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Environmental Associates

Noise Assessment

West Benton, Phase 1

June 2021

Persimmon Homes

Noise Assessment

West Benton, Phase 1

Client: Persimmon Homes

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1 INTRODUCTION

1.1 Background

1.1.1 In 2018 Hybrid Planning Approval was granted for a total of 593no. residential dwellings with full planning permission for 175no. residential dwellings at land to the west of Station Road, North Tyneside (planning app ref. 16/01885/FUL).

1.1.2 NJD Environmental Associates LTD was instructed by Persimmon Homes to undertake a noise assessment in relation to the discharge of planning conditions associated with Phase 1 of the approved scheme.

1.1.3 The layout and site location relating to Phase 1 of the development is shown in Drawing 1 below.

Drawing 1: Site Location and Layout

1.1.4 A report has been prepared in support of the discharge of the associated planning conditions; with data derived from the transport assessment and previous studies in the vicinity of the site. Calculations have been performed

using noise modelling software, and the results interpreted in accordance with the relevant standards.

2 ASSESSMENT METHODOLOGY

2.1 Planning Conditions

2.1.1 With regards to Phase 1 of the development, the planning conditions relating to noise read as follows:

'20. Notwithstanding Condition 1, prior to the occupation of any dwelling within Phase 1, a noise scheme shall be submitted to and approved in writing by the Local Planning Authority. This noise scheme shall take into account future noise levels within the site, likely to be experienced within the next 15 years. The noise scheme shall include details of the acoustic glazing to ensure habitable bedrooms meet the good internal standard of 30 dB LAeq,T at night and prevent the exceedance of Lmax of 45 dB(A) and living rooms meet an internal equivalent noise level of 35 dB LAeq,T in accordance to BS8233:2014. Thereafter, these agreed details shall be implemented prior to the occupation of any dwelling.

21. Notwithstanding Condition 1, prior to the occupation of any dwelling within Phase 1, a ventilation scheme for habitable rooms shall be submitted to and approved in writing by the Local Planning Authority. This scheme shall ensure an appropriate standard of ventilation that meets as a minimum System 3 of Table 5.2 of Approved Document F. Mechanical ventilation, with an extract vent in each eastern elevation serving habitable rooms, must be provided as a minimum for properties located to the eastern boundary of the site adjacent to the A186. For other properties an alternative passive acoustic ventilation shall be provided. The ventilation must meet the requirements of Building Regulations with windows closed. Thereafter, these agreed details shall be implemented prior to the occupation of any dwelling.'

2.1.2 The traffic data presented as part of the transport assessment provided flows relating to AM and PM peak scenarios (i.e. no AAWT data was presented for either the day or night-time periods, as would typically be required for use in an assessment of road traffic noise of this nature).

2.1.3 On this basis, contact has been established with the Transport Consultant commissioned for the 2017 application, who has subsequently provided

additional data suitable for use in the noise modelling exercise, the details of which are summarised in Section 4.

2.2 BS8233:2014 and WHO:1999 Guidance Levels

2.2.1 BS8233:2014 *'Guidance on sound insulation and noise reduction for buildings'* provides guidance for the control of noise in and around buildings. It applies to the design of new buildings, or refurbished buildings undergoing a change of use.

2.2.2 BS8233 refers to the World Health Organisation research and recommendations when defining acceptable and upper guidance noise levels within gardens during the day, and within habitable rooms in dwellings during the day and night-time periods as follows:

Table 1: Summary of BS8233 and WHO guidance noise levels

Activity	Location	0700 to 2300h	2300 to 0700h
Resting	Living room	35dB LAeq,16h	-
Relaxing	Gardens	55dB LAeq,16h	-
Dining	Dining room	40dB LAeq,16h	-
Sleeping (daytime resting)	Bedroom	35dB LAeq,16h	30dB LAeq,8h 45dB LAmax

3 ROAD TRAFFIC DATA

3.1 Road Traffic

3.1.1 Discussions have been held with the project transport consultant in order to derive appropriate traffic flow levels for use in the noise impact assessment.

3.1.2 Data has been provided based on the future year 2032 'with development' scenario for the AAWT (24h) and AAWT (16h) periods. Discussions held with the Transport Consultant have identified that the AAWT (8h) flows cannot be provided based on the data at hand, and due to current traffic levels being affected by public health restrictions, fully representative traffic surveys cannot currently be undertaken.

3.1.3 On this basis, the AAWT (24h) flows have been used in CadnaA and modified using the road traffic assessment function based on the 'local' road type identified in the software function.

3.1.4 Appendix 1 provides a full breakdown of the traffic flows provided by the Transport Consultant for use in the modelling exercise, with further details of how the models were programmed discussed in Section 4.

4 CADNAA NOISE MODELS

4.1 Input Data

4.1.1 Topographic data from the engineering layout of the site and surrounding land has been incorporated into the noise models, with buildings and roads positioned to reflect the proposed future conditions.

4.1.2 Buildings proposed as part of the development have been assigned ridge heights based on elevation plans provided by the project architect.

4.1.3 For the purpose of these calculations, the ground absorption has been set to G=0.5 (which represents a mixture of acoustically soft and hard ground around the development site), with buildings and roads set to G=0 (acoustically hard and reflective), with two orders of reflection considered.

4.1.4 The models have been programmed to assess scenarios based on the daytime (0700 to 2300h) and night-time (2300 to 0700h) periods, with receiver and grid calculation heights set at 1.5m and 4m respectively.

4.1.5 Flows, speeds and HGV percentages on the identified roads have been assessed based on the levels stipulated by the Transport Consultant for both the daytime periods. For the night-time period, the road traffic noise evaluation function has been used to convert the 2032 AAWT (24h) to provide the projected flows for the associated 8h period, based on the 'local' road classification.

4.1.6 The LAmax impact during the night-time period has been assessed using the 'pass-by' function in CadnaA, which calculates the associated level based on a function of road speed and HGV percentage. Using the calculated pass-by sound power level for each road link, the impact has been assessed across the site using point sources distributed across the road network accordingly.

4.2 Noise Model Results

4.2.1 The results from each scenario assessing road traffic noise sources are shown in Figures 1 to 3.

4.2.2 Table 2 summarises the highest levels expected in the vicinity of Proposed Sensitive Receptor (PSR) locations across the site during the respective periods.

4.2.3 The PSR locations have been selected on the basis of those plots generally most exposed to noise in the different areas of the site, and therefore provide an indication of the highest impact that can be expected across the site, with

significantly lower levels expected towards central and western areas, as shown in the Figures.

Table 2: Summary of highest modelled external noise levels			
Assessment Metric →	**Figure 1 dB LAeq,16h**	**Figure 2 dB LAeq,8h**	**Figure 3 dB LAmax**
Area of Site ↓	**Façade of Living Rooms**	**Façade of Bedrooms**	**Façade of Bedrooms**
PSR1	64	57	71
PSR2	63	56	71
PSR3	64	56	71

4.2.4 The modelled noise levels have been assessed with reference to the required standards to determine appropriate mitigation, as discussed in Section 5.

4.3 Noise Model Factors and Limitations

4.3.1 The noise models presented in this assessment calculate noise propagation to the methodologies contained within ISO 9613-2 Acoustic – Attenuation of sound during propagation outdoors. This gives a higher level of accuracy for the level of attenuation provided by intervening topography and barriers than the method provided by BS5228.

4.3.2 All noise level predictions are based on simplified models of sound generation and propagation; however, some local conditions such as gusts of wind or bursts of turbulence in the air are too complex to be factored into the algorithms.

4.3.3 The noise models may therefore be subject to some minor uncertainties; however, it is noted that all predictions assume theoretical down-wind propagation from all sources to all receptors, and as such the models are more likely to over-predict noise levels compared to real-life conditions.

4.3.4 The primary factor that governs the validity of the models is the quality of the input data. As such, all practicable means have been explored to ensure that the data used in the models is as accurate as possible.

5 BS8233 ASSESSMENT OF NOISE LEVELS IN LIVING ROOMS AND BEDROOMS

5.1.1 The highest predicted noise levels and the associated levels of attenuation required to meet the BS8233/WHO guidelines are presented in Table 3 below:

5.1.2

Table 3: Summary of attenuation requirements			
Assessment Metric →	**Figure 1 dB LAeq,16h**	**Figure 2 dB LAeq,8h**	**Figure 3 dB LAmax**
Area of Site ↓	**Façade of Living Rooms**	**Façade of Bedrooms**	**Façade of Bedrooms**
PSR1	64	57	71
BS8233 Guidance Level	35	30	45
Required Level of Attenuation	29	27	26

5.2 Living Rooms and Bedrooms During the Daytime

5.2.1 During the daytime period, BS8233 recommends a guidance level of 35dB LAeq,16h inside living room and bedroom areas.

5.2.2 WHO (1999) indicates that with a window partially open for ventilation, approximately 15dB of attenuation from external noise sources should be achieved.

5.2.3 On this basis, a number of plots towards the eastern perimeter of the site may not achieve internal guidance levels without the provision of some form of acoustic ventilation.

5.3 Bedrooms During the Night-time

5.3.1 During the night-time period, BS8233 and WHO (1999) recommend a guidance level of 30dB LAeq,8h and 45dB LAmax inside bedroom areas.

5.3.2 As per the daytime requirements, a number of bedrooms towards the eastern perimeter of the site may not achieve the guidance levels with windows open.

5.3.3 Appropriate mitigation measures for both living rooms and bedrooms are discussed in the following Section.

6 MITIGATION MEASURES TO ACHIEVE INTERNAL GUIDANCE LEVELS

6.1.1 The receiving rooms subject to the highest potential impact are generally those with the greatest ratio of window area to room volume, in closest proximity to the dominant noise sources surrounding the development.

6.1.2 The rooms most exposed to road traffic noise ingress during the daytime and night-time periods were found to be those on the easternmost perimeter of the site.

6.1.3 BS8233 and BS EN12354-3 provide equations for performing detailed noise break-in calculations for composite facades and individual façade elements such as ventilators. The equations are shown below.

$$L_2 = L_{1,in} - R + 10 \times Log\ (S/V) + 10 \times Log(T) + 11$$

$$L_2 = L_{1,in} - D_{n,e} - 10 \times Log\ (V) + 10 \times Log(T) + 21$$

6.1.4 The calculation uses dimensions of glazing and façade elements from the plots experiencing the highest noise impact in combination with the highest glazing to internal room volume ratio.

6.1.5 Table 4 summarises calculations performed for a front facing bedroom of plot 160 (PSR1), which was found to experience the highest potential impact during the respective periods.

Table 4: Detailed noise break-in calculation PSR1 – Bedroom: Noise Level: 64dB LAeq,16h

External Noise Level	125	250	500	1000	2000	Total	Room Volume	33m³
dB LAeq,16h	50	54	57	60	58	64	Glazing Area	2.8m²
Attenuation	**125**	**250**	**500**	**1000**	**2000**	**Total**	Wall Area	7.7m²
Glazing: 10/12-20/6mm	25	29	34	39	37	36	R/T	0.5s
Greenwood EAR42w	33	39	39	43	50	42	Number Vents	2
Walls: 102.5mm brickwork, 50mm cavity,rigid wall ties	37	42	52	60	63	50		
Element Contribution	**125**	**250**	**500**	**1000**	**2000**	**Total**		
Glazing	22	22	20	18	18	28		
Ventilation	23	21	24	23	14	29		
Walls	15	14	7	2	0	18		
Internal Noise Level	**125**	**250**	**500**	**1000**	**2000**	**Total**		
Combined dB LAeq	26	25	25	24	20	31		

6.1.6 The results demonstrate that with an appropriate scheme of glazing and acoustic ventilation, the required internal noise levels can be achieved in the worst affected rooms at the perimeters of the site.

6.1.7 Calculations have been performed for the other plots that do not achieve guidance levels with windows open, with the recommendations summarised in Table 5 and on a plot-by-plot basis in Figure 4.

6.1.8 The recommendations reflect the requirements outlined in Condition 21 in relation to the Building Regulations Approved Document F, System 3 ventilation, for habitable rooms on the easternmost boundary of the site.

Table 5: Glazing and ventilation requirements summary

Location	Glazing	Ventilation
Living rooms and Bedrooms on the Eastern boundary of the site (refer to Figure 4)	10/12-20/6mm Double Glazing (or equivalent)**	ADF System 3 coupled with Greenwoods EAR42w Acoustic Trickle Vents (or equivalent)*
Living rooms and bedrooms with partial line of sight to Station Road. (refer to Figure 4)	4/12-20/4mm Double Glazing (or equivalent)**	Titon SFXSA V25/C25 2500EA Acoustic Trickle Vents (or equivalent)*
All other rooms (refer to Figure 4)	4/12-20/4mm Double Glazing (or equivalent)**	No specific requirements
Notes		
*Greenwood EAR42W acoustic vents provide approximately 40dB Dn,e,w (Ctr) with an equivalent area of 3912mm^2; Titon SFXSA V25/C25 2500EA acoustic vents provide approximately 34dB Dn,e,w (Ctr) with an equivalent area of 2500mm^2. ** 10/12-20/6mm Double Glazing provides approximately Rw (Ctr) = 36dB (-3); 4/12-20/4mm Double Glazing provides approximately Rw (Ctr) = 29dB (-2). Any other glazing or acoustic vent achieving or exceeding the respective weighted level of attenuation would therefore be suitable.		

7 CONCLUSIONS

7.1 Introduction

7.1.1 NJD Environmental Associates has undertaken a noise assessment for a proposed residential development on land associated with West Benton, Phase 1.

7.1.2 The assessment considers noise from the road network based on the 2032 projections; with data derived from the transport assessment, calculations performed using noise modelling software, and the results interpreted in accordance with the relevant standards.

7.2 BS8233 and WHO Assessment

7.2.1 The BS8233:2014 assessment found that a number of noise sensitive rooms across the site will not achieve internal guidance levels with windows open.

7.2.2 Noise break-in calculations have therefore been performed in order to demonstrate appropriate schemes of glazing and ventilation that can be adopted across the site.

7.2.3 The recommended mitigation measures are summarised in Table 5 and shown on a plot-by-plots basis on Figure 4.

7.2.4 It is concluded that subject to the recommended mitigation measures being implemented, the requirements of Conditions 20 and 21 of the approved scheme can be discharged.

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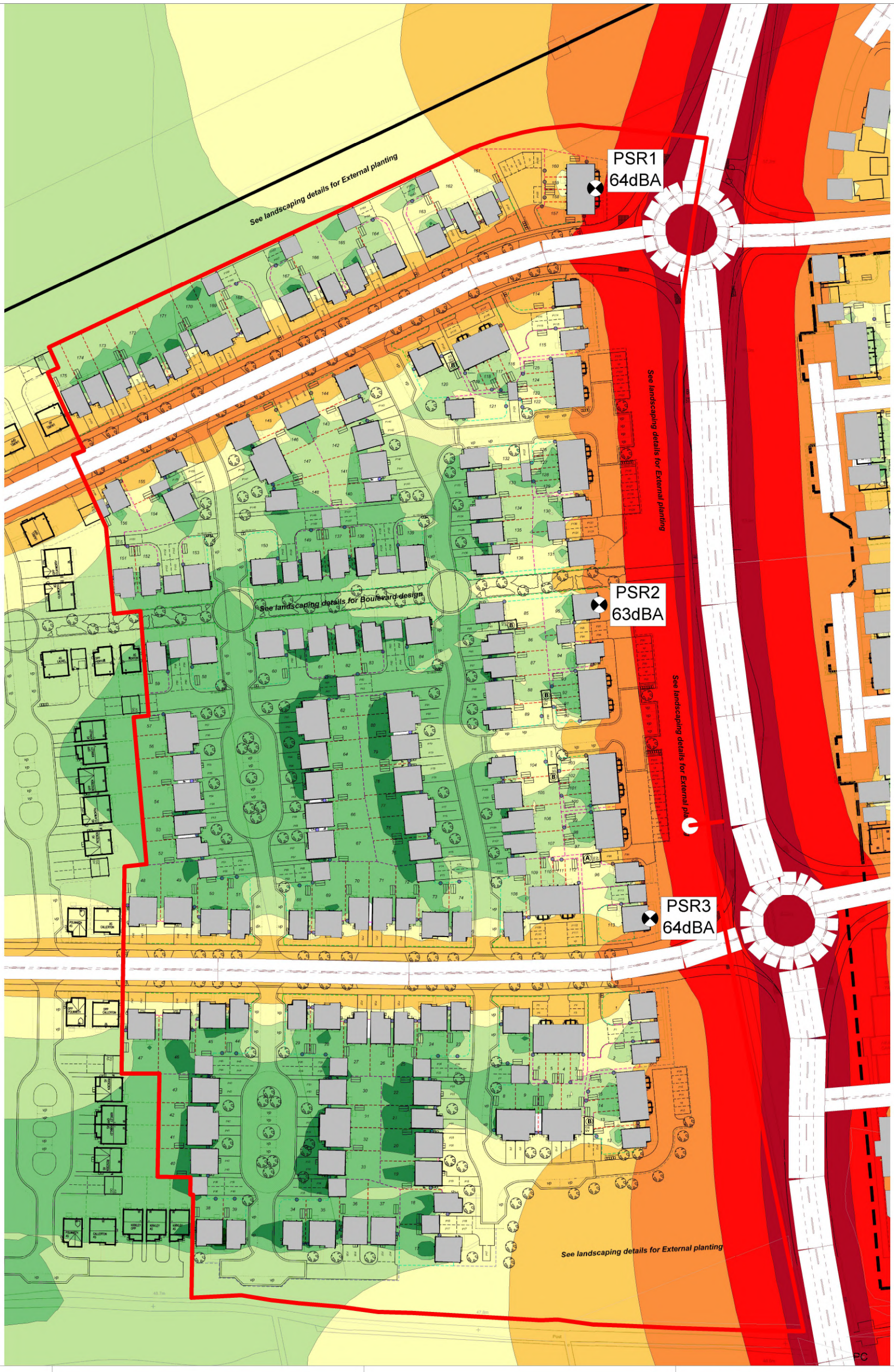

njd Environmental Associates	Client: Persimmon Homes	Figure 1: Daytime LAeq,16hr (1.5m receptor height)	0 <= ... < 35 35 <= ... < 40 40 <= ... < 45 45 <= ... < 50 50 <= ... < 55 55 <= ... < 60 60 <= ... < 65 65 <= ... < 70 70 <= ... < 75 75 <= ... < 80 80 <= ...
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njd Environmental Associates	Client: Persimmon Homes	Figure 1: Night-time LAeq,8hr (4m receptor height)	0 <= ... < 35 35 <= ... < 40 40 <= ... < 45 45 <= ... < 50 50 <= ... < 55 55 <= ... < 60 60 <= ... < 65 65 <= ... < 70 70 <= ... < 75 75 <= ... < 80 80 <= ...
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Persimmon Homes

Figure 3:
Night-time LAmax
(4m receptor height)

0 <= ... < 35
35 <= ... < 40
40 <= ... < 45
45 <= ... < 50
50 <= ... < 55
55 <= ... < 60
60 <= ... < 65
65 <= ... < 70
70 <= ... < 75
75 <= ... < 80
80 <= ...

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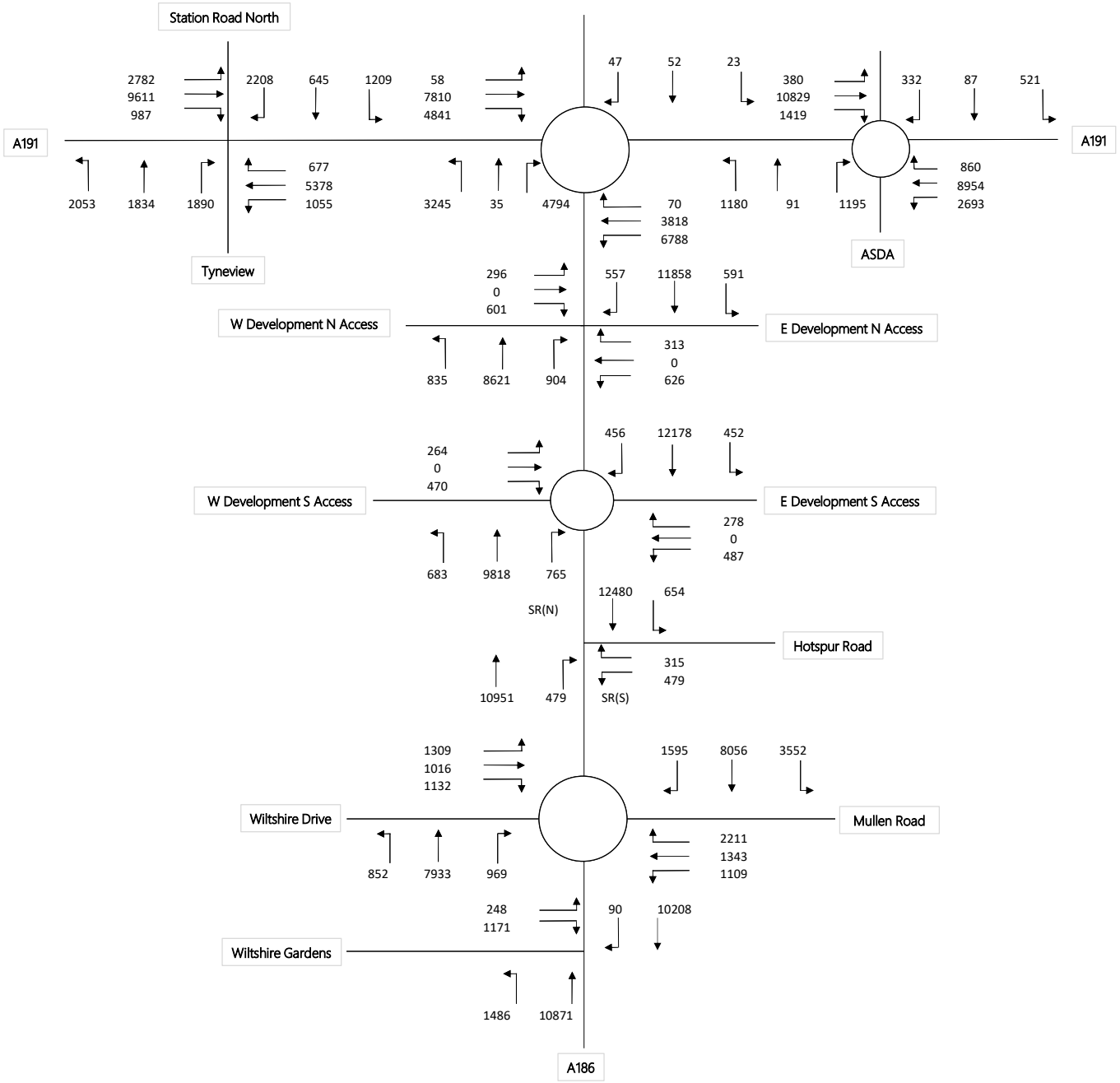
West Benton Phase 1

Drawn By:
NJ Dennon

Date:
May 2021

njd Environmental Associates	Client: Persimmon Homes	Figure 4: Indicative Glazing and Ventilation Scheme for Living Rooms and Bedrooms	Key: / Living Room and Bedroom Mitigation: — 10/12-20/6mm glazing; ADF System 3 and EAR42W vents (or equivalent) — 4/12-20/4mm glazing; Titon SFXSA V25/C25 vents (or equivalent) — Unmarked facades have no specific requirements	N
	Job Title: NJD21-0079-001R West Benton Phase 1	Drawn By: NJ Dennon		Date: May 2021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9611
987
2208
645
1209
58
7810
4841
47
52
23
380
10829
1419
332
87
521
A191
A191
677
5378
1055
2053
1834
1890
3245
35
4794
70
3818
6788
1180
91
1195
860
8954
2693
Tyneview
ASDA
296
0
601
557
11858
591
W Development N Access
E Development N Access
313
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626
835
8621
904
264
0
470
456
12178
452
W Development S Access
E Development S Access
278
0
487
683
9818
765
SR(N)
12480
654
Hotspur Road
315
479
10951
479
SR(S)
1309
1016
1132
1595
8056
3552
Wiltshire Drive
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Wiltshire Gardens
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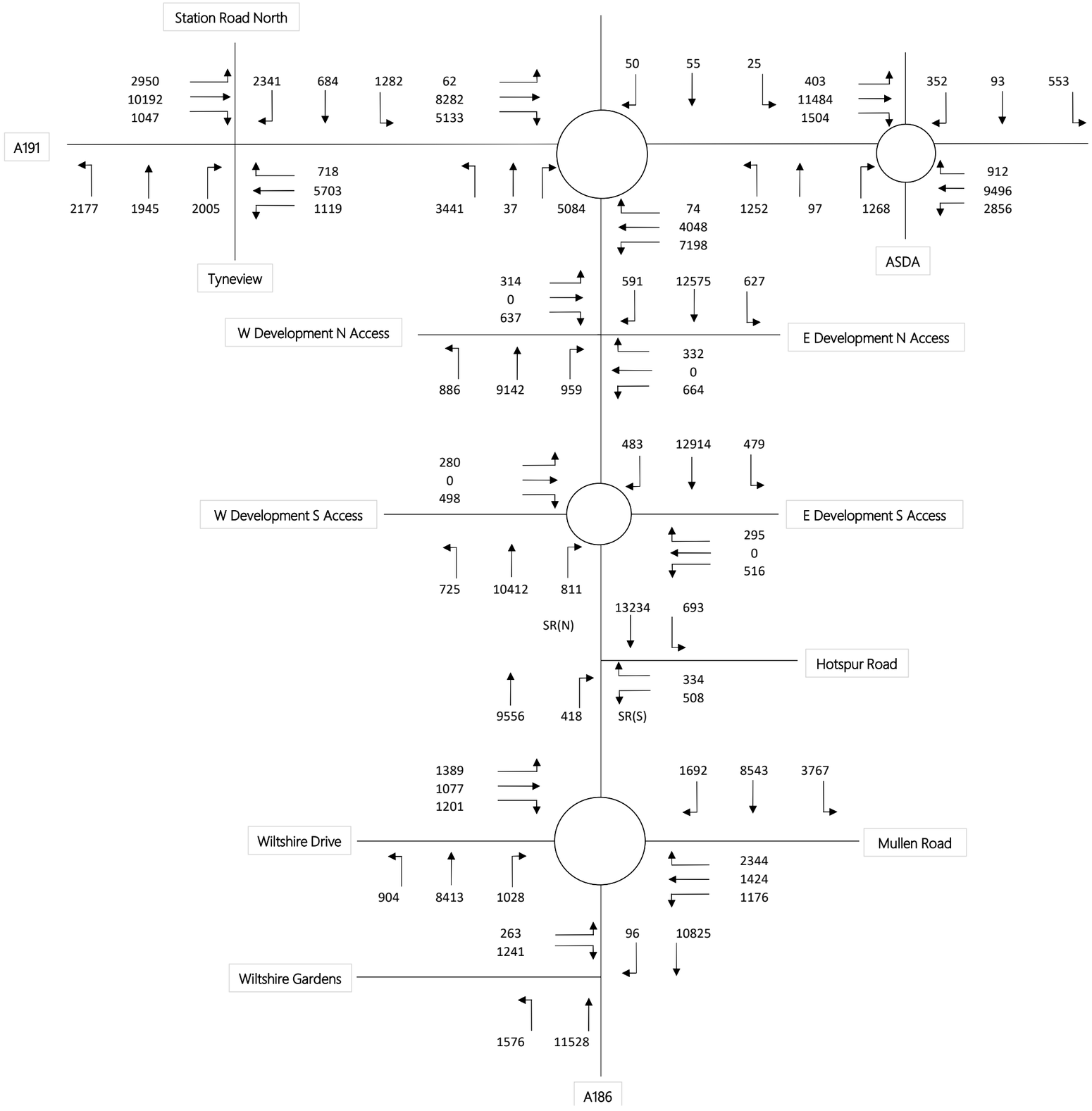
10871
A186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93
553
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1119
2177
1945
2005
3441
37
5084
74
4048
7198
1252
97
1268
912
9496
2856
Tyneview
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12575
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9556
418
SR(S)
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1692
8543
3767
Wiltshire Drive
Mullen Road
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1424
1176
904
8413
1028
263
1241
96
10825
Wiltshire Gardens
1576
11528
A186