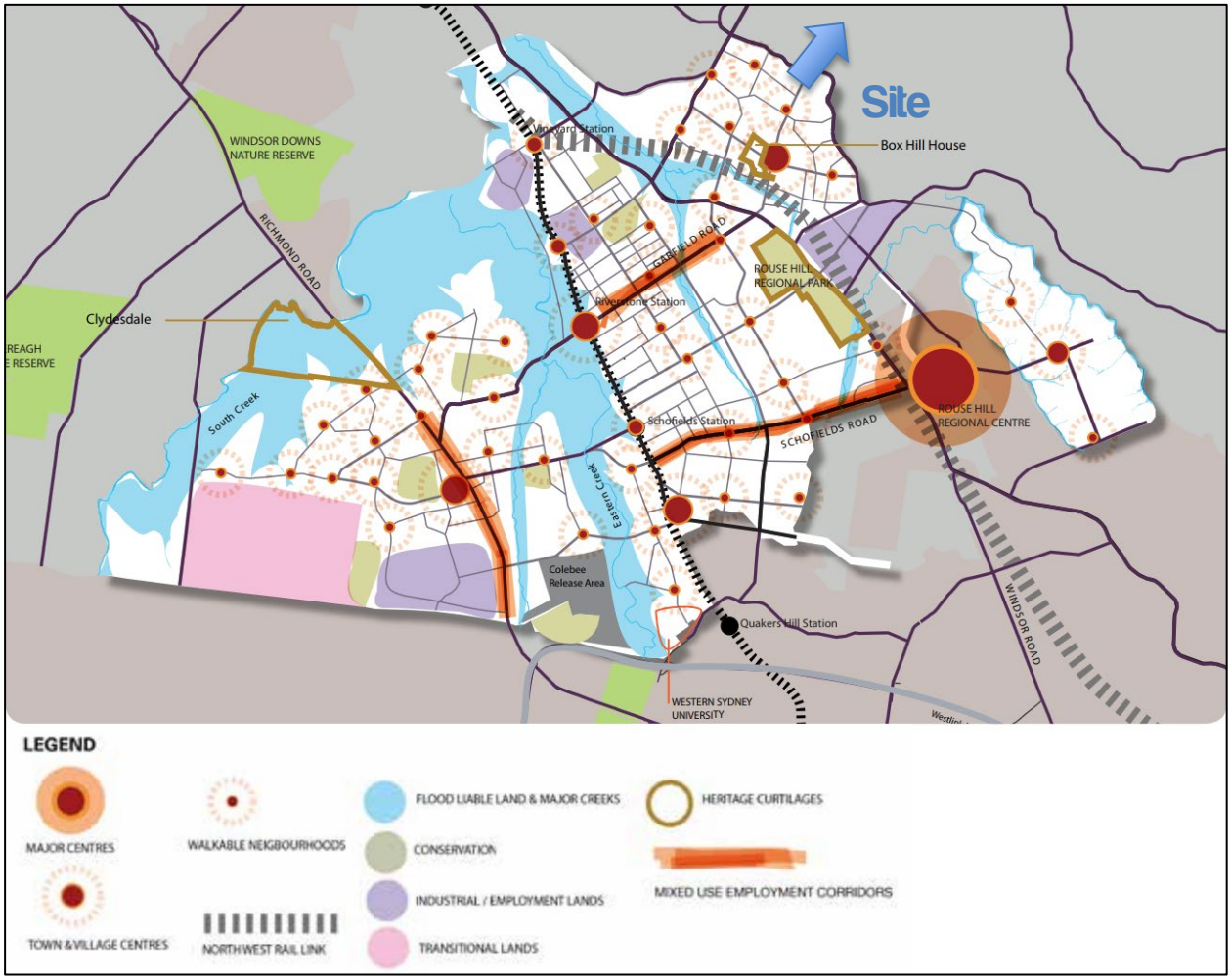


Figure 4: North West Growth Area

As mentioned above, the Box Hill and Box Hill Industrial Precinct, detailed in **Figure 4** is located to the south of the Box Hill North Precinct and will contain about approximately 9,600 new dwellings and employment for about 16,000 people.

5.2 Sydney Metro Northwest

The Sydney Metro Northwest forms a key component of the NWGA infrastructure upgrades, delivering 8 new railway stations and 4,000 commuter car parking spaces. The new metro line has a target capacity of 40,000 customers per hour and will provide services every 4 minutes during peak periods. With the delivery of the new metro stations, improved cycling and pedestrian amenities will be provided thereby further improving the Growth Centres provision of amenities directed at encouraging residents and employees to use alternative modes of transport.

The nearest stations to the Site are the Tallawong Railway Station and Rouse Hill Station which are located on the corner of Tallawong Road and Schofields Road, and the corner of Rouse Hill Drive and Windsor Road respectively. **Figure 5** details the location of the stations in relation to the Site. Construction is currently underway at both stations and is due for completion within the first half of 2019.

Upon completion of the Tallawong Railway Station the following amenities will be provided:

- 4 bus bays,
- 9 taxi spaces,
- Parking and storage of 55 bicycles,
- 15 Kiss and Ride Spaces, and
- 1,000 commuter parking spaces.

Upon completion of the Rouse Hill Station the following amenities will be provided:

- 8 bus bays,
- 9 taxi spaces,
- Parking and storage of 45 bicycles, and
- 25 Kiss and Ride Spaces.

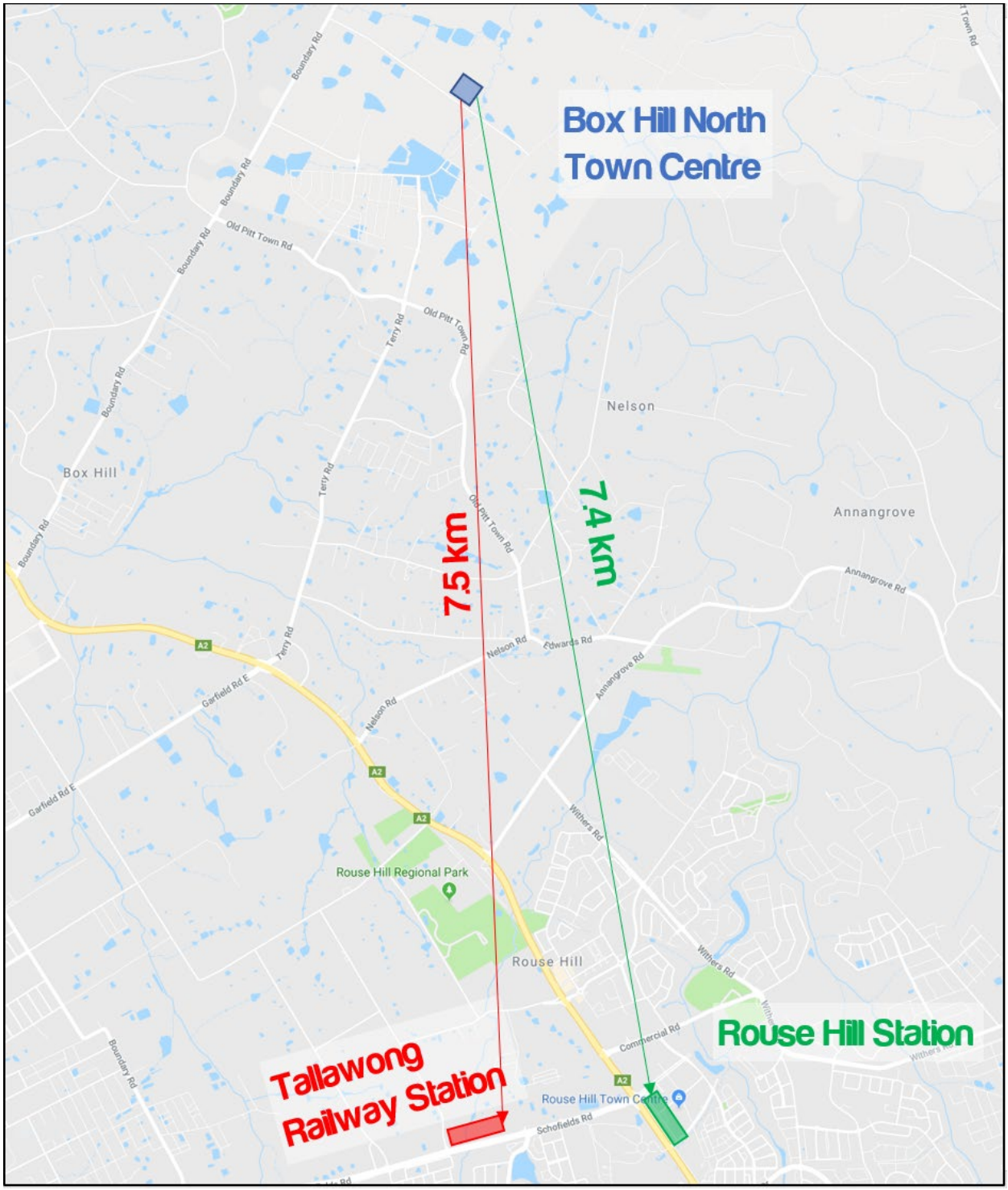


Figure 5: Northwest Metro Station Proximity

5.3 Outer Sydney Orbital

TfNSW is currently investigating the Outer Sydney Orbital (M9) corridor with the intention to preserve land for this key motorway and freight rail spine in the future. **Figure 6** details the proposed route for the Outer Sydney Orbital. This will provide a north-south bypass between northern and southern NSW to avoid the more congested roads of Sydney and alleviate pressure on the existing road networks. The Outer Sydney Orbital corridor will support the growing logistics and freight businesses in Western Sydney and provide additional traffic capacity for the increasing population of Western Sydney. This motorway would provide an important strategic link between the North West and South West Growth Areas.

The motorway would start between Scheyville National Park and Boundary Road and the proposed alignment would then pass along the north-western side of the North West Growth Area, with key interchanges at Windsor Road and Richmond Road. The Gables Town Centre would be approximately 4km from the nearest interchange at Windsor Road. There are ongoing investigations to extend the northern section of the Outer Sydney Orbital corridor to continue towards the Central Coast. **Figure 7** frames the Outer Sydney Orbital motorway in the locality of Box Hill.

The future Outer Sydney Orbital corridor will connect the North West Growth Area to the Western Sydney Parklands, Badgerys Creek Aerotropolis, the South West Growth Area, the Western Sydney Employment Area and Central Coast regions. The improved travel links would decrease transportation time and costs to enhance the freight productivities for the burgeoning Western Sydney industries.

Figure 6: Proposed Outer Sydney Orbital Corridor

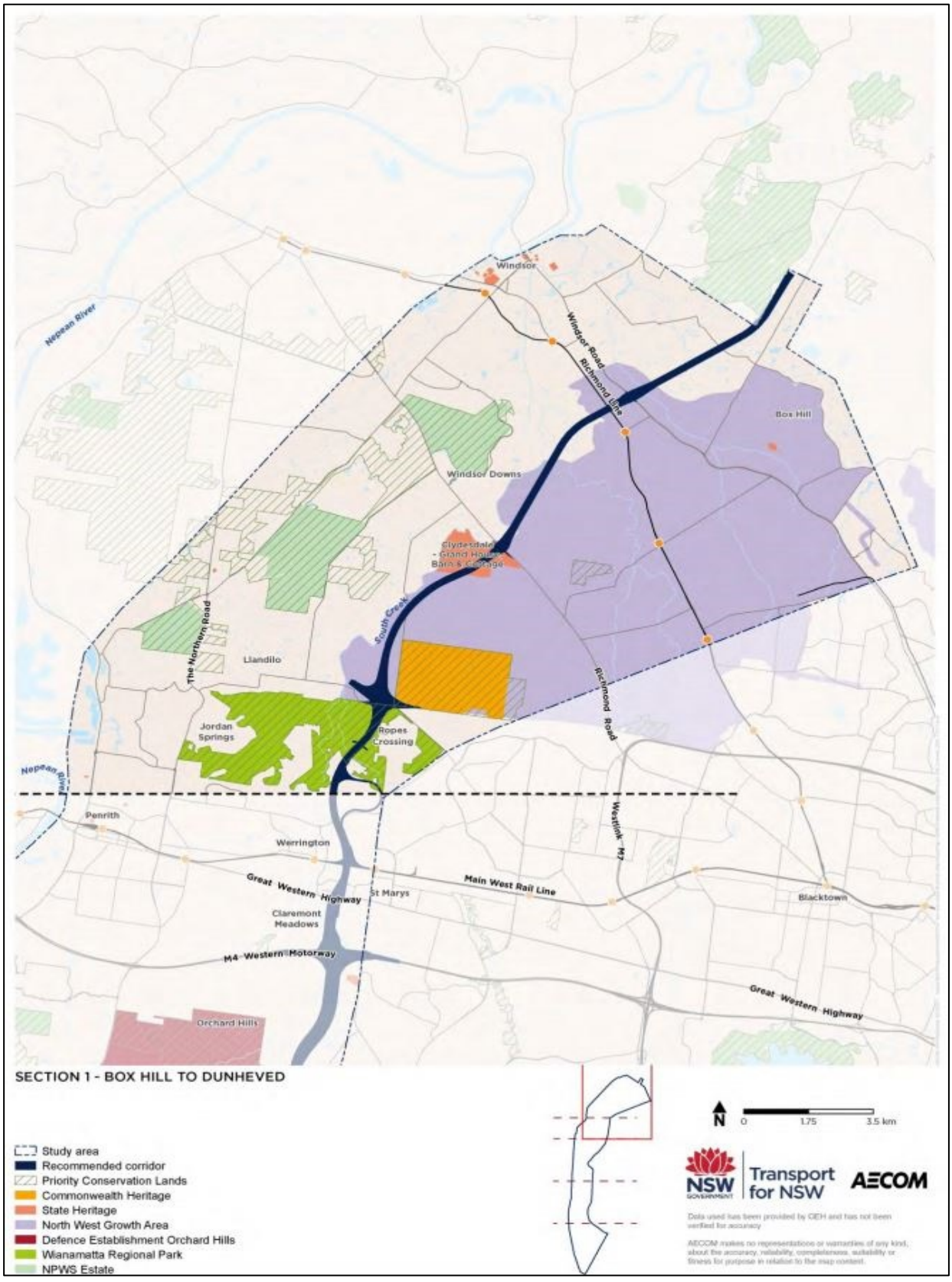


Figure 7: Outer Sydney Orbital Corridor near Box Hill

5.4 Regional Road Network Improvements

The Box Hill and Box Hill Industrial Precincts – Transport and Access Study (GHD, February 2011) (The GHD Report) was prepared for the then Department of Planning and the purpose of the study was to:

- Assess the transport implications of the Box Hill and Box Hill Industrial ILP; and
- Identify transport improvements required to accommodate the future (2036) travel demand requirements of the Box Hill and Box Hill Industrial ILP.

The GHD Report identified several intersection capacity and road widening improvements to the local and regional road network. The regional road network improvements as identified in the GHD Report have been included as part of the State Infrastructure Contribution (SIC) levies for Box Hill and the broader North West Growth Centre or alternative funding arrangements. The works include capacity improvements at key intersections along Windsor Road, namely:

- Boundary Road – conversion to a four-way intersection with re-alignment of Loftus;
- Terry Road / Garfield Road – additional right-turn lane along Windsor Road East, two lanes (one through, one right turn) along Terry Road and Garfield Road;

It is also understood that funding will be available to upgrade the vertical road alignment along Boundary Road between Windsor Road and Old Pitt Town Road with the widening of Boundary Road to 4 lanes. It is noted that these regional and local road network improvements are required to accommodate future growth excluding the Box Hill North Precinct.

6 Active and Public Transport Infrastructure

6.1 Existing Public and Active Transport

The current Site and surrounding areas are undeveloped greenfield/agricultural land. As such, little public and active transport amenities have been provided in the area. However, as discussed further in Section 4, the Box Hill North area would be receiving two future public bus routes and pedestrian and cycling amenities in the area. **Figure 8** shows the existing public and active transport options in the area as well as the indicative future transport options.

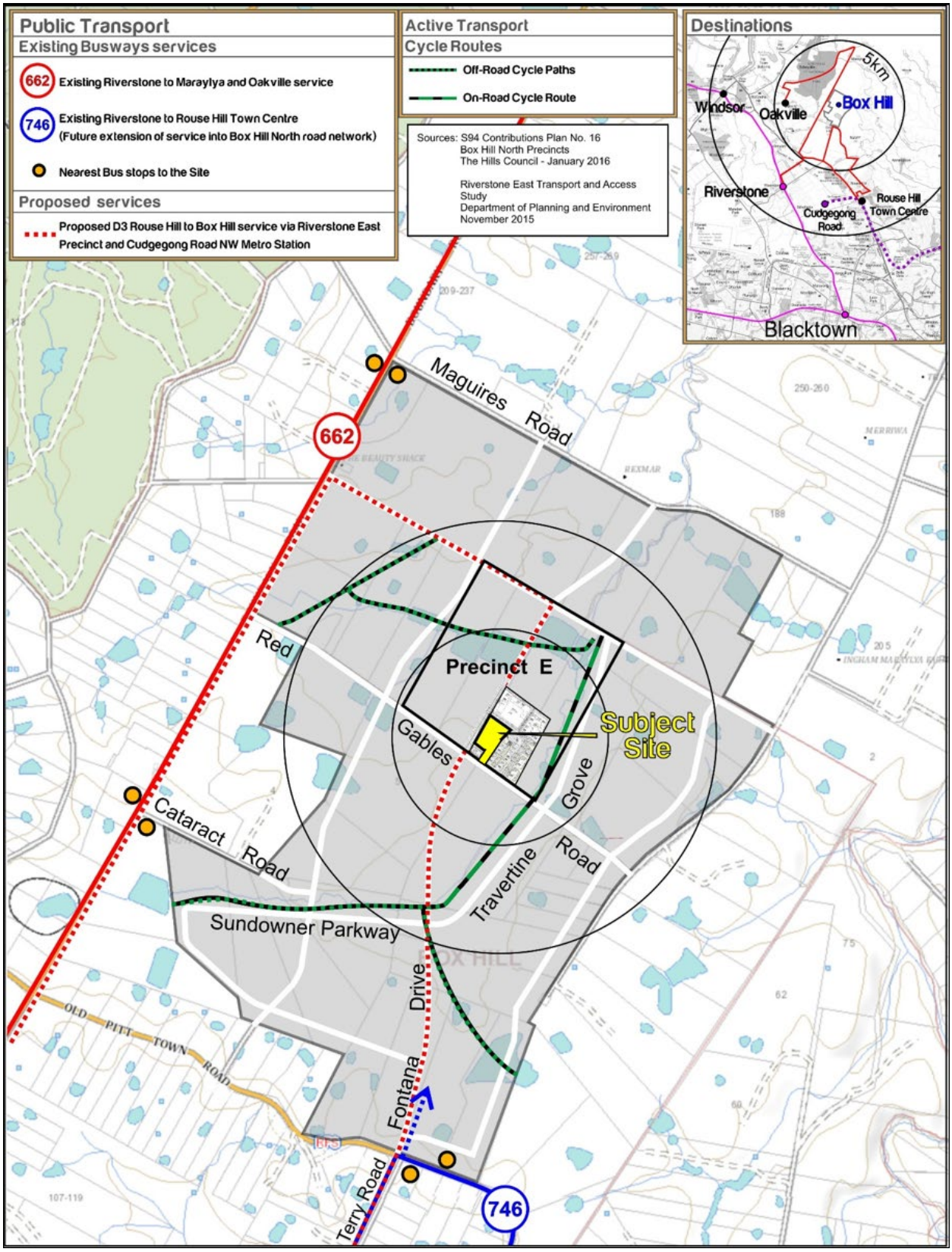


Figure 8: Existing Public and Active Transport

6.2 Future Bus Services

To accommodate the future transport demands of the NWGA and the Box Hill North Precinct, the North West Sector Bus Servicing Plan was adopted to increase the level of accessibility of public transport. **Figure 9** details the proposed bus network and routes detailed in the North West Sector Bus Servicing Plan.

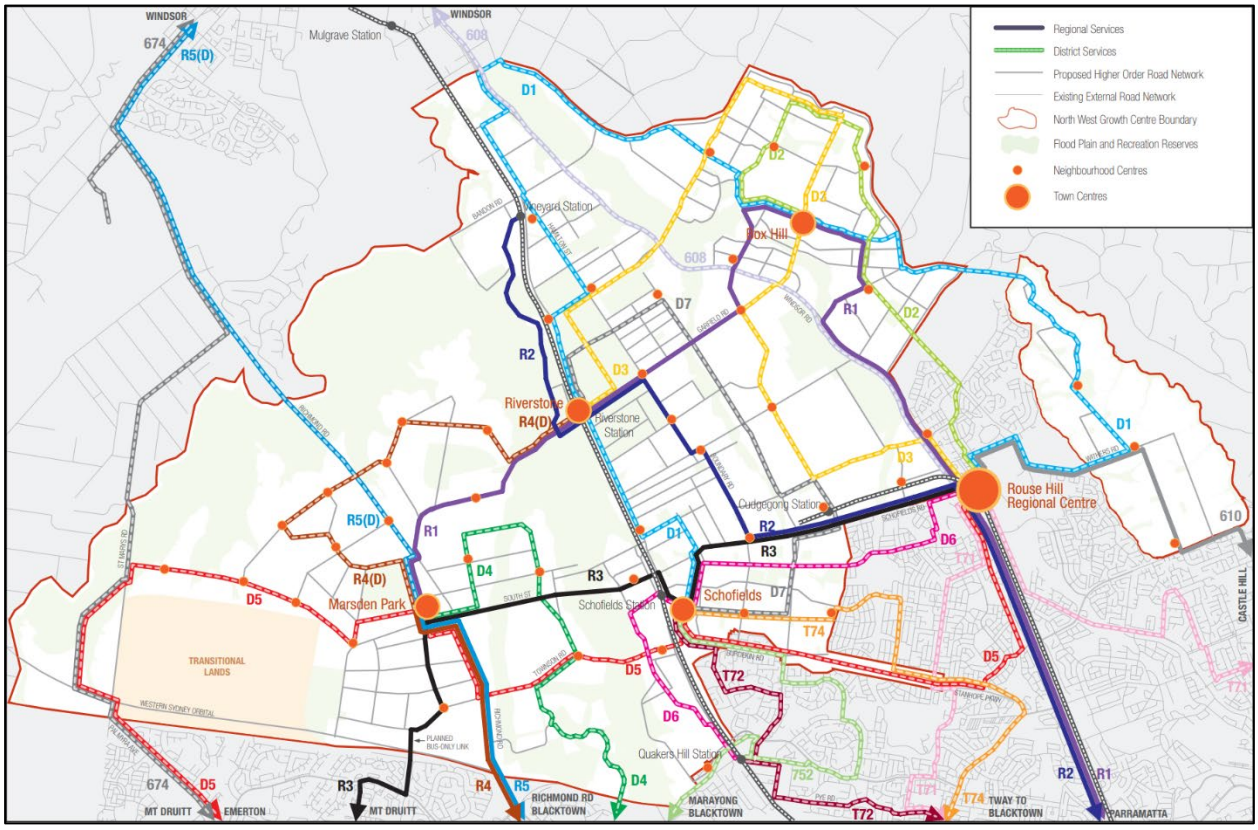


Figure 9: North West Sector Bus Servicing Plan

Council has approved a Development Plan and Transport Plan **Figure 10** which identifies two indicative District Bus Routes within the Precinct Bus Route 1 does not traverse the road network which bounds the Town Centre Precinct requiring public transport patrons to walk to the centre, thereby requiring usage of the Fontana Drive / Red Gables Road intersection. It is acknowledged that the bus routes are indicative and subject to final confirmation by TfNSW however the Transport Plan indicates that pedestrian demands, and desire lines would further be substantiated by the public transport linkages.

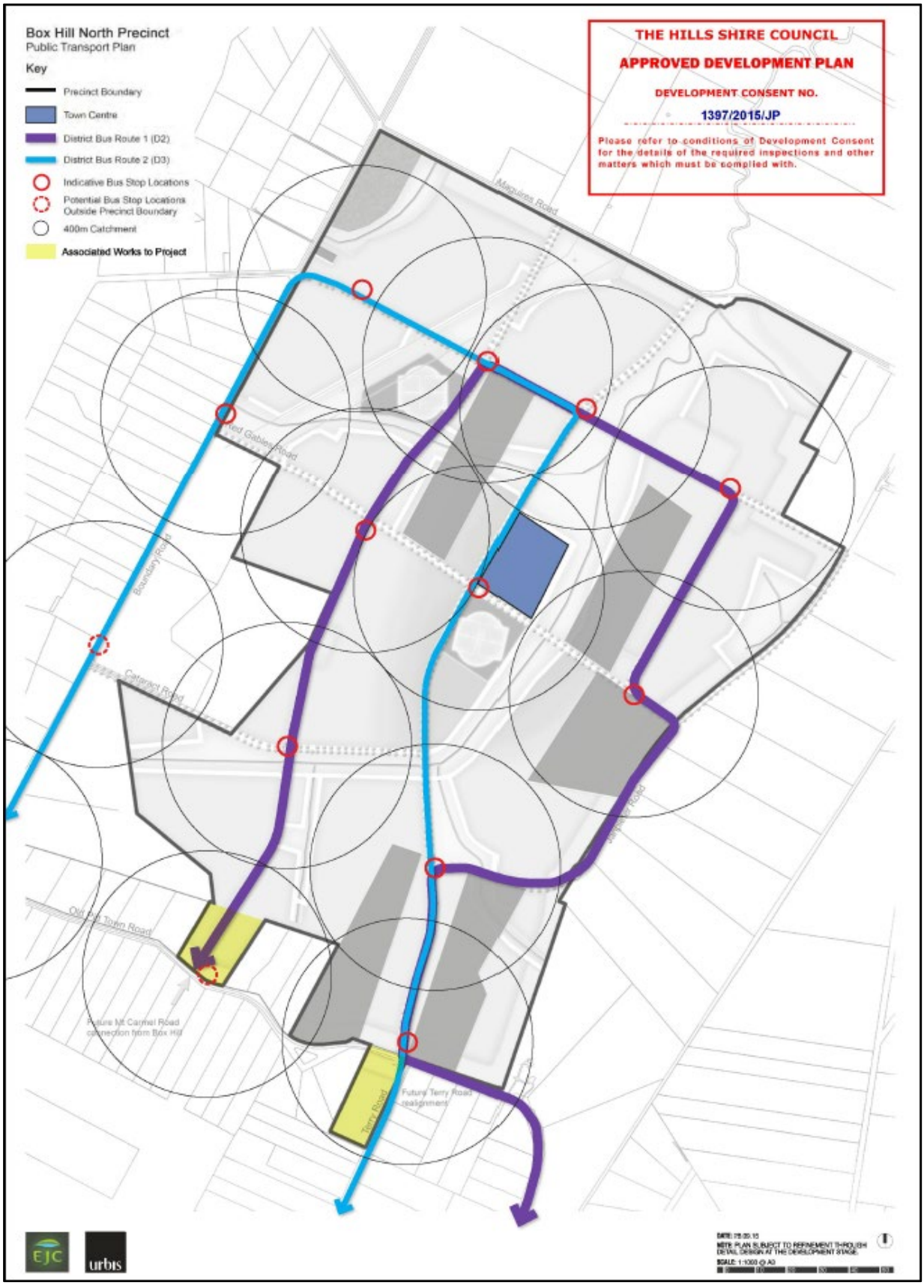


Figure 10: Approved Future Public Transport Plan

6.3 Future Pedestrian and Cycling Links

The Hills Shire Council has provided an indicative pedestrian and cycle network for the future community at Box Hill North in their The Hills Shire Development Control Plan 2012, Part D Section 17 – Box Hill North. The network map details a proposed on-road cycle path along Fontana Drive that will border the Gables Town Centre to the west. The on-road cycle path serves as a continuous cycling route spine from the Gables Town Centre to Terry Road in Box Hill to the south.

Shared Pedestrian and Cycle Paths would border the west and south street frontages of the Gables Town Centre at Fontana Drive and Red Gables Road. These indicative pedestrian and cycling amenities are detailed in the following figure below.

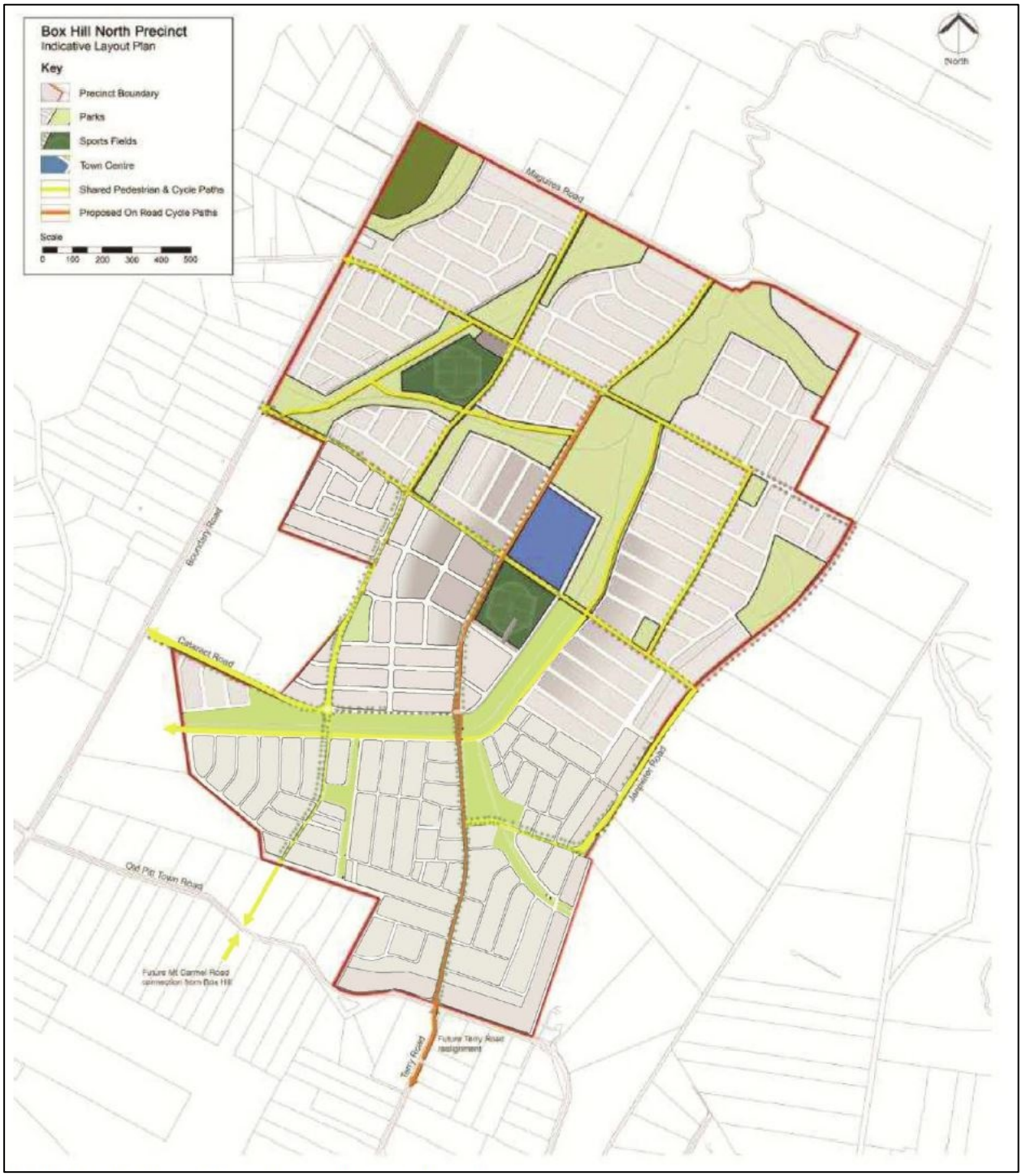


Figure 11: Indicative Box Hill North Pedestrian and Cycle Network

7 The Gables

7.1 Box Hill North Precinct

In 2011 the NSW State Government commenced an initiative to invite land owners to submit expressions of interest to develop their land to assist with housing affordability and supply issues. Sites were assessed against infrastructure provision, consistency with local, state and national strategies, plans and policies and the viability of the land to support urban development. Box Hill North was identified as a site suitable for this initiative by the NSW State Government.

The Box Hill North Precinct is located to the north of the Box Hill and Box Hill Industrial Precinct with an approximate area of 380 hectares. Box Hill North is generally bound by Maguires Road to the north, Boundary Road to the west, Janpieter Road to the east and Old Pitt Town Road to the south.

A Planning Proposal was submitted to Council in 2014 to amend The Hills Local Environmental Plan 2012 which sought to amend the RU6 Transition to a range of zones to aid in the development of approximately 4,100 dwellings, a local centre, a primary school, community and sporting facilities. The Indicative Layout Plan of Box Hill North is detailed in **Figure 12**.

This was accompanied by the Addendum Traffic Report which is discussed in further detail below.

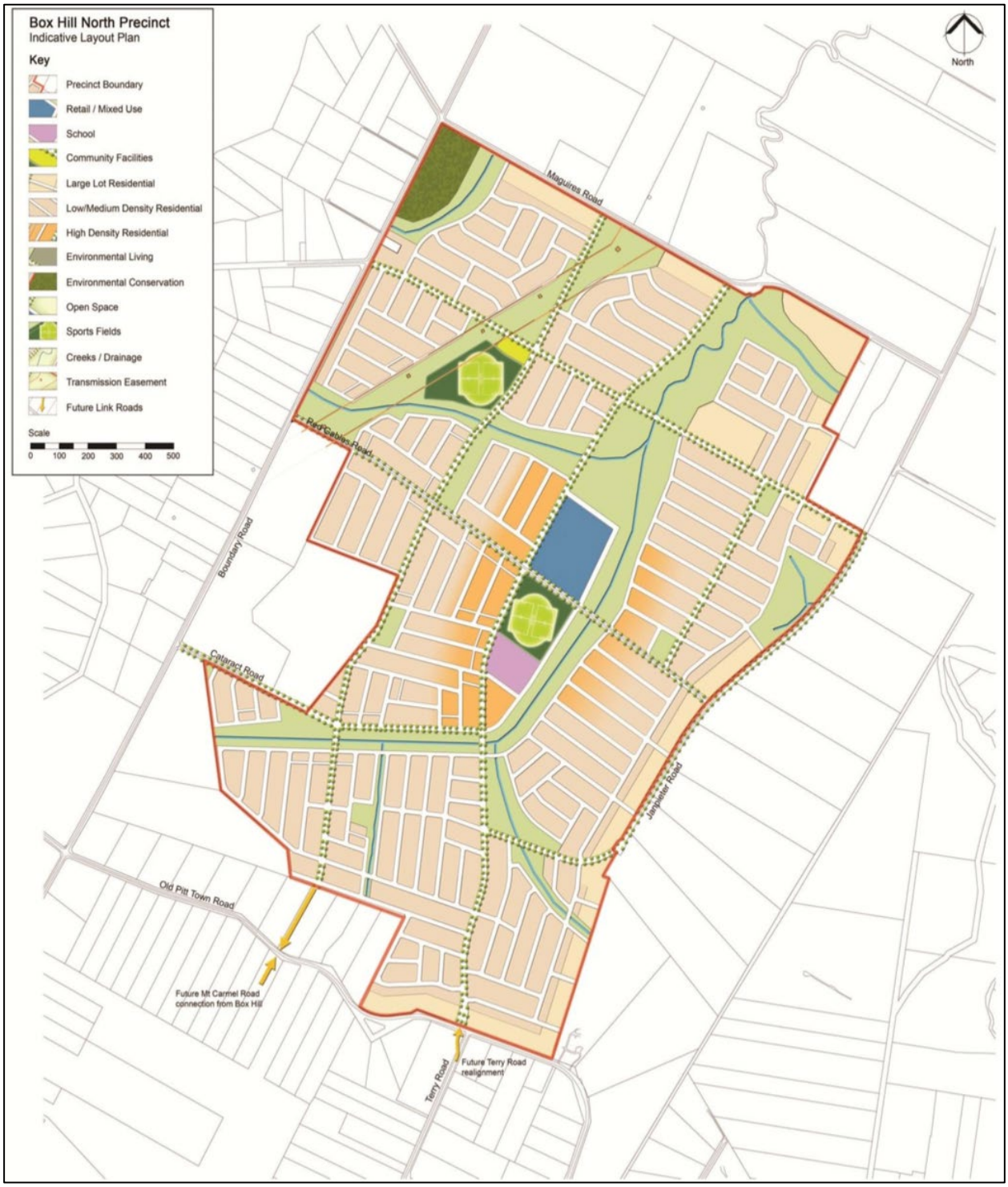


Figure 12: Box Hill North ILP

7.2 Box Hill North Planning Proposal - Traffic Assessment

To support the Planning Proposal (2014) and subsequent Masterplan Development Application (2015), GTA Consultants provided accompanying traffic reports detailing the anticipated traffic and transport implications of the development of the Box Hill North Precinct. The DA Report assessed a yield of 4,800 units and determined the peak hour traffic generation of the Precinct detailed in **Table 3**.

Table 3: External Traffic Generation

Residential Density	Dwellings	Trip Generation Rate (car trips per dwelling)		Total Traffic Generation	
		AM Peak	PM Peak	AM Peak	PM Peak
Low-density	2,045	0.90	0.99	1841	2025
Medium-density	1,911	0.40	0.48	764	917
High-density	1,289	0.40	0.48	516	619
Total	4,600			3121	3561
Mode shift			0%	-	-
Trip containment			20%	-624	-712
Total external trips				**2,496**	**2,849**
Inbound				499	2279
Outbound				1997	570

As detailed in the above table, a total of 3,121 and 3,561 vehicles during the AM and PM peak periods respectively would be generated by the development of the Precinct. A trip containment of 20% was adopted which corresponds to 624 and 712 trips during the AM and PM peak periods respectively. This trip containment included traffic demand associated with multiple uses within the Box Hill North Precinct, namely education facilities, retail and commercial uses. As such, 2,496 and 2,849 vehicles during the AM and PM peak periods respectively were estimated to impact the external intersections.

To determine the trip distribution of traffic generated by the Box Hill Precinct, a mesoscopic assignment model of the traffic conditions using a Netanal model was developed. The model utilises defined travel demand (both vehicle and persons) between zonal pairs, represented as assimilated traffic movements, throughout the Sydney Metropolitan Area. The program is a logit type, incremental assignment mesoscopic program, consigning vehicular traffic onto a, computer-based road network, developing link demand forecasts on each modelled section of road.

SIDRA intersection analysis of the above intersections was undertaken of the following two development scenarios:

- **Base:** Existing + Background Growth (2036) + Full Development of Box Hill and Box Hill North Industrial Precincts; and
- **Full Development:** Base + Full Development of Box Hill North.

Intersection improvement works were proposed by GTA to accommodate the additional traffic generated by the Box Hill North Precinct. The improvements are detailed in **Table 4** and **Table 5**.

Table 4: Intersection Improvements

Item No. (see Figure 4.6)	Intersection Location	Previous Proposed Improvement Works	Additional Improvement Works (Identified by Revised Assessment)	Comments
Windsor Road Intersections				
1	Windsor Rd / Boundary Rd / Loftus Street	Extension of turning lane lengths: - Windsor Rd westbound right turn lane - Boundary Rd southbound left and right turn lanes	Additional Turn Bay length required on Loftus Road Approach (+220m)	
2	Windsor Rd / Mt Carmel Rd	Extension of turning lane lengths: - Windsor Rd eastbound left turn lane - Mount Carmel Rd southbound right turn lane	Additional Turn Bay length required (+30m)	This is a new intersection proposed as part of the Box Hill and Box Hill Industrial Precincts.
3	Windsor Rd / Terry Rd / Garfield Rd	Extension of turning lane lengths: - Windsor Rd westbound right turn lane - Terry Rd southbound left turn lane	Additional Turn Bay length required (+135m)	
4	Windsor Rd / Box Rd/ Guntawong Rd	Extension of turning lane length: - Guntawong Rd northbound left turn lane	Additional Turn Bay length required (+30m)	Additional storage capacity required on Guntawong Rd to accommodate additional through traffic along Windsor Rd associated with Box Hill North development.
5	Windsor Rd / Annangrove Rd	Extension of turning lane length: - Windsor Rd westbound right turn lane		
Boundary Road Intersections				
6	Boundary Rd / Maguires Rd (BHN Access)	Give Way Control – localised pavement widening to accommodate turn lanes		
7	Boundary Rd / BHN Site Access / Hession Rd	Give Way Control – localised pavement widening to accommodate turn lanes		
8	Boundary Rd / Red Gables Rd (BHN Access)	Give Way Control – localised pavement widening to accommodate turn lanes		
9	Boundary Rd / Cataract Rd / BHN Site Access	Give Way Control – localised pavement widening to accommodate turn lanes		
10	Boundary Rd / Old Pitt Town Rd	Upgrade existing 1 lane roundabout to a dual (2) lane roundabout	Signalisation of Intersection Required	Subject to further discussions with The Hills Shire Council this intersection could be upgraded with traffic signals. However, roundabout provides better operational performance with Box Hill North traffic distribution. A two lane roundabout also would incur a higher cost than traffic signals and thus the recommendation is considered financially.

Table 5: Intersection Improvements cont.

Item No. (see Figure 4.6)	Intersection Location	Previous Proposed Improvement Works	Additional Improvement Works (Identified by Revised Assessment)	Comments
				conservative.
Old Pitt Town Road Intersections				
11	Old Pitt Town Rd / BHN Access Rd (west)	Provide a new dual (2) lane roundabout		Consideration was given to the provision of traffic signals at this location. However roundabout was selected due to proximity to Old Pitt Town Rd / Terry Rd intersection (approx. 150m).
12	Old Pitt Town Rd / Terry Rd	Upgrade existing intersection to a dual (2) lane roundabout		Consideration was given to the provision of traffic signals at this location. However roundabout was selected due to proximity to BHN access roads.
13	Old Pitt Town Rd / BHN Access Rd (east)	Provide a new dual (2) lane roundabout		Consideration was given to the provision of traffic signals at this location. However roundabout was selected due to proximity to Old Pitt Town Rd / Terry Rd intersection (approx. 150m).
Other Intersections				
14	Annangrove Rd / The Water Lane / Withers Rd	Provision of left turn slip lane on Annangrove Road northbound		

With the provision of the above upgrades, the Windsor Road intersections would operate at the same LOS and operating conditions as during the Base development scenario. All other intersections would operate at a LOS of D or better.

Subsequent to the above recommendations, it should be noted that the intersections of Old Pitt Town Road / Box Hill North Access west (herein referred to as Fontana Drive) (11), and Old Pitt Town Road / Terry Road (12) have been combined as one priority-controlled intersection, and Old Pitt Town Road / Box Hill North Access Road (east) (13) has been removed.

7.3 The Gables Town Centre – Planning Proposal Traffic Assessment

Ason Group was engaged to prepare a Traffic Impact Assessment to support the Planning Proposal for the Town Centre within Box Hill North. The Town Centre Planning Proposal Report detailed the anticipated traffic and transport implications of the development of the Town Centre on the Box Hill North Precinct and the surrounding local and external road network. The Town Centre Planning Proposal Report assessed the following yield in **Table 6**.

Table 6: Planning Proposal Yield

Land Use	Yield
High Density Residential	Approximately 570 dwellings
Supermarket	4,000 m^2 GFA
Specialty Retail	3,700 m^2 GFA
Mixed Use – Community Space	3,000 m^2 GFA
Commercial	4,890 m^2 GFA
Education Establishment	20,000 m^2 of GFA (approximately 2,000) students

The performance of the key intersections was analysed using the SIDRA Intersection computer program. SIDRA modelling outputs a range of performance measures, in particular:

- Degree of Saturation (DOS) – The DOS is defined as the ratio of demand (arrival) flow to capacity. The DOS is used to measure the performance of intersections where a value of 1.0 represents an intersection at theoretical capacity, above 1.0 represent over-saturated conditions (demand flows exceed capacity) and degrees of saturation below 1.0 represent under-saturated conditions (demand flows are below capacity). As the performance of an intersection approaches DOS of 1.0, queue lengths and delays increase rapidly. It is usual to attempt to keep DOS to less than 0.9, with satisfactory intersection operation generally achieved with a DOS below 0.8.
- Average Vehicle Delay (AVD) – The AVD (or average delay per vehicle in seconds) for intersections also provides a measure of the operational performance of an intersection and is used to determine an intersection's Level of Service (see below). For signalised intersections, the AVD reported relates

to the average of all vehicle movements through the intersection. For priority (Give Way, Stop & Roundabout controlled) intersections, the AVD reported is that for the movement with the highest AVD.

- Level of Service (LOS) – This is a comparative measure that provides an indication of the operating performance, based on AVD.

The following table provides a recommended baseline for assessment as per the RMS Guide:

Table 7: RMS Level of Service Summary

Level of Service	Average Delay per Vehicle (secs/veh)	Traffic Signals, Roundabout	Give Way and Stop Signs
A	less than 14	Good operation	Good operation
B	15 to 28	Good with acceptable delays & spare capacity	Acceptable delays & spare capacity
C	29 to 42	Satisfactory	Satisfactory, but accident study required
D	43 to 56	Operating near capacity	Near capacity & accident study required
E	57 to 70	At capacity; at signals, incidents will cause excessive delays. Roundabouts require other control mode	At capacity, requires other control mode
F	More than 70	Unsatisfactory and requires additional capacity.	Unsatisfactory and requires other control mode or major treatment.

Based on the yields detailed in Table 6 , the following traffic generation was estimated.

Table 8: Planning Proposal: Traffic Generation

Land Use	Period	Yield	Trip Rate	Traffic Generation
High Density Residential	AM	720 units*	0.4 trips per unit	288 (58 in, 230 out)
	PM		0.48 trips per unit	346 (277 in, 69 out)
Retail				
Supermarket	AM	4,000 m^2 GFA	6.2 trips per 100 m^2	186 (74 in, 112 out)
	PM		15.5 trips per 100 m^2	465 (279 in, 186 out)
Speciality Retail	AM	3,700 m^2 GFA	1.84 trips per 100 m^2	51 (23 in, 28 out)
	PM		4.6 trips per 100 m^2	128 (70 in, 58 out)

Mixed Use – Community Space	AM	3,000 m^2 GFA	2 trips per 100 m^2	60 (30 in, 30 out)
	PM		2 trips per 100 m^2	60 (30 in, 30 out)
Commercial	AM	4,890 m^2 GFA	1.6 trips per 100 m^2	78 (66 in, 12 out)
	PM		1.2 trips per 100 m^2	59 (9 in, 50 out)
Proposed Education Establishment				
Primary Education Establishment	AM	1,000 students	0.67 trips per student	670 (369 in, 301 out)
	PM		0.053 trips per student	53 (24 in, 29 out)
Secondary Education Establishment	AM	1,000 students	0.51 trips per student	510 (281 in, 229 out)
	PM		0.028 trips per student	28 (13 in 15 out)

The yield assessed in the Town Centre PP resulted in the following total trip generation:

- AM Peak Period: 1,843 trips (901 arrival trips, 942 departure trips)
- PM Peak Period: 1,139 trips (702 arrival trips, 437 departure trips)

To assess the traffic impacts of the proposed Town Centre on the external and internal intersections, Ason Group undertook a mesoscopic assignment model (Netanal) of the traffic conditions pertaining to the proposed Gables Development, Box Hill North. The modelling assessment identified the transport trends within the Gables Development precinct.

7.3.1 External Intersections

The development scenario assessed by the Netanal model evaluated the 2026 traffic volumes which assumed full development of Box Hill, Box Hill Industrial Precinct, and the Box Hill North Precinct. Traffic volumes were extracted from the Netanal model to assess the following intersections in further detail using SIDRA software:

- Boundary Road / Red Gables Road;
- Boundary Road / Cataract Road;
- Red Gables Road / Janpieter Road;
- Old Pitt Town Road / Boundary Road;
- Old Pitt Town Road / Valletta Drive;
- Old Pitt Town Road / Fontana Drive / Terry Road;

The intersection layouts of the key external intersection were adopted from the Addendum Traffic Report and the Box Hill North Precinct S94 Contributions Plan. These assessed intersection layouts are detailed in **Figure 13** and **Figure 14**.

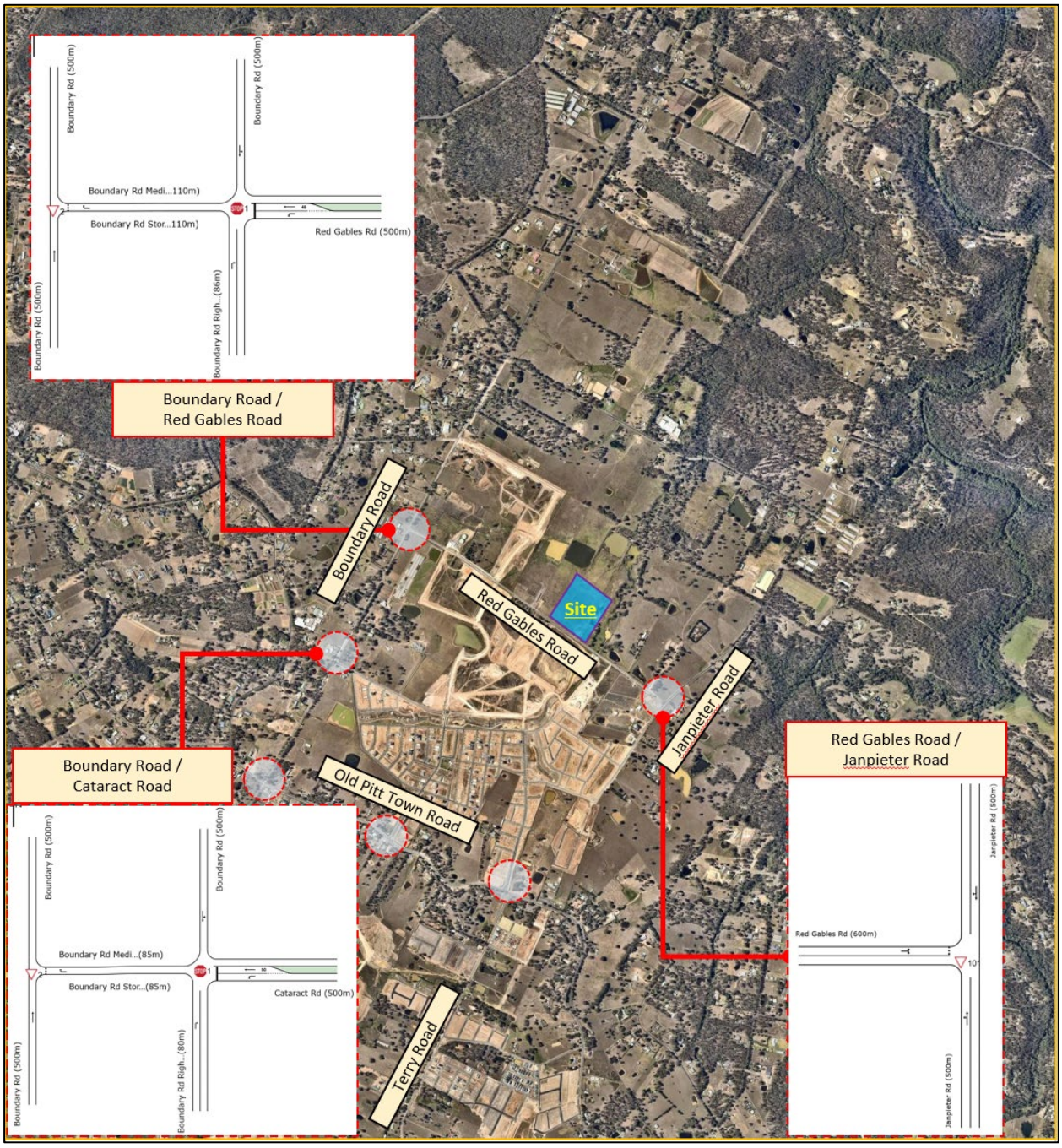


Figure 13: Box Hill North Precinct Intersections

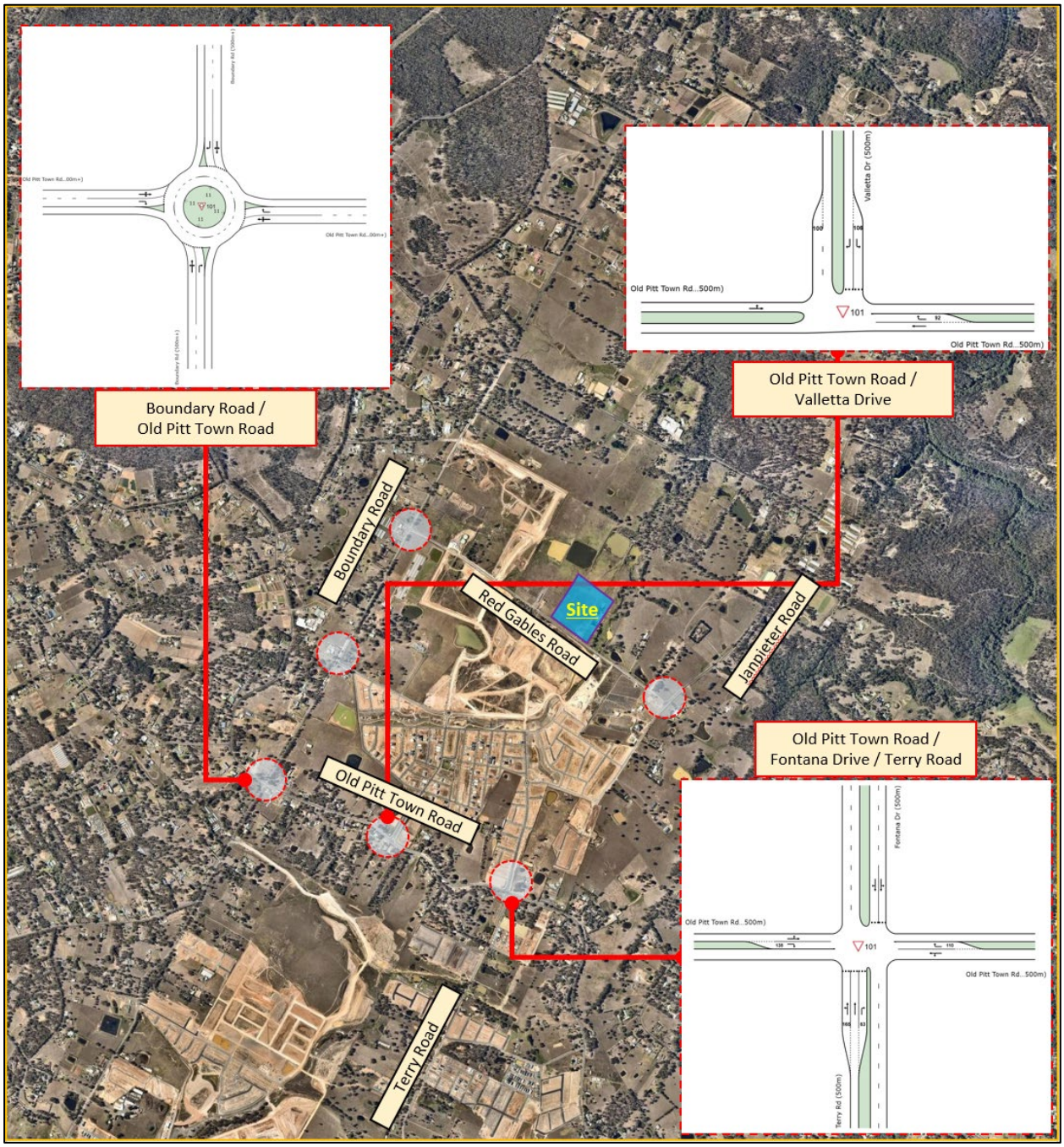


Figure 14: Old Pitt Town Road Intersections

Based on the Netanal results and the using the above intersection layouts, **Table 9** details the results of the traffic assessment for the Town Centre PP.

Table 9: SIDRA Intersection Results – External Intersections

Intersection	Period	Average Vehicle Delay (AVD) (secs)	LOS
Boundary Rd / Red Gables Rd	AM	18.8	B
	PM	15.9	B
Boundary Rd / Cataract Rd	AM	26.3	B
	PM	17.4	B
Red Gables Rd / Janpieter Rd	AM	7.8	A
	PM	7.5	A
Old Pitt Town Rd / Boundary Rd	AM	26.7	B
	PM	35.1	C
Old Pitt Town Rd / Valletta Dr	AM	9.2	A
	PM	9.5	A
Old Pitt Town Rd / Fontana Dr / Terry Rd	AM	33.6	C
	PM	34.9	C

The SIDRA analysis concluded that the local external intersections would generally operate within acceptable limits of performance.

7.3.2 Town Centre Intersections

The internal Town Centre Intersections were also assessed, and the results are detailed in **Table 10**.

Table 10: SIDRA Intersection Results – Town Centre Intersections

Intersection	Period	Average Vehicle Delay (AVD) (secs)	LOS
Red Gables Rd / Fontana Dr	AM	31.8	C
	PM	37.4	C
Red Gables Rd / Road A	AM	15.5	B
	PM	10.5	A
Fontana Dr / Road B	AM	13.4	A
	PM	12.9	A
Fontana Dr / Road C	AM	12.6	A
	PM	13.8	A

As detailed above, the intersection of Red Gables Road / Fontana Drive would operate at a Level of Service C during both peak periods. The intersections of Red Gables Road / Road A, Fontana Drive / Road B, and Fontana Drive / Road C would generally operate at a Level of Service B\C or better.

An iterative assessment was undertaken as part of the traffic assessment to determine the layout and geometric design of the Town Centre key intersections.

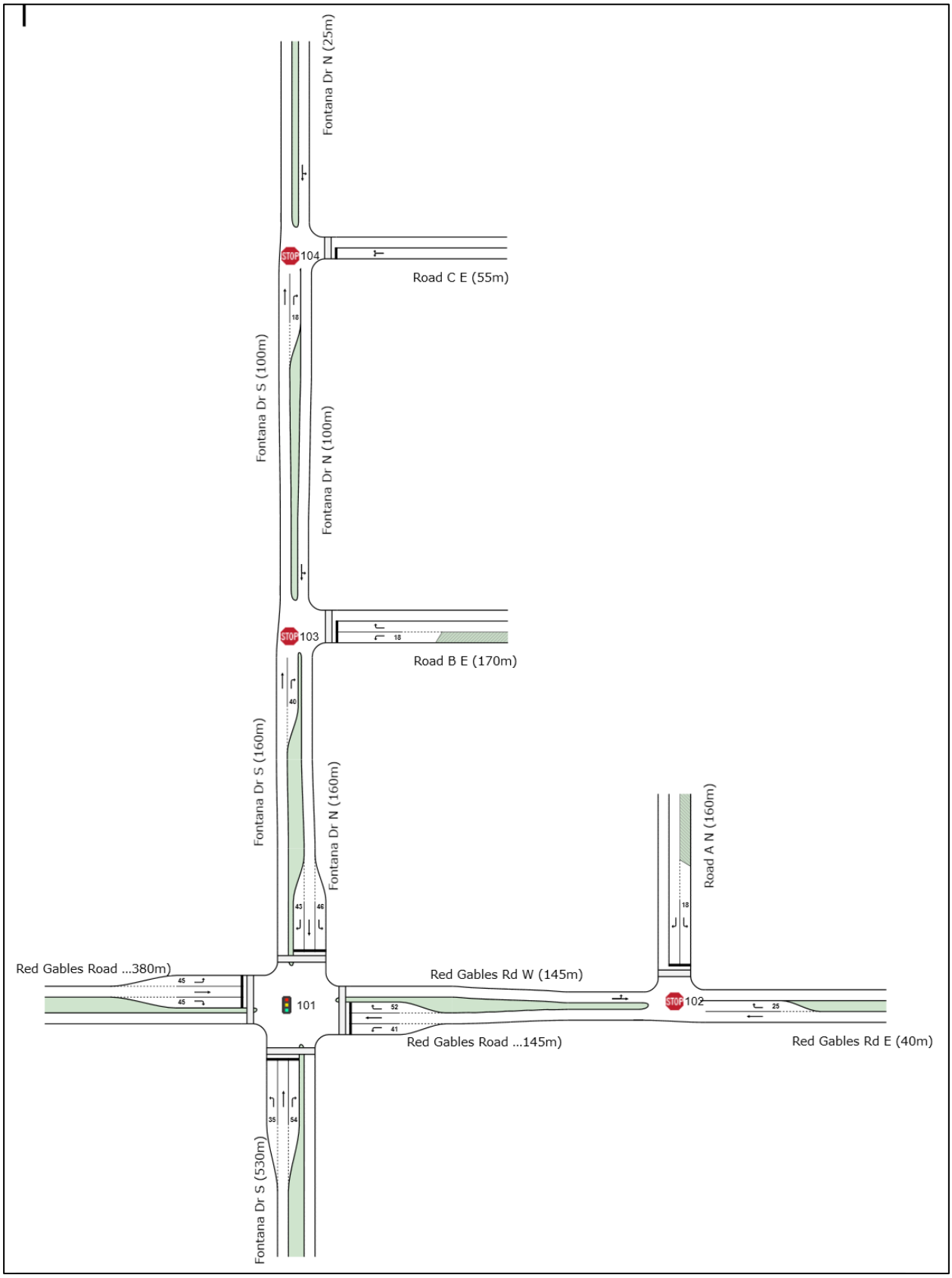


Figure 15: Town Centre Internal Intersection Layout

8 Parking and Servicing Requirements

8.1 DCP Parking Requirements

The School's parking provision has been assessed against The Hills Shire Council's DCP parking requirements as found in The Hills Shire DCP 2012 Part C Section 1. The Santa Sophia School and Early Learning Centre parking requirements are shown in **Table 11** and outlines the minimum parking requirement set by Council's DCP.

Table 11: DCP Minimum Parking Requirements

Land Use	Parking Rate	Yield	Parking Requirements
Early Learning Centre (CELC)	1 space per 1 Employee (assumed 1 employee per 10 children)	6	6
	1 space per 6 Children	60	10
	Total		**16**
Education Establishment (school)	1 space per 1 Employee	130	130
	1 space per 8 Year 12 students	150	18
	1 space per 30 students enrolled for visitors and / or parent parking	1,860	62
	Total		**211**
	Total		**227**

As detailed above, the minimum parking requirement for the School and CELC of Council's DCP is 227 spaces. These facilities generally relate to long term parking provisions with 154 parking spaces (67%) of the overall requirement associated with Staff and Year 12 students. Separate to the 227 parking spaces, it should be noted that there is a need for proposed strategies relating to pick-up / drop-off parking in order to satisfy the school's AM and PM peak demands. Although this is not a DCP parking requirement, it is a key factor that is addressed in further detail below in Section 8.4.

Given the constrained nature of the Site, the Catholic Education Dioceses of Parramatta (CEDP) seeks to maximise green space within the Site. The unique characterises of the Proposal include a multi-storey configuration and, therefore, it is evident that a parking strategy is required to provide adequate parking that can accommodate the anticipated demand while encouraging alternative modes of transport,

maximising green space for students, and reducing the impact on the surrounding road network. The proposed strategy includes;

- Survey and data analysis of similar developments, to confirm the anticipated demand and undertake a comparative assessment with Council's DCP which is an LGA wide requirement.
- Green Travel Planning which seeks to promoting alternative modes of transport, car sharing and accounts for the surrounding residential development.

8.2 Proposed Car Parking Provision

8.2.1 School Staff and ELC Staff Parking Provision

It is proposed that 104 spaces (80% of 130 spaces required) of the total School staff parking requirement be provided. An agreement between Celestino and CEDP has confirmed that these spaces would be provided within the Town Centre off-street parking facilities, in addition to the parking for the Town Centre. The staff parking required by the CELC will also be provided on-site within the Town Centre, making the total parking provided by the Town Centre 110 spaces. This allows the Town Centre to gain an additional 110 spaces within the carpark for use during peak demand times (Christmas, Easter, weekends, etc).

Prior to the completion of the Town Centre, a temporary car park located to the east of the site – accessible via Road A – is proposed to provide the 110 spaces. This temporary car park is subject to a separate Development Application.

This reduction in parking spaces is supplemented by a preliminary Sustainable Transport Management Plan in Section 12 which provides guidance and incentives from the School to encourage alternative modes of transport instead of reliance on private vehicles.

8.2.2 Year 12 Student Parking Provision

With regards to Year 12 students, no parking will be provided as it is CEDP policy that students do not drive to school. As such measures will be undertaken to encourage students to utilise alternative modes of transport, in particular active modes of transport noting the location of the school within the Town Centre.

8.2.3 CELC Parking Provision

Ten (10) parking spaces for the pick-up/drop-off area will be provided on-site accessed via the private road to the south of the development and Red Gables Road.

As stated above, staff parking will be provided within the Town Centre with the school staff requirement.

8.2.4 Visitor Parking Provision

The relationship between visitor parking requirement and number of students is not considered a linear relationship and as such, surveys were undertaken at St Mark's Catholic College, Stanhope Gardens and St Luke's Catholic College, Marsden Park to determine an appropriate visitor parking provision. Information provided by the CEDP is detailed in **Table 12**.

Table 12: Observed Visitor Parking Requirements

School	Number of Students	Maximum Observed Visitor Parking Requirement	Corresponding Visitor Parking Rate
St Mark's (secondary school)	965	10	1 space per 96 students
John XXIII (primary school)	744	12	1 space per 62 students
St Luke's (primary school)	417	7	1 space per 60 students

As is demonstrated in the above, the maximum observed visitor parking rate over the course of the survey was 1 visitor space per 60 students for a Primary School and 1 space per 96 students for the Secondary School. Application of the St Luke's observed rate and the St Mark's observed rate to the primary and secondary student numbers respectively determines a visitor parking provision of 25 spaces.

It is envisaged this short-stay (visitors) parking demand can be accommodated on-street within the surrounding road network of the adjacent residential precincts.

Ason Group has assessed the future road layouts of The Gables to determine the on-street parking capacity and investigate the opportunity to accommodate some of the school parking demand. The study area encompasses a 400-metre radius from the centre point of Santa Sophia School. This catchment is supported by CEPD. The estimated quantum of on-street parking has been developed based on the following criteria / considerations:

- Statutory 'No Stopping' requirements at signalised / unsignalised intersections,
- Road Classification,
- Cross-sections and design of the road network,
- Parking bay width and lengths, and
- Assumed indicative driveway locations (to estimate the loss of on-street parking).

Figure 16 illustrates the study catchment area in a 400m radius from the School Site.

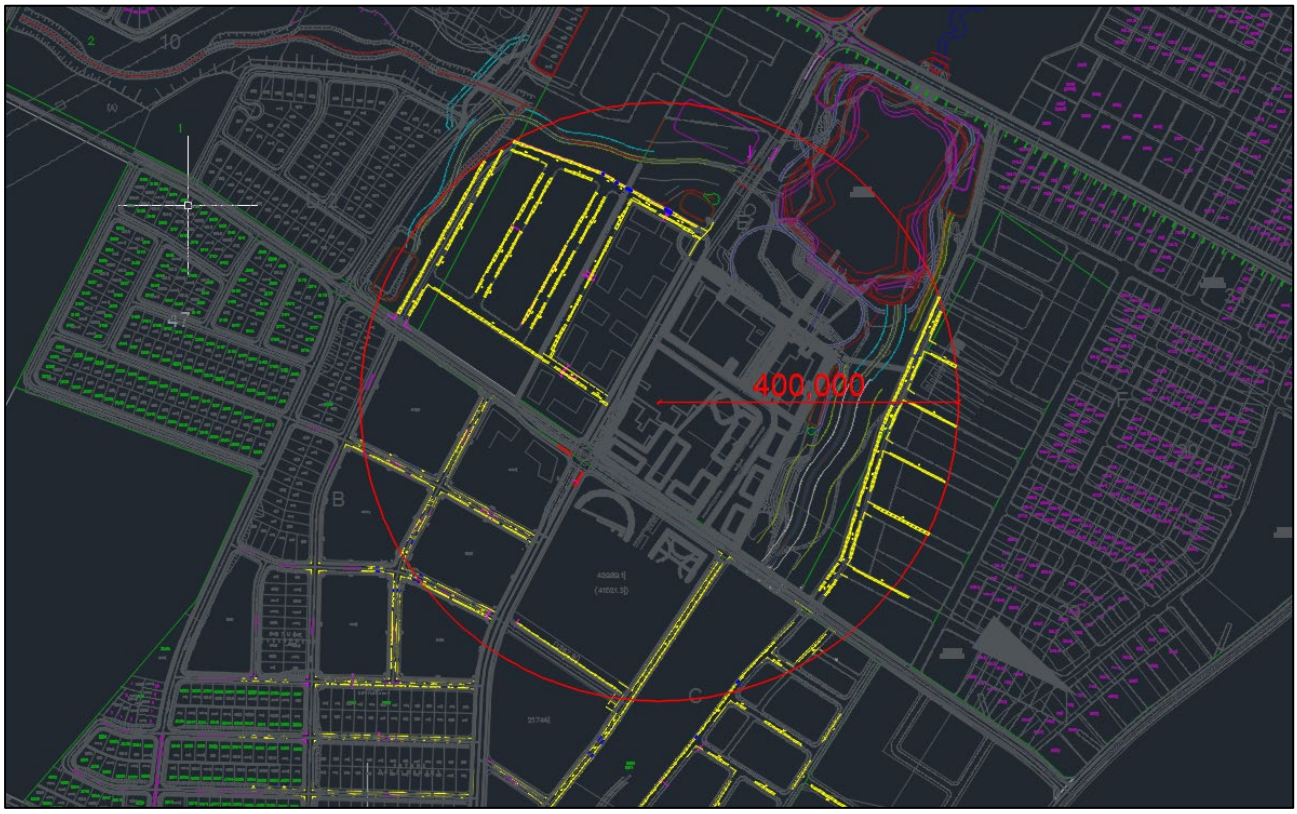


Figure 16: Santa Sophia Study Area - 400m Radius

The findings of the on-street parking study indicate that there are 625 parking spaces within the 400m catchment area radius. In addition, there are 32 (excluding the pick-up/drop-off) spaces proposed within Road A and Road B (the internal Gables town centre road network connecting to Fontana Drive and Red Gables Road). With a dedicated provision of 110 spaces for off-street parking for staff, the School would have a target demand of 25 visitor parking spaces.

The 25-space deficiency corresponds to ~4% of the available on-street parking within the 400m catchment.

It is noteworthy that the above analysis does not consider the use of the 150 spaces provided by the hockey field, nor does it account for the additional spaces within the proposed car park for the lake / park to the north of the site.

8.3 Accessible Parking

Council's DCP stipulates the following rate for accessible parking:

- Schools: 3% of the total car parking

In response, the Proposal provides a single accessible space at the CELC's pick up/drop off area, thereby satisfying the CELC requirements. For the remainder of the parking, the Proposal will provide 3 dedicated accessible parking spaces.

8.4 Pick-Up / Drop-Off Facilities

Council's DCP Part C Section 1 Clause 2.6 requires a set down area be provided for Education Establishments, to provide safe and convenient designated set down areas for passengers to arrive close to their destination. It is noted however, that no rates are provided for the pick-up / drop-off area.

As per the parking requirement, to determine an appropriate pick-up / drop-off parking facility provision Ason Group undertook a review of St Mark's Catholic College, Stanhope Gardens, a K-12 School with approximately 1,700 students. On-site observations and information provided by St Mark's details that it provides 15 pick-up / drop-off spaces for 1,682 students which corresponds to a rate of 1 space per 76 students.

Application of the above rates to the proposed 1,860 students determines a pick-up / drop-off facilities provision of 24 spaces. However, on-site investigations of the St Mark's pick-up / drop-off facilities observed that significant queuing occurs during both the AM and PM peak periods. The queue was observed to be approximately 180m long with 100m contained on-site. As such, it is considered that the St Mark's provision is considered insufficient for the observed demand.

As such, the Proposal provides 12 on-street pick-up / drop-off spaces along the northern frontage on internal Road B, detailed in the figure below.

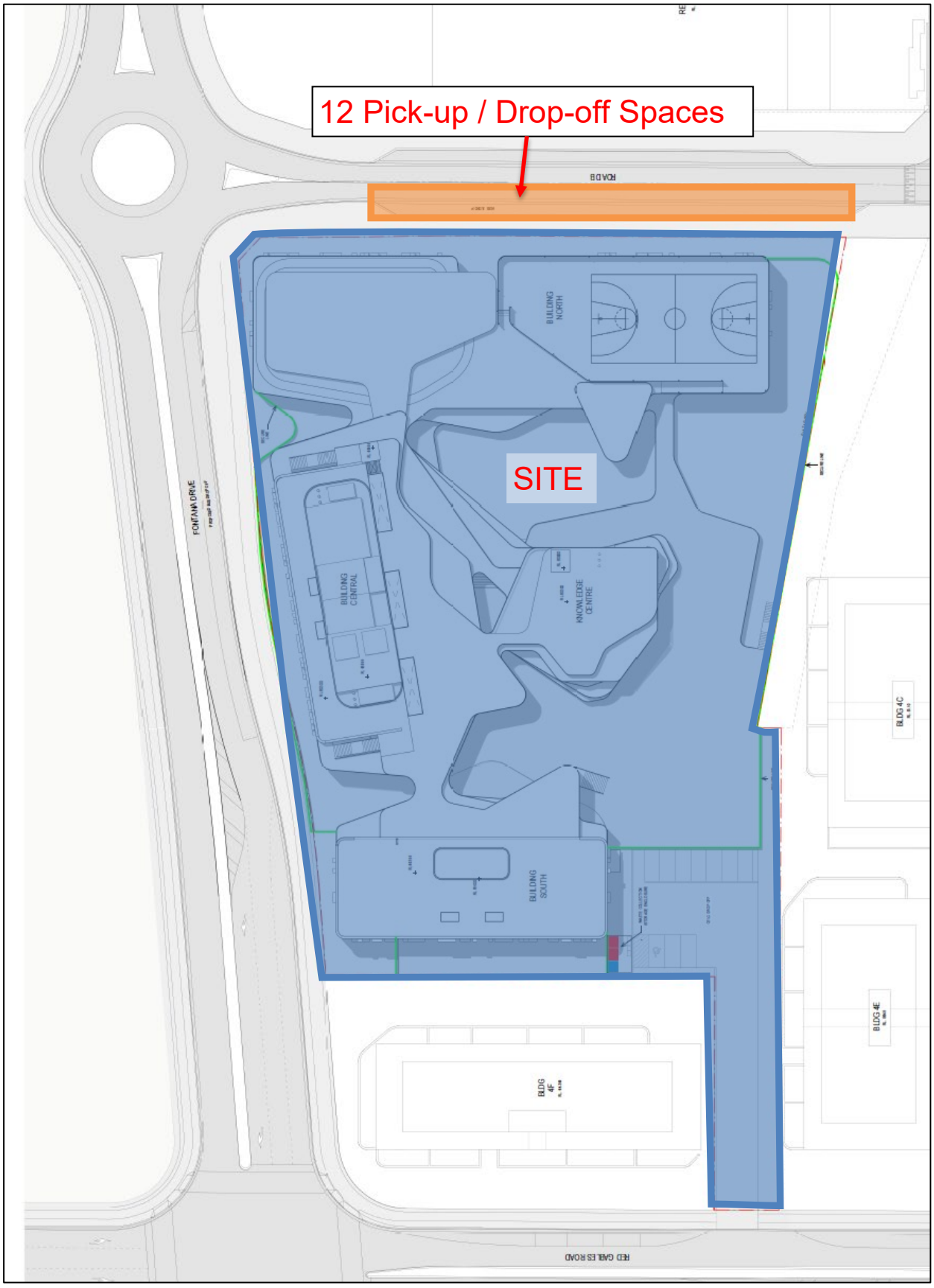


Figure 17: Pick-up / Drop-off Facilities

The arrival / departure times of students utilising the pick-up / drop-off area was determined through an online survey provided to the students of St Mark's Catholic College and was further verified with on-site investigations. The peak demand on the pick-up / drop-off facilities was observed to occur approximately 10 minutes prior to the commencement of school.

The Proposal also provides a Before & After School Care for between 300-400 Primary school students only. This requires students to be signed in/out and operates between 6AM–9AM and 4PM-10PM. For the purpose of this assessment, 300 students are presumed to be in Before and After School Care. This has been reflected in our analysis by reducing the number primary school students utilising the pick-up / drop-off area during the critical AM and PM peaks.

Application of the pick-up / drop-off demand to the proposed School capacity is detailed in **Figure 18** and **Figure 19**.

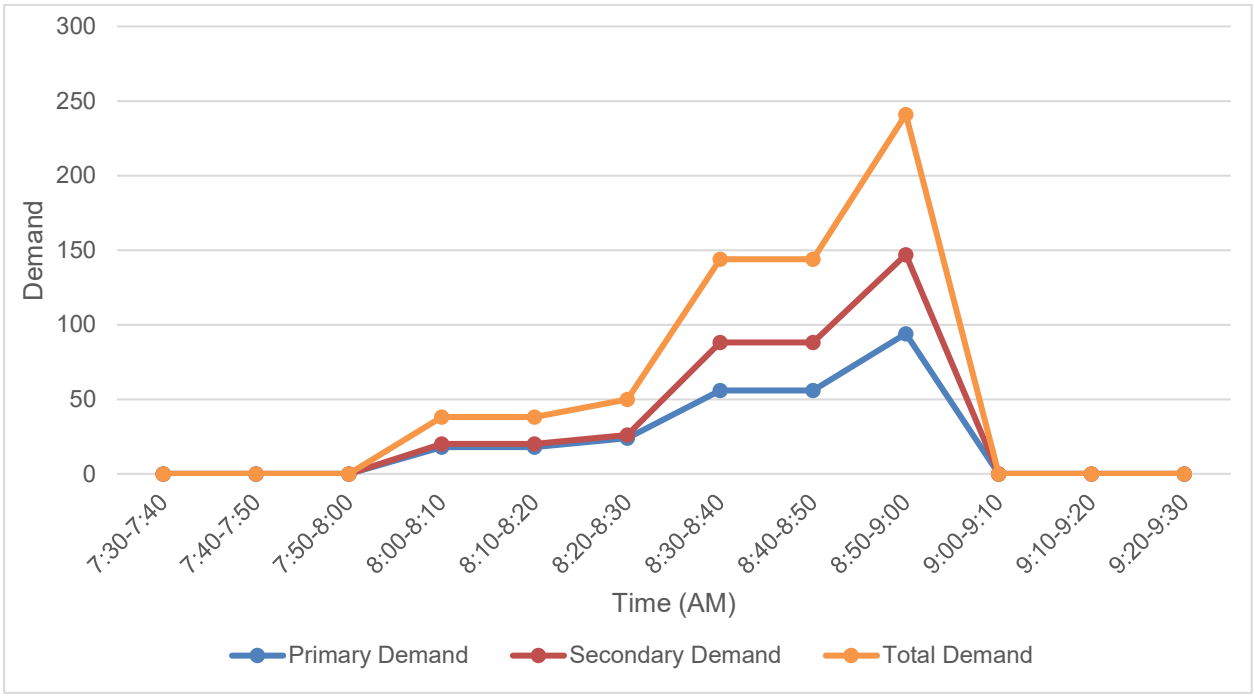


Figure 18: Pick-Up / Drop-Off Demand – AM Peak Period

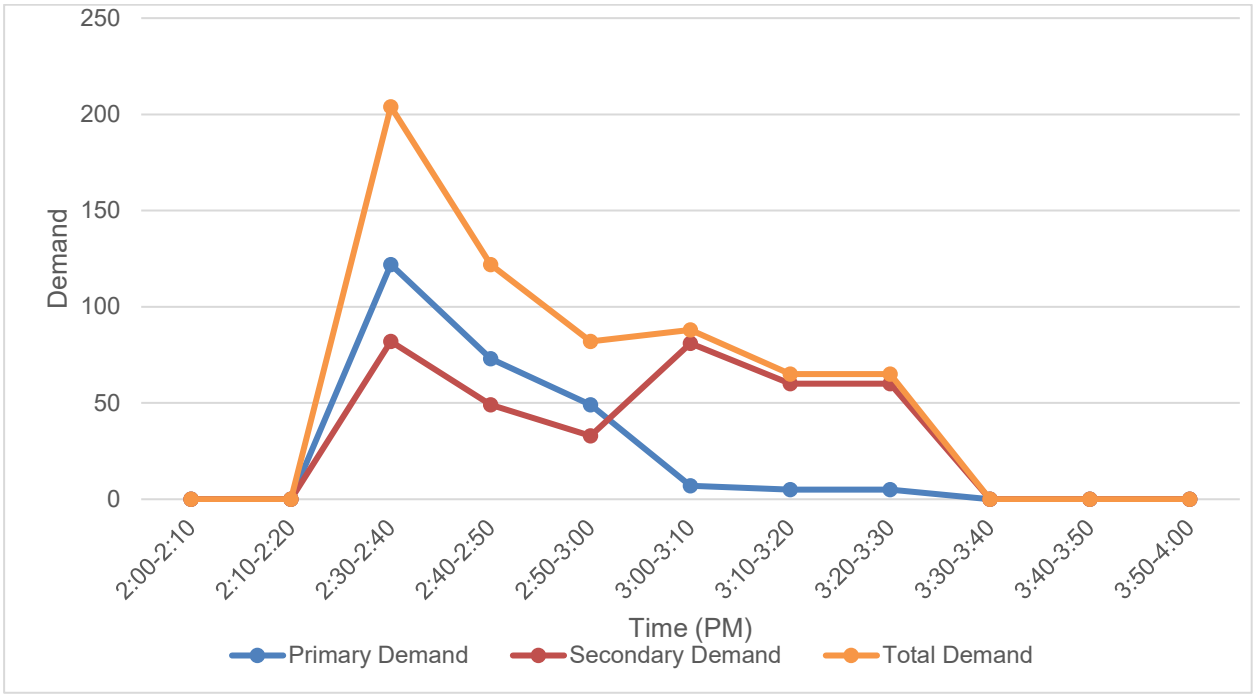


Figure 19: Pick-Up / Drop-Off Demand – PM Peak Period

The above figures detail a peak demand of 241 cars during the 10-minute period prior to commencement of school was determined. With the provision of 12 pick-up / drop-off spaces on-street along the northern frontage, a traffic management plan would also be implemented to facilitate reduced times to pick-up / drop-off children. It is envisaged that a traffic management plan could facilitate a turnover rate of 1 vehicle per space every minute. This corresponds to a capacity of 120 vehicles along the frontage during the 10-minute period prior to school commencement. Preliminary discussions have been held with Celestino to provide "15 Minute Parking" restrictions during key school peak periods for all spaces along Road B within the internal Town Centre road to accommodate the pick-up / drop-off demand.

The traffic management plan provided for pick-up / drop-off area will be reviewed on an annual basis to establish inefficiencies and areas for improvement. Implementation of new strategies will ensure that the demand for pick-up / drop-off is accommodated while reducing impact on the local road network. These future strategies may include staggering starting / finishing times to allow reduce the demand. In addition, investigations into the public transport provision and modal splits of students will also provide insight into potential methods at accommodating the demand of the pick-up / drop-off area. This traffic management plan will be an evolving document which will undergo renewal and revision.

8.5 Bicycle Parking

Bicycle parking has been assessed with regard to Council's DCP Part C Section 1 Table 3 with rates detailed below.

Table 13: Bicycle Parking Rates

Land Use	Parking Rate
Education Establishment (school)	1 space per 5 pupils over Year 4

Further to the above, all developments that provide bicycle parking are required to provide change and shower facilities. These bicycle parking spaces will be designed in accordance with AS2890.3.

At full development, Santa Sophia Catholic College would have a capacity of 1,260 students over Year 4.

Applications of the bicycle parking rate to the number of pupils over Year 4 would results in:

- 252 Bicycle Spaces

Therefore, the School has provided 252 bicycle parking spaces. Changeroom and shower facilities have been provided for staff members in accordance with Council's DCP and bicycle racks are provided throughout the site for students.

8.6 Servicing

Councils DCP does not outline service vehicle requirement rates for education establishments. In this regard, it must be demonstrated that the objectives of Council's DCP are met. These are as follows:

i. *To provide suitable access on-site for service vehicles, for the purpose of loading and/or delivering goods.*
ii. *To ensure that types of loading and delivery areas are suited to the needs of the development.*
iii. *To ensure that adequate numbers of loading and delivery areas are allocated for appropriate types of service vehicles.*
iv. *To protect neighbourhood amenity and safety in the design and construction and operation of loading and service areas in accordance with Council's ESD objective 7.*

The Proposal provides a loading dock accessible via Red Gables Road within the proposed CELC pick-up / drop-off area. An additional loading area available along the Road B site frontage within in the pick-up / drop-off area is also provided for infrequent deliveries. Information provided by the CEDP details the number of vehicles accessing the site and the size of vehicles. **Table 14** details the vehicle size and frequency of deliveries / servicing.

Table 14: Service / Delivery Vehicle Size and Frequency

Service / Delivery Purpose	Vehicle Size	Frequency
Food Delivery	Up to and including 8.8m Medium Rigid Vehicle	3 times per week
On-site repairs / construction works	Up to and including standard B99 vehicle	As necessary
Creative Hub Deliveries	Up to and including 12.5m Heavy Rigid Vehicle	2 – 3 times per year
Waste Collection	A private contractor approximately 11m in length	2 times per week

To demonstrate vehicle access to the site, swept path analysis has been provided in **Appendix A** which details a 12.5m HRV and the waste collection vehicle accessing the servicing area located within the CELC car park and the Road B frontage. A management plan would be implemented stipulating that all servicing / deliveries would occur outside of the key peak periods of operation for the CELC and the School pick-up / drop-off area. This management plan would be further developed and provided in response to an appropriate condition of consent. The servicing / delivery facilities are therefore considered acceptable to service the proposed development.

8.7 School Bus Parking

As detailed in Section 1.5, it is proposed that 5 bus bays will be provided along the western frontage along Fontana Drive. The bus bay provision is detailed in **Figure 20**. As per the discussion with TfNSW and Busways, no line-marking has been provided to encourage reduced gaps between buses while queuing during key peak periods.

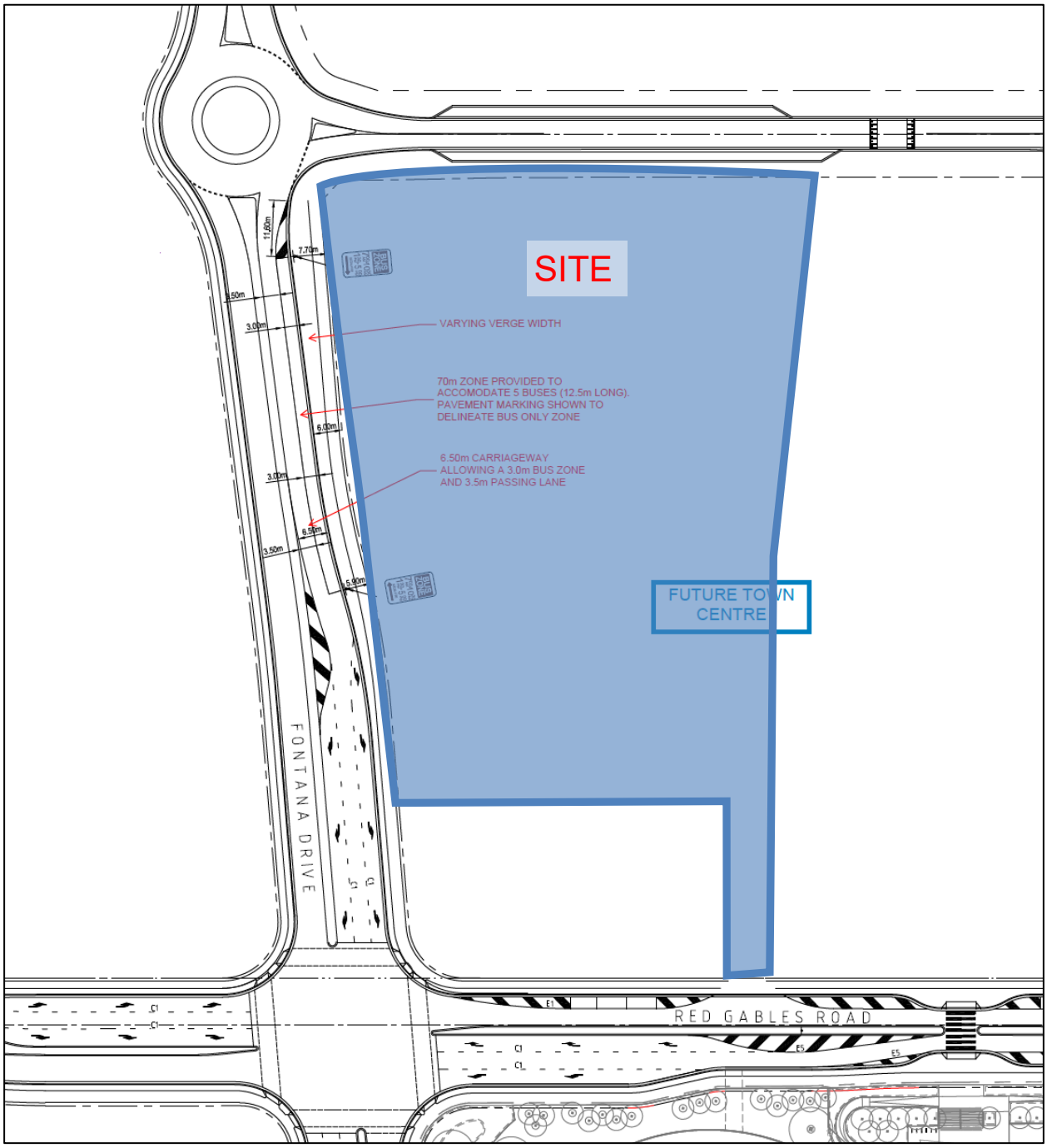


Figure 20: Bus Bay Layout

The proposed bus bays provide a dedicated bus stopping area with sufficient queue capacity for the buses during the key peak periods.

9 Traffic Analysis

9.1 School Travel Survey

A school travel questionnaire of St. Mark's Catholic College at Stanhope Gardens was undertaken in 2018 to determine a similar travel behaviour for students and staff near the locality of Box Hill North. This school was selected for survey due to the following similar characteristics:

- K-12 school structure.
- Similar School Student and Staff Size
- Locality of the Site in the Hills Shire LGA
- A Private College

The following table details the survey results for existing travel behaviours of at St. Mark's Catholic College:

Table 15: Staff and Student Modal Split

Travel Mode	Staff Mode Share	Student Mode Share
Vehicle driver	100%	3.1%
Vehicle passenger	0%	53.7%
Train	0%	0.2%
Bus	0%	25.7%
Bicycle	0%	1%
Walked only	0%	14.4%
Other mode*	0%	1.9%

* primarily consists of multiple modal trips i.e. vehicle passenger to bus

Utilising the modal surveys undertaken by Ason of St Mark's Catholic College, **Table 16** summarises the estimated future student modal split and trips for the proposed school and **Table 17** summarises the estimated future staff modal split and trips for the proposed school.

Table 16: Estimated Student Modal Split

Travel mode	Modal Split	Student Numbers
Car Passenger	50%	930
Bus	25%	465
Walking	15%	279
Bicycle	8%	149
Other (multi-modal, dropped off further off-site then walk, etc.)	2%	37

Table 17: Estimated Staff Modal Split

Travel mode	Modal Split	Staff Numbers
Vehicle Driver	75%	97
Vehicle Passenger	10%	13
Bus	0%	0
Walking	5%	7
Bicycle	5%	7
Other (multi-modal, dropped off further off-site then walk, etc.)	5%	6

In order to reduce the number of staff vehicle drivers, a Green Travel Plan is proposed to incentivise drivers to use alternative modes of transport. This is further enforced due to the limited amount of staff parking spaces (110) available. Section 12 provides further discussion of these GTP strategies.

9.2 Trip Generation Rates

9.2.1 Santa Sophia Catholic College Traffic Generation Rates

The travel mode surveys undertaken at St. Mark's Catholic College also includes the arrival and departure time for each staff and student that responded to the survey. Of the 596 student and 103 staff responses, the following vehicle trip rates per student/staff were found for the AM Peak and the School PM Peak:

AM Peak (7:30 AM – 8:30 AM)

- Primary School Trip Rates: 0.60 Vehicle Trips / Student
- Secondary School Trip Rates: 0.46 Vehicle Trips / Student
- Staff Trip Rates: 0.79 Vehicle Trips / Staff

School PM Peak (2:30 PM – 3:30 PM)

- Primary School Trip Rates: 0.63 Vehicle Trips / Student
- Secondary School Trip Rates: 0.46 Vehicle Trips / Student
- Staff Trip Rates: 0.26 Vehicle Trips / Staff

It was noted within the RMS study of School Traffic Generation, that the PM peak period for schools generally occurred between 2.00-4.00PM, outside of the road network peak period. As such, a reduced PM trip generation rate of 10% the surveyed traffic generation rate has been adopted. The St. Mark's Catholic College's travel survey results reflects this assumption as only 2 student respondents indicated that they would be picked-up after 4PM. School staff would still be departing the School after 4PM, however staff departure times varied and were not all within the road network peak. Therefore, the following traffic generation rates have been adopted for the network PM Peak:

Road Network PM Peak (4:00 PM – 5:00 PM)

- Primary School Trip Rates: 0.063 Vehicle Trips / Student
- Secondary School Trip Rates: 0.046 Vehicle Trips / Student
- Staff Trip Rates: 0.34 Vehicle Trips / Staff

It is important to note that typically some students do not travel alone with their parents in a private vehicle. Often carpooling and siblings would occupy the same vehicle. As such, an occupancy rate of 1.3 students per vehicle trip has been adopted and applied to each student trip rate. The following table details the final traffic trips to be adopted for the College's traffic generation:

Table 18: Adopted College Trip Rates

Person Type	AM Trip Rate	School PM Trip Rate	Network PM Trip Rate
Primary School	0.46	0.48	0.048
Secondary School	0.35	0.35	0.035
Staff	0.79	0.26	0.34

These School traffic generation rates will be adopted for the SSDA traffic generation assessment.

9.2.2 Catholic Early Learning Centre Traffic Generation Rates

The RMS Guide provides trips rates for a Child Care Centre. The ELC will exhibit similar characteristics of a Child Care Centre and as such, the RMS traffic generation rates for a Long-day care centre was adopted. The following RMS traffic generation rates have been adopted for the ELC:

- AM Peak Trip Rates: 0.8 Vehicle Trips / Child
- School PM Peak Trip Rates: 0.3 Vehicle Trips / Child
- Road Network PM Peak Trip Rates: 0.7 Vehicle Trips / Child

9.3 Year of Opening

9.3.1 Traffic Generation & Distribution

Based on information provided by CEDP and detailed in Section 2.3, an assessment of the local road network has been undertaken. Noting the reduced yield, the traffic generation is detailed in **Table 19**.

Table 19: Year of Opening Traffic Generation

Land Use	Yield	Period	Traffic Generation		
			Total	In	Out
Santa Sophia	520 students	AM	218	120	98
		PM	23	10	13
	33 staff	AM	26	26	0
		PM	11	0	11
Catholic Early Learning Centre	30 spaces	AM	24	13	11
		PM	21	9	12

The total traffic generation at Year of Opening is as follows:

AM Peak: 268 trips (159 in, 109 out)

PM Peak: 55 trips (19 in, 26 out)

The trip distribution considers the road network at year of opening noting the Road A within the Town Centre, and Fontana Drive north of the intersection of Fontana Drive / Road C would not be not constructed. The trip distribution during the AM and PM peak periods is detailed in **Figure 21** and **Figure 22** respectively.

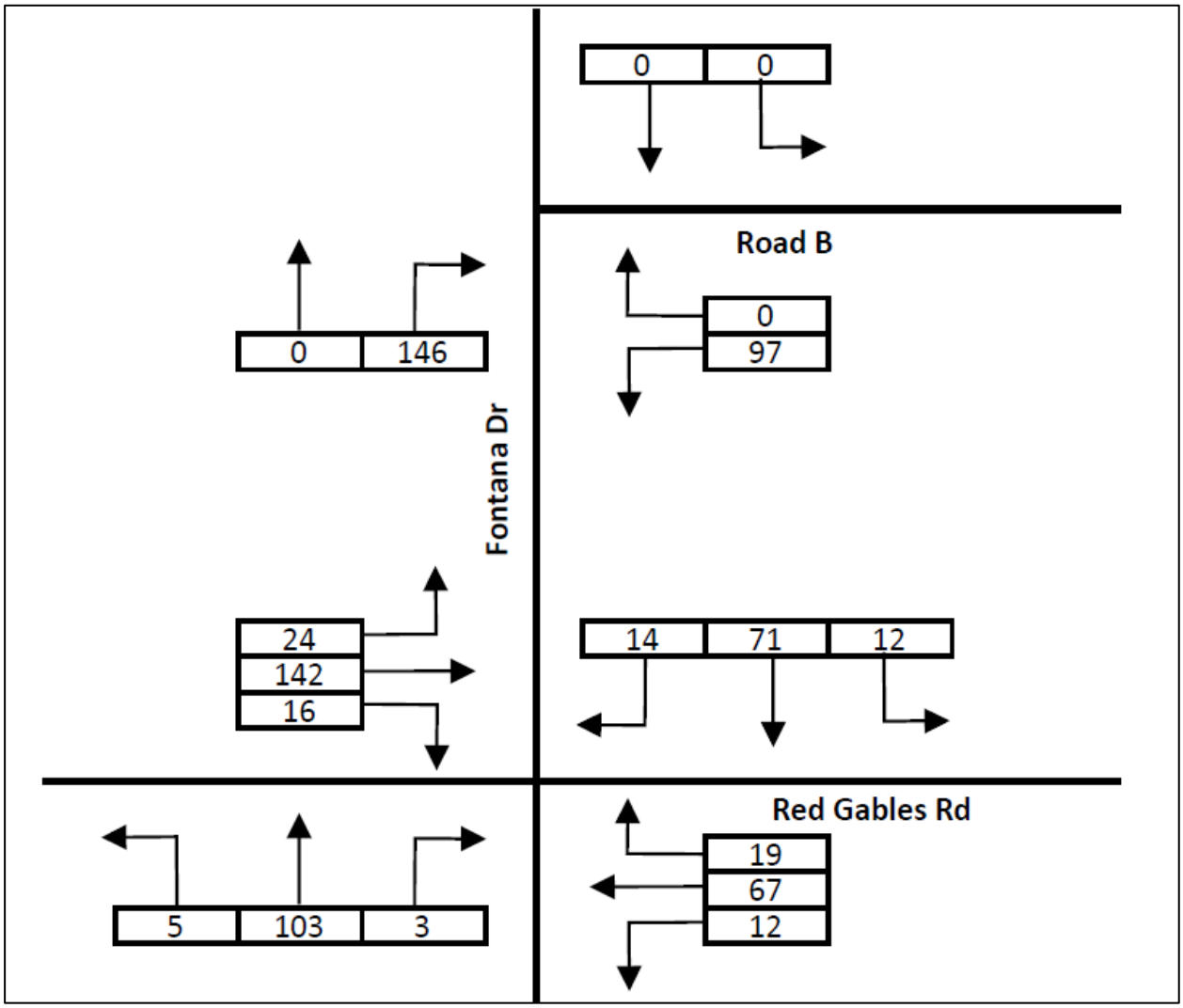


Figure 21: AM Trip Distribution

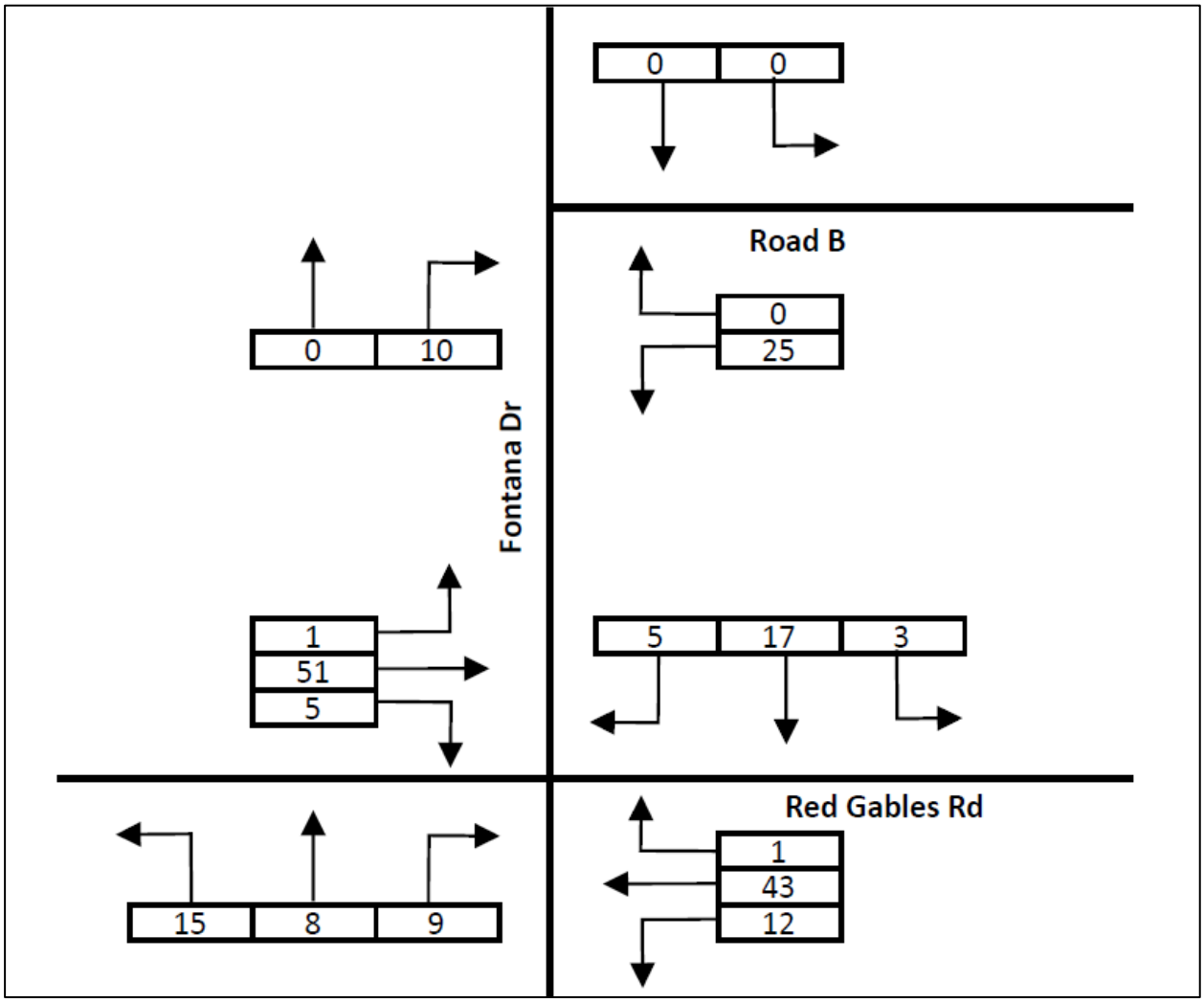


Figure 22: PM Trip Distribution

9.3.2 Traffic Impacts

Further to the above, it is understood that the intersection of Red Gables Road / Fontan Drive may operate as a Priority Controlled Intersection at Year of Opening in 2021 subject to the approval associated with the signalised intersection Development Application. The following table details the SIDRA network modelling analysis of Priority controlled intersection layout (which may represent an interim intersection layout at year of opening.

Table 20: SIDRA Intersection Results

Intersection Treatment	Intersection	Period	Degree of Saturation	Average Vehicle Delay (AVD) (secs)	LOS
Priority Control: North-South Major Leg	Red Gables Rd / Fontana Dr	AM	0.252	12.4	A
		PM	0.065	8.4	A
	Fontana Dr / Road B	AM	0.094	6.8	A
		PM	0.015	6.8	A
Priority Control: East-West Major Leg	Red Gables Rd / Fontana Dr	AM	0.174	12.4	A
		PM	0.036	8.6	A
	Fontana Dr / Road B	AM	0.094	6.8	A
		PM	0.015	6.8	A

As is evident from the above, both intersection arrangements would operate well within capacity with a Level of Service of A and, as such, the local road network can accommodate the School traffic generation at year of opening. Detailed SIDRA outputs have been provided by in **Appendix B**.

9.4 Full Development

9.4.1 Traffic Generation & Comparison

Ason Group previously undertook an assessment of the traffic generation of the Proposal as part of The Town Centre PP Report. This considered the traffic generation of a K-12 school in the Town Centre utilising RMS traffic surveys of a total of 22 schools within the greater Sydney metropolitan area and regional NSW to determine the School's traffic generation rates. The Planning Proposal traffic report determined that the RMS trip generation rates for Primary and Secondary schools within the Sydney Metropolitan area was to be used to estimate the traffic generation of the School.

It should also be noted that the schools surveyed were selected due to their location in isolated / residential precincts and not adjacent to retail and business precincts. As such, the adopted rates may be considered conservative given that the proposed education establishment is located within a Town Centre that provides retail, commercial, and residential land uses within close proximity. Noting the above, the following tables detail the traffic generation of the Proposal during the AM peak network period, School PM peak period and PM road network peak periods which would generally occur from 7.00-9.00AM, 2.00-4.00PM and 4.00-6.00PM respectively.

The following table provides a comparison between Planning Proposal's Traffic Generation and this SSDA's traffic generation:

Table 21: Santa Sophia Catholic College Traffic Generation Comparison

Demographic	Population	AM Trip Rates	AM Trips	School PM Trip Rates	School PM Trips	Network PM Trip Rates	Network PM Trips
The Gables Town Centre Planning Proposal							
Primary School Students	1,000	0.67	670	0.53	530	0.053	53
Secondary School Students	1,000	0.51	510	0.28	280	0.028	28
Total	**-**	**-**	**1,180**	**-**	**810**	**-**	**81**
State Significant Development Application							
Primary School Students	840	0.46	386	0.48	403	0.048	40
Secondary School Students	1,020	0.35	357	0.35	357	0.035	36
College Staff	130	0.79	103	0.26	34	0.34	44
School Total	**-**	**-**	**846**	**-**	**794**	**-**	**120**
CELC Children	60	0.8	48	0.3	18	0.7	42
CELC Staff	6	-	-	-	-	-	-
CELC Total	66	-	48	-	18	-	42
Total	**-**	**-**	**894**	**-**	**812**	**-**	**162**
Net Change	**-**	**-**	**- 286**	**-**	**+ 2**	**-**	**+ 81**

This corresponds to the following total trip generation:

- AM Peak Period: 894 trips
- School PM Peak Period: 812 trips
- Network PM Peak Period: 162 trips

The following details the net changes to the SSDA trip generation compared to the Planning Proposal:

- AM Peak Period: 286 fewer trips
- School PM Peak Period: 2 additional trips
- Network PM Peak Period: 81 additional trips

9.4.2 Traffic Impacts

As detailed in Section 9.3 and Table 21, the school would generate 286 fewer trips during the AM peak period and 81 additional trips during the PM peak period. With reference to the Town Centre PP Report, the local road network was determined to operate with a Level of Service of C or better during AM and PM peak periods. As such, noting the reduction of 268 trips during the AM peak, the operation of the local road network would continue to operate at a LOS of C or better. With regard to the PM peak, the addition of 81 trips corresponds to approximately 1 additional vehicle every 45 seconds. This is would have no material impact to the operation of the surrounding road network and, as such, is considered supportable.

9.5 Traffic Summary

It is concluded that the traffic generation of Santa Sophia Catholic College would be accommodated within the local road network at year of opening with intersections operating at a LOS of A. Furthermore, at Full Development, noting the reduction of traffic generated during the AM peak period, the local road network would operate at a LOS of C or better as per the Town Centre PP Report. While the PM traffic generation would increase, the increase would have no material impact on the surrounding road network.

10 Construction Traffic Management Plan

A detailed Construction Traffic Management Plan (CTMP) will be provided as part of detailed construction management plan submitted under the conditions of any approval. For the purposes of this TAIA report, the following general principles for managing construction traffic have been assumed and provide an understanding of the likely traffic impacts during the construction period. It should be noted that the construction programme for the development has not yet been finalised.

10.1 Contractor Parking

Temporary contractor parking will be provided at an adjacent plot of land to the northwest of the Site across Fontana Drive. This area would be eventually be developed as a residential precinct, but during the construction of the School, this area would be vacant. Key contractors and staff will be provided parking there throughout the construction works. No on-site parking will be permitted as all parking will be wholly contained within these parking areas. The location of the parking spaces can be found on Site Plan at **Figure 26**.

It is noted that during construction, the Site is poorly located to utilise existing public transport infrastructure, and therefore car-pooling will be actively encouraged by the builder and all sub-contractors to reduce the quantity of private vehicles and minimise parking demands.

10.2 Proposed Work Hours

The construction work will vary depending on the phase of construction and associated activities. Construction works however will be undertaken during standard construction-working hours, which are likely to be as follows:

- Monday to Friday: 7.00AM to 6:00PM
- Saturday: 7.00AM to 5.00PM
- Sunday and Public holidays: No planned work.

It may (on occasions) be necessary to undertake night works to minimise disruption to traffic however any works undertaken outside of these times will only occur with prior approval from Council.

10.3 Staging and Duration

The construction program has not been devised at this stage and a more precise schedule would be provided during the Construction Certificate Stage. However, the construction program would generally consist of the following construction stages and duration:

Table 22: Indicative Construction Program Overview

Timing / Stages	Demolition	Excavation	General Construction	Concrete Pours	External Finishes	Kerb / Footpath Works
Start Date	N/A	6th January 2020	6th January 2020	13th February 2020	5th June 2020	1st September 2020
End Date	N/A	14th February 2020	31st October 2020	31st October 2020	31st October 2020	31st October 2020

It is expected that construction would start on 6th January 2020 and end approximately 31st October 2020. This is a total of approximately 10 months of construction activities for Santa Sophia Catholic College.

During all Stages, all vehicle entry and exit movements are to be in a forward direction only, with soil to be loaded within the Site and under the careful supervision of an authorised traffic controller. Accordingly, supervision by an authorised traffic controller would also be required for the movements of vehicles that would cross the footpath during deliveries.

10.4 Vehicle Access

During the construction works, there would likely be one site access, two located at the northern Road B street frontage. **Figure 23** details the likely entry and exit options to and from the Site. All vehicles would need to avoid the Red Gables Road / Fontana Drive intersection to allow the construction of the precinct's key intersections and roads. As such, construction vehicles would be redirected to turn off-road at Red Gables Road onto a temporary off-road haulage track before turning back onto Road B to access the Site. It is unlikely any residential construction activity would be occurring along Fontana Drive during the construction of the Santa Sophia Catholic College.

The largest vehicle accessing the Site would be a 19.6m Truck and Dog. Contractor parking would be provided on-site but the location of the temporary contractor parking would change throughout the construction schedule.

Pedestrians attempting to cross the Site's heavy vehicle accesses are to be managed through signage, pedestrian barriers and traffic controllers.

Emergency vehicle access to and from the Site will be available at all times while the Site is occupied by construction workers. This process would be implemented through emergency protocols on the site which will be developed by the Contractor.

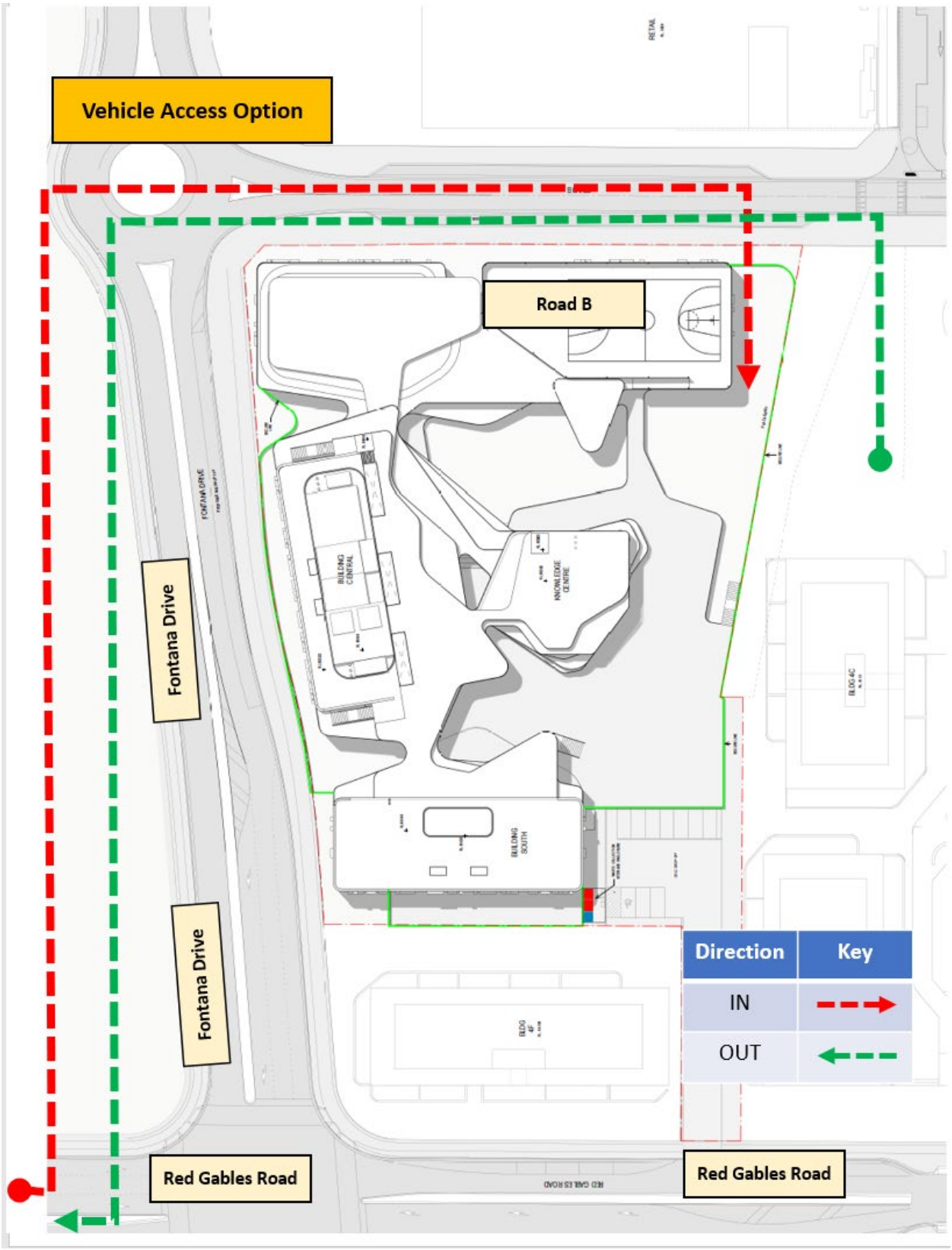


Figure 23: Proposed Site Access

10.5 Construction Vehicle Access Routes

All construction vehicles would enter and exit the Site via the routes shown in **Figure 24** and **Figure 25**. The routes shown are to be utilised by all construction vehicles travelling to and from the site and represents the shortest route available - hence minimising the impacts of the construction process. A copy of the approved routes will be distributed by the Contractor to all drivers before their arrival to Site.

All vehicles would access the construction site via Windsor Road (A2). The following entry and exit routes are listed below:

Entry Route

- From Windsor Road, to Boundary Road, right onto Red Gables Road, right onto a temporary off-road haulage route and right into Road B before turning right into the Site.

Exit Route

- From the Site, turn left onto Road B, straight onto temporary off-road track, right onto Red Gables Road, left onto Boundary Road and then exit onto Windsor Road.

Any oversized or over-mass vehicles travelling to and / or from the Site will be required to obtain a permit from the Roads and Maritime Services (RMS) and / or the National Heavy Vehicle Register (NHVR). Notwithstanding, this CTMP relates to general construction which does not seek the use of oversize vehicles. A separate application would be submitted to Council if required.

All construction vehicles associated with the construction project will enter and exit the Site in a forward direction.

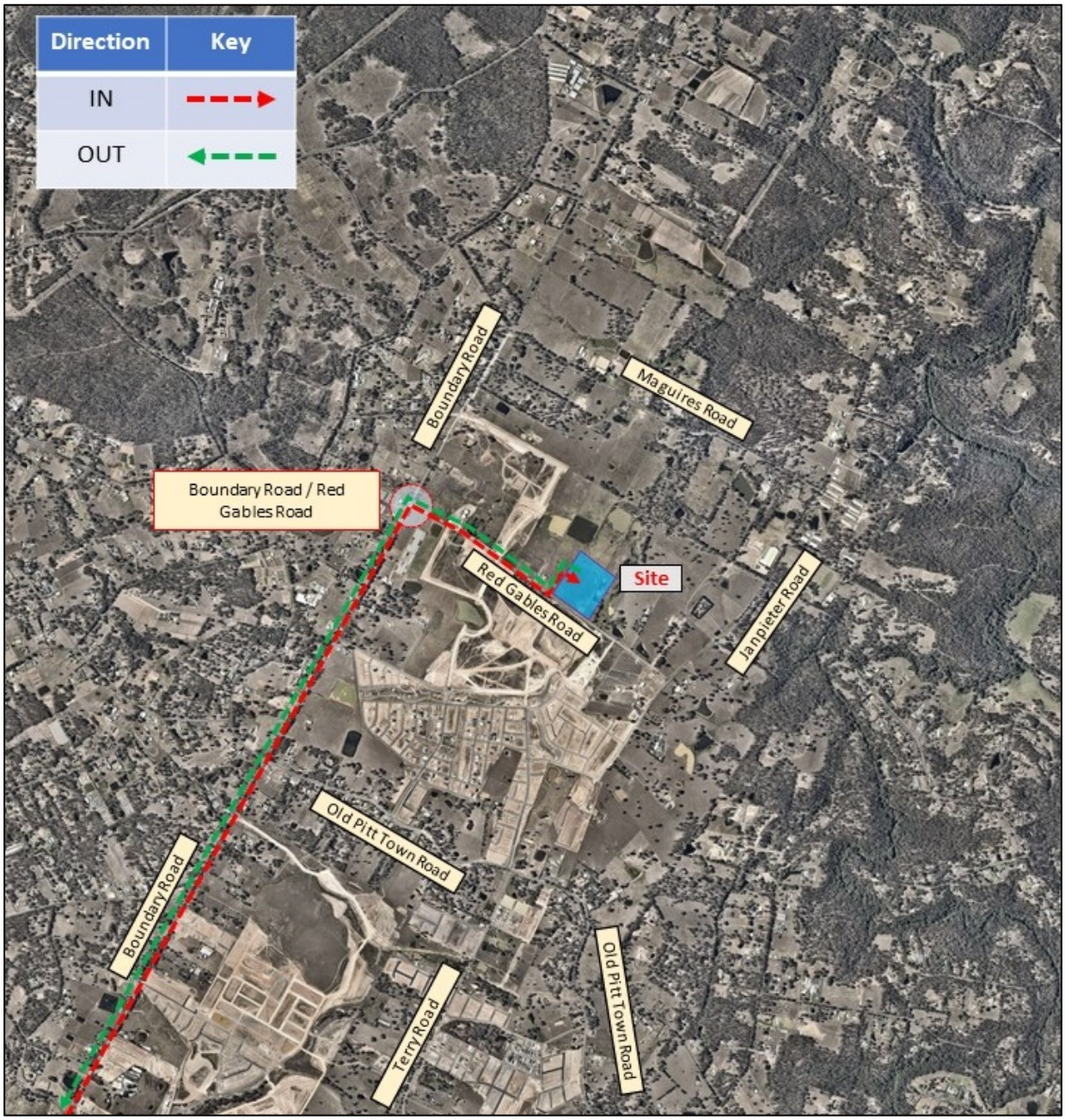


Figure 24: Vehicle Access Route

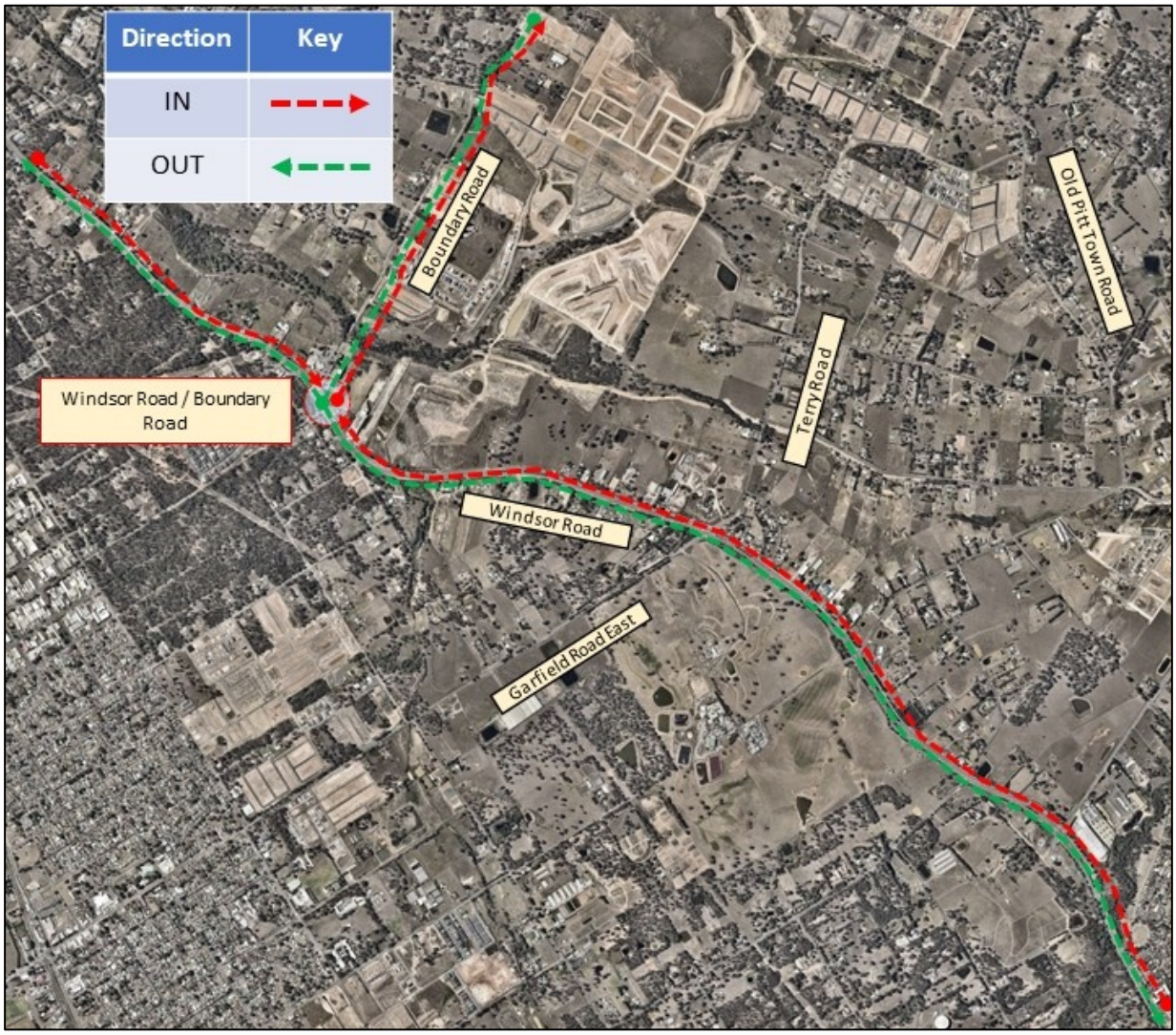


Figure 25: Vehicle Access Route

10.6 Authorised Traffic Controller

There is a requirement for an authorised traffic controller to be present throughout the demolition, excavation and construction stages of the project. The responsibilities include:

- Supervision of all vehicle movements across pedestrian footpaths at all times, and
- Supervision of all loading and unloading of construction materials during the deliveries in the construction phase of the project.
- Pedestrian management, to ensure that adverse conflicts between vehicle movements and pedestrians do not occur.

10.7 Work Zone

At this stage, the Builder has stated that a Work Zone is not required. However, if a Work Zone is deemed necessary, the Work Zone's traffic and pedestrian management will be considered during the formulation of the final Construction Management Plan.

10.8 Fencing Requirements

Security fencing will be erected along the entire boundary of the site and will be maintained for the duration of the construction program. The fencing is to ensure unauthorised persons are kept out of the Site. Site access gates would be provided along Road B or Red Gables Road and will be closed at all times outside of the permitted construction hours.

Hoarding layout and timings may change throughout the development, however prior approval shall be sought from the Council.

10.9 Material Handling

It is proposed that all material loading will occur within the construction site boundary. Equipment, materials and waste will be kept within the construction site boundary. Should materials handling be required from the public roadway then prior approval shall be sought and obtained from Council.

10.10 Site Management

Site management will be required to notify adjacent properties of any temporary traffic restrictions and measures being implemented at least fourteen (14) days in advance.

Some works may be required within the roadway during the external finishes stage. These works would most likely be undertaken at night or during off peak periods to limit any interaction with peak traffic conditions along the key roads.

Any Traffic Control measures necessary for these works will be submitted to Council for approval and 14 days' notice would be provided to adjoining property owners as required by Council. Pedestrian amenities and footpaths will be kept to serviceable conditions during the construction periods. Remediation of any damaged footpaths and pedestrian facilities will be undertaken at the discretion of Council.

10.11 Site Plan

Figure 26 provides the indicative construction site layout for the Site during all stages of construction works. The site layout may change during the detailed CTMP stage at Construction Certificate.

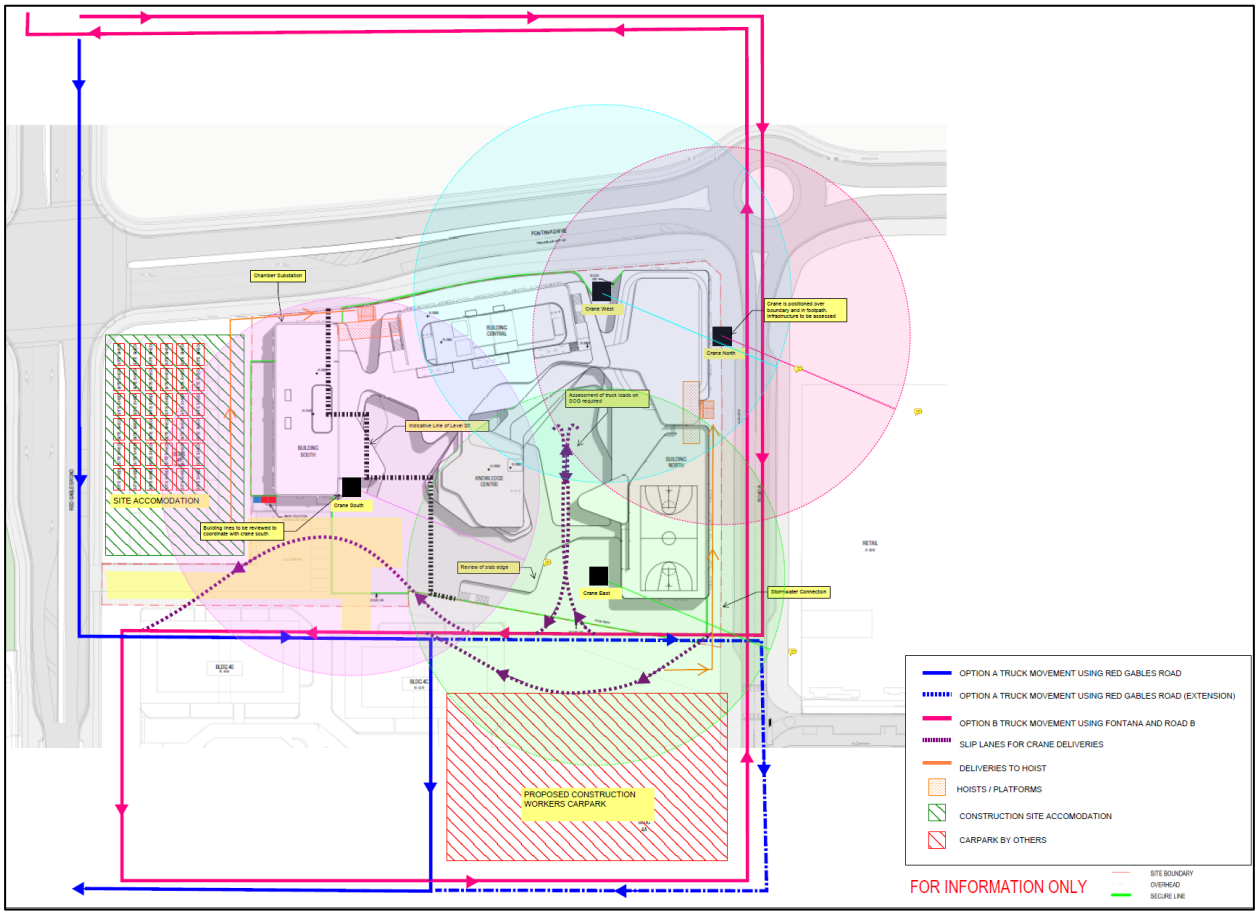


Figure 26: Indicative Site Plan

10.12 CTMP – Monitoring & Review Process

The CTMP has been based on the future site conditions and information provided by the Builder. Consultation with Council and the Builder will continue to be undertaken to ensure that the cumulative traffic impacts of construction within the area does not adversely impact the road network. The CTMP will be reviewed and monitored frequently to confirm that the construction traffic methodologies reflect the current traffic situation in the Site's locality.

10.13 Truck Movements

Information provided by the Builder indicates the following breakdown of truck movements:

Table 23: Truck Movement Overview

Stage	Demolition	Excavation	General Construction	Concrete Pours	External Finishes	Footpath Works
Truck Movements Per Day	N/A	72	135	138	22	18
Peak Hour Truck Movements	N/A	32	18	60	12	12
Largest Vehicle Size	N/A	Truck & Dog	HRV	HRV	HRV	MRV

It is estimated that there would be a peak of 138 truck movements a day and a peak of 60 truck movements per hour during the peak periods (30 in and 30 out).

It is understood that peak volumes would be associated with concrete pours. During these peak periods, trucks are expected to arrive and depart the Site between the hours of 7:00am – 6:00pm. The Builder indicates that at each construction site, a peak of 60 truck movements per hour will occur during the concrete pour's activities (30 in & 30 out).

10.14 Light Vehicle Movements

In relation to light vehicle movements, it is anticipated that a maximum of 275 workers and staff could be on-site at any one time during the peak construction periods.

Any light vehicle traffic generation would be generally associated with staff movements to and from the Site. The workforce arrival and departure periods (6.00-7.00AM and 6.00-7.00PM) represent the peak construction traffic generation periods. This is potentially 275 light vehicle trips during the peak construction traffic hours. However, staff and contractors would generally arrive before and leave after network AM and PM peaks, reducing the traffic impacts at key roads and intersections. Staff would be encouraged to carpool to limit the reliance on single occupancy private vehicles.

10.15 Cumulative Traffic Impacts

During the construction of the School, there would likely be a number of concurrent construction activities occurring across Box Hill North. However, it would be difficult to assess the total cumulative impacts of the simultaneous construction occurring as the construction programs and traffic of all nearby developments. Nevertheless, consultation would be undertaken with neighbouring constructions projects at CC stage as part of the detailed CTMP.

Light construction traffic movements would occur outside of network peak hours as contractors typically arrive and depart the construction site before construction works begins and after work ends as discussed in Section 10.14. These peak light traffic movements would have a reduced impact to the surrounding road network during peak road network hours.

During construction hours, it is expected that the majority of construction traffic generation would be heavy truck movements. The hourly peak of 60 heavy truck movements would be able to be readily accommodated by the key intersections near the Site as there would be little traffic at a greenfield area.

10.16 Vehicle Management

10.16.1 Principles

In accordance with Road and Maritime Services (RMS) requirements, all vehicles transporting loose materials would have the entire load covered and/or secured to prevent any large items, excess dust or dirt particles depositing onto the roadway during travel to and from the site. All drivers are to be familiar with the Driver Code of Conduct before attending the Site. A copy of the Code will be provided in the final formulation of the CTMP.

Further to covering/securing the load to prevent deposits onto the roadway, a Shaker Grid is proposed and installed at the point of vehicle egress to minimise the risk of dirt on the local roads. The responsibility of the driver to ensure that the Shaker Grid is driven over would be included as part of the Driver Code of conduct.

All subcontractors must be inducted by the Contractor to ensure that the procedures are met for all vehicles entering and exiting the construction site. The Head Contractor will monitor the roads leading to and from the site and take all necessary steps to rectify any road deposits caused by site vehicles.

Vehicle movements to, from and within the Site shall do so in a manner, which does not create unreasonable or unnecessary noise or vibration. No tracked vehicles will be permitted or required on any paved roads. Public roads and access points will not be obstructed by any materials, vehicles, refuse skips or the like, under any circumstances.

10.16.2 Queuing

It is expected that a schedule for deliveries of materials and goods will be established prior to that day, with Traffic Controllers maintaining radio contact with construction vehicles at all times. Thus, at no stage shall queueing occur on the public road network. No trucks are to be queued on local roads.

10.17 Pedestrian and Cyclist Access

The majority of construction activities would occur off-street. Although construction activities occur off-road, the pedestrian and cycle connections would be managed by traffic controllers and boom gates during construction activities. It is proposed that traffic controllers be at each vehicle access to remotely control the pedestrian boom gates at the vehicle accesses to control the pedestrian flow.

Pedestrians and cyclists using the footpath fronting the Site or Work Zone will be halted by an accredited Traffic Controller using a remote-controlled boom gate while construction vehicles are exiting the Site. An expandable barrier (pedestrian boom gate or equivalent) would be installed on both sides of the driveway, to be operated when construction vehicles are on approach / ready to depart from the Site. Once the construction vehicles are clear from the footpath, the Traffic Controller can allow the pedestrians and cyclists to continue along their journey.

The Contractor shall make clear to Traffic Controllers that pedestrians have right of way and, as far as reasonable (mostly associated with exit vehicle movements). An on-Site waiting bay and stopping location is proposed for all Heavy Vehicle exiting movements. This will allow co-ordination and management of pedestrian/cyclist right of Way and interaction with traffic controllers.

In addition, it will provide Traffic Controllers the ability to advise drivers the appropriate time to approach the Site's boundary.

The Traffic Controllers would use these extendable gates to create a physical barrier that would restrict pedestrians walking across the driveway, while maintaining radio communication with the construction vehicle driver at all times.

10.18 Traffic Control

The RMS guide "Traffic Control at Worksites" (TCAW) manual contains standard traffic control plans (TCPs) for a range or work activities. The manual's objective is to maximise safety by ensuring traffic control at worksites complies with best practice. The RMS TCAW outlines the requirements for a Vehicle Movement Plan (VMP).

A VMP is a diagram showing the preferred travel paths for vehicles associated with a work site entering, leaving or crossing the through traffic stream. A VMP should also show travel paths for trucks at key points on routes remote from the work site such as places to turn around, accesses, ramps and side roads.

Regarding construction work on roads with an average daily total (ADT) in excess of 1,500 vehicles, approach speeds of between 60 km/hr and 80 km/hr, with truck movements > 20 veh/shift, and sight distance is less than 2d, (where d equals the posted speed limit and in this instance the sight distance is

required to be up to 120 metres), the following is required for the Margaret Road and Vernon Street accesses by the RMS TCAW:

- TCP with Traffic controllers/Traffic Signals YES
- VMP YES
- Warning Signs required during shifts YES

It is proposed that the TCPs would be provided during the final formulation of the CTMP during CC stage.

10.19 Construction Mitigation Measures

Construction of the above development would generate a moderate increase in traffic on the surrounding road network. In this regard, the following measures should be undertaken to minimise the impacts of the construction activities of the development:

- Traffic control would be required to manage and regulate traffic movements into and out of the site during construction, with pedestrian priority provided during peak hour periods to maintain accessibility to public transport facilities.
- Disruption to road users would be kept to a minimum by scheduling intensive delivery activities outside of peak network hours.

10.20 Development of Monitoring Program

The development of a program to monitor the effectiveness of this CTMP shall be established by the lead contractor. It is not anticipated that the monitoring of the processes will have any material cost implications. We note the following items to consider when developing the processes and tasks involved within monitoring the CTMP.

This CTMP shall be subject to ongoing review and will be updated accordingly. Regular reviews will be undertaken by the on-site coordinator. As a minimum, review of the CTMP shall occur monthly, however a weekly review would be preferred.

All and any reviews undertaken should be documented, however key considerations regarding the review of the CTMP shall be:

- Tracking deliveries against the estimated volumes.
- To identify any shortfalls and develop an updated action plan to address issues that may arise during construction (Parking and access issues)

- To ensure TCP's are updated (if necessary) by "Prepare a Work Zone Traffic Management Plan" card holders to ensure they remain consistent with the set-up on-site.
- Regular checks undertaken to ensure all loads are leaving site covered as outlined within this CTMP.

10.21 Communications Strategy

The communications strategy will outline the most effective communication methods to ensure adequate information within the community and assist the project team to deliver the traffic changes with minimal disruption to the road network.

All surrounding occupants shall be notified of any work that is deemed disruptive to the surrounding network prior to commencement. Ongoing communication is also proposed so that all stakeholders are kept up to date of works and potential impacts.

Nearby property owners that may be affected by the construction works shall be included within the communications strategy.

10.22 Summary

This preliminary CTMP has been prepared to ensure appropriate pedestrian, cyclist and traffic management is undertaken during construction of the Santa Sophia School. This preliminary CTMP has regard for the principles outlined in the RMS Traffic Control at Worksites Manual (2010) and AS1742.3 and is recommended for adoption. Any minor variation to these standards is considered acceptable having regard to the constraints inherent by the Site and proposed development. The following measures should be undertaken to minimise the impacts across each construction phase:

- Traffic control would be required to manage and regulate construction vehicle traffic movements into and out of the site during construction.
- All vehicles transporting loose materials will have the load covered and/or secured to prevent any items depositing onto the roadway during travel to and from the Site.
- All vehicles to enter and exit the site in a forward direction with reverse movements to occur only within the property boundary as necessary, prior approval and subject to supervision.
- Construction and delivery vehicles would be limited to the use of surrounding arterial roads and the necessary local roads.

In summary, the CTMP has provided the following targeted management measures:

- Contractor Parking on-site.
- Traffic Controllers to Manage Pedestrian / Cyclist traffic along the Site frontage.
- Prioritisation Strategies for truck movements.

In summary, the detailed CTMP report is proposed in accordance with the RMS TCAW. This preliminary CTMP would be further developed at CC stage in consultation with Council but provides a detailed and clear indication of the future construction methodology and principles to be adopted.

11 Design Commentary

11.1 Relevant Design Standards

The site access, car park, and loading areas would be designed to comply with the following relevant Australian Standards:

- AS2890.1 for car parking areas;
- AS2890.2 for commercial vehicle loading areas;
- AS2890.5 for on-street parking;
- AS2890.6 for accessible (disabled) parking; and
- Austroads: Guide to Road Design Part 4: Intersections and Crossings – General (2017)

11.2 Pick Up / Drop Off Area(s)

As discussed in Section 7.4, 12 Pick-up / Drop-off spaces are provided along the northern boundary of the School. These have been designed in accordance with AS2890.5 and the Council's DCP Part 17: Box Hill North with a the following noteworthy characteristics:

- 2.4m minimum space width;
- End spaces to be provided with a minimum length of 6.6m;
- Internal spaces to be provided with a minimum length of 6.3m.

These spaces will be dedicated for pick-up/drop-off use only during school terms and will be utilised as on-street parking during school holidays and weekends.

11.3 Internal Site Access

11.3.1 Car Park Access

As discussed in Section 8, 110 staff parking spaces would be provided at the Gables Town Centre, separate from the School's Site. Access to this staff car parking area would be restricted to staff members only during the school operations on weekdays. On weekends and holiday periods, the staff parking area would be made available for public use and provide additional parking supply to the Gables Town Centre. This would be managed via a secure access driveway and boom gate during the weekdays. At year of opening, this parking is provided to the east of the Site accessible via internal Road A. This would be designed in accordance with the AS2890 series.

Access to the Early Learning Centre pick-up/drop-off parking area is provided via Red Gables Road. This access would be designed in accordance with the AS2890 series for the all vehicle types that would use this road.

11.4 Car Park Design

Noting the differing land uses within the Town Centre, all staff parking modules will be designed in accordance with User Class 3 (short term, high-turnover) due to the weekend use being allocated for public parking for the Town Centre. The design requirements for this staff carpark will be reviewed in a separate Development Application regarding the Town Centre.

The CELC pick-up / drop-off parking will be designed in accordance with User Class 3.

The following characteristics are noteworthy with regard to the design of the internal CELC Car Park:

- A single private entry/exit driveway for residential and commercial vehicles that is to be designed in accordance with AS2890.1 and AS2890.2 design standards.
- All parking spaces are designed in accordance with a User Class 3A and are to be provided with a minimum space length of 5.4m, a minimum space width of 2.6m, and a minimum 6.6m aisle width or a minimum space width of 2.7m and a minimum aisle width of 6.2m.
- Dead-end aisles are provided with the required 1.0m aisle extension in accordance with Figure 2.3 of AS2890.1.
- All disabled and adaptable parking spaces are to be provided in accordance with AS2890.6, which requires a space with a clear width of 2.4m and located adjacent to a minimum shared area of 2.4m.

It is expected all future DA architectural plans would be designed to comply with AS2890.1.

11.5 Servicing Arrangements

Service / delivery vehicles will access the site via Red Gables Road and utilise the CELC car park to manoeuvre and load / unload. For certain deliveries, the pick-up / drop-off area along Road B would also be utilised. Swept path analysis has been provided in Appendix A which details a 12.5m HRV and a 11m waste collection vehicle manoeuvring on-site. Noting that these movements require the use of the whole car park, a management plan would be provided in response to an appropriate condition of consent which would stipulate that all servicing / deliveries would occur outside of the key operating period of the CELC and the pick-up / drop-off area.

12 Sustainable Transport Management

12.1 Sustainable Transport Targets

As previously discussed, a travel mode questionnaire was undertaken at St Marks Catholic College, Stanhope Gardens by both staff and students. The results of these surveys are detailed in Section 9.1.

Utilising the modal surveys undertaken by Ason of St Mark's Catholic College, **Table 24** summarises the estimated future modal split of students for the proposed school.

Table 24: Estimated Modal Split

Travel mode	Modal Split	Student Numbers
Car Passenger	50%	930
Bus	25%	465
Walking	15%	279
Bicycle	8%	149
Other (multi-modal, dropped off further off-site then walk, etc.)	2%	37

As previously discussed in Section 1, key objectives of developing Box Hill North are to:

- Encourage walking and cycling and use of public transport.
- Minimise vehicular usage by enhancing pedestrian and bicycle connections to the Town Centre, schools and parks.
- Locate public transport stops close to key nodes, community facilities, schools and medium density residential development.

Noting the delivery of an integrated walking and cycling network and the proposed bus routes within the Box Hill North, the reliance on private vehicles would be reduced.

In this regard, to further encourage the use of alternative modes of transport a Green Travel Plan (GTP), is to be implemented which is discussed in Section 12.4. The GTP proposes new targets for the mode share, which will be achieved through Travel Plan measures. **Table 25** details the person trips by mode, based on the proposed mode share targets identified as part of this assessment. It should be noted these are

goals which are set to be achieved through the promotion of alternate modes and take into consideration the primary location of the Site with respect public transport.

Table 25: Staff Person Trips per Mode Based on Proposed Mode Share Targets (AM/PM Peak Hour)

Travel Mode	Proposed Staff Mode Share	AM Peak Hour Person Trips	PM Peak Hour Person Trips
Vehicle driver	75%	97	97
Vehicle passenger	10%	13	13
Train	0%	0	0
Bus	5%	7	7
Walked only	5%	7	7
Cycle	5%	6	6
Other mode	0%	0	0

Table 26: Student Person Trips per Mode Based on Proposed Mode Share Targets (AM/PM Peak Hour)

Travel Mode	Proposed Student Mode Share	AM Peak Hour Person Trips	PM Peak Hour Person Trips
Vehicle driver	0%	0	0
Vehicle passenger	50%	930	930
Train	0%	0	0
Bus	25%	465	465
Walked only	15%	279	279
Cycle	8%	149	149
Other mode*	2%	37	37

12.2 Bus Patronage

As demonstrated by the above, approximately 25% of students are estimated to travel to and from school using public transport (buses). Given that the standard STA bus has a combined seating and standing capacity of 65 people and a total of 465 students are anticipated to utilise buses, this corresponds to requirement of 7.2 buses (at full capacity). Realistically, with irregular loading, it is expected that a minimum of 9 buses would be generated during peak periods.

As detailed in Section 1.5, discussions undertaken with TfNSW and Busways detailed that the provision of 5 bus bay along the western boundary on Fontana Drive is considered sufficient to accommodate the demand of the School.

12.3 Pedestrian Access

There are 279 pedestrian trips predicted to be generated by the development in the AM and PM peak periods. As discussed in Section 6.3, the Site would be afforded excellent pedestrian connectivity as detailed in the Box Hill North DCP which aims to deliver an environment that encourages pedestrian trips by reduce the overall reliance on private vehicles. Primarily, these walking trips will be generated by the residential component of the Box Hill North. In addition, all the trips made by public transport (buses) will ultimately end their journey on-foot.

12.4 Green Travel Plan (Travel Plan Framework)

12.4.1 Introduction

It is proposed to prepare a Framework Travel Plan (FTP) to inform the future GTP for the development in response to a suitable condition of consent. The primary objectives of the Plan will be to:

- Reduce the environmental footprint of the development
- Promote the use of 'active transport' modes such walking and cycling, particularly for short-medium distance journeys
- Reduce reliance on the use of private vehicles for all journeys
- Encourage a healthier, happier and more active social culture

Having regard for the above, this Plan would seek to adopt the following movement hierarchy with priority given to 'active transport'.

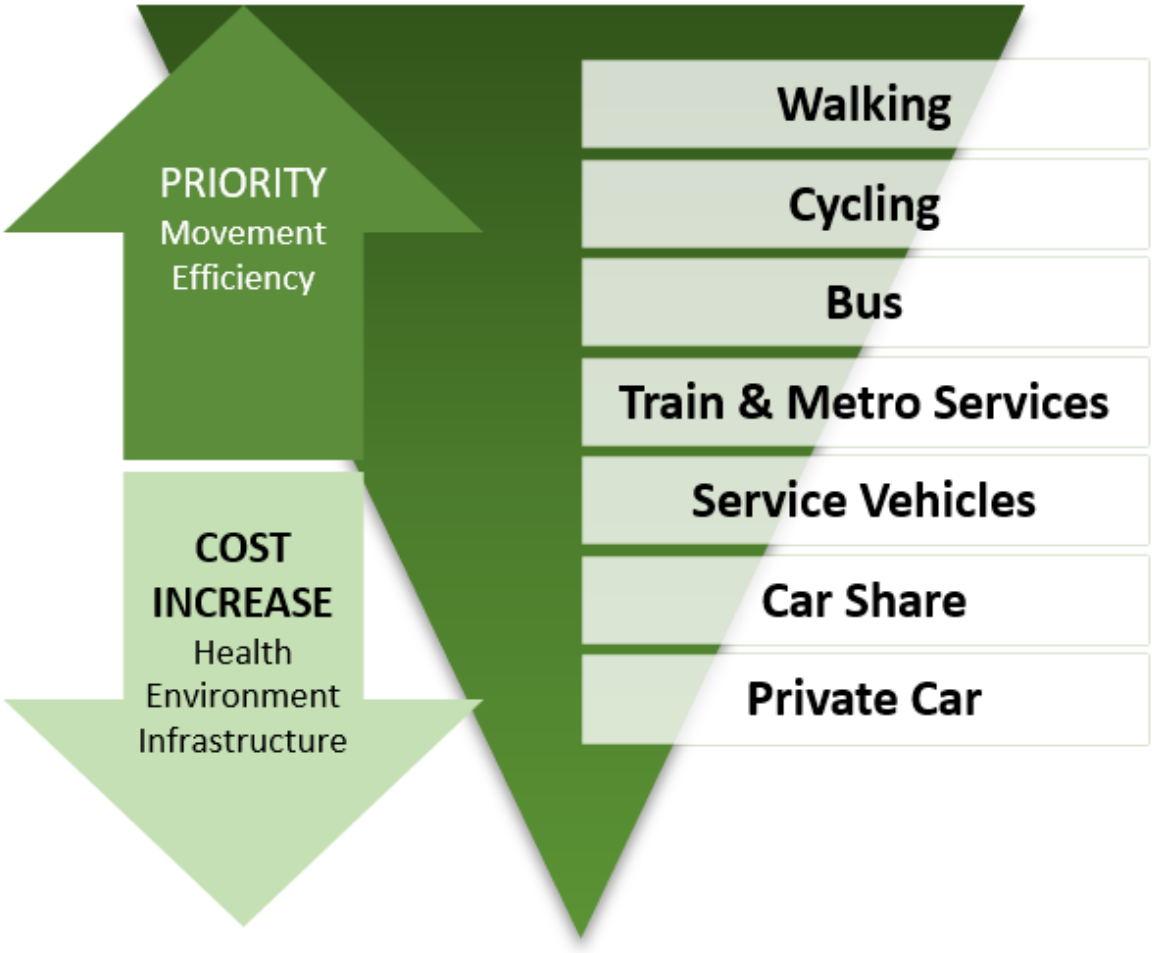


Figure 14: Movement Hierarchy

12.4.2 Site Audit & Targets

An audit of the site and proposed development was conducted to determine existing facilities in the area and current modal splits. The audit considered the following:

- Public transport services in the area, including proximity to the site, frequency of services and accessibility;
- Location of nearby car share pods;
- Existing bike and pedestrian facilities, including accessibility, connectivity and safety;
- Existing mode-split data for the Site and local area.

As discussed in Section 12.1, a similar school was surveyed to gauge the travel patterns of staff and students. However, the school surveyed doesn't necessarily reflect the ultimate vision for the Site, which

is to encourage students and staff to travel by sustainable modes of transport. This includes the approach of restraining on-site car parking and promoting the use of alternatives, which is reflected by the proposed targets. Parking in the area is constrained noting that the parking available on the frontages is to be used for pick-up / drop-off purposes, bus bays, and the surrounding commercial developments. In this regard, **Table 27** details the proposed mode share targets once the operation of the School commences.

These targets have been developed with consideration to the *NSW 2021* plan and the *NSW Long Term Transport Master Plan*.

Table 27: Proposed Mode Share Targets

Travel Mode	Proposed Targets for Staff	Proposed Targets for Students
Vehicle driver	85%	0%
Vehicle passenger	10%	50%
Train	0%	0%
Bus	5%	25%
Walked only	0%	15%
Cycle	0%	8%
Other mode**	0%	2%

The FTP is intended to develop a package of site-specific measures to promote and maximise the use of sustainable travel modes, including walking, cycling, public transport and car sharing. It will include a review of existing transport choices and sets targets so that the effective implementation of the plan can be assessed. These targets are to be realistic but ambitious enough to initiate substantiative behavioural change to achieve the desired outcomes. The plan shall be reviewed regularly as part of an ongoing review to ensure it remains relevant and reflective of current conditions.

12.4.3 Action Strategies

Three main strategies have been identified and the actions required for each are detailed in **Table 28**. The table details how the targets the specific actions to be implemented as part of this FTP, the timeframe for implementation and who will be responsible for implementing each action.

The GTP is intended to develop a package of site-specific measures to promote and maximise the use of sustainable travel modes, including walking, cycling, public transport and car sharing. It will be further developed at OC stage and it is expected that a suitable condition of consent would be imposed requiring approval by Council.

Table 28: Framework Travel Plan Action Table

STRATEGY	HOW IT WORKS	IMPLEMENTATION	RESOURCES
1 Managing Car Use			
1.1 Carpooling	Establish a car-pooling program to help both staff and students find someone to share in their daily commute.	Prepare information sheets specific to staff and students on site.	CEDP, staff members and students.
2 Promoting Public Transport			
2.1 Travel Pass Loan Schemes	CEDP may consider subsidising staff travel passes to increase public transport use. Alternatively, staff can pay for their own annual travel pass through their salary, spreading the cost over the year making it more affordable.	Subject to CEDP negotiations and incentives.	CEDP responsibility
2.2 Provision of bus services operated by TfNSW	The CEDP may consider providing private buses to facilitate access to the school from key train stations and bus routes.	Subject to CEDP negotiations and incentives.	CEDP responsibility
3 Promoting Cycling and Walking			
3.1 Providing End of Journey Facilities	Providing facilities such as showers, change rooms, lockers.	252 bicycle parking spaces will be provided for students and staff members.	CEDP responsibility
4 Other			
4.1 Out of peak operation hours	CEDP may consider selecting start and finishing times that are outside peak hours to reduce overall congestion and travel time.	Manage staff rosters and develop work-from-home policies and procedures, where possible.	CEDP responsibility
4.3 Workplace Travel Plan	Provide staff with a Workplace Travel Plan advise them of the transport options available in the area.	Keep a copy of the WTP current, relevant, useful and accessible. The WTP should be clearly displayed in communal areas.	CEDP responsibility

13 Conclusions

The SSDA seeks approval for a Primary and Secondary School accommodating 1,860 students and a 60-space Early Learning Centre, as well as ancillary set down, access, parking and servicing infrastructure.

Parking

- In accordance with Council's DCP requirements, a total of 227 parking spaces are required for staff, students and visitors. Separate to the 227 parking spaces, Council's DCP also requires pick-up / drop-off facilities.
- 10 pick-up/drop-off spaces are provided for the Early Learning Centre on-site with 6 staff parking spaces provided within the Town Centre to the north of the Site, thereby meeting the requirements of Council's DCP.
- A total of 104 staff parking spaces are provided (excluding the 6 staff spaces for the ELC) within the Town Centre. This corresponds to 80% of the total staff parking requirement. This reduction from Council's DCP is considered supportable as it meets the objectives of Government Policy by reducing the reliance on private vehicle and encourages alternative modes of transport whilst satisfying a high proportion of future parking demands. A preliminary Sustainable Transport Management plan has been provided that details strategies to further reduce the reliance on parking.
- Prior to the completion of the Town Centre to the north of the Site, a temporary car park located to the east of the Site will accommodate 110 parking spaces. This is subject to a separate Development Application to The Hills Shire Council.
- No student parking is provided as per CEDP policy and surveys undertaken of St Mark's Catholic College, Stanhope Gardens indicates a visitor parking demand of 25 spaces. This can be readily accommodated within the surrounding road network.

Pick-Up / Drop-Off

- A total of 12 spaces are provided for pick-up/drop-off along the northern frontage on Road B. These spaces. These spaces would be utilised during the key AM and PM peak periods to accommodate the pick-up / drop-off demand. This would be supplemented with a Traffic Management Plan that would facilitate faster turnaround times (approximately 120 vehicles per 10 minutes) to prevent excessive on-street queueing.
- At Year of Opening, the pick-up / drop-off demand is between 56-67 spaces, which can be accommodated within the 12 on-street spaces along the northern frontage.
- At Full Development, the pick-up / drop-off demand is between 181-241 spaces. This demand exceeds the capacity of the provided pick-up / drop-off facilities and, as such, on-going monitoring is recommended to determine and inform appropriate strategies to reduce the demand. These strategies

could include the reliance on on-street parking spaces or staggering of starting and finishing times between Primary and Secondary School components.

Traffic Impacts – Year of Opening (2021)

- At Year of Opening, the traffic generation is 268 trips and 55 trips during the AM and PM road network peak periods respectively.
- A SIDRA network analysis was undertaken to determine the impact of the surrounding road network in 2021. This assessment looked at two (2) priority-control intersection layouts for the intersection of Red Gables Road / Fontana Drive. The analysis indicated that the local road network would operate at LOS of A indicating the there is sufficient capacity to accommodate the School traffic generation at Year of Opening.

Traffic Impacts – Full Development

- The traffic generation of the Proposal is 894 and 162 during the AM and PM road network peak periods at full development.
- Ason Group undertook a precinct wide study for the Town Centre Planning Proposal. That assessment investigated the full development of The Gables Precinct including the rezoning of the town centre with the proposed school and the full development of all surrounding residential development. The modelling undertaken for that assessment demonstrated the surrounding road network would accommodate the precinct traffic generation within the local road network.

Design Commentary and Servicing Arrangements

- The proposed design would meet the relevant Australian Standards for access design, parking and accessible parking requirements.
- Servicing will occur within the CELC car park accessible via Red Gables Road. Swept path analysis demonstrate a 12.5m HRV and an 11m waste collection vehicle manoeuvring on-site utilising the entire car park. A managed plan would be provided in response to suitable Condition of Consent.

Construction Traffic Management Plan

- A preliminary Construction Management Plan has been provided and details the likely construction haulage routes, construction hours, and mitigation measures. A comprehensive CTMP would be provided separately in response to a suitable Condition of Consent.

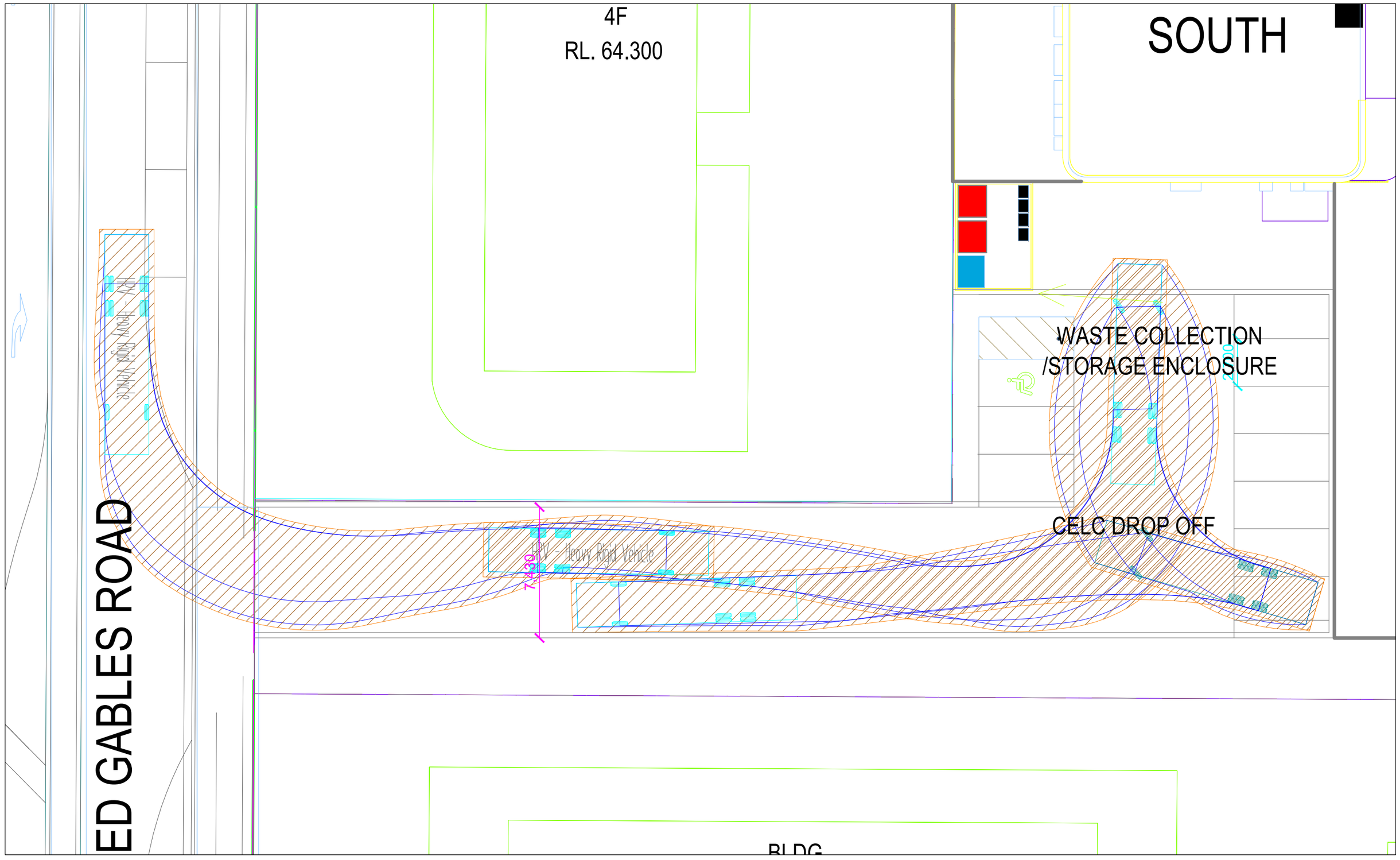
Sustainable Transport Management

- A preliminary Sustainable Transport Management has been provided which details the travel mode targets and future bus patronage. A preliminary Green Travel Plan has been provided which details the measures that can be implemented to encourage the use of alternative modes of transport for both

students and staff. This would include continuous monitoring to develop and refine the strategies and methodologies to encourage alternative modes of transport to staff and students. This would be further refined as a separate document as part of a suitable Condition of Consent.

In summary, it is concluded that the Proposal is supportable on both parking and traffic planning grounds.

Appendix A – Swept Path Analysis



Revision notes:

Rev:	Date:	Notes:

For information purposes only - not for construction

Drawn By: TL

Client: TSA Management

Project: 0760 Santa Sophia Catholic College

Drawing Title: 12.5m HRV Forward In

Date: 14/05/19

Scale @ A3: 1:200

Drawing Number: 03

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BLDG
4F
RL. 64.300

BUILDING
SOUTH

WASTE COLLECTION
/STORAGE ENCLOSURE

Suez Front Loader

Suez Front Loader

Suez Front Loader

CELC DROP OFF

ED GABLES ROAD

Revision notes:

Rev:	Date:	Notes:

For information purposes only - not for construction

Drawn By: TL

Client: TSA Management

Project: 0760 Santa Sophia Catholic College

Drawing Title: Suez Front Loader Reverse In

Date: 14/05/19

Scale @ A3: 1:200

Drawing Number: 01

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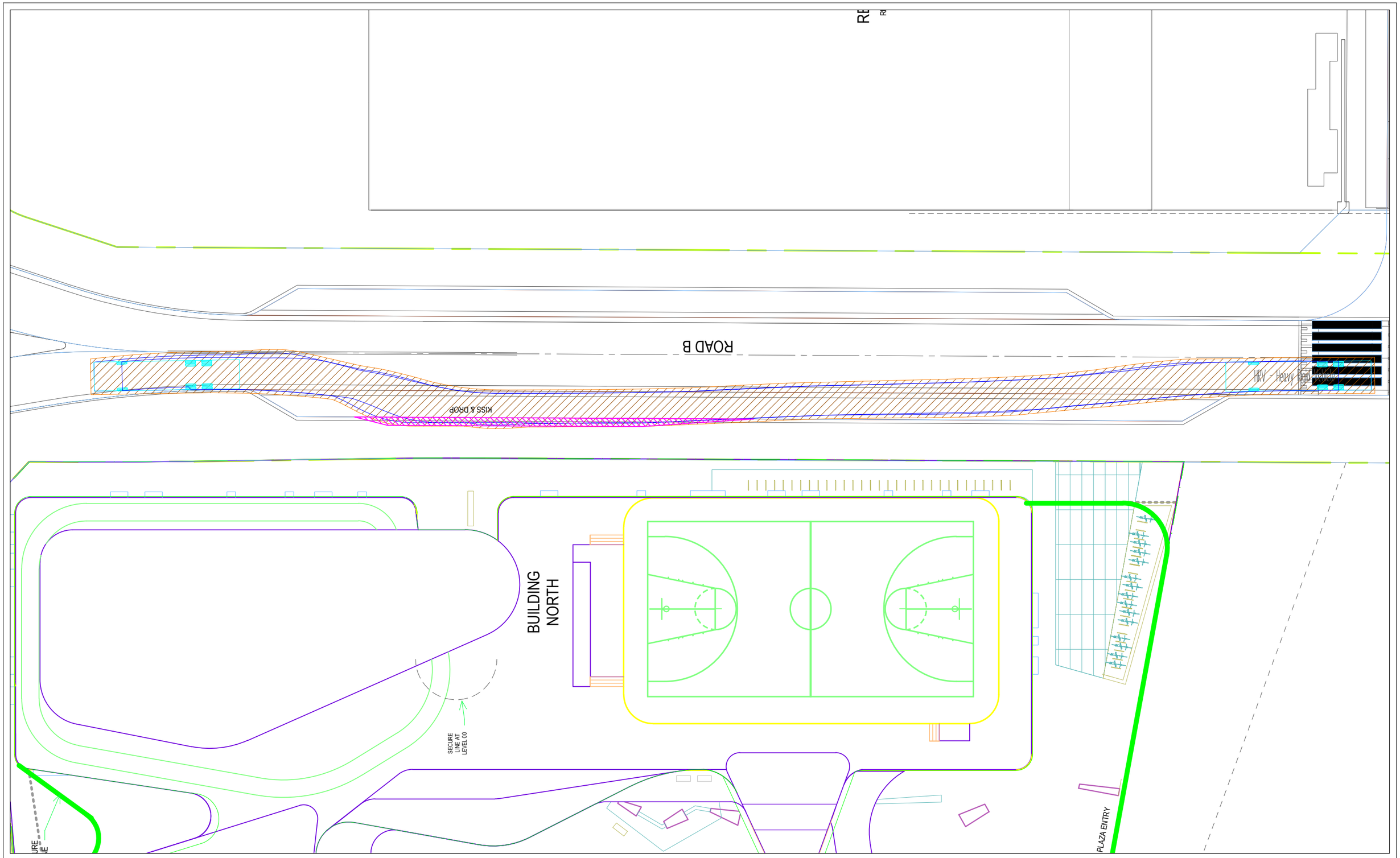

Notes:

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Document Info:

Drawn by: Thomas Lehmann

File name: 0760d10 Road B Loading.dwg

Client:

CEDP

Project:

0760

Santa Sophia

Drawing Title:

Road B Loading

12.5m HRV

Date:

1/05/19

Scale @ A3:

1:300

Drawing Number:

01

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Appendix B – SIDRA Outputs (Year of Opening)

MOVEMENT SUMMARY

Site: 101vv [Red Gables Rd x Fontana Dr_AM - E-W Major Road]

Network: N101 [Network_AM - E-W Major Road]

Red Gables Rd x Fontana Dr
AM Traffic
Year of Opening 2021
Site Category: (None)
Stop (Two-Way)

Movement Performance - Vehicles

Mov ID	Turn	Demand Flows Total	HV	Arrival Flows Total	HV	Deg. Satn	Average Delay	Level of Service	Aver. Back of Queue Vehicles	Distance	Prop. Queued	Effective Stop Rate	Aver. No. Cycles	Average Speed
		veh/h	%	veh/h	%	v/c	sec		veh	m				km/h
South: Fontana Dr S (530m)														
1	L2	5	3.0	5	3.0	0.174	7.6	LOS A	0.3	2.2	0.26	0.95	0.26	43.1
2	T1	108	3.0	108	3.0	0.174	10.7	LOS A	0.3	2.2	0.26	0.95	0.26	39.9
3	R2	3	3.0	3	3.0	0.174	11.9	LOS A	0.3	2.2	0.26	0.95	0.26	40.8
Approach		117	3.0	117	3.0	0.174	10.6	LOS A	0.3	2.2	0.26	0.95	0.26	40.1
East: Red Gables Road E (145m)														
4	L2	13	3.0	13	3.0	0.011	4.6	LOS A	0.0	0.0	0.00	0.33	0.00	46.6
5	T1	71	3.0	71	3.0	0.050	0.2	LOS A	0.1	0.4	0.14	0.16	0.14	47.7
6	R2	20	3.0	20	3.0	0.050	5.3	LOS A	0.1	0.4	0.15	0.13	0.15	43.3
Approach		103	3.0	103	3.0	0.050	1.8	NA	0.1	0.4	0.12	0.17	0.12	47.2
North: Fontana Dr N (160m)														
7	L2	13	3.0	13	3.0	0.153	7.6	LOS A	0.3	1.8	0.17	0.96	0.17	33.9
8	T1	75	3.0	75	3.0	0.153	10.6	LOS A	0.3	1.8	0.17	0.96	0.17	41.3
9	R2	15	3.0	15	3.0	0.153	12.4	LOS A	0.3	1.8	0.17	0.96	0.17	39.1
Approach		102	3.0	102	3.0	0.153	10.5	LOS A	0.3	1.8	0.17	0.96	0.17	40.4
West: Red Gables Road W (380m)														
10	L2	25	3.0	25	3.0	0.019	4.6	LOS A	0.0	0.0	0.00	0.38	0.00	44.9
11	T1	149	3.0	149	3.0	0.086	0.1	LOS A	0.1	0.4	0.04	0.08	0.04	48.9
12	R2	17	3.0	17	3.0	0.086	4.9	LOS A	0.1	0.4	0.05	0.06	0.05	48.7
Approach		192	3.0	192	3.0	0.086	1.1	NA	0.1	0.4	0.04	0.12	0.04	48.5
All Vehicles		514	3.0	514	3.0	0.174	5.2	NA	0.3	2.2	0.13	0.49	0.13	44.2

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Network Data dialog (Network tab).
Vehicle movement LOS values are based on average delay per movement.
Minor Road Approach LOS values are based on average delay for all vehicle movements.
NA: Intersection LOS and Major Road Approach LOS values are Not Applicable for two-way sign control since the average delay is not a good LOS measure due to zero delays associated with major road movements.
SIDRA Standard Delay Model is used. Control Delay includes Geometric Delay.
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

MOVEMENT SUMMARY

Site: 103v [Fontana Dr x Road B_AM]

Network: N101 [Network_AM - E-W Major Road]

Fontana Dr x Road B
PM Traffic
Year of Opening 2021
Site Category: (None)
Roundabout

Movement Performance - Vehicles

Mov ID	Turn	Demand Flows Total	HV	Arrival Flows Total	HV	Deg. Satn	Average Delay	Level of Service	Aver. Back of Queue Vehicles	Distance	Prop. Queued	Effective Stop Rate	Aver. No. Cycles	Average Speed
		veh/h	%	veh/h	%	v/c	sec		veh	m				km/h
South: Fontana Dr S (160m)														
2	T1	1	3.0	1	3.0	0.094	3.7	LOS A	0.2	1.4	0.02	0.63	0.02	33.3
3	R2	154	3.0	154	3.0	0.094	6.8	LOS A	0.2	1.4	0.02	0.63	0.02	37.5
Approach		155	3.0	155	3.0	0.094	6.8	LOS A	0.2	1.4	0.02	0.63	0.02	37.4
East: Road B E (170m)														
4	L2	102	3.0	102	3.0	0.063	2.6	LOS A	0.1	1.1	0.02	0.41	0.02	34.3
6	R2	1	3.0	1	3.0	0.063	5.4	LOS A	0.1	1.1	0.02	0.41	0.02	34.3
Approach		103	3.0	103	3.0	0.063	2.7	LOS A	0.1	1.1	0.02	0.41	0.02	34.3
North: Fontana Dr N (100m)														
7	L2	1	3.0	1	3.0	0.002	4.6	LOS A	0.0	0.0	0.33	0.43	0.33	35.7
8	T1	1	3.0	1	3.0	0.002	4.5	LOS A	0.0	0.0	0.33	0.43	0.33	31.0
Approach		2	3.0	2	3.0	0.002	4.6	LOS A	0.0	0.0	0.33	0.43	0.33	34.2
All Vehicles		260	3.0	260	3.0	0.094	5.1	LOS A	0.2	1.4	0.02	0.54	0.02	36.6

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Network Data dialog (Network tab).
Vehicle movement LOS values are based on average delay per movement.
Intersection and Approach LOS values are based on average delay for all vehicle movements.
Roundabout Capacity Model: SIDRA Standard.
SIDRA Standard Delay Model is used. Control Delay includes Geometric Delay.
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

MOVEMENT SUMMARY

Site: 101vv [Red Gables Rd x Fontana Dr_AM - N-S Major Road]

Network: N101 [Network_AM - N-S Major Road]

Red Gables Rd x Fontana Dr
AM Traffic
Year of Opening 2021
Site Category: (None)
Stop (Two-Way)

Movement Performance - Vehicles

Mov ID	Turn	Demand Flows Total veh/h	HV %	Arrival Flows Total veh/h	HV %	Deg. Satn v/c	Average Delay sec	Level of Service	Aver. Back of Queue Vehicles veh	Distance m	Prop. Queued	Effective Stop Rate	Aver. No. Cycles	Average Speed km/h
South: Fontana Dr S (530m)														
1	L2	5	3.0	5	3.0	0.011	4.6	LOS A	0.0	0.0	0.00	0.13	0.00	48.6
2	T1	108	3.0	108	3.0	0.051	0.0	LOS A	0.0	0.1	0.01	0.04	0.01	49.6
3	R2	3	3.0	3	3.0	0.051	4.9	LOS A	0.0	0.1	0.02	0.02	0.02	48.5
Approach		117	3.0	117	3.0	0.051	0.4	NA	0.0	0.1	0.01	0.04	0.01	49.4
East: Red Gables Road E (145m)														
4	L2	13	3.0	13	3.0	0.146	7.6	LOS A	0.2	1.8	0.12	0.97	0.12	41.4
5	T1	71	3.0	71	3.0	0.146	9.7	LOS A	0.2	1.8	0.12	0.97	0.12	39.5
6	R2	20	3.0	20	3.0	0.146	12.4	LOS A	0.2	1.8	0.12	0.97	0.12	27.3
Approach		103	3.0	103	3.0	0.146	10.0	LOS A	0.2	1.8	0.12	0.97	0.12	38.7
North: Fontana Dr N (160m)														
7	L2	13	3.0	13	3.0	0.011	4.6	LOS A	0.0	0.0	0.00	0.34	0.00	42.8
8	T1	75	3.0	75	3.0	0.047	0.1	LOS A	0.0	0.3	0.08	0.12	0.08	48.7
9	R2	15	3.0	15	3.0	0.047	5.0	LOS A	0.0	0.3	0.09	0.10	0.09	47.2
Approach		102	3.0	102	3.0	0.047	1.4	NA	0.0	0.3	0.07	0.15	0.07	48.1
West: Red Gables Road W (380m)														
10	L2	25	3.0	25	3.0	0.252	7.6	LOS A	0.5	3.4	0.22	0.94	0.22	37.8
11	T1	149	3.0	149	3.0	0.252	10.0	LOS A	0.5	3.4	0.22	0.94	0.22	39.6
12	R2	17	3.0	17	3.0	0.252	11.2	LOS A	0.5	3.4	0.22	0.94	0.22	43.3
Approach		192	3.0	192	3.0	0.252	9.8	LOS A	0.5	3.4	0.22	0.94	0.22	39.9
All Vehicles		514	3.0	514	3.0	0.252	6.0	NA	0.5	3.4	0.12	0.58	0.12	43.2

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Network Data dialog (Network tab).
Vehicle movement LOS values are based on average delay per movement.
Minor Road Approach LOS values are based on average delay for all vehicle movements.
NA: Intersection LOS and Major Road Approach LOS values are Not Applicable for two-way sign control since the average delay is not a good LOS measure due to zero delays associated with major road movements.
SIDRA Standard Delay Model is used. Control Delay includes Geometric Delay.
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

MOVEMENT SUMMARY

Site: 103v [Fontana Dr x Road B_AM]

Network: N101 [Network_AM - N-S Major Road]

Fontana Dr x Road B
PM Traffic
Year of Opening 2021
Site Category: (None)
Roundabout

Movement Performance - Vehicles

Mov ID	Turn	Demand Flows Total	HV	Arrival Flows Total	HV	Deg. Satn	Average Delay	Level of Service	Aver. Back of Queue Vehicles	Distance	Prop. Queued	Effective Stop Rate	Aver. No. Cycles	Average Speed
		veh/h	%	veh/h	%	v/c	sec		veh	m				km/h
South: Fontana Dr S (160m)														
2	T1	1	3.0	1	3.0	0.094	3.7	LOS A	0.2	1.4	0.02	0.63	0.02	33.3
3	R2	154	3.0	154	3.0	0.094	6.8	LOS A	0.2	1.4	0.02	0.63	0.02	37.5
Approach		155	3.0	155	3.0	0.094	6.8	LOS A	0.2	1.4	0.02	0.63	0.02	37.4
East: Road B E (170m)														
4	L2	102	3.0	102	3.0	0.063	2.6	LOS A	0.1	1.1	0.02	0.41	0.02	34.3
6	R2	1	3.0	1	3.0	0.063	5.4	LOS A	0.1	1.1	0.02	0.41	0.02	34.3
Approach		103	3.0	103	3.0	0.063	2.7	LOS A	0.1	1.1	0.02	0.41	0.02	34.3
North: Fontana Dr N (100m)														
7	L2	1	3.0	1	3.0	0.002	4.6	LOS A	0.0	0.0	0.33	0.43	0.33	35.7
8	T1	1	3.0	1	3.0	0.002	4.5	LOS A	0.0	0.0	0.33	0.43	0.33	31.0
Approach		2	3.0	2	3.0	0.002	4.6	LOS A	0.0	0.0	0.33	0.43	0.33	34.2
All Vehicles		260	3.0	260	3.0	0.094	5.1	LOS A	0.2	1.4	0.02	0.54	0.02	36.6

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Network Data dialog (Network tab).
Vehicle movement LOS values are based on average delay per movement.
Intersection and Approach LOS values are based on average delay for all vehicle movements.
Roundabout Capacity Model: SIDRA Standard.
SIDRA Standard Delay Model is used. Control Delay includes Geometric Delay.
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

MOVEMENT SUMMARY

Site: 101vvv [Red Gables Rd x Fontana Dr_PM - E-W Major Road]

Network: N101 [Network_PM - E-W Major Road]

Red Gables Rd x Fontana Dr
PM Traffic
Year of Opening 2021
Site Category: (None)
Stop (Two-Way)

Movement Performance - Vehicles

Mov ID	Turn	Demand Flows Total	HV	Arrival Flows Total	HV	Deg. Satn	Average Delay	Level of Service	Aver. Back of Queue Vehicles	Distance	Prop. Queued	Effective Stop Rate	Aver. No. Cycles	Average Speed
		veh/h	%	veh/h	%	v/c	sec		veh	m				km/h
South: Fontana Dr S (530m)														
1	L2	16	3.0	16	3.0	0.036	7.5	LOS A	0.0	0.3	0.00	1.00	0.00	44.2
2	T1	8	3.0	8	3.0	0.036	8.5	LOS A	0.0	0.3	0.00	1.00	0.00	41.6
3	R2	9	3.0	9	3.0	0.036	8.6	LOS A	0.0	0.3	0.00	1.00	0.00	42.1
Approach		34	3.0	34	3.0	0.036	8.1	LOS A	0.0	0.3	0.00	1.00	0.00	43.2
East: Red Gables Road E (145m)														
4	L2	13	3.0	13	3.0	0.007	4.6	LOS A	0.0	0.0	0.00	0.53	0.00	45.1
5	T1	45	3.0	45	3.0	0.024	0.0	LOS A	0.0	0.0	0.01	0.01	0.01	49.8
6	R2	1	3.0	1	3.0	0.024	4.8	LOS A	0.0	0.0	0.01	0.01	0.01	49.4
Approach		59	3.0	59	3.0	0.024	1.1	NA	0.0	0.0	0.01	0.12	0.01	48.5
North: Fontana Dr N (160m)														
7	L2	5	3.0	5	3.0	0.030	7.6	LOS A	0.0	0.3	0.11	0.94	0.11	36.0
8	T1	18	3.0	18	3.0	0.030	8.6	LOS A	0.0	0.3	0.11	0.94	0.11	42.6
9	R2	3	3.0	3	3.0	0.030	8.5	LOS A	0.0	0.3	0.11	0.94	0.11	40.7
Approach		26	3.0	26	3.0	0.030	8.4	LOS A	0.0	0.3	0.11	0.94	0.11	41.6
West: Red Gables Road W (380m)														
10	L2	1	3.0	1	3.0	0.006	4.6	LOS A	0.0	0.0	0.00	0.05	0.00	49.3
11	T1	54	3.0	54	3.0	0.027	0.0	LOS A	0.0	0.1	0.03	0.06	0.03	49.2
12	R2	5	3.0	5	3.0	0.027	4.8	LOS A	0.0	0.1	0.04	0.06	0.04	48.7
Approach		60	3.0	60	3.0	0.027	0.5	NA	0.0	0.1	0.03	0.06	0.03	49.2
All Vehicles		179	3.0	179	3.0	0.036	3.3	NA	0.0	0.3	0.03	0.39	0.03	46.2

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Network Data dialog (Network tab).
Vehicle movement LOS values are based on average delay per movement.
Minor Road Approach LOS values are based on average delay for all vehicle movements.
NA: Intersection LOS and Major Road Approach LOS values are Not Applicable for two-way sign control since the average delay is not a good LOS measure due to zero delays associated with major road movements.
SIDRA Standard Delay Model is used. Control Delay includes Geometric Delay.
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

MOVEMENT SUMMARY

Site: 103v [Fontana Dr x Road B_PM]

Network: N101 [Network_PM - E-W Major Road]

Fontana Dr x Road B
PM Traffic
Year of Opening 2021
Site Category: (None)
Roundabout

Movement Performance - Vehicles

Mov ID	Turn	Demand Flows Total	HV	Arrival Flows Total	HV	Deg. Satn	Average Delay	Level of Service	Aver. Back of Queue Vehicles	Distance	Prop. Queued	Effective Stop Rate	Aver. No. Cycles	Average Speed
		veh/h	%	veh/h	%	v/c	sec		veh	m				km/h
South: Fontana Dr S (160m)														
2	T1	1	3.0	1	3.0	0.008	3.7	LOS A	0.0	0.1	0.02	0.62	0.02	33.7
3	R2	11	3.0	11	3.0	0.008	6.8	LOS A	0.0	0.1	0.02	0.62	0.02	37.7
Approach		12	3.0	12	3.0	0.008	6.5	LOS A	0.0	0.1	0.02	0.62	0.02	37.5
East: Road B E (170m)														
4	L2	22	3.0	22	3.0	0.015	2.6	LOS A	0.0	0.2	0.02	0.42	0.02	34.1
6	R2	1	3.0	1	3.0	0.015	5.4	LOS A	0.0	0.2	0.02	0.42	0.02	34.1
Approach		23	3.0	23	3.0	0.015	2.8	LOS A	0.0	0.2	0.02	0.42	0.02	34.1
North: Fontana Dr N (100m)														
7	L2	1	3.0	1	3.0	0.002	3.8	LOS A	0.0	0.0	0.07	0.44	0.07	37.2
8	T1	1	3.0	1	3.0	0.002	3.8	LOS A	0.0	0.0	0.07	0.44	0.07	33.8
Approach		2	3.0	2	3.0	0.002	3.8	LOS A	0.0	0.0	0.07	0.44	0.07	36.1
All Vehicles		37	3.0	37	3.0	0.015	4.0	LOS A	0.0	0.2	0.02	0.48	0.02	35.7

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Network Data dialog (Network tab).
Vehicle movement LOS values are based on average delay per movement.
Intersection and Approach LOS values are based on average delay for all vehicle movements.
Roundabout Capacity Model: SIDRA Standard.
SIDRA Standard Delay Model is used. Control Delay includes Geometric Delay.
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

MOVEMENT SUMMARY

Site: 101vvv [Red Gables Rd x Fontana Dr_PM - N-S Major Road]

Network: N101 [Network_PM - N-S Major Road]

Red Gables Rd x Fontana Dr
PM Traffic
Year of Opening 2021
Site Category: (None)
Stop (Two-Way)

Movement Performance - Vehicles

Mov ID	Turn	Demand Flows Total	HV	Arrival Flows Total	HV	Deg. Satn	Average Delay	Level of Service	Aver. Back of Queue Vehicles	Distance	Prop. Queued	Effective Stop Rate	Aver. No. Cycles	Average Speed
		veh/h	%	veh/h	%	v/c	sec		veh	m				km/h
South: Fontana Dr S (530m)														
1	L2	16	3.0	16	3.0	0.009	4.6	LOS A	0.0	0.0	0.00	0.53	0.00	46.3
2	T1	8	3.0	8	3.0	0.011	0.1	LOS A	0.0	0.1	0.08	0.28	0.08	46.7
3	R2	9	3.0	9	3.0	0.011	4.7	LOS A	0.0	0.1	0.08	0.28	0.08	46.2
Approach		34	3.0	34	3.0	0.011	3.5	NA	0.0	0.1	0.04	0.39	0.04	46.4
East: Red Gables Road E (145m)														
4	L2	13	3.0	13	3.0	0.060	7.5	LOS A	0.1	0.6	0.00	1.00	0.00	42.6
5	T1	45	3.0	45	3.0	0.060	8.1	LOS A	0.1	0.6	0.00	1.00	0.00	40.9
6	R2	1	3.0	1	3.0	0.060	8.3	LOS A	0.1	0.6	0.00	1.00	0.00	29.8
Approach		59	3.0	59	3.0	0.060	8.0	LOS A	0.1	0.6	0.00	1.00	0.00	41.3
North: Fontana Dr N (160m)														
7	L2	5	3.0	5	3.0	0.003	4.6	LOS A	0.0	0.0	0.00	0.53	0.00	40.3
8	T1	18	3.0	18	3.0	0.012	0.0	LOS A	0.0	0.1	0.03	0.08	0.03	49.2
9	R2	3	3.0	3	3.0	0.012	4.7	LOS A	0.0	0.1	0.03	0.08	0.03	47.7
Approach		26	3.0	26	3.0	0.012	1.5	NA	0.0	0.1	0.02	0.17	0.02	47.9
West: Red Gables Road W (380m)														
10	L2	1	3.0	1	3.0	0.065	7.5	LOS A	0.1	0.8	0.02	0.99	0.02	39.1
11	T1	54	3.0	54	3.0	0.065	8.1	LOS A	0.1	0.8	0.02	0.99	0.02	40.7
12	R2	5	3.0	5	3.0	0.065	8.4	LOS A	0.1	0.8	0.02	0.99	0.02	44.0
Approach		60	3.0	60	3.0	0.065	8.1	LOS A	0.1	0.8	0.02	0.99	0.02	41.2
All Vehicles		179	3.0	179	3.0	0.065	6.2	NA	0.1	0.8	0.02	0.76	0.02	43.2

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Network Data dialog (Network tab).
Vehicle movement LOS values are based on average delay per movement.
Minor Road Approach LOS values are based on average delay for all vehicle movements.
NA: Intersection LOS and Major Road Approach LOS values are Not Applicable for two-way sign control since the average delay is not a good LOS measure due to zero delays associated with major road movements.
SIDRA Standard Delay Model is used. Control Delay includes Geometric Delay.
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

MOVEMENT SUMMARY

Site: 103v [Fontana Dr x Road B_PM]

Network: N101 [Network_PM - N-S Major Road]

Fontana Dr x Road B
PM Traffic
Year of Opening 2021
Site Category: (None)
Roundabout

Movement Performance - Vehicles

Mov ID	Turn	Demand Flows Total	HV	Arrival Flows Total	HV	Deg. Satn	Average Delay	Level of Service	Aver. Back of Queue Vehicles	Distance	Prop. Queued	Effective Stop Rate	Aver. No. Cycles	Average Speed
		veh/h	%	veh/h	%	v/c	sec		veh	m				km/h
South: Fontana Dr S (160m)														
2	T1	1	3.0	1	3.0	0.008	3.7	LOS A	0.0	0.1	0.02	0.62	0.02	33.7
3	R2	11	3.0	11	3.0	0.008	6.8	LOS A	0.0	0.1	0.02	0.62	0.02	37.7
Approach		12	3.0	12	3.0	0.008	6.5	LOS A	0.0	0.1	0.02	0.62	0.02	37.5
East: Road B E (170m)														
4	L2	22	3.0	22	3.0	0.015	2.6	LOS A	0.0	0.2	0.02	0.42	0.02	34.1
6	R2	1	3.0	1	3.0	0.015	5.4	LOS A	0.0	0.2	0.02	0.42	0.02	34.1
Approach		23	3.0	23	3.0	0.015	2.8	LOS A	0.0	0.2	0.02	0.42	0.02	34.1
North: Fontana Dr N (100m)														
7	L2	1	3.0	1	3.0	0.002	3.8	LOS A	0.0	0.0	0.07	0.44	0.07	37.2
8	T1	1	3.0	1	3.0	0.002	3.8	LOS A	0.0	0.0	0.07	0.44	0.07	33.8
Approach		2	3.0	2	3.0	0.002	3.8	LOS A	0.0	0.0	0.07	0.44	0.07	36.1
All Vehicles		37	3.0	37	3.0	0.015	4.0	LOS A	0.0	0.2	0.02	0.48	0.02	35.7

Site Level of Service (LOS) Method: Delay (RTA NSW). Site LOS Method is specified in the Network Data dialog (Network tab).
Vehicle movement LOS values are based on average delay per movement.
Intersection and Approach LOS values are based on average delay for all vehicle movements.
Roundabout Capacity Model: SIDRA Standard.
SIDRA Standard Delay Model is used. Control Delay includes Geometric Delay.
Gap-Acceptance Capacity: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.

Appendix E – Waste Management Plan

Level 4, 10 Mallett Street
Camperdown NSW 2150
Phone: 02 9565 0000

Waste Management Plan

Santa Sophia School

Corner of Fontana Drive and future road 'B',
between Red Gables Road and Fontana Drive,
The Gables, Box Hill North

Approved by:

Manager	**Date**
Mike Currie	28 March 2019

Record of revisions of HSE Waste Management Plan

Edition Revision	**Date**	**Page**	**By**	**Revision Details**
A	28 March 2019	First issue	MC	Preliminary Issue

Controlled Copies / Distribution List

No.	User	Position	Issue Date
01	SSDA Issue	BDM	28 March 2019

Introduction

This Waste Management Plan outlines Buildcorp's strategy to minimise the generation of waste, maximise reuse and recycling and ensure waste is disposed of at a licensed EPA waste disposal facility.

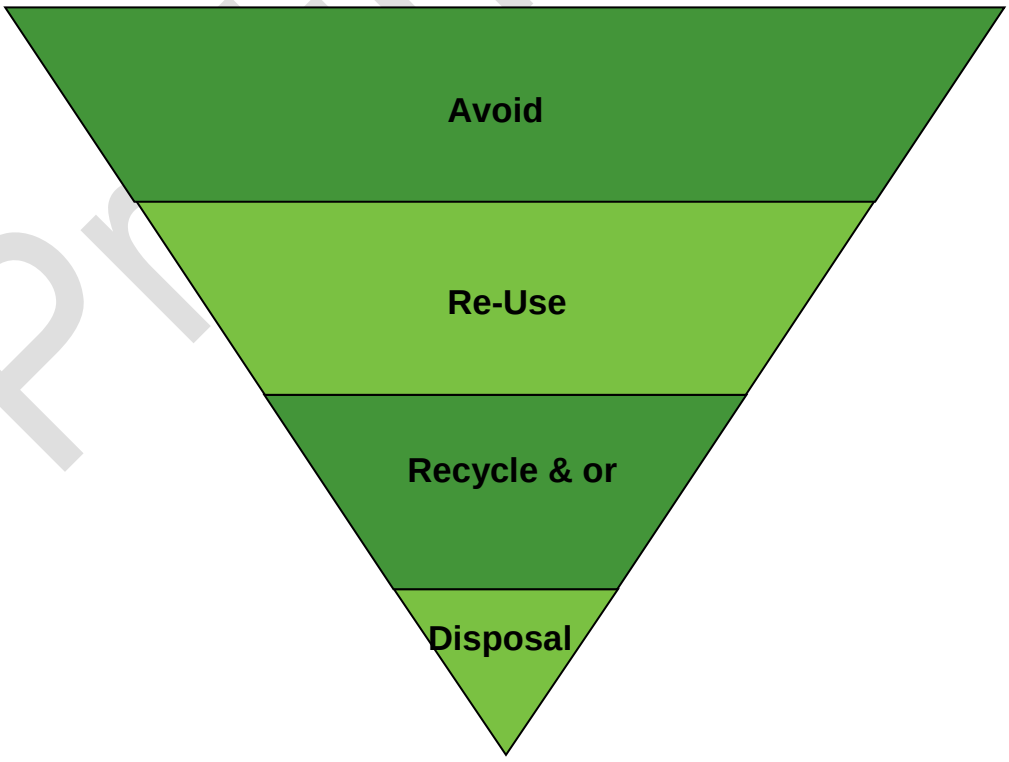
The purpose of this plan is to:

- Establish the specific procedures to ensure waste generated by project activities are minimised and waste is appropriately recycled.
- Provide a consistent and uniform approach that assures the required standards relating to waste are attained and maintained for the project works to achieve minimum recycling / reuse target of 80% of waste by weight minimising the amount of waste going to landfill.
- Establish waste management strategies for the construction stages from demolition, building construction through to commissioning.
- Establish provision for on-site monitoring of wastes generated with details of each material, disposal destinations (tracking) and receipts.
- Define the appropriate waste disposal measures to be undertaken for materials that pose an environmental risk such as soils, concrete, contaminated water, paints etc

Waste Management Hierarchy

Buildcorp have prioritised waste management by adopting a waste management hierarchy as follows:

1. **Avoiding Waste (**identify demolition and construction waste to minimise packaging and over ordering of materials)
2. **Re-Use Materials** (pallets and storage containers)
3. **Recycle and Reprocess Materials**
4. **Disposal of Waste**



Waste Minimisation Controls

The following controls will be implemented on site to ensure waste is minimised on the project:

- Main subcontractors are asked to submit waste minimisation details in their SWMS including the following:
    i. Avoiding over-ordering materials
    ii. Minimising the use of un-recyclable packaging materials
    iii. Reviewing with suppliers, the potential for reusable packaging, such as cloth bags, blankets, pallets or containers for materials and equipment
    iv. Buying environmentally-approved and recycled-content products where possible
- Waste management training is provided as part of Site Induction, ensuring that subcontractors and site visitors are aware of the materials on-site (in particular any hazardous wastes) and waste disposal requirements.
- Buildcorp will utilise the services of a Waste Sub-Contractor whose facilities and waste procedures have been audited by our sustainability management team for stringency and accuracy. They should need also meet the following requirements:
    i. Be appropriately licensed under the POEO Act (1997) and associated regulations to transport, store, recycle, reprocess and/or dispose of wastes removed from the site;
    ii. Provide waste containers and transport vehicles suitable for storage and carriage of waste types to be generated at the site;
    iii. Can provide EPA licenses of the appropriate landfills that are licensed to accept the waste which is generated on site
    iv. Provide accurate written documentation including tracking documentation and disposal receipts to Buildcorp in a prompt manner following the disposal of waste from the site to comply with regulatory and Buildcorp contract requirements;
    v. Remove and transport all waste for disposal to a facility lawfully able to accept the waste;
    vi. Securely load and cover all vehicles/bins and containing waste prior to exit from the site to minimise the risk of waste spillage, dust generation etc during transport.
    vii. Facilitate recycling of appropriate materials.
- Prior to commencing work on site project personnel (including subcontractors) are to be informed through the site induction process of the importance of waste, recycling, spills or incident impacts on the site and adjacent areas. Site supervisors are to discuss waste management issues at toolbox and other meetings as required.
- All work areas are to be maintained in a clean and tidy manner. A weekly (or more frequent if required) sweep of the entire site will be completed by the contractor to remove loose waste and/or litter present within the site to appropriate waste/recycling storage facilities in the loading dock.
- Daily inspections are to be conducted to ensure that the worksite is left in a rubbish-free state and that no rubbish has been “trapped” against site fencing
- Regular management audits are to be carried out to ensure that the Waste Management Plan is being adhered to

Waste Management

The table below represents the expected waste types that will be generated during the works and describes how each will be managed on-site, collected and the waste management outcome ranked from the most to least preferred.

Waste Type	Waste Management Outcome				
	Most Preferred				Least Preferred
	Avoid/Reduce	Reuse	Recycle	Recover	Treat &/or Dispose
Plasterboard			■	■	
Paper & Cardboard	■	■	■		
Steel, Scrap Metal etc…			■		
Timber		■	■	■	
Plastics and Foam	■				■
Insulation Material	■				■
Excavated Fill		■			■
Glass		■	■	■	
Concrete and Bed Mix	■				■
Residual			■		■
Hazardous					■
Food and General Waste			■		■

Notes;

1. Waste is collected in "general construction waste" bins and is sorted at a resource recovery facility using mechanical and manual sorting techniques that remove wastes such as plasterboard, timber, metal, cardboard and plastic for recycling.
2. Residual waste refers to construction waste other than those listed as a waste type.
3. Waste Management Definitions:
   - *Re-use,* means the activity of using waste materials in their current form (ie. not altering their chemical or physical state)
   - *Recycling,* means the activity of processing waste materials to form new products
   - *Recovery*, means the activity of processing waste materials for the purpose of recovering energy (eg. incineration)
   - *Disposal,* means the activity of depositing waste materials in landfill

Demolition

Generally, Demolition is not required for this development as it is a greenfield site.

Excavation Fill Material

Any fill materials identified requiring excavation within the site footprint should be reused, where suitable, on the site as part of the site engineering or landscaping work. Excess or contaminated excavation fill is to be removed off site and classified in accordance with relevant guidelines. To ensure the fill is being taken to the correct landfill the subcontractor transporting the waste should provide details of the landfill site, the EPA licence details and confirmation that landfill is authorised to receive that waste. Trucking docket records are to be kept on site to check that fill is going to the nominated landfills.

Construction Waste

The construction waste generated on site is to be placed as follows;

- in mixed waste skip bins, meaning that all waste is deposited in the one skip bin and segregation into the appropriate waste streams occurs offsite.
- Where site room allows and subject to waste type quantity sorted into the appropriate waste bins and will be removed and where applicable recycled off site by the waste generating contractor.

Food and general waste

Food scrap/ general waste bins are provided in the vicinity of site offices and amenities. It is sorted into general waste, cans/bottles and paper/cardboard. Buildcorp site sheds have paper bins and printer cartridge bins (for staff to return to head office for recycling).

Hazardous Materials

Contaminated waste will be disposed of to an EPA licensed facility which is able to take the waste. Contaminated waste will be stored within designated storage areas on site. Records of disposal of the waste should be maintained with site records.

Hazardous Substances

Any subcontractors handling, using or disposing of harmful or toxic chemicals or substances are to ensure they follow appropriate manufacture requirements and legislation requirements in disposal. No chemicals or substances are to be disposed of down any drains, sewer etc on- site.

If a spillage of a hazardous substance occurs staff are appropriately trained in spill kit procedures to clean up spills immediately. Spill kits are located adjacent to the areas where hazardous substances are stored on site. Once the substance has been cleaned up it will then be disposed of to the appropriate EPA licensed facility. Records of disposal and the clean up methods of the spill are to be maintained with site records.

Waste Water/Wash Out Areas

Wash out facilities for finishing trades including concrete and paint waste are to be minimised and water recycling for these activities are encouraged. If a wash out facility is utilised it will not be plumbed to any building services or drain to stormwater.

The wash out area will have sediment controls and should be clearly signposted. The location of the wash down area is shown on the sites layout plan and everyone is made aware of this location during the site induction. Refer to the Sediment control section.

The wash out area and sediment controls should be emptied of all solid residues regularly in order for it to catch waste water. Solids which are caught by this process should be disposed of in a bin going to a licensed waste facility.

Site Management Roles and Responsibilities

To manage waste generation on site the following roles and responsibilities have been set for all contractors to follow and ensure the waste recycling targets can be met. The table below represents a summary of the waste management roles and responsibilities for the works on the Santa Sophia School project.

Responsibility	Project Task
Site Operation	
Base building management	• Ensuring that waste is segregated and collected in accordance with this Plan • Ensuring that Duty of Care documentation is obtained and maintained in the site file (eg. copy of waste transporters licence, waste collection receipts, waste transport certificates) • Updates to the Plan and Building Management approvals • Supervising the collection of waste by the waste contractor (where practical) • Maintaining site records of waste types and approximate quantities collected from site
Waste Sorting	
All Contractors	• It is the responsibility of all contractors to be inducted into this plan and put waste into the correct bins on site for appropriate disposal off site • Contractors are to use the designated bins on site and not dispose of any materials expect within designated bins on site • Minimise the generation of wastes through appropriate behaviour on site through site measurement and ongoing management of works
Waste Collection & Management	
Waste Contractor & Buildcorp Project Manager	• Supply of bins, according to agreed approach & ongoing site requirements • Collection & disposal of waste, as agreed & according to ongoing site requirements • Weighing and sorting of all wastes generated on site for disposal off site • Ensuring that the waste collected is managed in accordance with the relevant legislation and the identified wastes are re-used, recycled or recovered
Reporting	
Buildcorp Project Administrator	• Tracking of wastes generated • Reporting of all waste data • End of Project reporting of waste data to confirm % recycled / reused and wastes to landfill • Preparation of final waste report for the site

Monitoring, Conformance and Reporting

The Buildcorp (BC) approved Waste Contractor will provide monthly recycling and waste minimisation reports. These reports are audited to ensure that we are reaching our set targets. Records of the total waste generation and disposal to landfill or recycling are retained on site by Buildcorp contractor site staff.

Any subcontractor found to be inappropriately acting will be issued with a non-conformance and rectification notice immediately by BC. The procedure for environmental non-conformances is as follows:

i. Site issue is identified
ii. BC investigates and issues a response to all subcontractors
iii. BC issues non-conformance/rectification notice to party responsible
iv. Subcontractor to clean up immediately to relevant legislative requirements
v. BC notifies external parties as required and final notice to subcontractor

Audits are to be conducted on waste generated to ensure it is being disposed of as per the procedures set out in this Waste Management Plan.