



STANBURY
TRAFFIC PLANNING

TRAFFIC, PARKING & TRANSPORT CONSULTANTS

UPDATED TRAFFIC & PARKING IMPACT ASSESSMENT

**PROPOSED INDUSTRIAL DEVELOPMENT
4 MINNA CLOSE
BELROSE**

**PREPARED FOR WU PROPERTIES
OUR REF: 22-003-4**



3 MAY 2024

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TABLE OF CONTENTS

1. INTRODUCTION	4
1.1 SCOPE OF ASSESSMENT	4
1.2 BACKGROUND	5
1.3 REFERENCE DOCUMENTS	6
1.4 SITE DETAILS	6
1.4.1 SITE LOCATION	6
1.4.2 SITE DESCRIPTION	8
1.3.3 EXISTING SITE USE	8
1.3.4 SURROUNDING USES	8
2. PROPOSED DEVELOPMENT	9
2.1 BUILT FORM	9
2.2 PROPOSED OPERATION	9
3. SITE ACCESS, PARKING & INTERNAL CIRCULATION	11
3.1 ACCESS ARRANGEMENTS	11
3.1.1 PASSENGER VEHICLE ACCESS	11
3.1.2 HEAVY VEHICLE ACCESS	12
3.2 PARKING PROVISION	12
3.2.1 PASSENGER VEHICLE PARKING	12
3.2.2 HEAVY VEHICLE LOADING FACILITIES	13
3.2.3 MOTORCYCLE PARKING	13
3.2.4 BICYCLE PARKING	14
3.2.5 ON-STREET PARKING IMPACTS	14
3.3 INTERNAL CIRCULATION AND MANOEUVRABILITY	15
3.3.1 PASSENGER VEHICLE CIRCULATION	15
3.3.2 HEAVY VEHICLE CIRCULATION	17
3.3.3 HEAVY VEHICLE SITE EGRESS MANAGEMENT	17
3.3.4 BICYCLE PARKING DESIGN	18
3.3.5 MOTORCYCLE PARKING DESIGN	18
4. EXISTING TRAFFIC CONDITIONS	19
4.1 SURROUNDING ROAD NETWORK	19
4.2 EXISTING TRAFFIC VOLUMES	20
4.3 EXISTING ROAD NETWORK OPERATION	21
4.3.1 SITE ACCESS ASSESSMENT	22
4.4 PUBLIC TRANSPORT	22

4.4.1 BUSES	22
4.5 PEDESTRIANS / CYCLISTS	23

5. PROJECTED TRAFFIC CONDITIONS **24**

5.1 TRAFFIC GENERATION	24
5.2 TRIP ASSIGNMENT AND PROJECTED TRAFFIC VOLUMES	24
5.3 TRAFFIC IMPACTS	26
5.3.1 PROJECTED INTERSECTION PERFORMANCE	26
5.3.2 ROAD NETWORK ASSESSMENT	27
5.3.3 SITE ACCESS ASSESSMENT	27
5.4 PARKING IMPACTS	27
5.5 TRANSPORT IMPACTS	27

6. CONCLUSION **28**

APPENDICES

- 1. Architectural Plans**
- 2. Swept Path Plans**
- 3. Traffic Survey Output**
- 4. SIRDA Output (Existing Conditions)**
- 5. SIRDA Output (Projected Conditions)**

1. INTRODUCTION

1.1 Scope of Assessment

Stanbury Traffic Planning has been commissioned by Wu Properties to prepare an Updated Traffic & Parking Impact Assessment accompanying a development application to be lodged with Northern Beaches Council. The proposal involves the construction an industrial development at 4 Minna Close, Belrose (hereafter referred to as the 'subject site').

The development is proposed to comprise a single building providing an approximate warehouse / factory floor area of 1,513.84m² in conjunction with a mezzanine level of support office floor space providing a floor area of 175.47m².

The development is to be serviced by 25 passenger vehicle parking spaces within one level of basement parking. Vehicular access to the basement parking area is proposed via a combined ingress / egress driveway connecting with Minna Close in the south-western portion of the site.

Two heavy vehicle loading bays are also proposed to be provided at ground floor level capable of accommodating vehicles up to and including 12.5m long Heavy Rigid Vehicles (HRVs). Heavy vehicle entry is to be facilitated by an ingress only driveway connecting with Minna Close in the south-western corner of the site. Heavy vehicle egress from the site is proposed via right of way over the adjacent development roadway to the east of the site which connects with Minna Close via a driveway adjacent to the south-eastern corner of the site.

The aim of this assessment is to investigate and report upon the potential traffic and parking consequences of the development application and to recommend appropriate ameliorative measures where required. This report provides the following scope of assessment:

- Section 1 provides a summary of the site location, details, existing and surrounding land-uses;
- Section 2 describes the proposed development;
- Section 3 assesses the adequacy of the proposed site access arrangements, parking provision, internal circulation and servicing arrangements with reference to relevant Council, Transport for NSW (TfNSW) and Australian Standard specifications;
- Section 4 assesses the existing traffic, parking and transport conditions surrounding and servicing the subject development site including a description of the surrounding road network, traffic demands, operational performance and available public transport infrastructure; and
- Section 5 estimates the projected traffic generating ability of the proposed development and assesses the ability or otherwise of the surrounding road network to be capable of accommodating the altered demand in a safe and efficient manner.

The report has been prepared pursuant to State Environmental Planning Policy (Transport & Infrastructure) 2021.

1.2 Background

A Development Application (DA2023/1763) was lodged with Northern Beaches Council seeking consent for the construction of an industrial development to accommodate a brewery for the production, bottling, storing and distribution of beer at 4 Minna Close, Belrose. The development was proposed to be serviced by a basement parking area containing a total of 26 off-street parking spaces.

This Practice prepared a Parking and Traffic Impact Assessment Report dated May 2023 in support of the subject Development Application.

Council have responded with a letter to request for additional information dated 26 February 2024. Specifically, concern was raised with respect to the potential heavy vehicles accessing the site via the adjacent existing driveway to conflict with passenger vehicles accessing / exiting the adjacent development to the east.

In response to the abovementioned letter, amended architectural plans were subsequently prepared by SRH Architecture to address comments within Council's correspondence. The amendments to the development scheme include, but are not limited to, the following:

- Replacement of the originally proposed brewery operation with a generic industrial warehouse operation;
- Reversal of the heavy vehicle circulation arrangements to, throughout and from the site from an anti-clockwise to a clockwise arrangement and the introduction of traffic management arrangements to ensure that any potential conflicts between development generated heavy vehicle movements and passenger vehicle movements travelling to / from the adjacent development are appropriately governed / managed;
- Minor modifications to the northern corner of the development building to accommodate the above altered internal heavy vehicle access, circulation and servicing arrangements, resulting in a reduction in the originally proposed warehouse gross floor area from 1551.52m² to 1513.84m²; and
- Minor modifications to the basement car parking layout, resulting in a reduction in the number of car parking spaces from 26 to 25 spaces.

The abovementioned alterations are detailed within amended architectural plans prepared by SRH Architecture, reduced copies of a selection of which are included as **Appendix 1**.

This report forms an updated Parking and Traffic Impact Assessment reflecting the amended architectural plans and addressing the items raised within Council's abovementioned letter with respect to traffic considerations.

1.3 Reference Documents

Reference is made to the following documents throughout this report:

- TfNSW's *Guide to Traffic Generating Developments*;
- Northern Beaches Council's *Warringah Development Control Plan 2011* (WDCP 2011);
- Australian Standard for *Parking Facilities Part 1: Off-Street Car Parking* (AS2890.1:2004);
- Australian Standard for *Parking Facilities Part 2: Off-Street Commercial Vehicle Facilities* (AS2890.1:2018);
- Australian Standard for *Parking Facilities Part 3: Bicycle Parking* (AS2890.3:2015); and
- Australian Standard for *Parking Facilities Part 6: Off-Street Parking for People with Disabilities* (AS2890.6:2022).

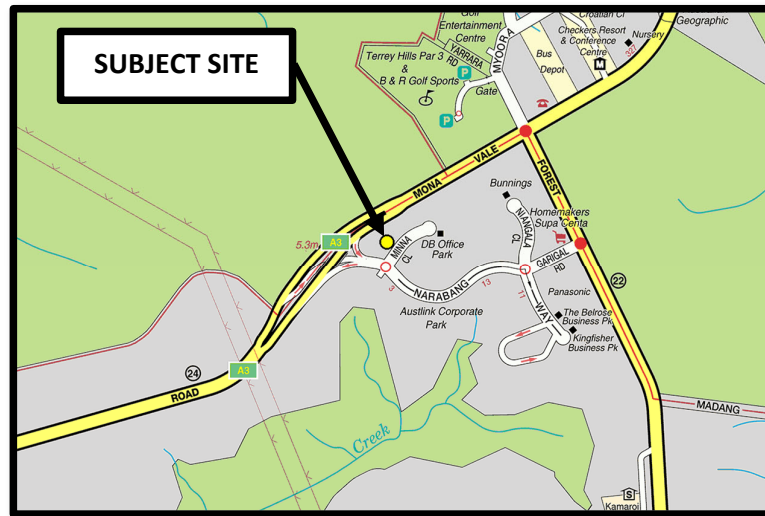
Architectural plans have been prepared by SRH Architecture and should be read in conjunction with this report, reduced copies of a selection of which are included as **Appendix 1** for reference.

1.4 Site Details

1.4.1 Site Location

The subject site is situated on the northern side of Minna Close being bounded by Narabang Way and Mona Vale Road, Belrose, in the north. The site location is illustrated overleaf within a local context by **Figure 1** within an aerial context by **Figure 2**.

FIGURE 1: SITE LOCATION WITHIN A LOCAL CONTEXT



Source: UBD's Australian City Streets – Version 8

FIGURE 2: SITE LOCATION WITHIN AN AERIAL CONTEXT



Source: NearMap (Image Date: 01/05/2023)

1.4.2 Site Description

The subject site provides a real property description of Lot 502 within DP 875858 and a street address of 4 Minna Close, Belrose.

The site forms a primarily rectangular shaped parcel of land, providing approximate frontages of 52m to Minna Close and 60m to Mona Vale Road. The site provides a total area in the order of 4,655m².

1.3.3 Existing Site Use

The subject site is currently vacant and undeveloped.

1.3.4 Surrounding Uses

The subject site is surrounded by the following land-uses:

- Industrial development is situated to the west, south and east of the site;
- A Bunnings Warehouse is situated further to the east of the site being serviced by Niangala Close; and
- Mona Vale Road carriageways are situated to the north of the site.

2. PROPOSED DEVELOPMENT

2.1 Built Form

The proposal involves the construction of an industrial development within the southern portion of the subject site. The building is proposed to be provided over two floors. The ground floor of the development is proposed to provide a reception / lobby area, a staff room, a warehouse area and ancillary amenities. The second floor of the development is proposed to provide an office space.

Table 1 below provides a summary of the proposed building uses and gross floor areas.

TABLE 1: SUMMARY OF PROPOSED BUILDING LAND-USE FLOOR AREAS				
	Industry (m²)	Internal Loading Areas (m²)	Offices (m²)	Total (Excludes Internal Loading Area) (m²)
Gross Floor Area Yield	1,513.84	87.5	175.47	1,689.31

The development is to be serviced by a basement parking area providing a total of 25 car parking spaces, including one disabled parking spaces. Vehicular access to the basement parking area is proposed via a combined ingress / egress driveway, connecting with Minna Close in the south-western portion of the site.

The development is also proposed to be serviced by two internal loading bays situated at ground floor level and accessed by roller doors situated on the northern wall of the warehouse building, capable of accommodating vehicles up to and including 12.5m long HRVs. Heavy vehicle entry is proposed to be provided via an ingress-only driveway connecting with Minna Close in the south-western corner of the site. Heavy vehicle egress from the site is proposed via right of way over the adjacent development roadway to the east of the site which connects with Minna Close via a driveway adjacent to the south-eastern corner of the site. Potential conflicts between heavy vehicles exiting the subject development and users of the adjacent development to the east are proposed to be managed / governed through the establishment of appropriate priority arrangements, the details of which are discussed in subsequent sections of this report.

2.2 Proposed Operation

The development is proposed to comprise one large format warehouse and ancillary office use. The specific operational functions of the site user is unknown at this stage, however this Practice has been advised of the following generic operational characteristics:

- 25 staff are to be accommodated on-site at any given time;

- Hours of operation are expected to be 8:00am – 5pm, Monday to Saturday;
and
- The largest vehicle expected to service the site is a HRV.

3. SITE ACCESS, PARKING & INTERNAL CIRCULATION

3.1 Access Arrangements

3.1.1 Passenger Vehicle Access

Passenger vehicle access between the basement parking area and Minna Close is proposed via a 6m wide combined ingress / egress driveway in the south-western portion of the site.

AS2890.1:2004 provides driveway design specifications based on the proposed primary land use, the functional order of the access road and the number of spaces the driveway is to serve. Tables 3.1 and 3.2 of AS2890.1:2004 specify that, at minimum, a Category 2 type driveway is required, providing a minimum combined driveway width of between 6m and 9m based on the non-arterial functional order of Minna Close, the proposed land-use and the passenger vehicle parking provision in which the subject driveway is to service being between 25 and 100 spaces. The proposed combined 6m wide ingress / egress driveway therefore complies with the minimum AS2890.1:2004 specifications and accordingly, is considered to continue to be satisfactory.

Swept path plans have been prepared in order to demonstrate the ability of passenger vehicles to enter and exit the site in a forward direction, copies of which are included as **Appendix 2**. These swept paths also indicate that all vehicles are able to enter and exit the site in a forward direction.

The safety and efficiency of passenger vehicle access / egress movements are also proposed to be assisted by the following:

- The provision of a relatively level (1:20) grade within the first 6m inside the property boundary within the driveway;
- The reasonably consistent horizontal and vertical alignment of Minna Close in the vicinity of the subject site facilitates appropriate sight distance between the driveway and approaching public road traffic flow;
- No obstructions to visibility adjacent to the egress side (eastern side) of the driveway facilitating appropriate sight distance between exiting motorists and potential pedestrians travelling along Minna Close; and
- The passenger vehicle site access driveway is proposed to be offset from the adjacent proposed heavy vehicle egress driveway by approximately 4.5 metres to effectively facilitate a pedestrian refuge island between the two driveways.

3.1.2 Heavy Vehicle Access

Heavy vehicle access between the on-site heavy vehicle loading areas and Minna Close is proposed to be provided via the following access arrangements:

- Heavy vehicle ingress movements are proposed to occur through the provision of a 5.8m wide driveway (not including proposed splays which result in an approximate total width of 11m measured at the property boundary) situated in the southern corner of the site.

Heavy vehicle egress from the site is proposed via right of way over the adjacent development roadway to the east of the site which connects with Minna Close via an existing 7m wide driveway adjacent to the south-eastern corner of the site.

Swept path plans have been prepared in order to demonstrate the ability of vehicles up to and including HRVs to enter and exit the site, copies of which are included as **Appendix 2**. These plans indicate that the largest vehicles required to service the site are capable of entering and exiting the site without unreasonable encroachment on driveway extents, internal development obstructions and potential adjoining public road kerb-side parking.

The safety and efficiency of access / egress movements are also proposed to be assisted by the provision of a relatively level (maximum of 1:20) grade within the development on immediate approach to the property boundary.

Potential conflicts between heavy vehicles exiting the subject development and users of the adjacent development to the east are proposed to be managed / governed through the establishment of appropriate priority arrangements, the details of which are discussed in subsequent sections of this report.

3.2 Parking Provision

3.2.1 Passenger Vehicle Parking

The development is proposed to be serviced by 25 off-street passenger vehicle parking spaces, including one disabled parking spaces, provided within the basement parking area.

WDCP 2011 specifies the following locally sensitive relevant off-street parking rates relevant to the subject development:

Industry

1.3 spaces per 100m² GFA

(Including up to 20% of floor area as office premises space component. Office premises component above 20% determined at office premises rate).

On the basis of 1,513.84m² of proposed gross floor area of warehouse and 175.47m² of proposed mezzanine office space, the following calculation applies utilising the above parking rates:

$$(1.3 \times (1,689.31\text{m}^2 / 100\text{m}^2)) = 21.96 \text{ (adopt 22) spaces}$$

The development is accordingly required to provide 22 passenger vehicle parking spaces in accordance with WDCP 2011.

The proposed total parking provision of 25 spaces therefore exceeds the minimum WDCP 2011 requirements and accordingly, is considered to be satisfactory.

3.2.2 Heavy Vehicle Loading Facilities

WDCP 2011 specifies the following locally sensitive relevant loading / unloading area requirements relevant to the subject development:

On-site Loading and Unloading

Facilities for the loading and unloading of service, delivery and emergency vehicles are to be:

Appropriate to the size and nature of the development, screened from public view; and designed so that vehicles may enter and leave in a forward direction.

The proposed warehouse development is to be serviced by two internal heavy vehicle loading bays capable of accommodating vehicles up to and including 12.5m long HRVs in the northern portion of the site at ground level being accessed via the provision of roller doors. The loading bays are to be accessed via an internal roadway that connects to the ingress and egress driveways situated in the eastern and southern corner of the site, respectively. The internal roadway and internal loading bays have been designed so that all heavy vehicles can enter and exit the site in a forward direction.

Section 2.2 of the report presents that the proposed development use is expected to generate five heavy vehicles per day. The provision of two formalised loading bays, representing a rate of approximately of one bay per 850m² total gross floor area, is accordingly envisaged to readily accommodate peak operational demands and therefore, is satisfactory.

3.2.3 Motorcycle Parking

The development is proposed to be serviced by two motorcycle parking spaces provided within the basement parking area.

WDCP 2011 does not specify motorcycle parking requirements relevant to the subject development.

The proposed motorcycle parking provision of two spaces, representing approximately one space per 12 to 13 car spaces, is considered to be satisfactory.

3.2.4 Bicycle Parking

The development is proposed to be serviced by 14 bicycle parking spaces comprising 10 x Class B spaces situated within a bicycle storage room provided at the ground floor level of the warehouse building and 4 x Class C spaces situated at the lower ground floor level in close proximity to the basement lobby door.

WDCP 2011 specifies the following locally sensitive relevant off-street bicycle parking rates relevant to the subject development:

Light and General Industry

High-Medium Security Level: 1 per 200m² GFA

Visitors: 1 per 600m² GFA

On the basis of a total development GFA of 1,727m², the following calculation applies utilising the above parking rates:

High-Medium Security Level: $(1,689.31\text{m}^2 / 200\text{m}^2) = 8.5$ (adopt 9) spaces

Visitors: $(1,689.31\text{m}^2 / 600\text{m}^2) = 2.8$ (adopt 3) spaces

The development is accordingly required to provide 9 x Class B and 3 x Class C bicycle parking spaces in accordance with WDCP 2011 and AS2890.3:2015.

The proposed total bicycle parking provision of 14 spaces, comprising 10 x Class B spaces and 4 x Class C spaces, therefore complies with the minimum WDCP 2011 requirements and accordingly, is considered to be satisfactory.

3.2.5 On-Street Parking Impacts

The proposed development includes the creation of two access driveways situated in the south-western corner of the site. The two access driveways are proposed to provide a total width of 22m (including the 4.5-metre offset between the two driveways). It is therefore acknowledged that the creation of the two driveways associated with the subject site will result in the loss of on-street kerb-side parking supply, equivalent to approximately four parking spaces.

Minna Close currently accommodates the following on-street parking infrastructure in close proximity to the subject site between the terminating cul-de-sac bulb in the east and Narabang Way in the west:

- Approximately 21 unrestricted parking spaces along the northern kerb alignment (including seven parking spaces directly adjacent to the subject site); and
- Approximately 19 unrestricted parking spaces along the southern kerb alignment.

In order to obtain the existing demand for on-street parking throughout the year in the vicinity of the site, this Practice has reviewed aerial imagery from Nearmap.com.au which captures the time and day the photo was taken. Aerial imagery was observed on available days during the years 2019 and 2022, during

which time there were no COVID-19 lockdowns in place potentially impacting parking demand.

A summary of the on-street parking demand within Minna Close is provided below in **Table 2**.

TABLE 2: SUMMARY OF ON-STREET KERB-SIDE PARKING DEMAND MINNA CLOSE					
Survey Details			North Side (Capacity = 21)	South Side (Capacity = 19)	Total (Capacity = 40)
Date	Day	Time			
12/03/2019	Tuesday	4:43pm	9	7	16
14/05/2019	Tuesday	12:49pm	15	15	30
2/07/2019	Tuesday	1:10pm	13	12	25
27/09/2019	Friday	12:11pm	17	9	26
12/11/2019	Saturday	9:40am	1	1	2
05/04/2022	Tuesday	12:09pm	15	11	26
18/05/2022	Wednesday	10:47am	15	9	24
28/07/2022	Thursday	2:17pm	17	15	32
21/08/2022	Sunday	11:04am	0	2	2

Table 2 indicates that the highest parking demand of the survey period occurred on Thursday the 28th of July 2022, when a total of 32 car parking spaces were occupied, representing an available supply of eight on-street parking spaces in close proximity of the site.

Therefore, incorporating the creation of the two access driveways associated with the subject site, it is considered that Minna Close will continue to provide capacity for up to four additional parking spaces during peak periods.

It is accordingly concluded that there is ready capacity within Minna Close to continue to accommodate the on-street parking demand, notwithstanding the implementation of the site access driveways and therefore the loss of four on-street parking spaces.

3.3 Internal Circulation and Manoeuvrability

3.3.1 Passenger Vehicle Circulation

Passenger vehicles will gain entry to the basement parking area via the proposed 6m wide combined ingress / egress driveway situated in the south-western corner of the site, connecting with Minna Close. The site access driveway provides direct connectivity to an internal ramp / roadway that connects directly with the parking circulation aisle.

The basement parking area comprises one parking circulation aisle provided in an east-west alignment providing access to two rows of 90-degree angled parking spaces.

The passenger vehicle parking spaces have been designed to accord with the relevant requirements of AS2890.1:2004 and AS2890.6:2022, providing the following minimum dimensions:

- Standard 90-degree angled vehicular parking space width = 2.4m;
- Disabled vehicular parking space width = 2.4m (with adjoining 2.4m wide shared area);
- Additional vehicular space width where parking spaces adjoins an obstruction = 0.3m;
- Standard 90-degree angled parking space length = 5.4m;
- Minimum parking aisle width adjoining 90-degree angled parking spaces = 6.1m;
- Minimum headroom = 2.2m;
- Minimum headroom above disabled parking space = 2.5m;
- Maximum grade within 6m of the property boundary = 1:20; and
- Maximum ramp grade = 1:8.

Safe and efficient internal manoeuvring and parking space accessibility is anticipated to result, taking into consideration the above compliance with the relevant AS2890.1:2004 and AS2890.6:2022 specifications.

In order to demonstrate the internal passenger vehicle manoeuvrability within the internal parking areas, a number of swept path plans have been prepared which are included as **Appendix 2**. The turning paths provided on the plans have been generated using Autoturn software and derived from B85 and B99 vehicle specifications provided within AS2890.1-2004.

Section B4.4 of AS2890.1:2004 states the following with regard to the use of templates to assess vehicle manoeuvring:

‘Constant radius swept turning paths, based on the design vehicle’s minimum turning circle are not suitable for determining the aisle width needed for manoeuvring into and out of parking spaces. Drivers can manoeuvre vehicles within smaller spaces than swept turning paths would suggest.’

It would therefore appear that whilst the turning paths provided within AS 2890.1:2004 can be utilised to provide a ‘general indication’ of the suitability or otherwise of internal parking and manoeuvring areas, vehicles can generally manoeuvre more efficiently than the paths indicate. Notwithstanding this, the swept path plans illustrate that passenger vehicles can manoeuvre throughout and enter and exit the most difficult passenger vehicle parking spaces within the parking area. The proposed site layout as it relates to passenger vehicle manoeuvrability is considered satisfactory.

3.3.2 Heavy Vehicle Circulation

The warehouse has been designed to accommodate vehicles up to and including 12.5m long HRVs through the provision of two internal loading bays situated in the northern portion of the site and accessed via a roller door connecting with the internal roadway at ground level.

The heavy vehicle servicing arrangements have been designed to comply with the relevant requirements of AS2890.2:2018, providing the following minimum dimensions:

- Minimum Roller door width servicing internal loading bays = 3.5m;
- Minimum width of loading bay = 3.5m;
- Minimum length of loading bay accommodating vehicles up to and including HRVs = 12.5m (whereby a portion of the HRV cab is to be situated outside of the building);
- Minimum clearance of loading bay accommodating vehicles up to and including Heavy Rigid vehicles = 5.0m;
- Maximum gradient throughout heavy vehicle manoeuvring area = level grade;
- Maximum grade throughout internal circulation area = 1:8;
- Maximum grade on approach to exit driveway = 1:20; and
- Maximum instantaneous change in grade = 1:16 over 10m of travel.

A series of swept path plans have been prepared and included as **Appendix 2** which demonstrate the manoeuvring of HRVs to and from the internal loading bays. These paths indicate that the proposed building and site design is capable of accommodating the manoeuvring requirements of the largest vehicles expected to service the building. In consideration of this and the above discussion, the subject development design is considered to be capable of accommodating vehicles up to and including 12.5m long HRVs in a safe and efficient manner.

3.3.3 Heavy Vehicle Site Egress Management

Heavy vehicle egress from the site is proposed via right of way over the adjacent development roadway to the east of the site which connects with Minna Close via a driveway adjacent to the south-eastern corner of the site.

Heavy vehicles exiting the site via the right of the way are proposed to be governed by the provision of "Stop" signage and pavement marking at the connection of the rear servicing area of the development to the adjacent development access road. This control will ensure that heavy vehicles exiting the site will not unreasonably or undesirably conflict, impede or delay vehicle movements associated with the adjacent development.

Further to the above, an appropriately positioned convex mirror is proposed on the eastern wall of the proposed warehouse building in the immediate vicinity of the abovementioned control point. This mirror is envisaged to facilitate an appropriate extent of visibility between heavy vehicle drivers exiting the site and vehicles entering and exiting the adjacent development via abutting access road. In consideration of this and the above discussion, it is considered that heavy vehicles will be able to exit the proposed development without unreasonably impacting the safety and efficiency of vehicles entering and exiting the adjacent development.

3.3.4 Bicycle Parking Design

The development is proposed to provide 14 bicycle parking spaces comprising 10 x Class B spaces and 4 x Class C spaces. The bicycle parking facilities are proposed to provide the following minimum design parameters in accordance with the relevant requirements of WDCP 2011 and the specifications of AS2890.3:2015:

Class B Parking Spaces:

- Situated within a secure and enclosed room at ground floor level of the warehouse building;
- Rack depth / length = 1.8m;
- Rack spacing = 0.5m; and
- Aisle width adjoining racks = 1.5m.

Class C Parking Spaces (Visitor Parking):

- Situated at basement level, accessed via the footpath and in close proximity to the basement lobby entrance;
- Rack depth / length = 1.8m;
- Rack spacing = 0.5m; and
- Aisle width adjoining racks = 1.5m.

3.3.5 Motorcycle Parking Design

Two motorcycle parking spaces are proposed to be situated within the north-eastern corner of the basement parking area.

The motorcycle parking spaces are to provide the following minimum design parameters in accordance with the relevant specifications of AS2890.1:2004:

- Parking space width = 1.2m; and
- Parking space length = 2.5m.

4. EXISTING TRAFFIC CONDITIONS

4.1 Surrounding Road Network

- **Minna Close** performs a local access function under the care and control of Northern Beaches Council, primarily providing an east-west alignment, facilitating access between abutting commercial / industrial properties prior to terminating in a cul-de-sac with a bulb diameter of approximately 28m some 200m to the east of Narabang Way.

In the vicinity of the site, Minna Close provides an 11m wide pavement providing one through lane of traffic in conjunction with parallel parking along both kerb alignments. Traffic flow within Mina Close is governed by a sign posted speed limit of 50km/h.

To the south-west of the site, Minna Close forms an intersection with Narabang Way and a development access driveway operating under two-lane circulating roundabout control.

- **Narabang Way** performs a collector access function under the care and control of Northern Beaches Council, primarily providing connectivity between Mona Vale Road in the north-west Garigal Way in the south-east, prior to extending further to the south, providing a local access function and terminating cul-de-sac bulb 250m to the south of Garigal Way.

Narabang Way primarily provides a dual carriageway providing one lane of traffic in each direction in conjunction with parallel parking providing along the outside kerb alignment being separated by a vegetated median. Traffic flow within Narabang Way is governed by a sign posted speed limit of 50km/h.

At its northern extremity, Narabang Way connects with Mona Vale Road, providing on and off-ramps / merge lanes with the westbound carriageway and a grade separated off-ramp from the eastbound carriageway.

To the south-east of the site, Narabang Way forms an intersection with Garigal Way and Niangala Close operating under two-lane circulating roundabout control.

- **Mona Vale Road** performs a State Road function operating under the care and control of TfNSW primarily providing an east-west alignment between Mona Vale in the east and Gordon in the south-west, where it forms Ryde Road.

Mona Vale Road provides a dual carriageway providing two lanes of traffic in each direction in the vicinity of the site. Traffic flow within Mona Vale Road in the vicinity of the site is governed by a sign posted speed limit of 90km/h.

4.2 Existing Traffic Volumes

4.2.1 Junction of Minna Close and Narabang Way

This Practice has commissioned peak hour traffic surveys to be completed of the intersection of Minna Close and Narabang Way, in order to accurately ascertain existing traffic demands within the immediate precinct.

Surveys were undertaken between 7:00am – 9:00am and 4:00pm – 6:00pm on Friday the 29th of July 2022.

Figure 3 below provides a summary of the surveyed peak hour intervals of traffic flows at the subject intersection including a morning peak hour which has been identified as 8:00am – 9:00am (AM Peak) and 4:15pm – 5:15pm (PM Peak), whilst full details are contained within **Appendix 3**.

**FIGURE 3: EXISTING WEEKDAY COMMUTER PEAK HOUR TRAFFIC VOLUMES
INTERSECTION OF MINNA CLOSE AND NARABANG WAY**

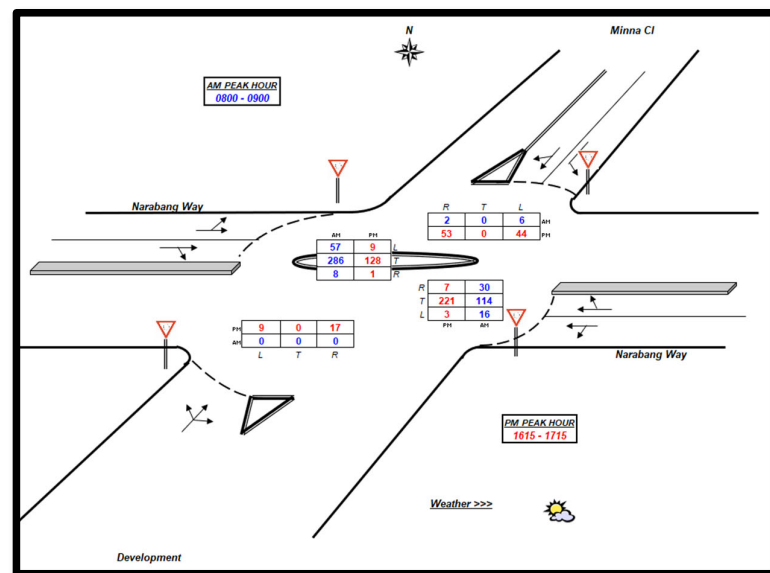


Figure 3 indicates the following:

- Narabang Way accommodates tidal traffic demands with southbound flow predominating during the morning peak hour and northbound demands predominating during the afternoon peak hour;
- Narabang Way accommodates predominate directional traffic demands of between approximately 250 – 350 vehicles during weekday peak hours;
- Mina Close accommodates tidal traffic demands with eastbound flow predominating during the morning peak hour and westbound flow predominating during the afternoon peak hour; and

- Minna Close accommodates predominate directional traffic demands of approximately 100 vehicles during weekday peak hours.

4.3 Existing Road Network Operation

The surveyed intersection of Minna Close and Narabang Way has been analysed utilising the SIDRA computer intersection analysis program in order to objectively assess the operation of the nearby public road network.

SIDRA is a computerised traffic arrangement program which, when volume and geometrical configurations of an intersection are imputed, provides an objective assessment of the operation efficiency under varying types of control (i.e. signs, signal and roundabouts). Key indicators of SIDRA include level of service where results are placed on a continuum from A to F, with A providing the greatest intersection efficiency and therefore being the most desirable by TfNSW.

SIDRA uses detailed analytical traffic models coupled with an iterative approximation method to provide estimates of the abovementioned key indicators of capacity and performance statistics. Other key indicators provided by SIDRA are average vehicle delay, the number of stops per hour and the degree of saturation. Degree of saturation is the ratio of the arrival rate of vehicles to the capacity of the approach. Degree of saturation is a useful and professionally accepted measure of intersection performance.

SIDRA provides analysis of the operating conditions that can be compared to the performance criteria set out in **Table 3** below (being TfNSW method calculation of Level of Service).

TABLE 3: LEVEL OF SERVICE CRITERIA FOR ROUNDABOUT CONTROLLED INTERSECTIONS		
Level of Service	Average Delay per Vehicle (secs/veh)	Expected Delay
A	Less than 14	Little or no delay
B	15 to 28	Minimal delay and spare capacity
C	29 to 42	Satisfactory delays with spare capacity
D	43 to 56	Satisfactory but near capacity
E	57 to 70	At capacity, incidents will cause excessive delays
F	> 70	Extreme delay, unsatisfactory

The existing conditions have been modelled utilising the peak hour traffic volumes presented within **Figure 3**.

Table 4 overleaf provides a summary of the SIDRA output data whilst more detailed summaries are included as **Appendix 4**.

TABLE 4: SIDRA OUTPUT - EXISTING WEEKDAY PEAK HOUR PERFORMANCE INTERSECTION OF MINNA CLOSE AND NARABANG WAY		
	AM PEAK (8:00AM – 9:00AM)	PM PEAK (4:15PM – 5:15PM)
Narabang Way North Approach		
Delay (seconds / vehicle)	7.6	7.6
Degree of Saturation	0.22	0.10
Level of Service	A	A
Narabang Way South Approach		
Delay (seconds / vehicle)	7.5	7.7
Degree of Saturation	0.09	0.14
Level of Service	A	A
Minna Close Approach		
Delay (seconds / vehicle)	9.7	8.3
Degree of Saturation	0.006	0.05
Level of Service	A	A
Development Driveway		
Delay (seconds / vehicle)	0.4	1.0
Degree of Saturation	0.003	0.03
Level of Service	A	A
Total Intersection		
Delay (seconds / vehicle)	7.6	8.3
Degree of Saturation	0.22	0.14
Level of Service	A	A

Table 4, in conjunction with more detailed output contained within **Appendix 4**, indicates that the intersection of Minna Close and Narabang Way provides all movements with a level of service 'A' during peak periods, representing good operation with spare capacity.

4.3.1 Site Access Assessment

Turning movements between abutting sites and Minna Close are generally assisted by particularly low traffic volumes and a low traffic speed within Minna Close. This situation, combined with acceptable sight distance conditions, results in vehicles being able to undertake entry and egress movements between abutting developments and Minna Close in a safe and efficient manner.

4.4 Public Transport

4.4.1 Buses

The following bus routes operate in the vicinity of the subject site:

- Route 141 – Austlink to Manly via Frenchs Forest & Seaforth;
- Route 193 – Austlink to Warringah Mall via Frenchs Forest;
- Route 196 – Mona Vale to Gordon;
- Route 197 – Mona Vale to Macquarie University via Gordon;

- Route 260 – Terrey Hills to North Sydney;
- Route 270 – Terrey Hills to City QVB;
- Route 271 – Belrose to City QVB; and
- Route 284 – Duffys Forest to Terrey Hills & Chatswood.

The above routes provide an approximate collective service frequency of 20 minutes during weekday peak periods, 30 minutes during weekday business hours and hourly on weekends.

The closest bus stop to the subject site is situated at approximately 170m walking distance (or approximately 2-minute walk) to the south of the site situated on the northern side of Narabang Way.

4.5 Pedestrians / Cyclists

Pedestrians and cyclists are provided with the following access and mobility infrastructure within the immediate vicinity of the subject site:

- A footpath is provided along the northern side of Minna Close and sections of the southern side of Minna Close;
- Footpaths are provided along both sides of Narabang Way, Niangala Close and Garigal Road;
- A pedestrian refuge is provided across the eastern approach of the roundabout controlled intersection of Narabang way, Niangala Close and Garigal Way;
- Signalised pedestrian crossings are provided over the northern and western approaches of the junction of Garigal Way and Forest Way; and
- A pedestrian crossing is provided across the left turn slip lane of Forest Way.

5. PROJECTED TRAFFIC CONDITIONS

5.1 Traffic Generation

Traffic generation rates for various land-uses have been established through extensive surveys undertaken throughout NSW and published within TfNSW's *Guide to Traffic Generating Developments*. The following provides a summary of the traffic generating potential of the existing and proposed site uses with respect to those rates established by TfNSW:

Warehouse (Industry)

0.5 peak hour trip per 100m² of gross floor area

Office and Commercial Premises

2 peak hour trips per 100m² of gross floor area

Section 2.1 of this report presents that the subject development is proposed to provide an office gross floor area of 175.47m² and warehouse gross floor area of 1,515.84m². Application of TfNSW's traffic generation rates to the proposed development results in the following peak hour traffic generation provided in **Table 5** below.

TABLE 5: SUMMARY OF TRAFFIC GENERATING POTENTIAL OF EXISTING SITE STRUCTURES BASED UPON STANDARD INDUSTRIAL USAGE			
Use	Size GFA	Rate	Peak Hour Trips
Office	175.47	2 trips per 100m ² GFA	3.5 (adopt 4)
Warehouse	1,513.84	0.5 trips per 100m ² GFA	7.6 (adopt 8)
Total			12

The proposed development is therefore estimated to generate in the order of 12 peak hour vehicle trips to and from the subject site, based on established average TfNSW traffic generation rates.

5.2 Trip Assignment and Projected Traffic Volumes

The proposed development has been projected to generate 12 trips during the morning and afternoon peak hours in accordance with the traffic generation rates specified within TfNSW's *Guide to Traffic Generating Developments*.

The development-generated peak hour trips are likely to be evenly distributed between inbound and outbound movements associated with the typical journey to work behaviour as the traffic generated by the subject site is largely to be staff arriving in the morning and leaving in the evening. Therefore, it has been estimated that the morning peak hour trips are to comprise 80% inbound trips and 20% outbound trips. Conversely, the afternoon peak hour trips are to comprise 20% inbound trips and 80% outbound trips. The development is therefore projected to generate 10 ingress movements and 2 egress movements

during the morning peak hour and 2 ingress movements and 10 egress movements during the evening peak hour.

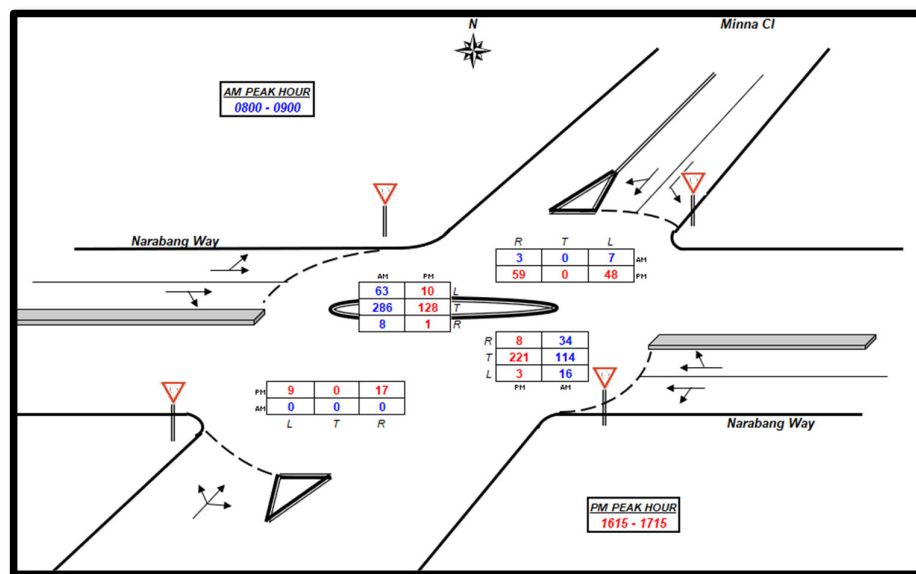
For the purposes of this assessment, it has been assumed that the ingress and trips have been assigned with a proportional distribution throughout the possible approaches to the site. Therefore, development generated traffic has been assigned as follows:

Trip Assignment

- 60% to / from the north along Narabang Way; and
- 40% to / from the south along Narabang Way.

On this basis, the projected peak hour traffic volumes at the junction of Minna Close and Narabang Way has been formulated by adding the abovementioned traffic generation and trip assignment to the existing demands presented within **Figure 4**. **Figure 5** below provides an estimation of the future traffic demands at the nearby public road intersection.

**FIGURE 45: PROJECTED WEEKDAY PEAK HOUR TRAFFIC VOLUMES
JUNCTION OF MINNA CLOSE AND NARABANG WAY**



5.3 Traffic Impacts

5.3.1 Projected Intersection Performance

The junction of Minna Close and Narabang Way has been modelled in order to estimate the likely impact on traffic safety and efficiency utilising the projected traffic volumes illustrated within **Figure 5**. A summary of the most pertinent results is indicated overleaf within **Table 6** whilst more detailed summaries are provided within **Appendix 6**.

TABLE 6: SIDRA OUTPUT - PROJECTED CONDITIONS INTERSECTION OF MINNA CLOSE AND NARABANG WAY				
	Existing Conditions		Projected Conditions	
	AM	PM	AM	PM
Narabang Way North Approach				
Delay (seconds / vehicle)	7.6	7.6	7.7	7.6
Degree of Saturation	0.22	0.10	0.22	0.10
Level of Service	A	A	A	A
Narabang Way South Approach				
Delay (seconds / vehicle)	7.5	7.7	7.5	7.7
Degree of Saturation	0.09	0.14	0.09	0.14
Level of Service	A	A	A	A
Minna Close Approach				
Delay (seconds / vehicle)	9.7	8.3	9.6	8.4
Degree of Saturation	0.006	0.05	0.007	0.05
Level of Service	A	A	A	A
Development Driveway				
Delay (seconds / vehicle)	0.5	1.1	0.5	1.1
Degree of Saturation	0.003	0.03	0.003	0.03
Level of Service	A	A	A	A
Total Intersection				
Delay (seconds / vehicle)	9.7	8.3	9.6	8.4
Degree of Saturation	0.22	0.14	0.22	0.14
Level of Service	A	A	A	A

Table 6 indicates that the additional traffic generated by the proposed development is not projected to result in significant impacts on the existing operational performance of the surveyed intersection. In this regard, whilst it is expected that the additional traffic will result in some minor increases to the average vehicle delay and the degree of saturation, the prevailing level of service of the intersection is projected to remain unaltered.

5.3.2 Road Network Assessment

The surrounding public road network has been assessed to provide motorists with a good level of service with spare capacity.

The proposed development has been projected to generate 12 peak hour trips to and from the site. This equates to approximately one additional vehicle movement every five minutes during commuter peak periods. Such a level of additional traffic is not projected to, in itself, result in any unreasonable impacts on the existing operational performance of the surrounding local road network.

In consideration of the above, the impact of the development is most likely to be a result of the safety and efficiency with which motorists are capable of entering and exiting the development.

5.3.3 Site Access Assessment

Traffic demands within Minna Close have been observed to be low. Additionally, roundabout intersection control at the intersection of Minna Close and Narabang Way to the south-west of the site therefore results in regular and extended gaps in traffic whereby vehicles are envisaged to be able to enter and exit the site in a safe and efficient manner.

Adequate sight distance between the subject site and Minna Close is facilitated through the relatively consistent horizontal and vertical alignment of Minna Close and the low travel speeds of vehicles within Minna Close.

5.4 Parking Impacts

The proposed development provides an off-street parking provision which exceeds the relevant parking requirements of WDCP 2011. It is however acknowledged that the creation of two site access driveways in the south-western corner of the site will result in the loss of two on-street parking spaces. However, Section 3.2.5 presents that there will continue to be ready capacity within the on-street parking provision of Minna Close to accommodate the parking demand.

It is accordingly not expected that the development will result in unreasonable impacts on surrounding public road parking supply / capacity.

5.5 Transport Impacts

The subject site is located within reasonably close walking distance to bus services operating along Narabang Way. It is accordingly expected that a portion of the future centre users / staff will utilise the surrounding public transport infrastructure to access the site and other destinations throughout the Sydney metropolitan area. The capacity of the existing public transport system is however not envisaged to be measurably affected by any additional demand associated with the development, given its limited scale.

6. CONCLUSION

This report assesses the potential traffic and parking implications associated with the construction of an industrial development at 4 Minna Close, Belrose. Based on this assessment, the following conclusions are now made:

- The proposed passenger vehicle site access arrangements are compliant with the relevant AS2890.1:2004 and are capable of accommodating entering and exiting passenger vehicles in combination;
- Swept path analysis indicates that the proposed heavy vehicle site access and egress arrangements are capable of accommodating the largest vehicles expected to service the site;
- Appropriate arrangements are proposed to govern / manage potential conflicts between heavy vehicles exiting the site and vehicles entering / exiting the adjacent development such that no unreasonable impacts on the overall level of adjacent development safety and efficiency are envisaged;
- The proposed off-street passenger vehicle, motorcycle and bicycle parking provision complies with the relevant requirements of WDCP 2011;
- The on-site loading and unloading arrangements are provided in accordance with the relevant requirements of WDCP 2011;
- The internal passenger vehicle circulation arrangements as well as the internal heavy vehicle servicing arrangements are capable of providing for safe and efficient internal manoeuvring;
- The surrounding road network operates with a reasonable level of service during peak periods;
- The subject development has been projected to generate 12 peak hour vehicle trips to and from the subject site; and
- The adjoining road network is capable of accommodating the additional traffic projected to be generated by the subject development.

It is considered, based on the contents of this report and the conclusions contained herein, there are no traffic or parking related issues that should prevent construction of the subject development.

APPENDIX 1



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Nominated Architect: Simon Hanson #6739

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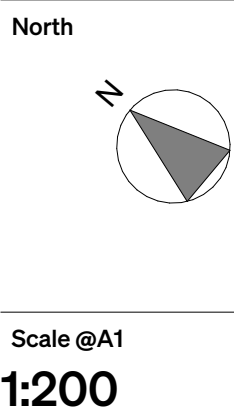
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01	4/04/2023	Issue for coordination
02	17/04/2023	Issue for coordination
03	10/05/2023	Issue for coordination
A	16/05/2023	Issue for DA submission
04	8/03/2024	Issue for Coordination
B	24/04/2024	Issue for Council - Response to RFIs

Project:
**4 MINNA CLOSE, BELROSE
NSW 2085**

Stage:
DA



Drawing title BASEMENT PLAN		
Drawn AS	Checked EO	Approved SRH
Client WU PROPERTIES	Date 3/05/2024	

PRELIMINARY NOT FOR CONSTRUCTION	
Project No. 21108	Drawing No. DA100
Revision B	

Rev	Date	Description
01	4/04/2023	Issue for coordination
02	13/04/2023	Issue for coordination
03	17/04/2023	Issue for coordination
04	9/05/2023	Issue for coordination
05	10/05/2023	Issue for coordination
A	16/05/2023	Issue for DA submission
06	8/03/2024	Issue for Coordination
B	24/04/2024	Issue for Council - Response to RFIs

Project:
**4 MINNA CLOSE, BELROSE
NSW 2085**

Stage:
DA

North

Scale @A1
1:200

Drawing title
GROUND FLOOR PLAN

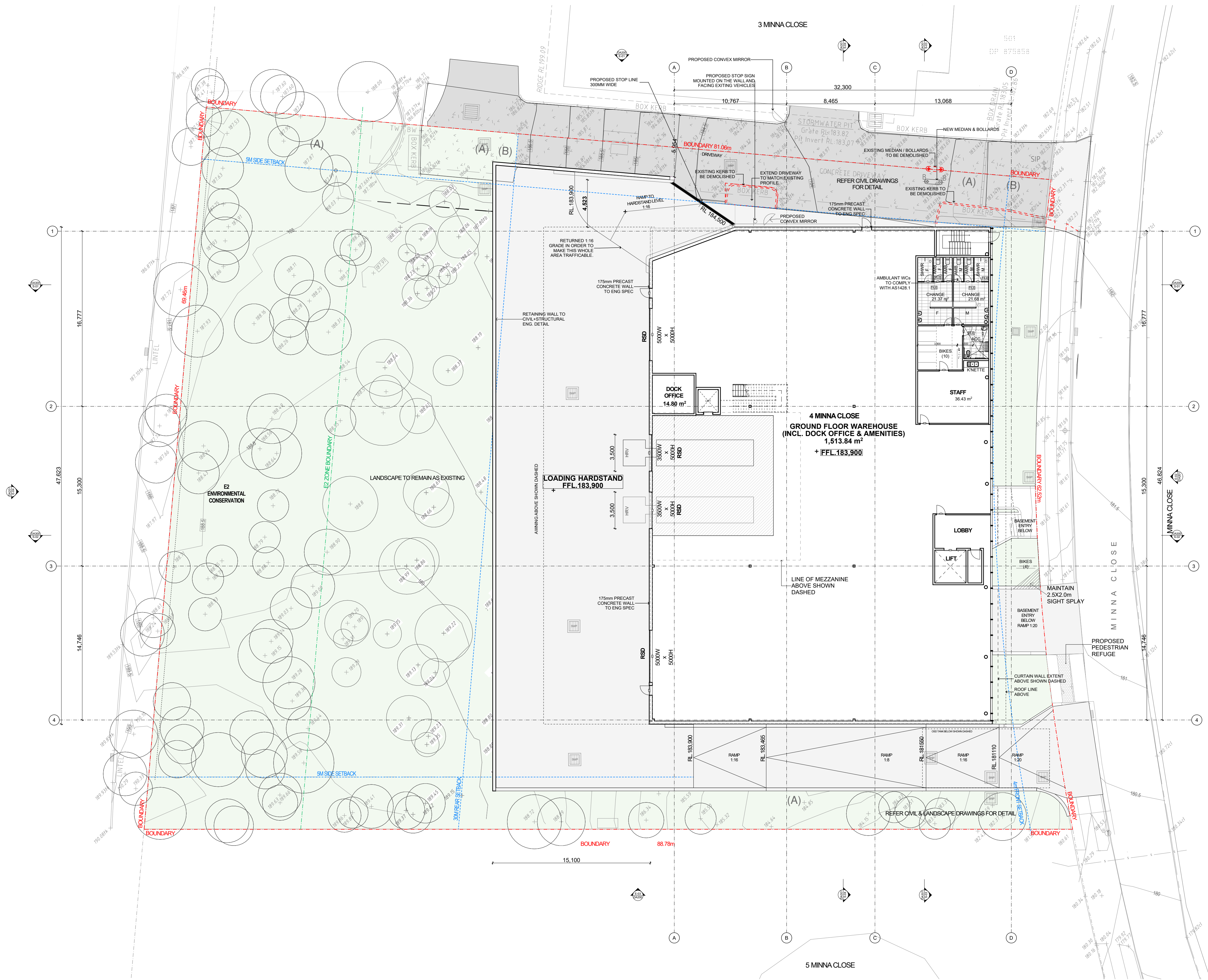
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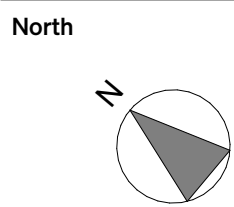
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B	24/04/2024	Issue for Council - Response to RFIs

Project:
**4 MINNA CLOSE, BELROSE
NSW 2085**

Stage:
DA



Scale @A1
1:200

Drawing title
FIRST FLOOR PLAN

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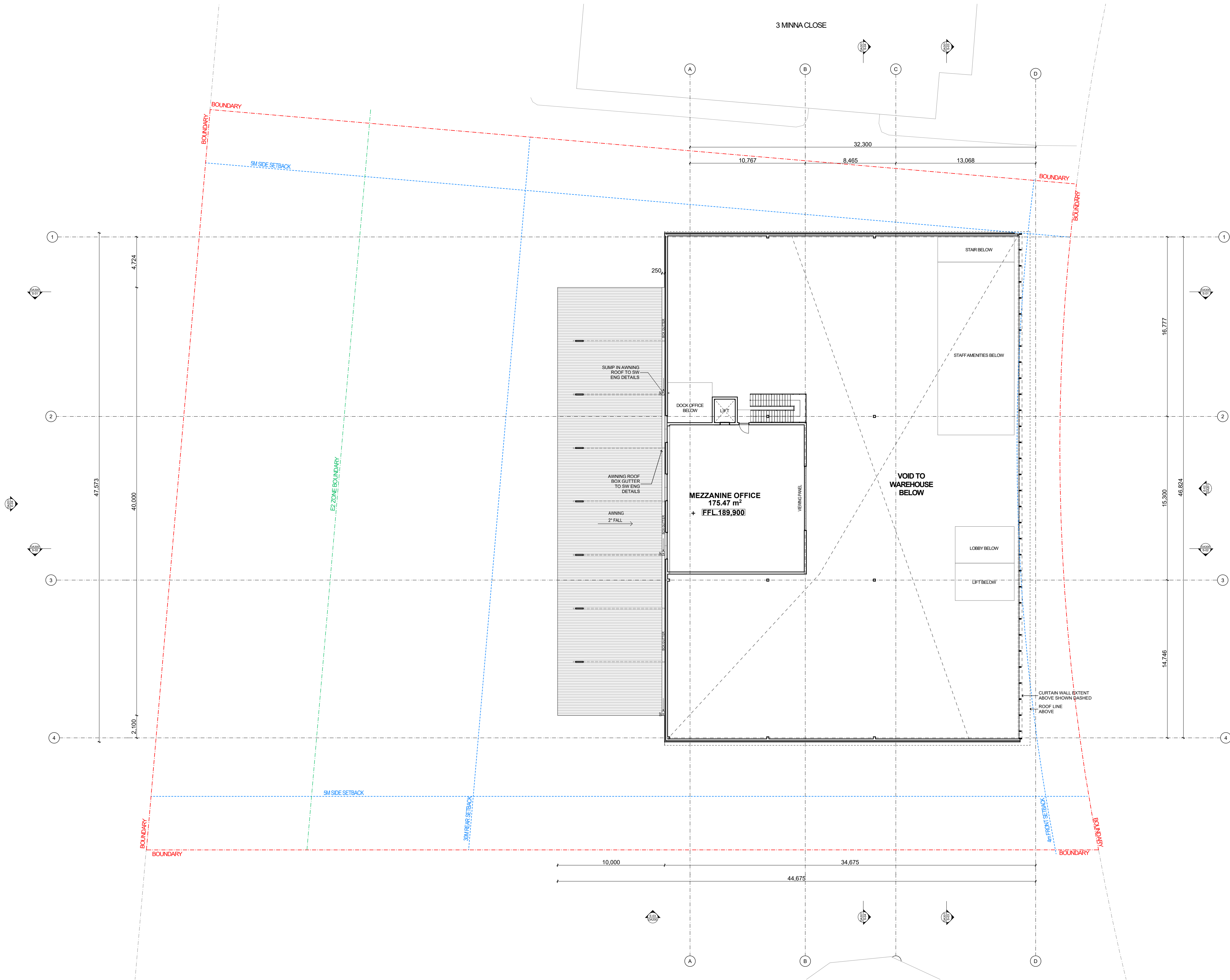
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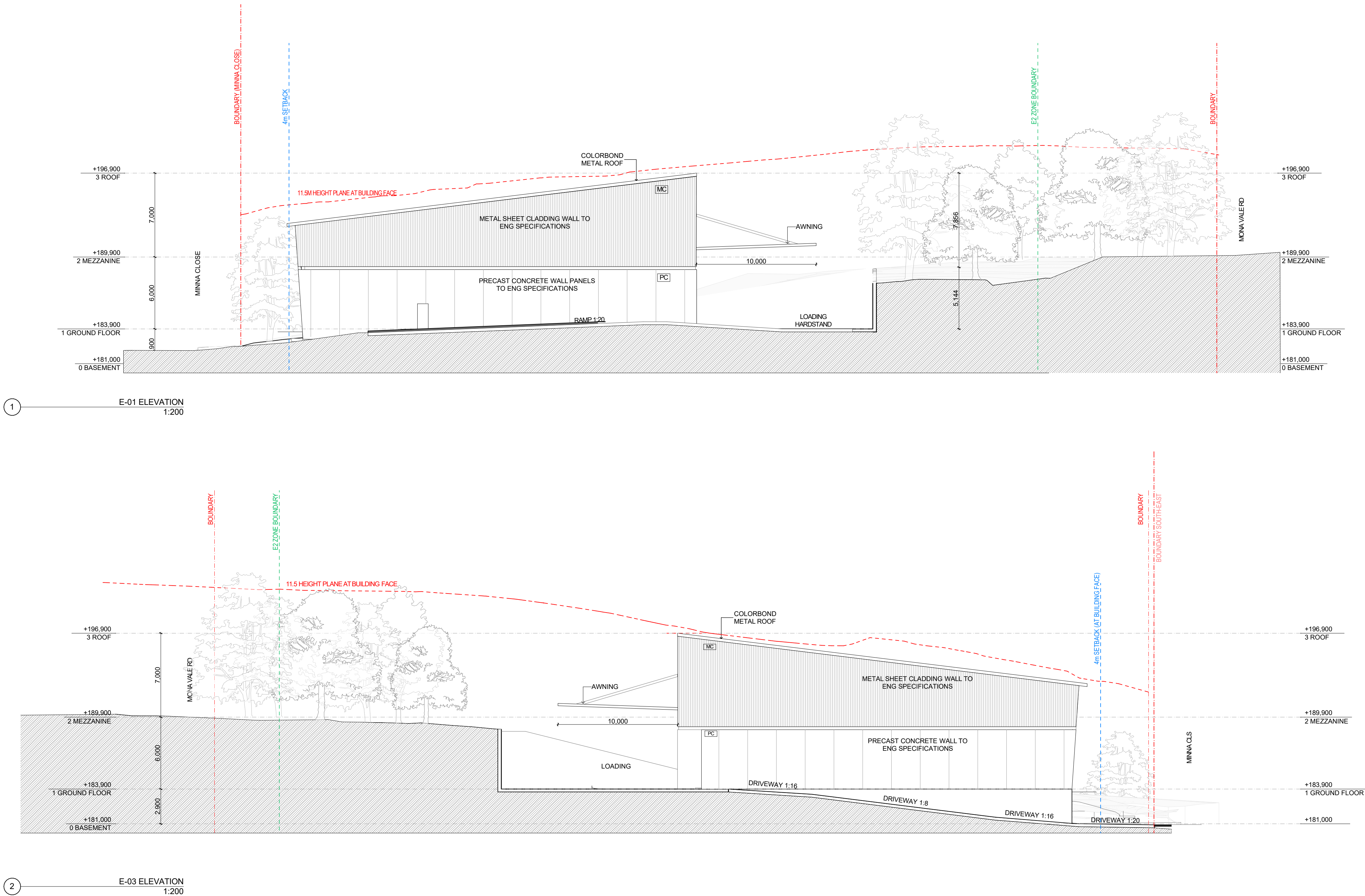
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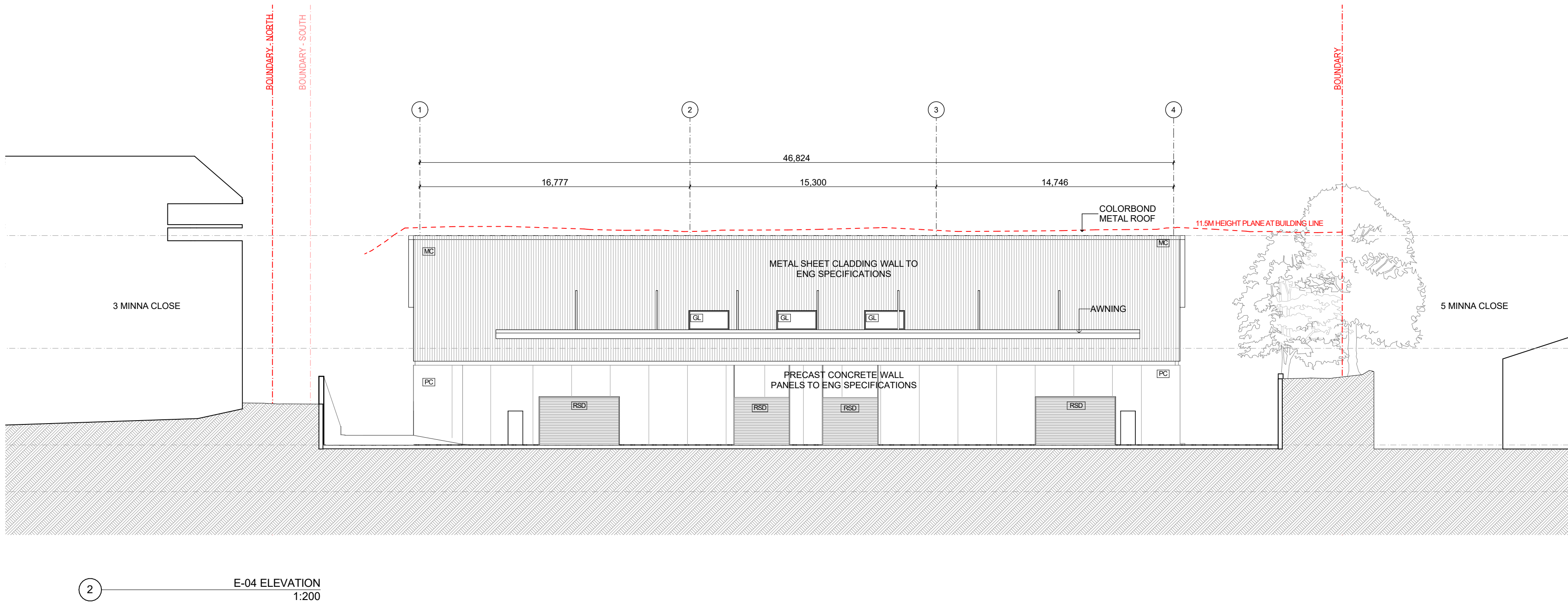
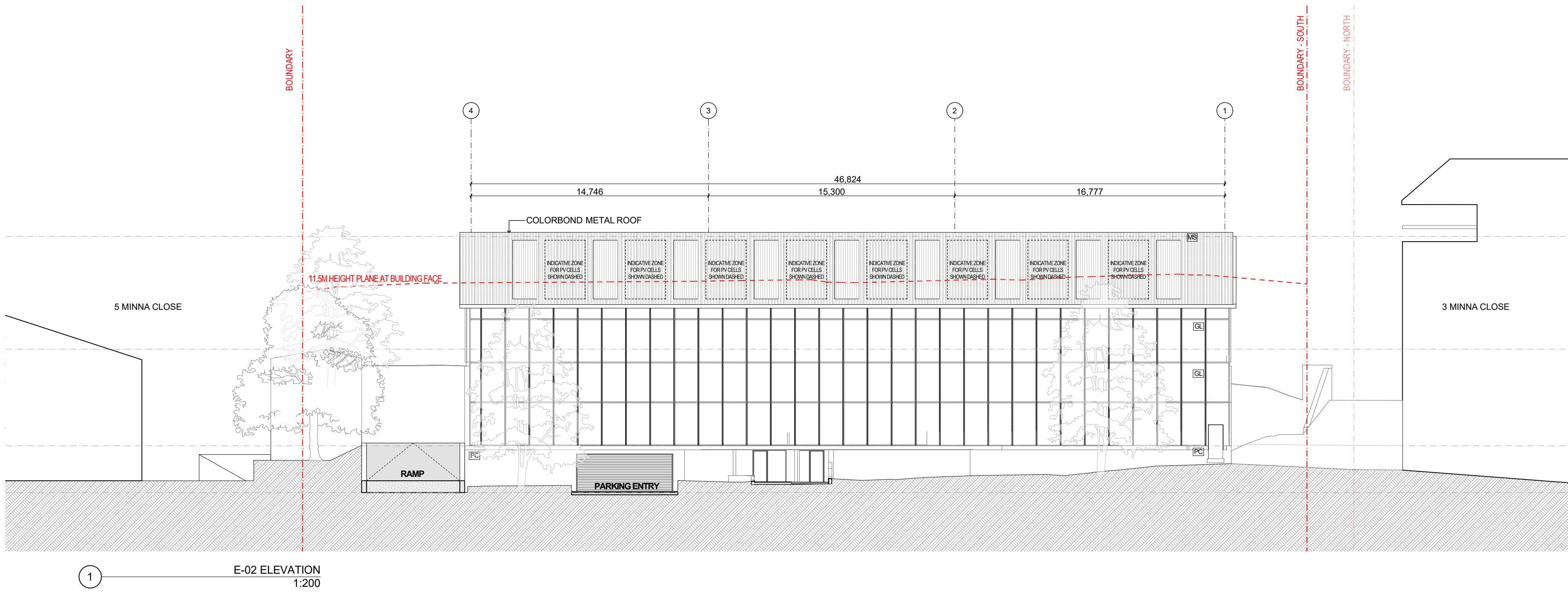
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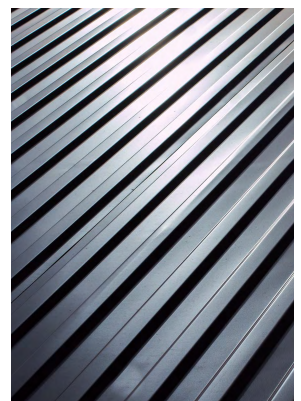




GL - GLAZING



PC - PRECAST PANEL



MS - METAL ROOF SHEETING



MC - METAL SHEET CLADDING

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Project:
**4 MINNA CLOSE, BELROSE
NSW 2085**

Stage:
DA

North

Scale @A1
1:200

Drawing title
ELEVATIONS SHEET 02

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AS	EO	SRH

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21108

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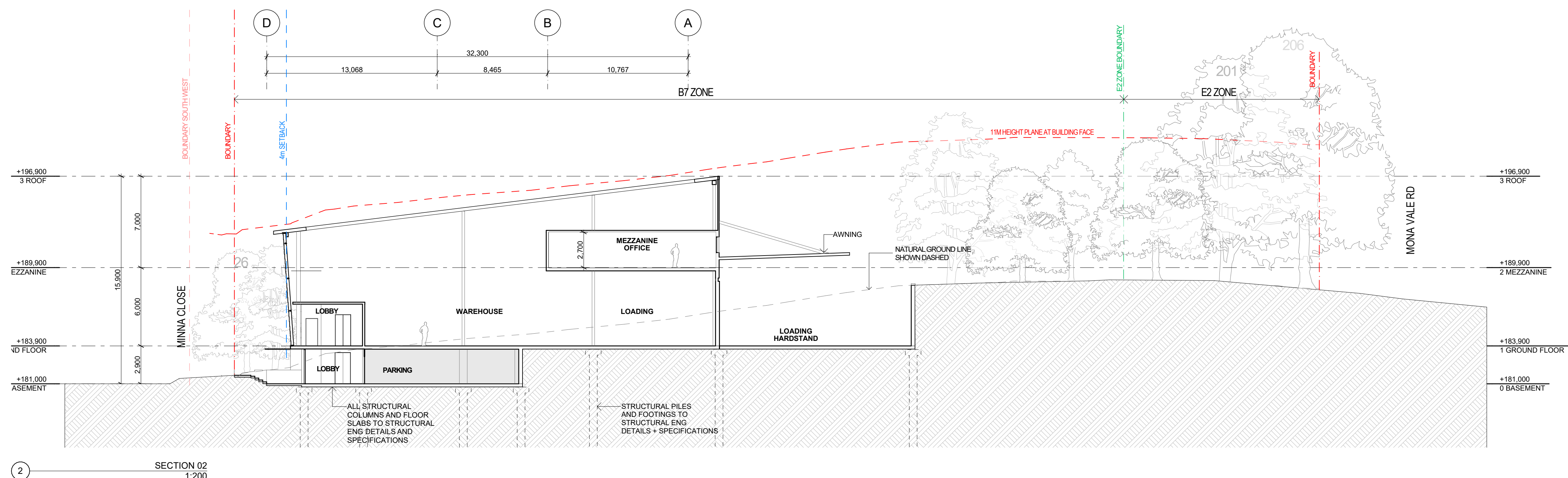
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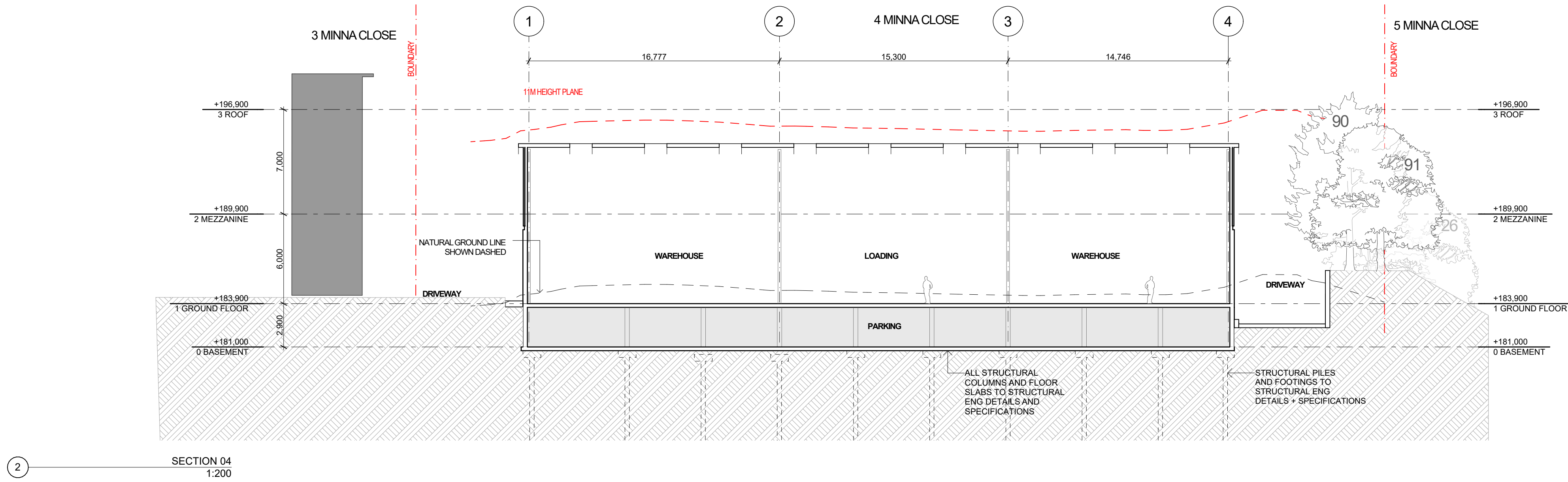
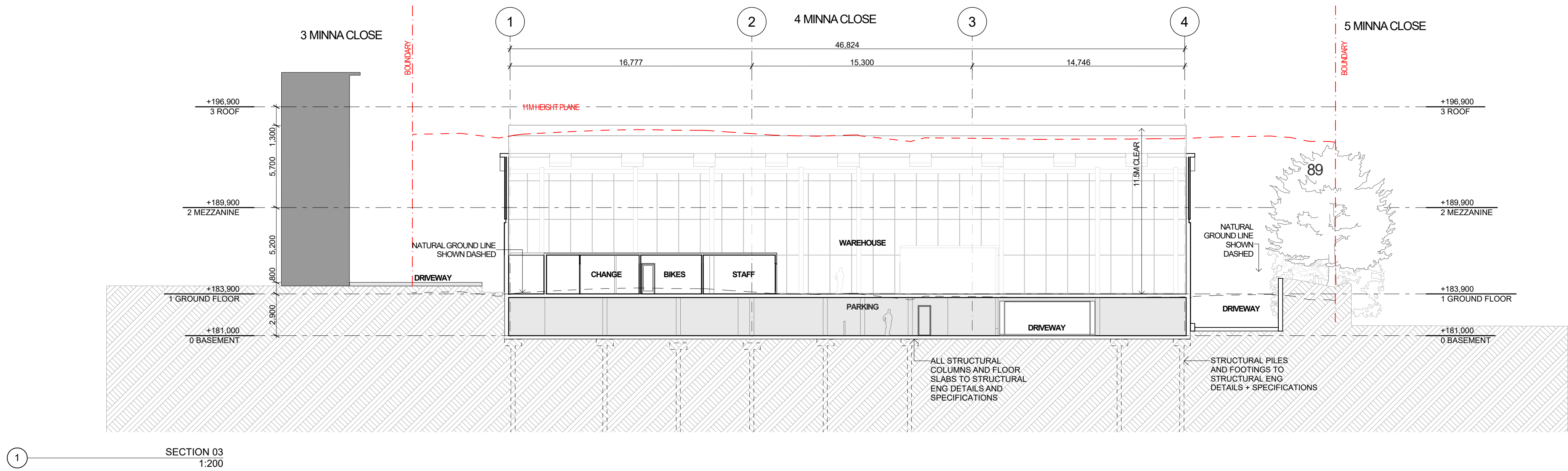


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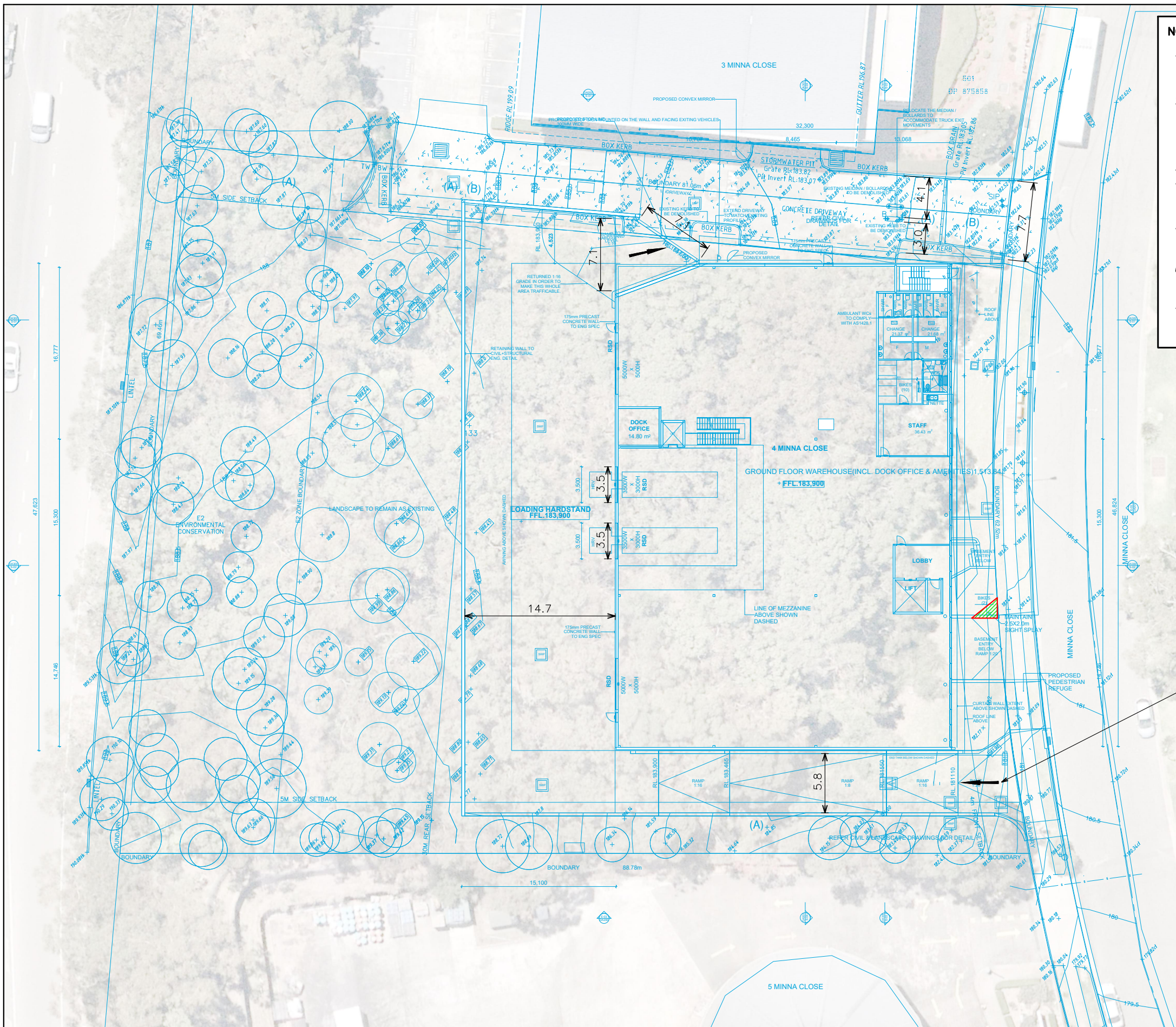
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APPENDIX 2



- NOTES:
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 2. THE SWEEP PATHS PROVIDED ON THIS PLAN HAVE BEEN GENERATED UTILISING AUTOTURN PRO VERSION 11 IN CONJUNCTION WITH VEHICLE MANOEUVRING SPECIFICATIONS IN ACCORDANCE WITH THE AUSTRALIAN STANDARD AS2890.1:2004 AND AS2890.2:2018
 3. MAXIMUM CHANGE IN GRADE FOR CARS SHOULD BE 1:8 OVER 2M
 4. A MINIMUM HEIGHT CLEARANCE OF 2.2M (TO SERVICES AND STRUCTURE) SHOULD BE PROVIDED ABOVE CIRCULATION AISLES AND PARKING SPACES.
 5. A MINIMUM HEIGHT CLEARANCE OF 2.5M (TO SERVICES AND STRUCTURE) SHOULD BE PROVIDED ABOVE DISABLED PARKING SPACES
 6. A MINIMUM HEIGHT CLEARANCE OF 4.5M (TO SERVICES AND STRUCTURE) SHOULD BE PROVIDED ABOVE SERVICE VEHICLE ACCESS ROADWAYS AND LOADING DOCKS
 7. HEIGHT CLEARANCE ABOVE A SAG CHANGE IN GRADES SHOULD BE MEASURED IN ACCORDANCE WITH FIGURE 5.3 AS2890.1-2004.

PROPOSED ENTRY ONLY DRIVEWAY



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EMAIL: info@stanburytraffic.com.au
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STANBURY TRAFFIC PLANNING
4 MINNA CLOSE BELROSE
CAR PARK COMPLIANCE REVIEW
CONCEPT LAYOUT
GROUND

SCALE 0 4.0 8.0 1:400@A3

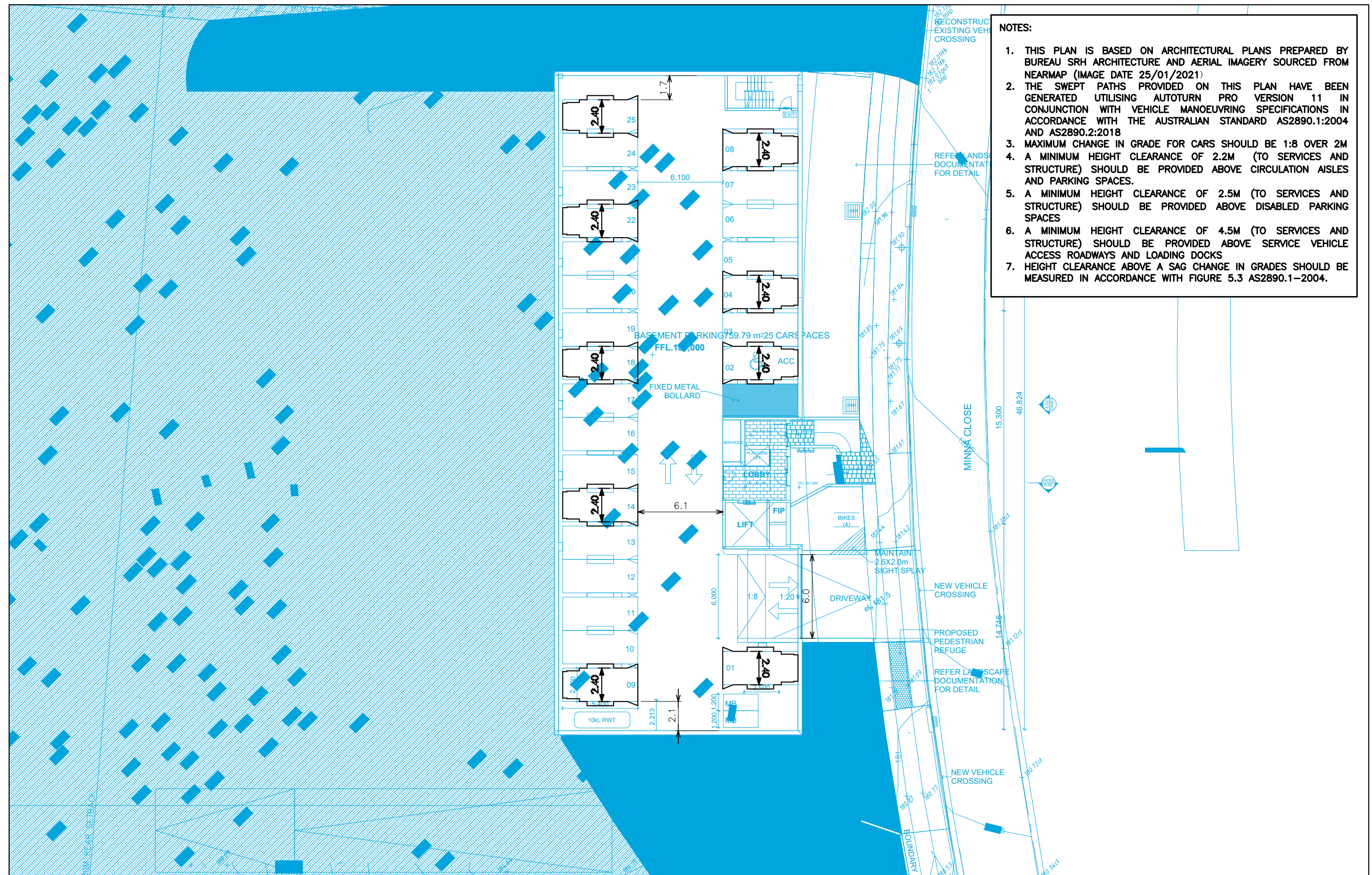
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DATE 7 May 2024

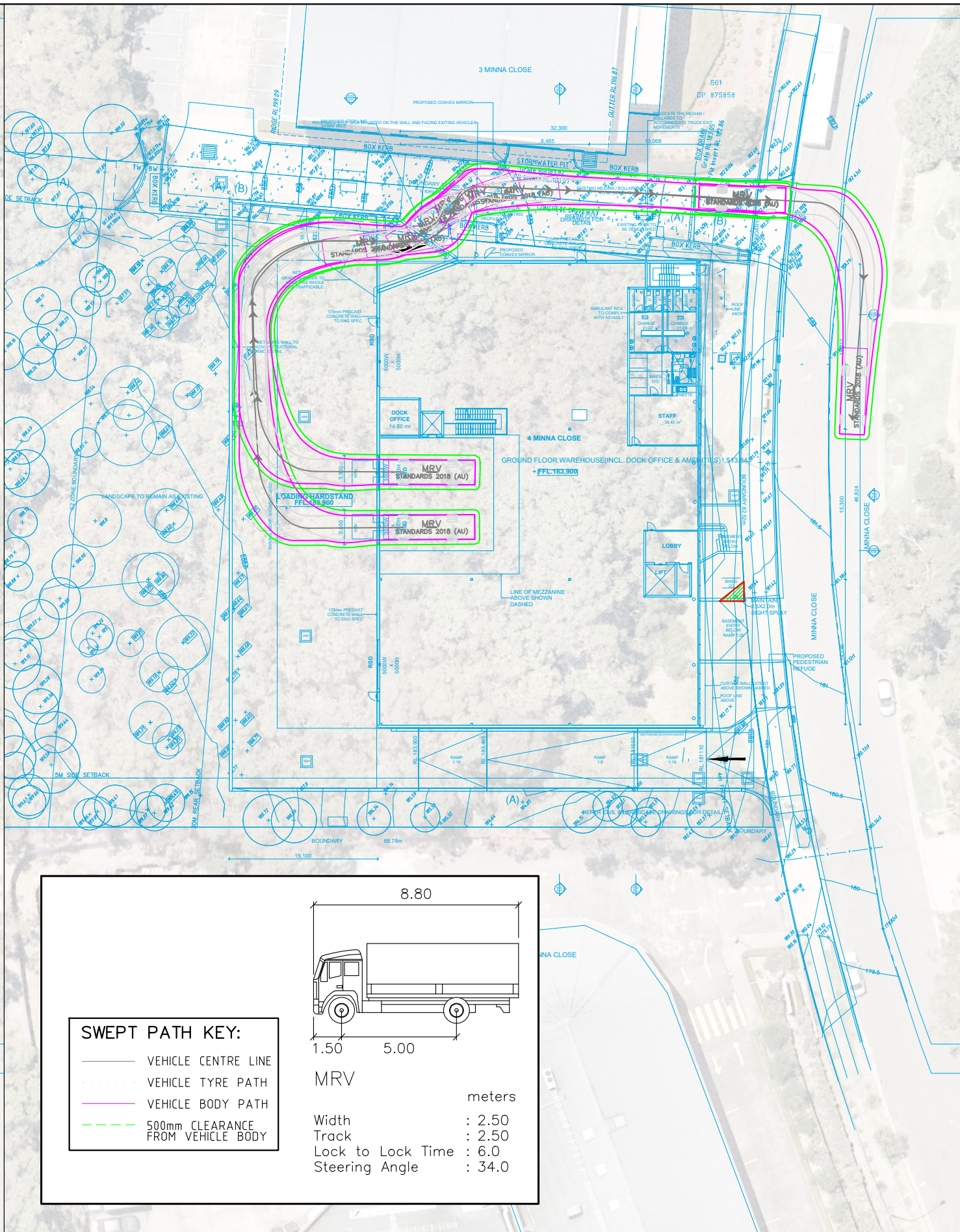
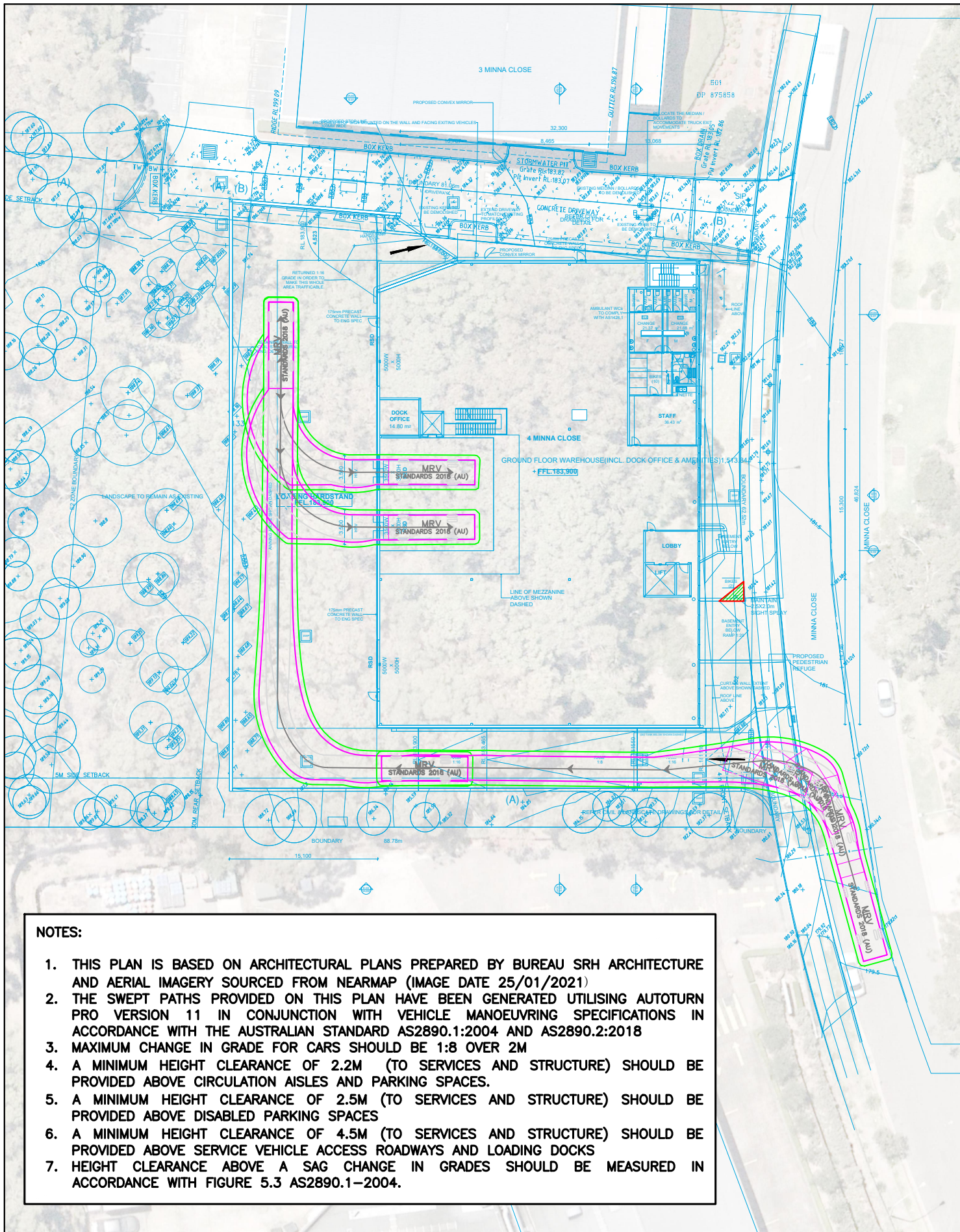
CREATED BY
Y.H

APPROVED BY
M.S

SHEET
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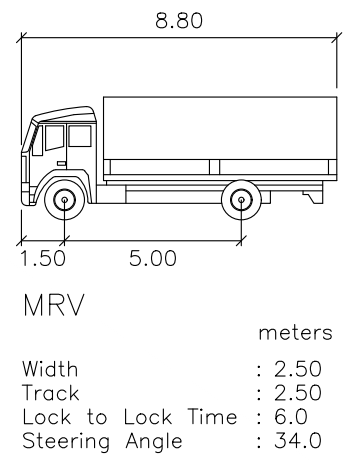
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- NOTES:**
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SWEPT PATH KEY:

- VEHICLE CENTRE LINE
- VEHICLE TYRE PATH
- VEHICLE BODY PATH
- 500mm CLEARANCE FROM VEHICLE BODY



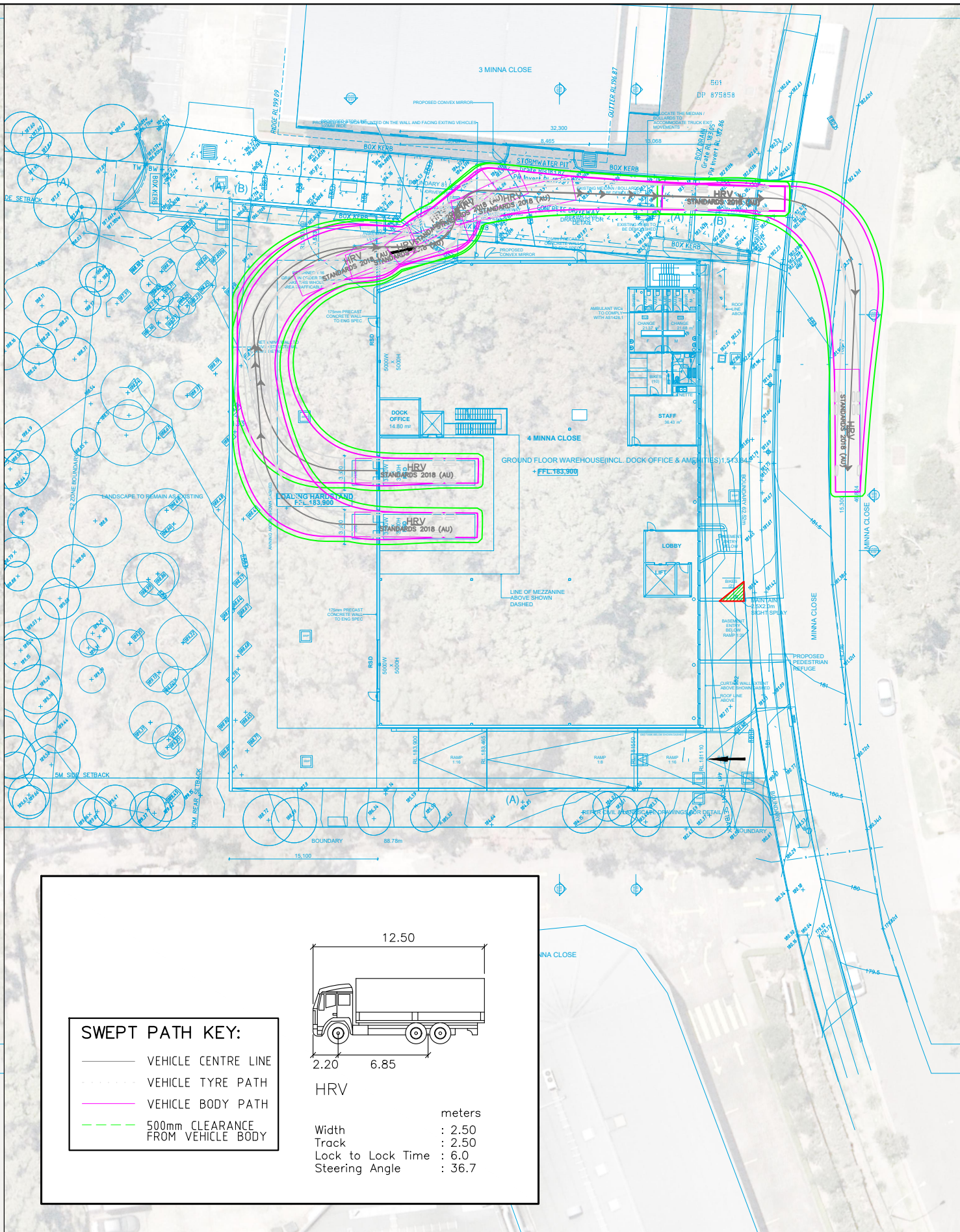
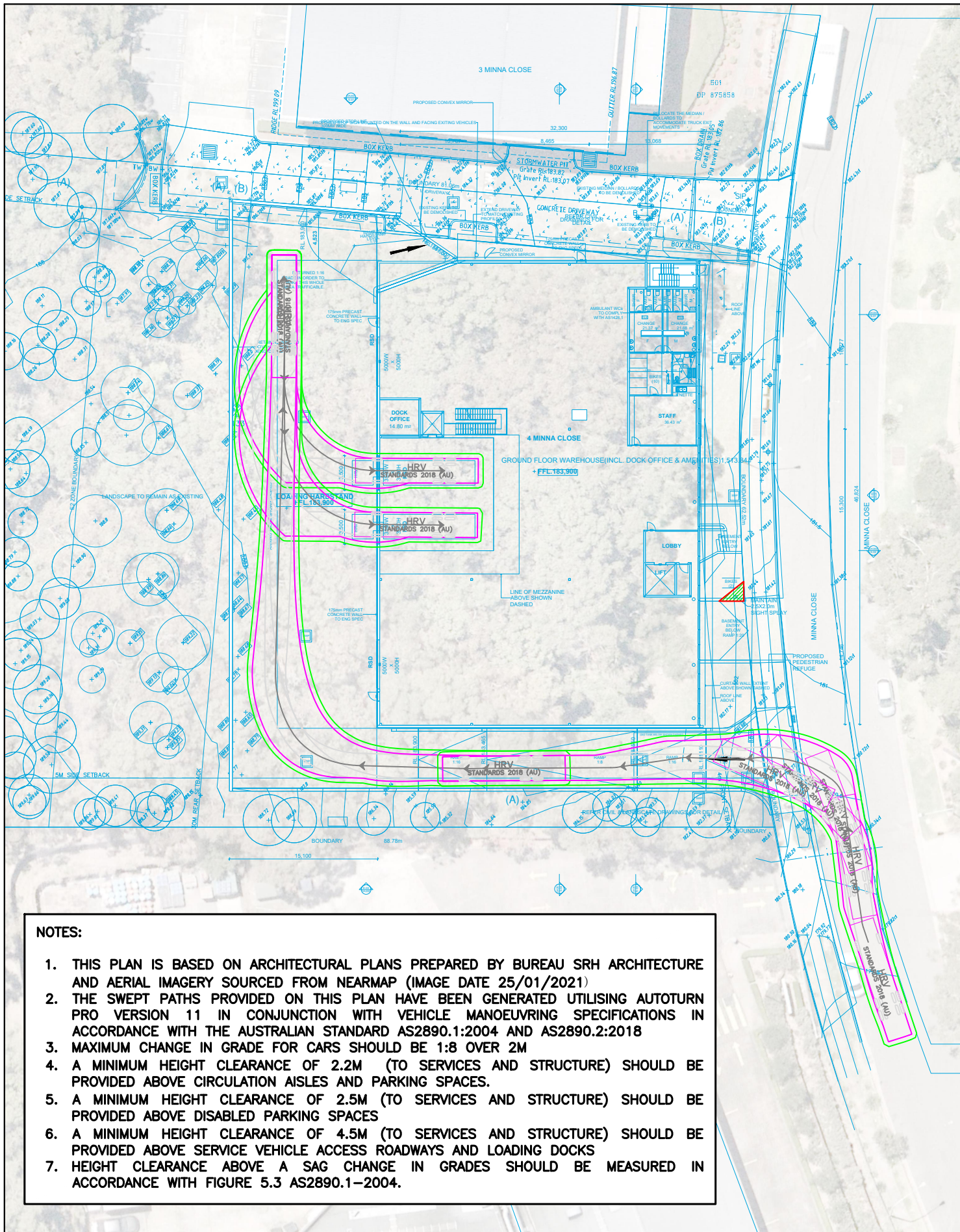
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STANBURY TRAFFIC PLANNING

4 MINNA CLOSE BELROSE
CAR PARK COMPLIANCE REVIEW
SWEPT PATH ASSESSMENT
GROUND

SCALE 0 5.0 10.0 1:500@A3
DRAWING NO. 22-003-04-V5
DATE 7 May 2024

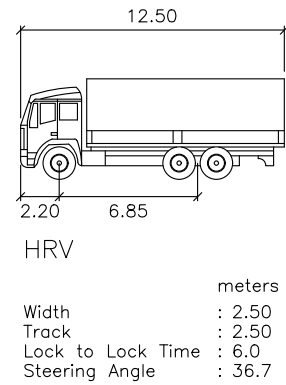
CREATED BY Y.H
APPROVED BY M.S
SHEET 03 / 07



- NOTES:**
1. THIS PLAN IS BASED ON ARCHITECTURAL PLANS PREPARED BY BUREAU SRH ARCHITECTURE AND AERIAL IMAGERY SOURCED FROM NEARMAP (IMAGE DATE 25/01/2021)
 2. THE SWEEP PATHS PROVIDED ON THIS PLAN HAVE BEEN GENERATED UTILISING AUTOTURN PRO VERSION 11 IN CONJUNCTION WITH VEHICLE MANOEUVRING SPECIFICATIONS IN ACCORDANCE WITH THE AUSTRALIAN STANDARD AS2890.1:2004 AND AS2890.2:2018
 3. MAXIMUM CHANGE IN GRADE FOR CARS SHOULD BE 1:8 OVER 2M
 4. A MINIMUM HEIGHT CLEARANCE OF 2.2M (TO SERVICES AND STRUCTURE) SHOULD BE PROVIDED ABOVE CIRCULATION AISLES AND PARKING SPACES.
 5. A MINIMUM HEIGHT CLEARANCE OF 2.5M (TO SERVICES AND STRUCTURE) SHOULD BE PROVIDED ABOVE DISABLED PARKING SPACES
 6. A MINIMUM HEIGHT CLEARANCE OF 4.5M (TO SERVICES AND STRUCTURE) SHOULD BE PROVIDED ABOVE SERVICE VEHICLE ACCESS ROADWAYS AND LOADING DOCKS
 7. HEIGHT CLEARANCE ABOVE A SAG CHANGE IN GRADES SHOULD BE MEASURED IN ACCORDANCE WITH FIGURE 5.3 AS2890.1-2004.

SWEEP PATH KEY:

- VEHICLE CENTRE LINE
- - - VEHICLE TYRE PATH
- VEHICLE BODY PATH
- - - 500mm CLEARANCE FROM VEHICLE BODY

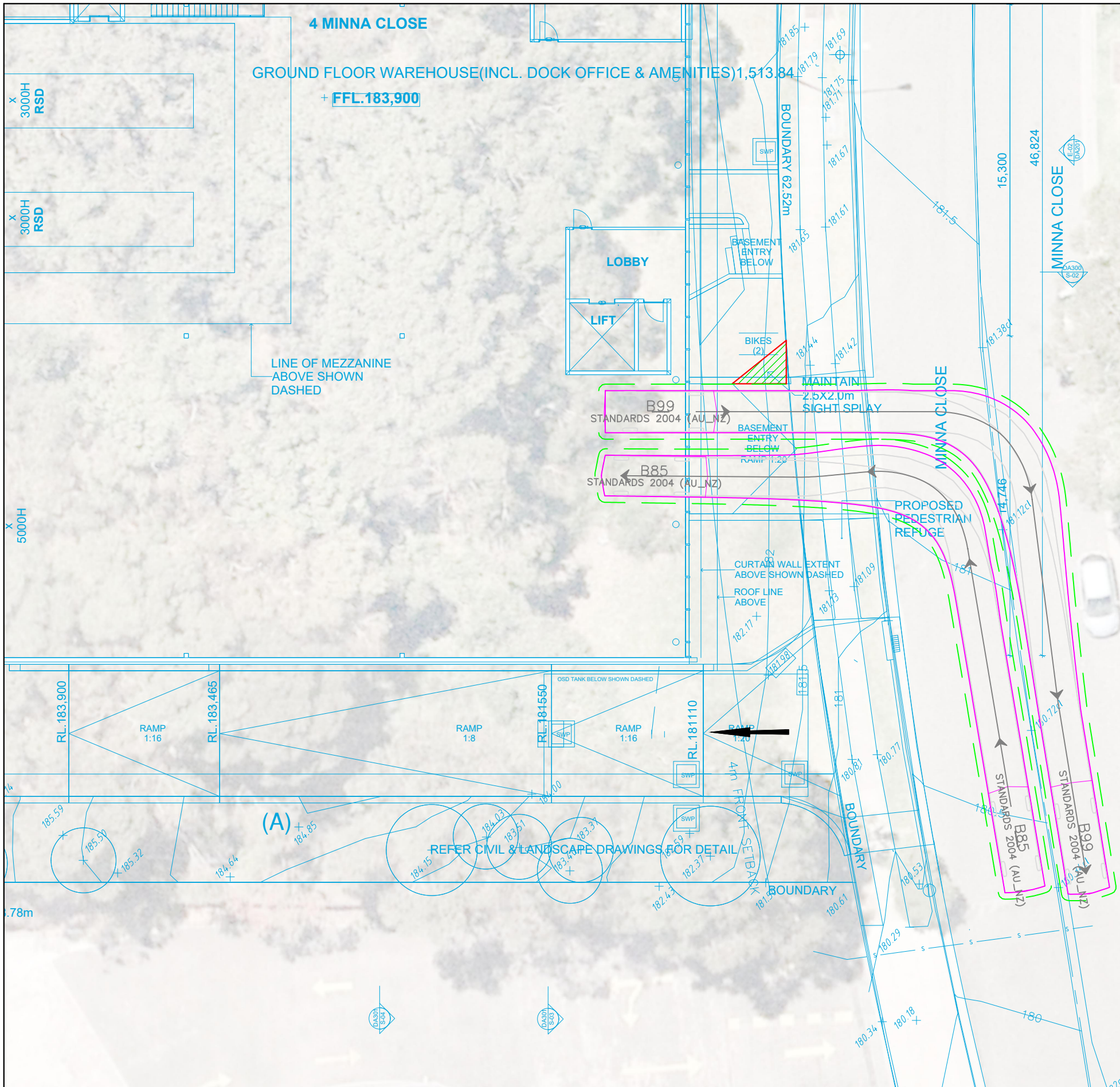


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STANBURY TRAFFIC PLANNING
4 MINNA CLOSE BELROSE
CAR PARK COMPLIANCE REVIEW
SWEEP PATH ASSESSMENT
GROUND

SCALE 0 5.0 10.0 1:500@A3
DRAWING NO. 22-003-04-V5
DATE 7 May 2024

CREATED BY Y.H
APPROVED BY M.S
SHEET 04 / 07



- NOTES:
1. THIS PLAN IS BASED ON ARCHITECTURAL PLANS PREPARED BY BUREAU SRH ARCHITECTURE AND AERIAL IMAGERY SOURCED FROM NEARMAP (IMAGE DATE 25/01/2021)
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 7. HEIGHT CLEARANCE ABOVE A SAG CHANGE IN GRADES SHOULD BE MEASURED IN ACCORDANCE WITH FIGURE 5.3 AS2890.1-2004.

B85


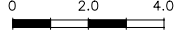
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Steering Angle	: 34.1

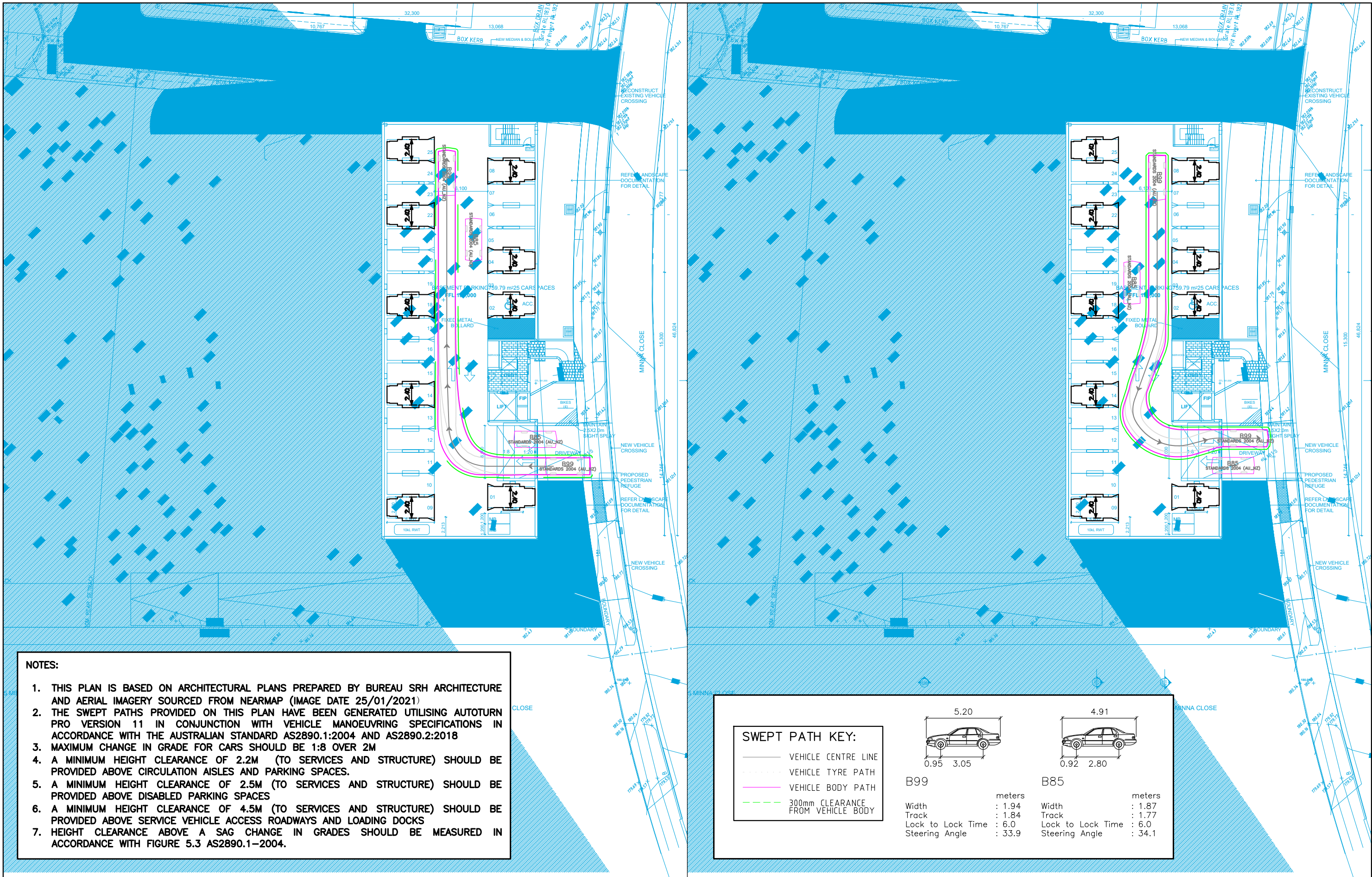
B99

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Lock to Lock Time	: 6.0
Steering Angle	: 33.9

SWEPT PATH KEY:

- VEHICLE CENTRE LINE
- - - VEHICLE TYRE PATH
- VEHICLE BODY PATH
- - - 300mm CLEARANCE FROM VEHICLE BODY

 <div>STANBURY TRAFFIC PLANNING</div> <div>TRAFFIC, PARKING & TRANSPORT CONSULTANTS</div>	ADDRESS: 401/380 HARRIS ST, PYRMONT PH: (02) 8971 8314 EMAIL: info@stanburytraffic.com.au WEBSITE: www.stanburytraffic.com.au	STANBURY TRAFFIC PLANNING		SCALE  1:200@A3	CREATED BY Y.H
		4 MINNA CLOSE BELROSE CAR PARK COMPLIANCE REVIEW SWEPT PATH ASSESSMENT GROUND		DRAWING NO. 22-003-04-V5	APPROVED BY M.S
				DATE 7 May 2024	SHEET 05 / 07



STANBURY
TRAFFIC
PLANNING

TRAFFIC, PARKING & TRANSPORT CONSULTANTS

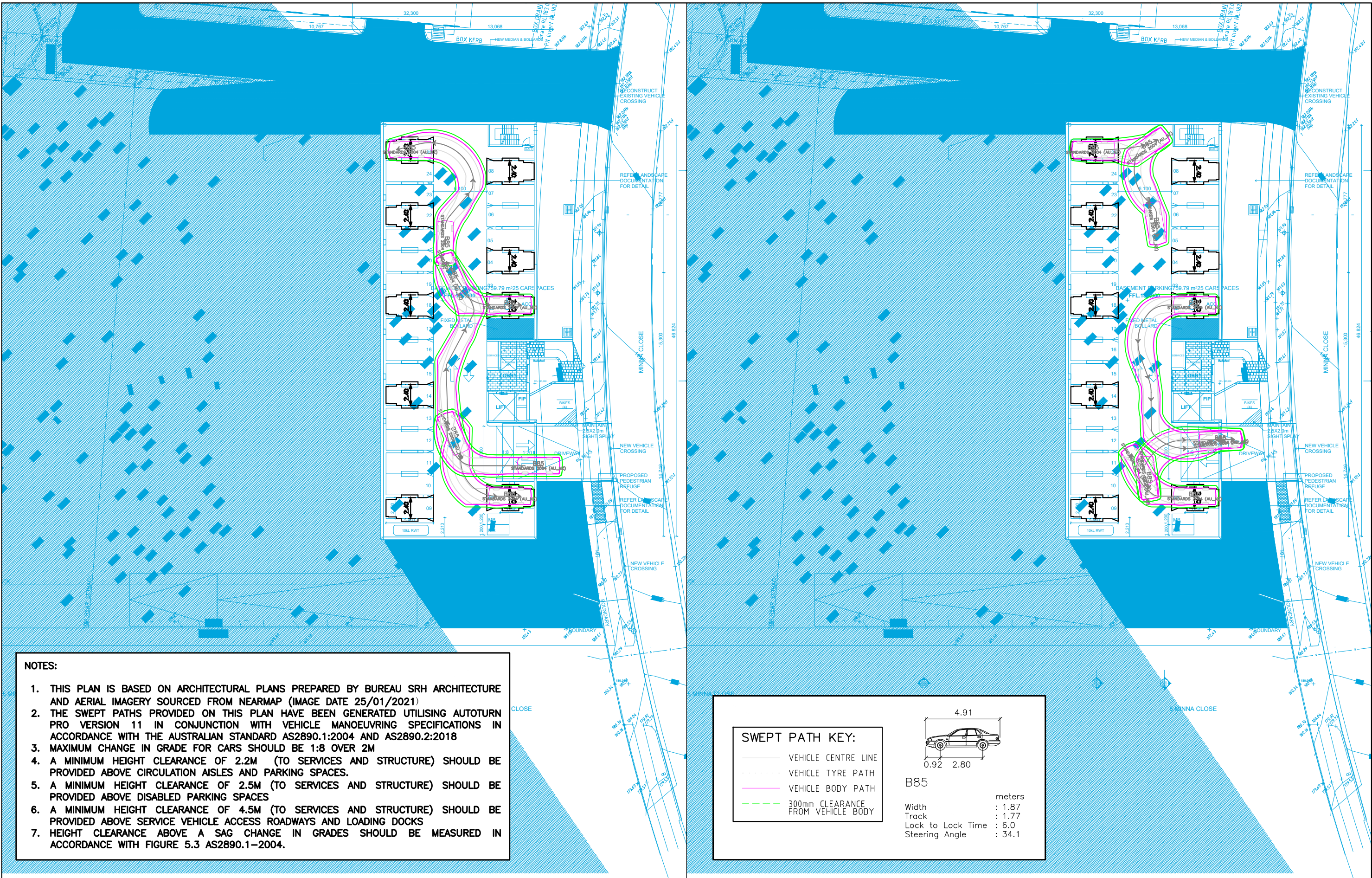
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STANBURY TRAFFIC PLANNING

4 MINNA CLOSE BELROSE CAR PARK COMPLIANCE REVIEW SWEEP PATH ASSESSMENT BASEMENT

SCALE 0 4.0 8.0 1:400@A3
DRAWING NO. 22-003-04-V5
DATE 7 May 2024

CREATED BY
Y.H
APPROVED BY
M.S
SHEET
06 / 07

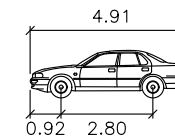


NOTES:

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7. HEIGHT CLEARANCE ABOVE A SAG CHANGE IN GRADES SHOULD BE MEASURED IN ACCORDANCE WITH FIGURE 5.3 AS2890.1-2004.

SWEEP PATH KEY:

- VEHICLE CENTRE LINE
- - - VEHICLE TYRE PATH
- VEHICLE BODY PATH
- - - 300mm CLEARANCE FROM VEHICLE BODY



B85

Width : 1.87
Track : 1.77
Lock to Lock Time : 6.0
Steering Angle : 34.1

APPENDIX 3



R.O.A.R. DATA

Reliable, Original & Authentic Results

Ph. Mob.0418-239019

Client : Stanbury Traffic Planning
Job No/Name : 7720 BELROSE Minna Close
Day/Date : Friday 29th July 2022

Intersection Layout

Obtained via satellite

May be incorrect

AM PEAK HOUR
0800 - 0900



Minna Cl

Narabang Way

	AM	PM
L	57	9
T	286	128
R	8	1

R	T	L	
2	0	6	AM
53	0	44	PM

R	T	L	
7	30		AM
221	114		PM

PM	L	T	R
9	0	17	
0	0	0	

Narabang Way

PM PEAK HOUR
1615 - 1715

Weather >>>



Development

APPENDIX 4

MOVEMENT SUMMARY

Site: 101 [Minna Close and Narabang Way - AM (Site Folder: Existing)]

Output produced by SIDRA INTERSECTION Version: 9.1.3.210

AM Existing Peak
Site Category: (None)
Roundabout

Vehicle Movement Performance															
Mov ID	Turn	Mov Class	Demand Flows		Arrival Flows		Deg. Satn	Aver. Delay	Level of Service	95% Back Of Queue		Prop. Que	Eff. Stop Rate	Aver. No. of Cycles	Aver. Speed
			[Total HV]	%	[Total HV]	%	v/c	sec		[Veh. veh	Dist]				km/h
South: Narabang Way South															
1	L2	All MCs	17	10.0	17	10.0	0.038	2.9	LOS A	0.2	1.3	0.08	0.31	0.08	36.4
2	T1	All MCs	120	10.0	120	10.0	0.086	2.2	LOS A	0.4	3.0	0.07	0.35	0.07	46.7
3	R2	All MCs	32	10.0	32	10.0	0.086	7.5	LOS A	0.4	3.0	0.07	0.36	0.07	44.6
Approach			168	10.0	168	10.0	0.086	3.3	LOS A	0.4	3.0	0.07	0.35	0.07	45.4
East: Minna Close															
4	L2	All MCs	6	10.0	6	10.0	0.006	4.2	LOS A	0.0	0.2	0.47	0.43	0.47	45.2
5	T1	All MCs	1	10.0	1	10.0	0.004	4.4	LOS A	0.0	0.1	0.50	0.52	0.50	26.8
6	R2	All MCs	2	10.0	2	10.0	0.004	9.7	LOS A	0.0	0.1	0.50	0.52	0.50	38.9
Approach			9	10.0	9	10.0	0.006	5.4	LOS A	0.0	0.2	0.48	0.46	0.48	42.5
North: Narabang Way North															
7	L2	All MCs	60	10.0	60	10.0	0.069	3.2	LOS A	0.3	2.6	0.18	0.39	0.18	43.6
8	T1	All MCs	301	10.0	301	10.0	0.215	2.3	LOS A	1.2	9.3	0.15	0.27	0.15	47.0
9	R2	All MCs	8	10.0	8	10.0	0.215	7.6	LOS A	1.2	9.3	0.15	0.27	0.15	20.5
Approach			369	10.0	369	10.0	0.215	2.6	LOS A	1.2	9.3	0.16	0.29	0.16	46.1
West: Site Driveway															
10	L2	All MCs	1	10.0	1	10.0	0.003	0.5	LOS A	0.0	0.0	0.15	0.06	0.15	23.2
11	T1	All MCs	1	10.0	1	10.0	0.003	0.3	LOS A	0.0	0.0	0.15	0.06	0.15	19.5
12	R2	All MCs	1	10.0	1	10.0	0.003	0.3	LOS A	0.0	0.0	0.15	0.06	0.15	30.1
Approach			3	10.0	3	10.0	0.003	0.4	LOS A	0.0	0.0	0.15	0.06	0.15	25.1
All Vehicles			551	10.0	551	10.0	0.215	2.8	LOS A	1.2	9.3	0.14	0.31	0.14	45.7

Site Level of Service (LOS) Method: Delay (RTA NSW). 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.

Roundabout 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.

MOVEMENT SUMMARY

Site: 101 [Minna Close and Narabang Way - PM (Site Folder: Existing)]

Output produced by SIDRA INTERSECTION Version: 9.1.3.210

PM Existing Peak
Site Category: (None)
Roundabout

Vehicle Movement Performance															
Mov ID	Turn	Mov Class	Demand Flows		Arrival Flows		Deg. Satn	Aver. Delay	Level of Service	95% Back Of Queue		Prop. Que	Eff. Stop Rate	Aver. No. of Cycles	Aver. Speed
			[Total HV]	%	[Total HV]	%	v/c	sec		[Veh. veh	Dist]				km/h
South: Narabang Way South															
1	L2	All MCs	3	10.0	3	10.0	0.061	3.3	LOS A	0.3	2.2	0.22	0.30	0.22	36.1
2	T1	All MCs	233	10.0	233	10.0	0.140	2.5	LOS A	0.7	5.5	0.20	0.29	0.20	46.8
3	R2	All MCs	7	10.0	7	10.0	0.140	7.7	LOS A	0.7	5.5	0.20	0.29	0.20	44.8
Approach			243	10.0	243	10.0	0.140	2.7	LOS A	0.7	5.5	0.20	0.29	0.20	46.6
East: Minna Close															
4	L2	All MCs	46	10.0	46	10.0	0.043	3.5	LOS A	0.2	1.7	0.35	0.41	0.35	45.6
5	T1	All MCs	1	10.0	1	10.0	0.049	3.0	LOS A	0.3	1.9	0.34	0.57	0.34	26.6
6	R2	All MCs	56	10.0	56	10.0	0.049	8.3	LOS A	0.3	1.9	0.34	0.57	0.34	38.4
Approach			103	10.0	103	10.0	0.049	6.1	LOS A	0.3	1.9	0.35	0.50	0.35	41.9
North: Narabang Way North															
7	L2	All MCs	9	10.0	9	10.0	0.011	3.1	LOS A	0.1	0.4	0.15	0.38	0.15	43.8
8	T1	All MCs	135	10.0	135	10.0	0.097	2.3	LOS A	0.5	3.9	0.13	0.26	0.13	47.2
9	R2	All MCs	1	10.0	1	10.0	0.097	7.6	LOS A	0.5	3.9	0.13	0.26	0.13	20.6
Approach			145	10.0	145	10.0	0.097	2.3	LOS A	0.5	3.9	0.13	0.27	0.13	46.9
West: Site Driveway															
10	L2	All MCs	9	10.0	9	10.0	0.027	1.1	LOS A	0.1	0.5	0.24	0.15	0.24	22.4
11	T1	All MCs	1	10.0	1	10.0	0.027	0.6	LOS A	0.1	0.5	0.24	0.15	0.24	18.9
12	R2	All MCs	18	10.0	18	10.0	0.027	0.6	LOS A	0.1	0.5	0.24	0.15	0.24	29.2
Approach			28	10.0	28	10.0	0.027	0.8	LOS A	0.1	0.5	0.24	0.15	0.24	27.1
All Vehicles			520	10.0	520	10.0	0.140	3.2	LOS A	0.7	5.5	0.21	0.32	0.21	44.7

Site Level of Service (LOS) Method: Delay (RTA NSW). 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.

Roundabout 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.

APPENDIX 5

MOVEMENT SUMMARY

Site: 101 [Minna Close and Narabang Way - AM (Site Folder: Projected - 2)]

Output produced by SIDRA INTERSECTION Version: 9.1.3.210

AM Projected Peak
Site Category: (None)
Roundabout

Vehicle Movement Performance															
Mov ID	Turn	Mov Class	Demand Flows		Arrival Flows		Deg. Satn	Aver. Delay	Level of Service	95% Back Of Queue		Prop. Que	Eff. Stop Rate	Aver. No. of Cycles	Aver. Speed
			[Total HV]	%	[Total HV]	%	v/c	sec		[Veh. veh	Dist] m				km/h
South: Narabang Way South															
1	L2	All MCs	17	10.0	17	10.0	0.039	2.9	LOS A	0.2	1.3	0.08	0.31	0.08	36.4
2	T1	All MCs	120	10.0	120	10.0	0.089	2.2	LOS A	0.4	3.2	0.07	0.36	0.07	46.6
3	R2	All MCs	36	10.0	36	10.0	0.089	7.5	LOS A	0.4	3.2	0.07	0.37	0.07	44.5
Approach			173	10.0	173	10.0	0.089	3.4	LOS A	0.4	3.2	0.07	0.35	0.07	45.3
East: Minna Close															
4	L2	All MCs	7	10.0	7	10.0	0.007	4.2	LOS A	0.0	0.3	0.47	0.43	0.47	45.2
5	T1	All MCs	1	10.0	1	10.0	0.005	4.3	LOS A	0.0	0.2	0.49	0.54	0.49	26.6
6	R2	All MCs	3	10.0	3	10.0	0.005	9.6	LOS A	0.0	0.2	0.49	0.54	0.49	38.6
Approach			12	10.0	12	10.0	0.007	5.7	LOS A	0.0	0.3	0.48	0.47	0.48	42.4
North: Narabang Way North															
7	L2	All MCs	66	10.0	66	10.0	0.077	3.3	LOS A	0.4	2.9	0.19	0.39	0.19	43.6
8	T1	All MCs	301	10.0	301	10.0	0.217	2.3	LOS A	1.2	9.4	0.17	0.28	0.17	47.0
9	R2	All MCs	8	10.0	8	10.0	0.217	7.7	LOS A	1.2	9.4	0.17	0.28	0.17	20.5
Approach			376	10.0	376	10.0	0.217	2.6	LOS A	1.2	9.4	0.17	0.30	0.17	46.0
West: Site Driveway															
10	L2	All MCs	1	10.0	1	10.0	0.003	0.5	LOS A	0.0	0.0	0.15	0.06	0.15	23.2
11	T1	All MCs	1	10.0	1	10.0	0.003	0.4	LOS A	0.0	0.0	0.15	0.06	0.15	19.5
12	R2	All MCs	1	10.0	1	10.0	0.003	0.3	LOS A	0.0	0.0	0.15	0.06	0.15	30.1
Approach			3	10.0	3	10.0	0.003	0.4	LOS A	0.0	0.0	0.15	0.06	0.15	25.1
All Vehicles			563	10.0	563	10.0	0.217	2.9	LOS A	1.2	9.4	0.15	0.32	0.15	45.6

Site Level of Service (LOS) Method: Delay (RTA NSW). 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.

Roundabout 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.

MOVEMENT SUMMARY

Site: 101 [Minna Close and Narabang Way - PM (Site Folder: Projected - 2)]

Output produced by SIDRA INTERSECTION Version: 9.1.3.210

PM Projected Peak
Site Category: (None)
Roundabout

Vehicle Movement Performance															
Mov ID	Turn	Mov Class	Demand Flows		Arrival Flows		Deg. Satn	Aver. Delay	Level of Service	95% Back Of Queue		Prop. Que	Eff. Stop Rate	Aver. No. of Cycles	Aver. Speed
			[Total HV]	%	[Total HV]	%	v/c	sec		[Veh. veh	Dist] m				km/h
South: Narabang Way South															
1	L2	All MCs	3	10.0	3	10.0	0.062	3.4	LOS A	0.3	2.2	0.23	0.30	0.23	36.1
2	T1	All MCs	233	10.0	233	10.0	0.142	2.6	LOS A	0.7	5.6	0.21	0.30	0.21	46.7
3	R2	All MCs	8	10.0	8	10.0	0.142	7.7	LOS A	0.7	5.6	0.21	0.30	0.21	44.7
Approach			244	10.0	244	10.0	0.142	2.8	LOS A	0.7	5.6	0.21	0.30	0.21	46.5
East: Minna Close															
4	L2	All MCs	51	10.0	51	10.0	0.047	3.5	LOS A	0.2	1.9	0.35	0.41	0.35	45.6
5	T1	All MCs	1	10.0	1	10.0	0.054	3.0	LOS A	0.3	2.2	0.34	0.57	0.34	26.6
6	R2	All MCs	62	10.0	62	10.0	0.054	8.4	LOS A	0.3	2.2	0.34	0.57	0.34	38.4
Approach			114	10.0	114	10.0	0.054	6.1	LOS A	0.3	2.2	0.35	0.50	0.35	41.8
North: Narabang Way North															
7	L2	All MCs	11	10.0	11	10.0	0.012	3.1	LOS A	0.1	0.4	0.15	0.38	0.15	43.8
8	T1	All MCs	135	10.0	135	10.0	0.097	2.3	LOS A	0.5	3.9	0.13	0.26	0.13	47.2
9	R2	All MCs	1	10.0	1	10.0	0.097	7.6	LOS A	0.5	3.9	0.13	0.26	0.13	20.6
Approach			146	10.0	146	10.0	0.097	2.4	LOS A	0.5	3.9	0.13	0.27	0.13	46.9
West: Site Driveway															
10	L2	All MCs	9	10.0	9	10.0	0.027	1.1	LOS A	0.1	0.5	0.25	0.15	0.25	22.4
11	T1	All MCs	1	10.0	1	10.0	0.027	0.7	LOS A	0.1	0.5	0.25	0.15	0.25	18.9
12	R2	All MCs	18	10.0	18	10.0	0.027	0.6	LOS A	0.1	0.5	0.25	0.15	0.25	29.2
Approach			28	10.0	28	10.0	0.027	0.8	LOS A	0.1	0.5	0.25	0.15	0.25	27.0
All Vehicles			533	10.0	533	10.0	0.142	3.3	LOS A	0.7	5.6	0.22	0.33	0.22	44.6

Site Level of Service (LOS) Method: Delay (RTA NSW). 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.

Roundabout 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.