OSKA CONSULTING GROUP

CONCEPTUAL STORMWATER MANAGEMENT PLAN

Proposed Commercial Development

177-179 Musgrave Street, Berserker

Lots 30 & 31 on RP603419, Lot 100 on SP251414 and Lot 1 on RP607576

For Gladstone Drafting

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Synopsis:	This *Conceptual Stormwater Management Plan* describes the existing site characteristics, and corresponding stormwater quantity and quality management controls to be implemented during the construction and operational phase of the development.

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Appendix A JFP Urban Consultants Pty Ltd, *Contour & Detail Survey* (Ref: G3837 01 Issue A)
Appendix B Gladstone Drafting, Site Plan (Ref: GD2682 – A01.00)
Appendix C OSKA Consulting Group, Pre-Development Catchment Plan (Ref: OSK7132/P001/A)
Appendix D OSKA Consulting Group, Post-Development Catchment Plan (Ref: OSK7132/P002/A)
Appendix E OSKA Consulting Group, Conceptual Stormwater Management Plan (Ref: OSK7132/P003/B) & Conceptual Stormwater Management Details (Ref: OSK7132/P004/B)
Appendix F OSKA Consulting Group, Concept Sediment and Erosion Control Plan (Ref: OSK7132/P005/A) & Concept Sediment and Erosion Control Details (Ref: OSK7132/P006/A)

1.0 INTRODUCTION

1.1 Background

OSKA Engineers has been commissioned by Gladstone Drafting to prepare a Conceptual Stormwater Management Plan (CSWMP) to support a Development Application for the proposed Commercial Development situated at 177-179 Musgrave Street, Berserker.

The subject site is described as Lots 30 & 31 on RP603419, Lot 100 on SP251414 and Lot 1 on RP607576 and has a total site area of 0.217ha.

This revision of the report (B) was issued in response to Council's Information Request (D/156-2025) received via email on 24 February 2026.

1.2 Scope

This CSWMP details the conceptual planning, layout and design of the stormwater management infrastructure for both the construction and operational phases of this development.

This CSWMP aims to:

- Establish the required performance criteria for the proposed stormwater quantity and quality improvement systems;
- Provide a conceptual design of stormwater infrastructure including stormwater quality improvement devices and stormwater quantity management controls;
- Demonstrate the modelled post-development stormwater quality discharging from the site does not adversely impact on the water quality and ecological values of downstream watercourses;
- Demonstrate stormwater runoff is conveyed through the site to a Lawful Point of Discharge (LPOD) in accordance with the Queensland Urban Drainage Manual (QUDM); and
- Provide reporting and monitoring mechanisms whereby the performance of this system can be measured enabling identification of corrective actions/alterations required to ensure the above mentioned objectives are maintained.

This CSWMP has been prepared in accordance with the IEAust Australian Runoff Quality: Guide to Water Sensitive Urban Design, Queensland State Planning Policy 2017, IPWEA Queensland Urban Drainage Manual (QUDM) Fourth Edition (2017), Water By Design MUSIC Modelling Guidelines V1 – 2010, and the Rockhampton Regional Planning Scheme 2015.

2.0 SITE DESCRIPTION

2.1 Location

The subject site is located at 177-179 Musgrave Street, Berserker. The site fronts Elphinstone Street to the south, Musgrave Street to the east, an existing commercial property to the north and existing residential properties to the north and west with Ascot Lane running through the middle of the site. The site covers a total combined area of 0.217ha, with details as summarised in *Table 1* and as located in *Figure 1.*

Table 1: Site Description

Client	Lot and Property Description	Street Address
Gladstone Drafting	*Lots 30 & 31 on RP603419, Lot 100 on SP251414 and Lot 1 on RP607576*	*177-179 Musgrave Street, Berserker*

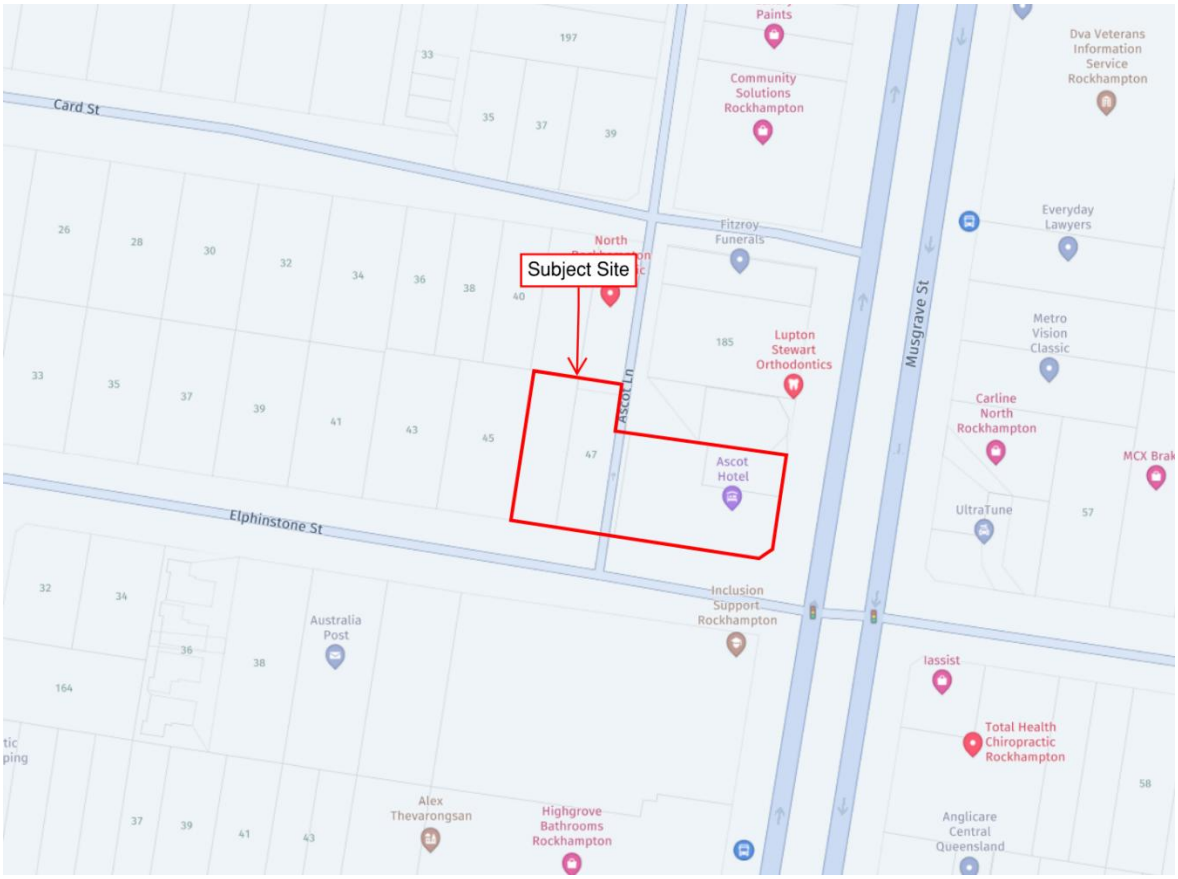

Figure 1: Locality Plan (Source: Nearmap)

2.2 Site Topography

The majority of the eastern part of the site consists of buildings with the ground area to the west of the lot generally grading at 4-5% to the south-west towards Ascot Lane. The western part of the site generally grades to the south-west at 1-2% towards private property and Elphinstone Street. Spot heights on site range from approximately RL 14.92m AHD to 15.85m AHD. Based on the provided survey and aerial information, the majority of stormwater runoff from roof and ground surfaces ultimately drains to the kerb and channel of Elphinstone Street.

For further information, the site survey has been provided by JFP Urban Consultants Pty Ltd, Contour & Detail Survey (Ref: G3837 01 Issue A) included as Appendix A.

2.3 Vegetation and Land Use

The subject site currently consists of existing commercial properties (Ascot Hotel and a vacant dwelling) and a gravel carpark with Ascot Lane separating the commercial properties and the carpark. There are small grassed areas scattered across the existing carpark with a few trees along the western boundary. Access to the site is gained from the south via Elphinstone Street or via Ascot Lane that runs through the middle of the site.

An aerial photograph taken on the 4 July 2025 of the subject site is included in *Figure 2.*

Figure 2: Aerial Image of the Site (Source: Nearmap – Image taken 4 July 2025)

2.4 Proposed Development

The proposed development for the site consists of a Health Care Super Clinic with five (5) tenancy areas and two carparks (outdoor and undercover). Driveway access to the site will be gained via a proposed crossover from Elphinstone Street to the south and via Ascot Lane that runs through the middle of the site which will provide access to both outdoor and undercover carparks.

Refer to Appendix B for further proposed architectural details prepared by Gladstone Drafting, Site Plan (Ref: GD2682 – A01.00).

2.5 Proposed Conceptual Drainage

It is proposed that the site's captured runoff from the roof areas are to be diverted to an above ground stormwater quantity tank. The captured flows within the tank are to be discharged to the kerb and channel of Elphinstone Street. The runoff from the remainder of the site is to be conveyed to the kerb and channel of Elphinstone Street. The stormwater connection to the Lawful Point of Discharge (LPOD) is conceptual at this stage with all site flows to ultimately be discharged to the kerb and channel of Elphinstone Street.

2.6 Rainfall Data

Rainfall intensity data has been obtained from the Australian Bureau of Meteorology's 2016 Design IFD Rainfall System. The data has been extracted for the nearest grid cell at Latitude 23.3625 (S) and Longitude 150.5125 (E). The IFD data and average rainfall intensities used in this report are in accordance with the procedures outlined in Geosciences Australia, Australian Rainfall and Runoff 2019.

3.0 DATA

Data which has been sourced or provided, in order to prepare this report for the site, was gathered from the following sources:

- Detailed site survey provided by JFP Urban Consultants Pty Ltd, Contour & Detail Survey (Ref: G3837 01 Issue A) included as Appendix A;
- Proposed site layout provided by Gladstone Drafting, Site Plan (Ref: GD2682 – A01.00) included as Appendix B;
- LIDAR data for the subject site sourced from Australian Government Elevation and Depth Foundation Spatial Data (ELVIS), Date Source: 2014, DEM Data;
- Rainfall and Meteorological 2016 IFD Data by the Australian Bureau of Meteorology;
- Information Extracted from Rockhampton Regional Council Interactive Mapping; and
- Aerial Imagery by Nearmap (Accessed on 11 November 2025).

4.0 SITE HYDROLOGY

4.1 Background

The following sections define the method and parameters utilised within the hydrologics of the site, in order to establish a simulation of the anticipated flow regime and peak discharge at the Lawful Point of Discharge (LPOD). A Rational Method calculation has been provided for comparison of the pre and post-development peak flow rates.

The Rational Method (Section 4.3 of the Queensland Urban Drainage Manual - QUDM 2017) is a suitable estimation technique, given its flexibility in its data requirements and is able to produce satisfactory estimates of peak site discharges based on the following data input:

Specific intensity frequency duration (IFD) data;

- length/type of flow path;
- contributing catchment areas; and
- coefficient of discharge.

4.2 Pre-Development

4.2.1 Catchment Definition and Lawful Point of Discharge

The pre-development site has been analysed as a singular internal catchment and has a contributing area of 2,168m^2.

Stormwater captured on the roof areas is conveyed via downpipes to the kerb and channel of Musgrave Street, Elphinstone Street and Ascot Lane with all flows ultimately being conveyed to the kerb and channel of Elphinstone Street.

Any stormwater on ground surfaces from the eastern part of the site is conveyed to the kerb and channel of Ascot Lane and ultimately to the kerb and channel of Elphinstone Street. Any stormwater on ground surfaces from the western part of the site is conveyed as sheet flow to the west towards private property at 45 Elphinstone Street.

The existing Lawful Point of Discharge (LPOD) for the subject site (for analysis in accordance with QUDM), is the kerb and channel of Elphinstone Street and Musgrave Street. The Existing Point of Discharge (EPOD) for the subject site is private property to the west at 45 Elphinstone Street.

It is to be noted that despite stormwater runoff in the pre-development scenario being conveyed to a number of different locations, all stormwater runoff from the site is ultimately conveyed to either through private property or along Elphinstone Street into Moores Creek to the west of the subject site. Therefore, the pre-development site will be assessed as a singular internal catchment.

The catchment area and LPOD for the subject site are shown on OSKA Consulting Group, Pre-Development Catchment Plan (Ref: OSK7132/P001/A) included as Appendix C.

4.2.2 Coefficient of Runoff

The pre-development coefficient of runoff (C year) was determined based on the fraction impervious method specified in QUDM. The pre-development catchment, based on the provided survey information, has 1,526m^2 of impervious surfaces, which equates to a fraction impervious (fi) of 0.70. It is to be noted that the majority of the western part of the existing site is covered in compacted gravel areas (approx. 634m^2) which have been assumed to be 50% impervious for the purpose of this assessment. The gravel areas have been compacted over time with this area of the site being used as an open carparking area.

Using a one hour, ten-year rainfall intensity ($^1I_{10}$) of 65.4 mm/hr, a C_{10} value of 0.83 has been adopted for the pre-development catchment.

The following pre-development coefficients of runoff (as shown in *Table 2*) have been adopted in accordance with QUDM Table 4.5.2, which apply the frequency factors for the standard Annual Exceedance Probability (AEP) design storms of 39%, 18%, 10%, 5%, 2% and 1% (corresponding to the 2, 5, 10, 20, 50 and 100-year Average Recurrence Interval (ARI) storms).

Table 2: Pre-Development Coefficient of Runoff

Catchment	C_2	C_5	C_{10}	C_{20}	C_{50}	C_{100}
Pre	0.70	0.78	0.83	0.87	0.95	0.99

4.2.3 Time of Concentration

The Time Of Concentration (TOC) for the pre-development catchment has been calculated in accordance with QUDM Table 4.6.2 – Recommended standard inlet times & 4.6.3 – Recommended roof drainage system travel times.

In accordance with Tables 4.6.2 & 4.6.3 of QUDM, the pre-development catchment will have a time of concentration that will incorporate five (5) minutes for road surfaces and paved areas and for the roof to downpipes time plus one (1) minute of pipe flow. This equates to a total travel time of six (6) minutes.

4.2.4 Design Flow Rates

Pre-development peak flow rates have been estimated for the adopted storms using design rainfall intensities from the Bureau of Meteorology IFD Data. The Rational Method ($Q = 2.78 \times 10^{-3}$ CIA) has been used to estimate the subject site's design peak flow rates. The pre-development peak flows for the subject site are presented in *Table 3.*

Table 3: Pre-Development Peak Flow Estimation – Rational Method

Pre-Development							
Annual Exceedance Probability	**AEP**	39%	18%	10%	5%	2%	1%
Coefficient of Runoff	**C**	0.70	0.78	0.83	0.87	0.95	0.99
Area of Catchment (ha)	**A**	0.217	0.217	0.217	0.217	0.217	0.217
Average Rainfall Intensity (mm/h)	**I**	137	168	193	221	260	291
Peak Flow Rate (m^3/s)	**Q**	**0.058**	**0.079**	**0.096**	**0.116**	**0.149**	**0.174**

4.3 Post-Development

4.3.1 Catchment Definition and Lawful Point of Discharge

The post-development scenario has been analysed as described in the pre-development scenario with a single internal catchment (A and B) and has a total contributing area of 2,168m^2.

Stormwater collected from the roof areas shall be conveyed via downpipes directly to the proposed above ground detention tank. The captured flows within the tank are to be discharged to the kerb and channel of Elphinstone Street (the site's LPOD). The stormwater runoff from the remainder of the site is to ultimately be discharged to the kerb and channel of Elphinstone Street.

The internal building drainage design to facilitate this stormwater strategy is to be coordinated with the building hydraulic engineer at the detailed design phase.

The post-development catchment area and LPOD are detailed on OSKA Consulting Group, Post-Development Catchment Plan (Ref: OSK7132/P002/A) included as Appendix D.

4.3.2 Coefficient of Runoff

The post-development coefficients of runoff (C year) were determined using the fraction impervious method as specified in QUDM.

Based on the supplied architectural plans, the post-development catchment has approximately 2,015m^2 of impervious surfaces which equates to a fraction impervious (fi) of 0.93. Using a one-hour, ten-year rainfall intensity ($^1I_{10}$) of 65.4 mm/hr, a C_{10} value of 0.89 has been adopted for the post-development catchment.

The following post-development Coefficients of Runoff (as shown in *Table 4*) have been adopted in accordance with QUDM Table 4.5.2, which apply the frequency factors for the standard Annual Exceedance Probability (AEP) design storms of 39%, 18%, 10%, 5%, 2% and 1% (corresponding to the 2, 5, 10, 20, 50 and 100-year ARI storms).

Table 4: Post-Development Coefficient of Runoff

Catchment	C_2	C_5	C_{10}	C_{20}	C_{50}	C_{100}
Post	0.75	0.84	0.89	0.93	1.00	1.00

4.3.3 Time of Concentration

The Time of Concentration for the post-developed catchment has been calculated in accordance with QUDM Table 4.6.3 – Recommended roof drainage system travel times.

In accordance with Table 4.6.3 of QUDM, the post-development catchment will have a time of concentration that will incorporate five (5) minutes of the roof to downpipes time plus one (1) minute of pipe flow. This equates to a total travel time of six (6) minutes.

4.3.4 Design Flow Rates

Post-development peak flow rates have been calculated for the adopted storms using design rainfall intensities from the Bureau of Meteorology 2016 IFD Data. The Rational Method ($Q = 2.78 \times 10^{-3}$ CIA) has been used to estimate the required design peak flow rates for the subject site. The post-development peak flows for the subject site are presented in *Table 5.*

Table 5: Post-Development Peak Flow Estimation – Rational Method

Post-Development							
Annual Exceedance Probability	**AEP**	39%	18%	10%	5%	2%	1%
Coefficient of Runoff	**C**	0.75	0.84	0.89	0.93	1.00	1.00
Area of Catchment (ha)	**A**	0.217	0.217	0.217	0.217	0.217	0.217
Average Rainfall Intensity (mm/h)	**I**	137	168	193	221	260	291
Peak Flow Rate (m^3/s)	**Q**	**0.062**	**0.085**	**0.103**	**0.124**	**0.157**	**0.175**

4.3.5 Change in Flow Rates

The difference in peak flow rates calculated from the total pre and post-developed site as estimated via The Rational Method, is detailed in *Table 6.*

Table 6: Change in Peak Flow Rates Estimation – Rational Method

LPOD							
Annual Exceedance Probability	**AEP**	39%	18%	10%	5%	2%	1%
Pre-Developed Peak Flow Rate (m^3/s)	**Q**	0.058	0.079	0.096	0.116	0.149	0.174
Post-Developed Peak Flow Rate (m^3/s)	**Q**	0.062	0.085	0.103	0.124	0.157	0.175
Change in Peak Flow Rate (m^3/s)	**Q**	**+0.004**	**+0.006**	**+0.007**	**+0.008**	**+0.008**	**+0.001**

The Rational Method assessment has demonstrated that an increase in peak flow rates discharging from the subject site is anticipated due to the proposed development. Therefore, On-Site Detention (OSD) will be required to mitigate flows to the pre-development rates.

4.4 External Catchments

The subject site and the surrounding area were examined to determine if any localised external catchments will contribute to the subject site. The site is deemed to not contain any influencing localised external catchments.

5.0 STORMWATER QUANTITY ASSESSMENT

5.1 Background

The proposed development will increase peak flow rates from the subject site due to increased impervious areas and a reduction in the surface roughness of the site. Accordingly, the following section provides preliminary details of a proposed On-Site Detention (OSD) system to demonstrate no increase in nuisance flows or adverse impacts as a result of potential increased post-development runoff, on neighbouring properties and/or authorities stormwater infrastructure.

5.2 Objective

In accordance with RRC's requirements and typical industry-standard practices, the following objective has been set for post-development stormwater discharge from the site:

- No net increase in peak flows from the subject site, for all events up to the 1% AEP design storm event, during the post-developed scenario.

This objective shall be demonstrated via a suitable hydrologic and hydraulic modelling package, by detaining site runoff from the subject site within proposed above ground detention tanks.

5.3 Hydraulic Model

An estimation of the required detention volume to mitigate any increase in total site discharge rates has been undertaken using the DRAINS software programme.

A DRAINS model has been adopted at the preliminary planning stage to ensure that the above ground detention tanks volume is estimated with a higher degree of confidence. As finished site levels and internal pipe levels are still preliminary, this initial calculation is an estimate, however, it has the required level of accuracy to progress the design with confidence.

The model was developed by simulating the pre, post and mitigated catchment layouts and comparing the peak flow rates generated from each scenario.

The mitigated catchment consists of the 1% AEP runoff generated from the roof (1,116m^2) of Catchment A being conveyed to the proposed above ground detention tank with the remaining road and ground areas (1,052m^2 total) from Catchment A and B bypassing the proposed tank. This catchment arrangement provides enough mitigation to demonstrate no increase in the peak flow rates exiting the site when compared to the pre-development scenario. The adopted sub-catchment areas for the site, time of concentration and fraction imperviousness, for the pre and post-development have been tabulated in *Table 7.*

Note that roof gutters are to be designed to convey the major event (up to the 1% AEP) into the detention tank.

The pre and post-development catchment area and LPOD are detailed on OSKA Consulting Group, Pre-Development Catchment Plan (Ref: OSK7132/P001/A) and on OSKA Consulting Group, Post-Development Catchment Plan (Ref: OSK7132/P002/A) included respectively as *Appendix C and D*.

Table 7: Adopted Sub-Catchment Parameters

Pre-Development Sub-Catchments			
DRAINS Sub-Catchment ID	***Total Area (ha)***	***Time of Concentration (mins)***	***Fi (%)***
Pre	0.2168	6	70.45
Post-Development Sub-Catchments			
DRAINS Sub-Catchment ID	***Total Area (ha)***	***Time of Concentration (mins)***	***Fi***
Post (Total)	**0.2168**	**6**	**93.03**
Post (to tank)	0.1116	6	100
Post (bypass)	0.1052	6	85.62

The TOC values calculated in the Rational Method calculations in Section 4 for the pre and post-development scenarios were adopted. The 39%, 18%, 10%, 5%, 2% and 1% AEP design storm events were analysed for all standard durations ranging from 5 minutes to 120 minutes. The critical durations for the combined peak site discharges were determined to be the 10-minute storm for the pre-development and post-development scenarios.

The peak discharge rates for the site calculated by the DRAINS model are shown in *Table 8*.

Table 8: Anticipated Peak Site Discharge Rate – Extracted from DRAINS Model (m^3/s)

	Peak Flow Rate Discharge (m^3/s)					
Design AEP Events	**39%**	**18%**	**10%**	**5%**	**2%**	**1%**
Pre-development	0.056	0.076	0.091	0.109	0.136	0.156
Post-development (unmitigated)	0.059	0.080	0.096	0.114	0.143	0.160

The DRAINS assessment results shown in *Table 8* supports the Rational Method in Section 4 in confirming that an increase in peak flow rates discharging from the site is anticipated. Therefore, On-Site Detention is required to mitigate flows to pre-development conditions.

5.4 Detention Volume

The following detention storage parameters were adopted to achieve the target pre-development flow rates, via mitigation of the post-development flow rates.

Table 9: Adopted Detention Tank Parameters

Minimum Detention Area:	3.00m^2
Detention Tank Internal Height:	2.00m
Low Flow (at invert of tank)	Ø225mm Pipe at 1% grade fitted with Ø180mm Orifice
Emergency High Flow (at 1.70m above tank invert)	Ø225mm Pipe
Consolidated Outlet Pipe/s:	4 x Ø100mm kerb adaptors at 1% grade*
1% AEP (Q100) Water Level:	1.67m
Required Detention Volume:	6.00m^3

*The development proposes to discharge flows via a grouping of 4 x Ø100mm kerb adaptors to the kerb and channel of Elphinstone Street and given the existing building has a similar arrangement (4 kerb adaptors within 13.00m), the proposal is considered to be generally maintaining the existing drainage scenario.

The 10-minute design storm was determined as the critical storm duration for determining the required volume within the detention tank. A comparison of the pre-development and mitigated flow rates based on the above arrangement is shown in *Table 10.*

Table 10: Comparison of Pre-Development and Mitigated Flow Rates – Extracted from DRAINS

Annual Exceedance Probability	39%	18%	10%	5%	2%	1%
Pre-Development Peak Flow Rate (m^3/sec)	0.056	0.076	0.091	0.109	0.136	0.156
Mitigated Peak Flow Rate (m^3/sec)	0.055	0.073	0.091	0.109	0.135	0.151

The hydrograph for the critical duration of the Mitigated 1% AEP storm event compared against the pre and post-development is shown in *Figure 3.*

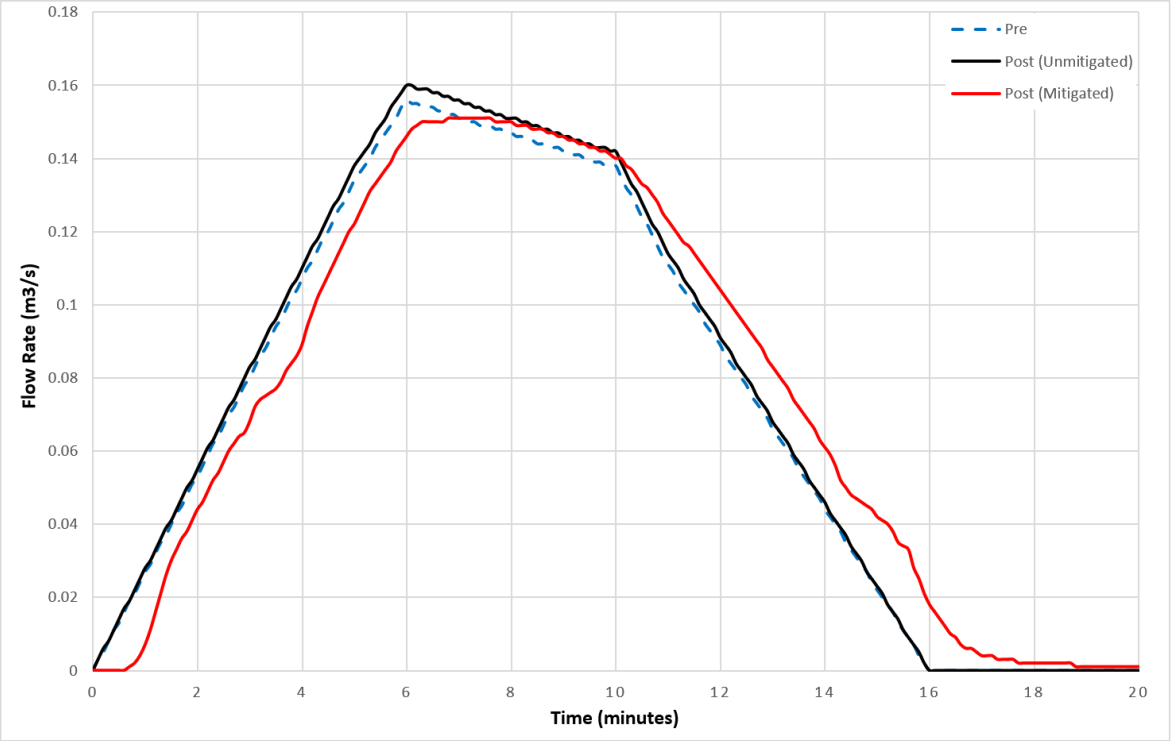

Figure 3: Pre, Post and Mitigated Flow Rates for the 1% AEP Design Storm Event

As demonstrated in the results displayed in *Table 10 and Figure 3*, the detention arrangement can be seen to effectively mitigate the post-development flows in the adopted critical design storm AEP events.

The hydraulic analysis using the DRAINS model has determined that a minimum total of 6.00m^3 of storage is required for runoff attenuation and is to be provided in the form of an above ground detention tank. The above ground detention tank is to be fitted with an outlet configuration (low and high flow outlets) as detailed in Table 9 to satisfy the mitigation requirements. Refer to the OSKA Consulting Group, Conceptual Stormwater Management Plan (Ref: OSK7132/P003/B) & Conceptual Stormwater Management Details (Ref: OSK7132/P004/B) in Appendix *E* for details of the tank's arrangement and indicative location. The final location onsite and construction levels will be determined at the detailed design stage.

A copy of DRAINS model used in this report can be made available to Council upon request.

6.0 STORMWATER QUALITY ASSESSMENT

6.1 Background

The development of the land has the potential to increase the pollutant loads within stormwater runoff and downstream watercourses. During the construction phase of the development, disturbances to the existing ground have the potential to significantly increase sediment loads entering downstream drainage systems and watercourses. The operational phase of the development will potentially increase the amount of sediments and nutrients washing from the site.

The following sections describe the construction and operational phase controls and water quality modelling of the proposed treatment train in compliance with Council guidelines.

6.2 Construction Phase

A high risk of stormwater pollution will occur from the site during the construction phase due to erosion and sediment transportation off-site to the receiving environment. The majority of this risk results from construction activities disturbing the site and exposing areas of soil to the direct erosive influence of the environment.

The following section outlines the procedures necessary to minimise erosion and control sediment during construction in accordance with the International Erosion Control Association (IECA) Best Practice ESC Document.

6.2.1 Key Pollutants

The key pollutants have been identified for the Construction Phase of this development.

Table 11: Key Pollutants, Construction Phase

Pollutant	Sources
Litter	Paper, construction packaging, food packaging, cement bags, material offcuts.
Sediment	Exposed soils and stockpiles during earthworks and building works.
Hydrocarbons	Fuel and oil spills, leaks from construction equipment and temporary car park areas.
Toxic Materials	Cement slurry, asphalt primer, solvents, cleaning agents, and wash waters (e.g., from tile works).
Acids or Alkaline substances	Acid sulphate soils, cement slurry and wash waters.

6.2.2 Sediment and Erosion Controls

Sediment and Erosion Control devices (S&EC) employed on the site shall be designed and constructed in accordance with the International Erosion Control Association (IECA) Best Practice ESC Document as shown on OSKA Consulting Group, Concept Sediment and Erosion Control Plan (Ref: OSK7132/P005/A) & Concept Sediment and Erosion Control Details (Ref: OSK7132/P006/A) included as Appendix F.

Pre-Construction

- Stabilised site access/exit onto Elphinstone Street to the south and Ascot Lane in the middle of the site;
- Sediment fences to be located around the perimeter of the site;
- Sediment trap to be installed if required;
- Dust fencing to be installed if required; and

- Educate site personnel to the requirements of Erosion and Sediment Control Plan.

Initial Construction

- Maintain construction access/exit, sediment fencing, dust fences and all other existing controls as required;
- Construct diversion drains to convey disturbed site run-off to the temporary sediment traps; and
- Confine construction activities to stages to minimise areas of disturbance at any given time.

Second Stage Construction

- Maintain construction access/exit, sediment fencing, dust fences, diversion drain and all other existing controls as required;
- Progressively revegetate finished areas where applicable;
- Divert runoff from undisturbed areas around disturbed areas; and
- Drainage structure protection around field inlets and gully pits.

During construction, all areas of exposed soils allowing dust generation are to be suitably treated. Treatments will include covering the soil and watering. Road accesses are to be regularly cleaned to prevent the transmission of soil on vehicle wheels and eliminate any build-up of typical road dirt and tyre dust from delivery vehicles.

Adequate waste disposal facilities are to be provided and maintained on the site to cater for all waste materials such as litter, hydrocarbons, toxic materials, acids or alkaline substances.

6.2.3 Water Quality Monitoring and Inspections

To ensure that the water quality objectives are being met during the construction phase of the development, water quality monitoring shall be conducted. Water quality monitoring shall use a calibrated probe or sampling and testing at a NATA registered laboratory.

Location: Monitoring Stations shown on OSKA Consulting Group, *Concept Sediment and Erosion Control Plan* (Ref: OSK7132/P005/A).

Parameters: Site discharge criteria.

Frequency: Following at least 10 mm of rainfall in a 24-hour period.

The contractor shall be responsible for the inspection and maintenance of all sediment and erosion control devices. Additional controls and review of existing controls shall be undertaken in response to the results of the above-mentioned monitoring program.

6.2.4 Reporting

An inspection report shall be written by a suitably qualified and experienced scientist/engineer following each water quality monitoring episode. The report shall include at least the following information:

- Name, address and real property description for the development site;
- Council file reference number (if known);
- Monitoring locations;
- Performance criteria;
- Results for each monitoring location, identifying any breaches of performance criteria;
- Recommended corrective actions to be taken and additional sediment and erosion controls, if required; and
- Inspection reports shall be provided to the contractor for their action and compilation in an on-site register.

If the above-mentioned performance criteria are exceeded and results from the downstream monitoring stations show significant deterioration from upstream results (if applicable), the contractor shall implement all recommendation of the inspection report within one (1) working day of receipt of the report.

6.3 Operational Phase

The proposed development will not require any permanent stormwater quality devices as the total developable site area for the proposed development is 2,166m^2 which is less than the 2,500m² required to trigger permanent stormwater quality improvement devices. This is in accordance with the State Planning Policy Part E Environment and heritage where if the proposed development for the subject site does not propose to disturb an area greater than 2,500m², permanent stormwater quality devices are deemed not required for the operational phase of the development.

7.0 CONCLUSIONS

OSKA Engineers has been commissioned by Gladstone Drafting to prepare a Conceptual Stormwater Management Plan (CSWMP) to support a Development Application (DA) to the Rockhampton Regional Council (RRC) for the proposed Commercial Development situated at 177-179 Musgrave Street, Berserker. This CSWMP intends to provide an optimised stormwater management system that would be compatible and readily integrated into the proposed site use.

This CSWMP details the conceptual planning, layout and design of the stormwater management infrastructure for both the construction and operational phases of this development and satisfies the requirements of the Rockhampton Regional Planning Scheme 2015.

A hydrological analysis demonstrated that the anticipated post-development peak flow rates discharging from the site are higher than the pre-development flow rates. A hydraulic model was built using the DRAINS software program, to estimate the required detention volume and arrangement. The report and stormwater management plan define the preliminary size and layout of the proposed above ground stormwater detention tank. The captured flows from the tank are to be discharged to the kerb and channel of Elphinstone Street (the site's LPOD). A minimum total tank volume of 6.00m^3 was modelled demonstrating adequate mitigation of post-developed flows resulting in no additional or actionable nuisance to downstream properties or infrastructure.

In accordance with the State Planning Policy, in managing the stormwater runoff from the proposed development no permanent stormwater quality devices are required as the total developable site area is less than the 2,500m² to trigger the need for permanent stormwater quality improvement devices.

A concept sediment and erosion control plan is provided for the construction phase of the development and shall be implemented by the contractor and developer.

This stormwater quality strategy has defined the preliminary requirements and layout of the proposed development to demonstrate compliance with the State Planning Policy 2017 and the Rockhampton Regional Planning Scheme 2015 requirements.

APPENDIX

A

JFP Urban Consultants Pty Ltd, Contour & Detail Survey (Ref: G3837 01 Issue A)

LEGEND

- FENCE, OLD SHORT FENCE POST
- O/H ELECTRICITY, POWER POLE
- U/G ELECTRICITY, PIT
- O/H COMMUNICATIONS, POLE
- U/G COMMUNICATIONS, PIT, BOX
- SIGN, TRAFFIC LIGHT
- SEWER PIPE, MANHOLE
- WATER MAIN, VALVE, HYDRANT, METER
- GAS MAIN, VALVE
- UNIDENTIFIED PIT
- TREE

UNDERGROUND UTILITY QUALITY LEVELS

- C(A) — QUALITY LEVEL A: Highest quality level, positive identification and absolute spatial position in three dimensions (eg Direct measurement and visible)
- C(B) — QUALITY LEVEL B: Relative subsurface feature location in three dimensions (eg Electronic trace)
- C(C) — QUALITY LEVEL C: Approximate location and attributes using a combination of existing records and a survey of visible evidence
- C(D) — QUALITY LEVEL D: Lowest quality level. Compiled from any, or a combination of existing records, site inspections, anecdotal evidence

ROCKHAMPTON REGIONAL COUNCIL

APPROVED PLANS

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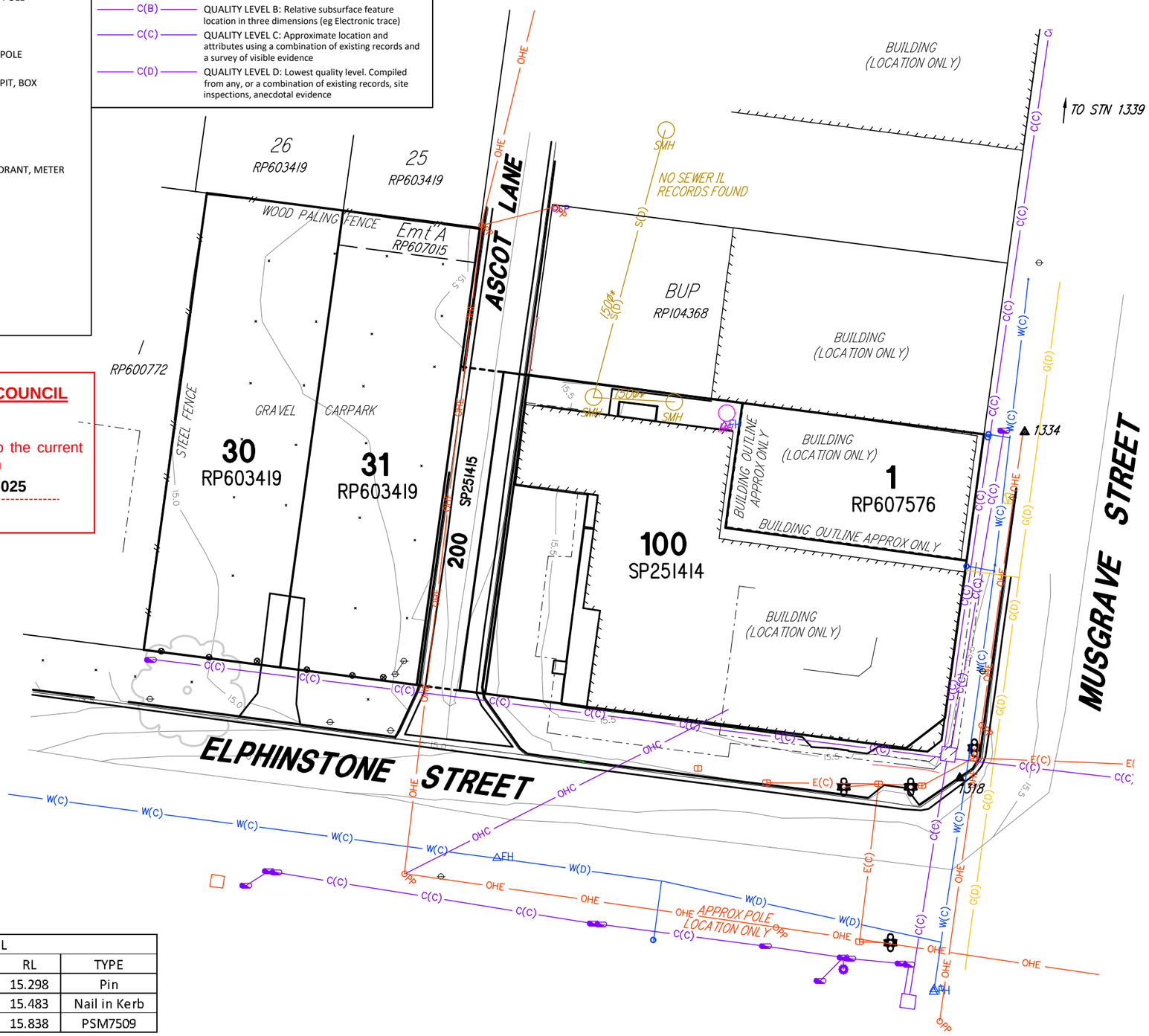
Development Permit No.: D/156-2025

Dated: 12 May 2026



SURVEY CONTROL				
STN	EASTING	NORTHING	RL	TYPE
1318	246736.828	7414156.779	15.298	Pin
1334	246742.523	7414187.131	15.483	Nail in Kerb
1339	246749.646	7414246.124	15.838	PSM7509

NOTES

(1) This plan was prepared for the purpose and exclusive use of GLADSTONE DRAFTING and their other professional advisers and is not to be used for any other purpose or by any other person or corporation.
JFP URBAN CONSULTANTS PTY LTD accepts no responsibility for any loss or damage arising to any person or corporation who may use or rely on this plan in contravention of these terms.

(2) The title boundaries shown on this plan were not marked at the time of survey and have been determined from plan dimensions and marks surveyed in the field. The dimensions and positioning of these property boundaries and any other boundaries shown on this plan are not absolute and are subject to an Identification Survey. Please contact this office for a quote or for further advice.

(3) The Location of Underground services are in accordance with Australian Standard AS5488, Classification of Subsurface Utility Information (SUI). Services shown hereon have been located where possible by field survey. If not able to be so located, services have been plotted from the records of the relevant authorities where available. However, the information shown on these records pertinent to services location is indicative only and sometimes inadequate. The exact nature and location of these services should be confirmed prior to construction.
Information shown with " * " indicates taken from records.

(4) Prior to any demolition, excavation or construction on the site, the classification and location of these services should be confirmed and the relevant authority should be contacted for possible location of further underground services and detailed locations of all services.

(5) Spot heights and contours are representative of the topographical terrain at time of survey, 18/06/2025. 3D TIN/DTM faces are located in the layer "tin-G3837-DTM" which is turned off.

(6) Spot heights are not shown on this plan. Refer to the AutoCAD drawing for all spot heights and codes in frozen layers: X-RL-T, X-CODE-T & X-NOTE-T.

(7) Trees shown on this plan have been located only where the trunk diameter at breast height (DBH) is 300mm or greater.

(8) These notes form an integral part of this plan. If others use this information, they should be advised of its purpose and limitations.

(9) This plan may not be reproduced unless these notes are included.

12d Project: S:\G3837\Gladstone Drafting\
01 Rocky Medical Centre\12D\Individual\G3837\G3837.project

Contour Interval: 0.25m

PROPERTY DESCRIPTION

LOTS 30 & 31 ON RP603419, LOT 1 ON RP607576
& LOT 100 ON SP251414
LOCALITY OF BERSERKER
LOCAL GOVT. OF ROCKHAMPTON R.C.
TOTAL AREA 2166m² (Deed)

JFP URBAN CONSULTANTS
BRISBANE - SUNSHINE COAST - CENTRAL QLD
CENTRAL QUEENSLAND
59 Goondoon Street,
Gladstone Qld 4680
P 07 3012 0100 W www.jfp.com.au
JFP URBAN CONSULTANTS PTY LTD ACN 050 414 045
PLANNERS
URBAN DESIGNERS
SURVEYORS
ENGINEERS
LANDSCAPE ARCHITECTS

NORTH: N

SCALE: SCALE: @ A3 1:400
0 4 8 12 16 20 24 28
SCALE 1:400 at (A3) size
THIS SCALE SHOWN IS ORIGINAL DRAWING SCALE - (A3 SIZE)
DO NOT SCALE FROM THIS DRAWING - USE ONLY DIMENSIONS PROVIDED - IF IN DOUBT PLEASE ENQUIRE

SURVEYED	STW	CHECKED	CPD	DATUM	Horizontal:- MGA94 Zone 56 (Plane) Vertical:- AHD
DRAWN	CPD	APPROVED	APM	ORIGIN (BM)	SMARTNET VIDE STN 4GLE

ISSUES:

ISSUE:	DETAILS:	DATE:	INIT:
A	ORIGINAL ISSUE	02-07-2025	CPD

TITLE:

CONTOUR & DETAIL SURVEY

GLADSTONE DRAFTING

177 & 179 MUSGRAVE STREET
BERSERKER

DETAILS:
JOB NUMBER: G3837 PLAN: 01 ISSUE: A
SHEET: 1 OF 1
FILE: G3837-01A Detail.dwg
DATE: 2 JULY 2025

3/07/2025 S:\G3837\GLADSTONE DRAFTING\01 ROCKY MEDICAL CENTRE\AUTOCAD\G3837-01A DETAIL

APPENDIX

B

Gladstone Drafting, Site Plan (Ref: GD2682 – A01.00)

LOCALITY PLAN

NOT TO SCALE

AREA SCHEDULE[1]	
LABEL	AREA
GROUND FLOOR	
CHEMIST	201 m²
CONSULTANTS	111 m²
COMMON AREA[2]	111 m²
TOTAL GF GFA	423 m²
FIRST FLOOR	
GP CLINIC	751 m²
CONSULTANTS	300 m²
COMMON AREA	68 m²
TOTAL 1F GFA	1119 m²

[1] CONCEPTUAL AREAS ONLY. TO BE CONFIRMED AFTER LAYOUT IS CONFIRMED.
[2] INCLUDES GF PORTION OF FIRE ISOLATED EXITS FOR GFA

VALUES TO BE REVISED

BEFORE YOU DIG www.byda.com.au

EXISTING SERVICES CHECKLIST		
(INFORMATION BASED PURELY ON JFP SURVEYOR, BYDA & RRC PROVIDED INFORMATION. MAY NOT BE AN EXHAUSTIVE SEARCH)		
SERVICE	FINDINGS	SOURCE
WATER	YES	JFP
SEWER	YES	JFP
STORMWATER	YES	JFP
GAS	YES	JFP
TELECOMS	YES	JFP

SERVICE INFORMATION ON THIS DRAWING HAS BEEN SOURCED FROM ROCKHAMPTON REGIONAL COUNCIL ONLINE MAPPING AND APA (GAS SERVICES) THE INFORMATION IS PROVIDED FOR REFERENCE ONLY. BUILDERS ARE TO USE BEFORE YOU DIG AUSTRALIA PRIOR TO ANY/ALL EXCAVATION AND SITE WORKS. NOTE THAT INFORMATION REGARDING TELSTRA/TELECOM LINES HAS NOT BEEN PROVIDED DUE TO TELSTRA CHARGES. ELECTRICAL SERVICES HAVE NOT BEEN LOCATED OR SHOWN

NORTH

1F PROPOSED GP CLINIC

1F PROPOSED CONSULTANT TENANCY

PROPOSED AMBULANCE

AMB.P1

DP1

GF PROPOSED CHEMIST TENANCY

GF PROPOSED CONSULTANT TENANCY

UP

UNDER-COVER PARKING

PARKING AISLE

PARKING AISLE

ASCOT LANE

MUSGRAVE STREET

ELPHINSTONE STREET

P1 P2 P3 P4 P5 P6 P7 P8 P9 P10 P11 P12 P13 P14 P15 P16 P17 P18 P19 P20 P21 P22 P23 P24 P25 P26 P27 P28 P29 P30 P31 P32 P33 P34 P35 P36 P37 P38 P39 P40 P41 P42 P43 P44 P45 P46 P47 P48 P49 P50 P51 P52 P53 P54 P55 P56 P57

ROCKHAMPTON REGIONAL COUNCIL

APPROVED PLANS

These plans are approved subject to the current conditions of approval associated with

Development Permit No.: D/156-2025

Dated: 12 May 2026

SITE PLAN

SCALE: - 1:200
LOTS 30 & 31 ON RP603419, LOT 1 ON RP607576 & LOT 100 ON SP251414
TOTAL AREA: 2166m²
LOCALITY OF BERSERKER
LOCAL GOVT: ROCKHAMPTON

00 5000 10000 SCALEBAR - 1:250

FOR APPROVAL

NOT FOR CONSTRUCTION

REV	DESCRIPTION	DATE	BY	APPVD
E	CONCEPTUAL APPEARANCE UPDATE	17.09.25	JW	
D	NEW CONCEPT - INTEGRATED PARKING	15.08.25	JW	
C	NEW BUILD - CONCEPT	28.07.25	AB	
B	RENOVATION - CONCEPT	10.12.24	AN	
A	RENOVATION INITIAL CONCEPT LAYOUT	06.12.24	AN	

REVISION SCHEDULE

GladstoneDrafting
QUALITY DESIGN. CONCEPT TO COMPLETION.

A.S. BUENEN P/L T/a. GLADSTONE DRAFTING
INDUSTRIAL - MECHANICAL - STRUCTURAL DESIGN
DOMESTIC & COMMERCIAL BUILDING DESIGNERS
QBCC Lic. No. 1191231 ABN 96 081 040 600
1/48 GOONDOON STREET, GLADSTONE, QUEENSLAND, 4680
PH: 4972 6066
EMAIL: design@gladstonedrafting.com.au
WEB: www.gladstonedrafting.com.au

DESIGNED BY: A.BUENEN
DRAWN BY: A.BUENEN
CHECKED BY: -

TITLE: PROPOSED ASCOT SUPER CLINIC
177 - 179 MUSGRAVE STREET BERSERKER, QLD
DUTTON HOLDINGS
SITE PLAN

SCALE: 1 : 250
REVISION: E
JOB No.: GD2682
SHEET No.: A01.00
A3

APPENDIX

C

OSKA Consulting Group, Pre-Development Catchment Plan (Ref: OSK7132/P001/A)

LEGEND

- STORMWATER CATCHMENT BOUNDARY
- (A) STORMWATER CATCHMENT I.D.
- 80.0 EXISTING SURFACE CONTOURS
- ● LPOD LAWFUL POINT OF DISCHARGE
- ● EPOD EXISTING POINT OF DISCHARGE
- FLOW DIRECTION
- SITE BOUNDARY

STORMWATER CATCHMENT TABLE	
STORMWATER CATCHMENT I.D.	AREA (ha)
A	0.2168
TOTAL	0.2168

EXISTING SERVICES LEGEND

- EXISTING SEWER MAIN (FROM RECORDS)
- EXISTING WATER MAIN (FROM RECORDS)
- EXISTING OVERHEAD ELECTRICAL CABLE
- EXISTING UNDERGROUND ELECTRICAL CABLE (FROM RECORDS)
- EXISTING OVERHEAD TELSTRA CABLE
- EXISTING COMMUNICATIONS CABLE (FROM RECORDS)
- EXISTING GAS MAIN (FROM RECORDS)

ROCKHAMPTON REGIONAL COUNCIL

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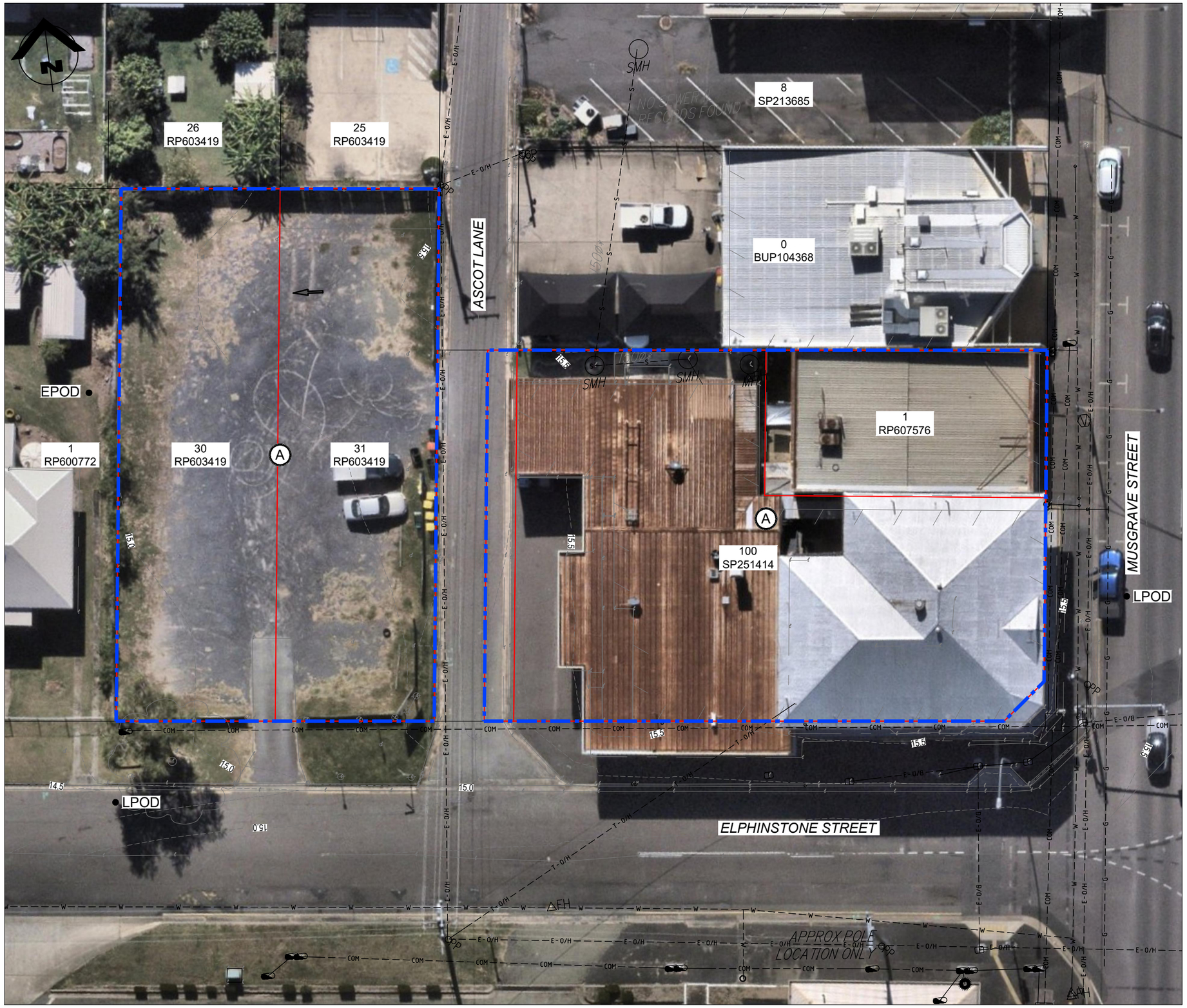
Development Permit No.: D/156-2025

Dated: 12 May 2026

CONTRACTOR TO DETERMINE AND LOCATE ALL EXISTING SERVICES PRIOR TO COMMENCEMENT OF WORKS



REV	DESCRIPTION	DRAWN	DATE
A	ISSUED FOR REPORT	BG	21-11-25

DRAWN BG | DESIGN BG | APPROVED ----

SIGNED ----

DATE

OSKA CONSULTING GROUP

DRAWING IS NOT TO BE SCALED

SCALE

1:150 AT A1 | 1:300 AT A3 — 0 — 5m

CLIENT: GLADSTONE DRAFTING

PROJECT: PROPOSED COMMERCIAL DEVELOPMENT
177-179 MUSGRAVE STREET
BERSERKER, QLD, 4701

STAGE / PHASE: FOR INFORMATION ONLY — NOT FOR CONSTRUCTION

TITLE: PRE-DEVELOPMENT CATCHMENT PLAN

DRAWING NUMBER: OSK7132-P001

REVISION: A

APPENDIX

D

OSKA Consulting Group, Post-Development Catchment Plan (Ref: OSK7132/P002/A)

LEGEND

- STORMWATER CATCHMENT BOUNDARY
- (A) STORMWATER CATCHMENT I.D.
- 80.0 EXISTING SURFACE CONTOURS
- ● LPOD — LAWFUL POINT OF DISCHARGE
- FLOW DIRECTION
- SITE BOUNDARY
- ROOF OUTLINE

STORMWATER CATCHMENT TABLE	
STORMWATER CATCHMENT I.D.	AREA (ha)
A	0.1192
B	0.0976
TOTAL	0.2168

EXISTING SERVICES LEGEND

- S — EXISTING SEWER MAIN (FROM RECORDS)
- W — EXISTING WATER MAIN (FROM RECORDS)
- E-O/H — EXISTING OVERHEAD ELECTRICAL CABLE
- E-U/G — EXISTING UNDERGROUND ELECTRICAL CABLE (FROM RECORDS)
- T-O/H — EXISTING OVERHEAD TELSTRA CABLE
- COM — EXISTING COMMUNICATIONS CABLE (FROM RECORDS)
- G — EXISTING GAS MAIN (FROM RECORDS)

ROCKHAMPTON REGIONAL COUNCIL

APPROVED PLANS

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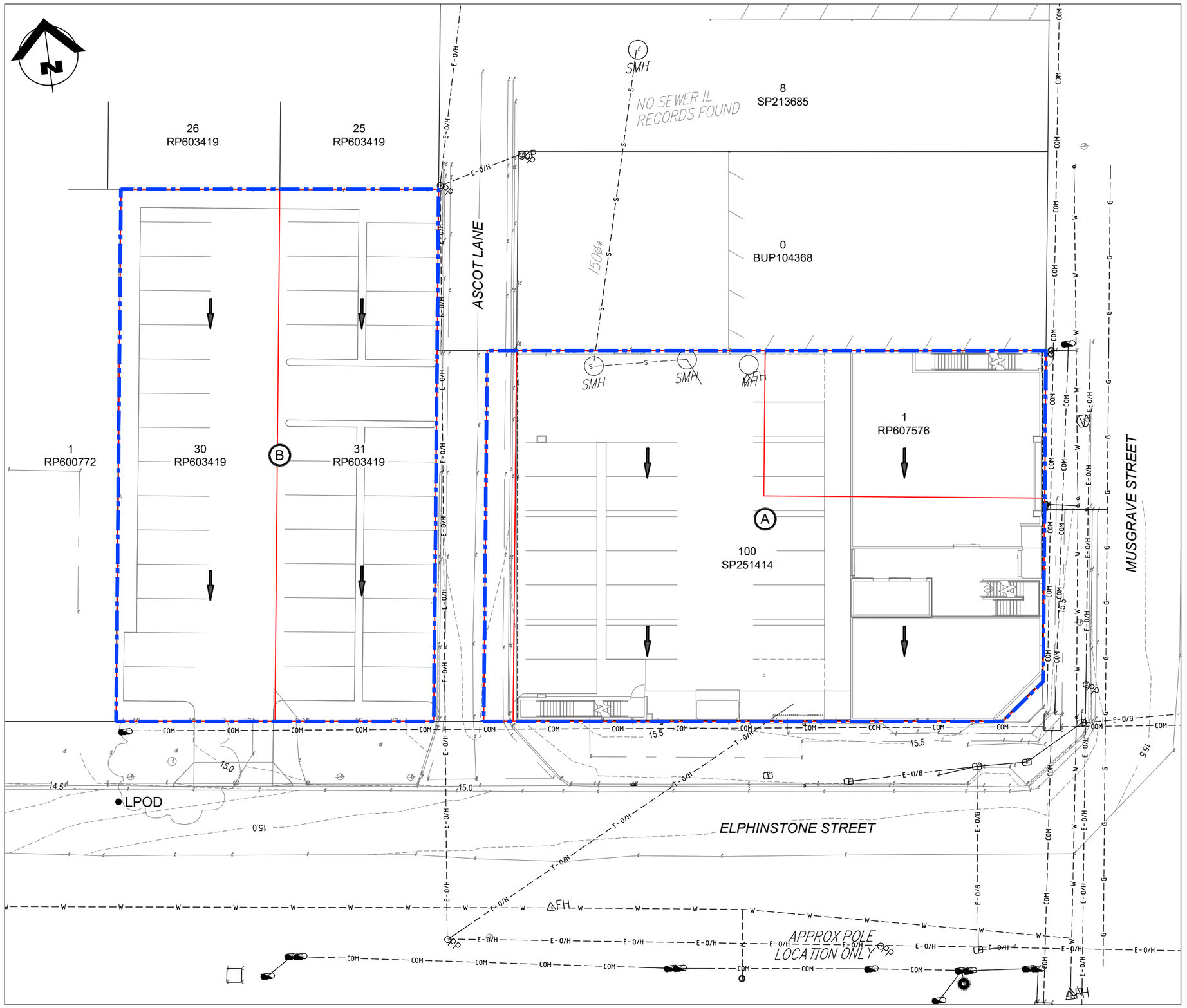
Development Permit No.: D/156-2025

Dated: 12 May 2026

CONTRACTOR TO DETERMINE AND LOCATE ALL EXISTING SERVICES PRIOR TO COMMENCEMENT OF WORKS



REV	DESCRIPTION	DRAWN	DATE
A	ISSUED FOR REPORT	BG	21-11-25

DRAWN BG | DESIGN BG | APPROVED ----

SIGNED ----

DATE

OSKA CONSULTING GROUP

DRAWING IS NOT TO BE SCALED

SCALE
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1:300 AT A3

CLIENT
GLADSTONE DRAFTING

PROJECT
PROPOSED COMMERCIAL DEVELOPMENT
177-179 MUSGRAVE STREET
BERSERKER, QLD, 4701

STAGE / PHASE
FOR INFORMATION ONLY NOT FOR CONSTRUCTION

TITLE
POST-DEVELOPMENT CATCHMENT PLAN

DRAWING NUMBER
OSK7132-P002

REVISION
A

APPENDIX

E

OSKA Consulting Group, Conceptual Stormwater Management Plan (Ref: OSK7132/P003/B) & Conceptual Stormwater Management Details (Ref: OSK7132/P004/B)

LEGEND

- STORMWATER CATCHMENT BOUNDARY
- 80.0 EXISTING SURFACE CONTOURS
- ● LPOD LAWFUL POINT OF DISCHARGE
- FLOW DIRECTION
- SITE BOUNDARY
- ROOF OUTLINE
- PROPOSED STORMWATER TANK
- SWD PROPOSED STORMWATER PIPE
- PROPOSED SURCHARGE PIT

EXISTING SERVICES LEGEND

- S EXISTING SEWER MAIN (FROM RECORDS)
- W EXISTING WATER MAIN (FROM RECORDS)
- E-O/H EXISTING OVERHEAD ELECTRICAL CABLE
- E-U/G EXISTING UNDERGROUND ELECTRICAL CABLE (FROM RECORDS)
- T-O/H EXISTING OVERHEAD TELSTRA CABLE
- COM EXISTING COMMUNICATIONS CABLE (FROM RECORDS)
- G EXISTING GAS MAIN (FROM RECORDS)

ROCKHAMPTON REGIONAL COUNCIL

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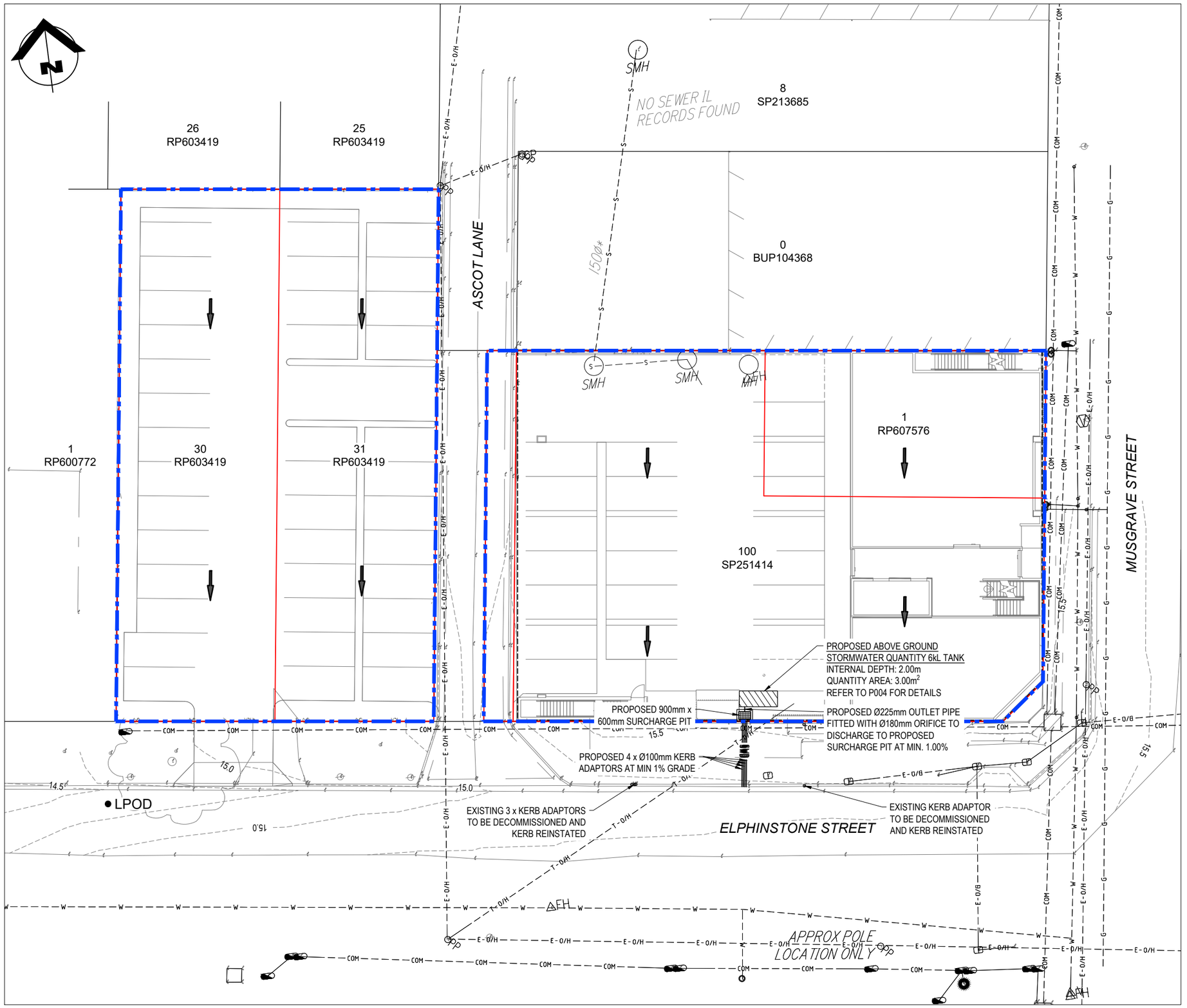
Dated: 12 May 2026

CONTRACTOR TO DETERMINE AND LOCATE ALL EXISTING SERVICES PRIOR TO COMMENCEMENT OF WORKS



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				BG	BG	
B	ISSUED FOR REPORT	MS	27-03-26	SIGNED		
A	ISSUED FOR REPORT	BG	21-11-25			
REV	DESCRIPTION	DRAWN	DATE	DATE		

OSKA CONSULTING GROUP

DRAWING IS NOT TO BE SCALED

SCALE
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1:300 AT A3

CLIENT
GLADSTONE DRAFTING

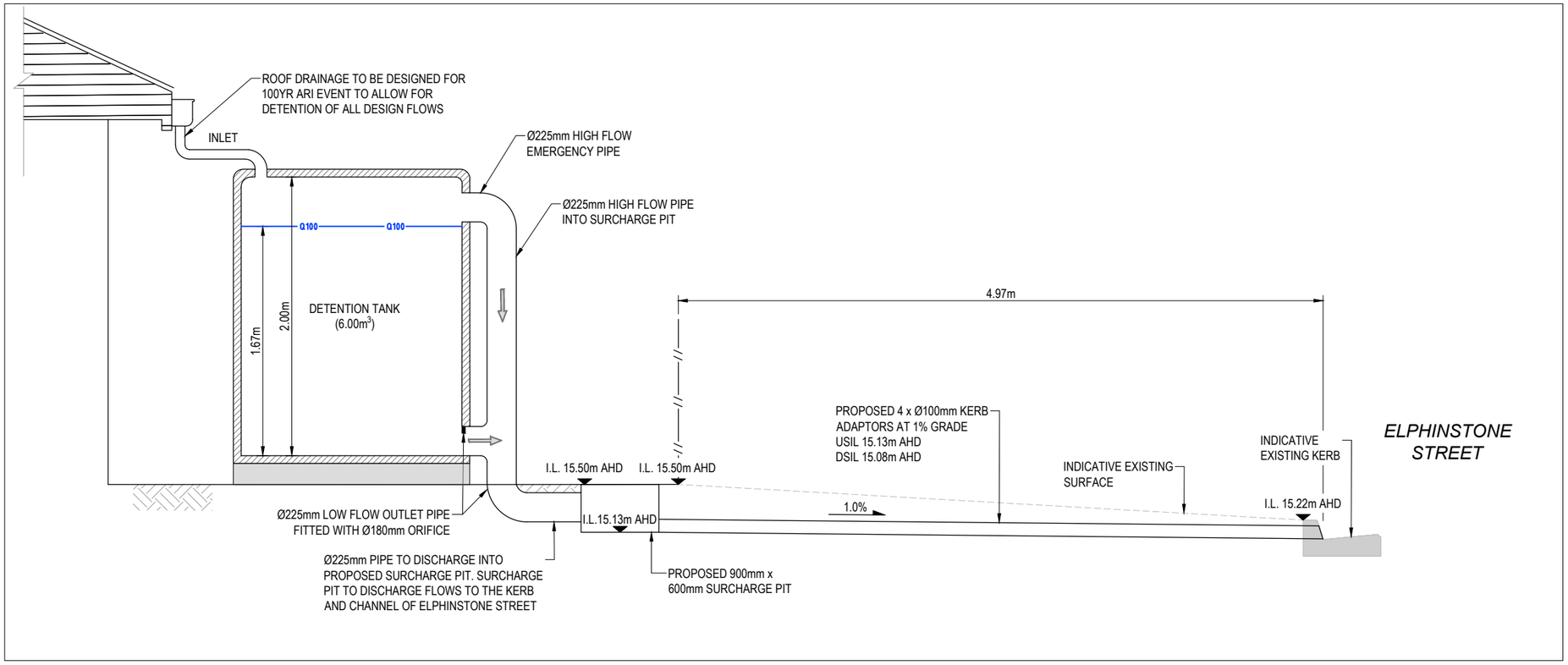
PROJECT
PROPOSED COMMERCIAL DEVELOPMENT
177-179 MUSGRAVE STREET
BERSERKER, QLD, 4701

STAGE / PHASE
FOR INFORMATION ONLY NOT FOR CONSTRUCTION

TITLE
CONCEPTUAL STORMWATER MANAGEMENT PLAN

DRAWING NUMBER
OSK7132-P003

REVISION
B



PROPOSED STORMWATER DETENTION TANK
AND SURCHARGE PIT TYPICAL SECTION
SCALE: N.T.S

ROCKHAMPTON REGIONAL COUNCIL

APPROVED PLANS

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Dated: **12 May 2026**

REV	DESCRIPTION	DRAWN	DATE
B	ISSUED FOR REPORT	MS	27-03-26
A	ISSUED FOR REPORT	BG	21-11-25

DRAWN: BG | DESIGN: BG | APPROVED:
SIGNED
DATE

OSKA CONSULTING GROUP

DRAWING IS NOT TO BE SCALED

SCALE

CLIENT: GLADSTONE DRAFTING

PROJECT: PROPOSED COMMERCIAL DEVELOPMENT
177-179 MUSGRAVE STREET
BERSERKER, QLD, 4701

STAGE / PHASE: FOR INFORMATION ONLY NOT FOR CONSTRUCTION

TITLE: CONCEPTUAL STORMWATER MANAGEMENT DETAILS

DRAWING NUMBER: OSK7132-P004

REVISION: B

APPENDIX

F

OSKA Consulting Group, Concept Sediment and Erosion Control Plan (Ref: OSK7132/P005/A) & Concept Sediment and Erosion Control Details (Ref: OSK7132/P006/A)

SEDIMENT & EROSION CONTROL LEGEND

- SF — SEDIMENT FENCE
- 80.0 — EXISTING SURFACE CONTOURS
- S.E.P. — LOCATION OF STABILISED ENTRY/EXIT POINT
- DSP — DRAINAGE STRUCTURE PROTECTION
- MS1 — WATER QUALITY MONITORING STATION
- SITE BOUNDARY
- ROOF OUTLINE
- FLOW DIRECTION
- PROPOSED STORMWATER TANK
- SWD — PROPOSED STORMWATER PIPE
- PROPOSED SURCHARGE PIT

EXISTING SERVICES LEGEND

- S — EXISTING SEWER MAIN (FROM RECORDS)
- W — EXISTING WATER MAIN (FROM RECORDS)
- E-O/H — EXISTING OVERHEAD ELECTRICAL CABLE
- E-U/G — EXISTING UNDERGROUND ELECTRICAL CABLE (FROM RECORDS)
- T-O/H — EXISTING OVERHEAD TELSTRA CABLE
- COM — EXISTING COMMUNICATIONS CABLE (FROM RECORDS)
- G — EXISTING GAS MAIN (FROM RECORDS)

ROCKHAMPTON REGIONAL COUNCIL

APPROVED PLANS

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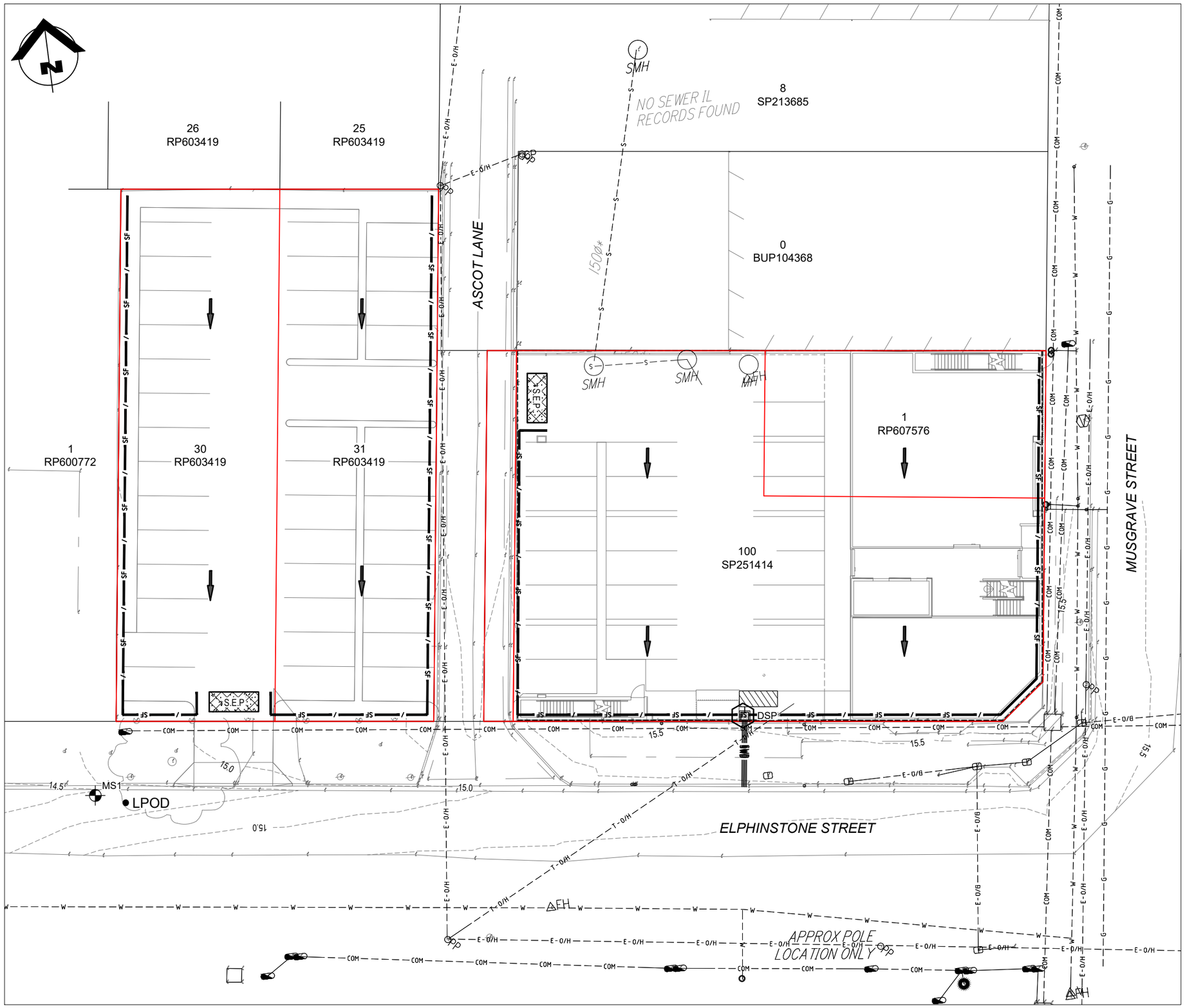
Development Permit No.: D/156-2025

Dated: 12 May 2026

CONTRACTOR TO DETERMINE AND LOCATE ALL EXISTING SERVICES PRIOR TO COMMENCEMENT OF WORKS



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				BG	BG	----
A	ISSUED FOR REPORT	BG	21-11-25	SIGNED		
REV	DESCRIPTION	DRAWN	DATE	----		
				DATE		

OSKA CONSULTING GROUP

DRAWING IS NOT TO BE SCALED

SCALE
1:150 AT A1 0 5m
1:300 AT A3

CLIENT
GLADSTONE DRAFTING

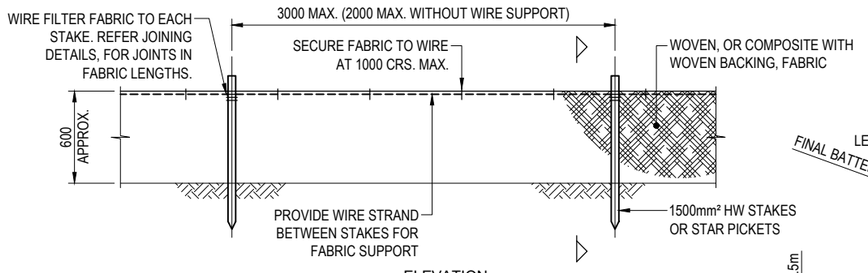
PROJECT
PROPOSED COMMERCIAL DEVELOPMENT
177-179 MUSGRAVE STREET
BERSERKER, QLD, 4701

STAGE / PHASE
FOR INFORMATION ONLY NOT FOR CONSTRUCTION

TITLE
CONCEPT SEDIMENT AND EROSION CONTROL PLAN

DRAWING NUMBER
OSK7132-P005

REVISION
A



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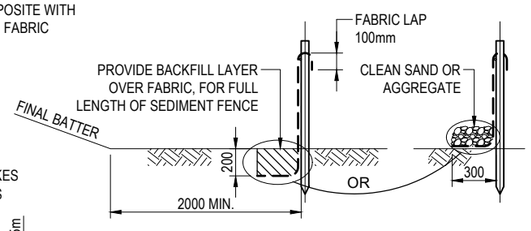
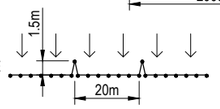
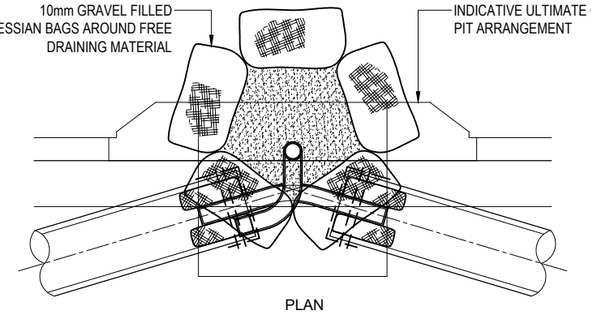


SECTION



NOTE: INSTALL 1.5m (MIN.) DEEP 'RETURNS' AT 20m SPACING (MAX.) ON UPSLOPE SIDE OF FENCELINE (5-10m MAX SPACING IF FENCE ALIGNED AT ANGLE TO CONTOUR). EG:



PLAN

CONCEPT ONLY

IT IS THE CONTRACTOR'S RESPONSIBILITY TO MAINTAIN ADEQUATE SEDIMENT & EROSION CONTROL DURING ALL PHASES OF CONSTRUCTION TO THE SATISFACTION OF BOTH THE SUPERINTENDENT AND COUNCIL.

CONTRACTOR TO DETERMINE AND LOCATE ALL EXISTING SERVICES PRIOR TO COMMENCEMENT OF WORKS

ROCKHAMPTON REGIONAL COUNCIL

APPROVED PLANS

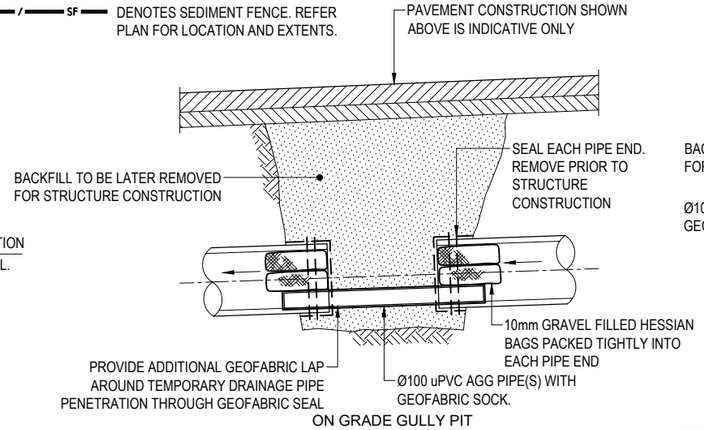
These plans are approved subject to the current conditions of approval associated with

Development Permit No.: D/156-2025

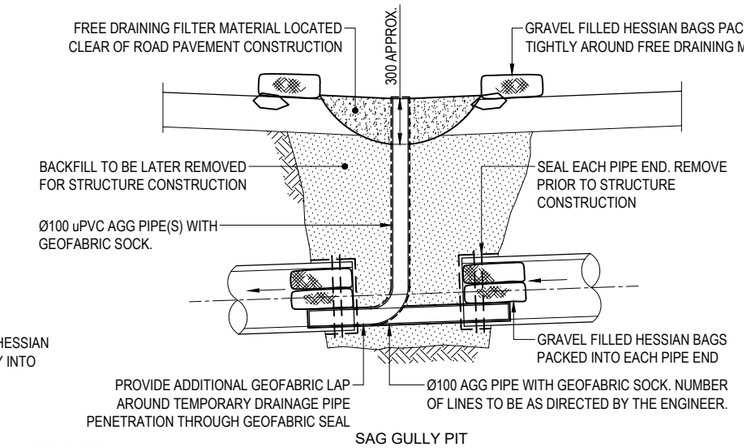
Dated: 12 May 2026

SEDIMENT FENCE DETAILS

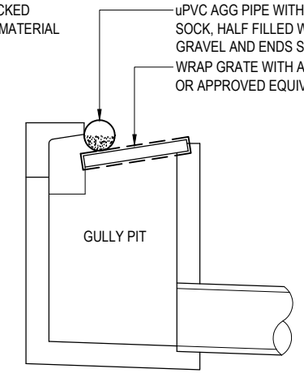
N.T.S. —/—SF— DENOTES SEDIMENT FENCE. REFER PLAN FOR LOCATION AND EXTENTS.



ON GRADE GULLY PIT

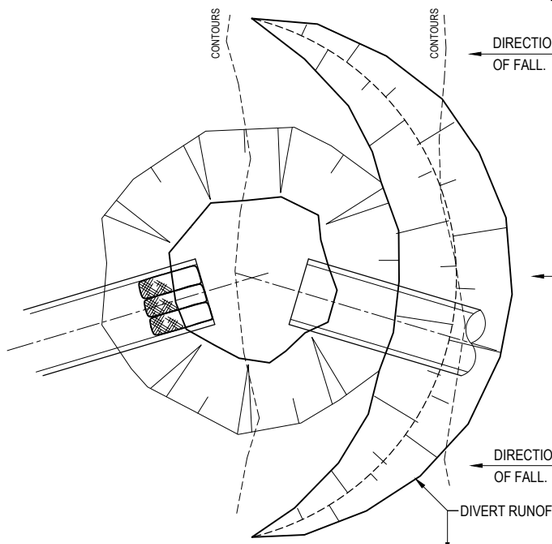


SAG GULLY PIT

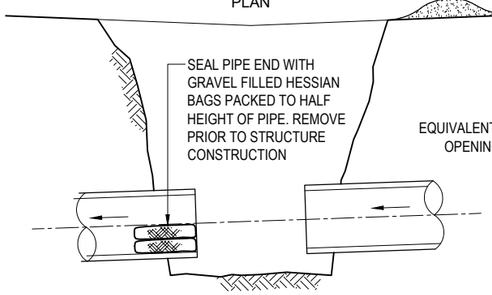


STAGE 2
STRUCTURE COMPLETE

STAGE 1
EXCAVATION, PIPE INSTALLATION AND INTERIM BACKFILLING



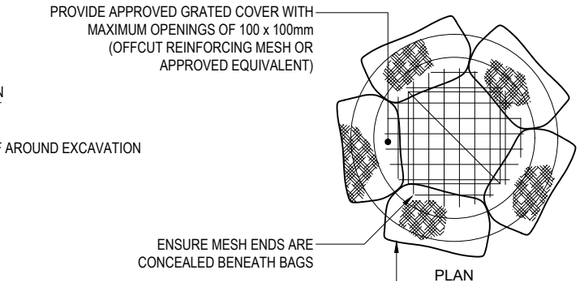
PLAN



STAGE 1

ROADWAY GULLY PIT
N.T.S.

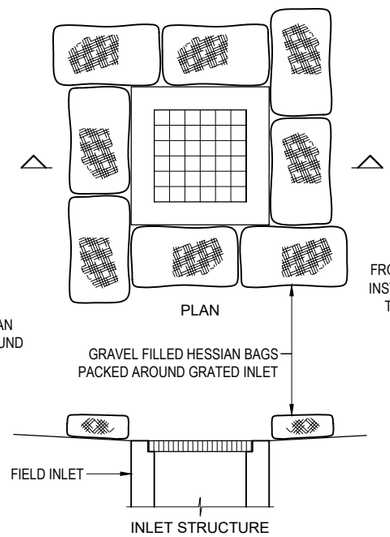
DSP DENOTES DRAINAGE STRUCTURE PROTECTION. REFER PLAN FOR LOCATION & EXTENTS.



ACCESS CHAMBER

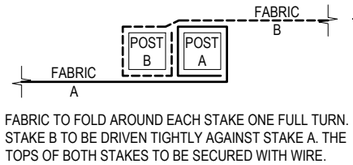
INLET STRUCTURE

STAGE 2



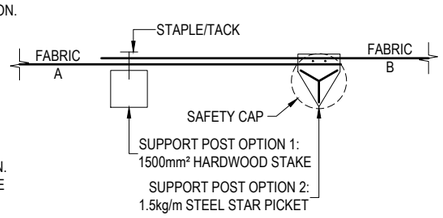
INLET STRUCTURE

STAGE 3



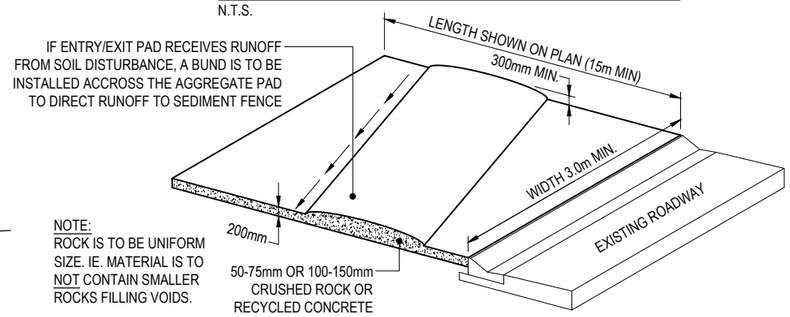
FABRIC TO FOLD AROUND EACH STAKE ONE FULL TURN. STAKE B TO BE DRIVEN TIGHTLY AGAINST STAKE A. THE TOPS OF BOTH STAKES TO BE SECURED WITH WIRE.

METHOD 1



METHOD 2

SEDIMENT FENCE FABRIC JOINING DETAILS
N.T.S.



NOTE:
ROCK IS TO BE UNIFORM SIZE. IE. MATERIAL IS TO NOT CONTAIN SMALLER ROCKS FILLING VOIDS.

STABILISED ENTRY/EXIT POINT
N.T.S. OR APPROVED EQUIVALENT

SEP DENOTES STABILISED ENTRY/EXIT POINT, REFER PLAN FOR LOCATIONS.

REV	DESCRIPTION	DRAWN	DATE
A	ISSUED FOR REPORT	BG	21-11-25

DRAWN BG | DESIGN BG | APPROVED ----

SIGNED ----

DATE

OSKA CONSULTING GROUP

SCALE

CLIENT: GLADSTONE DRAFTING

PROJECT: PROPOSED COMMERCIAL DEVELOPMENT
177-179 MUSGRAVE STREET
BERSERKER, QLD, 4701

STAGE / PHASE: FOR INFORMATION ONLY NOT FOR CONSTRUCTION

TITLE: CONCEPT SEDIMENT AND EROSION CONTROL DETAILS

DRAWING NUMBER: OSK7132-P006

REVISION: A

MLEI Queensland Pty Ltd trading as OSKA Engineers
Head Office Gold Coast
L1, 155 Varsity Parade, Varsity Lakes QLD 4227
Brisbane Office
147 Musgrave Road, Red Hill QLD 4059
ABN: 99 665 498 359
Telephone: 07 5580 9777
Email: civil@oska.net.au
www.oska.net.au

Our Ref: OSK7132-0004
Your Ref: D/156-2025

27 March 2026

Rockhampton Regional Council
PO Box 1860
Rockhampton QLD 4700

ROCKHAMPTON REGIONAL COUNCIL
APPROVED PLANS
These plans are approved subject to the current conditions of approval associated with
Development Permit No.: D/156-2025
Dated: 12 May 2026

Dear Sir/Madam,

RE: INFORMATION REQUEST FOR 177-179 MUSGRAVE STREET, BERSERKER

We refer to Rockhampton Regional Council's Information Request (IR) regarding the Stormwater Management Plan lodged by Gladstone Drafting. On behalf of our client, please find below our response to the civil engineering items:

1. In accordance with section D05.15.02 of the Stormwater Drainage Design Specifications of the Capricorn Municipal Development Guidelines (CMDG), the maximum permissible discharge to the kerb and channel at any point must be limited to 30 L/s. Additionally, no greater than two (2) x 100mm diameter pipes with approved kerb adapters shall be used at any single discharge location. It is noted that application proposes four (4) x 100mm diameter kerb adaptor at the point of discharge to Elphinstone Street. Please provide a solution that satisfies the CMDG requirements.

   RESPONSE: The existing building currently has a grouping of three (3) kerb adaptors located along Elphinstone Street with another kerb adaptor within 13.00m (refer Figure below and detail survey) with no underground stormwater drainage network at the front of the site. The closest underground stormwater drainage network to the site is located on the other side of the Elphinstone Street and Musgrave Street intersection and extending this line is not considered to be a reasonable solution (if a connection is even possible/viable).

   The development proposes to discharge flows via a grouping of 4 x Ø100mm kerb adaptors to the kerb and channel of Elphinstone Street and given the existing building has a similar arrangement, the proposal is considered to be generally maintaining the existing drainage scenario.

   The flows discharged via the proposed 4 x Ø100mm kerb adaptors have been modelled as 29L/s in the 39% AEP event which is below the 30L/s limit stated in the CMDG however, this flow rate increases to 36L/s in the 1% AEP event. The 36L/s discharging via the kerb adaptors in the 1% AEP event is considered to be reasonable given the existing site conditions and limitations. There is a possibility to split the kerb adaptors up via two separate groupings of 2 x Ø100mm kerb adaptors however, this would result in a reduced hydraulic performance of the kerb adaptors given the 90-degree bends that would be implemented for this scenario. Therefore, the proposal for 4 x Ø100mm kerb adaptors at a single location is considered to be a reasonable solution.

Figure 1: Existing Building and Kerb Adaptors

1. Please demonstrate how the stormwater from the surcharge pit to the kerb and channel will be discharged. Please provide cross section as a supporting reference.

   RESPONSE: The Conceptual Stormwater Management Details drawing (Ref: OSK7132/P004/B) has been updated to demonstrate how the flows from the surcharge pit will be discharged to the kerb and channel. Refer to the updated Conceptual Stormwater Management Plan for further details.

We trust that the above response satisfies your request. If you have any further queries, please do not hesitate to contact our office.

Yours faithfully,

Tom Watt
Principal Engineer – Civil
RPEQ 16222

Ben Grant
Engineer - Civil

MODUS
Transport & Traffic Engineering

Traffic Impact Assessment

177 and 179 Musgrave Street, Berserker
Proposed Development

Document Information

Prepared for Dutton Holdings Pty Ltd (A.C.N 681 804 526) as trustee for the Rocky Property Trust	**Job Reference** MOD24783QLD
Project: 177 and 179 Musgrave Street, Berserker Proposed Development	

Document Control

Version	Date	Description of Revision	Prepared by	Approved By
A	03/10/25	Draft for client review and comment	Afaf El Harda	Harj Singh

RPEQ Certification

Harj Singh
Executive Director

RPEQ 22364

MODUS TRANSPORT & TRAFFIC ENGINEERING

ABN 49 668 863 269

310 Edward Street
Brisbane City QLD 4000

P 1300 606 408
E info@moduseng.com.au

Modus has expanded its capabilities and assembled its systems, capital, and resources to drive value for customers via the delivery of a full suite of traffic engineering services.

Here at Modus, we are a team of engineers with extensive knowledge and experience providing quality service to both public and private sectors, from large contractors and developers to state and local governments.

Whether your project is a small residential development, mixed use development, a large commercial precinct or anything in between, our experienced traffic engineers will apply sound and practical traffic engineering principles to achieve an outstanding outcome for your project.

For more information about our company and the services we provide, please visit www.modusengineering.com.au

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1 Introduction

1.1 Overview

Modus has been commissioned by Dutton Holdings Pty Ltd (A.C.N 681 804 526) as trustee for the Rocky Property Trust to provide traffic and transport advice in relation to the proposed development located at 177 and 179 Musgrave Street, Berserker.

This Traffic Impact Assessment has been produced by Modus to assess the traffic and transport engineering items in support of the proposed development. A copy of the development plans is provided at **Appendix A**.

1.2 References

The following documents and guidelines have been referenced in the assessment herein:

- Rockhampton Region Planning Scheme, 2015,
- Development Plans by Gladstone Drafting, Revision E,
- AS2890.1 Australian Standards Parking Facilities Part 1: Off-Street Car Parking, 2004,
- AS2890.2 Australian Standards Parking Facilities Part 2: Off-Street Commercial Facilities, 2018,
- AS2890.3 Australian Standards Parking Facilities Part 3: Bicycle Parking, 2015,
- TMR Guide to Traffic Impact Assessments (GTIA), 2017,
- Austroads Guide to Road Design, Part 4A: Unsignalised and Signalised Intersections,
- TMR Annual Segment Report,
- NSW Guide to Transport Impact Assessment, 2024.

1.3 Limitations

Modus has completed this traffic report in accordance with the usual care and thoroughness of the consulting profession. The assessment is based on accepted traffic engineering practices and standards applicable at the time of undertaking the assessment. Modus disclaims responsibility for any changes to project planning or road conditions that may occur after completion of the assessment.

2 Existing Conditions

2.1 Site Location

The development site is located at 177 and 179 Musgrave Street, Berserker and is bounded by Elphinstone Street to the south, Musgrave Street to the east, a Residential use and a Medical Centre to the north and a Residential use to the west. Additionally, Ascot Lane runs between the subject sites and a part of the associated car parking area.

The site is located within the Specialised Centre Zone as part of the Rockhampton Regional Council (RRC) Local Government Area. The site location is shown on Figure 2-1.

Figure 2-1 Site Location

2.2 Existing Site Use

The subject site is currently occupied by the Ascot Hotel, with an existing car park located west of Ascot Lane which accommodates the following:

- One (1) approximately 3.0m wide crossover onto Elphinstone Street
- One (1) approximately 5.5m wide crossover onto Ascot Lane.

Furthermore, it is noted that access to the rear of the site via Ascot lane is currently provided, indicating a total number of three (3) existing access points.

2.3 Existing Road Network

Table 2-1 outlines characteristics of the existing road network in proximity to the development site.

Table 2-1 Key Road Characteristics

Road	Hierarchy	Speed Limit	Typical Form
Musgrave Street	State-Controlled Road	60 km/h	Six lanes, divided
Elphinstone Street	Major Collector Road	60 km/h	Two lanes, undivided
Ascot Lane	Urban Access Street	50 km/h	One lane, divided
Card Street	Urban Access Place	50 km/h	Two lanes, undivided

2.4 Active and Public Transport Facilities

Pedestrian footpaths are provided along both verges of Musgrave Street, creating a connection to the surrounding developments. Additionally, there are no dedicated bicycle lanes along the surrounding roads.

Furthermore, there are seven (7) bus stops within a 400m radius (a comfortable 5-minute walk) of the development site, connecting the proposed development to the surrounding suburbs.

3 Proposed Development

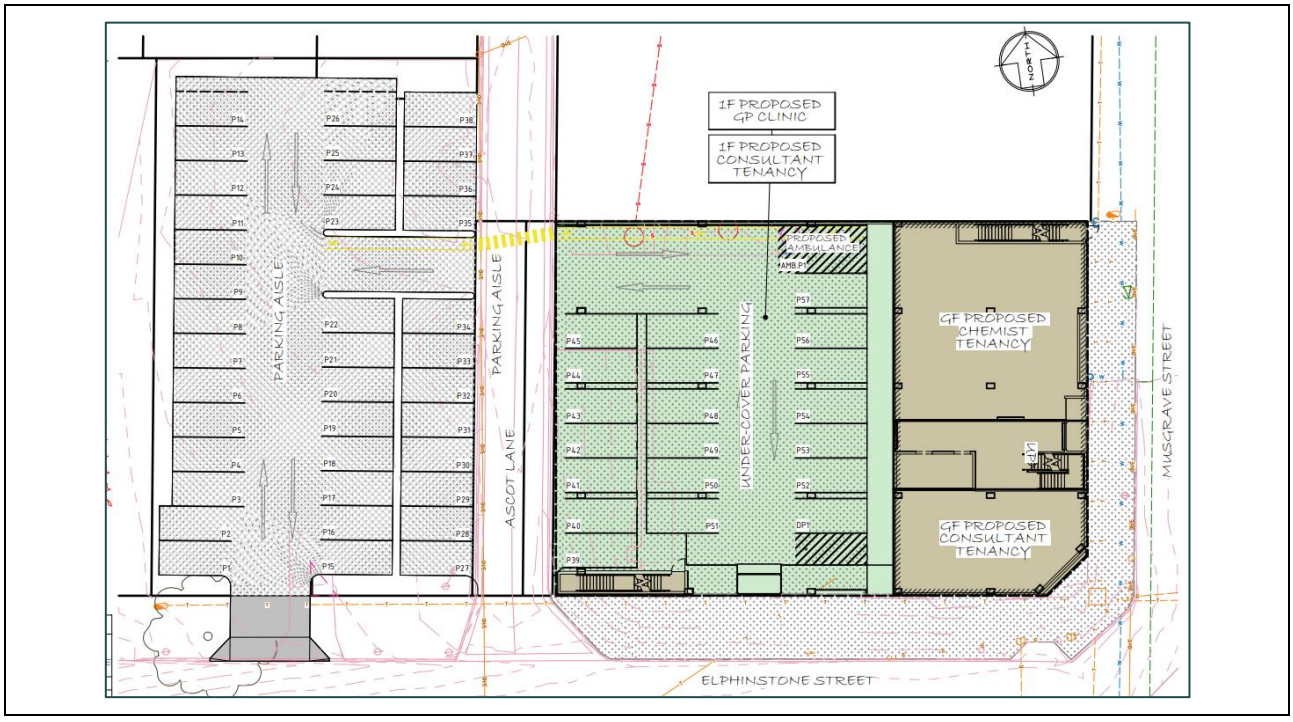
3.1 Overview

The proposed development comprises a GP Super Clinic (Health Care Services use) consisting of a total Gross Floor Area (GFA) of 1,542 sq.m.

As part of the proposed development, on-site car parking is provided across two (2) areas, accommodating one (1) Ambulance Bay and 58 car parking spaces.

The proposed development layout is illustrated on Figure 3-1. A copy of the development plans can be found at **Appendix A**.

Figure 3-1 Proposed Development Layout



3.2 Development Access

The proposed development will achieve vehicular access on the following basis:

- One (1) 6.0m wide entry / exit crossover via Elphinstone Street,
- One (1) 4.1m wide entry only crossover via Ascot Lane,
- One (1) 6.5m wide entry / exit crossover via Ascot Lane.

4 Traffic and Transport Advice

4.1 Access Design

4.1.1 Driveway Design

In accordance with Australian Standards AS2890.1, the minimum driveway requirement for the proposed development is outlined in Table 4-1.

Table 4-1 Driveway Design Compliance

Road Frontage	AS2890.1 Driveway Design Compliance	Conditions
Elphinstone Street (Entry / Exit)	Site Conditions	Minor Road Frontage User Class 3 25 to 100 Spaces
	Access Facility Category	2
	Required Driveway Widths	Minimum 6.0m – 9.0m (Combined)
	Proposed Driveway Widths	**6.0m**
Ascot Lane (Entry)	Site Conditions	Minor Road Frontage User Class 3 25 to 100 Spaces
	Access Facility Category	2
	Required Driveway Widths	Minimum 3.0m (Separate)
	Proposed Driveway Widths	**4.1m**
Ascot Lane (Entry / Exit)	Site Conditions	Minor Road Frontage User Class 3 25 to 100 Spaces
	Access Facility Category	2
	Required Driveway Widths	Minimum 6.0m – 9.0m (Combined)
	Proposed Driveway Widths	**6.5m**

Therefore, the proposed driveway widths comply with Australian Standards AS2890.1.

Furthermore, the crossover along Elphinstone Street is designed with 1.5m x 1.8m splays in accordance with the IPWEA Standards Drawing RS-051**.** Additionally, the proposed accesses onto Ascot Lane do not accommodate typical crossovers in line with IPWEA Standards on the basis that existing rollover kerbs are currently accommodated. The swept path assessment (provided at **Appendix B**) also confirms vehicles can safely and efficiently move to and from Ascot Lane.

On this basis, the proposed driveway design arrangements are considered acceptable.

4.1.2 Driveway Location

In accordance with Australian Standards AS2890.1, development accesses with a Class 2 and Class 3 Access Facility Category are to achieve a 6.0m separation to any formal intersections. Provided that the proposed access locations are not located within a 6.0m distance to any formal intersections, the proposed access location is considered acceptable.

4.1.3 Pedestrian Sight Splays

In accordance with Australian Standards AS2890.1, pedestrian sight splays should be provided at the egress point of a driveway and measure 2.5m in length and 2.0m in width from the property boundary. The proposed crossover along Elphinstone Street achieves compliance, providing a 2.0m x 2.5m pedestrian sight splay to ensure sufficient visibility between outbound vehicles and pedestrians along the site frontage.

The crossover along Ascot Lane does not provide a compliant 2.5m x 2.0m pedestrian sight splay. However, Ascot Lane is a one-way lane which is generally not considered to be utilised for pedestrian movements

Given the expected low travel speeds expected to and from the site and no anticipated pedestrian movements along Ascot Lane, the proposed pedestrian sight splay provisions are considered acceptable.

4.2 Car Parking Provision

In accordance with Table 6.4.9.1 within the RRC Planning Scheme, the minimum car parking requirements for the proposed development are outlined in Table 4-2.

Table 4-2 Proposed Car Parking Provision

Land Use	Car Parking Rate	Yield	Car Parking Required	Car Parking Provided	Compliant
Healthcare Services	One (1) space per twenty-five (25) square metres or part thereof of gross floor area; One (1) space for special use vehicles (such as blood collection/transport vehicles); and One (1) emergency ambulance space.	1,542 sq.m GFA	62 general spaces 1 space for special use vehicles 1 emergency ambulance space	57 general spaces	X
				1 space for special use vehicles	✓
				1 emergency ambulance space	✓

Therefore, the proposed development accommodates a parking shortfall of five (5) general car parking spaces.

To further assess the suitability of the parking provision, Modus has referenced the NSW RTA Trip Generation Surveys Medical Centre Analysis Report.

The NSW RTA Trip Generation Surveys Medical Centre Analysis Report provides peak parking accumulation rates and trip generation data pertaining to 20 Medical Centres. To inform the minimum car parking rate for the proposed development, Modus has selected survey sites with a medium-high Accessibility Score (i.e > 100). The Accessibility Score refers to the site's capability to accommodate staff / patron trips outside of private vehicle trips (such as public transport, walking etc.).

Provided that the proposed development is located within a 400m radius of seven (7) bus stops, and is also located in walking distance to various Commercial / Retail uses and Residential precincts, the subject site is considered to have a medium-high accessibility score.

On this basis, the average peak parking accumulation rate for Medical Centres with medium-high accessibility scores (i.e > 100) is 3.4 spaces per 100 sq.m GFA. Application of this car parking rate for the proposed development yield (1,542 sq.m GFA) corresponds to a minimum parking provision of 53 spaces, of which the proposed development accords with.

On this basis, the reduced provision is considered acceptable from a traffic engineering perspective.

4.3 Parking Layout

Modus has conducted a design review of the car park against the design guidelines within Australian Standards AS2890.1 and AS2890.2. The compliance has been summarised in Table 4-3.

Table 4-3 Car Parking Layout Compliance

Design Criteria	AS2890.1 Requirement	Proposed Design	Compliant
Parking Bays			
Bay Width – Visitor Spaces	2.6m	2.6m	✓
Bay Width – PWD spaces	2.4m width with a 2.4m wide shared zone	2.6m width with a 2.4m wide shared zone	✓
Bay Width – Ambulance Bay	3.5m	3.6m	✓
Bay Length – General (Class 3)	5.4m	5.4m	✓
Bay Length – PWD spaces	5.4m	5.4m	✓
Bay Length – Ambulance Bay	6.4m	6.7m	✓
Bay Length – Tandem spaces	10.8m	10.8m	✓
Parking Aisles			
Parking Aisle Width	5.8m	5.8m (min)	✓
Maximum Parking Aisle Length	100m	< 100m	✓
Parking Clearance (any obstruction exceeding 0.15m)	0.3m	> 0.3m	✓
Blind Aisle Extension	1.0m	1.0m (min)	✓
Height Clearance			
General Vehicle	2.1m	>2.1m	✓
PWD Vehicle	2.4m	>2.4m	✓
Service Vehicle (Ambulance)	3.5m	>3.5m	✓

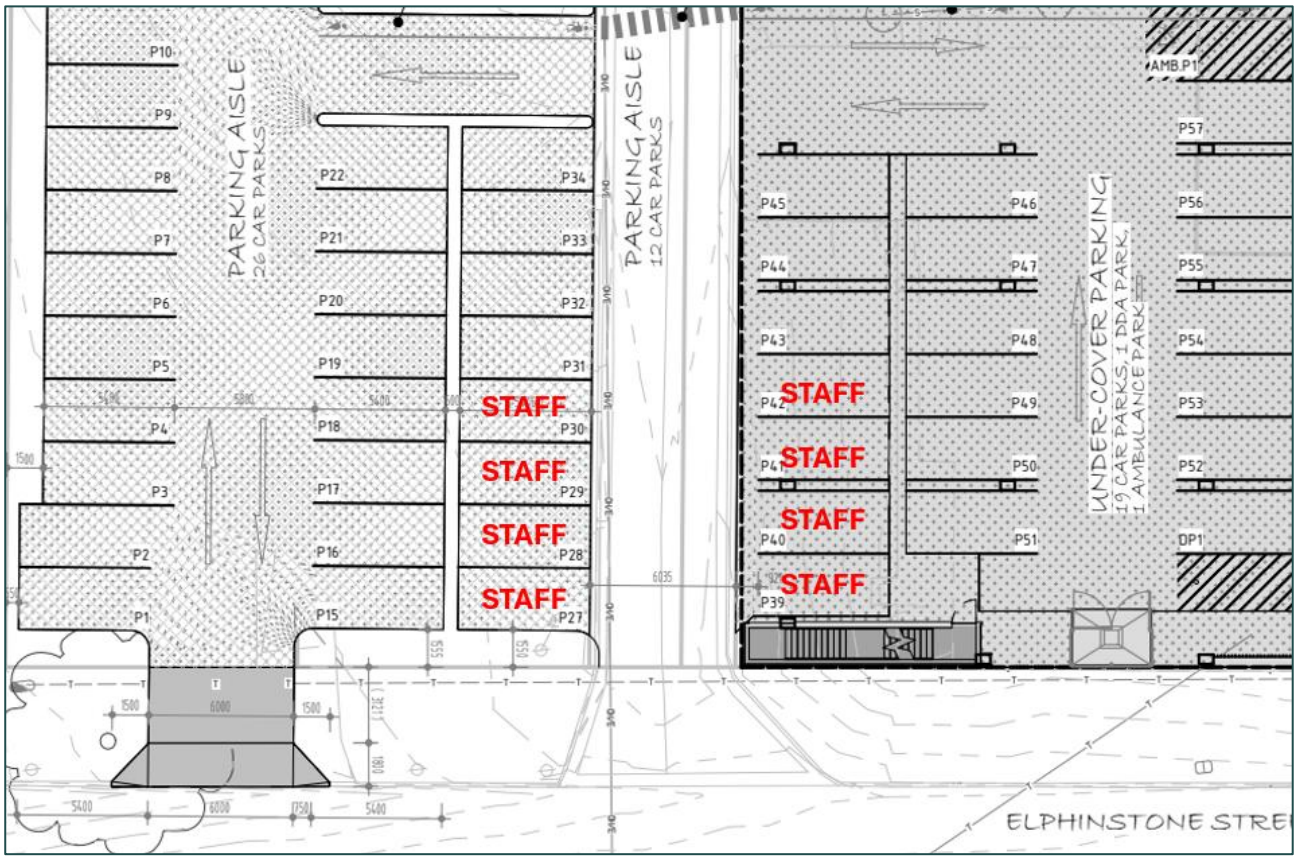
Therefore, the proposed parking layout is compliant with the requirements of Australian Standards AS2890.1 and AS2890.2.

4.4 Vehicle Access Via Ascot Lane

As part of the proposed development, it is proposed that direct vehicle access to a specific number of parking spaces occurs via Ascot Lane.

To accommodate low vehicle turnover near the Elphinstone Street / Ascot Lane intersection, Modus recommends that staff parking allocation be accommodated as illustrated on Figure 4-1.

Figure 4-1 Recommended Staff Parking Allocation



4.5 Queueing Provision

In accordance with Table 3.3 of Australian Standards AS2890.1, the proposed development is required to provide a minimum queuing provision of two (2) vehicles (equivalent to 12.0m in length) from the property boundary to the first point of conflict.

This requirement is achieved at the two (2) crossovers along Ascot Lane. However, it is not met at the crossover along Elphinstone Street, where the first point of conflict (a car parking bay) is located within 2.0m of the property boundary.

This shortfall is considered acceptable, as the presence of multiple alternative crossovers along Ascot Lane provides sufficient access and dispersal of vehicles, ensuring that safe and efficient entry and exit can be maintained. On this basis, the queuing provision on site is considered acceptable from a traffic engineering perspective.

4.6 Pedestrian Facilities

To ensure safe and efficient pedestrian movements across Ascot Lane to the western car parking area, the development accommodates a 1.0m zebra footpath across Ascot Lane that connects to shared pedestrian / vehicle arrangements in the eastern and western parking areas.

The zebra footpath is located approximately 30m north of the Elphinstone Street / Ascot lane intersection, in which vehicle movements along Ascot Lane will be at low speeds via a one-way arrangement.

Therefore, Modus considers the location and provision of the pedestrian footpath across Ascot Lane to be acceptable.

4.7 Servicing Arrangements

4.7.1 General Servicing

Based on the nature and scale of the proposed development, the largest service vehicle anticipated for the proposed development is an Ambulance / SRV.

On this basis, Modus has conducted a swept path assessment (provided at **Appendix B**), which demonstrates that an SRV can safely manoeuvre into, within and out of the development site in forward gear while maintaining 300mm clearance to obstructions.

Therefore, the proposed general servicing arrangement is considered acceptable.

4.7.2 Refuse Collection

It is anticipated that refuse collection will occur via Ascot Lane in line with the existing servicing arrangements, in which bins are to be presented near Ascot Lane on scheduled refuse collection days for servicing within Ascot Lane.

5 Traffic Assumptions

5.1 Study Intersections

The study intersections for the assessment are outlined in Figure 5-1 and are detailed in Table 5-1.

Figure 5-1 Study Intersections

Table 5-1 Study Intersections

Intersection ID	Intersection	Formation
1	Musgrave Street / Elphinstone Street	Signalised
2	Ascot Lane / Elphinstone Street	Priority Controlled
3	Site Access / Elphinstone Street	Priority Controlled

5.2 Background Traffic Volumes

5.2.1 Intersection Count Data

To assess the existing traffic conditions at the study intersections, Modus utilised the traffic surveys undertaken by Austraffic during the AM and PM peak periods on Tuesday, 12th August 2025. A copy of the traffic survey data is provided at **Appendix C.**

5.2.2 Ascot Lane Volumes

Furthermore, Modus notes that background volumes were not commissioned along the Ascot Lane. For the purposes of the assessment herein, Modus has assumed the peak hour volumes along Ascot Lane are 5% of the total volumes approaching from the east and west. This is demonstrated on the Traffic Network Flow Diagrams provided at **Appendix D.**

5.3 Traffic Growth

Modus has adopted the TMR annual segment report for Musgrave Street within proximity to the subject site to inform the historic growth rate. Based on the TMR annual segment report for Musgrave Street (TMR Segment Site 60102, Site 61076, Site 160075 and Site 160071), the average linear growth rate observed within the previous 10-year period was 0.27% per annum.

Therefore, Modus has conservatively applied an average linear growth rate of 1% per annum to inform future background traffic volumes.

5.4 Development Traffic Generation

5.4.1 Proposed Traffic Generation

Modus has referenced the TMR Traffic Generation Data to determine the traffic generation of the proposed development for a Medical Centre use. The resulting traffic generation estimates are presented in Table 5-2.

Table 5-2 Proposed Development Traffic Generation

Land Use	Yield	Traffic Generation Rates		Traffic Generation	
		AM Peak	PM Peak	AM Peak	PM Peak
Medical Centre	1,542 sq.m	9.81 vph per 100 sq.m	5.8 vph per 100 sq.m	**152 vph**	**90 vph**

The proposed development is anticipated to generate up to 152 vph in the AM and 90 vph in the PM peak periods.

5.5 Development Traffic Distribution

5.5.1 Inbound / Outbound Distribution

The peak hour trip generation is inclusive of inbound and outbound movements. The adopted directional trip distribution is outlined in Table 5-3.

Table 5-3 Proposed Development Traffic Distribution

Land Use	AM Peak		PM Peak	
	IN	OUT	IN	OUT
Medical Centre	50%	50%	50%	50%

Therefore, the inbound and outbound traffic generation of the development is outlined in Table 5-4.

Table 5-4 Proposed Development VPH Distribution

Land Use	Peak Hour In / Out Volumes			
	AM IN	AM OUT	PM IN	PM OUT
Medical Centre	76 vph	76 vph	45 vph	45 vph

5.5.2 External Directional Distribution

Modus has applied external directional distributions at the Site Access / Elphinstone Street intersection and Ascot Lane / Elphinstone Street intersection based on the surrounding attractors and proximity to higher-order roads.

A copy of the Traffic Network Flow Diagram has been provided at **Appendix D.**

6 Operational Criteria

6.1 Assessment Scenarios

To determine the impact of the development on the existing road network, each study intersection has been analysed for the AM and PM peak periods, assessing the development related traffic outlined in the previous report section. The SIDRA results and layouts are provided in **Appendix E**.

In accordance with the TMR Guide to Traffic Impact Assessments (GTIA), the impact assessment year for the site assessed should be the year of opening and 10 years after the year of opening for proposed intersections.

For the assessment herein, Modus has assumed that the proposed development will be operational in Year 2028 and therefore indicates the design horizon assessment Year 2038. Table 6-1 summarises the impact assessment scenarios.

Table 6-1 Assessment Scenarios

Impact Assessment Scenario	Study Intersections
2028 BG	1 and 2
2028 BG + DEV	1, 2 and 3
2038 BG	1 and 2
2038 BG + DEV	1, 2 and 3

6.2 Assessment Criteria

6.2.3 Intersection Degree of Saturation

The performance of each study intersection has been analysed using SIDRA Intersection 9.1 (SIDRA). SIDRA is the primary industry modelling software that estimates the capacity and performance of intersections SIDRA analyses an intersection's Degree of Saturation (DOS), queues and delays. DOS is a measure of the proportion of traffic entering an intersection relative to the intersection's capacity.

Provided that the study intersections are signalised and priority-controlled, **the DOS threshold as defined by TMR is 0.90 and 0.80 for signalised and priority-controlled intersections, respectively.** If DOS exceeds the abovementioned threshold, it indicates the intersection is nearing its practical capacity and upgrade works may be required. Above these threshold values, users of the intersection are likely to experience increasing delays and queueing.

6.2.4 Intersection Delay

The TMR *Guide to Traffic Impact Assessments* (GTIA) recognises the intersection delay as a greater indicator of intersection performance in comparison to the previous TMR *Guidelines for Assessment of Road Impacts of Development* (GARID) significance on the degree of saturation (DOS). For priority-controlled intersections, where the average peak-hour delays for any movement exceed 42 seconds, as outlined in the GTIA, the intersection should be upgraded for safety reasons.

6.2.5 Intersection Queue Lengths

The 95th percentile queue relates to the queue length, which 95% of all observed queue lengths during the assessment hour fall under, or in other terms, the length which 5% of all observed queues exceed. This provides an indication of the maximum queue length which should be designed for such that upstream lanes are not adversely impacted.

7 Operational Assessment

7.1 Intersection 1: Musgrave Street / Elphinstone Street

The Musgrave Street / Elphinstone Street intersection is an existing four-way, signalised intersection where Musgrave Street is the major road. Figure 7-1 illustrates the existing intersection formation and SIDRA layout for this study intersection.

Figure 7-1 Musgrave Street / Elphinstone Street Intersection and SIDRA Layout

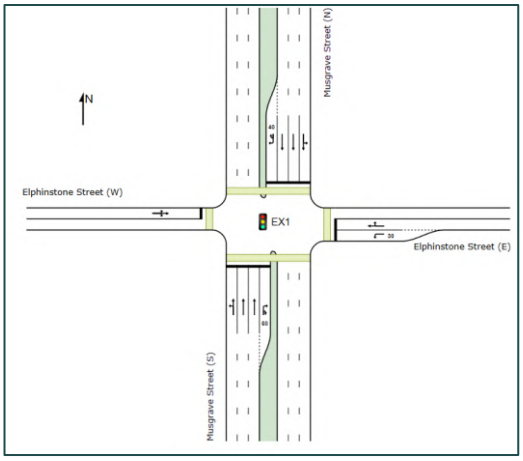


Table 7-1 outlines the SIDRA Assessment results for the Musgrave Street / Elphinstone Street intersection for the background scenarios and with development traffic scenarios. The SIDRA results and layouts are provided in **Appendix E.**

Table 7-1 Musgrave Street / Elphinstone Street Intersection - SIDRA Results

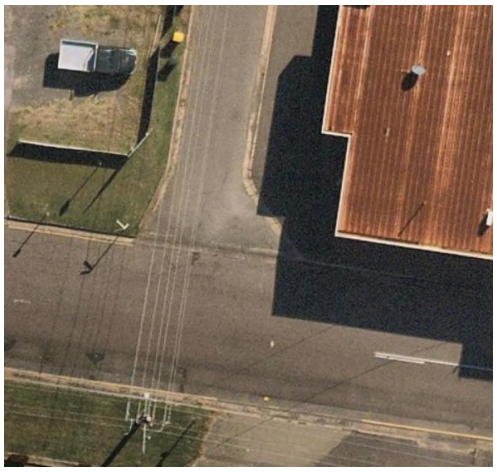
Scenario	DOS	Average Delay	95th %ile Queue	Critical Movement
AM Peak Period (120 Second Cycle Time)				
2028 BG	0.767	55.7 sec	131.7m	Musgrave Street (S)
2028 BG + DEV	0.767	56.6 sec	134.2m	Musgrave Street (S)
2038 BG	0.843	59.6 sec	154.5m	Musgrave Street (S)
2038 BG + DEV	0.843	60.7 sec	158.4m	Musgrave Street (S)
PM Peak Period (120 Second Cycle Time)				
2028 BG	0.725	48.7 sec	154.3m	Musgrave Street (S)
2028 BG + DEV	0.720	48.5 sec	156.7m	Musgrave Street (S)
2038 BG	0.798	51.0 sec	178.4m	Musgrave Street (S)
2038 BG + DEV	0.798	52.0 sec	186.1m	Musgrave Street (S)

Table 7-1 indicates that the Musgrave Street / Elphinstone Street intersection operates within the acceptable operational capacity thresholds for all assessment scenarios.

7.2 Intersection 2: Ascot Lane / Elphinstone Street

The Ascot Lane / Elphinstone Street intersection is an existing three-way, priority-controlled intersection where Elphinstone Street is the major road. Figure 7-2 illustrates the existing intersection formation and SIDRA layout for this study intersection.

Figure 7-2 Ascot Lane / Elphinstone Street Intersection Existing and SIDRA Layout



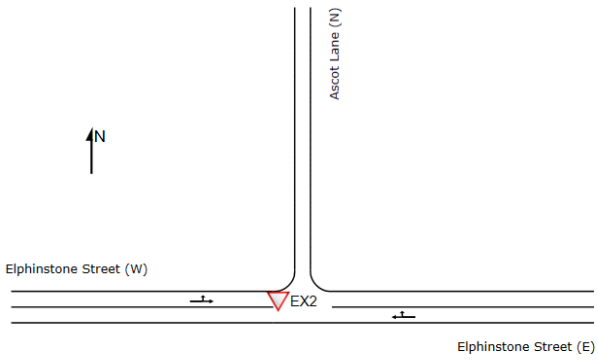


Table 7-2 outlines the SIDRA Assessment results for the Ascot Lane / Elphinstone Street intersection for the background scenarios and with development traffic scenarios. The SIDRA results and layouts are provided in **Appendix E.**

Table 7-2 Ascot Lane / Elphinstone Street Intersection - SIDRA Results

Scenario	DOS	Critical Delay	95th %ile Queue	Critical Movement
AM Peak Period				
2028 BG	0.021	5.7 sec	0.1m	Elphinstone Street (E)
2028 BG + DEV	0.070	6.0 sec	2.4m	Elphinstone Street (E)
2038 BG	0.023	5.7 sec	0.1m	Elphinstone Street (E)
2038 BG + DEV	0.072	6.0 sec	2.5m	Elphinstone Street (E)
PM Peak Period				
2028 BG	0.026	5.7 sec	0.1m	Elphinstone Street (E)
2028 BG + DEV	0.055	5.9 sec	1.7m	Elphinstone Street (E)
2038 BG	0.029	5.7 sec	0.1m	Elphinstone Street (E)
2038 BG + DEV	0.058	5.9 sec	1.8m	Elphinstone Street (E)

Therefore, Table 7-2 indicates that the Ascot Lane / Elphinstone Street intersection operates within the acceptable operational capacity thresholds for all assessment scenarios.

7.3 Intersection 3: Site Access / Elphinstone Street intersection

The Site Access / Elphinstone Street intersection is a priority-controlled three-way intersection where Elphinstone Street is the major road. Figure 7-3 illustrates the proposed intersection formation and SIDRA layout for this study intersection.

Figure 7-3 Site Access / Elphinstone Street Intersection Proposed and SIDRA Layout

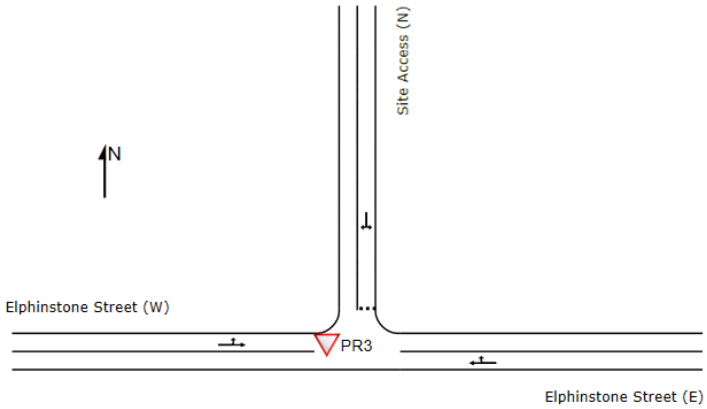


Table 7-3 outlines the SIDRA Assessment results for the Site Access / Elphinstone Street intersection for the background with development traffic scenarios. The SIDRA results and layouts are provided in **Appendix E.**

Table 7-3 Site Access / Elphinstone Street Intersection - SIDRA Results

Scenario	DOS	Critical Delay	95th %ile Queue	Critical Movement
AM Peak Period				
2028 BG + DEV	0.035	5.7 sec	1.0m	Site Access (N)
2038 BG + DEV	0.035	5.8 sec	1.0m	Site Access (N)
PM Peak Period				
2028 BG + DEV	0.026	5.8 sec	0.6m	Elphinstone Street (E)
2038 BG + DEV	0.028	5.8 sec	0.6m	Elphinstone Street (E)

Therefore, Table 7-3 indicates that the Site Access / Elphinstone Street intersection operates within the acceptable operational capacity thresholds for all assessment scenarios.

7.4 Intersection Delay Assessment

In accordance with the GTIA requirements for no net worsening to baseline road network operations, this assessment has investigated the delay impact of the development traffic on the network at the Elphinstone Street / Musgrave Street intersection.

The assessment has reviewed whether the increase in average delay at the intersections exceeds 5%. The average delay has been calculated in accordance with the GTIA by taking the aggregate average delay across the intersections for both the baseline scenario (2028 BG) and the With Development scenario (2028 BG + DEV).

$$\mathrm{ID} = \sum_{i=1}^{n} WD - \sum_{i=1}^{n} BC$$

where:

ID	is aggregate intersection-delay impact vehicle-minutes.
WD	is 'with development' intersection vehicle-minutes for design peak periods. This is calculated by multiplying the 'with development' average delay by movement to the base case volume on each movement, thus not counting the impact as delays to development traffic, only to pre-existing traffic that is affected by these additional delays.
BC	is base case intersection vehicle-minutes for design peak periods
n	is the number of intersections in the impact assessment area
i	is each intersection within the impact assessment area.

The results of the network impact assessment for the Musgrave Street / Elphinstone Street intersection are summarised below in Table 7-4. The detailed movement delays and veh-min values have been detailed on the Network Flow Diagram provided at **Appendix D**.

Table 7-4 Delay Assessment

Assessment Scenario	Aggregate Delay (veh-min)	
	AM Peak	PM Peak
2028 Background	1,923	1,982
2028 Background + Dev	1,943	1,963
Difference (Dev Impact)	+20	-19
Dev Delay Impact (%)	1.1%	-0.9%
Average Delay Impact (%)	**0.1%**	

The Network Average Delay Impact is less than 5% at the Musgrave Street/ Elphinstone Street intersection and therefore does not trigger mitigation upgrades for the intersection.

8 Summary

Therefore, Modus is of the opinion that the proposed development is acceptable from a traffic engineering perspective and will not have a substantial impact on the safety or efficiency of the external road network.

Should there be any issue with the above, please contact the undersigned.

Yours sincerely,

HSingh

MODUS TRANSPORT AND TRAFFIC ENGINEERING

Harj Singh
Executive Director (RPEQ 22364)

APPENDIX A

Development Plans

LOCALITY PLAN

NOT TO SCALE

AREA SCHEDULE[1]	
LABEL	AREA
GROUND FLOOR	
CHEMIST	201 m²
CONSULTANTS	111 m²
COMMON AREA[2]	111 m²
TOTAL GF GFA	423 m²
FIRST FLOOR	
GP CLINIC	751 m²
CONSULTANTS	300 m²
COMMON AREA	68 m²
TOTAL 1F GFA	1119 m²

[1] CONCEPTUAL AREAS ONLY. TO BE CONFIRMED AFTER LAYOUT IS CONFIRMED.
[2] INCLUDES GF PORTION OF FIRE ISOLATED EXITS FOR GFA

VALUES TO BE REVISED

BEFORE YOU DIG www.byda.com.au

EXISTING SERVICES CHECKLIST		
(INFORMATION BASED PURELY ON JFP SURVEYOR, BYDA & RRC PROVIDED INFORMATION. MAY NOT BE AN EXHAUSTIVE SEARCH)		
SERVICE	FINDINGS	SOURCE
WATER	YES	JFP
SEWER	YES	JFP
STORMWATER	YES	JFP
GAS	YES	JFP
TELECOMS	YES	JFP

SERVICE INFORMATION ON THIS DRAWING HAS BEEN SOURCED FROM ROCKHAMPTON REGIONAL COUNCIL ONLINE MAPPING AND APA (GAS SERVICES) THE INFORMATION IS PROVIDED FOR REFERENCE ONLY. BUILDERS ARE TO USE BEFORE YOU DIG AUSTRALIA PRIOR TO ANY/ALL EXCAVATION AND SITE WORKS. NOTE THAT INFORMATION REGARDING TELSTRA/TELECOM LINES HAS NOT BEEN PROVIDED DUE TO TELSTRA CHARGES. ELECTRICAL SERVICES HAVE NOT BEEN LOCATED OR SHOWN

NORTH

1F PROPOSED GP CLINIC

1F PROPOSED CONSULTANT TENANCY

PROPOSED AMBULANCE

AMB.P1

PARKING AISLE

PARKING AISLE

ASCOT LANE

UNDER-COVER PARKING

GF PROPOSED CHEMIST TENANCY

GF PROPOSED CONSULTANT TENANCY

MUSGRAVE STREET

ELPHINSTONE STREET

P1 P2 P3 P4 P5 P6 P7 P8 P9 P10 P11 P12 P13 P14 P15 P16 P17 P18 P19 P20 P21 P22 P23 P24 P25 P26 P27 P28 P29 P30 P31 P32 P33 P34 P35 P36 P37 P38 P39 P40 P41 P42 P43 P44 P45 P46 P47 P48 P49 P50 P51 P52 P53 P54 P55 P56 P57 DP1

SITE PLAN

SCALE: - 1:200
LOTS 30 & 31 ON RP603419, LOT 1 ON RP607576 & LOT 100 ON SP251414
TOTAL AREA: 2166m²
LOCALITY OF BERSERKER
LOCAL GOVT: ROCKHAMPTON

00 5000 10000 SCALEBAR - 1:250

FOR APPROVAL

NOT FOR CONSTRUCTION

REV	DESCRIPTION	DATE	BY	APPVD
E	CONCEPTUAL APPEARANCE UPDATE	17.09.25	JW	
D	NEW CONCEPT - INTEGRATED PARKING	15.08.25	JW	
C	NEW BUILD - CONCEPT	28.07.25	AB	
B	RENOVATION - CONCEPT	10.12.24	AN	
A	RENOVATION INITIAL CONCEPT LAYOUT	06.12.24	AN	

REVISION SCHEDULE

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QUALITY DESIGN. CONCEPT TO COMPLETION.

A.S. BUENEN P/L T/a. GLADSTONE DRAFTING
INDUSTRIAL - MECHANICAL - STRUCTURAL DESIGN
DOMESTIC & COMMERCIAL BUILDING DESIGNERS
QBCC Lic. No. 1191231 ABN 96 081 040 600
1/48 GOONDOON STREET, GLADSTONE, QUEENSLAND, 4680
PH: 4972 6066
EMAIL: design@gladstonedrafting.com.au
WEB: www.gladstonedrafting.com.au

DESIGNED BY: A.BUENEN
DRAWN BY: A.BUENEN
CHECKED BY: -

TITLE: PROPOSED ASCOT SUPER CLINIC
177 - 179 MUSGRAVE STREET BERSERKER, QLD
DUTTON HOLDINGS
SITE PLAN

SCALE: 1 : 250
REVISION: E
JOB No.: GD2682
SHEET No.: A01.00
A3

CAR PARKING CALCULATION				
DESCRIPTION (TO RRC 9.3.1.3.2)	CAR PARKING REQUIRED			BICYCLE PARKING (PER SC6.4.7)
HEALTH CARE SERVICE	1 SPACE PER 25 m² OF GFA; PLUS 1 SPACE FOR SPECIAL USE VEHICLES; AND 1 EMERGENCY AMBULANCE SPACE			1 PER 400 m² GFA (EMPLOYEE) 1 PER 200 m² GFA (VISITOR)
DESCRIPTION (TO RRC 9.3.1.3.2)	GFA	CAR PARKS REQ'D	BICYCLES (EMPLOYEE)	BICYCLES (VISITOR)
HEALTH CARE SERVICE				
- CHEMIST (GF)	201 m²	8.0	0.50	1.00
- COMMON (GF)	111 m²	4.4	0.28	0.56
- CONSULTANTS (GF)	111 m²	4.4	0.28	0.56
- GP (1F)	751 m²	30.0	1.88	3.76
- COMMON (1F)	68 m²	2.7	0.17	0.34
- CONSULTANTS (1F)	300 m²	12.0	0.75	1.5
TOTAL REQUIRED	1542 m²	61.5 (62) + 2 (SPECIAL, AMBO)	3.86 (4)	7.72 (8)
TOTAL PROVIDED		57 + 2 (SPECIAL, AMBO)	TBD	TBD
DIFFERENCE		-5	TBD	TBD

MINOR ADJUSTMENTS REQUIRED, TO BE REVISED

1 m WIDE PEDESTRIAN ACCESS PATH FROM EXTERNAL CAR PARKING TO NEW BUILDING ENTRY

NOTE: PREVIOUS REVISION WAS 797 m². THIS OPTION PROVIDES 325 m² ADDITIONAL GFA TO GP

PEDESTRIAN CROSSING AT ROAD

SHARED DRIVEWAY SPACE BETWEEN PEDESTRIAN ACCESS AND VEHICLES

PARKING AISLE
26 CAR PARKS

PARKING AISLE
12 CAR PARKS

UNDER-COVER PARKING
19 CAR PARKS, 1 DDA PARK, 1 AMBULANCE PARK

GF PROPOSED CHEMIST TENANCY

GF PROPOSED CONSULTANT TENANCY

MUSGRAVE STREET

ELPHINSTONE STREET

00 5000 10000 SCALEBAR - 1:250

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REVISION SCHEDULE

REV	DESCRIPTION	DATE	BY	APPVD
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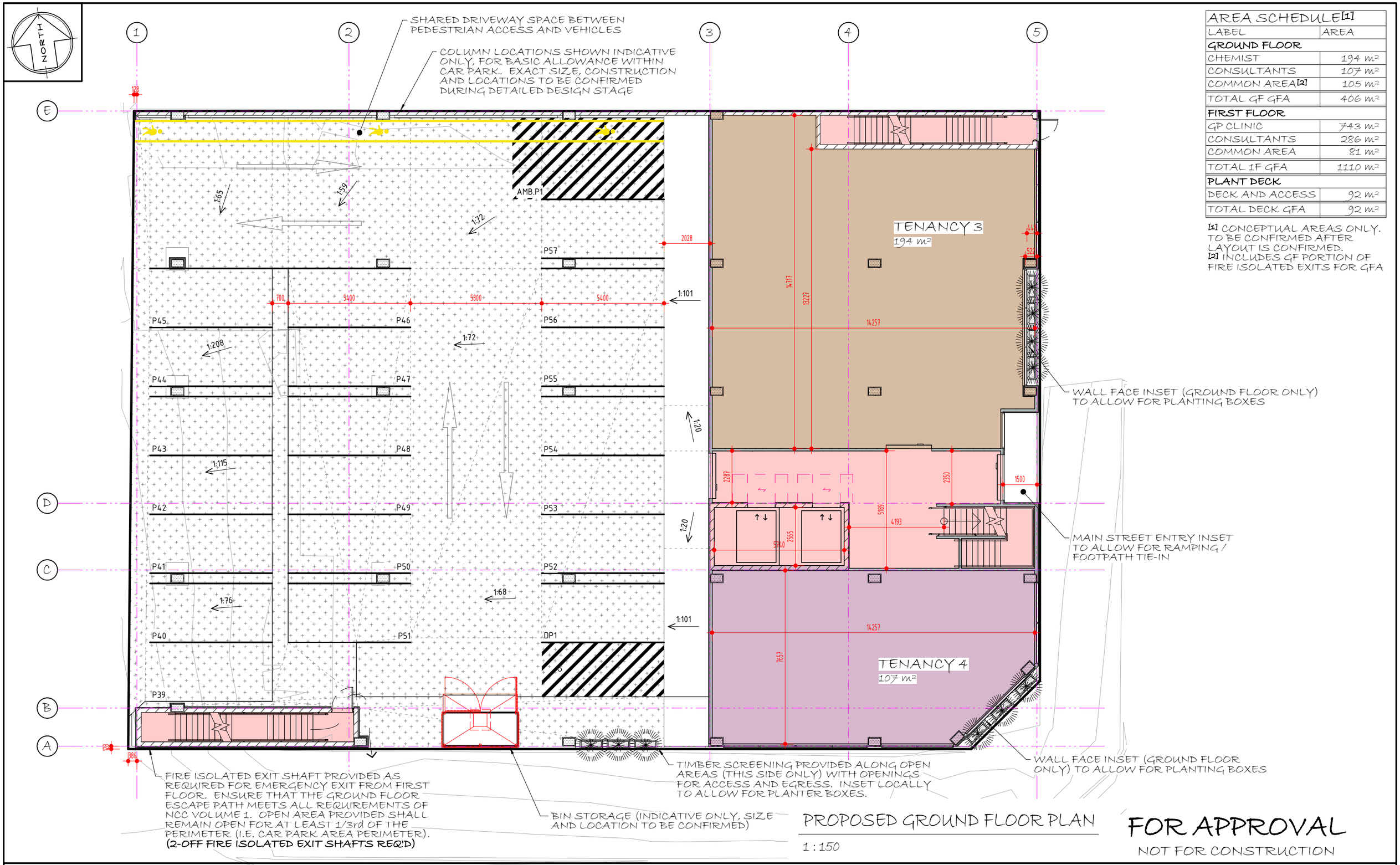
1/48 GOONDOON STREET, GLADSTONE, QUEENSLAND, 4680
PH: 4972 6066
EMAIL: design@gladstonedrafting.com.au
WEB: www.gladstonedrafting.com.au

DESIGNED BY: A.BUENEN
DRAWN BY: A.BUENEN
CHECKED BY: -

TITLE:
PROPOSED ASCOT SUPER CLINIC
177 - 179 MUSGRAVE STREET BERSERKER, QLD
DUTTON HOLDINGS
CAR PARKING PLAN

SCALE: 1 : 250
REVISION: E
JOB No.: GD2682
SHEET No.: A01.02
A3



AREA SCHEDULE[1]	
LABEL	AREA
GROUND FLOOR	
CHEMIST	194 m²
CONSULTANTS	107 m²
COMMON AREA[2]	105 m²
TOTAL GF GFA	406 m²
FIRST FLOOR	
GP CLINIC	743 m²
CONSULTANTS	286 m²
COMMON AREA	81 m²
TOTAL 1F GFA	1110 m²
PLANT DECK	
DECK AND ACCESS	92 m²
TOTAL DECK GFA	92 m²

[1] CONCEPTUAL AREAS ONLY. TO BE CONFIRMED AFTER LAYOUT IS CONFIRMED.
[2] INCLUDES GF PORTION OF FIRE ISOLATED EXITS FOR GFA

PROPOSED GROUND FLOOR PLAN

1 : 150

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REVISION SCHEDULE

REV	DESCRIPTION	DATE	BY	APPVD
E	CONCEPTUAL APPEARANCE UPDATE	17.09.25	JW	
D	NEW CONCEPT - INTEGRATED PARKING	15.08.25	JW	
C	NEW BUILD - CONCEPT	28.07.25	AB	
B	RENOVATION - CONCEPT	10.12.24	AN	
A	RENOVATION INITIAL CONCEPT LAYOUT	06.12.24	AN	

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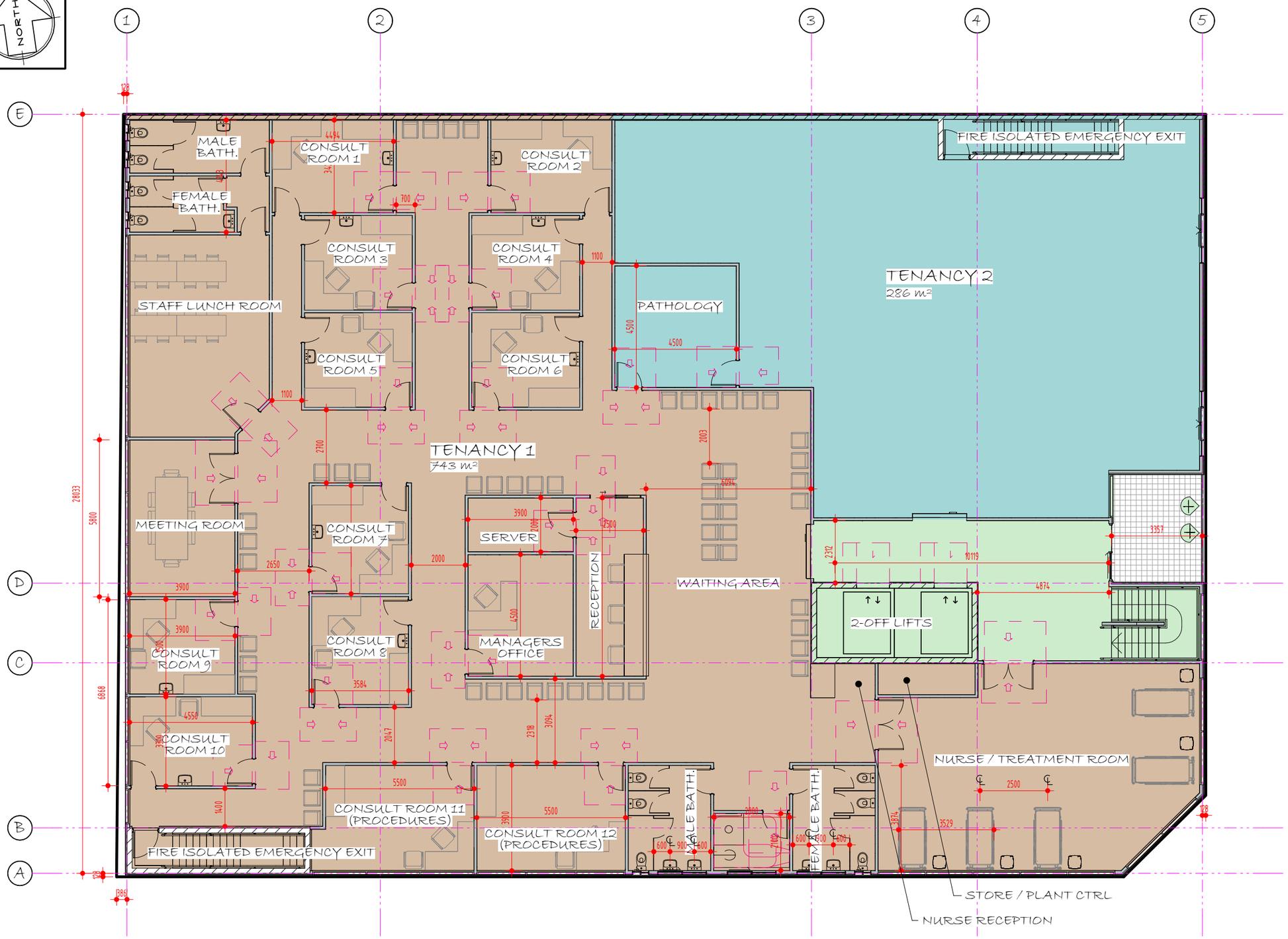
DRAWN BY: A.BUENEN
CHECKED BY: -

TITLE:
PROPOSED ASCOT SUPER CLINIC
177 - 179 MUSGRAVE STREET BERSERKER, QLD
DUTTON HOLDINGS
PROPOSED GROUND FLOOR PLAN

SCALE: 1 : 150
REVISION: E
JOB No.: GD2682
SHEET No.: A02.01
A3



PROPOSED FIRST FLOOR PLAN

1 : 150

AREA SCHEDULE[1]	
LABEL	AREA
GROUND FLOOR	
CHEMIST	194 m²
CONSULTANTS	107 m²
COMMON AREA[2]	105 m²
TOTAL GF GFA	406 m²
FIRST FLOOR	
GP CLINIC	743 m²
CONSULTANTS	286 m²
COMMON AREA	81 m²
TOTAL 1F GFA	1110 m²
PLANT DECK	
DECK AND ACCESS	92 m²
TOTAL DECK GFA	92 m²

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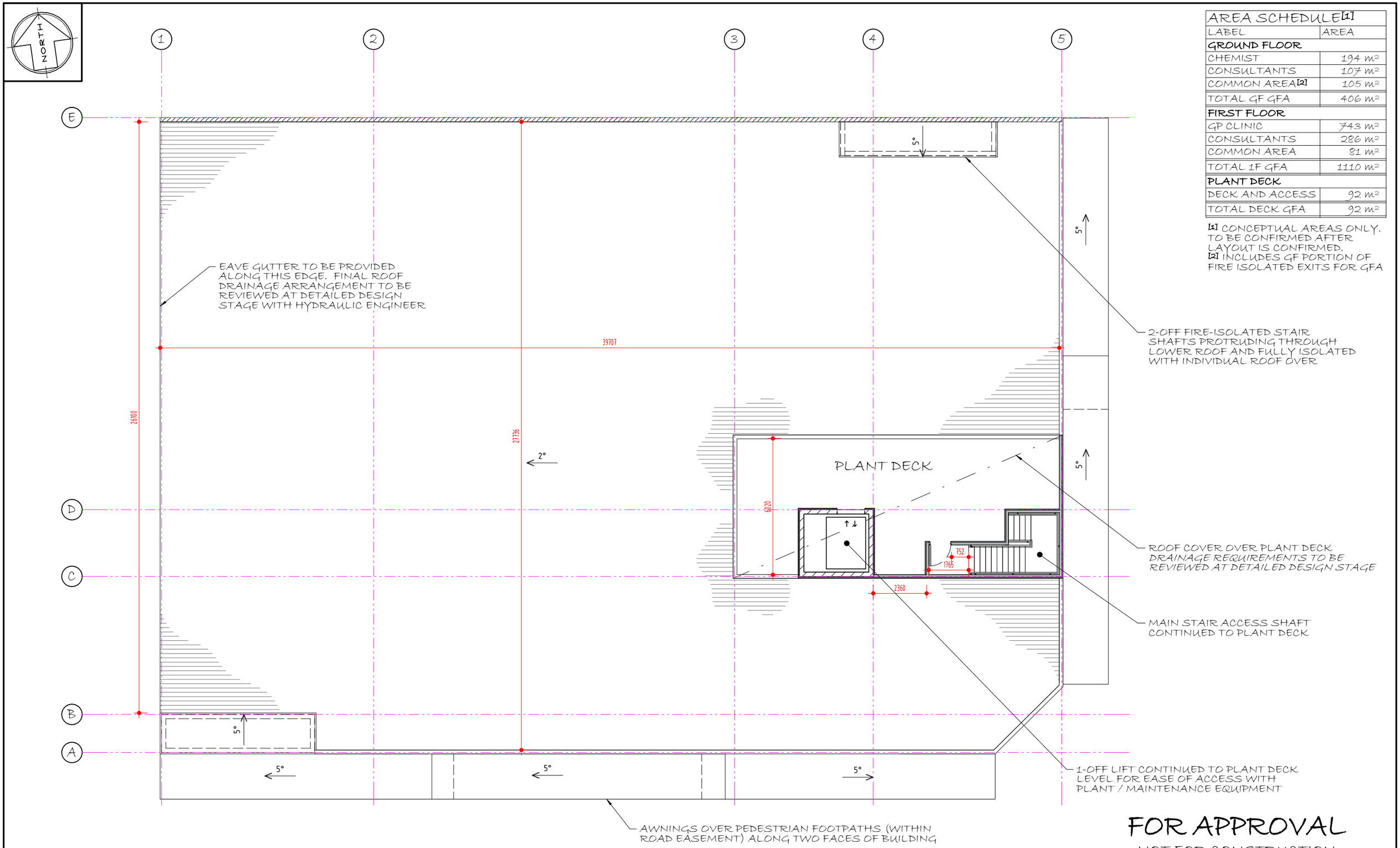
DRAWN BY: A.BUENEN
CHECKED BY: -

TITLE:
PROPOSED ASCOT SUPER CLINIC
177 - 179 MUSGRAVE STREET BERSERKER, QLD
DUTTON HOLDINGS
PROPOSED FIRST FLOOR PLAN

SCALE: 1 : 150
REVISION: E
JOB No.: GD2682
SHEET No.: A02.11
A3



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CONSULTANTS	286 m²
COMMON AREA	81 m²
TOTAL 1F GFA	1110 m²
PLANT DECK	
DECK AND ACCESS	92 m²
TOTAL DECK GFA	92 m²

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FOR APPROVAL

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REV	DESCRIPTION	DATE	BY	APPVD
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REVISION SCHEDULE

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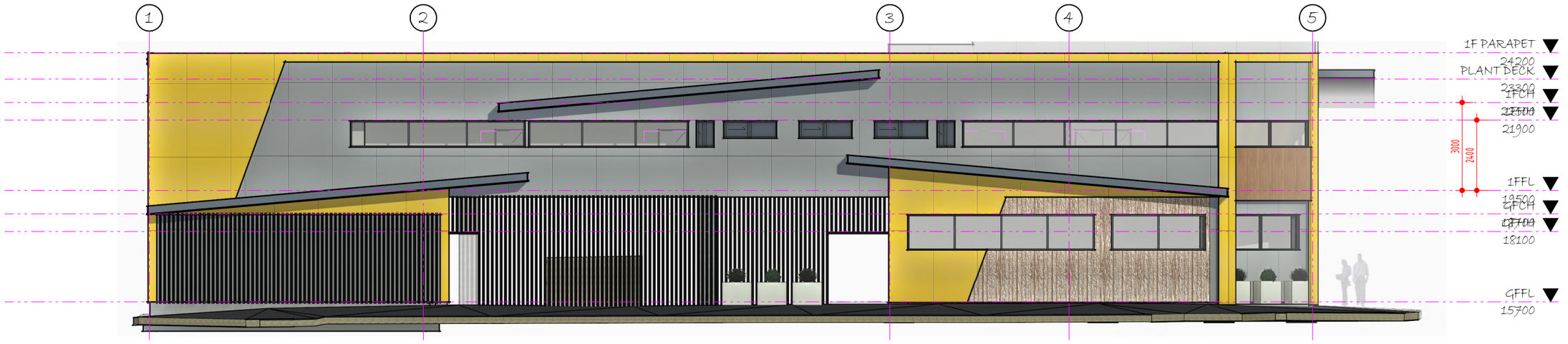
PH: 4972 6066
EMAIL: design@gladstonedrafting.com.au
WEB: www.gladstonedrafting.com.au

DESIGNED BY: A.BUENEN
DRAWN BY: J.WALKER
CHECKED BY: -

TITLE:
PROPOSED ASCOT SUPER CLINIC
177 - 179 MUSGRAVE STREET BERSERKER, QLD
DUTTON HOLDINGS
PROPOSED PLANT DECK

SCALE: 1 : 150
REVISION: E
JOB No.: GD2682
SHEET No.: A02.20
A3



EAST ELEVATION

1 : 150

NORTH ELEVATION

1 : 100

00 2000 4000 SCALEBAR - 1:100

CONCEPT APPROVAL

NOT FOR CONSTRUCTION

REV	DESCRIPTION	DATE	BY	APPVD

REVISION SCHEDULE

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PH: 4972 6066
EMAIL: design@gladstonedrafting.com.au
WEB: www.gladstonedrafting.com.au

DESIGNED BY: A.BUENEN

DRAWN BY: XXX

CHECKED BY: -

TITLE:
PROPOSED ASCOT SUPER CLINIC
177 - 179 MUSGRAVE STREET BERSERKER, QLD
DUTTON HOLDINGS
ELEVATIONS, SHEET 1

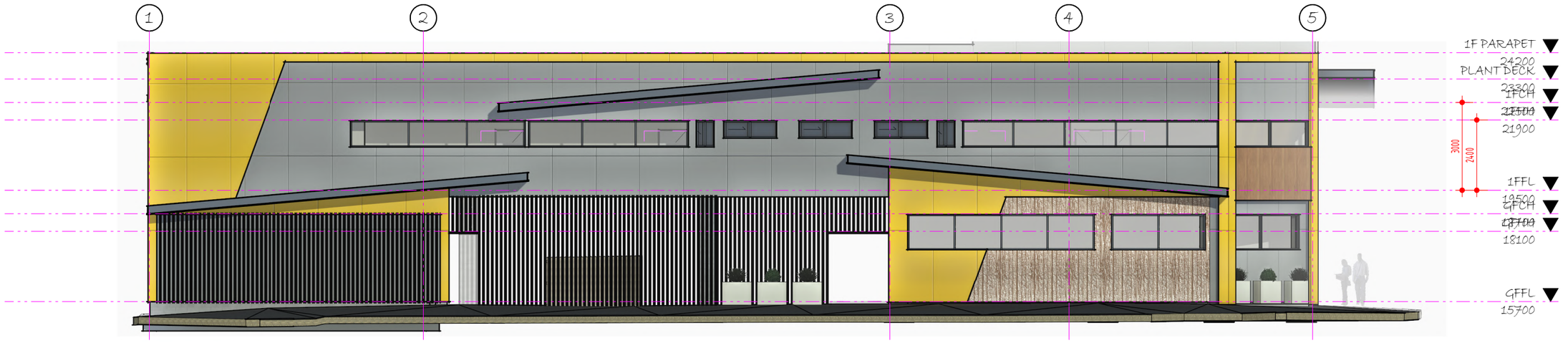
SCALE: As indicated

REVISION:

JOB No.: GD2682

SHEET No.: A03.00

A3



SOUTH ELEVATION

1 : 150

00 2000 4000 SCALEBAR - 1:100

EAST ELEVATION

1 : 100

FOR APPROVAL

NOT FOR CONSTRUCTION

REVISION SCHEDULE

REV	DESCRIPTION	DATE	BY	APPVD
E	CONCEPTUAL APPEARANCE UPDATE	17.09.25	JW	

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PH: 4972 6066
EMAIL: design@gladstonedrafting.com.au
WEB: www.gladstonedrafting.com.au

DESIGNED BY: A.BUENEN
DRAWN BY: J.WALKER
CHECKED BY: -

TITLE:
PROPOSED ASCOT SUPER CLINIC
177 - 179 MUSGRAVE STREET BERSERKER, QLD
DUTTON HOLDINGS
ELEVATIONS 1

SCALE: As indicated
REVISION: E
JOB No.: GD2682
SHEET No.: A03.00
A3

WEST ELEVATION

1 : 100

00 2000 4000 SCALEBAR - 1:100

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NOT FOR CONSTRUCTION

REV	DESCRIPTION	DATE	BY	APPVD
E	CONCEPTUAL APPEARANCE UPDATE	17.09.25	JW	

REVISION SCHEDULE

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WEB: www.gladstonedrafting.com.au

DESIGNED BY: A.BUENEN

DRAWN BY: XXX

CHECKED BY: -

TITLE:
PROPOSED ASCOT SUPER CLINIC
177 - 179 MUSGRAVE STREET BERSERKER, QLD
DUTTON HOLDINGS
ELEVATIONS 2

SCALE: 1 : 100

REVISION: E

JOB No.: GD2682

SHEET No.: A03.01

A3

NOTE: WORK-IN-PROGRESS (WIP) DRAWING PROVIDED FOR ALTERNATE COLOUR OPTION REVIEW ONLY.

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REV	DESCRIPTION	DATE	BY	APPVD
E	CONCEPTUAL APPEARANCE UPDATE	17.09.25	JW	

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WEB: www.gladstonedrafting.com.au

DESIGNED BY: A.BUENEN
DRAWN BY: J.WALKER
CHECKED BY: -

TITLE:
PROPOSED ASCOT SUPER CLINIC
177 - 179 MUSGRAVE STREET BERSERKER, QLD
DUTTON HOLDINGS
PERSPECTIVE STREET VIEW 1

SCALE: NTS
REVISION: E
JOB No.: GD2682
SHEET No.: ~~A00.03~~ SK00.03
A3

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REV	DESCRIPTION	DATE	BY	APPVD
E	CONCEPTUAL APPEARANCE UPDATE	17.09.25	JW	

REVISION SCHEDULE

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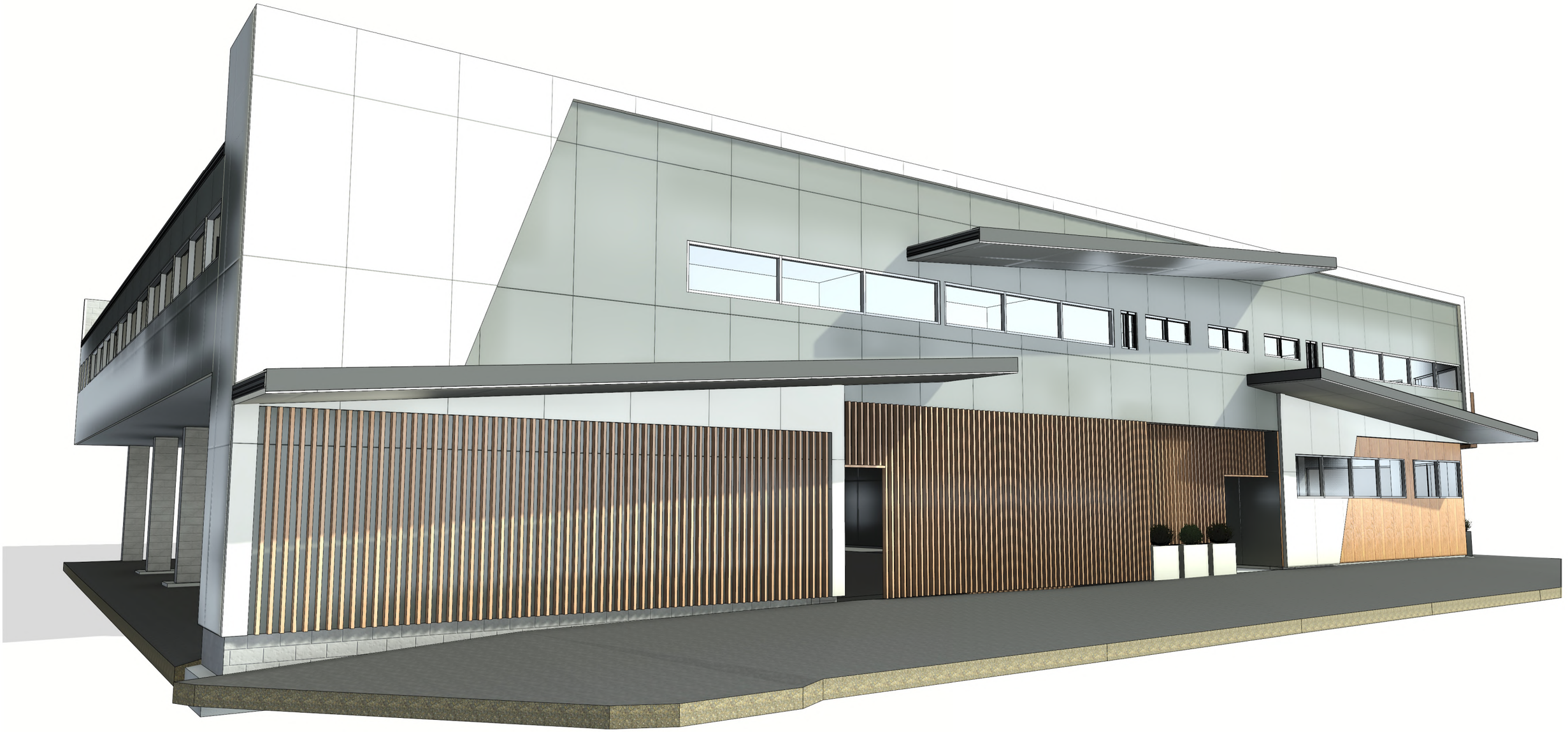
DESIGNED BY: A.BUENEN
DRAWN BY: J.WALKER
CHECKED BY: -

TITLE:
PROPOSED ASCOT SUPER CLINIC
177 - 179 MUSGRAVE STREET BERSERKER, QLD
DUTTON HOLDINGS
PERSPECTIVE STREET VIEW 2

SCALE:
REVISION: E

JOB No.: GD2682
SHEET No.: ~~A00.04~~ SK00.04
A3



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REV	DESCRIPTION	DATE	BY	APPVD
E	CONCEPTUAL APPEARANCE UPDATE	17.09.25	JW	

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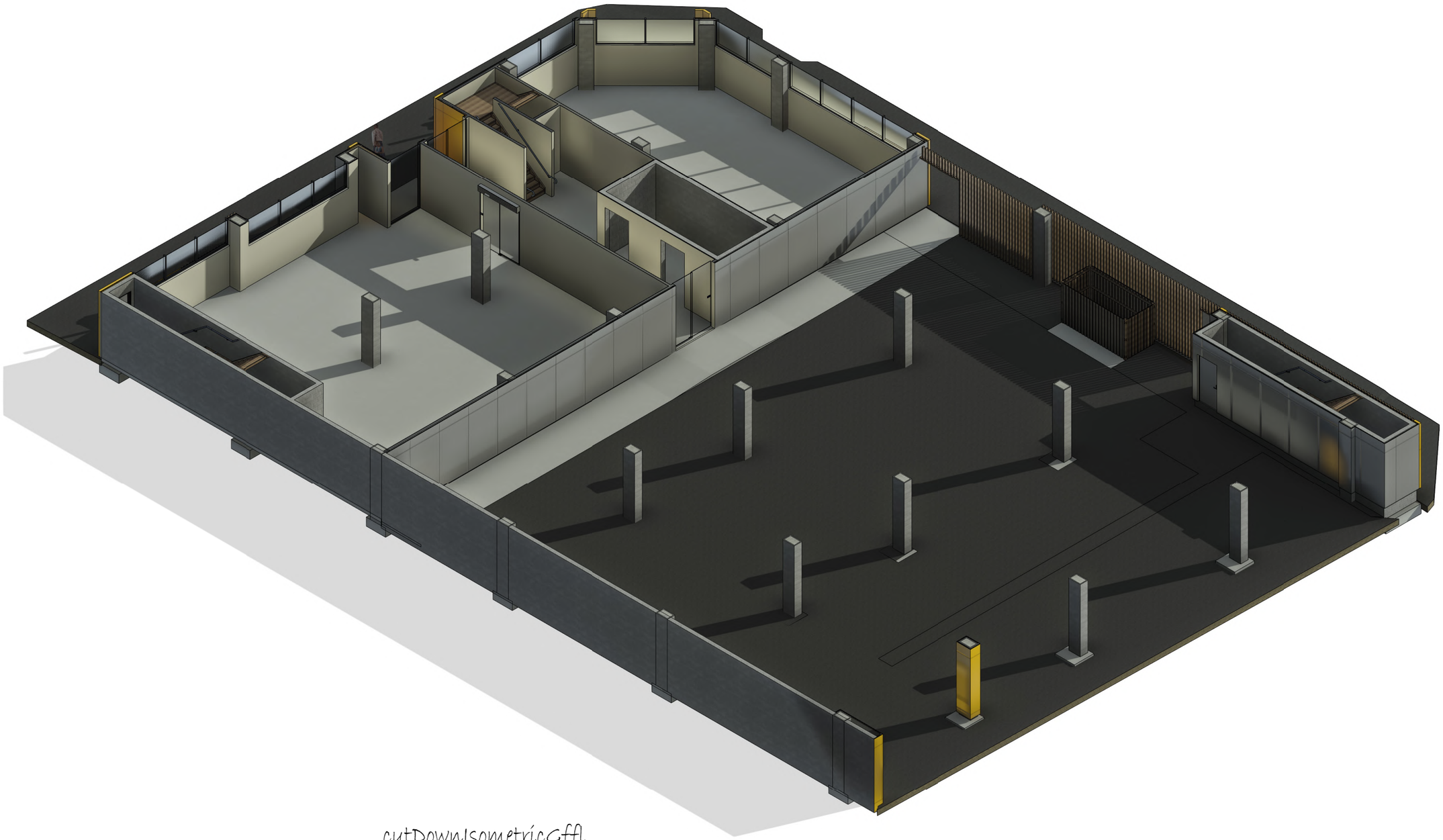
DESIGNED BY: A.BUENEN
DRAWN BY: J.WALKER
CHECKED BY: -

TITLE:
PROPOSED ASCOT SUPER CLINIC
177 - 179 MUSGRAVE STREET BERSERKER, QLD
DUTTON HOLDINGS
PERSPECTIVE STREET VIEW 3

SCALE:
REVISION: E

JOB No.: GD2682
SHEET No.: ~~A00.05~~ SK00.05
A3



cutDownIsometricGffl

NTS

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NOT FOR CONSTRUCTION

REV	DESCRIPTION	DATE	BY	APPVD
E	CONCEPTUAL APPEARANCE UPDATE	17.09.25	JW	

REVISION SCHEDULE

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QUALITY DESIGN. CONCEPT TO COMPLETION.

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DESIGNED BY: A.BUENEN

DRAWN BY: J.WALKER

CHECKED BY: -

TITLE:
PROPOSED ASCOT SUPER CLINIC
177 - 179 MUSGRAVE STREET BERSERKER, QLD
DUTTON HOLDINGS
CUT-DOWN ISOMETRIC VIEW 1

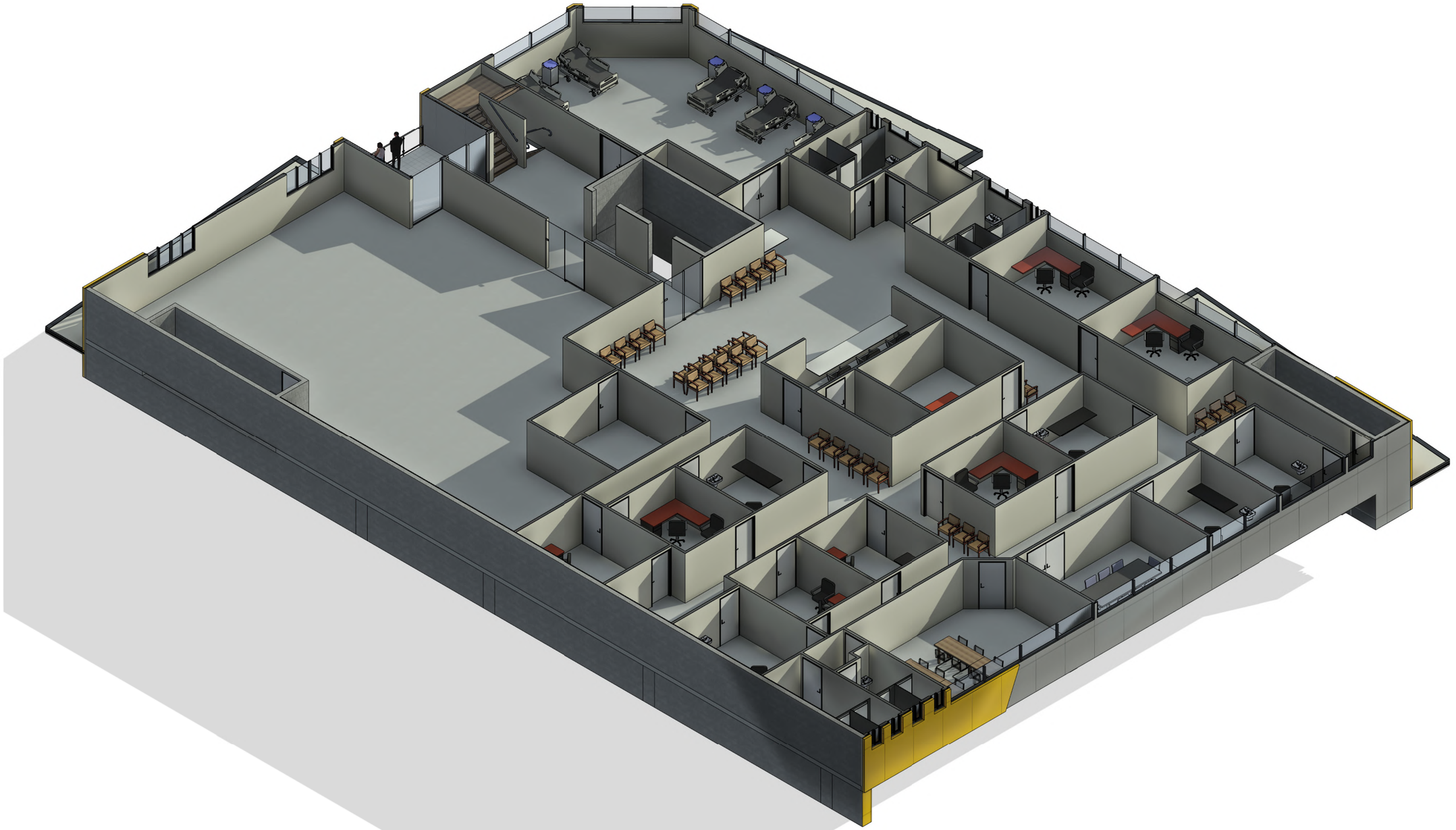
SCALE: NTS

REVISION: E

JOB No.: GD2682

SHEET No.: A00.01

A3



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NOT FOR CONSTRUCTION

REV	DESCRIPTION	DATE	BY	APPVD
E	CONCEPTUAL APPEARANCE UPDATE	17.09.25	JW	

REVISION SCHEDULE

GladstoneDrafting
QUALITY DESIGN, CONCEPT TO COMPLETION

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DESIGNED BY: A.BUENEN
DRAWN BY: J.WALKER
CHECKED BY: -

TITLE:
PROPOSED ASCOT SUPER CLINIC
177 - 179 MUSGRAVE STREET BERSERKER, QLD
DUTTON HOLDINGS
CUT-DOWN ISOMETRIC VIEW 2

SCALE: NTS
REVISION: E
JOB No.: GD2682
SHEET No.: A00.02
A3

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REV	DESCRIPTION	DATE	BY	APPVD
E	CONCEPTUAL APPEARANCE UPDATE	17.09.25	JW	

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WEB: www.gladstonedrafting.com.au

DESIGNED BY: A.BUENEN
DRAWN BY: J.WALKER
CHECKED BY: -

TITLE:
PROPOSED ASCOT SUPER CLINIC
177 - 179 MUSGRAVE STREET BERSERKER, QLD
DUTTON HOLDINGS
PERSPECTIVE STREET VIEW 1

SCALE: NTS
REVISION: E
JOB No.: GD2682
SHEET No.: A00.03
A3

CONCEPT APPROVAL

NOT FOR CONSTRUCTION

REV	DESCRIPTION	DATE	BY	APPVD
E	CONCEPTUAL APPEARANCE UPDATE	17.09.25	JW	

REVISION SCHEDULE

GladstoneDrafting
QUALITY DESIGN, CONCEPT TO COMPLETION

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DESIGNED BY: A.BUENEN
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CHECKED BY: -

TITLE:
PROPOSED ASCOT SUPER CLINIC
177 - 179 MUSGRAVE STREET BERSERKER, QLD
DUTTON HOLDINGS
PERSPECTIVE STREET VIEW 2

SCALE:
REVISION: E
JOB No.: GD2682
SHEET No.: A00.04
A3

CONCEPT APPROVAL

NOT FOR CONSTRUCTION

REVISION SCHEDULE

REV	DESCRIPTION	DATE	BY	APPVD
E	CONCEPTUAL APPEARANCE UPDATE	17.09.25	JW	

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WEB: www.gladstonedrafting.com.au

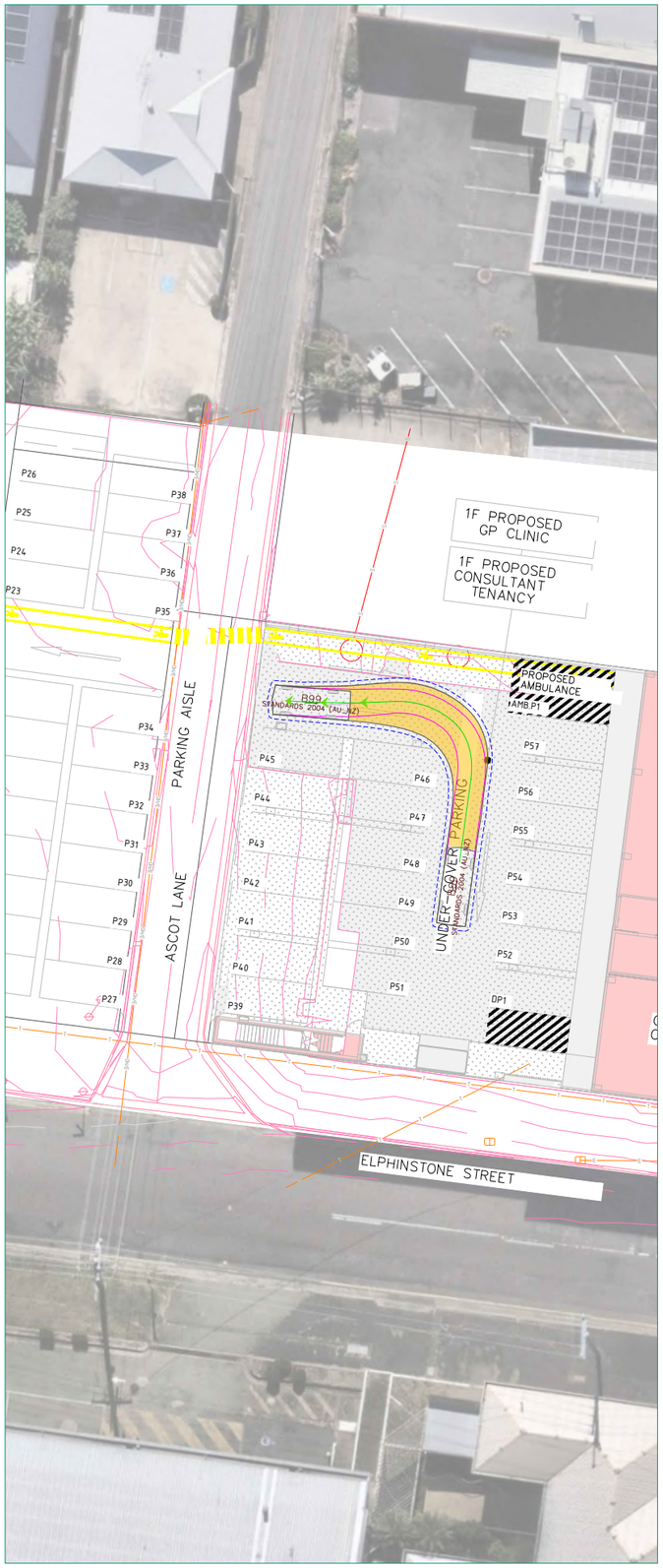
DESIGNED BY: A.BUENEN
DRAWN BY: J.WALKER
CHECKED BY: -

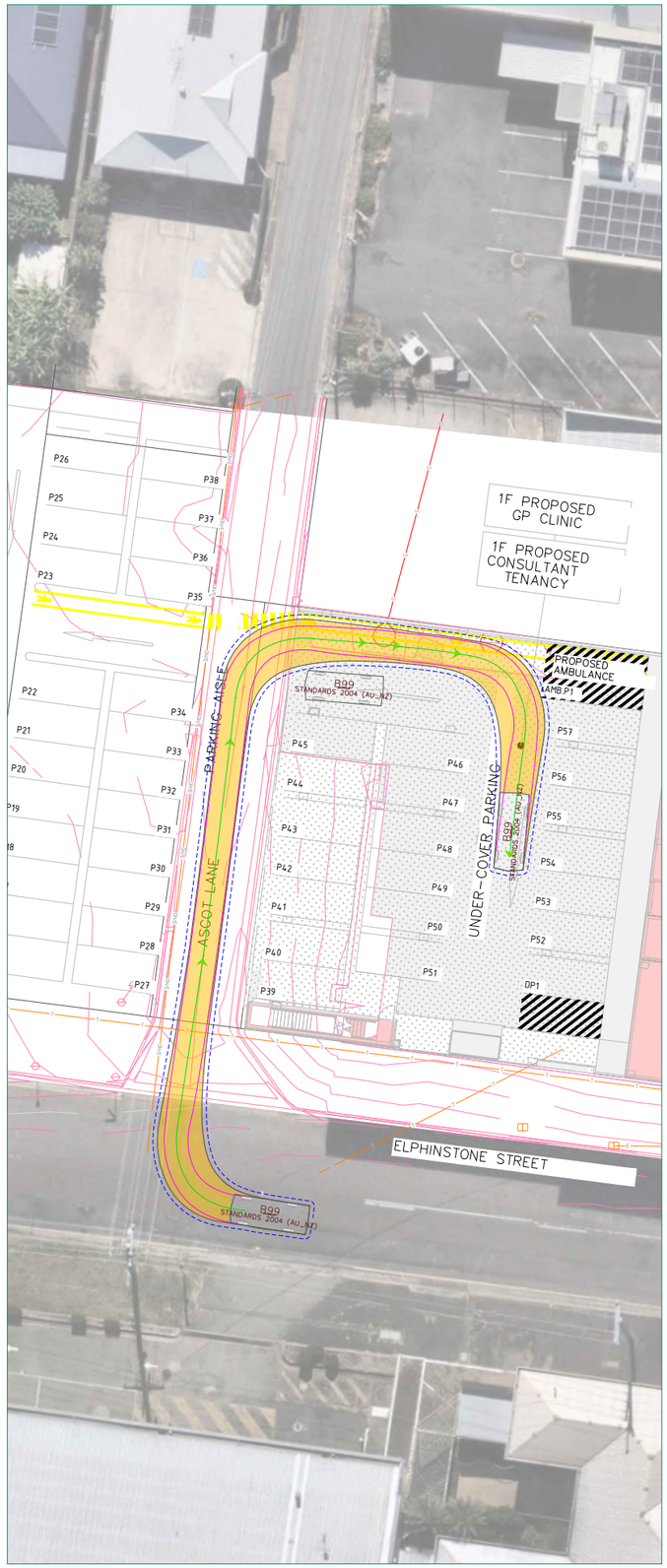
TITLE:
PROPOSED ASCOT SUPER CLINIC
177 - 179 MUSGRAVE STREET BERSERKER, QLD
DUTTON HOLDINGS
PERSPECTIVE STREET VIEW 3

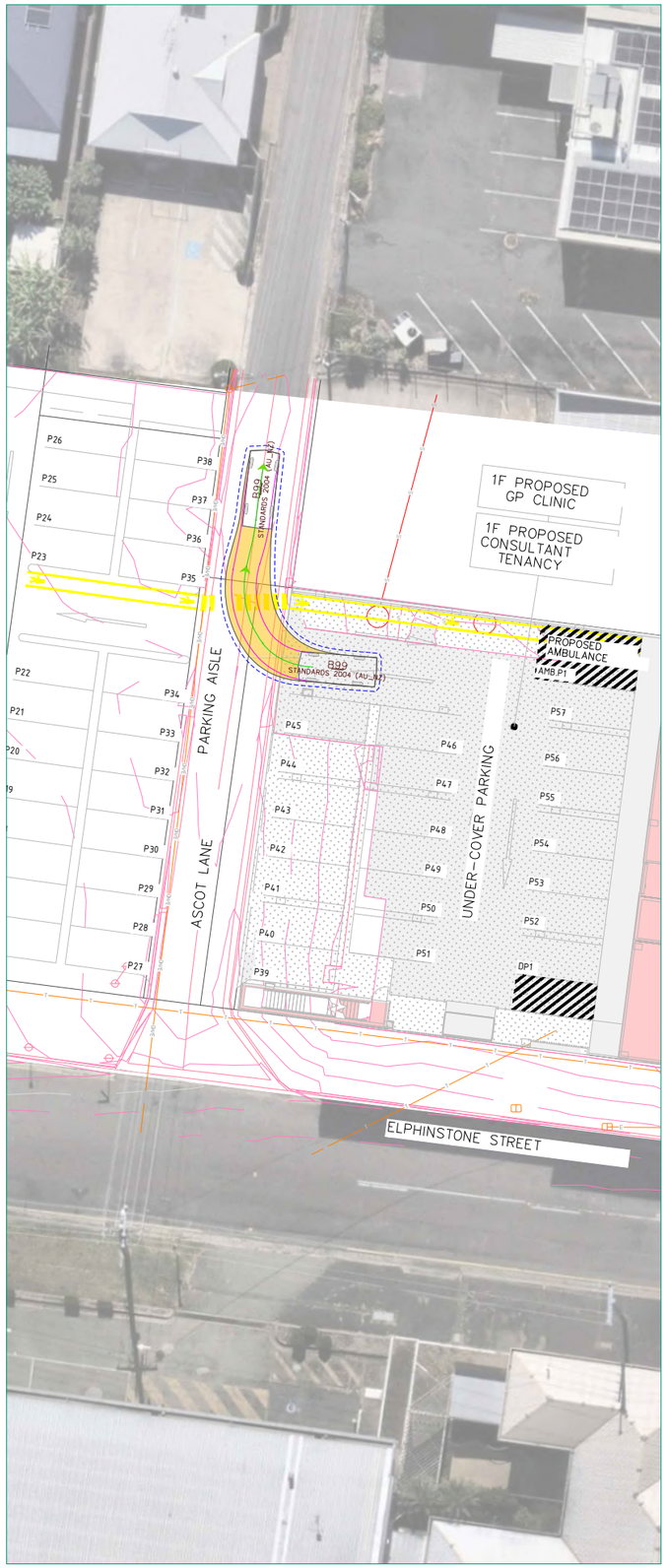
SCALE:
REVISION: E
JOB No.: GD2682
SHEET No.: A00.05
A3

APPENDIX B

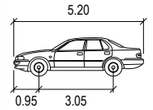
Swept Path Assessment







VEHICLE USED IN SIMULATION



B99

	Meters
Width	: 1.94
Track	: 1.84
Lock to Lock Time	: 6.0
Steering Angle	: 33.5

SWEPT PATH LEGEND

- VEHICLE BODY
- FRONT TIRES
- VEHICLE PATH
- VEHICLE CLEARANCE (300mm)
- VEHICLE
- 5KM/H DESIGN SPEED
- 10KM/H DESIGN SPEED

N

0 2 4 6 8 10 12 14 16 18 20m
4 3 2 1
SCALE 1:400

PROJECT

177 AND 179 MUSGRAVE STREET, BERSERKER

CLIENT

DUTTON HOLDINGS PTY LTD

DRAWING TITLE

B99 SWEPT PATH ASSESSMENT

DRAWING NUMBER

MOD24783QLD - SK05

DATE	REVISION
29 SEP 2025	B

REV	DRAWN BY	APPROVED	DATE	AMENDMENT DETAILS
A	A.E.H	B.F	28/08/25	DESIGN REVIEW
B	A.E.H	B.F	29/09/25	DESIGN REVIEW

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2.ALL DIMENSIONS ARE PROVIDED IN METERS UNLESS NOTED OTHERWISE.

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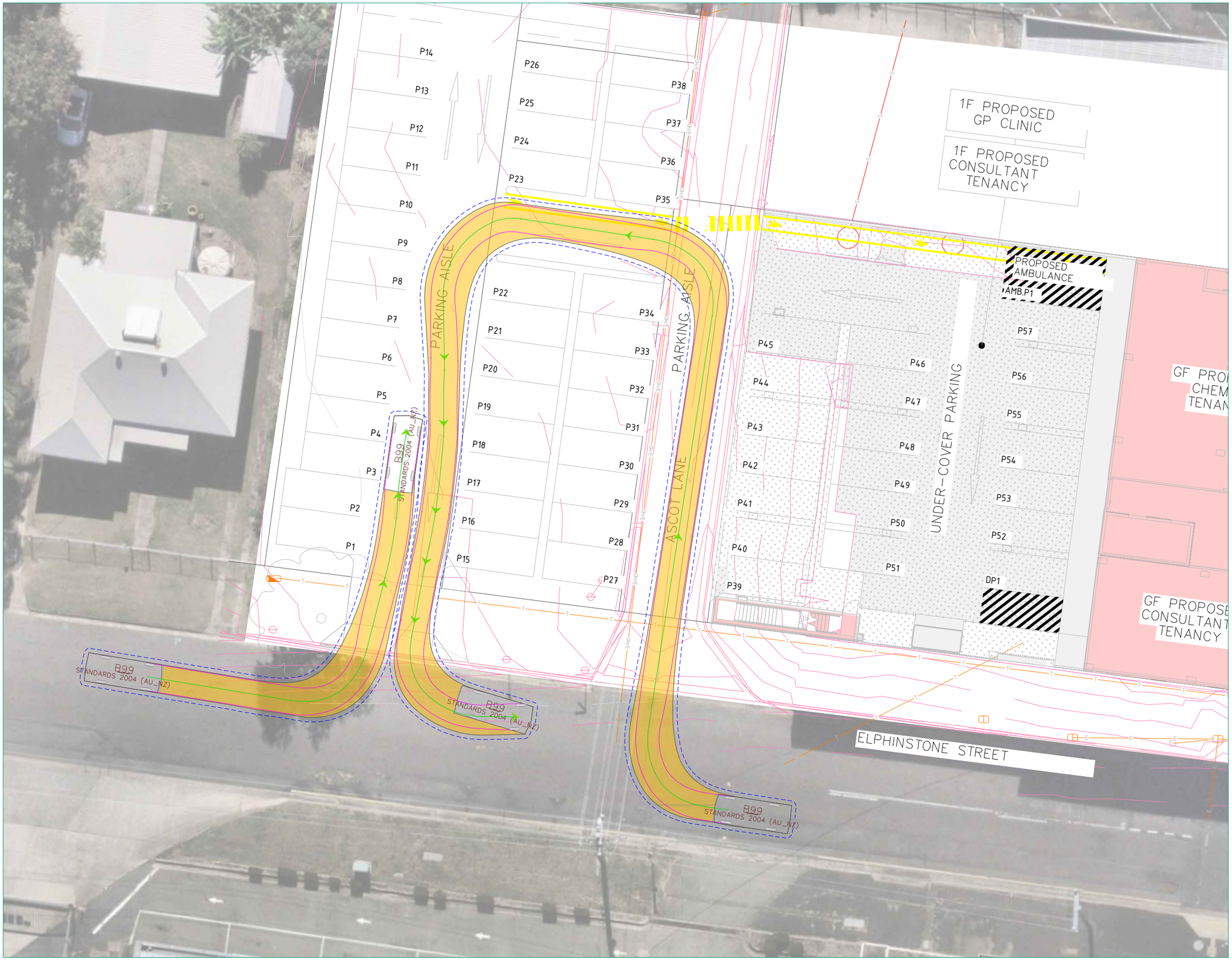
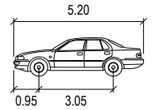
310 Edward Street, BRISBANE CITY QLD 4000

T: 1300 606 408 E: marketing@moduseng.com.au
W: www.modusengineering.com.au



VEHICLE USED IN SIMULATION



B99

	Meters
Width	: 1.94
Track	: 1.84
Lock to Lock Time	: 6.0
Steering Angle	: 33.5

SWEPT PATH LEGEND

- VEHICLE BODY
- FRONT TIRES
- VEHICLE PATH
- VEHICLE CLEARANCE (300mm)
- VEHICLE
- 5KM/H DESIGN SPEED
- 10KM/H DESIGN SPEED

N

0 2.5 5 7.5 10 12.5m
2.5 2 1.5 1 .5
SCALE 1:250

PROJECT

177 AND 179 MUSGRAVE STREET, BERSERKER

CLIENT

DUTTON HOLDINGS PTY LTD

DRAWING TITLE

B99 SWEPT PATH ASSESSMENT

DRAWING NUMBER

MOD24783QLD - SK06

DATE	REVISION
29 SEP 2025	B

REV	DRAWN BY	APPROVED	DATE	AMENDMENT DETAILS
A	A.E.H	B.F	28/08/25	DESIGN REVIEW
B	A.E.H	B.F	29/09/25	DESIGN REVIEW

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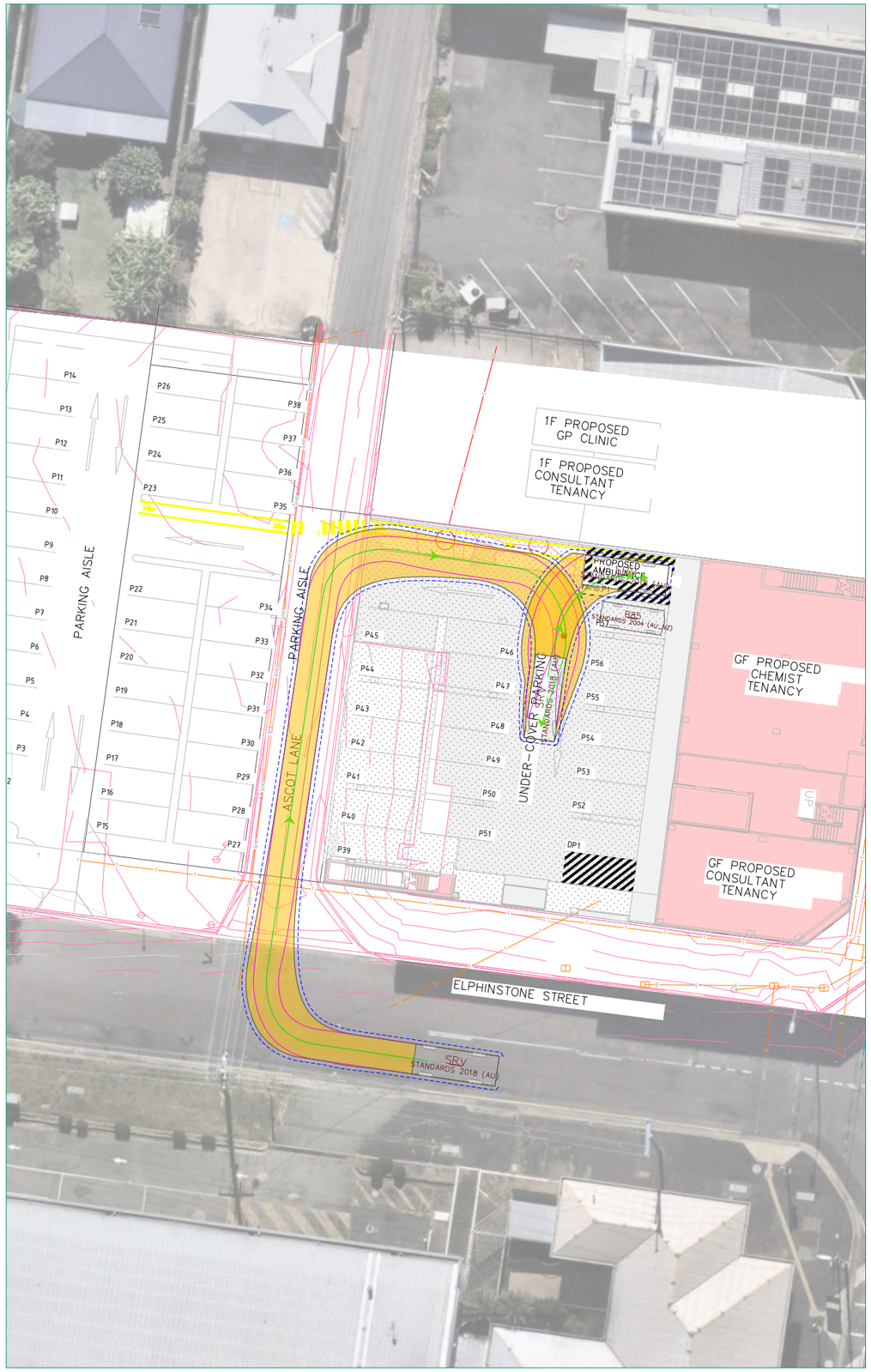
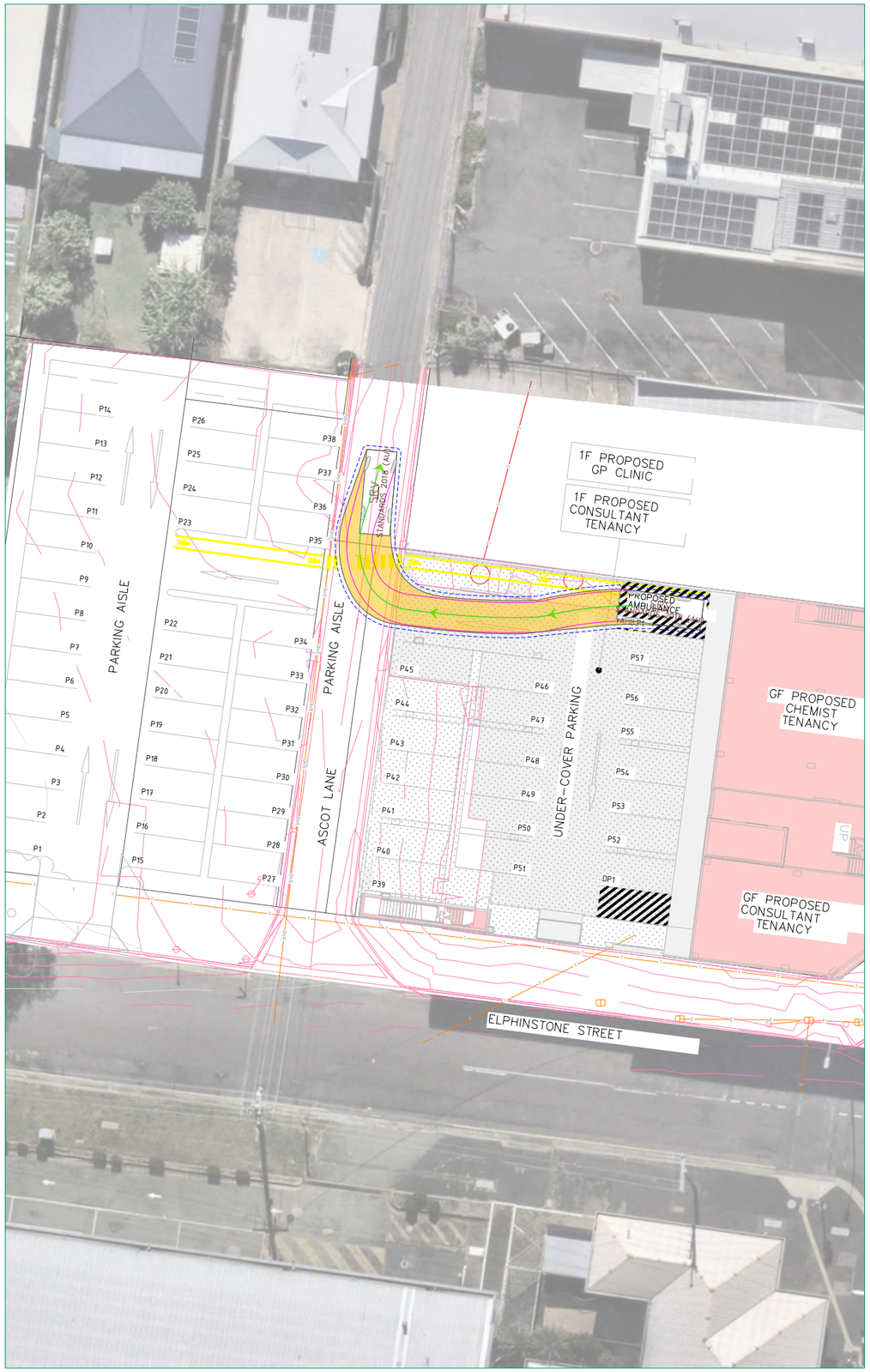
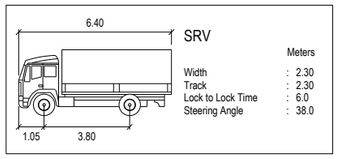




VEHICLE USED IN SIMULATION

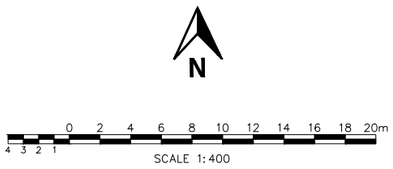


SRV

	Meters
Width	: 2.30
Track	: 2.30
Lock to Lock Time	: 6.0
Steering Angle	: 38.0

SWEPT PATH LEGEND

- VEHICLE BODY
- FRONT TIRES
- VEHICLE PATH
- VEHICLE CLEARANCE (300mm)
- VEHICLE
- 5KM/H DESIGN SPEED
- 10KM/H DESIGN SPEED



PROJECT

177 AND 179 MUSGRAVE STREET, BERSERKER

CLIENT

DUTTON HOLDINGS PTY LTD

DRAWING TITLE

SRV SWEPT PATH ASSESSMENT

DRAWING NUMBER

MOD24783QLD - SK07

DATE	REVISION
29 SEP 2025	B

REV	DRAWN BY	APPROVED	DATE	AMENDMENT DETAILS
A	A.E.H	B.F	28/08/25	DESIGN REVIEW
B	A.E.H	B.F	29/09/25	DESIGN REVIEW

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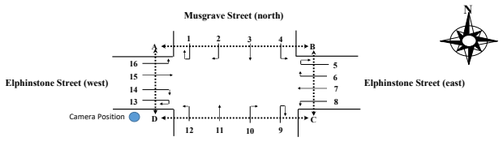
APPENDIX C

Traffic Survey Data

AUSTRAFFIC VIDEO INTERSECTION COUNT

Site No.: 1 **Weather:** Fine
Location: Musgrave Street/Elphinstone Street, Berserker (Rockhampton)
Day/Date: Tuesday, 12 August 2025
AM Peak: *Hour ending - 9:00 AM*
PM Peak: *Hour ending - 5:15 PM*



TIME (1/4 hr end)	Movement 1				Movement 2				Movement 3				Movement 4				Movement 5				Movement 6				Movement 7				Movement 8			
	Light Vehicles	*Heavy Vehicles*	***Total***	*Cyclists*	*Light Vehicles*	*Heavy Vehicles*	***Total***	*Cyclists*	*Light Vehicles*	*Heavy Vehicles*	***Total***	*Cyclists*	*Light Vehicles*	*Heavy Vehicles*	***Total***	*Cyclists*	*Light Vehicles*	*Heavy Vehicles*	***Total***	*Cyclists*	*Light Vehicles*	*Heavy Vehicles*	***Total***	*Cyclists*	*Light Vehicles*	*Heavy Vehicles*	***Total***	*Cyclists*	*Light Vehicles*	*Heavy Vehicles*	***Total***	*Cyclists*
6:15 AM	1	0	**1**	0	8	1	**9**	0	60	5	**65**	2	4	0	**4**	0	0	0	**0**	0	8	1	**9**	0	4	0	**4**	0	4	0	**4**	0
6:30 AM	1	0	**1**	0	9	1	**10**	0	89	6	**95**	0	5	2	**7**	0	0	0	**0**	0	8	0	**8**	0	4	0	**4**	0	5	0	**5**	0
6:45 AM	2	0	**2**	0	4	0	**4**	0	110	3	**113**	2	3	0	**3**	0	0	0	**0**	0	16	2	**18**	0	4	0	**4**	0	9	0	**9**	0
7:00 AM	0	0	**0**	0	2	0	**2**	0	122	6	**128**	1	11	1	**12**	0	0	0	**0**	0	17	1	**18**	0	2	0	**2**	0	9	0	**9**	0
7:15 AM	5	0	**5**	0	2	0	**2**	0	121	6	**127**	1	3	1	**4**	0	0	0	**0**	0	15	1	**16**	0	1	0	**1**	0	16	0	**16**	0
7:30 AM	3	0	**3**	0	3	0	**3**	0	196	4	**200**	1	11	0	**11**	0	0	0	**0**	0	22	1	**23**	0	1	0	**1**	0	17	0	**17**	0
7:45 AM	7	0	**7**	0	4	0	**4**	0	179	4	**183**	0	19	0	**19**	0	0	0	**0**	0	32	0	**32**	0	3	0	**3**	0	22	1	**23**	0
8:00 AM	13	0	**13**	0	3	0	**3**	0	186	9	**195**	0	25	1	**26**	0	0	0	**0**	0	51	0	**51**	0	2	0	**2**	0	21	1	**22**	0
8:15 AM	12	1	**13**	0	3	2	**5**	0	170	5	**175**	0	34	1	**35**	0	0	0	**0**	0	59	0	**59**	0	2	0	**2**	0	25	0	**25**	0
8:30 AM	6	0	**6**	0	5	0	**5**	0	166	7	**173**	0	37	1	**38**	0	0	0	**0**	0	77	2	**79**	0	3	0	**3**	0	21	3	**24**	0
8:45 AM	7	0	**7**	0	4	0	**4**	0	191	3	**194**	0	21	0	**21**	0	0	0	**0**	0	71	2	**73**	0	1	1	**2**	0	28	1	**29**	1
9:00 AM	7	0	**7**	0	5	0	**5**	0	159	7	**166**	0	30	0	**30**	0	0	0	**0**	0	52	0	**52**	0	4	0	**4**	0	27	0	**27**	0
3 hr Total	**64**	**1**	**65**	**0**	**52**	**4**	**56**	**0**	**1749**	**65**	**1814**	**7**	**205**	**7**	**212**	**0**	**0**	**0**	**0**	**0**	**423**	**10**	**433**	**0**	**31**	**1**	**32**	**0**	**204**	**6**	**210**	**1**
AM Peak	**32**	**1**	**33**	**0**	**17**	**2**	**19**	**0**	**686**	**22**	**708**	**0**	**122**	**2**	**124**	**0**	**0**	**0**	**0**	**0**	**259**	**4**	**263**	**0**	**10**	**1**	**11**	**0**	**101**	**4**	**105**	**1**

TIME (1/4 hr end)	Movement 1				Movement 2				Movement 3				Movement 4				Movement 5				Movement 6				Movement 7				Movement 8			
	Light Vehicles	*Heavy Vehicles*	***Total***	*Cyclists*	*Light Vehicles*	*Heavy Vehicles*	***Total***	*Cyclists*	*Light Vehicles*	*Heavy Vehicles*	***Total***	*Cyclists*	*Light Vehicles*	*Heavy Vehicles*	***Total***	*Cyclists*	*Light Vehicles*	*Heavy Vehicles*	***Total***	*Cyclists*	*Light Vehicles*	*Heavy Vehicles*	***Total***	*Cyclists*	*Light Vehicles*	*Heavy Vehicles*	***Total***	*Cyclists*	*Light Vehicles*	*Heavy Vehicles*	***Total***	*Cyclists*
3:15 PM	13	0	**13**	0	7	0	**7**	0	161	5	**166**	1	32	0	**32**	0	0	0	**0**	0	55	0	**55**	0	4	0	**4**	0	32	1	**33**	0
3:30 PM	15	0	**15**	0	5	0	**5**	0	208	6	**214**	0	54	2	**56**	0	0	0	**0**	0	26	2	**28**	0	3	0	**3**	0	13	0	**13**	0
3:45 PM	26	0	**26**	0	6	1	**7**	0	171	6	**177**	0	34	0	**34**	0	0	0	**0**	0	28	1	**29**	0	2	0	**2**	0	23	0	**23**	0
4:00 PM	6	0	**6**	0	2	0	**2**	0	205	4	**209**	0	48	1	**49**	0	0	0	**0**	0	24	1	**25**	0	0	0	**0**	0	13	1	**14**	0
4:15 PM	11	0	**11**	0	7	0	**7**	0	172	3	**175**	0	40	0	**40**	0	0	0	**0**	0	37	0	**37**	0	4	0	**4**	0	19	0	**19**	0
4:30 PM	11	0	**11**	0	3	0	**3**	0	164	5	**169**	0	41	0	**41**	0	0	0	**0**	0	34	0	**34**	0	3	0	**3**	0	16	0	**16**	0
4:45 PM	13	0	**13**	0	12	0	**12**	0	167	4	**171**	1	33	0	**33**	0	0	0	**0**	0	51	0	**51**	0	2	1	**3**	0	21	0	**21**	0
5:00 PM	15	0	**15**	0	6	0	**6**	0	192	5	**197**	1	41	0	**41**	0	0	0	**0**	0	34	0	**34**	0	2	0	**2**	0	16	0	**16**	0
5:15 PM	22	0	**22**	0	5	0	**5**	0	174	2	**176**	2	31	0	**31**	0	0	0	**0**	0	33	1	**34**	0	3	0	**3**	0	13	0	**13**	0
5:30 PM	11	1	**12**	0	4	0	**4**	0	161	3	**164**	0	38	1	**39**	0	0	0	**0**	0	28	0	**28**	0	2	0	**2**	0	18	0	**18**	0
5:45 PM	9	0	**9**	0	3	0	**3**	0	152	5	**157**	0	27	0	**27**	0	0	0	**0**	0	31	0	**31**	0	2	0	**2**	0	13	0	**13**	0
6:00 PM	12	0	**12**	0	2	1	**3**	0	133	5	**138**	1	34	0	**34**	0	0	0	**0**	0	22	0	**22**	0	2	0	**2**	0	13	0	**13**	0
3 hr Total	**164**	**1**	**165**	**0**	**62**	**2**	**64**	**0**	**2060**	**53**	**2113**	**6**	**453**	**4**	**457**	**0**	**0**	**0**	**0**	**0**	**403**	**5**	**408**	**0**	**29**	**1**	**30**	**0**	**210**	**2**	**212**	**0**
PM Peak	**61**	**0**	**61**	**0**	**26**	**0**	**26**	**0**	**697**	**16**	**713**	**4**	**146**	**0**	**146**	**0**	**0**	**0**	**0**	**0**	**152**	**1**	**153**	**0**	**10**	**1**	**11**	**0**	**66**	**0**	**66**	**0**

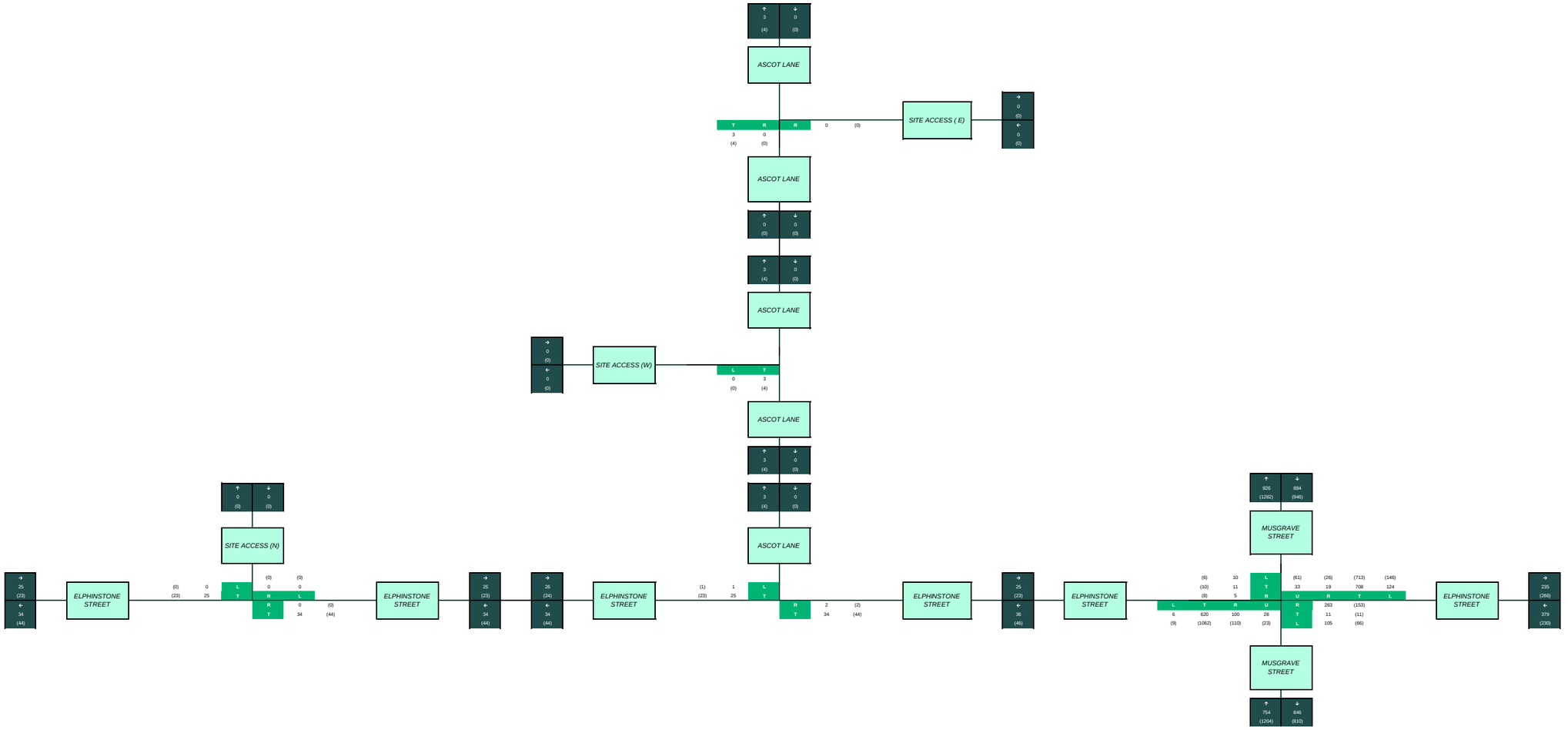
APPENDIX D

Traffic Network Flow Diagrams

Legend

L	Left turn
T	Through
R	Right turn
U	U-turn
00	AM Peak Hour Volumes
(00)	PM Peak Hour Volumes
	Development Area

Base year	2025
Assessment year	2035
Linear Growth Rate	1.0%
AM Peak Hour End	9:00 AM
PM Peak Hour End	6:15 PM



MODUS
Transport and Traffic Engineering

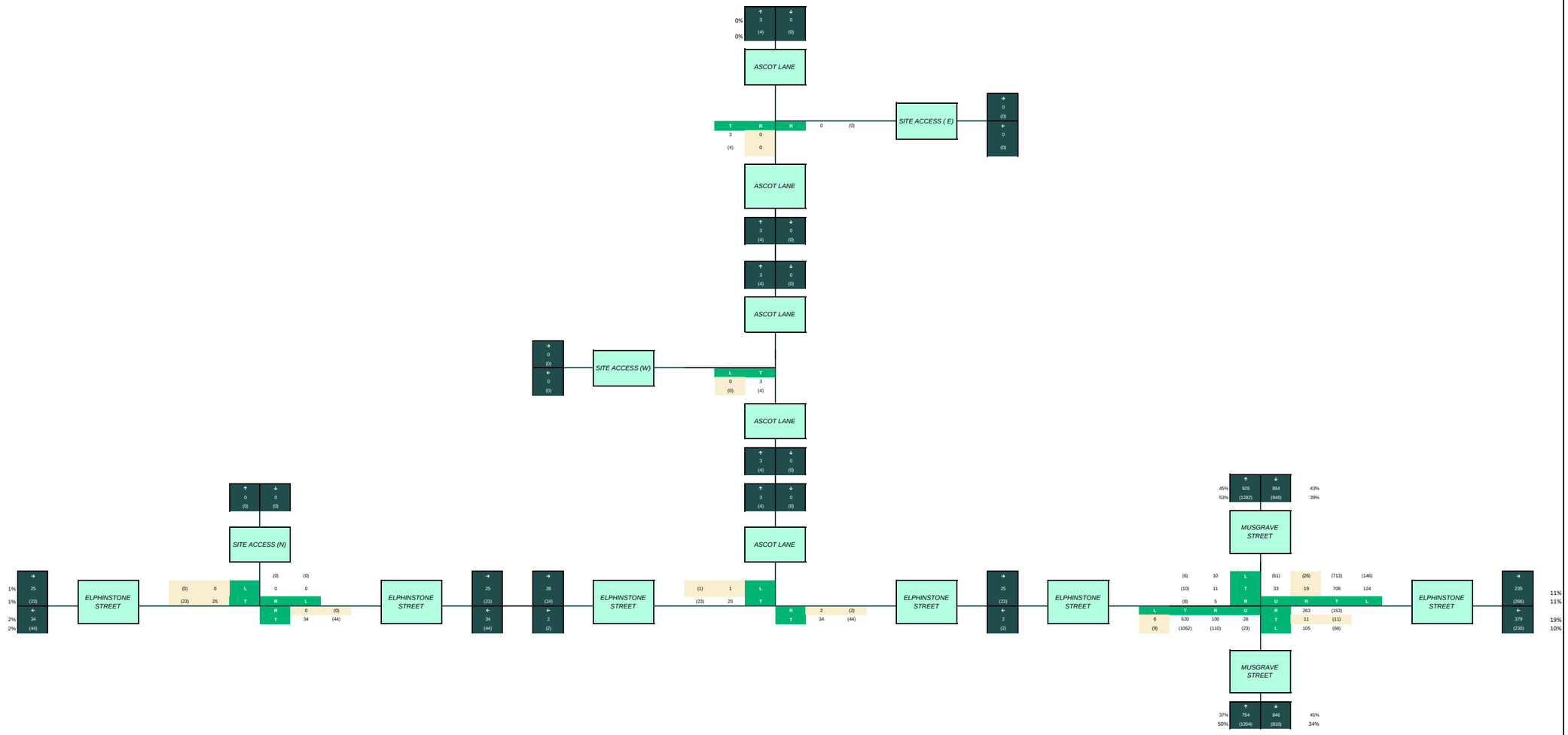
Project: 177 and 179 Musgrave Street
Client: Dutton Holdings Pty Ltd
Date: 2/10/2025
Prepared by: Afaf El Harda
Reviewed by: Bradley Fuller

2025 Background Traffic Surveys

Legend

L	Left turn
T	Through
R	Right turn
U	U-turn
00	AM Peak Hour Volumes
(00)	PM Peak Hour Volumes
	Development Area

Base year	2025
Assessment year	2035
Linear Growth Rate	1.0%
AM Peak Hour End	9:00 AM
PM Peak Hour End	6:15 PM



MODUS
Transport and Traffic Engineering

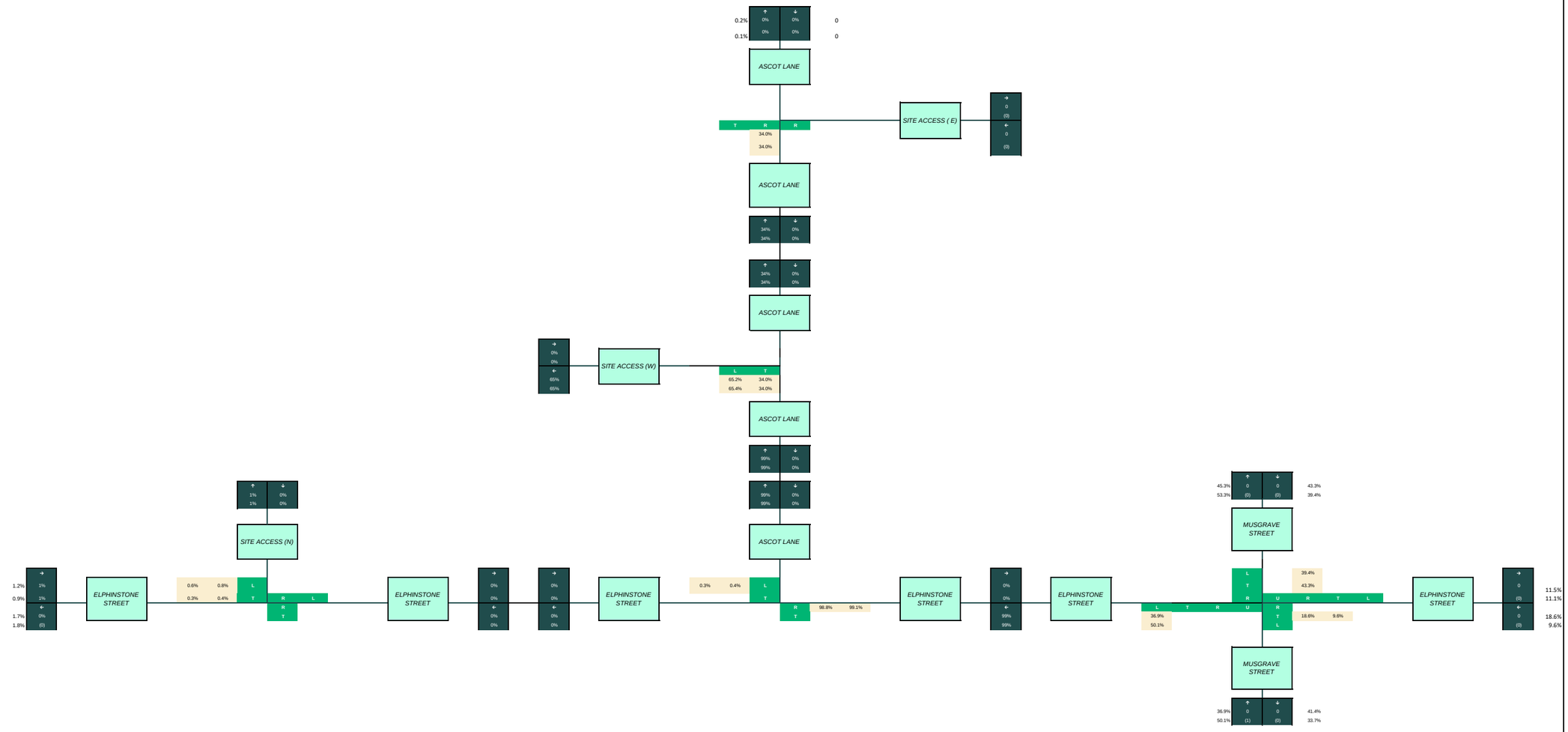
Project: 177 and 179 Musgrave Street
Client: Dutton Holdings Pty Ltd
Date: 2/10/2025
Prepared by: Afaf El Harda
Reviewed by: Bradley Fuller

Inbound Volume Movements

Legend

L	Left turn
T	Through
R	Right turn
U	U-turn
00	AM Peak Hour Volumes
(00)	PM Peak Hour Volumes
	Development Area

Base year	2025
Assessment year	2035
Linear Growth Rate	1.0%
AM Peak Hour End	9:00 AM
PM Peak Hour End	6:15 PM



MODUS
Transport and Traffic Engineering

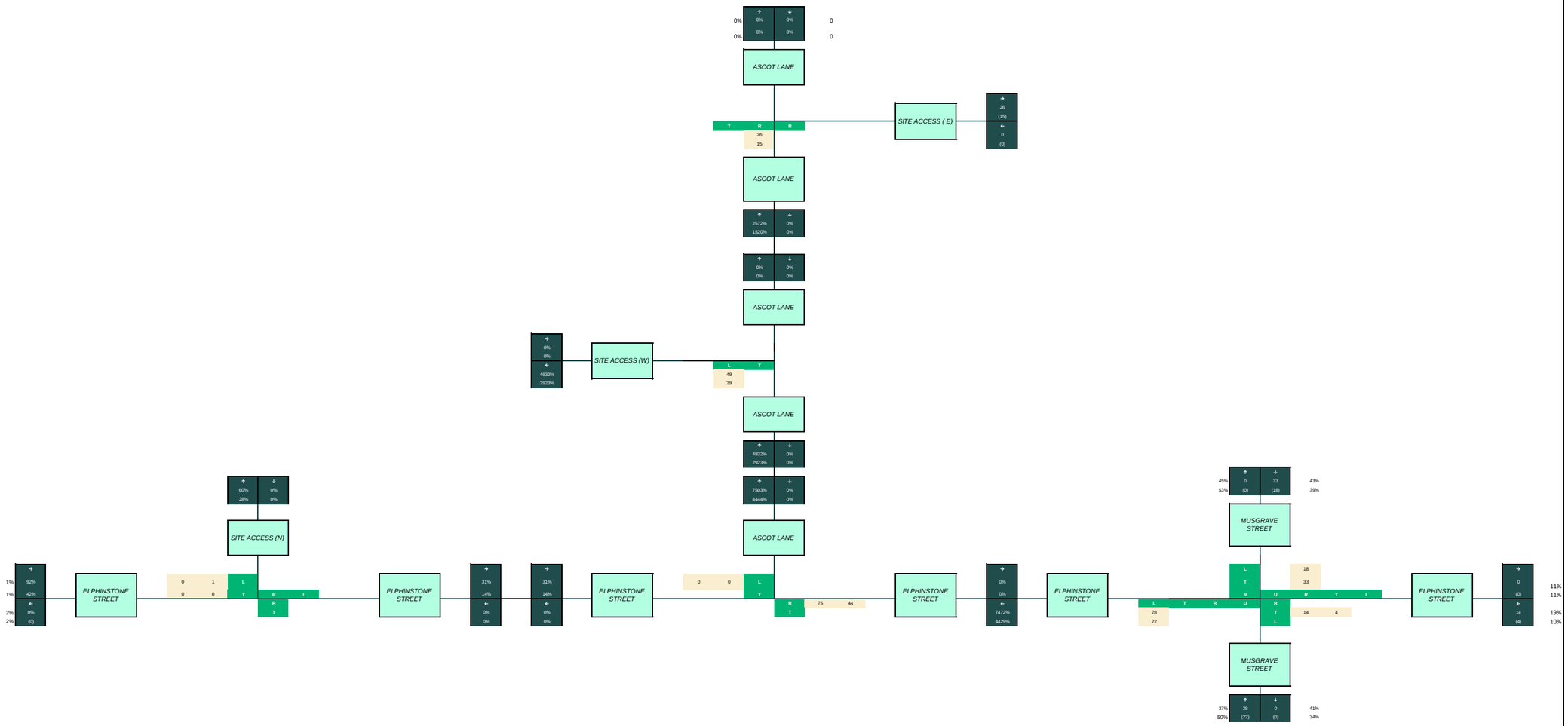
Project: 177 and 179 Musgrave Street
Client: Dutton Holdings Pty Ltd
Date: 2/10/2025
Prepared by: Afaf El Harda
Reviewed by: Bradley Fuller

Inbound Volume %

Legend

L	Left turn
T	Through
R	Right turn
U	U-turn
00	AM Peak Hour Volumes
(00)	PM Peak Hour Volumes
	Development Area

Base year	2025
Assessment year	2035
Linear Growth Rate	1.0%
AM Peak Hour End	9:00 AM
PM Peak Hour End	6:15 PM



MODUS
Transport and Traffic Engineering

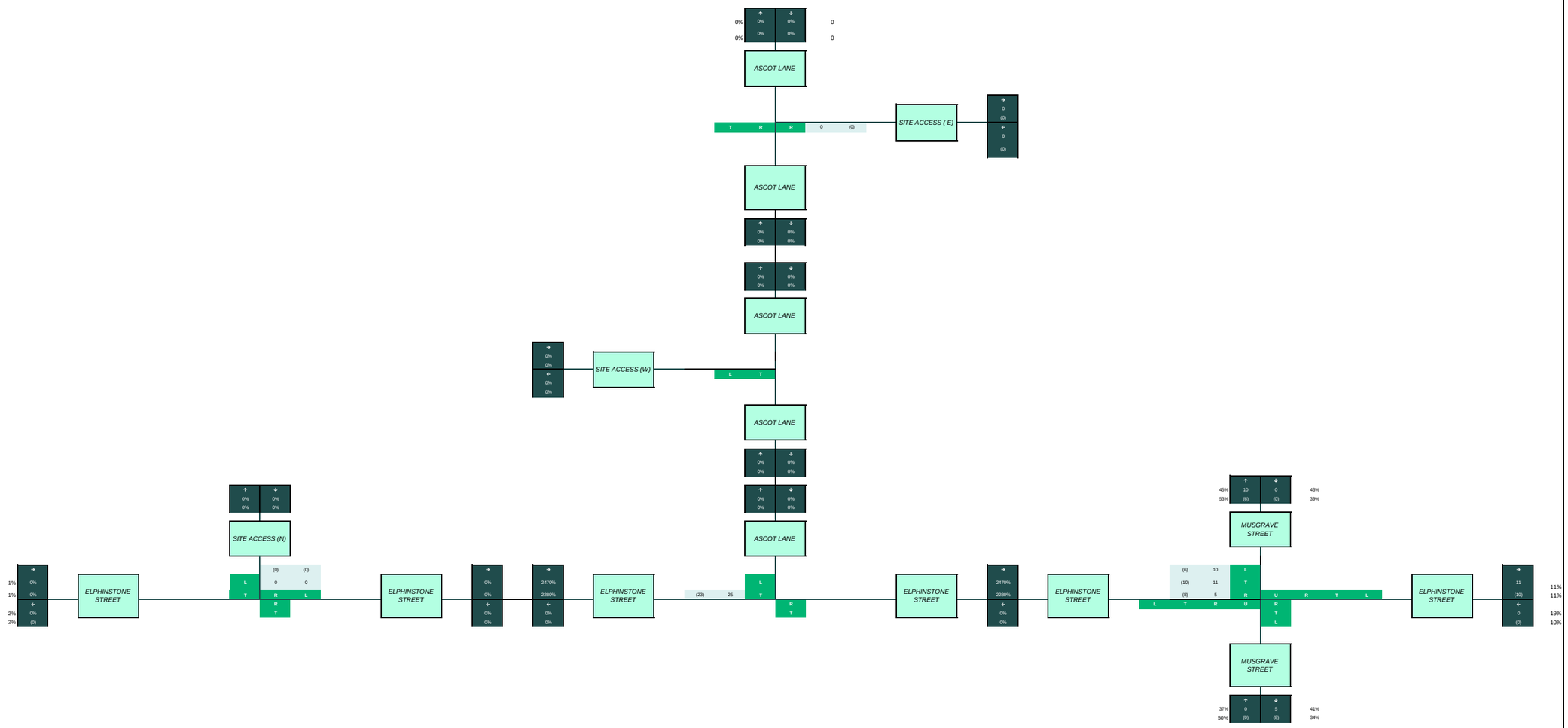
Project: 177 and 179 Musgrave Street
Client: Dutton Holdings Pty Ltd
Date: 2/10/2025
Prepared by: Afaf El Harda
Reviewed by: Bradley Fuller

Inbound Volumes

Legend

L	Left turn
T	Through
R	Right turn
U	U-turn
00	AM Peak Hour Volumes
(00)	PM Peak Hour Volumes
	Development Area

Base year	2025
Assessment year	2035
Linear Growth Rate	1.0%
AM Peak Hour End	9:00 AM
PM Peak Hour End	6:15 PM



MODUS
Transport and Traffic Engineering

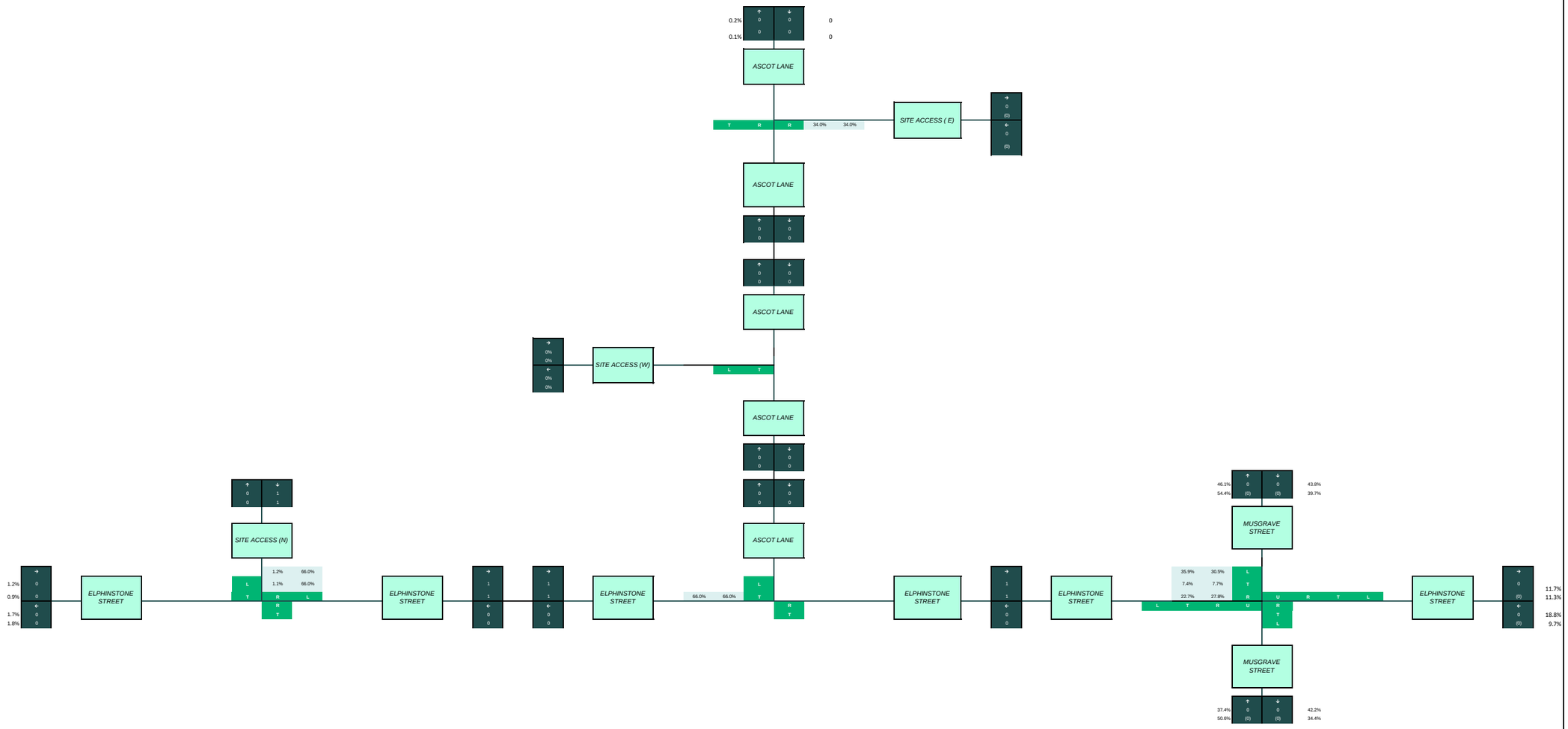
Project: 177 and 179 Musgrave Street
Client: Dutton Holdings Pty Ltd
Date: 2/10/2025
Prepared by: Afaf El Harda
Reviewed by: Bradley Fuller

Outbound Volume Movements

Legend

L	Left turn
T	Through
R	Right turn
U	U-turn
00	AM Peak Hour Volumes
(00)	PM Peak Hour Volumes
	Development Area

Base year	2025
Assessment year	2035
Linear Growth Rate	1.0%
AM Peak Hour End	9:00 AM
PM Peak Hour End	6:15 PM



MODUS
Transport and Traffic Engineering

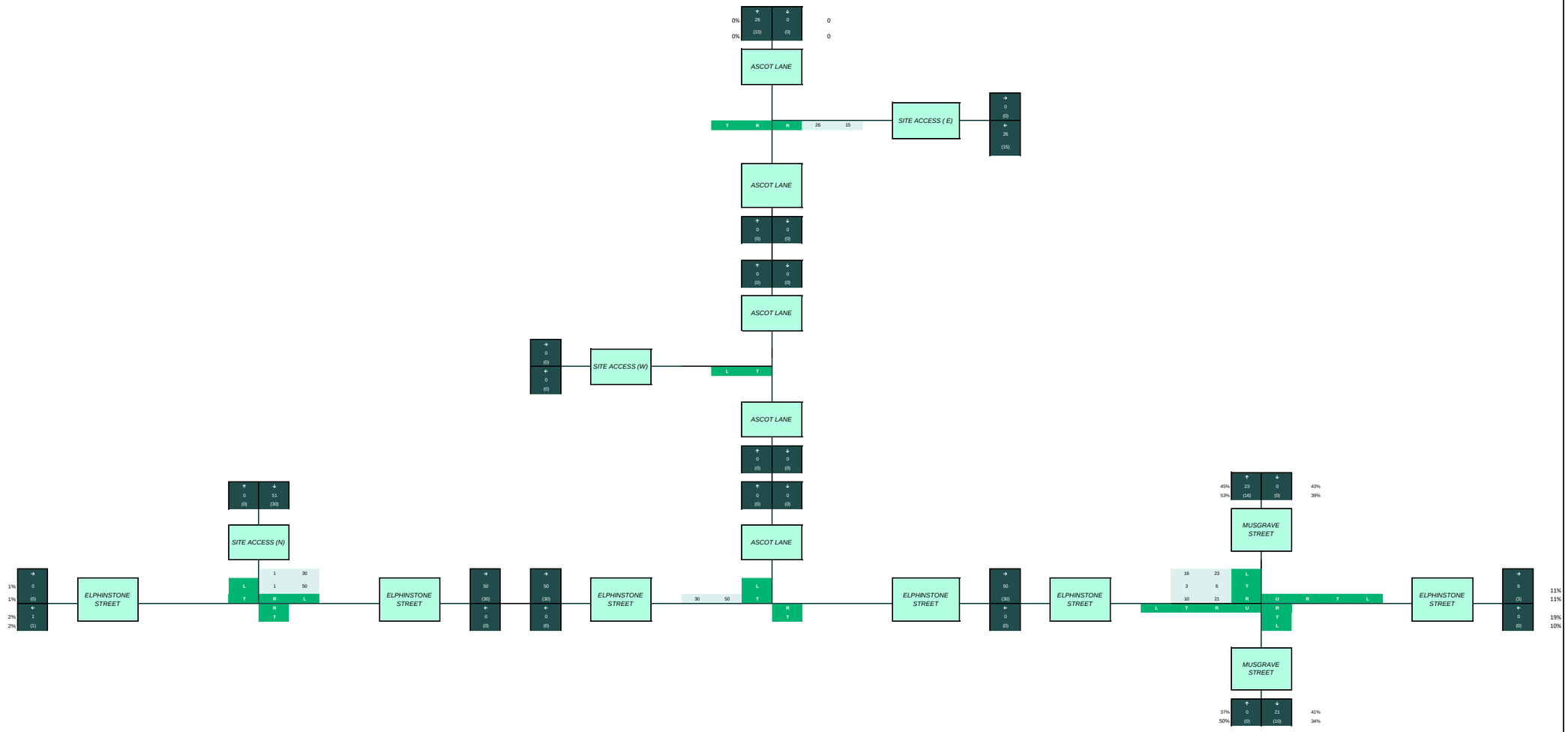
Project: 177 and 179 Musgrave Street
Client: Dutton Holdings Pty Ltd
Date: 2/10/2025
Prepared by: Afaf El Harda
Reviewed by: Bradley Fuller

Outbound Volume %

Legend

L	Left turn
T	Through
R	Right turn
U	U-turn
00	AM Peak Hour Volumes
(00)	PM Peak Hour Volumes
	Development Area

Base year	2025
Assessment year	2035
Linear Growth Rate	1.0%
AM Peak Hour End	9:00 AM
PM Peak Hour End	6:15 PM



MODUS
Transport and Traffic Engineering

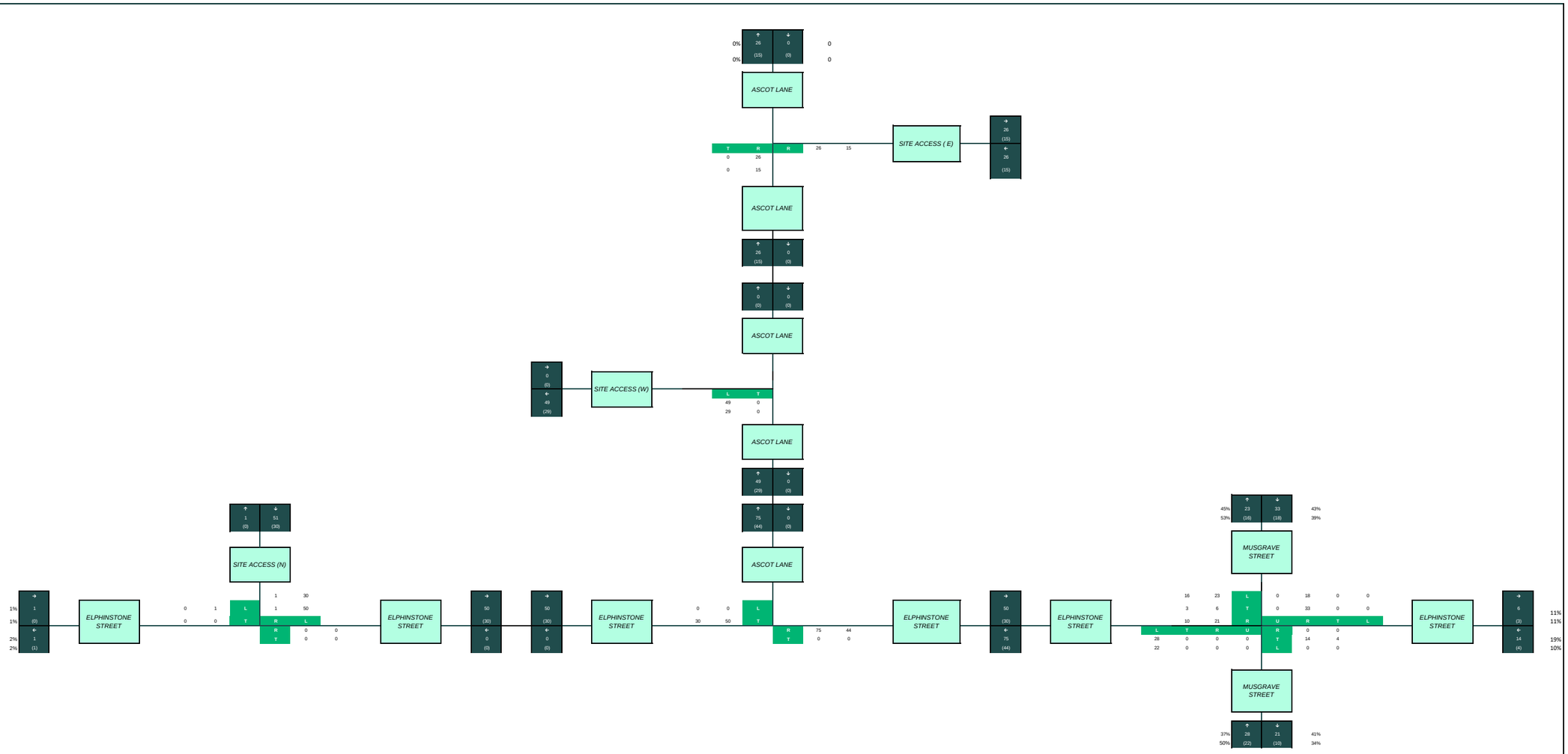
Project: 177 and 179 Musgrave Street
Client: Dutton Holdings Pty Ltd
Date: 2/10/2025
Prepared by: Afaf El Harda
Reviewed by: Bradley Fuller

Outbound Volumes

Legend

L	Left turn
T	Through
R	Right turn
U	U-turn
00	AM Peak Hour Volumes
(00)	PM Peak Hour Volumes
	Development Area

Base year	2025
Assessment year	2035
Linear Growth Rate	1.0%
AM Peak Hour End	9:00 AM
PM Peak Hour End	6:15 PM



MODUS
Transport and Traffic Engineering

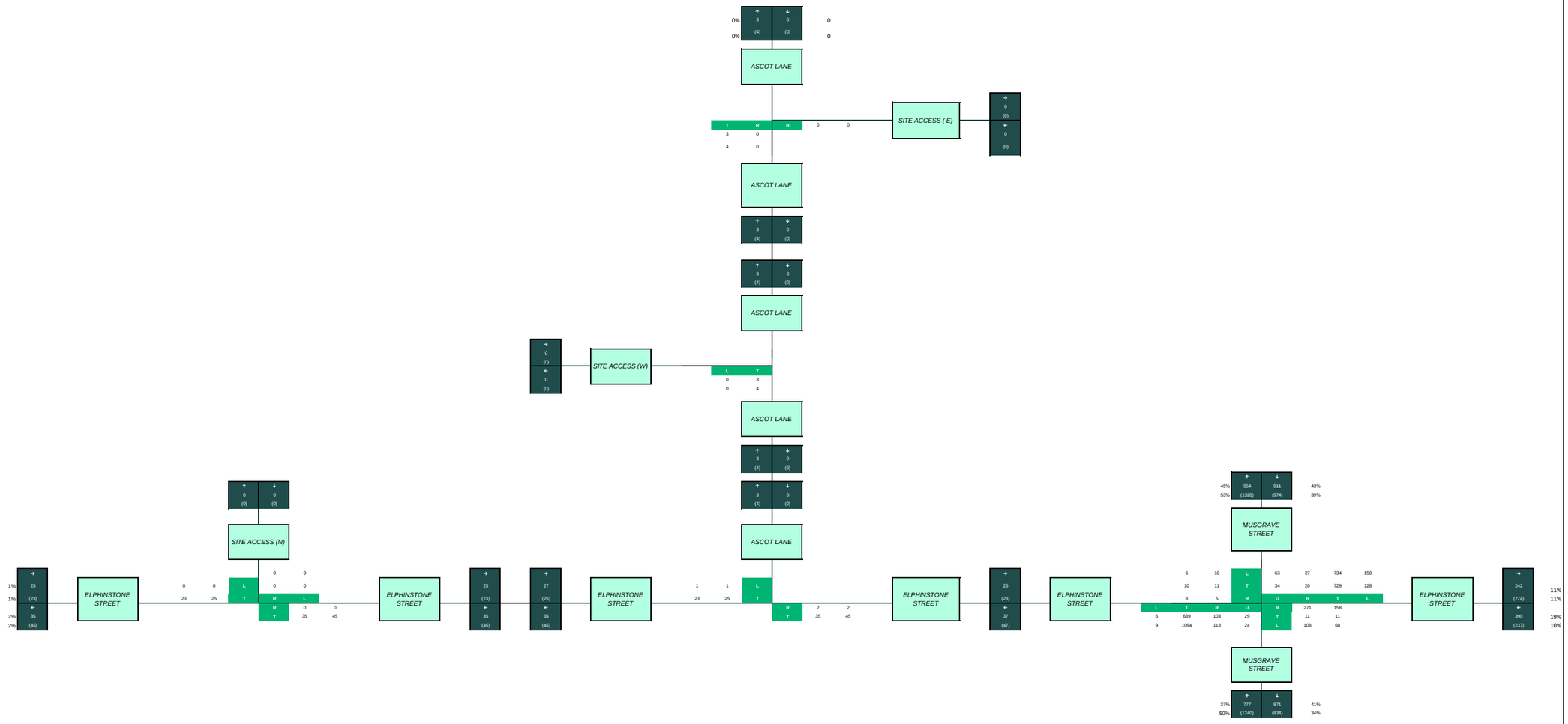
Project: 177 and 179 Musgrave Street
Client: Dutton Holdings Pty Ltd
Date: 2/10/2025
Prepared by: Afaf El Harda
Reviewed by: Bradley Fuller

Proposed Development Volumes

Legend

L	Left turn
T	Through
R	Right turn
U	U-turn
00	AM Peak Hour Volumes
(00)	PM Peak Hour Volumes
	Development Area

Base year	2025
Assessment year	2028
Linear Growth Rate	1.0%
AM Peak Hour End	9:00 AM
PM Peak Hour End	6:15 PM



MODUS
Transport and Traffic Engineering

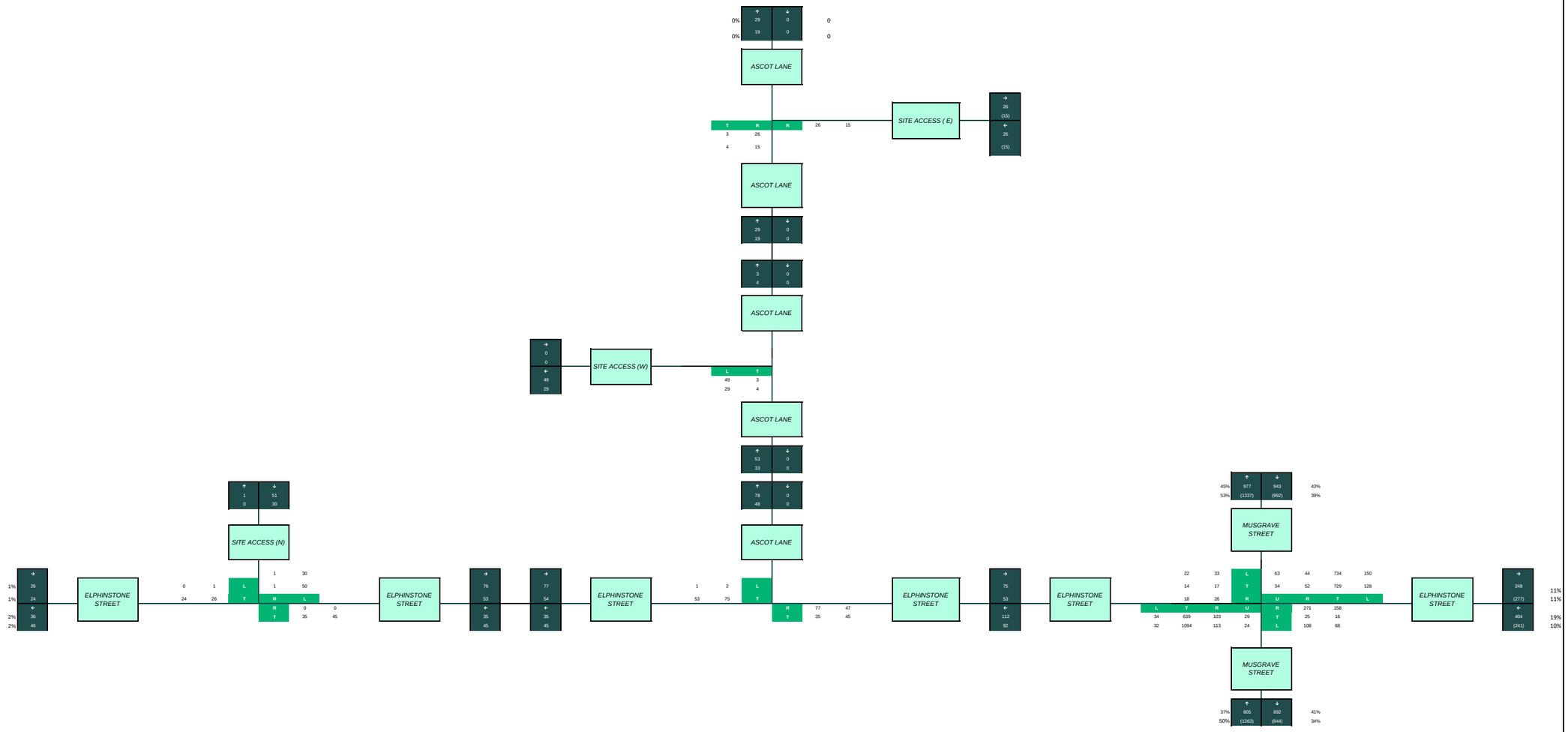
Project: 177 and 179 Musgrave Street
Client: Dutton Holdings Pty Ltd
Date: 2/10/2025
Prepared by: Afaf El Harda
Reviewed by: Bradley Fuller

2028 Background Volumes

Legend

L	Left turn
T	Through
R	Right turn
U	U-turn
00	AM Peak Hour Volumes
(00)	PM Peak Hour Volumes
	Development Area

Base year	2025
Assessment year	2028
Linear Growth Rate	1.0%
AM Peak Hour End	9:00 AM
PM Peak Hour End	6:15 PM



MODUS
Transport and Traffic Engineering

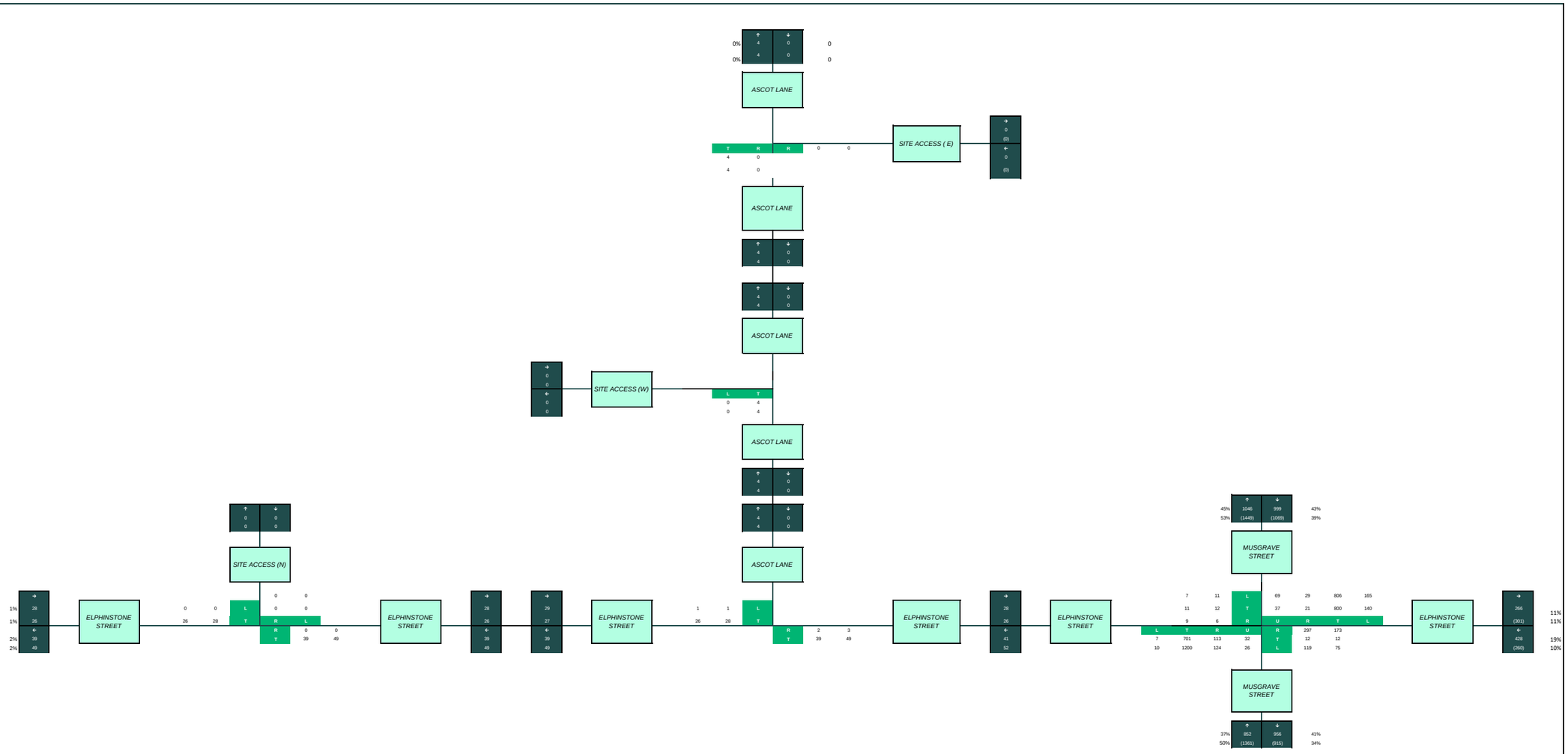
Project: 177 and 179 Musgrave Street
Client: Dutton Holdings Pty Ltd
Date: 2/10/2025
Prepared by: Afaf El Harda
Reviewed by: Bradley Fuller

2028 Background + Development Volumes

Legend

L	Left turn
T	Through
R	Right turn
U	U-turn
00	AM Peak Hour Volumes
(00)	PM Peak Hour Volumes
	Development Area

Base year	2025
Assessment year	2035
Linear Growth Rate	1.0%
AM Peak Hour End	9:00 AM
PM Peak Hour End	6:15 PM



MODUS
Transport and Traffic Engineering

Project: 177 and 179 Musgrave Street
Client: Dutton Holdings Pty Ltd
Date: 2/10/2025
Prepared by: Afaf El Harda
Reviewed by: Bradley Fuller

2038 Background Volumes

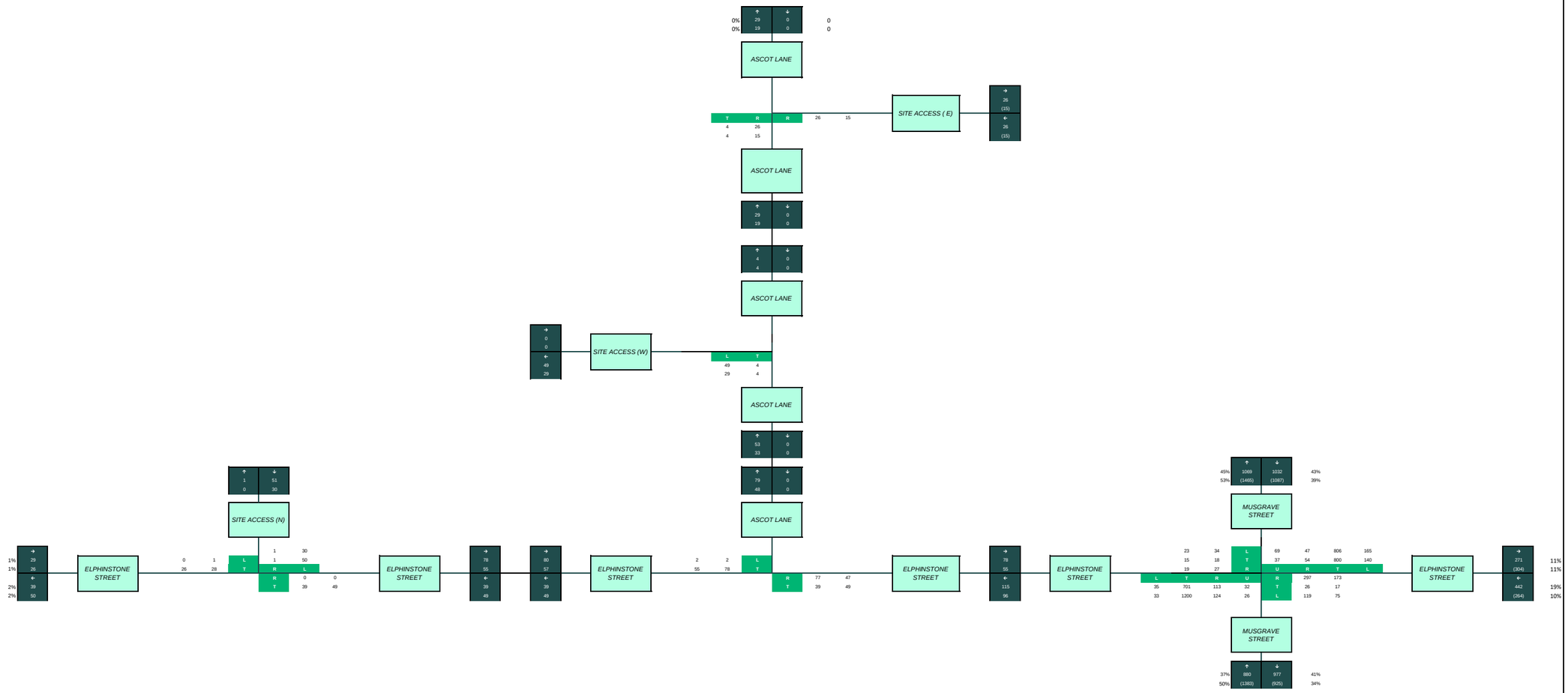
Legend

L	Left turn
T	Through
R	Right turn
U	U-turn
00	AM Peak Hour Volumes
(00)	PM Peak Hour Volumes
	Development Area

Base year	2025
Assessment year	2038

Linear Growth Rate	1.0%

AM Peak Hour End	9:00 AM
PM Peak Hour End	6:15 PM



MODUS
Transport and Traffic Engineering

Project: 177 and 179 Musgrave Street
Client: Dutton Holdings Pty Ltd
Date: 2/10/2025
Prepared by: Afaf El Harda
Reviewed by: Bradley Fuller

2038 Background + Development Volumes

APPENDIX E

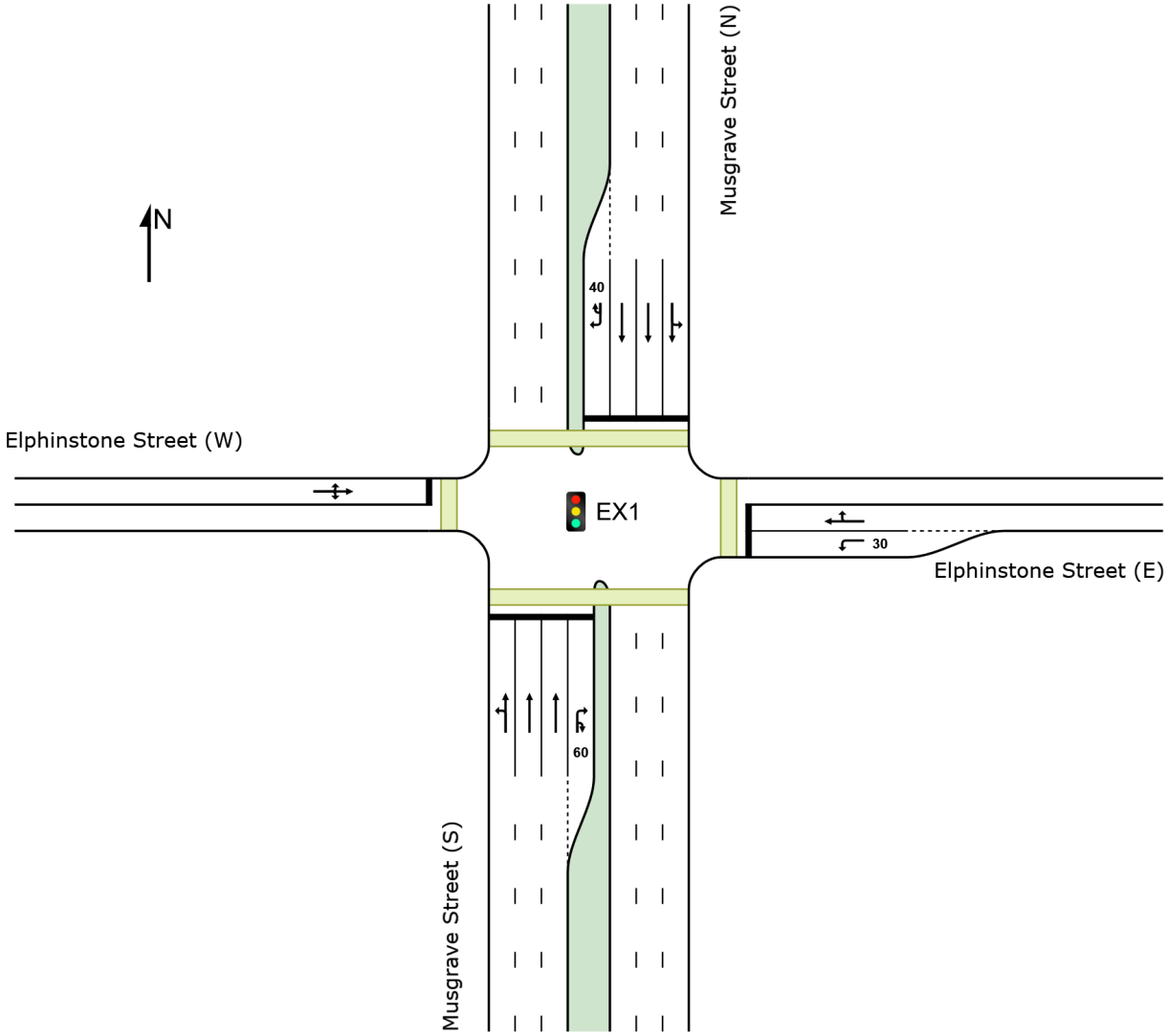
SIDRA Results and Layouts

SITE LAYOUT

Site: EX1 [BG2028 AM (Site Folder: BG2028)]

Musgrave Street / Elphinstone Street Intersection
Site Category: Existing Conditions
Signals - EQUISAT (Fixed-Time/SCATS) Isolated

Layout pictures are schematic functional drawings reflecting input data. They are not design drawings.



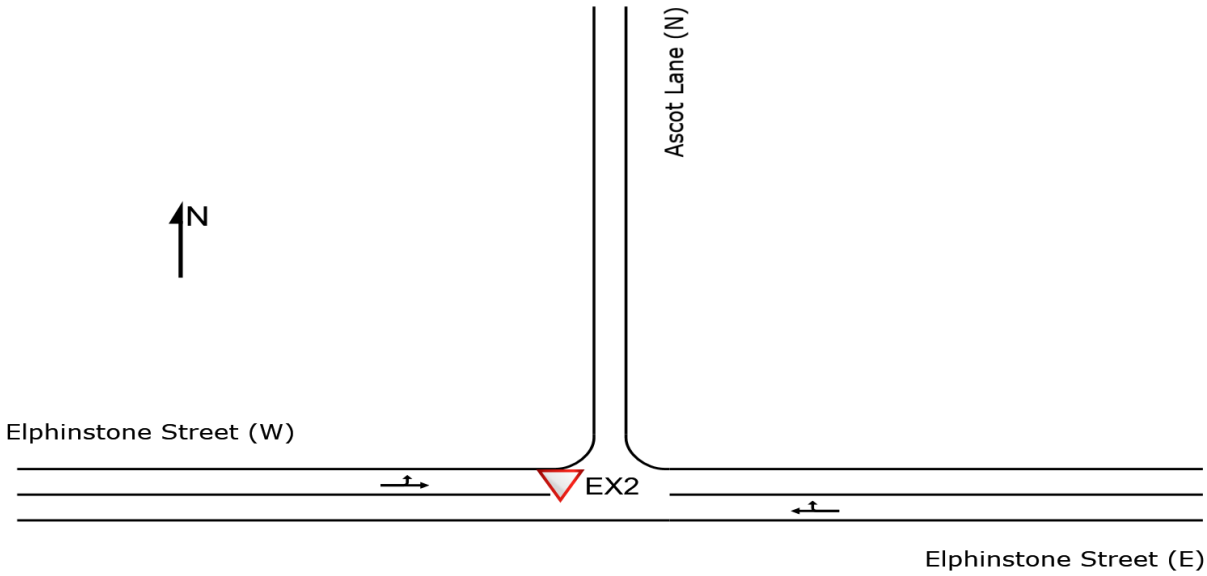
Organisation: MODUS TRAFFIC ENGINEERING PTY LTD | Licence: NETWORK / 1PC | Created: Thursday, 2 October 2025 7:09:19 PM
Project: C:\Users\BradleyFuller\OneDrive - Modus Engineering\Documents\177 MUSGRAVE\MOD24783QLD - 177 & 179 Musgrave Street, Berserker.sip9

SITE LAYOUT

Site: EX2 [BG2028 AM (Site Folder: BG2028)]

Ascot Lane / Elphinstone Street
Site Category: Existing Conditions
Give-Way (Two-Way)

Layout pictures are schematic functional drawings reflecting input data. They are not design drawings.



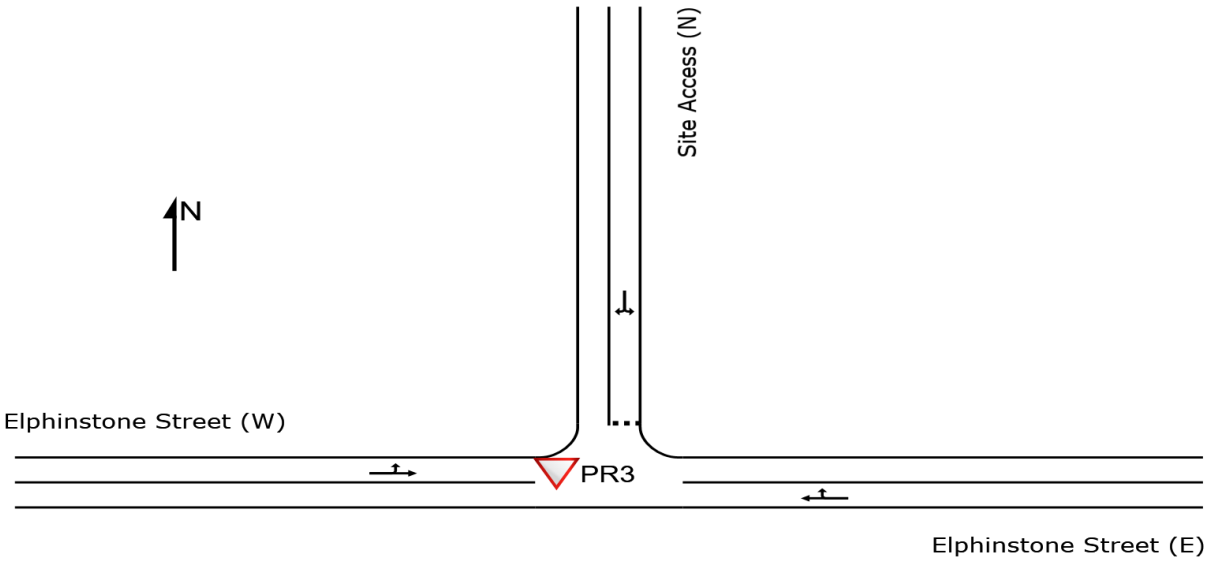
Organisation: MODUS TRAFFIC ENGINEERING PTY LTD | Licence: NETWORK / 1PC | Created: Thursday, 2 October 2025 7:09:19 PM
Project: C:\Users\BradleyFuller\OneDrive - Modus Engineering\Documents\177 MUSGRAVE\MOD24783QLD - 177 & 179 Musgrave Street, Berserker.sip9

SITE LAYOUT

Site: PR3 [BG2028 + DEV AM (Site Folder: BG2028 + DEV)]

Elphinstone Street / Site Access
Site Category: Proposed Conditions
Give-Way (Two-Way)

Layout pictures are schematic functional drawings reflecting input data. They are not design drawings.



Organisation: MODUS TRAFFIC ENGINEERING PTY LTD | Licence: NETWORK / 1PC | Created: Thursday, 2 October 2025 7:09:20 PM
Project: C:\Users\BradleyFuller\OneDrive - Modus Engineering\Documents\177 MUSGRAVE\MOD24783QLD - 177 & 179 Musgrave Street, Berserker.sip9

PHASING SUMMARY

Site: EX1 [BG2028 AM (Site Folder: BG2028)]

Output produced by SIDRA INTERSECTION Version: 9.1.5.224

Musgrave Street / Elphinstone Street Intersection
Site Category: Existing Conditions
Signals - EQUISAT (Fixed-Time/SCATS) Isolated Cycle Time = 120 seconds (Site User-Given Cycle Time)

Timings based on settings in the Site Phasing & Timing dialog
Phase Times determined by the program
Phase Sequence: Four-Phase Leading Right Turns
Input Phase Sequence: A, B, C, D
Output Phase Sequence: A, B, C, D
Reference Phase: Phase A

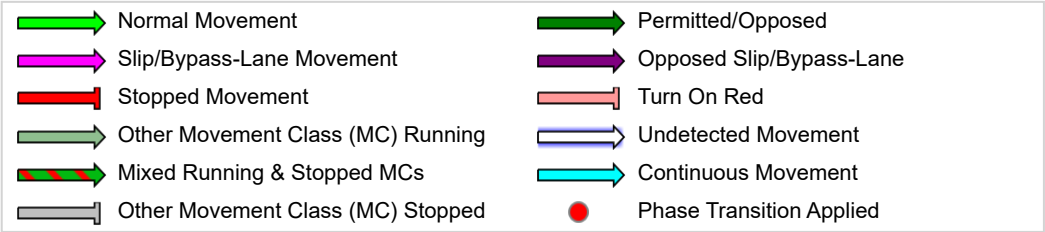
Phase Timing Summary

Phase	A	B	C	D
Phase Change Time (sec)	0	33	72	101
Green Time (sec)	27	33	23	13
Phase Time (sec)	33	39	29	19
Phase Split	28%	33%	24%	16%
Phase Frequency (%)	100.0	100.0	100.0	100.0

See the Timing Analysis report for more detailed information including input values of Yellow Time and All-Red Time, and information on any adjustments to Intergreen Time, Phase Time and Green Time values in cases of Pedestrian Actuation, Minor Phase Actuation and Phase Frequency values (user-specified or implied) less than 100%.

Output Phase Sequence

REF: Reference Phase
VAR: Variable Phase



PHASING SUMMARY

Site: EX3 [BG2028 PM (Site Folder: BG2028)]

Output produced by SIDRA INTERSECTION Version: 9.1.5.224

Musgrave Street / Elphinstone Street Intersection
Site Category: Existing Conditions
Signals - EQUISAT (Fixed-Time/SCATS) Isolated Cycle Time = 120 seconds (Site User-Given Cycle Time)

Timings based on settings in the Site Phasing & Timing dialog
Phase Times determined by the program
Phase Sequence: Four-Phase Leading Right Turns
Input Phase Sequence: A, B, C, D
Output Phase Sequence: A, B, C, D
Reference Phase: Phase A

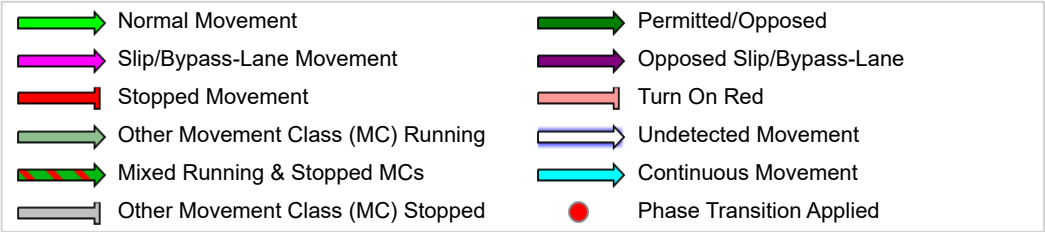
Phase Timing Summary

Phase	A	B	C	D
Phase Change Time (sec)	0	41	70	99
Green Time (sec)	35	23	23	15
Phase Time (sec)	41	29	29	21
Phase Split	34%	24%	24%	18%
Phase Frequency (%)	100.0	100.0	100.0	100.0

See the Timing Analysis report for more detailed information including input values of Yellow Time and All-Red Time, and information on any adjustments to Intergreen Time, Phase Time and Green Time values in cases of Pedestrian Actuation, Minor Phase Actuation and Phase Frequency values (user-specified or implied) less than 100%.

Output Phase Sequence

REF: Reference Phase
VAR: Variable Phase



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MOVEMENT SUMMARY

Site: EX1 [BG2028 AM (Site Folder: BG2028)]

Output produced by SIDRA INTERSECTION Version: 9.1.5.224

Musgrave Street / Elphinstone Street Intersection
Site Category: Existing Conditions
Signals - EQUISAT (Fixed-Time/SCATS) Isolated Cycle Time = 120 seconds (Site User-Given Cycle Time)

Vehicle Movement Performance

Mov ID	Turn	Mov Class	Demand Flows [Total veh/h	HV] %	Arrival Flows [Total veh/h	HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	95% Back Of Queue [Veh. veh	Dist] m	Prop. Que	Eff. Stop Rate	Aver. No. of Cycles	Aver. Speed km/h
South: Musgrave Street (S)															
1	L2	All MCs	6	5.0	6	5.0	0.534	52.9	LOS D	11.7	85.7	0.93	0.78	0.93	33.7
2	T1	All MCs	673	5.0	673	5.0	0.534	44.5	LOS D	11.8	86.1	0.93	0.78	0.93	29.4
3	R2	All MCs	108	5.0	108	5.0	*0.767	67.1	LOS E	8.6	62.7	1.00	0.89	1.16	28.0
3u	U	All MCs	31	5.0	31	5.0	0.767	68.6	LOS E	8.6	62.7	1.00	0.89	1.16	27.9
Approach			818	5.0	818	5.0	0.767	48.4	LOS D	11.8	86.1	0.94	0.80	0.97	29.1
East: Elphinstone Street (E)															
4	L2	All MCs	114	5.0	114	5.0	0.254	65.0	LOS E	5.3	39.0	0.84	0.77	0.84	33.8
5	T1	All MCs	12	5.0	12	5.0	*0.725	64.4	LOS E	16.2	118.0	0.96	0.86	1.00	33.3
6	R2	All MCs	285	5.0	285	5.0	0.725	70.1	LOS E	16.2	118.0	0.96	0.86	1.00	27.2
Approach			411	5.0	411	5.0	0.725	68.5	LOS E	16.2	118.0	0.93	0.83	0.96	24.4
North: Musgrave Street (N)															
7	L2	All MCs	135	5.0	135	5.0	*0.750	57.1	LOS E	16.7	122.1	0.99	0.88	1.05	26.2
8	T1	All MCs	767	5.0	767	5.0	0.750	55.1	LOS E	18.0	131.7	0.99	0.88	1.05	27.8
9	R2	All MCs	21	5.0	21	5.0	0.353	78.0	LOS E	3.2	23.5	0.97	0.76	0.97	24.0
9u	U	All MCs	36	5.0	36	5.0	0.353	79.6	LOS E	3.2	23.5	0.97	0.76	0.97	16.7
Approach			959	5.0	959	5.0	0.750	56.8	LOS E	18.0	131.7	0.99	0.87	1.04	25.4
West: Elphinstone Street (W)															
10	L2	All MCs	11	5.0	11	5.0	0.083	51.1	LOS D	1.3	9.7	0.86	0.68	0.86	27.8
11	T1	All MCs	12	5.0	12	5.0	*0.083	42.8	LOS D	1.3	9.7	0.86	0.68	0.86	34.0
12	R2	All MCs	5	5.0	5	5.0	0.083	48.5	LOS D	1.3	9.7	0.86	0.68	0.86	33.2
Approach			27	5.0	27	5.0	0.083	47.1	LOS D	1.3	9.7	0.86	0.68	0.86	31.6
All Vehicles			2215	5.0	2215	5.0	0.767	55.7	LOS E	18.0	131.7	0.96	0.84	1.00	26.5

Site Level of Service (LOS) Method: Delay (SIDRA). Site LOS Method is specified in the Parameter Settings dialog (Options 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.
Delay Model: SIDRA Standard (Control Delay: Geometric Delay is included).
Queue Model: SIDRA queue estimation methods are used for Back of Queue and Queue at Start of Green.
Gap-Acceptance Capacity Formula: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.
Arrival Flows used in performance calculations are adjusted to include any Initial Queued Demand and Upstream Capacity Constraint effects.

* Critical Movement (Signal Timing)

Pedestrian Movement Performance

Mov ID	Crossing	Input Vol. ped/h	Dem. Flow ped/h	Aver. Delay sec	Level of Service	AVERAGE BACK OF QUEUE [Ped ped	Dist] m	Prop. Que	Eff. Stop Rate	Travel Time sec	Travel Dist. m	Aver. Speed m/sec
South: Musgrave Street (S)												
P1	Full	50	53	54.3	LOS E	0.2	0.2	0.95	0.95	208.1	200.0	0.96

East: Elphinstone Street (E)												
P2	Full	50	53	54.3	LOS E	0.2	0.2	0.95	0.95	208.1	200.0	0.96
North: Musgrave Street (N)												
P3	Full	50	53	54.3	LOS E	0.2	0.2	0.95	0.95	208.1	200.0	0.96
West: Elphinstone Street (W)												
P4	Full	50	53	54.3	LOS E	0.2	0.2	0.95	0.95	208.1	200.0	0.96
All Pedestrians		200	211	54.3	LOS E	0.2	0.2	0.95	0.95	208.1	200.0	0.96

Level of Service (LOS) Method: SIDRA Pedestrian LOS Method (Based on Average Delay)
Pedestrian movement LOS values are based on average delay per pedestrian movement.
Intersection LOS value for Pedestrians is based on average delay for all pedestrian movements.

MOVEMENT SUMMARY

Site: EX2 [BG2028 AM (Site Folder: BG2028)]

Output produced by SIDRA INTERSECTION Version: 9.1.5.224

Ascot Lane / Elphinstone Street
Site Category: Existing Conditions
Give-Way (Two-Way)

Vehicle Movement Performance

Mov ID	Turn	Mov Class	Demand Flows [Total veh/h	HV] %	Arrival Flows [Total veh/h	HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	95% Back Of Queue [Veh. veh	Dist] m	Prop. Que	Eff. Stop Rate	Aver. No. of Cycles	Aver. Speed km/h
East: Elphinstone Street (E)															
5	T1	All MCs	37	5.0	37	5.0	0.021	0.0	LOS A	0.0	0.1	0.01	0.04	0.01	59.6
6	R2	All MCs	2	5.0	2	5.0	0.021	5.7	LOS A	0.0	0.1	0.01	0.04	0.01	56.4
Approach			39	5.0	39	5.0	0.021	0.3	NA	0.0	0.1	0.01	0.04	0.01	59.5
West: Elphinstone Street (W)															
10	L2	All MCs	1	5.0	1	5.0	0.015	5.6	LOS A	0.0	0.0	0.00	0.02	0.00	57.0
11	T1	All MCs	26	5.0	26	5.0	0.015	0.0	LOS A	0.0	0.0	0.00	0.02	0.00	59.8
Approach			27	5.0	27	5.0	0.015	0.2	NA	0.0	0.0	0.00	0.02	0.00	59.7
All Vehicles			66	5.0	66	5.0	0.021	0.3	NA	0.0	0.1	0.01	0.03	0.01	59.5

Site Level of Service (LOS) Method: Delay (SIDRA). Site LOS Method is specified in the Parameter Settings dialog (Options 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 (TWSC): Level of Service is not defined for major road approaches or the intersection as a whole for Two-Way Sign Control (HCM LOS rule).
Two-Way Sign Control Capacity Model: SIDRA Standard.
Delay Model: SIDRA Standard (Control Delay: Geometric Delay is included).
Queue Model: SIDRA queue estimation methods are used for Back of Queue and Queue at Start of Gap.
Gap-Acceptance Capacity Formula: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.
Arrival Flows used in performance calculations are adjusted to include any Initial Queued Demand and Upstream Capacity Constraint effects.

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MOVEMENT SUMMARY

Site: EX3 [BG2028 PM (Site Folder: BG2028)]

Output produced by SIDRA INTERSECTION Version: 9.1.5.224

Musgrave Street / Elphinstone Street Intersection
Site Category: Existing Conditions
Signals - EQUISAT (Fixed-Time/SCATS) Isolated Cycle Time = 120 seconds (Site User-Given Cycle Time)

Vehicle Movement Performance

Mov ID	Turn	Mov Class	Demand Flows [Total veh/h	HV] %	Arrival Flows [Total veh/h	HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	95% Back Of Queue [Veh. veh	Dist] m	Prop. Que	Eff. Stop Rate	Aver. No. of Cycles	Aver. Speed km/h
South: Musgrave Street (S)															
1	L2	All MCs	9	5.0	9	5.0	*0.725	49.9	LOS D	21.1	153.8	0.96	0.84	0.97	34.6
2	T1	All MCs	1152	5.0	1152	5.0	0.725	44.3	LOS D	21.1	154.3	0.96	0.84	0.97	30.4
3	R2	All MCs	119	5.0	119	5.0	*0.680	71.4	LOS E	8.5	62.1	1.00	0.84	1.06	29.0
3u	U	All MCs	25	5.0	25	5.0	0.680	73.0	LOS E	8.5	62.1	1.00	0.84	1.06	28.9
Approach			1305	5.0	1305	5.0	0.725	47.3	LOS D	21.1	154.3	0.96	0.84	0.98	29.1
East: Elphinstone Street (E)															
4	L2	All MCs	72	5.0	72	5.0	0.239	63.0	LOS E	3.7	26.9	0.91	0.76	0.91	31.3
5	T1	All MCs	12	5.0	12	5.0	*0.564	58.1	LOS E	9.6	70.0	0.96	0.81	0.96	32.1
6	R2	All MCs	166	5.0	166	5.0	0.564	63.7	LOS E	9.6	70.0	0.96	0.81	0.96	26.1
Approach			249	5.0	249	5.0	0.564	63.2	LOS E	9.6	70.0	0.94	0.79	0.94	25.6
North: Musgrave Street (N)															
7	L2	All MCs	158	5.0	158	5.0	0.603	47.1	LOS D	15.6	114.0	0.92	0.81	0.92	29.0
8	T1	All MCs	773	5.0	773	5.0	0.603	43.7	LOS D	16.7	122.2	0.92	0.79	0.92	31.0
9	R2	All MCs	28	5.0	28	5.0	0.520	72.7	LOS E	5.4	39.6	0.98	0.79	0.98	24.1
9u	U	All MCs	66	5.0	66	5.0	0.520	74.3	LOS E	5.4	39.6	0.98	0.79	0.98	16.8
Approach			1025	5.0	1025	5.0	0.603	47.1	LOS D	16.7	122.2	0.92	0.79	0.92	28.0
West: Elphinstone Street (W)															
10	L2	All MCs	6	5.0	6	5.0	0.075	50.5	LOS D	1.2	8.9	0.85	0.67	0.85	28.1
11	T1	All MCs	11	5.0	11	5.0	*0.075	42.2	LOS D	1.2	8.9	0.85	0.67	0.85	34.3
12	R2	All MCs	8	5.0	8	5.0	0.075	47.9	LOS D	1.2	8.9	0.85	0.67	0.85	33.5
Approach			25	5.0	25	5.0	0.075	46.2	LOS D	1.2	8.9	0.85	0.67	0.85	32.6
All Vehicles			2605	5.0	2605	5.0	0.725	48.7	LOS D	21.1	154.3	0.94	0.82	0.95	28.3

Site Level of Service (LOS) Method: Delay (SIDRA). Site LOS Method is specified in the Parameter Settings dialog (Options 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.
Delay Model: SIDRA Standard (Control Delay: Geometric Delay is included).
Queue Model: SIDRA queue estimation methods are used for Back of Queue and Queue at Start of Green.
Gap-Acceptance Capacity Formula: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.
Arrival Flows used in performance calculations are adjusted to include any Initial Queued Demand and Upstream Capacity Constraint effects.

* Critical Movement (Signal Timing)

Pedestrian Movement Performance

Mov ID	Crossing	Input Vol. ped/h	Dem. Flow ped/h	Aver. Delay sec	Level of Service	AVERAGE BACK OF QUEUE [Ped ped	Dist] m	Prop. Que	Eff. Stop Rate	Travel Time sec	Travel Dist. m	Aver. Speed m/sec
South: Musgrave Street (S)												
P1	Full	50	53	54.3	LOS E	0.2	0.2	0.95	0.95	208.1	200.0	0.96

East: Elphinstone Street (E)												
P2	Full	50	53	54.3	LOS E	0.2	0.2	0.95	0.95	208.1	200.0	0.96
North: Musgrave Street (N)												
P3	Full	50	53	54.3	LOS E	0.2	0.2	0.95	0.95	208.1	200.0	0.96
West: Elphinstone Street (W)												
P4	Full	50	53	54.3	LOS E	0.2	0.2	0.95	0.95	208.1	200.0	0.96
All Pedestrians		200	211	54.3	LOS E	0.2	0.2	0.95	0.95	208.1	200.0	0.96

Level of Service (LOS) Method: SIDRA Pedestrian LOS Method (Based on Average Delay)
Pedestrian movement LOS values are based on average delay per pedestrian movement.
Intersection LOS value for Pedestrians is based on average delay for all pedestrian movements.

MOVEMENT SUMMARY

Site: EX4 [BG2028 PM (Site Folder: BG2028)]

Output produced by SIDRA INTERSECTION Version: 9.1.5.224

Ascot Lane / Elphinstone Street
Site Category: Existing Conditions
Give-Way (Two-Way)

Vehicle Movement Performance

Mov ID	Turn	Mov Class	Demand Flows [Total veh/h	HV] %	Arrival Flows [Total veh/h	HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	95% Back Of Queue [Veh. veh	Dist] m	Prop. Que	Eff. Stop Rate	Aver. No. of Cycles	Aver. Speed km/h
East: Elphinstone Street (E)															
5	T1	All MCs	47	5.0	47	5.0	0.026	0.0	LOS A	0.0	0.1	0.00	0.03	0.00	59.7
6	R2	All MCs	2	5.0	2	5.0	0.026	5.7	LOS A	0.0	0.1	0.00	0.03	0.00	56.5
Approach			49	5.0	49	5.0	0.026	0.2	NA	0.0	0.1	0.00	0.03	0.00	59.6
West: Elphinstone Street (W)															
10	L2	All MCs	1	5.0	1	5.0	0.002	5.6	LOS A	0.0	0.0	0.00	0.15	0.00	56.0
11	T1	All MCs	3	5.0	3	5.0	0.002	0.0	LOS A	0.0	0.0	0.00	0.15	0.00	58.7
Approach			4	5.0	4	5.0	0.002	1.4	NA	0.0	0.0	0.00	0.15	0.00	58.0
All Vehicles			54	5.0	54	5.0	0.026	0.3	NA	0.0	0.1	0.00	0.04	0.00	59.5

Site Level of Service (LOS) Method: Delay (SIDRA). Site LOS Method is specified in the Parameter Settings dialog (Options 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 (TWSC): Level of Service is not defined for major road approaches or the intersection as a whole for Two-Way Sign Control (HCM LOS rule).
Two-Way Sign Control Capacity Model: SIDRA Standard.
Delay Model: SIDRA Standard (Control Delay: Geometric Delay is included).
Queue Model: SIDRA queue estimation methods are used for Back of Queue and Queue at Start of Gap.
Gap-Acceptance Capacity Formula: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.
Arrival Flows used in performance calculations are adjusted to include any Initial Queued Demand and Upstream Capacity Constraint effects.

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MOVEMENT SUMMARY

Site: PR1 [BG2028 + DEV AM (Site Folder: BG2028 + DEV)]

Output produced by SIDRA INTERSECTION Version: 9.1.5.224

Musgrave Street / Elphinstone Street Intersection
Site Category: Proposed Conditions
Signals - EQUISAT (Fixed-Time/SCATS) Isolated Cycle Time = 120 seconds (Site User-Given Cycle Time)

Vehicle Movement Performance

Mov ID	Turn	Mov Class	Demand Flows [Total veh/h	HV] %	Arrival Flows [Total veh/h	HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	95% Back Of Queue [Veh. veh	Dist] m	Prop. Que	Eff. Stop Rate	Aver. No. of Cycles	Aver. Speed km/h
South: Musgrave Street (S)															
1	L2	All MCs	36	5.0	36	5.0	0.561	52.9	LOS D	12.2	88.7	0.94	0.79	0.94	33.3
2	T1	All MCs	673	5.0	673	5.0	0.561	44.7	LOS D	12.5	91.2	0.94	0.79	0.94	29.2
3	R2	All MCs	108	5.0	108	5.0	* 0.767	67.1	LOS E	8.6	62.7	1.00	0.89	1.16	28.0
3u	U	All MCs	31	5.0	31	5.0	0.767	68.6	LOS E	8.6	62.7	1.00	0.89	1.16	27.9
Approach			847	5.0	847	5.0	0.767	48.8	LOS D	12.5	91.2	0.95	0.81	0.98	29.1
East: Elphinstone Street (E)															
4	L2	All MCs	114	5.0	114	5.0	0.254	66.3	LOS E	5.3	39.0	0.84	0.77	0.84	33.8
5	T1	All MCs	26	5.0	26	5.0	* 0.760	67.5	LOS E	17.5	127.6	0.98	0.88	1.04	32.8
6	R2	All MCs	285	5.0	285	5.0	0.760	73.1	LOS E	17.5	127.6	0.98	0.88	1.04	26.8
Approach			425	5.0	425	5.0	0.760	71.0	LOS E	17.5	127.6	0.94	0.85	0.99	24.0
North: Musgrave Street (N)															
7	L2	All MCs	135	5.0	135	5.0	* 0.759	57.5	LOS E	17.1	124.6	1.00	0.89	1.06	26.1
8	T1	All MCs	767	5.0	767	5.0	0.759	55.1	LOS E	18.4	134.2	0.99	0.89	1.06	27.7
9	R2	All MCs	55	5.0	55	5.0	0.527	78.3	LOS E	5.2	38.3	0.99	0.78	0.99	23.8
9u	U	All MCs	36	5.0	36	5.0	0.527	79.9	LOS E	5.2	38.3	0.99	0.78	0.99	16.5
Approach			993	5.0	993	5.0	0.759	57.6	LOS E	18.4	134.2	0.99	0.88	1.05	25.2
West: Elphinstone Street (W)															
10	L2	All MCs	35	5.0	35	5.0	0.246	52.8	LOS D	4.1	29.6	0.90	0.75	0.90	26.9
11	T1	All MCs	18	5.0	18	5.0	* 0.246	44.4	LOS D	4.1	29.6	0.90	0.75	0.90	33.0
12	R2	All MCs	27	5.0	27	5.0	0.246	50.1	LOS D	4.1	29.6	0.90	0.75	0.90	32.3
Approach			80	5.0	80	5.0	0.246	50.0	LOS D	4.1	29.6	0.90	0.75	0.90	30.3
All Vehicles			2345	5.0	2345	5.0	0.767	56.6	LOS E	18.4	134.2	0.97	0.84	1.01	26.5

Site Level of Service (LOS) Method: Delay (SIDRA). Site LOS Method is specified in the Parameter Settings dialog (Options 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.
Delay Model: SIDRA Standard (Control Delay: Geometric Delay is included).
Queue Model: SIDRA queue estimation methods are used for Back of Queue and Queue at Start of Green.
Gap-Acceptance Capacity Formula: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.
Arrival Flows used in performance calculations are adjusted to include any Initial Queued Demand and Upstream Capacity Constraint effects.

* Critical Movement (Signal Timing)

Pedestrian Movement Performance

Mov ID	Crossing	Input Vol. ped/h	Dem. Flow ped/h	Aver. Delay sec	Level of Service	AVERAGE BACK OF QUEUE [Ped ped	Dist] m	Prop. Que	Eff. Stop Rate	Travel Time sec	Travel Dist. m	Aver. Speed m/sec
South: Musgrave Street (S)												
P1	Full	50	53	54.3	LOS E	0.2	0.2	0.95	0.95	208.1	200.0	0.96

East: Elphinstone Street (E)												
P2	Full	50	53	54.3	LOS E	0.2	0.2	0.95	0.95	208.1	200.0	0.96
North: Musgrave Street (N)												
P3	Full	50	53	54.3	LOS E	0.2	0.2	0.95	0.95	208.1	200.0	0.96
West: Elphinstone Street (W)												
P4	Full	50	53	54.3	LOS E	0.2	0.2	0.95	0.95	208.1	200.0	0.96
All Pedestrians		200	211	54.3	LOS E	0.2	0.2	0.95	0.95	208.1	200.0	0.96

Level of Service (LOS) Method: SIDRA Pedestrian LOS Method (Based on Average Delay)
Pedestrian movement LOS values are based on average delay per pedestrian movement.
Intersection LOS value for Pedestrians is based on average delay for all pedestrian movements.

MOVEMENT SUMMARY

Site: PR2 [BG2028 + DEV AM (Site Folder: BG2028 + DEV)]

Output produced by SIDRA INTERSECTION Version: 9.1.5.224

Ascot Lane / Elphinstone Street
Site Category: Proposed Conditions
Give-Way (Two-Way)

Vehicle Movement Performance

Mov ID	Turn	Mov Class	Demand Flows [Total veh/h	HV] %	Arrival Flows [Total veh/h	HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	95% Back Of Queue [Veh. veh	Dist] m	Prop. Que	Eff. Stop Rate	Aver. No. of Cycles	Aver. Speed km/h
East: Elphinstone Street (E)															
5	T1	All MCs	37	5.0	37	5.0	0.070	0.2	LOS A	0.3	2.4	0.18	0.43	0.18	55.8
6	R2	All MCs	81	5.0	81	5.0	0.070	6.0	LOS A	0.3	2.4	0.18	0.43	0.18	53.0
Approach			118	5.0	118	5.0	0.070	4.2	NA	0.3	2.4	0.18	0.43	0.18	53.8
West: Elphinstone Street (W)															
10	L2	All MCs	2	5.0	2	5.0	0.043	5.6	LOS A	0.0	0.0	0.00	0.02	0.00	57.1
11	T1	All MCs	79	5.0	79	5.0	0.043	0.0	LOS A	0.0	0.0	0.00	0.02	0.00	59.8
Approach			81	5.0	81	5.0	0.043	0.2	NA	0.0	0.0	0.00	0.02	0.00	59.8
All Vehicles			199	5.0	199	5.0	0.070	2.6	NA	0.3	2.4	0.11	0.26	0.11	56.1

Site Level of Service (LOS) Method: Delay (SIDRA). Site LOS Method is specified in the Parameter Settings dialog (Options 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 (TWSC): Level of Service is not defined for major road approaches or the intersection as a whole for Two-Way Sign Control (HCM LOS rule).
Two-Way Sign Control Capacity Model: SIDRA Standard.
Delay Model: SIDRA Standard (Control Delay: Geometric Delay is included).
Queue Model: SIDRA queue estimation methods are used for Back of Queue and Queue at Start of Gap.
Gap-Acceptance Capacity Formula: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.
Arrival Flows used in performance calculations are adjusted to include any Initial Queued Demand and Upstream Capacity Constraint effects.

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MOVEMENT SUMMARY

Site: PR3 [BG2028 + DEV AM (Site Folder: BG2028 + DEV)]

Output produced by SIDRA INTERSECTION Version: 9.1.5.224

Elphinstone Street / Site Access
Site Category: Proposed Conditions
Give-Way (Two-Way)

Vehicle Movement Performance

Mov ID	Turn	Mov Class	Demand Flows [Total veh/h	HV] %	Arrival Flows [Total veh/h	HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	95% Back Of Queue [Veh. veh	Dist] m	Prop. Que	Eff. Stop Rate	Aver. No. of Cycles	Aver. Speed km/h
East: Elphinstone Street (E)															
5	T1	All MCs	37	5.0	37	5.0	0.020	0.0	LOS A	0.0	0.0	0.01	0.02	0.01	59.8
6	R2	All MCs	1	5.0	1	5.0	0.020	5.5	LOS A	0.0	0.0	0.01	0.02	0.01	56.7
Approach			38	5.0	38	5.0	0.020	0.2	NA	0.0	0.0	0.01	0.02	0.01	59.7
North: Site Access (N)															
7	L2	All MCs	53	5.0	53	5.0	0.035	5.7	LOS A	0.1	1.0	0.09	0.54	0.09	52.4
9	R2	All MCs	1	5.0	1	5.0	0.035	5.7	LOS A	0.1	1.0	0.09	0.54	0.09	52.1
Approach			54	5.0	54	5.0	0.035	5.7	LOS A	0.1	1.0	0.09	0.54	0.09	52.4
West: Elphinstone Street (W)															
10	L2	All MCs	1	5.0	1	5.0	0.015	5.6	LOS A	0.0	0.0	0.00	0.02	0.00	57.1
11	T1	All MCs	27	5.0	27	5.0	0.015	0.0	LOS A	0.0	0.0	0.00	0.02	0.00	59.8
Approach			28	5.0	28	5.0	0.015	0.2	NA	0.0	0.0	0.00	0.02	0.00	59.7
All Vehicles			120	5.0	120	5.0	0.035	2.6	NA	0.1	1.0	0.04	0.25	0.04	56.2

Site Level of Service (LOS) Method: Delay (SIDRA). Site LOS Method is specified in the Parameter Settings dialog (Options 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 (TWSC): Level of Service is not defined for major road approaches or the intersection as a whole for Two-Way Sign Control (HCM LOS rule).
Two-Way Sign Control Capacity Model: SIDRA Standard.
Delay Model: SIDRA Standard (Control Delay: Geometric Delay is included).
Queue Model: SIDRA queue estimation methods are used for Back of Queue and Queue at Start of Gap.
Gap-Acceptance Capacity Formula: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.
Arrival Flows used in performance calculations are adjusted to include any Initial Queued Demand and Upstream Capacity Constraint effects.

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MOVEMENT SUMMARY

Site: PR4 [BG2028 + DEV PM (Site Folder: BG2028 + DEV)]

Output produced by SIDRA INTERSECTION Version: 9.1.5.224

Musgrave Street / Elphinstone Street Intersection
Site Category: Proposed Conditions
Signals - EQUISAT (Fixed-Time/SCATS) Isolated Cycle Time = 120 seconds (Site User-Given Cycle Time)

Vehicle Movement Performance

Mov ID	Turn	Mov Class	Demand Flows [Total veh/h	HV] %	Arrival Flows [Total veh/h	HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	95% Back Of Queue [Veh. veh	Dist] m	Prop. Que	Eff. Stop Rate	Aver. No. of Cycles	Aver. Speed km/h
South: Musgrave Street (S)															
1	L2	All MCs	34	5.0	34	5.0	*0.722	48.9	LOS D	21.2	154.9	0.96	0.84	0.96	34.8
2	T1	All MCs	1152	5.0	1152	5.0	0.722	43.5	LOS D	21.5	156.7	0.95	0.83	0.96	30.7
3	R2	All MCs	119	5.0	119	5.0	*0.729	73.9	LOS E	8.7	63.6	1.00	0.87	1.11	28.5
3u	U	All MCs	25	5.0	25	5.0	0.729	75.5	LOS E	8.7	63.6	1.00	0.87	1.11	28.4
Approach			1329	5.0	1329	5.0	0.729	47.0	LOS D	21.5	156.7	0.96	0.84	0.98	29.3
East: Elphinstone Street (E)															
4	L2	All MCs	72	5.0	72	5.0	0.239	64.1	LOS E	3.7	26.9	0.91	0.76	0.91	31.3
5	T1	All MCs	17	5.0	17	5.0	*0.584	59.4	LOS E	9.9	72.4	0.96	0.81	0.96	32.1
6	R2	All MCs	166	5.0	166	5.0	0.584	65.1	LOS E	9.9	72.4	0.96	0.81	0.96	26.1
Approach			255	5.0	255	5.0	0.584	64.4	LOS E	9.9	72.4	0.95	0.80	0.95	25.5
North: Musgrave Street (N)															
7	L2	All MCs	158	5.0	158	5.0	0.588	46.2	LOS D	15.5	113.2	0.91	0.81	0.91	29.3
8	T1	All MCs	773	5.0	773	5.0	0.588	42.5	LOS D	16.6	121.2	0.91	0.78	0.91	31.3
9	R2	All MCs	46	5.0	46	5.0	0.643	74.4	LOS E	6.7	48.7	1.00	0.82	1.05	23.6
9u	U	All MCs	66	5.0	66	5.0	0.643	76.0	LOS E	6.7	48.7	1.00	0.82	1.05	16.3
Approach			1043	5.0	1043	5.0	0.643	46.6	LOS D	16.6	121.2	0.92	0.79	0.92	28.1
West: Elphinstone Street (W)															
10	L2	All MCs	23	5.0	23	5.0	0.174	52.1	LOS D	2.8	20.7	0.88	0.73	0.88	27.2
11	T1	All MCs	15	5.0	15	5.0	*0.174	43.8	LOS D	2.8	20.7	0.88	0.73	0.88	33.3
12	R2	All MCs	19	5.0	19	5.0	0.174	49.4	LOS D	2.8	20.7	0.88	0.73	0.88	32.6
Approach			57	5.0	57	5.0	0.174	49.0	LOS D	2.8	20.7	0.88	0.73	0.88	30.8
All Vehicles			2684	5.0	2684	5.0	0.729	48.5	LOS D	21.5	156.7	0.94	0.81	0.95	28.5

Site Level of Service (LOS) Method: Delay (SIDRA). Site LOS Method is specified in the Parameter Settings dialog (Options 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.
Delay Model: SIDRA Standard (Control Delay: Geometric Delay is included).
Queue Model: SIDRA queue estimation methods are used for Back of Queue and Queue at Start of Green.
Gap-Acceptance Capacity Formula: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.
Arrival Flows used in performance calculations are adjusted to include any Initial Queued Demand and Upstream Capacity Constraint effects.

* Critical Movement (Signal Timing)

Pedestrian Movement Performance

Mov ID	Crossing	Input Vol. ped/h	Dem. Flow ped/h	Aver. Delay sec	Level of Service	AVERAGE BACK OF QUEUE [Ped ped	Dist] m	Prop. Que	Eff. Stop Rate	Travel Time sec	Travel Dist. m	Aver. Speed m/sec
South: Musgrave Street (S)												
P1	Full	50	53	54.3	LOS E	0.2	0.2	0.95	0.95	208.1	200.0	0.96

East: Elphinstone Street (E)												
P2	Full	50	53	54.3	LOS E	0.2	0.2	0.95	0.95	208.1	200.0	0.96
North: Musgrave Street (N)												
P3	Full	50	53	54.3	LOS E	0.2	0.2	0.95	0.95	208.1	200.0	0.96
West: Elphinstone Street (W)												
P4	Full	50	53	54.3	LOS E	0.2	0.2	0.95	0.95	208.1	200.0	0.96
All Pedestrians		200	211	54.3	LOS E	0.2	0.2	0.95	0.95	208.1	200.0	0.96

Level of Service (LOS) Method: SIDRA Pedestrian LOS Method (Based on Average Delay)
Pedestrian movement LOS values are based on average delay per pedestrian movement.
Intersection LOS value for Pedestrians is based on average delay for all pedestrian movements.

MOVEMENT SUMMARY

Site: PR5 [BG2028 + DEV PM (Site Folder: BG2028 + DEV)]

Output produced by SIDRA INTERSECTION Version: 9.1.5.224

Ascot Lane / Elphinstone Street
Site Category: Proposed Conditions
Give-Way (Two-Way)

Vehicle Movement Performance

Mov ID	Turn	Mov Class	Demand Flows [Total veh/h	HV] %	Arrival Flows [Total veh/h	HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	95% Back Of Queue [Veh. veh	Dist] m	Prop. Que	Eff. Stop Rate	Aver. No. of Cycles	Aver. Speed km/h
East: Elphinstone Street (E)															
5	T1	All MCs	47	5.0	47	5.0	0.055	0.1	LOS A	0.2	1.7	0.13	0.33	0.13	56.8
6	R2	All MCs	49	5.0	49	5.0	0.055	5.9	LOS A	0.2	1.7	0.13	0.33	0.13	53.9
Approach			97	5.0	97	5.0	0.055	3.1	NA	0.2	1.7	0.13	0.33	0.13	55.3
West: Elphinstone Street (W)															
10	L2	All MCs	1	5.0	1	5.0	0.030	5.6	LOS A	0.0	0.0	0.00	0.01	0.00	57.1
11	T1	All MCs	56	5.0	56	5.0	0.030	0.0	LOS A	0.0	0.0	0.00	0.01	0.00	59.9
Approach			57	5.0	57	5.0	0.030	0.1	NA	0.0	0.0	0.00	0.01	0.00	59.8
All Vehicles			154	5.0	154	5.0	0.055	2.0	NA	0.2	1.7	0.08	0.21	0.08	56.9

Site Level of Service (LOS) Method: Delay (SIDRA). Site LOS Method is specified in the Parameter Settings dialog (Options 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 (TWSC): Level of Service is not defined for major road approaches or the intersection as a whole for Two-Way Sign Control (HCM LOS rule).
Two-Way Sign Control Capacity Model: SIDRA Standard.
Delay Model: SIDRA Standard (Control Delay: Geometric Delay is included).
Queue Model: SIDRA queue estimation methods are used for Back of Queue and Queue at Start of Gap.
Gap-Acceptance Capacity Formula: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.
Arrival Flows used in performance calculations are adjusted to include any Initial Queued Demand and Upstream Capacity Constraint effects.

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MOVEMENT SUMMARY

Site: PR6 [BG2028 + DEV PM (Site Folder: BG2028 + DEV)]

Output produced by SIDRA INTERSECTION Version: 9.1.5.224

Elphinstone Street / Site Access
Site Category: Proposed Conditions
Give-Way (Two-Way)

Vehicle Movement Performance

Mov ID	Turn	Mov Class	Demand Flows [Total veh/h	HV] %	Arrival Flows [Total veh/h	HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	95% Back Of Queue [Veh. veh	Dist] m	Prop. Que	Eff. Stop Rate	Aver. No. of Cycles	Aver. Speed km/h
East: Elphinstone Street (E)															
5	T1	All MCs	47	5.0	47	5.0	0.026	0.0	LOS A	0.0	0.0	0.00	0.01	0.00	59.9
6	R2	All MCs	1	5.0	1	5.0	0.026	5.5	LOS A	0.0	0.0	0.00	0.01	0.00	56.8
Approach			48	5.0	48	5.0	0.026	0.1	NA	0.0	0.0	0.00	0.01	0.00	59.8
North: Site Access (N)															
7	L2	All MCs	32	5.0	32	5.0	0.021	5.7	LOS A	0.1	0.6	0.09	0.55	0.09	52.4
9	R2	All MCs	1	5.0	1	5.0	0.021	5.8	LOS A	0.1	0.6	0.09	0.55	0.09	52.1
Approach			33	5.0	33	5.0	0.021	5.7	LOS A	0.1	0.6	0.09	0.55	0.09	52.4
West: Elphinstone Street (W)															
10	L2	All MCs	2	5.0	2	5.0	0.015	5.6	LOS A	0.0	0.0	0.00	0.05	0.00	56.9
11	T1	All MCs	25	5.0	25	5.0	0.015	0.0	LOS A	0.0	0.0	0.00	0.05	0.00	59.6
Approach			27	5.0	27	5.0	0.015	0.4	NA	0.0	0.0	0.00	0.05	0.00	59.4
All Vehicles			108	5.0	108	5.0	0.026	1.9	NA	0.1	0.6	0.03	0.18	0.03	57.3

Site Level of Service (LOS) Method: Delay (SIDRA). Site LOS Method is specified in the Parameter Settings dialog (Options 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 (TWSC): Level of Service is not defined for major road approaches or the intersection as a whole for Two-Way Sign Control (HCM LOS rule).
Two-Way Sign Control Capacity Model: SIDRA Standard.
Delay Model: SIDRA Standard (Control Delay: Geometric Delay is included).
Queue Model: SIDRA queue estimation methods are used for Back of Queue and Queue at Start of Gap.
Gap-Acceptance Capacity Formula: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.
Arrival Flows used in performance calculations are adjusted to include any Initial Queued Demand and Upstream Capacity Constraint effects.

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MOVEMENT SUMMARY

Site: EX5 [BG2038 AM (Site Folder: BG2038)]

Output produced by SIDRA INTERSECTION Version: 9.1.5.224

Musgrave Street / Elphinstone Street Intersection
Site Category: Existing Conditions
Signals - EQUISAT (Fixed-Time/SCATS) Isolated Cycle Time = 120 seconds (Site User-Given Cycle Time)

Vehicle Movement Performance

Mov ID	Turn	Mov Class	Demand Flows [Total veh/h	HV] %	Arrival Flows [Total veh/h	HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	95% Back Of Queue [Veh. veh	Dist] m	Prop. Que	Eff. Stop Rate	Aver. No. of Cycles	Aver. Speed km/h
South: Musgrave Street (S)															
1	L2	All MCs	7	5.0	7	5.0	0.586	53.6	LOS D	13.1	95.4	0.95	0.80	0.95	33.5
2	T1	All MCs	738	5.0	738	5.0	0.586	45.1	LOS D	13.1	95.9	0.95	0.80	0.95	29.2
3	R2	All MCs	119	5.0	119	5.0	* 0.843	71.0	LOS E	9.8	71.8	1.00	0.95	1.27	27.2
3u	U	All MCs	34	5.0	34	5.0	0.843	72.6	LOS E	9.8	71.8	1.00	0.95	1.27	27.1
Approach			898	5.0	898	5.0	0.843	49.6	LOS D	13.1	95.9	0.96	0.82	1.00	28.7
East: Elphinstone Street (E)															
4	L2	All MCs	125	5.0	125	5.0	0.279	68.0	LOS E	5.9	43.3	0.85	0.77	0.85	33.7
5	T1	All MCs	13	5.0	13	5.0	* 0.809	72.2	LOS E	19.2	140.1	0.99	0.91	1.11	31.8
6	R2	All MCs	313	5.0	313	5.0	0.809	77.9	LOS E	19.2	140.1	0.99	0.91	1.11	25.8
Approach			451	5.0	451	5.0	0.809	75.0	LOS E	19.2	140.1	0.95	0.87	1.04	23.1
North: Musgrave Street (N)															
7	L2	All MCs	147	5.0	147	5.0	* 0.826	61.5	LOS E	19.6	143.3	1.00	0.95	1.14	25.1
8	T1	All MCs	842	5.0	842	5.0	0.826	60.6	LOS E	21.2	154.5	1.00	0.96	1.13	26.5
9	R2	All MCs	22	5.0	22	5.0	0.380	81.2	LOS F	3.5	25.4	0.97	0.76	0.97	23.9
9u	U	All MCs	39	5.0	39	5.0	0.380	82.7	LOS F	3.5	25.4	0.97	0.76	0.97	16.6
Approach			1051	5.0	1051	5.0	0.826	62.0	LOS E	21.2	154.5	1.00	0.95	1.13	24.2
West: Elphinstone Street (W)															
10	L2	All MCs	12	5.0	12	5.0	0.092	51.2	LOS D	1.5	10.9	0.86	0.68	0.86	27.7
11	T1	All MCs	13	5.0	13	5.0	* 0.092	42.9	LOS D	1.5	10.9	0.86	0.68	0.86	33.9
12	R2	All MCs	6	5.0	6	5.0	0.092	48.6	LOS D	1.5	10.9	0.86	0.68	0.86	33.1
Approach			31	5.0	31	5.0	0.092	47.3	LOS D	1.5	10.9	0.86	0.68	0.86	31.6
All Vehicles			2429	5.0	2429	5.0	0.843	59.6	LOS E	21.2	154.5	0.97	0.88	1.06	25.6

Site Level of Service (LOS) Method: Delay (SIDRA). Site LOS Method is specified in the Parameter Settings dialog (Options 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.
Delay Model: SIDRA Standard (Control Delay: Geometric Delay is included).
Queue Model: SIDRA queue estimation methods are used for Back of Queue and Queue at Start of Green.
Gap-Acceptance Capacity Formula: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.
Arrival Flows used in performance calculations are adjusted to include any Initial Queued Demand and Upstream Capacity Constraint effects.

* Critical Movement (Signal Timing)

Pedestrian Movement Performance

Mov ID	Crossing	Input Vol. ped/h	Dem. Flow ped/h	Aver. Delay sec	Level of Service	AVERAGE BACK OF QUEUE [Ped ped	Dist] m	Prop. Que	Eff. Stop Rate	Travel Time sec	Travel Dist. m	Aver. Speed m/sec
South: Musgrave Street (S)												
P1	Full	50	53	54.3	LOS E	0.2	0.2	0.95	0.95	208.1	200.0	0.96

East: Elphinstone Street (E)												
P2	Full	50	53	54.3	LOS E	0.2	0.2	0.95	0.95	208.1	200.0	0.96
North: Musgrave Street (N)												
P3	Full	50	53	54.3	LOS E	0.2	0.2	0.95	0.95	208.1	200.0	0.96
West: Elphinstone Street (W)												
P4	Full	50	53	54.3	LOS E	0.2	0.2	0.95	0.95	208.1	200.0	0.96
All Pedestrians		200	211	54.3	LOS E	0.2	0.2	0.95	0.95	208.1	200.0	0.96

Level of Service (LOS) Method: SIDRA Pedestrian LOS Method (Based on Average Delay)
Pedestrian movement LOS values are based on average delay per pedestrian movement.
Intersection LOS value for Pedestrians is based on average delay for all pedestrian movements.

MOVEMENT SUMMARY

Site: EX6 [BG2038 AM (Site Folder: BG2038)]

Output produced by SIDRA INTERSECTION Version: 9.1.5.224

Ascot Lane / Elphinstone Street
Site Category: Existing Conditions
Give-Way (Two-Way)

Vehicle Movement Performance

Mov ID	Turn	Mov Class	Demand Flows [Total veh/h	HV] %	Arrival Flows [Total veh/h	HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	95% Back Of Queue [Veh. veh	Dist] m	Prop. Que	Eff. Stop Rate	Aver. No. of Cycles	Aver. Speed km/h
East: Elphinstone Street (E)															
5	T1	All MCs	41	5.0	41	5.0	0.023	0.0	LOS A	0.0	0.1	0.01	0.03	0.01	59.7
6	R2	All MCs	2	5.0	2	5.0	0.023	5.7	LOS A	0.0	0.1	0.01	0.03	0.01	56.4
Approach			43	5.0	43	5.0	0.023	0.3	NA	0.0	0.1	0.01	0.03	0.01	59.5
West: Elphinstone Street (W)															
10	L2	All MCs	1	5.0	1	5.0	0.016	5.6	LOS A	0.0	0.0	0.00	0.02	0.00	57.1
11	T1	All MCs	29	5.0	29	5.0	0.016	0.0	LOS A	0.0	0.0	0.00	0.02	0.00	59.8
Approach			31	5.0	31	5.0	0.016	0.2	NA	0.0	0.0	0.00	0.02	0.00	59.7
All Vehicles			74	5.0	74	5.0	0.023	0.2	NA	0.0	0.1	0.01	0.03	0.01	59.6

Site Level of Service (LOS) Method: Delay (SIDRA). Site LOS Method is specified in the Parameter Settings dialog (Options 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 (TWSC): Level of Service is not defined for major road approaches or the intersection as a whole for Two-Way Sign Control (HCM LOS rule).
Two-Way Sign Control Capacity Model: SIDRA Standard.
Delay Model: SIDRA Standard (Control Delay: Geometric Delay is included).
Queue Model: SIDRA queue estimation methods are used for Back of Queue and Queue at Start of Gap.
Gap-Acceptance Capacity Formula: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.
Arrival Flows used in performance calculations are adjusted to include any Initial Queued Demand and Upstream Capacity Constraint effects.

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MOVEMENT SUMMARY

Site: EX7 [BG2038 PM (Site Folder: BG2038)]

Output produced by SIDRA INTERSECTION Version: 9.1.5.224

Musgrave Street / Elphinstone Street Intersection
Site Category: Existing Conditions
Signals - EQUISAT (Fixed-Time/SCATS) Isolated Cycle Time = 120 seconds (Site User-Given Cycle Time)

Vehicle Movement Performance

Mov ID	Turn	Mov Class	Demand Flows [Total veh/h	HV] %	Arrival Flows [Total veh/h	HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	95% Back Of Queue [Veh. veh	Dist] m	Prop. Que	Eff. Stop Rate	Aver. No. of Cycles	Aver. Speed km/h
South: Musgrave Street (S)															
1	L2	All MCs	11	5.0	11	5.0	*0.779	51.9	LOS D	24.4	177.8	0.98	0.89	1.02	34.0
2	T1	All MCs	1263	5.0	1263	5.0	0.779	46.9	LOS D	24.4	178.4	0.98	0.89	1.03	29.7
3	R2	All MCs	131	5.0	131	5.0	*0.798	78.6	LOS E	9.9	71.9	1.00	0.91	1.19	27.9
3u	U	All MCs	27	5.0	27	5.0	0.798	80.1	LOS F	9.9	71.9	1.00	0.91	1.19	27.8
Approach			1432	5.0	1432	5.0	0.798	50.5	LOS D	24.4	178.4	0.98	0.89	1.04	28.2
East: Elphinstone Street (E)															
4	L2	All MCs	79	5.0	79	5.0	0.264	66.7	LOS E	4.1	29.9	0.91	0.76	0.91	31.2
5	T1	All MCs	13	5.0	13	5.0	*0.636	62.3	LOS E	10.7	77.9	0.97	0.82	0.97	31.9
6	R2	All MCs	182	5.0	182	5.0	0.636	68.0	LOS E	10.7	77.9	0.97	0.82	0.97	25.9
Approach			274	5.0	274	5.0	0.636	67.3	LOS E	10.7	77.9	0.96	0.80	0.96	24.8
North: Musgrave Street (N)															
7	L2	All MCs	174	5.0	174	5.0	0.648	47.1	LOS D	17.5	127.5	0.93	0.82	0.93	29.0
8	T1	All MCs	848	5.0	848	5.0	0.648	44.3	LOS D	18.7	136.5	0.93	0.80	0.93	31.0
9	R2	All MCs	31	5.0	31	5.0	0.607	76.7	LOS E	6.1	44.2	1.00	0.81	1.03	23.6
9u	U	All MCs	73	5.0	73	5.0	0.607	78.2	LOS E	6.1	44.2	1.00	0.81	1.03	16.4
Approach			1125	5.0	1125	5.0	0.648	47.8	LOS D	18.7	136.5	0.93	0.81	0.94	27.7
West: Elphinstone Street (W)															
10	L2	All MCs	7	5.0	7	5.0	0.084	50.6	LOS D	1.4	10.0	0.85	0.68	0.85	28.0
11	T1	All MCs	12	5.0	12	5.0	*0.084	42.3	LOS D	1.4	10.0	0.85	0.68	0.85	34.2
12	R2	All MCs	9	5.0	9	5.0	0.084	48.0	LOS D	1.4	10.0	0.85	0.68	0.85	33.4
Approach			28	5.0	28	5.0	0.084	46.3	LOS D	1.4	10.0	0.85	0.68	0.85	32.5
All Vehicles			2859	5.0	2859	5.0	0.798	51.0	LOS D	24.4	178.4	0.96	0.85	0.99	27.6

Site Level of Service (LOS) Method: Delay (SIDRA). Site LOS Method is specified in the Parameter Settings dialog (Options 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.
Delay Model: SIDRA Standard (Control Delay: Geometric Delay is included).
Queue Model: SIDRA queue estimation methods are used for Back of Queue and Queue at Start of Green.
Gap-Acceptance Capacity Formula: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.
Arrival Flows used in performance calculations are adjusted to include any Initial Queued Demand and Upstream Capacity Constraint effects.

* Critical Movement (Signal Timing)

Pedestrian Movement Performance

Mov ID	Crossing	Input Vol. ped/h	Dem. Flow ped/h	Aver. Delay sec	Level of Service	AVERAGE BACK OF QUEUE [Ped ped	Dist] m	Prop. Que	Eff. Stop Rate	Travel Time sec	Travel Dist. m	Aver. Speed m/sec
South: Musgrave Street (S)												
P1	Full	50	53	54.3	LOS E	0.2	0.2	0.95	0.95	208.1	200.0	0.96

East: Elphinstone Street (E)												
P2	Full	50	53	54.3	LOS E	0.2	0.2	0.95	0.95	208.1	200.0	0.96
North: Musgrave Street (N)												
P3	Full	50	53	54.3	LOS E	0.2	0.2	0.95	0.95	208.1	200.0	0.96
West: Elphinstone Street (W)												
P4	Full	50	53	54.3	LOS E	0.2	0.2	0.95	0.95	208.1	200.0	0.96
All Pedestrians		200	211	54.3	LOS E	0.2	0.2	0.95	0.95	208.1	200.0	0.96

Level of Service (LOS) Method: SIDRA Pedestrian LOS Method (Based on Average Delay)
Pedestrian movement LOS values are based on average delay per pedestrian movement.
Intersection LOS value for Pedestrians is based on average delay for all pedestrian movements.

MOVEMENT SUMMARY

Site: EX8 [BG2038 PM (Site Folder: BG2038)]

Output produced by SIDRA INTERSECTION Version: 9.1.5.224

Ascot Lane / Elphinstone Street
Site Category: Existing Conditions
Give-Way (Two-Way)

Vehicle Movement Performance

Mov ID	Turn	Mov Class	Demand Flows [Total veh/h	HV] %	Arrival Flows [Total veh/h	HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	95% Back Of Queue [Veh. veh	Dist] m	Prop. Que	Eff. Stop Rate	Aver. No. of Cycles	Aver. Speed km/h
East: Elphinstone Street (E)															
5	T1	All MCs	52	5.0	52	5.0	0.029	0.0	LOS A	0.0	0.1	0.01	0.04	0.01	59.6
6	R2	All MCs	3	5.0	3	5.0	0.029	5.7	LOS A	0.0	0.1	0.01	0.04	0.01	56.4
Approach			55	5.0	55	5.0	0.029	0.3	NA	0.0	0.1	0.01	0.04	0.01	59.4
West: Elphinstone Street (W)															
10	L2	All MCs	1	5.0	1	5.0	0.015	5.6	LOS A	0.0	0.0	0.00	0.02	0.00	57.1
11	T1	All MCs	27	5.0	27	5.0	0.015	0.0	LOS A	0.0	0.0	0.00	0.02	0.00	59.8
Approach			28	5.0	28	5.0	0.015	0.2	NA	0.0	0.0	0.00	0.02	0.00	59.7
All Vehicles			83	5.0	83	5.0	0.029	0.3	NA	0.0	0.1	0.01	0.03	0.01	59.5

Site Level of Service (LOS) Method: Delay (SIDRA). Site LOS Method is specified in the Parameter Settings dialog (Options 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 (TWSC): Level of Service is not defined for major road approaches or the intersection as a whole for Two-Way Sign Control (HCM LOS rule).
Two-Way Sign Control Capacity Model: SIDRA Standard.
Delay Model: SIDRA Standard (Control Delay: Geometric Delay is included).
Queue Model: SIDRA queue estimation methods are used for Back of Queue and Queue at Start of Gap.
Gap-Acceptance Capacity Formula: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.
Arrival Flows used in performance calculations are adjusted to include any Initial Queued Demand and Upstream Capacity Constraint effects.

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MOVEMENT SUMMARY

Site: PR7 [BG2038 + DEV AM (Site Folder: BG2038 + DEV)]

Output produced by SIDRA INTERSECTION Version: 9.1.5.224

Musgrave Street / Elphinstone Street Intersection
Site Category: Proposed Conditions
Signals - EQUISAT (Fixed-Time/SCATS) Isolated Cycle Time = 120 seconds (Site User-Given Cycle Time)

Vehicle Movement Performance

Mov ID	Turn	Mov Class	Demand Flows [Total veh/h	HV] %	Arrival Flows [Total veh/h	HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	95% Back Of Queue [Veh. veh	Dist] m	Prop. Que	Eff. Stop Rate	Aver. No. of Cycles	Aver. Speed km/h
South: Musgrave Street (S)															
1	L2	All MCs	37	5.0	37	5.0	0.613	53.6	LOS D	13.5	98.5	0.95	0.81	0.95	33.2
2	T1	All MCs	738	5.0	738	5.0	0.613	45.3	LOS D	13.9	101.1	0.95	0.81	0.95	29.0
3	R2	All MCs	119	5.0	119	5.0	* 0.843	71.0	LOS E	9.8	71.8	1.00	0.95	1.27	27.2
3u	U	All MCs	34	5.0	34	5.0	0.843	72.6	LOS E	9.8	71.8	1.00	0.95	1.27	27.1
Approach			927	5.0	927	5.0	0.843	50.0	LOS D	13.9	101.1	0.96	0.83	1.01	28.8
East: Elphinstone Street (E)															
4	L2	All MCs	125	5.0	125	5.0	0.279	69.2	LOS E	5.9	43.3	0.85	0.77	0.85	33.7
5	T1	All MCs	27	5.0	27	5.0	* 0.843	76.7	LOS E	20.9	152.7	1.00	0.95	1.16	31.0
6	R2	All MCs	313	5.0	313	5.0	0.843	82.3	LOS F	20.9	152.7	1.00	0.95	1.16	25.1
Approach			465	5.0	465	5.0	0.843	78.4	LOS E	20.9	152.7	0.96	0.90	1.08	22.6
North: Musgrave Street (N)															
7	L2	All MCs	147	5.0	147	5.0	* 0.837	62.5	LOS E	20.1	147.0	1.00	0.97	1.15	24.9
8	T1	All MCs	842	5.0	842	5.0	0.837	61.1	LOS E	21.7	158.4	1.00	0.97	1.15	26.2
9	R2	All MCs	57	5.0	57	5.0	0.559	81.5	LOS F	5.6	40.7	0.99	0.79	0.99	23.7
9u	U	All MCs	39	5.0	39	5.0	0.559	83.1	LOS F	5.6	40.7	0.99	0.79	0.99	16.4
Approach			1085	5.0	1085	5.0	0.837	63.2	LOS E	21.7	158.4	1.00	0.96	1.14	23.9
West: Elphinstone Street (W)															
10	L2	All MCs	36	5.0	36	5.0	0.256	52.9	LOS D	4.2	30.8	0.90	0.75	0.90	26.9
11	T1	All MCs	19	5.0	19	5.0	* 0.256	44.5	LOS D	4.2	30.8	0.90	0.75	0.90	33.0
12	R2	All MCs	28	5.0	28	5.0	0.256	50.2	LOS D	4.2	30.8	0.90	0.75	0.90	32.3
Approach			83	5.0	83	5.0	0.256	50.1	LOS D	4.2	30.8	0.90	0.75	0.90	30.3
All Vehicles			2561	5.0	2561	5.0	0.843	60.7	LOS E	21.7	158.4	0.98	0.89	1.07	25.4

Site Level of Service (LOS) Method: Delay (SIDRA). Site LOS Method is specified in the Parameter Settings dialog (Options 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.
Delay Model: SIDRA Standard (Control Delay: Geometric Delay is included).
Queue Model: SIDRA queue estimation methods are used for Back of Queue and Queue at Start of Green.
Gap-Acceptance Capacity Formula: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.
Arrival Flows used in performance calculations are adjusted to include any Initial Queued Demand and Upstream Capacity Constraint effects.

* Critical Movement (Signal Timing)

Pedestrian Movement Performance

Mov ID	Crossing	Input Vol. ped/h	Dem. Flow ped/h	Aver. Delay sec	Level of Service	AVERAGE BACK OF QUEUE [Ped ped	Dist] m	Prop. Que	Eff. Stop Rate	Travel Time sec	Travel Dist. m	Aver. Speed m/sec
South: Musgrave Street (S)												
P1	Full	50	53	54.3	LOS E	0.2	0.2	0.95	0.95	208.1	200.0	0.96

East: Elphinstone Street (E)												
P2	Full	50	53	54.3	LOS E	0.2	0.2	0.95	0.95	208.1	200.0	0.96
North: Musgrave Street (N)												
P3	Full	50	53	54.3	LOS E	0.2	0.2	0.95	0.95	208.1	200.0	0.96
West: Elphinstone Street (W)												
P4	Full	50	53	54.3	LOS E	0.2	0.2	0.95	0.95	208.1	200.0	0.96
All Pedestrians		200	211	54.3	LOS E	0.2	0.2	0.95	0.95	208.1	200.0	0.96

Level of Service (LOS) Method: SIDRA Pedestrian LOS Method (Based on Average Delay)
Pedestrian movement LOS values are based on average delay per pedestrian movement.
Intersection LOS value for Pedestrians is based on average delay for all pedestrian movements.

MOVEMENT SUMMARY

Site: PR8 [BG2038 + DEV AM (Site Folder: BG2038 + DEV)]

Output produced by SIDRA INTERSECTION Version: 9.1.5.224

Ascot Lane / Elphinstone Street
Site Category: Proposed Conditions
Give-Way (Two-Way)

Vehicle Movement Performance

Mov ID	Turn	Mov Class	Demand Flows [Total veh/h	HV] %	Arrival Flows [Total veh/h	HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	95% Back Of Queue [Veh. veh	Dist] m	Prop. Que	Eff. Stop Rate	Aver. No. of Cycles	Aver. Speed km/h
East: Elphinstone Street (E)															
5	T1	All MCs	41	5.0	41	5.0	0.072	0.2	LOS A	0.3	2.5	0.19	0.41	0.19	55.9
6	R2	All MCs	81	5.0	81	5.0	0.072	6.0	LOS A	0.3	2.5	0.19	0.41	0.19	53.1
Approach			122	5.0	122	5.0	0.072	4.1	NA	0.3	2.5	0.19	0.41	0.19	54.0
West: Elphinstone Street (W)															
10	L2	All MCs	2	5.0	2	5.0	0.045	5.6	LOS A	0.0	0.0	0.00	0.01	0.00	57.1
11	T1	All MCs	82	5.0	82	5.0	0.045	0.0	LOS A	0.0	0.0	0.00	0.01	0.00	59.8
Approach			84	5.0	84	5.0	0.045	0.1	NA	0.0	0.0	0.00	0.01	0.00	59.8
All Vehicles			206	5.0	206	5.0	0.072	2.5	NA	0.3	2.5	0.11	0.25	0.11	56.2

Site Level of Service (LOS) Method: Delay (SIDRA). Site LOS Method is specified in the Parameter Settings dialog (Options 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 (TWSC): Level of Service is not defined for major road approaches or the intersection as a whole for Two-Way Sign Control (HCM LOS rule).
Two-Way Sign Control Capacity Model: SIDRA Standard.
Delay Model: SIDRA Standard (Control Delay: Geometric Delay is included).
Queue Model: SIDRA queue estimation methods are used for Back of Queue and Queue at Start of Gap.
Gap-Acceptance Capacity Formula: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.
Arrival Flows used in performance calculations are adjusted to include any Initial Queued Demand and Upstream Capacity Constraint effects.

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MOVEMENT SUMMARY

Site: PR9 [BG2038 + DEV AM (Site Folder: BG2038 + DEV)]

Output produced by SIDRA INTERSECTION Version: 9.1.5.224

Elphinstone Street / Site Access
Site Category: Proposed Conditions
Give-Way (Two-Way)

Vehicle Movement Performance

Mov ID	Turn	Mov Class	Demand Flows [Total veh/h	HV] %	Arrival Flows [Total veh/h	HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	95% Back Of Queue [Veh. veh	Dist] m	Prop. Que	Eff. Stop Rate	Aver. No. of Cycles	Aver. Speed km/h
East: Elphinstone Street (E)															
5	T1	All MCs	41	5.0	41	5.0	0.022	0.0	LOS A	0.0	0.0	0.01	0.02	0.01	59.8
6	R2	All MCs	1	5.0	1	5.0	0.022	5.5	LOS A	0.0	0.0	0.01	0.02	0.01	56.8
Approach			42	5.0	42	5.0	0.022	0.1	NA	0.0	0.0	0.01	0.02	0.01	59.8
North: Site Access (N)															
7	L2	All MCs	53	5.0	53	5.0	0.035	5.7	LOS A	0.1	1.0	0.09	0.54	0.09	52.4
9	R2	All MCs	1	5.0	1	5.0	0.035	5.8	LOS A	0.1	1.0	0.09	0.54	0.09	52.1
Approach			54	5.0	54	5.0	0.035	5.7	LOS A	0.1	1.0	0.09	0.54	0.09	52.4
West: Elphinstone Street (W)															
10	L2	All MCs	1	5.0	1	5.0	0.016	5.6	LOS A	0.0	0.0	0.00	0.02	0.00	57.1
11	T1	All MCs	29	5.0	29	5.0	0.016	0.0	LOS A	0.0	0.0	0.00	0.02	0.00	59.8
Approach			31	5.0	31	5.0	0.016	0.2	NA	0.0	0.0	0.00	0.02	0.00	59.7
All Vehicles			126	5.0	126	5.0	0.035	2.5	NA	0.1	1.0	0.04	0.24	0.04	56.4

Site Level of Service (LOS) Method: Delay (SIDRA). Site LOS Method is specified in the Parameter Settings dialog (Options 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 (TWSC): Level of Service is not defined for major road approaches or the intersection as a whole for Two-Way Sign Control (HCM LOS rule).
Two-Way Sign Control Capacity Model: SIDRA Standard.
Delay Model: SIDRA Standard (Control Delay: Geometric Delay is included).
Queue Model: SIDRA queue estimation methods are used for Back of Queue and Queue at Start of Gap.
Gap-Acceptance Capacity Formula: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.
Arrival Flows used in performance calculations are adjusted to include any Initial Queued Demand and Upstream Capacity Constraint effects.

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MOVEMENT SUMMARY

Site: PR10 [BG2038 + DEV PM (Site Folder: BG2038 + DEV)]

Output produced by SIDRA INTERSECTION Version: 9.1.5.224

Musgrave Street / Elphinstone Street Intersection
Site Category: Proposed Conditions
Signals - EQUISAT (Fixed-Time/SCATS) Isolated Cycle Time = 120 seconds (Site User-Given Cycle Time)

Vehicle Movement Performance

Mov ID	Turn	Mov Class	Demand Flows [Total veh/h	HV] %	Arrival Flows [Total veh/h	HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	95% Back Of Queue [Veh. veh	Dist] m	Prop. Que	Eff. Stop Rate	Aver. No. of Cycles	Aver. Speed km/h
South: Musgrave Street (S)															
1	L2	All MCs	35	5.0	35	5.0	*0.798	53.0	LOS D	25.2	184.1	0.99	0.91	1.05	33.6
2	T1	All MCs	1263	5.0	1263	5.0	0.798	48.4	LOS D	25.5	186.1	0.98	0.91	1.05	29.3
3	R2	All MCs	131	5.0	131	5.0	*0.798	79.3	LOS E	9.9	71.9	1.00	0.91	1.19	27.9
3u	U	All MCs	27	5.0	27	5.0	0.798	80.8	LOS F	9.9	71.9	1.00	0.91	1.19	27.8
Approach			1456	5.0	1456	5.0	0.798	51.9	LOS D	25.5	186.1	0.99	0.91	1.07	27.8
East: Elphinstone Street (E)															
4	L2	All MCs	79	5.0	79	5.0	0.264	67.7	LOS E	4.1	29.9	0.91	0.76	0.91	31.2
5	T1	All MCs	18	5.0	18	5.0	*0.655	63.8	LOS E	11.1	80.7	0.98	0.83	0.99	31.8
6	R2	All MCs	182	5.0	182	5.0	0.655	69.4	LOS E	11.1	80.7	0.98	0.83	0.99	25.8
Approach			279	5.0	279	5.0	0.655	68.6	LOS E	11.1	80.7	0.96	0.81	0.97	24.6
North: Musgrave Street (N)															
7	L2	All MCs	174	5.0	174	5.0	0.651	47.2	LOS D	17.6	128.4	0.93	0.82	0.93	29.0
8	T1	All MCs	848	5.0	848	5.0	0.651	44.2	LOS D	18.8	137.5	0.93	0.80	0.93	31.0
9	R2	All MCs	49	5.0	49	5.0	0.698	78.1	LOS E	7.4	53.7	1.00	0.85	1.10	23.3
9u	U	All MCs	73	5.0	73	5.0	0.698	79.7	LOS E	7.4	53.7	1.00	0.85	1.10	16.1
Approach			1144	5.0	1144	5.0	0.698	48.4	LOS D	18.8	137.5	0.94	0.81	0.95	27.6
West: Elphinstone Street (W)															
10	L2	All MCs	24	5.0	24	5.0	0.183	52.2	LOS D	3.0	21.9	0.88	0.73	0.88	27.2
11	T1	All MCs	16	5.0	16	5.0	*0.183	43.9	LOS D	3.0	21.9	0.88	0.73	0.88	33.3
12	R2	All MCs	20	5.0	20	5.0	0.183	49.5	LOS D	3.0	21.9	0.88	0.73	0.88	32.5
Approach			60	5.0	60	5.0	0.183	49.1	LOS D	3.0	21.9	0.88	0.73	0.88	30.8
All Vehicles			2939	5.0	2939	5.0	0.798	52.0	LOS D	25.5	186.1	0.96	0.86	1.01	27.4

Site Level of Service (LOS) Method: Delay (SIDRA). Site LOS Method is specified in the Parameter Settings dialog (Options 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.
Delay Model: SIDRA Standard (Control Delay: Geometric Delay is included).
Queue Model: SIDRA queue estimation methods are used for Back of Queue and Queue at Start of Green.
Gap-Acceptance Capacity Formula: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.
Arrival Flows used in performance calculations are adjusted to include any Initial Queued Demand and Upstream Capacity Constraint effects.

* Critical Movement (Signal Timing)

Pedestrian Movement Performance

Mov ID	Crossing	Input Vol. ped/h	Dem. Flow ped/h	Aver. Delay sec	Level of Service	AVERAGE BACK OF QUEUE [Ped ped	Dist] m	Prop. Que	Eff. Stop Rate	Travel Time sec	Travel Dist. m	Aver. Speed m/sec
South: Musgrave Street (S)												
P1	Full	50	53	54.3	LOS E	0.2	0.2	0.95	0.95	208.1	200.0	0.96

East: Elphinstone Street (E)												
P2	Full	50	53	54.3	LOS E	0.2	0.2	0.95	0.95	208.1	200.0	0.96
North: Musgrave Street (N)												
P3	Full	50	53	54.3	LOS E	0.2	0.2	0.95	0.95	208.1	200.0	0.96
West: Elphinstone Street (W)												
P4	Full	50	53	54.3	LOS E	0.2	0.2	0.95	0.95	208.1	200.0	0.96
All Pedestrians		200	211	54.3	LOS E	0.2	0.2	0.95	0.95	208.1	200.0	0.96

Level of Service (LOS) Method: SIDRA Pedestrian LOS Method (Based on Average Delay)
Pedestrian movement LOS values are based on average delay per pedestrian movement.
Intersection LOS value for Pedestrians is based on average delay for all pedestrian movements.

MOVEMENT SUMMARY

Site: PR6 [BG2038 + DEV PM (Site Folder: BG2038 + DEV)]

Output produced by SIDRA INTERSECTION Version: 9.1.5.224

Ascot Lane / Elphinstone Street
Site Category: Proposed Conditions
Give-Way (Two-Way)

Vehicle Movement Performance

Mov ID	Turn	Mov Class	Demand Flows [Total veh/h	HV] %	Arrival Flows [Total veh/h	HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	95% Back Of Queue [Veh. veh	Dist] m	Prop. Que	Eff. Stop Rate	Aver. No. of Cycles	Aver. Speed km/h
East: Elphinstone Street (E)															
5	T1	All MCs	52	5.0	52	5.0	0.058	0.1	LOS A	0.2	1.8	0.14	0.31	0.14	56.9
6	R2	All MCs	49	5.0	49	5.0	0.058	5.9	LOS A	0.2	1.8	0.14	0.31	0.14	54.0
Approach			101	5.0	101	5.0	0.058	3.0	NA	0.2	1.8	0.14	0.31	0.14	55.4
West: Elphinstone Street (W)															
10	L2	All MCs	2	5.0	2	5.0	0.032	5.6	LOS A	0.0	0.0	0.00	0.02	0.00	57.1
11	T1	All MCs	58	5.0	58	5.0	0.032	0.0	LOS A	0.0	0.0	0.00	0.02	0.00	59.8
Approach			60	5.0	60	5.0	0.032	0.2	NA	0.0	0.0	0.00	0.02	0.00	59.7
All Vehicles			161	5.0	161	5.0	0.058	1.9	NA	0.2	1.8	0.08	0.20	0.08	56.9

Site Level of Service (LOS) Method: Delay (SIDRA). Site LOS Method is specified in the Parameter Settings dialog (Options 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 (TWSC): Level of Service is not defined for major road approaches or the intersection as a whole for Two-Way Sign Control (HCM LOS rule).
Two-Way Sign Control Capacity Model: SIDRA Standard.
Delay Model: SIDRA Standard (Control Delay: Geometric Delay is included).
Queue Model: SIDRA queue estimation methods are used for Back of Queue and Queue at Start of Gap.
Gap-Acceptance Capacity Formula: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.
Arrival Flows used in performance calculations are adjusted to include any Initial Queued Demand and Upstream Capacity Constraint effects.

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MOVEMENT SUMMARY

Site: PR9 [BG2038 + DEV PM (Site Folder: BG2038 + DEV)]

Output produced by SIDRA INTERSECTION Version: 9.1.5.224

Elphinstone Street / Site Access
Site Category: Proposed Conditions
Give-Way (Two-Way)

Vehicle Movement Performance

Mov ID	Turn	Mov Class	Demand Flows [Total veh/h	HV] %	Arrival Flows [Total veh/h	HV] %	Deg. Satn v/c	Aver. Delay sec	Level of Service	95% Back Of Queue [Veh. veh	Dist] m	Prop. Que	Eff. Stop Rate	Aver. No. of Cycles	Aver. Speed km/h
East: Elphinstone Street (E)															
5	T1	All MCs	52	5.0	52	5.0	0.028	0.0	LOS A	0.0	0.0	0.00	0.01	0.00	59.9
6	R2	All MCs	1	5.0	1	5.0	0.028	5.5	LOS A	0.0	0.0	0.00	0.01	0.00	56.8
Approach			53	5.0	53	5.0	0.028	0.1	NA	0.0	0.0	0.00	0.01	0.00	59.8
North: Site Access (N)															
7	L2	All MCs	32	5.0	32	5.0	0.021	5.7	LOS A	0.1	0.6	0.09	0.54	0.09	52.4
9	R2	All MCs	1	5.0	1	5.0	0.021	5.8	LOS A	0.1	0.6	0.09	0.54	0.09	52.1
Approach			33	5.0	33	5.0	0.021	5.7	LOS A	0.1	0.6	0.09	0.54	0.09	52.4
West: Elphinstone Street (W)															
10	L2	All MCs	1	5.0	1	5.0	0.015	5.6	LOS A	0.0	0.0	0.00	0.02	0.00	57.1
11	T1	All MCs	27	5.0	27	5.0	0.015	0.0	LOS A	0.0	0.0	0.00	0.02	0.00	59.8
Approach			28	5.0	28	5.0	0.015	0.2	NA	0.0	0.0	0.00	0.02	0.00	59.7
All Vehicles			114	5.0	114	5.0	0.028	1.7	NA	0.1	0.6	0.03	0.17	0.03	57.4

Site Level of Service (LOS) Method: Delay (SIDRA). Site LOS Method is specified in the Parameter Settings dialog (Options 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 (TWSC): Level of Service is not defined for major road approaches or the intersection as a whole for Two-Way Sign Control (HCM LOS rule).
Two-Way Sign Control Capacity Model: SIDRA Standard.
Delay Model: SIDRA Standard (Control Delay: Geometric Delay is included).
Queue Model: SIDRA queue estimation methods are used for Back of Queue and Queue at Start of Gap.
Gap-Acceptance Capacity Formula: SIDRA Standard (Akçelik M3D).
HV (%) values are calculated for All Movement Classes of All Heavy Vehicle Model Designation.
Arrival Flows used in performance calculations are adjusted to include any Initial Queued Demand and Upstream Capacity Constraint effects.

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LOCALITY PLAN
NOT TO SCALE

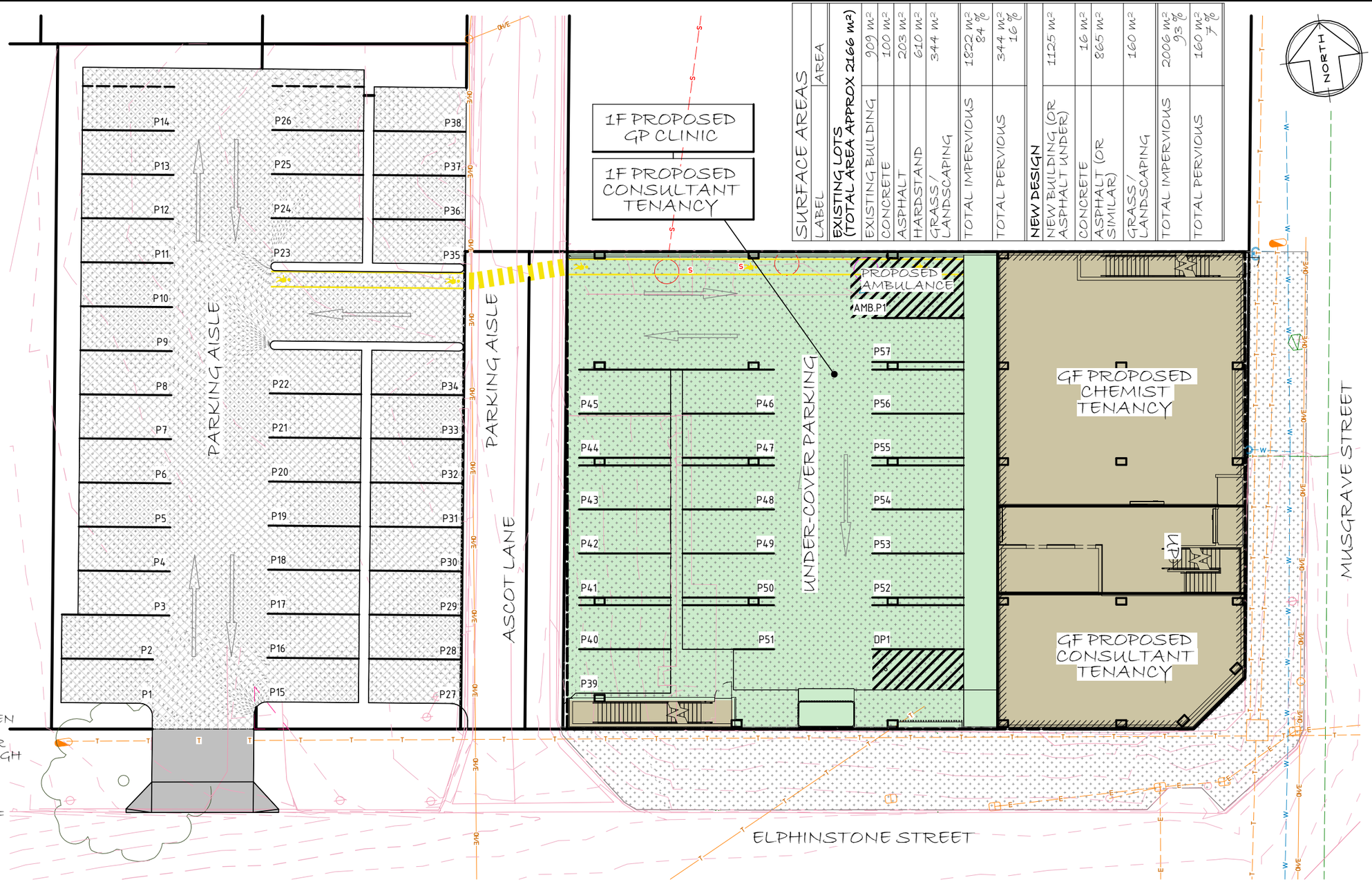
AREA SCHEDULE[1]	
LABEL	AREA
EXISTING BUILDING [4]	
EXISTING GF GFA	669 m²
EXISTING 1F GFA	283 m²
TOTAL EXST GFA	952 m²
GROUND FLOOR	
CHEMIST	194 m²
CONSULTANTS	107 m²
COMMON AREA[2]	105 m²
TOTAL GF GFA	406 m²
FIRST FLOOR	
GP CLINIC	743 m²
CONSULTANTS	286 m²
COMMON AREA	81 m²
TOTAL 1F GFA	1110 m²
PLANT DECK	
DECK AND ACCESS	92 m²
TOTAL DECK GFA	0 m²[3]
EXISTING/NEW COMPARISON	
EXISTING	952 m²
NEW	1516 m²
CHANGE	+564 m²

[1] CONCEPTUAL AREAS ONLY. TO BE CONFIRMED AFTER LAYOUT IS CONFIRMED.
[2] INCLUDES GF PORTION OF FIRE ISOLATED EXITS FOR GFA
[3] PLANT DECK IS EXCLUDED FROM GFA CALCULATION BASED ON DEFINITIONS GIVEN IN RRC PLANNING SCHEME
[4] APPROXIMATE EXISTING GFA PROVIDED FOR COMPARISON ONLY. UPPER FLOOR IS ROUGH BASED ON SURVEYED EAVE LINE ONLY.

NOTE:
GFA = GROSS FLOOR AREA, TO OUTSIDE FACE OF WALLS IN ACCORDANCE (OR CENTRELINE OF COMMON WALLS) OTHER THAN AREAS USED FOR BALCONIES, PARKING, LOADING, BUILDING SERVICES ETC.

BEFORE YOU DIG www.byda.com.au

SERVICE INFORMATION ON THIS DRAWING HAS BEEN SOURCED FROM ROCKHAMPTON REGIONAL COUNCIL ONLINE MAPPING AND APA (GAS SERVICES) THE INFORMATION IS PROVIDED FOR REFERENCE ONLY. BUILDERS ARE TO USE BEFORE YOU DIG AUSTRALIA PRIOR TO ANY/ALL EXCAVATION AND SITE WORKS. NOTE THAT INFORMATION REGARDING TELSTRA/TELECOM LINES HAS NOT BEEN PROVIDED DUE TO TELSTRA CHARGES. ELECTRICAL SERVICES HAVE NOT BEEN LOCATED OR SHOWN



SURFACE AREAS	
LABEL	AREA
EXISTING LOTS (TOTAL AREA APPROX 2166 m2)	
EXISTING BUILDING	909 m²
CONCRETE	100 m²
ASPHALT	203 m²
HARDSTAND	610 m²
GRASS/ LANDSCAPING	344 m²
TOTAL IMPERVIOUS	1822 m² 84 %
TOTAL PERVIOUS	344 m² 16 %
NEW DESIGN	
NEW BUILDING (OR ASPHALT UNDER)	1125 m²
CONCRETE	16 m²
ASPHALT (OR SIMILAR)	865 m²
GRASS/ LANDSCAPING	160 m²
TOTAL IMPERVIOUS	2006 m² 93 %
TOTAL PERVIOUS	160 m² 7 %

EXISTING SERVICES CHECKLIST

(INFORMATION BASED PURELY ON JFP SURVEYOR, BYDA & RRC PROVIDED INFORMATION. MAY NOT BE AN EXHAUSTIVE SEARCH)

SERVICE	FINDINGS	SOURCE
WATER	YES	JFP
SEWER	YES	JFP
STORMWATER	YES	JFP
GAS	YES	JFP
TELECOMS	YES	JFP

SITE PLAN

SCALE: - 1:200
LOTS 30 & 31 ON RP603419,
LOT 1 ON RP607576
& LOT 100 ON SP251414
TOTAL AREA: 2166m²
LOCALITY OF BERSERKER
LOCAL GOVT: ROCKHAMPTON

00 5000 10000 SCALEBAR - 1:250

FOR APPROVAL
NOT FOR CONSTRUCTION

REV	DESCRIPTION	DATE	BY	APPVD
G	AREAS UPDATED, INCL IMPERVIOUS	29.01.26	JW	
E	CONCEPTUAL APPEARANCE UPDATE	17.09.25	JW	
D	NEW CONCEPT - INTEGRATED PARKING	15.08.25	JW	
C	NEW BUILD - CONCEPT	28.07.25	AB	
B	RENOVATION - CONCEPT	10.12.24	AN	
A	RENOVATION INITIAL CONCEPT LAYOUT	06.12.24	AN	

REVISION SCHEDULE

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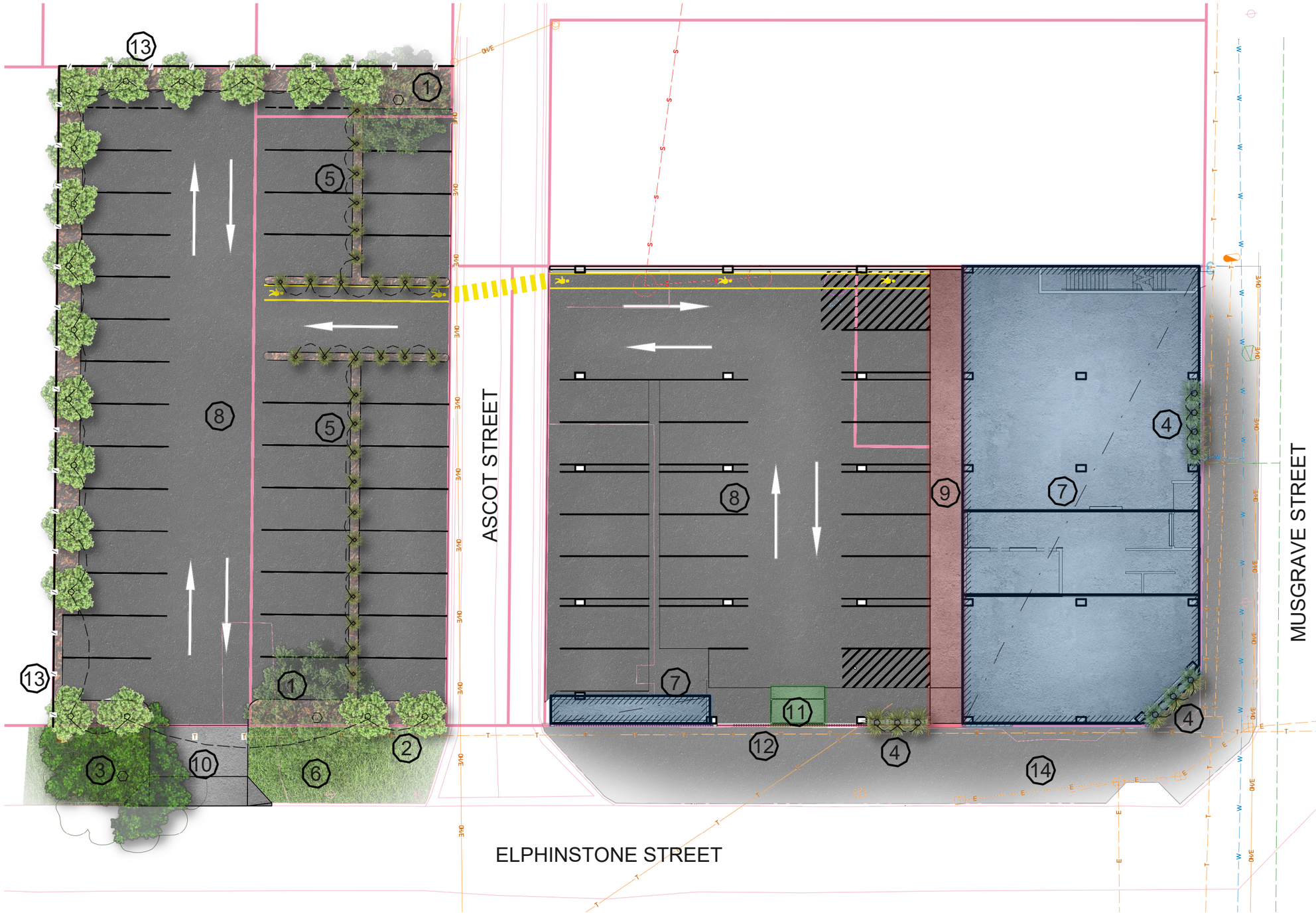
DOMESTIC & COMMERCIAL BUILDING DESIGNERS
QBCC Lic. No. 1191231 ABN 96 081 040 600
1/48 GOONDOON STREET, GLADSTONE, QUEENSLAND, 4680
PH: 4972 6066
EMAIL: design@gladstonedrafting.com.au
WEB: www.gladstonedrafting.com.au

DESIGNED BY: A.BUENEN
DRAWN BY: A.BUENEN
CHECKED BY: -

TITLE: PROPOSED ASCOT SUPER CLINIC
177 - 179 MUSGRAVE STREET BERSERKER, QLD
DUTTON HOLDINGS
SITE PLAN

SCALE: 1 : 250
REVISION: G
JOB No.: GD2682
SHEET No.: A01.00
A3



LANDSCAPING LEGEND

1. NEW SHADE TREES PROVIDED 'TULIPWOOD' OR SIMILAR
2. NEW LOWER SHRUBS TO BE PROVIDED BETWEEN SHADE TREES AND ALONG EXPOSED EDGES OF NEW CAR PARK 'SOUTHERN LILLY PILLY' OR SIMILAR
3. EXISTING STREET TREE TO BE RETAINED, CARE TO BE TAKEN TO AVOID ROOT DAMAGE DURING CONSTRUCTION 'WEEPING WILLOW'
4. NEW PLANTER BOXES WITH MAINTAINED PLANTING TO PROVIDE NATURAL CONTRAST AGAINST / AROUND NEW BUILDING 'LITTLE JOHN' OR SIMILAR
5. NEW GROUND COVER PLANTING THROUGH BEDS BETWEEN PARKING BAYS 'FLAX LILY' OR SIMILAR
6. EXISTING GRASSED NATURE STRIP TO BE MAINTAINED

GENERAL LEGEND

7. NEW BUILDINGS
8. ASPHALT / CAR PARK SURFACING
9. CONCRETE FOOTPATH
10. CONCRETE CROSSOVER
11. BIN STORAGE AREA (CONCRETE SURFACE, TIMBER SCREENED)
12. TIMBER SCREENING TO REDUCE VISUAL IMPACT OF UNDERCOVER CAR PARKING AREA FROM STREETSCAPE
13. 1.8 m HIGH ACOUSTIC / PRIVACY FENCING TO BE CONSTRUCTED BETWEEN NEIGHBOURING PROPERTIES AND NEW CAR PARK
14. EXISTING ASPHALT FOOT PATHS AROUND NEW BUILDING

FOR APPROVAL

NOT FOR CONSTRUCTION

REV	DESCRIPTION	DATE	BY	APPVD
F	LANDSCAPING PREPARED FOR APPROVAL	02.12.25	JW	

REVISION SCHEDULE

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WEB: www.gladstonedrafting.com.au

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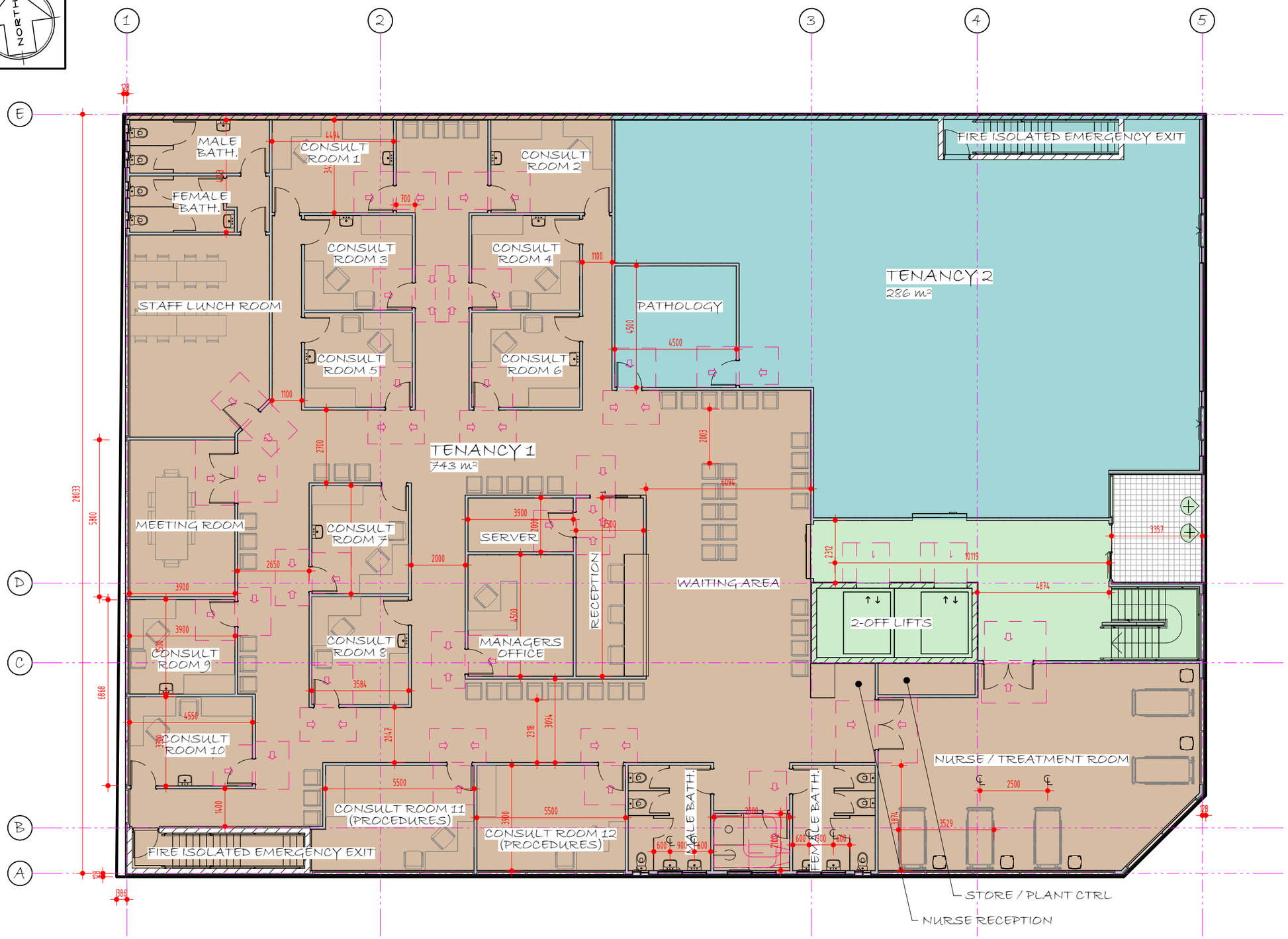
DRAWN BY: J.WALKER
CHECKED BY: -

TITLE:
PROPOSED ASCOT SUPER CLINIC
177 - 179 MUSGRAVE STREET BERSERKER, QLD
DUTTON HOLDINGS
LANDSCAPING INTENT PLAN

SCALE: NTS
REVISION: F
JOB No.: GD2682
SHEET No.: A01.01
A3



PROPOSED FIRST FLOOR PLAN

1 : 150

AREA SCHEDULE[1]	
LABEL	AREA
GROUND FLOOR	
CHEMIST	194 m²
CONSULTANTS	107 m²
COMMON AREA[2]	105 m²
TOTAL GF GFA	406 m²
FIRST FLOOR	
GP CLINIC	743 m²
CONSULTANTS	286 m²
COMMON AREA	81 m²
TOTAL 1F GFA	1110 m²
PLANT DECK	
DECK AND ACCESS	92 m²
TOTAL DECK GFA	92 m²

[1] CONCEPTUAL AREAS ONLY. TO BE CONFIRMED AFTER LAYOUT IS CONFIRMED.
[2] INCLUDES GF PORTION OF FIRE ISOLATED EXITS FOR GFA

FOR APPROVAL

NOT FOR CONSTRUCTION

REVISION SCHEDULE

REV	DESCRIPTION	DATE	BY	APPVD
E	CONCEPTUAL APPEARANCE UPDATE	17.09.25	JW	
D	NEW CONCEPT - INTEGRATED PARKING	15.08.25	JW	
C	NEW BUILD - CONCEPT	28.07.25	AB	
B	RENOVATION - CONCEPT	10.12.24	AN	
A	RENOVATION INITIAL CONCEPT LAYOUT	06.12.24	AN	

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DESIGNED BY: A.BUENEN
DRAWN BY: A.BUENEN
CHECKED BY: -

TITLE: PROPOSED ASCOT SUPER CLINIC
177 - 179 MUSGRAVE STREET BERSERKER, QLD
DUTTON HOLDINGS
PROPOSED FIRST FLOOR PLAN

SCALE: 1 : 150
REVISION: E
JOB No.: GD2682
SHEET No.: A02.11
A3

CAR PARKING CALCULATION				
DESCRIPTION (TO RRC 9.3.1.3.2)	CAR PARKING REQUIRED		BICYCLE PARKING (PER SC6.4.7)	
HEALTH CARE SERVICE	1 SPACE PER 25 m² OF GFA; PLUS 1 SPACE FOR SPECIAL USE VEHICLES; AND 1 EMERGENCY AMBULANCE SPACE		1 PER 400 m² GFA (EMPLOYEE) 1 PER 200 m² GFA (VISITOR)	
DESCRIPTION (TO RRC 9.3.1.3.2)	GFA	CAR PARKS REQ'D	BICYCLES (EMPLOYEE)	BICYCLES (VISITOR)
HEALTH CARE SERVICE				
- CHEMIST (GF)	201 m²	8.0	0.50	1.00
- COMMON (GF)	111 m²	4.4	0.28	0.56
- CONSULTANTS (GF)	111 m²	4.4	0.28	0.56
- GP (1F)	751 m²	30.0	1.88	3.76
- COMMON (1F)	68 m²	2.7	0.17	0.34
- CONSULTANTS (1F)	300 m²	12.0	0.75	1.5
TOTAL REQUIRED	1542 m²	61.5 (62) + 2 (SPECIAL, AMBO)	3.86 (4)	7.72 (8)
TOTAL PROVIDED		57 + 2 (SPECIAL, AMBO)	TBD	TBD
DIFFERENCE		-5	TBD	TBD

MINOR ADJUSTMENTS REQUIRED, TO BE REVISED

1 m WIDE PEDESTRIAN ACCESS PATH FROM EXTERNAL CAR PARKING TO NEW BUILDING ENTRY

NOTE: PREVIOUS REVISION WAS 797 m². THIS OPTION PROVIDES 325 m² ADDITIONAL GFA TO GP

PEDESTRIAN CROSSING AT ROAD

SHARED DRIVEWAY SPACE BETWEEN PEDESTRIAN ACCESS AND VEHICLES

PARKING AISLE
26 CAR PARKS

PARKING AISLE
12 CAR PARKS

UNDER-COVER PARKING
19 CAR PARKS, 1 DDA PARK,
1 AMBULANCE PARK

GF PROPOSED CHEMIST TENANCY

GF PROPOSED CONSULTANT TENANCY

MUSGRAVE STREET

ELPHINSTONE STREET

00 5000 10000 SCALEBAR - 1:250

FOR APPROVAL
NOT FOR CONSTRUCTION

REVISION SCHEDULE

REV	DESCRIPTION	DATE	BY	APPVD
E	CONCEPTUAL APPEARANCE UPDATE	17.09.25	JW	
D	NEW CONCEPT - INTEGRATED PARKING	15.08.25	JW	

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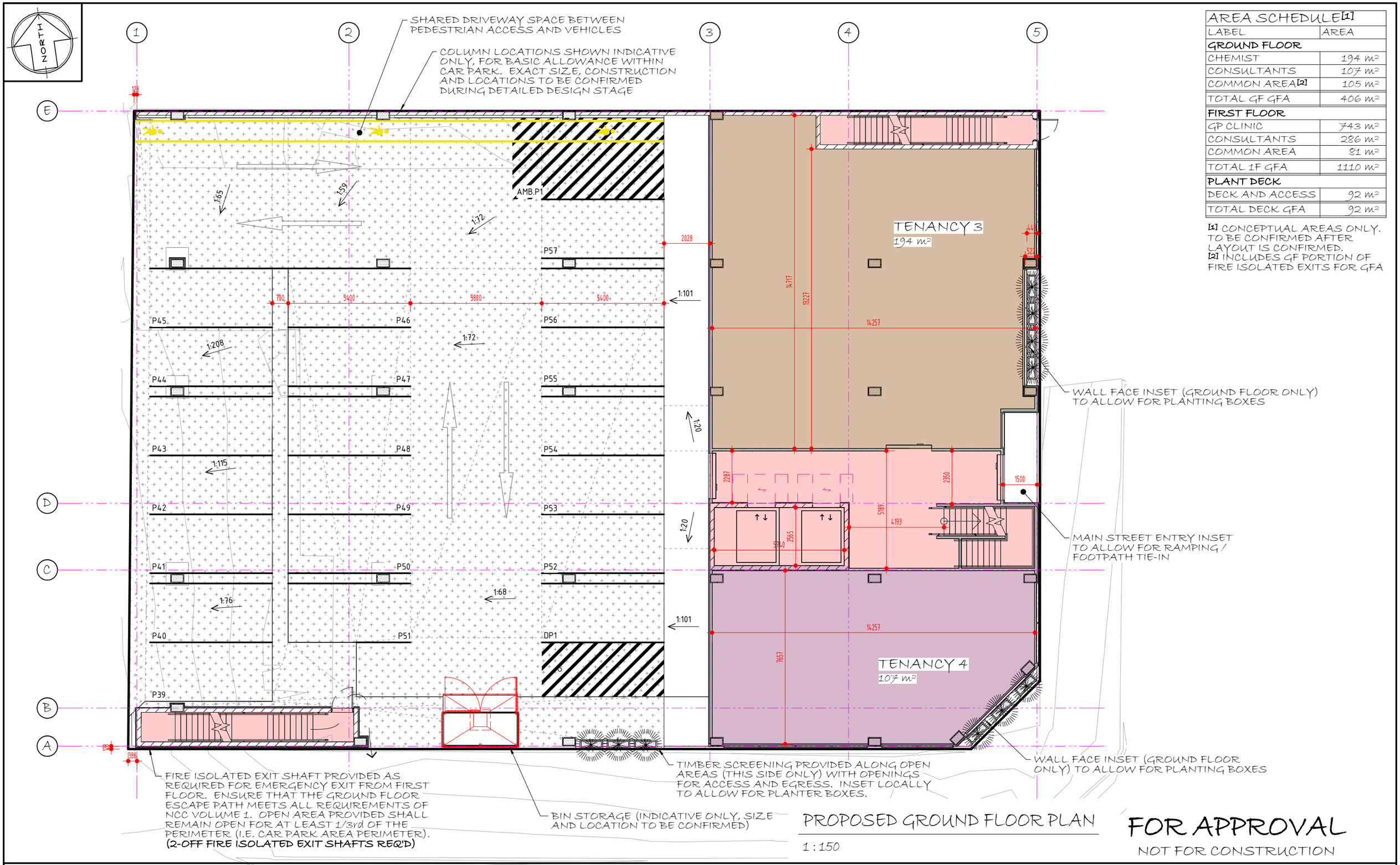
DESIGNED BY: A.BUENEN
DRAWN BY: A.BUENEN
CHECKED BY: -

TITLE:
PROPOSED ASCOT SUPER CLINIC
177 - 179 MUSGRAVE STREET BERSERKER, QLD
DUTTON HOLDINGS
CAR PARKING PLAN

SCALE: 1 : 250
REVISION: E
JOB No.: GD2682
SHEET No.: A01.02
A3



AREA SCHEDULE[1]	
LABEL	AREA
GROUND FLOOR	
CHEMIST	194 m²
CONSULTANTS	107 m²
COMMON AREA[2]	105 m²
TOTAL GF GFA	406 m²
FIRST FLOOR	
GP CLINIC	743 m²
CONSULTANTS	286 m²
COMMON AREA	81 m²
TOTAL 1F GFA	1110 m²
PLANT DECK	
DECK AND ACCESS	92 m²
TOTAL DECK GFA	92 m²

[1] CONCEPTUAL AREAS ONLY. TO BE CONFIRMED AFTER LAYOUT IS CONFIRMED.
[2] INCLUDES GF PORTION OF FIRE ISOLATED EXITS FOR GFA

PROPOSED GROUND FLOOR PLAN

1 : 150

FOR APPROVAL

NOT FOR CONSTRUCTION

REVISION SCHEDULE

REV	DESCRIPTION	DATE	BY	APPVD
E	CONCEPTUAL APPEARANCE UPDATE	17.09.25	JW	
D	NEW CONCEPT - INTEGRATED PARKING	15.08.25	JW	
C	NEW BUILD - CONCEPT	28.07.25	AB	
B	RENOVATION - CONCEPT	10.12.24	AN	
A	RENOVATION INITIAL CONCEPT LAYOUT	06.12.24	AN	

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QUALITY DESIGN. CONCEPT TO COMPLETION
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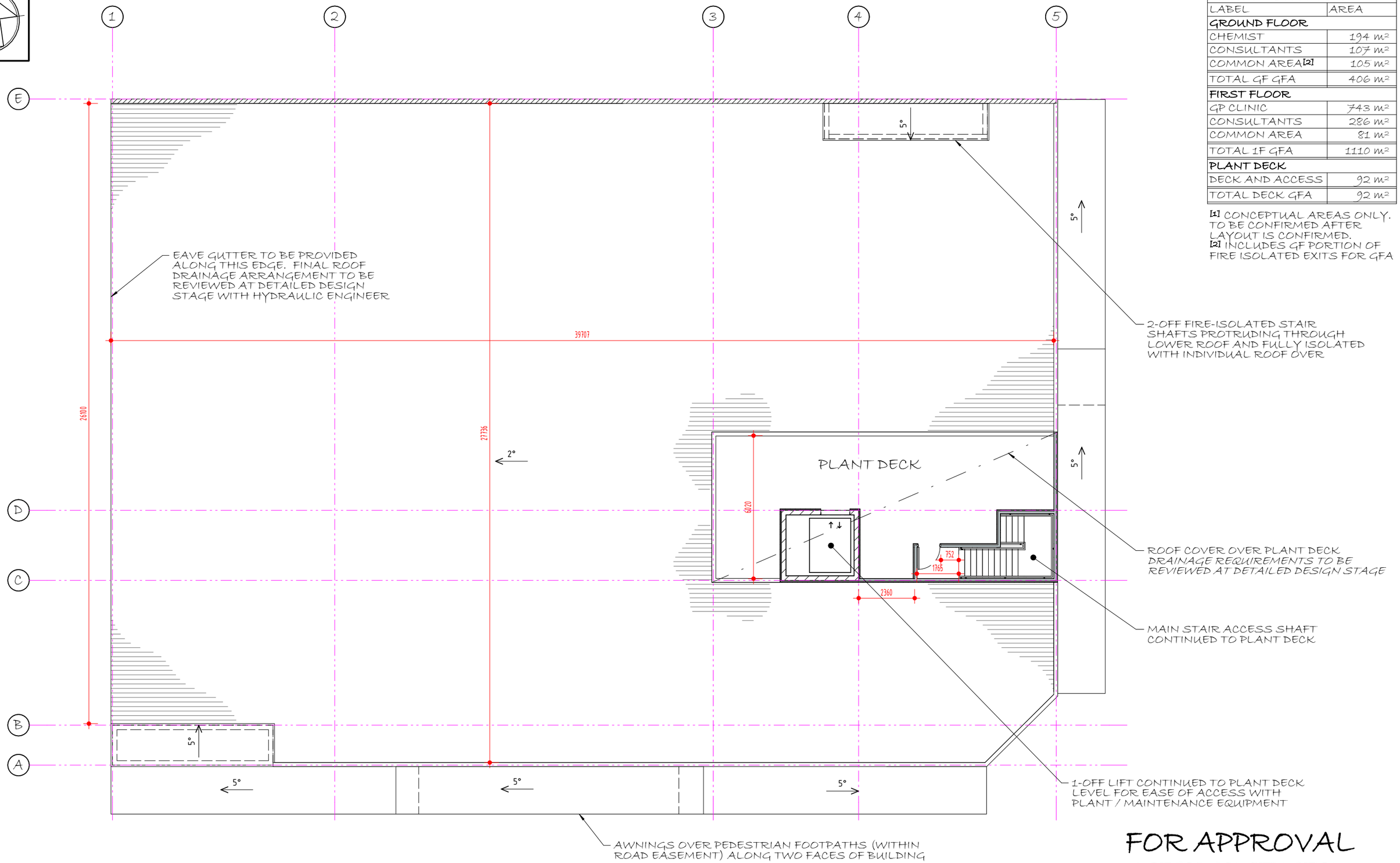
INDUSTRIAL - MECHANICAL - STRUCTURAL DESIGN
DOMESTIC & COMMERCIAL BUILDING DESIGNERS
QBCC Lic. No. 1191231 ABN 96 081 040 600
1/48 GOONDOON STREET, GLADSTONE, QUEENSLAND, 4680
PH: 4972 6066
EMAIL: design@gladstonedrafting.com.au
WEB: www.gladstonedrafting.com.au

DESIGNED BY:	A.BUENEN
DRAWN BY:	A.BUENEN
CHECKED BY:	-

TITLE:
PROPOSED ASCOT SUPER CLINIC
177 - 179 MUSGRAVE STREET BERSERKER, QLD
DUTTON HOLDINGS
PROPOSED GROUND FLOOR PLAN

SCALE:	REVISION:
1 : 150	E
JOB No.:	SHEET No.:
GD2682	A02.01

A3



AREA SCHEDULE[1]	
LABEL	AREA
GROUND FLOOR	
CHEMIST	194 m²
CONSULTANTS	107 m²
COMMON AREA[2]	105 m²
TOTAL GF GFA	406 m²
FIRST FLOOR	
GP CLINIC	743 m²
CONSULTANTS	286 m²
COMMON AREA	81 m²
TOTAL 1F GFA	1110 m²
PLANT DECK	
DECK AND ACCESS	92 m²
TOTAL DECK GFA	92 m²

[1] CONCEPTUAL AREAS ONLY. TO BE CONFIRMED AFTER LAYOUT IS CONFIRMED.
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REVISION SCHEDULE

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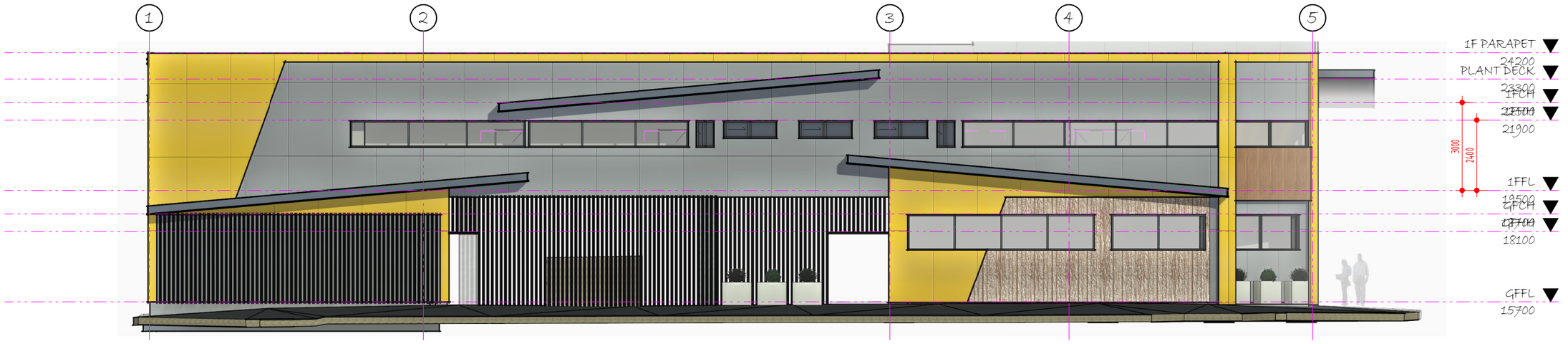
PH: 4972 6066
EMAIL: design@gladstonedrafting.com.au
WEB: www.gladstonedrafting.com.au

DESIGNED BY: A.BUENEN
DRAWN BY: J.WALKER
CHECKED BY: -

TITLE:
PROPOSED ASCOT SUPER CLINIC
177 - 179 MUSGRAVE STREET BERSERKER, QLD
DUTTON HOLDINGS
PROPOSED PLANT DECK

SCALE: 1 : 150
REVISION: E
JOB No.: GD2682
SHEET No.: A02.20
A3



EAST ELEVATION

1 : 150

NORTH ELEVATION

1 : 100

00 2000 4000 SCALEBAR - 1:100

CONCEPT APPROVAL

NOT FOR CONSTRUCTION

REV	DESCRIPTION	DATE	BY	APPVD

REVISION SCHEDULE

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PH: 4972 6066
EMAIL: design@gladstonedrafting.com.au
WEB: www.gladstonedrafting.com.au

DESIGNED BY: A.BUENEN

DRAWN BY: XXX

CHECKED BY: -

TITLE:
PROPOSED ASCOT SUPER CLINIC
177 - 179 MUSGRAVE STREET BERSERKER, QLD
DUTTON HOLDINGS
ELEVATIONS, SHEET 1

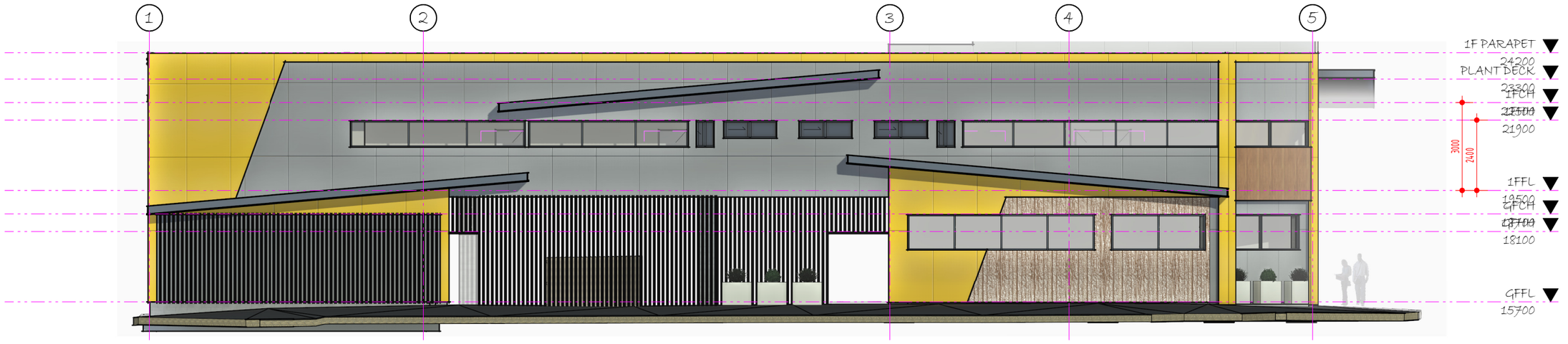
SCALE: As indicated

REVISION:

JOB No.: GD2682

SHEET No.: A03.00

A3



SOUTH ELEVATION

1 : 150

00 2000 4000 SCALEBAR - 1:100

EAST ELEVATION

1 : 100

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REVISION SCHEDULE

REV	DESCRIPTION	DATE	BY	APPVD
E	CONCEPTUAL APPEARANCE UPDATE	17.09.25	JW	

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EMAIL: design@gladstonedrafting.com.au
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DESIGNED BY: A.BUENEN
DRAWN BY: J.WALKER
CHECKED BY: -

TITLE:
PROPOSED ASCOT SUPER CLINIC
177 - 179 MUSGRAVE STREET BERSERKER, QLD
DUTTON HOLDINGS
ELEVATIONS 1

SCALE: As indicated
REVISION: E
JOB No.: GD2682
SHEET No.: A03.00
A3

WEST ELEVATION

1 : 100

00 2000 4000 SCALEBAR - 1:100

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REV	DESCRIPTION	DATE	BY	APPVD
E	CONCEPTUAL APPEARANCE UPDATE	17.09.25	JW	

REVISION SCHEDULE

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DESIGNED BY: A.BUENEN
DRAWN BY: XXX
CHECKED BY: -

TITLE:
PROPOSED ASCOT SUPER CLINIC
177 - 179 MUSGRAVE STREET BERSERKER, QLD
DUTTON HOLDINGS
ELEVATIONS 2

SCALE: 1 : 100
REVISION: E
JOB No.: GD2682
SHEET No.: A03.01
A3