



Stage 2 Flood Risk Assessment

Wellesley Court, Fitzalan Road, Littlehampton

West Sussex BN17 5JW

Client

M&M Property Investment Ltd

157 Dorset Road

Wimbledon

SW19 3EQ

Ref: 11514A

Date: March 2022

Consulting Engineers

GTA Civils Ltd

Gloucester House

66a Church Walk

Burgess Hill

West Sussex RH15 9AS

Index

1	Introduction	2
2	Existing Site & Flood Risk Profile	3
3	Proposed Development & Mitigation	5
4	Sustainable Surface Water Drainage Design	7

Schedule of Appendices

A	Site Location Map & Aerial Photo
B	Environment Agency Flood Data & Groundwater Maps
C	SFRA Maps
D	Topographic Survey, Sewer Records & Proposed Scheme Drawings
E	MicroDrainage Calculation Sheets

Annex

Flood Risk Management Plan

Issue	Issue date	Compiled	Checked
Preliminary Issues	08 March 2022	JP	MR
First Issue	11 March 2022	JP	MR

1 Introduction

- 1.1 This Stage 2 FRA report has been prepared for M&M Property Investment Ltd in relation to the proposed development at Wellesley Court, Fitzalan Road, Littlehampton, West Sussex BN17 5JW. No responsibility is accepted to any third party for all or part of this study in connection with this or any other development.
- 1.2 GTA Civils & Transport Limited was appointed by the client to provide a Flood Risk Assessment (FRA) as required by the Environment Agency and Arun District Council in order to achieve Planning Approval at said property.
- 1.3 This report will take the form of a formal Flood Risk Assessment in accordance with the 2021 National Planning Policy Framework (NPPF) and the current Planning Practice Guidance (PPG). Arun's Core Policies W DM2 "Flood Risk" and W DM3 "Sustainable Urban Drainage Systems" have been studied and complied with.

2 Existing Site & Flood Risk Profile

- 2.1 The application site is located in Littlehampton, which is administered by Arun District Council (ADC). The site comprises of Wellesley Court, a large residential building divided into 10 apartments, with hardstanding car parking to the north and a private landscaped garden to the south. A site location map and aerial view are shown in Appendix A. Vehicular access is from Selborne Road at the NE corner of the site.
- 2.2 Topography: a topographic survey is shown in Appendix D. The site's external levels range between 2.91m AOD and 2.34m AOD. The lower of the 2 building threshold levels is 2.99m AOD.
- 2.3 Hydrology: the site is approximately 630m north of the English Channel. The River Arun, originating near Horsham, flows broadly southwards passing the site approximately 800m to the west before depositing into the English Channel. The River Arun continues to be tidal 25 miles upstream from the sea. Located approximately 590m to the WSW of the site is the Oyster Pond.
- 2.4 Geology: the site's solid geology is Lewes Nodular Chalk, Seaford Chalk, Newhaven Chalk, Culver Chalk and Portsdown Chalk Formations. This solid bedrock is overlain by a stratum of Raised Beach Deposits (sand and gravel). Both of these should provide at least a reasonably high soakage rate and so it is assumed that the current surface water network is routed to one or more soakaways.
- 2.5 Existing Sewers: Southern Water's sewer records show a 300mm combined surface water and foul sewer flowing south below Fitzalan Road – refer to Appendix D. Near the site's access on Selborne Road a 225mm combined sewer (head of run) flows east. The site is also served by a 225mm dia storm sewer that flows southwards to the west.
- 2.6 Coastal/Tidal flooding: the EA's fluvial flood map in Appendix B indicates that the site is in Flood Zone 3 (FZ3), 'High Risk' of tidal flooding. Tidally affected sites in FZ3 are liable to flood with an annual expectation of over 0.5% (greater than once every 200 years on average).
- 2.7 The EA has provided modelled outputs (levels and depths) for both the undefended and defended scenarios. The undefended scenario is considered largely superfluous given the fact that flood defences are in situ for the foreseeable future. A model that assumes no defences place is unrealistic.
- 2.8 The EA defines the site as lying in FZ3, which is coastal / tidal land with a 0.5% AEP (1 in 200 years) (2115) defended Tidal. The EA has provided modelled flood levels for three nodes within the site. Node #2 is within the existing unit while #1 lies near to the north boundary and #3 is to the south. The 0.5% 2115 defended scenario level for node 2 is **3.51m AOD**, this being **0.52m** above the lower building threshold of 2.99m AOD.

- 2.9 The 2012 SFRA includes various flood maps (see Appendix C). The site is liable to flood from Residual Defended Tidal Flood Risk and within the area susceptible to 2056 Climate Change Tidal Flooding. These 2 flood patterns tie in with the EA's more recent modelling, namely the defended 0.5% 2115 scenario. The site is liable to flood in the SFRA Breach flood scenario – refer to the 3rd map in Appendix C. Note that this study is from before 2012 and so is considered to be very old. Only the breach modelling has much validity – solely because there is no more recent breach modelling for this area available in the public domain.
- 2.10 Surface water flooding: this occurs when excess rainwater does not infiltrate into the ground or is not intercepted. The EA's Online 'Surface Water Depth - Low Risk Scenario' (1 in 1000 years) Flood Map (in Appendix B) shows the garden to the south of the site is susceptible to flooding below 300mm and in some parts between 300mm and 900mm. The area in the northeast near the access is liable to flood below 300mm. As neither of these patterns coincide with the 2 areas of developed building (new units and extension) this can be ignored.
- 2.11 Artificial sources: flooding from reservoirs, canals and docks. The EA's Reservoirs Flood Map in Appendix B shows that the site is clear from the risk of flooding from this source.
- 2.12 Historic: the site is removed from affected areas of recorded flood incidents – according to the EA's Historic Flood Map in Appendix B.
- 2.13 Groundwater: the site overlies a 'Medium' aquifer (with soluble rock risk); it is located outside all Groundwater Source Protection Zones – refer to EA's maps in Appendix B. The Chalk stratum may pose a risk of gulling (soluble rock) and the Site Investigation (in due course) will contain more advice on this matter.
- 2.14 In conclusion, the flood risk profile of this site is 'High', due to the risk of flooding in the defended 0.5% + CC scenario (from the tidal River Arun). The predicted internal flood depth in the critical storm is **0.52m**.

3 Proposed Development & Mitigation

- 3.1 The proposed development is to extend the block of flats to the north, with 3 no' new 3-storey townhouses. A small extension is proposed at the SE corner of the building, too. The proposed scheme drawings are shown in Appendix D.
- 3.2 As summarised in section 2.14 above, the flood risk profile of the building is 'High'. Both the building and external areas are liable to flood in the critical 2115 '1 in 200 years' storm event.
- 3.3 Vulnerability and the Sequential Test: the vulnerability classification of any new development should be considered. According to Table 2 of the NPPF, dwelling units are rated as 'More Vulnerable'. With the extension, there is an increase in scale, ie there will be 3 additional family units on this site.
- 3.4 Table 3 of the NPPF states that More Vulnerable uses, such as dwellings, must pass the Sequential and/or Exception Tests in FZ3A. This procedure is outside the remit of this report. Figure 1 below shows this table:

Table 3: Flood risk vulnerability and flood zone 'compatibility'

Flood risk vulnerability classification (see table 2)		Essential infrastructure	Water compatible	Highly vulnerable	More vulnerable	Less vulnerable
Flood zone (see table 1)	Zone 1	✓	✓	✓	✓	✓
	Zone 2	✓	✓	Exception Test required	✓	✓
	Zone 3a	Exception Test required	✓	✗	Exception Test required	✓
	Zone 3b functional floodplain	Exception Test required	✓	✗	✗	✗

Key: ✓ Development is appropriate.
 ✗ Development should not be permitted.

Notes to table 3:

This table does not show:

- the application of the Sequential Test which guides development to Flood Zone 1 first, then Zone 2, and then Zone 3;
- flood risk assessment requirements; or
- the policy aims for each flood zone.

Figure 1: Table 3 of the NPPF

- 3.5 Sequential Testing procedures lie outside GTA's skillset. This report demonstrates that the developed site will be safe, ie this passes the second part of the Exception Test.

- 3.6 For full compliance of flood risk policies, new buildings' (habitable accommodation) floor levels must be set at least 0.3m above the critical flood level over its expected lifetime. The existing ground floor's level is set and both extensions' floor level shall be set at **3.51m AOD**. Setting these to **3.81m AOD** was considered - but the level difference was such that compliance with Building Regulations Parts K and M would not have been possible. No bedrooms are proposed on the ground floor – these are all on the upper 2 levels.
- 3.7 Additional flood mitigation is proposed to mitigate the flood risk. Flood Resistance in the form of passive flood barriers is proposed in front of each external door. 0.3m (minimum height) barriers are proposed in front of each external door to the extensions. These barriers rise only when the pressure of flood water pushes them up. These work even when there are no personnel around, eg at night or when the houses are vacant.
- 3.8 Safe Access To Dry Land: In order to comply with the NPPF, all occupants must be able to make their way, unassisted by the Emergency Services, to dry land. This is known as 'safe access to dry land' and it does not have to be dry, just not *hazardous* (safe).
- 3.9 The access/egress of the site are liable to flood to depths of over 0.7m. This would be hazardous to all users, whether able bodied or not. Because the flood threat is tidal and because there is refuge at high level, it is contended that occupants can reside safely at high level for the brief predicted duration of such a tidal flood. A Flood Risk Management Plan has been drafted to raise the awareness of flooding at this site.

4 Sustainable Surface Water Drainage Design

4.1 CIRIA's SuDS hierarchy has been applied here to determine how the development's surface water should be dealt with, this being:-

- Infiltration to ground, namely features such as soakaways, infiltration trenches and the like;
- Discharging to a watercourse;
- Discharging to a public sewer.

4.2 Infiltration may be possible here due to the gravels and chalk geology. It is requested that soil soakage testing be deferred to post-planning by way of a planning condition. It is contended that – as there is a nearby public storm sewer – there is a viable alternative route for discharging the development's surface water that does not rely on infiltration.

4.3 Porous paving will be used here. It is proposed to route the surface water from the new unit's roof to porous paved hardstanding (parking and turning) to the east – and from the extension's roof to the south under the garden. The pavings' sub-base will consist of coarse granular fill – with 0.3 voids ratio.

4.4 An assumed – conservative – soakage rate of 5×10^{-6} m/s has been used to size the paved areas' sub-base layers. The drainage layout in Appendix D shows the main porous paved area, whose dimensions are approx. $242\text{m}^2 \times 0.65\text{m}$ deep will store 47.2m^3 . The trench soakaway will be $26\text{m}^2 \times 0.40\text{m}$ deep (storing 3.12m^3). These are both greater than the volumes needed: Micro Drainage calculation sheets in Appendix E show these are 28.5m^3 and 2.8m^3 respectively.

4.5 Exceedance flows: any flow in exceedance of the design event or following the silting up of either of the soakaways will be southwards in the garden and northeast at the NE corner (as there will be a fall from 2.8m at the south end). Note that there is 18.7m^3 extra volume in the paved area, in any case, which will be more than necessary to hold the volume in the 1000 years storm.

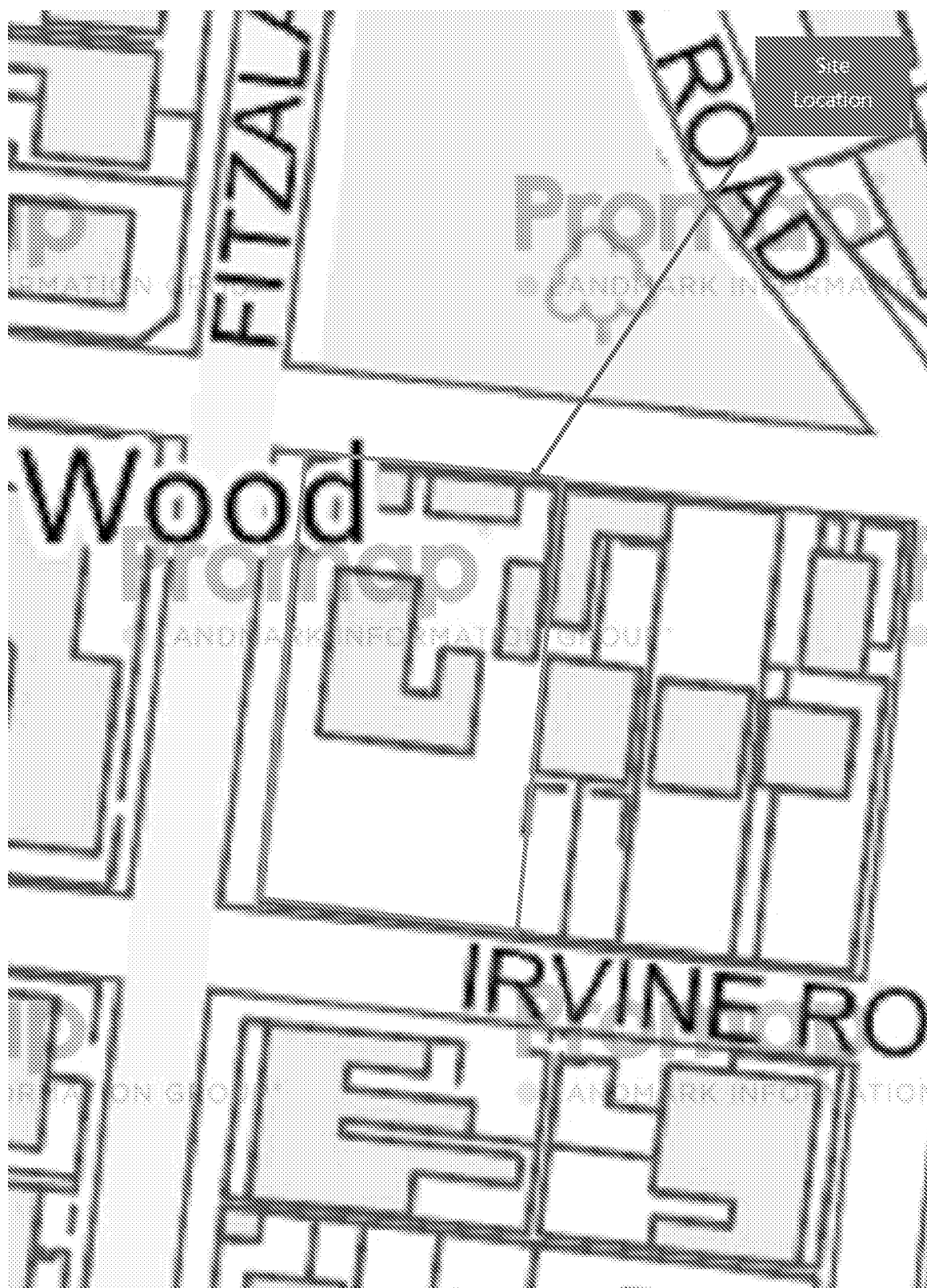
4.6 Maintenance of the SuDS network will remain the responsibility of the applicant. Maintenance responsibilities for the drainage system are likely to be contracted out to an estate management company. The schedules for reviewing all the components will be set up in line with established best practice and guidance documents including The SuDS Manual (CIRIA C753, 2015) - plus other resources available at the susdrain website (www.susdrain.org).

4.7 Foul water drainage: the development's foul effluent is to be routed to the nearby public combined sewer next to the NE corner (namely MH ref 1604) – refer to the drainage strategy layout in Appendix D. This proposed connection will be subject to an application under Section 106 of the Water Industry Act - to Southern Water, as the owner of the sewerage network.

- 4.8 Conclusion: this proposed development will not increase the flood risk of this site – or that of neighbouring properties. It complies fully with the 2021 National Planning Policy Framework and current Planning Practice Guidance (PPG).

- End of Report -

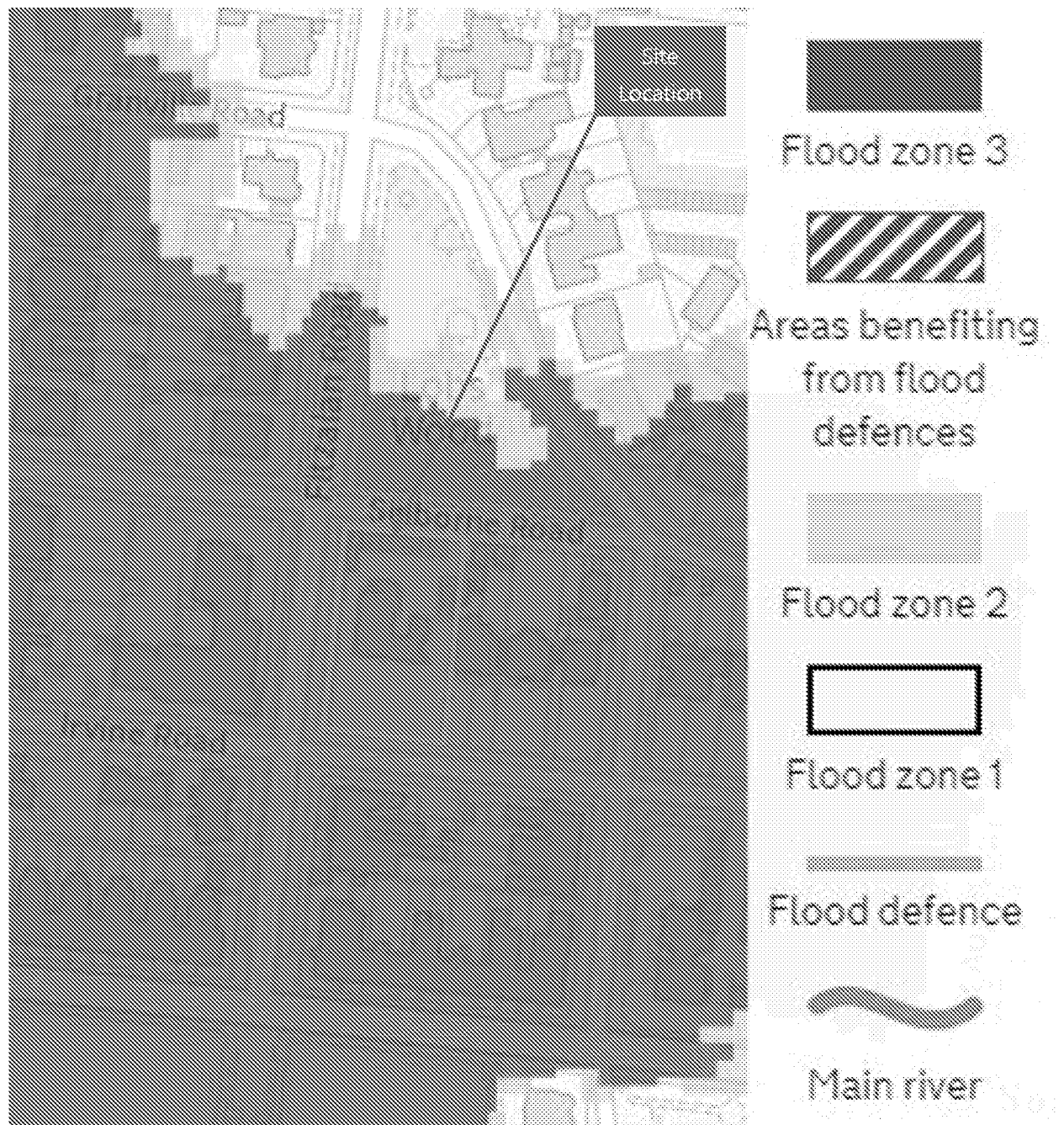
Site Location Map & Aerial Photo





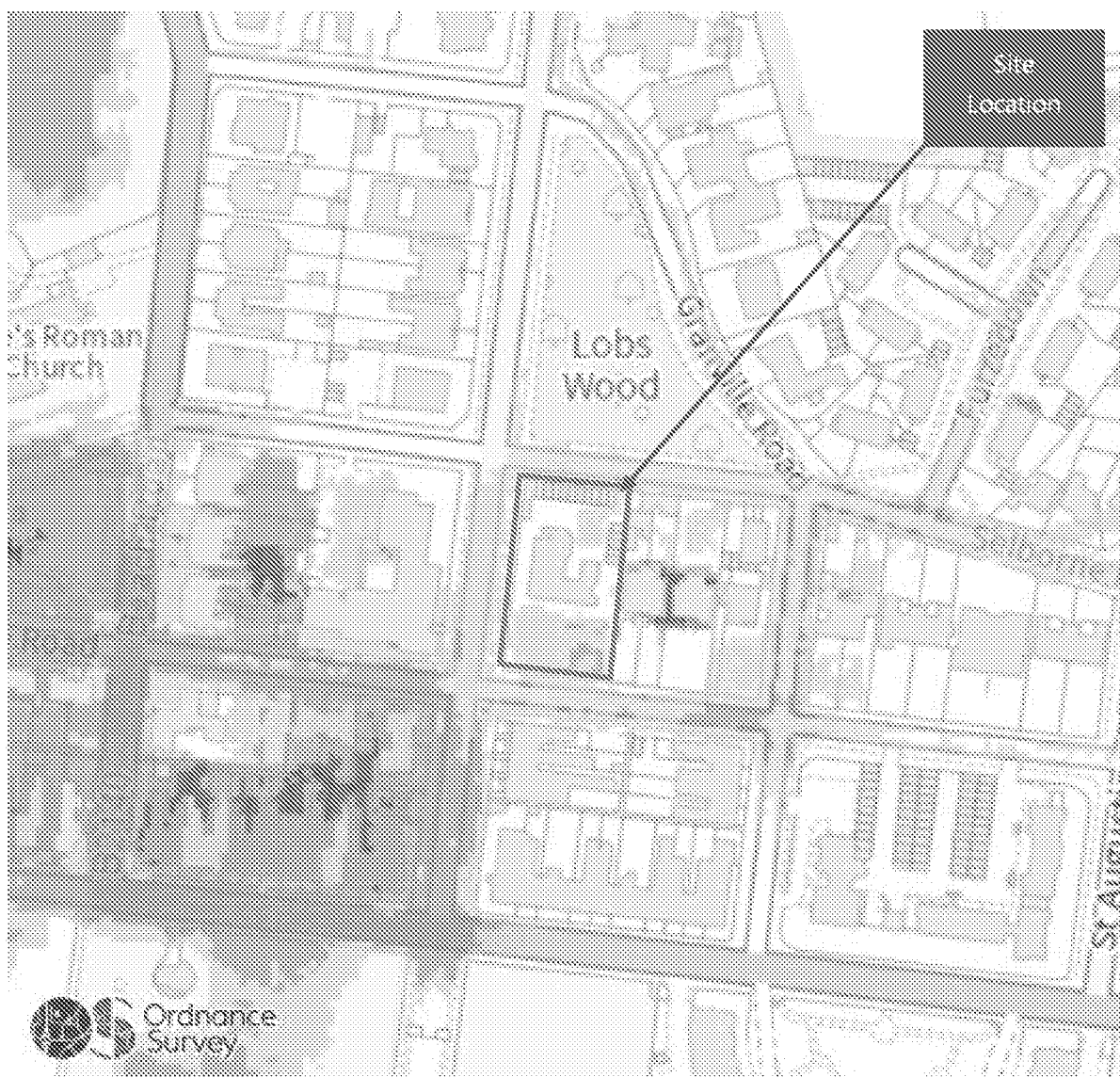
Appendix B

Environment Agency Flood Data & Groundwater Maps

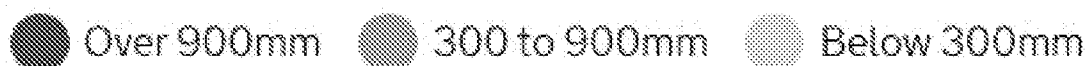


EA's Online Flood Map for Planning (Rivers and Seas)

The site is located in Flood Zone 3 (FZ3)



Surface water flood risk: water depth in a low risk scenario Flood depth (millimetres)



EA's Online Surface Water Flood Depth Map in a 'Low Risk Scenario' (1 in 1000 years storm event)

The garden area in the south of the site is susceptible to flooding below 300mm and in some parts between 300mm and 900mm. The area in the northeast near the access is liable to flood below 300mm

Name	Product 4
Description	Detailed Flood Risk Assessment Map for Wellesley Court, Fitzalan Road, Littlehampton, BN17 5JW.
Licence	<u>Open Government Licence</u>
Information Warnings	The flood risk data provided is based on existing EA hydraulic models for existing 0.5% annual probability events with an allowance for climate change. Please note the climate change allowances provided are not up to date. These were updated on 17 December 2019. You should refer to '<u>Flood risk assessments: climate change allowances</u>' for the most up to date allowances. You will need to undertake further assessment of future flood risk using different allowances to ensure your assessment of future flood risk is based on best available evidence.
Information Warning - OS background mapping	<i>The mapping of features provided as a background in this product is © Ordnance Survey. It is provided to give context to this product. The Open Government Licence does not apply to this background mapping. You are granted a non-exclusive, royalty free, revocable licence solely to view the Licensed Data for non-commercial purposes for the period during which the Environment Agency makes it available. You are not permitted to copy, sub-license, distribute, sell or otherwise make available the Licensed Data to third parties in any form. Third party rights to enforce the terms of this licence shall be reserved to OS.</i>
Attribution	Contains Environment Agency information © Environment Agency and/or database rights. Contains Ordnance Survey data © Crown copyright 2021 Ordnance Survey 100024198.

Data Available Online

Many of our flood datasets are available online:

- Flood Map For Planning ([Flood Zone 2](#), [Flood Zone 3](#), [Flood Storage Areas](#), [Flood Defences](#), [Areas Benefiting from Defences](#))
- [Risk of Flooding from Rivers and Sea](#)
- [Historic Flood Map](#)
- [Current Flood Warnings](#)

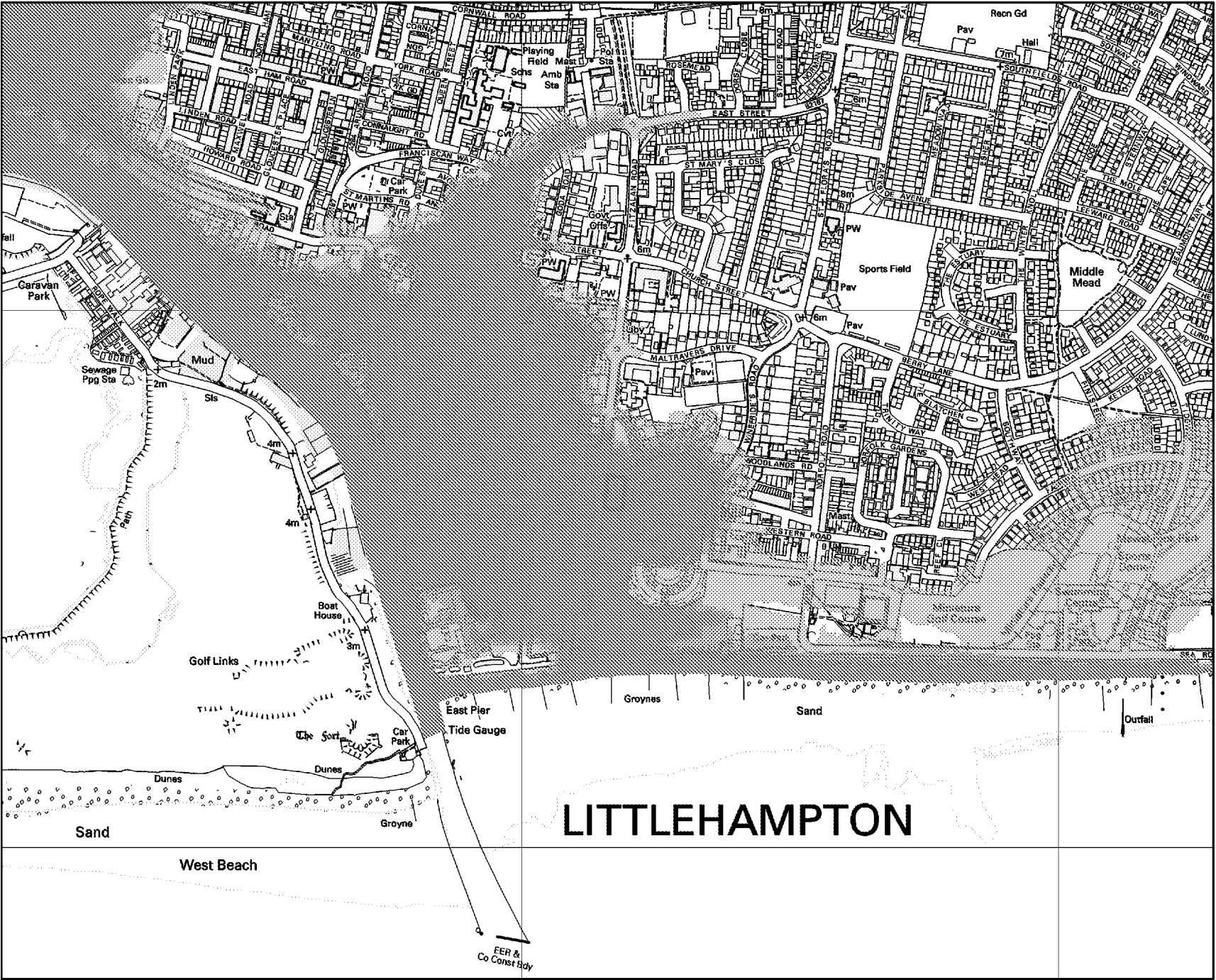
Please get in touch if you have any further queries or contact us within two months if you'd like us to review the information we have sent.

Yours sincerely,

Edward Conway

Partnership & Strategic Overview - West Sussex

Environment Agency, Guildbourne House, Chatsworth Road, Worthing, West Sussex, BN11 1LD

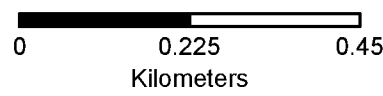


Legend

- Site Boudary
- 0.5% AEP (2012) (Undefended)
- 0.5% AEP (2070) (Undefended)
- 0.5% AEP (2115) (Undefended)
- 0.1% AEP (2012) (Undefended)

Annual Exceedance Probability (AEP) The probability of a flood of a particular magnitude, or greater occurring in any given year.

Scale: 1:10,000





Environment
Agency



N

Legend

-  Site Boundary
-  0.5% AEP Defended Tidal
-  0.5% AEP (2065) Defended Tidal
-  0.5% AEP (2115) Defended Tidal
-  0.1% AEP Defended Tidal

Annual Exceedance Probability (AEP) The probability of a flood of a particular magnitude, or greater occurring in any given year.

Scale: 1:10,000



0 0.225 0.45
Kilometers



Environment
Agency

N



Legend

 Site Nodes

 Site Boundary

Annual Exceedance Probability (AEP) The probability of a flood of a particular magnitude, or greater occurring in any given year.

Scale: 1:1,000

0

0.0225

0.045

Kilometers



Product 4 Flood Risk Data Requested by: GTA Civils Ltd.

Site: Wellesley Court, Fitzalan Road, Littlehampton, BN17 5JW

Table 1: Water Levels: Tidal Undefended

Node Ref	NGR		Modelled Flood Levels in Metres AOD			
	Eastings	Northings	Undefended Annual Exceedance Probability			
			0.5%	0.5% (2065)	0.5% (2115)	0.1%
1	503172	101686	3.73	4.35	4.96	4.05
2	503170	101664	3.73	4.35	4.96	4.05
3	503169	101664	3.73	4.35	4.96	4.05

Table 2: Water Levels: Tidal Defended

Node Ref	NGR		Modelled Flood Levels in Metres AOD			
	Eastings	Northings	Defended Annual Exceedance Probability			
			0.5%	0.5% (2065)	0.5% (2115)	0.1%
1	503172	101686	-	-	3.48	-
2	503170	101664	-	-	3.51	-
3	503169	101664	-	-	3.53	-

Table 3: Water Depths: Tidal Undefended

Node Ref	NGR		Modelled Flood Depths in Metres			
	Eastings	Northings	Undefended Annual Exceedance Probability			
			0.5%	0.5% (2065)	0.5% (2115)	0.1%
1	503172	101686	1.01	1.63	2.23	1.33
2	503170	101664	1.04	1.66	2.26	1.36
3	503169	101664	1.42	2.04	2.64	1.74

Table 4: Water Depths: Tidal Defended

Node Ref	NGR		Modelled Flood Depths in Metres			
	Eastings	Northings	Defended Annual Exceedance Probability			
			0.5%	0.5% (2065)	0.5% (2115)	0.1%
1	503172	101686	-	-	0.76	-
2	503170	101664	-	-	0.81	-
3	503169	101664	-	-	1.21	-

All levels taken from: Arun to Adur Coastal Modelling (2012) with updated defended modelling (2017)

Produced on: 21/07/2021

There is no additional information or health warnings for these levels/depths or the model from which they have been produced.



Recorded Flood Outlines. Centred BN17 5JW. Created 21/07/2021.

Legend

 All recorded flood outlines



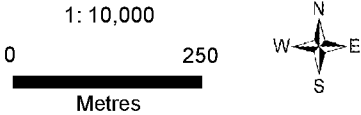
1: 10,000

0 250
Metres



Legend

 Please see page 2 for asset
symbology



Structures

-  Control Gate
-  Draw Off Tower
-  Fish Pass
-  Hydrobrake
-  In Channel Stoplogs
-  Inspection Chamber
-  Jetty
-  Outfall
-  Screen
-  Spillway
-  Stilling Basin
-  Weir

Beach Structures

-  Breakwater
-  Ramp
-  Slipway
-  Steps
-  Groyne

Instruments

-  Active Monitoring
-  Passive Monitoring

Channel Crossings

-  Bridge
-  Utility Services

Aids to Navigation

-  Beacon
-  Buoy
-  Dolphin
-  Signage
-  Signal

Building Assets

-  Pump House

Major Civils

-  Abutment
-  Central Pier

Defences

-  Embankment
-  Wall
-  Flood Gate
-  Demountable defence
-  Bridge abutment
-  High Ground
-  Beach
-  Barrier Beach
-  Promenade
-  Quay
-  Cliff
-  Dunes

Channels

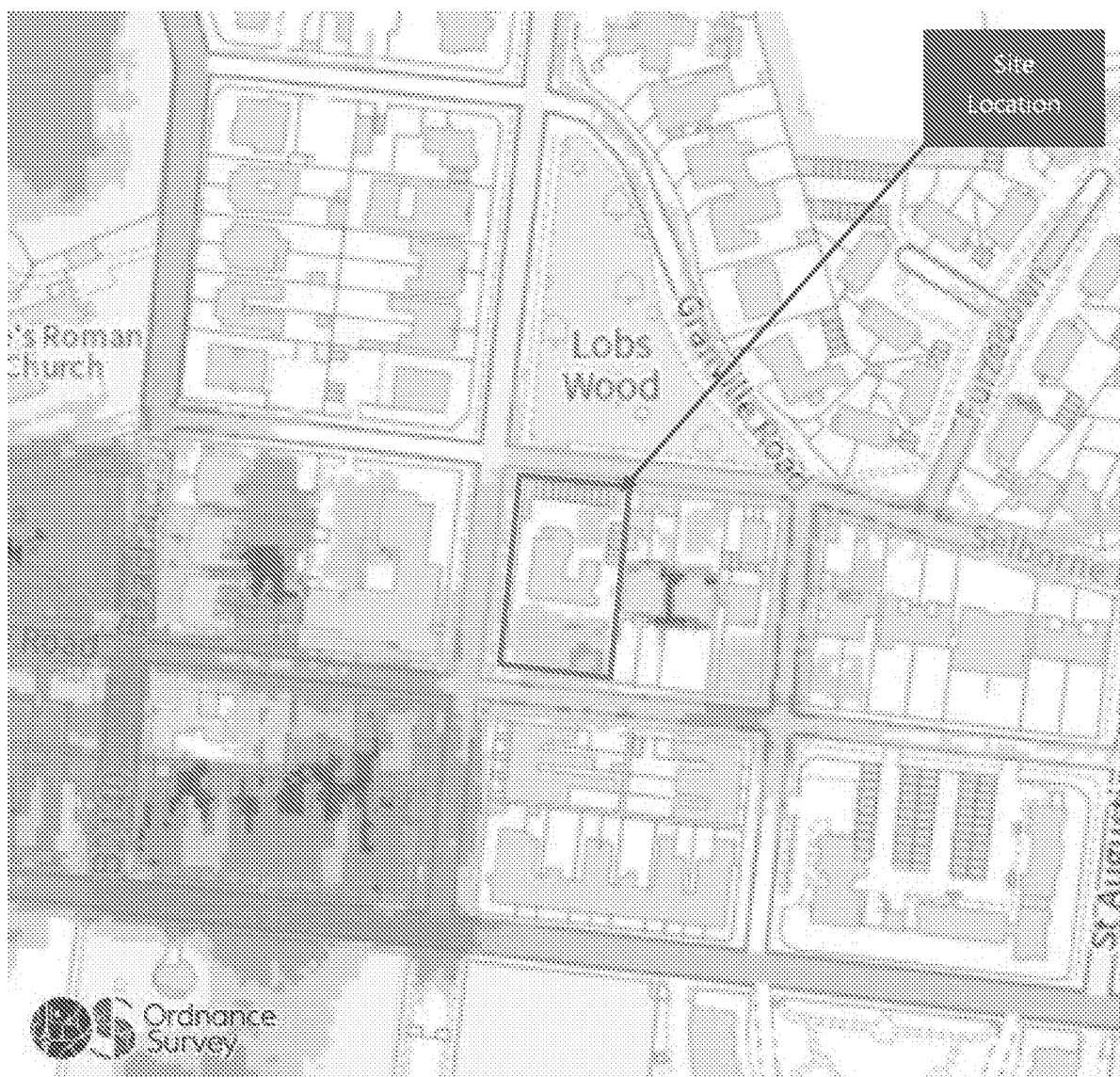
-  Open channel
-  Simple culvert
-  Complex culvert

Land

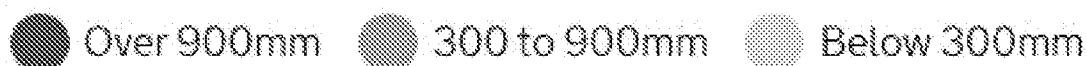
-  Mudflats
-  Saltmarsh
-  Washland

Sites

-  Amenity
-  Control Structure
-  Erosion Protection
-  General
-  Harbour
-  Monitoring
-  Navigation Lock
-  Pumping Station
-  Reservoir
-  Tidal Barrier

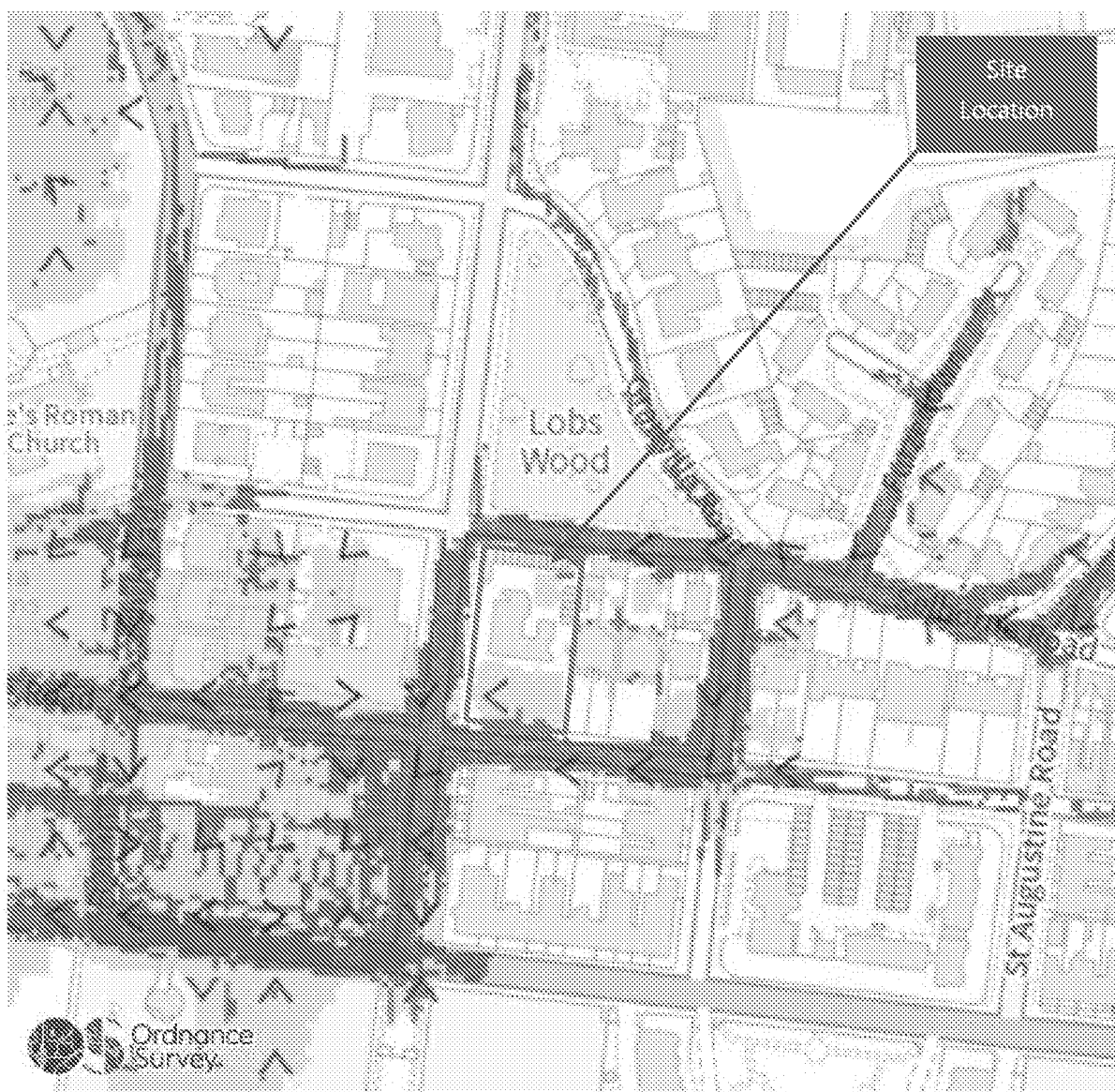


Surface water flood risk: water depth in a low risk scenario Flood depth (millimetres)



EA's Online Surface Water Flood Depth Map in a 'Low Risk Scenario' (1 in 1000 years storm event)

The garden area in the south of the site is susceptible to flooding below 300mm and in some parts between 300mm and 900mm. The area in the northeast near the access is liable to flood below 300mm



Surface water flood risk: water velocity in a low risk scenario
Flood velocity (metres/second)

● Over 0.25 m/s ● Less than 0.25 m/s ↖ Direction of water flow

EA's Online Surface Water Flood Velocity Map in a 'Low Risk Scenario'
(1 in 1000 years storm event)

The surface water flows west at a velocity of less than 0.25 m/s



Reservoir flood risk: flood water depth

Over 2m
 Between 0.3 and 2m
 Below 0.3m

EA's Online Flood Risk from Reservoirs – Flood Depth - Map

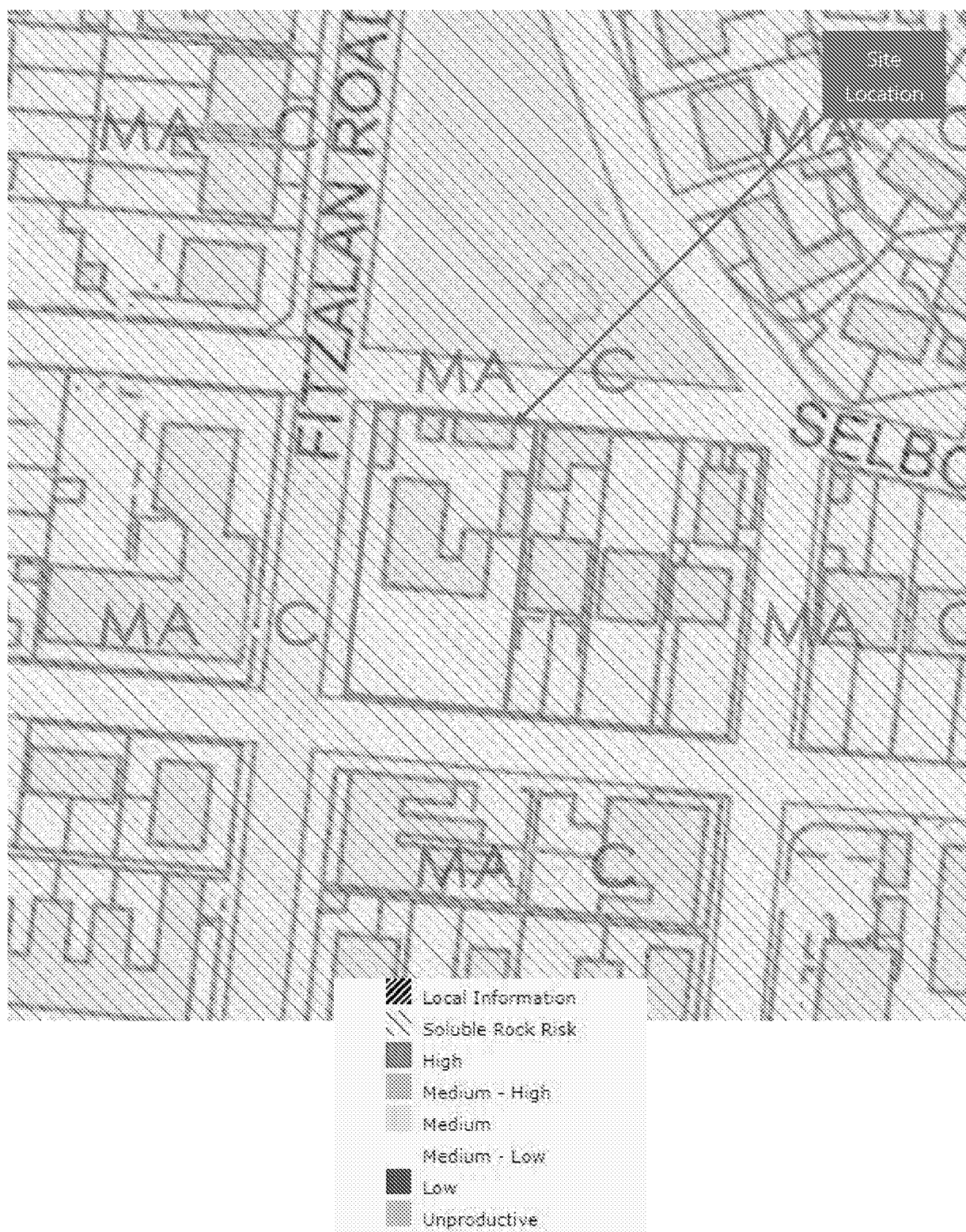
The site is clear from the risk of flooding from this source



Historic Flood Map

Environment Agency's Online Historic Flood Map

The site is removed from the nearest flood record



Environment Agency's Online Groundwater Vulnerability Zones Map

The site overlies a 'Medium' Zone with soluble rock risk



W:\Projects\11514 FRA, Corbiel, Wellesley Court, Fitzalan Road, Littlehampton, West
Sussex, BN17 5PW\2.3 Specifications & Reports\F. Flood Risk Assessments

Appendix C

SFRA Maps



"Actual and Residential Flooding from the Sea" Map

Residual Defended Tidal Flood Risk (0.1% AEP, 2006)



Legend



Arun District Boundary

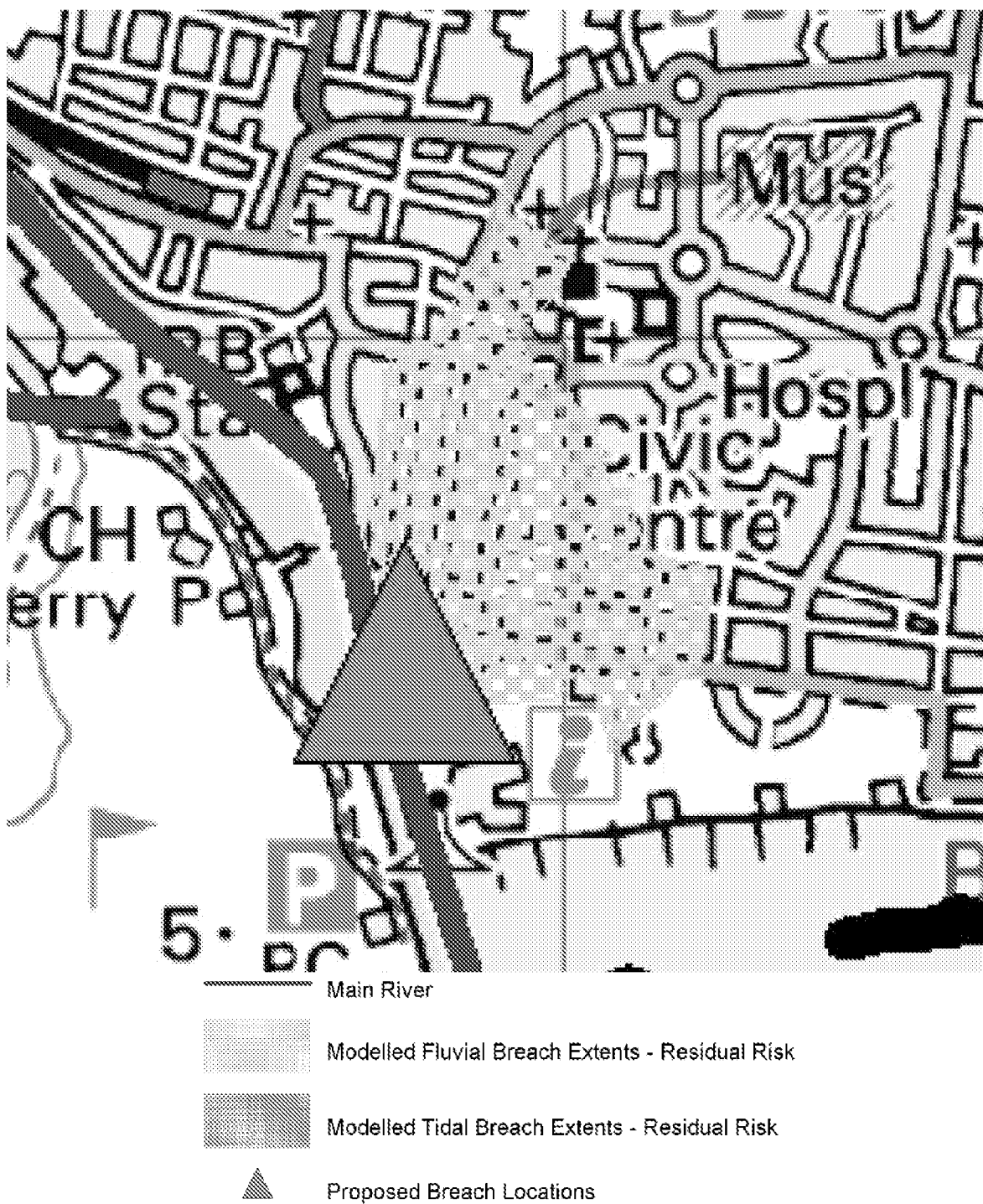
2056 Climate Change Tidal Flooding Extents (0.5% AEP, defended)

2106 Climate Change Tidal Flooding Extents (0.5% AEP, defended)

Coastal Risk Area

"Actual Sea Climate Change Extents (with defences)" Map

2056 Climate Change Tidal Flooding Extents (0.5% AEP, defended)



"Residual Risk from Breach" Map B

The site is liable to flood in this scenario

Appendix D

Topographic Survey, Sewer Records & Proposed Scheme Drawings



LEGEND

BANKING
Top
Bottom

BUSHES & HEDGES
Top
Bottom

MARSH
Top
Bottom

TREES
3T / 0.2 / 8
Top
Bottom

NOTE:-
SPREADS AND HEIGHTS ARE INDICATIVE ONLY

GATES
Top
Bottom

RETAINING WALL
Top
Bottom

SLOPING MASONRY
Top
Bottom

FENCE
Top
Bottom

WALL
Top
Bottom

BUILDING - SURVEYED
Top
Bottom

BUILDINGS - SURVEYED
Top
Bottom

BASIC DATA ONLY
Top
Bottom

OPEN SIDED BUILDING
Top
Bottom

GLASS ROOFED
Top
Bottom

CONTOURS
Top
Bottom

OVERHEAD WIRES
Top
Bottom

ABBREVIATIONS (WHERE APPLICABLE)

AIR VALVE	AV	MARKER	MH
SED LEVEL	SL	MARKER	MKR
BELISHA BEACON	BB	NOTICE BOARD	NB
BOLLARD	B	NAME PLATE	NP
BRITISH TELECOM BOX	BTB	OVERHEAD WIRES	OHV
BRITISH TELECOM MANHOLE	BTMH	PARKING METER	PM
BRICKWORK	BWK	RIDGE LEVEL	RD
BUS STOP	BS	RODGING EYE	RE
CABLE TV	CTV	RODGING EYE	RE
COVER LEVEL	CL	RETAINING WALL	RTW
CABLE MARKER	CM	SLUICE VALVE	SV
CONCRETE POST	CP	STOP COCK	SC
DOWN PIPE	DP	SOFFIT LEVEL	SOF
DROP KERB	DK	SPOT LEVEL	SL
EAVES LEVEL	EA	STRUCTURAL SLAB LEVEL	SSL
ELECTRICITY CABLE PIT	ELCP	STATION	STN
ELECTRICITY CONTROL BOX	ECB	TREE STUMP	TS
ELECTRICITY POLE	EP	TELEGRAPH POLE	TP
EARTH ROD	ER	TELEPHONE CALL BOX	TCB
FIRE HYDRANT	FH	TOP OF KERB	TK
FLOWER BED	FB	TURNSTILE	TS
FOOTPATH	FP	TRAFFIC LIGHT	TL
FLOOR LEVEL	FL	TOP OF WALL	TW
FLAG STAFF	FS	UNDERGROUND	UG
GAS VALVE	GV	UNABLE TO LIFT	UTL
GATE STOP	GS	UNABLE TO SURVEY	UTS
GULLY	G	VENT PIPE	VP
GULLY OUTLET	GO	WATER LEVEL	WL
INSPECTION COVER	IC	WATER METER	WM
INVERT LEVEL	IL	WASH OUT	WO
LAMP POST	LP	WASTE PIPE	WP
LETTER BOX	LB	WATER VALVE	WV

BUILDING

ACCESS HATCH	AH	WINDOW CILL LEVEL	WCL
ARCH HEAD HEIGHT	AHH	WINDOW HEAD LEVEL	WHL
ARCH HEAD LEVEL	AHL	SKYLIGHT	SL
ARCH SPRINGER HEIGHT	ASH	SOIL AND VENT PIPE	SVP
ARCH SPRINGER LEVEL	ASL	THRESHOLD LEVEL	THL
BEAM	BE	WASH BASIN	WB
BEAM HEIGHT	BH	WATER TANK	WT
BEAM HEAD LEVEL	BHL		
BEAM SOFFIT LEVEL	BSL		
COLUMN	COI		
CILL TO HEAD	C-H		
CEILING LEVEL	CL		
DOOR HEAD	DH		
DOOR HEAD LEVEL	DHL		
FIRE ALARM	FA		
FLOOR TO CILL	F-C		
FALSE CEILING	FC		
FLOOR TO CEILING HEIGHT	FCL		
FINISHED FLOOR LEVEL	FFL		
HOSE REEL	HR		
IRON RAILING	IRL		
RADIATOR	Rad		
RAIN WATER PIPE	RWP		

FENCES

BARBED WIRE FENCE	BWF
CORRUGATED IRON FENCE	CIF
CLOSE BOARD FENCE	CBF
CHAIN LINK FENCE	CLF
CHESTNUT PALING FENCE	CPF
FENCE POST	FP
INTERWOVEN FENCE	IF
IRON RAILING FENCE	IRF
LARCH LAP FENCE	LLF
MISCELLANEOUS FENCING	Misc F
PALISADE FENCE	PF
POST AND CHAIN FENCE	PCF
POST AND RAIL FENCE	PRF
POST AND WIRE	PWF
TUBULAR STEEL RAIL	TSRF
WIRE MESH FENCE	WMF

(Concrete Post/Steel Post/Timber Post) (CP/SP/TP)

ARCHIDATA LTD ARE FULL MEMBERS OF THE UK LAND AND HYDROGRAPHIC SURVEY ASSOCIATION LTD (Member No. 208)

THE SURVEY ASSOCIATION
FULL MEMBER

VISIT OUR WEBSITE AT
www.archidata.co.uk OR
SCAN OUR QR CODE HERE

NOTES

- The Survey Grid is on Ordnance Survey Level & Grid.
- Fences shown are not necessarily legal boundaries.
- Dimensions shown are not scaled. All dimensions should be checked on site before any fabrication / construction.
- All drainage connections shown are sounded only. They have not been water tested.
- Copyright of all data produced by ARCHIDATA shall remain with ARCHIDATA unless otherwise specifically agreed.
- Information provided should not be altered or modified in any way. It should not be used for any purpose other than for which it was intended and should not be issued to other parties without prior agreement of ARCHIDATA.
- ARCHIDATA cannot accept responsibility for any damage to computer systems which may result from viruses which may be contained in the data provided.
- Preliminary data is generally unchecked therefore it is not guaranteed.
- If the AutoCAD drawing is being read by any system other than AutoCAD it should be checked against a hard copy. ARCHIDATA cannot accept liability for omissions.
- The tree species have been identified to the best of the surveyors knowledge. They have not been verified by an Arboriculturist and are not guaranteed. If they are important they should be verified. Tree heights are estimated. Trees have been shown diagrammatically (i.e. circular), however, their true shape in plan will be different.
- Some CAD layers exists with additional information which are turned off.
- This survey has been carried out to an accuracy consistent scale of 1:100; therefore interrogated dimensions will be within the tolerance associated with this scale. The same accuracies implied by the plotingscale are equally applicable to digital data supplied for CAD. The scale of this drawing should not be changed without permission.

Note:
Survey is based on OS grid and datum about Station TN10 (value 2.811) shown ringed in red.

REV	DATE	BY	AMENDMENT

SURVEY

archidata
specialist land and building surveyors

THE DESIGN STUDIO
94 HIGH STREET, STEYNING
WEST SUSSEX BN44 3RD

TEL: (01903) 863225
MOB: (07762) 146343
info@archidata.co.uk
www.archidata.co.uk

CLIENT
Krona Design

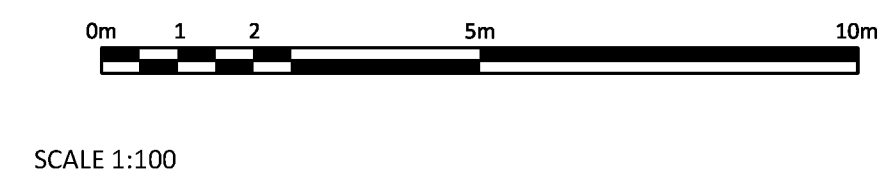
JOB TITLE
Wellesley Court
Fitzalan Road
Littlehampton

DRAWING TITLE
Topographical Survey
Sheet 1 of 2

DATE	SCALE-A1 SHEET	DRAWN BY
03.06.21	1:100	TN
		CHECKED RM

JOB NO.	DRAWING NO.	REVISION
AD21016	1.01	

PRELIMINARY



TOPOGRAPHICAL SURVEY

PRELIMINARY



SCALE 1:100

TOPOGRAPHICAL SURVEY

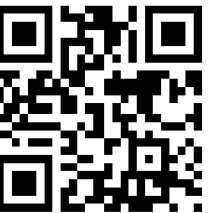
PRELIMINARY

LEGEND	
BANKING	
BUSHES & HEDGES	
MARSH	
TREES	
NOTE:-	
GATES	
RETAINING WALL	
ABBREVIATIONS	
SLOPING MASONRY	
FENCE	
WALL	
BUILDING - SURVEYED	
BUILDING - SURVEYED BASIC DATA ONLY	
OPEN SIDED BUILDING	
GLASS ROOFED	
CONTOURS	
OVERHEAD WIRES	
ABBREVIATIONS (WHERE APPLICABLE)	
AIR VALVE	
BED LEVEL	
BELISHA BEACON	
BOLLARD	
BRITISH TELECOM BOX	
BRITISH TELECOM MANHOLE	
BRICKWORK	
BUS STOP	
CABLE TV	
COVER LEVEL	
CABLE MARKER	
CONCRETE POST	
CROWN PIPE	
DROP KERB	
EAVES LEVEL	
ELECTRICITY CABLE PIT	
ELECTRICITY CONTROL BOX	
ELECTRICITY POLE	
EARTH ROD	
FIRE HYDRANT	
FLOWER BED	
FOOTPATH	
FLOOR LEVEL	
FLAG STAFF	
UNDERGROUND	
UNABLE TO LIFT	
UNABLE TO SURVEY	
VENT PIPE	
WATER LEVEL	
WATER METER	
WASH OUT	
WASTE PIPE	
WATER VALVE	
INVERT LEVEL	
LAMP POST	
LETTER BOX	
LAMP	
RAIN WATER PIPE	
MARKER	
NOTICE BOARD	
NAME PLATE	
OVERHEAD WIRES	
PARKING METER	
RIDGE LEVEL	
ROAD SIGN	
RODDING EYE	
RETAINING WALL	
SLUICE VALVE	
STOP COCK	
SOFFIT LEVEL	
SPOT LEVEL	
STRUCTURAL SLAB LEVEL	
STATION	
TREE STUMP	
TELEGRAPH POLE	
TELEPHONE CALL BOX	
TOP OF KERB	
TURNSTILE	
TRAFFIC LIGHT	
TOP OF WALL	
UNDERGROUND	
UNABLE TO LIFT	
UNABLE TO SURVEY	
VENT PIPE	
WATER LEVEL	
WATER METER	
WASH OUT	
WASTE PIPE	
WATER VALVE	
WINDOW CILL LEVEL	
WINDOW HEAD LEVEL	
SKYLIGHT	
SOIL AND VENT PIPE	
THRESHOLD LEVEL	
WASH BASIN	
WATER TANK	
BARBED WIRE FENCE	
CORRUGATED IRON FENCE	
CLOSE BOARD FENCE	
CHAIN LINK FENCE	
CHESTNUT PALING FENCE	
FENCE POST	
INTERWOVEN FENCE	
IRON RAILING FENCE	
LARCH LAP FENCE	
MISCELLANEOUS FENCING	
PALISADE FENCE	
POST AND CHAIN FENCE	
POST AND RAIL FENCE	
POST AND WIRE	
TUBULAR STEEL RAIL	
WIRE MESH FENCE	
MANHOLE	
NOTICE BOARD	
NAME PLATE	
OVERHEAD WIRES	
PARKING METER	
RIDGE LEVEL	
ROAD SIGN	
RODDING EYE	
RETAINING WALL	
SLUICE VALVE	
STOP COCK	
SOFFIT LEVEL	
SPOT LEVEL	
STRUCTURAL SLAB LEVEL	
STATION	
TREE STUMP	
TELEGRAPH POLE	
TELEPHONE CALL BOX	
TOP OF KERB	
TURNSTILE	
TRAFFIC LIGHT	
TOP OF WALL	
UNDERGROUND	
UNABLE TO LIFT	
UNABLE TO SURVEY	
VENT PIPE	
WATER LEVEL	
WATER METER	
WASH OUT	
WASTE PIPE	
WATER VALVE	
WINDOW CILL LEVEL	
WINDOW HEAD LEVEL	
SKYLIGHT	
SOIL AND VENT PIPE	
THRESHOLD LEVEL	
WASH BASIN	
WATER TANK	
BARBED WIRE FENCE	
CORRUGATED IRON FENCE	
CLOSE BOARD FENCE	
CHAIN LINK FENCE	
CHESTNUT PALING FENCE	
FENCE POST	
INTERWOVEN FENCE	
IRON RAILING FENCE	
LARCH LAP FENCE	
MISCELLANEOUS FENCING	
PALISADE FENCE	
POST AND CHAIN FENCE	
POST AND RAIL FENCE	
POST AND WIRE	
TUBULAR STEEL RAIL	
WIRE MESH FENCE	
(Concrete Post/Steel Post/Timber Post) (CP/SP/TP)	

ARCHIDATA LTD ARE FULL MEMBERS OF THE UK LAND AND HYDROGRAPHIC SURVEY ASSOCIATION LTD (Member No. 208)



VISIT OUR WEBSITE AT www.archidata.co.uk OR SCAN OUR QR CODE HERE



NOTES

- The Survey Grid is on Ordnance Survey Level & Grid.
- Fences shown are not necessarily legal boundaries.
- Dimensions should not be scaled. All dimensions should be checked on site before any fabrication / construction.
- All drainage connections shown are sounded only. They have not been water tested.
- Copyright of all data produced by ARCHIDATA shall remain with ARCHIDATA unless otherwise specifically agreed.
- Information provided should not be altered or modified in any way. It should not be used for any purpose other than for which it was intended and should not be issued to other parties without prior agreement of ARCHIDATA.
- ARCHIDATA cannot accept responsibility for any damage to computer systems which may result from viruses which may be contained in the data provided.
- Preliminary data is generally unchecked therefore it is not guaranteed.
- If the AutoCAD drawing is being read by any system other than AutoCAD it should be checked against a hard copy. ARCHIDATA cannot accept liability for omissions.
- The tree species have been identified to the best of the surveyors knowledge. They have not been verified by an Arboriculturist and are not guaranteed. If they are important they should be verified. Tree heights are estimated. Trees have been shown diagrammatically (i.e. circular), however, their true shape in plan will be different.
- Some CAD layers exists with additional information which are turned off.
- This survey has been carried out to an accuracy consistent scale of 1:100; therefore interrogated dimensions will be within the tolerance associated with this scale. The same accuracies implied by the plotingscale are equally applicable to digital data supplied for CAD. The scale of this drawing should not be changed without permission.

REV	DATE	BY	AMENDMENT
-----	------	----	-----------

SURVEY

archidata
specialist land and building surveyors

THE DESIGN STUDIO
94 HIGH STREET, STEYNING
WEST SUSSEX BN44 3RD

TEL: (01903) 863225
MOB: (07762) 146343
info@archidata.co.uk
www.archidata.co.uk

CLIENT
Krona Design

JOB TITLE
Wellesley Court
Fitzalan Road
Littlehampton

DRAWING TITLE
Topographical Survey
Sheet 2 of 2

DATE	SCALE-A1 SHEET	DRAWN BY
03.06.21	1:100	TN
		CHECKED RM

JOB NO.	DRAWING NO.	REVISION
AD21016	1.02	



(c) Crown copyright and database rights 2021 Ordnance Survey 100031673

Date: 21/07/21

Scale: 1:1250

Map Centre: 503168,101666

Data updated: 19/07/21

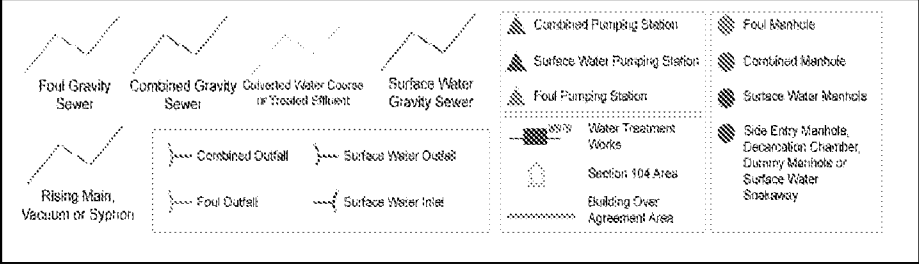
Our Ref: 603875 - 1

Wastewater Plan A3

The positions of pipes shown on this plan are believed to be correct, but Southern Water Services Ltd accept no responsibility in the event of inaccuracy. The actual positions should be determined on site. This plan is produced by Southern Water Services Ltd (c) Crown copyright and database rights 2021 Ordnance Survey 100031673. This map is to be used for the purposes of viewing the location of Southern Water plant only. Any other uses of the map data or further copies is not permitted.

WARNING: BAC pipes are constructed of Bonded Asbestos Cement.

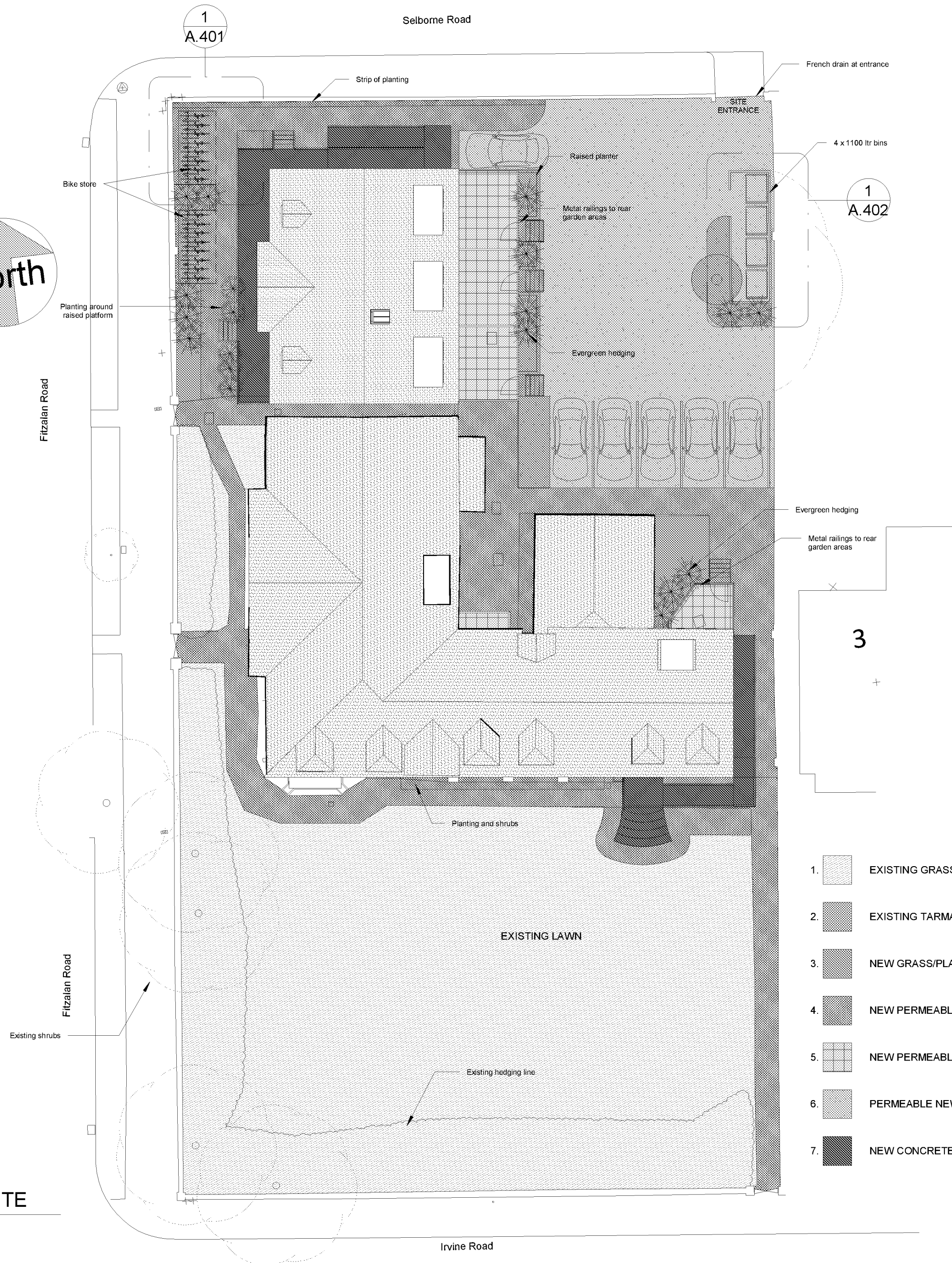
WARNING: Unknown (UNK) materials may include Bonded Asbestos Cement.



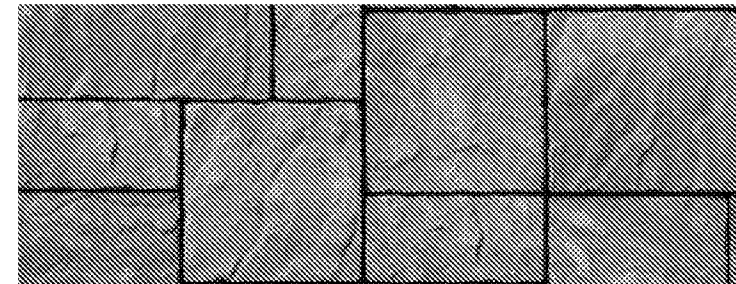
tjenkins@gtacivils.co.uk

11514/JP/TJ

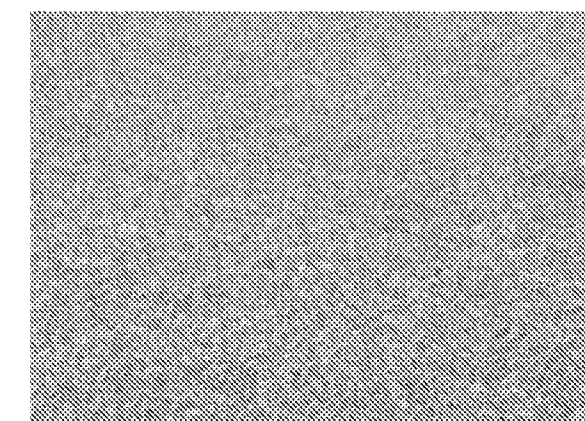




4. NEW PERMEABLE RED PAVING



5. NEW PERMEABLE GREY PATIO



6. PERMEABLE NEW BOUND GRAVEL

1.  EXISTING GRASS AREAS
2.  EXISTING TARMAC
3.  NEW GRASS/PLANTING AREA
4.  NEW PERMEABLE RED PAVING
5.  NEW PERMEABLE PATIO
6.  PERMEABLE NEW BOUND GRAVEL
7.  NEW CONCRETE RAMP/STEP

A horizontal line representing a 20m road. Above the line, markers are placed at 0m, 4m, 8m, 12m, 16m, and 20m. The road is divided into five equal segments of 4m each. The segments from 0m to 4m, 8m to 12m, and 16m to 20m are shaded with a cross-hatch pattern, representing paved sections. The segments from 4m to 8m and 12m to 16m are unshaded, representing unpaved sections.

VISUAL SCALE 1:200 @ A2

[illegible]


**KRONA
DESIGN**
ARCHITECTURAL DESIGN & DRAFTING
4 Union Place | Worthing | BN11 1LG
info@kronadesign.co.uk | kronadesign.co.uk
Tel: 01903 256150 Mob: 07827 994111

PROJECT

Proposed Development

ADDRESS

Wellesley Court
Fitzalan Road
Littlehampton
BN17 5JW

TITLE

Proposed Site

CLIENT

CLIENT **M & M Premier
Property Investments**

DRAWN JLB	STATUS Design	DATE 11/11/21
--------------	------------------	------------------

SCALE (@ A2)	PROJECT NUMBER
1:200	KD.1041

DRAWING NUMBER	REV
A.004	E

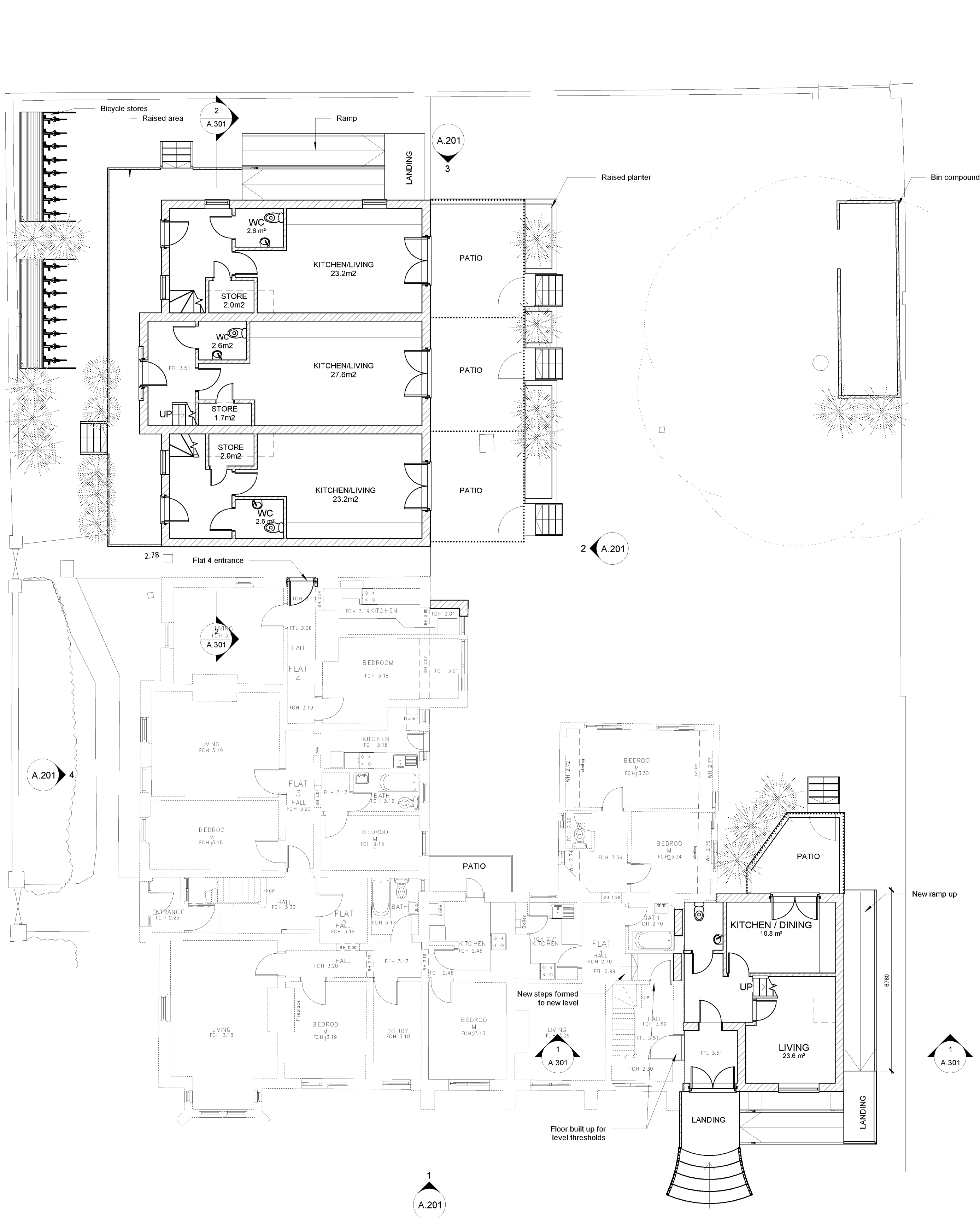
© KRONA DESIGN

PROPOSED SITE

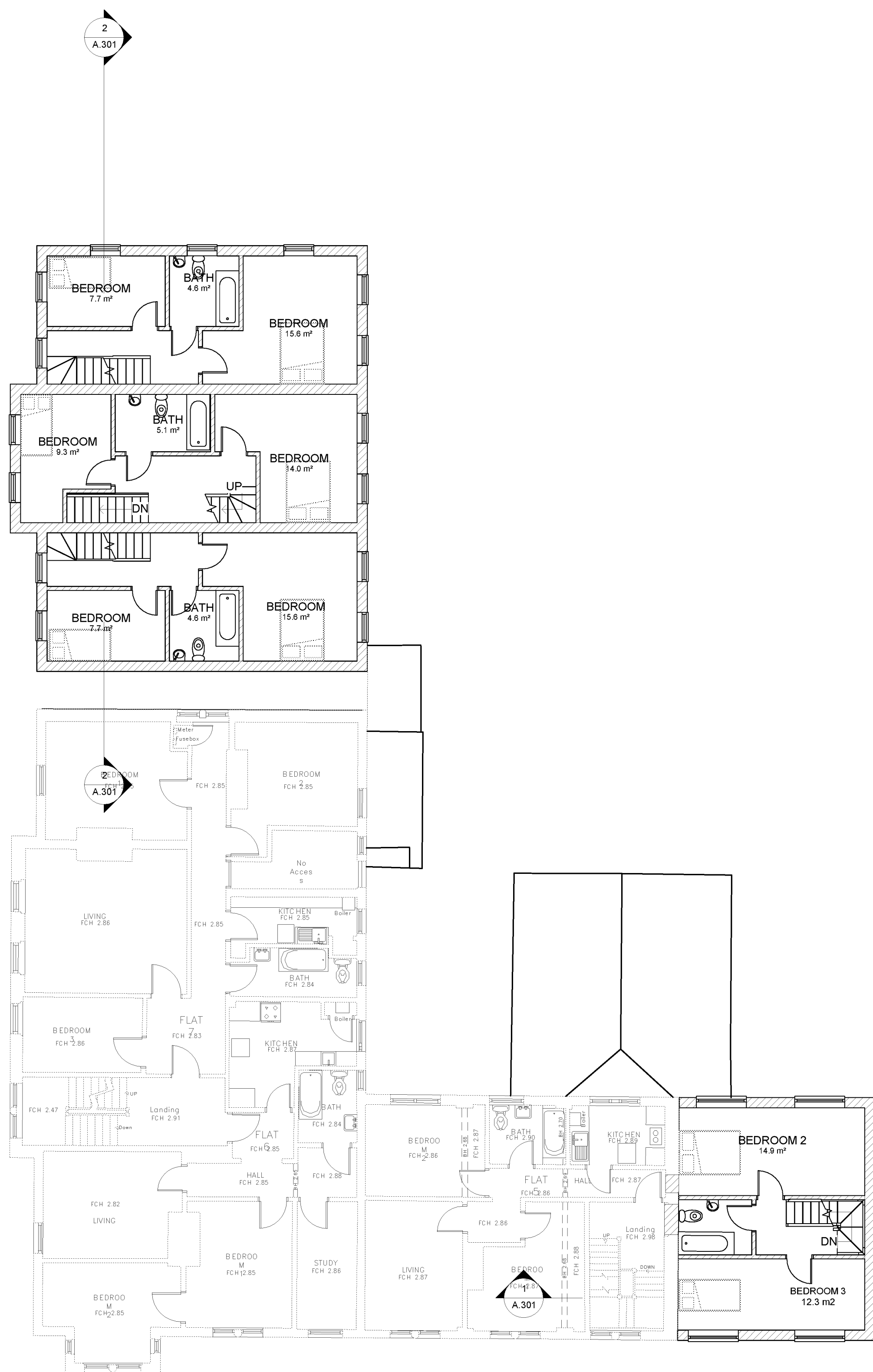
1 : 200

0m 2m 4m 6m 8m 10m

VISUAL SCALE 1:100 @ A1



1 GROUND FLOOR
1 : 100



2 FIRST FLOOR
1 : 100

KRONA
DESIGN

ARCHITECTURAL DESIGN & DRAFTING

4 Union Place | Worthing | BN11 1LG
info@kronadesign.co.uk | kronadesign.co.uk
Tel: 01903 256150 Mob: 07827 994111

PROJECT
Proposed Development

ADDRESS
**Wellesley Court
Fitzalan Road
Littlehampton
BN17 5JW**

TITLE
Proposed Plans

CLIENT
M & M Premier Property Investments

DRAWN
JLB

STATUS
1 : 100

DATE
11/11/21

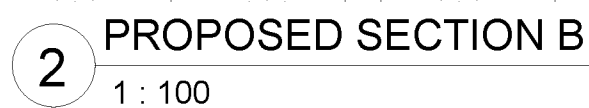
SCALE (@ A1)
1 : 100

PROJECT NUMBER
KD.1041

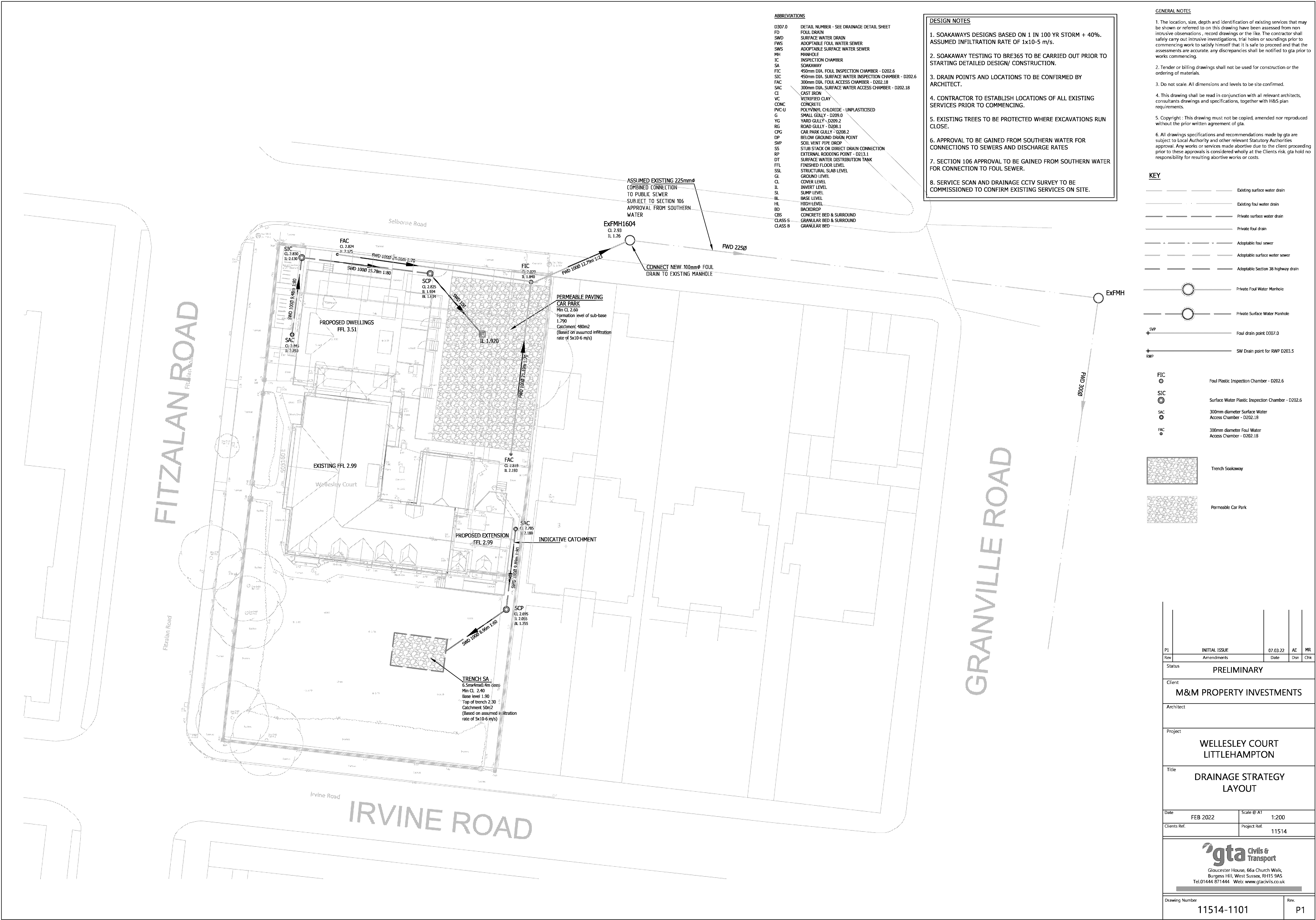
DRAWING NUMBER
A.101

REV
D

© KRONA DESIGN



© KRONA DESIGN



ABBREVIATIONS

D307.0	DETAIL NUMBER - SEE DRAINAGE DETAIL SHEET
FD	FOUL DRAIN
SWD	SURFACE WATER DRAIN
FWS	ADOPTABLE FOUL WATER SEWER
SWS	ADOPTABLE SURFACE WATER SEWER
MHI	MANHOLE
IC	INSPECTION CHAMBER
SA	SOAKAWAY
FIC	450mm DIA. FOUL INSPECTION CHAMBER - D202.6
SIC	450mm DIA. SURFACE WATER INSPECTION CHAMBER - D202.6
FAC	300mm DIA. FOUL ACCESS CHAMBER - D202.18
SAC	300mm DIA. SURFACE WATER ACCESS CHAMBER - D202.18
CI	CAST IRON
VC	VITRIFIED CLAY
CONC	CONCRETE
PVC-U	POLYVINYL CHLORIDE - UNPLASTICISED
G	SMALL GULLY - D209.0
YG	YARD GULLY - D209.2
RG	ROAD GULLY - D208.1
CPG	CAR PARK GULLY - D208.2
DP	BELOW GROUND DRAIN POINT
SVP	SOIL VENT PIPE DROP
SS	STUB STACK OR DIRECT DRAIN CONNECTION
RP	EXTERNAL RODDING POINT - D213.1
DT	SURFACE WATER DISTRIBUTION TANK
FIL	FINISHED FLOOR LEVEL
SSL	STRUCTURAL SLAB LEVEL
GL	GROUND LEVEL
CL	COVER LEVEL
IL	INVERT LEVEL
SL	SUMP LEVEL
BL	BASE LEVEL
HL	HIGH LEVEL
BD	BACKDROP
CBS	CONCRETE BED & SURROUND
BD	GRANULAR BED & SURROUND
CLASS 5	CLASS 5
CLASS B	CLASS B

DESIGN NOTES

1. SOAKAWAYS DESIGNS BASED ON 1 IN 100 YR STORM + 40%. ASSUMED INFILTRATION RATE OF 1x10-5 m/s.
2. SOAKAWAY TESTING TO BRE365 TO BE CARRIED OUT PRIOR TO STARTING DETAILED DESIGN/ CONSTRUCTION.
3. DRAIN POINTS AND LOCATIONS TO BE CONFIRMED BY ARCHITECT.
4. CONTRACTOR TO ESTABLISH LOCATIONS OF ALL EXISTING SERVICES PRIOR TO COMMENCING.
5. EXISTING TREES TO BE PROTECTED WHERE EXCAVATIONS RUN CLOSE.
6. APPROVAL TO BE GAINED FROM SOUTHERN WATER FOR CONNECTIONS TO SEWERS AND DISCHARGE RATES
7. SECTION 106 APPROVAL TO BE GAINED FROM SOUTHERN WATER FOR CONNECTION TO FOUL SEWER.
8. SERVICE SCAN AND DRAINAGE CCTV SURVEY TO BE COMMISSIONED TO CONFIRM EXISTING SERVICES ON SITE.

GENERAL NOTES

1. The location, size, depth and identification of existing services that may be shown or referred to on this drawing have been assessed from non-intrusive observations, record drawings or the like. The contractor shall safely carry out intrusive investigations, trial holes or soundings prior to commencing work to satisfy himself that it is safe to proceed and that the assessments are accurate. Any discrepancies shall be notified to gta prior to works commencing.
2. Tender or billing drawings shall not be used for construction or the ordering of materials.
3. Do not scale. All dimensions and levels to be site confirmed.
4. This drawing shall be read in conjunction with all relevant architects, consultants drawings and specifications, together with H&S plan requirements.
5. Copyright: This drawing must not be copied, amended nor reproduced without the prior written agreement of gta.
6. All drawings specifications and recommendations made by gta are subject to Local Authority and other relevant Statutory Authorities approval. Any works or services made abortive due to the client proceeding prior to these approvals is considered wholly at the Clients risk. gta hold no responsibility for resulting abortive works or costs.

KEY

-----	Existing surface water drain
-----	Existing foul water drain
-----	Private surface water drain
-----	Private foul drain
-----	Adoptable foul sewer
-----	Adoptable surface water sewer
-----	Adoptable Section 38 Highway drain
-----	Private Foul Water Manhole
-----	Private Surface Water Manhole
-----	Foul drain point D307.0
-----	SW Drain point for RWP D203.5
FIC	Foul Plastic Inspection Chamber - D202.6
SIC	Surface Water Plastic Inspection Chamber - D202.6
SAC	300mm diameter Surface Water Access Chamber - D202.18
FAC	300mm diameter Foul Water Access Chamber - D202.18
-----	Trench Soakaway
-----	Permeable Car Park

P1	INITIAL ISSUE	07.03.22	AE	MR
Rev	Amendments	Date	Dsn	Chk
Status PRELIMINARY				
Client M&M PROPERTY INVESTMENTS				
Architect				
Project WELLESLEY COURT LITTLEHAMPTON				
Title DRAINAGE STRATEGY LAYOUT				
Date FEB 2022		Scale @ A1 1:200		
Clients Ref.		Project Ref. 11514		
 Civils & Transport Gloucester House, 66a Church Walk, Burgess Hill, West Sussex, RH15 9AS Tel:01444 871444 Web: www.gtacivils.co.uk				
Drawing Number 11514-1101			Rev. P1	

Appendix E

MicroDrainage Calculation Sheets

GTA Civils Ltd		Page 1
Gloucester House 66a Church Walk Burgess Hill, BN43 6LB	11514 Wellesley Court PP calcs to 1 in 100yr+40%	
Date 07/03/2022 16:15 File 11514 AREA 1 - PP.SRCX	Designed by AElsir Checked by	
XP Solutions		Source Control 2020.1.3

Summary of Results for 100 year Return Period (+40%)

Half Drain Time : 531 minutes.

Storm Event	Max Level (m)	Max Depth (m)	Max Infiltration (l/s)	Max Volume (m ³)	Status
15 min Summer	2.014	0.224	0.5	12.1	○ K
30 min Summer	2.091	0.301	0.5	16.3	○ K
60 min Summer	2.171	0.381	0.5	20.5	○ K
120 min Summer	2.220	0.430	0.5	23.2	○ K
180 min Summer	2.241	0.451	0.5	24.3	○ K
240 min Summer	2.248	0.458	0.5	24.8	○ K
360 min Summer	2.244	0.454	0.5	24.5	○ K
480 min Summer	2.228	0.438	0.5	23.6	○ K
600 min Summer	2.213	0.423	0.5	22.8	○ K
720 min Summer	2.198	0.408	0.5	22.0	○ K
960 min Summer	2.170	0.380	0.5	20.5	○ K
1440 min Summer	2.123	0.333	0.5	18.0	○ K

Storm Event	Rain (mm/hr)	Flooded Volume (m ³)	Time-Peak (mins)
15 min Summer	148.682	0.0	22
30 min Summer	99.312	0.0	37
60 min Summer	63.288	0.0	66
120 min Summer	37.159	0.0	126
180 min Summer	27.033	0.0	184
240 min Summer	21.478	0.0	242
360 min Summer	15.406	0.0	360
480 min Summer	12.121	0.0	430
600 min Summer	10.051	0.0	484
720 min Summer	8.620	0.0	544
960 min Summer	6.763	0.0	674
1440 min Summer	4.826	0.0	940

GTA Civils Ltd		Page 2
Gloucester House 66a Church Walk Burgess Hill, BN43 6LB	11514 Wellesley Court PP calcs to 1 in 100yr+40%	
Date 07/03/2022 16:15 File 11514 AREA 1 - PP.SRCX	Designed by AElsir Checked by	
XP Solutions		Source Control 2020.1.3

Summary of Results for 100 year Return Period (+40%)

Storm Event	Max Level (m)	Max Depth (m)	Max Infiltration (l/s)	Max Volume (m³)	Status
2160 min Summer	2.065	0.275	0.5	14.9	○ K
2880 min Summer	2.017	0.227	0.5	12.3	○ K
4320 min Summer	1.944	0.154	0.5	8.3	○ K
5760 min Summer	1.894	0.104	0.5	5.6	○ K
7200 min Summer	1.863	0.073	0.5	4.0	○ K
8640 min Summer	1.845	0.055	0.5	3.0	○ K
10080 min Summer	1.839	0.049	0.4	2.6	○ K
15 min Winter	2.043	0.253	0.5	13.7	○ K
30 min Winter	2.131	0.341	0.5	18.4	○ K
60 min Winter	2.221	0.431	0.5	23.3	○ K
120 min Winter	2.279	0.489	0.5	26.4	○ K
180 min Winter	2.305	0.515	0.5	27.8	Flood Risk
240 min Winter	2.317	0.527	0.5	28.4	Flood Risk

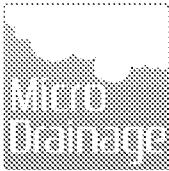
Storm Event	Rain (mm/hr)	Flooded Volume (m³)	Time-Peak (mins)
2160 min Summer	3.468	0.0	1344
2880 min Summer	2.761	0.0	1732
4320 min Summer	2.031	0.0	2464
5760 min Summer	1.653	0.0	3120
7200 min Summer	1.422	0.0	3816
8640 min Summer	1.265	0.0	4416
10080 min Summer	1.152	0.0	5136
15 min Winter	148.682	0.0	22
30 min Winter	99.312	0.0	36
60 min Winter	63.288	0.0	66
120 min Winter	37.159	0.0	124
180 min Winter	27.033	0.0	180
240 min Winter	21.478	0.0	238

GTA Civils Ltd		Page 3
Gloucester House 66a Church Walk Burgess Hill, BN43 6LB	11514 Wellesley Court PP calcs to 1 in 100yr+40%	
Date 07/03/2022 16:15 File 11514 AREA 1 - PP.SRCX	Designed by AElsir Checked by	
XP Solutions		Source Control 2020.1.3

Summary of Results for 100 year Return Period (+40%)

Storm Event	Max Level (m)	Max Depth (m)	Max Infiltration (l/s)	Max Volume (m³)	Status
360 min Winter	2.317	0.527	0.5	28.5	Flood Risk
480 min Winter	2.303	0.513	0.5	27.7	Flood Risk
600 min Winter	2.284	0.494	0.5	26.7	O K
720 min Winter	2.264	0.474	0.5	25.6	O K
960 min Winter	2.229	0.439	0.5	23.7	O K
1440 min Winter	2.162	0.372	0.5	20.1	O K
2160 min Winter	2.074	0.284	0.5	15.3	O K
2880 min Winter	2.000	0.210	0.5	11.4	O K
4320 min Winter	1.894	0.104	0.5	5.6	O K
5760 min Winter	1.841	0.051	0.5	2.8	O K
7200 min Winter	1.834	0.044	0.4	2.4	O K
8640 min Winter	1.829	0.039	0.3	2.1	O K
10080 min Winter	1.825	0.035	0.3	1.9	O K

Storm Event	Rain (mm/hr)	Flooded Volume (m³)	Time-Peak (mins)
360 min Winter	15.496	0.0	352
480 min Winter	12.121	0.0	460
600 min Winter	10.051	0.0	562
720 min Winter	8.620	0.0	584
960 min Winter	6.763	0.0	730
1440 min Winter	4.826	0.0	1026
2160 min Winter	3.468	0.0	1448
2880 min Winter	2.761	0.0	1844
4320 min Winter	2.031	0.0	2512
5760 min Winter	1.653	0.0	3000
7200 min Winter	1.422	0.0	3680
8640 min Winter	1.265	0.0	4416
10080 min Winter	1.152	0.0	5144

GTA Civils Ltd		Page 4
Gloucester House 66a Church Walk Burgess Hill, BN43 6LB	11514 Wellesley Court PP calcs to 1 in 100yr+40%	
Date 07/03/2022 16:15 File 11514 AREA 1 - PP.SRCX	Designed by AElsir Checked by	
XP Solutions		Source Control 2020.1.3

Rainfall Details

Rainfall Model	FEH	Data Type	Point	Cv (Winter)	0.840
Return Period (years)	100	Summer Storms	Yes	Shortest Storm (mins)	15
FEH Rainfall Version	2013	Winter Storms	Yes	Longest Storm (mins)	10080
Site Location	GB 503170 101662 TQ 03170 01662	Cv (Summer)	0.750	Climate Change %	+40

Time Area Diagram

Total Area (ha) 0.048

Time (mins)	Area	Time (mins)	Area
From: To: (ha)		From: To: (ha)	
0 4	0.023	4 8	0.025

GTA Civils Ltd		Page 5
Gloucester House 66a Church Walk Burgess Hill, BN43 6LB	11514 Wellesley Court PP calcs to 1 in 100yr+40%	
Date 07/03/2022 16:15 File 11514 AREA 1 - PP.SRCX	Designed by AElsir Checked by	
XP Solutions	Source Control 2020.1.3	

Model Details

Storage is Online Cover Level (m) 2.600

Porous Car Park Structure

Infiltration Coefficient Base (m/hr)	0.01800	Porosity	0.30	Slope (1:X)	0.0
Membrane Percolation (mm/hr)	1000	Invert Level (m)	1.790	Depression Storage (mm)	5
Max Percolation (l/s)	50.0	Width (m)	10.0	Evaporation (mm/day)	3
Safety Factor	2.0	Length (m)	18.0	Membrane Depth (m)	0

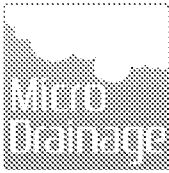
GTA Civils Ltd		Page 1
Gloucester House 66a Church Walk Burgess Hill, BN43 6LB	11514 Welleseley Court TS calcs to 1 in 100yr+40	
Date 07/03/2022 16:17 File 11514 AREA 2 - TS.SRCX	Designed by AElsir Checked by	
XP Solutions		Source Control 2020.1.3

Summary of Results for 100 year Return Period (+40%)

Half Drain Time : 381 minutes.

Storm Event	Max Level (m)	Max Depth (m)	Max Infiltration (l/s)	Max Volume (m³)	Status
15 min Summer	2.072	0.172	0.1	1.3	Flood Risk
30 min Summer	2.126	0.226	0.1	1.8	Flood Risk
60 min Summer	2.180	0.280	0.1	2.2	Flood Risk
120 min Summer	2.209	0.309	0.1	2.4	Flood Risk
180 min Summer	2.217	0.317	0.1	2.5	Flood Risk
240 min Summer	2.216	0.316	0.1	2.5	Flood Risk
360 min Summer	2.203	0.303	0.1	2.4	Flood Risk
480 min Summer	2.189	0.289	0.1	2.3	Flood Risk
600 min Summer	2.176	0.276	0.1	2.2	Flood Risk
720 min Summer	2.163	0.263	0.1	2.1	Flood Risk
960 min Summer	2.139	0.239	0.1	1.9	Flood Risk
1440 min Summer	2.098	0.198	0.1	1.5	Flood Risk

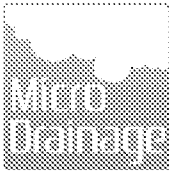
Storm Event	Rain (mm/hr)	Flooded Volume (m³)	Time-Peak (mins)
15 min Summer	148.682	0.0	19
30 min Summer	99.312	0.0	33
60 min Summer	63.288	0.0	62
120 min Summer	37.159	0.0	122
180 min Summer	27.033	0.0	182
240 min Summer	21.478	0.0	240
360 min Summer	15.406	0.0	308
480 min Summer	12.121	0.0	366
600 min Summer	10.051	0.0	428
720 min Summer	8.620	0.0	494
960 min Summer	6.763	0.0	628
1440 min Summer	4.826	0.0	894

GTA Civils Ltd		Page 2
Gloucester House 66a Church Walk Burgess Hill, BN43 6LB	11514 Welleseley Court TS calcs to 1 in 100yr+40	
Date 07/03/2022 16:17 File 11514 AREA 2 - TS.SRCX	Designed by AElsir Checked by	
XP Solutions		Source Control 2020.1.3

Summary of Results for 100 year Return Period (+40%)

Storm Event	Max Level (m)	Max Depth (m)	Max Infiltration (l/s)	Max Volume (m³)	Status
2160 min Summer	2.050	0.150	0.1	1.2	Flood Risk
2880 min Summer	2.013	0.113	0.1	0.9	Flood Risk
4320 min Summer	1.967	0.067	0.1	0.5	O K
5760 min Summer	1.949	0.049	0.1	0.4	O K
7200 min Summer	1.943	0.043	0.1	0.3	O K
8640 min Summer	1.939	0.039	0.1	0.3	O K
10080 min Summer	1.936	0.036	0.0	0.3	O K
15 min Winter	2.094	0.194	0.1	1.5	Flood Risk
30 min Winter	2.155	0.255	0.1	2.0	Flood Risk
60 min Winter	2.216	0.316	0.1	2.5	Flood Risk
120 min Winter	2.251	0.351	0.1	2.7	Flood Risk
180 min Winter	2.263	0.363	0.1	2.8	Flood Risk
240 min Winter	2.265	0.365	0.1	2.8	Flood Risk

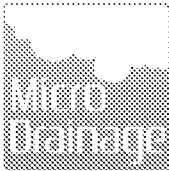
Storm Event	Rain (mm/hr)	Flooded Volume (m³)	Time-Peak (mins)
2160 min Summer	3.468	0.0	1276
2880 min Summer	2.761	0.0	1640
4320 min Summer	2.031	0.0	2292
5760 min Summer	1.653	0.0	2944
7200 min Summer	1.422	0.0	3672
8640 min Summer	1.265	0.0	4408
10080 min Summer	1.152	0.0	5144
15 min Winter	148.682	0.0	18
30 min Winter	99.312	0.0	33
60 min Winter	63.288	0.0	62
120 min Winter	37.159	0.0	120
180 min Winter	27.033	0.0	178
240 min Winter	21.478	0.0	234

GTA Civils Ltd		Page 3
Gloucester House 66a Church Walk Burgess Hill, BN43 6LB	11514 Welleseley Court TS calcs to 1 in 100yr+40	
Date 07/03/2022 16:17 File 11514 AREA 2 - TS.SRCX	Designed by AElsir Checked by	
XP Solutions		Source Control 2020.1.3

Summary of Results for 100 year Return Period (+40%)

Storm Event	Max Level (m)	Max Depth (m)	Max Infiltration (l/s)	Max Volume (m³)	Status
360 min Winter	2.254	0.354	0.1	2.8	Flood Risk
480 min Winter	2.235	0.335	0.1	2.6	Flood Risk
600 min Winter	2.218	0.318	0.1	2.5	Flood Risk
720 min Winter	2.201	0.301	0.1	2.3	Flood Risk
960 min Winter	2.167	0.267	0.1	2.1	Flood Risk
1440 min Winter	2.106	0.206	0.1	1.6	Flood Risk
2160 min Winter	2.033	0.133	0.1	1.0	Flood Risk
2880 min Winter	1.982	0.082	0.1	0.6	O K
4320 min Winter	1.945	0.045	0.1	0.4	O K
5760 min Winter	1.937	0.037	0.0	0.3	O K
7200 min Winter	1.932	0.032	0.0	0.2	O K
8640 min Winter	1.929	0.029	0.0	0.2	O K
10080 min Winter	1.926	0.026	0.0	0.2	O K

Storm Event	Rain (mm/hr)	Flooded Volume (m³)	Time-Peak (mins)
360 min Winter	15.406	0.0	342
480 min Winter	12.121	0.0	394
600 min Winter	10.051	0.0	464
720 min Winter	8.620	0.0	540
960 min Winter	6.763	0.0	686
1440 min Winter	4.826	0.0	966
2160 min Winter	3.468	0.0	1344
2880 min Winter	2.761	0.0	1672
4320 min Winter	2.031	0.0	2248
5760 min Winter	1.653	0.0	2944
7200 min Winter	1.422	0.0	3672
8640 min Winter	1.265	0.0	4376
10080 min Winter	1.152	0.0	5120

GTA Civils Ltd		Page 4
Gloucester House 66a Church Walk Burgess Hill, BN43 6LB	11514 Welleseley Court TS calcs to 1 in 100yr+40	
Date 07/03/2022 16:17 File 11514 AREA 2 - TS.SRCX	Designed by AElsir Checked by	
XP Solutions		Source Control 2020.1.3

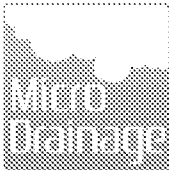
Rainfall Details

Rainfall Model	FEH	Data Type	Point	Cv (Winter)	0.840
Return Period (years)	100	Summer Storms	Yes	Shortest Storm (mins)	15
FEH Rainfall Version	2013	Winter Storms	Yes	Longest Storm (mins)	10080
Site Location	GB 503170 101662 TQ 03170 01662	Cv (Summer)	0.750	Climate Change %	+40

Time Area Diagram

Total Area (ha) 0.005

Time (mins)	Area
From:	To: (ha)
0	4 0.005

GTA Civils Ltd		Page 5
Gloucester House 66a Church Walk Burgess Hill, BN43 6LB	11514 Welleseley Court TS calcs to 1 in 100yr+40	
Date 07/03/2022 16:17 File 11514 AREA 2 - TS.SRCX	Designed by AElsir Checked by	
XP Solutions		Source Control 2020.1.3

Model Details

Storage is Online Cover Level (m) 2.300

Trench Soakaway Structure

Infiltration Coefficient Base (m/hr)	0.01800	Invert Level (m)	1.900	Cap Volume Depth (m)	0.000
Infiltration Coefficient Side (m/hr)	0.00000	Trench Width (m)	4.0	Cap Infiltration Depth (m)	0.000
Safety Factor	2.0	Trench Length (m)	6.5		
Porosity	0.30	Slope (1:X)	0.0		

Annex – Flood Risk Management Plan

Introduction

The main objectives of this Plan are to 1) raise the awareness of the flood risk to this site and 2) to highlight the need for residents to plan in advance how they would evacuate this area before the peak flooding (when the water levels will make evacuation hazardous).

A copy of this Plan must be bound into the legal documentation (leases or freehold deeds), so as to alert the owners or tenants.

This plan has been prepared so that all occupants can plan ahead – and prepare to evacuate in good time.

Background

This unit is in the area administered by Arun District Council.

The main threat of flooding is from the nearby river (Arun) bursting its banks. There is also risk of the access route into the site from the north becoming inundated from surface water flows. The ground floor level has been set such that there should be no internal flooding, except possibly a nominal amount due to wind/wave action.

The doors of these houses have been fitted with passive flood barrier systems. These rise only when flood water pressure pushes them upwards into position. These should be maintained in accordance with manufacturer's instructions.

Warning Arrangements

This area is covered by the EA's Flood Warnings service. All residents are 'strongly advised' (ie must) subscribe to 'Floodline', the Environment Agency's free flood warning system. Visit <https://www.fws.environment-agency.gov.uk/app/plr/register>, this being the best web page at the time of preparing this in 2020 – search "EA flood warnings UK" if this has changed.

The possibility of flooding to the property will trigger an automatic 24 alert message to the registered address contact. These flood warnings are intended to be given in sufficient time to allow evacuation plans to be implemented.

For tenanted dwellings: The landlord is responsible for ensuring that the details in this section are completed with the correct occupant details at the beginning of each change of tenancy. If the tenant changes their

details they should communicate this to the landlord who will then update this FRMP with the correct information. The registered contact for the site is [INSERT OCCUPIER'S NAME], and his/her contact number is [INSERT OCCUPIER'S TELEPHONE NUMBER]. His/her email address is [INSERT OCCUPIER'S EMAIL ADDRESS].

Likely depth: the flood depth outside your house may be as great as **0.75m**.

Time to inundation: the likely warning time period for tidal flooding given by the Environment Agency (EA) is usually 36-48 hours, ie plenty of notice.

This plan has been prepared so that you can prepare to evacuate the area via the best safe route – see the Appendix - so as to minimise the impact on the emergency services.

In addition to the automated service, further information on the flooding can be obtained by consulting the Environment Agency website (www.environmentagency.gov.uk/flood) and phoning Floodline on 0345 988 1188, selecting option 1. The site lies within an EA Flood Warning Area. Information on these telephone numbers is updated every 15 minutes.

For a local media outlet offering flood information, consider tuning into BBC Radio Sussex:

Frequency: 104.5, 104.8 & 95.0–95.3 FM; DAB:
NOW Sussex Coast; Freeview: 720

Many other radio stations are available online and DAB – browse by name.

Emergency Telephone numbers:

General first responders, namely police, ambulance and fire:	999
Arun District Council (business hours)	01903 737500
Gas Leaks/safety	0800 111 999
EA Floodline	0345 988 1188
RSPA	0300 1234 999

You should prepare by collecting all emergency numbers relevant to you, eg vehicle cover, insurer, landlord.

Flood Warning Codes

If flooding is forecast, alerts are issued by the EA using a set of four easily recognisable codes.

Each of the four codes indicates the level of danger associated with the warning/alert. The EA aims to issue flood alerts up to 12 hours in advance, although this is not always possible. The codes may not always be

used in sequence; a Severe Flood Warning may be issued immediately, with no other warning code preceding it.

The Flood Warning Codes and their meanings are:



- What it means: Flooding is possible. Be prepared.
- When it's used: two hours to two days in advance of flooding.
- Impact: flooding of low lying land and roads - property flooding is not expected.

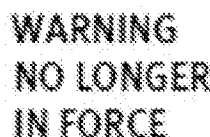


- What it means: Flooding is expected. Immediate action required.
- When it's used: Half an hour to one day in advance of flooding.
- Impact: Property flooding of homes and businesses is expected.



- What it means: Severe flooding. Danger to life.
- When it's used: When flooding poses a significant threat to life.
- Impact: Deep, fast flowing water. Debris in water. Communities cut off.

Source: https://www.gov.uk/government/uploads/system/uploads/attachment_data/file/311020/flood_warnings_LIT_5215.pdf



- No further flooding is currently expected in your area.
- When it's used: When river (and sea) conditions return to normal.

Action to be Taken on Receipt of Flood Warnings



- What it means: Be prepared to act on your flood plan. Refer to the Action Checklist – below.
- Call Floodline on 0345 988 1188, select option 1 for up to date information.
- Monitor local water levels and flood forecast on the EA website.

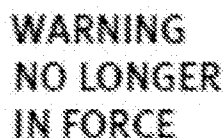


- What it means: Flooding is expected. Serious consideration needs to be given to the need to evacuate. It may be impossible for the emergency services to reach this building if events unfold differently to as anticipated.
- Move valuable items to as high a level as possible.
- Carry out the rest of the Action Checklist – as appropriate to the nature of the flooding

THE PROPERTY MUST BE EVACUATED IF SAFE TO DO SO.



- Co-operate with the emergency services. Call 999 if you are in immediate danger.
- If there has been a sudden breach or overtopping of a reservoir resulting in hazardous floodwaters surrounding the site, seek safe refuge at high level.



- Be careful. Floodwater may still be around for several days.
- If you've been flooded, ring your insurance company as soon as possible.

There is a map in the Appendix showing the *probable best* route to dry land. You and all adults in this dwelling should be familiar with this.

Preparation for a Flood Event

The flood level should recede quickly as the Arun is tidally influenced here. The best option is to reside safely at high level until the conditions outside return to normal. This plan has been prepared so that you can prepare to evacuate *in advance* of unduly deep flooding – as per the EA's warnings.

You should consider evacuating if you need to get out and about (eg if you have a pressing appointment/engagement or if your medical condition requires this).

Prepare a grab bag of essential items and keep it to hand. It can include the following:

- List of prescription medication for the family
- Pen
- Blankets and warm clothing
- Waterproofs
- Important documents such as passport and insurance certificates
- First aid kit
- Radio (battery or wind up)
- Torch (battery or wind up)
- Spare batteries
- Spare glasses
- Mobile phone and charger
- Contact numbers in a notebook (see 6.1)
- Insurance details
- Spare keys for house and car
- Tinned and non-perishable food, and a tin opener

Prepare a list of all your important contacts written in a notebook - and keep it close to hand, eg in the grab bag.

Ensure you know how to turn off electricity, gas and water.

Make arrangements with family/friends living outside the flood area to receive you in case of evacuation. If this is not feasible, ensure that you have appropriate insurance cover that provides alternative accommodation (ie guest house/hotel).

Action Checklist

An evacuation route is shown in the Appendix of this Plan. You should consider evacuating the property via this or a similar route on receipt of a flood alert. Bear in mind that there may be short notice between warnings and this area becoming inundated.

The evacuation route guides occupants from this building to higher, dry ground. Study this so that you are familiar with this in advance of deciding to evacuate.

Evacuate! Ensure all the measures listed above are in place – and lock up.

Pets

Pets should be included in your emergency planning arrangements.

Be prepared:

- Make sure your cats and dogs are wearing proper identification e.g. up to date contact details on their collar, microchip
- Make sure pet foods and medicines are well stocked
- Arrange for a family member or friend living outside the flood risk area to take in your pets when an evacuation order comes

If there's a flood warning:

- Bring your small pets inside (upstairs)
- Move food, bedding and fresh water to somewhere safe and dry
- Keep your portable pet carriers at hand
- Keep familiar toys dry, because pets under stress will welcome something that smells of home
- Consider taking pets to a family member or friend who lives outside the flood risk area
- Put documents like vaccination records, your vet's details, and microchip number(s) in a sealed bag with any other important documents. Include a current photograph in case your pet(s) get lost

If disaster strikes:

- Don't leave pets behind, unless by transporting animals you will be putting your own or anyone else's life in danger
- Cats, rabbits and other small pets should be transported in suitable carriers, birds in a secure cage and dogs using sturdy leads
- In cold weather put a blanket over the carrier. Don't put water inside the carrier during transportation
- Remember to take your pet's food, water and bedding with you
- If you have no choice but to leave your pets behind, shut them inside an upstairs room with plenty of food and water. Put notices on external doors saying there are animals inside and contact the RSPCA or your local flood warden as soon as practicable

Upon Return & Recovery

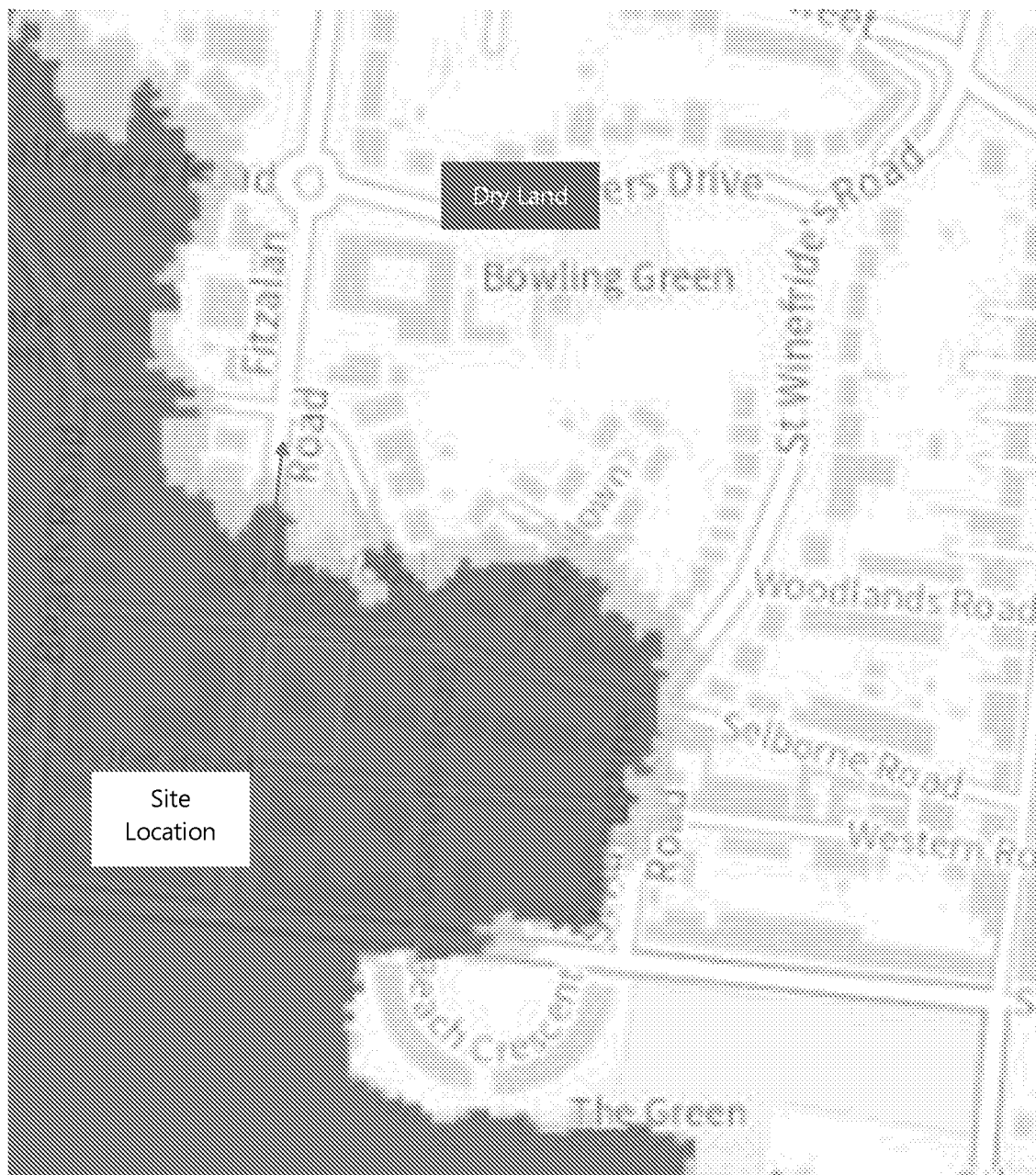
When to go back? The responding organisations will be providing updates on the situation and notification when it is safe to return. Follow their advice.

- Do not start the clean-up until the threat of further flooding has passed
- Don't throw anything away until told to do so by your insurer
- Check with your insurance company if it is OK to start cleaning your property before starting
- Confirm what services your insurance company will pay for
- Use a permanent marker to mark on the wall the height of the flood water in each room
- Wear waterproof, gloves, boots and a face mask when clearing up
- Household products are sufficient to clean and disinfect your property
- Use mains pressure garden hose for washing down, not high pressure hose lines
- As soon as possible, ask your insurance company when a loss adjuster will visit
- Ask your insurance company if they will pay for repairs that will make your property more flood resilient for the future
- Keep records: date, time, name of person you spoke to and what was agreed
- Keep receipts
- Take photos and video of your damaged property
- Make a list of your damaged property

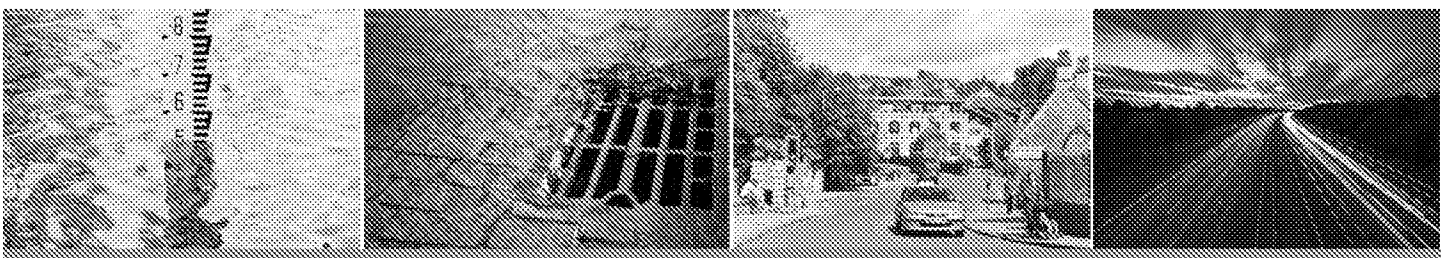
- End of Plan -

Appendix

Map Showing Route to Dry Land



The shortest route to land outside the floodplain is northwards (RH turn) along Fitzalan Road



Civil Engineering - Transport Planning - Flood Risk

