



Reading Borough Council

GEORGE STREET

Drainage Strategy



GEORGE STREET, READING

DRAINAGE STRATEGY STATEMENT

Project Title	70012984 – RBC Housing Sites – George Street
Subject	Drainage Strategy Advice
Date	16 March 2018
Client	Reading Borough Council
Prepared by	D Muirhead
Checked by	D Muirhead
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Notes	
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BACKGROUND

- 1.1 WSP was commissioned by Reading Borough Council (the Client), to provide advice on the provision of drainage for land located to the north of 94, George Street, Reading, RG1 7NT (the Site). It is understood that the client is intending to develop the land for residential purposes and requires this advice to confirm suitability for proposed use and support a planning application.

INTRODUCTION

- 2.1 The site is situated in an area of disused land located in a predominately residential area. Terraced housing is present to the south and a community centre, (including an open field and playground) is present to the east of the site. A railway line is present on a high embankment, close to the northern and north-western boundaries of the site, there is a drain associated with this immediately adjacent to it. Pedestrian access to an area of allotments (located west of the site) runs along the north-western boundary.
- 2.2 A site location plan is shown below in Figure 1.

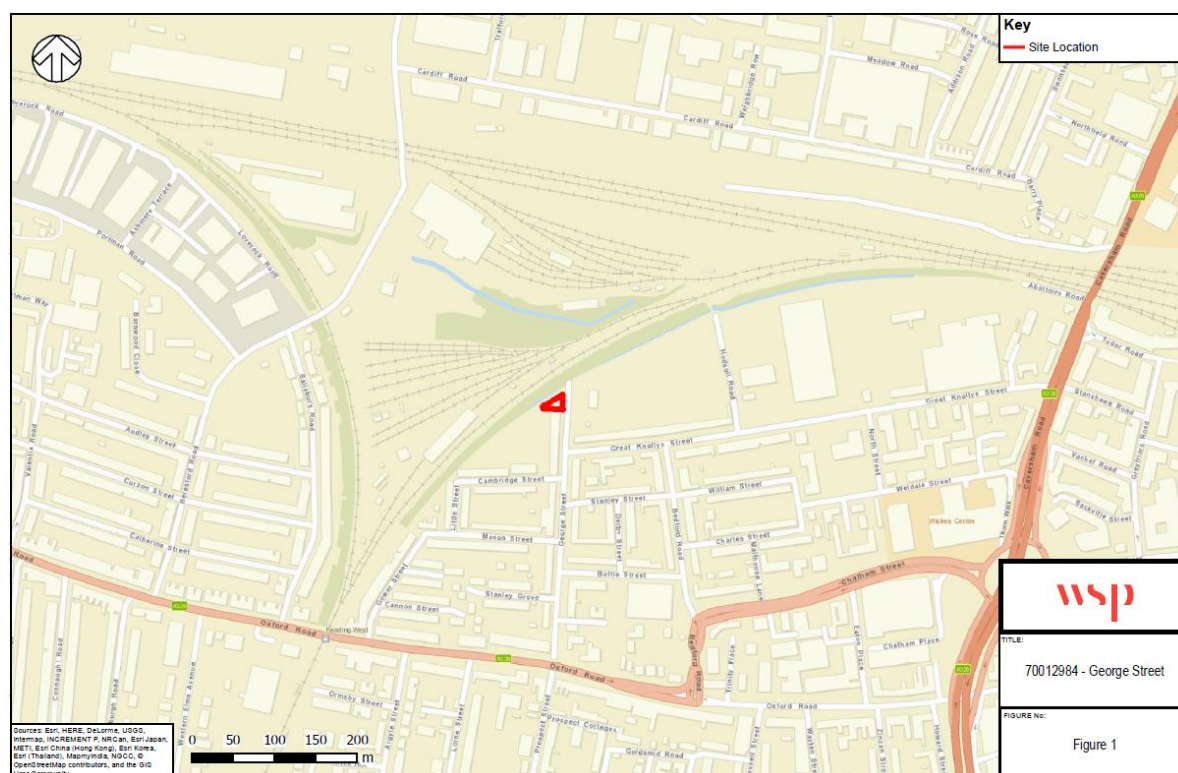


Figure 1: Site Location, attached as Appendix A

PLANNING POLICY GUIDANCE

Ordinary Watercourse

- 3.1 The ditch north of the site is assumed to be either a drainage feature for the railway or an Ordinary Watercourse and therefore the responsibility of Network Rail or the Lead Local Flood Authority (LLFA) in this case Reading Borough Council respectively. Prior to any construction permission will need to be sought from Network Rail or the LLFA to work within 8m of the ditch. This is to ensure any works carried out do not impact on flood risk due to detrimental impacts on the ditch.

- 3.2 This ditch flows in a north easterly direction along the railway. It is considered likely that this is culverted beneath the railway and subsequent industrial unit to the River Thames. The catchment area at the site is likely to be limited, in the unlikely event of a blockage in the channel flood waters may back up on to the site before reaching a critical level and flowing overland adjacent to the channel. The preferential flow route is shown on the Environment Agency's Flood Risk from Surface Water map, which indicates that the site is only at risk in a 1 in 1000 year event. However due to the residual risk it is recommended that FFL are a minimum of 300mm above the ground levels.

RBC Core Strategy 2008 (Alterations Adopted 2015)

Policy CS1: Sustainable Construction and Design

- 3.3 Developments incorporate sustainable urban drainage facilities and techniques as part of the layout of a development as appropriate and as advised by the Environment Agency, including minimising the size of impermeable areas so that peak run-off and annual water run-off is reduced where possible and in any case is no greater than the original conditions of the site. Particular care will be needed in areas of flood risk where different solutions may be required.

Sites and Detailed Policies Document 2012, (Alterations Adopted 2015)

Policy DM1: Adaption to Climate Change

- 3.4 All development shall minimise the impact of surface water runoff from the development in the design of the drainage system.

Pre-Submission Draft Local Plan (consultation closed, due to be submitted to SoS)

Policy CC3: ADAPTATION TO CLIMATE CHANGE

- 3.5 *All development shall minimise the impact of surface water runoff from the development in the design of the drainage system, and where possible incorporate mitigation and resilience measures for any increases in river flooding levels as a result of climate change.*

Policy EN18: FLOODING AND SUSTAINABLE DRAINAGE SYSTEMS

- 3.6 *Smaller schemes* are encouraged to incorporate SuDS, where possible. Runoff rates should aim to reflect greenfield conditions and, in any case, must be no greater than the existing conditions of the site. Schemes should ensure that the movement of water through vertical infiltration as well as horizontal run-off does not worsen contamination effects. Wherever possible, SuDS provision should maximise ecological benefits, link into the existing Green Network, incorporate tree planting and landscaping and avoid damage to existing significant trees, including through changes to the site hydrology. All new developments in areas of flood risk should give priority to SuDS.*

**(less than 10 or more dwellings or equivalent non-residential or mixed developments)*

EXISTING DEVELOPMENT

- 4.1 The existing site is accessed from George Street. The north-western site boundaries comprise wooden fence panelling, although this is noted to be in poor repair. The site area is highly overgrown with dense vegetation. The ground surface is generally level, comprises soft-standing. An existing stockpile of material including brick, concrete and other assorted debris such as metal bars, broken glass, plastic waste, and other general refuse, has been observed on site.

- 4.2 A surface water drain is present at the toe of the embankment slope and filter tanks are present in the road to the east of the site boundary. A narrow strip of land which permits pedestrian access to an area of allotments runs along the north-western boundary.

PROPOSED DEVELOPMENT

- 5.1 It is understood that there are currently proposals to develop the site into four residential units, comprising one-bed and two-bed apartments over 2.5 storeys with communal gardens. Development plans for the site can be found in Appendix B.

DRAINAGE STRATEGY

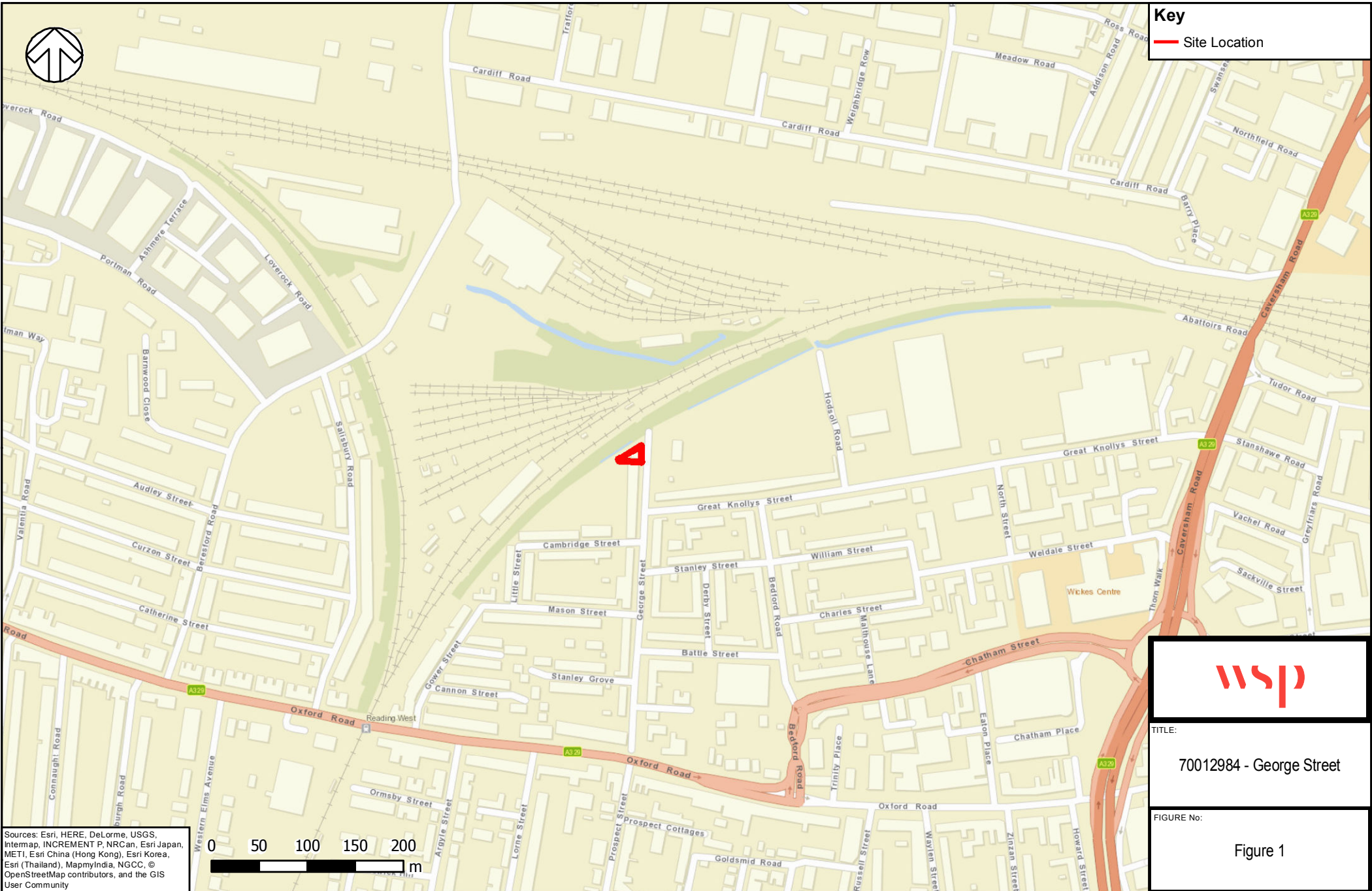
- 6.1 On the understanding that the site is underlain by chalk; infiltration solutions were considered as the initial step in line with SuDS good practice. However, given the multiple contamination sources which have been identified in the local area (see Ground Investigation Reporting - George Street, Reading: Phase 1 Contaminated Land Assessment) it is considered to be unlikely that an infiltration solution would be practical for this site. It is therefore assumed that surface water from this site would discharge to the local surface water receptor, in this instance the Thames Water Sewer in George Street, see Appendix C.
- 6.2 Due to the small size of the site the calculated Greenfield run-off rate cannot be feasibly constructed within an outfall as there would be a significant chance of blockage for such a small orifice. In line with best practice a greenfield/trickle discharge of 2 l/s has been used as the threshold for discharge from this site.
- 6.3 Based on a site area of 366m² and an assumption that 60% of this area is impermeable an impermeable drainage area of 220m² has been utilised.
- 6.4 Microdrainage software has been used to calculate the required volume of storage for the site. Based on an impermeable drainage area of 220m² with a maximum discharge rate of 2 l/s the maximum storage volume to attenuate a 1 in 100 year + 40% for climate change event would be 7.8m³. See Appendix D for Microdrainage outputs.
- 6.5 This volume can be provided within the redline boundary outside of adoptable roads and structures. The most appropriate area would appear to be beneath the proposed footpath at the front of the property. For reference a 19.5m² storage structure 0.4m deep would provide the required storage.
- 6.6 The foul water discharge from the site would be connected to the existing Thames Water infrastructure in George Street.

SUMMARY

- 7.1 Site is currently undeveloped but has been developed previously.
- 7.2 The site will be developed to provide 4no. 1 & 2 bedroom residential dwellings.
- 7.3 The finished floor levels will be set 300mm above ground levels to mitigate the residual risk of flooding.
- 7.4 Surface Water runoff will be limited to 2 l/s (lowest possible engineered design).
- 7.5 Surface water attenuation will be provided to limit runoff up to the 1 in 100 year + 40 climate change event. The maximum calculated size for this storage would be 7.8m³. This can be provided with the redline boundary outside of adoptable roads and structures.
- 7.6 Foul Water drainage would be connected to the existing infrastructure within George Street.

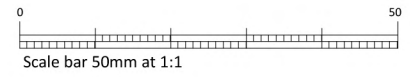
APPENDIX A

SITE LOCATION



APPENDIX B

PROPOSED DEVELOPMENT



Key

Existing Trees

Proposed Trees

This drawing may be scaled for the purposes of Planning Applications, Land Registry and for Legal plans where the scale bar is used, and where it verifies that the drawing is an original or an accurate copy. It may not be scaled for construction purposes.

Always refer to figured dimensions. All dimensions are to be checked on site. Discrepancies and/or ambiguities between this drawing and information given elsewhere must be reported immediately to this office for clarification before proceeding. All drawings are to be read in conjunction with the specification and all works to be carried out in accordance with latest British Standards / Codes of Practice.

Project

Reading Affordable Housing Sites

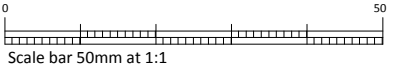
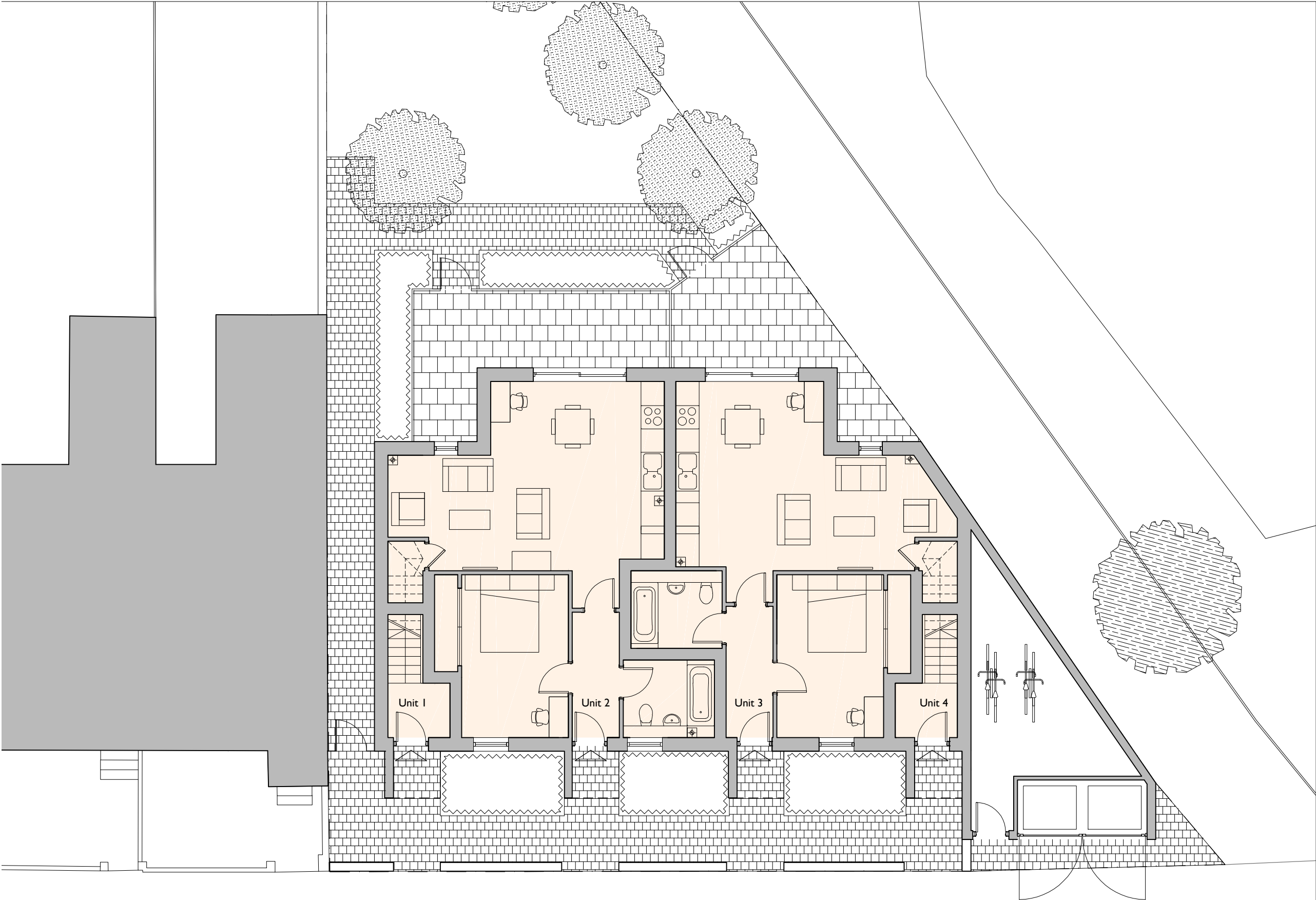
George Street

Title

Site Plan

Scale	Date
1:200 @ A3	21/11/2017
Drawn	Checked
AS	MS
Drawing Number	Revision
7870_SK_002	-

Saunders
Architecture + Urban Design



Unit	Typology	Storeys	GIA (m2)
1	2B4P Apartment	2	83
2	1B2P Apartment	1	56
3	1B2P Apartment	1	55
4	2B4P Apartment	2	83
Totals			277

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Project

Reading Affordable Housing Sites

George Street

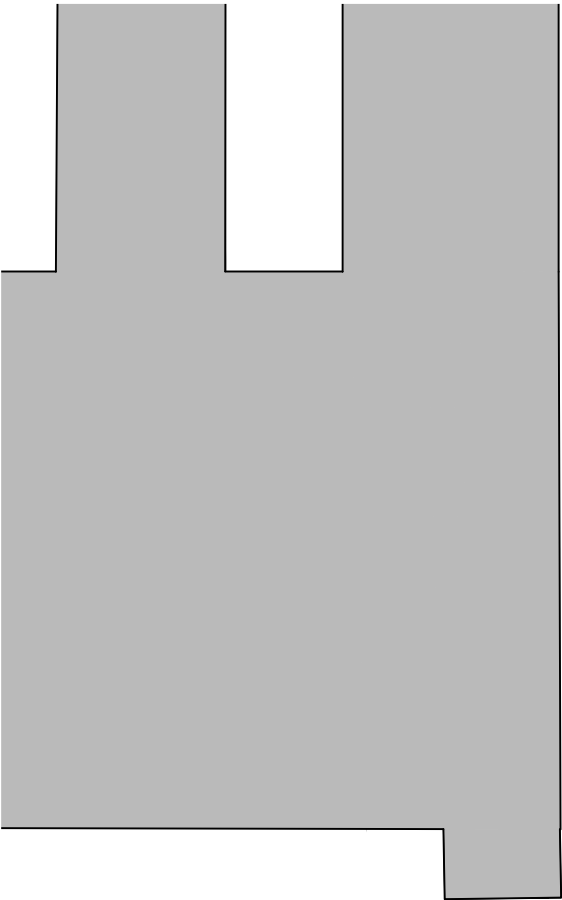
Title

Ground Floor Plan

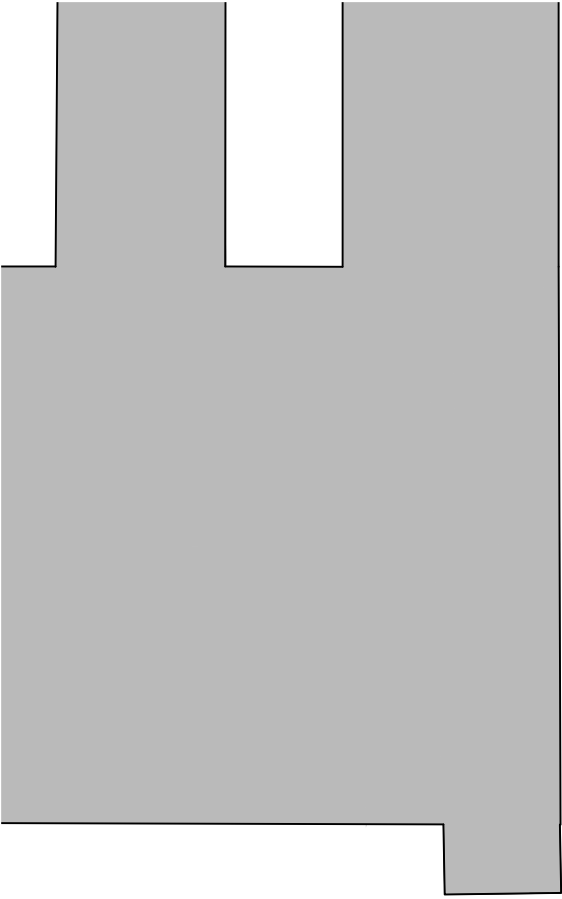
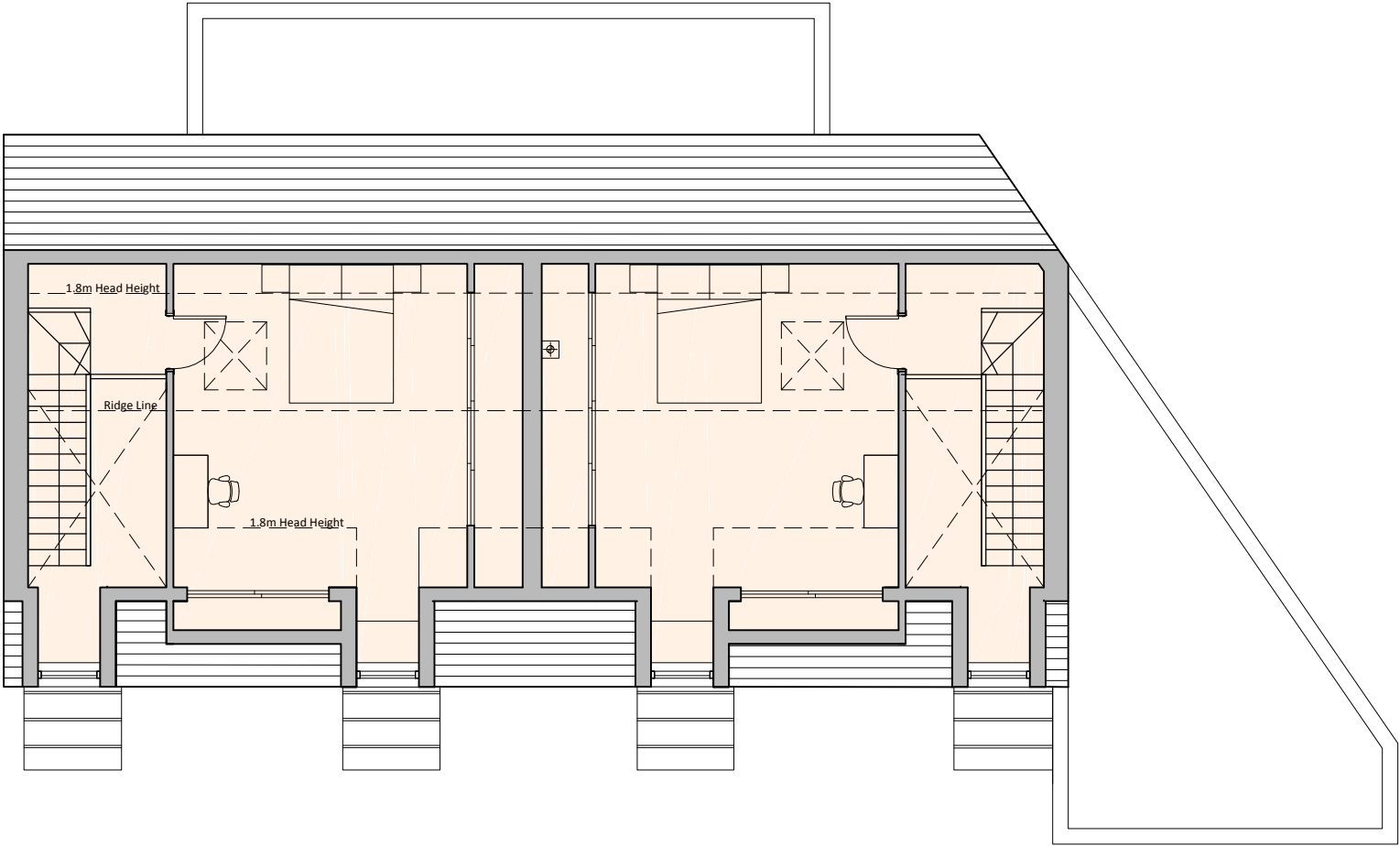
Scale	Date
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Drawn	Checked
AS	MS

Drawing Number	Revision
7870_SK_003	-

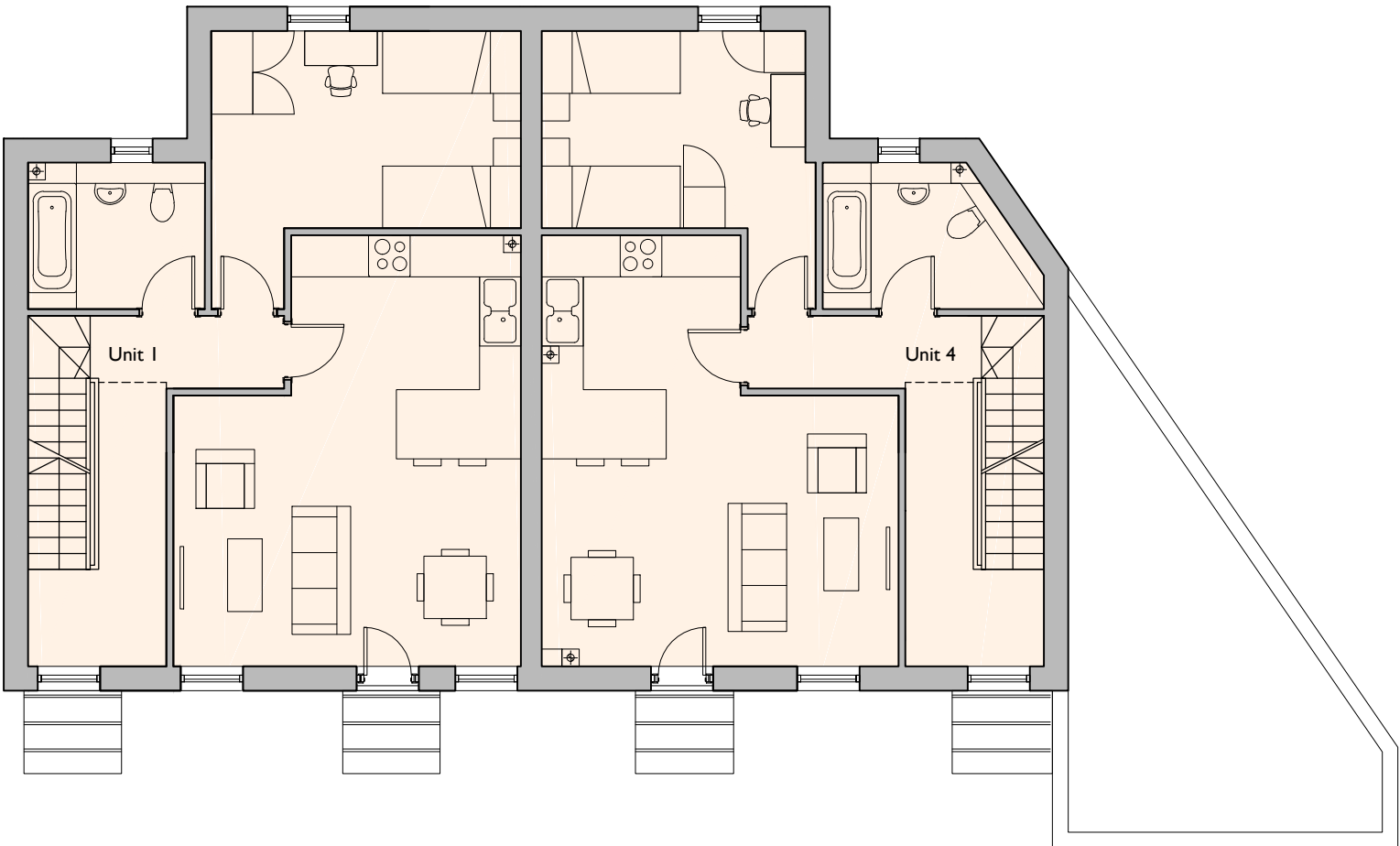
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Second Floor Plan



First Floor Plan



NOTES

050

0

Scale bar 50mm at 1:1

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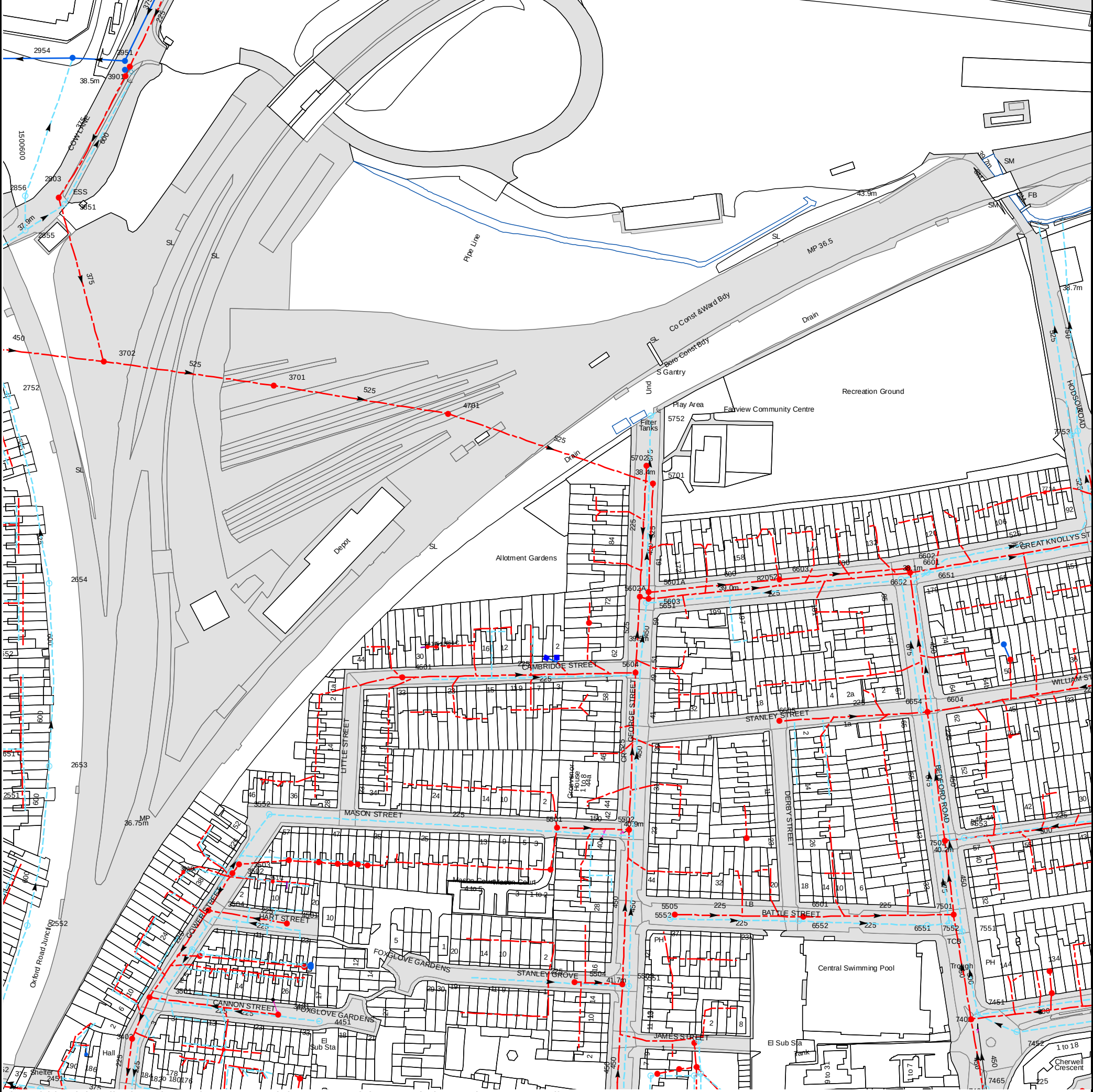
Project			
Reading Affordable Housing Sites			
George Street			
Title			
First and Second Floor Plans			
Scale			
1:100	@ A3	Date	21/11/17
Drawn		Checked	
AS		MS	
Drawing Number			Revision
7870_SK_004			-

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Architecture + Urban Design

APPENDIX C

SEWER PLANS

Asset Location Search Sewer Map - ALS/ALS Standard/2017 3558243



The width of the displayed area is 500 m and the centre of the map is located at OS coordinates 470523,173710
The position of the apparatus shown on this plan is given without obligation and warranty, and the accuracy cannot be guaranteed. Service pipes are not shown but their presence should be anticipated. No liability of any kind whatsoever is accepted by Thames Water for any error or omission. The actual position of mains and services must be verified and established on site before any works are undertaken.

Based on the Ordnance Survey Map with the Sanction of the controller of H.M. Stationery Office, License no. 100019345 Crown Copyright Reserved.



ALS Sewer Map Key

Public Sewer Types (Operated & Maintained by Thames Water)

	Foul: A sewer designed to convey waste water from domestic and industrial sources to a treatment works.
	Surface Water: A sewer designed to convey surface water (e.g. rain water from roofs, yards and car parks) to rivers or watercourses.
	Combined: A sewer designed to convey both waste water and surface water from domestic and industrial sources to a treatment works.
	Trunk Surface Water
	Trunk Foul
	Storm Relief
	Trunk Combined
	Vent Pipe
	Bio-solids (Sludge)
	Proposed Thames Surface Water Sewer
	Proposed Thames Water Foul Sewer
	Gallery
	Foul Rising Main
	Surface Water Rising Main
	Combined Rising Main
	Sludge Rising Main
	Proposed Thames Water Rising Main
	Vacuum

Notes:

- 1) All levels associated with the plans are to Ordnance Datum Newlyn.
- 2) All measurements on the plans are metric.
- 3) Arrows (on gravity fed sewers) or flecks (on rising mains) indicate direction of flow.
- 4) Most private pipes are not shown on our plans, as in the past, this information has not been recorded.
- 5) 'na' or '0' on a manhole level indicates that data is unavailable.

Sewer Fittings

A feature in a sewer that does not affect the flow in the pipe. Example: a vent is a fitting as the function of a vent is to release excess gas.

	Air Valve
	Dam Chase
	Fitting
	Meter
	Vent Column

Operational Controls

A feature in a sewer that changes or diverts the flow in the sewer. Example: A hydrobrake limits the flow passing downstream.

	Control Valve
	Drop Pipe
	Ancillary
	Weir

End Items

End symbols appear at the start or end of a sewer pipe. Examples: an Undefined End at the start of a sewer indicates that Thames Water has no knowledge of the position of the sewer upstream of that symbol, Outfall on a surface water sewer indicates that the pipe discharges into a stream or river.

	Outfall
	Undefined End
	Inlet

Other Symbols

Symbols used on maps which do not fall under other general categories

	Public/Private Pumping Station
	Change of characteristic indicator (C.O.C.I.)
	Invert Level
	Summit

Areas

Lines denoting areas of underground surveys, etc.

	Agreement
	Operational Site
	Chamber
	Tunnel
	Conduit Bridge

Other Sewer Types (Not Operated or Maintained by Thames Water)

	Foul Sewer
	Surface Water Sewer
	Combined Sewer
	Gully
	Culverted Watercourse
	Proposed
	Abandoned Sewer

- 6) The text appearing alongside a sewer line indicates the internal diameter of the pipe in millimetres. Text next to a manhole indicates the manhole reference number and should not be taken as a measurement. If you are unsure about any text or symbology present on the plan, please contact a member of Property Insight on 0845 070 9148.

APPENDIX D

MICRODRAINAGE OUTPUTS

ICP SUDS Input (FSR Method)		Results
Return Period (Years)	100	QBAR rural (l/s)
Area (ha)	0.022	
SAAR (mm)	700	QBAR urban (l/s)
Soil	0.150	
Growth Curve	(None)	

Partly Urbanised Catchment (QBAR)
 Urban: 0.000
 Region: Region 6

Quick Storage Estimate

Variables

Results

Design

Overview 2D

Overview 3D

Vt

Variables

FSR Rainfall
▼

Return Period (years)
100

Region
England and Wales ▼

Map
M5-60 (mm) 18.800

Ratio R
0.400

Cv (Summer)
0.750

Cv (Winter)
0.840

Impermeable Area (ha)
0.022

Maximum Allowable Discharge (l/s)
2.0

Infiltration Coefficient (m/hr)
0.00000

Safety Factor
2.0

Climate Change (%)
40

Enter Area between 0.000 and 999.999

Quick Storage Estimate

Variables

Results

Design

Overview 2D

Overview 3D

Vt

Results

Global Variables require approximate storage of between 4.3 m³ and 7.8 m³.

These values are estimates only and should not be used for design purposes.

Enter Area between 0.000 and 999.999