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AQ Assessment

Great Western Yard

Miller Goodall

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MILLER GOODALL
ACOUSTICS AND AIR QUALITY

AIR QUALITY ASSESSMENT

on behalf of

EUTOPIA HOMES

for

GREAT WESTERN YARD, GLOUCESTER

REPORT DATE: 11TH JULY 2022

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Summary

This air quality report has been prepared to accompany a planning application for a proposed residential development at Great Western Yard, Gloucester. It assesses the potential changes in air quality due to the construction and operation of the proposed development and whether these potential changes would significantly alter air quality.

The assessment of dust soiling and human health impacts during the demolition and construction phase of the development results in the proposal of dust mitigation measures. The implementation of these will ensure that residual dust impacts during the demolition and construction phase are not significant.

Concentrations of NO_2 and PM_{10} are likely to be below their respective long and short-term objectives at the proposed development site which is therefore considered suitable for residential use with regards to air quality. Concentrations of $PM_{2.5}$ are expected to be below the annual mean target.

The proposed development is not expected to have a significant impact on local air quality.

There is, therefore, no reason for this application to be refused on the grounds of air quality.

Prepared By	Philip Walton	Reviewed By	Melody Horan
Signed	[redacted]	Signed	[redacted]
Date	11th July 2022	Date	11th July 2022

Record of changes

Version	Date	Change	Initials
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Contents

1 Introduction

1.1 Miller Goodall Ltd has been instructed to prepare an air quality assessment to accompany a planning application for a proposed residential development at Great Western Yard, Gloucester. The site lies within the administrative boundary of Gloucester City Council (GCC).

1.2 The report provides a review of the existing air quality in proximity to the proposed development site and assesses the potential impact of the proposed development on local air quality following Local Air Quality Management Technical Guidance[1] and EPUK and IAQM guidance[2].

1.3 The report provides an assessment of the potential air quality impacts associated with the construction and operational phases of the proposed development. The potential air quality changes at existing sensitive receptors adjacent to the site and roads subject to increased vehicle generation from the development are assessed. The suitability of the site for the intended use will also be assessed once the required traffic data has been recieved.

1.4 The main pollutants of health concern from road traffic exhaust releases are nitrogen dioxide (NO_2) and fine particulates, normally assessed as the fraction of airborne particles of mean aerodynamic diameter less than ten micrometres (PM_{10}) and 2.5 micrometres ($PM_{2.5}$) since these pollutants are most likely to approach their respective air quality objectives in proximity to major roads and congested areas. This assessment has therefore focused on the impact of the proposed development on concentrations of NO_2, PM_{10} and $PM_{2.5}$.

2 Site Description

2.1 The site is located approximately 600 m to the south east of Gloucester city centre. The development land is on a former rail yard.

2.2 Most of the site is derelict and historic rail lines cross the development land. There are two commercial premises operating from the northern part of the site comprising a vehicle repair shop and a timber merchant. Both premises would be demolished as part of the development proposals.

2.3 Great Western Road borders most of the site's north boundary, with the exception of several terraced properties located in the central part of the northern boundary. The land uses further north comprise a mix of commercial and residential use. Horton Road borders the eastern boundary of the site, with commercial uses located beyond. A level crossing borders the south eastern corner of the development site. The Gloucester main railway line borders the southern boundary (Gloucester to Newport line[3]). Commercial uses border the site to the west and north west.

2.4 The development is not located within an Air Quality Management Area (AQMA). The closest AQMA is located approximately 450 m to the south west of the site and had been declared along Barton Street (B4073). The site location and its proximity to the closest AQMAs is shown in **Appendix A**.

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[1] Department for the Environment Food and Rural Affairs (2018) '*Local Air Quality Management Technical Guidance Document LAQM.TG (16)*', London: Defra.

[2] EPUK and IAQM (January 2017) Land Use Planning and Development Control: Planning for Air Quality (v1.2)

[3] Rail Map Online. Available at: https://www.railmaponline.com/UKIEMap.php

3 Proposed Development

3.1 The proposed development includes a mix of individual 2-storey townhouses and residential apartment blocks of between 4- to 6-storey heights. The apartment blocks will be located in the northwestern part of the site. The total number of residential units to be provided is 330.

4 Policy Context

4.1 Air Quality Objectives

4.1.1 The standards and objectives relevant to the LAQM framework have been prescribed through the Air Quality (England) Regulations (2000) and the Air Quality (England) (Amendment) Regulations 2002; the Air Quality Standards Regulations 2010 set out the combined Daughter Directive limit values and interim targets for Member State compliance.

4.1.2 The United Kingdom left the European Union on 31st January 2020 and is no longer a member state. However, the current framework of air quality legislation was converted into domestic law through the European Union (Withdrawal) Act 2018[4].

4.1.3 The relevant air quality standards and objectives are presented in **Table 1**. Pollutant standards relate to ambient pollutant concentrations in air, set on the basis of medical and scientific evidence of how each pollutant affects human health.

Table 1: Air Quality Strategy Objectives (England) for the Purposes of Local Air Quality Management

Pollutant	Air Quality Objective	
	Concentration	Measured As
Nitrogen dioxide (NO_2)	200 µg/m^3	1-hour mean not to be exceeded more than 18 times per year
	40 µg/m^3	Annual mean
Particles (PM_{10})	50 µg/m^3	24-hour mean not to be exceeded more than 35 per year
	40 µg/m^3	Annual mean
Particles ($PM_{2.5}$)	25 µg/m^3	Annual mean (target)

4.1.4 Where an air quality objective is unlikely to be met by the relevant deadline, local authorities must designate those areas as Air Quality Management Areas (AQMAs) and take action to work towards meeting the

[4] UK Parliament (2018): http://www.legislation.gov.uk/ukpga/2018/16/contents/enacted

objectives. Following the designation of an AQMA, local authorities are required to develop an Air Quality Action Plan (AQAP) to work towards meeting the objectives and to improve air quality locally.

4.1.5 Possible exceedances of air quality objectives are generally assessed in relation to those locations where members of the public are likely to be regularly present and are likely to be exposed for a period of time appropriate to the averaging period of the objective.

4.2 GCC Air Quality Action Plan (2008, updated 2011)

4.2.1 GCC's Air Quality Action Plan provides information in respect of the actions planned by GCC in relation to the declared AQMAs. Action Plans are the mechanism by which the local authorities, in collaboration with national agencies and others, outline their plans for working towards achieving the air quality objectives through the powers available to them.

4.2.2 The Action Plan presents a cost to benefit analysis of different mitigation measures. Commentary is provided on their effectiveness and/or financial constraints to their implementation. Miller Goodall note there is several instances of outdated information or short term actions with no listed resolution in the document such as, in relation to traffic surveys, *"a quote had been received to carry out this work. Work is taking place to identify resources to carry it out."*

4.2.3 The 2021 Annual Status Report states:

"A revised AQAP is being developed for the Barton Street, Priory Road and Painswick Road AQMAs. However, owing to the reallocation of Council resources during 2020, the development and implementation of the AQAP has been slightly delayed. Current estimates are that the revised AQAP will be prepared in and sent out for draft consultation during 2021."

4.2.4 The draft report could not be found on the GCC webpages. It is unknown on its status. The theme of the Action Plan is to reduce private vehicle usage, reduce congestion and promote alternative modes of travel.

5 Methodology

5.1 Data Sources

5.1.1 The air quality assessment has been undertaken and prepared with reference to information from several sources, as detailed in **Table 2**.

Table 2: Key Information Sources

Data Source	Reference
Gloucester City Council (GCC)	GCC (2021) *2021 Air Quality Annual Status Report*
Institute of Air Quality Management (IAQM)	IAQM (2014) *Assessment of Dust from Demolition and Construction* (v1.1)
Department for Environment Food and Rural Affairs (Defra)	Defra *Local Air Quality Management Technical Guidance TG(16), updated 2021*
Environmental Protection UK (EPUK) and Institute of Air Quality Management (IAQM)	EPUK and IAQM (January 2017) *Land Use Planning and Development Control: Planning for Air Quality (v1.2)*
Ministry of Housing, Communities & Local Government	Planning Practice Guidance: Air Quality, November 2019 National Planning Policy Framework (NPPF), July 2021
Defra's LAQM Support Tools	Local Air Quality Management 1 km x 1 km grid background pollutant maps NOx to NO_2 Calculator
Vectos	Traffic Data
Air Pollution Services	Meteorological data from Pershore for the year 2019
Worcestershire Regulatory Services (WRS)	WRS (2019) Air Quality and Dispersion Modelling for Planning WRS (2019) Sensitivity Analysis Rationale Note

5.2 Consultation

5.2.1 The proposed air quality assessment methodology was discussed and agreed with Mr Stephen Williams (Senior Technical Officer) of Worcestershire Regulatory Services (WRS)[5]. GCC outsources review of air quality matters to WRS.

5.2.2 It was agreed that both a construction phase assessment and an assessment of road traffic emissions across the site would be undertaken for the proposed development. The types of assessments to be undertaken, meteorological data to be used, assessment roads, approach to verification and baseline data sources were also agreed upon and are detailed in the following sections.

5.2.3 Mr Williams provided the following additional information that requires inclusion in the air quality assessment:

- Verification is undertaken utilising a minimum of three monitoring locations.
- A 'no-improvement' worst-case sensitivity analysis is included. This scenario assumes there is no air quality improvement from the base year, to either vehicle emissions or background concentrations. A rationale note was provided that explains WRS's stance on the no-improvement scenario.
- A pdf titled 'Air Quality Dispersion Modelling for Planning' was also provided. This document outlines the content and modelling approach to be taken.

5.2.4 During the initial consultation, Miller Goodall proposed to use the Gloucestershire Airport meteorological station. However, following feedback, it was discovered the data capture was less than 50% and would be unsuitable for use. The Pershore meteorological station has been used instead.

5.2.5 Following the initial consultation, approximately one month later further work had been completed with regard to the transport assessment. It was initially confirmed that neither 500 light duty vehicle movements outside an AQMA, or 100 LDV movements in an AQMA would be exceeded. However, this was later revised due to the scheme design and a very slight exceedance, at 101 AADT, was concluded for adjacent to the AQMA. These matters were dfiscussed in further emails with Mr Williams, and it was proposed to sceen out an assessment of the air quality change to existing sensitive receptors. Further information to conclude why this approach has been taken is provided in **Section 5.11** of this report. WRS provided agreement[5].

5.2.6 All of these matters have been considered in the assessment.

5.3 Sensitivity Analysis Rationale Note

5.4 WRS has requested the adoption of a worst-case no improvement sensitivity analysis scenario. Historically, the air quality sector has known that previous versions of the Emission Factor Toolkit (particularly from version 9 and earlier) underperformed. There was a significant shift in future year predictions, particularly from the 'diesel-gate' scandal which caused a rethink of vehicle emission testing. The emissions from Euro 6 onward classes have also been found to have significantly improved compared to earlier Euro classes.

[5] Emails between Miller Goodall Ltd. to WRS during 30th March 2022 to 11th July 2022 (several emails).

5.5 The WRS Rational Note outlines why uncertainty exists and references the use of COPERT (v5.0) in the EFT database. This document is outdated. COPERT (v5.0) was superseded with Version 9 of the EFT. EFT v10, and the recently released V11, now incorporate emissions from COPERT v5.3 [6].

5.6 The effectiveness of COPERT 5.3 for future predictions is only being recognised with time. However, it has been performing well. So much so, that Air Quality Consultants have ceased producing the 'CURED' database, which was a tool for the assessment of 'worst-case but realistic' air quality predictions to counter the poor prediction capacities of EFT v9 and earlier versions. Air Quality Consultants (AQC) released a report to discuss the comparisons between EFT v10 and EFT v9 (comprising the switch to COPERT v5.3 [7]. The document provides a technical analysis of the future year predictions and states in the final part of the report that a sensitivity analysis is no longer necessary with the introduction of EFT v10:

"EFT v10 generally predicts lower NOx emissions than EFT v9. It also predicts a greater reduction in emissions over time into the future. Differences are, however, sufficiently small that AQC's previous work validating the use of the EFT remains valid. There remains no justification for the use of sensitivity tests assuming higher NOx emissions in the future than EFT v10 predicts."

5.7 The AQC Report[7] expands on the above conclusion by providing graphical and numerical data of comparisons between the two emission databases (and by association the COPERT inclusions in each EFT version)

5.8 The available evidence suggests that EFT v10, and now v11 which is based on v10, is satisfactory for the prediction of future air quality. For these reasons, Miller Goodall has concluded that a no-improvement sensitivity analysis would not be of benefit to the prediction of future air quality, interpretation of modelled results, and the overall conclusions.

5.9 A no-improvement sensitivity analysis has not been undertaken. The availability to carry out model verification ensures that the ADMS-Roads model has not provided a systematic underprediction of concentrations.

5.10 IAQM Construction Dust Assessment

5.10.1 The IAQM has produced guidance[8] on the assessment of air quality impacts arising from dust associated with construction and demolition activities and provides a methodology by which to complete such assessments. The IAQM methodology provides a risk assessment structure to determine the likely impact of the development on nearby receptor locations and recommends mitigation measures that should be implemented to reduce any such impact. The methodology for the assessment is shown in **Appendix B**. The study area in relation to dust and the zones of interest used within the assessment (<20 m, 20 m – 50 m and 50 – 100 m from the site) are shown in **Appendix C**. The dust assessment informed the recommended mitigation outlined in **Appendix D**.

[6] EFTv11.0-user-guide-v1.0.pdf (defra.gov.uk)

[7] Air Quality Consultants, 2020. Comparison of EFT v10 with EFT v9.

[8] IAQM "Assessment of dust from demolition and construction" v1.1 2014

5.11 Road Traffic Emissions Assessment

Air Dispersion Model

5.11.1 The validated Atmospheric Dispersion Modelling System for Roads (ADMS-Roads) v5.0.1.3 was used to assess the local air quality impact of vehicle exhaust emissions, on concentrations of NO_2, PM_{10} and $PM_{2.5}$ at proposed sensitive receptors to be introduced at the development site.

5.11.2 A qualitative discussion has been provided in relation to the potential air quality changes to existing sensitive receptors.

Assessment Scenarios

5.11.3 The assessment considered the following scenarios:

- Scenario 1: 2019 - base year;
- Scenario 2: 2025- opening year 'with development'.

Traffic Data

5.11.4 The spatial scope for the assessment focused on those routes affected by the proposed development. The traffic data used in the assessment and a map of the road network are provided in **Appendix E**.

5.11.5 Vehicles within the study area have been modelled at posted speed limits apart from the approach to junctions where queuing traffic sections are included in the model at 5 to 20 kph where appropriate following Defra guidance.

5.11.6 An extended queue length and reduced speeds have been modelled for the rail crossing. Further details are provided in **Appendix E.**

5.11.7 LAQM.TG (16) recommends temporal variations to be considered within air quality modelling. Therefore, a 7-day profile based on the Department for Transport's statistics was used within the model.

Meteorological Data

5.11.8 Meteorological data for 2019 from the Gloucestershire Airport recording station was used in the ADMS-Roads model. This is the most representative recording station for the development site.

5.11.9 The wind rose for 2019 from Gloucestershire Airport recording station is provided in **Appendix E**. Dispersion values for the site and meteorological station have been used. The factors applied for surface roughness (m) and the minimum Monin-Obukhov length (m) are outlined in **Appendix E**.

Sensitive Receptors – Existing Sensitive Receptors

5.11.10 An assessment of the air quality change to existing sensitive receptors has been screened out.

5.11.11 The proposals will not generate more than 500 AADT outside an AQMA, therefore, the roads surrounding the site will not exceed the relevant criterion listed in the EPUK 2017 Guidance[2]. However, following revisions to the transport data, a minor exceedance of the 100 AADT criterion adjacent to an AQMA was concluded.

5.11.12 The revision now shows 101 AADT travelling southwards of the site, onto Derby Road and subsequently into the Barton Street AQMA. However, there are several reasons why the air quality change would be insignificant:

- On entering Barton Street AQMA from Derby Road, 24% of the vehicles will travel westwards, and 76% will travel eastwards. Consequently, the vehicle movements adjacent to the AQMA on either side of the entry junction will be below 100 AADT.
- The EPUK criteria is a guideline and a recommendation of when an air quality change may occur, rather than a specification of when an impact will definitely occur. Based on professional experience, it is considered unlikely an exceedance would occur.
- Derby Road enters a crossroad junction with Barton Street. All the units surrounding this crossroad are designated for commercial uses. Commercial users are not exposed to the 24-hour or annual mean air quality objectives. The residential units near the crossroads are approximately 10 to 15 m from the centre of the crossroads where the 101 AADT will be experienced. Pollution reduces with distance from the road source, and the adjacent road will experience less than 100 AADT.
- The residential units are located on the southern side of the street. The prevailing wind direction from Pershore is from the south and south west (**Appendix E**). Consequently, ADMS-Roads would disperse the pollution based on this prevailing wind direction from this data input. The highest pollution would be expected on the north side of the road. There are no dwellings in close proximity to the junction on Derby Road.

5.11.13 For the reasons outlined above, it is considered the risk of adverse air quality changes would be not significant. This approach and the reasoning outlined above was also agreed by WRS.

Sensitive Receptors – Proposed Sensitive Receptors

5.11.14 Four proposed sensitive receptor locations within the development site were considered within the assessment. NO_2, PM_{10} and $PM_{2.5}$ concentrations were calculated at these locations to determine whether future site users may be exposed to elevated pollutant levels. PSRs were selected at worst-case positions closest to the main sources of pollution affecting the site. The PSR locations are presented in **Table 3** and **Appendix A**.

Table 3: **Proposed Sensitive Receptor Locations**

Receptor	Grid Ref	
PSR 1	384253	218255
PSR 2	384249	218351
PSR 3	383991	218559
PSR 4	384079	218482

5.12 Proposed sensitive receptors 3 and 4 are positioned in the footprints of the proposed residential blocks. These buildings will be constructed up to heights between 4- to 6-storeys. The assessment modelled all receptors at the ground floor (1.5 m height). Air pollution concentrations reduce with increased distance and height from the source, therefore, concentrations above the ground floor would be lower.

5.13 NO_2, PM_{10} and $PM_{2.5}$ contour plots (at 1.5 height) has been included to show how concentrations will reduce into the development footprint. These are available in **Appendix F**.

Conversion of NOx to NO_2

5.13.1 Oxides of nitrogen (NO_x) concentrations were predicted using the ADMS-Roads model. The modelled road contribution of NO_x at the identified receptor locations was then converted to NO_2 using the NO_x to NO_2 calculator (v8.1, 2020)[9] following Defra guidance.

Emission Factors

5.13.2 Defra's Emission Factor Toolkit (EFT)[10] (V11, 2021) was used within the ADMS-Roads model to predict emissions from road vehicles for all scenarios.

Background Concentrations

5.13.3 The ADMS model requires the derivation of background pollutant concentration data that are factored to the year of assessment, to which the contributions from the assessed roads are added.

5.13.4 GCC operates an urban background diffusion tube at Elmbridge Primary Upper School which is considered suitable for inclusion in the air quality assessment. This monitor is located approximately 1.3 km to the northeast of the site. The 2019 result has been included and the future year calculations of background concentrations were completed in accordance with LAQM.TG(16). The calculations and results of the background concentrations used are shown in **Appendix E**.

5.13.5 GCC does not operate any automatic monitors. Background PM_{10} and $PM_{2.5}$ concentrations were obtained from the Defra LAQM support tools for the 1 km x 1 km grid squares covering the proposed development site and receptor locations for the years of assessment (2019 and 2025).

Model Verification

5.13.6 Model verification is the process of adjusting model outputs to improve the consistency of modelling results with respect to available monitored data.

5.13.7 The verification procedure has been completed following receipt of the finalised traffic data requested. The verification procedure considers diffusion tube IDs: 18 and 26 which are located within the study area that is representative of air quality conditions outside of an AQMA. The locations of these air quality monitoring sites are shown in **Appendix A** and the results are provided in **Section 6.2**.

5.13.8 GCC does not undertake any PM_{10} or $PM_{2.5}$ monitoring, therefore it was not possible to undertake verification for particulate matter concentrations.

Relevant Objectives

5.13.9 As the development is for residential use, both the annual mean and the short-term objectives apply.

5.13.10 LAQM.TG(16) provides a qualitative screening approach to determine whether there is a risk of exceedance of the one-hour NO_2 air quality objective. If the ambient NO_2 annual mean concentration is above 60 µg/m^3 there is a risk that the one-hour objective (200 µg/m^3) may be exceeded. A qualitative comparison to this screening

[9] Background maps. Tools. Local Air Quality Management Support - Defra, UK

[10] Emissions Factors Toolkit (defra.gov.uk)

method has been undertaken for this assessment.

5.14 Rail Emissions

5.14.1 The Gloucester main railway line borders the southern boundary (Gloucester to Newport line[3]) of the development site.

5.14.2 Defra LAQM.TG(16) provides a methodology for the assessment of rail emissions. The first stage is to determine whether the line of interest is affected by heavy diesel locomotives, from Table 7.2 of LAQM.TG(16).

5.14.3 If the line of interest is not listed, then there is little risk of adverse impacts from rail emissions and a detailed assessment can be screened out. An assessment to this methodology has been undertaken for this assessment.

6 Baseline Air Quality

6.1 Local Air Quality

6.1.1 Baseline air quality at the proposed development has been established by examining monitoring data produced by GCC (provided in the 2021 Annual Status Report) and background concentration maps provided by Defra for the grid squares covering the proposed development.

6.1.2 GCC has declared three AQMAs in the city, all for exceedances of the NO_2 annual mean air quality objective. These are located to the south east, south and north west of the site. The closest of these is Barton Street AQMA, which is located approximately 450 m to the south of the site. The site location and its relationship to the AQMA is shown in **Appendix A**.

6.1.3 GCC are currently reviewing whether the Barton Street AQMA can be revoked (quote from the ASR):

"Barton Street AQMA – To remain in force as one of the six monitoring sites has recorded exceedances of the annual mean objective within the past five years, with the exception of 2020. As the remaining five sites have not exceeded the annual mean objective in the three years prior to 2020, consideration will be given to whether the boundary of this AQMA should be amended. The AQMA review being finalised as part of the update to the AQAP will be used to support any decision"

6.2 Air Quality Monitoring

Nitrogen Dioxide (NO_2)

6.2.1 GCC operates several non-automatic diffusion tubes in the local area, these include:

- ID 18: located approximately 100 m to the south west of the site. This is considered to be the most representative of the development site.
- ID 26: located approximately 470 m to the north west of the site, outside of an AQMA.
- ID's 19, 20, 21: located approximately 830 m to 1.2 km to the east of the site. These are outside an AQMA, and ID 21 is an urban background monitor.
- ID's 12 – 17: located approximately 550 to 750 m to the west and south west of the site. All of these monitors are located in the Barton Street AQMA.

6.2.2 Air quality monitoring data for 2020 is available. The Covid-19 pandemic caused significant traffic reductions on the UK road network during 2020. Consequently, air quality concentrations during 2020 experienced significant and noticeable reductions compared to the pre-2019 record.

6.2.3 The results from the diffusion tube are shown in **Table 4** and the monitor locations are shown in **Appendix A**.

Table 4: Annual Mean NO_2 Concentrations Monitored by GCC within the Study Area

Site ID & Classification	Location		Annual Mean NO_2 Concentrations ($\mu g/m^3$)				
			2016	2017	2018	2019	2020
12 (Roadside)	384000	217863	**40.1**	36.5	36.8	36.2	27.8
13 (Roadside)	383717	218094	39.1	35.0	37.6	37.2	31.7
14 (Roadside)	383726	218074	**47.4**	**48.1**	**42.4**	**43.9**	31.5
15 (Roadside)	383989	217857	**42.9**	39.3	38.4	39.7	30.1
16 (Roadside)	384081	217725	35.1	33.0	32.1	31.2	21.6
17 (Roadside)	384175	217501	38.0	35.2	32.7	35.5	26.1
18 (Roadside)	384190	218160	31.3	30.2	29.1	29.4	21.8
19 (Roadside)	385130	218585	37.2	34.1	35.4	34.1	25.8
20 (Roadside)	385113	218595	36.5	36.5	33.0	34.7	24.8
21 (urban background)	385430	218870	15.2	17.6	17.5	17.7	17.2
26 (Roadside)	383560	218775	30.7	30.4	33.4	33.9	26.5
Annual Mean NO_2 air quality objective			40 $\mu g/m^3$				

6.2.4 The monitoring results in **Table 4** indicate that annual mean concentrations of NO_2 were below the NO_2 annual mean objective at all locations during 2020. However, it is recognised that the 2020 data record may have been affected by the continued regional and national lockdowns and reduced traffic caused by the Covid-19 pandemic. Air quality concentratons have remained below the air quality objectives since 2017 at almost all monitors listed, with the exception of continued exceedances in one location (ID #14) in the Barton Street AQMA.

6.2.5 Air quality concentrations outside of the AQMAs are below the air quality objectives.

6.2.6 The results indicate that the short-term objective for NO_2 was unlikely to be exceeded at the identified monitoring sites as monitored annual mean concentrations were well below the indicative screening concentration of 60 μ/gm^3 during the period shown.

Particulate Matter (PM_{10} & $PM_{2.5}$)

6.2.7 GCC does not operate any automatic monitors. Therefore, GCC does not monitor PM_{10} or $PM_{2.5}$.

6.3 Background Concentrations

6.3.1 GCC operates diffusion tube ID 21, an urban background monitor that is considered to be representative of the study area. NO_2 (and NO_x) have been derived from this air quality monitor for use in the assessment. The future year concentrations have been derived with reference to LAQM.TG(16). The calculation procedure is provided in **Appendix E**.

6.3.2 Background concentrations of PM_{10} and $PM_{2.5}$ have been obtained from the background concentration maps provided by Defra for the grid squares covering the proposed development and receptor locations[11]. The background concentrations are shown in **Table 5**.

Table 5: Background Pollutant Concentrations Covering the Site and Receptor Locations*

Grid Square	Pollutant	2019	2025
		(µg/m^3)	(µg/m^3)
384500, 218500 (PSR 1 – 2, PSR 4)	NO_2	17.70	14.58
	PM_{10}	14.18	13.18
	$PM_{2.5}$	9.76	8.98
383500, 218500 (PSR 3)	NO_2	17.70	14.58
	PM_{10}	14.73	13.72
	$PM_{2.5}$	9.83	9.03

** Defra background concentrations obtained from the latest 2018 based background maps*

7 Construction Dust Impact Assessment

7.1 Step 1 – Requirement for a Detailed Assessment

7.1.1 There are sensitive receptors located within 350m of the site boundary, therefore, a detailed assessment of the construction phase of the development has been undertaken. There are no ecological designations within 50m of the site boundary or trackout routes which require assessment.

7.2 Step 2 – Assess the Risk of Dust Impacts

Step 2A Dust Emission Magnitude

7.2.1 The potential dust emission magnitude in relation to the development has been determined using the criteria detailed in **Table B1** in **Appendix B**. The scale and nature of works onsite were considered to determine the potential dust emission magnitude for demolition, earthwork activities, construction and trackout activities. Information to determine the classification has been estimated from the site plans, Google Earth and information provided by the Applicant. The dust emission magnitude is outlined in **Table 6.**

Table 6: Dust Emission Magnitudes for Each Activity

Activity	Dust Emission Magnitudes	Justification for Sensitivity Classification

[11] http://uk-air.defra.gov.uk/data/laqm-background-maps?year=2018

Demolition	Small	• The total building volume to be demolished is less than 20,000 m^3
Earthworks	Large	• the site area is >10,000 m^2
Construction	Large	• total building volume to be constructed is estimated to be >100,000 m^3
Trackout	Medium	• there are likely to be between 10 to 50 HDV outward movements in any one day

Step 2B Sensitivity of the Receptors to Dust Soiling and Health Effects

7.2.2 Dwellings are located within a distance of 20 m from construction, demolition and earthworks and 20 m of road edges used by traffic associated with the site construction. In accordance with the criteria in **Table B2** in **Appendix B** and the IAQM guidance, the sensitivity of human receptors is **high**.

Step 2B Sensitivity of the Area to Dust Soiling and Human Health Effects of PM_{10}

7.2.3 The sensitivity of the area for dust soiling and human health effects has been determined using the criteria detailed in **Table B3 and Table B4** respectively in **Appendix B.**

7.2.4 The sensitivity of the area to dust soiling and human health for each activity is summarised in **Table 7**.

Table 7: Outcome of Defining the Sensitivity of the Area

Pollution	Activity	Sensitivity of the Surrounding Area	Justification for Sensitivity Classification
Dust Soiling	Demolition	Medium	There are 10 – 100 highly sensitive residential receptors between 20 m - 50 m of the site boundary
	Earthworks	High	There are 10 – 100 highly sensitive residential receptors within 20 m of the site boundary
	Construction	High	There are 10 – 100 highly sensitive residential receptors within 20 m of the construction activity
	Trackout	High	There are 10 – 100 highly sensitive residential receptors within 20 m within 20 m of the trackout route, up to 500 m of the site exit
Human Health	Demolition	Low	There are 10 – 100 highly sensitive residential receptors between 20 m - 50 m of the site boundary. Background pollutant concentrations are below 24 µg/m^3
	Earthworks	Low	There are 10 – 100 highly sensitive residential receptors within 20 m of the site boundary. Background pollutant concentrations are below 24 µg/m^3
	Construction	Low	There are 10 – 100 highly sensitive residential receptors within 20 m of the construction activity. Background pollutant concentrations are below 24 µg/m^3
	Trackout	Low	There are 10 – 100 highly sensitive residential receptors within 20 m of the trackout route. Background pollutant concentrations are below 24 µg/m^3

Step 2C Risk of Impacts

7.2.5 The dust emission magnitude and sensitivity of the area were combined and the risk of impacts have been determined using the criteria detailed in **Table B5** to **Table B8** in **Appendix B.**

7.2.6 A summary of the risks, before mitigation measures are applied, for dust soiling and human health are shown in **Table 8**.

Table 8: Risk of Dust Impacts

Potential Impact	Dust Risk			
	Demolition	Earthworks	Construction	Trackout
Dust Soiling	Low Risk	High Risk	High Risk	Medium Risk
Human Health	Negligible Risk	Low Risk	Low Risk	Low Risk

7.3 Step 3 – Site-Specific Mitigation

7.3.1 Step 3 of the IAQM guidance identifies appropriate site-specific mitigation. These measures are related to the site risk for each activity. Mitigation measures specific to demolition, earthworks, construction and trackout are

proposed based on the risk classifications in **Table 8**. Recommended mitigation measures are shown in **Appendix D.**

7.3.2 The general mitigation measures (for site management, preparing and maintaining the site, operating vehicle/machinery, operations and waste management), are appropriate for a site with a 'high risk' classification (in this instance the site is classified as "high" risk due to earthworks and construction)[12].

7.4 Step 4 – Determine Significant Effects

7.4.1 The characteristics of the site and the surrounding area suggest that mitigation would not be impracticable or ineffective. With the implementation of the mitigation measures, therefore, the residual impacts from the construction are considered to be not significant when considered following IAQM guidance.

8 Road Traffic Assessment

8.1 Baseline Assessment

8.1.1 A 2019 baseline has been modelled to obtain the relevant model verification adjustment factor, provided in **Appendix E**. Proposed sensitive receptors will not exist in 2019, therefore, no sensitive receptor assessment is required for the 2019 base year scenario.

8.1.2 An opening year without development scenario is not required, as an assessment of ESR air quality change is not required.

8.2 Impact Assessment

Proposed Receptors

8.3 NO_2, PM_{10}, and $PM_{2.5}$ concentrations have been predicted at four proposed sensitive receptor locations. The sensitive receptors have been selected at locations nearest the main sources of pollution affecting the site. PSR 1 is representative of the nearest residential property to the rail crossing.

8.4 Pollutant concentrations have been predicted at ground level (1.5 m) and a qualitative discussion is provided to discuss how pollution disperses to the upper floors.

8.5 The results of the air quality assessment are shown in **Table 9**. Proposed sensitive receptor locations are shown in **Appendix A**.

[12] For those mitigation measures that are general, the highest risk category should be applied. For example, if the site is medium risk for earthworks and construction, but a high risk for demolition and track-out, the general measures applicable to a high risk site should be applied.

Table 9: Air Quality Concentrations at Proposed Sensitive Receptors

Proposed Sensitive Receptor	2025 With Development – Pollutant Concentrations		
	NO_2 Concentration with Development µg/m³	PM_{10} Concentration with Development µg/m³	$PM_{2.5}$ Concentration with Development µg/m³
PSR 1	20.58	13.71	9.28
PSR 2	16.55	13.43	9.12
PSR 3	16.48	14.08	9.23
PSR 4	16.44	13.52	9.17

8.5.1 The results of the dispersion modelling assessment indicate that annual mean concentrations of NO_2 and PM_{10} would be below the annual mean objectives at proposed residential receptors in 2025 once the development is operational.

8.5.2 LAQM.TG(16) provides a qualitative screening approach to determine whether there is a risk of exceedance of the one-hour NO_2 air quality objective. If the ambient NO_2 annual mean concentration is above 60 µg/m³ there is a risk that the one-hour objective (200 µg/m³) may be exceeded.

8.5.3 The predicted NO_2 concentrations are all well below 60 µg/m³ and, therefore, when considered in light of guidance in LAQM.TG (16), the 1-hour mean objective is unlikely to be exceeded.

8.5.4 The short term PM_{10} objective is predicted to be met at the proposed receptor location with no exceedances of the daily mean objective of 50 µg/m³.

8.5.5 Pollution disperses with distance and height from a pollutant source (road source). The predictions presented in **Table 9** indicate that pollutant concentrations are below the air quality objectives at the ground level, at locations closest to the main pollution sources. The air quality concentrations at the floors above the ground floor will be lower. No significant effects are predicted from the receptors above the ground floor too.

8.5.6 NO_2, PM_{10} and $PM_{2.5}$ pollution concentration contour maps are provided in **Appendix F**. These maps show how pollution will disperse in the development footprint, at a height of 1.5 m. A zoomed image showing the pollution nearest PSR 1 is also included.

8.5.7 The site is therefore considered suitable for residential use with regard to air quality.

9 Rail Emissions

9.1 Defra Guidance LAQM.TG(16) [1] provides a methodology for the assessment of rail emissions (Paragraphs 7.18 to 7.19 and Table 7.2 of LAQM.TG(16)).

9.2 The first stage of the methodology is to identify whether the rail line of interest is affected by heavy diesel locomotive traffic. If the rail is not affected by heavy-diesel locomotives, then the risk of air quality impacts from rail emissions can be concluded as not significant and does not require further detailed assessment.

9.3 The Gloucester to Chepstow[3] rail line borders the southern boundary of the proposed development. This rail line is not identified by Defra to have significant diesel locomotive use. The Gloucester railway station platform is located approximately 150 m from a future residential receptor. Emissions from the idling of locomotives is considered to be not significant, in accordance with the distances outlined in LAQM.TG(16).

9.4 The risk of air quality impacts to proposed sensitive receptors from rail emissions can, therefore, be concluded to be not significant.

10 Dust Emissions

10.1 Allstone Sand and Gravel Limited operate an inert crushing and screening operation to produce secondary aggregates. These operations are carried out on the land located approximately 55 m to the east of the proposed development site. The land includes several material stockpiles and dust-prone unsealed surfaces.

10.2 The crushing and screening operation has operated since 2011. During this time period, three separate extension of time applications have been made to the original temporary operations. The most recent (Planning Reference 19/0070/GLMAJW) extension of time application received planning permission in early 2020 to extend the operational timeframe by a further 3 years.

10.3 The purpose of the extension of time is stated in the committee report and supporting statement for the 2019 application:

"The application seeks to extend the end date from 5th October 2019 for a further three years. The reason that the Applicant is not seeking a permanent planning consent is provided in the Supporting Statement, following the granting of outline planning permission on 19th December 2018 for the redevelopment of the site for (400 units) of housing and student accommodation; "At the present time, the Company wish to renew the recycling operation for a further period of three years to allow them sufficient time to continue to explore viable options for their business in the long term." "

10.4 The Applicant proposed their own condition wording as part of the latest extension of time application, stating: *"The development hereby permitted shall cease and the site be restored to permeable hard standing to the levels indicated on the Site Survey Plan ASG/001/2019, dated September 2019, with all plant and machinery removed, by no later than 5th October 2022."*

10.5 The proposals to change the use of land from industrial to residential has received planning permission. There is no reason to consider that the development will not proceed as planned. This mechanism places a final cessation date to the crushing and screening operations that currently take place. The Applicant (of the crushing and screening operation) themselves has provided their own timeframes to when the site will be vacated.

10.6 The proposed development will be constructed over several years. Parts of the site may be occupied as construction progresses; however, we can confirm that no proposed sensitive receptor will be introduced at the development during the operational timeframes of the crushing and screening operations. The first sensitive receptors to be introduced to the site will likely be from 2024/25 onward.

10.7 Consequently, the potential for dust emissions to impact proposed sensitive receptors is non-existent. The crushing and screening operations will have ceased prior to any occupation of the development site. It is likely the 400-unit development will be in the stages of construction during the time periods when future sensitive receptors are introduced into the development site.

11 Mitigation

11.1 The air quality assessment has predicted pollutant concentrations across the development footprint. Air quality concentrations were predicted to be below the air quality objectives. No specific mitigation to protect future occupants from adverse air quality is required.

11.2 The air quality assessment has predicted the site will not have a significant impact on local air quality. Mitigation in relation to vehicular emission impacts is not required. However, best practice measures should still be adopted where possible, these may include:

- Control of Construction Emissions. In this case, mitigation of construction dust will be achieved by the use of the mitigation measures outlined in **Appendix D**.
- Electric vehicle charging infrastructure or charge points.
- Travel Plan.
- Any gas-fired boilers installed to meet a minimum standard of <40 mgNO_x/kWh [2]. Legislation proposes to cease fossil-fuel fired boiler sales from 2025. Electric-fired boilers may be a preferred means of heating.

12 Summary of Impacts and Conclusion

12.1 This air quality report assesses the potential changes in air quality due to the construction and operation of the proposed development and whether these potential changes would significantly alter air quality.

12.2 The assessment of dust soiling and human health impacts during the demolition and construction phase of the development results in the proposal of dust mitigation measures. The implementation of these will ensure that residual dust impacts during the demolition and construction phase are not significant.

12.3 Concentrations of NO_2 and PM_{10} are likely to be below their respective long and short-term objectives at the proposed development site which is therefore considered suitable for residential use with regards to air quality. Concentrations of $PM_{2.5}$ are expected to be below the annual mean target.

12.4 The proposed development is not expected to have a significant impact on local air quality.

12.5 The potential for rail emissions to impact proposed sensitive receptors has been assessed. The potential impact is concluded to be negligible and not significant as the rail line of interest does not have significant diesel locomotive traffic.

12.6 The potential for dust emissions to impact proposed sensitive receptors from the nearby crushing and screening operations has been assessed. The crushing and screening operations is expected to cease activities and leave the local area by 2022/23. No proposed sensitive receptors will be introduced into the development site during this time period. The potential for dust emissions to impact future receptors is non-existent.

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APPENDICES

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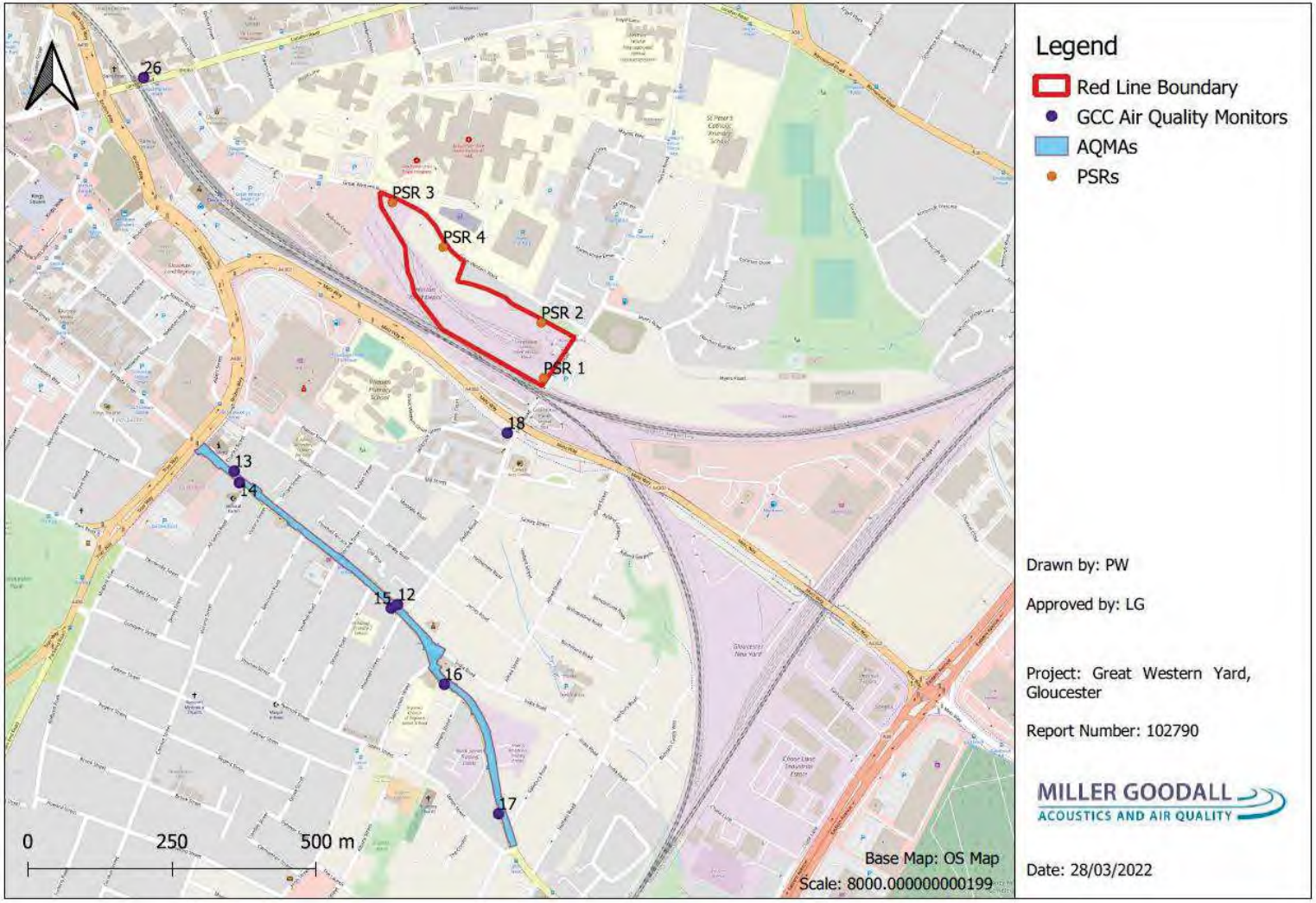
Appendix A: Location of site, AQMA, GCC monitoring and receptors



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Appendix B: IAQM Dust Risk Assessment Methodology

The following section outlines criteria developed by the IAQM for the assessment of air quality impacts arising from construction and demolition activities[8]. The assessment procedure is divided into four steps and is summarised below:

Step 1: Screen the Need for a Detailed Assessment

An assessment will normally be required where there are human receptors within 350 m of the site boundary and/or within 50 m of the route(s) used by construction vehicles on the public highway, up to 500 m from the site entrance(s). Ecological receptors within 50 m of the site boundary or within 50 m of the route(s) used by construction vehicles on the public highway, up to 500 m from the site entrance(s), are also identified at this stage. An ecological receptor refers to any sensitive habitat affected by dust soiling. For locations with a statutory designation, such as a Site of Specific Scientific Interest (SSSI), Special Area of Conservation (SACs) and Special Protection Areas (SPAs), consideration should be given as to whether the particular site is sensitive to dust. Some non-statutory sites may also be considered if appropriate.

Where the need for a more detailed assessment is screened out, it can be concluded that the level of risk is 'negligible' and any effects will not be significant.

Step 2: Assess the Risk of Dust Impacts

In step two, a site is allocated to a risk category on the basis of the scale and nature of the works (Step 2A) and the sensitivity of the area to dust impacts (Step 2B). These two factors are combined in Step 2C to determine the risk of dust impacts before the implementation of mitigation measures. The assigned risk categories may be different for each of the construction activities outlined by the IAQM (construction, demolition, earthworks and trackout). A site can be divided into zones, for example on a large site where there are differing distances to the nearest receptors.

Step 2A: Define the Potential Dust Emission Magnitude

Dust emission magnitude is based on the scale of the anticipated works and is classified as Small, Medium or Large. The IAQM guidance recommends that the dust emission magnitude is determined separately for demolition, earthworks, construction and trackout. **Table B1** describes the potential dust emission class criteria for each outlined activity.

Table B1: Criteria Used in the Determination of Dust Emission Magnitude

Activity	Criteria used to Determine Dust Emission Magnitude		
	Small	Medium	Large
Demolition	Total building volume <20,000 m^3, construction materials with low potential for dust release.	Total building volume 20,000 m^3 – 50,000 m^3, potential dusty construction material.	Total building volume >50,000 m^3, potentially dusty construction material.
Earthworks	Total site area <2,500 m^2, soil type with large grain	Total site area 2,500 – 10,000 m^2, moderately dusty soil type	Total site area >10,000 m^2, potentially dusty soil type
Construction	Total building volume <25,000 m^3.	Total building volume 25,000 – 100,000 m^3.	Total building volume >100,000 m^3.
Trackout	<10 outward HDV trips in any one day. Unpaved road length <50 m.	10-50 outward HDV trips in any one day. Unpaved road length 50-100 m.	>50 outward HDV trips in any one day. Unpaved road length >100 m.

Step 2B: Define the Sensitivity of the Area

The sensitivity of the area takes into account the following factors:

- the specific sensitivities of receptors in the area;
- the proximity and number of receptors;
- the local background PM_{10} concentration; and
- site-specific factors, such as whether there are natural shelters, such as trees, to reduce the risk of windblown dust.

The criteria detailed in **Table B2** is used to determine the sensitivity of the receptor in relation to dust soiling, health effects and ecological effects.

Table B2: Criteria for Determining Sensitivity of Receptors

Sensitivity of Receptor	Criteria for Determining Sensitivity		
	Dust Soiling Effects	Health Effects of PM_{10}	Ecological Sites
High	Dwellings, museums and other culturally important collections, medium and long-term car parks and car showrooms	Residential properties, hospitals, schools and residential care homes	International or national designation *and* the features may be affected by dust soiling
Medium	Parks, places of work	Office and shop workers not occupationally exposed to PM_{10}	Presence of an important plant species where dust sensitivity is uncertain or locations with a national designation with features that may be affected by dust deposition
Low	Playing fields, farmland, footpaths, short-term car parks and roads	Public footpaths, playing fields, parks and shopping streets	Local designation where features may be affected by dust deposition

Table B3 and **Table B4** are then used to define the sensitivity of the area to dust soiling and human health effects. This should be derived for each of construction, demolition, earthworks and trackout.

Table B3: Sensitivity of the Area to Dust Soiling Effects on People and Property.

Receptor Sensitivity	Number of Receptors	Distance from Source (m)*			
		<20	<50	<100	<350
High	>100	High	High	Medium	Low
	10-100	High	Medium	Low	Low
	1-10	Medium	Low	Low	Low
Medium	>1	Medium	Low	Low	Low
Low	>1	Low	Low	Low	Low

*distances considered are to the dust source

Table B4: Sensitivity of the Area to Human Health Impacts

Receptor Sensitivity	Annual Mean PM_{10} Concentrations	Number of Receptors	Distance from the Source (m)				
			<20	<50	<100	<200	<350
High	>32 µg/m-	>100	High	High	High	Medium	Low
		10-100	High	High	Medium	Low	Low
		1-10	High	Medium	Low	Low	Low
	28-32 µg/m^3	>100	High	High	Medium	Low	Low
		10-100	High	Medium	Low	Low	Low
		1-10	High	Medium	Low	Low	Low
	24-28 µg/m^3	>100	High	Medium	Low	Low	Low
		10-100	High	Medium	Low	Low	Low
		1-10	Medium	Low	Low	Low	Low
	<24 µg/m^3	>100	Medium	Low	Low	Low	Low
		10-100	Low	Low	Low	Low	Low
		1-10	Low	Low	Low	Low	Low
Medium	>32 µg/m-	>10	High	Medium	Low	Low	Low
		1-10	Medium	Low	Low	Low	Low
	28-32 µg/m^3	>10	Medium	Low	Low	Low	Low
		1-10	Low	Low	Low	Low	Low
	24-28 µg/m^3	>10	Low	Low	Low	Low	Low
		1-10	Low	Low	Low	Low	Low
	<24 µg/m^3	>10	Low	Low	Low	Low	Low
		1-10	Low	Low	Low	Low	Low
Low	-	>1	Low	Low	Low	Low	Low

The sensitivity of the area is then summarised.

Step 2C Define the Risks of Impacts

The dust emission magnitude from **Table B1** and sensitivity of the area and receptors from **Table B2**, **Table B3** and **Table B4** are combined, and the risk of impacts from each activity (demolition, earthworks, construction and trackout) before mitigation is applied, is determined using the criteria detailed in **Table B5** to **Table B8.**

Table B5: Risk of Dust Impacts - Demolition

Potential Impact Sensitivity of the Area	Dust Emission Magnitude		
	Large	Medium	Small
High	High Risk	Medium Risk	Medium Risk
Medium	High Risk	Medium Risk	Low Risk
Low	Medium Risk	Low Risk	Negligible

Table B6: Risk of Dust Impacts- Earthworks

Potential Impact Sensitivity of the Area	Dust Emission Magnitude		
	Large	Medium	Small
High	High Risk	Medium Risk	Low Risk
Medium	Medium Risk	Medium Risk	Low Risk
Low	Low Risk	Low Risk	Negligible

Table B7: Risk of Dust Impacts- Construction

Potential Impact Sensitivity of the Area	Dust Emission Magnitude		
	Large	Medium	Small
High	High Risk	Medium Risk	Low Risk
Medium	Medium Risk	Medium Risk	Low Risk
Low	Low Risk	Low Risk	Negligible

Table B8: Risk of Dust Impacts- Trackout

Potential Impact Sensitivity of the Area	Dust Emission Magnitude		
	Large	Medium	Small
High	High Risk	Medium Risk	Low Risk
Medium	Medium Risk	Low Risk	Negligible
Low	Low Risk	Low Risk	Negligible

Step 3 Determine Site Specific Mitigation

Step three of the IAQM guidance identifies appropriate site-specific mitigation. These measures are related to whether the site is a low, medium or high risk site.

Step 4 Determine Significance of Residual Effects

At step four the significance of residual effects is assessed. For almost all construction activity, the aim should be to prevent significant effects on receptors through the use of effective mitigation. Experience shows that this is normally possible. Hence the residual effect will normally be 'not significant'.

There may be cases where, for example, there is inadequate access to water for dust suppression to be effective, and even with other mitigation measures in place there may be a significant effect. Therefore, it is important to consider the specific characteristics of the site and the surrounding area to ensure that a conclusion of no significant effect is robust.

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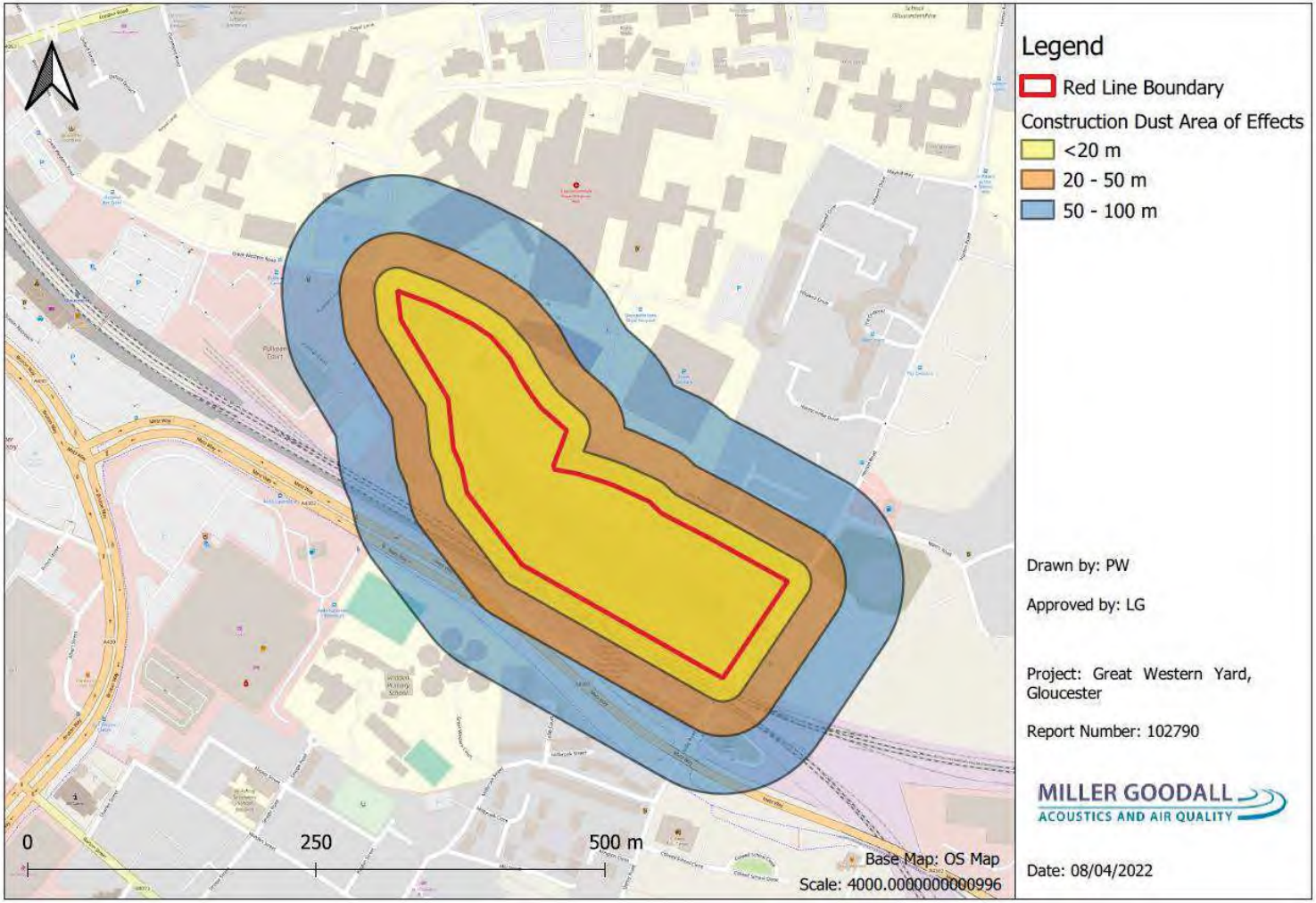
Appendix C: Construction Dust Area of Effects



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Appendix D: IAQM Dust Assessment Mitigation

xx Highly Recommended **x Desirable**

Measures relevant for demolition, earthworks, construction and trackout.

Mitigation Measure	High Risk
Communications	
Develop and implement a stakeholder communications plan that includes community engagement before work commences on site.	xx
Display the name and contact details of person(s) accountable for air quality and dust issues on the site boundary. This may be the environment manager/engineer or the site manager.	xx
Display the head or regional office contact information.	xx
Develop and implement a Dust Management Plan (DMP).	xx
Site management	
Record all dust and air quality complaints, identify cause(s), take appropriate measures to reduce emissions in a timely manner, and record the measures taken.	xx
Make the complaints log available to the local authority when asked.	xx
Record any exceptional incidents that cause dust and/or air emissions, either on- or offsite, and the action taken to resolve the situation in the log book.	xx
Hold regular liaison meetings with other high risk construction sites within 500 m of the site boundary, to ensure plans are co-ordinated and dust and particulate matter emissions are minimised. It is important to understand the interactions of the off-site transport/ deliveries which might be using the same strategic road network routes.	xx
Monitoring	
Undertake daily on-site and off-site inspection, where receptors (including roads) are nearby, to monitor dust, record inspection results, and make the log available to the local authority when asked. This should include regular dust soiling checks of surfaces such as street furniture, cars and window sills within 100 m of site boundary, with cleaning to be provided if necessary.	xx
Carry out regular site inspections to monitor compliance with the DMP, record inspection results, and make an inspection log available to the local authority when asked.	xx
Increase the frequency of site inspections by the person accountable for air quality and dust issues on site when activities with a high potential to produce dust are being carried out and during prolonged dry or windy conditions.	xx
If requested by the Local Authority: Agree dust deposition, dust flux, or real-time PM_{10} continuous monitoring locations with the Local Authority; where possible commence baseline monitoring at least three months before work commences on site or, if it a large site, before work on a phase commences. Further guidance is provided by IAQM on monitoring during demolition, earthworks and construction.	xx
Preparing and maintaining the site	
Plan site layout so that machinery and dust causing activities are located away from receptors, as far as is possible.	xx

Erect solid screens or barriers around dusty activities or the site boundary that are at least as high as any stockpiles on site.	xx
Fully enclose site or specific operations where there is a high potential for dust production and the site is actives for an extensive period.	xx
Avoid site runoff of water or mud.	xx
Keep site fencing, barriers and scaffolding clean using wet methods.	xx
Remove materials that have a potential to produce dust from site as soon as possible, unless being re-used on site. If they are being re-used on-site cover as described below.	xx
Cover, seed or fence stockpiles to prevent wind whipping.	xx
Operating vehicle/machinery and sustainable travel	
Ensure all on-road vehicles comply with the requirements of the London Low Emission Zone and the London NRMM standards, where applicable.	xx
Ensure all vehicles switch off engines when stationary - no idling vehicles.	xx
Avoid the use of diesel or petrol-powered generators and use mains electricity or battery powered equipment where practicable.	xx
Impose and signpost a maximum-speed-limit of 15 mph on surfaced and 10 mph on unsurfaced haul roads and work areas (if long haul routes are required these speeds may be increased with suitable additional control measures provided, subject to the approval of the nominated undertaker and with the agreement of the local authority, where appropriate).	xx
Produce a Construction Logistics Plan to manage the sustainable delivery of goods and materials.	xx
Implement a Travel Plan that supports and encourages sustainable travel (public transport, cycling, walking, and car-sharing).	xx
Operations	
Only use cutting, grinding or sawing equipment fitted or in conjunction with suitable dust suppression techniques such as water sprays or local extraction, e.g. suitable local exhaust ventilation systems.	xx
Ensure an adequate water supply on the site for effective dust/particulate matter suppression/mitigation, using non-potable water where possible and appropriate.	xx
Use enclosed chutes and conveyors and covered skips.	xx
Minimise drop heights from conveyors, loading shovels, hoppers and other loading or handling equipment and use fine water sprays on such equipment wherever appropriate.	xx
Ensure equipment is readily available on site to clean any dry spillages, and clean up spillages as soon as reasonably practicable after the event using wet cleaning methods.	xx
Waste management	
Avoid bonfires and burning of waste materials.	xx

Measures specific to demolition

Mitigation Measure	Low Risk
Soft strip inside buildings before demolition (retaining walls and windows in the rest of the building where possible, to provide a screen against dust).	x
Ensure effective water suppression is used during demolition operations. Hand held sprays are more effective than hoses attached to equipment as the water can be directed to where it is needed. In addition high volume water suppression systems, manually controlled, can produce fine water droplets that effectively bring the dust particles to the ground.	xx
Avoid explosive blasting, using appropriate manual or mechanical alternatives.	xx
Bag and remove any biological debris or damp down such material before demolition.	xx

Measures specific to earthworks.

Mitigation Measure	High Risk
Re-vegetate earthworks and exposed areas/soil stockpiles to stabilise surfaces as soon as practicable.	xx
Use Hessian, mulches or trackifiers where it is not possible to re-vegetate or cover with topsoil, as soon as practicable.	xx
Only remove the cover in small areas during work and not all at once.	xx

Measures specific to construction.

Mitigation Measure	High Risk
Avoid scabbling (roughening of concrete surfaces) if possible.	xx
Ensure sand and other aggregates are stored in bunded areas and are not allowed to dry out, unless this is required for a particular process, in which case ensure that appropriate additional control measures are in place.	xx
Ensure bulk cement and other fine powder materials are delivered in enclosed tankers and stored in silos with suitable emission control systems to prevent escape of material and overfilling during delivery.	xx

Measures specific to trackout.

Mitigation Measure	Medium Risk
Use water-assisted dust sweeper(s) on the access and local roads, to remove, as necessary, any material tracked out of the site. This may require the sweeper being continuously in use.	xx
Avoid dry sweeping of large areas.	xx
Ensure vehicles entering and leaving sites are covered to prevent escape of materials during transport.	xx
Inspect on-site haul routes for integrity and instigate necessary repairs to the surface as soon as reasonably practicable	xx
Record all inspections of haul routes and any subsequent action in a site log book.	xx
Install hard surfaced haul routes, which are regularly damped down with fixed or mobile sprinkler systems, or mobile water bowsers and regularly cleaned.	xx
Implement a wheel washing system (with rumble grids to dislodge accumulated dust and mud prior to leaving the site where reasonably practicable).	xx
Ensure there is an adequate area of hard surfaced road between the wheel wash facility and the site exit, wherever site size and layout permits.	xx
Access gates to be located at least 10 m from receptors where possible.	xx

Appendix E: Assessment and Model Inputs

This appendix outlines the inputs used in the road traffic emissions assessment.

Calculation of Background NO_X and NO_2 Concentrations

Background concentrations of NO_2 for 2019 have been used from the nearby urban background monitoring location ID 21. The background concentrations of NO_2 and NO_x for future year assessments (2025) have been determined using the following formula:

$$Future\ Year\ Concentration = Base\ Year\ Concentration \times \frac{DEFRA\ Map\ Future\ Year\ Concentration}{DEFRA\ Map\ Base\ Year\ Concentration}$$

Table E1 shows the predicted background concentrations derived from urban background air quality monitor '21' for 2025.

Table E1: Calculation of Diffusion Tube '21' Background NO_X and NO_2 Concentrations

			Defra 2018-based Background Concentrations	Final Concentrations
Year	2019 Monitored Concentration	2019 NO_2 Concentration	2025 NO_2 Concentration	Calculated NO_2 Concentration
2019	17.70	16.00	-	**17.70**
2025	-	-	13.18	**14.58**

Traffic Data

The ADMS-Roads model requires the inclusion of detailed road traffic data for the routes to be affected by the proposed development.

Traffic data has been provided as 24-hour Annual Average Daily Traffic (AADT) and heavy-duty vehicle percentages (HGV%). No average speed traffic survey information was available, therefore, posted speed limits have been utilised in the model. Areas of congestion, queuing and junction locations have been modelled at reduced speeds of 5 to 20 km/h.

After reviewing the National LiDAR digital surface model of the study area, it was concluded the A4032 (Metz Way) rose in height as it passed via bridge over Derby Road. An increasing height has been modelled in the ADMS-Roads model. This included 4 individual links that were at heights of 6.6 m, 4.1 m, 2.5 m and finally dropping to 0 m datum height. The heights and average distances of where these heights were placed has been concluded from LiDAR data for the area. No street canyons have been identified in the study area.

The traffic data used in the assessment is detailed in **Table E2** and presented in **Figure E1**.

Table E2: Traffic Data used in the Assessment

Link Number	Road	Speed (km/h)	2019 Base Year/Verification		2025 With Development		Total Development AADT
			AADT LDV	AADT HDV	AADT LDV	AADT HDV	
1	Horton Road (North of Great Western Road)	48	8,578	265	9,264	284	71
2	Horton Road (South of Great Western Road)	48	8,578	265	9,294	284	101
3	Great Western Road (East of site access)	48	6,397	198	7,027	212	172
4	Great Western Road (West of site access)	48	6,666	425	7,241	456	99
5	Derby Road	48 & 32	5,767	304	6,281	325	101
6	Metz Way	64	18,922	191	20,631	208	0
7	London Road (west)	48	14,813	946	15,923	1,013	48
8	London Road (east)	48	11,603	741	12,484	794	51

Figure E1: Spatial Model Scope

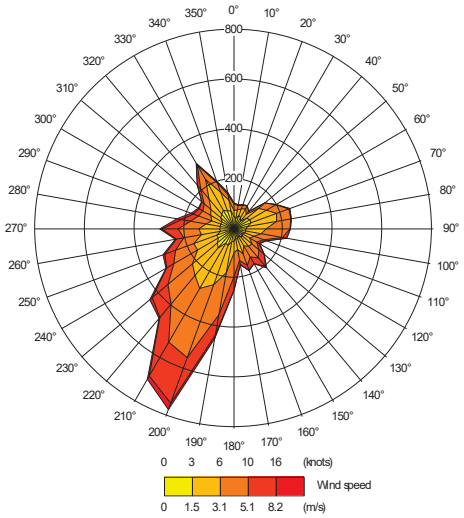
Meteorological Data

The air quality assessment includes the use of the 2019 Pershore meteorological recording station.

The Pershore recording station is located approximately 35.6 km to the north east of the proposed development site and is considered to be the most representative of the site conditions in terms of altitude and distance.

The 2019 wind rose for Pershore recording station is provided in **Figure E2**.

Figure E2: Wind Rose



Rail Crossing

Measured rail crossing queue lengths and speeds were not available, therefore, assumptions and reference to Defra LAQM.TG(16) has been made. To ensure a robust assessment, the entire length of queue on either side of the rail crossing has been assumed to travel at speeds of 5 km/h.

SCP provided detailed information regarding potential queue lengths at rail crossings. Based on a 2019 baseline flow of 8,843 for Horton Road, this equates to 368 vehicles per hour; 184 per hour in each direction or 3 cars per minute. The Horton Road level crossing is typically down for an average of 7 minutes [13]. This equals 3 vehicle build up per minute (3*7=21) that the barriers are down. Assuming a 6 m length per vehicle (vehicle length and gaps before and after), this equates to a queue length of approximately 126 m (21*6=126).

An approximate queue length of 126 m has been modelled on both sides of the rail crossing, at a speed of 5 km/h to simulate labouring engines.

The sign posting at the rail crossing advises drivers to turn off engines, therefore, it is likely the model is overestimating, even if only a few vehicles turn the engine off.

[13] Gloucester (Horton Road) Level Crossing. Informational video. Available at:, https://www.youtube.com/watch?v=ziL2yKBU1oI

Dispersion and Meteorological Site Characteristics

The air dispersion characteristics for the site and meteorological recording station differ, therefore, these have been adjusted accordingly within ADMS-Roads. **Table E3** details the adjustments made.

Table E3: Dispersion and Meteorological Site Characteristics

Parameter	Dispersion Site	Meteorological Site
Surface Roughness	1 m	0.2 m
Surface Albedo	0.23	0.23
Minimum Monin-Obukhov Length	30 m	10 m
Priestley-Taylor Parameter	1	1

Gradients

Defra LAQM.TG(16) advises that for gradients exceeding 2.5%, the increased engine labouring for vehicle travelling uphill may result in increased vehicle emissions. At gradients of less than 2.5%, the emissions on the uphill and downhill sections of the road are comparable. No gradients exceeding 2.5% have been identified from Google Street View © of the Study Area.

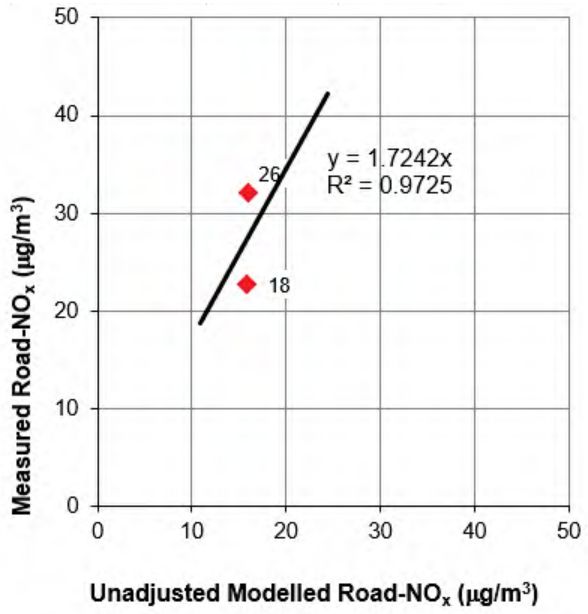
Model Verification

Model verification has been completed for NO_2. GCC does not operate any PM_{10} or $PM_{2.5}$ monitors in the study area, therefore, it was not possible to undertake verification of particulate matter. The verification procedure for the selected air quality monitors of this assessment is detailed in **Table E4.** Air quality monitor positions can be seen on **Appendix A.**

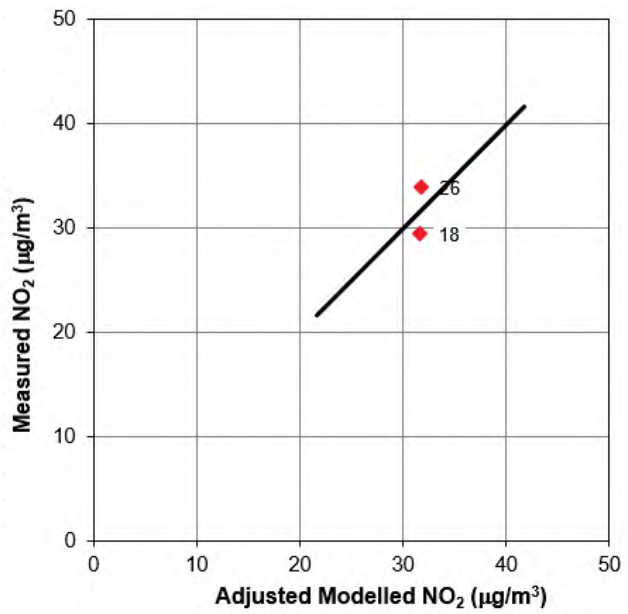
Table E4: NO_2 Model Verification Procedure

Monitor	Monitored Total NO_2	Monitored Road NO_X	Background NO_2	Background NO_X	Monitored Road Contribution NO_2 (total - background)	Modelled Road Contribution NO_x (excludes background)	Ratio of Monitored Road Contribution NO_X / Modelled Road Contribution NO_X	Adjustment Factor	Adjusted Road Contribution NO_x	Adjusted Modelled Total Nox (including background NO_X)	Modelled Total NO_2 (based on empirical NO_X / NO_2 relationship)	% Difference [(modelled - monitored) / monitored] x 100
18	29.40	22.74	17.70	24.61	11.70	15.87	1.4325	**1.7242**	27.37	51.99	31.64	7.62
26	33.90	32.13	17.70	24.61	16.20	15.96	2.0128		27.52	52.14	31.71	-6.46

Unadjusted Road Nox compared to Monitored Nox



Adjusted Model NO_2 compared to Monitored NO_2



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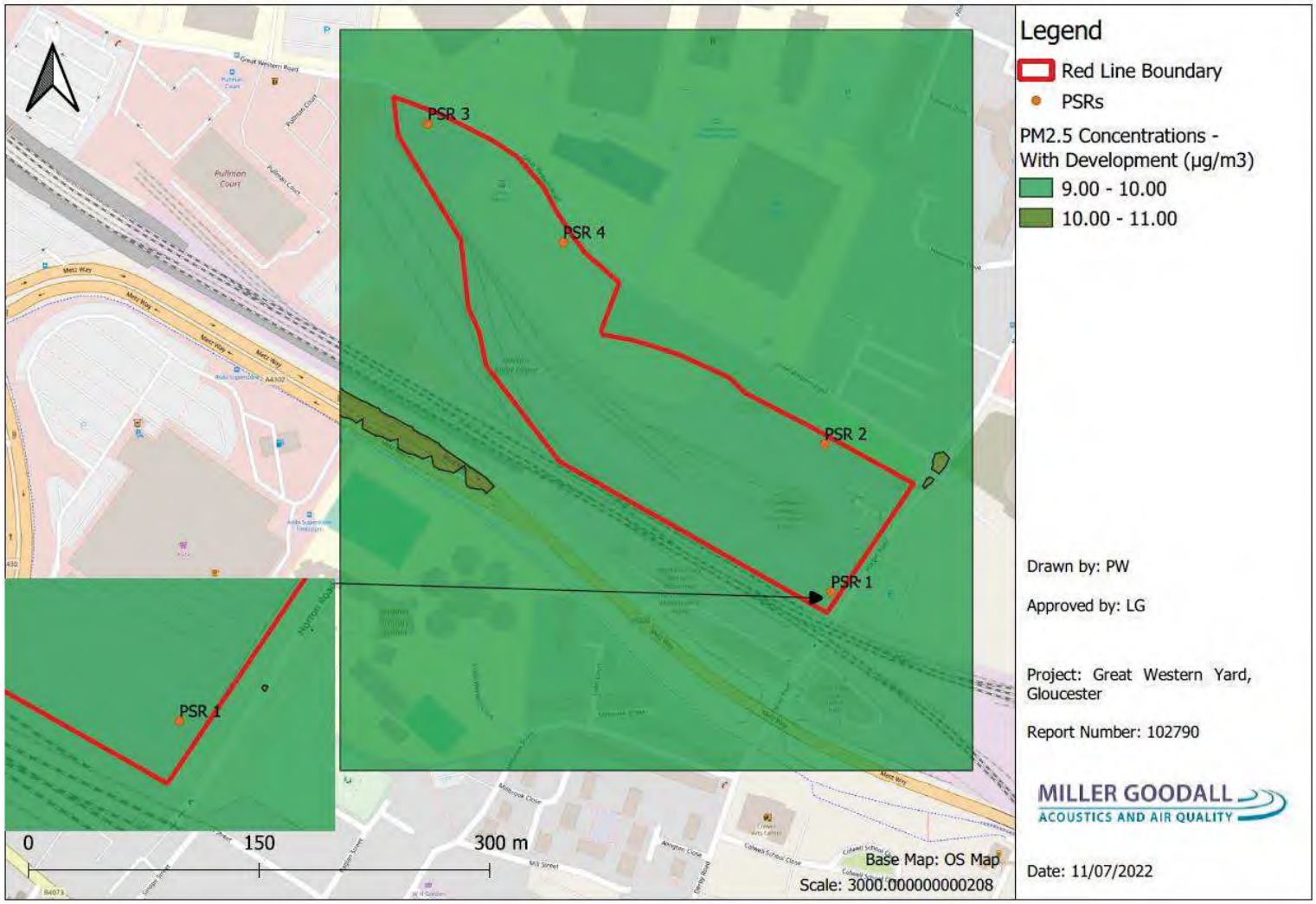
Appendix F: Pollution Contour Maps (Modelled at 1.5 m)

NO_2 Concentrations

PM_{10} Concentrations

$PM_{2.5}$ Concentrations



Glossary of Terms

AADT Annual Average Daily Traffic flow

Air Quality Standard Pollutant standards relate to ambient pollutant concentrations in air, set on the basis of medical and scientific evidence of how each pollutant affects human health and the environment

Air Quality Objective Pollutant Objectives incorporate future dates by which a standard is to be achieved, taking into account economic considerations, practicability and technical feasibility

Annual Mean A mean pollutant concentration value in air which is calculated on a yearly basis, yielding one annual mean per calendar year. In the UK air quality regulations, the annual mean for a particular substance at a particular location for a particular calendar year is:

(a) in the case of lead, the mean of the daily levels for that year;

(b) in the case of nitrogen dioxide, the mean of the hourly means for that year;

(c) in the case of PM_{10}, the mean of the 24-hour means for that year.

Annoyance (Dust) Loss of amenity due to dust deposition or visible dust plumes, often related to people making complaints, but not necessarily sufficient to be a legal nuisance.

AQAP Air Quality Action Plan

AQEG Air Quality Expert Group

AQMA Air Quality Management Area

AQMP Air Quality Management Plan

AQO Air Quality Objective

AQS Air Quality Strategy for England, Scotland, Wales and Northern Ireland

Background Concentrations The term used to describe pollutant concentrations which exist in the ambient atmosphere, excluding local pollution sources such as roads and stacks

Construction Any activity involved with the provision of a new structure (or structures), its modification or refurbishment. A structure will include a residential dwelling, office building, retail outlet, road, etc.

Construction Impact Assessment An assessment of the impacts of demolition, earthworks, construction and trackout. In this Guidance, specifically the air quality impacts.

Defra Department for Environment, Food and Rural Affairs

Demolition Any activity involved with the removal of an existing structure (or structures). This may also be referred to as de-construction, specifically when a building is to be removed a small part at a time.

Deposited Dust that is no longer in the air and which has settled onto a surface. Deposited dust is also sometimes called amenity dust or nuisance dust, with the term nuisance applied in the general sense rather than the specific legal definition.

DMP Dust Management Plan; a document that describes the site-specific methods to be used to control dust emissions.

Dust Solid particles that are suspended in air, or have settled out onto a surface after having been suspended in air. The terms dust and particulate matter (PM) are often used interchangeably, although in some contexts one term tends to be used in preference to the other. In this guidance the term 'dust' has been used to include the particles that give rise to soiling, and to other human health and ecological effects. Note: this is different to the definition given in BS 6069, where dust refers to particles up to 75 µm in diameter.

Earthworks Covers the processes of soil-stripping, ground-levelling, excavation and landscaping.

Effects The consequences of the changes in airborne concentration and/or dust deposition for a receptor. These might manifest as annoyance due to soiling, increased morbidity or morality due to exposure to PM_{10} or $PM_{2.5}$ or plant dieback due to reduced photosynthesis. The term 'significant effect' has a specific meaning in EIA regulations. The opposite is an insignificant effect. In the context of construction impacts any effect will usually be adverse, however, professional judgement is required to determine whether this adverse effect is significant based in the evidence presented.

EPUK Environmental Protection UK

HDV Heavy Duty Vehicle

Impacts The changes in airborne concentrations and/or dust deposition. A scheme can have an 'impact' on airborne dust without having any 'effects', for instance if there are no receptors to experience the impact.

LAQM Local Air Quality Management

LDV Light Duty Vehicle

Mg/m^3 Microgrammes (of pollutant) per cubic metre of air. A measure of concentration in terms of mass per unit volume. A concentration of 1 µg/m^3 means that one cubic metre of air contains one microgramme (millionth of a gramme) of pollutant

NO_2 Nitrogen Dioxide

NOx A collective term used to represent the mixture of nitrogen oxides in the atmosphere, as nitric oxide (NO) and nitrogen dioxide (NO_2)

NPPF National Planning Policy Framework

Nuisance The term nuisance dust is often used in a general sense when describing amenity dust. However, this term also has specific meanings in environmental law:

Statutory nuisance, as defined in S79(1) of the Environmental Protection Act 1990 (as amended from time to time).

Private nuisance, arising from substantial interference with a person's enjoyment and us of his land.

Public nuisance, arising from and act or omission that obstructs, damages or inconveniences the right of the community.

Each of these applying in so far as the nuisance relates to the unacceptable effects of emissions. It is recognised that a significant loss of amenity may occur at lower levels of emission than would constitute a statutory nuisance.

Note: as nuisance has a specific meaning in environmental law, and to avoid confusion, it is recommended that the term is not used in a more general sense.

$PM_{2.5}$ The fraction of particles with a mean aerodynamic diameter equal to, or less than, 2.5 µm. More strictly, particulate matter which passes through a size selective inlet as defined in the reference method for the sampling and measurement of $PM_{2.5}$, EN 14907, with a 50% efficiency cut-off at 2.5 µm aerodynamic diameter

PM_{10} The fraction of particles with a mean aerodynamic diameter equal to, or less than, 10 µm. More strictly, particulate matter which passes through a size selective inlet as defined in the reference method for the sampling and measurement of PM_{10}, EN 12341, with a 50% efficiency cut-off at 10 µm aerodynamic diameter

Running Annual Mean A mean pollutant concentration value in air which is calculated on an hourly basis, yielding one running annual mean per hour. The running annual mean for a particular substance at a particular location for a particular hour is the mean of the hourly levels for that substance at that location for that hour and the preceding 8759 hours

Trackout The transport of dust and dirt from the construction/demolition site onto the public road network, where it may be deposited and then re-suspended by vehicles using the network. This arises when heavy duty vehicles (HDVs) leave the construction/demolition site with dusty materials, which may then spill onto the road, and/or when HDVs transfer dust and dirt onto the road having travelled over muddy ground on site.


MILLER GOODALL
ACOUSTICS AND AIR QUALITY

EUTOPIA
HOMES

Arboricultural Report

Great Western Yard

Advanced Arboriculture Ltd

advanced Arboriculture

advanced:

progressive *adj.*
forward-thinking
forward-looking
unconventional
cutting edge
innovative

higher *adj.*
superior
highly developed
sophisticated
complex

11th July 2022

Mr T Pierce
Director
Darling Associates Architects
1 Greencoat Row
London SW1P 1PQ

Our Ref: TH/B330/0622

Dear Mr Pierce,

Re: Great Western Yard, Gloucester – Effect of Proposed Development on Trees

Introduction

Further to receipt of the finalised proposals for the residential development at Great Western Yard in Gloucester, I have undertaken a full arboricultural appraisal of the site and considered the effect of the proposals based on the data collected, following the principles of British Standard 5837:2012 *Trees in relation to design, demolition and construction – Recommendations*. The purpose of this report is to provide a supporting statement for a planning application to Gloucester City Council. This report has been undertaken in accordance with the instructions of the client and is intended for their sole and specific use.

This covering letter provides a full Arboricultural Impact Assessment in addition to a detailed Tree Protection Statement; the specific tree protection details are contained within the attached Tree Protection Plan, Arboricultural Method Statement and Arboricultural Guidance Sheets.

Document Limitations

This document has been prepared based on information available to Advanced Arboriculture Ltd at the time of writing, however, further technical, topographical, arboricultural, architectural, ecological or engineering information may come to light after the relevant arboricultural conditions have been cleared. It is the responsibility of the project manager to draw any changes in the project scope to our attention at the earliest opportunity.

Trees are dynamic structures and advice should be taken on validity two years after the survey was undertaken. The report may not be considered valid after more than three years. The report has been prepared using all reasonable skill and care. Opinions are provided in good faith.

The scheduling and implementation of the tree protection measures detailed in the report also remains the responsibility of the project manager and/or site manager. Whilst the project team may appoint a suitably qualified third party arboricultural supervisor, Advanced Arboriculture Ltd are able to take on this role subject to the project manager's formal instruction.

Advanced Arboriculture Ltd shall not be held liable for any unauthorised deviation from the tree protection measures and scheduling detailed within this report.

Tree Stock Appraisal

Great Western Yard in Gloucester comprises a long strip of land formerly occupied by railway infrastructure. Some of the land within the project redline has been repurposed and now includes a garage, a timber yard and a structural steelworks depot. The remainder of the site still contains redundant railway buildings, sidings and a car park. Security fencing has been constructed along the edge of the site adjacent to the retained railway sidings.

The main section of the site is presently accessed via security gates on Horton Road, while the businesses' yards are accessed from Great Western Road. Any arboricultural officer seeking to access the site will need to contact the applicant for instructions on entering this secure land, however, I have included photographs within this report which provide an additional visual commentary relating to the existing tree stock.

My survey considered those trees on or immediately adjacent to the site boundary and included a total of five individual trees, five areas and two groups.

The first two trees, Ash T1 and Sycamore T2, are both located on the Great Western Road frontage. Ash T1 is a middle-aged specimen which is probably naturally regenerated. The crown of this tree extends some distance across the carriageway and features very low foliar density with extensive dieback, all consistent with Ash Dieback Disease. This tree's low safe useful life expectancy renders it a British Standard 5837:2012 category U specimen.

Sycamore T2 is another almost-certainly naturally regenerated specimen in indeterminate ownership. The tree's structural form suggests that it has been reduced in size in the past and this has left it with a series of inherently poor unions which would be more susceptible to failure as the tree grows. On this basis, I consider Sycamore T1 to be a category C specimen.

Whilst there are few trees on this side of Great Western Road, the opposite side of the road features a broad swathe of trees which have established within the hospital grounds. These trees accordingly serve to limit the visual impact of any likely loss of trees on the road frontage of the proposed development plot.

The remaining three individual trees are all located within the back gardens of the neighbouring properties towards the south-eastern end of Great Western Road; these trees all back on to the structural steelworks depot and overhang the boundary fence to a greater or lesser extent.

The north-westernmost tree is Ash T3. This tree has a compromised structural form which I was unable to inspect in detail. Its crown has a clearly reduced density consistent with Ash Dieback Disease and I expect it to have a low life expectancy, irrespective of any development proposals. It is therefore a category U specimen though its removal cannot be assumed since it is in third-party ownership.

Lawson Cypress T4 and Sycamore T5 are growing at the opposite end of this section of the boundary and form a larger coalesced crown. The Cypress is an ornamental conifer with a limited visual amenity value. One of its two co-dominant leaders has died completely and the crown is engulfed in Ivy. I consider this tree to be a category C specimen.

Sycamore T5 is a larger tree with a dense crown. It is probably naturally regenerated and offers negligible visual amenity value from any public locations. I was unable to inspect the tree's lower structure from within the site but the branch formation suggests that it may have been reduced in the past. I consider this to be a category C specimen.

Inspection of the ground surface within the steelworks yard shows that it has been historically very heavily compacted, both by vehicular movements as well as the storage of heavy steel components. As a result of this, I expect trees T3 through T5 to be preferentially rooting within the conducive soil environment of the gardens of the dwellings rather than beneath the dense compacted roadstone of the yard; this is shown on the Tree Constraints Plans attached.

The first area of trees, A1, is located to the rear of the garage and comprises a cluster of Balsam Poplar stems. These all appear to be self-seeded or suckered stems, noting that Balsam Poplars sucker readily and are frequently found on redundant industrial or railway sites. Inspection of the base of these trees revealed that many feature inherently structurally poor unions and bowed lower main stems. Furthermore, Balsam Poplar is also a relatively short-lived and brittle species so not well-suited to areas subject to increased public pressure. Whilst I acknowledge the contribution that these trees make to the green infrastructure of the local landscape, this has to be considered in the context of their future potential and management. On this basis, I consider them to be category C specimens.

Areas A2 through A5 feature a very similar character, all comprising young to early middle-aged self-seeded pioneer species. They have grown to form belts of stems of variable quality, but which in the absence of any active management, have become compromised by high stem densities. From an arboricultural perspective, they all comprise category C features. I do not consider any of these areas to be worthy of partial or full retention unless any compelling ecological justification can be demonstrated.

Group G1 is located towards the north-western end of the site and comprises two Balsam Poplar stems which are still within railway ownership. Both of these stems have grown from suckers, many of which can be seen damaging the tarmac surface locally. The bases of both trees have grown around a former steel security fence which has since been removed, though extensive steelwork remains embedded in their lower main stems. These trees have limited future potential, irrespective of any development proposals, hence being a category U feature.

Group G2 is located towards the south-eastern end of the site and comprises one naturally regenerated Alder and one naturally regenerated twin-stemmed Silver Birch. Neither tree is individually or collectively outstanding and both are category C specimens.

As is typical with a regeneration site such as this, the overall quality of the tree stock is low, noting that pioneer species which thrive in these conditions are generally fast-growing and have low safe useful life expectancies. This is further compounded by the lack of active management which has resulted in an overly dense array of trees and scrub across the site. On this basis, I do not consider there to be any trees within the site itself which are worthy of retention, especially given the quality of the tree stock within the hospital grounds on the opposite side of Great Western Road. The only trees which are therefore shown for retention are those on the rear boundaries of the residential properties on Great Western Road as they remain within third-party ownership and control.

A Note on Ash

We note the presence of a number of Ash trees on and adjacent to the site. Ash Dieback Disease (ADD) is now widespread throughout the south-west of England, though specific symptoms are not always obvious on more mature trees. The rate of decline of infected trees and the long-term prognosis for the health of Ash trees generally is currently uncertain. Some sources suggest that the UK may experience losses of up to 90% or more of its Ash trees in some areas. Woodland trees, in particular, appear to be particularly prone to decline. Once infected, trees can decline rapidly and quickly lose their structural integrity. On reaching less than 50% of their normal foliar density, they are likely to require removal where they pose a threat to persons or property. Such trees can be become unpredictable and dangerous to fell, or to dismantle using normal rope access techniques,

and may thus require removal using a Mobile Elevated Work Platform (MEWP) or other machinery. Hence, where trees are in an early stage of infection, are in locations that are inaccessible to machinery and would pose a risk to persons or property if they declined further, it may be appropriate to consider the pre-emptive removal of such trees while it is still possible to deal with them safely using conventional techniques.

Current recommendations, on those sites where Ash trees are present within falling distance of significant targets, are that trees be inspected regularly so as to account for the potentially rapid decline of currently healthy trees should ADD occur. Should any Ash trees on site show signs of rapid defoliation or dieback then further advice from an experienced arboriculturist should be sought. When considering the longer term management of Ash trees on a site, our advice is that, where such trees are within falling distance of significant targets or otherwise present a significant constraint to the site, then lesser quality trees are unlikely to be worthy of consideration for longer term retention. In these cases, removal of these lesser quality Ash trees and their replacement with suitable alternative species is highly likely to result in a net gain in amenity, landscape and biodiversity values for the site over the medium to long term.

Arboricultural Impact Assessment

The proposals show the development of the site to accommodate four new blocks offering a total of 228 apartments along with a total of ten new terraces comprising a total of 87 individual houses. The whole site features extensive open space, including courtyard gardens for the apartment blocks, a pocket park set centrally within the site, and a larger area of public open space with play equipment at the south-eastern end of the site, adjacent to the existing public open space on Great Western Road.

The proposed site layout acknowledges the very limited quality of the existing tree stock and addresses this by means of extensive tree planting, comprising around 200 new specimens across the site with all of the roads, paths and public open spaces benefiting from tree planting throughout. I consider new tree planting on this scale to constitute good and appropriate mitigation for the trees and scrub which will need to be removed to accommodate the proposals.

The proposals allow for the retention of the neighbouring trees, namely Ash T3, Lawson Cypress T4 and Sycamore T5. There will need to be some limited pruning back of the crown spreads into the site but this can be achieved sympathetically without any detrimental impact on the trees' visual amenity value from their owners' perspectives. In the case of Ash T3 and Lawson Cypress T4, both of which are the shorter-lived specimens, there is ample clearance available for these trees to be replaced by their owners without impacting on the amenity of the new dwellings immediately adjacent. The shade cast by these trees will not impact on the adjacent new end-terrace dwellings.

Whilst the root incursion into the site from these three trees is expected to be limited, I recommend that the section of proposed new estate road adjacent to Cypress T4 and Sycamore T5 be constructed using a no-dig specification. This will minimise the likelihood of harm to any rooting which does extend any distance into the site. A suggested specification is attached though this will require engineering scrutiny and possible modification as necessary (see Arboricultural Guidance Sheet AGS301).

Overall, whilst the proposals show the removal of all of the trees within the site's redline, this has been robustly mitigated by the provision of new plantings throughout. The site layout is therefore considered to be sustainable from an arboricultural point of view subject to the appropriate care being taken during construction, and protective fencing and ground protection being installed and maintained for the duration of the project.

Tree Protection Statement

The tree protection measures required for the project, including timings, are all provided within the attached Tree Protection Statement. The retention of a suitably qualified arboricultural supervisor is required in the event of any accidental damage to the trees.

This document must be reviewed by the project manager and/or site manager with the arboricultural supervisor prior to the commencement of any works to ensure that both the scheduling and protection measures detailed within the Arboricultural Method Statement remain achievable and realistic. Once the Tree Protection Plan and Arboricultural Method Statement Plans have been reviewed and signed off by both the site manager and arboricultural supervisor, these drawings must be held on site for ongoing reference and to allow the local planning authority to check them at any reasonable time. Any variations to the Tree Protection Plan or Arboricultural Method Statement must be copied to the local planning authority; in the case of major variations to these documents, written approval may be required.

Adherence to the recommendations detailed within the Tree Protection Statement will almost certainly be made a condition of any planning consent granted by Gloucester City Council.

Tree Works Schedule

The following tree works are required prior to the commencement of any development on site:

Tree No	Species	Preliminary Management Recommendations
T1	Ash	• Dismantle to near ground level irrespective of development within three months of the date of this report
T2	Sycamore	• Dismantle to near ground level to facilitate development
T3	Ash	• Reduce lateral spread over proposed development plot to approximately 1.0m south-south-west of the boundary line and reshape to leave a balanced natural appearance
T4	Lawson Cypress	• Reduce lateral spread over proposed development plot to approximately 1.0m south-south-west of the boundary line and reshape to leave a balanced natural appearance
T5	Sycamore	• Reduce lateral spread over proposed development plot to approximately 1.0m south-south-west of the boundary line and reshape to leave a balanced natural appearance
A1	Balsam Poplar	• Dismantle to near ground level to facilitate development
A2	Hawthorn, Cherry, Dogwood	• Dismantle to near ground level to facilitate development
A3	Hawthorn, Field Maple, Dogwood	• Dismantle to near ground level to facilitate development
A4	Silver Birch, Dogwood	• Dismantle to near ground level to facilitate development

Tree No	Species	Preliminary Management Recommendations
A5	Silver Birch	• Dismantle to near ground level to facilitate development
G1	Balsam Poplar	• Prune roots to the boundary line to prevent future damage to the site
G2	Alder, Silver Birch	• Dismantle to near ground level

The appointed tree work contractor must ensure that all tree works comply with British Standard 3998:2010 (*Tree Works – Recommendations*) and it is strongly advised that the appointed tree contractor is Arboricultural Association Approved to ensure high standards and a consistency of work.

Under the Wildlife & Countryside Act 1981 & Countryside & Rights of Way Act 2000 it is an offence to recklessly damage or destroy the nest of a wild bird whilst in use or being built; planning consent does not provide a defence against prosecution under these Acts. Trees, shrubs and hedgerows on this site may contain nesting birds between 1st March and 31st August and it is advisable to undertake a survey of the site before commencing any vegetation removal between these dates, to ensure that no nesting birds are present. Advanced Arboriculture are able to undertake a survey to identify the presence of bats or nesting birds if required at the request of the client.

Recommendations and Conclusions

The proposals are considered to be sustainable from an arboricultural point of view subject to the provision of the tree protection measures detailed within the Tree Protection Statement.

A copy of this report, plus the attached drawings and Tree Protection Statement, must be submitted to the local planning authority as a supporting document to the planning application. If the council's officers have any queries, they are welcome to contact us directly.

If you have any further queries, please do not hesitate to contact me.

Yours sincerely

[redacted]

Tom Hurley, BSc(For)Hons, M Arbor A
Senior Consultant.

Attachments:

Arboricultural Data Tables
Tree Location Plans
Tree Constraints Plans
Photographs
Tree Protection Statement which includes:

- Tree Protection Plan
- Arboricultural Method Statement Plan
- Arboricultural Induction Sheet
- Arboricultural Supervision Inspection Record
- AGS101 Braced Heras Fencing
- AGS201 Ground Protection
- AGS301 No-Dig Specification
- AGS408 Demolition of Structures and Surfaces Near Trees
- AGS801 Protective Fencing Poster
- AGS802 Site Office Tree Poster

Data Table Key

Site Ref: **TH/B330/0622**

Site Location: **Great Western Yard, Gloucester**

The following section shows the results of the tree inspection. Abbreviations used in the survey are as follows:

Tree No	Corresponding to plan	
Species	Common name	
Ht	Height in metres	
Crown Spread	Crown spread in metres as measured at the four cardinal points of the compass	
Stem Dia	Diameter at breast height in mm (1.5 metres above ground level), or measured in accordance with the prescribed British Standard protocol in the case of multi-stemmed specimens (see Annex C in British Standard 5837:2012 for full details)	
RPA	Root Protection Area radius in metres (derived from the British Standard 5837:2012 formulae)	
Ht to L/B	Crown height in metres as measured to the height of the lowest branch	
Dir	Direction from which the lowest branch arises	
Cr Ht	Height of crown in metres above ground level	
Age Class	Y	Young (grown to less than one third of life expectancy)
	MA	Middle Aged (grown to between one to two-thirds of life expectancy)
	M	Mature (grown to over two thirds of normal life expectancy)
	OM	Over Mature
	V	Veteran
SULE	Safe useful life expectancy range in years	
Cond	Condition, both physiological and structural:	
	G	Good (trees with no significant defects)
	F	Fair (trees with some defects amenable to surgery)
	P	Poor (trees with significant defects)
BS Cat	British Standard 5837:2012 Category (see Table 1 in British Standard 5837:2012 for full details)	
m/s	Denotes multistem tree along with the individual stem diameters	
#	Denotes estimated value where access was not possible	

Data: Areas and Groups	Site Reference: TH/B330/0622	Location: Great Western Yard, Gloucester	Inspection Date: 14th June 2022	Lead Surveyor: Tom Hurley

Tree No.	Species	Tree Height	Crown Spread	Stem Dia (mm)	RPA Radius	RPA Area	LB Ht / Dir	Cr Ht	Age Cl	SULE	Cond Phys/Str	Observations	Recommendations	BS Cat
T1	Ash	14.0	N: 7.5 E: 8.0 S: 9.0 W: 6.0	580	n/a	n/a	2.0/S	1.0	MA	<10	P/P	• Naturally regenerated specimen within secure compound to the south of the footpath on Great Western Road • Damage noted within crown of the tree • Established Ash Dieback Disease throughout crown • Tree has very short safe useful life expectancy irrespective of proposed development	• Dismantle to near ground level irrespective of development within three months of the date of this report	U
T2	Sycamore	10.0	N: 4.0 E: 4.0 S: 3.5 W: 4.0	360	4.20	55	2.0/S	2.0	Y	20-40	F/P	• Naturally regenerated specimen growing between fenceline and the Great Western Road footpath • Tree has poor structural form at the point of main crown break at ~2.0m	• Dismantle to near ground level to facilitate development	C1
T3	Ash	13.0	N: 6.0 E: 7.0 S: 6.0 W: 7.0	550 #	n/a	n/a	1.0/S	1.0	MA	<10	P/P	• Tree located in neighbouring property to north of steelworks yard • Tree is probably naturally regenerated • Very poor lower structure • Tree displaying symptoms of established Ash Dieback Disease • Negligible rooting anticipated beneath heavily compacted surface of steelworks yard	• Reduce lateral spread over proposed development plot to approximately 1.0m south-south-west of the boundary line and reshape to leave a balanced natural appearance	U
T4	Lawson Cypress	10.0	N: 2.5 E: 1.5 S: 2.5 W: 2.5	250 #	3.00	28	1.0/S	0.0	MA	10-20	F/F	• Ornamental conifer in neighbouring property to north of steelworks yard • Western sub-dominant stem has died • Dense Ivy present • Tree is dominated to the east by Sycamore T5 • Negligible rooting anticipated beneath heavily compacted surface of steelworks yard	• Reduce lateral spread over proposed development plot to approximately 1.0m south-south-west of the boundary line and reshape to leave a balanced natural appearance	C1

Data: Areas and Groups	Site Reference: TH/B330/0622	Location: Great Western Yard, Gloucester	Inspection Date: 14th June 2022	Lead Surveyor: Tom Hurley

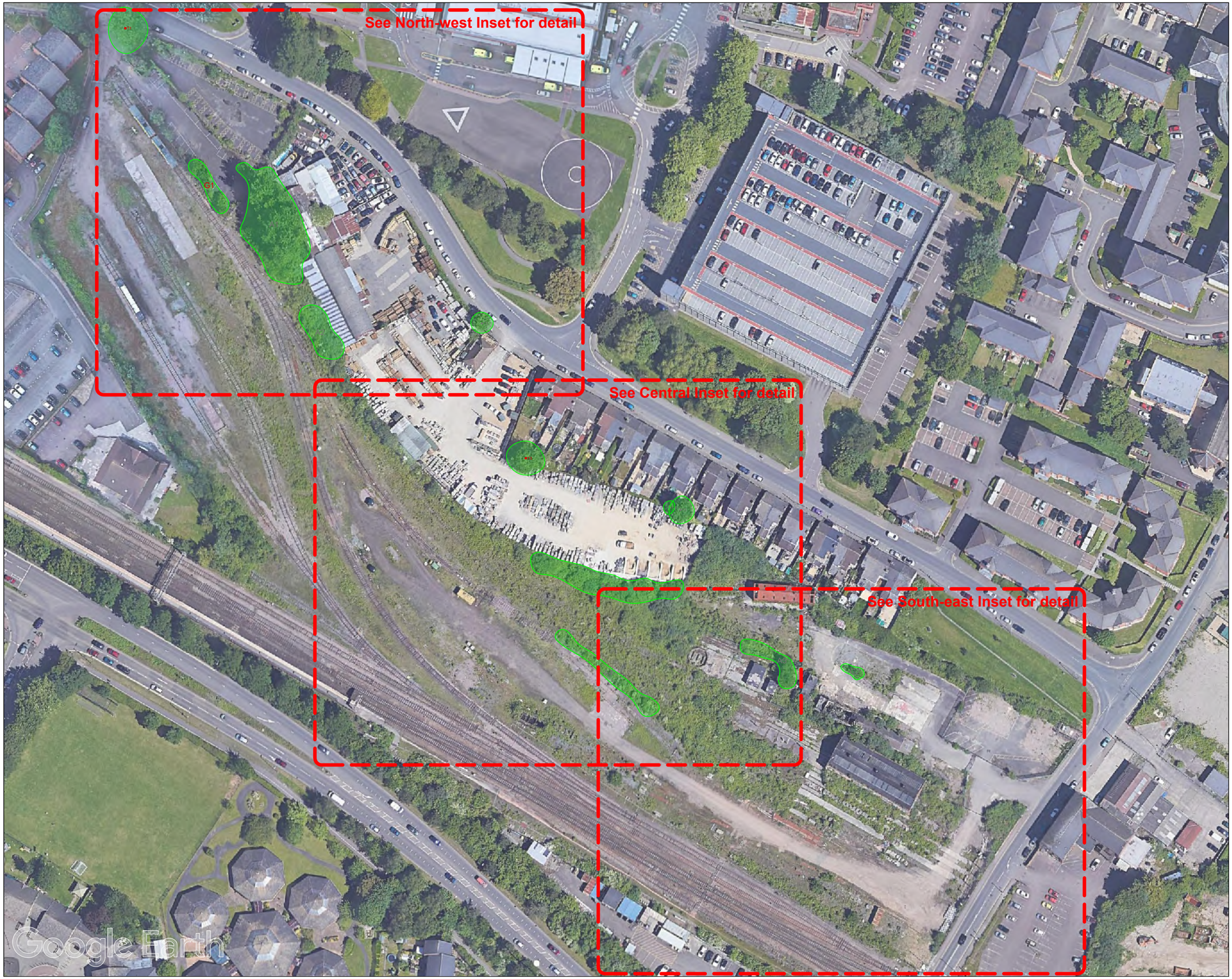
Tree No.	Species	Tree Height	Crown Spread	Stem Dia (mm)	RPA Radius	RPA Area	LB Ht / Dir	Cr Ht	Age Cl	SULE	Cond Phys/Str	Observations	Recommendations	BS Cat
T5	Sycamore	12.0	N: 5.0 E: 5.0 S: 5.0 W: 4.0	450 #	5.40	92	1.0/S	1.5	MA	20-40	G/F	• Tree located in neighbouring property to north of steelworks yard • Tree has limited public visual amenity value • Dense Ivy present • Negligible rooting anticipated beneath heavily compacted surface of steelworks yard	• Reduce lateral spread over proposed development plot to approximately 1.0m south-south-west of the boundary line and reshape to leave a balanced natural appearance	C1

Data: Areas and Groups	Site Reference: TH/B330/0622	Location: Great Western Yard, Gloucester	Inspection Date: 14th June 2022	Lead Surveyor: Tom Hurley

Ref No.	Species	Tree Height	Crown Spread	Stem Dia (mm)	RPA Radius	RPA Area	LB Ht	Cr Ht	Age Cl	SULE	Cond Phys/Str	Observations	Recommendations	BS Cat
A1	• Balsam Poplar	<22.0	Max: 6.0m	<600	<7.20	<163	>=0.0	>=0.0	Y-MA	10-20	F-G/P-G	• Belt of overgrown invasive sucker stems with limited future potential • Many trees feature very poor multi-stemmed structural form • Stems are collectively suckering heavily with significant damage noted to tarmac surface of former car park • Trees form reasonable landscape feature but with limited future potential	• Dismantle to near ground level to facilitate development	C1
A2	• Hawthorn • Cherry • Dogwood	<5.5	Max: 2.5m	<200	<2.40	<18	>=0.0	>=0.0	Y	10-20	F-G/P-F	• Area of young naturally regenerated stem with negligible future potential • Trees have minimal visual amenity value	• Dismantle to near ground level to facilitate development	C1
A3	• Hawthorn • Field Maple • Dogwood	<6.0	Max: 3.5m	<200	<2.40	<18	>=0.0	>=0.0	Y	10-20	F-G/P-G	• Belt of young naturally regenerated stems on boundary with steelworks yard • No individually or collectively outstanding stems present	• Dismantle to near ground level to facilitate development	C1
A4	• Silver Birch • Dogwood	<5.5	Max: 2.5m	<100	<1.20	<5	>=0.0	>=0.0	Y	10-20	F-G/P-G	• Belt of young naturally regenerated stems growing amongst redundant sidings • No individually or collectively outstanding stems present	• Dismantle to near ground level to facilitate development	C1
A5	• Silver Birch	<12.0	Max: 4.5m	<380	<4.50	<64	>=0.0	>=0.0	Y	10-20	F-G/P-G	• Discrete belt of naturally regenerated stems • Largest tree features inherently compromised low fork at ground level • No individually or collectively outstanding stems present	• Dismantle to near ground level to facilitate development	C1

Data: Areas and Groups	Site Reference: TH/B330/0622	Location: Great Western Yard, Gloucester	Inspection Date: 14th June 2022	Lead Surveyor: Tom Hurley

Ref No.	Species	Tree Height	Crown Spread	Stem Dia (mm)	RPA Radius	RPA Area	LB Ht	Cr Ht	Age Cl	SULE	Cond Phys/Str	Observations	Recommendations	BS Cat
G1	• Balsam Poplar	<13.0	Max: 3.0m	<200	n/a	n/a	>=0.0	>=0.0	Y	<10	G/P	• Two Balsam Poplar stems located on railway land which appear to have been retained due to the extent of security fencing embedded into their lower main stems • Both trees are suckering heavily both on the host side of the security fence and on the proposed development side	• Prune roots to the boundary line to prevent future damage to the site	U
G2	• Alder • Silver Birch	<9.5	Max: 3.0m	<240	<3.00	<28	>=0.5	>=0.0	Y	20-40	G/F	• One young naturally regenerated Silver Birch and one young naturally regenerated twin-stemmed Alder growing amongst redundant buildings • No individually or collectively outstanding stems present	• Dismantle to near ground level	C1



Key

- Category A tree
- Category B tree
- Category C tree
- Category U tree
- Individual tree crown spread
- Collective crown spreads
- Root protection area
- BS5837:2012 shade path
- Trees to remove to enable development
- Trees to remove irrespective of development
- Collective crown spread to be removed
- Proposed development footprint
- Construction exclusion zone
- Braced Heras fencing (see AGS101)
- Ground protection zone (see AGS201)
- No-dig surfacing (see AGS301)

N

Notes

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- Tree locations shown on these drawings must not be used for the purposes of setting out the site.

Drawing Title:

Site Extents Plan

Location:

Great Western Yard
Gloucester

Date:	Project Reference:	Revision:
11.07.2022	TH/B330/0622	1.0
Scale:	**Paper Size:**	**Drawn By:**
1:1,250	A3	TH

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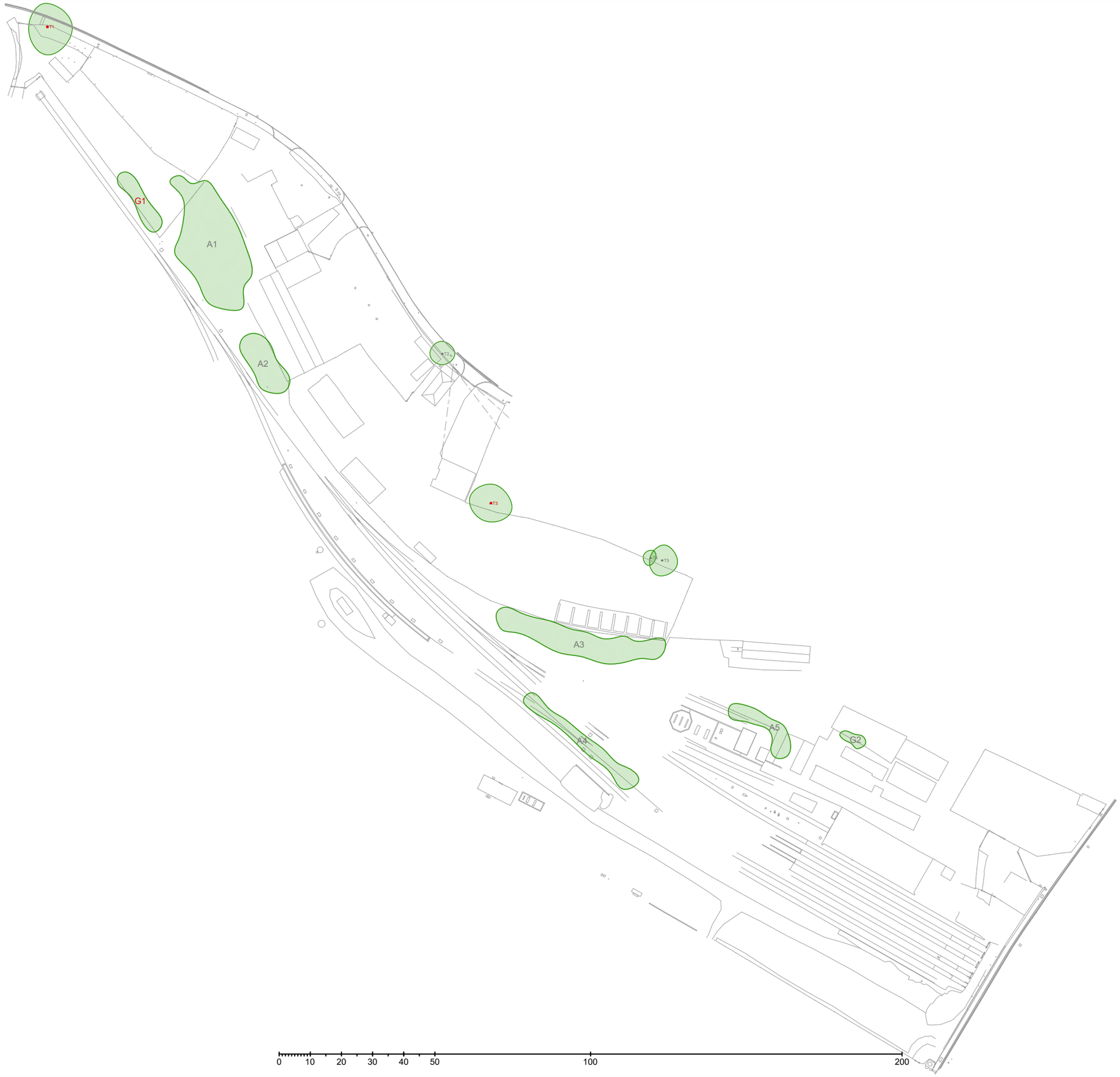

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Drawing Title:

Tree Location Plan Master

Location:

Great Western Yard
Gloucester

Date:	Project Reference:	Revision:
11.07.2022	TH/B330/0622	1.0
Scale:	**Paper Size:**	**Drawn By:**
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Drawing Title:

Tree Location Plan
North-west Inset

Location:

Great Western Yard
Gloucester

Date:	Project Reference:	Revision:
11.07.2022	TH/B330/0622	1.0
Scale:	**Paper Size:**	**Drawn By:**
1:500	A3	TH

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Drawing Title:

Tree Location Plan
Central Inset

Location:

Great Western Yard
Gloucester

Date:	Project Reference:	Revision:
11.07.2022	TH/B330/0622	1.0
Scale:	**Paper Size:**	**Drawn By:**
1:500	A3	TH

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A3

A4

A5

G2

0 5 10 20 30 40 50 100

Key

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Drawing Title:

Tree Location Plan South-east Inset

Location:

Great Western Yard
Gloucester

Date:	Project Reference:	Revision:
11.07.2022	TH/B330/0622	1.0
Scale:	**Paper Size:**	**Drawn By:**
1:500	A3	TH

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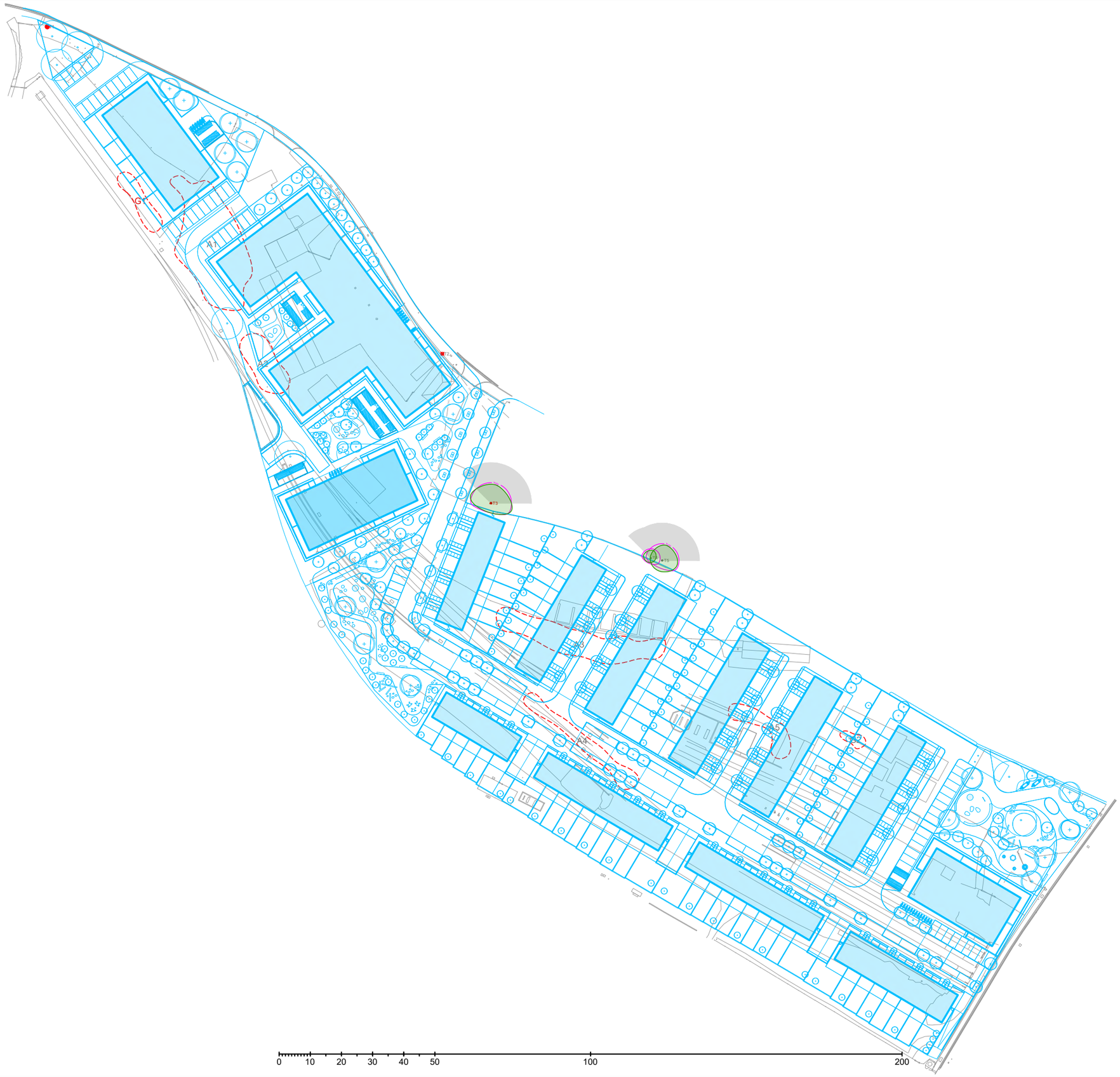

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Drawing Title:

Tree Constraints Plan Master

Location:

Great Western Yard Gloucester

Date:	Project Reference:	Revision:
11.07.2022	TH/B330/0622	1.0
Scale:	**Paper Size:**	**Drawn By:**
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Drawing Title:

Tree Constraints Plan North-west Inset

Location:

Great Western Yard
Gloucester

Date:	Project Reference:	Revision:
11.07.2022	TH/B330/0622	1.0
Scale:	**Paper Size:**	**Drawn By:**
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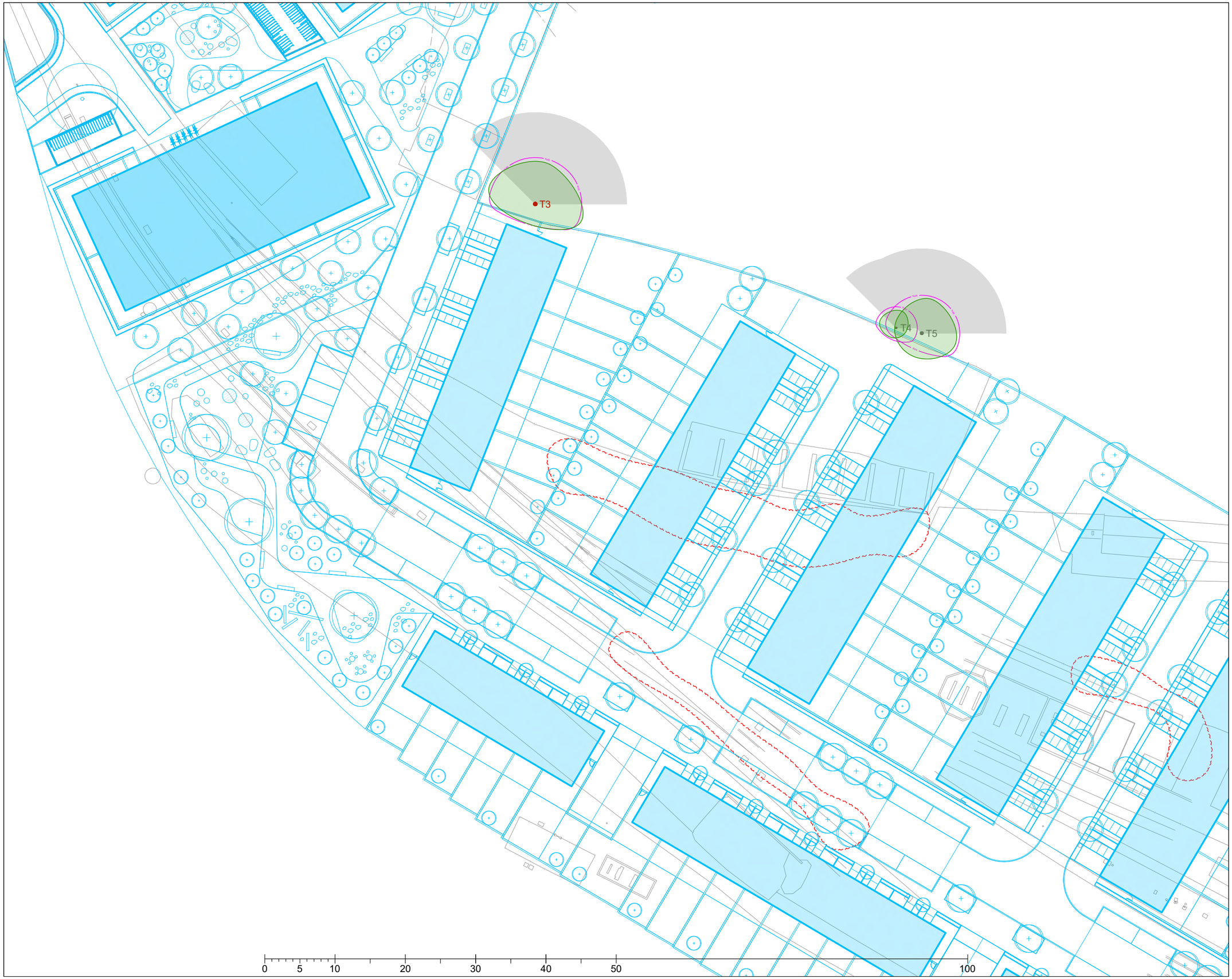

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Drawing Title:

Tree Constraints Plan
Central Inset

Location:

Great Western Yard
Gloucester

Date:	Project Reference:	Revision:
11.07.2022	TH/B330/0622	1.0
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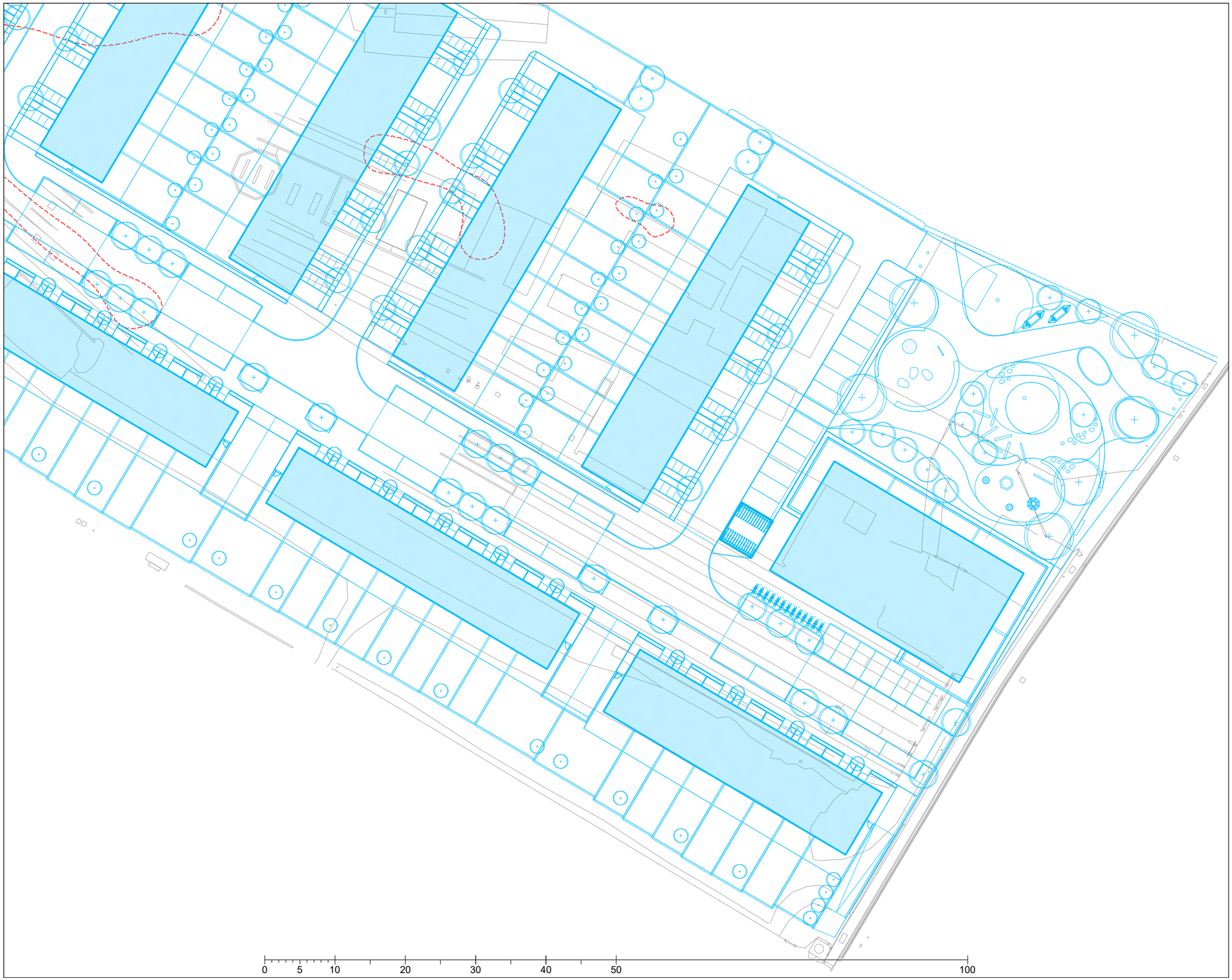

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Drawing Title:

Tree Constraints Plan South-east Inset

Location:

Great Western Yard
Gloucester

Date:	Project Reference:	Revision:
11.07.2022	TH/B330/0622	1.0
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Photograph 1: Crown damage and low foliar density due to Ash Dieback within Ash T1

Photograph 2: Structurally compromised union on main stem of Sycamore T2

Photograph 3: Ash T3 displaying low foliar density due to Ash Dieback

Photograph 4: Cypress T4, noting dead, ivy-covered sub-dominant stem on left hand side (see red arrow)

Photograph 5: Sycamore T5

Photograph 6: Example of poor structural form at the base of a Balsam Poplar within area A1

Photograph 7: Embedded security fence in base of Balsam Poplar within group G1

Photograph 8: Surface root extending into site from Balsam Poplar in group G1

Notes

- Copies of these photographs in JPEG format are available from Advanced Arboriculture on request.

Drawing Title:

Photographs

Location:

Great Western Yard
Gloucester

Date:	Project Reference:	Revision:
11.07.2022	TH/B330/0622	1.0
Scale:	**Paper Size:**	**Drawn By:**
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Great Western Yard Gloucester

Tree Protection Plan and Arboricultural Method Statement

Tom Hurley, **BSc(For)Hons, M Arbor A**

11th July 2022

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Tree Protection Statement - Key Information

- Once planning consent has been granted, this Tree Protection Statement is a legally binding document.
- All planning conditions must be read and fully implemented.
- Failure to follow the measures detailed within the drawings and method statement can lead to the issue of a Stop Notice or further enforcement action.
- The drawings and method statement must be reviewed by the demolition/groundwork/construction/landscape teams to ensure that all works can be completed without encroachment into the Construction Exclusion Zones. If this is not possible then any issues must be raised with Advanced Arboriculture and alternative solutions found.

Document Downloads:
Scan these QR codes with your mobile device to download PDF versions of the Arboricultural Guidance Sheets referred to within this document.

AGS101 AGS201 AGS301 AGS408 AGS901 AGS902 FENCE SIGN OFFICE SIGN

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Tree Protection Statement

Introduction

Heads of Terms

This document provides information for the benefit of the local planning authority and the project team, however, the specific tree protection details are contained within the attached Tree Protection Plan, Arboricultural Method Statement and Arboricultural Guidance Sheets.

The document has been prepared based on information available to Advanced Arboriculture Ltd at the time of writing, however, further technical, topographical, arboricultural, architectural, ecological or engineering information may come to light after the relevant arboricultural conditions have been cleared. It is the responsibility of the project manager to draw any changes in the project scope to our attention at the earliest opportunity.

The scheduling and implementation of the tree protection measures detailed in the report also remains the responsibility of the client. Whilst the project team may appoint a suitably qualified third party arboricultural supervisor, Advanced Arboriculture Ltd are able to take on this role subject to the client's formal instruction.

Advanced Arboriculture Ltd shall not be held liable for any unauthorised deviation from the tree protection measures and scheduling detailed within this report.

Tree Protection Overview

The included Tree Protection Plan and Arboricultural Method Statement detail the tree protection measures required for the proposals, the timing of the provision of tree protection measures, and the retention of a suitably qualified arboricultural supervisor in the event of any accidental damage to the trees.

This document must be reviewed by the client or their delegated project manager and/or site manager with the arboricultural supervisor prior to the commencement of any works to ensure that both the scheduling and protection measures detailed within the Arboricultural Method Statement remain achievable and realistic. Once the Tree Protection Plan and Arboricultural Method Statement Plans have been reviewed and signed off by both the client/site manager and arboricultural supervisor, these drawings must be held on site for ongoing reference and to allow the local planning authority to check them at any reasonable time. Any variations to the Tree Protection Plan or Arboricultural Method Statement must be copied to the local planning authority; in the case of major variations to these documents, written approval may be required.

Tree Protection Measures Overview

Arboricultural Supervision

An ad-hoc arboricultural inspection programme is shown on the Arboricultural Method Statement Plans. Inspections must be requested by the client, project manager and/or site manager where the project scope changes, or where unforeseen construction activities may present a threat to retained trees on or adjacent to the site. The attached Arboricultural Supervision Record Sheet must be filled in on an ongoing basis and retained on site for inspection by the local planning authority at any reasonable time.

Staff Induction

The Arboricultural Method Statement references the attached Arboricultural Staff Induction Sheet. This must be read, understood and signed by all site operatives, including sub-contractors, as an integral element of their initial site induction. The purpose of this is to minimise the potential for damage to trees during construction.

Protective Fencing

Protective fencing is a key element of the tree protection measures for this project. This comprises five braced Heras panels (see Arboricultural Guidance Sheet AGS101 attached); the specification for these matches the specification detailed within British Standard 5837:2012.

There may be instances on site where it is desirable to substitute braced Heras fencing with site hoarding; the specification for the hoarding and the method statement for its construction must be approved prior to installation by the arboricultural supervisor.

A total of XXXX metres of high visibility fencing (see Arboricultural Guidance Sheet AGS105) is also shown on the Tree Protection Plan. The purpose of this is to act as a visual demarcation of the construction exclusion zones where there is considered to be a low risk of damage to retained trees from plant, materials or personnel.

All fencing must be erected prior to the commencement of any mobilisation to site by contractors, plant or materials and must remain in situ until all construction works have been completed and approval for removal is granted by the arboricultural supervisor.

Site Organisation

Prior to the commencement of any demolition or construction activities on site, the locations for site offices, welfare facilities, parking, a materials storage area and a concrete/plaster mixing area must be designated and marked on the Tree Protection Plan.

It may be possible to locate site huts, cabins and welfare facilities where protective fencing is shown on the Tree Protection Plan, however, this will only be possible with the written consent of the arboricultural supervisor and subject to the following conditions:

- The site huts will remain in situ for the duration of the project (if not, protective fencing will still be required prior to the installation of the huts, or after their removal);
- There is sufficient crown height available to accommodate the huts without the need for unauthorised crown lifting or pruning;
- Any services or sewerage for the huts must be remain above ground and not require excavation;
- No discharge from the huts, including grey water, shall be permitted within the demarcated construction exclusion zone, with the exception of rainwater from the roofs or guttering;
- Where foundation pads are required to support huts, these must comprise timber sleepers or concrete paving slabs placed on the existing ground level (digging foundations in must be avoided).

Parking, materials storage and materials mixing must remain outside of the designated construction exclusion zones, and the materials mixing area should be bunded or contained such that any spillage or rinsings cannot run towards the root protection areas of any retained trees.

Ground Protection

Ground protection is shown on the Tree Protection Plan where construction access over root protection areas is unavoidable. A ground protection specification is shown in Arboricultural Guidance Sheet AGS201.

Ground protection must be installed at the same time as the protective fencing and must remain in situ for the duration of the project. The ground protection may only be lifted earlier in the construction programme with the written consent of the arboricultural supervisor.

No-dig Surfacing

No-dig surfacing is shown on the Tree Protection Plan where an access route crosses the outer root protection areas of trees T4 and T5. This must be installed at the earliest opportunity, utilising a temporary wear course as required for the duration of the construction programme, replacing this with a final permanent wear course on completion of all construction works.

A suggested specification detail is shown within Arboricultural Guidance Sheet AGS301 though this will need to be reviewed and amended as necessary by a suitably qualified engineer. During the review of this document by the project manager and/or site manager, the site levels will need to be reviewed, noting that no-dig surfacing can typically add 250-300mm to existing ground levels, and surrounding surfaces may therefore need to be amended to match.

Demolition of Existing Structures and Surfaces

Care will be required when undertaking demolition works on site. Demolition activities must be informed by the diagrams and information detailed within Arboricultural Guidance Sheet AGS408. A copy of this document must be included within all tender documents to ensure that the appointed contractor factors tree constraints and protection into their workflow and costings.

Services

The location of proposed new services has not been made available to Advanced Arboriculture Ltd at the time of this report's preparation. All services must be routed outside of the root protection areas of all retained trees. Where this is not possible, alternative installation methods must be investigated, including manual digging, directional boring, etc.

Engineering drawings showing the proposed service routes should be forwarded to Advanced Arboriculture Ltd for review prior to the commencement of any ground works or services installation. Advanced Arboriculture is able to forward a PDF or AutoCAD DWG file directly to the project engineers on request showing the accurate locations of the root protection areas.

Hard and Soft Landscaping

Any hard landscaping within the root protection area of any retained trees which includes changes in ground levels (cut or fill), new walls or new paths will require further arboricultural review to ensure that any detrimental impact is limited. If unsustainable damage is considered to be unavoidable then the landscaping scheme will require revision.

Soft landscaping near retained trees, including the planting of new trees and shrubs, must be undertaken with considerable care due to the potential for rooting damage. Mechanical rotovation or cultivation within the construction exclusion zones shown on the Tree Protection Plan must be avoided as this can cause significant damage to the rooting system of adjacent trees.

All new trees must be sourced from a reputable nursery and planted in accordance with the recommendations detailed within British Standard 8545:2014. We are able to provide an independent verification of the quality of new trees prior to planting on request.

Tree Works

The appointed tree work contractor must ensure that all tree works comply with British Standard 3998:2010 (Tree Works - Recommendations) and it is strongly advised that the appointed tree contractor is Arboricultural Association Approved to ensure high standards and a consistency of work.

Under the Wildlife & Countryside Act 1981 & Countryside & Rights of Way Act 2000 it is an offence to recklessly damage or destroy the nest of a wild bird whilst in use or being built; planning consent does not provide a defence against prosecution under these Acts. Trees, shrubs and hedgerows on this site may contain nesting birds between 1st March and 31st August and it is advisable to undertake a survey of the site before commencing any vegetation removal between these dates, to ensure that no nesting birds are present. Advanced Arboriculture are able to undertake a survey to identify the presence of bats or nesting birds if required at the request of the client.

Attachments

- Tree Protection Plan
- Arb Method Statement Plan
- AGS101 Braced Heras Fencing
- AGS201 Ground Protection
- AGS301 No-Dig Specification
- AGS408 Demolition of Structures and Surfaces Near Trees
- AGS801 Protective Fencing Poster
- AGS802 Site Office Tree Poster

Document Title:
Background Information

Location:
Great Western Yard
Gloucester

Date:	Project Reference:	Revision:
11.07.2022	TH/B330/0622	1.0
Scale:	**Paper Size:**	**Drawn By:**
n/a	A3	TH

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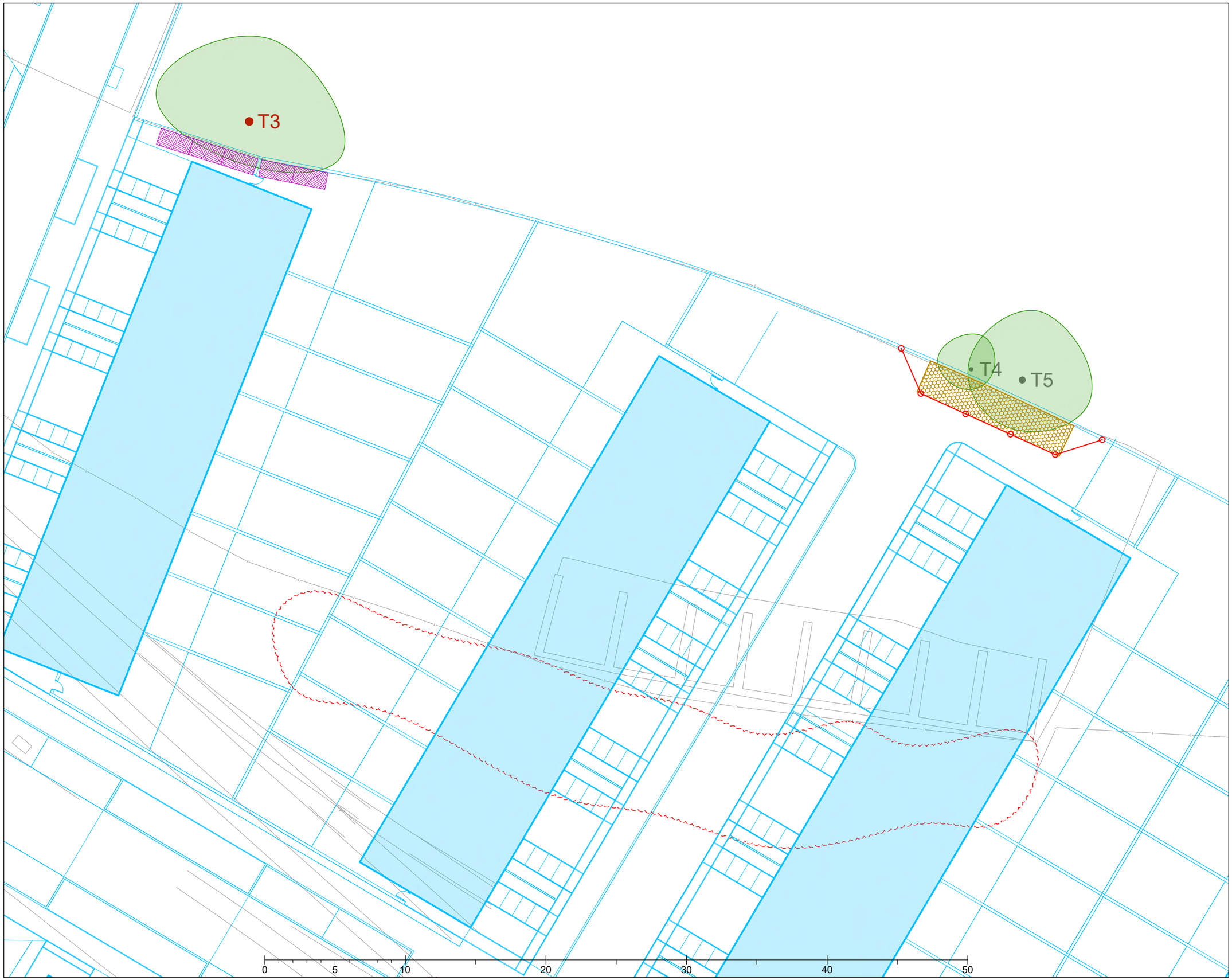

Key

- Tn Category A tree
- Tn Category B tree
- Tn Category C tree
- Tn Category U tree
- Individual tree crown spread
- Collective crown spreads
- Root protection area
- BS5837:2012 shade path
- Trees to remove to enable development
- Trees to remove irrespective of development
- Collective crown spread to be removed
- Proposed development footprint
- Construction exclusion zone
- Braced Heras fencing (see AGS101)
- Ground protection zone (see AGS201)
- No-dig surfacing (see AGS301)
- N

Notes

- **Protective fencing must not be breached or dismantled at any point during the construction programme without the written consent of the local planning authority.**
- **Failure to fully comply with this Tree Protection Plan may result in the local planning authority pursuing enforcement action.**
- **It is the Site Manager's responsibility to ensure that all site personnel, plant and materials remain outside of the Construction Exclusion Zones and protective fencing at all times.**

Drawing Title:

Tree Protection Plan

Location:

Great Western Yard
Gloucester

Date:	Project Reference:	Revision:
11.07.2022	TH/B330/0622	1.0
Scale:	**Paper Size:**	**Drawn By:**
1:250	A3	TH

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Arboricultural Method Statement

All works to be undertaken sequentially in accordance with the following schedule:

1. Tree Protection Plan and Arboricultural Method Statement to be reviewed and signed off by the Site Manager and Arboricultural Supervisor (see below). Any amendments to be made and a copy of all revised documents sent to the local planning authority as necessary. Signed off copy to be held on file in the site office for the duration of construction works.
2. All site personnel, including sub-contractors, to be advised of tree protection requirements during induction (see Arboricultural Induction Sheet).
3. All tree works to be undertaken in accordance with British Standard 3998:2010.
4. Construct section of no-dig road surface adjacent to trees T4 and T5.
5. Protective fencing and ground protection to be installed as per the specifications detailed within the Arboricultural Guidance Sheets.
6. Arboricultural supervisor to attend site to inspect fencing prior to the commencement of any construction activities (may be done via Skype/Facetime where practicable).
7. Demolition and construction to commence in accordance with approved site layout.
8. Advanced Arboriculture to undertake ad hoc inspections at the request of the site manager or client. All inspections to be logged on the Arboricultural Supervision Inspection Record and any issues to be raised within an Exception Report to the client.
9. Any accidental damage to trees to be reported immediately to Advanced Arboriculture with any necessary remedial works to be agreed with the local planning authority.
10. Fencing and ground protection to be dismantled only on completion of all construction works and to allow for soft landscaping.
11. Signed copy of this drawing and Arboricultural Supervision Inspection Record to be held on project files on completion of all construction works.

Document Review

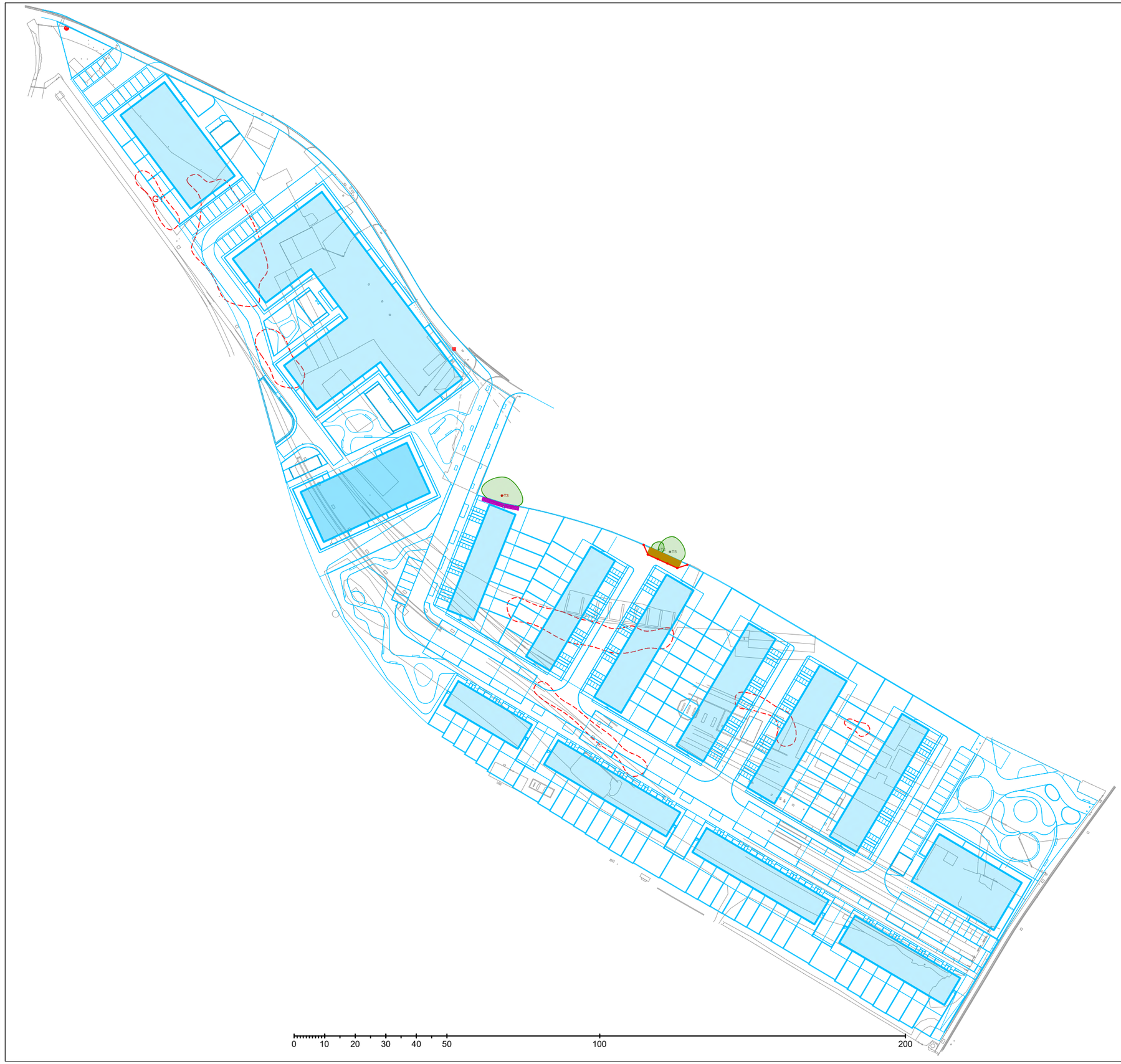
The Arboricultural Method Statement must be reviewed and signed off by the Site Manager and Arboricultural Supervisor prior to the commencement of works to ensure that it is fit for purpose.

Site Manager: _____

Arb Supervisor: _____

Date: _____

	Yes	No
Document reviewed?	☐	☐
Issues raised?	☐	☐
Revised document required?	☐	☐



Key

- T_n Category A tree
- T_n Category B tree
- T_n Category C tree
- T_n Category U tree
- Individual tree crown spread
- Collective crown spreads
- Root protection area
- BS5837:2012 shade path
- Trees to remove to enable development
- Trees to remove irrespective of development
- Collective crown spread to be removed
- Proposed development footprint
- Construction exclusion zone
- Braced Heras fencing (see AGS101)
- Ground protection zone (see AGS201)
- No-dig surfacing (see AGS301)

N

Notes

- **Protective fencing must not be breached or dismantled at any point during the construction programme without the written consent of the local planning authority.**
- **Failure to fully comply with this Arboricultural Method Statement may result in the local planning authority pursuing enforcement action.**
- **It is the Site Manager's responsibility to ensure that all site personnel, plant and materials remain outside of the Construction Exclusion Zones and protective fencing at all times.**

Drawing Title:

Arboricultural Method Statement Plan

Location:

Great Western Yard
Gloucester

Date:	Project Reference:	Revision:
11.07.2022	TH/B330/0622	1.0
Scale:	**Paper Size:**	**Drawn By:**
1:1,250	A3	TH

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Tree Protection Information

Trees on this site are legally protected by the Local Planning Authority.

- Planning conditions, Tree Preservation Orders and Conservation Area regulations mean that damage to trees may result in enforcement action and all site works being stopped.

Protective fencing must not be moved or dismantled under any circumstances.

- The protective fencing for the trees is there to protect the trees and their rooting systems.
- The fencing must not be moved for any reason unless it has been approved by the Site Manager and the Arboricultural Supervisor.

The Construction Exclusion Zones are not to be used for any reason.

- These areas are there for a reason: to protect the tree above and below the ground.
- Storage of materials, the mixing of concrete, the fueling of machines, the parking of vehicles, *etc*. all cause damage to a tree's roots so use a designated zone for these activities.

Trees are not to be used for any purpose - they are there for the future.

- Trees are not to be used as a place to screw signs onto, or as cable supports.
- Fires can do massive damage to trees, both above and below ground, and even some distance away. If a fire is permitted on site, it must be at least ten metres from the nearest branch of any retained tree.

Extra care will always be required when craning or using excavators.

- It's too easy to accidentally swing an excavator boom, HIAB, crane jib or load into the branches or trunk of a tree so extra care is always required.
- Plan all movements carefully, make sure the operator has good visibility and, where possible, use an experienced banksman.

What to do if it all goes wrong?

- Accidents can happen so if a tree is damaged, even only slightly, this must be reported to the Site Manager immediately.
- If the Site Manager is not available then contact Advanced Arboriculture immediately to seek further advice.

All site staff including archaeologists, consultants, contractors, sub-contractors, arborists and landscapers must sign below to confirm that they have read and understood this information

Full Name: _____ **Signature:** _____ **Company:** _____ **Date:** _____	**Full Name:** _____ **Signature:** _____ **Company:** _____ **Date:** _____
Full Name: _____ **Signature:** _____ **Company:** _____ **Date:** _____	**Full Name:** _____ **Signature:** _____ **Company:** _____ **Date:** _____
Full Name: _____ **Signature:** _____ **Company:** _____ **Date:** _____	**Full Name:** _____ **Signature:** _____ **Company:** _____ **Date:** _____
Full Name: _____ **Signature:** _____ **Company:** _____ **Date:** _____	**Full Name:** _____ **Signature:** _____ **Company:** _____ **Date:** _____
Full Name: _____ **Signature:** _____ **Company:** _____ **Date:** _____	**Full Name:** _____ **Signature:** _____ **Company:** _____ **Date:** _____
Full Name: _____ **Signature:** _____ **Company:** _____ **Date:** _____	**Full Name:** _____ **Signature:** _____ **Company:** _____ **Date:** _____
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Full Name: _____ **Signature:** _____ **Company:** _____ **Date:** _____	**Full Name:** _____ **Signature:** _____ **Company:** _____ **Date:** _____
Full Name: _____ **Signature:** _____ **Company:** _____ **Date:** _____	**Full Name:** _____ **Signature:** _____ **Company:** _____ **Date:** _____

Notes for Site Manager

- **Damage to trees during construction can result in enforcement action, including the local authority issuing Stop Notices or pursuing prosecution for damage to trees covered by a Tree Preservation Order.**
- It is essential that all staff working on site, including contractors, sub-contractors and delivery drivers, are made aware of the tree protection measures in operation on this site.
- It may be necessary to read the sheet out to personnel with limited literacy or language skills.
- Every member of staff must sign this sheet to confirm that they have fully understood the tree protection measures. The sheet must remain on site with the Tree Protection Plan and Arboricultural Method Statement to allow for inspection at any reasonable time by the Arboricultural Supervisor or the Local Planning Authority Arboricultural Officer.
- In the event of any queries, concerns or amendments, please contact Advanced Arboriculture at the earliest opportunity.
- **It is essential that the project has a designated Arboricultural Supervisor. If this role has not been assigned then please contact the client or Project Manager to request authorisation to appoint an Arboricultural Supervisor.**
- **It is the Site Manager's responsibility to ensure that all staff are fully inducted, that all tree protection measures are installed and maintained correctly, and that the scheduling detailed within the Arboricultural Method Statement is followed.**

Arboricultural Supervisor
(unless otherwise instructed)
Name: Tom Hurley
Company: Advanced Arboriculture
[redacted]

Drawing Title:
Arboricultural Site Induction Sheet

Location:
Great Western Yard
Gloucester

Date:	Project Reference:	Revision:
11.07.2022	TH/B330/0622	1.0
Scale:	**Paper Size:**	**Drawn By:**
1:1,250	A3	TH

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Arboricultural Supervision Inspection Record

Initial Tree Protection Inspection

Date: _____

Inspector: _____

Summary of Reason for Inspection:

	Yes	No
All concerns resolved?	☐	☐
Tree issues?	☐	☐
Fencing issues?	☐	☐
Exception Report required?	☐	☐

Ad Hoc Inspection

Date: _____

Inspector: _____

Summary of Reason for Inspection:

	Yes	No
All concerns resolved?	☐	☐
Tree issues?	☐	☐
Fencing issues?	☐	☐
Exception Report required?	☐	☐

Ad Hoc Inspection

Date: _____

Inspector: _____

Summary of Reason for Inspection:

	Yes	No
All concerns resolved?	☐	☐
Tree issues?	☐	☐
Fencing issues?	☐	☐
Exception Report required?	☐	☐

Ad Hoc Inspection

Date: _____

Inspector: _____

Summary of Reason for Inspection:

	Yes	No
All concerns resolved?	☐	☐
Tree issues?	☐	☐
Fencing issues?	☐	☐
Exception Report required?	☐	☐

Ad Hoc Inspection

Date: _____

Inspector: _____

Summary of Reason for Inspection:

	Yes	No
All concerns resolved?	☐	☐
Tree issues?	☐	☐
Fencing issues?	☐	☐
Exception Report required?	☐	☐

Ad Hoc Inspection

Date: _____

Inspector: _____

Summary of Reason for Inspection:

	Yes	No
All concerns resolved?	☐	☐
Tree issues?	☐	☐
Fencing issues?	☐	☐
Exception Report required?	☐	☐

Ad Hoc Inspection

Date: _____

Inspector: _____

Summary of Reason for Inspection:

	Yes	No
All concerns resolved?	☐	☐
Tree issues?	☐	☐
Fencing issues?	☐	☐
Exception Report required?	☐	☐

Ad Hoc Inspection

Date: _____

Inspector: _____

Summary of Reason for Inspection:

	Yes	No
All concerns resolved?	☐	☐
Tree issues?	☐	☐
Fencing issues?	☐	☐
Exception Report required?	☐	☐

Ad Hoc Inspection

Date: _____

Inspector: _____

Summary of Reason for Inspection:

	Yes	No
All concerns resolved?	☐	☐
Tree issues?	☐	☐
Fencing issues?	☐	☐
Exception Report required?	☐	☐

Ad Hoc Inspection

Date: _____

Inspector: _____

Summary of Reason for Inspection:

	Yes	No
All concerns resolved?	☐	☐
Tree issues?	☐	☐
Fencing issues?	☐	☐
Exception Report required?	☐	☐

Ad Hoc Inspection

Date: _____

Inspector: _____

Summary of Reason for Inspection:

	Yes	No
All concerns resolved?	☐	☐
Tree issues?	☐	☐
Fencing issues?	☐	☐
Exception Report required?	☐	☐

Ad Hoc Inspection

Date: _____

Inspector: _____

Summary of Reason for Inspection:

	Yes	No
All concerns resolved?	☐	☐
Tree issues?	☐	☐
Fencing issues?	☐	☐
Exception Report required?	☐	☐

Final Project Inspection

Date: _____

Inspector: _____

Outstanding Arboricultural Issues:

	Yes	No
All concerns resolved?	☐	☐
Tree issues?	☐	☐
Fencing issues?	☐	☐
Exception Report required?	☐	☐

Notes for Site Manager

- **Where arboricultural supervision is included as a condition of a planning consent, there is a legal obligation to ensure that it is complied with in full.**
- It is the Site Manager's responsibility to ensure that the Arboricultural Supervisor is appointed and inspections commissioned as per the planning consent. Failure to comply with the prescribed arboricultural supervision requirements remains the responsibility of the Site Manager.
- Reasons for requesting ad hoc inspections may include accidental damage to trees, an amendment to proposals, or to clarify a detail on the Tree Protection Plan or Arboricultural Method Statement. The Arboricultural Supervisor shall make every effort to attend site within 48 hours of receiving a request from the Site Manager.
- Local planning authority officers may ask to see the completed Arboricultural Supervision Inspection Record at any reasonable time.
- Any issues raised during an inspection may require the Arboricultural Supervisor to prepare an Exception Report detailing remedial works or actions; these must also be kept on file in the site office.
- On completion of all construction works, a copy of this completed document must be sent to the local planning authority by the Arboricultural Supervisor to discharge the relevant conditions of the planning consent.

Arboricultural Supervisor

(unless otherwise instructed)

Name: Tom Hurley

Company: Advanced Arboriculture

[redacted]

Drawing Title:

Arboricultural Supervision Log

Location:

Great Western Yard
Gloucester

Date:	Project Reference:	Revision:
11.07.2022	TH/B330/0622	1.0

Scale:	Paper Size:	Drawn By:
1:1,250	A3	TH

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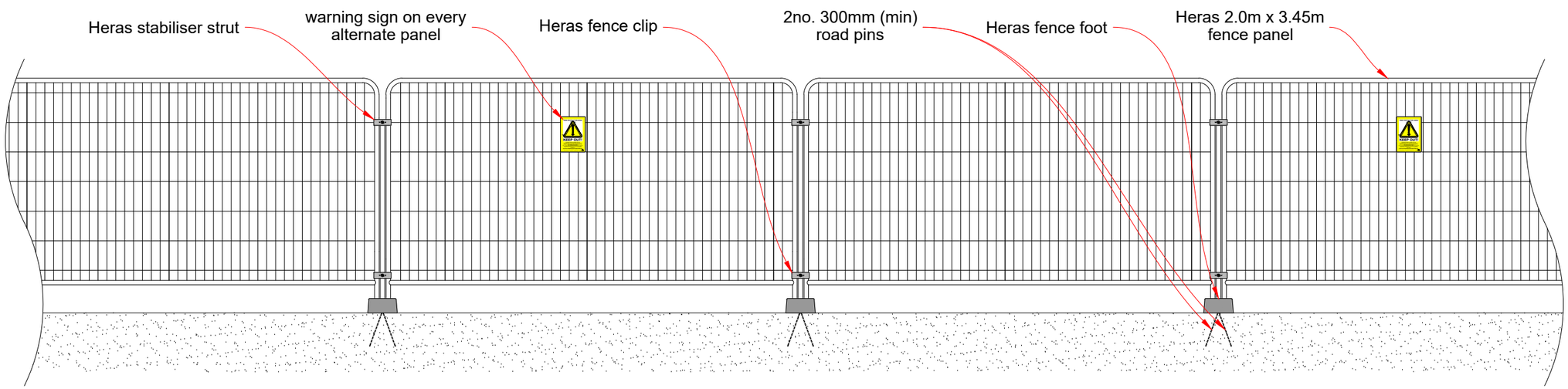
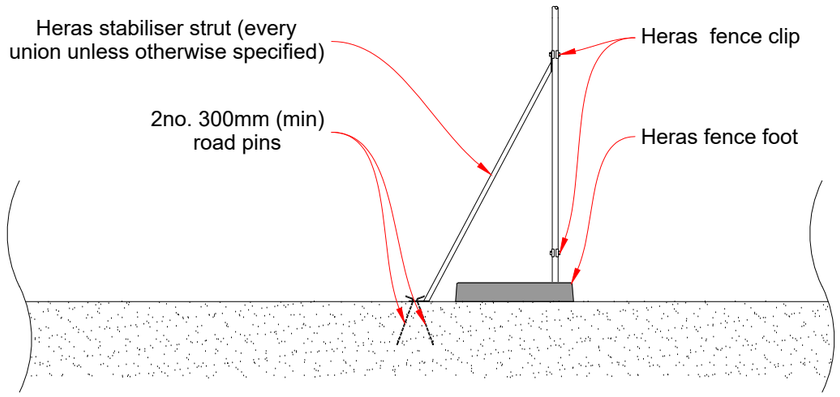
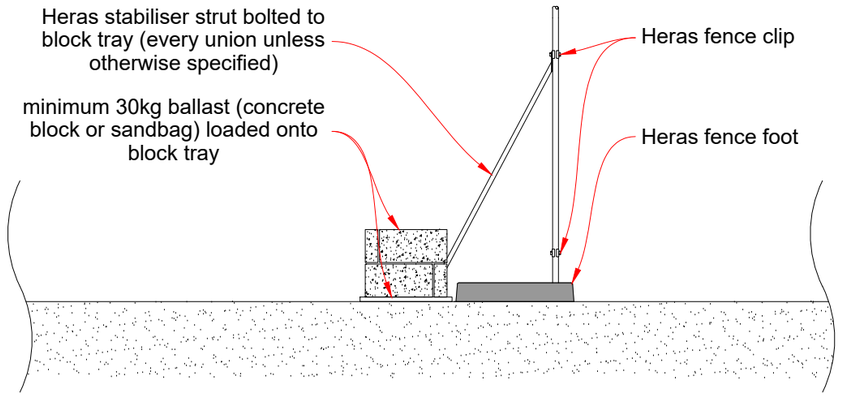




Back Bracing Cross Section (for use where road pins may be driven into the ground)



Back Bracing Cross Section (for use where road pins cannot be driven into the ground)

Notes

- These specifications are for guidance only.
- This fencing specification is based on the specification detailed within British Standard 5837:2012 Figure 3 but adds an additional detail for where the use of road pins is not possible.
- Stabiliser struts to be attached at every panel union unless specified otherwise.
- A check for underground services must be completed before driving any road pins into the ground.
- Where it is not possible to use road pins due to hard surfacing or the presence of underground services, a Heras block tray may be used with a minimum of 10kg of ballast (concrete blocks, metal weights or sandbags).
- This information must accompany all tender documents to enable contractors to include tree protection measures in their costings.
- Local planning authority consent for these specifications cannot be assumed and must be sought prior to commencement of any construction works.

Drawing Title:

Braced Heras Fencing

Date:	Drawing Number:	Revision:
01.02.2021	AGS101	1.0
Scale:	**Paper Size:**	**Drawn By:**
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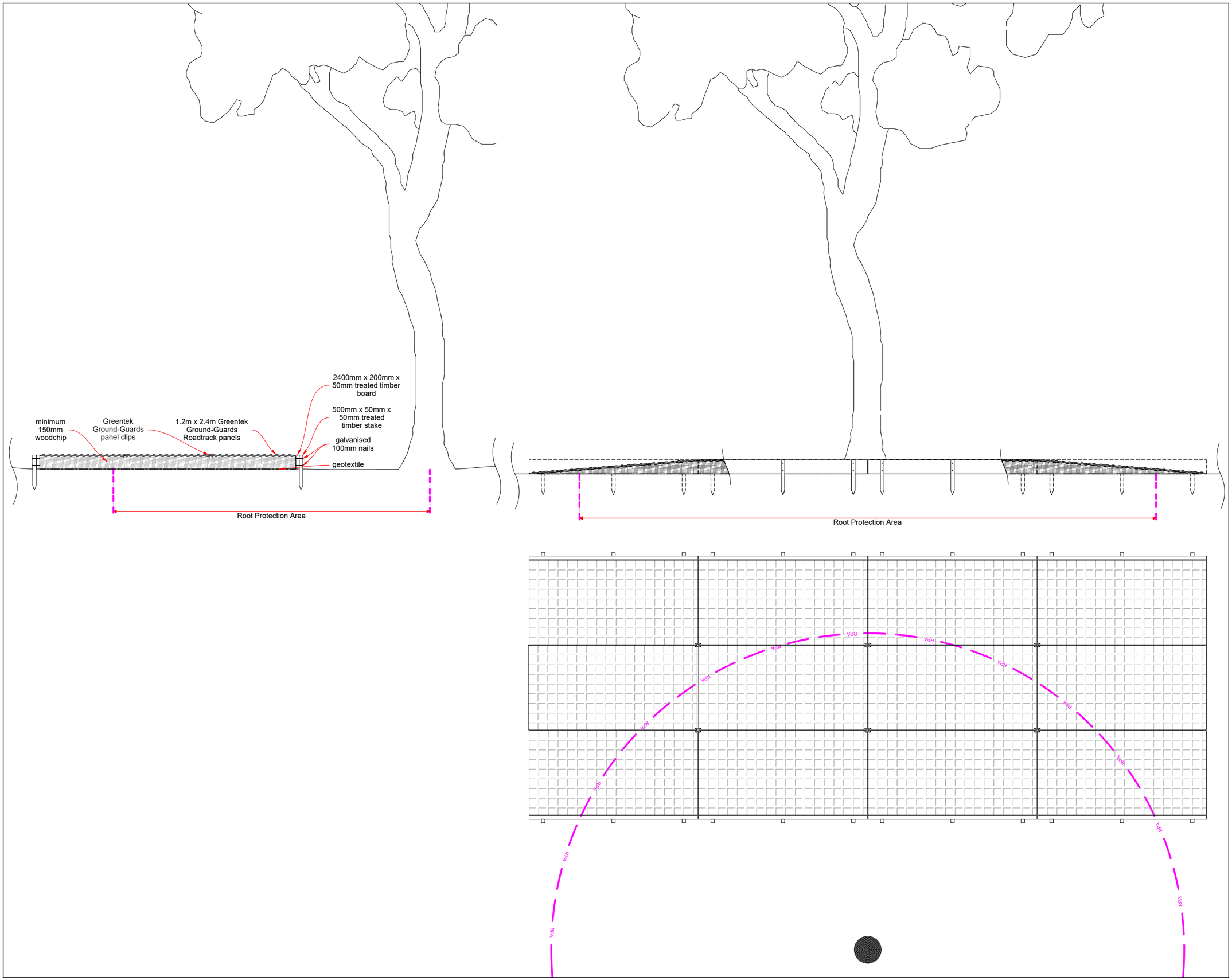

Notes

- These specifications are for guidance only.
- This information must accompany all tender documents to enable contractors to include tree protection measures in their costings.
- Local planning authority consent for these specifications cannot be assumed and must be sought prior to commencement of any construction works.

Drawing Title:

Ground Protection

Date:	Drawing Number:	Revision:
01.02.2021	AGS201	1.0
Scale:	**Paper Size:**	**Drawn By:**
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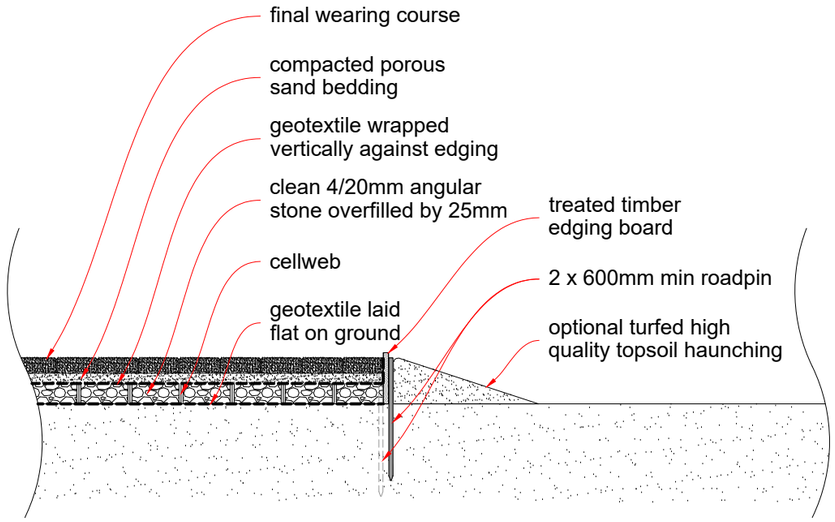
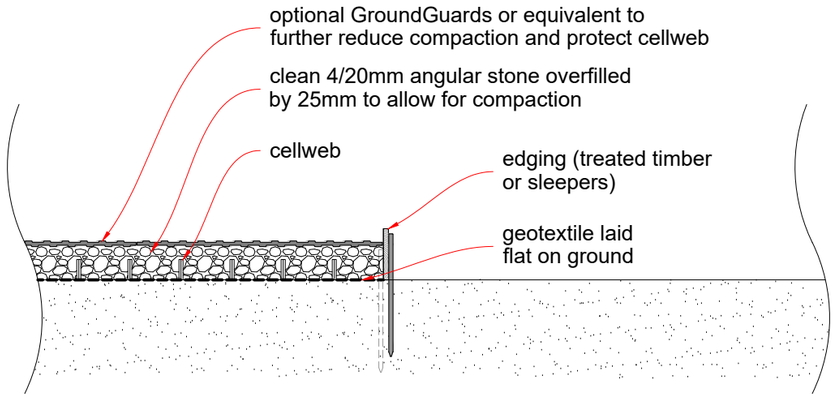
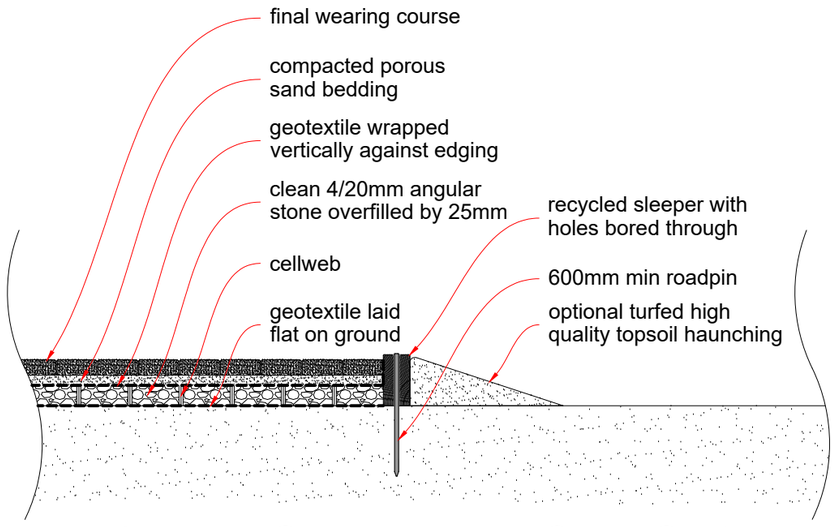


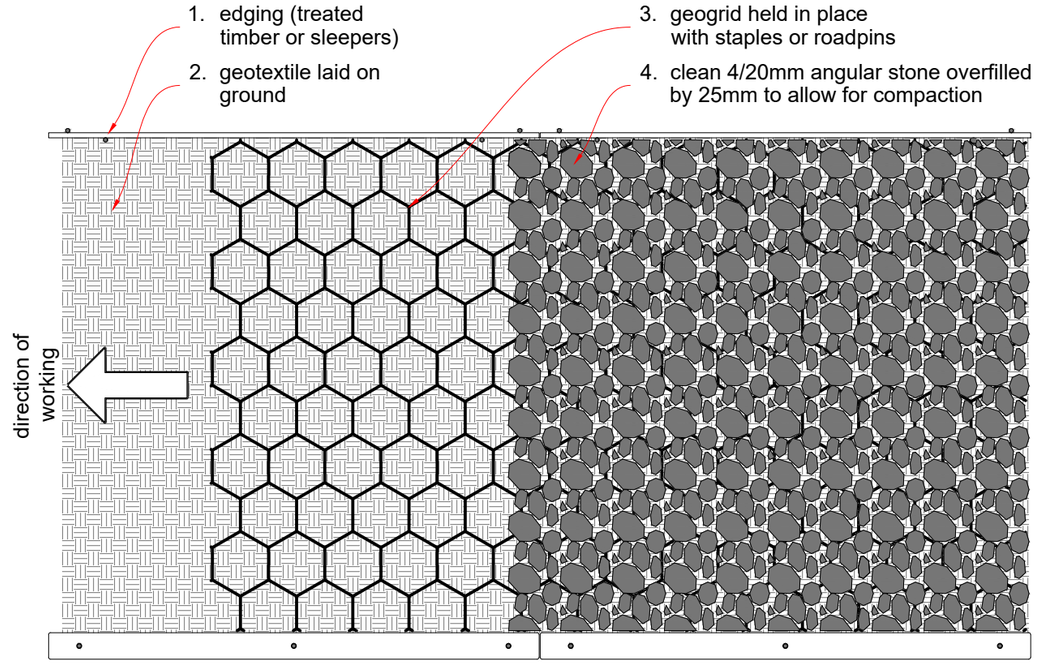
Timber-Board Edging Cross Section



Temporary Ground Protection Cross Section



Recycled Sleeper Edging Cross Section



Plan View of No-Dig Installation

Notes

- These specifications are for guidance only and **must** be reviewed by the Project Manager, Project Engineer and Arboricultural Supervisor prior to commencement of any works on site.
- We recommend Greenfix to provide a comprehensive engineering and design service for no-dig surfaces (t: 01608 666027, w: www@greenfix.co.uk).
- The Arboricultural Method Statement below is to be followed for all no-dig surfacing permitted within the root protection area (RPA) by a full planning consent.
- This information must accompany all tender documents to enable contractors to factor these specifications in their costings.
- Local planning authority consent for these specifications cannot be assumed and must be sought prior to commencement of any construction works.

Arboricultural Method Statement

1. Chosen specification to be reviewed by suitably qualified engineer to ensure that it is fit for purpose.
2. Ground to be raked clear of debris including leaf litter and twigs.
3. Treated timber or recycled sleeper edging to be installed, ensuring no services are present before driving roadpins in to secure edging.
4. A layer of geotextile (Greenfix *TRP-3000* or equivalent) to be laid out across the entire area to be surfaced.
5. Layer of cellular confinement geogrid (Greenfix *GEOWEB* or equivalent) to be secured into place along the entire length of the route using Greenfix *ATRA Keys* and roadpins.
6. The geogrid to be overfilled by 25mm with 4/20mm clean angular stone using a mini-dumper truck, powered barrow or hand barrow, working along the route from its starting point so that the stone delivery only runs over filled areas of grid.
7. If the no-dig is to be used as a construction access, it should be slightly overfilled with stone and optional GroundGuards or equivalent placed on top to protect the geogrid and further reduce compaction.
8. Remove GroundGuards (if fitted) to allow for installation of final wear course.
9. Some tamping down may be necessary to ensure a firm interlock between stones and minimise settlement.
10. A layer of geotextile (Greenfix *TRP-3000* or equivalent) to be laid out across the entire area to be surfaced, wrapping the sides up to the level of the top of the timber or sleeper edging.
11. Cover the geotextile in a layer of sand and firm down thoroughly.
12. Install the final wearing course, ensuring that any block paving is permeable.

Alternative wear courses including permeable tarmac or resin-bound gravel may be suitable for installation on the stone and geogrid base but will require further arboricultural input to ensure the specification, sub-base and installation method are acceptable.

Drawing Title:

No-Dig Specification

Date:	Drawing Number:	Revision:
01.02.2021	AGS301	1.0
Scale:	**Paper Size:**	**Drawn By:**
1:30	A3	TH

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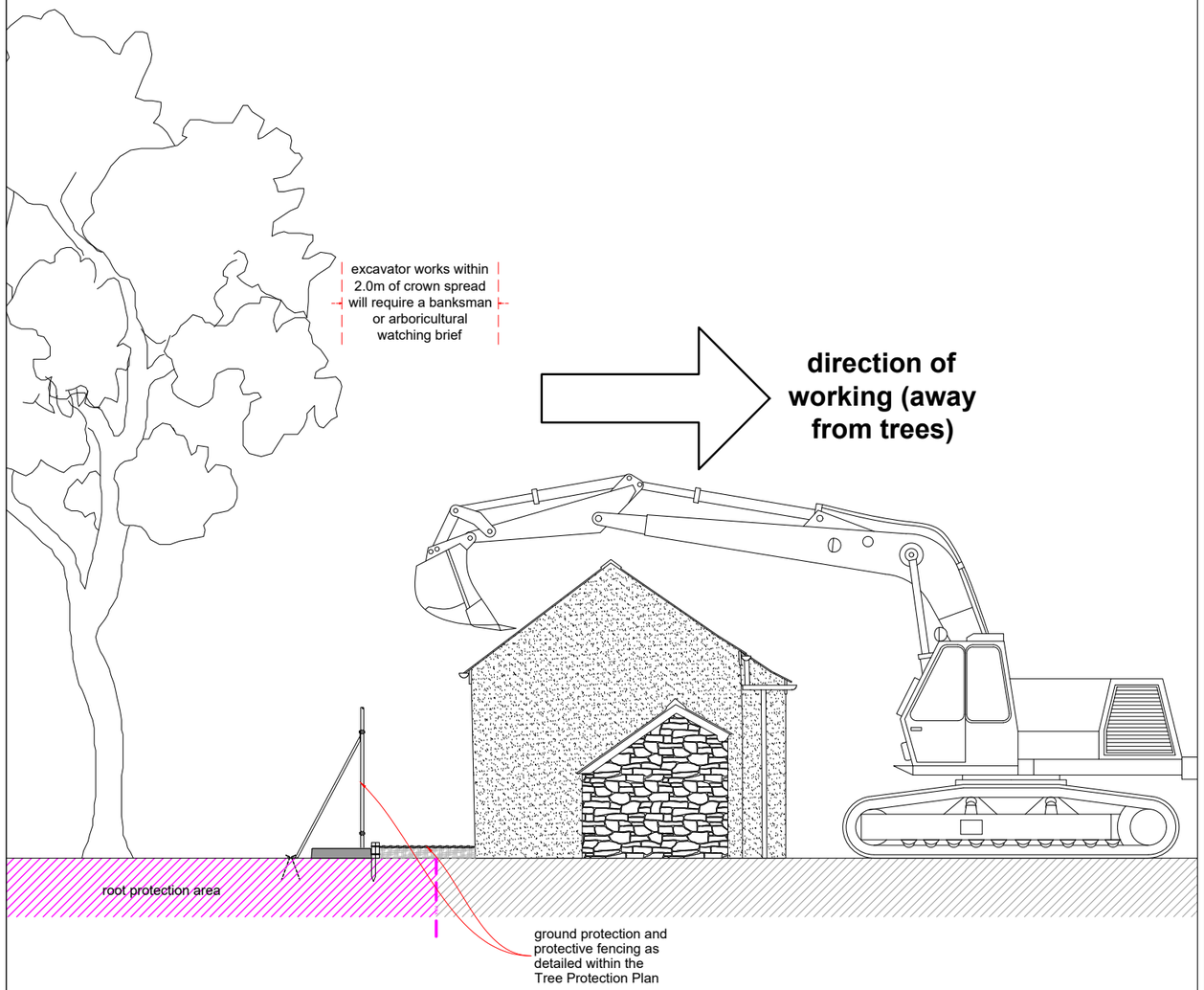
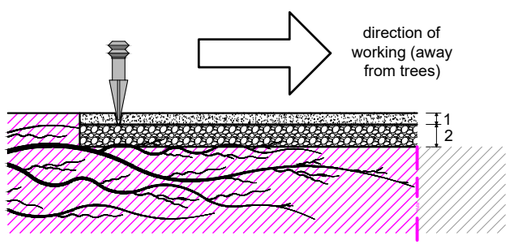
Demolition Zone Working Directions



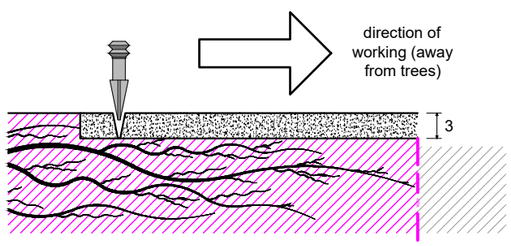
Removal of Hard Surfaces Near Trees

Removal of surface with a sub-base



1. tarmac / concrete (maximum depth for pick)
2. sub-base (to be loosened with a fork and removed with a shevel

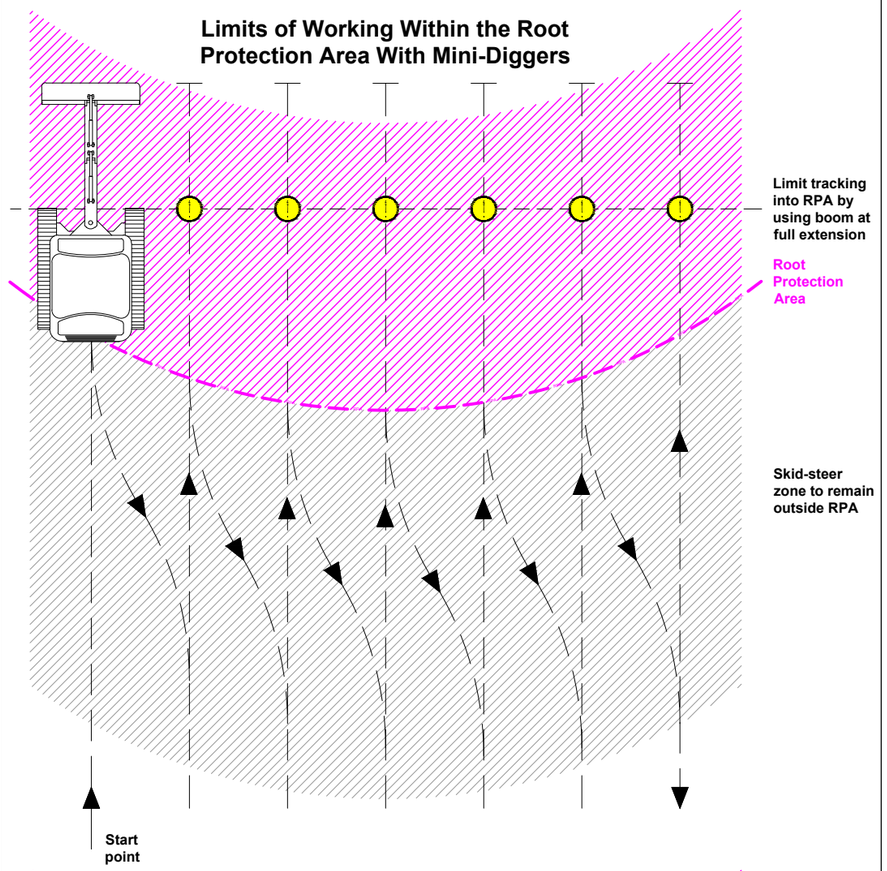
Removal of surface without a sub-base



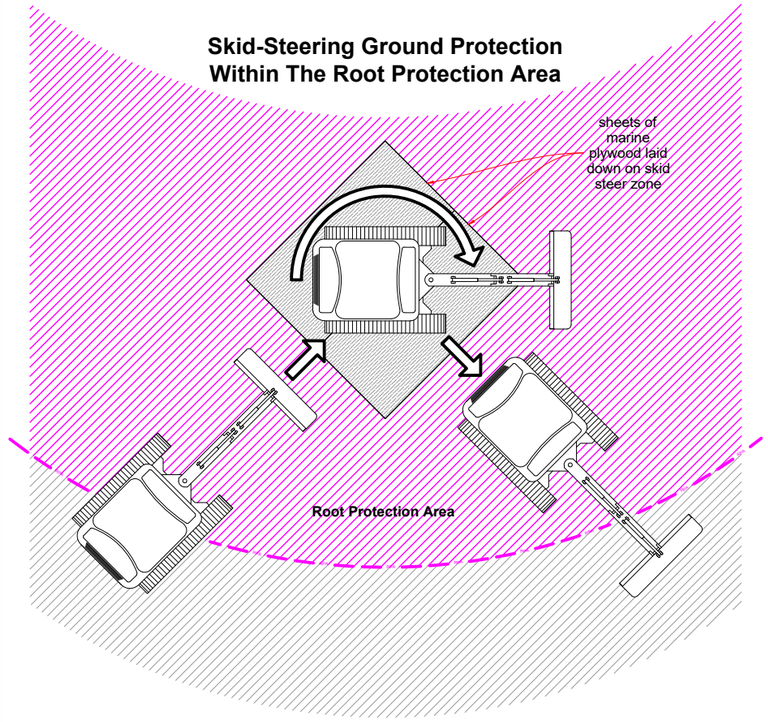
3. tarmac / concrete (maximum depth for pick)

Mechanical Plant Operations Near Trees

Limits of Working Within the Root Protection Area With Mini-Diggers



Skid-Steering Ground Protection Within The Root Protection Area



Notes

- These specifications are for guidance only and must be reviewed by the Project Manager, Demolition Contractor and Arboricultural Supervisor prior to commencement of any works on site.
- This information must accompany all tender documents to enable contractors to include for specific working requirements in their costings.
- Local planning authority consent for these specifications cannot be assumed and may need to be sought prior to commencement of any demolition works.

Site Organisation

1. All works to be undertaken from outside of the root protection areas.
2. Tree protection measures to be installed prior to mobilisation to site by demolition contractors.
3. Any excavator or crane works within 2.0m of the crown spread of retained trees will require an experienced banksman or arboricultural watching brief.
4. Structures to be demolished in opposite direction from retained trees.
5. All arisings to be stored outside of the root protection areas in a location that allows rubble, *etc.* to be collected without unnecessary HGV movements across any root protection areas.
6. Any crushed rubble piles to be located so that fine particles cannot be carried towards root protection areas by rainfall.
7. All hard surfacing within root protection areas to be removed as detailed, working away from retained trees.

Arboricultural Method Statement

1. All permitted tree works, including access facilitation pruning or felling, to be undertaken as per permitted tree works specification and in accordance with BS3998:2010 and any relevant ecological legislation.
2. Ground protection measures (as detailed within the Tree Protection Plan) which may include protective fencing, ground protection, signage, or other elements to be installed prior to demolition contractor mobilising to site.
3. Layout of site for demolition to be set out as agreed with Arboricultural Supervisor
4. Schedule of demolition to be agreed with Arboricultural Supervisor to allow for pre-booking of arboricultural watching brief if required.
5. Demolition works to commence as agreed.
6. Arboricultural Supervisor to undertake ad hoc inspections at the request of the site manager or client. All inspections to be logged on the Arboricultural Supervision Inspection Record and any issues to be raised within an Exception Report to the client.
7. Any accidental damage to trees to be reported immediately to Advanced Arboriculture with any necessary remedial works to be agreed with the local planning authority.

Drawing Title:

Demolition of Structures and Surfaces Near Trees

Date:	Drawing Number:	Revision:
13.10.2021	AGS408	1.0
Scale:	**Paper Size:**	**Drawn By:**
n/a	A3	TH

Advanced Arboriculture
Venmore Barn
Woodbury
Devon EX5 1LD
[redacted]
w: www.advancedarb.com

TREE PROTECTION AREA

KEEP OUT

(TOWN AND COUNTRY PLANNING ACT 1990)
TREES ENCLOSED BY THIS FENCE ARE LEGALLY PROTECTED BY PLANNING CONDITIONS AND MAY BE THE SUBJECT OF A TREE PRESERVATION ORDER.
ANY INCURSION INTO THE PROTECTED AREA MUST HAVE THE WRITTEN PERMISSION OF THE LOCAL PLANNING AUTHORITY.
IN CASE OF ANY DAMAGE TO PROTECTIVE FENCING OR TREES, CALL ADVANCED ARBORICULTURE ON 01395 239002.

Advanced Arboriculture • www.advancedarb.com • office@advancedarb.com • 01395 239002

Notes

This poster may be printed out and laminated or requested electronically as an A4 PDF or ready printed on laminated board.

Printing Instructions (A4 printing only):

- For the best results, this document should be printed using a colour laser printer and laminated.
- Open this file in Adobe Acrobat Reader or Acrobat Pro.
- Select *File* > *Print*.
- Choose the printer and make sure it is set to print on A4 paper.
- Under *Size Options*, choose "*Actual size*".
- Under *Orientation*, choose "*Portrait*".
- Select *Print*.

Electronic Copies:

- This document may be downloaded directly from the Advanced Arboriculture website using the following links:

  A4: http://www.advancedarb.com/download/A4.pdf
  A3: http://www.advancedarb.com/download/A3.pdf

These documents may only be used for projects where Advanced Arboriculture have been appointed as the arboricultural supervisors.

Arboricultural Supervisor
(unless otherwise instructed)
Name: Tom Hurley
Company: Advanced Arboriculture
[redacted]

Drawing Title:
Protective Fencing Poster

Date:	Drawing Number:	Revision:
01.02.2021	AGS801	1.0
Scale:	**Paper Size:**	**Drawn By:**
n/a	A3	TH

Advanced Arboriculture
Venmore Barn
Woodbury
[redacted]
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CAUTION

PROTECTED TREES ON SITE

- **DO NOT ENTER TREE PROTECTION FENCING**
- **ALWAYS USE DESIGNATED STORAGE, MIXING AND PARKING AREAS**
- **TAKE ADDITIONAL CARE WHEN DRIVING HIGH SIDED VEHICLES**
- **ALWAYS USE A BANKSMAN WHEN USING HIABS, CRANES AND EXCAVATORS NEAR TREES**

REPORT ANY TREE DAMAGE TO SITE MANAGER IMMEDIATELY

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Notes

The poster must be put up on the site office board and in the workforce welfare facilities at the commencement of construction and must remain clearly visible for the duration of the project.

The Site Manager must enter their name and mobile telephone number in the box on the poster. In the event of any accidental damage to any trees (including rooting damage), the Site Manager must contact the Arboricultural Supervisor immediately to seek further advice.

This poster may be printed out and laminated or requested electronically as an A4 PDF or ready printed on laminated board.

Printing Instructions (A4 printing only):

- For the best results, this document should be printed using a colour laser printer and laminated.
- Open this file in Adobe Acrobat Reader or Acrobat Pro.
- Select *File > Print*.
- Choose the printer and make sure it is set to print on A4 paper.
- Under *Size Options*, choose "*Actual size*".
- Under *Orientation*, choose "*Portrait*".
- Select *Print*.

Electronic Copies:

- This document may be downloaded directly from the Advanced Arboriculture website using the following links:

  A4: http://www.advancedarb.com/download/siteposterA4.pdf
  A3: http://www.advancedarb.com/download/siteposterA3.pdf

These documents may only be used for projects where Advanced Arboriculture have been appointed as the arboricultural supervisors.

Arboricultural Supervisor
(unless otherwise instructed)

Name: Tom Hurley
Company: Advanced Arboriculture

[redacted]

Drawing Title:
Site Office Tree Poster

Date:	Drawing Number:	Revision:
01.02.2021	AGS802	1.0
Scale:	**Paper Size:**	**Drawn By:**
n/a	A3	TH

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EUTOPIA

HOMES

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Biodiverstity Net Gain Report

Great Western Yard

Burton Reid Associates

EUTOPIA

HOMES

COMPANY PHILOSOPHY

Burton Reid Associates are a multi-disciplinary consultancy specialising in providing high quality ecological and landscape design and advice related to the provision of embedded green and blue infrastructure and biodiversity net gains. We have a simple philosophy, designing with nature in mind supports the long-term health and wellbeing of us all. We work with clients who share this philosophy.

We can help you to achieve biodiversity net gains and deliver high-quality green infrastructure at a local and strategic level. We provide expert ecological services, undertaking surveys for protected species and habitats and supporting you to create on and off-site mitigation with our dedicated habitat management team. Our services include landscape architecture and production of high quality graphics that clearly communicate information and data.

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DOCUMENT CONTROL

Site name:	Great Western Yard, Gloucester
Project No:	BR0696
Document Title:	Biodiversity Net Gain Report
Document No:	BR0696/BNG/A
Client:	Eutopia Homes Ltd.
Date of survey:	June 2022

X	Original Document		Revision		Revision Code

Prepared by:	Tamsyn Bridger MSc ACIEEM	Senior Ecologist	[redacted]	28/06/2022
Checked by:	Jenni Reid CEnv MCIEEM	Founder	[redacted]	28/06/2022
Approved by:	Jenni Reid CEnv MCIEEM	Founder	[redacted]	28/06/2022

Revision Record

Rev Code	Date Prepared	Prepared By	Checker/Approved	Description of Changes

BURTON REID
ASSOCIATES

"As we rekindle our imagination, we discover our power to act. And that is the point at which we become unstoppable."

George Monbiot, journalist and author

BURTON REID
ASSOCIATES

DECLARATIONS OF COMPLIANCE

The report which we have prepared and provided is in accordance with the Chartered Institute for Ecology and Environmental Management's Code of Professional Conduct. We confirm that the opinions expressed are our true and professional bona fide opinions.

This report has been produced in accordance with British Standard 42020:2013 "Biodiversity, Code of practice for planning and development" and the Chartered Institute of Ecology and Environmental Management's Guidelines for Ecological Report Writing (CIEEM, 2017).

DATA VALIDITY

Please note that unless otherwise stated, the contents of this report will remain valid for a maximum period of 12 months from date of issue. Beyond this updated survey work may be required to establish any changes in baseline conditions.

DISCLAIMER

Burton Reid Associates has exercised all reasonable skill and due care in preparing this report. Burton Reid Associates has not, unless specifically stated, independently verified information provided by others. No other warranty, express or implied, is made in relation to the content of this report and Burton Reid Associates assumes no liability for any loss resulting from errors, omissions or misrepresentation made by others.

Any recommendation, opinion or finding stated in this report is based on circumstances and facts as they existed at the time that Burton Reid Associates performed the work (including based on the information provided by the client). Professional judgement and opinion has been utilised where required. All opinion is provided in good faith.

Nothing in this report constitutes legal advice or opinion. If legal opinion is required a qualified legal professional should be contacted for advice.

CONTENTS

1 INTRODUCTION

1.1 BACKGROUND

This document has been prepared by Burton Reid Associates on behalf of Eutopia Homes Ltd who intend to submit a planning application to Gloucester City Council for a residential development at approximately 3.5ha of land at Great Western Yard in Gloucester, hereinafter referred to as 'the Site'. The Site is defined on the map in Appendix I.

Biodiversity Net Gain (BNG) is an approach to development that aims to "leave the natural environment in a measurably better state than before". The recently enacted Environment Act 2021 now makes Biodiversity Net Gain a mandatory part of the development process. Local Planning Authorities (LPAs) have been given 18 months (as of November 2021) to fully implement this legislation, however many have already made BNG a requirement of new planning applications through local planning policy.

Furthermore, the recently updated National Planning Policy Framework (NPPF 2021) now states that the planning system should:

> *'contribute to and enhance the natural and local environment by …minimising impacts on and providing net gains for biodiversity…".* NPPF 2021 Paragraph 180 (d) *states 'opportunities to improve biodiversity in and around developments should be integrated as part of their design especially where this can secure measurable net gains for biodiversity..'*

As a result many Local Planning Authorities (LPAs) are now requiring planning proposals to demonstrate that a 10% net gain in biodiversity will be achieved through the use of the DEFRA Biodiversity Impact Assessment Calculator Metric. The use of a biodiversity metric for the Site was advised as part of pre-planning advice by Gloucester City Council to demonstrate a measurable biodiversity net gain in accordance with the Local Plan, NPPF (2021) and Section 40 of the NERC Act 2006.

1.2 PROPOSED DEVELOPMENT

The proposed development involves demolition of existing buildings at the Site and construction of a residential development of up to 315no. dwellings along with associated landscaping, parking, public open space and ancillary works. A plan showing the proposed development layout is provided in Appendix II.

1.3 SCOPE OF REPORT

This document details the findings of the Defra Biodiversity Metric Calculator Tool 3.1 and provides justification for the assessment of each habitat before and after development under each of the assessment criteria.

The Defra Biodiversity Metric Calculator 3.1 Tool spreadsheet accompanies this document. Headline results are provided in Section 5.

This document should be read in conjunction with the Ecological Impact Assessment report (Burton Reid Associates, 2022), which provides details of the survey methods and findings of the habitat survey as existing. Plans showing habitats as existing and those proposed using UKHAB classification symbology are provided in Appendices I and II respectively. Prescriptions for the establishment and long-term management of post-development habitats should be set out in an appropriate Landscape Management Plan, in place prior to the commencement of works.

2 METHODS OF ASSESSMENT

2.1 DEFINING AND MEASURING HABITAT AREAS

Baseline and post-development habitats were mapped, and areas measured, using Geographic Information System (GIS) software QGIS using georeferenced topographic survey plans and overlayed landscape proposals layouts for the development. Boundaries of baseline habitats were mapped on site as part of the UK Habitat Classification (UKHAB) survey carried out by Burton Reid Associates on 2nd September 2020 with an updated field survey on 13th August 2021. Full details of the UKHAB survey are provided in the Ecological Impact Assessment (EcIA) report (Burton Reid Associates, 2022).

2.2 MEASURES OF BIODIVERSITY VALUE

The biodiversity value of a site's habitats is assessed against a range of criteria including types of habitat present, their condition and strategic significance of a site's location in the context of the wider landscape. Below is an explanation of the criteria used to assess non-linear habitats:

1. **Habitat type** – Categorisation of habitats in the Biodiversity Metric 3.1 Tool is based on the broad habitats described by the UK Habitat Classification, with some habitats split into subcategories in accordance with descriptions provided in the Biodiversity Net Gain guidelines.
2. **Habitat distinctiveness** - An automatically generated value is based on the quality of the habitat present. On a scale from 'very low' to 'very high', this is a measure of how natural a habitat is, meaning a habitat characteristic of heavily modified land receives a low score and unmodified habitats are scored highly. Rare traditionally managed habitats (such as hay meadows) which are UK 'priority habitat' also receive high scores.
3. **Habitat condition** – Each habitat parcel is assessed by the ecologist against criteria in the condition assessments relevant to its respective broad habitat. Habitats are given a score of between 'poor' and 'good' condition, which is a measure of their level of ecological interest relative to other habitats of the same type. Generally, lower scoring habitats are those that have been subject to adverse anthropogenic pressures such as inappropriate management but can include natural factors such as damage by wild grazing animals.
4. **Strategic significance** – Including three categories based on the significance of a site's geography for connectivity within the landscape. The highest scoring of the three options is for land located within a priority area for ecological enhancement or that falls within a biodiversity network site designated within local or national green infrastructure strategies (e.g. Local Biodiversity Network sites, Nature Recovery Networks).

2.3 ASSESSMENT OF HABITAT CONDITION

Each habitat parcel included within the Site baseline calculations of the Metric Tool was assessed by the ecologist relating to its respective broad habitat as identified during the UK Habitat Classification survey. The assessment was carried out in accordance with the "Biodiversity Metric 3.1 - Technical Supplement" and "Biodiversity Metric 3.1 - Habitat Condition Assessment Sheets with Instructions", which provide guidance on choosing the correct condition assessment for the broad habitats present and how to correctly use and interpret these.

The condition assessment forms for each habitat type are provided in Appendix III. Habitat parcels of the same broad habitat and that meet the same assessment criteria have been grouped on the same form.

2.4 ASSESSMENT OF HEDGEROWS

Linear habitats including hedgerows are dealt with under separate calculators in the Metric. Therefore, development proposals must take into account impacts on these features separately to other habitats. The biodiversity value of these habitats is assessed against the same criteria as those described in Sections 2.2 and 2.3 above.

Hedgerows

The condition of hedgerows is determined through the assessment of each feature under eight criteria, where attributes must meet minimum requirements for the hedgerow be regarded as in favourable condition. The eight attributes are split into four functional groups (A-D), each with two attributes as follows (further details provided in Crosher et al., 2019):

- A1. Height – over 1.5m average along length.
- A2. Width – over 1.5m average along length.
- B1. Gap (hedge base) – Gap between ground and base of canopy less than 0.5m for over 90% of length (unless line of trees).
- B2. Gap (hedge canopy continuity) – Gaps make up less than 10% of total length and no canopy gaps over 5m.
- C1. Undisturbed ground and perennial vegetation – Over 1m measured from centre of hedge of undisturbed vegetation for over 90% of total length, on at least one side of the hedgerow.
- C2. Undesirable perennial vegetation – Plant species indicative of nutrient enrichment of soils dominate less than 20% cover of undisturbed ground at hedgerow base.
- D1. Invasive and neophyte species – Over 90% of the hedgerow and undisturbed ground is free of invasive non-native and neophyte species.

- D2. Current damage – Over 90% of the hedgerow or undisturbed ground is free of damage caused by human activities.

The condition of each hedgerow (poor, moderate or good) is determined by how many criteria are failed in total and if the hedgerow attributes fail more than one criterion from each group, as follows:

- Good - No more than 2 failures in total and no more than 1 in any functional group.
- Moderate - No more than 4 failures in total and fails both attributes in a maximum of one functional group.
- Poor - Fails a total of more than 4 attributes or both attributes in more than one functional group.

2.5 HABITAT CREATION AND ENHANCEMENT

Post-development, newly created habitats within the development area (On-Site) are entered in the 'Site Habitat Creation' tab of the Metric. These areas are generally those cleared to facilitate development or where a different broad habitat is created on the same footprint. Habitat 'enhancement' is where a habitat is retained and improved to create a similar broad habitat of higher distinctiveness and/or the same habitat of a higher condition to increase its biodiversity unit value in the Metric. An example of creating a habitat of higher distinctness through enhancement would be amenity grassland of 'low' distinctiveness which is overseeded with a diverse native wildflower seed mix to create a neutral grassland of 'medium' distinctiveness. This is not appropriate for where a habitat would need to be cleared or eventually lost during establishment of a higher value habitat. If a grassland habitat were to be planted with trees or shrubs to create an area of scrub or woodland, even if not being removed in the first instance, the grassland habitat will overtime be lost and so classifying this as enhancement is not appropriate.

Habitats proposed to be created or enhanced are assessed against the same criteria in Sections 2.2 and 2.3. The habitat type and condition are assessed based on what it is expected can be achieved taking into account the existing site conditions (soil type and likely nutrient content etc.), and future land use and management.

The assessment of new habitats also includes two further criteria with values automatically generated by the Metric based on the habitat type and condition proposed:

1. **Temporal multiplier** - The number of years that it is expected that the habitat will take to reach its target condition. Habitats such as woodland take longer to establish than grassland for example, so a higher number will be displayed here. Some habitats will take longer to establish if the proposed 'condition' of the habitat is set higher. Habitats that establish quicker will score higher in the Metric as it takes a shorter time for the habitat to reach a sufficient value for wildlife. This value is adjusted if commencement of habitat creation is to begin in advance of development or will be delayed. Due to this negative multiplier, if a habitat is cleared then a larger area of an identical habitat would be required to achieve no net loss of

habitat units.

2. **Difficulty multiplier –** A value between Low and High is generated based on how difficult the proposed habitat is to create. The higher the difficulty of creating the habitat, the higher the risk that it will fail to establish and a habitat of lower distinctiveness will likely be the result. This risk is dealt with in the calculations by reducing the unit score of the proposed habitat. For this reason, in many cases creation of a lower distinctiveness habitat will score higher in the Metric.
3. **Spatial risk (Off-Site only)** – Due to the general preference for providing biodiversity compensation in close proximity to where biodiversity loss is occurring, a spatial risk negative multiplier is applied to biodiversity units gained through creation or enhancement of 'Off-Site' habitats. Although there is no effect (a multiplier of 1) if habitats are located within proximity to the Site, there is an increasing negative effect on unit gains if Off-Site areas are located in the neighbouring Local Planning Authority or further afield (down to a multiplier of 0.5).

3 SITE HABITAT ASSESSMENT

This section provides justification for the assessment of each habitat under the criteria in the Metric tool as described in Section 2 above, except for where these are automatically generated. This may be the case when an assessment is not appropriate due to the habitat type, e.g. it is not appropriate to assess the condition of habitats with no inherent ecological value, such as buildings and hardstanding. Condition assessment forms for each habitat type are provided in Appendix III and summaries of the assessment results are provided in the tables below.

3.1 BASELINE (PRE-DEVELOPMENT)

3.1.1 Habitat baseline

Details of the habitats present within the existing Site and assessment of their biodiversity value are provided in Table 1 below. All existing habitats will be lost as a results of the development proposals, with the exception of a medium-sized Ash Fraxinus excelsior at the north-western tip of the Site.

Table 1: Site habitats before development

Ref.	Habitat and (Distinctiveness score*)	Description	Habitat Condition	Strategic Significance
1	Heathland and shrub – Mixed scrub **(Medium)**	Established stands of scrub forming boundary features and growing on former railway siding ballast / bare ground, comprising largely of Butterfly-bush *Buddleja* sp. and Bramble *Rubus fruticosus agg.*.	**Poor**	**Low** (Area/compensation not in local strategy/no local strategy)
2	Artificial unvegetated, unsealed surface **(V. Low)**	Compacted bare ground in builder's yard, along with gravel and bare ground along railway sidings. Some vegetation encroachment along railway sidings areas beginning to develop, but of limited extent and value.	**N/A – Other***	The Site is not located within a local strategy area.
3	Urban - Developed land; sealed surface **(V.Low)**	Existing disused buildings, along with areas of concrete hardstanding around the buildings and car park.	**N/A – Other***	
4	Vacant / derelict land / bareground **(Low)**	Area of alternating concrete and gravel strips being colonised by species-poor early successional vegetation. Not meeting criteria for Open Mosaic Habitat description but differing from neighbouring developed sealed land and artificial unvegetated land.	**Moderate**	
5	Urban – Urban Tree **(Medium)**	1no. small Sycamore *Acer pseudoplatanus (T2)*, 1no. medium Ash *Fraxinus excelsior (T1)*, and a line of 5no. Balsam Poplar *Populus balsamifera (G1)* present within the existing habitats on Site. All except the existing medium Ash tree to be lost during development.	**Moderate**	

*Automatically generated assessment by calculator.

3.1.2 Hedgerow baseline

Details of the hedgerows and treelines present within the existing Site and assessment of their biodiversity value are provided in Table 2 below. All existing hedges will be lost as a result of the development.

Table 2: Site hedgerows before development

Ref.	Habitat and (Distinctiveness score*)	Description	Habitat Condition	Strategic Significance
H1, H2 and H3	Hedge Ornamental Non-Native **(V. Low)**	Short sections of hedge (self-set in places) along the Site boundary with Great Western Road in the north-east of the Site. Comprising predominantly of Butterfly-bush (non-native) with some sections of Bramble.	**Poor** – Meets criteria A1 and B1.. Fails criteria A2, B2, C1, C2, D1 and D2.	**Low** (Area/compensation not in local strategy/no local strategy) The Site is not located within a local strategy area.

*Automatically generated assessment by calculator.

3.2 PROPOSED (POST-DEVELOPMENT)

3.2.1 Habitat creation

Details of the habitats proposed to be newly created during development of the Site and an assessment of their expected biodiversity value (in the long-term once habitats are established) are provided in Table 3 below. Post-development habitat types and anticipated condition assessments have been based on the landscape proposals contained within drawing ref. *7594-PHL-SW-XX-DR-L-1000* (Park Hood, 2022).

Table 3: Site habitat creation proposed after development

Ref.	Habitat and (Distinctiveness score*)	Description	Habitat Condition	Strategic Significance
1	Grassland – Modified grassland **(Low)**	Grasscrete parking provisions and "low maintenance" lawns in play areas.	**Poor** – these areas area anticipated to only pass criteria 6 and 7 of the Habitat Condition Assessment sheet "Grassland (Low)".	**Low** (Area/compensation not in local strategy/no local strategy) The Site is not located within a local strategy area.
2	Grassland – Other neutral grassland **(Medium)**	Wildflower meadow mix seeding in public open space.	**Moderate** – habitat anticipated to pass criteria 3, 4, 5 and 6 of the Habitat Condition Assessment sheet "Grassland (Medium and High)".	
3	Heathland and shrub – Mixed scrub **(Medium)**	Wildlife buffer planning mix, native species.	**Poor** - habitat anticipated to pass criteria 1 and 3, of the Habitat Condition Assessment sheet "Scrub". Potential for criteria 2 and 4 to be passed through appropriate long-term management, however given the limited extent of the areas proposed, it is considered unlikely that the scrub provision would reach "Moderate" quality.	
4	Urban – Biodiverse green roof **(Medium)**	Green roof provisions on Blocks A, B, C and D	**Moderate** – through appropriate further detailed design, proposals have the potential to pass criteria 2, 3, and 4c2 of the Habitat Condition Assessment sheet "Urban" (4 criteria assessed).	

Ref.	Habitat and (Distinctiveness score*)	Description	Habitat Condition	Strategic Significance
5	Urban – developed land; sealed surface **(V. Low)**	Buildings, tarmac roadways and paved public spaces.	**N/A – Other***	
6	Urban – Introduced shrub **(Low)**	Planted beds in public open spaces with "naturalistic planting mixes" of shrubs, perennials and grasses.	**Condition Assessment N/A***	
7	Urban – Rain garden **(Low)**	Planted beds in public open spaces with "SUDs planting" of shrubs, perennials and grasses.	**Moderate** - habitat anticipated to pass criteria 2 and 3 of the Habitat Condition Assessment sheet "Urban" (3 criteria assessed).	
8	Urban – Vegetated garden **(Low)**	Private residential gardens	**Condition Assessment N/A***	
9	Urban – Urban tree **(Medium)**	Urban tree planting in public open spaces.	**Moderate -** habitat anticipated to pass criteria 2, 4 and 6 of the Habitat Condition Assessment sheet "Urban Tree". Some tree planting will involve native species, in which case criteria 1 may also be passed in some instances.	

*Automatically generated assessment by calculator.

3.2.2 Hedgerow creation

Details of the habitats proposed to be newly created during development of the Site and an assessment of their expected biodiversity value are provided in Table 5 below.

Table 5: Site hedgerow creation proposed after development

Ref.	Habitat and (Distinctiveness score*)	Description	Habitat Condition	Strategic Significance
All	Native hedgerow (**Low**)	New Hornbeam *Carpinus betulus* hedges proposed around apartment blocks and property frontages with roads..	**Poor** – Single species, ornamental in nature.	**Low** (Area/compensation not in local strategy/no local strategy) The Site is not located within a local strategy area.

*Automatically generated assessment by calculator.

4 HEADLINE RESULTS

Based on the above assessment of habitats before and after development, and the habitat area measurements given in the accompanying Biodiversity Metric Calculator 3.1 Tool (distribution of post-development habitats shown on plan in Appendix II), the following headline results were returned:

On-site baseline	Habitat units	5.39
	Hedgerow units	0.10
	River units	N/A
On-site post-intervention (Including habitat retention, creation and enhancement)	Habitat units	6.73
	Hedgerow units	1.48
	River units	N/A
On-site net % change (Including habitat retention, creation and enhancement)	Habitat units	+24.96%
	Hedgerow units	+1364.14%
	River units	N/A

Total net unit change (Including all on-site & off-site habitat retention, creation and enhancement)	Habitat units	1.34
	Hedgerow units	1.38
	River units	N/A
Total on-site net gain change plus off-site surplus (Including all on-site & off-site habitat retention, creation and enhancement)	Habitat units	+24.96%
	Hedgerow units	+1364.14%
	River units	N/A

Trading Rules Satisfied?	No

The proposed development would result in the loss of approximately 0.75ha of mixed scrub (a medium distinctness habitat in Poor condition, comprising heavily of non-native Butterfly-bush and Bramble) representing 3.02 habitat units, which would need to be off-set by establishment of the same broad habitat type or higher distinctiveness habitat to provide at least this unit value lost through development. It is considered that the loss of this habitat of relatively low ecological value within the context of the Site and wider area is not significant and that similar opportunities for wildlife will be provided by extensive tree and shrub planting in the public realm.

5 CONCLUSION

Using the Biodiversity Metric Calculator 3.1 Tool, the biodiversity unit baseline (before development) has been calculated as 5.39 habitat units and 0.10 hedgerow units. The post- development score has been calculated under current proposals as 6.73 habitat units, which is an increase in 1.34 units (+24.96%) and 1.48 hedgerow units, which is an increase of 1.38 units (+1364.14%).

It is considered this assessment can robustly demonstrate the development as proposed will achieve a measurable 10% Biodiversity Net Gain in accordance with emerging national and local planning policy. Long-term management prescriptions for these habitats should be implemented via a Landscape Management Plan to ensure the longevity of their ecological value and that the target conditions set out within the Metric calculations are reached.

6 REFERENCES

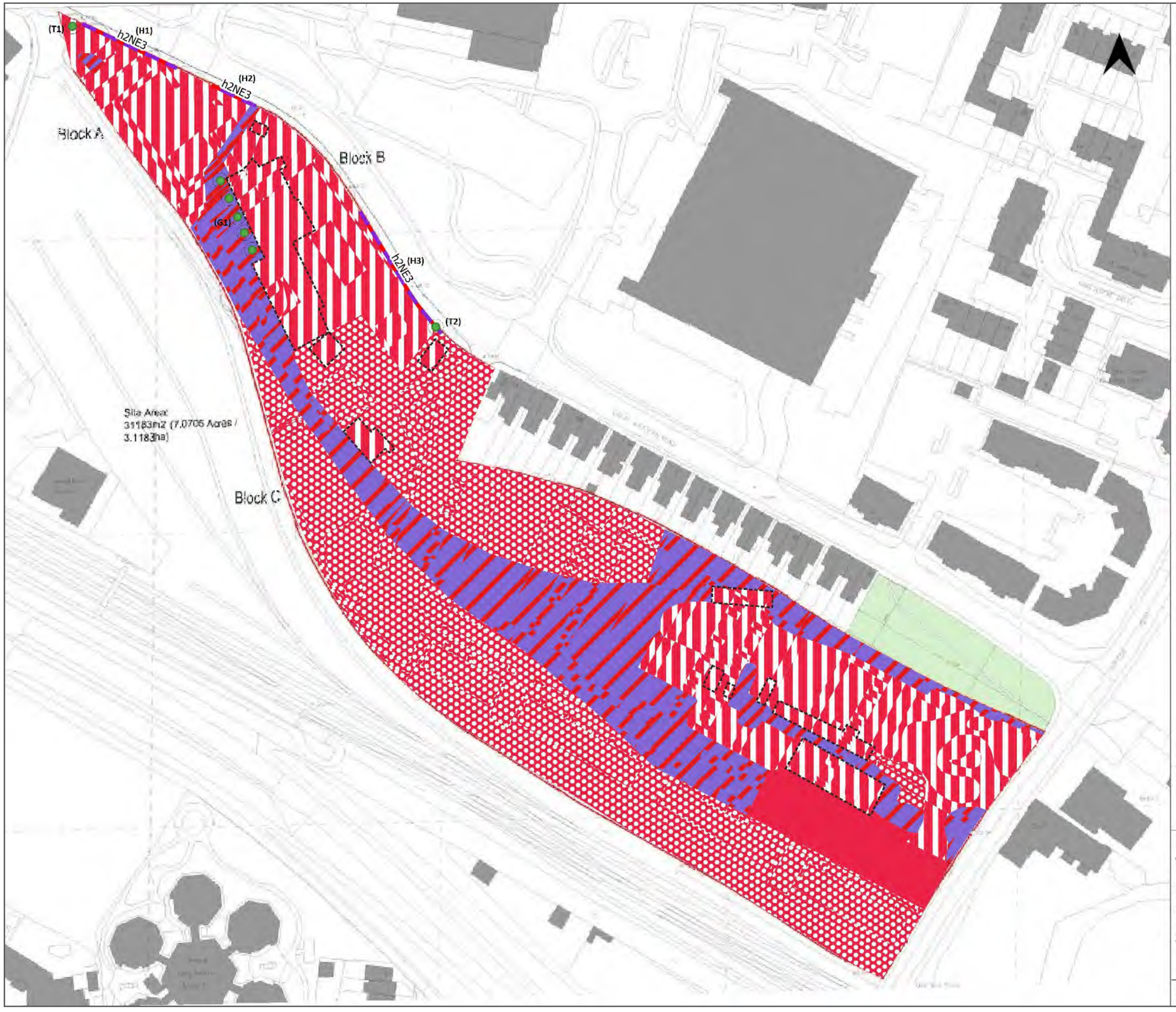
Burton Reid Associates (2022) *Ecological Impact Assessment: Great Western Yard, Gloucester*. June 2022. Burton Reid Associates, Buckfastleigh.

Butcher, B., Carey, P., Edmonds, R., Norton, L. and Treweek, J. (2020). The UK Habitat Classification User Manual Version 1.1. at http://www.ukhab.org/

Panks, S., White, N., Newsome, A., Nash, M., Potter, J., Heydon, M., Mayhew, E., Alvarez, M., Russell, T., Cashon, C., Goddard, F., Scott, S. J., Heaver, M., Scott, S. H., Treweek, J., Butcher, B. & Stone, D. (2022a) *Biodiversity metric 3.1: Auditing and Accounting For Biodiversity - User Guide.* Natural England.

Panks, S., White, N., Newsome, A., Nash, M., Potter, J., Heydon, M., Mayhew, E., Alvarez, M., Russell, T., Cashon, C., Goddard, F., Scott, S. J., Heaver, M., Scott, S. H., Treweek, J., Butcher, B. & Stone, D. (2022b) *Biodiversity metric 3.1: Auditing and Accounting For Biodiversity – Technical Supplement.* Natural England.

7 APPENDICES



Key

URBAN TREES

- Existing Large
- Existing Medium
- Existing Small

HEDGEROWS

- Hedge Ornamental Non Native

HABITATS

- Artificial unvegetated, unsealed surface
- Developed land; sealed surface
- Mixed scrub
- Vacant/derelict land/ bareground
- Buildings

BURTON REID ASSOCIATES

Great Western Yard, Gloucester

Eutopia Homes Ltd

Biodiversity Net Gain - Baseline Habitats

June 2022

BY TB | **DOC REF** BR0696/BNG/A | **REV.** A

BURTON REID ASSOCIATES

Project No:	BR0696	**Date:**	June 2022
Client:	Eutopia Homes Ltd.	**Project:**	Great Western Yard, Gloucester
Status:	Survey	**Figure:**	APPENDIX I: BASELINE (PRE-DEVELOPMENT) HABITAT PLAN

Key

URBAN TREES

- Existing Large
- Existing Medium
- Existing Small

HEDGEROWS

- Native Hedgerow

HABITATS

- Vegetated garden
- Biodiverse green roof
- Rain garden
- Developed land; sealed surface
- Introduced shrub
- Mixed scrub
- Modified grassland
- Other neutral grassland
- Buildings

BURTON REID ASSOCIATES

Great Western Yard, Gloucester

Eutopia Homes Ltd

Biodiversity Net Gain - Proposed Habitats

June 2022

BY TB | **DOC REF** BR0696/BNG/A | **REV.** A

BURTON REID ASSOCIATES

Project No:	BR0696	**Date:**	June 2022
Client:	Eutopia Homes Ltd.	**Project:**	Great Western Yard, Gloucester
Status:	Survey	**Figure:**	APPENDIX III: PROPOSED (POST-DEVELOPMENT) HABITAT PLAN

APPENDIX III: HABITAT CONDITION ASSESSMENT FORMS

Site name/location	Land at Great Western Yard, Gloucester	**Onsite/offsite**	Onsite
Limitations (if applicable)	None	**Metric 3.1 survey ref**	n/a
Metric 3.1 habitat type	Heathland and shrub - Mixed scrub	**Condition sheet used**	19. SCRUB

Habitat Description

Established stands of scrub forming boundary features and growing on former railway siding ballast / bare ground, comprising largely of Butterfly-bush Buddleja sp. and Bramble Rubus fruticosus agg..

	Condition Assessment Criteria	Condition Achieved (Y/N)	Notes/Justification
1	Habitat is representative of UKHab description (where in its natural range). There are at least three woody species, with no one species comprising more than 75% of the cover (except common juniper, sea buckthorn or box, which can be up to 100% cover).	N	Primarily limited to Buddleja and Bramble with limited occurrences of other shrub species.
2	There is a good age range – all of the following are present: seedlings, young shrubs and mature shrubs.	N	All growth relatively young / early successional scrub.
3	There is an absence of invasive non-native species (as listed on Schedule 9 of WCA, 1981) and species indicative of sub-optimal condition (see footnote 1) make up less than 5% of ground cover.	N	Japanese Knotweed (WCA9) present in east of site. Buddleja abundant.
4	The scrub has a well-developed edge with scattered scrub and tall grassland and/or herbs present between the scrub and adjacent habitat(s).	N	Well developed edge not present.
5	There are clearings, glades or rides present within the scrub, providing sheltered edges.	N	Not present.
		Number of criteria passed	0

Condition Assessment Result	Condition Assessment Score	Score Achieved (✓)
Passes 5 of 5 criteria	Good (3)	
Passes 3 or 4 of 5 criteria	Moderate (2)	
Passes 0, 1 or 2 of 5 criteria	Poor (1)	✓

Footnote 1 - Species indicative of sub-optimal condition for this habitat type include: tree-of-heaven *Alianthus altissima*, holm oak *Quercus ilex*, turkey oak *Quercus cerris*, creeping thistle *Cirsium arvense*, common nettle *Urtica dioica*, cherry laurel *Prunus laurocerasus*, snowberry *Symphoricarpos* spp., buddleia *Buddleja* spp., cotoneaster *Cotoneaster* spp., Spanish bluebell *Hyacinthoides hispanica* (or hybrids).

Site name/location	Land at Great Western Yard, Gloucester	**Onsite/offsite**	Onsite
Limitations (if applicable)	None	**Metric 3.1 survey ref**	n/a
Metric 3.1 habitat type	Urban – Vacant/derelict land/bare ground	**Condition sheet used**	21. URBAN

Habitat Description

Area of alternating concrete and gravel areas being colonised by species-poor early successional vegetation. Not meeting criteria for Open Mosaic Habitat description but differing from neighbouring developed sealed land and artificial unvegetated land and therefore considered worthy of separate assessment.

	Condition Assessment Criteria	**Condition Achieved (Y/N)**	**Notes / Justification**
CORE CRITERIA - applicable to **all urban habitat types:**			
1	Vegetation structure is varied, providing opportunities for insects, birds and bats to live and breed. A single ecotone (i.e. scrub, grassland, herbs) should not account for more than 80% of the total habitat area.	Y	Borderline. Vegetation structure shows some variation and does not represent an ecotone, however does not provide suitable habitat for nesting birds or roosting bats.
2	There is a diverse range of flowering plant species, providing nectar sources for insects. These species may be either native, or non-native but beneficial to wildlife. **NB - To achieve GOOD condition, criterion 2 must be satisfied by native species only (rather than non-natives beneficial to wildlife). Note that Biodiverse green roofs are exempt from this requirement, and can include non-native sedums, as set out in footnote 1.**	N	Relatively species poor.
3	Invasive non-native species (Schedule 9 of WCA) cover less than 5% of total vegetated area. **NB - To achieve GOOD condition, criterion 3 must be satisfied by a complete absence of invasive non-native species (rather than <5% cover).**	Y	No WCA Sch9 species recorded in this habitat area.
ADDITIONAL CRITERION - only applicable to **Open mosaic on previously developed land** habitat type:			
4a		N/A	
ADDITIONAL CRITERION - only applicable to **Bioswale and SUDS** habitat types:			
4b		N/A	
ADDITIONAL CRITERION - only applicable to **green roof** habitat types (select as necessary):			
4c1		N/A	
4c2		N/A	
	Essential criterion 2&3 achieved? (must be achieved to score a good condition for non biodiverse green roofs) (Y/N)		N
	Number of criteria passed		2

If 3 criteria assessed:	
• Passes 3 of 3 core criteria; AND • Meets the requirements for good condition within criteria 2 and 3	Good (3)

• Passes 2 of 3 core criteria; OR • Passes 3 of 3 core criteria but does not meet the requirements for good condition within criteria 2 and 3	Moderate (2)	✓
• Passes 0 or 1 of 3 core criteria	Poor (1)	
If 4 criteria assessed: N/A		
• Passes 3 of 3 core criteria; AND • Meets the requirements for good condition within criteria 2 and 3; AND • Passes additional criterion 4a or 4b	Good (3)	
• Passes 2 of 3 of 4 criteria; OR • Passes 4 of 4 criteria but does not meet the requirements for good condition within criteria 2 and 3	Moderate (2)	
• Passes 0 or 1 of 4 criteria	Poor (1)	

Site name/location	Land at Great Western Yard, Gloucester	**Onsite/offsite**	Onsite
Limitations (if applicable)	None	**Metric 3.1 survey ref**	n/a
Metric 3.1 habitat type	Urban – Urban tree	**Condition sheet used**	22. URBAN TREE

Habitat Description

1no. small Sycamore Acer pseudoplatanus, 1no. medium Ash Fraxinus excelsior, and a line of 5no. Balsam Poplar Populus balsamifera present within the existing habitats on Site. All except the existing medium Ash tree to be lost during development.

Covers the following topographical formations most commonly found in urban areas[1]:

Individual Trees: Young trees over 75mm in diameter measured at 1.5m from ground level and individual semi-mature and mature trees of significant stature and size that dominate their surroundings whose canopies are not touching but that are in close proximity to other trees.

Perimeter Blocks: Groups or stands of trees within and around boundaries of land, former field boundary trees incorporated into developments, individual trees in gardens whose canopies overlap continuously

Linear Blocks: Lines of trees along streets, highways, railways and canals whose canopies may or may not overlap continuously.

	Condition Assessment Criteria	Condition Achieved (Y / N)	Notes/Justification
1	The tree is a native species(or more than 70% within the block are native species).	T1: Y T2: N G1: N	Sycamore (T2) is a naturalised species within the UK having been introduced to the UK sometime in the 15th or 16th century, but is not native. Balsam Poplar (G1) is native to North America.
2	The tree canopy is predominantly continuous, with gaps in canopy cover making up <10% of total area and no individual gap being >5 m wide (individual trees automatically pass this criterion).	Y (all)	Individual trees automatically pass this criterion.

3	The tree is mature[2] or veteran[3] (or more than 50% within the block are mature[2] or veteran[3]).	N (all)	All trees semi-mature.
4	There is little or no evidence of an adverse impact on tree health by anthropogenic activities such as vandalism or herbicide use. There is no current regular pruning regime so the trees retain >75% of expected canopy for their age range and height.	Y (all)	Trees do not undergo any obvious management.
5	Micro-habitats for birds, mammals and insects are present e.g. presence of deadwood, cavities, ivy or loose bark	N (all)	Features not present on any of the trees.
6	More than 20% of the tree canopy area is oversailing vegetation beneath.	Y (all)	All trees oversail vegetation for at least 50% of the canopy extent.
Number of criteria passed			T1: 4, T2: 3, G1: 3

Condition Assessment Result	Condition Assessment Score	Score Achieved >/<
Passes 5 or 6 of 6 criteria	Good (3)	
Passes 3 or 4 of 6 criteria	Moderate (2)	✓ (all existing trees)
Passes 0, 1 or 2 of 6 criteria	Poor (1)	

Footnote 1 - This covers all trees in artificial urban habitats such as private gardens, private land, institutional land and land used for transport functions; roads, streets, canals, rail, footpaths etc. Trees in urban areas can under the right conditions provide a large range of habitat opportunities, supporting lichens, invertebrates and birds. Tree planting in urban areas has for over two hundred years also introduced non-native species into towns and cities. In the context of biodiversity native species are the preferred option. However, non-native tree species can contribute positively to biodiversity richness particularly in relation to providing a seasonal food source for nectar feeders and other invertebrates as well as supporting vertebrates that feed on species that are hosted by non-native trees. Examples are early and late flowering species of *Prunus* and aphids on varieties of *Acer* providing food for species higher up the food chain. The species of trees (native or non-native) together with the intensity and type of management they are subject to will determine the biodiversity value of the trees in question. Trees in urban areas provide opportunistic sites for biodiversity to colonise and re-colonise, increasing connectivity and contributing to biodiversity critical mass between already established patches or sites. This is especially so where transport corridors are populated with mixed native species

Footnote 2 - A mature tree in this context is one that is at least 2/3 expected fully mature height for the species.

Footnote 3 - All ancient trees are veteran trees, but not all veteran trees are ancient. A veteran tree may not be very old, but it has decay features, such as branch death and hollowing. These features contribute to its biodiversity, cultural and heritage value. Veteran trees can be classified if they have four out of the five following features:

(1) Rot sites associated with wounds which are decaying >400cm2; (2) Holes and water pockets in the trunk and mature crown >5 cm diameter; (3) Dead branches or stems >15 cm diameter; (4) Any hollowing in the trunk or major limbs; (5) Fruit bodies of fungi known to cause wood decay.

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BURTON REID
ASSOCIATES

Building with Nature

CIEEM REGISTERED PRACTICE 2021-2022

Landscape Institute Registered Practice

LF/P20-0832 Planning Portal Reference: **PP-11367132**

21st July 2022

Adam Smith
Gloucester City Council
Development Control
Gloucester City Council
PO Box 3252
Gloucester
GL1 9FW

Dear Adam,

P20-0832 Great Western Yard, Great Western Road
Residential development of up to 315 dwellings with associated landscaping, parking, open space and ancillary works including demolition of existing buildings.

Pegasus are pleased to submit a full planning application for the development described above, on behalf of our client Eutopia Homes (Gloucester) Ltd at Great Western Yard, Great Western Road, Gloucester.

The site is draft allocation SA05 in the emerging Gloucester City Local Plan and extensive pre-application discussions have taken place between yourself, Jon Bishop and our client, Lorna Henderson of Eutopia Homes.

The application is submitted with a comprehensive suite of associated technical documentation, as required by the Gloucester City Local Validation Checklist, which for convenience is listed below.

The application plans are detailed in the accompanying table at Appendix 1.

In summary the following information is submitted;

1. Planning Application forms including signed Certificate A
2. CIL forms
3. Site Location Plan
4. Existing and Proposed Block Plan

5. Demolition Plan

6. Comprehensive suite of existing and proposed plans as per the table below:

Drawing Title	Reference	Rev
Design		
Existing Site Plan	19050-01-0-00	PL
Topographical Survey	19050-01-0-01	PL
Demolition Plan	19050-01-0-02	PL
Proposed Site Plan	19050-03-0-00	PL
Proposed Phasing Plan	19050-03-0-01	PL
Proposed Site Plan Northern Phase	19050-N-03-0-00	PL
Proposed Site Plan Southern Phase	19050-S-03-0-00	PL
Proposed Site Wide – Ground Floor Plan	19050-SW-03-1-00	PL
Proposed Site Wide – 1st Floor Plan	19050-SW-03-1-01	PL
Proposed Site Wide – 2nd Floor Plan	19050-SW-03-1-02	PL
Proposed Site Wide – 3rd Floor Plan	19050-SW-03-1-03	PL
Proposed Site Wide – 4th Floor Plan	19050-SW-03-1-04	PL
Proposed Roof Plan	19050-SW-03-1-05	PL
Street Elevetions Sheet 1 of 2	19050-SW-03-2-00	PL
Street Elevations Sheet 2 of 2	19050-SW-03-2-01	PL
House Type Plans – Block A		
Block A – Ground Floor Plan	19050-A-03-1-00	PL
Block A – Proposed 1st Floor Plan	19050-A-03-1-01	PL
Block A – Proposed 2nd Floor Plan	19050-A-03-1-02	PL
Block A – Proposed 3rd Floor Plan	19050-A-03-1-03	PL
Block A – Proposed 4th Floor Plan	19050-A-03-1-04	PL
Block A – Proposed Roof Plan	19050-A-03-1-05	PL
Block A – Apartment Elevations	19050-A-03-2-01	PL
Block A – Bay Studies	19050-A-03-2-02	PL
Block A – Apartment Sections	19050-A-03-3-01	PL
House Type Plans – Block B		
Block B – Ground Floor Plan	19050-B-03-1-00	PL
Block B – Proposed 1st Floor Plan	19050-B-03-1-01	PL
Block B – Proposed 2nd Floor Plan	19050-B-03-1-02	PL
Block B – Proposed 3rd Floor Plan	19050-B-03-1-03	PL
Block B – Proposed 4th Floor Plan	19050-B-03-1-04	PL
Block B – Proposed Roof Plan	19050-B-03-1-05	PL
Block B – Apartment Elevations Sheet 1 of 3	19050-B-03-2-01	PL
Block B – Apartment Elevations Sheet 2 of 3	19050-B-03-2-02	PL

Block B – Apartment Elevations Sheet 3 of 3	19050-B-03-2-03	PL
Block B – Bay Studies	19050-B-03-2-04	PL
Block B – Apartment Sections	19050-B-03-3-01	PL
House Type Plans – Block C		
Block C – Ground Floor Plan	19050-C-03-1-00	PL
Block C – Proposed 1st Floor Plan	19050-C-03-1-01	PL
Block C – Proposed 2nd Floor Plan	19050-C-03-1-02	PL
Block C – Proposed 3rd Floor Plan	19050-C-03-1-03	PL
Block C – Proposed Roof Plan	19050-C-03-1-05	PL
Block C – Apartment Elevations	19050-C-03-2-01	PL
Block C – Bay Studies	19050-C-03-2-02	PL
Block C – Apartment Sections	19050-C-03-3-01	PL
House Type Plans – Block D		
Block D – Ground Floor Plan	19050-D-03-1-00	PL
Block D – Proposed 1st Floor Plan	19050-D-03-1-01	PL
Block D – Proposed 2nd Floor Plan	19050-D-03-1-02	PL
Block D – Proposed 3rd Floor Plan	19050-D-03-1-03	PL
Block D – Proposed Roof Plan	19050-D-03-1-05	PL
Block D – Apartment Elevations	19050-D-03-2-01	PL
Block D – Bay Studies	19050-D-03-2-02	PL
Block D – Apartment Sections	19050-D-03-3-01	PL
House Type Plans		
House Elevations – 3B 5P Type 1	19050-03-02-01- 3b5p	PL
House Elevations – 3B 4P Type 1	19050-03-02-02-3b4p	PL
House Elevations – 3B 5P Type 2	19050-03-02-03-3b4p	PL
House Elevations – 2B 3P Type 1	19050-03-02-04-2b3p	PL
House Elevations – 2B 3P Type 2	19050-03-02-05-2b3p	PL
House Sections – 3B 5P Type 1	19050-03-03-01- 3b5p	PL
House Sections – 3B 4P Types 1&2	19050-03-03-02-3b4p	PL
House Sections – 2B 3P Type 1&2	19050-03-03-03-2b3p	PL
House Plans -2b3p Type 1&2	19050-05-4-00-2b3p	PL
House Plans – 3B 4P Types 1&2	19050-05-4-00-3b4p	PL
House Plans – 3B 5P Type 1	19050-05-4-00-3b5p	PL
Proposed Apt Studio Type 1	19050-05-4-00-0B1	PL
Proposed Apt Studio Type 2	19050-05-4-00-0B2	PL
Proposed Apt 1b Type 1	19050-05-4-00-1B1	PL
Proposed Apt 1b Type 2	19050-05-4-00-1B2	PL
Proposed Apt 1b Type 3	19050-05-4-00-1B3	PL
Proposed Apt 1b Type 4	19050-05-4-00-1B4	PL
Proposed Apt 1b Type 5	19050-05-4-00-1B5	PL

Proposed Apt 1b Type 6	19050-05-4-00-1B6	PL
Proposed Apt 2b Type 1	19050-05-4-00-2B1	PL
Proposed Apt 2b Type 2	19050-05-4-00-2B2	PL
Proposed Apt 2b Type 3	19050-05-4-00-2B3	PL
Proposed Apt 2b Type 4	19050-05-4-00-2B4	PL
Proposed Apt 2b Type 5	19050-05-4-00-2B5	PL
Proposed Apt 2b Type 8	19050-05-4-00-2B8	PL
Proposed Apt 2b Type 9	19050-05-4-00-2B9	PL
Proposed Apt 2b Type 10	19050-05-4-00-2B10	PL
Proposed Apt 2b Type 11	19050-05-4-00-2B11	PL
Proposed Apt 2b Type 12	19050-05-4-00-2B12	PL
Proposed Apt 3b Type 1	19050-05-4-00-3B01	PL
Proposed Apt 3b Type 2	19050-05-4-00-3B02	PL
Proposed Apt 3b Type 3	19050-05-4-00-3B03	PL
Landscape Plans		
Proposed Landscape Plan	7594-PHL-SW-XX-DR-L-1000	03

7. Design and Access Statement including Townscape and Visual Analysis and Daylight and Sunlight Assessment (Darling Associates Architects)

8. Planning Statement including Affordable Housing Statement and Draft S.106 Heads of Terms (Pegasus)

9. Air Quality Assessment (esd)

10. Statement of Community Involvement (Polity)

11. Landscape Management and Maintenance Plan (Parkhood)

12. Landscape Plan (Park Hood)

13. Arboricultural Assessment including Tree Protection Plan and Arboricultural Method Statement (Advanced Arboriculture)

14. Detailed Quantitative Risk Assessment (Hydrock)

15. Supplementary Phase 2 Ground Investigation Report (Hydrock)

16. Transport Assessment (Vectos)

17. Framework Travel Plan (Vectos)

18. Flood Risk Assessment and Drainage Strategy (IDOM)

19. Heritage Assessment (Pegasus)

20. Condition of Buildings Report (Artisan)
21. Noise Impact Assessment (Hann Tucker Associates)
22. Ecological Impact Assessment (Burton Reid)
23. Biodiversity Net Gain Report (Burton Reid)
24. Shadow Habitats Regulations Assessment (Burton Reid)
25. Energy Strategy (esd)
26. Waste Minimisation Report (IDOM)

The Viability Assessment, which is being prepared by Pioneer, will follow. Please note that it is our client's intention that the proposal will deliver affordable housing and that this will be negotiated through the application process subject to the findings of the Pioneer Viability Assessment.

I can confirm that our client has paid the requisite planning application fee to the Planning Portal of £59,461.20.

Pre-application discussions confirmed that the proposals do not constitute EIA development and therefore the application is not accompanied by an Environmental Statement.

I trust you have all the documentation required to validate this planning application.

Meanwhile should you have an queries, please do not hesitate to contact me. I together with our client, look forward to working with you on this full planning application to deliver a new sustainable residential quarter on the edge of the City Centre.

Yours sincerely,

[redacted]

Louise Follett
Principal Planner
[redacted]

Great Western Yard,
Gloucester

Design & Access Statement

July 2022

EUTOPIA
HOMES

DARLING ASSOCIATES
ARCHITECTS

Contents

Design Statement

1.0 Introduction

1.1 Executive Summary - The Project

Overview

This Design and Access Statement has been prepared by Darling Associates on behalf of Eutopia Homes to support a planning application for a residential mixed-tenure development at Great Western Yard, Great Western Road, Gloucester.

Project Description

The redevelopment of Great Western Yard will provide 315 new homes, in four and five storey blocks and a mix of two storey town houses. New gateways into the site will provide a sense of place as well as connecting large areas of new and existing green space.

Purpose of the Document

The purpose of this document is to show the design evolution of the project; linking a technical assessment of the site constraints with a best scenario design response to them. The document should be read in conjunction with the documents submitted as part of this application.

Vision Statement

- Creation of a new, high quality and sustainable residential neighbourhood which reduces reliance on the private car and encourages walking and cycling.
- Creation of a mixed tenure development.
- Give an underused, secluded site a new identity.
- Creation of a new neighbourhood which fits with the existing townscape.
- Creating high-quality green spaces that people will want to use.
- Reduce car dominance & encourage sustainable trips through walking and cycling.

View along Great Western Road

1.2 Executive Summary - The Client & The Brief

The Client

At Eutopia Homes, place making is at the heart of everything they do. They strive to acquire projects in locations that can help be a catalyst for urban regeneration and deliver homes and communities that people aspire to live in.

Focusing on urban brownfield sites, Eutopia Homes start from the ground up and work with some of the leading design and place making practices to create long-term communities. At the heart of all of the projects is a sustainable ethos, be that proximity to local transport hubs or utilising off-site construction techniques to reduce waste.

Eutopia Homes creates homes across the complete housing spectrum from affordable housing, private for sale and the private rental sector. Eutopia Homes provides local amenities and residents facilities on their sites to help deliver a sense of community both within and outside the projects.

Eutopia Homes 'Ethos'

The core values of Eutopia Homes are;

- Delivering homes in great places
- Developing a strong sense of community
- Focus on good quality landscaping
- Producing homes that people can afford to buy or rent
- High quality design with great space planning
- Regenerating brownfield urban sites
- Delivering creative spaces and co-working opportunities
- Modern design philosophies that focus on shared communal landscaping for high density environments
- Sustainable ethos with reduced car dependency, shared parking arrangements and increased cycle usage

The Brief

The Great Western Yard brief was to provide a mix of accomodation types to create a diverse offering to Gloucester housing.
The scheme intends to diversify the tenure to provide a blend of private sale and affordable homes to attract a varied demographic to the development, creating a true mixed-tenure community.

Provide high quality communal amenity across the development as a whole with public green spaces, generous communal amenity areas (internal and external) and private amenity areas too.

EUTOPIA HOMES






Eutopia Homes Projects

1.3 Darling Associates Profile

Overview

Our approach begins and ends with the objective of creating beautiful places to live, work and relax. The practice is listed as one of the top UK architecture practices in the Architect's Journal Top 100 list and has won multiple awards for architectural schemes across the UK.

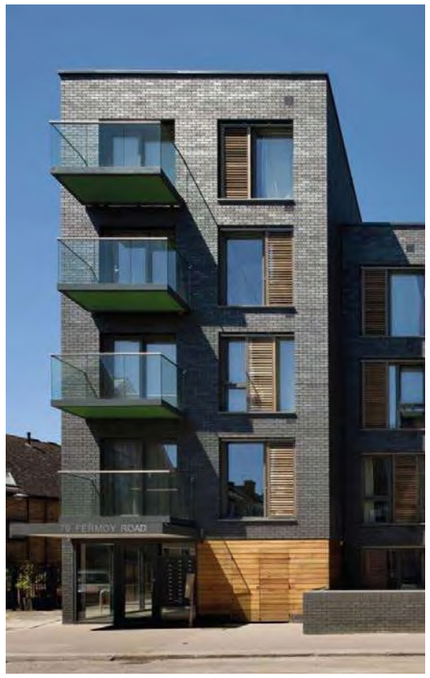
Our multi-disciplinary team works across multiple sectors, including affordable to luxury residential developments, offices, hotels, leisure and retail schemes. Each team brings with them a wealth of skills and expertise to deliver minor to major projects across the world.

Every building we create is underpinned with a collective desire to produce elegant and beautiful architecture, delivered by a dynamic and stimulated creative studio.

We work with major clients including Berkeley Group, Canary Wharf Developments, Essential Living, Legal and General, Helical Bar, Salmon Developments/NFU and Lend Lease. We value and nurture these long-term relationships and regularly receive repeat commissions to deliver a wide range of high-quality architecture.

With every single project, our ambition is to design beautiful and elegant architecture and provide all our clients with an exemplary service.
We work in a range of affordable to luxury residential projects, hotels, offices and retail schemes – and our diverse and talented team have the skills to deliver major, complex projects.

Lollard Street, Lambeth



Fermoy Road, Westminster

Exmouth Junction, Exeter

2.0 Context

2.1 Site Location within City of Gloucester

Overview

The City of Gloucester is the largest settlement within Gloucestershire with the highest population density. The city lies close to the Welsh border, and is on the River Severn.

The site is located in the city of Gloucester, approximately 260m to the west of Gloucester Railway Station which provides a direct service to Birmingham New Street and Cheltenham with journey times of approximately 1 hour and 10 minutes and 10 minutes respectively.

The site was previously owned by Network Rail and comprises a disused rail depot, located off Horton Road, and a small operational timber yard and vehicle repair garage, located off Great Western Road.

To the south of the site is the operational rail line which serves Gloucester Station. To the north is Great Western Road, on which a row of terrace houses borders the northern end of the site. The eastern boundary is formed by a low brick wall and security fence which faces onto Horton Road. To the west the site tapers to a point, beyond which are modern office units.

Gloucester is served by the M5 motorway, A38 and the A40. The A40 links Gloucester with Cheltenham (20 minute drive East), Oxford (1 hour drive East) & Bristol (45 minute drive South). The M5 provides connectivity to Birmingham (1 hour drive North).

Key:

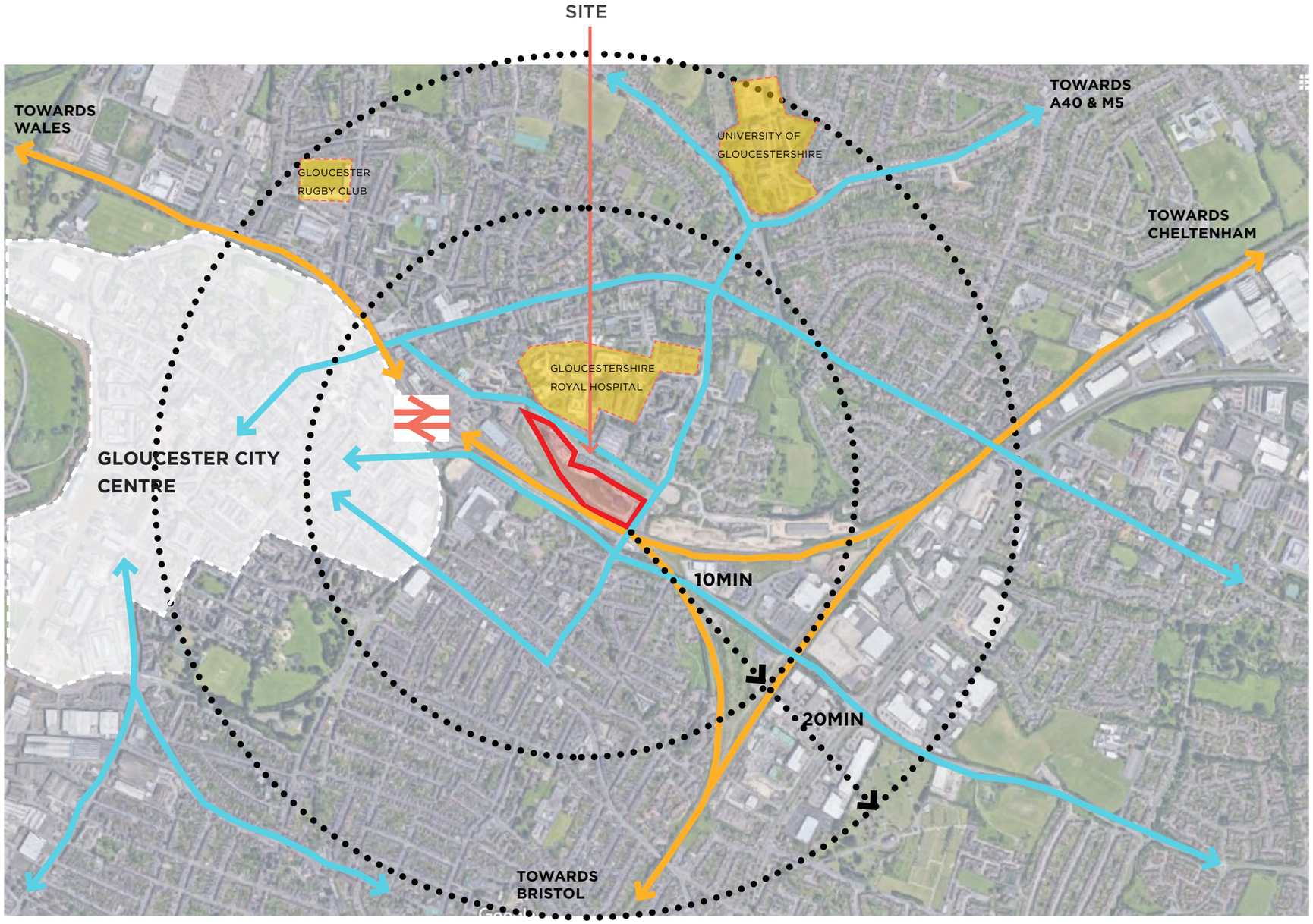
The Site

Train Stations

Railway Routes

Main Vehicular Routes

Walking Distances



Site location within the City of Gloucester

2.2 The Development Site

Overview

The site extends to approximately 7.78 acres (3.14 ha) gross and comprises disused rail sidings, parking and commercial premises. The site is flat in gradient in keeping with the surrounding area which is generally level.

The site is linear in nature running north-west to south-east between Great Western Road to the north and the retained railway line to the south.

The land is situated in a mixed-use area comprising residential and commercial uses. The Gloucestershire Royal Hospital is situated to the north, Pullman Court business centre to the west and circa 1900's Victorian terrace properties adjoin the site to the north.

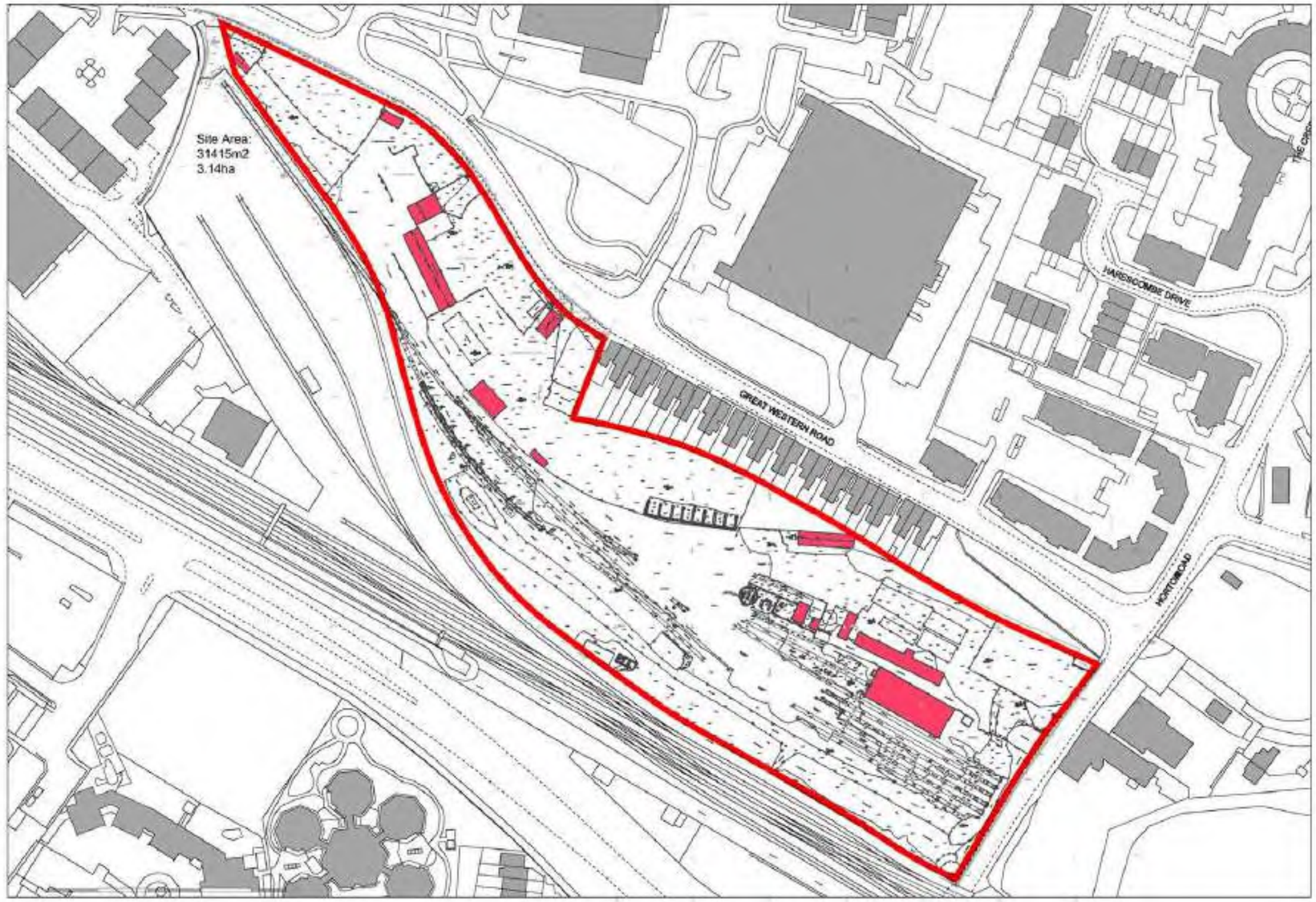
Access to the site is currently to its north beside the existing terrace houses via Great Western Road and to its north-east corner via Horton Road.

There is an area of Public Open Space adjacent to the north eastern corner of the site with a modern 'flatted' residential development on the opposite frontage to Great Western Road, adjacent to the hospital.

To the northern part of the site are several industrial units which are occupied and subject to several leasehold interests.

Situated on the main body of the site are disused brick and metal framed sheds and workshops which we understand were built in the 1950's. The buildings are in poor condition and are vacant.

The railway line runs along the southern boundary.



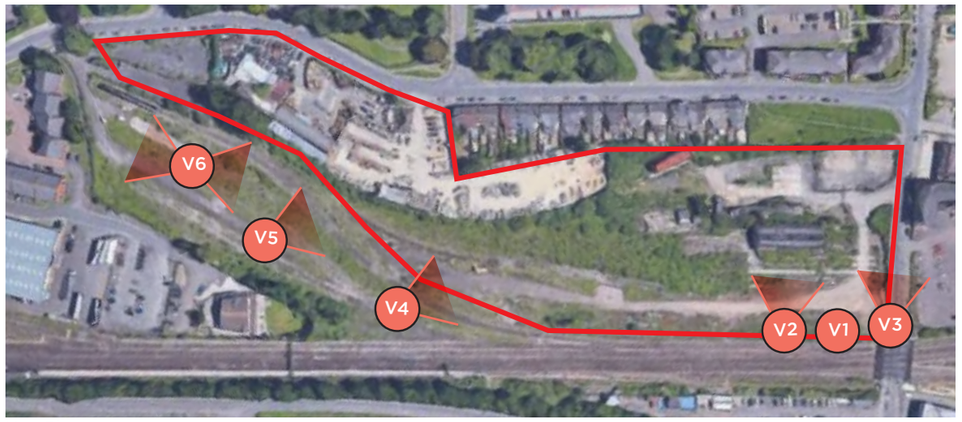
2.3 Site Photos

Overview

The site is largely empty and flat with unmanaged undergrowth to the periphery. There is vehicular access to the former Network Rail land from Horton Road. The existing buildings within the site boundaries are inaccessible and in disrepair.

The architectural style of the disused train depot building will be brought into the design of the proposals to link the site to its heritage. The cathedral is visible from site as seen in view 6.

Disused rail sidings are located on the eastern part of the site. Active rail sidings are found to the west of the site, where existing access is being maintained privately for Network Rail.



Key Plan

View 1

View 2

View 3

2.4 Site Photos

View 4

View 5

View 6

2.4 Development Site - Local Area

View 1

View of existing Network Rail access on the north-west side of the site. To be maintained.

View 2

View of existing terrace houses to the north of the site.

View 3

View across existing underused green space located to the north-east of the site.

View 4

View looking across the level crossing onto the site and its existing disused depot buildings.

Key:

Extract from the Gloucester Regeneration Economic Development Strategy

View 1

View 2

View 3

View 4

2.5 Heritage and Conservation

Overview

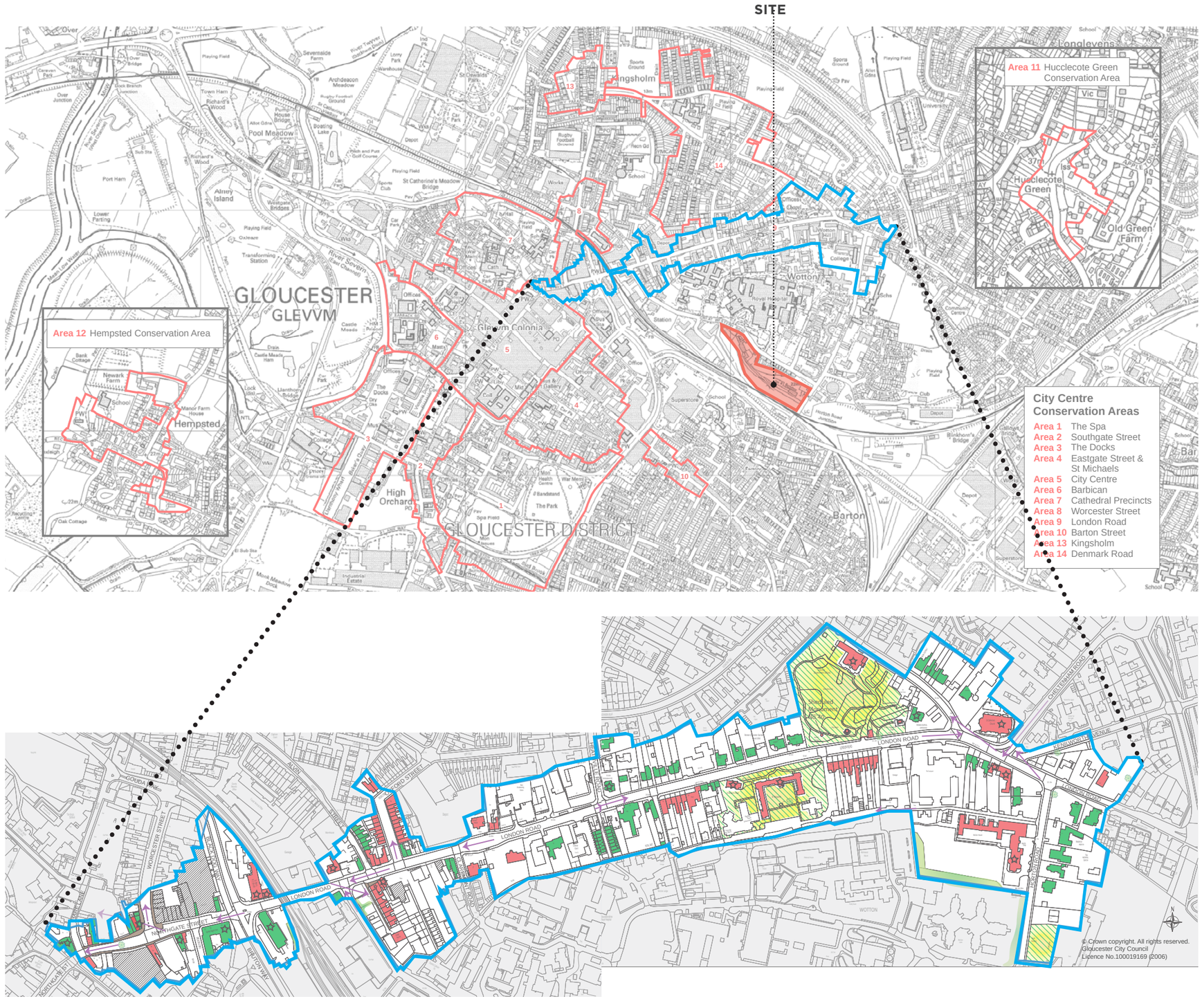
In order to provide a considered development, an assessment of statutory heritage assets was made.

The map opposite shows the concentration of heritage assets in the local area. The majority of the heritage assets occur in the city centre.

A heritage assessment has been submitted with this application.

Conservation Areas

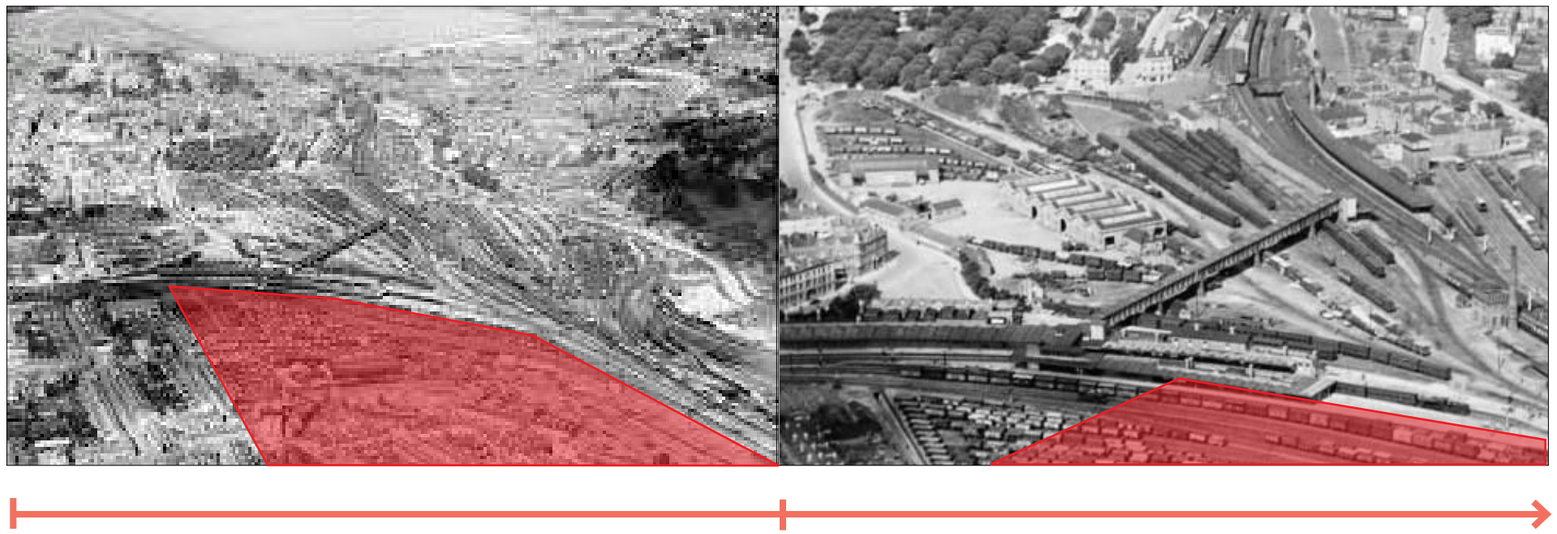
The site is not within a conservation area nor does it have any listed buildings within its boundary. The nearest conservation area to the site is London Road conservation area to the north of the site.

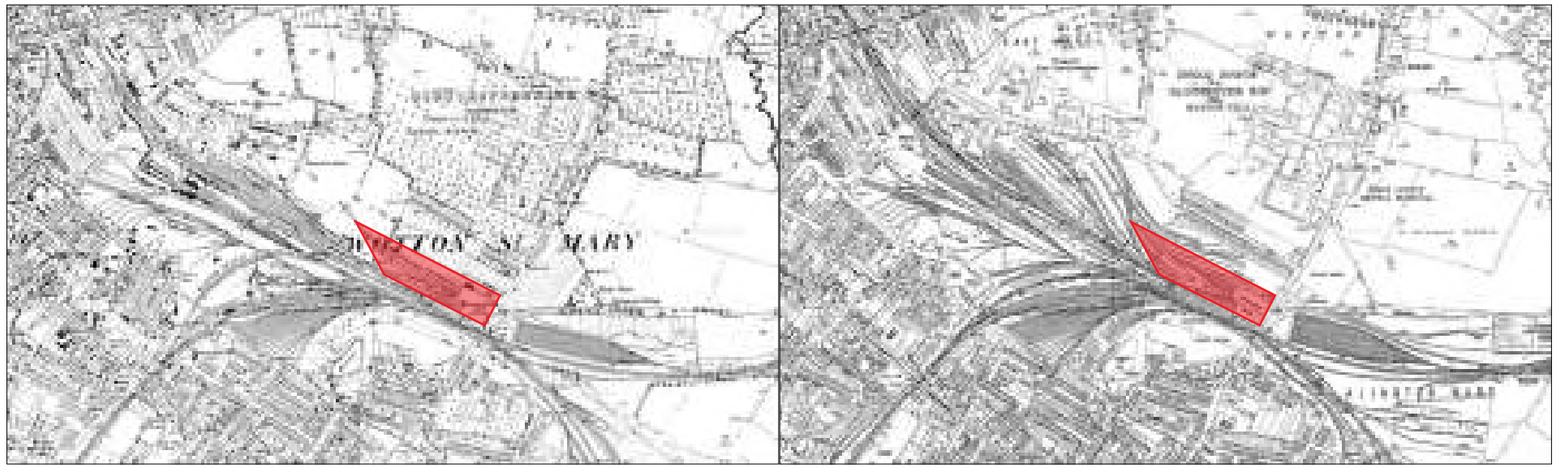


2.6 Historical Analysis

Overview

The historic docks in Gloucester were a major contributor to Gloucester's trading in the 19th century. They allowed a route to supply goods to many of the growing towns in the Midlands. The docks were rail-served from the mid 19th century, but by the 1980s almost all commercial traffic through the docks had stopped.





1. 1880

This map shows Gloucester

3. 1920

This map shows Gloucester

Key:

Approximate site location

Historical Analysis

Overview

No longer in use, our proposals aim to reinvigorate this historic site. In developing the Great Western Yard, our proposals will help to reconnect the north and south sides of the railway line,

4. 1950

This map shows Gloucester

5. 2021

This map shows Gloucester

Key:

Approximate site location

2.7 Townscape Analysis

Overview

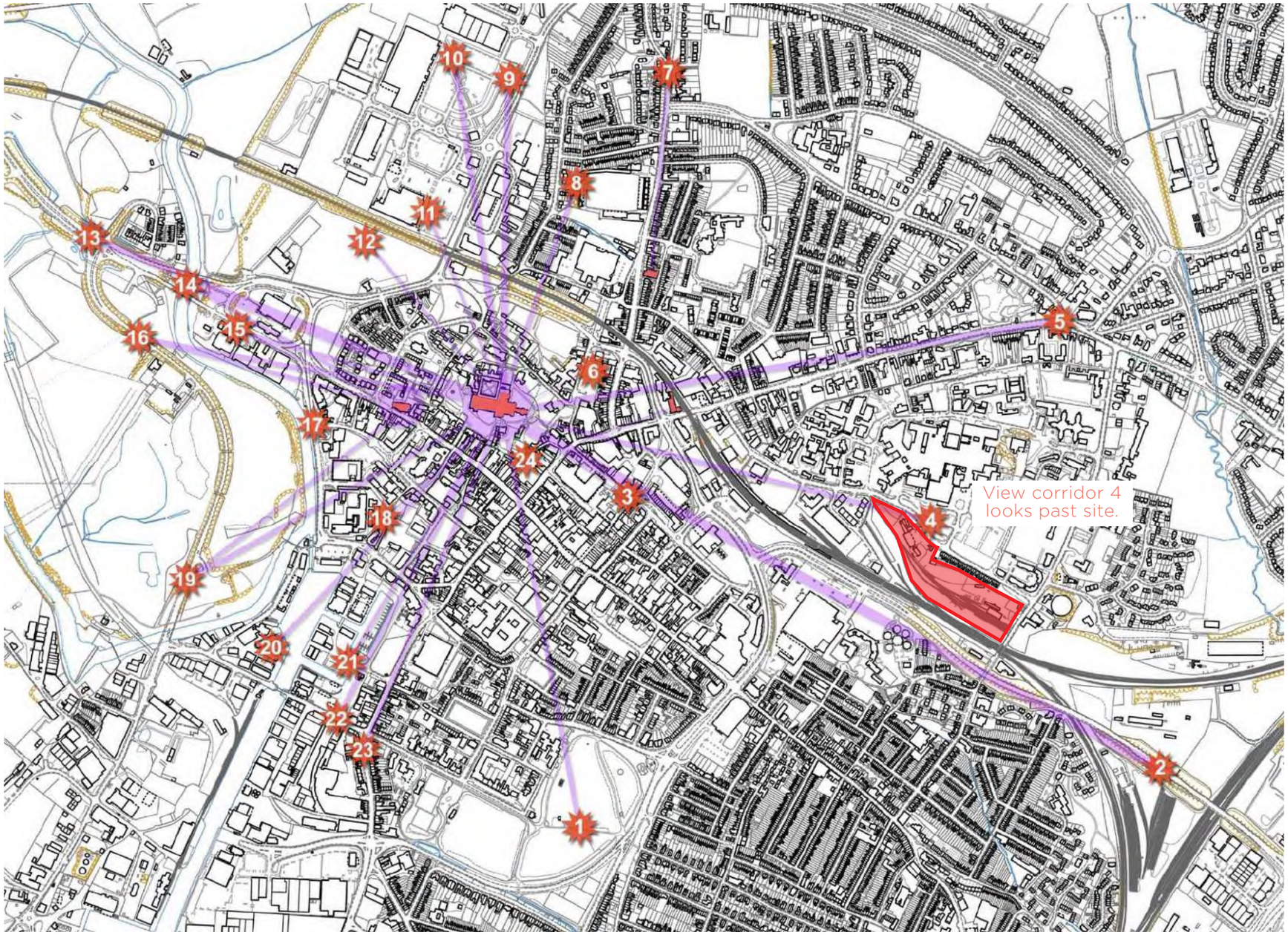
The site lies near view corridor 4 from Gloucester City Council's November 2008 Interim Adoption Supplementary Planning Document "Heights of Buildings".

It does not lie along any of the other view corridors .

Key:

The Site

Cathedral View



View corridors map

2.8 Townscape Analysis

Overview

Following detailed assessment it is apparent that the view shown in the guidance did not match the view from the location shown on the map.

View 4 from guidance (incorrectly mapped)

The site is not visible from the view shown in the guidance.

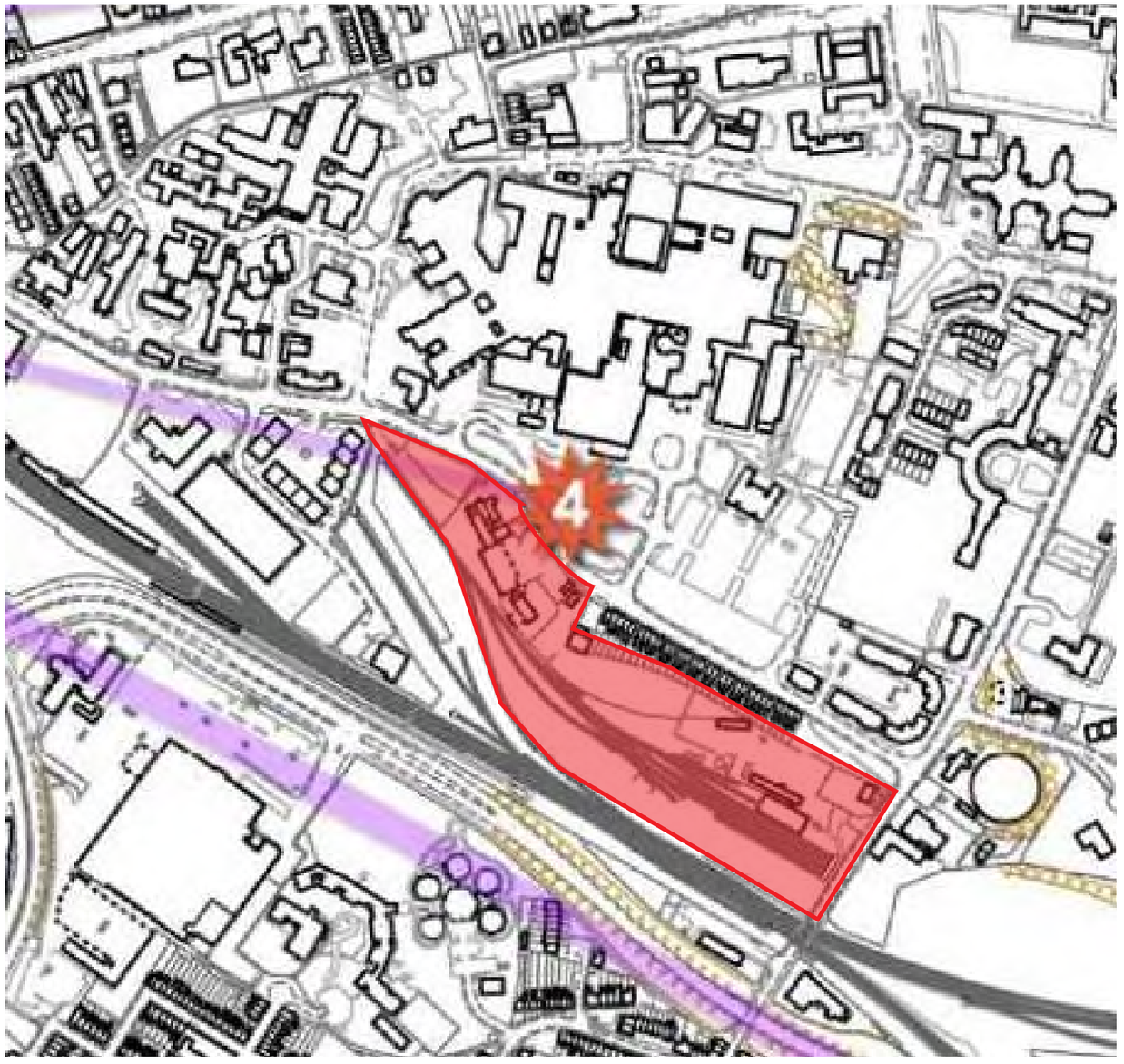
Text from guidance:

4 Gloucester Royal Hospital Viewpoint from pedestrian and cycle path, which links Great Western Road with the main hospital grounds. Well used throughout the day. View of cathedral tower between mature trees. Partially obscured during summer.

Key:

The Site

Cathedral/
Cathedral View



View corridors map

Photograph taken from view 4 location, as specified on the map.

Further to the left or right of this view, the cathedral was not visible due to existing buildings. It was further in the distance than indicated in the photograph shown in the guidance.

Further views taken along the described footpath around this area are shown on the next page.

2.9 Townscape Analysis

Overview

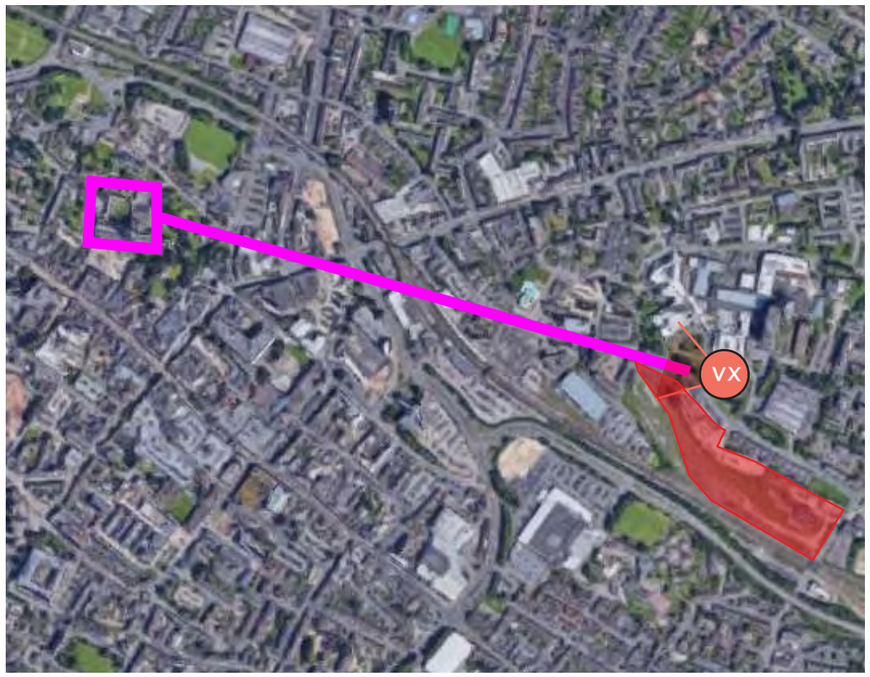
These views are taken along the described footpath, along view corridor four. They show that development on the site will not obstruct views of the cathedral.

Key:

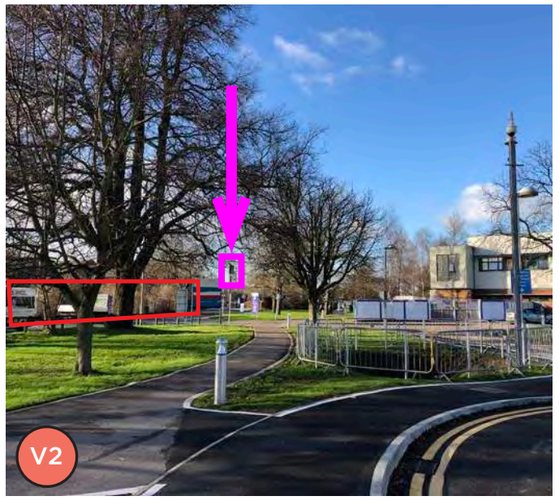
View Location/s

The Site

Cathedral/
Cathedral View



Site does not intercept view. Existing tall buildings to the right of this position block the view of the cathedral.



View from view corridor 4 location shown on map. The site will not obstruct the view along Great Western road of the cathedral.

With any views across site, the cathedral is already obscured by existing buildings.

2.10 The Development Opportunity

Development Opportunity

Gloucester has several physical constraints that affect its ability to expand. The River Severn, green spaces to the east and west, and the train line have defined a zone in which development occurs. These constraints have focused most of the development within the city centre.

New Development Zones - Canal Corridor & Railway Triangle / Corridor

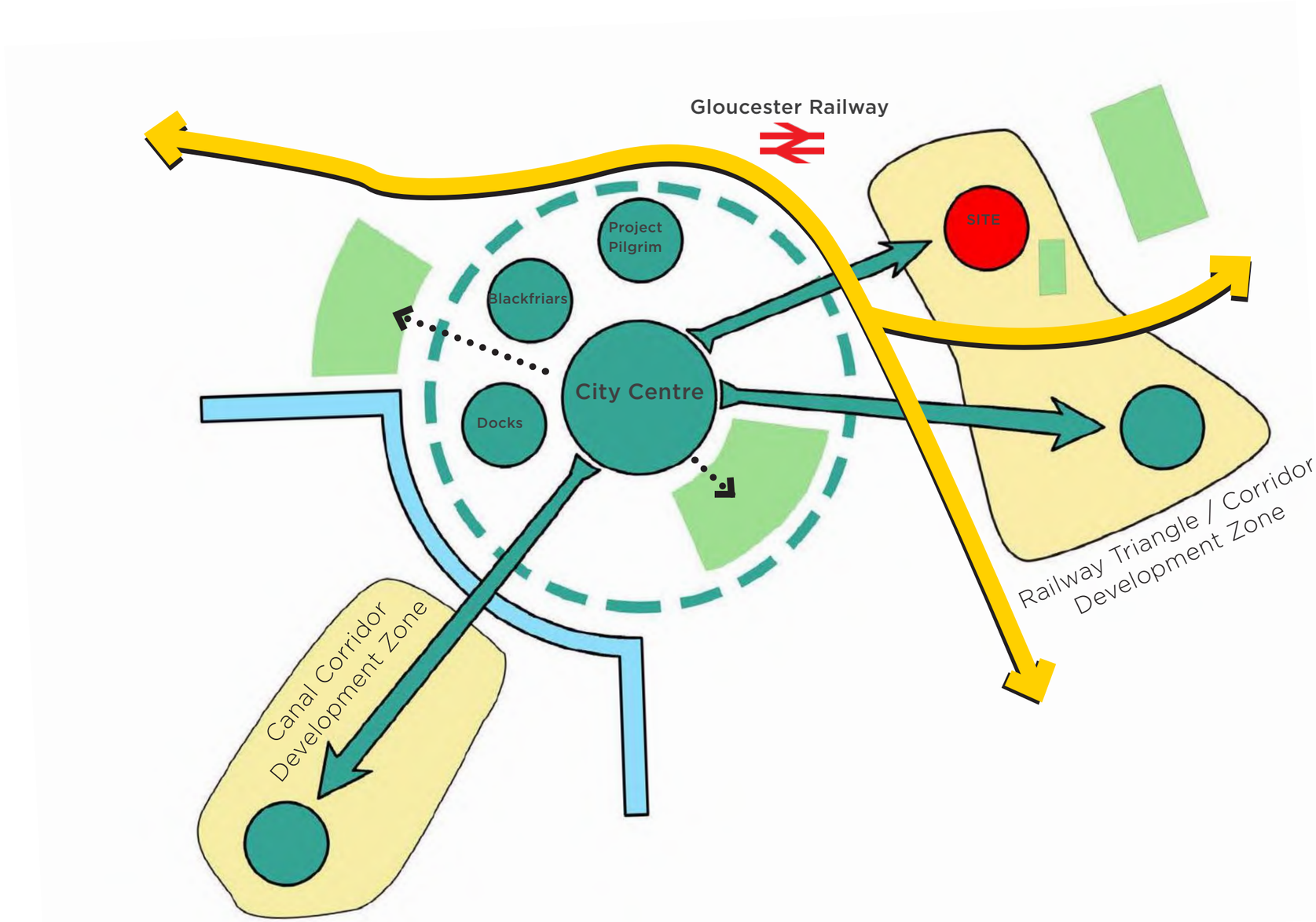
Gloucester City Council has highlighted areas which are to see intensification in development in the coming years. The railway triangle / corridor development zone is part of this plan and will push development out beyond the city centre and allow the fringe areas of Gloucester to see the benefit of new development.

Opportunity

It is important to recognise sites with opportunity to link the development zones. The railway triangle currently acts as a barrier between zones so developing it will further integrate the city centre.

Green Spaces

The site offers the opportunity to link to a small existing green space to its north-east.



3.0 Planning Background

3.1 Gloucester City Council Guidance

Planning Context

The site contributes significantly to meeting the objectively assessed needs for Gloucester City (2011-2031) as identified through the Gloucester Cheltenham and Tewkesbury Joint Core Strategy (2017) (JCS). The JCS identified that Gloucester was unable to meet its full housing requirement of approximately 14,300 homes and was adopted subject to an immediate review, one limb of which was to address the housing land supply shortfall for the City.

The City Council has long held aspirations for the redevelopment of the 'Great Western Road Sidings' site with it being allocated in historic unadopted development plan documents and the locally adopted Railway Corridor Supplementary Planning Brief (March 2011). This Planning Brief has been taken into consideration in the development of the proposals. However, it should be noted that it has been superseded by the emerging Gloucester City Plan with elements of the brief being brought forward into the current emerging policy for the Great Western Road Sidings site.

The site is allocated in the emerging Gloucester City Plan which has recently been subject to a Main Modification public consultation.

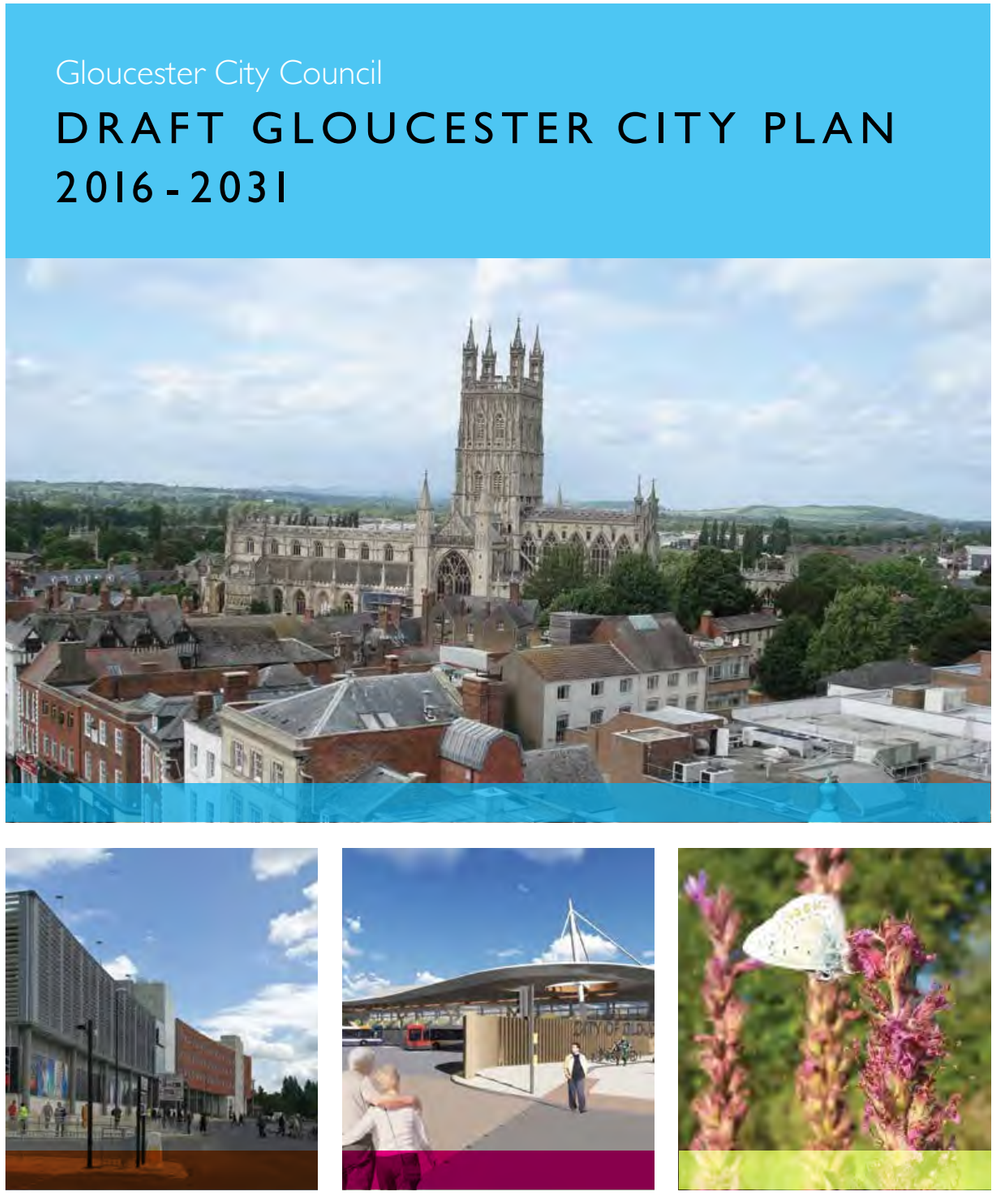
The Main Modification consultation increased the potential capacity at the site from 200 dwellings to 300, the draft allocation at the site is not a maximum but an approximate figure. The submission for 315 dwellings is considered to be appropriate and in accordance with the emerging policy for the site.

The site is one of only two large brownfield sites located on the edge of the City Centre, SA05 and SA11, to come forward as draft allocations in the City Plan. The site is therefore important to the City in terms of delivering 'City Plan capacity' identified through the JCS.

The City rely on delivery of new homes from the site for their five-year housing land supply as witnessed by the '2020 Five Year Housing Land Supply Statement' (October 2020) . Appendix 2 of the report – City Plan Sites – shows site SA05 contributing 125 dwellings to the City's five-year supply.

Neither the report nor the capacity of the site have yet been updated however it is clear that the City are relying on the site to deliver both City Plan capacity and to contribute to the City's five-year housing land supply.

The site is available now and has the capacity for up to 300 dwellings (including much needed affordable housing) to help support the authority's five-year housing land supply.

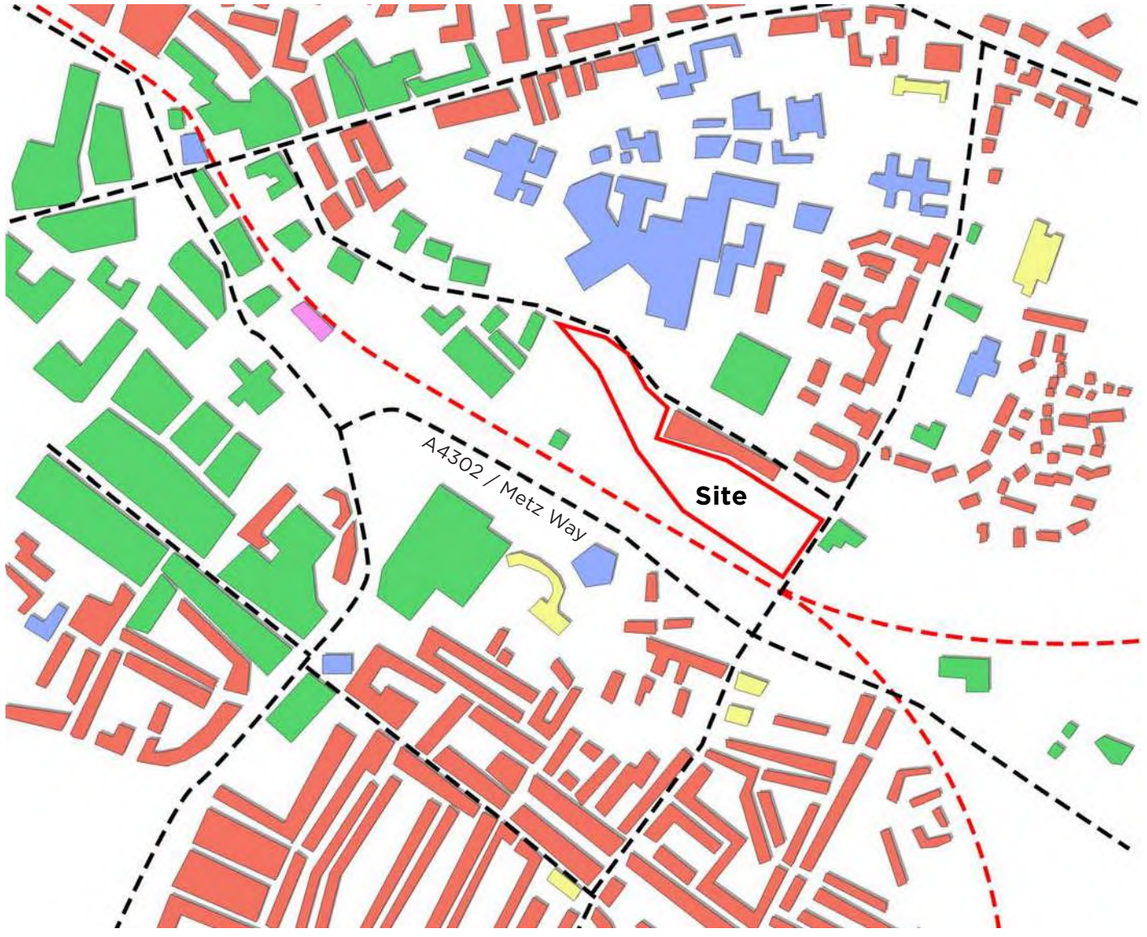


4.0 Site Analysis

4.1 Surrounding Buildings

Current Land Use

- The site is located in an area currently dominated by Gloucester Royal Hospital which lies to its north.
- The land is a former rail junction. There are a series of derelict buildings on site with small scale industrial units at the north of it.
- Along the Great Western Road are a row of terraced houses that must be considered when developing this site.
- To the south of the site is mainly residential with a local high street.
- The majority of retail happens within the city centre which itself is undergoing several renewal projects.

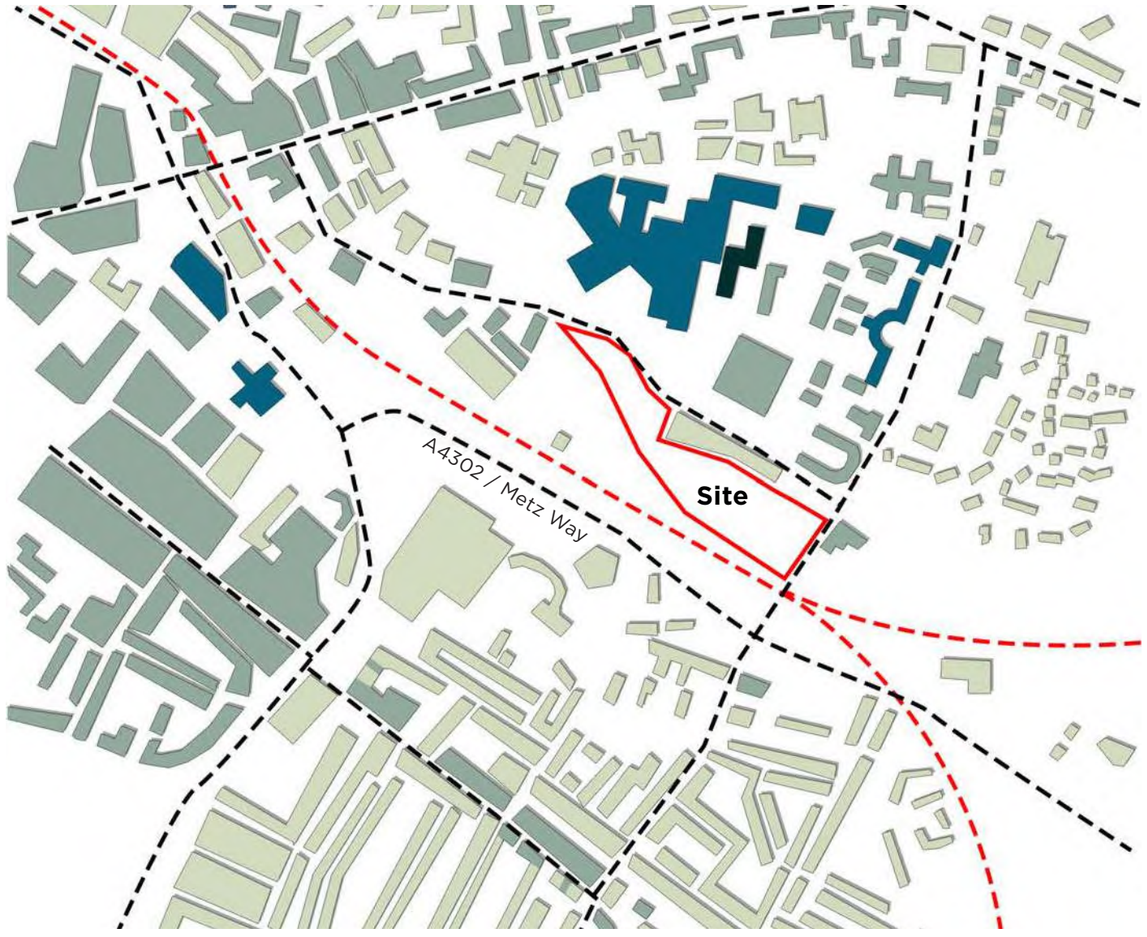


Key

- Residential
- Commercial/Retail
- Community
- Education
- Transport

Building Heights

- The site is surrounded by a variety of building heights.
- The hospital to the north and commercial centre of Gloucester to the south-west are comprised of taller buildings, from three to over ten storeys.
- The hospital dominates the skyline in the vicinity of the site.
- Gloucester's local vernacular is predominantly 2 storeys, particularly in residential areas such as to the south of the site.



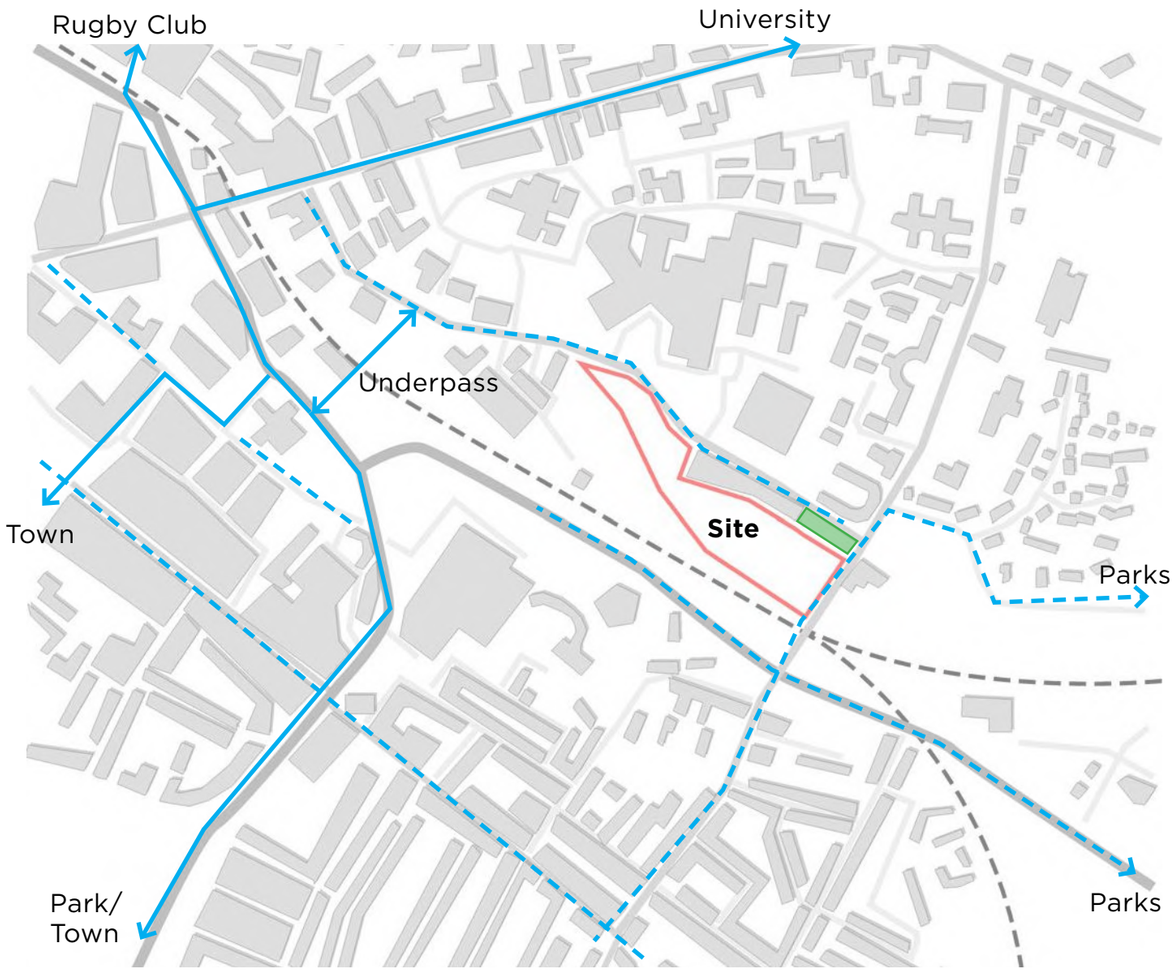
Key

- 1-2 Storey
- 3-4 Storey
- 5-10 Storey
- 10 Storey +

4.2 Access - Transport & Movement

Pedestrian Movement

Existing pedestrian movement is limited to the south of the site connecting the station and residential areas to the main town centre. The proposed site offers opportunities to develop more pedestrian links north of the train line connecting the isolated green spaces.

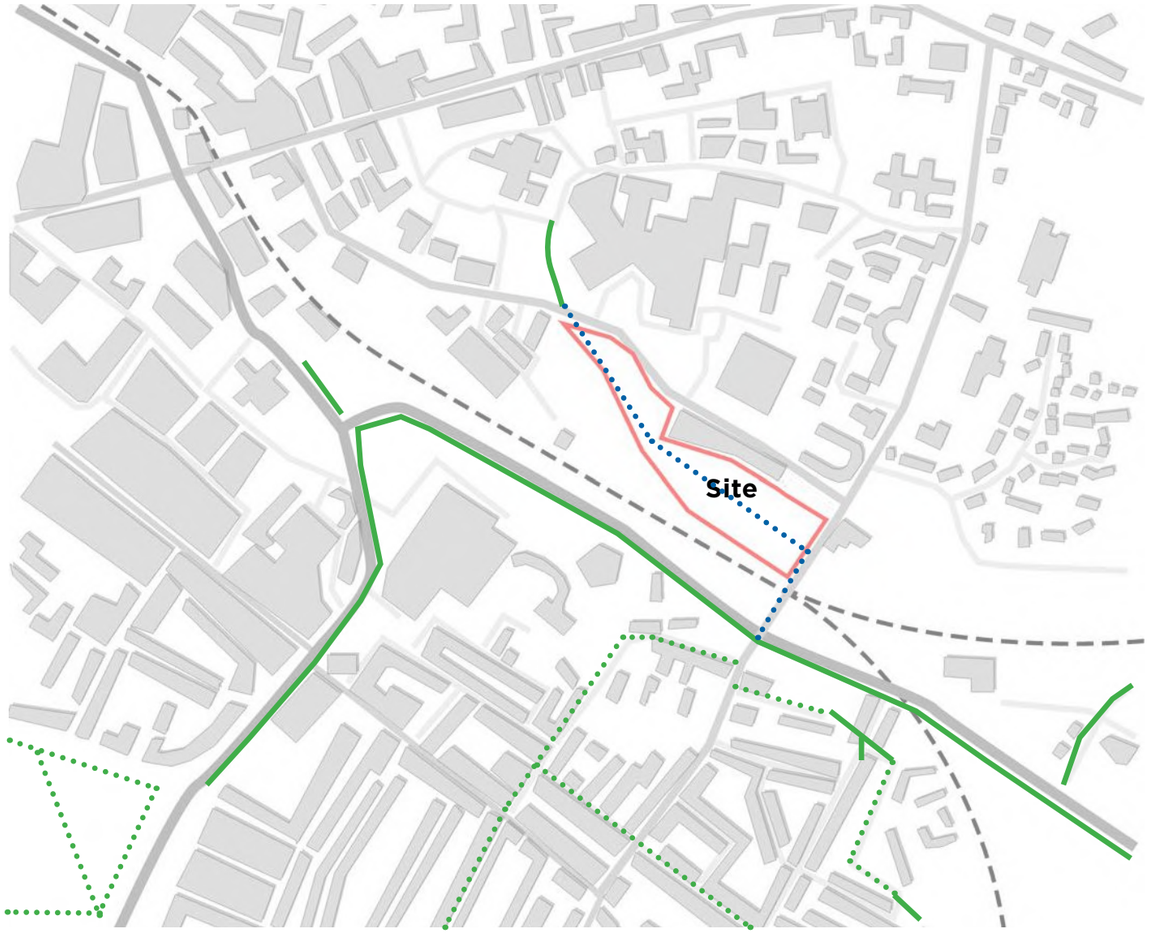


Key

- Primary pedestrian routes
- Secondary pedestrian routes
- Existing isolated green space

Cycle Movement

The cycle routes are minimal. The site has an opportunity to create a new safer route connecting the isolated parks and avoiding the busy main roads.



Key

- Bike friendly roads
- Dedicated lanes/tracks
- Trails
- Potential connecting route

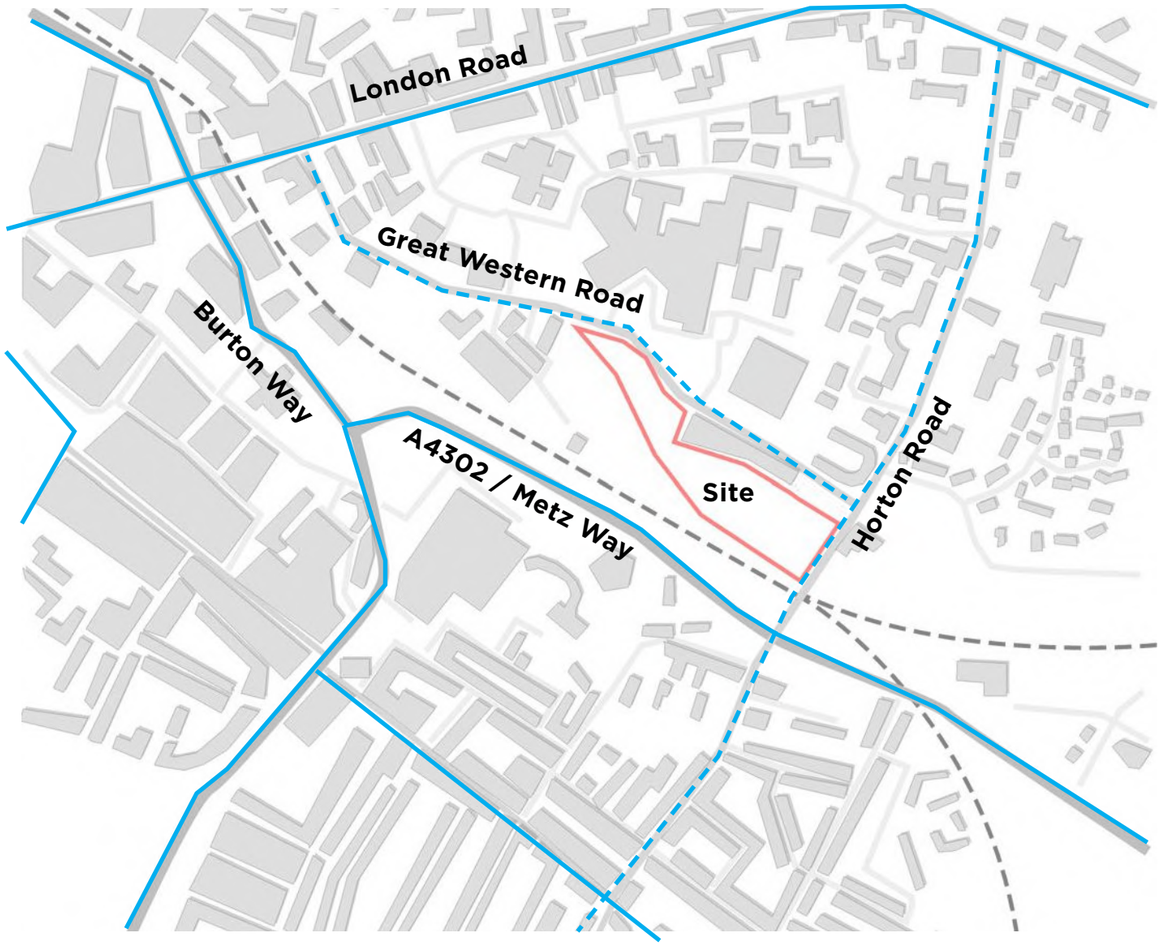
Access - Transport & Movement

Vehicle Movement

Key routes around the site allow for access at both ends of the linear site.

The busiest road is Burton Way into Metz Way to the south of the site. Coupled with the train line it will be important to create a buffer zone to block potential noise.

The site can be directly accessed via secondary and tertiary roads, however primary roads A4302 and Metz Way are close by.



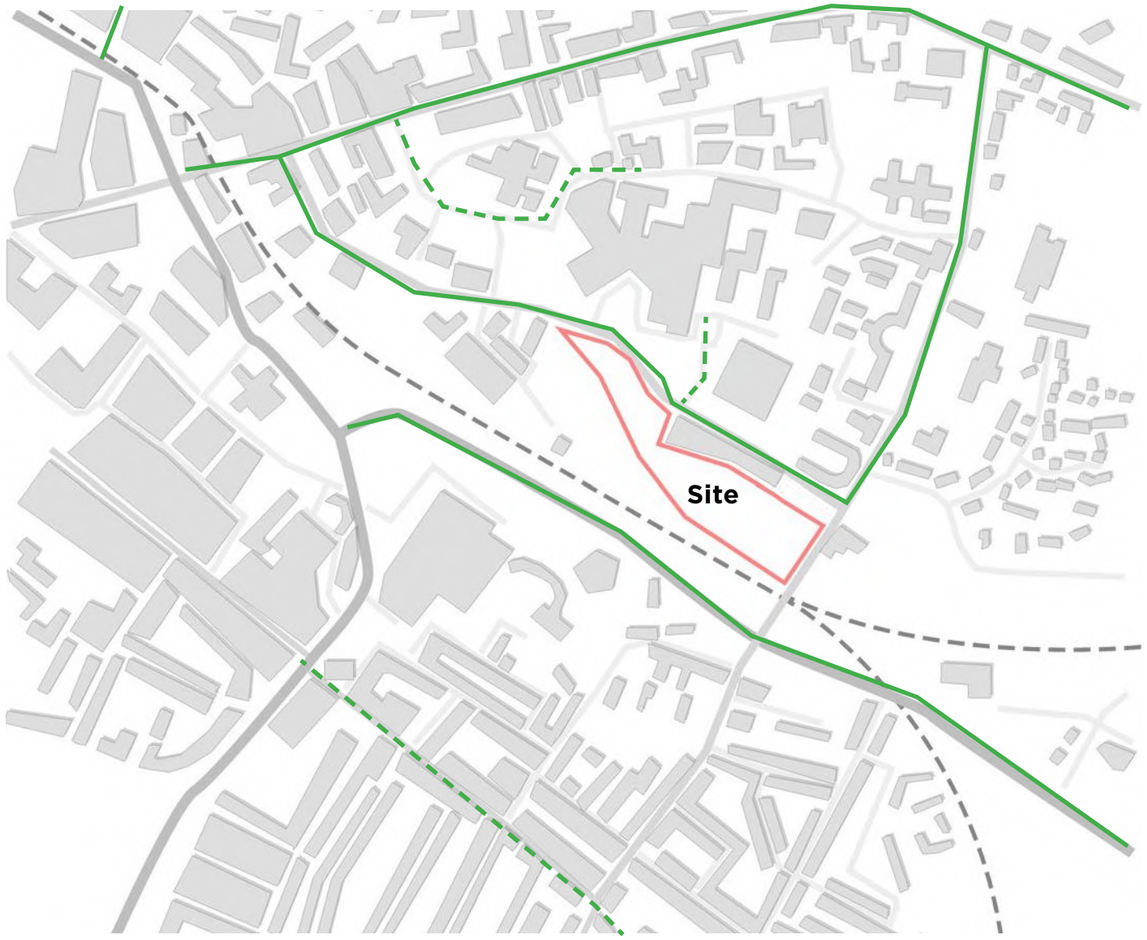
Key

Primary Routes

Secondary Routes

Public Transport

The site and surrounding area are well connected by numerous bus routes into the town centre and retail zones. Given the site's accessibility to the town centre and transport links there is a clear opportunity to promote low parking, helping with congestion.



Key

Key Bus Routes

Secondary Bus Routes

4.3 Local Facilities and Amenities

Overview

The Great Western Road site sits on the edge of the retail zone, forming the transition between the vibrant town centre and the residential areas to its south and east. The streets surrounding the site are important in connecting these zones.

The area is dominated by Gloucestershire Royal Hospital but also comprises varied residential developments. It benefits from great public transport, footway and vehicular access due to the proximity of the hospital.

Multiple community facilities are in the near vicinity, with Gloucester Irish Club immediately to the east and multiple educational and medical facilities also nearby on Horton Road.

To the south is a large residential area with a busy local high street and a wide variety of shops.

Key

- Retail Areas
- Residential
- Commercial
- Industrial
- Medical
- Cinema
- Sports & Leisure
- Library
- School
- Supermarket
- Theatre
- Church
- Bus Station
- College/Uni
- Tourist Info
- Hospital/Health Centre

Land Use Patterns

4.4 Green Space

Overview

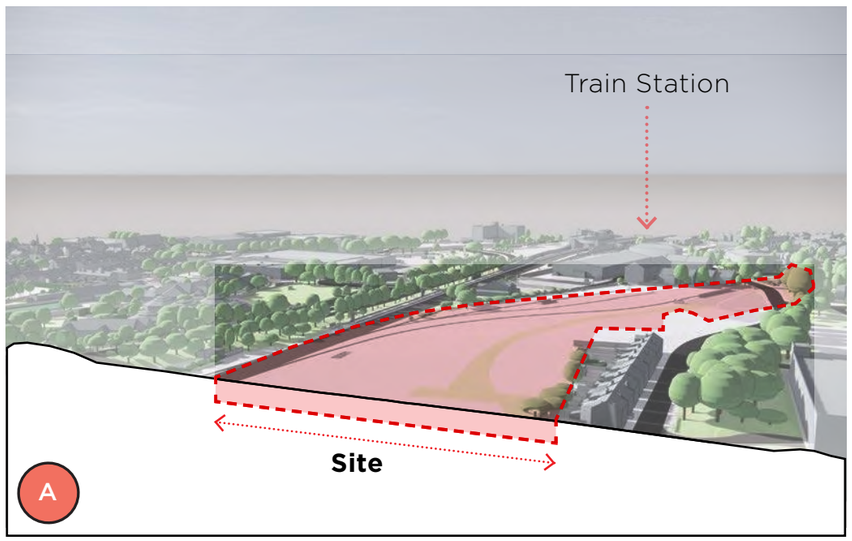
The site is located within close vicinity of three large green spaces, all within a 15 minute walk.

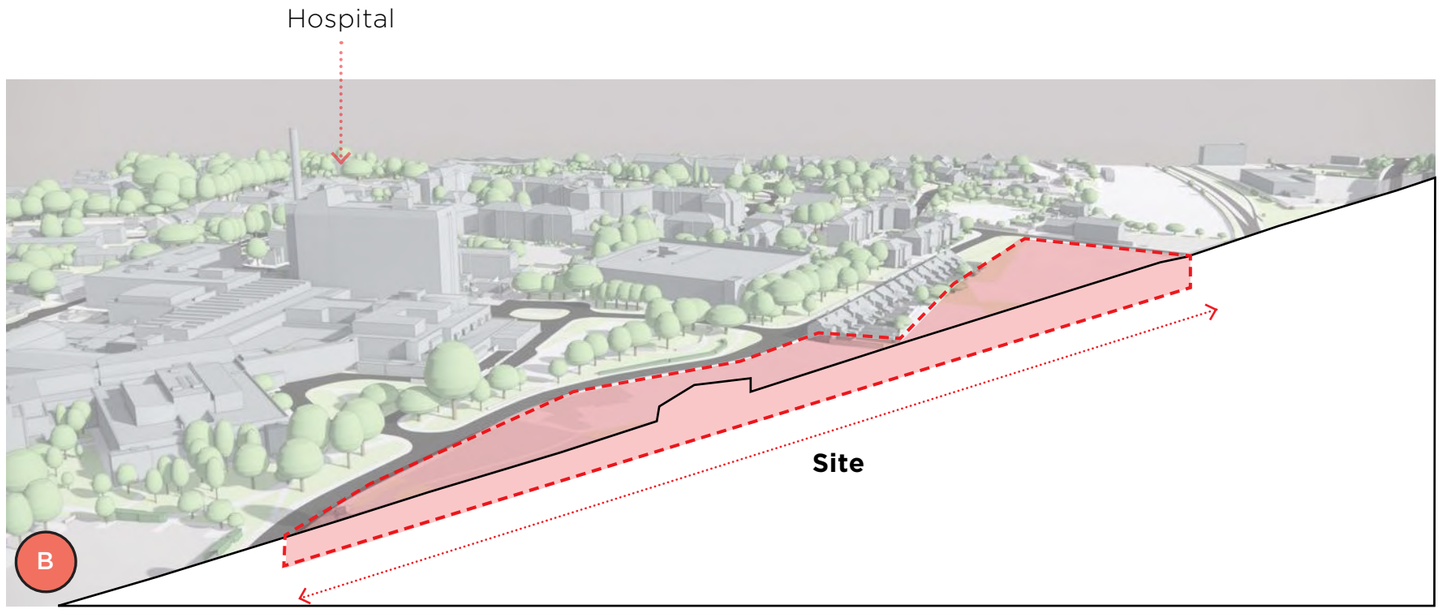
The proposal seeks to provide further well designed landscaping on site, as an extension to the existing underused green space to its north-east.

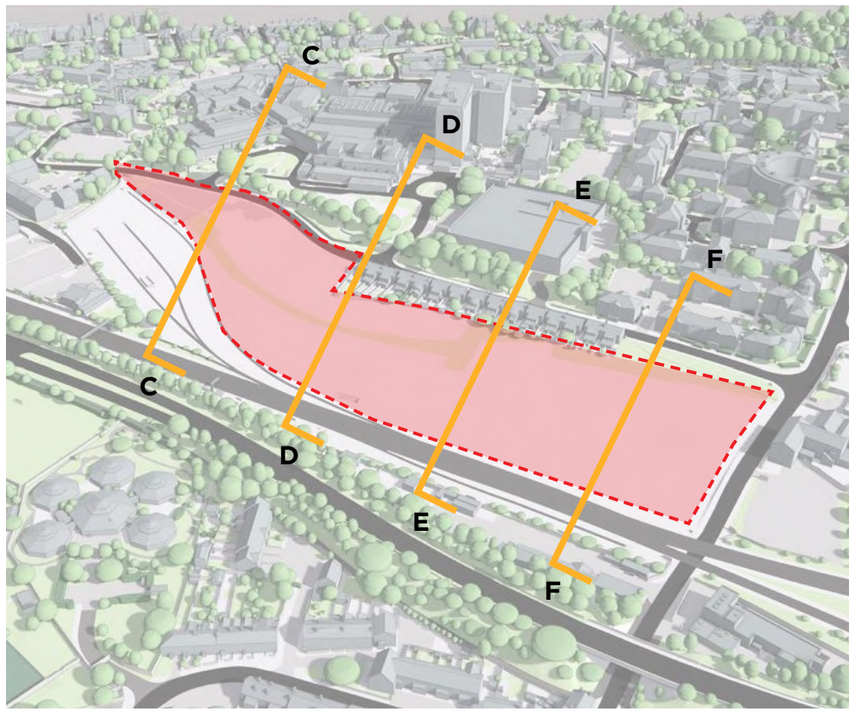
4.5 Site Constraints - Linear Site & Topography

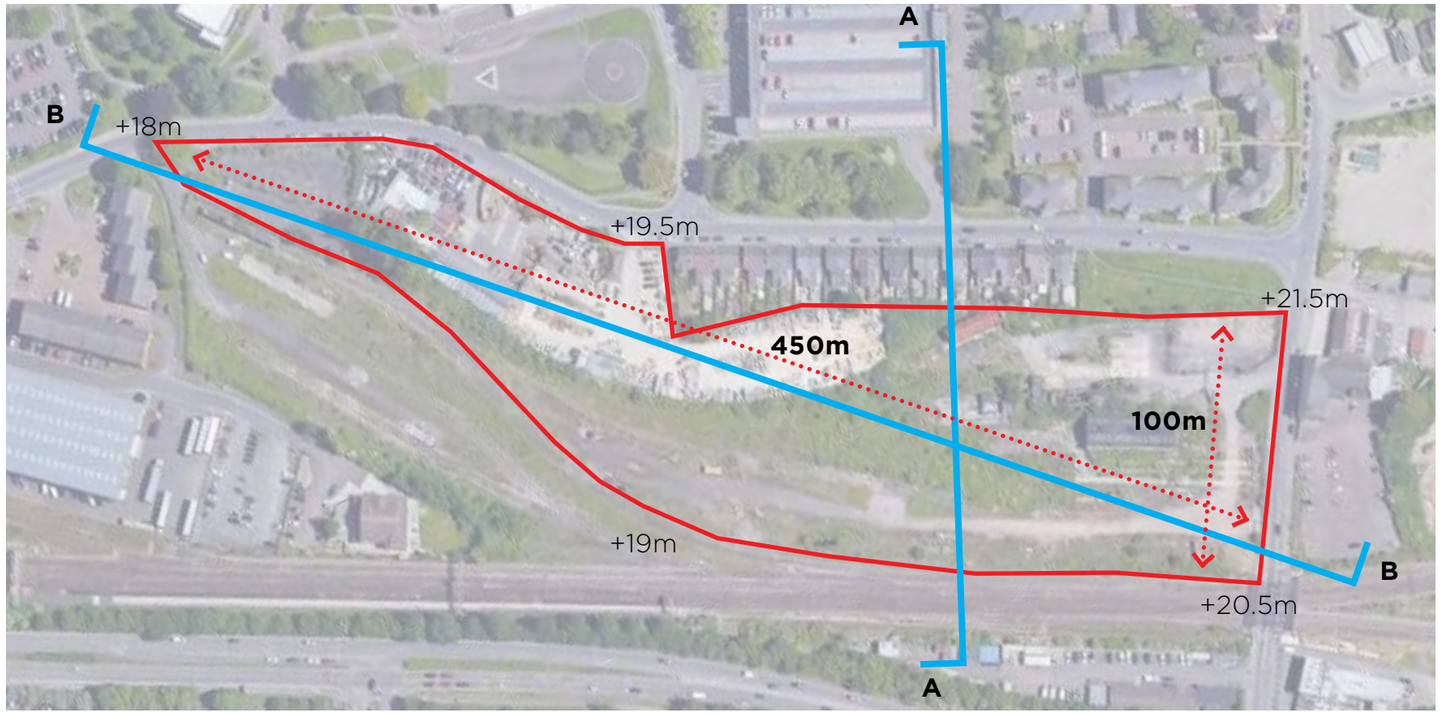
Overview

The site topography is relatively straight forward, with a gentle fall of roughly 2m across the long axis of the site.

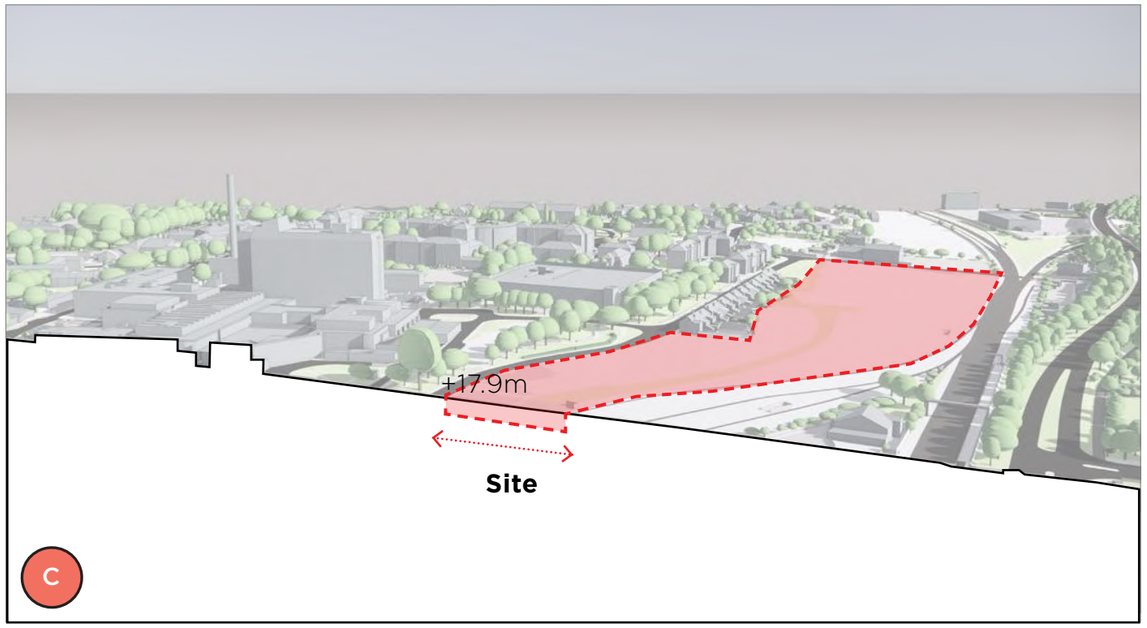


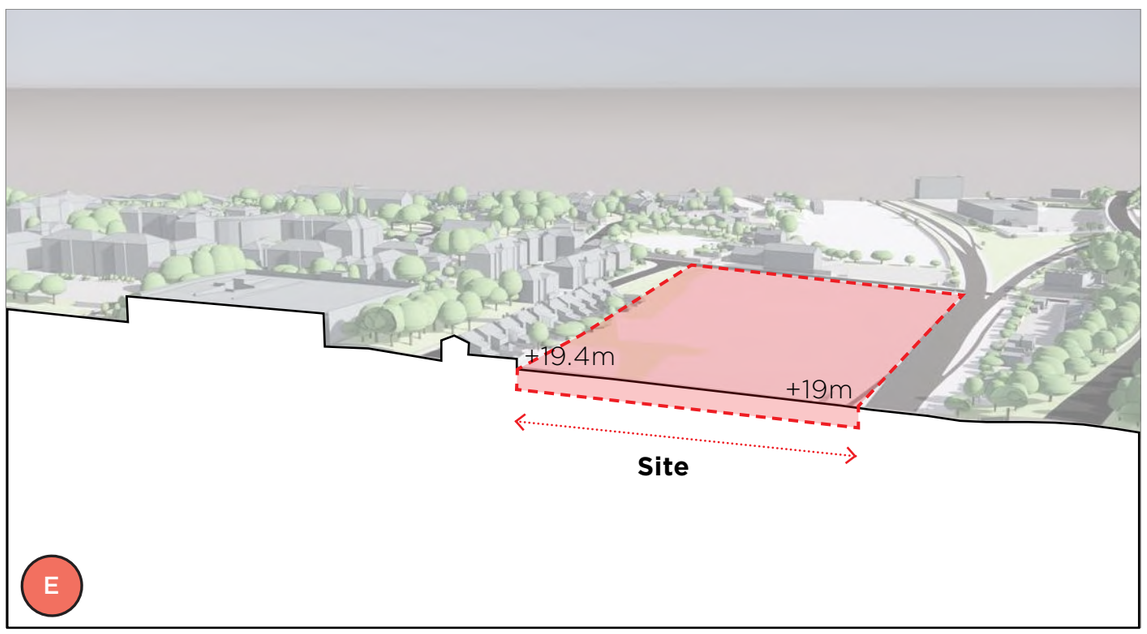


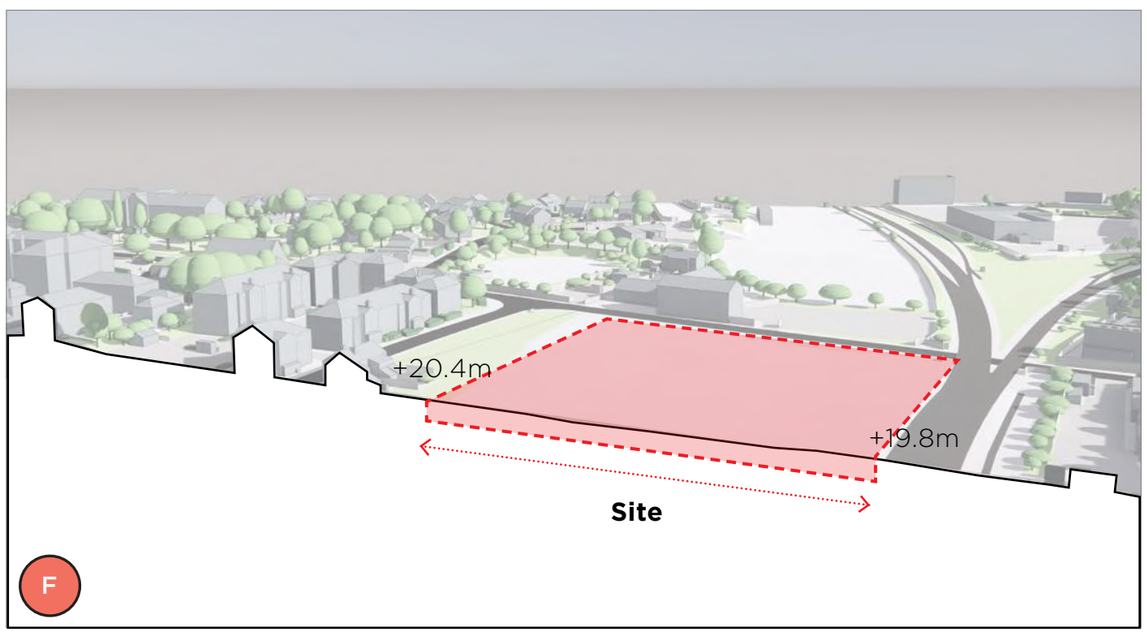




4.6 Site Topography







5.0 Design Strategy

5.1 Site Location

Overview

- Close to city centre (between 1-2KM).
- Located on key routes in & out of the city.
- Site boundary flanks a railway line.
- Site is former railway depot for Western Railway.
- Maintains access route and ownership boundary with Network Rail land.
- Site area 3.14 hectares.
- Linear east/west footprint.

The design has developed through a thorough analysation of the site constraints and opportunities. The design brief established the requirement for varied housing typologies along with the ability for the site to be split into phases which has informed our design approach.

Great Western Yard

5.2 Site Constraints

Overview

- Potential noise issues. Rail and Road (Metz Way). Trains approximately every ten minutes.
- Fairly heavy traffic to the east of the site.
- Existing rail depot building on site.
- Requirement to maintain access to network rail land.
- Proximity to hospital buildings and land.
- Existing terrace houses share site boundary.

Key

Site Boundary

Existing Buildings

Traffic routes

Proximity to railway - noise issue

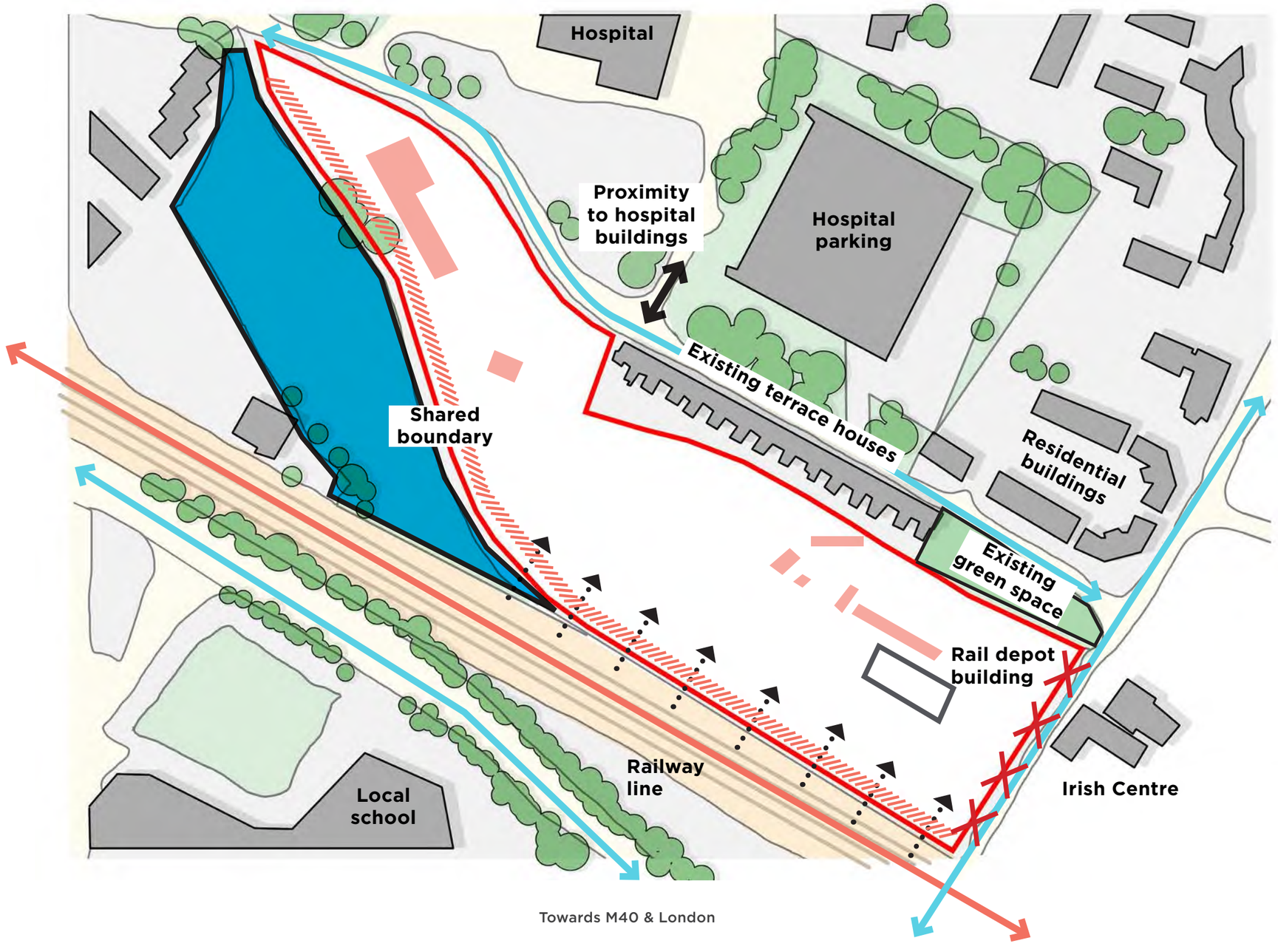
Existing Rail Depot Building

Railway Line

Network Rail Land

Existing Green Space

Site Access Restriction
(due to level crossing)



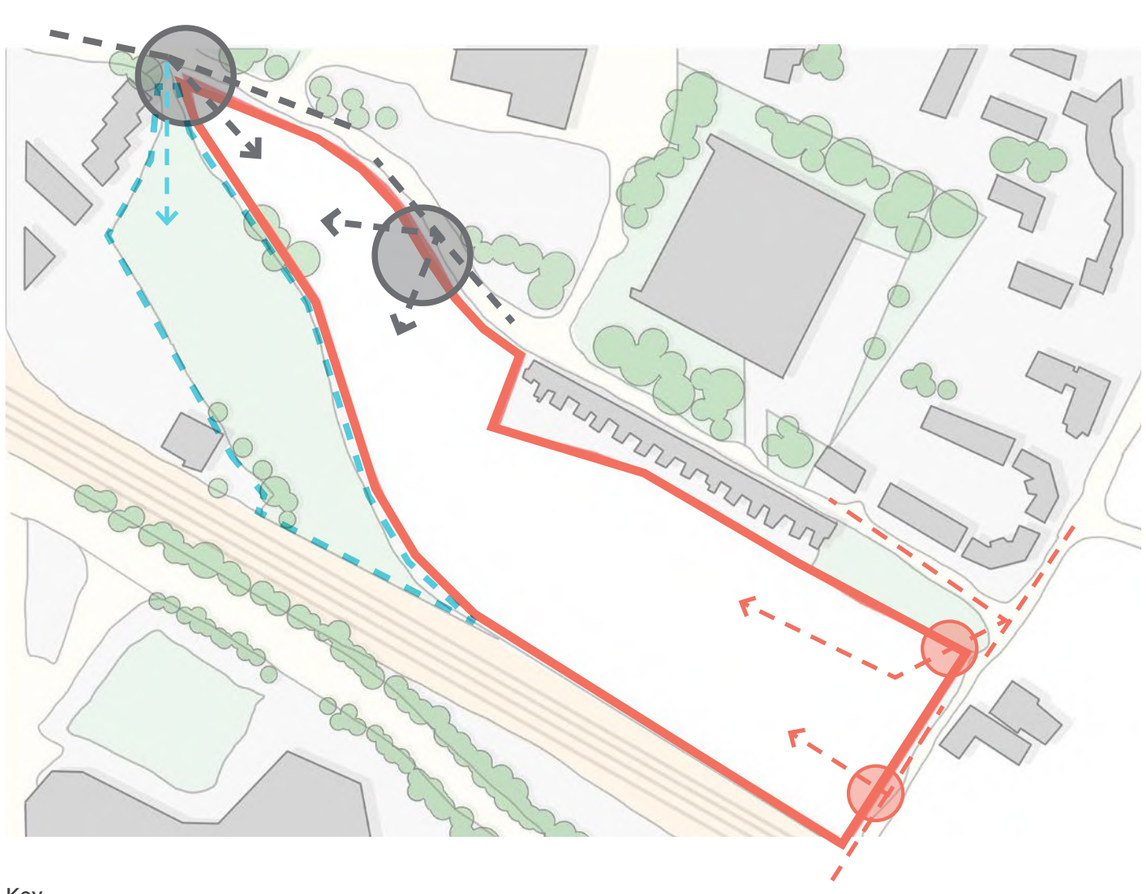
5.3 Layout Rationale

Entry Points

The site layout, movement of pedestrians, cars & local transport create focal points for entry into the site.

The designated pedestrian only entry points are located away from the vehicle entry points, focusing on the pedestrian experience.

The Network Rail entrance will be maintained.



Key

Vehicle entry point/access

Pedestrian entry point/access

Existing Network Rail access

Phasing - Divide the Site

The site is intended to be developed in two phases:

Apartments in the Northern half and Town Houses in the Southern.

The Divide has been chosen to maintain a central access to both sites during development.

A secondary private entrance can also be included if phases were to happen at different times.

Key

Northern phase

Southern phase

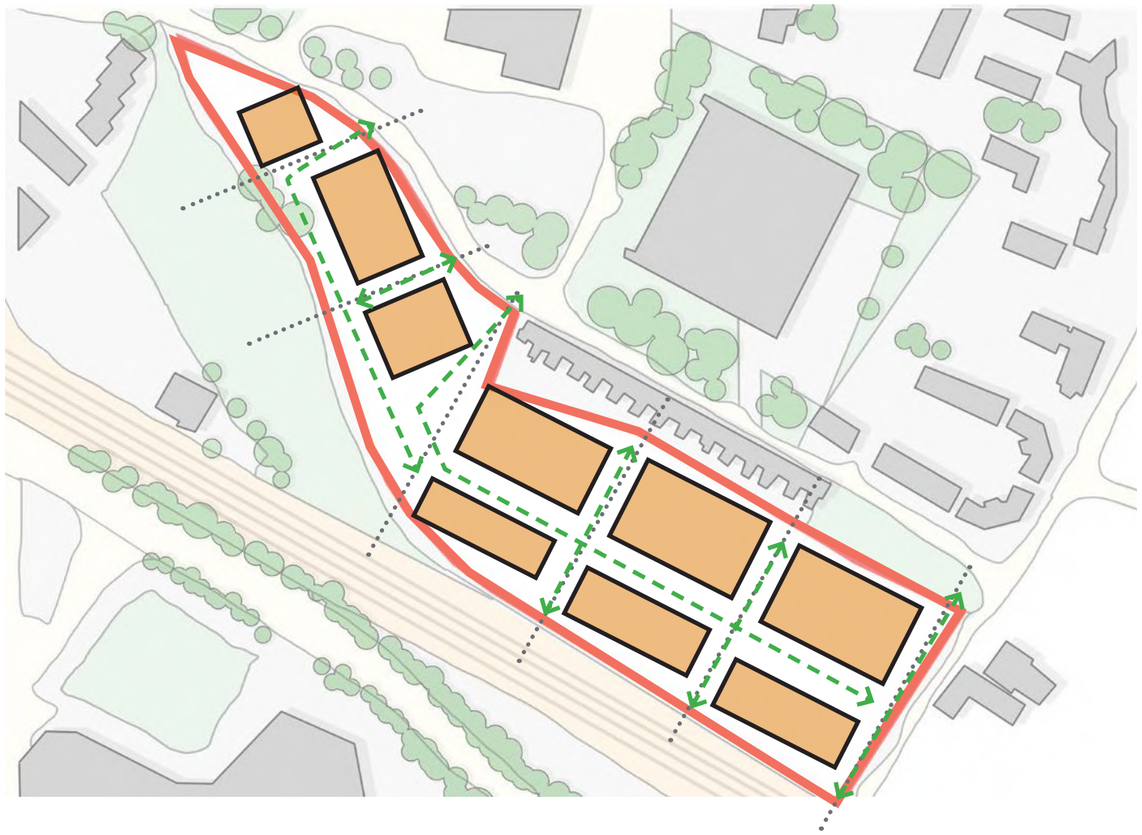
Layout Rationale

Orientation & Sun-path

Plot layouts influenced by sun-path and site orientation.

Massing

Break the site down into plots to be developed, maintaining connectivity.

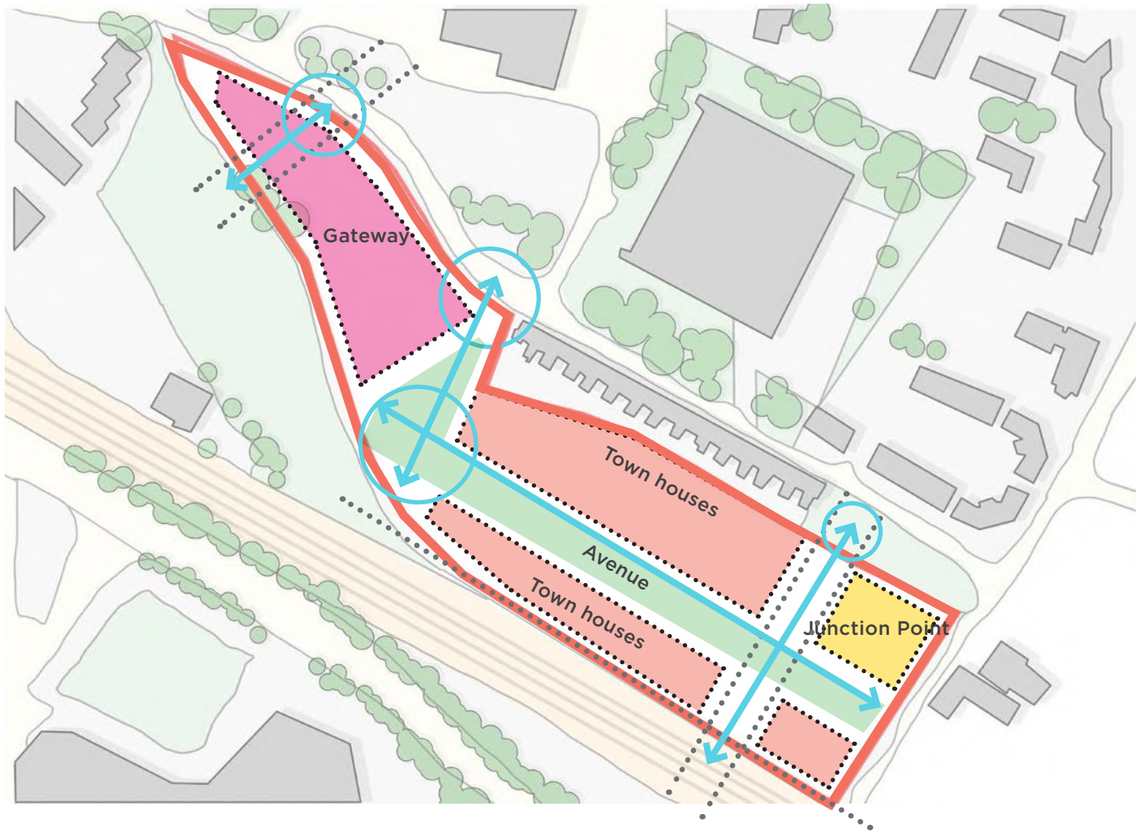


Layout Rationale

Divide Site by Create Character Areas

The premise for allocating character areas is to assist with place making and create identity within the development. The changes between the areas are intended to be subtle to ensure the development still reads as a whole.

The avenue connects each zone.



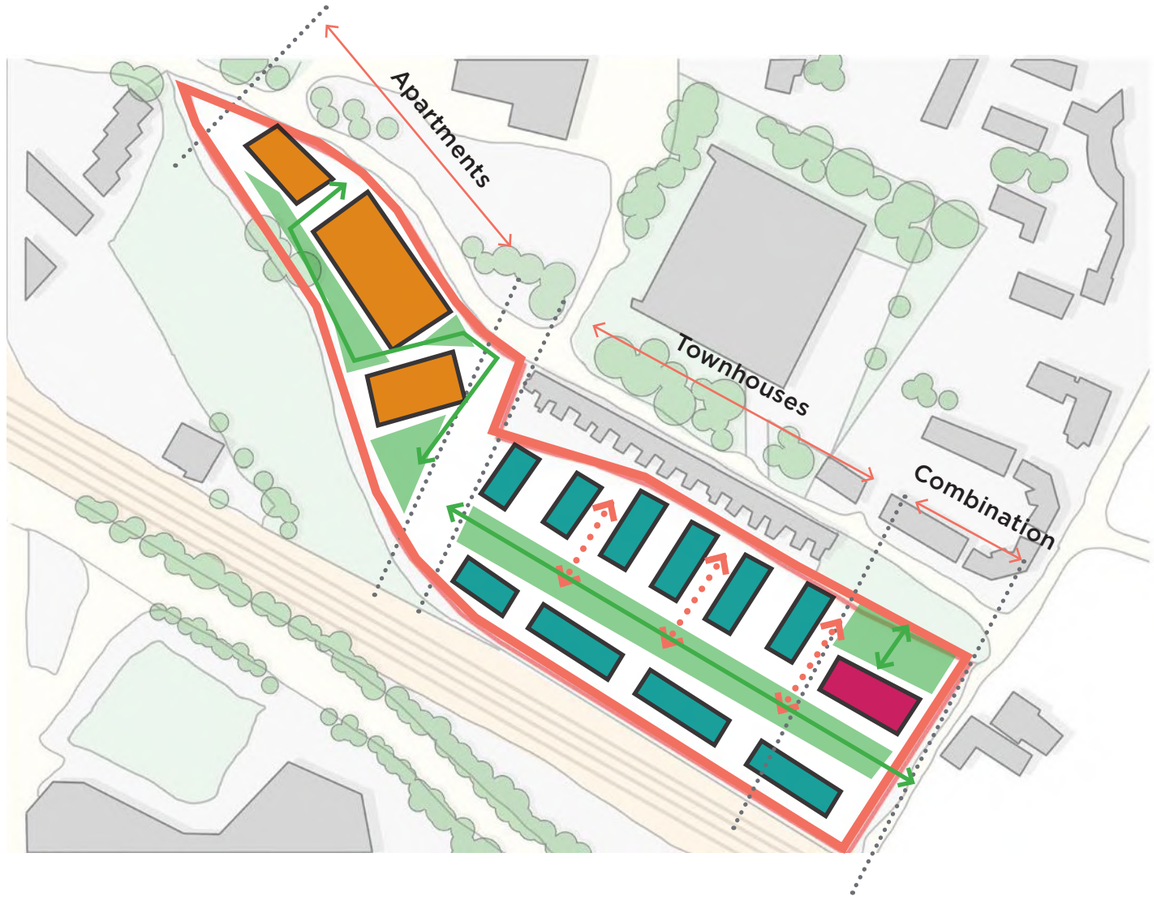
Zoning and Place Making

Plot arrangement gives site the flexibility of phasing the development.

Layout creates sheltered pedestrian zones, the allocation of massing shelters pedestrians from traffic routes.

Creating a hierarchy of public and private zones. Green edge enhanced to provide green spine route through entire site.

Plots oriented to respect neighbours.



Collaborative Approach and Pre-Application Process

- 06.2021 - Initial meeting

Eutopia first met with the Council in June 2021, before the pre-application process, to introduce themselves and discuss the principles of redevelopment on the site.

- 07.02.2022 - Pre-Application 1

First formal pre-application meeting.

- 29.04.2022 - Pre-Application 2

Follow-up pre-application meeting.

- 09.05.2022- Pre-Application 3

Design workshop on site.

6.0 Consultation

6.1 Collaborative Approach

Overview

Eutopia Homes adopt a collaborative approach through planning on all their developments. Over the past 2 years they have engaged with the Gloucester City Council, initially on the site allocation and then through a pre-application process. In addition, they have engaged with the public through a project website, a public consultation, and a webinar.

www.greatesternyard.info

Consultation Schedule

- 06.2021 - Initial meeting

Eutopia first met with the Council in June 2021, before the pre-application process, to introduce themselves and discuss the principles of redevelopment on the site.

- 07.02.2022 - Pre-Application 1

First formal pre-application meeting.

- 29.04.2022 - Pre-Application 2

Follow-up pre-application meeting.

- 09.05.2022- Pre-Application 3

Design workshop on site.

- 07.04.2022- Local Elected Representatives Site Visit.
- 29.05.2022 - Drop in Session (Public Consultation)
- 31.05.2022- Webinar (Public Consultation)

Early Design Sketch

6.2 Response to Pre-Application 1 Summary

Further to the Pre-Application meeting which took place on the 7th February 2022, GCC provided comments by email on the 11th March 2022. These

comments included:

Design and appearance

- Well considered and appropriate for the site.
- Material palette, detailing and housing variation would add quality to the character of the area.
- Architectural design level considered positive.
- Further clarification of defensible space at ground level.

Scale and massing

- Lower scale housing on eastern portion considered correct approach.
- Scope to increase housing on southern boundary to 3 storeys if desired.
- There is scope for taller buildings on the western part of the site. The current step from Block C down to terraced housing considered too great. Solution would be to reduce the hight of Block C which is closest to the 2 storey housing.
- Clarify Block B relationship to the road.

Internal separation distances

- The layout will need to maintain back to back separation distances of a minimum of 21 metres.

Housing mix

- Housing development will be required to provide an appropriate mix of dwelling sizes, types and tenures in order to contribute to mixed and balanced communities and a balanced housing market. Development should address the needs of the local area, including the needs of older people, as set out in the local housing evidence base, including the most up to date Strategic Housing Market Assessment.
- The number of 1 bed apartments should be reduced and the housing mix brought more closely in line with the policy requirements.

Space standards and amenity space

- All units will need to be designed to meet national space standards as set out in policy SD11 of the JCS.
- The provision of balconies to all flats where possible.

Boundary treatments

- Clarification is required in respect of the boundary treatments proposed, particularly with regards to the southern boundary and the boundary to the existing housing on the northern boundary of the site.

Highways and parking

- The site is in a sustainable location and a reduced level of parking is considered to be acceptable on this site.
- Details of cycle parking are required with the application submission.
- Clarification from Highways that shared surfaces are acceptable for an adopted highway.

Neighbours to the north

- It is considered that locating the housing in the western part of the site is the right approach in this regard and that the relationship between the proposed housing and the existing housing to the north is acceptable.
- Block C has the potential to have an adverse impact on the houses to the north and as such it is recommended that the application is supported by a daylight/sunlight assessment to demonstrate that the neighbours will not be adversely affected.

Proximity to level crossing to the south east

- The relationship with the level crossing needs to be considered in relation to the location of the proposed housing.

Landscaping and open space

- This is an urban site and should be developed at a higher density, therefore it is vital that the open space which is incorporated within the scheme is as high quality as it can be.

Affordable housing

- The scheme will be required to comply with policy SD12 of the JCS in respect of affordable housing provision.

Ecology

- Demonstrate a net gain in biodiversity in accordance with policy SD9 of the JCS and the NPPF.

6.3 Actions from Pre-Application 1 Feedback

Pre-Application 1 Meeting Action Points	Achieved / Addressed
1. Reduce massing of Block C (note massing of Block D increase)	✓
2. Address defensible land on Northern boundary	✓
3. Confirmation of 21 m back to back	✓
4. Daylight studies of existing Northern Terrace	✓
5. Interior layouts for apartment blocks	✓
6. Ground floor layout and interaction with landscaping	✓
7. Updated unit mix	✓
8. Addition of private balconies	✓
9. Southern Boundary analysis	✓
10. Engagement with ecologist consultants to determine biodiversity requirements	✓
11. Clarification of accessible and adaptable homes	✓
12. Re-design and highlighting of bicycle and waste storage provision	✓

6.4 Response to Pre-Application 2 Summary

During the Pre-Application meeting which took place on the 29th April 2022, GCC provided comments, including:

Design and appearance

- Recommendation to only use brick externally on block C, due to concerns of staining with render

Scale and massing

- Officers welcomed the reduction in height of block C
- Increase of height for block D as previously recommended felt imposing, reduced again

Housing mix

- Officers were happy with the reduction of 1 bed apartments and the amended housing mix.

Boundary treatments

- Officers were happy with the further clarification regarding boundary treatments

Neighbours to the north

- Requested a further explanation of the relationship between the blocks and existing terrace housing, regarding any overlooking into gardens
- Townhouses were pushed further from the boundary with the existing terrace houses.

Landscaping and open space

- Officers wanted further details on SUDs and linear route strategies
- Landscaping has been further specified to ensure it is of high quality

Existing green space

- Agreed that the appropriate treatment of the existing green space is to direct money to the local parks department for its re-design
- The treatment of the boundary to extend this space was seen as suitable

Other Consultants

- Officers recommended further dialogue on the following issues before the application's submission: railway vibrations, noise and air quality, mineral waste

Matters raised by GCC following the latest Pre-App:

Waste storage

- Council's Waste Storage and Collection Guidance (February 2020) was provided to check against. This had already been considered in the proposals.

Network Rail boundary

- Suggestion to liaise with Network Rail on suitable boundary treatments

6.5 Actions from Pre-Application 2 Feedback

Pre-Application 2 Meeting Action Points	Achieved / Addressed
1. Reduce massing of Block D to previous height	✓
2. Remove use of render	✓
3. Townhouses pushed further from northern boundary	✓
4. Further development of landscaping to ensure high quality	✓
5. Further details on SUDs, linear route strategies	✓
6. Further dialogue on waste	✓
7. Dialogue with Network Rail on suitable boundary treatments	✓

6.6 Public Consultation

There was full and fair opportunity over an extended period for all interested residents, businesses, community-based groups and other stakeholders to give their feedback on the emerging proposals.

The following public consultations have been held for the proposals:

Community Letter

- A community letter was distributed to local residents, with details of the proposals and upcoming drop-in session and webinar.

Drop-in Session, 30.05.2022, 4-7pm

- A drop-in session was held at Gloucester Irish Club (located immediately to the west of the site on Horton Road)

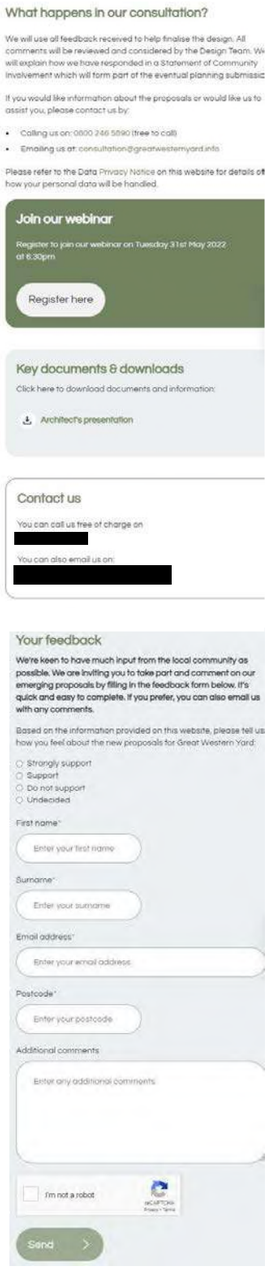
Webinar, 31.05.2022, 6:30pm

- A webinar was held, with a presentation on the proposals and time for questions and feedback.

Website

- A dedicated website went live on 20.05.2022 to provide information on the proposals and an easy way to send feedback. A dedicated phoneline and email address were also provided on this.

Local and public opinion have been predominantly positive about the proposals, partially due to the pre-allocation of the land to this use and its designation for 300 new homes, which has been met.



7.0 Masterplan & Layout

7.1 Proposed Masterplan

Overview

Through the design process we have responded to the site's constraints and opportunities. We have also been through a rigorous consultation process with Gloucester Councils and residents.

The proposed scheme emerges as a development that will be a positive addition to Gloucester. The proposals offer a wealth of high-quality homes and apartments punctuated and surrounded by green spaces, that may be used by resident inside the development and community groups around Gloucester.

The masterplan is organised into a series of zones,that are connected by high quality landscaping, which creates pedestrian links and break out spaces across the site

Careful thought was put into the materials of the buildings, and the colour choice of bricks, to take elements from local typologies and respond to them with a modern and clean design.

7.2 Masterplan - Phasing and Character Areas

Overview

The site is split into 2 distinct phases both with individual access.

The northern phase is characterised by apartment blocks and communal living spaces, with the southern phase predominantly low-rise housing for individuals.

Each area is designed to have its individual character, which are linked through an integrated landscaping solution that harmoniously connects the site as a whole.

North Phase -Sensitive massing and use of material, as well as the inclusion of open areas offer plenty of greenery which are intended to make this a positive entry point to the development from the west.

Houses - Three town house designs with varying roof types take into the account those that face onto the primary route, and those that face onto the secondary streets that create home zones instead. These home zones will act as a buffer between the home and the primary route, allowing the street outside to feel like a safe extension of the family home.

South Phase - The proposed block on this site was carefully designed and positioned to create green space that will connect back into the surrounding context.

7.3 Building Heights

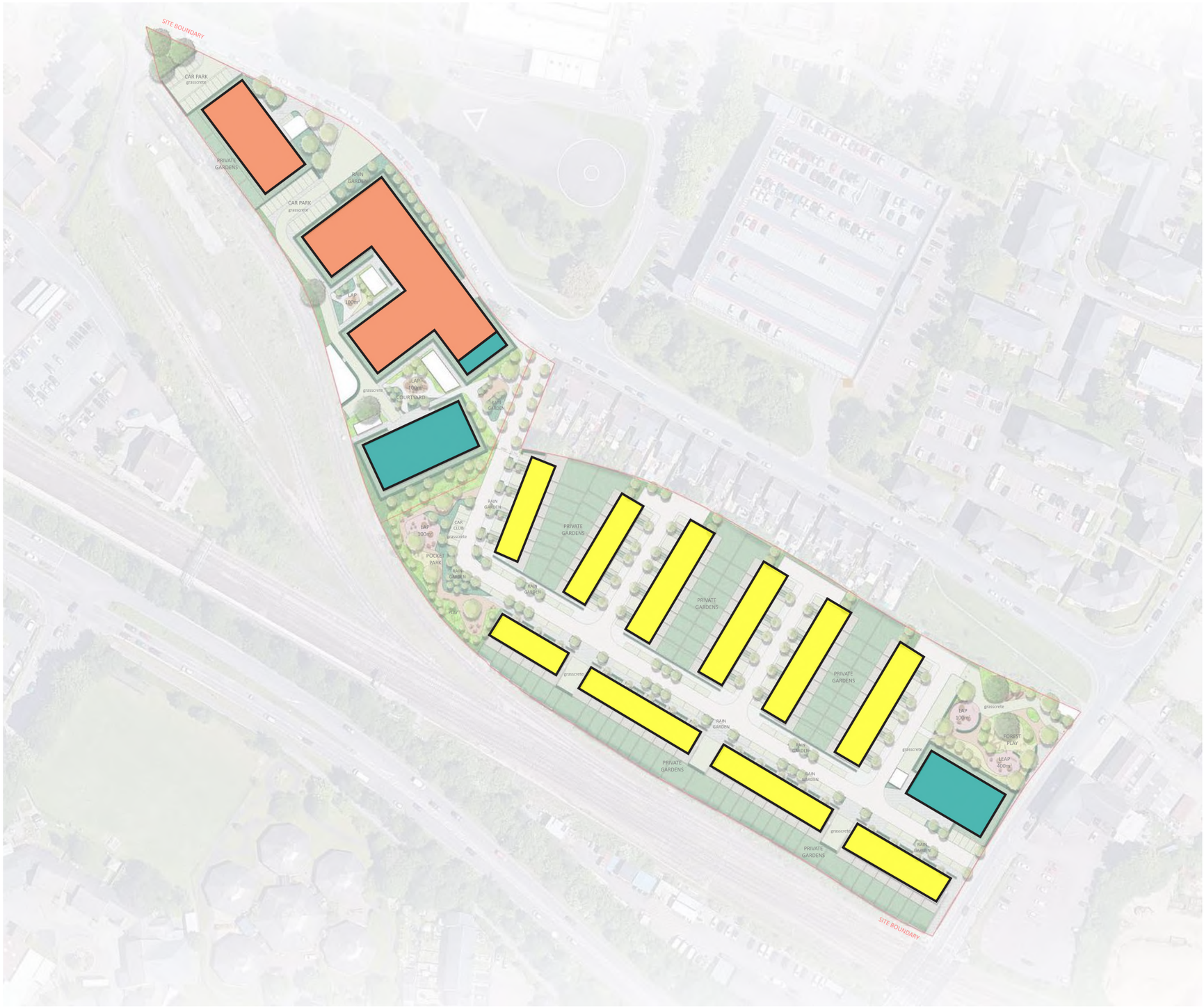
Overview

A full analysis of local building heights and the sites topography has informed the allocation of height across the site. The scheme has tested multiple options before arriving at the preferred layout.

The height steps from 2 up to 5 storeys. The distributed across the site to fit accordingly with orientation and daylight, but also to define the elements of the architecture.

The majority of the site is low rise, 2 storey town houses occupy a large central area adjacent to the existing 2 storey houses on Great Western Road.

The top storey of block B is stepped-in with a terrace to the edge. This help with the transition between the 2-storey housing up to 5 storey blocks.



Key:

2 Storeys

4 Storeys

5 Storeys

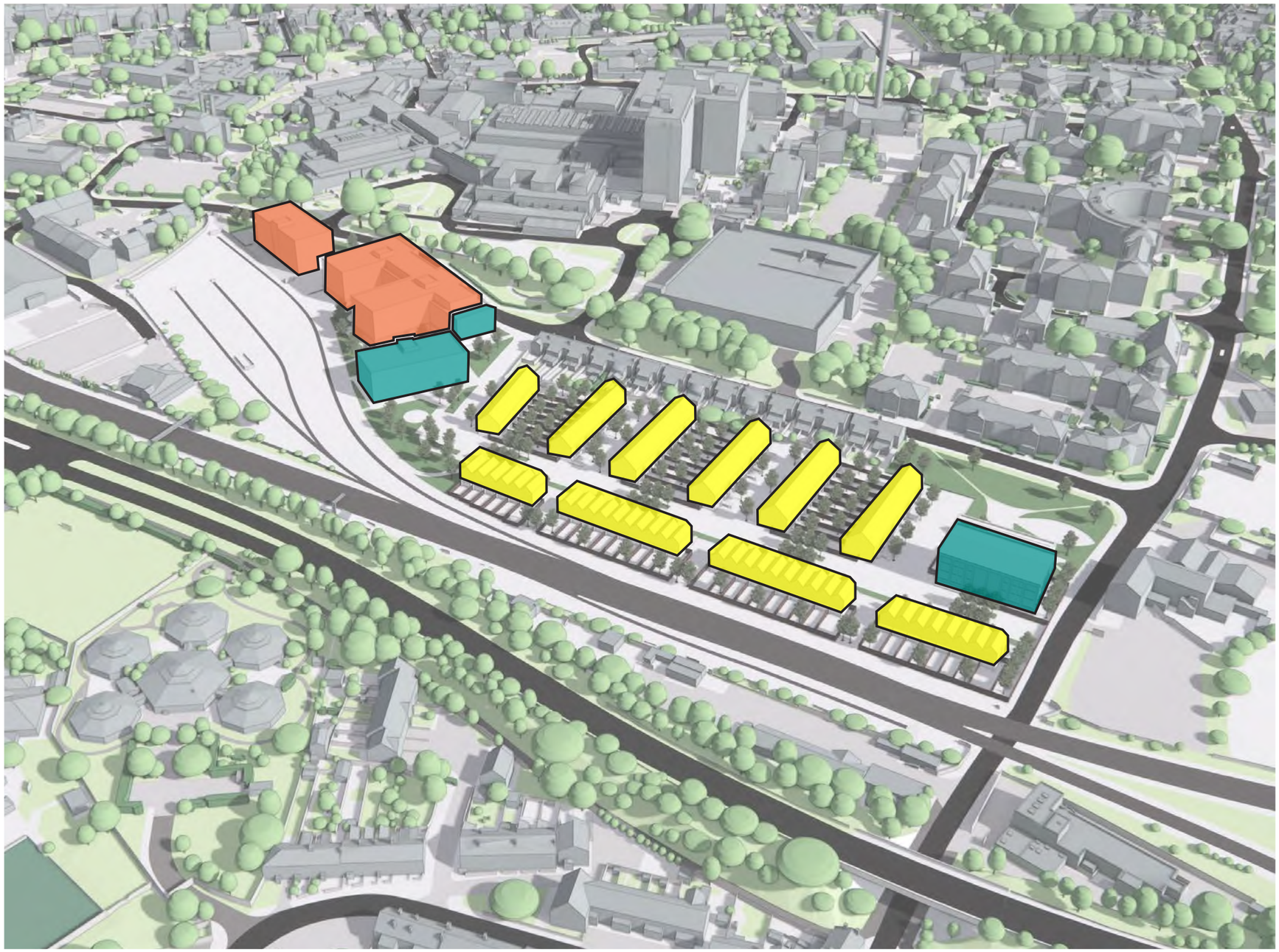
7.4 Building Heights - Massing View

Overview

The massing strategy has been presented and discussed with Gloucester City Council. Throughout the design process the massing has been adjusted and reduced to address officer's feedback. Key consideration has been given to the proposed buildings impact on the row of terraces houses facing Great Western Road.

The layout and massing have been adapted to reduce ridge heights and maximise separation distances between existing and proposed dwellings.

Consideration has also been given to the transition in heights across the site. This has been done through the varying in block heights and recessing floor plates.



Key:

2 Storeys

4 Storeys

5 Storeys

7.5 View looking at building relationships with existing housing

Overview

Proposed massing to step down to existing terraced houses to help situate new buildings into the site.

By stepping the apartments it creates a gentle more comfortable change in height across the site.

7.6 Street Hierarchy

Overview

The building layout and arrangement has been organised around creating a pedestrian friendly development.

The scheme looks to seamlessly integrate the movement of both vehicle and pedestrain to create a balance between operational requirement and pedestrian friendly movement.

The street hierarchy is focused on enhancing the pedestrian zones as much as possible. Vehicle access is limited to where necessary, with wide pedestrian footways and integrated landscaping running along these routes.

Within the northern phase, vehicle movements will be predominantly for servicing via a route south of the apartment blocks.

Within the southern phase secondary streets running perpendicular the central avenue. These are intended to be shared surfaces prioritising pedestrian movement.

An emergency access only point is incorporated via a shared surface through the park to the east.

Key:

Primary Route

Secondary Route - Part Shared Surface

Pedestrian Route

Vehicle Access Point

Emergency Access Point

7.7 Car Parking & Vehicle Access

Overview

The scheme has been designed to give cars access across the whole site without cars dominating the scheme.

Individual car parking spaces are located in front of each townhouse, with additional spaces integrated into the layout at multiple locations throughout the site providing both standard and blue-badge parking spaces.

There is the provision of a car club to reduce a resident's need to own a car should they only need to use one irregularly. To the western end of the site there will be electrical charging points for electrical cars.

The roads have been tracked to ensure larger vehicles can negotiate the road network.

Car Club

Electrical Charging

Parking Area

Electrical Charging Points

Car Club

7.8 Pedestrian Access & Movement

Overview

The building arrangement has been organised around creating a pedestrian friendly development. The scheme looks to seamlessly integrate the movement of both vehicles and pedestrians to create a balance between operational requirement and pedestrian friendly movements.

To promote a sustainable development the scheme looks to prioritise pedestrians by providing a series of break out landscaped spaces that are linked via a network of walkways, creating a pedestrian route that allows people traverse across the site

Key:

Pedestrian Routes

Entry Point

Linked Route

7.9 PV + Biodiverse Roofs

Overview

As part of our energy and ecological strategy, we are proposing to use a Bio Solar roof system across the apartment block in order to maximise both PV and Biodiverse areas.

Sample product:

https://www.bauder.co.uk/solar-pv/bauder-biosolar

Key Features include:

- Where a green roof and solar are required BioSolar allows the whole roof area to be vegetated as well as maximising PV output.
- Allows easy maintenance beneath front end of modules where vegetation is likely to be strongest and cause shading.
- The Flora 3 seedmix is specifically designed to work beneath the PV modules.

Key:

Biodiverse roofs

7.10 Cycle Parking

Overview

Bike storage is calculated based on the councils requirements.

- Secure cycle storage is provided per each apartment block. (394)

A - 64

B - 228

C - 50

D - 52

- Visitor cycle storage is provided across thes site via sheffield bike stands. (62)
- Each terrace house has individual secure cycle storage to the front of the property. (174)

Cycle Storage Enclosure

Key:

Cycle Storage

Visitor Cycle Storage

7.11 Green Space

Overview

The green spaces on site are a mixture of public and private.

Alongside existing green spaces that are located within a 10/15 minute walk from the site, green spaces are included throughout the site design.

This is done in the form of gardens, general free space and most importantly a buffer zone from the adjoining railway route. The buffer zone of landscaping will help to reduce both noise and pollution levels to the site.

The site vision is to create a tree-lined avenue bisecting the development linking north with south.

The East of the site aims to respect the existing green space, setting the proposed apartment block back from the space. The new apartment block will also provide natural surveillance of the new public open space.

The landscaping section provides a detailed assessment of the landscaping proposals

Key

Public Green space

Private Green space

Tree-lined avenue

7.12 Waste Management

Overview

Bin storage is based on Gloucester City Councils requirements. Bins will be collected via the council collection team and the layout has been tracked to accommodate the required refuse vehicle. See transport statement.

There is a bin stores located on the ground floor of each apartment block to accommodate the various waste bins. Each house is provided with an outdoor bin store for wheel bins.

Key:

Turning Head

Primary Route

Primary Entry Point

Refuse Collection Point

Waste Separation

8.0 Massing and Appearance

8.1 Overview

Townscape & Allocation of Height

The site is in a good location within Gloucester close to the train station and adjacent to the city hospital.

We have tested the massing in key views using a 3D-Zmap which has help inform the overall approach to heights.

The northern part of the site is not close to any residential properties therefore more suited to providing some height on the site.

The southern part of the site is more sensitive due to the existing houses along Great Western Road therefore the proposed height in this location is lower to prevent overshadowing and overlooking.

Materials

We have carried out an in-depth analysis of the local area as part of our design analysis. This study has helped inform our overall design approach.

Z Map View

Scheme View

8.2 Materials

Existing Materials

The terrace houses and church neighbouing site use the traditional facade material of predominantly red brick with alternate coloured brick details.

Key

- Varying flemish brick, predominantly red
- Render
- Concrete
- Metal clad

Proposed Materials

The proposals use the local red brick, alternative coloured brick tones and metal cladding.

Key

- Red brick
- Metal cladding and dark brick elements

Materials

Overview

Reinterpreting the use of materials within the local context and utilising a modernised take on Gloucester's defined local character was at the forefront of our design process.

As red brick was the predominant building material in the area, the proposals use this cladding material. Decorative brick divides up the buildings and adds interest, taking inspiration from the brick patterns in the local vernacular.

Block D is designed to be of similar scale and location on site to the rail depot building, also built of red brick.

Existing Materials

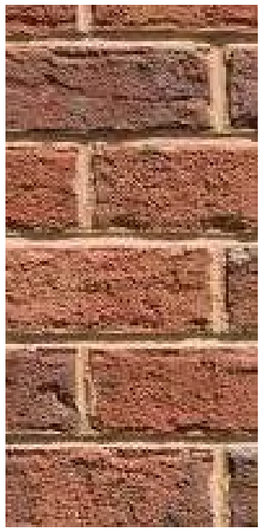
Local vernacular with red brick and saw tooth brick detail and large windows.

Local vernacular terraces in red brick with brick lintels.

Local vernacular terraces with decorative coloured brick details.

Local existing rail depot on site with worn painted red brick, brick lintels, metal roof and chimneys.

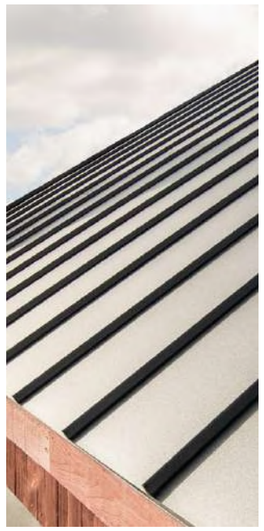
Proposed Materials



Red brick

Dark brick

Reconstituted stone



Metal roof panels

8.3 Masterplan Northern Phase

Overview

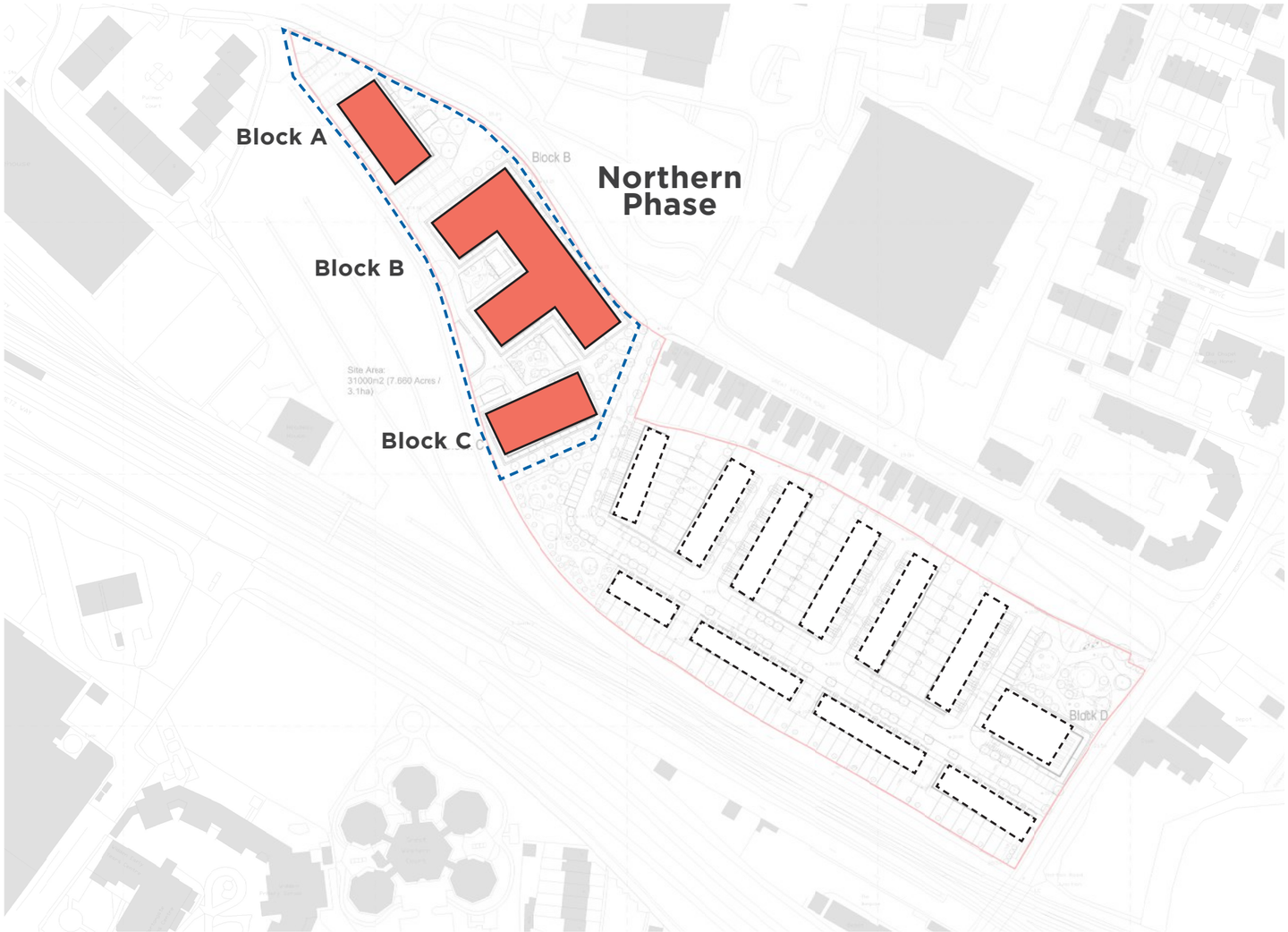
The northern phase of the development consists of apartment blocks A, B and C.

Mix:

- Block A: apartments
  Studio = 4
  1 bed/2 person = 19
  2 bed/3 person = 15
  3 bed/4 person = 5

- Block B: apartments
  Studio = 1
  1 bed/2 person = 46
  2 bed/3 person = 39
  2 bed/4 person = 36
  3 bed/5 person = 3

- Block C apartments:
  Studio = 3
  1 bed/2 person = 15
  2 bed/3 person = 12
  3 bed/6 person = 4



Block A

Block B

Block C

8.4 Elevation Strategy - Analysis

Warehouses Vernacular

Gloucester has a canal heritage which links to the development of the railyard site. City centre and wharfside warehouse buildings reference this past. The photographed example is from nearby the wharf in central Gloucester.

Bays

Warehouse blocks are divided up by set back bays, giving a columned appearance.

Windows

Consistent openings provide regularity, while varying infill elements are seen.

Storeys Definition

Varied spacing between storeys provides division across the facade. Taller openings provide emphasis to the ground floor.

Key:

Overall facade

Bays

Window openings

Storey groupings

Elevation Strategy - Analysis

Local Shops Vernacular

To the south of the site is a large residential area of Gloucester, mostly comprising of two and three storey buildings. The style of a typical shop on the local high street, Barton Street, is analysed.

Separation Between Floors

Highly decorative tiling, more openings and a plinth provide visual separation between the two storeys and place emphasis on the public ground floor compared to the private residential first floor.

Decorative Detail

Ornate tiling and brickwork are used. These are focused around openings and as a plinth/ horizontal visual element.

Openings

Larger, more frequent openings on the ground floor further emphasise the public/private split in the building between the storeys. Openings are regular and equally spaced horizontally but not vertically.

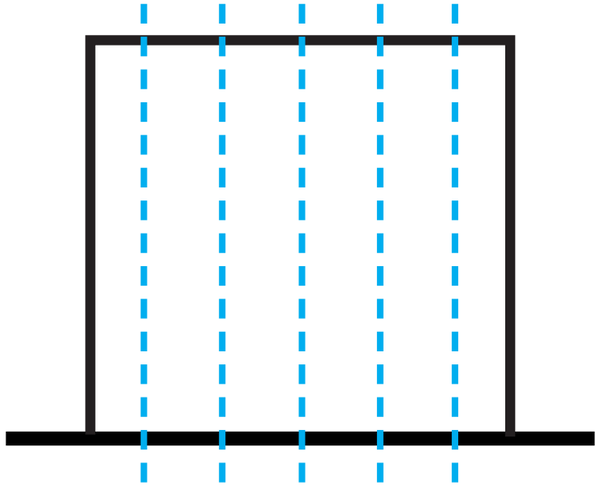
Key:

Visual focus in facade

Openings

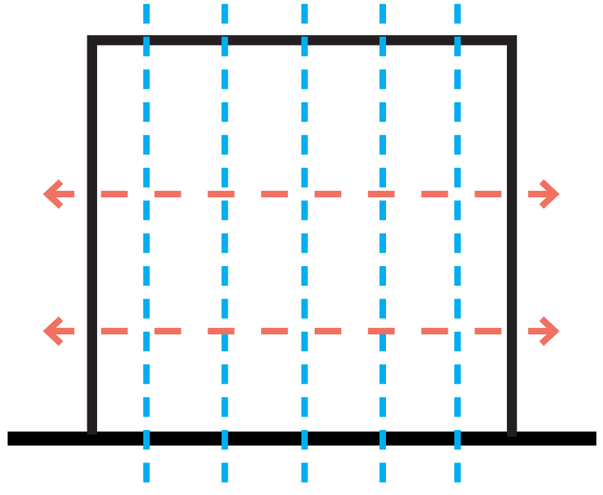
Decorative detail

8.5 Elevation Strategy - Analysis and Application



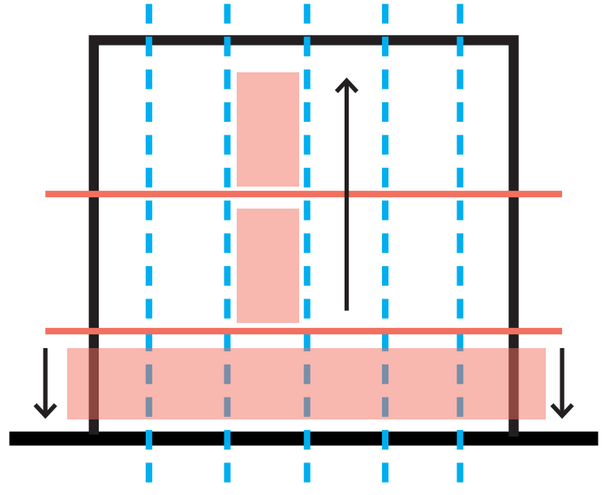
Vertical Division

The apartments are divided vertically, taking inspiration from the wharfside warehouse buildings in Gloucester.



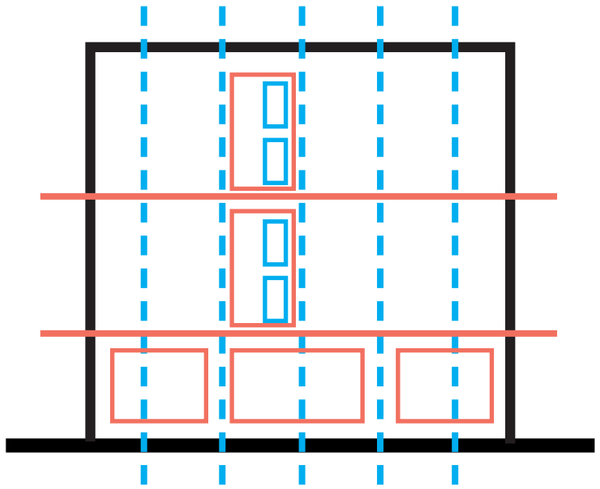
Horizontal Division

Horizontal divisions further break up the scale and place an emphasis on the ground floor, as seen in the local shops found in the residential area to the south of the site.



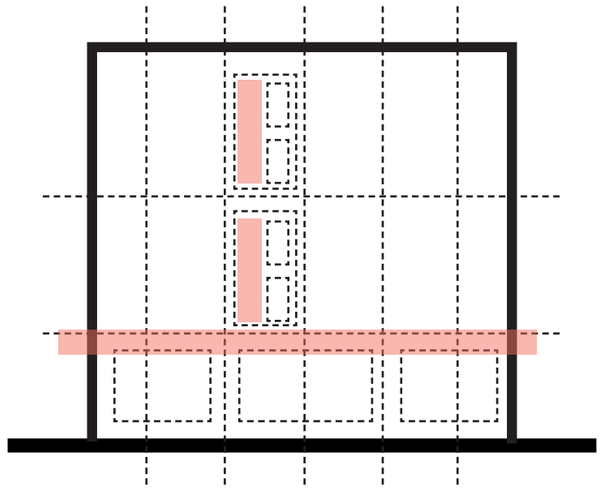
Material and Style Variation

Material and openings variations between floors places greater emphasis on the more public ground floor and further emphasises the reference to the local shops.



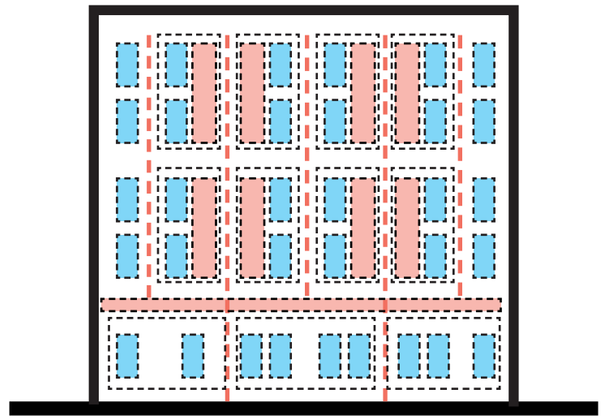
Openings Layout

The scale of the openings varies between the public ground and private upper floors. Regular openings with varying infill elements, influenced by the warehouses in Gloucester, allow for window and door adaptations within the overall layout.



Textured Brick

A variety of decorative brick types are used, as found in the local vernacular style of the area. Textured brick variation provides the outline of window openings and soldier course plinths emphasise storey divisions.



Decorative Detail

Overall, the façades are divided horizontally and vertically to reduce the scales of the blocks, in a style that takes inspiration from local vernacular warehouses and houses.

8.6 Block A, Bay Study

Overview

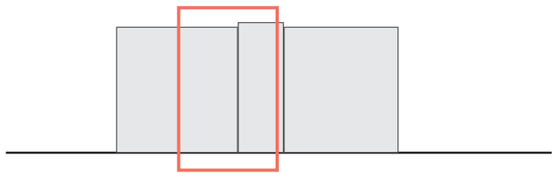
The proposed scheme is characterised by its use of red brick, as seen in local vernacular buildings. The use of bays and banded brick patterns break up the face of the facade and also relate to local architecural styles, with a modern approach.

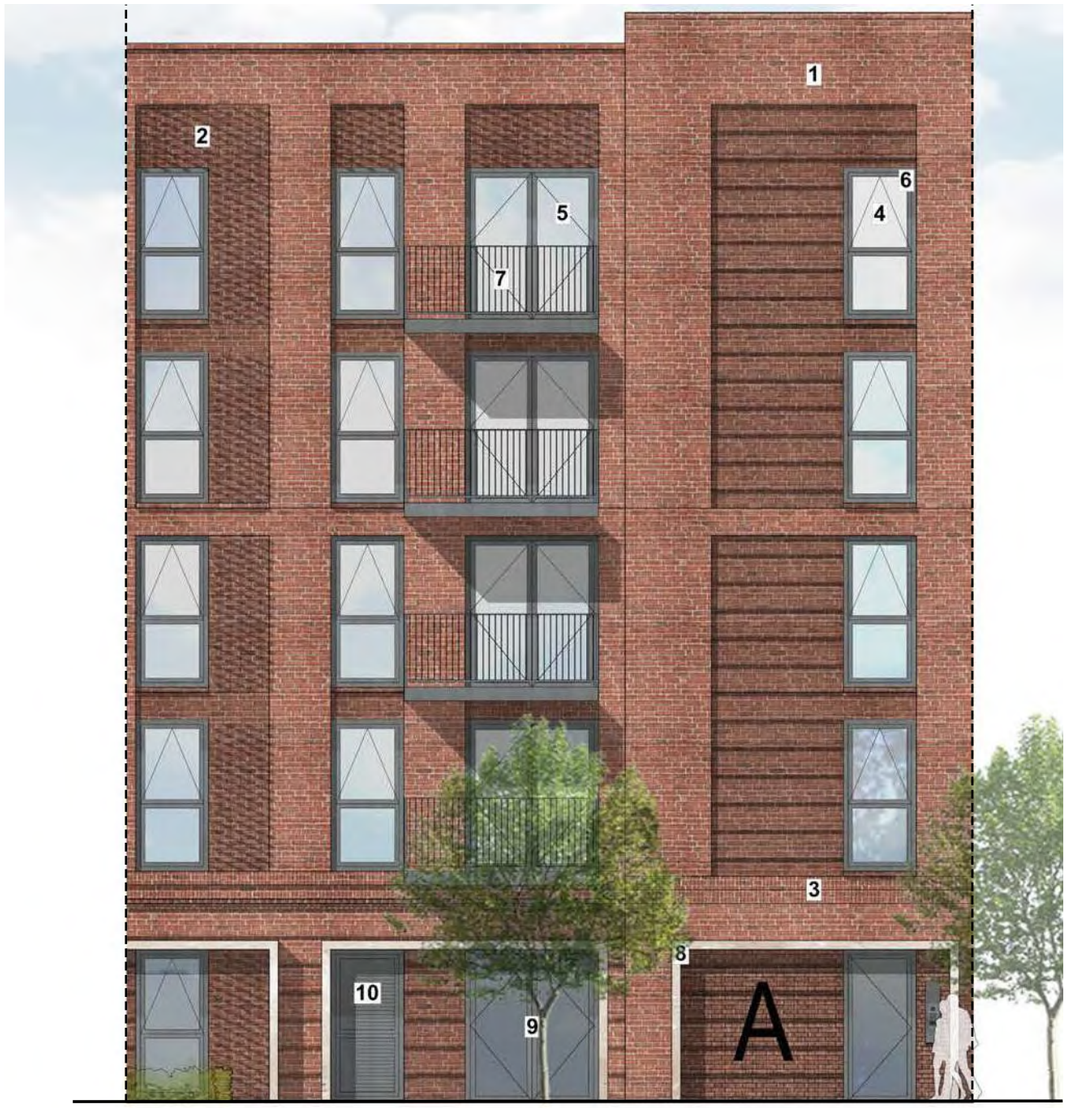
Light grey metal balconies provide a soft contrast.

In block A, the contrast of the two types of decorative brickwork provide distinction between floors and bays and add interest, with banded brickwork emphasising the ground floor.

Palette of Materials

1 Red brick
2 Feature brick
3 Soldier course brick banding
4 Double glazed window unit
5 Double glazed door unit
6 Grey metal window surround
7 Balcony
8 GRP canopy
9 Opaque double doors
10 Louvred panel





A Block A - Bay Study
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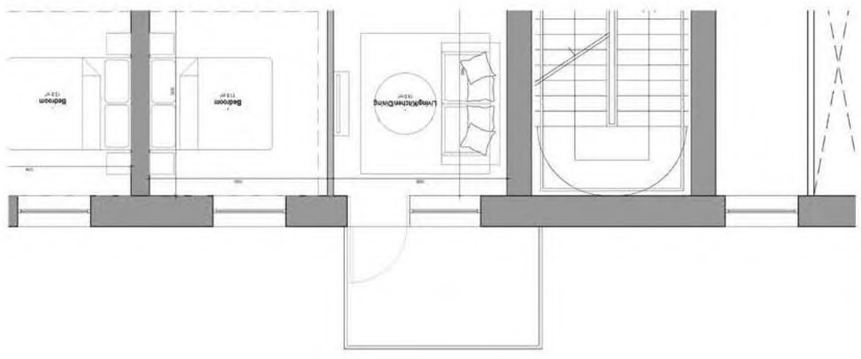
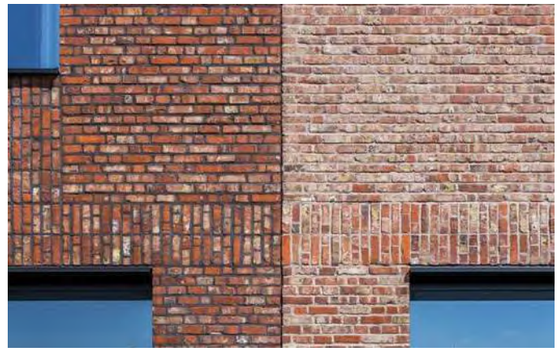




8.7 Block A

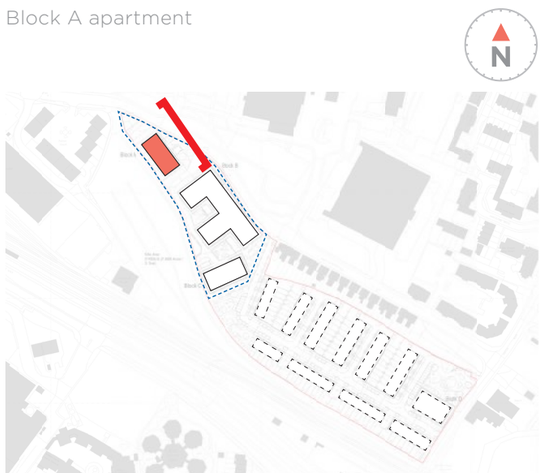
Front/East Elevation

Palette of Materials

1 Red brick
2 Feature brick
3 Soldier course brick banding
4 Double glazed window unit
5 Double glazed window and door unit
6 Grey metal window surround
7 Balcony
8 GRP canopy

Block location

Block A apartment



8.8 Block B, Bay Study

Overview

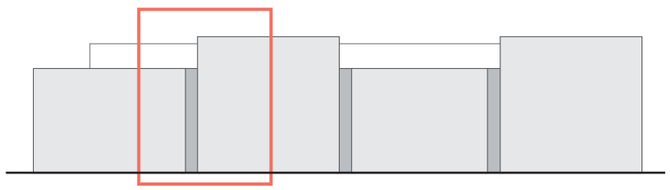
The proposed scheme is characterised by its use of red brick, as seen in local vernacular buildings. The use of bays and banded brick patterns break up the face of the facade and also relate to local architecural styles, with a modern approach.

Light grey metal balconies provide a soft contrast.

In block B, a brown brick is used to provide a contrast between it and the other apartment blocks. Light grey metal and dark grey brick cladding breaks up the facade further. The contrast of the two types of decorative brickwork provide distinction between floors and bays and add interest, with banded brickwork emphasising the ground floor.

Palette of Materials

1 Red brick
2 Feature brick
3 Soldier course brick banding
4 Double glazed window unit
5 Double glazed door unit
6 Grey metal window surround
7 Balcony
8 GRP canopy
9 Opaque screen
10 Dark metal panelling



A Block B - Bay Study
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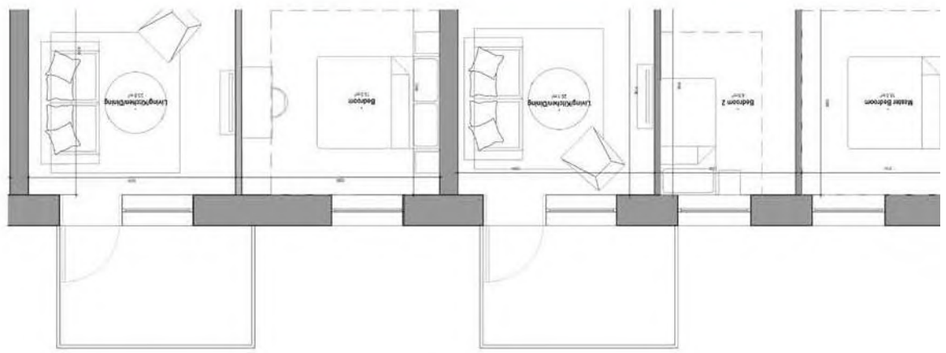
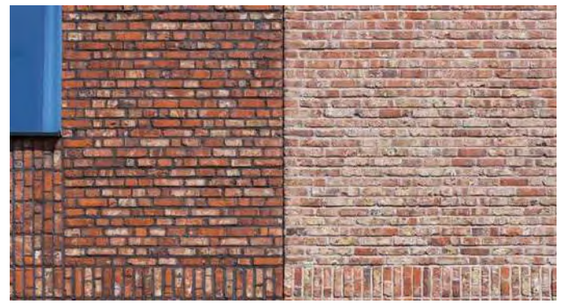




8.9 Block B

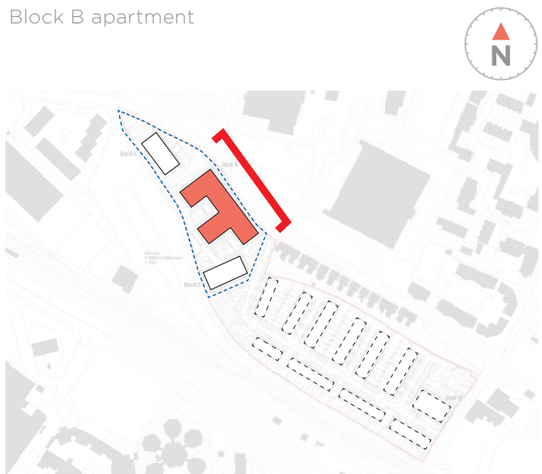
Front/East Elevation

Palette of Materials

1 Red brick
2 Feature brick
3 Soldier course brick banding
4 Double glazed window unit
5 Double glazed window and door unit
6 Grey metal window surround
7 Balcony
8 GRP canopy
9 Opaque screen
10 Metal panelling

Block location

Block B apartment



8.10 Block C, Bay Study

Overview

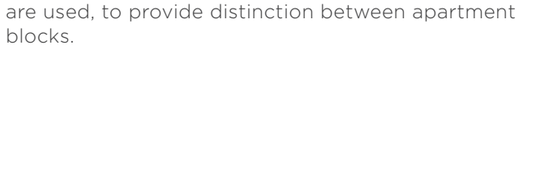
The proposed scheme is characterised by its use of red brick, as seen in local vernacular buildings. The use of bays and banded brick patterns break up the face of the facade and also relate to local architecural styles, with a modern approach.

Light grey metal balconies provide a soft contrast.

In block C, two types of banded brick patterning are used, to provide distinction between apartment blocks.

Palette of Materials

1 Red brick
2 Feature brick
3 Soldier course brick banding
4 Double glazed window unit
5 Double glazed window unit
6 Grey metal window surround
7 Balcony
8 GRP canopy
9 Opaque double doors



A Block C - Bay Study
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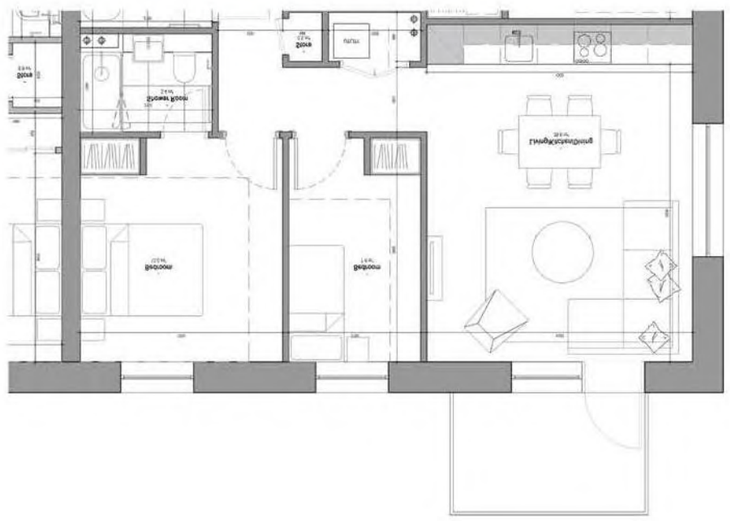
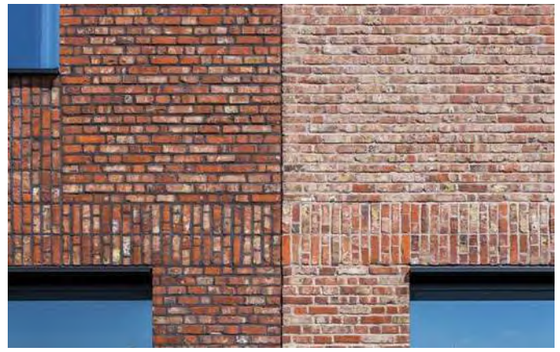




8.11 Block C

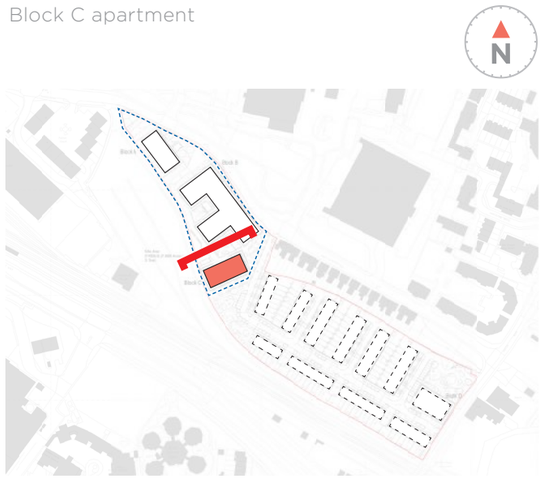
Front/North Elevation

Palette of Materials

1 Red brick
2 Feature brick
3 Soldier course brick banding
4 Double glazed window unit
5 Double glazed window and door unit
6 Grey metal window surround
7 Balcony
8 GRP canopy
9 Opaque double doors
10 Louvred panel

Block location

Block C apartment



8.12 CGIs - Block A

8.13 Masterplan Southern Phase

Overview

The southern phase of the development consists of three varying sizes of town houses and block D.

Mix:

- Block D: apartments
  1 bed/2 person= 11
  2 bed/3 person =15

- Town Houses
  2 bed/3 person = 43
  3 bed/4 person 28
  3 bed/5 person =16

Town House Example - 3 bed/4p

Block D

8.14 Local Context - Gloucester Character

Overview

Three distinct style areas of Gloucester were identified, and their associated residential styles:

01 Cathedral and city centre

02 Wharfside and industrial buildings

03 Large residential areas

Key:

Area View (x)

Residential Styles (x)

Three identified style areas of Gloucester.

Local vernacualr residential styles found in each of these areas.

8.15 Identifying Vernacular Features

Overview

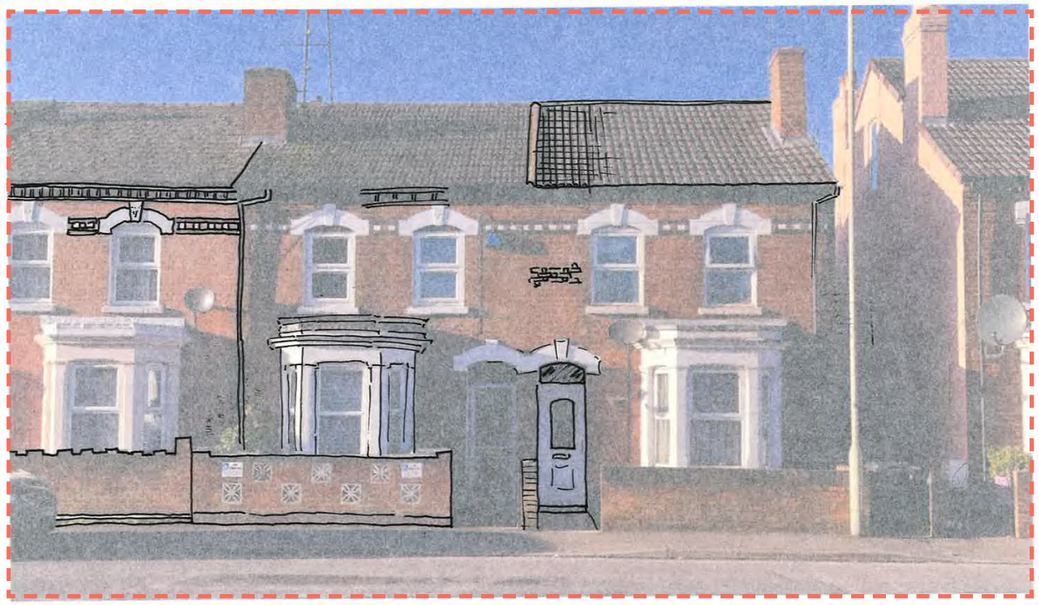
There are consistent features found in Gloucester's vernacular houses. The decorative elements, material variations and overall dimensions all influenced our design proposals. This means the style of the proposals are in keeping with the existing styles seen in Gloucester.

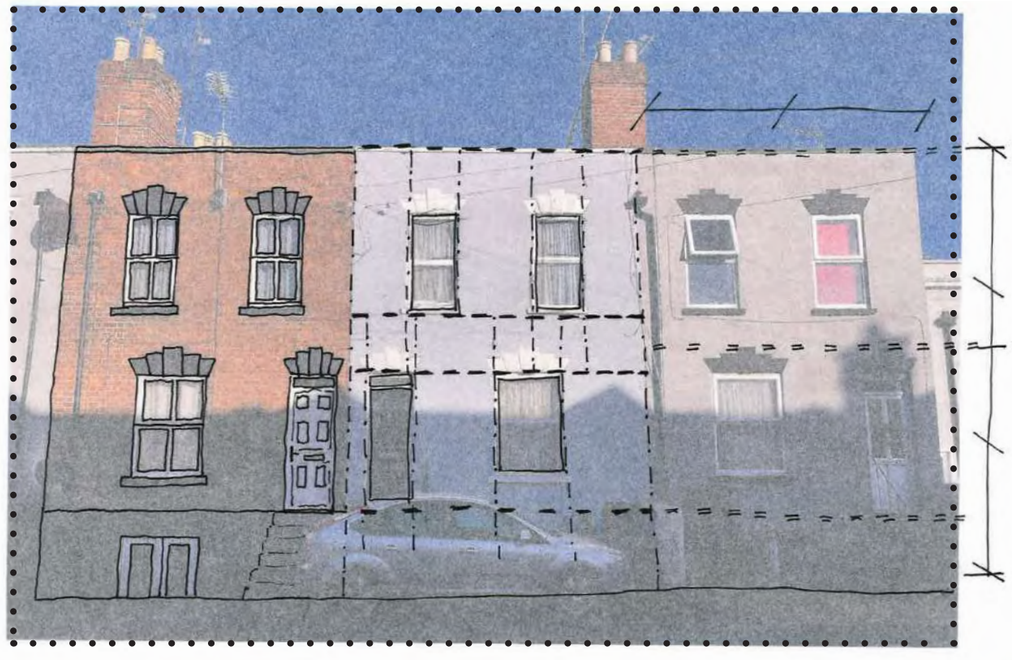
Key:

Decorative Elements/Materials

Overall visual divisions

Openings





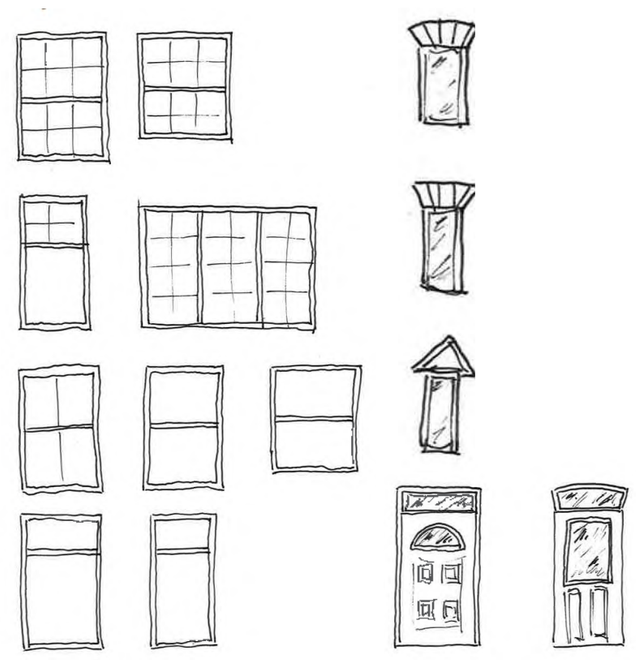
Clay Roof Tiles

Brick banding detail

Painted brick detail

Red brick

Bay window detail



8.16 Vernacular Elements Brought into the Proposal

Roof Tiling

Local vernacular terrace houses use either clay or slate roof tiling. The proposals will use grey roof tiling in keeping with these.

Brick Details

Brick details at lintels and eaves in local vernacular. This is brought into the proposals.

Brick Patterns

Red brick was the predominant facade material in the area, so this is used. Decorations to the terrace house façades in the area were predominantly done with brick patterning. Brick patterns will be incorporated, as a combination of those already seen in the area and modern textured brick variations.

Window/Door Ratios

Local terrace houses have a variety of large, single and bay windows. The overall ratios of the buildings have been taken into account, incorporating the even divide of the two storeys and the uneven window and door openings.

Key:

Terrace Outline

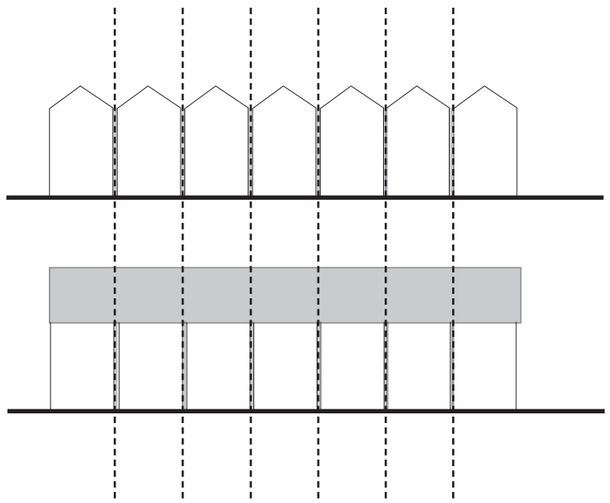
Layout Markers

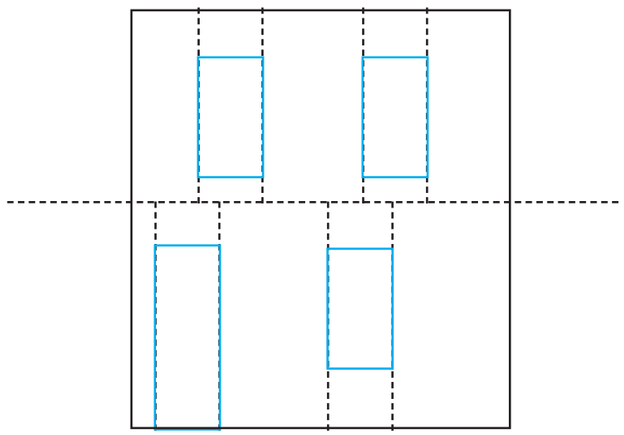
Openings

Brick Details

Texture Brick

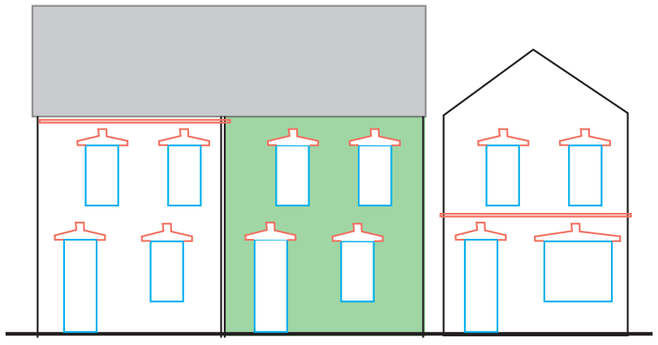
Roof Tiling





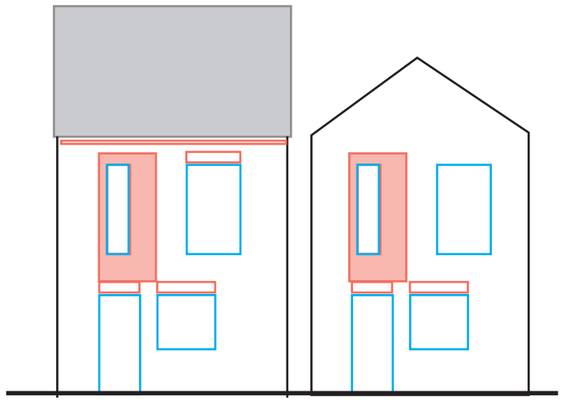
Terrace Houses

Local vernacular houses were usually terraces, with varied roof pitch directions and fairly regular dimensions. Rooves were tiled with either clay or slate tiles.



Ratios

Most houses were two storeys with regular storey heights. Windows and door openings were irregular.



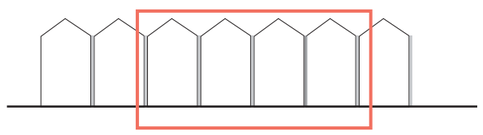
Decoration and variation

Decorative lintels, eaves and plinths give interest to local houses. A row would usually have a visual division between houses by variation in brick decoration, paintwork or rainwater pipe location.

The Developed Design

The proposals apply two storey and irregular openings elements to the design. Our proposals incorporate decorative and variety elements in material variety, brick textures and rainwater pipe location. Grey roof tiles and varying pitch directions.

8.17 Town House, 2 Bed 3 person Type 1



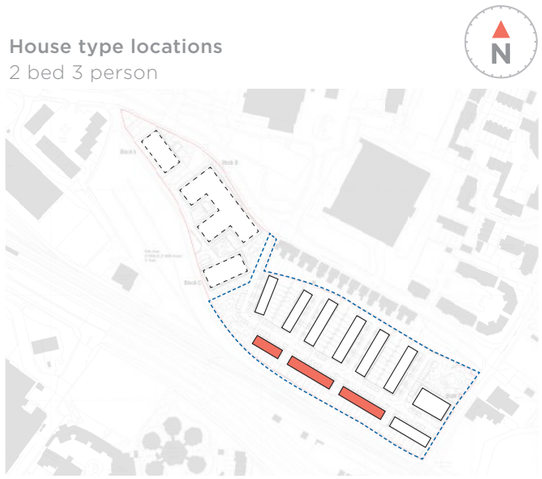
Palette of Materials

1 Red brick
2 Dark red brick
3 RWP
4 Feature coloured brick
5 GRP canopy
6 Double glazed window unit
7 Grey metal window surround
8 Dark roof tile
9 Double glazed bi-fold doors

1 Townhouse 2B 3P Type 1 - Front Elevation
SCALE 1:50

2 Townhouse 2B 3P Type 1 - Side Elevation
SCALE 1:50

House type locations
2 bed 3 person



3 Townhouse 2B 3P Type 1 - Rear Elevation
SCALE 1:50

8.18 Town House, 2 Bed 3 person Type 2

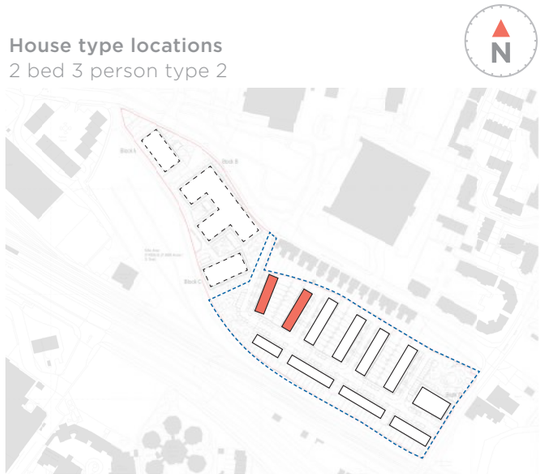
Palette of Materials

1 Red brick
2 Dark red brick
3 RWP
4 Feature coloured brick
5 GRP canopy
6 Double glazed window unit
7 Grey metal window surround
8 Dark roof tile
9 Double glazed bi-fold doors

1 Townhouse 2B 3P Type 2 - Front Elevation
SCALE 1:50

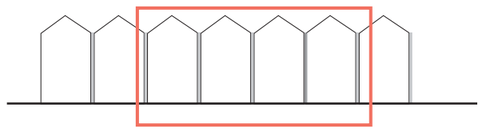
2 Townhouse 2B 3P Type 2 - Side Elevation
SCALE 1:50

House type locations
2 bed 3 person type 2



3 Townhouse 2B 3P Type 2 - Rear Elevation
SCALE 1:50

8.19 Town House, 3 Bed 4 person Type 1



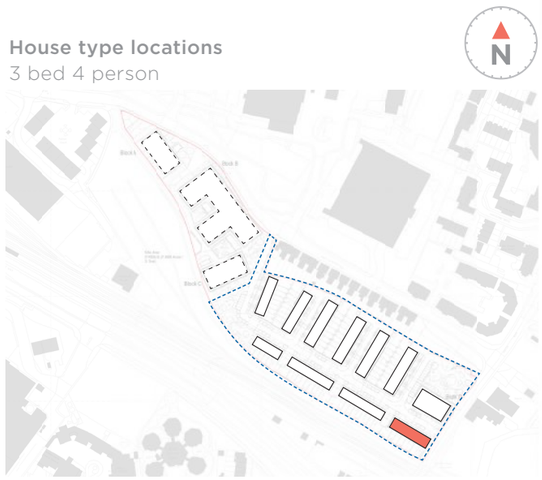
Palette of Materials

1 Red brick
2 Dark red brick
3 RWP
4 Feature coloured brick
5 GRP canopy
6 Double glazed window unit
7 Grey metal window surround
8 Dark roof tile
9 Double glazed bi-fold doors

1 Townhouse 3B 4P Type 1 - Front Elevation
SCALE 1:50

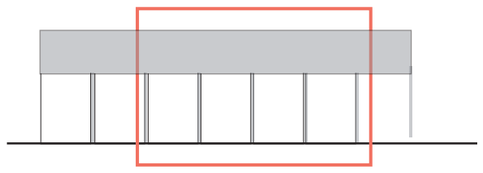
2 Townhouse 3B 4P Type 1 - Side Elevation
SCALE 1:50

House type locations
3 bed 4 person



3 Townhouse 3B 4P Type 1 - Rear Elevation
SCALE 1:50

8.20 Town House, 3 Bed 4 person Type 2



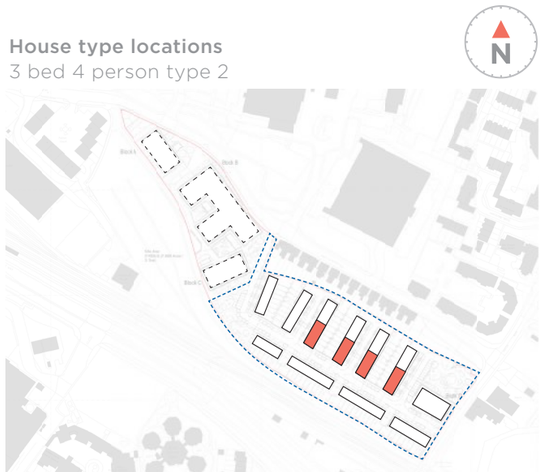
Palette of Materials

1 Red brick
2 Dark red brick
3 RWP
4 Feature coloured brick
5 GRP canopy
6 Double glazed window unit
7 Grey metal window surround
8 Dark roof tile
9 Double glazed bi-fold doors

1 Townhouse 3B 4P Type 2 - Front Elevation
SCALE 1:50

2 Townhouse 3B 4P Type 2 - Side Elevation
SCALE 1:50

House type locations
3 bed 4 person type 2



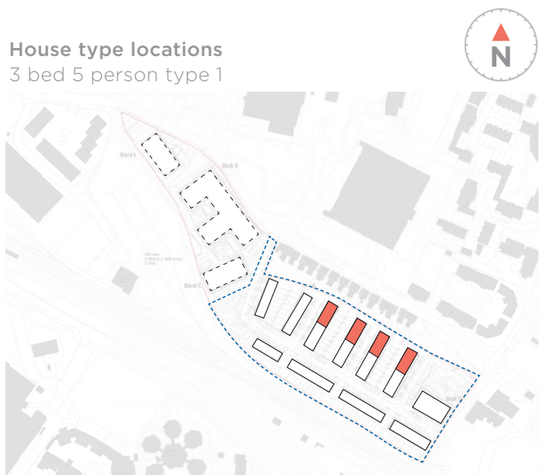
3 Townhouse 3B 4P Type 2 - Rear Elevation
SCALE 1:50

8.21 Town House, 3 Bed 5 person Type 1

Palette of Materials

1 Red brick
2 Dark red brick
3 RWP
4 Feature coloured brick
5 GRP canopy
6 Double glazed window unit
7 Grey metal window surround
8 Dark roof tile
9 Double glazed bi-fold doors

House type locations
3 bed 5 person type 1



3 Townhouse 3B 5P Type 1 - Rear Elevation
SCALE 1:50

8.22 Building Typologies - Houses

Design Proposals

The townhouses designs are a contemporary take on the Gloucester vernacular terraced house.

There is a mixture of 2 bed 3 person, 3 bed 4 person and 3 bed 5 person units. The units sizes have been established based on local market research and affordability for potential purchasers.

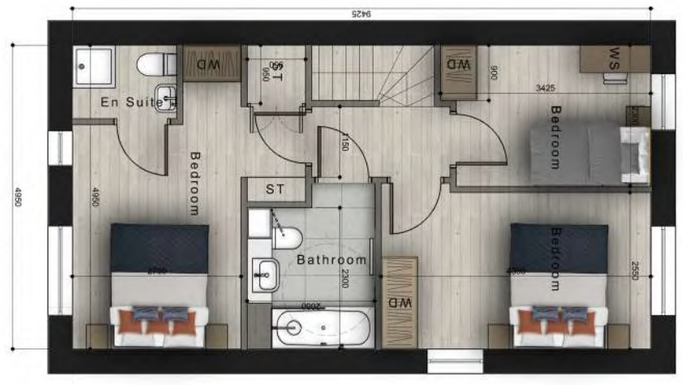
With the use of varied rooflines, the townhouses are visually separated into those that face the central avenue through the site and those that face onto the secondary roads.

These secondary roads will be a shared surfaces street with a turning head at the end. These streets are design to prioritise pedestrian movement.

The area to the front of the homes contains a single car parking space, bike storage, and bin storage, as well as some greenery. To the back of each townhouse is a garden with a wooden decking area to serve as a patio between the indoors and the garden.

Each house has a garden to the rear with minimum back-to-back dimensions of 21m.

Ground Floor Plan



First Floor Plan

8.23 CGIs - Town Houses

8.24 Block D, Bay Study

Overview

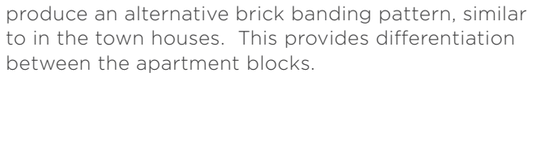
The proposed scheme is characterised by its use of red brick, as seen in local vernacular buildings. The use of bays and banded brick patterns break up the face of the facade and also relate to local architecural styles, with a modern approach.

Light grey metal balconies provide a soft contrast.

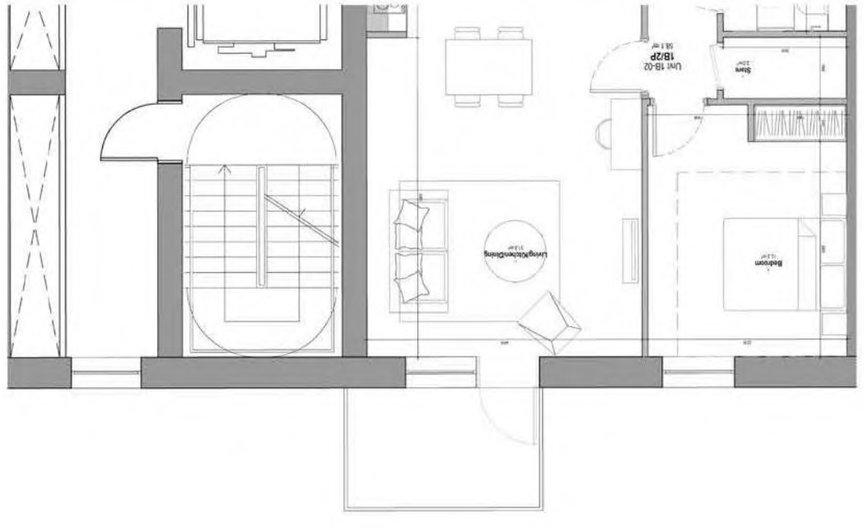
In block D, differential tones of brick are used to produce an alternative brick banding pattern, similar to in the town houses. This provides differentiation between the apartment blocks.

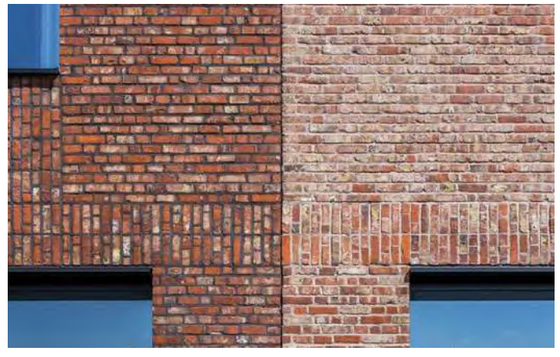
Palette of Materials

1 Red brick
2 Brick banding
3 Double glazed window unit
4 Double glazed window and door unit
5 Grey metal window surround
6 Balcony
7 GRP canopy
8 Grey zinc RWP
9 Opaque screen



A Block D - Bay Study
SCALE 1:50





8.25 Block D

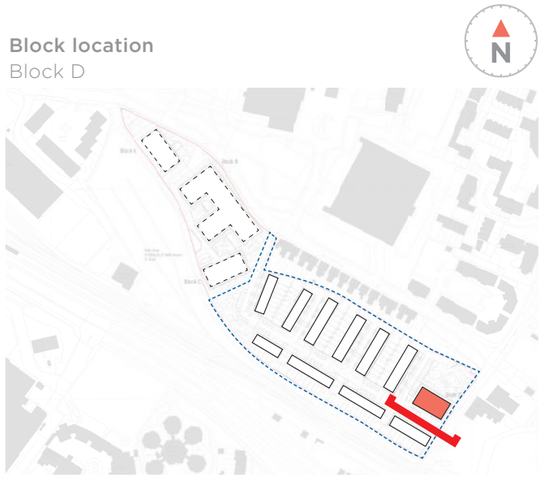
South/Front Elevation

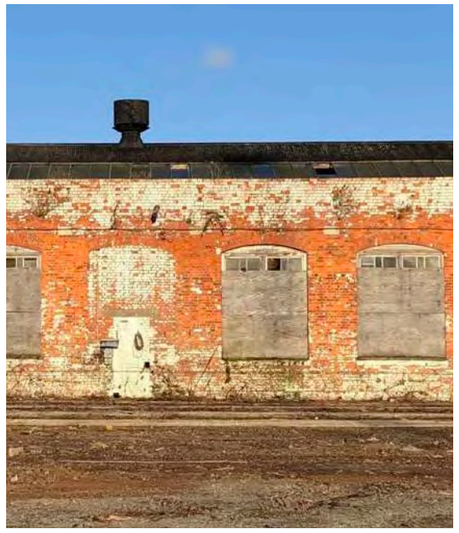
A Elevation A - Front
SCALE 1:125

Palette of Materials

1 Red brick
2 Feature brick
3 Brick banding
4 Double glazed window unit
5 Double glazed window and door unit
6 Grey metal window surround
7 Balcony
8 GRP canopy
9 Grey zinc RWP

Block location
Block D





Existing train depot on site

Irish Centre beside site

Warehouse nearby wharfside

Massing and Appearance

8.26 Block D

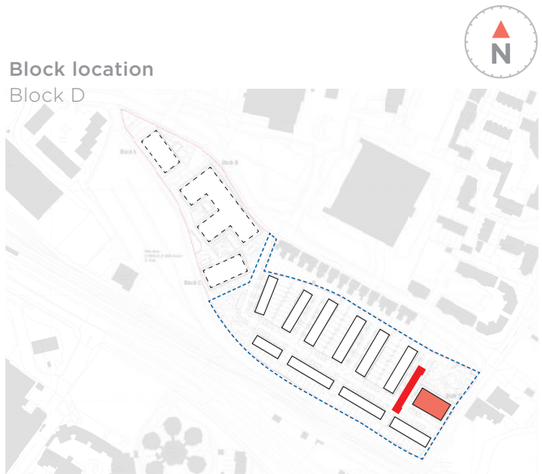
West/Side Elevation

4 Elevation B - Side
SCALE 1:125

Palette of Materials

1 Red brick
2 Feature brick
3 Brick banding
4 Double glazed window unit
5 Double glazed window and door unit
6 Grey metal window surround
7 Balcony
8 GRP canopy
9 Grey zinc RWP

Block location
Block D



8.27 CGIs - Block D

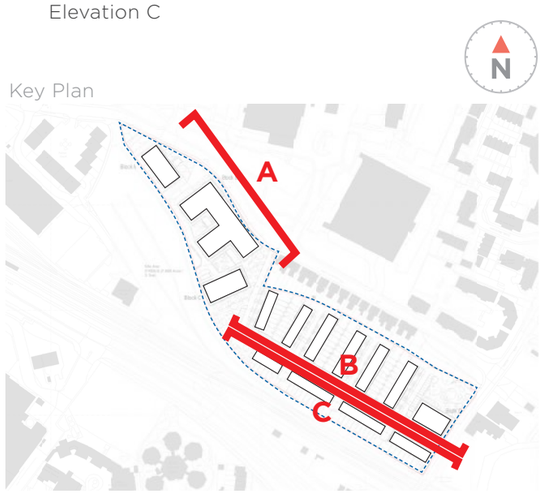
8.28 Site Elevations

Elevation A

Elevation B

Elevation C

Key Plan



8.29 Precedent Developments

Overview

The concept underlying the scheme is to create a modern environment that utilises green areas and amenity spaces to create a cohesive design with architecture inspired by and responding to its surroundings.

A contemporary architecture need not alienate itself from historical precedents, yet it should also prevent itself from simply copying the past.

A successful modern design looks at precedents and creates something new and improved with designs that have proven themselves in the past already. Through a cleaner look and the ability to have larger windows and openings, the designs throughout this scheme create a modern atmosphere whilst linking to the typologies surrounding it, such as terraced houses and brick buildings.

Scale and Form - Assessing the site and its unique topography and identifying how would be best to utilise the architecture to shape the indoor and outdoor spaces of the scheme.

Material Choice - Responding to the use of brick and detailing across terraced houses that characterise the area surrounding the site and using them in a varying number of ways across the scheme on different groups of buildings.

Detail - Identifying a select family of details and abstracting them with the influence from the precedents to the right to create a modern look that merges with its context and unify the proposed buildings.







9.0 Landscape

9.1 Design Proposal

9.2 Design Statement

The landscape design aims to create a sense of connectivity between spaces and promotes a sense of place within the development. This will be achieved through the use of high quality materials and the establishment of a carefully considered planting scheme.

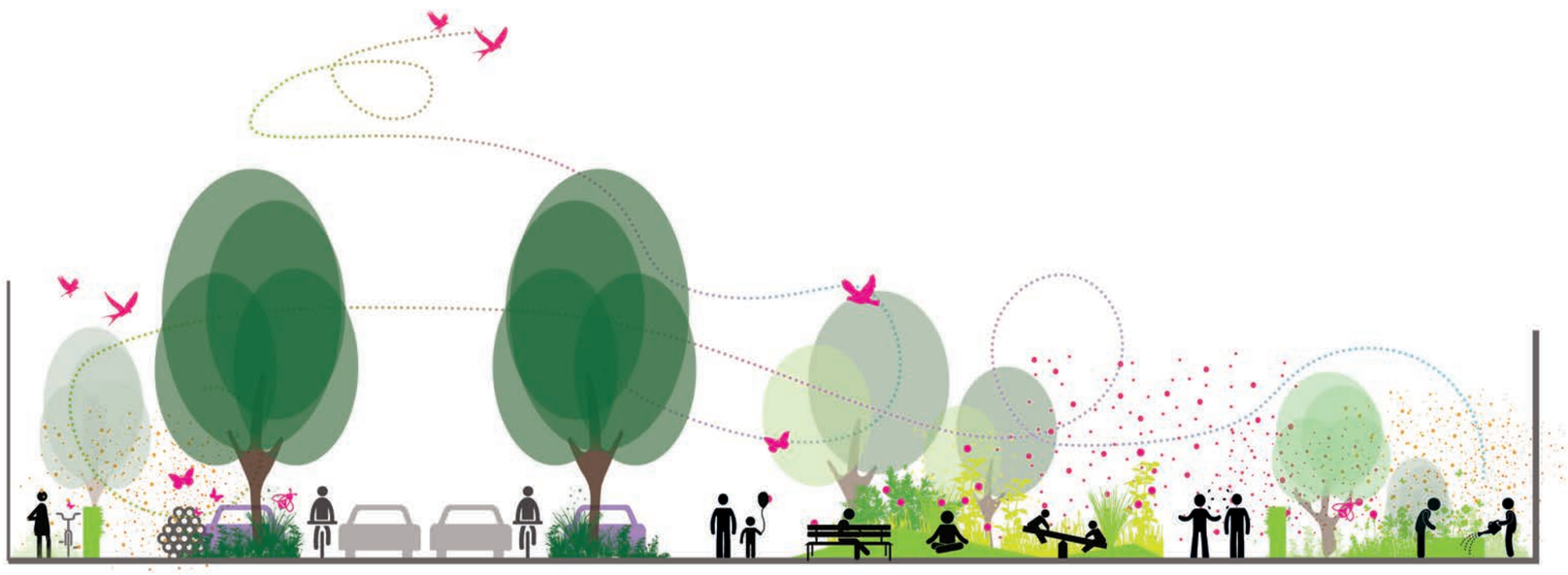
A coherent pedestrian footpath network ensures residents and guests can navigate around the site easily. The main public open space incorporates green avenue, pocket gardens, courtyards with seating areas and play spaces to ensure the landscape is interactive for children all ages.

The planting scheme uses a mix of native and ornamental tree and shrub species to create a seasonal landscape that is functional (by providing sustainable urban drainage solutions, but also shelter from the wind and sun), whilst also being sympathetic to the surrounding environment.

Overall the design will create high quality public open space including areas for passive and active recreation and social/community interaction.

KEY DESIGN PRINCIPLES

- To provide a buffer between the new residential of Great Western Yard and the existing sites
- To enhance boundary treatments
- To connect the area with the wider urban fabric and provide alternative transport opportunities
- To provide an attractive and playful external space
- To create an attractive public space and integrate play
- To provide shelter and planting buffers from the roads
- Use of SUDS - Biodiversity and stormwater mitigation
- Biodiversity and climate mitigation



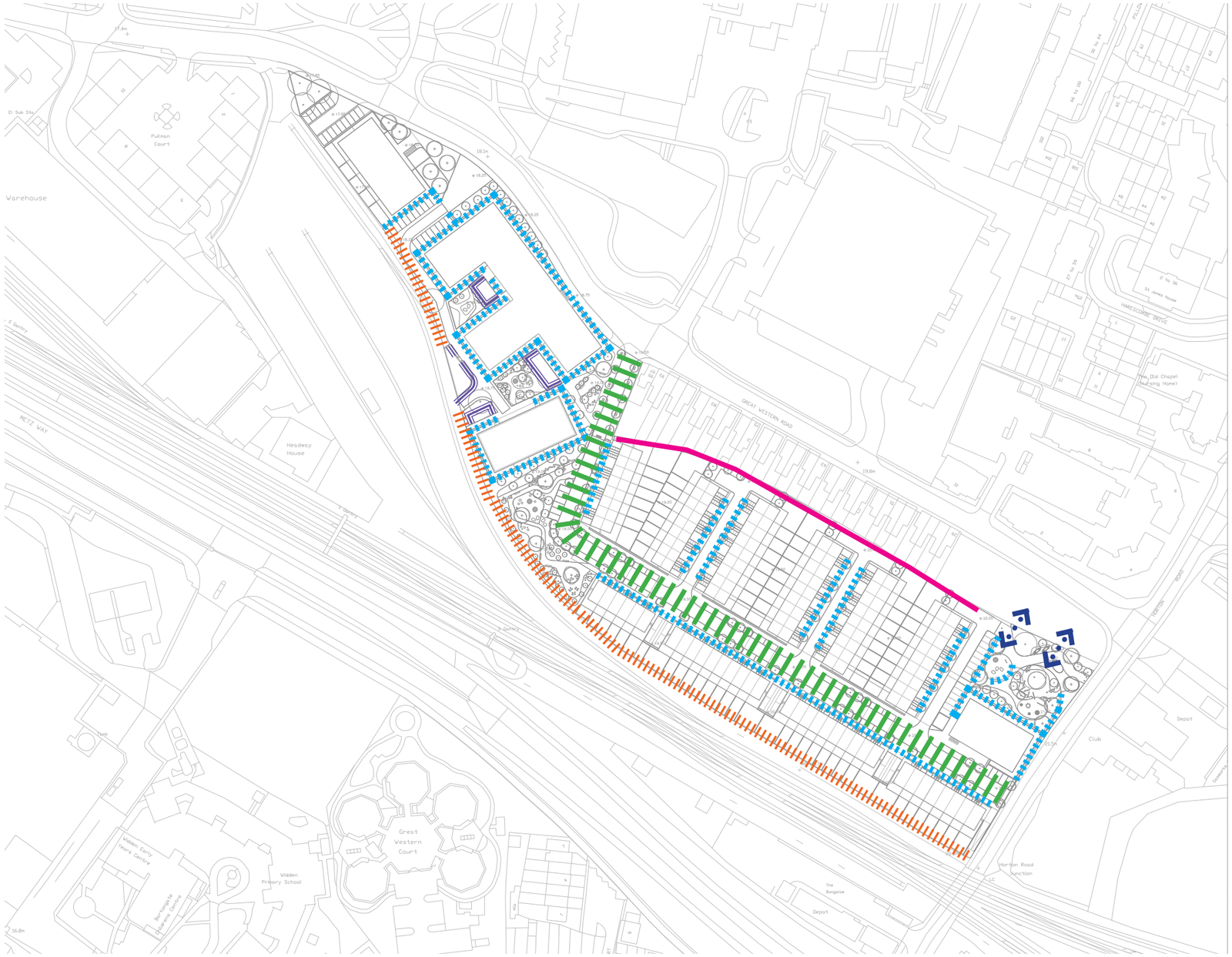
9.3 Site Boundary Treatments

The landscape design proposes various boundary treatments to address the surrounding characteristics of the environment.

The current proposal includes a tree lined avenue trees with rain gardens, wide footpaths and raised crossings creating comfortable and safe connections.

The landscape features include:

- Semi mature avenue trees
- Visible SUDs features i.e rain gardens
- Segregated and permeable pedestrian footways, improved cycleways and generous buffers between both
- Robust and hard wearing permeable paving punctuating corners



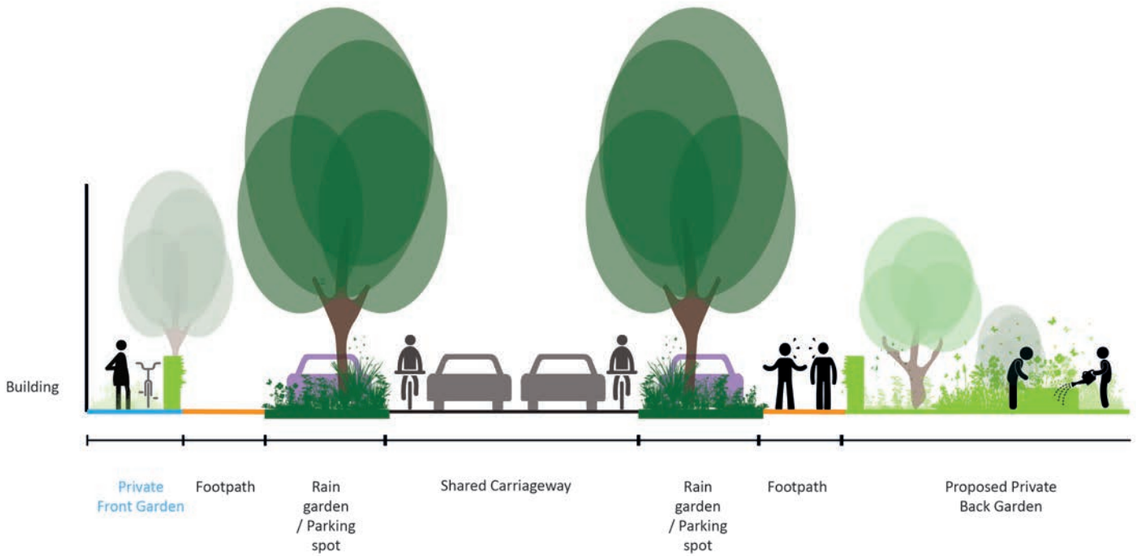
Legend:

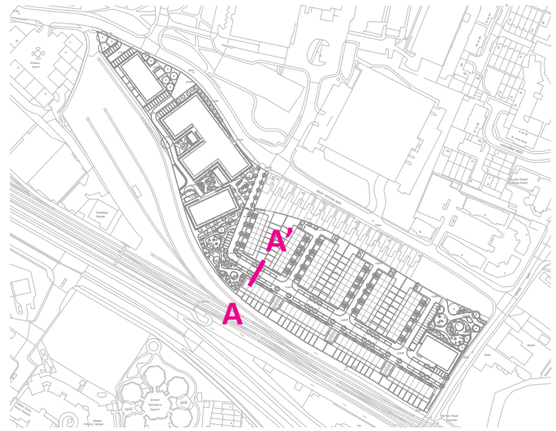
Green Avenue:
With wide pedestrian footpath &
Rain gardens/buffer from the road

Green Screening:
Hedge
Hedge with Railing
Climbing plants
Wildlife buffer

Potential connections to the existing green space

9.4 Site Boundary Treatments-Public Realm Improvement





Site Boundary Treatment - Section AA'

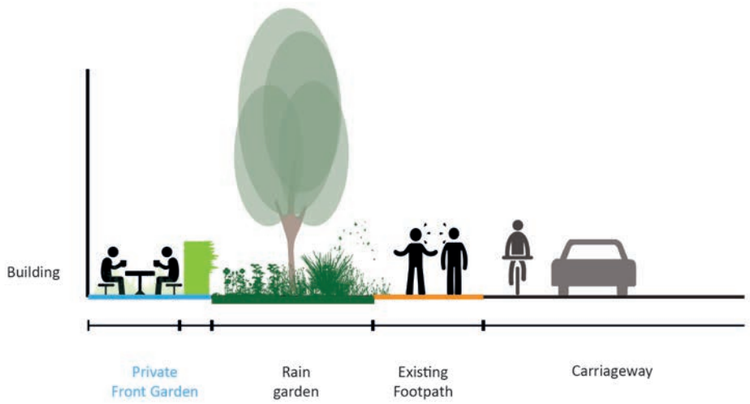
Public realm improvement:
Rain gardens, shading trees and seating by the pocket park

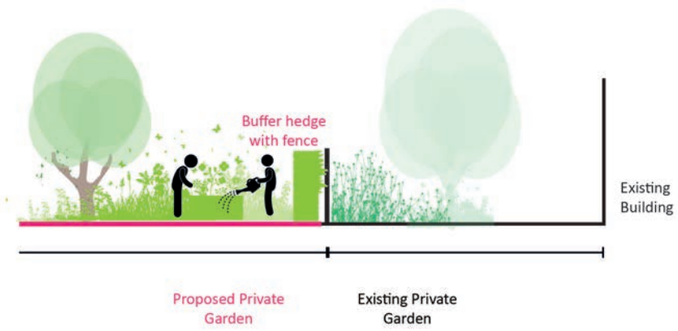
Public realm improvement:
Rain gardens

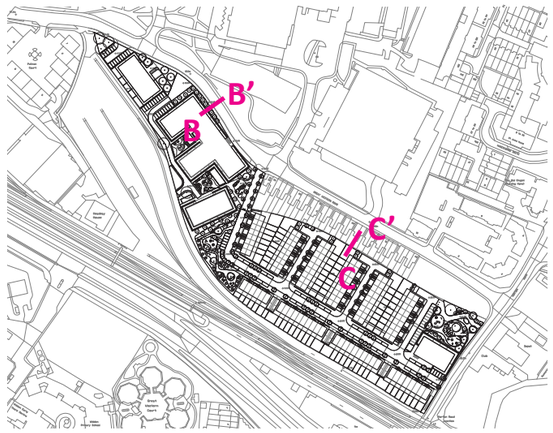
Public realm improvement:
Pocket parks with rain gardens

Green Screening
Climbing Plants

9.5 Site Boundary Treatments-Green Screening







Site Boundary Treatment - Section BB'

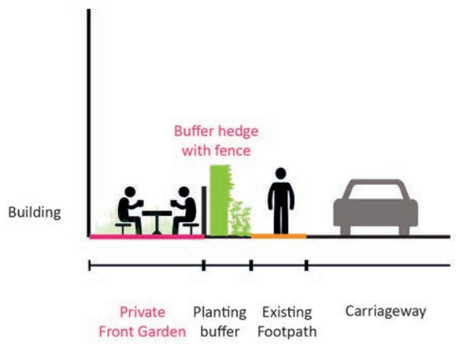
Public Realm Improvement
Green Screening
Rain gardens and Privacy hedges

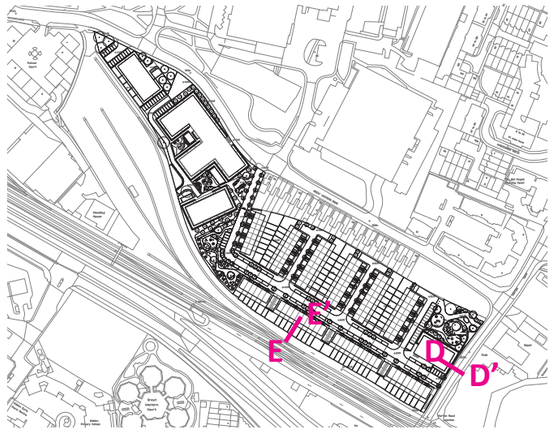
Site Boundary Treatment - Section CC'

Green Screening
Hedge

Green Screening
Hedge

9.6 Site Boundary Treatments-Green Screening





Site Boundary Treatment - Section DD'

Site Boundary Treatment - Section EE'

Green Screening
Hedge with fence

9.7 Public / Private Access

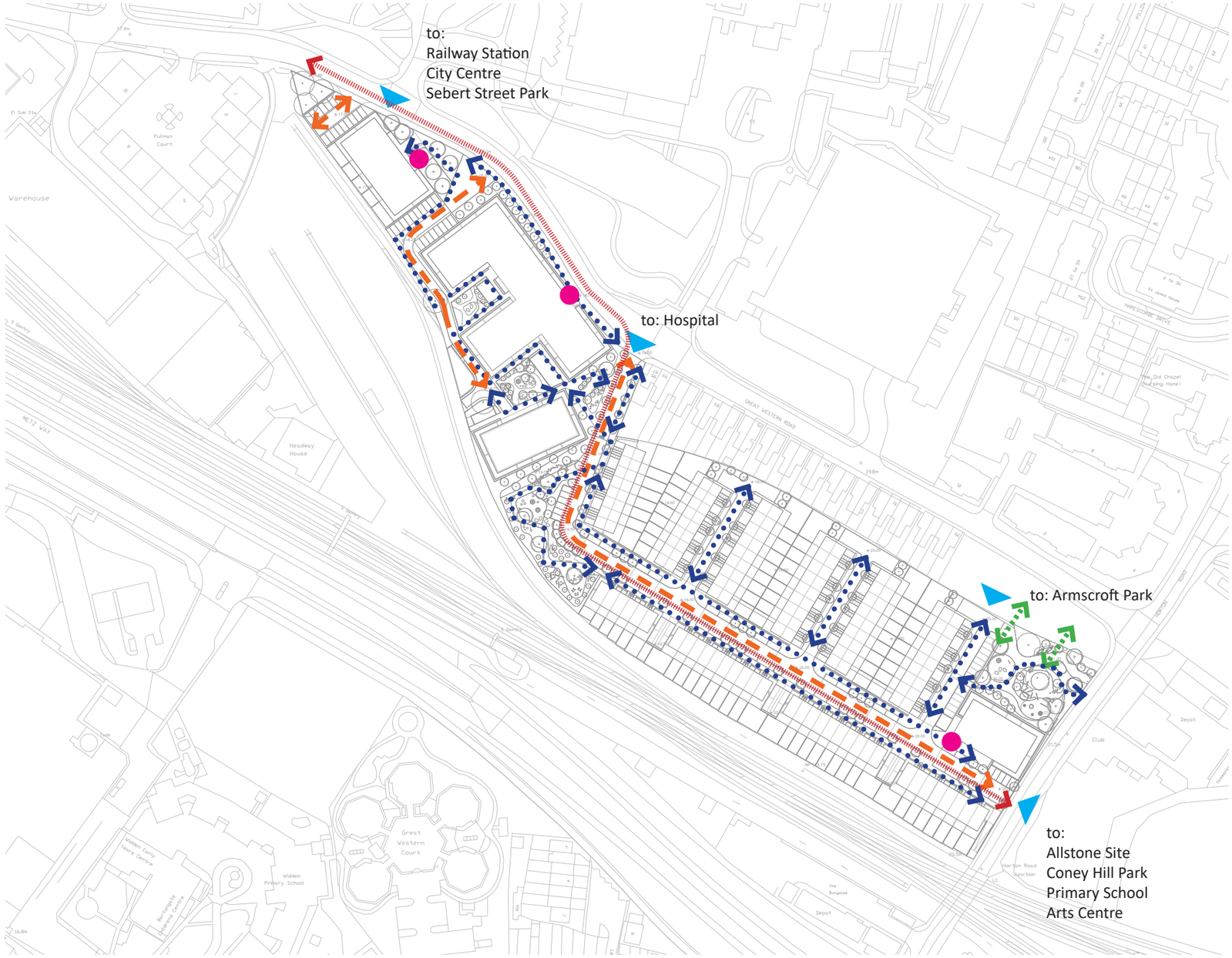
The main vehicular entrances to the development are located off Great Western Road, and Horton Road.

There are two designated parking lots for apartment buildings, along with parking spaces located along the avenue and private parking areas located in front of the houses.

The site looks to create pockets gardens linked through a network of footpaths. All spaces are connected, but afford a level of privacy from the surrounding area.

Short stay cycle stands

Throughout the development are areas of external secured, but also short stay cycle stands for visitors.



Legend:
- Entrances to the Site
- Vehicular Access
- Cycle Route
- Pedestrian Access
- Potential connection to the existing green space
- Short stay cycle stands

9.8 Landscape Zones

Legend:

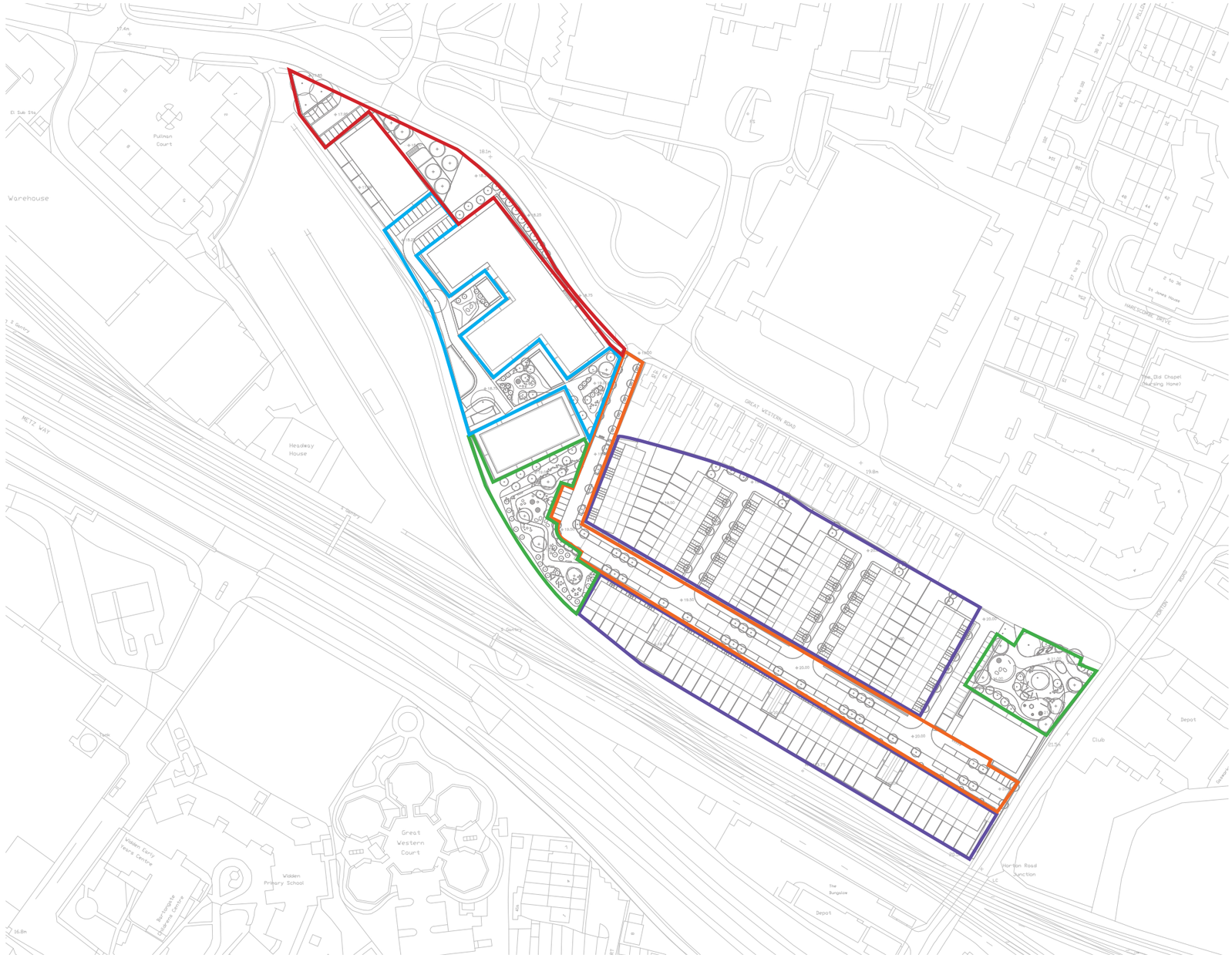
Green frontage
Green boundary
Semi-mature trees

‘The Green’
LEAP and LAP
Seating areas
Lawns
Biodiverse planting

‘Sidings Park’
LAPs
Interconnected paths
Lawns
Seating areas
Biodiverse planting
Green buffer from the rail

Avenue
Tree planting
Rain gardens
Grasscrete parking spaces

Private gardens



9.9 Landscape Zones

Green Frontage

‘The Green’

‘Sidings Park’

Avenue

9.10 Public / Private Amenity Space

The plan indicates the breakdown of Public and Private Amenity Space.

These areas will provide opportunities for seating and soft areas of landscaping. The public open space includes green infrastructure (including rain gardens), pocket parks, shared spaces and designated play spaces.

1. Pocket Parks

There is a range of communal amenity which is accessible to all. It is located across the site providing an attractive green route throughout the development.

2. External Communal Amenity

There are open terraces in Block B. These spaces offer landscaped areas with covered areas to shelter residents from the elements.

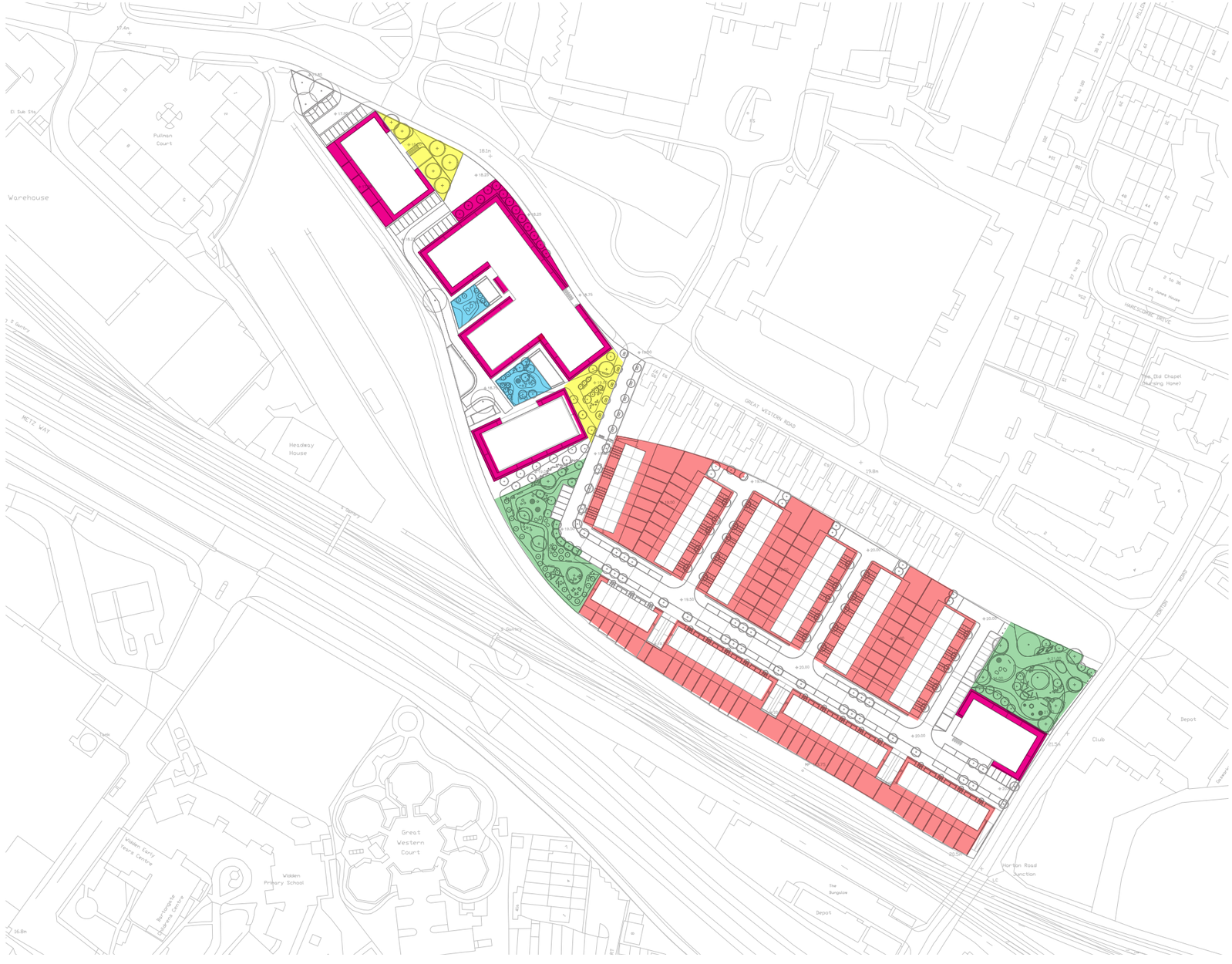
3. Interactive Spaces

A range of external play space is provided within the

proposed scheme, which caters for children aged between 0-15 years. The main hub for play space will be in the eastern green however, the majority of spaces will be child friendly.

Private Amenity Space

Ground floor gardens/terraces are provided in all blocks.



Legend:
- Pocket Parks
- External Communal Amenity
- Interactive Space
- Private House Amenity: Gardens at rear and front
- Private Apartments Amenity: Ground floor gardens

9.11 Play Requirements

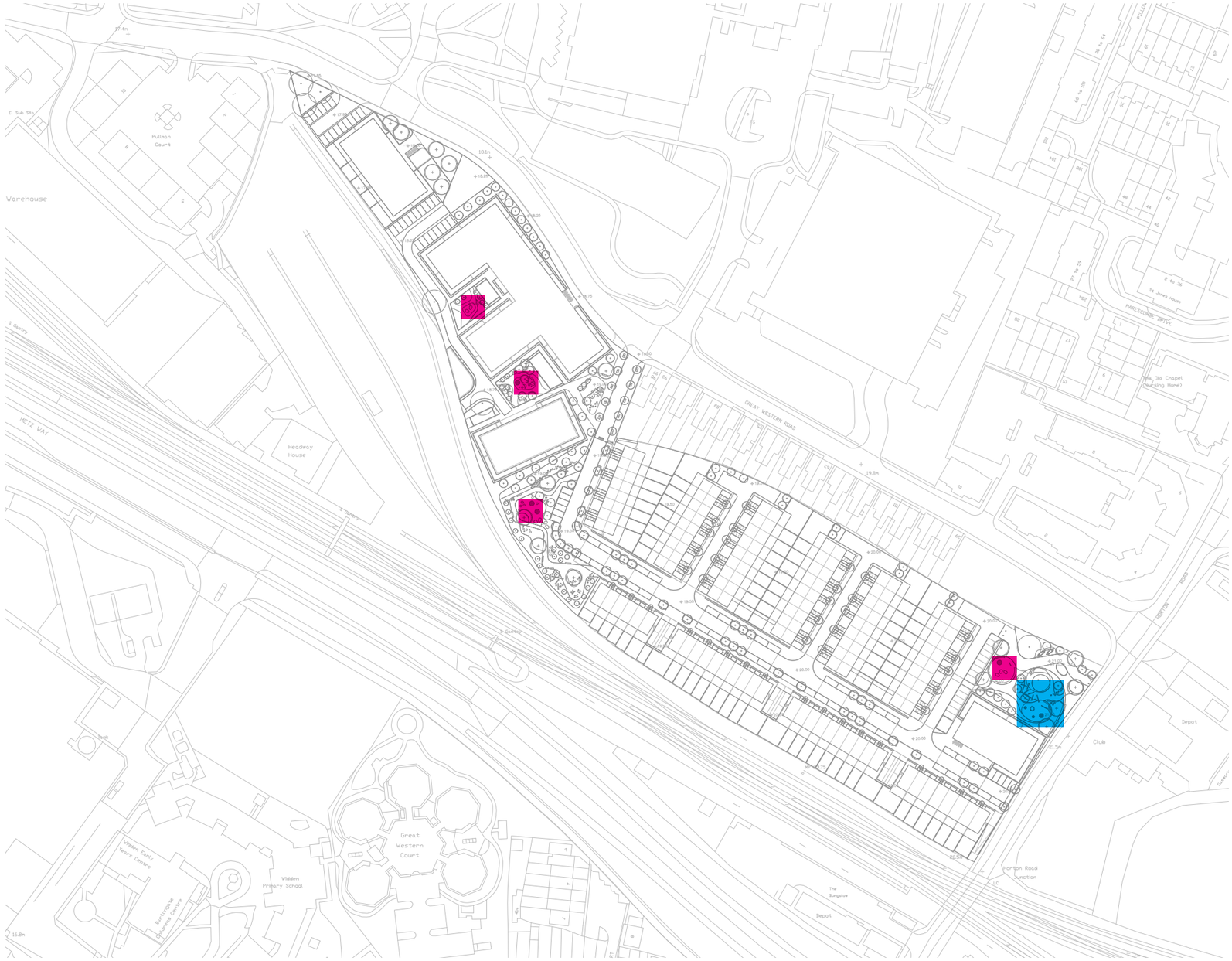
LEAPs - Local Equipped Area for Pay

LEAPs are to be designed and laid out specifically for children who are beginning to go out and play independently and has a minimum activity zone of 400m^2. The play criteria is that the area is to provide play experiences (rather than a set number of pieces of equipment).

The space is therefore to be designed to provide a stimulating and challenging play experience. A minimum of six play experiences are to be provided. The outdoor play area should also have a buffer zone of at least 20m in depth which contains varied planting.

LAPs - Local Area of Play

LAPs provide a minimum 100m2 activity zone, and also have a 5m buffer from nearest residential unit to provide some privacy.



Nature Play

Teenage Play

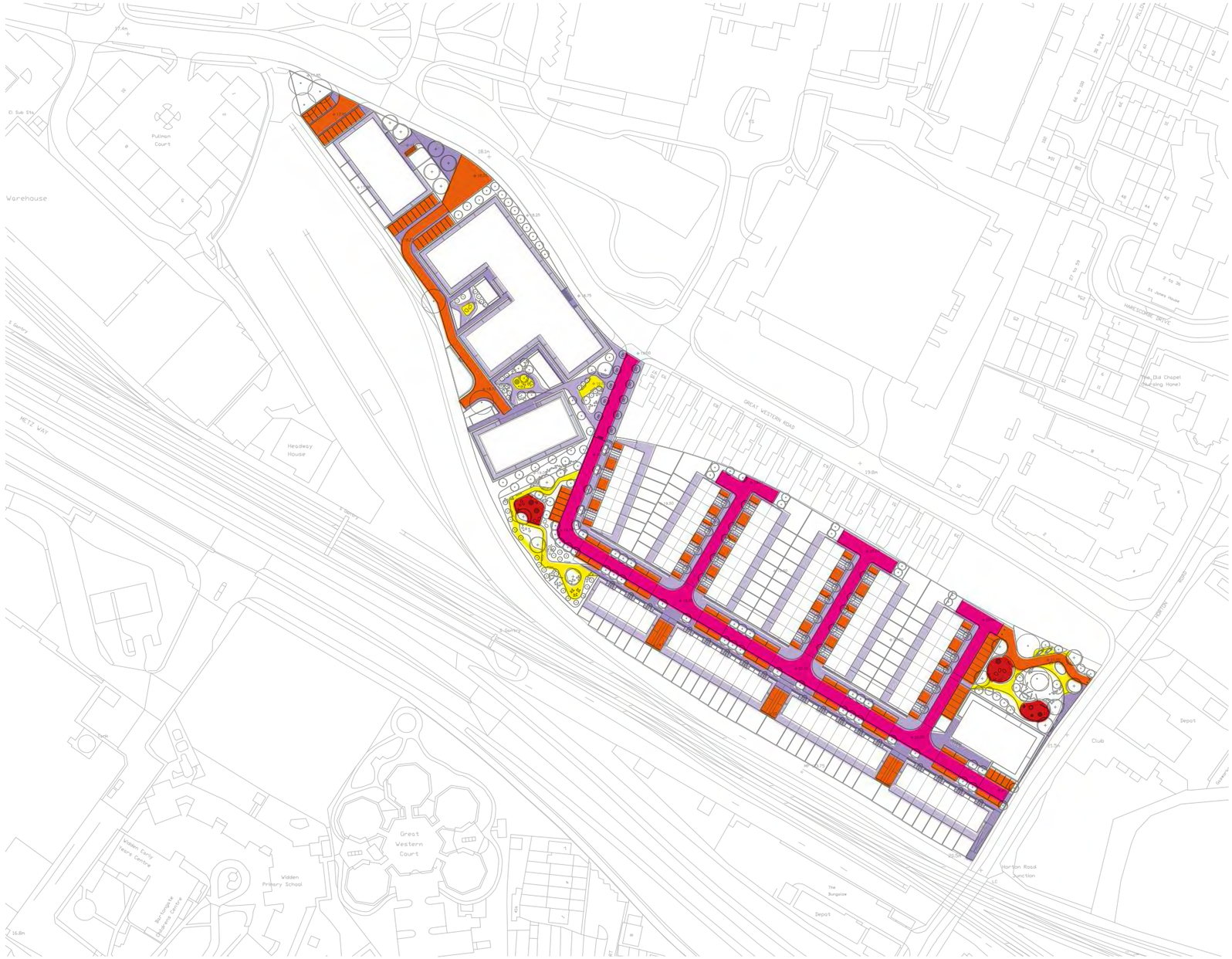
Accessible Play

Early Play

9.12 Hard Landscaping

The selection of hard landscaping materials has been chosen after much consideration of their suitability for long term use and suitability for water management. All of the specified materials are robust in nature in order to maximize the longevity of the development and minimize maintenance issues but also permeable where possible.

A consistent selection of materials is specified throughout the design, with variations being provided in the form of shape unit size, mix and colour.



Legend:
- Tarmac/asphalt
- Permeable low carbon concrete paving
- Permeable and sustainable safe play surface
- Compacted gravel
- Grasscrete


Permeable tarmac


Parking paving - Grasscrete


Permeable low carbon concrete paving


Sustainable safe play surface


Informal paths

9.13 Soft Landscaping

The landscape plan proposes a mix of tree species to create a natural and welcoming environment for people. The proposed tree planting schedule will add a layer of colour and seasonal interest within the site, but also to consider climate mitigation by choosing hardy, locally sourced plants.

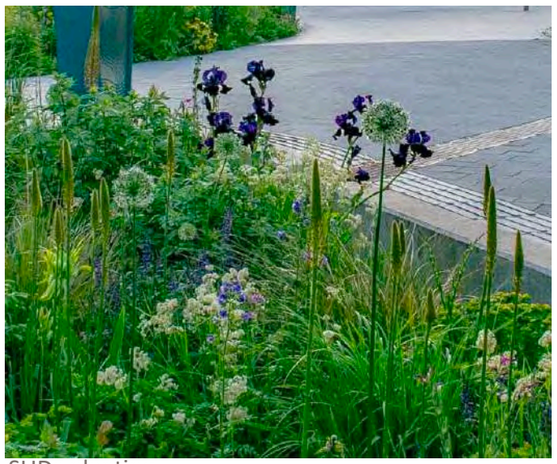
Specific planting mixes are also considered for rain gardens, lighting conditions (sun and shade-loving species) and emphasis on pollinators and invertebrates to enhance the biodiversity at the site.

Trees are used to provide a natural buffer between spaces and punctuate pedestrian routes to reinforce the paths. They also create shelter and focal points within the landscape.

The use of semi-mature tree planting ensures the site will provide an instant positive contribution to the surrounding environment.

Planting takes into consideration the restrictions along the Network Rail Land. Tree species are selected to be smaller growing multistems, and setback the appropriate distances.

Legend:
- Lawn
- Naturalistic planting
- Wildflower meadows
- Rain gardens
- Wildlife buffer planting
- Private gardens
- Hedges


SUDs planting


Wildflower meadows


Wildflower meadows


Naturalistic planting


Hedge screening


Buffer planting


Wildlife buffer


Lawns

9.14 Tree Planting

Native Street Tree Planting

Sorbus aucuparia

Prunus avium ‘Plena’

Alnus glutinosa ‘Imperialis’

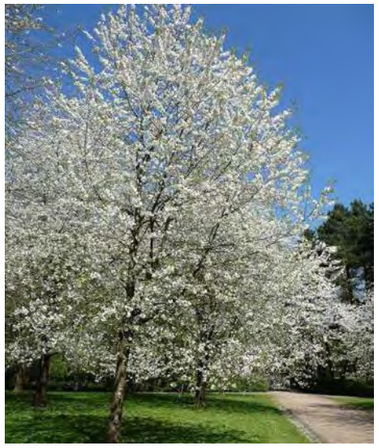
Pollinating Street Tree Planting

Pyrus calleryana ‘Chanticleer’

Malus tschonoskii

Tilia cordata ‘Greenspire’

Native Open Space Tree Planting



Prunus padus

Betula pubescens

Cornus mas

Pollinating Open Space Tree Planting

Prunus serrulata ‘Tai Haku’

Amelanchier lamarkii

Hamamelis xintermedia ‘Diane’

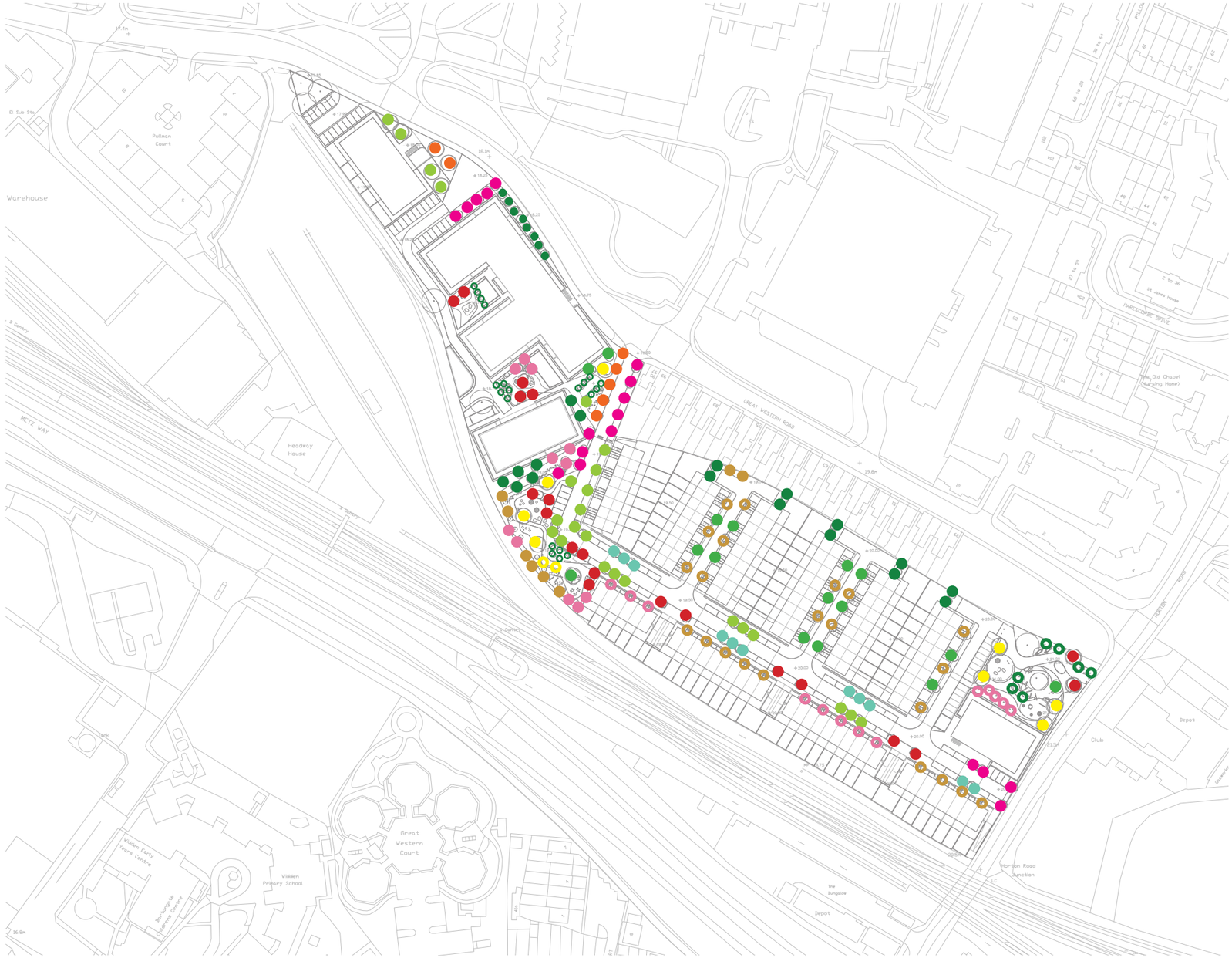
PROPOSED TREES

Standard Trees

- Acer campestre ‘Elsrijk’
- Alnus glutinosa ‘Imperialis’
- Betula pubescens
- Malus tschonoskii
- Prunus avium ‘Plena’
- Prunus padus
- Prunus serrulata ‘Tai-Haku’
- Pyrus calleryana ‘Chanticleer’
- Sorbus aucuparia
- Tilia cordata ‘Greenspire’

Multistem Trees

- Amelanchier lamarkii
- Betula utilis var. jaquemontii
- Hamamelis xintermedia ‘Diane’
- Malus domestica
- Cornus mas



Tree planting diversity diagram

9.15 Planting Mixes

Wildlife Planting Buffer


Rubus fruticosus


Prunus spinosa


Crataegus monogyna


Hyacinthoides non-scripta


Helleborus foetidus*


Geranium maccrorhizum

Naturalistic planting


Euonymus fortunei Emerald N Gold


Lavandula angustifolia


Verbena bonariensis


Aster novi-belgii


Helleborus foetidus


Sanguisorba officinalis*


Geranium Rozanne ‘Gerwat’


Allium sphaerocephalon


Echinacea purpurea


Persicaria amplexicaulis ‘firedance’


Achillea filipendulina ‘Moonshine’


Rudbekia ‘Goldstrum’


Angelica archangelica


Geum rivale*


Hyacinthoides non-scripta


Narcissus ‘Tete a Tete’


Colchium autumnale


Deschampsia cespitosa*


Hakonechloa macra (autumn)


Hedera helix

9.16 Planting Mixes

Hedges


Carpinus betulus


summer / winter season

Climbing plants


Lonicera peryclimenum


Parthenocissus tricuspidata vetchii


Hedera helix

SUDs planting mix


Cornus alba ‘Sibirica’


Sarcococca hookeriana


Lavandula angustifolia


Verbena bonariensis


Alchemilla mollis


Sanguisorba officinalis*


Geranium Rozanne ‘Gerwat’


Allium sphaerocephalon


Echinacea purpurea


Helleborus foetidus


Achillea filipendulina ‘Moonshine’


Rudbekia ‘Goldstrum’


Iris pseudoacorus


Geum ‘Mai Tai’


Primula japonica ‘Millers’ Crimson’


Osmunda regalis


Miscanthus s. ‘Kleine Fontäne’


Deschampsia cespitosa*


Hakonechloa macra (autumn)


Lonicera peryclimenum

9.17 Biodiversity

In order to promote and enhance the biodiversity in the development, various strategies will be considered such as:

Establishing wildlife corridors

To support and enhance the habitat for a diversity of wild creatures (birds, bats, hedgehogs etc.)

Hedges

Provide flowers and fruits for wildlife, nesting opportunities for birds and cover for hedgehogs.

Log Piles

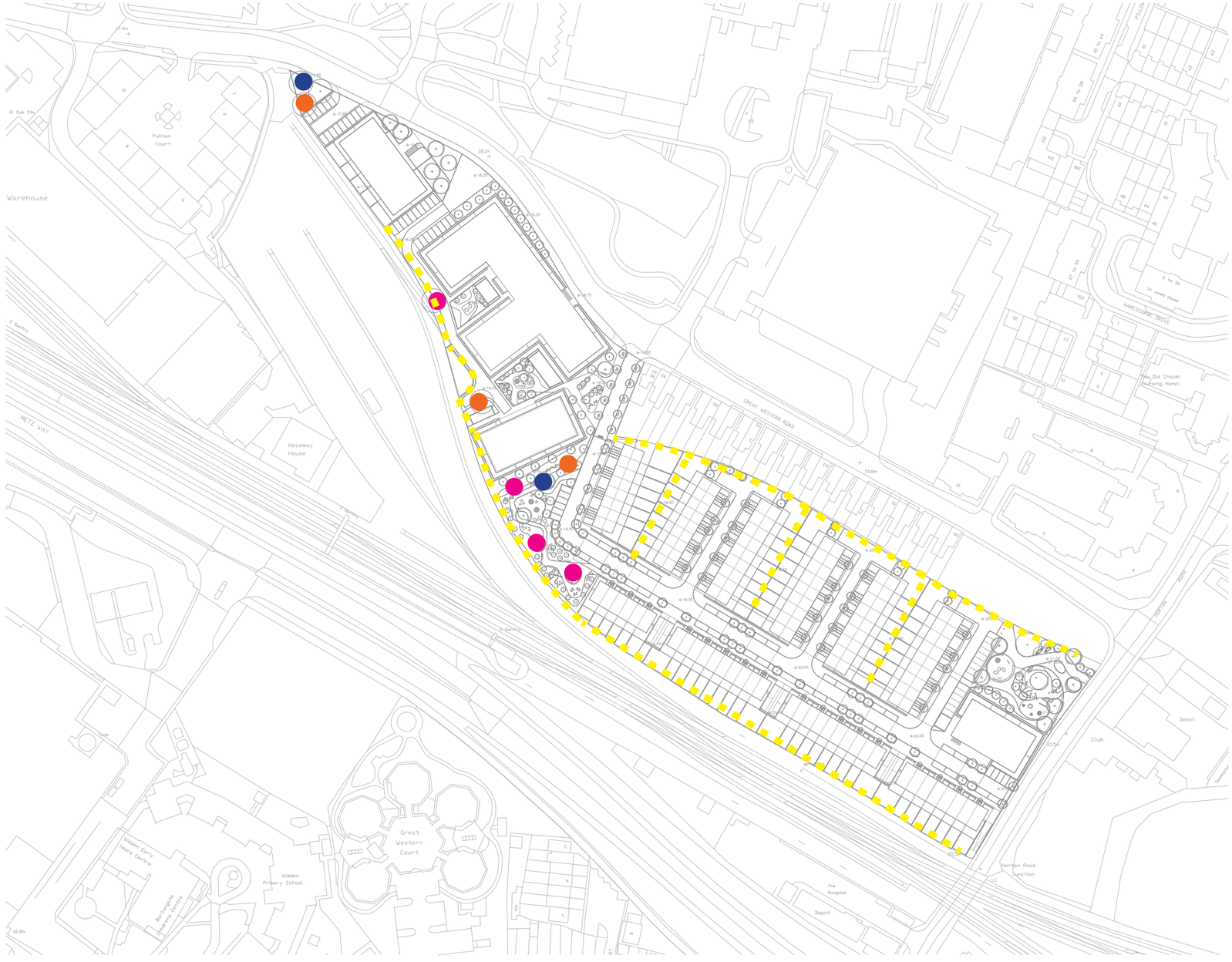
Can be used to create habitats for amphibians, invertebrates and bryophytes micro-habitats by leaving piles of dead wood or recumbent dead logs.

Pollinators

A variety of wildflowers and shrubs are proposed in the planting that providing shelter as well as nectar and pollen to feed butterflies and bees.

Wildlife corridor / Hedgehog Highway

In order to establish a well-connected habitat, ground-level boundary holes (Size: 13cm x 13cm) are proposed within the boundary wall/fence. These small holes establish links between the new corridor and the adjacent landscapes.




Bird box


Bat Box


Insect hotel


Log piles


Pollinator friendly planting


Specie-rich planting mix


Biodiverse roofs

9.18 Sustainable Urban Drainage Systems

The landscape proposal aims to promote Sustainable Urban Drainage strategies in order to alleviate the demand on with surface water drainage networks.

Considerations such as the following can contribute to managing surface water.

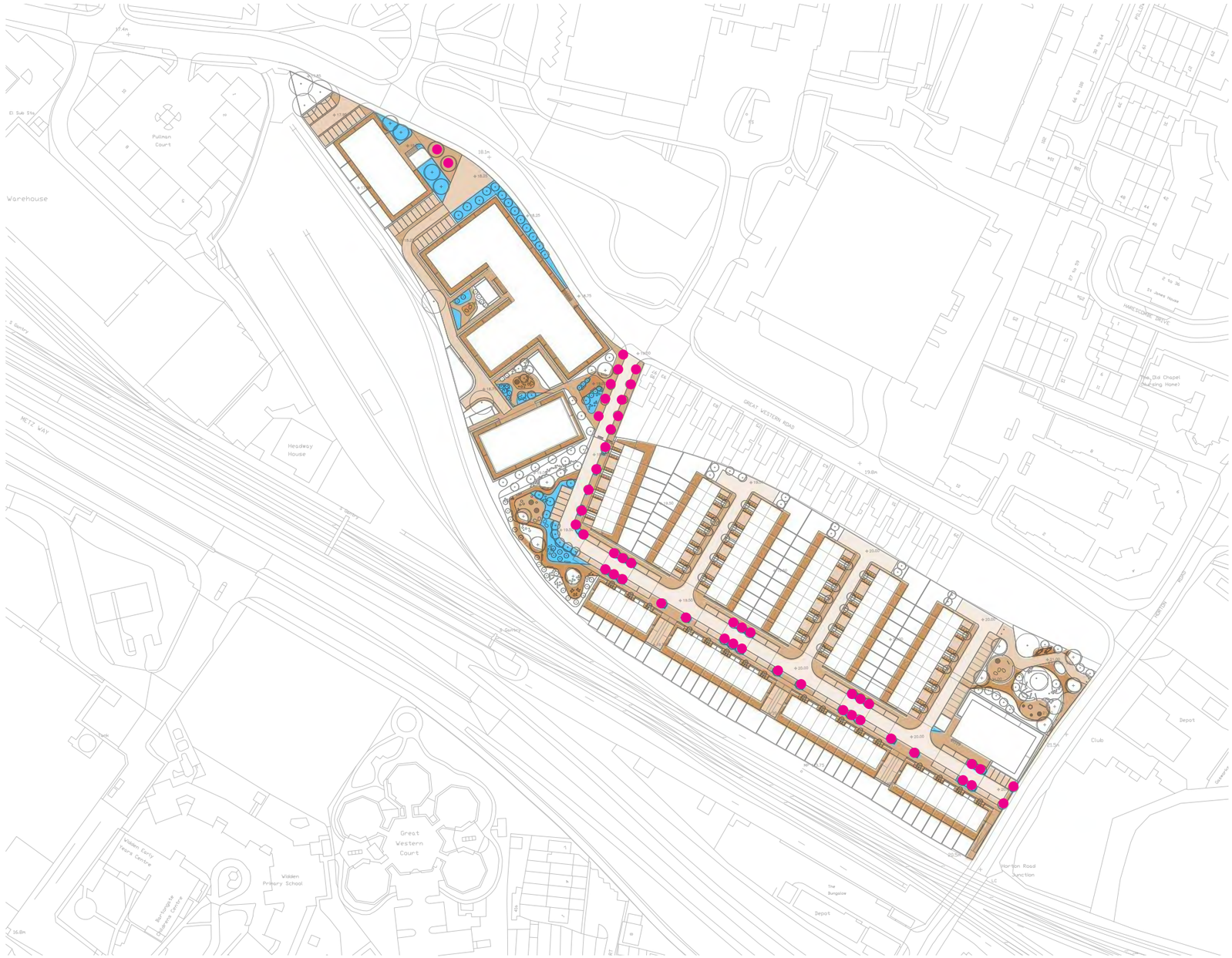
The following methods have been included:

Permeable paving
Permeable paving can assist the infiltration of water into the ground rather than surface run off to be discharged into the main drainage network

Rain Gardens
Rain garden can help attenuate surface water run off and rain in the planting medium. The gravel mulch creates a clean and neat surface that will look effective in the winter. The mulch acts as a weed control and creates a stable surface should the rain garden fill with water.

Tree pits
Tree pits can collect and store run off. There is the option to have an additional attenuation area below the tree pit for additional storage and droughts.

Grasscrete parking areas
Large areas of parking can be made more aesthetically pleasing as well provide areas that is permeable.




Rain Gardens with various planting volumes


Rain beds flushed with surface to collect excess rain water


Pollinator friendly planting


Permeable paving


Trees planted in the pavement


Rain garden gravel mulch

10.0 Amenity

10.1 Location Plan

There are four main types of amenity proposed:

1 Pocket Parks

There is a range of communal amenity which is accessible to all. It is located across the site providing a green route and breaking up the massing on site.

2 External Communal Amenity

There are open terraces in Block B. These spaces offer landscaped areas with covered areas to shelter residents from the elements allowing them to enjoy the fresh air.

3 Interactive Spaces

A range of external play space is provided within the proposed scheme, which caters for children aged between 0-15 years. The main hub for play space will be in the eastern green however, the majority of spaces will be child friendly.

4 Private amenity

Balconies are provided in all blocks for all units.

5 Greening

Green buffers to provide privacy a separation of spaces.


Private Balconies

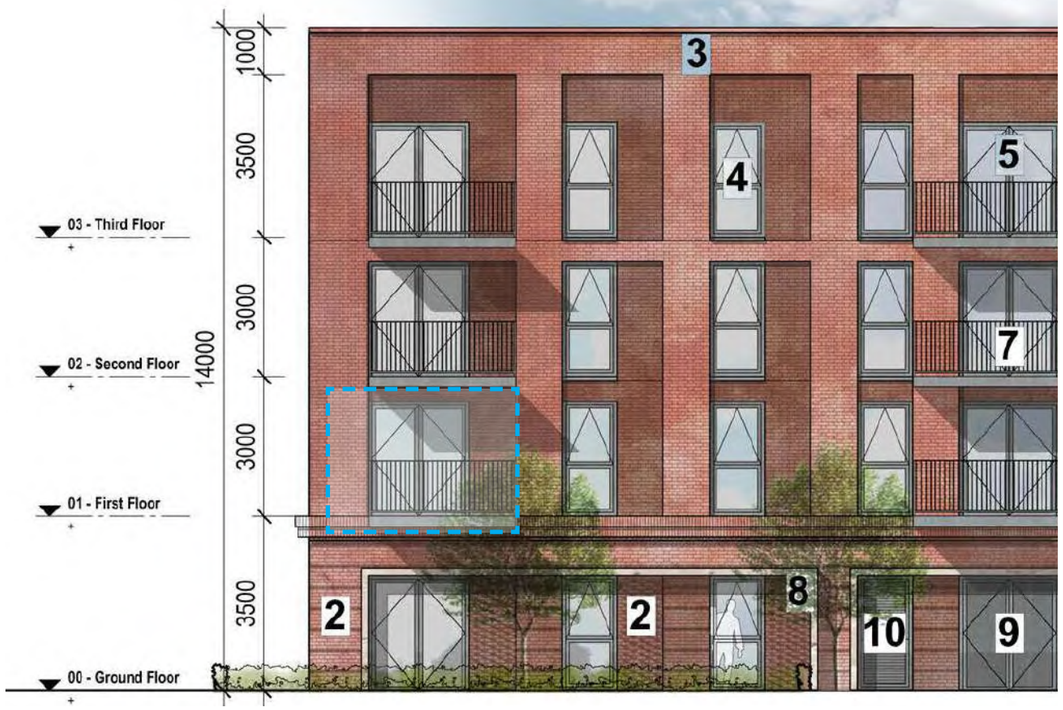

Open Park


Private Gardens


Pocket Parks

10.2 Private Amenity

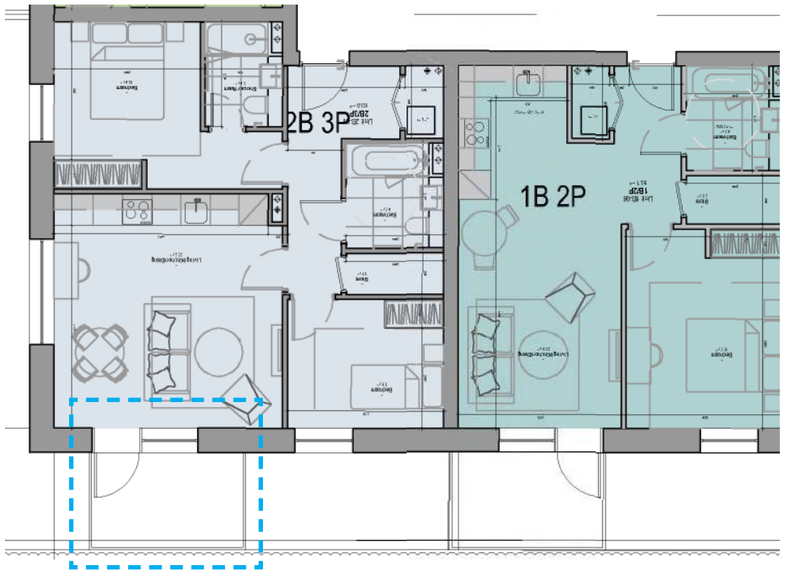
GWR Elevation



Fall Prevention Summary

Suitable control measures may include: fitting adequate window restrictors. Fitting an adequate screen or barrier to prevent access to a window or balcony edge. Ensuring balconies have edge protection that is sufficiently robust.

Ballustrade to be building control compliant.



Block location

Block A apartment

10.3 CGIs - Block B Courtyard Gardens

10.4 CGIs - Block D Open Space

11.0 Area and Accommodation Schedule

11.1 Summary of the Proposed Development

Area Schedule - Unit Mix

Project Procedures

Project Title	GWY
Project No	19050
Revision	PL
Date	07/06/2022

Accommodation Schedule

Tenure	Block A					Block B					Block C					Townhouses			Block D	
Adv Size M2	43	50	63	70	79	43	50	63	70	93	43	50	63	70	79	70	84	90	50	63
Unit	Studio	1b2p	2b3p	2b4p	3b4p	Studio	1b2p	2b3p	2b4p	3b5p	Studio	1b2p	2b3p	2b4p	3b4p	2b/3p	3b/4p	3b/5p	1b	2b
Ground		3	3		1		11	7	6			3	3		1	43	28	16	2	3
1st Floor	1	4	3		1		11	8	8		1	4	3		1				3	4
2nd Floor	1	4	3		1		11	8	8		1	4	3		1				3	4
3rd Floor	1	4	3		1	1	10	8	8		1	4	3		1				3	4
4th Floor	1	4	3		1		3	8	6	3										
5th Floor																				
Total	**4**	**19**	**15**	**0**	**5**	**1**	**46**	**39**	**36**	**3**	**3**	**15**	**12**	**0**	**4**	**43**	**28**	**16**	**11**	**15**
Units Per Block					**43**					**125**					**34**			**87**		**26**
	9%	44%	35%	0%	12%	1%	37%	31%	29%	2%	9%	44%	35%	0%	1%	49%	32%	18%	42%	58%
	172	950	945	0	395	43	2,300	2,457	2,520	279	129	750	756	0	316	3,010	2,352	1,440	550	945
					2,462					7,599					1,951			6,802		1,495
																				20,309

Overall Summary (Actual)

Totals Summary	min size	No.	Area Sqm	Area Sqft	
Studio	43	8	344	3,703	4%
1 Bed	50	80	4,000	43,056	40%
2 bed 3	63	66	4,158	44,757	33%
2 bed 4	70	36	2,520	27,125	18%
3 bed 4	79	9	711	7,653	4%
3 bed 5	93	3	279	3,003	1%
Total		**202**	**12,012**	**129,297**	

Totals Summary	min size	No.	Area Sqm	Area Sqft	
2 bed 3p	70	43	3,010	32,400	49%
3 bed 4p	84	28	2,352	25,317	32%
3 bed 5p	90	16	1,440	15,500	18%
Total		**87**	**6,802**	**73,217**	

Totals Summary	min size	No.	Area Sqm	Area Sqft	
1 bed	50	11	550	5,920	42%
2 Bed 3	63	15	945	10,172	58%
Total		**26**	**1,495**	**16,092**	

Total		**315**	**20,309**	**218,606**

Studio	**8**	**3%**
1 Bed	**91**	**29%**
2 bed 3	**124**	**39%**
2 bed 4	**36**	**11%**
3 bed 4p	**37**	**12%**
3 bed 5p	**19**	**6%**
	315	

12.0 Technical Strategy

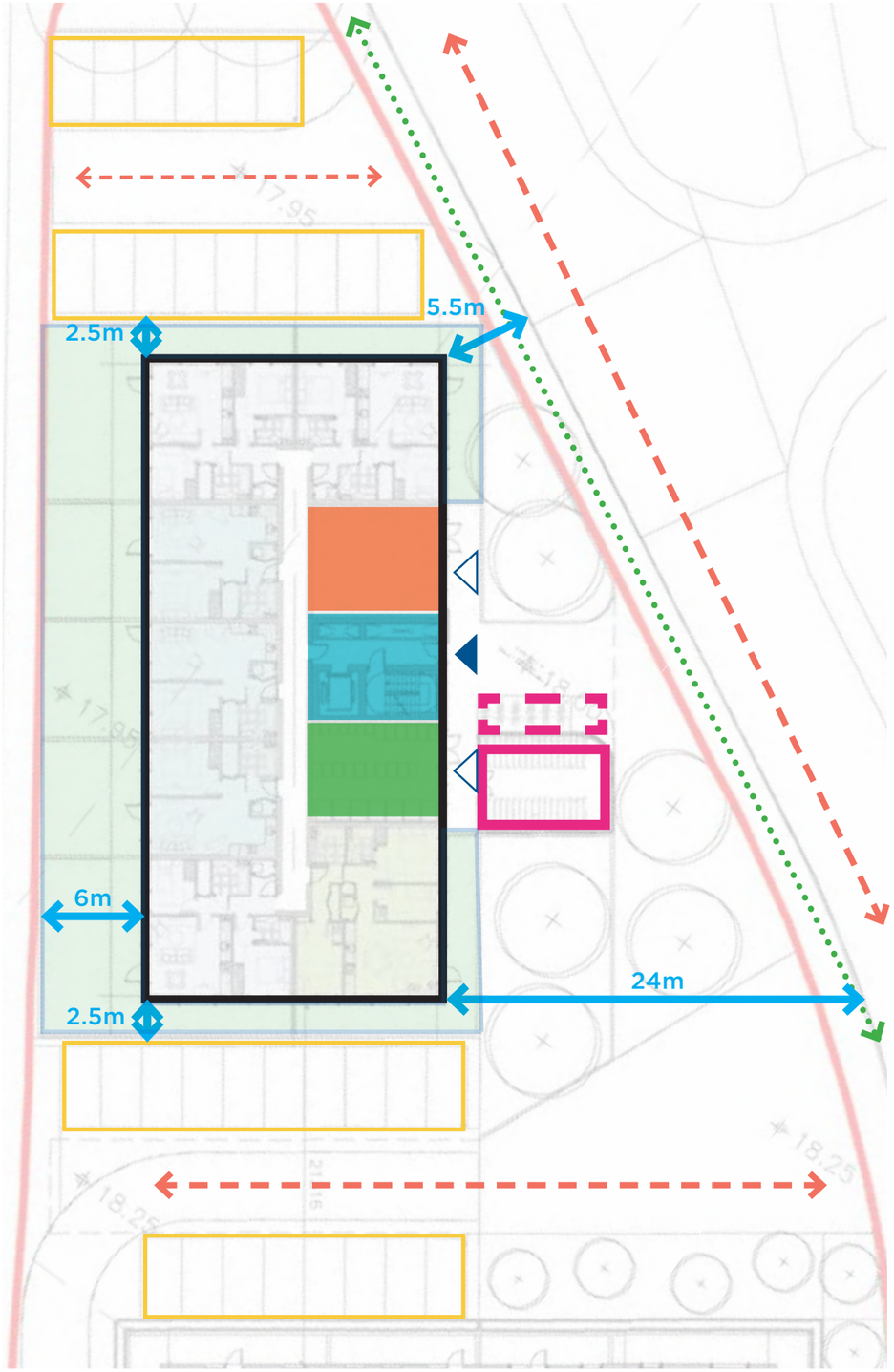
12.1 Layout Strategy - Block A

Overview

Block A

- Height - 5 Storeys
- Units - 43
- Generous space allowance around the building so not to impact on neighbours.
- Green space allocated along western edge of block, creates a buffer zone between the block and road.
- 15 car parking spaces are provided at ground
- Refuse stores located at ground floor.
- Building entrances located in clear visible locations along the eastern edge of the building.
- Cores are provided from ground to fourth floor all blocks. Each core provided has a staircase and a lifts that serve all floors.

- Building entry points
- Secondary Building entry points
- Access and movement
- Pedestrian Circulation
- Separation Distances
- Gardens
- Bin stores
- Car parking
- Bike storage
- Visitor Bike storage
- Plant areas
- Circulation Core



12.2 Layout Strategy - Block B

Overview

Block A

- Height - 5 Storeys
- Units - 125
- Generous space allowance around the building so not to impact on neighbours.
- Green space allocated along western edge of block, creates a buffer zone between the block and road.
- 18 car parking spaces are provided at ground
- Refuse stores located at ground floor.
- Building entrances located in clear visible locations along the eastern edge of the building.
- Cores are provided from ground to fourth floor all blocks. Each core provided has a staircase and two lifts that serve all floors.
- Plant is located, where possible, away from residential entrances, keeping it away from the residents.

Building entry points

Secondary Building entry points

Access and movement

Pedestrian Circulation

Separation Distances

Gardens

Bin stores

Car parking

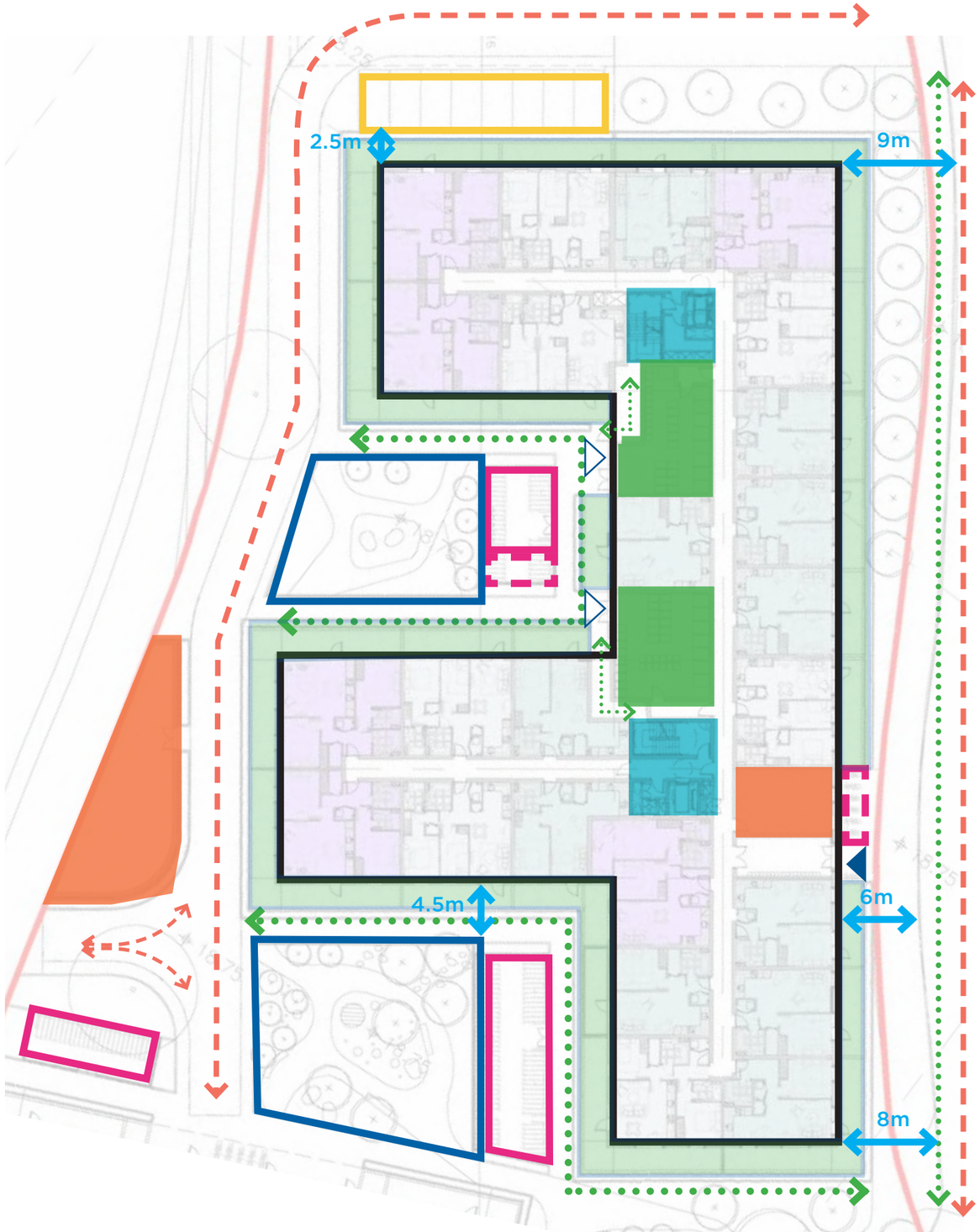
Bike storage

Visitor Bike storage

Plant areas

Circulation Core

Public Green Space



12.3 Layout Strategy - Block C

Overview

- Height - 4 Storeys
- Units - 34
- Generous space allowance around the building so not to impact on neighbours.
- Green space allocated along western edge of block, creates a buffer zone between the block and road.
- Refuse stores located at ground floor.
- Building entrances located in clear visible locations along the eastern edge of the building.
- Cores are provided from ground to fourth floor all blocks. Each core provided has a staircase and two lifts that serve all floors.
- Plant is located, where possible, away from residential entrances, keeping it away from the residents.

Building entry points

Secondary Building entry points

Access and movement

Pedestrian Circulation

Separation Distances

Gardens

Bin stores

Car parking

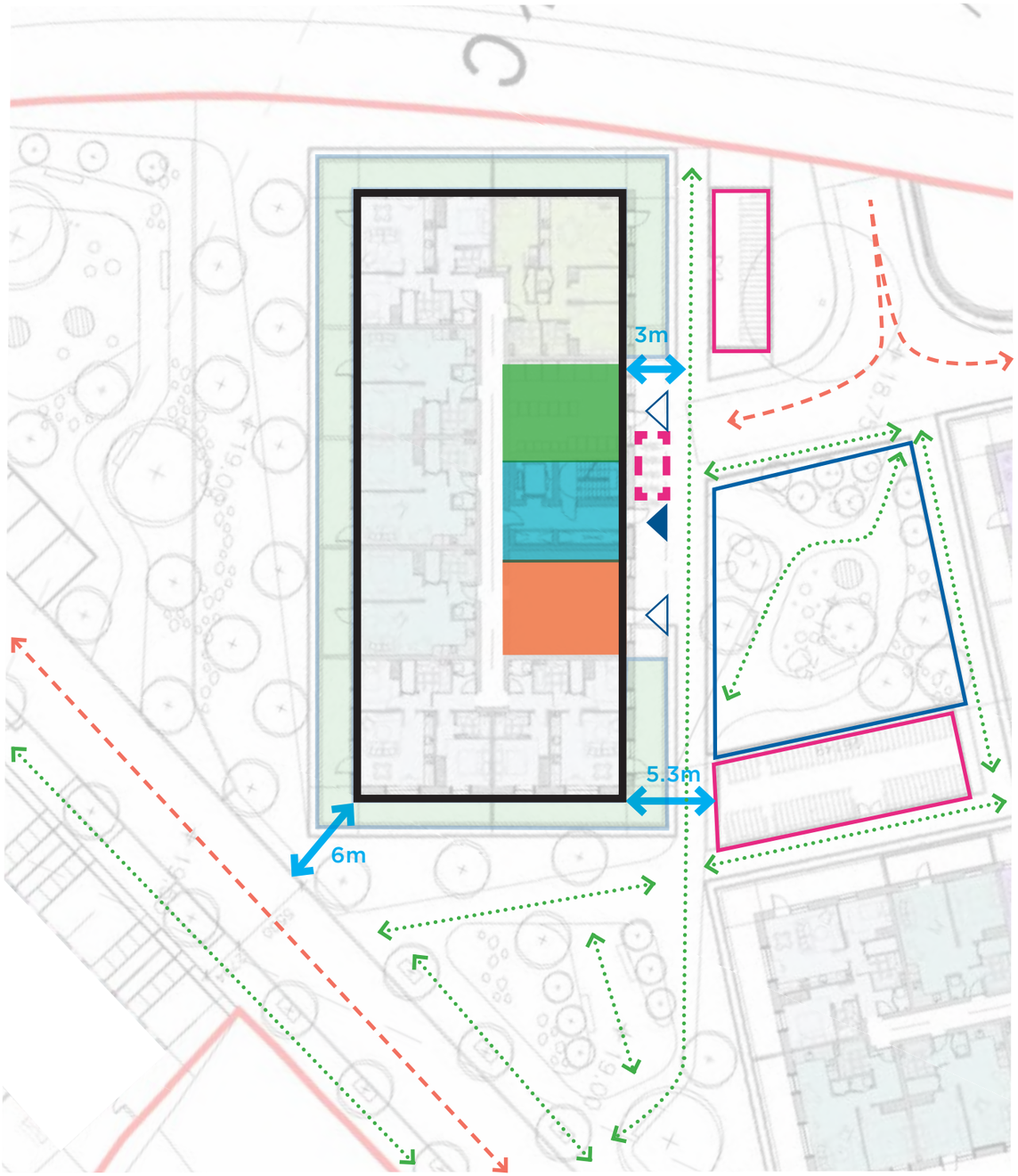
Bike storage

Visitor Bike storage

Plant areas

Circulation Core

Public Green Space



12.4 Layout Strategy - Block D

Overview

- Height - 4 Storeys
- Units - 26
- Generous space allowance around the building so not to impact on neighbours.
- Green space allocated along western edge of block, creates a buffer zone between the block and road.
- 24 car parking spaces are provided at ground
- Refuse stores located at ground floor.
- Building entrances located in clear visible locations along the eastern edge of the building.
- Cores are provided from ground to fourth floor all blocks. Each core provided has a staircase and two lifts that serve all floors.
- Staircases will be provided with standard handrails along both sides.
- Plant is located, where possible, away from residential entrances, keeping it away from the residents.

Building entry points

Secondary Building entry points

Access and movement

Pedestrian Circulation

Separation Distances

Gardens

Bin stores

Car parking

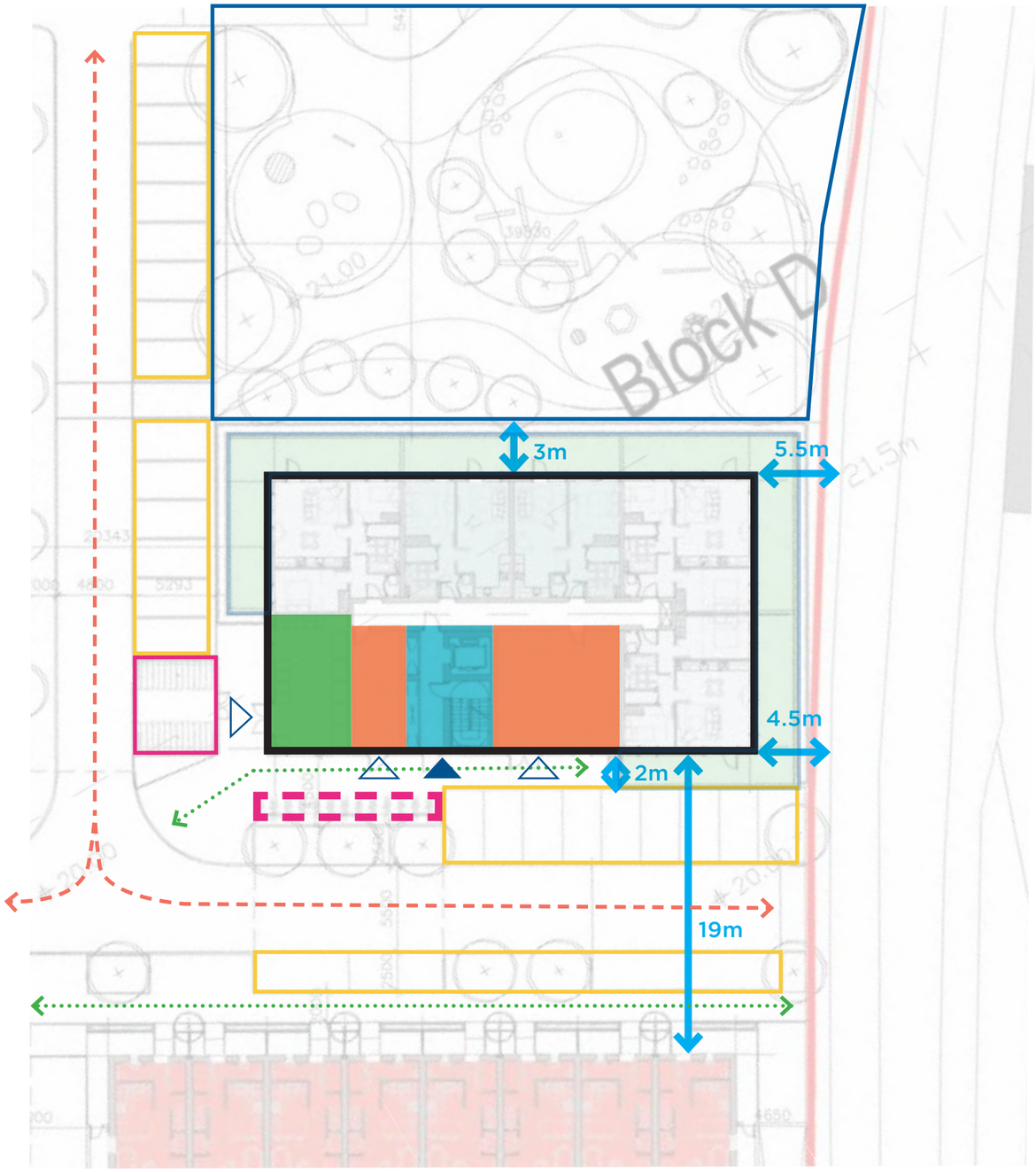
Bike storage

Visitor Bike storage

Plant areas

Circulation Core

Public Green Space



12.5 Layout Strategy - Townhouses

Overview

The masterplan concept focused on creating a series of character areas linked with green routes. Each block having its own distinct parameters and architectural treatment.

The ‘townhouse’ is considered a main feature of the scheme, reflecting the urban grain of the local area in a contemporary way.

Design features of ‘townhouses’:

- Defining the ‘home zone’ on secondary streets.
- Individual car & bike parking for each townhouse.
- Individual refuse storage for each townhouse.
- Softer plot divisions on street frontage, use of bushes and planting rather than high walls.
- Planting and tree line creates framed views looking down the street.
- Defensible space for each dwelling.

Building entry points

Secondary Building entry points

Access and movement

Pedestrian Circulation

Separation Distances

Gardens

Bin stores

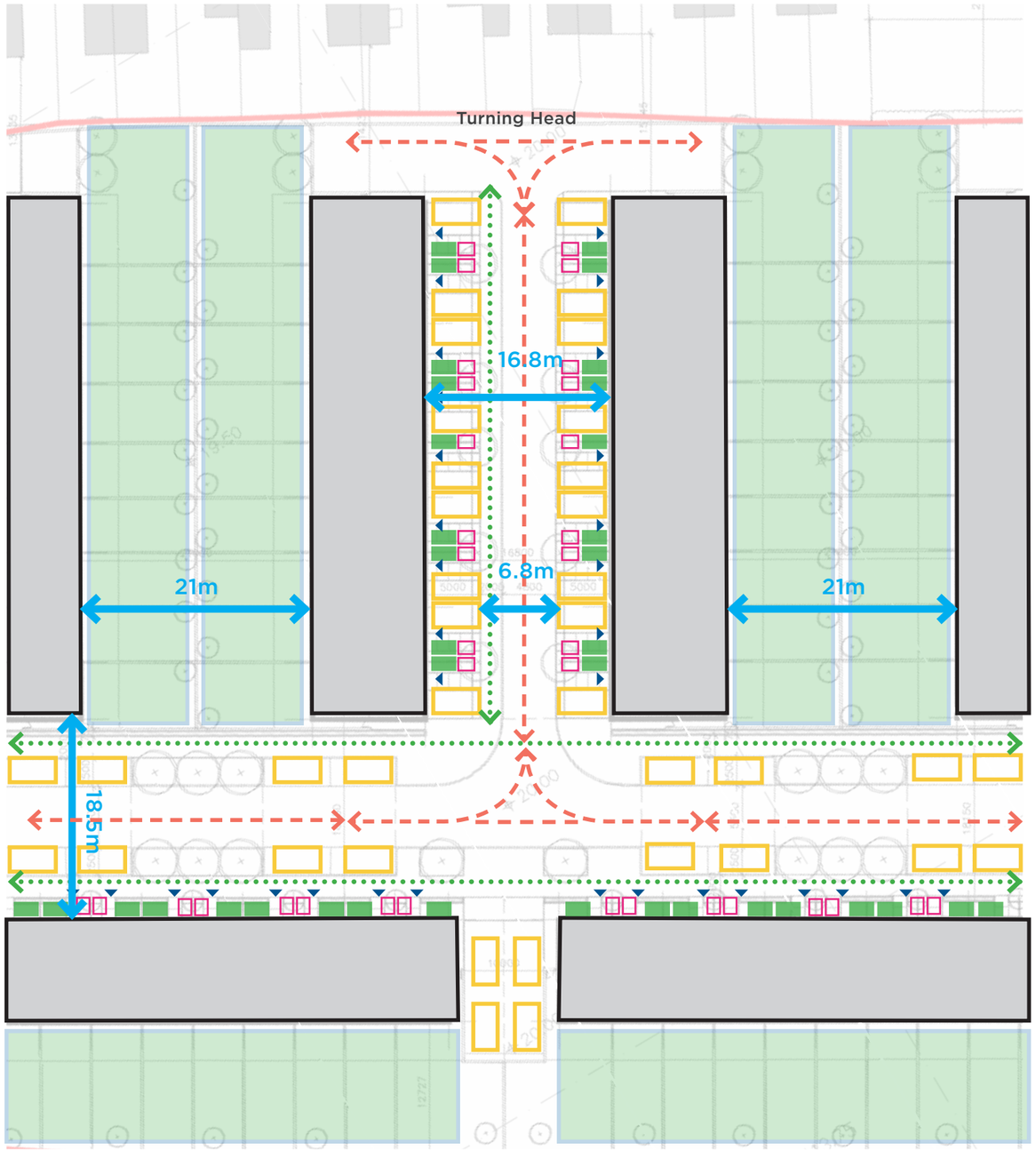
Car parking

Bike storage

Visitor Bike storage

Plant areas

Bike and bin storage appearance



12.6 Daylight and Overshadowing Analysis

Overview

A detailed Daylight, Sunlight and Overshadowing Report has been prepared by OSM and should be consulted for the full assessment.

This chapter considers the Daylight and Sunlight issues against the criteria set out for national discretionary guidance in the publication 'Site Layout Planning for Daylight and Sunlight, a Guide to Good Practice1 (also known as the BRE Guide or BR 209) published by the Building Research Establishment in 2011. This guide gives advice on site layout planning to achieve good daylighting and sunlighting both within buildings and in open spaces between them. The BRE Guide also gives advice on safeguarding daylight and sunlight within existing buildings and at existing amenity areas nearby, in relation to new developments.

The analyses used are:

- For Daylight to Existing Properties: The principles set out in Section 2 of the BRE Guide together with the concept of Vertical Sky Component (VSC).
- For Sunlight to Existing Properties: The sun light protractor method and sunlight availability indicator for 51.5o N.
- For Shadow Paths: The proposals are digitally modelled in 3D and then analysed in MBS Transient Shadow Assessment, version 5.0.0.0. Shadows are predicted at hourly intervals on the equinox date, 21st March, in accordance with the BRE criteria.

Conclusion

The Local Planning Authorities have not set alternative target values for skylight, and often refer to the target values and recommendations set out in the BRE Guide.

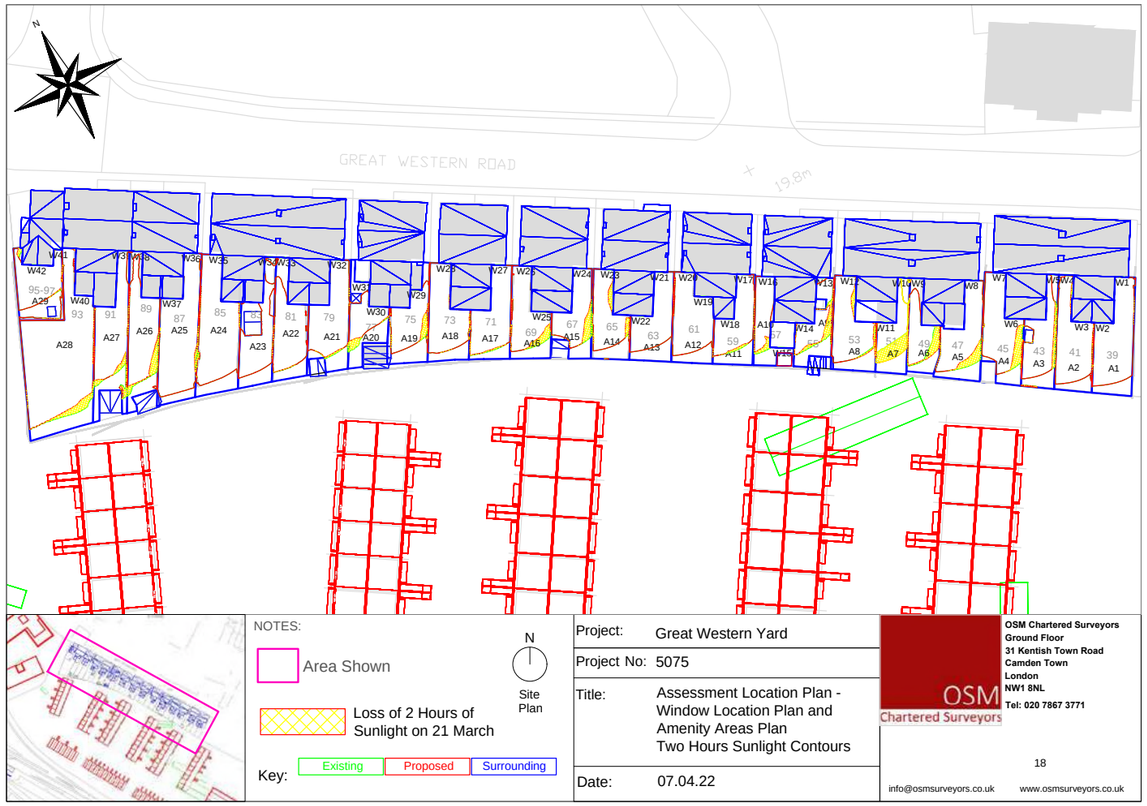
We have assessed the possible Daylight, Sunlight and Overshadowing impact of the proposed development at Great Western Yard on to the existing residential properties to the north off Great Western Road. The assessments have been carried out to existing residential properties, before and after development at Great Western Yard to evaluate and assess the potential impact against the relevant guidance and recommendations given by the BRE.

The results of the Daylight analysis carried out at existing residential properties adjacent to the proposed scheme at Great Western Yard demonstrate that the existing windows tested to the rear of the properties fronting Great Western Road would continue to receive sufficient levels of daylight following development of the proposed scheme, and these levels would also meet the recommendations set out in the BRE Guide.

The results of the Sunlight analysis carried out to the rear of the properties fronting Great Western Road also demonstrate that all the existing residential properties would continue to receive sunlight levels that would meet the BRE Guide recommendations following development at Great Western Yard.

The Overshadowing assessment demonstrates that following development at Great Western Yard, the rear gardens of properties fronting Great Western Road would receive sufficient levels of sunlight on 21st March in accordance with the BRE recommendations.

On 21st June, mid-summer, the assessment demonstrates that there would be ample levels of sunshine reaching the existing gardens with the development in place. In midwinter, when the sun is lower in the sky and when there are less sunlight hours available, most of the gardens will receive some sunlight throughout the day on 21st December.



Daylight Impacts

12.7 Energy and Sustainability Summary

Energy Assessment

A detailed Energy Assessment has been prepared by ESD and should be consulted for the full assessment.

The scheme has considered the issue of energy from an early stage. The client and architect have been decisive in their brief and design intentions.

Where more than one dwelling is physically attached to another, for example a block of flats or a terrace of houses, the average emission rate can be used to demonstrate compliance with the regulations of all included flats and houses (Block Compliance). This is instead of requiring each flat and house to meet the requirements in its stand-alone form.

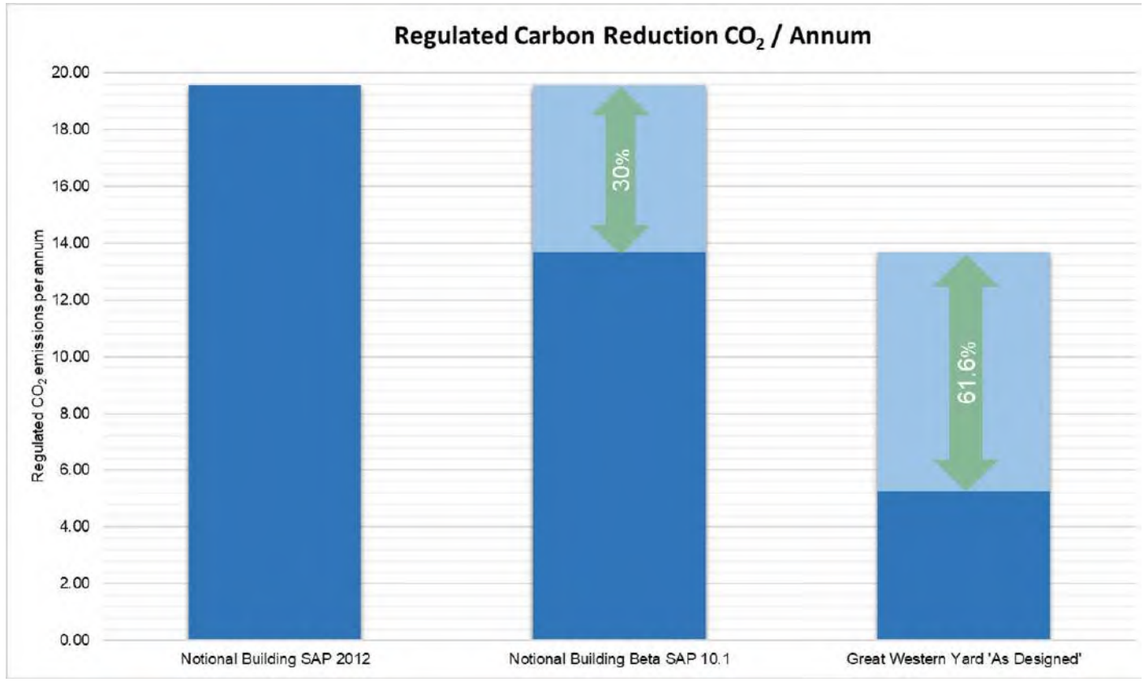
The Block Compliance method has been used in this report, providing average DER / TER results. Compliance is reached when the overall averaged DER is less than that of the equivalent TER.

Updates to Part L of the Building Regulations were published in December 2021, replacing the previous 2013 edition. A Government press release on the 15th of December 2021 stated that CO2 emissions from new build homes must be around 30% lower than current standards [2013 edition]. The updates to Part L have now taken affect from 15th June 2022. The methodology used to determine the CO2 emissions for the proposed development is in accordance with the 2021 edition of Building Regulations Part L as the regulation in force at the time of this application.

Energy calculations were carried out using the beta version of Stroma FSAP 10.1 for the residential units.

Conclusion

The results of the Block Compliance method demonstrating compliance with Part L (2021 edition) of the Building Regulations are shown below, with the proposed development achieving a reduction in carbon (CO2) emissions of 61.6%, compared with the Building Regulations notional dwelling.



Carbon Reduction

12.8 Secured By Design Summary

Overview

As part of the design process The scheme has looked to adopted Secured by Design principals in terms of good design, security features, natural surveillance and controlled access wherever possible.

Public realm

- All communal and all residential doors to this building will be to a security enhanced standard. BS PAS 24-2012. LPS 1175 sr2 or higher. STS 201, 202 BR 2. An external or internal security line will be defined, where security enhanced products will be fitted to prevent an unauthorised entry.
- Pedestrian access in and around the site will be well lit and monitored by CCTV with Access control systems provided within the building entrances.
- Extensive consideration of the surrounding environment of the Site has sought to produce a well-designed, attractive, clearly defined and easy to maintain solution for the public realm so as to promote civic pride among the local residents in their surroundings where they will feel comfortable and safe and have a sense of shared ownership and responsibility.
- The external spaces have been designed to be low maintenance with robust paving and planting. The finish of the public space will be of a high quality and will encourage active use.
- Both hard and soft landscaping has been provided. Care has been taken in the design of the external environment to avoid the inadvertent creation of opportunities for crime and hiding places. The placement of planting that facilitates climbing onto balconies has been minimised.
- The landscape has been positively designed, all space has been considered and there are no areas of left over space or undeveloped land where opportunities for crime might exist.

Natural Surveillance through active frontage

- There is a high level of overlooking from windows positioned on all edges of the site, together with balconies facing the edges at above ground level, helping to promote active surveillance of the areas in and around the Site.

Space provision and management

- The communal areas have been designed to limit the opportunity to gain access to properties to commit crimes or engage in anti-social behaviour. The terraces are not only overlooked from the apartments but also have a secured access where only residents have use of this facility. Specifically designed play areas have been incorporated/ developed as part of the landscape by the Landscape Architects. The landscaped Courtyard will benefit from a long term site management strategy.

Lighting & CCTV

- Lighting & CCTV will be provided throughout the Site and areas of large shadow will be avoided. Where low level light is provided the fittings are highly vandal resistant.

Additional and Key Provisions

- Bin stores in secure area with good management procedures for collection.
- Access points to rear of buildings controlled by means of lockable fob activated gates.
- Planting has been generally kept low to avoid creating hiding places.
- Good visibility has been maintained on all pedestrian routes with views of end destinations.
- Specification for lighting across the site to ensure safe well lit spaces created by the landscape designers.
- Lifts will be controlled by encrypted fob control. This will prevent unauthorised use of the lift.
- All opening and accessible windows will be to BS PAS 24-2012 with P1A laminated glass.
- Bike stores will have self closing and locking door to BS PAS 24-2012. The bike store can be sub-divided and CCTV considered.
- Recesses should be no more than 600mm. This can be further controlled by uneven floor surface, gating, roller shutters, and lighting.
- Post delivered to a bank of individual post boxes in the foyer with no master key. Internal security line will apply here, so access to the lift and stairs will be controlled with either fob or security enhanced door at stairwell.
- Access control will be audio and video with no trades button fitted. Further access control is required within the building per 25 units.
- Stud partition will be supported with 9mm plywood expanded metal mesh from the common parts of the building.
- Gating if used should be to a minimum height of 1.8m high.

12.9 Noise and Air Quality Summary

Noise Overview

A detailed Noise Report has been prepared by Hanns Tucker and should be consulted for the full assessment.

A detailed environmental noise survey has been undertaken in order to establish the currently prevailing environmental noise climate around the site. Due to location of the proposed development site, the following potential impacts shall primarily

be considered:

- Environmental Noise Impact (ie road/rail);
- Noise in Outdoor Living Areas;
- Control of Noise Emissions (ie building services plant/commercial uses).

The environmental noise impact upon the proposed dwellings has been assessed in the context of national and local planning policies.

Appropriate target internal noise levels have been proposed. These are achievable using conventional mitigation measures.

Mitigation advice, including the use of suitably specified glazing and acoustically attenuated ventilation, have been recommended to reduce to a minimum the adverse impact on health and quality life arising from environmental noise.

The assessment shows that the site, subject to appropriate mitigation measures, is suitable for residential development in terms of noise.

2m Closeboard Fence along railway

Air Quality Overview

A detailed Air Quality Assessment has been prepared by Environmental Service Design and should be consulted for the full assessment.

The suitability of the Site has been undertaken in reference to air quality in the local area and in line with relevant air quality policies, legislation and guidance.

The proposal mitigates air pollution by favouring a scheme utilising air source heat pumps (ASHP) rather than a centralised CHP system or gas fired heating. The heating and cooling strategy is driven by clean electricity, rather than fossil fuels with local NOx emissions.

During construction it will therefore be necessary to apply a package of mitigation measures to minimise dust emissions, the detail of which will be developed by the site construction team, but in accordance with the commitments within this document and inline with good practice.

With on-site mitigation measures in place, it is expected that any residual effects will not be significant.

There is limited car parking provision being made on the site, and links to local train stations and bus stops supports a transition to communities not needing personal cars.

12.10 Facade access and Maintenance Strategy

Facade Cleaning and Maintenance.

The scheme has been designed to accomodate the use of mobile elevated work platforms (MEWPs) access for window cleaning. Pole & wash method can also be adopted at lower levels.

The glazing where there are balconies shall be accessed directly for cleaning by the occupants, from their apartments.

Pole & Wash

At low level the glazing can be accessed and cleaned with a pole and was system. Water supplies and power should be available close to the point of delivery.

A pole & wash system can reach at most 2-3 storeys to offer a good quality wash, beyond this the quality of the operation is comprimised by the length of the pole and ability to maneuver it.

Gull Roosting Prevention

We have referred to Guidance set out in:

‘Gulls – How to Stop Them Nesting on Your Roof’ (2016), produced by Gloucester City Council

Some of the measures that will be incorporated into the design will include:

- Reducing opportunities for feeding through secure waste management
- Pitched roofs on the townhouses
- Easy Access to flat roof
- Wirea and Spikes where applicable
- Building management and maintenance plan to be developed

MWEP

Daddy Long Legs Gull Prevention

Netting along PVs

Access Statement

13.0 Inclusive Access Principals

13.1 Inclusive Access Principals

Access statement

This access statement comments upon the accessibility of the proposed Great Western Yard development in Gloucester and has been prepared at planning application stage. This report is based on current proposals and discussions with the design team. It contains an explanation of inclusive design measures to be incorporated within the scheme and gives details of how current standards, as set out below, are met.

The report outlines the design rationale, where appropriate, and explains how a good standard of accessibility is to be achieved. The assessment includes parking, external areas in the immediate vicinity of the building, approach, entrances and common parts, residential and commercial accommodation.

Policies, legislation and guidance followed

- Building Regulations, Approved Documents M 2015 and K 2013 (AD M and AD K);
- Department for Communities and Local Government Technical Housing Strandards;
- Designed to meet national space standards as set out in policy SD11 of the JCS;

The principles of an accessible environment contained within this document address the needs of the following user groups:

- Individuals with mobility, sight, comprehension or hearing impairment;
- The ageing population;
- People with temporary injuries; and
- People whose movement may be impaired or encumbered in any way i.e. pregnant women, people with young children or people with baggage.

Accommodation provided

The scheme comprises of four apartment blocks and 87 Houses, with ancillary accommodation at ground floor and residential accommodation above. There is extensive public spaces and pedestrian route across the site.

There are 315 residential units in total with a range of sizes from 1 bed to three bedroom apartments and 2bed 3p to 3bed 5p houses.

Housing technical standards

As required the of homes will meet Building Regulations M4(2) ‘accessible and adaptable dwellings ’and 10% are to be designed to be wheelchair accessible or easily adaptable for residents who are wheelchair uses to meet Building Regulation M4(3)’ wheelchair user dwellings’.

There is a provision to increase the number of wheelchair units should this be requested. We have design units to be flexible to accommodate a M4(2) or M4(3) standard.

13.2 Inclusive Access Principals

Building Entrances

It is proposed that all entrances will be weather protected from the elements.

All entrances will afford step-free access into the building from the street. All entrances will be signed and sufficiently illuminated.

Each door leaf will provide a clear opening width of 1000mm, in accordance with Approved Document M. The entrances will be manually operated and will adhere to the maximum door opening force of 30N from 0-30 degrees and 22.5N from 30-60 degrees of the door opening cycle.

Internal Access - General

Each floor within the building will be level, and step free access between floors will be achieved by means of accessible lifts.

All horizontal and vertical access will be designed to the recommendations set out in Approved Document M and BS 8300.

In addition to the lifts, escape stairs will also be provided for the residential cores. These will be designed to the fire requirements, although it is proposed that Approved Document M features (e.g. nosing's and handrails) will be provided to assist ambulant disabled people, blind and partially sighted people who may be using the stairs in an emergency.

Vertical circulation

All dwellings and communal areas are accessed by lift and stairs, with lift access from parking to residential areas. All cores have a lift and a stair serving all floors.

The design of the stairs will follow guidance in Approved Document K 2013 (AD K).

The lifts will meet residential access standards in AD M with a car size of at least 1100mm by 1400mm and 800mm door clear opening with a 1500mm by 1500mm level landing in front of the lift doors at all levels. Lifts controls will meet guidance in AD M.

Car Parking and Setting Down Points

The designated accessible parking bays will be clearly defined and signposted from the approach roads and within the car park itself. Pedestrian routes within the car park will be marked, be well lit and will indicate a safe route towards the entrances.

Where accessible bays are provided, they will meet the design guidance AD M with 1200mm access zone to each side and there will be level access from the accessible parking bays to lifts serving all levels.

Means of Escape

Provisions will be made for disabled persons within the building as per the recommendations of BS 9999: 2008. There will be an audible and visual alarm system within each building.

Common Areas

All common areas including circulation and residents' facilities have been designed to meet Building Regulation Part M following AD M guidance for dwellings. Internal communal corridors are all at least 1500mm wide.

All doors in communal areas give 850mm clear opening width, have 300mm nibs adjacent to the leading edge on the opening side and an opening force not exceeding 30N, all in line with guidance in AD M.

13.3 Inclusive Access Principals

Approved Document M - M4(2) standard

M4(2) standard dwellings have features as set out below.

Circulation

Communal and dwelling entrance doors have an opening width of 850mm clear with 300mm nib. Internal door opening clear widths give at least 750 - 800mm relating to corridor width, with

A 300mm nib to leading edge of doors on the pull side on the entry level. The minimum door widths do not apply to cupboards unless large enough to be entered.

The minimum corridor width is 900mm with localised obstructions, such as radiators, not located opposite or close to doors or at a change of direction and corridors are not less than 750mm wide at any point.

There is level entry to dwellings and flush thresholds to private outdoor spaces.

Accommodation

All units will have a suitable living area at entry level and suitable WC facilities with an outward opening door at entry level. There is 1200mm clear space in front of kitchen units.

Generous clearance is provided around beds with at least 750mm clear to sides and end of bed in main bedroom, and 750mm to one side and end of bed in all other bedrooms.

A bathroom is located at same level as main bedroom, and the bathroom and WC size and layout will follow AD M standards. There will be provision for an accessible shower within the bathroom where not provided elsewhere in the dwelling and there will be the ability for adaptation including reinforced walls for grab rails in WC and bathrooms.

Glazing, services and controls

Glazing height will not exceed 850mm to the principal window in the living room and the handle to at least one window in the living room will be at 450mm -1200mm above the floor. All other window handles will be between 450mm -1400mm above the floor.

Accessible detailed elements such as door ironmongery and positioning of switches and controls will be provided, all in line with AD M standards.

Approved Document M M4(3) standard

Wheelchair adaptability to be achieved in 10% of the units by providing units that are designed to have adequate space and structural provision to allow easy adaptation by the addition of fixtures and fittings to suit the potential resident's preference. These units will meet the M4(3) wheelchair adaptable standard and have the following features.

Circulation

Communal and dwelling entrance doors have an opening width of 850mm clear with 300mm nibs to the pull side and 200mm nibs to push side. Adequate turning space is provided inside the dwelling entrance door, with 300mm clear space to side of leading edge of door for depth of 1800mm.

There is level entry to dwellings, flush thresholds to any private outdoor spaces and adequate wheelchair manoeuvre space in all rooms.

Internal door opening clear widths give at least 850mm, with 300mm nibs on the pull side and at least 200mm nibs to push side of all doors. The minimum door widths do not apply to cupboards unless large enough to be entered.

The minimum corridor width is 1050mm, increased to 1200mm when approach to a doorway is not head-on.

A space 1100mm by 1700mm is provided for wheelchair charging and storage, located as close as possible to the principal entrance

Accommodation

Bedroom layouts meet the AD M dimensional requirements and the Appendix D furniture schedule. The principal bedroom in each wheelchair adaptable dwelling has 1000mm clear to both sides and end of the bed and 1200mm by 1200mm manoeuvre space to each side.

Other double bedrooms are a minimum of 3000mm wide with 1000mm clear to one side and end of bed and single and twin bedrooms have 1000mm clear to one side of bed. Single bedrooms are a minimum of 2400mm wide.

There is 1500mm clear space in front of kitchen units and the length of units meets the standard in AD M.

It is noted that the kitchen unit measurement is taken along the mid-line of the units and includes tall fittings such as fridge freezer and high-level oven, as described in AD M.

The combined floor area for living, dining and kitchen space and the storage requirements is in line with guidance in AD M for M4(3) dwellings.

Suitable sanitary facilities with clear access zones meeting AD M guidance and dimensions and layouts meeting wheelchair adaptable standards are provided. A bathroom with a level access shower and a separate WC/cloakroom or bathroom is provided in dwellings with four or more bed spaces.

Glazing, services and controls

The glazing height does not exceed 850mm to the principal window in the living room and the handle to at least one window in the living room is at 700mm -1000mm above the floor. All other window handles between 450mm -1200mm above the floor

Accessible detailed elements such as door ironmongery will be provided and positioning of switches and controls will all meet AD M standards.

14.0 Unit Compliance

14.1 Internal Space Standards

This standard deals with internal space within new dwellings and is suitable for application across all tenures. It sets out requirements for the Gross Internal (floor) Area of new dwellings at a defined level of occupancy as well as floor areas and dimensions for key parts of the home, notably bedrooms, storage and floor to ceiling height.

Technical requirements

The standard requires that:

- The dwelling provides at least the gross internal floor area and built-in storage area set out in Table 1 below
- A dwelling with two or more bedspaces has at least one double (or twin) bedroom
- In order to provide one bedspace, a single bedroom has a floor area of at least 7.5m2 and is at least 2.15m wide
- In order to provide two bedspaces, a double (or twin bedroom) has a floor area of at least 11.5m2
- One double (or twin bedroom) is at least 2.75m wide and every other double (or twin) bedroom is at least 2.55m wide
- Any area with a headroom of less than 1.5m is not counted within the Gross Internal Area unless used solely for storage (if the area under the stairs is to be used for storage, assume a general floor area of 1m2 within the Gross Internal Area)
- Any other area that is used solely for storage and has a headroom of 900-1500mm (such as under eaves) is counted at 50% of its floor area, and any area lower than 900mm is not counted at all
- A built-in wardrobe counts towards the Gross Internal Area and bedroom floor area requirements, but should not reduce the effective width of the room below the minimum widths set out above. The built-in area in excess of 0.72m2 in a double bedroom and 0.36m2 in a single bedroom counts towards the built-in storage requirement
- The minimum floor to ceiling height is 2.3m for at least 75% of the Gross Internal Area - 2.5 in accordance with the GLA Design Guide

Table 1

Minimum gross internal floor areas and storage (m2)

Number of bedrooms(b)	Number of bed spaces (persons)	1 storey dwellings	2 storey dwellings	3 storey dwellings	Built-in storage
1b	1p	39 (37) *			1.0
	2p	50	58		1.5
2b	3p	61	70		2.0
	4p	70	79		
3b	4p	74	84	90	2.5
	5p	86	93	99	
	6p	95	102	108	
4b	5p	90	97	103	3.0
	6p	99	106	112	
	7p	108	115	121	
	8p	117	124	130	
5b	6p	103	110	116	3.5
	7p	112	119	125	
	8p	121	128	134	
6b	7p	116	123	129	4.0
	8p	125	132	138	

Study and Work

- Dwelling plans should demonstrate that all homes are provided with adequate space and services to be able to work from home. The Code for Sustainable Homes guidance on working from home is recommended as a reference.

Private Open Space

- A minimum of 5 sqm of private outdoor space should be provided for 1-2 person dwellings and an extra 1 sqm should be provided for each additional occupant.

Floor to Ceiling Heights

- The minimum floor to ceiling height in habitable rooms should be 2.4m between finished floor level and finished ceiling level.

Compliance with Building Control

BC Cat 2 - Compliant

BC Cat 3 - Compliant

14.2 Internal Provisions - Cat M4(2)

Private entrances

- All private internal and external entrances should have an external landing of minimum 1200 x 1200 mm and have suitable lighting activated automatically.
- All entrance doors should have a minimum clear opening width of 850 mm. Entrance doors that are double leaf doors, should provide the minimum clear opening width in the main leaf.
- All entrances should have a clear approach space to the door of 300 mm on the leading edge of the door on the pull side maintained for a minimum distance of 1200 mm beyond it.
- All entrance doors should be located centrally in the wall so that the depth of the reveal on the leading side of the doors will be no more than 200 mm.
- All thresholds should be wheelchair accessible.

Other external doors

- All doors to balconies and external amenities should have a minimum clear opening width of 850 mm. Doors that are double leaf doors should provide the minimum clear opening width in both leaves.
- All doors to balconies and external amenities should have a clear approach space to the door of 300 mm on the leading edge of the door on the pull side, maintained for a minimum distance of 1200 mm beyond it.
- All doors to balconies and external amenities should be located in the wall where they are installed so that the depth of the reveal on the leading side of the door will be no more than 200 mm.
- All thresholds should be wheelchair accessible.

Internal doors and corridors

- All internal corridors should meet or exceed the minimum required, i.e. 900 mm.
- All internal doors should have clear opening widths that conform the specification below:

  - 750 mm, where approach is head-on or at right angles to a corridor at least 1200 mm wide;
  - 775 mm, where approach is at right angles to a corridor between 1050-1200 mm wide;
  - 800 mm, where approach is at right angles to a corridor of 900 mm wide.
- Internal double doors should provide the minimum clear opening width with both leaves.
- All internal doors, including sliding doors, within the entrance storey should provide a minimum nib of 300 mm to the leading edge of the door. (Please note that doors to cupboards that cannot be entered and en-suite bathrooms are exempt of having a 300 mm nib).

Changes of level within the dwelling

- All dwellings should be single-storey and provide step-free access to all rooms and facilities within the dwelling.

Living, kitchen and eating areas

- All dwellings should have the main living room in the entrance storey.
- All kitchens should have a clear space of 1200 mm depth in front of and between all kitchen units and appliances.
- All principal living areas should have a window where the glazing will start a maximum of 850 mm above floor level or at the minimum height necessary to comply with the requirements of Part K for guarding to windows.

Bedrooms

- All bedrooms should provide a clear access route from the door to the window of 750 mm as minimum.
- The main double bedroom of all dwellings should provide a clear access zone of 750 mm as a minimum to both sides and the foot of the bed.
- All other bedrooms should provide a clear access
- Zone of 750 mm as a minimum to one side and the foot of the bed.

Sanitary facilities

- All walls of bathrooms, shower rooms and cloakrooms should be capable of supporting grab rails, seats and other adaptations.
- All single-storey dwellings should have a bathroom that meets the provisions of Diagram 2.5 and 2.7 of AD-M, V1, M4(2).
- All doors to the bathrooms required to meet the provisions of diagrams 2.5 and 2.6 of AD-M, V1 (and WC rooms) should open outwards.

Services and controls

- The detailed design of switches, sockets, window controls and services will be finalised at a later stage of the design process but will be expected to meet the requirements of paragraph 2.30 of AD-M, V1.

14.3 Internal Provisions - Cat M4(3)

Private entrances

- All private entrances will have an external landing of minimum 1500 x 1500 mm and will have suitable lighting activated automatically.
- All dwellings will be located from level 1 and above, so all private entrances will be covered.
- All entrance doors will have a minimum clear opening width of 850mm.
- All entrances will have a clear approach space to the door of 300 mm on the leading edge of the door on the pull side maintained for a minimum distance of 1800 mm beyond it.
- All entrances will have a clear approach space to the door of 200 mm on the following edge of the door on the push side maintained for a minimum distance of 1500 mm beyond it.
- All entrances will have a minimum 150 mm nib to the hinge side of the door.
- All entrance doors will be located centrally in the wall where are installed so that the depth of the reveal on the leading side of the doors will be no more than 200 mm.
- Inside all entrance areas, in front of the door, there will be a minimum 1500 mm clear turning circle.
- All thresholds will be accessible.

Other external doors

- All doors to balconies and external amenities will have a minimum clear opening width of 850mm. Doors that are double doors, will provide the minimum clear opening width in both leaves.
- All doors to balconies and external amenities will have a clear approach space to the door of 300 mm on the leading edge of the door on the pull side maintained for a minimum distance of 1800 mm beyond it.
- All doors to balconies and external amenities will have a clear approach space to the door of 200 mm on the following edge of the door on the push side maintained for a minimum distance of 1500 mm beyond it.
- All doors to balconies and external amenities will be located in the wall where are installed so that the depth of the reveal on the leading side of the doors will be no more than 200 mm.
- All thresholds will be accessible.

Internal doors and corridors

- All internal corridors will meet or exceed the minimum required, i.e. 1050 mm or 1200 mm where the approach to a doorway is not head-on.
- All internal doors will have minimum clear opening widths of 850 mm. Doors that are double doors, will provide the minimum clear opening width in the main leaf.
- All internal doors will provide a minimum nib of 300 mm to the leading edge of the door and a minimum nib of 200 mm to the following edge of the door. (Please note that doors to cupboards that cannot be entered and en-suite bathrooms are exempt of having a 200/300 mm nib.)

Wheelchair storage and transfer space

- All dwellings will have a space 1100 mm deep by 1700 mm wide available on the entrance storey, close to the private entrance, and the route to access this space will have a minimum clear width of 1200 mm.
- All wheelchair storage and transfer spaces will have provision of a power socket within the space.

General storage space

- All dwellings are required to have provision for general built-in storage in accordance with the specification below:
  - 1 Bedroom unit: 1.5 m^2;
  - 2 Bedroom unit: 2.0 m^2;
  - 3 Bedroom unit: 2.5 m^2;
  - 4 Bedroom unit: 3.0 m^2;

Changes of level within the dwelling

- All wheelchair dwellings will provide step-free access to all rooms and facilities within the entrance storey.

Living areas

- All dwellings will have a living area in the entrance storey.
- The internal floor area for combined living/dining/kitchen space should be in accordance with the specification below:
  - 2 Bed spaces unit: 25 m^2;
  - 4 Bed spaces unit: 29 m^2;
  - 6 Bed spaces unit: 33 m^2;
  - 8 Bed spaces unit: 37 m^2;
- All principal living areas will have a window where the glazing will start a maximum of 850 mm above floor level or at the minimum height necessary to comply with the requirements of Part K for guarding to windows.

Kitchens

- All dwellings will have the kitchen and principal eating areas within the entrance storey.
- All kitchens will have a clear space of 1500 mm depth in front of and between all kitchen units and appliances.
- The detailed design of the kitchen will be finalised at a later stage of the design process but will be expected to meet the provisions of paragraph 3.34 of AD-M, V1, M4(3).

Internal Provisions - Cat M4(3)

Bedrooms

- All dwellings will have all bedrooms in the entrance storey and the bedrooms will have an internal floor area in accordance with the specification below:
  - Principal double bedroom: 13.5 m^2;
  - Double bedroom: 12.5 m^2;
  - Single bedroom: 8.5 m^2;
- The principal double bedroom of all dwellings will provide a clear access zone of 1000 mm as a minimum to both sides and the foot of the bed and in front of all furniture.
- The principal double bedroom of all dwellings will have a manoeuvring space of minimum 1200 x 1200 mm on both sides of the bed.
- All other bedrooms will provide a clear access zone of 1000 mm as a minimum to one side and the foot of the bed and in front of all furniture as well.

Sanitary facilities

- All walls of bathrooms, shower room and cloakrooms will be strong enough to support grab rails, seats and other adaptations.
- All ceiling structures of bathrooms, shower room and cloakrooms will be strong enough to allow for the fitting of an overhead hoist capable of carrying a load of 200 kg.
- All dwellings will have a bathroom on the entrance storey, on the same floor as the main double bedroom, that will meet the provisions of Diagram 3.11 of AD-M, V1. The door to these bathrooms will open outwards.

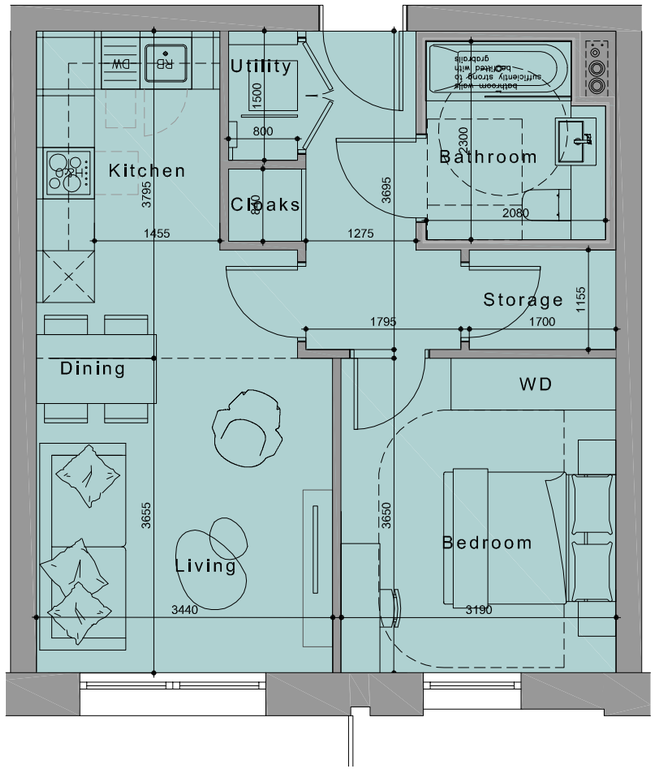
Sanitary facilities

- All walls of bathrooms, shower room and cloakrooms will be strong enough to support grab rails, seats and other adaptations.
- All ceiling structures of bathrooms, shower room and cloakrooms will be strong enough to allow for the fitting of an overhead hoist capable of carrying a load of 200 kg.
- All dwellings will have a bathroom on the entrance storey, on the same floor as the main double bedroom, that will meet the provisions of Diagram 3.11 of AD-M, V1. The door to these bathrooms will open outwards.

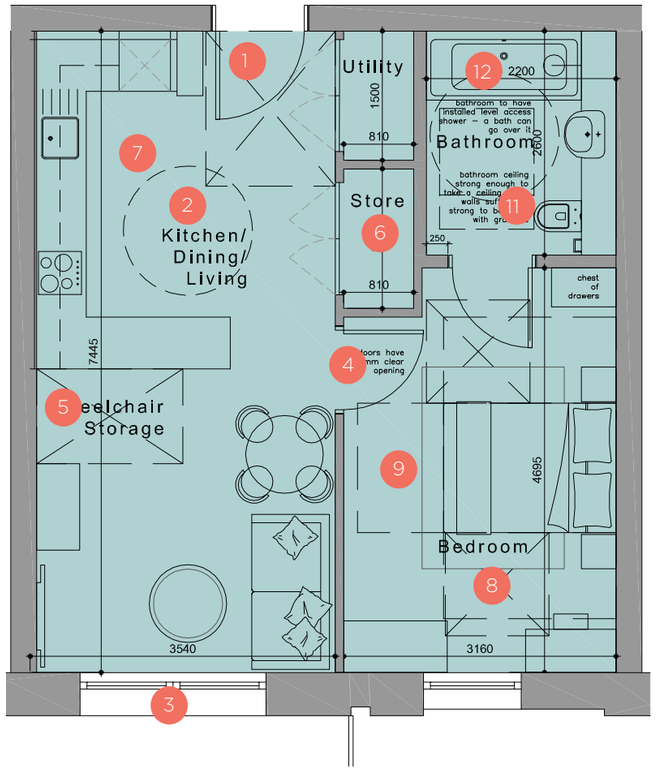
Services and controls

- The detailed design of switches, sockets, window controls and services will be finalised at a later stage of the design process but will be expected to meet the requirements of paragraph 3.44 of AD-M, V1.

14.4 Cat 3 (Disabled Adaptable Unit Compliance)



Typical 1 Bed unit



Adaptable 1 Bed unit

Adaptable units

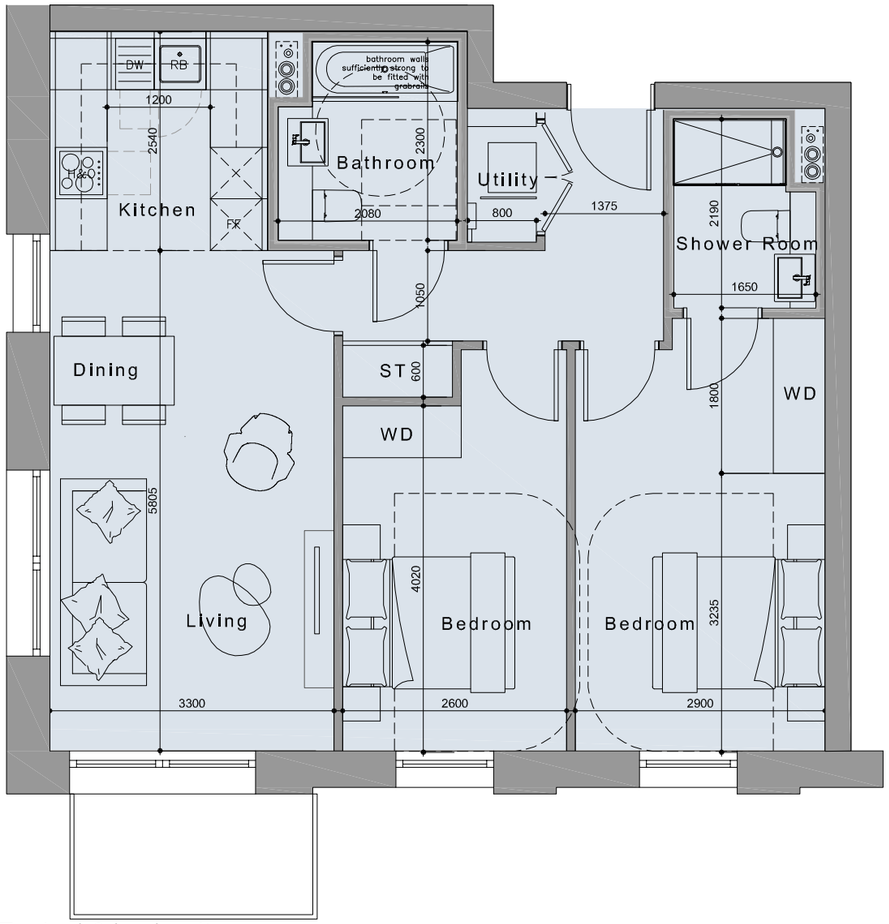
A range of units have been designed to meet Approved Document M4(3) - wheelchair user dwellings, so that they can be easily adapted to meet the needs of a wheelchair user.

Wheelchair accessible units (M4(3) can be distributed throughout the buildings, across type, size and level, as far as possible to ensure that households wheelchair users have as much choice about the location and level of their home as anybody else, as far as possible.

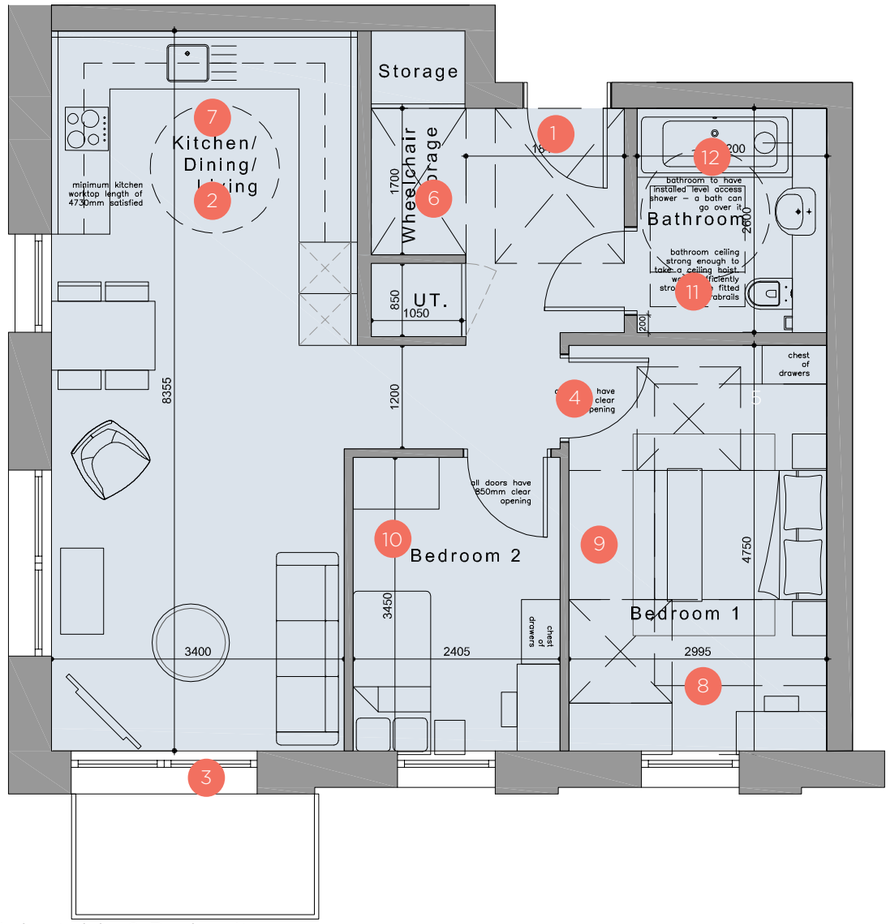
Key

1. 850mm clear opening entrance door, 300mm on the leading edge maintained for 1800mm
2. 1500mm clear turning circle
3. Accessible thresholds
4. 850 clear opening doors
5. Wheelchair storage/ provision of power socket
6. Storage
7. 1500mm depth in front of and between all kitchen units
8. 1200x1200mm manoeuvring space to both sides of the bed
9. 1000mm to both sides and front of the bed to main bedrooms
10. 1000mm to one side and front of the bed to every other bedroom
11. Walls of bathrooms and shower rooms capable of supporting grab rails, seats and other adaptations; ceilings capable of carrying a load of 200kg.
12. Cat 3 Compliant Bathroom

14.5 Cat 3 (Disabled Adaptable Unit Compliance)



Typical 2 bed unit



Adaptable 2 Bed unit

Key

1. 850mm clear opening entrance door, 300mm on the leading edge maintained for 1800mm
2. 1500mm clear turning circle
3. Accessible thresholds
4. 850 clear opening doors
5. Wheelchair storage/ provision of power socket
6. Storage
7. 1500mm depth in front of and between all kitchen units
8. 1200x1200mm manoeuvring space to both sides of the bed
9. 1000mm to both sides and front of the bed to main bedrooms
10. 1000mm to one side and front of the bed to every other bedroom
11. Walls of bathrooms and shower rooms capable of supporting grab rails, seats and other adaptations; ceilings capable of carrying a load of 200kg.
12. Cat 3 Compliant Bathroom

15.0 Standard Unit Types

15.1 Studio

Overview

- Bedroom 11.8m2
- Living/Kitchen 19m2
- Bathroom 4.3m2

15.2 1 Bed

Overview

- Bedroom 13.3m2
- Living/Kitchen 23.3m2
- Bathroom 4.3m2

15.3 2 Bed 3 Person

Overview

- Master Bedroom 10.3m2
- Bedroom 2 8.9m2
- Living/Kitchen 25.1m2
- En suite 3.4m2
- Bathroom 4.3m2

15.4 2 Bed 4 Person - 70m2

Overview

- Master Bedroom 13m2
- Bedroom 2 11.5m2
- Living/Kitchen 27.8m2
- En suite 3.4m2
- Bathroom 4.3m2

Standard Unit Types

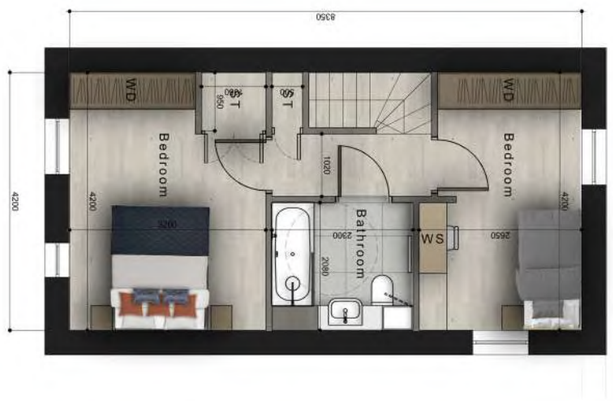
15.5 3 Bed 4 Person - 79m2

Overview

- Master Bedroom 12.3m2
- Bedroom 2 12m2
- Bedroom 3 7.8m2
- Living/Kitchen 26.6m2
- En suite 3.4m2
- Bathroom 4.3m2

15.6 House Type 1 - 2B 3P - 70m2

Ground Floor Plan



First Floor Plan

15.7 House Type 2 - 3B 4P - 84m2

Ground Floor Plan

First Floor Plan

15.8 House Type 3 - 3B 5P - 90m2

Ground Floor Plan

First Floor Plan

DARLING ASSOCIATES
ARCHITECTS

AFFORDABLE HOUSING

EDUCATIONAL

HERITAGE + LISTED BUILDINGS

HEADQUARTERS

INTERIOR ARCHITECTURE

LEISURE + HOSPITALITY

LUXURY

MARKETING + SALES SUITES

MASTERPLANNING

PRS/BUILD TO RENT

RESIDENTIAL

RETAIL

TALL BUILDINGS

WORKPLACE

London
1 Greencoat Row
Victoria
London, UK
SW1P 1PQ

[redacted]