

Environmental Noise Assessment

Carl's Junior Fast Food Restaurant
Part Lot 2076 Butler Boulevard, Butler
Reference: 22067354-01

Prepared for:
Shimal Realstar No.3 Pty Ltd

Report: 22067354-01

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Date:	Rev	Description	Prepared By	Verified
11-Aug-22	-	Issued to Client	Matt Moyle	Terry George

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1 INTRODUCTION

Lloyd George Acoustics was commissioned to undertake a noise assessment for a proposed Carl's Junior restaurant development at Part Lot 2076 Butler Boulevard, Butler (subject site) – refer *Figure 1-1*.

While other commercial aspects form part of other applications or are planned in the future (refer site plan in *Figure 1-2*), this assessment addresses the noise aspects of this “Stage 2” restaurant development only, with future areas left vacant. Building No.1 on the site plan is a fast food project proposed under a separate approval (DA No. 2022/65) and this building is therefore included in the modelling.

The most critical noise sensitive premises identified in this assessment are existing residences to the south.

Noise sources considered were those associated with mechanical plant, delivery vehicles, vehicle noise in the drive-through and parking areas as well as the speaker associated with the ordering system. Noise from this equipment was assessed against the prescribed standards of the *Environmental Protection (Noise) Regulations 1997* by way of noise modelling.

The proposed operating hours are understood to be 9.00am to midnight, 7-Days a week.



Figure 1-1 Subject Site Locality

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

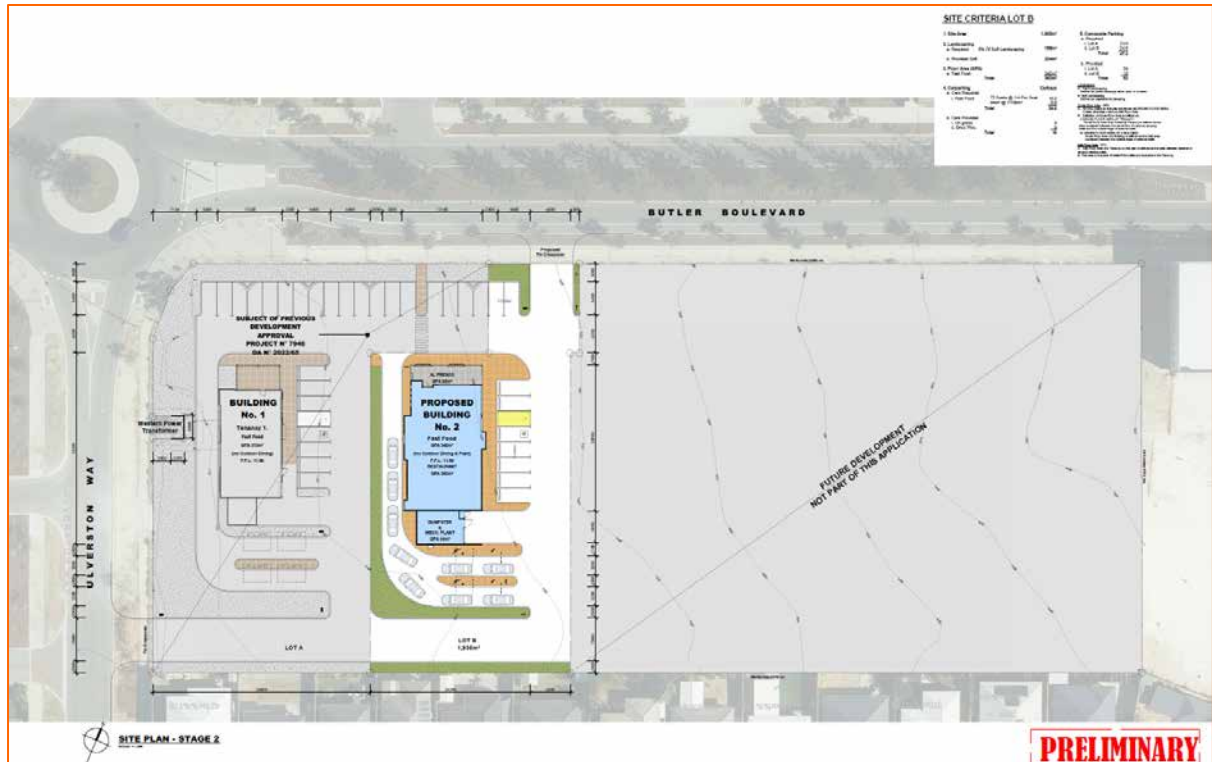


Figure 1-2 Overall Site Plan (From Development Application)

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,

when assessed under regulation 9”

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 prescribed under regulation 7 after the adjustments of *Table 2-1* are made to the noise emission as measured at the point of reception.

Table 2-1 Adjustments Where Characteristics Cannot Be Removed

Where Noise Emission is Not Music			Where Noise Emission is Music	
Tonality	Modulation	Impulsiveness	No Impulsiveness	Impulsiveness
+ 5 dB	+ 5 dB	+ 10 dB	+ 10 dB	+ 15 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 ¹	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
Noise sensitive premises: any area other than highly sensitive area	All hours	60	75	80
Commercial	All hours	60	75	80

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.

The influencing factor, applicable at the noise sensitive premises has been calculated as 5 dB for all noise sensitive locations, as shown in *Table 2-3*. The transport factor has been calculated as 2 dB, due to Butler Boulevard being considered a secondary road ($\geq 6,000$ vehicles per day – based on signal lane counts at Exmouth Drive interchange being approximately 7,000 vpd) within 100 metres of the noise sensitive premises.

As per the relevant Structure Plan map, the subject site itself is within Precinct B, which encourages a mix of office, commercial, consultancy, retail and residential type uses.

Table 2-3 Influencing Factor Calculation

Description	Within 100 metre Radius	Within 450 metre Radius	Total
Industrial Land	0 %	0 %	0 dB
Commercial Land	35%	25 %	2.7 dB
Transport Factor			2 dB
Total			5 dB

Table 2-4 shows the assigned noise levels including the influencing factor at the receiving locations. The receiving noise sensitive premises are identified in *Figure 3-1*. The restaurant is proposed to operate from 9.00am to midnight, 7-Days a week. Therefore, the night-time period is most critical for assessment.

Table 2-4 Assigned Noise Levels

Premises Receiving Noise	Time of Day	Assigned Level (dB)		
		L _{A10}	L _{A1}	L _{Amax}
Residences within 100m of Butler Bvd	0700 to 1900 hours Monday to Saturday (Day)	50	60	70
	0900 to 1900 hours Sunday and public holidays (Sunday)	45	55	70
	1900 to 2200 hours all days (Evening)	45	55	60
	2200 hours on any day to 0700 hours Monday to Saturday and 0900 hours Sunday and public holidays (Night)	40	50	60
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.

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.*

Since the development is open to the public, the carpark and associated like areas are considered to be a road and therefore vehicle noise (propulsion and braking) is not strictly assessed. However, vehicle propulsion noise in the drive-through area has been considered assessable in this report due to the nature of the lanes being solely for food ordering purposes and not road access. Vehicle door closing noise is also assessable in any parts of the car park, as this does not form part of the ‘propulsion or braking’ systems.

Regulation 14A provides requirements for the collection of waste stating that this activity can also be exempt from having to comply with regulation 7 prescribed standards provided it is undertaken between 7am and 7pm Mondays to Saturdays and undertaken in the quietest reasonable manner.

3 METHODOLOGY

Computer modelling has been used to predict the noise emissions from the site. The software used was *SoundPLAN 8.2* with the ISO 9613 algorithms (ISO 17354 compliant) selected. These algorithms have been selected as they include the influence of wind and atmospheric stability. 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	Night (1900-0700)	Day (0700-1900)
Temperature (°C)	15	20
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* and proposed plans. Existing buildings and Building 1 (approved under separate DA) have also been included as these can provide barrier attenuation when located between a source and receiver as well as reflection paths. Parapets are assumed to be atop the restaurant building and 1.0 metres higher than the roof. A permeable fence is noted surrounding the service yard, and this was therefore not included as a solid barrier in the model - refer *Appendix A*.

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). In this instance, a value 0.0 has been used for all road and car park areas and 0.6 for all other areas.

3.4 Source Sound Levels

Table 3-2 shows the sound power levels used in the modelling. The spectrum and overall levels are for individual point sources within the model. The general list of noise emissions considered in the assessment are:

- Mechanical Services (Air-conditioning, ventilation systems, and refrigeration plant);
- Drive-through speaker noise;
- Vehicles (including deliveries) idling in drive through areas; and
- Car doors closing in parking bays.

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	
Refrig Condenser Package– L _{A10}	88	87	85	81	76	70	64	59	82
AC-1&2 Actron PCA233U Package Unit High Speed – L _{A10}	-	76	75	74	71	66	65	60	71
Fan, Toilet and Kitchen Exhaust Fans – L _{A10}	80	78	74	71	62	64	63	53	73
Refrigerated Truck delivery – L _{A1}	100	91	87	88	83	81	79	75	90
Drive-Through Speaker – L _{A1}	62	64	66	77	80	73	57	42	82
Car Idling – L _{A10}	81	78	74	72	74	74	67	64	79
Car Door Closing – L _{Amax}	71	74	77	81	80	78	72	61	84

Modelled noise sources were based on file data for similar scaled restaurants. The locations of the noise sources are based on general locations on the site plan (refer *Appendix A*) noting the following:

- Exhaust and refrigeration plant are assumed to be roof mounted at 1.0m above building height in the noise model;
- Air-conditioning plant are modelled within the designated enclosed plant yard area;
- Car door and all engine sources are modelled at 0.5m above ground;
- 4 to 9 vehicles are modelled idling in the Drive-Through queuing, ordering and waiting areas, depending on the calculation scenario (see below).

Noise modelling scenarios are:

1. Night L_{A10} – Consists of all mechanical plant operating and 4 vehicles idling in the drive-through areas;
2. Night L_{A1} – Consists of drive-through speaker noise, 9 vehicles idling, mechanical equipment, and a small delivery truck in designated bay;
3. Sunday Day L_{A10} – Includes all mechanical plant. Also includes 9 vehicles idling in the drive-through areas including the waiting bay;
4. Night L_{Amax} – Includes all mechanical plant described for the night scenario, and car door closures at parking bays.

A 2-D overview image of the noise model showing receivers and sources is included in *Figure 3-1*.



Figure 3-1 2D Image of Noise Model

4 RESULTS & ASSESSMENT

4.1 Scenario 1: Predicted Noise Night L_{A10}

The results of the L_{A10} Night scenario noise modelling are shown as a noise level contour plot in *Figure 4-1* and summarised below in *Table 4-1*. Refer to *Figure 3-1* for receiver locations positioned within the noise model.

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

Location	Mechanical Plant	4 Drive-Through Vehicles	Combined	Critical Assigned Level, dB L_{A10}	Exceedence Amount
14 Millom St	20	31	31	40	Complies
16 Millom St	22	33	33	40	Complies
18 Millom St	23	36	36	40	Complies
20 Millom st	24	38	38	40	Complies
22 Millom St	22	37	37	40	Complies
24 Millom St	22	38	38	40	Complies
26 Millom St	23	36	37	40	Complies
28 Millom St	20	33	33	40	Complies
34 Millom St	16	30	30	40	Complies

A worst-case combined level of 38 dB L_{A10} is predicted with drive-through vehicles contributing the most to overall noise.

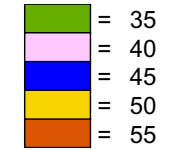
The noise from vehicles alone would not be considered tonal due to the number of vehicles and variation in engine sounds over a representative period, or when combined with mechanical plant noise, therefore no adjustments have been applied.

Summary Scenario 1: Compliance achieved at all receivers by at least 2 dB

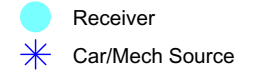
Figure 4-1 Scenario 1 Noise, Night, dB LA10



Predicted Noise level



Legend



Scale 1:1200



Project No: 22067354
Consultant: MM
Date: 10/08/2022
Algorithm: ISO 9613
SoundPLAN Version: 8.2



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4.2 Scenario 2: Predicted Noise Night L_{A1}

The results of the Night L_{A1} scenario noise modelling are shown as a noise level contour plot in *Figure 4-2* and summarised below in *Table 4-2*.

Table 4-2 Predicted Night Noise Levels, dB L_{A1}

Location	Truck Delivery	Drive-Through Speaker	9 Drive-Through Vehicles	Combined ¹	Critical Assigned Level, dB L_{A1}	Exceedence Amount
14 Millom St	37	35	34	40	50	Complies
16 Millom St	39	37	37	43	50	Complies
18 Millom St	39	40	39	44	50	Complies
20 Millom st	39	41	39	44	50	Complies
22 Millom St	33	40	37	42	50	Complies
24 Millom St	31	40	38	43	50	Complies
26 Millom St	30	39	37	41	50	Complies
28 Millom St	28	37	34	39	50	Complies
34 Millom St	23	32	29	35	50	Complies

1. Combined level also includes the mechanical plant sources.

The worst-case calculated noise level for assessment purposes is 44 dB L_{A1} at 18 and 20 Millom Street. This noise level is evenly based on all three source types. The noise level complies for all locations.

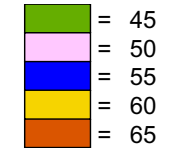
Note that the delivery truck is included in this scenario, being considered applicable to the L_{A1} assessment as the nature of the delivery is short term for a small-scale restaurant. It assumes that a delivery is going on during a full drive-through of cars, which is a conservative worst-case scenario. The noise is not considered to contain tonal characteristics when assessed over a representative period.

Summary Scenario 2: Compliance achieved at all receivers by at least 6 dB.

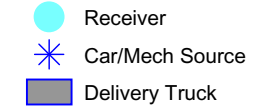
Figure 4-2 Scenario 2 Noise, Night, dB LA1



Predicted Noise level



Legend



Scale 1:1200



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Consultant: MM
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4.3 Scenario 3: Predicted Noise Sunday L_{A10}

The Sunday daytime period includes a full drive-through area with nine (9) cars in total (all in queuing positions). Mechanical plant are operating at high speeds, however assigned levels are higher for noise sensitive premises at this time, compared to during the night. The results of the Sunday day L_{A10} scenario noise modelling are shown as a noise level contour plot in *Figure 4-3* and summarised in *Table 4-3*.

Table 4-3 Predicted Sunday Day Noise Levels, dB L_{A10}

Location	Mechanical Plant	9 Drive-Through Vehicles	Combined	Critical Assigned Level, dB L_{A10}	Exceedence Amount
14 Millom St	21	34	34	45	Complies
16 Millom St	23	37	37	45	Complies
18 Millom St	24	39	39	45	Complies
20 Millom st	24	41	41	45	Complies
22 Millom St	24	40	40	45	Complies
24 Millom St	23	40	40	45	Complies
26 Millom St	24	39	39	45	Complies
28 Millom St	21	37	37	45	Complies
34 Millom St	17	32	33	45	Complies

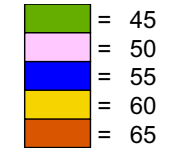
As with the Night L_{A10} assessment, noise from vehicles is dominant for most receivers. The Sunday daytime scenario includes 9 drive-thru cars and mechanical plant on high speed mode, thus leading to increased combined levels. This combined noise level with mechanical plant, yields a worst-case level of 41 dB L_{A10} at 20 Millom St. Again, noise would not be considered tonal given the idling vehicles are dominant and would all be idling at different speeds. The Sunday time period is compliant at all receivers with its assigned level of 45 dB L_{A10} .

Summary Scenario 3: Compliance achieved at all receivers by at least 4 dB.

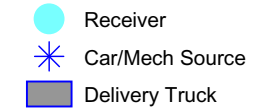
Figure 4-3 Scenario 3 Noise, Sunday dB LA10



Predicted Noise level



Legend



Scale 1:1200



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 SoundPLAN Version: 8.2



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4.4 Scenario 4: Predicted Noise Night L_{Amax}

The results of the Night L_{Amax} scenario noise modelling are shown below in *Table 4-4*. The noise from car doors (non-cumulative) is shown graphically in *Figure 4-4*. Noise levels in this case are adjusted by + 10 dB for potential impulsive characteristics.

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

Location	Car Doors	Adjusted	Critical Assigned Level, dB L_{Amax}	Exceedence Amount
14 Millom St	33	43	55	Complies
16 Millom St	34	44	55	Complies
18 Millom St	35	45	55	Complies
20 Millom st	33	43	55	Complies
22 Millom St	31	41	55	Complies
24 Millom St	32	42	55	Complies
26 Millom St	29	39	55	Complies
28 Millom St	27	37	55	Complies
34 Millom St	20	30	55	Complies

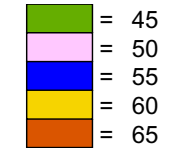
Vehicle door noise is predicted to be up to an adjusted level of 45 dB L_{Amax} at the worst-case receivers to the south, being the residential premises of 18 Millom Street. This is 10 dB below the most critical noise sensitive assigned level of 55 dB L_{Amax} and therefore compliant for all time periods.

Summary Scenario 4: Compliance achieved at all receivers by at least 10 dB.




Figure 4-4 Scenario 4 Noise, Night dB L_{Amax}



Predicted Noise level



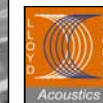
Legend

-  Receiver
-  Car/Mech Source
-  Delivery Truck

Scale 1:1200



Project No: 22067354
 Consultant: MM
 Date: 10/08/2022
 Algorithm: ISO 9613
 SoundPLAN Version: 8.2



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5 CONCLUSION

The potential noise impacts resulting from the proposed Stage 2, Carl's Junior Fast Food Restaurant development at Part Lot 2076 Butler Boulevard, Butler have been assessed against the *Environmental Protection (Noise) Regulations 1997*.

Noise impacts of day-to-day restaurant operations have been predicted and assessed by way of noise modelling and compliance with the assigned levels has been demonstrated for all time periods for the surrounding land uses. Therefore no further noise mitigation measures are necessary.

Regarding waste collection activities, regulation 14A provides requirements stating that this can also be exempt from having to comply with regulation 7 prescribed standards provided it is undertaken between 7am and 7pm Mondays to Saturdays and undertaken in the quietest reasonable manner. Collection outside of these hours will require a separate noise management plan.

Appendix A

Site Plans

PROPOSED FAST FOOD DEVELOPMENT STAGE 2

LOCATION: PART LOT 2076, Butler Boulevard, Butler

FOR: SHIMAL REALSTAR PTY LTD BY: VEND PROPERTY



PRELIMINARY



Location Plan

SCALE: 1:500

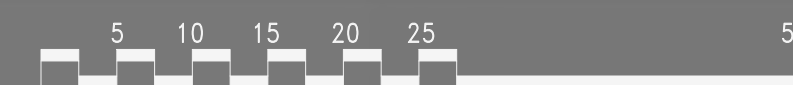
PRELIMINARY

PROPOSED FAST FOOD DEVELOPMENT STAGE 2
LOCATION: PART LOT 2076, Butler Boulevard, Butler
FOR: SHIMAL REALSTAR PTY LTD BY: VEND PROPERTY

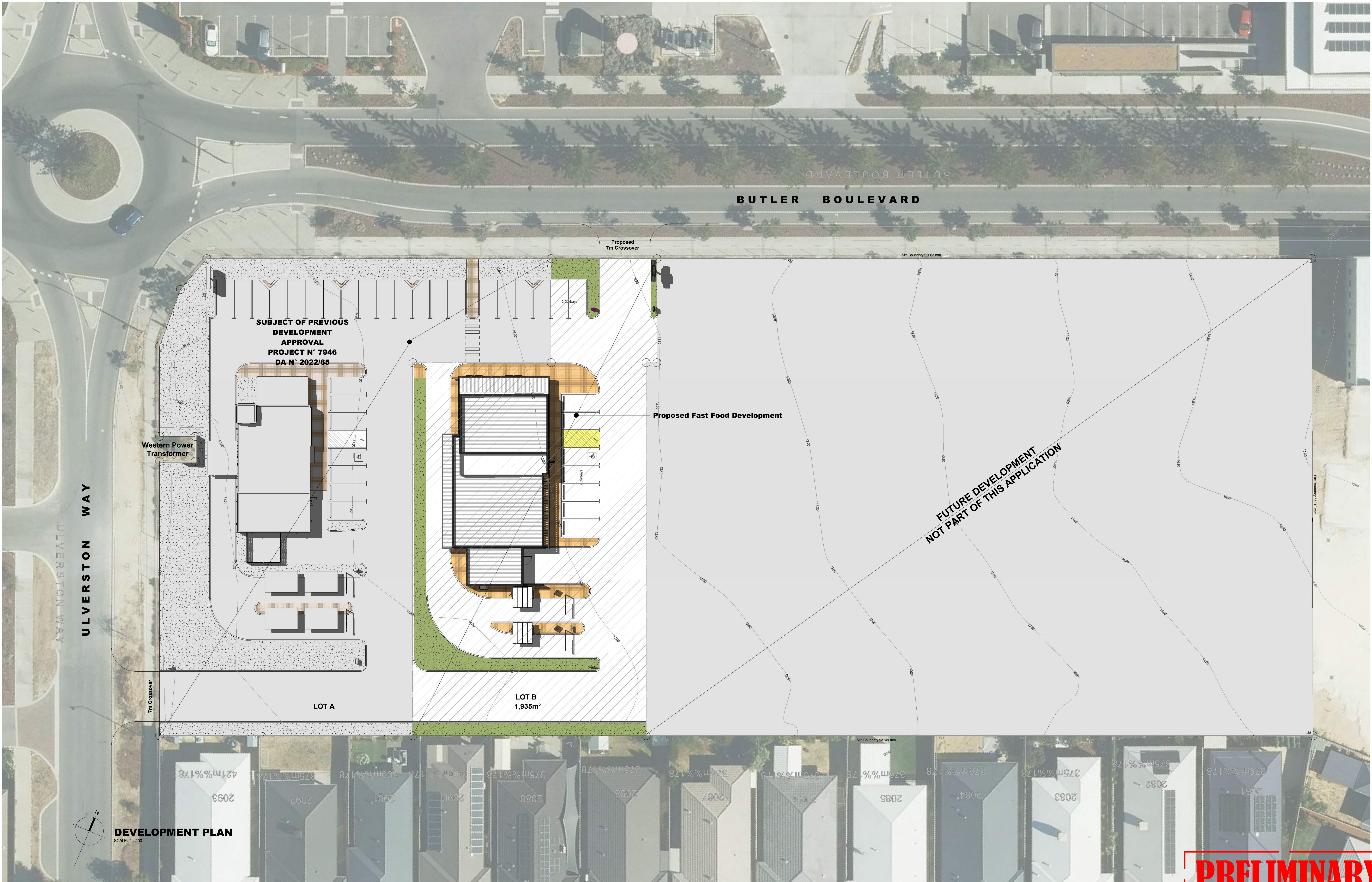
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DEVELOPMENT PLAN
SCALE: 1:200

PRELIMINARY

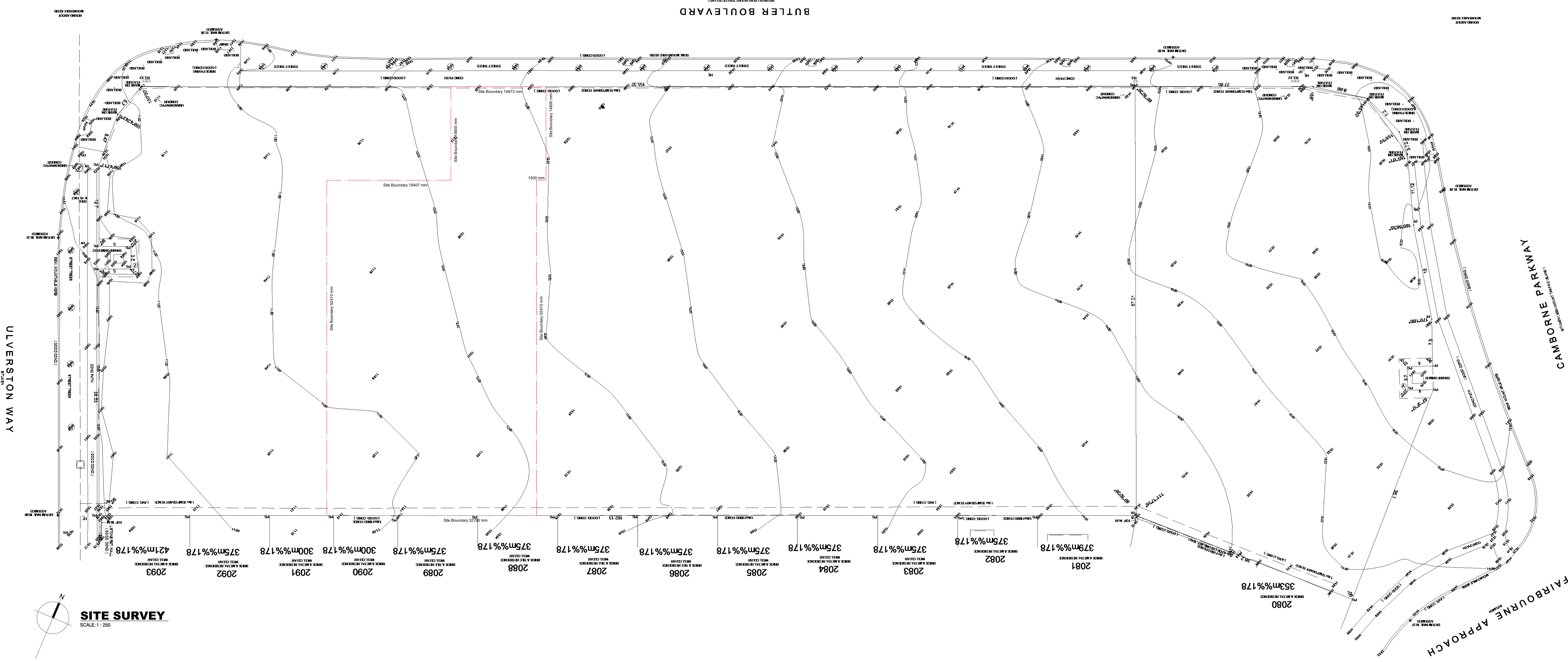
PROPOSED FAST FOOD DEVELOPMENT STAGE 2
LOCATION: PART LOT 2076, Butler Boulevard, Butler
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PRELIMINARY

PROPOSED FAST FOOD DEVELOPMENT STAGE 2
 LOCATION: PART LOT 2076, Butler Boulevard, Butler
 FOR: SHIMAL REALSTAR PTY LTD BY: VEND PROPERTY

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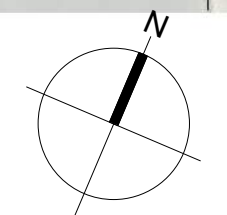
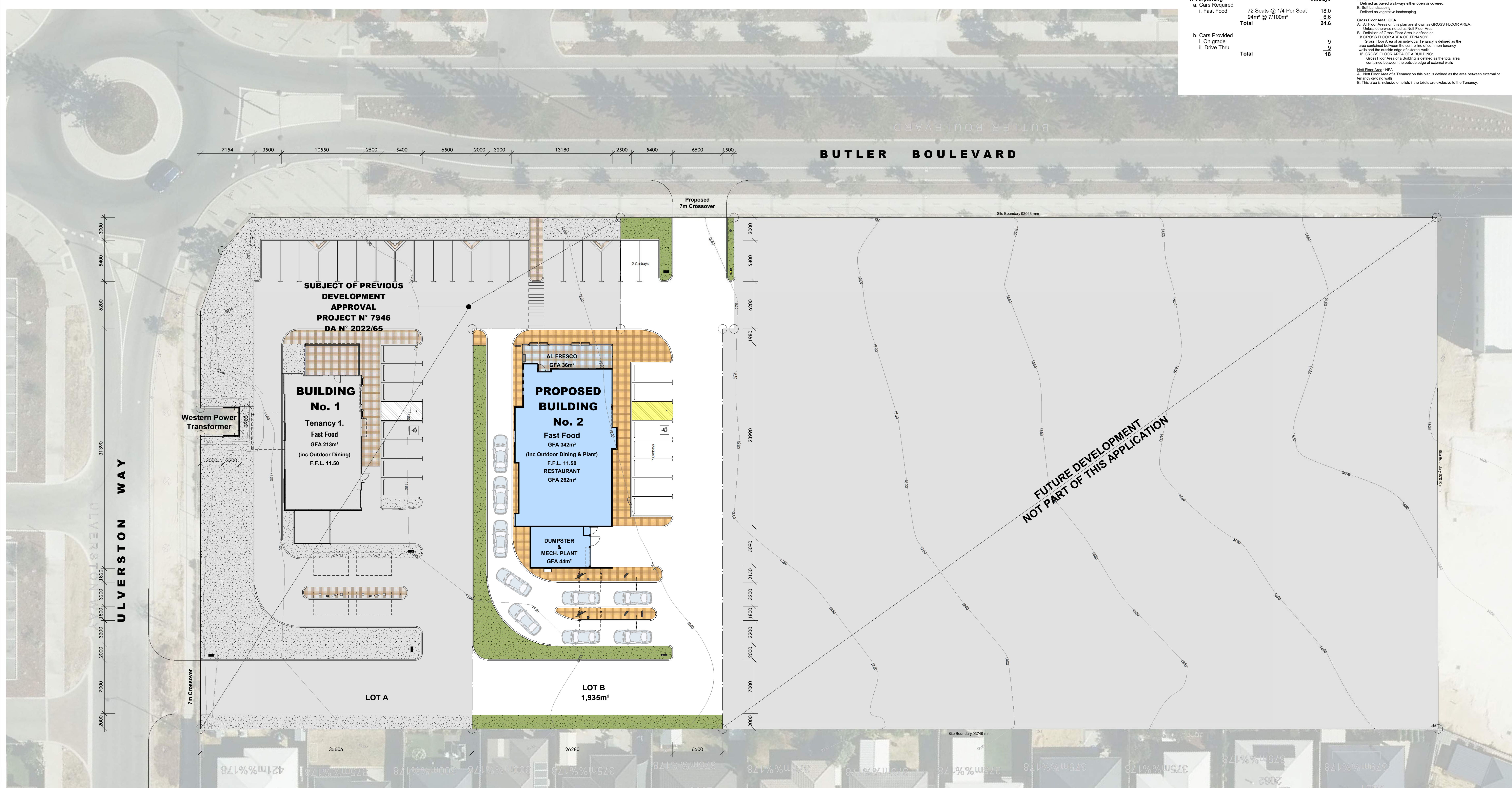
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SITE CRITERIA LOT B

1. Site Area		1,935m²	5. Composite Parking	
2. Landscaping			a. Required	
a. Required 8% Of Soft Landscaping		155m²	i. Lot A	23.0
b. Provided Soft		224m²	ii. Lot B	24.6
			Total	47.6
3. Floor Area (GFA)			b. Provided	
a. Fast Food		342m²	i. Lot A	34
			ii. Lot B	18
Total		342m²	Total	52
4. Carparking			Carbays	
a. Cars Required			A. Hard Landscaping	
i. Fast Food	72 Seats @ 1/4 Per Seat	18.0	Defined as paved walkways either open or covered.	
	94m ² @ 7/100m ²	6.6	B. Soft Landscaping	
Total		24.6	Defined as vegetative landscaping.	
b. Cars Provided			Gross Floor Area - GFA	
i. On grade		9	A. All Floor Areas on this plan are shown as GROSS FLOOR AREA.	
ii. Drive Thru		18	Unless otherwise noted as Net Floor Area.	
Total		18	GROSS FLOOR AREA OF TENANCY	
			Gross Floor Area of an individual Tenancy is defined as the	
			area contained between the centre line of common tenancy	
			walls and the outside edge of external walls	
			ii. GROSS FLOOR AREA OF A BUILDING	
			Gross Floor Area of a Building is defined as the total area	
			contained between the outside edge of external walls	
			Net Floor Area - NFA	
			A. Net Floor Area of a Tenancy on this plan is defined as the area between external or	
			tenancy dividing walls.	
			B. This area is inclusive of toilets if the toilets are exclusive to the Tenancy.	



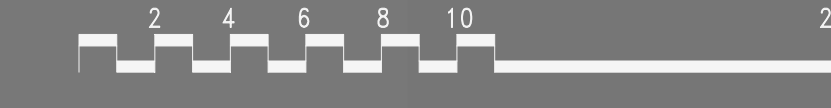
SITE PLAN - STAGE 2
SCALE: 1:200

PROPOSED FAST FOOD DEVELOPMENT STAGE 2
LOCATION: PART LOT 2076, Butler Boulevard, Butler
FOR: SHIMAL REALSTAR PTY LTD BY: VEND PROPERTY

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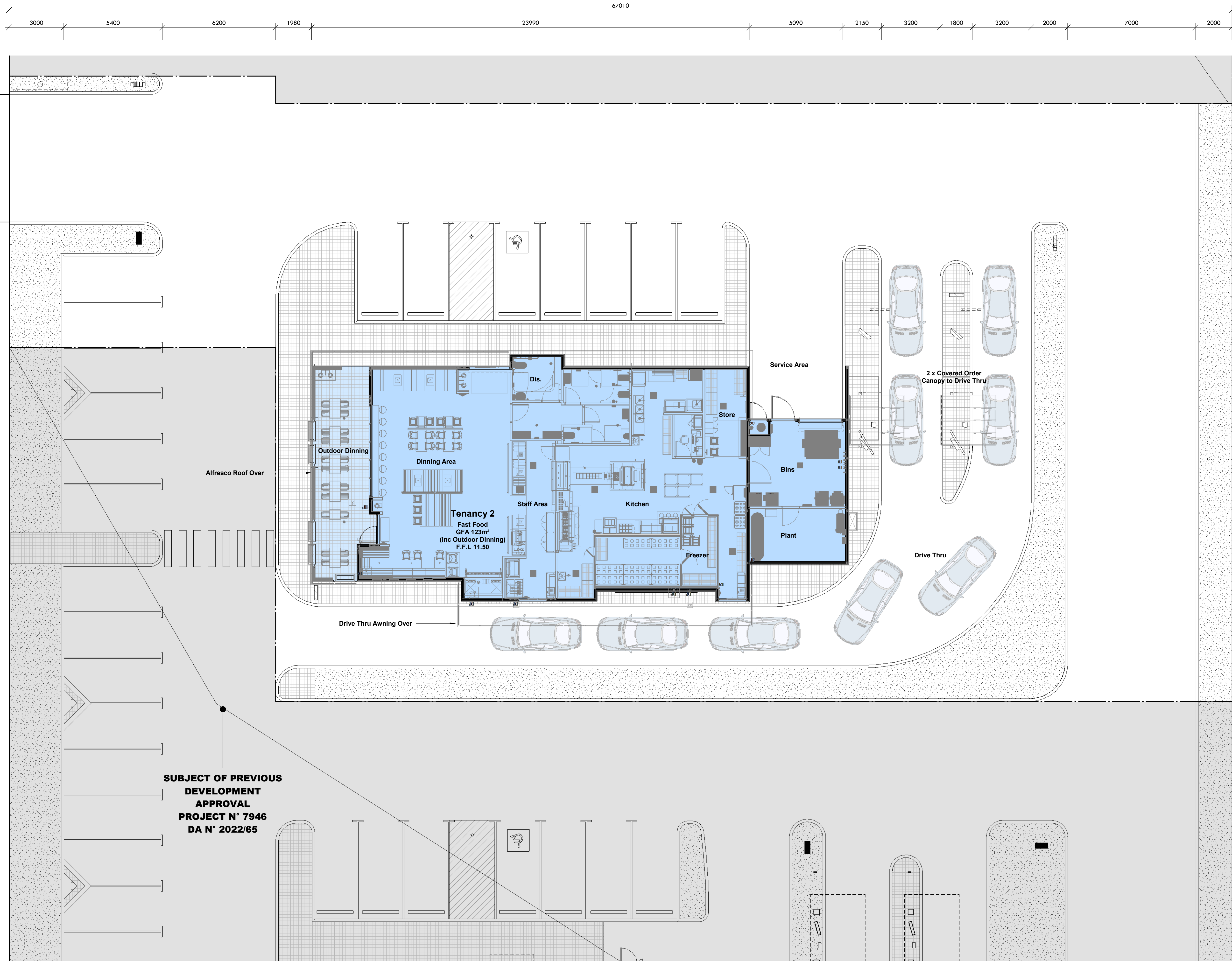


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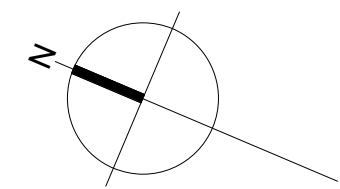
BUTLER BOULEVARD

14873
1873
5000
7000
1000

Proposed
7m Crossover



SUBJECT OF PREVIOUS
DEVELOPMENT
APPROVAL
PROJECT N° 7946
DA N° 2022/65



PROPOSED FAST FOOD FLOOR PLAN

SCALE: 1 : 100

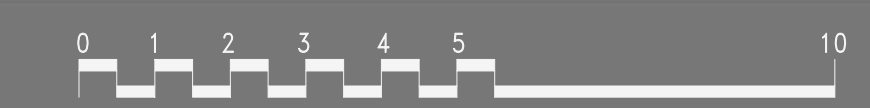
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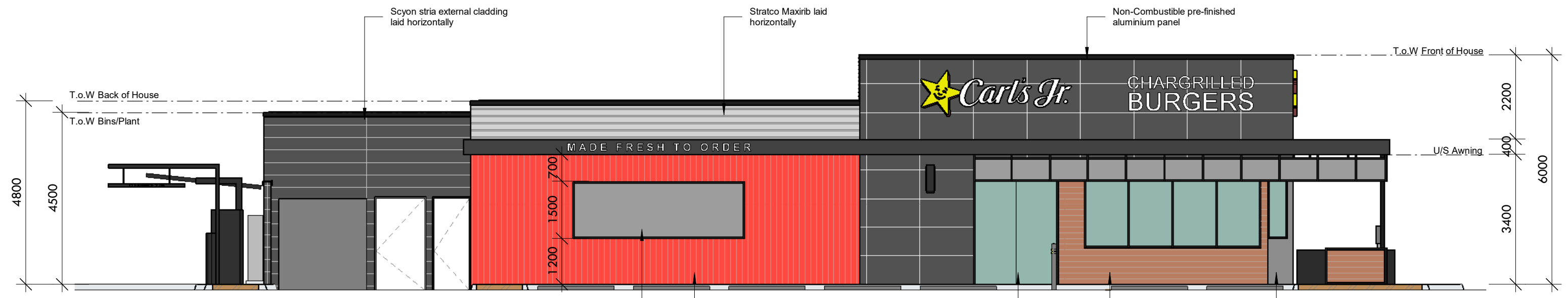
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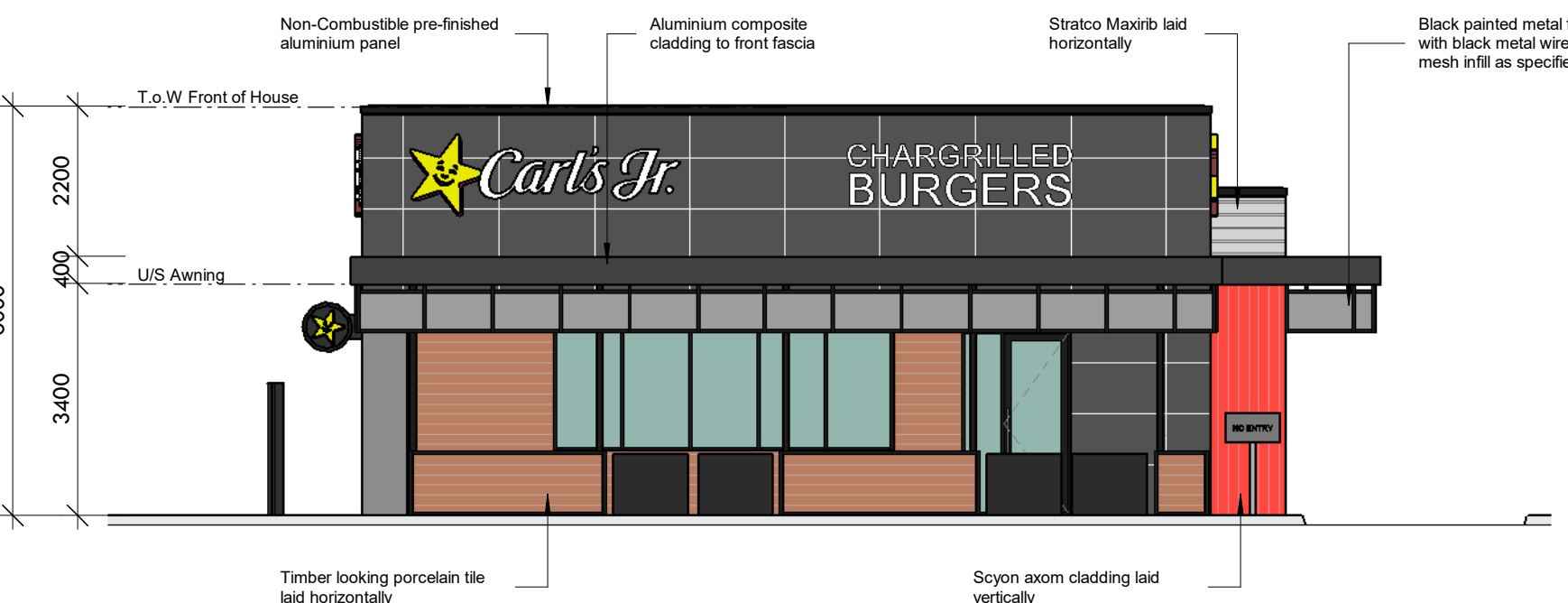
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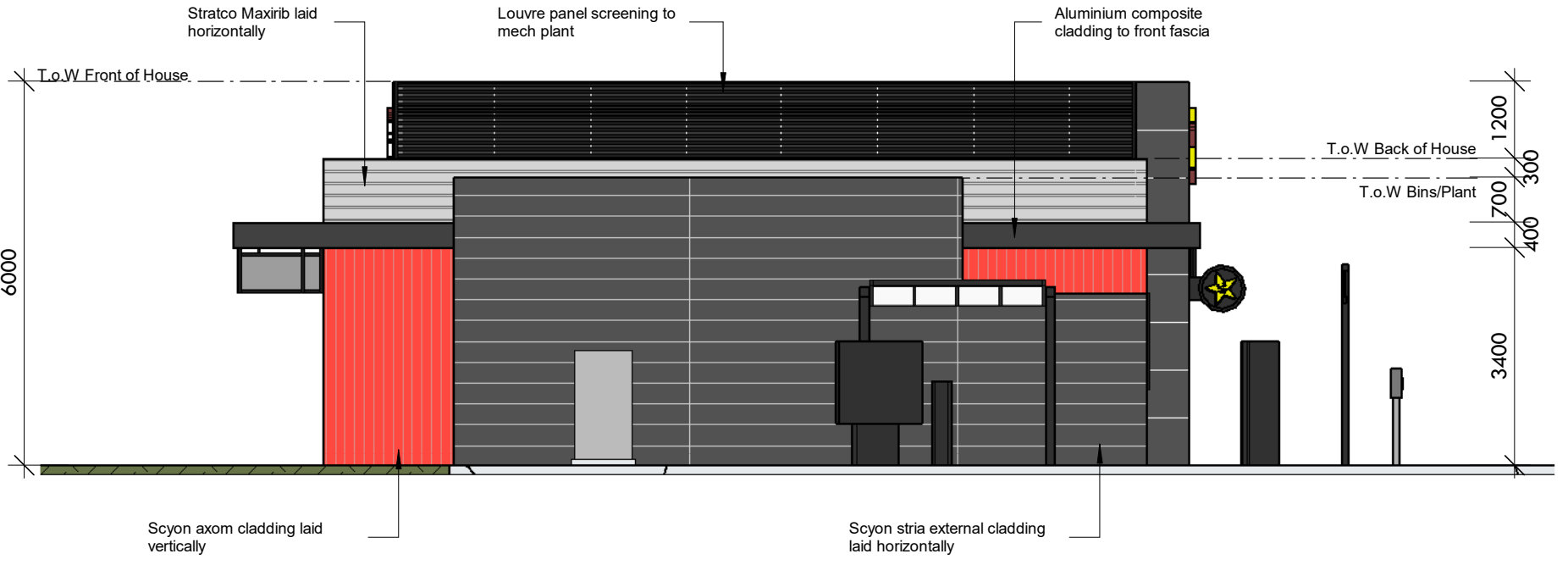
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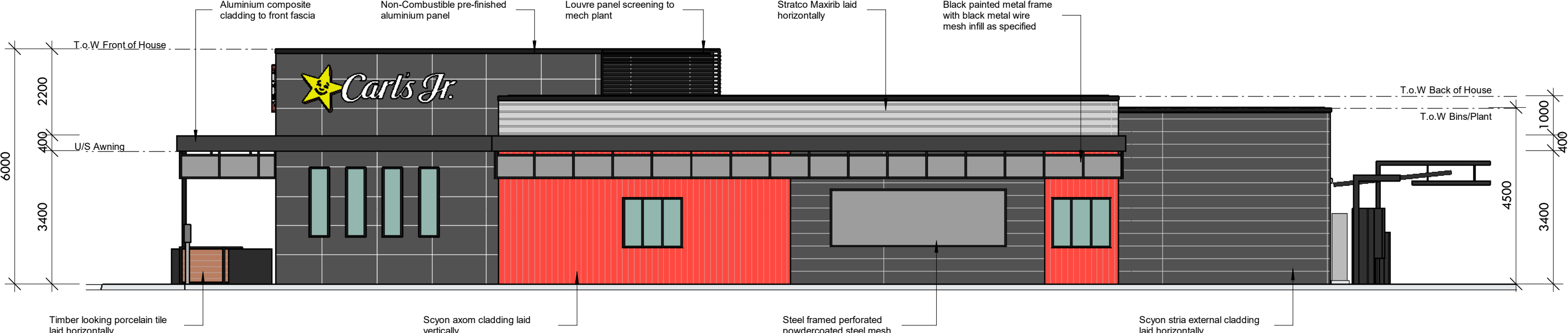
BUILDING 2 - EAST ELEVATION
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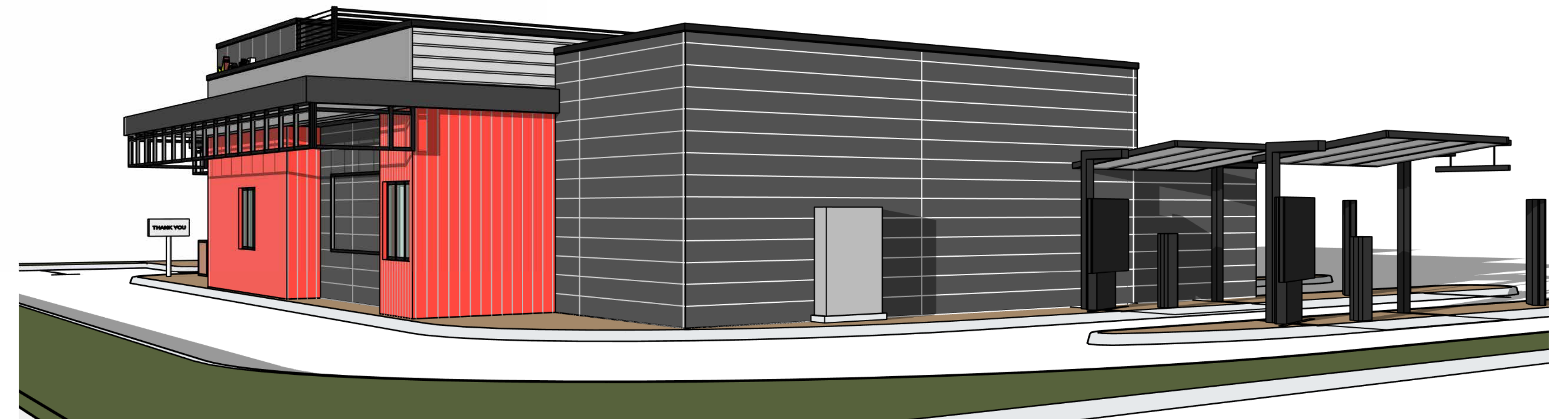
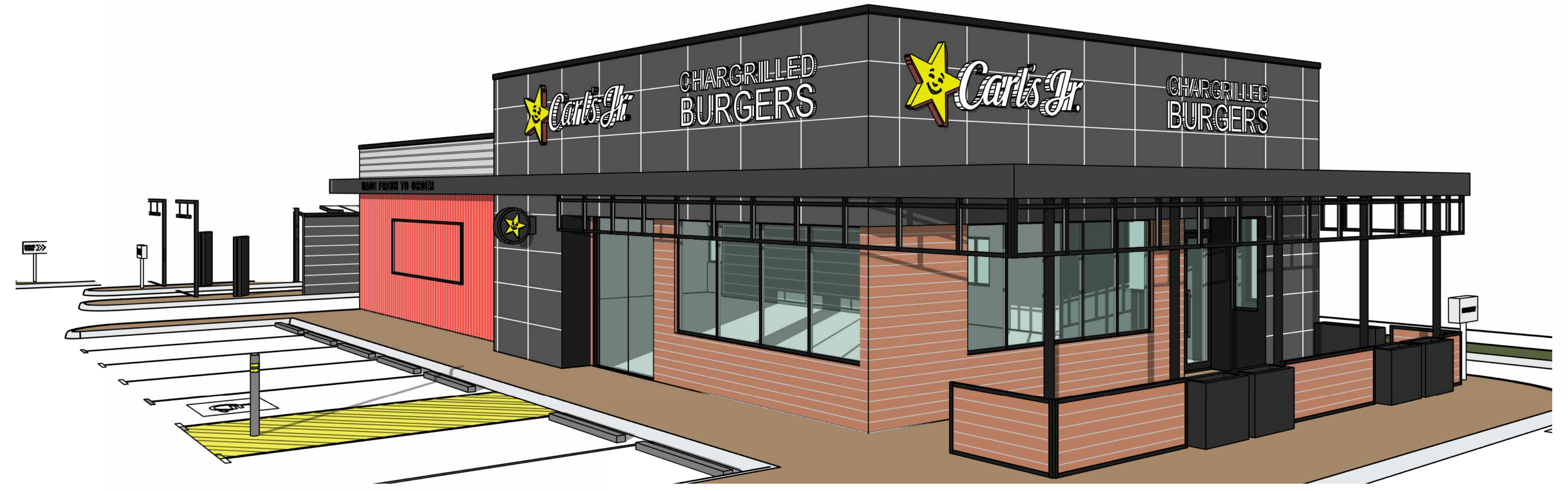
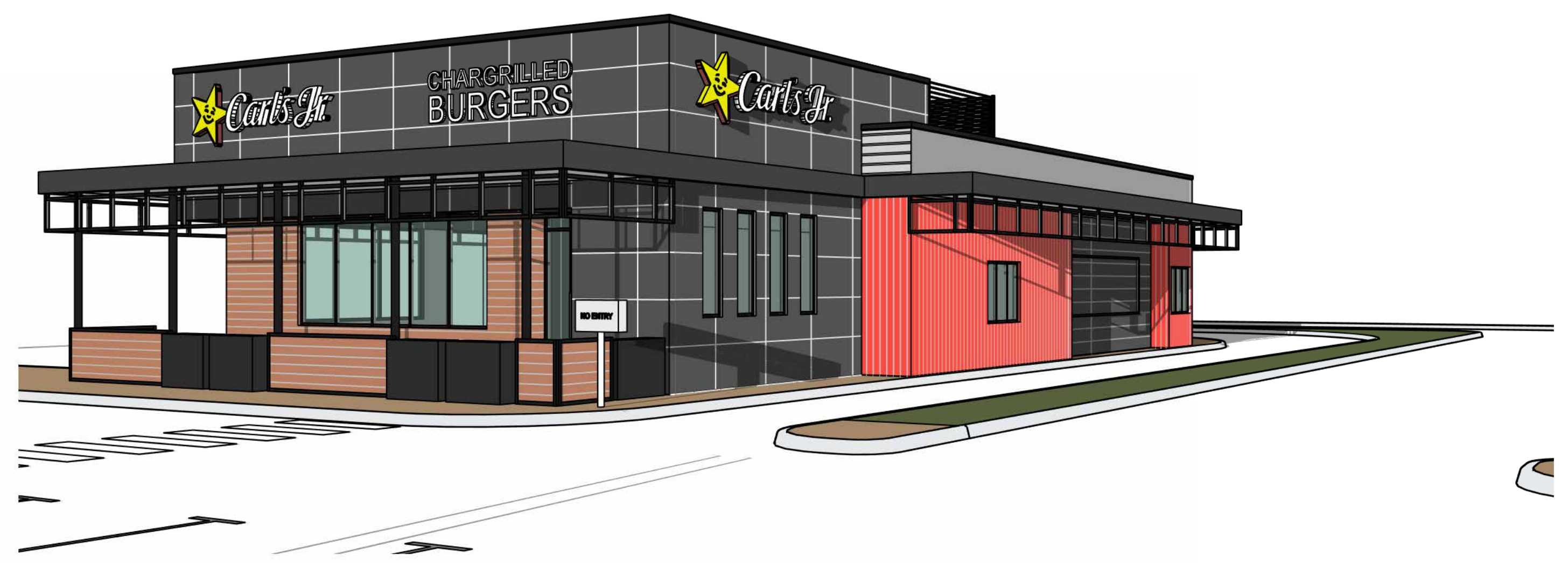
BUILDING 2 - NORTH ELEVATION
SCALE: 1: 100



BUILDING 2 - SOUTH ELEVATION
SCALE: 1: 100



BUILDING 2 - WEST ELEVATION
SCALE: 1: 100



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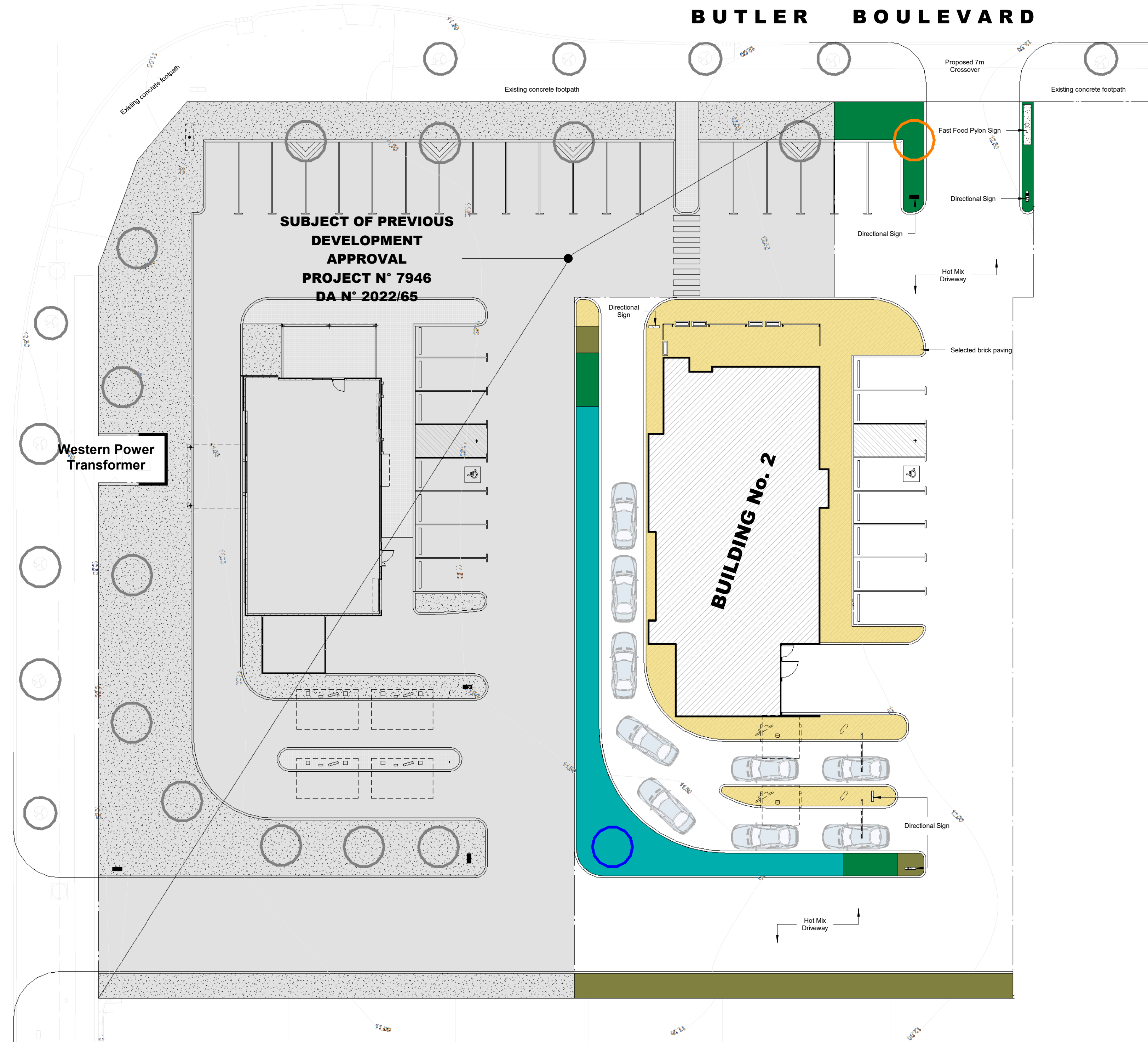
PROPOSED FAST FOOD DEVELOPMENT STAGE 2
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LANDSCAPE LEGEND

PLANTING SCHEDULE

Symbol	Description	Spacing	Size
	MIX 01 - Groundcovers	3 per sqm.	140mm
	MIX 02 - Low Hedging & Groundcovers	3 per sqm.	140mm
	MIX 03 - Low Shrubs & Groundcovers	3 per sqm.	140mm

TREE SCHEDULE

Symbol	Description	Spacing	Size
	TREE 01 - AGONIS FLEXUOSA	As shown	100L
	TREE 02 - CORYMBIA FICIFOLIA	As shown	100L
	TREE 03 - EUCALYPTUS TORQUATA	As shown	100L
	EXISTING TREE		

PLANTING MIX 01



PLANTING MIX 02



PLANTING MIX 03



TREE



NOTES

- Landscape Works**
 - 1.1 Confirm set out of all trees and kerbs prior to commencement of works.
 - 1.2 All areas are to be fine graded evenly to conform to kerb levels and surrounding finishes.
 - 1.3 Final grading shall be provided consistently self draining falls to surfaces. Surfaces shall be free from depressions, irregularities and awkward and noticeable changes in grade. Generally, grades shall deviate in level no greater than 20mm in one linear metre.
- Soil Preparation**
 - 2.1 Existing soil in planting areas shall be treated with soil wetting agent. Planted areas shall be spread with 50mm of approved standard soil conditioner that shall be ripped into existing soil to a min. depth of 200mm.
 - 2.2 Turf areas shall be evenly spread w/50mm of medium texture general purpose garden soil, to comply with AS 2223-1978, rip into existing site soil to a depth of 50mm.
- Planting**
 - 3.1 Planted areas shall be mulched with an organic mulch unless otherwise stated to a minimum depth of 100mm.
 - 3.2 Advanced trees shall be staked w/ 3 x 85mm Dia CCA treated pine poles. Posts shall be painted black and installed to a min depth of 600mm. Trees shall be secured to poles w/ 3 x rubber ties.
 - 3.3 Trees planted within 1000mm of boundary walls and/or parking areas shall be installed within 600mm depth nylax root barrier membrane. Membrane shall be installed as per manufacturers recommendations.
- Irrigation**
 - 4.1 All planting and grassing to be irrigated via a fully automatic system from mains.
 - 4.2 All turf to be irrigated via articulated risers. All shrubs to be irrigated w/ poly riser jets. All trees to be irrigated via bubblers.
 - 4.3 Controller to be located in bin store unless otherwise directed.
 - 4.4 System to overlap sufficiently to counteract wind blow and avoid drought shadow.
 - 4.5 Sleeves beneath paved surfaces to be provided by others.
 - 4.6 Irrigation system shall be dual program to allow turf and planting areas to be watered separately.



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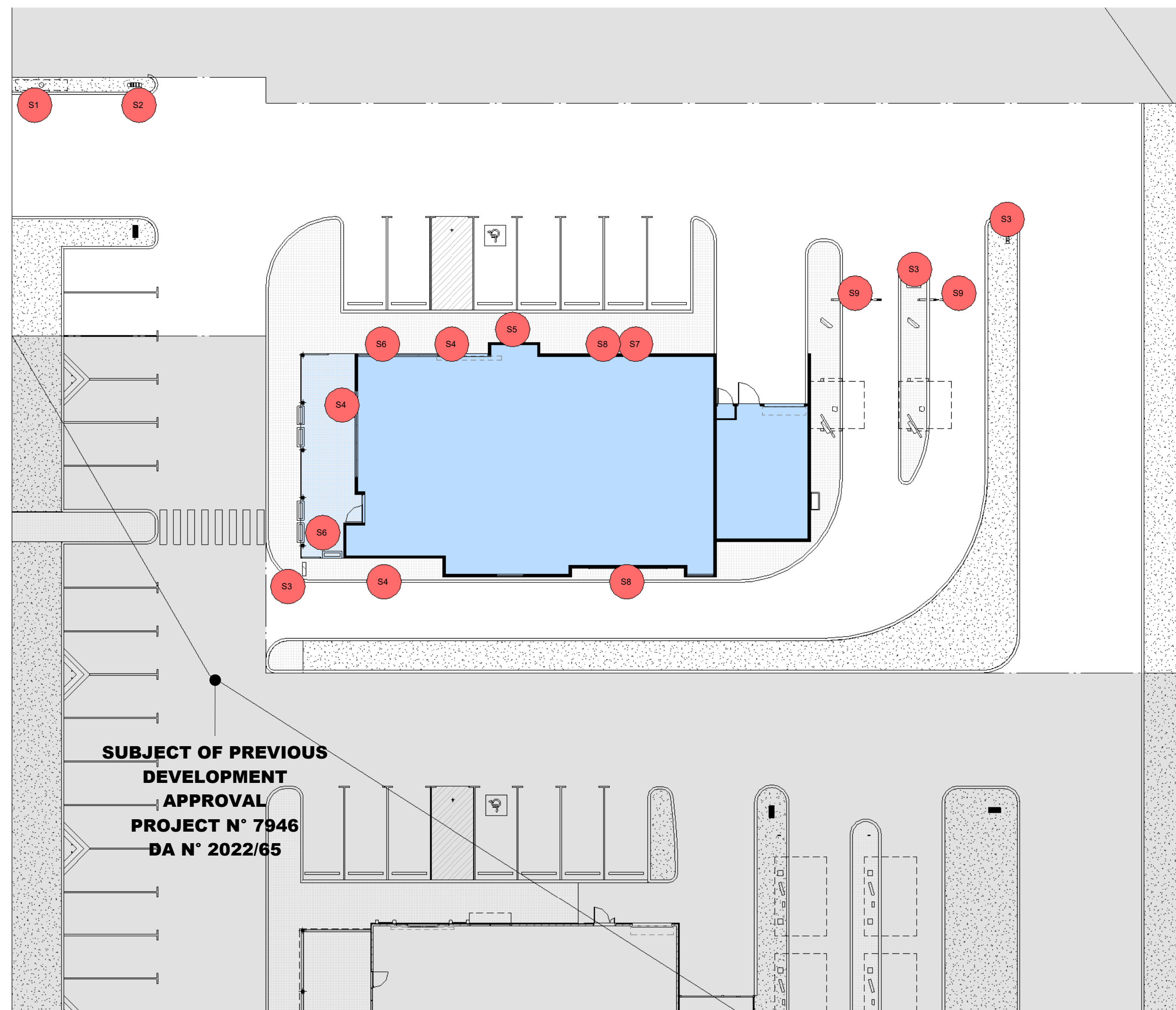
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PROPOSED FAST FOOD DEVELOPMENT STAGE 2
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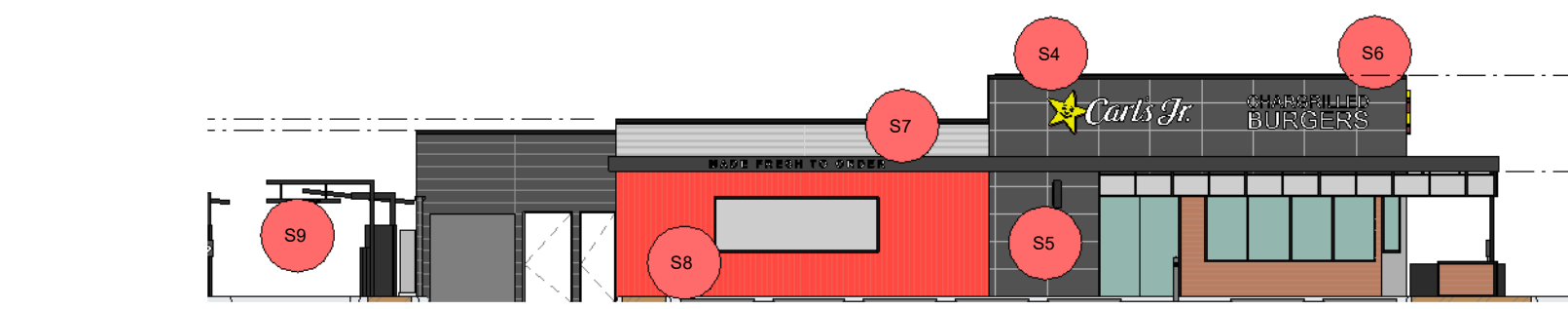
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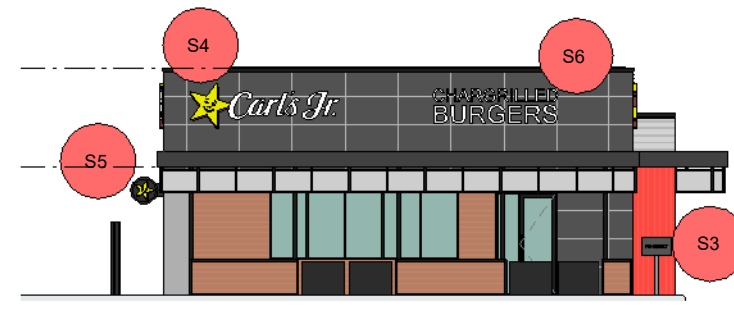
PROPOSED SIGNAGE LOCATIONS

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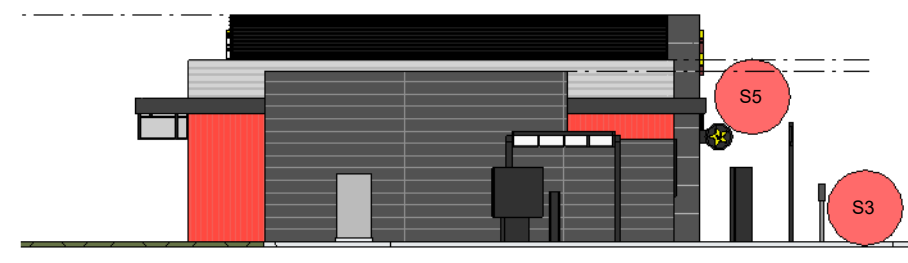
BUILDING 2 - EAST ELEVATION SIGNAGE

SCALE: 1 : 200



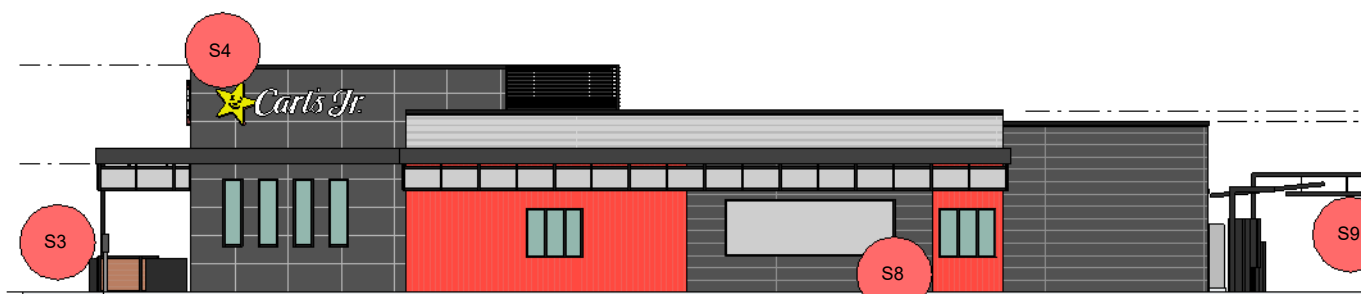
BUILDING 2 - NORTH ELEVATION SIGNAGE

SCALE: 1 : 200



BUILDING 2 - SOUTH ELEVATION SIGNAGE

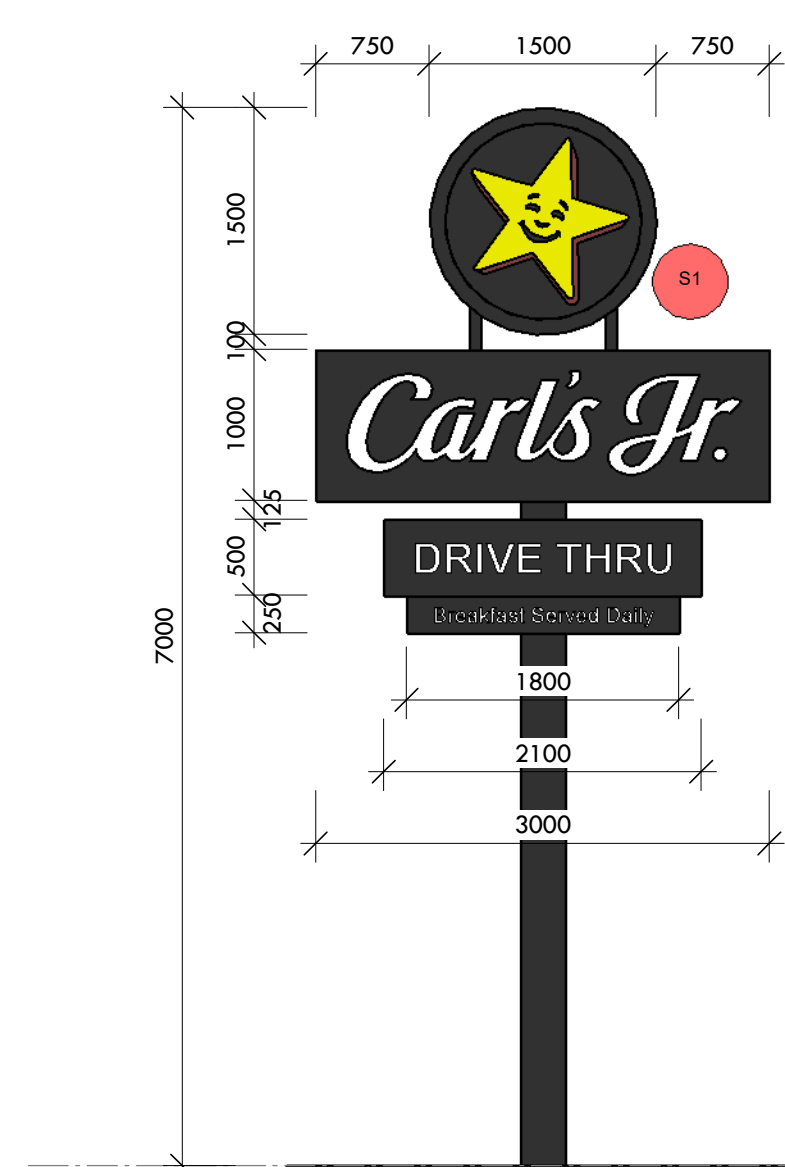
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BUILDING 2 - WEST ELEVATION SIGNAGE

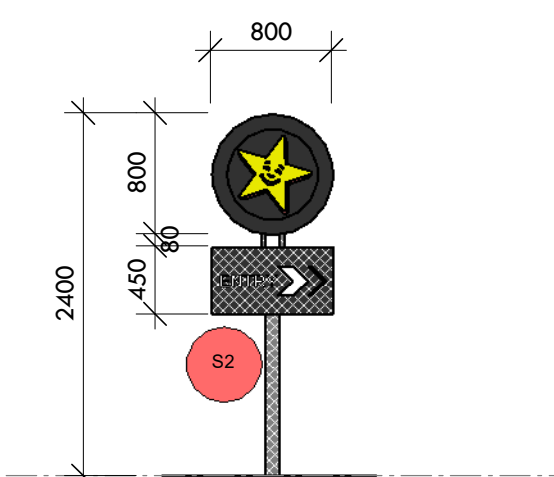
SCALE: 1 : 200

No.	Location	Signage/Graphic	Description
S1	1 x Butler Blvd Entry	Refer Elevations	Internally illuminated Pylon Sign. Client to confirm details.
S2	1 x Butler Blvd Entry	Refer Elevations	Internally illuminated Directional Sign. Client to confirm details.
S3	1 x Corner of drive way 1 x Island of Drive Thru 1 x Exit of Drive Thru	Refer Elevations	Internally illuminated Directional Sign. Client to confirm details.
S4	1 x Above Entry 1 x Above Dining roof 1 x Above Drive Thru		Carl's Junior script logo and star 1.2m H x 4.0m W building sign Client to confirm details.
S5	1 x Above Entry		Star blade sign 0.75m Ø building sign Client to confirm details.
S6	1 x Above Entry 1 x Above Dining Roof		Chargilled burgers tagline 0.3m H x 3.4m W building sign Client to confirm details.
S7	1 x Above parking wall		Made fresh to order tagline 0.2m H x 4.80m W building sign Client to confirm details.
S8	1 x Drive thru Wall 1 x Parking Wall		Promo/offer banner 3 x banners 1190 H x 840 W (Nom) Client to confirm details.
S9	2 x Drive thru Height Bars		Height restrictor 3.12m H x 2.9m W Client to confirm details.



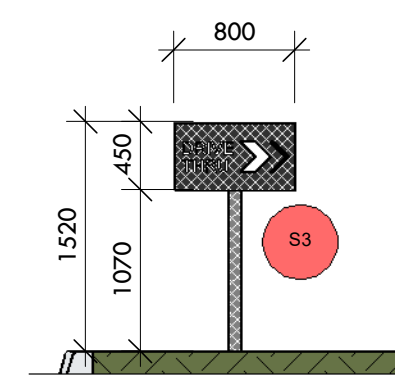
TENANT PYLON SIGN - S1

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TENANT ENTRY SIGN - S2

SCALE: 1 : 50



TENANT DIRECTIONAL SIGN - S3

SCALE: 1 : 50

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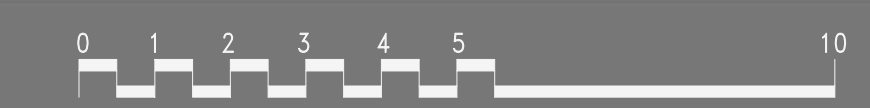
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Appendix B

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 (Slow) time weighting as specified in IEC 61672-1:2002. 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 (Fast) time weighting as specified in IEC 61672-1:2002. This is used when assessing the presence of modulation only.

L_{APeak}

This is the greatest absolute instantaneous sound pressure in decibels using the A frequency weighting as specified in IEC 61672-1:2002.

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.

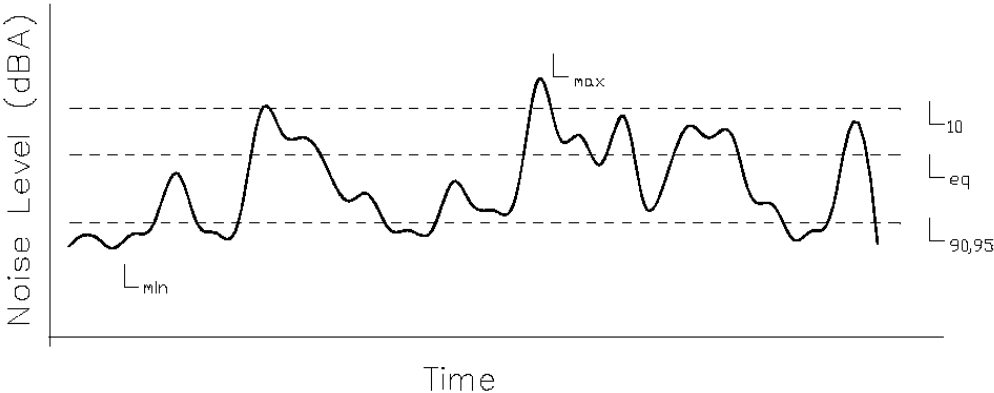
Ambient Noise

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.

Chart of Noise Level Descriptors



Typical Noise Levels

