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# Traffic Engineering Assessment

Proposed Sports and Aquatic Centre  
141 Burwood Hwy, Burwood

Prepared for  
Presbyterian Ladies College

March 2022

G27300R-01F

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## Document Control

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# List of Appendices

- Appendix A Proposed Development Plan
- Appendix B SIDRA Output

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# 1. Introduction

Traffic Group has been engaged by Presbyterian Ladies College (PLC) to undertake a traffic engineering assessment for a proposed sports and aquatic centre at 141 Burwood Hwy, Burwood.

This report provides a traffic engineering assessment of the access and traffic issues associated with the proposed development.

# 2. Existing Conditions

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### 2.1. Site Locality

The development area is part of the larger PLC campus located on the north side of Burwood Highway, between Parer Street and Elgar Road in Burwood, as shown in Figure 1 below.

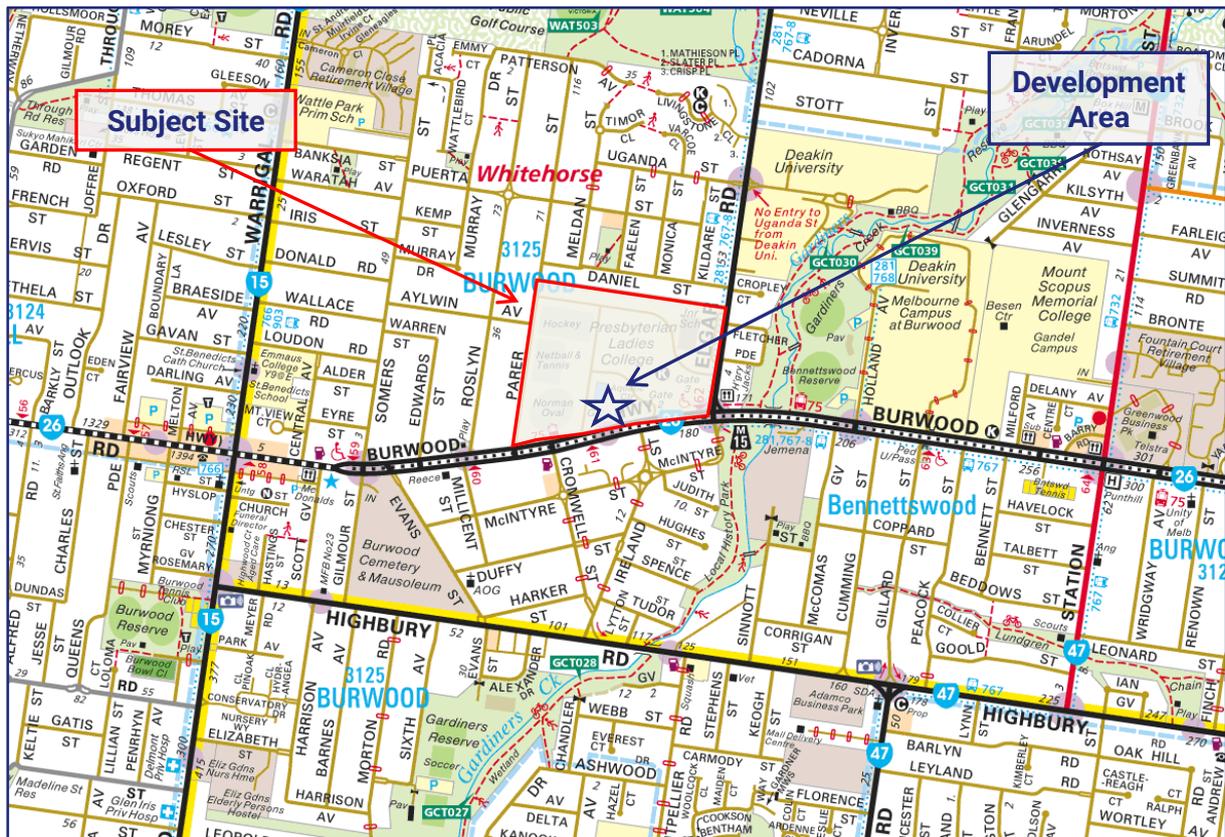


Figure 1: Locality Map

The subject site is occupied by the existing PLC campus. Vehicle access to the subject site is currently taken from several crossovers including:

- two left-in/left-out crossovers to Burwood Highway (Gate 1 and Gate 2),

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## Traffic Engineering Assessment

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- a 6.8m wide (approx.) two-way crossover located at the site's northern boundary to Parer Street providing access to the senior school staff carpark (Gate 4), located approximately 400m north of Burwood Highway and 45m south of Daniel Street,
- a maintenance access gate and crossover to Parer Street approximately 170m north of Burwood Highway (just south of pedestrian access Gate 5), and
- three crossovers to Elgar Road.

The overall PLC campus has an area of approximately 15 hectares. The development area has a total area of approximately 7,000m<sup>2</sup> and a frontage to Burwood Highway of approximately 130m.

An aerial photograph of the subject site is presented at Figure 2 below.



Figure 2: Aerial Photograph (August, 2019)

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**2.2. Land Use**

The subject site is located within the General Residential Zone – Schedule 1 under the Whitehorse Planning Scheme as presented at Figure 3 below.

Significant non-residential land uses near to the site include:

- Gardiners Creek and Bennettswood Reserve approximately 170m east of the subject site,
- Deakin University, located approximately 400m east of the subject site,
- Industrial and commercial uses to the south side of Burwood Highway, opposite the site’s western boundary, and
- Burwood Cemetery, located approximately 320m west of the subject site.

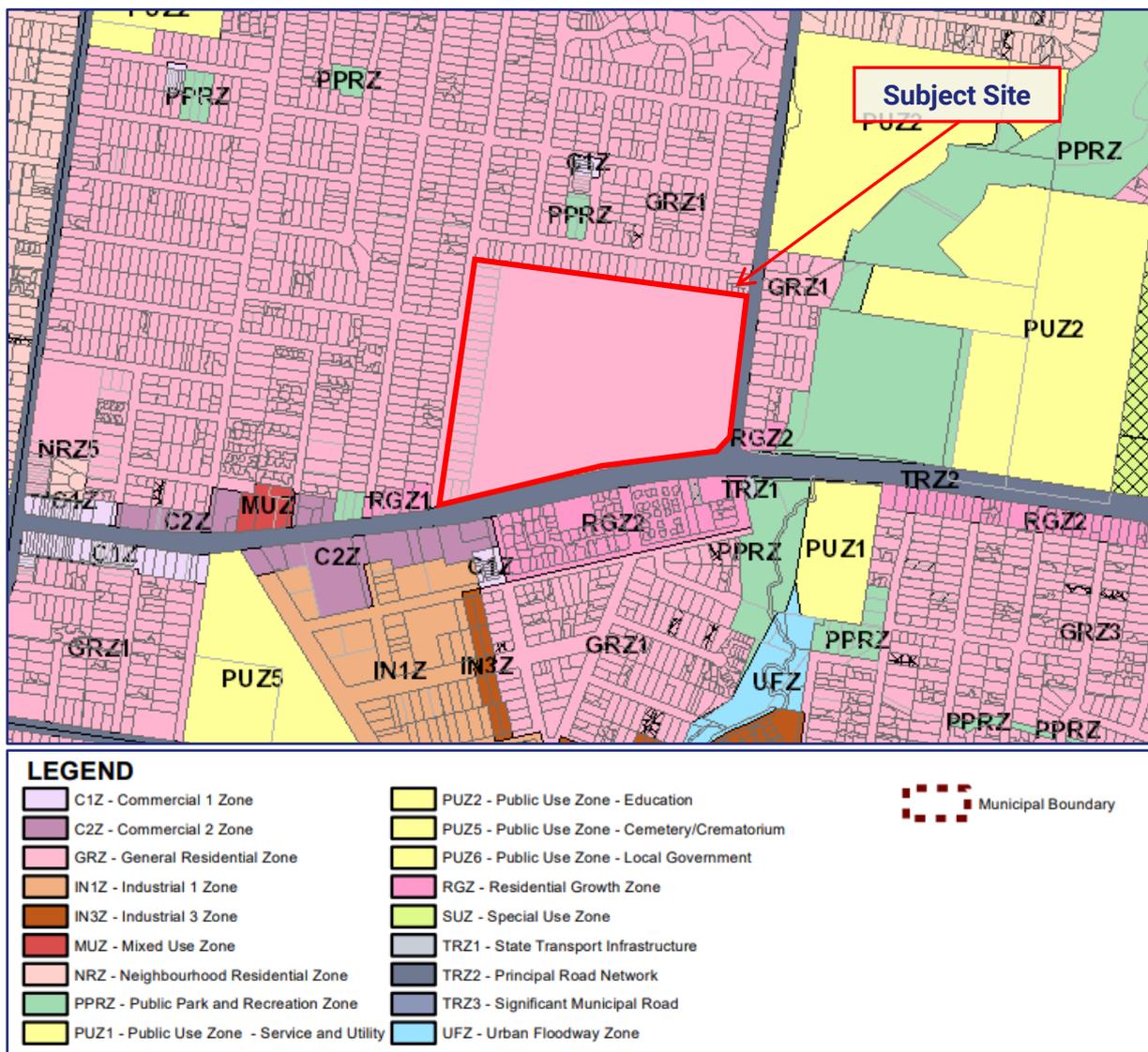


Figure 3: Land Use Zoning Map

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## 2.3. Road Network

### Burwood Highway

Burwood Highway is a State Arterial Road zoned Transport Zone 2 (TRZ2 – Principal Road Network) generally aligned in an east-west direction between Belgrave to the east and Warrigal Road to the west (where it continues as Toorak Road).

In the vicinity of the site, Burwood Highway is constructed with a divided carriageway providing two traffic lanes in each direction. Tram tracks are located in the centre median. A signalised pedestrian crossing is located approximately 170m east of Parer Street and provides a pedestrian connection to the nearby tram stop.

A posted speed limit of 60km/h applies to Burwood Highway in the vicinity of the site. An electronic 40km/h speed limit sign applies during school times.



Figure 4: Burwood Highway Looking East Towards Parer Street (Source: Google Streetview)

## 2.4. Existing Traffic Volume

Traffic Group has collected traffic volume data for Burwood Highway directly in front of the development area from Thursday 11<sup>th</sup> October 2018.

The data identifies three peak periods, being the AM commuter peak, an afternoon school peak and the PM commuter peak.

The following traffic volumes were recorded for the three periods:

- AM Peak (8am-9am): 2,415vph (1,073 eastbound and 1,342 westbound),
- School Peak (3pm-4pm): 2,184vph (1,242 eastbound and 942 westbound), and
- PM Peak (5pm-6pm): 2,673vph (1,600 eastbound and 1,073 westbound).

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### 2.5. Public Transport

The following public transport services operate nearby to the school:

- Tram Route 75 operates along Burwood Highway, with stop 61 located midway along the school frontage, and provides a service between Etihad Stadium Docklands and Vermont South via Burwood Railway Station.
- Bus Routes 201, 281 and 767 operate along Elgar Road. Routes 281 and 767 have bus stops located on the school's frontage, and provide connections to Deakin University, Box Hill, Templestowe, Southland, Chadstone and Jordanville. Route 201 is an express service with fewer stops, operating between Box Hill and Deakin University.

## 3. Proposal

### 3.1. Development

The application is for the construction of a sports and aquatic centre within the existing PLC site.

The proposal includes new swimming and learn to swim pools, cardio and weights rooms, gymnasium, basketball courts, meeting rooms, multi-purpose rooms and a single level of underground car parking.

The use of the centre will be limited to school use and continued use for the existing Learn to Swim that currently occurs on the site within the existing aquatic centre.

No other public use of the site is proposed.

A copy of the proposed development plans, prepared by Warren and Mahoney (dated September 2021) are attached at appendix A.

### 3.2. Access

The development area will make use of the existing Gate 2 access, but modified to create a functional two-way internal access road with a wider splay on the western corner of the crossover to facilitate access by larger vehicles from Burwood Highway.

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## 4. Car Parking Assessment

### 4.1. Statutory Car Parking Requirement

Clause 52.06 of the Planning Scheme sets out the statutory requirements for car parking. The purposes of Clause 52.06 are:

- To ensure that car parking is provided in accordance with the Municipal Planning Strategy and the Planning Policy Framework.
- *To ensure the provision of an appropriate number of car parking spaces having regard to the demand likely to be generated, the activities on the land and the nature of the locality.*
- *To support sustainable transport alternatives to the motor car.*
- *To promote the efficient use of car parking spaces through the consolidation of car parking facilities.*
- *To ensure that car parking does not adversely affect the amenity of the locality.*
- *To ensure that the design and location of car parking is of a high standard, creates a safe environment for users and enables easy and efficient use.*

The proposed building is ancillary to the primary function of the school.

The statutory car parking rate for schools (primary and secondary) is based on number of number of employees on the site at any one time.

There are no proposed changes to the number of employees on-site as a part of the proposal and accordingly there is no additional car parking requirement associated with the construction of the sports and aquatic centre.

Furthermore, we note that the site is intended to be used in part for the continued use of Learn to Swim classes but these classes typically occur outside of school hours.

### 4.2. Car Parking Provision

A total of 63 parking spaces are proposed within a basement arrangement which allows for the aggregation of part of the existing parking already occurring on the school grounds.

This will include:-

- some ELC staff parking,
- aquatic centre attendees,
- some junior school staff parking, and
- after hours use from the school and existing Learn to Swim classes.

The majority of the parking will be allocated to existing uses allowing other existing parking areas to be redeveloped/reallocated. Accordingly, there is no "overall demand" for the parking but rather the development provides the opportunity to improve the supply and operation of parking with the school environs/campus.

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The provision of 63 parking spaces located within a basement to the new facility is a significant increase in the amount of parking being accommodated on-site.

By having car parking located proximate to the new facility, it will limit the amount of internal movement that occurs throughout the campus as patrons for the Learn to Swim will no longer need to walk from the Senior School carpark located in the northwest corner of the campus.

Significantly, we understand that the development of this part of the site is just one of a number of projects planned for the future which intend to provide an increase in the amount of parking provided on the campus to improve parking, traffic flow and operational issues.

### 4.3. Car Parking Layout

The proposed car parking layout and access arrangements have been checked against the relevant requirements of the Planning Scheme and Australian Standards (where necessary). The following is noted:

- All vehicles can enter and exit in a forwards direction.
- All accessways have a minimum width of 6.1m and allow for simultaneous two-way traffic movements.
- All parking accessways and parking spaces have a minimum headroom clearance of 2.1m.
- Changes of direction can appropriately accommodate the turning movements of a B85 design vehicle (the 85<sup>th</sup> percentile vehicle by length).
- All car parking is provided in accordance with the minimum dimensions set out at Clause 52.06-9 of the Planning Scheme.
- Disabled parking spaces are provided in accordance with AS/NZS 2890.6:2009.
- Ramps have a maximum grade of 1:5.
- Changes in grade have been designed to ensure that vehicles do not scrape or bottom out at the top or bottom of the ramps

We are satisfied that the layout of the carparking adheres to the requirements of the Planning Scheme and Australian Standard and importantly, will work well.

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## **5. Bicycle Facilities**

Clause 52.34 of the Planning Scheme sets out the statutory bicycle parking requirements new developments. The purpose of Clause 52.34 is:

- *To encourage cycling as a mode of transport.*
- *To provide secure, accessible and convenient bicycle parking spaces and associated shower and change facilities.*

The statutory bicycle parking requirements for the school use are based on the number of employees and students on-site. There are no proposed changes to either of these measures and accordingly there is no requirement to provide additional on-site bicycle parking associated with construction of the sports and aquatic centre.

## **6. Traffic Assessment**

### **6.1. Access to the Principal Road Network**

Clause 52.29 of the Whitehorse Planning Scheme requires a permit if an application includes the creation or alteration of an access to the Principal Road Network (Transport Zone 2). The intensification of the use of a crossover is considered an alteration and would therefore trigger a permit requirement.

The proposal includes the creation of 63 new parking spaces which will be accessed via the existing Gate 2 via Burwood Highway. The majority of traffic to/from this carpark will be new traffic that previously took access from other locations around the site and accordingly, we believe that there is an intensification of the access at this location.

Based on the above, a permit is required under Clause 52.29 of the Planning Scheme.

The suitability of granting a permit for amending the gate 2 access point is discussed below.

### **6.2. Traffic Generation**

The proposed car parking will be used by a number of staff and by parents for pick-up/drop off. The busiest use of the carpark will typically be outside of school hours when the new centre will host swim meets and school basketball matches.

We anticipate that in the worst case, there may be in the order of 63 vehicles entering and exiting the site in an hour. This represents a single movement to/from each parking space being provided as part of this development.

### **6.3. Traffic Distribution**

Traffic to and from Gate 2 is restricted to left-IN and left-OUT and there is no proposal to change that arrangement as part of the current application.

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### 6.4. Traffic Impact

The proposed development may generate up to 63 movements out from the development area. For the purposes of a robust assessment, these have been assumed to coincide with the AM, PM and School peak traffic periods, identified in Section 2.4 of this report.

We note that 10 years growth of 2% on the arterial road has been included on top of the peak traffic volumes.

A SIDRA assessment of the proposed ingress and egress arrangements have been undertaken and the key outputs are summarised in Tables 2 below.

Table 1: SIDRA Outputs

Approach	Degree of Saturation	Average Delay (sec)	95 <sup>th</sup> Percentile Queue (m)
<b>AM Peak</b>			
North Approach – School Egress	0.072	8.2 sec	1.9m
West Approach – Burwood Highway	0.251	0.3 sec	0.0m
<b>School Peak</b>			
North Approach – School Egress	0.079	8.8 sec	2.1m
West Approach – Burwood Highway	0.289	0.3 sec	0.0m
<b>PM Peak</b>			
North Approach – School Egress	0.098	10.1 sec	2.5m
West Approach – Burwood Highway	0.369	0.2 sec	0.0m

For unsignalised intersections, degrees of saturation less than 0.8 are considered to represent good operating conditions.

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The analysis shows that the driveway exit has a degree of saturation less than 0.1 in all peak periods with minor queues and delays which is consistent with good intersection operation.

The relatively low number of turning movements to/from Burwood Highway can readily be accommodated without adverse impacts to the operation of the external road network.

A copy of the detailed SIDRA output is attached at Appendix B.

## 7. Conclusion

Having undertaken a traffic engineering assessment for the proposed sports and aquatic centre at 141 Burwood Highway, Burwood, we are of the opinion that:

- a) the proposed development does not generate any statutory requirement to provide additional car parking on the site,
- b) car parking is provided in accordance with the relevant standards set out in the Planning Scheme and Australian Standards and importantly, will work well,
- c) the proposed development does not generate any statutory requirement to provide additional bicycle parking on the site
- d) a permit is required to amend access to the Principal Road Network,
- e) the busiest use of the car park is expected to occur outside of school hours,
- f) the SIDRA assessment shows that there will be no adverse impacts to the operation of the external road network, and
- g) there are no traffic engineering reasons why a planning permit for the proposed sports and aquatic centre at 141 Burwood Highway, Burwood should be not be granted.

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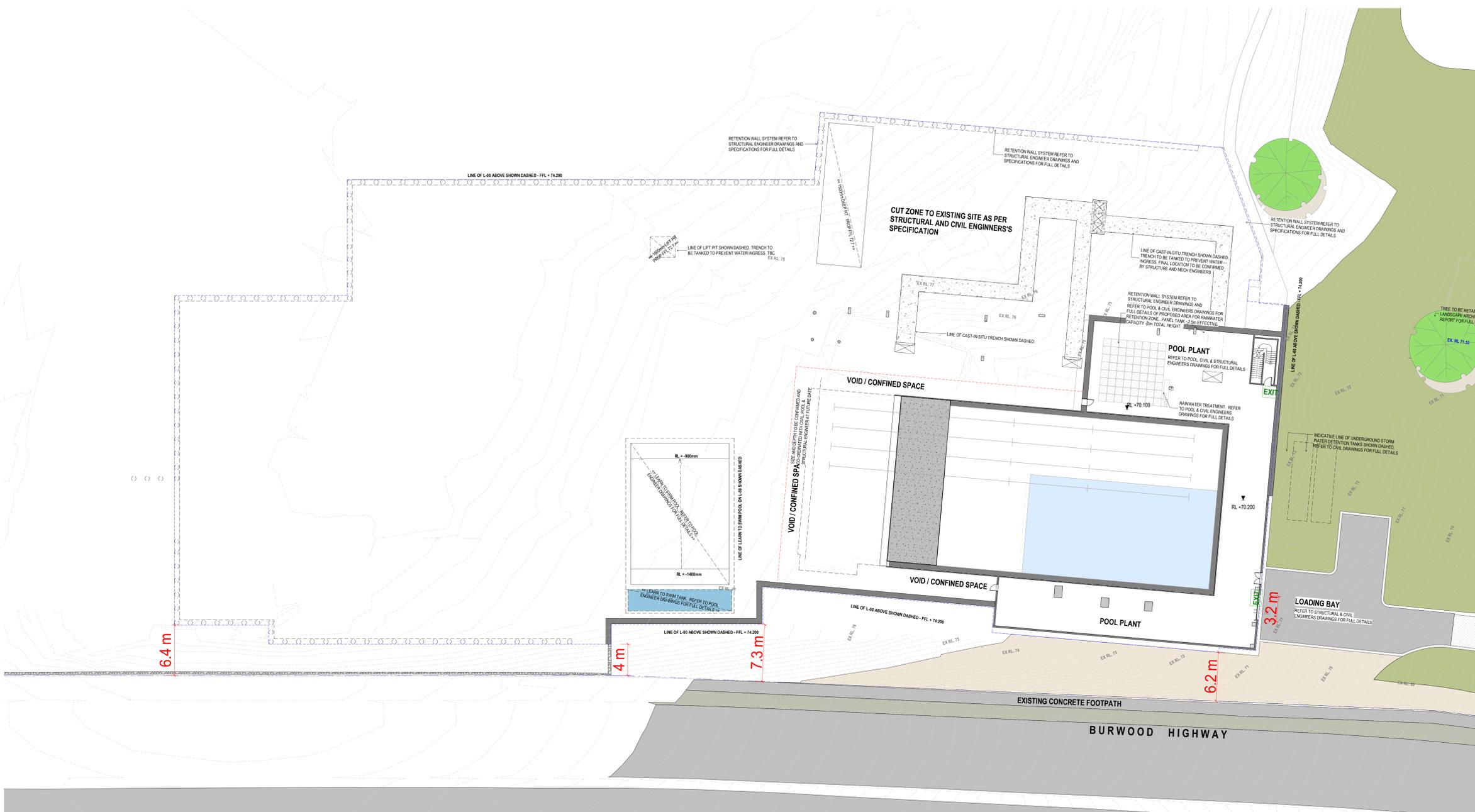
# Appendix A

## Proposed Development Plan

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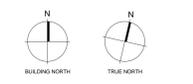
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**LANDSCAPE**

- PROPOSED LAWN ZONE
- PROPOSED MULCH ZONE
- PROPOSED PAVEMENT ZONE
- PROPOSED ASPHALT ZONE

**NOTE:**  
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 CIVIL ENGINEERS: RIMMINGTON & ASSOCIATES  
 POOL ENGINEERS: HYDRAUTECH DESIGNS  
 TRAFFIC CONSULTANTS: TRAFFIX GROUP  
 SURVEYOR: TAYLORS  
 SUSTAINABILITY ENGINEER: STANTEC  
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 — FLOOR PLAN - BASEMENT - EAST

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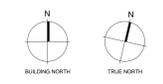
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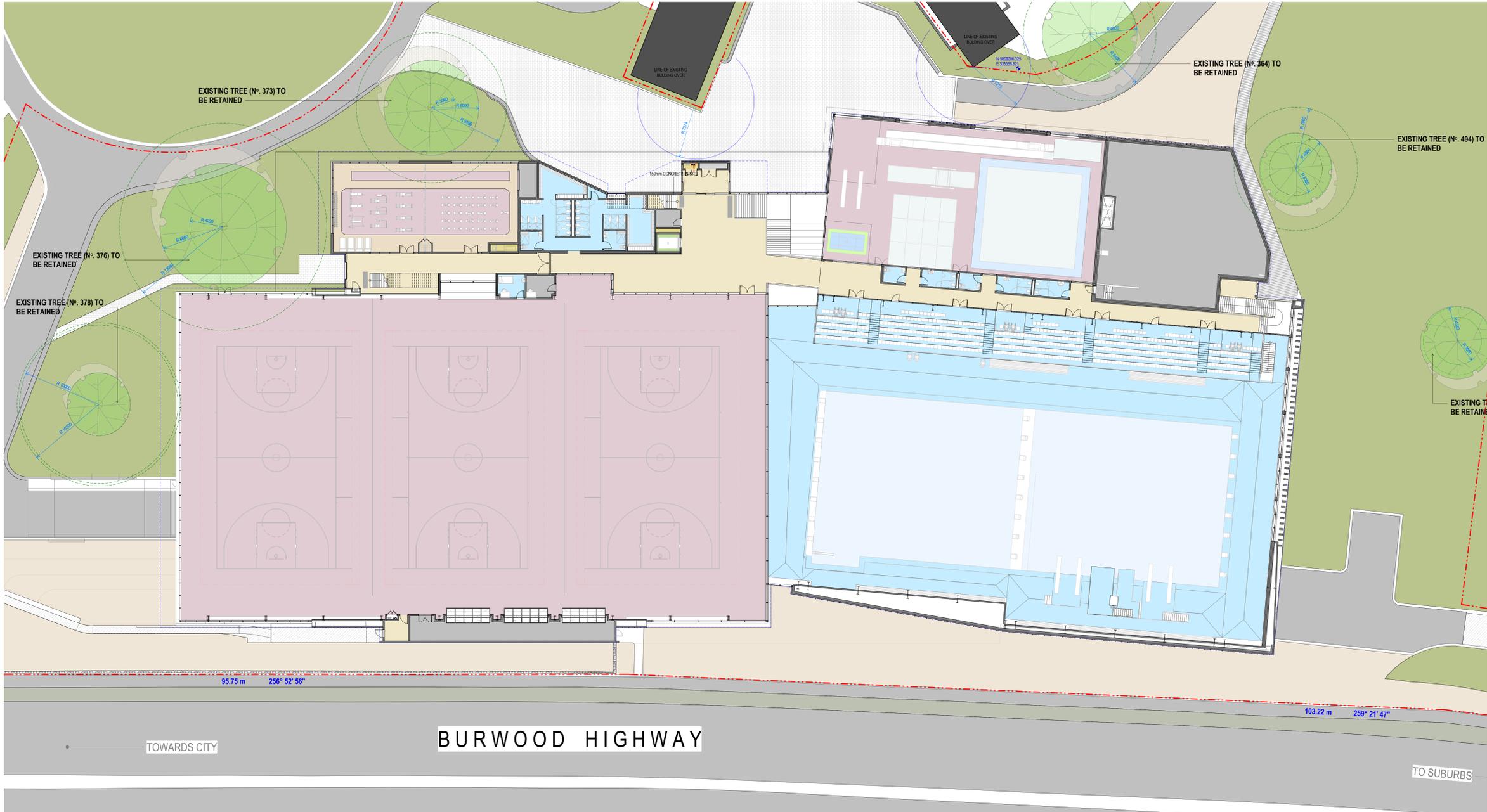
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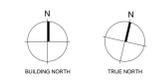
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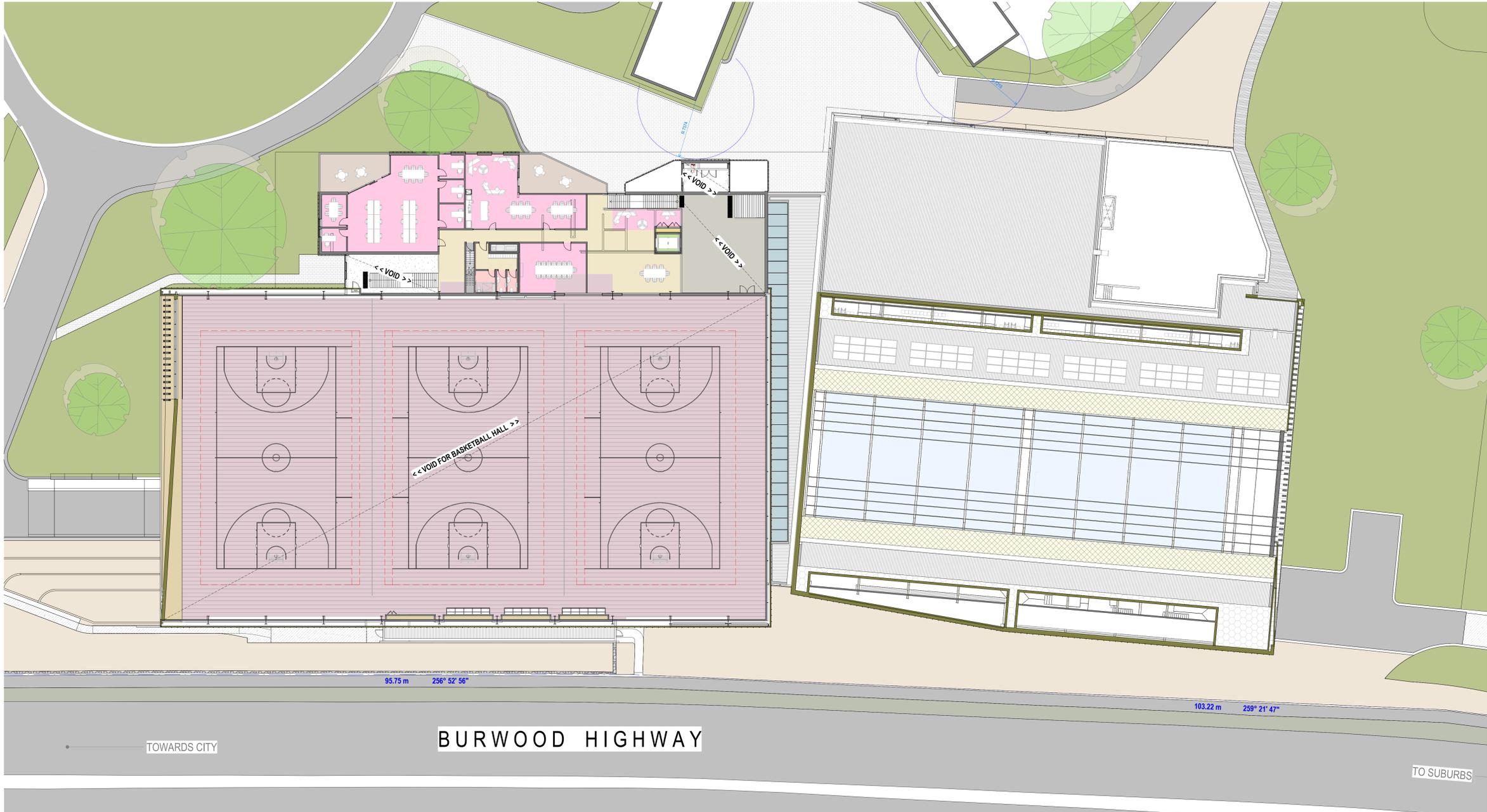
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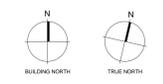
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FOLLOWING REPORTS, DRAWINGS AND SPECIFICATIONS.

- LANDSCAPE ARCHITECTS : T.C.L - TAYLOR, CULLITY, LETHAN  
RIMMINGTON & ASSOCIATES  
HYDRAUTECH DESIGNS  
CIVIL ENGINEERS: TRAFFIX GROUP  
POOL ENGINEERS: TAYLORS  
TRAFFIC CONSULTANTS: STANTEC  
SURVEYOR: OMNI  
SUSTAINABILITY ENGINEER: OMNI  
FIRE ENGINEER: OMNI  
ARBORIST: URBAN CANOPY TREE SERVICES



- Consultants
- ROOT PARTNERSHIPS  
Project Manager
  - STANTEC  
Structural | Mechanical | Electrical Engineer
  - RIMMINGTON & ASSOCIATES  
Civil | Hydraulics | Fire Services Engineer
  - OMNI  
Fire Engineer
  - T.C.L - TAYLOR CULLITY LETHAN  
Landscape Architect
  - HYDRAUTECH DESIGNS  
Pool Engineer

Client  
— PRESBYTERIAN LADIES COLLEGE

Warren and Mahoney Architects  
Australia Pty Ltd  
Level 4, 141 Flinders Lane  
Melbourne VIC 3000  
Australia  
Phone + 61 3 8547 6977

Registered Architects and Designers  
www.warrenandmahoney.com

Project Title  
— PLC SPORTS AQUATIC  
AND FITNESS CENTRE

141 Burwood Hwy, Burwood VIC 3125

Drawing Title  
— FLOOR PLAN -  
LEVEL 02 - OVERALL

Drawing Status  
— TOWN PLANNING ISSUE

Drawing Details

Scale 1 : 200 @ A0  
Date  
Job No 8862  
Drawn PC  
Checked PS | BD

Drawing No TP10.30  
Revision

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**ADVERTISED PLAN**



**SITE LEGEND**

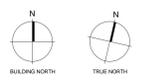
- TITLE BOUNDARY
- LINE OF BUILDING OVER
- EXTENT OF WORKS PROPOSED SPORTS, AQUATIC, FITNESS AND FUNCTION CENTRE
- COMPACT FILL ZONE TO EXISTING SITE AS PER STRUCTURAL AND CIVIL ENGINEERS SPECIFICATION
- CUT ZONE TO EXISTING SITE AS PER STRUCTURAL AND CIVIL ENGINEERS SPECIFICATION
- EXISTING SOIL - CUT & FILLED AS REQUIRED AS PER STRUCTURAL AND CIVIL ENGINEERS SPECIFICATION

**LANDSCAPE**

- PROPOSED LAWN ZONE
- PROPOSED MULCH ZONE
- PROPOSED PAVEMENT ZONE
- PROPOSED ASPHALT ZONE

**NOTE:**  
ARCHITECTURAL DRAWINGS TO BE READ IN CONJUNCTION WITH FOLLOWING REPORTS, DRAWINGS AND SPECIFICATIONS.

LANDSCAPE ARCHITECTS : T.C.L - TAYLOR, CULLITY, LETHAN  
 CIVIL ENGINEERS: RIMMINGTON & ASSOCIATES  
 POOL ENGINEERS: HYDRAUTECH DESIGNS  
 TRAFFIC CONSULTANTS: TRAFFIX GROUP  
 SURVEYOR: TAYLORS  
 SUSTAINABILITY ENGINEER: STANTEC  
 FIRE ENGINEER: OMNI  
 ARBORIST: URBAN CANOPY TREE SERVICES



**Consultants**  
 — ROOT PARTNERSHIPS  
 Project Manager  
 STANTEC  
 Structural | Mechanical | Electrical Engineer  
 RIMMINGTON & ASSOCIATES  
 Civil | Hydraulics | Fire Services Engineer  
 OMNI  
 Fire Engineer  
 T.C.L - TAYLOR CULLITY LETHAN  
 Landscape Architect  
 HYDRAUTECH DESIGNS  
 Pool Engineer

**Client**  
 — PRESBYTERIAN LADIES COLLEGE

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**Project Title**  
 — PLC SPORTS AQUATIC AND FITNESS CENTRE  
 141 Burwood Hwy, Burwood VIC 3125

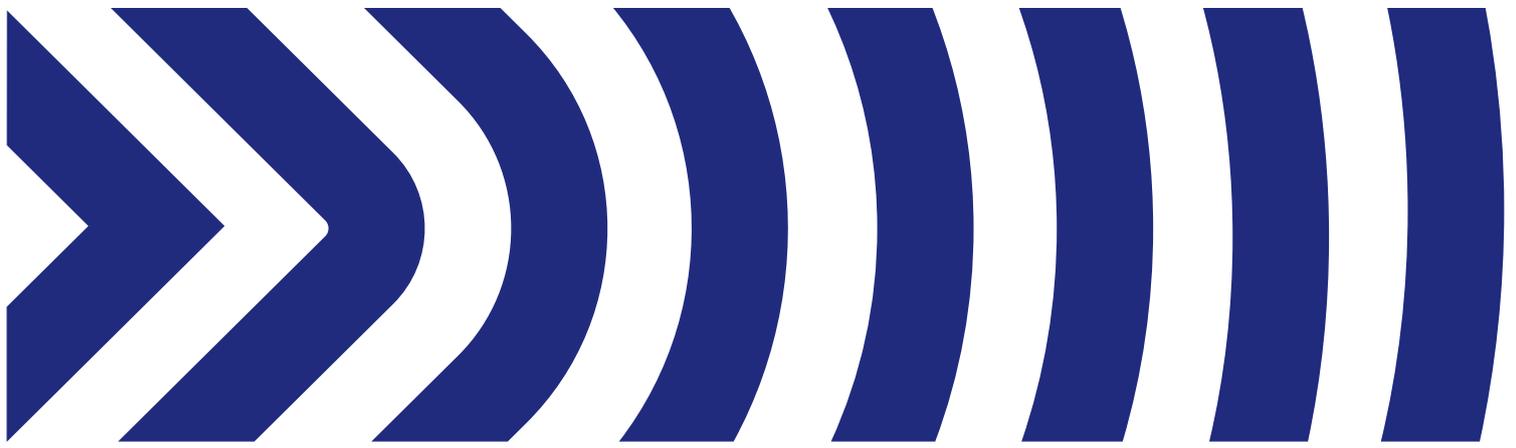
**Drawing Title**  
 — FLOOR PLAN - GROUND FLOOR - OVERALL

**Drawing Status**  
 — TOWN PLANNING ISSUE

**Drawing Details**  
 Scale: 1:200@ A0  
 Date: \_\_\_\_\_  
 Job No: 8862  
 Drawn: PC  
 Checked: PS | BD

**Drawing No**  
 — TP10.10

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# Appendix B

**SIDRA Output**

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PLAN**

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# MOVEMENT SUMMARY

 **Site: 101 [Gate 2 - AM Peak]**

Gate 2 - AM Peak  
 Site Category: (None)  
 Stop (Two-Way)  
 Design Life Analysis (Final Year): Results for 10 years

Movement Performance - Vehicles												
Mov ID	Turn	Demand Total veh/h	Flows HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	Prop. Queued	Effective Stop Rate	Aver. No. Cycles	Average Speed km/h	
North: Gate 2												
7	L2	66	0.0	0.072	8.2	LOS A	0.3	1.9	0.46	0.90	0.46	47.4
Approach		66	0.0	0.072	8.2	LOS A	0.3	1.9	0.46	0.90	0.46	47.4
West: Burwood Highway												
10	L2	66	0.0	0.251	5.6	LOS A	0.0	0.0	0.00	0.08	0.00	30.2
11	T1	1355	5.0	0.251	0.0	LOS A	0.0	0.0	0.00	0.03	0.00	59.7
Approach		1422	4.8	0.251	0.3	NA	0.0	0.0	0.00	0.03	0.00	58.2
All Vehicles		1488	4.6	0.251	0.6	NA	0.3	1.9	0.02	0.07	0.02	57.9

Site Level of Service (LOS) Method: Delay (SIDRA). Site LOS Method is specified in the Parameter Settings dialog (Site 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.

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PLAN**

# MOVEMENT SUMMARY

 **Site: 101 [Gate 2 - School Peak]**

Gate 2 - School Peak  
 Site Category: (None)  
 Stop (Two-Way)  
 Design Life Analysis (Final Year): Results for 10 years

Movement Performance - Vehicles												
Mov ID	Turn	Demand Total veh/h	Flows HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	Prop. Queued	Effective Stop Rate	Aver. No. Cycles	Average Speed km/h	
North: Gate 2												
7	L2	66	0.0	0.079	8.8	LOS A	0.3	2.1	0.50	0.92	0.50	47.0
Approach		66	0.0	0.079	8.8	LOS A	0.3	2.1	0.50	0.92	0.50	47.0
West: Burwood Highway												
10	L2	66	0.0	0.289	5.6	LOS A	0.0	0.0	0.00	0.07	0.00	30.2
11	T1	1569	5.0	0.289	0.0	LOS A	0.0	0.0	0.00	0.02	0.00	59.7
Approach		1635	4.8	0.289	0.3	NA	0.0	0.0	0.00	0.02	0.00	58.4
All Vehicles		1701	4.6	0.289	0.6	NA	0.3	2.1	0.02	0.06	0.02	58.1

Site Level of Service (LOS) Method: Delay (SIDRA). Site LOS Method is specified in the Parameter Settings dialog (Site 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.

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# MOVEMENT SUMMARY

 **Site: 101 [Gate 2 - PM Peak]**

Gate 2 - PM Peak  
 Site Category: (None)  
 Stop (Two-Way)  
 Design Life Analysis (Final Year): Results for 10 years

Movement Performance - Vehicles												
Mov ID	Turn	Demand Total veh/h	Flows HV %	Deg. Satn v/c	Average Delay sec	Level of Service	95% Back of Queue Vehicles veh	Distance m	Prop. Queued	Effective Stop Rate	Aver. No. Cycles	Average Speed km/h
North: Gate 2												
7	L2	66	0.0	0.098	10.1	LOS B	0.4	2.5	0.57	0.97	0.57	45.7
Approach		66	0.0	0.098	10.1	LOS B	0.4	2.5	0.57	0.97	0.57	45.7
West: Burwood Highway												
10	L2	66	0.0	0.369	5.6	LOS A	0.0	0.0	0.00	0.06	0.00	30.3
11	T1	2021	5.0	0.369	0.0	LOS A	0.0	0.0	0.00	0.02	0.00	59.7
Approach		2087	4.8	0.369	0.2	NA	0.0	0.0	0.00	0.02	0.00	58.7
All Vehicles		2154	4.7	0.369	0.5	NA	0.4	2.5	0.02	0.05	0.02	58.4

Site Level of Service (LOS) Method: Delay (SIDRA). Site LOS Method is specified in the Parameter Settings dialog (Site 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.

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