

APPENDIX 5

ACOUSTIC ASSESSMENT



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Environmental Noise Assessment

Service Station
101 Chateau Avenue, Alkimos

Reference: 21076532-01

Prepared for:
LWP Capital Pty Ltd

Report: 21076532-01

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Date:	Rev	Description	Prepared By	Verified
26-Oct-21	0	Issued to Client	Matt Moyle	Terry George

Table of Contents

1	INTRODUCTION	1
2	CRITERIA	2
2.1	Vehicle Movements on Site	5
2.2	Waste Collection and Site Cleaning (Specified Works)	5
3	METHODOLOGY	6
3.1	Meteorological Information	6
3.2	Topographical Data	6
3.3	Ground Absorption	6
3.4	Source Sound Levels	7
4	RESULTS AND ASSESSMENT	9
4.1	Scenario 1 – Night L_{A10}	9
4.2	Scenario 2 – Cold Deliveries L_{A1}	11
4.3	Scenario 3 – Night L_{Amax}	13
5	RECOMMENDATIONS	14
6	CONCLUSION	14

List of Tables

Table 2-1	Adjustments for Intrusive Characteristics	3
Table 2-2	Baseline Assigned Noise Levels	3
Table 2-3	Influencing Factor – Noise Sensitive (within 100m of Marmion Ave)	4
Table 2-4	Influencing Factor – Noise Sensitive (more than 100m from Marmion Ave)	4
Table 2-5	Assigned Noise Levels	4
Table 3-1	Modelling Meteorological Conditions	6
Table 3-2	Source Sound Power Levels, dB	7
Table 4-1	Predicted Noise Levels, Scenario 1: Night, L_{A10} dB	9
Table 4-2	Predicted Noise Levels, Scenario 2: L_{A1} dB	11
Table 4-3	Predicted Noise Levels, Scenario 3: Night, L_{Amax} dB	13

List of Figures

Figure 1-1 Site Locality _____ 1

Figure 1-2 Development Site Layout _____ 2

Figure 3-1 2D Image of Noise Model _____ 8

Figure 4-1 Scenario 1: Night L_{A10} Noise Contour Plot _____ 10

Figure 4-2 Scenario 2: Cold Delivery L_{A1} Noise Contour Plot _____ 12

Appendices

- A Site Plans
- B Terminology

1 INTRODUCTION

Lloyd George Acoustics was commissioned by LWP Capital Pty Ltd to undertake a noise assessment for a proposed service station development at Lot 9062 (2561) Marmion Avenue, Alkimos (subject site) – refer *Figure 1-1*. The store is part of a commercial development which includes a restaurant on the adjacent site (separate application by others).

While other commercial aspects are planned in the future (refer site plan in *Figure 1-2*), the assessment addresses the noise aspects of the service station only. Indicative buildings for other future commercial sites were included in the model.

The most critical noise sensitive premises identified in this assessment are existing and future residences to the east, south and north.

Noise sources considered were those associated with mechanical plant, the air servicing equipment, vehicles and fuel bowsers. Noise from these items was assessed against the prescribed standards of the *Environmental Protection (Noise) Regulations 1997* by way of noise modelling.

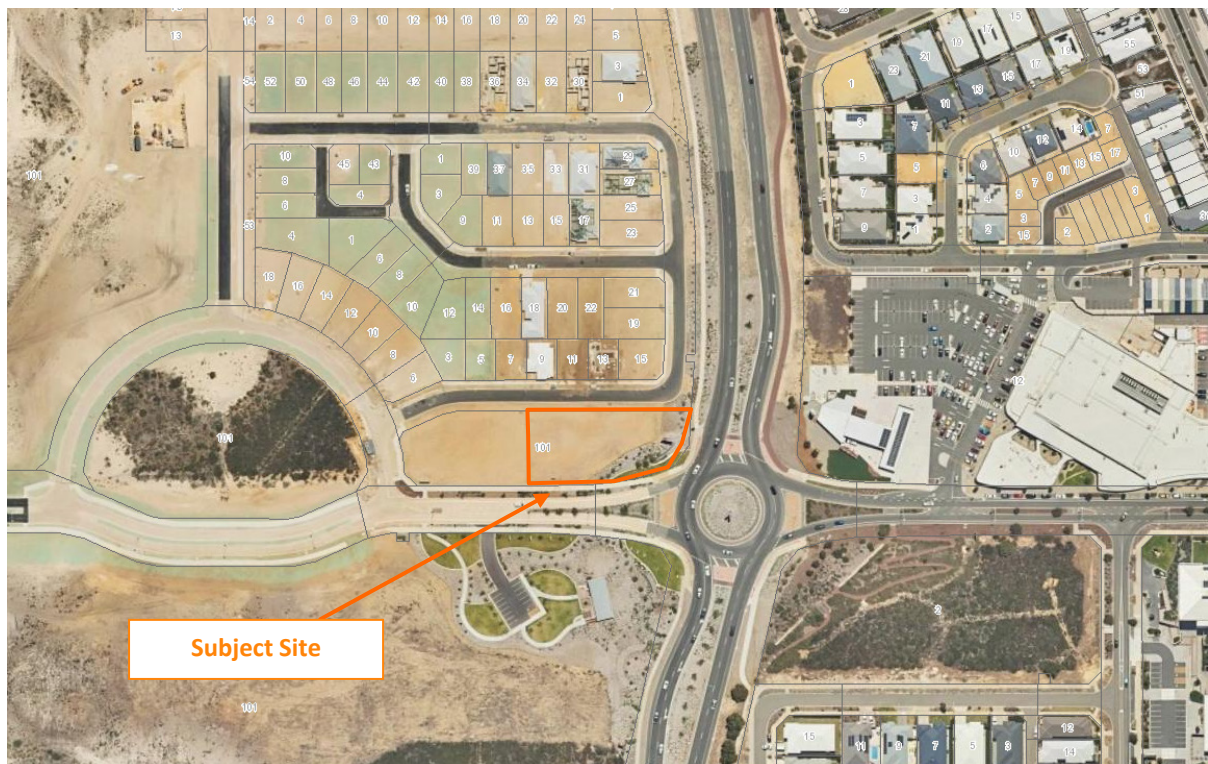


Figure 1-1 Site Locality

The service station is proposed to operate 24 hours a day, 7-days a week. The site layout of the service station is depicted in *Figure 1-2*.

Site drawings used in this assessment are included in *Appendix A*.

Appendix B contains a description of some of the terminology used throughout this report.

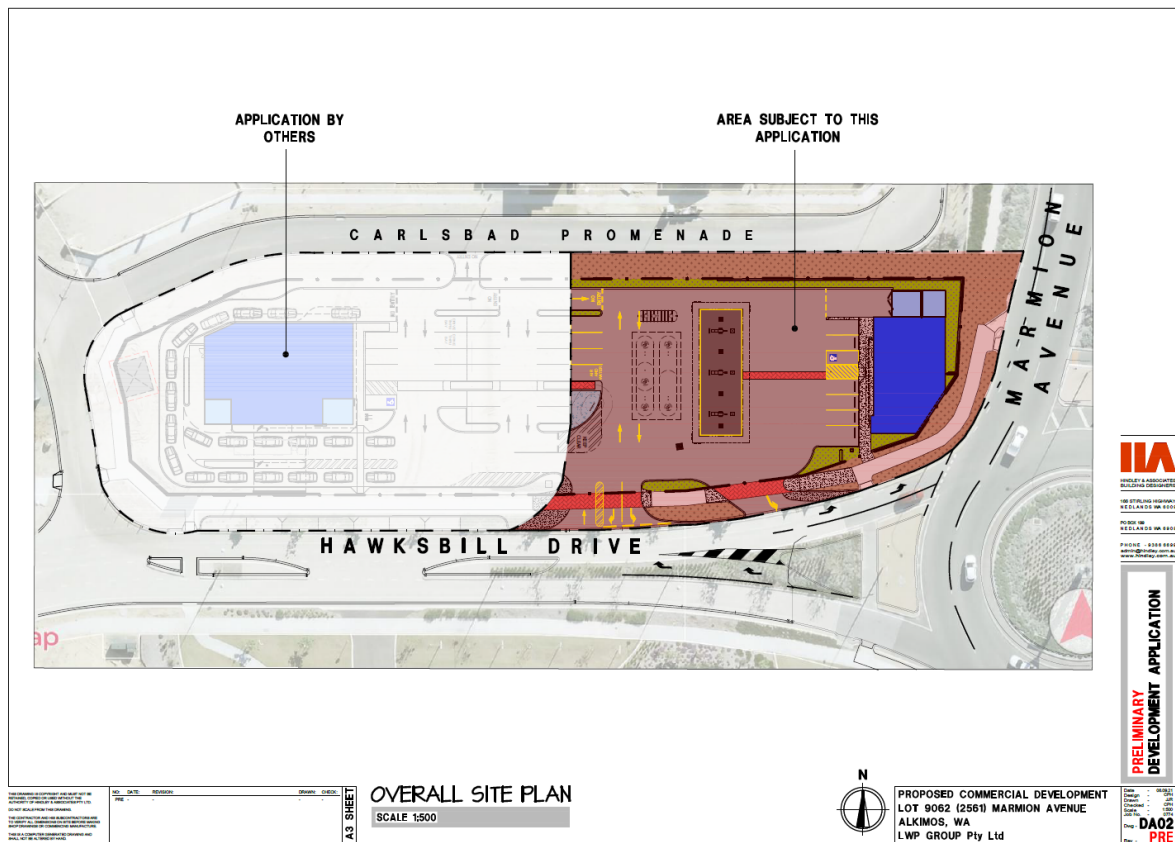


Figure 1-2 Development Site Layout

2 CRITERIA

Environmental noise in Western Australia is governed by the *Environmental Protection Act 1986*, through the *Environmental Protection (Noise) Regulations 1997* (the Regulations).

Regulation 7 defines the prescribed standard for noise emissions as follows:

“7. (1) Noise emitted from any premises or public place when received at other premises –

- a) must not cause or significantly contribute to, a level of noise which exceeds the assigned level in respect of noise received at premises of that kind; and
- b) Must be free of:
 - i. Tonality;
 - ii. Impulsiveness; and
 - iii. Modulation”.

A “...noise emission is taken to *significantly contribute to* a level of noise if the noise emission exceeds a value which is 5 dB below the assigned level...”

Tonality, impulsiveness and modulation are defined in Regulation 9. Noise is to be taken to be free of these characteristics if:

- a) The characteristics cannot be reasonably and practicably removed by techniques other than attenuating the overall level of noise emission; and
- b) The noise emission complies with the standard after the adjustments of *Table 2-1* are made to the noise emission as measured at the point of reception.

Table 2-1 Adjustments for Intrusive Characteristics

Tonality	Modulation	Impulsiveness
+ 5 dB	+ 5 dB	+ 10 dB

Note: The above are cumulative to a maximum of 15dB.

The baseline assigned levels (prescribed standards) are specified in Regulation 8 and are shown in *Table 2-2*.

Table 2-2 Baseline Assigned Noise Levels

Premises Receiving Noise	Time of Day	Assigned Level (dB)		
		L _{A10}	L _{A1}	L _{Amax}
Noise sensitive premises: highly sensitive area	0700 to 1900 hours Monday to Saturday (Day)	45 + influencing factor	55 + influencing factor	65 + influencing factor
	0900 to 1900 hours Sunday and public holidays (Sunday)	40 + influencing factor	50 + influencing factor	65 + influencing factor
	1900 to 2200 hours all days (Evening)	40 + influencing factor	50 + influencing factor	55 + influencing factor
	2200 hours on any day to 0700 hours Monday to Saturday and 0900 hours Sunday and public holidays (Night)	35 + influencing factor	45 + influencing factor	55 + influencing factor
Commercial	All hours	60	75	80
Industrial	All hours	65	80	90

1. **highly sensitive area** means that area (if any) of noise sensitive premises comprising —
- (a) a building, or a part of a building, on the premises that is used for a noise sensitive purpose; and
 - (b) any other part of the premises within 15 metres of that building or that part of the building;

As per the local structure plan, the subject site is amongst a commercial zoned area with commercial uses nominated to the south. The remaining areas are noted to be residential use or public open space. It is noted that both residential and commercial premises are planned to the south as part of the local structure plan and these have been included as such in the assessment.

An influencing factor of between 3 dB and 7 dB has been calculated for the nearest noise sensitive premises, based on a transport factor of 2 and 6 dB for premises within 450m or 100m of Marmion

Avenue (Major Road with 23,100 vpd in 2018 – Main Roads Count Site 51834). Furthermore, 1 dB has been determined applicable from nearby commercial land uses – refer *Table 2-3* and *Table 2-4*.

Table 2-3 Influencing Factor – Noise Sensitive (within 100m of Marmion Ave)

Description	Within 100 metre Radius	Within 450 metre Radius	Total
Commercial Land	0.7 dB (14%)	0.2 dB (4%)	1 dB
Major Road	6 dB	-	6 dB
Total			7 dB

Table 2-4 Influencing Factor – Noise Sensitive (more than 100m from Marmion Ave)

Description	Within 100 metre Radius	Within 450 metre Radius	Total
Commercial Land	0.7 dB (14%)	0.2 dB (4%)	1 dB
Major Road	-	2 dB	2 dB
Total			3 dB

Table 2-5 shows the assigned noise levels including the influencing factor at the receiving locations.

Table 2-5 Assigned Noise Levels

Premises Receiving Noise	Time of Day	Assigned Level (dB)		
		LA10	LA1	L _{Amax}
Residences within 100m of Marmion Ave	0700 to 1900 hours Monday to Saturday (Day)	52	62	72
	0900 to 1900 hours Sunday and public holidays (Sunday)	47	57	72
	1900 to 2200 hours all days (Evening)	47	57	62
	2200 hours on any day to 0700 hours Monday to Saturday and 0900 hours Sunday and public holidays (Night)	42	52	62
Nearest Residences more than 100m from Marmion Ave	0700 to 1900 hours Monday to Saturday (Day)	48	58	68
	0900 to 1900 hours Sunday and public holidays (Sunday)	43	53	68
	1900 to 2200 hours all days (Evening)	43	53	58
	2200 hours on any day to 0700 hours Monday to Saturday and 0900 hours Sunday and public holidays (Night)	38	48	58
Commercial	All hours	60	75	80

1. **highly sensitive area** means that area (if any) of noise sensitive premises comprising –
- a building, or a part of a building, on the premises that is used for a noise sensitive purpose; and
 - any other part of the premises within 15 metres of that building or that part of the building.

It must be noted the assigned noise levels apply outside the receiving premises and at a point at least 3 metres away from any substantial reflecting surfaces.

It is further noted the assigned noise levels are statistical levels and therefore the period over which they are determined is important. The Regulations define the Representative Assessment Period (RAP) as *a period of time of not less than 15 minutes, and not exceeding 4 hours*, which is determined by an *inspector or authorised person* to be appropriate for the assessment of a noise emission, having regard to the type and nature of the noise emission. An *inspector or authorised person* is a person appointed under Sections 87 & 88 of the *Environmental Protection Act 1986* and include Local Government Environmental Health Officers and Officers from the Department of Environment Regulation. Acoustic consultants or other environmental consultants are not appointed as an *inspector or authorised person*. Therefore, whilst this assessment is based on a 4 hour RAP, which is assumed to be appropriate given the nature of the operations, this is to be used for guidance only.

2.1 Vehicle Movements on Site

Regulation 3 states the following with regards to vehicles:

- (1) *Nothing in these regulations applies to the following noise emissions —*
 - (a) *noise emissions from the propulsion and braking systems of motor vehicles operating on a road;*

The service station and carpark are considered to be a road and therefore vehicle noise (propulsion and braking) is not strictly assessed. Noise from vehicle doors and truck mounted condensers still require assessment, as they do not form part of the propulsion or braking systems.

It is understood that bulk refuelling is gravity fed (no pump) with the tanker engine turned off. This activity is not assessed, as noise impact is considered negligible.

2.2 Waste Collection and Site Cleaning (Specified Works)

Regulation 14A provides requirements for such activities as the collection of waste, landscaped area maintenance and car park cleaning. Such activities can also be exempt from having to comply with regulation 7, provided they are undertaken in accordance with regulation 14A(2) as follows:

- during daytime hours, defined as:
 - 7.00am to 7.00pm Monday to Saturday (excluding public holiday), or
 - 9.00am to 7:00pm on a Sunday or public holiday
- in the quietest reasonable and practicable manner and using the quietest equipment reasonably available.

In the case where specified works are to be carried outside daytime hours and their noise emissions are likely not to comply with regulation 7, the works also need to be carried out according to a Noise Management Plan which has been approved by the local government authority CEO.

3 METHODOLOGY

Computer modelling was undertaken, using the software *SoundPLAN 8.1* with the ISO 9613 algorithms (ISO 17354 compliant) selected. These algorithms have been selected as they include the influence of wind. Input data required in the model are:

- Meteorological Information;
- Topographical data;
- Ground Absorption; and
- Source sound power levels.

3.1 Meteorological Information

Meteorological information utilised is provided in *Table 3-1* and is considered to represent worst-case conditions for noise propagation. At wind speeds greater than those shown, sound propagation may be further enhanced, however background noise from the wind itself and from local vegetation is likely to be elevated and dominate the ambient noise levels.

Table 3-1 Modelling Meteorological Conditions

Parameter	Day (0700-1900)	Night (1900-0700)
Temperature (°C)	20	15
Humidity (%)	50	50
Wind Speed (m/s)	Up to 5m/s	Up to 5m/s
Wind Direction*	All	All

* Note that the modelling package used allows for all wind directions to be modelled simultaneously.

It is generally considered that compliance with the assigned noise levels needs to be demonstrated for 98% of the time, during the day and night periods, for the month of the year in which the worst-case weather conditions prevail. In most cases, the above conditions occur for more than 2% of the time and therefore must be satisfied.

3.2 Topographical Data

Topographical data was adapted from *Google*, Streetview images and proposed plans. Existing buildings have also been included as these can provide barrier attenuation when located between a source and receiver, much the same as a hill, as well as also providing reflection paths. Parapets are assumed to be 1.2-metres higher than the roof. An enclosed plant is modelled as per plans provided.

3.3 Ground Absorption

Ground absorption varies from a value of 0 to 1, with 0 being for an acoustically reflective ground (e.g. water or bitumen) and 1 for acoustically absorbent ground (e.g. grass). A value of 0.1 has been used for road and service station areas, and 0.6 has been used for the remaining areas.

3.4 Source Sound Levels

Note that as the development is at DA stage, the various plant selections are of a generic nature based on similar projects. A detailed review of these elements should be carried out prior to building permit stage when final selection of plant is known. The sound power levels used in the modelling are provided in *Table 3-2*.

Table 3-2 Source Sound Power Levels, dB

Description	Octave Band Centre Frequency (Hz)								Overall dB(A)
	63	125	250	500	1k	2k	4k	8k	
Fuel Bowser x 4	-	65	68	65	67	65	59	50	71
Air Service Alarm - L _{max}	-	-	-	-	-	91	96	92	99
Exhaust Fan x 2	72	70	64	61	53	53	51	45	63
Toilet Exhaust Fan	-	61	67	61	64	60	52	46	67
2 x Actron 25kW Condensers	-	77	75	72	70	67	62	56	75
Pulford Silenced Compressor	73	72	75	71	67	63	59	51	73
Ice Box Compressor	51	61	61	63	63	59	56	47	68
Car Door Closings – L _{Amax}	71	74	77	81	80	78	72	61	84
Refrigerated Truck delivery – L _{A1}	100	91	87	88	83	81	79	75	90

With regards to the above, please note the following:

- The majority of noise sources are assumed to be present for more than 10% of the time and are therefore assessed against the L_{A10} parameter. The exception is noise from car door closings and the air service alarm at the service station, which are assessed against the L_{Amax} level as well as noise from the refrigerated truck, assessed against the L_{A1};
- Refrigerated delivery truck condenser is modelled at 2.3-metres above ground floor within the designated loading area.
- The air conditioning condenser units and air compressor are assumed to be floor mounted within an enclosed service yard.
- Exhaust fans are assumed to be roof mounted, and are modelled at 1.0-metre above roof level.

Three assessment scenarios are considered as follows:

1. Night L_{A10} Noise – All service station plant running including all bowzers simultaneously.
2. L_{A1} Noise – A refrigerated truck at idle in the loading area (Cold deliveries).
3. Night L_{Amax} Noise – All plant from Scenario 1 and with car door and air service alarm noise sources.

An image of the noise model overview is shown in *Figure 3-1*.



Figure 3-1 2D Image of Noise Model

4 RESULTS AND ASSESSMENT

4.1 Scenario 1 – Night L_{A10}

Table 4-1 provides the results for the night time L_{A10} scenario with all mechanical plant and all fuel bowsers in use. Figure 4-1 provides the noise contour plots for the Night L_{A10} Scenario. It should be noted that the assessment has assumed all fuel bowsers will be used simultaneously during the night, which is conservative as in reality, they will be used more intermittently at such time.

Table 4-1 Predicted Noise Levels, Scenario 1: Night, L_{A10} dB

Location	Predicted Noise Level Worst-Case Downwind			Critical Assigned Level	Calculated Exceedence
	Mechanical Plant	Fuel Bowsers	Combined ¹		
1. 6 Fontana Loop	14	22	28	38	Complies
2. 3 Carlsbad Prom	16	22	28	38	Complies
3. 5 Carlsbad Prom	18	25	31	38	Complies
4. 7 Carlsbad Prom	19	28	34	42	Complies
5. 9 Carlsbad Prom	10	22	27	42	Complies
6. 11 Carlsbad Prom	24	32	38	42	Complies
7. 13 Carlsbad Prom	26	33	39	42	Complies
8. 15 Carlsbad Prom	29	33	39	42	Complies
9.9 Longstaff Ave	14	20	26	42	Complies
10. Future South (Comm)	23	30	36	60	Complies
11. Future South Res	12	19	25	38	Complies

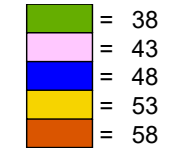
1. Includes + 5 dB adjustment for tonality.

The most critical receiving premises is at 13 and 15 Carlsbad Street to the north, with predicted combined level of 34 dB L_{A10} . The mechanical plant noise during the night period, when background noise is lowest, may be considered to have tonal characteristics, attracting a +5 dB adjustment. Therefore, the predicted level is adjusted to 39 dB L_{A10} and compliant at the worst-case location. As the analysis is based on file data, it is recommended that a follow up verification of mechanical plant selections be carried out at detailed design by a suitably qualified acoustical consultant.






Figure 4-1 Scenario 1, Night Time Noise, dB L_{A10}



Predicted Noise level



Legend

-  Existing Building
-  Future building
-  Receiver
-  Fence
-  Point source



Scale 1:1200



Project No: 21076532

Consultant: MM

Date: 26/10/2021

Algorithm: ISO 9613

SoundPLAN Version: 8.1



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4.2 Scenario 2 – Cold Deliveries LA1

Table 4-2 provides the results for the Cold Deliveries LA1 scenario. Figure 4-2 displays the noise contour plot for this scenario. Given the intermittent nature of this activity and short duration (less than 10% of a RAP), the noise is assessed against the LA1 criteria. Note that this assumes deliveries will take less than 24 minutes at a time, which is considered sufficient for a small scale store.

Table 4-2 Predicted Noise Levels, Scenario 2: LA1 dB

Location	Refrigerated Delivery Truck ¹	Night Assigned Level	Evening/Sunday Assigned Level	Day Assigned Level	Calculated Exceedence
1. 6 Fontana Loop	39	48	53	58	Complies
2. 3 Carlsbad Prom	40	48	53	58	Complies
3. 5 Carlsbad Prom	41	48	53	58	Complies
4. 7 Carlsbad Prom	43	52	57	62	Complies
5. 9 Carlsbad Prom	31	52	57	62	Complies
6. 11 Carlsbad Prom	48	52	57	62	Complies
7. 13 Carlsbad Prom	51	52	57	62	Complies
8. 15 Carlsbad Prom	52	52	57	62	Complies
9.9 Longstaff Ave	34	52	57	62	Complies
10. Future South (Comm)	43	75	75	75	Complies
11. Future South Res	35	48	53	58	Complies

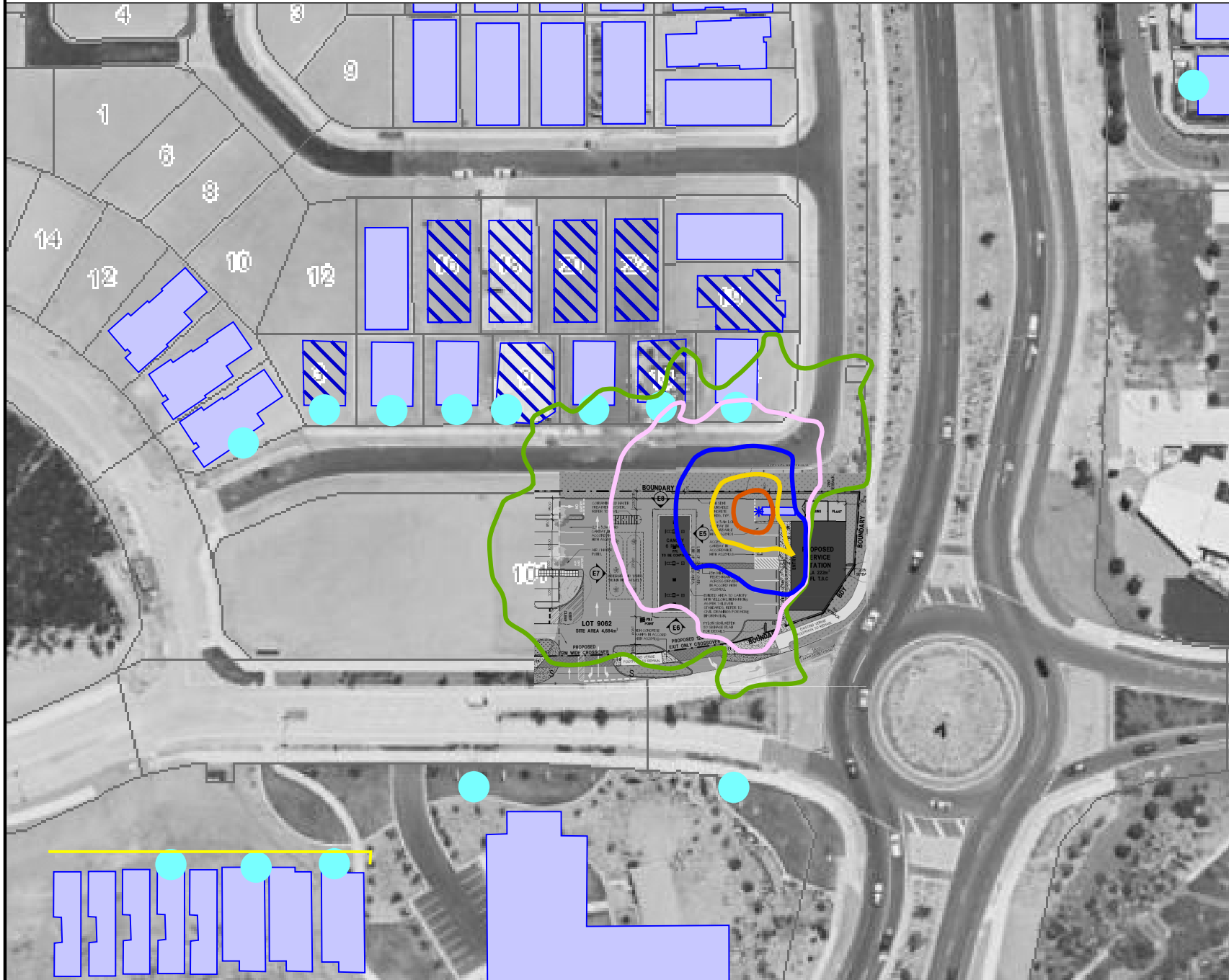
1. Includes + 5 dB adjustment for tonality.

The plans indicate a designated loading bay on the north side of the convenience store building. The critical assessable noise source is a refrigerated truck parked in this area for a short time whilst unloading stock.

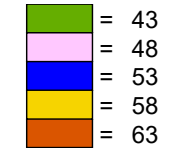
The worst case noise sensitive receiver is at 15 Carlsbad Promenade to the north with a predicted level of 47 dB(A). Noise from these units may be considered tonal and therefore the level for assessment purposes is 52 dB(A), which complies at all times. Where deliveries must occur during the hours outside of day time, additional management measures may be required to be determined on the basis of frequency, duration and truck condenser make/model.

Non-Refrigerated trucks are not considered an issue, although to minimise impacts, these should not be left to idle as part of good practice.






Figure 4-2 Scenario 2, Refrigerated Delivery Noise, dB LA1



Predicted Noise level



Legend

-  Existing Building
-  Future building
-  Receiver
-  Fence
-  Point source



Scale 1:1200



Project No: 21076532

Consultant: MM

Date: 26/10/2021

Algorithm: ISO 9613

SoundPLAN Version: 8.1



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4.3 Scenario 3 – Night L_{Amax}

Table 4-3 provides the results for the night time L_{Amax} scenario. Where the maximum level is a car door, a +10 dB adjustment is applied for impulsiveness. Where the maximum level is the air alarm, a +5 dB adjustment is applied for tonality.

Table 4-3 Predicted Noise Levels, Scenario 3: Night, L_{Amax} dB

Location	Air-Service Alarm	Car Doors	Maximum ¹	Critical Assigned Level	Calculated Exceedence
1. 6 Fontana Loop	40	32	45	58	<i>Complies</i>
2. 3 Carlsbad Prom	40	32	45	58	<i>Complies</i>
3. 5 Carlsbad Prom	45	34	50	58	<i>Complies</i>
4. 7 Carlsbad Prom	47	37	52	62	<i>Complies</i>
5. 9 Carlsbad Prom	37	32	42	62	<i>Complies</i>
6. 11 Carlsbad Prom	52	42	57	62	<i>Complies</i>
7. 13 Carlsbad Prom	53	43	58	62	<i>Complies</i>
8. 15 Carlsbad Prom	55	43	60	62	<i>Complies</i>
9.9 Longstaff Ave	18	30	40	62	<i>Complies</i>
10. Future South (Comm)	55	41	60	80	<i>Complies</i>
11. Future South Res	39	28	44	58	<i>Complies</i>

1. "+ 5" in the table has been assumed for potential tonal penalty and "+ 10" for impulsive penalty and included in the maximum.

Noise levels are highest at 15 Carlsbad Promenade with a predicted level of 60 dB L_{Amax} , inclusive of the tonality adjustment. This complies with the night-time assigned level and is caused by noise from the air-service alarm unit. Compliance is also achieved at all nearest commercial receivers.

5 RECOMMENDATIONS

The assessment has demonstrated that noise can comply with the assigned levels determined in accordance with the *Environmental Protection (Noise) Regulations 1997*. Noise controls are not required based on the assumptions of this assessment.

Separate to the above, some best practice recommendations have been included below though not required for compliance – to be implemented in the design and operation where practicable:

- All delivery vehicles are to be encouraged to have broadband type reversing alarms fitted rather than standard tonal alarms. To minimise impact to nearby residential, where possible deliveries should be scheduled outside night time hours.
- Mechanical plant to be maintained to ensure noise levels do not increase over time;
- Mechanical plant to be installed using vibration isolation mounts;
- Mechanical plant to be in line with those assumed in the modelling – refer *Table 3-2*;
- Any external music or the like shall be low level and inaudible at residences;
- Bin servicing shall occur between 7.00am and 7.00pm Mondays to Saturdays. The servicing of bins would fall under Regulation 14A and provided it is carried out within the stipulated hours and undertaken as quietly as reasonably practicable, the ‘normal’ assigned levels do not apply. Where possible, bins shall be located in areas away from and/or screened from residences. Where this activity also includes truck reversing alarm noise, this would be considered exempt under Regulation 14A within the stipulated hours.
- Access grates shall be firmly seated in position and fitted with rubber gaskets to avoid excess banging.

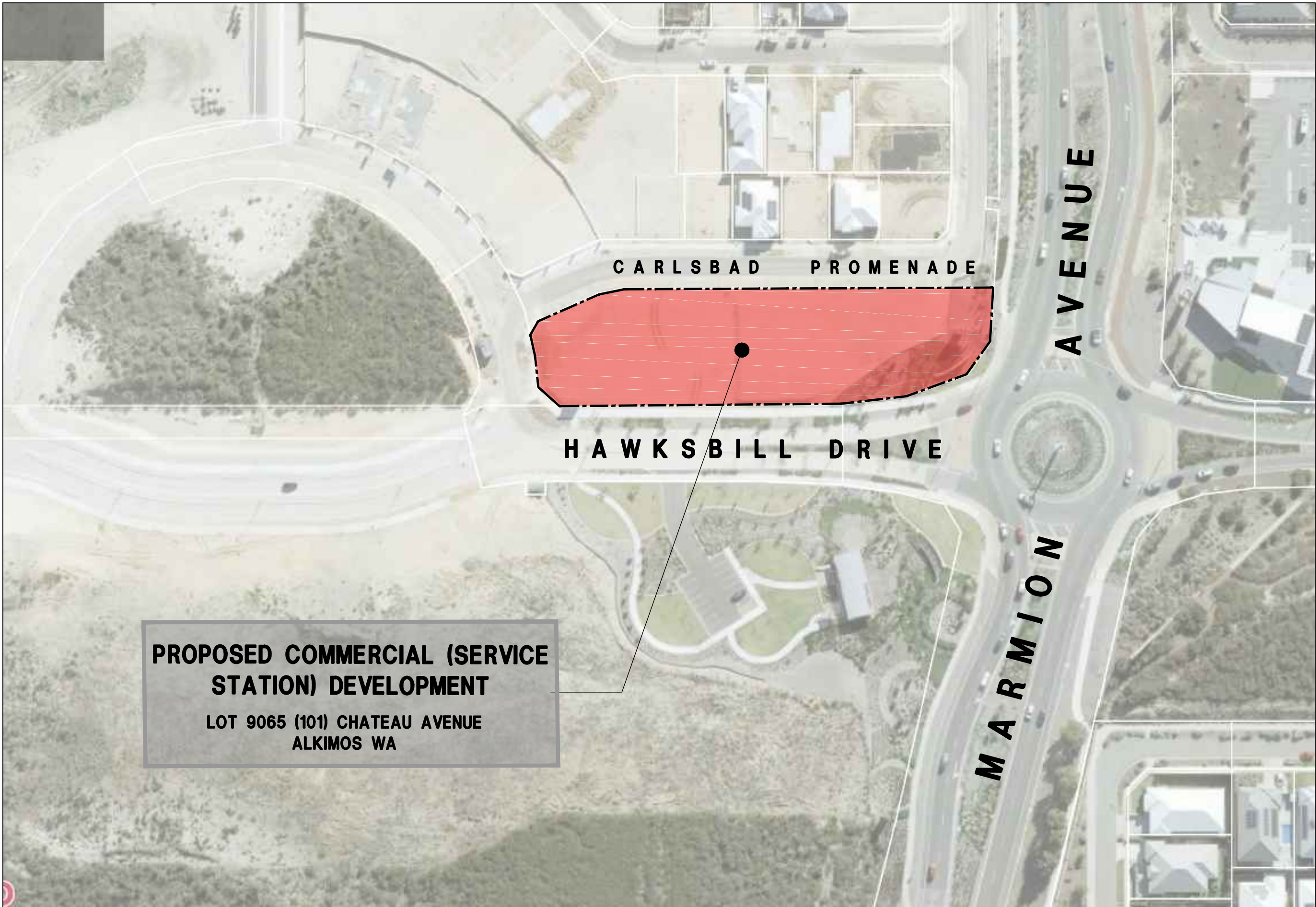
6 CONCLUSION

The potential noise impacts resulting from the proposed service station at Lot 9062 (2561) Marmion Avenue, Alkimos have been assessed in accordance with the *Environmental Protection (Noise) Regulations 1997*.

Compliance with the assigned levels has been demonstrated for activities on site, and no further noise mitigation measures are necessary.

Appendix A

Site Plans



PROPOSED COMMERCIAL (SERVICE STATION) DEVELOPMENT
LOT 9065 (101) CHATEAU AVENUE
ALKIMOS WA



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A3 SHEET
SITE LOCATION PLAN
N.T.S

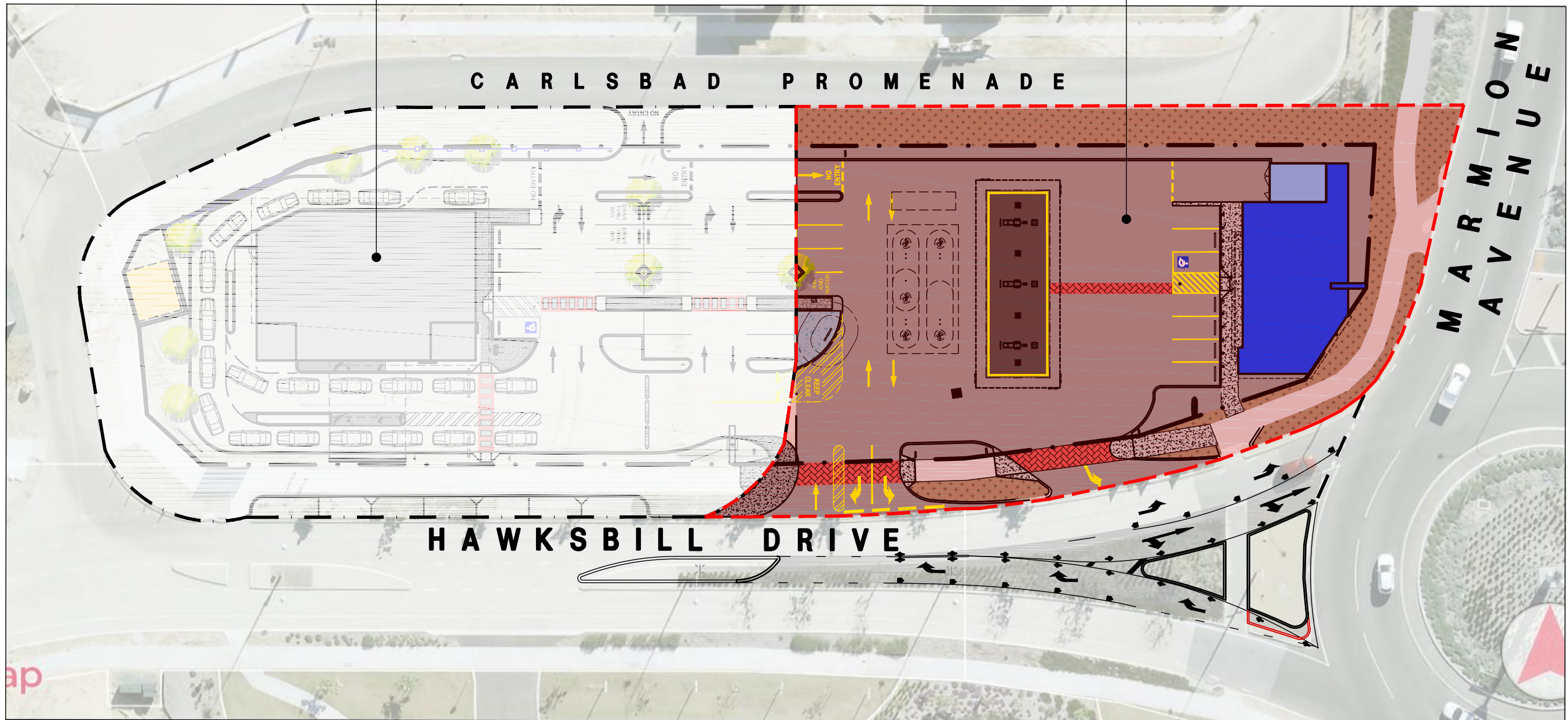


PROPOSED COMMERCIAL (SERVICE STATION) DEVELOPMENT
LOT 9065 (101) CHATEAU AVE, ALKIMOS WA
 for LWP CAPITAL Pty. Ltd.

Date	08.02.21
Design	CPH
Drawn	JJR
Checked	CPH
Scale	N.T.S
Job No.	0774
Dwg.	DA01
Rev.	A

APPLICATION BY
OTHERS

AREA SUBJECT TO THIS
APPLICATION



HINDLEY & ASSOCIATES
BUILDING DESIGNERS

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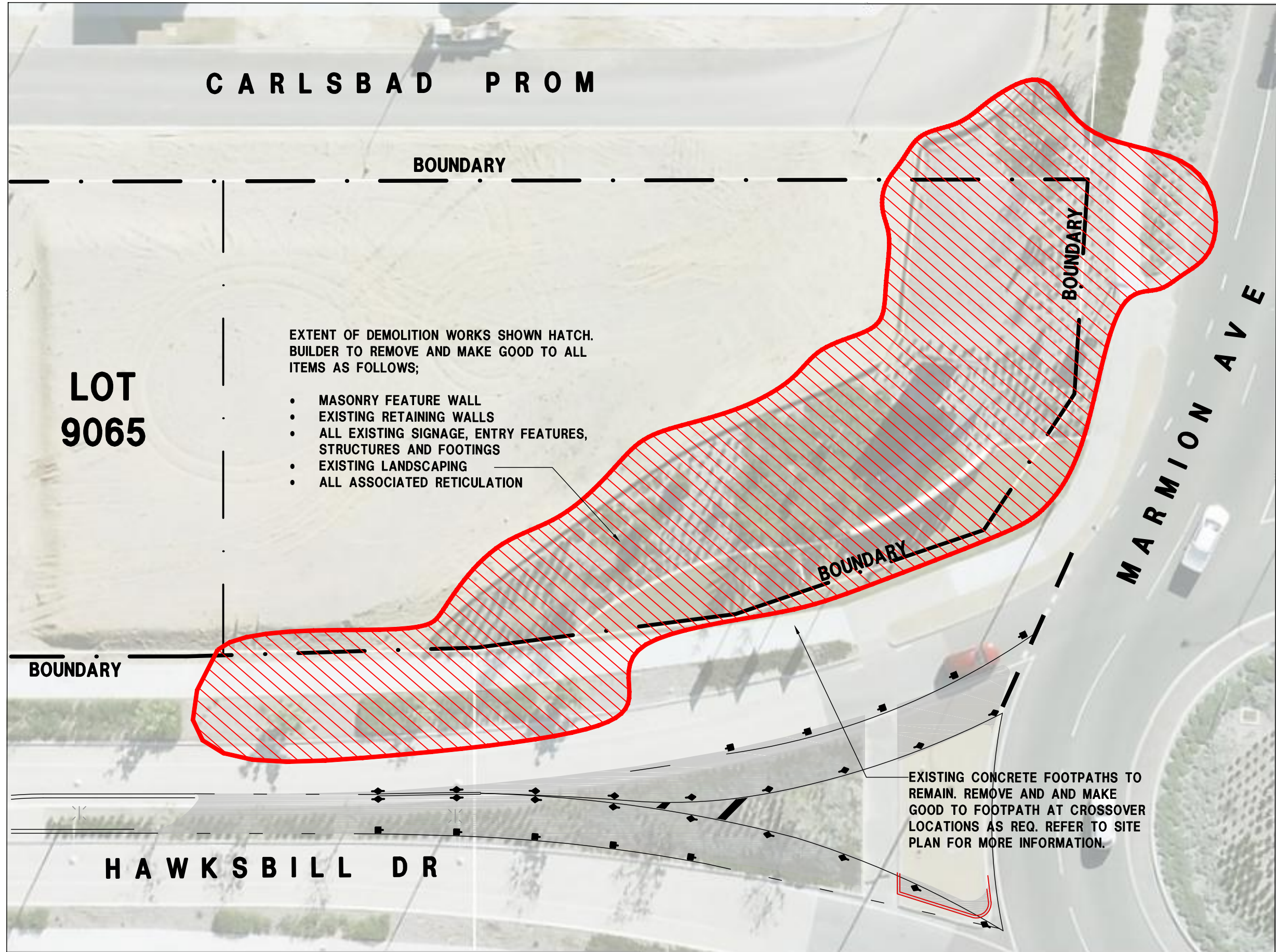
OVERALL SITE PLAN

SCALE 1:500



PROPOSED COMMERCIAL
(SERVICE STATION) DEVELOPMENT
LOT 9065 (101) CHATEAU AVE, ALKIMOS WA
for LWP CAPITAL Pty. Ltd.

Date	08.02.21
Design	CPH
Drawn	JJR
Checked	CPH
Scale	1:500
Job No.	0774
Dwg.	DA02
Rev.	A



CARLSBAD PROM

BOUNDARY

LOT 9065

EXTENT OF DEMOLITION WORKS SHOWN HATCH. BUILDER TO REMOVE AND MAKE GOOD TO ALL ITEMS AS FOLLOWS;

- MASONRY FEATURE WALL
- EXISTING RETAINING WALLS
- ALL EXISTING SIGNAGE, ENTRY FEATURES, STRUCTURES AND FOOTINGS
- EXISTING LANDSCAPING
- ALL ASSOCIATED RETICULATION

BOUNDARY

BOUNDARY

BOUNDARY

MARMION AVE

HAWKSBILL DR

EXISTING CONCRETE FOOTPATHS TO REMAIN. REMOVE AND MAKE GOOD TO FOOTPATH AT CROSSOVER LOCATIONS AS REQ. REFER TO SITE PLAN FOR MORE INFORMATION.



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DEVELOPMENT APPLICATION

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PROPOSED DEMOLITION PLAN

SCALE 1:300



PROPOSED COMMERCIAL (SERVICE STATION) DEVELOPMENT
LOT 9065 (101) CHATEAU AVE, ALKIMOS WA
for LWP CAPITAL Pty. Ltd.

Date	08.02.21
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Dwg.	DA03
Rev.	A

SHRUB SPECIES

-  ROLL ON LAWN
-  HIBBERTIA SCANDENS
14cm POT SIZE @ 600mm SPACING
-  PIMELEA FERRUGINEA
14cm POT SIZE @ 600mm SPACING
-  JUNIPERUS CONFERTA
14cm POT SIZE @ 600mm SPACING
-  DIANELLA REVOLUTA
14cm POT SIZE @ 600mm SPACING
-  SCAEVOLA SP
14cm POT SIZE @ 600mm SPACING
-  KANGAROO PAW
14cm POT SIZE @ 600mm SPACING
-  EREMOPHILLIA GLABRA
14cm POT SIZE @ 500mm SPACING
-  AGONIS FLEXUOSA 'AFTER DARK'
30LT POT SIZE

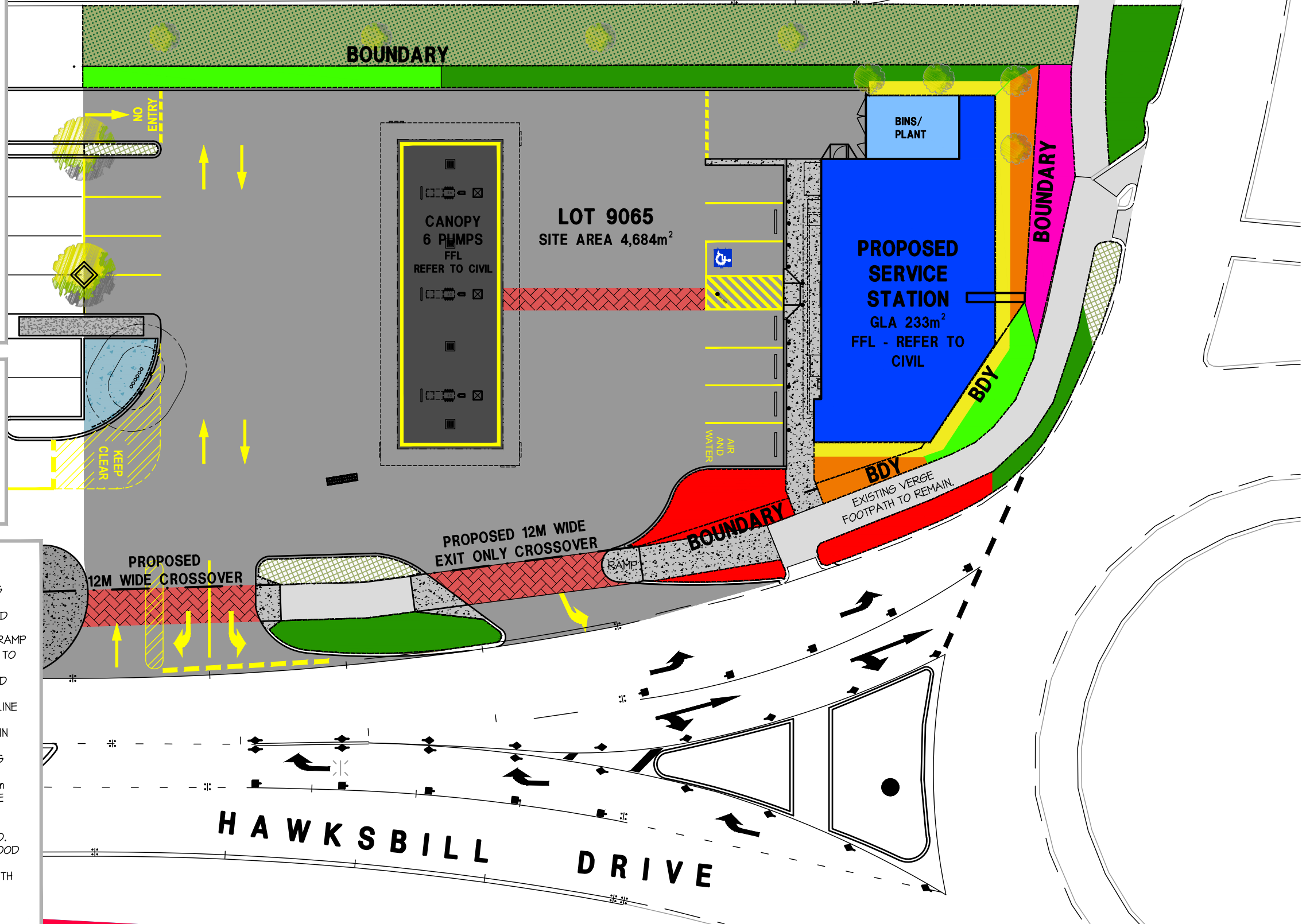
LANDSCAPING AREA

TOTAL SITE AREA	4,684m ²
LANDSCAPING AREA (NOT INCLUDING VERGE AREA)	270m ²
PERCENTAGE OF LANDSCAPING	5.76%

LANDSCAPING NOTES

- FINAL DENSITY, SPECIES AND PLANTING LOCATION OF SHRUBS AND GROUNDCOVERS ARE TO BE CONFIRMED BY CONTRACTOR WITH THE SUPERINTENDENT PRIOR TO PLANTING. RAMP
- FINAL LOCATIONS OF TREE PLANTINGS TO BE DETERMINED BY ACTUAL SERVICE LOCATIONS AND ARE TO BE CONFIRMED ON SITE.
- PLANTS TO BE OFFSET 1m FROM KERBLINE TO ALLOW FOR OVERHANG IF ABLE.
- GROUNDCOVERS ARE TO BE PLANTED IN GROUPS OF 3 & 5.
- SQUARE SHOULDER CONCRETE KERBING TO DEFINE GARDEN AREAS.
- CONCRETE SQUARE SHOULDER KERB 3m AROUND VENT STACKS WITH 20mm BLUE METAL AT BASE OF STACKS.
- RETICULATION CONTROLLER FIXED IN SERVICE AREA WITH WATERPROOF GPO.
- ALL GARDEN AREAS SUPPLIED WITH WOOD CHIP MULCH.
- IRRIGATION TO ALL GARDEN AREAS WITH 13mm COMMERCIAL BORE DRIP LINE.
- 1000mm SPACING BETWEEN PLANT VARIETIES.

CARLSBAD PROMENADE



MARMION AVE



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A3 SHEET

PROPOSED LANDSCAPING PLAN

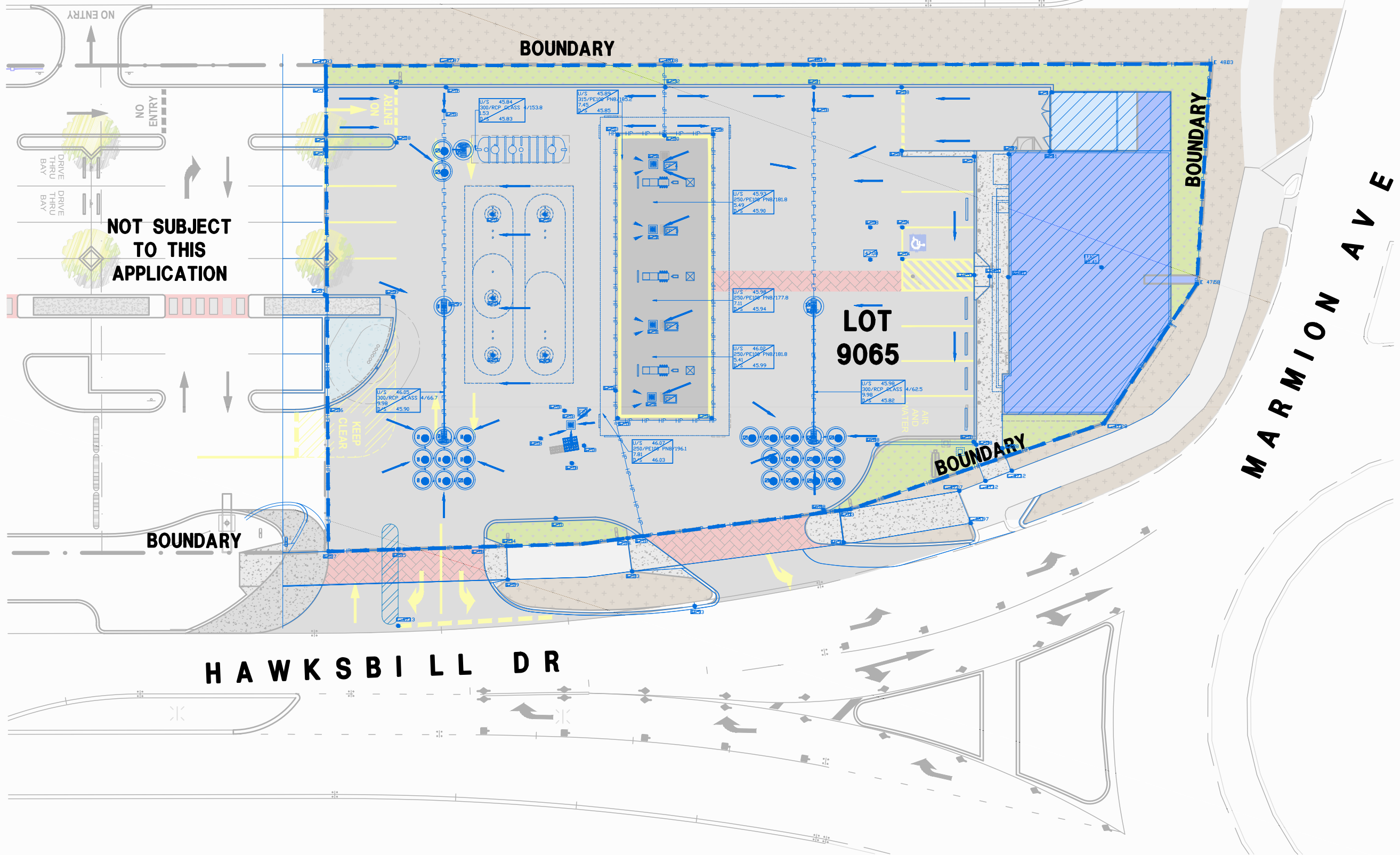
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**PROPOSED COMMERCIAL
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LOT 9065 (101) CHATEAU AVE, ALKIMOS WA
for LWP CAPITAL Pty. Ltd.

Date	08.09.21
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Drawn	JJR
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Rev.	A

CARLSBAD PROM



NOT SUBJECT TO THIS APPLICATION



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DEVELOPMENT APPLICATION

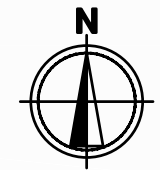
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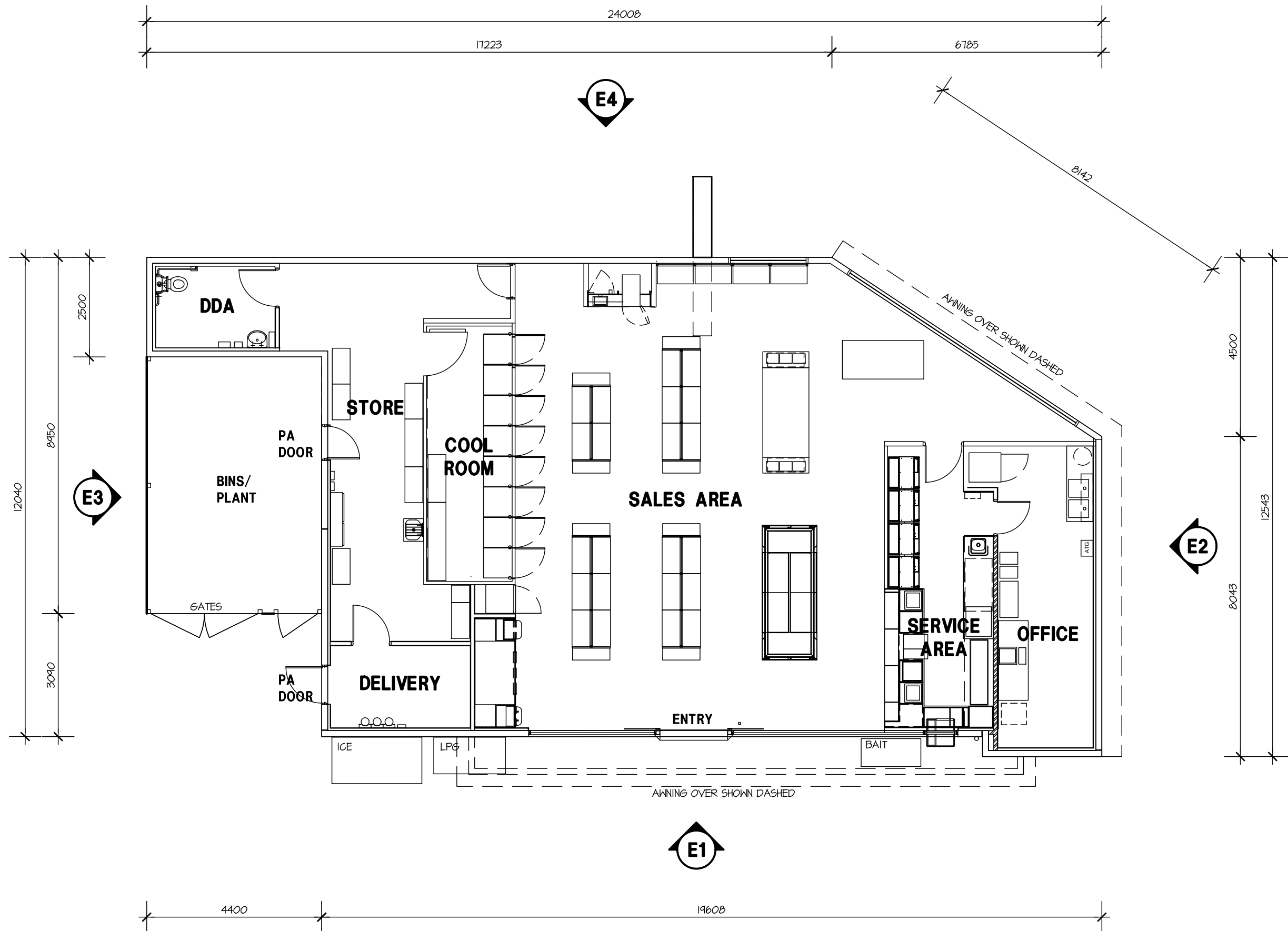
DRAINAGE AND LEVELS OVERLAY

SCALE 1:300



PROPOSED COMMERCIAL
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LOT 9065 (101) CHATEAU AVE, ALKIMOS WA
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Dwg.	DA06
Rev.	A

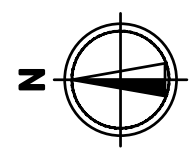


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DEVELOPMENT APPLICATION

PROPOSED FLOOR PLAN

SCALE 1:100



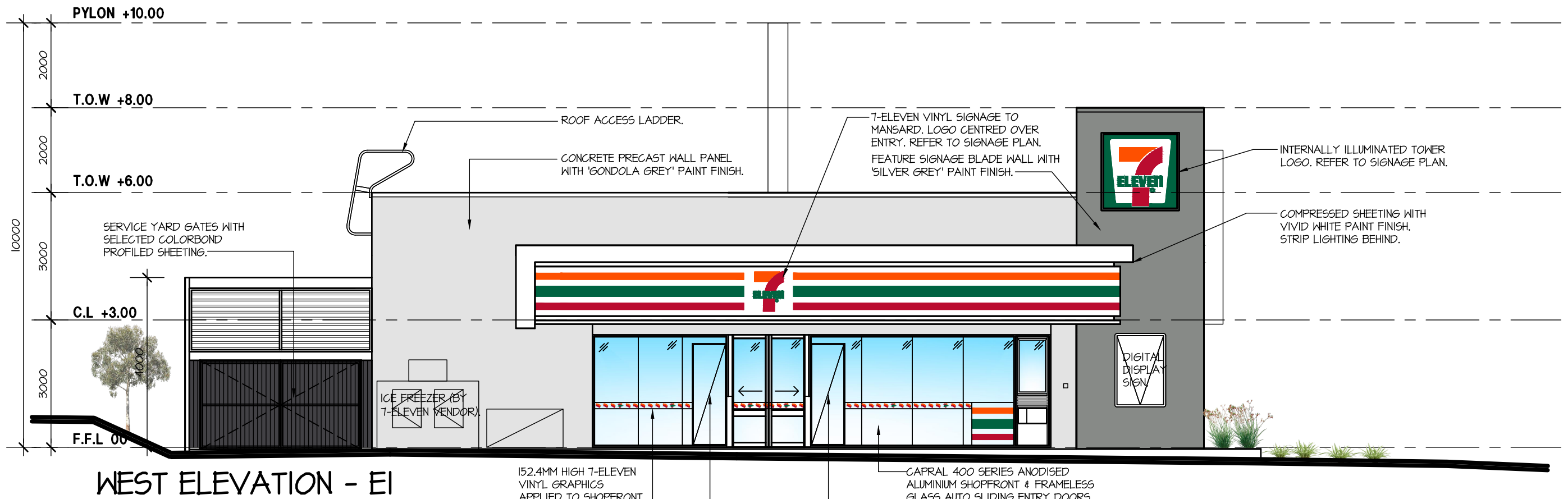
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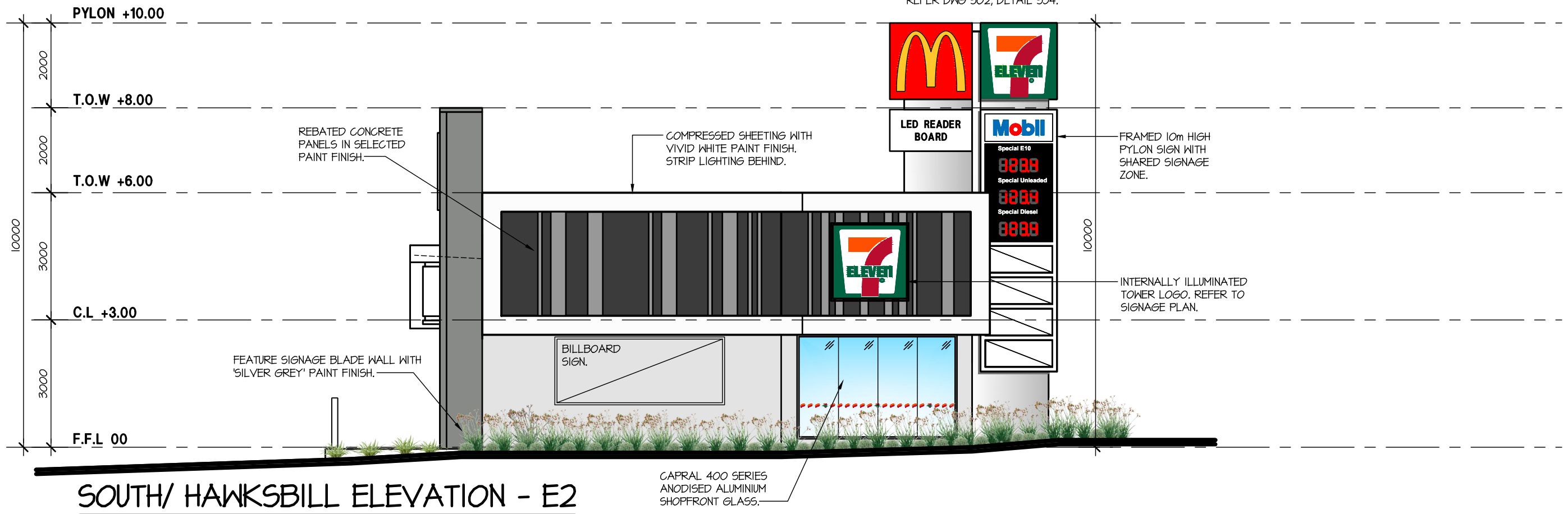
NO.	DATE	REVISION	DRAWN	CHECK
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A3 SHEET

Date - 08.02.21
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Dwg - **DA07**
Rev - **A**



WEST ELEVATION - E1



SOUTH/ HAWKSBILL ELEVATION - E2

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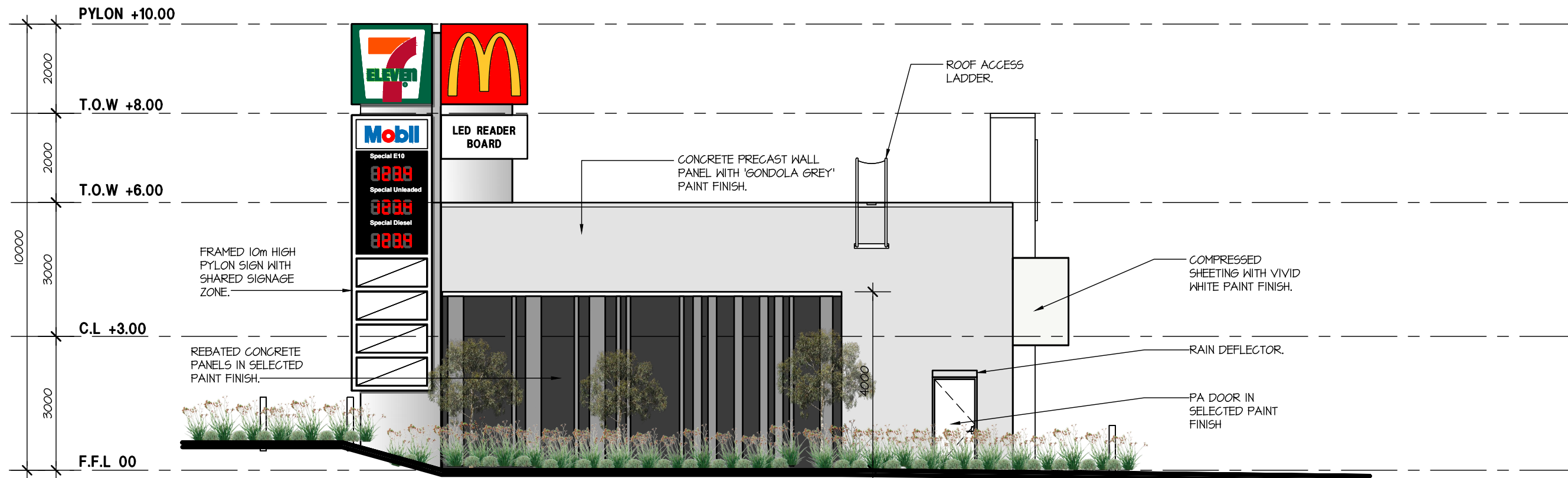
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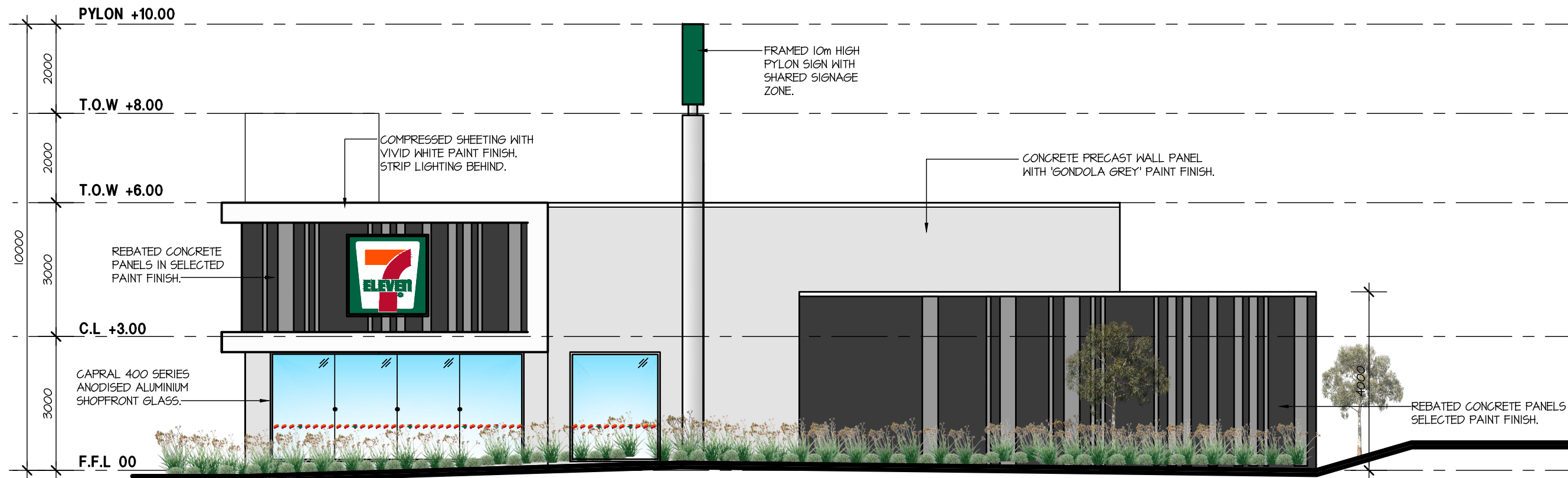
PROPOSED ELEVATIONS
 SCALE 1:100
 A3 SHEET

PROPOSED COMMERCIAL (SERVICE STATION) DEVELOPMENT
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 for LWP CAPITAL Pty. Ltd.

Date - 08.02.21
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 Checked - CPH
 Scale - 1:500
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 Dwg - **DA08**
 Rev - **A**



NORTH/ CARLSBAD ELEVATION - E3



EAST/ MARMION ELEVATION - E4



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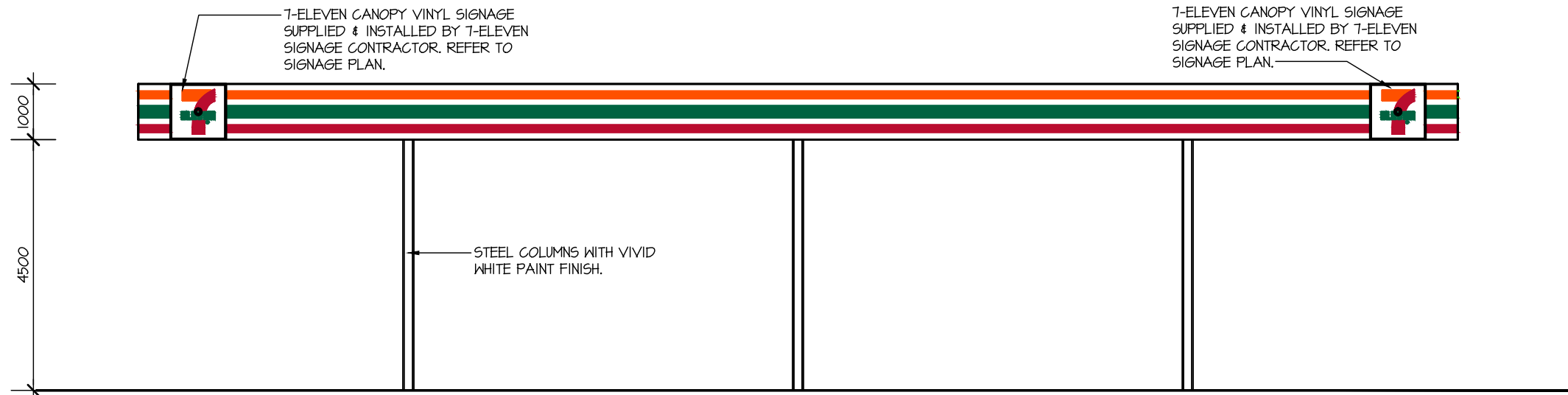
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PROPOSED ELEVATIONS

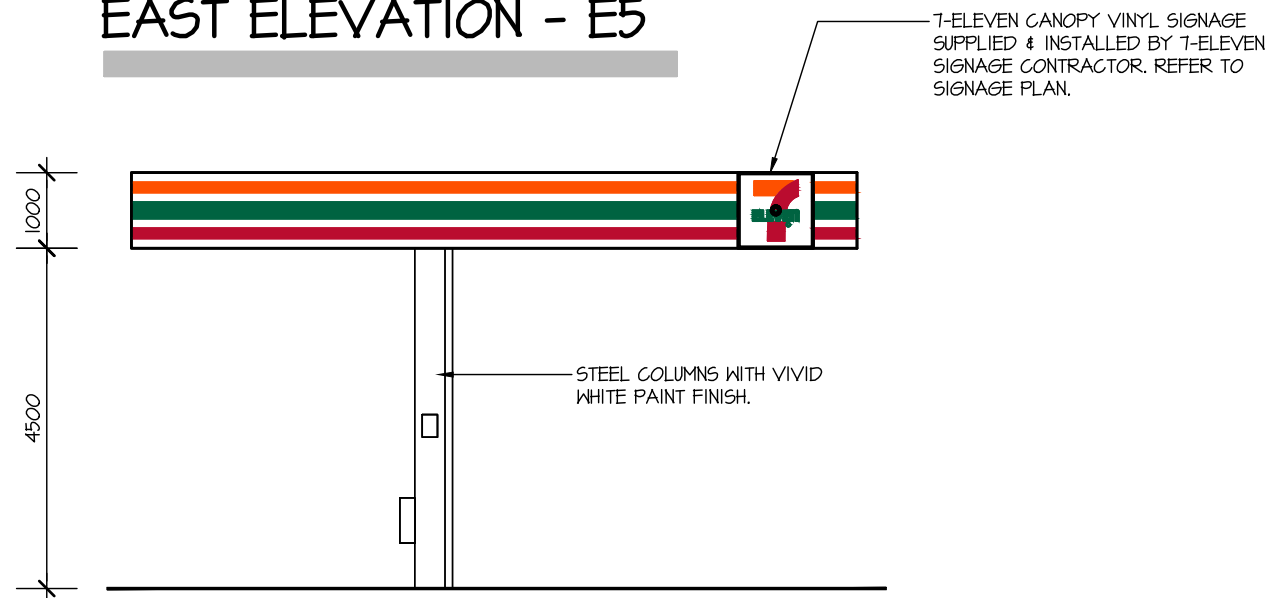
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(SERVICE STATION) DEVELOPMENT**
LOT 9065 (101) CHATEAU AVE, ALKIMOS WA
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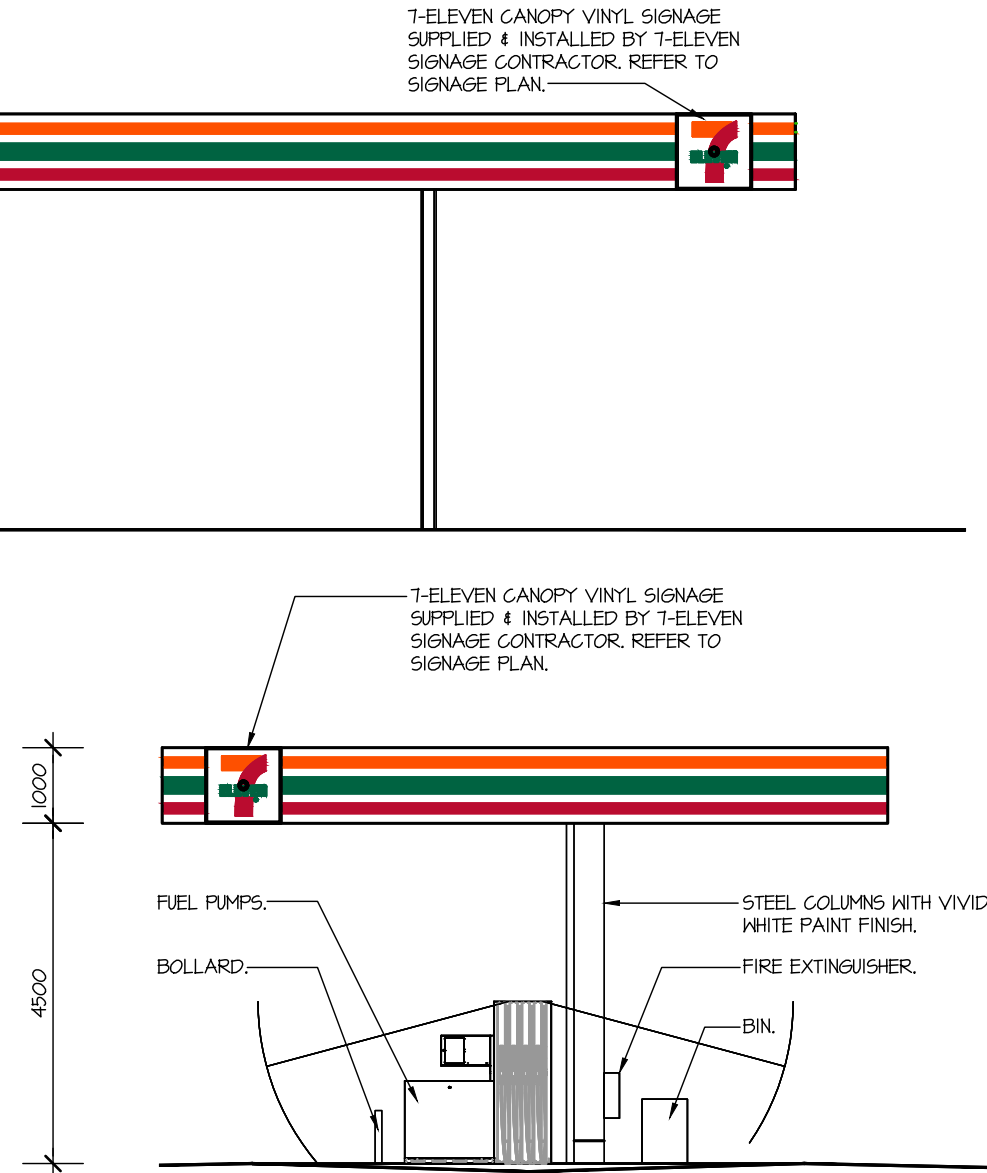
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Scale - 1:500
Job No. - 0774
Dwg - **DA09**
Rev - **A**



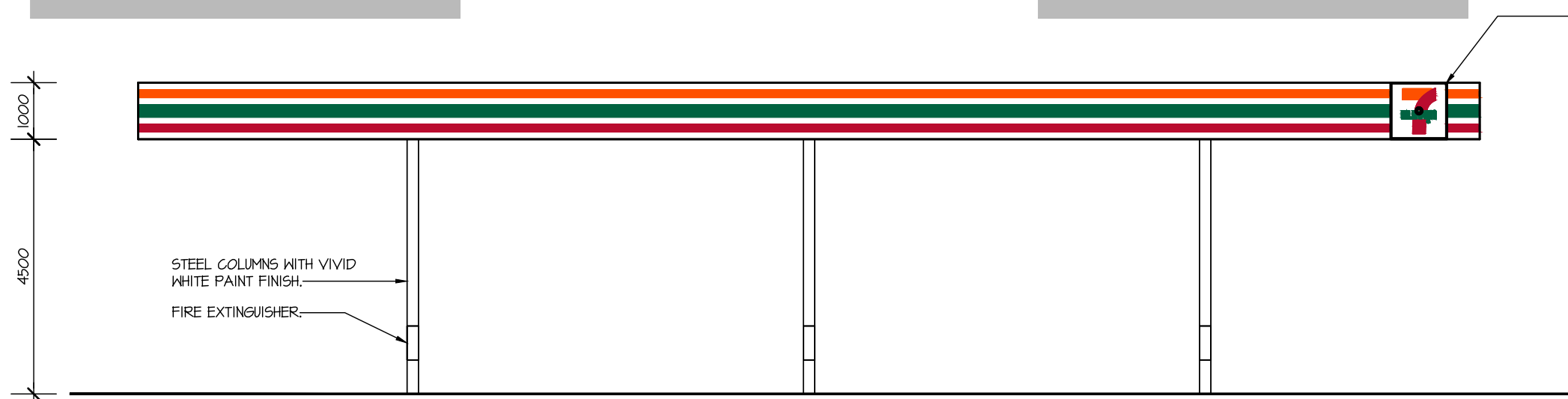
EAST ELEVATION - E5



SOUTH ELEVATION - E6



NORTH ELEVATION - E8



WEST ELEVATION - E7



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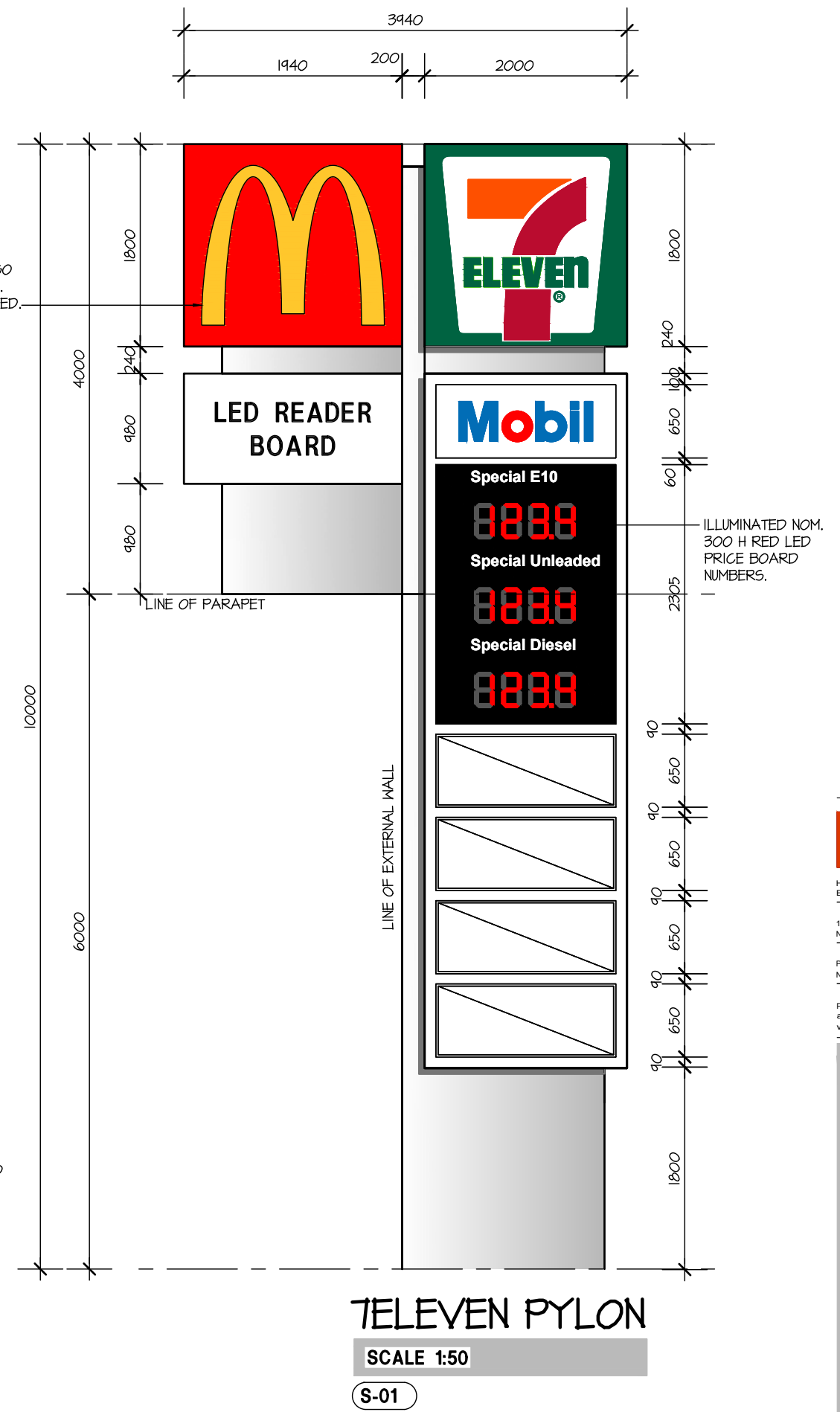
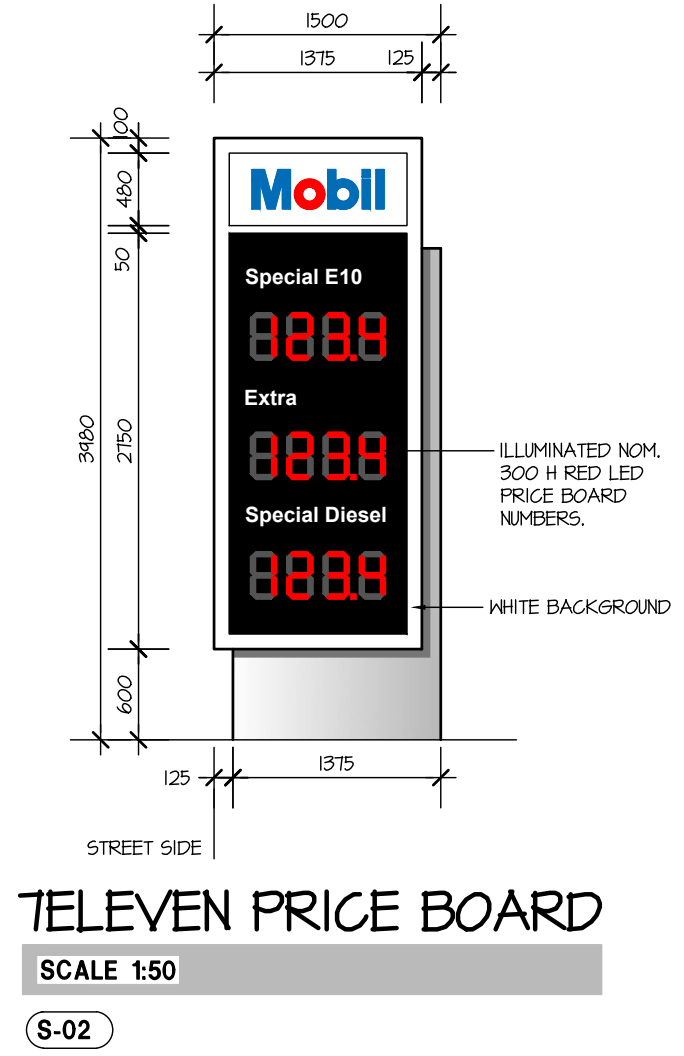
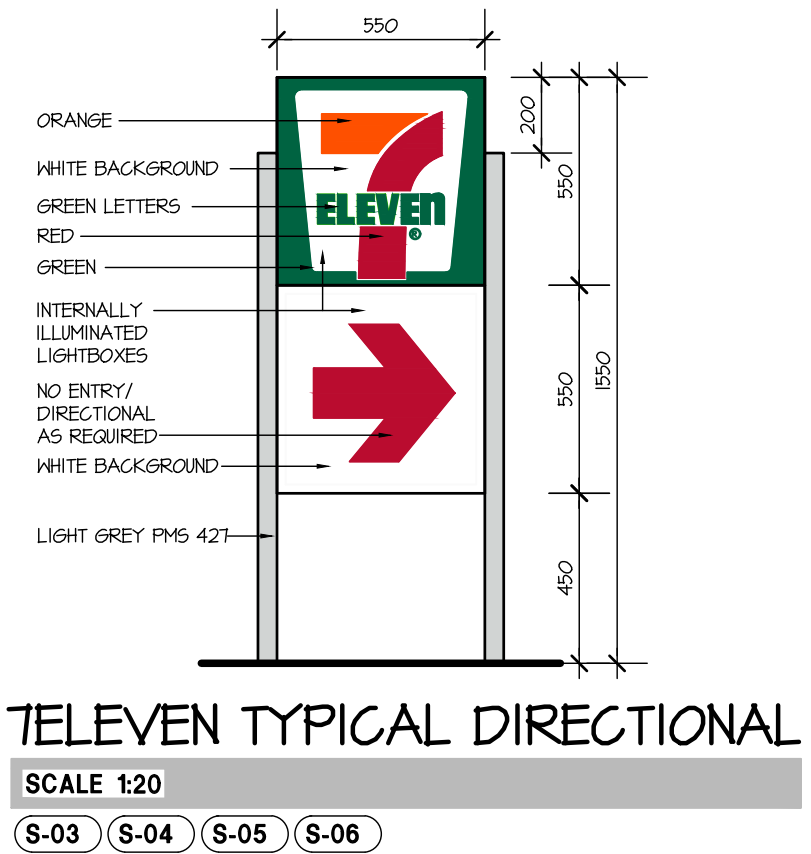
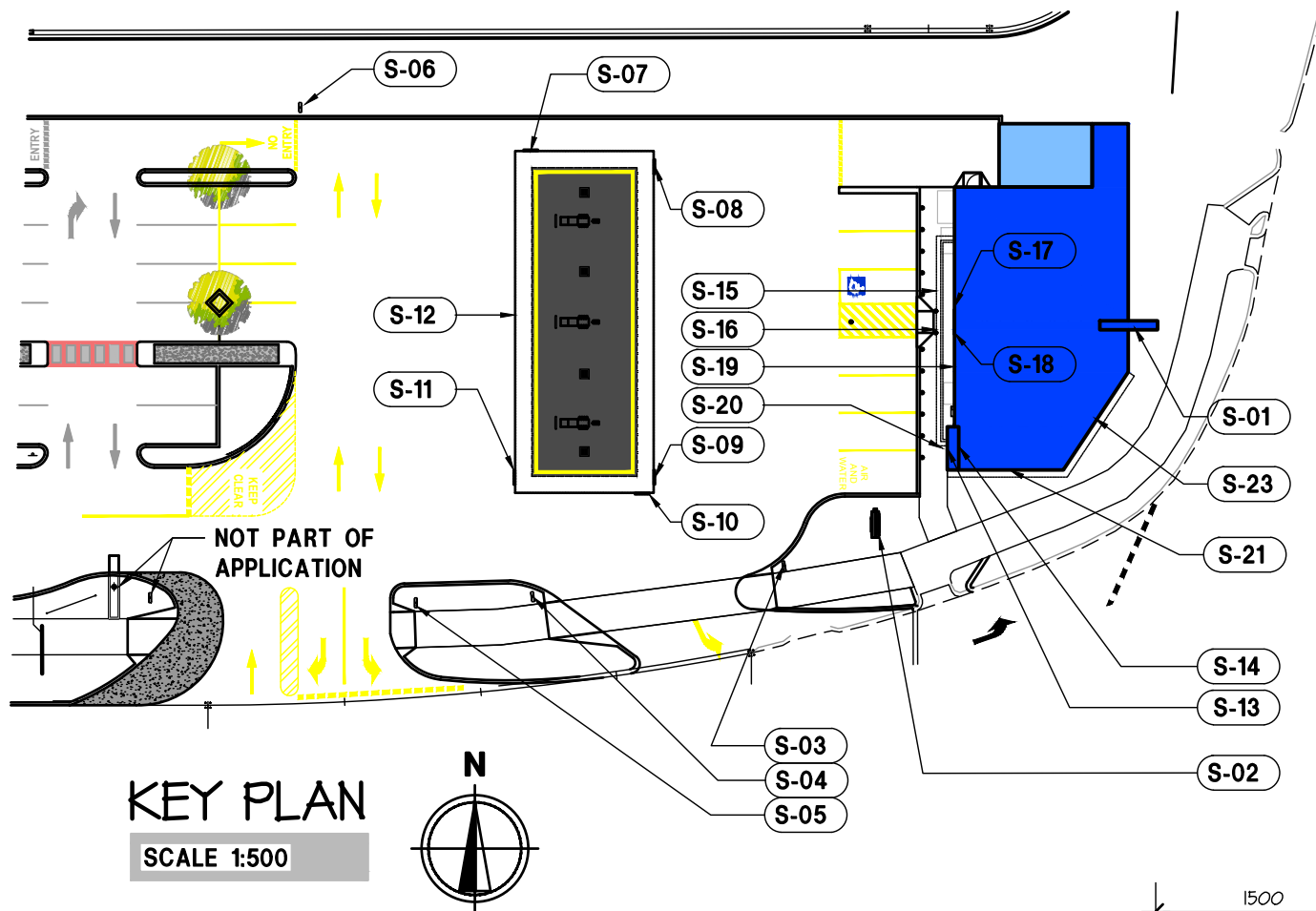
A3 SHEET

PROPOSED ELEVATIONS

SCALE 1:100

**PROPOSED COMMERCIAL
(SERVICE STATION) DEVELOPMENT
LOT 9065 (101) CHATEAU AVE, ALKIMOS WA
for LWP CAPITAL Pty. Ltd.**

Date - 08.02.21
Design - CPH
Drawn - JJR
Checked - CPH
Scale - 1:500
Job No. - 0774
Dwg - **DA10**
Rev - **A**



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DEVELOPMENT APPLICATION

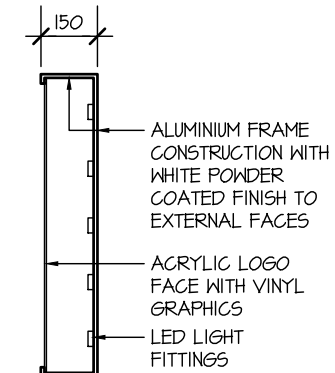
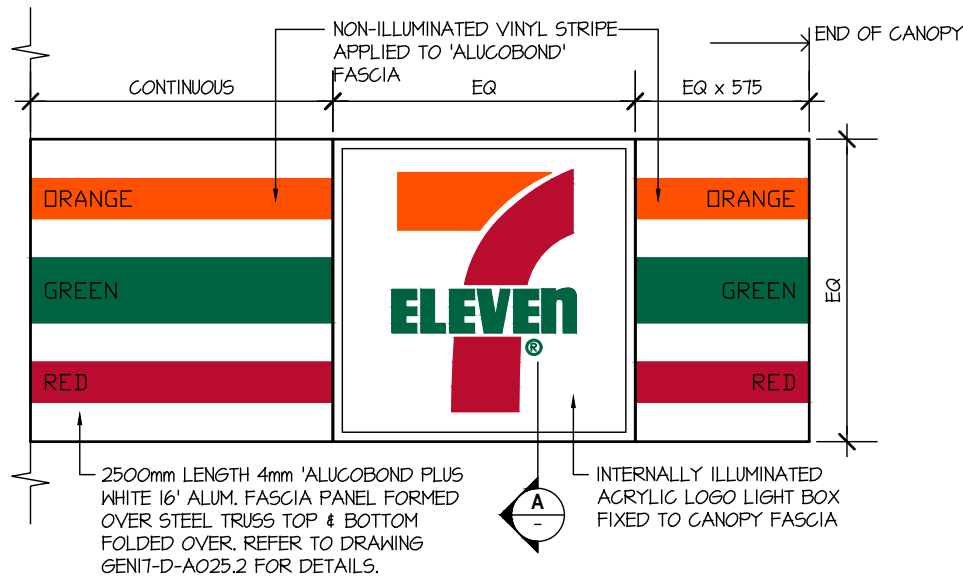
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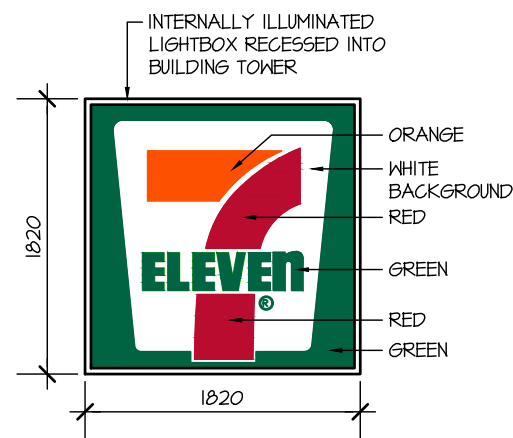
A3 SHEET

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LOT 9065 (101) CHATEAU AVE, ALKIMOS WA
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Checked - CPH
Scale - 1:500
Job No. - 0774
Dwg - **DA11**
Rev - **A**

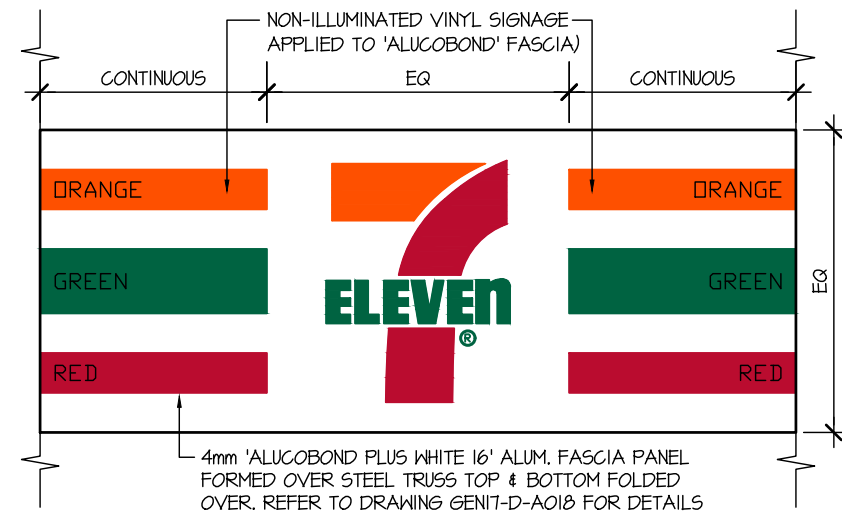


SEC-A
SCALE 1:20



TELEVEN TOWER LOGO
SCALE 1:50

S-13 S-14 S-23



TELEVEN TYPICAL AWNING FACADE
SCALE 1:20

S-15 S-16

TELEVEN TYPICAL CANOPY FASCIA

SCALE 1:20

S-07 S-08 S-09 S-10 S-11 S-12

TELEVEN TOWER LOGO

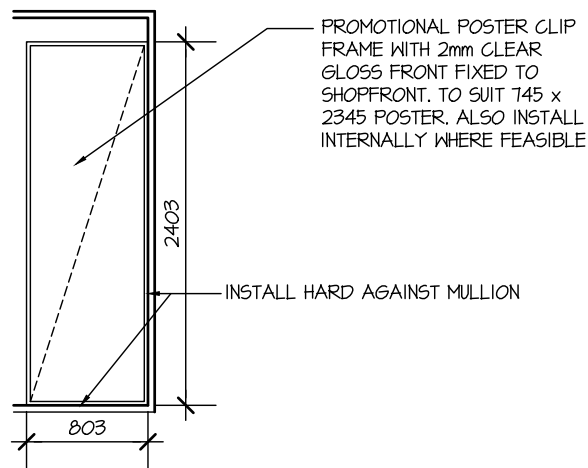
SCALE 1:50

S-13 S-14 S-23

TELEVEN TYPICAL AWNING FACADE

SCALE 1:20

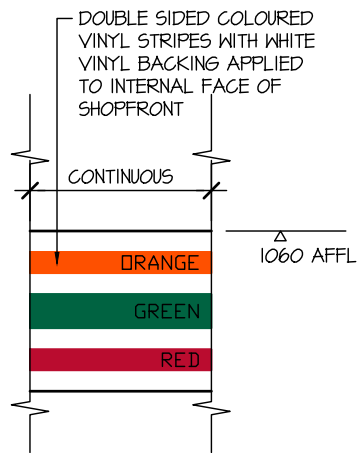
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TELEVEN ENTRY POSTERS

SCALE 1:50

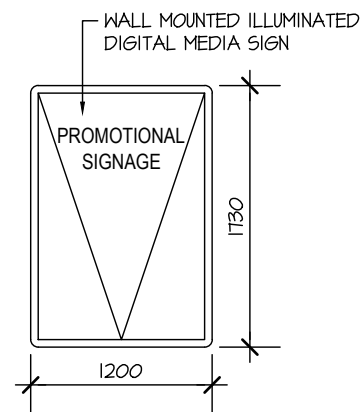
S-17 S-18



TELEVEN WINDOW FILM

SCALE 1:50

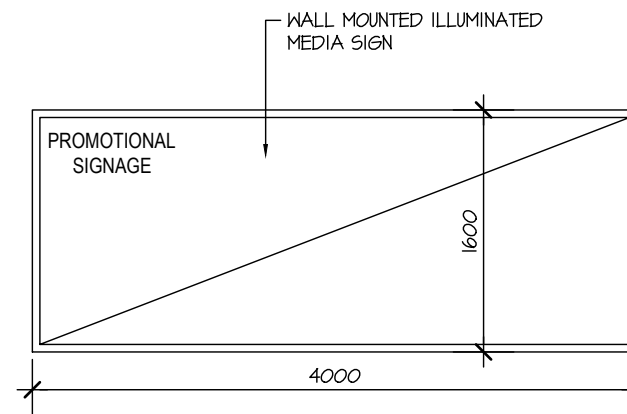
S-19



TELEVEN DIGITAL SIGN

SCALE 1:50

S-20



TELEVEN BILLBOARD

SCALE 1:50

S-21



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(SERVICE STATION) DEVELOPMENT
LOT 9065 (101) CHATEAU AVE, ALKIMOS WA
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Date - 08.02.21
Design - CPH
Drawn - JJR
Checked - CPH
Scale - 1:500
Job No. - 0774
Dwg - **DA12**
Rev - **A**

Appendix B

Terminology

The following is an explanation of the terminology used throughout this report.

Decibel (dB)

The decibel is the unit that describes the sound pressure and sound power levels of a noise source. It is a logarithmic scale referenced to the threshold of hearing.

A-Weighting

An A-weighted noise level has been filtered in such a way as to represent the way in which the human ear perceives sound. This weighting reflects the fact that the human ear is not as sensitive to lower frequencies as it is to higher frequencies. An A-weighted sound level is described as L_A dB.

Sound Power Level (L_w)

Under normal conditions, a given sound source will radiate the same amount of energy, irrespective of its surroundings, being the sound power level. This is similar to a 1kW electric heater always radiating 1kW of heat. The sound power level of a noise source cannot be directly measured using a sound level meter but is calculated based on measured sound pressure levels at known distances. Noise modelling incorporates source sound power levels as part of the input data.

Sound Pressure Level (L_p)

The sound pressure level of a noise source is dependent upon its surroundings, being influenced by distance, ground absorption, topography, meteorological conditions etc and is what the human ear actually hears. Using the electric heater analogy above, the heat will vary depending upon where the heater is located, just as the sound pressure level will vary depending on the surroundings. Noise modelling predicts the sound pressure level from the sound power levels taking into account ground absorption, barrier effects, distance etc.

L_{ASlow}

This is the noise level in decibels, obtained using the A frequency weighting and the S time weighting as specified in AS1259.1-1990. Unless assessing modulation, all measurements use the slow time weighting characteristic.

L_{AFast}

This is the noise level in decibels, obtained using the A frequency weighting and the F time weighting as specified in AS1259.1-1990. This is used when assessing the presence of modulation only.

L_{APeak}

This is the maximum reading in decibels using the A frequency weighting and P time weighting AS1259.1-1990.

L_{Amax}

An L_{Amax} level is the maximum A-weighted noise level during a particular measurement.

L_{A1}

An L_{A1} level is the A-weighted noise level which is exceeded for one percent of the measurement period and is considered to represent the average of the maximum noise levels measured.

L_{A10}

An L_{A10} level is the A-weighted noise level which is exceeded for 10 percent of the measurement period and is considered to represent the "intrusive" noise level.

L_{Aeq}

The equivalent steady state A-weighted sound level (“equal energy”) in decibels which, in a specified time period, contains the same acoustic energy as the time-varying level during the same period. It is considered to represent the “average” noise level.

L_{A90}

An L_{A90} level is the A-weighted noise level which is exceeded for 90 percent of the measurement period and is considered to represent the “background” noise level.

One-Third-Octave Band

Means a band of frequencies spanning one-third of an octave and having a centre frequency between 25 Hz and 20 000 Hz inclusive.

L_{Amax} assigned level

Means an assigned level which, measured as a $L_{A\ Slow}$ value, is not to be exceeded at any time.

L_{A1} assigned level

Means an assigned level which, measured as a $L_{A\ Slow}$ value, is not to be exceeded for more than 1% of the representative assessment period.

L_{A10} assigned level

Means an assigned level which, measured as a $L_{A\ Slow}$ value, is not to be exceeded for more than 10% of the representative assessment period.

Tonal Noise

A tonal noise source can be described as a source that has a distinctive noise emission in one or more frequencies. An example would be whining or droning. The quantitative definition of tonality is:

the presence in the noise emission of tonal characteristics where the difference between -

- (a) the A-weighted sound pressure level in any one-third octave band; and
- (b) the arithmetic average of the A-weighted sound pressure levels in the 2 adjacent one-third octave bands,

is greater than 3 dB when the sound pressure levels are determined as $L_{Aeq,T}$ levels where the time period T is greater than 10% of the representative assessment period, or greater than 8 dB at any time when the sound pressure levels are determined as $L_{A\ Slow}$ levels.

This is relatively common in most noise sources.

Modulating Noise

A modulating source is regular, cyclic and audible and is present for at least 10% of the measurement period. The quantitative definition of modulation is:

a variation in the emission of noise that —

- (a) is more than 3 dB $L_{A\ Fast}$ or is more than 3 dB $L_{A\ Fast}$ in any one-third octave band;
- (b) is present for at least 10% of the representative.

Impulsive Noise

An impulsive noise source has a short-term banging, clunking or explosive sound. The quantitative definition of impulsiveness is:

a variation in the emission of a noise where the difference between $L_{A\ peak}$ and $L_{A\ Max\ slow}$ is more than 15 dB when determined for a single representative event;

Major Road

Is a road with an estimated average daily traffic count of more than 15,000 vehicles.

Secondary / Minor Road

Is a road with an estimated average daily traffic count of between 6,000 and 15,000 vehicles.

Influencing Factor (IF)

$$= \frac{1}{10} (\% \text{ Type A}_{100} + \% \text{ Type A}_{450}) + \frac{1}{20} (\% \text{ Type B}_{100} + \% \text{ Type B}_{450})$$

where :

% Type A₁₀₀ = the percentage of industrial land within
a 100m radius of the premises receiving the noise

%TypeA₄₅₀ = the percentage of industrial land within
a 450m radius of the premises receiving the noise

% Type B₁₀₀ = the percentage of commercial land within
a 100m radius of the premises receiving the noise

%TypeB₄₅₀ = the percentage of commercial land within
a 450m radius of the premises receiving the noise

+ Traffic Factor (maximum of 6 dB)

= 2 for each secondary road within 100m

= 2 for each major road within 450m

= 6 for each major road within 100m

Representative Assessment Period

Means a period of time not less than 15 minutes, and not exceeding four hours, determined by an inspector or authorised person to be appropriate for the assessment of a noise emission, having regard to the type and nature of the noise emission.

Background Noise

Background noise or residual noise is the noise level from sources other than the source of concern. When measuring environmental noise, residual sound is often a problem. One reason is that regulations often require that the noise from different types of sources be dealt with separately. This separation, e.g. of traffic noise from industrial noise, is often difficult to accomplish in practice. Another reason is that the measurements are normally carried out outdoors. Wind-induced noise, directly on the microphone and indirectly on trees, buildings, etc., may also affect the result. The character of these noise sources can make it difficult or even impossible to carry out any corrections.

Ambient Noise

Means the level of noise from all sources, including background noise from near and far and the source of interest.

Specific Noise

Relates to the component of the ambient noise that is of interest. This can be referred to as the noise of concern or the noise of interest.

Peak Component Particle Velocity (PCPV)

The maximum instantaneous velocity in mm/s of a particle at a point during a given time interval and in one of the three orthogonal directions (x, y or z) measured as a peak response. Peak velocity is normally used for the assessment of structural damage from vibration.

Peak Particle Velocity (PPV)

The maximum instantaneous velocity in mm/s of a particle at a point during a given time interval and is the vector sum of the PCPV for the x, y and z directions measured as a peak response. Peak velocity is normally used for the assessment of structural damage from vibration.

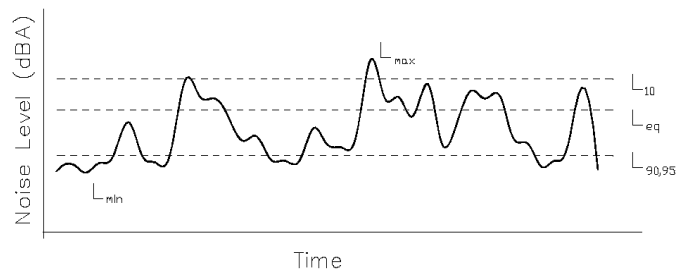
RMS Component Particle Velocity (PCPV)

The maximum instantaneous velocity in mm/s of a particle at a point during a given time interval and in one of the three orthogonal directions (x, y or z) measured as a root mean square (rms) response. RMS velocity is normally used for the assessment of human annoyance from vibration.

Peak Particle Velocity (PPV)

The maximum instantaneous velocity in mm/s of a particle at a point during a given time interval and is the vector sum of the PCPV for the x, y and z directions measured as a root mean square (rms) response. RMS velocity is normally used for the assessment of human annoyance from vibration.

Chart of Noise Level Descriptors



Typical Noise Levels

