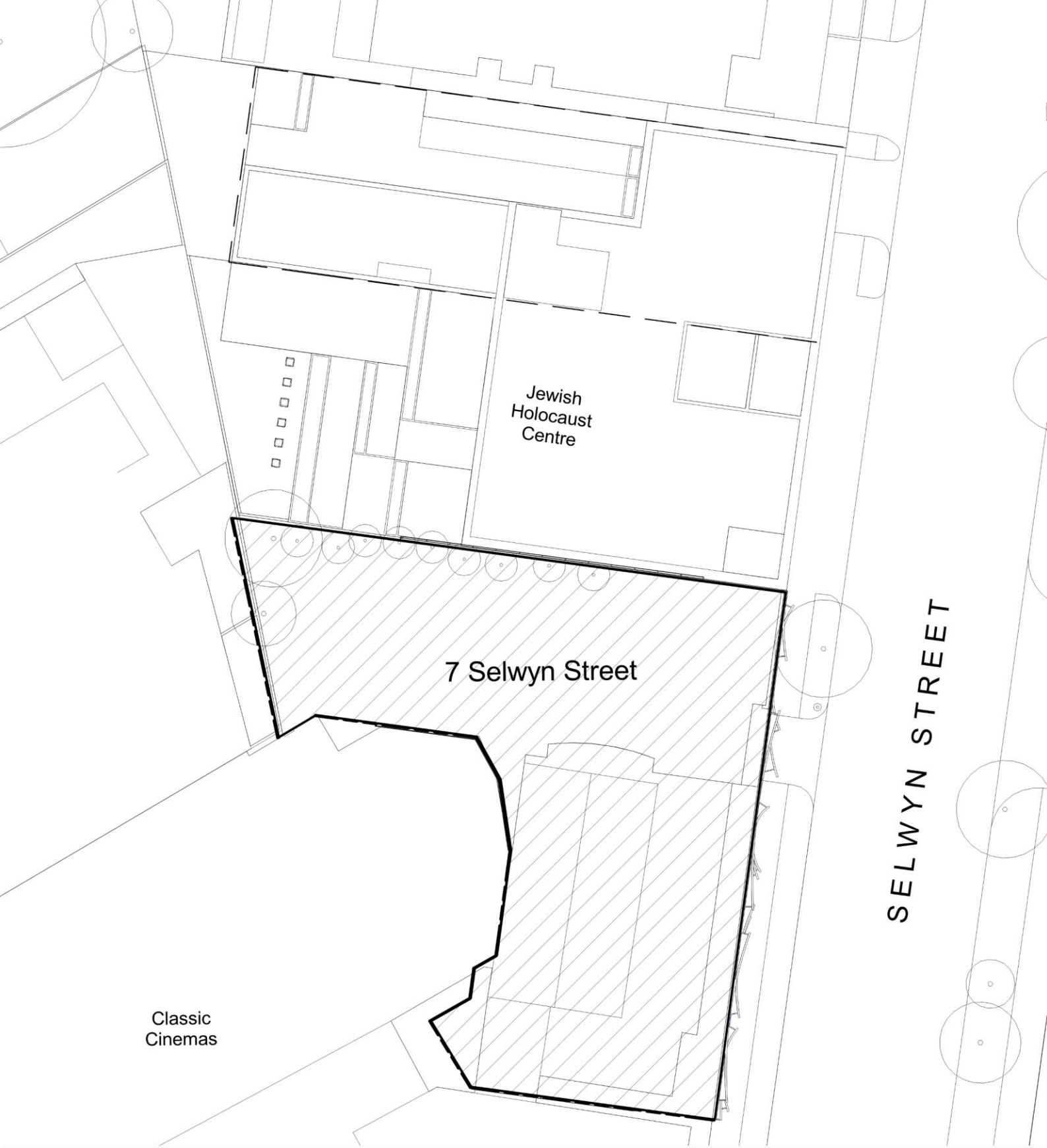

MARSHALL DAY Acoustics

JEWISH ARTS QUARTER
ACOUSTIC REPORT FOR TOWN PLANNING

Rp 001 R03 20200280 | 15 June 2021

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Project: **JEWISH ARTS QUARTER**

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Report No.: **Rp 001 R03 20200280**

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Final	03	Addressed items requested by SAC. Commented on forthcoming policy changes	15.06.2021	B. Kalt	T. Nicholls

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1.0 INTRODUCTION

It is proposed to redevelop the site at 7 Selwyn Street, Elsternwick. The development proposal includes the construction of the new Jewish Arts Quarter.

Key features of the proposed development are as follows:

- Basement performing arts space with associated green room/rehearsal space
- Ground floor foyer with café, retail space, back of house facilities including a loading bay
- Learning and exhibition spaces on Ground Mezzanine, Level 1 & Level 2
- Shared administration, meeting and informal work spaces for the co-work offices on Level 3
- External terraces on Level 2 & Level 3
- Co-work office space on Levels 4-7
- There is no car parking on site.

Marshall Day Acoustics Pty Ltd (MDA) has previously prepared a town planning assessment for the project (Report ref: *Rp 001 R02 20200280*, dated 6 May 2020). City of Glen Eira has subsequently issued a notice of decision to grant a planning permit in September 2020 (Application Number: GE/DP-33539/2020). The permit includes the following conditions relating to the acoustic design.

Acoustic requirements

7. *Before the development starts, an updated Acoustic Report to the satisfaction of the Responsible Authority must be submitted to and approved by the Responsible Authority. When approved, the report will be endorsed and will then form part of the permit. The report must be generally in accordance with the report prepared by Marshall Day Acoustics (Revision 02) and dated 6 May 2020, but modified to include the following:*

   (a) any specific acoustic design and attenuation to ensure noise levels from the uses, plant and equipment can meet the requirements of Condition 10.

8. *The provisions, recommendations and requirements of the endorsed Acoustic Report, must be implemented and complied with to the satisfaction of the Responsible Authority and must not be varied except with the written approval of the Responsible Authority.*

9. *Within two months of all of the uses starting, a further Acoustic Report prepared by an acoustic engineer must be submitted to the Responsible Authority to its satisfaction. The further report must detail whether the noise levels associated with the uses are in accordance with the requirements of the endorsed Acoustic Report at Condition 7 with plant equipment operating at practical peak load (assuming operation during hot weather in summer during the evening and night). If the noise levels exceed those specified in the endorsed Acoustic Report at Condition 7, the report must outline a program or measures to ameliorate or attenuate noise to ensure that the levels are met, to the satisfaction of the Responsible Authority. The uses must not continue until such time that the attenuation measures have been implemented to the satisfaction of the Responsible Authority.*

10. *Noise levels to and from the development and use must not exceed those required to be met under the State Environment Protection Policy (Control of Noise from Industrial Commerce, Industry and Trade), No. N-1 (SEPP N-1) and the State Environment Protection Policy (Control of Music Noise from Public Premises), No. N-2 (SEPP N-2), or any other equivalent or applicable State or relevant policy and should meet accepted sleep disturbance criteria EPA Publication 1254 and any other relevant guideline or Australian Standard.*

Following this, the project was referred to a Priority Projects Special Advisory Committee (SAC). The SAC has requested the following relating to acoustics:

> *6. b) an addendum update to the Acoustic Report (Marshall Day) submitted with the permit application that:*
>
> *(i) correlates with the waste collection volume estimates in the Waste Management Plan (Leigh Design at page 213)*
>
> *(ii) addresses any impacts that facilities for the collection, storage and removal of containers and packaging that may be required under the draft Victorian Container Deposit Scheme may have on noise attenuation measures.*

This report has been prepared to assess the potential acoustic impacts from the proposed development and address the items requested by the Planning conditions and SAC.

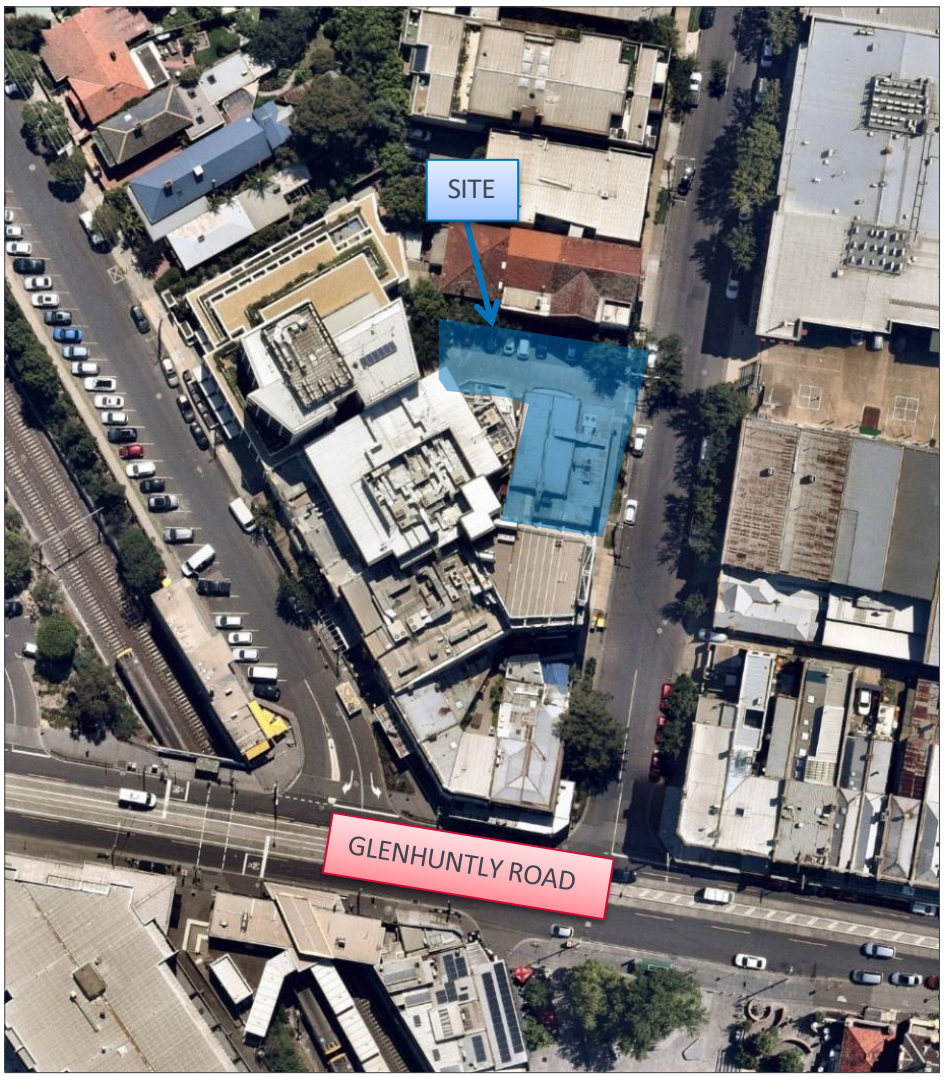
A glossary of acoustic terms is provided in Appendix A.

2.0 SITE DESCRIPTION

2.1 Development site

The proposed development site is located at 7 Selwyn Street, Elsternwick and comprises the parcel of land as shown in the aerial photograph in Figure 1.

Figure 1: Subject site (Source: Nearmap)



The site is currently occupied by the Kadimah Jewish Cultural Centre and National Library. The land is bounded by the following:

- Commercial building directly to the north with the Jewish Holocaust Centre and residential apartments beyond
- Residential apartments to the north-west
- Classic cinema bounding the site to the west and south
- Former ABC studios to the north-east across Selwyn Street
- Commercial/industrial premises to the east across Selwyn Street.

The proposed development will include the following:

- Three basement levels including a performing arts space and associated green room/rehearsal space
- Ground floor foyer with café, retail space, back of house facilities including a loading bay
- Learning and exhibition spaces on Ground Mezzanine, Level 1 & Level 2
- Shared administration, meeting and informal work spaces for the co-work offices on Level 3
- External terraces on Level 2 & Level 3
- Co-work office space on Levels 4-7
- Mechanical services plant at roof level.

The floor plans of the proposed development are provided in Appendix B.

The subject site and land to the north, east and north-west is zoned Mixed-Use Zone 1 (MUZ1). Land to the south is zoned Commercial Zone 1 (C1Z). Land to the north-west beyond the MUZ1 zone is zoned Residential Growth Zone 1 (RGZ1). The relevant planning map is provided in Appendix C.

2.2 Noise-sensitive receivers

The closest noise-sensitive receivers to the subject site have been identified in Table 1.

Table 1: Closest identified noise-sensitive receivers to subject site

Address	Description
Rear of 15-19 Gordon Street	7-storey apartments approximately 5 m west of development
19 Selwyn Street	4-storey apartments approximately 15 m north of development
Rear of units on Glenhuntly Road	2nd storey apartment approximately 30 m south-east of development
Possible future residences – ABC site	Located approximately 20 m east of the development

3.0 DRAWINGS REVIEWED

The Town Planning Package drawings dated 1 May 2020 and issued by McIldowie Partners have been reviewed as part of this assessment. Copies of the drawings are included in Appendix B for reference.

4.0 IDENTIFIED NOISE SOURCES

4.1 Noise from the development to surrounding residential dwellings

The following noise sources from the proposed development may affect nearby properties:

- Patron and music noise associated with the basement performing arts space. It is understood that the performing arts space will be a multi-purpose space and will be used for speakers / presentation, video, dance, theatre, comedy, music & gatherings such as lectures or community meetings. The events will include amplified music
- Patron and music noise associated with cafes and terraces
- Noise associated with the ground floor loading bay including deliveries and waste collection
- Noise associated with mechanical plant, including fire tank pump room, substation, roof plant (chiller, air handling units, fans).

5.0 REGULATORY FRAMEWORK

The following sections outline a review of:

- Key noise legislation in Victoria
- Related guidelines and standards commonly referenced in Victoria

5.1 Victorian Guidelines and Legislation

The Environment Protection Act 1970 (the Act) provides the legislative framework for the protection of the environment in Victoria. The Act includes requirements relating to noise and defines prescribed standards for a range of situations where noise must be assessed.

A summary of the key requirements and provisions of the Act and associated prescribed standards is provided in Table 2.

Table 2: Key noise legislation/guidelines

Document	Overview
Environment Protection Act 1970 (the Act)	Establishes obligations for the control of environmental noise and applies to all types of noise sources except rail operations. The legislation does not specify noise limit values but sets out legal requirements to comply with State Environment Protection Policies and prescribed standards.
State Environment Protection Policy (Control of Noise from Commerce, Industry and Trade) No. N-1 (SEPP N-1)	SEPP N-1 defines mandatory noise limits for commercial, industrial or trade premises in the Metropolitan Region of Melbourne. The limits apply to the level of noise occurring at sensitive receivers. The noise limits are determined on the basis of land zoning and background noise levels, and are separately defined for day, evening and night periods. Refer Appendix D1 for further detail and noise limit derivation.
State Environment Protection Policy (Control of Music Noise from Public Premises) No. N-2 (SEPP N-2)	Music noise from entertainment venues is controlled by *State Environment Protection Policy (Control of Music Noise from Public Premises) No. N-2* (SEPP N-2). Compliance with SEPP N-2 is mandatory under section 46 of the Environment Protection Act 1970. Refer Appendix D2 for further detail and noise limit derivation.

Document	Overview
Patron noise guidelines	Noise predominantly related to voices of patrons in outdoor areas is not covered under any State Environment Protection Policy or general Victorian guideline. In lieu of an established state policy or criterion, MDA has developed a set of design targets which have been referenced as part of numerous planning applications and VCAT hearings for proposed external patron noise areas. The design targets are defined separately for day, evening and night periods and are determined on the basis of background noise levels.
EPA Publication 1254 *Noise Control Guidelines* (EPA Guidelines)	Provides an overview of noise policies and legislation in Victoria for a range of different noise sources and provides supplementary guidance for situations where there is no policy or legislation. Refer to Appendix D3 for further detail.

The Act and SEPP N-1/SEPP N-2 are scheduled to be superseded by new legislation and guidelines later in 2021. In particular, SEPP N-1/SEPP N-2 are to be replaced by EPA Publication 1826 *Noise limit and assessment protocol for the control of noise from commercial, industrial and trade premises and entertainment venues* (the Noise Protocol) as of 1 July 2021. The relevant criteria and assessment procedures of SEPP N-1/SEPP N-2 are consistent with the Noise Protocol. Demonstrating compliance with SEPP N-1/SEPP N-2 therefore also demonstrates compliance with the criteria of the forthcoming Noise Protocol.

5.2 Other Standards & Guidelines

Other standards and guidelines reviewed as part of this noise assessment are provided in Table 3.

Table 3: General standards and guidelines

Document	Overview
NSW *Road Noise Policy* 2011 produced by the NSW Environmental Protection Agency	Strictly only applies in NSW. However, the provisions of the document are often referred to in Victoria for general guidance on potential sleep disturbance. The NSW policy notes that from the research on sleep disturbance to date it can be concluded that: • maximum internal noise levels below 50–55 dB LAmax are unlikely to awaken people from sleep • one or two noise events per night, with maximum internal noise levels of 65-70 dB LAmax, are not likely to affect health and wellbeing significantly. It is generally accepted that a partially open window provides approximately 10 dB noise reduction from outside to inside. Therefore, in accordance with the *NSW Road Noise Policy* sleep disturbance findings, we recommend that maximum noise levels from on-site activities at night should not exceed 65 dB L_{Amax} outside an openable window of existing or future residential dwellings.

6.0 NOISE LEVEL DATA

6.1 Existing noise environment

The determination of applicable SEPP N-1 and SEPP N-2 limits is based on land zoning and existing background noise levels at a location representative of the nearest affected residential receiver.

Usually, unattended noise monitoring would be conducted for a period of several days. However, a suitable secure location could not be found to install noise monitoring equipment. Therefore, attended noise measurements were taken at the subject site on Friday 27 March 2020 and Monday 30 March 2020 using a Brüel & Kjær Type 2250 sound level meter.

The microphone was positioned at a height of approximately 1.5 m above the local floor level under free field conditions. Measurements were obtained using the 'F' response time and A-weighting frequency network. The equipment was checked before and after the survey and no significant calibration drifts were observed.

Two measurements positions were used to measure the noise climate at the front and rear of the site. Measurement Position 1 was located at the rear of the site in the existing car park – this position is close to an existing apartment development. Measurement Position 2 was located at the front of the site on Selwyn Street.

Each measurement was conducted for a minimum of 10 minutes.

The noise climate at the site is described as relatively quiet with little road traffic on Selwyn Street. Other noise sources in the area include occasional trams on Glenhuntly Road and trains on the nearby Sandringham line. Some mechanical plant serving other nearby buildings was faintly audible.

The measurement positions are indicated on the site plan in Figure 2.

Figure 2: Noise survey measurement plan

The measured noise levels at the site are presented in Table 4 and Table 5.

Table 4: Measured noise levels at site – dB L_{Aeq}

		Octave Band Centre Frequency (Hz)							
Date/Time	**Position**	**63**	**125**	**250**	**500**	**1k**	**2k**	**4k**	**A**
27 March 2020 1437 hrs	1	54	50	43	40	39	35	28	44
27 March 2020 1458 hrs	2	60	53	50	49	49	46	39	53
30 March 2020 1811 hrs	1	56	50	44	42	42	40	45	49
30 March 2020 2159 hrs	1	54	51	43	40	41	36	27	45

Table 5: Measured noise levels at site – dB L_{A90}

		Octave Band Centre Frequency (Hz)							
Date/Time	**Position**	**63**	**125**	**250**	**500**	**1k**	**2k**	**4k**	**A**
27 March 2020 1437 hrs	1	48	48	40	38	34	28	21	40
27 March 2020 1458 hrs	2	52	48	44	42	39	33	26	44
30 March 2020 1811 hrs	1	46	40	36	35	33	28	20	38
30 March 2020 2159 hrs	1	43	40	35	36	35	29	18	39

The lowest of the measured background noise levels over the monitoring period are shown in Table 6.

Table 6: Measured background noise levels dB L_{A90}

Period	**Lowest average background noise level, L_{A90}**
Day	40
Evening	38
Night	39

These noise levels have been used to determine the SEPP N-1 and SEPP N-2 noise limits and the full derivation is provided in Appendix D.

6.2 Noise levels of loading bay activities

Noise level data of delivery trucks and loading bay activity has been sourced from the MDA database. The MDA database is a comprehensive compilation of noise measurements performed by staff at MDA, including noise levels (L_{Aeq}) of truck movements, loading activity and waste collections at similar sites.

Typical sound power levels based on the MDA data are provided in Table 7.

Table 7: Waste vehicle, loading bay and truck delivery noise emission data, dB Lw

Description	**Octave band centre frequency (Hz)**							
	63	**125**	**250**	**500**	**1k**	**2k**	**4k**	**A**
Waste collection truck	103	99	97	96	96	95	91	101
Waste truck emptying bin	99	99	93	91	90	91	87	96
Medium Rigid Vehicle (MRV) – L_{eq}	100	94	95	90	90	90	86	96
Medium Rigid Vehicle (MRV) – L_{max}	107	103	97	96	97	99	97	104
Van/ Small rigid vehicle (SRV)	93	91	89	89	89	86	79	93
Compactor	78	77	76	77	85	84	76	89
Loading bay activity – L_{eq}	88	87	81	75	74	70	66	80
Loading bay activity – L_{max}	104	107	104	97	98	94	87	102

6.3 Performing arts space events

It is understood that the performing arts space will be a multi-purpose space and will be used for speakers / presentation, video, dance, theatre, comedy, music & gatherings such as lectures or community meetings. The events will include amplified music.

The space is expected to be used by the museum during daytime hours and then used for performances during weekday evenings (typically 3 times Monday - Friday) and weekends (typically 2 per weekend in the afternoon and/or evening).

It is understood that the maximum number of patrons in the performing arts space will be 300.

For the purpose of assessing compliance with SEPP N-2, indicative music noise levels have been provided in Table 8. It should be noted that the music noise levels presented below are intended to represent typical amplified music noise levels from a live band (e.g. a wedding band or equivalent). However, actual music noise levels may vary according to the type of performance.

Table 8: Typical noise levels for live music, dB $L_{p,rev}$ L_{10}

	Octave Band Centre Frequency (Hz)							
Description	**63**	**125**	**250**	**500**	**1k**	**2k**	**4k**	**A**
Live amplified band (e.g. wedding band)	95	95	95	90	90	90	90	97

6.4 Patron noise

The ground floor Foyer space and Level 2 & 3 Terraces will, at times, hold a number of patrons associated with certain events.

MDA has developed a prediction methodology to determine typical patron noise levels associated with particular types of use of a space. Typical patron noise levels have been provided in Table 9.

Table 9: Patron sound power level data

	Octave Band Centre Frequency (Hz)							
Semi-steady state component, dB L_{eq}	**63**	**125**	**250**	**500**	**1k**	**2k**	**4k**	**A**
Foyer – ≤200 patrons, standing with limited alcoholic beverages	89	91	92	99	97	93	86	101
Level 2 Terrace – ≤40 patrons standing with limited alcoholic beverages	82	84	85	92	90	86	79	94
Level 3 Terrace – ≤100 patrons standing with limited alcoholic beverages	86	88	89	96	94	90	83	98

6.5 Mechanical services equipment

The proposed external mechanical services equipment serving the development includes the following:

- Fire diesel-electric pumps (located internally but with external exhaust flues)
- Electrical substation (located internally but may include ventilation louvres)
- Roof-mounted chiller (with associated pumps), air handing units, general fans, hot water/heating plant
- General outside air intake and exhaust points
- Smoke exhaust and stair pressurisation fans (to operate for routine testing and emergencies only).

7.0 SEPP N-1 ASSESSMENT

7.1 Noise limits

The cumulative noise from all commercial on-site activities and commercial mechanical services must comply with the SEPP N-1 noise limits at the nearest noise-affected residential dwellings.

Commercial noise associated with the development must meet the SEPP N-1 limits (as shown in Appendix D1) outside habitable spaces of all existing neighbouring dwellings and any known future dwellings. The external assessment is mandatory where facades to habitable spaces are openable, such as windows and balcony doors.

Additionally, if the primary sound transmission path between a mechanical source and receiver is through a solid wall, ceiling or floor or sealed window then the procedures according to Schedule A14 of SEPP N-1 shall apply and the assessment point shall be located inside the affected dwelling with the applicable internal noise level adjusted as follows:

- Adjustment of 15 dB if the noise (including vibration induced noise) is transmitted through a solid wall, ceiling or floor
- Adjustment of 25 dB if the noise is transmitted through a fixed double-glazed window

Taking the above requirements into consideration, Table 10 summarises the SEPP N-1 limits to be met by any commercial activity or equipment item.

Table 10: SEPP N-1 limits for any commercial activity or equipment item, dB L_{eff}

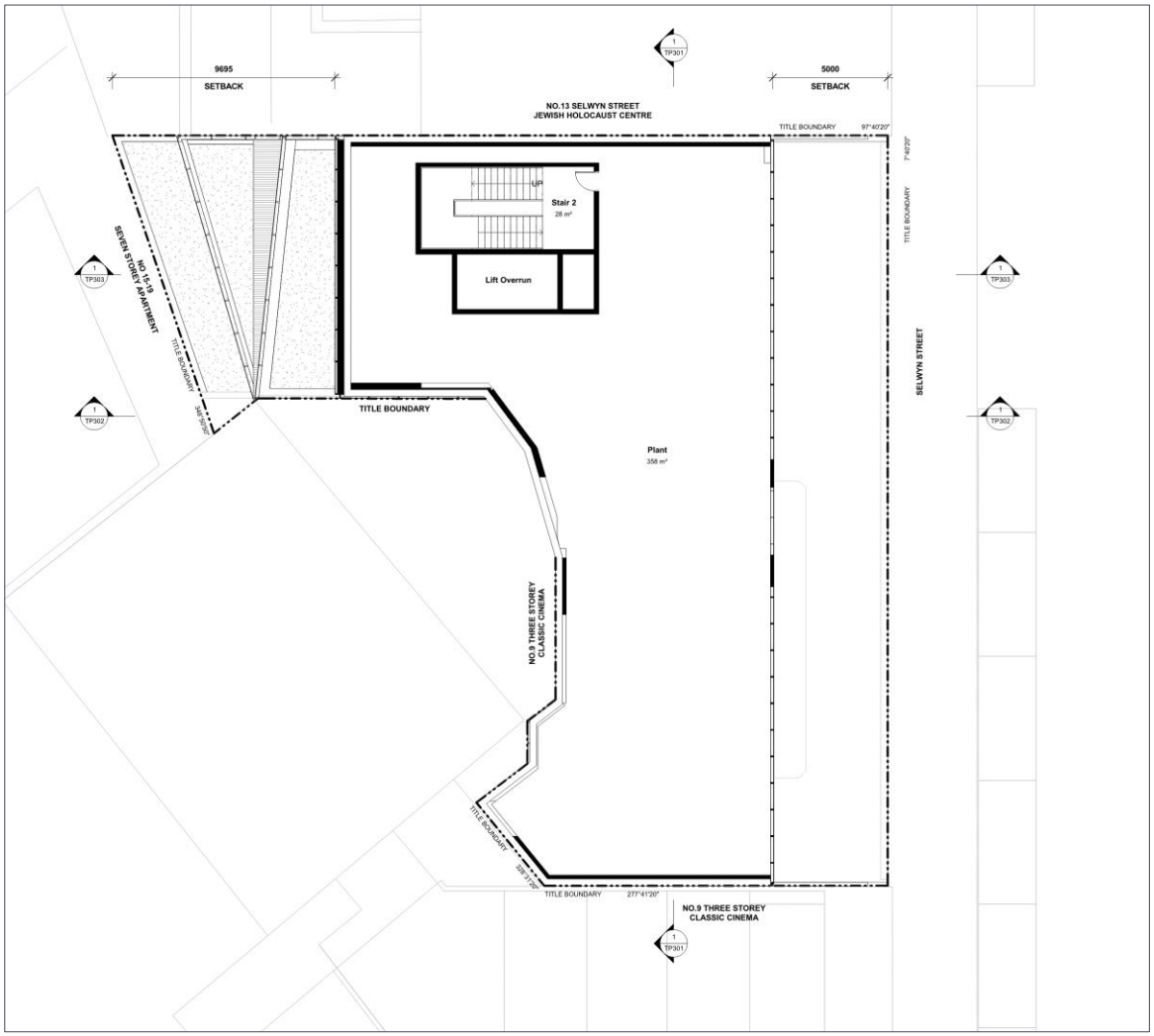
Period	Day of week	Time period	External
Day	Mon-Fri	0700-1800hrs	53
	Sat	0700-1300hrs	
Evening	Mon-Fri	1800-2200hrs	47
	Sat	1300-2200hrs	
	Sun	0700-2200hrs	
Night	Mon-Sun	2200-0700hrs	44

In addition to the above, the assessment of noise emissions from the site must include corrections for special audible character such as tonality, intermittency and impulsiveness. The noise impact assessment must include appropriate allowances for these factors and acoustic treatments must be designed accordingly.

7.2 Mechanical services equipment

The majority of the mechanical services equipment is located on the roof of the proposed development as shown in Figure 3.

Figure 3: Roof plant – preliminary plan



It is understood the equipment in this location is likely to comprise the following:

- Chiller (with associated pumps)
- Air handing units
- Outside air and exhaust fans
- Hot water/heating plant
- Emergency smoke exhaust and stair pressurisation fans.

Other mechanical services equipment elsewhere in the development is expected include:

- Fire diesel-electric pumps (located in a basement plantroom but with external exhaust flues)
- Electrical substation (located internally but may include ventilation louvres)
- General outside air intake and exhaust points.

Noise from the plant equipment may potentially impact upon the following noise sensitive dwellings:

- Existing residences immediately to the north-west and to the north beyond the Jewish Holocaust Centre
- Possible future residences to the east on the site of the former ABC Studios building
- Possible residences to the south-east above retail units on Glenhuntly Road.

Some of the equipment may operate during night-time period, therefore the SEPP N-1 night-time noise limit has been used for the purpose of this preliminary assessment.

7.2.1 Mitigation requirements

In order to achieve compliance with the night-time noise limit, based on the preliminary mechanical services equipment listed above, the following mitigation measures will be required:

- Selection of a low noise chiller, air handing units and fans will be required
- The chiller may require acoustic treatment in order to comply with SEPP N-1 noise limits at a potential future residential development on the old ABC studio site to the east of Selwyn Street
- Attenuation of mechanical noise sources, including ventilation fan intakes and exhaust louvres in the building facade
- Screening the line of sight between any exposed equipment and the facades of habitable spaces – in the case of receivers at the rear of 15-19 Gordon Street, 19 Selwyn Street and the rear of units on Glenhuntly Road, the roof edge will offer significant screening of roof plant.

During the detailed design stage, an acoustic analysis can be performed to determine the exact nature of the treatments required. To perform this analysis, the following information would be required for review:

- Equipment schedules and operating duties
- Manufacturer's noise level data
- Updated mechanical services drawings showing specific equipment locations and configurations.

7.3 Loading bay

The entry to the loading bay is located on the eastern facade towards the south of the development site. It is understood that the loading bay will be in regular use during the daytime and may be used during evening/night-time periods and weekends as required for bump in/bump out for the performing arts space.

For the purposes of this assessment, it has been assumed that the maximum size of vehicle using the loading bay will be a Medium Rigid Vehicle (MRV). This is consistent with the dimensions of the loading bay as currently drawn.

It has also been assumed that waste collections will occur at the street side, not inside the loading bay.

The loading bay will need to incorporate a number of mitigation measures and operational requirements in order to achieve compliance with the relevant noise limits. Detailed calculations are presented in Appendix E.

7.3.1 Mitigation measures

The following mitigation measures are necessary to achieve compliance with SEPP N-1 due to activities associated with the loading dock:

- Use of the loading bay should generally be restricted to daytime and evening periods only (as defined under SEPP N-1, i.e. 0700-2200hrs, 7 days per week). Night-time use of the loading bay should be avoided wherever possible, although predictions indicate that night-time compliance would still be achieved subject to adherence of the following measures
- All loading/unloading activities and use of any compactors must be conducted only with the loading bay door closed during SEPP N-1 evening and night-time periods (i.e. Monday to Friday 1800-2200hrs, Saturday 1300-2200hrs*, Sunday 0700-2200hrs and 2200-0700hrs, 7 days per week)
- Waste collections can take place only during Daytime hours as defined under SEPP N-1, i.e. Monday to Friday 0700-1800hrs, Saturday 0700-1300hrs*
- Loading dock door to be a fold-up type acoustic door with acoustic seals achieving R_w 25-30 (e.g. Mirage Doors)
- Loading dock door frame and mechanism to be vibration isolated from the building structure
- Loading dock to be treated with absorption material to control reverberation (e.g. 100mm thick glasswool insulation with perforated metal facing to achieve ≥NRC 0.85)
- The use of white-noise reversing beepers on trucks should be adopted wherever possible
- Waste collections associated with the development should comply with the schedules and practices nominated in EPA Publication 1254.

* As noted previously, SEPP N-1 will be superseded by new legislation and guidelines from 1 July 2021. As part of the forthcoming update, the Saturday time period between 1300-2200hrs will be classified as day period (currently classified as Evening period).

8.0 SEPP N-2 ASSESSMENT

8.1 Music noise limits

8.1.1 External noise

Amplified music associated with the proposal must comply with the SEPP N-2 noise limits detailed in Appendix D2.

For indoor venues with music playing more than three times per week, SEPP N-2 sets noise limits as shown in Table 11.

Table 11: SEPP N-2 criteria (music on more than three nights per week)

Time period*		Noise limit
Day/Evening	Saturday 1000 - 2200hrs Sunday 1200 - 2100hrs Other 0900 - 2200hrs	Music noise (L_{Aeq}) not permitted to exceed background noise (L_{A90}) plus 5dB
Night	Saturday 2200 - 1200hrs Sunday 2100 - 0900hrs Other 2200 - 0900hrs	Music noise (L_{OCT10}) is not permitted to exceed the background noise level (L_{OCT90}) by more than 8dB in any octave band (63Hz-4kHz) at a noise-sensitive area

* As noted previously, SEPP N-2 will be superseded by new legislation and guidelines from 1 July 2021. As part of the forthcoming update, the above times periods will be revised. Further information is contained in Appendix D2,

The derived SEPP N-2 day and evening music noise limits are outlined in Table 12.

Table 12: SEPP N-2 day and evening music noise limits, dB

Period	Measured background noise level, L_{90}	Adjustment	SEPP N-2 limit, L_{Aeq}
Day	40	+5 dB	45
Evening	38	+5 dB	43

Table 13: SEPP N-2 night noise limits, dB

	Octave band centre frequency (Hz)							
	63	125	250	500	1k	2k	4k	A
Background noise levels, L_{90}	43	40	35	36	35	29	18	39
Adjustment + 8dB	+8	+8	+8	+8	+8	+8	+8	-
Night noise limit, L_{10}	51	48	43	44	43	37	26	47

8.2 Music noise levels

It is understood that the performing arts space will be used for speakers / presentation, video, dance, theatre, comedy, music & gatherings such as lectures or community meeting. Amplified music is expected to form part of most events in the space.

The performing arts space is expected to be used by the museum during daytime hours and then used for performances during weekday evenings (typically 3 times Monday - Friday) and weekends (typically 2 per weekend in the afternoon and/or evening). It is not expected that performances will take place during usual night-time hours, however, on occasion performances may occur during the SEPP N-2 night-time period (e.g. up to 10pm on a Sunday evening).

For the purpose of assessing compliance with SEPP N-2, indicative music noise levels have been provided in Table 8. It should be noted that the music noise levels presented below correspond with a live amplified band, such as a wedding band (or equivalent). However, music noise levels may vary according to the type of performance.

Table 14: Typical noise levels for live music, dB $L_{p,rev}$ L_{10}

	Octave Band Centre Frequency (Hz)							
Description	**63**	**125**	**250**	**500**	**1k**	**2k**	**4k**	**A**
Live amplified band (e.g. wedding band)	95	95	95	90	90	90	90	97

8.3 Summary of mitigation measures

The performing arts space is located within the basement of the proposed development and is therefore well insulated in terms of potential noise breakout to noise-sensitive receivers. However, internal airlocks will be required between the performing arts space and passenger/goods lifts and stairwells etc to control noise breakout to the Foyer space and loading bay.

The following mitigation measures are necessary to achieve compliance with SEPP N-2 for music noise associated with the performing arts space:

- Internal airlocks will be required between the performing arts space and passenger/goods lifts and stairwells etc to control noise breakout to the Foyer space and loading bay
- External doors must remain closed during performances. An air-lock will be required at the Foyer main entrance to control general noise breakout as well as music noise
- The Foyer space will need to incorporate sound absorption treatment to control reverberation including any music noise spill from the performing arts space
- Air conditioning and outside air ducts will need to be acoustically treated to control noise break-out.

8.4 Predicted music noise levels

8.4.1 External to the neighbouring dwellings

The predicted external music noise levels at the neighbouring dwellings due to music noise from the performing arts space are provided in Table 15.

Table 15: Predicted external music noise levels, day/evening period

External location	Internal noise level, dB	Predicted external noise level, dB L_{eq}	Criteria, dB L_{Aeq}	Comment
Rear of 15-19 Gordon Street	97 dB $L_{p,rev}$ L_{10}	32	43	Complies
19 Selwyn Street	97 dB $L_{p,rev}$ L_{10}	≤30	43	Complies
Rear of units on Glenhuntly Road	97 dB $L_{p,rev}$ L_{10}	≤30	43	Complies
Possible future residences – ABC site	97 dB $L_{p,rev}$ L_{10}	≤30	43	Complies

Table 16: Predicted external music noise levels, night period

	Octave Band Centre Frequency (Hz)						
Description	**63**	**125**	**250**	**500**	**1000**	**2000**	**4000**
Live amplified band (e.g. a wedding band or equivalent), dB $L_{p,rev}$ L_{10}	95	95	95	90	90	90	90
Sound transmission loss of building, dB TL	48	50	53	58	63	65	70
External noise level, dB L_{10}	47	45	42	32	27	25	20
Distance attenuation loss, dB	5	5	5	5	5	5	5
Resultant noise level at nearest receiver, dB L_{10}	42	40	37	27	22	20	15
Night SEPP N-2 noise limit, dB L_{10}	**51**	**48**	**43**	**44**	**43**	**37**	**26**
Excess	-	-	-	-	-	-	-
Compliance	✓	✓	✓	✓	✓	✓	✓

The results shown in Table 15 and Table 16 demonstrates that music noise levels are predicted to comply with SEPP N-2 limits externally outside habitable spaces during the day, evening and night-time period.

8.5 Foyer, Level 3 Café and external terraces

Music noise levels in the Foyer, Level 3 Café and external terraces must be restricted to background music noise levels only.

The term “background music” was defined in a VCAT decision (Ref B2/2005 Whiting v Hosier Bar Pty Ltd). In this decision, which is reproduced in the Liquor Control Reform Act, a background level requires that music be played at a level enabling normal voice level conversation at a distance of 600 mm.

This is equivalent to a music noise level of approximately 67 dB L_{A10}, as detailed below in Table 17.

Table 17: Typical background music levels

Description	Octave Band Centre Frequency (Hz)							
	63	**125**	**250**	**500**	**1000**	**2000**	**4000**	**A**
Background music, dB L_{OCT10}	65	65	65	60	60	60	60	67

9.0 PATRON NOISE

9.1 Performing arts space

Patron noise associated with the performing arts space has not been specifically assessed. This is on the basis that there will be no external/outdoor areas associated with the performing arts space and that the building envelope would be expected to comfortably contain any patron noise from the performing arts centre. It is, however, noted that the Foyer space may be used in conjunction with the performing arts space and is therefore addressed below.

9.2 Foyer

The ground floor Foyer space will, at times, hold a number of patrons associated with certain events. It is understood that up to 200 patrons may use the Foyer at any one time.

The Foyer is an internal space and therefore will contain patron noise within the building. However, it will be necessary for the main entry airlock to incorporate two sets of acoustically-rated doors (e.g. R_w 30 doors with appropriate acoustic seals) in order to maintain a high level of sound transmission loss to the exterior.

The facade will need to provide a high degree of sound transmission loss and will need to be specified to achieve an acoustic performance in the region of R_w 38.

Furthermore, any openings in the facade must be closable and must be fitted with appropriate acoustic seals.

9.3 Terraces

The Level 2 & 3 Terraces will hold a number of patrons associated with certain events. It is understood that the Level 2 Terrace will hold up to 40 patrons and the Level 3 Terrace will hold up to 100 patrons. Because the terraces are external spaces, they will contain patron noise and have therefore been specifically assessed to predict likely noise levels at neighbouring residences.

MDA has extensive experience in the assessment of patron noise and has developed a set of proposed guidelines. These guidelines have been implemented on many projects to date. This section presents a summary of the patron noise assessment as follows:

- The design target applicable to the use of the outdoor areas
- Noise data used to represent the behaviour of patrons in the outdoor areas
- Conceptual noise mitigation measures to control patron noise
- Predicted noise levels from patrons in outdoor areas.

Noise of patrons within dining and licensed venues is highly variable according to a wide range of factors including:

- The type of venue
- The function of the space within the venue (i.e. seated areas for dining or standing areas with a focus on alcohol consumption)
- Total crowd numbers
- The composition of the total patron numbers in terms of demographics and group sizes
- Weather
- Alcohol consumption
- Background noise levels
- The acoustic properties of the space.

Total patron noise will vary significantly between different venues and from day to day depending upon the influence of these factors.

9.3.1 Design Targets

The derivation of the applicable semi-steady design targets for patron noise is summarised in Table 18, based on the method defined in Appendix D4 and the background noise data presented in Section 6.0. The background noise levels for the daytime period are based on measurements on Selwyn Street, whereas the background noise levels for the evening and night period are based on measurements in the car park. The design targets are based on protecting residential amenity and give an indication of the likely impact of predicted or measured patron noise levels at a noise-sensitive location such as a residential dwelling.

Table 18: Patron noise design targets

Time period	Patron noise target, dB $L_{Aeq,\ 15\ min}$
Day	54
Evening	48
Night	44

9.3.2 Patron noise data

MDA has developed a prediction methodology to determine typical patron noise levels associated with particular types of use of a space. Typical patron noise levels have been provided in Table 19.

Table 19: Patron sound power level data

	Octave Band Centre Frequency (Hz)							
Semi-steady state component, dB L_{eq}	**63**	**125**	**250**	**500**	**1k**	**2k**	**4k**	**A**
Level 2 Terrace – ≤40 patrons sitting with limited alcoholic beverages	82	84	85	92	90	86	79	94
Level 3 Terrace – ≤100 patrons sitting with limited alcoholic beverages	86	88	89	96	94	90	83	98

9.3.3 Predicted patron noise levels

A summary of the predicted semi-steady noise levels at the dwelling locations closest to the development is provided in Table 20. The objective of the predictions is to establish if predicted patron noise levels could achieve the design targets detailed in Section 9.3.1.

The prediction has been based on the Level 2 terrace (up to 40-60 patrons) being used during daytime and evening periods, and the Level 3 terrace (up to 100 patrons) being used during the daytime only.

Table 20: Predicted steady state worst-case patron noise levels

Receiver	Predicted Noise Level, dB $L_{Aeq, 15\ min}$	Patron noise target, dB $L_{Aeq, 15\ min}$	Margin to design target, dB
Rear of 15-19 Gordon Street	Daytime 40	Daytime 54	Complies
	Evening 37	Evening 48	Complies
19 Selwyn Street	Daytime 42	Daytime 54	Complies
	Evening 38	Evening 48	Complies
Rear of units on Glenhuntly Road	Daytime 53	Daytime 54	Complies
	Evening 48	Evening 48	Complies
Possible future residences – ABC site	Daytime 56	Daytime 54	+2
	Evening 51	Evening 48	+3

A 1-2dB exceedance during the daytime period is not expected to result in adverse impact.

According to the interpretation matrix, an exceedance of the design target of between 3 and 5 dB (evening period) indicates a possibility of impact. However, given that the exceedance is at the lower end of the range (+3 dB), it is expected that any potential impact will be minimal.

It should be noted that compliance is unlikely to be achievable during night-time periods, therefore the terraces must be closed to patrons no later than 2200 hrs.

10.0 NOISE FROM WASTE COLLECTIONS AND DELIVERIES

The Waste Management Plan (WMP) prepared by Leigh Design, dated 9 April 2020, has been reviewed as part of this assessment.

All waste bins will be kept in a dedicated refuse room located inside the building on the ground floor, which will minimise noise breakout to surrounding receivers. The bins will only be transferred outside to Selwyn Street during collection times. The WMP lists the following anticipated collection volumes.

Table 21: Waste collection volumes taken from the Leigh Design WMP

Waste Source	Waste Stream	Bin Qty	Bin Litres	Collections per Week	Net Area m^2
Whole development (shared bins)	Garbage	2	1,100	3	3.2
	Recycling	2	1,100	3	3.2
	Food Organics	1	240	3	0.5
	Hard Waste	-	-	At Call	2.0
Net Waste Storage Area (excludes circulation), m^2:					**8.9**

It is recommended that the schedules and practices detailed in EPA Publication 1254 *Noise Control Guidelines* be adopted for waste collections on the site as follows:

- Refuse bins should be located at sites that provide minimal annoyance to residential premises
- Compaction should be carried out while the vehicle is moving
- Bottles should not be broken up at the collection site
- Routes which service predominantly residential areas should be altered regularly to reduce early morning disturbances
- Noisy verbal communication between operators should be avoided if possible.

The following schedule of acceptable times for waste collection is also provided in the *EPA Noise Control Guidelines*:

One collection per week

6:30am-8pm Monday to Saturday

9am-8pm Sunday and public holidays

Two or more collections per week

7am-8pm Monday to Saturday

9am-8pm Sunday and public holidays

10.1 Victorian Container Deposit Scheme

Details of how the Victorian Container Deposit Scheme (CDS) will work are still in draft form. The WMP states that the overall recycling capacity can be used for commingled recycling or split into various recycling streams. It is therefore not expected that any additional space for storage would be required for the CDS. Hence, storage and collection of containers and packaging will be minimised by keeping them in a dedicated refuse room located inside the building. Further, noise from removal of containers can be adequately controlled by adherence to the schedule provided in the EPA Noise Control Guidelines.

11.0 MAXIMUM NOISE LEVELS AND SLEEP DISTURBANCE

11.1 Sleep disturbance criteria

When loading bay activities and associated vehicle movements occur during the night-time period of 2200-0700 hours, it is considered appropriate that criteria based on sleep disturbance are used to assess the noise impact. When such movements occur during the day, they are usually not considered to have an adverse impact on the existing amenity.

A document published in March 2011 by the New South Wales Government Environment Climate Change and Water (now the Office of Environment and Heritage) entitled NSW Road Noise Policy has compared a number of sleep disturbance criteria and concluded the following:

> *Maximum internal noise levels below 50-55dBA are unlikely to cause awakening reactions;*
>
> *One or two noise events per night, with maximum internal noise levels of 65-70dBA are not likely to affect health and wellbeing significantly.*

It is accepted that internal noise levels in conventional dwellings with the windows open are generally 10dB lower than external noise levels. Therefore, maximum noise levels from vehicle movements should not exceed 60-65 dB L_{Amax} outside an open window.

Noise level data of delivery trucks and loading bay activity has been sourced from the MDA database. The MDA database is a comprehensive compilation of noise measurements performed by staff at MDA, including noise levels of truck movements, loading activity and waste collections at similar sites.

Typical sound power levels based on the MDA data are provided in Table 22.

Table 22: Waste vehicle, loading bay and truck delivery noise emission data, dB Lw

Description	Octave band centre frequency								
	A	63	125	250	500	1k	2k	4k	Hz
Medium Rigid Vehicle (MRV) – L_{max}	104	107	103	97	96	97	99	97	dB
Loading bay activity - L_{max}	102	104	107	104	97	98	94	87	dB

Table 23 presents the maximum noise levels due to these loading bay activities used in the calculation of maximum noise levels for assessing risk of sleep disturbance.

Table 23: Predicted maximum noise levels due to loading bay activities

Description	Rear of units on Glenhuntly Road	Possible future residences – ABC site
Loading dock activity	Vehicle entry/exit and loading/unloading activities	Vehicle entry/exit and loading/unloading activities
Noise level MRV truck, dB L_{Amax}	104	104
Distance correction	-39	-39
Sub-total	65	65
Noise level loading bay activity, dB L_{Amax}	102	102
Distance correction	-39	-39
Transmission loss of loading bay door	-20	-20
Sub-total	43	43
Combined total	65	65
Sleep disturbance criteria outside open window	60-65	60-65
Compliance achieved	Yes	Yes

12.0 CONCLUSION

It is proposed to redevelop the site at 7 Selwyn Street, Elsternwick. The development proposal includes the construction of the new Jewish Arts Quarter.

This report has been prepared to assess the potential acoustic impacts from the proposed development and details our findings and recommendations.

MDA has carried out environmental noise assessment of the proposed redevelopment in accordance with the relevant Victorian EPA legislation, guidelines and accepted industry practice.

This assessment has been based on:

- Existing noise conditions determined from measurement surveys at the site;
- Limits determined in accordance with the relevant Victorian EPA legislation, guidelines and accepted industry practice.; and
- Noise modelling of the site and surrounding environment, accounting for typical worst-case atmospheric conditions which favour the propagation of noise

It has been demonstrated that compliance with the relevant legislation can be achieved provided the recommended noise controls are successfully implemented.

The following recommendations have been made:

12.1 Mechanical services

- Selection of a low noise chiller, air handing units and fans will be required
- The chiller may require acoustic treatment in order to comply with SEPP N-1 noise limits at a potential future residential development on the old ABC studio site
- Attenuation of mechanical noise sources, including ventilation fan intakes and exhaust louvres in the building facade
- Screening the line of sight between any exposed equipment and the facades of habitable spaces – in the case of receivers at the rear of 15-19 Gordon Street, 19 Selwyn Street and the rear of units on Glenhuntly Road, the roof edge will offer significant screening of roof plant
- Mechanical services associated with the development be reviewed during the detailed design process to confirm that compliance with the relevant noise criteria can be achieved.

12.2 Loading bay

- Use of the loading bay should generally be restricted to daytime and evening periods only (as defined under SEPP N-1, i.e. 0700-2200hrs, 7 days per week). Night-time use of the loading bay should be avoided wherever possible, although predictions indicate that night-time compliance would still be achieved subject to adherence of the following measures
- All loading/unloading activities and use of any compactors must be conducted only with the loading bay door closed during SEPP N-1 evening and night-time periods (i.e. Monday to Friday 1800-2200hrs, Saturday 1300-2200hrs*, Sunday 0700-2200hrs and 2200-0700hrs, 7 days per week)
- Waste collections can take place only during Daytime hours as defined under SEPP N-1, i.e. Monday to Friday 0700-1800hrs, Saturday 0700-1300hrs*
- Loading dock door to be a fold-up type acoustic door with acoustic seals achieving R_w 25-30 (e.g. Mirage Doors)
- Loading dock door frame and mechanism to be vibration isolated from the building structure

- Loading dock to be treated with absorption material to control reverberation (e.g. 100mm thick glasswool insulation with perforated metal facing to achieve ≥NRC 0.85)
- The use of white-noise reversing beepers on trucks should be adopted wherever possible
- Waste collections associated with the development should comply with the schedules and practices nominated in EPA Publication 1254

* As noted previously, SEPP N-1 will be superseded by new legislation and guidelines from 1 July 2021. As part of the forthcoming update, the Saturday time period between 1300-2200hrs will be classified as day period (currently classified as Evening period)

12.3 Music noise

- Internal airlocks will be required between the performing arts space and passenger/goods lifts and stairwells etc to control noise breakout to the Foyer space and loading bay
- External doors must remain closed during performances. An air-lock will be required at the Foyer main entrance to control general noise breakout as well as music noise
- The Foyer space will need to incorporate sound absorption treatment to control reverberation including any music noise spill from the performing arts space
- Air conditioning and outside air ducts will need to be acoustically treated to control noise break-out
- Music noise levels in the Foyer, Level 3 Café and external terraces must be restricted to background music noise levels only.

12.4 Terraces

- Predictions have been based on the Level 2 terrace (up to 40-60 patrons) being used during daytime and evening periods, and the Level 3 terrace (up to 100 patrons) being used during the daytime only
- Minor exceedances are predicted during the evening period, only in the event that future residences are constructed on the site of the old ABC studios on Selwyn Street. Any such exceedances are expected to result in minimal impact
- Compliance is unlikely to be achieved during night-time periods, therefore the terraces must be closed to patrons no later than 2200 hrs.

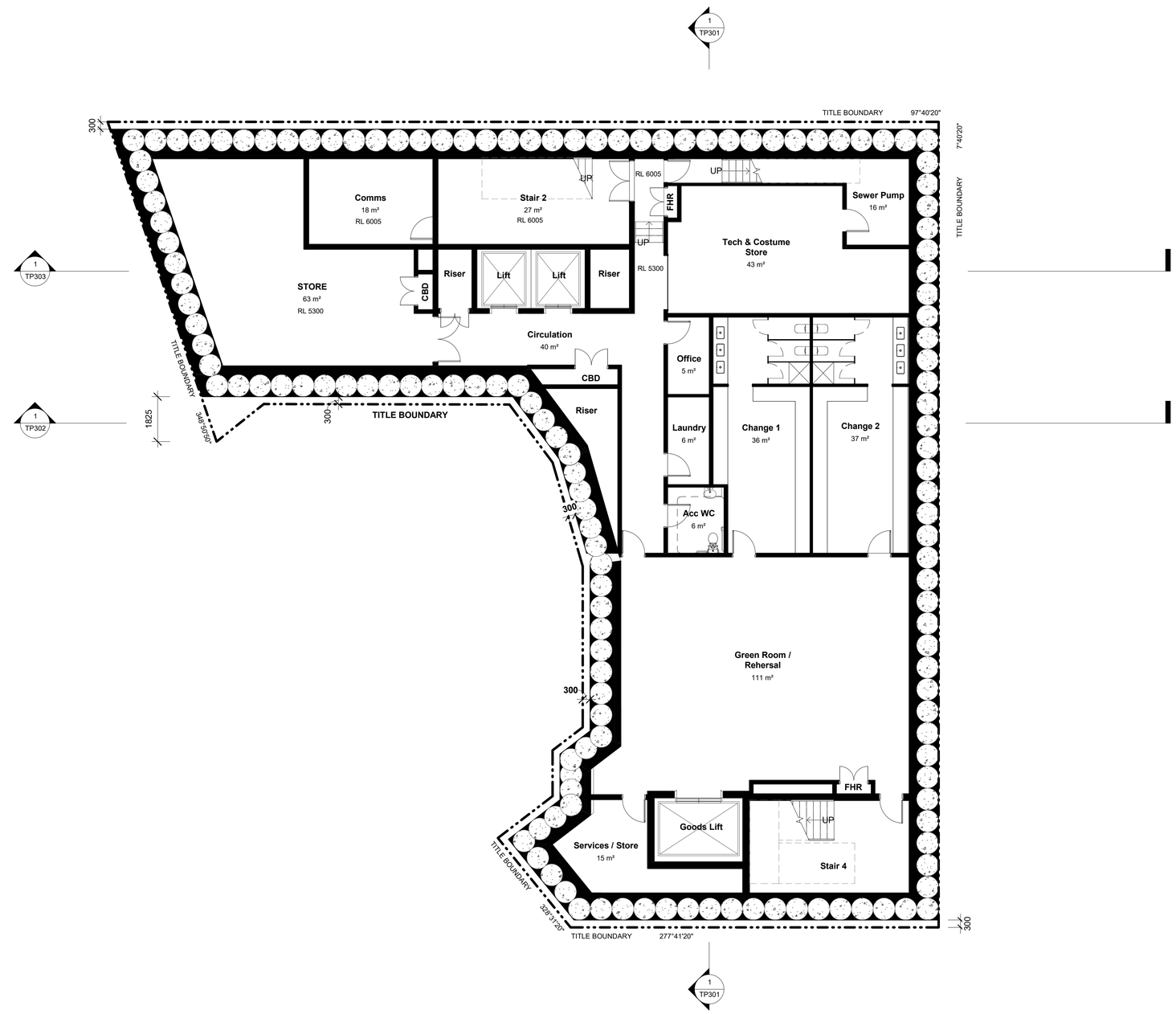
12.5 Summary

The preliminary assessment indicates that all noise impacts associated with the proposed development can be adequately mitigated.

APPENDIX A GLOSSARY OF TERMINOLOGY

dB	Decibel The unit of sound level. Expressed as a logarithmic ratio of sound pressure P relative to a reference pressure of Pr=20 μPa i.e. dB = 20 x log(P/Pr)
A-weighting	The process by which noise levels are corrected to account for the non-linear frequency response of the human ear.
L_w (or SWL)	Sound Power Level. The level of total sound power radiated by a sound source.
L_{Aeq}	The equivalent continuous (time-averaged) A-weighted sound level. This is commonly referred to as the average noise level.
L_{A90}	The A-weighted noise level equalled or exceeded for 90% of the measurement period. This is commonly referred to as the background noise level.
L_{Amax}	The A-weighted maximum noise level. The highest noise level which occurs during the measurement period.
Octave Band	A range of frequencies where the highest frequency included is twice the lowest frequency. Octave bands are referred to by their logarithmic centre frequencies, these being 31.5 Hz, 63 Hz, 125 Hz, 250 Hz, 500 Hz, 1 kHz, 2 kHz, 4 kHz, 8 kHz, and 16 kHz for the audible range of sound.
L_{eff}	The effective noise level of commercial or industrial noise determined in accordance with *State Environment Protection Policy (Control of Noise from Commerce, Industry and Trade) No. N-1* (SEPP N-1). This is the L_{Aeq} noise level over a half-hour period, adjusted for the character of the noise. Adjustments are made for tonality, intermittency and impulsiveness.
R_w	Weighted Sound Reduction Index A single number rating of the sound insulation performance of a specific building element. R_w is measured in a laboratory. R_w is commonly used by manufacturers to describe the sound insulation performance of building elements such as plasterboard and concrete.
NRC	Noise Reduction Coefficient A single number rating between 0 and 1 of the ability of a material to absorb sound. It is the average of the absorption coefficients in the 250-2000Hz octave bands rounded to the nearest 0.05. The larger the number, the more absorptive the material.

APPENDIX B FLOOR PLANS



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Jewish Arts Quarter

PROJECT ADDRESS
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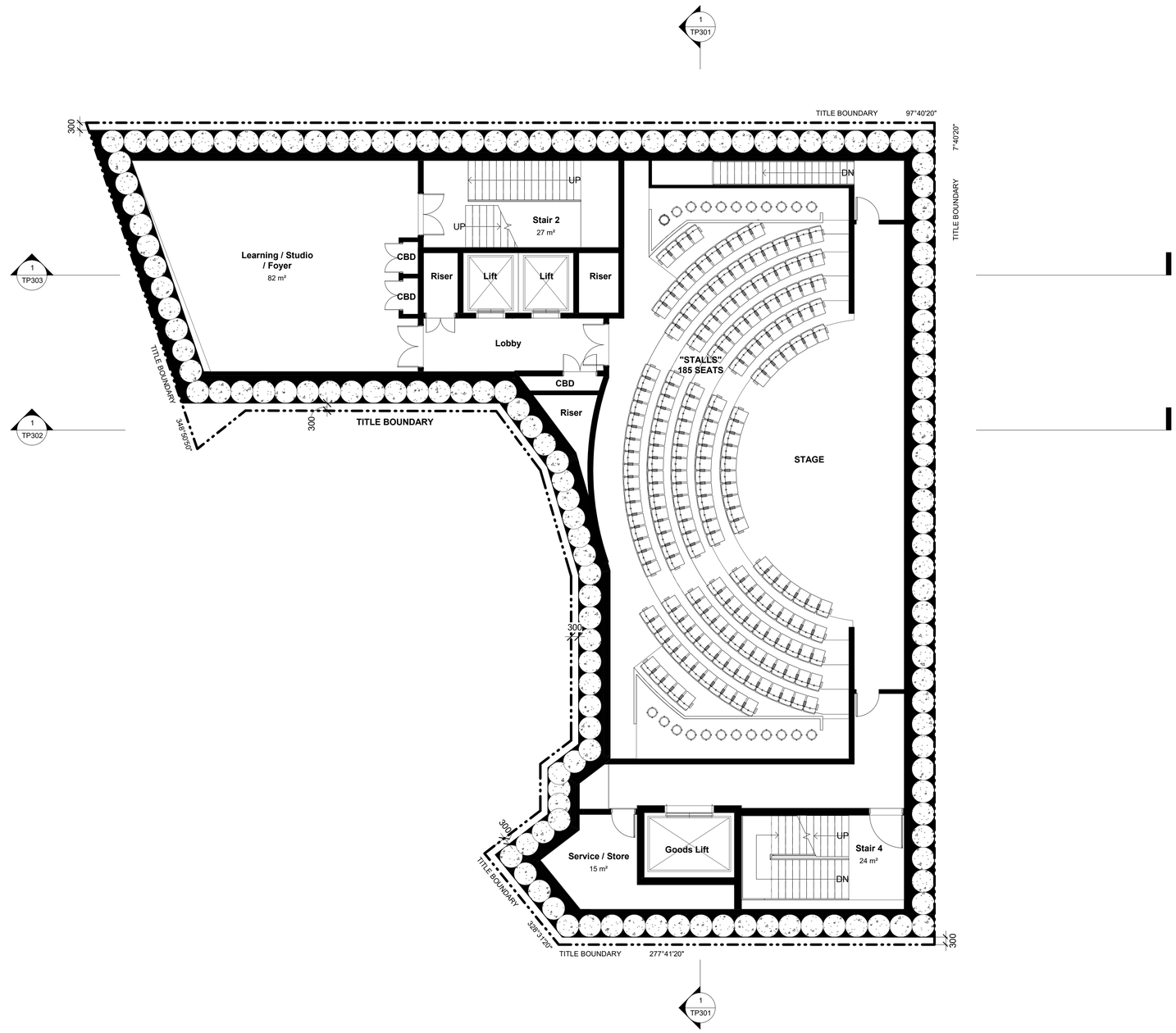

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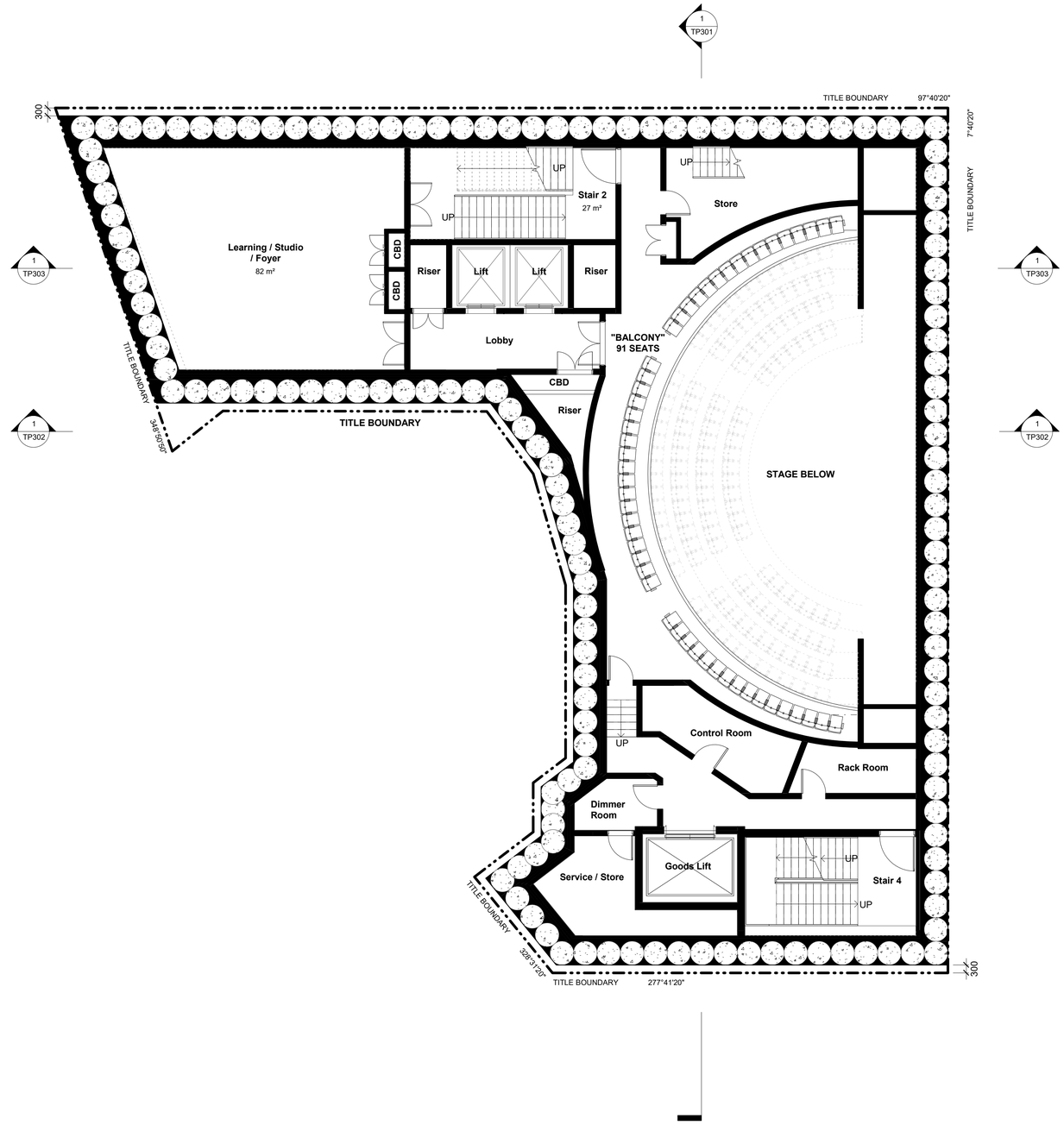

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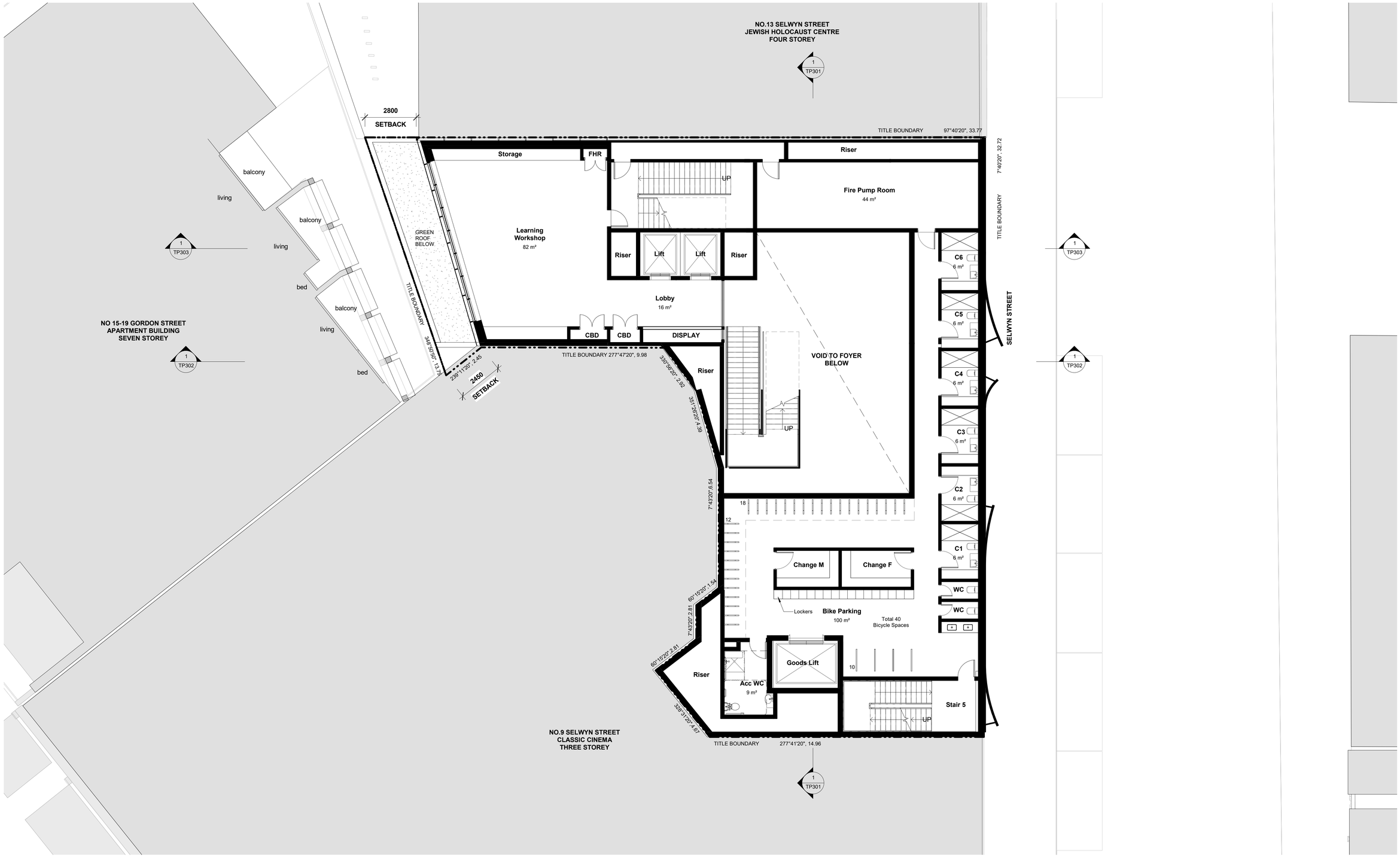

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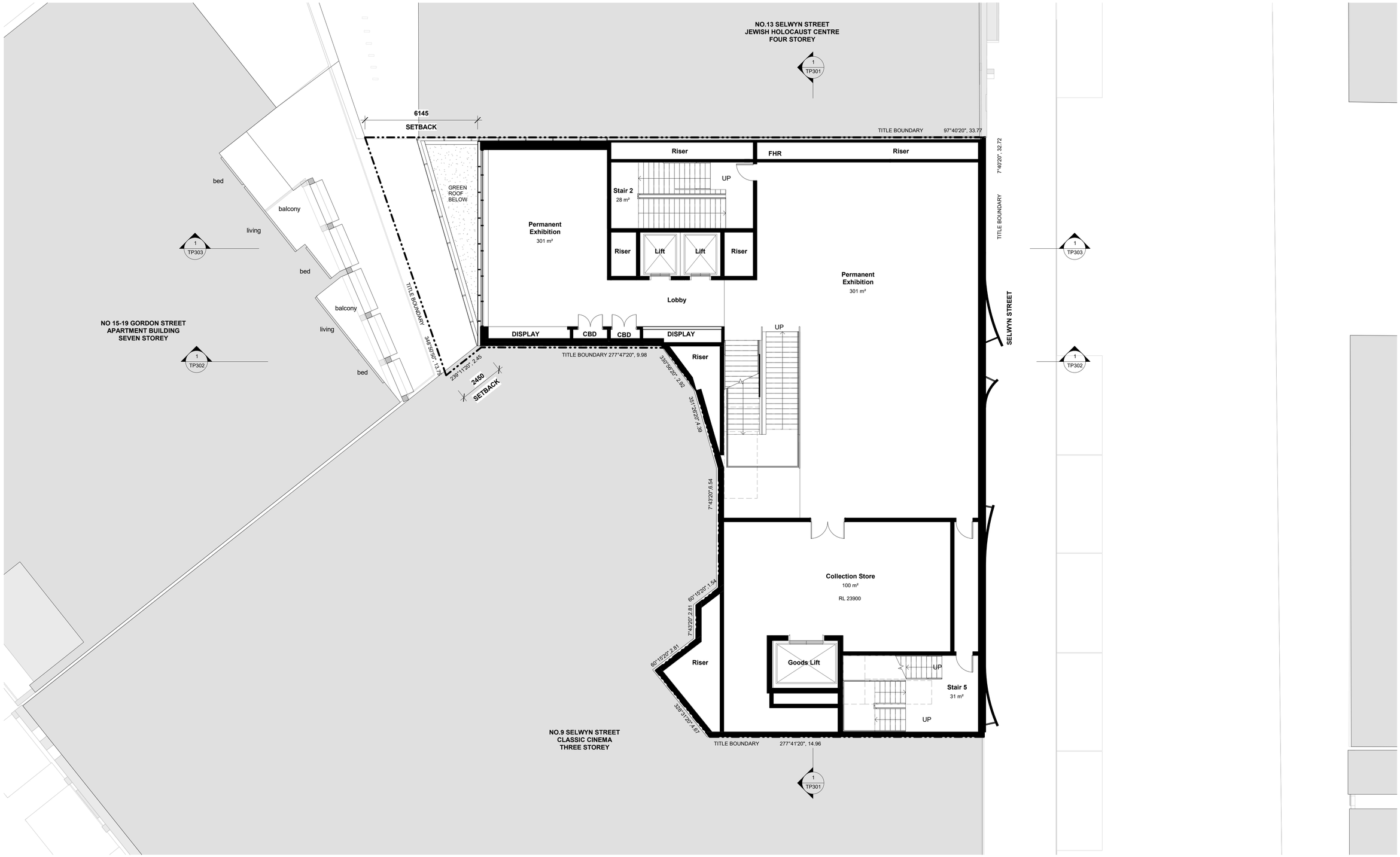

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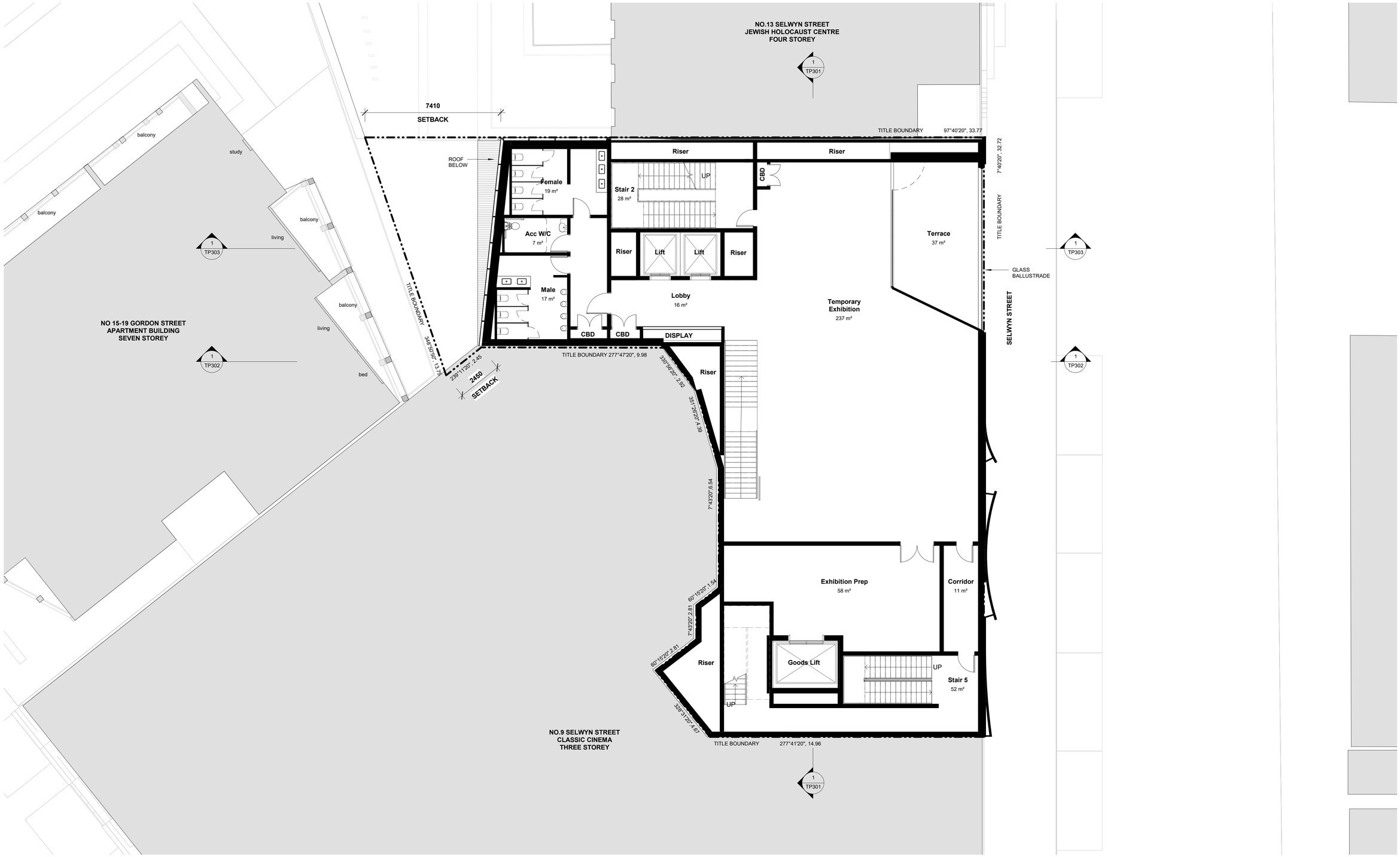

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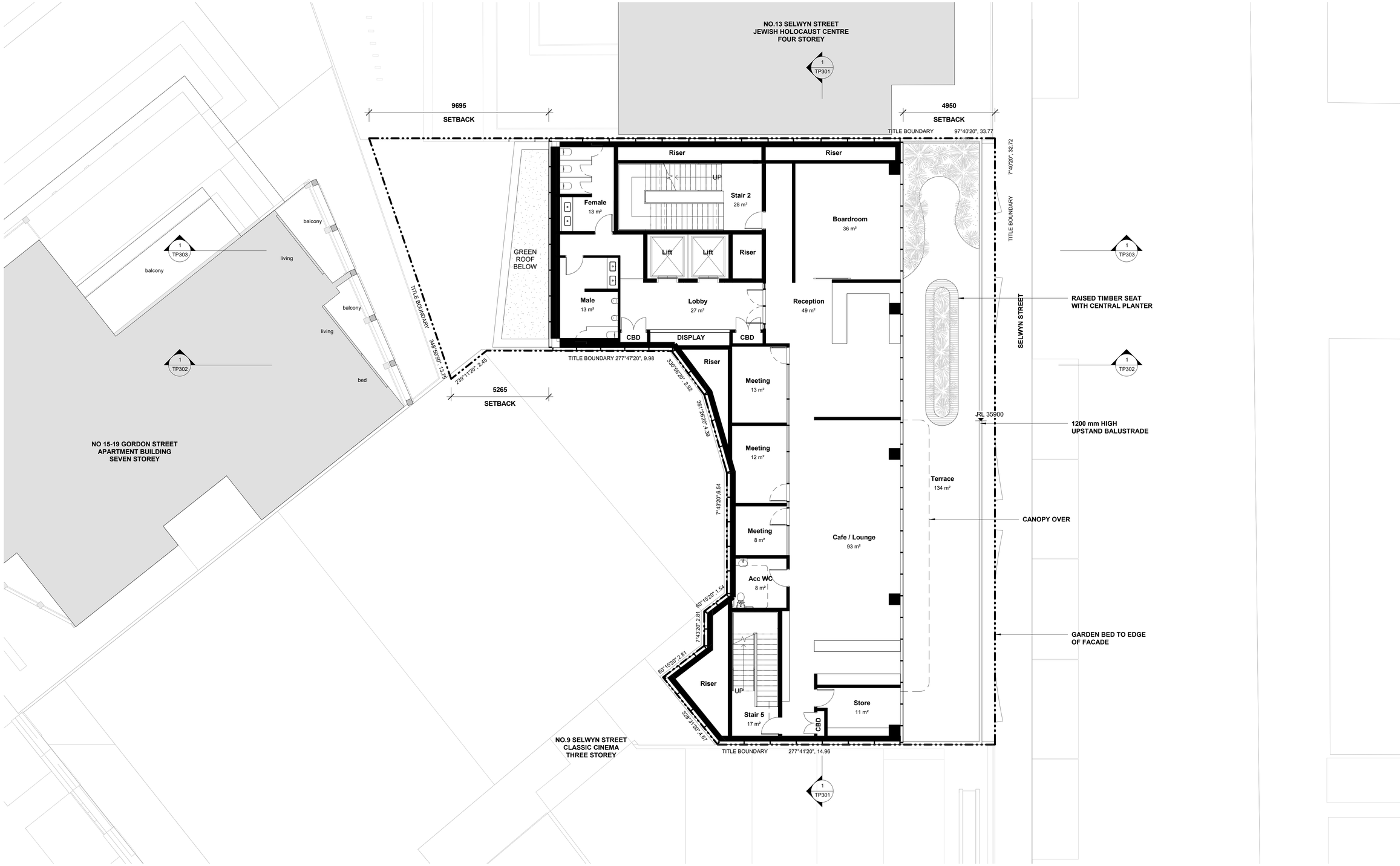

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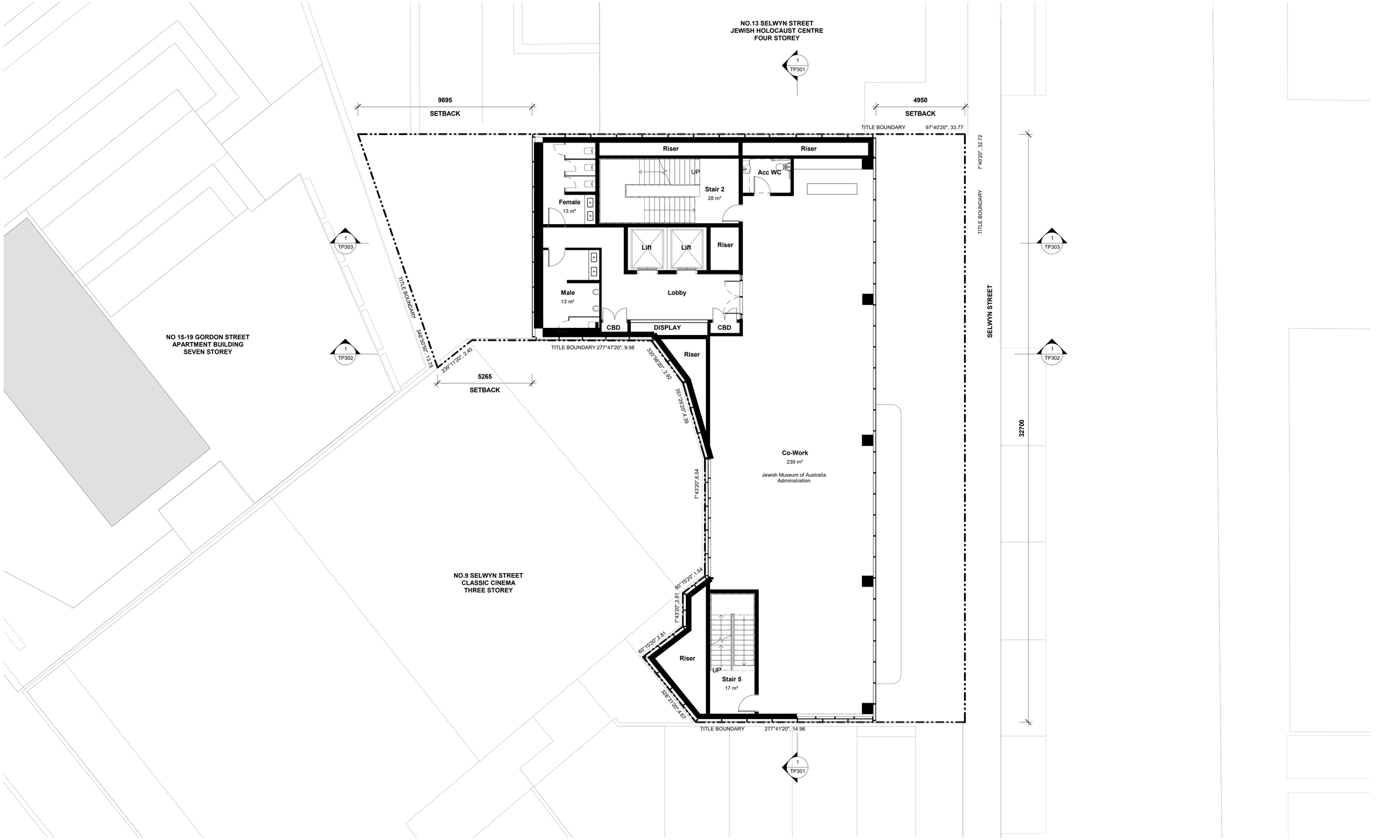

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CLIENT
Jewish Cultural & Arts Precinct

PROJECT NAME
Jewish Arts Quarter

PROJECT ADDRESS
7 Selwyn Street, Elsternwick

DRAWING TITLE
Level 4 Plan

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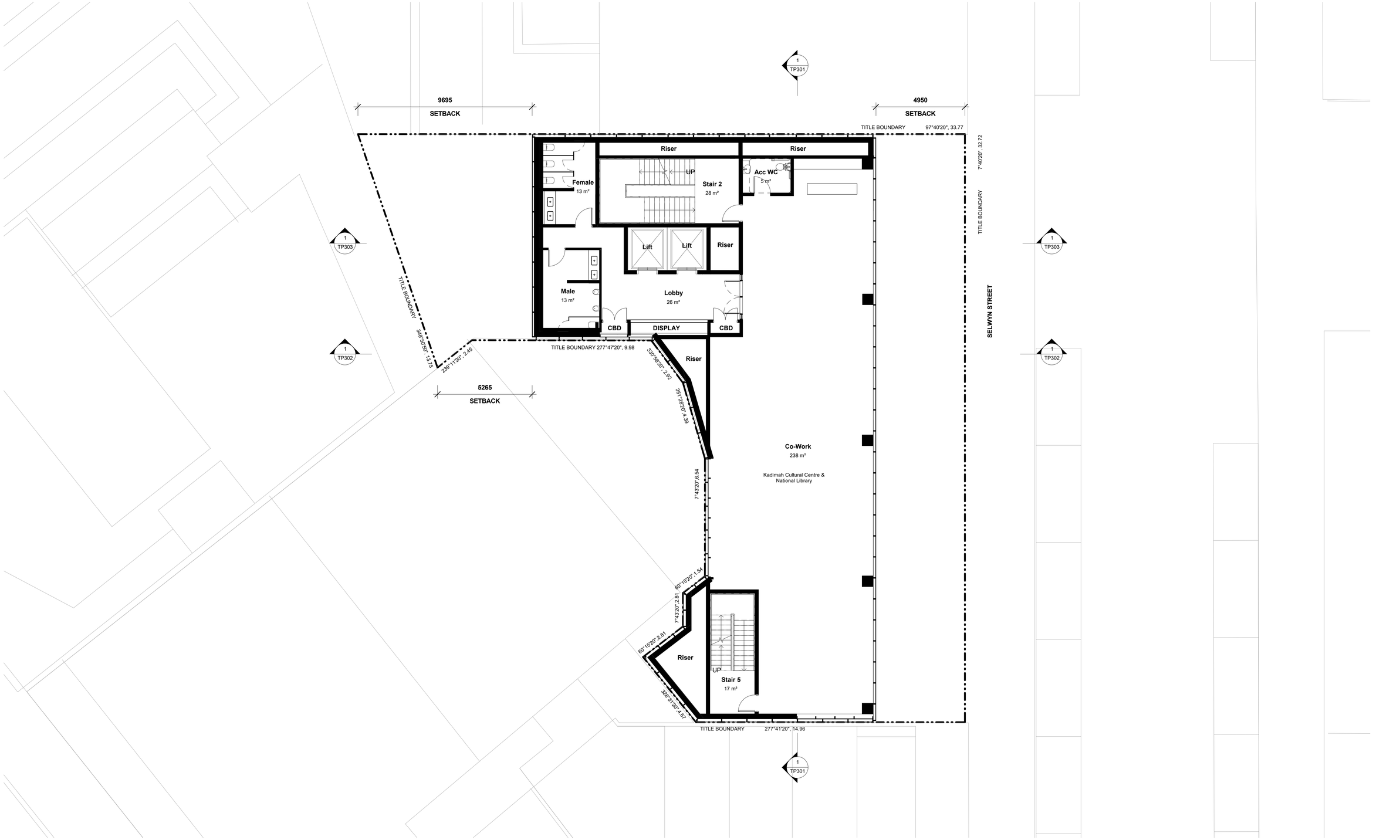

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DRAWING TITLE
Level 5 Plan

SCALE	DRAWN	DRAWING NUMBER
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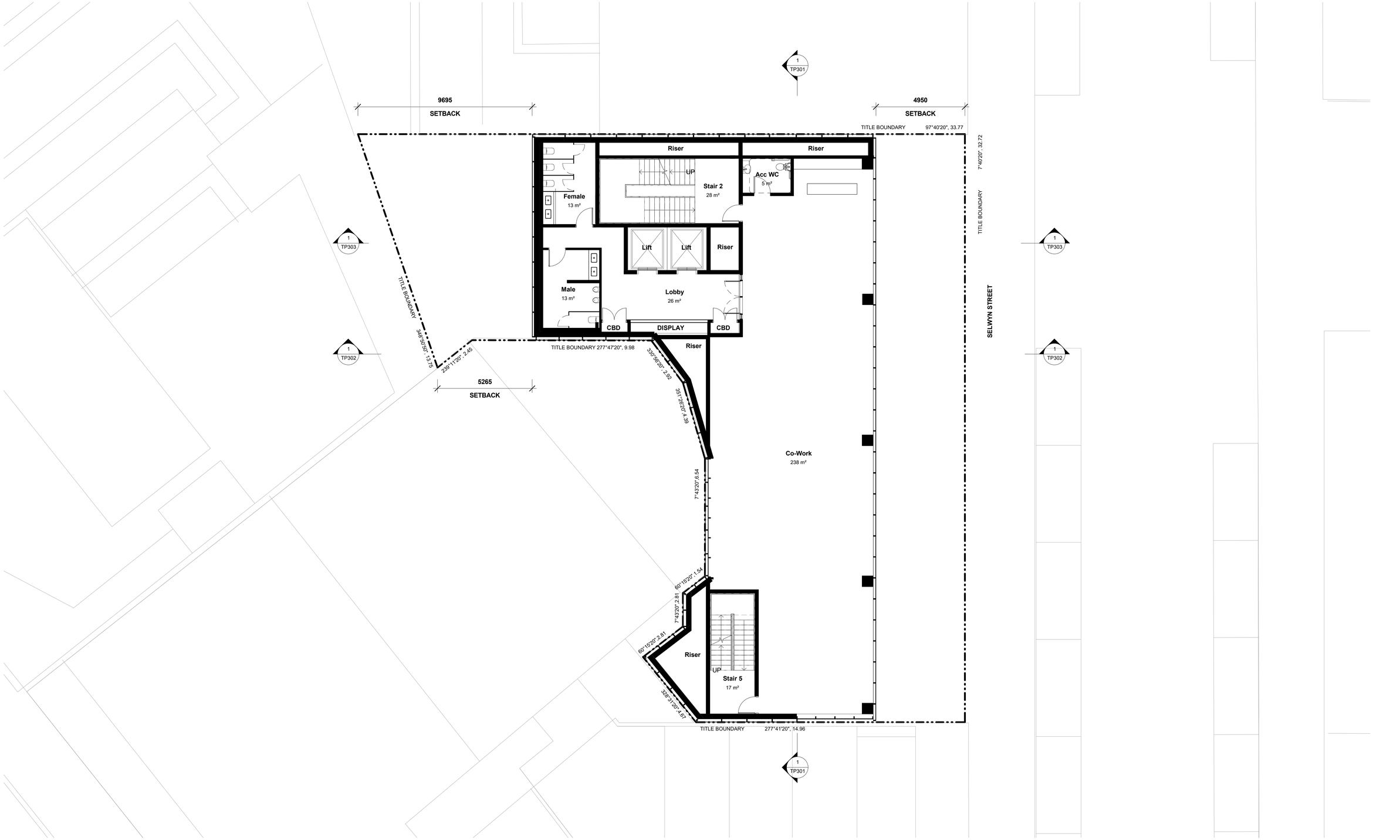

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Jewish Arts Quarter

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7 Selwyn Street, Elsternwick

DRAWING TITLE
Level 6 Plan

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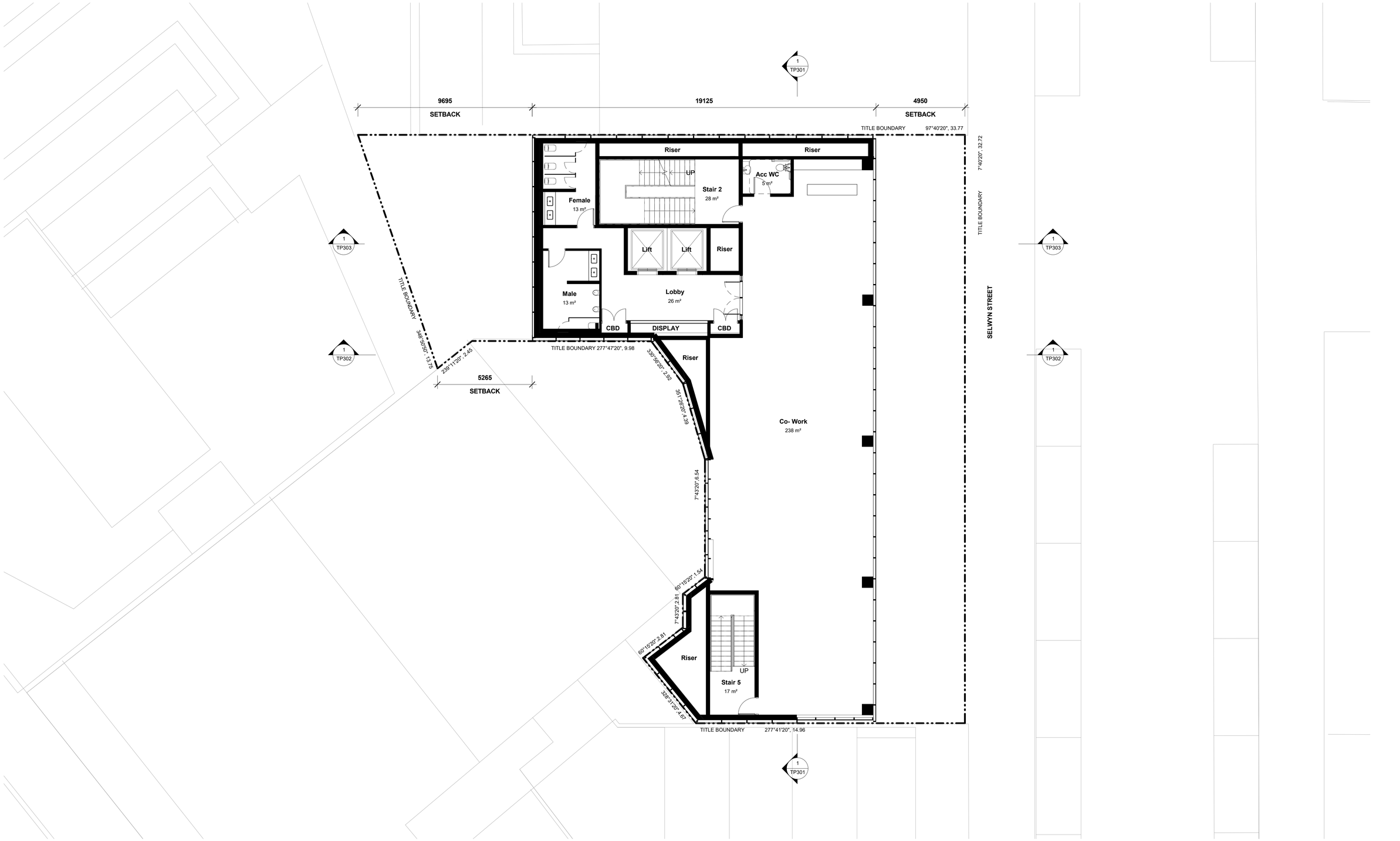

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PROJECT NAME
Jewish Arts Quarter

PROJECT ADDRESS
7 Selwyn Street, Elsternwick

DRAWING TITLE
Level 7 Plan

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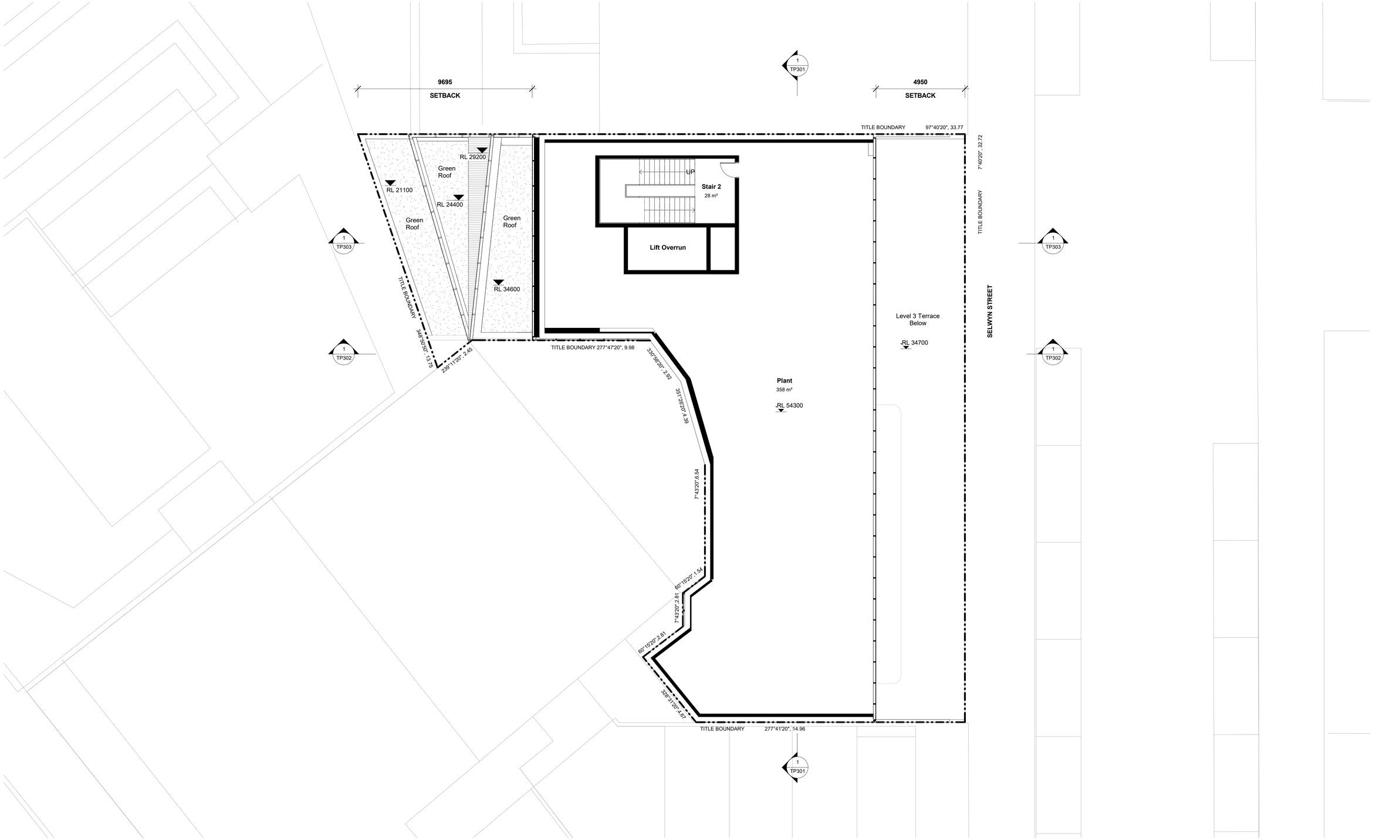

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Roof Plan

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PROJECT NAME
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PROJECT ADDRESS
7 Selwyn Street, Elsternwick

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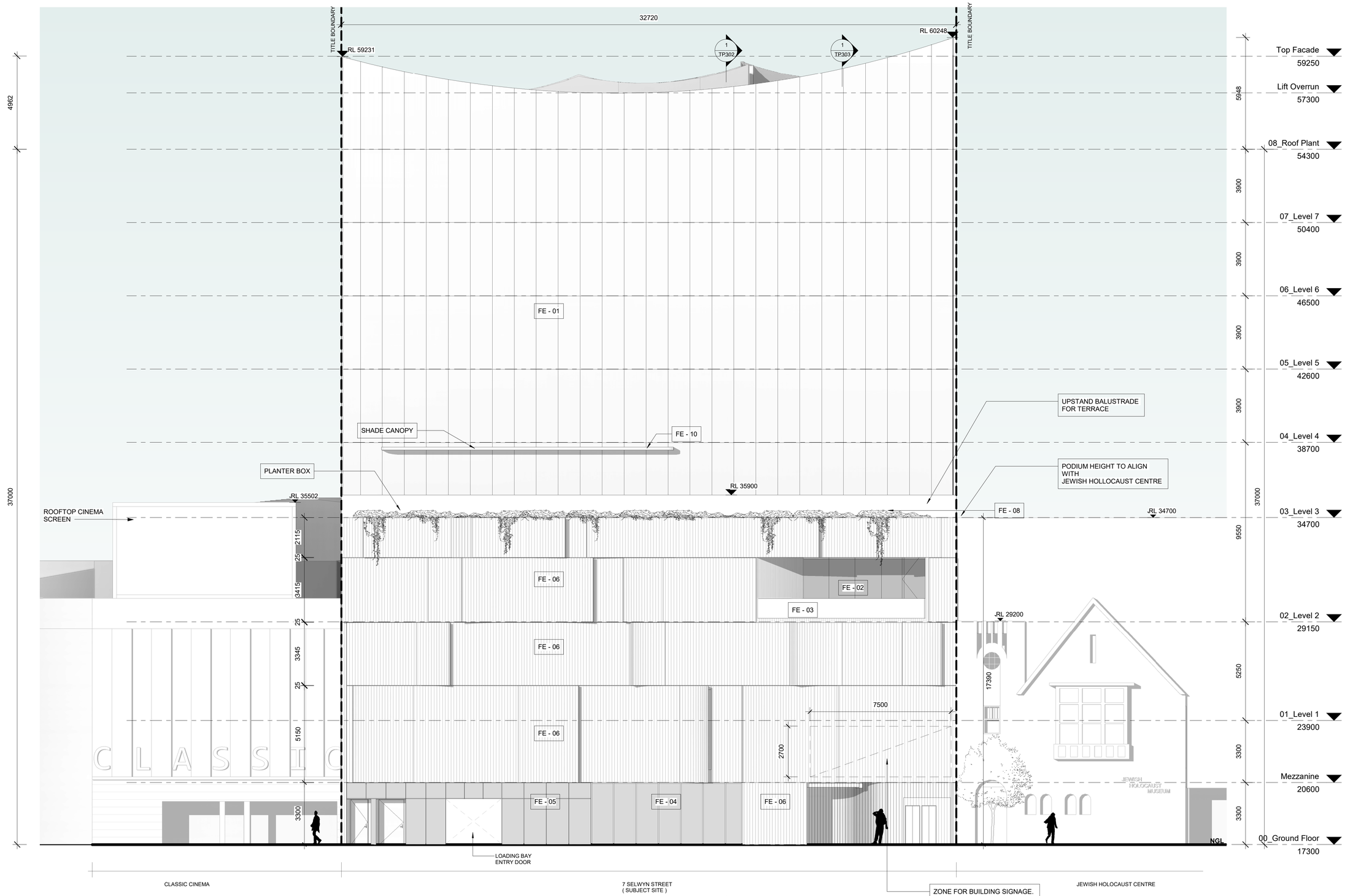

Town Planning

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East Elevation

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Jewish Arts Quarter

PROJECT ADDRESS
7 Selwyn Street, Elsternwick

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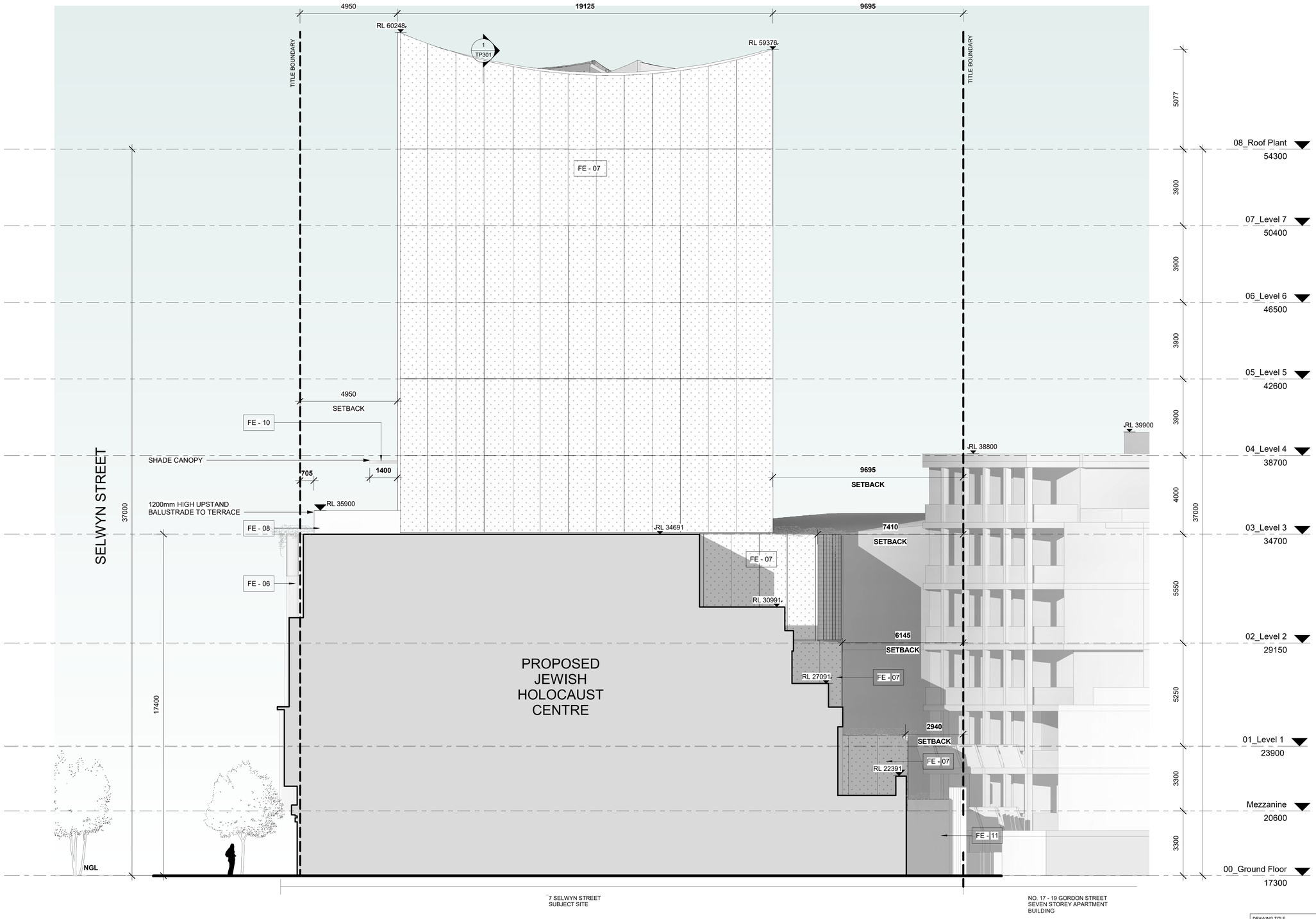

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PROJECT NAME
Jewish Arts Quarter

PROJECT ADDRESS
7 Selwyn Street, Elsternwick

DRAWING TITLE
North Elevation

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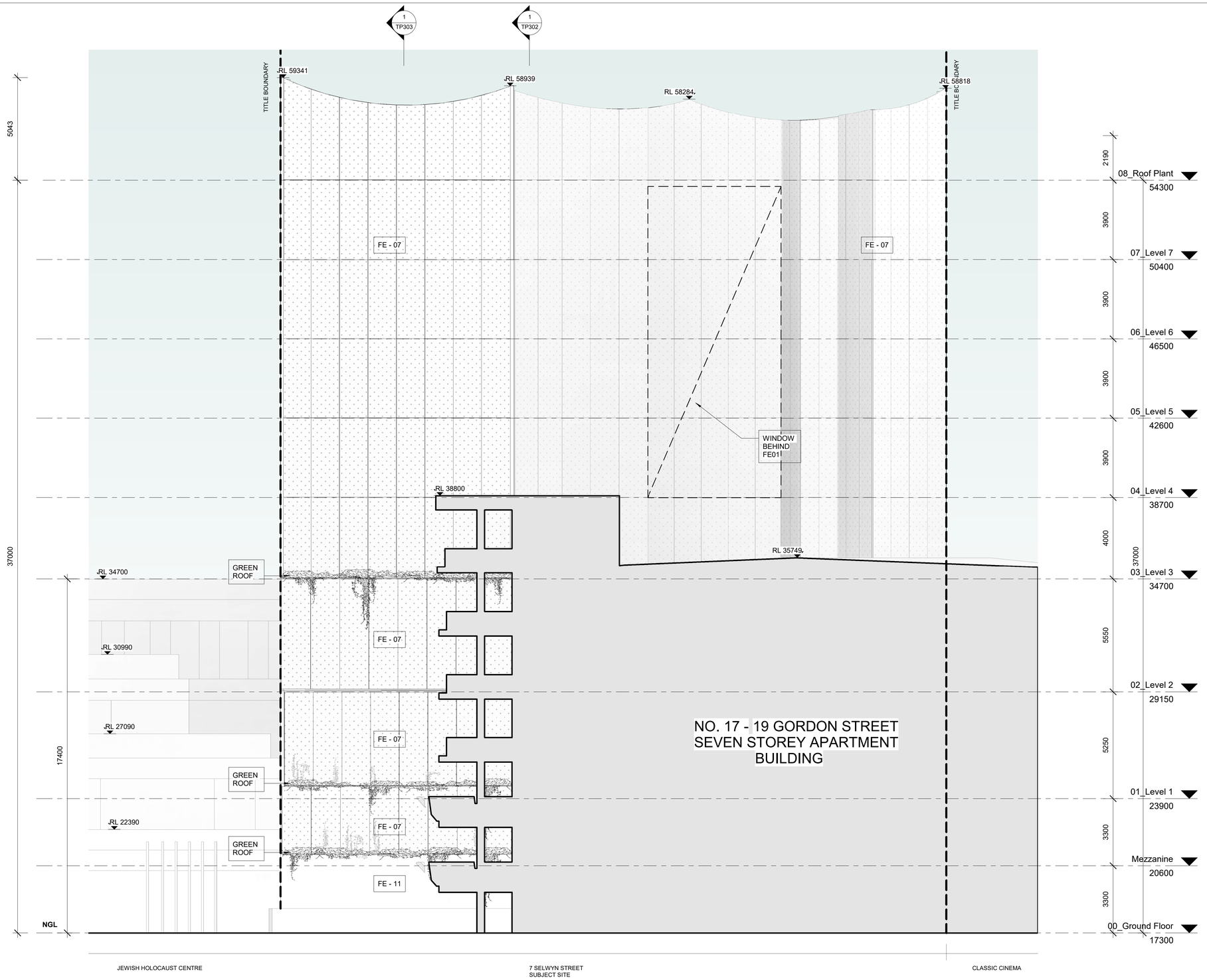

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Jewish Arts Quarter

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7 Selwyn Street, Elsternwick

DRAWING TITLE
West Elevation

SCALE	DRAWN	DRAWING NUMBER
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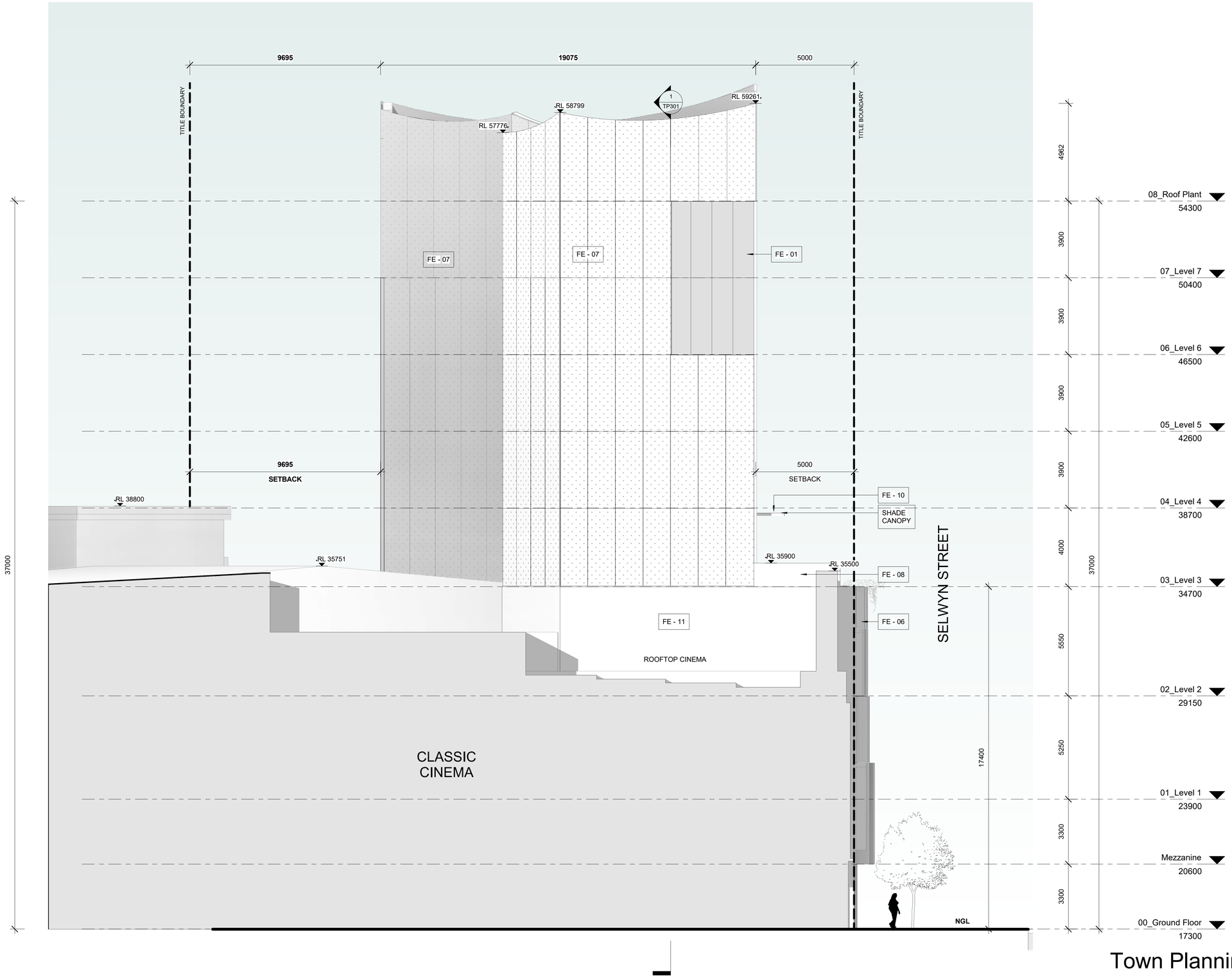

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PROJECT ADDRESS
7 Selwyn Street, Elsternwick

DRAWING TITLE
South Elevation

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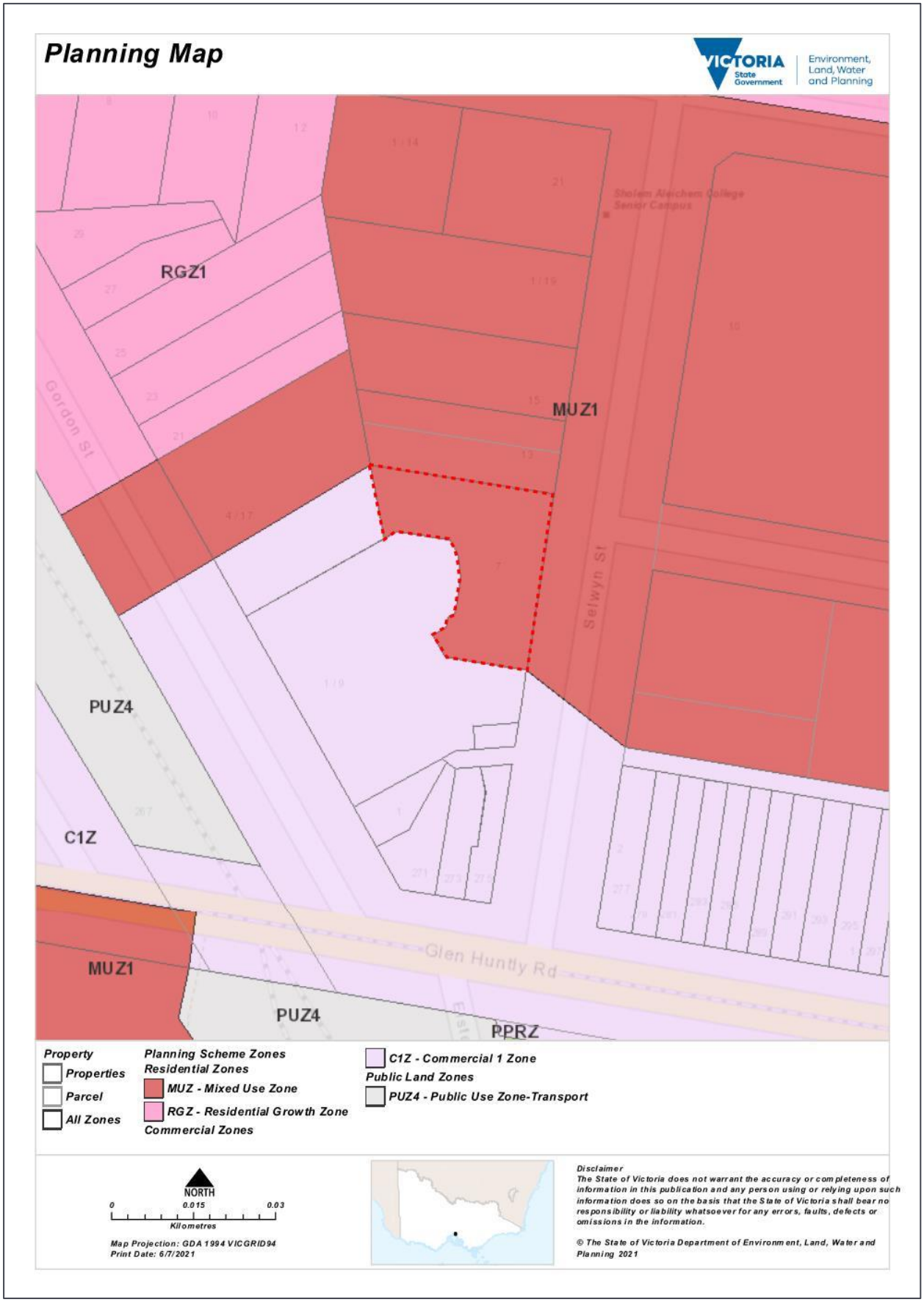
APPENDIX C PLANNING MAP



APPENDIX D ASSESSMENT CRITERIA – DETAILED INFORMATION

The Act and SEPP N-1/SEPP N-2 are scheduled to be superseded by new legislation and guidelines later in 2021. In particular, SEPP N-1/SEPP N-2 are to be replaced by EPA Publication 1826 *Noise limit and assessment protocol for the control of noise from commercial, industrial and trade premises and entertainment venues* (the Noise Protocol) as of 1 July 2021. The relevant criteria and assessment procedures of SEPP N-1/SEPP N-2 are consistent with the Noise Protocol. Demonstrating compliance with SEPP N-1/SEPP N-2 therefore also demonstrates compliance with the criteria of the forthcoming Noise Protocol. Note that the time periods for day, evening and night as defined per SEPP N-1/SEPP N-2 will be revised.

D1 SEPP N-1

D1.1 Application

State Environment Protection Policy (Control of Noise from Commerce, Industry and Trade) No. N-1 (SEPP N-1) sets noise limits that apply to commercial, industrial and trade premises within the Melbourne metropolitan region. Compliance with SEPP N-1 is mandatory under section 46 of the Environment Protection Act 1970.

SEPP N-1 defines a 'commercial, industrial and trade premises' as:

> *any premises except:*
>
> *(a) residential premises as defined in section 48A of the [Environment Protection] Act;*
>
> *(b) a street or road, including every carriageway, footpath, reservation and traffic island on any street or road;*
>
> *(c) a tram, light rail or railway line not being a siding, marshalling yard or maintenance depot of any tram, light rail or railway line; and*
>
> *(d) [land situated at Luna Park, St Kilda].*
>
> *Section 48A of the Act defines residential premises as:*
>
> *any building or part of a building used as or for the purposes of a private residence or residential flat.*

D1.2 Assessment methodology

SEPP N-1 is a policy and technical document. The Policy prescribes the methodology and measurement procedure used to determine applicable noise limits and assessment of compliance.

The Policy requires that proposed commercial premises be designed to comply with SEPP N-1 noise limits. Clause 16 of the Policy states:

> *Where it is planned to develop new commercial, industrial or trade premises, the premises shall be designed so that the noise emissions do not exceed the noise limits*

Further, the occupier of commercial, industrial or trade premises has an ongoing obligation to meet the SEPP N-1 noise limits. Clause 15 of the Policy states:

> *where noise emissions from existing commercial, industrial or trade premises exceed the requirements set out in the Policy, steps shall be taken by the occupier to reduce the level of these noise emissions to, or below, the relevant Policy noise limits.*

SEPP N-1 defines a 'noise sensitive area' as an area of land within 10m outside the external walls of:

a dwelling or residential building

a dormitory, ward or bedroom of a caretaker's house, hospital, hotel, institutional home, motel, reformative institution, tourist establishment or work release hostel.

The assessment of noise from the subject site under SEPP N-1 is based on the calculation of a noise limit at a receiver position, taking into account a zoning noise level derived from the land zoning types in the surrounding area and the background noise level.

Once a noise limit is established, the noise level (L_{Aeq}) due to the commercial premises is measured or predicted. If necessary, the L_{Aeq} noise level is adjusted for noise character and duration to give the effective noise level (L_{eff}). If the L_{eff} level exceeds the noise limit, then remedial action is required.

D1.3 Calculation of noise limits

SEPP N-1 noise limits are calculated taking into account land 'zoning types' within a 70 m and 200 m radius of a noise sensitive building. Zoning types are categorised as type 1, 2 or 3.[1] A prescribed formula is used to calculate a corresponding Zoning Level. In general, zone type designations are as follows.

- areas such as residential, rural and open space are type 1;
- areas such as commercial, business and light industry are type 2; and
- areas such as general industry and major roads are type 3.

The SEPP N-1 Noise Limit is equal to the 'zoning level' unless the background level at the noise sensitive site is categorised as low or high according to Clause B3 of the Policy. If the background level is low or high, the Noise Limit is calculated from a formula taking into account the Zoning Level and the Background Level.

The limits are separately defined for the day, evening and night periods as defined in Table 24 which shows the limits for this project.

Table 24: SEPP N-1 time periods and noise limits

Period	Day of week	Start time	End time	Measured background, L_{A90} dB	Zoning level dB	Background relative to zoning level	Noise limit, L_{eff} dB
Day	Monday-Friday	0700 hrs	1800 hrs	40	56	Low	53
	Saturday	0700 hrs	1300 hrs				
Evening	Monday-Friday	1800 hrs	2200 hrs	38	49	Low	47
	Saturday	1300 hrs	2200 hrs				
	Sunday, Public holidays	0700 hrs	2200 hrs				
Night	Monday-Sunday	2200 hrs	0700 hrs	39	44	Neutral	44

[1] EPA Publication no.: 316a, 17 February 2000, *Designation of Types of Zones and Reservations in the Metropolitan Region Planning Schemes for the Purposes of State Environment Protection Policy (Control of Noise from Commerce, Industry and Trade) No. N-1* <http://www.epa.vic.gov.au/our-work/publications/publication/2000/february/316a>

The cumulative noise from all commercial on-site activities and commercial mechanical services must be designed so that noise emissions comply with the SEPP N-1 noise limits presented in Table D1.1. The SEPP N-1 assessment includes but may not be limited to the following noise sources:

- Loading bay activities such as truck movements, loading operations, waste collection and loading bay shutter door operation
- Any mechanical equipment operating in or associated with commercial tenancies such as air conditioning systems, pallet jacks or the like
- Any mechanical equipment situated on common property and/or operated by the body corporate, such as the car park exhaust system (if any) and shutter doors, centralised electrical plant, mechanical equipment related to lifts, centralised waste management equipment or any centralised rooftop plant

Compliance with the SEPP N-1 noise limits includes compliance at neighbouring noise sensitive receptors and at dwellings within the development itself.

D1.4 Changes to legislation

As noted previously, SEPP N-1 will be superseded by new legislation and guidelines later in 2021. As part of the forthcoming update, the Saturday time period between 1300-2200hrs will be classified as day period (currently classified as Evening period).

D2 SEPP N-2

Music noise from entertainment venues is controlled by State Environment Protection Policy (*Control of Music Noise from Public Premises*) No. N-2 (SEPP N-2). Compliance with SEPP N-2 is mandatory under section 46 of the Environment Protection Act 1970.

Clause 20 of SEPP N-2 states that:

> *Where the level of music noise from indoor or outdoor venues exceeds the noise limit, steps shall be taken by the occupier to reduce those levels to, or below, the noise limit.*

SEPP N-2 sets noise limits that must be achieved in a 'noise sensitive area'. The Policy defines a noise sensitive area as:

> (a) that part of the land within the apparent boundaries of any piece of land which is within a *distance of 10 metres outside the external walls of any of the following buildings:*
>
> *Dwelling (except Caretaker's House), [or] Residential Building.*
>
> *(b) that part of the land within the apparent boundaries of any piece of land on which is situated any of the following buildings which is within a distance of 10 metres outside the external walls of any dormitory, ward or bedroom of such buildings:*
>
> *Caretaker's house, Hospital, Hotel, Institutional Home Motel, Reformative Institution, Tourist Establishment, Work Release Hostel.*

For indoor venues with music playing more than three times per week, SEPP N-2 sets noise limits as shown in Table 9.

Table 25: SEPP N-2 criteria (music on more than three nights per week)

Time period		Noise limit
Day/Evening	Saturday 1000 - 2200hrs Sunday 1200 - 2100hrs Other 0900 - 2200hrs	Music noise (L_{Aeq}) not permitted to exceed background noise (L_{A90}) plus 5dB
Night	Saturday 2200 - 1200hrs Sunday 2100 - 0900hrs Other 2200 - 0900hrs	Music noise (L_{OCT10}) is not permitted to exceed the background noise level (L_{OCT90}) by more than 8dB in any octave band (63Hz-4kHz) at a noise-sensitive area

The derived SEPP N-2 day and evening music noise limits are outlined in Table 26.

Table 26: SEPP N-2 day and evening music noise limits, dB

Period	Measured background noise level, L_{90}	Adjustment	SEPP N-2 limit, L_{Aeq}
Day	40	+5 dB	45
Evening	38	+5 dB	43

The derived SEPP N-2 night-time music noise limits are outlined in Table 27.

Table 27: SEPP N-2 night noise limits, dB

	Octave band centre frequency, Hz							
	63	**125**	**250**	**500**	**1k**	**2k**	**4k**	**A**
Background noise levels, L_{90}	43	40	35	36	35	29	18	39
Adjustment + 8dB	+8	+8	+8	+8	+8	+8	+8	-
Night noise limit, L_{10}	51	48	43	44	43	37	26	47

D2.1 Changes to legislation

As noted previously, SEPP N-2 will be superseded by new legislation and guidelines later in 2021. As part of the forthcoming update, the day, evening and night periods will be revised. The time periods stated in the forthcoming Environment Protection Regulations 2021 are shown in Figure 4.

Figure 4: Times as per Environment Protection Regulations 2021

Time period	
Day/Evening	Monday - Saturday 0700-2300hrs
	Sunday/Public Holiday (other than if either is preceding a Public Holiday) 0900 - 2200hrs
	Sunday/Public Holiday (if either is preceding a Public Holiday) 0900 - 2300hrs
Night	Monday - Friday 2300 - 0900hrs
	Saturday or any day preceding a Public Holiday 2300 - 0900hrs
	Sunday/Public Holiday (if neither is preceding a Public Holiday) 2200 - 0700hrs

D3 EPA Publication 1254 Noise Control Guidelines

EPA Publication 1254.2 *Noise Control Guidelines* state the following in the introduction:

These guidelines are primarily intended to be used by municipal officers to assist in the resolution of complaints or to avert a possible noise nuisance. Some guidelines have been prepared so that they could be incorporated into a permit condition of a development or embodied as a local law. The guidelines are designed, however, to be the basis of assessment and not the last word.

Many of the guidelines do not require an actual measurement of the noise. In these cases, the inherent nature of the activity outside the hours suggested is sufficient to consider the activity unreasonable.

D3.1 Deliveries and industrial waste collection

MDA considers that if noise from deliveries and waste collection can meet the applicable objective criteria (e.g. SEPP N-1) that apply during the relevant period, then impact is considered reasonable and restrictions as per the guideline recommendations do not need to be applied during that period.

D3.2 Industrial waste collection

EPA Publication 1254 Noise Control Guidelines provides the following recommendations for industrial waste collections:

- Refuse bins should be located at sites that provide minimal annoyance to residential premises
- Compaction should be carried out while the vehicle is moving
- Bottles should not be broken up at the collection site
- Routes which service predominantly residential areas should be altered regularly to reduce early morning disturbances
- Noisy verbal communication between operators should be avoided if possible.

The following schedule of acceptable times for waste collection is also provided in the *Guidelines*:

One collection per week

6:30am-8pm	Monday to Saturday
9am-8pm	Sunday and public holidays

Two or more collections per week

7am-8pm	Monday to Saturday
9am-8pm	Sunday and public holidays.

It is recommended that waste disposal activities adhere to the above guidelines and procedures.

D4 Patron noise

Noise from voices of patrons outdoors is not covered under any State Environment Protection Policy or general Victorian guideline. There has been extensive discussion between members of the Association of Australian Acoustical Consultants (AAAC) in regards to suitable criteria but consensus between members has not yet been reached.

In lieu of an established state policy or criterion, MDA has developed a set of design targets which have been referenced as part of numerous planning applications and VCAT hearings for proposed external patron noise areas.

The structure of the patron noise design targets is summarised in Table 28.

Table 28: Recommended design targets for night-time patron noise

Description	Design Target	Purpose
Semi-steady noise levels - L_{Aeq}	Day Period - 50 dB or background noise (L_{A90}) + 10 dB, whichever is higher Evening Period - 45 dB or background noise (L_{A90}) + 10 dB, whichever is higher Night Period - 40 dB or background noise (L_{A90}) + 5 dB, whichever is higher	Amenity protection
Short-term maximum noise levels L_{Amax}	60-65 dB (refer to Appendix D5)	Sleep disturbance protection

The defined periods for the day, evening and night-time periods are taken from the NSW (Industrial Noise Policy). For a theoretical assessment of a venue, the purpose of the proposed patron noise criteria is not to provide an absolute limit but to provide an indication of whether a venue has the potential to cause an unreasonable impact.

It is difficult to propose an absolute limit because unlike other noise sources (e.g. mechanical equipment), there is a large variation in patron noise and this variation is not always linked to the number of patrons.

The results of the analysis are interpreted as follows:

Table 19: Interpretation of patron noise assessment results

Predicted noise level	Likely impact
Meets the proposed criteria	No impact likely
Exceeds the proposed criteria by up to 2 dB	No impact likely
Exceeds the criteria by 3-5 dB	There is a possibility of impact and the proposal should be assessed with measurements once it is operational to determine typical crowd noise levels from the venue. Provision should be made to adopt managerial controls and retrofit engineering controls if deemed necessary
Exceeds the criteria by 5-8 dB	There is a strong possibility of impact and engineering controls should be incorporated. Managerial controls should also be considered at the planning stage. Further measurements will be required once the development is operational to determine appropriate managerial controls
Exceeds the criteria by more than 8 dB	There will be noise impact and major changes to the design and/or operation of the proposed outdoor area will be required

D5 Sleep disturbance

The NSW *Road Noise Policy* 2011 produced by the NSW Environmental Protection Agency strictly only applies in NSW. However, the provisions of the document are often referred to in Victoria for general guidance on potential sleep disturbance.

The NSW policy notes that from the research on sleep disturbance to date it can be concluded that:

> *maximum internal noise levels below 50–55 dB LAmax are unlikely to awaken people from sleep one or two noise events per night, with maximum internal noise levels of 65-70 dB LAmax, are not likely to affect health and wellbeing significantly.*

It is generally accepted that a partially open window provides approximately 10 dB noise reduction from outside to inside. Therefore, in accordance with the *NSW Road Noise Policy* sleep disturbance findings, we recommend that maximum noise levels from on-site activities at night should not exceed 65 dB L_{Amax} outside an openable window of existing or future residential dwellings.

APPENDIX E DETAILED LOADING BAY CALCULATIONS

Table 29: Daytime operation

Activity	Predicted effective noise levels, L_{eff} dB			
	Rear of 15-19 Gordon St	**19 Selwyn Street**	**Rear of GHR units**	**Future ABC site**
Scenario: 1 waste collection or 1 MRV delivery within 30 min period				
1 Waste collection truck movement LwA	101	101	101	101
1 Medium rigid vehicle (MRV) movement LwA	96	96	96	96
Highest LwA	101	101	101	101
Distance correction	-41	-44	-39	-39
Duration correction 30 seconds	-18	-18	-18	-18
Screening/directivity	-15	-8	0	0
Tonality correction	2	2	2	2
Effective noise level	**29**	**33**	**46**	**46**
Collection/bin empty LwA	96	96	96	96
Distance correction	-41	-44	-39	-39
Collection/bin empty duration correction	-15	-15	-15	-15
Transmission loss of loading dock door	0	0	0	0
Tonality correction	2	2	2	2
Effective noise level	**42**	**39**	**44**	**44**
Loading bay activity (30 minutes)	80	80	80	80
Transmission loss of loading dock door	0	0	0	0
Distance correction	-41	-44	-39	-39
Effective noise level	**39**	**36**	**41**	**41**
Effective noise level of compactor operation (full 30 minutes)	89	89	89	89
Transmission loss of loading dock door	0	0	0	0
Distance correction	-41	-44	-39	-39
Effective noise level	**48**	**45**	**50**	**50**
Total cumulative effective noise level	**49**	**47**	**52**	**52**
SEPP N-1 daytime limit	**53**	**53**	**53**	**53**
Compliance?	**Yes**	**Yes**	**Yes**	**Yes**

Table 30: Evening operation

Activity	Predicted effective noise levels, L_{eff} dB			
	Rear of 15-19 Gordon St	**19 Selwyn Street**	**Rear of GHR units**	**Future ABC site**
Scenario: 1 Medium rigid vehicle (MRV) delivery within 30 min period				
1 Medium rigid vehicle (MRV) movement LwA	96	96	96	96
Distance correction	-41	-44	-39	-39
Duration correction 30 seconds	-18	-18	-18	-18
Screening/directivity	-15	-8	0	0
Tonality correction	2	2	2	2
Effective noise level	**24**	**28**	**41**	**41**
Loading bay activity (30 minutes)	80	80	80	80
Transmission loss of loading dock door	-20	-20	-20	-20
Distance correction	-41	-44	-39	-39
Effective noise level	**19**	**16**	**21**	**21**
Effective noise level of compactor operation (full 30 minutes)	**89**	**89**	**89**	**89**
Transmission loss of loading dock door	-20	-20	-20	-20
Distance correction	-41	-44	-39	-39
Effective noise level	**28**	**25**	**30**	**30**
Total cumulative effective noise level	**30**	**30**	**41**	**41**
SEPP N-1 evening limit	**47**	**47**	**47**	**47**
Compliance?	**Yes**	**Yes**	**Yes**	**Yes**

Table 31: Night-time operation

Activity	Predicted effective noise levels, L_{eff} dB			
	Rear of 15-19 Gordon St	**19 Selwyn Street**	**Rear of GHR units**	**Future ABC site**
Scenario: 1 MRV truck within 30 min period				
1 Medium rigid vehicle (MRV) movement LwA	96	96	96	96
Distance correction	-41	-44	-39	-39
Duration correction 30 seconds	-18	-18	-18	-18
Screening/directivity	-15	-8	0	0
Tonality correction	2	2	2	2
Effective noise level	**24**	**28**	**41**	**41**
Loading bay activity (30 minutes)	80	80	80	80
Transmission loss of loading dock door	-20	-20	-20	-20
Distance correction	-41	-44	-39	-39
Screening/directivity	-15	-8	0	0
Effective noise level	**4**	**8**	**21**	**21**
Total cumulative effective noise level	**24**	**28**	**41**	**41**
SEPP N-1 night-time limit	**44**	**44**	**44**	**44**
Compliance?	**Yes**	**Yes**	**Yes**	**Yes**

Table 32: Night-time operation – L_{max} sleep disturbance

Activity	Predicted effective noise levels, LAmax dB			
	Rear of 15-19 Gordon St	**19 Selwyn Street**	**Rear of GHR units**	**Future ABC site**
Scenario: 1 MRV truck within 30 min period				
1 Medium rigid vehicle (MRV) movement LwA,max	104	104	104	104
Distance correction	-41	-44	-39	-39
Screening/directivity	-15	-8	0	0
Tonality correction	0	0	0	0
Effective noise level	**48**	**52**	**65**	**65**
Loading bay activity (30 minutes) - LAmax	102	102	102	102
Transmission loss of loading dock door	-20	-20	-20	-20
Distance correction	-41	-44	-39	-39
Screening/directivity	-15	-8	0	0
Effective noise level	**26**	**30**	**43**	**43**
Total cumulative effective noise level	**48**	**52**	**65**	**65**
Night-time maximum limit for sleep disturbance	**65**	**65**	**65**	**65**
Compliance?	**Yes**	**Yes**	**Yes**	**Yes**

APPENDIX F PATRON NOISE DATA

The noise of patron areas associated with dining and licensed venues is highly variable according to a wide range of factors including:

- The type of venue
- The function of the space within the venue (i.e. seated areas for dining or standing areas with a focus on alcohol consumption)
- Total crowd numbers
- The composition of the total patron numbers in terms of demographics and group sizes
- Weather
- Alcohol consumption
- Background noise levels
- The acoustic properties of the space.

Based on the above considerations, total patron noise emissions will vary significantly between different venues. Further, for a given venue patron noise emissions will vary from day to day and hour to hour according to these types of factors.

The individual and cumulative effect of these factors cannot be precisely calculated. Accordingly, to provide a practical basis for assessing the noise from proposed external areas, a simplified method has been developed to characterise the noise emissions of four broad categories of venue type for different number of patrons. The method is based on a single representative vocal effort to characterise the range of emissions of all individuals within the crowd.

It is assumed that a portion of the crowd may be speaking at any given point in time.

In practice, the vocal effort of each individual will vary across the crowd and throughout the assessment period. The portion of the crowd will also vary. The selected values are therefore not considered exact representations of a crowd's patterns. The values have been chosen to enable a simple relationship to be formulated which provides close agreement with patron noise measurements conducted at a range of venues.

Marshall Day Acoustics and other acoustic consultants in Melbourne have measured patron noise from several different venues. These measurements indicate a large variation in the noise levels of crowds. Variations are due to a number of factors including the situational context of the crowd.

For the purpose of predicting noise levels from a venue, external patron areas are categorised according to the descriptions outlined in Table 33. Reference sound power data for one person is detailed in the 2011 Hayne paper[2].

Table 33: Patron area use categories

Area use category	Reference sound power data per one person		Area use definition
	Equivalent	Maximum	
Vertical drinking ('worst-case' crowd)	88 dB L_{AW}	104 dB L_{AW}	Standing patrons drinking and talking Focus of activity on drinking and socialising
Taverns with significant food offerings	83 dB L_{AW}	104 dB L_{AW}	Predominantly seated patrons, drinking, dining and talking Focus of activity on drinking, whilst dining and socialising
Restaurant dining	78 dB L_{AW}	98 dB L_{AW}	Seated patrons, drinking, dining and talking Focus of activity on dining and socialising
Small smoking areas (<40 patrons)	73 dB L_{AW}	98 dB L_{AW}	Patrons using area for smoking Focus of activity on smoking rather than socialising (data also includes outdoor areas with alcohol consumption)

Based on the above reference sound power data and measurements by Marshall Day Acoustics, a simplified empirical relationship to represent the total sound power level for which crowd numbers and character were varied has been derived for determining design equivalent and maximum sound power level as follows:

- Design equivalent sound power level - derived by assuming that one third of the total crowd speaks continuously over the duration of the assessment period, and each of these speakers emit a constant total sound power level over the duration of the assessment period. In practice, the actual number of individuals speaking, the sound power emitted by each individual, and the temporal characteristics of each speaker will vary considerably over the assessment period. The derived values therefore do not represent the actual percentage of patrons speaking, or the emission of each patron, but simply represent the total sound power level for the number of patrons

- Design maximum sound power level - derived by assuming that the maximum noise level occurs as a result of two (2) individuals simultaneously producing a maximum level. Smoking areas and restaurants are considered to have the same maximum sound power level characteristics, as are taverns with significant food offerings and vertical consumption crowds.

[2] Hayne et al 2011, 'Prediction of noise from small to medium sized crowds', in *Acoustics 2011: Breaking New Ground, Proceedings of the Annual Conference of the Australian Acoustical Society*, AAS Queensland Division 2011, Gold Coast, paper number 133.

Figure 5 provides the total equivalent sound power based on patron numbers.

Figure 5: Total equivalent sound power based on patron number

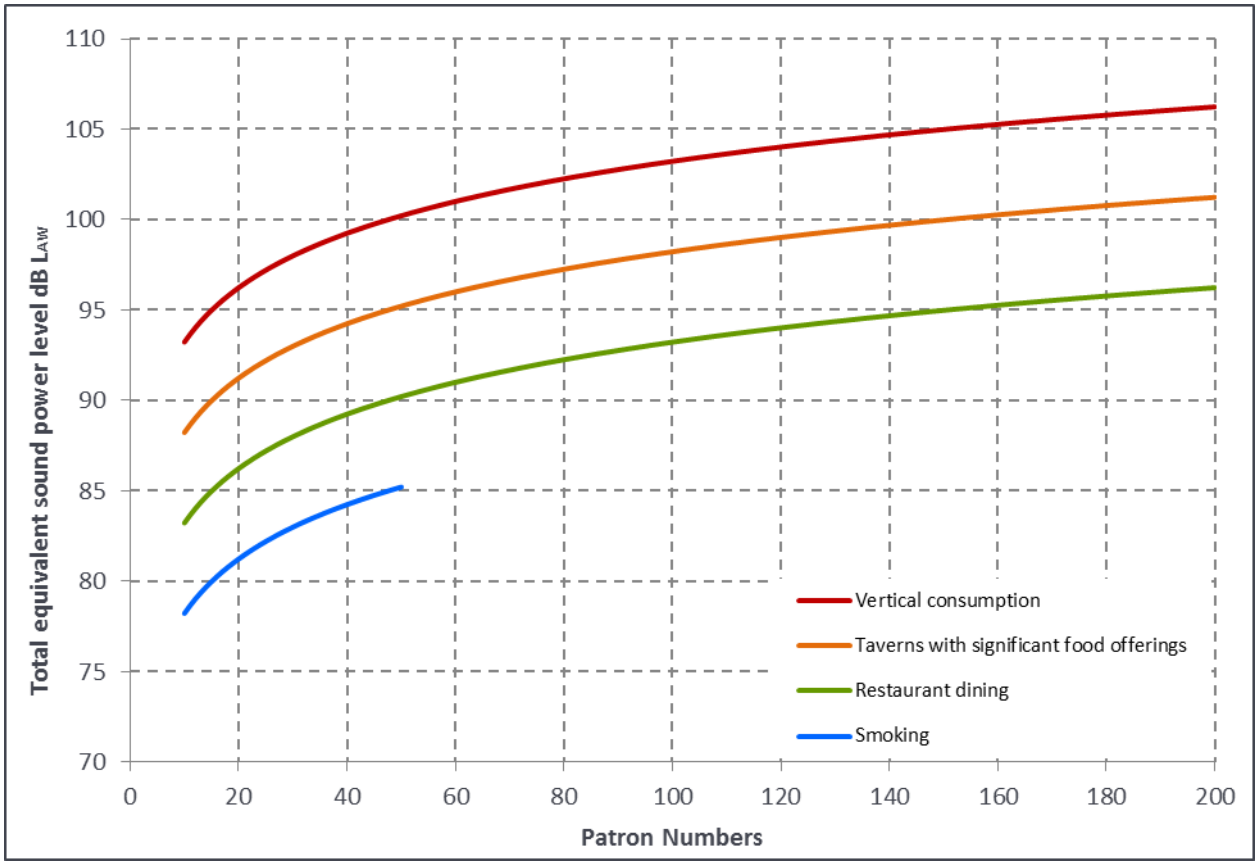


Table 34 provides the octave band spectral correction applied to the calculated patron sound power.

Table 34: Octave band spectral correction

	Octave Band Centre Frequency (Hz)						
Source	**63**	**125**	**250**	**500**	**1000**	**2000**	**4000**
Spectral Correction	-12	-10	-9	-2	-4	-8	-15