



**Development at Crockwell House Farm,  
Manor Road, Great Bourton**

***Drainage Statement  
Revision A***

*25<sup>th</sup> June 2020*

**1. Site**

Cotswold Transport Planning have been commissioned to provide drainage consultancy by Ridge and Partners LLP at the behest of March Projects for the development at Crockwell House Farm, Great Bourton.

The site is located off Manor Road, Great Bourton. The proposed development consists of a barn conversion to a residential dwelling with associated access and landscaping. The development will create approximately 480m<sup>2</sup> (0.048Ha) of impermeable area in a currently brownfield site.

**2. Existing Site Conditions & Drainage**

The site is brownfield with multiple existing barns and an access from Manor Road/Stanwell Lane.

British Geological Survey (BGS) mapping indicates the site to have bedrock of Dyrham Formation – Siltstone and mudstone interbedded. Soilsmap indicates the site to be Loamy freely draining soils.

Thames Water Asset Records indicate an existing 150mm dia foul sewer at the junction of Manor Road/Stanwell Lane.

The above geology details insinuate the area is of a permeable nature. Thames Water records also imply this due to the lack of surface water sewers in the area.

**3. Site Infiltration Testing (BRE365)**

Site infiltration testing was completed on 1st May 2020 as part of a GIR, Soiltechnics report ref STS5055. Multiple exploratory excavations were undertaken up to 2.3m deep.



No groundwater was found in any of the excavations. Each one comprised of made ground overlying the Dyrham Formation.

All excavations remained stable for the duration of the investigation and testing.

Infiltration testing was undertaken in four of the trial pits, however water levels experienced insufficient infiltration in three of the pits in the allocated time on site. One pit, TP04, experienced rates between  $2.9 \times 10^{-5}$  m/s and  $6.58 \times 10^{-5}$  m/s.

In TP04 limestone rock was encountered, with lateral migration of water on the limestone. Trial Pit logs also denote Limestone in TP02. It should be noted that Approximately 5m to the north of TP04 there is an existing well, as indicated on the topographical survey.

Based on the site results infiltration will be a suitable method of stormwater management however, further on-site testing within the Limestone layer is required for detail design. For the purposes of this strategy the lowest rate,  $2.9 \times 10^{-5}$  m/s, will be taken as the design rate.

#### 4. Proposed Stormwater Drainage

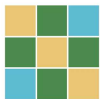
It is proposed stormwater will be collected via traditional gravity system and outfall to a single soakaway. The Soakaway is to be designed in accordance with BRE 365 and located a minimum of 5m from any structure or building. Due to the limited area of known permeability (refer to GIR STS5055) it is proposed to utilise a cellular soakaway (plastic crates) instead of a granular soakaway.

Calculations have been run to size a single soakaway to serve the proposed private access road and dwelling. The soakaway has been designed for up to the 1 in 100 year + 40% CC event using the design rate,  $2.9 \times 10^{-5}$  m/s.

The stormwater systems have been:

- Designed with Microdrainage Source Control (2020.01)
- Run with a suitable return period – 100 year with 40% allowance for climate change.

Furthermore, exceedance flow routes have been assessed for an event beyond the 1 in 100 year plus 40% CC design. It is expected flows will travel south down the



access road and enter Manor Road, then south towards Great Bourton to be intercepted by highway drainage.

Please refer to enclosed drainage plan and associated Microdrainage Source Control calculations.

## **5. Water Quality**

All stormwater gullies, inspection chambers and manholes are recommended to contain silt traps and/or catch pits to reduce sediment in the system.

It is recommended, as good practise, that the property utilise rainwater butts for water quality. These can also provide a small reduction in the runoff volume entering the stormwater system.

The cellular soakaway is to have a non-woven geotextile membrane. This will provide filtration and further water quality benefits to stormwater discharging to ground.

## **6. Maintenance Regime**

Maintenance of SuDS features are essential to ensure that the stormwater drainage system operates effectively and that flooding of the site and surrounding areas is prevented.

The responsibility of maintaining the stormwater system and soakaway would be the individual property owner or a management company.

A full maintenance regime should be carried out to ensure that all aspects of the drainage system remain operational.

## **7. Proposed Foul Water Drainage**

It is proposed to drain the foul sewerage via traditional gravity system to an existing on-site foul manhole. The existing foul chamber is assumed to connect to the Thames Water foul manhole, ref 5602, in Manor Road.

Connection to the existing foul chamber will be subject to a CCTV survey confirming condition and outfall.

Anticipated foul flows have been calculated using SFA7 principles of 4000 litres per day per dwelling. This equates to a foul discharge rate of 0.05 l/s from site for a single property.



Connection to the existing 150mm dia foul sewer, direct or indirect, will be subject to a S106 agreement with Thames Water.

#### **8. Supporting Information**

- Thames Water Asset Location Records
- CTP-19-869 C001 Proposed Drainage Plan.
- Microdrainage Source Control Calcs - 100 year with 40% allowance for climate change.

# Asset location search



## Property Searches

Cotswold Transport Planning  
CTH House CTH House

CHELTENHAM  
GL50 3QQ

**Search address supplied** Crockwell House Farm  
Manor Road  
Great Bourton  
Banbury  
OX17 1QT

**Your reference** CTP-20-269

**Our reference** ALS/ALS Standard/2020\_4197930

**Search date** 12 June 2020

### Knowledge of features below the surface is essential for every development

The benefits of this knowledge not only include ensuring due diligence and avoiding risk, but also being able to ascertain the feasibility of any development.

Did you know that Thames Water Property Searches can also provide a variety of utility searches including a more comprehensive view of utility providers' assets (across up to 35-45 different providers), as well as more focused searches relating to specific major utility companies such as National Grid (gas and electric).

Contact us to find out more.



Thames Water Utilities Ltd  
Property Searches, PO Box 3189, Slough SL1 4WW  
DX 151280 Slough 13

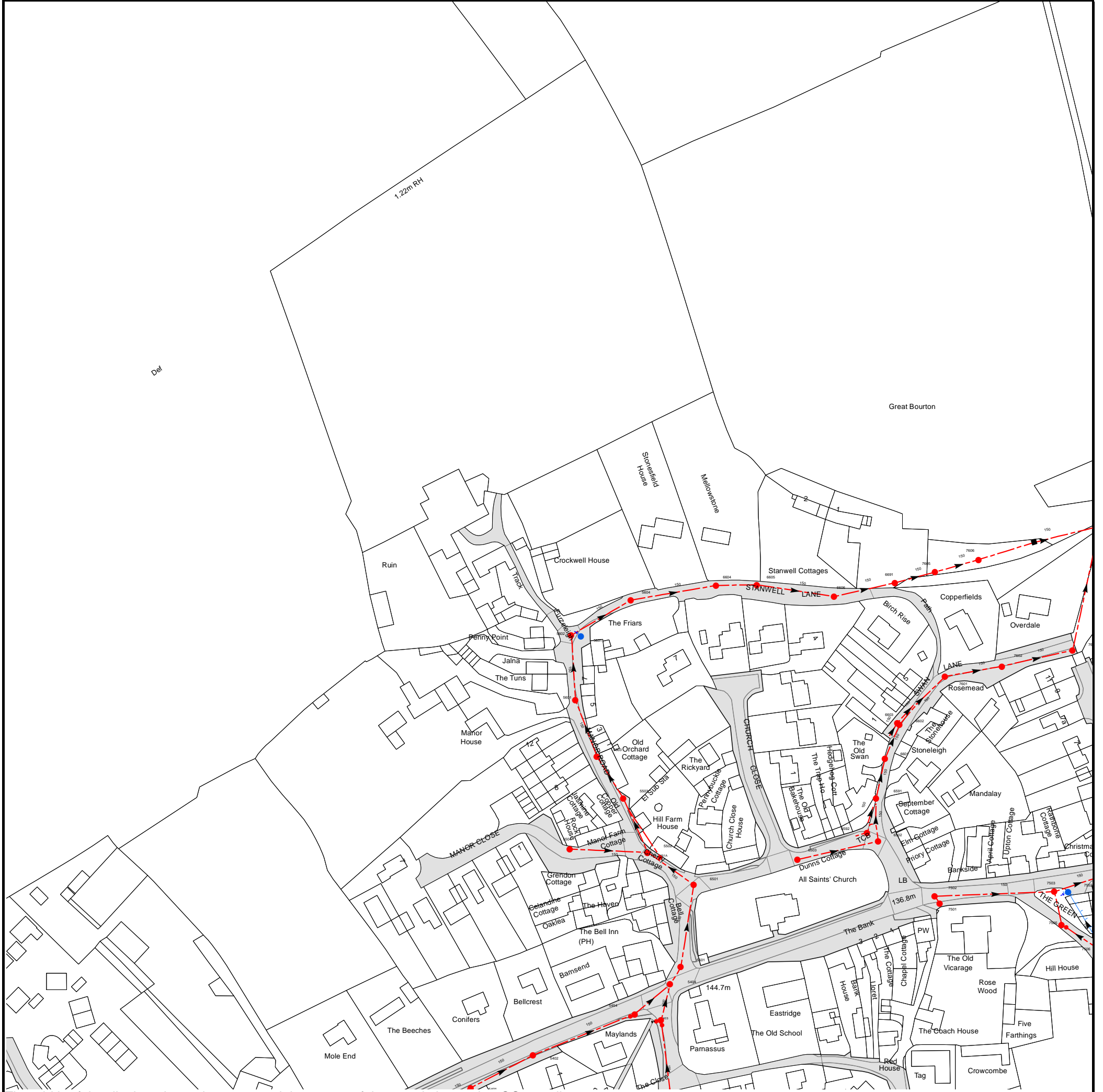


[searches@thameswater.co.uk](mailto:searches@thameswater.co.uk)  
[www.thameswater-propertysearches.co.uk](http://www.thameswater-propertysearches.co.uk)



0845 070 9148

Asset Location Search Sewer Map - ALS/ALS Standard/2020\_4197930



The width of the displayed area is 500 m and the centre of the map is located at OS coordinates 445538,245697

The position of the apparatus shown on this plan is given without obligation and warranty, and the accuracy cannot be guaranteed. Service pipes are not shown but their presence should be anticipated. No liability of any kind whatsoever is accepted by Thames Water for any kind or omission. The actual position of mains and services must be verified and established on site before any works are undertaken.

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

NB. Levels quoted in metres Ordnance Newlyn Datum. The value -9999.00 indicates that no survey information is available

Manhole Reference	Manhole Cover Level	Manhole Invert Level
7602	131.5	130.02
7503	133.93	132.9
7505	135.58	133.99
7552	133.7	133.02
7603	127.93	126.44
7506	137.05	135.85
7791	n/a	n/a
5504	144.35	143.41
5602	141.89	139.54
5601	142	140.51
5651	141.77	140.43
5603	142.46	141.09
5503	142.78	141.47
5604	139.93	138.36
5502	143.26	141.82
551A	n/a	n/a
5501	144.77	143.39
6501	143.54	142.07
6604	136.61	135.72
6605	135.51	134.18
6503	140.77	139.86
6606	133.23	131.73
6592	n/a	n/a
6591	n/a	n/a
6502	138.8	137.63
6601	136.54	135.1
6691	n/a	n/a
6603	135.77	134.27
6602	135.44	133.94
7502	137.29	135.82
7605	126.08	123.82
7501	137.62	136.92
7601	132.37	131.04
7606	125.15	123.55
5401	147.61	146.47
5402	146.96	145.74
5403	145.32	144.01
5454	n/a	n/a
5404	145.06	143.62

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0 45 90 180 270 360  
Meters

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**Scale:** 1:7158  
**Width:** 2000m  
**Printed By:** G1KANAGA  
**Print Date:** 12/06/2020  
**Map Centre:** 445538,245697  
**Grid Reference:** SP4545NE



















**Comments:**










# ALS Sewer Map Key

## Public Sewer Types (Operated & Maintained by Thames Water)

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





## Sewer Fittings

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

-  Air Valve
-  Dam Chase
-  Fitting
-  Meter
-  Vent Column




## Operational Controls

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

-  Control Valve
-  Drop Pipe
-  Ancillary
-  Weir






## End Items

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

-  Outfall
-  Undefined End
-  Inlet






## Other Symbols

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








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

### Areas

Lines denoting areas of underground surveys, etc.


-  Agreement
-  Operational Site
-  Chamber
-  Tunnel
-  Conduit Bridge

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

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

### Notes:

- 1) All levels associated with the plans are to Ordnance Datum Newlyn.
- 2) All measurements on the plans are metric.
- 3) Arrows (on gravity fed sewers) or flecks (on rising mains) indicate direction of flow.
- 4) Most private pipes are not shown on our plans, as in the past, this information has not been recorded.
- 5) 'na' or '0' on a manhole level indicates that data is unavailable.
- 6) The text appearing alongside a sewer line indicates the internal diameter of the pipe in millimetres. Text next to a manhole indicates the manhole reference number and should not be taken as a measurement. If you are unsure about any text or symbology present on the plan, please contact a member of Property Insight on 0845 070 9148.


Cotswold Transport Planning		Page 1
CTP House, Knapp Road Cheltenham Gloucestershire, GL50 3QQ	CROCKWELL HOUSE FARM CELLULAR SOAKAWAY - BARN 1 IN 100YR + 40% CC	
Date 25/06/2020 12:58 File CTP-20-269 Barn Cellula...	Designed by NT Checked by KT	
Innovyze	Source Control 2020.1	

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

Half Drain Time : 304 minutes.

Storm Event	Max Level (m)	Max Depth (m)	Max Infiltration (l/s)	Max Volume (m <sup>3</sup> )	Status
15 min Summer	99.294	1.094	0.5	12.0	O K
30 min Summer	99.605	1.405	0.6	15.3	O K
60 min Summer	99.886	1.686	0.7	18.4	O K
120 min Summer	100.092	1.892	0.7	20.7	O K
180 min Summer	100.143	1.943	0.8	21.2	O K
240 min Summer	100.140	1.940	0.8	21.2	O K
360 min Summer	100.111	1.911	0.7	20.9	O K
480 min Summer	100.074	1.874	0.7	20.5	O K
600 min Summer	100.028	1.828	0.7	20.0	O K
720 min Summer	99.978	1.778	0.7	19.4	O K
960 min Summer	99.876	1.676	0.7	18.3	O K
1440 min Summer	99.696	1.496	0.6	16.3	O K
2160 min Summer	99.481	1.281	0.6	14.0	O K
2880 min Summer	99.309	1.109	0.5	12.1	O K
4320 min Summer	99.045	0.845	0.5	9.2	O K
5760 min Summer	98.853	0.653	0.4	7.1	O K
7200 min Summer	98.706	0.506	0.4	5.5	O K
8640 min Summer	98.590	0.390	0.3	4.3	O K
10080 min Summer	98.499	0.299	0.3	3.3	O K
15 min Winter	99.428	1.228	0.6	13.4	O K


Storm Event	Rain (mm/hr)	Flooded Volume (m <sup>3</sup> )	Time-Peak (mins)
15 min Summer	137.178	0.0	19
30 min Summer	89.676	0.0	33
60 min Summer	55.837	0.0	62
120 min Summer	33.603	0.0	122
180 min Summer	24.646	0.0	180
240 min Summer	19.668	0.0	212
360 min Summer	14.244	0.0	274
480 min Summer	11.334	0.0	338
600 min Summer	9.486	0.0	410
720 min Summer	8.198	0.0	478
960 min Summer	6.508	0.0	616
1440 min Summer	4.694	0.0	892
2160 min Summer	3.380	0.0	1296
2880 min Summer	2.675	0.0	1672
4320 min Summer	1.921	0.0	2424
5760 min Summer	1.517	0.0	3168
7200 min Summer	1.263	0.0	3896
8640 min Summer	1.087	0.0	4592
10080 min Summer	0.957	0.0	5344
15 min Winter	137.178	0.0	18

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CTP House, Knapp Road Cheltenham Gloucestershire, GL50 3QQ	CROCKWELL HOUSE FARM CELLULAR SOAKAWAY - BARN 1 IN 100YR + 40% CC	
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Innovyze	Source Control 2020.1	

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

Storm Event	Max Level (m)	Max Depth (m)	Max Infiltration (l/s)	Max Volume (m <sup>3</sup> )	Status
30 min Winter	99.779	1.579	0.7	17.3	O K
60 min Winter	100.101	1.901	0.7	20.8	O K
120 min Winter	100.345	2.145	0.8	23.4	O K
180 min Winter	100.416	2.216	0.8	24.2	O K
240 min Winter	100.420	2.220	0.8	24.3	O K
360 min Winter	100.376	2.176	0.8	23.8	O K
480 min Winter	100.328	2.128	0.8	23.2	O K
600 min Winter	100.266	2.066	0.8	22.6	O K
720 min Winter	100.197	1.997	0.8	21.8	O K
960 min Winter	100.057	1.857	0.7	20.3	O K
1440 min Winter	99.799	1.599	0.7	17.5	O K
2160 min Winter	99.502	1.302	0.6	14.2	O K
2880 min Winter	99.272	1.072	0.5	11.7	O K
4320 min Winter	98.937	0.737	0.4	8.1	O K
5760 min Winter	98.709	0.509	0.4	5.6	O K
7200 min Winter	98.542	0.342	0.3	3.7	O K
8640 min Winter	98.418	0.218	0.3	2.4	O K
10080 min Winter	98.324	0.124	0.3	1.4	O K

Storm Event	Rain (mm/hr)	Flooded Volume (m <sup>3</sup> )	Time-Peak (mins)
30 min Winter	89.676	0.0	33
60 min Winter	55.837	0.0	62
120 min Winter	33.603	0.0	118
180 min Winter	24.646	0.0	174
240 min Winter	19.668	0.0	228
360 min Winter	14.244	0.0	284
480 min Winter	11.334	0.0	362
600 min Winter	9.486	0.0	438
720 min Winter	8.198	0.0	514
960 min Winter	6.508	0.0	664
1440 min Winter	4.694	0.0	952
2160 min Winter	3.380	0.0	1364
2880 min Winter	2.675	0.0	1760
4320 min Winter	1.921	0.0	2548
5760 min Winter	1.517	0.0	3288
7200 min Winter	1.263	0.0	4032
8640 min Winter	1.087	0.0	4752
10080 min Winter	0.957	0.0	5352

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CTP House, Knapp Road Cheltenham Gloucestershire, GL50 3QQ	CROCKWELL HOUSE FARM CELLULAR SOAKAWAY - BARN 1 IN 100YR + 40% CC	
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Innovyze	Source Control 2020.1	


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)	19.700	Shortest Storm (mins)	15
Ratio R	0.411	Longest Storm (mins)	10080
Summer Storms	Yes	Climate Change %	+40

Time Area Diagram

Total Area (ha) 0.048

Time (mins)		Area
From:	To:	(ha)
0	4	0.048

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CTP House, Knapp Road Cheltenham Gloucestershire, GL50 3QQ	CROCKWELL HOUSE FARM CELLULAR SOAKAWAY - BARN 1 IN 100YR + 40% CC	
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Model Details

Storage is Online Cover Level (m) 101.100

Cellular Storage Structure

Invert Level (m) 98.200 Safety Factor 1.5  
 Infiltration Coefficient Base (m/hr) 0.10440 Porosity 0.95  
 Infiltration Coefficient Side (m/hr) 0.10440

Depth (m)	Area (m <sup>2</sup> )	Inf. Area (m <sup>2</sup> )	Depth (m)	Area (m <sup>2</sup> )	Inf. Area (m <sup>2</sup> )
0.000	11.5	11.5	2.401	0.0	45.6
2.400	11.5	45.6			

**KEY:**

EXISTING

THAMES WATER FOUL SEWER

PROPOSED

STORMWATER SEWER

STORMWATER INSPECTION CHAMBER

STORMWATER RODDING EYE

INDICATIVE RWP

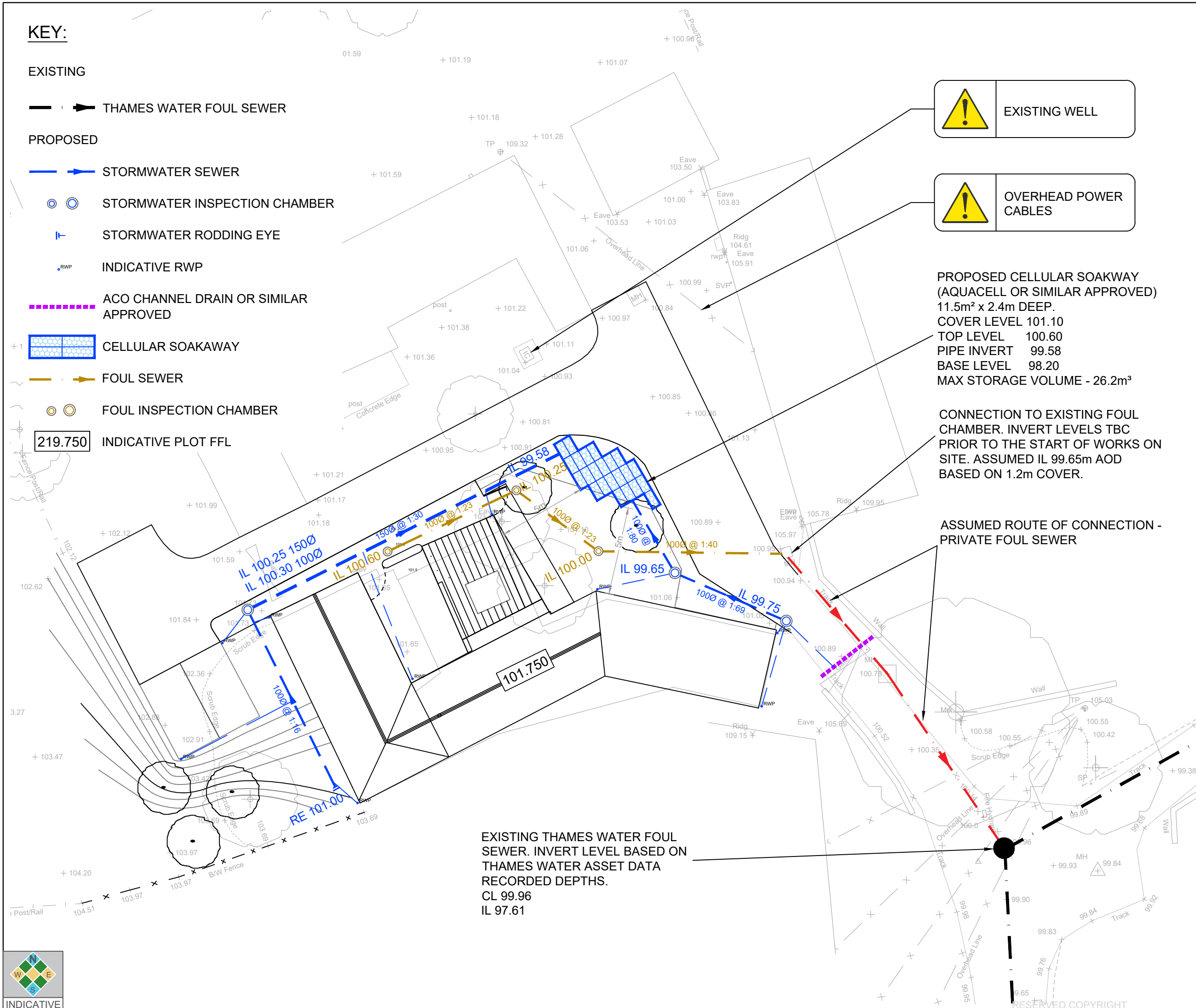
ACO CHANNEL DRAIN OR SIMILAR APPROVED

CELLULAR SOAKAWAY


FOUL SEWER

FOUL INSPECTION CHAMBER

219.750 INDICATIVE PLOT FFL



 EXISTING WELL

 OVERHEAD POWER CABLES

PROPOSED CELLULAR SOAKAWAY (AQUACELL OR SIMILAR APPROVED)  
 11.5m<sup>2</sup> x 2.4m DEEP.  
 COVER LEVEL 101.10  
 TOP LEVEL 100.60  
 PIPE INVERT 99.58  
 BASE LEVEL 98.20  
 MAX STORAGE VOLUME - 26.2m<sup>3</sup>

CONNECTION TO EXISTING FOUL CHAMBER. INVERT LEVELS TBC PRIOR TO THE START OF WORKS ON SITE. ASSUMED IL 99.65m AOD BASED ON 1.2m COVER.

ASSUMED ROUTE OF CONNECTION - PRIVATE FOUL SEWER

EXISTING THAMES WATER FOUL SEWER. INVERT LEVEL BASED ON THAMES WATER ASSET DATA RECORDED DEPTHS.  
 CL 99.96  
 IL 97.61

**NOTES:**

- DO NOT SCALE FROM THIS DRAWING. ALL DIMENSIONS ARE IN METRES, UNLESS STATED OTHERWISE.
- THIS DRAWING IS BASED ON THE ARCHITECTS LAYOUT RECEIVED FROM RIDGE AND PARTNERS LLP ON 03/06/2020.
- DRAWING TO BE READ IN CONJUNCTION WITH ALL OTHER DRAWINGS. ANY DISCREPANCIES ARE TO BE REPORTED TO THE ENGINEER 5 WORKING DAYS IN ADVANCE OF UNDERTAKING ANY WORK.
- ALL PUBLIC THAMES WATER ASSETS ARE BASED ON ASSET RECORDS ISSUED ON 12/06/2020 REF: 2020\_4197930

Rev	Date	Details	Drawn by	Checked by
A	25/06/20	SOAKAWAY REVISED & DRAINAGE AMENDED TO SUIT	NT	KT



CLIENT:  
**MARCH PROJECTS**

PROJECT:  
**CROCKWELL HOUSE FARM, MANOR ROAD, GREAT BOURTON**

TITLE:  
**PROPOSED DRAINAGE STRATEGY**

STATUS:  
**PLANNING**

SCALE @ A3:	DATE:	DRAWN:	CHECKED:	APPROVED:
1:200	24/06/20	NT	KT	KT
JOB NO:	DRAWING NO:	REVISION:		
CTP-20-269	C001	A		



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