

LAND ADJACENT TO THE CROFT SURGERY,
EASTERGATE,
WEST SUSSEX,
PO20 3RP

Flood Risk Assessment

**New Medical Centre incorporating Pharmacy Unit and Other Ancillary
Uses together with Access off Barnham Road and Associated car parking;
with some Reserved Matters for future Consideration.**

June 2016

For

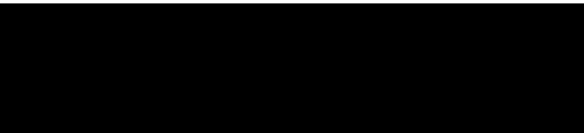


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Also at Hove and St Albans

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1. Executive Summary

The site is not within a Flood Zone, is less than 1 hectare in size and does not suffer from any know existing flooding.

Examination of the proposals shows that there is no increase in flood risk to people or properties in the catchment than exists in the current situation, including when taking into account the effects of climate change.

2. Introduction

Gyoury Self Partnership have been appointed to provide a Flood Risk Assessment for the construction of a new doctors surgery on land adjacent to the existing Croft Surgery, Eastergate, West Sussex.

This Flood Risk Assessment (FRA) is to be submitted as part of the planning application for the proposed dwelling.

This Flood Risk Assessment has been prepared in accordance with Communities & Local Government, National Planning Policy Framework (NPPF), National Planning Practice Guidance (NPPG) and the Department for Environment, Food & Rural Affairs (DEFRA), Sustainable Drainage Systems, Non-statutory technical standards for sustainable drainage systems March 2015.

2.1. Limitations

This report has been prepared solely for the benefit of the owners of the site. It shall not be relied upon or transferred to any other party without the prior written authorisation of the Author.

This report has been commissioned to appraise the flood risk and drainage associated with the development. It does not address any other potential environmental impacts that may result at the site.

The author does not accept any liability for the accuracy or otherwise of any information derived from secondary sources, however, reasonable endeavours have been made to verify the information obtained in this way.

3. Site Description

3.1. Site Location & Surrounding Area

The site is located in Eastergate, which is a village located 4.5 miles west of Chichester, West Sussex, see Figures 1-4.

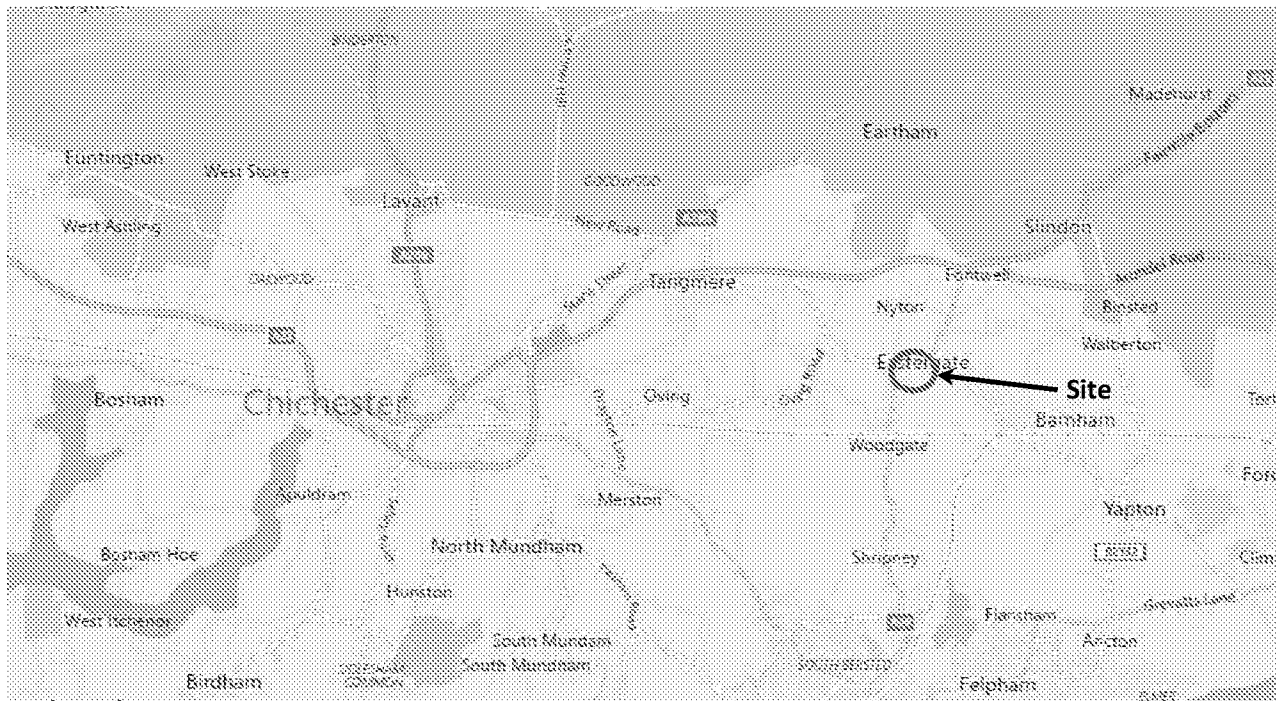


Figure 1 - Site Location Plan (www.bing.com)

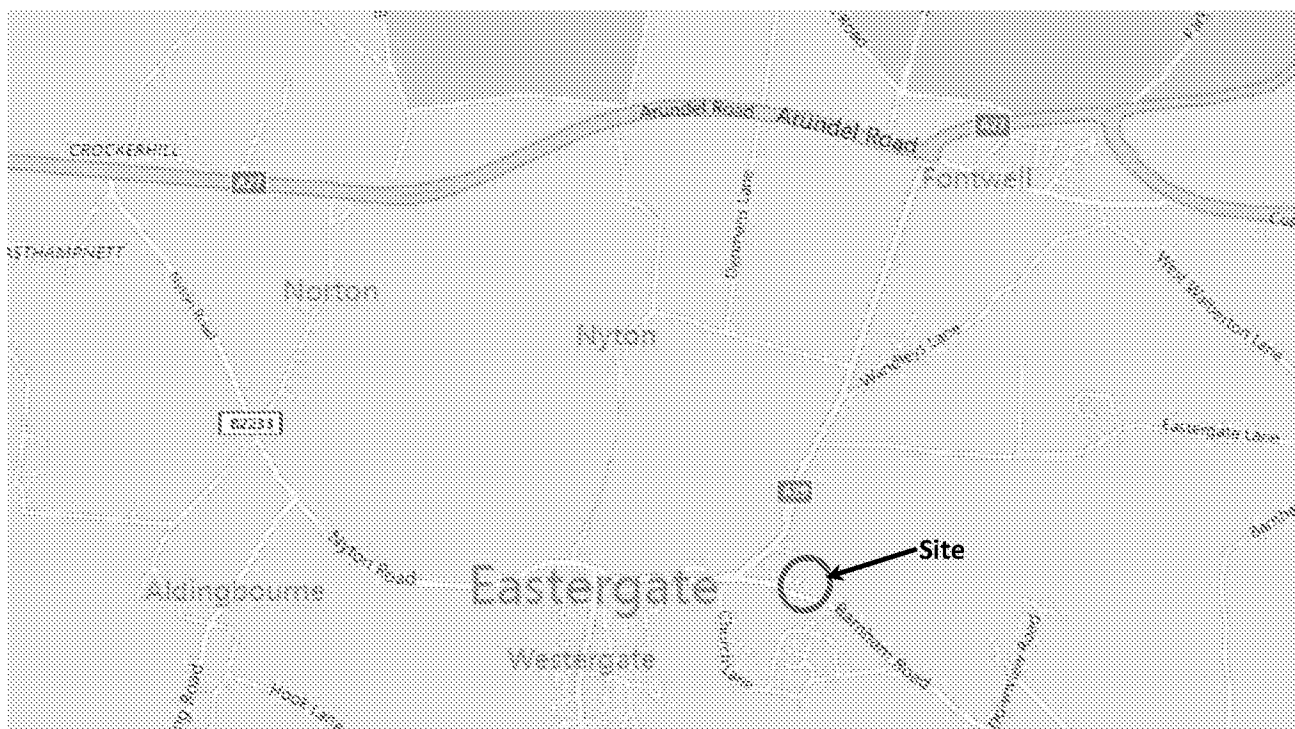


Figure 2 - Site Location Plan (www.bing.com)

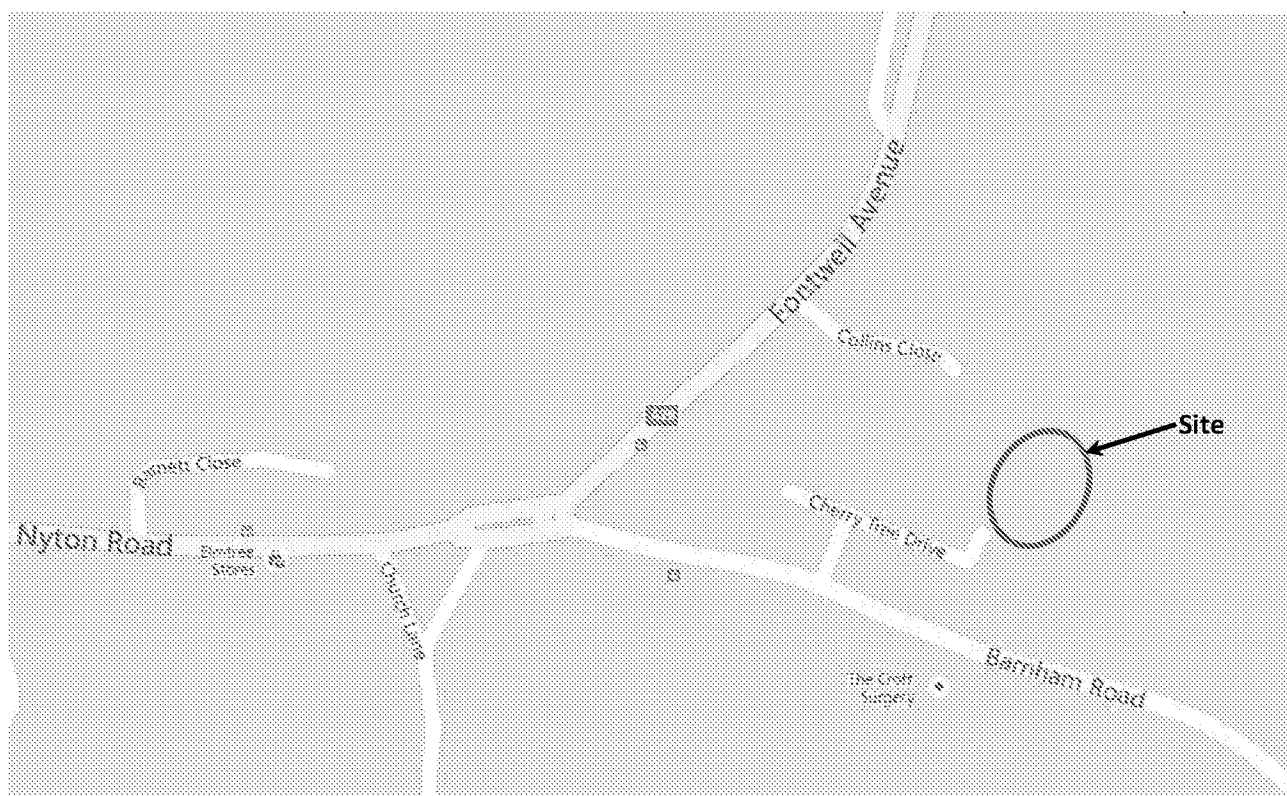


Figure 3 – Aerial Photograph (www.bing.com)



Figure 4 – Aerial Photograph (www.bing.com)

The site area is 7,032sqm in size, is predominately greenfield in nature with a temporary gravel access and parking area off of Barnham Road.

3.2. Topography and overland flow baseline

Site levels range from the highest level at the north east boundary at 15.37mAOD to the lowest level at the south east boundary at 12.97mAOD, refer to Appendix A.

3.3. Hydraulic baseline

There are no watercourses on the site. British geological survey maps indicate that the site is within an area susceptible to ground water flooding although the confidence of this is moderately low.

3.4. Geology

British Geological Survey map information indicates that the ground conditions beneath the site are a bedrock geology of Whitecliff Sand Member with superficial alluvium deposits, clay, silt, sand and gravel, see figure 7.

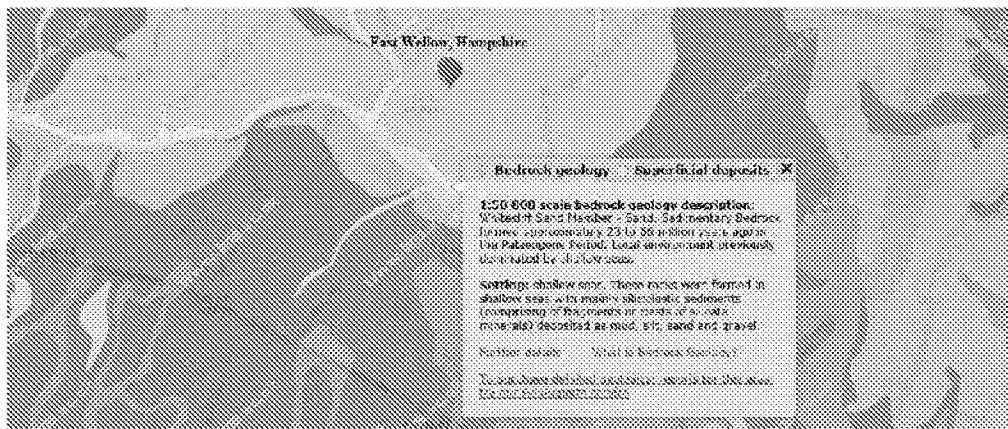


Figure 7 – British Geological Survey map (www.mapapps.bgs.ac.uk)

4. Strategic Flood Risk Assessment

A strategic Flood Risk Assessment (SFRA) was carried out by Capita Symonds for West Sussex County Council in September 2008.

The purpose of the SFRA was to assess and map flood risk from groundwater, surface water, sewer, tidal and river sources taking into account climate change predictions.

The SFRA does not specifically identify Eastergate as being at a high risk of flooding from groundwater, surface water, sewer, tidal and river sources.

West Sussex Preliminary Flood Risk Assessment 2011, also does not identify Eastergate as being at risk of flooding groundwater, surface water, sewer, tidal and river sources.

5. Potential Sources of External Flooding Impacting on Development

5.1. Fluvial

The EA produces floodplain maps for the UK, which show the areas at risk of fluvial (river) and tidal (sea) flooding. The magnitudes of the flooding events considered are defined in terms of their return period. Generally, when determining the impact of any development within the floodplain of a fluvial reach, the design standard against which the EA will consider the feasibility of any scheme is typically the 1% annual probability flood (1 in 100 year return period flood) for sites within the floodplain, or the effects of a 1 in 100 year storm if outside the floodplain.

The EA flood zone maps identify undefended floodplain, giving the horizontal extent of low (Zone 1), medium (Zone 2) and high risk flood zones (Zones 3a and 3b) depending on the severity of the flood event.

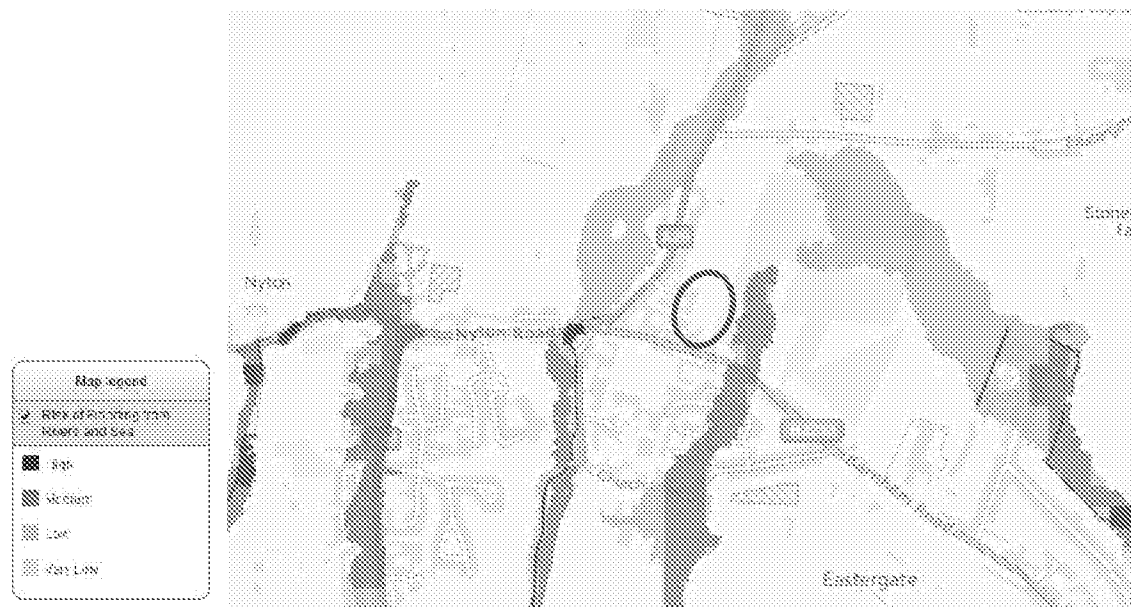


Figure 11 – Indicative Floodplain Map (www.environment-agency.gov.uk)

It can be seen from the Environment Agency's indicative floodplain mapping that the site is located within Flood Zone 1, low risk.

5.2. Pluvial Surface Water Inundation Map

The Environment Agency also produces maps which highlight the risk of flooding from surface water flows illustrating when the capacity of existing surface water drainage networks and channels are exceeded in extreme rainfall events.



Figure 13 – Surface Water Inundation Map (www.environment-agency.gov.uk)

It can be seen from the surface water inundation map that the site is not at risk of pluvial flooding.

5.3. Ground Water

British geological survey maps indicate that the site is within an area susceptible to ground water flooding although the confidence of this is moderately low. There are no historic reported incidents of flooding from this source.

5.4. Reservoirs/Canals & other Artificial Sources

There are no known reservoirs or canals within the vicinity of the site, therefore the site is not at risk of flooding from this source.

5.5. Sewer

There are no surface water sewers within the vicinity of the site, a foul water sewer runs within Barnham Road, there are no historic reported incidents of flooding from this source.

6. Existing Drainage Regime

6.1. Surface Water

The existing site has no surface water drainage system, the greenfield and the temporary gravel access and parking areas drain natural in to the ground.

6.2. Foul Water

The site has no existing foul water drainage.

7. Development Proposals

It is proposed to construct a new doctors surgery with associated access road and parking refer to Appendix B.

The proposed hard paved area for the site is 4,288 sqm.

7.1. Surface Water Drainage

The proposed drainage strategy is to discharge surface water runoff to trench soakaways serving the car parks and building and ring soakaways serving the access road (Appendix C).

By keeping the access road surface water drainage separate to the roof and car park the access road can be offered for adoption in the future. Ring soakways have been specified as this is the local Highways authorities preferred method. The soakaway's have been design to cater for a 1:100 storm event plus have an additional 30% capacity to allow for climate change (Appendix C).

Prior to construction a ground investigation will be carried out to determine the depth of the sand and its permeability.

7.1.1. Peak Flow

The surface water runoff from the existing greenfield and gravel areas on the site discharges to ground.

It is proposed that the Surface water runoff from the development will be discharged to onsite soakaways and therefore there is no peak flow from the site to third party land or drainage systems

The proposed drainage system on the site will therefore create no flood risk within the site or onto third party land.

7.1.2. Volume of Run-off

A 10% Increase in hard paved area to allow for Urban Creep will be applied to all proposed roof and hard paved areas.

The roof and hard paved area of the site has increase as part of the development and surface water will be discharged to onsite soakaways.

Therefore there is no increase in volume of run-off from the site to third party land or drainage systems.

7.1.3. Exceedance Routes

During the detailed design stage Site levels will be designed such that any flows caused by storms above the designed return period of 1:100+30% are managed in exceedance routes that reduce the risk to people and properties

7.2. Foul Water Drainage

It is proposed that the foul water flows from the development will be connected to the foul water sewer within Barnham Road (Appendix C & D). A sewer connection application will be lodged with Southern Water at construction stage for approval of the connection.

If capacity is unavailable within the sewer the developer will request that under Section 98 of The Water Resources Act 1991, Southern Water carry out works to provide capacity within the Sewer to take the foul flows from the development. Until capacity becomes available it is proposed that the foul water flows will be discharged to a sewage treatment plant. The proposed treatment plant will connect to a drainage field which will allow the treated effluent to infiltrate the ground. The proposal for the sewage treatment plant will be sent to the Environment Agency for consent approval.

The treated effluent will be discharged to a drainage field.

The STP will be sized and designed to conform to BSEN12566:3 and will be capable of producing a minimum effluent discharge quality of 20:30:20 (Biochemical Oxygen Demand (BOD); Suspended Solids (SS); Ammoniacal Nitrogen in mg/ltr)

The treatment plant will be serviced, along with the removal of sludge that will build up within the settlement tanks as part of the treatment process, in accordance with the manufactures requirements.

8. Conclusions

Based on the information available the proposed dwelling is considered to be fully appropriate for its location and should not increase the risk of flooding at the site or elsewhere.

As a result of undertaking the Flood Risk Assessment, the key conclusions are:

- The site falls within Flood Risk Zone 1.
- Examination of the proposals shows that there is no increase in flood risk to people or properties in the catchment than exists in the current situation, including when taking into account the effects of climate change.
- The surface water drainage strategy for the site will be to discharge the surface water to soakaways designed to cater for the 1:100 year storm with 30% additional storage to allow for climate change.
- The hard paved area of the site has been increased but surface water is to be discharged to ground and therefore the peak rate and volume of runoff will also be reduced.

Therefore, it can be concluded that the development is in accordance with Communities & Local Government, National Planning Policy Framework (NPPF), Planning Practice Guidance (PPG) and the Department for Environment, Food and Rural Affairs (DEFRA), sustainable Drainage Systems, Non-statutory technical standards for sustainable drainage systems March 2015.

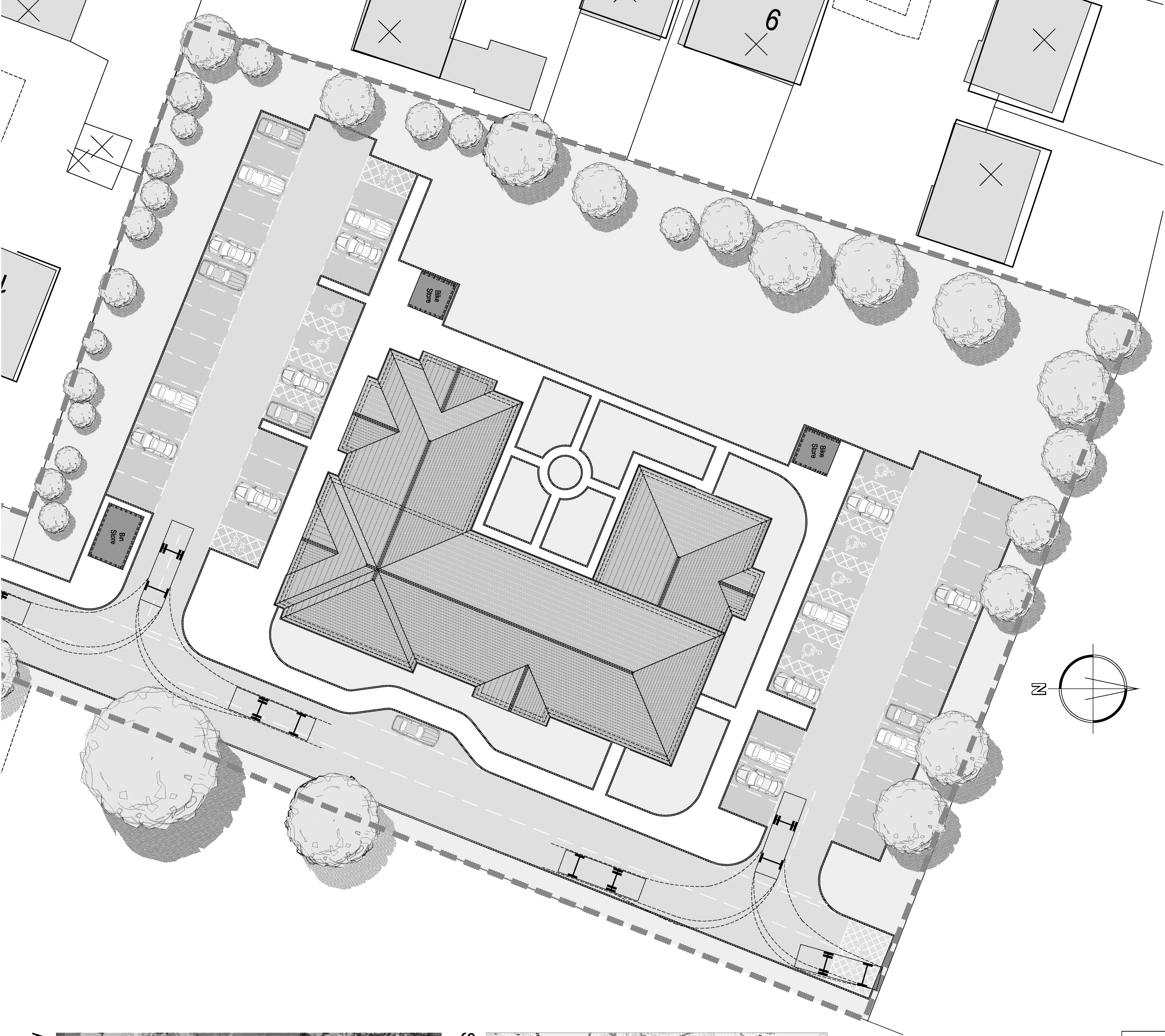
Appendix A

Existing Site Survey

Appendix B

Development Proposals

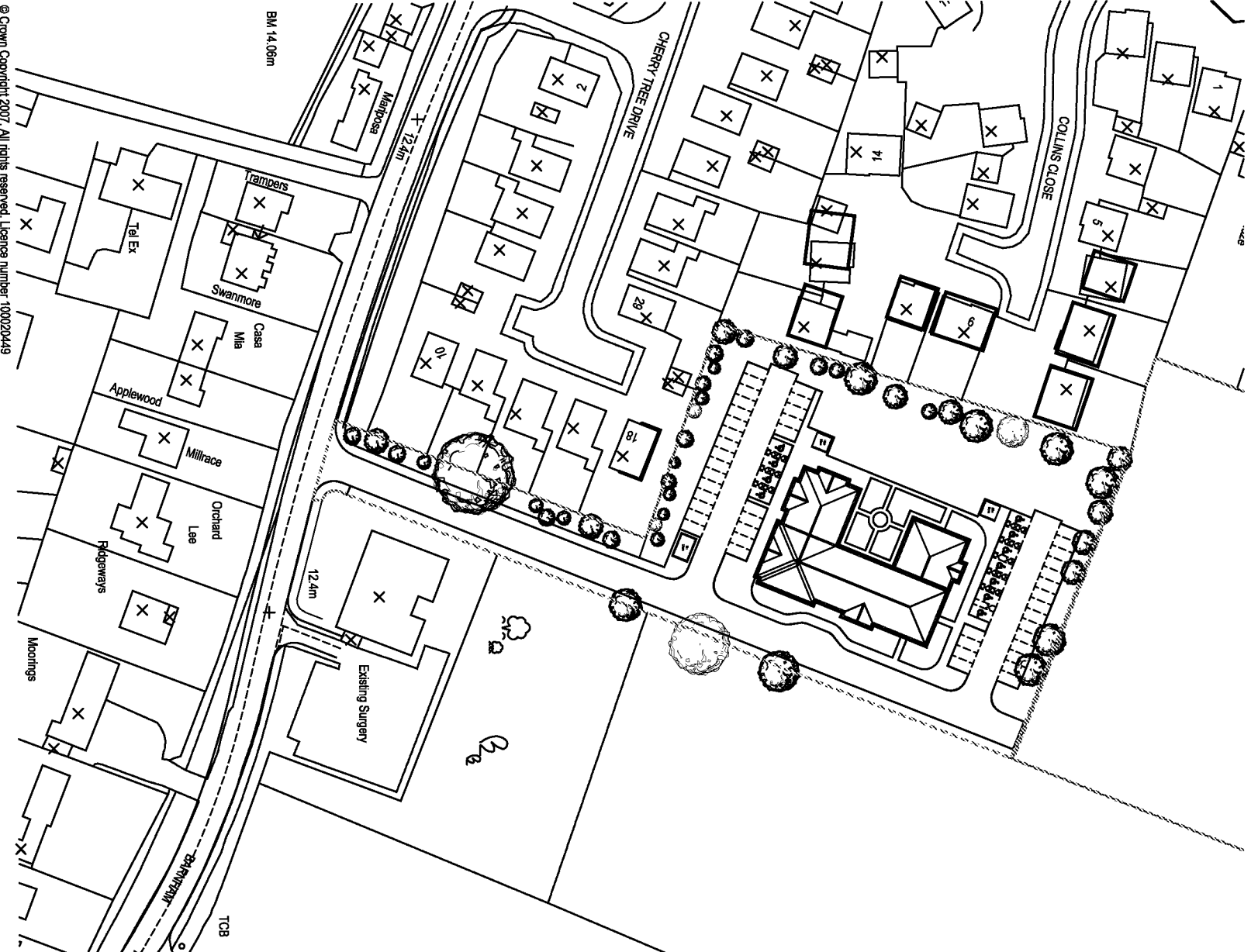
NOTE: Site plan below is only indicative with regards to the site landscaping. See separate drawings by Landscape Perspective for actual materials and planting types along with the locations where they will be used planted.



SITE LOCATION SCALE: NTS

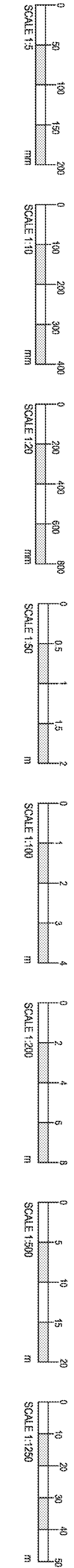


AERIAL PHOTOGRAPH SCALE: NTS



LOCATION PLAN SCALE: 1:1250

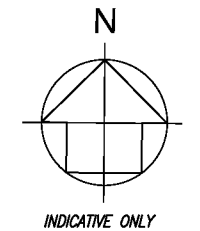
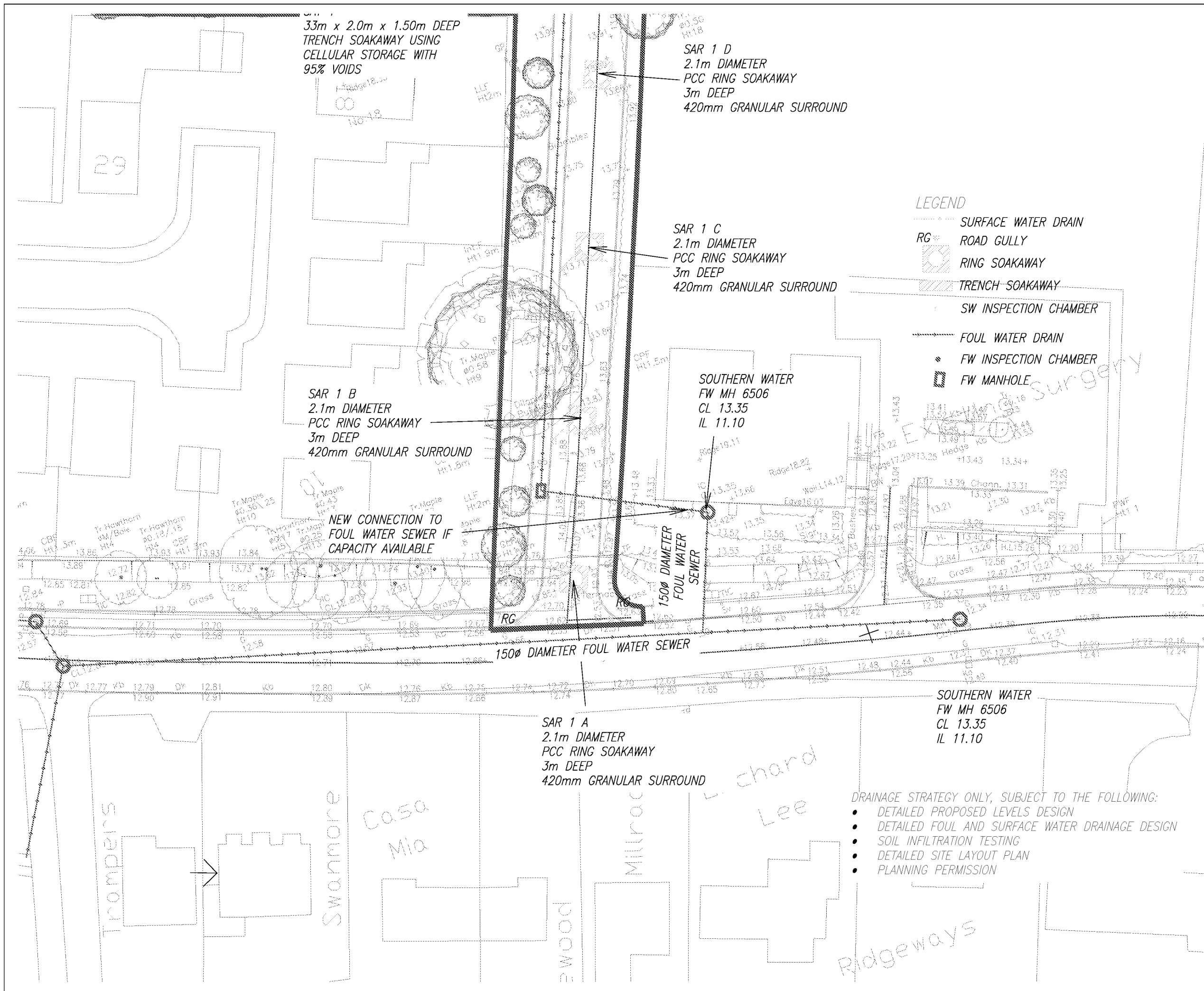
SITE PLAN SCALE: 1:200



DRAWING STATUS			
PLANNING			
THE CROFT MEDICAL CENTRE BARNHAM ROAD EASTERGATE WEST SUSSEX PO20 3RP			
DATE: 03.02.09	DESIGNED BY: J.M.	DATE: 03.02.09	SCALE: 1:1250
1:500, 1:1250	DESIGNED BY: J.M.	DATE: 03.02.09	SCALE: 1:1250
5499	110	A	

Appendix C

**Drainage Strategy &
Soakaway Calculations**



LEGEND

- SURFACE WATER DRAIN
- RG ROAD GULLY
- RING SOAKAWAY
- ▨ TRENCH SOAKAWAY
- SW INSPECTION CHAMBER
- FOUL WATER DRAIN
- ◆ FW INSPECTION CHAMBER
- FW MANHOLE

PREFERS TO DRAWING NUMBERS SHALL SIGNIFY THE FOLLOWING --

P = PRELIMINARY	SHALL NOT BE USED FOR CONTRACT OR CONSTRUCTION PURPOSES.
T = TENDER	SHALL NOT BE USED FOR CONSTRUCTION PURPOSES.
C = CONSTRUCTION	THESE ARE THE ONLY DRAWINGS THAT SHALL BE USED FOR CONSTRUCTION PURPOSES.
R = RECORD	RECORD OF ACTUAL COMPLETED WORK.

REV	DATE	DESCRIPTION	BY	CHK	APP
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DATE

PROJECT: **SIMPSON HILDER ASSOCIATES**

JOB TITLE: **THE CROFT SURGERY
EASTERGATE**

DRAWING TITLE: **DRAINAGE STRATEGY
SHEET 2 OF 2**

DATE	ENGINEER	DESIGNED	APP
SPB	SPB	R.J.P.	R.J.P.

DATE	JUNE 2016	SCALE @ A1	1:200
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JOB NO.	F.17064	PROJECT NO.	601	REV.	1
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FOR INFORMATION

- DRAINAGE STRATEGY ONLY, SUBJECT TO THE FOLLOWING:
- DETAILED PROPOSED LEVELS DESIGN
 - DETAILED FOUL AND SURFACE WATER DRAINAGE DESIGN
 - SOIL INFILTRATION TESTING
 - DETAILED SITE LAYOUT PLAN
 - PLANNING PERMISSION

The Croft Surgery
Eastergate
PCC Rings A to H



Date 24.06.16
File PCC Rings A to H.srcx

Designed by S Baker
Checked by

Micro Drainage

Source Control 2016.1

Summary of Results for 100 year Return Period (+30%)

Half Drain Time : 630 minutes.

Storm Event	Max Level (m)	Max Depth (m)	Max Infiltration (l/s)	Max Volume (m³)	Status
15 min Summer	0.772	0.772	0.8	33.4	O K
30 min Summer	1.023	1.023	0.9	44.2	O K
60 min Summer	1.282	1.282	1.0	55.4	O K
120 min Summer	1.527	1.527	1.2	66.0	O K
180 min Summer	1.645	1.645	1.2	71.1	O K
240 min Summer	1.705	1.705	1.3	73.7	O K
360 min Summer	1.755	1.755	1.3	75.8	O K
480 min Summer	1.763	1.763	1.3	76.2	O K
600 min Summer	1.764	1.764	1.3	76.2	O K
720 min Summer	1.759	1.759	1.3	76.0	O K
960 min Summer	1.737	1.737	1.3	75.1	O K
1440 min Summer	1.669	1.669	1.2	72.1	O K
2160 min Summer	1.548	1.548	1.2	66.9	O K
2880 min Summer	1.437	1.437	1.1	62.1	O K
4320 min Summer	1.250	1.250	1.0	54.0	O K
5760 min Summer	1.095	1.095	0.9	47.3	O K
7200 min Summer	0.965	0.965	0.9	41.7	O K
8640 min Summer	0.853	0.853	0.8	36.9	O K
10080 min Summer	0.759	0.759	0.8	32.8	O K
15 min Winter	0.866	0.866	0.8	37.4	O K
30 min Winter	1.149	1.149	1.0	49.6	O K
60 min Winter	1.441	1.441	1.1	62.3	O K
120 min Winter	1.721	1.721	1.3	74.4	O K
180 min Winter	1.858	1.858	1.3	80.3	O K

Storm Event	Rain (mm/hr)	Flooded Volume (m³)	Time-Peak (mins)
15 min Summer	116.878	0.0	19
30 min Summer	78.200	0.0	34
60 min Summer	49.937	0.0	64
120 min Summer	30.810	0.0	122
180 min Summer	22.897	0.0	182
240 min Summer	18.424	0.0	242
360 min Summer	13.506	0.0	360
480 min Summer	10.835	0.0	438
600 min Summer	9.126	0.0	494
720 min Summer	7.927	0.0	556
960 min Summer	6.342	0.0	684
1440 min Summer	4.622	0.0	966
2160 min Summer	3.362	0.0	1380
2880 min Summer	2.679	0.0	1788
4320 min Summer	1.942	0.0	2592
5760 min Summer	1.544	0.0	3352
7200 min Summer	1.291	0.0	4112
8640 min Summer	1.116	0.0	4848
10080 min Summer	0.987	0.0	5648
15 min Winter	116.878	0.0	19
30 min Winter	78.200	0.0	33
60 min Winter	49.937	0.0	62
120 min Winter	30.810	0.0	120
180 min Winter	22.897	0.0	178

The Croft Surgery
Eastergate
PCC Rings A to H



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Summary of Results for 100 year Return Period (+30%)

Storm Event	Max Level (m)	Max Depth (m)	Max Infiltration (l/s)	Max Volume (m³)	Status
240 min Winter	1.932	1.932	1.4	83.5	O K
360 min Winter	2.012	2.012	1.4	86.4	O K
480 min Winter	2.066	2.066	1.4	87.3	O K
600 min Winter	2.561	2.561	1.4	87.0	O K
720 min Winter	2.158	2.158	1.4	86.6	O K
960 min Winter	1.976	1.976	1.4	85.4	O K
1440 min Winter	1.880	1.880	1.3	81.2	O K
2160 min Winter	1.709	1.709	1.3	73.9	O K
2880 min Winter	1.546	1.546	1.2	66.8	O K
4320 min Winter	1.282	1.282	1.0	55.4	O K
5760 min Winter	1.072	1.072	0.9	46.3	O K
7200 min Winter	0.902	0.902	0.9	39.0	O K
8640 min Winter	0.761	0.761	0.8	32.9	O K
10080 min Winter	0.644	0.644	0.7	27.8	O K

Storm Event	Rain (mm/hr)	Flooded Volume (m³)	Time-Peak (mins)
240 min Winter	18.424	0.0	236
360 min Winter	13.506	0.0	348
480 min Winter	10.835	0.0	456
600 min Winter	9.126	0.0	552
720 min Winter	7.927	0.0	574
960 min Winter	6.342	0.0	724
1440 min Winter	4.622	0.0	1038
2160 min Winter	3.362	0.0	1476
2880 min Winter	2.679	0.0	1904
4320 min Winter	1.942	0.0	2728
5760 min Winter	1.544	0.0	3568
7200 min Winter	1.291	0.0	4328
8640 min Winter	1.116	0.0	5104
10080 min Winter	0.987	0.0	5848

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Rainfall Details

Rainfall Model	FSR	Winter Storms	Yes
Return Period (years)	100	Cv (Summer)	0.750
Region	England and Wales	Cv (Winter)	0.840
M5-60 (mm)	19.000	Shortest Storm (mins)	15
Ratio R	0.360	Longest Storm (mins)	10080
Summer Storms	Yes	Climate Change %	+30

Time Area Diagram

Total Area (ha) 0.155

Time (mins) Area

From: To: (ha)

0 4 0.155

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Model Details

Storage is Online Cover Level (m) 3.000

Lined Soakaway Structure

Infiltration Coefficient Base (m/hr)	0.03600	Ring Diameter (m)	2.10
Infiltration Coefficient Side (m/hr)	0.03600	Pit Multiplier	1.5
Safety Factor	2.0	Number Required	8
Porosity	0.30	Cap Volume Depth (m)	2.000
Invert Level (m)	0.000	Cap Infiltration Depth (m)	2.000

The Croft Surgery
Eastergate
SAT 1



Date 24.06.16
File SAT 1.srcx

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Source Control 2016.1

Summary of Results for 100 year Return Period (+30%)

Half Drain Time : 1078 minutes.

Storm Event	Max Level (m)	Max Depth (m)	Max Infiltration (l/s)	Max Volume (m³)	Status
15 min Summer	0.499	0.499	0.6	35.1	O K
30 min Summer	0.663	0.663	0.6	46.6	O K
60 min Summer	0.836	0.836	0.7	58.8	O K
120 min Summer	1.008	1.008	0.8	70.9	O K
180 min Summer	1.099	1.099	0.8	77.3	O K
240 min Summer	1.155	1.155	0.8	81.2	O K
360 min Summer	1.218	1.218	0.8	85.6	O K
480 min Summer	1.250	1.250	0.9	87.9	O K
600 min Summer	1.265	1.265	0.9	88.9	O K
720 min Summer	1.267	1.267	0.9	89.1	O K
960 min Summer	1.261	1.261	0.9	88.7	O K
1440 min Summer	1.237	1.237	0.9	86.9	O K
2160 min Summer	1.183	1.183	0.8	83.2	O K
2880 min Summer	1.124	1.124	0.8	79.0	O K
4320 min Summer	1.018	1.018	0.8	71.6	O K
5760 min Summer	0.924	0.924	0.7	65.0	O K
7200 min Summer	0.840	0.840	0.7	59.1	O K
8640 min Summer	0.764	0.764	0.7	53.7	O K
10080 min Summer	0.697	0.697	0.6	49.0	O K
15 min Winter	0.559	0.559	0.6	39.3	O K
30 min Winter	0.744	0.744	0.7	52.3	O K
60 min Winter	0.939	0.939	0.7	66.0	O K
120 min Winter	1.135	1.135	0.8	79.8	O K
180 min Winter	1.240	1.240	0.9	87.2	O K

Storm Event	Rain (mm/hr)	Flooded Volume (m³)	Time-Peak (mins)
15 min Summer	116.878	0.0	19
30 min Summer	78.200	0.0	34
60 min Summer	49.937	0.0	64
120 min Summer	30.810	0.0	124
180 min Summer	22.897	0.0	182
240 min Summer	18.424	0.0	242
360 min Summer	13.506	0.0	362
480 min Summer	10.835	0.0	482
600 min Summer	9.126	0.0	600
720 min Summer	7.927	0.0	716
960 min Summer	6.342	0.0	818
1440 min Summer	4.622	0.0	1068
2160 min Summer	3.362	0.0	1472
2880 min Summer	2.679	0.0	1900
4320 min Summer	1.942	0.0	2724
5760 min Summer	1.544	0.0	3520
7200 min Summer	1.291	0.0	4328
8640 min Summer	1.116	0.0	5104
10080 min Summer	0.987	0.0	5856
15 min Winter	116.878	0.0	19
30 min Winter	78.200	0.0	33
60 min Winter	49.937	0.0	62
120 min Winter	30.810	0.0	122
180 min Winter	22.897	0.0	180

The Croft Surgery
Eastergate
SAT 1



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Summary of Results for 100 year Return Period (+30%)

Storm Event	Max Level (m)	Max Depth (m)	Max Infiltration (l/s)	Max Volume (m³)	Status
240 min Winter	1.304	1.304	0.9	91.7	O K
360 min Winter	1.380	1.380	0.9	97.0	O K
480 min Winter	1.423	1.423	0.9	100.1	O K
600 min Winter	1.446	1.446	0.9	101.6	O K
720 min Winter	1.456	1.456	0.9	102.3	O K
960 min Winter	1.452	1.452	0.9	102.0	O K
1440 min Winter	1.419	1.419	0.9	99.7	O K
2160 min Winter	1.350	1.350	0.9	94.9	O K
2880 min Winter	1.268	1.268	0.9	89.2	O K
4320 min Winter	1.113	1.113	0.8	78.2	O K
5760 min Winter	0.977	0.977	0.8	68.7	O K
7200 min Winter	0.858	0.858	0.7	60.3	O K
8640 min Winter	0.753	0.753	0.7	52.9	O K
10080 min Winter	0.661	0.661	0.6	46.5	O K

Storm Event	Rain (mm/hr)	Flooded Volume (m³)	Time-Peak (mins)
240 min Winter	18.424	0.0	238
360 min Winter	13.506	0.0	354
480 min Winter	10.835	0.0	468
600 min Winter	9.126	0.0	582
720 min Winter	7.927	0.0	692
960 min Winter	6.342	0.0	902
1440 min Winter	4.622	0.0	1124
2160 min Winter	3.362	0.0	1580
2880 min Winter	2.679	0.0	2048
4320 min Winter	1.942	0.0	2936
5760 min Winter	1.544	0.0	3800
7200 min Winter	1.291	0.0	4608
8640 min Winter	1.116	0.0	5440
10080 min Winter	0.987	0.0	6160

The Croft Surgery
Eastergate
SAT 1



Date 24.06.16
File SAT 1.srcx

Designed by S Baker
Checked by

Micro Drainage

Source Control 2016.1

Rainfall Details

Rainfall Model	FSR	Winter Storms	Yes
Return Period (years)	100	Cv (Summer)	0.750
Region	England and Wales	Cv (Winter)	0.840
M5-60 (mm)	19.000	Shortest Storm (mins)	15
Ratio R	0.360	Longest Storm (mins)	10080
Summer Storms	Yes	Climate Change %	+30

Time Area Diagram

Total Area (ha) 0.162

Time (mins) Area

From: To: (ha)

0 4 0.162

The Croft Surgery
Eastergate
SAT 1



Date 24.06.16
File SAT 1.srcx

Designed by S Baker
Checked by

Micro Drainage

Source Control 2016.1

Model Details

Storage is Online Cover Level (m) 1.500

Trench Soakaway Structure

Infiltration Coefficient Base (m/hr)	0.03600	Trench Width (m)	2.0
Infiltration Coefficient Side (m/hr)	0.03600	Trench Length (m)	37.0
Safety Factor	2.0	Slope (1:X)	0.0
Porosity	0.95	Cap Volume Depth (m)	0.000
Invert Level (m)	0.000	Cap Infiltration Depth (m)	0.000

The Croft Surgery
Eastergate
SAT 2



Date 24.06.16
File SAT 2.srcx

Designed by S Baker
Checked by

Micro Drainage

Source Control 2016.1

Summary of Results for 100 year Return Period (+30%)

Half Drain Time : 1072 minutes.

Storm Event	Max Level (m)	Max Depth (m)	Max Infiltration (l/s)	Max Volume (m³)	Status
15 min Summer	0.497	0.497	0.5	31.2	O K
30 min Summer	0.661	0.661	0.6	41.4	O K
60 min Summer	0.833	0.833	0.6	52.2	O K
120 min Summer	1.004	1.004	0.7	63.0	O K
180 min Summer	1.095	1.095	0.7	68.7	O K
240 min Summer	1.150	1.150	0.7	72.1	O K
360 min Summer	1.213	1.213	0.8	76.0	O K
480 min Summer	1.245	1.245	0.8	78.1	O K
600 min Summer	1.259	1.259	0.8	79.0	O K
720 min Summer	1.262	1.262	0.8	79.1	O K
960 min Summer	1.255	1.255	0.8	78.7	O K
1440 min Summer	1.231	1.231	0.8	77.2	O K
2160 min Summer	1.177	1.177	0.7	73.8	O K
2880 min Summer	1.118	1.118	0.7	70.1	O K
4320 min Summer	1.012	1.012	0.7	63.5	O K
5760 min Summer	0.919	0.919	0.7	57.6	O K
7200 min Summer	0.835	0.835	0.6	52.3	O K
8640 min Summer	0.759	0.759	0.6	47.6	O K
10080 min Summer	0.692	0.692	0.6	43.4	O K
15 min Winter	0.557	0.557	0.5	34.9	O K
30 min Winter	0.741	0.741	0.6	46.5	O K
60 min Winter	0.936	0.936	0.7	58.7	O K
120 min Winter	1.130	1.130	0.7	70.9	O K
180 min Winter	1.235	1.235	0.8	77.4	O K

Storm Event	Rain (mm/hr)	Flooded Volume (m³)	Time-Peak (mins)
15 min Summer	116.878	0.0	19
30 min Summer	78.200	0.0	34
60 min Summer	49.937	0.0	64
120 min Summer	30.810	0.0	124
180 min Summer	22.897	0.0	182
240 min Summer	18.424	0.0	242
360 min Summer	13.506	0.0	362
480 min Summer	10.835	0.0	482
600 min Summer	9.126	0.0	600
720 min Summer	7.927	0.0	716
960 min Summer	6.342	0.0	818
1440 min Summer	4.622	0.0	1068
2160 min Summer	3.362	0.0	1472
2880 min Summer	2.679	0.0	1900
4320 min Summer	1.942	0.0	2724
5760 min Summer	1.544	0.0	3520
7200 min Summer	1.291	0.0	4328
8640 min Summer	1.116	0.0	5104
10080 min Summer	0.987	0.0	5856
15 min Winter	116.878	0.0	19
30 min Winter	78.200	0.0	33
60 min Winter	49.937	0.0	62
120 min Winter	30.810	0.0	122
180 min Winter	22.897	0.0	180

The Croft Surgery
Eastergate
SAT 2



Date 24.06.16
File SAT 2.srcx

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Micro Drainage

Source Control 2016.1

Summary of Results for 100 year Return Period (+30%)

Storm Event	Max Level (m)	Max Depth (m)	Max Infiltration (l/s)	Max Volume (m³)	Status
240 min Winter	1.299	1.299	0.8	81.5	O K
360 min Winter	1.375	1.375	0.8	86.2	O K
480 min Winter	1.417	1.417	0.8	88.9	O K
600 min Winter	1.440	1.440	0.8	90.3	O K
720 min Winter	1.449	1.449	0.8	90.9	O K
960 min Winter	1.445	1.445	0.8	90.6	O K
1440 min Winter	1.412	1.412	0.8	88.5	O K
2160 min Winter	1.343	1.343	0.8	84.2	O K
2880 min Winter	1.261	1.261	0.8	79.1	O K
4320 min Winter	1.106	1.106	0.7	69.3	O K
5760 min Winter	0.970	0.970	0.7	60.8	O K
7200 min Winter	0.852	0.852	0.6	53.4	O K
8640 min Winter	0.747	0.747	0.6	46.8	O K
10080 min Winter	0.656	0.656	0.6	41.1	O K

Storm Event	Rain (mm/hr)	Flooded Volume (m³)	Time-Peak (mins)
240 min Winter	18.424	0.0	238
360 min Winter	13.506	0.0	354
480 min Winter	10.835	0.0	468
600 min Winter	9.126	0.0	580
720 min Winter	7.927	0.0	692
960 min Winter	6.342	0.0	902
1440 min Winter	4.622	0.0	1124
2160 min Winter	3.362	0.0	1580
2880 min Winter	2.679	0.0	2044
4320 min Winter	1.942	0.0	2936
5760 min Winter	1.544	0.0	3800
7200 min Winter	1.291	0.0	4608
8640 min Winter	1.116	0.0	5440
10080 min Winter	0.987	0.0	6160

The Croft Surgery
Eastergate
SAT 2



Date 24.06.16
File SAT 2.srcx

Designed by S Baker
Checked by

Micro Drainage

Source Control 2016.1

Rainfall Details

Rainfall Model	FSR	Winter Storms	Yes
Return Period (years)	100	Cv (Summer)	0.750
Region	England and Wales	Cv (Winter)	0.840
M5-60 (mm)	19.000	Shortest Storm (mins)	15
Ratio R	0.360	Longest Storm (mins)	10080
Summer Storms	Yes	Climate Change %	+30

Time Area Diagram

Total Area (ha) 0.144

Time (mins) Area

From: To: (ha)

0 4 0.144

The Croft Surgery
Eastergate
SAT 2



Date 24.06.16
File SAT 2.srcx

Designed by S Baker
Checked by

Micro Drainage

Source Control 2016.1

Model Details

Storage is Online Cover Level (m) 1.500

Trench Soakaway Structure

Infiltration Coefficient Base (m/hr)	0.03600	Trench Width (m)	2.0
Infiltration Coefficient Side (m/hr)	0.03600	Trench Length (m)	33.0
Safety Factor	2.0	Slope (1:X)	0.0
Porosity	0.95	Cap Volume Depth (m)	0.000
Invert Level (m)	0.000	Cap Infiltration Depth (m)	0.000

Appendix C

Sewer Records

SEWER RECORDS PAGE 1 OF 2

105619



CHERRY TREE
23 MAY 2009
RECEIVED

105331

O.S. REF. SU9405SE	Drawn by: StickIA Scale: 1:1250	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. WARNING: E&C pipes are constructed of Bonded Asbestos Cement WARNING: Unknown (UNK) materials may include Bonded Asbestos Cement	N Southern Water
Title: The Croft Surgery	Date: 28/05/2009	Based upon Ordnance Survey Digital Data with the permission of the controller of H.M.S.O. Crown Copyright Reserved Licence No. WU 298530.	

494909

SEWER RECORDS PAGE 2 OF 2

Node	Cover	Invert	Size	Material	Shape	Node	Cover	Invert	Size	Material	Shape	Node	Cover	Invert	Size	Material	Shape	Node	Cover	Invert	Size	Material	Shape
4501X	11.94	10.4	150	VC	CIRC																		
5301X	12.46	11.28	150	VC	CIRC																		
5302X	12.58	12.09	150	VC	CIRC																		
5303X	12.87	12.35	100	VC	CIRC																		
5306X	12.87	12.02	150	VC	CIRC																		
5401X	12.72	11.97	150	VC	CIRC																		
5404X	13.38	11.54	150	VC	CIRC																		
5405X	13.4	11.52	150	VC	CIRC																		
5501X	13.93	12.04	150	VC	CIRC																		
5502X	12.61	11.7	150	VC	CIRC																		
5503X	14.22	11.81	150	VC	CIRC																		
5504X	12.75	11.35	150	VC	CIRC																		
5505X	12.72	11.23	175	VC	CIRC																		
5507X	13.67	11.33	150	VC	CIRC																		
5601X	13.57	12.47	150	VC	CIRC																		
6301X	12.03	11.39	150	PF	CIRC																		
6401X	12.54	12.16	150	PF	CIRC																		
6402X	12.68	12.03	150	PF	CIRC																		
6403X	12.6	11.93	150	PF	CIRC																		
6404X	12.37	11.97	150	PF	CIRC																		
6405X	12.87		150	VC	CIRC																		
6501X	12.64	10.96	175	VC	CIRC																		
6502X	12.42	10.8	175	VC	CIRC																		
6503X	13.84	12.02	150	VC	CIRC																		
6506X	13.7	11.45	150	PVC	CIRC																		
7301X	12.03	11.19	150	PF	CIRC																		
7302X	12.82	10.92	175	VC	CIRC																		
7304X	12.43	11.13	175	VC	CIRC																		
7305X	12.15	10.59	175	VC	CIRC																		
7306X	12.24	10.45	175	VC	CIRC																		
7403X	12.22	10.26	175	VC	CIRC																		
7501X	12.2	10.68	175	VC	CIRC																		
8301X	11.92	9.79	175	VC	CIRC																		
8302X	12.04	9.98	175	VC	CIRC																		

EXAMINED ONLY
23 MAY 2009
RECEIVED

LINE STYLES / COLOURS	MATERIALS	LEGEND - SEWERS
Brown ----- Road Styptic Sewer ----- Road Vacuum Main ----- Road Flushing Main ----- Combined ----- Combined Syphonic Sewer ----- Combined Flushing Main ----- Lateral Drop ----- Building Over Agreement Area	AK Asphalt BAQ Bitumen Subbase Cement BRD Brick (Common) BRE Brick (Engineering) CD Concrete Box Culvert CI Cast Iron CO Concrete (in situ) CP Concrete (Pre-Cast) CS Concrete (Segmental) CSU Concrete (Segmental) (Uncoated) DI Ductile Iron GRD Glass Reinforced Plastic GRP Glass Reinforced Plastic MAZ Masonry in regular Courses MAH Masonry in random Courses PE Polyethylene PF Pitch Fibre PP Polypropylene PVC Polyvinyl Chloride RPM Reinforced Plastic Main SI Spun Iron ST Steel VC Vitrified Clay ZZZ Other ZZZ Unknown	Manhole (SW) Manhole (FAC) Lamp hole (SW) Lamp hole (FAC) Pumping Station (SW) Pumping Station (FAC) Side entry manhole (SW) Side entry manhole (FAC) Blind shaft (SW) Blind shaft (FAC) Ejector station (SW) Ejector station (FAC) Waterlight door (SW) Waterlight door (FAC) Flushing ch. Man (SW) Flushing ch. Man (FAC) Flushing ch. No. (SW) Flushing ch. No. (FAC) Demolition Chamber Whodown (SW) Whodown (FAC) Roughing Eye (SW) Roughing Eye (FAC) Gauging point (SW) Gauging point (FAC) Intercept chamber (SW) Intercept chamber (FAC) Storm Tank (SW) Storm Tank (FAC) Vortex chamber (SW) Vortex chamber (FAC) Label slope Dumery/S24 manhole Outlet Penstock chamber Demolition Storm Overhead Backdrop manhole Other (S) Other Change in sewer (S) Robur valve Flap valve Gate Airlock Valve Closed Valve Air Valve Hatch box (SW) Hatch box (FAC) Direction arrow Emptying valve Catchpit Soakaway Joint Relieving Point Whodown treatment works Manhole treatment works Outlet treatment works Vent Vent column Total storage tank Stack end Head of Public Sewer Mini Pumping Station SHAPES (S) A. Androm B. Barrel C. Circular E. Egg H. Horseshoe K. Key R. Rectangular S. Square T. Triangular U. U-shape X. Cross NODE REFERENCING SYSTEM 1st digit: Inverted manhole identifier 2nd digit: Inverted manhole identifier 3rd digit: Inverted manhole identifier 4th digit: Inverted manhole identifier

Drawn by: StickIA

Title: The Croft Surgrey

Date: 28/05/2009

Southern
Water