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380 Hawthorn Road, Caulfield South

Acoustic Assessment

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0	25/06/2019	20190681.1/2506A/R0/SHN	SHN	BAW	
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2	14/09/2020	20190681.1/1409A/R2/SHN	SHN	BAW	BAW

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1 INTRODUCTION

Acoustic Logic Consultancy (ALC) has been engaged by Olithorn Pty Ltd to undertake an acoustic assessment of the proposed mixed use retail/commercial and residential development located at 380 Hawthorn Road, Caulfield South.

The assessment addresses external noise intrusion associated with the adjoining roads, the proposed mechanical plant and equipment serving the development. The assessment has been conducted based on the following documentation.

Table 1 – Referenced Documents

Prepared By	Document	Date
Armsby Architects	Drawing Number TP02 – TP304	17/09/2020
Victoria Planning Provisions / Glen Eira Planning Scheme	Clause 58.04-3	2017
Victorian Government Publication	State Environment Protection Policy No. N-1 (SEPP N-1)	1989
SAI Global	Australian/New Zealand Standard AS/NZS 2107:2016	2016

2 SITE DESCRIPTION

The subject development is located at 380 Hawthorn Road, Caulfield South. It is bounded by Hawthorn Road to the east, Olive Street and a mixed commercial and residential development to the north and existing residential dwellings to the south and west. The proposed development consists of 2 basement level car parks, ground floor retail/commercial tenancy and including 4 levels of residential tenancies.

Figure 1 below details the subject site and surrounding environment.

Figure 1 - Subject site and surrounding environments (source: Google Maps)

2.1 LOCAL NOISE SOURCES

The following observations were made with respect to the subject site and its surrounding environment;

1. The acoustic environment surrounding the site is dominated by traffic and tram movement along Hawthorn Road to the east of the site.

2. Vehicle repair centre "Go Rapid Caulfield" is located approximately 50 metres north of the subject site. During site inspections the operation of the repair centre was inaudible at the development site, therefore no further acoustic investigation is required.

3 ENVIRONMENTAL NOISE DESCRIPTORS

Environmental noise constantly varies in level, due to fluctuations in local noise sources including traffic and tram. Accordingly, a 15-minute measurement interval is normally utilised. Over this period, noise levels are monitored on a continuous basis and statistical and integrating techniques are used to determine noise description parameters.

In the case of environmental noise three principal measurement parameters are used, namely L_{10}, L_{90} and L_{eq}.

The L_{10} and L_{90} measurement parameters are statistical levels that represent the average maximum and average minimum noise levels respectively, over the measurement intervals.

The L_{10} parameter is commonly used to measure noise produced by a particular intrusive noise source since it represents the average of the loudest noise levels produced by the source.

Conversely, the L_{90} level (which is commonly referred to as the background noise level) represents the noise level heard in the quieter periods during a measurement interval. The L_{90} parameter is used to set the allowable noise level for new, potentially intrusive noise sources since the disturbance caused by the new source depends on how audible it is above the pre-existing noise environment, particularly during quiet periods, as represented by the L_{90} level.

The L_{eq} parameter represents the average noise energy during a measurement period. This parameter is derived by integrating the noise levels measured over the measurement period. L_{eq} is important in the assessment of traffic and rail noise impact as it closely corresponds with human perception of a changing noise environment; such is the character of industrial noise.

The L_1 parameter (or the noise level exceeded for 1% of the time) is used during the night period to assess potential sleep arousal effects due to transient noise sources.

4 NOISE LEVEL MEASUREMENTS

Noise level measurements were conducted at the locations indicated in Figure 1 and described below.

- Location 1 – An unattended noise monitor was installed on the eastern boundary of the project site. The microphone of the noise monitor was approximately 2m above grade and the measurements were affected by façade reflections.

- Location 2 – An unattended noise monitor was installed on the northern boundary of the project site. The microphone of the noise monitor was 1.5m above grade. The measurements were affected by façade reflections.

- of Location 3 – manned noise level measurement traffic and tram movements was conducted along Hawthorn road in line with the eastern boundary of the subject site. Measurements were conducted at 1.5m above grade and were affected by facade reflections.

- Location 4 – manned noise level measurement of traffic movements was conducted along Olive Street in line with the northern boundary of the subject site. Measurements were conducted at 1.5m above grade and were affected by facade reflections.

4.1 MEASUREMENT EQUIPMENT

A Norsonic Nor140 Sound Level Analyser was used for the manned noise level measurements. The equipment was calibrated at the beginning and the end of the measurement using a B&K 4231 calibrator; no significant drift was detected. All measurements were taken on fast response mode.

The long-term noise monitoring was conducted using an ARL-315 noise monitor and an Ngara Noise Monitor. The equipment was calibrated at the beginning and the end of the measurement using a B&K 4231 calibrator; no significant drift was detected. All measurements were taken on fast response mode.

4.2 MEASUREMENT DATE AND TIME

The measurements were conducted as the following:

- Unattended noise measurements were conducted between 21 and 26 June 2019 at Location 1 and 2 as shown in Figure 1.

- Manned traffic and tram noise measurements at the subject site was conducted on 26 June 2019 between 03:30pm and 05:30pm.

4.3 MEASUREMENT RESULTS

4.3.1 Traffic Noise Measurements

Traffic and tram noise levels measured adjacent the site is provided in Table 2 and 3 below.

Table 2 – Measured Traffic/Tram Noise Levels – Manned Measurements

Measurement Location[1]	Date and Time of Measurements	Measured Noise Levels $L_{eq,\ 15mins}$ dB(A)
Location 3 Facing Hawthorn Road	26/06/2019 (03:55pm-04:10pm)	67[2]
	26/06/2019 (04:10pm-04:25pm)	67[2]
Location 3 Facing Olive Street	26/06/2019 (04:30pm-04:45pm)	56[2]

Note 1 – Refer Figure 1 for measurement locations.
Note 2 – Measured noise levels presented have been corrected -2.5 dB(A) for façade reflections

Table 3 – Measured Traffic/Tram Noise Levels – Unattended Measurements

Location[1]	Period	Measured Noise Levels
Location 1 Facing Hawthorn Road	Day (6.00 – 22.00)	65 $L_{eq,15hr}$ dB (A)
	Night (22.00 – 6.00)	59 $L_{eq,9hr}$ dB (A)

Note 1 – Refer Figure 1 for measurement locations

4.3.2 Background Noise Levels

Background noise level measurements were conducted at Location 2 as indicated in Figure 1 and presented below in Table 4.

Table 4 – Measured Ambient Noise Levels

Period	Time	Measured Background $L_{90,15min}$ dB(A)[1]
Day	7am – 6pm (Mon – Fri) 7am – 1pm (Sat)	37
Evening	6pm – 10pm (Mon – Fri) 1pm – 10pm (Sat) 7am – 10pm (Sun)	33
Night	6am – 7am	33
	10pm – 7am	28[2]

Note 1 - Measurements have been corrected -2.5dB for façade reflections.
Note 2 - Lowest noise level during night period (e.g. between 2am and 3am).

5 ASSESSMENT CRITERIA

5.1 STANDARD D16 AT CLAUSE 58.04-3

Standard D16 of Clause 58.04-3 of the Glen Eira Planning Scheme has the following objective for noise impacts:

To contain noise sources in developments that may affect existing dwellings.

To protect residents from external and internal noise sources.

Standard D16

Noise sources, such as mechanical plants should not be located near bedrooms of immediately adjacent existing dwellings.

The layout of new dwellings and buildings should minimise noise transmission within the site.

Noise sensitive rooms (such as living areas and bedrooms) should be located to avoid noise impacts from mechanical plants, lifts, building services, non-residential uses, car parking, communal areas and other dwellings.

New dwellings should be designed and constructed to include acoustic attenuation measures to reduce noise levels from off-site noise sources.

Buildings within a noise influence area specified in Table D3 should be designed and constructed to achieve the following noise levels:

- Not greater than 35dB(A) for bedrooms, assessed as an LAeq,8h from 10pm to 6am.
- Not greater than 40dB(A) for living areas, assessed LAeq,16h from 6am to 10pm.

Buildings, or part of a building screened from a noise source by an existing solid structure, or the natural topography of the land, do not need to meet the specified noise level requirements.

Noise levels should be assessed in unfurnished rooms with a finished floor and the windows closed.

Table D3 Noise influence area

Noise Source	***Noise influence area***
Zone interface	
Industry	*300 metres from the industrial 1, 2 and 3 zone boundaries*
Roads	
Freeways, tollways and other roads carrying 40,000 Annual Average Daily Traffic Volume	*300 metres from the nearest trafficable lane*
Railways	
Railway servicing passengers in Victoria	*80 metres from the centre of the nearest track*
Railway servicing freight outside Metropolitan Melbourne	*80 metres from the centre of the nearest track*
Railway servicing freight in Metropolitan Melbourne	*135 metres from the centre of the nearest track*

Note: The noise influence area should be measured from the closest part of the building to the noise source.

Decision guidelines

Before deciding on an application, the responsible authority must consider:

- *The design response.*
- *Whether it can be demonstrated that the design treatment incorporated into the development meets the specified noise levels or an acoustic report by a suitably qualified consultant submitted with the application.*
- *Whether the impact of potential noise sources within a development have been mitigated through design, location and siting.*
- *Whether the layout of rooms within a dwelling mitigates noise transfer within and between dwellings.*
- *Whether an alternative design meets the relevant objectives having regard to the amenity of the dwelling and the site context.*

Based on these conditions, the subject site has been reviewed as follows:

1. Noise sources, such as mechanical plants should not be located near bedrooms of immediately adjacent existing dwellings
2. The layout of new dwellings and buildings should minimise noise transmission within the site.
3. Noise sensitive rooms (such as living areas and bedrooms) should be located to avoid noise impacts from mechanical plants, lifts, building services, non-residential uses, car parking, communal areas and other dwellings.

The above objectives have been considered during design of the subject development by the design team and been implemented as far as reasonably practicable.

4. New dwellings should be designed and constructed to include acoustic attenuation measures to reduce noise levels from off-site noise sources.

Road traffic from Hawthorn Road will be assessed against the noise level requirements of AS2107:2016.

Buildings within a noise influence area specified in Table D3 should be designed and constructed to achieve the following noise levels:

1. The development is **not** within 300m of an industrial zone.
2. The development is **not** within 300m of a freeway, tollway or road carrying an AADT >40,000
3. The development is within **not** within 80m of railway servicing passengers.

The noise level criteria recommended in Clause 58.04-3 does not apply to this development. As such, road traffic from Hawthorn Road will be assessed against the noise level requirements of AS2107:2016 as set out below.

5.2 AS/NZS 2107:2016

Australian Standard AS/NZS2107:2016 *"Recommended Design Sound Levels and Reverberation Times for Building Interiors"* sets out recommended design sound levels for residential developments depending on locality to minor or major roads. Table 5 below details the criterion set for this development;

Table 5 – AS/NZS 2107:2016 Criteria for Traffic

Location	Required Internal Noise Level[1]	
	dB(A) $L_{eq\ 1hr}$ (7am – 10pm)	dB(A) $L_{eq\ 1hr}$ (10pm – 7am)
Bedrooms	45[2]	40
Living Areas	45	N/A

Note 1 – Assessment is based on apartments suitably furnished ready for occupation.
Note 2 – Bedrooms assessed as living rooms outside 10pm-7am.

5.3 SEPP N-1

To ensure noise emissions from plant/equipment do not impact adversely on the amenity of nearby residents, the proposed development should where possible be designed to comply with SEPP N-1.

It is noted that SEPP N-1 provides assessment criteria applied to external areas on the proposed development site. (SEPP N-1 details the methodology to be used in assessing environmental noise emissions such that protection of residential amenity may be preserved. SEPP are statutory instruments that are required to be complied with both private individuals and public and private sector organisations. SEPP N-1 includes both Schedule A and B that provide procedures to measure noise from premises and to determine noise emission limits respectively. To determine the assessment criteria both the 'Zoning' level and ambient background noise levels are required to determine if the background noise level is neutral, high or low.

5.3.1 Zoning Level

The 'Zoning' level is determined by the Influencing Factor (IF) and is calculated by the formula nominated in B.2.4 of SEPP N-1. The IF is calculated from the proportion of industrial and commercial land around noise sensitive areas (in this case residential premises). Review of the surrounding area indicates an IF of approximately **0.21** which results in the Zoning limits detailed in Table 6 below.

Table 6 – Zoning Levels

Period	Zoning Level
Day time	54
Evening	48
Night time	43

5.3.2 Noise Limits

Table 7 summarizes the environmental noise assessment criteria for this development. Assessment has been conducted in accordance with SEPP N-1 based on both the zoning levels and the measured background noise levels.

Table 7 – Environmental Noise Limits

Period	Time	Measured Background $L_{90,15min}$ dB(A)	Zoning limit	Classification	Project Noise Limits L_{eq} dB(A)
Day	7am – 6pm (Mon – Fri) 7am – 1pm (Sat)	37	54	Low	**50**
Evening	6pm – 10pm (Mon – Fri) 1pm – 10pm (Sat) 7am – 10pm (Sun)	33	48	Low	**43**
Night	6am – 7am	33	43	Low	**41**
	10pm – 7am	28	43	Low	**38**

6 EVALUATION OF EXTERNAL NOISE INTRUSION

Internal noise levels will primarily be as a result of noise transfer through the windows, doors and roof as these are relatively light building elements that offer less resistance to the transmission of sound. Walls that are proposed to be heavy masonry elements will not require upgrading.

The predicted noise levels through the windows, doors and roof are discussed below. The predicted noise levels have been based on the expected level and spectral characteristics of the external noise, the area of building elements exposed to traffic noise, the absorption characteristics of the rooms and the noise reduction performance of the building elements.

Glazing/façade treatment was determined based on the measured noise levels and transmission loss of the façade. The constructions set out below are necessary for the satisfactory control of external noise.

6.1 RECOMMENDED GLAZING

The minimum glazing requirements schedule for this development is detailed in **Appendix 1 – Façade Mark-up**. The glass thicknesses shown in the schedule do not consider thermal, structural, safety or any other requirements other than acoustic requirements and thus may require upgrading for reasons other than noise attenuation in some instances. In these instances, increasing the glass thickness beyond the acoustic requirement will be acceptable. Where the glazing thickness has not been specified, standard glazing will be acceptable.

Table 8 below details the minimum Weighted Sound Reduction Index (Rw) performance requirements for the glazing assembly installed. Where open-able windows or sliding doors are installed, the total Rw performance of the system shall not be lower than the values listed in Table 8**.** It is noted that the system supplied shall meet the overall minimum Rw ratings nominated based on a laboratory test report for the system. If an alternative system is proposed the system shall be reviewed and will require approval by a suitably qualified acoustic consultant to ensure that the proposed system is acceptable and will ensure compliance with the nominated internal noise design criteria.

Table 8 – Minimum External Glazing Requirements / Performance

Location	Required Glazing Construction[1]	Minimum Rw of Installed Window System	Acoustic Seals[2]
Refer Appendix 1 – Façade Mark-up	6mm glass or 6/12/6 IGU	29	Yes
	6.38mm lam or 6/12/10.38 lam IGU	31	Yes
	10.38mm lam or 6/12/10.38 lam IGU	35	Yes

6.2 EXTERNAL WALLS

Concrete or masonry walls will be sufficient to address external traffic noise intrusion and will not require further acoustic treatment. Lightweight external walls shall be constructed as per Figure 2 below. For extent of treatment, refer to Appendix 1.

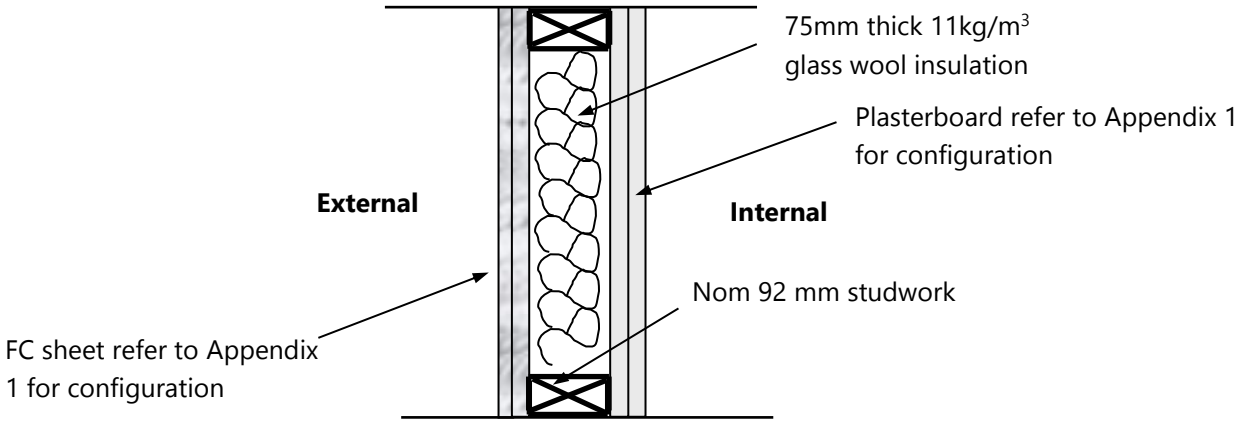


Figure 2 - Lightweight Wall Construction

Penetrations in walls must be sealed gap free with a flexible sealant. Any ventilation openings in should be acoustically treated to maintain the acoustic performance of the external wall construction.

6.3 ROOF

The roof is proposed to be constructed of concrete and will not require further acoustic treatment. If a lightweight roof construction is proposed it shall be reviewed by a suitable qualified acoustic consultant.

7 MECHANICAL PLANT AND EQUIPMENT SERVING THE DEVELOPMENT

To ensure that noise emissions from plant and equipment serving the development do not impact adversely on the amenity of neighbouring residential properties, noise emissions from the mechanical plant and equipment shall comply with SEPP N-1.

It is noted that plant and equipment selections/design have not yet been finalised. Therefore, to ensure amenity of nearby noise sensitive receivers is preserved, mechanical plant and equipment shall be designed to ensure compliance with the noise level criterion nominated in Table 7. This will be achieved by the use of standard acoustic treatment such as internally lined ductwork, acoustic attenuators, variable speed drives, solid screens and vibration mounts.

8 CONCLUSION

This report details our acoustic assessment for the proposed development site located at 380 Hawthorn Road, Caulfield South. The recommendations detailed in Section 6, 7 and 8 will ensure compliance with criteria detailed in Section 5.

We trust this information is satisfactory. Please contact us should you have any further queries.

Yours faithfully,

Acoustic Logic Consultancy Pty Ltd
Sheran Nana

APPENDIX 1 – FAÇADE MARKUP

ACOUSTIC LOGIC

Rev: 3

Date: 22/09/2020

Glazing Schedule

- (green) 6mm or 6/12/6 IGU
- (blue) 6.38mm lam or 6/12/6.38mm lam IGU
- (red) 10.38mm lam or 6/12/10.38mm lam IGU

All glazing to be installed with acoustic seals equal to Schlegel Q-lon bulb seals. Note that Mohair seals will not be acoustically acceptable.

External Wall Types

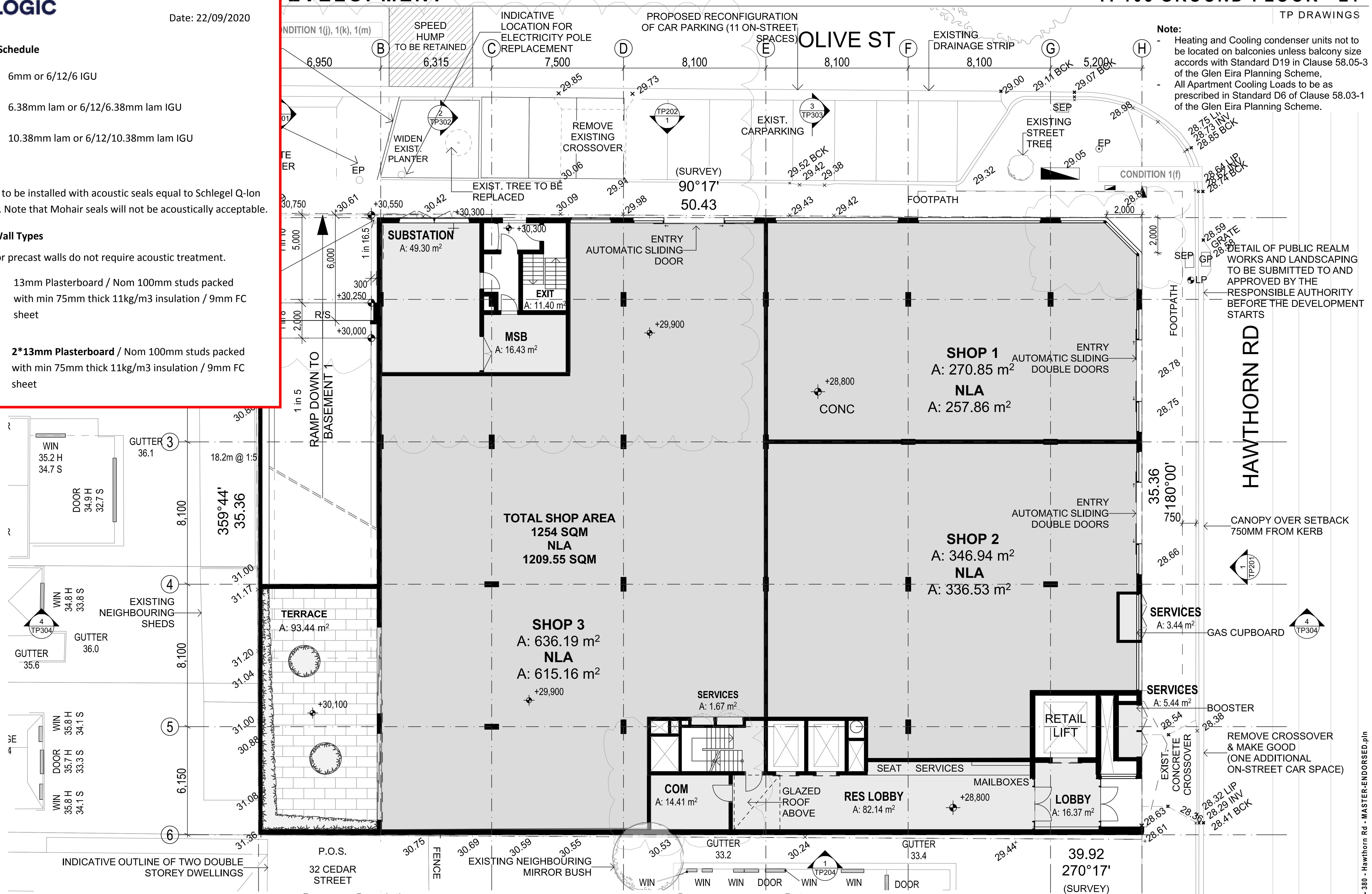
Masonry or precast walls do not require acoustic treatment.

(unmarked)	13mm Plasterboard / Nom 100mm studs packed with min 75mm thick 11kg/m3 insulation / 9mm FC sheet
(purple)	**2*13mm Plasterboard** / Nom 100mm studs packed with min 75mm thick 11kg/m3 insulation / 9mm FC sheet

DEVELOPMENT — TP105 GROUND FLOOR - L1

TP DRAWINGS

Note:
- Heating and Cooling condenser units not to be located on balconies unless balcony size accords with Standard D19 in Clause 58.05-3 of the Glen Eira Planning Scheme,
- All Apartment Cooling Loads to be as prescribed in Standard D6 of Clause 58.03-1 of the Glen Eira Planning Scheme.



OLIVE ST
HAWTHORN RD
SPEED HUMP TO BE RETAINED
INDICATIVE LOCATION FOR ELECTRICITY POLE REPLACEMENT
PROPOSED RECONFIGURATION OF CAR PARKING (11 ON-STREET SPACES)
EXISTING DRAINAGE STRIP
WIDEN EXIST. PLANTER
REMOVE EXISTING CROSSOVER
EXIST. CARPARKING
EXISTING STREET TREE
EXIST. TREE TO BE REPLACED
(SURVEY) 90°17' 50.43
FOOTPATH
CONDITION 1(f)
SUBSTATION A: 49.30 m²
EXIT A: 11.40 m²
MSB A: 16.43 m²
ENTRY AUTOMATIC SLIDING DOOR
1 in 5 RAMP DOWN TO BASEMENT 1
SHOP 1 A: 270.85 m² NLA A: 257.86 m²
CONC
ENTRY AUTOMATIC SLIDING DOUBLE DOORS
DETAIL OF PUBLIC REALM WORKS AND LANDSCAPING TO BE SUBMITTED TO AND APPROVED BY THE RESPONSIBLE AUTHORITY BEFORE THE DEVELOPMENT STARTS
TOTAL SHOP AREA 1254 SQM NLA 1209.55 SQM
SHOP 2 A: 346.94 m² NLA A: 336.53 m²
CANOPY OVER SETBACK 750MM FROM KERB
SHOP 3 A: 636.19 m² NLA A: 615.16 m²
TERRACE A: 93.44 m²
EXISTING NEIGHBOURING SHEDS
SERVICES A: 3.44 m²
GAS CUPBOARD
SERVICES A: 5.44 m²
BOOSTER
SERVICES A: 1.67 m²
RETAIL LIFT
COM A: 14.41 m²
GLAZED ROOF ABOVE
RES LOBBY A: 82.14 m²
SEAT SERVICES
MAILBOXES
LOBBY A: 16.37 m²
REMOVE CROSSOVER & MAKE GOOD (ONE ADDITIONAL ON-STREET CAR SPACE)
EXIST. CONCRETE CROSSOVER
INDICATIVE OUTLINE OF TWO DOUBLE STOREY DWELLINGS
P.O.S. 32 CEDAR STREET
FENCE
EXISTING NEIGHBOURING MIRROR BUSH
39.92 270°17' (SURVEY)
35.36 180°00'
359°44' 35.36

ARMSBY ARCHITECTS

37/574 Plummer St, Port Melbourne, VIC, 3207 T: (03) 9676 2296 E: armsby@armsby.com.au

Rev	Description	By	Date
A	TOWN PLANNING ISSUE	LH	13.08.2019
B	ISSUE FOR RFI	LH	23.10.2019
C	ISSUE FOR RFI	FD	04.12.2019
D	ISSUE FOR ENDORSEMENT	FD	17.09.2020

Scale 1:200 @ A3

N

21/09/2020 1807 - 380 - Hawthorn Rd - MASTER-ENDORSED.pln

ACOUSTIC LOGIC

Rev: 3

Date: 22/09/2020

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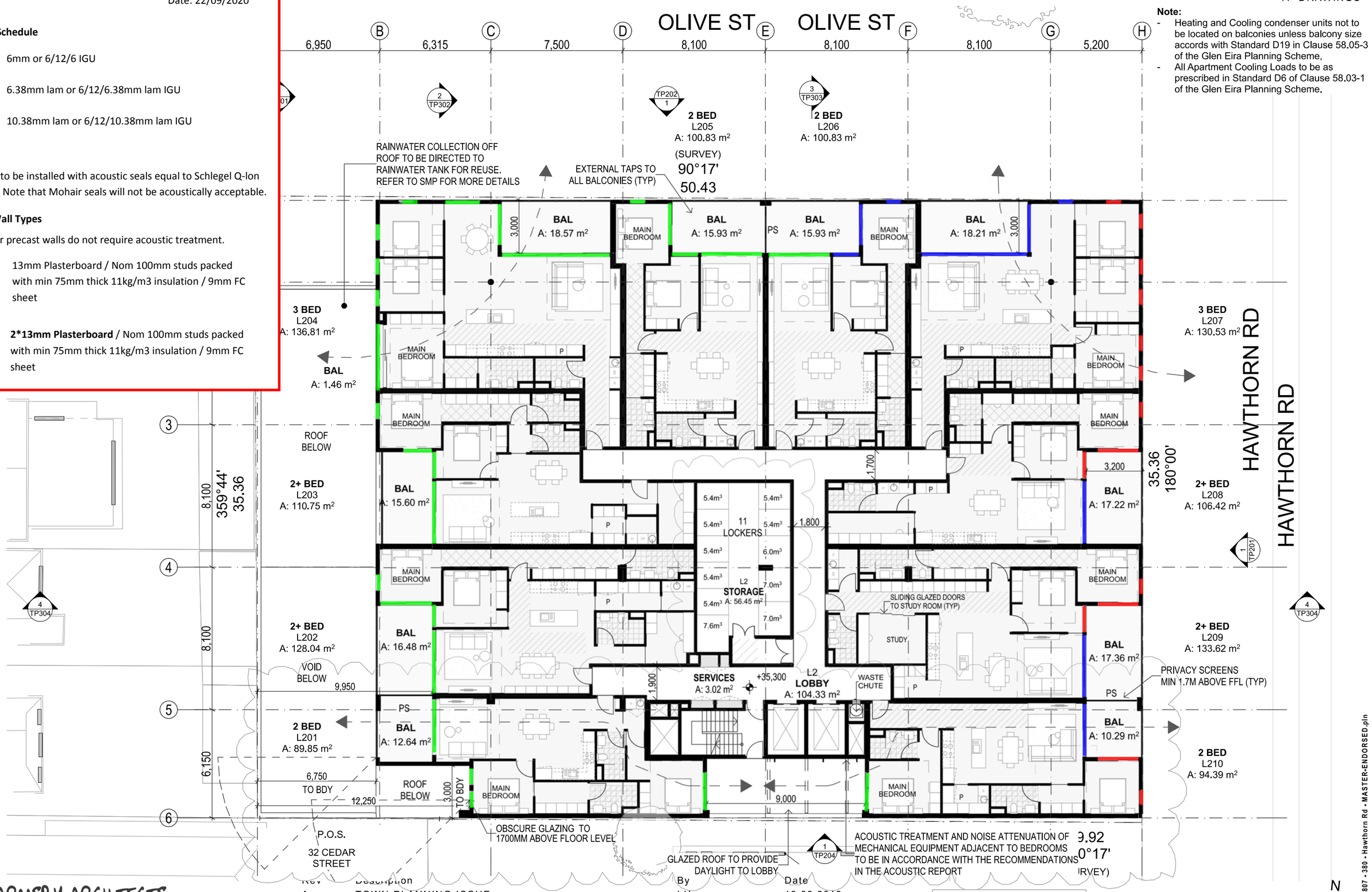

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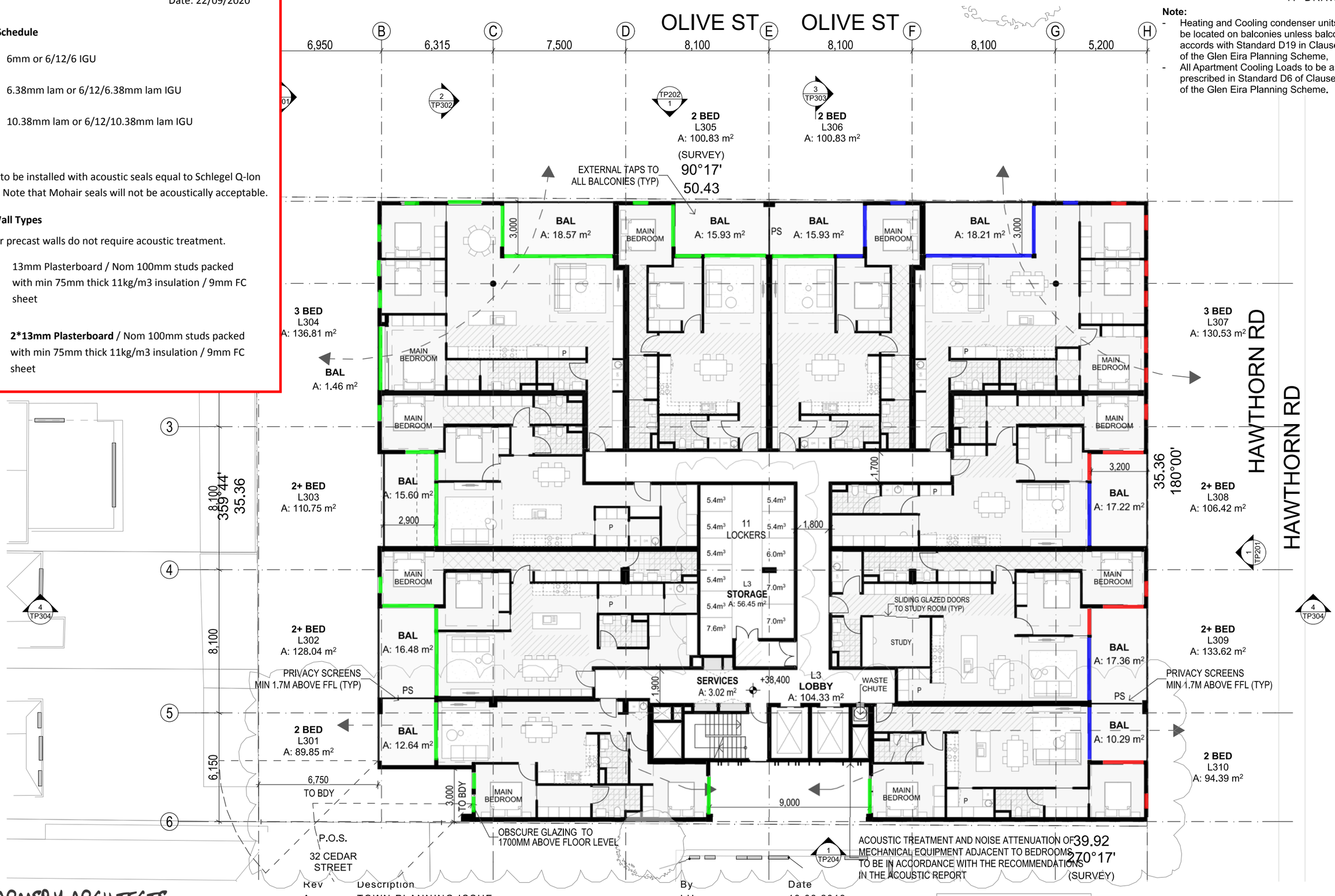

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CONDITION 1(a), 1(e), 1(r), 1(s), 1(t)

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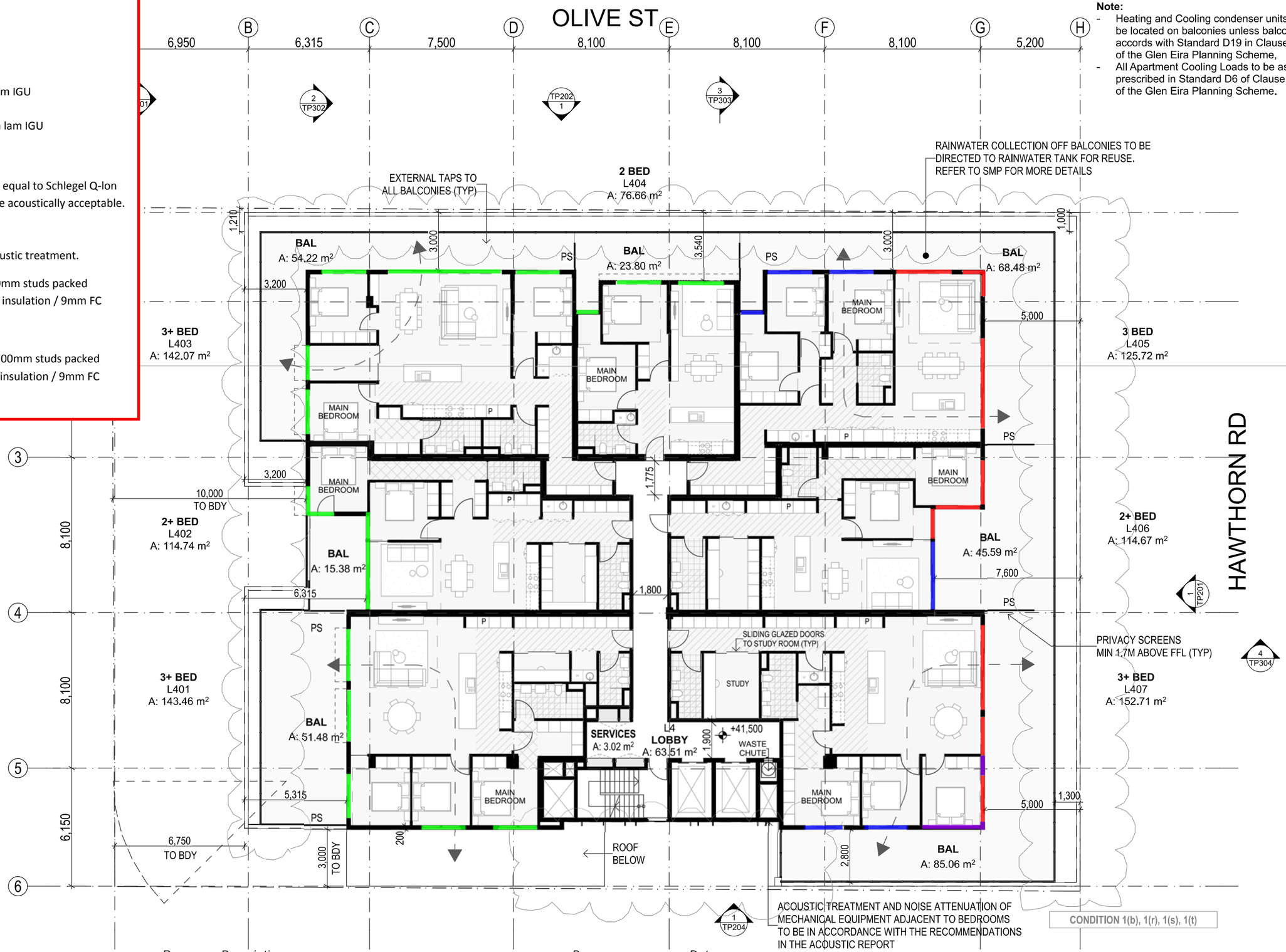

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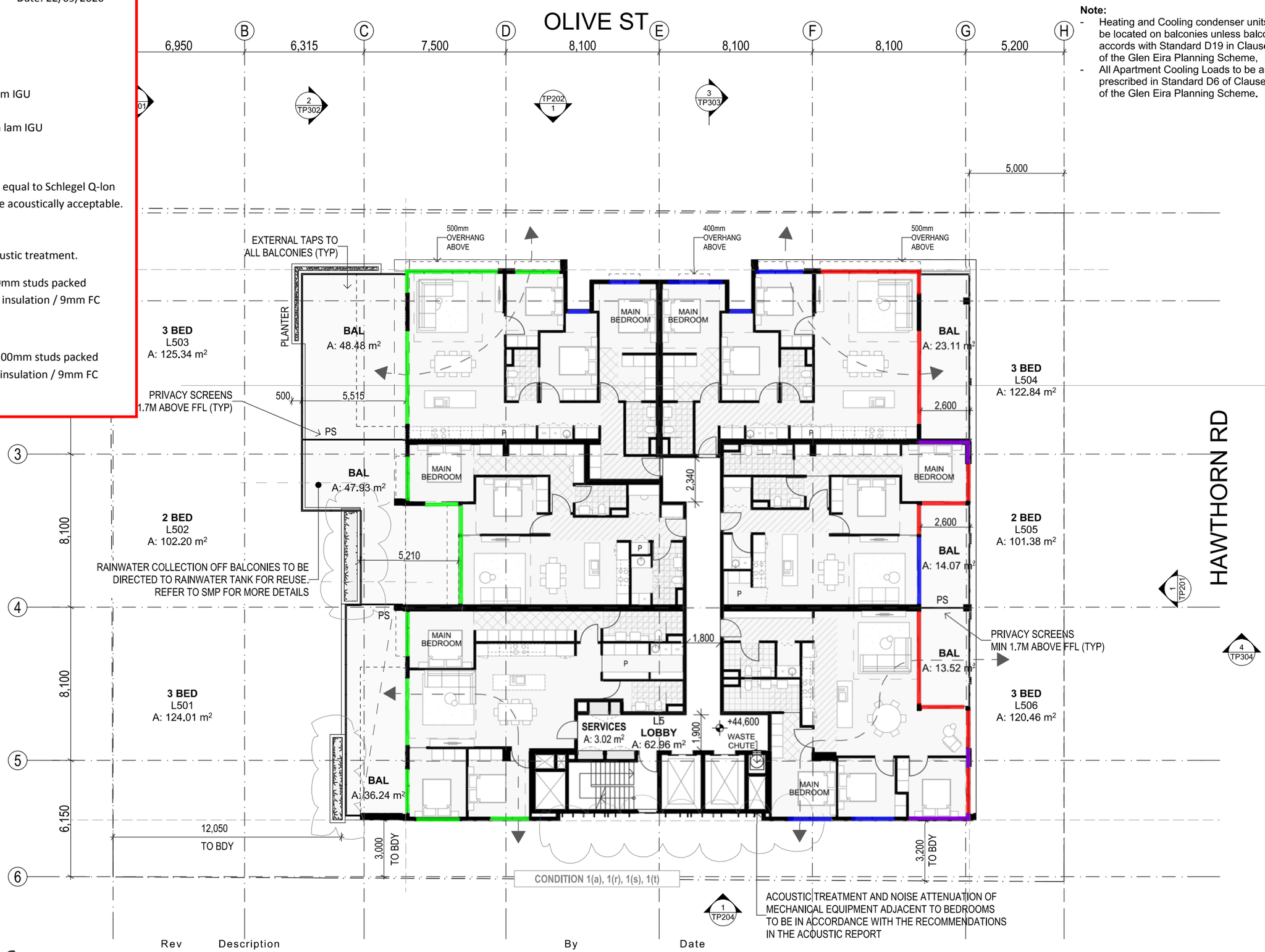

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B	ISSUE FOR RFI	LH	23.10.2019
C	ISSUE FOR RFI	FD	04.12.2019
D	ISSUE FOR ENDORSEMENT	FD	17.09.2020

ARMSBY ARCHITECTS

37/574 Plummer St, Port Melbourne, VIC, 3207 T: (03) 9676 2296 E: armsby@armsby.com.au

Scale 1:200 @ A3

N

ACOUSTIC LOGIC

Rev: 3

Date: 22/09/2020

Glazing Schedule

6mm or 6/12/6 IGU

6.38mm lam or 6/12/6.38mm lam IGU

10.38mm lam or 6/12/10.38mm lam IGU

All glazing to be installed with acoustic seals equal to Schlegel Q-lon bulb seals. Note that Mohair seals will not be acoustically acceptable.

External Wall Types

Masonry or precast walls do not require acoustic treatment.

(unmarked) 13mm Plasterboard / Nom 100mm studs packed with min 75mm thick 11kg/m3 insulation / 9mm FC sheet

2*13mm Plasterboard / Nom 100mm studs packed with min 75mm thick 11kg/m3 insulation / 9mm FC sheet

OLIVE ST

HAWTHORN RD

6,950 | 6,315 | 7,500 | 8,100 | 8,100 | 8,100 | 5,200

B C D E F G H

3 4 5 6

2 TP302 | TP202 1 | 3 TP303

RAINWATER COLLECTION OFF ROOF TERRACE & ROOFTOP TO BE DIRECTED TO RAINWATER TANK FOR REUSE. REFER TO SMP FOR MORE DETAILS

15,000 TO BDY | 5,500 | 10,100 TO BDY

RAINWATER COLLECTION OFF ROOF & BALCONIES TO BE DIRECTED TO RAINWATER TANK FOR REUSE. REFER TO SMP FOR MORE DETAILS

2100mm HIGH BALUSTRADE

2100m HIGH ACOUSTIC SCREENING TO SERVICES AREA AS PER ACOUSTIC REPORT

7.75 m² | RAISED PLANTER - 7.59m² (1100mm HIGH)

RAISED PLANTER (400mm HIGH) & COMMUNAL FOOD GARDEN

TERRACE
A: 202.39 m²

LINE OF SOLAR PERGOLA OVER
Min 30% required = 85.7m², 37% provided = 106.88 m²

PLANTER

SERVICES
A: 92.39 m²

28.42 m²

TOTAL COMMUNAL SPACE
A: 285.54 m²

COMPOST BIN

+48,700 POSSIBLE BARBEQUE AREA

WASTE CHUTE

SERVICES
A: 17.19 m²

STAIR
A: 8.03 m²

Min 30% required = @@m2, @@m2,

TOTAL COMMUNAL OPEN SPACE
285.54m² including planters and gardens
(STANDARD D7 RATE IS 2.5m² PER DWELLING = TOTAL OF 82.5m² REQUIRED)

22,100 TO BDY

3,500 TO BDY

4,050 TO BDY

9,300 TO BDY

CONDITION 1(a), 1(p), 1(r), 1(s), 1(t)

4 TP304 | 1 TP201 | 4 TP304 | 1 TP204

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