



Indoor Ambient Noise Level Verification Report for Approval 131891/FO/2021 Condition 17(b)

**Land on the Corner of Victoria Avenue and Chain Road,
Manchester**

Bowker Sadler Partnership Limited

Hatherlow House, Hatherlow, Stockport SK6 3DY

Prepared by:

SLR Consulting Limited

15 Middle Pavement, Nottingham, NG1 7DX

SLR Project No.: 403.064791.00001

Client Reference No: 126220

3 May 2024

Revision: 01

Revision Record

Revision	Date	Prepared By	Checked By	Authorised By
01	3 May 2024	S. Skingle	T. Leighton-Crawford	V. Taylor

Basis of Report

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Appendices

Appendix A Glossary of Terminology

A.1 Acoustic Terminology

Appendix B Scheme Drawings

Appendix C IANL Summary



1.0 Introduction

SLR Consulting Limited (SLR) has been appointed by Bowker Sadler Architecture (BSA) to assist with the discharge of Condition 17(b) of Manchester City Council (MCC) planning approval 131891/FO/2021 for the following scheme development:

“Proposal: Erection of 12, two storey dwelling houses (Use Class C3a) together with the erection of a three storey building to form 20 residential apartments (Use Class C3a) with associated car parking, landscaping, boundary treatment and other associated works

Location: Land On The Corner Of Victoria Avenue And Chain Road, Manchester”

Detail of MCC Condition 17(b) subject to review within this report has been highlighted as follows with the entire condition provided for context:

“17) (a) Notwithstanding the noise report stamped as received by the City Council, as Local Planning Authority, on the 11 October 2021

(a) a scheme for acoustically insulating and ventilating the proposed residential accommodation against noise from the local traffic network shall be submitted for approval in writing by the City Council, as Local Planning Authority.

The approved noise insulation scheme shall be completed before the first occupation of the development.

Noise survey data must include measurements taken during a rush-hour period and night time to determine the appropriate sound insulation measures necessary. The following noise criteria will be required to be achieved:

Bedrooms (night time - 23.00 - 07.00) 30 dB LAeq (individual noise events shall not exceed 45 dB L_{Amax,F} by more than 15 times)

Living Rooms (daytime - 07.00 - 23.00) 35 dB LAeq

Gardens and terraces (daytime) 55 dB LAeq

Where applicable (entertainment/music): Additionally, where entertainment noise is a factor in the noise climate the sound insulation scheme shall be designed to achieve internal noise levels in the 63Hz and 125Hz octave centre frequency bands so as not to exceed (in habitable rooms) 47dB and 41dB, respectively.

(b) Prior to the first occupation of the development, a verification report will be required to validate that the work undertaken conforms to the recommendations and requirements approved as part of part (a) of this planning condition. The verification report shall include post completion testing to confirm the noise criteria has been met. In instances of non-conformity, these shall be detailed along with mitigation measures required to ensure compliance with the noise criteria. A verification report and measures shall be agreed until such a time as the development complies with part (a) of this planning condition.

Any mitigation measures shall be implemented in accordance with a timescale to be agreed with the City Council, as Local Planning Authority, and thereafter retained and maintained in situ.

Reason: To secure a reduction in noise from traffic or other sources in order to protect future residents from noise disturbance pursuant to policies SP1, H1 and DM1 of the Core Strategy (2007) and saved policy DC26 of the Unitary Development Plan for the City of Manchester (1995).”



A review of the Contractor's proposals and compliance with the recommended acoustic and ventilation measures was provided by SLR technical memorandum¹ in September 2023. This was further to detail provided at planning stage² as associated with scheme approval.

This report has been prepared and checked by suitably qualified persons as defined in Section 4.0. Whilst reasonable effort has been made to ensure that this report is easy to understand, it is technical in nature. To assist the reader, a glossary of terminology has been included in Appendix A.

Areas of the residential development subject to verification within this report have been provided within Appendix B and Appendix C.

¹ Chain Road, Manchester (Planning ref: 131891/FO/2021, Condition 17a) Acoustic Technical Memorandum. Project Ref: 403.064791.0001. SLR Consulting Limited, 8th September 2023.

² Chain Road, Manchester. Noise Impact Assessment. Report Ref: 410.12096.0001, Version 1. SLR Consulting Limited, August 2021.



2.0 Pre-Completion Measurements

This section has been provided to evidence the in-situ conditions of the first-available Plots 2 and 11 as part of Phase 1 of the scheme, comprising an indoor ambient noise level (IANL) study undertaken between Monday 29th and Tuesday 30th April 2024.

The period of surveying incorporated a period of calm and sunny weather conditions that were conducive for sound surveying works. Temperatures ranged from nominally 7 – 15 °C with average and gust wind speeds below 5 m/s and an absence of rainfall.

2.1 Methodology

The method of measurement has followed ANC measurement guidance³ as advocated by MCC noise technical guidance⁴.

A sound level meter was positioned inside a front facing bedroom of each Plot, with pressure level measured for a nominal period outside of main construction hours over consecutive days and including a night. Those areas were considered at extremities of the Site, defined by Plots adjacent to neighbouring roads, defining different schemes of sound insulation, as:

- Plot 2 / Block 1: to front of Site and Victoria Avenue.
- Plot 11 / Block 6: to rear of Site and Chain Road.

At the time of measurements, the Site was generally active during working daytime hours including general construction works within the wider Site, as the site is being built and occupied in phases, the period from 16:00 has been used.

The dwellings were complete as including glazing and ventilation. Different measurement conditions were considered according to:

- Building ventilation conditions (overnight):
 - Plot 2 / Block 1: windows closed and through wall trickle ventilators open.
 - Plot 11 / Block 6: windows closed and through window trickle ventilators open.
- Building ventilation conditions (short term):
 - Plot 2 / Block 1: windows closed and PIV mechanical ventilation on.
 - Plot 11 / Block 6: windows partially open (in locked-open position).

2.1.1 Sound Level Measurement Parameters

To accord with the technical detail of Condition 17(b), the following measurement parameters have been recorded:

- The A-weighted equivalent continuous sound pressure level, dB $L_{Aeq,T}$, over the defined measurement period, T .
- The A-weighted maximum sound pressure level, dB $L_{Amax,T}$, over the defined measurement period ($T = 2$ -minutes), with 'Fast' time-weighting.
- Details include each octave band between the range 125 Hz to 4 kHz.

³ Measurement of Sound Levels in buildings. ANC Guidelines, Version 1.0. Association of Noise Consultants, June 2020.

⁴ Manchester City Council Planning and Noise Technical Guidance, October 2022.



2.1.2 Correcting for reverberation time

In following of ANC measurement guidance, a significant problem with the measurement of sound levels in rooms, is that the room provides an acoustic response to any sound within it. The response of the room may change significantly between being in an empty and unfurnished state and being fully furnished. It would be assumed that the specification refers to sound levels when the room is normally furnished, and the level refers to a level standardised to the anticipated or reference reverberation time.

A reasonable anticipated reverberation time for a furnished domestic room of typical proportions would be 0.5 seconds, across the relevant frequency range. A correction would be made to account for the anticipated change in reverberation time.

2.2 Equipment and Measurements

Sound pressure level measurements were carried out using the following equipment listed in Table A, conforming to Class 1 acoustic accuracy for sound level meters and matched calibrators.

The sound level meter was calibrated before the measurements using the handheld acoustic calibrator and further checked upon completion of the survey. No significant drift was observed with calibration offsets of ≤ 0.2 dB. The calibration chain of equipment has been maintained traceably to national standards, no greater than one year for sound calibrators and two years for sound level meters.

Table A: Sound Monitoring Equipment

Location	Description	Serial No.
Plot 2 / Block 1 Front Bedroom	Cirrus CR:171B Class 1 Sound Level Meter	G068726
	Cirrus CR:515 Acoustic Calibrator	102979
Plot 11 / Block 6 Front Bedroom	Cirrus CR:171B Class 1 Sound Level Meter	G303356
	Cirrus CR:515 Acoustic Calibrator	97641

2.3 Summary Results Corrected for Reverberation Time

As the response of a room may change significantly between an empty and unfurnished state, to being fully furnished, those criteria of Condition 17 have been understood for sound within a room that is normally furnished, so have been standardised to the anticipated reverberation time of 0.5 seconds for a bedroom.

Reverberation time measurements were therefore undertaken within both bedrooms in accordance with BS EN ISO 3382-2⁵ using an impulsive source (starter pistol) and conforming to engineering level accuracy, based on results extrapolated from T_{20} data.

The results have provided a spectrum of average reverberation times from 0.6 – 1.5 seconds with relevant corrections in the range of 1 – 5 dB, or approximately 4 dB(A) on average. This has been shown within full calculations of Appendix C.

⁵ BS EN ISO 3382-2:2008 Acoustics. Measurement of room acoustic parameters. Reverberation time in ordinary rooms. BSI, 2008.



Table B: Measured Sound Levels in Building Ventilation Conditions (Corrected For Reverberation Time)

Measured Date Range	Measured Location	Measured Period	Period Time HH:MM	Average dB $L_{Aeq,T}$		15 th Highest dB $L_{Amax(F)}$ *		Pass / Fail Condition 17 **
				Meas.	Limit	Meas.	Limit	
Monday 29/04/24 – Tuesday 30/04/24	Plot 2 / Block 1 Front Bedroom	Day	07:00 – 23:00	28	≤ 35	-	N/A	Pass
		Night	23:00 – 07:00	22	≤ 30	37	≤ 45	Pass
	Plot 11 / Block 6 Front Bedroom	Day	07:00 – 23:00	34	≤ 35	-	N/A	Pass
		Night	23:00 – 07:00	30	≤ 30	45	≤ 45	Pass
* 2-minute value exceeded 15 times per night in following of technical requirements of Condition 17(a).								
** Measured values accord with limit values in this ventilation state per Condition 17(a).								

Table C: Measured Sound Levels in Overheating Ventilation Conditions (Corrected For Reverberation Time)

Measured Date Range	Measured Location	Measured Period	Measured Detail	Average dB $L_{Aeq,T}$		Pass / Fail Condition 17 *
				Meas.	Limit	
Monday 29/04/24	Plot 2 / Block 1 Front Bedroom	Part Day	PIV off	28	≤ 50	Pass
			PIV 60 %	32	≤ 50	Pass
			PIV 100 %	50	≤ 50	Pass
	Plot 11 / Block 6 Front Bedroom	Part Day	Partial open window	45	≤ 50	Pass
* Measured values accord with limit values in this ventilation state per AVO guide and planning stage works.						



3.0 Discussion – Results and Mitigation

3.1 Plot 2 / Block 1 Front Bedroom

The measured sound levels within Plot 2 / Block 1 front bedroom complied with the technical requirements of Condition 17 and with a good degree of tolerance under building ventilation conditions. External noise levels were notably higher in this area of the Site from planning stage noise impact assessment works.

PIV ventilators have also been considered to operate exactly as intended. When off and in building ventilation conditions, they act as high attenuating through-wall trickle ventilation. When on, and accounting for residual sound from traffic, the PIV vent noise would be nominally 30 dB $L_{Aeq,T}$ at 60 % and 50 dB $L_{Aeq,T}$ at 100 % operation. These have followed manufacturers' data⁶ quoted at 29.3 dB $L_{Aeq,T}$ at 60 % and 49.3 dB $L_{Aeq,T}$ at 100 % operation.

In following and to achieve overheating ventilation conditions according with the planning stage works and AVO Guide limits of 50 dB $L_{Aeq,T}$ day and 42 dB $L_{Aeq,T}$ night, PIV operation would remain acceptable at any percentage during the day and up to 80 % at night.

No mitigation measures have been required for this Block or any similar scheme facing Victoria Avenue.

3.2 Plot 11 / Block 6 Front Bedroom

The measured sound levels within Plot 11 / Block 6 Front Bedroom complied with the technical requirements of Condition 17 with minimal tolerance under building ventilation conditions.

IANLs with an open window as per the overheating ventilation condition, achieved the acoustic design aim from planning stage works, of 45 dB $L_{Aeq,T}$ day to match planning stage calculations. This would be acceptably low at night and around 41 dB $L_{Aeq,T}$ based on differences from internal data and furthermore, notably match planning stage calculations.

Given that only a 'close pass' has been noted in the building ventilation condition, attention has been drawn to the following potential factors:

- The quantity of ventilators in the building façade being 2 No. per bedroom
 - Whereas the quantity of ventilators submitted under Condition 17(a) was 1 No. per bedroom.
- The influence of non-transportation sources, such as the dawn chorus applicable in spring and influential during the morning hours from sunrise, typically 05:00 – 07:00.

3.3 Advisory Mitigation

It is advised that the development conforms to the details of the acoustic design with respect to ensuring only a single trickle ventilator per habitable bedroom as per the quantity of ventilators submitted under Condition 17(a). This recommendation would apply for all front facing bedrooms of blocks (3-6) at the rear of the Site.

Where this measure has been implemented it would be expected for compliance with the technical requirements of Condition 17 to be maintained for all Plots during the day and night, but better aligning with the acoustic design (with lower IANLs).

⁶ <https://www.titon.com/uk/wp-content/uploads/sites/10/2023/06/Sonair-3-catalogue-pages.pdf>



This recommendation may however be onerous, given that from the outset, the current development complies with technical requirements of Condition 17 in the worst-case. This is only advisory remediation where it could be viewed unnecessary or impracticable.

Furthermore, should the development remain as constructed, the occupant would have the ability to close a single trickle vent and achieve acceptably quieter conditions whilst maintaining suitable airflow for the building regulations ventilation strategy.



4.0 Closure

The assessment has required a suitable level of technical ability and has been undertaken by a Suitably Qualified Person (SQP). An individual with all the following credentials has been considered a SQP for this assessment:

- Has a minimum of three years' verifiable experience (within the last five years) of providing noise impact assessments in planning. Such experience has clearly demonstrated a practical understanding of factors affecting acoustics in relation to the proposed development use and in the built environment in general, including acting in an advisory capacity to provide recommendations and design advice in planning, and;
- Holds a recognised acoustic qualification and membership of an appropriate professional body. The primary professional body for acoustics in the UK is the Institute of Acoustics.

This assessment has been led and managed by a SQP as defined above.

Where some elements of the assessment (e.g. measurements) have been carried out by an acoustician who does not meet the requirements above, this has been undertaken with the direct guidance and supervision of a SQP who has reviewed, agreed and overseen the measurement methodology and any results obtained.

The SQP confirms that the relevant measurements and calculations:

- Represent good industry practice in accordance with available guidance.
- Are appropriate given the development being assessed and scope of works proposed.
- Avoid invalid, biased and exaggerated claims.

The checker and author of this document confirm that they both comply with the definition of a SQP defined in this Section.

Regards,

SLR Consulting Limited

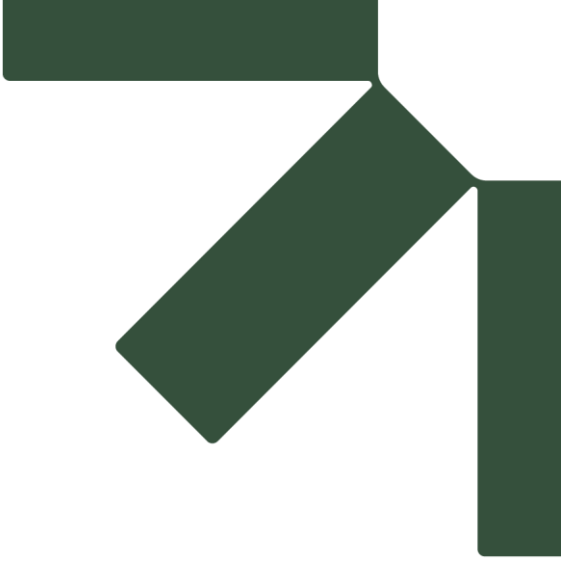


**Steve Skingle, BSc. (Hons) PgDip MIOA
MAES**
Principal Acoustic Consultant



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Technical Director - Acoustics





Appendix A Glossary of Terminology

Indoor Ambient Noise Level Verification Report for Approval 131891/FO/2021 Condition 17(b)

Land on the Corner of Victoria Avenue and Chain Road, Manchester

Bowker Sadler Partnership Limited

SLR Project No.: 403.064791.00001

3 May 2024

The human ear can detect a very wide range of pressure fluctuations, which are perceived as sound. In order to express these fluctuations in a manageable way, a logarithmic scale called the decibel, or dB scale is used. The decibel scale typically ranges from 0dB (the threshold of hearing) to over 120dB. An indication of the range of sound levels commonly found in the environment is given in the following table.

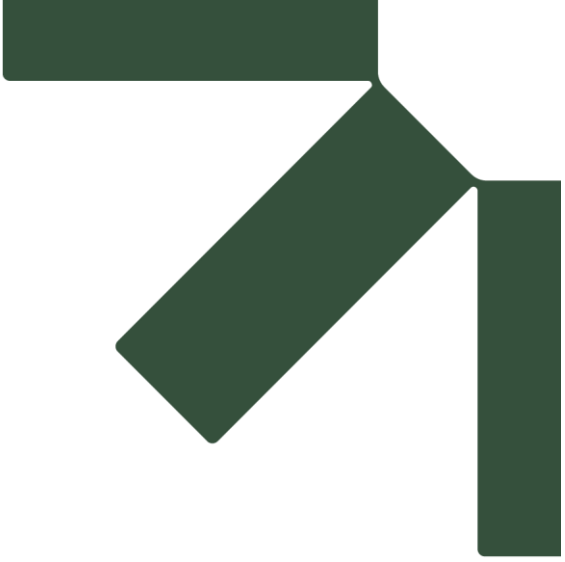
Table A-1: Sound Levels Commonly Found in the Environment

Sound Level	Location
0 dB(A)	Threshold of hearing
20 to 30 dB(A)	Quiet bedroom at night
30 to 40 dB(A)	Living room during the day
40 to 50 dB(A)	Typical office
50 to 60 dB(A)	Inside a car
60 to 70 dB(A)	Typical high street
70 to 90 dB(A)	Inside factory
100 to 110 dB(A)	Burglar alarm at 1m away
110 to 130 dB(A)	Jet aircraft on take off
140 dB(A)	Threshold of Pain

A.1 Acoustic Terminology

dB (decibel)	The scale on which sound pressure level is expressed. It is defined as 20 times the logarithm of the ratio between the root-mean-square pressure of the sound field and a reference pressure (of 20 μ Pa).
dB(A)	A-weighted decibel. This is a measure of the overall level of sound across the audible spectrum with a frequency weighting (i.e. 'A' weighting) to compensate for the varying sensitivity of the human ear to sound at different frequencies.
$L_{Aeq, T}$	$L_{Aeq, T}$ is defined as the notional steady sound level which, over a stated period T, would contain the same amount of acoustical energy as the A-weighted fluctuating sound measured over that period.
$L_{A10, T}$ & L_{A90}	If a non-steady noise is to be described it is necessary to know both its level and the degree of fluctuation. The L_n indices are used for this purpose, and the term refers to the level exceeded for n% of the time. Hence L_{10} is the level exceeded for 10% of the time and as such can be regarded as the 'average maximum level'. Similarly, L_{90} is the 'average minimum level' and is often used to describe the background noise. It is common practice to use the L_{10} index to describe traffic noise.
$L_{Amax(F)}$	$L_{Amax(F)}$ is the maximum A-weighted sound pressure level recorded over the period stated. L_{Amax} is sometimes used in assessing environmental noise where occasional loud noises occur, which may have little effect on the overall L_{eq} noise level but will still affect the noise environment. Unless described otherwise, it is measured using the 'fast' sound level meter response.





Appendix B Scheme Drawings

Indoor Ambient Noise Level Verification Report for Approval 131891/FO/2021 Condition 17(b)

Land on the Corner of Victoria Avenue and Chain Road, Manchester

Bowker Sadler Partnership Limited

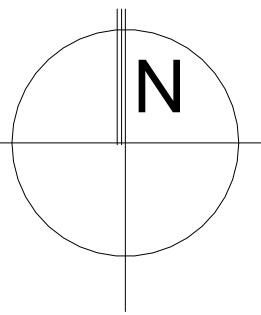
SLR Project No.: 403.064791.00001

3 May 2024



Site Phasing Plan
1 : 200

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Rev. Date Dim. Chkd.

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Project
Chain Road, Blackley

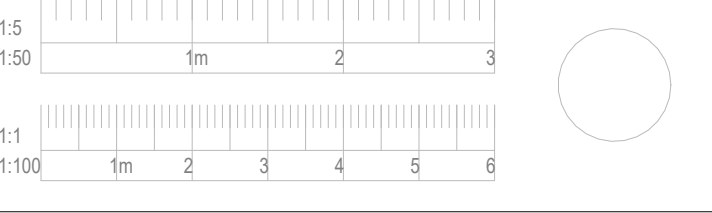
Client
Great Places Housing Group

Drawing
Site Phasing Plan

Scale 1 : 200	Sheet Size @ A1	Drawn ACo	Checked SW	Date 12.03.24			
Project No.	Originator	Zone	Level	Form	Discipline	Number	Revision
18-002 - BSA -						1200	
Status							

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- External wall - 353mm o'all width
102.5mm facing brickwork,
150mm (TBC) fully filled cavity with injected insulation
system 100mm medium density blockwork (TBC)
12.5mm plasterboard on dabs to
achieve 0.22W/mK U-value.
- Party wall - 320mm o'all width
2 leaves of 100mm concrete
blockwork, density 1350-1600kg/m³
either side of 75mm cavity fully filled
with Isover RD Party Wall Roll.
12.5mm plasterboard (nominal 8kg/m²)
on dabs to achieve 0.09W/mK U-value.
- Internal wall - 115mm o'all width 12.5mm
plasterboard (8kg/m²) with 3mm skim
finish, with 18mm WBP plywood to face of
stud to bathroom side only, on 70mm metal
C studs at 600mm centres. 25mm Isover
APR 1200 to be fitted between studs to
bedroom and bathroom walls.
- Internal wall - 97mm o'all width 12.5mm
plasterboard (8kg/m²) with 3mm skim finish
on 70mm metal C studs at 600mm centres.
25mm Isover APR 1200 to be fitted between
studs to bedroom and bathroom walls.

Wall Types

1 : 50

E	17.02.23	SP	SVP moved	
D	06.10.22	SP	RWP S.O.	
C	16.09.22	SP	Front door dims and meters amended	SW
B	30.05.22	SP	Amendments following S.E. construction issue, SW Cavity Barriers shown, PV panels location amended	SW
A	18.03.22	SP	Concrete sill removed, PV added, Window sizes amended, Meters added	SW

Rev.	Date	Dm.		Chkd.
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BOWKER SADLER ARCHITECTURE

Hatherlow House | Hatherlow | Romiley | Stockport | SK6 3DY
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Project
Chain Road, Blackley

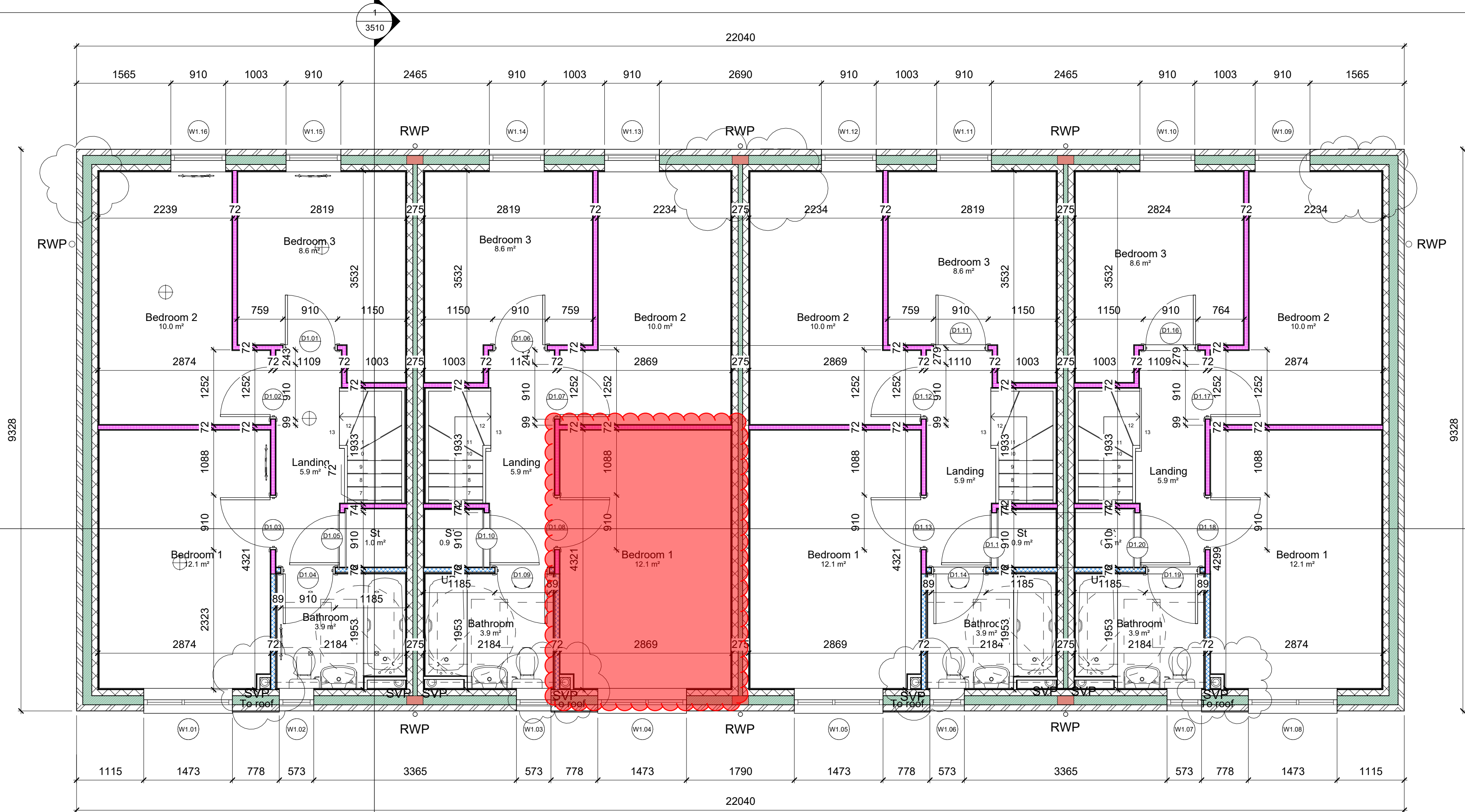
Client
Great Places Housing
Group

Drawing
Block 1 - Setting Out Plans

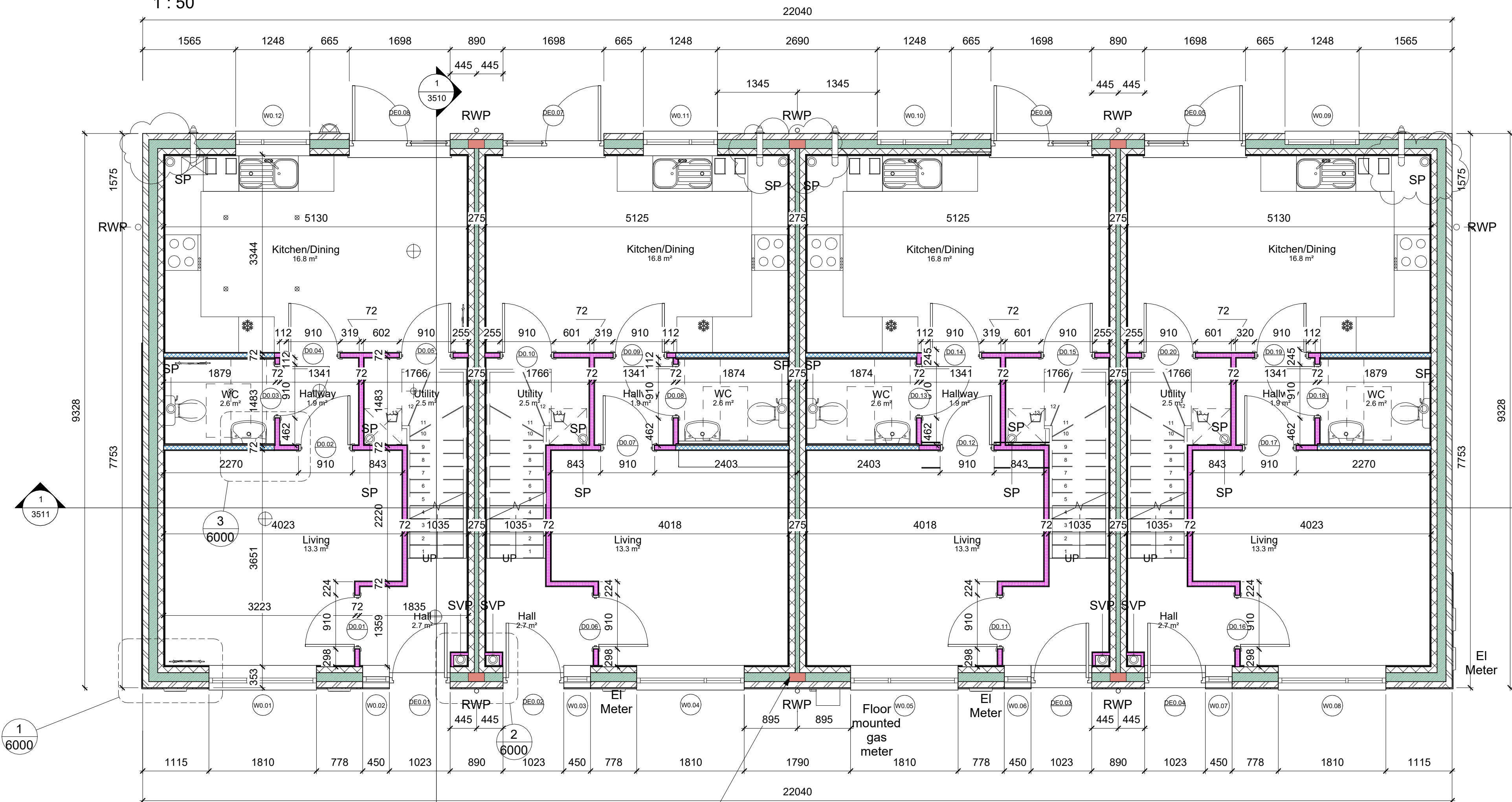
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Project No. 18-002 -BSA - Zone Level Form Discipline Number Revision

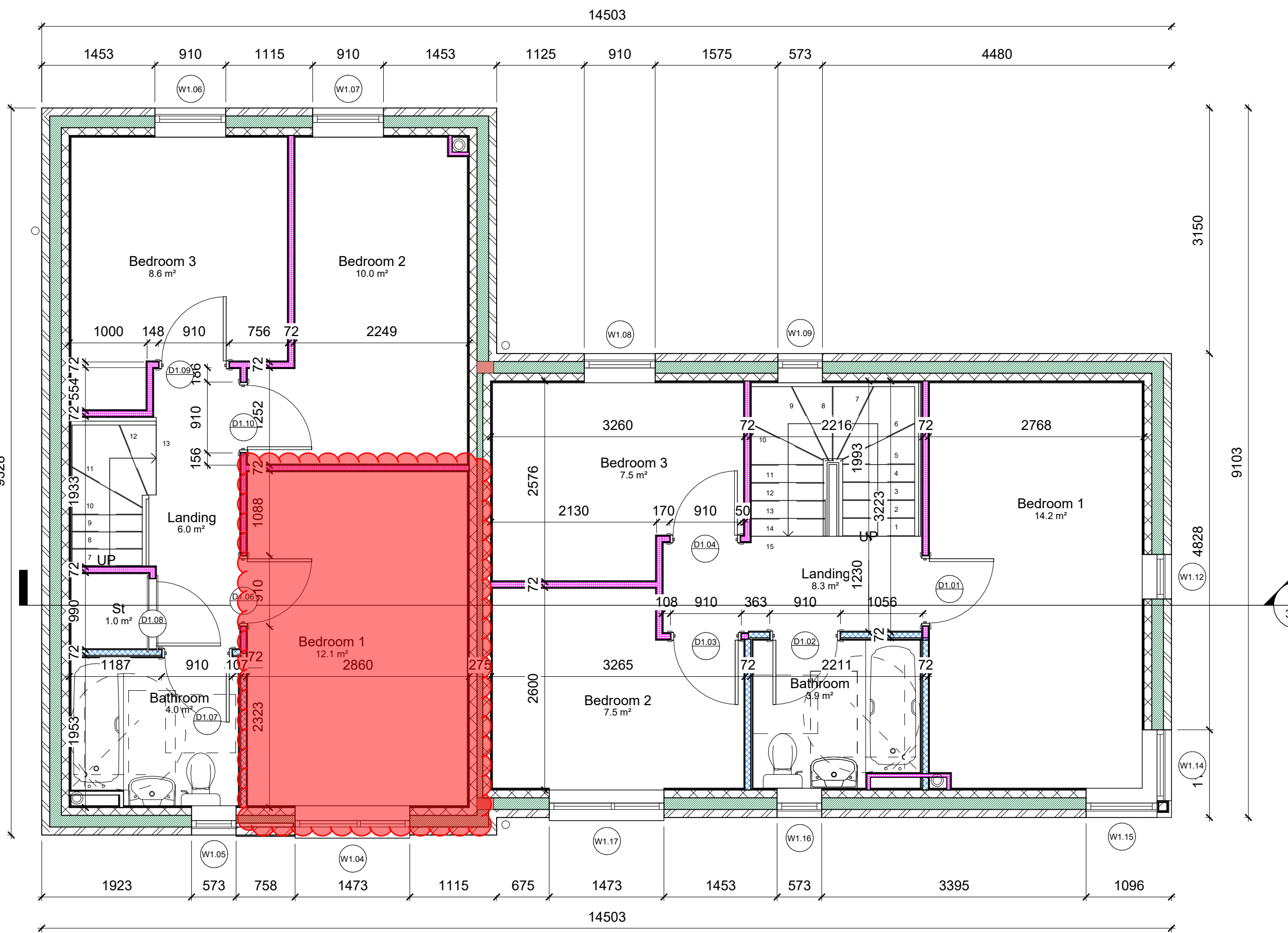
Status Construction



First Floor Plan
1 : 50

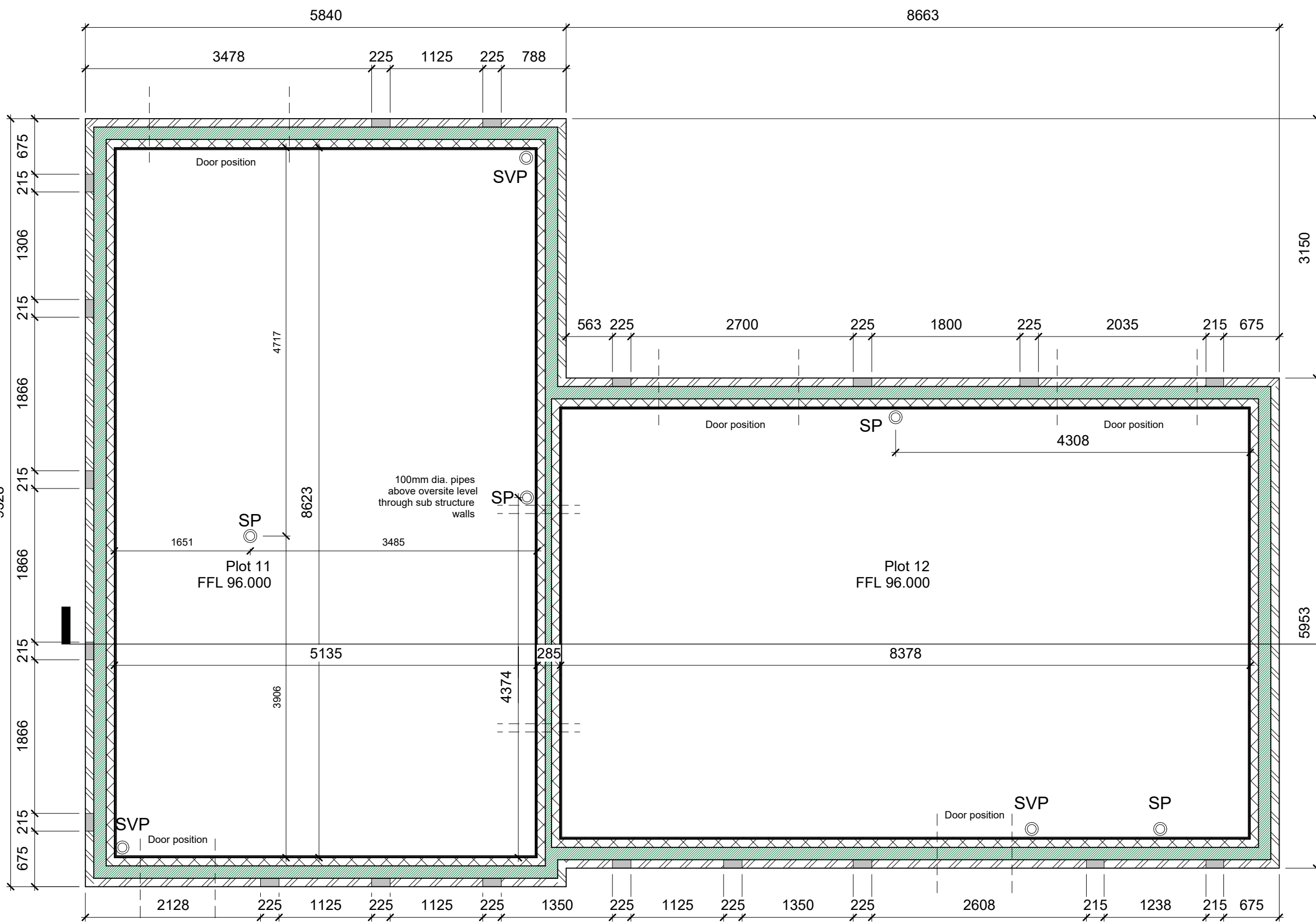
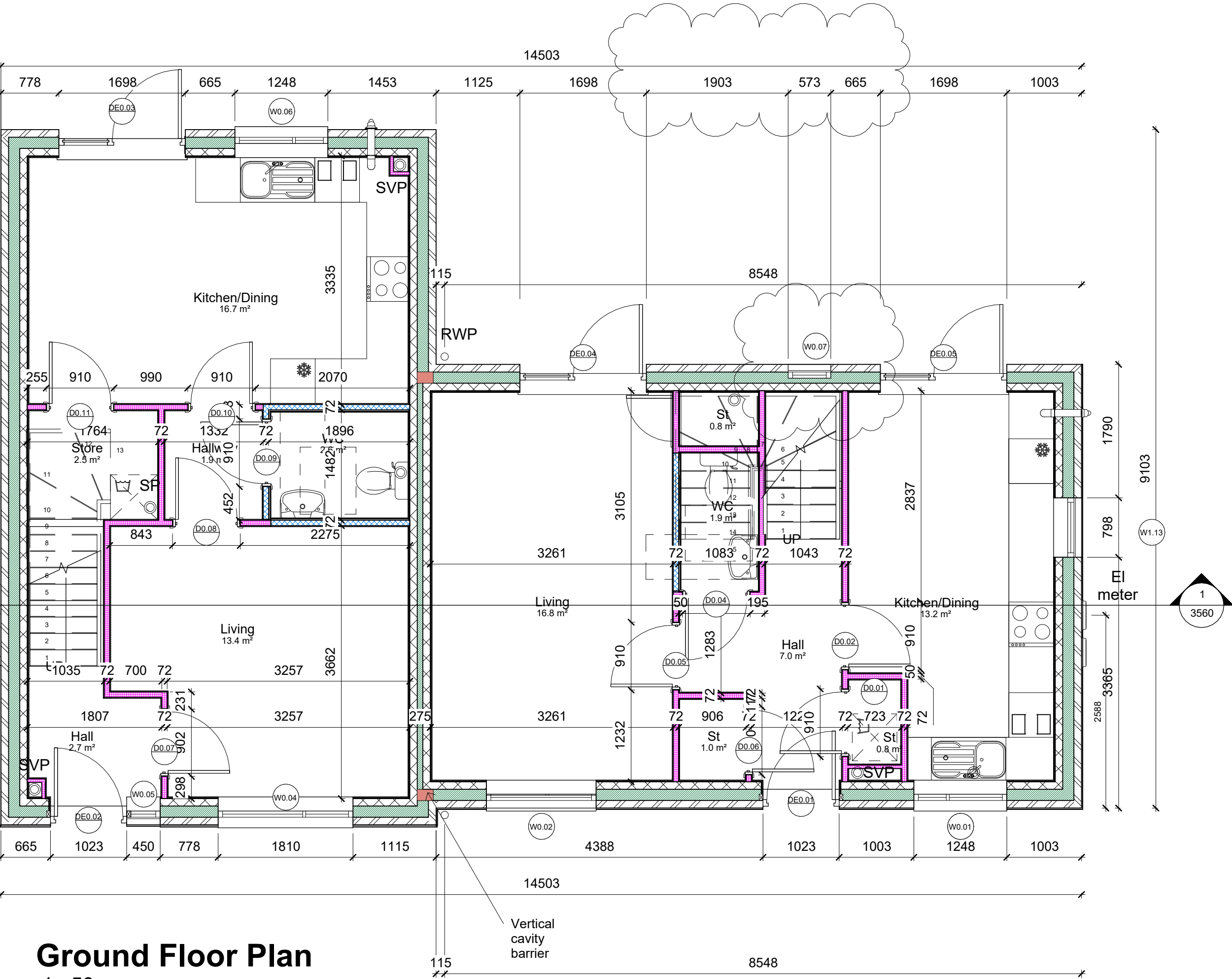


Ground Floor Plan
1 : 50



First Floor Plan
1 : 50

Roof Plan
1 : 50



Ground Floor Plan
1 : 50

Below Ground Plan
1 : 50

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1:50
1:100

- External wall - 353mm o'all width
102.5mm facing brickwork,
150mm (TBC) fully filled cavity with injected insulation
system 100mm medium density blockwork (TBC)
12.5mm plasterboard on dabs to
achieve 0.22W/m²K U-value.
- Party wall - 320mm o'all width
2 leaves of 100mm concrete
blockwork density 1350-1600kg/m³
either side of 75mm cavity fully filled
with Isover RD Party Wall Roll
12.5mm plasterboard (nominal 8kg/m²)
on dabs to achieve 0.0W/m²K U-value.
- Internal wall - 115mm o'all width 12.5mm
plasterboard (8kg/m²) with 3mm skim
finish, with 18mm WBP plywood to face of
stud to bathroom side only, on 70mm metal
C studs at 600mm centres. 25mm Isover
APR 1200 to be fitted between studs to
bedroom and bathroom walls.
- Internal wall - 97mm o'all width 12.5mm
plasterboard (8kg/m²) with 3mm skim finish
on 70mm metal C studs at 600mm centres.
25mm Isover APR 1200 to be fitted between
studs to bedroom and bathroom walls.

Wall Types
1 : 50

E	05.12.22	SP	W0.07 S.O.	
D	10.06.22	SP	RWP S.O.	
C	16.09.22	SP	Front door dims and meters amended	SW
B	30.05.22	SP	Amendments following S.E. construction issue, Cavity Barriers shown, PV panels location amended	
A	18.03.22	SP	Concrete oil removed, PV added, Window sizes amended, Meters added	SW

Rev.	Date	Dm.	Chkd.
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BOWKER SADLER ARCHITECTURE

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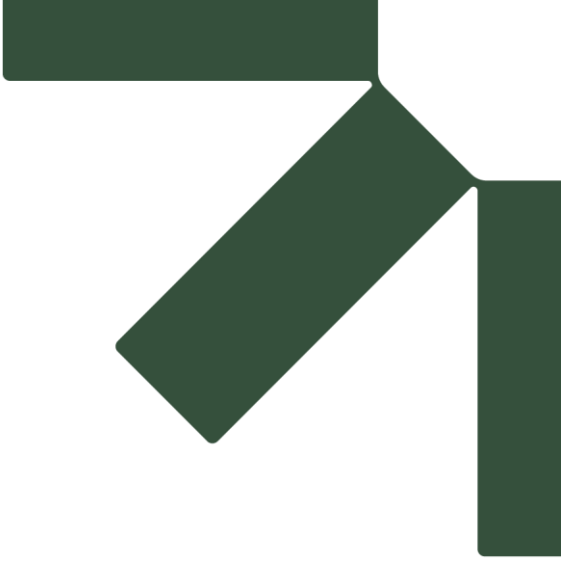
Project
Chain Road, Blackley

Client
Great Places Housing Group

Drawing
Block 6 - Setting Out & Roof Plans

Scale 1 : 50	Sheet Size @ A1	Drawn SP	Checked SW	Date 17.01.22
Project No. 18-002 -BSA -	Originator Zone	Level	Form Discipline	Number 2060
Status				Revision E

Construction



Appendix C IANL Summary

Indoor Ambient Noise Level Verification Report for Approval 131891/FO/2021 Condition 17(b)

Land on the Corner of Victoria Avenue and Chain Road, Manchester

Bowker Sadler Partnership Limited

SLR Project No.: 403.064791.00001

3 May 2024

Figure C1: Summary Results – Plot 2 / Block 1 Front Bedroom



Job No.	403.064791	Job Title	Chain Road
Date Created	01 May 2024	By	SS
Date Reviewed	03 May 2024	By	VT
Date Revised	01 May 2024	Rev	1
Review Type	Detailed Review	Review Status	No Comments

Indoor Ambient Noise Level - Block 1 / Plot 2 Front Bedroom

Rating/Broadband/Input					Octave Band Centre Frequency, Hz								
Item / Description		dB(A)			31.5	63	125	250	500	1k	2k	4k	8k
Building Ventilation		Period Measurements		Period	Data								
29 Apr 2024 16:00:00		29 Apr 2024 23:00:00		Day Av.	dB L _{Aeq,T}	31.4		36.2	35.0	28.0	25.8	18.8	17.2
29 Apr 2024 23:00:00		30 Apr 2024 07:00:00		Night Av.	dB L _{Aeq,T}	25.9		29.4	28.4	21.9	19.9	15.4	16.3
29 Apr 2024 23:00:00		30 Apr 2024 07:00:00		15th Max	dB L _{Amax(F)}	40.3		49.1	45.4	35.3	31.9	26.5	22.4
Overheating Ventilation		Period Measurements											
29 Apr 2024 14:15:00		29 Apr 2024 14:18:00		Res. / Off	dB L _{Aeq,T}	32.1		34.9	35.8	27.6	25.5	22.8	21.6
29 Apr 2024 14:25:00		29 Apr 2024 14:27:00		60%	dB L _{Aeq,T}	35.3		38.0	38.7	34.6	28.6	22.8	18.4
29 Apr 2024 14:28:00		29 Apr 2024 14:30:00		100%	dB L _{Aeq,T}	54.5		48.4	54.7	55.4	48.6	42.2	34.9
ISO 3382-2 Reverberation Time		Room Measurements											
		Position 1						0.6	0.9	1.3	1.5	1.3	1.1
		Position 2						0.9	1.1	1.5	1.5	1.4	1.1
		Position 3						0.9	1.1	1.5	1.5	1.3	1.1
		Position 4						0.8	1.1	1.5	1.5	1.3	1.1
		Position 5						0.8	1.1	1.5	1.5	1.3	1.1
		Position 6						0.8	1.1	1.5	1.5	1.3	1.1
		Arithmetic average						0.8	1.1	1.5	1.5	1.3	1.1
		Decibel correction to 0.5s						-1.9	-3.4	-4.7	-4.8	-4.2	-3.5
Building Ventilation		Rt Corrected Measurement		Period	Data								
29 Apr 2024 16:00:00		29 Apr 2024 23:00:00		Day Av.	dB L _{Aeq,T}	27.5		34.4	31.6	23.3	21.0	14.6	13.7
29 Apr 2024 23:00:00		30 Apr 2024 07:00:00		Night Av.	dB L _{Aeq,T}	22.0		27.5	25.1	17.3	15.1	11.2	12.8
29 Apr 2024 23:00:00		30 Apr 2024 07:00:00		15th Max	dB L _{Amax(F)}	36.9		47.2	42.0	30.6	27.1	22.3	18.9
Overheating Ventilation		Rt Corrected Measurement											
29 Apr 2024 14:15:00		29 Apr 2024 14:18:00		Res. / Off	dB L _{Aeq,T}	28.3		33.0	32.4	22.9	20.7	18.6	18.1
29 Apr 2024 14:25:00		29 Apr 2024 14:27:00		60%	dB L _{Aeq,T}	31.5		36.1	35.3	29.9	23.8	18.6	14.9
29 Apr 2024 14:28:00		29 Apr 2024 14:30:00		100%	dB L _{Aeq,T}	50.4		46.5	51.3	50.7	43.8	38.0	31.4
Overheating Ventilation		Residual & Rt Corrected Measurement											
29 Apr 2024 14:25:00		29 Apr 2024 14:27:00		60%	dB L _{Aeq,T}	30.3		34.8	34.0	29.0	22.5	17.3	13.6
29 Apr 2024 14:28:00		29 Apr 2024 14:30:00		100%	dB L _{Aeq,T}	50.4		46.5	51.3	50.7	43.8	38.0	31.4



Figure C2: Site Photographs – Plot 2 / Block 1 Front Bedroom



Figure C3: Summary Results – Plot 11 / Block 6 Front Bedroom



Job No.	403.064791	Job Title	Chain Road
Date Created	By	Date Revised	Rev
01 May 2024	SS	01 May 2024	1
Date Reviewed	By	Review Type	Review Status
03 May 2024	VT	Detailed Review	No Comments

Indoor Ambient Noise Level - Block 6 / Plot 11 Front Bedroom

Rating/Broadband/Input					Octave Band Centre Frequency, Hz									
Item / Description					dB(A)	31.5	63	125	250	500	1k	2k	4k	8k
Building Ventilation	Period Measurements	Period	Data											
29 Apr 2024 16:00:00	29 Apr 2024 23:00:00	Day Av.	dB $L_{Aeq,T}$	38.7 (A)				35.2	35.5	32.4	37.3	26.0	18.2	
29 Apr 2024 23:00:00	30 Apr 2024 07:00:00	Night Av.	dB $L_{Aeq,T}$	34.1 (A)				28.4	29.2	27.6	32.8	21.6	16.2	
29 Apr 2024 23:00:00	30 Apr 2024 07:00:00	15th Max	dB $L_{Amax(F)}$	49.2 (A)				44.0	46.3	42.8	48.1	33.4	22.7	
Overheating Ventilation	Period Measurements													
29 Apr 2024 13:46:00	29 Apr 2024 14:39:00	Open Win.	dB $L_{Aeq,T}$	49.6 (A)				46.2	47.2	43.8	47.9	38.6	26.1	
ISO 3382-2 Reverberation Time	Room Measurements													
	Position 1								0.7	1.1	1.4	1.4	1.3	1.1
	Position 2								0.7	0.9	1.4	1.5	1.3	1.1
	Position 3								0.7	1.1	1.3	1.4	1.3	1.1
	Position 4								0.7	1.0	1.4	1.6	1.2	1.1
	Position 5								0.6	1.1	1.3	1.4	1.3	1.1
	Position 6								0.5	1.0	1.3	1.4	1.2	1.1
	Arithmetic average								0.6	1.0	1.3	1.4	1.3	1.1
	Decibel correction to 0.5s								-1.0	-3.1	-4.2	-4.6	-4.0	-3.3
Building Ventilation	Rt Corrected Measurement	Period	Data											
29 Apr 2024 16:00:00	29 Apr 2024 23:00:00	Day Av.	dB $L_{Aeq,T}$	34.4 (A)				34.2	32.4	28.2	32.8	22.0	14.9	
29 Apr 2024 23:00:00	30 Apr 2024 07:00:00	Night Av.	dB $L_{Aeq,T}$	29.7 (A)			27.5	26.0	23.4	28.3	17.6	12.9		
29 Apr 2024 23:00:00	30 Apr 2024 07:00:00	15th Max	dB $L_{Amax(F)}$	44.8 (A)			43.0	43.2	38.6	43.5	29.4	19.4		
Overheating Ventilation	Rt Corrected Measurement													
29 Apr 2024 14:15:00	29 Apr 2024 14:18:00	Res. / Off	dB $L_{Aeq,T}$	45.3 (A)			45.2	44.0	39.6	43.3	34.6	22.7		



Figure C4: Site Photographs – Plot 11 / Block 6 Front Bedroom





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