

Report

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Reading Golf Club, Emmer Green
Flood Risk Assessment and Sustainable Drainage Systems (SuDS) Strategy

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Executive summary

This report presents the findings of a Flood Risk Assessment and SuDS Strategy for the proposed residential development of Reading Golf Course.

The Site is located in Flood Zone 1 and therefore has a Low Probability of flooding from rivers and the sea – this will also be true post-development after allowing for the expected effects of climate change. The Environment Agency's (EA's) Flood Map for Surface Water indicates that a surface water flow pathway runs along the northern part of the Site and appears to flow south west to north east, although this is only present under the extreme, 1 in 1000 year storm scenario.

The Site is currently 'greenfield' and as such the surface water runoff from the proposed development will need to be sustainably managed. This report provides SuDS Strategy for the Site. The principal components of the scheme are four infiltration basins located in the northern half of the Site, along with the inclusion of permeable paving in appropriate areas. The White Chalk underlying the Site is considered an appropriate medium to receive infiltrating stormwater. This was confirmed during permeability tests at the Site. Overlying gravelly superficial deposits are also considered receptive media where the clay content is low.

The viability of the SuDS Strategy has been demonstrated using the MicroDrainage software. This demonstrates that the basins are capable of attenuating and infiltrating all Site runoff up to and including the 1 in 100 year event +40% allowance for climate change, in combination with the use of permeable paving.

The proposed SuDS Strategy will also intercept, attenuate and divert the potential surface water flow pathway to remove flood risk to the Site and reduce flood risk downgradient.

1.0 Introduction

Stantec UK Ltd (Stantec) was instructed by Temple Group Ltd (Temple) on behalf of Fairfax Acquisitions Ltd (Fairfax) to undertake a Flood Risk Assessment (FRA) and Sustainable Drainage Systems (SuDS) Strategy for the proposed residential development of Reading Golf Course, Kidmore End Road, Emmer Green, Reading, Berkshire, RG4 8SG ('the Site').

This report has been produced in accordance with the National Planning Policy Framework (NPPF) and supporting Planning Practice Guidance (PPG). The NPPF and PPG require that flood risk is accounted for during all stages of the planning process to ensure that new development is appropriate for its location, will remain safe, and will not increase flood risk elsewhere.

1.1 Report objectives

This report presents the findings of an FRA and SuDS Strategy for the Site that demonstrates that the proposed residential development meets the above requirements of the NPPF and PPG.

1.2 Available information

This report is based on the following available information:

- Proposed development plan (Appendix A);
- Environment Agency (EA) Flood Map for Planning (Appendix B);
- EA Flood Map for Surface Water (Appendix C);
- EA Flood Map for Reservoirs (Appendix D);
- Reading Borough Council's Strategic Flood Risk Assessment (SFRA; PBA, 2017);
- Ordnance Survey mapping;
- Site specific data collected during a Site walkover on 22nd February 2020;
- Hydrological descriptors from the Centre of Ecology and Hydrology's online Flood Estimation Handbook service (NERC, 2020);
- Open-source LiDAR Digital Terrain Model (DTM) data;
- British Geological Survey mapping; and
- Site specific geo-environmental assessment (Idom, 2019, Appendix G).

1.3 Report limitations

The findings presented in this report are primarily based on information supplied by third parties. Whilst Stantec assumes that all information is representative of past and present conditions, Stantec cannot guarantee its validity.

2.0 Site setting

2.1 Description of the existing Site

The Site is located in Emmer Green, c.1km north of Caversham in Reading and falls within the boundary of Reading Borough Council. The approximate National Grid Reference for the centre of the Site is SU 71527 76647 (Eastings: 471657m; Northings: 176771m) with the closest postcode being RG4 8QZ.

The Site is currently a golf course (and, as such, is considered to be 'Greenfield' for the purposes of this FRA and SuDS report). The surface covering is principally grass with some trees, sand bunkers and footpaths with the main club house along Kidmore End Road in the south-east corner. The total Site area is c. 12 ha. It is important to note that the Site only includes approximately 50% of the existing golf course up to the County boundary.

2.2 Topography

The topography of the Site slopes from ca. 83m AOD along its southern boundary to ca. 73m AOD along its northern boundary. These gradients will dictate the flow pathways and discharge location point for any surface water runoff that the Site currently generates, which will gravitate towards a natural discharge point in the north-eastern corner of the Site (refer to coverage of the EA's Surface Water Flood Mapping outlined below).

2.3 Geological context

Cranfield University's Soilscales website (Cranfield University, 2020) provides high level information on soil characteristics across the UK. Soilscales classifies the soil at the Site as: '*Slightly acid loamy and clayey soils with impeded drainage*'. In-situ intrusive investigations undertaken at the Site, however, (Idom, 2019) describe the soil as brown loam with flint/chert gravel; this empirical description provides a more accurate account of existing soil properties.

The southern half of the Site is underlain by the Lambeth Group (Clay, Silt and Sand) and its northern half by the White Chalk. The White Chalk is defined by the EA as a Principal Aquifer and the Lambeth Group a Secondary Aquifer. Further details of the geological conditions at the Site are provided in the Idom report (2019).

There are no surface water features within 250m of the boundary of the Site.

2.3.1 Permeability tests

Permeability tests were undertaken during the site investigation (Idom, 2019; Appendix G). Site investigation locations are included in Figure 7.4. These were conducted at various depths at three in-situ boreholes in the centre and northern half of the Site. The tests results are summarised in Table 1. In general, the tests in the superficial deposits suggest little opportunity for disposal of water to ground (typically having a high clay content), although the geological logs indicate varying clay content around the site and the potential for infiltration will be greater in some areas than others. The White Chalk underlying the northern portion of the Site has good infiltration potential.

Table 1 Permeability test results (Idom, 2019)

ID	Location	Geology	Permeability results (m/s)	Permeability results (m/h)
MBH1	Centre of the Site	Clay	10^{-8} or 10^{-9}	3.6^{-3} or 3.6^{-6}
MBH2	Eastern part of the Site	Hoggin (gravelly clay)	1.8×10^{-5} and 2.4×10^{-7}	0.0648 and 0.000864
MBH3	Northern part of the Site	Chalk	1.5×10^{-4} and 1.6×10^{-5}	0.54 and 0.058

2.4 Proposed development details

The illustrative masterplan for the Site is provided in Appendix A. The proposal is for a residential development with green spaces, access roads and parking facilities. The development will contain 260 separate dwellings of varying sizes up to 4 bedroom detached houses with gardens.

The private parking areas and minor roadways will be surfaced with permeable paving to reduce overall runoff and increase stormwater storage capacity. This is discussed further in Section 7.0.

3.0 Potential sources of flood risk

3.1 Flood Zones

The PPG defines three flood zones as shown in Table 2.

Table 2 PPG Flood Zones

Flood Zone	Return Period (Annual Exceedance Probability)
1	Low probability - less than 1 in 1,000 year (<0.1%) for river or sea flooding.
2	Medium probability - between 1 in 1,000 year (0.1%) and 1 in 100 year (1%) for river flooding or between 1 in 1,000 year (0.1%) and 1 in 200 year (0.5%) for sea flooding.
3a	High probability - 1 in 100 year (1%) or greater for river flooding or 1 in 200 year (0.5%) or greater for sea flooding.
3b	The Functional Floodplain - land where water has to flow or be stored in times of flood. There is not a strict definition of the annual probability of flooding in this zone, but the 1 in 20 year (5%) or greater return period should provide a starting point for consideration.

According to the EA's Flood Map for Planning (Appendix B), the Site is located in Flood Zone 1 (Low Probability). According to the NPPF/PPG, planning applications for sites greater than 1ha in Flood Zone 1 are required to be accompanied by an appropriate FRA.

3.2 Sources of flooding

Flooding can occur from a number of sources as shown in Table 3.

Table 3 Possible Sources of Flooding Identified in the PPG

Source	Description
Flooding from rivers	River flows which exceed the flow capacity of the river channel (or culverts) can cause flooding from rivers.
Flooding from the sea	High tides and/or storm surges can cause flooding from the sea.
Flooding from land	Intense rainfall that cannot soak into the ground or enter drainage systems can quickly run off the land and result in local flooding.
Flooding from groundwater	Groundwater flooding occurs when water levels in the ground rise above surface elevations.
Flooding from sewers	Sewer flooding can occur when piped systems are overwhelmed by heavy rainfall, when sewers become blocked or when sewers are of inadequate capacity.
Flooding from reservoirs, canals and other artificial sources	Non-natural or artificial sources of flooding can include reservoirs, canals and lakes where water is retained above natural ground level.

4.0 Flood risk to the Site

4.1 Sources of flood risk data

The EA's Flood Maps shown in Appendix B, Appendix C and Appendix D provide a high level overview of the likely flood risk to a specific area or region, although do not account for the presence of existing flood defences or the likely impacts of climate change. Each of these sources of flood risk is considered in more detail below. Further details of modelled flood risk data, including allowances for climate change and defence assets, are included in the local Strategic Flood Risk Assessment (PBA, 2017).

4.2 Flooding from rivers and the sea

The EA's Flood Map for Planning (Appendix B) indicates that the proposed development is located in Flood Zone 1, and as such has a Low Probability of flooding from rivers and the sea (i.e. less than a 0.1% annual probability of flooding from these sources). As such, the risk to the proposed development from flooding from rivers or the sea is not considered further. The Site is not protected by any flood defences (PBA, 2017).

4.3 Flooding from surface water

The EA's Flood Map for Surface Water (Appendix C) indicates that a surface water flow pathway runs through the northern part of the Site. This surface water flow pathway conveys overland flow from off-site areas (i.e. the existing residential area to the west of the Site) in a south-west to a north-easterly direction through the northern portion of the Site to a downstream discharge point to the east of Cucumber Wood (Appendix C). This flow path is only shown to be present during 'Low Risk' events (i.e. surface water flooding events with an annual probability of occurring of between 1% and 0.1%).

The SuDS Strategy for the proposed development (see Section 7.0) has been designed to a) discharge all surface water runoff generated by the proposed development to ground for events up to the 1% (plus climate change) probability; and b) intercept and divert the off-site runoff that contributes to this flow pathway during 'Low Risk' events of between the 1% and 0.1% probability. As such, with the proposed development in place, this surface water flow pathway will be reduced in extent and diverted to avoid the residential properties, although would still retain its existing discharge point to the east of Cucumber Wood. This is discussed further in Section 7.5 below.

4.4 Flooding from groundwater

During the recent intrusive investigation works at the Site (Idom, 2019), no groundwater was encountered during the drilling of boreholes (i.e. no groundwater recorded in bedrock beneath the Site). Wet gravel layers were noted in places during the shallow windowless sampling however, and resting water levels in some borehole standpipes were recorded as shallow as 0.95 m below ground level (m bgl). This suggests that groundwater within the bedrock beneath the Site is at a considerable depth below the surface, although some shallow perched water is thought to be present in places within the superficial deposits.

Based on the above, it is unlikely that significant groundwater reserves are present beneath the Site at elevations close enough to existing ground levels to present a potential risk of groundwater flooding. In addition, the Site is located in the headwaters of a surface water catchment and bounded

to the south by an interfluvium. Any potential groundwater emergence would, therefore, be expected to follow a similar route to the overland flow pathway discussed above towards the bottom of the valley just to the north of Cucumber Wood. Accordingly, this source of flood risk is not considered further.

4.5 Flooding from sewers

The SFRA for the Site states that sewer flooding has occurred historically on Kidmore End Road c. 250 m east of the Site (based on SFRA historical flood mapping).

The SuDS Strategy for the proposed development (see Section 7.0) has been designed to safely convey and discharge all surface water runoff generated by the proposed development to ground for events up to the 1% (plus climate change) probability. As such, the risk of sewer flooding to the proposed development is not considered further.

4.6 Flooding from reservoirs, canals and other artificial sources

There are no historical records of flooding of the Site from reservoir failure, canals or other artificial sources. Reservoir flooding is unlikely to happen, although the EA has produced flood mapping to indicate the worst-case scenario in the event of reservoir failure. The EA's Flood Map for Reservoirs (Appendix D) indicates that the Site would not be at risk of reservoir flooding. Accordingly, these sources of flood risk are not considered further.

4.7 Climate change

Results of flood risk modelling, including the likely impacts of climate change are included in the local SFRA (PBA, 2017). This report indicates that the Site will remain within Flood Zone 1 in the future after allowing for climate change uplifts.

5.0 Planning practice guidance

5.1 Proposed land use classification

The proposed residential development is classified as a '*More Vulnerable*' land use, which is defined under the PPG as: "*Buildings used for dwelling houses...*". According to the PPG, this would mean that the proposed development is considered appropriate for location within Flood Zone 1.

5.2 Sequential Test

The PPG Sequential Test aims to steer new development to areas that have the lowest probability of flooding. Given that the proposed development is located within Flood Zone 1 (Low Probability), the Sequential Test is considered to be passed (notwithstanding the need for the proposed development to manage the surface water flow pathway as mentioned in Section 4.3 above and Section 7.5 below, and provide an appropriate SuDS Strategy).

6.0 Flood risk considerations

6.1 Key considerations

To meet (or exceed) the PPG requirements, '*More Vulnerable*' residential land use such as that proposed at the Site will be considered suitable for location within Flood Zone 1 provided it:

- Remains safe in times of surface (or groundwater) flooding whilst taking climate change into account;
- Does not result in a net loss of floodplain storage;
- Does not impede existing surface water flow pathways; and
- Does not increase the volume and rate of surface water runoff leaving the Site over its intended design lifetime.

Each of these requirements is discussed in relation to the proposed development in Sections 6.2 to 6.4 below.

6.2 Remain safe in times of flooding

The Site is not considered to be at significant risk of flooding from rivers, groundwater or the sea, although this FRA has given due consideration to the potential surface water flow pathway that could cross the northern part of the Site during 'Low Risk' events of between the 1% and 0.1% probability (see Section 4.3 above). The SuDS Strategy for the proposed development (see Section 7.0) has been designed to a) discharge all surface water runoff generated by the proposed development to ground for events up to the 1% (plus climate change) probability; and b) intercept and divert the off-Site runoff that contributes to this flow pathway during 'Low Risk' events (see Section 7.5). The surface water flow pathway will, therefore, be reduced in extent and diverted to avoid the residential properties, although would still retain its existing discharge point to the east of Cucumber Wood. As such, with these measures in place, the proposed development would be safe for its users over its intended design lifetime.

6.3 No net loss of floodplain storage

The proposed development would not result in a net loss of river floodplain storage as the Site is not shown to be at a significant risk of flooding from rivers (see Appendix B).

6.4 No impediment to flood water flows

As described above and in Section 7.5 below, the proposed development will enable the surface water flow pathway to retain its existing discharge point to the east of Cucumber Wood and, as such, will not result in an impediment to surface water flood flows.

7.0 Sustainable Drainage Systems (SuDS) Strategy

7.1 Introduction

The following sections describe the SuDS Strategy for the proposed development with due regard to DEFRA's Non-statutory technical standards for SuDS (DEFRA, 2015), which recommends the following hierarchy for the disposal of surface water from new developments:

- 1) Discharge to ground via infiltration techniques (most preferred);
- 2) Discharge to a surface water body;
- 3) Discharge to a surface water sewer;
- 4) Discharge to a local highway drain; and
- 5) Discharge to a combined sewer (least preferred).

The proposed residential development will be located on previously undeveloped, 'greenfield' land. A significant proportion of the Site would comprise impermeable area following its development (for example, roofs, roads and car parking areas). Without appropriate management, this would result in a significant increase in both the volume and rate of surface runoff generated by the proposed development, which could lead to an increase in surface water flood risk elsewhere (i.e. downstream). Surface runoff from the developed site will, however, be sustainably managed using SuDS, as described in the following sections.

SuDS aim to mimic the natural drainage characteristics of a site prior to its development by controlling surface water runoff as close to where the rain falls as possible e.g. through interception and re-use, evaporation and infiltration into the ground. Furthermore, SuDS provide opportunities to remove pollutants from runoff and also provide amenity and biodiversity benefits.

7.2 Runoff destination

The White Chalk underlying the northern half of the Site is sufficiently permeable to allow surface water from the proposed development to be discharged to ground using infiltration techniques, as are the gravelly superficial deposits present where the clay content is not high. Infiltration testing results and textbook values for the untested strata are presented in Section 7.4.

As such, surface water from the proposed development will discharge via gravity to four infiltration basins, termed Basins 1, 2, 3 and 4 respectively (see Appendix A for the location of these infiltration basins). Basin 2 is intersected by a roadway, but will be served by appropriately sized pipes beneath this road to retain connectivity. The proposed development layout has been sub-divided into four catchments that will each drain via gravity to one of these infiltration basins (see Figure 7.1). These sub-catchments have been delineated based on the indicative layout plan included in Appendix A and LiDAR Digital Terrain Model (DTM) data. The Site will require some reprofiling of ground levels to achieve the required cover depths and gradients for an adoptable surface water drainage system. This is particularly the case in the north eastern corner where ground level raising will be required. It is anticipated that in-situ arisings from the excavation of the infiltration basins and the construction of house foundations would be used for this purpose, without the requirement to import significant volumes of external fill material.

Off-Site runoff post development is therefore expected to be negligible and well below the current, greenfield rates (see below).

7.3 Greenfield runoff and permissible discharge rates

The Institute of Hydrology Report 124 (IH124) method in the 'Rural Runoff' calculator within MicroDrainage was utilised to estimate the greenfield runoff rates for the existing Site. The calculation was carried out for an assumed site area of 50ha, with the rate then pro-rated per unit area (as recommended in the Interim Code of Practice for SuDS Design and Environment Agency/DEFRA Report: Preliminary Rainfall-Runoff Management for Developments (DEFRA, 2015)). The 'QBAR' (i.e. 1 in 2.3 year return period) greenfield runoff rate for the existing Site was thus determined along with runoff rates for other return period storm using the regional growth curve (see Table 4).

Table 4 Greenfield runoff

Return period (yrs)	Rainfall depth (mm)	Runoff rate (l/s)
1	22.00	3.9
2.3 (Qbar)	24.82	4.6
30	50.11	10.4
100	62.37	14.7

The QBAR greenfield runoff rate was used to determine the 'permissible discharge' rates for the Site. Current industry guidance recommends that the minimum permissible discharge rate for any single point of discharge is 5l/s (i.e. to minimise the risk of blockage of flow control devices designed to achieve lower rates). The QBAR greenfield runoff rate yielded 'permissible discharge' rate that was lower than 5l/s. As such, a 5l/s 'permissible discharge' rate has been assumed, although this is largely academic given that all Site runoff will be discharged to ground post-development.

7.4 Infiltration basin design

The initial design of the infiltration basins has been undertaken using the MicroDrainage software. Simulations were run for the 1 in 100-year event plus a 40% allowance for climate change.

Hydrological point descriptors for the Site were obtained from the Flood Estimation Handbook (FEH) website (CEH, 2020). These are shown in Table 5 below.

Table 5 FEH Catchment Descriptors

Catchment Descriptor	Abbreviation	Value
Base Flow Index associated with each HOST soil class	BFIHOST	0.745
Proportion of time when soil moisture deficit was equal to, or below, 6mm during 1961-90	PROPWET	0.29 (i.e. 29% of the time)

Catchment Descriptor	Abbreviation	Value
Average Annual Rainfall (1961 – 1990)	SAAR	664 mm

GIS software was used to calculate the total impermeable area (i.e. roofs, roads, parking areas etc) proposed within the sub-catchment draining to each infiltration basin (see Table 6 below). Areas of potential permeable paving (which have been implemented in the following calculations) are shown in Figure 7.1. For the purposes of the runoff calculations, the areas of permeable paving were subtracted from each overall catchment area (i.e. it was assumed that these areas would not generate surface runoff). This was considered a reasonable approach given that a) permeable paving systems can accommodate high rainfall intensities; b) the granular sub-grade fill beneath the paving units would provide attenuation storage; and c) some infiltration to ground would be possible beneath the sub-grade, although the rate of which is expected to vary across the site.

Table 6 Proposed impermeable and permeable area draining to each infiltration basin

Catchment	Impermeable area (ha)*	Permeable paving area (ha)	Residual permeable area (ha)	Total
Basin 1	0.77	0.28	2.04	3.10
Basin 2	1.29	0.15	1.89	3.33
Basin 3	1.80	0.26	3.16	5.22
Basin 4	0.04	0.05	0.35	0.44
Total	3.91	0.74	7.44	12.09

* Includes 10% uplift for urban creep.

The impermeable areas in Table 6 were uplifted by 10% to account for urban creep (e.g. the conversion of private gardens to paved areas) over the lifetime of the proposed development, as per the current guidance for drainage design. A safety factor of 2 (MicroDrainage default setting) was also maintained for the calculations.

The infiltration rate for the basins was estimated based on the nearest site investigation data. In all instances, data from the two closest locations were used (see Figure 7.4). In some instances, permeability test data were available and in others textbook values (Innovyze, 2018) were ascribed to the geological description from the relevant log. A final infiltration value has been attributed to each basin based on the above and best judgement. Table 7 summarises this data and the values used in the calculations. In the instance of Basin 1, the adjacent logs suggest a permeable gravel over lower permeability clay; the infiltration potential is likely to be low via the base and high via the sides of this feature. The potential exists to replace the clay at the base with permeable material to improve the connection with the underlying White Chalk.

Table 7 Permeability data used in calculations

Basin	Location	Geology noted	Estimated infiltration rate (m/hr)	Final infiltration value used (m/hr)
Basin 1	MWS8	Gravelly clay	0.01	0.15
	MWS3	Sandy gravel over clay	0.2	
Basin 2 (both sub-basins)	WMS2	Slightly clayey sand	0.5	0.299
	MBH3	Chalk	0.299 (mean test result)	
	MWS1	Sandy Gravel	1	
Basin 3	MWS1	Sandy Gravel	1	0.299
	MBH2	Hoggin (Very clayey sand and gravel)	0.033 (mean test result)	
Basin 4	MWS3	Sandy gravel over clay	0.2	0.299
	WMS2	Slightly clayey sand	0.5	

It should be noted that industry standard soakaway testing using the BRE365 methodology at each of the basin locations should be undertaken in due course to verify the values used in these calculations and to inform the detailed drainage design.

An outline drainage network was drafted based upon the outline development plan and the current site topography (see Figure 7.2) The pipe network within each sub-catchment was calculated using GIS software and converted to a storage volume by conservatively assuming a constant pipe diameter of 0.30 m for the entire Site. Indicative key manhole locations are included in Figure 7.2 along with current ground levels at each location (extracted from LiDAR data); this highlights areas where raising or lowering of ground will be required to produce an adoptable drainage system.

Connecting pipes will be required to link the two sub-basins comprising Basin 2 in the north of the Site. Assuming the final bank levels of each basin are slightly below the road level, a connecting pipe diameter of 0.3m would ensure a cover depth of at least 1.2 m below the road which intersects the features.

The dimensions of each infiltration basin are presented below; these were measured from the proposed layout in Appendix A.

Table 8 Infiltration basin dimensions

Feature	Basin invert level (m AOD)	/Bank elevation (m AOD)	Basin Depth (m)	Area of base (m ²)	Area of top (at bank) (m ²)	Total volume (m ³)
Basin 1	79.2	80.7	1.5	812	1,433	1,662
Basin 2	75.9	77.5	1.6	250	25	747
Basin 3	77	78.5	1.5	994	2,596	2,580
Basin 4	77.8	79.3	1.5	58	217	194

Initial Micro-Drainage simulations for the basins established critical storm durations of 120 minutes for Basin 1, 180 minutes for Basin 2, 120 minutes for Basin 3 and 60 minutes for Basin 4.

Runoff volumes from the areas of proposed open space (i.e. 'Greenfield' areas) draining to each basin were also calculated and used as additional inputs to each basin in the MicroDrainage simulations. The residual Greenfield areas draining to each basin are shown in Table 6.

Runoff hydrographs for these Greenfield areas were generated using the ReFH2 method, which is considered appropriate for estimating Greenfield runoff volumes from areas of open space (CIRIA, 2015). Output reports are included in Appendix F. Runoff hydrographs were added as additional inputs (i.e. 'user-defined' hydrographs) to each infiltration basin in the MicroDrainage calculations.

Appendix E contains the output from the MicroDrainage simulations. This confirms that, based on the parameters described above, the proposed infiltration basins will be able to store and infiltrate all runoff generated during the 1 in 100 year storm event with a 40% allowance for climate change, when combined with the use of permeable paving. The simulated maximum water levels within each basin are at least 300mm below bank level in each case. A summary of the performance of each infiltration basin is included in Table 9. Note that the critical durations in Table 9 differ from the initial results set out in the text above owing to the additional hydrographs added to the calculations

Table 9 Performance of the infiltration basins under a 1 in 100 year + 40% storm event.

Feature	Critical duration (mins)	Max. water level (m AOD)	Min. freeboard remaining (m)
Basin 1	240	79.57	1.13
Basin 2	240	77.17	0.33
Basin 3	120	77.47	1.03
Basin 4	60	77.97	1.33

The infiltration basins will be constructed with due consideration to the guidance contained within CIRIA Report C574 'Engineering in Chalk'. It is important that a suitable stand-off distance is maintained between the constructed infiltration features and any adjacent structures with below-ground foundations. Stand-off distances could be informed by textbook values from building regulations or site-specific geotechnical assessments.

7.5 Exceedance routes

The available freeboard within each infiltration basin will ensure that their respective capacity will in reality be somewhat greater than the 1 in 100-year (plus 40% for climate change) event. Due consideration, however, also needs to be given to the exceedance routes that could occur during events above the design standard of the various components of the proposed SuDS Strategy (i.e. surface water sewers and the infiltration basins).

Figure 7.3 shows exceedance routes for two scenarios:

- 1) Surcharging water from the proposed surface water sewers under storm conditions ranging from the 1 in 30-year event to the 1 in 100-year event plus climate change.

Under this scenario, water would surcharge from manholes and be safely conveyed along the road surfaces to the respective infiltration basins. These exceedance flows would be shallow and contained within road kerbing. These exceedance routes have been calculated using the proposed stormwater drainage routes (Figure 7.2) and the existing LiDAR DTM data. In some instances, some reprofiling of the site will be required to ensure these drainage routes are viable as discussed previously.

- 2) Over-topping of the infiltration basins under events in excess of the 1 in 100 year plus 40% return period which has been used for the feature design in this instance.

Under these extreme events, exceedance flows from the infiltration basins will be designed to mimic the surface water flow pathway described in Section 4.3 and to preserve the existing discharge location of this feature, which is located to the east of Cucumber Wood (see Figure 7.3). Infiltration Basin 3 will serve to intercept and store some of the existing overland flow emanating from Eric Avenue to the west (1.03 m of freeboard will be available within this basin during the 1 in 100-year plus 40% climate change event). This basin will be served with a spillway on its northern bank that will ensure that exceedance flows from this feature will be diverted to the north and then east away from the residential properties. Basins 1, 2 and 4 will be served with similar spill mechanisms that will ensure that the existing discharge point for exceedance flows (i.e. to the east of Cucumber Wood) is retained. These measures will also ensure that the proposed residential units will remain flood-free under exceedance events. In the instance of Basin 2 and Basin 4 the exceedance route for Scenario 2 events will need to cross roadways to reach the principal exceedance route channels running along the site boundaries. A narrow buffer will be required along the northern and north-eastern boundaries (as shown in Figure 7.3) for the installation of these flow routes.

7.6 Water quality

SuDS techniques can be used to effectively manage the quality of surface water flowing across a site. Different methods can be used to intercept pollutants and allow them to degrade or be stored in situ without impacting the quality of water further downstream. Frequent and short duration rainfall events are those that are most loaded with potential contaminants (silts, fines, heavy metals and various organic and inorganic contaminants). Therefore, the first 5-10 mm of rainfall (i.e. the 'first flush') should be adequately treated using SuDS.

The proposed development will include residential dwellings, low traffic roads and driveways. The CIRIA SuDS manual categorises runoff from residential dwellings as presenting a very low water quality hazard and runoff from low usage roads and residential driveways as presenting a low hazard rating.

Table 10 Water quality hazard ratings (CIRIA, 2015)

Land use	Hazard level
Residential Roof drainage	Very Low
Residential, amenity uses including low usage car parking spaces and roads, other roof drainage.	Low
Commercial uses including car parking spaces and roads (excluding low usage roads, trunk roads and motorways).	Medium
Sites with heavy pollution (e.g. haulage yards, lorry parks, highly frequented lorry approaches to industrial estates, waste sites), sites where chemical and fuels (other than domestic fuel oil) are delivered, handled, stored used or manufactured, industrial sites.	High
Trunk roads and motorways	High

The CIRIA SuDS manual (CIRIA, 2015) advocates a qualitative approach to designing a SuDS scheme for a site with a low hazard rating. This should provide adequate controls on pollutants contained in runoff water.

As the proposed development is residential in nature with a low hazard rating, hazard indices of 0.5 for Total Suspended Solids (TSS), 0.4 for Metals and 0.4 for Hydrocarbons are considered applicable.

The following measures are examples which are suitable for inclusion in a drainage strategy for a residential development to mitigate a potential increase in sediment loads within on-site and off-site runoff. Removal indices are included for each feature type relative to the specific pollutant.

Table 11 Mitigation indices for SuDS components

Component Type	TSS	Metals	Hydrocarbons
Filter drain	0.4	0.4	0.4
Swale	0.5	0.6	0.6
Permeable paving	0.7	0.6	0.7
Detention basin (infiltration basin)	0.5	0.5	0.6
Pond	0.7	0.7	0.5

The infiltration basins included within the SuDS Strategy for the proposed development will provide adequate treatment to mitigate the low hazard associated with runoff from the development.

Sediment traps (i.e. sumps within the inspection chambers of the final manhole upstream of each basin) will be used to facilitate the maintenance of these basins and reduce the build-up of potentially polluted material stored within.

The Site is with Zone III (Total Catchment) of a Source Protection Zone. The water quality mitigation measures outlined above are considered appropriate for treating runoff before infiltration occurs.

7.7 SuDS maintenance

Inspection and long-term maintenance of SuDS components ensures efficient operation and prevents failure. Surface SuDS components can be managed using landscape maintenance techniques. Table 11 describes the management and maintenance requirements for infiltration basins. These requirements will be implemented following the completion of the proposed development, and will be undertaken either by the Lead Local Flood Authority, a private management company or by Thames Water, subject to ongoing discussions regarding this responsibility.

Table 12 Management and maintenance requirements for infiltration basins

SuDS Device	Maintenance requirements	Maintenance frequency
Infiltration basin	- Litter/trash removal - Inlet/outlet cleaning - Vegetation management - Sediment monitoring and silt removal.	- Monthly - Quarterly - Quarterly - Annually or every 3 yrs
Hydro-Brake®	As per manufacturers guidance.	As per manufacturers guidance.

7.8 Additional potential recommendations

Rainwater harvesting and re-use techniques (e.g. for flushing of private WCs) should also be considered for use within each of the residential properties.

7.9 Biodiversity and amenity

SuDS schemes present opportunities to enhance habitat for wildlife onsite and this often improves the biodiversity of the vicinity. Ponds, constructed wetlands and other surface water features are landscape assets that have amenity value and improve the aesthetics of a site more than conventional drainage systems. The use of infiltration basins will enhance the biodiversity and amenity value of the Site when compared with its current use as a golf course. Ecological diversity should be enhanced by the use of native planting within each infiltration basin.

8.0 Conclusions and recommendations

This report presents the findings of a Flood Risk Assessment and SuDS Strategy for the proposed residential development of part of Reading Golf Course. The Site is located in Flood Zone 1 and therefore has a Low Probability of flooding from rivers and the sea – this will also be true post-development after allowing for the expected effects of climate change. The EA's Flood Map for Surface Water indicates that a surface water flow pathway runs along the northern part of the Site and appears to flow south west to north east, although this is only present under the extreme, 1 in 1000 year storm scenario. The Site is currently 'greenfield' and as such the surface water runoff from the proposed development will need to be sustainably managed.

This report provides SuDS Strategy for the Site. The principal components of the scheme are four infiltration basins located in the northern half of the Site in combination with the use of permeable paving. The White Chalk underlying the northern part of the Site is considered an appropriate medium to receive infiltrating stormwater, as are the gravelly superficial deposits where the clay content is low. This was confirmed during permeability testing in the chalk by others at the Site, although further BRE365 soakaway testing is recommended to validate this data.

The viability of the SuDS Strategy has been demonstrated using the MicroDrainage software. This demonstrates that the basins are capable of attenuating and infiltrating all Site runoff up to and including the 1 in 100 year event +40% allowance for climate change.

The proposed SuDS Strategy will also intercept, attenuate and divert the potential surface water flow to remove flood risk to the Site and reduce flood risk downgradient.

It is also noted (from a review of the local drainage asset plans) that a Thames Water foul sewer currently runs through the Site (as shown in Appendix A). This sewer will need to be realigned as part of the proposed development.

Appropriate management and maintenance arrangements for the proposed SuDS scheme will be in place throughout the lifetime of the proposed development.

9.0 References

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Figures

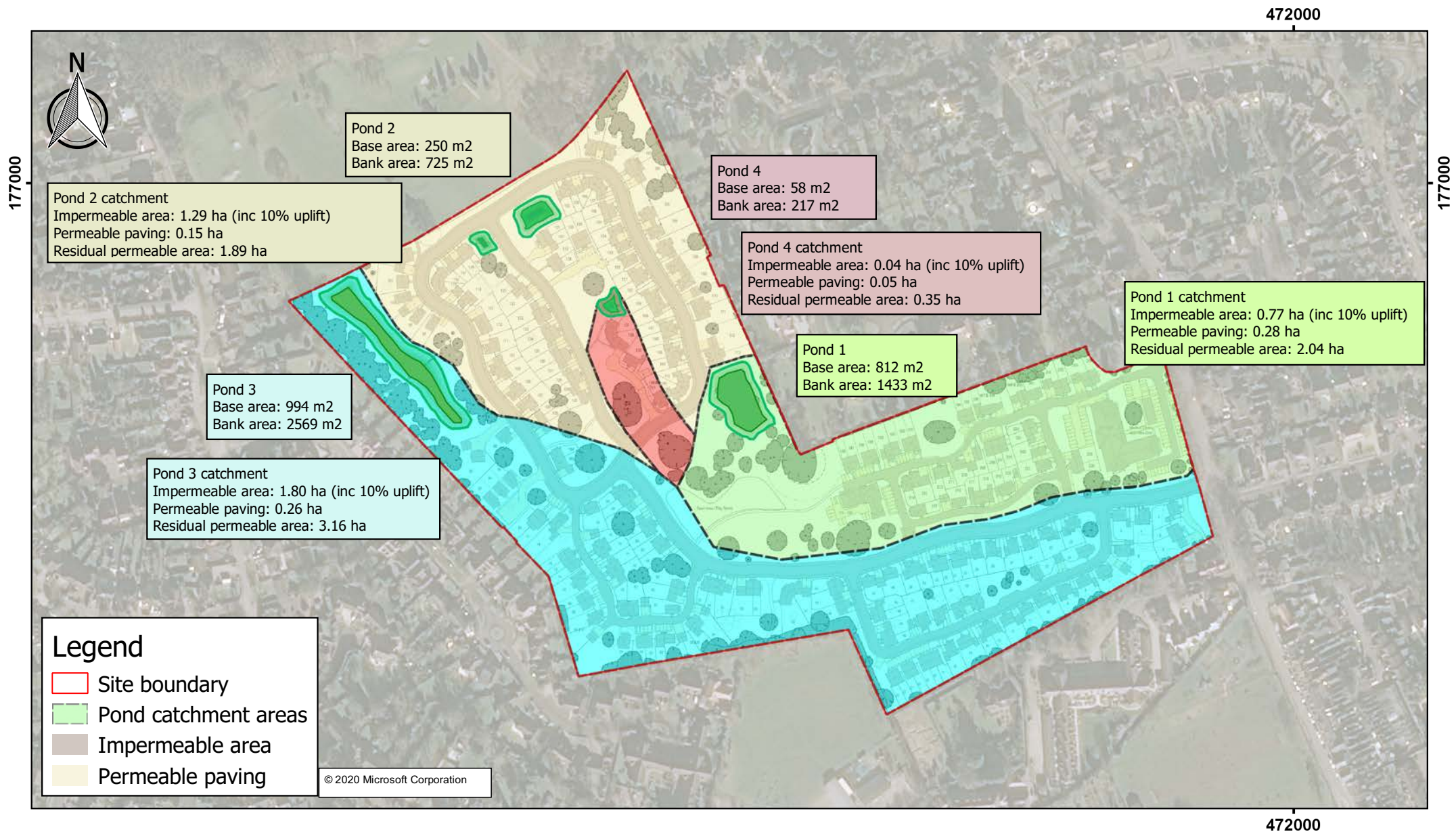


Figure 7.1

Drainage information

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Original	A4	Revision	1
File Reference			
O:\67058\GIS\Map documents\HIA			





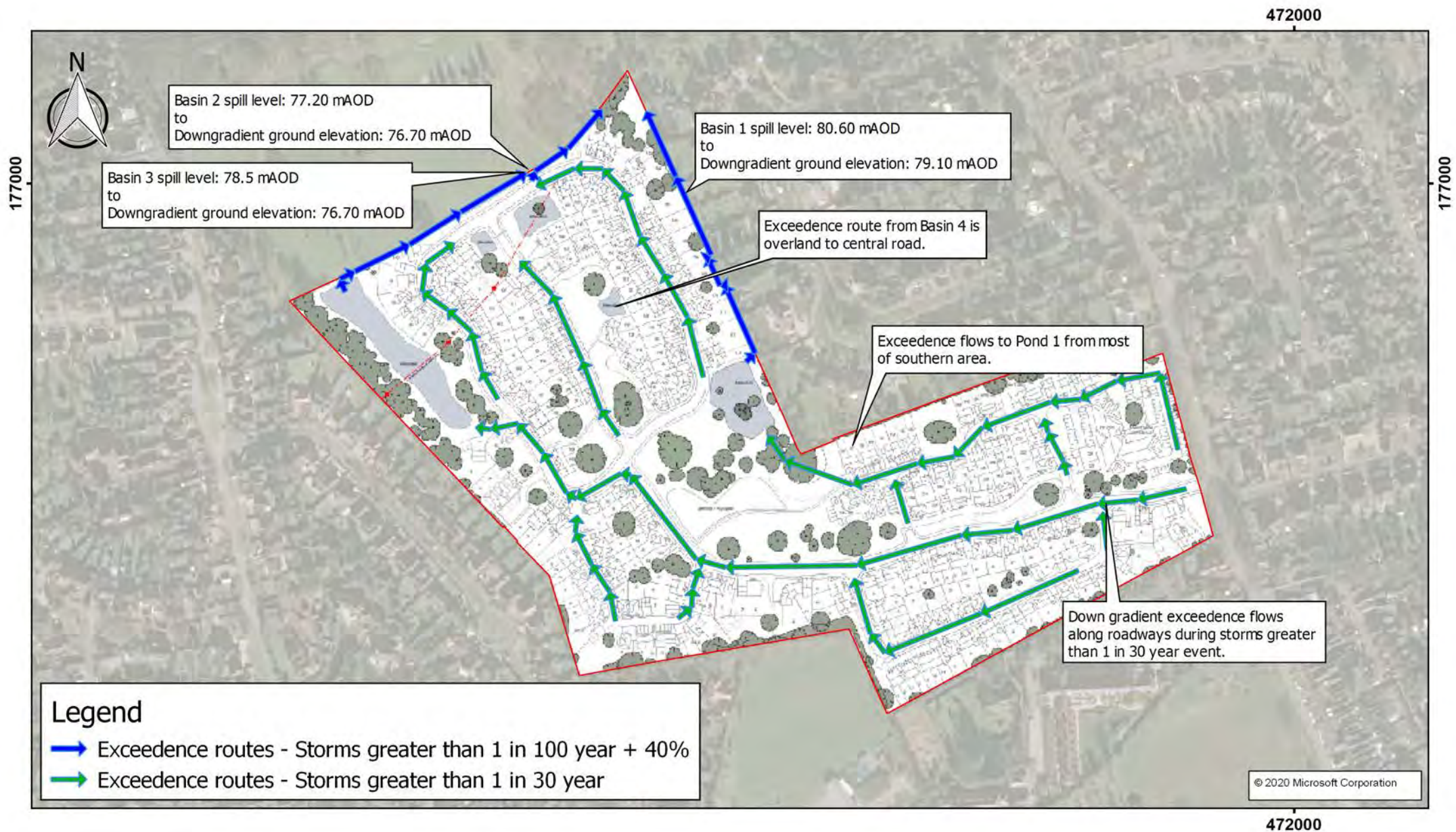


Figure 7.3

Exceedence flow routes

Date	2020	Drawn	HJK
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Original	A4	Revision	1
File Reference			
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Figure 7.4

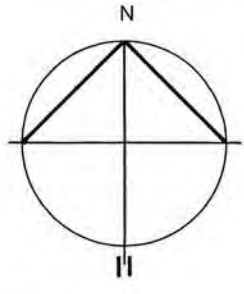
Site investigation locations informing infiltration estimates

Date	2020	Drawn	HJK
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Original	A4	Revision	1
File Reference			
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Appendix A - Proposed Development Layout

SCALE
0m 5m 10m 20m 50m 100m



Fairfax

FAIRFAX AQUISITIONS LTD

Scale: 1 : 1000 Drn By: PJH Date: May '20
Drg No: 2036/SK.04 Rev.J

Project: Land at:
READING GOLF CLUB
KIDMORE END ROAD,
EMMER GREEN, READING

Drawing Title:
INDICATIVE SITE LAYOUT - BASE

Copyright: Paul J Hewett R.I.B.A. Chartered Architect

Paul Hewett R.I.B.A.

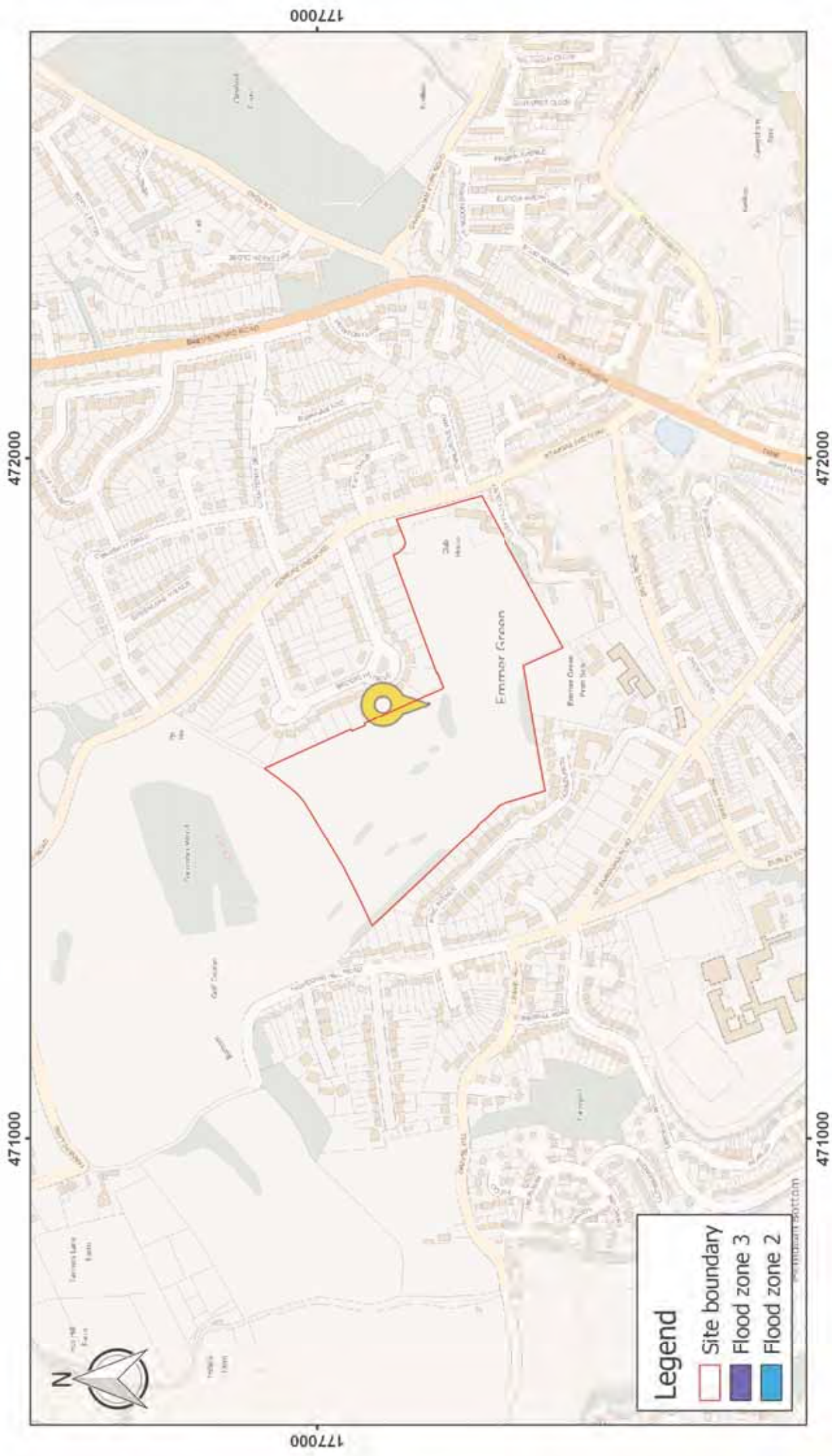
CHARTERED ARCHITECT

Paul Hewett BA(Hons)DipArch(Hons)R.I.B.A.
CHARTERED ARCHITECT
51 Foxdale Drive : The Dell : Angmering : West Sussex : BN16 4HF



FOR INDICATIVE PURPOSES ONLY

Appendix B - Environment Agency Flood Map for Planning



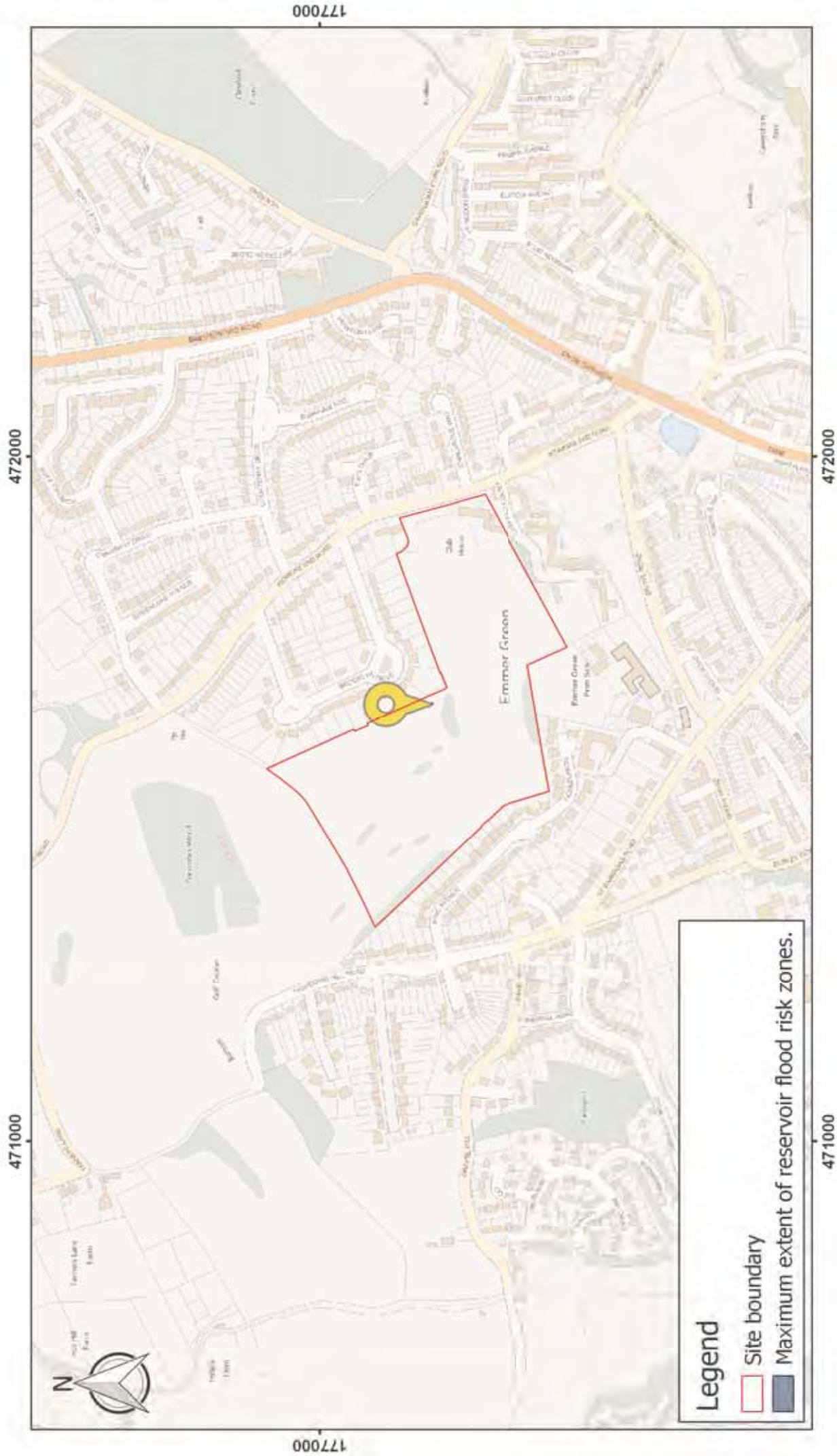
Appendix B	Flood risk from rivers and the sea			 Stantec	
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	Scale	1:7,500	Checked	KL	
	Original	A4	Revision	1	
File Reference O:\67058\GIS\Map documents\HIA					

Appendix C - Environment Agency Flood Map for Surface Water



Appendix C	Stantec			
	Date	2020	Drawn	HJK
	Scale	1:10,000	Checked	KL
	Original	A4	Revision	1
File Reference O:\67058\GIS\Map documents\HIA				

Appendix D - Environment Agency Flood Map for Reservoirs



Appendix D		Flood risk from reservoir failure		 Stantec	
Date	2020	Drawn	HJK	File Reference O:\67058\GIS\Map documents\HIA	
Scale	1:7,500	Checked	KL		
Original	A4	Revision	1		
File Reference					

Appendix E - MicroDrainage Calculations

E.1 Greenfield calculations

Stantec UK		Page 1																								
Dominion House Warrington																										
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Innovyze	Source Control 2018.1.1																									
<u>ICP SUDS Mean Annual Flood</u> Input <table><tr><td>Return Period (years)</td><td>1.00</td><td>Soil</td><td>0.150</td></tr><tr><td>Area (ha)</td><td>12.093</td><td>Urban</td><td>0.000</td></tr><tr><td>SAAR (mm)</td><td>664</td><td>Region Number</td><td>Region 6</td></tr></table> Results 1/s <table><tr><td>QBAR Rural</td><td>4.6</td></tr><tr><td>QBAR Urban</td><td>4.6</td></tr><tr><td>Q100 years</td><td>14.7</td></tr><tr><td>Q1 year</td><td>3.9</td></tr><tr><td>Q30 years</td><td>10.4</td></tr><tr><td>Q100 years</td><td>14.7</td></tr></table>			Return Period (years)	1.00	Soil	0.150	Area (ha)	12.093	Urban	0.000	SAAR (mm)	664	Region Number	Region 6	QBAR Rural	4.6	QBAR Urban	4.6	Q100 years	14.7	Q1 year	3.9	Q30 years	10.4	Q100 years	14.7
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Q30 years	10.4																									
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E.2 Basin 1 calculations

Stantec UK		Page 1																																																																																																																																																																																																																			
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Summary of Results for 100 year Return Period (+40%) Half Drain Time : 130 minutes. <table><thead><tr><th>Storm Event</th><th>Max Level (m)</th><th>Max Depth (m)</th><th>Max Infiltration (l/s)</th><th>Max Volume (m³)</th><th>Status</th></tr></thead><tbody><tr><td>15 min Summer</td><td>79.373</td><td>0.173</td><td>19.8</td><td>146.0</td><td>0 K</td></tr><tr><td>30 min Summer</td><td>79.434</td><td>0.234</td><td>20.8</td><td>200.2</td><td>0 K</td></tr><tr><td>60 min Summer</td><td>79.488</td><td>0.288</td><td>21.7</td><td>248.7</td><td>0 K</td></tr><tr><td>120 min Summer</td><td>79.511</td><td>0.311</td><td>22.1</td><td>270.1</td><td>0 K</td></tr><tr><td>180 min Summer</td><td>79.520</td><td>0.320</td><td>22.2</td><td>278.2</td><td>0 K</td></tr><tr><td>240 min Summer</td><td>79.526</td><td>0.326</td><td>22.3</td><td>284.5</td><td>0 K</td></tr><tr><td>360 min Summer</td><td>79.529</td><td>0.329</td><td>22.4</td><td>287.0</td><td>0 K</td></tr><tr><td>480 min Summer</td><td>79.515</td><td>0.315</td><td>22.1</td><td>273.4</td><td>0 K</td></tr><tr><td>600 min Summer</td><td>79.486</td><td>0.286</td><td>21.7</td><td>246.9</td><td>0 K</td></tr><tr><td>720 min Summer</td><td>79.450</td><td>0.250</td><td>21.1</td><td>214.7</td><td>0 K</td></tr><tr><td>960 min Summer</td><td>79.384</td><td>0.184</td><td>19.9</td><td>155.5</td><td>0 K</td></tr><tr><td>1440 min Summer</td><td>79.305</td><td>0.105</td><td>18.6</td><td>87.3</td><td>0 K</td></tr><tr><td>2160 min Summer</td><td>79.255</td><td>0.055</td><td>17.8</td><td>45.1</td><td>0 K</td></tr><tr><td>2880 min Summer</td><td>79.243</td><td>0.043</td><td>15.1</td><td>35.0</td><td>0 K</td></tr><tr><td>4320 min Summer</td><td>79.232</td><td>0.032</td><td>11.2</td><td>25.8</td><td>0 K</td></tr><tr><td>5760 min Summer</td><td>79.226</td><td>0.026</td><td>9.0</td><td>20.9</td><td>0 K</td></tr><tr><td>7200 min Summer</td><td>79.222</td><td>0.022</td><td>7.8</td><td>18.1</td><td>0 K</td></tr><tr><td>8640 min 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15 min Summer	139.281	0.0	43																																																																																																																																																																																																																		
30 min Summer	91.531	0.0	54																																																																																																																																																																																																																		
60 min Summer	57.245	0.0	76																																																																																																																																																																																																																		
120 min Summer	33.817	0.0	128																																																																																																																																																																																																																		
180 min Summer	24.958	0.0	180																																																																																																																																																																																																																		
240 min Summer	20.060	0.0	216																																																																																																																																																																																																																		
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480 min Summer	11.541	0.0	332																																																																																																																																																																																																																		
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720 min Summer	8.237	0.0	458																																																																																																																																																																																																																		
960 min Summer	6.453	0.0	580																																																																																																																																																																																																																		
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4320 min Summer	1.808	0.0	2216																																																																																																																																																																																																																		
5760 min Summer	1.444	0.0	2944																																																																																																																																																																																																																		
7200 min Summer	1.223	0.0	256																																																																																																																																																																																																																		
8640 min Summer	1.075	0.0	256																																																																																																																																																																																																																		
10080 min Summer	0.969	0.0	256																																																																																																																																																																																																																		
15 min Winter	139.281	0.0	44																																																																																																																																																																																																																		
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Dominion House Warrington					
Date 21/05/2020 14:46 File BASIN 1.SRCX		Designed by hekelly Checked by			
Innovyze		Source Control 2018.1.1			
<u>Summary of Results for 100 year Return Period (+40%)</u>					
Storm Event	Max Level (m)	Max Depth (m)	Max Infiltration (l/s)	Max Volume (m³)	Status
30 min Winter	79.466	0.266	21.3	228.9	0 K
60 min Winter	79.526	0.326	22.3	284.3	0 K
120 min Winter	79.555	0.355	22.8	311.2	0 K
180 min Winter	79.567	0.367	23.0	322.2	0 K
240 min Winter	79.573	0.373	23.1	328.3	0 K
360 min Winter	79.569	0.369	23.1	324.3	0 K
480 min Winter	79.546	0.346	22.7	302.6	0 K
600 min Winter	79.509	0.309	22.0	268.7	0 K
720 min Winter	79.466	0.266	21.3	228.5	0 K
960 min Winter	79.375	0.175	19.8	147.2	0 K
1440 min Winter	79.269	0.069	18.0	56.8	0 K
2160 min Winter	79.241	0.041	14.4	33.2	0 K
2880 min Winter	79.232	0.032	11.3	26.2	0 K
4320 min Winter	79.223	0.023	8.1	19.1	0 K
5760 min Winter	79.222	0.022	7.8	18.1	0 K
7200 min Winter	79.222	0.022	7.6	17.6	0 K
8640 min Winter	79.221	0.021	7.4	17.3	0 K
10080 min Winter	79.221	0.021	7.4	17.2	0 K
Storm Event	Rain (mm/hr)	Flooded Volume (m³)	Time-Peak (mins)		
30 min Winter	91.531	0.0	55		
60 min Winter	57.245	0.0	78		
120 min Winter	33.817	0.0	128		
180 min Winter	24.958	0.0	184		
240 min Winter	20.060	0.0	234		
360 min Winter	14.579	0.0	290		
480 min Winter	11.541	0.0	356		
600 min Winter	9.596	0.0	422		
720 min Winter	8.237	0.0	486		
960 min Winter	6.453	0.0	606		
1440 min Winter	4.555	0.0	824		
2160 min Winter	3.212	0.0	1120		
2880 min Winter	2.516	0.0	1472		
4320 min Winter	1.808	0.0	2220		
5760 min Winter	1.444	0.0	264		
7200 min Winter	1.223	0.0	264		
8640 min Winter	1.075	0.0	264		
10080 min Winter	0.969	0.0	256		
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Date 21/05/2020 14:46 File BASIN 1.SRCX	Designed by hekelly Checked by									
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Source Control 2018.1.1										
Model Details Storage is Online Cover Level (m) 80.700 Infiltration Basin Structure Invert Level (m) 79.200 Safety Factor 2.0 Infiltration Coefficient Base (m/hr) 0.15000 Porosity 1.00 Infiltration Coefficient Side (m/hr) 0.15000 <table><thead><tr><th colspan="2">Depth (m) Area (m²)</th><th colspan="2">Depth (m) Area (m²)</th></tr></thead><tbody><tr><td>0.000</td><td>812.0</td><td>1.500</td><td>1433.0</td></tr></tbody></table>			Depth (m) Area (m²)		Depth (m) Area (m²)		0.000	812.0	1.500	1433.0
Depth (m) Area (m²)		Depth (m) Area (m²)								
0.000	812.0	1.500	1433.0							
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Additional Hydrograph #1

Time (mins)	Flow (l/s)	Time (mins)	Flow (l/s)	Time (mins)	Flow (l/s)	Time (mins)	Flow (l/s)	Time (mins)	Flow (l/s)	Time (mins)	Flow (l/s)
15	0.0	255	7.3	495	1.4	735	0.0	975	0.0	1215	0.0
30	0.0	270	6.8	510	1.1	750	0.0	990	0.0	1230	0.0
45	0.1	285	6.2	525	0.9	765	0.0	1005	0.0	1245	0.0
60	0.3	300	5.7	540	0.6	780	0.0	1020	0.0	1260	0.0
75	0.6	315	5.1	555	0.4	795	0.0	1035	0.0	1275	0.0
90	1.3	330	4.6	570	0.2	810	0.0	1050	0.0	1290	0.0
105	2.0	345	4.1	585	0.1	825	0.0	1065	0.0	1305	0.0
120	2.9	360	3.7	600	0.0	840	0.0	1080	0.0	1320	0.0
135	3.8	375	3.4	615	0.0	855	0.0	1095	0.0	1335	0.0
150	4.8	390	3.1	630	0.0	870	0.0	1110	0.0	1350	0.0
165	5.7	405	2.8	645	0.0	885	0.0	1125	0.0	1365	0.0
180	6.6	420	2.6	660	0.0	900	0.0	1140	0.0	1380	0.0
195	7.3	435	2.3	675	0.0	915	0.0	1155	0.0	1395	0.0
210	7.8	450	2.1	690	0.0	930	0.0	1170	0.0	1410	0.0
225	7.9	465	1.8	705	0.0	945	0.0	1185	0.0		
240	7.7	480	1.6	720	0.0	960	0.0	1200	0.0		

E.3 Basin 2 calculations

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Innovyze			Source Control 2018.1.1																																																																																																																																																																																																																				
<u>Summary of Results for 100 year Return Period (+40%)</u> Half Drain Time : 129 minutes. <table><tr><th>Storm Event</th><th>Max Level (m)</th><th>Max Depth (m)</th><th>Max Infiltration (l/s)</th><th>Max Volume (m³)</th><th>Status</th></tr><tr><td>15 min Summer</td><td>76.629</td><td>0.729</td><td>27.3</td><td>246.9</td><td>0 K</td></tr><tr><td>30 min Summer</td><td>76.797</td><td>0.897</td><td>31.5</td><td>324.0</td><td>0 K</td></tr><tr><td>60 min Summer</td><td>76.961</td><td>1.061</td><td>35.8</td><td>408.3</td><td>0 K</td></tr><tr><td>120 min Summer</td><td>77.038</td><td>1.138</td><td>37.8</td><td>450.3</td><td>0 K</td></tr><tr><td>180 min Summer</td><td>77.058</td><td>1.158</td><td>38.3</td><td>461.8</td><td>0 K</td></tr><tr><td>240 min Summer</td><td>77.065</td><td>1.165</td><td>38.5</td><td>465.7</td><td>0 K</td></tr><tr><td>360 min Summer</td><td>77.067</td><td>1.167</td><td>38.6</td><td>467.1</td><td>0 K</td></tr><tr><td>480 min Summer</td><td>77.049</td><td>1.149</td><td>38.1</td><td>456.7</td><td>0 K</td></tr><tr><td>600 min Summer</td><td>77.008</td><td>1.108</td><td>37.0</td><td>433.9</td><td>0 K</td></tr><tr><td>720 min Summer</td><td>76.954</td><td>1.054</td><td>35.6</td><td>404.2</td><td>0 K</td></tr><tr><td>960 min Summer</td><td>76.828</td><td>0.928</td><td>32.3</td><td>339.5</td><td>0 K</td></tr><tr><td>1440 min Summer</td><td>76.606</td><td>0.706</td><td>26.8</td><td>237.0</td><td>0 K</td></tr><tr><td>2160 min Summer</td><td>76.432</td><td>0.532</td><td>22.5</td><td>166.4</td><td>0 K</td></tr><tr><td>2880 min Summer</td><td>76.309</td><td>0.409</td><td>19.6</td><td>121.7</td><td>0 K</td></tr><tr><td>4320 min Summer</td><td>76.147</td><td>0.247</td><td>15.9</td><td>68.6</td><td>0 K</td></tr><tr><td>5760 min Summer</td><td>76.046</td><td>0.146</td><td>13.6</td><td>38.9</td><td>0 K</td></tr><tr><td>7200 min Summer</td><td>75.982</td><td>0.082</td><td>12.2</td><td>21.3</td><td>0 K</td></tr><tr><td>8640 min Summer</td><td>75.949</td><td>0.049</td><td>11.3</td><td>12.6</td><td>0 K</td></tr><tr><td>10080 min Summer</td><td>75.945</td><td>0.045</td><td>10.2</td><td>11.4</td><td>0 K</td></tr><tr><td>15 min Winter</td><td>76.666</td><td>0.766</td><td>28.3</td><td>263.3</td><td>0 K</td></tr></table> <table><tr><th>Storm Event</th><th>Rain (mm/hr)</th><th>Flooded Volume (m³)</th><th>Time-Peak (mins)</th></tr><tr><td>15 min Summer</td><td>139.281</td><td>0.0</td><td>49</td></tr><tr><td>30 min Summer</td><td>91.531</td><td>0.0</td><td>58</td></tr><tr><td>60 min Summer</td><td>57.245</td><td>0.0</td><td>80</td></tr><tr><td>120 min Summer</td><td>33.817</td><td>0.0</td><td>128</td></tr><tr><td>180 min Summer</td><td>24.958</td><td>0.0</td><td>164</td></tr><tr><td>240 min Summer</td><td>20.060</td><td>0.0</td><td>200</td></tr><tr><td>360 min Summer</td><td>14.579</td><td>0.0</td><td>268</td></tr><tr><td>480 min Summer</td><td>11.541</td><td>0.0</td><td>332</td></tr><tr><td>600 min Summer</td><td>9.596</td><td>0.0</td><td>394</td></tr><tr><td>720 min Summer</td><td>8.237</td><td>0.0</td><td>458</td></tr><tr><td>960 min Summer</td><td>6.453</td><td>0.0</td><td>584</td></tr><tr><td>1440 min Summer</td><td>4.555</td><td>0.0</td><td>842</td></tr><tr><td>2160 min Summer</td><td>3.212</td><td>0.0</td><td>1212</td></tr><tr><td>2880 min Summer</td><td>2.516</td><td>0.0</td><td>1572</td></tr><tr><td>4320 min Summer</td><td>1.808</td><td>0.0</td><td>2296</td></tr><tr><td>5760 min Summer</td><td>1.444</td><td>0.0</td><td>3008</td></tr><tr><td>7200 min Summer</td><td>1.223</td><td>0.0</td><td>3696</td></tr><tr><td>8640 min Summer</td><td>1.075</td><td>0.0</td><td>4408</td></tr><tr><td>10080 min Summer</td><td>0.969</td><td>0.0</td><td>5112</td></tr><tr><td>15 min Winter</td><td>139.281</td><td>0.0</td><td>49</td></tr></table>						Storm Event	Max Level (m)	Max Depth (m)	Max Infiltration (l/s)	Max Volume (m³)	Status	15 min Summer	76.629	0.729	27.3	246.9	0 K	30 min Summer	76.797	0.897	31.5	324.0	0 K	60 min Summer	76.961	1.061	35.8	408.3	0 K	120 min Summer	77.038	1.138	37.8	450.3	0 K	180 min Summer	77.058	1.158	38.3	461.8	0 K	240 min Summer	77.065	1.165	38.5	465.7	0 K	360 min Summer	77.067	1.167	38.6	467.1	0 K	480 min Summer	77.049	1.149	38.1	456.7	0 K	600 min Summer	77.008	1.108	37.0	433.9	0 K	720 min Summer	76.954	1.054	35.6	404.2	0 K	960 min Summer	76.828	0.928	32.3	339.5	0 K	1440 min Summer	76.606	0.706	26.8	237.0	0 K	2160 min Summer	76.432	0.532	22.5	166.4	0 K	2880 min Summer	76.309	0.409	19.6	121.7	0 K	4320 min Summer	76.147	0.247	15.9	68.6	0 K	5760 min Summer	76.046	0.146	13.6	38.9	0 K	7200 min Summer	75.982	0.082	12.2	21.3	0 K	8640 min Summer	75.949	0.049	11.3	12.6	0 K	10080 min Summer	75.945	0.045	10.2	11.4	0 K	15 min Winter	76.666	0.766	28.3	263.3	0 K	Storm Event	Rain (mm/hr)	Flooded Volume (m³)	Time-Peak (mins)	15 min Summer	139.281	0.0	49	30 min Summer	91.531	0.0	58	60 min Summer	57.245	0.0	80	120 min Summer	33.817	0.0	128	180 min Summer	24.958	0.0	164	240 min Summer	20.060	0.0	200	360 min Summer	14.579	0.0	268	480 min Summer	11.541	0.0	332	600 min Summer	9.596	0.0	394	720 min Summer	8.237	0.0	458	960 min Summer	6.453	0.0	584	1440 min Summer	4.555	0.0	842	2160 min Summer	3.212	0.0	1212	2880 min Summer	2.516	0.0	1572	4320 min Summer	1.808	0.0	2296	5760 min Summer	1.444	0.0	3008	7200 min Summer	1.223	0.0	3696	8640 min Summer	1.075	0.0	4408	10080 min Summer	0.969	0.0	5112	15 min Winter	139.281	0.0	49
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Summary of Results for 100 year Return Period (+40%)

Storm Event	Max Level (m)	Max Depth (m)	Max Infiltration (l/s)	Max Volume (m³)	Status
30 min Winter	76.868	0.968	33.4	359.3	0 K
60 min Winter	76.856	0.956	33.1	353.5	0 K
120 min Winter	77.156	1.256	40.9	519.0	0 K
180 min Winter	77.172	1.272	41.4	528.5	0 K
240 min Winter	77.174	1.274	41.4	530.1	0 K
360 min Winter	77.165	1.265	41.2	524.6	0 K
480 min Winter	77.126	1.226	40.2	501.3	0 K
600 min Winter	77.064	1.164	38.5	465.0	0 K
720 min Winter	76.991	1.091	36.6	424.5	0 K
960 min Winter	76.835	0.935	32.5	343.0	0 K
1440 min Winter	76.574	0.674	26.0	223.2	0 K
2160 min Winter	76.347	0.447	20.5	135.0	0 K
2880 min Winter	76.202	0.302	17.1	85.9	0 K
4320 min Winter	76.024	0.124	13.1	32.6	0 K
5760 min Winter	75.948	0.048	11.1	12.3	0 K
7200 min Winter	75.941	0.041	9.4	10.4	0 K
8640 min Winter	75.937	0.037	8.4	9.4	0 K
10080 min Winter	75.937	0.037	8.3	9.3	0 K

Storm Event	Rain (mm/hr)	Flooded Volume (m³)	Time-Peak (mins)
30 min Winter	91.531	0.0	59
60 min Winter	57.245	0.0	64
120 min Winter	33.817	0.0	128
180 min Winter	24.958	0.0	174
240 min Winter	20.060	0.0	208
360 min Winter	14.579	0.0	282
480 min Winter	11.541	0.0	352
600 min Winter	9.596	0.0	420
720 min Winter	8.237	0.0	484
960 min Winter	6.453	0.0	612
1440 min Winter	4.555	0.0	876
2160 min Winter	3.212	0.0	1252
2880 min Winter	2.516	0.0	1612
4320 min Winter	1.808	0.0	2316
5760 min Winter	1.444	0.0	2936
7200 min Winter	1.223	0.0	3680
8640 min Winter	1.075	0.0	280
10080 min Winter	0.969	0.0	280

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Rainfall Details

Rainfall Model	FEH
Return Period (years)	100
FEH Rainfall Version	2013
Site Location	GB 471574 176843 SU 71574 76843
Data Type	Point
Summer Storms	Yes
Winter Storms	Yes
Cv (Summer)	0.750
Cv (Winter)	0.840
Shortest Storm (mins)	15
Longest Storm (mins)	10080
Climate Change %	+40

Pipe Network

Volume in Pipe Network (m³) 177 Dia of Outfall Pipe (m) 0.3
Slope of Outfall Pipe (1:X) 50 Roughness of Outfall Pipe (mm) 0.100

Time Area Diagram

Total Area (ha) 1.290

Time (mins) From:	Time (mins) To:	Area (ha)	Time (mins) From:	Time (mins) To:	Area (ha)	Time (mins) From:	Time (mins) To:	Area (ha)
0	4	0.430	4	8	0.430	8	12	0.430

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Model Details Storage is Online Cover Level (m) 77.500 Infiltration Basin Structure Invert Level (m) 75.900 Safety Factor 2.0 Infiltration Coefficient Base (m/hr) 0.29900 Porosity 1.00 Infiltration Coefficient Side (m/hr) 0.29900 <table><thead><tr><th colspan="2">Depth (m) Area (m²)</th><th colspan="2">Depth (m) Area (m²)</th></tr></thead><tbody><tr><td>0.000</td><td>250.0</td><td>1.600</td><td>725.0</td></tr></tbody></table>			Depth (m) Area (m²)		Depth (m) Area (m²)		0.000	250.0	1.600	725.0
Depth (m) Area (m²)		Depth (m) Area (m²)								
0.000	250.0	1.600	725.0							
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Additional Hydrograph #1

Time (mins)	Flow (l/s)	Time (mins)	Flow (l/s)	Time (mins)	Flow (l/s)	Time (mins)	Flow (l/s)	Time (mins)	Flow (l/s)	Time (mins)	Flow (l/s)
15	0.0	255	8.0	495	2.0	735	0.0	975	0.0	1215	0.0
30	0.0	270	7.9	510	1.8	750	0.0	990	0.0	1230	0.0
45	0.1	285	7.6	525	1.5	765	0.0	1005	0.0	1245	0.0
60	0.1	300	7.2	540	1.3	780	0.0	1020	0.0	1260	0.0
75	0.2	315	6.7	555	1.0	795	0.0	1035	0.0	1275	0.0
90	0.4	330	6.2	570	0.8	810	0.0	1050	0.0	1290	0.0
105	0.8	345	5.6	585	0.5	825	0.0	1065	0.0	1305	0.0
120	1.4	360	5.1	600	0.3	840	0.0	1080	0.0	1320	0.0
135	2.2	375	4.6	615	0.2	855	0.0	1095	0.0	1335	0.0
150	3.0	390	4.1	630	0.1	870	0.0	1110	0.0	1350	0.0
165	3.9	405	3.7	645	0.1	885	0.0	1125	0.0	1365	0.0
180	4.8	420	3.4	660	0.0	900	0.0	1140	0.0	1380	0.0
195	5.7	435	3.1	675	0.0	915	0.0	1155	0.0	1395	0.0
210	6.6	450	2.8	690	0.0	930	0.0	1170	0.0	1410	0.0
225	7.3	465	2.6	705	0.0	945	0.0	1185	0.0		
240	7.9	480	2.3	720	0.0	960	0.0	1200	0.0		

E.4 Basin 3 calculations

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<u>Summary of Results for 100 year Return Period (+40%)</u> Half Drain Time : 67 minutes. <table><thead><tr><th>Storm Event</th><th>Max Level (m)</th><th>Max Depth (m)</th><th>Max Infiltration (l/s)</th><th>Max Volume (m³)</th><th>Status</th></tr></thead><tbody><tr><td>15 min Summer</td><td>77.221</td><td>0.221</td><td>58.7</td><td>240.0</td><td>0 K</td></tr><tr><td>30 min Summer</td><td>77.317</td><td>0.317</td><td>66.5</td><td>357.5</td><td>0 K</td></tr><tr><td>60 min Summer</td><td>77.294</td><td>0.294</td><td>64.6</td><td>328.8</td><td>0 K</td></tr><tr><td>120 min Summer</td><td>77.417</td><td>0.417</td><td>74.7</td><td>488.4</td><td>0 K</td></tr><tr><td>180 min Summer</td><td>77.411</td><td>0.411</td><td>74.3</td><td>480.5</td><td>0 K</td></tr><tr><td>240 min Summer</td><td>77.412</td><td>0.412</td><td>74.3</td><td>482.0</td><td>0 K</td></tr><tr><td>360 min Summer</td><td>77.402</td><td>0.402</td><td>73.5</td><td>468.8</td><td>0 K</td></tr><tr><td>480 min Summer</td><td>77.381</td><td>0.381</td><td>71.8</td><td>440.4</td><td>0 K</td></tr><tr><td>600 min Summer</td><td>77.344</td><td>0.344</td><td>68.7</td><td>391.6</td><td>0 K</td></tr><tr><td>720 min Summer</td><td>77.299</td><td>0.299</td><td>65.0</td><td>334.0</td><td>0 K</td></tr><tr><td>960 min Summer</td><td>77.216</td><td>0.216</td><td>58.3</td><td>234.6</td><td>0 K</td></tr><tr><td>1440 min Summer</td><td>77.112</td><td>0.112</td><td>50.0</td><td>116.5</td><td>0 K</td></tr><tr><td>2160 min Summer</td><td>77.050</td><td>0.050</td><td>44.9</td><td>50.7</td><td>0 K</td></tr><tr><td>2880 min Summer</td><td>77.040</td><td>0.040</td><td>36.0</td><td>40.5</td><td>0 K</td></tr><tr><td>4320 min Summer</td><td>77.030</td><td>0.030</td><td>26.3</td><td>29.9</td><td>0 K</td></tr><tr><td>5760 min Summer</td><td>77.024</td><td>0.024</td><td>21.4</td><td>24.2</td><td>0 K</td></tr><tr><td>7200 min Summer</td><td>77.021</td><td>0.021</td><td>18.2</td><td>20.6</td><td>0 K</td></tr><tr><td>8640 min Summer</td><td>77.018</td><td>0.018</td><td>16.0</td><td>18.1</td><td>0 K</td></tr><tr><td>10080 min Summer</td><td>77.016</td><td>0.016</td><td>14.2</td><td>16.5</td><td>0 K</td></tr><tr><td>15 min Winter</td><td>77.243</td><td>0.243</td><td>60.5</td><td>266.0</td><td>0 K</td></tr></tbody></table> <table><thead><tr><th>Storm Event</th><th>Rain (mm/hr)</th><th>Flooded Volume (m³)</th><th>Time-Peak (mins)</th></tr></thead><tbody><tr><td>15 min Summer</td><td>139.281</td><td>0.0</td><td>48</td></tr><tr><td>30 min Summer</td><td>91.531</td><td>0.0</td><td>57</td></tr><tr><td>60 min Summer</td><td>57.245</td><td>0.0</td><td>62</td></tr><tr><td>120 min Summer</td><td>33.817</td><td>0.0</td><td>124</td></tr><tr><td>180 min Summer</td><td>24.958</td><td>0.0</td><td>162</td></tr><tr><td>240 min Summer</td><td>20.060</td><td>0.0</td><td>192</td></tr><tr><td>360 min Summer</td><td>14.579</td><td>0.0</td><td>258</td></tr><tr><td>480 min Summer</td><td>11.541</td><td>0.0</td><td>322</td></tr><tr><td>600 min Summer</td><td>9.596</td><td>0.0</td><td>384</td></tr><tr><td>720 min Summer</td><td>8.237</td><td>0.0</td><td>444</td></tr><tr><td>960 min Summer</td><td>6.453</td><td>0.0</td><td>566</td></tr><tr><td>1440 min Summer</td><td>4.555</td><td>0.0</td><td>800</td></tr><tr><td>2160 min Summer</td><td>3.212</td><td>0.0</td><td>1120</td></tr><tr><td>2880 min Summer</td><td>2.516</td><td>0.0</td><td>1484</td></tr><tr><td>4320 min Summer</td><td>1.808</td><td>0.0</td><td>2208</td></tr><tr><td>5760 min Summer</td><td>1.444</td><td>0.0</td><td>2936</td></tr><tr><td>7200 min Summer</td><td>1.223</td><td>0.0</td><td>3680</td></tr><tr><td>8640 min Summer</td><td>1.075</td><td>0.0</td><td>4360</td></tr><tr><td>10080 min Summer</td><td>0.969</td><td>0.0</td><td>5136</td></tr><tr><td>15 min Winter</td><td>139.281</td><td>0.0</td><td>48</td></tr></tbody></table>				Storm Event	Max Level (m)	Max Depth (m)	Max Infiltration (l/s)	Max Volume (m³)	Status	15 min Summer	77.221	0.221	58.7	240.0	0 K	30 min Summer	77.317	0.317	66.5	357.5	0 K	60 min Summer	77.294	0.294	64.6	328.8	0 K	120 min Summer	77.417	0.417	74.7	488.4	0 K	180 min Summer	77.411	0.411	74.3	480.5	0 K	240 min Summer	77.412	0.412	74.3	482.0	0 K	360 min Summer	77.402	0.402	73.5	468.8	0 K	480 min Summer	77.381	0.381	71.8	440.4	0 K	600 min Summer	77.344	0.344	68.7	391.6	0 K	720 min Summer	77.299	0.299	65.0	334.0	0 K	960 min Summer	77.216	0.216	58.3	234.6	0 K	1440 min Summer	77.112	0.112	50.0	116.5	0 K	2160 min Summer	77.050	0.050	44.9	50.7	0 K	2880 min Summer	77.040	0.040	36.0	40.5	0 K	4320 min Summer	77.030	0.030	26.3	29.9	0 K	5760 min Summer	77.024	0.024	21.4	24.2	0 K	7200 min Summer	77.021	0.021	18.2	20.6	0 K	8640 min Summer	77.018	0.018	16.0	18.1	0 K	10080 min Summer	77.016	0.016	14.2	16.5	0 K	15 min Winter	77.243	0.243	60.5	266.0	0 K	Storm Event	Rain (mm/hr)	Flooded Volume (m³)	Time-Peak (mins)	15 min Summer	139.281	0.0	48	30 min Summer	91.531	0.0	57	60 min Summer	57.245	0.0	62	120 min Summer	33.817	0.0	124	180 min Summer	24.958	0.0	162	240 min Summer	20.060	0.0	192	360 min Summer	14.579	0.0	258	480 min Summer	11.541	0.0	322	600 min Summer	9.596	0.0	384	720 min Summer	8.237	0.0	444	960 min Summer	6.453	0.0	566	1440 min Summer	4.555	0.0	800	2160 min Summer	3.212	0.0	1120	2880 min Summer	2.516	0.0	1484	4320 min Summer	1.808	0.0	2208	5760 min Summer	1.444	0.0	2936	7200 min Summer	1.223	0.0	3680	8640 min Summer	1.075	0.0	4360	10080 min Summer	0.969	0.0	5136	15 min Winter	139.281	0.0	48
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<u>Summary of Results for 100 year Return Period (+40%)</u>					
Storm Event	Max Level (m)	Max Depth (m)	Max Infiltration (l/s)	Max Volume (m³)	Status
30 min Winter	77.359	0.359	69.9	411.2	0 K
60 min Winter	77.364	0.364	70.3	417.7	0 K
120 min Winter	77.466	0.466	78.8	556.8	0 K
180 min Winter	77.466	0.466	78.8	555.6	0 K
240 min Winter	77.461	0.461	78.4	549.0	0 K
360 min Winter	77.438	0.438	76.5	516.9	0 K
480 min Winter	77.400	0.400	73.3	465.9	0 K
600 min Winter	77.349	0.349	69.1	398.3	0 K
720 min Winter	77.292	0.292	64.4	325.5	0 K
960 min Winter	77.184	0.184	55.7	196.4	0 K
1440 min Winter	77.058	0.058	45.8	59.0	0 K
2160 min Winter	77.038	0.038	33.7	38.2	0 K
2880 min Winter	77.030	0.030	26.8	30.2	0 K
4320 min Winter	77.022	0.022	19.1	21.6	0 K
5760 min Winter	77.018	0.018	15.5	17.6	0 K
7200 min Winter	77.016	0.016	14.2	16.1	0 K
8640 min Winter	77.016	0.016	13.8	15.7	0 K
10080 min Winter	77.016	0.016	13.8	15.6	0 K
Storm Event	Rain (mm/hr)	Flooded Volume (m³)	Time-Peak (mins)		
30 min Winter	91.531	0.0	58		
60 min Winter	57.245	0.0	62		
120 min Winter	33.817	0.0	128		
180 min Winter	24.958	0.0	174		
240 min Winter	20.060	0.0	200		
360 min Winter	14.579	0.0	274		
480 min Winter	11.541	0.0	340		
600 min Winter	9.596	0.0	402		
720 min Winter	8.237	0.0	464		
960 min Winter	6.453	0.0	582		
1440 min Winter	4.555	0.0	792		
2160 min Winter	3.212	0.0	1128		
2880 min Winter	2.516	0.0	1468		
4320 min Winter	1.808	0.0	2248		
5760 min Winter	1.444	0.0	2912		
7200 min Winter	1.223	0.0	272		
8640 min Winter	1.075	0.0	280		
10080 min Winter	0.969	0.0	272		
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Innovyze	Source Control 2018.1.1	

Rainfall Details

Rainfall Model	FEH
Return Period (years)	100
FEH Rainfall Version	2013
Site Location	GB 471574 176843 SU 71574 76843
Data Type	Point
Summer Storms	Yes
Winter Storms	Yes
Cv (Summer)	0.750
Cv (Winter)	0.840
Shortest Storm (mins)	15
Longest Storm (mins)	10080
Climate Change %	+40

Pipe Network

Volume in Pipe Network (m³) 280 Dia of Outfall Pipe (m) 0.3
Slope of Outfall Pipe (1:X) 50 Roughness of Outfall Pipe (mm) 0.100

Time Area Diagram

Total Area (ha) 1.800

Time (mins) From:	Time (mins) To:	Area (ha)	Time (mins) From:	Time (mins) To:	Area (ha)	Time (mins) From:	Time (mins) To:	Area (ha)
0	4	0.600	4	8	0.600	8	12	0.600

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Dominion House Warrington										
Date 21/05/2020 14:52 File Basin 3.SRCX	Designed by hekelly Checked by									
Innovyze										
Source Control 2018.1.1										
Model Details Storage is Online Cover Level (m) 78.500 Infiltration Basin Structure Invert Level (m) 77.000 Safety Factor 2.0 Infiltration Coefficient Base (m/hr) 0.29900 Porosity 1.00 Infiltration Coefficient Side (m/hr) 0.29900 <table><thead><tr><th>Depth (m)</th><th>Area (m²)</th><th>Depth (m)</th><th>Area (m²)</th></tr></thead><tbody><tr><td>0.000</td><td>994.0</td><td>1.500</td><td>2569.0</td></tr></tbody></table>			Depth (m)	Area (m²)	Depth (m)	Area (m²)	0.000	994.0	1.500	2569.0
Depth (m)	Area (m²)	Depth (m)	Area (m²)							
0.000	994.0	1.500	2569.0							
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Dominion House Warrington		
Date 21/05/2020 14:52 File Basin 3.SRCX	Designed by hekelly Checked by	
Innovyze		Source Control 2018.1.1

Additional Hydrograph #1

Time (mins)	Flow (l/s)	Time (mins)	Flow (l/s)	Time (mins)	Flow (l/s)	Time (mins)	Flow (l/s)	Time (mins)	Flow (l/s)	Time (mins)	Flow (l/s)
15	0.0	255	13.4	495	3.4	735	0.0	975	0.0	1215	0.0
30	0.0	270	13.2	510	2.9	750	0.0	990	0.0	1230	0.0
45	0.1	285	12.7	525	2.5	765	0.0	1005	0.0	1245	0.0
60	0.2	300	12.0	540	2.1	780	0.0	1020	0.0	1260	0.0
75	0.4	315	11.2	555	1.7	795	0.0	1035	0.0	1275	0.0
90	0.7	330	10.3	570	1.3	810	0.0	1050	0.0	1290	0.0
105	1.3	345	9.4	585	0.9	825	0.0	1065	0.0	1305	0.0
120	2.4	360	8.5	600	0.6	840	0.0	1080	0.0	1320	0.0
135	3.6	375	7.6	615	0.3	855	0.0	1095	0.0	1335	0.0
150	5.0	390	6.9	630	0.2	870	0.0	1110	0.0	1350	0.0
165	6.5	405	6.3	645	0.1	885	0.0	1125	0.0	1365	0.0
180	8.0	420	5.7	660	0.0	900	0.0	1140	0.0	1380	0.0
195	9.5	435	5.2	675	0.0	915	0.0	1155	0.0	1395	0.0
210	11.0	450	4.7	690	0.0	930	0.0	1170	0.0	1410	0.0
225	12.3	465	4.3	705	0.0	945	0.0	1185	0.0		
240	13.1	480	3.8	720	0.0	960	0.0	1200	0.0		

E.5 Basin 4 calculations

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Dominion House Warrington																																																																																																																																																																																																																							
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Summer</td><td>77.903</td><td>0.103</td><td>3.2</td><td>6.4</td><td>0 K</td></tr><tr><td>600 min Summer</td><td>77.870</td><td>0.070</td><td>2.9</td><td>4.3</td><td>0 K</td></tr><tr><td>720 min Summer</td><td>77.852</td><td>0.052</td><td>2.8</td><td>3.1</td><td>0 K</td></tr><tr><td>960 min Summer</td><td>77.838</td><td>0.038</td><td>2.1</td><td>2.3</td><td>0 K</td></tr><tr><td>1440 min Summer</td><td>77.827</td><td>0.027</td><td>1.4</td><td>1.6</td><td>0 K</td></tr><tr><td>2160 min Summer</td><td>77.826</td><td>0.026</td><td>1.4</td><td>1.5</td><td>0 K</td></tr><tr><td>2880 min Summer</td><td>77.825</td><td>0.025</td><td>1.4</td><td>1.5</td><td>0 K</td></tr><tr><td>4320 min Summer</td><td>77.825</td><td>0.025</td><td>1.3</td><td>1.5</td><td>0 K</td></tr><tr><td>5760 min Summer</td><td>77.825</td><td>0.025</td><td>1.3</td><td>1.4</td><td>0 K</td></tr><tr><td>7200 min Summer</td><td>77.824</td><td>0.024</td><td>1.3</td><td>1.4</td><td>0 K</td></tr><tr><td>8640 min 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min Summer</td><td>9.596</td><td>0.0</td><td>332</td></tr><tr><td>720 min Summer</td><td>8.237</td><td>0.0</td><td>382</td></tr><tr><td>960 min Summer</td><td>6.453</td><td>0.0</td><td>502</td></tr><tr><td>1440 min Summer</td><td>4.555</td><td>0.0</td><td>746</td></tr><tr><td>2160 min Summer</td><td>3.212</td><td>0.0</td><td>196</td></tr><tr><td>2880 min Summer</td><td>2.516</td><td>0.0</td><td>196</td></tr><tr><td>4320 min Summer</td><td>1.808</td><td>0.0</td><td>196</td></tr><tr><td>5760 min Summer</td><td>1.444</td><td>0.0</td><td>200</td></tr><tr><td>7200 min Summer</td><td>1.223</td><td>0.0</td><td>200</td></tr><tr><td>8640 min Summer</td><td>1.075</td><td>0.0</td><td>200</td></tr><tr><td>10080 min Summer</td><td>0.969</td><td>0.0</td><td>200</td></tr><tr><td>15 min Winter</td><td>139.281</td><td>0.0</td><td>26</td></tr></tbody></table>						Storm Event	Max Level (m)	Max Depth (m)	Max Infiltration (l/s)	Max Volume (m³)	Status	15 min Summer	77.908	0.108	3.2	6.7	0 K	30 min Summer	77.936	0.136	3.5	8.6	0 K	60 min Summer	77.948	0.148	3.6	9.4	0 K	120 min Summer	77.943	0.143	3.5	9.1	0 K	180 min Summer	77.941	0.141	3.5	8.9	0 K	240 min Summer	77.942	0.142	3.5	9.0	0 K	360 min Summer	77.935	0.135	3.5	8.5	0 K	480 min Summer	77.903	0.103	3.2	6.4	0 K	600 min Summer	77.870	0.070	2.9	4.3	0 K	720 min Summer	77.852	0.052	2.8	3.1	0 K	960 min Summer	77.838	0.038	2.1	2.3	0 K	1440 min Summer	77.827	0.027	1.4	1.6	0 K	2160 min Summer	77.826	0.026	1.4	1.5	0 K	2880 min Summer	77.825	0.025	1.4	1.5	0 K	4320 min Summer	77.825	0.025	1.3	1.5	0 K	5760 min Summer	77.825	0.025	1.3	1.4	0 K	7200 min Summer	77.824	0.024	1.3	1.4	0 K	8640 min Summer	77.824	0.024	1.3	1.4	0 K	10080 min Summer	77.824	0.024	1.3	1.4	0 K	15 min Winter	77.923	0.123	3.4	7.7	0 K	Storm Event	Rain (mm/hr)	Flooded Volume (m³)	Time-Peak (mins)	15 min Summer	139.281	0.0	26	30 min Summer	91.531	0.0	36	60 min Summer	57.245	0.0	54	120 min Summer	33.817	0.0	88	180 min Summer	24.958	0.0	124	240 min Summer	20.060	0.0	158	360 min Summer	14.579	0.0	222	480 min Summer	11.541	0.0	278	600 min Summer	9.596	0.0	332	720 min Summer	8.237	0.0	382	960 min Summer	6.453	0.0	502	1440 min Summer	4.555	0.0	746	2160 min Summer	3.212	0.0	196	2880 min Summer	2.516	0.0	196	4320 min Summer	1.808	0.0	196	5760 min Summer	1.444	0.0	200	7200 min Summer	1.223	0.0	200	8640 min Summer	1.075	0.0	200	10080 min Summer	0.969	0.0	200	15 min Winter	139.281	0.0	26
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Dominion House Warrington					
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<u>Summary of Results for 100 year Return Period (+40%)</u>					
Storm Event	Max Level (m)	Max Depth (m)	Max Infiltration (l/s)	Max Volume (m³)	Status
30 min Winter	77.955	0.155	3.6	9.9	0 K
60 min Winter	77.967	0.167	3.7	10.7	0 K
120 min Winter	77.955	0.155	3.6	9.9	0 K
180 min Winter	77.948	0.148	3.6	9.4	0 K
240 min Winter	77.946	0.146	3.5	9.2	0 K
360 min Winter	77.929	0.129	3.4	8.1	0 K
480 min Winter	77.890	0.090	3.1	5.5	0 K
600 min Winter	77.851	0.051	2.8	3.1	0 K
720 min Winter	77.843	0.043	2.4	2.5	0 K
960 min Winter	77.831	0.031	1.7	1.8	0 K
1440 min Winter	77.827	0.027	1.5	1.6	0 K
2160 min Winter	77.826	0.026	1.4	1.5	0 K
2880 min Winter	77.825	0.025	1.4	1.5	0 K
4320 min Winter	77.825	0.025	1.3	1.5	0 K
5760 min Winter	77.824	0.024	1.3	1.4	0 K
7200 min Winter	77.824	0.024	1.3	1.4	0 K
8640 min Winter	77.824	0.024	1.3	1.4	0 K
10080 min Winter	77.824	0.024	1.3	1.4	0 K
Storm Event	Rain (mm/hr)	Flooded Volume (m³)	Time-Peak (mins)		
30 min Winter	91.531	0.0	37		
60 min Winter	57.245	0.0	58		
120 min Winter	33.817	0.0	94		
180 min Winter	24.958	0.0	132		
240 min Winter	20.060	0.0	172		
360 min Winter	14.579	0.0	232		
480 min Winter	11.541	0.0	282		
600 min Winter	9.596	0.0	318		
720 min Winter	8.237	0.0	378		
960 min Winter	6.453	0.0	490		
1440 min Winter	4.555	0.0	196		
2160 min Winter	3.212	0.0	200		
2880 min Winter	2.516	0.0	200		
4320 min Winter	1.808	0.0	196		
5760 min Winter	1.444	0.0	200		
7200 min Winter	1.223	0.0	200		
8640 min Winter	1.075	0.0	200		
10080 min Winter	0.969	0.0	200		
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Dominion House Warrington		
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Innovyze		Source Control 2018.1.1

Additional Hydrograph #1

Time (mins)	Flow (l/s)	Time (mins)	Flow (l/s)	Time (mins)	Flow (l/s)	Time (mins)	Flow (l/s)	Time (mins)	Flow (l/s)	Time (mins)	Flow (l/s)
5	0.0	240	1.0	475	0.2	710	0.0	945	0.0	1180	0.0
10	0.0	245	1.0	480	0.2	715	0.0	950	0.0	1185	0.0
15	0.0	250	1.0	485	0.1	720	0.0	955	0.0	1190	0.0
20	0.0	255	0.9	490	0.1	725	0.0	960	0.0	1195	0.0
25	0.0	260	0.9	495	0.1	730	0.0	965	0.0	1200	0.0
30	0.0	265	0.9	500	0.1	735	0.0	970	0.0	1205	0.0
35	0.0	270	0.8	505	0.1	740	0.0	975	0.0	1210	0.0
40	0.1	275	0.8	510	0.1	745	0.0	980	0.0	1215	0.0
45	0.1	280	0.8	515	0.1	750	0.0	985	0.0	1220	0.0
50	0.2	285	0.8	520	0.1	755	0.0	990	0.0	1225	0.0
55	0.2	290	0.7	525	0.0	760	0.0	995	0.0	1230	0.0
60	0.2	295	0.7	530	0.0	765	0.0	1000	0.0	1235	0.0
65	0.3	300	0.7	535	0.0	770	0.0	1005	0.0	1240	0.0
70	0.3	305	0.6	540	0.0	775	0.0	1010	0.0	1245	0.0
75	0.4	310	0.6	545	0.0	780	0.0	1015	0.0	1250	0.0
80	0.4	315	0.6	550	0.0	785	0.0	1020	0.0	1255	0.0
85	0.5	320	0.6	555	0.0	790	0.0	1025	0.0	1260	0.0
90	0.5	325	0.6	560	0.0	795	0.0	1030	0.0	1265	0.0
95	0.6	330	0.5	565	0.0	800	0.0	1035	0.0	1270	0.0
100	0.6	335	0.5	570	0.0	805	0.0	1040	0.0	1275	0.0
105	0.7	340	0.5	575	0.0	810	0.0	1045	0.0	1280	0.0
110	0.7	345	0.5	580	0.0	815	0.0	1050	0.0	1285	0.0
115	0.8	350	0.5	585	0.0	820	0.0	1055	0.0	1290	0.0
120	0.8	355	0.5	590	0.0	825	0.0	1060	0.0	1295	0.0
125	0.9	360	0.5	595	0.0	830	0.0	1065	0.0	1300	0.0
130	0.9	365	0.5	600	0.0	835	0.0	1070	0.0	1305	0.0
135	1.0	370	0.4	605	0.0	840	0.0	1075	0.0	1310	0.0
140	1.0	375	0.4	610	0.0	845	0.0	1080	0.0	1315	0.0
145	1.1	380	0.4	615	0.0	850	0.0	1085	0.0	1320	0.0
150	1.1	385	0.4	620	0.0	855	0.0	1090	0.0	1325	0.0
155	1.2	390	0.4	625	0.0	860	0.0	1095	0.0	1330	0.0
160	1.2	395	0.4	630	0.0	865	0.0	1100	0.0	1335	0.0
165	1.3	400	0.4	635	0.0	870	0.0	1105	0.0	1340	0.0
170	1.3	405	0.3	640	0.0	875	0.0	1110	0.0	1345	0.0
175	1.3	410	0.3	645	0.0	880	0.0	1115	0.0	1350	0.0
180	1.3	415	0.3	650	0.0	885	0.0	1120	0.0	1355	0.0
185	1.3	420	0.3	655	0.0	890	0.0	1125	0.0	1360	0.0
190	1.3	425	0.3	660	0.0	895	0.0	1130	0.0	1365	0.0
195	1.3	430	0.3	665	0.0	900	0.0	1135	0.0	1370	0.0
200	1.3	435	0.3	670	0.0	905	0.0	1140	0.0	1375	0.0
205	1.2	440	0.3	675	0.0	910	0.0	1145	0.0	1380	0.0
210	1.2	445	0.2	680	0.0	915	0.0	1150	0.0	1385	0.0
215	1.2	450	0.2	685	0.0	920	0.0	1155	0.0	1390	0.0
220	1.1	455	0.2	690	0.0	925	0.0	1160	0.0	1395	0.0
225	1.1	460	0.2	695	0.0	930	0.0	1165	0.0	1400	0.0
230	1.1	465	0.2	700	0.0	935	0.0	1170	0.0	1405	0.0
235	1.1	470	0.2	705	0.0	940	0.0	1175	0.0	1410	0.0



Appendix F – RefH2 Calculations

F.1 Basin 1 catchment

UK Design Flood Estimation

Generated on Thursday, May 21, 2020 1:37:41 PM by hekelly
Printed from the ReFH2 Flood Modelling software package, version 3.0.7257.30020

Summary of estimate using the Flood Estimation Handbook revitalised flood hydrograph method (ReFH2)

Site details

Checksum: DE3E-756F

Site name: FEH_Point_Descriptors_471574_176843 (2)

Easting: 471574

Northing: 176843

Country: England, Wales or Northern Ireland

Catchment Area (km²): 0.02 [0.5]*

Using plot scale calculations: Yes

Model: ReFH2.3

Site description: None

Model run: 100 year 1.4 CC

Summary of results

Rainfall - FEH 2013 model (mm):	69.68	Total runoff (ML):	0.11
Total Rainfall (mm):	68.09	Total flow (ML):	0.37
Peak Rainfall (mm):	24.13	Peak flow (m ³ /s):	0.01

Parameters

Where the user has overridden a system-generated value, this original value is shown in square brackets after the value used.

** Indicates that the user locked the duration/timestep*

Rainfall parameters (Rainfall - FEH 2013 model)

Name	Value	User-defined?
Duration (hh:mm:ss)	02:15:00 [03:30:00]*	Yes
Timestep (hh:mm:ss)	00:15:00 [00:30:00]*	Yes
SCF (Seasonal correction factor)	0.98	No
ARF (Areal reduction factor)	0.99	No
Seasonality	Summer [Winter]	Yes
Climate change factor	1.40	Yes

Loss model parameters

Name	Value	User-defined?
Cini (mm)	37.19	No
Cmax (mm)	867.38	No
Use alpha correction factor	No	No
Alpha correction factor	n/a	No

Routing model parameters

Name	Value	User-defined?
Tp (hr)	2.34 [1]	Yes
Up	0.65	No
Uk	0.8	No

Baseflow model parameters

Name	Value	User-defined?
BF0 (m ³ /s)	0	No
BL (hr)	55.49 [43.52]	Yes
BR	2.91	No

Urbanisation parameters

Name	Value	User-defined?
Urban area (km ²)	0	No
Urbext 2000	0	No
Impervious runoff factor	0.7	No
Imperviousness factor	0.4	No
Tp scaling factor	0.75	No
Depression storage depth (mm)	0.5	No
Exporting drained area (km ²)	0.00	Yes
Sewer capacity (m ³ /s)	0.00	Yes

Time series data

Time (hh:mm:ss)	Rain (mm)	Sewer Loss (mm)	Net Rain (mm)	Runoff (m³/s)	Baseflow (m³/s)	Total Flow (m³/s)
00:00:00	2.0118	0.0000	0.0886	0.0000	9.14E-05	9.14E-05
00:15:00	3.2930	0.0000	0.1551	0.0000	9.1E-05	9.85E-05
00:30:00	5.6820	0.0000	0.2970	0.0000	9.09E-05	0.000126
00:45:00	10.9931	0.0000	0.6802	0.0001	9.14E-05	0.000193
01:00:00	24.1334	0.0000	1.9819	0.0003	9.33E-05	0.000344
01:15:00	10.9931	0.0000	1.1254	0.0006	9.86E-05	0.000722
01:30:00	5.6820	0.0000	0.6363	0.0013	0.00011	0.00137
01:45:00	3.2930	0.0000	0.3858	0.0020	0.000132	0.00217
02:00:00	2.0118	0.0000	0.2419	0.0029	0.000163	0.00308
02:15:00	0.0000	0.0000	0.0000	0.0038	0.000207	0.00404
02:30:00	0.0000	0.0000	0.0000	0.0048	0.000262	0.00504
02:45:00	0.0000	0.0000	0.0000	0.0057	0.00033	0.00602
03:00:00	0.0000	0.0000	0.0000	0.0066	0.000408	0.00696
03:15:00	0.0000	0.0000	0.0000	0.0073	0.000497	0.00781
03:30:00	0.0000	0.0000	0.0000	0.0078	0.000594	0.00842
03:45:00	0.0000	0.0000	0.0000	0.0079	0.000694	0.00858
04:00:00	0.0000	0.0000	0.0000	0.0077	0.000793	0.00844
04:15:00	0.0000	0.0000	0.0000	0.0073	0.000887	0.00814
04:30:00	0.0000	0.0000	0.0000	0.0068	0.000974	0.00773
04:45:00	0.0000	0.0000	0.0000	0.0062	0.00105	0.00727
05:00:00	0.0000	0.0000	0.0000	0.0057	0.00113	0.00679
05:15:00	0.0000	0.0000	0.0000	0.0051	0.00119	0.00632
05:30:00	0.0000	0.0000	0.0000	0.0046	0.00125	0.00585
05:45:00	0.0000	0.0000	0.0000	0.0041	0.0013	0.00541
06:00:00	0.0000	0.0000	0.0000	0.0037	0.00135	0.00506
06:15:00	0.0000	0.0000	0.0000	0.0034	0.00139	0.00477
06:30:00	0.0000	0.0000	0.0000	0.0031	0.00142	0.00452
06:45:00	0.0000	0.0000	0.0000	0.0028	0.00146	0.00429
07:00:00	0.0000	0.0000	0.0000	0.0026	0.00149	0.00407
07:15:00	0.0000	0.0000	0.0000	0.0023	0.00151	0.00385
07:30:00	0.0000	0.0000	0.0000	0.0021	0.00153	0.00363
07:45:00	0.0000	0.0000	0.0000	0.0018	0.00155	0.0034
08:00:00	0.0000	0.0000	0.0000	0.0016	0.00157	0.00317
08:15:00	0.0000	0.0000	0.0000	0.0014	0.00158	0.00294
08:30:00	0.0000	0.0000	0.0000	0.0011	0.00159	0.0027

Time (hh:mm:ss)	Rain (mm)	Sewer Loss (mm)	Net Rain (mm)	Runoff (m³/s)	Baseflow (m³/s)	Total Flow (m³/s)
08:45:00	0.0000	0.0000	0.0000	0.0009	0.0016	0.00247
09:00:00	0.0000	0.0000	0.0000	0.0006	0.0016	0.00223
09:15:00	0.0000	0.0000	0.0000	0.0004	0.0016	0.00201
09:30:00	0.0000	0.0000	0.0000	0.0002	0.00159	0.00182
09:45:00	0.0000	0.0000	0.0000	0.0001	0.00159	0.0017
10:00:00	0.0000	0.0000	0.0000	0.0000	0.00158	0.00163
10:15:00	0.0000	0.0000	0.0000	0.0000	0.00158	0.00159
10:30:00	0.0000	0.0000	0.0000	0.0000	0.00157	0.00157
10:45:00	0.0000	0.0000	0.0000	0.0000	0.00156	0.00156
11:00:00	0.0000	0.0000	0.0000	0.0000	0.00156	0.00156
11:15:00	0.0000	0.0000	0.0000	0.0000	0.00155	0.00155
11:30:00	0.0000	0.0000	0.0000	0.0000	0.00154	0.00154
11:45:00	0.0000	0.0000	0.0000	0.0000	0.00153	0.00153
12:00:00	0.0000	0.0000	0.0000	0.0000	0.00153	0.00153
12:15:00	0.0000	0.0000	0.0000	0.0000	0.00152	0.00152
12:30:00	0.0000	0.0000	0.0000	0.0000	0.00151	0.00151
12:45:00	0.0000	0.0000	0.0000	0.0000	0.00151	0.00151
13:00:00	0.0000	0.0000	0.0000	0.0000	0.0015	0.0015
13:15:00	0.0000	0.0000	0.0000	0.0000	0.00149	0.00149
13:30:00	0.0000	0.0000	0.0000	0.0000	0.00149	0.00149
13:45:00	0.0000	0.0000	0.0000	0.0000	0.00148	0.00148
14:00:00	0.0000	0.0000	0.0000	0.0000	0.00147	0.00147
14:15:00	0.0000	0.0000	0.0000	0.0000	0.00147	0.00147
14:30:00	0.0000	0.0000	0.0000	0.0000	0.00146	0.00146
14:45:00	0.0000	0.0000	0.0000	0.0000	0.00145	0.00145
15:00:00	0.0000	0.0000	0.0000	0.0000	0.00145	0.00145
15:15:00	0.0000	0.0000	0.0000	0.0000	0.00144	0.00144
15:30:00	0.0000	0.0000	0.0000	0.0000	0.00143	0.00143
15:45:00	0.0000	0.0000	0.0000	0.0000	0.00143	0.00143
16:00:00	0.0000	0.0000	0.0000	0.0000	0.00142	0.00142
16:15:00	0.0000	0.0000	0.0000	0.0000	0.00142	0.00142
16:30:00	0.0000	0.0000	0.0000	0.0000	0.00141	0.00141
16:45:00	0.0000	0.0000	0.0000	0.0000	0.0014	0.0014
17:00:00	0.0000	0.0000	0.0000	0.0000	0.0014	0.0014
17:15:00	0.0000	0.0000	0.0000	0.0000	0.00139	0.00139
17:30:00	0.0000	0.0000	0.0000	0.0000	0.00138	0.00138

Time (hh:mm:ss)	Rain (mm)	Sewer Loss (mm)	Net Rain (mm)	Runoff (m³/s)	Baseflow (m³/s)	Total Flow (m³/s)
17:45:00	0.0000	0.0000	0.0000	0.0000	0.00138	0.00138
18:00:00	0.0000	0.0000	0.0000	0.0000	0.00137	0.00137
18:15:00	0.0000	0.0000	0.0000	0.0000	0.00137	0.00137
18:30:00	0.0000	0.0000	0.0000	0.0000	0.00136	0.00136
18:45:00	0.0000	0.0000	0.0000	0.0000	0.00135	0.00135
19:00:00	0.0000	0.0000	0.0000	0.0000	0.00135	0.00135
19:15:00	0.0000	0.0000	0.0000	0.0000	0.00134	0.00134
19:30:00	0.0000	0.0000	0.0000	0.0000	0.00133	0.00133
19:45:00	0.0000	0.0000	0.0000	0.0000	0.00133	0.00133
20:00:00	0.0000	0.0000	0.0000	0.0000	0.00132	0.00132
20:15:00	0.0000	0.0000	0.0000	0.0000	0.00132	0.00132
20:30:00	0.0000	0.0000	0.0000	0.0000	0.00131	0.00131
20:45:00	0.0000	0.0000	0.0000	0.0000	0.00131	0.00131
21:00:00	0.0000	0.0000	0.0000	0.0000	0.0013	0.0013
21:15:00	0.0000	0.0000	0.0000	0.0000	0.00129	0.00129
21:30:00	0.0000	0.0000	0.0000	0.0000	0.00129	0.00129
21:45:00	0.0000	0.0000	0.0000	0.0000	0.00128	0.00128
22:00:00	0.0000	0.0000	0.0000	0.0000	0.00128	0.00128
22:15:00	0.0000	0.0000	0.0000	0.0000	0.00127	0.00127
22:30:00	0.0000	0.0000	0.0000	0.0000	0.00126	0.00126
22:45:00	0.0000	0.0000	0.0000	0.0000	0.00126	0.00126
23:00:00	0.0000	0.0000	0.0000	0.0000	0.00125	0.00125
23:15:00	0.0000	0.0000	0.0000	0.0000	0.00125	0.00125
23:30:00	0.0000	0.0000	0.0000	0.0000	0.00124	0.00124
23:45:00	0.0000	0.0000	0.0000	0.0000	0.00124	0.00124
24:00:00	0.0000	0.0000	0.0000	0.0000	0.00123	0.00123
24:15:00	0.0000	0.0000	0.0000	0.0000	0.00123	0.00123
24:30:00	0.0000	0.0000	0.0000	0.0000	0.00122	0.00122
24:45:00	0.0000	0.0000	0.0000	0.0000	0.00121	0.00121
25:00:00	0.0000	0.0000	0.0000	0.0000	0.00121	0.00121
25:15:00	0.0000	0.0000	0.0000	0.0000	0.0012	0.0012
25:30:00	0.0000	0.0000	0.0000	0.0000	0.0012	0.0012
25:45:00	0.0000	0.0000	0.0000	0.0000	0.00119	0.00119
26:00:00	0.0000	0.0000	0.0000	0.0000	0.00119	0.00119
26:15:00	0.0000	0.0000	0.0000	0.0000	0.00118	0.00118
26:30:00	0.0000	0.0000	0.0000	0.0000	0.00118	0.00118

Time (hh:mm:ss)	Rain (mm)	Sewer Loss (mm)	Net Rain (mm)	Runoff (m³/s)	Baseflow (m³/s)	Total Flow (m³/s)
26:45:00	0.0000	0.0000	0.0000	0.0000	0.00117	0.00117
27:00:00	0.0000	0.0000	0.0000	0.0000	0.00117	0.00117
27:15:00	0.0000	0.0000	0.0000	0.0000	0.00116	0.00116
27:30:00	0.0000	0.0000	0.0000	0.0000	0.00116	0.00116
27:45:00	0.0000	0.0000	0.0000	0.0000	0.00115	0.00115
28:00:00	0.0000	0.0000	0.0000	0.0000	0.00115	0.00115
28:15:00	0.0000	0.0000	0.0000	0.0000	0.00114	0.00114
28:30:00	0.0000	0.0000	0.0000	0.0000	0.00113	0.00113
28:45:00	0.0000	0.0000	0.0000	0.0000	0.00113	0.00113
29:00:00	0.0000	0.0000	0.0000	0.0000	0.00112	0.00112
29:15:00	0.0000	0.0000	0.0000	0.0000	0.00112	0.00112
29:30:00	0.0000	0.0000	0.0000	0.0000	0.00111	0.00111
29:45:00	0.0000	0.0000	0.0000	0.0000	0.00111	0.00111
30:00:00	0.0000	0.0000	0.0000	0.0000	0.0011	0.0011
30:15:00	0.0000	0.0000	0.0000	0.0000	0.0011	0.0011
30:30:00	0.0000	0.0000	0.0000	0.0000	0.00109	0.00109
30:45:00	0.0000	0.0000	0.0000	0.0000	0.00109	0.00109
31:00:00	0.0000	0.0000	0.0000	0.0000	0.00108	0.00108
31:15:00	0.0000	0.0000	0.0000	0.0000	0.00108	0.00108
31:30:00	0.0000	0.0000	0.0000	0.0000	0.00108	0.00108
31:45:00	0.0000	0.0000	0.0000	0.0000	0.00107	0.00107
32:00:00	0.0000	0.0000	0.0000	0.0000	0.00107	0.00107
32:15:00	0.0000	0.0000	0.0000	0.0000	0.00106	0.00106
32:30:00	0.0000	0.0000	0.0000	0.0000	0.00106	0.00106
32:45:00	0.0000	0.0000	0.0000	0.0000	0.00105	0.00105
33:00:00	0.0000	0.0000	0.0000	0.0000	0.00105	0.00105
33:15:00	0.0000	0.0000	0.0000	0.0000	0.00104	0.00104
33:30:00	0.0000	0.0000	0.0000	0.0000	0.00104	0.00104
33:45:00	0.0000	0.0000	0.0000	0.0000	0.00103	0.00103
34:00:00	0.0000	0.0000	0.0000	0.0000	0.00103	0.00103
34:15:00	0.0000	0.0000	0.0000	0.0000	0.00102	0.00102
34:30:00	0.0000	0.0000	0.0000	0.0000	0.00102	0.00102
34:45:00	0.0000	0.0000	0.0000	0.0000	0.00101	0.00101
35:00:00	0.0000	0.0000	0.0000	0.0000	0.00101	0.00101
35:15:00	0.0000	0.0000	0.0000	0.0000	0.001	0.001
35:30:00	0.0000	0.0000	0.0000	0.0000	0.001	0.001

Time (hh:mm:ss)	Rain (mm)	Sewer Loss (mm)	Net Rain (mm)	Runoff (m³/s)	Baseflow (m³/s)	Total Flow (m³/s)
35:45:00	0.0000	0.0000	0.0000	0.0000	0.000996	0.000996
36:00:00	0.0000	0.0000	0.0000	0.0000	0.000991	0.000991
36:15:00	0.0000	0.0000	0.0000	0.0000	0.000987	0.000987
36:30:00	0.0000	0.0000	0.0000	0.0000	0.000983	0.000983
36:45:00	0.0000	0.0000	0.0000	0.0000	0.000978	0.000978
37:00:00	0.0000	0.0000	0.0000	0.0000	0.000974	0.000974
37:15:00	0.0000	0.0000	0.0000	0.0000	0.000969	0.000969
37:30:00	0.0000	0.0000	0.0000	0.0000	0.000965	0.000965
37:45:00	0.0000	0.0000	0.0000	0.0000	0.000961	0.000961
38:00:00	0.0000	0.0000	0.0000	0.0000	0.000956	0.000956
38:15:00	0.0000	0.0000	0.0000	0.0000	0.000952	0.000952
38:30:00	0.0000	0.0000	0.0000	0.0000	0.000948	0.000948
38:45:00	0.0000	0.0000	0.0000	0.0000	0.000944	0.000944
39:00:00	0.0000	0.0000	0.0000	0.0000	0.000939	0.000939
39:15:00	0.0000	0.0000	0.0000	0.0000	0.000935	0.000935
39:30:00	0.0000	0.0000	0.0000	0.0000	0.000931	0.000931
39:45:00	0.0000	0.0000	0.0000	0.0000	0.000927	0.000927
40:00:00	0.0000	0.0000	0.0000	0.0000	0.000922	0.000922
40:15:00	0.0000	0.0000	0.0000	0.0000	0.000918	0.000918
40:30:00	0.0000	0.0000	0.0000	0.0000	0.000914	0.000914
40:45:00	0.0000	0.0000	0.0000	0.0000	0.00091	0.00091
41:00:00	0.0000	0.0000	0.0000	0.0000	0.000906	0.000906
41:15:00	0.0000	0.0000	0.0000	0.0000	0.000902	0.000902
41:30:00	0.0000	0.0000	0.0000	0.0000	0.000898	0.000898
41:45:00	0.0000	0.0000	0.0000	0.0000	0.000894	0.000894
42:00:00	0.0000	0.0000	0.0000	0.0000	0.00089	0.00089
42:15:00	0.0000	0.0000	0.0000	0.0000	0.000886	0.000886
42:30:00	0.0000	0.0000	0.0000	0.0000	0.000882	0.000882
42:45:00	0.0000	0.0000	0.0000	0.0000	0.000878	0.000878
43:00:00	0.0000	0.0000	0.0000	0.0000	0.000874	0.000874
43:15:00	0.0000	0.0000	0.0000	0.0000	0.00087	0.00087
43:30:00	0.0000	0.0000	0.0000	0.0000	0.000866	0.000866
43:45:00	0.0000	0.0000	0.0000	0.0000	0.000862	0.000862
44:00:00	0.0000	0.0000	0.0000	0.0000	0.000858	0.000858
44:15:00	0.0000	0.0000	0.0000	0.0000	0.000854	0.000854
44:30:00	0.0000	0.0000	0.0000	0.0000	0.000851	0.000851

Time (hh:mm:ss)	Rain (mm)	Sewer Loss (mm)	Net Rain (mm)	Runoff (m³/s)	Baseflow (m³/s)	Total Flow (m³/s)
44:45:00	0.0000	0.0000	0.0000	0.0000	0.000847	0.000847
45:00:00	0.0000	0.0000	0.0000	0.0000	0.000843	0.000843
45:15:00	0.0000	0.0000	0.0000	0.0000	0.000839	0.000839
45:30:00	0.0000	0.0000	0.0000	0.0000	0.000835	0.000835
45:45:00	0.0000	0.0000	0.0000	0.0000	0.000832	0.000832
46:00:00	0.0000	0.0000	0.0000	0.0000	0.000828	0.000828
46:15:00	0.0000	0.0000	0.0000	0.0000	0.000824	0.000824
46:30:00	0.0000	0.0000	0.0000	0.0000	0.000821	0.000821
46:45:00	0.0000	0.0000	0.0000	0.0000	0.000817	0.000817
47:00:00	0.0000	0.0000	0.0000	0.0000	0.000813	0.000813
47:15:00	0.0000	0.0000	0.0000	0.0000	0.000809	0.000809
47:30:00	0.0000	0.0000	0.0000	0.0000	0.000806	0.000806
47:45:00	0.0000	0.0000	0.0000	0.0000	0.000802	0.000802
48:00:00	0.0000	0.0000	0.0000	0.0000	0.000799	0.000799
48:15:00	0.0000	0.0000	0.0000	0.0000	0.000795	0.000795
48:30:00	0.0000	0.0000	0.0000	0.0000	0.000791	0.000791
48:45:00	0.0000	0.0000	0.0000	0.0000	0.000788	0.000788
49:00:00	0.0000	0.0000	0.0000	0.0000	0.000784	0.000784
49:15:00	0.0000	0.0000	0.0000	0.0000	0.000781	0.000781
49:30:00	0.0000	0.0000	0.0000	0.0000	0.000777	0.000777
49:45:00	0.0000	0.0000	0.0000	0.0000	0.000774	0.000774
50:00:00	0.0000	0.0000	0.0000	0.0000	0.00077	0.00077
50:15:00	0.0000	0.0000	0.0000	0.0000	0.000767	0.000767
50:30:00	0.0000	0.0000	0.0000	0.0000	0.000763	0.000763
50:45:00	0.0000	0.0000	0.0000	0.0000	0.00076	0.00076
51:00:00	0.0000	0.0000	0.0000	0.0000	0.000757	0.000757
51:15:00	0.0000	0.0000	0.0000	0.0000	0.000753	0.000753
51:30:00	0.0000	0.0000	0.0000	0.0000	0.00075	0.00075
51:45:00	0.0000	0.0000	0.0000	0.0000	0.000746	0.000746
52:00:00	0.0000	0.0000	0.0000	0.0000	0.000743	0.000743
52:15:00	0.0000	0.0000	0.0000	0.0000	0.00074	0.00074
52:30:00	0.0000	0.0000	0.0000	0.0000	0.000736	0.000736
52:45:00	0.0000	0.0000	0.0000	0.0000	0.000733	0.000733
53:00:00	0.0000	0.0000	0.0000	0.0000	0.00073	0.00073
53:15:00	0.0000	0.0000	0.0000	0.0000	0.000727	0.000727
53:30:00	0.0000	0.0000	0.0000	0.0000	0.000723	0.000723

Time (hh:mm:ss)	Rain (mm)	Sewer Loss (mm)	Net Rain (mm)	Runoff (m³/s)	Baseflow (m³/s)	Total Flow (m³/s)
53:45:00	0.0000	0.0000	0.0000	0.0000	0.00072	0.00072
54:00:00	0.0000	0.0000	0.0000	0.0000	0.000717	0.000717
54:15:00	0.0000	0.0000	0.0000	0.0000	0.000714	0.000714
54:30:00	0.0000	0.0000	0.0000	0.0000	0.00071	0.00071
54:45:00	0.0000	0.0000	0.0000	0.0000	0.000707	0.000707
55:00:00	0.0000	0.0000	0.0000	0.0000	0.000704	0.000704
55:15:00	0.0000	0.0000	0.0000	0.0000	0.000701	0.000701
55:30:00	0.0000	0.0000	0.0000	0.0000	0.000698	0.000698
55:45:00	0.0000	0.0000	0.0000	0.0000	0.000695	0.000695
56:00:00	0.0000	0.0000	0.0000	0.0000	0.000691	0.000691
56:15:00	0.0000	0.0000	0.0000	0.0000	0.000688	0.000688
56:30:00	0.0000	0.0000	0.0000	0.0000	0.000685	0.000685
56:45:00	0.0000	0.0000	0.0000	0.0000	0.000682	0.000682
57:00:00	0.0000	0.0000	0.0000	0.0000	0.000679	0.000679
57:15:00	0.0000	0.0000	0.0000	0.0000	0.000676	0.000676
57:30:00	0.0000	0.0000	0.0000	0.0000	0.000673	0.000673
57:45:00	0.0000	0.0000	0.0000	0.0000	0.00067	0.00067
58:00:00	0.0000	0.0000	0.0000	0.0000	0.000667	0.000667
58:15:00	0.0000	0.0000	0.0000	0.0000	0.000664	0.000664
58:30:00	0.0000	0.0000	0.0000	0.0000	0.000661	0.000661
58:45:00	0.0000	0.0000	0.0000	0.0000	0.000658	0.000658
59:00:00	0.0000	0.0000	0.0000	0.0000	0.000655	0.000655
59:15:00	0.0000	0.0000	0.0000	0.0000	0.000652	0.000652
59:30:00	0.0000	0.0000	0.0000	0.0000	0.000649	0.000649
59:45:00	0.0000	0.0000	0.0000	0.0000	0.000646	0.000646
60:00:00	0.0000	0.0000	0.0000	0.0000	0.000643	0.000643
60:15:00	0.0000	0.0000	0.0000	0.0000	0.00064	0.00064
60:30:00	0.0000	0.0000	0.0000	0.0000	0.000638	0.000638
60:45:00	0.0000	0.0000	0.0000	0.0000	0.000635	0.000635
61:00:00	0.0000	0.0000	0.0000	0.0000	0.000632	0.000632
61:15:00	0.0000	0.0000	0.0000	0.0000	0.000629	0.000629
61:30:00	0.0000	0.0000	0.0000	0.0000	0.000626	0.000626
61:45:00	0.0000	0.0000	0.0000	0.0000	0.000623	0.000623
62:00:00	0.0000	0.0000	0.0000	0.0000	0.000621	0.000621
62:15:00	0.0000	0.0000	0.0000	0.0000	0.000618	0.000618
62:30:00	0.0000	0.0000	0.0000	0.0000	0.000615	0.000615

Time (hh:mm:ss)	Rain (mm)	Sewer Loss (mm)	Net Rain (mm)	Runoff (m³/s)	Baseflow (m³/s)	Total Flow (m³/s)
62:45:00	0.0000	0.0000	0.0000	0.0000	0.000612	0.000612
63:00:00	0.0000	0.0000	0.0000	0.0000	0.000609	0.000609
63:15:00	0.0000	0.0000	0.0000	0.0000	0.000607	0.000607
63:30:00	0.0000	0.0000	0.0000	0.0000	0.000604	0.000604
63:45:00	0.0000	0.0000	0.0000	0.0000	0.000601	0.000601
64:00:00	0.0000	0.0000	0.0000	0.0000	0.000599	0.000599
64:15:00	0.0000	0.0000	0.0000	0.0000	0.000596	0.000596
64:30:00	0.0000	0.0000	0.0000	0.0000	0.000593	0.000593
64:45:00	0.0000	0.0000	0.0000	0.0000	0.000591	0.000591
65:00:00	0.0000	0.0000	0.0000	0.0000	0.000588	0.000588
65:15:00	0.0000	0.0000	0.0000	0.0000	0.000585	0.000585
65:30:00	0.0000	0.0000	0.0000	0.0000	0.000583	0.000583
65:45:00	0.0000	0.0000	0.0000	0.0000	0.00058	0.00058
66:00:00	0.0000	0.0000	0.0000	0.0000	0.000577	0.000577
66:15:00	0.0000	0.0000	0.0000	0.0000	0.000575	0.000575
66:30:00	0.0000	0.0000	0.0000	0.0000	0.000572	0.000572
66:45:00	0.0000	0.0000	0.0000	0.0000	0.00057	0.00057
67:00:00	0.0000	0.0000	0.0000	0.0000	0.000567	0.000567
67:15:00	0.0000	0.0000	0.0000	0.0000	0.000565	0.000565
67:30:00	0.0000	0.0000	0.0000	0.0000	0.000562	0.000562
67:45:00	0.0000	0.0000	0.0000	0.0000	0.000559	0.000559
68:00:00	0.0000	0.0000	0.0000	0.0000	0.000557	0.000557
68:15:00	0.0000	0.0000	0.0000	0.0000	0.000554	0.000554
68:30:00	0.0000	0.0000	0.0000	0.0000	0.000552	0.000552
68:45:00	0.0000	0.0000	0.0000	0.0000	0.000549	0.000549
69:00:00	0.0000	0.0000	0.0000	0.0000	0.000547	0.000547
69:15:00	0.0000	0.0000	0.0000	0.0000	0.000545	0.000545
69:30:00	0.0000	0.0000	0.0000	0.0000	0.000542	0.000542
69:45:00	0.0000	0.0000	0.0000	0.0000	0.00054	0.00054
70:00:00	0.0000	0.0000	0.0000	0.0000	0.000537	0.000537
70:15:00	0.0000	0.0000	0.0000	0.0000	0.000535	0.000535
70:30:00	0.0000	0.0000	0.0000	0.0000	0.000532	0.000532
70:45:00	0.0000	0.0000	0.0000	0.0000	0.00053	0.00053
71:00:00	0.0000	0.0000	0.0000	0.0000	0.000528	0.000528
71:15:00	0.0000	0.0000	0.0000	0.0000	0.000525	0.000525
71:30:00	0.0000	0.0000	0.0000	0.0000	0.000523	0.000523

Time (hh:mm:ss)	Rain (mm)	Sewer Loss (mm)	Net Rain (mm)	Runoff (m³/s)	Baseflow (m³/s)	Total Flow (m³/s)
71:45:00	0.0000	0.0000	0.0000	0.0000	0.000521	0.000521
72:00:00	0.0000	0.0000	0.0000	0.0000	0.000518	0.000518
72:15:00	0.0000	0.0000	0.0000	0.0000	0.000516	0.000516
72:30:00	0.0000	0.0000	0.0000	0.0000	0.000514	0.000514
72:45:00	0.0000	0.0000	0.0000	0.0000	0.000511	0.000511
73:00:00	0.0000	0.0000	0.0000	0.0000	0.000509	0.000509
73:15:00	0.0000	0.0000	0.0000	0.0000	0.000507	0.000507
73:30:00	0.0000	0.0000	0.0000	0.0000	0.000504	0.000504
73:45:00	0.0000	0.0000	0.0000	0.0000	0.000502	0.000502
74:00:00	0.0000	0.0000	0.0000	0.0000	0.0005	0.0005
74:15:00	0.0000	0.0000	0.0000	0.0000	0.000498	0.000498
74:30:00	0.0000	0.0000	0.0000	0.0000	0.000495	0.000495
74:45:00	0.0000	0.0000	0.0000	0.0000	0.000493	0.000493
75:00:00	0.0000	0.0000	0.0000	0.0000	0.000491	0.000491
75:15:00	0.0000	0.0000	0.0000	0.0000	0.000489	0.000489
75:30:00	0.0000	0.0000	0.0000	0.0000	0.000487	0.000487
75:45:00	0.0000	0.0000	0.0000	0.0000	0.000484	0.000484
76:00:00	0.0000	0.0000	0.0000	0.0000	0.000482	0.000482
76:15:00	0.0000	0.0000	0.0000	0.0000	0.00048	0.00048
76:30:00	0.0000	0.0000	0.0000	0.0000	0.000478	0.000478

Appendix

Catchment descriptors *

Name	Value	User-defined value used?
BFIHOST	0.75	No
BFIHOST19	0.78	No
PROPWET (mm)	0.29	No
SAAR (mm)	664	No

Values in square brackets are the original values loaded from the FEH Web Service or FEH CD-ROM

F.2Basin 2 catchment

UK Design Flood Estimation

Generated on Thursday, May 21, 2020 1:39:01 PM by hekelly
Printed from the ReFH2 Flood Modelling software package, version 3.0.7257.30020

Summary of estimate using the Flood Estimation Handbook revitalised flood hydrograph method (ReFH2)

Site details

Checksum: 07EA-1FEF

Site name: FEH_Point_Descriptors_471574_176843 (2)

Easting: 471574

Northing: 176843

Country: England, Wales or Northern Ireland

Catchment Area (km²): 0.02 [0.5]*

Using plot scale calculations: Yes

Model: ReFH2.3

Site description: None

Model run: 100 year 1.4 CC

Summary of results

Rainfall - FEH 2013 model (mm):	76.36	Total runoff (ML):	0.12
Total Rainfall (mm):	74.76	Total flow (ML):	0.44
Peak Rainfall (mm):	20.58	Peak flow (m ³ /s):	0.01

Parameters

Where the user has overridden a system-generated value, this original value is shown in square brackets after the value used.

* Indicates that the user locked the duration/timestep

Rainfall parameters (Rainfall - FEH 2013 model)

Name	Value	User-defined?
Duration (hh:mm:ss)	03:15:00 [03:30:00]*	Yes
Timestep (hh:mm:ss)	00:15:00 [00:30:00]*	Yes
SCF (Seasonal correction factor)	0.99	No
ARF (Areal reduction factor)	0.99	No
Seasonality	Summer [Winter]	Yes
Climate change factor	1.40	Yes

Loss model parameters

Name	Value	User-defined?
Cini (mm)	37.19	No
Cmax (mm)	867.38	No
Use alpha correction factor	No	No
Alpha correction factor	n/a	No

Routing model parameters

Name	Value	User-defined?
Tp (hr)	2.34 [1]	Yes
Up	0.65	No
Uk	0.8	No

Baseflow model parameters

Name	Value	User-defined?
BF0 (m ³ /s)	0	No
BL (hr)	55.49 [43.27]	Yes
BR	2.91	No

Urbanisation parameters

Name	Value	User-defined?
Urban area (km ²)	0	No
Urbext 2000	0	No
Impervious runoff factor	0.7	No
Imperviousness factor	0.4	No
Tp scaling factor	0.75	No
Depression storage depth (mm)	0.5	No
Exporting drained area (km ²)	0.00	Yes
Sewer capacity (m ³ /s)	0.00	Yes

Time series data

Time (hh:mm:ss)	Rain (mm)	Sewer Loss (mm)	Net Rain (mm)	Runoff (m³/s)	Baseflow (m³/s)	Total Flow (m³/s)
00:00:00	1.4144	0.0000	0.0618	0.0000	8.47E-05	8.47E-05
00:15:00	1.9718	0.0000	0.0900	0.0000	8.43E-05	8.91E-05
00:30:00	2.8020	0.0000	0.1356	0.0000	8.41E-05	0.000106
00:45:00	4.0928	0.0000	0.2143	0.0001	8.42E-05	0.00014
01:00:00	6.2524	0.0000	0.3647	0.0001	8.5E-05	0.000203
01:15:00	10.5554	0.0000	0.7179	0.0002	8.68E-05	0.000311
01:30:00	20.5779	0.0000	1.7690	0.0004	9.06E-05	0.000507
01:45:00	10.5554	0.0000	1.0968	0.0008	9.82E-05	0.0009
02:00:00	6.2524	0.0000	0.7103	0.0014	0.000112	0.00152
02:15:00	4.0928	0.0000	0.4893	0.0022	0.000135	0.0023
02:30:00	2.8020	0.0000	0.3462	0.0030	0.000168	0.00317
02:45:00	1.9718	0.0000	0.2490	0.0039	0.000213	0.00411
03:00:00	1.4144	0.0000	0.1814	0.0048	0.000269	0.00508
03:15:00	0.0000	0.0000	0.0000	0.0057	0.000336	0.00606
03:30:00	0.0000	0.0000	0.0000	0.0066	0.000415	0.007
03:45:00	0.0000	0.0000	0.0000	0.0073	0.000505	0.00785
04:00:00	0.0000	0.0000	0.0000	0.0079	0.000602	0.00847
04:15:00	0.0000	0.0000	0.0000	0.0080	0.000703	0.00871
04:30:00	0.0000	0.0000	0.0000	0.0079	0.000804	0.00869
04:45:00	0.0000	0.0000	0.0000	0.0076	0.000902	0.0085
05:00:00	0.0000	0.0000	0.0000	0.0072	0.000995	0.00819
05:15:00	0.0000	0.0000	0.0000	0.0067	0.00108	0.00779
05:30:00	0.0000	0.0000	0.0000	0.0062	0.00116	0.00734
05:45:00	0.0000	0.0000	0.0000	0.0056	0.00123	0.00685
06:00:00	0.0000	0.0000	0.0000	0.0051	0.0013	0.00637
06:15:00	0.0000	0.0000	0.0000	0.0046	0.00135	0.00591
06:30:00	0.0000	0.0000	0.0000	0.0041	0.0014	0.00553
06:45:00	0.0000	0.0000	0.0000	0.0037	0.00145	0.0052
07:00:00	0.0000	0.0000	0.0000	0.0034	0.00149	0.00491
07:15:00	0.0000	0.0000	0.0000	0.0031	0.00153	0.00464
07:30:00	0.0000	0.0000	0.0000	0.0028	0.00156	0.00438
07:45:00	0.0000	0.0000	0.0000	0.0026	0.00159	0.00414
08:00:00	0.0000	0.0000	0.0000	0.0023	0.00161	0.0039
08:15:00	0.0000	0.0000	0.0000	0.0020	0.00163	0.00366
08:30:00	0.0000	0.0000	0.0000	0.0018	0.00165	0.00342

Time (hh:mm:ss)	Rain (mm)	Sewer Loss (mm)	Net Rain (mm)	Runoff (m³/s)	Baseflow (m³/s)	Total Flow (m³/s)
08:45:00	0.0000	0.0000	0.0000	0.0015	0.00166	0.00317
09:00:00	0.0000	0.0000	0.0000	0.0013	0.00167	0.00293
09:15:00	0.0000	0.0000	0.0000	0.0010	0.00168	0.00268
09:30:00	0.0000	0.0000	0.0000	0.0008	0.00169	0.00245
09:45:00	0.0000	0.0000	0.0000	0.0005	0.00169	0.00222
10:00:00	0.0000	0.0000	0.0000	0.0003	0.00168	0.00202
10:15:00	0.0000	0.0000	0.0000	0.0002	0.00168	0.00188
10:30:00	0.0000	0.0000	0.0000	0.0001	0.00167	0.00179
10:45:00	0.0000	0.0000	0.0000	0.0001	0.00167	0.00173
11:00:00	0.0000	0.0000	0.0000	0.0000	0.00166	0.00169
11:15:00	0.0000	0.0000	0.0000	0.0000	0.00165	0.00166
11:30:00	0.0000	0.0000	0.0000	0.0000	0.00165	0.00165
11:45:00	0.0000	0.0000	0.0000	0.0000	0.00164	0.00164
12:00:00	0.0000	0.0000	0.0000	0.0000	0.00163	0.00163
12:15:00	0.0000	0.0000	0.0000	0.0000	0.00162	0.00162
12:30:00	0.0000	0.0000	0.0000	0.0000	0.00162	0.00162
12:45:00	0.0000	0.0000	0.0000	0.0000	0.00161	0.00161
13:00:00	0.0000	0.0000	0.0000	0.0000	0.0016	0.0016
13:15:00	0.0000	0.0000	0.0000	0.0000	0.0016	0.0016
13:30:00	0.0000	0.0000	0.0000	0.0000	0.00159	0.00159
13:45:00	0.0000	0.0000	0.0000	0.0000	0.00158	0.00158
14:00:00	0.0000	0.0000	0.0000	0.0000	0.00157	0.00157
14:15:00	0.0000	0.0000	0.0000	0.0000	0.00157	0.00157
14:30:00	0.0000	0.0000	0.0000	0.0000	0.00156	0.00156
14:45:00	0.0000	0.0000	0.0000	0.0000	0.00155	0.00155
15:00:00	0.0000	0.0000	0.0000	0.0000	0.00155	0.00155
15:15:00	0.0000	0.0000	0.0000	0.0000	0.00154	0.00154
15:30:00	0.0000	0.0000	0.0000	0.0000	0.00153	0.00153
15:45:00	0.0000	0.0000	0.0000	0.0000	0.00153	0.00153
16:00:00	0.0000	0.0000	0.0000	0.0000	0.00152	0.00152
16:15:00	0.0000	0.0000	0.0000	0.0000	0.00151	0.00151
16:30:00	0.0000	0.0000	0.0000	0.0000	0.00151	0.00151
16:45:00	0.0000	0.0000	0.0000	0.0000	0.0015	0.0015
17:00:00	0.0000	0.0000	0.0000	0.0000	0.00149	0.00149
17:15:00	0.0000	0.0000	0.0000	0.0000	0.00148	0.00148
17:30:00	0.0000	0.0000	0.0000	0.0000	0.00148	0.00148

Time (hh:mm:ss)	Rain (mm)	Sewer Loss (mm)	Net Rain (mm)	Runoff (m³/s)	Baseflow (m³/s)	Total Flow (m³/s)
17:45:00	0.0000	0.0000	0.0000	0.0000	0.00147	0.00147
18:00:00	0.0000	0.0000	0.0000	0.0000	0.00146	0.00146
18:15:00	0.0000	0.0000	0.0000	0.0000	0.00146	0.00146
18:30:00	0.0000	0.0000	0.0000	0.0000	0.00145	0.00145
18:45:00	0.0000	0.0000	0.0000	0.0000	0.00145	0.00145
19:00:00	0.0000	0.0000	0.0000	0.0000	0.00144	0.00144
19:15:00	0.0000	0.0000	0.0000	0.0000	0.00143	0.00143
19:30:00	0.0000	0.0000	0.0000	0.0000	0.00143	0.00143
19:45:00	0.0000	0.0000	0.0000	0.0000	0.00142	0.00142
20:00:00	0.0000	0.0000	0.0000	0.0000	0.00141	0.00141
20:15:00	0.0000	0.0000	0.0000	0.0000	0.00141	0.00141
20:30:00	0.0000	0.0000	0.0000	0.0000	0.0014	0.0014
20:45:00	0.0000	0.0000	0.0000	0.0000	0.00139	0.00139
21:00:00	0.0000	0.0000	0.0000	0.0000	0.00139	0.00139
21:15:00	0.0000	0.0000	0.0000	0.0000	0.00138	0.00138
21:30:00	0.0000	0.0000	0.0000	0.0000	0.00138	0.00138
21:45:00	0.0000	0.0000	0.0000	0.0000	0.00137	0.00137
22:00:00	0.0000	0.0000	0.0000	0.0000	0.00136	0.00136
22:15:00	0.0000	0.0000	0.0000	0.0000	0.00136	0.00136
22:30:00	0.0000	0.0000	0.0000	0.0000	0.00135	0.00135
22:45:00	0.0000	0.0000	0.0000	0.0000	0.00134	0.00134
23:00:00	0.0000	0.0000	0.0000	0.0000	0.00134	0.00134
23:15:00	0.0000	0.0000	0.0000	0.0000	0.00133	0.00133
23:30:00	0.0000	0.0000	0.0000	0.0000	0.00133	0.00133
23:45:00	0.0000	0.0000	0.0000	0.0000	0.00132	0.00132
24:00:00	0.0000	0.0000	0.0000	0.0000	0.00131	0.00131
24:15:00	0.0000	0.0000	0.0000	0.0000	0.00131	0.00131
24:30:00	0.0000	0.0000	0.0000	0.0000	0.0013	0.0013
24:45:00	0.0000	0.0000	0.0000	0.0000	0.0013	0.0013
25:00:00	0.0000	0.0000	0.0000	0.0000	0.00129	0.00129
25:15:00	0.0000	0.0000	0.0000	0.0000	0.00129	0.00129
25:30:00	0.0000	0.0000	0.0000	0.0000	0.00128	0.00128
25:45:00	0.0000	0.0000	0.0000	0.0000	0.00127	0.00127
26:00:00	0.0000	0.0000	0.0000	0.0000	0.00127	0.00127
26:15:00	0.0000	0.0000	0.0000	0.0000	0.00126	0.00126
26:30:00	0.0000	0.0000	0.0000	0.0000	0.00126	0.00126

Time (hh:mm:ss)	Rain (mm)	Sewer Loss (mm)	Net Rain (mm)	Runoff (m³/s)	Baseflow (m³/s)	Total Flow (m³/s)
26:45:00	0.0000	0.0000	0.0000	0.0000	0.00125	0.00125
27:00:00	0.0000	0.0000	0.0000	0.0000	0.00125	0.00125
27:15:00	0.0000	0.0000	0.0000	0.0000	0.00124	0.00124
27:30:00	0.0000	0.0000	0.0000	0.0000	0.00123	0.00123
27:45:00	0.0000	0.0000	0.0000	0.0000	0.00123	0.00123
28:00:00	0.0000	0.0000	0.0000	0.0000	0.00122	0.00122
28:15:00	0.0000	0.0000	0.0000	0.0000	0.00122	0.00122
28:30:00	0.0000	0.0000	0.0000	0.0000	0.00121	0.00121
28:45:00	0.0000	0.0000	0.0000	0.0000	0.00121	0.00121
29:00:00	0.0000	0.0000	0.0000	0.0000	0.0012	0.0012
29:15:00	0.0000	0.0000	0.0000	0.0000	0.0012	0.0012
29:30:00	0.0000	0.0000	0.0000	0.0000	0.00119	0.00119
29:45:00	0.0000	0.0000	0.0000	0.0000	0.00119	0.00119
30:00:00	0.0000	0.0000	0.0000	0.0000	0.00118	0.00118
30:15:00	0.0000	0.0000	0.0000	0.0000	0.00117	0.00117
30:30:00	0.0000	0.0000	0.0000	0.0000	0.00117	0.00117
30:45:00	0.0000	0.0000	0.0000	0.0000	0.00116	0.00116
31:00:00	0.0000	0.0000	0.0000	0.0000	0.00116	0.00116
31:15:00	0.0000	0.0000	0.0000	0.0000	0.00115	0.00115
31:30:00	0.0000	0.0000	0.0000	0.0000	0.00115	0.00115
31:45:00	0.0000	0.0000	0.0000	0.0000	0.00114	0.00114
32:00:00	0.0000	0.0000	0.0000	0.0000	0.00114	0.00114
32:15:00	0.0000	0.0000	0.0000	0.0000	0.00113	0.00113
32:30:00	0.0000	0.0000	0.0000	0.0000	0.00113	0.00113
32:45:00	0.0000	0.0000	0.0000	0.0000	0.00112	0.00112
33:00:00	0.0000	0.0000	0.0000	0.0000	0.00112	0.00112
33:15:00	0.0000	0.0000	0.0000	0.0000	0.00111	0.00111
33:30:00	0.0000	0.0000	0.0000	0.0000	0.00111	0.00111
33:45:00	0.0000	0.0000	0.0000	0.0000	0.0011	0.0011
34:00:00	0.0000	0.0000	0.0000	0.0000	0.0011	0.0011
34:15:00	0.0000	0.0000	0.0000	0.0000	0.00109	0.00109
34:30:00	0.0000	0.0000	0.0000	0.0000	0.00109	0.00109
34:45:00	0.0000	0.0000	0.0000	0.0000	0.00108	0.00108
35:00:00	0.0000	0.0000	0.0000	0.0000	0.00108	0.00108
35:15:00	0.0000	0.0000	0.0000	0.0000	0.00107	0.00107
35:30:00	0.0000	0.0000	0.0000	0.0000	0.00107	0.00107

Time (hh:mm:ss)	Rain (mm)	Sewer Loss (mm)	Net Rain (mm)	Runoff (m³/s)	Baseflow (m³/s)	Total Flow (m³/s)
35:45:00	0.0000	0.0000	0.0000	0.0000	0.00106	0.00106
36:00:00	0.0000	0.0000	0.0000	0.0000	0.00106	0.00106
36:15:00	0.0000	0.0000	0.0000	0.0000	0.00105	0.00105
36:30:00	0.0000	0.0000	0.0000	0.0000	0.00105	0.00105
36:45:00	0.0000	0.0000	0.0000	0.0000	0.00104	0.00104
37:00:00	0.0000	0.0000	0.0000	0.0000	0.00104	0.00104
37:15:00	0.0000	0.0000	0.0000	0.0000	0.00104	0.00104
37:30:00	0.0000	0.0000	0.0000	0.0000	0.00103	0.00103
37:45:00	0.0000	0.0000	0.0000	0.0000	0.00103	0.00103
38:00:00	0.0000	0.0000	0.0000	0.0000	0.00102	0.00102
38:15:00	0.0000	0.0000	0.0000	0.0000	0.00102	0.00102
38:30:00	0.0000	0.0000	0.0000	0.0000	0.00101	0.00101
38:45:00	0.0000	0.0000	0.0000	0.0000	0.00101	0.00101
39:00:00	0.0000	0.0000	0.0000	0.0000	0.001	0.001
39:15:00	0.0000	0.0000	0.0000	0.0000	0.000999	0.000999
39:30:00	0.0000	0.0000	0.0000	0.0000	0.000994	0.000994
39:45:00	0.0000	0.0000	0.0000	0.0000	0.00099	0.00099
40:00:00	0.0000	0.0000	0.0000	0.0000	0.000985	0.000985
40:15:00	0.0000	0.0000	0.0000	0.0000	0.000981	0.000981
40:30:00	0.0000	0.0000	0.0000	0.0000	0.000977	0.000977
40:45:00	0.0000	0.0000	0.0000	0.0000	0.000972	0.000972
41:00:00	0.0000	0.0000	0.0000	0.0000	0.000968	0.000968
41:15:00	0.0000	0.0000	0.0000	0.0000	0.000964	0.000964
41:30:00	0.0000	0.0000	0.0000	0.0000	0.000959	0.000959
41:45:00	0.0000	0.0000	0.0000	0.0000	0.000955	0.000955
42:00:00	0.0000	0.0000	0.0000	0.0000	0.000951	0.000951
42:15:00	0.0000	0.0000	0.0000	0.0000	0.000946	0.000946
42:30:00	0.0000	0.0000	0.0000	0.0000	0.000942	0.000942
42:45:00	0.0000	0.0000	0.0000	0.0000	0.000938	0.000938
43:00:00	0.0000	0.0000	0.0000	0.0000	0.000934	0.000934
43:15:00	0.0000	0.0000	0.0000	0.0000	0.000929	0.000929
43:30:00	0.0000	0.0000	0.0000	0.0000	0.000925	0.000925
43:45:00	0.0000	0.0000	0.0000	0.0000	0.000921	0.000921
44:00:00	0.0000	0.0000	0.0000	0.0000	0.000917	0.000917
44:15:00	0.0000	0.0000	0.0000	0.0000	0.000913	0.000913
44:30:00	0.0000	0.0000	0.0000	0.0000	0.000909	0.000909

Time (hh:mm:ss)	Rain (mm)	Sewer Loss (mm)	Net Rain (mm)	Runoff (m³/s)	Baseflow (m³/s)	Total Flow (m³/s)
44:45:00	0.0000	0.0000	0.0000	0.0000	0.000905	0.000905
45:00:00	0.0000	0.0000	0.0000	0.0000	0.000901	0.000901
45:15:00	0.0000	0.0000	0.0000	0.0000	0.000897	0.000897
45:30:00	0.0000	0.0000	0.0000	0.0000	0.000892	0.000892
45:45:00	0.0000	0.0000	0.0000	0.0000	0.000888	0.000888
46:00:00	0.0000	0.0000	0.0000	0.0000	0.000884	0.000884
46:15:00	0.0000	0.0000	0.0000	0.0000	0.00088	0.00088
46:30:00	0.0000	0.0000	0.0000	0.0000	0.000877	0.000877
46:45:00	0.0000	0.0000	0.0000	0.0000	0.000873	0.000873
47:00:00	0.0000	0.0000	0.0000	0.0000	0.000869	0.000869
47:15:00	0.0000	0.0000	0.0000	0.0000	0.000865	0.000865
47:30:00	0.0000	0.0000	0.0000	0.0000	0.000861	0.000861
47:45:00	0.0000	0.0000	0.0000	0.0000	0.000857	0.000857
48:00:00	0.0000	0.0000	0.0000	0.0000	0.000853	0.000853
48:15:00	0.0000	0.0000	0.0000	0.0000	0.000849	0.000849
48:30:00	0.0000	0.0000	0.0000	0.0000	0.000846	0.000846
48:45:00	0.0000	0.0000	0.0000	0.0000	0.000842	0.000842
49:00:00	0.0000	0.0000	0.0000	0.0000	0.000838	0.000838
49:15:00	0.0000	0.0000	0.0000	0.0000	0.000834	0.000834
49:30:00	0.0000	0.0000	0.0000	0.0000	0.00083	0.00083
49:45:00	0.0000	0.0000	0.0000	0.0000	0.000827	0.000827
50:00:00	0.0000	0.0000	0.0000	0.0000	0.000823	0.000823
50:15:00	0.0000	0.0000	0.0000	0.0000	0.000819	0.000819
50:30:00	0.0000	0.0000	0.0000	0.0000	0.000816	0.000816
50:45:00	0.0000	0.0000	0.0000	0.0000	0.000812	0.000812
51:00:00	0.0000	0.0000	0.0000	0.0000	0.000808	0.000808
51:15:00	0.0000	0.0000	0.0000	0.0000	0.000805	0.000805
51:30:00	0.0000	0.0000	0.0000	0.0000	0.000801	0.000801
51:45:00	0.0000	0.0000	0.0000	0.0000	0.000797	0.000797
52:00:00	0.0000	0.0000	0.0000	0.0000	0.000794	0.000794
52:15:00	0.0000	0.0000	0.0000	0.0000	0.00079	0.00079
52:30:00	0.0000	0.0000	0.0000	0.0000	0.000787	0.000787
52:45:00	0.0000	0.0000	0.0000	0.0000	0.000783	0.000783
53:00:00	0.0000	0.0000	0.0000	0.0000	0.00078	0.00078
53:15:00	0.0000	0.0000	0.0000	0.0000	0.000776	0.000776
53:30:00	0.0000	0.0000	0.0000	0.0000	0.000773	0.000773

Time (hh:mm:ss)	Rain (mm)	Sewer Loss (mm)	Net Rain (mm)	Runoff (m³/s)	Baseflow (m³/s)	Total Flow (m³/s)
53:45:00	0.0000	0.0000	0.0000	0.0000	0.000769	0.000769
54:00:00	0.0000	0.0000	0.0000	0.0000	0.000766	0.000766
54:15:00	0.0000	0.0000	0.0000	0.0000	0.000762	0.000762
54:30:00	0.0000	0.0000	0.0000	0.0000	0.000759	0.000759
54:45:00	0.0000	0.0000	0.0000	0.0000	0.000755	0.000755
55:00:00	0.0000	0.0000	0.0000	0.0000	0.000752	0.000752
55:15:00	0.0000	0.0000	0.0000	0.0000	0.000749	0.000749
55:30:00	0.0000	0.0000	0.0000	0.0000	0.000745	0.000745
55:45:00	0.0000	0.0000	0.0000	0.0000	0.000742	0.000742
56:00:00	0.0000	0.0000	0.0000	0.0000	0.000739	0.000739
56:15:00	0.0000	0.0000	0.0000	0.0000	0.000735	0.000735
56:30:00	0.0000	0.0000	0.0000	0.0000	0.000732	0.000732
56:45:00	0.0000	0.0000	0.0000	0.0000	0.000729	0.000729
57:00:00	0.0000	0.0000	0.0000	0.0000	0.000725	0.000725
57:15:00	0.0000	0.0000	0.0000	0.0000	0.000722	0.000722
57:30:00	0.0000	0.0000	0.0000	0.0000	0.000719	0.000719
57:45:00	0.0000	0.0000	0.0000	0.0000	0.000716	0.000716
58:00:00	0.0000	0.0000	0.0000	0.0000	0.000712	0.000712
58:15:00	0.0000	0.0000	0.0000	0.0000	0.000709	0.000709
58:30:00	0.0000	0.0000	0.0000	0.0000	0.000706	0.000706
58:45:00	0.0000	0.0000	0.0000	0.0000	0.000703	0.000703
59:00:00	0.0000	0.0000	0.0000	0.0000	0.0007	0.0007
59:15:00	0.0000	0.0000	0.0000	0.0000	0.000697	0.000697
59:30:00	0.0000	0.0000	0.0000	0.0000	0.000693	0.000693
59:45:00	0.0000	0.0000	0.0000	0.0000	0.00069	0.00069
60:00:00	0.0000	0.0000	0.0000	0.0000	0.000687	0.000687
60:15:00	0.0000	0.0000	0.0000	0.0000	0.000684	0.000684
60:30:00	0.0000	0.0000	0.0000	0.0000	0.000681	0.000681
60:45:00	0.0000	0.0000	0.0000	0.0000	0.000678	0.000678
61:00:00	0.0000	0.0000	0.0000	0.0000	0.000675	0.000675
61:15:00	0.0000	0.0000	0.0000	0.0000	0.000672	0.000672
61:30:00	0.0000	0.0000	0.0000	0.0000	0.000669	0.000669
61:45:00	0.0000	0.0000	0.0000	0.0000	0.000666	0.000666
62:00:00	0.0000	0.0000	0.0000	0.0000	0.000663	0.000663
62:15:00	0.0000	0.0000	0.0000	0.0000	0.00066	0.00066
62:30:00	0.0000	0.0000	0.0000	0.0000	0.000657	0.000657

Time (hh:mm:ss)	Rain (mm)	Sewer Loss (mm)	Net Rain (mm)	Runoff (m³/s)	Baseflow (m³/s)	Total Flow (m³/s)
62:45:00	0.0000	0.0000	0.0000	0.0000	0.000654	0.000654
63:00:00	0.0000	0.0000	0.0000	0.0000	0.000651	0.000651
63:15:00	0.0000	0.0000	0.0000	0.0000	0.000648	0.000648
63:30:00	0.0000	0.0000	0.0000	0.0000	0.000645	0.000645
63:45:00	0.0000	0.0000	0.0000	0.0000	0.000642	0.000642
64:00:00	0.0000	0.0000	0.0000	0.0000	0.000639	0.000639
64:15:00	0.0000	0.0000	0.0000	0.0000	0.000637	0.000637
64:30:00	0.0000	0.0000	0.0000	0.0000	0.000634	0.000634
64:45:00	0.0000	0.0000	0.0000	0.0000	0.000631	0.000631
65:00:00	0.0000	0.0000	0.0000	0.0000	0.000628	0.000628
65:15:00	0.0000	0.0000	0.0000	0.0000	0.000625	0.000625
65:30:00	0.0000	0.0000	0.0000	0.0000	0.000622	0.000622
65:45:00	0.0000	0.0000	0.0000	0.0000	0.00062	0.00062
66:00:00	0.0000	0.0000	0.0000	0.0000	0.000617	0.000617
66:15:00	0.0000	0.0000	0.0000	0.0000	0.000614	0.000614
66:30:00	0.0000	0.0000	0.0000	0.0000	0.000611	0.000611
66:45:00	0.0000	0.0000	0.0000	0.0000	0.000609	0.000609
67:00:00	0.0000	0.0000	0.0000	0.0000	0.000606	0.000606
67:15:00	0.0000	0.0000	0.0000	0.0000	0.000603	0.000603
67:30:00	0.0000	0.0000	0.0000	0.0000	0.0006	0.0006
67:45:00	0.0000	0.0000	0.0000	0.0000	0.000598	0.000598
68:00:00	0.0000	0.0000	0.0000	0.0000	0.000595	0.000595
68:15:00	0.0000	0.0000	0.0000	0.0000	0.000592	0.000592
68:30:00	0.0000	0.0000	0.0000	0.0000	0.00059	0.00059
68:45:00	0.0000	0.0000	0.0000	0.0000	0.000587	0.000587
69:00:00	0.0000	0.0000	0.0000	0.0000	0.000584	0.000584
69:15:00	0.0000	0.0000	0.0000	0.0000	0.000582	0.000582
69:30:00	0.0000	0.0000	0.0000	0.0000	0.000579	0.000579
69:45:00	0.0000	0.0000	0.0000	0.0000	0.000576	0.000576
70:00:00	0.0000	0.0000	0.0000	0.0000	0.000574	0.000574
70:15:00	0.0000	0.0000	0.0000	0.0000	0.000571	0.000571
70:30:00	0.0000	0.0000	0.0000	0.0000	0.000569	0.000569
70:45:00	0.0000	0.0000	0.0000	0.0000	0.000566	0.000566
71:00:00	0.0000	0.0000	0.0000	0.0000	0.000564	0.000564
71:15:00	0.0000	0.0000	0.0000	0.0000	0.000561	0.000561
71:30:00	0.0000	0.0000	0.0000	0.0000	0.000559	0.000559

Time (hh:mm:ss)	Rain (mm)	Sewer Loss (mm)	Net Rain (mm)	Runoff (m³/s)	Baseflow (m³/s)	Total Flow (m³/s)
71:45:00	0.0000	0.0000	0.0000	0.0000	0.000556	0.000556
72:00:00	0.0000	0.0000	0.0000	0.0000	0.000554	0.000554
72:15:00	0.0000	0.0000	0.0000	0.0000	0.000551	0.000551
72:30:00	0.0000	0.0000	0.0000	0.0000	0.000549	0.000549
72:45:00	0.0000	0.0000	0.0000	0.0000	0.000546	0.000546
73:00:00	0.0000	0.0000	0.0000	0.0000	0.000544	0.000544
73:15:00	0.0000	0.0000	0.0000	0.0000	0.000541	0.000541
73:30:00	0.0000	0.0000	0.0000	0.0000	0.000539	0.000539
73:45:00	0.0000	0.0000	0.0000	0.0000	0.000536	0.000536
74:00:00	0.0000	0.0000	0.0000	0.0000	0.000534	0.000534
74:15:00	0.0000	0.0000	0.0000	0.0000	0.000532	0.000532
74:30:00	0.0000	0.0000	0.0000	0.0000	0.000529	0.000529
74:45:00	0.0000	0.0000	0.0000	0.0000	0.000527	0.000527
75:00:00	0.0000	0.0000	0.0000	0.0000	0.000524	0.000524
75:15:00	0.0000	0.0000	0.0000	0.0000	0.000522	0.000522
75:30:00	0.0000	0.0000	0.0000	0.0000	0.00052	0.00052
75:45:00	0.0000	0.0000	0.0000	0.0000	0.000517	0.000517
76:00:00	0.0000	0.0000	0.0000	0.0000	0.000515	0.000515
76:15:00	0.0000	0.0000	0.0000	0.0000	0.000513	0.000513
76:30:00	0.0000	0.0000	0.0000	0.0000	0.00051	0.00051
76:45:00	0.0000	0.0000	0.0000	0.0000	0.000508	0.000508
77:00:00	0.0000	0.0000	0.0000	0.0000	0.000506	0.000506
77:15:00	0.0000	0.0000	0.0000	0.0000	0.000504	0.000504
77:30:00	0.0000	0.0000	0.0000	0.0000	0.000501	0.000501
77:45:00	0.0000	0.0000	0.0000	0.0000	0.000499	0.000499
78:00:00	0.0000	0.0000	0.0000	0.0000	0.000497	0.000497
78:15:00	0.0000	0.0000	0.0000	0.0000	0.000495	0.000495
78:30:00	0.0000	0.0000	0.0000	0.0000	0.000492	0.000492
78:45:00	0.0000	0.0000	0.0000	0.0000	0.00049	0.00049
79:00:00	0.0000	0.0000	0.0000	0.0000	0.000488	0.000488
79:15:00	0.0000	0.0000	0.0000	0.0000	0.000486	0.000486
79:30:00	0.0000	0.0000	0.0000	0.0000	0.000484	0.000484
79:45:00	0.0000	0.0000	0.0000	0.0000	0.000481	0.000481
80:00:00	0.0000	0.0000	0.0000	0.0000	0.000479	0.000479
80:15:00	0.0000	0.0000	0.0000	0.0000	0.000477	0.000477
80:30:00	0.0000	0.0000	0.0000	0.0000	0.000475	0.000475

Time (hh:mm:ss)	Rain (mm)	Sewer Loss (mm)	Net Rain (mm)	Runoff (m³/s)	Baseflow (m³/s)	Total Flow (m³/s)
80:45:00	0.0000	0.0000	0.0000	0.0000	0.000473	0.000473
81:00:00	0.0000	0.0000	0.0000	0.0000	0.000471	0.000471
81:15:00	0.0000	0.0000	0.0000	0.0000	0.000469	0.000469
81:30:00	0.0000	0.0000	0.0000	0.0000	0.000466	0.000466
81:45:00	0.0000	0.0000	0.0000	0.0000	0.000464	0.000464
82:00:00	0.0000	0.0000	0.0000	0.0000	0.000462	0.000462
82:15:00	0.0000	0.0000	0.0000	0.0000	0.00046	0.00046
82:30:00	0.0000	0.0000	0.0000	0.0000	0.000458	0.000458
82:45:00	0.0000	0.0000	0.0000	0.0000	0.000456	0.000456
83:00:00	0.0000	0.0000	0.0000	0.0000	0.000454	0.000454
83:15:00	0.0000	0.0000	0.0000	0.0000	0.000452	0.000452
83:30:00	0.0000	0.0000	0.0000	0.0000	0.00045	0.00045
83:45:00	0.0000	0.0000	0.0000	0.0000	0.000448	0.000448
84:00:00	0.0000	0.0000	0.0000	0.0000	0.000446	0.000446
84:15:00	0.0000	0.0000	0.0000	0.0000	0.000444	0.000444
84:30:00	0.0000	0.0000	0.0000	0.0000	0.000442	0.000442
84:45:00	0.0000	0.0000	0.0000	0.0000	0.00044	0.00044
85:00:00	0.0000	0.0000	0.0000	0.0000	0.000438	0.000438
85:15:00	0.0000	0.0000	0.0000	0.0000	0.000436	0.000436
85:30:00	0.0000	0.0000	0.0000	0.0000	0.000434	0.000434
85:45:00	0.0000	0.0000	0.0000	0.0000	0.000432	0.000432
86:00:00	0.0000	0.0000	0.0000	0.0000	0.00043	0.00043
86:15:00	0.0000	0.0000	0.0000	0.0000	0.000428	0.000428
86:30:00	0.0000	0.0000	0.0000	0.0000	0.000426	0.000426
86:45:00	0.0000	0.0000	0.0000	0.0000	0.000424	0.000424
87:00:00	0.0000	0.0000	0.0000	0.0000	0.000422	0.000422
87:15:00	0.0000	0.0000	0.0000	0.0000	0.000421	0.000421
87:30:00	0.0000	0.0000	0.0000	0.0000	0.000419	0.000419
87:45:00	0.0000	0.0000	0.0000	0.0000	0.000417	0.000417
88:00:00	0.0000	0.0000	0.0000	0.0000	0.000415	0.000415
88:15:00	0.0000	0.0000	0.0000	0.0000	0.000413	0.000413
88:30:00	0.0000	0.0000	0.0000	0.0000	0.000411	0.000411
88:45:00	0.0000	0.0000	0.0000	0.0000	0.000409	0.000409
89:00:00	0.0000	0.0000	0.0000	0.0000	0.000408	0.000408
89:15:00	0.0000	0.0000	0.0000	0.0000	0.000406	0.000406
89:30:00	0.0000	0.0000	0.0000	0.0000	0.000404	0.000404

Time (hh:mm:ss)	Rain (mm)	Sewer Loss (mm)	Net Rain (mm)	Runoff (m³/s)	Baseflow (m³/s)	Total Flow (m³/s)
89:45:00	0.0000	0.0000	0.0000	0.0000	0.000402	0.000402
90:00:00	0.0000	0.0000	0.0000	0.0000	0.0004	0.0004
90:15:00	0.0000	0.0000	0.0000	0.0000	0.000398	0.000398
90:30:00	0.0000	0.0000	0.0000	0.0000	0.000397	0.000397
90:45:00	0.0000	0.0000	0.0000	0.0000	0.000395	0.000395
91:00:00	0.0000	0.0000	0.0000	0.0000	0.000393	0.000393
91:15:00	0.0000	0.0000	0.0000	0.0000	0.000391	0.000391
91:30:00	0.0000	0.0000	0.0000	0.0000	0.00039	0.00039
91:45:00	0.0000	0.0000	0.0000	0.0000	0.000388	0.000388
92:00:00	0.0000	0.0000	0.0000	0.0000	0.000386	0.000386
92:15:00	0.0000	0.0000	0.0000	0.0000	0.000384	0.000384
92:30:00	0.0000	0.0000	0.0000	0.0000	0.000383	0.000383
92:45:00	0.0000	0.0000	0.0000	0.0000	0.000381	0.000381
93:00:00	0.0000	0.0000	0.0000	0.0000	0.000379	0.000379
93:15:00	0.0000	0.0000	0.0000	0.0000	0.000377	0.000377
93:30:00	0.0000	0.0000	0.0000	0.0000	0.000376	0.000376
93:45:00	0.0000	0.0000	0.0000	0.0000	0.000374	0.000374
94:00:00	0.0000	0.0000	0.0000	0.0000	0.000372	0.000372
94:15:00	0.0000	0.0000	0.0000	0.0000	0.000371	0.000371
94:30:00	0.0000	0.0000	0.0000	0.0000	0.000369	0.000369
94:45:00	0.0000	0.0000	0.0000	0.0000	0.000367	0.000367
95:00:00	0.0000	0.0000	0.0000	0.0000	0.000366	0.000366
95:15:00	0.0000	0.0000	0.0000	0.0000	0.000364	0.000364
95:30:00	0.0000	0.0000	0.0000	0.0000	0.000362	0.000362
95:45:00	0.0000	0.0000	0.0000	0.0000	0.000361	0.000361
96:00:00	0.0000	0.0000	0.0000	0.0000	0.000359	0.000359
96:15:00	0.0000	0.0000	0.0000	0.0000	0.000358	0.000358
96:30:00	0.0000	0.0000	0.0000	0.0000	0.000356	0.000356
96:45:00	0.0000	0.0000	0.0000	0.0000	0.000354	0.000354
97:00:00	0.0000	0.0000	0.0000	0.0000	0.000353	0.000353
97:15:00	0.0000	0.0000	0.0000	0.0000	0.000351	0.000351
97:30:00	0.0000	0.0000	0.0000	0.0000	0.00035	0.00035
97:45:00	0.0000	0.0000	0.0000	0.0000	0.000348	0.000348
98:00:00	0.0000	0.0000	0.0000	0.0000	0.000346	0.000346
98:15:00	0.0000	0.0000	0.0000	0.0000	0.000345	0.000345
98:30:00	0.0000	0.0000	0.0000	0.0000	0.000343	0.000343

Time (hh:mm:ss)	Rain (mm)	Sewer Loss (mm)	Net Rain (mm)	Runoff (m³/s)	Baseflow (m³/s)	Total Flow (m³/s)
98:45:00	0.0000	0.0000	0.0000	0.0000	0.000342	0.000342
99:00:00	0.0000	0.0000	0.0000	0.0000	0.00034	0.00034
99:15:00	0.0000	0.0000	0.0000	0.0000	0.000339	0.000339
99:30:00	0.0000	0.0000	0.0000	0.0000	0.000337	0.000337
99:45:00	0.0000	0.0000	0.0000	0.0000	0.000336	0.000336
100:00:00	0.0000	0.0000	0.0000	0.0000	0.000334	0.000334
100:15:00	0.0000	0.0000	0.0000	0.0000	0.000333	0.000333
100:30:00	0.0000	0.0000	0.0000	0.0000	0.000331	0.000331
100:45:00	0.0000	0.0000	0.0000	0.0000	0.00033	0.00033
101:00:00	0.0000	0.0000	0.0000	0.0000	0.000328	0.000328
101:15:00	0.0000	0.0000	0.0000	0.0000	0.000327	0.000327
101:30:00	0.0000	0.0000	0.0000	0.0000	0.000325	0.000325
101:45:00	0.0000	0.0000	0.0000	0.0000	0.000324	0.000324
102:00:00	0.0000	0.0000	0.0000	0.0000	0.000322	0.000322
102:15:00	0.0000	0.0000	0.0000	0.0000	0.000321	0.000321
102:30:00	0.0000	0.0000	0.0000	0.0000	0.000319	0.000319
102:45:00	0.0000	0.0000	0.0000	0.0000	0.000318	0.000318
103:00:00	0.0000	0.0000	0.0000	0.0000	0.000317	0.000317
103:15:00	0.0000	0.0000	0.0000	0.0000	0.000315	0.000315
103:30:00	0.0000	0.0000	0.0000	0.0000	0.000314	0.000314
103:45:00	0.0000	0.0000	0.0000	0.0000	0.000312	0.000312
104:00:00	0.0000	0.0000	0.0000	0.0000	0.000311	0.000311
104:15:00	0.0000	0.0000	0.0000	0.0000	0.00031	0.00031
104:30:00	0.0000	0.0000	0.0000	0.0000	0.000308	0.000308
104:45:00	0.0000	0.0000	0.0000	0.0000	0.000307	0.000307
105:00:00	0.0000	0.0000	0.0000	0.0000	0.000305	0.000305
105:15:00	0.0000	0.0000	0.0000	0.0000	0.000304	0.000304
105:30:00	0.0000	0.0000	0.0000	0.0000	0.000303	0.000303
105:45:00	0.0000	0.0000	0.0000	0.0000	0.000301	0.000301
106:00:00	0.0000	0.0000	0.0000	0.0000	0.0003	0.0003
106:15:00	0.0000	0.0000	0.0000	0.0000	0.000299	0.000299
106:30:00	0.0000	0.0000	0.0000	0.0000	0.000297	0.000297
106:45:00	0.0000	0.0000	0.0000	0.0000	0.000296	0.000296
107:00:00	0.0000	0.0000	0.0000	0.0000	0.000295	0.000295
107:15:00	0.0000	0.0000	0.0000	0.0000	0.000293	0.000293
107:30:00	0.0000	0.0000	0.0000	0.0000	0.000292	0.000292

Time (hh:mm:ss)	Rain (mm)	Sewer Loss (mm)	Net Rain (mm)	Runoff (m³/s)	Baseflow (m³/s)	Total Flow (m³/s)
107:45:00	0.0000	0.0000	0.0000	0.0000	0.000291	0.000291
108:00:00	0.0000	0.0000	0.0000	0.0000	0.000289	0.000289
108:15:00	0.0000	0.0000	0.0000	0.0000	0.000288	0.000288
108:30:00	0.0000	0.0000	0.0000	0.0000	0.000287	0.000287
108:45:00	0.0000	0.0000	0.0000	0.0000	0.000285	0.000285
109:00:00	0.0000	0.0000	0.0000	0.0000	0.000284	0.000284
109:15:00	0.0000	0.0000	0.0000	0.0000	0.000283	0.000283
109:30:00	0.0000	0.0000	0.0000	0.0000	0.000282	0.000282
109:45:00	0.0000	0.0000	0.0000	0.0000	0.00028	0.00028
110:00:00	0.0000	0.0000	0.0000	0.0000	0.000279	0.000279
110:15:00	0.0000	0.0000	0.0000	0.0000	0.000278	0.000278
110:30:00	0.0000	0.0000	0.0000	0.0000	0.000277	0.000277

Appendix

Catchment descriptors *

Name	Value	User-defined value used?
BFIHOST	0.75	No
BFIHOST19	0.78	No
PROPWET (mm)	0.29	No
SAAR (mm)	664	No

Values in square brackets are the original values loaded from the FEH Web Service or FEH CD-ROM

F.3Basin 3 catchment

UK Design Flood Estimation

Generated on Thursday, May 21, 2020 1:40:03 PM by hekelly
Printed from the ReFH2 Flood Modelling software package, version 3.0.7257.30020

Summary of estimate using the Flood Estimation Handbook revitalised flood hydrograph method (ReFH2)

Site details

Checksum: C839-B0C0

Site name: FEH_Point_Descriptors_471574_176843 (2)

Easting: 471574

Northing: 176843

Country: England, Wales or Northern Ireland

Catchment Area (km²): 0.03 [0.5]*

Using plot scale calculations: Yes

Model: ReFH2.3

Site description: None

Model run: 100 year 1.4 CC

Summary of results

Rainfall - FEH 2013 model (mm):	76.36	Total runoff (ML):	0.20
Total Rainfall (mm):	74.66	Total flow (ML):	0.73
Peak Rainfall (mm):	20.55	Peak flow (m ³ /s):	0.01

Parameters

Where the user has overridden a system-generated value, this original value is shown in square brackets after the value used.

* Indicates that the user locked the duration/timestep

Rainfall parameters (Rainfall - FEH 2013 model)

Name	Value	User-defined?
Duration (hh:mm:ss)	03:15:00 [01:45:00]*	Yes
Timestep (hh:mm:ss)	00:15:00*	No
SCF (Seasonal correction factor)	0.99	No
ARF (Areal reduction factor)	0.99	No
Seasonality	Summer [Winter]	Yes
Climate change factor	1.40	Yes

Loss model parameters

Name	Value	User-defined?
Cini (mm)	37.19	No
Cmax (mm)	867.38	No
Use alpha correction factor	No	No
Alpha correction factor	n/a	No

Routing model parameters

Name	Value	User-defined?
Tp (hr)	2.34 [1.08]	Yes
Up	0.65	No
Uk	0.8	No

Baseflow model parameters

Name	Value	User-defined?
BF0 (m ³ /s)	0	No
BL (hr)	55.49 [44.99]	Yes
BR	2.91	No

Urbanisation parameters

Name	Value	User-defined?
Urban area (km ²)	0	No
Urbext 2000	0	No
Impervious runoff factor	0.7	No
Imperviousness factor	0.4	No
Tp scaling factor	0.75	No
Depression storage depth (mm)	0.5	No
Exporting drained area (km ²)	0.00	Yes
Sewer capacity (m ³ /s)	0.00	Yes

Time series data

Time (hh:mm:ss)	Rain (mm)	Sewer Loss (mm)	Net Rain (mm)	Runoff (m³/s)	Baseflow (m³/s)	Total Flow (m³/s)
00:00:00	1.4126	0.0000	0.0617	0.0000	0.000142	0.000142
00:15:00	1.9693	0.0000	0.0899	0.0000	0.000141	0.000149
00:30:00	2.7985	0.0000	0.1354	0.0000	0.000141	0.000177
00:45:00	4.0876	0.0000	0.2140	0.0001	0.000141	0.000234
01:00:00	6.2445	0.0000	0.3641	0.0002	0.000142	0.000338
01:15:00	10.5420	0.0000	0.7167	0.0004	0.000145	0.00052
01:30:00	20.5519	0.0000	1.7656	0.0007	0.000152	0.000846
01:45:00	10.5420	0.0000	1.0946	0.0013	0.000164	0.0015
02:00:00	6.2445	0.0000	0.7088	0.0024	0.000188	0.00254
02:15:00	4.0876	0.0000	0.4883	0.0036	0.000226	0.00384
02:30:00	2.7985	0.0000	0.3454	0.0050	0.000281	0.0053
02:45:00	1.9693	0.0000	0.2485	0.0065	0.000355	0.00686
03:00:00	1.4126	0.0000	0.1810	0.0080	0.000449	0.00848
03:15:00	0.0000	0.0000	0.0000	0.0095	0.000562	0.0101
03:30:00	0.0000	0.0000	0.0000	0.0110	0.000694	0.0117
03:45:00	0.0000	0.0000	0.0000	0.0122	0.000843	0.0131
04:00:00	0.0000	0.0000	0.0000	0.0131	0.001	0.0141
04:15:00	0.0000	0.0000	0.0000	0.0134	0.00117	0.0145
04:30:00	0.0000	0.0000	0.0000	0.0132	0.00134	0.0145
04:45:00	0.0000	0.0000	0.0000	0.0127	0.00151	0.0142
05:00:00	0.0000	0.0000	0.0000	0.0120	0.00166	0.0137
05:15:00	0.0000	0.0000	0.0000	0.0112	0.0018	0.013
05:30:00	0.0000	0.0000	0.0000	0.0103	0.00194	0.0122
05:45:00	0.0000	0.0000	0.0000	0.0094	0.00206	0.0114
06:00:00	0.0000	0.0000	0.0000	0.0085	0.00216	0.0106
06:15:00	0.0000	0.0000	0.0000	0.0076	0.00226	0.00987
06:30:00	0.0000	0.0000	0.0000	0.0069	0.00234	0.00922
06:45:00	0.0000	0.0000	0.0000	0.0063	0.00242	0.00868
07:00:00	0.0000	0.0000	0.0000	0.0057	0.00249	0.00819
07:15:00	0.0000	0.0000	0.0000	0.0052	0.00255	0.00774
07:30:00	0.0000	0.0000	0.0000	0.0047	0.0026	0.00731
07:45:00	0.0000	0.0000	0.0000	0.0043	0.00265	0.00691
08:00:00	0.0000	0.0000	0.0000	0.0038	0.00269	0.00651
08:15:00	0.0000	0.0000	0.0000	0.0034	0.00272	0.00611
08:30:00	0.0000	0.0000	0.0000	0.0029	0.00275	0.0057

Time (hh:mm:ss)	Rain (mm)	Sewer Loss (mm)	Net Rain (mm)	Runoff (m³/s)	Baseflow (m³/s)	Total Flow (m³/s)
08:45:00	0.0000	0.0000	0.0000	0.0025	0.00278	0.00529
09:00:00	0.0000	0.0000	0.0000	0.0021	0.00279	0.00488
09:15:00	0.0000	0.0000	0.0000	0.0017	0.00281	0.00448
09:30:00	0.0000	0.0000	0.0000	0.0013	0.00281	0.00408
09:45:00	0.0000	0.0000	0.0000	0.0009	0.00281	0.00371
10:00:00	0.0000	0.0000	0.0000	0.0006	0.00281	0.00338
10:15:00	0.0000	0.0000	0.0000	0.0003	0.0028	0.00315
10:30:00	0.0000	0.0000	0.0000	0.0002	0.0028	0.00299
10:45:00	0.0000	0.0000	0.0000	0.0001	0.00278	0.00289
11:00:00	0.0000	0.0000	0.0000	0.0000	0.00277	0.00282
11:15:00	0.0000	0.0000	0.0000	0.0000	0.00276	0.00278
11:30:00	0.0000	0.0000	0.0000	0.0000	0.00275	0.00275
11:45:00	0.0000	0.0000	0.0000	0.0000	0.00274	0.00274
12:00:00	0.0000	0.0000	0.0000	0.0000	0.00272	0.00272
12:15:00	0.0000	0.0000	0.0000	0.0000	0.00271	0.00271
12:30:00	0.0000	0.0000	0.0000	0.0000	0.0027	0.0027
12:45:00	0.0000	0.0000	0.0000	0.0000	0.00269	0.00269
13:00:00	0.0000	0.0000	0.0000	0.0000	0.00268	0.00268
13:15:00	0.0000	0.0000	0.0000	0.0000	0.00266	0.00266
13:30:00	0.0000	0.0000	0.0000	0.0000	0.00265	0.00265
13:45:00	0.0000	0.0000	0.0000	0.0000	0.00264	0.00264
14:00:00	0.0000	0.0000	0.0000	0.0000	0.00263	0.00263
14:15:00	0.0000	0.0000	0.0000	0.0000	0.00262	0.00262
14:30:00	0.0000	0.0000	0.0000	0.0000	0.0026	0.0026
14:45:00	0.0000	0.0000	0.0000	0.0000	0.00259	0.00259
15:00:00	0.0000	0.0000	0.0000	0.0000	0.00258	0.00258
15:15:00	0.0000	0.0000	0.0000	0.0000	0.00257	0.00257
15:30:00	0.0000	0.0000	0.0000	0.0000	0.00256	0.00256
15:45:00	0.0000	0.0000	0.0000	0.0000	0.00255	0.00255
16:00:00	0.0000	0.0000	0.0000	0.0000	0.00253	0.00253
16:15:00	0.0000	0.0000	0.0000	0.0000	0.00252	0.00252
16:30:00	0.0000	0.0000	0.0000	0.0000	0.00251	0.00251
16:45:00	0.0000	0.0000	0.0000	0.0000	0.0025	0.0025
17:00:00	0.0000	0.0000	0.0000	0.0000	0.00249	0.00249
17:15:00	0.0000	0.0000	0.0000	0.0000	0.00248	0.00248
17:30:00	0.0000	0.0000	0.0000	0.0000	0.00247	0.00247

Time (hh:mm:ss)	Rain (mm)	Sewer Loss (mm)	Net Rain (mm)	Runoff (m³/s)	Baseflow (m³/s)	Total Flow (m³/s)
17:45:00	0.0000	0.0000	0.0000	0.0000	0.00246	0.00246
18:00:00	0.0000	0.0000	0.0000	0.0000	0.00244	0.00244
18:15:00	0.0000	0.0000	0.0000	0.0000	0.00243	0.00243
18:30:00	0.0000	0.0000	0.0000	0.0000	0.00242	0.00242
18:45:00	0.0000	0.0000	0.0000	0.0000	0.00241	0.00241
19:00:00	0.0000	0.0000	0.0000	0.0000	0.0024	0.0024
19:15:00	0.0000	0.0000	0.0000	0.0000	0.00239	0.00239
19:30:00	0.0000	0.0000	0.0000	0.0000	0.00238	0.00238
19:45:00	0.0000	0.0000	0.0000	0.0000	0.00237	0.00237
20:00:00	0.0000	0.0000	0.0000	0.0000	0.00236	0.00236
20:15:00	0.0000	0.0000	0.0000	0.0000	0.00235	0.00235
20:30:00	0.0000	0.0000	0.0000	0.0000	0.00234	0.00234
20:45:00	0.0000	0.0000	0.0000	0.0000	0.00233	0.00233
21:00:00	0.0000	0.0000	0.0000	0.0000	0.00232	0.00232
21:15:00	0.0000	0.0000	0.0000	0.0000	0.00231	0.00231
21:30:00	0.0000	0.0000	0.0000	0.0000	0.0023	0.0023
21:45:00	0.0000	0.0000	0.0000	0.0000	0.00229	0.00229
22:00:00	0.0000	0.0000	0.0000	0.0000	0.00227	0.00227
22:15:00	0.0000	0.0000	0.0000	0.0000	0.00226	0.00226
22:30:00	0.0000	0.0000	0.0000	0.0000	0.00225	0.00225
22:45:00	0.0000	0.0000	0.0000	0.0000	0.00224	0.00224
23:00:00	0.0000	0.0000	0.0000	0.0000	0.00223	0.00223
23:15:00	0.0000	0.0000	0.0000	0.0000	0.00222	0.00222
23:30:00	0.0000	0.0000	0.0000	0.0000	0.00221	0.00221
23:45:00	0.0000	0.0000	0.0000	0.0000	0.0022	0.0022
24:00:00	0.0000	0.0000	0.0000	0.0000	0.00219	0.00219
24:15:00	0.0000	0.0000	0.0000	0.0000	0.00218	0.00218
24:30:00	0.0000	0.0000	0.0000	0.0000	0.00217	0.00217
24:45:00	0.0000	0.0000	0.0000	0.0000	0.00216	0.00216
25:00:00	0.0000	0.0000	0.0000	0.0000	0.00216	0.00216
25:15:00	0.0000	0.0000	0.0000	0.0000	0.00215	0.00215
25:30:00	0.0000	0.0000	0.0000	0.0000	0.00214	0.00214
25:45:00	0.0000	0.0000	0.0000	0.0000	0.00213	0.00213
26:00:00	0.0000	0.0000	0.0000	0.0000	0.00212	0.00212
26:15:00	0.0000	0.0000	0.0000	0.0000	0.00211	0.00211
26:30:00	0.0000	0.0000	0.0000	0.0000	0.0021	0.0021

Time (hh:mm:ss)	Rain (mm)	Sewer Loss (mm)	Net Rain (mm)	Runoff (m³/s)	Baseflow (m³/s)	Total Flow (m³/s)
26:45:00	0.0000	0.0000	0.0000	0.0000	0.00209	0.00209
27:00:00	0.0000	0.0000	0.0000	0.0000	0.00208	0.00208
27:15:00	0.0000	0.0000	0.0000	0.0000	0.00207	0.00207
27:30:00	0.0000	0.0000	0.0000	0.0000	0.00206	0.00206
27:45:00	0.0000	0.0000	0.0000	0.0000	0.00205	0.00205
28:00:00	0.0000	0.0000	0.0000	0.0000	0.00204	0.00204
28:15:00	0.0000	0.0000	0.0000	0.0000	0.00203	0.00203
28:30:00	0.0000	0.0000	0.0000	0.0000	0.00202	0.00202
28:45:00	0.0000	0.0000	0.0000	0.0000	0.00201	0.00201
29:00:00	0.0000	0.0000	0.0000	0.0000	0.00201	0.00201
29:15:00	0.0000	0.0000	0.0000	0.0000	0.002	0.002
29:30:00	0.0000	0.0000	0.0000	0.0000	0.00199	0.00199
29:45:00	0.0000	0.0000	0.0000	0.0000	0.00198	0.00198
30:00:00	0.0000	0.0000	0.0000	0.0000	0.00197	0.00197
30:15:00	0.0000	0.0000	0.0000	0.0000	0.00196	0.00196
30:30:00	0.0000	0.0000	0.0000	0.0000	0.00195	0.00195
30:45:00	0.0000	0.0000	0.0000	0.0000	0.00194	0.00194
31:00:00	0.0000	0.0000	0.0000	0.0000	0.00193	0.00193
31:15:00	0.0000	0.0000	0.0000	0.0000	0.00193	0.00193
31:30:00	0.0000	0.0000	0.0000	0.0000	0.00192	0.00192
31:45:00	0.0000	0.0000	0.0000	0.0000	0.00191	0.00191
32:00:00	0.0000	0.0000	0.0000	0.0000	0.0019	0.0019
32:15:00	0.0000	0.0000	0.0000	0.0000	0.00189	0.00189
32:30:00	0.0000	0.0000	0.0000	0.0000	0.00188	0.00188
32:45:00	0.0000	0.0000	0.0000	0.0000	0.00187	0.00187
33:00:00	0.0000	0.0000	0.0000	0.0000	0.00187	0.00187
33:15:00	0.0000	0.0000	0.0000	0.0000	0.00186	0.00186
33:30:00	0.0000	0.0000	0.0000	0.0000	0.00185	0.00185
33:45:00	0.0000	0.0000	0.0000	0.0000	0.00184	0.00184
34:00:00	0.0000	0.0000	0.0000	0.0000	0.00183	0.00183
34:15:00	0.0000	0.0000	0.0000	0.0000	0.00182	0.00182
34:30:00	0.0000	0.0000	0.0000	0.0000	0.00182	0.00182
34:45:00	0.0000	0.0000	0.0000	0.0000	0.00181	0.00181
35:00:00	0.0000	0.0000	0.0000	0.0000	0.0018	0.0018
35:15:00	0.0000	0.0000	0.0000	0.0000	0.00179	0.00179
35:30:00	0.0000	0.0000	0.0000	0.0000	0.00178	0.00178

Time (hh:mm:ss)	Rain (mm)	Sewer Loss (mm)	Net Rain (mm)	Runoff (m³/s)	Baseflow (m³/s)	Total Flow (m³/s)
35:45:00	0.0000	0.0000	0.0000	0.0000	0.00178	0.00178
36:00:00	0.0000	0.0000	0.0000	0.0000	0.00177	0.00177
36:15:00	0.0000	0.0000	0.0000	0.0000	0.00176	0.00176
36:30:00	0.0000	0.0000	0.0000	0.0000	0.00175	0.00175
36:45:00	0.0000	0.0000	0.0000	0.0000	0.00174	0.00174
37:00:00	0.0000	0.0000	0.0000	0.0000	0.00174	0.00174
37:15:00	0.0000	0.0000	0.0000	0.0000	0.00173	0.00173
37:30:00	0.0000	0.0000	0.0000	0.0000	0.00172	0.00172
37:45:00	0.0000	0.0000	0.0000	0.0000	0.00171	0.00171
38:00:00	0.0000	0.0000	0.0000	0.0000	0.00171	0.00171
38:15:00	0.0000	0.0000	0.0000	0.0000	0.0017	0.0017
38:30:00	0.0000	0.0000	0.0000	0.0000	0.00169	0.00169
38:45:00	0.0000	0.0000	0.0000	0.0000	0.00168	0.00168
39:00:00	0.0000	0.0000	0.0000	0.0000	0.00167	0.00167
39:15:00	0.0000	0.0000	0.0000	0.0000	0.00167	0.00167
39:30:00	0.0000	0.0000	0.0000	0.0000	0.00166	0.00166
39:45:00	0.0000	0.0000	0.0000	0.0000	0.00165	0.00165
40:00:00	0.0000	0.0000	0.0000	0.0000	0.00164	0.00164
40:15:00	0.0000	0.0000	0.0000	0.0000	0.00164	0.00164
40:30:00	0.0000	0.0000	0.0000	0.0000	0.00163	0.00163
40:45:00	0.0000	0.0000	0.0000	0.0000	0.00162	0.00162
41:00:00	0.0000	0.0000	0.0000	0.0000	0.00162	0.00162
41:15:00	0.0000	0.0000	0.0000	0.0000	0.00161	0.00161
41:30:00	0.0000	0.0000	0.0000	0.0000	0.0016	0.0016
41:45:00	0.0000	0.0000	0.0000	0.0000	0.00159	0.00159
42:00:00	0.0000	0.0000	0.0000	0.0000	0.00159	0.00159
42:15:00	0.0000	0.0000	0.0000	0.0000	0.00158	0.00158
42:30:00	0.0000	0.0000	0.0000	0.0000	0.00157	0.00157
42:45:00	0.0000	0.0000	0.0000	0.0000	0.00157	0.00157
43:00:00	0.0000	0.0000	0.0000	0.0000	0.00156	0.00156
43:15:00	0.0000	0.0000	0.0000	0.0000	0.00155	0.00155
43:30:00	0.0000	0.0000	0.0000	0.0000	0.00154	0.00154
43:45:00	0.0000	0.0000	0.0000	0.0000	0.00154	0.00154
44:00:00	0.0000	0.0000	0.0000	0.0000	0.00153	0.00153
44:15:00	0.0000	0.0000	0.0000	0.0000	0.00152	0.00152
44:30:00	0.0000	0.0000	0.0000	0.0000	0.00152	0.00152

Time (hh:mm:ss)	Rain (mm)	Sewer Loss (mm)	Net Rain (mm)	Runoff (m³/s)	Baseflow (m³/s)	Total Flow (m³/s)
44:45:00	0.0000	0.0000	0.0000	0.0000	0.00151	0.00151
45:00:00	0.0000	0.0000	0.0000	0.0000	0.0015	0.0015
45:15:00	0.0000	0.0000	0.0000	0.0000	0.0015	0.0015
45:30:00	0.0000	0.0000	0.0000	0.0000	0.00149	0.00149
45:45:00	0.0000	0.0000	0.0000	0.0000	0.00148	0.00148
46:00:00	0.0000	0.0000	0.0000	0.0000	0.00148	0.00148
46:15:00	0.0000	0.0000	0.0000	0.0000	0.00147	0.00147
46:30:00	0.0000	0.0000	0.0000	0.0000	0.00146	0.00146
46:45:00	0.0000	0.0000	0.0000	0.0000	0.00146	0.00146
47:00:00	0.0000	0.0000	0.0000	0.0000	0.00145	0.00145
47:15:00	0.0000	0.0000	0.0000	0.0000	0.00144	0.00144
47:30:00	0.0000	0.0000	0.0000	0.0000	0.00144	0.00144
47:45:00	0.0000	0.0000	0.0000	0.0000	0.00143	0.00143
48:00:00	0.0000	0.0000	0.0000	0.0000	0.00142	0.00142
48:15:00	0.0000	0.0000	0.0000	0.0000	0.00142	0.00142
48:30:00	0.0000	0.0000	0.0000	0.0000	0.00141	0.00141
48:45:00	0.0000	0.0000	0.0000	0.0000	0.0014	0.0014
49:00:00	0.0000	0.0000	0.0000	0.0000	0.0014	0.0014
49:15:00	0.0000	0.0000	0.0000	0.0000	0.00139	0.00139
49:30:00	0.0000	0.0000	0.0000	0.0000	0.00139	0.00139
49:45:00	0.0000	0.0000	0.0000	0.0000	0.00138	0.00138
50:00:00	0.0000	0.0000	0.0000	0.0000	0.00137	0.00137
50:15:00	0.0000	0.0000	0.0000	0.0000	0.00137	0.00137
50:30:00	0.0000	0.0000	0.0000	0.0000	0.00136	0.00136
50:45:00	0.0000	0.0000	0.0000	0.0000	0.00135	0.00135
51:00:00	0.0000	0.0000	0.0000	0.0000	0.00135	0.00135
51:15:00	0.0000	0.0000	0.0000	0.0000	0.00134	0.00134
51:30:00	0.0000	0.0000	0.0000	0.0000	0.00134	0.00134
51:45:00	0.0000	0.0000	0.0000	0.0000	0.00133	0.00133
52:00:00	0.0000	0.0000	0.0000	0.0000	0.00132	0.00132
52:15:00	0.0000	0.0000	0.0000	0.0000	0.00132	0.00132
52:30:00	0.0000	0.0000	0.0000	0.0000	0.00131	0.00131
52:45:00	0.0000	0.0000	0.0000	0.0000	0.00131	0.00131
53:00:00	0.0000	0.0000	0.0000	0.0000	0.0013	0.0013
53:15:00	0.0000	0.0000	0.0000	0.0000	0.0013	0.0013
53:30:00	0.0000	0.0000	0.0000	0.0000	0.00129	0.00129

Time (hh:mm:ss)	Rain (mm)	Sewer Loss (mm)	Net Rain (mm)	Runoff (m³/s)	Baseflow (m³/s)	Total Flow (m³/s)
53:45:00	0.0000	0.0000	0.0000	0.0000	0.00128	0.00128
54:00:00	0.0000	0.0000	0.0000	0.0000	0.00128	0.00128
54:15:00	0.0000	0.0000	0.0000	0.0000	0.00127	0.00127
54:30:00	0.0000	0.0000	0.0000	0.0000	0.00127	0.00127
54:45:00	0.0000	0.0000	0.0000	0.0000	0.00126	0.00126
55:00:00	0.0000	0.0000	0.0000	0.0000	0.00126	0.00126
55:15:00	0.0000	0.0000	0.0000	0.0000	0.00125	0.00125
55:30:00	0.0000	0.0000	0.0000	0.0000	0.00124	0.00124
55:45:00	0.0000	0.0000	0.0000	0.0000	0.00124	0.00124
56:00:00	0.0000	0.0000	0.0000	0.0000	0.00123	0.00123
56:15:00	0.0000	0.0000	0.0000	0.0000	0.00123	0.00123
56:30:00	0.0000	0.0000	0.0000	0.0000	0.00122	0.00122
56:45:00	0.0000	0.0000	0.0000	0.0000	0.00122	0.00122
57:00:00	0.0000	0.0000	0.0000	0.0000	0.00121	0.00121
57:15:00	0.0000	0.0000	0.0000	0.0000	0.00121	0.00121
57:30:00	0.0000	0.0000	0.0000	0.0000	0.0012	0.0012
57:45:00	0.0000	0.0000	0.0000	0.0000	0.00119	0.00119
58:00:00	0.0000	0.0000	0.0000	0.0000	0.00119	0.00119
58:15:00	0.0000	0.0000	0.0000	0.0000	0.00118	0.00118
58:30:00	0.0000	0.0000	0.0000	0.0000	0.00118	0.00118
58:45:00	0.0000	0.0000	0.0000	0.0000	0.00117	0.00117
59:00:00	0.0000	0.0000	0.0000	0.0000	0.00117	0.00117
59:15:00	0.0000	0.0000	0.0000	0.0000	0.00116	0.00116
59:30:00	0.0000	0.0000	0.0000	0.0000	0.00116	0.00116
59:45:00	0.0000	0.0000	0.0000	0.0000	0.00115	0.00115
60:00:00	0.0000	0.0000	0.0000	0.0000	0.00115	0.00115
60:15:00	0.0000	0.0000	0.0000	0.0000	0.00114	0.00114
60:30:00	0.0000	0.0000	0.0000	0.0000	0.00114	0.00114
60:45:00	0.0000	0.0000	0.0000	0.0000	0.00113	0.00113
61:00:00	0.0000	0.0000	0.0000	0.0000	0.00113	0.00113
61:15:00	0.0000	0.0000	0.0000	0.0000	0.00112	0.00112
61:30:00	0.0000	0.0000	0.0000	0.0000	0.00112	0.00112
61:45:00	0.0000	0.0000	0.0000	0.0000	0.00111	0.00111
62:00:00	0.0000	0.0000	0.0000	0.0000	0.00111	0.00111
62:15:00	0.0000	0.0000	0.0000	0.0000	0.0011	0.0011
62:30:00	0.0000	0.0000	0.0000	0.0000	0.0011	0.0011

Time (hh:mm:ss)	Rain (mm)	Sewer Loss (mm)	Net Rain (mm)	Runoff (m³/s)	Baseflow (m³/s)	Total Flow (m³/s)
62:45:00	0.0000	0.0000	0.0000	0.0000	0.00109	0.00109
63:00:00	0.0000	0.0000	0.0000	0.0000	0.00109	0.00109
63:15:00	0.0000	0.0000	0.0000	0.0000	0.00108	0.00108
63:30:00	0.0000	0.0000	0.0000	0.0000	0.00108	0.00108
63:45:00	0.0000	0.0000	0.0000	0.0000	0.00107	0.00107
64:00:00	0.0000	0.0000	0.0000	0.0000	0.00107	0.00107
64:15:00	0.0000	0.0000	0.0000	0.0000	0.00106	0.00106
64:30:00	0.0000	0.0000	0.0000	0.0000	0.00106	0.00106
64:45:00	0.0000	0.0000	0.0000	0.0000	0.00105	0.00105
65:00:00	0.0000	0.0000	0.0000	0.0000	0.00105	0.00105
65:15:00	0.0000	0.0000	0.0000	0.0000	0.00104	0.00104
65:30:00	0.0000	0.0000	0.0000	0.0000	0.00104	0.00104
65:45:00	0.0000	0.0000	0.0000	0.0000	0.00103	0.00103
66:00:00	0.0000	0.0000	0.0000	0.0000	0.00103	0.00103
66:15:00	0.0000	0.0000	0.0000	0.0000	0.00102	0.00102
66:30:00	0.0000	0.0000	0.0000	0.0000	0.00102	0.00102
66:45:00	0.0000	0.0000	0.0000	0.0000	0.00102	0.00102
67:00:00	0.0000	0.0000	0.0000	0.0000	0.00101	0.00101
67:15:00	0.0000	0.0000	0.0000	0.0000	0.00101	0.00101
67:30:00	0.0000	0.0000	0.0000	0.0000	0.001	0.001
67:45:00	0.0000	0.0000	0.0000	0.0000	0.000997	0.000997
68:00:00	0.0000	0.0000	0.0000	0.0000	0.000993	0.000993
68:15:00	0.0000	0.0000	0.0000	0.0000	0.000988	0.000988
68:30:00	0.0000	0.0000	0.0000	0.0000	0.000984	0.000984
68:45:00	0.0000	0.0000	0.0000	0.0000	0.00098	0.00098
69:00:00	0.0000	0.0000	0.0000	0.0000	0.000975	0.000975
69:15:00	0.0000	0.0000	0.0000	0.0000	0.000971	0.000971
69:30:00	0.0000	0.0000	0.0000	0.0000	0.000966	0.000966
69:45:00	0.0000	0.0000	0.0000	0.0000	0.000962	0.000962
70:00:00	0.0000	0.0000	0.0000	0.0000	0.000958	0.000958
70:15:00	0.0000	0.0000	0.0000	0.0000	0.000953	0.000953
70:30:00	0.0000	0.0000	0.0000	0.0000	0.000949	0.000949
70:45:00	0.0000	0.0000	0.0000	0.0000	0.000945	0.000945
71:00:00	0.0000	0.0000	0.0000	0.0000	0.000941	0.000941
71:15:00	0.0000	0.0000	0.0000	0.0000	0.000936	0.000936
71:30:00	0.0000	0.0000	0.0000	0.0000	0.000932	0.000932

Time (hh:mm:ss)	Rain (mm)	Sewer Loss (mm)	Net Rain (mm)	Runoff (m³/s)	Baseflow (m³/s)	Total Flow (m³/s)
71:45:00	0.0000	0.0000	0.0000	0.0000	0.000928	0.000928
72:00:00	0.0000	0.0000	0.0000	0.0000	0.000924	0.000924
72:15:00	0.0000	0.0000	0.0000	0.0000	0.00092	0.00092
72:30:00	0.0000	0.0000	0.0000	0.0000	0.000916	0.000916
72:45:00	0.0000	0.0000	0.0000	0.0000	0.000911	0.000911
73:00:00	0.0000	0.0000	0.0000	0.0000	0.000907	0.000907
73:15:00	0.0000	0.0000	0.0000	0.0000	0.000903	0.000903
73:30:00	0.0000	0.0000	0.0000	0.0000	0.000899	0.000899
73:45:00	0.0000	0.0000	0.0000	0.0000	0.000895	0.000895
74:00:00	0.0000	0.0000	0.0000	0.0000	0.000891	0.000891
74:15:00	0.0000	0.0000	0.0000	0.0000	0.000887	0.000887
74:30:00	0.0000	0.0000	0.0000	0.0000	0.000883	0.000883
74:45:00	0.0000	0.0000	0.0000	0.0000	0.000879	0.000879
75:00:00	0.0000	0.0000	0.0000	0.0000	0.000875	0.000875
75:15:00	0.0000	0.0000	0.0000	0.0000	0.000871	0.000871
75:30:00	0.0000	0.0000	0.0000	0.0000	0.000867	0.000867
75:45:00	0.0000	0.0000	0.0000	0.0000	0.000864	0.000864
76:00:00	0.0000	0.0000	0.0000	0.0000	0.00086	0.00086
76:15:00	0.0000	0.0000	0.0000	0.0000	0.000856	0.000856
76:30:00	0.0000	0.0000	0.0000	0.0000	0.000852	0.000852
76:45:00	0.0000	0.0000	0.0000	0.0000	0.000848	0.000848
77:00:00	0.0000	0.0000	0.0000	0.0000	0.000844	0.000844
77:15:00	0.0000	0.0000	0.0000	0.0000	0.00084	0.00084
77:30:00	0.0000	0.0000	0.0000	0.0000	0.000837	0.000837
77:45:00	0.0000	0.0000	0.0000	0.0000	0.000833	0.000833
78:00:00	0.0000	0.0000	0.0000	0.0000	0.000829	0.000829
78:15:00	0.0000	0.0000	0.0000	0.0000	0.000825	0.000825
78:30:00	0.0000	0.0000	0.0000	0.0000	0.000822	0.000822
78:45:00	0.0000	0.0000	0.0000	0.0000	0.000818	0.000818
79:00:00	0.0000	0.0000	0.0000	0.0000	0.000814	0.000814
79:15:00	0.0000	0.0000	0.0000	0.0000	0.000811	0.000811
79:30:00	0.0000	0.0000	0.0000	0.0000	0.000807	0.000807
79:45:00	0.0000	0.0000	0.0000	0.0000	0.000803	0.000803
80:00:00	0.0000	0.0000	0.0000	0.0000	0.0008	0.0008
80:15:00	0.0000	0.0000	0.0000	0.0000	0.000796	0.000796
80:30:00	0.0000	0.0000	0.0000	0.0000	0.000793	0.000793

Time (hh:mm:ss)	Rain (mm)	Sewer Loss (mm)	Net Rain (mm)	Runoff (m³/s)	Baseflow (m³/s)	Total Flow (m³/s)
80:45:00	0.0000	0.0000	0.0000	0.0000	0.000789	0.000789
81:00:00	0.0000	0.0000	0.0000	0.0000	0.000786	0.000786
81:15:00	0.0000	0.0000	0.0000	0.0000	0.000782	0.000782
81:30:00	0.0000	0.0000	0.0000	0.0000	0.000779	0.000779
81:45:00	0.0000	0.0000	0.0000	0.0000	0.000775	0.000775
82:00:00	0.0000	0.0000	0.0000	0.0000	0.000772	0.000772
82:15:00	0.0000	0.0000	0.0000	0.0000	0.000768	0.000768
82:30:00	0.0000	0.0000	0.0000	0.0000	0.000765	0.000765
82:45:00	0.0000	0.0000	0.0000	0.0000	0.000761	0.000761
83:00:00	0.0000	0.0000	0.0000	0.0000	0.000758	0.000758
83:15:00	0.0000	0.0000	0.0000	0.0000	0.000754	0.000754
83:30:00	0.0000	0.0000	0.0000	0.0000	0.000751	0.000751
83:45:00	0.0000	0.0000	0.0000	0.0000	0.000748	0.000748
84:00:00	0.0000	0.0000	0.0000	0.0000	0.000744	0.000744
84:15:00	0.0000	0.0000	0.0000	0.0000	0.000741	0.000741
84:30:00	0.0000	0.0000	0.0000	0.0000	0.000738	0.000738
84:45:00	0.0000	0.0000	0.0000	0.0000	0.000734	0.000734
85:00:00	0.0000	0.0000	0.0000	0.0000	0.000731	0.000731
85:15:00	0.0000	0.0000	0.0000	0.0000	0.000728	0.000728
85:30:00	0.0000	0.0000	0.0000	0.0000	0.000724	0.000724
85:45:00	0.0000	0.0000	0.0000	0.0000	0.000721	0.000721
86:00:00	0.0000	0.0000	0.0000	0.0000	0.000718	0.000718
86:15:00	0.0000	0.0000	0.0000	0.0000	0.000715	0.000715
86:30:00	0.0000	0.0000	0.0000	0.0000	0.000711	0.000711
86:45:00	0.0000	0.0000	0.0000	0.0000	0.000708	0.000708
87:00:00	0.0000	0.0000	0.0000	0.0000	0.000705	0.000705
87:15:00	0.0000	0.0000	0.0000	0.0000	0.000702	0.000702
87:30:00	0.0000	0.0000	0.0000	0.0000	0.000699	0.000699
87:45:00	0.0000	0.0000	0.0000	0.0000	0.000696	0.000696
88:00:00	0.0000	0.0000	0.0000	0.0000	0.000692	0.000692
88:15:00	0.0000	0.0000	0.0000	0.0000	0.000689	0.000689
88:30:00	0.0000	0.0000	0.0000	0.0000	0.000686	0.000686
88:45:00	0.0000	0.0000	0.0000	0.0000	0.000683	0.000683
89:00:00	0.0000	0.0000	0.0000	0.0000	0.00068	0.00068
89:15:00	0.0000	0.0000	0.0000	0.0000	0.000677	0.000677
89:30:00	0.0000	0.0000	0.0000	0.0000	0.000674	0.000674

Time (hh:mm:ss)	Rain (mm)	Sewer Loss (mm)	Net Rain (mm)	Runoff (m³/s)	Baseflow (m³/s)	Total Flow (m³/s)
89:45:00	0.0000	0.0000	0.0000	0.0000	0.000671	0.000671
90:00:00	0.0000	0.0000	0.0000	0.0000	0.000668	0.000668
90:15:00	0.0000	0.0000	0.0000	0.0000	0.000665	0.000665
90:30:00	0.0000	0.0000	0.0000	0.0000	0.000662	0.000662
90:45:00	0.0000	0.0000	0.0000	0.0000	0.000659	0.000659
91:00:00	0.0000	0.0000	0.0000	0.0000	0.000656	0.000656
91:15:00	0.0000	0.0000	0.0000	0.0000	0.000653	0.000653
91:30:00	0.0000	0.0000	0.0000	0.0000	0.00065	0.00065
91:45:00	0.0000	0.0000	0.0000	0.0000	0.000647	0.000647
92:00:00	0.0000	0.0000	0.0000	0.0000	0.000644	0.000644
92:15:00	0.0000	0.0000	0.0000	0.0000	0.000641	0.000641
92:30:00	0.0000	0.0000	0.0000	0.0000	0.000639	0.000639
92:45:00	0.0000	0.0000	0.0000	0.0000	0.000636	0.000636
93:00:00	0.0000	0.0000	0.0000	0.0000	0.000633	0.000633
93:15:00	0.0000	0.0000	0.0000	0.0000	0.00063	0.00063
93:30:00	0.0000	0.0000	0.0000	0.0000	0.000627	0.000627
93:45:00	0.0000	0.0000	0.0000	0.0000	0.000624	0.000624
94:00:00	0.0000	0.0000	0.0000	0.0000	0.000621	0.000621
94:15:00	0.0000	0.0000	0.0000	0.0000	0.000619	0.000619
94:30:00	0.0000	0.0000	0.0000	0.0000	0.000616	0.000616
94:45:00	0.0000	0.0000	0.0000	0.0000	0.000613	0.000613
95:00:00	0.0000	0.0000	0.0000	0.0000	0.00061	0.00061
95:15:00	0.0000	0.0000	0.0000	0.0000	0.000608	0.000608
95:30:00	0.0000	0.0000	0.0000	0.0000	0.000605	0.000605
95:45:00	0.0000	0.0000	0.0000	0.0000	0.000602	0.000602
96:00:00	0.0000	0.0000	0.0000	0.0000	0.000599	0.000599
96:15:00	0.0000	0.0000	0.0000	0.0000	0.000597	0.000597
96:30:00	0.0000	0.0000	0.0000	0.0000	0.000594	0.000594
96:45:00	0.0000	0.0000	0.0000	0.0000	0.000591	0.000591
97:00:00	0.0000	0.0000	0.0000	0.0000	0.000589	0.000589
97:15:00	0.0000	0.0000	0.0000	0.0000	0.000586	0.000586
97:30:00	0.0000	0.0000	0.0000	0.0000	0.000583	0.000583
97:45:00	0.0000	0.0000	0.0000	0.0000	0.000581	0.000581
98:00:00	0.0000	0.0000	0.0000	0.0000	0.000578	0.000578
98:15:00	0.0000	0.0000	0.0000	0.0000	0.000576	0.000576
98:30:00	0.0000	0.0000	0.0000	0.0000	0.000573	0.000573

Time (hh:mm:ss)	Rain (mm)	Sewer Loss (mm)	Net Rain (mm)	Runoff (m³/s)	Baseflow (m³/s)	Total Flow (m³/s)
98:45:00	0.0000	0.0000	0.0000	0.0000	0.00057	0.00057
99:00:00	0.0000	0.0000	0.0000	0.0000	0.000568	0.000568
99:15:00	0.0000	0.0000	0.0000	0.0000	0.000565	0.000565
99:30:00	0.0000	0.0000	0.0000	0.0000	0.000563	0.000563
99:45:00	0.0000	0.0000	0.0000	0.0000	0.00056	0.00056
100:00:00	0.0000	0.0000	0.0000	0.0000	0.000558	0.000558
100:15:00	0.0000	0.0000	0.0000	0.0000	0.000555	0.000555
100:30:00	0.0000	0.0000	0.0000	0.0000	0.000553	0.000553
100:45:00	0.0000	0.0000	0.0000	0.0000	0.00055	0.00055
101:00:00	0.0000	0.0000	0.0000	0.0000	0.000548	0.000548
101:15:00	0.0000	0.0000	0.0000	0.0000	0.000545	0.000545
101:30:00	0.0000	0.0000	0.0000	0.0000	0.000543	0.000543
101:45:00	0.0000	0.0000	0.0000	0.0000	0.00054	0.00054
102:00:00	0.0000	0.0000	0.0000	0.0000	0.000538	0.000538
102:15:00	0.0000	0.0000	0.0000	0.0000	0.000536	0.000536
102:30:00	0.0000	0.0000	0.0000	0.0000	0.000533	0.000533
102:45:00	0.0000	0.0000	0.0000	0.0000	0.000531	0.000531
103:00:00	0.0000	0.0000	0.0000	0.0000	0.000528	0.000528
103:15:00	0.0000	0.0000	0.0000	0.0000	0.000526	0.000526
103:30:00	0.0000	0.0000	0.0000	0.0000	0.000524	0.000524
103:45:00	0.0000	0.0000	0.0000	0.0000	0.000521	0.000521
104:00:00	0.0000	0.0000	0.0000	0.0000	0.000519	0.000519
104:15:00	0.0000	0.0000	0.0000	0.0000	0.000517	0.000517
104:30:00	0.0000	0.0000	0.0000	0.0000	0.000514	0.000514
104:45:00	0.0000	0.0000	0.0000	0.0000	0.000512	0.000512
105:00:00	0.0000	0.0000	0.0000	0.0000	0.00051	0.00051
105:15:00	0.0000	0.0000	0.0000	0.0000	0.000507	0.000507
105:30:00	0.0000	0.0000	0.0000	0.0000	0.000505	0.000505
105:45:00	0.0000	0.0000	0.0000	0.0000	0.000503	0.000503
106:00:00	0.0000	0.0000	0.0000	0.0000	0.000501	0.000501
106:15:00	0.0000	0.0000	0.0000	0.0000	0.000498	0.000498
106:30:00	0.0000	0.0000	0.0000	0.0000	0.000496	0.000496
106:45:00	0.0000	0.0000	0.0000	0.0000	0.000494	0.000494
107:00:00	0.0000	0.0000	0.0000	0.0000	0.000492	0.000492
107:15:00	0.0000	0.0000	0.0000	0.0000	0.000489	0.000489
107:30:00	0.0000	0.0000	0.0000	0.0000	0.000487	0.000487

Time (hh:mm:ss)	Rain (mm)	Sewer Loss (mm)	Net Rain (mm)	Runoff (m³/s)	Baseflow (m³/s)	Total Flow (m³/s)
107:45:00	0.0000	0.0000	0.0000	0.0000	0.000485	0.000485
108:00:00	0.0000	0.0000	0.0000	0.0000	0.000483	0.000483
108:15:00	0.0000	0.0000	0.0000	0.0000	0.000481	0.000481
108:30:00	0.0000	0.0000	0.0000	0.0000	0.000479	0.000479
108:45:00	0.0000	0.0000	0.0000	0.0000	0.000476	0.000476
109:00:00	0.0000	0.0000	0.0000	0.0000	0.000474	0.000474
109:15:00	0.0000	0.0000	0.0000	0.0000	0.000472	0.000472
109:30:00	0.0000	0.0000	0.0000	0.0000	0.00047	0.00047
109:45:00	0.0000	0.0000	0.0000	0.0000	0.000468	0.000468
110:00:00	0.0000	0.0000	0.0000	0.0000	0.000466	0.000466
110:15:00	0.0000	0.0000	0.0000	0.0000	0.000464	0.000464
110:30:00	0.0000	0.0000	0.0000	0.0000	0.000462	0.000462

Appendix

Catchment descriptors *

Name	Value	User-defined value used?
BFIHOST	0.75	No
BFIHOST19	0.78	No
PROPWET (mm)	0.29	No
SAAR (mm)	664	No

Values in square brackets are the original values loaded from the FEH Web Service or FEH CD-ROM

F.4Basin 4 catchment

UK Design Flood Estimation

Generated on Thursday, May 21, 2020 1:41:28 PM by hekelly
Printed from the ReFH2 Flood Modelling software package, version 3.0.7257.30020

Summary of estimate using the Flood Estimation Handbook revitalised flood hydrograph method (ReFH2)

Site details

Checksum: 5CA2-F91F

Site name: FEH_Point_Descriptors_471574_176843 (2)

Easting: 471574

Northing: 176843

Country: England, Wales or Northern Ireland

Catchment Area (km²): 0 [0.5]*

Using plot scale calculations: Yes

Model: ReFH2.3

Site description: None

Model run: 100 year 1.4 CC

Summary of results

Rainfall - FEH 2013 model (mm):	58.45	Total runoff (ML):	0.02
Total Rainfall (mm):	57.35	Total flow (ML):	0.07
Peak Rainfall (mm):	15.79	Peak flow (m ³ /s):	0.00

Parameters

Where the user has overridden a system-generated value, this original value is shown in square brackets after the value used.

* Indicates that the user locked the duration/timestep

Rainfall parameters (Rainfall - FEH 2013 model)

Name	Value	User-defined?
Duration (hh:mm:ss)	01:05:00 [03:30:00]*	Yes
Timestep (hh:mm:ss)	00:05:00 [00:30:00]*	Yes
SCF (Seasonal correction factor)	0.99	No
ARF (Areal reduction factor)	0.99	No
Seasonality	Summer [Winter]	Yes
Climate change factor	1.40	Yes

Loss model parameters

Name	Value	User-defined?
Cini (mm)	37.19	No
Cmax (mm)	867.38	No
Use alpha correction factor	No	No
Alpha correction factor	n/a	No

Routing model parameters

Name	Value	User-defined?
Tp (hr)	2.34 [1]	Yes
Up	0.65	No
Uk	0.8	No

Baseflow model parameters

Name	Value	User-defined?
BF0 (m ³ /s)	0	No
BL (hr)	55.19 [38.58]	Yes
BR	2.91	No

Urbanisation parameters

Name	Value	User-defined?
Urban area (km ²)	0	No
Urbext 2000	0	No
Impervious runoff factor	0.7	No
Imperviousness factor	0.4	No
Tp scaling factor	0.75	No
Depression storage depth (mm)	0.5	No
Exporting drained area (km ²)	0.00	Yes
Sewer capacity (m ³ /s)	0.00	Yes

Time series data

Time (hh:mm:ss)	Rain (mm)	Sewer Loss (mm)	Net Rain (mm)	Runoff (m³/s)	Baseflow (m³/s)	Total Flow (m³/s)
00:00:00	1.0850	0.0000	0.0472	0.0000	1.87E-05	1.87E-05
00:05:00	1.5125	0.0000	0.0681	0.0000	1.86E-05	1.89E-05
00:10:00	2.1494	0.0000	0.1012	0.0000	1.86E-05	1.98E-05
00:15:00	3.1396	0.0000	0.1575	0.0000	1.86E-05	2.17E-05
00:20:00	4.7963	0.0000	0.2625	0.0000	1.86E-05	2.51E-05
00:25:00	8.0971	0.0000	0.5033	0.0000	1.86E-05	3.09E-05
00:30:00	15.7853	0.0000	1.1985	0.0000	1.87E-05	4.12E-05
00:35:00	8.0971	0.0000	0.7263	0.0000	1.88E-05	6.13E-05
00:40:00	4.7963	0.0000	0.4658	0.0001	1.9E-05	9.26E-05
00:45:00	3.1396	0.0000	0.3193	0.0001	1.94E-05	0.000131
00:50:00	2.1494	0.0000	0.2252	0.0002	1.99E-05	0.000174
00:55:00	1.5125	0.0000	0.1616	0.0002	2.07E-05	0.00022
01:00:00	1.0850	0.0000	0.1176	0.0002	2.16E-05	0.000269
01:05:00	0.0000	0.0000	0.0000	0.0003	2.28E-05	0.000319
01:10:00	0.0000	0.0000	0.0000	0.0003	2.42E-05	0.000371
01:15:00	0.0000	0.0000	0.0000	0.0004	2.58E-05	0.000423
01:20:00	0.0000	0.0000	0.0000	0.0004	2.76E-05	0.000474
01:25:00	0.0000	0.0000	0.0000	0.0005	2.96E-05	0.000527
01:30:00	0.0000	0.0000	0.0000	0.0005	3.19E-05	0.000579
01:35:00	0.0000	0.0000	0.0000	0.0006	3.43E-05	0.000631
01:40:00	0.0000	0.0000	0.0000	0.0006	3.7E-05	0.000684
01:45:00	0.0000	0.0000	0.0000	0.0007	3.99E-05	0.000737
01:50:00	0.0000	0.0000	0.0000	0.0007	4.3E-05	0.00079
01:55:00	0.0000	0.0000	0.0000	0.0008	4.63E-05	0.000844
02:00:00	0.0000	0.0000	0.0000	0.0008	4.99E-05	0.000897
02:05:00	0.0000	0.0000	0.0000	0.0009	5.36E-05	0.000951
02:10:00	0.0000	0.0000	0.0000	0.0009	5.76E-05	0.00101
02:15:00	0.0000	0.0000	0.0000	0.0010	6.18E-05	0.00106
02:20:00	0.0000	0.0000	0.0000	0.0010	6.62E-05	0.00111
02:25:00	0.0000	0.0000	0.0000	0.0011	7.08E-05	0.00117
02:30:00	0.0000	0.0000	0.0000	0.0011	7.56E-05	0.00122
02:35:00	0.0000	0.0000	0.0000	0.0012	8.06E-05	0.00127
02:40:00	0.0000	0.0000	0.0000	0.0012	8.59E-05	0.00132
02:45:00	0.0000	0.0000	0.0000	0.0013	9.13E-05	0.00137
02:50:00	0.0000	0.0000	0.0000	0.0013	9.68E-05	0.00141

Time (hh:mm:ss)	Rain (mm)	Sewer Loss (mm)	Net Rain (mm)	Runoff (m³/s)	Baseflow (m³/s)	Total Flow (m³/s)
02:55:00	0.0000	0.0000	0.0000	0.0013	0.000102	0.00143
03:00:00	0.0000	0.0000	0.0000	0.0013	0.000108	0.00144
03:05:00	0.0000	0.0000	0.0000	0.0013	0.000114	0.00144
03:10:00	0.0000	0.0000	0.0000	0.0013	0.000119	0.00143
03:15:00	0.0000	0.0000	0.0000	0.0013	0.000125	0.00141
03:20:00	0.0000	0.0000	0.0000	0.0013	0.00013	0.00139
03:25:00	0.0000	0.0000	0.0000	0.0012	0.000136	0.00137
03:30:00	0.0000	0.0000	0.0000	0.0012	0.000141	0.00134
03:35:00	0.0000	0.0000	0.0000	0.0012	0.000146	0.00132
03:40:00	0.0000	0.0000	0.0000	0.0011	0.000151	0.00129
03:45:00	0.0000	0.0000	0.0000	0.0011	0.000155	0.00127
03:50:00	0.0000	0.0000	0.0000	0.0011	0.00016	0.00124
03:55:00	0.0000	0.0000	0.0000	0.0011	0.000164	0.00122
04:00:00	0.0000	0.0000	0.0000	0.0010	0.000169	0.00119
04:05:00	0.0000	0.0000	0.0000	0.0010	0.000173	0.00117
04:10:00	0.0000	0.0000	0.0000	0.0010	0.000177	0.00114
04:15:00	0.0000	0.0000	0.0000	0.0009	0.000181	0.00112
04:20:00	0.0000	0.0000	0.0000	0.0009	0.000185	0.00109
04:25:00	0.0000	0.0000	0.0000	0.0009	0.000188	0.00107
04:30:00	0.0000	0.0000	0.0000	0.0008	0.000192	0.00104
04:35:00	0.0000	0.0000	0.0000	0.0008	0.000195	0.00102
04:40:00	0.0000	0.0000	0.0000	0.0008	0.000198	0.00099
04:45:00	0.0000	0.0000	0.0000	0.0008	0.000202	0.000964
04:50:00	0.0000	0.0000	0.0000	0.0007	0.000205	0.000938
04:55:00	0.0000	0.0000	0.0000	0.0007	0.000207	0.000912
05:00:00	0.0000	0.0000	0.0000	0.0007	0.00021	0.000886
05:05:00	0.0000	0.0000	0.0000	0.0006	0.000213	0.000861
05:10:00	0.0000	0.0000	0.0000	0.0006	0.000215	0.000838
05:15:00	0.0000	0.0000	0.0000	0.0006	0.000218	0.000817
05:20:00	0.0000	0.0000	0.0000	0.0006	0.00022	0.0008
05:25:00	0.0000	0.0000	0.0000	0.0006	0.000222	0.000785
05:30:00	0.0000	0.0000	0.0000	0.0005	0.000224	0.000772
05:35:00	0.0000	0.0000	0.0000	0.0005	0.000226	0.000759
05:40:00	0.0000	0.0000	0.0000	0.0005	0.000228	0.000747
05:45:00	0.0000	0.0000	0.0000	0.0005	0.00023	0.000736
05:50:00	0.0000	0.0000	0.0000	0.0005	0.000232	0.000725

Time (hh:mm:ss)	Rain (mm)	Sewer Loss (mm)	Net Rain (mm)	Runoff (m³/s)	Baseflow (m³/s)	Total Flow (m³/s)
05:55:00	0.0000	0.0000	0.0000	0.0005	0.000234	0.000713
06:00:00	0.0000	0.0000	0.0000	0.0005	0.000235	0.000702
06:05:00	0.0000	0.0000	0.0000	0.0005	0.000237	0.000691
06:10:00	0.0000	0.0000	0.0000	0.0004	0.000239	0.000679
06:15:00	0.0000	0.0000	0.0000	0.0004	0.00024	0.000668
06:20:00	0.0000	0.0000	0.0000	0.0004	0.000242	0.000656
06:25:00	0.0000	0.0000	0.0000	0.0004	0.000243	0.000645
06:30:00	0.0000	0.0000	0.0000	0.0004	0.000244	0.000633
06:35:00	0.0000	0.0000	0.0000	0.0004	0.000246	0.000622
06:40:00	0.0000	0.0000	0.0000	0.0004	0.000247	0.00061
06:45:00	0.0000	0.0000	0.0000	0.0003	0.000248	0.000598
06:50:00	0.0000	0.0000	0.0000	0.0003	0.000249	0.000586
06:55:00	0.0000	0.0000	0.0000	0.0003	0.00025	0.000574
07:00:00	0.0000	0.0000	0.0000	0.0003	0.000251	0.000562
07:05:00	0.0000	0.0000	0.0000	0.0003	0.000252	0.00055
07:10:00	0.0000	0.0000	0.0000	0.0003	0.000253	0.000538
07:15:00	0.0000	0.0000	0.0000	0.0003	0.000254	0.000526
07:20:00	0.0000	0.0000	0.0000	0.0003	0.000255	0.000514
07:25:00	0.0000	0.0000	0.0000	0.0002	0.000256	0.000501
07:30:00	0.0000	0.0000	0.0000	0.0002	0.000256	0.000489
07:35:00	0.0000	0.0000	0.0000	0.0002	0.000257	0.000477
07:40:00	0.0000	0.0000	0.0000	0.0002	0.000257	0.000464
07:45:00	0.0000	0.0000	0.0000	0.0002	0.000258	0.000452
07:50:00	0.0000	0.0000	0.0000	0.0002	0.000258	0.000439
07:55:00	0.0000	0.0000	0.0000	0.0002	0.000259	0.000426
08:00:00	0.0000	0.0000	0.0000	0.0002	0.000259	0.000414
08:05:00	0.0000	0.0000	0.0000	0.0001	0.000259	0.000401
08:10:00	0.0000	0.0000	0.0000	0.0001	0.00026	0.000388
08:15:00	0.0000	0.0000	0.0000	0.0001	0.00026	0.000375
08:20:00	0.0000	0.0000	0.0000	0.0001	0.00026	0.000362
08:25:00	0.0000	0.0000	0.0000	0.0001	0.00026	0.000349
08:30:00	0.0000	0.0000	0.0000	0.0001	0.00026	0.000336
08:35:00	0.0000	0.0000	0.0000	0.0001	0.00026	0.000324
08:40:00	0.0000	0.0000	0.0000	0.0001	0.00026	0.000311
08:45:00	0.0000	0.0000	0.0000	0.0000	0.000259	0.000299
08:50:00	0.0000	0.0000	0.0000	0.0000	0.000259	0.000287

Time (hh:mm:ss)	Rain (mm)	Sewer Loss (mm)	Net Rain (mm)	Runoff (m³/s)	Baseflow (m³/s)	Total Flow (m³/s)
08:55:00	0.0000	0.0000	0.0000	0.0000	0.000259	0.000277
09:00:00	0.0000	0.0000	0.0000	0.0000	0.000258	0.000269
09:05:00	0.0000	0.0000	0.0000	0.0000	0.000258	0.000265
09:10:00	0.0000	0.0000	0.0000	0.0000	0.000258	0.000261
09:15:00	0.0000	0.0000	0.0000	0.0000	0.000257	0.000259
09:20:00	0.0000	0.0000	0.0000	0.0000	0.000257	0.000258
09:25:00	0.0000	0.0000	0.0000	0.0000	0.000257	0.000257
09:30:00	0.0000	0.0000	0.0000	0.0000	0.000256	0.000256
09:35:00	0.0000	0.0000	0.0000	0.0000	0.000256	0.000256
09:40:00	0.0000	0.0000	0.0000	0.0000	0.000255	0.000255
09:45:00	0.0000	0.0000	0.0000	0.0000	0.000255	0.000255
09:50:00	0.0000	0.0000	0.0000	0.0000	0.000255	0.000255
09:55:00	0.0000	0.0000	0.0000	0.0000	0.000254	0.000254
10:00:00	0.0000	0.0000	0.0000	0.0000	0.000254	0.000254
10:05:00	0.0000	0.0000	0.0000	0.0000	0.000254	0.000254
10:10:00	0.0000	0.0000	0.0000	0.0000	0.000253	0.000253
10:15:00	0.0000	0.0000	0.0000	0.0000	0.000253	0.000253
10:20:00	0.0000	0.0000	0.0000	0.0000	0.000252	0.000252
10:25:00	0.0000	0.0000	0.0000	0.0000	0.000252	0.000252
10:30:00	0.0000	0.0000	0.0000	0.0000	0.000252	0.000252
10:35:00	0.0000	0.0000	0.0000	0.0000	0.000251	0.000251
10:40:00	0.0000	0.0000	0.0000	0.0000	0.000251	0.000251
10:45:00	0.0000	0.0000	0.0000	0.0000	0.00025	0.00025
10:50:00	0.0000	0.0000	0.0000	0.0000	0.00025	0.00025
10:55:00	0.0000	0.0000	0.0000	0.0000	0.00025	0.00025
11:00:00	0.0000	0.0000	0.0000	0.0000	0.000249	0.000249
11:05:00	0.0000	0.0000	0.0000	0.0000	0.000249	0.000249
11:10:00	0.0000	0.0000	0.0000	0.0000	0.000249	0.000249
11:15:00	0.0000	0.0000	0.0000	0.0000	0.000248	0.000248
11:20:00	0.0000	0.0000	0.0000	0.0000	0.000248	0.000248
11:25:00	0.0000	0.0000	0.0000	0.0000	0.000247	0.000247
11:30:00	0.0000	0.0000	0.0000	0.0000	0.000247	0.000247
11:35:00	0.0000	0.0000	0.0000	0.0000	0.000247	0.000247
11:40:00	0.0000	0.0000	0.0000	0.0000	0.000246	0.000246
11:45:00	0.0000	0.0000	0.0000	0.0000	0.000246	0.000246
11:50:00	0.0000	0.0000	0.0000	0.0000	0.000246	0.000246

Time (hh:mm:ss)	Rain (mm)	Sewer Loss (mm)	Net Rain (mm)	Runoff (m³/s)	Baseflow (m³/s)	Total Flow (m³/s)
11:55:00	0.0000	0.0000	0.0000	0.0000	0.000245	0.000245
12:00:00	0.0000	0.0000	0.0000	0.0000	0.000245	0.000245
12:05:00	0.0000	0.0000	0.0000	0.0000	0.000245	0.000245
12:10:00	0.0000	0.0000	0.0000	0.0000	0.000244	0.000244
12:15:00	0.0000	0.0000	0.0000	0.0000	0.000244	0.000244
12:20:00	0.0000	0.0000	0.0000	0.0000	0.000243	0.000243
12:25:00	0.0000	0.0000	0.0000	0.0000	0.000243	0.000243
12:30:00	0.0000	0.0000	0.0000	0.0000	0.000243	0.000243
12:35:00	0.0000	0.0000	0.0000	0.0000	0.000242	0.000242
12:40:00	0.0000	0.0000	0.0000	0.0000	0.000242	0.000242
12:45:00	0.0000	0.0000	0.0000	0.0000	0.000242	0.000242
12:50:00	0.0000	0.0000	0.0000	0.0000	0.000241	0.000241
12:55:00	0.0000	0.0000	0.0000	0.0000	0.000241	0.000241
13:00:00	0.0000	0.0000	0.0000	0.0000	0.00024	0.00024
13:05:00	0.0000	0.0000	0.0000	0.0000	0.00024	0.00024
13:10:00	0.0000	0.0000	0.0000	0.0000	0.00024	0.00024
13:15:00	0.0000	0.0000	0.0000	0.0000	0.000239	0.000239
13:20:00	0.0000	0.0000	0.0000	0.0000	0.000239	0.000239
13:25:00	0.0000	0.0000	0.0000	0.0000	0.000239	0.000239
13:30:00	0.0000	0.0000	0.0000	0.0000	0.000238	0.000238
13:35:00	0.0000	0.0000	0.0000	0.0000	0.000238	0.000238
13:40:00	0.0000	0.0000	0.0000	0.0000	0.000238	0.000238
13:45:00	0.0000	0.0000	0.0000	0.0000	0.000237	0.000237
13:50:00	0.0000	0.0000	0.0000	0.0000	0.000237	0.000237
13:55:00	0.0000	0.0000	0.0000	0.0000	0.000237	0.000237
14:00:00	0.0000	0.0000	0.0000	0.0000	0.000236	0.000236
14:05:00	0.0000	0.0000	0.0000	0.0000	0.000236	0.000236
14:10:00	0.0000	0.0000	0.0000	0.0000	0.000235	0.000235
14:15:00	0.0000	0.0000	0.0000	0.0000	0.000235	0.000235
14:20:00	0.0000	0.0000	0.0000	0.0000	0.000235	0.000235
14:25:00	0.0000	0.0000	0.0000	0.0000	0.000234	0.000234
14:30:00	0.0000	0.0000	0.0000	0.0000	0.000234	0.000234
14:35:00	0.0000	0.0000	0.0000	0.0000	0.000234	0.000234
14:40:00	0.0000	0.0000	0.0000	0.0000	0.000233	0.000233
14:45:00	0.0000	0.0000	0.0000	0.0000	0.000233	0.000233
14:50:00	0.0000	0.0000	0.0000	0.0000	0.000233	0.000233

Time (hh:mm:ss)	Rain (mm)	Sewer Loss (mm)	Net Rain (mm)	Runoff (m³/s)	Baseflow (m³/s)	Total Flow (m³/s)
14:55:00	0.0000	0.0000	0.0000	0.0000	0.000232	0.000232
15:00:00	0.0000	0.0000	0.0000	0.0000	0.000232	0.000232
15:05:00	0.0000	0.0000	0.0000	0.0000	0.000232	0.000232
15:10:00	0.0000	0.0000	0.0000	0.0000	0.000231	0.000231
15:15:00	0.0000	0.0000	0.0000	0.0000	0.000231	0.000231
15:20:00	0.0000	0.0000	0.0000	0.0000	0.000231	0.000231
15:25:00	0.0000	0.0000	0.0000	0.0000	0.00023	0.00023
15:30:00	0.0000	0.0000	0.0000	0.0000	0.00023	0.00023
15:35:00	0.0000	0.0000	0.0000	0.0000	0.000229	0.000229
15:40:00	0.0000	0.0000	0.0000	0.0000	0.000229	0.000229
15:45:00	0.0000	0.0000	0.0000	0.0000	0.000229	0.000229
15:50:00	0.0000	0.0000	0.0000	0.0000	0.000228	0.000228
15:55:00	0.0000	0.0000	0.0000	0.0000	0.000228	0.000228
16:00:00	0.0000	0.0000	0.0000	0.0000	0.000228	0.000228
16:05:00	0.0000	0.0000	0.0000	0.0000	0.000227	0.000227
16:10:00	0.0000	0.0000	0.0000	0.0000	0.000227	0.000227
16:15:00	0.0000	0.0000	0.0000	0.0000	0.000227	0.000227
16:20:00	0.0000	0.0000	0.0000	0.0000	0.000226	0.000226
16:25:00	0.0000	0.0000	0.0000	0.0000	0.000226	0.000226
16:30:00	0.0000	0.0000	0.0000	0.0000	0.000226	0.000226
16:35:00	0.0000	0.0000	0.0000	0.0000	0.000225	0.000225
16:40:00	0.0000	0.0000	0.0000	0.0000	0.000225	0.000225
16:45:00	0.0000	0.0000	0.0000	0.0000	0.000225	0.000225
16:50:00	0.0000	0.0000	0.0000	0.0000	0.000224	0.000224
16:55:00	0.0000	0.0000	0.0000	0.0000	0.000224	0.000224
17:00:00	0.0000	0.0000	0.0000	0.0000	0.000224	0.000224
17:05:00	0.0000	0.0000	0.0000	0.0000	0.000223	0.000223
17:10:00	0.0000	0.0000	0.0000	0.0000	0.000223	0.000223
17:15:00	0.0000	0.0000	0.0000	0.0000	0.000223	0.000223
17:20:00	0.0000	0.0000	0.0000	0.0000	0.000222	0.000222
17:25:00	0.0000	0.0000	0.0000	0.0000	0.000222	0.000222
17:30:00	0.0000	0.0000	0.0000	0.0000	0.000222	0.000222
17:35:00	0.0000	0.0000	0.0000	0.0000	0.000221	0.000221
17:40:00	0.0000	0.0000	0.0000	0.0000	0.000221	0.000221
17:45:00	0.0000	0.0000	0.0000	0.0000	0.000221	0.000221
17:50:00	0.0000	0.0000	0.0000	0.0000	0.00022	0.00022

Time (hh:mm:ss)	Rain (mm)	Sewer Loss (mm)	Net Rain (mm)	Runoff (m³/s)	Baseflow (m³/s)	Total Flow (m³/s)
17:55:00	0.0000	0.0000	0.0000	0.0000	0.00022	0.00022
18:00:00	0.0000	0.0000	0.0000	0.0000	0.00022	0.00022
18:05:00	0.0000	0.0000	0.0000	0.0000	0.000219	0.000219
18:10:00	0.0000	0.0000	0.0000	0.0000	0.000219	0.000219
18:15:00	0.0000	0.0000	0.0000	0.0000	0.000219	0.000219
18:20:00	0.0000	0.0000	0.0000	0.0000	0.000218	0.000218
18:25:00	0.0000	0.0000	0.0000	0.0000	0.000218	0.000218
18:30:00	0.0000	0.0000	0.0000	0.0000	0.000218	0.000218
18:35:00	0.0000	0.0000	0.0000	0.0000	0.000217	0.000217
18:40:00	0.0000	0.0000	0.0000	0.0000	0.000217	0.000217
18:45:00	0.0000	0.0000	0.0000	0.0000	0.000217	0.000217
18:50:00	0.0000	0.0000	0.0000	0.0000	0.000216	0.000216
18:55:00	0.0000	0.0000	0.0000	0.0000	0.000216	0.000216
19:00:00	0.0000	0.0000	0.0000	0.0000	0.000216	0.000216
19:05:00	0.0000	0.0000	0.0000	0.0000	0.000215	0.000215
19:10:00	0.0000	0.0000	0.0000	0.0000	0.000215	0.000215
19:15:00	0.0000	0.0000	0.0000	0.0000	0.000215	0.000215
19:20:00	0.0000	0.0000	0.0000	0.0000	0.000214	0.000214
19:25:00	0.0000	0.0000	0.0000	0.0000	0.000214	0.000214
19:30:00	0.0000	0.0000	0.0000	0.0000	0.000214	0.000214
19:35:00	0.0000	0.0000	0.0000	0.0000	0.000213	0.000213
19:40:00	0.0000	0.0000	0.0000	0.0000	0.000213	0.000213
19:45:00	0.0000	0.0000	0.0000	0.0000	0.000213	0.000213
19:50:00	0.0000	0.0000	0.0000	0.0000	0.000212	0.000212
19:55:00	0.0000	0.0000	0.0000	0.0000	0.000212	0.000212
20:00:00	0.0000	0.0000	0.0000	0.0000	0.000212	0.000212
20:05:00	0.0000	0.0000	0.0000	0.0000	0.000212	0.000212
20:10:00	0.0000	0.0000	0.0000	0.0000	0.000211	0.000211
20:15:00	0.0000	0.0000	0.0000	0.0000	0.000211	0.000211
20:20:00	0.0000	0.0000	0.0000	0.0000	0.000211	0.000211
20:25:00	0.0000	0.0000	0.0000	0.0000	0.00021	0.00021
20:30:00	0.0000	0.0000	0.0000	0.0000	0.00021	0.00021
20:35:00	0.0000	0.0000	0.0000	0.0000	0.00021	0.00021
20:40:00	0.0000	0.0000	0.0000	0.0000	0.000209	0.000209
20:45:00	0.0000	0.0000	0.0000	0.0000	0.000209	0.000209
20:50:00	0.0000	0.0000	0.0000	0.0000	0.000209	0.000209

Time (hh:mm:ss)	Rain (mm)	Sewer Loss (mm)	Net Rain (mm)	Runoff (m³/s)	Baseflow (m³/s)	Total Flow (m³/s)
20:55:00	0.0000	0.0000	0.0000	0.0000	0.000208	0.000208
21:00:00	0.0000	0.0000	0.0000	0.0000	0.000208	0.000208
21:05:00	0.0000	0.0000	0.0000	0.0000	0.000208	0.000208
21:10:00	0.0000	0.0000	0.0000	0.0000	0.000207	0.000207
21:15:00	0.0000	0.0000	0.0000	0.0000	0.000207	0.000207
21:20:00	0.0000	0.0000	0.0000	0.0000	0.000207	0.000207
21:25:00	0.0000	0.0000	0.0000	0.0000	0.000206	0.000206
21:30:00	0.0000	0.0000	0.0000	0.0000	0.000206	0.000206
21:35:00	0.0000	0.0000	0.0000	0.0000	0.000206	0.000206
21:40:00	0.0000	0.0000	0.0000	0.0000	0.000206	0.000206
21:45:00	0.0000	0.0000	0.0000	0.0000	0.000205	0.000205
21:50:00	0.0000	0.0000	0.0000	0.0000	0.000205	0.000205
21:55:00	0.0000	0.0000	0.0000	0.0000	0.000205	0.000205
22:00:00	0.0000	0.0000	0.0000	0.0000	0.000204	0.000204
22:05:00	0.0000	0.0000	0.0000	0.0000	0.000204	0.000204
22:10:00	0.0000	0.0000	0.0000	0.0000	0.000204	0.000204
22:15:00	0.0000	0.0000	0.0000	0.0000	0.000203	0.000203
22:20:00	0.0000	0.0000	0.0000	0.0000	0.000203	0.000203
22:25:00	0.0000	0.0000	0.0000	0.0000	0.000203	0.000203
22:30:00	0.0000	0.0000	0.0000	0.0000	0.000202	0.000202
22:35:00	0.0000	0.0000	0.0000	0.0000	0.000202	0.000202
22:40:00	0.0000	0.0000	0.0000	0.0000	0.000202	0.000202
22:45:00	0.0000	0.0000	0.0000	0.0000	0.000202	0.000202
22:50:00	0.0000	0.0000	0.0000	0.0000	0.000201	0.000201
22:55:00	0.0000	0.0000	0.0000	0.0000	0.000201	0.000201
23:00:00	0.0000	0.0000	0.0000	0.0000	0.000201	0.000201
23:05:00	0.0000	0.0000	0.0000	0.0000	0.0002	0.0002
23:10:00	0.0000	0.0000	0.0000	0.0000	0.0002	0.0002
23:15:00	0.0000	0.0000	0.0000	0.0000	0.0002	0.0002
23:20:00	0.0000	0.0000	0.0000	0.0000	0.000199	0.000199
23:25:00	0.0000	0.0000	0.0000	0.0000	0.000199	0.000199
23:30:00	0.0000	0.0000	0.0000	0.0000	0.000199	0.000199
23:35:00	0.0000	0.0000	0.0000	0.0000	0.000199	0.000199
23:40:00	0.0000	0.0000	0.0000	0.0000	0.000198	0.000198
23:45:00	0.0000	0.0000	0.0000	0.0000	0.000198	0.000198
23:50:00	0.0000	0.0000	0.0000	0.0000	0.000198	0.000198

Time (hh:mm:ss)	Rain (mm)	Sewer Loss (mm)	Net Rain (mm)	Runoff (m³/s)	Baseflow (m³/s)	Total Flow (m³/s)
23:55:00	0.0000	0.0000	0.0000	0.0000	0.000197	0.000197
24:00:00	0.0000	0.0000	0.0000	0.0000	0.000197	0.000197
24:05:00	0.0000	0.0000	0.0000	0.0000	0.000197	0.000197
24:10:00	0.0000	0.0000	0.0000	0.0000	0.000196	0.000196
24:15:00	0.0000	0.0000	0.0000	0.0000	0.000196	0.000196
24:20:00	0.0000	0.0000	0.0000	0.0000	0.000196	0.000196
24:25:00	0.0000	0.0000	0.0000	0.0000	0.000196	0.000196
24:30:00	0.0000	0.0000	0.0000	0.0000	0.000195	0.000195
24:35:00	0.0000	0.0000	0.0000	0.0000	0.000195	0.000195
24:40:00	0.0000	0.0000	0.0000	0.0000	0.000195	0.000195
24:45:00	0.0000	0.0000	0.0000	0.0000	0.000194	0.000194
24:50:00	0.0000	0.0000	0.0000	0.0000	0.000194	0.000194
24:55:00	0.0000	0.0000	0.0000	0.0000	0.000194	0.000194
25:00:00	0.0000	0.0000	0.0000	0.0000	0.000193	0.000193
25:05:00	0.0000	0.0000	0.0000	0.0000	0.000193	0.000193
25:10:00	0.0000	0.0000	0.0000	0.0000	0.000193	0.000193
25:15:00	0.0000	0.0000	0.0000	0.0000	0.000193	0.000193
25:20:00	0.0000	0.0000	0.0000	0.0000	0.000192	0.000192
25:25:00	0.0000	0.0000	0.0000	0.0000	0.000192	0.000192
25:30:00	0.0000	0.0000	0.0000	0.0000	0.000192	0.000192
25:35:00	0.0000	0.0000	0.0000	0.0000	0.000191	0.000191
25:40:00	0.0000	0.0000	0.0000	0.0000	0.000191	0.000191
25:45:00	0.0000	0.0000	0.0000	0.0000	0.000191	0.000191
25:50:00	0.0000	0.0000	0.0000	0.0000	0.000191	0.000191
25:55:00	0.0000	0.0000	0.0000	0.0000	0.00019	0.00019
26:00:00	0.0000	0.0000	0.0000	0.0000	0.00019	0.00019
26:05:00	0.0000	0.0000	0.0000	0.0000	0.00019	0.00019
26:10:00	0.0000	0.0000	0.0000	0.0000	0.000189	0.000189
26:15:00	0.0000	0.0000	0.0000	0.0000	0.000189	0.000189
26:20:00	0.0000	0.0000	0.0000	0.0000	0.000189	0.000189
26:25:00	0.0000	0.0000	0.0000	0.0000	0.000189	0.000189
26:30:00	0.0000	0.0000	0.0000	0.0000	0.000188	0.000188
26:35:00	0.0000	0.0000	0.0000	0.0000	0.000188	0.000188
26:40:00	0.0000	0.0000	0.0000	0.0000	0.000188	0.000188
26:45:00	0.0000	0.0000	0.0000	0.0000	0.000187	0.000187
26:50:00	0.0000	0.0000	0.0000	0.0000	0.000187	0.000187

Time (hh:mm:ss)	Rain (mm)	Sewer Loss (mm)	Net Rain (mm)	Runoff (m³/s)	Baseflow (m³/s)	Total Flow (m³/s)
26:55:00	0.0000	0.0000	0.0000	0.0000	0.000187	0.000187
27:00:00	0.0000	0.0000	0.0000	0.0000	0.000187	0.000187
27:05:00	0.0000	0.0000	0.0000	0.0000	0.000186	0.000186
27:10:00	0.0000	0.0000	0.0000	0.0000	0.000186	0.000186
27:15:00	0.0000	0.0000	0.0000	0.0000	0.000186	0.000186
27:20:00	0.0000	0.0000	0.0000	0.0000	0.000185	0.000185
27:25:00	0.0000	0.0000	0.0000	0.0000	0.000185	0.000185
27:30:00	0.0000	0.0000	0.0000	0.0000	0.000185	0.000185
27:35:00	0.0000	0.0000	0.0000	0.0000	0.000185	0.000185
27:40:00	0.0000	0.0000	0.0000	0.0000	0.000184	0.000184
27:45:00	0.0000	0.0000	0.0000	0.0000	0.000184	0.000184
27:50:00	0.0000	0.0000	0.0000	0.0000	0.000184	0.000184
27:55:00	0.0000	0.0000	0.0000	0.0000	0.000184	0.000184
28:00:00	0.0000	0.0000	0.0000	0.0000	0.000183	0.000183
28:05:00	0.0000	0.0000	0.0000	0.0000	0.000183	0.000183
28:10:00	0.0000	0.0000	0.0000	0.0000	0.000183	0.000183
28:15:00	0.0000	0.0000	0.0000	0.0000	0.000182	0.000182
28:20:00	0.0000	0.0000	0.0000	0.0000	0.000182	0.000182
28:25:00	0.0000	0.0000	0.0000	0.0000	0.000182	0.000182
28:30:00	0.0000	0.0000	0.0000	0.0000	0.000182	0.000182
28:35:00	0.0000	0.0000	0.0000	0.0000	0.000181	0.000181
28:40:00	0.0000	0.0000	0.0000	0.0000	0.000181	0.000181
28:45:00	0.0000	0.0000	0.0000	0.0000	0.000181	0.000181
28:50:00	0.0000	0.0000	0.0000	0.0000	0.000181	0.000181
28:55:00	0.0000	0.0000	0.0000	0.0000	0.00018	0.00018
29:00:00	0.0000	0.0000	0.0000	0.0000	0.00018	0.00018
29:05:00	0.0000	0.0000	0.0000	0.0000	0.00018	0.00018
29:10:00	0.0000	0.0000	0.0000	0.0000	0.000179	0.000179
29:15:00	0.0000	0.0000	0.0000	0.0000	0.000179	0.000179
29:20:00	0.0000	0.0000	0.0000	0.0000	0.000179	0.000179
29:25:00	0.0000	0.0000	0.0000	0.0000	0.000179	0.000179
29:30:00	0.0000	0.0000	0.0000	0.0000	0.000178	0.000178
29:35:00	0.0000	0.0000	0.0000	0.0000	0.000178	0.000178
29:40:00	0.0000	0.0000	0.0000	0.0000	0.000178	0.000178
29:45:00	0.0000	0.0000	0.0000	0.0000	0.000178	0.000178
29:50:00	0.0000	0.0000	0.0000	0.0000	0.000177	0.000177

Time (hh:mm:ss)	Rain (mm)	Sewer Loss (mm)	Net Rain (mm)	Runoff (m³/s)	Baseflow (m³/s)	Total Flow (m³/s)
29:55:00	0.0000	0.0000	0.0000	0.0000	0.000177	0.000177
30:00:00	0.0000	0.0000	0.0000	0.0000	0.000177	0.000177
30:05:00	0.0000	0.0000	0.0000	0.0000	0.000176	0.000176
30:10:00	0.0000	0.0000	0.0000	0.0000	0.000176	0.000176
30:15:00	0.0000	0.0000	0.0000	0.0000	0.000176	0.000176
30:20:00	0.0000	0.0000	0.0000	0.0000	0.000176	0.000176
30:25:00	0.0000	0.0000	0.0000	0.0000	0.000175	0.000175
30:30:00	0.0000	0.0000	0.0000	0.0000	0.000175	0.000175
30:35:00	0.0000	0.0000	0.0000	0.0000	0.000175	0.000175
30:40:00	0.0000	0.0000	0.0000	0.0000	0.000175	0.000175
30:45:00	0.0000	0.0000	0.0000	0.0000	0.000174	0.000174
30:50:00	0.0000	0.0000	0.0000	0.0000	0.000174	0.000174
30:55:00	0.0000	0.0000	0.0000	0.0000	0.000174	0.000174
31:00:00	0.0000	0.0000	0.0000	0.0000	0.000174	0.000174
31:05:00	0.0000	0.0000	0.0000	0.0000	0.000173	0.000173
31:10:00	0.0000	0.0000	0.0000	0.0000	0.000173	0.000173
31:15:00	0.0000	0.0000	0.0000	0.0000	0.000173	0.000173
31:20:00	0.0000	0.0000	0.0000	0.0000	0.000173	0.000173
31:25:00	0.0000	0.0000	0.0000	0.0000	0.000172	0.000172
31:30:00	0.0000	0.0000	0.0000	0.0000	0.000172	0.000172
31:35:00	0.0000	0.0000	0.0000	0.0000	0.000172	0.000172
31:40:00	0.0000	0.0000	0.0000	0.0000	0.000171	0.000171
31:45:00	0.0000	0.0000	0.0000	0.0000	0.000171	0.000171
31:50:00	0.0000	0.0000	0.0000	0.0000	0.000171	0.000171
31:55:00	0.0000	0.0000	0.0000	0.0000	0.000171	0.000171
32:00:00	0.0000	0.0000	0.0000	0.0000	0.00017	0.00017
32:05:00	0.0000	0.0000	0.0000	0.0000	0.00017	0.00017
32:10:00	0.0000	0.0000	0.0000	0.0000	0.00017	0.00017
32:15:00	0.0000	0.0000	0.0000	0.0000	0.00017	0.00017
32:20:00	0.0000	0.0000	0.0000	0.0000	0.000169	0.000169
32:25:00	0.0000	0.0000	0.0000	0.0000	0.000169	0.000169
32:30:00	0.0000	0.0000	0.0000	0.0000	0.000169	0.000169
32:35:00	0.0000	0.0000	0.0000	0.0000	0.000169	0.000169
32:40:00	0.0000	0.0000	0.0000	0.0000	0.000168	0.000168
32:45:00	0.0000	0.0000	0.0000	0.0000	0.000168	0.000168
32:50:00	0.0000	0.0000	0.0000	0.0000	0.000168	0.000168

Time (hh:mm:ss)	Rain (mm)	Sewer Loss (mm)	Net Rain (mm)	Runoff (m³/s)	Baseflow (m³/s)	Total Flow (m³/s)
32:55:00	0.0000	0.0000	0.0000	0.0000	0.000168	0.000168
33:00:00	0.0000	0.0000	0.0000	0.0000	0.000167	0.000167
33:05:00	0.0000	0.0000	0.0000	0.0000	0.000167	0.000167
33:10:00	0.0000	0.0000	0.0000	0.0000	0.000167	0.000167
33:15:00	0.0000	0.0000	0.0000	0.0000	0.000167	0.000167
33:20:00	0.0000	0.0000	0.0000	0.0000	0.000166	0.000166
33:25:00	0.0000	0.0000	0.0000	0.0000	0.000166	0.000166
33:30:00	0.0000	0.0000	0.0000	0.0000	0.000166	0.000166
33:35:00	0.0000	0.0000	0.0000	0.0000	0.000166	0.000166
33:40:00	0.0000	0.0000	0.0000	0.0000	0.000165	0.000165
33:45:00	0.0000	0.0000	0.0000	0.0000	0.000165	0.000165
33:50:00	0.0000	0.0000	0.0000	0.0000	0.000165	0.000165
33:55:00	0.0000	0.0000	0.0000	0.0000	0.000165	0.000165
34:00:00	0.0000	0.0000	0.0000	0.0000	0.000164	0.000164
34:05:00	0.0000	0.0000	0.0000	0.0000	0.000164	0.000164
34:10:00	0.0000	0.0000	0.0000	0.0000	0.000164	0.000164
34:15:00	0.0000	0.0000	0.0000	0.0000	0.000164	0.000164
34:20:00	0.0000	0.0000	0.0000	0.0000	0.000163	0.000163
34:25:00	0.0000	0.0000	0.0000	0.0000	0.000163	0.000163
34:30:00	0.0000	0.0000	0.0000	0.0000	0.000163	0.000163
34:35:00	0.0000	0.0000	0.0000	0.0000	0.000163	0.000163
34:40:00	0.0000	0.0000	0.0000	0.0000	0.000162	0.000162
34:45:00	0.0000	0.0000	0.0000	0.0000	0.000162	0.000162
34:50:00	0.0000	0.0000	0.0000	0.0000	0.000162	0.000162
34:55:00	0.0000	0.0000	0.0000	0.0000	0.000162	0.000162
35:00:00	0.0000	0.0000	0.0000	0.0000	0.000161	0.000161
35:05:00	0.0000	0.0000	0.0000	0.0000	0.000161	0.000161
35:10:00	0.0000	0.0000	0.0000	0.0000	0.000161	0.000161
35:15:00	0.0000	0.0000	0.0000	0.0000	0.000161	0.000161
35:20:00	0.0000	0.0000	0.0000	0.0000	0.00016	0.00016
35:25:00	0.0000	0.0000	0.0000	0.0000	0.00016	0.00016
35:30:00	0.0000	0.0000	0.0000	0.0000	0.00016	0.00016
35:35:00	0.0000	0.0000	0.0000	0.0000	0.00016	0.00016
35:40:00	0.0000	0.0000	0.0000	0.0000	0.000159	0.000159
35:45:00	0.0000	0.0000	0.0000	0.0000	0.000159	0.000159
35:50:00	0.0000	0.0000	0.0000	0.0000	0.000159	0.000159

Time (hh:mm:ss)	Rain (mm)	Sewer Loss (mm)	Net Rain (mm)	Runoff (m³/s)	Baseflow (m³/s)	Total Flow (m³/s)
35:55:00	0.0000	0.0000	0.0000	0.0000	0.000159	0.000159
36:00:00	0.0000	0.0000	0.0000	0.0000	0.000159	0.000159
36:05:00	0.0000	0.0000	0.0000	0.0000	0.000158	0.000158
36:10:00	0.0000	0.0000	0.0000	0.0000	0.000158	0.000158
36:15:00	0.0000	0.0000	0.0000	0.0000	0.000158	0.000158
36:20:00	0.0000	0.0000	0.0000	0.0000	0.000158	0.000158
36:25:00	0.0000	0.0000	0.0000	0.0000	0.000157	0.000157
36:30:00	0.0000	0.0000	0.0000	0.0000	0.000157	0.000157
36:35:00	0.0000	0.0000	0.0000	0.0000	0.000157	0.000157
36:40:00	0.0000	0.0000	0.0000	0.0000	0.000157	0.000157
36:45:00	0.0000	0.0000	0.0000	0.0000	0.000156	0.000156
36:50:00	0.0000	0.0000	0.0000	0.0000	0.000156	0.000156
36:55:00	0.0000	0.0000	0.0000	0.0000	0.000156	0.000156
37:00:00	0.0000	0.0000	0.0000	0.0000	0.000156	0.000156
37:05:00	0.0000	0.0000	0.0000	0.0000	0.000155	0.000155
37:10:00	0.0000	0.0000	0.0000	0.0000	0.000155	0.000155
37:15:00	0.0000	0.0000	0.0000	0.0000	0.000155	0.000155
37:20:00	0.0000	0.0000	0.0000	0.0000	0.000155	0.000155
37:25:00	0.0000	0.0000	0.0000	0.0000	0.000155	0.000155
37:30:00	0.0000	0.0000	0.0000	0.0000	0.000154	0.000154
37:35:00	0.0000	0.0000	0.0000	0.0000	0.000154	0.000154
37:40:00	0.0000	0.0000	0.0000	0.0000	0.000154	0.000154
37:45:00	0.0000	0.0000	0.0000	0.0000	0.000154	0.000154
37:50:00	0.0000	0.0000	0.0000	0.0000	0.000153	0.000153
37:55:00	0.0000	0.0000	0.0000	0.0000	0.000153	0.000153
38:00:00	0.0000	0.0000	0.0000	0.0000	0.000153	0.000153
38:05:00	0.0000	0.0000	0.0000	0.0000	0.000153	0.000153
38:10:00	0.0000	0.0000	0.0000	0.0000	0.000152	0.000152
38:15:00	0.0000	0.0000	0.0000	0.0000	0.000152	0.000152
38:20:00	0.0000	0.0000	0.0000	0.0000	0.000152	0.000152
38:25:00	0.0000	0.0000	0.0000	0.0000	0.000152	0.000152
38:30:00	0.0000	0.0000	0.0000	0.0000	0.000152	0.000152
38:35:00	0.0000	0.0000	0.0000	0.0000	0.000151	0.000151
38:40:00	0.0000	0.0000	0.0000	0.0000	0.000151	0.000151
38:45:00	0.0000	0.0000	0.0000	0.0000	0.000151	0.000151
38:50:00	0.0000	0.0000	0.0000	0.0000	0.000151	0.000151

Time (hh:mm:ss)	Rain (mm)	Sewer Loss (mm)	Net Rain (mm)	Runoff (m³/s)	Baseflow (m³/s)	Total Flow (m³/s)
38:55:00	0.0000	0.0000	0.0000	0.0000	0.00015	0.00015
39:00:00	0.0000	0.0000	0.0000	0.0000	0.00015	0.00015
39:05:00	0.0000	0.0000	0.0000	0.0000	0.00015	0.00015
39:10:00	0.0000	0.0000	0.0000	0.0000	0.00015	0.00015
39:15:00	0.0000	0.0000	0.0000	0.0000	0.000149	0.000149
39:20:00	0.0000	0.0000	0.0000	0.0000	0.000149	0.000149
39:25:00	0.0000	0.0000	0.0000	0.0000	0.000149	0.000149
39:30:00	0.0000	0.0000	0.0000	0.0000	0.000149	0.000149
39:35:00	0.0000	0.0000	0.0000	0.0000	0.000149	0.000149
39:40:00	0.0000	0.0000	0.0000	0.0000	0.000148	0.000148
39:45:00	0.0000	0.0000	0.0000	0.0000	0.000148	0.000148
39:50:00	0.0000	0.0000	0.0000	0.0000	0.000148	0.000148
39:55:00	0.0000	0.0000	0.0000	0.0000	0.000148	0.000148
40:00:00	0.0000	0.0000	0.0000	0.0000	0.000147	0.000147
40:05:00	0.0000	0.0000	0.0000	0.0000	0.000147	0.000147
40:10:00	0.0000	0.0000	0.0000	0.0000	0.000147	0.000147
40:15:00	0.0000	0.0000	0.0000	0.0000	0.000147	0.000147
40:20:00	0.0000	0.0000	0.0000	0.0000	0.000147	0.000147
40:25:00	0.0000	0.0000	0.0000	0.0000	0.000146	0.000146
40:30:00	0.0000	0.0000	0.0000	0.0000	0.000146	0.000146
40:35:00	0.0000	0.0000	0.0000	0.0000	0.000146	0.000146
40:40:00	0.0000	0.0000	0.0000	0.0000	0.000146	0.000146
40:45:00	0.0000	0.0000	0.0000	0.0000	0.000145	0.000145
40:50:00	0.0000	0.0000	0.0000	0.0000	0.000145	0.000145
40:55:00	0.0000	0.0000	0.0000	0.0000	0.000145	0.000145
41:00:00	0.0000	0.0000	0.0000	0.0000	0.000145	0.000145
41:05:00	0.0000	0.0000	0.0000	0.0000	0.000145	0.000145
41:10:00	0.0000	0.0000	0.0000	0.0000	0.000144	0.000144
41:15:00	0.0000	0.0000	0.0000	0.0000	0.000144	0.000144
41:20:00	0.0000	0.0000	0.0000	0.0000	0.000144	0.000144
41:25:00	0.0000	0.0000	0.0000	0.0000	0.000144	0.000144
41:30:00	0.0000	0.0000	0.0000	0.0000	0.000143	0.000143
41:35:00	0.0000	0.0000	0.0000	0.0000	0.000143	0.000143
41:40:00	0.0000	0.0000	0.0000	0.0000	0.000143	0.000143
41:45:00	0.0000	0.0000	0.0000	0.0000	0.000143	0.000143
41:50:00	0.0000	0.0000	0.0000	0.0000	0.000143	0.000143

Time (hh:mm:ss)	Rain (mm)	Sewer Loss (mm)	Net Rain (mm)	Runoff (m³/s)	Baseflow (m³/s)	Total Flow (m³/s)
41:55:00	0.0000	0.0000	0.0000	0.0000	0.000142	0.000142
42:00:00	0.0000	0.0000	0.0000	0.0000	0.000142	0.000142
42:05:00	0.0000	0.0000	0.0000	0.0000	0.000142	0.000142
42:10:00	0.0000	0.0000	0.0000	0.0000	0.000142	0.000142
42:15:00	0.0000	0.0000	0.0000	0.0000	0.000142	0.000142
42:20:00	0.0000	0.0000	0.0000	0.0000	0.000141	0.000141
42:25:00	0.0000	0.0000	0.0000	0.0000	0.000141	0.000141
42:30:00	0.0000	0.0000	0.0000	0.0000	0.000141	0.000141
42:35:00	0.0000	0.0000	0.0000	0.0000	0.000141	0.000141
42:40:00	0.0000	0.0000	0.0000	0.0000	0.00014	0.00014
42:45:00	0.0000	0.0000	0.0000	0.0000	0.00014	0.00014
42:50:00	0.0000	0.0000	0.0000	0.0000	0.00014	0.00014
42:55:00	0.0000	0.0000	0.0000	0.0000	0.00014	0.00014
43:00:00	0.0000	0.0000	0.0000	0.0000	0.00014	0.00014
43:05:00	0.0000	0.0000	0.0000	0.0000	0.000139	0.000139
43:10:00	0.0000	0.0000	0.0000	0.0000	0.000139	0.000139
43:15:00	0.0000	0.0000	0.0000	0.0000	0.000139	0.000139
43:20:00	0.0000	0.0000	0.0000	0.0000	0.000139	0.000139
43:25:00	0.0000	0.0000	0.0000	0.0000	0.000139	0.000139
43:30:00	0.0000	0.0000	0.0000	0.0000	0.000138	0.000138
43:35:00	0.0000	0.0000	0.0000	0.0000	0.000138	0.000138
43:40:00	0.0000	0.0000	0.0000	0.0000	0.000138	0.000138
43:45:00	0.0000	0.0000	0.0000	0.0000	0.000138	0.000138
43:50:00	0.0000	0.0000	0.0000	0.0000	0.000138	0.000138
43:55:00	0.0000	0.0000	0.0000	0.0000	0.000137	0.000137
44:00:00	0.0000	0.0000	0.0000	0.0000	0.000137	0.000137
44:05:00	0.0000	0.0000	0.0000	0.0000	0.000137	0.000137
44:10:00	0.0000	0.0000	0.0000	0.0000	0.000137	0.000137
44:15:00	0.0000	0.0000	0.0000	0.0000	0.000137	0.000137
44:20:00	0.0000	0.0000	0.0000	0.0000	0.000136	0.000136
44:25:00	0.0000	0.0000	0.0000	0.0000	0.000136	0.000136
44:30:00	0.0000	0.0000	0.0000	0.0000	0.000136	0.000136
44:35:00	0.0000	0.0000	0.0000	0.0000	0.000136	0.000136
44:40:00	0.0000	0.0000	0.0000	0.0000	0.000135	0.000135
44:45:00	0.0000	0.0000	0.0000	0.0000	0.000135	0.000135
44:50:00	0.0000	0.0000	0.0000	0.0000	0.000135	0.000135

Time (hh:mm:ss)	Rain (mm)	Sewer Loss (mm)	Net Rain (mm)	Runoff (m³/s)	Baseflow (m³/s)	Total Flow (m³/s)
44:55:00	0.0000	0.0000	0.0000	0.0000	0.000135	0.000135
45:00:00	0.0000	0.0000	0.0000	0.0000	0.000135	0.000135
45:05:00	0.0000	0.0000	0.0000	0.0000	0.000134	0.000134
45:10:00	0.0000	0.0000	0.0000	0.0000	0.000134	0.000134
45:15:00	0.0000	0.0000	0.0000	0.0000	0.000134	0.000134
45:20:00	0.0000	0.0000	0.0000	0.0000	0.000134	0.000134
45:25:00	0.0000	0.0000	0.0000	0.0000	0.000134	0.000134
45:30:00	0.0000	0.0000	0.0000	0.0000	0.000133	0.000133
45:35:00	0.0000	0.0000	0.0000	0.0000	0.000133	0.000133
45:40:00	0.0000	0.0000	0.0000	0.0000	0.000133	0.000133
45:45:00	0.0000	0.0000	0.0000	0.0000	0.000133	0.000133
45:50:00	0.0000	0.0000	0.0000	0.0000	0.000133	0.000133
45:55:00	0.0000	0.0000	0.0000	0.0000	0.000132	0.000132
46:00:00	0.0000	0.0000	0.0000	0.0000	0.000132	0.000132
46:05:00	0.0000	0.0000	0.0000	0.0000	0.000132	0.000132
46:10:00	0.0000	0.0000	0.0000	0.0000	0.000132	0.000132
46:15:00	0.0000	0.0000	0.0000	0.0000	0.000132	0.000132
46:20:00	0.0000	0.0000	0.0000	0.0000	0.000131	0.000131
46:25:00	0.0000	0.0000	0.0000	0.0000	0.000131	0.000131
46:30:00	0.0000	0.0000	0.0000	0.0000	0.000131	0.000131
46:35:00	0.0000	0.0000	0.0000	0.0000	0.000131	0.000131
46:40:00	0.0000	0.0000	0.0000	0.0000	0.000131	0.000131
46:45:00	0.0000	0.0000	0.0000	0.0000	0.00013	0.00013
46:50:00	0.0000	0.0000	0.0000	0.0000	0.00013	0.00013
46:55:00	0.0000	0.0000	0.0000	0.0000	0.00013	0.00013
47:00:00	0.0000	0.0000	0.0000	0.0000	0.00013	0.00013
47:05:00	0.0000	0.0000	0.0000	0.0000	0.00013	0.00013
47:10:00	0.0000	0.0000	0.0000	0.0000	0.000129	0.000129
47:15:00	0.0000	0.0000	0.0000	0.0000	0.000129	0.000129
47:20:00	0.0000	0.0000	0.0000	0.0000	0.000129	0.000129
47:25:00	0.0000	0.0000	0.0000	0.0000	0.000129	0.000129
47:30:00	0.0000	0.0000	0.0000	0.0000	0.000129	0.000129
47:35:00	0.0000	0.0000	0.0000	0.0000	0.000129	0.000129
47:40:00	0.0000	0.0000	0.0000	0.0000	0.000128	0.000128
47:45:00	0.0000	0.0000	0.0000	0.0000	0.000128	0.000128
47:50:00	0.0000	0.0000	0.0000	0.0000	0.000128	0.000128

Time (hh:mm:ss)	Rain (mm)	Sewer Loss (mm)	Net Rain (mm)	Runoff (m³/s)	Baseflow (m³/s)	Total Flow (m³/s)
47:55:00	0.0000	0.0000	0.0000	0.0000	0.000128	0.000128
48:00:00	0.0000	0.0000	0.0000	0.0000	0.000128	0.000128
48:05:00	0.0000	0.0000	0.0000	0.0000	0.000127	0.000127
48:10:00	0.0000	0.0000	0.0000	0.0000	0.000127	0.000127
48:15:00	0.0000	0.0000	0.0000	0.0000	0.000127	0.000127
48:20:00	0.0000	0.0000	0.0000	0.0000	0.000127	0.000127
48:25:00	0.0000	0.0000	0.0000	0.0000	0.000127	0.000127
48:30:00	0.0000	0.0000	0.0000	0.0000	0.000126	0.000126
48:35:00	0.0000	0.0000	0.0000	0.0000	0.000126	0.000126
48:40:00	0.0000	0.0000	0.0000	0.0000	0.000126	0.000126
48:45:00	0.0000	0.0000	0.0000	0.0000	0.000126	0.000126
48:50:00	0.0000	0.0000	0.0000	0.0000	0.000126	0.000126
48:55:00	0.0000	0.0000	0.0000	0.0000	0.000125	0.000125
49:00:00	0.0000	0.0000	0.0000	0.0000	0.000125	0.000125
49:05:00	0.0000	0.0000	0.0000	0.0000	0.000125	0.000125
49:10:00	0.0000	0.0000	0.0000	0.0000	0.000125	0.000125
49:15:00	0.0000	0.0000	0.0000	0.0000	0.000125	0.000125
49:20:00	0.0000	0.0000	0.0000	0.0000	0.000125	0.000125
49:25:00	0.0000	0.0000	0.0000	0.0000	0.000124	0.000124
49:30:00	0.0000	0.0000	0.0000	0.0000	0.000124	0.000124
49:35:00	0.0000	0.0000	0.0000	0.0000	0.000124	0.000124
49:40:00	0.0000	0.0000	0.0000	0.0000	0.000124	0.000124
49:45:00	0.0000	0.0000	0.0000	0.0000	0.000124	0.000124
49:50:00	0.0000	0.0000	0.0000	0.0000	0.000123	0.000123
49:55:00	0.0000	0.0000	0.0000	0.0000	0.000123	0.000123
50:00:00	0.0000	0.0000	0.0000	0.0000	0.000123	0.000123
50:05:00	0.0000	0.0000	0.0000	0.0000	0.000123	0.000123
50:10:00	0.0000	0.0000	0.0000	0.0000	0.000123	0.000123
50:15:00	0.0000	0.0000	0.0000	0.0000	0.000122	0.000122
50:20:00	0.0000	0.0000	0.0000	0.0000	0.000122	0.000122
50:25:00	0.0000	0.0000	0.0000	0.0000	0.000122	0.000122
50:30:00	0.0000	0.0000	0.0000	0.0000	0.000122	0.000122
50:35:00	0.0000	0.0000	0.0000	0.0000	0.000122	0.000122
50:40:00	0.0000	0.0000	0.0000	0.0000	0.000122	0.000122
50:45:00	0.0000	0.0000	0.0000	0.0000	0.000121	0.000121
50:50:00	0.0000	0.0000	0.0000	0.0000	0.000121	0.000121

Time (hh:mm:ss)	Rain (mm)	Sewer Loss (mm)	Net Rain (mm)	Runoff (m³/s)	Baseflow (m³/s)	Total Flow (m³/s)
50:55:00	0.0000	0.0000	0.0000	0.0000	0.000121	0.000121
51:00:00	0.0000	0.0000	0.0000	0.0000	0.000121	0.000121
51:05:00	0.0000	0.0000	0.0000	0.0000	0.000121	0.000121
51:10:00	0.0000	0.0000	0.0000	0.0000	0.00012	0.00012
51:15:00	0.0000	0.0000	0.0000	0.0000	0.00012	0.00012
51:20:00	0.0000	0.0000	0.0000	0.0000	0.00012	0.00012
51:25:00	0.0000	0.0000	0.0000	0.0000	0.00012	0.00012
51:30:00	0.0000	0.0000	0.0000	0.0000	0.00012	0.00012
51:35:00	0.0000	0.0000	0.0000	0.0000	0.00012	0.00012
51:40:00	0.0000	0.0000	0.0000	0.0000	0.000119	0.000119
51:45:00	0.0000	0.0000	0.0000	0.0000	0.000119	0.000119
51:50:00	0.0000	0.0000	0.0000	0.0000	0.000119	0.000119
51:55:00	0.0000	0.0000	0.0000	0.0000	0.000119	0.000119
52:00:00	0.0000	0.0000	0.0000	0.0000	0.000119	0.000119
52:05:00	0.0000	0.0000	0.0000	0.0000	0.000118	0.000118
52:10:00	0.0000	0.0000	0.0000	0.0000	0.000118	0.000118
52:15:00	0.0000	0.0000	0.0000	0.0000	0.000118	0.000118
52:20:00	0.0000	0.0000	0.0000	0.0000	0.000118	0.000118
52:25:00	0.0000	0.0000	0.0000	0.0000	0.000118	0.000118
52:30:00	0.0000	0.0000	0.0000	0.0000	0.000118	0.000118
52:35:00	0.0000	0.0000	0.0000	0.0000	0.000117	0.000117
52:40:00	0.0000	0.0000	0.0000	0.0000	0.000117	0.000117
52:45:00	0.0000	0.0000	0.0000	0.0000	0.000117	0.000117
52:50:00	0.0000	0.0000	0.0000	0.0000	0.000117	0.000117
52:55:00	0.0000	0.0000	0.0000	0.0000	0.000117	0.000117
53:00:00	0.0000	0.0000	0.0000	0.0000	0.000116	0.000116
53:05:00	0.0000	0.0000	0.0000	0.0000	0.000116	0.000116
53:10:00	0.0000	0.0000	0.0000	0.0000	0.000116	0.000116
53:15:00	0.0000	0.0000	0.0000	0.0000	0.000116	0.000116
53:20:00	0.0000	0.0000	0.0000	0.0000	0.000116	0.000116
53:25:00	0.0000	0.0000	0.0000	0.0000	0.000116	0.000116
53:30:00	0.0000	0.0000	0.0000	0.0000	0.000115	0.000115
53:35:00	0.0000	0.0000	0.0000	0.0000	0.000115	0.000115
53:40:00	0.0000	0.0000	0.0000	0.0000	0.000115	0.000115
53:45:00	0.0000	0.0000	0.0000	0.0000	0.000115	0.000115
53:50:00	0.0000	0.0000	0.0000	0.0000	0.000115	0.000115

Time (hh:mm:ss)	Rain (mm)	Sewer Loss (mm)	Net Rain (mm)	Runoff (m³/s)	Baseflow (m³/s)	Total Flow (m³/s)
53:55:00	0.0000	0.0000	0.0000	0.0000	0.000115	0.000115
54:00:00	0.0000	0.0000	0.0000	0.0000	0.000114	0.000114
54:05:00	0.0000	0.0000	0.0000	0.0000	0.000114	0.000114
54:10:00	0.0000	0.0000	0.0000	0.0000	0.000114	0.000114
54:15:00	0.0000	0.0000	0.0000	0.0000	0.000114	0.000114
54:20:00	0.0000	0.0000	0.0000	0.0000	0.000114	0.000114
54:25:00	0.0000	0.0000	0.0000	0.0000	0.000114	0.000114
54:30:00	0.0000	0.0000	0.0000	0.0000	0.000113	0.000113
54:35:00	0.0000	0.0000	0.0000	0.0000	0.000113	0.000113
54:40:00	0.0000	0.0000	0.0000	0.0000	0.000113	0.000113
54:45:00	0.0000	0.0000	0.0000	0.0000	0.000113	0.000113
54:50:00	0.0000	0.0000	0.0000	0.0000	0.000113	0.000113
54:55:00	0.0000	0.0000	0.0000	0.0000	0.000113	0.000113
55:00:00	0.0000	0.0000	0.0000	0.0000	0.000112	0.000112
55:05:00	0.0000	0.0000	0.0000	0.0000	0.000112	0.000112
55:10:00	0.0000	0.0000	0.0000	0.0000	0.000112	0.000112
55:15:00	0.0000	0.0000	0.0000	0.0000	0.000112	0.000112
55:20:00	0.0000	0.0000	0.0000	0.0000	0.000112	0.000112
55:25:00	0.0000	0.0000	0.0000	0.0000	0.000112	0.000112
55:30:00	0.0000	0.0000	0.0000	0.0000	0.000111	0.000111
55:35:00	0.0000	0.0000	0.0000	0.0000	0.000111	0.000111
55:40:00	0.0000	0.0000	0.0000	0.0000	0.000111	0.000111
55:45:00	0.0000	0.0000	0.0000	0.0000	0.000111	0.000111
55:50:00	0.0000	0.0000	0.0000	0.0000	0.000111	0.000111
55:55:00	0.0000	0.0000	0.0000	0.0000	0.000111	0.000111
56:00:00	0.0000	0.0000	0.0000	0.0000	0.00011	0.00011
56:05:00	0.0000	0.0000	0.0000	0.0000	0.00011	0.00011
56:10:00	0.0000	0.0000	0.0000	0.0000	0.00011	0.00011
56:15:00	0.0000	0.0000	0.0000	0.0000	0.00011	0.00011
56:20:00	0.0000	0.0000	0.0000	0.0000	0.00011	0.00011
56:25:00	0.0000	0.0000	0.0000	0.0000	0.00011	0.00011
56:30:00	0.0000	0.0000	0.0000	0.0000	0.000109	0.000109
56:35:00	0.0000	0.0000	0.0000	0.0000	0.000109	0.000109
56:40:00	0.0000	0.0000	0.0000	0.0000	0.000109	0.000109
56:45:00	0.0000	0.0000	0.0000	0.0000	0.000109	0.000109
56:50:00	0.0000	0.0000	0.0000	0.0000	0.000109	0.000109

Time (hh:mm:ss)	Rain (mm)	Sewer Loss (mm)	Net Rain (mm)	Runoff (m³/s)	Baseflow (m³/s)	Total Flow (m³/s)
56:55:00	0.0000	0.0000	0.0000	0.0000	0.000109	0.000109
57:00:00	0.0000	0.0000	0.0000	0.0000	0.000108	0.000108
57:05:00	0.0000	0.0000	0.0000	0.0000	0.000108	0.000108
57:10:00	0.0000	0.0000	0.0000	0.0000	0.000108	0.000108
57:15:00	0.0000	0.0000	0.0000	0.0000	0.000108	0.000108
57:20:00	0.0000	0.0000	0.0000	0.0000	0.000108	0.000108
57:25:00	0.0000	0.0000	0.0000	0.0000	0.000108	0.000108
57:30:00	0.0000	0.0000	0.0000	0.0000	0.000107	0.000107
57:35:00	0.0000	0.0000	0.0000	0.0000	0.000107	0.000107
57:40:00	0.0000	0.0000	0.0000	0.0000	0.000107	0.000107
57:45:00	0.0000	0.0000	0.0000	0.0000	0.000107	0.000107
57:50:00	0.0000	0.0000	0.0000	0.0000	0.000107	0.000107
57:55:00	0.0000	0.0000	0.0000	0.0000	0.000107	0.000107
58:00:00	0.0000	0.0000	0.0000	0.0000	0.000106	0.000106
58:05:00	0.0000	0.0000	0.0000	0.0000	0.000106	0.000106
58:10:00	0.0000	0.0000	0.0000	0.0000	0.000106	0.000106
58:15:00	0.0000	0.0000	0.0000	0.0000	0.000106	0.000106
58:20:00	0.0000	0.0000	0.0000	0.0000	0.000106	0.000106
58:25:00	0.0000	0.0000	0.0000	0.0000	0.000106	0.000106
58:30:00	0.0000	0.0000	0.0000	0.0000	0.000105	0.000105
58:35:00	0.0000	0.0000	0.0000	0.0000	0.000105	0.000105
58:40:00	0.0000	0.0000	0.0000	0.0000	0.000105	0.000105
58:45:00	0.0000	0.0000	0.0000	0.0000	0.000105	0.000105
58:50:00	0.0000	0.0000	0.0000	0.0000	0.000105	0.000105
58:55:00	0.0000	0.0000	0.0000	0.0000	0.000105	0.000105
59:00:00	0.0000	0.0000	0.0000	0.0000	0.000104	0.000104
59:05:00	0.0000	0.0000	0.0000	0.0000	0.000104	0.000104
59:10:00	0.0000	0.0000	0.0000	0.0000	0.000104	0.000104
59:15:00	0.0000	0.0000	0.0000	0.0000	0.000104	0.000104
59:20:00	0.0000	0.0000	0.0000	0.0000	0.000104	0.000104
59:25:00	0.0000	0.0000	0.0000	0.0000	0.000104	0.000104
59:30:00	0.0000	0.0000	0.0000	0.0000	0.000104	0.000104
59:35:00	0.0000	0.0000	0.0000	0.0000	0.000103	0.000103
59:40:00	0.0000	0.0000	0.0000	0.0000	0.000103	0.000103
59:45:00	0.0000	0.0000	0.0000	0.0000	0.000103	0.000103
59:50:00	0.0000	0.0000	0.0000	0.0000	0.000103	0.000103

Time (hh:mm:ss)	Rain (mm)	Sewer Loss (mm)	Net Rain (mm)	Runoff (m³/s)	Baseflow (m³/s)	Total Flow (m³/s)
59:55:00	0.0000	0.0000	0.0000	0.0000	0.000103	0.000103
60:00:00	0.0000	0.0000	0.0000	0.0000	0.000103	0.000103
60:05:00	0.0000	0.0000	0.0000	0.0000	0.000102	0.000102
60:10:00	0.0000	0.0000	0.0000	0.0000	0.000102	0.000102
60:15:00	0.0000	0.0000	0.0000	0.0000	0.000102	0.000102
60:20:00	0.0000	0.0000	0.0000	0.0000	0.000102	0.000102
60:25:00	0.0000	0.0000	0.0000	0.0000	0.000102	0.000102
60:30:00	0.0000	0.0000	0.0000	0.0000	0.000102	0.000102
60:35:00	0.0000	0.0000	0.0000	0.0000	0.000102	0.000102
60:40:00	0.0000	0.0000	0.0000	0.0000	0.000101	0.000101
60:45:00	0.0000	0.0000	0.0000	0.0000	0.000101	0.000101
60:50:00	0.0000	0.0000	0.0000	0.0000	0.000101	0.000101
60:55:00	0.0000	0.0000	0.0000	0.0000	0.000101	0.000101
61:00:00	0.0000	0.0000	0.0000	0.0000	0.000101	0.000101
61:05:00	0.0000	0.0000	0.0000	0.0000	0.000101	0.000101
61:10:00	0.0000	0.0000	0.0000	0.0000	0.0001	0.0001
61:15:00	0.0000	0.0000	0.0000	0.0000	0.0001	0.0001
61:20:00	0.0000	0.0000	0.0000	0.0000	0.0001	0.0001
61:25:00	0.0000	0.0000	0.0000	0.0000	0.0001	0.0001
61:30:00	0.0000	0.0000	0.0000	0.0000	9.99E-05	9.99E-05
61:35:00	0.0000	0.0000	0.0000	0.0000	9.97E-05	9.97E-05
61:40:00	0.0000	0.0000	0.0000	0.0000	9.96E-05	9.96E-05
61:45:00	0.0000	0.0000	0.0000	0.0000	9.94E-05	9.94E-05
61:50:00	0.0000	0.0000	0.0000	0.0000	9.93E-05	9.93E-05
61:55:00	0.0000	0.0000	0.0000	0.0000	9.91E-05	9.91E-05
62:00:00	0.0000	0.0000	0.0000	0.0000	9.9E-05	9.9E-05
62:05:00	0.0000	0.0000	0.0000	0.0000	9.88E-05	9.88E-05
62:10:00	0.0000	0.0000	0.0000	0.0000	9.87E-05	9.87E-05
62:15:00	0.0000	0.0000	0.0000	0.0000	9.85E-05	9.85E-05
62:20:00	0.0000	0.0000	0.0000	0.0000	9.84E-05	9.84E-05
62:25:00	0.0000	0.0000	0.0000	0.0000	9.82E-05	9.82E-05
62:30:00	0.0000	0.0000	0.0000	0.0000	9.81E-05	9.81E-05
62:35:00	0.0000	0.0000	0.0000	0.0000	9.79E-05	9.79E-05
62:40:00	0.0000	0.0000	0.0000	0.0000	9.78E-05	9.78E-05
62:45:00	0.0000	0.0000	0.0000	0.0000	9.76E-05	9.76E-05
62:50:00	0.0000	0.0000	0.0000	0.0000	9.75E-05	9.75E-05

Time (hh:mm:ss)	Rain (mm)	Sewer Loss (mm)	Net Rain (mm)	Runoff (m³/s)	Baseflow (m³/s)	Total Flow (m³/s)
62:55:00	0.0000	0.0000	0.0000	0.0000	9.73E-05	9.73E-05
63:00:00	0.0000	0.0000	0.0000	0.0000	9.72E-05	9.72E-05
63:05:00	0.0000	0.0000	0.0000	0.0000	9.7E-05	9.7E-05
63:10:00	0.0000	0.0000	0.0000	0.0000	9.69E-05	9.69E-05
63:15:00	0.0000	0.0000	0.0000	0.0000	9.68E-05	9.68E-05
63:20:00	0.0000	0.0000	0.0000	0.0000	9.66E-05	9.66E-05
63:25:00	0.0000	0.0000	0.0000	0.0000	9.65E-05	9.65E-05
63:30:00	0.0000	0.0000	0.0000	0.0000	9.63E-05	9.63E-05
63:35:00	0.0000	0.0000	0.0000	0.0000	9.62E-05	9.62E-05
63:40:00	0.0000	0.0000	0.0000	0.0000	9.6E-05	9.6E-05
63:45:00	0.0000	0.0000	0.0000	0.0000	9.59E-05	9.59E-05
63:50:00	0.0000	0.0000	0.0000	0.0000	9.57E-05	9.57E-05
63:55:00	0.0000	0.0000	0.0000	0.0000	9.56E-05	9.56E-05
64:00:00	0.0000	0.0000	0.0000	0.0000	9.54E-05	9.54E-05
64:05:00	0.0000	0.0000	0.0000	0.0000	9.53E-05	9.53E-05
64:10:00	0.0000	0.0000	0.0000	0.0000	9.52E-05	9.52E-05
64:15:00	0.0000	0.0000	0.0000	0.0000	9.5E-05	9.5E-05
64:20:00	0.0000	0.0000	0.0000	0.0000	9.49E-05	9.49E-05
64:25:00	0.0000	0.0000	0.0000	0.0000	9.47E-05	9.47E-05
64:30:00	0.0000	0.0000	0.0000	0.0000	9.46E-05	9.46E-05
64:35:00	0.0000	0.0000	0.0000	0.0000	9.44E-05	9.44E-05
64:40:00	0.0000	0.0000	0.0000	0.0000	9.43E-05	9.43E-05
64:45:00	0.0000	0.0000	0.0000	0.0000	9.42E-05	9.42E-05
64:50:00	0.0000	0.0000	0.0000	0.0000	9.4E-05	9.4E-05
64:55:00	0.0000	0.0000	0.0000	0.0000	9.39E-05	9.39E-05
65:00:00	0.0000	0.0000	0.0000	0.0000	9.37E-05	9.37E-05
65:05:00	0.0000	0.0000	0.0000	0.0000	9.36E-05	9.36E-05
65:10:00	0.0000	0.0000	0.0000	0.0000	9.34E-05	9.34E-05
65:15:00	0.0000	0.0000	0.0000	0.0000	9.33E-05	9.33E-05
65:20:00	0.0000	0.0000	0.0000	0.0000	9.32E-05	9.32E-05
65:25:00	0.0000	0.0000	0.0000	0.0000	9.3E-05	9.3E-05
65:30:00	0.0000	0.0000	0.0000	0.0000	9.29E-05	9.29E-05
65:35:00	0.0000	0.0000	0.0000	0.0000	9.27E-05	9.27E-05
65:40:00	0.0000	0.0000	0.0000	0.0000	9.26E-05	9.26E-05
65:45:00	0.0000	0.0000	0.0000	0.0000	9.25E-05	9.25E-05
65:50:00	0.0000	0.0000	0.0000	0.0000	9.23E-05	9.23E-05

Time (hh:mm:ss)	Rain (mm)	Sewer Loss (mm)	Net Rain (mm)	Runoff (m³/s)	Baseflow (m³/s)	Total Flow (m³/s)
65:55:00	0.0000	0.0000	0.0000	0.0000	9.22E-05	9.22E-05
66:00:00	0.0000	0.0000	0.0000	0.0000	9.2E-05	9.2E-05
66:05:00	0.0000	0.0000	0.0000	0.0000	9.19E-05	9.19E-05
66:10:00	0.0000	0.0000	0.0000	0.0000	9.18E-05	9.18E-05
66:15:00	0.0000	0.0000	0.0000	0.0000	9.16E-05	9.16E-05
66:20:00	0.0000	0.0000	0.0000	0.0000	9.15E-05	9.15E-05
66:25:00	0.0000	0.0000	0.0000	0.0000	9.14E-05	9.14E-05
66:30:00	0.0000	0.0000	0.0000	0.0000	9.12E-05	9.12E-05
66:35:00	0.0000	0.0000	0.0000	0.0000	9.11E-05	9.11E-05
66:40:00	0.0000	0.0000	0.0000	0.0000	9.09E-05	9.09E-05
66:45:00	0.0000	0.0000	0.0000	0.0000	9.08E-05	9.08E-05
66:50:00	0.0000	0.0000	0.0000	0.0000	9.07E-05	9.07E-05
66:55:00	0.0000	0.0000	0.0000	0.0000	9.05E-05	9.05E-05
67:00:00	0.0000	0.0000	0.0000	0.0000	9.04E-05	9.04E-05
67:05:00	0.0000	0.0000	0.0000	0.0000	9.03E-05	9.03E-05
67:10:00	0.0000	0.0000	0.0000	0.0000	9.01E-05	9.01E-05
67:15:00	0.0000	0.0000	0.0000	0.0000	9E-05	9E-05
67:20:00	0.0000	0.0000	0.0000	0.0000	8.99E-05	8.99E-05
67:25:00	0.0000	0.0000	0.0000	0.0000	8.97E-05	8.97E-05
67:30:00	0.0000	0.0000	0.0000	0.0000	8.96E-05	8.96E-05
67:35:00	0.0000	0.0000	0.0000	0.0000	8.94E-05	8.94E-05
67:40:00	0.0000	0.0000	0.0000	0.0000	8.93E-05	8.93E-05
67:45:00	0.0000	0.0000	0.0000	0.0000	8.92E-05	8.92E-05
67:50:00	0.0000	0.0000	0.0000	0.0000	8.9E-05	8.9E-05
67:55:00	0.0000	0.0000	0.0000	0.0000	8.89E-05	8.89E-05
68:00:00	0.0000	0.0000	0.0000	0.0000	8.88E-05	8.88E-05
68:05:00	0.0000	0.0000	0.0000	0.0000	8.86E-05	8.86E-05
68:10:00	0.0000	0.0000	0.0000	0.0000	8.85E-05	8.85E-05
68:15:00	0.0000	0.0000	0.0000	0.0000	8.84E-05	8.84E-05
68:20:00	0.0000	0.0000	0.0000	0.0000	8.82E-05	8.82E-05
68:25:00	0.0000	0.0000	0.0000	0.0000	8.81E-05	8.81E-05
68:30:00	0.0000	0.0000	0.0000	0.0000	8.8E-05	8.8E-05
68:35:00	0.0000	0.0000	0.0000	0.0000	8.78E-05	8.78E-05
68:40:00	0.0000	0.0000	0.0000	0.0000	8.77E-05	8.77E-05
68:45:00	0.0000	0.0000	0.0000	0.0000	8.76E-05	8.76E-05
68:50:00	0.0000	0.0000	0.0000	0.0000	8.74E-05	8.74E-05

Time (hh:mm:ss)	Rain (mm)	Sewer Loss (mm)	Net Rain (mm)	Runoff (m³/s)	Baseflow (m³/s)	Total Flow (m³/s)
68:55:00	0.0000	0.0000	0.0000	0.0000	8.73E-05	8.73E-05
69:00:00	0.0000	0.0000	0.0000	0.0000	8.72E-05	8.72E-05
69:05:00	0.0000	0.0000	0.0000	0.0000	8.7E-05	8.7E-05
69:10:00	0.0000	0.0000	0.0000	0.0000	8.69E-05	8.69E-05
69:15:00	0.0000	0.0000	0.0000	0.0000	8.68E-05	8.68E-05
69:20:00	0.0000	0.0000	0.0000	0.0000	8.67E-05	8.67E-05
69:25:00	0.0000	0.0000	0.0000	0.0000	8.65E-05	8.65E-05
69:30:00	0.0000	0.0000	0.0000	0.0000	8.64E-05	8.64E-05
69:35:00	0.0000	0.0000	0.0000	0.0000	8.63E-05	8.63E-05
69:40:00	0.0000	0.0000	0.0000	0.0000	8.61E-05	8.61E-05
69:45:00	0.0000	0.0000	0.0000	0.0000	8.6E-05	8.6E-05
69:50:00	0.0000	0.0000	0.0000	0.0000	8.59E-05	8.59E-05
69:55:00	0.0000	0.0000	0.0000	0.0000	8.57E-05	8.57E-05
70:00:00	0.0000	0.0000	0.0000	0.0000	8.56E-05	8.56E-05
70:05:00	0.0000	0.0000	0.0000	0.0000	8.55E-05	8.55E-05
70:10:00	0.0000	0.0000	0.0000	0.0000	8.54E-05	8.54E-05
70:15:00	0.0000	0.0000	0.0000	0.0000	8.52E-05	8.52E-05
70:20:00	0.0000	0.0000	0.0000	0.0000	8.51E-05	8.51E-05
70:25:00	0.0000	0.0000	0.0000	0.0000	8.5E-05	8.5E-05
70:30:00	0.0000	0.0000	0.0000	0.0000	8.48E-05	8.48E-05
70:35:00	0.0000	0.0000	0.0000	0.0000	8.47E-05	8.47E-05
70:40:00	0.0000	0.0000	0.0000	0.0000	8.46E-05	8.46E-05
70:45:00	0.0000	0.0000	0.0000	0.0000	8.45E-05	8.45E-05
70:50:00	0.0000	0.0000	0.0000	0.0000	8.43E-05	8.43E-05
70:55:00	0.0000	0.0000	0.0000	0.0000	8.42E-05	8.42E-05
71:00:00	0.0000	0.0000	0.0000	0.0000	8.41E-05	8.41E-05
71:05:00	0.0000	0.0000	0.0000	0.0000	8.39E-05	8.39E-05
71:10:00	0.0000	0.0000	0.0000	0.0000	8.38E-05	8.38E-05
71:15:00	0.0000	0.0000	0.0000	0.0000	8.37E-05	8.37E-05
71:20:00	0.0000	0.0000	0.0000	0.0000	8.36E-05	8.36E-05
71:25:00	0.0000	0.0000	0.0000	0.0000	8.34E-05	8.34E-05
71:30:00	0.0000	0.0000	0.0000	0.0000	8.33E-05	8.33E-05
71:35:00	0.0000	0.0000	0.0000	0.0000	8.32E-05	8.32E-05
71:40:00	0.0000	0.0000	0.0000	0.0000	8.31E-05	8.31E-05
71:45:00	0.0000	0.0000	0.0000	0.0000	8.29E-05	8.29E-05
71:50:00	0.0000	0.0000	0.0000	0.0000	8.28E-05	8.28E-05

Time (hh:mm:ss)	Rain (mm)	Sewer Loss (mm)	Net Rain (mm)	Runoff (m³/s)	Baseflow (m³/s)	Total Flow (m³/s)
71:55:00	0.0000	0.0000	0.0000	0.0000	8.27E-05	8.27E-05
72:00:00	0.0000	0.0000	0.0000	0.0000	8.26E-05	8.26E-05
72:05:00	0.0000	0.0000	0.0000	0.0000	8.24E-05	8.24E-05
72:10:00	0.0000	0.0000	0.0000	0.0000	8.23E-05	8.23E-05
72:15:00	0.0000	0.0000	0.0000	0.0000	8.22E-05	8.22E-05
72:20:00	0.0000	0.0000	0.0000	0.0000	8.21E-05	8.21E-05
72:25:00	0.0000	0.0000	0.0000	0.0000	8.19E-05	8.19E-05
72:30:00	0.0000	0.0000	0.0000	0.0000	8.18E-05	8.18E-05
72:35:00	0.0000	0.0000	0.0000	0.0000	8.17E-05	8.17E-05
72:40:00	0.0000	0.0000	0.0000	0.0000	8.16E-05	8.16E-05
72:45:00	0.0000	0.0000	0.0000	0.0000	8.15E-05	8.15E-05
72:50:00	0.0000	0.0000	0.0000	0.0000	8.13E-05	8.13E-05
72:55:00	0.0000	0.0000	0.0000	0.0000	8.12E-05	8.12E-05
73:00:00	0.0000	0.0000	0.0000	0.0000	8.11E-05	8.11E-05
73:05:00	0.0000	0.0000	0.0000	0.0000	8.1E-05	8.1E-05
73:10:00	0.0000	0.0000	0.0000	0.0000	8.08E-05	8.08E-05
73:15:00	0.0000	0.0000	0.0000	0.0000	8.07E-05	8.07E-05
73:20:00	0.0000	0.0000	0.0000	0.0000	8.06E-05	8.06E-05
73:25:00	0.0000	0.0000	0.0000	0.0000	8.05E-05	8.05E-05
73:30:00	0.0000	0.0000	0.0000	0.0000	8.04E-05	8.04E-05
73:35:00	0.0000	0.0000	0.0000	0.0000	8.02E-05	8.02E-05
73:40:00	0.0000	0.0000	0.0000	0.0000	8.01E-05	8.01E-05
73:45:00	0.0000	0.0000	0.0000	0.0000	8E-05	8E-05
73:50:00	0.0000	0.0000	0.0000	0.0000	7.99E-05	7.99E-05
73:55:00	0.0000	0.0000	0.0000	0.0000	7.97E-05	7.97E-05
74:00:00	0.0000	0.0000	0.0000	0.0000	7.96E-05	7.96E-05
74:05:00	0.0000	0.0000	0.0000	0.0000	7.95E-05	7.95E-05
74:10:00	0.0000	0.0000	0.0000	0.0000	7.94E-05	7.94E-05
74:15:00	0.0000	0.0000	0.0000	0.0000	7.93E-05	7.93E-05
74:20:00	0.0000	0.0000	0.0000	0.0000	7.91E-05	7.91E-05
74:25:00	0.0000	0.0000	0.0000	0.0000	7.9E-05	7.9E-05
74:30:00	0.0000	0.0000	0.0000	0.0000	7.89E-05	7.89E-05
74:35:00	0.0000	0.0000	0.0000	0.0000	7.88E-05	7.88E-05
74:40:00	0.0000	0.0000	0.0000	0.0000	7.87E-05	7.87E-05
74:45:00	0.0000	0.0000	0.0000	0.0000	7.86E-05	7.86E-05
74:50:00	0.0000	0.0000	0.0000	0.0000	7.84E-05	7.84E-05

Time (hh:mm:ss)	Rain (mm)	Sewer Loss (mm)	Net Rain (mm)	Runoff (m³/s)	Baseflow (m³/s)	Total Flow (m³/s)
74:55:00	0.0000	0.0000	0.0000	0.0000	7.83E-05	7.83E-05
75:00:00	0.0000	0.0000	0.0000	0.0000	7.82E-05	7.82E-05
75:05:00	0.0000	0.0000	0.0000	0.0000	7.81E-05	7.81E-05
75:10:00	0.0000	0.0000	0.0000	0.0000	7.8E-05	7.8E-05
75:15:00	0.0000	0.0000	0.0000	0.0000	7.78E-05	7.78E-05
75:20:00	0.0000	0.0000	0.0000	0.0000	7.77E-05	7.77E-05
75:25:00	0.0000	0.0000	0.0000	0.0000	7.76E-05	7.76E-05
75:30:00	0.0000	0.0000	0.0000	0.0000	7.75E-05	7.75E-05
75:35:00	0.0000	0.0000	0.0000	0.0000	7.74E-05	7.74E-05
75:40:00	0.0000	0.0000	0.0000	0.0000	7.73E-05	7.73E-05
75:45:00	0.0000	0.0000	0.0000	0.0000	7.71E-05	7.71E-05
75:50:00	0.0000	0.0000	0.0000	0.0000	7.7E-05	7.7E-05
75:55:00	0.0000	0.0000	0.0000	0.0000	7.69E-05	7.69E-05
76:00:00	0.0000	0.0000	0.0000	0.0000	7.68E-05	7.68E-05
76:05:00	0.0000	0.0000	0.0000	0.0000	7.67E-05	7.67E-05
76:10:00	0.0000	0.0000	0.0000	0.0000	7.66E-05	7.66E-05
76:15:00	0.0000	0.0000	0.0000	0.0000	7.64E-05	7.64E-05
76:20:00	0.0000	0.0000	0.0000	0.0000	7.63E-05	7.63E-05
76:25:00	0.0000	0.0000	0.0000	0.0000	7.62E-05	7.62E-05
76:30:00	0.0000	0.0000	0.0000	0.0000	7.61E-05	7.61E-05
76:35:00	0.0000	0.0000	0.0000	0.0000	7.6E-05	7.6E-05
76:40:00	0.0000	0.0000	0.0000	0.0000	7.59E-05	7.59E-05
76:45:00	0.0000	0.0000	0.0000	0.0000	7.58E-05	7.58E-05
76:50:00	0.0000	0.0000	0.0000	0.0000	7.56E-05	7.56E-05
76:55:00	0.0000	0.0000	0.0000	0.0000	7.55E-05	7.55E-05
77:00:00	0.0000	0.0000	0.0000	0.0000	7.54E-05	7.54E-05
77:05:00	0.0000	0.0000	0.0000	0.0000	7.53E-05	7.53E-05
77:10:00	0.0000	0.0000	0.0000	0.0000	7.52E-05	7.52E-05
77:15:00	0.0000	0.0000	0.0000	0.0000	7.51E-05	7.51E-05
77:20:00	0.0000	0.0000	0.0000	0.0000	7.5E-05	7.5E-05
77:25:00	0.0000	0.0000	0.0000	0.0000	7.48E-05	7.48E-05
77:30:00	0.0000	0.0000	0.0000	0.0000	7.47E-05	7.47E-05
77:35:00	0.0000	0.0000	0.0000	0.0000	7.46E-05	7.46E-05
77:40:00	0.0000	0.0000	0.0000	0.0000	7.45E-05	7.45E-05
77:45:00	0.0000	0.0000	0.0000	0.0000	7.44E-05	7.44E-05
77:50:00	0.0000	0.0000	0.0000	0.0000	7.43E-05	7.43E-05

Time (hh:mm:ss)	Rain (mm)	Sewer Loss (mm)	Net Rain (mm)	Runoff (m³/s)	Baseflow (m³/s)	Total Flow (m³/s)
77:55:00	0.0000	0.0000	0.0000	0.0000	7.42E-05	7.42E-05
78:00:00	0.0000	0.0000	0.0000	0.0000	7.41E-05	7.41E-05
78:05:00	0.0000	0.0000	0.0000	0.0000	7.39E-05	7.39E-05
78:10:00	0.0000	0.0000	0.0000	0.0000	7.38E-05	7.38E-05
78:15:00	0.0000	0.0000	0.0000	0.0000	7.37E-05	7.37E-05
78:20:00	0.0000	0.0000	0.0000	0.0000	7.36E-05	7.36E-05
78:25:00	0.0000	0.0000	0.0000	0.0000	7.35E-05	7.35E-05
78:30:00	0.0000	0.0000	0.0000	0.0000	7.34E-05	7.34E-05
78:35:00	0.0000	0.0000	0.0000	0.0000	7.33E-05	7.33E-05
78:40:00	0.0000	0.0000	0.0000	0.0000	7.32E-05	7.32E-05
78:45:00	0.0000	0.0000	0.0000	0.0000	7.31E-05	7.31E-05
78:50:00	0.0000	0.0000	0.0000	0.0000	7.3E-05	7.3E-05
78:55:00	0.0000	0.0000	0.0000	0.0000	7.28E-05	7.28E-05
79:00:00	0.0000	0.0000	0.0000	0.0000	7.27E-05	7.27E-05
79:05:00	0.0000	0.0000	0.0000	0.0000	7.26E-05	7.26E-05
79:10:00	0.0000	0.0000	0.0000	0.0000	7.25E-05	7.25E-05
79:15:00	0.0000	0.0000	0.0000	0.0000	7.24E-05	7.24E-05
79:20:00	0.0000	0.0000	0.0000	0.0000	7.23E-05	7.23E-05
79:25:00	0.0000	0.0000	0.0000	0.0000	7.22E-05	7.22E-05
79:30:00	0.0000	0.0000	0.0000	0.0000	7.21E-05	7.21E-05
79:35:00	0.0000	0.0000	0.0000	0.0000	7.2E-05	7.2E-05
79:40:00	0.0000	0.0000	0.0000	0.0000	7.19E-05	7.19E-05
79:45:00	0.0000	0.0000	0.0000	0.0000	7.17E-05	7.17E-05
79:50:00	0.0000	0.0000	0.0000	0.0000	7.16E-05	7.16E-05
79:55:00	0.0000	0.0000	0.0000	0.0000	7.15E-05	7.15E-05
80:00:00	0.0000	0.0000	0.0000	0.0000	7.14E-05	7.14E-05
80:05:00	0.0000	0.0000	0.0000	0.0000	7.13E-05	7.13E-05
80:10:00	0.0000	0.0000	0.0000	0.0000	7.12E-05	7.12E-05
80:15:00	0.0000	0.0000	0.0000	0.0000	7.11E-05	7.11E-05
80:20:00	0.0000	0.0000	0.0000	0.0000	7.1E-05	7.1E-05
80:25:00	0.0000	0.0000	0.0000	0.0000	7.09E-05	7.09E-05
80:30:00	0.0000	0.0000	0.0000	0.0000	7.08E-05	7.08E-05
80:35:00	0.0000	0.0000	0.0000	0.0000	7.07E-05	7.07E-05
80:40:00	0.0000	0.0000	0.0000	0.0000	7.06E-05	7.06E-05
80:45:00	0.0000	0.0000	0.0000	0.0000	7.05E-05	7.05E-05
80:50:00	0.0000	0.0000	0.0000	0.0000	7.04E-05	7.04E-05

Time (hh:mm:ss)	Rain (mm)	Sewer Loss (mm)	Net Rain (mm)	Runoff (m³/s)	Baseflow (m³/s)	Total Flow (m³/s)
80:55:00	0.0000	0.0000	0.0000	0.0000	7.02E-05	7.02E-05
81:00:00	0.0000	0.0000	0.0000	0.0000	7.01E-05	7.01E-05
81:05:00	0.0000	0.0000	0.0000	0.0000	7E-05	7E-05
81:10:00	0.0000	0.0000	0.0000	0.0000	6.99E-05	6.99E-05
81:15:00	0.0000	0.0000	0.0000	0.0000	6.98E-05	6.98E-05
81:20:00	0.0000	0.0000	0.0000	0.0000	6.97E-05	6.97E-05
81:25:00	0.0000	0.0000	0.0000	0.0000	6.96E-05	6.96E-05
81:30:00	0.0000	0.0000	0.0000	0.0000	6.95E-05	6.95E-05
81:35:00	0.0000	0.0000	0.0000	0.0000	6.94E-05	6.94E-05
81:40:00	0.0000	0.0000	0.0000	0.0000	6.93E-05	6.93E-05
81:45:00	0.0000	0.0000	0.0000	0.0000	6.92E-05	6.92E-05
81:50:00	0.0000	0.0000	0.0000	0.0000	6.91E-05	6.91E-05
81:55:00	0.0000	0.0000	0.0000	0.0000	6.9E-05	6.9E-05
82:00:00	0.0000	0.0000	0.0000	0.0000	6.89E-05	6.89E-05
82:05:00	0.0000	0.0000	0.0000	0.0000	6.88E-05	6.88E-05
82:10:00	0.0000	0.0000	0.0000	0.0000	6.87E-05	6.87E-05
82:15:00	0.0000	0.0000	0.0000	0.0000	6.86E-05	6.86E-05
82:20:00	0.0000	0.0000	0.0000	0.0000	6.85E-05	6.85E-05
82:25:00	0.0000	0.0000	0.0000	0.0000	6.84E-05	6.84E-05
82:30:00	0.0000	0.0000	0.0000	0.0000	6.83E-05	6.83E-05
82:35:00	0.0000	0.0000	0.0000	0.0000	6.82E-05	6.82E-05
82:40:00	0.0000	0.0000	0.0000	0.0000	6.81E-05	6.81E-05
82:45:00	0.0000	0.0000	0.0000	0.0000	6.8E-05	6.8E-05
82:50:00	0.0000	0.0000	0.0000	0.0000	6.79E-05	6.79E-05
82:55:00	0.0000	0.0000	0.0000	0.0000	6.77E-05	6.77E-05
83:00:00	0.0000	0.0000	0.0000	0.0000	6.76E-05	6.76E-05
83:05:00	0.0000	0.0000	0.0000	0.0000	6.75E-05	6.75E-05
83:10:00	0.0000	0.0000	0.0000	0.0000	6.74E-05	6.74E-05
83:15:00	0.0000	0.0000	0.0000	0.0000	6.73E-05	6.73E-05
83:20:00	0.0000	0.0000	0.0000	0.0000	6.72E-05	6.72E-05
83:25:00	0.0000	0.0000	0.0000	0.0000	6.71E-05	6.71E-05
83:30:00	0.0000	0.0000	0.0000	0.0000	6.7E-05	6.7E-05
83:35:00	0.0000	0.0000	0.0000	0.0000	6.69E-05	6.69E-05
83:40:00	0.0000	0.0000	0.0000	0.0000	6.68E-05	6.68E-05
83:45:00	0.0000	0.0000	0.0000	0.0000	6.67E-05	6.67E-05
83:50:00	0.0000	0.0000	0.0000	0.0000	6.66E-05	6.66E-05

Time (hh:mm:ss)	Rain (mm)	Sewer Loss (mm)	Net Rain (mm)	Runoff (m³/s)	Baseflow (m³/s)	Total Flow (m³/s)
83:55:00	0.0000	0.0000	0.0000	0.0000	6.65E-05	6.65E-05
84:00:00	0.0000	0.0000	0.0000	0.0000	6.64E-05	6.64E-05
84:05:00	0.0000	0.0000	0.0000	0.0000	6.63E-05	6.63E-05
84:10:00	0.0000	0.0000	0.0000	0.0000	6.62E-05	6.62E-05
84:15:00	0.0000	0.0000	0.0000	0.0000	6.61E-05	6.61E-05
84:20:00	0.0000	0.0000	0.0000	0.0000	6.6E-05	6.6E-05
84:25:00	0.0000	0.0000	0.0000	0.0000	6.59E-05	6.59E-05
84:30:00	0.0000	0.0000	0.0000	0.0000	6.58E-05	6.58E-05
84:35:00	0.0000	0.0000	0.0000	0.0000	6.57E-05	6.57E-05
84:40:00	0.0000	0.0000	0.0000	0.0000	6.56E-05	6.56E-05
84:45:00	0.0000	0.0000	0.0000	0.0000	6.55E-05	6.55E-05
84:50:00	0.0000	0.0000	0.0000	0.0000	6.54E-05	6.54E-05
84:55:00	0.0000	0.0000	0.0000	0.0000	6.53E-05	6.53E-05
85:00:00	0.0000	0.0000	0.0000	0.0000	6.52E-05	6.52E-05
85:05:00	0.0000	0.0000	0.0000	0.0000	6.51E-05	6.51E-05
85:10:00	0.0000	0.0000	0.0000	0.0000	6.5E-05	6.5E-05
85:15:00	0.0000	0.0000	0.0000	0.0000	6.49E-05	6.49E-05
85:20:00	0.0000	0.0000	0.0000	0.0000	6.48E-05	6.48E-05
85:25:00	0.0000	0.0000	0.0000	0.0000	6.47E-05	6.47E-05
85:30:00	0.0000	0.0000	0.0000	0.0000	6.46E-05	6.46E-05
85:35:00	0.0000	0.0000	0.0000	0.0000	6.46E-05	6.46E-05
85:40:00	0.0000	0.0000	0.0000	0.0000	6.45E-05	6.45E-05
85:45:00	0.0000	0.0000	0.0000	0.0000	6.44E-05	6.44E-05
85:50:00	0.0000	0.0000	0.0000	0.0000	6.43E-05	6.43E-05
85:55:00	0.0000	0.0000	0.0000	0.0000	6.42E-05	6.42E-05
86:00:00	0.0000	0.0000	0.0000	0.0000	6.41E-05	6.41E-05
86:05:00	0.0000	0.0000	0.0000	0.0000	6.4E-05	6.4E-05
86:10:00	0.0000	0.0000	0.0000	0.0000	6.39E-05	6.39E-05
86:15:00	0.0000	0.0000	0.0000	0.0000	6.38E-05	6.38E-05
86:20:00	0.0000	0.0000	0.0000	0.0000	6.37E-05	6.37E-05
86:25:00	0.0000	0.0000	0.0000	0.0000	6.36E-05	6.36E-05
86:30:00	0.0000	0.0000	0.0000	0.0000	6.35E-05	6.35E-05
86:35:00	0.0000	0.0000	0.0000	0.0000	6.34E-05	6.34E-05
86:40:00	0.0000	0.0000	0.0000	0.0000	6.33E-05	6.33E-05
86:45:00	0.0000	0.0000	0.0000	0.0000	6.32E-05	6.32E-05
86:50:00	0.0000	0.0000	0.0000	0.0000	6.31E-05	6.31E-05

Time (hh:mm:ss)	Rain (mm)	Sewer Loss (mm)	Net Rain (mm)	Runoff (m³/s)	Baseflow (m³/s)	Total Flow (m³/s)
86:55:00	0.0000	0.0000	0.0000	0.0000	6.3E-05	6.3E-05
87:00:00	0.0000	0.0000	0.0000	0.0000	6.29E-05	6.29E-05
87:05:00	0.0000	0.0000	0.0000	0.0000	6.28E-05	6.28E-05
87:10:00	0.0000	0.0000	0.0000	0.0000	6.27E-05	6.27E-05
87:15:00	0.0000	0.0000	0.0000	0.0000	6.26E-05	6.26E-05
87:20:00	0.0000	0.0000	0.0000	0.0000	6.25E-05	6.25E-05
87:25:00	0.0000	0.0000	0.0000	0.0000	6.24E-05	6.24E-05
87:30:00	0.0000	0.0000	0.0000	0.0000	6.23E-05	6.23E-05
87:35:00	0.0000	0.0000	0.0000	0.0000	6.23E-05	6.23E-05
87:40:00	0.0000	0.0000	0.0000	0.0000	6.22E-05	6.22E-05
87:45:00	0.0000	0.0000	0.0000	0.0000	6.21E-05	6.21E-05
87:50:00	0.0000	0.0000	0.0000	0.0000	6.2E-05	6.2E-05
87:55:00	0.0000	0.0000	0.0000	0.0000	6.19E-05	6.19E-05
88:00:00	0.0000	0.0000	0.0000	0.0000	6.18E-05	6.18E-05
88:05:00	0.0000	0.0000	0.0000	0.0000	6.17E-05	6.17E-05
88:10:00	0.0000	0.0000	0.0000	0.0000	6.16E-05	6.16E-05
88:15:00	0.0000	0.0000	0.0000	0.0000	6.15E-05	6.15E-05
88:20:00	0.0000	0.0000	0.0000	0.0000	6.14E-05	6.14E-05
88:25:00	0.0000	0.0000	0.0000	0.0000	6.13E-05	6.13E-05
88:30:00	0.0000	0.0000	0.0000	0.0000	6.12E-05	6.12E-05
88:35:00	0.0000	0.0000	0.0000	0.0000	6.11E-05	6.11E-05
88:40:00	0.0000	0.0000	0.0000	0.0000	6.1E-05	6.1E-05
88:45:00	0.0000	0.0000	0.0000	0.0000	6.1E-05	6.1E-05
88:50:00	0.0000	0.0000	0.0000	0.0000	6.09E-05	6.09E-05
88:55:00	0.0000	0.0000	0.0000	0.0000	6.08E-05	6.08E-05
89:00:00	0.0000	0.0000	0.0000	0.0000	6.07E-05	6.07E-05
89:05:00	0.0000	0.0000	0.0000	0.0000	6.06E-05	6.06E-05
89:10:00	0.0000	0.0000	0.0000	0.0000	6.05E-05	6.05E-05
89:15:00	0.0000	0.0000	0.0000	0.0000	6.04E-05	6.04E-05
89:20:00	0.0000	0.0000	0.0000	0.0000	6.03E-05	6.03E-05
89:25:00	0.0000	0.0000	0.0000	0.0000	6.02E-05	6.02E-05
89:30:00	0.0000	0.0000	0.0000	0.0000	6.01E-05	6.01E-05
89:35:00	0.0000	0.0000	0.0000	0.0000	6E-05	6E-05
89:40:00	0.0000	0.0000	0.0000	0.0000	5.99E-05	5.99E-05
89:45:00	0.0000	0.0000	0.0000	0.0000	5.99E-05	5.99E-05
89:50:00	0.0000	0.0000	0.0000	0.0000	5.98E-05	5.98E-05

Time (hh:mm:ss)	Rain (mm)	Sewer Loss (mm)	Net Rain (mm)	Runoff (m³/s)	Baseflow (m³/s)	Total Flow (m³/s)
89:55:00	0.0000	0.0000	0.0000	0.0000	5.97E-05	5.97E-05
90:00:00	0.0000	0.0000	0.0000	0.0000	5.96E-05	5.96E-05
90:05:00	0.0000	0.0000	0.0000	0.0000	5.95E-05	5.95E-05
90:10:00	0.0000	0.0000	0.0000	0.0000	5.94E-05	5.94E-05
90:15:00	0.0000	0.0000	0.0000	0.0000	5.93E-05	5.93E-05
90:20:00	0.0000	0.0000	0.0000	0.0000	5.92E-05	5.92E-05
90:25:00	0.0000	0.0000	0.0000	0.0000	5.91E-05	5.91E-05
90:30:00	0.0000	0.0000	0.0000	0.0000	5.91E-05	5.91E-05
90:35:00	0.0000	0.0000	0.0000	0.0000	5.9E-05	5.9E-05
90:40:00	0.0000	0.0000	0.0000	0.0000	5.89E-05	5.89E-05
90:45:00	0.0000	0.0000	0.0000	0.0000	5.88E-05	5.88E-05
90:50:00	0.0000	0.0000	0.0000	0.0000	5.87E-05	5.87E-05
90:55:00	0.0000	0.0000	0.0000	0.0000	5.86E-05	5.86E-05
91:00:00	0.0000	0.0000	0.0000	0.0000	5.85E-05	5.85E-05
91:05:00	0.0000	0.0000	0.0000	0.0000	5.84E-05	5.84E-05
91:10:00	0.0000	0.0000	0.0000	0.0000	5.83E-05	5.83E-05
91:15:00	0.0000	0.0000	0.0000	0.0000	5.83E-05	5.83E-05
91:20:00	0.0000	0.0000	0.0000	0.0000	5.82E-05	5.82E-05
91:25:00	0.0000	0.0000	0.0000	0.0000	5.81E-05	5.81E-05
91:30:00	0.0000	0.0000	0.0000	0.0000	5.8E-05	5.8E-05
91:35:00	0.0000	0.0000	0.0000	0.0000	5.79E-05	5.79E-05
91:40:00	0.0000	0.0000	0.0000	0.0000	5.78E-05	5.78E-05
91:45:00	0.0000	0.0000	0.0000	0.0000	5.77E-05	5.77E-05
91:50:00	0.0000	0.0000	0.0000	0.0000	5.76E-05	5.76E-05
91:55:00	0.0000	0.0000	0.0000	0.0000	5.76E-05	5.76E-05
92:00:00	0.0000	0.0000	0.0000	0.0000	5.75E-05	5.75E-05
92:05:00	0.0000	0.0000	0.0000	0.0000	5.74E-05	5.74E-05
92:10:00	0.0000	0.0000	0.0000	0.0000	5.73E-05	5.73E-05
92:15:00	0.0000	0.0000	0.0000	0.0000	5.72E-05	5.72E-05
92:20:00	0.0000	0.0000	0.0000	0.0000	5.71E-05	5.71E-05
92:25:00	0.0000	0.0000	0.0000	0.0000	5.7E-05	5.7E-05
92:30:00	0.0000	0.0000	0.0000	0.0000	5.69E-05	5.69E-05
92:35:00	0.0000	0.0000	0.0000	0.0000	5.69E-05	5.69E-05
92:40:00	0.0000	0.0000	0.0000	0.0000	5.68E-05	5.68E-05
92:45:00	0.0000	0.0000	0.0000	0.0000	5.67E-05	5.67E-05
92:50:00	0.0000	0.0000	0.0000	0.0000	5.66E-05	5.66E-05

Time (hh:mm:ss)	Rain (mm)	Sewer Loss (mm)	Net Rain (mm)	Runoff (m³/s)	Baseflow (m³/s)	Total Flow (m³/s)
92:55:00	0.0000	0.0000	0.0000	0.0000	5.65E-05	5.65E-05
93:00:00	0.0000	0.0000	0.0000	0.0000	5.64E-05	5.64E-05
93:05:00	0.0000	0.0000	0.0000	0.0000	5.63E-05	5.63E-05
93:10:00	0.0000	0.0000	0.0000	0.0000	5.63E-05	5.63E-05
93:15:00	0.0000	0.0000	0.0000	0.0000	5.62E-05	5.62E-05
93:20:00	0.0000	0.0000	0.0000	0.0000	5.61E-05	5.61E-05
93:25:00	0.0000	0.0000	0.0000	0.0000	5.6E-05	5.6E-05
93:30:00	0.0000	0.0000	0.0000	0.0000	5.59E-05	5.59E-05
93:35:00	0.0000	0.0000	0.0000	0.0000	5.58E-05	5.58E-05
93:40:00	0.0000	0.0000	0.0000	0.0000	5.58E-05	5.58E-05
93:45:00	0.0000	0.0000	0.0000	0.0000	5.57E-05	5.57E-05
93:50:00	0.0000	0.0000	0.0000	0.0000	5.56E-05	5.56E-05
93:55:00	0.0000	0.0000	0.0000	0.0000	5.55E-05	5.55E-05
94:00:00	0.0000	0.0000	0.0000	0.0000	5.54E-05	5.54E-05
94:05:00	0.0000	0.0000	0.0000	0.0000	5.53E-05	5.53E-05
94:10:00	0.0000	0.0000	0.0000	0.0000	5.53E-05	5.53E-05
94:15:00	0.0000	0.0000	0.0000	0.0000	5.52E-05	5.52E-05
94:20:00	0.0000	0.0000	0.0000	0.0000	5.51E-05	5.51E-05
94:25:00	0.0000	0.0000	0.0000	0.0000	5.5E-05	5.5E-05
94:30:00	0.0000	0.0000	0.0000	0.0000	5.49E-05	5.49E-05
94:35:00	0.0000	0.0000	0.0000	0.0000	5.48E-05	5.48E-05
94:40:00	0.0000	0.0000	0.0000	0.0000	5.48E-05	5.48E-05
94:45:00	0.0000	0.0000	0.0000	0.0000	5.47E-05	5.47E-05
94:50:00	0.0000	0.0000	0.0000	0.0000	5.46E-05	5.46E-05
94:55:00	0.0000	0.0000	0.0000	0.0000	5.45E-05	5.45E-05
95:00:00	0.0000	0.0000	0.0000	0.0000	5.44E-05	5.44E-05
95:05:00	0.0000	0.0000	0.0000	0.0000	5.43E-05	5.43E-05
95:10:00	0.0000	0.0000	0.0000	0.0000	5.43E-05	5.43E-05
95:15:00	0.0000	0.0000	0.0000	0.0000	5.42E-05	5.42E-05
95:20:00	0.0000	0.0000	0.0000	0.0000	5.41E-05	5.41E-05
95:25:00	0.0000	0.0000	0.0000	0.0000	5.4E-05	5.4E-05
95:30:00	0.0000	0.0000	0.0000	0.0000	5.39E-05	5.39E-05
95:35:00	0.0000	0.0000	0.0000	0.0000	5.39E-05	5.39E-05
95:40:00	0.0000	0.0000	0.0000	0.0000	5.38E-05	5.38E-05
95:45:00	0.0000	0.0000	0.0000	0.0000	5.37E-05	5.37E-05
95:50:00	0.0000	0.0000	0.0000	0.0000	5.36E-05	5.36E-05

Time (hh:mm:ss)	Rain (mm)	Sewer Loss (mm)	Net Rain (mm)	Runoff (m³/s)	Baseflow (m³/s)	Total Flow (m³/s)
95:55:00	0.0000	0.0000	0.0000	0.0000	5.35E-05	5.35E-05
96:00:00	0.0000	0.0000	0.0000	0.0000	5.34E-05	5.34E-05
96:05:00	0.0000	0.0000	0.0000	0.0000	5.34E-05	5.34E-05
96:10:00	0.0000	0.0000	0.0000	0.0000	5.33E-05	5.33E-05
96:15:00	0.0000	0.0000	0.0000	0.0000	5.32E-05	5.32E-05
96:20:00	0.0000	0.0000	0.0000	0.0000	5.31E-05	5.31E-05
96:25:00	0.0000	0.0000	0.0000	0.0000	5.3E-05	5.3E-05
96:30:00	0.0000	0.0000	0.0000	0.0000	5.3E-05	5.3E-05
96:35:00	0.0000	0.0000	0.0000	0.0000	5.29E-05	5.29E-05
96:40:00	0.0000	0.0000	0.0000	0.0000	5.28E-05	5.28E-05
96:45:00	0.0000	0.0000	0.0000	0.0000	5.27E-05	5.27E-05
96:50:00	0.0000	0.0000	0.0000	0.0000	5.26E-05	5.26E-05
96:55:00	0.0000	0.0000	0.0000	0.0000	5.26E-05	5.26E-05
97:00:00	0.0000	0.0000	0.0000	0.0000	5.25E-05	5.25E-05
97:05:00	0.0000	0.0000	0.0000	0.0000	5.24E-05	5.24E-05
97:10:00	0.0000	0.0000	0.0000	0.0000	5.23E-05	5.23E-05
97:15:00	0.0000	0.0000	0.0000	0.0000	5.23E-05	5.23E-05
97:20:00	0.0000	0.0000	0.0000	0.0000	5.22E-05	5.22E-05
97:25:00	0.0000	0.0000	0.0000	0.0000	5.21E-05	5.21E-05
97:30:00	0.0000	0.0000	0.0000	0.0000	5.2E-05	5.2E-05
97:35:00	0.0000	0.0000	0.0000	0.0000	5.19E-05	5.19E-05
97:40:00	0.0000	0.0000	0.0000	0.0000	5.19E-05	5.19E-05
97:45:00	0.0000	0.0000	0.0000	0.0000	5.18E-05	5.18E-05
97:50:00	0.0000	0.0000	0.0000	0.0000	5.17E-05	5.17E-05
97:55:00	0.0000	0.0000	0.0000	0.0000	5.16E-05	5.16E-05
98:00:00	0.0000	0.0000	0.0000	0.0000	5.15E-05	5.15E-05
98:05:00	0.0000	0.0000	0.0000	0.0000	5.15E-05	5.15E-05
98:10:00	0.0000	0.0000	0.0000	0.0000	5.14E-05	5.14E-05
98:15:00	0.0000	0.0000	0.0000	0.0000	5.13E-05	5.13E-05
98:20:00	0.0000	0.0000	0.0000	0.0000	5.12E-05	5.12E-05
98:25:00	0.0000	0.0000	0.0000	0.0000	5.12E-05	5.12E-05
98:30:00	0.0000	0.0000	0.0000	0.0000	5.11E-05	5.11E-05
98:35:00	0.0000	0.0000	0.0000	0.0000	5.1E-05	5.1E-05
98:40:00	0.0000	0.0000	0.0000	0.0000	5.09E-05	5.09E-05
98:45:00	0.0000	0.0000	0.0000	0.0000	5.09E-05	5.09E-05
98:50:00	0.0000	0.0000	0.0000	0.0000	5.08E-05	5.08E-05

Time (hh:mm:ss)	Rain (mm)	Sewer Loss (mm)	Net Rain (mm)	Runoff (m³/s)	Baseflow (m³/s)	Total Flow (m³/s)
98:55:00	0.0000	0.0000	0.0000	0.0000	5.07E-05	5.07E-05
99:00:00	0.0000	0.0000	0.0000	0.0000	5.06E-05	5.06E-05
99:05:00	0.0000	0.0000	0.0000	0.0000	5.05E-05	5.05E-05
99:10:00	0.0000	0.0000	0.0000	0.0000	5.05E-05	5.05E-05
99:15:00	0.0000	0.0000	0.0000	0.0000	5.04E-05	5.04E-05
99:20:00	0.0000	0.0000	0.0000	0.0000	5.03E-05	5.03E-05
99:25:00	0.0000	0.0000	0.0000	0.0000	5.02E-05	5.02E-05
99:30:00	0.0000	0.0000	0.0000	0.0000	5.02E-05	5.02E-05
99:35:00	0.0000	0.0000	0.0000	0.0000	5.01E-05	5.01E-05
99:40:00	0.0000	0.0000	0.0000	0.0000	5E-05	5E-05
99:45:00	0.0000	0.0000	0.0000	0.0000	4.99E-05	4.99E-05
99:50:00	0.0000	0.0000	0.0000	0.0000	4.99E-05	4.99E-05
99:55:00	0.0000	0.0000	0.0000	0.0000	4.98E-05	4.98E-05
100:00:00	0.0000	0.0000	0.0000	0.0000	4.97E-05	4.97E-05
100:05:00	0.0000	0.0000	0.0000	0.0000	4.96E-05	4.96E-05
100:10:00	0.0000	0.0000	0.0000	0.0000	4.96E-05	4.96E-05
100:15:00	0.0000	0.0000	0.0000	0.0000	4.95E-05	4.95E-05
100:20:00	0.0000	0.0000	0.0000	0.0000	4.94E-05	4.94E-05
100:25:00	0.0000	0.0000	0.0000	0.0000	4.93E-05	4.93E-05
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100:40:00	0.0000	0.0000	0.0000	0.0000	4.91E-05	4.91E-05
100:45:00	0.0000	0.0000	0.0000	0.0000	4.9E-05	4.9E-05
100:50:00	0.0000	0.0000	0.0000	0.0000	4.9E-05	4.9E-05
100:55:00	0.0000	0.0000	0.0000	0.0000	4.89E-05	4.89E-05
101:00:00	0.0000	0.0000	0.0000	0.0000	4.88E-05	4.88E-05
101:05:00	0.0000	0.0000	0.0000	0.0000	4.87E-05	4.87E-05
101:10:00	0.0000	0.0000	0.0000	0.0000	4.87E-05	4.87E-05
101:15:00	0.0000	0.0000	0.0000	0.0000	4.86E-05	4.86E-05
101:20:00	0.0000	0.0000	0.0000	0.0000	4.85E-05	4.85E-05
101:25:00	0.0000	0.0000	0.0000	0.0000	4.85E-05	4.85E-05
101:30:00	0.0000	0.0000	0.0000	0.0000	4.84E-05	4.84E-05
101:35:00	0.0000	0.0000	0.0000	0.0000	4.83E-05	4.83E-05
101:40:00	0.0000	0.0000	0.0000	0.0000	4.82E-05	4.82E-05
101:45:00	0.0000	0.0000	0.0000	0.0000	4.82E-05	4.82E-05
101:50:00	0.0000	0.0000	0.0000	0.0000	4.81E-05	4.81E-05

Time (hh:mm:ss)	Rain (mm)	Sewer Loss (mm)	Net Rain (mm)	Runoff (m³/s)	Baseflow (m³/s)	Total Flow (m³/s)
101:55:00	0.0000	0.0000	0.0000	0.0000	4.8E-05	4.8E-05
102:00:00	0.0000	0.0000	0.0000	0.0000	4.79E-05	4.79E-05
102:05:00	0.0000	0.0000	0.0000	0.0000	4.79E-05	4.79E-05
102:10:00	0.0000	0.0000	0.0000	0.0000	4.78E-05	4.78E-05
102:15:00	0.0000	0.0000	0.0000	0.0000	4.77E-05	4.77E-05
102:20:00	0.0000	0.0000	0.0000	0.0000	4.77E-05	4.77E-05
102:25:00	0.0000	0.0000	0.0000	0.0000	4.76E-05	4.76E-05
102:30:00	0.0000	0.0000	0.0000	0.0000	4.75E-05	4.75E-05
102:35:00	0.0000	0.0000	0.0000	0.0000	4.74E-05	4.74E-05
102:40:00	0.0000	0.0000	0.0000	0.0000	4.74E-05	4.74E-05
102:45:00	0.0000	0.0000	0.0000	0.0000	4.73E-05	4.73E-05
102:50:00	0.0000	0.0000	0.0000	0.0000	4.72E-05	4.72E-05
102:55:00	0.0000	0.0000	0.0000	0.0000	4.72E-05	4.72E-05
103:00:00	0.0000	0.0000	0.0000	0.0000	4.71E-05	4.71E-05
103:05:00	0.0000	0.0000	0.0000	0.0000	4.7E-05	4.7E-05
103:10:00	0.0000	0.0000	0.0000	0.0000	4.69E-05	4.69E-05
103:15:00	0.0000	0.0000	0.0000	0.0000	4.69E-05	4.69E-05
103:20:00	0.0000	0.0000	0.0000	0.0000	4.68E-05	4.68E-05
103:25:00	0.0000	0.0000	0.0000	0.0000	4.67E-05	4.67E-05
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103:35:00	0.0000	0.0000	0.0000	0.0000	4.66E-05	4.66E-05
103:40:00	0.0000	0.0000	0.0000	0.0000	4.65E-05	4.65E-05
103:45:00	0.0000	0.0000	0.0000	0.0000	4.64E-05	4.64E-05
103:50:00	0.0000	0.0000	0.0000	0.0000	4.64E-05	4.64E-05
103:55:00	0.0000	0.0000	0.0000	0.0000	4.63E-05	4.63E-05
104:00:00	0.0000	0.0000	0.0000	0.0000	4.62E-05	4.62E-05
104:05:00	0.0000	0.0000	0.0000	0.0000	4.62E-05	4.62E-05
104:10:00	0.0000	0.0000	0.0000	0.0000	4.61E-05	4.61E-05
104:15:00	0.0000	0.0000	0.0000	0.0000	4.6E-05	4.6E-05
104:20:00	0.0000	0.0000	0.0000	0.0000	4.6E-05	4.6E-05
104:25:00	0.0000	0.0000	0.0000	0.0000	4.59E-05	4.59E-05
104:30:00	0.0000	0.0000	0.0000	0.0000	4.58E-05	4.58E-05
104:35:00	0.0000	0.0000	0.0000	0.0000	4.58E-05	4.58E-05
104:40:00	0.0000	0.0000	0.0000	0.0000	4.57E-05	4.57E-05
104:45:00	0.0000	0.0000	0.0000	0.0000	4.56E-05	4.56E-05
104:50:00	0.0000	0.0000	0.0000	0.0000	4.55E-05	4.55E-05

Time (hh:mm:ss)	Rain (mm)	Sewer Loss (mm)	Net Rain (mm)	Runoff (m³/s)	Baseflow (m³/s)	Total Flow (m³/s)
104:55:00	0.0000	0.0000	0.0000	0.0000	4.55E-05	4.55E-05
105:00:00	0.0000	0.0000	0.0000	0.0000	4.54E-05	4.54E-05
105:05:00	0.0000	0.0000	0.0000	0.0000	4.53E-05	4.53E-05
105:10:00	0.0000	0.0000	0.0000	0.0000	4.53E-05	4.53E-05
105:15:00	0.0000	0.0000	0.0000	0.0000	4.52E-05	4.52E-05
105:20:00	0.0000	0.0000	0.0000	0.0000	4.51E-05	4.51E-05
105:25:00	0.0000	0.0000	0.0000	0.0000	4.51E-05	4.51E-05
105:30:00	0.0000	0.0000	0.0000	0.0000	4.5E-05	4.5E-05
105:35:00	0.0000	0.0000	0.0000	0.0000	4.49E-05	4.49E-05
105:40:00	0.0000	0.0000	0.0000	0.0000	4.49E-05	4.49E-05
105:45:00	0.0000	0.0000	0.0000	0.0000	4.48E-05	4.48E-05
105:50:00	0.0000	0.0000	0.0000	0.0000	4.47E-05	4.47E-05
105:55:00	0.0000	0.0000	0.0000	0.0000	4.47E-05	4.47E-05
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106:05:00	0.0000	0.0000	0.0000	0.0000	4.45E-05	4.45E-05
106:10:00	0.0000	0.0000	0.0000	0.0000	4.45E-05	4.45E-05
106:15:00	0.0000	0.0000	0.0000	0.0000	4.44E-05	4.44E-05
106:20:00	0.0000	0.0000	0.0000	0.0000	4.43E-05	4.43E-05
106:25:00	0.0000	0.0000	0.0000	0.0000	4.43E-05	4.43E-05
106:30:00	0.0000	0.0000	0.0000	0.0000	4.42E-05	4.42E-05
106:35:00	0.0000	0.0000	0.0000	0.0000	4.41E-05	4.41E-05
106:40:00	0.0000	0.0000	0.0000	0.0000	4.41E-05	4.41E-05
106:45:00	0.0000	0.0000	0.0000	0.0000	4.4E-05	4.4E-05
106:50:00	0.0000	0.0000	0.0000	0.0000	4.39E-05	4.39E-05
106:55:00	0.0000	0.0000	0.0000	0.0000	4.39E-05	4.39E-05
107:00:00	0.0000	0.0000	0.0000	0.0000	4.38E-05	4.38E-05
107:05:00	0.0000	0.0000	0.0000	0.0000	4.37E-05	4.37E-05
107:10:00	0.0000	0.0000	0.0000	0.0000	4.37E-05	4.37E-05
107:15:00	0.0000	0.0000	0.0000	0.0000	4.36E-05	4.36E-05
107:20:00	0.0000	0.0000	0.0000	0.0000	4.35E-05	4.35E-05
107:25:00	0.0000	0.0000	0.0000	0.0000	4.35E-05	4.35E-05
107:30:00	0.0000	0.0000	0.0000	0.0000	4.34E-05	4.34E-05
107:35:00	0.0000	0.0000	0.0000	0.0000	4.33E-05	4.33E-05
107:40:00	0.0000	0.0000	0.0000	0.0000	4.33E-05	4.33E-05
107:45:00	0.0000	0.0000	0.0000	0.0000	4.32E-05	4.32E-05
107:50:00	0.0000	0.0000	0.0000	0.0000	4.31E-05	4.31E-05

Time (hh:mm:ss)	Rain (mm)	Sewer Loss (mm)	Net Rain (mm)	Runoff (m³/s)	Baseflow (m³/s)	Total Flow (m³/s)
107:55:00	0.0000	0.0000	0.0000	0.0000	4.31E-05	4.31E-05
108:00:00	0.0000	0.0000	0.0000	0.0000	4.3E-05	4.3E-05
108:05:00	0.0000	0.0000	0.0000	0.0000	4.29E-05	4.29E-05
108:10:00	0.0000	0.0000	0.0000	0.0000	4.29E-05	4.29E-05
108:15:00	0.0000	0.0000	0.0000	0.0000	4.28E-05	4.28E-05
108:20:00	0.0000	0.0000	0.0000	0.0000	4.27E-05	4.27E-05
108:25:00	0.0000	0.0000	0.0000	0.0000	4.27E-05	4.27E-05
108:30:00	0.0000	0.0000	0.0000	0.0000	4.26E-05	4.26E-05
108:35:00	0.0000	0.0000	0.0000	0.0000	4.26E-05	4.26E-05
108:40:00	0.0000	0.0000	0.0000	0.0000	4.25E-05	4.25E-05
108:45:00	0.0000	0.0000	0.0000	0.0000	4.24E-05	4.24E-05
108:50:00	0.0000	0.0000	0.0000	0.0000	4.24E-05	4.24E-05
108:55:00	0.0000	0.0000	0.0000	0.0000	4.23E-05	4.23E-05
109:00:00	0.0000	0.0000	0.0000	0.0000	4.22E-05	4.22E-05
109:05:00	0.0000	0.0000	0.0000	0.0000	4.22E-05	4.22E-05
109:10:00	0.0000	0.0000	0.0000	0.0000	4.21E-05	4.21E-05
109:15:00	0.0000	0.0000	0.0000	0.0000	4.2E-05	4.2E-05
109:20:00	0.0000	0.0000	0.0000	0.0000	4.2E-05	4.2E-05
109:25:00	0.0000	0.0000	0.0000	0.0000	4.19E-05	4.19E-05

Appendix

Catchment descriptors *

Name	Value	User-defined value used?
BFIHOST	0.75	No
BFIHOST19	0.78	No
PROPWET (mm)	0.29	No
SAAR (mm)	664	No

Values in square brackets are the original values loaded from the FEH Web Service or FEH CD-ROM



Appendix G Geoenvironmental Assessment – Reading Golf Club

**GEOENVIRONMENTAL ASSESSMENT
READING GOLF CLUB
KIDMORE END ROAD, RG4 8SQ
REDROW HOMES THAMES VALLEY
GEA-21962B-19-476
NOVEMBER 2019**

IDOM



GEOENVIRONMENTAL ASSESSMENT
READING GOLF CLUB
KIDMORE END ROAD, RG4 8SQ
REDROW HOMES THAMES VALLEY
GEA-21962B-19-476
NOVEMBER 2019

Current Document Details

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- Historical Plans

APPENDIX 3

- Exploratory Hole Logs
- BGS Borehole Log SU77NW68

APPENDIX 4

- Soil Chemistry
- Laboratory Analysis Certificates

APPENDIX 5

- Geotechnical Laboratory Certificates

APPENDIX 6

- Field Monitoring Records
- Groundwater Level Data
- Hazardous Soil Gas Data

APPENDIX 7

- Gas Risk Assessment

EXECUTIVE SUMMARY

A Geo-Environmental Assessment was requested by Redrow Homes Thames Valley. The purpose of the assessment was to identify any contaminative or geotechnical issues associated with former land use at *Reading Golf Club, Kidmore End Road, RG4 8SQ* which might impact on the site's purchase and redevelopment.

SITE DETAILS

Approximate site area	12.3 ha
Current use / historic use	Golf Course
Proposed use	Residential development with gardens.

PHASE 1 NON-INTRUSIVE INVESTIGATION

Expected geology	Superficial: terrace gravels over western two-thirds of site. Bedrock: Lambeth Groups (clays and sands) in the south and Chalk in the north.
Groundwater	Terrace gravels and Lambeth Group classed as Secondary A aquifers. Chalk classed as a Principal Aquifer. Site rests within Total catchment of a groundwater protection zone.
Surface water	No surface water receptors in vicinity. Site is within a Flood Zone 1.

PHASE 2 EXPLORATORY INVESTIGATION

Ground Conditions	Topsoil over mainly medium dense, locally dense very clayey sand and gravel or firm and stiff very gravelly clay. Shallow chalk identified in north-east.
Contamination	No significant contamination identified.
Geotechnical issues	Locally loose/soft conditions persist to > 2m depth in east of site. Potentially shrinkable soils in zone of influence of trees. There are records of chalk cavities (solution features) off site but within the vicinity. Therefore potential for weak solution feature infill or voids possible in north of site. Low permeability soils in south. Infiltration drainage may be limited to northern areas.

RECOMMENDATIONS

Geotechnical	Mostly shallow strip footings. Deeper foundations or possible ground improvement where loose/soft strata found to depth and in zone of influence of trees (subject to tree survey). Trial pit investigation recommended for soakage testing, to target soft zones, investigate desiccation around trees, inspect chalk composition and generally, investigate shallow strata for foundation assessment.
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Remediation	No requirements identified to date.
Waste classification	Soil arisings likely to be non-hazardous and natural soils anticipated to be accepted as inert waste.
Re-use of site-won materials	Site won materials are currently indicated to be suitable for use. It is recommended that a Materials Management Plan is in place where soil arisings are intended for re-use as fill.

SECTION 1 INTRODUCTION

- 1.1 Redrow Homes Thames Valley (Redrow) proposes to purchase an area of land comprising the southern part of the Reading Golf Club, located at 17 Kidmore End Road, Emmer Green, Reading for residential development purposes. An appraisal layout provided shows the proposed development comprises 228 dwellings with private gardens, estate roads and retained open space with surface water storage/attenuation. IDOM Merebrook Limited (IDOM) has been commissioned by Redrow to undertake preliminary site investigation works and to advise on the geo-environmental implications of the purchase and redevelopment of the site for the proposed end use.
- 1.2 The objectives of the investigation are to:
- i. Assess surface and sub-surface ground conditions present at the site;
 - ii. Identify hazards associated with ground contamination which may place constraints on the site and the proposed development;
 - iii. Evaluate the risks associated with any identified hazards;
 - iv. Provide preliminary recommendations for the mitigation of any significant risks identified; and
 - v. Provide preliminary geotechnical recommendations.
- 1.3 A Phase 1 (Non-intrusive Investigation) and a Phase 2a (Preliminary Exploratory Investigation) have been undertaken for the subject site.
- 1.4 This report presents the findings of the geo-environmental investigation and provides an interpretation of the geo-environmental conditions that exist at the site. The contaminative status of the site and the implications with respect to development have been interpreted in accordance with the current government guidance on source-pathway-receptor risk assessment. This report uses a Tier 1 risk assessment to ascribe a conservative qualitative appraisal of the hazards associated with the site.
- 1.5 This report has been prepared for Redrow Homes Thames Valley for the sole purpose described above and no extended duty of care to any third party is implied or offered. Third parties making reference to the report should consult Redrow Homes Thames Valley and IDOM as to the extent to which the findings may be appropriate for their use.

SECTION 2 PHASE 1 (NON-INTRUSIVE INVESTIGATION)

2.1 INTRODUCTION

- 2.1.1 The non-intrusive investigation has been conducted with reference to the documents and sources detailed in Table 1 below:

Table 1: Published Data and Information Sources

SOURCE DATA	GROUNDSURE DATA
BGS 1:50,000 Series Geological Sheet 268 Reading	Ordnance Survey (OS) historical maps scaled at 1:10,560, 1:10,000, 1:2,500 and 1:1,250 dated 1878-2019.
BGS Geology of Britain 1:50,000 online maps	Water abstraction, discharge and pollution data
Radon: guidance on protection measures for new dwellings	Registered waste management sites
Environment Agency (EA) online data maps	Mining records and natural ground stability data
UK National Air Quality Archive, online	Protected areas of environmentally sensitive land use or conservation
	Other relevant designations and/or authorisations and Trade Directory entries

- 2.1.2 The above sources are all authoritative and it is believed that they are reasonably reliable. However, independent verification of the information supplied has not necessarily been carried out and IDOM cannot be held liable for inaccuracies or deficiencies in the information.

2.2 SITE LOCATION AND SETTING

- 2.2.1 The site is located to the west of Kidmore End Road, Emmer Green, Reading.
- 2.2.2 The site occupies an area of approximately 12.13 hectares located at National Grid Reference 471939, 176777 and indicated in Figure 1 below.

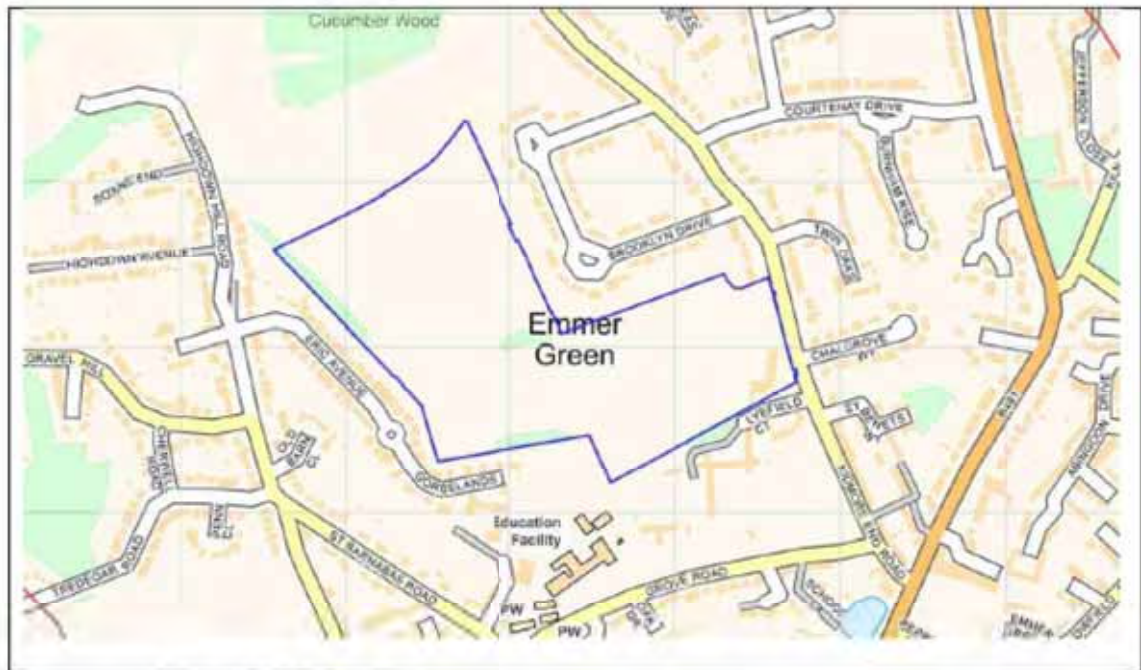


Figure 1. Site location.

- 2.2.3 The site is bounded to the south by residential development off Lyefield Court and the sports field of Emmer Green Primary School. To the west is established residential development off Eric Avenue. To the northern boundary (which also marks the local authority boundary) is the northern part of the golf course and to the east is established residential development off Brooklyn Drive and the highway of Kidmore End Road. The general setting is predominantly residential to the south, east and west and rural/semi-rural to the north.
- 2.2.4 The site is currently in use as a golf course with mown grass, scattered trees and groups of trees, sand bunkers and low mounds, with the clubhouse and car park occupying the south-eastern portion adjacent to Kidmore End Road.
- 2.2.5 The site topography generally falls from the south to north. At its highest the site elevation sits at around 84 m AOD at the site entrance in the south-east, falling to around 75.20 m AOD in the north-east corner of the development area. Further off site to the north, the land slopes away more markedly.
- 2.2.6 No obvious contaminative uses were noted on the adjacent land.

2.3 SITE HISTORY

- 2.3.1 The site history, based on a review of the historic and current maps, dating from 1878 to 2019 is summarised below. Potentially contaminative land uses are shown in **bold**. Copies of key maps used in this review are provided in Appendix 2.

Table 2: Summary of the key features shown on historic maps

DATA SOURCE	SITE / SURROUNDINGS
1878 – 1882 (1:10 000 and 1:2500 scales).	Site - no significant features shown on site. Surroundings - mostly fields with scattered farms and dwellings. Small gravel pit 350 m to the west. Brick and Tile Works covering land 350-750 m to the east. Small pit (later labelled a Chalk Pit 300 m to the north.
1900-1915 (1:10 000 and 1:2500 scales).	Site – no significant features or changes noted. By 1910, the site is labelled as a Golf Course in the north with a small square structure in the south-east corner. Surroundings – number of small old chalk pits shown off site to the north. St Benet's Home built adjacent to the southern boundary.
1932-1956 (1:10 000 and 1:2500 scales).	Site – little change on site. The small square structure in south-east of site has been enlarged and is labelled as a Club House Surroundings – residential development along Brooklyn Drive and generally increasing density of development.
1961-1973(1:10 000 scale).	Site – little change on site. Surroundings – generally increasing density of development. Allotments shown adjacent to the southern boundary. Emmer Green Primary School shown to the south by this period. Progressive redevelopment of the former Brick and Tile Works to the east.
1990-present (1:10 000 scale).	Site – little change on site. Enlargement/replacement of the Club House and car park. Surroundings – St Benet's Home replaced by residential development along Lyefield Court and continued residential development.

- 2.3.2 In summary, historic plans show that the site has only been developed as a Golf Course prior to which it was presumably farmland. Anecdotal evidence indicates fire damage and replacement of the club house structures in the south. Off-site, development includes sporadic extraction of gravel and chalk and more extensive brick works to the east which ceased several decades previously. Otherwise, the surrounding land has undergone development for residential, allotment and school uses.
- 2.3.3 Given the nature of the historical mapping process (scale, representation of conditions at discrete time intervals frequency etc.), any such maps and plans may not provide a comprehensive account of a site's history. Identification of pertinent

land uses and associated potentially contaminative activities, may therefore be absent from mapping records.

2.4 GEOLOGY

2.4.1 The published geological map indicates the presence of superficial drift deposits of Terrace Gravels of the River Thames (Black Park Gravels) covering the western parts of the site. Online descriptions of this unit from the BGS indicates it attains thicknesses of between 1 and 6 m and an average of 3 m thickness. These are shown to be absent in a zone adjacent to Brooklyn Drive and the south-east corner of the site.

2.4.2 The underlying bedrock geology comprises two formations: the Seaford and Newhaven Chalk Formations which are indicated to underlie the northern third (approximately) of the site. These comprise off-white and white Chalk with flints. The majority of the site (southern two-thirds) is indicated to be underlain by the Lambeth Group. This is a laterally variable sequence mainly of clay, some silty or sandy, with some sands and gravels, minor limestones and lignites and occasional sandstone and conglomerate which directly overlies the Chalk Group. In the Reading area this typically comprises mottled clays and sands.

2.4.3 A borehole record located in the golf course 106 m to the north (drilled in 1990 presumably for irrigation purposes), records 0.30 m of 'soil and pebbles' overlying Chalk with flints proved to at least 70 m depth. The record of this borehole (reference SU77NW68) is included in Appendix 3.

2.4.4 From mapping evidence, no artificial ground deposits are shown on the site, however it is likely that modelling/landscaping of the golf course and installation of drainage and irrigation will have resulted in placement of mounds and trench fill. This is likely to comprise re-worked natural materials. Anecdotally, it was indicated on site that localised filling is present in the form of soakaways. Off-site the nearest artificial ground feature is a small area of worked ground 215 m to the north-west. This likely represents a small chalk pit shown on 19th and early 20th century mapping.

2.5 CHALK CAVITIES

2.5.1 Chalk extraction is indicated in the area to the north which can result in filled ground. Also, as a soluble rock, dissolution features can exist as both voids and weakly infilled structures. A search of databases held by PBA records no features from mining, extraction or natural chalk cavities on the site itself. However, there are three locations within 250 m of the northern half of the site where natural cavities features have been recorded. These include solution pipes located along Brooklyn Drive 60 m to the north of the site. Two locations between 139 and 230 m west are listed where sink holes have been recorded, one of which also is listed as having a swallow hole and the other co-occurring with a solution pipe. The recorded incidences to the west should, based on the mapped geology, be located where terrace gravels overlie the chalk.

2.6 HYDROGEOLOGY

- 2.6.1 The Black Park Gravels are classed as a Secondary A aquifer. Secondary A aquifers may be important in providing local water supplies and base flow to streams.
- 2.6.2 Of the bedrock formations, the Lambeth Group is also classed as a Secondary A aquifer. The Chalk is classed as a Principal aquifer. These are formations which are capable of supporting large scale abstractions for public supply.
- 2.6.3 The site is shown to be located within a Zone 3 groundwater source protection zone (total catchment). There are however no licensed potable water abstractions within 2000 m of the site. The nearest licensed abstraction is located to the Golf Club – 106 m to the north of the site. The BGS borehole record gives a depth to groundwater of 37 m in 1990. There are no other abstraction licences listed to within 1 km of the site.

2.7 HYDROLOGY

- 2.7.1 There are no surface water features within 250 m of the site. The nearest listed inland river is located 338 m from the site.
- 2.7.2 There are no surface water abstraction licences listed within 1 km of the site.
- 2.7.3 From EA mapping the site is shown to be within a Flood Zone 1 (<0.1 annual risk of flooding from rivers and the sea).
- 2.7.4 The geological conditions indicate a hazard from groundwater flooding – where groundwater levels may rise into basements and belowground infra structure. This can occur where granular strata overlie low permeability soils. The highest susceptibility rating for groundwater flooding within a 50 m radius search area is listed as *Potential at Surface*. The confidence rating for this is high. This indicates that unless there is evidence of groundwater flood events having occurred no further action is required.

2.8 CURRENT SITE ISSUES

- 2.8.1 Potentially significant environmental issues have been investigated within relevant distances of the site, based on the database of records supplied by Groundsure. These relate to the following searches:
- i. Water discharge or pollution incidents within 250 m of the site;
 - ii. Waste management sites within 250 m of the site;
 - iii. Statutory authorisations within 50 m of the site;
 - iv. Trade directory entries of possible contaminative use within 50 m of the site;
 - v. Special protection or conservation areas within 50 m of the site; and

vi. Any other relevant issues.

2.8.2 Potentially significant environmental issues identified by the above searches are summarised in Table 3 below.

Table 3: Potentially significant environmental issues

ENVIRONMENTAL CATEGORY	DESCRIPTION
Water discharge or pollution incidents within 250 m	None listed
Waste management sites within 250 m	There are no currently licensed or historic licensed landfill sites within 250 m. From BGS/DoE databases, there is one historical feature (infilled pit) located 79 m north-west. This is unlikely to impact the subject site. There are no other waste sites listed within the search area.
Statutory authorisations within 50 m	None listed
Current and historical industrial possible contaminative uses within 50 m	There is an electrical feature (substation) located 29 m to the east. This is unlikely to affect the subject site.
Special protection or conservation areas within 50 m	None listed.
Other relevant issues	None identified at this time.

2.9 INDICATIVE GROUND STABILITY HAZARDS

2.9.1 The following ground stability hazards and their hazard ratings have been supplied by Groundsure based on published mapping data:

- i. Shrink-swell soils – moderate.
- ii. Landslides – very low.
- iii. Soluble rocks – high (this would apply mainly in the north of the site directly underlain by Chalk or Terrace deposits over Chalk).
- iv. Compressible ground – negligible.
- v. Collapsible rocks – very low.
- vi. Running sand – very low.

2.10 RADON GAS

- 2.10.1 The site does not lie within a Radon Affected Area as defined by the former Health Protection Agency, now Public Health England (less than 1% of houses are above the action level). Guidance issued by the Buildings Research Establishment (BRE-211) indicates that radon protection measures are not required for new dwellings.

2.11 AIR QUALITY

- 2.11.1 The site does not lie within a designated Air Quality Management Area (AQMA) for Local Authority. Proposals for a development of this scale may require an air quality assessment if a sufficient number of vehicle journeys are generated.

2.12 ECOLOGY

- 2.12.1 There are no designated environmentally sensitive sites on the property. An area of deciduous woodland is shown in the north-east of the site which is listed on the MAGIC database priority habitat inventory. It is possible that an ecological assessment of the site and mitigation measures may be required.

2.13 PREVIOUS INVESTIGATIONS

- 2.13.1 No known previous ground investigation data exists for the site. The site has been the subject of a Pre-application Report by Temple Group for Fairfax Properties for a 350 unit development and proposed medical centre which included land to the north. This report included the topics of flooding, drainage, utilities, noise and vibration and socio-economic aspects of the development.

2.14 PRELIMINARY CONCEPTUAL SITE MODEL AND RISK ASSESSMENT

- 2.14.1 From the Phase 1 assessment a preliminary site conceptual model and risk assessment have been produced using the framework established in Part IIA of the *Environmental Protection Act 1990* and detailed in Contaminated Land Report CLR11 - *Model Procedures for the Management of Land Contamination*.
- 2.14.2 Risk from contamination has been assessed using the source-pathway-receptor and pollutant linkage methodology, whereby a risk can only exist if all elements of: source, pathway and receptor, are present.
- 2.14.3 Potential Sources. Very limited potential. Fuels and oils are likely to be stored for grounds maintenance equipment but this would be localised and likely kept and used within or next to buildings. Background soil geochemistry for a range of heavy metals are not indicated to exceed screening levels appropriate for the development. Artificial and filled ground with the potential act as sources of gas have not been identified on or in proximity to the site. Dissolution of chalk soils can generate elevated carbon dioxide concentrations.
- 2.14.4 Potential Pathways. Contact with soil by existing users is limited by the high degree of grass cover. Future development would increase the potential for exposure to soil

via oral, dermal and inhalation pathways and introduce gas ingress pathways in new dwellings.

- 2.14.5 Potential Receptors. Currently of low sensitivity, mainly adult users being present on site for short duration periods. Future development would introduce a sensitive child receptor, building materials (such as water pipes and concrete).
- 2.14.6 From the Phase 1 assessment a preliminary site conceptual model has been produced as Table 4 which identifies the potential pollutant linkages. These have been used to inform the Phase 2 intrusive investigation presented in the subsequent sections.

Table 4: Preliminary Conceptual Model

POSSIBLE POLLUTANT LINKAGE			RISK CHARACTERISATION
POTENTIAL SOURCES	PATHWAYS	RECEPTORS	
Heavy metals and hydrocarbons (made ground)	Contact with contaminated soil	Human health (current users)	No risk identified Ground conditions anticipated to be substantially natural.
	Ingestion and inhalation of contaminated soil and dust	Human health (current users)	
Heavy metals and hydrocarbons (made ground)	Contact with contaminated soil	Human health (future residents and construction workers)	No risk identified Ground conditions anticipated to be substantially natural. Use of fuels and oils likely to be highly localised.
	Ingestion and inhalation of contaminated soil and dust	Human health (future residents and construction workers)	
Asbestos (made ground)	Ingestion and inhalation of contaminated soil and dust	Human health (future residents and construction workers)	Low risk identified Potential for made ground to contain asbestos from demolition/refurbishment of club buildings
Contamination (all forms)	Vertical migration to aquifer	Controlled waters	Low risk identified Presence of shallow gravel and chalk aquifer receptors but very low potential for contamination to be present.
Contamination (all forms)	Horizontal migration to surface water	Controlled waters	No risk identified No surface waters in the vicinity
Hydrocarbons	Direct contact	Plastic water pipes	Low risk identified No risk anticipated over majority of the site but cannot rule out presence of localised shallow hydrocarbon contamination at this stage.
Hazardous Gas/Vapours In soil	Ingress into buildings and voids	Human health (future residents and construction workers)	Low risk identified Significant sources of gas generation have not been identified. Unlikely that carbon dioxide from chalk would be present at levels likely to ingress into dwellings.

POSSIBLE POLLUTANT LINKAGE			RISK CHARACTERISATION
POTENTIAL SOURCES	PATHWAYS	RECEPTORS	
Adjacent Land	Dust, groundwater migration, surface run-off and gas migration	Human health (current and future users)	No risk identified Unlikely to be significant sources

SECTION 3 SITE INVESTIGATION RATIONALE

3.1 INTRODUCTION

- 3.1.1 A site investigation rationale has been devised in accordance with the findings of the Phase 1 investigation and the resultant preliminary conceptual site model and risk assessment. The purpose of the intrusive investigation was to identify the main stratigraphic sequence for foundation design purposes, presence of permeable soils and to confirm a natural soil sequence. Intrusive sampling locations were chosen on the basis of providing broad spatial coverage of the site, as far as the existing land use allowed (greens and fairways were avoided). There were intended primarily to assess the variation in ground conditions which may arise from the transition between areas underlain by superficial deposits, Chalk and the Lambeth Group. Due to the active use as a Golf Course, targeting around and within buildings was not undertaken.
- 3.1.2 No specific contaminants of concern were identified within the main golf course area and selected soil samples were scheduled for a broad suite of common contaminants.

3.2 SITE INVESTIGATION METHODS

- 3.2.1 An intrusive investigation was carried out by IDOM on 15 and 16 October 2019 and comprised the following scope of work:
- i. Three cable percussion boreholes (MBH1-MBH3) drilled to 8.45 metres below ground level (m bgl);
 - ii. Twelve shallow windowless sample probe holes (MWS1 to MWS12) to depths of 1.40 to 5.0 m bgl. The shallowest drilled holes were terminated upon reaching dense soils as determined from SPT results.
- 3.2.2 Exploratory hole locations are indicated on drawing 304-001 in Appendix 1. Logging of exploratory holes was undertaken by an IDOM Officer. Exploratory hole logs are contained in Appendix 3.
- 3.2.3 Light cable percussion equipment was used to advance borehole MBH1-MBH3. Standard Penetration Tests (SPTs) were performed at approximate 1 metre intervals. The tests involved driving a steel cone tipped series of rods into the ground over a distance of 450 mm using the repeated blows of a 63.5 kg weight allowed to

free fall over a distance of 760 mm. The total number of blows required for the final 300 mm penetration (the 'N' value) is recorded on the window sample logs.

- 3.2.4 As the casing was advanced, falling head permeability tests were conducted within a 0.50 m section of the underlying soil profile beneath the base of casing. Two tests were performed in each hole with test depths decided on the day, depending on the ground conditions encountered. Boreholes were then backfilled with arisings on completion.
- 3.2.5 A tracked windowless sampling rig was used to advance MWS1-MWS12. This comprised a rig-mounted drop hammer to drive a hollow steel barrel into the ground. The barrel is recovered along with a removable plastic sleeve, which lines the barrel and holds a core of soil which is retracted for logging and sampling. SPTs were performed at approximate 1 m intervals in all windowless sample holes.
- 3.2.6 Pipes for gas and groundwater monitoring were installed in five windowless sampler holes (MWS1, MWS3, MWS5, MWS9 and MWS12). These comprised an upper section of plain 50 mm diameter pipe (from the ground surface up to 1 m long) with a slotted pipe section continuing to the base of the hole in window samples. Pipes were fitted with sealed bungs and gas taps and with a steel protective cover concreted in place.
- 3.2.7 Representative soil samples were taken from various depths and strata to assess the contaminative status of the site. Soil samples were submitted to an MCERTS/UKAS accredited laboratory for chemical analysis of a broad suite of potential contaminants. The results are provided in Appendix 4.
- 3.2.8 A programme of geotechnical laboratory testing was performed on selected soil samples obtained from the boreholes, comprising classification and strength tests. Chemical testing was also undertaken to assess the aggressiveness of the ground with respect to buried concrete. The results are provided in Appendix 5.

SECTION 4 GROUND CONDITIONS

4.1 SURFACE GROUND CONDITIONS

- 4.1.1 Hardstanding present at site entrance and car parking around club house. Site is mostly grass and scattered trees and paths.

4.2 SUB-SURFACE GROUND CONDITIONS

- 4.2.1 Ground conditions were generally in accordance with the published geology. However, suspected superficial deposits comprising sandy gravelly clays were found further east than shown on the geological map. These are indicative of alluvially reworked Lambeth Group soils or terrace deposits.

- 4.2.2 A summary of the ground conditions encountered is presented in Table 5, whilst a more detailed assessment of the strata is contained in the following sections of the report.

Table 5: Summary of Sub-surface Ground Conditions

STRATA	DEPTH TO TOP RANGE (m bgl)	THICKNESS RANGE (m)
Made Ground	0.0	0.40
Topsoil	0.0	0.20-0.40
Superficial strata - Terrace Deposits	0.20-0.40	0.80-5.80
Lambeth Group	2.70-6.00	1.20->2.45
Newhaven and Seaford Chalk	1.20-6.00	>7.25

4.2.3 Made Ground

- 4.2.3.1 Made ground was present in two locations: MWS11 and MWS12 as 0.40 m of sandy clayey loam with fine to medium gravel of flint and sparse brick fragments, indicative of a re-worked/disturbed topsoil.

- 4.2.3.2 There was no visual or olfactory evidence of contamination in this stratum.

4.2.4 Topsoil

- 4.2.4.1 This was present at the surface in all exploratory holes except MWS11 and MWS12, as 0.20 to 0.40 m of brown loam with flint/chert gravel.

4.2.5 River Terrace Deposits

- 4.2.5.1 Strata consistent with superficial alluvial Terrace Deposits were encountered in all locations although they displayed variability in clay content across the site. In MBH1 and MBH2 they typically comprised a rusty brown clay matrix-supported sandy flint gravel and cohesive soil of slightly gravelly clay, typical of soils which could informally be described as 'hoggin'. Locally, such as in MWS2, a slightly clayey sand was dominant and a gravelly sand with little or no clay was described in MWS6. In some areas superficial deposits may represent reworked Lambeth Group materials, comprising mainly clay and silt but indicated by the presence of flint gravel.

- 4.2.5.2 Samples at 1 m depth from MBH1 and MBH2 were classified by wet sieve analysis which determined these as very clayey very sand GRAVEL and sandy gravelly CLAY, respectively. Three samples from MBH1-MBH2 at 2.0 m and in MBH3 at 1 m were subject to determination of Atterberg Limits which gave plasticity indices of 21-37% and liquid limits of 41-68% which indicate medium and high plasticity clay of medium volume change potential

- 4.2.5.3 Groundwater was not struck however wet gravel was observed in: MWS6 from 1.2 m, in MWS5 around 2.0 m, MWS10 at 3.95 m and MWS12 below 1.80 m.
- 4.2.5.4 In situ penetration tests gave SPT N values in the granular layers between 12->50 indicating mainly medium dense and dense ground but with an N value of 6 in MWS3 at 1 m indicating loose conditions. Looser conditions may be anticipated in saturated gravel layers. In the strata logged as predominantly cohesive, N values of 11 to 32 were recorded but with a singular low value of 4 recorded in MWS3 at 2 m. These indicate mainly firm medium strength and stiff high strength clays. It is noted that artificially high values may be returned where a high gravel content or coarse gravel is present.
- 4.2.6 Lambeth Group
 - 4.2.6.1 Strata which were considered to belong to the Lambeth Group were observed in three locations: MBH1 below 6 m depth, in MWS9 and MWS11, these all being in the eastern and southern areas and inferred from the absence of flint gravel and the mottled colouration. The stratum was described as a stiff red silty clay, grey clay and silt with grey mottled sandy layers. SPT N values were recorded in the range of 14-41 indicating firm approaching stiff and very stiff high strength conditions.
- 4.2.7 Chalk
 - 4.2.7.1 This was identified in MBH2, MBH3 and MWS3. It was recovered as an off-white silt with medium gravel-sized weak clasts and sparse flint gravel. From the disturbed samples, the composition is indicative of structure Grade Dm Chalk, however, this method of recovery may not provide a fully representative picture of the chalk grade. SPT N values of typically 11-17 in cable percussion boreholes and 21-36 in MWS3 are indicative of a more competent material.
 - 4.2.7.2 Groundwater not struck in this stratum.

SECTION 5 PRELIMINARY GEOTECHNICAL RECOMMENDATIONS

5.1 FOUNDATIONS

- 5.1.1 The proposed development is indicated to comprise low-rise detached dwellings and, in the majority of investigation locations, the identified ground conditions indicate that the use of traditional strip footings should be feasible. For areas underlain by cohesive soil of medium volume change potential, a minimum foundation depth of 0.90 m will be required and 0.75 m depth in areas underlain by granular soils. Where foundations span granular and cohesive soil, use of light mesh reinforcement is recommended.
- 5.1.2 From SPT data obtained at 1 m depth, a safe allowable bearing pressure of at least 125 kN/m² is available for medium dense gravels and firm to stiff medium/high strength clay. Higher N values at shallow depth have been recorded, however in view of the variability in the superficial deposits and that coarse gravel content may

give rise to artificially high values, it is recommended that allowable bearing pressures be limited to the value recommended above at this stage. The exceptions are MWS3 where loose conditions were found at 1 and 2 m depth and in MWS8 where soft clay was found at 1 m before firm conditions were identified at 2 m depth. Here allowable bearing pressures have been inferred as low as 35 to 60 kN/m² and deep strip or possible abnormal foundations (ground improvement or piles) may be required in this area. In view of the preliminary nature of the investigation and the lateral variation between granular and cohesive soils, further investigation of this area is recommended to allow more definitive foundation recommendations.

- 5.1.3 Foundation depths within the zone of influence of trees, foundation depths should be increased in accordance with NHBC standards.
- 5.1.4 From inspection of disturbed samples recovered in boreholes, the chalk is indicated to be unstructured and matrix dominated. However, the majority of SPT N values indicate fairly competent ground conditions more indicative of clast dominated chalk. At this stage it is recommended that allowable bearing pressures in shallow chalk be limited to 75-100 kN/m², assuming matrix dominated chalk will be present. It is recommended that trial pits are excavated to allow fuller inspection of the chalk grade at shallow depth.
- 5.1.5 Solution features have been recorded within the vicinity of the site, including to the west where a cover of superficial terrace deposits is mapped. This indicates potential constraints for foundation design, although it is noted that recorded solution features are located in areas of existing residential development. It is recommended that a trial pit investigation is undertaken in the area of chalk to allow more extensive inspection of the ground and provide a fuller assessment of the risks and recommended solutions (for example, use of rafts). As a minimum vigilance or a watching brief by a geotechnical specialist is recommended during foundation excavations. Where weak ground or infill is observed probing of plots may be required to assess their extent.

5.2 EXCAVATIONS AND GROUNDWATER

- 5.2.1 Excavations are indicated to remain stable in the short-term, however, where they are to remain open for extended periods or where man-entry is proposed, they should be supported or battered back to a safe angle.
- 5.2.2 Groundwater was not struck during drilling but wet gravel layers were found and resting water levels in some borehole standpipes were recorded as shallow as 0.95 m (MWS12). Some water ingress may occur where excavations intersect gravel layers and provision for dewatering is recommended.

5.3 FLOOR SLABS

- 5.3.1 For shrinkable soils, particularly where in the zone of influence of trees and hedges, it is recommended that suspended floor slabs are adopted. There are areas of the

site where shallow granular soil is present which are likely to be suitable for the adoption of ground bearing slabs.

5.4 BURIED CONCRETE

5.4.1 Recommendations given in BRE Special Digest 1:2005 "*Concrete in aggressive ground*" have been followed in order to give recommendations with respect to buried concrete.

5.4.2 Water soluble sulphate analysis was carried out on seven subsoil samples obtained from depths of between 0.45-1.80 m bgl with soil pH determination also carried out on these samples. Water soluble sulphate contents ranged between 0.0059 and 0.017 g/l. In accordance with BRE guidelines the characteristic value is calculated by determining the mean of the highest 20 % of results. In this case the characteristic value is 0.0165 g/l. On this basis the Design Sulphate Class is DS-1

5.4.3 The pH values in the soil samples varied between 6.1 and 7.2. The mean of the lowest 20 % of values is 6.15 which represents the characteristic value. Mobile groundwater conditions have been assumed and on this basis the Aggressive Chemical Environment for Concrete (ACEC) class for the site is AC-1.

5.5 ROADS AND PAVED AREAS

5.5.1 At this stage it is recommended that a CBR value of 2 % is adopted for the site. Higher values may be available in areas of shallow granular soils and it is recommended that in situ testing is undertaken for design purposes.

5.6 SOAKAWAYS

5.6.1 Permeability tests were performed in MBH1-MBH3 and the calculation sheets are included within Appendix 5. Within clay in MBH1, no significant water drops were recorded and inferred values of permeability (k) were 10^{-8} or 10^{-9} m.s⁻¹. In MBH2 in the hoggin-like material, values of 1.8×10^{-5} and 2.4×10^{-7} m.s⁻¹ were calculated with the variability likely reflecting clay content. In Chalk in MBH3, the tests recorded more favourable k values of 1.5×10^{-4} and 1.6×10^{-5} m.s⁻¹.

5.6.2 These results indicate little potential for use of soakaways in the south-east of the site. Further west, soakaways may be possible where terrace gravel strata are less clayey and providing a shallow water table is absent. Here suitable ground conditions at individual soakaway locations would need to be confirmed by targeted trial pit investigation. In the chalk, which despite being recovered in boreholes as predominantly silt matrix, the permeability test results suggest good rates of infiltration would be available in the north-east of the site. However, fairly deep soakaways would be required where chalk is overlain by superficial deposits and if highly weathered putty chalk persists. Soakaways should be located at a suitable distance from structures in areas underlain by soluble strata.

5.6.3 Anecdotally, it is understood the golf course uses soakaways which, from the descriptions, suggest informally designed rubble filled pits.

5.6.4 For design purposes, soakage test pits would be required.

SECTION 6 ENVIRONMENTAL ASSESSMENT

6.1 SOIL QUALITY

6.1.1 A total of 10 soil samples were submitted to the laboratory for chemical analysis, including five samples from topsoil, three samples from natural subsoil and two samples of the surface made ground. The laboratory chemical analysis certificates are contained in Appendix 4. The results of the analysis are summarised in Table 6.

6.1.2 An initial screening exercise has been undertaken whereby contaminant concentrations recorded in soils have been assessed against *Suitable for Use Levels* (S4ULs) published in 2015 by LQM/CIEH¹. These precautionary screening levels are designed to be representative of minimal risk to human health in a number of land use scenarios. In this report S4ULs have been selected for a residential land use where the possibility of consumption of homegrown produce exists and, conservatively applying a soil organic matter of 1 %. For lead the DEFRA Category 4 Screening Level² has been used as this is based on updated toxicological data and a low risk to human health.

6.1.3 An additional set of phytotoxin screening levels have been adopted from 'The Code of Agricultural Practice for the Protection of Soil' Ministry of Agriculture, Fisheries and Food (MAFF), 1993, which are protective of healthy plant growth.

Table 6: Summary of Soils Chemical Analysis Results

CONTAMINANT	UNITS	MIN	MAX	No of Tests	SCREENING LEVEL (SL)	No > SL*
HUMAN HEALTH RISK ASSESSMENT						
Asbestos in soil	-	NAD	NAD	2	Detected	0
pH	-	5.1	7.2	15	5 – 9	0
Arsenic	mg.kg ⁻¹	9	26	10	37	0
Cadmium	mg.kg ⁻¹	<0.2	<0.2	10	11	0
Chromium (total)	mg.kg ⁻¹	15	34	10	910	0
Lead	mg.kg ⁻¹	8.9	49	10	200	0
Mercury	mg.kg ⁻¹	<0.3	<0.3	10	40	0
Nickel	mg.kg ⁻¹	11	29	10	130	0

¹ Nathanail, C. P., McCaffrey, C., Gillett, A. G., Ogden, R. C. and Nathanail, J. F. 2015. *The LQM/CIEH S4ULs for Human Health Risk Assessment*. Land Quality Press, Nottingham. Copyright Land Quality Management Limited reproduced with permission; Publication Number S4UL3100. All rights reserved. Including August 2015 nickel update.

² SP1010 *Development of Category 4 Screening Levels Main Report* (Dec 2013) and SP1010 *Policy Companion Document* (Mar 2014).

CONTAMINANT	UNITS	MIN	MAX	No of Tests	SCREENING LEVEL (SL)	No > SL*
HUMAN HEALTH RISK ASSESSMENT						
Selenium	mg.kg ⁻¹	<0.1	3.4	10	250	0
TPH C10-C40	mg.kg ⁻¹	<10	28	10	-	-
Acenaphthene	mg.kg ⁻¹	<0.05	<0.05	10	210	0
Acenaphthylene	mg.kg ⁻¹	<0.05	<0.05	10	170	0
Anthracene	mg.kg ⁻¹	<0.05	<0.05	10	2400	0
Benz(a)anthracene	mg.kg ⁻¹	<0.05	<0.05	10	7.2	0
Benzo(a)pyrene	mg.kg ⁻¹	<0.05	<0.05	10	2.2	0
Benzo(b)fluoranthene	mg.kg ⁻¹	<0.05	<0.05	10	2.6	0
Benzo(ghi)perylene	mg.kg ⁻¹	<0.05	<0.05	10	320	0
Benzo(k)fluoranthene	mg.kg ⁻¹	<0.05	<0.05	10	77	0
Chrysene	mg.kg ⁻¹	<0.05	<0.05	10	15	0
Dibenz(ah)anthracene	mg.kg ⁻¹	<0.05	<0.05	10	0.24	0
Fluoranthene	mg.kg ⁻¹	<0.05	0.3	10	280	0
Fluorene	mg.kg ⁻¹	<0.05	<0.05	10	170	0
Indeno(123-cd)pyrene	mg.kg ⁻¹	<0.05	<0.05	10	27	0
Naphthalene	mg.kg ⁻¹	<0.05	<0.05	10	2.3	0
Phenanthrene	mg.kg ⁻¹	<0.05	<0.05	10	95	0
Pyrene	mg.kg ⁻¹	<0.05	0.31	10	620	0
PHYTOTOXICITY RISK ASSESSMENT						
	Units	Max	Mean	No of Test	Screening Level (SL)	No > SL
Copper	mg.kg ⁻¹	7.4	22	10	200	0
Nickel	mg.kg ⁻¹	11	29	10	110	0
Zinc	mg.kg ⁻¹	27	60	10	300	0

Notes: * Number of samples exceeding screening level

nd = not detected

6.1.4 Zootoxic Metals (harmful to human health)

6.1.4.1 None detected above their respective screening levels.

6.1.5 Phytotoxic Metals (harmful to plant health)

6.1.5.1 None detected above their respective screening levels.

6.1.6 Organic Contaminants

6.1.6.1 None detected above their respective screening levels. The priority 16 PAHs were mostly undetected.

6.1.6.2 For petroleum hydrocarbons, a total screen analysis was employed. However, the maximum concentrations did not exceed any of the screening levels derived for individual aliphatic and aromatic fractions.

6.1.7 Inorganic Contaminants

- 6.1.7.1 No asbestos fibres were detected within the two made ground samples analysed.

6.2 HAZARDOUS GAS

- 6.2.1 Gas monitoring has been undertaken on one occasion – 06 November 2019. Levels of methane, carbon dioxide and oxygen were recorded in each standpipe, together with associated parameters including borehole flow and ambient air pressure. The results of the gas monitoring round are contained in Appendix 6.

- 6.2.2 The monitoring was undertaken at barometric pressures ranging from 994 to 995 mb. Peak positive flow was recorded in the two standpipes (MWS9 and MWS12) both of which were found to contain water. This dissipated to undetectable flow in MWS9 but remained steady at 3.0 litres/hour in MWS12. However, based on the ground conditions pressure driven flow caused by gas generation is unlikely. Methane (CH₄) was not detected in any standpipe, carbon dioxide (CO₂) was detected to a maximum of 4.1 % v/v with a corresponding depleted oxygen concentration of 15.3 % v/v.

6.3 WASTE CLASSIFICATION, OFF-SITE DISPOSAL OR RE-USE

6.3.1 Waste Considerations

- 6.3.1.1 Using the WM3 waste assessment guidance, the soil analysis would indicate that arisings disposed of as waste would be classed as non-hazardous. It is anticipated that natural soil arisings would also be suitable for disposal at inert licensed landfill facilities.

- 6.3.1.2 Natural as-dug arisings (excluding topsoil) could be classed as inert waste without the requirement for WAC testing.

- 6.3.1.3 Materials, including waste soils which are not to be retained on site, should be removed and disposed of in accordance with all relevant statutes including the *Environmental Protection Act 1990 as amended*, *The Controlled Waste Regulations 2012 as amended*, *The Waste Regulations 2011 as amended*, *The Hazardous Waste Regulations 2005 as amended*, *The Waste Management Regulations 2006*, *The Environmental Permitting Regulations 2010 as amended* and *The Hazardous Waste (Miscellaneous Amendments) Regulations 2015*.

- 6.3.1.4 It is a requirement of these regulations that waste sent to landfill should have been subject to measures to reduce the amount of waste, reduce harmful or hazardous properties and facilitate recycling. These requirements may be satisfied by measures such as segregation and screening of wastes to recover suitable fill and material for crushing, segregation of inert materials and putrescible wastes.

6.3.2 Re-use Considerations

- 6.3.2.1 As a sustainable alternative to off-site disposal, it may be possible to re-use site-won soils provided the following criteria are met:

- i. Use of the material will not create an unacceptable risk of pollution to the environment or harm to human health;
 - ii. The material must be chemically and geotechnically suitable without further treatment;
 - iii. There must be certainty of use within the scheme;
 - iv. Material should only be used in the quantity necessary for that use.
- 6.3.2.2 Provided these criteria are met, the re-use of site-won materials is unlikely to be deemed a waste activity. Production of a *Materials Management Plan* under the industry *CL:AIRE Code of Practice on the Definition of Waste* represents a robust method of demonstrating that the proposed re-use of material meets the criteria and is not liable for landfill tax.

SECTION 7 RISK ASSESSMENT

- 7.1 The potential sources of contamination at the site and the implications with respect to development have been interpreted in accordance with the current government guidance on source-pathway-receptor risk assessment.
- 7.2 The investigations have not found significant soil contamination however it is noted that in the immediate club house vicinity made ground deposits are likely to be present, particularly after demolition, which may contain higher levels of contamination than those found over the bulk of the site. These ground conditions identified to date are considered for their potential to act as sources for a number of pollutant linkages.
- 7.3 The potential impacts of contamination sources have been considered with respect to the following receptors:
 - i. The general public and present site users,
 - ii. Residents of future development,
 - iii. Groundwater,
 - iv. Surface water,
 - v. Construction workers,
 - vi. Adjacent land, and
 - vii. Infrastructure.
- 7.4 In each case the existence of a pollutant linkage requires a pathway by which the receptor could be exposed to the source. A qualitative assessment of risk is thus considered in the first instance with respect to the site in its current condition and is summarised in the sections below.

7.5 The general public and present site users

7.5.1 No risk identified.

7.6 Residents of future development

7.6.1 Soil contamination (chemical)

7.6.1.1 No risk identified. However, under the clubhouse area, made ground may be present which could contain contaminants. Also if existing buildings have been subject to redevelopment or extension, the presence of asbestos containing materials cannot be discounted.

7.6.2 Hazardous Soil Gas/Vapours (including hydrocarbon vapours/radon)

7.6.2.1 No risks of significant gas ingress into dwellings has been identified from the investigation. The gas screening value derived from the data obtained to date, is consistent with an NHBC GREEN condition.

7.6.2.2 Additional monitoring is ongoing.

7.7 Controlled waters

7.7.1 No risk identified.

7.8 Construction workers

7.8.1 Potentially, construction workers are initially at the greatest risk from exposure to contamination due to excavation works and during the handling of materials including imported soils. Providing that dust levels are kept within statutory limits and appropriate health and safety procedures are adhered to during the construction phase, the levels of chemical contamination recorded to date are not considered to present an acute risk to human health.

7.9 Adjacent land

7.9.1 Surrounding land uses appear to have been largely residential and no risks from off site sources have been identified. Similarly, the site is not likely to pose a risk to adjacent land users.

7.10 Infrastructure

7.10.1 Phytotoxic contaminants which can inhibit plant growth have not been detected at significant levels.

7.10.2 Contamination with the potential to permeate polymeric services has not been identified by this investigation, however it is recommended that the utility provider is consulted with respect to their requirements for water supply pipes.

- 7.10.3 Utility companies apply strict guideline levels on use of polymeric pipes and may consider all made ground unsuitable for typical plastic pipe materials to be used.

SECTION 8 UPDATED CONCEPTUAL MODEL

- 8.1 Following completion of phases 1 and 2 of the investigation and a qualitative risk assessment, the conceptual model for the site, with relation to pollutant linkages, has been updated. The revised model is presented in Table 7 below.

Table 7: Revised Conceptua Model

POSSIBLE POLLUTANT LINKAGE			RISK CHARACTERISATION
POTENTIAL SOURCES	PATHWAYS	RECEPTORS	
Heavy metals and hydrocarbons (made ground)	Contact with contaminated soil	Human health (current users)	No risk identified Ground conditions found to be substantially natural.
	Ingestion and inhalation of contaminated soil and dust	Human health (current users)	
Heavy metals and hydrocarbons (made ground)	Contact with contaminated soil	Human health (future residents and construction workers)	No risk identified Ground conditions found to be substantially natural. However possible made ground under and in vicinity of club house.
	Ingestion and inhalation of contaminated soil and dust	Human health (future residents and construction workers)	
Asbestos (made ground)	Ingestion and inhalation of contaminated soil and dust	Human health (future residents and construction workers)	Low risk identified None identified. Potential for made ground to contain asbestos from demolition of club buildings
Contamination (all forms)	Vertical migration to aquifer	Controlled waters	No risk identified Presence of shallow gravel and chalk aquifer receptors but very low contamination found so far.
Contamination (all forms)	Horizontal migration to surface water	Controlled waters	No risk identified No surface waters in the vicinity
Hydrocarbons	Direct contact	Plastic water pipes	Low risk identified No risk identified over majority of the site but cannot rule out presence of localised shallow hydrocarbon contamination at this stage.
Hazardous Gas/Vapours In soil	Ingress into buildings and voids	Human health (future residents and construction workers)	Low risk identified Significant sources of gas generation have not been identified. Monitoring to date has not found gas likely to ingress into dwellings to hazardous levels.
Adjacent Land	Dust, groundwater migration, surface run-off and gas migration	Human health (current and future users)	No risk identified No significant sources found.

SECTION 9 PRELIMINARY REMEDIATION STRATEGY

- 9.1 The identified risks at the site can be mitigated by removal of either the source, pathway or receptor. With reference to the conceptual model for the site a remediation strategy, based on source or pathway removal, has been designed.

- 9.2 No remedial actions are identified at this time. However, when the site becomes available, further investigation in and around the built area should be undertaken to confirm the presence of made ground and associated contaminants. This would be be suited to post-demolition trial pits.
- 9.3 It is anticipated that site-won topsoil will be used for the formation of domestic gardens and landscaped areas. This should be handled in accordance with current good practice guidelines and where made ground is found, it should be kept separate from natural topsoil.
- 9.4 Significant risks to construction workers have not been identified but as with all sites, the adoption of appropriate Health and Safety procedures will ensure that hazards from materials handling are minimised. Operatives should not be allowed to eat, drink or smoke on site except in designated areas and should be required to wash all exposed skin at the end of each shift. Operatives should be informed of the potential hazards at the site and should be required to report any observations of suspect material.
- 9.5 Materials, including waste soils which are not to be retained on site, should be removed and disposed of in accordance with all relevant statutes including the *Environmental Protection Act 1990* as amended, *The Controlled Waste Regulations 2012* as amended, *The Waste Regulations 2011* as amended, *The Hazardous Waste Regulations 2005* as amended, *The Waste Management Regulations 2006*, *The Environmental Permitting Regulations 2010* as amended and *The Hazardous Waste (Miscellaneous Amendments) Regulations 2015*.
- 9.6 It is recommended that this report is submitted to the regulators (Local Authority EHO and Planners, Environment Agency Planning Liaison and NHBC) for approval prior to commencement of the works.
- 9.7 Any observations of ground conditions atypical of those already described should be reported to IDOM immediately so that an assessment of appropriate action can be made.

APPENDIX 1 • Drawings

APPENDIX 2 ▪ Historical Plans

Site Details:

READING GOLF CLUB, 17
KIDMORE END ROAD, EMMER
GREEN, READING, RG4 8SQ

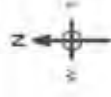
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Map Name: County Series

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Revised 1878
Edition N/A
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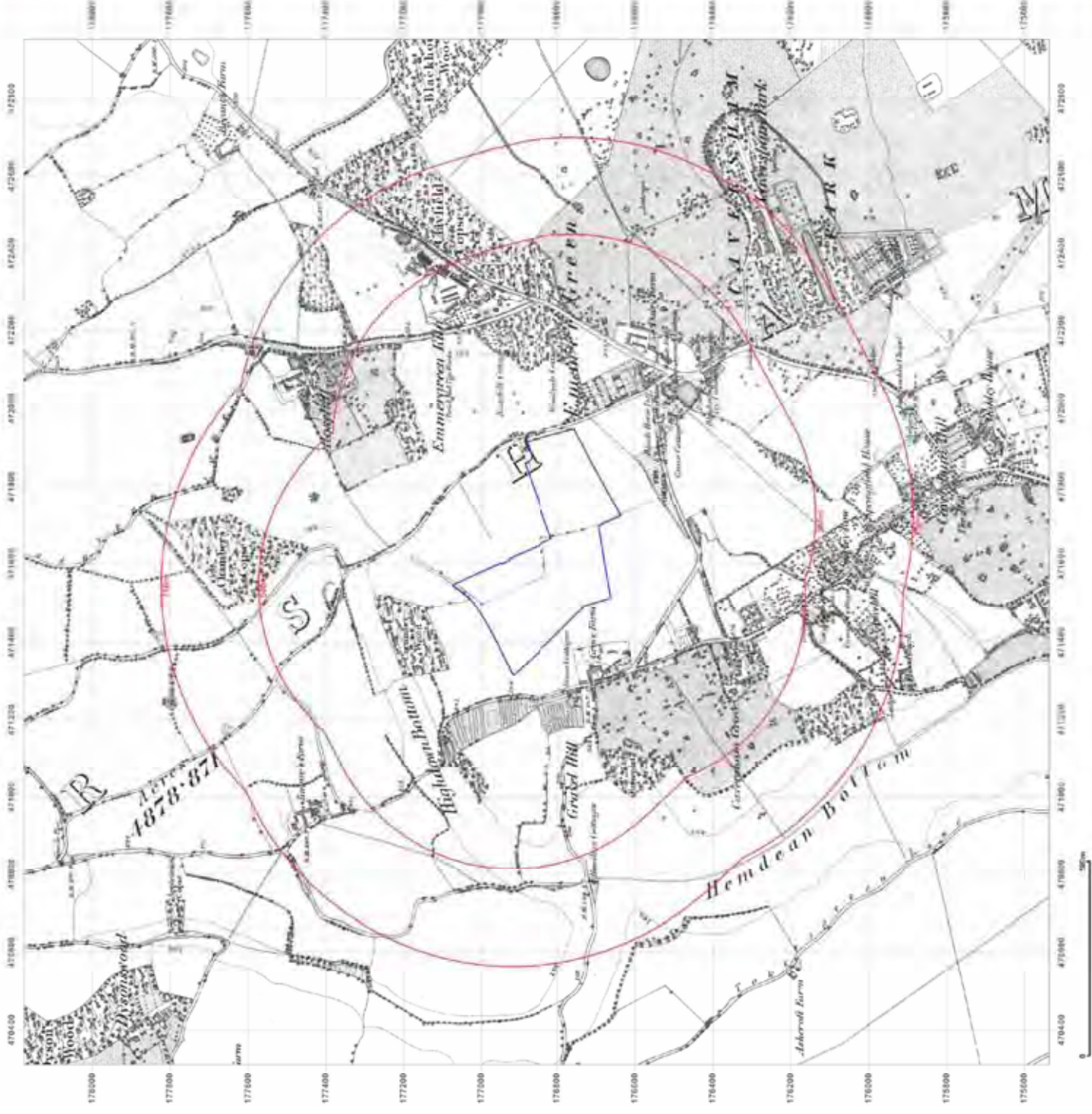
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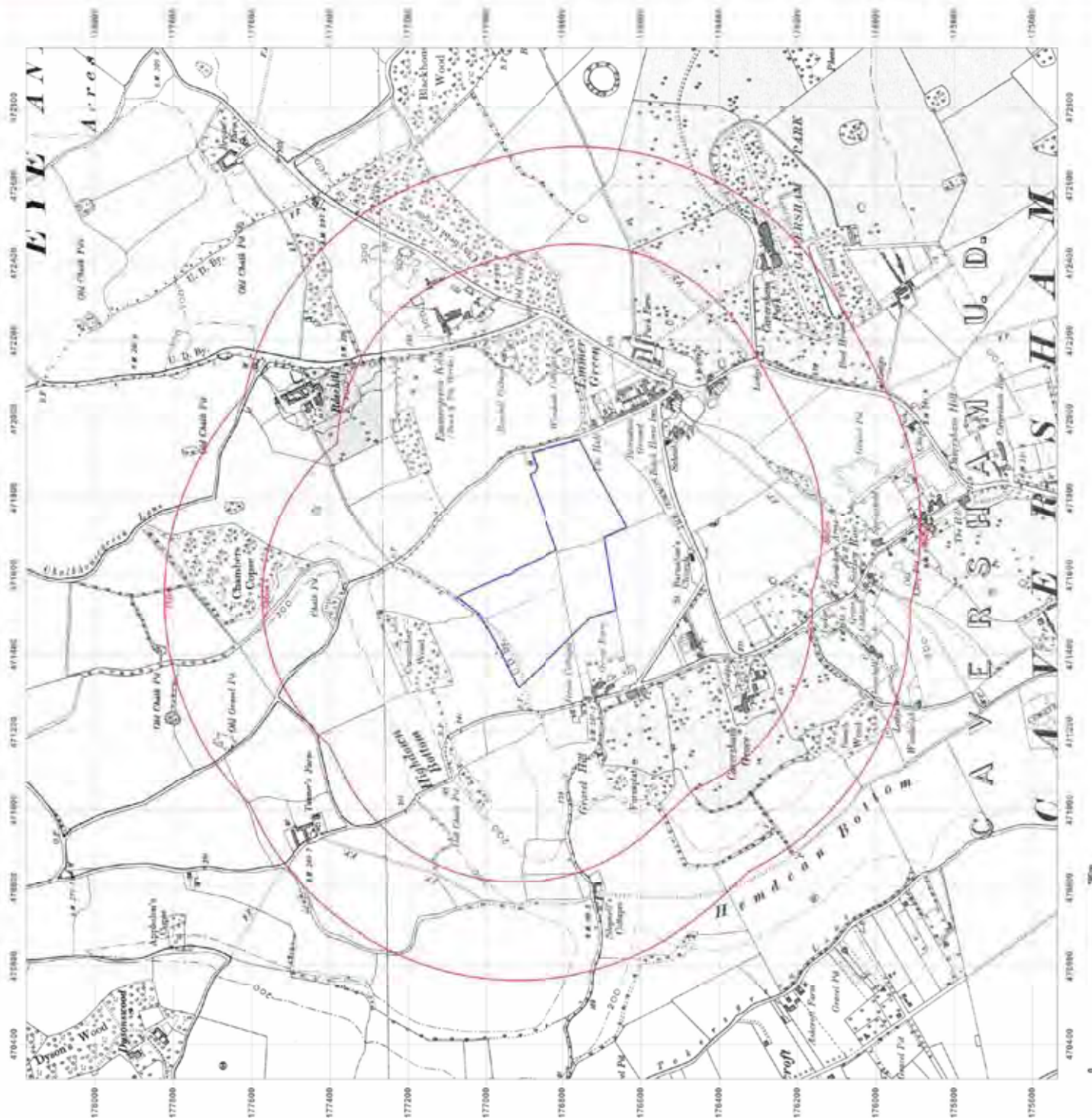
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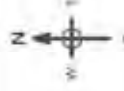
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Surveyed N/A
Revised N/A
Edition N/A
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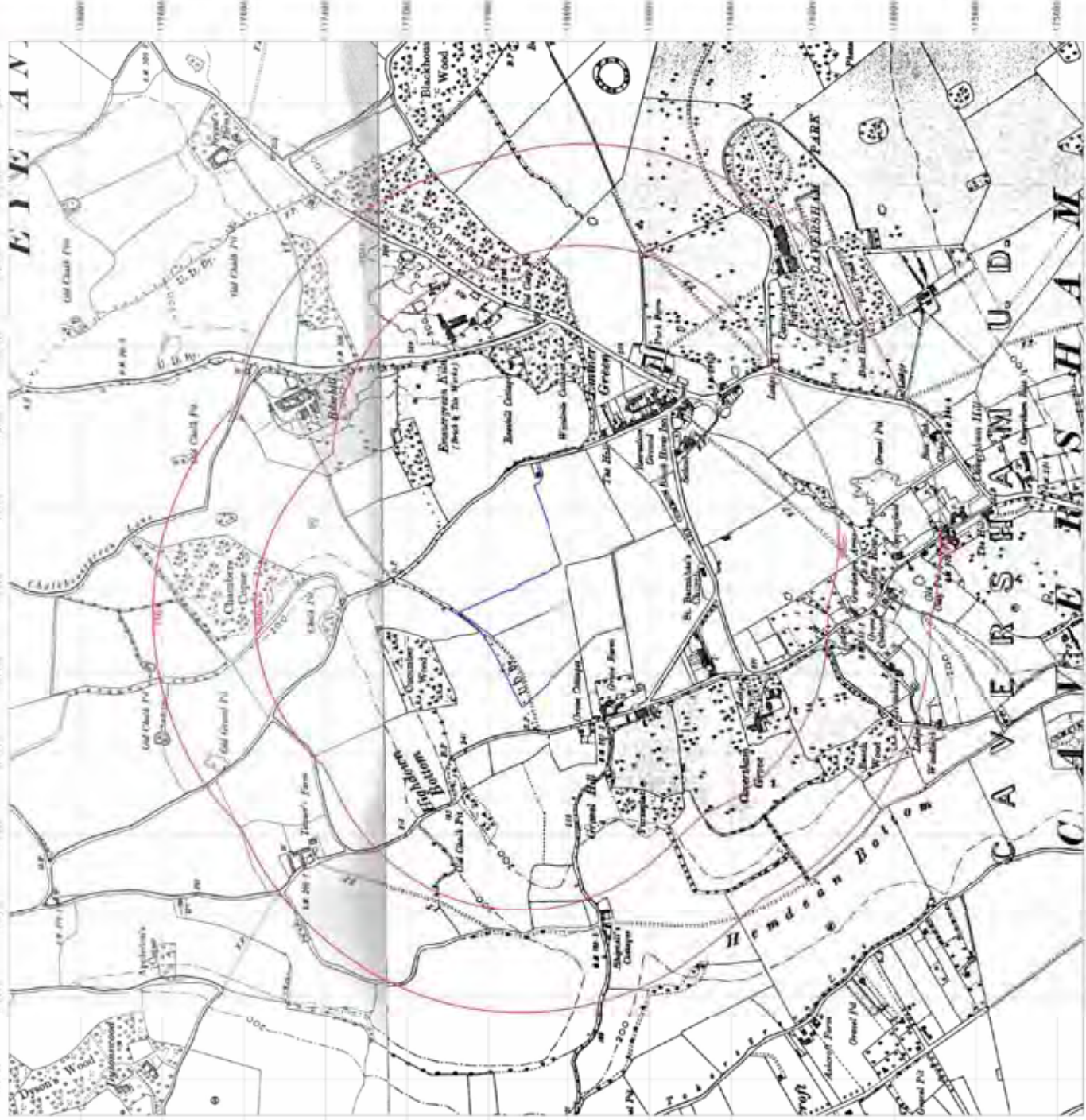


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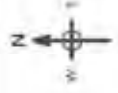
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Edition N/A
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Landlord N/A

Surveyed 1877
Revised 1910
Edition N/A
Copyright N/A
Landlord N/A

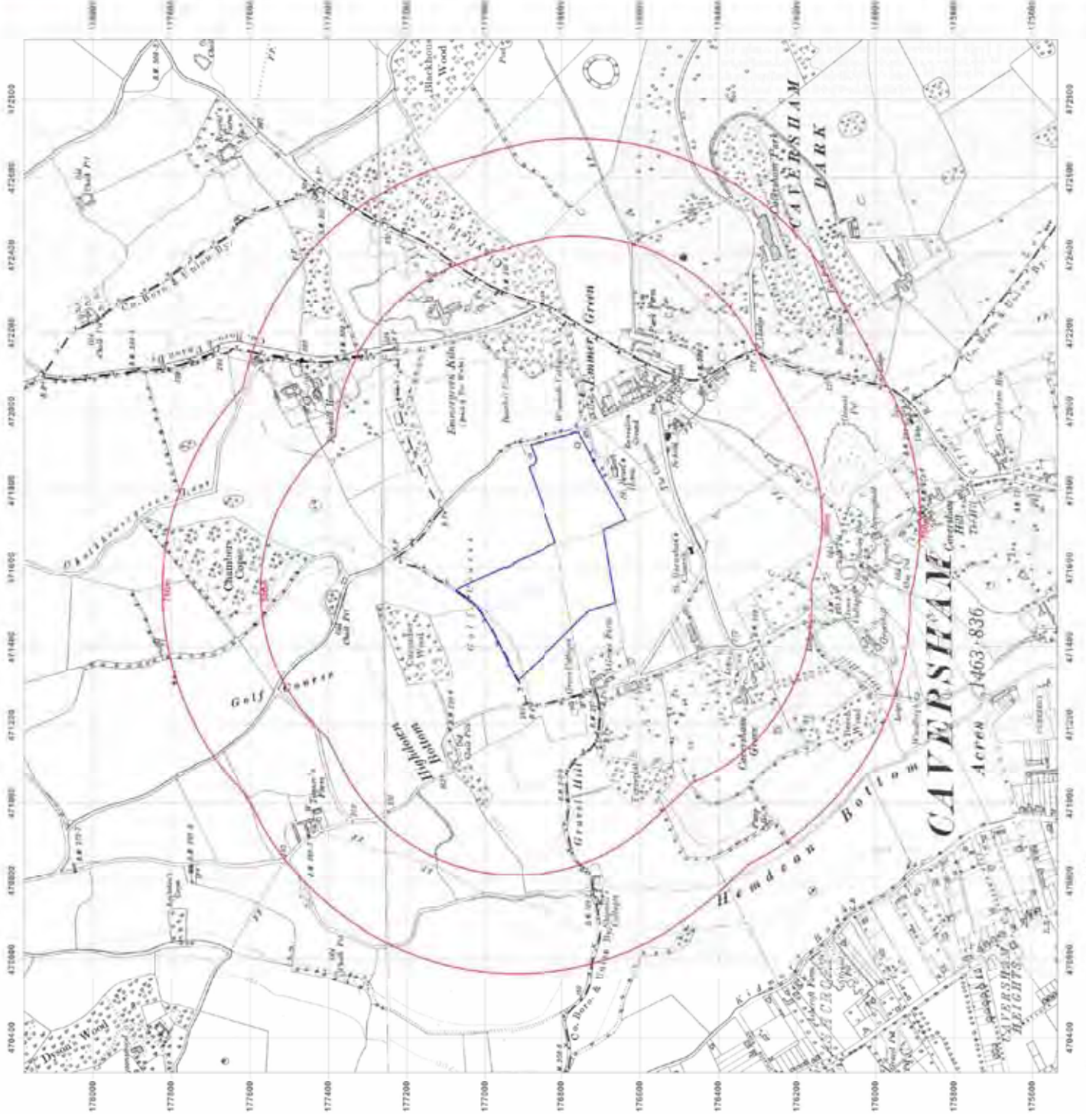


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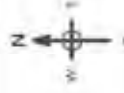
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Edition 1915
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Unpublished NIA

Surveyed 10/77
Revised 10/10
Edition 10/14
Copyright N/A

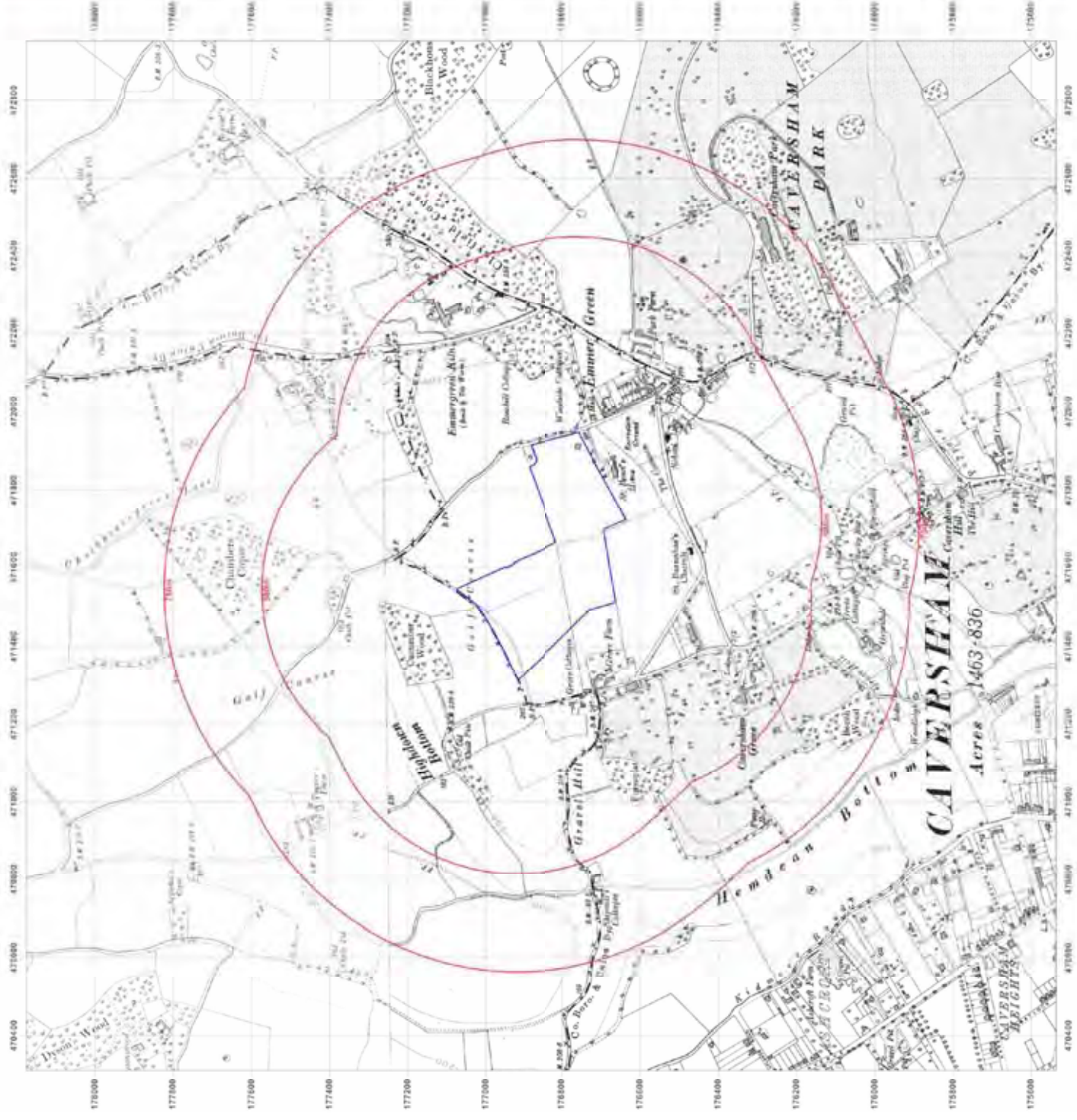


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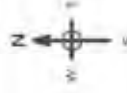
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Edition N/A
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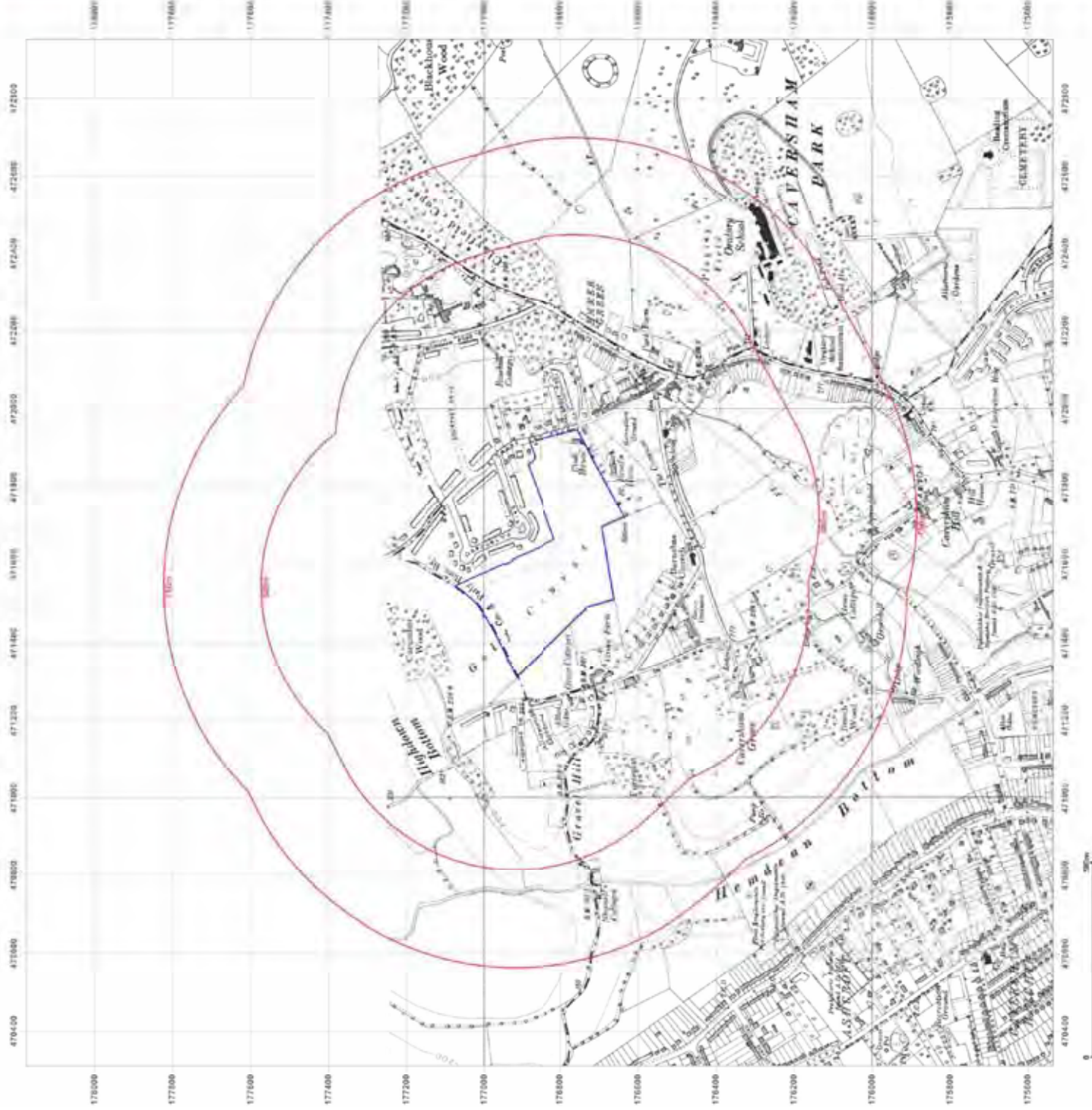
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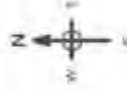
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Map Name: Provisional

Map date: 1961

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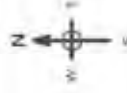
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Revised 1973
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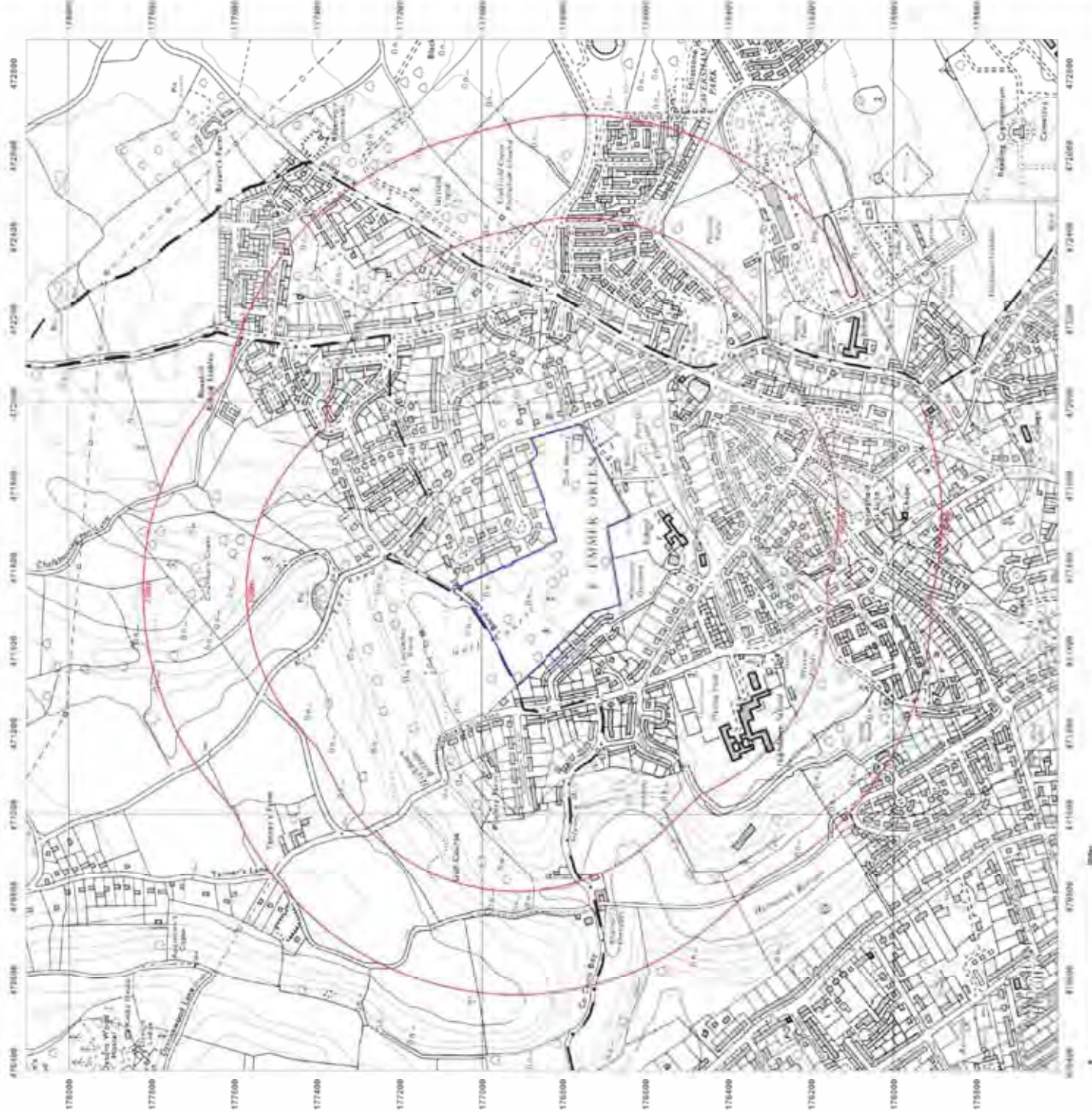
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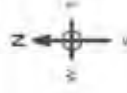
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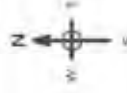
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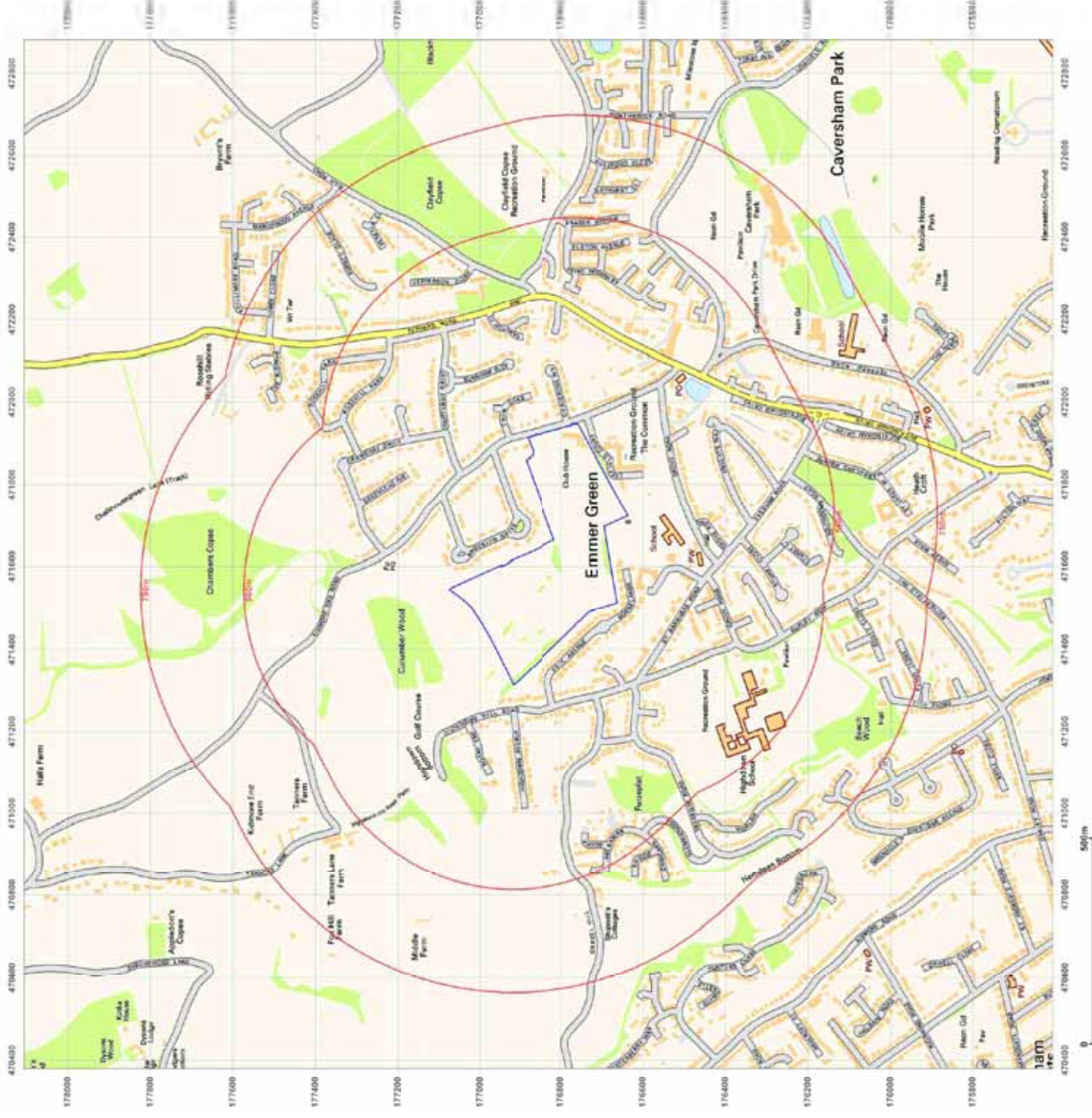


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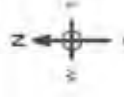
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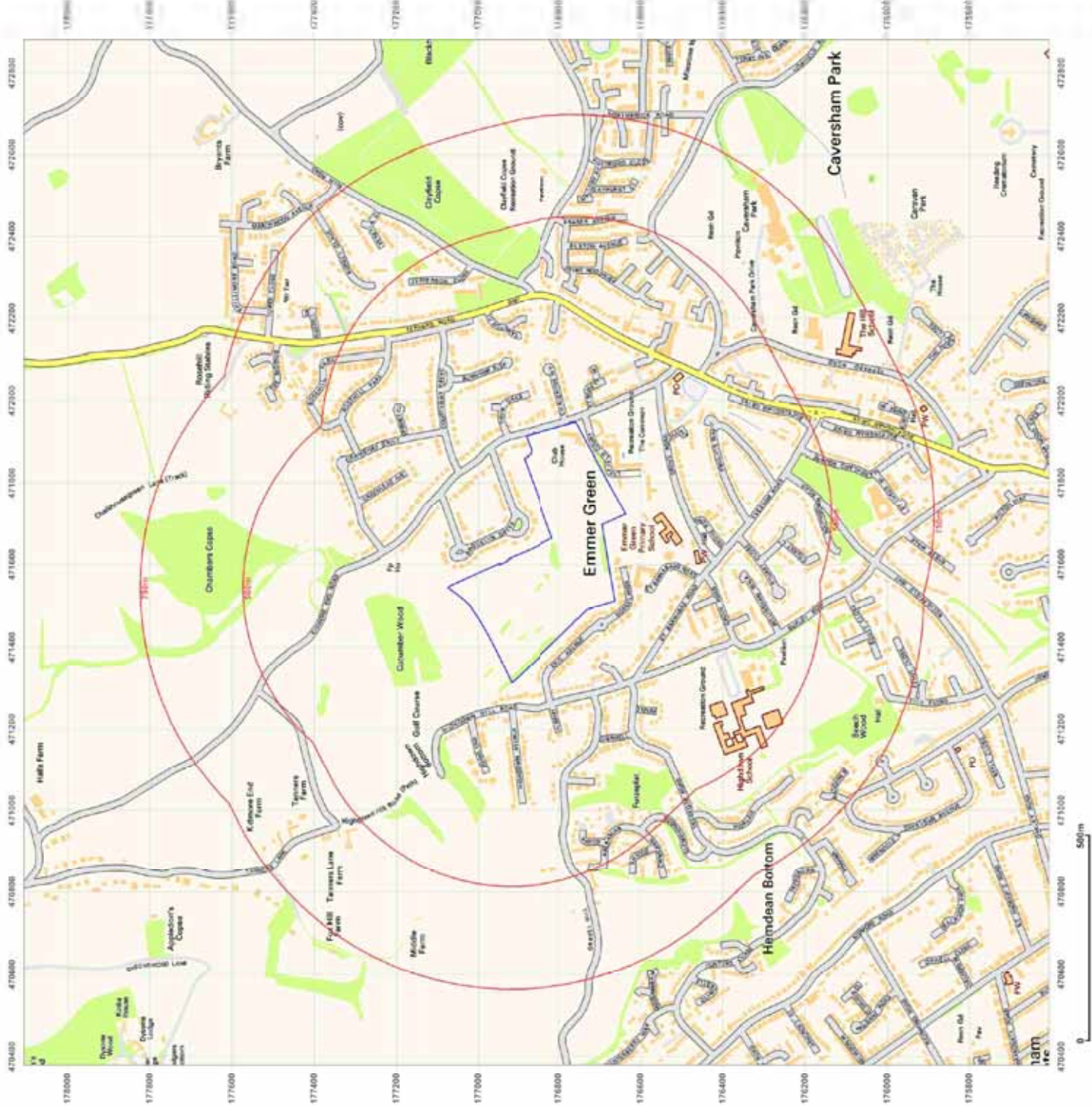


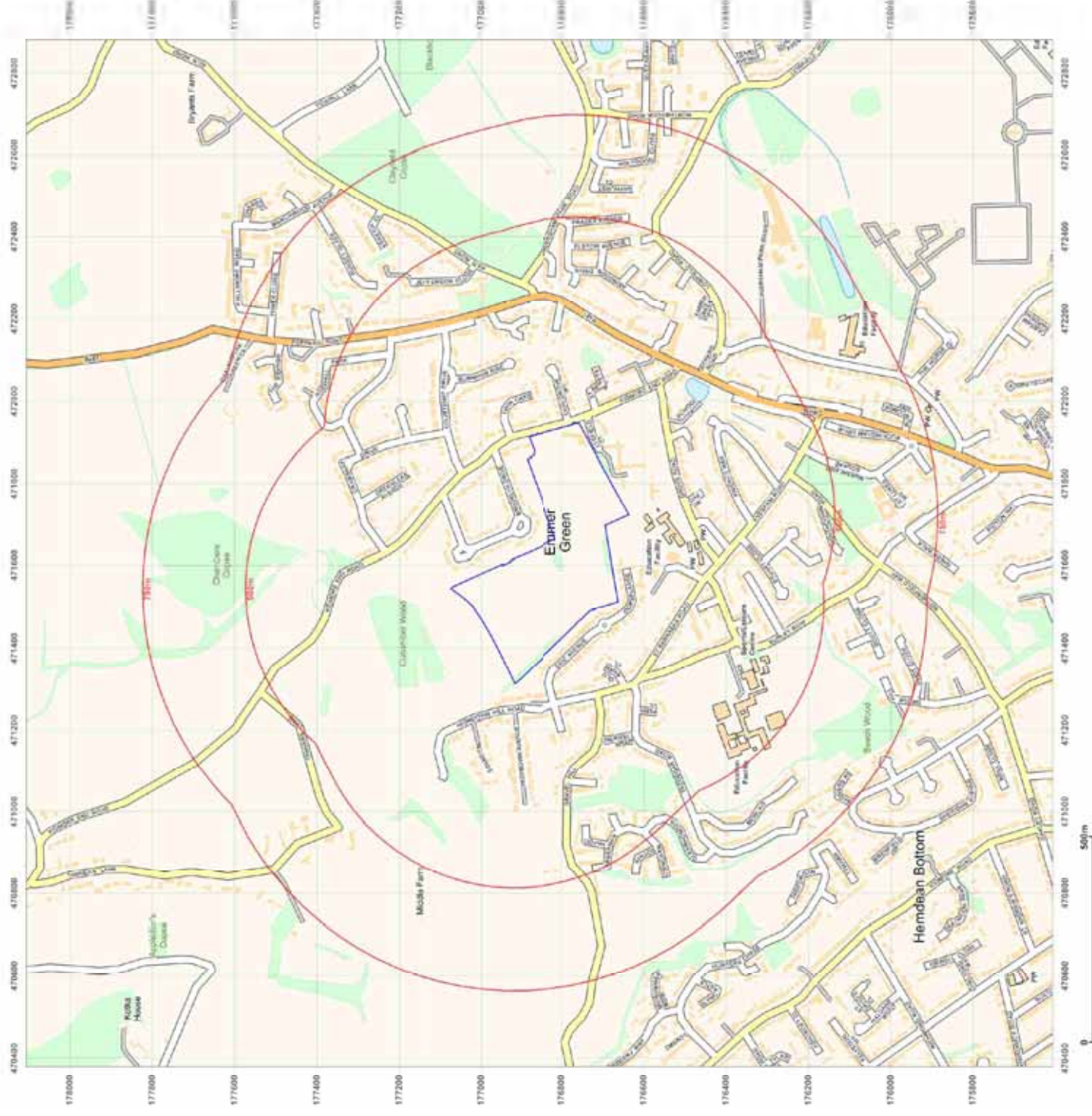
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APPENDIX 3

- Exploratory Hole Logs
- BGS Borehole Log SU77NW68

IDOM					Borehole Log					Borehole No.				
										MBH1				
										Sheet 1 of 1				
Project Name: Reading Golf Club			Project No. 21962B		Co-ords:					Hole Type CP				
Location:					Level (m):					Scale 1:50				
Equipment: Dando 2000 Mark 2					Dates: 15/10/2019					Logged By Driller/KP				
Well	Wtr Strk	Sample and In Situ Testing			Coring				Depth (m)	Level (m)	Legend	Stratum Description		
		Depth (m)	Type	Results	FI	TCR	SCR	RQD						
									0.20			Grass over dark brown gravelly loam TOPSOIL.		
		1.00 1.20	D SPT(C)	N=15 (1,2/3,4,4,4)								Medium dense, rusty brown, friable very clayey, silty gravelly SAND. Gravel is angular flint.	1	
		2.00 2.00	D SPT(C)	N=15 (2,2/3,4,4,4)					2.00			Firm, friable, rusty brown silty sandy slightly gravelly CLAY. Gravel is angular flint.	2	
		3.00 3.00	D SPT(C)	N=12 (1,2/2,3,3,4)									3	
		4.00 4.00	D SPT(C)	N=11 (2,2/2,3,3,3)									4	
		5.00 5.00	D SPT(C)	N=14 (3,2/3,3,4,4)									5	
		6.00 6.50	D SPT(C)	N=16 (2,3/3,4,4,5)					6.00			Stiff, rusty brown silty CLAY.	6	
		7.00 8.00	D SPT(C)	N=14 (1,3/3,3,4,4)									7	
									8.45			End of Borehole at 8.45m	8	
													9	
													10	
D = small disturbed sample (tub) J = organic sample (amber glass jar) V = volatile sample (amber glass vial) B = bulk bag sample SPT(C) = Standard Penetration Test (Cone) SPT(S) = Standard Penetration Test (Split Spoon)					HSV = hand shear vane (kPa) PP = pocket penetrometer (kg.cm2) PID = photoionisation detector (ppm) FI = fracture index TCR = total core recovery SCR = solid core recovery RQD = rock quality designation					Remarks Service clearance pit to 1.20m. Hole backfilled with arisings. Groundwater not encountered.				

IDOM					Borehole Log			Borehole No.					
								MBH2					
								Sheet 1 of 1					
Project Name: Reading Golf Club			Project No. 21962B		Co-ords:			Hole Type CP					
Location:					Level (m):			Scale 1:50					
Equipment: Dando 2000 Mark 2					Dates: 16/10/2019			Logged By Driller/KP					
Well	Wtr Strk	Sample and In Situ Testing			Coring				Depth (m)	Level (m)	Legend	Stratum Description	
		Depth (m)	Type	Results	FI	TCR	SCR	RQD					
									0.20			Grass over dark brown gravelly loam TOPSOIL.	
												Rusty brown, friable very clayey, silty gravelly SAND. Gravel is angular flint.	
		1.00	D						1.00				1
		1.20	SPT(C)	N=13 (2,3/3,3,3,4)									
		2.00	D										2
		2.00	SPT(C)	N=15 (3,3/3,4,4,4)									
		3.00	D										3
		3.00	SPT(C)	N=18 (2,3/4,4,5,5)									
		4.00	D										4
		4.00	SPT(C)	N=15 (3,3/3,4,4,4)									
												5	
												6	
									6.00				
													7
													8
									8.45				
												End of Borehole at 8.45m	9
													10

D = small disturbed sample (tub)

I = organic sample (amber glass jar)

V = volatile sample (amber glass vial)

B = bulk bag sample

SPT(C) = Standard Penetration Test (Cone)

SPT(S) = Standard Penetration Test (Split Spoon)

HSV = hand shear vane (kPa)

PP = pocket penetrometer (kg.cm2)

PID = photoionisation detector (ppm)

FI = fracture index

TCR = total core recovery

SCR = solid core recovery

RQD = rock quality designation

Remarks

Service clearance pit to 1.20m. Hole backfilled with arisings.

IDOM										Borehole Log			Borehole No.	
													MBH3	
													Sheet 1 of 1	
Project Name: Reading Golf Club					Project No: 21962B					Co-ords:			Hole Type CP	
Location:										Level (m):			Scale 1:50	
Equipment: Dando 2000 Mark 2										Dates: 16/10/2019			Logged By Driller/KP	
Well	Wtr Strk	Sample and In Situ Testing			Coring				Depth (m)	Level (m)	Legend	Stratum Description		
		Depth (m)	Type	Results	FI	TCR	SCR	RQD						
									0.40			Grass over dark brown gravelly loam TOPSOIL.		
		1.00	D									Firm to stiff rusty brown sandy very gravelly CLAY/very clayey sandy GRAVEL. Gravel is medium angular flint.	1	
		1.20	SPT(C)	N=30 (3,5/8,12,6,4)					1.20					
												Creamy-brown becoming ff white CHALK, recovered as 80% silt with some sub-angular chalk gravel and occasional gravel sized flint fragments.		
		2.00	D										2	
		2.00	SPT(C)	N=11 (6,7/3,3,2,3)										
		3.00	D										3	
		3.00	SPT(C)	N=15 (2,3/4,4,3,4)										
		4.00	D										4	
		4.00	SPT(C)	N=17 (3,5/6,3,3,5)										
		5.00	D										5	
		5.00	SPT(C)	N=21 (2,4/5,8,4,4)										
		6.00	D										6	
		6.50	SPT(C)	N=17 (9,12/6,4,4,3)										
		7.00	D										7	
		8.00	D										8	
		8.00	SPT(C)	N=17 (3,4/5,5,3,4)										
									8.45					
												End of Borehole at 8.45m	9	
													10	
D = small disturbed sample (tub) J = organic sample (amber glass jar) V = volatile sample (amber glass vial) B = bulk bag sample SPT(C) = Standard Penetration Test (Cone) SPT(S) = Standard Penetration Test (Split Spoon) HSV = hand shear vane (kPa) PP = pocket penetrometer (kg.cm2) PID = photoionisation detector (ppm) FI = fracture index TCR = total core recovery SCR = solid core recovery RQD = rock quality designation										Remarks Service clearance pit to 1.20m. Hole backfilled with arisings.				

IDOM						Windowless Sample Log		Borehole No. MWS1 Sheet 1 of 1	
Project Name: Reading Golf Club				Project No. 21962B		Co-ords:		Hole Type WLS	
Location:						Level (m):		Scale 1:25	
Equipment: Premier Compact 110 Series						Dates: 15/10/2019		Logged By CEK	
Well	Wtr Strk	Sample and In Situ Testing			Depth (m)	Level (m)	Legend	Stratum Description	
		Depth (m)	Type	Results					
		0.10 - 0.20	D,J		0.20			TOPSOIL. Brown loamy sandy clay with occasional medium to coarse subangular chert gravel. Grass topped with rootlets throughout.	
		0.10 - 0.20	D,J						
		0.45 - 0.55	D		0.55			Brown slightly fine sandy gravelly CLAY. Gravel is fine to medium chert. Rootlets common.	
		1.00	SPT(C)	N=34 (10,11/10,10,7,7)	1.60			Beige silty fine sandy GRAVEL of fine to coarse subrounded to subangular chert.	1
		2.00	SPT(C)	N=20 (3,6/6,6,4,4)	2.50			Brown gravelly clay. Medium to coarse chert gravel.	2
		3.00	SPT(C)	N=20 (7,7/6,6,3,5)				Orange clayey fine sandy GRAVEL of fine to coarse subrounded to subangular chert.	3
		4.00	SPT(C)	N=16 (4,4/4,4,4,4)					4
		5.00	SPT(C)	N=39 (7,7/10,10,10,9)	5.00				5
							End of Borehole at 5.00m		
D = small disturbed sample (tub) J = organic sample (amber glass jar) V = volatile sample (amber glass vial) B = bulk bag sample SPT(C) = Standard Penetration Test (Cone) SPT(S) = Standard Penetration Test (Split Spoon) HSV = hand shear vane (kPa) PP = pocket penetrometer (kg,cm2) PID = photoionisation detector (ppm)						Remarks			

Project Name: Reading Golf Club

Project No.
21962B

Co-ords:

Hole Type
WLS

Location:

Level (m):

Scale
1:25

Equipment: Premier Compact 110 Series

Dates: 16/10/2019

Logged By
CEK

Well	Wtr Strk	Sample and In Situ Testing			Depth (m)	Level (m)	Legend	Stratum Description	
		Depth (m)	Type	Results					
		0.10 - 0.20	D,J		0.20			TOPSOIL. Brown loamy sandy clay with occasional medium to coarse subangular chert gravel. Grass topped with rootlets throughout.	
		1.00	SPT(C)	N=20 (4,4/5,5,5,5)	0.95			Brown very gravelly CLAY. Gravel is fine to coarse rounded to angular chert.	
		2.00	SPT(C)	N=31 (6,6/5,6,10,10)	2.30			Orange fine sandy gravelly CLAY. Fine to coarse rounded to angular chert gravel.	1
								Mottled black.	
								Orangish brown clayey slightly gravelly fine to medium SAND. Fine subrounded chert gravel.	
		3.00	SPT(C)	N=22 (2,2/4,5,5,8)	2.85			Greyish brown mottled red CLAY.	3
		4.00	SPT(C)	N=7 (1,1/2,1,2,2)	3.95 4.00			Orange coarse sandy fine rounded to subrounded chert GRAVEL. Very wet. End of Borehole at 4.00m	4
									5

D = small disturbed sample (tub)
J = organic sample (amber glass jar)
V = volatile sample (amber glass vial)
B = bulk bag sample

SPT(C) = Standard Penetration Test (Cone)
SPT(S) = Standard Penetration Test (Split Spoon)
HSV = hand shear vane (kPa)
PP = pocket penetrometer (kg,cm2)
PID = photoionisation detector (ppm)

Remarks

IDOM					Windowless Sample Log		Borehole No. MWS11 Sheet 1 of 2	
Project Name: Reading Golf Club				Project No. 21962B		Co-ords:		Hole Type WLS
Location:						Level (m):		Scale 1:25
Equipment: Premier Compact 110 Series						Dates: 16/10/2019		Logged By CEK
Well	Wtr Strk	Sample and In Situ Testing			Depth (m)	Level (m)	Legend	Stratum Description
		Depth (m)	Type	Results				
		0.10 - 0.30	D,J		0.40		MADE GROUND. Brown loamy sandy clay with occasional medium to coarse subangular chert gravel and occasional fine to medium gravel sized brick fragments. Grass topped with rootlets throughout.	
		1.00	SPT(C)	N=32 (6,7/5,7,10,10)			Orange fine to medium sandy gravelly CLAY. Gravel is fine to coarse subangular chert.	1
		2.00	SPT(C)	N=24 (7,7/6,6,6,6)	2.20		Orange clayey gravelly fine to medium SAND. Gravel is fine to coarse subangular chert.	2
		3.00	SPT(C)	N=17 (2,4/4,3,5,5)	2.70		Grey CLAY.	3
		4.00	SPT(C)	N=41 (2,4/10,10,10,11)	3.70 3.80		Grey mottled black clayey SAND. Grey CLAY.	4
					4.35 4.50		Grey mottled red brown and yellow clayey medium SAND.	
							End of Borehole at 4.50m	
							Continued on Next Sheet	5

D = small disturbed sample (tub)
J = organic sample (amber glass jar)
V = volatile sample (amber glass vial)
B = bulk bag sample

SPT(C) = Standard Penetration Test (Cone)
SPT(S) = Standard Penetration Test (Split Spoon)
HSV = hand shear vane (kPa)
PP = pocket penetrometer (kg,cm2)
PID = photoionisation detector (ppm)

Remarks

[illegible]

IDOM						Windowless Sample Log		Borehole No. MWS12 Sheet 1 of 1	
Project Name: Reading Golf Club				Project No. 21962B		Co-ords:		Hole Type WLS	
Location:						Level (m):		Scale 1:25	
Equipment: Premier Compact 110 Series						Dates: 16/10/2019		Logged By CEK	
Well	Wtr Strk	Sample and In Situ Testing			Depth (m)	Level (m)	Legend	Stratum Description	
		Depth (m)	Type	Results					
		0.10 - 0.30	D,J		0.40		MADE GROUND. Brown loamy sandy clay with occasional medium to coarse subangular chert gravel and occasional fine to medium gravel sized brick fragments. Grass topped with rootlets throughout.		
		0.80 - 0.90	D,J				Brownish orange slightly medium sandy very gravelly CLAY. Subangular chert gravel.		
		1.00	SPT(C)	N=20 (7,5/4,6,5,5)				1	
		2.00	SPT(C)	N=22 (2,2/5,5,6,6)	1.80		Orange mottled beige slightly clayey slightly gravelly fine to medium SAND. Gravel is fine to medium subrounded chert. Very wet at depth.	2	
		2.50	SPT(C)	0 (17 for 75mm/0 for 0mm)	2.50		End of Borehole at 2.50m		
		3.00	SPT(C)	0 (17 for 75mm/0 for 0mm)				3	
								4	
								5	

D = small disturbed sample (tub)
J = organic sample (amber glass jar)
V = volatile sample (amber glass vial)
B = bulk bag sample

SPT(C) = Standard Penetration Test (Cone)
SPT(S) = Standard Penetration Test (Split Spoon)
HSV = hand shear vane (kPa)
PP = pocket penetrometer (kg,cm2)
PID = photoionisation detector (ppm)

Remarks

IDOM						Windowless Sample Log		Borehole No. MWS2 Sheet 1 of 1	
Project Name: Reading Golf Club				Project No. 21962B		Co-ords:		Hole Type WLS	
Location:						Level (m):		Scale 1:25	
Equipment: Premier Compact 110 Series						Dates: 15/10/2019		Logged By CEK	
Well	Wtr Strk	Sample and In Situ Testing			Depth (m)	Level (m)	Legend	Stratum Description	
		Depth (m)	Type	Results					
					0.35			TOPSOIL. Brown loamy sandy clay with occasional medium to coarse subangular chert gravel. Grass topped with rootlets throughout.	
		0.80 - 1.00	D,J					Orange (mottled brown in upper 20 cm) clayey medium SAND with occasional rootlets.	1
		1.00	SPT(C)	N=30 (10,8/8,8,7,7)					
					1.50			Orange slightly clayey fine SAND.	2
		2.00	SPT(C)	N=17 (4,4/4,5,4,4)					
		2.80 - 2.90	D						
		3.00	SPT(C)	N=12 (3,3/3,3,3,3)					3
		4.00	SPT(C)	N=32 (1,2/2,10,10,10)					
								Greyish orange here with fine to medium sub angular flint gravel.	4
		5.00	SPT(C)	N=18 (2,3/4,4,5,5)	5.00				5
								End of Borehole at 5.00m	
D = small disturbed sample (tub) J = organic sample (amber glass jar) V = volatile sample (amber glass vial) B = bulk bag sample						SPT(C) = Standard Penetration Test (Cone) SPT(S) = Standard Penetration Test (Split Spoon) HSV = hand shear vane (kPa) PP = pocket penetrometer (kg,cm2) PID = photoionisation detector (ppm)			
Remarks									

IDOM					Windowless Sample Log		Borehole No. MWS3 Sheet 1 of 1	
Project Name: Reading Golf Club				Project No. 21962B		Co-ords:		Hole Type WLS
Location:						Level (m):		Scale 1:25
Equipment: Premier Compact 110 Series						Dates: 15/10/2019		Logged By CEK
Well	Wtr Strk	Sample and In Situ Testing			Depth (m)	Level (m)	Legend	Stratum Description
		Depth (m)	Type	Results				
					0.20			TOPSOIL. Brown loamy sandy clay with occasional medium to coarse subangular chert gravel. Grass topped with rootlets throughout
					0.40			Greyish brown gravelly CLAY. Gravel is subrounded to subangular fine to medium chert.
					0.70			Orange clayey slightly medium sandy GRAVEL. Gravel is subrounded to subangular fine to medium chert.
		1.00	SPT(C)	N=6 (5,4/3,1,1,1)	1.40			Orange slightly clayey fine to medium sandy GRAVEL. Gravel is subrounded to subangular fine to medium chert.
		1.70 - 1.80	D		2.00			Grey mottled orange CLAY.
		2.00	SPT(C)	N=4 (1,1/1,1,1,1)	2.60			Greyish orange slightly medium sandy CLAY.
		3.00	SPT(C)	N=36 (1,1/4,6,13,13)				White mottled orangish grey structureless CHALK. Occasional medium to coarse subangular to subrounded chert.
		3.50 - 3.70	D					
		4.00	SPT(C)	N=21 (4,5/5,4,6,6)	4.00			End of Borehole at 4.00m
D = small disturbed sample (tub) I = organic sample (amber glass jar) V = volatile sample (amber glass vial) B = bulk bag sample SPT(C) = Standard Penetration Test (Cone) SPT(S) = Standard Penetration Test (Split Spoon) HSV = hand shear vane (kPa) PP = pocket penetrometer (kg,cm2) PID = photoionisation detector (ppm)								
Remarks								

IDOM						Windowless Sample Log		Borehole No. MWS4 Sheet 1 of 1	
Project Name: Reading Golf Club				Project No. 21962B		Co-ords:		Hole Type WLS	
Location:						Level (m):		Scale 1:25	
Equipment: Premier Compact 110 Series						Dates: 15/10/2019		Logged By CEK	
Well	Wtr Strk	Sample and In Situ Testing			Depth (m)	Level (m)	Legend	Stratum Description	
		Depth (m)	Type	Results					
								TOPSOIL. Brown loamy sandy clay with occasional medium to coarse subangular chert gravel. Grass topped with rootlets throughout.	
					0.40				
					0.50			Brownish orange gravelly CLAY. Gravel is medium to coarse angular chert.	
		0.80 - 1.00	D,J					Brownish orange slightly gravelly CLAY. Gravel is medium to coarse angular chert.	
		1.00	SPT(C)	N=45 (7,10/10,12,13,10)	1.00			Multicoloured medium to coarse sandy GRAVEL. Gravel is fine to coarse angular chert.	1
					1.50			Multicoloured gravelly CLAY. Gravel is fine to coarse angular chert.	
					1.80			Multicoloured medium to coarse sandy GRAVEL. Gravel is fine to coarse angular chert.	
		2.00	SPT(C)	N=50 (10,10/50 for 275mm)	2.00			End of Borehole at 2.00m	2
									3
									4
									5

D = small disturbed sample (tub)
J = organic sample (amber glass jar)
V = volatile sample (amber glass vial)
B = bulk bag sample

SPT(C) = Standard Penetration Test (Cone)
SPT(S) = Standard Penetration Test (Split Spoon)
HSV = hand shear vane (kPa)
PP = pocket penetrometer (kg,cm2)
PID = photoionisation detector (ppm)

Remarks

IDOM						Windowless Sample Log		Borehole No. MWS5 Sheet 1 of 1	
Project Name: Reading Golf Club				Project No. 21962B		Co-ords:		Hole Type WLS	
Location:						Level (m):		Scale 1:25	
Equipment: Premier Compact 110 Series						Dates: 15/10/2019		Logged By CEK	
Well	Wtr Strk	Sample and In Situ Testing			Depth (m)	Level (m)	Legend	Stratum Description	
		Depth (m)	Type	Results					
		0.00 - 0.20	D,J		0.30			TOPSOIL. Brown loamy sandy clay with occasional medium to coarse subangular chert gravel. Grass topped with rootlets throughout.	
		0.80 - 0.90	D,J						
		1.00	SPT(C)	N=20 (10,6/5,5,5,5)	1.65			Orangish brown very gravelly clay. Fine to coarse rounded to subangular chert gravel.	1
		2.00	SPT(C)	N=14 (2,2/2,4,4,4)					
		3.00	SPT(C)	N=12 (2,2/3,3,3,3)	3.00			Orange fine sandy gravelly CLAY. Fine to coarse rounded to subangular chert gravel.	2
		3.50 - 3.60	D						
		4.00	SPT(C)	N=23 (3,2/4,5,7,7)	4.00			Orange slightly gravelly CLAY. Fine to medium chert gravel.	3
								End of Borehole at 4.00m	4
									5

D = small disturbed sample (tub)
J = organic sample (amber glass jar)
V = volatile sample (amber glass vial)
B = bulk bag sample

SPT(C) = Standard Penetration Test (Cone)
SPT(S) = Standard Penetration Test (Split Spoon)
HSV = hand shear vane (kPa)
PP = pocket penetrometer (kg,cm2)
PID = photoionisation detector (ppm)

Remarks

IDOM						Windowless Sample Log		Borehole No. MWS6 Sheet 1 of 1	
Project Name: Reading Golf Club				Project No. 21962B		Co-ords:		Hole Type WLS	
Location:						Level (m):		Scale 1:25	
Equipment: Premier Compact 110 Series						Dates: 15/10/2019		Logged By CEK	
Well	Wtr Strk	Sample and In Situ Testing			Depth (m)	Level (m)	Legend	Stratum Description	
		Depth (m)	Type	Results					
		0.50 - 0.70	D,J		0.30		TOPSOIL. Brown loamy sandy clay with occasional medium to coarse subangular chert gravel. Grass topped with rootlets throughout.		
		1.00	SPT(C)	N=41 (6,7/11,10,10,10)	0.90 1.00		Orange slightly clayey medium sandy GRAVEL. Fine to coarse subangular to subrounded chert gravel.	1	
		1.30	D		1.20		Orange mottled black slightly clayey fine SAND.		
		2.00	SPT(C)	N=12 (1,2/2,2,4,4)	2.00		Orange slightly clayey medium sandy GRAVEL. Fine to coarse subangular to subrounded chert gravel.		
							Orange gravelly fine SAND. Gravel is fine to medium subangular chert. Wet.	2	
							End of Borehole at 2.00m	3	
								4	
								5	

D = small disturbed sample (tub)
J = organic sample (amber glass jar)
V = volatile sample (amber glass vial)
B = bulk bag sample

SPT(C) = Standard Penetration Test (Cone)
SPT(S) = Standard Penetration Test (Split Spoon)
HSV = hand shear vane (kPa)
PP = pocket penetrometer (kg,cm2)
PID = photoionisation detector (ppm)

Remarks

IDOM						Windowless Sample Log		Borehole No. MWS7 Sheet 1 of 1	
Project Name: Reading Golf Club				Project No. 21962B		Co-ords:		Hole Type WLS	
Location:						Level (m):		Scale 1:25	
Equipment: Premier Compact 110 Series						Dates: 16/10/2019		Logged By CEK	
Well	Wtr Strk	Sample and In Situ Testing			Depth (m)	Level (m)	Legend	Stratum Description	
		Depth (m)	Type	Results					
		0.10 - 0.20	D,J		0.30		TOPSOIL. Brown loamy sandy clay with occasional medium to coarse subangular chert gravel. Grass topped with rootlets throughout.		
					0.90		Orange slightly clayey medium sandy GRAVEL. Fine to coarse subangular to subrounded chert gravel.		
		1.00	SPT(C)	N=44 (2,4/10,11,13,10)	1.20		Orange gravelly CLAY. Gravel is fine to coarse subangular to subrounded chert.	1	
		1.40	SPT(C)	N=50 (12,11/50 for 275mm)	1.40		Orange slightly clayey medium sandy GRAVEL. Fine to coarse subangular to rounded chert gravel.		
							End of Borehole at 1.40m	2	
								3	
								4	
								5	

D = small disturbed sample (tub)
J = organic sample (amber glass jar)
V = volatile sample (amber glass vial)
B = bulk bag sample

SPT(C) = Standard Penetration Test (Cone)
SPT(S) = Standard Penetration Test (Split Spoon)
HSV = hand shear vane (kPa)
PP = pocket penetrometer (kg/cm2)
PID = photoionisation detector (ppm)

Remarks

						Windowless Sample Log		Borehole No. MWS8 Sheet 1 of 1	
Project Name: Reading Golf Club				Project No. 21962B		Co-ords:		Hole Type WLS	
Location:						Level (m):		Scale 1:25	
Equipment: Premier Compact 110 Series						Dates: 16/10/2019		Logged By CEK	
Well	Wtr Strk	Sample and In Situ Testing			Depth (m)	Level (m)	Legend	Stratum Description	
		Depth (m)	Type	Results					
		0.10 - 0.20	D,J		0.30			TOPSOIL. Brown loamy sandy clay with occasional medium to coarse subangular chert gravel. Grass topped with rootlets throughout.	1
								Brown slightly gravelly CLAY. Gravel of fine to medium subangular chert.	
		1.00 1.10 - 1.20	SPT(C) D	N=7 (1,1/1,2,2,2)	1.00			Orangish brown slightly fine sandy slightly gravelly CLAY. Gravel is fine to medium subangular chert.	
		2.00	SPT(C)	N=12 (1,2/3,3,3,3)	1.75			Orangish brown slightly fine sandy CLAY. Gravel is fine to medium subangular chert.	
		3.00	SPT(C)	N=17 (2,3/3,4,5,5)	3.00			End of Borehole at 3.00m	3
									4
									5
D = small disturbed sample (tub) J = organic sample (amber glass jar) V = volatile sample (amber glass vial) B = bulk bag sample SPT(C) = Standard Penetration Test (Cone) SPT(S) = Standard Penetration Test (Split Spoon) HSV = hand shear vane (kPa) PP = pocket penetrometer (kg,cm2) PID = photoionisation detector (ppm)							Remarks		

IDOM Windowless Sample Log Borehole No. MWS9 Sheet 1 of 1									
Project Name: Reading Golf Club				Project No. 21962B		Co-ords:		Hole Type WLS	
Location:						Level (m):		Scale 1:25	
Equipment: Premier Compact 110 Series						Dates: 16/10/2019		Logged By CEK	
Well	Wtr Strk	Sample and In Situ Testing			Depth (m)	Level (m)	Legend	Stratum Description	
		Depth (m)	Type	Results					
		0.00 - 0.30	D,J		0.30			TOPSOIL. Brown loamy sandy clay with occasional medium to coarse subangular chert gravel. Grass topped with rootlets throughout.	1 2 3 4 5
		0.90 - 1.00	D		1.45			Orangish brown mottled orange CLAY.	
		1.00	SPT(C)	N=15 (2,2/3,3,4,5)	1.90			Orange mottled black gravelly CLAY. Medium to coarse rounded to subangular chert gravel.	
		2.00	SPT(C)	N=17 (3,3/3,4,5,5)	2.50			Orangish brown clayey SAND.	
					2.80			Orange clayey medium sandy GRAVEL of fine to coarse chert.	
		3.00	SPT(C)	N=27 (4,5/5,5,7,10)	3.50			Grey CLAY.	
								End of Borehole at 3.50m	
D = small disturbed sample (tub) J = organic sample (amber glass jar) V = volatile sample (amber glass vial) B = bulk bag sample SPT(C) = Standard Penetration Test (Cone) SPT(S) = Standard Penetration Test (Split Spoon) HSV = hand shear vane (kPa) PP = pocket penetrometer (kg,cm2) PID = photoionisation detector (ppm)						Remarks			

EMMER GREEN		British Geological Survey		SU 77/166 SU77NW	
Owner <u>READING GOLF CLUB</u>		Licence No.		Nat. Grid Ref. <u>SU 7146 7714</u>	
Occupier		IGS Ref. No.		Status <u>To be licensed.</u>	
Ground Level <u>62.00</u> m OD		ft. CD		Aquifer <u>U. CHALK.</u>	
Level of Well Top <u>61.50</u> m OD		ft. CD			
Rest Water Level <u>36.40</u> m bwt		ft. bwt		Summary of Geological Section	
(Date <u>10.9.90</u>) <u>25.60</u> m OD		ft. OD		Thickness	
Construction <u>TR/OD/BE/RQ</u>				Depth	
Depth bwt	Dia.	Linings (below well top)			
		From	To	Dia.	Type
<u>70.0m</u>	<u>150mm</u>	<u>0</u>	<u>15</u>	<u>150mm</u>	<u>Plain</u>
Abstraction Rates		Type of Pump <u>Grundfos SP27.7</u>		Submersible	
gph		Chem./Bact. Anal.		YES NO	
gpd		Well Driller <u>Smith & Webb</u>		<u>10.9.90</u>	

If insufficient space has been allowed, continue in 'Notes' overleaf.

APPENDIX 4

- Soil Chemistry
- Laboratory Analysis Certificates



4041



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Analytical Report Number : 19-67435

Project / Site name:	Reading Golf Club	Samples received on:	21/10/2019
Your job number:	21962B	Samples instructed on:	22/10/2019
Your order number:	19-S2-FDO-LABS	Analysis completed by:	29/10/2019
Report Issue Number:	1	Report issued on:	29/10/2019
Samples Analysed:	15 soil samples		

Signed:

Rexona Rahman
 Head of Customer Services
For & on behalf of i2 Analytical Ltd.

Standard Geotechnical, Asbestos and Chemical Testing Laboratory located at: ul. Pionierów 39, 41 -711 Ruda Śląska, Poland.

Accredited tests are defined within the report, opinions and interpretations expressed herein are outside the scope of accreditation.

Standard sample disposal times, unless otherwise agreed with the laboratory, are :

soils	- 4 weeks from reporting
leachates	- 2 weeks from reporting
waters	- 2 weeks from reporting
asbestos	- 6 months from reporting

Excel copies of reports are only valid when accompanied by this PDF certificate.

Any assessments of compliance with specifications are based on actual analytical results with no contribution from uncertainty of measurement. Application of uncertainty of measurement would provide a range within which the true result lies. An estimate of measurement uncertainty can be provided on request.

Iss No 19-67435-1 Reading Golf Club 21962B

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 The results included within the report are representative of the samples submitted for analysis.

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Environmental Science

Analytical Report Number: 19-67435

Project / Site name: Reading Golf Club

Your Order No: 19-S2-FDO-LABS

Lab Sample Number	1338678	1338679	1338680	1338681	1338682
Sample Reference	MWS1 D1	MWS1 D2	MWS2 D1	MWS2 D1	MWS4 D1
Sample Number	None Supplied	None Supplied	None Supplied	None Supplied	None Supplied
Depth (m)	0.10-0.20	0.45-0.55	0.80-1.00	1.70-1.80	0.80-1.00
Date Sampled	16/10/2019	16/10/2019	16/10/2019	16/10/2019	16/10/2019
Time Taken	None Supplied	None Supplied	None Supplied	None Supplied	None Supplied
Analytical Parameter (Soil Analysis)	Units	Limit of detection	Acceptance Status		
Stone Content	%	0.1	NONE	< 0.1	< 0.1
Moisture Content	%	N/A	NONE	7.8	7.0
Total mass of sample received	kg	0.061	NONE	1.2	0.90

Asbestos in Soil	Type	N/A	ISO 17025	-	-	-	-	-
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General Inorganics								
pH - Automated	pH Units	N/A	MCERTS	6.1	6.9	7.1	7.1	7.2
Total Sulphate as SO ₄	mg/kg	50	MCERTS	-	300	180	160	-
Water Soluble SO ₄ (5hr extraction (2:1 Leachate Equivalent))	mg/kg	0.00135	MCERTS	-	0.0096	0.0059	0.016	-
Total Sulphur	mg/kg	50	MCERTS	-	130	61	71	-
Organic Matter	%	0.1	MCERTS	2.5	-	0.3	-	1.8

Speciated PAHs								
Naphthalene	mg/kg	0.05	MCERTS	< 0.05	-	< 0.05	-	< 0.05
Acenaphthylene	mg/kg	0.05	MCERTS	< 0.05	-	< 0.05	-	< 0.05
Acenaphthene	mg/kg	0.05	MCERTS	< 0.05	-	< 0.05	-	< 0.05
Fluorene	mg/kg	0.05	MCERTS	< 0.05	-	< 0.05	-	< 0.05
Phenanthrene	mg/kg	0.05	MCERTS	< 0.05	-	< 0.05	-	< 0.05
Anthracene	mg/kg	0.05	MCERTS	< 0.05	-	< 0.05	-	< 0.05
Fluoranthene	mg/kg	0.05	MCERTS	< 0.05	-	< 0.05	-	< 0.05
Pyrene	mg/kg	0.05	MCERTS	< 0.05	-	< 0.05	-	< 0.05
Benzo(a)anthracene	mg/kg	0.05	MCERTS	< 0.05	-	< 0.05	-	< 0.05
Chrysene	mg/kg	0.05	MCERTS	< 0.05	-	< 0.05	-	< 0.05
Benzo(b)fluoranthene	mg/kg	0.05	MCERTS	< 0.05	-	< 0.05	-	< 0.05
Benzo(k)fluoranthene	mg/kg	0.05	MCERTS	< 0.05	-	< 0.05	-	< 0.05
Benzo(a)pyrene	mg/kg	0.05	MCERTS	< 0.05	-	< 0.05	-	< 0.05
Indeno(1,2,3-cd)pyrene	mg/kg	0.05	MCERTS	< 0.05	-	< 0.05	-	< 0.05
Dibenz(a,h)anthracene	mg/kg	0.05	MCERTS	< 0.05	-	< 0.05	-	< 0.05
Benzo(ghi)perylene	mg/kg	0.05	MCERTS	< 0.05	-	< 0.05	-	< 0.05

Total PAH								
Speciated Total EPA-16 PAHs	mg/kg	0.8	MCERTS	< 0.80	-	< 0.80	-	< 0.80

Heavy Metals / Metalloids								
Arsenic (aqua regia extractable)	mg/kg	1	MCERTS	11	-	11	-	11
Boron (water soluble)	mg/kg	0.2	MCERTS	0.7	-	0.4	-	0.5
Cadmium (aqua regia extractable)	mg/kg	0.2	MCERTS	< 0.2	-	< 0.2	-	< 0.2
Chromium (aqua regia extractable)	mg/kg	1	MCERTS	21	-	23	-	32
Copper (aqua regia extractable)	mg/kg	1	MCERTS	9.9	-	7.4	-	12
Lead (aqua regia extractable)	mg/kg	1	MCERTS	29	-	8.9	-	17
Mercury (aqua regia extractable)	mg/kg	0.3	MCERTS	< 0.3	-	< 0.3	-	< 0.3
Nickel (aqua regia extractable)	mg/kg	1	MCERTS	15	-	11	-	19
Selenium (aqua regia extractable)	mg/kg	1	MCERTS	3.4	-	< 1.0	-	< 1.0
Zinc (aqua regia extractable)	mg/kg	1	MCERTS	41	-	27	-	39

Petroleum Hydrocarbons								
TPH C10 - C40	mg/kg	10	MCERTS	< 10	-	< 10	-	< 10



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Environmental Science

Analytical Report Number: 19-67435

Project / Site name: Reading Golf Club

Your Order No: 19-S2-FDO-LABS

Lab Sample Number	1338683	1338684	1338685	1338686	1338687
Sample Reference	MWS5 D1	MWS6 D1	MWS6 D2	MWS7 D1	MWS8 D1
Sample Number	None Supplied	None Supplied	None Supplied	None Supplied	None Supplied
Depth (m)	0.00-0.20	0.50-0.70	1.30	0.10-0.20	0.10-0.20
Date Sampled	16/10/2019	16/10/2019	16/10/2019	16/10/2019	16/10/2019
Time Taken	None Supplied	None Supplied	None Supplied	None Supplied	None Supplied
Analytical Parameter (Soil Analysis)	Units	Limit of detection	Acceptation Status		
Stone Content	%	0.1	NONE	< 0.1	20
Moisture Content	%	N/A	NONE	20	5.4
Total mass of sample received	kg	0.061	NONE	0.70	1.4

Asbestos in Soil	Type	N/A	ISO 17025	-	-	-	-	-
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General Inorganics								
pH - Automated	pH Units	N/A	MCERTS	6.4	6.9	7.2	5.2	6.1
Total Sulphate as SO ₄	mg/kg	50	MCERTS	-	210	160	-	-
Water Soluble SO ₄ (5hr extraction (2:1 Usachuk Equivalent))	mg/kg	0.00135	MCERTS	-	0.013	0.012	-	-
Total Sulphur	mg/kg	50	MCERTS	-	81	58	-	-
Organic Matter	%	0.1	MCERTS	5.5	0.3	-	2.7	3.0

Speciated PAHs								
Naphthalene	mg/kg	0.05	MCERTS	< 0.05	< 0.05	-	< 0.05	< 0.05
Acenaphthylene	mg/kg	0.05	MCERTS	< 0.05	< 0.05	-	< 0.05	< 0.05
Acenaphthene	mg/kg	0.05	MCERTS	< 0.05	< 0.05	-	< 0.05	< 0.05
Fluorene	mg/kg	0.05	MCERTS	< 0.05	< 0.05	-	< 0.05	< 0.05
Phenanthrene	mg/kg	0.05	MCERTS	< 0.05	< 0.05	-	< 0.05	< 0.05
Anthracene	mg/kg	0.05	MCERTS	< 0.05	< 0.05	-	< 0.05	< 0.05
Fluoranthene	mg/kg	0.05	MCERTS	< 0.05	< 0.05	-	< 0.05	< 0.05
Pyrene	mg/kg	0.05	MCERTS	< 0.05	< 0.05	-	< 0.05	< 0.05
Benzo(a)anthracene	mg/kg	0.05	MCERTS	< 0.05	< 0.05	-	< 0.05	< 0.05
Chrysene	mg/kg	0.05	MCERTS	< 0.05	< 0.05	-	< 0.05	< 0.05
Benzo(b)fluoranthene	mg/kg	0.05	MCERTS	< 0.05	< 0.05	-	< 0.05	< 0.05
Benzo(k)fluoranthene	mg/kg	0.05	MCERTS	< 0.05	< 0.05	-	< 0.05	< 0.05
Benzo(a)pyrene	mg/kg	0.05	MCERTS	< 0.05	< 0.05	-	< 0.05	< 0.05
Indeno(1,2,3-cd)pyrene	mg/kg	0.05	MCERTS	< 0.05	< 0.05	-	< 0.05	< 0.05
Dibenz(a,h)anthracene	mg/kg	0.05	MCERTS	< 0.05	< 0.05	-	< 0.05	< 0.05
Benzo(ghi)perylene	mg/kg	0.05	MCERTS	< 0.05	< 0.05	-	< 0.05	< 0.05

Total PAH								
Speciated Total EPA-16 PAHs	mg/kg	0.8	MCERTS	< 0.80	< 0.80	-	< 0.80	< 0.80

Heavy Metals / Metalloids								
Arsenic (aqua regia extractable)	mg/kg	1	MCERTS	13	26	-	18	14
Boron (water soluble)	mg/kg	0.2	MCERTS	0.5	< 0.2	-	0.3	0.4
Cadmium (aqua regia extractable)	mg/kg	0.2	MCERTS	< 0.2	< 0.2	-	< 0.2	< 0.2
Chromium (aqua regia extractable)	mg/kg	1	MCERTS	15	34	-	19	20
Copper (aqua regia extractable)	mg/kg	1	MCERTS	11	14	-	13	12
Lead (aqua regia extractable)	mg/kg	1	MCERTS	33	11	-	29	36
Mercury (aqua regia extractable)	mg/kg	0.3	MCERTS	< 0.3	< 0.3	-	< 0.3	< 0.3
Nickel (aqua regia extractable)	mg/kg	1	MCERTS	11	29	-	16	14
Selenium (aqua regia extractable)	mg/kg	1	MCERTS	< 1.0	3.7	-	< 1.0	< 1.0
Zinc (aqua regia extractable)	mg/kg	1	MCERTS	35	29	-	43	55

Petroleum Hydrocarbons								
TPH C10 - C40	mg/kg	10	MCERTS	21	< 10	-	< 10	28

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Environmental Science

Analytical Report Number: 19-67435

Project / Site name: Reading Golf Club

Your Order No: 19-S2-FDO-LABS

Lab Sample Number	1338688	1338689	1338690	1338691	1338692
Sample Reference	MWS9 D2	MWS9 D1	MWS9 D2	MWS11 D1	MWS12 D1
Sample Number	None Supplied	None Supplied	None Supplied	None Supplied	None Supplied
Depth (m)	1.10-0.20	0.10-0.30	0.90-1.00	0.10-0.30	0.10-0.30
Date Sampled	16/10/2019	16/10/2019	16/10/2019	16/10/2019	16/10/2019
Time Taken	None Supplied	None Supplied	None Supplied	None Supplied	None Supplied
Analytical Parameter (Soil Analysis)	Units	Limit of detection	MCERTS Status		
Stone Content	%	0.1	NONE	< 0.1	< 0.1
Moisture Content	%	N/A	NONE	13	8.8
Total mass of sample received	kg	0.061	NONE	0.74	1.0

Asbestos in Soil	Type	N/A	ISO 17025	-	-	-	Not-detected	Not-detected
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General Inorganics								
pH - Automated	pH Units	N/A	MCERTS	6.8	5.3	6.1	5.2	6.2
Total Sulphate as SO ₄	mg/kg	50	MCERTS	180	-	180	-	620
Water Soluble SO ₄ (5hr extraction (2:1 Usachuk Equivalent))	mg/kg	0.00135	MCERTS	0.014	-	0.017	-	0.014
Total Sulphur	mg/kg	50	MCERTS	80	-	82	-	360
Organic Matter	%	0.1	MCERTS	-	2.3	-	2.0	3.5

Speciated PAHs								
Naphthalene	mg/kg	0.05	MCERTS	-	< 0.05	-	< 0.05	< 0.05
Acenaphthylene	mg/kg	0.05	MCERTS	-	< 0.05	-	< 0.05	< 0.05
Acenaphthene	mg/kg	0.05	MCERTS	-	< 0.05	-	< 0.05	< 0.05
Fluorene	mg/kg	0.05	MCERTS	-	< 0.05	-	< 0.05	< 0.05
Phenanthrene	mg/kg	0.05	MCERTS	-	< 0.05	-	< 0.05	< 0.05
Anthracene	mg/kg	0.05	MCERTS	-	< 0.05	-	< 0.05	< 0.05
Fluoranthene	mg/kg	0.05	MCERTS	-	< 0.05	-	< 0.05	0.30
Pyrene	mg/kg	0.05	MCERTS	-	< 0.05	-	< 0.05	0.31
Benzo(a)anthracene	mg/kg	0.05	MCERTS	-	< 0.05	-	< 0.05	< 0.05
Chrysene	mg/kg	0.05	MCERTS	-	< 0.05	-	< 0.05	< 0.05
Benzo(b)fluoranthene	mg/kg	0.05	MCERTS	-	< 0.05	-	< 0.05	< 0.05
Benzo(k)fluoranthene	mg/kg	0.05	MCERTS	-	< 0.05	-	< 0.05	< 0.05
Benzo(a)pyrene	mg/kg	0.05	MCERTS	-	< 0.05	-	< 0.05	< 0.05
Indeno(1,2,3-cd)pyrene	mg/kg	0.05	MCERTS	-	< 0.05	-	< 0.05	< 0.05
Dibenz(a,h)anthracene	mg/kg	0.05	MCERTS	-	< 0.05	-	< 0.05	< 0.05
Benzo(ghi)perylene	mg/kg	0.05	MCERTS	-	< 0.05	-	< 0.05	< 0.05

Total PAH								
Speciated Total EPA-16 PAHs	mg/kg	0.8	MCERTS	-	< 0.80	-	< 0.80	< 0.80

Heavy Metals / Metalloids								
Arsenic (aqua regia extractable)	mg/kg	1	MCERTS	-	16	-	9.0	10
Boron (water soluble)	mg/kg	0.2	MCERTS	-	0.3	-	0.3	0.5
Cadmium (aqua regia extractable)	mg/kg	0.2	MCERTS	-	< 0.2	-	< 0.2	0.3
Chromium (aqua regia extractable)	mg/kg	1	MCERTS	-	20	-	19	19
Copper (aqua regia extractable)	mg/kg	1	MCERTS	-	12	-	17	22
Lead (aqua regia extractable)	mg/kg	1	MCERTS	-	31	-	23	49
Mercury (aqua regia extractable)	mg/kg	0.3	MCERTS	-	< 0.3	-	< 0.3	< 0.3
Nickel (aqua regia extractable)	mg/kg	1	MCERTS	-	14	-	12	11
Selenium (aqua regia extractable)	mg/kg	1	MCERTS	-	< 1.0	-	1.3	1.4
Zinc (aqua regia extractable)	mg/kg	1	MCERTS	-	36	-	41	60

Petroleum Hydrocarbons								
TPH C10 - C40	mg/kg	10	MCERTS	-	< 10	-	< 10	< 10

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Environmental Science

Analytical Report Number : 19-67435**Project / Site name: Reading Golf Club**

* These descriptions are only intended to act as a cross check if sample identities are questioned. The major constituent of the sample is intended to act with respect to MCERTS validation. The laboratory is accredited for sand, clay and loam (MCERTS) soil types. Data for unaccredited types of solid should be interpreted with care.

Stone content of a sample is calculated as the % weight of the stones not passing a 10 mm sieve. Results are not corrected for stone content.

Lab Sample Number	Sample Reference	Sample Number	Depth (m)	Sample Description *
1338678	MWS1 D1	None Supplied	0.10-0.20	Brown clay and loam with vegetation and gravel
1338679	MWS1 D2	None Supplied	0.45-0.55	Brown clay and sand with gravel.
1338680	MWS2 D1	None Supplied	0.80-1.00	Brown sandy clay.
1338681	MWS3 D1	None Supplied	1.70-1.80	Beige clay.
1338682	MWS4 D1	None Supplied	0.80-1.00	Brown clay and sand.
1338683	MWS5 D1	None Supplied	0.00-0.20	Brown loam and clay with vegetation.
1338684	MWS6 D1	None Supplied	0.50-0.70	Brown sand with gravel and stones.
1338685	MWS6 D2	None Supplied	1.30	Brown sand with gravel.
1338686	MWS7 D1	None Supplied	0.10-0.20	Brown loam and clay with gravel and vegetation.
1338687	MWS8 D1	None Supplied	0.10-0.20	Brown loam and clay with vegetation.
1338688	MWS8 D2	None Supplied	1.10-0.20	Brown clay.
1338689	MWS9 D1	None Supplied	0.10-0.30	Brown clay and loam with vegetation and gravel
1338690	MWS9 D2	None Supplied	0.90-1.00	Brown clay.
1338691	MWS11 D1	None Supplied	0.10-0.30	Brown loam and clay with vegetation and gravel
1338692	MWS12 D1	None Supplied	0.10-0.30	Brown clay and loam with vegetation and gravel



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Environmental Science

Analytical Report Number : 19-67435

Project / Site name: Reading Golf Club

Water matrix abbreviations: Surface Water (SW) Potable Water (PW) Ground Water (GW) Process Water (PrW)

Analytical Test Name	Analytical Method Description	Analytical Method Reference	Method number	Wet / Dry Analysis	Accreditation Status
Asbestos identification in soil	Asbestos Identification with the use of polarised light microscopy in conjunction with dispersion staining techniques.	In house method based on HSG 248	A001-PL	D	ISO 17025
Boron, water soluble, in soil	Determination of water soluble boron in soil by hot water extract followed by ICP-OES.	In-house method based on Second Site Properties version 3	L038-PL	D	MCERTS
Metals in soil by ICP-OES	Determination of metals in soil by aqua-regia digestion followed by ICP-OES.	In-house method based on MEWAM 2006 Methods for the Determination of Metals in Soil.	L038-PL	D	MCERTS
Moisture Content	Moisture content, determined gravimetrically. (30 °C)	In-house method based on BS1377 Part 2, 1990, Classification tests	L019-UK/PL	W	NONE
Organic matter (Automated) in soil	Determination of organic matter in soil by oxidising with potassium dichromate followed by titration with iron (II) sulphate.	BS1377 Part 3, 1990, Chemical and Electrochemical Tests™	L009-PL	D	MCERTS
pH in soil (automated)	Determination of pH in soil by addition of water followed by automated electrometric measurement.	In-house method based on BS1377 Part 3, 1990, Chemical and Electrochemical Tests	L099-PL	D	MCERTS
Speciated EPA-16 PAHs in soil	Determination of PAH compounds in soil by extraction in dichloromethane and hexane followed by GC-MS with the use of surrogate and internal standards.	In-house method based on USEPA 8270	L064-PL	D	MCERTS
Stones content of soil	Standard preparation for all samples unless otherwise detailed. Gravimetric determination of stone > 10 mm as % dry weight.	In-house method based on British Standard Methods and MCERTS requirements.	L019-UK/PL	D	NONE
Sulphate, water soluble, in soil (16hr extraction)	Determination of water soluble sulphate by ICP-OES. Results reported directly (leachate equivalent) and corrected for extraction ratio (soil equivalent).	In-house method based on BS1377 Part 3, 1990, Chemical and Electrochemical Tests, 2:1 water:soil extraction, analysis by ICP-OES.	L038-PL	D	MCERTS
Total sulphate (as SO4 in soil)	Determination of total sulphate in soil by extraction with 10% HCl followed by ICP-OES.	In-house method based on BS1377 Part 3, 1990, Chemical and Electrochemical Tests	L038-PL	D	MCERTS
Total Sulphur in soil	Determination of total sulphur in soil by extraction with aqua-regia, potassium bromide/bromate followed by ICP-OES.	In-house method based on BS1377 Part 3, 1990, and MEWAM 2006 Methods for the Determination of Metals in Soil	L038-PL	D	MCERTS
TPH Banding in Soil by FID	Determination of hexane extractable hydrocarbons in soil by GC-FID.	In-house method, TPH with carbon banding and silica gel split/cleanup.	L075-PL	W	MCERTS

For method numbers ending in 'UK' analysis have been carried out in our laboratory in the United Kingdom.

For method numbers ending in 'PL' analysis have been carried out in our laboratory in Poland.

Soil analytical results are expressed on a dry weight basis. Where analysis is carried out on as-received the results obtained are multiplied by a moisture correction factor that is determined gravimetrically using the moisture content which is carried out at a maximum of 30°C.

APPENDIX 5 ▪ Geotechnical Laboratory Certificates



TEST CERTIFICATE

Liquid and Plastic Limits

i2 Analytical Ltd
7 Woodshots Meadow
Croxley Green Business Park
Watford Herts WD18 8YS



4041

Tested in Accordance with: BS 1377-2: 1990; Clause 4.3 and 5

Client: Merebrook
Client Address: First Floor, 1 Leonard Place,
Westerham Road, Keston,
BR2 6HQ
Contact: Keith Paramor
Site Name: Reading Golf Club
Site Address: Not Given

Client Reference: 21962-B
Job Number: 19-67504
Date Sampled: 15/10/2019
Date Received: 22/10/2019
Date Tested: 28/10/2019
Sampled By: CEK

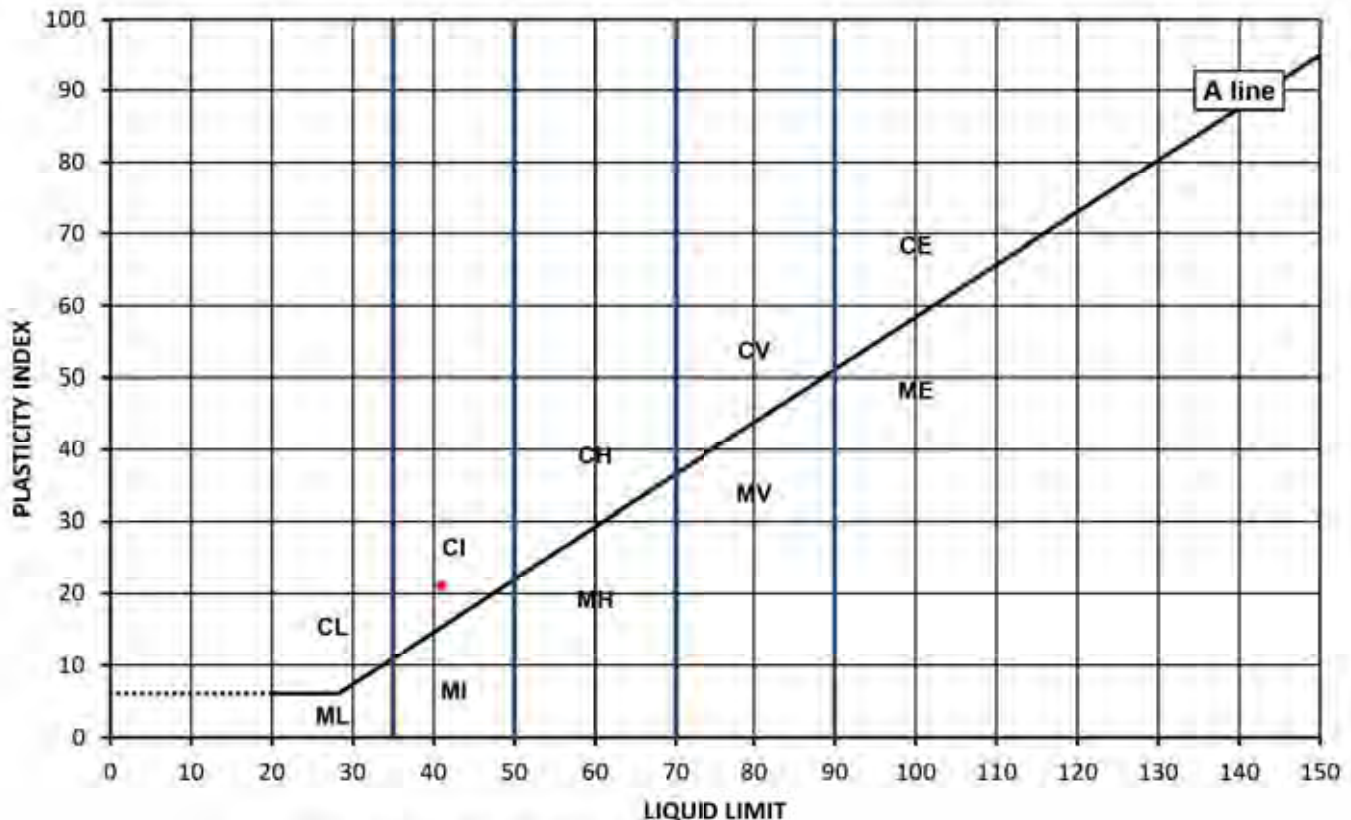
Test Results:

Laboratory Reference: 1339036
Hole No.: BH1
Sample Reference: D2
Soil Description: Brown slightly gravelly sandy CLAY

Depth Top [m]: 2.00
Depth Base [m]: Not Given
Sample Type: D

Sample Preparation: Tested after washing to remove >425um

As Received Moisture Content [%]	Liquid Limit [%]	Plastic Limit [%]	Plasticity Index [%]	% Passing 425µm BS Test Sieve
12	41	20	21	73



Legend, based on BS 5930:2015 Code of practice for site investigations

C	Clay	L	Low	Liquid Limit
M	Silt	I	Medium	below 35
		H	High	35 to 50
		V	Very high	50 to 70
		E	Extremely high	70 to 90
				exceeding 90
	Organic	O	append to classification for organic material (eg CHO)	

Note: Moisture Content by BS 1377-2: 1990; Clause 3.2

Remarks:

Approved: Dariusz Piotrowski
PL Geotechnical Laboratory Manager
Date Reported: 05/11/2019

Signed: Darren Berrill
Geotechnical General Manager
for and on behalf of i2 Analytical Ltd GF 236.5

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The results included within the report are representative of the samples submitted for analysis.
The analysis was carried out at i2 Analytical Limited, ul. Pionierow 39, 41-711 Ruda Śląska, Poland.*



TEST CERTIFICATE

Liquid and Plastic Limits

i2 Analytical Ltd
7 Woodshots Meadow
Croxley Green Business Park
Watford Herts WD18 8YS



4041

Tested in Accordance with: BS 1377-2: 1990; Clause 4.3 and 5

Client: Merebrook
Client Address: First Floor, 1 Leonard Place,
Westerham Road, Keston,
BR2 6HQ
Contact: Keith Paramor
Site Name: Reading Golf Club
Site Address: Not Given

Client Reference: 21962-B
Job Number: 19-67504
Date Sampled: 16/10/2019
Date Received: 22/10/2019
Date Tested: 28/10/2019
Sampled By: CEK

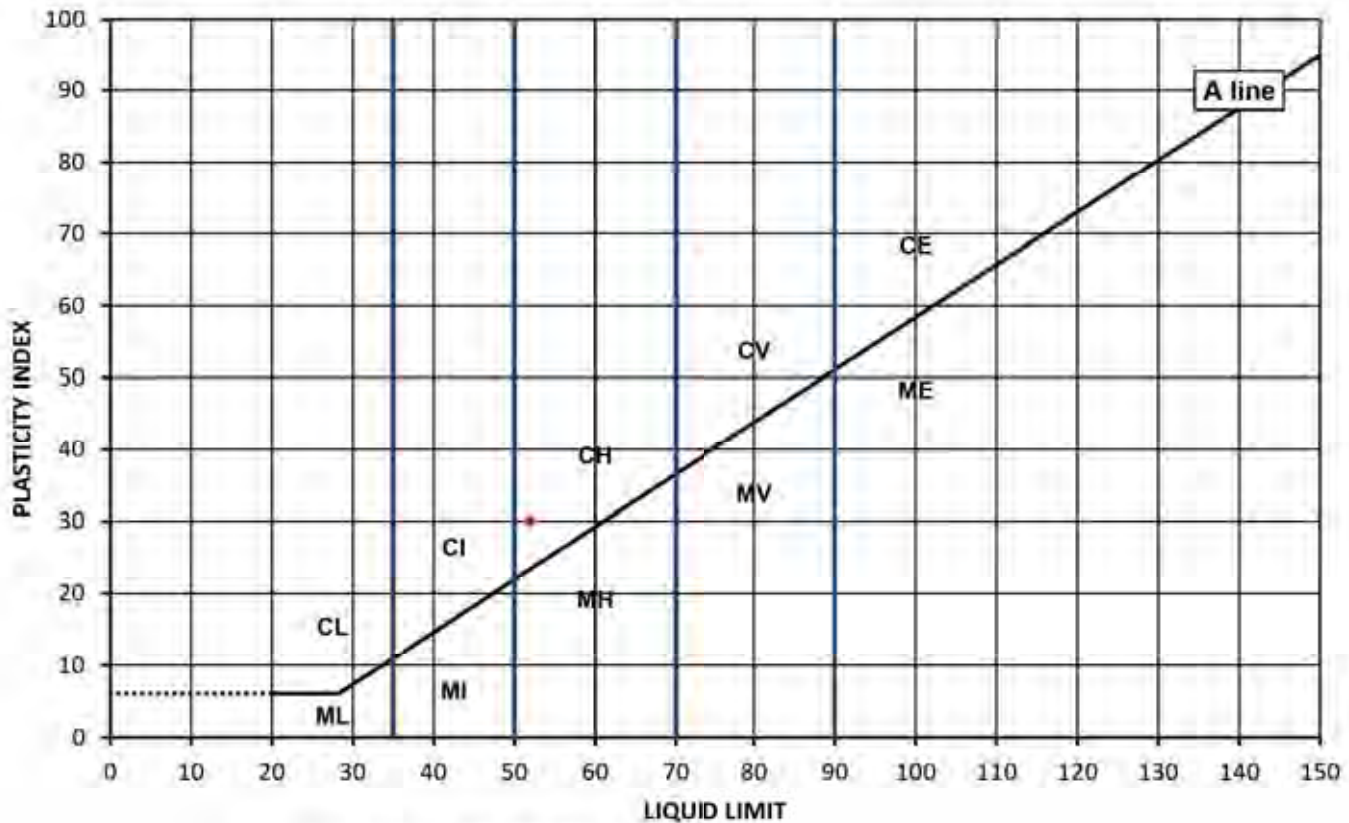
Test Results:

Laboratory Reference: 1339038
Hole No.: BH2
Sample Reference: D2
Soil Description: Brown slightly gravelly slightly sandy CLAY

Depth Top [m]: 2.00
Depth Base [m]: Not Given
Sample Type: D

Sample Preparation: Tested after washing to remove >425um

As Received Moisture Content [%]	Liquid Limit [%]	Plastic Limit [%]	Plasticity Index [%]	% Passing 425um BS Test Sieve
19	52	22	30	97



Legend, based on BS 5930:2015 Code of practice for site investigations

	Plasticity	Liquid Limit
C	Clay	
M	Silt	
L	Low	below 35
I	Medium	35 to 50
H	High	50 to 70
V	Very high	70 to 90
E	Extremely high	exceeding 90
O	Organic	append to classification for organic material (eg CHO)

Note: Moisture Content by BS 1377-2: 1990; Clause 3.2

Remarks:

Approved: Dariusz Piotrowski
PL Geotechnical Laboratory Manager
Date Reported: 05/11/2019

Signed: Darren Berrill
Geotechnical General Manager
for and on behalf of i2 Analytical Ltd GF 236.5

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The results included within the report are representative of the samples submitted for analysis.
The analysis was carried out at i2 Analytical Limited, ul. Pionierow 39, 41-711 Ruda Śląska, Poland.*



TEST CERTIFICATE

Liquid and Plastic Limits

i2 Analytical Ltd
7 Woodshots Meadow
Croxley Green Business Park
Watford Herts WD18 8YS



4041

Tested in Accordance with: BS 1377-2: 1990; Clause 4.3 and 5

Client: Merebrook
Client Address: First Floor, 1 Leonard Place,
Westerham Road, Keston,
BR2 6HQ
Contact: Keith Paramor
Site Name: Reading Golf Club
Site Address: Not Given

Client Reference: 21962-B
Job Number: 19-67504
Date Sampled: 15/10/2019
Date Received: 22/10/2019
Date Tested: 28/10/2019
Sampled By: CEK

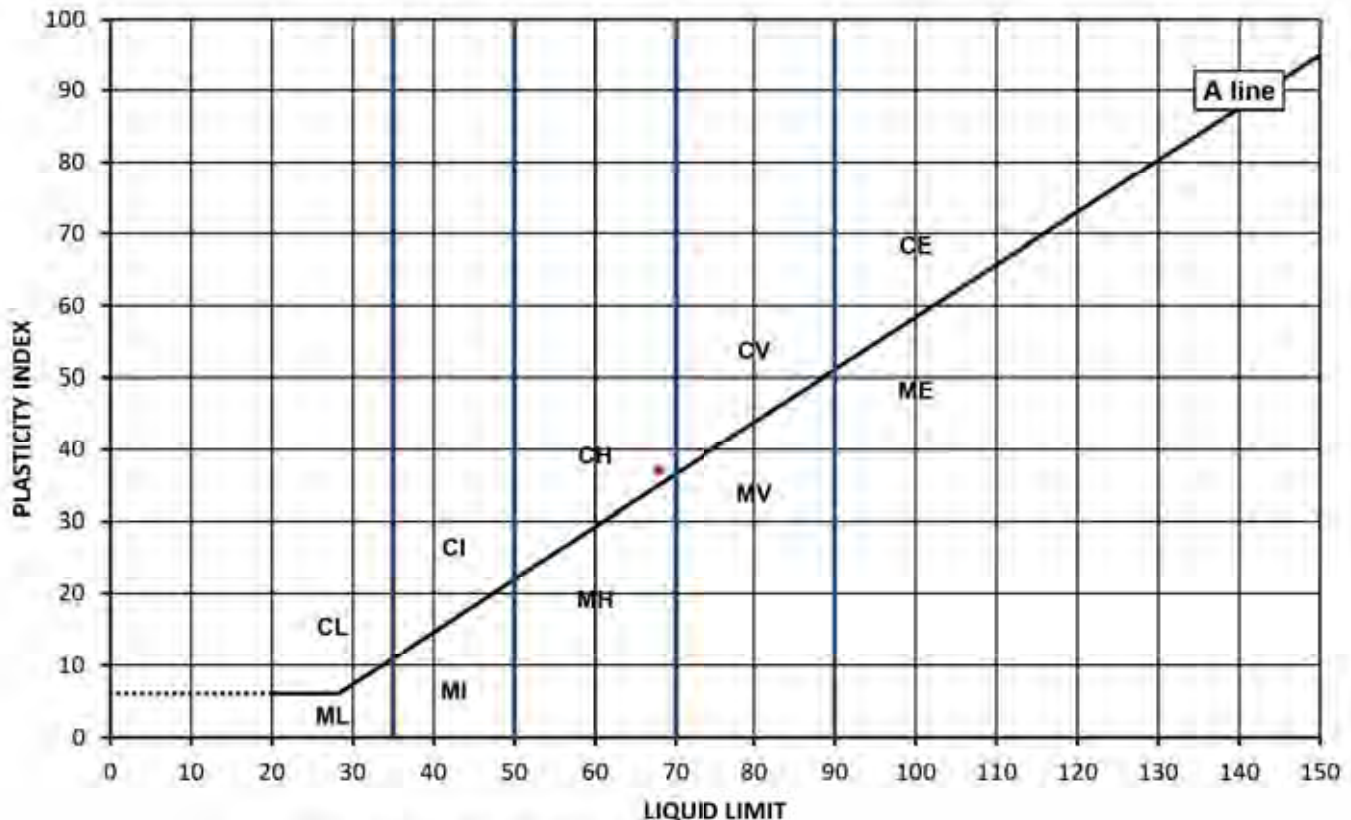
Test Results:

Laboratory Reference: 1339039
Hole No.: BH3
Sample Reference: D1
Soil Description: Dark brown gravelly CLAY

Depth Top [m]: 1.00
Depth Base [m]: Not Given
Sample Type: D

Sample Preparation: Tested after washing to remove >425um

As Received Moisture Content [%]	Liquid Limit [%]	Plastic Limit [%]	Plasticity Index [%]	% Passing 425um BS Test Sieve
11	68	31	37	55



Legend, based on BS 5930:2015 Code of practice for site investigations

	Plasticity	Liquid Limit
C	Clay	
M	Silt	
L	Low	below 35
I	Medium	35 to 50
H	High	50 to 70
V	Very high	70 to 90
E	Extremely high	exceeding 90
O	Organic append to classification for organic material (eg CHO)	

Note: Moisture Content by BS 1377-2: 1990; Clause 3.2

Remarks:

Approved: Dariusz Piotrowski
PL Geotechnical Laboratory Manager
Date Reported: 05/11/2019

Signed: Darren Berrill
Geotechnical General Manager
for and on behalf of i2 Analytical Ltd GF 236.5

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TEST CERTIFICATE

Particle Size Distribution

Tested in Accordance with: BS 1377-2: 1990

i2 Analytical Ltd
7 Woodshots Meadow
Croxley Green Business Park
Watford Herts WD18 8YS



4041

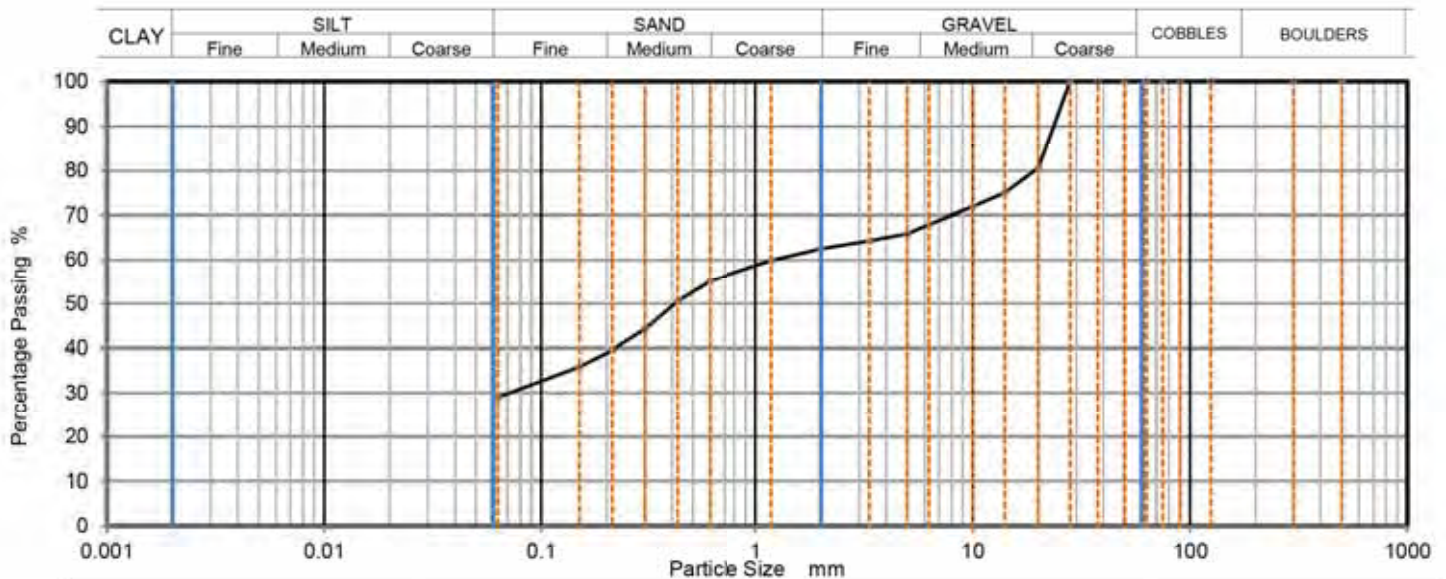
Client: Merebrook
Client Address: First Floor, 1 Leonard Place,
Westerham Road, Keston,
BR2 6HQ
Contact: Keith Paramor
Site Name: Reading Golf Club
Site Address: Not Given

Client Reference: 21962-B
Job Number: 19-67504
Date Sampled: 15/10/2019
Date Received: 22/10/2019
Date Tested: 28/10/2019
Sampled By: CEK

Test Results:

Laboratory Reference: 1339035
Hole No.: BH1
Sample Reference: D1
Sample Description: Brown very clayey very sandy GRAVEL

Depth Top [m]: 1.00
Depth Base [m]: Not Given
Sample Type: D



Sieving		Sedimentation	
Particle Size mm	% Passing	Particle Size mm	% Passing
500	100		
300	100		
125	100		
90	100		
75	100		
63	100		
50	100		
37.5	100		
28	100		
20	81		
14	75		
10	72		
6.3	68		
5	66		
3.35	64		
2	63		
1.18	60		
0.6	55		
0.425	51		
0.3	44		
0.212	40		
0.15	36		
0.063	30		

Sample Proportions	% dry mass
Very coarse	0.00
Gravel	37.50
Sand	32.70
Fines <0.063mm	29.80

Grading Analysis	
D100	mm 28
D60	mm 1.2
D30	mm 0.0645
D10	mm
Uniformity Coefficient	
Curvature Coefficient	

Note: Tested in Accordance with BS1377:Part 2:1990, clause 9.2

Remarks: The material submitted - fails to meet the minimum mass requirements as stated in BS1377 Part 2 Table 3

Approved: Dariusz Piotrowski
PL Geotechnical Laboratory Manager
Date Reported: 05/11/2019

Signed: Darren Berrill
Geotechnical General Manager
for and on behalf of i2 Analytical Ltd GF 100.13

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The analysis was carried out at i2 Analytical Limited, ul. Pionierow 39, 41-713 Ruda Śląska, Poland.*

Any assessment of compliance with specifications based on the analytical results in a report takes in to account no contribution from uncertainty of measurement. Application of uncertainty of measurement would provide a range within which the true result lies. An estimate of measurement uncertainty can be provided on request.



TEST CERTIFICATE

Particle Size Distribution

Tested in Accordance with: BS 1377-2: 1990

i2 Analytical Ltd
7 Woodshots Meadow
Croxley Green Business Park
Watford Herts WD18 8YS



4041

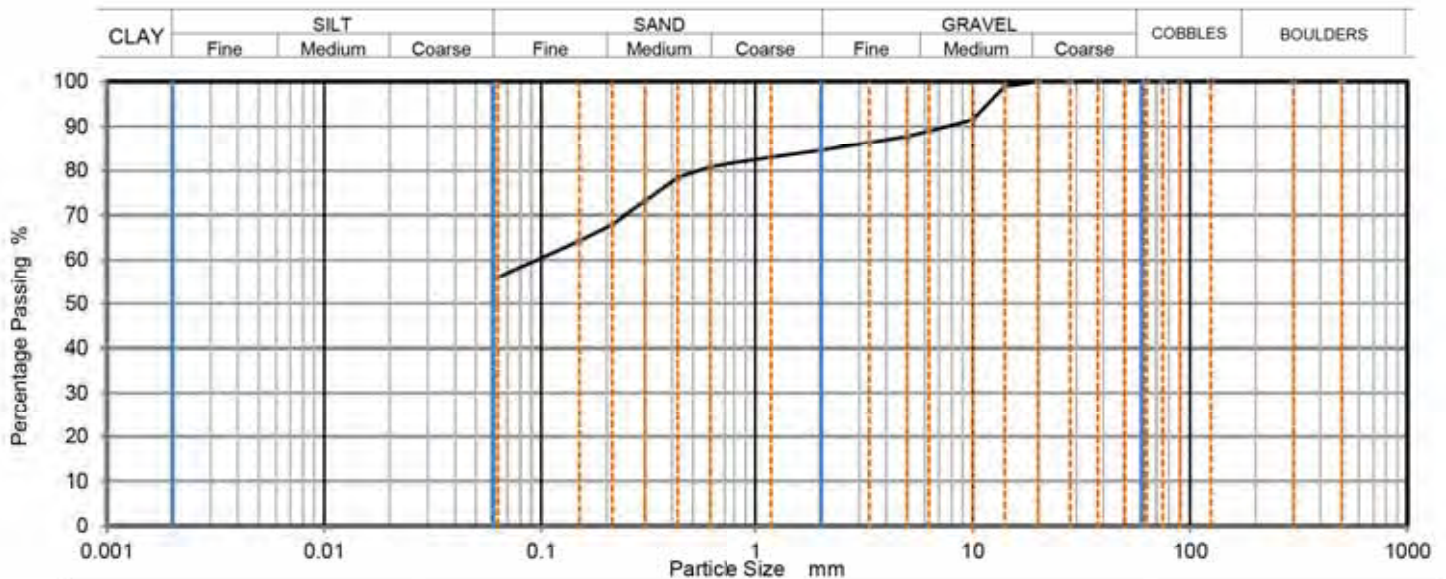
Client: Merebrook
Client Address: First Floor, 1 Leonard Place,
Westerham Road, Keston,
BR2 6HQ
Contact: Keith Paramor
Site Name: Reading Golf Club
Site Address: Not Given

Client Reference: 21962-B
Job Number: 19-67504
Date Sampled: 16/10/2019
Date Received: 22/10/2019
Date Tested: 28/10/2019
Sampled By: CEK

Test Results:

Laboratory Reference: 1339037
Hole No.: BH2
Sample Reference: D1
Sample Description: Brown gravelly sandy CLAY

Depth Top [m]: 1.00
Depth Base [m]: Not Given
Sample Type: D



Sieving		Sedimentation	
Particle Size mm	% Passing	Particle Size mm	% Passing
500	100		
300	100		
125	100		
90	100		
75	100		
63	100		
50	100		
37.5	100		
28	100		
20	100		
14	99		
10	92		
6.3	89		
5	88		
3.35	86		
2	85		
1.18	83		
0.6	81		
0.425	78		
0.3	73		
0.212	68		
0.15	64		
0.063	57		

Sample Proportions	% dry mass
Very coarse	0.00
Gravel	15.40
Sand	27.90
Fines <0.063mm	56.60

Grading Analysis	
D100	mm
D60	mm
D30	mm
D10	mm
Uniformity Coefficient	
Curvature Coefficient	

Note: Tested in Accordance with BS1377:Part 2:1990, clause 9.2

Remarks:

Approved: Dariusz Piotrowski
PL Geotechnical Laboratory Manager
Date Reported: 05/11/2019

Signed: Darren Berrill
Geotechnical General Manager
for and on behalf of i2 Analytical Ltd GF 100.13

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APPENDIX 6

- Field Monitoring Records
- Groundwater Level Data
- Hazardous Soil Gas Data

APPENDIX 7 ▪ Gas Risk Assessment

NHBC TRAFFIC LIGHT GAS CHARACTERISTIC SITUATION

SITE: Reading Golf Club

JOB NUMBER: 219628

13/11/2019

Carbon Dioxide		Methane	
Maximum Gas Concentration (%)	4.10	Maximum Gas Concentration (%)	0.10
Maximum Measured Steady Flow Gas Screening Value (L hr ⁻¹)	3.00	Maximum Measured Peak Flow Gas Screening Value (L hr ⁻¹)	16.00
Gas Screening Value (L hr ⁻¹)	0.12	Gas Screening Value (L hr ⁻¹)	0.02
Characteristic Situation	Green	Characteristic Situation	Green
If measured values are zero then resolution limit of instrument is used for calculation of GSV worst case carbon dioxide or methane characteristic situation value defines overall characteristic situation for the site			

NHBC Classification

Protection Measures

Characteristic Situation	Carbon Dioxide		Methane		Identified Gas Regime	Protection Measures Required
	Typical Maximum Concentration (%v/v)	Gas Screening Value (L hr ⁻¹)	Typical Maximum Concentration (%v/v)	Gas Screening Value (L hr ⁻¹)		
Green	5	0.78	1	0.16	negligible	Ground gas protection measures are not required
Amber 1	10	1.56	5	0.63	low to intermediate	Low-level ground gas protection measures are required, using a membrane and ventilated sub-floor void that creates a permeability contrast to limit the ingress of gas into buildings. Gas protection measures are to be installed as prescribed in BRE 414. Ventilation of the sub-floor void should be designed to provide a minimum of one complete volume change per 24 hours
Amber 2	30	3.10	20	1.56	intermediate to high	High-level ground gas protection measures are required, creating a permeability contrast to prevent ingress of gas into buildings. Gas protection measures are to be installed as prescribed in BRE 414. Membranes used should always be fitted by a specialist contractor and should be fully certified (see Appendix E). As with Amber 1, ventilation of the sub-floor void should be designed to provide a minimum of one complete volume change per 24 hours
Red					high	Standard residential housing is not normally acceptable without further Ground Gas Risk Assessment and/or possible remedial mitigation measures to reduce/remove the source of the ground gases. In certain circumstances, active protection methods could be applied, but only when there is a legal agreement assuring the management and maintenance of the system for the life of the property.

IDOM

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