Barns Off Main Road, Upper Pollicott, Buckinghamshire, HP18 0HH – Drainage Design

17/11/2023
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1.0 Introduction

RAB Consultants has prepared this Drainage Strategy in support of the proposed residential development located at Barns Off Main Road, Upper Pollicott, Buckinghamshire, HP18 0HH.

The Secretary of State for Communities and Local Government laid a Written Ministerial Statement in the House of Commons on 18th December 2014 setting out changes to planning that will apply for major development from 6 April 2015. Therefore, from 6 April 2015 local planning policies and decisions on planning applications relating to major development are required to ensure that sustainable drainage systems (SuDS) are used for the management of surface water. As the Lead Local Flood Authority, Buckinghamshire Council is required under Article 18 of the Town and Country Planning (Development Management Procedure) (England) Order 2015 (the Development Management Procedure Order) to provide consultation response on the surface water drainage provisions associated with major development.

Major development is defined within the Development Management Procedure Order as development that involves any one or more of the following:

1. the winning and working of minerals or the use of land for mineral working deposits;
2. waste development;
3. the provision of dwelling houses where:
    i. the number of dwelling houses to be provided is 10 or more; or
    ii. the development is to be carried out on a site having an area of 0.5 hectares or more and it is not known whether the development falls within sub-paragraph 3.1;
4. the provision of a building or buildings where the floor space to be created by the development is 1,000 square metres or more; or
5. development carried out on a site having an area of 1 hectare or more.

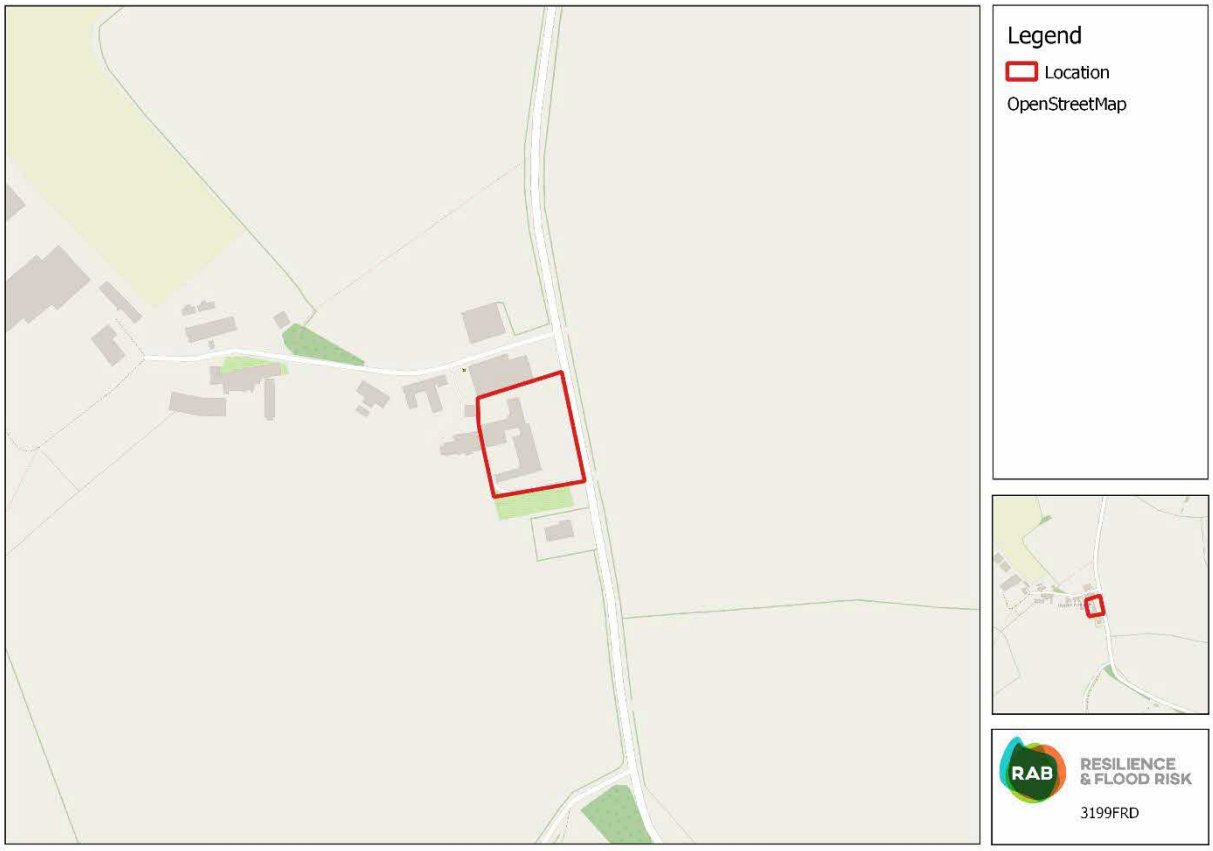
Condition 9 of application 21/03165/APP states '*No works (other than demolition) shall begin until a surface water drainage scheme for the site, based on sustainable drainage principles has been submitted to and approved in writing by the Local Planning Authority*.'

2.0 Site details

2.1 Site location

TABLE 1: SITE LOCATION

Site address:	Barns Off Main Road, Upper Pollicott, Buckinghamshire, HP18 0HH
Site area:	3423m^2
Existing land use:	Barns
OS NGR:	SP 70316 13581
Local Planning Authority:	Buckinghamshire Council



2.2 Site description

The site is located in the rural area of Buckinghamshire and is accessed from Main Street. The site currently consists of two barns, and it is surrounded by greenfield land.

2.3 Development proposal

Permission is sought to change the use and extend the existing barns to create five dwellings. This will include outdoor amenity space and a parking area.

3.0 Drainage Strategy

3.1 Existing site constraints

3.1.1 Fluvial flood risk

According to the Environment Agency Flood Map for Planning, the site is located in Flood Zone 1 therefore, has less than 0.1% AEP risk of flooding from this source.

3.1.2 Surface water flood risk

When the infiltration capacity of land or the drainage capacity of a local sewer network is exceeded, excess rainwater flows overland. This water will collect in topographic depressions and at obstructions, which can inundate development in low lying areas. The severity of the rainfall event, the degree of saturation of the soil before the event, the permeability of soils and geology, and the gradient of the surrounding land and it's use; all contribute to and affect the severity of overland flow.

The Environment Agency Flood Map for Surface Water (Figure 1), can be used to see the approximate areas that would experience surface water flooding from a range of AEPs, which is used to categorise the risk (Table 2).

The site and access are shown to be at very low risk from surface water flooding.

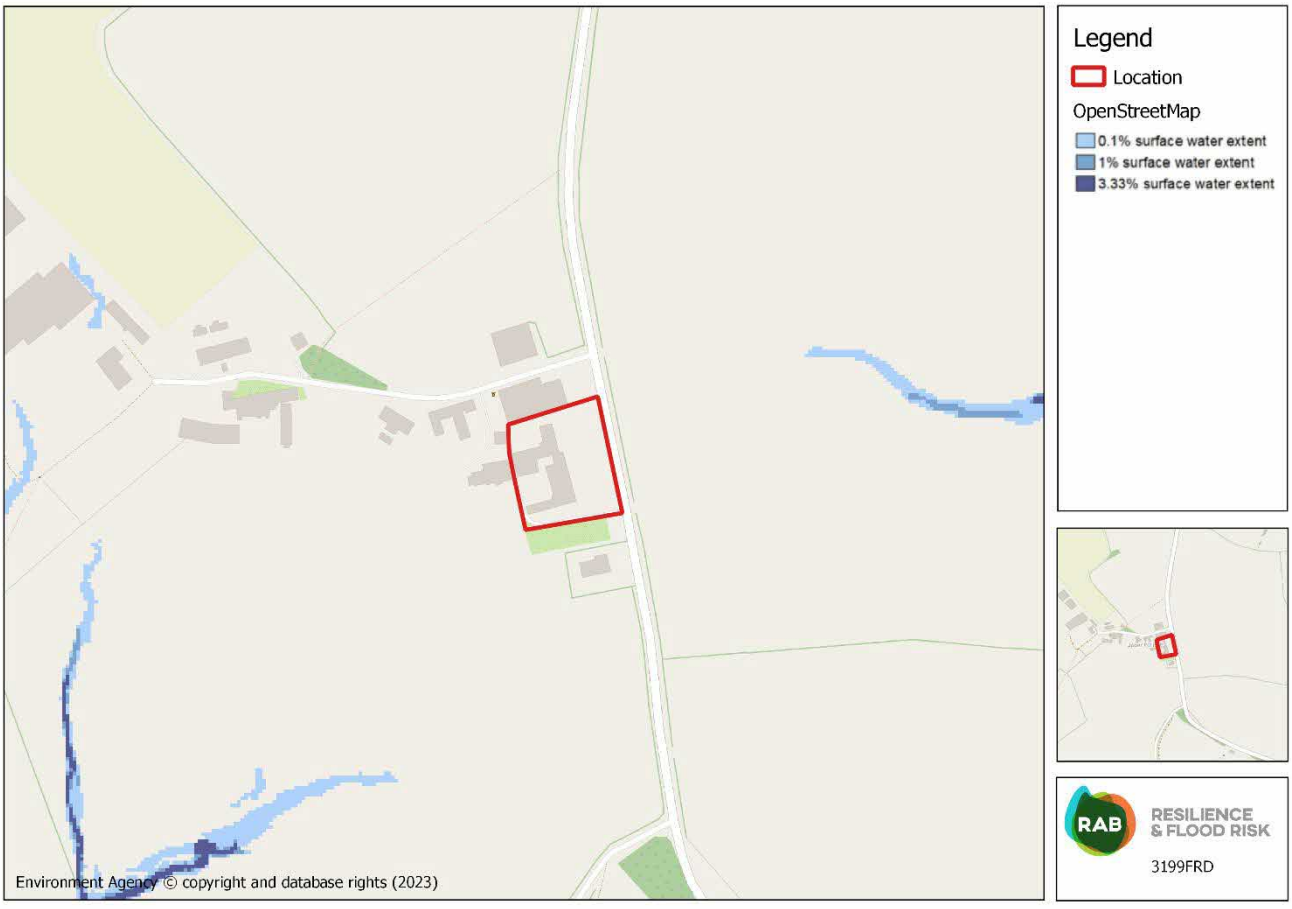


FIGURE 1: ENVIRONMENT AGENCY FLOOD RISK FROM SURFACE WATER

TABLE 2: ENVIRONMENT AGENCY SURFACE WATER RISK CATEGORIES

Surface Water Risk Category	Surface water flooding Annual Exceedance Probability
Very Low	< 0.1%
Low	Between 1% and 0.1% (1 in 100 years and 1 in 1000 years)
Medium	Between 1% and 3.3% (1 in 100 years and 1 in 30 years)
High	> 3.3% (1 in 30 years)

3.1.3 Groundwater flood risk

British Geological Survey (BGS) records indicate that the proposed development site overlies bedrock composed of Portland Group - limestone and calcareous sandstone. There are no recorded superficial deposits.

Soilscapes shows the site is located within an area of freely draining/slightly impeded drainage.

The Magic Maps tool shows the site is within a Secondary A Bedrock aquifer but is not located within a Superficial Drift Aquifer. It also shows the site is within an area of high groundwater vulnerability with soluble rock risk.

As there is a high degree of variability when considering groundwater flooding, using historic flooding is not a robust measure of the risk of flooding in future years.

3.1.4 Sewers flood risk

Thames Water is responsible for the adopted surface and foul sewer networks within the District and maintain a DG5 register of sites affected by sewer flood incidents on a post code basis. The 2017 Aylesbury Vale Strategic Flood Risk Assessment (SFRA) shows that the postcode area of HP18 0 has 1-5 properties on the register. It was unclear whether the site was affected by these events.

It is important to note that previous sewer flood incidents, or the lack thereof, do not indicate the current or future risk to the site. Upgrade work could have been carried out to alleviate any issues or conversely, in areas that have not experienced sewer flooding incidents, the local drainage infrastructure could deteriorate leading to future flooding.

3.2 Existing runoff condition

3.2.1 Existing drainage arrangements

It is assumed that the existing barns drain into the existing drainage network however, this cannot be confirmed from current data.

3.2.2 Natural flow path

The site has a general fall from northeast to southwest with levels ranging from 130.38mAOD - 133.30mAOD.

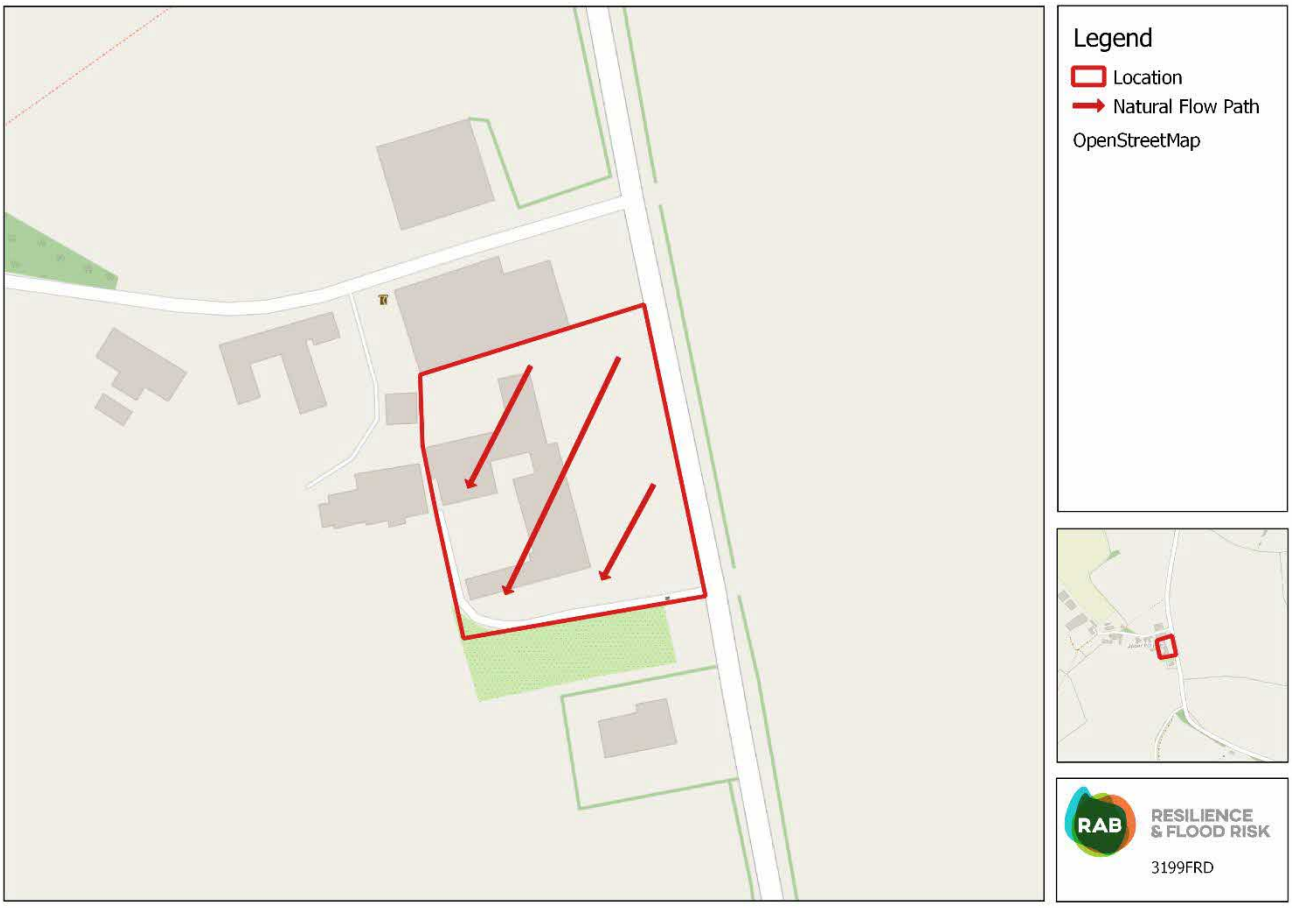


FIGURE 2: NATURAL FLOW PATH

3.2.3 Greenfield runoff

The greenfield runoff rate was calculated using the IH124 method for determining Greenfield runoff rate built into Microdrainage WinDes:

SAAR (mm) = 629

Area (ha) = 0.161

Soil = 0.450

Region = 6

The QBAR was calculated at 0.6 l/s/ha (see Appendix D). The greenfield runoff rate was calculated on the basis of the proposed hardstanding area of 0.161 ha.

TABLE 3: GREENFIELD RUNOFF RATES

AEP (%)	Greenfield peak flow rate (l/s)
100	0.5
QBAR	0.6
3.33	1.4

AEP (%)	Greenfield peak flow rate (l/s)
1	2.0
1 +31% Climate Change*	2.6

* 2080s central Thames and South Chilterns Management Catchment peak river flow allowances

3.2.4 Brownfield runoff

The brownfield runoff rate has been estimated using the existing hardstanding area of 0.164ha and the Modified Rational Method. The Modified Rational Method calculates runoff based on the following formula:

Q=2.78 x C (Cv x Cr) x i x A

Where Cv and Cr are coefficients, which equal 1 when multiplied together, i is rainfall intensity in mm/hr, and A is area in hectares. Rainfall intensity has been identified using Microdrainage Source Control.

Table 4 below shows the estimated peak flow runoff rates for a range of AEPs for the existing condition using an area of 0.164ha.

TABLE 4: ESTIMATED BROWNFIELD PEAK FLOW RUNOFF RATES

AEP (%)	Rainfall intensity (mm/hr)	Brownfield peak flow rate (l/s)
50	38.465	17.54
3.33	88.264	40.24
1	112.276	51.19
1 + 40% Climate Change*	157.187	71.66

* Upper End peak rainfall allowance

3.3 SuDS feasibility

The SuDS Manual (2015) discusses the SuDS approach to managing surface water runoff which is intended to mimic the natural catchment process as closely as is possible. The approach sets out the design objectives in respect of SuDS:

Use of surface water runoff as a resource;

Manage rainwater close to where it falls (at source);

Manage runoff on the surface (above ground);

Allow rainwater to soak into the ground (infiltration);

Promote evapotranspiration;

Slow and store runoff to mimic natural runoff rates and volumes;

Reduce contamination of runoff through pollution prevention and by controlling the runoff at source; and

Treat runoff to reduce the risk of urban contaminants causing environmental pollution.

Depending on the characteristics of the site and local requirements, these may be used in conjunction and varying degrees. Table 6 presents the functions of the SuDS components (from which a management train can be created) and their feasibility in respect of the site.

TABLE 5: FEASIBILITY OF SUDS TECHNIQUES AT THE DEVELOPMENT SITE

Technique	Description	Feasibility Y / N / M (Maybe)
Good building design and rainwater harvesting	Components that capture rainwater and facilitate its use within the building or local environment.	**Yes** – Water butts could be incorporated into the residential gardens.
Porous and pervious surface materials	Structural surfaces that allow water to penetrate, thus offering attenuation potential, while reducing the rate of runoff (green roofs, pervious paving).	**Yes** – Car parking spaces could be made permeable.
Infiltration Systems	Components that facilitate the infiltration of water into the ground. These often include temporary storage zones to accommodate runoff volumes before slow release to the soil.	**No** – Infiltration is not possible due to the BRE infiltration test results which suggest a low infiltration rate.
Conveyance Systems	Components that convey flows to downstream storage systems (e.g. swales, watercourses).	**No** – Features such as swales or filter drains could not be incorporated into the final design due to the land availability.
Storage Systems	Components that control the flows and, where possible, volumes of runoff being discharged from the site, by storing water and releasing it slowly (attenuation). These systems may also provide further treatment of the runoff (e.g. ponds, wetlands, and detention basins).	**Yes** – A feature such as a pond could be included in the design.
Treatment Systems	Components that remove or facilitate the degradation of contaminants present in the runoff.	**Yes** – Treatment systems can be included in the above SuDS features.

The site has the potential to incorporate a number of SuDS options to manage surface water. These are discussed in more detail below.

3.4 Proposed discharge

The 2015 SuDS Manual recommends a specific hierarchy in terms of surface water discharge destinations:

1. Discharge into the ground.

2. Discharge into a surface water body.
3. Discharge to a surface water sewer.
4. Discharge to a combined sewer.

Discharge into the ground is not possible as the infiltration test to BRE Digest 365 identified a low infiltration rate which would not be suitable. As such, infiltration SuDS are not viable in this instance.

There is no surface water body within close proximity to the site therefore it is not possible to discharge into a surface water body.

There is no surface water or combined sewer within close proximity to the site therefore, the only option is to discharge into the foul sewer at manhole 3501 at a rate of 1.4 l/s for all events up to and including the 1% AEP +40% CC (1 in 100 year plus 40% climate change). Although this manhole is on third party land, the client confirmed that they have permission to connect into it. In addition, Thames Water had provided confirmation of capacity (see Appendix D).

3.5 Proposed surface water management

The proposed drainage scheme has been modelled in Microdrainage Source Network to understand the evolving flow regime under flood conditions and the potential for flooding. The discharge rate has been limited as close as reasonably practical to QBAR for all events up to and including the 1% AEP + 40%CC.

The proposed scheme (see Appendix D) will integrate a range of features, in line with the SuDS Manual philosophy, taking into consideration site constraints. In detail, runoff from roofs and roads within the site will be conveyed via a piped network to an attenuation basin downstream. Runoff on drives will be collected and filtered through the permeable paving, then conveyed via a piped network to the basin downstream.

Surface water from the basin will then flow into a flow control chamber which will control the flow rate to 1.4 l/s for all events up to and including the 1% AEP +40% CC. The final receptor will be the Thames Water foul sewer manhole 3501 which has a cover level of 129.15mAOD and an invert level of 127.12mAOD. Thames Water has confirmed that their system has capacity to receive the controlled flow rate from the site (Appendix D).

3.5.1 Attenuation basin

The proposed basin will need to provide a storage volume of 150.3 m^3 in order to manage runoff from the site. The side slopes of the basin should be set at a minimum of 1 in 3 and planted with short grass (50 mm-75mm) and native reed species as shown in Appendix D.

A vegetated (emergent) island placed at the central part of the basin should be included in order to promote plug flow and improve the sedimentation potential. The island should be planted with native reed species such as *Phragmites australis* or *Glyceria maxima*. A small patch of dense vegetation will be included within the pond, in close proximity to the incoming pipe towards the north to help slow the flow rate.

A planting schedule should be produced at the detailed design stage to identify native species that should be used along with measures to ensure vegetation establishment at the post-construction phase. Vegetation should not be planted near the outlet as research suggests that this decreases discharge capacity and water treatment efficiency. The basin construction must comply with the CIRIA Guidance on the construction of SuDS C768 (2017) recommendations.

3.5.2 Permeable pavement

A Type C (see Table 20.1 of the SuDS Manual) permeable pavement will be used to manage road runoff at the site. There are two locations where permeable pavement is to be implemented (see Appendix D). The permeable pavement features will act as sinks for the road runoff, filter the water, and offer some storage benefits prior to discharging downstream.

Road runoff from the access road and relevant parking areas will infiltrate to the permeable pavement and receive an appropriate level of treatment. Kerb design should be in line with local standards and at least 100 mm to encourage water to infiltrate to the permeable pavement structure efficiently.

The laying course material must be sufficiently coarse to allow the free vertical flow of water and to prevent its intrusion into the underlying coarse-graded aggregate, yet sufficiently fine to permit the accurate installation of the paving blocks. The material should comply with the requirements of a material of type 2/6.3 Gc 80/20 according to BS EN 13242:2002. The requirement for a capping material should be identified once detailed soil investigations have been undertaken at the site. All capping materials should meet the requirements of either 6F1 or 6F2 of Table 6.1 of Highways Agency's '*Specification for Highway Works – Series 600 – Earthworks*'.

3.5.3 Water quantity benefits

The scheme will offer significant reductions in runoff rates, compared to the corresponding greenfield runoff rate, in the order of 7% - 46%, as shown in Table 6. This is to counterbalance the increased volume of runoff as a result of the development. It should also be noted that the scheme will offer far greater reductions when compared to the brownfield runoff rates. As such, the proposed scheme provides water quantity benefits, in line with the 2015 SuDS Manual.

TABLE 6: EXISTING AND PROPOSED PEAK FLOW RUNOFF RATES

AEP (%)	Greenfield peak flow rate (l/s)	Brownfield peak flow rate (l/s)	Proposed peak flow rate (l/s)	Change (%)
50 (QBAR)	0.6	17.54	1.2	-
3.33	1.4	40.24	1.3	7
1	2.0	51.19	1.3	35
1 +40% CC*	2.6**	71.66	1.4	46

*Upper End peak rainfall allowance ** 2080s central Thames and South Chilterns Management Catchment peak river flow allowances

3.5.4 Water quality benefits

In line with the SuDS Manual, the water must receive a certain degree of treatment. There are no significant risks of pollution as a result of the development as it is classed a low density residential with no major risks.

According to Table 26.2 of the SuDS Manual and based on the land use, the site has a low pollution hazard level. In detail, the pollution hazard indices are:

Total Suspended Solids = 0.5

Heavy Metals = 0.4

Hydrocarbons = 0.4

Consequently, the proposed SuDS feature(s) must have a higher mitigation index. Mitigation indices for various SuDS components can be found in Table 26.3 of the SuDS Manual (2015).

Total SuDS Mitigation Index = mitigation index$_1$ + (0.5 x mitigation index$_n$)

Where mitigation index$_n$ = mitigation index for component n.

The proposed drainage scheme utilises a combination of permeable pavement and an attenuation basin.

Using Table 26.3 of the SuDS Manual (2015), the mitigation indices for each pollutant and for each feature were identified:

TSS – SuDS mitigation index = 0.7+0.25 = 0.95>0.5.

Heavy Metals – SuDS mitigation index = 0.6+0.25 = 0.85>0.4.

Hydrocarbons – SuDS mitigation index = 0.7+0.3 = 1>0.4.

Consequently, the proposed scheme is in line with the water quality requirements of the SuDS Manual (2015).

3.6 Future resilience

3.6.1 Designing for exceedance

It is inevitable that as a result of heavy or extreme rainfall, the capacities of sewers and other drainage systems will be exceeded on occasion. Drainage exceedance will occur when the rate of surface water runoff exceeds the inlet capacity of the drainage system, when the receiving water or pipe system becomes overloaded, when the outfall becomes restricted due to flood levels in the receiving water, or due to poor maintenance of the SuDS features.

The system has been modelled to manage the 1% AEP +40% CC without significant flooding. Should a blockage occur, runoff would follow the natural topography of the site flowing towards the southwest; exceedance flows have been mapped in Appendix D. A gully has been included at the lowest point of the site in order to collect any overland exceedance flows and drain it back to the permeable pavement.

3.7 Amenity and biodiversity

Primary consideration should be given to locally native species, and plants that benefit wildlife through their nectar, fruit, or berries. Generally, the choice of plant species should reflect the usual design decisions relating to their location in terms of aspect, sun or shade, height, from, colour, whether evergreen or deciduous, native or ornamental, and soil factors such as pH, depth, nutrient status and organic content. However, the consideration has to be their ability to withstand the fluctuations in soil moisture that will occur; this is very important for attenuation basin. A planting schedule for the entire site will need to be developed by a qualified ecologist to maximise biodiversity benefits. The attenuation basin will offer amenity benefits by providing green open space.

4.0 Maintenance and Management Plan

The following maintenance and management plan has been formed to assist with ensuring the longevity of the surface water scheme to provide multiple benefits throughout its lifetime. The plan will also aim to

prevent any blockages or damage occurring to each component of the scheme to minimise the risk of flooding as much as possible.

The level of inspection and maintenance will vary depending on the type of SuDS component and scheme, the land use, and the type of vegetation. It is vital that SuDS construction is supervised and inspected on completion if owners are to avoid taking on liabilities and to ensure the specified materials are being used and placed correctly. Incorrect materials or installation should be rejected as they will adversely affect the performance, maintenance costs and ultimately the design life of the SuDS components.

The site manager must maintain maintenance logs for all elements.

The SuDS features incorporated to this particular design have to be maintained in order to ensure efficient water treatment and water management.

4.1 SuDS features checklist

Basins, ponds and wetlands are depressions in the ground where water is stored and treated. Water levels rise after rain and then drops to the normal level as the excess is released slowly to a watercourse or drain. Some water maybe held back as a pond for final treatment, amenity or wildlife interest.

Permeable surfaces as permeable block paving, porous Asphalt, gravel or free draining soils that allow rain to percolate through the surface into underlying drainage layers. They must be protected from silt, sand, compost, mulch, etc.

Inlet and outlet structures are often conveyance pipes protected with mesh guards. They must be free from obstruction at all times to allow free flow through the SuDS.

SuDS flow control structures are usually small orifices in control chamber, slots or V notches in weirs. They are usually near the surface so are accessible and easy to maintain. They may be in baskets, in small chambers or in the open.

Inspection Chambers and rodding eyes are used on bends or where pipes come together. They allow cleaning of the system if necessary.

4.2 Sustainable Drainage Maintenance Specification

4.2.1 General requirements

Maintenance	Frequency	Owner
Maintenance activities comprise: Regular maintenance Occasional tasks Remedial Work	Will vary depending on activity	(Private or adopted)

Regular maintenance (including inspections and monitoring). Consists of basic tasks done on a frequent and predictable schedule, including vegetation management, litter and debris removal, and inspections.

Occasional maintenance Comprises tasks that are likely to be required periodically, but on a much less frequent and predictable basis than the routine tasks (sediment removal is an example).

Remedial maintenance Comprises intermittent tasks that may be required to rectify faults associated with the system, although the likelihood of faults can be minimised by good design.

Where remedial work is found to be necessary, it is likely to be due to site-specific characteristics or unforeseen events, and as such timings are difficult to predict.

Avoid use of weedkillers and pesticides to prevent chemical pollution.

4.2.2 Landscape maintenance

TABLE 7: MAINTENANCE SCHEDULE FOR SURROUNDING LANDSCAPE

Maintenance	Frequency	Owner
Regular maintenance Litter management: Pick up all litter in SuDS and Landscape areas and remove from site.	Monthly	**Flaxfields Limited** 1 Harraton Cottages, Ducks Lane, Exning, Suffolk, CB8 7HQ, England Email:enquiries@flaxfields.co.uk Tel:01223941380
Grass Maintenance: Mow all grass verges, paths and amenity at 35-50mm with 75mm max. Leaving grass *in situ*. Wildflower areas trimmed to 50mm on 3 year rotation	As required or monthly	
Occasional tasks Prune (trim) tree branches to allow for sunlight to reach ground level flora.	Annually or as required	

4.2.3 Basin

TABLE 8: MAINTENANCE SCHEDULE FOR THE BASIN, ADAPTED FROM CIRIA RP992/23 & C753

Maintenance	Frequency	Owner
Regular maintenance	Monthly or as required	**Flaxfields Limited** 1 Harraton Cottages, Ducks Lane, Exning, Suffolk, CB8 7HQ, England Email:enquiries@flaxfields.co.uk Tel:01223941380
Mow grass access paths and verges surrounding ponds at 35mm-50mm minimum and 75mm maximum or as specified to provide a cared for appearance and allow pedestrian access.		
Mow rough grass areas for occasional access or habitat reasons at 100mm and maximum 150mm with cuttings removed to wildlife piles.	As required 4-6 times annually	
Grass areas not required for access may be managed for wildlife interest and to reduce costs.	Annually or as required	
Occasional tasks		

Maintenance	Frequency	Owner
Where silt accumulates on apron or area in front of inlet or outlet then remove and land apply within design profile of SuDS. Remove silt as instructed but not more than 30% of pond area at any one time and to an agreed depth but not subsoil layer. Retain as much representative existing vegetation as possible to ensure rapid re-colonisation of open areas. Undertake silt removal during September-October to minimise damage to protected wildlife and ensure re-growth of aquatic vegetation before winter. Monitor presence of wildlife and log any changes in terms of species variety, population numbers, and any signs of concern (dead amphibians, etc.).	Annually or every 3 years as required	

4.2.4 Permeable pavement

TABLE 9: MAINTENANCE SCHEDULE FOR PERMEABLE PAVEMENTS, ADAPTED FROM CIRIA RP992/23 AND C753

Maintenance	Frequency	Owner
Regular Monitoring Brush regularly and remove sweepings from all hard surfaces. Inspect all inflows/outflows along with manholes for blockages. Check monitoring wells for any signs of siltation.	Quarterly and after flood events	**Flaxfields Limited** 1 Harraton Cottages, Ducks Lane, Exning, Suffolk, CB8 7HQ, England Email:enquiries@flaxfields.co.uk Tel:01223941380
Occasional Tasks Brush and vacuum surface once a year to prevent silt blockage and enhance design life. Check operation of perforated pipes by inspection of flows after rain	Every six months	
Remedial Work Monitor effectiveness of permeable paving and if water does not infiltrate immediately a reinstatement of the top layers or specialist cleaning. The manufacturer should be contacted to provide further guidance.	As required and after flood events	

Maintenance	Frequency	Owner
Remedial work to any depressions, rutting and cracked or broken blocks considered detrimental to the structural performance or a hazard to users, and replace lost jointing material. Rehabilitation of surface and upper substructure by remedial sweeping. Check monitoring wells and replace permeable layer and sand-bed layer if heavily silted.		

4.2.5 Inlets, outlets, controls and inspection chambers

Please note that the flow control chambers will require regular maintenance. The maintenance schedule for the chamber must be specified by the manufacturer as different features have different requirements.

TABLE 10: MAINTENANCE SCHEDULE FOR THE INLETS, OUTLETS, CONTROL STRUCTURES, PUMPS AND INSPECTION CHAMBERS/MANHOLES

Maintenance	Frequency	Owner
Regular maintenance Inlets, outlets: Inspect surface structures removing obstructions and silt as necessary. Check there is no physical damage Strim vegetation 1m min. surround to structures and keep hard aprons free from silt and debris	Monthly	**Flaxfields Limited** 1 Harraton Cottages, Ducks Lane, Exning, Suffolk, CB8 7HQ, England Email:enquiries@flaxfields.co.uk Tel:01223941380
Inspection chambers/manholes and below ground flow control chambers: Remove cover and inspect ensuring water is flowing freely and that the exit route for water is unobstructed. Remove debris and silt. Undertake inspection after leaf fall in autumn.	Monthly for 12 months, then annually.	
Occasional tasks Check topsoil levels are 20mm above edges of baskets and chambers to avoid mower damage.	As necessary	
Remedial Work Repair physical damage if necessary.	As required	

4.2.6 Drainage network

TABLE 11: MAINTENANCE SCHEDULE FOR PIPED DRAINAGE NETWORK

Drainage Element	Maintenance	Frequency	Owner
Downpipes and gullies	**Regular maintenance** Open any covers, inspect integrity of gullies and repair as necessary.	Monthly	**Flaxfields Limited** 1 Harraton Cottages, Ducks Lane, Exning, Suffolk, CB8 7HQ, England Email:enquiries@flaxfields.co.uk Tel:01223941380
	Remove silt / debris by suction.	Annually or as required	
Pipe network	**Regular maintenance** Remove any sediment within the network and inspection chambers.	Every 3 years or as required	
	Open covers inspect integrity of chambers and repair as necessary. Remove silt / debris by suction.	Annually	

4.3 Maintenance during construction

Normally traditional drainage is one of the first elements of infrastructure constructed on site. For SuDS, although the form of the drainage will be constructed during the earthworks phase, final construction of the proposed SuDS features should not take place until the end of the development programme. It is highly recommended that the proposed SuDS features do not receive runoff from the site during construction and other means of disposing surface water runoff, in a controlled manner, should be investigated by the contractor. A suitable construction phase plan should be developed prior to construction commencing on site.

5.0 Conclusion

The proposed development at Barns Off Main Road, Upper Pollicott, is located in Flood Zone 1 as defined in the NPPF. The proposal includes the construction of an extension and a change of use (Appendix A).

On the basis of the available information from the Environment Agency and Buckinghamshire Council, the site is at low risk from fluvial and surface water flooding. There have been historic sewer flooding incidences within the postcode area and Magic Maps shows the site to be within a high groundwater vulnerability area.

The proposed development must incorporate SuDS as described in Section 3.3 of this report and in the relevant drawings in Appendix D.

The proposed development can be deemed appropriate, provided that the recommendations in this report are adhered to, it will not increase the flood risk to other people, and it will provide multiple benefits with respect to the sustainable management of surface water runoff.

6.0 Recommendations

The site should manage surface water through the use of SuDS as described in Section 3.5 and Appendix D of this report.

Contractor to submit a S106 to the Water Company prior to connecting to the public sewer.

All SuDS features must be constructed in line with recommendations made in the CIRIA Guidance on the Construction of SuDS (2017).

All SuDS features should be maintained in line with Table 7, Table 8, Table 9, Table 10, and Table 11.

A planting schedule must be confirmed for the attenuation basin along with suitable erosion control measures to ensure vegetation establishment and manage erosion, especially close to the headwalls.

Permeable pavement must be installed strictly to manufacturer's specification.

Should the CBR value be <5%, a capping layer must be installed; the permeable pavement construction detail will require updating.

The permeable pavement sub-base may require the installation of geogrids to further strengthen the feature. Contractor must liaise with permeable pavement provider(s), accordingly, prior to installation.

Others to confirm structural configuration of internal (building) drainage pipe runs (if applicable).

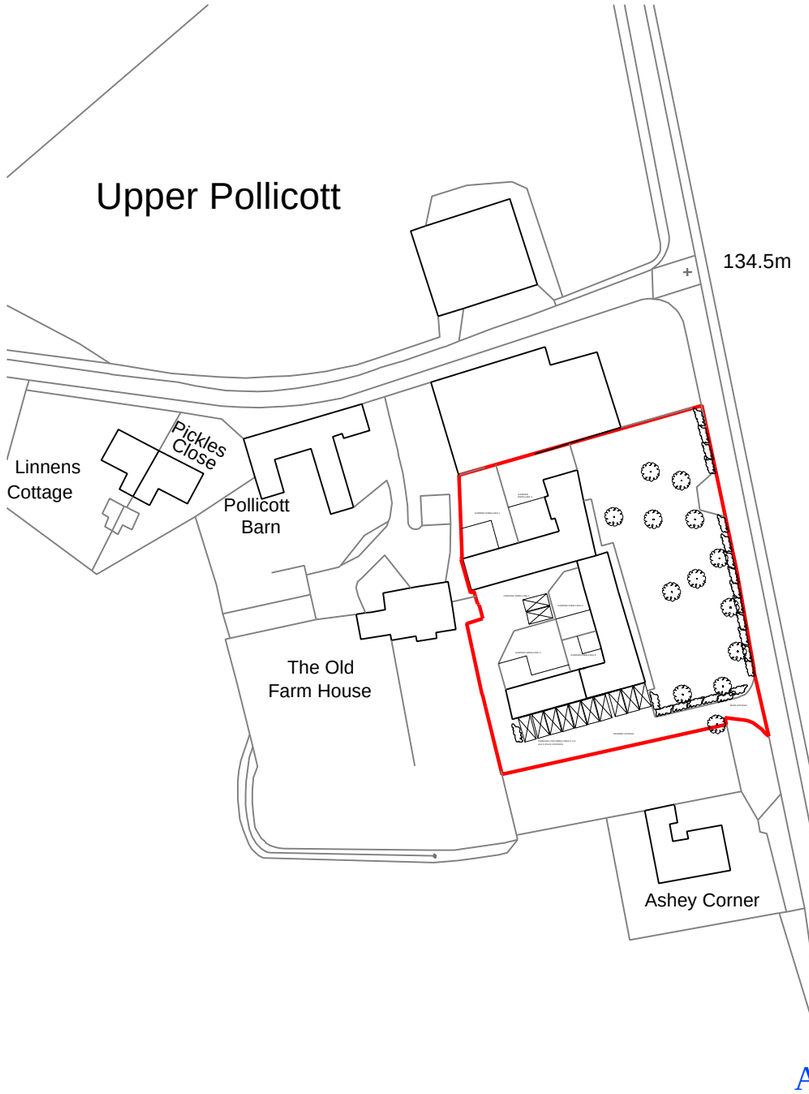
Construction (Design and Management) Regulations 2015:

- The revised CDM Regulations came into force in April 2015, which defines the duties for all parties involved in a construction project, including those promoting the development. One of the designer's responsibilities is to ensure that the client organisation, in this instance DPA (London) Ltd , is made aware of their duties (please see link for Commercial Client) under the CDM Regulations.

Appendix A – Development proposals

ld
use

BLOCK PLAN 1/500



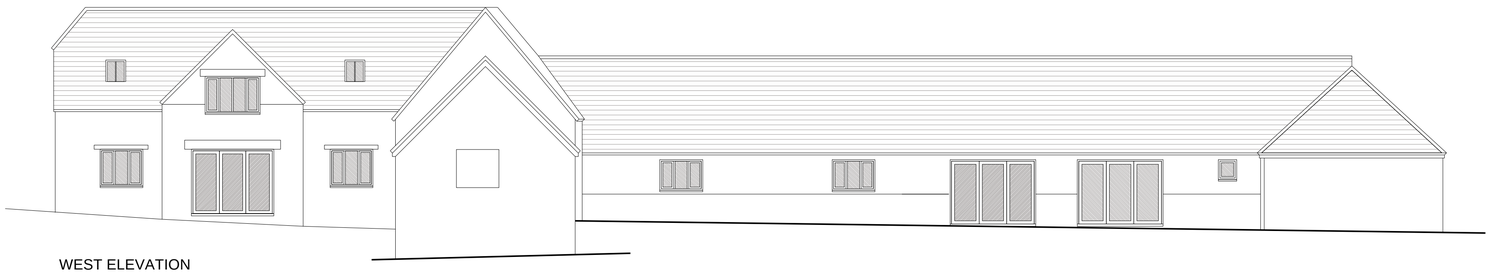
Upper Pollicott Farm

SITE LOCATION PLAN
1/1250

ANTONY THOMPSON
ARCHITECTURAL SERVICES
48, ST, JAMES CLOSE,
HANSLOPE,
MILTON KEYNES, MK19 7LF.
EMAIL:ATARCHSERV@GMAIL.COM
MOB: 07740099717

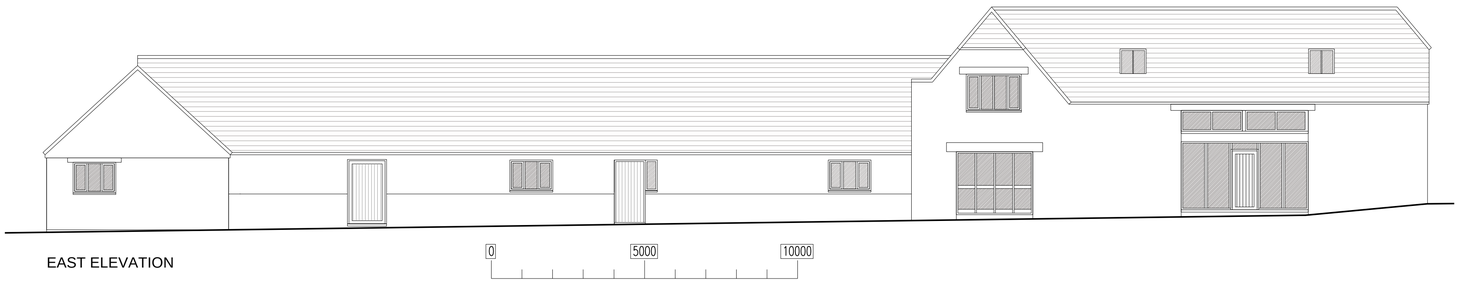
TITLE: SITE/BLOCK PLANS

CLIENT: THOMAS BETTS & CO		
PROJECT: PROPOSED BARN CONVERSIONS AT UPPER POLLICOTT FARM ASHENDON, AYLESBURY HP18 0HH		
JOB No.: 487	DWG No.: 001 A3	SCALE: 1:500
DRAWN: AT	DATE: 11.04.19	REV.: D



WEST ELEVATION

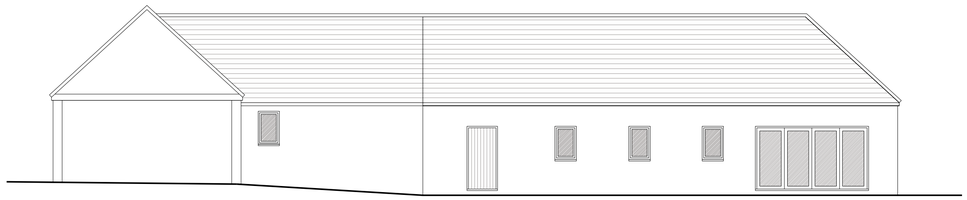
NORTH ELEVATION



EAST ELEVATION

0 5000 10000

SOUTH ELEVATION



ELEVATION 'Y'

ELEVATION 'Z'

REV.	DATE	DRAWN

ANTONY THOMPSON
ARCHITECTURAL SERVICES

48, ST, JAMES CLOSE,
HANSLOPE,
MILTON KEYNES, MK19 7LF.
EMAIL:AT.ARCHSERV@G MAIL .COM
MOB: 07740099717

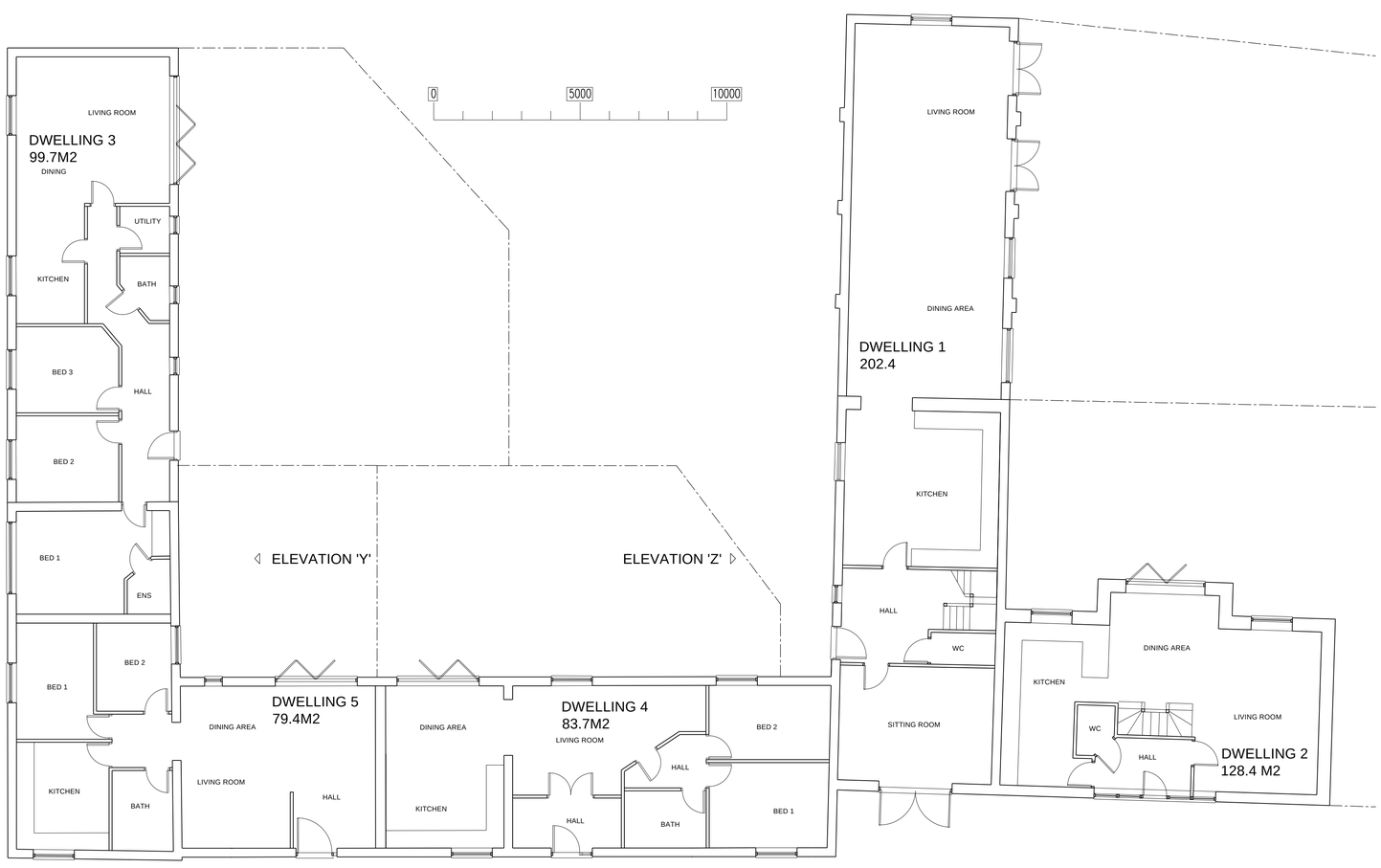
NOTES:

1) All new electrical work is to be designed, installed, inspected and tested in accordance with BS7671:2008 (I.E.E Wiring Regulations 17th Edition)

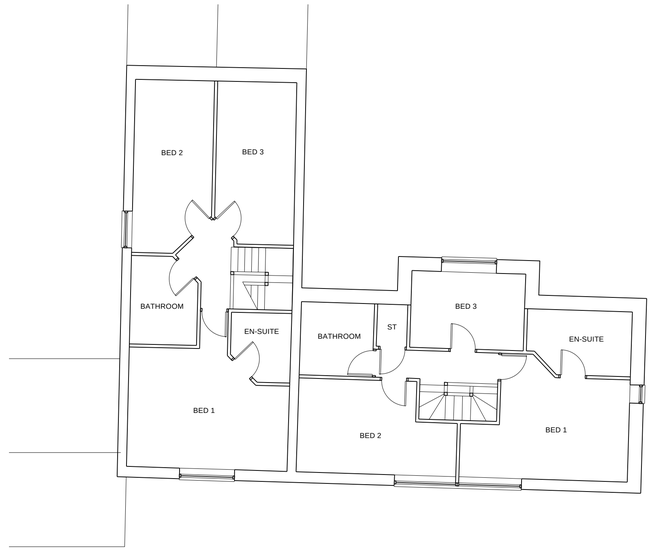
2) Electrical layout to clients specification

3) Lighting layout to clients details and 3 out of 4 to take low energy light bulbs.

TITLE: PROPOSED ELEVATIONS		A1
CLIENT: THOMAS BETTS & CO LTD	DATE: 29.11.20	DRAWN: AT
PROJECT: PROPOSED CONVERSION OF BARNS TO 2NO DWELLINGS AT UPPER POLLICOTT	JOB No. 487	SCALE: 1:100
	DWG No. 103	REV.: E



GROUND FLOOR PLAN



FIRST FLOOR PLAN

REV.	DATE	DRAWN

ANTONY THOMPSON
ARCHITECTURAL SERVICES

48, ST, JAMES CLOSE,
HANSLOPE,
MILTON KEYNES, MK19 7LF.
EMAIL:AT.ARCHSERV@G MAIL.COM
MOB: 07740099717

NOTES:

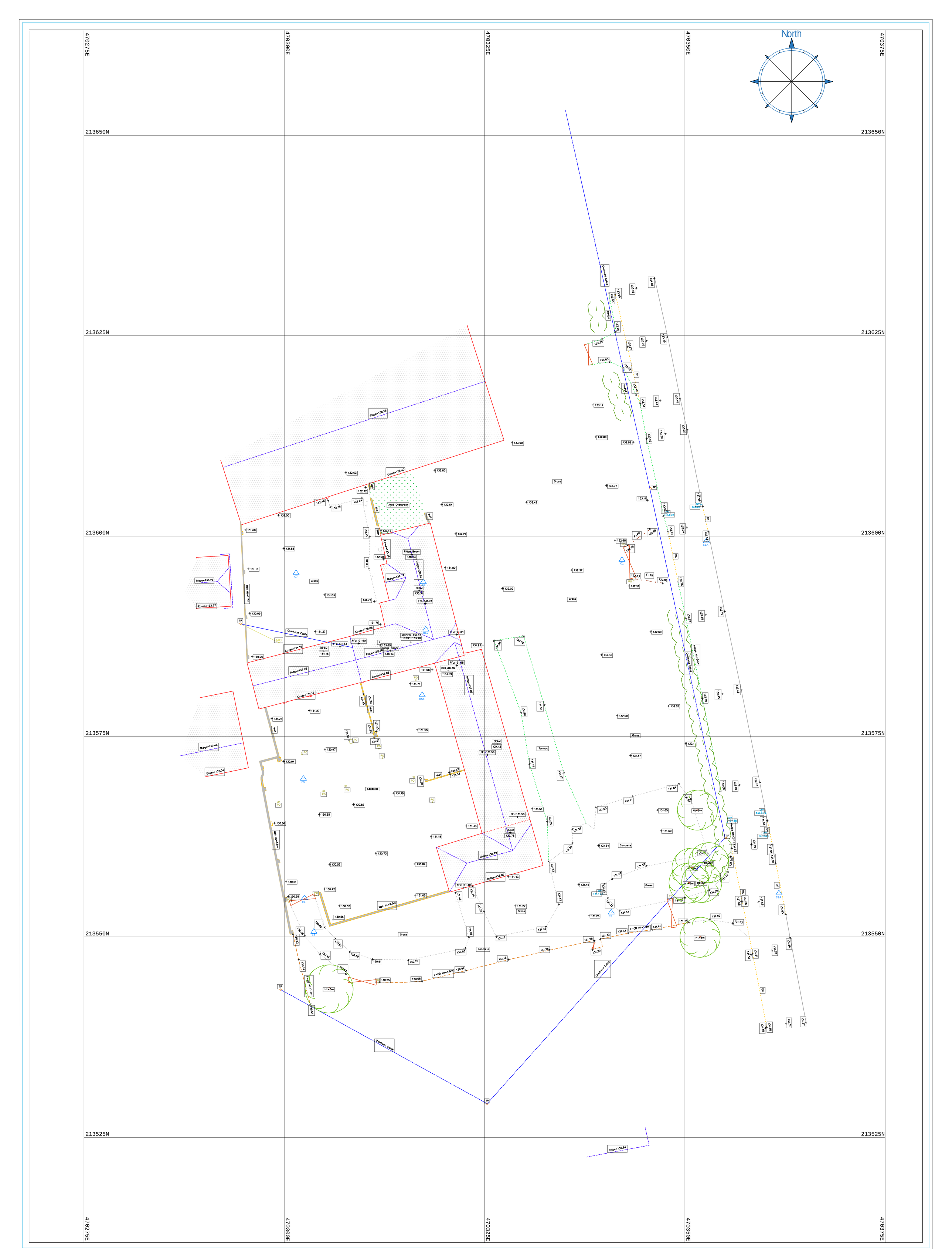
1) All new electrical work is to be designed, installed, inspected and tested in accordance with BS7671:2008 (I.E.E Wiring Regulations 17th Edition)

2) Electrical layout to clients specification

3) Lighting layout to clients details and 3 out of 4 to take low energy light bulbs.

TITLE: PLANS AS PROPOSED		A1
CLIENT: THOMAS BETTS & CO LTD	DATE: 29.11.20	DRAWN: AT
PROJECT: PROPOSED CONVERSION OF BARNS TO SNO DWELLINGS AT: UPPER POLLICOTT	JOB No.: 487	SCALE: 1:100
	DWG No.: 1032	REV.: D

Appendix B – Topographic Survey



Location	Upper Pollicot Farm, Aylesbury	Notes	Position & level fixed to OSGB(15) Grid. Scale factor value 1 applied. All dimensions should be checked on site prior to construction. Where invert levels are shown, depths/pipe sizes have been obtained witout entry. This drawing is subject to Copyright and should not be duplicated or altered without the consent of William Morris Surveys Limited or the "client".
Requirement	Topographical Survey		
Client	DPA (London) Ltd	Reference	2307-121
		Scale	1:200@A1
		Initial	CM
		Date	17/07/23

Legend

BH	Bore Hole	F-PW	Post & Wire Fence	TAC	Tactile Paving
BT	BT Cover	F-P	Palisade Fence	TP	Telegraph Post
BO	Bollard	FH	Fire Hydrant	TS	Traffic Signal
BP	Block Paving	FL	Finish Level	UL	Up Light
CAB	Cabinet	GV	Gate	>150	Flow Direction & Pipe Size
CB	Composite Bollard	GT	Gully		
CTC	Cable TV Cover	I-B	Illuminated Bollard		
DKC	Drop Kerb	IC-C	Inspection Chamber (Combined)		
DP	Down Pipe	IC-F	Inspection Chamber (Foul)		
DPC	Damp Proof Course	IC-S	Inspection Chamber (Surface Water)		
EL	Eaves Level	KI	Kerb Inlet		
EP	Electricity Pole	LP	Lamp Post		
FM	Farm Post	MH-C	Manhole (Combined)		
FB	Flower Bed	MH-F	Manhole (Foul)		
F-BW	Barbed Wire Fence	MH-S	Manhole (Surface Water)		
F-CB	Close Boarded Fence	NP	Name Plate		
F-CL	Chain Link Fence	PM	Parking Meter		
F-KR	Knee Rail	PO	Post		
F-HE	Heritage Fence	SCB	Signal Control Box		
F-MR	Metal Railings	SP	Sign Post		
F-PI	Picket Fence	SV	Stop Valve		
F-PR	Post & Rail Fence	SVG	Stop Valve (Gas)		

Symbols & Hatches

Building; Concrete; Shrubs/Vegetation; Block Paving; Wall; Spot Level; Survey Station; Tadpole (Bank Detail); Tree (to scale) & Height

Line Types

Block Paving; Change of Surface; Concrete; Sewer (Foul); Sewer (Surface); Sewer (Combined); Fence (Close Boarded); Fence (Chain Link); Fence (Post & Rail); Fence (Post & Wire); Fence (Metal Railings); Overhead Cable; Vegetation

Survey Control

Station	Easting	Northing	Level
C1	470342.151	213597.024	132.619
C2	470340.866	213553.055	131.343
C3	470303.694	213550.646	130.437
C4	470302.520	213554.842	130.498
C5	470302.392	213569.739	130.857
C6	470317.349	213594.282	131.895
C7	470301.473	213595.395	131.496
C1A	470352.672	213599.353	132.984
C2A	470361.737	213595.453	131.687
RS1	470317.211	213580.179	131.695
RS2	470317.665	213588.354	131.725

Revision Notes

William Morris Surveys Limited
17 Lees Lane
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Alfreton
Derbyshire
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William Morris Surveys

Appendix C – Infiltration Testing

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Andrew.hare@grangegeo.co.uk
www.grangegeo.co.uk

Geotechnical & Environmental Specialists

26th October 2023

For the attention of **Dr Alexandros Tsavdaris**

Dear **Alexandros,**

Re: soakaway testing at Upper Pollicott

The following investigation was carried out at the above location in accordance with our quotation dated 31st of July 2023 and emailed instruction from Alexandros Tsavdaris from RAB Consultants Ltd to proceed. Initial background information for the site indicated the site to be directly underlain by the solid geology of the (Kimmeridge Clay Formation).

Site Works

The purpose of the investigation was to supply soakaway test data in general accordance with BRE document 365 (Soakaway Design) at two positions of potential development at barns at Upper Pollicott, Buckinghamshire.

The appended drawing (R23106-DWG2) illustrates the position of the two test pits, which were excavated on 17/10/2023 to a depth of 1.8 to 1.85mbgl (metres below ground level). All the trial pits were found to have a layer of Topsoil or Made Ground, underlain by sandy CLAYs of the weathered Kimmeridge Clay Formation. A groundwater seepage was recorded within trial pit TP2 at a depth of 1.8m.

Water was added to the trial pits via a towable water tanker. Falling water level readings were undertaken using a dip meter. Three tests were achieved within trial pit SP1 and SP2.

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Grange Geo
Geotechnical & Environmental Specialists

Results

A single test was conducted within both trial pits. After filling the water failed to drain from 75% to 25% within a 24 hour period. As such the infiltration rate was too low to calculate. As such it is considered that soakaways are unlikely to be suitable for the site.

Yours sincerely,

for **Grange GeoConsulting Ltd**

[redacted]

Andrew Hare
Director
MSc DIC FGS

APPENDICES

Appendix A SITE LOCATION PLAN

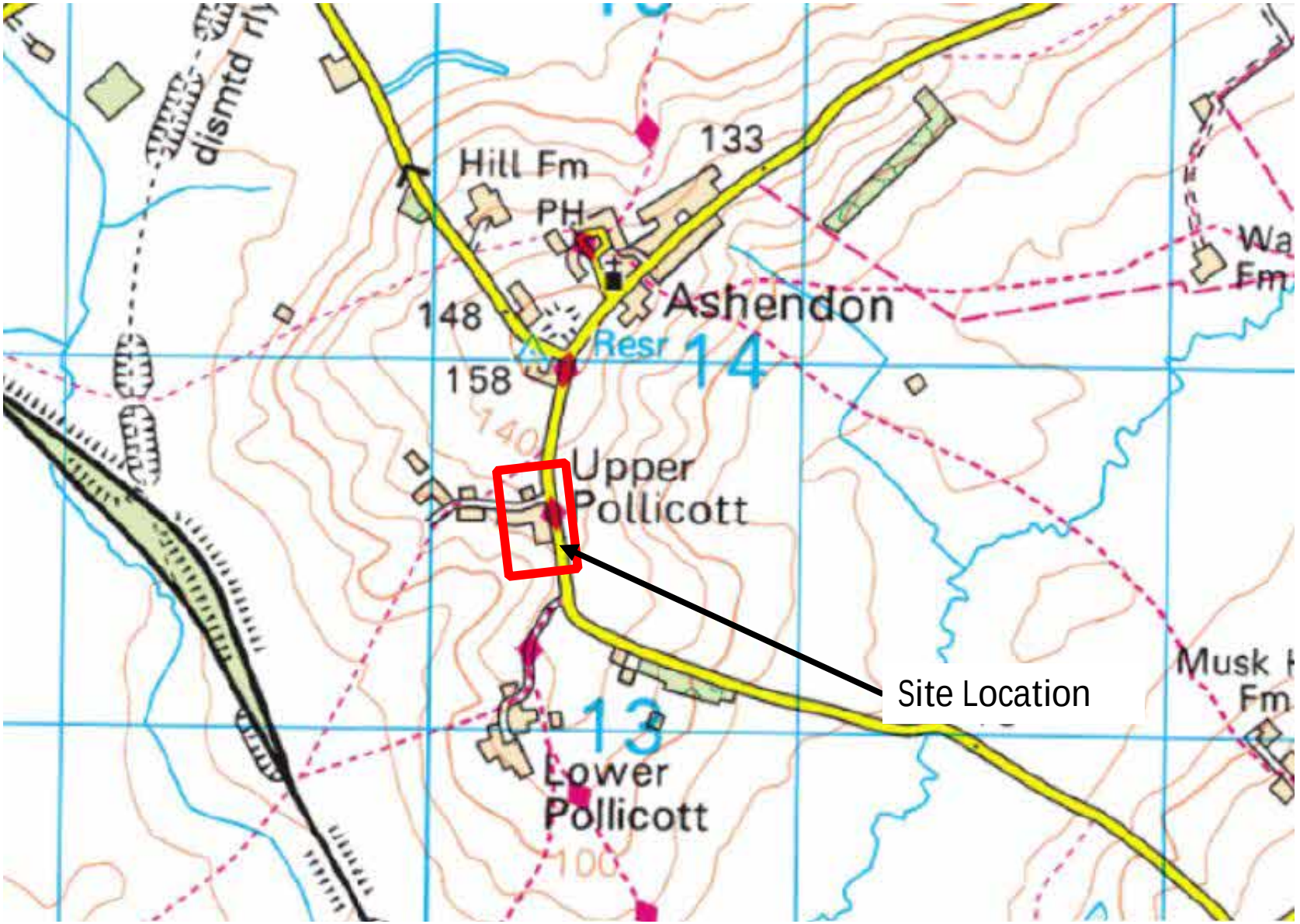
Appendix B TRIAL PIT PHOTOGRAPHS

Appendix C GROUND INVESTIGATION PLAN, EXPLORATORY HOLE LOGS

Appendix D SOAKAWAY TESTING RESULTS

Appendix A

SITE LOCATION PLAN



Grange Geo	Site Location, Upper Pollicot,	Client- RAB Consultants Date- October 2023	North	Drawing- R23106-1

Appendix B

TRIAL PIT PHOTOGRAPHS

TP1

Grange Geo	Soakaway testing, Upper Pollicot	Client- RAB Consultants Ltd Date- October 2023		

TP1

Grange Geo	Soakaway testing, Upper Pollicot	Client- RAB Consultants Ltd Date- October 2023		

TP2

TP2

Grange Geo	Soakaway testing, Upper Pollicot	Client- RAB Consultants Ltd Date- October 2023		

Appendix C

GROUND INVESTIGATION PLAN, EXPLORATORY HOLE LOGS

Grange Geo	GI Location Plan Upper Pollicot	Date: Oct 2023		Drawing: R23106-002

Trial Pit Log

TP No: TP1

Client: RAB Consultants

Sheet: 1 of 1

Project: Upper Pollicott

Method: Excavation with 3t digger

Sample Depth (m)	Sample Type	S. Vane kN/m²	Description	Depth mBGL	Legend
			Made Ground, dark brown, sandy, CLAY with occasional brick cobbles.		
			Made Ground, pale grey, sandy Gravel. Gravels of limestone and brick.		
0.50			Stiff, orange brown and grey mottled, slightly sandy, slightly silty CLAY. (Weathered Kimmeridge Clay Formation)	0.50	
1.00				1.00	
			Stiff, pale grey with orange brown mottling, silty, sandy CLAY. (Weathered Kimmeridge Clay Formation)		
1.50				1.50	
			End of trial pit.		
2.00				2.00	
2.50				2.50	
3.00				3.00	

General Comments:

1. Pit walls stable.
2. No groundwater
3. No visible or olfactory evidence of contamination

Date: 17/10/2023

Logged by: JD

Checked: AH

Job No: R23106

Grange Geo Consulting Ltd, 43 Winchilsea Avenue, Newark, NG24 4AD

Tel: 07773529385

Trial Pit Log

TP No: TP2

Client: RAB Consultants

Sheet: 1 of 1

Project: Upper Pollicott

Method: Excavation with 3t digger

Sample Depth (m)	Sample Type	S. Vane kN/m²	Description	Depth mBGL	Legend
			Made Ground, dark brown, sandy, CLAY with occasional brick cobbles.		
			Made Ground, pale grey, sandy Gravel. Gravels of limestone and brick.		
0.50			Stiff, brown and pale grey mottled, silty, sandy CLAY with pockets of grey brown and orange brown mottled, clayey SAND. (Weathered Kimmeridge Clay Formation)	0.50	
1.00				1.00	
1.50				1.50	
			1.85m base of trial pit.		
2.00				2.00	
2.50				2.50	
3.00				3.00	

General Comments:

1. Pit walls stable.
2. Slight groundwater seepage at 1.80m
3. Pockets of sand with a hydrocarbon odour present.

Date: 17/10/2023

Logged by: JD

Checked: AH

Job No: R23106

Grange Geo Consulting Ltd, 43 Winchilsea Avenue, Newark, NG24 4AD

Tel: 07773529385

Appendix D

Soakaway Testing Results

BRE BR365 - Trial Pit Soakaway Data Sheet

Site: Upper Pollicot

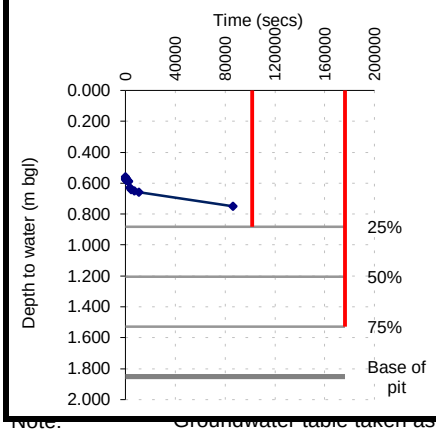
Client: RAB

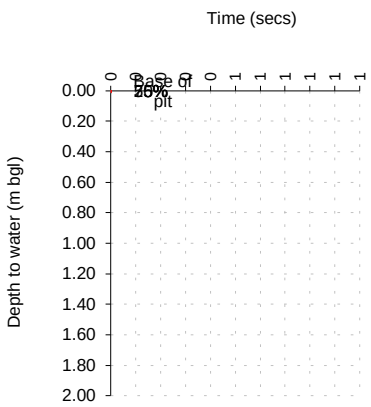
Test Location TP1 **Date of start of testing** 17/10/2023 **Date at end of testing** 18/10/2023

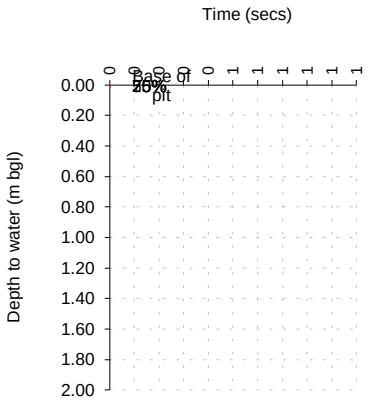
Test Run 1		Test Run 2		Test Run 3	
Pit Dimensions (m)		**Pit Dimensions (m)**		**Pit Dimensions (m)**	
Length	2.000m	Length		Length	
Width	0.500m	Width		Width	
Depth	1.850m	Depth		Depth	
Fill Depth	1.290m	Fill Depth	0.000m	Fill Depth	0.000m
Max Volume	1.290m³	Max Volume	0.000m³	Max Volume	0.000m³
Gravel used to backfill Test Pit	No	Gravel used to backfill Test Pit	No	Gravel used to backfill Test Pit	No

Time to soakaway			Time to soakaway			Time to soakaway		
Time		Depth to water	Time		Depth to water	Time		Depth to water
(secs)	(min)	(m bgl)	(secs)	(min)	(m bgl)	(secs)	(min)	(m bgl)
	0	*0.560*		*0*		*0*	*0*	
60	1	0.560						
120	2	0.570						
180	3	0.570						
240	4	0.570						
300	5	0.570						
360	6	0.570						
420	7	0.570						
480	8	0.570						
540	9	0.580						
600	10	0.580						
900	15	0.580						
1200	20	0.580						
1500	25	0.580						
1800	30	0.590						
2400	40	0.590						
3600	60	0.630						
4800	80	0.640						
7200	120	0.650						
10800	180	0.660						
86400	1440	0.750						

25% water depth	0.883m	**25% water depth**	0.000m	**25% water depth**	0.000m
50% water depth	1.205m	**50% water depth**	0.000m	**50% water depth**	0.000m
75% water depth	1.528m	**75% water depth**	0.000m	**75% water depth**	0.000m
25% time (seconds)	101664 sec	**25% time (seconds)**		**25% time (seconds)**	
75% time (seconds)	175968 sec	**75% time (seconds)**		**75% time (seconds)**	
$V_{p\ 75\text{-}25}$	0.6450m³	$V_{p\ 75\text{-}25}$	0.0000m³	$V_{p\ 75\text{-}25}$	0.0000m³
$a_{p\ 50}$ **(Actual area from test)**	6.9750m²	$a_{p\ 50}$ **(Actual area from test)**	0.0000m²	$a_{p\ 50}$ **(Actual area from test)**	0.0000m²
$t_{p\ 75\text{-}25}$	74304.0	$t_{p\ 75\text{-}25}$		$t_{p\ 75\text{-}25}$	
Soil Infiltration Rate	**NA**	**Soil Infiltration Rate**		**Soil Infiltration Rate**	







Note: Groundwater table taken as base of pit for infiltration rate calculation.

BRE BR365 - Trial Pit Soakaway Data Sheet

Site: Upper Pollicot

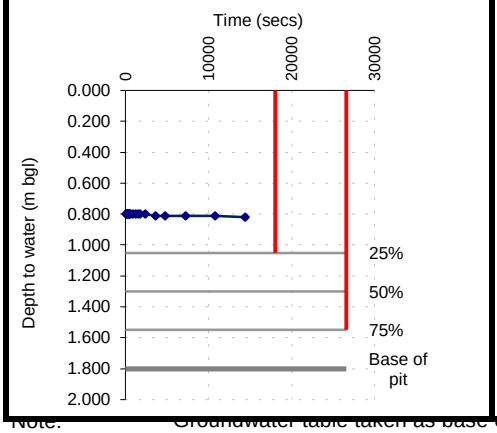
Client: RAB

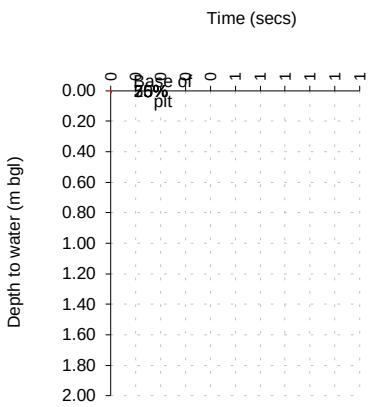
Test Location TP2 **Date of start of testing** 17/10/2023 **Date at end of testing** 18/10/2023

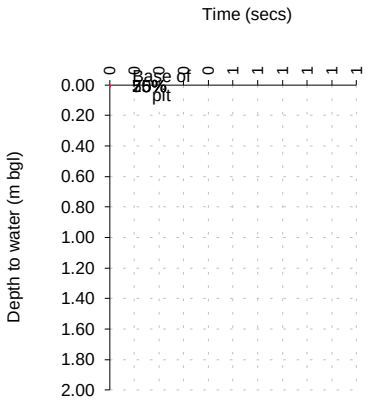
Test Run 1		Test Run 2		Test Run 3	
Pit Dimensions (m)		**Pit Dimensions (m)**		**Pit Dimensions (m)**	
Length	2.000m	Length		Length	
Width	0.500m	Width		Width	
Depth	1.800m	Depth		Depth	
Fill Depth	1.000m	Fill Depth	0.000m	Fill Depth	0.000m
Max Volume	1.000m³	Max Volume	0.000m³	Max Volume	0.000m³
Gravel used to backfill Test Pit	No	Gravel used to backfill Test Pit	No	Gravel used to backfill Test Pit	No

Time to soakaway			Time to soakaway			Time to soakaway		
Time		Depth to water	Time		Depth to water	Time		Depth to water
(secs)	(min)	(m bgl)	(secs)	(min)	(m bgl)	(secs)	(min)	(m bgl)
	0	*0.800*		*0*		*0*	*0*	
60	1	0.800						
120	2	0.800						
180	3	0.800						
240	4	0.800						
300	5	0.800						
360	6	0.800						
420	7	0.800						
480	8	0.800						
540	9	0.800						
600	10	0.800						
900	15	0.800						
1200	20	0.800						
1500	25	0.800						
1800	30	0.800						
2400	40	0.800						
3600	60	0.810						
4800	80	0.810						
7200	120	0.810						
10800	180	0.810						
14400	240	0.820						
	1440	0.840						

25% water depth	1.050m	**25% water depth**	0.000m	**25% water depth**	0.000m
50% water depth	1.300m	**50% water depth**	0.000m	**50% water depth**	0.000m
75% water depth	1.550m	**75% water depth**	0.000m	**75% water depth**	0.000m
25% time (seconds)	18000 sec	**25% time (seconds)**		**25% time (seconds)**	
75% time (seconds)	26571 sec	**75% time (seconds)**		**75% time (seconds)**	
$V_{p\ 75\text{-}25}$	0.5000m³	$V_{p\ 75\text{-}25}$	0.0000m³	$V_{p\ 75\text{-}25}$	0.0000m³
$a_{p\ 50}$ **(Actual area from test)**	5.9000m²	$a_{p\ 50}$ **(Actual area from test)**	0.0000m²	$a_{p\ 50}$ **(Actual area from test)**	0.0000m²
$t_{p\ 75\text{-}25}$	8571.4	$t_{p\ 75\text{-}25}$		$t_{p\ 75\text{-}25}$	
Soil Infiltration Rate	**NA**	**Soil Infiltration Rate**		**Soil Infiltration Rate**	







Note: Groundwater table taken as base of pit for infiltration rate calculation.

Appendix D – Drainage

Microdrainage Calculations:

- 1% AEP + 40% CC
- 1% AEP
- 3.33% AEP
- 50% AEP
- QBAR
- Urban Creep
- Surcharged outfall

RAB Drawings

Asset location search

Confirmation of capacity

Time Area Diagram for Storm

Time (mins)	Area (ha)	Time (mins)	Area (ha)	Time (mins)	Area (ha)
0-4	0.070	4-8	0.091	8-12	0.000

Total Area Contributing (ha) = 0.161

Total Pipe Volume (m^3) = 219.316

STORM SEWER DESIGN by the Modified Rational Method

Network Design Table for Storm

PN	Length (m)	Fall (m)	Slope (1:X)	I.Area (ha)	T.E. (mins)	Base Flow (l/s)	k (mm)	n	HYD SECT	DIA (mm)	Section Type	Auto Design
S1.000	19.363	0.286	67.7	0.033	5.00	0.0	0.600		o	150	Pipe/Conduit	
S1.001	25.378	0.411	61.7	0.011	0.00	0.0	0.600		o	150	Pipe/Conduit	
S1.002	24.061	0.727	33.1	0.000	0.00	0.0		0.045	→_/		Pond/Tank	
S2.000	11.251	0.075	150.0	0.013	5.00	0.0	0.600		o	150	Pipe/Conduit	
S2.001	14.753	0.254	58.1	0.000	0.00	0.0	0.600		o	150	Pipe/Conduit	
S2.002	18.290	0.530	34.5	0.030	0.00	0.0	0.600		o	150	Pipe/Conduit	
S2.003	5.207	0.034	153.1	0.010	0.00	0.0	0.600		o	300	Pipe/Conduit	
S2.004	37.646	0.252	149.4	0.054	0.00	0.0		0.045	→|↓|→		Porous Car Park	
S2.005	5.992	0.070	85.6	0.008	0.00	0.0	0.600		o	300	Pipe/Conduit	
S1.003	11.777	0.382	30.8	0.000	0.00	0.0	0.600		o	150	Pipe/Conduit	
S1.004	36.519	0.382	95.6	0.000	0.00	0.0	0.600		o	225	Pipe/Conduit	

Network Results Table

PN	Rain (mm/hr)	T.C. (mins)	US/IL (m)	Σ I.Area (ha)	Σ Base Flow (l/s)	Foul (l/s)	Add Flow (l/s)	Vel (m/s)	Cap (l/s)	Flow (l/s)
S1.000	67.24	5.26	131.422	0.033	0.0	0.0	0.0	1.22	21.6	6.1
S1.001	65.67	5.59	131.136	0.045	0.0	0.0	0.0	1.28	22.7	7.9
S1.002	65.06	5.72	130.725	0.045	0.0	0.0	0.0	3.15	19658.8	7.9
S2.000	67.40	5.23	130.684	0.013	0.0	0.0	0.0	0.82	14.5	2.4
S2.001	66.52	5.42	130.609	0.013	0.0	0.0	0.0	1.32	23.4	2.4
S2.002	65.67	5.59	130.355	0.044	0.0	0.0	0.0	1.72	30.4	7.8
S2.003	65.35	5.66	129.825	0.054	0.0	0.0	0.0	1.27	89.6	9.5
S2.004	57.24	7.52	129.791	0.108	0.0	0.0	0.0	0.34	290.9	16.7
S2.005	57.01	7.58	129.539	0.116	0.0	0.0	0.0	1.70	120.2	17.9
S1.003	56.60	7.69	129.469	0.161	0.0	0.0	0.0	1.82	32.2	24.6
S1.004	54.92	8.14	129.012	0.161	0.0	0.0	0.0	1.34	53.2	24.6

Cathedral House
Beacon Street
Lichfield WS13 7AA

Date 09/11/2023 10:43 | Designed by Micro Drainage
File 3199.MDX | Checked by
Micro Drainage | Network 2020.1.3

Manhole Schedules for Storm

MH Name	MH CL (m)	MH Depth (m)	MH Connection	MH Diam.,L*W (mm)	Pipe Out PN	Pipe Out Invert Level (m)	Pipe Out Diameter (mm)	Pipes In PN	Pipes In Invert Level (m)	Pipes In Diameter (mm)	Backdrop (mm)
S1	132.427	1.005	Open Manhole	600	S1.000	131.422	150				
S2	132.925	1.789	Open Manhole	1200	S1.001	131.136	150	S1.000	131.136	150	
S3	132.225	1.500	Open Manhole	10000	S1.002	130.725		S1.001	130.725	150	
S4	131.684	1.000	Open Manhole	600	S2.000	130.684	150				
S5	131.314	0.705	Open Manhole	600	S2.001	130.609	150	S2.000	130.609	150	
S6	130.855	0.500	Open Manhole	600	S2.002	130.355	150	S2.001	130.355	150	
S7	130.325	0.500	Sealed Manhole	600	S2.003	129.825	300	S2.002	129.825	150	
S8	130.470	0.679	Open Manhole	3000	S2.004	129.791		S2.003	129.791	300	
S9	131.593	2.054	Open Manhole	3000	S2.005	129.539	300	S2.004	129.539		
S10	131.669	2.200	Open Manhole	10000	S1.003	129.469	150	S1.002	129.998		1879
								S2.005	129.469	300	
S11	131.476	2.464	Open Manhole	1200	S1.004	129.012	225	S1.003	129.087	150	
S	129.150	0.520	Open Manhole	1200		OUTFALL		S1.004	128.630	225	

MH Name	Manhole Easting (m)	Manhole Northing (m)	Intersection Easting (m)	Intersection Northing (m)	Manhole Access	Layout (North)
S1	470306.168	213604.441	470306.168	213604.441	Required	
S2	470324.714	213610.006	470324.714	213610.006	Required	
S3	470335.836	213587.195	470335.836	213587.195	Required	
S4	470317.559	213582.824	470317.559	213582.824	Required	
S5	470314.269	213572.065	470314.269	213572.065	Required	
S6	470300.404	213567.024	470300.404	213567.024	Required	

Manhole Schedules for Storm

MH Name	Manhole Easting (m)	Manhole Northing (m)	Intersection Easting (m)	Intersection Northing (m)	Manhole Access	Layout (North)
S7	470303.146	213548.940			No Entry	
S8	470308.157	213550.356	470308.157	213550.356	Required	
S9	470344.641	213559.637	470344.641	213559.637	Required	
S10	470346.123	213565.443	470346.123	213565.443	Required	
S11	470351.118	213554.778	470351.118	213554.778	Required	
S	470318.131	213539.109			No Entry	

PIPELINE SCHEDULES for Storm

Upstream Manhole

PN	Hyd Sect	Diam (mm)	MH Name	C.Level (m)	I.Level (m)	D.Depth (m)	MH Connection	MH DIAM., L*W (mm)
S1.000	o	150	S1	132.427	131.422	0.855	Open Manhole	600
S1.001	o	150	S2	132.925	131.136	1.639	Open Manhole	1200
S1.002	→_/		S3	132.225	130.725	0.000	Open Manhole	10000
S2.000	o	150	S4	131.684	130.684	0.850	Open Manhole	600
S2.001	o	150	S5	131.314	130.609	0.555	Open Manhole	600
S2.002	o	150	S6	130.855	130.355	0.350	Open Manhole	600
S2.003	o	300	S7	130.325	129.825	0.200	Sealed Manhole	600
S2.004	→|↓|→		S8	130.470	129.791	0.080	Open Manhole	3000
S2.005	o	300	S9	131.593	129.539	1.754	Open Manhole	3000
S1.003	o	150	S10	131.669	129.469	2.050	Open Manhole	10000
S1.004	o	225	S11	131.476	129.012	2.239	Open Manhole	1200

Downstream Manhole

PN	Length (m)	Slope (1:X)	MH Name	C.Level (m)	I.Level (m)	D.Depth (m)	MH Connection	MH DIAM., L*W (mm)
S1.000	19.363	67.7	S2	132.925	131.136	1.639	Open Manhole	1200
S1.001	25.378	61.7	S3	132.225	130.725	1.350	Open Manhole	10000
S1.002	24.061	33.1	S10	131.669	129.998	0.171	Open Manhole	10000
S2.000	11.251	150.0	S5	131.314	130.609	0.555	Open Manhole	600
S2.001	14.753	58.1	S6	130.855	130.355	0.350	Open Manhole	600
S2.002	18.290	34.5	S7	130.325	129.825	0.350	Sealed Manhole	600
S2.003	5.207	153.1	S8	130.470	129.791	0.379	Open Manhole	3000
S2.004	37.646	149.4	S9	131.593	129.539	1.455	Open Manhole	3000
S2.005	5.992	85.6	S10	131.669	129.469	1.900	Open Manhole	10000
S1.003	11.777	30.8	S11	131.476	129.087	2.239	Open Manhole	1200
S1.004	36.519	95.6	S	129.150	128.630	0.295	Open Manhole	1200

Area Summary for Storm

Pipe Number	PIMP Type	PIMP Name	PIMP (%)	Gross Area (ha)	Imp. Area (ha)	Pipe Total (ha)
1.000	User	-	100	0.015	0.015	0.015
	User	-	100	0.018	0.018	0.033
1.001	User	-	100	0.008	0.008	0.008
	User	-	100	0.003	0.003	0.011
1.002	-	-	100	0.000	0.000	0.000
2.000	User	-	100	0.013	0.013	0.013
2.001	-	-	100	0.000	0.000	0.000
2.002	User	-	100	0.009	0.009	0.009
	User	-	100	0.022	0.022	0.030
2.003	User	-	100	0.010	0.010	0.010
2.004	User	-	100	0.004	0.004	0.004
	User	-	100	0.050	0.050	0.054
2.005	User	-	100	0.004	0.004	0.004
	User	-	100	0.005	0.005	0.008
1.003	-	-	100	0.000	0.000	0.000
1.004	-	-	100	0.000	0.000	0.000
				Total	Total	Total
				0.161	0.161	0.161

Free Flowing Outfall Details for Storm

Outfall Pipe Number	Outfall Name	C. Level (m)	I. Level (m)	Min I. Level (m)	D,L (mm)	W (mm)
S1.004	S	129.150	128.630	0.000	1200	0

Online Controls for Storm

Hydro-Brake® Optimum Manhole: S10, DS/PN: S1.003, Volume (m³): 279.6

Unit Reference	MD-SHE-0057-1900-1800-1900
Design Head (m)	1.800
Design Flow (l/s)	1.9
Flush-Flo™	Calculated
Objective	Minimise upstream storage
Application	Surface
Sump Available	Yes
Diameter (mm)	57
Invert Level (m)	129.469
Minimum Outlet Pipe Diameter (mm)	75
Suggested Manhole Diameter (mm)	1200

Control Points	Head (m)	Flow (l/s)	Control Points	Head (m)	Flow (l/s)
Design Point (Calculated)	1.800	1.9	Kick-Flo®	0.506	1.1
Flush-Flo™	0.250	1.3	Mean Flow over Head Range	-	1.4

The hydrological calculations have been based on the Head/Discharge relationship for the Hydro-Brake® Optimum as specified. Should another type of control device other than a Hydro-Brake Optimum® be utilised then these storage routing calculations will be invalidated

Depth (m)	Flow (l/s)	Depth (m)	Flow (l/s)	Depth (m)	Flow (l/s)	Depth (m)	Flow (l/s)
0.100	1.1	1.200	1.6	3.000	2.4	7.000	3.6
0.200	1.3	1.400	1.7	3.500	2.6	7.500	3.7
0.300	1.3	1.600	1.8	4.000	2.7	8.000	3.8
0.400	1.2	1.800	1.9	4.500	2.9	8.500	3.9
0.500	1.1	2.000	2.0	5.000	3.0	9.000	4.0
0.600	1.2	2.200	2.1	5.500	3.2	9.500	4.1
0.800	1.3	2.400	2.2	6.000	3.3		
1.000	1.5	2.600	2.2	6.500	3.4		

Storage Structures for Storm

Tank or Pond Pipe: S1.002

Manning's N 0.045 Invert Level (m) 130.725

Depth (m)	Area (m²)	Depth (m)	Area (m²)
0.000	10.0	1.500	190.4

Porous Car Park Manhole: S6, DS/PN: S2.002

Infiltration Coefficient Base (m/hr)	0.00000	Width (m)	5.1
Membrane Percolation (mm/hr)	1000	Length (m)	4.8
Max Percolation (l/s)	6.8	Slope (1:X)	500.0
Safety Factor	2.0	Depression Storage (mm)	5
Porosity	0.30	Evaporation (mm/day)	3
Invert Level (m)	130.355	Membrane Depth (mm)	80

Porous Car Park Pipe: S2.004

Manning's N	0.045	Width (m)	4.8
Infiltration Coefficient Base (m/hr)	0.00000	Length (m)	37.6
Membrane Percolation (mm/hr)	1000	Slope (1:X)	149.4
Max Percolation (l/s)	50.2	Depression Storage (mm)	5
Safety Factor	2.0	Evaporation (mm/day)	3
Porosity	0.30	Membrane Depth (mm)	80
Invert Level (m)	129.791		

Manhole Headloss for Storm

PN	US/MH Name	US/MH Headloss
S1.000	S1	0.500
S1.001	S2	0.500
S1.002	S3	0.500
S2.000	S4	0.500
S2.001	S5	0.500
S2.002	S6	0.500
S2.003	S7	0.500
S2.004	S8	0.500
S2.005	S9	0.500
S1.003	S10	0.500
S1.004	S11	0.500

Summary of Critical Results by Maximum Level (Rank 1) for Storm

Simulation Criteria

Areal Reduction Factor	1.000	Additional Flow - % of Total Flow	0.000
Hot Start (mins)	0	MADD Factor * 10m³/ha Storage	2.000
Hot Start Level (mm)	0	Inlet Coeffiecient	0.800
Manhole Headloss Coeff (Global)	0.500	Flow per Person per Day (l/per/day)	0.000
Foul Sewage per hectare (l/s)	0.000		

Number of Input Hydrographs 0 Number of Offline Controls 0 Number of Time/Area Diagrams 0
Number of Online Controls 1 Number of Storage Structures 3 Number of Real Time Controls 0

Synthetic Rainfall Details

Rainfall Model	FEH
FEH Rainfall Version	2013
Site Location	GB 470318 213580 SP 70318 13580
Data Type	Point
Cv (Summer)	0.900
Cv (Winter)	0.900

Margin for Flood Risk Warning (mm)	300.0
Analysis Timestep	2.5 Second Increment (Extended)
DTS Status	ON
DVD Status	ON
Inertia Status	ON

Profile(s)	Summer and Winter
Duration(s) (mins)	15, 30, 60, 120, 180, 240, 360, 480, 600, 720, 960, 1440, 2160, 2880, 4320, 5760, 7200, 8640, 10080
Return Period(s) (years)	100
Climate Change (%)	40

WARNING: Half Drain Time has not been calculated as the structure is too full.

PN	US/MH Name	Storm	Return Period	Climate Change	First (X) Surcharge	First (Y) Flood	First (Z) Overflow	Overflow Act.
S1.000	S1	15 Summer	100	+40%	100/15 Summer			
S1.001	S2	15 Summer	100	+40%	100/15 Summer			
S1.002	S3	15 Summer	100	+40%				
S2.000	S4	15 Summer	100	+40%				
S2.001	S5	15 Summer	100	+40%				
S2.002	S6	15 Summer	100	+40%	100/15 Summer			
S2.003	S7	480 Winter	100	+40%	100/60 Summer			
S2.004	S8	360 Winter	100	+40%	100/360 Winter	100/180 Summer		

Summary of Critical Results by Maximum Level (Rank 1) for Storm

PN	US/MH Name	Water Level (m)	Surcharged Depth (m)	Flooded Volume (m³)	Flow / Cap.	Overflow (l/s)	Half Drain Time (mins)	Pipe Flow (l/s)	Status
S1.000	S1	132.174	0.602	0.000	1.19			24.1	FLOOD RISK
S1.001	S2	131.753	0.467	0.000	1.45			31.2	SURCHARGED
S1.002	S3	130.765	-1.459	0.000	0.00			28.5	OK
S2.000	S4	130.788	-0.046	0.000	0.81			10.6	OK
S2.001	S5	130.684	-0.075	0.000	0.49			10.5	OK
S2.002	S6	130.617	0.112	0.000	1.07		3	30.4	FLOOD RISK
S2.003	S7	130.325	0.200	0.000	0.07			4.2	FLOOD
S2.004	S8	130.394	0.004	0.000	0.02			6.2	FLOOD RISK

PN	US/MH Name	Level Exceeded
S1.000	S1	
S1.001	S2	
S1.002	S3	
S2.000	S4	
S2.001	S5	
S2.002	S6	
S2.003	S7	10
S2.004	S8	

Summary of Critical Results by Maximum Level (Rank 1) for Storm

PN	US/MH Name	Storm	Return Period	Climate Change	First (X) Surcharge	First (Y) Flood	First (Z) Overflow	Overflow Act.	Water Level (m)
S2.005	S9	360 Winter	100	+40%	100/15 Summer				130.395
S1.003	S10	360 Winter	100	+40%	100/15 Summer				130.394
S1.004	S11	360 Winter	100	+40%					129.037

PN	US/MH Name	Surcharged Depth (m)	Flooded Volume (m³)	Flow / Cap.	Overflow (l/s)	Half Drain Time (mins)	Pipe Flow (l/s)	Status	Level Exceeded
S2.005	S9	0.556	0.000	0.08			5.5	SURCHARGED	
S1.003	S10	0.775	0.000	0.05			1.4	SURCHARGED	
S1.004	S11	-0.200	0.000	0.03			1.4	OK	

Summary of Critical Results by Maximum Level (Rank 1) for Storm

Simulation Criteria

Areal Reduction Factor	1.000	Additional Flow - % of Total Flow	0.000
Hot Start (mins)	0	MADD Factor * 10m³/ha Storage	2.000
Hot Start Level (mm)	0	Inlet Coeffiecient	0.800
Manhole Headloss Coeff (Global)	0.500	Flow per Person per Day (l/per/day)	0.000
Foul Sewage per hectare (l/s)	0.000		

Number of Input Hydrographs 0 Number of Offline Controls 0 Number of Time/Area Diagrams 0
Number of Online Controls 1 Number of Storage Structures 3 Number of Real Time Controls 0

Synthetic Rainfall Details

Rainfall Model	FEH
FEH Rainfall Version	2013
Site Location	GB 470318 213580 SP 70318 13580
Data Type	Point
Cv (Summer)	0.900
Cv (Winter)	0.900

Margin for Flood Risk Warning (mm)	300.0
Analysis Timestep	2.5 Second Increment (Extended)
DTS Status	ON
DVD Status	ON
Inertia Status	ON

Profile(s)	Summer and Winter
Duration(s) (mins)	15, 30, 60, 120, 180, 240, 360, 480, 600, 720, 960, 1440, 2160, 2880, 4320, 5760, 7200, 8640, 10080
Return Period(s) (years)	100
Climate Change (%)	0

WARNING: Half Drain Time has not been calculated as the structure is too full.

PN	US/MH Name	Storm	Return Period	Climate Change	First (X) Surcharge	First (Y) Flood	First (Z) Overflow	Overflow Act.	Water Level (m)
S1.000	S1	15 Summer	100	+0%	100/15 Summer				131.620
S1.001	S2	15 Summer	100	+0%	100/15 Summer				131.384
S1.002	S3	15 Summer	100	+0%					130.756
S2.000	S4	15 Summer	100	+0%					130.767
S2.001	S5	15 Summer	100	+0%					130.671
S2.002	S6	15 Summer	100	+0%					130.472
S2.003	S7	240 Winter	100	+0%					130.108
S2.004	S8	240 Winter	100	+0%					130.108

Summary of Critical Results by Maximum Level (Rank 1) for Storm

PN	US/MH Name	Surcharged Depth (m)	Flooded Volume (m³)	Flow / Cap.	Overflow (l/s)	Half Drain Time (mins)	Pipe Flow (l/s)	Status	Level Exceeded
S1.000	S1	0.048	0.000	0.91			18.4	SURCHARGED	
S1.001	S2	0.098	0.000	1.11			23.9	SURCHARGED	
S1.002	S3	-1.469	0.000	0.00			22.3	OK	
S2.000	S4	-0.067	0.000	0.58			7.6	OK	
S2.001	S5	-0.088	0.000	0.35			7.5	OK	
S2.002	S6	-0.033	0.000	0.93		5	26.5	OK	
S2.003	S7	-0.017	0.000	0.09			5.5	FLOOD RISK*	
S2.004	S8	-0.282	0.000	0.02			7.1	OK	

Summary of Critical Results by Maximum Level (Rank 1) for Storm

PN	US/MH Name	Storm	Return Period	Climate Change	First (X) Surcharge	First (Y) Flood	First (Z) Overflow	Overflow Act.	Water Level (m)
S2.005	S9	240 Winter	100	+0%	100/30 Summer				130.108
S1.003	S10	240 Winter	100	+0%	100/15 Summer				130.108
S1.004	S11	2160 Winter	100	+0%					129.036

PN	US/MH Name	Surcharged Depth (m)	Flooded Volume (m³)	Flow / Cap.	Overflow (l/s)	Half Drain Time (mins)	Pipe Flow (l/s)	Status	Level Exceeded
S2.005	S9	0.269	0.000	0.09			6.3	SURCHARGED	
S1.003	S10	0.489	0.000	0.04			1.3	SURCHARGED	
S1.004	S11	-0.201	0.000	0.03			1.3	OK	

Summary of Critical Results by Maximum Level (Rank 1) for Storm

Simulation Criteria

Areal Reduction Factor	1.000	Additional Flow - % of Total Flow	0.000
Hot Start (mins)	0	MADD Factor * 10m³/ha Storage	2.000
Hot Start Level (mm)	0	Inlet Coeffiecient	0.800
Manhole Headloss Coeff (Global)	0.500	Flow per Person per Day (l/per/day)	0.000
Foul Sewage per hectare (l/s)	0.000		

Number of Input Hydrographs 0 Number of Offline Controls 0 Number of Time/Area Diagrams 0
Number of Online Controls 1 Number of Storage Structures 3 Number of Real Time Controls 0

Synthetic Rainfall Details

Rainfall Model	FEH
FEH Rainfall Version	2013
Site Location	GB 470318 213580 SP 70318 13580
Data Type	Point
Cv (Summer)	0.900
Cv (Winter)	0.900

Margin for Flood Risk Warning (mm)	300.0
Analysis Timestep	2.5 Second Increment (Extended)
DTS Status	ON
DVD Status	ON
Inertia Status	ON

Profile(s)	Summer and Winter
Duration(s) (mins)	15, 30, 60, 120, 180, 240, 360, 480, 600, 720, 960, 1440, 2160, 2880, 4320, 5760, 7200, 8640, 10080
Return Period(s) (years)	30
Climate Change (%)	0

PN	US/MH Name	Storm	Return Period	Climate Change	First (X) Surcharge	First (Y) Flood	First (Z) Overflow	Overflow Act.	Water Level (m)
S1.000	S1	15 Summer	30	+0%					131.520
S1.001	S2	15 Summer	30	+0%					131.254
S1.002	S3	15 Summer	30	+0%					130.750
S2.000	S4	15 Summer	30	+0%					130.755
S2.001	S5	15 Summer	30	+0%					130.663
S2.002	S6	15 Summer	30	+0%					130.453
S2.003	S7	240 Winter	30	+0%					129.982
S2.004	S8	240 Winter	30	+0%					129.982
S2.005	S9	240 Winter	30	+0%	30/60 Summer				129.982
S1.003	S10	240 Winter	30	+0%	30/15 Summer				129.981

Summary of Critical Results by Maximum Level (Rank 1) for Storm

PN	US/MH Name	Surcharged Depth (m)	Flooded Volume (m³)	Flow / Cap.	Overflow (l/s)	Half Drain Time (mins)	Pipe Flow (l/s)	Status	Level Exceeded
S1.000	S1	-0.052	0.000	0.74			15.0	OK	
S1.001	S2	-0.032	0.000	0.94			20.3	OK	
S1.002	S3	-1.475	0.000	0.00			17.9	OK	
S2.000	S4	-0.079	0.000	0.46			6.0	OK	
S2.001	S5	-0.096	0.000	0.27			5.9	OK	
S2.002	S6	-0.052	0.000	0.74		5	20.9	OK	
S2.003	S7	-0.143	0.000	0.07			4.3	OK	
S2.004	S8	-0.408	0.000	0.02		196	6.1	OK	
S2.005	S9	0.143	0.000	0.08			5.3	SURCHARGED	
S1.003	S10	0.362	0.000	0.04			1.3	SURCHARGED	

Summary of Critical Results by Maximum Level (Rank 1) for Storm

PN	US/MH Name	Storm	Return Period	Climate Change	First (X) Surcharge	First (Y) Flood	First (Z) Overflow	Overflow Act.	Water Level (m)
S1.004	S11	960 Winter	30	+0%					129.036

PN	US/MH Name	Surcharged Depth (m)	Flooded Volume (m³)	Flow / Cap.	Overflow (l/s)	Half Drain Time (mins)	Pipe Flow (l/s)	Status	Level Exceeded
S1.004	S11	-0.201	0.000	0.03			1.3	OK	

Summary of Critical Results by Maximum Level (Rank 1) for Storm

Simulation Criteria

Areal Reduction Factor	1.000	Additional Flow - % of Total Flow	0.000
Hot Start (mins)	0	MADD Factor * 10m³/ha Storage	2.000
Hot Start Level (mm)	0	Inlet Coeffiecient	0.800
Manhole Headloss Coeff (Global)	0.500	Flow per Person per Day (l/per/day)	0.000
Foul Sewage per hectare (l/s)	0.000		

Number of Input Hydrographs 0 Number of Offline Controls 0 Number of Time/Area Diagrams 0
Number of Online Controls 1 Number of Storage Structures 3 Number of Real Time Controls 0

Synthetic Rainfall Details

Rainfall Model	FEH
FEH Rainfall Version	2013
Site Location	GB 470318 213580 SP 70318 13580
Data Type	Point
Cv (Summer)	0.900
Cv (Winter)	0.900

Margin for Flood Risk Warning (mm)	300.0
Analysis Timestep	2.5 Second Increment (Extended)
DTS Status	ON
DVD Status	ON
Inertia Status	ON

Profile(s)	Summer and Winter
Duration(s) (mins)	15, 30, 60, 120, 180, 240, 360, 480, 600, 720, 960, 1440, 2160, 2880, 4320, 5760, 7200, 8640, 10080
Return Period(s) (years)	2
Climate Change (%)	0

PN	US/MH Name	Storm	Return Period	Climate Change	First (X) Surcharge	First (Y) Flood	First (Z) Overflow	Overflow Act.	Water Level (m)
S1.000	S1	15 Summer	2	+0%					131.481
S1.001	S2	15 Summer	2	+0%					131.201
S1.002	S3	15 Summer	2	+0%					130.735
S2.000	S4	15 Summer	2	+0%					130.729
S2.001	S5	15 Summer	2	+0%					130.644
S2.002	S6	15 Summer	2	+0%					130.408
S2.003	S7	15 Summer	2	+0%					129.903
S2.004	S8	15 Summer	2	+0%					129.873
S2.005	S9	240 Summer	2	+0%					129.737
S1.003	S10	240 Summer	2	+0%	2/30 Summer				129.736

Summary of Critical Results by Maximum Level (Rank 1) for Storm

PN	US/MH Name	Surcharged Depth (m)	Flooded Volume (m³)	Flow / Cap.	Overflow (l/s)	Half Drain Time (mins)	Pipe Flow (l/s)	Status	Level Exceeded
S1.000	S1	-0.091	0.000	0.32			6.6	OK	
S1.001	S2	-0.085	0.000	0.39			8.4	OK	
S1.002	S3	-1.489	0.000	0.00			7.5	OK	
S2.000	S4	-0.105	0.000	0.20			2.6	OK	
S2.001	S5	-0.115	0.000	0.12			2.6	OK	
S2.002	S6	-0.097	0.000	0.27		8	7.6	OK	
S2.003	S7	-0.222	0.000	0.15			9.2	OK	
S2.004	S8	-0.517	0.000	0.06		7	16.7	OK	
S2.005	S9	-0.102	0.000	0.08			5.5	OK	
S1.003	S10	0.117	0.000	0.04			1.2	SURCHARGED	

Summary of Critical Results by Maximum Level (Rank 1) for Storm

PN	US/MH Name	Storm	Return Period	Climate Change	First (X) Surcharge	First (Y) Flood	First (Z) Overflow	Overflow Act.	Water Level (m)
S1.004	S11	240 Summer	2	+0%					129.036

PN	US/MH Name	Surcharged Depth (m)	Flooded Volume (m³)	Flow / Cap.	Overflow (l/s)	Half Drain Time (mins)	Pipe Flow (l/s)	Status	Level Exceeded
S1.004	S11	-0.201	0.000	0.02			1.2	OK	

ICP SUDS Mean Annual Flood

Input

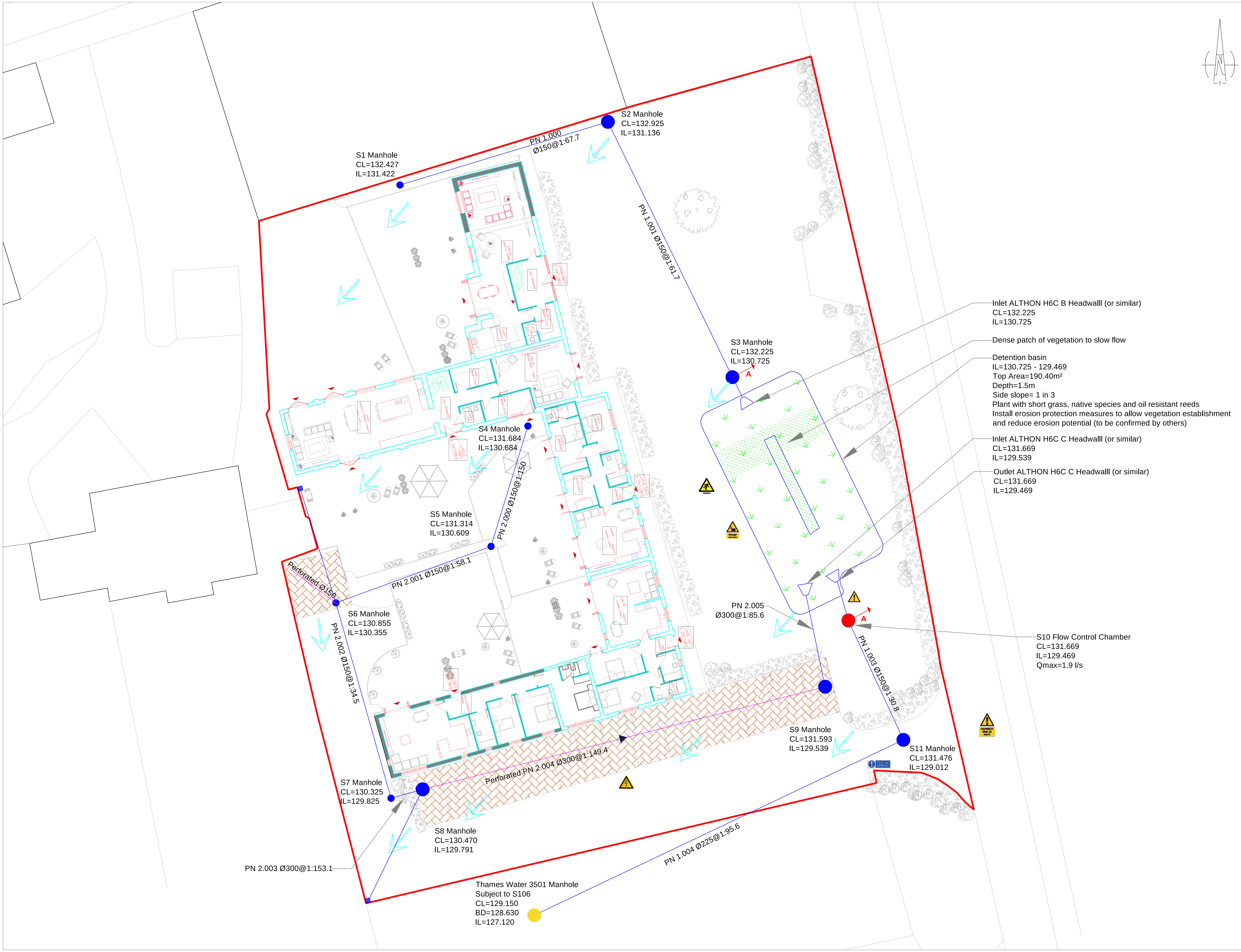
Return Period (years) 2 SAAR (mm) 629 Urban 0.000
Area (ha) 0.161 Soil 0.450 Region Number Region 6

Results l/s

QBAR Rural 0.6
QBAR Urban 0.6

Q2 years 0.5

Q1 year 0.5
Q30 years 1.4
Q100 years 2.0



LEGEND

- Type C Permeable Paving
- Perforated Pipe
- Surface Water pipes
- Exceedance flow routes
- Existing drainage infrastructure
- Inspection Chamber
- Flow control manhole
- Manhole
- SuDS vegetation (basin) including erosion control (to be confirmed by others)
- Gully

Notes:

1. All setting out to be in accordance with the Architects drawings. Any discrepancies between the Engineers and the Architects drawings to be referred to the Architect before proceeding. Dimensions must not be scaled.
2. This drawing must be read in conjunction with all relevant drawings and with the drainage report (RAB3199).
3. A construction phase plan, in line with CDM 2015, must be prepared by the principal contractor prior to any work taking place. The Contractor must comply with all current legislation relating to health and safety.
3. Connections to Public sewers to be agreed and inspected by Water Authority.
4. Until technical approval has been obtained from the relevant Authority, it should be understood that all drawings issued are Preliminary and not for construction. Should the contractor commence the work prior to such approval being given, it is entirely at his own risk.
5. Drainage to be in accordance with BS 7533-13:2009, Building Regulations Part H: Drainage and Waste Disposal, *Design and Construction Guidance for foul and surface water sewers offered for adoption under the Code for adoption agreements for water and sewerage companies operating wholly or mainly in England,* CIRIA Guidance on the Construction of (C768) SuDS and CIRIA SuDS Manual (C735).
6. The minimum depth of cover to the crown of gravity pipes without protection should be 0.35m for domestic gardens and pathways without any possibility of vehicular access; 0.5m in domestic driveways, parking areas and yards with height restrictions to prevent entry by vehicles weighing >7.5 tonnes; 0.9m in domestic driveways, parking areas and narrow streets without footways with limited access for vehicles with a gross vehicle weight in excess of 7.5 tonnes; 1.2m in highways and parking areas with unrestricted access to vehicles with a gross vehicle weight in excess of 7.5 tonnes.
7. All pipes not meeting the criteria 5 MUST include a minimum 150mm thick Class GEN3 Concrete surround in line with the 2020 Design And Construction Guidance document.
8. Where pipes are bedded and surrounded in concrete, flexible joints should be provided. Compressible boards (fibreboard or polystyrene) shall be provided at a maximum of 8m centres (coinciding with pipe joints). The boards shall be pre-cut to pipe diameter and to a height and width equal to the concrete cross section. A board thickness of 18mm for pipes up to 450mm nominal diameter and 36mm for pipes over 450mm nominal diameter.
9. The Contractor shall make allowance for raising / lowering all access covers & frames to suit finished levels.
10. Cover Class to manholes/inspection chambers are to suit anticipated vehicular loadings in accordance with BSEN 124:2015 (D400 where potential for HGV loading, C250/B125/A15 in footway trafficked areas not accessible by vehicles.
11. All soft / hard paved areas affected by the works shall be fully reinstated upon completion of the works. All surface markings damaged by the works shall be fully reinstated.
12. Before handover, all manholes shall be inspected, all rubble removed, and the whole system shall be thoroughly flushed and cleaned.
13. All levels are in Ordnance datum unless otherwise specified.
14. All pipe runs near buildings to comply with the Building Regulations 2002 Part H1. where a pipe is within 1m of a foundation the trench shall be filled with class GEN3 Concrete up to the lowest level of the foundation. Where the trench is further than 1m from the foundation, the trench shall be filled with class GEN3 Concrete to a level below the lowest level for the foundation equal to the distance from the foundation less 150mm. In both cases, the pipe shall be bedded and surrounded in 150mm thick class GEN3 Concrete.
15. All materials delivered to the site associated to the sub-base storage of the permeable pavement must be tested to obtain their porosity and permeability; in line with BS 1377-2:1990 and BS 1377-4:1990
16. Backfill material to drainage trenches under carriageways to be DOT Type 1 sub-base material, elsewhere backfill to be free draining readily compacted material, free from rubbish and organic matter, frozen soil clay lumps and large stones. To be compacted in layers of not exceeding 150mm thick.
17. Joints specification to be provided by manufacturers.
18. Typical pipe bedding to drainage for pipes up to D=525mm is to be Class S (i.e. 10-14mm).
19. Extra care must be taken once the permeable pavement(s) has been installed so that construction traffic does not impact the porosity due to compaction.
20. **Trench temporary formwork is required to all excavations exceeding 1.2m depth to provide adequate support and stability at all times.**
18. Sewers are to be constructed in single sections between manholes only. Trenches to be backfilled prior to excavating the succeeding sewer run.
19. All concrete products to be in accordance with BRE 363 for sulphates.
20. The requirement or not for a capping layer under the porous pavement(s) must be assessed by the highways engineer.
21. SuDS should not be installed between the months of October to February.
22. The proposed basin must include erosion protection measures to allow for estbalhsiment of vegetation but also reduce eorion potential from fast flowing water. Contractor must confirm such measures prior to installation.
23. No SuDS features should receive construction-related runoff. Alternative methods of surface water disposal must be employed.
24. Where sewer or drains are to be abandoned they shall be removed or infilled by grouting in accordance with the Civil Engineer Specification for the Water Industry 7th edition, Clause S.23.
25. All manholes shall be watertight.
26. The position of any existing public or private sewers, utility services, plant or apparatus shown on this drawing is believed to be correct, but no warranty to this is expressed or implied. Other such utilities, plant or apparatus may also be present but not shown. The Contractor must therefore undertake their own investigation where the presence of any existing sewers, services, plant or apparatus may affect the design installation and/or their operations, prior to the commencement of any works and inform the designer should there be any clashes. Should the contractor commence the work prior to such an investigation, it is entirely at his own risk. RAB Consultants accepts no liability should existing utilities clash with the proposed design.
27. This drawing is for planning purposes only, not construction.
28. RAB Consultants accepts no liability should the proposed drainage not be installed correctly and maintained to standards, and structural/functional failure occurs.
29. Client must fulfill their relevant duties, under CDM (2015) and regulations 4, 5, 6, & 8.
30. We have not been made aware that the site utilises siphonic roof drainage. Should siphonic roof drainage be used without our prior knowledge, we accept no liability associated with a failure of the drainage system.
31. A detailed H&S Design Risk Assessment must be undertaken prior to the detailed design stage. Preliminary residual risks have been identified in this drawing.

CDM (2015)

Follow standard HSE protocol during the installation of manholes and structures, placing of fill material, and excavations, especially close to foundations.

DANGER Men at work — Follow standard site protection HSE protocol during construction to ensure no unauthorized personnel enters the site.

Clean up spillages — Adopt appropriate methods to protect the local environment from construction activities (for example install silt-traps, train operatives for fuel spillages and use maintained/certified plant, etc.

The principal contractor and maintenance contractor are advised to follow HSE protocol during construction and maintenance, respectively, to manage the risk of trips and falls and adopt appropriate H & S mitigation measures.

Danger Deep water — A throw rope station must be present at all times during construction and post-construction close to the basin. SuDS slopes have been designed at 1 in 3 to allow for a mild slope and ease movement of individuals. Client should consider installing an information board at the site informing the public of H & S hazards, post-construction.

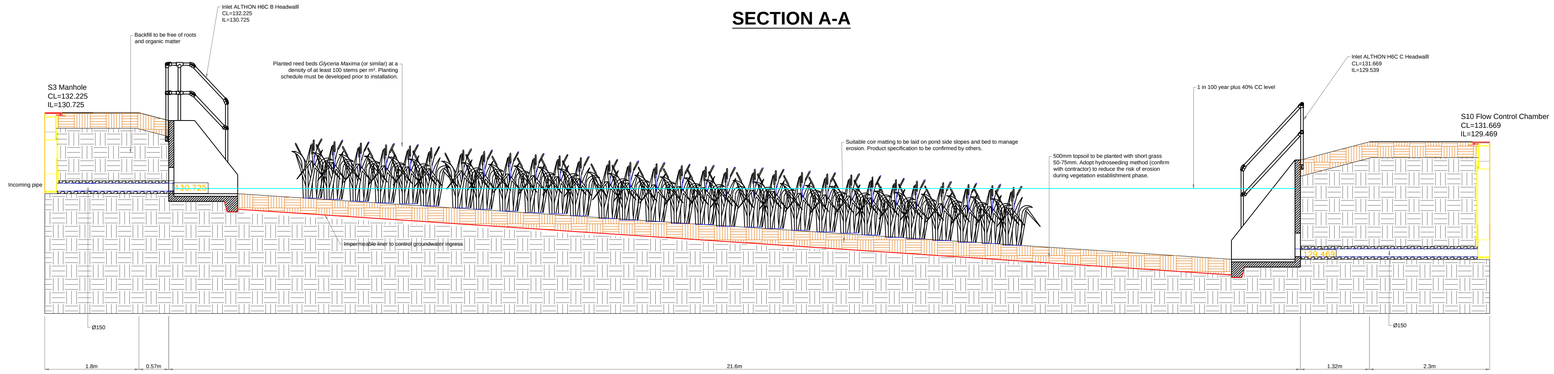
A utilities survey must be undertaken prior to any works taking place. The Contractor must undertake their own investigation where the presence of any existing sewers, services, plant or apparatus may affect the design installation and/or their operations, prior to the commencement of any works and inform the designer should there be any clashes.

RESILIENCE & FLOOD RISK

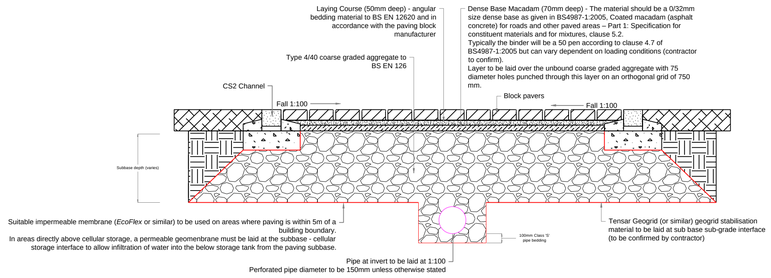
Bedford Heights,
Brickhill Drive,
Bedford,
MK41 7PH

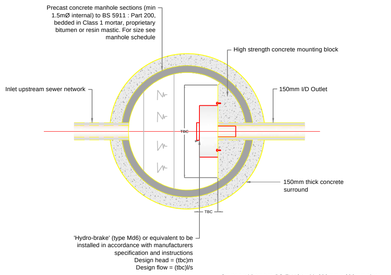
Client	DPA (London) Ltd
Project	Upper Pollicott
Drawing	Plan View of SW
Checked by AT	Approved by AT
Drawn by HG	Date: 08/11/2023 — Scale: 1:150@ A1
Drawing No. RAB3199_001	Revision -

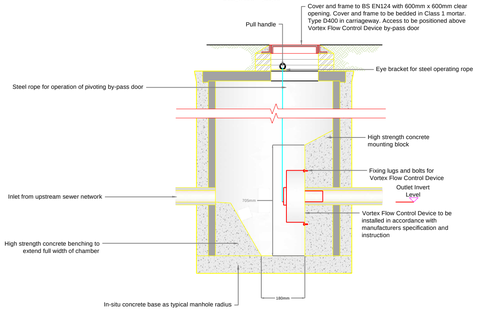
SECTION A-A

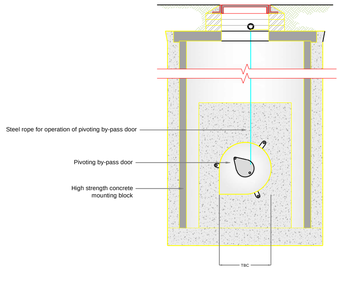


TYPICAL PERMEABLE PAVEMENT CROSS SECTION TO AREAS SUBJECT TO CONSTRUCTION TRAFFIC

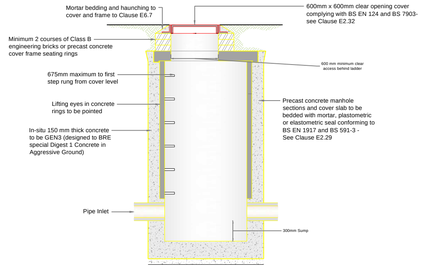


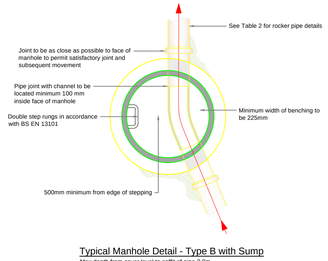




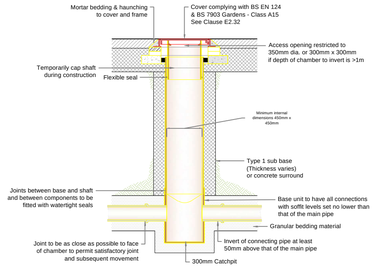


Typical Vortex Flow Control Manhole
(Scale 1:25)

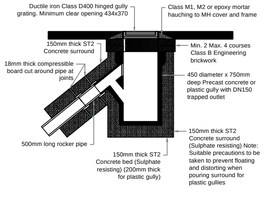




Typical Manhole Detail - Type B with Sump
Max depth from cover level to soffit of pipe 3.0m



Typical Inspection Chamber Detail with Catchpit - Type D
Max depth from cover level to soffit of pipe in areas subject to vehicle loading 3.0m, non-entry



Typical Gully Detail

Notes:

1. Same notes as RAB3199_001 apply.

Bedford Heights,
Brickhill Drive,
Bedford,
MK41 7PH

Client
DPA (London) Ltd

Project
Upper Pollicott

Drawing
Typical Details

Checked by AT	Approved by AT		
Drawn by HG	Date: 08/11/2023	Scale: 1:150@ A1	

Drawing No.
RAB3199_002

Revision
-

Asset location search

Property Searches

RAB Consultants
Kingsbrook House
7Kingsway
KINGSWAY
MK42 9BA

Search address supplied Pollicott Barn
Upper Pollicott
Ashendon
Aylesbury
HP18 0HH

Your reference 2816FRD

Our reference ALS/ALS Standard/2021_4523359

Search date 15 October 2021

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
www.thameswater-propertysearches.co.uk

0800 009 4540

Search address supplied: Pollicott Barn, Upper Pollicott, Ashendon, Aylesbury, HP18 0HH

Dear Sir / Madam

An Asset Location Search is recommended when undertaking a site development. It is essential to obtain information on the size and location of clean water and sewerage assets to safeguard against expensive damage and allow cost-effective service design.

The following records were searched in compiling this report: - the map of public sewers & the map of waterworks. Thames Water Utilities Ltd (TWUL) holds all of these.

This searchprovides maps showing the position, size of Thames Water assets close to the proposed development and also manhole cover and invert levels, where available.

Please note that none of the charges made for this report relate to the provision of Ordnance Survey mapping information. The replies contained in this letter are given following inspection of the public service records available to this company. No responsibility can be accepted for any error or omission in the replies.

You should be aware that the information contained on these plans is current only on the day that the plans are issued. The plans should only be used for the duration of the work that is being carried out at the present time. Under no circumstances should this data be copied or transmitted to parties other than those for whom the current work is being carried out.

Thames Water do update these service plans on a regular basis and failure to observe the above conditions could lead to damage arising to new or diverted services at a later date.

Contact Us

If you have any further queries regarding this enquiry please feel free to contact a member of the team on 0800 009 4540, or use the address below:

Thames Water Utilities Ltd
Property Searches
PO Box 3189
Slough
SL1 4WW

Email: searches@thameswater.co.uk
Web: www.thameswater-propertysearches.co.uk

Waste Water Services

Please provide a copy extract from the public sewer map.

The following quartiles have been printed as they fall within Thames' sewerage area:

SP7013NW

Enclosed is a map showing the approximate lines of our sewers. Our plans do not show sewer connections from individual properties or any sewers not owned by Thames Water unless specifically annotated otherwise. Records such as "private" pipework are in some cases available from the Building Control Department of the relevant Local Authority.

Where the Local Authority does not hold such plans it might be advisable to consult the property deeds for the site or contact neighbouring landowners.

This report relates only to sewerage apparatus of Thames Water Utilities Ltd, it does not disclose details of cables and or communications equipment that may be running through or around such apparatus.

The sewer level information contained in this response represents all of the level data available in our existing records. Should you require any further Information, please refer to the relevant section within the 'Further Contacts' page found later in this document.

The following quartiles have not been printed as they contain no assets:

SP7013SW
SP7013SE
SP7013NE

For your guidance:

The Company is not generally responsible for rivers, watercourses, ponds, culverts or highway drains. If any of these are shown on the copy extract they are shown for information only.

Any private sewers or lateral drains which are indicated on the extract of the public sewer map as being subject to an agreement under Section 104 of the Water Industry Act 1991 are not an ‘as constructed’ record. It is recommended these details be checked with the developer.

Clean Water Services

Please provide a copy extract from the public water main map.

The following quartiles have been printed as they fall within Thames' water area:

SP7013SW
SP7013NW
SP7013SE

Enclosed is a map showing the approximate positions of our water mains and associated apparatus. Please note that records are not kept of the positions of individual domestic supplies.

For your information, there will be a pressure of at least 10m head at the outside stop valve. If you would like to know the static pressure, please contact our Customer Centre on 0800 316 9800. The Customer Centre can also arrange for a full flow and pressure test to be carried out for a fee.

The following quartiles have not been printed as they contain no assets:

SP7013NE

For your guidance:

Assets other than vested water mains may be shown on the plan, for information only.

If an extract of the public water main record is enclosed, this will show known public water mains in the vicinity of the property. It should be possible to estimate the likely length and route of any private water supply pipe connecting the property to the public water network.

Payment for this Search

A charge will be added to your suppliers account.

Further contacts:

Waste Water queries

Should you require verification of the invert levels of public sewers, by site measurement, you will need to approach the relevant Thames Water Area Network Office for permission to lift the appropriate covers. This permission will usually involve you completing a TWOSA form. For further information please contact our Customer Centre on Tel: 0845 920 0800. Alternatively, a survey can be arranged, for a fee, through our Customer Centre on the above number.

If you have any questions regarding sewer connections, budget estimates, diversions, building over issues or any other questions regarding operational issues please direct them to our service desk. Which can be contacted by writing to:

Developer Services (Waste Water)
Thames Water
Clearwater Court
Vastern Road
Reading
RG1 8DB

Tel: 0800 009 3921
Email: developer.services@thameswater.co.uk

Clean Water queries

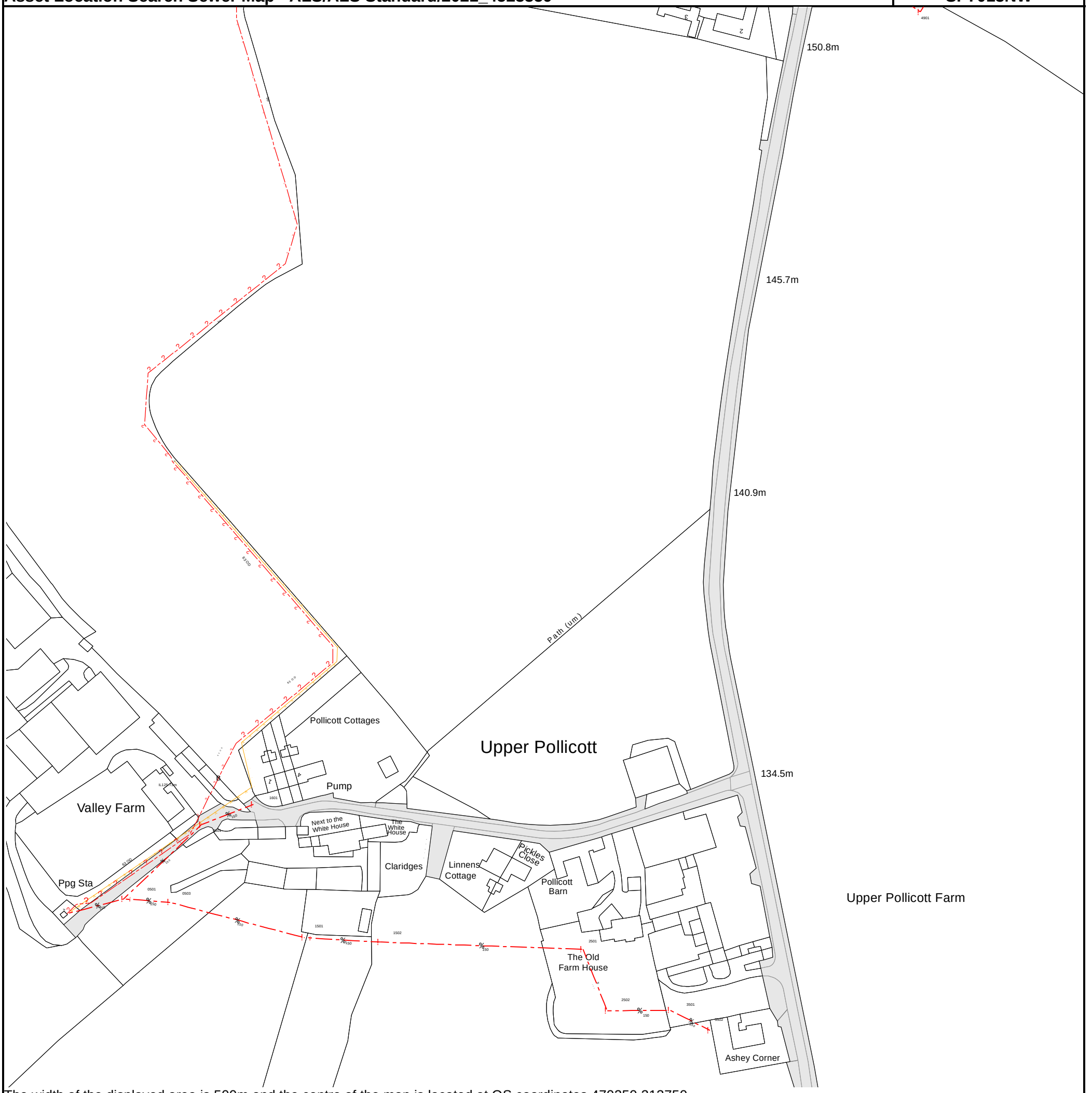
Should you require any advice concerning clean water operational issues or clean water connections, please contact:

Developer Services (Clean Water)
Thames Water
Clearwater Court
Vastern Road
Reading
RG1 8DB

Tel: 0800 009 3921
Email: developer.services@thameswater.co.uk

Asset Location Search Sewer Map - ALS/ALS Standard/2021_4523359

SP7013NW



The width of the displayed area is 500m and the centre of the map is located at OS coordinates 470250,213750

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

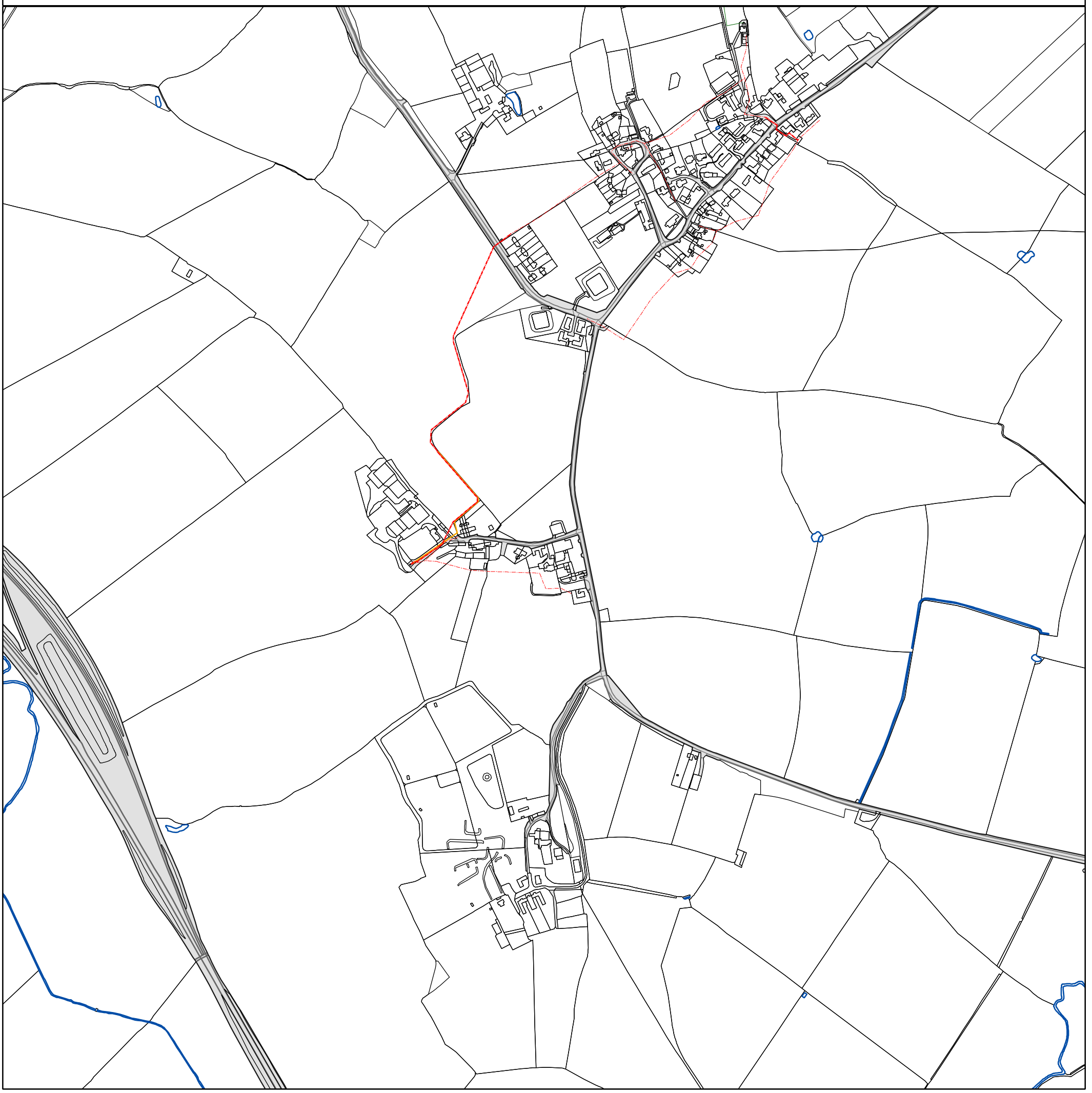
NB. Levels quoted in metres Ordnance Newlyn Datum. The value -9999.00 indicates that no survey information is available

Manhole Reference	Manhole Cover Level	Manhole Invert Level
0501	119.82	116.86
0503	120.03	117.02
0601	125.09	123.39
1601	126.03	124.28
1501	120.29	117.86
1502	124.12	122.13
2501	127.75	125.57
2502	127.09	125.81
3501	129.15	127.12
3502	129.59	127.83
4901	146.24	144.48

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

Based on the Ordnance Survey Map with the sanction of the Controller of H.M Stationary Office License Number 10019345

ALS/ALS Standard/2021_4523359



0 45 90 180 270 360
Meters

Scale:	1:7161
Width:	2000m
Printed By:	Rveldhur
Print Date:	15/10/2021
Map Centre:	470274,213611
Grid Reference:	SP7013NW

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

Gulley

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.

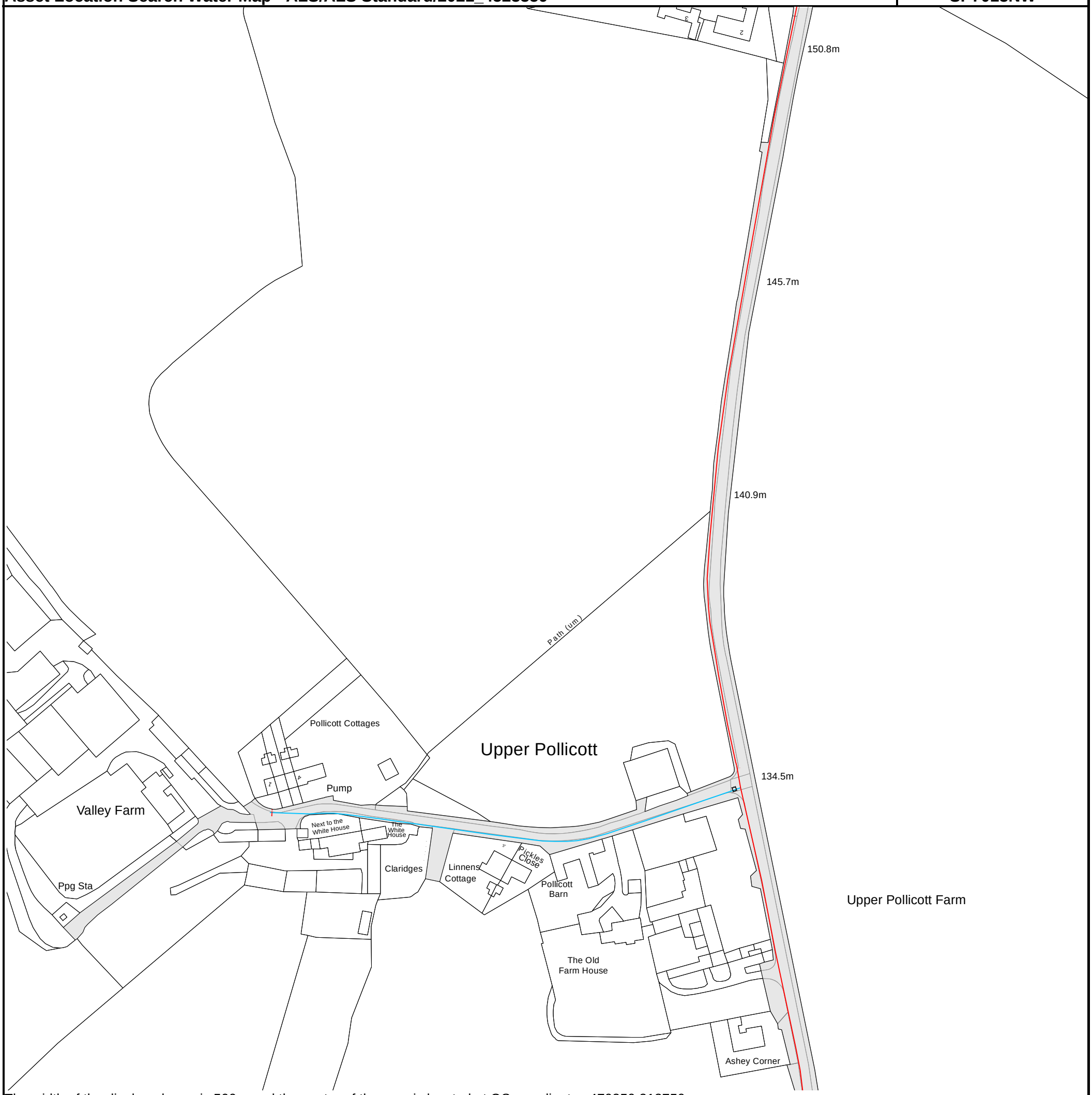
6) The text appearing alongside a sewer line indicates the internal diameter of the pipe in milimetres. Text next to a manhole indicates the manhole reference number and should not be taken as a measurement. If you are unsure about any text or symbology present on the plan, please contact a member of Property Searches on 0800 009 4540.

Asset Location Search Water Map - ALS/ALS Standard/2021_4523359	SP7013SW

The width of the displayed area is 500m and the centre of the map is located at OS coordinates 470250,213250

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

Asset Location Search Water Map - ALS/ALS Standard/2021_4523359	SP7013NW



The width of the displayed area is 500m and the centre of the map is located at OS coordinates 470250,213750

Asset Location Search Water Map - ALS/ALS Standard/2021_4523359	SP7013SE

The width of the displayed area is 500m and the centre of the map is located at OS coordinates 470750,213250

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

Based on the Ordnance Survey Map with the sanction of the Controller of H.M Stationary Office License Number 10019345

ALS/ALS Standard/2021_4523359

0 45 90 180 270 360
Meters

Scale:	1:7161
Width:	2000m
Printed By:	Rveldhur
Print Date:	15/10/2021
Map Centre:	470274,213611
Grid Reference:	SP7013NW

Comments:

ALS Water Map Key

Water Pipes (Operated & Maintained by Thames Water)

4"

Distribution Main: The most common pipe shown on water maps. With few exceptions, domestic connections are only made to distribution mains.

16"

Trunk Main: A main carrying water from a source of supply to a treatment plant or reservoir, or from one treatment plant or reservoir to another. Also a main transferring water in bulk to smaller water mains used for supplying individual customers.

3" SUPPLY

Supply Main: A supply main indicates that the water main is used as a supply for a single property or group of properties.

3" FIRE

Fire Main: Where a pipe is used as a fire supply, the word FIRE will be displayed along the pipe.

3" METERED

Metered Pipe: A metered main indicates that the pipe in question supplies water for a single property or group of properties and that quantity of water passing through the pipe is metered even though there may be no meter symbol shown.

Transmission Tunnel: A very large diameter water pipe. Most tunnels are buried very deep underground. These pipes are not expected to affect the structural integrity of buildings shown on the map provided.

Proposed Main: A main that is still in the planning stages or in the process of being laid. More details of the proposed main and its reference number are generally included near the main.

Valves

- General Purpose Valve
- Air Valve
- Pressure Control Valve
- Customer Valve

Hydrants

- Single Hydrant

Meters

- Meter

End Items

Symbol indicating what happens at the end of a water main.

- Blank Flange
- Capped End
- Emptying Pit
- Undefined End
- Manifold
- Customer Supply
- Fire Supply

Operational Sites

- Booster Station
- Other
- Other (Proposed)
- Pumping Station
- Service Reservoir
- Shaft Inspection
- Treatment Works
- Unknown
- Water Tower

Other Symbols

- Data Logger

PIPE DIAMETER	DEPTH BELOW GROUND
Up to 300mm (12")	900mm (3')
300mm - 600mm (12" - 24")	1100mm (3' 8")
600mm and bigger (24" plus)	1200mm (4')

Other Water Pipes (Not Operated or Maintained by Thames Water)

Other Water Company Main: Occasionally other water company water pipes may overlap the border of our clean water coverage area. These mains are denoted in purple and in most cases have the owner of the pipe displayed along them.

Private Main: Indiates that the water main in question is not owned by Thames Water. These mains normally have text associated with them indicating the diameter and owner of the pipe.

Terms and Conditions

All sales are made in accordance with Thames Water Utilities Limited (TWUL) standard terms and conditions unless previously agreed in writing.

1. All goods remain in the property of Thames Water Utilities Ltd until full payment is received.
2. Provision of service will be in accordance with all legal requirements and published TWUL policies.
3. All invoices are strictly due for payment 14 days from due date of the invoice. Any other terms must be accepted/agreed in writing prior to provision of goods or service, or will be held to be invalid.
4. Thames Water does not accept post-dated cheques-any cheques received will be processed for payment on date of receipt.
5. In case of dispute TWUL`s terms and conditions shall apply.
6. Penalty interest may be invoked by TWUL in the event of unjustifiable payment delay. Interest charges will be in line with UK Statute Law 'The Late Payment of Commercial Debts (Interest) Act 1998'.
7. Interest will be charged in line with current Court Interest Charges, if legal action is taken.
8. A charge may be made at the discretion of the company for increased administration costs.

A copy of Thames Water's standard terms and conditions are available from the Commercial Billing Team (cashoperations@thameswater.co.uk).

We publish several Codes of Practice including a guaranteed standards scheme. You can obtain copies of these leaflets by calling us on 0800 316 9800

If you are unhappy with our service you can speak to your original goods or customer service provider. If you are not satisfied with the response, your complaint will be reviewed by the Customer Services Director. You can write to her at: Thames Water Utilities Ltd. PO Box 492, Swindon, SN38 8TU.

If the Goods or Services covered by this invoice falls under the regulation of the 1991 Water Industry Act, and you remain dissatisfied you can refer your complaint to Consumer Council for Water on 0121 345 1000 or write to them at Consumer Council for Water, 1st Floor, Victoria Square House, Victoria Square, Birmingham, B2 4AJ.

Ways to pay your bill

Credit Card	**BACS Payment**	**Telephone Banking**	**Cheque**
Call **0800 009 4540** quoting your invoice number starting CBA or ADS / OSS	Account number **90478703** Sort code **60-00-01** A remittance advice must be sent to: **Thames Water Utilities Ltd., PO Box 3189, Slough SL1 4WW.** or email **ps.billing@thameswater.co.uk**	By calling your bank and quoting: Account number **90478703** Sort code **60-00-01** and your invoice number	Made payable to '**Thames Water Utilities Ltd**' Write your Thames Water account number on the back. Send to: **Thames Water Utilities Ltd., PO Box 3189, Slough SL1 4WW** or by DX to **151280 Slough 13**

Dr Alexandros Tsavdaris

Kingsbrook House
7 Kingsway
Bedford
Bedfordshire
MK42 9BA

Wastewater pre-planning
Our ref DS6089811

11 November 2021

Pre-planning enquiry: Confirmation of sufficient capacity

Site: BARNS OFF MAIN ROAD, UPPER POLLICOTT, HP18 0HH.

Dear Dr Tsavdaris,

Thank you for providing information on your development.

Proposed site: Housing (5 units) Proposed foul water: Proposed foul water discharge by gravity for 5 units of General Housing to 150mm foul water sewer into manhole MH 3501. Proposed surface water: Proposed surface water discharge at 2.5 l/s for all storm events up to and including 1:100yr+40%CC into 150 foul water manhole 3501.

We have completed the assessment of the foul water flows and surface water run-off based on the information submitted in your application with the purpose of assessing sewerage capacity within the existing Thames Water sewer network.

Foul Water

If your proposals progress in line with the details you've provided, we're pleased to confirm that there will be sufficient sewerage capacity in the adjacent foul water sewer network to serve your development.

This confirmation is valid for 12 months or for the life of any planning approval that this information is used to support, to a maximum of three years.

You'll need to keep us informed of any changes to your design – for example, an increase in the number or density of homes. Such changes could mean there is no longer sufficient capacity.

Surface Water

In accordance with the Building Act 2000 Clause H3.3, positive connection of surface water to a public sewer will only be consented when it can be demonstrated that the hierarchy of disposal methods have been examined and proven to be impracticable. Before we can consider your surface water needs, you'll need written approval from the lead local flood authority that you have followed the sequential approach to the disposal of surface water and considered all practical means.

When developing a site, policy SI 13 of the London Plan states “Development proposals should aim to achieve greenfield run-off rates and ensure that surface water run-off is managed as close to its source as possible. There should also be a preference for green over grey features, in line with the following drainage hierarchy:”

The disposal hierarchy being:

1. rainwater use as a resource (for example rainwater harvesting, blue roofs for irrigation)
2. rainwater infiltration to ground at or close to source
3. rainwater attenuation in green infrastructure features for gradual release (for example green roofs, rain gardens)
4. rainwater discharge direct to a watercourse (unless not appropriate)
5. controlled rainwater discharge to a surface water sewer or drain
6. controlled rainwater discharge to a combined sewer

Where connection to the public sewerage network is still required to manage surface water flows, we will accept these flows at a discharge rate in line with CIRIA’s best practice guide on SuDS or that stated within the sites planning approval.

If the above surface water hierarchy has been followed and if the flows are restricted to a total of 2.0 l/s, then Thames Water would not have any objections to the proposal.

Please see the attached ‘Planning your wastewater’ leaflet for additional information.

Trade Effluent

Please be advised a Trade Effluent consent will be required to discharge trade effluent into the public sewer. Trade effluent can be best described as anything other than domestic sewage (toilet, bath or sink waste and groundwater) or uncontaminated surface water and roof drainage (rainwater). Applications should be made at https://www.thameswater.co.uk/wholesale/trade-effluent and for enquiries, please contact our trade effluent team by phone on 0203 577 9200 or via email at trade.effluent@thameswater.co.uk .

Diversion

There are existing public sewers crossing the site. New buildings will need to be kept between 3 and 6.5m away from existing sewer depending on the size and depth of the sewer. Alternatively, it may be possible for sewers to be diverted around the new development. If you wish us to review a diversion proposal, please submit this via a Section 185 Diversion application. On some occasions it may be possible to abandon existing public sewers. Please contact us for further information on this process.

Source Protection Zone

The development site boundary falls within a Source Protection Zone for groundwater abstraction. These zones may be at particular risk from polluting activities on or below the land surface. To prevent pollution, the Environment Agency and Thames Water (or other local water undertaker) will use a tiered, risk-based approach to regulate activities that may impact groundwater resources, this may potentially affect your drainage or surface water strategies where deep or infiltration systems are proposed. The applicant is encouraged to read the Environment Agency’s approach to groundwater protection (available at *https://www.gov.uk/government/publications/groundwater-protection-position-statements*

and may wish to discuss the full implications for their development with a suitably qualified environmental consultant.

What happens next?

Please make sure you submit your connection application, giving us at least 21 days' notice of the date you wish to make your new connection/s.

If you have any further questions, please contact me on 0800 009 3921.

Yours Sincerely

Christopher Allen
Project Engineer
Developer Services – Sewer Connections Team
Tel: 0800 009 3921
M: 07747644658

Developer.services@thameswater.co.uk

Get advice on making your connection correctly at connectright.org.uk

Clearwater Court, Vastern Road, Reading, RG1 8DB
Find us online at developers.thameswater.co.uk